

## Errata

**Title & Document Type:** 8663A Synthesized Signal Generator Service Manual  
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### HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

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# HP 8663A SYNTHESIZED SIGNAL GENERATOR (Including Options 001, 002, & 003) Service Manual

## SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed:

2234A to 2927A and all *MAJOR* changes that apply to your instrument.

*rev.02OCT89*

For additional important information about serial numbers, refer to "INSTRUMENTS COVERED BY THIS MANUAL" in Section 1.

Third Edition

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Service Manual (Volume 1, 2, 3, 4) HP Part 08663-90071

**Other Documents Available:**

Operation and Calibration Manual HP Part 08663-90069

Microfiche Service Manual HP Part 08663-90072

Microfiche Operation and Calibration Manual HP Part 08663-90070

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# VOLUME 1 CONTENTS

## Section 6 – Replaceable Parts

Introduction to This Section . . . . .	6-1
Restored Assemblies . . . . .	6-1
Reference Designations and Abbreviations Used in This Manual . . . . .	6-1
Replaceable Parts List . . . . .	6-1
Factory Selected Parts (*) . . . . .	6-1
Instrument Changes . . . . .	6-1
Ordering Parts. . . . .	6-2
Replaceable Parts List Updating (Manual Updates) . . . . .	6-2
Mechanical and Chassis Part Locations and Reference Designations . . . . .	6-3
Ordering Information . . . . .	6-3
Recommended Spares List . . . . .	6-3
Phase Modulation Retrofit Kit . . . . .	6-3

## Section 7 – Instrument Changes

Introduction to This Section . . . . .	7-1
A2A8 (08663-60329) . . . . .	7-1
A2A9 (08663-60331) . . . . .	7-1
A3A5U2, A3A5U3 . . . . .	7-1
A4A2 (08663-60316) . . . . .	7-1
A4A3 - Standard and Option 001 (08663-60346) . . . . .	7-1
A4A3 - Option 002 Only (08663-60304) . . . . .	7-2
A4A4 (08663-60011) . . . . .	7-2
A4A4A2 (08663-60314) . . . . .	7-2
A4A4A2Q1 (1854-0483) . . . . .	7-2
A4A4A3 (08663-60313) . . . . .	7-2
A4A4A3Q1 (1854-0483) . . . . .	7-2
A4A4A5 (08663-60311) . . . . .	7-2
A4A4A5Q1 (1854-0483) . . . . .	7-2
A6A3 (08662-60314) . . . . .	7-3
A6A4U7 . . . . .	7-3
A6A5U7 . . . . .	7-3
A7A4 (08662-60156) . . . . .	7-3
A8A2 (08662-60001) . . . . .	7-3
A8A3 (10544B(003)) . . . . .	7-3
A8A5 (08662-60191) . . . . .	7-3
A12A3MP3 . . . . .	7-4
MISCELLANEOUS PARTS . . . . .	7-4
B1 . . . . .	7-4
MP23 . . . . .	7-4
MP103 . . . . .	7-4
RT2 . . . . .	7-4

**Section 8 – Service**

Safety Considerations . . . . .	8-100
General . . . . .	8-100
Before Applying Power . . . . .	8-100
Safety Earth Ground . . . . .	8-100
Safety Symbols . . . . .	8-100
Introduction . . . . .	8-102
Instrument Covered By Manual . . . . .	8-102
Circuit Descriptions . . . . .	8-102
Troubleshooting . . . . .	8-102
General . . . . .	8-102
Status Light and Status Codes . . . . .	8-103
Recommended Test Equipment . . . . .	8-103
Service Tools and Aids . . . . .	8-103
Service Accessory Kit . . . . .	8-103
Parts Locations . . . . .	8-103
Test Points and Adjustment Locations . . . . .	8-103
Service Aids on Printed Circuit Boards . . . . .	8-103
Poizdriv Screwdrivers . . . . .	8-104
Tuning Tools . . . . .	8-104
Silver Solder . . . . .	8-104
Repair . . . . .	8-104
Factory Selected Components (*) . . . . .	8-104
Disassembly Procedures . . . . .	8-104
Post-Repair Adjustments and Performance Tests . . . . .	8-104
Post-Service Product Safety Checks . . . . .	8-106
Etched Circuits (Printed Circuit Boards) . . . . .	8-106
MOS and CMOS Integrated Circuit Replacement . . . . .	8-106
Logic Symbology . . . . .	8-107
Basic Definitions . . . . .	8-107
Complex Device Symbology . . . . .	8-112
Logic Device Theory . . . . .	8-114
Schmitt Trigger . . . . .	8-114
One-Shot Multivibrator . . . . .	8-114
D-Type Flip-Flop (Edge Triggered) . . . . .	8-114
Four-Bit Register (Level Triggered) . . . . .	8-115
Presettable Counter . . . . .	8-115
Three-Bit Binary One-of-Eight Decoder . . . . .	8-116
Analog Multiplexer . . . . .	8-116
Digital-to-Analog Converter . . . . .	8-117
Four-Bit BCD Summer . . . . .	8-117
Divide-by-10/11 Prescaler . . . . .	8-117
Eight-to-Three Line Priority Encoder . . . . .	8-117
Random Access Memory (RAM) . . . . .	8-118
Read-Only Memory (ROM) . . . . .	8-120
Analog Switch . . . . .	8-120
Analog Multiplexer . . . . .	8-121
Phase-Frequency Detector . . . . .	8-121
Linear Device Theory . . . . .	8-122
Operational Amplifiers . . . . .	8-122
Comparators . . . . .	8-123
Limiter (Transistor Array) . . . . .	8-123
Schematic Diagram Notes . . . . .	8-123



## Section 6 REPLACEABLE PARTS

### 6-1. INTRODUCTION TO THIS SECTION

This section contains information for ordering parts. Table 6-1 lists assemblies within the instrument that may be replaced on an exchange basis. Table 6-2 lists reference designations and abbreviations that are used in the Replaceable Parts List. Table 6-3 lists all replaceable parts in the instrument. Table 6-4 contains the names and addresses that correspond to the manufacturer's code numbers listed in Table 6-3. Also included in this section are photographs and drawings to aid in identifying and ordering chassis mounted parts and mechanical parts.

### 6-2. RESTORED ASSEMBLIES

Table 6-1 lists assemblies within the instrument that may be replaced on an exchange basis, thus affording a considerable cost savings. Exchange, factory-repaired and tested assemblies are available only on a trade-in basis; therefore, the defective assemblies must be returned for credit. For this reason, assemblies required for spare parts stock must be ordered by the new assembly part number.

### 6-3. REFERENCE DESIGNATIONS AND ABBREVIATIONS USED IN THIS MANUAL

Table 6-2 lists the reference designation letters for electrical parts in the instrument. The letter designations found in Table 6-2 are coupled with numeric designations to provide a unique reference designation for each part in the instrument. For example A1A1R1 is the reference designation of a particular resistor R1 on assembly A1A1.

Table 6-2 also lists abbreviations used in the parts list and on schematics.

### 6-4. REPLACEABLE PARTS LIST

Table 6-3 is a list of replaceable parts and is organized as follows:

- a. Electrical assemblies and their components with reference designations in alphanumeric order.
- b. Chassis-Mounted parts with reference designations in alphanumeric order.
- c. Mechanical parts with reference designations in alphanumeric order.

#### **Factory Selected Parts (\*).**

Parts marked with an asterisk (\*) are factory selected parts. The value listed in the parts list is the nominal value. Refer to Section 5 for information on determining what value to use for replacement.

#### **Instrument Changes (†).**

Parts marked with a dagger have been changed to improve the performance and reliability of your instrument. Refer to Section 7 for an explanation of instrument changes.

## Ordering Parts.

### Instrument Serial Numbers.

Attached to the rear of the instrument is a serial-number plate. The first four digits and the letter are the instrument serial-number prefix. The last five digits (serial-number suffix) are unique to each instrument. When parts in the instrument are changed, the serial-number prefix of the instrument may also change. This means that sometimes a part will be listed more than once in the replaceable parts list along with a serial-number prefix or range of serial-number prefixes. Find the serial-number prefix on the serial plate of your instrument and order the part listed under the corresponding prefix in the table. If no serial prefix information is listed, the part is compatible in instruments of all serial numbers.

#### NOTE

*It is possible that some assemblies in your instrument have been updated (through service or retrofitting) to reflect changes made to instruments with serial-number prefixes later than that shown on your instrument serial-number tag. Be sure to note the board number of the assembly being repaired or replaced when ordering parts for your instrument.*

### How to Order

To order a part in the Replaceable Parts List, call or write the nearest Hewlett-Packard Sales Office. Have the following information ready to speed the ordering process:

1. The Hewlett-Packard part number with the check digit. (The check digit will ensure accurate and timely processing of your order.)
2. The quantity required.
3. An approved purchase order number. (Sometimes required.)

#### NOTE

*Within the USA, it is better to order directly from the HP Support Materials Organization, Roseville, California. Ask your nearest HP office for information and forms for the "Direct Order System".*

## Replaceable Parts List Updating (Manual Updates)

A "MANUAL UPDATES" packet is shipped with the manual, when necessary, to provide the most current information available at the time of shipment. These packets consist of replacement and addition pages which should be incorporated into the manual to bring it up to date.

Hewlett-Packard offers a Documentation Update Service that will provide you with further updates as they become available. If you operate or service instruments of different serial prefixes, we strongly recommend that you join this service immediately to ensure that your manual is kept current. For more information, refer to the Documentation Update Service reply card included in this manual, or call: Technical Writing Department (509) 922-4001,

or write: Hewlett-Packard Company  
Technical Writing Department  
24001 E. Mission - TAF C-34  
Spokane, WA 99220

## 6-5. MECHANICAL AND CHASSIS PART LOCATIONS AND REFERENCE DESIGNATIONS

Most mechanical parts are identified in Figures 6-1 and 6-2. These figures are located at the end of this section. Major mechanical parts have reference designations that begin with the letters MP. To find the part number and description of a mechanical part, find the part in one of the photographs or drawings, and then look up the reference designation in Table 6-3. Mechanical hardware, such as screws (not shown on the drawings or photos) are listed under the part which they attach. For example, the screws that attach the support bracket, MP43, are listed under MP43.

## 6-6. ORDERING INFORMATION

To order a part listed in the replaceable parts table, quote the Hewlett-Packard Part number (with the check digit), indicate the quantity required, and address the order to the nearest Hewlett-Packard office (see note). The check digit will ensure accurate and timely processing of your order.

To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument serial number, description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard office.

### NOTE

*Within the USA, it is better to order directly from the HP Parts Center in Mountain View, California. Ask your nearest HP office for information and forms for the "Direct Mail Order System."*

## 6-7. RECOMMENDED SPARES LIST

Stocking spare parts for an instrument is often done to ensure quick return to service after a malfunction occurs. Hewlett-Packard prepares a "Recommended Spares" list for this instrument. The contents of the list are based on failure reports and repair data. Quantities given are for one year of parts support. A complimentary copy of the "Recommended Spares" list and information concerning a "Spare Parts Kit" may be requested from your nearest Hewlett-Packard Office.

When stocking parts to support more than one instrument or to support a variety of Hewlett-Packard instruments, it may be more economical to work from one consolidated list rather than simply adding together stocking quantities from the individual instrument lists. Hewlett-Packard will prepare consolidated "Recommended Spares" lists for any number or combination of instruments. Contact your nearest Hewlett-Packard Office for details.

## 6-8. PHASE MODULATION RETROFIT KIT

It is possible to add phase modulation to an instrument which was ordered without that option (option 002). The modification kit is part number 08663-60348 and can be installed by any Hewlett-Packard repair facility.



**Table 6-1. Part Numbers for Restored Assemblies**

Reference Designator	Description	Part number <sup>1</sup>	
		Restored Assy	New Assy
AT1, AT2, A2A9U7	Standard Attenuator Kit <sup>2</sup> (Front Output)	08663-60102	08663-60104
AT1, AT2, A2A9U7	Option 001 Attenuator Kit <sup>2</sup> (Rear Output)	08663-60103	08663-60105
A4A2	Doubler #2 Assembly	08663-60100	08663-60351
A8A1, A8A2	High Frequency VCO	08662-60083	08662-60001
A12A1U1	Output Amplifier Microcircuit	08663-67103	08663-67002
A12A4	Doubler #1 Assembly	08663-60106	08663-60307

<sup>1</sup> When ordering extra assemblies for spare parts stock, use the new assembly part number only. Orders for the restored part number require return of the defective part.

<sup>2</sup> Attenuators are not separately replaceable. If either attenuator or the ROM fails, a complete kit must be ordered and installed. Both attenuators and the ROM must be returned if the restored assembly is ordered.

Table 6-2. Reference Designations and Abbreviations (1 of 2)

REFERENCE DESIGNATIONS

A ..... assembly	E ..... miscellaneous electrical part	P ..... electrical connector (movable portion); plug	U ..... integrated circuit; microcircuit
AT ..... attenuator; isolator; termination	F ..... fuse	Q ..... transistor; SCR; triode thyristor; FET	V ..... electron tube
B ..... fan; motor	FL ..... filter	R ..... resistor	VR ..... voltage regulator; breakdown diode
BT ..... battery	H ..... hardware	RT ..... thermistor	W ..... cable; transmission path; wire
C ..... capacitor	HY ..... circulator	S ..... switch	X ..... socket
CP ..... coupler	J ..... electrical connector (stationary portion); jack	T ..... transformer	Y ..... crystal unit (piezo-electric or quartz)
CR ..... diode; diode thyristor; varactor	K ..... relay	TB ..... terminal board	Z ..... tuned cavity; tuned circuit
DC ..... directional coupler	L ..... coil; inductor	TC ..... thermocouple	
DL ..... delay line	M ..... meter	TP ..... test point	
DS ..... annunciator; signaling device (audible or visual); lamp; LED	MP ..... miscellaneous mechanical part		

ABBREVIATIONS

A ..... ampere	COEF ..... coefficient	EDP ..... electronic data processing	INT ..... internal
ac ..... alternating current	COM ..... common	ELECT ..... electrolytic	kg ..... kilogram
ACCESS ..... accessory	COMP ..... composition	ENCAP ..... encapsulated	kHz ..... kilohertz
ADJ ..... adjustment	COMPL ..... complete	EXT ..... external	k ..... kilohm
A/D ..... analog-to-digital	CONN ..... connector	F ..... farad	kV ..... kilovolt
AF ..... audio frequency	CP ..... cadmium plate	FET ..... field-effect transistor	lb ..... pound
AFC ..... automatic frequency control	CRT ..... cathode-ray tube	F/F ..... flip-flop	LC ..... inductance-capacitance
AGC ..... automatic gain control	CTL ..... complementary transistor logic	FH ..... flat head	LED ..... light-emitting diode
AL ..... aluminum	CW ..... continuous wave	FIL H ..... fillister head	LF ..... low frequency
ALC ..... automatic level control	cw ..... clockwise	FM ..... frequency modulation	LG ..... long
AM ..... amplitude modulation	cm ..... centimeter	FP ..... front panel	LH ..... left hand
AMPL ..... amplifier	D/A ..... digital-to-analog	FREQ ..... frequency	LIM ..... limit
APC ..... automatic phase control	dB ..... decibel	FXD ..... fixed	LIN ..... linear taper (used in parts list)
ASSY ..... assembly	dBm ..... decibel referred to 1 mW	g ..... gram	LK WASH ..... lock washer
AUX ..... auxiliary	dc ..... direct current	GE ..... germanium	LO ..... low; local oscillator
avg ..... average	deg ..... degree (temperature interval or difference)	GHz ..... gigahertz	LOG ..... logarithmic taper (used in parts list)
AWG ..... American wire gauge	...° ..... degree (plane angle)	GL ..... glass	log ..... logarithm(ic)
BAL ..... balance	°C ..... degree Celsius (centigrade)	GRD ..... ground(ed)	LPF ..... low pass filter
BCD ..... binary coded decimal	°F ..... degree Fahrenheit	H ..... henry	LV ..... low voltage
BD ..... board	°K ..... degree Kelvin	h ..... hour	m ..... meter (distance)
BECU ..... beryllium copper	DEPC ..... deposited carbon	HET ..... heterodyne	mA ..... milliampere
BFO ..... beat frequency oscillator	DET ..... detector	HEX ..... hexagonal	MAX ..... maximum
BH ..... binder head	diam ..... diameter	HD ..... head	M ..... megohm
BKDN ..... breakdown	DIA ..... diameter (used in parts list)	HDW ..... hardware	MEG ..... meg (10 <sup>6</sup> ) (used in parts list)
BP ..... bandpass	DIFF AMPL ..... differential amplifier	HF ..... high frequency	MET FLM ..... metal film
BPF ..... bandpass filter	div ..... division	HG ..... mercury	MET OX ..... metallic oxide
BRS ..... brass	DPDT ..... double-pole, double-throw	HI ..... high	MF ..... medium frequency; microfarad (used in parts list)
BWO ..... backwave oscillator	DR ..... drive	HP ..... Hewlett-Packard	MFR ..... manufacturer
CAL ..... calibrate	DSB ..... double sideband	HPF ..... high pass filter	mg ..... milligram
ccw ..... counter-clockwise	DTL ..... diode transistor logic	HR ..... hour (used in parts list)	MHz ..... megahertz
CER ..... ceramic	DVM ..... digital voltmeter	HV ..... high voltage	mH ..... millihenry
CHAN ..... channel	ECL ..... emitter coupled logic	Hz ..... Hertz	mho ..... mho
cm ..... centimeter	EMF ..... electromotive force	IC ..... integrated circuit	min ..... minute (time)
CMO ..... cabinet mount only		ID ..... inside diameter	...° ..... minute (plane angle)
COAX ..... coaxial		IF ..... intermediate frequency	MINAT ..... miniature
		IMP ..... impregnated	mm ..... millimeter
		IN ..... incandescent	
		INCL ..... include(s)	
		INP ..... input	
		INS ..... insulation	

NOTE

All abbreviations in the parts list will be in upper-case.

**Table 6-2. Reference Designations and Abbreviations (2 of 2)**

MOD . . . . . modulator	OD . . . . . outside diameter	PWV . . . . . peak working voltage	TD . . . . . time delay
MOM . . . . . momentary	OH . . . . . oval head	RC . . . . . resistance-capacitance	TERM . . . . . terminal
MOS . . . . . metal-oxide semiconductor	OP AMPL . . . . . operational amplifier	RECT . . . . . rectifier	TFT . . . . . thin-film transistor
ms . . . . . millisecond	OPT . . . . . option	REF . . . . . reference	TGL . . . . . toggle
MTG . . . . . mounting	OSC . . . . . oscillator	REG . . . . . regulated	THD . . . . . thread
MTR . . . . . meter (indicating device)	OX . . . . . oxide	REPL . . . . . replaceable	THRU . . . . . through
mV . . . . . millivolt	oz . . . . . ounce	RF . . . . . radio frequency	TI . . . . . titanium
mVac . . . . . millivolt, ac	Ω . . . . . ohm	RFI . . . . . radio frequency interference	TOL . . . . . tolerance
mVdc . . . . . millivolt, dc	P . . . . . peak (used in parts list)	RH . . . . . round head; right hand	TRIM . . . . . trimmer
mVpk . . . . . millivolt, peak	PAM . . . . . pulse-amplitude modulation	RLC . . . . . resistance-inductance-capacitance	TSTR . . . . . transistor
mVp-p . . . . . millivolt, peak-to-peak	PC . . . . . printed circuit	RMO . . . . . rack mount only	TTL . . . . . transistor-transistor logic
mVrms . . . . . millivolt, rms	PCM . . . . . pulse-code modulation; pulse-count modulation	rms . . . . . root-mean-square	TV . . . . . television
mW . . . . . milliwatt	PDM . . . . . pulse-duration modulation	RND . . . . . round	TVI . . . . . television interference
MUX . . . . . multiplex	pF . . . . . picofarad	ROM . . . . . read-only memory	TWT . . . . . traveling wave tube
MY . . . . . mylar	PH BRZ . . . . . phosphor bronze	R&P . . . . . rack and panel	U . . . . . micro (10 <sup>-6</sup> ) (used in parts list)
μA . . . . . microampere	PHL . . . . . Phillips	RWV . . . . . reverse working voltage	UF . . . . . microfarad (used in parts list)
μF . . . . . microfarad	PIN . . . . . positive-intrinsic-negative	S . . . . . scattering parameter	UHF . . . . . ultrahigh frequency
μH . . . . . microhenry	PIV . . . . . peak inverse voltage	s . . . . . second (time)	UNDEF . . . . . undefined
μmho . . . . . micromho	pk . . . . . peak	" . . . . . second (plane angle)	UNREG . . . . . unregulated
μs . . . . . microsecond	PL . . . . . phase lock	S-B . . . . . slow-blow (fuse) (used in parts list)	V . . . . . volt
μV . . . . . microvolt	PLO . . . . . phase lock oscillator	SCR . . . . . silicon controlled rectifier; screw	VA . . . . . voltampere
μVac . . . . . microvolt, ac	PM . . . . . phase modulation	SE . . . . . selenium	Vac . . . . . volts, ac
μVdc . . . . . microvolt, dc	PNP . . . . . positive-negative-positive	SECT . . . . . sections	VAR . . . . . variable
μVpk . . . . . microvolt, peak	P/O . . . . . part of	SEMICON . . . . . semiconductor	VCO . . . . . voltage-controlled oscillator
μVp-p . . . . . microvolt, peak-to-peak	POLY . . . . . polystyrene	SHF . . . . . superhigh frequency	Vdc . . . . . volts, dc
μVrms . . . . . microvolt, rms	PORC . . . . . porcelain	SI . . . . . silicon	VDCW . . . . . volts, dc, working (used in parts list)
μW . . . . . microwatt	POS . . . . . positive; position(s) (used in parts list)	SIL . . . . . silver	V(F) . . . . . volts, filtered
nA . . . . . nanoampere	POSN . . . . . position	SL . . . . . slide	VFO . . . . . variable-frequency oscillator
NC . . . . . no connection	POT . . . . . potentiometer	SNR . . . . . signal-to-noise ratio	VHF . . . . . very-high frequency
N/C . . . . . normally closed	p-p . . . . . peak-to-peak	SPDT . . . . . single-pole, double-throw	Vpk . . . . . volts, peak
NE . . . . . neon	PP . . . . . peak-to-peak (used in parts list)	SPG . . . . . spring	Vp-p . . . . . volts, peak-to-peak
NEG . . . . . negative	PPM . . . . . pulse-position modulation	SR . . . . . split ring	Vrms . . . . . volts, rms
nF . . . . . nanofarad	PREAMPL . . . . . preamplifier	SPST . . . . . single-pole, single-throw	VSWR . . . . . voltage standing wave ratio
nI PL . . . . . nickel plate	PRF . . . . . pulse-repetition frequency	SS . . . . . Service Sheet	VTO . . . . . voltage-tune oscillator
N/O . . . . . normally open	PRR . . . . . pulse repetition rate	SSB . . . . . single sideband	VTVM . . . . . vacuum-tube voltmeter
NOM . . . . . nominal	ps . . . . . picosecond	SST . . . . . stainless steel	V(X) . . . . . volts, switched
NORM . . . . . normal	PT . . . . . point	STL . . . . . steel	W . . . . . watt
NPN . . . . . negative-positive-negative	PTM . . . . . pulse-time modulation	SQ . . . . . square	W/ . . . . . with
NPO . . . . . negative-positive zero (zero temperature coefficient)	PWM . . . . . pulse-width modulation	SWR . . . . . standing-wave ratio	WIV . . . . . working inverse voltage
NRFR . . . . . not recommended for field replacement		SYNC . . . . . synchronize	WW . . . . . wirewound
NSR . . . . . not separately replaceable		T . . . . . timed (slow-blow fuse)	W/O . . . . . without
ns . . . . . nanosecond		TA . . . . . tantalum	YIG . . . . . yttrium-iron-garnet
nW . . . . . nanowatt		TC . . . . . temperature compensating	Z <sub>0</sub> . . . . . characteristic impedance
OBD . . . . . order by description			

**NOTE**

All abbreviations in the parts list will be in upper-case.

**MULTIPLIERS**

Abbreviation	Prefix	Multiple
T	tera	10 <sup>12</sup>
G	giga	10 <sup>9</sup>
M	mega	10 <sup>6</sup>
k	kilo	10 <sup>3</sup>
da	deka	10
d	deci	10 <sup>-1</sup>
c	centi	10 <sup>-2</sup>
m	milli	10 <sup>-3</sup>
μ	micro	10 <sup>-6</sup>
n	nano	10 <sup>-9</sup>
p	pico	10 <sup>-12</sup>
f	femto	10 <sup>-15</sup>
a	atto	10 <sup>-18</sup>

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A1A1</b>						
A1A1	08663-60338	6	1	READOUT ASSEMBLY	28480	08663-60338
A1A1C1	0180-2620	6	47	CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A1A1C2	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A1A1C3	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A1A1C4	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A1A1C5	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A1A1C6	0160-4819	7	1	CAPACITOR-FXD 2200PF +5% 100VDC CER	28480	0160-4819
A1A1DS1	1990-0759	6	6	LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	HLMP-2620
A1A1DS2	1990-0696	0	4	LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	1LM1-2300
A1A1DS3	1990-0696	0		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	1LM1-2300
A1A1DS4	1990-0699	3	2	LED-LIGHT BAR MODULE LUM-INT=7MCD	28480	1LM1-2350
A1A1DS5	1990-0774	5	2	LED-LIGHT BAR MODULE LUM-INT=6.8MCD	28480	HLMP-2600(C,D,E)
A1A1DS6	1990-0759	6		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	HLMP-2620
A1A1DS7	1990-0759	6		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	HLMP-2620
A1A1DS8	1990-0759	6		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	HLMP-2620
A1A1DS9	1990-0699	3		LED-LIGHT BAR MODULE LUM-INT=7MCD	28480	1LM1-2350
A1A1DS10	1990-0759	6		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	HLMP-2620
A1A1DS11	1990-0696	0		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	1LM1-2300
A1A1DS12	1990-0759	6		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	HLMP-2620
A1A1DS13	1990-0774	5		LED-LIGHT BAR MODULE LUM-INT=6.8MCD	28480	HLMP-2600(C,D,E)
A1A1DS14	1990-0696	0		LED-LIGHT BAR MODULE LUM-INT=3MCD	28480	1LM1-2300
A1A1J1-5				NOT ASSIGNED		
<i>2234A TO 2601A</i>						
A1A1J6	1251-3024	8	1	CONNECTOR 26-PIN M RECTANGULAR	28480	1251-3024
<i>2602A AND ABOVE</i>						
A1A1J6	1251-8347	8	1	CONNECTOR POST TYPE .100-PIN-SPCG 26-CONT	28480	1251-8347
	1251-5595	2	1	POLARIZING KEY POST CONN	28480	1251-5595
A1A1MP1	2110-0726	4	1	FUSEHOLDER-CLIP TYPE.250-FUSE	28480	2110-0726
A1A1MP2	08672-20056	2	7	PAD-L.E.D.	28480	08672-20056
A1A1MP3	08672-20056	2		PAD-L.E.D.	28480	08672-20056
A1A1MP4	08672-20056	2		PAD-L.E.D.	28480	08672-20056
A1A1MP5	08672-20056	2		PAD-L.E.D.	28480	08672-20056
A1A1MP6	08672-20056	2		PAD-L.E.D.	28480	08672-20056
A1A1MP7	08672-20056	2		PAD-L.E.D.	28480	08672-20056
A1A1MP8	08662-20038	8	1	PAD-L.E.D. SINGLE	28480	08662-20038
A1A1MP9	08672-20056	2		PAD-L.E.D.	28480	08672-20056
A1A1MP9	08672-20057	3	8	HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8	8	SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1A1MP10	08672-20057	3		HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8		SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1A1MP11	08672-20057	3		HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8		SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1A1MP12	08672-20057	3		HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8		SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1A1MP13	08672-20057	3		HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8		SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1A1MP14	08672-20057	3		HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8		SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A1A1MP15	08672-20057	3		HEAT SINK-L.E.D.	28480	08672-20057
	2200-0109	8		SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1A1MP16	08672-20057 2200-0109	3 8		HEAT SINK-L.E.D. SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	28480 00000	08672-20057 ORDER BY DESCRIPTION
A1A1R1	1810-0392	3	5	NETWORK-RES 8-SIP68.0 OHM X 7	11236	750-81-R6B
A1A1R2	1810-0392	3		NETWORK-RES 8-SIP68.0 OHM X 7	11236	750-81-R6B
A1A1R3	0698-3438	3	4	RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A1A1R4	0757-0421	4	5	RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A1A1R5	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A1A1R6	0698-3437	2	1	RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A1A1R7	1810-0392	3		NETWORK-RES 8-SIP68.0 OHM X 7	11236	750-81-R6B
A1A1R8	1810-0392	3		NETWORK-RES 8-SIP68.0 OHM X 7	11236	750-81-R6B
A1A1R9	1810-0392	3		NETWORK-RES 8-SIP68.0 OHM X 7	11236	750-81-R6B
A1A1R10	0757-0397	3	3	RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A1A1R11	0757-0397	3		RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A1A1U1	1990-0330	9	20	DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U2	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U3	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U4	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U5	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U6	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U7	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U8	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U9	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U10	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U11	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U12	1820-1216	3	18	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1A1U13	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U14	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U15	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U16	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U17	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U18	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U19	1820-1997	7	6	IC FF TTL LS D-TYPE POS-EDGE-TRIG PRL-IN	01295	SN74LS374N
A1A1U20	1990-0399	0	1	DISPLAY-AN-DOT MAT 1-CHAR .135-H	28480	5082-7304
A1A1U21	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U22	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U23	1990-0330	9		DISPLAY-NUM-DOT MAT 1-CHAR .29-H	28480	5082-7302
A1A1U24	1820-1997	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG PRL-IN	01295	SN74LS374N
A1A1U25	1820-1997	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG PRL-IN	01295	SN74LS374N
A1A1U26	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1A1U27	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1A1U28	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A1A1U29	1820-1997	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG PRL-IN	01295	SN74LS374N
A1A1U30	1820-1997	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG PRL-IN	01295	SN74LS374N
A1A1U31	1820-2102	8	5	IC LCH TTL LS D-TYPE OCTL	01295	SN74LS373N
A1A1X1	1200-0688	7	8	SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X2	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X3	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X4	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X5	1200-0507	9	9	SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1A1X6	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A1A1X7	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A1A1X8	1200-0687	6	4	SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-0687
A1A1X9	1200-0687	6		SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-0687
A1A1X10	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A1A1X11	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A1A1X12	1200-0822	1	2	SOCKET-STRP 16-CONT DIP-SLDR	28480	1200-0822
A1A1X13	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A1A1X14	1200-0564	8	2	SOCKET-IC 8-CONT DIP-SLDR	28480	1200-0564
A1A1X15	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X16	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X17	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X18	1200-0688	7		SOCKET-STRP 11-CONT DIP-SLDR	28480	1200-0688
A1A1X19	1200-0933	5	2	SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-0933
A1A1X20	1200-0687	6		SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-0687
A1A1X21	1200-0564	8		SOCKET-IC 8-CONT DIP-SLDR	28480	1200-0564
A1A1X22	1200-0687	6		SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-0687
A1A1X23	1200-0822	1		SOCKET-STRP 16-CONT DIP-SLDR	28480	1200-0822
A1A1X24	1200-1366	0		SOCKET-STRP 12-CONT DIP-SLDR	28480	1200-1366
A1A1X25	1200-0932	4	1	SOCKET-STRP 8-CONT DIP-SLDR	28480	1200-0932

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A1A2</b>						
A1A2	08662-60168	9	1	LEFT KEYBOARD	28480	08662-60168
A1A2DS1	1990-0665	3	21	LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS2	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS3	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS4	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS5	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS6	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS7	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS8	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS9	1990-0719	8	2	LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	HLMP-1301
A1A2DS10	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS11	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS12	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS13	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS14	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS15	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS16	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS17	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS18	1990-0719	8		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	HLMP-1301
A1A2DS19	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A2DS20	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
2234A TO 2601A A1A2J1	1251-5315	4		CONNECTOR 40-PIN POST SERIES	28480	1251-5315
2602A AND ABOVE A1A2J1	1251-8828	0	1	CONNECTOR 40 POSITION	28480	1251-8828
	1251-5595	2	1	POLARIZING KEY POST CONN	28480	1251-5595
A1A2MP1	0380-0765	0	1	STANDOFF-RVT-ON .25-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
A1A2MP2	08662-00143	4	1	PLATE, CLAMP	28480	08662-00143
A1A2R1	0698-3132	4	29	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R2	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R3	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R4	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R5	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R6	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R7	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R8	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R9	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R10	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R11	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R12	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R13	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R14	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R15	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R16	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R17	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R18	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R19	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A2R20	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1A2S1	5060-9436	7	63	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1609	0	1	KEY CAP, "OFF(ALL OFF)"	28480	5041-1609
A1A2S2	5060-9436	7	18	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "MARKER 5"	28480	5041-0285
A1A2S3	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "MARKER 4"	28480	5041-0285
A1A2S4	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "MARKER 3"	28480	5041-0285
A1A2S5	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "MARKER 2"	28480	5041-0285
A1A2S6	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "MARKER 1"	28480	5041-0285
A1A2S7	5060-9436	7	1	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1613	6		KEY CAP, FULL "STOP FREQ."	28480	5041-1613
A1A2S8	5060-9436	7	1	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1612	5		KEY CAP, FULL "START FREQ."	28480	5041-1612
A1A2S9	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "10 MS"	28480	5041-0285
A1A2S10	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "2 MS"	28480	5041-0285
A1A2S11	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "1 MS"	28480	5041-0285
A1A2S12	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "0.5 MS"	28480	5041-0285
A1A2S13	5060-9436	7	3	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0286	7		KEY CAP, HALF "SINGLE"	28480	5041-0286
A1A2S14	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0286	7		KEY CAP, HALF "MANUAL"	28480	5041-0286
A1A2S15	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0286	7		KEY CAP, HALF "AUTO"	28480	5041-0286
A1A2S16	5060-9436	7	1	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0276	5		KEY CAP, QUARTER "OFF"	28480	5041-0276
A1A2S17	5060-9436	7	1	PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1638	5		KEY CAP, FULL "SPAN FREQ."	28480	5041-1638
A1A2S18	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "LOG 1%"	28480	5041-0285
A1A2S19	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "LOG 10%"	28480	5041-0285
A1A2S20	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "SET SIZE"	28480	5041-0285
A1A2S21	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "LIN 1000"	28480	5041-0285
A1A2S22	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "LIN 1000"	28480	5041-0285
A1A2S23	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY CAP, QUARTER "100 MS"	28480	5041-0285

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A1A3</b>						
A1A3	08663-60339	7	1	MAIN KEYBOARD ASSEMBLY	28480	08663-60339
A1A3C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A1A3DS1	1990-0486	6	5	LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4684
A1A3DS2	1990-0486	6		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4684
A1A3DS3	1990-0486	6		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4684
A1A3DS4	1990-0486	6		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4684
A1A3DS5	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A3DS6	1990-0486	6		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4684
A1A3DS7	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
A1A3DS8	1990-0665	3		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	1990-0665
2234A TO 2601A A1A3J1	1251-5315	4		CONNECTOR 40-PIN POST SERIES	28480	1251-5315
2602A AND ABOVE A1A3J1	1251-8828	0	1	CONNECTOR 40 POSITION	28480	1251-8828
	1251-5595	2	1	POLARIZING KEY POST CONN	28480	1251-5595
A1A3J2	1251-4989	6	1	CONNECTOR 5-PIN M POST TYPE	28480	1251-4989
A1A3R1	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R2	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R3	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R4	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R5	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R6	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R7	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3R8	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A1A3S1	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0441	6	1	KEY QUARTER "BLUE"	28480	5041-0441
A1A3S2	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0309	5	5	KEY QUARTER GY	28480	5041-0309
A1A3S3	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0309	5		KEY QUARTER GY	28480	5041-0309
A1A3S4	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY QTR GR LIT	28480	5041-0285
A1A3S5	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY QTR GR LIT	28480	5041-0285
A1A3S6	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0309	5		KEY QUARTER GY	28480	5041-0309
A1A3S7	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1629	3	1	KEY FULL BK "AM"	28480	5041-1629
A1A3S8	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1947	9	1	KEY FULL "MOD FREQ"	28480	5041-1947
A1A3S9	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0309	5		KEY QUARTER GY	28480	5041-0309
A1A3S10	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1630	7	1	KEY F DBL "FREQUENCY"	28480	5041-1630
A1A3S11	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1946	8	1	KEY FULL "PH M"	28480	5041-1946
A1A3S12	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1629	4	1	KEY F DBL "AMPLITUDE"	28480	5041-1629

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A1A3S13	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1627	2	1	KEY FULL BK "FM"	28480	5041-1627
A1A3S14	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1945	7	1	KEY HALF "FCTN OFF"	28480	5041-1945
A1A3S15	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0285	6		KEY QTR GR LIT	28480	5041-0285
A1A3S16	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1949	1	1	KEY SD FULL "INCREMENT SET"	28480	5041-1949
A1A3S17	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1610	3	1	KEY HALF "STORE"	28480	5041-1610
A1A3S18	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1620	5	1	KEY FULL DK GY "7"	28480	5041-1620
A1A3S19	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1617	0	1	KEY FULL DK GY "4"	28480	5041-1617
A1A3S20	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1614	7	1	KEY FULL DK GY "1"	28480	5041-1614
A1A3S21	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1623	8	1	KEY FULL DK GY "0"	28480	5041-1623
A1A3S22	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1611	4	1	KEY HALF "RECALL"	28480	5041-1611
A1A3S23	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1621	6	1	KEY FULL GY "8"	28480	5041-1621
A1A3S24	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1618	1	1	KEY FULL DK GY "5"	28480	5041-1618
A1A3S25	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1615	8	1	KEY FULL DK GY "2"	28480	5041-1615
A1A3S26	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1624	9	1	KEY F G Y W "DOT"	28480	5041-1624
A1A3S27	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1639	6	1	KEY HALF "SEQ" GY	28480	5041-1639
A1A3S28	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1622	7	1	KEY FULL DK GY "9"	28480	5041-1622
A1A3S29	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1619	2	1	KEY FULL DK GY "6"	28480	5041-1619
A1A3S30	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1616	9	1	KEY FULL DK GY "3"	28480	5041-1616
A1A3S31	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1625	0	1	KEY F "BACK SPACE"	28480	5041-1625
A1A3S32	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1632	9	1	KEY HALF "GHZ" GY	28480	5041-1632
A1A3S33	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1633	0	1	KEY HALF "MHZ" GY	28480	5041-1633
A1A3S34	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1634	1	1	KEY HALF "KHZ" GY	28480	5041-1634
A1A3S35	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1635	2	1	KEY HALF "HZ"	28480	5041-1635
A1A3S36	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1948	0	2	KEY S D FULL "INCR UP"	28480	5041-1948
A1A3S37	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1640	9	1	KEY HALF "X10" GY	28480	5041-1640
A1A3S38	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1948	0		KEY S D FULL "INCR DOWN"	28480	5041-1948
A1A3S39	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-1641	0	1	KEY HALF DIV GY	28480	5041-1641
A1A3S40	5060-9436	7		PUSHBUTTON SWITCH P.C. MOUNT	28480	5060-9436
	5041-0309	5		KEY QUARTER GY	28480	5041-0309

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A1</b>						
A2A1	08663-60336	4	1	KEYCODE ASSY	28480	08663-60336
A2A1C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A1C2	0160-3877	5	11	CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C3	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A1C4	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C5	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A1C6	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A1C7	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A1C8	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A1C9	0180-0291	3	1	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A2A1C10	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C11	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A1C12	0180-0197	8	6	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A1DS1	1990-0487	7	7	LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1DS2	1990-0487	7		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1DS3	1990-0487	7		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1DS4	1990-0487	7		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1DS5	1990-0487	7		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1DS6	1990-0487	7		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1DS7	1990-0487	7		LED-LAMP LUM-INT=1MCD IF=20MA-MAX BVR=5V	28480	5082-4584
A2A1MP1	4040-0749	4	1	EXTR-PC BD BRN POLYC .062-BD-THKNS	28480	4040-0749
	1480-0073	6	20	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A1MP2	4040-0748	3	11	EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A1R1	0698-7219	6	6	RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A2A1R2	1810-0280	8	7	NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R3	1810-0280	8		NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R4	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A2A1R5	1810-0280	8		NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R6	1810-0280	8		NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R7	1810-0280	8		NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R8	1810-0280	8		NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R9	0698-7272	1	3	RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
A2A1R10	1810-0339	8	1	NETWORK-RES 8-SIP270.0 OHM X 7	01121	208A271
A2A1R11	1810-0280	8		NETWORK-RES 10-SIP10.0K OHM X 9	01121	210A103
A2A1R12	0698-7284	5	4	RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1003-F
A2A1S1	3101-0860	9	1	SWITCH-SL DPDT MINTR .5A 125VAC/DC PC	28480	3101-0860
A2A1U1	1820-1202	7	4	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A1U2	1820-1425	6	2	IC SCHMITT-TRIG TTL LS NAND QUAD 2-INP	01295	SN74LS132N
A2A1U3	1820-1112	8	3	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A1U4	1820-1423	4	3	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A2A1U5	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2A1U6	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A2A1U7	1820-1425	6	1	IC SCHMITT-TRIG TTL LS NAND QUAD 2-INP	01295	SN74LS132N
A2A1U8	1820-1281	2	6	IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A2A1U9	1820-2307	5	1	IC-PROGRMBL TIMER MOD, 6MHZ, 3 ASYCH	28480	1820-2307
A2A1U10	1820-1199	1	6	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A1U11	1820-1195	7	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS175N
A2A1U12	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A1U13	1820-1851	2	6	IC ENCDR TTL LS	01295	SN74LS148N
A2A1U14	1820-1851	2		IC ENCDR TTL LS	01295	SN74LS148N
A2A1U15	1820-1201	6	5	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A1U16	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A1U17	1820-1851	2		IC ENCDR TTL LS	01295	SN74LS148N
A2A1U18	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A1U19	1820-1858	9	28	IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A1U20	1820-1473	4	1	IC ENCDR TTL 8-INP	01295	SN74148N
A2A1U21	1820-1851	2		IC ENCDR TTL LS	01295	SN74LS148N
A2A1U22	1820-2102	8		IC LCH TTL LS D-TYPE OCTL	01295	SN74LS373N
A2A1U23	1820-2102	8		IC LCH TTL LS D-TYPE OCTL	01295	SN74LS373N
A2A1U24	1820-1851	2		IC ENCDR TTL LS	01295	SN74LS148N
A2A1U25	1820-1244	7	1	IC MUXR/DATA-SEL TTL LS 4-TO-1-LINE DUAL	01295	SN74LS153N
A2A1U26	1820-2102	8		IC LCH TTL LS D-TYPE OCTL	01295	SN74LS373N
A2A1U27	1820-2311	1	1	IC COMPTR TTL LS MAGTD 8-BIT	34335	AM25LS2521PC
A2A1U28	1820-2081	2	2	IC NMOS	04713	MC68A21P
A2A1U29	1820-2075	4	7	IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075
A2A1W1	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A2</b>						
A2A2	08663-60337	5	1	SWEEP ASSEMBLY	28480	08663-60337
A2A2C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A2C2	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A2C3	0160-0164	7	1	CAPACITOR-FXD .039UF +-10% 200VDC POLYE	28480	0160-0164
A2A2C4	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A2C5	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A2C6	0160-0157	8	1	CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A2A2C7	0160-0153	4	1	CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A2A2C8	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A2C9	0160-3878	6	53	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A2A2C10	0180-2205	3	1	CAPACITOR-FXD .33UF+-10% 35VDC TA	56289	150D334X9035A2
A2A2C11	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A2C12	0180-1746	5	4	CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A2A2C13	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A2A2CR1	1901-0040	1	59	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A2CR2	1901-0050	3	27	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A2A2CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A2A2CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A2A2CR5	1901-0518	8	14	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A2A2MP1	4040-0750	7	1	EXTR-PC BD RED POLYC .062-BD-THKNS	28480	4040-0750
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A2MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A2Q1	1855-0020	8	2	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A2A2Q2	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A2A2Q3	1854-0071	7	2	TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A2Q4	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A2A2Q5	1853-0020	4	1	TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A2A2R1	0698-3136	8	5	RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A2A2R2	0757-0442	9	28	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A2R3	0757-0458	7	9	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A2R4	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A2R5	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A2R6	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A2R7	2100-2517	4	2	RESISTOR-TRMR 50K 10% C SIDE-ADJ 1-TRN	30983	ET50X503
A2A2R8	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A2R9	0698-3260	9	1	RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A2A2R10	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A2A2R11	0757-0460	1	2	RESISTOR 61.9K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A2A2R12	0698-3161	9	2	RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F
A2A2R13	0757-0460	1		RESISTOR 61.9K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A2A2R14	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A2A2R15	0757-0439	4	2	RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A2A2R16	0757-0401	0	14	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A2R17	0757-0416	7	15	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A2A2R18	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A2A2R19	0698-3155	1	3	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A2A2R20	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2A2R21	0757-0280	3	19	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A2R22	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A2R23	0698-3159	5	4	RESISTOR 26.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2612-F
A2A2R24	0698-3159	5		RESISTOR 26.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2612-F
A2A2R25	0698-3440	7	2	RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A2A2TP1	1251-0600	0	123	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A2TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A2U1	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A2U2	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A2A2U3	1826-0271	0	2	IC OP AMP GP 8-DIP-P PKG	01295	SN72741P
A2A2U4	1826-0921	7	3	D/A 10-BIT 16-CBRZ/SDR CMOS	28480	1826-0921
A2A2U5	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A2A2U6	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A2U7	1826-0323	3	1	IC OP AMP GP QUAD 14-DIP-C PKG	28480	1826-0323
A2A2U8	1826-0271	0		IC OP AMP GP 8-DIP-P PKG	01295	SN72741P
A2A2U9	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U10	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U11	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U12	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U13	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U14	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U15	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A2U16	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A2U17	1820-2024	3	35	IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A3</b>						
A2A3	08663-60328	4	1	PERIPHERAL RAM ASSEMBLY	28480	08663-60328
A2A3C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A3C2	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A3C3	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A3C4	0160-0576	5	53	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C5	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C6	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C7	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C8	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C9	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C10	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C11	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C12	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C13	0160-3447	5	1	CAPACITOR-FXD 470PF +-10% 1KVDC CER	28480	0160-3447
A2A3C14	0180-2619	3	8	CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A2A3C15	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A2A3C16	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A3C17	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A3C18	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C19	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C20	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C21	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C22	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C23	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A3C24	0160-3449	7	2	CAPACITOR-FXD 2000PF +-10% 250VDC CER	28480	0160-3449
A2A3C25	0160-3449	7		CAPACITOR-FXD 2000PF +-10% 250VDC CER	28480	0160-3449
A2A3CR1	1901-0376	6	5	DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A3CR2	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A3CR3	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A3CR4	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A3MP1	4040-0751	8	1	EXTR-PC BD ORN POLYC .062-BD-THKNS	28480	4040-0751
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A3MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A3Q1	1853-0393	4	2	TRANSISTOR PNP SI TO-18 PD=500MW	28480	1853-0393
A2A3Q2	1854-0810	2	5	TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A2A3Q3	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A2A3Q4	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A2A3Q5	1853-0393	4		TRANSISTOR PNP SI TO-18 PD=500MW	28480	1853-0393
A2A3Q6	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A2A3R1	1810-0279	5	7	NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A2A3R2	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A2A3R3	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A2A3R4	0757-0199	3	6	RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A2A3R5	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2A3R6	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/B-T0-2152-F
A2A3R7	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/B-T0-2152-F
A2A3R8	0757-0461	2	1	RESISTOR 68.1K 1% .125W F TC=0+-100	24546	C4-1/B-T0-6812-F
A2A3R9	0757-0466	7	4	RESISTOR 110K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1103-F
A2A3R10	0757-0346	2	5	RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/B-T0-10R0-F
A2A3R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1001-F
A2A3R12	0757-0466	7		RESISTOR 110K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1103-F
A2A3R13	0757-0466	7		RESISTOR 110K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1103-F
A2A3R14	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1002-F
A2A3R15	0757-0466	7		RESISTOR 110K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1103-F
A2A3R16	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/B-T0-5112-F
A2A3R17	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1002-F
A2A3R18	0757-0394	0	3	RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/B-T0-51R1-F
A2A3R19	0757-0274	5	5	RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1211-F
A2A3R20	0698-3459	8	2	RESISTOR 383K 1% .125W F TC=0+-100	28480	0698-3459
A2A3R21	0698-3459	8		RESISTOR 383K 1% .125W F TC=0+-100	28480	0698-3459
A2A3U1	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A2A3U2	1820-1194	6	3	IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A2A3U3	1820-1194	6		IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A2A3U4	1820-1208	3	3	IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N
A2A3U5	1820-1194	6		IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A2A3U6	1818-1330	7	4	IC CMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD444C-1
A2A3U7	1818-1330	7		IC CMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD444C-1
A2A3U8	1818-1330	7		IC CMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD444C-1
A2A3U9	1818-1330	7		IC CMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD444C-1
A2A3U10	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A3U11	1820-2081	2		IC NMOS	04713	MC68A21P
A2A3U12	1820-2102	8		IC LCH TTL LS D-TYPE OCTL	01295	SN74LS373N
A2A3U13	1820-1997	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG PRL-IN	01295	SN74LS374N
A2A3U14	1820-2075	4		IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075
A2A3U15	1826-0191	3	3	IC COMPARATOR GP DUAL TO-100 PKG	27014	LM319H
A2A3U16	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A3U17	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A3U18	1820-1204	9	4	IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A2A3U19	1820-1917	1	2	IC BFR TTL LS LINE DRVR OCTL	01295	SN74LS240N
A2A3U20	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A3U21	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A4</b>						
A2A4	08663-60334	2	1	MODULATION ASSEMBLY	28480	08663-60334
A2A4C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A4C2	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A4C3	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A4C4	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A4C5	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A4C6	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A4MP1	4040-0752	9	1	EXTR-PC BD YEL POLYC .062-BD-THKNS	28480	4040-0752
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A4MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A4R1	0698-7260	7	34	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A4R2	1810-0367	2	4	NETWORK-RES 6-SIP4.7K OHM X 5	01121	206A472
A2A4R3	1810-0367	2		NETWORK-RES 6-SIP4.7K OHM X 5	01121	206A472
A2A4R4	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A4U1	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A4U2	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U3	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U4	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U5	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U6	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U7	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U8	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A4U9	1820-1204	9		IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A2A4U10	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A4U11	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U12	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U13	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U14	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U15	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U16	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U17	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A4U18	1820-2075	4		IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A5</b>						
A2A5	08663-60341	1	1	FREQUENCY ASSEMBLY	28480	08663-60341
A2A5C1	0180-2617	1	20	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A5C2	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A5C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A5C4	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A5C5	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A5C6	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A5MP1	4040-0753	0	1	EXTR-PC BD GRN POLYC .062-BD-THKNS	28480	4040-0753
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A5MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A5R1	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R2	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A5R3	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A2A5R4	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R5	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R6	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R7	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R8	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R9	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R10	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5R11	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A2A5U1	1820-1207	2	5	IC GATE TTL LS NAND 8-INP	01295	SN74LS30N
A2A5U2	1820-1987	5	8	IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U3	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U4	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U5	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U6	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U7	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U8	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U9	1820-1987	5		IC SHF-RGTR TTL LS COM CLEAR STOR 8-BIT	01295	SN74LS299N
A2A5U10	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A5U11	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A5U12	1820-1204	9		IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A2A5U13	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A5U14	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A5U15	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A5U16	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A5U17	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A5U18	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A5U19	1820-1267	4	2	IC CONV TTL BCD-TO-BIN 6-BIT	01295	SN74184N
A2A5U20	1820-1267	4		IC CONV TTL BCD-TO-BIN 6-BIT	01295	SN74184N
A2A5U21	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A5U22	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A5U23	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A5U24	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A5U25	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A5U26	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A6</b>						
A2A6	08663-60333	1	1	HPIB ASSEMBLY	28480	08663-60333
A2A6C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A6C2	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A6C3	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A6C4	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A6C5	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A6C6	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A6C7	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A6C8	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A2A6CR24	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2A6MP1	4040-0754	1	1	EXTR-PC BD BLU POLYC .062-BD-THKNS	28480	4040-0754
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A6MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A6R1	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A6R2	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A6R3	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A2A6R4	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R5	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R6	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R7	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R8	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R10	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R11	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R12	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R13	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R14	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R15	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A2A6R16	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A6R17	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A6R18	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A2A6R19	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
A2A6R20	0698-3445	2	3	RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A2A6R21	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A2A6S1	3100-3414	3	1	SWITCH-THUMBWHEEL 2-MOD; BCD 1-2-4-8	28480	3100-3414
A2A6U1	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A6U2	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A6U3	1820-1208	3		IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N
A2A6U4	1820-2075	4		IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075
A2A6U5	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A6U6	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A6U7	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A6U8	1820-2148	2	1	IC MICPROC-ACCESS NMOS	04713	MC68A488L
A2A6U9	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A6U10	1820-0535	7	6	IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2A6U11	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A2A6U12	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A2A6U13	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A2A6U14	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A2A6U15	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A2A6U16	1820-2058	3	4	IC MISC TTL S QUAD	07263	MC3448AL
A2A6U17	1820-2058	3		IC MISC TTL S QUAD	07263	MC3448AL
A2A6U18	1820-2058	3		IC MISC TTL S QUAD	07263	MC3448AL
A2A6U19	1820-2058	3		IC MISC TTL S QUAD	07263	MC3448AL

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A7</b>						
A2A7	08663-60332	0	1	MICROPROCESSOR ASSEMBLY	28480	08663-60332
A2A7C1	0160-3455	5	2	CAPACITOR-FXD 470PF +-10% 1KVDC CER	28480	0160-3455
A2A7C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A7C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A7C4	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A7C5	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A7C6	0180-0374	3	1	CAPACITOR-FXD 10UF+-10% 20VDC TA	56289	150D106X9020B2
A2A7C7	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A7C8	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A7C9	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A7C10	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A7C11	0160-3879	7	65	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
2234A TO 2342A A2A7C12				NOT ASSIGNED		
2346A TO 2516A A2A7C12	0160-3774	1	1	CAPACITOR-FXD 22PF +-10% 100VDC CER	26654	2BN100S220KA
2526A AND ABOVE A2A7C12	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A2A7CR1	1901-0376	6		DIODE-GEN PRP 35V 50MA DO-35	28480	1901-0376
A2A7MP1	4040-0755	2	1	EXTR-PC BD VIO POLYC .062-BD-THKNS	28480	4040-0755
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A7MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A7R1	0698-7268	5	7	RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A7R2	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A7R3	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A7R4	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A7R5	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A2A7R6	0698-7236	7	17	RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A7R7	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A7R8	0698-7248	1	11	RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A2A7R9	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A2A7R10	0698-7283	4	1	RESISTOR 90.9K 1% .05W F TC=0+-100	24546	C3-1/8-T0-9092-F
A2A7R11	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A7R12	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A7R13	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A7R14	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A2A7R15	0698-7286	7	1	RESISTOR 121K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1213-F
A2A7R16	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A7R17	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A7R18	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A7R19	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A7R20	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A2A7R21	1810-0275	1	1	NETWORK-RES 10-SIP1.0K OHM X 9	01121	210A102
A2A7R22	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A7R23	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A7S1	3100-3364	2	1	SWITCH-ROTARY 16 PIN DIP 4PDT	28480	3100-3364
A2A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2A7TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A7U1	1826-0191	3		IC COMPARATOR GP DUAL TO-100 PKG	27014	LM319H
A2A7U2	1820-1208	3		IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N
A2A7U3	1820-1202	7		IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A7U4	1820-2369	9	1	IC OSC TTL LS DUAL	01295	SN74LS629N
A2A7U5	1816-1693	1	1	IC TTL S16384 (16K) PROM 80-NS 3-S	18324	N82S191F
	1200-0541	1	19	SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A7U6	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A7U7	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A7U8	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2A7U9	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
A2A7U10	1820-3929	9	1	IC MPU; CLK FREQ=2MHZ, W/INTNL CLK	28480	1820-3929
	1200-0654	7	1	SOCKET-IC 40-CONT DIP DIP-SLDR	28480	1200-0654
A2A7U11	1820-2075	4		IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075
A2A7U12	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A7U13	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A2A7U14	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A7U15	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A7U16	1820-1207	2		IC GATE TTL LS NAND 8-INP	01295	SN74LS30N
A2A7U17	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A7U18	1820-1275	4	1	IC GATE TTL S NOR DUAL 5-INP	01295	SN74S260N
A2A7U19	1820-2244	9	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS379N
A2A7U20	1820-1207	2		IC GATE TTL LS NAND 8-INP	01295	SN74LS30N
A2A7U21	1820-1199	1		IC INV TTL LS HEX 1-INP	01295	SN74LS04N
<i>2234A TO 2535A</i>						
A2A7Y1	0410-1184	4	1	CRYSTAL-QUARTZ 6.000 MHZ	28480	0410-1184
	0361-0026	6	1	RIVET	28480	0361-0026
	1400-0973	7	1	CLIP-CMPNT .139-.154-DIA STL	91506	6180-1A
<i>2536A AND ABOVE</i>						
A2A7Y1	0410-1292	5		CRYSTAL-QUARTZ 6 MHZ HC-18/U-HLDR	28480	0410-1292
	0361-0026	6	1	RIVET	28480	0361-0026
	1400-0973	7	1	CLIP-CMPNT .139-.154-DIA STL	91506	6180-1A

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A8 †</b>						
<b>08663-60329 – SERIAL PREFIX 2234A TO 2536A</b>						
A2A8	08663-60329	5	1	RAM/ROM ASSEMBLY	28480	08663-60329
A2A8C1	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C3	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C4	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C5	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C6	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C7	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C8	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C9	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C10	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C11	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A2A8C12	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A8C13	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A8C14	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A8C15	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A8MP1	4040-0747	2	1	EXTR-PC BD GRA POLYC .062-BD-THKNS	28480	4040-0747
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A8MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A8R1	1810-0279	5		NETWORK-RES 10-SIP4.7K OHM X 9	01121	210A472
<i>2234A TO 2248A</i>						
A2A8U1	08663-80005	6	1	EPROM	28480	08663-80005
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U2	08663-80006	7	1	EPROM	28480	08663-80006
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U3	08663-80007	8	1	EPROM	28480	08663-80007
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U4	08663-80008	9	1	EPROM	28480	08663-80008
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U5	08663-80009	0	1	EPROM	28480	08663-80009
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U6	08663-80010	3	1	EPROM	28480	08663-80010
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
<i>2313A TO 2536A</i>						
A2A8U1	08663-80024	9	1	EPROM PROG ROM 1	28480	08663-80024
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U2	08663-80025	0	1	EPROM PROG ROM 2	28480	08663-80025
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U3	08663-80026	1	1	EPROM PROG ROM 3	28480	08663-80026
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U4	08663-80027	2	1	EPROM PROG ROM 4	28480	08663-80027
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U5	08663-80028	3	1	EPROM PROG ROM 5	28480	08663-80028
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A8U6	08663-80029	4	1	EPROM PROG ROM 6	28480	08663-80029
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A8 †</b>				<b>08663-60329 - SERIAL PREFIX 2234A TO 2536A</b>		
A2A8U7	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A2A8U8	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS139N
A2A8U9	1820-1207	2		IC GATE TTL LS NAND 8-INP	01295	SN74LS30N
A2A8U10	1818-0443	1	4	IC NMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD2114LC-1
A2A8U11	1818-0443	1		IC NMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD2114LC-1
A2A8U12	1818-0443	1		IC NMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD2114LC-1
A2A8U13	1818-0443	1		IC NMOS 4096 (4K) STAT RAM 300-NS 3-S	S0545	UPD2114LC-1
A2A8U14	1820-1202	7		IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A2A8U15	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A2A8U16	1820-1207	2		IC GATE TTL LS NAND 8-INP	01295	SN74LS30N
A2A8U17	1820-1917	1		IC BFR TTL LS LINE DRVR OCTL	01295	SN74LS240N
A2A8U18	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A8U19	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A8U20	1820-2075	4		IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A8 †</b>						
<b>08663-60365 – SERIAL PREFIX 2537A AND ABOVE</b>						
A2A8	08663-60365	4		RAM/ROM ASSEMBLY	28480	08663-60365
A8A2BT1	1420-0281	2		BATTERY 2.8V .46A-HR LI/S-DIOX PIN	28480	1420-0281
A2A8C1	0180-0116	1	3	CAPACITOR-FXD 6.8UF +-10% 35VDC TA	56289	150D68549035B2
A2A8C2	0180-0116	1		CAPACITOR-FXD 6.8UF +-10% 35VDC TA	56289	150D68549035B2
A2A8C3	0180-0116	1		CAPACITOR-FXD 6.8UF +-10% 35VDC TA	56289	150D68549035B2
A2A8C4	0160-4835	7	10	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C5	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C6	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C7	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C8	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C9	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C10	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C11	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C12	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8C13	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A2A8L1	9100-3922	4	1	INDUCTOR-FIXE3D 120-1300HZ	28480	9100-3922
A2A8MP1	4040-0748	3		EXTR-PC BC BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0116	8		PIN GRV .062-IN-DIA .25-IN-LG STL	28480	1480-0116
A2A8MP2	4040-0747	2		EXTR-PC BC GRA POLYC .062-BD-THKNS	28480	4040-0747
	1480-0116	8		PIN GRV .062-IN-DIA .25-IN-LG STL	28480	1480-0116
A2A8R1	1810-0279	5		NETWORK-RES 10-SIP4.7K OHMX9	01121	210A472
A2A8R2	1810-0279	5		NETWORK-RES 10-SIP4.7K OHMX9	01121	210A472
A2A8R3	1810-0279	5		NETWORK-RES 10-SIP4.7K OHMX9	01121	210A472
A2A8TP1	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
<i>2537A to 2918A</i>						
A2A8U1	08662-80040	9	1	UV PROGRAMMED ROM	28480	08663-80040
<i>2927A and above</i>						
A2A8U1	08662-87007	2	1	UV PROGRAMMED ROM	28480	08663-87007
A2A8U2	08662-80062	4	1	UV PROGRAMMED ROM	28480	08663-80062
A2A8U3	1LJ6-0001	8	1	IC CMOS 16384 (16K) STAT RAM 250-NS 3-S	28480	1LJ6-0001
A2A8U4	1820-2913	9	1	IC RCVR TTL ALS OCTL	01295	SN74ALS245N
A2A8U5	1820-2657	9	3	IC GATE TTL ALS OR QUAD 2-INP	01295	SN74ALS32N
A2A8U6	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74ALS10N
A2A8U7	1820-2657	9		IC GATE TTL ALS OR QUAD 2-INP	01295	SN74ALS32N
A2A8U8	1820-2657	9		IC GATE TTL ALS OR QUAD 2-INP	01295	SN74ALS32N
A2A8U9	1820-2656	7	1	IC GATE TTL ALS NAND QUAD 2-INP	01295	SN74ALS00N
A2A8U10	1820-1441	6	1	IC ADDER TTL LS BIN FULL ADDR 4-BIT	01295	SN74LS283N

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Δ Errata part change.

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A9 †</b>						
<b>08663-60331 – SERIAL PREFIX 2234A TO 2248A</b>						
A2A9	08663-60331	9	1	ROM ASSEMBLY	28480	08663-60331
A2A9C1	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A9C2	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A9C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A9C4	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A2A9C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A9C15	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A2A9MP1	4040-0756	3	1	EXTR-PC BD WHT POLYC .062-BD-THKNS	28480	4040-0756
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A9MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A9R1	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R2	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R3	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R4	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R5	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R6	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R7	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R8	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R9	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9R10	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A2A9U1				NOT LOADED		
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
<i>2234A TO 2248A</i>						
A2A9U2	08663-80020	5	1	EPROM	28480	08663-80020
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U3	08663-80016	9	1	EPROM	28480	08663-80016
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U4	08663-80017	0	1	EPROM	28480	08663-80017
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U5	08663-80011	4	1	EPROM	28480	08663-80011
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U6	08663-80013	6	1	EPROM	28480	08663-80013
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
<i>2313A TO 2536A</i>						
A2A9U2	08663-80039	6	1	EPROM PROG ROM 16	28480	08663-80039
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U3	08663-80035	2	1	EPROM PROG ROM 12	28480	08663-80035
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U4	08663-80036	3	1	EPROM PROG ROM 13	28480	08663-80036
A2A9U5	08663-80030	7	1	EPROM PROG ROM 7	28480	08663-80030
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U6	08663-80032	9	1	EPROM PROG ROM 9	28480	08663-80032
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U7	08663-80021	6	1	EPROM	28480	08663-80021
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A9 †</b>						
<b>08663-60331 - SERIAL PREFIX 2234A TO 2248A</b>						
2234A TO 2248A						
A2A9U8	08663-80019	2	1	EPROM	28480	08663-80019
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U9	08663-80015	8	1	EPROM	28480	08663-80015
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U10	08663-80018	1	1	EPROM	28480	08663-80018
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U11	08663-80012	5	1	EPROM	28480	08663-80012
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U12	08663-80014	7	1	EPROM	28480	08663-80014
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
2313A TO 2536A						
A2A9U8	08663-80038	5	1	EPROM PROG ROM 15	28480	08663-80038
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U9	08663-80034	1	1	EPROM PROG ROM 11	28480	08663-80034
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U10	08663-80037	4	1	EPROM PROG ROM 14	28480	08663-80037
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U11	08663-80031	8	1	EPROM PROG ROM 8	28480	08663-80031
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U12	08663-80033	0	1	EPROM PROG ROM 10 (ALSO REPLACE A2ABU1-6, A2A9U2-6 A2A9U8-11)	28480	08663-80033
	1200-0541	1		SOCKET-IC 24-CONT DIP DIP-SLDR	28480	1200-0541
A2A9U13	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A9U14	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A9U15	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A9U16	1820-1205	0	1	IC GATE TTL LS AND DUAL 4-INP	01295	SN74LS21N
A2A9U17	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A9U18	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A9U19	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A9U20	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A2A10</b>						
A2A10	08663-60335	3	1	LEVEL ASSEMBLY	28480	08663-60335
A2A10C1	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A10C2	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A10C3	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A10C4	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A10C5	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A10C6	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A2A10MP1	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A10MP2	4040-0748	3		EXTR-PC BD BLK POLYC .062-BD-THKNS	28480	4040-0748
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A2A10R1	0698-6360	6	1	RESISTOR 10K .1% .125W F TC=0+-25	28480	0698-6360
A2A10R2	1810-0367	2		NETWORK-RES 6-SIP4.7K OHM X 5	01121	206A472
A2A10R3	1810-0367	2		NETWORK-RES 6-SIP4.7K OHM X 5	01121	206A472
A2A10R4	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A2A10R5	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A2A10R6	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A2A10U1	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A10U2	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A10U3	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A10U4	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A10U5	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A10U6	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A10U7	1820-2024	3		IC DRVR TTL LS LINE DRVR OCTL	01295	SN74LS244N
A2A10U8	1820-1204	9		IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A2A10U9	1820-1216	3		IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A2A10U10	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A10U11	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A10U12	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A10U13	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A10U14	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A10U15	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A2A10U16	1820-2075	4		IC TRANSCEIVER TTL LS BUS OCTL	28480	1820-2075

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 4-3. Replaceable Parts

**A2A11**

A2A11	08663-60340	0	1	DCU SECTION MOTHERBOARD	28480	08663-60340
A2A11C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A11C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A2A11F1	2110-0063	2		FUSE .75A 250V NTD 1.25X.25 UL	28480	2110-0063
A2A11J1	1251-5314	3	3	CONNECTOR 50-PIN POST SERIES	28480	1251-5314
A2A11J2	1251-5316	5	2	CONNECTOR 34-PIN POST SERIES	28480	1251-5316
A2A11J3	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A2A11J5	1200-0508	0	4	SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A2A11J6	1251-5314	3		CONNECTOR 50-PIN POST SERIES	28480	1251-5314
A2A11J7	1251-5316	5		CONNECTOR 34-PIN POST SERIES	28480	1251-5316
A2A11J8	1251-5314	3		CONNECTOR 50-PIN POST SERIES	28480	1251-5314
2234A TO 2601A A2A11J9	1251-5315	4		CONNECTOR 40-PIN POST SERIES	28480	1251-5315
2602A AND ABOVE A2A11J9	1252-0393	0		CONN-POST TYPE .100-PIN-SPCG 40-CONT	28480	1252-0393
	1251-5595	2		POLARIZING KEY POST CONN	28480	1251-5595
A2A11J10	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
2234A TO 2601A A2A11J11	1251-7034	8	1	CONNECTOR 40-PIN M POST TYPE	28480	1251-7034
2602A AND ABOVE A2A11J11	1252-1345	4		CONN-POST TYPE 40-CONT	28480	1251-1345
	1251-5595	2		POLARIZING KEY POST CONN	28480	1251-5595
A2A11J12	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
2234A TO 2601A A2A11J13	1251-5151	6	1	CONNECTOR 26-PIN M POST TYPE	28480	1251-5151
2602A AND ABOVE A2A11J13	1252-1335	2		CONN-POST TYPE 26-CONT	28480	1251-1335
	1251-5595	2		POLARIZING KEY POST CONN	28480	1251-5595
A2A11J14	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A2A11MP1	0340-0095	5	4	TERMINAL-STUD SGL-TUR PRESS-MTG	28480	0340-0095
A2A11MP2	0340-0095	5		TERMINAL-STUD SGL-TUR PRESS-MTG	28480	0340-0095
A2A11MP3	0340-0095	5		TERMINAL-STUD SGL-TUR PRESS-MTG	28480	0340-0095
A2A11MP4	0340-0095	5		TERMINAL-STUD SGL-TUR PRESS-MTG	28480	0340-0095
A2A11MP5	3160-0092	3		FINGER GUARD, FAN GRILLE	28480	3160-0092
A2A11TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A11TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A11TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A11TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A2A11XA1A	1251-2026	8	21	CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA1B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA2A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA2B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA3A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA3B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA4A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA4B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA5A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA5B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A2A11XA6A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA6B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA7A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA7B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XABA	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA8B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA9A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA9R	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA10A	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A2A11XA10B	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A3</b>						
A3A3	08663-60309	1	1	N LOOP DIVIDER/PHASE DETECTOR ASSEMBLY	28480	08663-60309
A3A3C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C3	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C9	0180-0558	5	1	CAPACITOR-FXD 470UF+-20% 10VDC TA	56289	150D477X0010S2
A3A3C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C13	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A3A3C14	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A3A3C15	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C16	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A3A3C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C18	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C19	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C22	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C23	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C24	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C26	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C27	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C28	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C29	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C30	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C31	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C33	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C34	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C35	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C36	0140-0195	2	1	CAPACITOR-FXD 130PF +-5% 300VDC MICA	72136	DM15F131J0300WV1CR
A3A3C37	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C38	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C40	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A3C41	0160-2205	1	1	CAPACITOR-FXD 120PF +-5% 300VDC MICA	28480	0160-2205
A3A3C42	0140-0205	5	2	CAPACITOR-FXD 62PF +-5% 300VDC MICA	72136	DM15E620J0300WV1CR
A3A3C43	0140-0205	5		CAPACITOR-FXD 62PF +-5% 300VDC MICA	72136	DM15E620J0300WV1CR
A3A3C44	0121-0105	4	2	CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304324 9/35PF N650
A3A3C45	0140-0210	2	5	CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A3C46	0140-0210	2		CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A3C47	0160-3538	5	2	CAPACITOR-FXD 750PF +-5% 100VDC MICA	28480	0160-3538
A3A3C48	0160-3538	5		CAPACITOR-FXD 750PF +-5% 100VDC MICA	28480	0160-3538
A3A3C49	0140-0191	8	2	CAPACITOR-FXD 56PF +-5% 300VDC MICA	72136	DM15E560J0300WV1CR
A3A3C50	0140-0210	2		CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A3C51	0140-0210	2		CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A3C52	0121-0105	4		CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304324 9/35PF N650
A3A3C53	0160-2199	2	1	CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A3A3C54	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A3C55	0121-0446	6	3	CAPACITOR-V TRMR-CER 4.5-20PF 160V	28480	0121-0446
A3A3C56	0160-2259	5	1	CAPACITOR-FXD 12PF +-5% 500VDC CER 0+-30	28480	0160-2259
A3A3C57	0121-0446	6		CAPACITOR-V TRMR-CER 4.5-20PF 160V	28480	0121-0446
A3A3C58	0160-2306	3	2	CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2306
A3A3C59	0160-2264	2	4	CAPACITOR-FXD 20PF +-5% 500VDC CER 0+-30	28480	0160-2264
A3A3C60	0160-3068	6	2	CAPACITOR-FXD 1500PF +-5% 300VDC MICA	28480	0160-3068
A3A3C61	0160-3068	6		CAPACITOR-FXD 1500PF +-5% 300VDC MICA	28480	0160-3068
A3A3C62	0160-0573	2	3	CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A3A3C63	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
<i>2234A TO 2706A</i>						
A3A3CR1	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A3CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A3CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A3CR4	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
<i>2716A AND ABOVE</i>						
A3A3CR1	1900-0089	6		DIODE-SM SIG SCHOTTKY	28480	1900-0089
A3A3CR2	1900-0089	6		DIODE-SM SIG SCHOTTKY	28480	1900-0089
A3A3CR3	1900-0089	6		DIODE-SM SIG SCHOTTKY	28480	1900-0089
A3A3CR4	1900-0089	6		DIODE-SM SIG SCHOTTKY	28480	1900-0089
A3A3CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR9	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR10	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR11	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3CR12	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A3DS1	1990-0326	3	3	LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444
A3A3E1	9170-0029	3	10	CORE-SHIELDING BEAD	28480	9170-0029
A3A3E2	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A3A3J1	1250-1220	0	16	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4	17	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9	16	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A3L1	9140-0144	0	25	INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A3L2	9140-0335	1	1	INDUCTOR 110UH 15% .47DX 1.25LG Q=10	28480	9140-0335
A3A3L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A3L4	9100-1629	4	6	INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A3A3L5	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A3L6	9140-0179	1	2	INDUCTOR RF-CH-MLD 22UH 10% .166DX.385LG	28480	9140-0179
A3A3L7	9140-0179	1		INDUCTOR RF-CH-MLD 22UH 10% .166DX.385LG	28480	9140-0179
A3A3L8	9140-0138	2	1	INDUCTOR RF-CH-MLD 180UH 5% .166DX.385LG	28480	9140-0138
A3A3L9	9140-0158	6	7	INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A3L10	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A3L11	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A3L12	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A3L13	9100-1635	2	2	INDUCTOR RF-CH-MLD 91UH 5% .166DX.385LG	28480	9100-1635
A3A3L14	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A3L15	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A3L16	9100-1633	0	1	INDUCTOR RF-CH-MLD 68UH 5% .166DX.385LG	28480	9100-1633
A3A3L17	9100-1631	8	1	INDUCTOR RF-CH-MLD 56UH 5% .166DX.385LG	28480	9100-1631
A3A3L18	9100-1627	2	2	INDUCTOR RF-CH-MLD 39UH 5% .166DX.385LG	28480	9100-1627
A3A3L19	9100-1627	2		INDUCTOR RF-CH-MLD 39UH 5% .166DX.385LG	28480	9100-1627
A3A3MP1	08663-00061	6	1	COVER, EXTRUSION, FULL	28480	08663-00061
	2360-0113	2	8	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A3MP2	5001-0176	0	20	STRAP GROUND	28480	5001-0176
A3A3MP3	5001-0176	0		STRAP GROUND	28480	5001-0176
A3A3Q1	1854-0404	0	27	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q2	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q3	1853-0034	0	2	TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A3A3Q4	1853-0034	0		TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A3A3Q5	1854-0247	9	7	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A3Q6	1853-0007	7	2	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A3Q7	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q8	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A3Q9	1853-0451	5	18	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A3Q10	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A3Q11	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A3Q12	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A3R1	0698-7218	5	14	RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R2	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R3	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R4	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R5	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R6	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R7	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R8	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R9	0757-0316	6	1	RESISTOR 42.2 1% .125W F TC=0+-100	24546	C4-1/8-TO-42R2-F
A3A3R10	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A3A3R11	0698-7213	0	3	RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-TO-110R-F
A3A3R12	0698-7222	1	8	RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A3A3R13	2100-3349	2	1	RESISTOR-TRMR 100 10% C SIDE-ADJ 1-TRN	28480	2100-3349
A3A3R14	0698-7216	3	8	RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A3R15	0698-7221	0	6	RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A3A3R16	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A3A3R17	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A3R18	0698-7234	5	8	RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A3R19	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A3R20	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A3R21	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A3R22	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A3A3R23	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A3R24	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A3A3R25	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A3R26	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A3A3R27	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A3A3R28	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R29	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R30	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R31	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A3A3R32	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A3R33	0698-7188	8	5	RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A3R34	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A3R35	0698-7233	4	28	RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R36	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R37	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R38	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R39	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A3A3R40	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R41	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A3R42	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A3R43	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A3A3R44	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R45	0698-7229	8	23	RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A3R46	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R47	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R48	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R49	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R50	0698-7226	5	3	RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-TO-383R-F
A3A3R51	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A3R52	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R53	0698-7220	9	5	RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A3A3R54	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A3R55	0698-7200	5	1	RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31.6R-F
A3A3R56	0698-7212	9	35	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R57	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R58	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R59	0698-7209	4	2	RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-TO-75R0-F
A3A3R60	0698-7253	8	12	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A3R61	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A3R62	0698-7238	9	5	RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1211-F
A3A3R63	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1211-F
A3A3R64	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A3R65	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A3R66	0698-7192	4	1	RESISTOR 14.7 1% .05W F TC=0+-100	24546	C3-1/8-TO-14.7R-F
A3A3R67	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R68	0698-7196	8	1	RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21.5R-F
A3A3R69	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R70	0698-7224	3	7	RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A3R71	0698-7237	8	2	RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1101-F
A3A3R72	0698-7226	5		RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-TO-383R-F
A3A3R73	0698-7237	8		RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1101-F
A3A3R74	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A3R75	0698-7213	0		RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-TO-110R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A3R76	0698-7226	5		RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-TO-383R-F
A3A3R77	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R78	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R79	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R80	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R81	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R82	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R83	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R84	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R85	0698-7263	0	2	RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1332-F
A3A3R86	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2152-F
A3A3R87	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
<i>2234A TO 2615A</i>						
A3A3R88	0698-7257	2	2	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-7501-F
<i>2619A AND ABOVE</i>						
A3A3R88*	0698-7257	2	2	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-7501-F
A3A3R89	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A3R90	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R91	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R92	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R93	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R94	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R95	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R96	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R97	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A3R98	0698-7247	0	3	RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2871-F
A3A3R99	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A3R100	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A3R101	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A3R102	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R103	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A3R104	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A3R105	0698-7240	3	4	RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A3A3R106	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A3A3R107	0698-7232	3	13	RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A3A3R108	0698-7244	7	3	RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A3A3R109	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A3R110	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A3R111	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A3R112	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A3R113	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A3R114	0698-7255	0	3	RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-TO-6191-F
A3A3R115	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A3R116	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A3R117	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A3R118	0698-7249	2	5	RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3481-F
A3A3R119	0698-7243	6	6	RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A3R120	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A3R121	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3481-F
A3A3R122	0698-7274	3	2	RESISTOR 38.3K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3832-F
<i>2234A ONLY</i>						
A3A3R123				NOT ASSIGNED		
<i>2245A AND ABOVE</i>						
A3A3R123	0699-0130	8	1	RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A3TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A3U1	1820-0794	0	2	IC FF ECL D-M/S	04713	MC1670L
A3A3U2	1820-0796	2	2	IC GATE ECL NOR QUAD 2-INP	04713	MC1662L
A3A3U3	1820-0794	0		IC FF ECL D-M/S	04713	MC1670L
A3A3U4	1820-0796	2		IC GATE ECL NOR QUAD 2-INP	04713	MC1662L
A3A3U5	1820-0801	0	2	IC GATE ECL OR-NOR QUAD 2-INP	04713	MC10101P
A3A3U6	1820-0813	4	1	IC GATE ECL AND-OR	04713	MC10119P
A3A3U7	1820-0825	8	2	IC SHF-RGTR ECL D-TYPE PRL-IN PRL-OUT	04713	MC10141L
A3A3U8	1820-0825	8		IC SHF-RGTR ECL D-TYPE PRL-IN PRL-OUT	04713	MC10141L
A3A3U9	1820-0803	2	3	IC GATE ECL OR-NOR TPL	04713	MC10105P
A3A3U10	1826-0026	3	3	IC COMPARATOR PRCN TO-99 PKG	01295	LM311L
A3A3U11	1820-0817	8	1	IC FF ECL D-M/S DUAL	04713	MC10131P
A3A3U12	1820-0801	0		IC GATE ECL OR-NOR QUAD 2-INP	04713	MC10101P
A3A3U13	1820-5386	6	2	IC 74S 583 PL ADDR	02237	74F583PC
A3A3U14	1820-0803	2		IC GATE ECL OR-NOR TPL	04713	MC10105P
A3A3U15	1826-0026	3		IC COMPARATOR PRCN TO-99 PKG	01295	LM311L
A3A3U16	1820-0693	8	1	IC FF TTL S D-TYPE POS-EDGE-TRIG	01295	SN74S74N
A3A3U17	1820-0579	9	1	IC MV TTL MONOSTBL RETRIG DUAL	01295	SN74123N
A3A3U18	1820-1191	3	1	IC FF TTL S D-TYPE POS-EDGE-TRIG COM	01295	SN74S175N
A3A3U19	1820-5386	1		IC 74S 583 PL ADDR	02237	74F583PC
A3A3U20	1820-0305	9	1	IC ADDR TTL FULL ADDER 4-BIT	01295	SN7483AN
A3A3U21	1820-0681	4	3	IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 4-3. Replaceable Parts**

**A3A4**

A3A4	08662-60136	1	1	N LOOP VCO ASSEMBLY	28480	08663-60033
A3A4C1	0160-4084	8	21	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A4C2	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A4C3	0160-5216	0	2	CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-5216
A3A4C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C6	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A3A4C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C10	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A4C11	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A4C12	0160-0174	9	1	CAPACITOR-FXD .47UF +80-20% 25VDC CER	28480	0160-0174
A3A4C13	0140-0191	8		CAPACITOR-FXD 56PF +-5% 300VDC MICA	72136	DM15E56J0300WV1CR
A3A4C14	0121-0446	6		CAPACITOR-V TRMR-CER 4.5-20PF 160V	28480	0121-0446
A3A4C15	0160-0939	4	4	CAPACITOR-FXD 430PF +-5% 300VDC MICA	28480	0160-0939
A3A4C16	0160-2020	8	1	CAPACITOR-FXD 910PF +-5% 100VDC MICA	28480	0160-2020
A3A4C17	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A4C18	0160-0939	4		CAPACITOR-FXD 430PF +-5% 300VDC MICA	28480	0160-0939
A3A4C19	0160-2406	4	1	CAPACITOR-FXD .27UF +-10% 80VDC POLYE	28480	0160-2406
A3A4C20	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A4C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C22	0160-4768	5	4	CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A3A4C24	0160-0570	9	3	CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A3A4C27	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C28	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C29	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C30	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C31	0160-2242	6	1	CAPACITOR-FXD 2.4PF +-25PF 500VDC CER	28480	0160-2242
A3A4C32	0160-2250	6	1	CAPACITOR-FXD 5.1PF +-25PF 500VDC CER	28480	0160-2250
A3A4C33	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C34	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C35	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C36	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A4C37	0160-2264	2		CAPACITOR-FXD 20PF +-5% 500VDC CER 0+-30	28480	0160-2264
A3A4C38	0160-2264	2		CAPACITOR-FXD 20PF +-5% 500VDC CER 0+-30	28480	0160-2264
A3A4C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4C40	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A4CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A4CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A4CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A4CR4	1901-0039	8	3	DIODE-SWITCHING 50V 300MA 8NS	28480	1901-0039
A3A4CR5	1901-0039	8		DIODE-SWITCHING 50V 300MA 8NS	28480	1901-0039
A3A4CR6	1901-0039	8		DIODE-SWITCHING 50V 300MA 8NS	28480	1901-0039
2234A TO 2419A						
A3A4CR7	0122-0065	7	14	DIODE-VVC 29PF 3%	28480	0122-0065
A3A4CR8	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
2441A TO 2548A						
A3A4CR7	0122-0162	5	14	DVVC 29PF 5.0CR	28480	0122-0162
A3A4CR8	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
2549A AND ABOVE						
A3A4CR7	0122-0173	8		DIODE VVC 29PF 10% C3/C25-MIN=5 BVR-30V	28480	0122-0173
A3A4CR8	0122-0173	8		DIODE VVC 29PF 10% C3/C25-MIN=5 BVR-30V	28480	0122-0173

**Table 4-3. Replaceable Parts**

A3A4J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A4J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A4L1	9100-2251	0	10	INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A4L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A4L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A4L4	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A4L5	9100-1635	2		INDUCTOR RF-CH-MLD 91UH 5% .166DX.385LG	28480	9100-1635
A3A4L6	9100-1625	0	1	INDUCTOR RF-CH-MLD 33UH 5% .166DX.385LG	28480	9100-1625
A3A4L7	9140-0142	8	3	INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A3A4L8	08662-00076	2	2	INDUCTOR, OSC.	28480	08662-00076
A3A4L9	9100-2247	4	11	INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A4L10	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A4L11	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A4L12	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A4L13	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A4L14	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A4L15	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A4L16	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A4MP1	08662-20061	7	1	COVER, 1/2 END	28480	08662-20061
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A4MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A4MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A4Q1	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A4Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A4Q3	1854-0345	8	6	TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
	1205-0037	0	10	HEAT SINK TO-18-CS	28480	1205-0037
A3A4Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A4Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A4Q6	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
2234A TO 2927A						
A3A4Q7	1855-0235	7	3	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
2936A AND ABOVE						
A3A4Q7	1855-0235	7	3	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
P/O Q7	1205-0037	0		HEATSINK TO-18-CS	28480	1205-0037
A3A4Q8	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A4Q9	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A4Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A4Q11	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A4Q12	1853-0012	4	2	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
2234A TO 2548A						
A3A4R1	2100-2514	1	1	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	30983	ET50W203
2549A AND ABOVE						
A3A4R1	2100-2516	3	1	RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	32997	3329W-1-104
A3A4R2	0757-0424	7	1	RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A3A4R3	2100-2574	3	2	RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501

*Table 4-3. Replaceable Parts*

A3A4R4*	0757-0290	5	5	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F	
A3A4R5	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F	
A3A4R6	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F	
A3A4R7	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F	
A3A4R8	0757-0422	5	3	RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F	
A3A4R9	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F	
<i>2234A TO 2419A</i>							
A3A4R10	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F	
<i>2441A TO 2548A</i>							
A3A4R10	0698-3153	9	4	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F	
<i>2549A AND ABOVE</i>							
A3A4R10	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F	
A3A4R11	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F	
<i>2234A TO 2419A</i>							
A3A4R12	0698-3156	2	6	RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F	
A3A4R13	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F	
<i>2441A TO 2548A</i>							
A3A4R12	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F	
A3A4R13	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F	
<i>2549A AND ABOVE</i>							
A3A4R12	0698-3158	4		RESISTOR 23.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2372-F	
A3A4R13	0757-0123	3		RESISTOR 34.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3482-F	
A3A4R14	0698-3157	3	3	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F	
A3A4R15	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F	
<i>2234A TO 2419A</i>							
A3A4R16	0698-3159	5		RESISTOR 26.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2612-F	
<i>2441A TO 2548A</i>							
A3A4R16	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F	
<i>2549A AND ABOVE</i>							
A3A4R16	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F	
A3A4R17	0757-0438	3	8	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F	
A3A4R18	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F	
<i>2234A TO 2419A</i>							
A3A4R19	0698-3160	8	3	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F	
<i>2441A AND ABOVE</i>							
A3A4R19	0757-0462	3	1	RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7502-F	
A3A4R20	0698-3444	1	4	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F	
A3A4R21	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F	
A3A4R22	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F	
A3A4R23	0757-0418	9	7	RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F	
<i>2234A TO 2548A</i>							
A3A4R24	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R1-F	
A3A4R25	0698-3447	4	3	RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F	
<i>2549A TO 2615A</i>							
A3A4R24	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F	
A3A4R25	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F	
<i>2619A AND ABOVE</i>							
A3A4R24	0698-3432	7	4	RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F	
A3A4R25	0698-3444	1	4	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F	

Table 4-3. Replaceable Parts

A3A4R26	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
2234A TO 2419A						
A3A4R27	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A4R28	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
2441A to 2927A						
A3A4R27	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A3A4R28	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
2936A AND ABOVE						
A3A4R27	0757-0338	2		RESISTOR 1K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1001-F
A3A4R28	0757-0338	2		RESISTOR 1K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1001-F
A3A4R29	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A4R30	0698-3154	0	5	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A4R31	0757-0180	2	2	RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A3A4R32	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A4R33	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A4R34	0698-3432	7	4	RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F
A3A4R35	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A4R36	0698-3152	8	11	RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A3A4R37	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A4R38	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A3A4R39	0757-0420	3	11	RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A4R40	0698-3432	7		RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F
A3A4R41	0698-3442	9	3	RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A3A4R42	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A4R43	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A3A4R44	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A3A4R45	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A3A4R46	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A4R47	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A4R48	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A4R49	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A4R50	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A3A4R51	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A3A4R52	0698-3443	0	10	RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A4R53	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A4R54	0757-0294	9	4	RESISTOR 17.8 1% .125W F TC=0+-100	19701	MF4C1/8-T0-17R8-F
A3A4R55	0757-0294	9		RESISTOR 17.8 1% .125W F TC=0+-100	19701	MF4C1/8-T0-17R8-F
A3A4R56	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A4R57	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A4T1	08640-60355	0	3	TRANSFORMER, RF BLUE	28480	08640-60355
A3A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A4TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600



**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A5</b>						
A3A5	08662-60141	8	1	SUM LOOP MIXER	28480	08662-60141
A3A5C1	0160-2055	9	2	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C2	0160-3456	6	6	CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A5C3	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A3A5C4	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A5C5	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A3A5C6	0160-3455	5		CAPACITOR-FXD 470PF +-10% 1KVDC CER	28480	0160-3455
A3A5C7	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A5C8	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A5C9	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A3A5C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A5C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A5C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A5C13	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A5C14	0160-0570	9		CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A3A5C15	0140-0210	2		CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A3A5C16	0160-0134	1	1	CAPACITOR-FXD 220PF +-5% 300VDC MICA	28480	0160-0134
A3A5C17	0140-0197	4	4	CAPACITOR-FXD 180PF +-5% 300VDC MICA	72136	DM15F181J0300WV1CR
A3A5C18	0140-0196	3	1	CAPACITOR-FXD 150PF +-5% 300VDC MICA	72136	DM15F151J0300WV1CR
A3A5C19	0160-0168	1	5	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A3A5C20	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A3A5C21	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A3A5C22	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A3A5C23	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
<i>2234A TO 2416A</i>						
<i>A3A5C24-25</i>						
<i>2419A AND ABOVE</i>						
A3A5C24	0160-4803	9	2	CAPACITOR-FXD 68PF +-5% 100VDC CER 0+-30	28480	0160-4803
A3A5C25	0160-4803	9		CAPACITOR-FXD 68PF +-5% 100VDC CER 0+-30	28480	0160-4803
A3A5CR1	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A5CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A5CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A5CR4	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A5CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A5J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A5J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A5L1	9140-0096	1	1	INDUCTOR RF-CH-MLD 1UH 10% .166DX.385LG	28480	9140-0096
A3A5L2	9140-0112	2	1	INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0112
A3A5L3	9100-1612	5	2	INDUCTOR RF-CH-MLD 330NH 20%	28480	9100-1612
A3A5L4	9100-1612	5		INDUCTOR RF-CH-MLD 330NH 20%	28480	9100-1612
A3A5L5	9100-1628	3	1	INDUCTOR RF-CH-MLD 43UH 5% .166DX.385LG	28480	9100-1628
A3A5L6	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A3A5L7	9100-1621	6	1	INDUCTOR RF-CH-MLD 18UH 10% .166DX.385LG	28480	9100-1621
A3A5MP1	08662-20062	8	1	COVER- 1/2	28480	08662-20062
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A5MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A3A5MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
<i>2234A TO 2416A</i>						
<i>A3A5MP4-7</i>						
<i>2419A AND ABOVE</i>						
A3A5MP4	0360-0124	3	2	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A3A5MP5	0360-0124			CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A3A5MP6	0360-0124		2	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A3A5MP7	0360-0124			CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A5Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A5Q2	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A5R1	0698-3430	5	1	RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A3A5R2	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A3A5R3	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A3A5R4	0698-3439	4	2	RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F
A3A5R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A5R6	0698-7208	3	1	RESISTOR 68.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-68R1-F
A3A5R7	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A5R8	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A5R9	0757-0294	9		RESISTOR 17.8 1% .125W F TC=0+-100	19701	MF4C1/8-T0-17R8-F
A3A5R10	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A3A5R11	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A5R12	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
<i>2234A TO 2614A</i>						
A3A5R13	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A5R14	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
<i>2419A AND ABOVE</i>						
A3A5R13	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A5R14	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A3A5R15	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A5R16	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A5R17	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A3A5R18	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A3A5R19	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A5R20	0757-0398	4	1	RESISTOR 75 1% .125W F TC=0+-100	24546	C4-1/8-T0-75R0-F
A3A5R21	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A3A5R22	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A3A5R23	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A5R24	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A3A5R25	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A5R26	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A3A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A5U1	1826-0372	2	3	LIMITER	28480	1826-0372
<i>2234A TO 2416A</i>						
NOTE WHEN REPLACING U2 OR U3, REFER TO SECTION 7 FOR IMPORTANT UPDATE INFORMATION						
A3A5U2 †	1820-3517	1	4	IC DIVR ECL VAR-MODULO	28480	1820-3517
A3A5U3 †	1820-3517	1		IC DIVR ECL VAR-MODULO	28480	1820-3517
<i>2419A AND ABOVE</i>						
A3A5U2	1820-3517	1	4	IC DIVR ECL VAR-MODULO	28480	1820-3517
A3A5U3	1820-3517	1		IC DIVR ECL VAR-MODULO	28480	1820-3517
A3A5U4	1820-1344	8	2	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A5U5	1826-0026	3		IC COMPARTOR PRCN TO-99 PKG	01295	LM311L
A3A5U6	1820-0704	2	2	IC MV TTL MONOSTBL RETRIG	01295	SN74122N
A3A5U7	0955-0095	8	2	MIXER,SRAI	28480	0955-0095

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A6</b>						
A3A6	08662-60142	9	1	SUM LOOP PHASE DETECTOR AND PRETUNE	28480	08662-60142
A3A6C1	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A6C2	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A6C3	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A6C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A6C7	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A6C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C11	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A6C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C13	0160-3875	3	14	CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A3A6C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C15	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C19	0160-0939	4		CAPACITOR-FXD 430PF +-5% 300VDC MICA	28480	0160-0939
A3A6C20	0140-0197	4		CAPACITOR-FXD 180PF +-5% 300VDC MICA	72136	DM15F181J0300WV1CR
A3A6C21	0140-0197	4		CAPACITOR-FXD 180PF +-5% 300VDC MICA	72136	DM15F181J0300WV1CR
A3A6C22	0160-2202	8	1	CAPACITOR-FXD 75PF +-5% 300VDC MICA	28480	0160-2202
A3A6C23	0160-0939	4		CAPACITOR-FXD 430PF +-5% 300VDC MICA	28480	0160-0939
A3A6C24	0140-0197	4		CAPACITOR-FXD 180PF +-5% 300VDC MICA	72136	DM15F181J0300WV1CR
A3A6C25	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A6C26	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A3A6C27	0160-0575	4	5	CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A6C28	0160-0127	2	2	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A3A6C29	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A3A6C30	0160-3876	4	3	CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A3A6C31	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A6C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A6C33	0160-0574	3	3	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A6C34	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A6C35	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A3A6CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A6DS1	1990-0326	3		DIODE LIGHT EMTR	28480	5082-4444

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A6J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A6L1	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A6L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A6L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A6L4	9100-1636	3	1	INDUCTOR RF-CH-MLD 110UH 5% .166DX.385LG	28480	9100-1636
A3A6L5	9100-1642	1	1	INDUCTOR RF-CH-MLD 270UH 5% .2DX.45LG	28480	9100-1642
A3A6L6	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A6MP1	08662-00088	6	1	COVER-1/2 END	28480	08662-00088
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A6MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A3A6MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A3A6MP4	1205-0202	1	2	THERMAL LINK DUAL TO-18-CS	28480	1205-0202
A3A6Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q2	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q3	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q4	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q7	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q8	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q9	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A6Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A6Q11	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A6Q12	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
	1205-0011	0	4	HEAT SINK TO-5/TO-39-CS	28480	1205-0011
2234A TO 2552A A3A6Q13	1854-0475	5	2	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
2601A AND ABOVE A3A6Q13	1854-1046	8		TRANSISTOR-DUAL NPN TO-78 PD=750MW	28480	1854-1046
A3A6Q14	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A6Q15	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A6R1	0698-7235	6	8	RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R2	0698-7205	0	12	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A3A6R3	0698-7245	8	8	RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A6R4	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R5	1810-0207	9	1	NETWORK-RES 8-SIP22.0K OHM X 7	01121	208A223
A3A6R6	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R7	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A6R8	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R9	0757-0447	4	1	RESISTOR 16.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1622-F
A3A6R10	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A6R11	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R12	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A3A6R13	0698-3200	7	1	RESISTOR 8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8001-F
A3A6R14	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-T0-681R-F
A3A6R15	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R16	0698-7252	7	3	RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4641-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A6R17	0698-7234	5	1	RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-T0-825R-F
A3A6R18	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A3A6R19	0698-8547	5		RESISTOR 4K .5% .1W F TC=0+-5	28480	0698-8547
A3A6R20	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A6R21	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A6R22	0698-7252	7	1	RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4641-F
A3A6R23	0698-7799	7		RESISTOR 2K .25% .125W F TC=0+-100	19701	MF4C1/8-T0-2001-C
A3A6R24	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A6R25	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R26	0757-0470	3		RESISTOR 162K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1623-F
A3A6R27	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A6R28	0698-7235	6	1	RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-T0-909R-F
A3A6R29	0757-0463	4		RESISTOR 82.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8252-F
A3A6R30	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A3A6R31	0698-3161	9		RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F
A3A6R32	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R33	0698-3157	3	8	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A3A6R34	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R35	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R36	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A6R37	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A6R38	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A6R39	0698-7212	9	8	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A6R40	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R41	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A3A6R42	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A3A6R43	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R44	0757-0419	0	3	RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A3A6R45	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A3A6R46	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A6R47	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A3A6R48	0698-7212	9	0	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A6R49	0698-7263	0		RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1332-F
A3A6R50	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A3A6R51	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A3A6R52	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A6R53	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A6R54	0698-7256	1	1	RESISTOR 8.81K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6811-F
A3A6R55	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A3A6R56	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A3A6R57	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R58	0698-3444	1	8	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A3A6R59	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R60	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A3A6R61	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A3A6R62	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A3A6R63	0757-0420	3	8	RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A3A6R64	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A3A6R65	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A3A6R66	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A6TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A6U1	1820-3517	1		IC DIVR ECL VAR-MODULO	28480	1820-3517
A3A6U2	1820-0751	9	1	IC CNTR TTL DECD NEG-EDGE-TRIG PRESET	01295	SN74196N
A3A6U3	1820-1197	9		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A3A6U4	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A3A6U5	1820-0681	4		IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N
A3A6U6	1820-0704	2		IC MV TTL MONOSTBL RETRIG	01295	SN74122N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 4-3. Replaceable Parts

## A3A7

A3A7	08662-60140	7	1	SUM LOOP VCO ASSEMBLY	28480	08662-60140
A3A7C1	0160-3534	1	1	CAPACITOR-FXD 510PF +5% 100VDC MICA	28480	0160-3534
A3A7C2	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C3	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C4	0160-5216	0		CAPACITOR-FXD .1UF +10% 100VDC CER	28480	0160-5216
A3A7C5	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C6	0160-0574	3		CAPACITOR-FXD .022UF +20% 100VDC CER	28480	0160-0574
A3A7C7	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C8	0180-2619	3		CAPACITOR-FXD 22UF+10% 15VDC TA	25088	D22GS1B15K
A3A7C9	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C10	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C11	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C12	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C13	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C14	0160-0127	2		CAPACITOR-FXD 1UF +20% 25VDC CER	28480	0160-0127
A3A7C15	0160-2208	4	1	CAPACITOR-FXD 330PF +5% 300VDC MICA	28480	0160-2208
A3A7C16	0160-2207	3	2	CAPACITOR-FXD 300PF +5% 300VDC MICA	28480	0160-2207
A3A7C17	0160-2207	3		CAPACITOR-FXD 300PF +5% 300VDC MICA	28480	0160-2207
A3A7C18	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C19	0160-3535	2	1	CAPACITOR-FXD 560PF +5% 300VDC MICA	28480	0160-3535
A3A7C20	0160-0889	3	1	CAPACITOR-FXD .33UF +10% 80VDC POLYE	28480	0160-0889
A3A7C21	0160-4084	8		CAPACITOR-FXD .1UF +20% 50VDC CER	28480	0160-4084
A3A7C22	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C23	0160-4768	5		CAPACITOR-FXD 470PF +5% 100VDC CER	28480	0160-4768
A3A7C25	0160-0570	9		CAPACITOR-FXD 220PF +20% 100VDC CER	20932	5024EM100RD221M
A3A7C28	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C29	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C30	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C31	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C32	0160-2261	9	2	CAPACITOR-FXD 15PF +5% 500VDC CER 0+30	28480	0160-2261
A3A7C33	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C34	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C35	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C36	0160-2266	4	1	CAPACITOR-FXD 24PF +5% 500VDC CER 0+30	28480	0160-2266
A3A7C37	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C38	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A3A7C39	0160-2261	9		CAPACITOR-FXD 15PF +5% 500VDC CER 0+30	28480	0160-2261
A3A7C40	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A3A7C41	0160-2264	2		CAPACITOR-FXD 20PF +5% 500VDC CER 0+30	28480	0160-2264
A3A7CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR9	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR10	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518

**Table 4-3. Replaceable Parts**

A3A7CR11	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A7CR12	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
<i>2234A TO 2419A</i>						
A3A7CR13	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
A3A7CR14	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
<i>2441A TO 2548A</i>						
A3A7CR13	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
A3A7CR14	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
<i>2549A AND ABOVE</i>						
A3A7CR13	0122-0173	8		DIODE-VVC 29PF 10% C3/C25-MIN=5 BVR=30V	28480	0122-0173
A3A7CR14	0122-0173	8		DIODE-VVC 29PF 10% C3/C25-MIN=5 BVR=30V	28480	0122-0173
A3A7CR15	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A7CR16	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A7J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A7J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A7L1	9100-1630	7	2	INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A3A7L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A7L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A7L4	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A7L5	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A3A7L6	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A3A7L7	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A3A7L8	08662-00076	2		INDUCTOR, OSCILLATOR	28480	08662-00076
A3A7L9	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A7L10	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A7L11	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A7L12	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A7L13	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A7L14	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A7L15	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A7L16	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A7MP1	08662-00089	7	1	COVER, 1/2 END	28480	08662-00089
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A7MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A7MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A7Q1	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A7Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A3A7Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A7Q4	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A7Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
	1205-0031	4	1	THERMAL LINK TO-18-CS	28480	1205-0031
A3A7Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A7Q7	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
<i>2234A TO 2927A</i>						
A3A7Q8	1855-0235	7		TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
<i>2936A AND ABOVE</i>						
A3A7Q8	1855-0235	7		TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
P/O Q8	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A7Q9	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A7Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799



Table 4-3. Replaceable Parts

A3A7Q11	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A7Q12	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A3A7R1	0698-0084	9	12	RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A3A7R2	2100-2517	4		RESISTOR-TRMR 50K 10% C SIDE-ADJ 1-TRN	30983	ET50X503
A3A7R3	2100-2574	3		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A3A7R4	0698-0082	7	4	RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
2234A TO 2548A						
A3A7R5	0698-3151	7	4	RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
2549A AND ABOVE						
A3A7R5*	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A7R6	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A3A7R7	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A7R8	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A3A7R9	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
2234A TO 2548A						
A3A7R10	0757-0439	4		RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
2549A ANND ABOVE						
A3A7R10	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A7R11	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
2234A TO 2419A						
A3A7R12	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A3A7R13	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
2441A TO 2549A						
A3A7R12	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A3A7R13	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
2549A AND ABOVE						
A3A7R12	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A3A7R13	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A3A7R14	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
2234A TO 2419A						
A3A7R15	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
2441A TO 2548A						
A3A7R15	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
2549A AND ABOVE						
A3A7R15	0757-0123	3		RESISTOR 34.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3482-F
A3A7R16	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
2234A TO 2419A						
AND						
2549A AND ABOVE						
A3A7R17	0698-3159	5		RESISTOR 26.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2612-F
2441A TO 2548A						
A3A7R17	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A3A7R18	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A3A7R19	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
2234A TO 2419A						
A3A7R20	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
2441A TO 2548A						
A3A7R20	0757-0462	3	1	RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7502-F
2549A AND ABOVE						
A3A7R20	0757-0464	5	1	RESISTOR 90.9K 1% .125W F TC=0+-100	24546	C4-1/8-T0-9092-F

Table 4-3. Replaceable Parts

A3A7R21	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F	
A3A7R22	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F	
A3A7R23	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F	
A3A7R24	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180	
A3A7R25	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F	
A3A7R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F	
A3A7R27*	0757-0465	6	3	RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F	
<i>2234A TO 2447A</i>							
A3A7R28	0757-0428	1	3	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F	
<i>2449A TO 2927A</i>							
A3A7R28	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F	
<i>2936A AND ABOVE</i>							
A3A7R28	0757-0338	2		RESISTOR 1K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1001-F	
A3A7R29	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F	
<i>2234A TO 2447A</i>							
A3A7R30	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F	
<i>2449A TO 2927A</i>							
A3A7R30	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F	
<i>2936A AND ABOVE</i>							
A3A7R30	0757-0338	2		RESISTOR 1K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1001-F	
A3A7R31	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F	
A3A7R32	0757-0399	5	1	RESISTOR 82.5 1% .125W F TC=0+-100	24546	C4-1/8-T0-82R5-F	
A3A7R33	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F	
A3A7R34	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F	
A3A7R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F	
A3A7R36	0698-3432	7		RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F	
A3A7R37	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F	
A3A7R38	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F	
A3A7R39	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F	
A3A7R40	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F	
A3A7R41	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F	
A3A7R42	0698-3432	7		RESISTOR 26.1 1% .125W F TC=0+-100	03888	PME55-1/8-T0-26R1-F	
A3A7R43	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F	
A3A7R44	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F	
A3A7R45	0757-0405	4	1	RESISTOR 162 1% .125W F TC=0+-100	24546	C4-1/8-T0-162R-F	
A3A7R46	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F	
A3A7R47	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F	
A3A7R48	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F	
A3A7R49	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F	
A3A7R50	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F	
A3A7R51	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F	
A3A7R52	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F	
A3A7R53	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F	
A3A7R54	0757-0294	9		RESISTOR 17.8 1% .125W F TC=0+-100	19701	MF4C1/8-T0-17R8-F	
A3A7R55	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F	
A3A7R56	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F	
A3A7T1	08640-60355	0		TRANSFORMER,RF BLUE	28480	08640-60355	
A3A7TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600	
A3A7TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600	
A3A7TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600	
A3A7TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600	
A3A7TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600	
A3A7TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600	

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A8</b>						
A3A8	08662-60143	0	1	FM SL VCO	28480	08662-60143
A3A8C1	0180-2618	2	5	CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A3A8C2	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A8C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A3A8C4	0180-3701	6		CAPACITOR-FXD 2.2UF+-10% 75VDC TA	28480	0180-3701
A3A8C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A8C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A8C7	0180-3701	6		CAPACITOR-FXD 2.2UF+-10% 75VDC TA	28480	0180-3701
A3A8C8	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A3A8C9	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A8C10	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A3A8C11	0160-0194	3	1	CAPACITOR-FXD .015UF +-10% 200VDC POLYE	28480	0160-0194
A3A8C12	0160-4385	2	1	CAPACITOR-FXD 15PF +-5% 200VDC CER 0+-30	28480	0160-4385
A3A8C13	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C14	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A8C15	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A8C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C18	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C19	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A3A8C22	0160-3874	2	10	CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A8C23	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A8C24	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A8C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A8C26	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A8CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A8CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
2234A TO 2419A A3A8CR3-12	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
2441A TO 2526A A3A8CR3-12	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
2539A AND ABOVE A3A8CR3-12	0122-0173	8		DIODE-VVC 29PF 10% C3/C25-MIN=5 BVR=30V	28480	0122-0173
A3A8J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A8J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A8J3	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A8L1	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A8L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A8L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A8L4	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A8L5	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A8L6	9100-2260	1	1	INDUCTOR RF-CH-MLD 1.8UH 10% .105DX.26LG	28480	9100-2260
A3A8L7	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A3A8L9	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A3A8L10	9100-2255	4	1	INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A3A8L11	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A8L12	08662-00157	0	1	INDUCTOR OSC	28480	08662-00157
A3A8L13	9100-0346	0	4	INDUCTOR RF-CH-MLD 50NH 20% .105DX.26LG	28480	9100-0346
A3A8L14	9100-3922	4	11	COIL, 3.0 UH	28480	9100-3922
A3A8MP1	08662-00082	0	1	COVER- 1/3 END	28480	08662-00082
A3A8MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A8MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A8MP4	08662-00107	0	1	RF SHIELD	28480	08662-00107
A3A8Q1	1855-0235	7		TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
A3A8Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A8Q3	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A8Q4	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A8R1	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A8R2	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A8R3	2100-2489	9	1	RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	30983	ET50X502
A3A8R4	2100-2633	5	1	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A3A8R5	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
2234A to 2716A A3A8R6	0698-7257	2		RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
2748A and above A3A8R6	0698-7256	3		RESISTOR 311 1% .25W F TC=0+-25	28480	0698-7256
2234A TO 2526A A3A8R7	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3481-F
2533A AND ABOVE A3A8R7	0698-7247	0		RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2871-F
A3A8R8	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
2234A TO 2526A A3A8R9	0698-7235	6		RESISTOR 909 1% .05W F TC=0+-100	24546	C3-1/8-TO-909R-F
A3A8R10	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A8R11	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
2533A AND ABOVE A3A8R9	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A3A8R10	0698-7257	2	2	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
A3A8R11	0698-7271	0		RESISTOR 28.7K 1% 0.5W F TC=0+-100	24546	C3-1/8-TO-2872-F
2533A ONLY A3A8R12	0698-3453	2		RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1963-F
2553A to 2716A A3A8R12	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1623-F
2748A and above A3A8R12	0698-3455	4	1	RESISTOR 261K 1% .125W F TC=0+-100	28480	C4-1/8-T0-2613-F
A3A8R13	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A8R14	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A8R15	0757-0279	0	3	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A3A8R16	0698-7227	6	6	RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A3A8R17	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A3A8R18	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A3A8R19	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A3A8R20	0698-7251	6	2	RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A8R26	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A3A8R27	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A8R28	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A3A8R29	0698-7213	0		RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-TO-110R-F
A3A8R30	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-TO-511R-F
2234A to 2840A A3A8R31	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
2846A and above A3A8R31	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A8R32	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A8R33	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A8R34	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A8T1	08640-60355	0		TRANSFORMER, RF BLUE	28480	08640-60355
A3A8TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A8TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A8TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A8U1	1826-0372	2		IC, LIMITER	28480	1826-0372
A3A8U2	1826-0372	2		IC, LIMITER	28480	1826-0372
A3A8U3	1820-3517	1		IC DIVR ECL VAR-MODULO	28480	1820-3517

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A9</b>						
A3A9	08662-60139	4	1	FM SL MIXER ASSEMBLY	28480	08662-60139
A3A9C1	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A3A9C2	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A3A9C3	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A3A9C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9C6	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A9C7	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A3A9C8	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A9C9	0160-3872	0	1	CAPACITOR-FXD 2.2PF +-25PF 200VDC CER	28480	0160-3872
A3A9C10	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A9C11	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A9C12	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A3A9C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A9C14	0160-2253	9	1	CAPACITOR-FXD 6.8PF +-25PF 500VDC CER	28480	0160-2253
A3A9C15	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A9C16	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A3A9C17	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A9CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A3A9CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A3A9J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A9J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A9J3	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A9L1	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A9L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A9L3	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A9L4	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A3A9L5	9100-0346	0		INDUCTOR RF-CH-MLD 50NH 20% .105DX.26LG	28480	9100-0346
A3A9L6	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A3A9L7	9100-0346	0		INDUCTOR RF-CH-MLD 50NH 20% .105DX.26LG	28480	9100-0346
A3A9L8	9100-0346	0		INDUCTOR RF-CH-MLD 50NH 20% .105DX.26LG	28480	9100-0346
A3A9L9	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A3A9L10	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A3A9MP1	08662-00113	8	1	COVER, EXTRUSION 1/3C	28480	08662-00113
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A9MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A9MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A9MP4	1205-0202	1		THERMAL LINK DUAL TO-18-CS	28480	1205-0202
<i>2234A TO 2552A</i>						
A3A9Q1	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
<i>2601A AND ABOVE</i>						
A3A9Q1	1854-1046	8		TRANSISTOR-DUAL NPN TO-78 PD=750MW	28480	1854-1046

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A9Q2	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A9Q3	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A9Q4	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A9Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A9Q6	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A9Q7	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A3A9R1	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A9R3	0698-7223	2	9	RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
<i>2234A TO 2526A</i>						
A3A9R4	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A9R5	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A9R6	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
<i>2533A AND ABOVE</i>						
A3A9R4	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A3A9R5	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3481-F
A3A9R6	0698-7236	6		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A9R7	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A9R8	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A9R9	0698-7194	6	4	RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A3A9R10	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A9R11	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A9R12	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A3A9R13	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
<i>2234A TO 2526A</i>						
A3A9R14*	0698-7215	2	1	RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-TO-133R-F
<i>2533A AND ABOVE</i>						
A3A9R14*	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A3A9R15	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A9R16	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A3A9R17	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A9R18	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A9R19	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A3A9R20	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A9R21	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A3A9R22	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A3A9R23	0698-7242	5	2	RESISTOR 1.78K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1781-F
A3A9R24	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A9R25	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A3A9R26	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A9R27	0698-7277	6	2	RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5112-F
A3A9R28	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A9R29	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5112-F
A3A9R30	0698-7254	9	1	RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5621-F
A3A9R31	0698-7261	8	3	RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1102-F
<i>2234A TO 2526A</i>						
A3A9R32	0698-7209	4		RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-TO-75R0-F
A3A9R33	0698-7217	4	2	RESISTOR 162 1% .05W F TC=0+-100	24546	C3-1/8-TO-162R-F
<i>2419A AND ABOVE</i>						
A3A9R32	0698-7211	8		RESISTOR 90.9 1% .05W F TC=0+-100	24546	C3-1/8-TO-90R9-F
A3A9R33	0698-7209	4		RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-75R0-F
A3A9R34	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A9R35	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A3A9TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A9U1	0955-0096	9	1	MIXER SRAI	28480	0955-0096

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A10</b>						
A3A10	08662-60145	2	1	FM SUM LOOP PHASE DETECTOR	28480	08662-60145
A3A10C1	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A3A10C2	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A3A10C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C6	0160-2204	0	1	CAPACITOR-FXD 100PF +-5% 300VDC MICA	28480	0160-2204
A3A10C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C8	0140-0190	7	1	CAPACITOR-FXD 39PF +-5% 300VDC MICA	72136	DM15E390J0300WV1CR
A3A10C9	0160-4926	7	1	CAPACITOR-FXD 110PF +-5% 200VDC CER	28480	0160-4926
A3A10C10	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A10C11	0160-2306	3		CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2306
A3A10C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C14	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A3A10C15	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A10C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C19	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C20	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A3A10C21	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A3A10C22	0160-2307	4	1	CAPACITOR-FXD 47PF +-5% 300VDC MICA	28480	0160-2307
A3A10C23	0160-4389	6	2	CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A3A10C24	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A3A10DS1	1990-0326	3		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444
A3A10J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A3A10L1	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A10L2	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A10L3	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A10L4	9140-0141	7	3	INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A3A10L5	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A10L6	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A3A10L7	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A3A10L8	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A3A10L9	9100-0368	6	1	INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A3A10L10	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A3A10MP1	08662-00083	1	1	COVER- 1/3 END	28480	08662-00083
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A3A10MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A10MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A3A10Q1	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A10Q2	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A3A10Q3	1854-0345	8		TRANSISTOR NPN 2N5179 SI TO-72 PD=200MW	04713	2N5179
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A3A10Q4	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A3A10Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).



**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A3A10R1*	0698-7206	1	2	RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A3A10R2	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A10R3	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A3A10R4	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A3A10R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A10R6	0698-7247	0		RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2871-F
A3A10R7	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A3A10R8	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A10R9	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-TO-10R0-F
A3A10R10	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A3A10R11	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A3A10R12	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A3A10R13	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A3A10R14	0698-7247	0		RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2871-F
A3A10R15	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A3A10R16	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A10R17	0683-0275	9	1	RESISTOR 2.7 5% .25W FC TC=-400/+500	01121	CB27G5
A3A10R18	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A3A10R19	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A10R20	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A3A10R21	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A3A10R22	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A3A10R23	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A3A10R24	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A10R25	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A10R26	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A3A10R27	0698-7246	9	1	RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2611-F
A3A10R28	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A10R29	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A10R30	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A10R31	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A10R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A3A10R33	0698-7241	4	1	RESISTOR 1.62K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1621-F
A3A10R34	0698-7230	1	1	RESISTOR 562 1% .05W F TC=0+-100	24546	C3-1/8-TO-562R-F
A3A10R35	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A10R36	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A10R37	0698-7261	8		RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1102-F
A3A10R38	0698-7261	8		RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1102-F
A3A10R39	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A3A10R40	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A3A10R41	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-TO-750R-F
A3A10R42	0698-7250	5	1	RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3831-F
A3A10R43	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A3A10TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A10TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A10U1	1820-1344	8		IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A3A10U2	0955-0095	8		MIXER SRAI	28480	0955-0095
A3A10U3	1826-0191	3		IC COMPARATOR GP DUAL TO-100 PKG	27014	LM319H
A3A10U4	1820-0803	2		IC GATE ECL OR-NOR TPL	04713	MC10105P

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A3A11</b>						
A3A11	08663-60315	9	1	LF LOOP MOTHER BOARD	28480	08663-60315
A3A11J1	1250-0835	1	3	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A3A11J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A3A11J3	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A3A11J4	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A3A11TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A3A11XA3A3	1251-2026	8		CONNECTOR-PC EDGE 18-CONT/ROW 2-ROWS	28480	1251-2026
A3A11XA3A4	1251-1633	1	3	CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A3A11XA3A5	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A3A11XA3A6	1251-2035	9	1	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A3A11XA3A7	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A3A11XA3A8	1251-1631	9	1	CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631
A3A11XA3A9	1251-2034	8	2	CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	28480	1251-2034
A3A11XA3A10	1251-2034	8		CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	28480	1251-2034

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A1</b>						
A4A1	08663-60302	4	1	ALC ASSEMBLY	28480	08663-60302
A4A1C1	0180-0089	7	1	CAPACITOR-FXD 10UF+50-10% 150VDC AL	56289	30D106F150DD2
A4A1C2	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A4A1C3	0180-0491	5	1	CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A4A1C4	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A4A1C5	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A4A1C6	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C7	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C8	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C9	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C10	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C11	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A4A1C12	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C13	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C14	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A4A1C15	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C16	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C17	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C18	0160-4768	5		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A4A1C19	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C20	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C21	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A1C22	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C23	0160-4103	2	2	CAPACITOR-FXD 220PF +-5% 100VDC CER	72982	8121-M100-COG-221J
A4A1C24	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C25	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C26	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C27	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C28	0180-2661	5	1	CAPACITOR-FXD 1UF+-10% 50VDC TA	25088	D1R0GS1A50K
A4A1C29	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C30	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C31	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A1C32	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C33	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C34	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C35	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C36	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A4A1C37	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C38	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C39	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A1C40	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A1C41	0160-2246	0	2	CAPACITOR-FXD 3.6PF +-25PF 500VDC CER	28480	0160-2246
A4A1C42	0160-2246	0		CAPACITOR-FXD 3.6PF +-25PF 500VDC CER	28480	0160-2246
A4A1C43	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C44	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C45	0160-4103	2		CAPACITOR-FXD 220PF +-5% 100VDC CER	72982	8121-M100-COG-221J

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A1C46	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C47	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C48	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C49	0160-3400	0	2	CAPACITOR-FXD .01UF +-5% 200VDC	28480	0160-3400
A4A1C50	0160-4243	1	2	CAPACITOR-FXD .022UF +-10% 50VDC	27556	BA4775K
A4A1C51	0160-3501	2	1	CAPACITOR-FXD 4UF +-10% 50VDC MET-POLYC	28480	0160-3501
A4A1C52	0160-3400	0		CAPACITOR-FXD .01UF +-5% 200VDC	28480	0160-3400
A4A1C53	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C54	0160-4243	1		CAPACITOR-FXD .022UF +-10% 50VDC	27556	BA4775K
A4A1C55	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C56	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A1C57	0160-4031	5	2	CAPACITOR-FXD 330PF +-5% 100VDC CER	28480	0160-4031
A4A1C58	0160-4768	5		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A4A1C59	0160-4031	5		CAPACITOR-FXD 330PF +-5% 100VDC CER	28480	0160-4031
A4A1CR1	1901-0539	3	4	DIODE-SM SIG SCHOTTKY	28480	1901-0539
A4A1CR2	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A4A1CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR9	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A4A1CR10	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A4A1CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR19	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR20	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR21	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR23	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR24	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1CR25	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A1DS1	1902-0326	8	1	DIODE-ZNR 8.87V 5% PD=1.5W	28480	1902-0326
A4A1J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A4A1L1	9100-4078	3	4	INDUCTOR 650H 54%	28480	9100-4078
A4A1L2	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A4A1L3	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A4A1L4	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A4A1L5	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A1L6	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A1MP1	08663-00050 2360-0113	3 2	1	COVER AGC SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	28480 00000	08663-00050 ORDER BY DESCRIPTION
A4A1Q1	1855-0414	4	5	TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393
A4A1Q2	1853-0459	3	5	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A1Q3	1854-0637	1	5	TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A4A1Q4	1854-0637	1		TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A4A1Q5	1854-0637	1		TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A4A1Q6	1855-0414	4		TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393
A4A1Q7	1855-0414	4		TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393
A4A1Q8	1855-0414	4		TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393
A4A1Q9	1854-0811	3	6	TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
A4A1Q10	1854-0811	3		TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
	9170-0847	3	1	CORE-SHIELDING BEAD	02114	56-590-65/3B PARYLENE COATED
2234A TO 2546A A4A1Q11	1853-0316	1	2	TRANSISTOR-DUAL PNP PD=500MW	28480	1853-0316
2548A AND ABOVE A4A1Q11	1853-0594	7		TRANSISTOR-DUAL PNP 2N3808 TO-78	04713	2N3808
A4A1Q12	1854-0811	3		TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
A4A1Q13	1854-0811	3		TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
2234A TO 2546A A4A1Q14	1853-0316	1		TRANSISTOR-DUAL PNP PD=500MW	28480	1853-0316
2548A AND ABOVE A4A1Q14	1853-0594	7		TRANSISTOR-DUAL PNP 2N3808 TO-78	04713	2N3808
A4A1Q15	1855-0414	4		TRANSISTOR J-FET 2N4393 N-CHAN D-MODE	04713	2N4393
A4A1Q16	1854-0811	3		TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
A4A1Q17	1854-0637	1		TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
A4A1Q18	1854-0811	3		TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
A4A1Q19	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
	0340-0834	0	1	INSULATOR-XSTR POLYI	28480	0340-0834
	1205-0095	0	1	HEAT SINK SGL TO-5/TO-39-CS	30161	3225B
A4A1Q20	1853-0405	9	1	TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A4A1R1	0698-7252	7		RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4641-F
A4A1R2	0698-7228	7	1	RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-T0-464R-F
A4A1R3	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A1R4	2100-3056	8	2	RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A4A1R5	0757-0818	3	1	RESISTOR 825 1% .5W F TC=0+-100	28480	0757-0818
A4A1R6	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A4A1R7	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A4A1R8	2100-3056	8		RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A4A1R9	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A1R10	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R11	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R12	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A1R13	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R14	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A1R15	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R16	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R17	0757-0732	0	1	RESISTOR 909 1% .25W F TC=0+-100	24546	C5-1/4-T0-909R-F
A4A1R18	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A4A1R19	2100-3103	6	3	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A4A1R20	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A4A1R21	0757-0417	8	1	RESISTOR 562 1% .125W F TC=0+-100	24546	C4-1/8-T0-562R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A1R22	2100-3207	1	2	RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	28480	2100-3207
A4A1R23	2100-3353	8	2	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A4A1R24	2100-3207	1		RESISTOR-TRMR 5K 10% C SIDE-ADJ 1-TRN	28480	2100-3207
A4A1R25	2100-3352	7	1	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	28480	2100-3352
A4A1R26	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A4A1R27	0757-1094	9	1	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A4A1R28	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A4A1R29	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A1R30	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A1R31	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A4A1R32	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A4A1R33	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A4A1R34	2100-3109	2	1	RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A4A1R35	0698-0085	0	1	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A4A1R36	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A4A1R37	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A1R38	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A4A1R39	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A4A1R40	0698-7259	4	2	RESISTOR 9.09K 1% .05W F TC=0+-100	24546	C3-1/8-T0-9091-F
A4A1R41	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3162-F
A4A1R42	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A1R43	0698-7259	4		RESISTOR 9.09K 1% .05W F TC=0+-100	24546	C3-1/8-T0-9091-F
A4A1R44	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R45	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R46	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A1R47	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A1R48	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A4A1R49	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A1R50	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A1R51	0698-3453	2	1	RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1963-F
A4A1R52	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R53	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R54	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A1R55	0698-7267	4	1	RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A4A1R56	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A4A1R57	0764-0013	5	1	RESISTOR 56 5% 2W MO TC=0+-200	28480	0764-0013
A4A1R58	0757-0198	2	1	RESISTOR 100 1% .5W F TC=0+-100	28480	0757-0198
A4A1R59	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A4A1R60	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A4A1R61	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A4A1R62	0698-7281	2	1	RESISTOR 75K 2% .05W F TC=0+-100	24546	C3-1/8-T0-7502-G
A4A1R63	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A4A1R64	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R65	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A4A1R66	0698-7231	2	1	RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/8-T0-619R-F
A4A1R67	0698-3454	3	3	RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2153-F
A4A1R68	0698-3454	3		RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2153-F
A4A1R69	0698-3454	3		RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2153-F
A4A1R70	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A4A1R71	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A1R72	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A4A1R73	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1211-F
A4A1R74	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2371-F
A4A1R75	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A4A1R76	0698-7217	4		RESISTOR 162 1% .05W F TC=0+-100	24546	C3-1/8-TO-162R-F
A4A1R77	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
A4A1R78	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A1R79	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1211-F
A4A1R80	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A4A1R81	0698-7239	0	2	RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1331-F
A4A1R82	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A4A1R83	0698-7242	5		RESISTOR 1.78K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1781-F
A4A1R84	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A4A1R85	0757-0440	7	3	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A4A1R86	0698-4645	6	4	RESISTOR 4.22K 1% .25W F TC=0+-100	24546	C5-1/4-TO-4221-F
A4A1R87	0698-4645	6		RESISTOR 4.22K 1% .25W F TC=0+-100	24546	C5-1/4-TO-4221-F
A4A1R88	0698-0086	1	2	RESISTOR 2.87K 1% .25W F TC=0+-100	24546	C5-1/4-TO-2871-F
A4A1R89	0698-0086	1		RESISTOR 2.87K 1% .25W F TC=0+-100	24546	C5-1/4-TO-2871-F
A4A1R90	0698-4645	6		RESISTOR 4.22K 1% .25W F TC=0+-100	24546	C5-1/4-TO-4221-F
A4A1R91	0698-4645	6		RESISTOR 4.22K 1% .25W F TC=0+-100	24546	C5-1/4-TO-4221-F
A4A1R92	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A4A1R93	0757-0833	2	2	RESISTOR 5.11K 1% .5W F TC=0+-100	28480	0757-0833
A4A1R94	0757-0833	2		RESISTOR 5.11K 1% .5W F TC=0+-100	28480	0757-0833
A4A1R95	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A1R96	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A4A1R97	0698-8827	4	4	RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4A1R98	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4A1R99	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4A1R100	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A4A1R101	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A4A1R102	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A4A1R103	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A4A1R104	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A4A1R105	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A4A1R106	2100-3181	6	2	RESISTOR-TRMR 20K 10% C SIDE-ADJ 17-TRN	02111	43P203
A4A1R107	2100-3181	6		RESISTOR-TRMR 20K 10% C SIDE-ADJ 17-TRN	02111	43P203
A4A1R108	0698-7280	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A1R109	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A4A1R110	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A4A1R111	0757-0338	2	1	RESISTOR 1K 1% .25W F TC=0+-100	24546	C5-1/4-TO-1001-F
A4A1R112	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A4A1R113	0698-7239	0		RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1331-F
A4A1R114	0757-0397	3		RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A4A1R115	1810-0316	1	1	NETWORK-RES 16-DIP10.0K OHM X 8	01121	316B103
A4A1R116	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A4A1R117	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A4A1R118	0698-3446	3	2	RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A4A1R119	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A4A1R120	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A4A1R121	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A1R122	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A1S1	3101-2126	4	1	SWITCH-SL 5-SPDT DIP-SLIDE-ASSY .1A	28480	3101-2126
A4A1TP22	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A1U1	1826-0358	4	2	IC OP AMP LOW-BIAS-H-IMPDP TO-99 PKG	27014	LF256H, SEL NOISE
	1205-0011	0		HEAT SINK TO-5/TO-39-CS	28480	1205-0011
A4A1U2	1826-0783	9	1	IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A4A1U3	1826-0850	1	4	IC SWITCH ANLG QUAD 16-DIP-P PKG	17856	DG211CJ
A4A1U5	1820-1202	7		IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A4A1U6	1826-0358	4		IC OP AMP LOW-BIAS-H-IMPDP TO-99 PKG	27014	LF256H, SEL NOISE
	1205-0011	0		HEAT SINK TO-5/TO-39-CS	28480	1205-0011
A4A1U7	1826-0347	1	1	IC COMPARATOR GP QUAD 14-DIP-P PKG	28480	1826-0347
A4A1U8	1826-0850	1		IC SWITCH ANLG QUAD 16-DIP-P PKG	17856	DG211CJ
A4A1U9	1826-0889	6	2	IC OP AMP LOW-NOISE DUAL 14-DIP-C PKG	52063	XR5533AN(PER HP DWG)
A4A1U10	1820-1416	5	1	IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A4A1U11	1820-0681	4		IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N
A4A1U12	1820-1211	8	1	IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
A4A1U13	1826-0921	7		D/A 10-BIT 16-CBRZ/SDR CMOS	28480	1826-0921
A4A1U14	1826-0889	6		IC OP AMP LOW-NOISE DUAL 14-DIP-C PKG	52063	XR5533AN(PER HP DWG)
A4A1U15	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A4A1U16	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A4A1U17	1826-0850	1		IC SWITCH ANLG QUAD 16-DIP-P PKG	17856	DG211CJ
A4A1U18	1826-0850	1		IC SWITCH ANLG QUAD 16-DIP-P PKG	17856	DG211CJ
A4A1U19	1826-0412	1	1	IC COMPARATOR PRON DUAL 8-DIP-P PKG	27014	LM393N
A4A1VR1	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	24046	1N827
A4A1VR2	1902-0951	5	4	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951
A4A1VR3	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A4A1VR4	1902-0950	4	1	DIODE-ZNR 4.7V 5% DO-35 PD=.4W TC=+.025%	28480	1902-0950

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\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<p><b>A4A2</b></p> <p>NOTE The A4A2 Assembly and its sub-assemblies are not recommended for field repair.</p>						
2234A TO 2245A A4A2 † 2248A AND ABOVE A4A2	08663-60316	0	2	DOUBLER #2 ASSEMBLY	28480	08663-60316
	08663-60351	3	1	DOUBLER #2 ASSEMBLY	28480	08663-60351
A4A2	08663-60100	0		DOUBLER #2 ASSEMBLY (RESTORED)	28480	08663-60100
A4A2C1	0160-4387	4	15	CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C2	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C3	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C4	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C5	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C6	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C7	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A4A2C8	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C9	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C10	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C11	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C12	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C13	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C14	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C15	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C16	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A4A2C17	0180-0116	1	3	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A4A2C18	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4A2C19	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A4A2C20	0160-4801	7	1	CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A4A2C21	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A4A2C22	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A4A2C23	0180-1745	4	3	CAPACITOR-FXD 1.5UF+-10% 20VDC TA	56289	150D155X9020A2
A4A2C24	0180-1745	4		CAPACITOR-FXD 1.5UF+-10% 20VDC TA	56289	150D155X9020A2
A4A2C25	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A4A2C26	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A4A2C27	0180-1745	4		CAPACITOR-FXD 1.5UF+-10% 20VDC TA	56289	150D155X9020A2
A4A2C28	0180-0553	0	1	CAPACITOR-FXD 22UF+-20% 25VDC TA	28480	0180-0553
A4A2C29	0160-4814	2	1	CAPACITOR-FXD 150PF +-5% 100VDC CER	28480	0160-4814
A4A2CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A2CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A2CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A2CR4	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A4A2L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2L6	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2L7	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A2MP1	08663-00047	8	1	CVR FULL *2 DBLR	28480	08663-00047
	08663-00064	9	1	GSKT FL *2 DBLR	28480	08663-00064
	2200-0105	4	1	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4A2MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A4A2MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A4A2MP4	08662-20285	7	1	CONTACT-FINGER	28480	08662-20285
A4A2Q2	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A2Q3	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A4A2Q4	1854-0637	1		TRANSISTOR NPN 2N2219A SI TO-5 PD=800MW	01295	2N2219A
	1200-0173	5	1	INSULATOR-XSTR DAP-GL	28480	1200-0173
	1205-0011	0		HEAT SINK TO-5/TO-39-CS	28480	1205-0011
A4A2Q5	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A2Q6	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A2R1	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R2	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R3	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R4	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R5	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R6	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R7	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R8	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R9	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A4A2R10	0757-0288	1	1	RESISTOR 9.09K 1% .125W F TC=0+-100	19701	MF4C1/8-TO-9091-F
A4A2R11	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A4A2R12	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-TO-6191-F
A4A2R13	2100-3273	1	1	RESISTOR-TRMR 2K 10% C SIDE-ADJ 1-TRN	28480	2100-3273
A4A2R14	0757-0444	1	1	RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1212-F
A4A2R15	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-TO-511R-F
A4A2R16	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A4A2R17	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A4A2R19	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-TO-7501-F
A4A2R20	0698-3398	4	2	RESISTOR 46.4 1% .5W F TC=0+-100	28480	0698-3398
A4A2R21	0698-0024	7	1	RESISTOR 2.61K 1% .5W F TC=0+-100	28480	0698-0024
A4A2R22	0698-3398	4		RESISTOR 46.4 1% .5W F TC=0+-100	28480	0698-3398
A4A2R23	0757-0159	5	1	RESISTOR 1K 1% .5W F TC=0+-100	28480	0757-0159
A4A2R24	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-TO-511R-F
A4A2R25	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-TO-751-F
2234A to 2837A A4A2R26	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
2840A and above A4A2R26	2100-3161	6	1	RESISTOR-TRMR 20K 10% C SIDE-ADJ 17-TRN	02111	43P203
A4A2R27	2100-3103	6		RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
2234A to 2837A A4A2R28	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3831-F
2840A and above A4A2R28	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C-1/8-TO-1332-F
A4A2R29	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3831-F
A4A2R30	2100-3162	7	2	RESISTOR-TRMR 200K 10% C SIDE-ADJ 17-TRN	02111	43P204
A4A2R31	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A4A2R32	2100-3162	7		RESISTOR-TRMR 200K 10% C SIDE-ADJ 17-TRN	02111	43P204
2234A to 2837A A4A2R33	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
2840A and above A4A2R33	0698-3450	9	1	RESISTOR 42.2K 1% .125W F TC=0+-100	24546	C4-1/8-TO-4222-F
A4A2R34	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A4A2R35	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-TO-825R-F
A4A2R36	2100-3352	7	2	RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	28480	2100-3232
A4A2R37	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A to 2837A A4A2R38	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
2840A and above A4A2R38	0698-3136	8	1	RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A4A2R39	0698-8812	7	3	RESISTOR 1 1% .125W F TC=0+-100	28480	0698-8812
A4A2R40	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A4A2R41	0698-8812	7		RESISTOR 1 1% .125W F TC=0+-100	28480	0698-8812
A4A2R42	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A4A2R43	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A4A2R44	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A4A2R45	0757-0289	2	1	RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
A4A2R46	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A4A2R47	2100-3352	7		RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	28480	2100-3232
A4A2R48	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A4A2R49	0698-8812	7		RESISTOR 1 1% .125W F TC=0+-100	28480	0698-8812
A4A2R50	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A4A2R51	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A4A2R52	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A4A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP7				NOT ASSIGNED		
A4A2TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A2U1			1	NOT ASSIGNED		
A4A2U2	1826-0785	1		IC OP AMP LOW-BIAS-H-IMP DUAL 8-DIP-C	01295	TL072ACJG
A4A2U3				NOT FIELD REPLACEABLE		
A4A2U4	1816-1008	2	1	IC TTL S 4096 (4K) PROM 75-NS 3-S	01295	TBP28S42J
A4A2U5	1200-0639	8	1	SOCKET-IC 20-CONT DIP DIP-SLDR	28480	1200-0639
A4A2U5	1826-0921	7		D/A 10-BIT 16-CBRZ/SDR CMOS	28480	1826-0921
A4A2U6	1820-0471	0	1	IC INV TTL HEX 1-INP	01295	SN7406N
A4A2U7	1826-0753	3		IC OP AMP LOW-BIAS-H-IMP QUAD 14-DIP-C	04713	MC34004BL
A4A2VR1	1902-0961	7	1	DIODE-ZNR 13V 5% DO-35 PD=.4W TC=+.082%	28480	1902-0961
A4A2VR2	1902-0962	8	1	DIODE-ZNR 15V 5% DO-35 PD=.4W TC=+.087%	28480	1902-0962
A4A2VR3	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951
A4A2VR4	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951
A4A2VR5	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951
A4A2VR6	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	28480	1902-0960
A4A2W1	08663-20033	4	1	CBL AY "I"	28480	08663-20033

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A2A1</b>				NOTE <i>The A4A2 Assembly and its sub-assemblies are not recommended for field repair.</i>		
A4A2A1	08663-60034	9	1	INTERNAL DOUBLER ASSEMBLY	28480	08663-60034
A4A2A1A1	08663-60317	1	1	INTERNAL DOUBLER BOARD ASSEMBLY	28480	08663-60317
A4A2A1C1	0160-4306	7	2	CAPACITOR-FXD 100PF +-10% 100VDC CER	51959	0805C101K3P
A4A2A1C2	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A4A2A1C3	0121-0448	8	1	CAPACITOR-V TRMR-CER 2.5-5PF 63V PC-MTG	28480	0121-0448
A4A2A1C4	0160-4303	4	1	CAPACITOR-FXD .027UF +-10% 50VDC CER	26654	3BX50S273K
A4A2A1C5	0160-4306	7		CAPACITOR-FXD 100PF +-10% 100VDC CER	51959	0805C101K3P
A4A2A1C6	0160-4226	0	1	CAPACITOR-FXD 2.2PF +--.25PF 100VDC CER	26654	2BN100S2R2C(D)
A4A2A1CR1	1901-1096	9	4	DIODE-PIN	28480	1901-1096
A4A2A1CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A2A1CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A2A1CR4	1906-0244	7	1	DIODE-FW BRDG 2V	17540	D5848
A4A2A1CR5	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A2A1E1	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A2A1E2	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A2A1E3	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A2A1E4	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A2A1E5	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A2A1E6	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A2A1FL1	9135-0002	8	3	FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A2A1FL2	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A2A1FL3	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A2A1J1	1250-0829	3	1	CONNECTOR-RF SMC M SGL-HOLE-FR 50-OHM	28480	1250-0829
A4A2A1J2	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A4A2A1J3	1250-1157	2	2	CONNECTOR-RF SMA FEM THD-HOLE 50-OHM	28480	1250-1157
A4A2A1J3	1250-1157	2		CONNECTOR-RF SMA FEM THD-HOLE 50-OHM	28480	1250-1157
A4A2A1L1	8151-0013	4	1	WIRE 22AWG 1X22	28480	8151-0013
A4A2A1L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2A1L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2A1L4	8180-2136	7	1	WIRE-MAG RND 36-AWG 130C CU	28480	8180-2136
A4A2A1L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A2A1MP1	08663-20020	9	1	HSG-INT DBLR	28480	08663-20020
A4A2A1MP1	2200-0101	0	1	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4A2A1MP1	2200-0165	6	2	ATTACH BOARD TO HOUSING SCREW-MACH 4-40 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A4A2A1MP2	08663-20021	0	1	CVR-INT DBLR	28480	08663-20021
A4A2A1MP2	2200-0165	6		SCREW-MACH 4-40 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A4A2A1Q1	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A2A1R1	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A2A1R2	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A4A2A1R3	0699-0180	8		RESISTOR 150 5% .1W C TC=0+-200	26654	3C151J
A4A2A1R4*	0699-0180	8	2	RESISTOR 150 5% .1W C TC=0+-200	26654	3C151J
A4A2A1R5*	0699-0179	5	1	RESISTOR 37.3 5% .1W C TC=0+-200	28480	0699-0179
A4A2A1R6	0699-0184	2	2	RESISTOR 870 5% .1W C TC=0+-200	28480	0699-0184
A4A2A1R7	0699-0157	9	1	RESISTOR 12 5% .1W C TC=0+-200	28654	3C120J
A4A2A1R8	0699-0184	2		RESISTOR 870 5% .1W C TC=0+-200	28480	0699-0184
A4A2A1U1	08663-67003	6	1	AMP-MICROWAVE	28480	08663-67003
A4A2A1U1	0520-0127	6	1	SCREW-MACH 2-56 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4A2A1W1	8120-1371	4	1	CABLE-COAX 50.2-OHM 29PF/FT	28480	8120-1371

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A3</b>						
2234A TO 2449A						
A4A3 †	08663-60346	6	1	DISTRIBUTOR ASSY (STANDARD & OPTION 001)	28480	08663-60346
A4A3 †	08663-60304	6	1	DISTRIBUTOR ASSEMBLY (OPTION 002 ONLY)	28480	08663-60304
2451A AND ABOVE						
A4A3	08663-60362	6	1	DISTRIBUTOR ASSY (STANDARD & OPTION 001)	28480	08663-60362
A4A3	08663-60361	5	1	DISTRIBUTOR ASSY (OPTION 002 ONLY)	28480	08663-60361
A4A3C1	0180-2619	3	1	CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A4A3C2	0180-2618	2	2	CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A4A3C3	0160-3874	2	9	CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A3C4	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
2234A TO 2449A						
A4A3C5	0180-2208	6	1	CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
2451A AND ABOVE						
A4A3C5	0180-2506	7	1	CAPACITOR-FXD 470UF+50-10% 25VDC AL	28480	0180-2506
A4A3C6	0160-3877	5	3	CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A4A3C7	0160-3879	7	2	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
2234A TO 2449A						
A4A3C8	0160-3878	6	9	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
2451A AND ABOVE						
A4A3C8	0160-0571	0	26	CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C9	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C10	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C11	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C12	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A3C13	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A3C14	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
2234A TO 2449A						
A4A3C15	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
2451A AND ABOVE						
A4A3C15	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C16	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A3C17	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C18	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C19	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C20	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A4A3C21	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C22	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A4A3C23	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C24	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C25	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C26	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C27	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C28	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A3C29	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A4A3C30	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C31	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C32	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C33	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C34	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A3C35	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A3C36	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A3C37	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A3C38	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A3C39	0180-2617	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A4A3C40	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A3C41	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A4A3C42	0121-0449	9	2	CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A3C43	0121-0061	1	2	CAPACITOR-V TRMR-CER 5.5-18PF 350V	52763	304322 5.5/18PF NPO
A4A3C44	0160-4519	4	2	CAPACITOR-FXD 9.1PF +/-5PF 200VDC CER	28480	0160-4519
A4A3C45	0160-4767	4	2	CAPACITOR-FXD 20PF +/-5% 200VDC CER 0+-30	28480	0160-4767
A4A3C46	0160-4519	4	4	CAPACITOR-FXD 9.1PF +/-5PF 200VDC CER	28480	0160-4519
A4A3C47	0160-4767	4	4	CAPACITOR-FXD 20PF +/-5% 200VDC CER 0+-30	28480	0160-4767
A4A3C48	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A4A3C49	0121-0061	1		CAPACITOR-V TRMR-CER 5.5-18PF 350V	52763	304322 5.5/18PF NPO
A4A3C50	0160-0571	0		CAPACITOR-FXD 470PF +/-20% 100VDC CER	28480	0160-0571
A4A3C51	0160-3878	6		CAPACITOR-FXD 1000PF +/-20% 100VDC CER	28480	0160-3878
A4A3C52	0160-0571	0		CAPACITOR-FXD 470PF +/-20% 100VDC CER	28480	0160-0571
A4A3C53	0160-0571	0		CAPACITOR-FXD 470PF +/-20% 100VDC CER	28480	0160-0571
A4A3C54	0160-3874	2		CAPACITOR-FXD 10PF +/-5PF 200VDC CER	28480	0160-3874
A4A3C55	0160-0576	5	1	CAPACITOR-FXD .1UF +/-20% 50VDC CER	28480	0160-0576
A4A3C56	0160-0571	0		CAPACITOR-FXD 470PF +/-20% 100VDC CER	28480	0160-0571
A4A3C57	0180-0197	8	1	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A4A3C58	0160-3878	6		CAPACITOR-FXD 1000PF +/-20% 100VDC CER	28480	0160-3878
A4A3C59	0180-0116	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A4A3C60	0160-0571	0		CAPACITOR-FXD 470PF +/-20% 100VDC CER	28480	0160-0571
A4A3C61	0160-0571	0		CAPACITOR-FXD 470PF +/-20% 100VDC CER	28480	0160-0571
A4A3C62	0160-4389	6	3	CAPACITOR-FXD 100PF +/-5PF 200VDC CER	28480	0160-4389
A4A3C63	0160-4389	6		CAPACITOR-FXD 100PF +/-5PF 200VDC CER	28480	0160-4389
A4A3C64	0160-3874	2		CAPACITOR-FXD 10PF +/-5PF 200VDC CER	28480	0160-3874
2234A TO 2350A A4A3C65				NOT ASSIGNED		
2401A TO 2449A A4A3C65	0160-4389	6		CAPACITOR-FXD 100PF +/-5PF 200VDC CER	28480	0160-4389
2451A AND ABOVE A4A3C65	0160-3874	2		CAPACITOR-FXD 10PF +/-5PF 200VDC CER	28480	0160-3874
A4A3CR1	1901-1096	9	12	DIODE-PIN	28480	1901-1096
A4A3CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR4	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR5	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR6	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR7	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR8	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR9	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR10	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR11	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3CR12	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A3E1	9170-0029	3	10	CORE-SHIELDING BEAD	28480	9170-0029
A4A3E2	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E3	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E4	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E5	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E6	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E7	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E8	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E9	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3E10	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A3J1	1250-1220	0	4	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4	4	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9	4	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A4A3J2	1250-1220	0	4	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4	4	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9	4	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A3J3	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A4A3J4	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A4A3L1	9100-3922	4	28	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L4	08662-60316	9	1		28480	08662-60316
A4A3L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L6	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L7	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L8	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L9	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
2234A TO 2449A A4A3L10	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
2451A AND ABOVE A4A3L10	9100-1637	4	1	INDUCTOR RF-CH-MLD 120UH 5% .166DX.385LG	28480	9100-1637
A4A3L11	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L12	9135-0080	2	7	INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L13	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L14	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L15	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L16	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L17	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L18	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L19	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L20	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L21	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L22	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L23	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L24	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L25	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L26	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L27	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L28	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A4A3L29	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L30	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L31	9140-0144	0	1	INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A4A3L32	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L33	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L34	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L35	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L36	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3L37	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A3MP1	08663-00046	7	1	COVER, DISTRIBUTOR (STANDARD AND OPTION 001 ONLY)	28480	08663-00078
	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
	2360-0113	2	1	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4A3MP1	08663-00078	5	1	COVER-FULL (OPTION 002 ONLY)	28480	08663-00078
	2200-0103	2	1	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
	2360-0113	2	1	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A4A3MP2	5001-0176	0	2	GROUND STRAP	28480	5001-0176
A4A3MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A4A3MP4	08662-00041	1	1	SHIELD-COMPONENT-LARGE	28480	08662-00041
A4A3MP5	08662-00170	7	1	SHIELD-CIRCUIT	28480	08662-00170

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A3MP6	08663-00072	9	1	SHIELD "A" DIST	28480	08663-00072
A4A3Q1	1853-0405	9	5	TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A4A3Q2	1853-0459	3	2	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A3Q3	1853-0405	9		TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A4A3Q4	1854-0809	9	3	TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	28480	1854-0809
A4A3Q5	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A4A3Q6	1853-0405	9		TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A4A3Q7	1853-0405	9		TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A4A3Q8	1854-0809	9		TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	28480	1854-0809
A4A3Q9	1854-0809	9		TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	28480	1854-0809
A4A3Q10	1853-0281	9	1	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A4A3Q11	1853-0405	9		TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A4A3R1	0698-7260	7	2	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1002-F
2234A TO 2449A AAA3R2	0698-8819	4	1	RESISTOR 3.83 1% .125W F TC=0+-100	28480	0698-8819
2451A AND ABOVE AAA3R2	0698-8812	7	1	RESISTOR 1 1% .125W F TC=0+-100	28480	0698-8812
A4A3R3	0698-7188	8	14	RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
A4A3R4	0698-7220	9	1	RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/B-T0-215R-F
A4A3R5	0698-3441	8	1	RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/B-T0-215R-F
A4A3R6	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
A4A3R7	0698-7229	8	2	RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/B-T0-511R-F
2234A TO 2615A AAA3R8	0698-7205	0	9	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/B-T0-51R1-F
2628A AND ABOVE AAA3R8	0699-1903	5	4	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C4-1/B-T0-51R1-F
A4A3R9	0698-3437	2	7	RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/B-T0-133R-F
A4A3R10	0698-7246	9	3	RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/B-T0-2611-F
2234A TO 2449A AAA3R11	0698-7212	9	2	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/B-T0-100R-F
2451A AND ABOVE AAA3R11	0698-7223	2	2	RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/B-T0-287R-F
A4A3R12	0698-7231	2	2	RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/B-T0-619R-F
A4A3R13	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/B-T0-133R-F
A4A3R14	0698-3447	4	3	RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/B-T0-422R-F
A4A3R15	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
2234A TO 2449A AAA3R16	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
AAA3R17	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/B-T0-51R1-F
2451A AND ABOVE AAA3R16	0698-3132	4	2	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/B-T0-2610-F
AAA3R17	0698-7207	2	1	RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/B-T0-619R-F
A4A3R18	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
2234A TO 2615A AAA3R19	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/B-T0-51R1-F
2628A AND ABOVE AAA3R19	0699-1903	5		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C4-1/B-T0-51R1-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2449A A4A3R20	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A4A3R21	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A4A3R22	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
2451A AND ABOVE A4A3R20	0698-3437	2	3	RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A3R21	0698-7210	7		RESISTOR 82.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-82R5-F
A4A3R22	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A4A3R23	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
2234A TO 2449A A4A3R24	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
2451A AND ABOVE A4A3R24	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A4A3R25	0698-7233	4	1	RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-T0-750R-F
A4A3R26	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A4A3R27	0698-7237	8	1	RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1101-F
2234A TO 2449A A4A3R28	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A4A3R29	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
2451A AND ABOVE A4A3R28	0698-7210	7		RESISTOR 82.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-82R5-F
A4A3R29	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A3R30	0757-0402	1	1	RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
2234A TO 2449A A4A3R31	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A4A3R32	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
2451A AND ABOVE A4A3R31	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A3R32	0698-7210	7		RESISTOR 82.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-82R5-F
A4A3R33	0757-0814	9	1	RESISTOR 511 1% .5W F TC=0+-100	28480	0757-0814
A4A3R34	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A4A3R35	0698-3442	9	3	RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A4A3R36	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A4A3R37	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A4A3R38	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
2234A TO 2615A A4A3R39	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
2628A AND ABOVE A4A3R39	0699-1903	5		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A4A3R40	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A3R41	0698-7231	2		RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/8-T0-619R-F
A4A3R42	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A4A3R43	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A3R44	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A4A3R45	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A4A3R46	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2615A A4A3R47	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
2628A AND ABOVE A4A3R47	0699-1903	5		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C4-1/8-TO-51R1-F
A4A3R48	0698-7216	3	2	RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A4A3R49	0698-7202	7	1	RESISTOR 38.3 1% .05W F TC=0+-100	24546	C3-1/8-TO-38R3-F
A4A3R50	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A4A3R51	0698-3443	0	2	RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-TO-287R-F
A4A3R52	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-TO-287R-F
A4A3R53	1810-0206	8	1	NETWORK-RES 8-SIP10.0K OHM X 7	01121	208A103
A4A3R54	0757-0280	3	2	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A4A3R55	0698-7244	7	1	RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A4A3R56	0698-7247	0	1	RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2871-F
A4A3R57	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A4A3R58	0757-0798	8	1	RESISTOR 110 1% .5W F TC=0+-100	28480	0757-0798
A4A3R59	0757-0442	9	3	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A4A3R60	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A4A3R61	0698-7227	6	2	RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A4A3R62	0757-0290	5	1	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-TO-6191-F
2234A TO 2346A A4A3R63	2100-2522	1	1	RESISTOR-TRMR 10K 10% C SIDE-ADJ 1-TRN	30983	ET50X103
2450A AND ABOVE A4A3R63	2100-3210	6	1	RESISTOR-TRMR 10K 10% C TOP-ADJ 1-TRN	28480	2100-3210
A4A3R64	0757-0441	8	1	RESISTOR 9.25K 1% .125W F TC=0+-100	24546	C4-1/8-TO-9251-F
A4A3R65	0698-7190	2	1	RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-12R1-F
A4A3R66	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A4A3R67	0757-0401	0	1	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-TO-101-F
A4A3R68	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A4A3R69	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-TO-237R-F
A4A3R70	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-TO-237R-F
A4A3R71	0757-1092	7	1	RESISTOR 287 1% .5W F TC=0+-100	28480	0757-1092
A4A3R72	0698-7271	0	1	RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2872-F
2234A TO 2449A A4A3R73	0698-7188	8		NOT ASSIGNED		
A4A3R74	0698-7188	8		NOT ASSIGNED		
A4A3R73	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A4A3R74	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A4A3TP1	1251-0600	0	5	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A3TP2	1251-1556	7	6	CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A4A3TP3	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A4A3TP4	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A4A3TP5	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A4A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A3TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A3TP8	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A4A3TP9	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A4A3TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A3TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A3U1	1826-0372	2	4	IC MISC 8-DIP-P PKG	28480	1826-0372
A4A3U2	1826-0372	2		IC MISC 8-DIP-P PKG	28480	1826-0372
A4A3U3	1820-1940	0	2	IC CNTR ECL BIN SYNCHRO POS-EDGE-TRIG	28480	1820-1940
A4A3U4	1820-1940	0		IC CNTR ECL BIN SYNCHRO POS-EDGE-TRIG	28480	1820-1940
A4A3U5	08662-67002	4	1	UHF POWER AMPLIFIER	28480	08662-67002
	0340-0834	0	1	INSULATOR-XSTR POLYI	28480	0340-0834
	1205-0206	5	1	HEAT SINK SGL TO-5/TO-39-CS	28480	1205-0206
A4A3U6	1820-0535	7	1	IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A4A3U7	0955-0147	1	1	MIXER-DOUBLE BALANCED FREQ=120 TO 640	28480	0955-0147
A4A3U8	1826-0372	2		IC MISC 8-DIP-P PKG	28480	1826-0372
A4A3U9	1820-0668	7	1	IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A4A3U10	1826-0372	2		IC MISC 8-DIP-P PKG	28480	1826-0372
A4A3U11	08663-80003	4	1	PROM	28480	08663-80003
A4A3U12	1820-1322	2	1	IC GATE TTL S NOR QUAD 2-INP	01295	SN74S02N
A4A3U13	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A4A3U14	08660-60060	1	1	OSCILLATOR ASSEMBLY 4 GHZ (STANDARD AND OPTION 001 ONLY)	28480	08663-60060 08663-00078
A4A3W1				NOT SEPARATELY REPLACEABLE (STANDARD AND OPTION 001 ONLY)	28480	08663-00078
2234A TO 2346A A4A3W2			1	NOT ASSIGNED		
2350A TO 2449A A4A3W2	08663-20357	5	1	4 GHZ STUB FILTER-COAX	28480	08663-20357
2451A AND ABOVE A4A3W2			1	NOT ASSIGNED		

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A3A1</b>						
2234A TO 2545A A4A3A1	08663-60033	B	1	OSCILLATOR ASSEMBLY-4 GHZ	28480	08663-60033
2546A AND ABOVE A4A3A1	08663-60033	B	1	OSCILLATOR ASSEMBLY-4 GHZ	28480	08663-60033
A4A3A1R1	0698-5378	4	1	RESISTOR 100 10% .1W C TC=0+-200	26654	3C101K
A4A3A1U1	11661-67002	0	1	VCO/MIXER ASSY	28480	11661-67002

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4</b>						
NOTE						
<i>The A4A4 Assembly and its sub-assemblies are not recommended for field repair.</i>						
2234A TO 2533A A4A4 †	08663-60011	2	1	PHASE MODULATOR ASSEMBLY (OPT. 002 ONLY)	28480	08663-60011
2535A AND ABOVE A4A4	08663-60070	3	1	PHASE MODULATOR ASSEMBLY (OPT. 002 ONLY)	28480	08663-60070
A4A4CR1	1906-0252	7		DIODE-MATCHED VF DIFF=20MV		1906-0252
A4A4E1	9170-0029	3	11	CORE-SHIELDING BEAD	28480	9170-0029
A4A4E2	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4E3	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4E4	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4E5	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4E6	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4E7	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4E8	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4FL1	9135-0002	8	9	FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A4FL2	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A4FL3	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A4FL4	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A4FL5	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A4FL6	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A4A4FL7	08663-20319	9	1	BD BBF	28480	08663-20319
A4A4J1	1250-0829	3	3	CONNECTOR-RF SMC M SGL-HOLE-FR 50-OHM	28480	1250-0829
	2190-0124	4	47	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A4A4J2	1250-1157	2	2	CONNECTOR-RF SMA FEM THD-HOLE 50-OHM	28480	1250-1157
A4A4J3	1250-1157	2		CONNECTOR-RF SMA FEM THD-HOLE 50-OHM	28480	1250-1157
A4A4J4	1250-0829	3		CONNECTOR-RF SMC M SGL-HOLE-FR 50-OHM	28480	1250-0829
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A4A4J5				NOT ASSIGNED		
A4A4J6	1250-0829	3		CONNECTOR-RF SMC M SGL-HOLE-FR 50-OHM	28480	1250-0829
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A4A4J7				NOT ASSIGNED		
A4A4J8	1250-0563	2	2	CONNECTOR-RF SMA M 4-HOLE-FLG-FR 50-OHM	28480	1250-0563
A4A4J9	1250-0563	2		CONNECTOR-RF SMA M 4-HOLE-FLG-FR 50-OHM	28480	1250-0563
A4A4MP1	08663-00052	5	1	COVER-PM (TOP)	28480	08663-00052
	2200-0105	4	4	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
2234A TO 2533A A4A4MP2	08663-20005	0	1	HOUSING-PHASE MOD.	28480	08663-20005
	0520-0164	1	1	SCREW-MACH 2-56 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
	2200-0567	2	1	SCREW-MACH 4-40 .125-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	08662-20305	2	1	THREADED PIN	28480	08662-20305
2535A AND ABOVE A4A4MP2	08663-20065	2	1	HOUSING-PHASE MOD.	28480	08663-20065
	0520-0174	1	1	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0103	2	1	SCREW-MACH 4-40 .125-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	08662-20305	2	1	THREADED PIN	28480	08662-20305

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A4A4MP3	08663-00091	2	1	COVER-PM (FRONT)	28480	08663-00091
	08663-00088	7	2	GASKET-PM (LARGE)	28480	08663-00088
A4A4MP4	08663-20007	2	1	COVER-PM (SMALL)	28480	08663-20007
	08663-00087	6	1	GASKET-PM (SMALL)	28480	08663-00087
A4A4MP5	08663-00090	1	1	COVER-PM (BACK)	28480	08663-00090
	08663-00088	7		GASKET-PM (LARGE)	28480	08663-00088
A4A4U1	0955-0045	8	1	CIRCULATOR 3.9-4.1GHZ: VSWR 1.25: 1 MAX	28480	0955-0045
A4A4W1	08663-60024	7	1	COAX-955-60011	28480	08663-60024
A4A4W2-5				NOT SEPARATELY REPLACEABLE		
2234A TO 2533A AAA4W6	08663-20036	7	2	SUBMIN COAX (LONG)	28480	08663-20036
2535A AND ABOVE AAA4W6	08663-20066	3		SUBMIN COAX (LONG)	28480	08663-20066
A4A4W7-11 A4A4W11	08663-20045	8	1	NOT SEPARATELY REPLACEABLE SEMIRIGID CABLE PM	28480	08663-20045
A4A4W12-14 A4A4W15				NOT SEPARATELY REPLACEABLE NOT ASSIGNED		
2234A TO 2533A AAA4W16	08663-20044	7	1	SUBMIN COAX (SHORT)	28480	08663-20044
2535A AND ABOVE AAA4W16	08663-20067	4	1	SUBMIN COAX (SHORT)	28480	08663-20067
A4A4W17	08663-20047	0	3	FEEDTHRU PIN	28480	08663-20047
	08663-20046	9	3	BEAD-DIELECTRIC	28480	08663-20046
A4A4W18	08663-20047	0		FEEDTHRU PIN	28480	08663-20047
	08663-20046	9		BEAD-DIELECTRIC	28480	08663-20046
A4A4W19	08663-20047	0		FEEDTHRU PIN	28480	08663-20047
	08663-20046	9		BEAD-DIELECTRIC	28480	08663-20046
A4A4W20	08663-20036	7		SUBMIN COAX (LONG)	28480	08663-20036

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4A1</b>						
NOTE <i>The A4A4 Assembly and its sub-assemblies are not recommended for field repair.</i>						
A4A4A1	08663-60312	6	1	BOARD ASSEMBLY-PM MIXER INPUT (OPTION 002 ONLY)	28480	08663-60312
A4A4A1C1	0160-3879	7	166	CAPACITOR-FXD .01PF +-20% 100VDC CER	28480	0160-3879
A4A4A1C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4A4A1C3	0160-5978	8	2	CAPACITOR-FXD 10PF +-5% 50VDC CER 0+-30	24840	0160-5975
A4A4A1C4	0160-5978	8	2	CAPACITOR-FXD 10PF +-5% 50VDC CER 0+-30	24840	0160-5975
A4A4A1C5	0160-4386	3	4	CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A4A4A1C6	0160-4386	3		CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A4A4A1C7	0160-3877	5	23	CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A4A4A1C8	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A4A4A1C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4A4A1C10	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A4A4A1CR1	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A4A1CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A4A1CR3	1901-0050	3	94	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A4A1CR4	1901-0639	4	1	DIODE-PIN	28480	5082-3080
A4A4A1CR5	1901-1085	6	1	DIODE-SM SIG SCHOTTKY	28480	1901-1085
A4A4A1CR6				NOT ASSIGNED		
A4A4A1L1	9100-3922	4	74	INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A1L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A1Q1	1854-0720	3	12	TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A4A4A1R1	0699-0130	8	12	RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A1R2	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A1R3	0698-7288	9	3	RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1473-F
A4A4A1R4	0698-7209	4	5	RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-T0-75R0-F
A4A4A1R5	0698-3444	1	8	RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A4A4A1R6	0757-0424	7	4	RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A4A4A1R7	0698-3132	4	7	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A4A4A1R8	0698-7277	6	15	RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A4A4A1R9	0698-7236	7	66	RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A4A4A1R10	2100-1986	9	2	RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	73138	82PR1K
A4A4A1R11	0698-7284	5	4	RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A4A4A1R12	0698-7205	0	35	RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A4A4A1U1	1826-0547	3	2	IC OP AMP LOW-BIAS-H-IMPED DUAL 8-DIP-P	01295	TL072ACP
A4A4A1VR1	1902-0959	3	1	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4A2 †</b>						
<b>08663-60314 – SERIAL PREFIX 2234A TO 2533A</b>						
<i>NOTE</i>						
<i>The A4A4 Assembly and its sub-assemblies are not recommended for field repair.</i>						
A4A4A2	08663-60314	8	1	BOARD-PM IF AMP	28480	08663-60314
A4A4A2C1	0160-5975	8	1	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A2MP1	08663-20048	1	1	POLYIRON SHIELD	28480	08663-20048
A4A4A2Q1 †				REPLACEMENT NO LONGER AVAILABLE		
A4A4A2R1	0698-3390	6	3	RESISTOR 19.6 1% .5W F TC=0+-100	28480	0698-3390
A4A4A2R2	0698-5378	4	1	RESISTOR 100 10% .1W C TC=0+-200	26654	3C101K
A4A4A2VR1	1902-0955	9	3	DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.062%	28480	1902-0955
<b>A4A4A2</b>						
<b>08663-60368 – SERIAL PREFIX 2535A AND ABOVE</b>						
A4A4A2	08663-60368	2	1	PHASE MOD IF AMP ASSEMBLY	28480	08663-60368
A4A4A2C1	0160-5975	8	3	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A2C2	0160-5975	8	3	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A2C3	0160-5975	8	3	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A2C4	0160-5975	8	1	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A2MP1	08663-20068	5	1	SHIELD, POLYIRON	28480	08663-20068
A4A4A2Q1	1855-0643	1	6	TRANSISTOR GAAS FET GALLIUM ARSENIDE	S0545	NE72089A
A4A4A2Q2	1855-0643	1	6	TRANSISTOR GAAS FET GALLIUM ARSENIDE	S0545	NE72089A
A4A4A2R1	0699-0183	1	4	RESISTOR 436 5% .1W C TC=0+-200	28480	0699-0183
A4A4A2R2	0699-0128	4	2	RESISTOR 10 5% .1W C TC=0+-200	26654	3C100J
A4A4A2R3	0699-0183	1	4	RESISTOR 436 5% .1W C TC=0+-200	28480	0699-0183
A4A4A2R4	0699-0183	1	4	RESISTOR 436 5% .1W C TC=0+-200	28480	0699-0183
A4A4A2R5	0699-0128	4	2	RESISTOR 10 5% .1W C TC=0+-200	26654	3C100J
A4A4A2R6	0699-0183	1	4	RESISTOR 436 5% .1W C TC=0+-200	28480	0699-0183
A4A4A2R7	0757-0401	0		RESISTOR 100 1% .125W F TC=0=-100	24546	C4-1/8-TO-101-F
A4A4A2R8	2100-2216	0		RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	73138	82PR5K
A4A4A2R9	0698-3435	0		RESISTOR 38.3 1% .125W F TC=0=-100	24546	C4-1/8-TO-38R3-F
A4A4A2R10	0757-0401	0		RESISTOR 100 1% .125W F TC=0=-100	24546	C4-1/8-TO-101-F
A4A4A2R11	2100-2216	0		RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	73138	82PR5K
A4A4A2R12	0698-3435	0		RESISTOR 38.3 1% .125W F TC=0=-100	24546	C4-1/8-TO-38R3-F
A4A4A2VR1	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=.035%	28480	1902-0951
A4A4A2VR2	1902-0951	5		DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=.035%	28480	1902-0951

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).



**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4A3 †</b>						
<b>08663-60313 – SERIAL PREFIX 2234A TO 2533A</b>						
NOTE <i>The A4A4 Assembly and its sub-assemblies are not recommended for field repair.</i>						
A4A4A3	08663-60313	7	1	BOARD-PHASE MOD LO AMP 1	28480	08663-60313
A4A4A3C1	0180-0491	5	1	CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A4A4A3C2	0160-5975	8	1	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A3Q1 †	REPLACEMENT NO LONGER AVAILABLE					
A4A4A3R1	0699-0180	8	2	RESISTOR 150 5% .1W C TC=0+-200	26654	3C151J
A4A4A3R2	0699-0179	5	1	RESISTOR 37.3 5% .1W C TC=0+-200	28480	0699-0179
A4A4A3R3	0698-8821	8	2	RESISTOR 5.62 1% .125W F TC=0+-100	28480	0698-8821
A4A4A3R4	0699-0180	8		RESISTOR 150 5% .1W C TC=0+-200	26654	3C151J
A4A4A3R5	0698-3390	6		RESISTOR 19.6 1% .5W F TC=0+-100	28480	0698-3390
A4A4A3R6	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A3R7	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A4A4A3R8	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A3VR1	1902-0955	9		DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.062%	28480	1902-0955
<b>A4A4A3</b>						
<b>08663-60367 – SERIAL PREFIX 2535A AND ABOVE</b>						
A4A4A3	08663-60367	1	1	BOARD-PHASE MOD LO AMP 1	28480	08663-60313
A4A4A3C1	0180-0491	5	1	CAPACITOR-FXD 10UF+-20% 25VDC TA	28480	0180-0491
A4A4A3C2	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A3C3	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A3C4	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A3C5	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 50VDC CER	28480	0160-5975
A4A4A3Q1	1855-0643	1	6	TRANSISTOR GAAS FET GALLIUM ARSENIDE	S0545	NE72089A
A4A4A3Q2	1855-0643	1	6	TRANSISTOR GAAS FET GALLIUM ARSENIDE	S0545	NE72089A
A4A4A3R1	0699-0180	8	2	RESISTOR 150 5% .1W C TC=0+-200	26654	3C151J
A4A4A3R2	0699-0179	5	1	RESISTOR 37.3 5% .1W C TC=0+-200	28480	0699-0179
A4A4A3R3	0698-8821	8	2	RESISTOR 5.62 1% .125W F TC=0+-100	28480	0698-8821
A4A4A3R4	0699-0180	8		RESISTOR 150 5% .1W C TC=0+-200	26654	3C151J
A4A4A3R5	0757-0401	0		RESISTOR 100 1% .125W F TC=0=-100	24546	C4-1/8-TO-101-F
A4A4A3R6	2100-2216	0		RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	73138	82PR5K
A4A4A3R7	0698-3435	0		RESISTOR 38.3 1% .125W F TC=0=-100	24546	C4-1/8-TO-38R3-F
A4A4A3R8	0699-0182	0		RESISTOR 220 5% .1W CTC=0+-200	26654	3C151J
A4A4A3R9	0699-0177	3		RESISTOR 28.3 5% .1W CTC=0+-200	28480	0699-0177
A4A4A3R10	0699-0182	0		RESISTOR 220 5% .1W CTC=0+-200	26654	3C151J
A4A4A3R11	0698-3435	0		RESISTOR 38.3 1% .125W F TC=0=-100	24546	C4-1/8-TO-38R3-F
A4A4A3R12	0757-0401	0		RESISTOR 100 1% .125W F TC=0=-100	24546	C4-1/8-TO-101-F
A4A4A3R13	2100-2216	0		RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	73138	82PR5K
A4A4A3VR1	1902-0951	5	4	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951
A4A4A3VR2	1902-0951	5	4	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4A4</b>						
NOTE The A4A4 Assembly and its sub-assemblies are not recommended for field repair.						
2234A TO 2313A A4A4A4 †	08663-60324	0	1	BOARD ASSEMBLY-PM-PM	28480	08663-60324
2323A AND ABOVE A4A4A4	08663-60356	8	1	BOARD ASSEMBLY-PM-PM	28480	08663-60356
A4A4A4C1	0180-2697	7	5	CAPACITOR-FXD 10UF+-10% 25VDC TA	28480	0180-2697
A4A4A4C2	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 100VDC CER	28480	0160-5975
A4A4A4C3	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 100VDC CER	28480	0160-5975
A4A4A4C4	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 100VDC CER	28480	0160-5975
A4A4A4C5	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 100VDC CER	28480	0160-5975
A4A4A4C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4A4A4C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4A4A4CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A4A4A4CR2	0122-0074	8	2	DIODE-VVC .7PF 10% C0/C25-MIN=4 BVR=40V	96341	MA45644
A4A4A4CR3	0122-0074	8		DIODE-VVC .7PF 10% C0/C25-MIN=4 BVR=40V	96341	MA45644
A4A4A4E1	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A4A4A4L1	9140-0142	8	8	INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A4A4A4Q1	1854-0597	2	3	TRANSISTOR NPN 2N5943 SI TO-39 PD=1W	04713	2N5943
A4A4A4Q2	1854-0597	2		TRANSISTOR NPN 2N5943 SI TO-39 PD=1W	04713	2N5943
A4A4A4Q3	1854-0597	2		TRANSISTOR NPN 2N5943 SI TO-39 PD=1W	04713	2N5943
A4A4A4R1	0698-7204	9	6	RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-T0-46R4-F
A4A4A4R2	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A4A4A4R3	2100-1788	9	1	RESISTOR-TRMR 500 10% C TOP-ADJ 1-TRN	73138	82PR500
A4A4A4R4	0757-0416	7	9	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A4A4A4R5	0757-0394	0	9	RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A4A4A4R6	0757-0346	2	10	RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A4A4A4R7	0698-8820	7	2	RESISTOR 4.64 1% .125W F TC=0+-100	28480	0698-8820
A4A4A4R8	0698-0083	8	6	RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A4A4A4R9	2100-1984	7	1	RESISTOR-TRMR 100 10% C TOP-ADJ 1-TRN	73138	82PR100
A4A4A4R10*	0698-3437	2		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A4A4R11*	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A4A4A4R12	0757-1060	9	2	RESISTOR 196 1% .5W F TC=0+-100	28480	0757-1060
A4A4A4R13	0698-7188	8	63	RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A4A4A4VR1	1902-0962	8	1	DIODE-ZNR 15V 5% DO-35 PD=.4W TC=+.087%	28480	1902-0962
A4A4A4VR2	1902-0949	1	1	DIODE-ZNR 4.3V 5% DO-35 PD=.4W TC=+.017%	28480	1902-0949

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4A5 †</b>						
<b>08663-60311 – SERIAL PREFIX 2234A TO 2533A</b>						
NOTE <i>The A4A4 Assembly and its sub-assemblies are not recommended for field repair.</i>						
A4A4A5	08663-60311	5	1	BOARD-PM LO AMP 2	28480	08663-60311
A4A4A5C1	0160-5975	8	1	CAPACITOR-FXD 10PF +-5% 100VDC CER	28480	0160-5975
A4A4A5L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A5L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A5Q1	1854-0810	2	4	TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A4A4A5Q2 †				REPLACEMENT NO LONGER AVAILABLE		
A4A4A5R1	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A5R2	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R3	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A4A4A5R4	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R5	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A5R6	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R7	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R8	0698-3390	6		RESISTOR 19.6 1% .5W F TC=0+-100	28480	0698-3390
A4A4A5U1	1820-0535	7	3	IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A4A4A5VR1	1902-0955	9		DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.062%	28480	1902-0955
<b>A4A4A5</b>						
<b>08663-60366 – SERIAL PREFIX 2535A AND ABOVE</b>						
A4A4A5	08663-60366	0	1	BOARD-PHASE MOD LO AMP 2	28480	08663-60366
A4A4A5C1	0160-5975	8	4	CAPACITOR-FXD 10PF +-5% 100VDC CER	28480	0160-5975
A4A4A5C2	0160-4304	5	7	CAPACITOR-FXD 10PF +-10% 100VDC CER	51959	0805C100K3T
A4A4A5C3	0160-4304	5	7	CAPACITOR-FXD 10PF +-10% 100VDC CER	51959	0805C100K3T
A4A4A5C4	0160-4304	5	7	CAPACITOR-FXD 10PF +-10% 100VDC CER	51959	0805C100K3T
A4A4A5L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A5L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A5Q1	1854-0597	2	3	TRANSISTOR NPN 2N5943 SI TO-39 PD=1W	04713	2N5943
A4A4A5Q2	1854-0597	2		TRANSISTOR NPN 2N5943 SI TO-39 PD=1W	04713	2N5943
A4A4A5Q3	1854-0810	2		TRANSISTOR NPN SI PD=625 MW FT=200 MHZ	28480	1854-0810
A4A4A5R1	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A5R2	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A4A4A5R3	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A5R4	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R5	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R6	0757-0401	0		RESISTOR 100 1% .125W F TC=0=-100	24546	C4-1/8-T0-101-F
A4A4A5R7	2100-2216	0		RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	73138	82PR5K
A4A4A5R8	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R9	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A5R10	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A4A4A5R11	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A4A5R12	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A4A4A5R13	0698-3435	0		RESISTOR 38.3 1% .125W F TC=0=-100	24546	C4-1/8-T0-38R3-F
A4A4A5R14	0698-3435	0		RESISTOR 38.3 1% .125W F TC=0=-100	24546	C4-1/8-T0-38R3-F
A4A4A5R15	0757-0401	0		RESISTOR 100 1% .125W F TC=0=-100	24546	C4-1/8-T0-101-F
A4A4A5R16	2100-2216	0		RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	73138	82PR5K
A4A4A5U1	1820-0535	7	3	IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A4A4A5VR1	1902-0951	5	4	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A4A6</b>						
NOTE <i>The A4A4 Assembly and its sub-assemblies are not recommended for field repair.</i>						
A4A4A6	08663-60325	1	1	BOARD ASSEMBLY-PM MIXER OUTPUT	28480	08663-60325
A4A4A6C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A4A4A6C2	0160-3873	1	4	CAPACITOR-FXD 4.7PF +-5PF 200VDC CER	28480	0160-3873
A4A4A6C3	0160-4389	6	30	CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A4A4A6C4	0160-4767	4	3	CAPACITOR-FXD 20PF +-5% 200VDC CER 0+-30	28480	0160-4767
A4A4A6C5	0160-3874	2	9	CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
2234A TO 2537A A4A4A6C6 A4A4A6C7	0160-4226	0		CAPACITOR-FXD 2.2PF +-25PF 100VDC CER NOT ASSIGNED	26654	2BN100S2R2C(D)
2545A AND ABOVE A4A4A6C6 A4A4A6C7	0160-5971	4		CAPACITOR-FXD 4.7PF 50VDC CER	28480	0160-5971
	0160-5971	4		CAPACITOR-FXD 4.7PF 50VDC CER	28480	0160-5971
A4A4A6CR1				NOT ASSIGNED		
A4A4A6CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A4A6CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A4A4A6L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A6L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A6L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A6L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A4A4A6L5	9135-0081	3	5	INDUCTOR RF-CH-MLD 68NH 5% .102DX.26LG	28480	9135-0081
A4A4A6L6	9135-0081	3		INDUCTOR RF-CH-MLD 68NH 5% .102DX.26LG	28480	9135-0081
A4A4A6Q1	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A4A4A6R1	0698-7212	9	62	RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A4A4A6R2	0698-3445	2	14	RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-TO-348R-F
A4A4A6R3	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1471-F
A4A4A6R4	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
2234A TO 2537A A4A4A6R5	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
2545A AND ABOVE A4A4A6R5				NOT ASSIGNED		

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A5</b>						
A4A5	08663-60310	4	1	PHASE MODULATION SECTION MOTHERBOARD	28480	08663-60310
A4A5C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C3	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C8	0180-0376	5	1	CAPACITOR-FXD .47UF+-10% 35VDC TA	56289	150D474X9035A2
A4A5C9	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5C13	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A4A5E1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A5E2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A5E3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A5E4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A5E5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A4A5J1	1250-0835	1	13	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A4A5J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A4A5J3	1200-0508	0	6	SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A4A5J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A4A5J5	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A4A5J6	1200-0507	9	3	SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A4A5J7	1251-5314	3	2	CONNECTOR 50-PIN POST SERIES	28480	1251-5314
A4A5L1	9140-0335	1	3	INDUCTOR 110UH 15% .47DX1.25LG Q=10	28480	9140-0335
	0360-0535	0	18	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A4A5XA4A1	1251-2582	1	2	CONNECTOR-PC EDGE 24-CONT/ROW 2-ROWS	28480	1251-2582
A4A5XA4A2	1251-2035	9	6	CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A4A5XA4A3	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A4A6</b>						
2234A ONLY A4A6 2245A AND ABOVE A4A6	08663-60354	6	1	NOT ASSIGNED PRE-ATTENUATOR ASSY, OUTPUT SECTION (EXCEPT OPTION 002)	28480	08663-60354
A4A6J1	1250-1220	0	34	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
A4A6J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
A4A6MP1	08663-00040	1	1	SHIELD, COMPONENT	28480	08663-00040
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2360-0113	2	31	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0078	9	41	NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A4A6R1	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A4A6R2	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A4A6R3	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A5A1</b>						
A5A1	08662-60146	3	1	ACCUMULATOR	28480	08662-60146
A5A1C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A1C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A1C3	0180-2208	6	7	CAPACITOR-FXD 220UF +-10% 10VDC TA	56289	150D227X9010S2
A5A1C4	0160-3456	6	14	CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C5	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C6	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C7	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C8	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C9	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C10	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C11	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C12	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C13	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C14	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1C15	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A1L1	9100-1618	1	2	INDUCTOR RF-CH-MLD 5.6UH 10%	28480	9100-1618
A5A1MP1	08662-00090	0	1	COVER- 1/2 END	28480	08662-00090
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A5A1MP2	5001-0173	7	2	STRAP, GROUND	28480	5001-0173
A5A1MP3	5001-0173	7		STRAP, GROUND	28480	5001-0173
A5A1R1	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R2	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R3	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R4	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R5	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R6	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R7	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R8	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R9	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R10	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R11	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R12	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A5A1R13	0698-3155	1	6	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A5A1R14	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A5A1R15	0757-0421	4	9	RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A5A1R16	0757-0280	3	43	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R17	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R18	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A5A1R19	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A5A1R20	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R21	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R22	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A5A1R23	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R24	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R25	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A1R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A1TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP1A	1251-0600	0	166	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP4A	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP6A	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A1U1	1820-1251	6	5	IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A5A1U2	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A5A1U3	1820-1193	5	1	IC CNTR TTL LS BIN ASYNCHRO	01295	SN74LS197N
A5A1U4	1820-0686	9	4	IC GATE TTL S AND TPL 3-INP	01295	SN74S11N
A5A1U5	1820-1195	7	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS175N
A5A1U6	08662-86082	0	1	PROM, PROGRAMMED	28480	08662-86082
A5A1U7	1820-1300	6	2	IC SHF-RGTR TTL LS R-S PRL-IN PRL-OUT	01295	SN74LS195AN
A5A1U8	1820-0629	0	3	IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A5A1U9	1820-1195	7		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS175N
A5A1U10	1820-1300	6		IC SHF-RGTR TTL LS R-S PRL-IN PRL-OUT	01295	SN74LS195AN
A5A1U11	1820-1112	8	4	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A5A1U12	1820-0685	8	1	IC GATE TTL S NAND TPL 3-INP	01295	SN74S10N
A5A1U13	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A5A1U14	1820-1777	1	1	IC ADDR TTL S BCD 4-BIT	18324	N82S83N
A5A1U15	1820-1244	7	3	IC MUXR/DATA-SEL TTL LS 4-TO-1-LINE DUAL	01295	SN74LS153N
A5A1U16	1820-1244	7		IC MUXR/DATA-SEL TTL LS 4-TO-1-LINE DUAL	01295	SN74LS153N

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A5A2</b>						
A5A2	08662-60148	5	1	N/DIVIDER ASSEMBLY	28480	08662-60148
A5A2C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A2C2	0160-2208	6		CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
A5A2C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A2C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A2C5	0160-4747	0	34	CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A2C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A2C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A2C9	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C10	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C11	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C12	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C13	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C14	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C15	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-10MM
A5A2C16	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C17	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C18	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C19	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C20	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A2C21	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A5A2CR1	1901-0518	8	23	DIODE-SM SIG SCHOTTKY	28480	1901-0518
A5A2CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A5A2CR3	1901-0039	8	3	DIODE-SWITCHING 50V 300MA 8NS	28480	1901-0039
A5A2CR4	1901-0039	8		DIODE-SWITCHING 50V 300MA 8NS	28480	1901-0039
A5A2J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A5A2L1	9100-1618	1		INDUCTOR RF-CH-MLD 5.6UH 10%	28480	9100-1618
A5A2L2	9140-0158	6	5	INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A5A2L3	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A5A2MP1	08662-00091	1	1	COVER- 1/2 END	28480	08662-00091
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A5A2MP2	5001-0176	0	37	STRAP, GROUND	28480	5001-0176
A5A2MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A5A2MP4	08662-00041	1	7	SHIELD, COMPONENT, LARGE	28480	08662-00041
A5A2R1	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A5A2R2	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-TO-2610-F
A5A2R3	0757-0420	3	11	RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-TO-751-F
A5A2R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A5A2R5	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A5A2R6	0698-3439	4	6	RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-TO-178R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A2R7	0698-3132	4	8	RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A5A2R8	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A5A2R9	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A5A2R10	0698-3155	1		RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A5A2R11	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A5A2R12	0698-3155	1	13	RESISTOR 4.64K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4641-F
A5A2R13	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A5A2R14	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A5A2R15	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A5A2R16	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A5A2R17	0698-7225	4	9	RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A5A2R18	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A5A2R19	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A5A2R20	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A5A2R21	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A5A2R22	0698-7232	3	3	RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A5A2R23	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A5A2R24	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A5A2TP1	1251-0600	0	0	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A2TP4A	1251-0600	0	0	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A2TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A2U1	1820-3517	1	2	IC DIVR ECL VAR-MODULO	28480	1820-3517
A5A2U2	1820-0686	9	3	IC GATE TTL S AND TPL 3-INP	01295	SN74S11N
A5A2U3	1820-0629	0		IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A5A2U4	1820-1322	2		IC GATE TTL S NOR QUAD 2-INP	01295	SN74S02N
A5A2U5	1820-0686	9	2	IC GATE TTL S AND TPL 3-INP	01295	SN74S11N
A5A2U6	1820-2049	2		IC CNTR TTL LS DECD ASYNCHRO PRESET	04713	SN74LS196N
A5A2U7	1820-0629	0		IC FF TTL S J-K NEG-EDGE-TRIG	01295	SN74S112N
A5A2U8	1820-2049	2		IC CNTR TTL LS DECD ASYNCHRO PRESET	04713	SN74LS196N
A5A2U9	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A5A3</b>						
A5A3	08662-60147	4	1	FRACTIONAL-N LOOP PHASE DETECTOR	28480	08662-60147
A5A3C1	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A3C2	0180-0116	1	16	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A3C3	0180-0229	7	3	CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A5A3C4	0180-0197	8	17	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C5	0180-1731	8	3	CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A5A3C6	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C7	0180-1731	8		CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A5A3C8	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A5A3C9	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A5A3C10	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A3C11	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
A5A3C12	0160-2055	9	22	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C13	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C14	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C15	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C16	0160-0159	0	1	CAPACITOR-FXD 6800PF +-10% 200VDC POLYE	28480	0160-0159
A5A3C17	0160-3466	8	2	CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A5A3C18	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C19	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C20	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C21	0160-0157	8	2	CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A5A3C22	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C23	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C24	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C25	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C26	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C27	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C28	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C29	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C30	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C31	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A3C32	0160-0161	4	3	CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A5A3C33	0180-0291	3	9	CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A5A3C34	0160-2219	7	1	CAPACITOR-FXD 1100PF +-5% 300VDC MICA	28480	0160-2219
A5A3C35	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A5A3C36	0160-2250	6	1	CAPACITOR-FXD 5.1PF +-25PF 500VDC CER	28480	0160-2250
A5A3C37	0160-2199	2	1	CAPACITOR-FXD 30PF +-5% 300VDC MICA	28480	0160-2199
A5A3C38	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C39	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A3C40	0180-1731	8		CAPACITOR-FXD 4.7UF+-10% 50VDC TA	56289	150D475X9050B2
A5A3C41	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C42	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C43	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A3C44	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A5A3C45	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number	
A5A3C46	0180-0197	8	1	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2	
A5A3C47	0160-2225	5		CAPACITOR-FXD 2000PF +-5% 300VDC MICA	28480	0160-2225	
A5A3C48	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2	
A5A3C49	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2	
A5A3CR1	1901-0040	1	33	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR6	1901-0040	1	32	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR9	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR10	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR11	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR12	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR13	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR14	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR15	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR16	1901-0539	3	5	DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR17	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR18	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR19	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR20	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR21	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR22	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040	
A5A3CR23	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR24	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR25	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR26	1901-0539	3	3	DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR27	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3CR28	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539	
A5A3DS1	1990-0326	3	4	LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444	
A5A3L1	9140-0144	0		7	INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A5A3L2	9100-1626	1			INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A3L3	9100-1626	1			INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A3L4	9100-1626	1			INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A3L5	9100-1626	1			INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A3L6	9100-1626	1		1	INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A3L7	9100-1626	1			INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A3MP1	08662-00102	5		1	COVER, EXTRUSION FULL	28480	08662-00102
	2360-0113	2			SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A5A3MP2	5001-0176	0			STRAP, GROUND	28480	5001-0176
A5A3MP3	5001-0176	0			STRAP, GROUND	28480	5001-0176
A5A3Q1	1853-0007	7		20	TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A3Q2	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3Q3	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3Q4	1855-0081	1	2	TRANSISTOR J-FET N-CHAN D-MODE SI	28480	1855-0081
A5A3Q5	1854-0210	6	9	TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A5A3Q6	1853-0012	4	29	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A5A3Q7	1854-0013	7	1	TRANSISTOR NPN 2N2218A SI TO-5 PD=800MW	04713	2N2218A
A5A3Q8	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3Q9	1855-0081	1		TRANSISTOR J-FET N-CHAN D-MODE SI	28480	1855-0081
A5A3Q10	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3Q11	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A5A3Q12	1854-0023	9	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0023
A5A3Q13	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3Q14	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3Q15	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A5A3R1	0757-0401	0	38	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R2	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R3	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A5A3R4	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A5A3R5	0698-3154	0	8	RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A5A3R6	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A5A3R7	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R8	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A5A3R9	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R10	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A3R11	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A5A3R12	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R13	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R14	0698-3447	4	2	RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-T0-422R-F
A5A3R15	0757-0417	8	3	RESISTOR 562 1% .125W F TC=0+-100	24546	C4-1/8-T0-562R-F
A5A3R16	0698-3150	6	11	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A5A3R17	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A5A3R18	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R19	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R20	0757-0317	7	7	RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A5A3R21	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A5A3R22	0698-3136	8	5	RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A5A3R23	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A5A3R24	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R25	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R26	0757-0199	3	7	RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A5A3R27	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A5A3R28	0698-3409	8	3	RESISTOR 2.37K 1% .5W F TC=0+-100	28480	0698-3409
A5A3R29	0698-3409	8		RESISTOR 2.37K 1% .5W F TC=0+-100	28480	0698-3409
A5A3R30	0698-0084	9	24	RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A5A3R31	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A5A3R32	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A5A3R33	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A5A3R34	0698-3153	9	9	RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A5A3R35	0757-0440	7	12	RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A3R36	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A5A3R37	0757-0428	1	10	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A5A3R38	0757-0441	8	2	RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A5A3R39	2100-3109	2	5	RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A5A3R40	2100-3123	0	2	RESISTOR-TRMR 500 10% C SIDE-ADJ 17-TRN	02111	43P501
A5A3R41	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A5A3R42	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F
A5A3R43	0698-3441	8	7	RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A5A3R44	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A5A3R45	0698-3158	4	3	RESISTOR 23.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2372-F
A5A3R46	0698-3440	7	8	RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A5A3R47	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R48	0698-4037	0	4	RESISTOR 46.4 1% .125W F TC=0+-100	24546	C4-1/8-T0-46R4-F
A5A3R49	0698-3157	3	3	RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A5A3R50	0757-0465	6	6	RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A5A3R51	0698-3260	9	3	RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A5A3R52	0757-0458	7	6	RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A5A3R53	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A5A3R54	0757-0288	1	3	RESISTOR 9.09K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-9091-F
A5A3R55	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R56	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A5A3R57	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A5A3R58	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A3R59	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A5A3R60	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A3R61	0698-3151	7	10	RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A5A3R62	0698-3156	2	7	RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A5A3R63	0757-0442	9	21	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A5A3R64	0757-0200	7	3	RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
A5A3R65	0757-0290	5	15	RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A5A3R66	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R67	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A5A3R68	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A5A3R69	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R70	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A5A3R71	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A5A3R72	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A5A3R73	0698-0089	4	1	RESISTOR 1.78K 1% .5W F TC=0+-100	28480	0698-0089
A5A3R74	0757-0400	9	5	RESISTOR 90.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-90R9-F
A5A3R75	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R76	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A5A3R77	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A5A3R78	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A5A3R79	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A5A3R80	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R81	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A5A3R82	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A5A3R83	0698-3443	0	3	RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A5A3R84	0698-3407	6	1	RESISTOR 1.96K 1% .5W F TC=0+-100	28480	0698-3407
A5A3R85	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A3R86	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3R87	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A3S1	3101-0860	9	3	SWITCH-SL DPDT MINTR .5A 125VAC/DC PC	28480	3101-0860
A5A3TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP5A	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A3U1	1826-0371	1	2	IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF256H
A5A3U2	1826-0089	8	1	IC OP AMP WB TO-99 PKG	29832	1322
A5A3U3	1826-0013	8	6	IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A5A3U4	1820-0681	4	2	IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N
A5A3U5	1820-0693	8	2	IC FF TTL S D-TYPE POS-EDGE-TRIG	01295	SN74S74N
A5A3U6	1826-0013	8		IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A5A3U7	1820-1422	3	2	IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A5A3U8	1820-0686	9		IC GATE TTL S AND TPL 3-INP	01295	SN74S11N
A5A3U9	1820-0683	6	1	IC INV TTL S HEX 1-INP	01295	SN74S04N
A5A3VR1	1902-0184	6	2	DIODE-ZNR 16.2V 5% DO-35 PD=.4W	28480	1902-0184
A5A3VR2	1902-0184	6		DIODE-ZNR 16.2V 5% DO-35 PD=.4W	28480	1902-0184
A5A3VR3	1902-3301	5	2	DIODE-ZNR 34.8V 5% DO-35 PD=.4W	28480	1902-3301
A5A3VR4	1902-3301	5		DIODE-ZNR 34.8V 5% DO-35 PD=.4W	28480	1902-3301

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A5A4</b>						
A5A4	08662-60151	0	1	REFERENCE DIVIDER ASSEMBLY	28480	08662-60151
A5A4C1	0160-3876	4	17	CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A5A4C2	0160-3466	8		CAPACITOR-FXD 100PF +-10% 1KVDC CER	28480	0160-3466
A5A4C3	0180-0116	1		CAPACITOR-FXD 8.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A4C4	0180-2208	6		CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
A5A4C5	0160-3457	7	3	CAPACITOR-FXD 2000PF +-10% 250VDC CER	28480	0160-3457
A5A4C6	0160-3878	6	161	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A5A4C7	0160-3538	5	2	CAPACITOR-FXD 750PF +-5% 100VDC MICA	28480	0160-3538
A5A4C8	0160-3457	7		CAPACITOR-FXD 2000PF +-10% 250VDC CER	28480	0160-3457
A5A4C9	0160-3457	7		CAPACITOR-FXD 2000PF +-10% 250VDC CER	28480	0160-3457
A5A4CR3	1901-0039	8		DIODE-SWITCHING 50V 300MA 8NS	28480	1901-0039
A5A4L1	9140-0112	2	1	INDUCTOR RF-CH-MLD 4.7UH 10%	28480	9140-0112
A5A4L2	9100-1626	1		INDUCTOR RF-CH-MLD 36UH 5% .166DX.385LG	28480	9100-1626
A5A4L3	9100-0368	6	3	INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A5A4MP1	08662-00085	3	1	COVER- 1/3 END	28480	08662-00085
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A5A4MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A5A4MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A5A4Q1	1853-0034	0	3	TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A5A4Q2	1853-0034	0		TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A5A4Q3	1853-0034	0		TRANSISTOR PNP SI TO-18 PD=360MW	28480	1853-0034
A5A4R1	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A5A4R2	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A5A4R3	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A4R4	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A5A4R5	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A5A4R6	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A4R7	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A5A4R8	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A5A4R11	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A5A4R12	0757-0200	7		RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
A5A4R13	0757-0817	2	2	RESISTOR 750 1% .5W F TC=0+-100	28480	0757-0817
A5A4R14	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A5A4R15	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A5A4R16	0757-0438	3	12	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A5A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A4U1	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A5A4U2	1820-1418	7	1	IC DCDR TTL LS BCD-TO-DEC 4-TO-10-LINE	01295	SN74LS42N
A5A4U3	1820-1206	1	1	IC GATE TTL LS NOR TPL 3-INP	01295	SN74LS27N
A5A4U4	1820-1251	6		IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS196N
A5A4U5	1820-0693	8		IC FF TTL S D-TYPE POS-EDGE-TRIG	01295	SN74S74N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A5A5</b>						
A5A5	08662-60149	6	1	VCO ASSEMBLY	28480	08662-60149
A5A5C1	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C2	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C3	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C4	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C5	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C6	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C7	0160-0575	4	15	CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A5A5C8	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A5A5C9	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A5A5C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A5A5C11	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A5A5C12	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A5C13	0160-2257	3	2	CAPACITOR-FXD 10PF +-5% 500VDC CER 0+-60	28480	0160-2257
A5A5C14	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A5C15	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A5C16	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A5A5C17	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A5A5C18	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A5A5C19	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A5A5C20	0160-0571	0	12	CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A5A5C21	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A5A5C22	0160-0158	9	5	CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A5A5C23	0160-3537	4	2	CAPACITOR-FXD 680PF +-5% 100VDC MICA	28480	0160-3537
A5A5C24	0160-0158	9		CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A5A5C25	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A5A5C26	0160-0573	2	16	CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A5A5C27	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A5A5C28	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A5A5C29	0180-0100	3	1	CAPACITOR-FXD 4.7UF+-10% 35VDC TA	56289	150D475X9035B2
A5A5C30	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C31	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C32	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C33	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C34	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C35	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C36	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C37	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C38	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C39	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C40	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C41	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C42	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C43	0160-4747	0		CAPACITOR-FXD 1000PF +-20% 100VDC CER	51642	200-100-X7R-102M
A5A5C44	0160-4747	0		CAPACITOR-FXD 10J0PF +-20% 100VDC CER	51642	200-100-X7R-102M

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A5CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
<i>2234A TO 2602A</i>						
A5A5CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A5A5CR9	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
<i>2604A AND ABOVE</i>						
A5A5CR6-9				NOT ASSIGNED		
<i>2234A TO 2419A</i>						
A5A5CR10	0122-0065	7	4	DIODE-VVC 29PF 3%	28480	0122-0065
A5A5CR11	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
A5A5CR12	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
<i>2411A AND ABOVE</i>						
A5A5CR10	0122-0162	5	4	DVVC 29PF 5.0CR	28480	0122-0162
A5A5CR11	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
A5A5CR12	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
A5A5J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A5A5J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A5A5L1	9100-1629	4	4	INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A5A5L2	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A5A5L3	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A5A5L4	9100-1629	4		INDUCTOR RF-CH-MLD 47UH 5% .166DX.385LG	28480	9100-1629
A5A5L5	9100-1666	9	1	INDUCTOR RF-CH-MLD 3.6MH 5% .23DX.57LG	28480	9100-1666
A5A5L6	9140-0210	1	13	INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A5A5MP1	08662-00099	9	1	COVER- 2/3 END	28480	08662-00099
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A5A5MP2	5001-0176	0		STRAP, GROUND	28480	5001-0176
A5A5MP3	5001-0176	0		STRAP, GROUND	28480	5001-0176
A5A5MP4	08662-00041	1		SHIELD, COMPONENTS, LARGE	28480	08662-00041
A5A5MP5	08662-00039	7	2	SHIELD, CIRCUIT, LARGE	28480	08662-00039
A5A5MP6	1205-0202	1	1	THERMAL LINK DUAL TO-18-CS	28480	1205-0202
A5A5Q1	1854-0540	5	4	TRANSISTOR NPN SI TO-72 PD=200MW FT=1GHZ	04713	MM8006
A5A5Q2	1854-0540	5		TRANSISTOR NPN SI TO-72 PD=200MW FT=1GHZ	04713	MM8006
A5A5Q3	1854-0039	7	1	TRANSISTOR NPN 2N3053S SI TO-.39 PD=1W	3L585	2N3053S
A5A5Q4	1853-0451	5	13	TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A5A5Q5	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A5A5Q6	1854-0540	5		TRANSISTOR NPN SI TO-72 PD=200MW FT=1GHZ	04713	MM8006
A5A5Q7	1854-0404	0	14	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A5A5Q8	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A5A5Q9	1855-0020	8	13	TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A5A5Q10	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A5A5Q11	1854-0540	5		TRANSISTOR NPN SI TO-72 PD=200MW FT=1GHZ	04713	MM8006
A5A5Q12	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
A5A5Q13	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A5A5Q14	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A5R1	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A5A5R2	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A5A5R3	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A5A5R4	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A5A5R5	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A5A5R6	0698-7218	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-TO-178R-F
A5A5R7	0698-3162	0	3	RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-TO-4642-F
A5A5R8	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-TO-4642-F
A5A5R9	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-TO-178R-F
A5A5R10	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2611-F
A5A5R11	0698-4008	5	1	RESISTOR 40K 1% .125W F TC=0+-100	24546	C4-1/8-TO-4002-F
A5A5R12	0757-0449	6	1	RESISTOR 20K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2002-F
A5A5R13	0698-7884	1	1	RESISTOR 16K 1% .125W F TC=0+-50	19701	MF4C1/8-T2-1602-F
A5A5R14	0698-3200	7	1	RESISTOR 8K 1% .125W F TC=0+-100	24546	C4-1/8-TO-8001-F
A5A5R15	0698-5323	9	1	RESISTOR 4K .5% .125W F TC=0+-50	28480	0698-5323
A5A5R16	0698-7799	7	1	RESISTOR 2K .25% .125W F TC=0+-100	19701	MF4C1/8-TO-2001-C
A5A5R17	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3831-F
A5A5R18	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1621-F
A5A5R19	0757-1060	9		RESISTOR 196 1% .5W F TC=0+-100	28480	0757-1060
A5A5R20	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1621-F
A5A5R21	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1331-F
A5A5R22	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-TO-7501-F
A5A5R23	0757-0289	2	6	RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-TO-1332-F
A5A5R24	2100-3109	2		RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A5A5R25	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
A5A5R26	0698-7238	9	7	RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1211-F
A5A5R27	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A5A5R28	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-TO-1332-F
A5A5R29	0698-3160	8	15	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A5A5R30	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1621-F
A5A5R31	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1621-F
A5A5R32	0757-0462	3	2	RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-TO-7502-F
A5A5R33	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-TO-10R0-F
A5A5R34	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A5A5R35	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1472-F
A5A5R36	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1472-F
A5A5R37	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A5A5R38	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A5A5R39	0757-0467	8	2	RESISTOR 121K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1213-F
A5A5R40	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5112-F
A5A5R41	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A5A5R42	0757-0462	3		RESISTOR 75K 1% .125W F TC=0+-100	24546	C4-1/8-TO-7502-F
A5A5R43	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A5A5R44	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-TO-101-F
A5A5R45	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-TO-511R-F
A5A5R46	0757-0463	4	1	RESISTOR 82.5K 1% .125W F TC=0+-100	24546	C4-1/8-TO-8252-F
A5A5R47	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-TO-511R-F
A5A5R48	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-TO-101-F
A5A5R49	0757-0821	8	1	RESISTOR 1.21K 1% .5W F TC=0+-100	28480	0757-0821
A5A5R50	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2611-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A5R51	0698-0082	7	12	RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A5A5R52	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
<i>2234A TO 2602A</i>						
A5A5R53	2100-3154	7		RESISTOR-TRMR 1K 10% C SIDE-ADJ 17-TRN	02111	43P102
A5A5R54	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
<i>2604A AND ABOVE</i>						
A5A5R53	2100-3056	5		RESISTOR-TRMR 3K 10% WW T-ADJ 1-TRN	28480	2100-3056
A5A5R54	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-100R-F
A5A5R55	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A5A5R56	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A5A5R57	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
<i>2234A TO 2602A</i>						
A5A5R58	0698-3346	2	1	RESISTOR 4.22K 1% .5W F TC=0+-100	28480	0698-3346
A5A5R59	0698-3455	4	1	RESISTOR 261K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2613-F
A5A5R60	0698-7213	0	4	RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-T0-110R-F
A5A5R61	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
<i>2604A AND ABOVE</i>						
A5A5R58	0698-3412	3		RESISTOR 3.83K 1% .5W F TC=0+-100	24546	C4-1/2-T0-3831-F
A5A5R59	0757-0459	8		RESISTOR 56.2K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5622-F
A5A5R60	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-T0-348R-F
A5A5R61	0757-0200	7		RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
<i>2234A TO 2602A</i>						
A5A5R62	0698-3453	2	2	RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1963-F
A5A5R63	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A5A5R64	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A5A5R65	0757-0460	1	1	RESISTOR 61.9K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A5A5R66	0698-7231	2	4	RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/8-T0-619R-F
A5A5R67	0698-3158	4		RESISTOR 23.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2372-F
A5A5R68	0698-7213	0		RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-T0-110R-F
A5A5R69	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A5A5R70	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A5A5R71	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A5A5R72	0698-3243	8	2	RESISTOR 178K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1783-F
A5A5R73	0757-0123	3	1	RESISTOR 34.8K 1% .125W F TC=0+-100	28480	0757-0123
<i>2604A AND ABOVE</i>						
<i>A5A5R62-73</i>						
NOT ASSIGNED						
A5A5R74	0698-3453	2		RESISTOR 196K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1963-F
A5A5R75	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A5A5R76	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A5A5R77	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A5A5R78	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A5A5R79	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A5A5R80	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A5A5R81	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A5A5R82	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A5A5R83	0757-0274	5	2	RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A5A5R84	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A5A5R85	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A5A5R86	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A5A5R87	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A5A5R88	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A5A5R89	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A5A5R90	0698-7207	2	10	RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A5A5R91	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A5A5R92	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A5A5R93	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A5A5R94	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A5A5R95	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A5A5R96	0698-3442	9	5	RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A5A5R97	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A5A5R98	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A5A5R99	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A5A5R100	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A5A5R101	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-51R1-F
A5A5T1	08640-60355	0	5	TRANSFORMER, RF, BLUE	28480	08640-60355
A5A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A5A5U1	1826-0371	1		IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF250H
A5A5U2	1820-0577	7	1	IC INV TTL HEX 1-INP	01295	SN7416N
A5A5U3	1820-1423	4	3	IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A5A5U4	1826-0138	8	4	IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A1</b>						
A6A1	08662-80115	6	1	LF MULTIPLIER ASSEMBLY	28480	08662-60115
A6A1C1	0180-2617	1	42	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A6A1C2	0180-2618	2	20	CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A1C3	0160-4527	4	8	CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A1C4	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A1C5	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A1C6	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A1C7	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A1C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C9	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A6A1C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C15	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C19	0160-4103	2	4	CAPACITOR-FXD 220PF +-5% 100VDC CER	72982	8121-M100-COG-221J
A6A1C20	0160-4512	7	2	CAPACITOR-FXD 120PF +-5% 200VDC CER	28480	0160-4512
A6A1C21	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C22	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A1C23	0160-4527	4		CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A1C24	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C26	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A6A1C27	0121-0449	9	11	CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A1C28	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C29	0160-4387	4	4	CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A6A1C30	0160-4493	3	2	CAPACITOR-FXD 27PF +-5% 200VDC CER 0+-30	28480	0160-4493
A6A1C31	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A1C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C33	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C34	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A1C35	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C37	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A6A1C38	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A1C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C40	0160-4521	8	1	CAPACITOR-FXD 12PF +-5% 200VDC CER 0+-30	28480	0160-4521
A6A1C41	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C42	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C43	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A1C44	0160-4522	9	1	CAPACITOR-FXD 13PF +-5% 200VDC CER 0+-30	28480	0160-4522
A6A1C45	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A1CR1	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR2	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR3	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR4	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR5	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR6	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR7	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1CR8	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A1FL1	0955-0115	3	1	FILTER-CRYSTAL 40MHZ	28480	0955-0115
	0360-1959	4	8	TERMINAL-STUD SGL-TUR SWGFRM-MTG	28480	0360-1959
	0380-0730	9	4	STANDOFF-RVT-ON .188-IN-LG 4-40THD	28480	0380-0730
	0905-0782	5	8	O-RING .239-IN-ID .07-IN-XSECT-DIA EPR	76680	AS 568-010 E50
A6A1J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A1J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A1J3	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A1L1	08662-60316	9	7		28480	08662-60316
A6A1L2	08662-60316	9			28480	08662-60316
A6A1L3	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A6A1L4	9140-0141	7	8	INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A1L5	9100-2254	3	3	INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A6A1L6	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A6A1L7	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A6A1L8	9100-2250	9	5	INDUCTOR RF-CH-MLD 180NH 10% .105DX.26LG	28480	9100-2250
A6A1L9	9100-2256	5	2	INDUCTOR RF-CH-MLD 560NH 10% .105DX.26LG	28480	9100-2256
A6A1L10	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A6A1L11	9100-2256	5		INDUCTOR RF-CH-MLD 560NH 10% .105DX.26LG	28480	9100-2256
A6A1L12	9135-0081	3		INDUCTOR .068 UH	28480	9135-0081
A6A1L13	9100-2251	0	3	INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A6A1L14	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A6A1L15	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A6A1MP1	08662-00092	2	1	COVER- 1/2 END	28480	08662-00092
	2360-0193	8	2	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	28480	2360-0193
	2190-0630	7	1	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0630
A6A1MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A1MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A1MP4				NOT ASSIGNED		
A6A1Q1	1854-0247	9	16	TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A1Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A1Q3	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A1Q4	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A1Q5	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A1Q6	1854-0071	7	12	TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A1Q7	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A6A1R1	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R2	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R3	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R4	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A1R6	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A1R7	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R8	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R9	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R10	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R11	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A1R12	0698-7251	6	24	RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R13	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R14	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R15	0698-7267	4	2	RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A6A1R16	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R17	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R18	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R19	0698-7201	6	4	RESISTOR 34.8 1% .05W F TC=0+-100	24546	C3-1/8-T0-34R8-F
A6A1R20	0698-7201	6		RESISTOR 34.8 1% .05W F TC=0+-100	24546	C3-1/8-T0-34R8-F
A6A1R21	0698-7239	0		RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1331-F
A6A1R22	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A6A1R23	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A6A1R24	0698-7219	6	18	RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A1R25	0698-7245	8	2	RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A6A1R26	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A1R27	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A1R28	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R29	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R30	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R31	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R33	0698-7201	6		RESISTOR 34.8 1% .05W F TC=0+-100	24546	C3-1/8-T0-34R8-F
A6A1R34	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A6A1R35	0698-7240	3	19	RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A6A1R36	0698-7215	2	6	RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-T0-133R-F
A6A1R37	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R38	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A1R39	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R40	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R41	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R42	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A6A1R43	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R44	0698-7217	4	2	RESISTOR 162 1% .05W F TC=0+-100	24546	C3-1/8-T0-162R-F
A6A1R45	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R46*	0698-7200	5	6	RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-T0-31R6-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A1R47	0698-7192	4	1	RESISTOR 14.7 1% .05W F TC=0+-100	24546	C3-1/8-T0-14R7-F
A6A1R48	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A6A1R49	0698-3446	3	11	RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A1R50	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A1R51	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1R52	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A1T1	08662-80013	5	9	TRANSFORMER, 12T	28480	08662-80013
A6A1T2	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A6A1T3	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A6A1T4	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A6A1TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A1TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A1TP3	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A1TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A1TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A1TP6	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A1TP7	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A1TP8	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A1TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A1TP10	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A1U1	1820-0817	8	2	IC FF ECL D-M/S DUAL	04713	MC10131P
A6A1U2	1820-1400	7	1	IC GATE ECL AND QUAD 2-INP	04713	MC10104P

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A2</b>						
A6A2	08662-60114	5	1	LO DRIVE ASSEMBLY	28480	08662-60114
A6A2C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C6	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A2C7	0180-2619	3	23	CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A2C8	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A2C9	0160-4383	0	5	CAPACITOR-FXD 6.8PF +-5PF 200VDC CER	20932	5024E0200RD689D
A6A2C10	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A2C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C12	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A2C13	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A2C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C15	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C17	0160-4493	3		CAPACITOR-FXD 27PF +-5% 200VDC CER 0+-30	28480	0160-4493
A6A2C18	0160-4527	4		CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A2C19	0160-4527	4		CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A2C20	0160-4527	4		CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A2C21	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A2C22	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A2C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C24	0160-4494	4	3	CAPACITOR-FXD 39PF +-5% 200VDC CER 0+-30	28480	0160-4494
A6A2C25	0160-4527	4		CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A2C26	0160-4527	4		CAPACITOR-FXD 56PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A2C27	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C28	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C29	0160-4350	1	2	CAPACITOR-FXD 68PF +-5% 200VDC CER 0+-30	28480	0160-4350
A6A2C30	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A2C31	0160-4383	0		CAPACITOR-FXD 6.8PF +-5PF 200VDC CER	20932	5024E0200RD689D
A6A2C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C33	0160-4350	1		CAPACITOR-FXD 68PF +-5% 200VDC CER 0+-30	28480	0160-4350
A6A2C34	0160-4497	7	4	CAPACITOR-FXD 82PF +-5% 200VDC CER 0+-30	28480	0160-4497
A6A2C35	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C36	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A6A2C37	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C38	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C40	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C41	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C42	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C43	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A2C44	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A2CR1	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR4	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR5	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR6	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR7	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2CR8	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A2J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A2J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A2L1	08662-60316	9			28480	08662-60316
A6A2L2	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A6A2L3	9135-0072	2	7	INDUCTOR, .056 UH	28480	9135-0072
A6A2L5	9100-2255	4	7	INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A2L7	9135-0072	2		INDUCTOR, .056 UH	28480	9135-0072
A6A2L8	9135-0078	8	2	INDUCTOR, .082 UH	28480	9135-0078
A6A2L9	9100-2250	9		INDUCTOR RF-CH-MLD 180NH 10% .105DX.26LG	28480	9100-2250
A6A2L10	9100-2250	9		INDUCTOR RF-CH-MLD 180NH 10% .105DX.26LG	28480	9100-2250
A6A2L11	9135-0078	8		INDUCTOR, .082 UH	28480	9135-0078
A6A2L12	9100-2250	9		INDUCTOR RF-CH-MLD 180NH 10% .105DX.26LG	28480	9100-2250
A6A2L13	9100-2250	9		INDUCTOR RF-CH-MLD 180NH 10% .105DX.26LG	28480	9100-2250
A6A2L14	9135-0069	7	8	INDUCTOR, .030 UH	28480	9135-0069
A6A2L15	9100-2254	3		INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A6A2L16	9135-0070	0	6	INDUCTOR, .024 UH	28480	9135-0070
A6A2L17	9100-2247	4	6	INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A6A2L18	9100-0368	6		INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A6A2L19	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A6A2MP1	08662-00093	3	1	COVER- 1/2 END	28480	08662-00093
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A2MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A2MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A2MP4				NOT ASSIGNED		
A6A2Q1	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A2Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A2Q3	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A2R1	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R2	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R3	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R4	0698-7249	2	11	RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3481-F
A6A2R5	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A6A2R6	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R7	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R8	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R9	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
A6A2R10	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A2R11	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A2R12	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A6A2R13	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R14	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A6A2R15	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R16	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R17	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R18	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A6A2R19	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A6A2R20	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R21	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R22	0698-7223	2	11	RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A6A2R23	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A2R24	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A6A2R25	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R26	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R27	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R28	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R29	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A2R30	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A6A2R31	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A6A2R32	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A6A2R33	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R34	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A2R35	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R36	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A2R37	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2R38	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A2TP5	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A2U1	1820-0817	8		IC FF ECL D-M/S DUAL	04713	MC10131P
A6A2U2	1820-1046	7	1	IC DCDR TTL 2-TO-4-LINE DUAL 2-INP	01295	SN74156N
A6A2U3	0955-0095	8	3	MIXER, SRAI	28480	0955-0095

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A3</b>						
2234A TO 2451A A6A3 †	08662-60314	7	1	HF MULTIPLIER ASSEMBLY	28480	08662-60314
2510A AND ABOVE A6A3	08662-60327	2	1	HF MULTIPLIER ASSEMBLY	28480	08662-60327
A6A3C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C3	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
2234A TO 2451A A6A3C5	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
2510A AND ABOVE A6A3C5	0180-0558	5		CAPACITOR-FXD 470UF+-20% 10VDC TA	56289	150D477X0010S2
A6A3C6	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A3C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C9	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C13	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A3C14	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C15	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A3C16	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A3C17	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A6A3C18	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C19	0160-3875	3	11	CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A6A3C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C22	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C23	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C24	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C25	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A6A3C27	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C28	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C29	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C30	0160-4491	1	3	CAPACITOR-FXD 8.2PF +-5% 200VDC CER	28480	0160-4491
A6A3C31	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C32	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C33	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C34	0160-4520	7	2	CAPACITOR-FXD 11PF +-5% 200VDC CER 0+-30	28480	0160-4520
A6A3C35	0160-3568	1	5	CAPACITOR-FXD 2.7PF +-5% 200VDC CER	51642	100-100-NP0-279J
A6A3C36	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C37	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
2234A TO 2326A A6A3C38	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
2333A AND ABOVE A6A3C38	0160-4306	7	1	CAPACITOR-FXD 100PF +-100VDC CER	51959	0160-4306

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A3C39	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C40	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C41	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C42	0160-4492	2	4	CAPACITOR-FXD 18PF +-5% 200VDC CER 0+-30	28480	0160-4492
A6A3C43	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A6A3C44	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C45	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C46	0121-0447	7	2	CAPACITOR-V TRMR-CER 1.5-2.5PF 63V	28480	0121-0447
A6A3C47	0160-4383	0		CAPACITOR-FXD 6.8PF +-5PF 200VDC CER	20932	5024E0200RD689D
A6A3C48	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C49	0160-4497	7		CAPACITOR-FXD 82PF +-5% 200VDC CER 0+-30	28480	0160-4497
A6A3C50	0160-4490	0	4	CAPACITOR-FXD 1.8PF +-25PF 200VDC CER	28480	0160-4490
A6A3C51	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A3C52	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A6A3C53	0160-4492	2		CAPACITOR-FXD 18PF +-5% 200VDC CER 0+-30	28480	0160-4492
A6A3C54	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C55	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C56	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C57	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C58	0160-3873	1		CAPACITOR-FXD 4.7PF +-5PF 200VDC CER	28480	0160-3873
A6A3C59	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C60	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C61	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C62	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C63	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C64	0160-4497	7		CAPACITOR-FXD 82PF +-5% 200VDC CER 0+-30	28480	0160-4497
A6A3C65	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C66	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C67	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C68	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A3C69	0160-4381	8	2	CAPACITOR-FXD 1.5PF +-25PF 200VDC CER	28480	0160-4381
A6A3C70	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C71	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C72	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C73	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C74	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C75	0160-4520	7		CAPACITOR-FXD 11PF +-5% 200VDC CER 0+-30	28480	0160-4520
A6A3C76	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C77	0160-4381	8		CAPACITOR-FXD 1.5PF +-25PF 200VDC CER	28480	0160-4381
A6A3C78	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C79	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C80	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C81	0121-0447	7		CAPACITOR-V TRMR-CER 1.5-2.5PF 63V	28480	0121-0447
A6A3C82	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C83	0160-4491	1		CAPACITOR-FXD 8.2PF +-5% 200VDC CER	28480	0160-4491
A6A3C84	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C85	0160-4497	7		CAPACITOR-FXD 82PF +-5% 200VDC CER 0+-30	28480	0160-4497
A6A3C86	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A3C87	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C88	0160-4491	1		CAPACITOR-FXD 8.2PF +-5% 200VDC CER	28480	0160-4491
A6A3C89	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C90	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A3C91	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C92	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
<i>2234A TO 2326A</i>						
A6A3C93	0160-3568	1		CAPACITOR-FXD 2.7PF +-5% 200VDC CER	51642	100-100-NP0-279J
A6A3C94	0160-5643	7	1	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-5643
<i>2333A AND ABOVE</i>						
A6A3C93	0160-4382	9	2	CAPACITOR-FXD 3.3PF +-25PF 200VDC CER	28480	0160-4382
A6A3C94	0160-4543	4	2	CAPACITOR-FXD 470PF +-10% 100VDC CER	28480	0160-4543
A6A3C95	0160-4490	0		CAPACITOR-FXD 1.8PF +-25PF 200VDC CER	28480	0160-4490
A6A3C96	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A3C97	0160-4527	4		CAPACITOR-FXD 58PF +-5% 200VDC CER 0+-30	28480	0160-4527
A6A3C98	0160-4490	0		CAPACITOR-FXD 1.8PF +-25PF 200VDC CER	28480	0160-4490
<i>2234A TO 2326A</i>						
<i>A6A3C99</i>						
<i>2333A AND ABOVE</i>						
A6A3C99	0160-4543	4		CAPACITOR-FXD 470PF +-10% 100VDC CER	28480	0160-4543
A6A3C100	0160-4518	3	12	CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A6A3C101	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A6A3C102	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A6A3C103	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A6A3C104	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A6A3C105	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
<i>2234A TO 2451A</i>						
<i>A6A3C106-109</i>						
<i>2510A AND ABOVE</i>						
A6A3C106	0180-2618	2		CAPACITOR-FXD 33UF +-10% 10VDC TA	25088	D33GS1B10K
A6A3C107	0180-2618	2		CAPACITOR-FXD 33UF +-10% 10VDC TA	25088	D33GS1B10K
A6A3C108	0180-2618	2		CAPACITOR-FXD 33UF +-10% 10VDC TA	25088	D33GS1B10K
A6A3C109	0180-2618	2		CAPACITOR-FXD 33UF +-10% 10VDC TA	25088	D33GS1B10K
A6A3CR1	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A3CR2	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A3CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A3CR4	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A3CR5	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A6A3CR6	1901-1096	9		DIODE-PIN	28480	1901-1096
A6A3FL1	0955-0116	4	1	FILTER 160 MHZ	28480	0955-0116
	0360-1959	4		TERMINAL .067" SHANK (4)	28480	0360-1959
	0380-0730	9		RIVET-ON STANDOFF, 4-40 (2)	28480	0380-0730
	0905-0782	5		"O" RING, .25" ID (4)	76680	AS 568-010 E50
	8150-0071	2	2	SCREW, 4-40 X .37 (2)	28480	8150-0071
A6A3J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A3J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A3J3	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A3J4	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A3L1	9100-3922	4		COIL 3.0 UH	28480	9100-3922
A6A3L2	9100-3922	4		COIL 3.0 UH	28480	9100-3922
A6A3L3	9100-3922	4		COIL 3.0 UH	28400	9100-3922
A6A3L4	9100-3922	4		COIL 3.0 UH	28480	9100-3922
A6A3L5	9100-3922	4		COIL 3.0 UH	28480	9100-3922
A6A3L6	9100-3922	4		COIL 3.0 UH	28480	9100-3922
2234A TO 2451A A6A3L7	9100-3922	4		COIL 3.0 UH	28480	9100-3922
2510A AND ABOVE A6A3L7	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A6A3L8	9100-3922	4		COIL 3.0 UH	28480	9100-3922
A6A3L9	9135-0079	9	6	INDUCTOR, .100 UH	28480	9135-0079
A6A3L10	9135-0079	9		INDUCTOR, .100 UH	28480	9135-0079
A6A3L11	9135-0072	2		INDUCTOR, .056 UH	28480	9135-0072
A6A3L12	9135-0079	9		INDUCTOR, .100 UH.	28480	9135-0079
A6A3L13	9140-0158	6		INDUCTOR RF-CH-MLD 1UH 10% .105DX.26LG	28480	9140-0158
A6A3L14	9100-0368	6		INDUCTOR RF-CH-MLD 330NH 10% .105DX.26LG	28480	9100-0368
A6A3L15	9135-0068	6	2	INDUCTOR, .033 UH	28480	9135-0068
A6A3L16	9135-0077	7	3	INDUCTOR, .036 UH	28480	9135-0077
A6A3L17	9135-0073	3	4	INDUCTOR, .051 UH	28480	9135-0073
A6A3L18	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A3L19				NSR, PART OF PC BOARD TRACE		
A6A3L20	9135-0072	2		INDUCTOR, .056 UH	28480	9135-0072
A6A3L21	9135-0073	3		INDUCTOR, .051 UH	28480	9135-0073
A6A3L22	9135-0076	6	4	INDUCTOR, .039 UH	28480	9135-0076
A6A3L23	9135-0079	9		INDUCTOR, .100 UH	28480	9135-0079
A6A3L24				NSR, PART OF PC BOARD TRACE		
A6A3L25	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A3L26	9135-0070	0		INDUCTOR, .024 UH	28480	9135-0070
A6A3L27	9135-0075	5	6	INDUCTOR, .043 UH	28480	9135-0075
A6A3L28	9135-0069	7		INDUCTOR, .030 UH	28480	9135-0069
A6A3L29				NSR, PART OF PC BOARD TRACE		
A6A3L30	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A3L31	9135-0081	3		INDUCTOR, .068 UH	28480	9135-0081
A6A3L32	9135-0075	5		INDUCTOR, .043 UH	28480	9135-0075
A6A3L33				NSR, PART OF PC BOARD TRACE		
A6A3L34	9135-0068	6		INDUCTOR, .033 UH	28480	9135-0068
A6A3L35	9135-0076	6		INDUCTOR, .039 UH	28480	9135-0076
A6A3L36	9135-0075	5		INDUCTOR, .043 UH	28480	9135-0075
A6A3L37	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A3L38	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A3L39	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2447A A6A3MP1	08662-00079	5	1	COVER, FULL END	28480	08662-00079
2449A AND ABOVE A6A3MP1	08662-00220	8	1	COVER, FULL END	28480	08662-00220
A6A3MP2	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A3MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A3MP4	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A3MP4	08662-00164	9	1	SHIELD, HF MULTIPLEXER	28480	08662-00164
A6A3MP5	08662-00170	7	2	SHIELD, CIRCUIT, LARGE	28480	08662-00170
A6A3MP6	08662-00041	1		SHIELD, COMP. LARGE	28480	08662-00041
2234A TO 2326A A6A3Q1	1854-0980	7	1	TRANSISTOR NPN SI PD=500MW	28480	1854-0980
2333A AND ABOVE A6A3Q1	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A6A3Q2	1854-0610	0	3	TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A6A3Q3	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A6A3Q4	1854-0720	3	3	TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A6A3Q5	1854-0720	3	3	TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A6A3Q6	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A3Q7	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A6A3Q8	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A3Q9	1854-0610	0		TRANSISTOR NPN SI TO-46 FT=800MHZ	28480	1854-0610
A6A3Q10	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A6A3Q11	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A6A3R1	0698-7224	3	24	RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A6A3R2	0698-7267	4		RESISTOR 19.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1962-F
A6A3R3	0698-7243	6	4	RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1961-F
A6A3R4	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A3R5	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A3R6	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A3R7	0757-1002	9	1	RESISTOR 61.9 1% .5W F TC=0+-100	28480	0757-1002
A6A3R8	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A3R9	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A6A3R10	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A3R11	0698-7255	0	7	RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A6A3R12	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A3R13	0698-7250	5	4	RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3831-F
A6A3R14	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R15	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A3R16	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R17	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A3R18	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A3R19	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-T0-178R-F
A6A3R20	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F
A6A3R21	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A3R22	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A3R23	0698-7226	5	5	RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-T0-383R-F
A6A3R24	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A6A3R25	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A3R26	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R27	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A3R28	0699-1903	5		RESISTOR 51.1 1% .05W F TC=0+-100	28480	0699-1903
A6A3R29	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F
A6A3R30	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A3R31	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A6A3R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A3R33	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A3R34	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A3R35	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A3R36	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-12R1-F
A6A3R37	0698-7207	2	5	RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F
A6A3R38	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R40	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A6A3R41	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A3R42	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A3R43	0699-1903	5		RESISTOR 51.1 1% .05W F TC=0+-100	28480	0699-1903
A6A3R44	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A3R45	0698-7260	7	15	RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6A3R46	0698-7229	8	40	RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A3R47	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A6A3R48	0698-7196	8	17	RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-21R5-F
A6A3R49	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A3R50	0698-7207	2	5	RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F
A6A3R51	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R52	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A3R53	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-T0-464R-F
A6A3R54	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A3R55	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R56	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A6A3R57	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-T0-464R-F
A6A3R58	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A3R59	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A3R60	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R61	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A3R62	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R63	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A3R64	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A3R65	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A3R66	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-21R5-F
A6A3R67	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A3R68	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A6A3R69	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R70				NOT ASSIGNED		
A6A3R71	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A6A3R72	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A3R73	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A3R74	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A3R75	0699-1902	4		RESISTOR 10 1% .05W F TC=0+-100	28480	0699-1902
A6A3R76	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1473-F
A6A3R77	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A3R78	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A3R79	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A3R80	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
2234A TO 2326A A6A3R81-83				NOT ASSIGNED		
2333A AND ABOVE A6A3R81*	0699-0183	1	2	RESISTOR 436 5% .1W C TC=0+-200	28480	0699-0183
A6A3R82*	0699-0174	0	3	RESISTOR 11.6 5% .1W C TC=0+-200	28480	0699-0174
A6A3R83*	0699-0183	1		RESISTOR 436 5% .1W C TC=0+-200	28480	0699-0183
2234A TO 2405A A6A3R84				NOT ASSIGNED		
2408A AND ABOVE A6A3R84*	0698-7198	0	9	RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
A6A3T1	08662-80004	4	1	TRANSFORMER	28480	08662-80004
A6A3T2	08662-80012	4	1	TRANSFORMER	28480	08662-80012
A6A3TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP2	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP8	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A3TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP10	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A3TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP12	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A3TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP15	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3TP16	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A6A3TP17	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A3U1	0955-0096	9	4	MIXER, SRAI	28480	0955-0096
A6A3U2	1826-0372	2	19	IC, LIMITER	28480	1826-0372
A6A3U3	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A3U4	0955-0096	9		MIXER, SRAI	28480	0955-0096
A6A3U5	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A3U6	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A3U7	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A3U8	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A3U9	1820-2140	4	1	IC CNTR ECL	52648	SP8610BDG
A6A3U10	0955-0095	8		MIXER, SRAI	28480	0955-0095
A6A3VR1	1902-3171	7	5	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171
A6A3VR2	1902-0041	4	3	DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A6A3W1	08662-20056	0	1	CABLE, SEMI-RIGID	28480	08662-20056
A6A3W2	08662-20057	1	1	CABLE, SEMI-RIGID	28480	08662-20057
A6A3W3	08662-20078	6	1	CABLE, SEMI-RIGID	28480	08662-20078

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A4</b>						
2234A TO 2704A						
A6A4	08662-60108	7	1	PHASE DETECTOR, OUTPUT SUM (OS) LOOP	28480	08662-60108
2706A AND ABOVE						
A6A4	08662-60358	9	1	PHASE DETECTOR, OUTPUT SUM (OS) LOOP	28480	08662-60358
A6A4C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C3	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A4C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C5	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A4C6	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A6A4C7	0180-0141	2	3	CAPACITOR-FXD 50UF+75-10% 50VDC AL	56289	30D50G050DD2
A6A4C8	0180-2208	6		CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
A6A4C9	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A4C10	0180-3701	6		CAPACITOR-FXD 2.2UF+-10% 75VDC TA	28480	0180-3701
A6A4C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A4C13	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A6A4C14	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A4C15	0180-3701	6		CAPACITOR-FXD 2.2UF+-10% 75VDC TA	28480	0180-3701
A6A4C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C19	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A4C20	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C21	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C22	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C24	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A6A4C25	0180-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A4C26	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A4C27	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C28	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A4C29	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A4C30	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C31	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C33	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A4C34	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A4C35	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A4C36	0160-4498	8	2	CAPACITOR-FXD 5.6PF +-5PF 200VDC CER	28480	0160-4498
A6A4C37	0160-0572	1	3	CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A6A4C38	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A4C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C40	0160-0574	3	2	CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A6A4C41	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A4C42	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A4C43	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A4C44	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A4C45	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4C46	0160-2209	5	4	CAPACITOR-FXD 360PF +-5% 300VDC MICA	28480	0160-2209
A6A4C47	0160-4084	8	5	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A6A4C48	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A4C49	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A4C50	0160-0570	9	5	CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A6A4C51	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C52	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A4C53	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A6A4C54	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A4C55	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C56	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A6A4C57	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C58	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C59	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A4C60	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A4C61	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A4C62	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A4C63	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A4C64	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A4C65	0160-0298	8	2	CAPACITOR-FXD 1500PF +-10% 200VDC POLYE	28480	0160-0298
A6A4C66	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C67	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C68	0160-2209	5		CAPACITOR-FXD 360PF +-5% 300VDC MICA	28480	0160-2209
A6A4C69	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A6A4C70	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A4C71	0140-0198	5	2	CAPACITOR-FXD 200PF +-5% 300VDC MICA	72136	DM15F201J0300WV1CR
A6A4C72	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A4C73	0160-4103	2		CAPACITOR-FXD 220PF +-5% 100VDC CER	72982	8121-M100-COG-221J
A6A4C74	0160-0570	9		CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A6A4CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
2234A to 2823A A6A4C75				NOT ASSIGNED		
2837A and above A6A4C75	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A6A4CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR19	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR20	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR21	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR22	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4CR23	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR24	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR25	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR26	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR27	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR28	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR29	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR30	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4CR31	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR32	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A4CR38	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A4DS1	1990-0326	3		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444
A6A4E1	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A6A4J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A4J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A4L1	9100-1788	6	7	CORE-FERRITE CHOKE-WIDEBAND; IMP:‡680	28480	9100-1788
A6A4L2	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND; IMP:‡680	28480	9100-1788
A6A4L3	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND; IMP:‡680	28480	9100-1788
A6A4L4	9100-4078	3	11	TOROID FILTER 630 UH	28480	9100-4078
A6A4L5	9100-4078	3		TOROID FILTER 630 UH	28480	9100-4078
A6A4L6	9100-1623	8	10	INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A4L9	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A4L10	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A4L11	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A4L12	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A4L13	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A4L14	9140-0179	1	2	INDUCTOR RF-CH-MLD 22UH 10% .166DX.385LG	28480	9140-0179
A6A4L15	9100-1630	7	8	INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A6A4L16	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A6A4L17	9100-4078	3		TOROID FILTER 630 UH	28480	9100-4078
A6A4L18	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A4L19	9100-1625	0	2	INDUCTOR RF-CH-MLD 33UH 5% .166DX.385LG	28480	9100-1625
A6A4L20	9100-1627	2	2	INDUCTOR RF-CH-MLD 39UH 5% .166DX.385LG	28480	9100-1627
A6A4L21	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A4L22	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A4L23	9100-1611	4	2	INDUCTOR RF-CH-MLD 220NH 20%	28480	9100-1611
2234A to 2823A A6A4L24				NOT ASSIGNED		
2637A and above A6A4L24	9100-2256	5	1	INDUCTOR RF-CH-MLD 560NH 10% .105DX26LG	28480	9100-2256
2234A to 2704A A6A4MP1	08662-00016	0	2	COVER- 1/3 END	28480	08662-00016
2706A and above A6A4MP1	08662-00229	7	2	COVER- 1/3 END	28480	08662-00292
A6A4MP2	2360-0113	2		SCREW-MACH 6-32 .25-JN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A4MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
	5001-0176	0		GROUND STRAP	28480	5001-0176
2234A to 2704A A6A4MP4	7120-8043	0	1	LABEL-IDENTIFICATION .15-IN-WD .7-IN-LG	28480	7120-8043
2706A and above A6A4MP4	08662-80066	8	1	LABEL-IDENTIFICATION .15-IN-WD .7-IN-LG	28480	08662-80066

‡Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A6A4Q2	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A6A4Q3	1854-0408	4	2	TRANSISTOR NPN SI TO-18 PD=300MW	28480	1854-0408
A6A4Q4	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A6A4Q5	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0	8	HEAT SINK TO-18-CS	28480	1205-0037
A6A4Q6	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
2234A to 2552A A6A4Q7	1854-0475	5	4	TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
2601A and above A6A4Q7	1854-1046	8		TRANSISTOR-DUAL NPN TO-78 PD=750MW	28480	1854-0475
A6A4Q8	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A4Q9	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A6A4Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A4Q11	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A6A4Q12	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A4Q13	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A4Q14	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A6A4Q17	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A4Q18	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A4Q19	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A4Q20	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A4R1	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
2234A to 2823A A6A4R2	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
2837A and above A6A4R2				NOT ASSIGNED		
A6A4R3	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A4R4	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A4R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A4R6	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A4R7	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
2234A to 2823A A6A4R8	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
2837A and above A6A4R8				NOT ASSIGNED		
A6A4R9	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A6A4R10	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A6A4R11	0698-7226	5		RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-TO-383R-F
2234A to 2823A A6A4R12	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
2837A and above A6A4R12				NOT ASSIGNED		
A6A4R13	0698-7222	1	12	RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A6A4R14	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A6A4R15	0698-7200	5		RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31R6-F
A6A4R16	0698-7200	5		RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31R6-F
A6A4R17	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A6A4R18	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-TO-261R-F
A6A4R19	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A4R20	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A4R21	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A4R22	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R23	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A6A4R24	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2151-F
A6A4R25	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-TO-6191-F
A6A4R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4R27	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A4R28	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A6A4R29	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A6A4R30	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A6A4R31	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R32	0698-7264	1	7	RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A6A4R33	0698-7244	7	14	RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A6A4R34	0698-7242	5		RESISTOR 1.78K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1781-F
A6A4R35	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A6A4R36	0698-7266	3	5	RESISTOR 17.8K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1782-F
A6A4R37	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A4R38	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A4R39	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A4R40	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-21R5-F
A6A4R41	0698-7275	4	5	RESISTOR 42.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4222-F
A6A4R42	0698-7256	1	4	RESISTOR 6.81K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6811-F
A6A4R43	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A6A4R44	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R45	0757-0279	0	19	RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A6A4R46	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A6A4R47	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A4R48	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A4R49	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A4R50	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A4R51	0698-7268	5	28	RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R52	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R53	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R54	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R55	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R56	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A6A4R57	0757-0424	7		RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A6A4R58	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A4R59	0757-0419	0	4	RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A6A4R60	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R61	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R62	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R63	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R64	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A6A4R65	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R66	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R67	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R68	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A4R69	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A6A4R70	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A6A4R71	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A6A4R72	0698-3476	9	2	RESISTOR 6K 1% .125W F TC=0+-100	03888	PME55-1/8-T0-6001-F
A6A4R73	0757-1093	8	2	RESISTOR 3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3001-F
A6A4R74	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A6A4R75	0698-3548	6	2	RESISTOR 732 1% .125W F TC=0+-100	24546	C4-1/8-T0-732R-F
A6A4R76	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4R77	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A6A4R78	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A6A4R79	0757-0288	1		RESISTOR 9.09K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-9091-F
A6A4R80	0698-3438	3	3	RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A6A4R81	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A6A4R82	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A6A4R83	0757-0403	2	3	RESISTOR 121 1% .125W F TC=0+-100	24546	C4-1/8-T0-121R-F
A6A4R84	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A6A4R85	2100-2497	9		RESISTOR-TRMR 2K 10% C TOP-ADJ 1-TRN	73139	B2PR2K
A6A4R86	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A6A4R87	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A6A4R88	0757-0398	4	4	RESISTOR 75 1% .125W F TC=0+-100	24546	C4-1/8-T0-75R0-F
A6A4R89	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A6A4R90	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R91	0757-0422	5	8	RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A6A4R92	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A6A4R93	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A6A4R94	0698-7221	0	5	RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-T0-237R-F
A6A4R95	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A6A4R96	0698-7234	5	5	RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-T0-825R-F
A6A4R97	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A4R98	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A4R99	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A6A4R100	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A4R101	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6A4R102	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R103	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A4R104	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A4R105	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A4R106	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A4R107	0698-7261	8	5	RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1102-F
A6A4R108	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R109	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R110	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R111	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R112	0698-7261	8		RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1102-F
A6A4R113	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A6A4R114	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A6A4R115	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R116	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A4R117	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A4R118	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A4R119	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A6A4R120	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A4R121	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A4R122	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A4R123	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-T0-348R-F
A6A4R124	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A4R125	0698-7241	4	4	RESISTOR 1.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1621-F
A6A4R126	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-T0-348R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4R127	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R128	0698-7241	4		RESISTOR 1.62K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1621-F
A6A4R129	0698-7262	9	7	RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1212-F
A6A4R130	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R132	0698-7275	4		RESISTOR 42.2K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4222-F
A6A4R133	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A4R134	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A4R135	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R136	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R138	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R139	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R140	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A6A4R141	0698-7272	1	5	RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
A6A4R142	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A6A4R143	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A6A4R144	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A4R145	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A6A4R146	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A4R147	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
<i>2234A TO 2513A</i>						
A6A4R148	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
<i>2516A AND ABOVE</i>						
A6A4R148	0698-7239	0		RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1331-F
A6A4R149	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A4R150	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A6A4R151	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A6A4R152	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A4R153	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A4R154	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A4R155	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A4R156	2100-2497	9		RESISTOR-TRMR 2K 10% C TOP-ADJ 1-TRN	73138	82PR2K
A6A4S1	3101-0860	9		SWITCH-SL DPDT MINTR .5A 125VAC/DC PC	28480	3101-0860
A6A4T1	08640-60355	0		TRANSFORMER, RF, BLUE	28480	08640-60355
A6A4T2	08640-60355	0		TRANSFORMER, RF, BLUE	28480	08640-60355
A6A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A4U1	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A4U2	1820-1344	8	2	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A6A4U3	1826-0026	3	2	IC COMPARATOR PRNC TO-99 PKG	01295	LM311L
A6A4U4	1826-0013	8		IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A6A4U5	1820-0688	7	3	IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A4U6	1820-1211	8	3	IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
2234A TO 2704A A6A4U7 †	1820-1781	7	4	IC SWITCH ANLG DUAL TO-100 PKG NOTE <i>When replacing A6A4U7, refer to Section 7 for important update information</i>	34371	HI2-200-5
2706A AND ABOVE A6A4U7	1820-1633	8	4	IC SWITCH ANLG DUAL TO-100 PKG	34371	HI2-200-5
2234A TO 2704A A6A4U8	1820-1781	7		IC SWITCH ANLG DUAL TO-100 PKG	34371	HI2-200-5
2706A AND ABOVE A6A4U8	1826-1633	8	4	IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
A6A4U9	1820-1322	2		IC GATE TTL S NOR QUAD 2-INP	01295	SN74S02N
A6A4U10	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A4U11	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A6A4U12	1820-0579	9	2	IC MV TTL MONOSTBL RETRIG DUAL	01295	SN74123N
A6A4U13	1826-0138	8		IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N
A6A4U14	1820-0475	4	2	IC COMPARATOR HS TO-99 PKG	27014	LM306H
A6A4VR1	1902-0556	6	2	DIODE-ZNR 20V 5% PD=1W IR=5UA	28480	1902-0556
2234A TO 2513A A6A4VR2	1902-0554	4	2	DIODE-ZNR 10V 5% PD=1W IR=10UA	28480	1902-0554
2516A AND ABOVE A6A4VR2	1902-0955	9	2	DIODE-ZNR 7.5V 5% PD=.4W	28480	1902-0955
2234A TO 2704A A6A4W1	08662-20055	9	2	CABLE-SEMI RIGID #51	28480	08662-20055
2706A AND ABOVE A6A4W1	08662-20292	6		CABLE-SEMI RIGID #51	28480	08662-20292

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A5</b>						
2234A TO 2704A						
A6A5	08662-60103	2	1	PHASE DETECTOR,REF. SUM (RS)LOOP ASSY	28480	08662-60103
2706A AND ABOVE						
A6A5	08662-60357	8	1	PHASE DETECTOR,REF. SUM (RS)LOOP ASSY	28480	08662-60357
A6A5C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C3	0160-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A5C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C5	0160-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A5C6	0160-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A6A5C7	0160-0141	2		CAPACITOR-FXD 50UF+75-10% 50VDC AL	56289	30D506G050DD2
A6A5C8	0160-2208	6		CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
A6A5C9	0160-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A5C10	0160-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A6A5C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A5C13	0160-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A6A5C14	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A5C15	0160-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A6A5C16	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C19	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A5C20	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C21	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C22	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C24	0160-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A6A5C25	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A5C26	0160-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A5C27	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C28	0160-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A5C29	0160-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A5C30	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C31	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C32	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C33	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A5C34	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A5C35	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A5C36	0160-4498	8		CAPACITOR-FXD 5.6PF +-5PF 200VDC CER	28480	0160-4498
A6A5C37	0160-0572	1		CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A6A5C38	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A5C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C40	0160-0574	3		CAPACITOR-FXD .022UF +-20% 100VDC CER	28480	0160-0574
A6A5C41	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A5C42	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A5C43	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A5C44	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A5C45	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5C46	0160-2209	5		CAPACITOR-FXD 360PF +-5% 300VDC MICA	28480	0160-2209
A6A5C47	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A6A5C48	0160-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A5C49	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A5C50	0160-0570	9		CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A6A5C51	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C52	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A6A5C53	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A6A5C54	0160-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A5C55	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C56	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A6A5C57	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C58	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C59	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A5C60	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A5C61	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A5C62	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A5C63	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A5C64	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A6A5C65	0160-0298	8		CAPACITOR-FXD 1500PF +-10% 200VDC POLYE	28480	0160-0298
A6A5C66	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C67	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C68	0160-2209	5		CAPACITOR-FXD 360PF +-5% 300VDC MICA	28480	0160-2209
A6A5C69	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A6A5C70	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A5C71	0140-0198	5		CAPACITOR-FXD 200PF +-5% 300VDC MICA	72136	DM15F201J0300WV1CR
A6A5C72	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A6A5C73	0160-4103	2		CAPACITOR-FXD 220PF +-5% 100VDC CER	72982	8121-M100-COG-221J
A6A5C74	0160-0570	9		CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
2234A to 2823A A6A5C75				NOT ASSIGNED		
2837A and above A6A5C75	0160-4801	7		CAPACITOR-FXD 100PF +-5% 100VDC CER	28480	0160-4801
A6A5CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR19	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR20	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR21	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR22	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5CR23	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR24	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR25	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR26	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR27	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR28	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR29	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR30	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5CR31	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR32	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A6A5CR38	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A5DS1	1990-0326	3		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444
A6A5E1	9170-0029	3		CORE-SHIELDING BEAD	28480	9170-0029
A6A5J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A5J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A5L1	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND; IMP:‡680	28480	9100-1788
A6A5L2	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND; IMP:‡680	28480	9100-1788
A6A5L3	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND; IMP:‡680	28480	9100-1788
A6A5L4	9100-4078	3		TOROID FILTER 630 UH	28480	9100-4078
A6A5L5	9100-4078	3		TOROID FILTER 630 UH	28480	9100-4078
A6A5L6	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A5L9	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A5L10	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A5L11	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A5L12	9100-1623	8		INDUCTOR RF-CH-MLD 27UH 5% .166DX.385LG	28480	9100-1623
A6A5L13	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A5L14	9140-0179	1		INDUCTOR RF-CH-MLD 22UH 10% .166DX.385LG	28480	9140-0179
A6A5L15	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A6A5L16	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A6A5L17	9100-4078	3		TOROID FILTER 630 UH	28480	9100-4078
A6A5L18	9140-0141	7		INDUCTOR RF-CH-MLD 680NH 10% .105DX.26LG	28480	9140-0141
A6A5L19	9100-1625	0		INDUCTOR RF-CH-MLD 33UH 5% .166DX.385LG	28480	9100-1625
A6A5L20	9100-1627	2		INDUCTOR RF-CH-MLD 39UH 5% .166DX.385LG	28480	9100-1627
A6A5L21	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A5L22	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A5L23	9100-1611	4		INDUCTOR RF-CH-MLD 220NH 20%	28480	9100-1611
2234A to 2823A A6A5L24				NOT ASSIGNED		
2837A and above A6A5L24	9100-2256	5	1	INDUCTOR RF-CH-MLD 560NH 10% .105DX.26LG	28480	9100-2256
2234A to 2704A A6A5MP1	08662-00116	1	1	COVER- 1/3 END	28480	08662-00116
2706A and above A6A5MP1	08662-00228	6	1	COVER- 1/3 END	28480	08662-00228
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A5MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A5MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A5Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5Q2	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A6A5Q3	1854-0408	4		TRANSISTOR NPN SI TO-18 PD=300MW	28480	1854-0408
A6A5Q4	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A6A5Q5	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A5Q6	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
<i>2234A to 2552A</i>						
A6A5Q7	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
<i>2601A and above</i>						
A6A5Q7	1854-1046	8		TRANSISTOR-DUAL NPN TO-78 PD=750MW	28480	1854-1046
A6A5Q8	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A5Q9	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A6A5Q10	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A5Q11	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A6A5Q12	1853-0451	5		TRANSISTOR PNP 2N3799 SI TO-18 PD=360MW	01295	2N3799
	1205-0037	0		HEAT SINK TO-18-CS	28480	1205-0037
A6A5Q13	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A6A5Q14	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A6A5Q17	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A5Q18	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A5Q19	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A5Q20	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A6A5R1	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
<i>2234A to 2823A</i>						
A6A5R2	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
<i>2837A and above</i>						
A6A5R2				NOT ASSIGNED		
A6A5R3	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R4	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R6	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R7	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
<i>2234A to 2823A</i>						
A6A5R8	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-T0-17R8-F
<i>2837A and above</i>						
A6A5R8				NOT ASSIGNED		
A6A5R9	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-T0-348R-F
A6A5R10	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R11	0698-7226	5		RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-T0-383R-F
<i>2234A to 2823A</i>						
A6A5R12	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
<i>2837A and above</i>						
A6A5R12				NOT ASSIGNED		
A6A5R13	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A5R14	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A5R15	0698-7200	5		RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-T0-31R6-F
A6A5R16	0698-7200	5		RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-T0-31R6-F
A6A5R17	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A5R18	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A5R19	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-21R5-F
A6A5R20	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A6A5R21	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-T0-147R-F
A6A5R22	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A5R23	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A6A5R24	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A6A5R25	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A6A5R26	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5R27	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A5R28	0698-3444	1		RESISTOR 316 1% .125W F TC=0+-100	24546	C4-1/8-T0-316R-F
A6A5R29	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A6A5R30	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A6A5R31	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R32	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A6A5R33	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A6A5R34*	0698-7242	5	2	RESISTOR 1.78K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1781-F
A6A5R35	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A6A5R36	0698-7266	3		RESISTOR 17.8K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1782-F
A6A5R37	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A5R38	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R39	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A6A5R40	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A6A5R41	0698-7275	4		RESISTOR 42.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4222-F
A6A5R42	0698-7256	1		RESISTOR 6.81K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6811-F
A6A5R43	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A6A5R44	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R45	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A6A5R46	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A6A5R47	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R48	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R49	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R50	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R51	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R52	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R53	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R54	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R55	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R56	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A6A5R57	0757-0424	7		RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A6A5R58	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A6A5R59	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A6A5R60	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R61	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R62	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R63	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R64	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A6A5R65	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R66	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R67	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R68	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A6A5R69	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A6A5R70	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A6A5R71	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A6A5R72	0698-3476	9		RESISTOR 6K 1% .125W F TC=0+-100	03888	PME55-1/8-T0-6001-F
A6A5R73	0757-1093	8		RESISTOR 3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3001-F
A6A5R74	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5R75	0698-3548	6		RESISTOR 732 1% .125W F TC=0+-100	24546	C4-1/8-T0-732R-F
A6A5R76	0757-0444	1		RESISTOR 12.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1212-F
A6A5R77	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A6A5R78	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A6A5R79	0757-0288	1		RESISTOR 9.09K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-9091-F
A6A5R80	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-T0-147R-F
A6A5R81	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A6A5R82	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A6A5R83	0757-0403	2		RESISTOR 121 1% .125W F TC=0+-100	24546	C4-1/8-T0-121R-F
A6A5R84	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A6A5R85	2100-2497	9		RESISTOR-TRMR 2K 10% C TOP-ADJ 1-TRN	7313B	82PR2K
A6A5R86	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A6A5R87	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A6A5R88	0757-0398	4		RESISTOR 75 1% .125W F TC=0+-100	24546	C4-1/8-T0-75R0-F
A6A5R89	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A6A5R90	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R91	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A6A5R92	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A6A5R93	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A6A5R94	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-T0-237R-F
A6A5R95	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1211-F
A6A5R96	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-T0-825R-F
A6A5R97	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A5R98	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A6A5R99	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A6A5R100	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A6A5R101	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A6A5R102	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R103	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A5R104	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A5R105	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A5R106	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A5R107	0698-7261	8		RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1102-F
A6A5R108	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R109	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R110	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R111	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R112	0698-7261	8		RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1102-F
A6A5R113	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A6A5R114	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A6A5R115	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R116	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A5R117	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A6A5R118	0698-7222	1		RESISTOR 261 1% .05W F TC=0+-100	24546	C3-1/8-T0-261R-F
A6A5R119	0698-7253	F		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A6A5R120	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A6A5R121	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5112-F
A6A5R122	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A6A5R123	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-T0-348R-F
A6A5R124	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5R125	0698-7241	4		RESISTOR 1.62K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1621-F
A6A5R126	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-TO-348R-F
A6A5R127	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R128	0698-7241	4		RESISTOR 1.62K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1621-F
A6A5R129	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1212-F
A6A5R130	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R132	0698-7275	4		RESISTOR 42.2K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4222-F
A6A5R133	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A5R134	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A5R135	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R136	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R138	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R139	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R140	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A6A5R141	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
A6A5R142	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A6A5R143	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A6A5R144	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A5R145	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A6A5R146	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A6A5R147	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
2234A TO 2513A A6A5R148	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
2516A AND ABOVE A6A4R148	0698-7239	0		RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1331-F
A6A5R149	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A5R150	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A6A5R151	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A6A5R152	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A5R153	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A5R154	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A5R155	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A6A5R156*	2100-2497	9	4	RESISTOR-TRMR 2K 10% C TOP-ADJ 1-TRN	73138	82PR2K
A6A5S1	3101-0860	9		SWITCH-SL DPDT MINTR .5A 125VAC/DC PC	28480	3101-0860
A6A5T1	08640-60355	0		TRANSFORMER, RF, BLUE	28480	08640-60355
A6A5T2	08640-60355	0		TRANSFORMER, RF, BLUE	28480	08640-60355
A6A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP12	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP13	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A5TP14	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A5U1	1826-0372		2	IC, LIMITER	28480	1826-0372
A6A5U2	1820-1344		8	IC PL LOOP 14-DIP-C PKG	04713	MC12040L
A6A5U3	1826-0026		3	IC COMPARATOR PRCN TO-99 PKG	01295	LM311L
A6A5U4	1826-0013		8	IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A6A5U5	1820-0668		7	IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A6A5U6	1820-1211		8	IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
2234A TO 2704A A6A5U7 †	1820-1781		7	IC SWITCH ANLG DUAL TO-100 PKG NOTE When replacing A6A4U7, refer to Section 7 for important update information	34371	HI2-200-5
2706A AND ABOVE A6A5U7	1820-1633		8	IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
2234A TO 2704A A6A5U8	1820-1781		7	IC SWITCH ANLG DUAL TO-100 PKG	34371	HI2-200-5
2706A AND ABOVE A6A5U8	1820-1633		8	IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
A6A5U9	1820-1322		2	IC GATE TTL S NOR QUAD 2-INP	01295	SN74S02N
A6A5U10	1826-0372		2	IC, LIMITER	28480	1826-0372
A6A5U11	1820-1112		8	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A6A5U12	1820-0579		9	IC MV TTL MONOSTBL RETRIG DUAL	01295	SN74123N
A6A5U13	1826-0138		8	IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N
A6A5U14	1820-0475		4	IC COMPARATOR HS TO-99 PKG	27014	LM306H
A6A5VR1	1902-0556		6	DIODE-ZNR 20V 5% PD=1W IR=5UA	28480	1902-0556
2234A TO 2513A A6A5VR2	1902-0554		4	DIODE-ZNR 10V 5% PD=1W IR=10UA	28480	1902-0554
2516A AND ABOVE A6A4VR2	1902-0955		9 2	DIODE-ZNR 7.5V 5% PD=.4W	28480	1902-0955
2234A TO 2704A A6A5W1	08662-20055		9	CABLE, SEMI-RIGID #51	28480	08662-20055
2706A AND ABOVE A6A5W1	08662-20292		6	CABLE, SEMI-RIGID #51	28480	08662-20292

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A6</b>						
A6A6	08662-60105	4	1	RF MIXER, RS LOOP ASSEMBLY	28480	08662-60105
A6A6C1	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A6A6C2	0160-3879	7		CAPACITOR-FXD .01UF +20% 100VDC CER	28480	0160-3879
A6A6C3	0180-2618	2		CAPACITOR-FXD 33UF+10% 10VDC TA	25088	D33GS1B10K
A6A6C4	0180-2619	3		CAPACITOR-FXD 22UF+10% 15VDC TA	25088	D22GS1B15K
A6A6C5	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C6	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C7	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C8	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C9	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C10	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C11	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C12	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C13	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C14	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C15	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C16	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C17	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C18	0160-3877	5		CAPACITOR-FXD 100PF +20% 200VDC CER	28480	0160-3877
A6A6C19	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C20	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A6A6C21	0160-3875	3		CAPACITOR-FXD 22PF +5% 200VDC CER 0+-30	28480	0160-3875
A6A6C22	0160-4547	8	2	CAPACITOR-FXD 150PF +5% 200VDC CER	28480	0160-4547
A6A6C23	0160-3874	2		CAPACITOR-FXD 10PF +.5PF 200VDC CER	28480	0160-3874
A6A6C24	0160-5970	3		CAPACITOR-FXD 3.9PF +.5PF 50VDC CER	28480	0160-5970
A6A6C25	0160-5970	3		CAPACITOR-FXD 3.9PF +.5PF 50VDC CER	28480	0160-5970
A6A6J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A6A6L1	9100-3922	4		COIL 3.0UH	28480	9100-3922
A6A6L2	9100-3922	4		COIL 3.0UH	28480	9100-3922
A6A6L3	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A6L4	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A6L5	9135-0073	3		INDUCTOR RF-CH-MLD 51NH 6% .102DX.26LG	28480	9135-0073
A6A6L6	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A6L7	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A6L8	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A6A6MP1	08662-00109	2	1	COVER- 1/3 END	28480	08662-00109
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A6MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A6MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A6MP4				NOT ASSIGNED		
A6A6Q1	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A6A6R1	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A6R2	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A6R3	0698-7216	3	16	RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A6R4	0757-0180	2	7	RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A6R5	0698-7202	7	1	RESISTOR 38.3 1% .05W F TC=0+-100	24546	C3-1/8-TO-38R3-F
A6A6R6	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A6R7	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A6R8	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A6R9	0698-3430	5	14	RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A6R10	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A6R11	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A6R12	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A6R13	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A6A6R14	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A6R15	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A6R16	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A6R17	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A6R18	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A6R19	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A6A6R20	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A6R21	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-TO-51R1-F
A6A6R22	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A6R23	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A6U1	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A6U2	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A6U3	0955-0096	9		MIXER, DOUBLE-BALANCE	28480	0955-0096
A6A6W1	08662-20048	0	2	CABLE, SEMI-RIGID (PART OF J2)	28480	08662-20048

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A7</b>						
A6A7	08662-60106	5	1	RF BUFFER ASSEMBLY	28480	08662-60106
A6A7C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A7C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A7C3	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A7C4	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A7C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C9	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C13	0160-3878	8		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C14	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C15	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C16	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C18	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C19	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C22	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A7C23	0160-3873	1		CAPACITOR-FXD 4.7PF +-5PF 200VDC CER	28480	0160-3873
A6A7C24	0160-3873	1		CAPACITOR-FXD 4.7PF +-5PF 200VDC CER	28480	0160-3873
A6A7J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A6A7J2	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A7L1	9100-3922	4		COIL, 3.0 UH	28480	9100-3922
A6A7L2	9100-3922	4		COIL, 3.0 UH	28480	9100-3922
A6A7L3	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A7L4	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A7L5	9135-0069	7		INDUCTOR, .030 UH	28480	9135-0069
A6A7MP1	08662-00104	7	1	COVER- 1/3 END	28480	08662-00104
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A7MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A7MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A7MP4				NOT ASSIGNED		
A6A7R1	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A7R2	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A7R3	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A7R4	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A7R5	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A7R6	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

*Table 6-3. Replaceable Parts*

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A7R7	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A6A7R8	0698-7198	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A7R9	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A6A7R10	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A7R11	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A7R12	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A7R13	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A6A7R14	0698-7198	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A7R15	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A6A7R16	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A7R17	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A6A7R18	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A7R19	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A6A7R20	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-T0-21R5-F
A6A7R21	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A7R22	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A7R23	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A7U1	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A7U2	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A7U3	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A7W1	08662-20047	9	1	CABLE, SEMI-RIGID (INCLUDES J2)	28480	08662-20047

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A8</b>						
A6A8	08662-60107	6	1	RF MIXER, OS LOOP ASSEMBLY	28480	08662-60107
<i>2234A to 2823A</i>						
A6A8C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A8C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
<i>2837A and above</i>						
A6A8C1	0160-6216	2		CAPACITOR-FXD 1000PF +-5% 50VDC CER	28480	0160-6216
A6A8C2	0160-6216	2		CAPACITOR-FXD 1000PF +-5% 50VDC CER	28480	0160-6216
A6A8C3	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A6A8C4	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A6A8C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C9	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C12	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C13	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C14	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C15	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C16	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C18	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A6A8C19	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A6A8C21	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A6A8C22	0160-4547	8		CAPACITOR-FXD 150PF +-5% 200VDC CER	28480	0160-4547
A6A8C23	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A6A8C24	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A6A8C25	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
<i>2234A to 2716A</i>						
A6A8C26				NOT ASSIGNED		
<i>2748A to 2823A</i>						
A6A8C26	0160-5971	4		CAPACITOR-FXD 4.7PF +-5PF 50VDC CER	28480	0160-5971
<i>2837A and above</i>						
A6A8C26	0160-5974	4		CAPACITOR-FXD 8.2PF +-5% 50VDC CER	28480	0160-5974
<i>2234A to 2823A</i>						
A6A8C27				NOT ASSIGNED		
<i>2837A and above</i>						
A6A8C27	0160-5974	4		CAPACITOR-FXD 8.2PF +-5% 50VDC CER	28480	0160-5974
A6A8J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A6A8L1	9100-3922	4		COIL 3.0UH	28480	9100-3922
A6A8L2	9100-3922	4		COIL 3.0UH	28480	9100-3922
A6A8L3	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A8L4	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A6A8L5	9135-0073	3		INDUCTOR, 051 UH	28480	9135-0073
A6A8L6	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A8L7	9100-2255	4		INDUCTOR RF-CH-MLD 470NH 10% .105DX.26LG	28480	9100-2255
A6A8L8	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A6A8MP1	08662-00012	6	1	COVER- 1/3 END	28480	08662-00012
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A6A8MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A8MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A6A8MP4				NOT ASSIGNED		
A6A8MP5	7120-8042	9	1	LABEL-IDENTIFICATION	28480	7120-8042

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).



**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A8Q1	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A6A8R1	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A8R2	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A8R3	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A8R4	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A8R5	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A6A8R6	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A6A8R7	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A8R8	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A8R9	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A8R10	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A8R11	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A8R12	0757-0180	2		RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
A6A8R13	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A6A8R14	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A8R15	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A8R16	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A6A8R17	0698-3430	5		RESISTOR 21.5 1% .125W F TC=0+-100	03888	PME55-1/8-TO-21R5-F
A6A8R18	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A6A8R19	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A6A8R20	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A8R21	0757-0394	0		RESISTOR 51.1 1% .125W F TC=0+-100	24546	C4-1/8-TO-51R1-F
A6A8R22	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A8R23	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/8-TO-21R5-F
A6A8U1	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A8U2	1826-0372	2		IC, LIMITER	28480	1826-0372
A6A8U3	0955-0096	9		MIXER, DOUBLE-BALANCE	28480	0955-0096
A6A8W1	08662-20048	0		CABLE, SEMI-RIGID (INCLUDES J2)	28480	08662-20048

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A9</b>						
2234A TO 2549A						
A6A9 †	08662-60101	0	1	HF LOOP & REF. SECTION CONTROLLER ASSY	28480	08662-60101
2552A AND ABOVE						
A6A9	08662-60326	1	1	HF LOOP & REF. SECTION CONTROLLER ASSY	28480	08662-60326
2234 TO 2549A						
A6A9C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C8	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A6A9C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
2552A AND ABOVE						
A6A9C1	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C2	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C3	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C4	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C5	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C6	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C7	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C8	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C9	0160-4832	4		CAPACITOR-FXD .01UF +-10% 100VDC CER	28480	0160-4832
A6A9C10	0180-2208	6		CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
A6A9C11	0180-2216	5	1	CAPACITOR-FXD 170UF+75-10% 15VDC AL	56289	30D177G015DD2
A6A9C12	0180-0141	2		CAPACITOR-FXD 50UF+75-10% 50VDC AL	56289	30D506G050DD2
A6A9CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A6A9J1	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A6A9J2	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A6A9L1	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND; IMP;>680	28480	9100-1788
A6A9L2	08662-60316	9		TOROID, FILTER 630 UH	28480	08662-60316
A6A9L3	08662-60316	9		TOROID, FILTER 630 UH	28480	08662-60316
A6A9L4	9100-3922	4		COIL, 3.0 UH	28480	9100-3922
A6A9L5	9100-3922	4		COIL, 3.0 UH	28480	9100-3922
A6A9MP1	08662-00080	8	1	COVER, FULL OSC. TANG	28480	08662-00080
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A9Q1-20				NOT ASSIGNED		
A6A9Q21	1853-0012	4	1	TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
A6A9Q22	1854-0263	9		TRANSISTOR NPN 2N3019 SI TO-39 PD=600MW	04713	2N3019
A6A9Q23	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A6A9Q24	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A6A9Q25	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A6A9R1	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R2	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R3	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R4	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R6	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R7	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A6A9R8	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A6A9R9	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A6A9R10	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R11	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2151-F
A6A9R12	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R13	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-TO-178R-F
A6A9R14	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R15	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R16	2100-1986	9		RESISTOR-TRMR 1K 10% C TOP-ADJ 1-TRN	73138	82PR1K
A6A9R17	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1002-F
A6A9R18	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2151-F
A6A9R19	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R20	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5111-F
A6A9R21	0757-0400	9		RESISTOR 90.9 1% .125W F TC=0+-100	24546	C4-1/8-TO-90R9-F
A6A9R22	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-TO-101-F
A6A9R23	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R24	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-TO-5111-F
A6A9R25	0764-0016	8		RESISTOR 1K 5% 2W MO TC=0+-200	28480	0764-0016
A6A9R26	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2151-F
A6A9R27	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R28	0757-0400	9		RESISTOR 90.9 1% .125W F TC=0+-100	24546	C4-1/8-TO-90R9-F
A6A9R29	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R30	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1001-F
A6A9R31	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R32	0698-4037	0		RESISTOR 46.4 1% .125W F TC=0+-100	24546	C4-1/8-TO-46R4-F
A6A9R33	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R34	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-TO-751-F
A6A9R35	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R36	0698-3391	7	2	RESISTOR 21.5 1% .5W F TC=0+-100	28480	0698-3391
A6A9R37	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R38	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2151-F
A6A9R39	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R40	0698-3439	4		RESISTOR 178 1% .125W F TC=0+-100	24546	C4-1/8-TO-178R-F
A6A9R41	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F
A6A9R42	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-TO-2151-F
A6A9R43	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3162-F
A6A9R44	0757-0400	9		RESISTOR 90.9 1% .125W F TC=0+-100	24546	C4-1/8-TO-90R9-F
A6A9R45	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3161-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A6A9R46	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A6A9R47	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A6A9R48	0757-0400	9		RESISTOR 90.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-90R9-F
A6A9R49	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A6A9R50	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A6A9R51	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A6A9R52	0698-4037	0		RESISTOR 46.4 1% .125W F TC=0+-100	24546	C4-1/8-T0-46R4-F
A6A9R53	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A6A9R54	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A6A9R55	0698-3160	8		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
A6A9R56	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A6A9R57	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A6A9R58	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A6A9R59	0698-3391	7		RESISTOR 21.5 1% .5W F TC=0+-100	28480	0698-3391
A6A9TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A9TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
<i>2234A to 2748A</i>						
A6A9U1	08662-80005	5	1	PROM, PROGRAMMED	28480	08662-80005
A6A9U2	08662-80006	6	1	PROM, PROGRAMMED	28480	08662-80006
A6A9U3	08662-80007	7	1	PROM, PROGRAMMED	28480	08662-80007
<i>2823A and above</i>						
A6A9U1	08662-80085	1	1	PROM, PROGRAMMED	28480	08662-80085
A6A9U2	08662-80086	2	1	PROM, PROGRAMMED	28480	08662-80086
A6A9U3	08662-80087	3	1	PROM, PROGRAMMED	28480	08662-80087
A6A9VR1	1902-3171	7		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171
A6A9VR2	1902-3171	7		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171
A6A9VR3	1902-3171	7		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A6A10</b>						
A6A10	08662-60110	1	1	HF LOOP & REF. SECTION MOTHER BOARD	28480	08662-60110
A6A10E1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A10E2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A10E3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A10E4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A10E5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A6A10J1	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A6A10J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A6A10J3	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A6A10J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A6A10L1	9140-0335	1		INDUCTOR, 110 UH	28480	9140-0335
A6A10MP1	08662-00161	6	1	CLAMP-CABLE	28480	08662-00161
	2190-0004	9	1	WASHER-LK INTL T NO. 4 .115-IN-ID	28480	2190-0004
A6A10XA6A1	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A6A10XA6A2	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A6A10XA6A3	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A6A10XA6A4	1251-1634	2	3	CONNECTOR-PC EDGE 18-CONT/ROW 1-ROW	28480	1251-1634
A6A10XA6A5	1251-1634	2		CONNECTOR-PC EDGE 18-CONT/ROW 1-ROW	28480	1251-1634
A6A10XA6A6	1251-1631	9		CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631
A6A10XA6A7	1251-1631	9		CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631
A6A10XA6A8	1251-1631	9		CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631
A6A10XA6A9	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A7A1</b>						
2234A TO 2644A A7A1	08662-60157	6	1	LINEAR REGULATOR ASSEMBLY	28480	08662-60157
2651A AND ABOVE A7A1	08662-60347	6	1	LINEAR REGULATOR ASSEMBLY	28480	08662-60347
A7A1C1	0180-2834	4	2	CAPACITOR-FXD 82UF+-10% 75VDC TA	56289	109D826X9075F2
A7A1C2	0180-2834	4		CAPACITOR-FXD 82UF+-10% 75VDC TA	56289	109D826X9075F2
A7A1C3	0180-0230	0	3	CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
A7A1C4	0160-0572	1		CAPACITOR-FXD 2200PF +-20% 100VDC CER	28480	0160-0572
A7A1C5	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A7A1C6	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A7A1C7	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
A7A1C8	0180-0230	0		CAPACITOR-FXD 1UF+-20% 50VDC TA	56289	150D105X0050A2
A7A1C9	0180-0228	6	4	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A7A1C10	0160-3445	3	3	CAPACITOR-FXD .047UF +-20% 200VDC PPR	28480	0160-3445
A7A1C11	0180-0049	9	1	CAPACITOR-FXD 20UF+75-10% 50VDC AL	56289	30D206G050CC2
A7A1C12	0160-3445	3		CAPACITOR-FXD .047UF +-20% 200VDC PPR	28480	0160-3445
A7A1C13	0160-3094	8	1	CAPACITOR-FXD .1UF +-10% 100VDC CER	28480	0160-3094
A7A1C14	0180-1704	5	1	CAPACITOR-FXD 47UF+-10% 6VDC TA	56289	150D476X9006B2
A7A1C15	0160-3445	3		CAPACITOR-FXD .047UF +-20% 200VDC PPR	28480	0160-3445
A7A1C16	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A7A1C17	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A7A1C18	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A7A1C19	0180-0597	2	1	CAPACITOR-FXD 22UF+-10% 50VDC TA	56289	M39003/01-2381
A7A1CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A1CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A1CR3	1901-1065	2	11	DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A1CR4	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A1CR5	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A1DS1	1990-0327	4	1	LED-LAMP LUM-INT=800UCD IF=50MA-MAX	28480	5082-4415
A7A1DS2	1990-0523	2	4	LED-LAMP LUM-INT=1MCD IF=50MA-MAX BVR=5V	28480	5082-4950
A7A1DS3	1990-0523	2		LED-LAMP LUM-INT=1MCD IF=50MA-MAX BVR=5V	28480	5082-4950
A7A1DS4	1990-0523	2		LED-LAMP LUM-INT=1MCD IF=50MA-MAX BVR=5V	28480	5082-4950
A7A1MP1	0340-0875	9		INSULATOR-XSTR THRM-CNDCT	28480	0340-0875
A7A1MP2	08662-00006	8	1	HEAT SINK, POWER SUPPLY	28480	08662-00006
	2190-0007	2	2	WASHER-LK INTL T NO. 6 .141-IN-ID	28480	2190-0007
	2360-0119	8	1	SCREW-MACH 6-32 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2420-0003	7	3	NUT-HEX-DBL-CHAM 6-32-THD .094-IN-THK	28480	2420-0003
A7A1MP3	4040-0749	4	2	EXTR-PC BD BRN POLYC .062-BD-THKNS	28480	4040-0749
	1480-0073	6	6	PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A7A1MP4	4040-0749	4		EXTR-PC BD BRN POLYC .062-BD-THKNS	28480	4040-0749
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A7A1MP5	08662-00017	1	2	SHIELD, PC BOARD	28480	08662-00017
	2200-0105	4		SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI (CONNECTS PC BOARD TO SHIELD)	00000	ORDER BY DESCRIPTION
A7A1Q1	1854-0846	4	3	TRANSISTOR NPN PD=150W FT=4MHZ	28480	1854-0846
	0340-0875	9	5	INSULATOR-XSTR THRM-CNDCT	28480	0340-0875
	3050-0023	7		WASHER-FL NM NO. 6 .144-IN-ID .25-IN-OD	28480	3050-0023
A7A1Q2	1854-0846	4		TRANSISTOR NPN PD=150W FT=4MHZ	28480	1854-0846
	0340-0875	9		INSULATOR-XSTR THRM-CNDCT	28480	0340-0875
	3050-0023	7		WASHER-FL NM NO. 6 .144-IN-ID .25-IN-OD	28480	3050-0023

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A1Q3	1854-0846	4		TRANSISTOR NPN PD=150W FT=4MHZ	28480	1854-0846
	0340-0875	9		INSULATOR-XSTR THRM-CNDCT	28480	0340-0875
	3050-0023	7		WASHER-FL NM NO. 6 .144-IN-ID .25-IN-OD	28480	3050-0023
<i>2234A TO 2644A</i>						
A7A1Q4	1884-0217	6	3	THYRISTOR-TRIAC	04713	MAC-10-2
<i>2651A AND ABOVE</i>						
A7A1Q4	1884-0330	4	3	THYRISTOR-TRIAC	04713	MAC-10-2
A7A1Q5	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
	1200-0173	5	12	INSULATOR-XSTR DAP-GL	28480	1200-0173
<i>2234A TO 2644A</i>						
A7A1Q6	1884-0217	6		THYRISTOR-TRIAC	04713	MAC-10-2
<i>2651A AND ABOVE</i>						
A7A1Q6	1884-0330	4		THYRISTOR-TRIAC	04713	MAC-10-2
A7A1Q7	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
<i>2234A TO 2644A</i>						
A7A1Q8	1884-0217	6		THYRISTOR-TRIAC	04713	MAC-10-2
<i>2651A AND ABOVE</i>						
A7A1Q8	1884-0330	4		THYRISTOR-TRIAC	04713	MAC-10-2
A7A1Q9	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A1Q10	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A7A1Q11	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A7A1Q12	1853-0020	4	6	TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A7A1Q13	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A7A1Q14	1884-0201	8	3	THYRISTOR-SCR TO-92 VRRM=60	04713	2N5061
A7A1Q15	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A7A1Q16	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A7A1R1	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A7A1R2	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A7A1R3	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A1R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A1R5	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
A7A1R6	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A7A1R7	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
A7A1R8	0757-0289	2		RESISTOR 13.3K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-1332-F
A7A1R9	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A7A1R10	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A7A1R11	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A7A1R12	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A7A1R13	0698-3451	0	1	RESISTOR 133K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1333-F
A7A1R14	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A7A1R15	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A7A1R16	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A7A1R17	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A7A1R18	2100-3109	2		RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A7A1R19	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4221-F
A7A1R20	2100-3056	8	2	RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A7A1R21	0698-3136	8		RESISTOR 17.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1782-F
A7A1R22	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A7A1R23	0698-4037	0		RESISTOR 46.4 1% .125W F TC=0+-100	24546	C4-1/8-T0-46R4-F
A7A1R24	0761-0058	2	1	RESISTOR 750 5% 1W MO TC=0+-200	28480	0761-0058
A7A1R25	0757-0276	7	2	RESISTOR 61.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A7A1R26	0757-0276	7		RESISTOR 61.9 1% .125W F TC=0+-100	24546	C4-1/8-T0-6192-F
A7A1R27	0811-1340	4	2	RESISTOR 1 5% 5W PW TC=0+-50	28480	0811-1340
A7A1R28	0811-1340	4		RESISTOR 1 5% 5W PW TC=0+-50	28480	0811-1340
A7A1R29	0757-0397	3	3	RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A7A1R30	0757-0397	3		RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A7A1R31	0757-0418	9	3	RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A1R32	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A7A1R33	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A1R34	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A7A1R35	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A7A1R36	0811-1659	8	1	RESISTOR .27 5% 2W PW TC=0+-800	75042	BWH2-27/100-J
A7A1R37	0811-1667	8	1	RESISTOR 1.2 5% 2W PW TC=0+-400	75042	BWH2-1R2-J
A7A1R38	0698-3157	3		RESISTOR 19.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1962-F
A7A1R39	2100-3123	0		RESISTOR-TRMR 500 10% C SIDE-ADJ 17-TRN	02111	43P501
A7A1R40	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A7A1R41	0757-0421	4		RESISTOR 825 1% .125W F TC=0+-100	24546	C4-1/8-T0-825R-F
A7A1R42	0698-3412	3	1	RESISTOR 3.83K 1% .5W F TC=0+-100	28480	0698-3412
A7A1R43	0757-0278	9		RESISTOR 1.78K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1781-F
A7A1R44	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A7A1R45	0757-0397	3		RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
A7A1R46	0698-3440	7		RESISTOR 196 1% .125W F TC=0+-100	24546	C4-1/8-T0-196R-F
A7A1TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A1TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A1TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A1TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A1TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A1TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
2234A TO 2416A A7A1U1	1826-0473	4	1	IC, LINEAR REGULATOR	28480	1826-0473
2419A AND ABOVE A7A1U1	1826-0016	1	2	IC 204 V RGLTR TO-100	04713	MLM204G
	1205-0011	0	3	HEAT SINK TO-5/TO-39-CS	28480	1205-0011
A7A1U2	1826-0016	1		IC 204 V RGLTR TO-100	04713	MLM204G
A7A1U3	1820-0247	8	1	IC V RGLTR TO-99	27014	LM305H
A7A1VR1	1902-3234	3	1	DIODE-ZNR 19.6V 5% DO-35 PD=.4W	28480	1902-3234
A7A1VR2	1902-3361	7	1	DIODE-ZNR 57.6V 2% DO-7 PD=.4W TC=+.082%	28480	1902-3361
A7A1VR3	1902-3323	1	1	DIODE-ZNR 42.2V 5% DO-35 PD=.4W TC=+.08%	28480	1902-3323
A7A1VR4	1902-3256	9	1	DIODE-ZNR 23.7V 5% DO-35 PD=.4W	28480	1902-3256
A7A1VR5	1902-3171	7		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.062%	28480	1902-3171
A7A1VR6	1902-3333	3	1	DIODE-ZNR 46.4V 5% DO-35 PD=.4W	28480	1902-3333

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A7A2</b>						
A7A2	08662-60158	7	1	CONTROL BOARD ASSEMBLY	28480	08662-60158
A7A2C1	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A7A2C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A7A2C3	0180-2779	6	4	CAPACITOR-FXD 470UF+75-10% 50VDC AL	56289	30D477G050FK2
A7A2C4	0180-2779	6		CAPACITOR-FXD 470UF+75-10% 50VDC AL	56289	30D477G050FK2
A7A2C5	0160-2453	1	1	CAPACITOR-FXD .22UF +-10% 80VDC POLYE	28480	0160-2453
A7A2C6	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A7A2C7	0180-1743	2	1	CAPACITOR-FXD .1UF+-10% 35VDC TA	56289	150D104X9035A2
A7A2C8	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A7A2C9	0180-2779	6		CAPACITOR-FXD 470UF+75-10% 50VDC AL	56289	30D477G050FK2
A7A2C10	0180-2779	6		CAPACITOR-FXD 470UF+75-10% 50VDC AL	56289	30D477G050FK2
A7A2C11	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A7A2C12	0160-0127	2	4	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A7A2C13	0160-3468	0	1	CAPACITOR-FXD .12UF +-10% 80VDC POLYE	28480	0160-3468
A7A2C14	0160-0158	9		CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A7A2C15	0160-3537	4		CAPACITOR-FXD 680PF +-5% 100VDC MICA	28480	0160-3537
A7A2C16	0140-0194	1	1	CAPACITOR-FXD 110PF +-5% 300VDC MICA	72136	DM15F111J0300WV1CR
A7A2C17	0160-2306	3	1	CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2306
A7A2C18	0180-1819	3	1	CAPACITOR-FXD 100UF+75-10% 50VDC AL	56289	30D107G050DH2
A7A2C19	0160-0153	4	1	CAPACITOR-FXD 1000PF +-10% 200VDC POLYE	28480	0160-0153
A7A2C20	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A7A2C21	0160-2201	7	1	CAPACITOR-FXD 51PF +-5% 300VDC MICA	28480	0160-2201
A7A2C22	0160-0161	4		CAPACITOR-FXD .01UF +-10% 200VDC POLYE	28480	0160-0161
A7A2C23	0160-0945	2	1	CAPACITOR-FXD 910PF +-5% 100VDC MICA	28480	0160-0945
A7A2C24	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A7A2C25	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A7A2C26	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A7A2C27	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A7A2C28	0180-1746	5	6	CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A7A2C29	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A7A2C30	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A7A2C31	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A7A2C32	0140-0197	4	2	CAPACITOR-FXD 180PF +-5% 300VDC MICA	72136	DM15F181J0300WV1CR
A7A2C33	0140-0197	4		CAPACITOR-FXD 180PF +-5% 300VDC MICA	72136	DM15F181J0300WV1CR
A7A2C34	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A7A2C35	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
A7A2CR1	1901-0200	5	4	DIODE-PWR RECT 100V 1.5A	28480	1901-0200
A7A2CR2	1901-0200	5		DIODE-PWR RECT 100V 1.5A	28480	1901-0200
A7A2CR3	1901-0200	5		DIODE-PWR RECT 100V 1.5A	28480	1901-0200
A7A2CR4	1901-0200	5		DIODE-PWR RECT 100V 1.5A	28480	1901-0200
A7A2CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A2CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR13	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR14	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2CR19	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A7A2DS1	1990-0523	2		LED-LAMP LUM-INT=1MCD IF=50MA-MAX BVR=5V	28480	5082-4950
A7A2L1	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A7A2L2	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A7A2L3	9140-0114	4	3	INDUCTOR RF-CH-MLD 10UH 10% .166DX.385LG	28480	9140-0114
A7A2L4	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A7A2MP1	4040-0750	7	2	EXTR-PC BD RED POLYC .062-BD-THKNS	28480	4040-0750
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A7A2MP2	4040-0750	7		EXTR-PC BD RED POLYC .062-BD-THKNS	28480	4040-0750
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A7A2MP3	1205-0312	4	1	HEAT SINK SGL TO-3-CS	28480	1205-0312
	2190-0006	1	2	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0006
	2380-0199	4	1	SCREW-MACH 6-32 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2420-0003	7		NUT-HEX-DBL-CHAM 6-32-THD .094-IN-THK	28480	2420-0003
A7A2Q1	1853-0053	3	1	TRANSISTOR PNP SI TO-3 PD=150W FT=3MHZ	28480	1853-0053
2234A TO 2552A A7A2Q2	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
2601A AND ABOVE A7A2Q2	1854-1046	8		TRANSISTOR-DUAL NPN TO-78 PD=750MW	28480	1854-1046
A7A2Q3	1853-0442	4	3	TRANSISTOR PNP 2N3867 SI TO-5 PD=1W	04713	2N3867
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A2Q4	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A7A2Q5	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q6	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q7	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q8	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A7A2Q9	1884-0201	8		THYRISTOR-SCR TO-92 VRRM=60	04713	2N5081
A7A2Q10	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A2Q11	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q12	1853-0012	4		TRANSISTOR PNP 2N2904A SI TO-39 PD=600MW	01295	2N2904A
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A2Q13	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q14	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A7A2Q15	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A7A2Q16	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q17	1853-0007	7		TRANSISTOR PNP 2N3251 SI TO-18 PD=360MW	04713	2N3251
A7A2Q18	1854-0210	6		TRANSISTOR NPN 2N2222 SI TO-18 PD=500MW	04713	2N2222
A7A2Q19	1884-0201	8		THYRISTOR-SCR TO-92 VRRM=60	04713	2N5081
A7A2R1	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A7A2R2	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R3	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R4	0757-0443	0	3	RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A7A2R5	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A7A2R6	0698-3161	9	1	RESISTOR 38.3K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3832-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A2R7	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A7A2R8	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A7A2R9	0698-3454	3	2	RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2153-F
A7A2R10	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A7A2R11	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A7A2R12	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A7A2R13	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A7A2R14	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A7A2R15	2100-3154	7		RESISTOR-TRMR 1K 10% C SIDE-ADJ 17-TRN	02111	43P102
A7A2R16	0757-0200	7		RESISTOR 5.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5621-F
A7A2R17	0698-3449	6	1	RESISTOR 28.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2872-F
A7A2R18	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R19	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A7A2R20	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R21	0698-3457	6	1	RESISTOR 316K 1% .125W F TC=0+-100	28480	0698-3457
A7A2R22	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A7A2R23	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A7A2R24	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A7A2R25	0757-0439	4	2	RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A7A2R26	0698-3159	5	1	RESISTOR 26.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2612-F
A7A2R27	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A7A2R28	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R29	0698-0090	7	2	RESISTOR 464 1% .5W F TC=0+-100	28480	0698-0090
A7A2R30	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A7A2R31	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A7A2R32	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A7A2R33	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A7A2R34	0698-3445	2		RESISTOR 348 1% .125W F TC=0+-100	24546	C4-1/8-T0-348R-F
A7A2R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R36	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R37	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A7A2R38	0757-0439	4		RESISTOR 6.81K 1% .125W F TC=0+-100	24546	C4-1/8-T0-6811-F
A7A2R39	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A7A2R40	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-T0-383R-F
A7A2R41	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A7A2R42	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A7A2R43	0757-0419	0		RESISTOR 681 1% .125W F TC=0+-100	24546	C4-1/8-T0-681R-F
A7A2R44	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A7A2R45	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A7A2R46	0698-3156	2		RESISTOR 14.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1472-F
A7A2R47	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A7A2R48	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R49	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A7A2R50	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A7A2R51	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A7A2R52	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A7A2R53	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A7A2R54	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A7A2R55	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A7A2R56	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F
A7A2R57	0698-0083	8		RESISTOR 1.96K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1961-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A7A2U1	1820-1746	4	1	IC BFR CMOS INV HEX	04713	MC14049UBCP
A7A2U2	1826-0180	0	1	IC TIMER TTL MONO/ASTBL	01295	NE555P
A7A2U3	1826-0192	4	1	IC V RGLTR TO-39	27014	LM320H-15
	1205-0011	0		HEAT SINK TO-5/TO-39-CS	28480	1205-0011
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A2U4	1820-1963	7	2	IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A7A2U5	1820-1965	9	1	IC GATE CMOS NOR TPL 3-INP	04713	MC14025BCP
A7A2U6	1820-1963	7		IC FF CMOS D-TYPE POS-EDGE-TRIG DUAL	3L585	CD4013BAE
A7A2U7	1820-1745	3	1	IC GATE CMOS NOR QUAD 2-INP	04713	MC14001BCP
A7A2U8	1826-0013	8		IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A7A2U9	1826-0488	1	4	IC OP AMP WB TO-99 PKG	27014	LM218H
A7A2U10	1826-0488	1		IC OP AMP WB TO-99 PKG	27014	LM218H
A7A2VR1	1902-0025	4	2	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025
A7A2VR2	1902-0680	7	1	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W	24046	1N827
A7A2VR3	1902-3104	6	1	DIODE-ZNR 5.62V 5% DO-35 PD=.4W	28480	1902-3104
A7A2VR4	1902-0064	1	2	DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.05%	28480	1902-0064
A7A2VR5	1902-3139	7	2	DIODE-ZNR 8.25V 5% DO-35 PD=.4W	28480	1902-3139
A7A2VR6	1902-0064	1		DIODE-ZNR 7.5V 5% DO-35 PD=.4W TC=+.05%	28480	1902-0064
A7A2VR7	1902-0579	3	1	DIODE-ZNR 5.1V 5% PD=1W IR=10UA	28480	1902-0579
A7A2VR8	1902-3149	9	2	DIODE-ZNR 9.09V 5% DO-35 PD=.4W	28480	1902-3149
A7A2VR9	1902-3149	9		DIODE-ZNR 9.09V 5% DO-35 PD=.4W	28480	1902-3149

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A7A3</b>						
A7A3	08662-60289	5	1	INVERTER ASSEMBLY	28480	08662-60289
A7A3C1	0180-4612	0	2	CAPACITOR-FXD 15UF+50-10% 300VDC AL	28480	0180-4612
A7A3C2	0180-4612	0		CAPACITOR-FXD 15UF+50-10% 300VDC AL	28480	0180-4612
A7A3C3	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A7A3C4	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A7A3C5	0160-4217	9	1	CAPACITOR-FXD 3900PF +-1% 500VDC MICA	28480	0160-4217
A7A3C6	0160-0297	7	1	CAPACITOR-FXD 1200PF +-10% 200VDC POLYE	28480	0160-0297
A7A3C8	0180-2751	4	1	CAPACITOR-FXD 470UF+100-10% 12VDC AL	00853	301EM471U012B
A7A3C9	0180-4614	2	1	CAPACITOR-FXD 68UF+100-10% 60VDC AL	56289	672D686H060DM5C
A7A3C10	0180-2749	0	1	CAPACITOR-FXD 270UF+100-10% 25VDC AL	00853	301EM271U025B
A7A3C11	0180-4613	1	1	CAPACITOR-FXD 27UF+100-10% 100VDC AL	56289	672D276H100DM5C
A7A3C12	0160-0168	1	3	CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A7A3C13	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A7A3CR1	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR2	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR3	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR4	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR5	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR6	1901-0792	0	2	DIODE-SCHOTTKY 45V 30A	28480	1901-0792
	2740-0003	5	2	NUT-HEX-W/LKWR 10-32-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
A7A3CR7	1901-0792	0		DIODE-SCHOTTKY 45V 30A	28480	1901-0792
	2740-0003	5		NUT-HEX-W/LKWR 10-32-THD .125-IN-THK	00000	ORDER BY DESCRIPTION
A7A3CR8	1901-0685	0	4	DIODE-PWR RECT 250V 5A 200NS	04713	MR822
A7A3CR9	1901-0685	0		DIODE-PWR RECT 250V 5A 200NS	04713	MR822
A7A3CR10	1901-0685	0		DIODE-PWR RECT 250V 5A 200NS	04713	MR822
A7A3CR11	1901-0685	0		DIODE-PWR RECT 250V 5A 200NS	04713	MR822
A7A3CR12	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR13	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3CR14	1901-1065	2		DIODE-PWR RECT 1N4936 400V 1A 200NS	14936	1N4936
A7A3F1	2110-0630	9	1	FUSE .4A 125V NTD .25X.27	28480	2110-0630
A7A3F2	9100-4033	0	2	FUSE .4A 125V NTD .25X.27	28480	9100-4033
A7A3L1	9100-4033	0	2	COIL, CHOKE 100 UH	28480	9100-4033
A7A3L2	9100-4033	0		COIL, CHOKE 100 UH	28480	9100-4033
A7A3L3	9100-4016	9	2	COIL, CHOKE 500 UH	28480	9100-4016
A7A3L4	9100-4016	9		COIL, CHOKE 500 UH	28480	9100-4016
A7A3L5	9100-4015	8	1	COIL, CHOKE 6.4 MH	28480	9100-4015
A7A3L6	9140-0315	7	2	FERRITE CHOKE	28480	9140-0315
A7A3L7	9140-0315	7		FERRITE CHOKE	28480	9140-0315
A7A3MP1	4040-0751	8	2	EXTR-PC BD ORN POLYC .062-BD-THKNS	28480	4040-0751
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A7A3MP2	4040-0751	8		EXTR-PC BD ORN POLYC .062-BD-THKNS	28480	4040-0751
	1480-0073	6		PIN-ROLL .062-IN-DIA .25-IN-LG BE-CU	28480	1480-0073
A7A3MP3	08662-00016	0		SUPPORT, PC BOARD #3	28480	08662-00016
A7A3MP4	08662-20042	4	2	EXTRUSION, HEAT SINK, .3	28480	08662-20042
	2360-0117	6	5	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	08662-00237	7		INSULATOR SHIELD BCK	28480	08662-00237
A7A3MP5	08662-20042	4		EXTRUSION, HEAT SINK, .3	28480	08662-20042
	2360-0117	6		SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	08662-00239	9		INSULATOR SHIELD BCK	28480	08662-00239
2234A TO 2441A						
A7A3MP6	08662-20043	5	1	EXTRUSION, HEAT SINK, DIODE	28480	08662-20043
	6960-0116	1	2	PLUG HOLE	28480	6960-0116
	2360-0117	6		SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
2446A AND ABOVE						
A7A3MP6	08662-20043	5	1	EXTRUSION, HEAT SINK, DIODE	28480	08662-20043
	08662-00218	4	1	INSULATOR, HT SK.	28480	08662-00218
	2360-0117	6		SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	08662-00238	8		INSULATOR SHIELD BCK	28480	08662-00238

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A3Q1	1853-0442	4		TRANSISTOR PNP 2N3867 SI TO-5 PD=1W	04713	2N3867
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A3Q2	1853-0442	4		TRANSISTOR PNP 2N3867 SI TO-5 PD=1W	04713	2N3867
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A7A3Q3	1854-0657	5	2	TRANSISTOR NPN SI TO-3 PD=73.5W	28480	1854-0657
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	1251-2313	6	4	CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	28480	1251-2313
A7A3Q4	1854-0657	5		TRANSISTOR NPN SI TO-3 PD=73.5W	28480	1854-0657
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	1251-2313	6		CONNECTOR-SGL CONT SKT .04-IN-BSC-SZ RND	28480	1251-2313
A7A3R1	0764-0006	6	4	RESISTOR 18K 5% 2W MO TC=0+-200	28480	0764-0006
A7A3R2	0764-0006	6		RESISTOR 18K 5% 2W MO TC=0+-200	28480	0764-0006
A7A3R3	0757-0402	1	3	RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A7A3R4	0757-0402	1		RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A7A3R5	0757-0984	4	2	RESISTOR 10 1% .5W F TC=0+-100	28480	0757-0984
A7A3R6	0757-0984	4		RESISTOR 10 1% .5W F TC=0+-100	28480	0757-0984
A7A3R7	0757-0405	4	2	RESISTOR 162 1% .125W F TC=0+-100	24546	C4-1/8-T0-162R-F
A7A3R8	0757-0405	4		RESISTOR 162 1% .125W F TC=0+-100	24546	C4-1/8-T0-162R-F
A7A3R9	0757-0398	4		RESISTOR 75 1% .125W F TC=0+-100	24546	C4-1/8-T0-75R0-F
A7A3R10	0757-0398	4		RESISTOR 75 1% .125W F TC=0+-100	24546	C4-1/8-T0-75R0-F
A7A3R11	0698-3180	2	2	RESISTOR 68 2% 2W MO TC=0+-200	28480	0698-3180
A7A3R12	0698-3180	2		RESISTOR 68 2% 2W MO TC=0+-200	28480	0698-3180
A7A3R13	0698-3620	5	1	RESISTOR 100 5% 2W MO TC=0+-200	28480	0698-3620
A7A3R15	0811-1673	6	1	RESISTOR 3.9 5% 2W PW TC=0+-400	75042	BWH2-3R9-J
A7A3RT1	0837-0153	9	1	THERMISTOR PROBE 100K-OHM TC=-4.6%/C-DEG	83186	51A92
	08662-00162	7	2	PAD, FOAM	28480	08662-00162
	0460-0042	6	2	TAPE ELE .75-IN-W .0025-IN-T POLYE-FLM	00000	ORDER BY DESCRIPTION
A7A3T1	9100-4018	1	2	TRANSFORMER	28480	9100-4018
A7A3T2	9100-4018	1		TRANSFORMER	28480	9100-4018
A7A3T3	9100-4017	0	1	TRANSFORMER	28480	9100-4017
	3050-0062	4	1	WASHER-FL NM NO. 8 .188-IN-ID .438-IN-OD	28480	3050-0062
	2580-0003	5	2	NUT-HEX-W/LKWR 8-32-THD .125-IN-THK	00000	ORDER BY DESCRIPTION

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A7A4</b>						
2234A TO 2537A						
A7A4 †	08662-60156	5	1	POWER SUPPLY MOTHER BOARD	28480	08662-60156
2545A AND ABOVE						
A7A4	08662-60376	1	1	POWER SUPPLY MOTHER BOARD	28480	08662-60376
A7A4C1	0150-0012	3	1	CAPACITOR-FXD .01UF +-20% 1KVDC CER	56289	C023A102J103MS38
A7A4C2	0180-2835	5	2	CAPACITOR-FXD 600UF+50-10% 250VDC AL	28480	0180-2835
	2680-0129	8	6	SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2190-0011	8	6	WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0011
A7A4C3	0180-2835	5		CAPACITOR-FXD 600UF+50-10% 250VDC AL	28480	0180-2835
	2680-0129	8		SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2190-0011	8		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0011
A7A4C4	0160-4851	7	1	CAPACITOR-FXD .022UF +-20% 250VAC(RMS)	28480	0160-4851
A7A4C5	0160-0168	1		CAPACITOR-FXD .1UF +-10% 200VDC POLYE	28480	0160-0168
A7A4C6	0180-2862	8	1	CAPACITOR-FXD .015F+-20% 7.5VDC AL	28480	0180-2862
	2680-0129	8		SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2190-0011	8		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0011
A7A4C7	0180-2208	6		CAPACITOR-FXD 220UF+-10% 10VDC TA	56289	150D227X9010S2
2234A TO 2537A						
A7A4CR1	1901-0494	9	6	DIODE-PWR RECT 1N5003 1KV 1.5A	04713	1N5003
A7A4CR2	1901-0494	9		DIODE-PWR RECT 1N5003 1KV 1.5A	04713	1N5003
A7A4CR3	1901-0494	9		DIODE-PWR RECT 1N5003 1KV 1.5A	04713	1N5003
A7A4CR4	1901-0494	9		DIODE-PWR RECT 1N5003 1KV 1.5A	04713	1N5003
A7A4CR5	1901-0494	9		DIODE-PWR RECT 1N5003 1KV 1.5A	04713	1N5003
A7A4CR6	1901-0494	9		DIODE-PWR RECT 1N5003 1KV 1.5A	04713	1N5003
2545A AND ABOVE						
A7A4CR1	1901-1188	0		DIODE-PWR RECT 800VA	28480	1901-1188
A7A4CR2	1901-1188	0		DIODE-PWR RECT 800VA	28480	1901-1188
A7A4CR3	1901-1188	0		DIODE-PWR RECT 800VA	28480	1901-1188
A7A4CR4	1901-1188	0		DIODE-PWR RECT 800VA	28480	1901-1188
A7A4CR5	1901-1188	0		DIODE-PWR RECT 800VA	28480	1901-1188
A7A4CR6	1901-1188	0		DIODE-PWR RECT 800VA	28480	1901-1188
A7A4K1	0490-1173	9	1	RELAY 1C 5VDC-COIL 2A 220VAC	28480	0490-1173
A7A4Q1	1884-0268	7	1	THYRISTOR-SCR 2N6508 TO-220AB VRRM=600	04713	2N6508
	2190-0007	2		WASHER-LK INTL T NO. 6 .141-IN-ID	28480	2190-0007
	2200-0101	0	1	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A7A4Q2	1884-0329	1	1	THYRISTOR-BDT MBS4992 TO-92	03508	1884-0329
A7A4R1	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A7A4R2	0764-0006	6		RESISTOR 18K 5% 2W MO TC=0+-200	28480	0764-0006
A7A4R3	0764-0006	6		RESISTOR 18K 5% 2W MO TC=0+-200	28480	0764-0006
A7A4R4	0698-3132	4		RESISTOR 261 1% .125W F TC=0+-100	24546	C4-1/8-T0-2610-F
A7A4R5	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
A7A4R6	0698-3433	8	1	RESISTOR 28.7 1% .125W F TC=0+-100	03888	PME55-1/8-T0-2BR7-F
A7A4R7	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A7A4R8	0811-1893	2	1	RESISTOR 5 5% 10W PW TC=0+-50	28480	0811-1893
A7A4R9	0698-3162	0		RESISTOR 46.4K 1% .125W F TC=0+-100	24546	C4-1/8-T0-4642-F
A7A4R10	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A7A4R11	0757-0466	7	2	RESISTOR 110K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1103-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A7A4R12	0811-3514	8	1	RESISTOR .005 5% 5W PW TC=0+-90	28480	0811-3514
A7A4R13	0811-3288	3	1	RESISTOR .025 10% 2W PW TC=0+-180	28480	0811-3288
A7A4RT1	0837-0366	6	1	THERMISTOR SURGE PTCTR 5 OHM AT 25 DEG C	28480	0837-0366
2234A to 2846A A7A4TP1 2918A and above A7A4TP1†	0360-0124	3	1	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND NOT ASSIGNED	28480	0360-0124
A7A4VR1	1902-0668	1	1	DIODE-ZNR 200V 5% DO-15 PD=1W TC=+.088%	28480	1902-0668
A7A4VR2	1902-0666	9	1	DIODE-ZNR 162V 5% DO-15 PD=1W TC=+.091%	28480	1902-0666
A7A4XA7A1A	1251-1631	9	6	CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631
A7A4XA7A1B	1251-1633	1	9	CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A7A4XA7A2	1251-1634	2		CONNECTOR-PC EDGE 18-CONT/ROW 1-ROW	28480	1251-1634
A7A4XA7A3	1251-5557	6	1	CONNECTOR-PC EDGE 22-CONT/ROW 1-ROW	28480	1251-5557
	0510-0160	6	2	NUT-HEX-DBL-CHAM 4-40-THD .122-IN-THK	00000	ORDER BY DESCRIPTION
	0570-0031	6	2	SCREW-MACH 4-40 .5-IN-LG RD-HD-SLT	00000	ORDER BY DESCRIPTION

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Δ Errata part change.



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A7A5</b>						
A7A5MP1	08662-00017	1		COVER, PS BOTTOM	28480	08662-00017
A7A5MP2	08662-00042	2	1	COVER, PS TOP	28480	08662-00042
	08662-00021	7	1	BUMPER, FOAM	28480	08662-00021
A7A5MP3	0380-0388	3	5	STANDOFF-HEX .375-IN-LG 6-32THD	28480	0380-0388
A7A5MP4	0403-0332	7	2	GUIDE-PC BD BLK POLYC .062-BD-THKNS	28480	0403-0332
A7A5MP5	2360-0181	4	13	SCREW-MACH 6-32 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A7A5MP6	08662-00054	6	1	SUPPORT, PC	28480	08662-00054
A7A5MP7	08662-00055	7	1	DECK, AC	28480	08662-00055
	08662-00124	1	7	RUBBER, FOAM	28480	08662-00124
A7A5MP8	08662-00015	9	1	SUPPORT, A7XP1	28480	08662-00015
A7A5MP9	2200-0165	6	1	SCREW-MACH 4-40 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
A7A5MP10	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
A7A5MP11	2360-0115	4	1	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A7A5MP12	08662-00131	0	1	SUPPORT, POWER MODULE	28480	08662-00131
A7A5MP13	08662-00014	8	1	COVER, AC	28480	08662-00014
A7A5XP1	1251-3315	0	1	CONNECTOR 9-PIN M UTILITY	28480	1251-3315
	1251-2097	3	8	CONTACT-CONN U/W-UTIL MALE CRP	28480	1251-2097

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A8</b>						
ABC1	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
ABC2	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
ABC3	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
ABC4	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
ABC5	0160-3036	8		CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
2234A TO 2405A ABC6				NOT ASSIGNED		
2408A AND ABOVE ABC6	0160-3036	8	6	CAPACITOR-FDTHRU 5000PF +80 -20% 200V	28480	0160-3036
ABMP1	0905-0741	6	1	GASKET, FOAM, SMALL	28480	0905-0741
ABMP2	0905-0742	7	1	GASKET, FOAM, LARGE	28480	0905-0742
ABMP3	5040-0394	6	1	BUTTON-INT	28480	5040-0394
ABMP4	5040-0395	7	2	BUTTON-EXT	28480	5040-0395
ABMP5	08660-00100	1	4	DAMPING PAD, FOAM	28480	08660-00100
ABMP6	08662-00124	1		RUBBER FOAM	28480	08662-00124
ABMP7	08662-00154	7	1	GASKET, 10 MHZ	28480	08662-00154
ABMP8	08662-20310	9	1	CASTING, BOTTOM 350 MHZ	28480	08662-20310
ABMP9	08662-20021	9	1	CASTING, COVER 10 MHZ	28480	08662-20021
2234A TO 2405A ABMP10	08662-20311	0	1	CASTING, BASE, 10 MHZ	28480	08662-20311
2408A AND ABOVE ABMP10	08662-20323	4	1		28480	08662-20323
ABMP11	08662-20037	7	1	LIMIT, CASTING	28480	08662-20037
ABMP12	08662-20284	6	1	CONTACT-FINGERS	28480	08662-20284
ABMP13	08662-00155	8	1	GASKET, 350 MHZ	28480	08662-00155
ABMP14	08662-20019	5	1	CASTING COVER, 350 MHZ	28480	08662-20019
ABMP15	2200-0509	2	9	SCREW-MACH 4-40 1.625-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
ABMP16	2190-0003	8		CONNECTOR	28480	2190-0003
ABMP17	08662-00023	9	1	PLATE, HF OSCILLATORS SUPPORT	28480	08662-00023
ABMP18	08662-20282	4	1	CONTACT-FINGERS	28480	08662-20282
ABMP19	08662-20283	5	1	CONTACT-FINGERS	28480	08662-20283
				A8 MISCELLANEOUS PARTS		
	0360-0037	7	5	TERMINAL-SLDR LUG PL-MTG FOR-#6-SCR	28480	0360-0037
	0362-0227	1	3	CONNECTOR-SGL CONT SKT 1.14-MM-BSC-SZ	28480	0362-0227
	0890-0041	6		TUBING-HS .11-D/.08-RCVD .016-WALL PVC	00000	ORDER BY DESCRIPTION
	2190-0003	8	14	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0003
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
	2200-0105	4		SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0111	2	1	SCREW-MACH 4-40 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	8160-0054	2		RFI ROUND STRIP CU SN-PL .07-IN-OD	28480	8160-0054

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A8A1</b>						
<i>2234A TO 2748A</i>						
A8A1	08662-60001	9	1	VCO (NOT RECOMMENDED FOR FIELD REPAIR)	28480	08662-60001
<i>2823A AND ABOVE</i>						
A8A1	08662-60401	3	1	VCO (NOT RECOMMENDED FOR FIELD REPAIR)	28480	08662-60401
A8A1	08662-60083	7	1	RESTORED VCO ASSEMBLY	28480	08662-60083
A8A1MP1	08662-80081	7	1	FACTORY REPAIR LABEL	28480	08662-80081
<b>A8A2</b>						
<i>2234A TO 2313A</i>						
A8A2 †	08662-60001	9		VCO (NOT RECOMMENDED FOR FIELD REPAIR)	28480	08662-60001
<i>2319A TO 2748A</i>						
A8A2	08662-60317	0	1	VCO (NOT RECOMMENDED FOR FIELD REPAIR)	28480	08662-60317
<i>2823A AND ABOVE</i>						
A8A2	08662-60417	1	1	VCO (NOT RECOMMENDED FOR FIELD REPAIR)	28480	08662-60417
A8A2	08662-60083	7		RESTORED VCO ASSEMBLY	28480	08662-60083
A8A1MP1	08662-80081	7	1	FACTORY REPAIR LABEL	28480	08662-80081
<b>A8A3</b>						
<i>2234A TO 2446A</i>						
A8A3 †	10544B(003)	8	1	10MHZ REFERENCE OSCILLATOR NOT RECOMMENDED FOR FIELD REPAIR	28480	10544B(003)
<i>2447A AND ABOVE</i>						
A8A3	5061-6002	8	1	10MHZ REFERENCE OSCILLATOR (NOT RECOMMENDED FOR FIELD REPAIR)	28480	10811-60111
A8A3	08662-60085	9	1	RESTORED VCO ASSEMBLY	28480	08662-60085

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A8A4</b>						
A8A4	08862-60306	7	1	REFERENCE BUFFER	28480	08862-60306
A8A4C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C2	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C5	0160-4512	7		CAPACITOR-FXD 120PF +-5% 200VDC CER	28480	0160-4512
A8A4C6	0160-4365	8	3	CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4365
A8A4C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C8	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A8A4C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C10	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A8A4C11	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A8A4C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C14	0160-4031	5	1	CAPACITOR-FXD 330PF +-5% 100VDC CER	28480	0160-4031
A8A4C15	0160-4588	7	1	CAPACITOR-FXD 270PF +-5% 100VDC CER	28480	0160-4588
A8A4C16	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A8A4C17	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C18	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A8A4C19	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C20	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C21	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C22	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C24	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A8A4C25	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A8A4C27	0160-4365	8		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4365
A8A4C28	0180-2205	3	1	CAPACITOR-FXD .33UF+-10% 35VDC TA	56289	150D334X9035A2
A8A4CR1	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A8A4CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A8A4CR3	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A8A4CR4	1901-0519	9	1	DIODE-SWITCHING 200V 50NS DO-34	28480	1901-0519
A8A4J1	1250-0083	1	1	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM	28480	1250-0083
	2190-0016	3	2	WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
	2950-0001	8	2	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A8A4J2	1250-0083	1		CONNECTOR RF BNC FEM SGL-HOLE-FR 50-OHM	28480	1250-0083
	2190-0016	3		WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
	2950-0001	8		NUT-HEX-OBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
A8A4L1	9140-0144	0		INDUCTOR RF-CH-MLD 4.7UH 10% .105DX.26LG	28480	9140-0144
A8A4L2	9140-0151	9	1	INDUCTOR RF-CH-MLD 2.07UH 5%	28480	9140-0151
A8A4L3	9140-0178	0	1	INDUCTOR RF-CH-MLD 12UH 10% .166DX.385LG	28480	9140-0178
A8A4L4	9100-2260	1	1	INDUCTOR RF-CH-MLD 1.8UH 10% .105DX.26LG	28480	9100-2260
A8A4L5	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
A8A4L6	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A8A4MP1	08662-00025	1	1	SUPPORT, BNC BRACKET	28480	08662-00025
	2200-0103	2	7	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
	08662-20391	6		INSULATOR	28480	08662-20391
A8A4MP2	6960-0069	3	1	PLUG-HOLE	28480	6960-0069
A8A4Q1	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A8A4Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
A8A4R1	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A8A4R2	0698-7239	0	3	RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1331-F
A8A4R3	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A8A4R4	0698-7261	8		RESISTOR 11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1102-F
A8A4R5	0698-7203	8	2	RESISTOR 42.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-42R2-F
A8A4R6	0698-0090	7		RESISTOR 464 1% .5W F TC=0+-100	28480	0698-0090
A8A4R7	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-TO-10R0-F
A8A4R8	0698-3438	3		RESISTOR 147 1% .125W F TC=0+-100	24546	C4-1/8-TO-147R-F
A8A4R10	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A8A4R11	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A8A4R13	0698-7239	0		RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1331-F
A8A4R14	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
A8A4R15	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-TO-133R-F
A8A4R16	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A8A4R17	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A8A4R18	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A8A4R19	0698-7266	3		RESISTOR 17.8K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1782-F
A8A4R20	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1003-F
A8A4R21	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A8A4R22	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5112-F
A8A4R23	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
A8A4R24	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
A8A4R25	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
A8A4R26	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
A8A4R27	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1961-F
A8A4R28	0698-7265	2	4	RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1622-F
A8A4R29	0698-7265	2		RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1622-F
A8A4R30	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A8A4R31	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A8A4R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1001-F
A8A4R33	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-TO-511R-F
A8A4R34	0698-7206	1	2	RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
A8A4R35	0698-7204	9		RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-TO-46R4-F
A8A4R36	0698-7215	2		RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-TO-133R-F
A8A4R37	0698-7204	9		RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-TO-46R4-F
A8A4R38	0698-7215	2		RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-TO-133R-F
A8A4R39	0698-7215	2		RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-TO-133R-F
A8A4R40	0698-7215	2		RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-TO-133R-F
A8A4R41	0757-1090	5	3	RESISTOR 261 1% .5W F TC=0+-100	28480	0757-1090
A8A4R42	0757-1090	5		RESISTOR 261 1% .5W F TC=0+-100	28480	0757-1090
A8A4S1	3101-1730	4	1	SWITCH-PB 3-STATION 15MM C-C SPACING	28480	3101-1730

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A8A4T1	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A8A4T2	08662-80003	3	4	TRANSFORMER	28480	08662-80003
A8A4T3	08662-80003	3		TRANSFORMER	28480	08662-80003
A8A4T4	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A8A4T5	08662-80003	3		TRANSFORMER	28480	08662-80003
A8A4T6	08662-80003	3		TRANSFORMER	28480	08662-80003
A8A4T7	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A8A4T8	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A8A4T9	08662-80013	5		TRANSFORMER, 12T	28480	08662-80013
A8A4U1	1826-0138	8		IC COMPARATOR GP QUAD 14-DIP-P PKG	01295	LM339N
A8A4U2	1826-0275	4	1	IC 78L12A V RGLTR TO-92	04713	MC78L12ACP
A8A4W1	8150-0033	6	2	WIRE, 22 AWG	28480	8150-0033
A8A4W2	8150-0033	6		WIRE, 22 AWG	28480	8150-0033

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A8A5</b>						
2234A TO 2401A A8A5 † 24085 AND ABOVE	08662-60191	8	1	REFERENCE SECTION MOTHER BOARD	28480	08662-60191
A8A5	08662-60322	7	1	REFERENCE SECTION MOTHERBOARD	28480	08662-60322
A8A5J1	1250-1588	3	5	CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1588
A8A5J2	1250-1588	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1588
A8A5J3	1250-1588	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1588
A8A5J4	1250-1588	3		CONNECTOR-RF SMB M PC 50-OHM	28480	1250-1588
2234A TO 2405A A8A5J5 2408A AND ABOVE	1250-1588	3	NOT ASSIGNED		28480	1250-1588
A8A5J5			CONNECTOR, 5-PIN, WAFER			
2234A TO 2405A A8A5R1-2 2408A AND ABOVE			NOT ASSIGNED			
A8A5R1	0698-7246	9	8	RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A8A5R2	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A8A5XA8A3	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A8A5XA8A4	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A8A6XA8A4	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A9</b>						
A9	08663-60342	2	1	BOARD ASSEMBLY, HP-IB	28480	08663-60342
A9J1A	1251-4736	1	1	CONNECTOR 26-PIN M RECTANGULAR	28480	1251-4736
A9J1B	1251-6707	0	1	CONNECTOR 26-PIN M POST TYPE	28480	1251-6707
A9J2	1251-3283	1	1	CONNECTOR 24-PIN F MICRORIBBON	28480	1251-3283
A9J3	1251-6608	0	1	CONNECTOR 16-PIN M POST TYPE	28480	1251-6608
A9MP1	0380-0643	3	1	STANDOFF-HEX .255-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
A9MP2	08662-20027	5	1	SUPPORT (LEFT)	28480	08662-20027
	2190-0017	4	2	WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
A9MP3	08662-20026	4	1	SUPPORT (RIGHT)	28480	08662-20026
	2190-0017	4		WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
A9TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



**A9**

A9	08663-60342	2	1	BOARD ASSEMBLY, HP-IB	28480	08663-60342
A9J1A	1251-4736	1	1	CONNECTOR 26-PIN M RECTANGULAR	28480	1251-4736
A9J1B	1251-6707	0	1	CONNECTOR 26-PIN M POST TYPE	28480	1251-6707
A9J2	1251-3283	1	1	CONNECTOR 24-PIN F MICRORIBBON	28480	1251-3283
A9J3	1251-6608	0	1	CONNECTOR 16-PIN M POST TYPE	28480	1251-6608
A9J4	1251-5595	2		POLARIZING KEY-POST CONN	28480	1251-5595
A9MP1	0380-0643	3	1	STANDOFF-HEX .255-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
A9MP2	08662-20027	5	1	SUPPORT (LEFT)	28480	08662-20027
	2190-0017	4	2	WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
A9MP3	08662-20026	4	1	SUPPORT (RIGHT)	28480	08662-20026
	2190-0017	4		WASHER-LK HLCL NO. 8 .168-IN-ID	28480	2190-0017
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
A9TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A9TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A11A1</b>						
A11A1	08663-60321	7	1	VARIABLE MODULATION OSCILLATOR ASSEMBLY	28480	08663-60321
A11A1C1	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A1C2	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A1C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A1C4	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C5	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A11A1C6	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A11A1C7	0160-0576	5	10	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A1C8	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A1C9	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A11A1C10	0160-2222	2	1	CAPACITOR-FXD 1500PF +-5% 300VDC MICA	28480	0160-2222
A11A1C11	0160-3538	5		CAPACITOR-FXD 750PF +-5% 100VDC MICA	28480	0160-3538
A11A1C12	0160-0157	8		CAPACITOR-FXD 4700PF +-10% 200VDC POLYE	28480	0160-0157
A11A1C13	0160-0162	5	1	CAPACITOR-FXD .022UF +-10% 200VDC POLYE	28480	0160-0162
A11A1C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C15	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C16	0140-0170	3	1	CAPACITOR-FXD 5600PF +-5% 300VDC MICA	72136	DM20F562J0300WV1CR
A11A1C17	0160-0570	9		CAPACITOR-FXD 220PF +-20% 100VDC CER	20932	5024EM100RD221M
A11A1C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C19	0180-2661	5	3	CAPACITOR-FXD 1UF+-10% 50VDC TA	25088	D1R0GS1A50K
A11A1C20	0180-2661	5		CAPACITOR-FXD 1UF+-10% 50VDC TA	25088	D1R0GS1A50K
A11A1C21	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A1C22	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A11A1C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C24	0160-3046	0	6	CAPACITOR-FXD 250PF +-1% 100VDC MICA	28480	0160-3046
A11A1C25	0160-3046	0		CAPACITOR-FXD 250PF +-1% 100VDC MICA	28480	0160-3046
A11A1C26	0140-0210	2	1	CAPACITOR-FXD 270PF +-5% 300VDC MICA	72136	DM15F271J0300WV1CR
A11A1C27	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A11A1C28	0160-3010	8	2	CAPACITOR-FXD 285PF +-1% 300VDC MICA	28480	0160-3010
A11A1C29	0160-3010	8		CAPACITOR-FXD 285PF +-1% 300VDC MICA	28480	0160-3010
A11A1C30	0160-3535	2	1	CAPACITOR-FXD 560PF +-5% 300VDC MICA	28480	0160-3535
A11A1C31	0180-2620	6		CAPACITOR-FXD 2.2UF+-10% 50VDC TA	25088	D2R2GS1B50K
A11A1C32	0160-3046	0		CAPACITOR-FXD 250PF +-1% 100VDC MICA	28480	0160-3046
A11A1C33	0160-3046	0		CAPACITOR-FXD 250PF +-1% 100VDC MICA	28480	0160-3046
A11A1C34	0140-0232	8	2	CAPACITOR-FXD 460PF +-1% 300VDC MICA	72136	DM15F461F0300WV1C
A11A1C35	0140-0232	8		CAPACITOR-FXD 460PF +-1% 300VDC MICA	72136	DM15F461F0300WV1C
A11A1C36	0160-3294	0	1	CAPACITOR-FXD 2700PF +-1% 100VDC MICA	28480	0160-3294
A11A1C37	0160-4595	6	1	CAPACITOR-FXD 5600PF +-1% 200VDC	28480	0160-4595
A11A1C38	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A11A1C39	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C40	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A1C41	0160-3046	0		CAPACITOR-FXD 250PF +-1% 100VDC MICA	28480	0160-3046
A11A1C42	0160-3046	0		CAPACITOR-FXD 250PF +-1% 100VDC MICA	28480	0160-3046
A11A1C43	0160-3264	4	1	CAPACITOR-FXD 2800PF +-1% 500VDC MICA	28480	0160-3264
A11A1C44	0160-3522	7	1	CAPACITOR-FXD 3000PF +-1% 100VDC MICA	28480	0160-3522
A11A1C45	0170-0066	9	1	CAPACITOR-FXD .027UF +-10% 200VDC POLYE	28480	0170-0066

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A1C46	0160-0165	8	1	CAPACITOR-FXD .056UF +-10% 200VDC POLYE	28480	0160-0165
A11A1C47	0160-4535	4	1	CAPACITOR-FXD 1UF +-10% 50VDC CER	28480	0160-4535
A11A1CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A11A1CR2	1901-0518	8		DIODE-SM SIG SCHOTTKY	28480	1901-0518
A11A1CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A11A1CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A11A1DS1	1990-0326	3		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444
A11A1MP1	08663-00038	7	1	COVER-FULL VMO	28480	08663-00038
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A11A1Q1	1854-0477	7	17	TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A1Q2	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A11A1Q3	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A1Q4	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A11A1R1	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A11A1R2	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A11A1R3	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A11A1R4	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A11A1R5	0698-7271	0	5	RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2872-F
A11A1R6	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2872-F
A11A1R7	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2872-F
A11A1R8	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2872-F
A11A1R9	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5112-F
A11A1R10	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5112-F
A11A1R11	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
A11A1R12	0698-3243	8		RESISTOR 178K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1783-F
A11A1R13	0698-7279	8	1	RESISTOR 61.9K 1% .05W F TC=0+-100	24546	C3-1/8-TO-6192-F
A11A1R14	0698-8826	3	1	RESISTOR 825K 1% .125W F TC=0+-100	28480	0698-8826
A11A1R15	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A11A1R16	0698-7250	5		RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3831-F
A11A1R17	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A11A1R18	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A11A1R19	0698-7285	6	6	RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1103-F
A11A1R20	0698-7266	3		RESISTOR 17.8K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1782-F
A11A1R21	0698-7257	2	6	RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-7501-F
A11A1R22	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-TO-751-F
A11A1R23	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1472-F
A11A1R24	0698-7257	2		RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-7501-F
A11A1R25	0698-7258	3	1	RESISTOR 8.25K 1% .05W F TC=0+-100	24546	C3-1/8-TO-8251-F
A11A1R26	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-TO-4221-F
A11A1R27	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F
A11A1R28	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1212-F
A11A1R29	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3162-F
A11A1R30	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-TO-6191-F
A11A1R31	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1212-F
A11A1R32	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A11A1R33	0698-7269	6	1	RESISTOR 23.7K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2372-F
A11A1R34	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A11A1R35	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5111-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A1R36	0698-7238	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1001-F
A11A1R37	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1471-F
A11A1R38	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/B-T0-2611-F
A11A1R39	0698-8059	4	1	RESISTOR 4.32K .1% .125W F TC=0+-25	19701	MF4C1/B-T9-4321-B
A11A1R40	0698-8856	9	1	RESISTOR 13.56K .1% .125W F TC=0+-25	28480	0698-8856
A11A1R41	0698-7257	2		RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/B-T0-7501-F
A11A1R42	0698-7254	9		RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/B-T0-5621-F
A11A1R43	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1001-F
A11A1R44	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/B-T0-2611-F
A11A1R45	0698-8336	0	1	RESISTOR 3.55K .1% .125W F TC=0+-50	19701	MF4C1/B-T2-3551-B
A11A1R46	0698-8805	8	1	RESISTOR 10.35K .1% .125W F TC=0+-25	28480	0698-8805
A11A1R47	0698-7256	1		RESISTOR 6.81K 1% .05W F TC=0+-100	24546	C3-1/B-T0-6811-F
A11A1R48	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1001-F
A11A1R49	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/B-T0-2871-F
A11A1R50	0698-8039	0	1	RESISTOR 8.87K .1% .125W F TC=0+-25	19701	MF4C1/B-T9-8871-B
A11A1R51	0699-0273	0	1	RESISTOR 2.15K .1% .125W F TC=0+-25	28480	0699-0273
A11A1R52	0699-0123	9	1	RESISTOR 6.75K .1% .125W F TC=0+-25	28480	0699-0123
A11A1R53	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1212-F
A11A1R54	0698-7243	6		RESISTOR 1.96K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1961-F
A11A1R55	0698-7252	7	3	RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/B-T0-4641-F
A11A1R56	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1212-F
A11A1R57	0698-7252	7		RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/B-T0-4641-F
A11A1R58	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
A11A1R59	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/B-T0-10R-F
A11A1R60	0698-7848	7	1	RESISTOR 1.25K .1% .125W F TC=0+-25	19701	MF4C1/B-T9-1251-B
A11A1R61	0698-7933	1	1	RESISTOR 3.83K .1% .125W F TC=0+-25	19701	MF4C1/B-T9-3831-B
A11A1R62	2100-2574	3	3	RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A11A1R63	2100-2633	5	4	RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A11A1R64	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/B-T0-909R-F
A11A1R65	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/B-T0-3161-F
A11A1R66	0698-7257	2		RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/B-T0-7501-F
A11A1R67	0698-7256	1		RESISTOR 6.81K 1% .05W F TC=0+-100	24546	C3-1/B-T0-6811-F
A11A1R68	0757-0470	3	1	RESISTOR 162K 1% .125W F TC=0+-100	24546	C4-1/B-T0-1623-F
A11A1R69	0698-7220	9	14	RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/B-T0-215R-F
A11A1R70	0698-7288	9		RESISTOR 147K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1473-F
A11A1R71	2100-2633	5		RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A11A1R72	0698-7262	9		RESISTOR 12.1K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1212-F
A11A1R73	0698-7274	3	2	RESISTOR 38.3K 1% .05W F TC=0+-100	24546	C3-1/B-T0-3832-F
A11A1R74	2100-2516	3	1	RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	32997	3329W-1-104
A11A1R75	0698-7263	0	3	RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1332-F
A11A1R76	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1002-F
A11A1R77	0698-7231	2		RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/B-T0-619R-F
A11A1TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A1TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A1U1	1826-0488	1		IC OP AMP WB TO-99 PKG	27014	LM218H
A11A1U2	1826-0188	8	2	IC CONV 8-B-D/A 16-DIP-C PKG	04713	MC1408L-8
A11A1U3	1820-1244	7		IC MUXR/DATA-SEL TTL LS 4-TO-1-LINE DUAL	01295	SN74LS153N
A11A1U4	1820-1279	8	4	IC CNTR TTL LS DECD UP/DOWN SYNCHRO	01295	SN74LS190N
A11A1U5	1820-1279	8		IC CNTR TTL LS DECD UP/DOWN SYNCHRO	01295	SN74LS190N
A11A1U6	1826-0873	8	1	IC 8-DIP-C PKG	52063	XR-2209CN
A11A1U7	1820-1858	9	2	IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A11A1U8	1826-0716	8	2	IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A11A1U9	1826-0716	8		IC OP AMP LOW-NOISE DUAL 8-DIP-C PKG	18324	NE5532AFE
A11A1U10	08663-80004	5	1	EPROM 1816-1160	28480	08663-80004
A11A1U11	1820-1279	8		IC CNTR TTL LS DECD UP/DOWN SYNCHRO	01295	SN74LS190N
A11A1U12	1820-1279	8		IC CNTR TTL LS DECD UP/DOWN SYNCHRO	01295	SN74LS190N
A11A1U13	1820-1144	6	2	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A11A1U14	1820-1858	9		IC FF TTL LS D-TYPE OCTL	01295	SN74LS377N
A11A1U15	1820-1208	3	1	IC GATE TTL LS OR QUAD 2-INP	01295	SN74LS32N
A11A1U16	1826-0188	8		IC CONV 8-B-D/A 16-DIP-C PKG	04713	MC1408L-8
A11A1U17	1826-0609	8	1	IC MULTIPLXR ANLG 16-DIP-C PKG	06665	MUX08FQ
A11A1U18	1826-0753	3	2	IC OP AMP LOW-BIAS-H-IMPQ QUAD 14-DIP-C	04713	MC34004BL
A11A1U19	1826-0191	3	3	IC COMPARATOR GP DUAL TO-100 PKG	27014	LM319H
A11A1U20	1826-0753	3		IC OP AMP LOW-BIAS-H-IMPQ QUAD 14-DIP-C	04713	MC34004BL
A11A1U21	1820-1201	6	2	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A11A1U22	1820-1991	1	1	IC CNTR TTL LS DECD DUAL 4-BIT	01295	SN74LS390N
A11A1U23	1820-1194	6	3	IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A11A1U24	1820-1194	6		IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A11A1U25	1820-1194	6		IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS193N
A11A1U26	1820-1422	3		IC MV TTL LS MONOSTBL RETRIG	01295	SN74LS122N
A11A1U27	1820-0630	3	2	IC MISC TTL	04713	MC4044P
A11A1U28	1826-0785	1	1	IC OP AMP LOW-BIAS-H-IMPQ DUAL 8-DIP-C	01295	TL072ACJG
A11A1VR1	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A11A1VR2	1902-0958	2	3	DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	28480	1902-0958
A11A1VR3	1902-0951	5	1	DIODE-ZNR 5.1V 5% DO-35 PD=.4W TC=+.035%	28480	1902-0951

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A11A2</b>						
A11A2	08663-60343	3	1	FM VCO ASSEMBLY	28480	08663-60343
A11A2C1	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A11A2C2	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A2C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A2C4	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A11A2C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A2C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C7	0160-0575	4		CAPACITOR-FXD .047UF +-20% 50VDC CER	28480	0160-0575
A11A2C8	0180-2697	7		CAPACITOR-FXD 10UF+-10% 25VDC TA	28480	0180-2697
A11A2C9	0180-2697	7		CAPACITOR-FXD 10UF+-10% 25VDC TA	28480	0180-2697
A11A2C10	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C11	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C12	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A2C13	0160-2257	3		CAPACITOR-FXD 10PF +-5% 500VDC CER 0+-60	28480	0160-2257
A11A2C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A2C15	0160-4365	8		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4365
A11A2C16	0160-4548	9	1	CAPACITOR-FXD 82PF +-1% 50VDC PORC	28480	0160-4548
A11A2C17	0160-3431	7	1	CAPACITOR-FXD 6.8PF +-5PF 500VDC CER	28480	0160-3431
A11A2C18	0121-0493	3	1	CAPACITOR-V TRMR-AIR 1.7-11PF 175V	74970	187-0306-125
A11A2C19	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A11A2C20	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C21	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C22	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C23	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A2C24	0160-4767	4		CAPACITOR-FXD 20PF +-5% 200VDC CER 0+-30	28480	0160-4767
A11A2C25	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A2C26	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A11A2C27	0160-4103	2		CAPACITOR-FXD 220PF +-5% 100VDC CER	72992	8121-M100-COG-221J
A11A2C28	0160-4767	4		CAPACITOR-FXD 20PF +-5% 200VDC CER 0+-30	28480	0160-4767
A11A2CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR6	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR7	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A2CR8	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
223A TO 241A A11A2CR9	0122-0065	7		DIODE-VVC 29PF 3%	28480	0122-0065
241A AND ABOVE A11A2CR9	0122-0162	5		DVVC 29PF 5.0CR	28480	0122-0162
A11A2CR10	1901-1034	5	1	DIODE-STABISTOR 90V DO-34	03508	MPD400
A11A2DS1	1990-0326	3		LED-LAMP LUM-INT=300UCD IF=50MA-MAX	28480	5082-4444
A11A2J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A2L1	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A11A2L2	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A11A2L3	08662-00163	8	1	INDUCTOR	28480	08662-00163
A11A2L4	9100-0346	0	1	INDUCTOR RF-CH-MLD 50NH 20% .105DX.26LG	28480	9100-0346
A11A2L5	9100-2252	1	2	INDUCTOR RF-CH-MLD 270NH 10% .105DX.26LG	28480	9100-2252
A11A2L6	9100-2252	1		INDUCTOR RF-CH-MLD 270NH 10% .105DX.26LG	28480	9100-2252
A11A2MP1	08663-00066	1	1	COVER-EXTRUSION A11-A2	28480	08663-00066
A11A2MP1	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A11A2MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A11A2MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A11A2MP4	08662-00135	4	1	SHIELD-FM VCO	28480	08662-00135
A11A2Q1	1855-0235	7	2	TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
A11A2Q2	1855-0235	7		TRANSISTOR J-FET N-CHAN D-MODE TO-52 SI	28480	1855-0235
A11A2Q3	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A11A2Q4	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A11A2Q5	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A11A2Q6	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A11A2Q7	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A11A2R1	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-TO-196R-F
A11A2R2	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A11A2R3	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-TO-316R-F
A11A2R4*	0698-7254	9	3	RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5621-F
A11A2R5	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A11A2R6	0698-8827	4	4	RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A11A2R7*	0698-7253	8	16	RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A11A2R8	0698-7257	2		RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
A11A2R9	2100-2633	5		RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A11A2R10	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A11A2R11	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A11A2R12	0698-7263	0		RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1332-F
A11A2R13	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A11A2R14	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A11A2R15	0698-7239	0		RESISTOR 1.33K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1331-F
A11A2R16	0698-7254	9		RESISTOR 5.62K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5621-F
A11A2R17	0698-7265	2		RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1622-F
A11A2R18	2100-2574	3		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A11A2R19	0698-7245	8		RESISTOR 2.37K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2371-F
A11A2R20	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A11A2R25	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-T0-464R-F
A11A2R26	0698-7248	1	15	RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A2R27	0698-7204	9		RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-T0-46R4-F
A11A2R28	0698-7204	9		RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-T0-46R4-F
A11A2R29*	0698-0085	0	10	RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A2R30	0698-7204	9		RESISTOR 46.4 1% .05W F TC=0+-100	24546	C3-1/8-TO-46R4-F
A11A2R31	0698-7232	3		RESISTOR 681 1% .05W F TC=0+-100	24546	C3-1/8-TO-681R-F
A11A2R32*	0757-1094	9	7	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1471-F
A11A2R33	0698-7200	5		RESISTOR 31.6 1% .05W F TC=0+-100	24546	C3-1/8-TO-31R6-F
A11A2R35	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A11A2R36	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1471-F
A11A2R37	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A11A2R38	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A11A2R39	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1003-F
A11A2R40	0698-7277	6		RESISTOR 51.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-5112-F
A11A2R41	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2152-F
A11A2R42	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A2R43	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1002-F
A11A2R44	0698-7208	3	1	RESISTOR 68.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-68R1-F
A11A2R45	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-TO-1331-F
A11A2R46	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A2R47	0698-3447	4		RESISTOR 422 1% .125W F TC=0+-100	24546	C4-1/8-TO-422R-F
A11A2R48	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-TO-383R-F
A11A2R49	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24546	C4-1/8-TO-383R-F
A11A2R50	0698-7216	3		RESISTOR 147 1% .05W F TC=0+-100	24546	C3-1/8-TO-147R-F
A11A2R51	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A11A2R52	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A11A2R53	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A11A2R54	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-17R8-F
A11A2R55	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-TO-287R-F
A11A2R56*	0698-7227	6	8	RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A11A2R57*	0698-7190	2	8	RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-12R1-F
A11A2R58*	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A11A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A2TP3	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A11A2U1	1826-0372	2		IC MISC 8-DIP-P PKG	28480	1826-0372
A11A2U2	0955-0095	8		MIXER FREQ: 1 TO 500MHZ; CONVERSION LOSS	28480	0955-0095
A11A2U3	1826-0191	3		IC COMPARATOR GP DUAL TO-100 PKG	27014	LM319H
A11A2VR1	1902-0041	4		DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041
A11A2VR2	1902-3082	9	2	DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A11A2VR3	1902-0041	4		DIODE-ZNR 5.11V 5% DO-35 PD=.4W	28480	1902-0041

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A11A3</b>						
A11A3	08663-60322	8	1	PHASE MOD INPUT ASSEMBLY (OPT. 002 ONLY)	28480	08663-60322
A11A3C1	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A3C2	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A11A3C3	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A3C4	0180-2615	9	2	CAPACITOR-FXD 22UF+-20% 10VDC TA	28480	0180-2615
A11A3C5	0180-2615	9		CAPACITOR-FXD 22UF+-20% 10VDC TA	28480	0180-2615
A11A3C6	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A3C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A3C8	0121-0046	2	5	CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650
A11A3C9	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A3C10	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A3C11	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A3C12	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A3C13	0160-0573	2		CAPACITOR-FXD 4700PF +-20% 100VDC CER	28480	0160-0573
A11A3CR1	1901-0033	2	15	DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR2	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR3	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR4	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR6	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR7	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR8	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR9	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR10	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR11	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR12	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR13	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR14	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3CR15	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-7	28480	1901-0033
A11A3J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A11A3J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A11A3J3	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A11A3K1	0490-0916	6	4	RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A11A3K2	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
<i>2234A TO 2510A</i>						
A11A3K3	0490-1013	6	5	RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1013
<i>2513A AND ABOVE</i>						
A11A3K3	0490-1423	2	5	RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1423
A11A3K4	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
<i>2234A TO 2510A</i>						
A11A3K7	0490-1013	6		RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1013
<i>2513A AND ABOVE</i>						
A11A3K7	0490-1423	2		RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1423
A11A3K8	0490-0670	9	12	RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
	0340-0440	4	11	INSULATOR-IC NYLON WHITE	28480	0340-0440
A11A3K9	0490-0670	9		RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
	0340-0440	4		INSULATOR-IC NYLON WHITE	28480	0340-0440
A11A3K10	0490-0670	9		RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
	0340-0440	4		INSULATOR-IC NYLON WHITE	28480	0340-0440

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A3K11	0490-0670 0340-0440	9 4		RELAY 2C 5VDC-COIL 1A 28VDC INSULATOR-IC NYLON WHITE	28480 28480	0490-0670 0340-0440
A11A3K12	0490-0670 0340-0440	9 4		RELAY 2C 5VDC-COIL 1A 28VDC INSULATOR-IC NYLON WHITE	28480 28480	0490-0670 0340-0440
A11A3K13	0490-0670 0340-0440	9 4		RELAY 2C 5VDC-COIL 1A 28VDC INSULATOR-IC NYLON WHITE	28480 28480	0490-0670 0340-0440
A11A3K14	0490-0670 0340-0440	9 4		RELAY 2C 5VDC-COIL 1A 28VDC INSULATOR-IC NYLON WHITE	28480 28480	0490-0670 0340-0440
A11A3K15	0490-0670 0340-0440	9 4		RELAY 2C 5VDC-COIL 1A 28VDC INSULATOR-IC NYLON WHITE	28480 28480	0490-0670 0340-0440
A11A3K16	0490-0670	9		RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
A11A3K17	0490-0916	6		RELAY-REED 1A 500MA 100VDC 5VDC-COIL	28480	0490-0916
A11A3L1	9140-0142	8		INDUCTOR RF-CH-MLD 2.2UH 10% .105DX.26LG	28480	9140-0142
A11A3MP1	08663-00051 2360-0113	4 2	1	COVER, 2/3 PHASE MOD. SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	28480 00000	08663-00051 ORDER BY DESCRIPTION
A11A3Q1	1854-0721	4	3	TRANSISTOR NPN SI TO-39 PD=1.5W	25403	BFR 95
A11A3Q2	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q3	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q4	1854-0721	4		TRANSISTOR NPN SI TO-39 PD=1.5W	25403	BFR 95
A11A3Q5	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q6	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q7	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q8	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q9	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q10	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q11	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q12	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3Q13	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A11A3R1	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A11A3R2	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
A11A3R3	2100-2632	4	2	RESISTOR-TRMR 100 10% C SIDE-ADJ 1-TRN	30983	ET50X101
A11A3R4	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-T0-825R-F
A11A3R5	2100-2574	3		RESISTOR-TRMR 500 10% C SIDE-ADJ 1-TRN	30983	ET50X501
A11A3R6	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A3R7	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F
A11A3R8	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-T0-237R-F
A11A3R9	0698-7193	5	1	RESISTOR 16.2 1% .05W F TC=0+-100	24546	C3-1/8-T0-16R2-F
A11A3R10	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-61R9-F
A11A3R11	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A11A3R12	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A3R13	0698-7170	8	2	RESISTOR 70.832 .1% .125W F TC=0+-25	28480	0698-7170
A11A3R14	0698-4414	7	1	RESISTOR 158 1% .125W F TC=0+-100	24546	C4-1/8-T0-158R-F
A11A3R15	0698-7170	8		RESISTOR 70.832 .1% .125W F TC=0+-25	28480	0698-7170
A11A3R16	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A3R17	0698-6806	5	2	RESISTOR 119.3 .25% .125W F TC=0+-25	28480	0698-6806
A11A3R18	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A3R19	0698-5822	3	1	RESISTOR 53.6 .5% .125W F TC=0+-100	28480	0698-5822
A11A3R20	2100-2413	9	1	RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN	30983	ET50X201

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A3R21	0698-6806	5		RESISTOR 119.3 .25% .125W F TC=0+-25	28480	0698-6806
A11A3R22	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A3R23	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A11A3R24	0698-7189	9	5	RESISTOR 11 1% .05W F TC=0+-100	24546	C3-1/8-TO-11R0-F
A11A3R25	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A11A3R26	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-TO-10R-F
A11A3R27	0698-7189	9		RESISTOR 11 1% .05W F TC=0+-100	24546	C3-1/8-TO-11R0-F
A11A3R28	0698-3446	3		RESISTOR 383 1% .125W F TC=0+-100	24548	C4-1/8-TO-383R-F
A11A3R29	0698-7191	3	1	RESISTOR 13.3 1% .05W F TC=0+-100	24546	C3-1/8-TO-16R3-F
A11A3R30	0698-7209	4		RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-TO-75R0-F
A11A3R31	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A11A3R32	0698-7189	9		RESISTOR 11 1% .05W F TC=0+-100	24546	C3-1/8-TO-11R0-F
A11A3R33	0698-7238	9		RESISTOR 1.21K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1211-F
A11A3R34	0757-0814	9	2	RESISTOR 511 1% .5W F TC=0+-100	28480	0757-0814
A11A3R35	0698-3431	6	1	RESISTOR 23.7 1% .125W F TC=0+-100	03888	PME55-1/8-TO-23R7-F
A11A3R36	0757-0814	9		RESISTOR 511 1% .5W F TC=0+-100	28480	0757-0814
A11A3R37	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A3R38	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A11A3R39	0698-7197	9	3	RESISTOR 23.7 1% .05W F TC=0+-100	24546	C3-1/8-TO-23R7-F
A11A3R40	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A11A3R41	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-12R1-F
A11A3R42	0698-7197	9		RESISTOR 23.7 1% .05W F TC=0+-100	24546	C3-1/8-TO-23R7-F
A11A3R43	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A11A3R44	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A3R45	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-51R1-F
A11A3R46	0698-7266	3		RESISTOR 17.8K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1782-F
A11A3R47	0698-7201	6		RESISTOR 34.8 1% .05W F TC=0+-100	24546	C3-1/8-TO-34R8-F
A11A3R48	2100-2633	5		RESISTOR-TRMR 1K 10% C SIDE-ADJ 1-TRN	30983	ET50X102
A11A3R49	0698-7227	6		RESISTOR 422 1% .05W F TC=0+-100	24546	C3-1/8-TO-422R-F
A11A3R50	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-TO-61R9-F
A11A3R51	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A11A3R52	0698-8821	8		RESISTOR 5.62 1% .125W F TC=0+-100	28480	0698-8821
A11A3R53	0698-7207	2		RESISTOR 61.9 1% .05W F TC=0+-100	24546	C3-1/8-TO-61R9-F
A11A3R54	0698-7234	5		RESISTOR 825 1% .05W F TC=0+-100	24546	C3-1/8-TO-825R-F
A11A3R55	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A3R56	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2152-F
A11A3R57	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2152-F
A11A3R58	0698-7237	8		RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1101-F
A11A3R59	0698-7189	9		RESISTOR 11 1% .05W F TC=0+-100	24546	C3-1/8-TO-11R0-F
A11A3R60	0698-8820	7		RESISTOR 4.64 1% .125W F TC=0+-100	28480	0698-8820
A11A3R61	0698-7237	8		RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-TO-1101-F
A11A3R62	0698-7189	9		RESISTOR 11 1% .05W F TC=0+-100	24546	C3-1/8-TO-11R0-F
A11A3R63	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A3R64	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A11A3R65	0698-7209	4		RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-TO-75R0-F
A11A3R65	0698-8816	1	1	RESISTOR 2.15 1% .125W F TC=0+-100	28480	0698-8816
A11A3R67	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-TO-2151-F
A11A3R68	0698-7209	4		RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-TO-75R0-F
A11A3R69	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-TO-3161-F
A11A3R70	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A3R71	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A11A3R72	0698-8813	8	1	RESISTOR 1.21 1% .125W F TC=0+-100	28480	0698-8813
A11A3R73	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A11A3R74	0698-7251	6		RESISTOR 4.22K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4221-F
A11A3R75	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A3R76	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A11A3R77	0698-7209	4		RESISTOR 75 1% .05W F TC=0+-100	24546	C3-1/8-T0-75R0-F
A11A3R78	0698-7257	2		RESISTOR 7.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-7501-F
A11A3R79	0698-8817	2	1	RESISTOR 2.61 1% .125W F TC=0+-100	28480	0698-8817
A11A3R80	0698-7195	7	1	RESISTOR 19.6 1% .05W F TC=0+-100	24546	C3-1/8-T0-19R6-F
A11A3R81	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-12R1-F
A11A3R82	2100-2632	4		RESISTOR-TRMR 100 10% C SIDE-ADJ 1-TRN	30983	ET50X101
A11A3R83	0698-7215	2		RESISTOR 133 1% .05W F TC=0+-100	24546	C3-1/8-T0-133R-F
A11A3U1	1826-0488	1		IC OP AMP WB TO-99 PKG	27014	LM218H
A11A3U2	1820-0321	9	2	IC COMPARATOR GP TO-99 PKG	01295	SN72710L
A11A3U3	1820-0321	9		IC COMPARATOR GP TO-99 PKG	01295	SN72710L
A11A3U4	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
A11A3U5	1820-1200	5	1	IC INV TTL LS HEX	01295	SN74LS05N
A11A3VR1	1902-3139	7		DIODE-ZNR 8.25V 5% DO-35 PD=.4W	28480	1902-3139
A11A3VR2	1902-3070	5	1	DIODE-ZNR 4.22V 5% DO-35 PD=.4W	28480	1902-3070

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A11A4</b>						
A11A4	08663-60344	4	1	FM PHASE DETECTOR ASSEMBLY	28480	08663-60344
A11A4C1	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4C2	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A11A4C3	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4C4	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A11A4C5	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4C6	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A11A4C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4C8	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A11A4C9	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A11A4C10	0180-2698	8	1	CAPACITOR-FXD 4.7UF+-10% 35VDC TA	28480	0180-2698
A11A4C11	0180-2697	7		CAPACITOR-FXD 10UF+-10% 25VDC TA	28480	0180-2697
A11A4C12	0180-2697	7		CAPACITOR-FXD 10UF+-10% 25VDC TA	28480	0180-2697
A11A4C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4C15	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A4J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A11A4J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A11A4L1	08662-60316	9			28480	08662-60316
A11A4L2	08662-60316	9			28480	08662-60316
A11A4L3	9140-0114	4		INDUCTOR RF-CH-MLD 10UH 10% .166DX.385LG	28480	9140-0114
A11A4L4	9140-0114	4		INDUCTOR RF-CH-MLD 10UH 10% .166DX.385LG	28480	9140-0114
A11A4MP1	08663-00067	2	1	COVER-EXTRUSION A11-A5	28480	08663-00067
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A11A4Q1	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A11A4Q2	1854-0019	3	1	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A11A4Q3	1854-0404	0		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0404
A11A4R1	0698-7264	1		RESISTOR 14.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1472-F
A11A4R2	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A4R3	0698-7224	3		RESISTOR 316 1% .05W F TC=0+-100	24546	C3-1/8-T0-316R-F
A11A4R4	0698-7253	8		RESISTOR 5.11K 1% .05W F TC=0+-100	24546	C3-1/8-T0-5111-F
A11A4R5	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A11A4R6	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A11A4R7	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A4R8	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-T0-464R-F
A11A4R9	0698-7275	4		RESISTOR 42.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4222-F
A11A4R10	0698-7252	7		RESISTOR 4.64K 1% .05W F TC=0+-100	24546	C3-1/8-T0-4641-F
A11A4R11	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A4R12	0698-7284	5		RESISTOR 100K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1003-F
A11A4R13	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A4R14	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A4R15	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A4R16	0698-7285	6		RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1103-F
A11A4R17	0698-7285	6		RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1103-F
A11A4R18	0698-7285	6		RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1103-F
A11A4R19	0698-7285	6		RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/B-T0-1103-F
A11A4R20	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/B-T0-2152-F
A11A4R21	0683-1065	7	1	RESISTOR 10M 5% .25W CC TC=-900/+1100	01121	CB1065
A11A4R22	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/B-T0-909R-F
A11A4R23	0698-7196	8		RESISTOR 21.5 1% .05W F TC=0+-100	24546	C3-1/B-T0-21R5-F
A11A4R24	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/B-T0-2152-F
A11A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A4U1	1820-3517	1		IC DIVR ECL VAR-MODULO	28480	1820-3517
A11A4U2	1820-1478	9	1	IC CNTR TTL LS BIN ASYNCHRO	01295	SN74LS93N
A11A4U3	1820-1201	6		IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A11A4U4	1820-0630	3		IC MISC TTL	04713	MC4044P
A11A4U5	1820-1490	5	1	IC CNTR TTL LS DECD ASYNCHRO	01295	SN74LS90N
A11A4U6	1820-1463	2	1	IC CNTR TTL DECD ASYNCHRO NEG-EDGE-TRIG	01295	SN74390N
A11A4U7	1826-0013	8		IC OP AMP LOW-NOISE TO-99 PKG	06665	SSS741CJ
A11A4VR1	1902-0025	4		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.06%	28480	1902-0025

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A11A5</b>						
A11A5	08663-60323	9	1	MODULATION DRIVE ASSEMBLY	28480	08663-60323
A11A5C1	0180-0194	5	4	CAPACITOR-FXD 150UF+-10% 15VDC TA	56289	150D157X9015S2
A11A5C2	0180-0194	5		CAPACITOR-FXD 150UF+-10% 15VDC TA	56289	150D157X9015S2
A11A5C3	0180-0194	5		CAPACITOR-FXD 150UF+-10% 15VDC TA	56289	150D157X9015S2
A11A5C4	0180-0194	5		CAPACITOR-FXD 150UF+-10% 15VDC TA	56289	150D157X9015S2
A11A5C5	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A5C6	0160-0576	5	5	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A5C7	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A5C8	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A5C9	0160-4524	1		CAPACITOR-FXD 24PF +-5% 200VDC CER 0+-30	51642	200-200-NP0-240J
A11A5C10	0160-4524	1		CAPACITOR-FXD 24PF +-5% 200VDC CER 0+-30	51642	200-200-NP0-240J
A11A5C11	0160-3879	7	1	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A5C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A5C13	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A5C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A5C15	0160-3694	4		CAPACITOR-FXD 330PF +-10% 100VDC CER	28480	0160-3694
A11A5C16	0160-3878	6	6	CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A5C17	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A11A5C18	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A5C19	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A5C20	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A5C21	0160-0127	2	2	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A11A5C22	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A11A5C23	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A11A5C24	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A5C25	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A11A5C26	0180-2617	1	1	CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A5C27	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A11A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A11A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A11A5CR3	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A11A5CR4	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
A11A5CR5	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A11A5CR6	1901-0539	3	3	DIODE-SM SIG SCHOTTKY	28480	1901-0539
A11A5CR7	1901-0539	3		DIODE-SM SIG SCHOTTKY	28480	1901-0539
2234A TO 2326A A11A5CR8	1901-0518	8	8	DIODE-SM SIG SCHOTTKY	28480	1901-0518
2333A AND ABOVE A11A5CR8				NOT ASSIGNED		
A11A5J1	1250-1220	0	4	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A11A5J2	1250-1220	0	4	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
2234A TO 2510A A11A5K1	0490-1013	6	6	RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1013
A11A5K2	0490-1013	6		RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1013
2513A AND ABOVE A11A5K1	0490-1423	2	2	RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1423
A11A5K2	0490-1423	2		RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1423

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A5L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A11A5L2	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A11A5L3	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A11A5MP1	08663-00049	0	1	COVER, 2/3 MOD DRIVER	28480	08663-00049
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A11A5Q1	1854-0810	2		TRANSISTOR NPN SI PD=625MW FT=200MHZ	28480	1854-0810
A11A5Q2	1855-0020	8		TRANSISTOR J-FET N-CHAN D-MODE TO-18 SI	28480	1855-0020
A11A5R1	0698-6366	2	2	RESISTOR 800 .1% .125W F TC=0+-25	28480	0698-6366
A11A5R2	0698-6366	2		RESISTOR 800 .1% .125W F TC=0+-25	28480	0698-6366
A11A5R3	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A11A5R4	0757-0418	9		RESISTOR 619 1% .125W F TC=0+-100	24546	C4-1/8-T0-619R-F
A11A5R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A11A5R6	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A11A5R7	0698-6348	0	2	RESISTOR 3K .1% .125W F TC=0+-25	28480	0698-6348
A11A5R8	0698-6348	0		RESISTOR 3K .1% .125W F TC=0+-25	28480	0698-6348
A11A5R9	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A11A5R10	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A11A5R11	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A11A5R12	2100-3355	0	2	RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	28480	2100-3355
A11A5R13	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A11A5R14	2100-3355	0		RESISTOR-TRMR 100K 10% C SIDE-ADJ 1-TRN	28480	2100-3355
A11A5R15	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A5R16	0698-7248	1		RESISTOR 3.16K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3161-F
A11A5R17	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A11A5R18	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A11A5R19	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A11A5R20	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A11A5R21	2100-3353	8	2	RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A11A5R22	2100-3353	8		RESISTOR-TRMR 20K 10% C SIDE-ADJ 1-TRN	28480	2100-3353
A11A5R23	0698-6344	6	2	RESISTOR 900 .1% .125W F TC=0+-25	28480	0698-6344
A11A5R24	0698-6323	1	2	RESISTOR 100 .1% .125W F TC=0+-25	28480	0698-6323
A11A5R25	0698-6344	6		RESISTOR 900 .1% .125W F TC=0+-25	28480	0698-6344
A11A5R26	0698-6323	1		RESISTOR 100 .1% .125W F TC=0+-25	28480	0698-6323
A11A5R27	0698-7211	8	2	RESISTOR 90.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-90R9-F
A11A5R28	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A11A5R29	0698-7211	8		RESISTOR 90.9 1% .05W F TC=0+-100	24546	C3-1/8-T0-90R9-F
A11A5R30	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A11A5R31	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A11A5R32	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A11A5R33	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A11A5R34	0698-7250	5		RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3831-F
A11A5R35	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
2234A TO 2552A						
A11A5R36	0698-3409	8		RESISTOR 2.37K 1% .5W F TC=0+-100	28480	0698-3409
2601A AND ABOVE						
A11A5R36	0698-3406	5		RESISTOR 1.33K 1% .5W F TC=0+-100	24546	C4-1/8-T0-1331-F
A11A5R37	0757-0815	0	2	RESISTOR 562 1% .5W F TC=0+-100	28480	0757-0815
A11A5R38	0698-7287	8	1	RESISTOR 133K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1333-F
A11A5R39	0698-7265	2		RESISTOR 16.2K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1622-F
A11A5R40	0698-7285	6		RESISTOR 110K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1103-F

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A11A5R41	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A11A5R42	0698-7272	1		RESISTOR 31.6K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3162-F
A11A5R43	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A11A5R44	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A11A5R45	0757-1092	7	1	RESISTOR 287 1% .5W F TC=0+-100	28480	0757-1092
A11A5R46	0698-7250	5		RESISTOR 3.83K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3831-F
A11A5R47	0698-7203	8		RESISTOR 42.2 1% .05W F TC=0+-100	24546	C3-1/8-T0-42R2-F
A11A5R48	0698-7237	8		RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1101-F
A11A5R49	2100-3350	5	1	RESISTOR-TRMR 200 10% C SIDE-ADJ 1-TRN	28480	2100-3350
A11A5R50	0698-7255	0		RESISTOR 6.19K 1% .05W F TC=0+-100	24546	C3-1/8-T0-6191-F
A11A5R51	0698-7231	2		RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/8-T0-619R-F
A11A5R52	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A11A5R53	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A11A5R54	0699-0075	0	1	RESISTOR 21.5M 1% .125W F TC=0+-150	28480	0699-0075
A11A5R55	0698-7274	3		RESISTOR 38.3K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3832-F
A11A5R56	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A11A5R57	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A11A5R58	0698-7268	5		RESISTOR 21.5K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2152-F
A11A5R59	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A11A5R60	0698-7260	7		RESISTOR 10K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1002-F
A11A5TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A5U1	1826-0783	9	2	IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A11A5U2	1826-0783	9		IC OP AMP LOW-NOISE 8-DIP-C PKG	52063	XR5534ACN
A11A5U3	1826-0358	4	3	IC OP AMP LOW-BIAS-H-IMPDT TO-99 PKG	27014	LF256H, SEL NOISE
A11A5U4	1826-0950	2	2	ANALOG SWITCH 2 SPDT 16-CERDIP	28480	1826-0950
A11A5U5	1826-0191	3		IC COMPARATOR GP DUAL TO-100 PKG	27014	LM319H
A11A5U6	1826-0950	2		ANALOG SWITCH 2 SPDT 16-CERDIP	28480	1826-0950
A11A5U7	1826-0358	4		IC OP AMP LOW-BIAS-H-IMPDT TO-99 PKG	27014	LF256H, SEL NOISE
A11A5U8	1820-1199	1	1	IC INV TTL LS HEX 1-INP	01295	SN74LS04N
2234A TO 2552A A11A5U9	1826-0161	7	1	IC OP AMP GP QUAD 14-DIP-P PKG	04713	MLM324P
2601A AND ABOVE A11A5U9	1826-0753	3	1	IC OP AMP LOW-BIAS-H-IMPDT QUAD 14-DIP-C	04713	MC34004BL
2234A TO 2326A A11A5U10	1826-0264	1	2	IC CONV 10-B-D/A 16-DIP-P PKG	24355	AD7520LN
2333A AND ABOVE A11A5U10	1826-0921	7	3	D/A 10-BIT 16-CBRZ/SDR CMOS	28480	1826-0921
A11A5U11	1820-1423	4		IC MV TTL LS MONOSTBL RETRIG DUAL	01295	SN74LS123N
2234A TO 2326A A11A5U12	1826-0264	1		IC CONV 10-B-D/A 16-DIP-P PKG	24355	AD7520LN
2333A AND ABOVE A11A5U12	1826-0921	7		D/A 10-BIT 16-CBRZ/SDR CMOS	28480	1826-0921
A11A5U13	1826-0951	3	1	ANALOG SWITCH 2 SPST 14 -CERDIP	28480	1826-0951
A11A5VR1	1902-0965	1	1	DIODE-ZNR 20V 5% DO-35 PD=,4W TC=+.092%	28480	1902-0965
A11A5VR2	1902-0958	2		DIODE-ZNR 10V 5% DO-35 PD=,4W TC=+.075%	28480	1902-0958
A11A5VR3	1902-3193	3	3	DIODE-ZNR 13.3V 5% DO-35 PD=,4W	28480	1902-3193

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A11A6</b>						
A11A6	08663-60320	6	1	MODULATION SECTION MOTHERBOARD	28480	08663-60320
A11A6J1	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J3	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J5	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J6	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J7	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0835
A11A6J8	1251-5316	5	1	CONNECTOR 34-PIN POST SERIES	28480	1251-5316
A11A6J9	1251-5314	3		CONNECTOR 50-PIN POST SERIES	28480	1251-5314
A11A6J10	1251-5595	2		POLARIZING KEY-POST CONN	28480	1251-5595
A11A6TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A6TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A6TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A6TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A6TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A11A6XA11A1	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A11A6XA11A2	1251-2034	8	2	CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	28480	1251-2034
A11A6XA11A3	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A11A6XA11A4	1251-2034	8		CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	28480	1251-2034
A11A6XA11A5	1251-2582	1		CONNECTOR-PC EDGE 24-CONT/ROW 2-ROWS	28480	1251-2582

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A12A1</b>						
A12A1	08663-60301	3	1	MULTIPLEXER & POWER AMP ASSEMBLY	28480	08663-60301
A12A1C1	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A1C2	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A1C3	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A1C4	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A1C5	0180-2618	2		CAPACITOR-FXD 33UF+-10% 10VDC TA	25088	D33GS1B10K
A12A1C6	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A1C7	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A12A1C8	0160-4835	7	6	CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A12A1C9	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A12A1C10	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A12A1C11	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A12A1C12	0180-0291	3		CAPACITOR-FXD 1UF+-10% 35VDC TA	56289	150D105X9035A2
A12A1C13	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A12A1C14	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A12A1C15	0160-4831	3	2	CAPACITOR-FXD 4700PF +-10% 100VDC CER	28480	0160-4831
A12A1C16	0160-4787	8	4	CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A12A1C17	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A12A1C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A12A1C19	0160-4834	6	1	CAPACITOR-FXD .047UF +-10% 100VDC CER	28480	0160-4834
A12A1C20	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12A1C21	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A1C22	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A12A1C23	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A1C24	0160-4831	3		CAPACITOR-FXD 4700PF +-10% 100VDC CER	28480	0160-4831
A12A1C25	0160-4819	7	1	CAPACITOR-FXD 2200PF +-5% 100VDC CER	28480	0160-4819
A12A1C26	0180-0218	4	1	CAPACITOR-FXD .15UF+-10% 35VDC TA	56289	150D154X9035A2
A12A1C27	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A12A1C28	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A12A1C29	0160-0158	9		CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A12A1C30	0160-4835	7		CAPACITOR-FXD .1UF +-10% 50VDC CER	28480	0160-4835
A12A1C31	0160-0158	9		CAPACITOR-FXD 5600PF +-10% 200VDC POLYE	28480	0160-0158
A12A1C32	0160-4787	8		CAPACITOR-FXD 22PF +-5% 100VDC CER 0+-30	28480	0160-4787
A12A1C33	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
<i>2234A TO 2401A</i>						
<i>A12A1C34</i>				NOT ASSIGNED		
<i>2405A AND ABOVE</i>						
<i>A12A1C34</i>	0160-4791	4	1	CAPACITOR-FXD 10PF +-5% 100VDC CER 0+-30	28480	0160-4791
A12A1CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR6	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A1E1	9170-0847	3	1	CORE-SHIELDING BEAD	02114	56-590-65/3B PARYLENE COATED
	2190-0045	8	2	WASHER-LK HLCL NO. 2 .088-IN-ID	28480	2190-0045
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
	2190-0045	8		WASHER-LK HLCL NO. 2 .088-IN-ID	28480	2190-0045

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2510A A12A1K1	0490-1013	6		RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1013
2513A AND ABOVE A12A1K1	0490-1423	2		RELAY-REED 1C 250MA 28VDC 5VDC-COIL 3VA	28480	0490-1423
A12A1L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1L6	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
2234A TO 2449A A12A1L7	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
2451A AND ABOVE A12A1L7	9100-4078	3		INDUCTOR 650 54%	28480	9100-4078
A12A1L8	9140-0245	2	2	INDUCTOR RF-CH-MLD 445UH 5% .29DX.924LG	28480	9140-0245
A12A1L9	9140-0245	2		INDUCTOR RF-CH-MLD 445UH 5% .29DX.924LG	28480	9140-0245
A12A1L10	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ 2.5-6UH @ 1MHZ	28480	9100-3922
A12A1L11	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1L12	9140-0210	1		INDUCTOR RF-CH-MLD 100UH 5% .166DX.385LG	28480	9140-0210
A12A1L13	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1MP1	08663-00059	2	1	COVER-POWER AMPLIFIER	28480	08663-00059
	0520-0128	7	1	SCREW-MACH 2-56 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A12A1MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A1MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A1MP4	08662-00041	1		SHIELD-COMPONENT (LARGE)	28480	08662-00041
A12A1MP5	08662-00039	7		SHIELD-CIRCUIT (LARGE)	28480	08662-00039
A12A1Q1	1853-0314	9	1	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A12A1Q2	1853-0459	3	2	TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A12A1Q3	1853-0281	9	4	TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
2234A TO 2552A A12A1Q4	1854-0475	5		TRANSISTOR-DUAL NPN PD=750MW	28480	1854-0475
2601A AND ABOVE A12A1Q4	1854-1046	8		TRANSISTOR-DUAL NPN TO-78 PD=750MW	28480	1854-1046
A12A1Q5	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A12A1Q6	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A12A1Q7	1854-0814	6	1	TRANSISTOR NPN SI TO-66 PD=75W FT=3MHZ	28480	1854-0814
	1205-0454	5	1	HEAT SINK SGL TO-66-CS	28480	1205-0454
	2360-0197	2	1	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	28480	2360-0197
	2190-0006	1		WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0006
	2420-0003	7		NUT-HEX-DBL-CHAM 6-32-THD .094-IN-THK	28480	2420-0003
A12A1Q8	1855-0420	2	2	TRANSISTOR J-FET 2N4391 N-CHAN D-MODE	01295	2N4391
A12A1Q9	1855-0420	2		TRANSISTOR J-FET 2N4391 N-CHAN D-MODE	01295	2N4391
A12A1Q10	1854-0811	3	1	TRANSISTOR NPN SI PD=625MW FT=100MHZ	28480	1854-0811
A12A1Q11	1854-0485	7	2	TRANSISTOR NPN SI TO-104 PD=175MW	28480	1854-0485
A12A1Q12	1854-0668	8	1	TRANSISTOR NPN SI TO-18 PD=500MW	28480	1854-0668
A12A1Q13	1854-0485	7		TRANSISTOR NPN SI TO-104 PD=175MW	28480	1854-0485
A12A1Q14	1853-0281	9		TRANSISTOR PNP 2N2907A SI TO-18 PD=400MW	04713	2N2907A
A12A1Q15	1853-0393	4	1	TRANSISTOR PNP SI TO-18 PD=500MW	28480	1853-0393

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A1R1	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R2	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A12A1R3	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R4	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A1R5	0757-0402	1		RESISTOR 110 1% .125W F TC=0+-100	24546	C4-1/8-T0-111-F
A12A1R6	2100-3109	2		RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A12A1R7	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A12A1R8	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A12A1R9	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R10	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A12A1R11	0757-0815	0		RESISTOR 562 1% .5W F TC=0+-100	28480	0757-0815
A12A1R12	2100-3109	2		RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A12A1R13	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A12A1R14	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A12A1R15	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A1R16	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A12A1R17	0698-8827	4		RESISTOR 1M 1% .125W F TC=0+-100	28480	0698-8827
A12A1R18	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A12A1R19	0698-3395	1	1	RESISTOR 34.8 1% .5W F TC=0+-100	28480	0698-3395
A12A1R20	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R21	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A12A1R22	0811-3470	5	1	RESISTOR 1.3% 3W PW TC=0+-90	28480	0811-3470
A12A1R23	0757-0274	5		RESISTOR 1.21K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1211-F
A12A1R24	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R25	0698-3258	5	1	RESISTOR 5.36K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5361-F
A12A1R26	2100-3252	6	1	RESISTOR-TRMR 5K 10% C TOP-ADJ 1-TRN	28480	2100-3252
A12A1R27	0757-0424	7		RESISTOR 1.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1101-F
A12A1R28	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A1R29	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A1R30	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A12A1R31	2100-3056	8		RESISTOR-TRMR 5K 10% C SIDE-ADJ 17-TRN	02111	43P502
A12A1R32	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A12A1R33	0698-3443	0		RESISTOR 287 1% .125W F TC=0+-100	24546	C4-1/8-T0-287R-F
A12A1R34	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A1R35	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A12A1R36	0757-0199	3		RESISTOR 21.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2152-F
A12A1R37	0698-3609	0	1	RESISTOR 22 5% 2W MO TC=0+-200	27167	FP42-2-T00-22R0-J
A12A1R38	0698-3607	8	1	RESISTOR 18 5% 2W MO TC=0+-200	27167	FP42-2-T00-18R0-J
A12A1R39	0698-8812	7	1	RESISTOR 1 1% .125W F TC=0+-100	28480	0698-8812
A12A1R40	0757-0465	6		RESISTOR 100K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1003-F
A12A1R41	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R42	0757-0422	5		RESISTOR 909 1% .125W F TC=0+-100	24546	C4-1/8-T0-909R-F
A12A1R43	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A1R44	0698-3458	7	2	RESISTOR 348K 1% .125W F TC=0+-100	28480	0698-3458
A12A1R45	0698-3153	9		RESISTOR 3.83K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3831-F
A12A1R46	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A12A1R47	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A1R48	0698-3458	7		RESISTOR 348K 1% .125W F TC=0+-100	28480	0698-3458
A12A1R49	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A12A1R50	0757-1022	3	2	RESISTOR 1.78K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1781-F
A12A1R51	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A1R52	0698-0082	7	2	RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A12A1R53	0698-4640	1		RESISTOR 3.16K 1% .25W F TC=0+-100	24546	C5-1/4-T0-3161-F
A12A1R54	0698-3442	9		RESISTOR 237 1% .125W F TC=0+-100	24546	C4-1/8-T0-237R-F
A12A1R55	0698-4640	1		RESISTOR 3.16K 1% .25W F TC=0+-100	24546	C5-1/4-T0-3161-F
A12A1R56	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A12A1R57	0757-0428	1	1	RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A12A1R58	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A12A1R59	0698-4632	1		RESISTOR 1.96K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1961-F
A12A1R60	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A1R61	2100-3161	6		RESISTOR-TRMR 20K 10% C SIDE-ADJ 17-TRN	02111	43P203
A12A1R62	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R63	0757-0442	9	1	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R64	2100-3162	7		RESISTOR-TRMR 200K 10% C SIDE-ADJ 17-TRN	02111	43P204
2234A TO 2323A A12A1R65	0698-3260	9		RESISTOR 464K 1% .125W F TC=0+-100	28480	0698-3260
2326A AND ABOVE A12A1R65	0698-8824	1	1	RESISTOR 562K 1% .125W F TC=0+-100	28480	0698-8824
A12A1R66	0757-0442	9	9	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R67	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
A12A1R68	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-T0-100R-F
A12A1TP1	0360-0535	0	0	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP2	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP3	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP4	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP5	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP6	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP7	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP8	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP9	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP10	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP11	0360-0535	0	0	TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1TP12	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A1U1	08663-67002	5	1	AMP-POWER	28480	08663-67002
A12A1U2	1205-0011	0		HEAT SINK TO-5/TO-39-CS	28480	1205-0011
A12A1U2	2200-0105	4		SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A12A1U3	1820-0535	7		IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP
A12A1U4	1820-0535	7	IC DRVR TTL AND DUAL 2-INP	01295	SN75451BP	
A12A1U5	1826-0358	4	1	IC OP AMP LOW-BIAS-H-IMPD TO-99 PKG	27014	LF256H, SEL NOISE
A12A1U6	1826-0759	9		IC COMPARATOR GP QUAD 14-DIP-C PKG	04713	LM339J
A12A1U7	1820-1281	2		IC DCDR TTL LS 2-TO-4-LINE DUAL 2-INP	01295	SN74LS139N
A12A1U8	1820-1211	8		IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
A12A1U9	1820-0471	0		IC INV TTL HEX 1-INP	01295	SN7406N
A12A1U10	1826-0889	6		IC OP AMP LOW-NOISE DUAL 14-DIP-C PKG	52063	XR5533AN(PER HP DWG)
A12A1VR1	1902-0961	7	1	DIODE-ZNR 13V 5% DO-35 PD=.4W TC=+.082%	28480	1902-0961
A12A1VR2	1902-0958	2		DIODE-ZNR 10V 5% DO-35 PD=.4W TC=+.075%	28480	1902-0958
A12A1W1	08663-20039	0	1	CABLE ASSEMBLY-INPUT	28480	08663-20039
A12A1W2	08663-20038	9		CABLE ASSEMBLY	28480	08663-20038

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A12A1A1</b>						
A12A1A1	08663-60035	0	1	MULTIPLEXER ASSEMBLY	28480	08663-60035
A12A1A1C1	0160-4303	4	2	CAPACITOR-FXD .027UF +-10% 50VDC CER	26654	3BX50S273K
A12A1A1C2	0160-4306	7	1	CAPACITOR-FXD 100PF +-10% 100VDC CER	51959	0805C101K3P
A12A1A1FL1	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A12A1A1FL2	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A12A1A1L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A1A1L2	9170-0636	8	2	CORE-TOROID AL=14-NH/T	28480	9170-0636
A12A1A1L3	9170-0636	8		CORE-TOROID AL=14-NH/T	28480	9170-0636
A12A1A1MP1	08663-20015	2	1	HOUSING-MUX	28480	08663-20015
	0520-0127	6	1	SCREW-MACH 2-56 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2200-0140	7	1	SCREW-MACH 4-40 .25-IN-LG 100 DEG	28480	2200-0140
	2200-0150	9	1	SCREW-MACH 4-40 .625-IN-LG 100 DEG	00000	ORDER BY DESCRIPTION
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	3050-0023	7	4	WASHER-FL NM NO. 6 .144-IN-ID .25-IN-OD	28480	3050-0023
A12A1A1MP2	08663-20017	4	1	COVER-MUX	28480	08663-20017
A12A1A1U1	08663-67004	7	1	MULTIPLEXER-RF IF DESIRED, THE ENTIRE MULTIPLEXER BD. ASSY(THAT IS, THE BD W/C1,C2 & L1-3 MTD) MAY BE ORDERED. THE HP P/N 08663-60305.	28480	08663-67004

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 4-3. Replaceable Parts

**A12A2**

A12A2	08663-60303	5	1	UHF MODULATOR ASSEMBLY	28480	08663-60303
A12A2C1	0160-4779	8	3	CAPACITOR-FXD 10PF +-2% 200VDC CER 0+-30	28480	0160-4779
A12A2C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A2C3	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A2C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A2C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A2C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A2C7	0160-4768	5	5	CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A12A2C8	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A12A2C9	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A12A2C10	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A12A2C11	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A12A2C12	9135-0002	8		FILTER-LOW PASS SOLDER-TERMS	33095	51-744-018
A12A2C13	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
<i>2234A TO 2604A</i>						
A12A2C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
<i>2615A AND ABOVE</i>						
A12A2C14	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A12A2C15	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A12A2C16	0160-4518	3		CAPACITOR-FXD 3.9PF +-5PF 200VDC CER	28480	0160-4518
A12A2C17	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A2C18	0160-4768	5		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A12A2C19	0160-4768	5		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A12A2C20	0160-6727	0		CAPACITOR-FXD .033UF +-10% 50VDC CER	12473	RALEIGH
A12A2C21	0160-3568	1		CAPACITOR-FXD 2.7PF +-5% 200VDC CER	51642	100-100-NP0-279J
A12A2C22	0160-4765	2	2	CAPACITOR-FXD 36PF +-5% 200VDC CER 0+-30	28480	0160-4765
A12A2C23	0160-4494	4		CAPACITOR-FXD 39PF +-5% 200VDC CER 0+-30	28480	0160-4494
A12A2C24	0160-4524	1		CAPACITOR-FXD 24PF +-5% 200VDC CER 0+-30	51642	200-200-NP0-240J
A12A2C25	0160-4765	2		CAPACITOR-FXD 36PF +-5% 200VDC CER 0+-30	28480	0160-4765
A12A2C26	0160-3568	1		CAPACITOR-FXD 2.7PF +-5% 200VDC CER	51642	100-100-NP0-279J
A12A2C27	0160-4768	5		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A12A2C28	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A12A2C29	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A12A2C30	0121-0061	1	4	CAPACITOR-V TRMR-CER 5.5-18PF 350V	52763	304322 5.5/18PF NPO
A12A2C31	0121-0046	2		CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650
A12A2C32	0121-0046	2		CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650
A12A2C33	0160-4779	8		CAPACITOR-FXD 10PF +-2% 200VDC CER 0+-30	28480	0160-4779
A12A2C34	0121-0061	1		CAPACITOR-V TRMR-CER 5.5-18PF 350V	52763	304322 5.5/18PF NPO
A12A2C35	0160-4524	1		CAPACITOR-FXD 24PF +-5% 200VDC CER 0+-30	51642	200-200-NP0-240J
A12A2C36	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A12A2C37	0160-4779	8		CAPACITOR-FXD 10PF +-2% 200VDC CER 0+-30	28480	0160-4779
A12A2C38	0160-4492	2		CAPACITOR-FXD 18PF +-5% 200VDC CER 0+-30	28480	0160-4492
A12A2C39	0160-4524	1		CAPACITOR-FXD 24PF +-5% 200VDC CER 0+-30	51642	200-200-NP0-240J
A12A2C40	0160-4386	3		CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A12A2C41	0160-4387	4		CAPACITOR-FXD 47PF +-5% 200VDC CER 0+-30	28480	0160-4387
A12A2C42	0160-4492	2		CAPACITOR-FXD 18PF +-5% 200VDC CER 0+-30	28480	0160-4492
A12A2C43	0160-4386	3		CAPACITOR-FXD 33PF +-5% 200VDC CER 0+-30	28480	0160-4386
A12A2C44	0121-0449	9		CAPACITOR-V TRMR-CER 3.5-10PF 63V PC-MTG	28480	0121-0449
A12A2C45	0121-0061	1		CAPACITOR-V TRMR-CER 5.5-18PF 350V	52763	304322 5.5/18PF NPO
A12A2C46	0121-0046	2		CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A2C47	0121-0061	1		CAPACITOR-V TRMR-CER 5.5-18PF 350V	52763	304322 5.5/18PF NPO
A12A2C48	0121-0046	2		CAPACITOR-V TRMR-CER 9-35PF 200V PC-MTG	52763	304322 9/35PF N650
A12A2C49	0160-4768	5		CAPACITOR-FXD 470PF +-5% 100VDC CER	28480	0160-4768
A12A2C50	0160-3568	1		CAPACITOR-FXD 2.7PF +-5% 200VDC CER	51642	100-100-NPO-279J
A12A2C52	0160-0690	4	1	CAPACITOR-FXD 1PF +-5PF 100VDC CER	28480	0160-0690
A12A2CR1	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR4	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR5	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR6	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR7	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR8	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR9	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR10	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR11	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR12	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR13	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2CR14	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A2J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
A12A2J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
A12A2L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L6	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L7	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L8	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L9	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L10	9135-0080	2	4	INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
<i>2234A TO 2604A</i>						
A12A2L11*	9135-0071	1	1	INDUCTOR RF-CH-MLD 62NH 5% .102DX.26LG	28480	9135-0071
<i>2615A AND ABOVE</i>						
A12A2L11*	9135-0072	2	1	INDUCTOR RF-CH-MLD 56NH 5% .102DX.26LG	28480	9135-0072
A12A2L12	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L13	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L14	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L15	9100-1621	6	2	INDUCTOR RF-CH-MLD 18UH 10% .166DX.385LG	28480	9100-1621
A12A2L16	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A12A2L17	9100-2248	5	3	INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248
A12A2L18	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L19	9100-2248	5		INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248
A12A2L20	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L21	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L22	9135-0070	0		INDUCTOR RF-CH-MLD 24NH 7% .102DX.26LG	28480	9135-0070
A12A2L23	9135-0077	7		INDUCTOR RF-CH-MLD 36NH 6% .102DX.26LG	28480	9135-0077
A12A2L24	9135-0072	2		INDUCTOR RF-CH-MLD 56NH 5% .102DX.26LG	28480	9135-0072
A12A2L25	9135-0070	0		INDUCTOR RF-CH-MLD 24NH 7% .102DX.26LG	28480	9135-0070
A12A2L26	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A2L27	9135-0076	6		INDUCTOR RF-CH-MLD 39NH 6% .102DX.26LG	28480	9135-0076
A12A2L28	9135-0075	5		INDUCTOR RF-CH-MLD 43NH 8% .102DX.26LG	28480	9135-0075
A12A2L29	9135-0072	2		INDUCTOR RF-CH-MLD 56NH 5% .102DX.26LG	28480	9135-0072
A12A2L30	9135-0070	0		INDUCTOR RF-CH-MLD 24NH 7% .102DX.26LG	28480	9135-0070
A12A2L31	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A12A2L32	9135-0077	7		INDUCTOR RF-CH-MLD 36NH 6% .102DX.26LG	28480	9135-0077
A12A2L33	9135-0075	5		INDUCTOR RF-CH-MLD 43NH 8% .102DX.26LG	28480	9135-0075
A12A2L34	9135-0072	2		INDUCTOR RF-CH-MLD 56NH 5% .102DX.26LG	28480	9135-0072
A12A2L35	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L36	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L37	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L38	9135-0080	2		INDUCTOR RF-CH-MLD 27NH 5% .102DX.26LG	28480	9135-0080
A12A2L39	9135-0075	5		INDUCTOR RF-CH-MLD 43NH 8% .102DX.26LG	28480	9135-0075
A12A2L40	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L41	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2L42	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A2MP1	08663-00058	1	1	COVER, 2/3 UHF MOD.	28480	08663-00058
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A12A2MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A2MP3 †	08663-00085	4	1	COVER, (FRONT) UHF	28480	08663-00085
	08663-00103	7	1	INSULATING PAD	28480	08663-00103
	0360-0269	7	1	TERMINAL-SLDR LUG LK-MTG FOR-#8-SCR	28480	0360-0269
	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
	2580-0002	4	1	NUT-HEX-DBL-CHAM 8-32-THD .085-IN-THK	28480	2580-0002
A12A2MP4	08663-00084	3	1	COVER, (REAR) UHF	28480	08663-00084
A12A2MP5	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A2MP6	08662-00041	1		SHIELD-COMPONENT (LARGE)	28480	08662-00041
A12A2MP7	08662-00170	7		SHIELD-CIRCUIT	28480	08662-00170
A12A2Q1	1853-0405	9	1	TRANSISTOR PNP SI PD=300MW FT=850MHZ	04713	2N4209
A12A2Q2	1854-0809	9	1	TRANSISTOR NPN 2N2369A SI TO-18 PD=360MW	28480	1854-0809
A12A2Q3	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A12A2Q4	1853-0459	3		TRANSISTOR PNP SI PD=625MW FT=200MHZ	28480	1853-0459
A12A2R1	0698-0085	0		RESISTOR 2.61K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2611-F
A12A2R2	0757-0417	8		RESISTOR 562 1% .125W F TC=0+-100	24546	C4-1/8-T0-562R-F
A12A2R3	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A12A2R4	0698-3437	2		RESISTOR 133 1% .125W F TC=0+-100	24546	C4-1/8-T0-133R-F
A12A2R5	0698-4590	0	2	RESISTOR 422 1% .25W F TC=0+-100	24546	C5-1/4-T0-422R-F
A12A2R6	0757-0346	2		RESISTOR 10 1% .125W F TC=0+-100	24546	C4-1/8-T0-10R0-F
2234A TO 2615A A12A2R7	0698-7205	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
2628A AND ABOVE A12A2R7	0699-1903	0		RESISTOR 51.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-51R1-F
A12A2R8	1810-0205	7	1	NETWORK-RES 8-SIP4.7K OHM X 7	01121	208A472
A12A2R9*	0698-7218	5	7	RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-T0-178R-F
A12A2R10	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A12A2R11	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A12A2R12	0698-3401	0	1	RESISTOR 215 1% .5W F TC=0+-100	28480	0698-3401

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 4-3. Replaceable Parts**

A12A2R13*	0699-1352	8		RESISTOR 21.5 +-1% .125W TKF TC=0+-100	02995	9C12063AFKR
A12A2R14	0757-1090	5		RESISTOR 261 1% .5W F TC=0+-100	28480	0757-1090
A12A2R15	0698-7233	4	2	RESISTOR 750 1% .05W F TC=0+-100	24546	CC-1/8-T0-750R-F
A12A2R16	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A12A2R17	0698-7240	3		RESISTOR 1.47K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1471-F
A12A2R18	0698-7237	8		RESISTOR 1.1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1101-F
A12A2R19	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A12A2R20	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A12A2R21	0757-0798	8	1	RESISTOR 110 1% .5W F TC=0+-100	28480	0757-0798
A12A2R22	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A12A2R23	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A2R24	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A2R25	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A2R26	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A2R27	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A2R28	0698-7223	2		RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
A12A2R29*	0699-1419	8		RESISTOR 147 +-1% .125W TKF TC=0+-100	02995	9C12063AFKR
A12A2R30*	0699-1346	0		RESISTOR 12.1 +-1% .125W TKF TC=0+-100	02995	0699-1346
A12A2R31*	0699-1350	8		RESISTOR 17.8 +-1% .125W TKF TC=0+-100	02995	0699-1350
A12A2R32*	0699-1417	6		RESISTOR 121 +-1% .125W TKF TC=0+-100	02995	9C12063AFKR
A12A2R33	0698-7271	0		RESISTOR 28.7K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2872-F
A12A2TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A2TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A2TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A2TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A2TP5	1251-2194	1		CONNECTOR-SGL CONT SKT .021-IN-BSC-SZ SQ	28480	1251-2194
A12A2U1	1826-0372	2		IC MISC 8-DIP-P PKG	28480	1826-0372
A12A2U2	1820-0681	4		IC GATE TTL S NAND QUAD 2-INP	01295	SN74S00N
A12A2U3	08662-67002	4	2	UHF POWER AMPLIFIER	28480	08662-67002
	0340-0834	0	2	INSULATOR-XSTR POLYI	28480	0340-0834
	1205-0206	5	1	HEAT SINK SGL TO-5/TO-39-CS	28480	1205-0206
A12A2U4	1820-1216	3	1	IC DCDR TTL LS 3-TO-8-LINE 3-INP	01295	SN74LS138N
A12A2U5	1820-0668	7		IC BFR TTL NON-INV HEX 1-INP	01295	SN7407N
A12A2U6	1820-1144	6		IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
A12A2W1	8159-0005	0	1	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A12A3</b>						
A12A3	08663-60345	5	1	LF AMPLIFIER	28480	08663-60345
A12A3C1	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A12A3C2	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A12A3C3	0160-3878	6		CAPACITOR-FXD 1000PF +20% 100VDC CER	28480	0160-3878
A12A3C4	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C5	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A12A3C6	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A12A3C7	0160-4896	0	1	CAPACITOR-FXD 47PF +-2% 200VDC CER 0+-30	28480	0160-4896
A12A3C8	0160-4776	5	1	CAPACITOR-FXD 29PF +-2% 200VDC CER 0+-30	28480	0160-4776
A12A3C9	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C10	0180-2619	3		CAPACITOR-FXD 22UF+-10% 15VDC TA	25088	D22GS1B15K
A12A3C11	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C12	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A3C13	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C14	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C15	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C16	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C17	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C18	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A3C19	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
2234A TO 2333A A12A3C20				NOT ASSIGNED		
2339A AND ABOVE A12A3C20	0160-3875	3		CAPACITOR-FXD 22PF+-5% 200VDC CER	28480	0160-3875
A12A3CR1	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A12A3CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A12A3CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A12A3J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A12A3J3	1250-0836	2	1	CONNECTOR-RF SMC M PC 50-OHM	28480	1250-0836
	2190-0124	4	2	WASHER-LK INTL T 5/8 IN .64-IN-ID	28480	2190-0124
A12A3K1	0490-0670	9		RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
	0340-0440	4		INSULATOR-IC NYLON WHITE	28480	0340-0440
A12A3K2	0490-0670	9		RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
	0340-0440	4		INSULATOR-IC NYLON WHITE	28480	0340-0440
A12A3K3	0490-0670	9		RELAY 2C 5VDC-COIL 1A 28VDC	28480	0490-0670
	0340-0440	4		INSULATOR-IC NYLON WHITE	28480	0340-0440
A12A3L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A3L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A3L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A3L4	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A12A3L5	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A3L6	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A12A3L7	9135-0081	3		INDUCTOR RF-CH-MLD 68NH 5% .102DX.26LG	28480	9135-0081
A12A3L8	9135-0079	9		INDUCTOR RF-CH-MLD 100NH 5% .102DX.26LG	28480	9135-0079
2234A TO 2333A A12A3L9	9100-2251	0		INDUCTOR RF-CH-MLD 220NH 10% .105DX.26LG	28480	9100-2251
2339A AND ABOVE A12A3L9	9100-2254	3		INDUCTOR RF-CH-MLD 390NH 10% .105DX.26LG	28480	9100-2254
A12A3L10	9135-0079	9		INDUCTOR RF-CH-MLD 100NH 5% .102DX.26LG	28480	9135-0079
A12A3L11	9100-2248	5		INDUCTOR RF-CH-MLD 120NH 10% .105DX.26LG	28480	9100-2248

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A3MP1	08663-00068	3	1	COVER-EXTRUSION A4-A3	28480	08663-00068
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A12A3MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A3MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A3MP4	08662-00040	0		SHIELD-COMPONENT (SMALL)	28480	08662-00040
A12A3MP5	08662-00038	6	2	SHIELD-CIRCUIT (SMALL)	28480	08662-00038
A12A3MP6	08662-60016	6	1	DUPLEXER SHIELD	28480	08662-60016
A12A3Q1	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A12A3Q2	1854-0247	9		TRANSISTOR NPN SI TO-39 PD=1W FT=800MHZ	28480	1854-0247
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A12A3Q3	1854-0721	4		TRANSISTOR NPN SI TO-39 PD=1.5W	25403	BFR 95
	1200-0173	5		INSULATOR-XSTR DAP-GL	28480	1200-0173
A12A3Q4	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A12A3Q5	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A12A3Q6	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A12A3R1	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-12R1-F
A12A3R2	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-12R1-F
A12A3R3	0757-1022	3		RESISTOR 1.78K 1% .25W F TC=0+-100	24546	C5-1/4-T0-1781-F
A12A3R4	0698-7225	4		RESISTOR 348 1% .05W F TC=0+-100	24546	C3-1/8-T0-348R-F
A12A3R5	0698-7229	8		RESISTOR 511 1% .05W F TC=0+-100	24546	C3-1/8-T0-511R-F
A12A3R6	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A12A3R7	0698-7194	6		RESISTOR 17.8 1% .05W F TC=0+-100	24546	C3-1/8-T0-17R8-F
A12A3R8	0698-3441	8		RESISTOR 215 1% .125W F TC=0+-100	24546	C4-1/8-T0-215R-F
A12A3R9	0698-4590	0		RESISTOR 422 1% .25W F TC=0+-100	24546	C5-1/4-T0-422R-F
A12A3R10	0698-7199	1	1	RESISTOR 28.7 1% .05W F TC=0+-100	24546	C3-1/8-T0-28R7-F
A12A3R11	0698-0079	2	1	RESISTOR 2.37K 1% .25W F TC=0+-100	24546	C5-1/4-T0-2371-F
A12A3R12	0698-7231	2		RESISTOR 619 1% .05W F TC=0+-100	24546	C3-1/8-T0-619R-F
A12A3R13	0698-7217	4		RESISTOR 162 1% .05W F TC=0+-100	24546	C3-1/8-T0-162R-F
A12A3R14	0698-4579	5	2	RESISTOR 261 1% .25W F TC=0+-100	24546	C5-1/4-T0-261R-F
A12A3R15	0698-4579	5		RESISTOR 261 1% .25W F TC=0+-100	24546	C5-1/4-T0-261R-F
A12A3R16	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-12R1-F
A12A3R17	0757-0403	2		RESISTOR 121 1% .125W F TC=0+-100	24546	C4-1/8-T0-121R-F
A12A3R18	0698-3152	8	3	RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
2234A TO 2333A						
A12A3R19*	0698-7223	2	9	RESISTOR 287 1% .05W F TC=0+-100	24546	C3-1/8-T0-287R-F
	1251-1556	7	21	CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
2339A AND ABOVE						
A12A3R19*	0698-7220	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-T0-178R-F
	1251-1556	7	21	CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A3R20				NOT ASSIGNED		
2234A TO 2333A						
A12A3R21	0757-0180	2	1	RESISTOR 31.6 1% .125W F TC=0+-100	28480	0757-0180
	1251-1998	1	1	CONNECTOR-SGL CONT SKT .025-IN-BSC-SZ	28480	1251-1998
2339A AND ABOVE						
A12A3R21*	0757-0379	1	1	RESISTOR 12.1 1% .125W F TC=0+-100	19701	MF4C1/8-T0-12R1-F
	1251-1998	1	1	CONNECTOR-SGL CONT SKT .025-IN-BSC-SZ	28480	1251-1998
A12A3R22	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
2234A TO 2333A						
A12A3R23*	0698-7220	5		RESISTOR 178 1% .05W F TC=0+-100	24546	C3-1/8-T0-178R-F
	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
2339A AND ABOVE						
A12A3R23*	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-T0-464R-F
	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2333A A12A3R24	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
2339A AND ABOVE A12A3R24	0698-7226	5		RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-TO-383R-F
A12A3R25	0698-7190	2		RESISTOR 12.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-12R1-F
A12A3R26	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-TO-3481-F
2234A TO 2333A A12A3R27	0698-7228	7		RESISTOR 464 1% .05W F TC=0+-100	24546	C3-1/8-TO-464R-F
2339A AND ABOVE A12A3R27	0698-7226	5		RESISTOR 383 1% .05W F TC=0+-100	24546	C3-1/8-TO-383R-F
A12A3R28	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
2234A TO 2333A A12A3R29	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
A12A3R30	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-TO-26R1-F
2339A AND ABOVE A12A3R29	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A12A3R30	0698-7197	9		RESISTOR 23.7 1% .05W F TC=0+-100	24546	C3-1/8-TO-23R7-F
A12A3R31	0698-3152	8		RESISTOR 3.48K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3481-F
2234A TO 2333A A12A3R32	0698-7221	0		RESISTOR 237 1% .05W F TC=0+-100	24546	C3-1/8-TO-237R-F
2339A AND ABOVE A12A3R32	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-TO-215R-F
A12A3R33	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
2234A TO 2333A A12A3R34	0698-7214	1	2	RESISTOR 121 1% .05W F TC=0+-100	24546	C3-1/8-TO-121R-F
2339A AND ABOVE A12A3R34	0698-7213	0		RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-TO-110R-F
A12A3R35	0698-7206	1		RESISTOR 56.2 1% .05W F TC=0+-100	24546	C3-1/8-TO-56R2-F
2234A TO 2333A A12A3R36	0698-7214	1		RESISTOR 121 1% .05W F TC=0+-100	24546	C3-1/8-TO-121R-F
2339A AND ABOVE A12A3R36	0698-7213	0		RESISTOR 110 1% .05W F TC=0+-100	24546	C3-1/8-TO-110R-F
A12A3TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A3TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A3TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A3TP4	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A12A4</b>						
A12A4	08663-60307	9	1	DOUBLER #1 ASSEMBLY	28480	08663-60307
	08663-60106	6	1	RESTORED DOUBLER #1 ASSEMBLY	28480	08663-60106
A12A4C1	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A12A4C2	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C3	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C4	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C5	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C6	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C7	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A12A4C8	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C9	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C10	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C11	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C12	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C13	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C14	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C15	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C16	0160-3876	4		CAPACITOR-FXD 47PF +-20% 200VDC CER	28480	0160-3876
A12A4C17	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A12A4C18	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A12A4C23	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A12A4C24	0180-1735	2	2	CAPACITOR-FXD .22UF+-10% 35VDC TA	56289	150D224X9035A2
A12A4C25	0160-2055	9		CAPACITOR-FXD .01UF +-80-20% 100VDC CER	28480	0160-2055
A12A4C27	0180-1746	5		CAPACITOR-FXD 15UF+-10% 20VDC TA	56289	150D156X9020B2
A12A4C28	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A12A4C29	0180-0228	6		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X9015B2
A12A4C31	0180-0229	7		CAPACITOR-FXD 33UF+-10% 10VDC TA	56289	150D336X9010B2
A12A4C32	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
A12A4C33	0180-0116	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	56289	150D685X9035B2
A12A4C35	0180-1735	2		CAPACITOR-FXD .22UF+-10% 35VDC TA	56289	150D224X9035A2
A12A4C36	0160-3877	5		CAPACITOR-FXD 100PF +-20% 200VDC CER	28480	0160-3877
A12A4C37	0160-2055	9		CAPACITOR-FXD .01UF +-80-20% 100VDC CER	28480	0160-2055
A12A4C38	0160-0127	2		CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
A12A4CR1	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
A12A4CR2	1901-0535	9	1	DIODE-SM SIG SCHOTTKY	28480	1901-0535
A12A4CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	28480	1901-0050
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
A12A4L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A4L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A4L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A4L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A4L5	9100-1636	3	1	INDUCTOR RF-CH-MLD 110UH 5% .166DX.385LG	28480	9100-1636
A12A4L6	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A4MP1	08663-00054	7	1	COVER, 2/3 END #1	28480	08663-00054
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A12A4MP2	5001-0176	0		GROUND STRAP	28480	5001-0176
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A4MP3	5001-0176	0	2	GROUND STRAP	28480	5001-0176
A12A4MP4	08662-20285	7		CONTACT-FINGER	28480	08662-20285
A12A4MP5	08662-20285	7		CONTACT-FINGER	28480	08662-20285
A12A4Q1	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A12A4Q2	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A12A4Q3	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A12A4Q4	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A12A4Q5	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A12A4Q6	1854-0071	7		TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A12A4Q7	1853-0020	4		TRANSISTOR PNP SI PD=300MW FT=150MHZ	28480	1853-0020
A12A4R1	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R2	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R3	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R4	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R5	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R6	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R7	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R8	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R9	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R10	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R11	0698-7212	9		RESISTOR 100 1% .05W F TC=0+-100	24546	C3-1/8-TO-100R-F
A12A4R12	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A12A4R13	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A4R14	2100-3122	9	1	RESISTOR-TRMR 100 10% C SIDE-ADJ 17-TRN	02111	43P101
A12A4R15	0698-0082	7		RESISTOR 464 1% .125W F TC=0+-100	24546	C4-1/8-T0-4640-F
A12A4R16	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A12A4R17	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A4R18	0757-0317	7		RESISTOR 1.33K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1331-F
A12A4R19	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A12A4R20	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A12A4R21	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A4R22	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A12A4R23	2100-3095	5	1	RESISTOR-TRMR 200 10% C SIDE-ADJ 17-TRN	02111	43P201
A12A4R24	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A12A4R25	0757-0438	3		RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
A12A4R26	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A12A4R27	0698-3264	3	1	RESISTOR 11.8K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1182-F
A12A4R28	0698-3158	4		RESISTOR 23.7K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2372-F
A12A4R29	2100-3096	6	1	RESISTOR-TRMR 50K 10% C TOP-ADJ 17-TRN	32997	3292W-1-503
A12A4R30	0757-0443	0		RESISTOR 11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1102-F
A12A4R31	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A4R32	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A12A4R33	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A12A4R34	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A4R35	0698-3102	8	1	RESISTOR 237 1% .5W F TC=0+-100	28480	0698-3102
A12A4R36	0757-0416	7		RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
A12A4R37	0757-0428	1		RESISTOR 1.62K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1621-F
A12A4R38	0757-0420	3		RESISTOR 750 1% .125W F TC=0+-100	24546	C4-1/8-T0-751-F
A12A4R39	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A12A4R40	2100-3678	0	1	RESISTOR-TRMR 500K 10% C TOP-ADJ 17-TRN	28480	2100-3678

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)



Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A4R41	0757-0458	7		RESISTOR 51.1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5112-F
A12A4R42	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
2234A to 2748A A12A4R43	0757-0290	5		RESISTOR 6.19K 1% .125W F TC=0+-100	19701	MF4C1/8-T0-6191-F
2823A and above A12A4R43	0698-3154	0		RESISTOR 4.22K 1% .125W F TC=0+-100	24546	C4-1/8-T0/4221-F
A12A4R44	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
A12A4R45	0757-0417	8		RESISTOR 562 1% .125W F TC=0+-100	24546	C4-1/8-T0-562R-F
A12A4R46	0757-0817	2		RESISTOR 750 1% .5W F TC=0+-100	28480	0757-0817
A12A4R47	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A12A4R48	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
A12A4R49	0698-3151	7		RESISTOR 2.87K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2871-F
A12A4R50	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A12A4R51	0757-0799	9	1	RESISTOR 121 1% .5W F TC=0+-100	28480	0757-0799
A12A4R53	0757-0467	8		RESISTOR 121K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1213-F
A12A4R54	0757-0441	8		RESISTOR 8.25K 1% .125W F TC=0+-100	24546	C4-1/8-T0-8251-F
A12A4R56	2100-3109	2		RESISTOR-TRMR 2K 10% C SIDE-ADJ 17-TRN	02111	43P202
A12A4R57	0757-0279	0		RESISTOR 3.16K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3161-F
A12A4R58	2100-3103	6	1	RESISTOR-TRMR 10K 10% C SIDE-ADJ 17-TRN	02111	43P103
A12A4R59	0757-0466	7		RESISTOR 110K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1103-F
A12A4R60	0698-3454	3		RESISTOR 215K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2153-F
A12A4R61	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A12A4R62	0757-0440	7		RESISTOR 7.5K 1% .125W F TC=0+-100	24546	C4-1/8-T0-7501-F
A12A4TP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP6	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP7	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A4U1	1826-0547	3		IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072ACP
A12A4U2	08662-67009	1	1	X2 FILTER NOT RECOMMENDED FOR FIELD REPLACEMENT	28480	08662-67009
A12A4U3	08662-67010	4	1	FILTER MOD NOT RECOMMENDED FOR FIELD REPLACEMENT	28480	08662-67010
A12A4U4	1816-1008	2	1	IC TTL S 4096 (4K) PROM 75-NS 3-S	01295	TBP28S42J
	1200-0639	8	1	SOCKET-IC 20-CONT DIP DIP-SLDR	28480	1200-0639
A12A4U5	1826-0921	7		D/A 10-BIT 16-CBRZ/SDR CMOS	28480	1826-0921
A12A4VR1	1902-3193	3		DIODE-ZNR 13.3V 5% DO-35 PD=.4W	28480	1902-3193
A12A4VR2	1902-3193	3		DIODE-ZNR 13.3V 5% DO-35 PD=.4W	28480	1902-3193
A12A4VR3	1902-3082	9		DIODE-ZNR 4.64V 5% DO-35 PD=.4W	28480	1902-3082
A12A4W1	08662-60048	4	1	CABLE ASSEMBLY #88	28480	08662-60048

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A12A5</b>						
A12A5	08663-60308	0	1	LF DOWN CONVERTER	28480	08663-60308
A12A5C1	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A12A5C2	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A5C3	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A12A5C4	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C5	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A12A5C6	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A5C7	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A12A5C8	0160-4494	4		CAPACITOR-FXD 39PF +-5% 200VDC CER 0+-30	28480	0160-4494
A12A5C9	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C10	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A12A5C12	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C13	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A5C14	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C15	0180-2661	5		CAPACITOR-FXD 1UF+-10% 50VDC TA	25088	D1R0GS1A50K
A12A5C16	0121-0451	3	1	CAPACITOR-V TRMR-AIR 1.7-11PF 175V	74970	1B7-0106-02B
A12A5C17	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C18	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A12A5C19	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C20	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A12A5C21	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A12A5C22	0180-2617	1		CAPACITOR-FXD 6.8UF+-10% 35VDC TA	25088	D6R8GS1B35K
A12A5C23	0160-0571	0		CAPACITOR-FXD 470PF +-20% 100VDC CER	28480	0160-0571
A12A5C24	0160-4382	9		CAPACITOR-FXD 3.3PF +-25PF 200VDC CER	28480	0160-4382
A12A5C25	0160-4389	6		CAPACITOR-FXD 100PF +-5PF 200VDC CER	28480	0160-4389
A12A5C26	0160-4897	1	2	CAPACITOR-FXD 4.7PF +-1PF 200VDC CER	28480	0160-4897
A12A5C27	0160-4383	0		CAPACITOR-FXD 6.8PF +-5PF 200VDC CER	20932	5024E0200RD689D
A12A5C28	0160-4885	7	1	CAPACITOR-FXD 8.2PF +-2% 200VDC CER	28480	0160-4885
A12A5C29	0160-3874	2		CAPACITOR-FXD 10PF +-5PF 200VDC CER	28480	0160-3874
A12A5C30	0160-4897	1		CAPACITOR-FXD 4.7PF +-1PF 200VDC CER	28480	0160-4897
A12A5C31	0160-4383	0		CAPACITOR-FXD 6.8PF +-5PF 200VDC CER	20932	5024E0200RD689D
A12A5C32	0160-4490	0		CAPACITOR-FXD 1.8PF +-25PF 200VDC CER	28480	0160-4490
A12A5CR1	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A5CR2	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A5CR3	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A5CR4	1901-1096	9		DIODE-PIN	28480	1901-1096
A12A5J1	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A12A5J2	1250-1220	0		CONNECTOR-RF SMC M PC 50-OHM	28480	1250-1220
	2190-0124	4		WASHER-LK INTL T NO. 10 .195-IN-ID	28480	2190-0124
	2950-0078	9		NUT-HEX-DBL-CHAM 10-32-THD .067-IN-THK	28480	2950-0078
A12A5L1	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L2	9100-1621	6		INDUCTOR RF-CH-MLD 18UH 10% .166DX.385LG	28480	9100-1621
A12A5L3	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L4	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L5	9135-0070	0		INDUCTOR RF-CH-MLD 24NH 7% .102DX.26LG	28480	9135-0070

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A5L6	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A12A5L7	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L8	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L10	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L11	9135-0076	6		INDUCTOR RF-CH-MLD 39NH 6% .102DX.26LG	28480	9135-0076
A12A5L12	9135-0069	7		INDUCTOR RF-CH-MLD 30NH 5% .102DX.26LG	28480	9135-0069
A12A5L13	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A5L14	9100-2247	4		INDUCTOR RF-CH-MLD 100NH 10% .105DX.26LG	28480	9100-2247
A12A5L15	9135-0069	7		INDUCTOR RF-CH-MLD 30NH 5% .102DX.26LG	28480	9135-0069
A12A5L16	9135-0069	7		INDUCTOR RF-CH-MLD 30NH 5% .102DX.26LG	28480	9135-0069
A12A5L17	9135-0069	7		INDUCTOR RF-CH-MLD 30NH 5% .102DX.26LG	28480	9135-0069
A12A5L18	9135-0069	7		INDUCTOR RF-CH-MLD 30NH 5% .102DX.26LG	28480	9135-0069
A12A5L19	9100-1630	7		INDUCTOR RF-CH-MLD 51UH 5% .166DX.385LG	28480	9100-1630
A12A5MP1	08663-00055	8	1	COVER-EXT DOWN CONVERTER	28480	08663-00055
A12A5MP2	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
A12A5MP3	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A5MP4	5001-0176	0		GROUND STRAP	28480	5001-0176
A12A5MP5	08662-00040	0		SHIELD-COMPONENT (SMALL)	28480	08662-00040
A12A5Q1	08662-00038	6		SHIELD-CIRCUIT (SMALL)	28480	08662-00038
A12A5Q2	1853-0036	2	2	TRANSISTOR PNP SI PD=310MW FT=250MHZ	28480	1853-0036
A12A5Q3	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A12A5Q4	1853-0036	2		TRANSISTOR PNP SI PD=310MW FT=250MHZ	28480	1853-0036
A12A5Q5	1854-0477	7		TRANSISTOR NPN 2N2222A SI TO-18 PD=500MW	04713	2N2222A
A12A5Q6	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A12A5R1	1854-0720	3		TRANSISTOR NPN SI PD=500MW FT=4GHZ	28480	1854-0720
A12A5R3A	0699-1426	7	2	RESISTOR 287 1% .125W F TC=0+-100	28480	0699-1426
A12A5R3B	0699-1350	6		RESISTOR 17.8 1% F TC=0+-100	28480	0699-1350
A12A5R4	0699-0174	0		RESISTOR 11.6 5% .1W C TC=0+-200	28480	0699-0174
A12A5R5	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A12A5R6	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A12A5R7	0698-7263	0		RESISTOR 13.3K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1332-F
A12A5R8	0699-1426	7	2	RESISTOR 287 1% .125W F TC=0+-100	28480	0699-1426
A12A5R9	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A12A5R10	0698-7249	2		RESISTOR 3.48K 1% .05W F TC=0+-100	24546	C3-1/8-T0-3481-F
A12A5R11	0698-7246	9		RESISTOR 2.81K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A12A5R12	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A5R13	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-26R1-F
A12A5R14	0699-0128	4	4	RESISTOR 10 5% .1W C TC=0+-200	26654	3C100J
A12A5R15	0698-7247	0	1	RESISTOR 2.87K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2871-F
A12A5R16	0699-0128	4		RESISTOR 10 5% .1W C TC=0+-200	26654	3C100J
A12A5R17	0757-0198	2	1	RESISTOR 100 1% .5W F TC=0+-100	28480	0757-0198
A12A5R18	0698-7244	7		RESISTOR 2.15K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2151-F
A12A5R19	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
A12A5R20	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F
A12A5R21	0698-7158	2	1	RESISTOR 100K .01% .5W F TC=0+-1	28480	0698-7158
A12A5R22	0698-7233	4		RESISTOR 750 1% .05W F TC=0+-100	24546	C3-1/8-T0-750R-F
A12A5R23	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A12A5R24	0698-7219	6		RESISTOR 196 1% .05W F TC=0+-100	24546	C3-1/8-T0-196R-F

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
A12A5R24	0698-7236	7		RESISTOR 1K 1% .05W F TC=0+-100	24546	C3-1/8-T0-1001-F
A12A5R25	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A12A5R26	0698-0084	9		RESISTOR 2.15K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2151-F
A12A5R27	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
A12A5R28	0698-7246	9		RESISTOR 2.61K 1% .05W F TC=0+-100	24546	C3-1/8-T0-2611-F
A12A5R29	0698-7220	9		RESISTOR 215 1% .05W F TC=0+-100	24546	C3-1/8-T0-215R-F
A12A5R30	0698-7198	0		RESISTOR 26.1 1% .05W F TC=0+-100	24546	C3-1/8-T0-26R1-F
A12A5R31	0699-0128	4		RESISTOR 10 5% .1W C TC=0+-200	26654	3C100J
A12A5R33	0699-0128	4		RESISTOR 10 5% .1W C TC=0+-200	26654	3C100J
A12A5R34	0698-3334	8	1	RESISTOR 178 1% .5W F TC=0+-100	28480	0698-3334
A12A5R35	0698-7188	8		RESISTOR 10 1% .05W F TC=0+-100	24546	C3-1/8-T0-10R-F
A12A5R36	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A12A5R37	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A12A5R38	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A12A5R39	0699-0129	5		RESISTOR 17.6 5% .1W C TC=0+-200	28480	0699-0129
A12A5R40	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A12A5R41	0699-0130	8		RESISTOR 287 5% .1W C TC=0+-200	28480	0699-0130
A12A5TP1	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A5TP2	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A5TP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A5TP4	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A5TP5	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A5TP6	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A5TP7	1251-1556	7		CONNECTOR-SGL CONT SKT .018-IN-BSC-SZ	28480	1251-1556
A12A5TP8	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A5TP9	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A5TP10	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A5TP11	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A5U1	08662-67002	4		UHF POWER AMPLIFIER	28480	08662-67002
	0340-0834	0		INSULATOR-XSTR POLYI	28480	0340-0834
	08662-20291	5	1	HEAT SINK	28480	08662-20291
A12A5U2	0960-0495	3	1	MIXER-DOUBLE BALANCED FREQ RANGE: LO	28480	0960-0495
A12A5W1	08662-20046	8	1	CABLE SEMIRIGID #46	28480	08662-20046
A12A5W2	08662-20050	4	1	CABLE SEMIRIGID	28480	08662-20050

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Table 6-3. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<b>A12A6</b>						
A12A6	08663-60300	2	1	OUTPUT SECTION MOTHERBOARD ASSEMBLY	28480	08663-60300
A12A6C1	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C2	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C3	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C4	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C5	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C6	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C7	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C8	0160-3878	6		CAPACITOR-FXD 1000PF +-20% 100VDC CER	28480	0160-3878
A12A6C9	0160-0576	5		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-0576
A12A6J1	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
A12A6J2	1200-0507	9		SOCKET-IC 16-CONT DIP-SLDR	28480	1200-0507
A12A6J3	1200-0508	0		SOCKET-IC 14-CONT DIP-SLDR	28480	1200-0508
<i>2234A TO 2449A</i>						
A12A6L1	9140-0335	1		INDUCTOR 110UH 15% .47DX1.25LG Q=10	28480	9140-0335
<i>2451A AND ABOVE</i>						
A12A6L1	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A12A6L2	9100-3922	4		INDUCTOR-FIXED 120-1300 HZ	28480	9100-3922
A12A6L7	9100-4078	3		INDUCTOR 650H 54%	28480	9100-4078
A12A6MP1	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A6MP2	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A6MP3	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A6MP4	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A6MP5	1251-0600	0		CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ SQ	28480	1251-0600
A12A6TP1	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A6TP2	0360-0535	0		TERMINAL TEST POINT PCB	00000	ORDER BY DESCRIPTION
A12A6XA12A1	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A12A6XA12A2	1251-1633	1		CONNECTOR-PC EDGE 15-CONT/ROW 1-ROW	28480	1251-1633
A12A6XA12A3	1251-1631	9		CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631
A12A6XA12A4	1251-2035	9		CONNECTOR-PC EDGE 15-CONT/ROW 2-ROWS	28480	1251-2035
A12A6XA12A5	1251-1631	9		CONNECTOR-PC EDGE 10-CONT/ROW 1-ROW	28480	1251-1631

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5.)

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
CHASSIS PARTS/MISCELLANEOUS PARTS						
AT1	08663-60104	4	1	ATTENUATOR SET-FRONT OUTPUT (STD ONLY)	28480	08663-60104
AT1	08663-60105	5	1	ATTENUATOR SET-REAR OUTPUT (OPT 001/002)	28480	08663-60105
2234A TO 2405A						
AT2				NOT ASSIGNED		
2408A AND ABOVE						
AT2	1250-0207	1	1	TERMINATION-COAXIAL SERIES BNC; 50 OHMS (STD)	28480	1250-0207
AT2	1250-0839	5	1	TERMINATION-COAXIAL SMC FEMALE; 50 OHMS (OPT 001/002)	28480	1250-0839
2234A TO 2846A						
B1 †				FAN		
2918A AND ABOVE						
B1	3160-0471	2	1	FAN-TBAX 106-CFM 24VDC .6KV-DIEL	28480	3160-0471
F1	2110-0010	9	1	FUSE 5A 250V NTD 1.25X.25 UL (LINE FUSE FOR ABOVE 115V OPERATION)	75915	312005
F1	2110-0083	6	1	FUSE 2.5A 250V NTD 1.25X.25 UL (LINE FUSE FOR 230V OPERATION)	28480	2110-0083
F2	2110-0063	2	1	FUSE .75A 250V NTD 1.25X.25 UL (OVEN FUSE FOR 115V OPERATION)	28480	2110-0063
F2	2110-0012	1	1	FUSE .5A 250V NTD 1.25X.25 UL (OVEN FUSE FOR 230V OPERATION)	28480	2110-0012
FL1	08662-60011	1	1	520 MHZ BAND PASS FILTER	28480	08662-60011
FL2	9135-0195	0	1	FILTER-LINE WIRE LEAD-TERMS	28480	9135-0195
J1				NSR P/O W1 "AM IN" (STD. & OPT 002)		
	1250-1091	3	3	CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1091
	2190-0068	5	4	WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0068
	0590-1011	6	3	NUT-KNRLD-R 15/32-32-THD .12-IN-THK	28480	0590-1011
J2				NSR P/O W2 "FM IN" (STD; OPT 002)		
	1250-1091	3		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1091
	2190-0068	5		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0068
	0590-1011	6		NUT-KNRLD-R 15/32-32-THD .12-IN-THK	28480	0590-1011
J3				NSR P/O W3 "PHASE MOD INPT" (OPT 002)		
	1250-1091	3		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1091
	2190-0068	5		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0068
	0590-1011	6		NUT-KNRLD-R 15/32-32-THD .12-IN-THK	28480	0590-1011
J4				OUTPUT CONNECTOR ASSEMBLY	28480	08662-60304
	1250-0915	8	1	CONTACT-RF CONN SER APC-N FEMALE	9D949	131-149
	2190-0104	0	1	WASHER-LK INTL T 7/16 IN .439-IN-ID	28480	2190-0104
	2950-0132	6	1	NUT-HEX-DBL-CHAM 7/16-28-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
	2360-0116	5	2	SCREW-MACH 6-32 .312-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
	5021-0863	4	1	BODY-RF CONNECTOR	28480	5021-0863
	5040-0306	0	1	INSULATOR	28480	5040-0306
	08555-20093	5	1	CONTACT JACK	28480	08555-20093
	08555-20094	6	1	BODY BULKHEAD	28480	08555-20094
	08731-210	2	1	NUT LOCK	28480	08731-210
	08761-2027	4	1	INSULATOR	28480	08761-2027
J6				NSR P/O W55 "PULSE BPSK"		
J7				NSR P/O W3 "PHASE MOD IN" (OPT. 001/002)		
J8				NSR P/O W88 "Z AXIS BLKG MKR"		
J10				NSR P/O W1 "AM IN" (OPT. 001)		
J12				NSR P/O W51 "AUX FM IN"		
J13				NSR P/O W2 "FM IN" (OPT. 001)		
J14	SAME AS J4	7	1	(OPTION 001 ONLY)	28480	SAME AS J4
J15				NSR P/O W93 "640 MHZ"		
2234A TO 2405A						
J16			1	NOT ASSIGNED		
2408A AND ABOVE						
J16	1250-0083	1	1	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM (STD)	28480	1250-0083
J16	1250-0829	3	1	CONNECTOR-RF SMC M SGL-HOLE-FR 50-OHM (OPT 001)	28480	1250-0829

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5).

Δ Errata part change.

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP1	08662-00176	3	1	RIGHT PANEL SUPPORT	28480	08662-00176
MP2	08662-00063	7	1	LEFT PANEL SUPPORT	28480	08662-00063
MP3	3050-0226	2	1	WASHER-FL MTLCL NO. 10 .203-IN-ID	28480	3050-0226
MP4	0510-0045	6		RETAINER-RING E-R EXT .188-IN-DIA STL	28480	0510-0045
MP5	08662-20024	2	1	SUPPORT PANEL TOP	28480	08662-20024
2234A TO 2651A MP6	08663-00021	8	1	SUB-PANEL	28480	08663-00021
2700A AND ABOVE MP6	08663-00120	8	1	SUB-PANEL	28480	08663-00120
MP7	08662-20301	9	1	SUB-PANEL BOTTOM	28480	08662-20301
MP8	2200-0165	6	1	SCREW-MACH 4-40 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
2234A TO 2918A MP9				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE MP9	08663-00125	3	1	SWEEP PANEL	28480	08663-00125
MP9B	0510-1148	2	2	RETAINER-PUSH ON KB-TO-SHFT EXT	28480	0510-1148
MP10	5040-6928	4	1	STRIP-DIVIDER	28480	5040-6928
2234A TO 2918A MP11				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE MP11	08663-00127	5	1	FRONT CASTING	28480	08663-00127
MP12	2200-0103	2		SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
2234A TO 2918A MP13				NO LONGER AVAILABLE, SEE SECTION 7		
MP14				NO LONGER AVAILABLE, SEE SECTION 7		
MP15				NO LONGER AVAILABLE, SEE SECTION 7		
MP16				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE MP13	08663-00121	9	1	RIGHT CONNECTOR PANEL (OPT. 001)	28480	08663-00121
MP14	08663-00124	2	1	RIGHT CONNECTOR PANEL (STD. ONLY)	28480	08663-00124
	0510-1148	2		RETAINER-PUSH ON KB-TO-SHFT EXT	28480	0510-1148
MP15	08663-00122	0	1	RIGHT CONNECTOR PANEL (OPT. 002)	28480	08663-00122
	1400-0053	4	1	CLAMP-CABLE .172-DIA .375-WD NYL	28480	1400-0053
	2190-0003	8	2	WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0003
	2200-0145	2	1	SCREW-MACH 4-40 .438-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	3050-0105	6	2	WASHER-FL MTLCL NO. 4 .125-IN-ID	28480	3050-0105
MP16	08663-00123	1	1	MAIN PANEL	28480	08663-00123
	2950-0001	8	1	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK	00000	ORDER BY DESCRIPTION
	2190-0016	3	1	WASHER-LK INTL T 3/8 IN .377-IN-ID	28480	2190-0016
MP17	0370-2389	7	1	KNOB-BASE 1-1/2 JGK .25-IN-ID	28480	0370-2389
MP18	08662-20300	7	1	RIGHT PIN HINGE	28480	08662-20300
MP19	0510-0045	6	3	RETAINER-RING E-R EXT .188-IN-DIA STL	28480	0510-0045
MP20	08662-20016	2	1	LEFT PIN HINGE	28480	08662-20016
	0510-0045	6		RETAINER-RING E-R EXT .188-IN-DIA STL	28480	0510-0045
MP21	1400-0014	7	1	CABLE CLAMP-HFCL .5-DIA .375-WD STL	28480	1400-0014
	2360-0113	2	6	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
2234A TO 2918A MP22				NO LONGER AVAILABLE, SEE SECTION 7		
MP22	5020-8805	8	1	FRONT FRAME-ENGLISH CAB.	28480	5020-8805
2936A AND ABOVE MP22	5021-8405	6	1	FRONT FRAME-METRIC CAB.	28480	5020-8405
2234A TO 2619A MP23 †				REAR PANEL		
2620A, 2704A AND ABOVE MP23	08663-20059	4	1	REAR PANEL	28480	08663-20059
2234A TO 2513A MP24	5020-8838	7	1	CORNER STRUTS - ENGLISH CABINET	28480	5020-8838
MP25	2510-0192	6	1	SCREW-MACH 8-32 .25-IN-LG 100 DEG ENGLISH CABINET	00000	ORDER BY DESCRIPTION

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

△ Errata part change.

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
<i>2516A AND ABOVE</i>						
MP24	5021-5838	3	1	CORNER STRUTS – METRIC CABINET	28480	5021-5838
MP25	0515-1331	5	1	SCREW-METRIC SPECIALTY M4 X 0.7 THD; 6 METRIC CABINET	28480	0515-1331
MP26	08663-00035	4	1	ATTENUATOR BRACKETS	28480	08663-00035
	2200-0103	2	2	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI	28480	2200-0103
MP27	08662-00053	5	1	REAR GUSSET	28480	08662-00053
MP28	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP29	08662-00133	2	1	GUSSET SUPPORT #2	28480	08662-00133
MP30	2360-0117	6	1	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP31	08663-00017	2	1	GUSSET SUPPORT #3	28480	08663-00017
MP32	08663-00016	1	1	GUSSET #2	28480	08663-00016
MP33	08663-00001	4	1	CENTER GUSSET SUPPORT	28480	08663-00001
MP34	08663-00015	0	1	FRONT GUSSET #1	28480	08663-00015
MP35	2420-0001	5		NUT-HEX-W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
MP36				NOT ASSIGNED		
MP37				NOT ASSIGNED		
MP38	2360-0115	4	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP39	3050-0227	3		WASHER-FL MTLC NO. 6 .149-IN-ID	28480	3050-0227
MP40	2360-0118	7	1	SCREW-MACH 6-32 .375-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
MP41	3050-0103	4	1	WASHER-FL MTLC NO. 12 .25-IN-ID	28480	3050-0103
MP42	08663-00027	4	1	WIRE DUCT	28480	08663-00027
	2190-0018	5	2	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
	3050-0227	3	4	WASHER-FL MTLC NO. 6 .149-IN-ID	28480	3050-0227
MP43	08662-00036	4	1	SUPPORT BRACKET	28480	08662-00036
	2360-0242	8	1	SCREW-MACH 6-32 1.25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP44	08662-00023	9	1	OSCILLATOR SUPPORT	28480	08662-00023
	2200-0105	4	1	SCREW-MACH 4-40 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP45	1400-0510	8	1	CLAMP-CABLE .15-DIA .62-WD NYL	28480	1400-0510
MP46	1400-0017	0	1	CLAMP-CABLE .312-DIA .375-WD NYL	28480	1400-0017
	2190-0018	5		WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0018
	2360-0195	0		SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	28480	2360-0195
	3050-0227	3		WASHER-FL MTLC NO. 6 .149-IN-ID	28480	3050-0227
MP47	08662-00020	6	1	CABLE SHIELD	28480	08662-00020
	2360-0123	4	1	SCREW-MACH 6-32 .625-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP48	8160-0226	0	1	RFI ROUND STRIP MNL-MSH .05-IN-OD	28480	8160-0226
MP49	1400-0015	8	1	CLAMP-CABLE .25-DIA .375-WD STL	28480	1400-0015
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP50	6960-0003	5	1	PLUG-HOLE DOME-HD FOR .75-D-HOLE STL	28480	6960-0003
MP51	08662-00011	5	1	TRANSFORMER COVER	28480	08662-00011
	0361-0295	1	1	RIVET-BLIND PL-STEM DOME-HD .125DIA	28480	0361-0295
	2200-0104	3	1	SCREW-MACH 4-40 .25-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP52	08662-00161	6	1	CABLE CLAMP	28480	08662-00161
	2420-0001	5	3	NUT-HEX-W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
MP53	1400-1151	5	1	CLAMP-CABLE .625-WD NYL	28480	1400-1151
	2360-0116	5		SCREW-MACH 6-32 .312-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
MP54	08663-00036	5	1	LED SCREEN	28480	08663-00036
MP55	2200-0759	4	1	SCREW-MACH 4-40 .156-IN-LG 82 DEG	28480	2200-0759
<i>2234A TO 2918A</i>						
MP56				NO LONGER AVAILABLE, SEE SECTION 7		
<i>2936A AND ABOVE</i>						
MP56	08663-00126	4	1	FRONT WINDOW	28480	08663-00126
MP57	08663-00032	1	1	DUCT COVER	28480	08663-00032
MP58	08662-00042	2	1	TOP POWER SUPPLY COVER	28480	08662-00042
	2360-0333	8	2	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
	08662-00021	7	1	FOAM BUMPER	28480	08662-00021

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

△ Errata part change.



**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP59	08662-00155	8	1	OSCILLATOR GASKET	28480	08662-00155
MP60	08662-20019	5	1	CASTING COVER	28480	08662-20019
	2190-0003	8		WASHER-LK HLCL NO. 4 .115-IN-ID	28480	2190-0003
	2200-0209	9	1	SCREW-MACH 4-40 .375-IN-LG STL	28480	2200-0209
MP61	08662-00017	1	1	BOTTOM POWER SUPPLY COVER	28480	08662-00017
	2360-0333	8		SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0333
2234A TO 2918A						
MP62				NO LONGER AVAILABLE, SEE SECTION 7		
MP63				NO LONGER AVAILABLE, SEE SECTION 7		
MP64				NO LONGER AVAILABLE, SEE SECTION 7		
2234A TO 2513A						
MP65	5060-9849	6	1	BOTTOM COVER - ENGLISH CABINET	28480	5060-9849
2234A TO 2918A						
MP65				NO LONGER AVAILABLE, SEE SECTION 7		
MP66				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE						
MP62	5062-3843	2	1	SIDE COVERS	28480	5062-3843
MP63	5001-0540	2	1	TRIM STRIPS	28480	5001-0540
MP64	5041-8802	6	1	TOP TRIM STRIPS	28480	5041-8802
MP65	5062-3748	6	1	BOTTOM COVER - METRIC CABINET	28480	5062-3748
MP66	5062-4034	5	1	INFORMATION TRAY	28480	5062-4034
MP67	08663-90057	9	1	PULL OUT CARD	28480	08663-90057
2234A TO 2918A						
MP68				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE						
MP68	5041-8801	8	1	FOOT	28480	5041-8801
2234A TO 2513A						
MP69	5060-9836	1	1	TOP COVER - ENGLISH CABINET	28480	5060-9836
2516A TO 2918A						
MP69				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE						
MP69	5062-3736	2	1	TOP COVER - METRIC CABINET	28480	5062-3736
	1460-1345	5	1	TILT STAND SST	28480	1460-1345
2234A TO 2513A						
MP70	7120-5911	5	1	LABEL-WARNING - ENGLISH CABINET	28480	7120-5911
				ENGLISH CABINET		
2516A AND ABOVE						
MP70	7120-8607	2	1	LABEL "THIS INSTRUMENT USES METRIC AND METRIC CABINET	28480	7120-8607
MP71	08663-00034	3	1	RIGHT DCU COVER	28480	08663-00034
	0590-1192	4	2	NUT-THUMB 4-40-THD .281-IN-THK .5-OD	28480	0590-1192
	08663-00169	5	2	FOAM CUSHION	28480	08663-00169
MP72	08663-00033	2	1	LEFT DCU COVER	28480	08663-00033
	0590-1192	4		NUT-THUMB 4-40-THD .281-IN-THK .5-OD	28480	0590-1192
	08663-00169	5		FOAM CUSHION	28480	08663-00169
2234A TO 2513A						
MP73	5040-7221	2	1	STANDOFFS	28480	5040-7221
	2360-0197	2	1	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI FOR ENGLISH CABINETS	28480	2360-0197
2516A TO 2918A						
MP73				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE						
MP73	5041-8821	2	1	STANDOFFS	28480	5041-8821
	0515-1232	5	1	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	28480	0515-1232
2234A TO 2918A						
MP74				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE						
MP74	5062-3705	5	1	SIDE HANDLE STRAP	28480	5062-3705
2234A TO 2513A						
MP75	5040-7219	8	1	HANDLE CAP, FRONT - ENGLISH CABINETS	28480	5040-7219
	2680-0118	5	2	SCREW-MACH 10-32 .5-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
MP76	5060-7220	3	1	HANDLE CAP, REAR - ENGLISH CABINETS	28480	5060-7220
	2680-0118	5		SCREW-MACH 10-32 .5-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Δ Errata part change.

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2918A MP75				NO LONGER AVAILABLE, SEE SECTION 7		
MP76				NO LONGER AVAILABLE, SEE SECTION 7		
2936A AND ABOVE MP75	5041-8819	8	1	HANDLE CAP, FRONT - METRIC CABINETS	28480	5041-8819
	0515-1132	4	2	SCREW-MACH M5 X 0.8 10MM-LG	28480	0515-1132
MP76	5041-8820	1	1	HANDLE CAP, REAR - METRIC CABINETS	28480	5041-8820
	0515-1132	4		SCREW-MACH M5 X 0.8 10MM-LG	28480	0515-1132
MP77	08662-00058	0	1	FUSEPLATE	28480	08662-00058
MP78	2110-0564	8	1	FUSEHOLDER BODY 12A MAX FOR UL	H9027	031.1657
	1400-0090	9	1	FUSEHOLDER COMPONENT FOR USE ON	28480	1400-0090
	2190-0068	5		WASHER-LK INTL T 1/2 IN .505-IN-ID	28480	2190-0068
	2110-0569	3	1	FUSEHOLDER COMPONENT NUT; THREAD M12.7	28480	2110-0569
MP79	2110-0565	9	1	FUSEHOLDER CAP 12A MAX FOR UL	28480	2110-0565
MP80	08662-20060	6	1	LINE FILTER SUPPORT	28480	08662-20060
MP81	0360-0053	7	1	TERMINAL-SLDR LUG LK-MTG FOR-#10-SCR	28480	0360-0053
	2510-0043	6	1	SCREW-MACH 8-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP82	08662-00134	3	1	REAR SUPPORT GUSSET	28480	08662-00134
	2360-0182	5	1	SCREW-MACH 6-32 .312-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
MP83	0590-0184	2	1	THREADED INSERT-NUT 4-40 .058-IN-LG SST	28480	0590-0184
MP84	1250-0043	3	1	GASKET-RF CONNECTOR .125 IN ID; FOR	28480	1250-0043
MP85	3050-0105	6		WASHER-FL MTLC NO. 4 .125-IN-ID	28480	3050-0105
MP86	0590-0076	1	1	NUT-HEX-PLSTC LKG 4-40-THD .143-IN-THK	28480	0590-0076
MP87	0360-0042	4	1	TERMINAL-SLDR LUG PL-MTG FOR-#6-SCR	28480	0360-0042
	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP88	08662-00159	2	1	INSULATOR	28480	08662-00159
	2420-0001	5		NUT-HEX-W/LKWR 6-32-THD .109-IN-THK	00000	ORDER BY DESCRIPTION
MP89	2360-0113	2		SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP90	08662-00013	7	1	MOLEX SUPPORT	28480	08662-00013
MP91	0400-0018	0	1	GROMMET-CHAN NCH .052-IN-THK-PNL	28480	0400-0018
MP92	2360-0318	9		SCREW-MACH 6-32 1.875-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP93	2190-0006	1		WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0006
MP94	3050-0227	3		WASHER-FL MTLC NO. 6 .149-IN-ID	28480	3050-0227
MP95	08662-00014	8	1	AC COVER	28480	08662-00014
MP96	2200-0101	0	1	SCREW-MACH 4-40 .188-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP97	2360-0115	4		SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
MP98	08662-20040	2	1	POWER SUPPLY SCREW	28480	08662-20040
2234A TO 2405A MP99	08663-60013	4	1	CONNECTOR PANEL REAR (STD. ONLY)	28480	08663-60013
MP99	08663-60041	8	1	CONNECTOR PANEL REAR (OPT. 001)	28480	08663-60041
2408A AND ABOVE MP99	08663-60358	0	1	CONNECTOR PANEL, REAR (STD ONLY)	28480	08663-60358
MP99	08663-60357	9	1	CONNECTOR PANEL, REAR (OPT 001 ONLY)	28480	08663-60357
MP100	2200-0556	9	1	SCREW-MACH 4-40 1.7-IN-LG 82 DEG	00000	ORDER BY DESCRIPTION
MP101	08662-60003	1	1	REFERENCE CASTING	28480	08662-60003
MP102	08662-00028	4	1	AIR DEFLECTOR	28480	08662-00028
2234A TO 2619A MP103 †				FAN COVER		
2620A, 2704A AND ABOVE MP103	08663-00118	4	1	FAN COVER	28480	08663-00118
2234A TO 2846A MP104 †	86701-00017			NOT SEPARATELY REPLACEABLE		
2918A AND ABOVE MP104 †				NOT SEPARATELY REPLACEABLE		

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

△ Errata part change.

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
MP105	2190-0198	2	4	WASHER-SHLDR NO. 4 .123-IN-ID .312-IN-OD	00000	ORDER BY DESCRIPTION
MP106	2260-0003	7	1	NUT-HEX-PLSTC LKG 4-40-THD .141-IN-THK	00000	ORDER BY DESCRIPTION
MP107	1250-0043	3	4	GASKET-RF CONNECTOR .125 IN ID	28480	1250-0043
MP108	1401-0230	1	4	CAP, CLEAR	28480	1401-0230
RT1 2234A TO 2451A			1	NOT ASSIGNED		
RT2 2510A AND ABOVE			1	NOT ASSIGNED		
RT2 †	0837-0027	6	1	THERMISTOR DISC 30-OHM TC=-3.9%/C-DEG	28480	0837-0027
RV1 2234A TO 2339A			1	NOT ASSIGNED		
RV1 2342A AND ABOVE	08662-60318	1	1	VARISTOR ASSEMBLY	28480	08662-60318
S1	3101-0613	0	1	SWITCH-TGL SUBMIN SPDT 5A 120VAC PC	28480	3101-0613
T1	9100-4014	7	1	TRANSFORMER-POWER 115/230V 48-440HZ	28480	9100-4014
	3050-0027	1	1	WASHER-FL MTLC NO. 10 .203-IN-ID	28480	3050-0027
	2190-0006	1	2	WASHER-LK HLCL NO. 6 .141-IN-ID	28480	2190-0006
	2360-0318	9	2	SCREW-MACH 6-32 1.875-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
U1	5061-4824	9	1	GENERATOR ROTARY PULSE ASSY	28480	5061-4824

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

Δ Errata part change.

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
W1	08663-60026	9	1	CABLE ASSY-COAX 901 "AM INPUT" (EXCEPT OPTION 001)	28480	08663-60026
W1	08663-60043	0	1	CABLE ASSY-COAX 901 "AM INPUT" (OPTION 001 ONLY)	28480	08663-60043
W2	08663-60027	0	1	CABLE ASSY-COAX 911 "FM INPUT" (EXCEPT OPTION 001)	28480	08663-60027
W2	08663-60044	1	1	CABLE ASSY-COAX 911 "FM INPUT" (OPTION 001 ONLY)	28480	08663-60044
W3	08663-60025	8	1	CABLE ASSY-COAX 907 "PHASE MOD INPUT" (EXCEPT OPTION 001)	28480	08663-60025
W3	08663-60042	9	2	CABLE ASSY-COAX 907 "PHASE MOD INPUT" (OPTION 001 ONLY)	28480	08663-60042
W4	08663-20026	5	1	SEMI RIGID-OUTPUT (EXCEPT OPTION 001)	28480	08663-20026
W5	08663-20027	6	1	SEMI RIGID-OUTPUT (OPTION 001 ONLY)	28480	08663-20027
W6	08663-20025	4	1	SEMI RIGID-AT1-AT2	28480	08663-20025
W7	08663-20024	3	1	SEMI RIGID-A12A1J1-AT1 (INCLUDES E1-10)	28480	08663-20024
W8	08663-60015	6	1	CABLE ASSY-COAX "975"	28480	08663-60015
W9	08663-60019	0	1	CABLE ASSY-COAX "941"	28480	08663-60019
W10	08662-60035	9	1	CABLE ASSY-COAX "940"	28480	08662-60035
W11	08663-60023	6	1	CABLE ASSY-COAX "944" (OPT. 002 ONLY)	28480	08663-60023
W12	08663-60024	7	1	CABLE ASSY-COAX "955"	28480	08663-60024
W13	08663-60042	9		CABLE ASSY-COAX "931"	28480	08663-60042
W14	5061-4807	8	1	CABLE ASSY-COAX "936"	28480	5061-4807
W15	08663-20032	3	1	SEMI RIGID-A12A1J4-A4A2J4	28480	08663-20032
W17	5016-4809	0	1	CABLE ASSY-COAX "934"	28480	5016-4809
W18	08663-60016	7	1	CABLE ASSY-COAX "941"	28480	08663-60016
W19	08662-60040	6	1	CABLE ASSY-COAX "930"	28480	08662-60040
W20	08663-60017	8	1	CABLE ASSY-COAX "933"	28480	08663-60017
W21	08662-60049	5	1	CABLE ASSY-COAX "920"	28480	08662-60049
W22	08662-60050	8	1	CABLE ASSY-COAX "921"	28480	08662-60050
W23	08662-60048	4	1	CABLE ASSY-COAX "922"	28480	08662-60048
W24	08662-60043	9	1	CABLE ASSY-COAX "951"	28480	08662-60043
W25	5061-4808	9	1	CABLE ASSY-COAX "924"	28480	5061-4808
W26	5061-4806	7	1	CABLE ASSY-COAX "925"	28480	5061-4806
W27	08662-60047	3	1	CABLE ASSY-COAX "923"	28480	08662-60047
W28	08662-60030	4	1	CABLE ASSY-COAX "961"	28480	08662-60030
W29	08662-60039	3	1	CABLE ASSY-COAX "932" (OPT. 002 ONLY)	28480	08662-60039
W30	08663-20029	8	1	SEMI RIGID-A4A4J3-A4A3J5 (OPT. 002 ONLY)	28480	08663-20029
W31	08663-20030	1	1	SEMI RIGID-A4A4J5-A4A3J6 (OPT. 002 ONLY)	28480	08663-20030
W32	08663-60014	5	1	CABLE ASSY-COAX "935"	28480	08663-60014
W33	08663-20028	7	1	SEMI RIGID-A4A4J2-A4A4J7 (OPT. 002 ONLY)	28480	08663-20028
W34	08662-60044	0	1	CABLE ASSY-COAX "950"	28480	08662-60044
W35	08662-60034	8	1	CABLE ASSY-COAX "971"	28480	08662-60034
W36	08662-60032	6	1	CABLE ASSY-COAX "972"	28480	08662-60032
W37	08662-60029	1	1	CABLE ASSY-COAX "973"	28480	08662-60029
W38	08662-60028	0	1	CABLE ASSY-COAX "964"	28480	08662-60028
W39	08663-20031	2	1	SEMI RIGID-A4A2J2-A4A2J3	28480	08663-20031
W40	08662-60033	7	1	CABLE ASSY-COAX "974"	28480	08662-60033
W41	08662-60026	8	1	CABLE ASSY-COAX "962"	28480	08662-60026
W42	08662-60021	3	1	CABLE ASSY-COAX "963"	28480	08662-60021
W43	08662-60022	4	1	CABLE ASSY-COAX "965"	28480	08662-60022
W44	08662-60027	9	1	CABLE ASSY-COAX "966"	28480	08662-60027
W45	08662-60023	5	1	CABLE ASSY-COAX "960"	28480	08662-60023
W46	08662-60025	7	1	CABLE ASSY-COAX "967"	28480	08662-60025
W47	08663-60021	4	1	CABLE ASSY-COAX "96"	28480	08663-60021
W48	5061-4810	3	1	CABLE ASSY-COAX "91"	28480	5061-4810
W49	08663-60022	5	1	CABLE ASSY-COAX "92"	28480	08663-60022
W50	08663-60094	1	1	CABLE ASSY-COAX "94"	28480	08663-60094
W51	08663-60031	6	1	CABLE ASSY-COAX "95"	28480	08663-60031
W52	08663-60028	1	1	CABLE ASSY-COAX "90"	28480	08663-60028
W53	08663-60038	3	1	CABLE ASSY-COAX "7"	28480	08663-60038
W54	08663-60052	1	1	CABLE ASSY-COAX "3"	28480	08663-60052
W55	08663-60030	5	1	CABLE ASSY-COAX "97"	28480	08663-60030
W56	08663-60018	9	1	CABLE ASSY-COAX "93"	28480	08663-60018
W57	08662-60059	7	1	CABLE ASSY-COAX "1"	28480	08662-60059
W58	08662-60058	6	1	CABLE ASSY-COAX "6"	28480	08662-60058
W59	08663-60065	6	3	CABLE-COAX-INTERCONNECT	28480	08663-60065
W60	08663-60065	6		CABLE-COAX-INTERCONNECT	28480	08663-60065
W61	08663-60065	6		CABLE-COAX-INTERCONNECT	28480	08663-60065

† Refer to Section 7 for update information.

\* Factory Selected Component (Refer to Section 5).

△ Errata part change.

**Table 6-3. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty.	Description	Mfr. Code	Mfr. Part Number
2234A TO 2601A W75	08663-60352	4	1	CABLE-RIBBON, READOUT	28480	08663-60352
2602A AND ABOVE W75	08663-60371	7	1	CABLE-RIBBON, READOUT	28480	08663-60371
W76	8120-2670	8	1	CABLE-RIBBON, MAIN KEYBOARD	28480	8120-2670
2234A TO 2601A W77	8120-2671	9	1	CABLE-RIBBON, LEFT KEYBOARD	28480	8120-2671
2602A AND ABOVE W77	08663-60370	6	1	CABLE-RIBBON, READOUT	28480	08663-60370
W78	8120-3206	8	1	CABLE ASSY, RIBBON A2A11J8-A10J1A, B	28480	8120-3206
W79	8120-3202	4	1	CABLE ASSY, RIBBON A2A11J7-A5A6J2	28480	8120-3202
W80	8120-3205	7	1	CABLE ASSY, RIBBON A4A5J7-A2A11J6	28480	8120-3205
W81	8120-3204	6	1	CABLE ASSY, RIBBON A12A6J3-A2A11J5	28480	8120-3204
W82	8120-3203	5	1	CABLE ASSY, RIBBON A6A10J1-A4A5J6	28480	8120-3203
W83	8120-3199	8	1	CABLE ASSY-RIBBON A2A11J3-A3A11J4	28480	8120-3199
W84	8120-3200	2	1	CABLE ASSY-RIBBON A2A11J2-A11A6J4	28480	8120-3200
W85	8120-3201	3	1	CABLE ASSY-RIBBON A2A11J1-A11A6J8	28480	8120-3201
W86	8120-3198	7	1	CABLE ASSY-RIBBON A12A6J1-A4A5J5	28480	8120-3198
W87	8120-2314	7	3	CABLE ASSY-RIBBON A4A5J3 (OPT. 002 ONLY)	28480	8120-2314
W88	08663-60040	7	1	JACK PANEL WIRE HARNESS	28480	08663-60040
	0520-0129	8	1	SCREW-MACH 2-56 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
	2190-0014	1	1	WASHER-LK INTL T NO. 2 .089-IN-ID	28480	2190-0014
	0610-0001	6	1	NUT-HEX-DBL-CHAM 2-56-THD .062-IN-THK	00000	ORDER BY DESCRIPTION
	0360-0002	6	1	TERMINAL-SLDR LUG PL-MTG FOR-#2-SCR	28480	0360-0002
W89	8120-2314	7		CABLE-RIBBON, A6A9J1-A8A2	28480	8120-2314
W90	8120-2314	7		CABLE-RIBBON, A6A9J2-A8A1	28480	8120-2314
W91	08663-60036	1	1	POWER SUPPLY WIRE HARNESS	28480	08663-60036
2234A ONLY W92				NOT ASSIGNED		
2245A AND ABOVE W92	08662-60041	7	1	CABLE ASSY 932 (EXCEPT OPTION 002)	28480	08662-60041
W93	08663-60359	1	1	CABLE ASSY-COAX "963" (STD ONLY)	28480	08663-60359
2234A TO 2405A W93				NOT ASSIGNED		
2408A TO 2447A W93	08663-60363	7	1	CABLE ASSY-COAX (STD ONLY)	28480	08663-60363
2449A AND ABOVE W93	08663-60360	4	1	CABLE ASSY-COAX "963" (OPT 001 ONLY)	28480	08663-60360
W93	08663-60364	8	1	CABLE ASSY-COAX (OPT 001 ONLY)	28480	08663-60364

†Refer to Section 7 for update information.

\*Factory Selected Component (Refer to Section 5).

△ Errata part change.

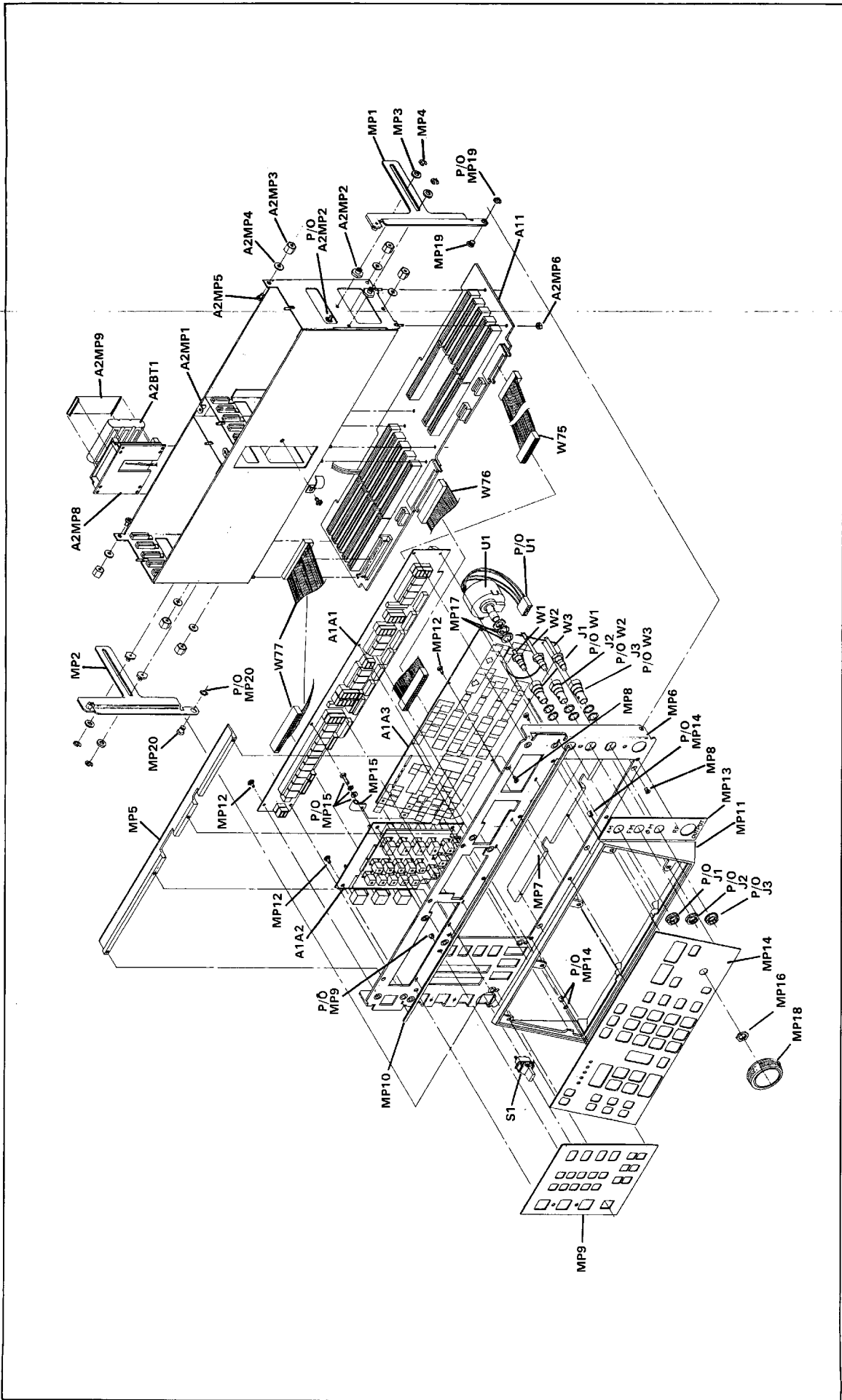


Figure 6-1. Front Panel/Cabinet Exploded View

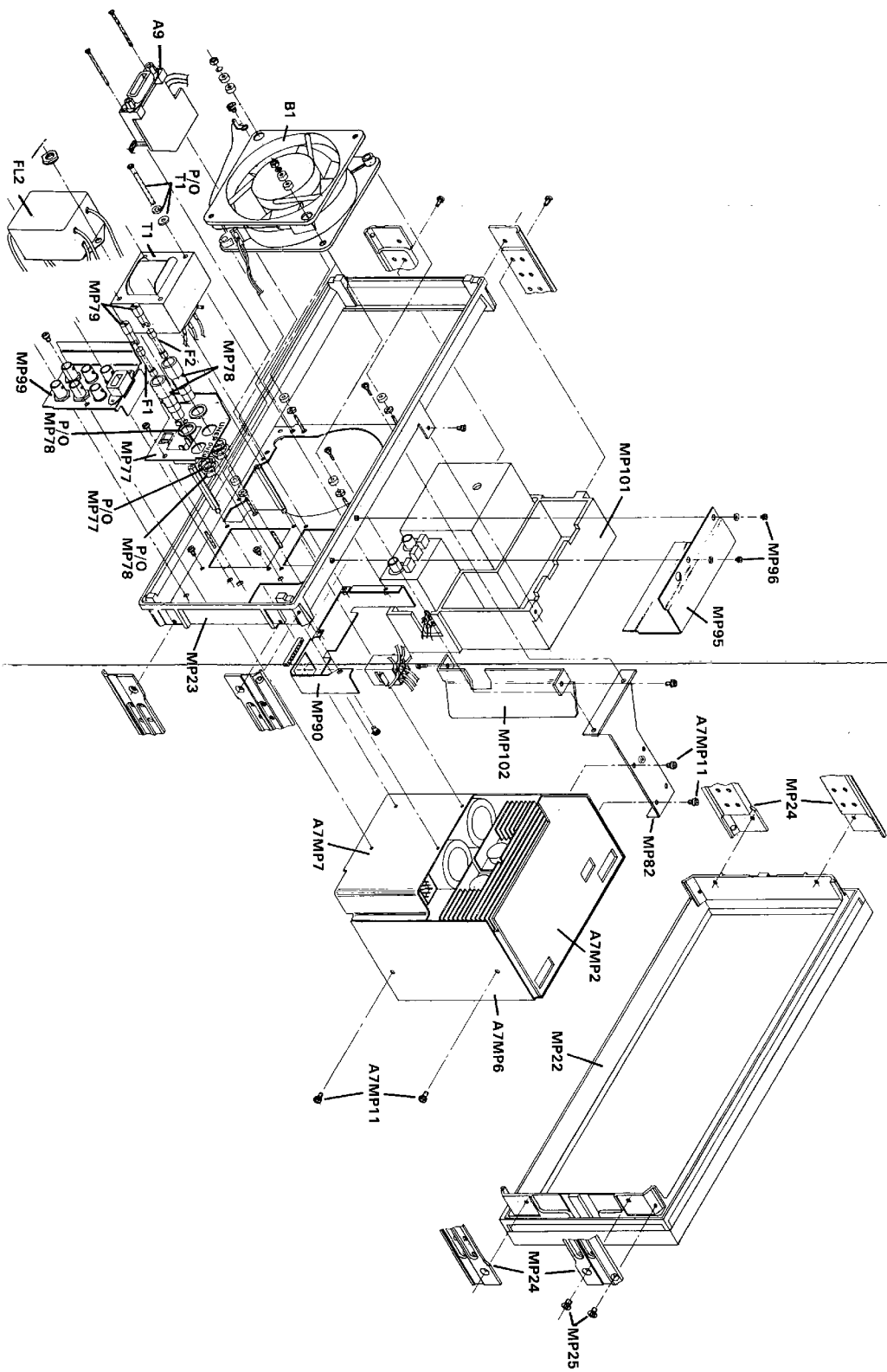


Figure 6-2. Rear Panel Cabinet Exploded View





## Section 7 INSTRUMENT CHANGES

### 7-1. INTRODUCTION TO THIS SECTION

This section contains instrument modification recommendations and procedures that could improve the performance and reliability of your instrument. Refer to *Instruments Covered by This Manual*, paragraph 1-5 in Section 1 for important information about serial number coverage.

#### A2A8 (08663-60329)

At instrument serial prefix **2537A** the A2A8 RAM/ROM Assembly 08663-60365 replaced both the A2A8 RAM/ROM Assembly (part number 08663-60329) and the A2A9 ROM Assembly (part number 08663-60331). If either the A2A8 (08663-60329) or the A2A9 (08663-60331) assembly requires replacement, remove both boards and replace them with the new RAM/ROM Assembly, **08663-60365**.

- **A2A8U1, (serial prefix 2927A and above)**

New ROM part number; A2A8U1 is 08663-87007: date code, 2827.

#### A2A9 (08663-60331)

At instrument serial prefix **2537A** the A2A8 RAM/ROM Assembly 08663-60365 replaced both the A2A8 RAM/ROM Assembly (part number 08663-60329) and the A2A9 ROM Assembly (part number 08663-60331). If either the A2A8 (08663-60329) or the A2A9 (08663-60331) assembly requires replacement, remove both boards and replace them with the new RAM/ROM Assembly, **08663-60365**.

#### A3A5U2, A3A5U3

At instrument serial prefix **2419A** part number 1820-1780 was replaced by part number 1820-3517 in all applications in the HP 8663A. The new part is the preferred replacement. The new part is directly plug-in compatible on all boards except the A3A5 Assembly.

On the A3A5 Assembly if either U2 or U3 requires replacement, both IC's must be replaced. In addition, resistors A3A5R13 and A3A5R14 must be removed from the board. Terminal solder studs (HP part number **0360-0124**) should be soldered into the R13 and R14 mounting holes and a new value R13 and R14 (287 ohms, HP part number **0698-3443**) should be wrapped and soldered to the terminal studs. Capacitors C24 and C25 (68 pF, HP part number **0160-4803**) are added to the assembly and must be soldered in parallel to R13 and R14 respectively.

#### A4A2 (08663-60316)

At instrument serial prefix **2248A**, A4A2 Doubler #2 Assembly, HP part number 08663-60316 was replaced by a new A4A2 Doubler #2 Assembly. The 08663-60316 is no longer available, if this assembly requires replacement, order HP part number **08663-60351**. A rebuilt Doubler #2 Assembly is also available refer to Section 6 for information.

#### A4A3 - Standard and Option 001 (08663-60346)

At instrument serial prefix **2451A**, A4A3 Distributor Assembly, HP part number 08663-60346 was replaced by a new A4A2 Distributor Assembly. The 08663-60346 is no longer available, if this assembly requires replacement, order HP part number **08663-60362**.

**A4A3 - Option 002 Only (08663-60304)**

At instrument serial prefix **2451A**, A4A3 Distributor Assembly, HP part number 08663-60304 was replaced by a new A4A2 Distributor Assembly. The 08663-60304 is no longer available, if this assembly requires replacement, order HP part number **08663-60361**.

**A4A4 (08663-60011)**

At instrument serial prefix **2535A**, A4A4 Phase Modulator Assembly, HP part number 08663-60011 was replaced by a new A4A4 Phase Modulator Assembly. The 08663-60011 is no longer available, if this assembly requires replacement, order HP part number **08663-60070**.

**A4A4A2 (08663-60314)**

At instrument serial prefix **2535A**, A4A4A2 Phase Mod IF Amp Assembly, HP part number 08663-60314 was replaced by a new A4A4A2 Phase Modulator Assembly. The 08663-60314 is no longer available, if this assembly requires replacement, the entire A4A4 Phase Modulator Assembly must be replaced with HP part number **08663-60070**.

**A4A4A2Q1 (1854-0483)**

At instrument serial prefix **2535A**, A4A4A2Q1, HP part number 1854-0483 became no longer available from the vendor, consequently, major modifications were made to the A4A4A2 Assembly. If A4A4A2Q1 requires replacement, the entire A4A4 Phase Modulator Assembly must be replaced with HP part number **08663-60070**.

**A4A4A3 (08663-60313)**

At instrument serial prefix **2535A**, A4A4A3 PM LO Amp 1 Assembly, HP part number 08663-60313 was replaced by a new A4A4A3 Phase Modulator Assembly. The 08663-60313 is no longer available, if this assembly requires replacement, the entire A4A4 Phase Modulator Assembly must be replaced with HP part number **08663-60070**.

**A4A4A3Q1 (1854-0483)**

At instrument serial prefix **2535A**, A4A4A3Q1, HP part number 1854-0483 became no longer available from the vendor, consequently, major modifications were made to the A4A4A3 Assembly. If A4A4A3Q1 requires replacement, the entire A4A4 Phase Modulator Assembly must be replaced with HP part number **08663-60070**.

**A4A4A5 (08663-60311)**

At instrument serial prefix **2535A**, A4A4A5 PM LO Amp 2 Assembly, HP part number 08663-60311 was replaced by a new A4A4A5 Phase Modulator Assembly. The 08663-60311 is no longer available, if this assembly requires replacement, the entire A4A4 Phase Modulator Assembly must be replaced with HP part number **08663-60070**.

**A4A4A5Q1 (1854-0483)**

At instrument serial prefix **2535A**, A4A4A5Q1, HP part number 1854-0483 became no longer available from the vendor, consequently, major modifications were made to the A4A4A5 Assembly. If A4A4A5Q1 requires replacement, the entire A4A4 Phase Modulator Assembly must be replaced with HP part number **08663-60070**.

**A6A3 (08662-60314)**

At instrument serial prefix **2510A**, A6A3 HF Multiplier Assembly, HP part number 08662-60314 was replaced by a new A6A3 HF Multiplier Assembly. The 08662-60314 is no longer available, if this assembly requires replacement, order HP part number **08662-60327**.

**A6A4U7**

At instrument serial prefix **2516A** a new date code of U7 parts (HP part number 1820-1781) was supplied by the vendor. If U7 must be replaced in instruments with serial number prefixes prior to 2516A, the following components should also be changed to ensure proper operation. Change R148 to HP part number **0698-7239**. Change VR2 to HP part number **1902-0955**.

**A6A5U7**

At instrument serial prefix **2516A** a new date code of U7 parts (HP part number 1820-1781) was supplied by the vendor. If U7 must be replaced in instruments with serial number prefixes prior to 2516A, the following components should also be changed to ensure proper operation. Change R148 to HP part number **0698-7239**. Change VR2 to HP part number **1902-0955**.

**A7A4 (08662-60156)**

At instrument serial prefix **2545A**, A7A4 Power Supply Motherboard, HP part number 08662-60156 was replaced by a new A7A4 Power Supply Motherboard Assembly. The 08662-60156 is no longer available, if this assembly requires replacement, the A7A4 Assembly must be replaced with HP part number **08662-60376**.

**WARNING**

*If replacing the old A7A4 Power Supply Motherboard with the new 08662-60376, extreme care should be exercised as the connection are arranged in a different order. For information regarding installing a new A7A4 Assembly in an instrument with serial prefix prior to 2545A, refer to Installation instructions 08662-90069 included in Section 8 of this manual.*

**A8A2 (08662-60001)**

At instrument serial prefix **2319A**, A8A2 VCO Assembly, HP part number 08662-60001 was replaced by a new A8A2 VCO Assembly. The 08662-60001 is no longer available, if this assembly requires replacement, order HP part number **08662-60317**.

**A8A3 (10544B(003))**

At instrument serial prefix **2447A**, A8A3 10 MHz Reference Oscillator Assembly, HP part number 10544B(003) was replaced by a new A8A3 10 MHz Reference Oscillator Assembly. The 10544B(003) is no longer available, if this assembly requires replacement, order HP part number **5061-6002**.

**A8A5 (08662-60191)**

At instrument serial prefix **2408A**, A8A5 Reference Section Motherboard Assembly, HP part number 08662-60191 was replaced by a new A8A5 Reference Section Motherboard Assembly. The 08662-60191 is no longer available, if this assembly requires replacement, order HP part number **08662-60322**.

**A12A3MP3**

At instrument serial prefix **2416A** an insulating pad, HP part number 08663-00103 was added to the UHF Front Cover to insulate the cover from shorting component A12A2Q1. If the UHF Front cover of you instrment does not have this insulator installed, either a new UHF Front Cover (HP part number 08663-00085) can be installed, or the insulating pad (HP part number 08663-00103) can be ordered separately and added to the old cover.

**MISCELLANEOUS PARTS****B1**

*Serial Prefix 2234A to 2846A*

If B1 the Fan need to be replaced order Fan Replacement Kit **08663-60383**.

**MP23**

*Serial Prefix 2234A to 2846A*

If MP23 the Rear Panel and the Fan need to be replaced, order Rear Panel Replacement Kit **08663-60384**.

**MP103**

If MP103 needs replacement order Fan Replacement Kit **08663-60383**.

**RT2**

At instrument serial prefix **2510A**, RT2 was added as a recommended retrofit when fuse blowing due to current surge transients during 230 volt operation occurs.



## SAFETY CONSIDERATIONS

### GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

### BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage and the correct fuse is installed.

### SAFETY EARTH GROUND

An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

### SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (refer to Table of Contents).



Indicates hazardous voltages.



Indicates earth (ground) terminal.

#### WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

#### CAUTION

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

#### WARNING

*Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection).*

*Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.*

*If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the power source.*

*Servicing instructions are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.*

*Adjustments described in the manual are performed with power supplied to the instrument while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.*

*Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.*

*For continued protection against fire hazard, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay, etc.). Do not use repaired fuses or short circuited fuseholders.*

**CAUTION**

The casual operator should not replace the LINE fuse. Replacing this fuse in a damaged Generator might cause additional damage. A qualified service person should first determine the cause of its failure, specifically with resistance checks in the power supply ( see Service Sheet 65); repair the failure and then replace the fuse.

Do not unplug the A4A1 ALC, A1A5 Modulation Drive, or A4A4 Phase Modulator (Option 002 only) assemblies unless the instrument is unplugged or switched to standby. The A4A7 and A4A9 boards contain CMOS devices which may be damaged if the board is removed when the power is on.

RF testpoints on on some pc boards (that is, the small two-contact cup connectors) require ac-coupling to test equipment. Use the ac-coupled RF test Probe in the 11714A Service Accessory kit.

**WARNING**

Maintenance described in this section is performed with power supplied to the instrument and with protective covers removed. Maintenance should be performed only by service trained personnel who are aware of the hazard involved (for example, fire and electrical shock). Where maintenance can be performed without power applied, the power should be removed.

When working on the power supply, remember that high voltage is present at all times when the line cord is plugged in (that is, plus and minus 160 Vdc and line voltage). Unplug the line cord before doing anything to the power supply. The line switch has no effect on the high voltage in the Power Supply Section.

A pin-to-pin voltage difference of 60 Vdc may be found on many of the Generator's circuit board connectors. Be careful while working on the circuit boards with power supplied to the instrument. If a circuit board is placed on an extender board, the possibility of coming in contact with 60 Vdc is greatly increased. Be careful while working on the circuit boards with power supplied. Work with one hand. Do not touch the extender board.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection).

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the power source.

When working near the back of the Generator, take care not to let long hair be drawn into the fan. This could result in personal injury.

For continued protection against fire hazards, replace the LINE and OVEN fuses only with 250V normal blow fuses with the same current rating. Do not use repaired fuses or short circuited fuseholders.



**SECTION VIII****SERVICE****8-1. INTRODUCTION**

This section contains troubleshooting and repair information for the HP Model 8663A Synthesized Signal Generator. This section includes diagrams, circuit descriptions, troubleshooting instructions, component locators and disassembly instructions.

The remaining sections of the Operating and Service Manual are in the Operation and Calibration Manual. They are General Information, Installation, Operation, Performance Tests, Adjustments.

**8-2. INSTRUMENTS COVERED BY MANUAL**

The contents of this manual apply to instruments with the serial number prefix(es) listed under SERIAL NUMBERS on the title page for Volume 1. A Documentation Update Packet for Volumes 1, 2, 3, and 4 is provided to document instruments with prefixes higher than those on the title page.

**8-3. CIRCUIT DESCRIPTIONS**

The Signal Generator's circuitry is described at three distinctly different levels.

1. Service Sheet BD1 contains an overview of the entire Generator.
2. Service Sheets BD2 through BD10 contain block diagram level descriptions of functional sections within the Generator.
3. Service Sheets 1 through 67 contain detailed component-level descriptions of the circuitry within the functional sections.

**8-4. TROUBLESHOOTING****8-5. General**

The troubleshooting strategy employed in this manual is described in the introduction to Service Sheet BD1 (in the Block Diagrams section).

**Page Numbering**

Pages in Section VIII are numbered in groupings of one hundred by subsection. This first subsection, that is "General Service Information", is the 8-100-grouping; the block diagrams are the 8-200-grouping; the Reference and HF Loops service sheets are the 8-300-grouping, etc.

### 8-6. Status Light and Status Codes

The STATUS light is a valuable troubleshooting aid but it should be used in conjunction with the other troubleshooting information in this manual. Its use and its numeric codes are described opposite BD1.

### 8-8. RECOMMENDED TEST EQUIPMENT

Table 1-3 (in the Operation and Calibration Manual) lists the equipment required for maintaining the Generator. The Critical Specification column describes the essential requirements for each piece of test equipment. Other equipment can be substituted if it meets or exceeds these critical specifications.

The Recommended Model column may suggest more than one model. The first model shown is usually the least expensive, single-purpose model. Alternate models are suggested for additional features that would make them a better choice in some applications. For example, reasons for recommending an alternate model might be:

- \* HP-IB programmability
- or-
- \* Multi-function capability (that is, one model can replace two or more single purpose models.

Table 1-4 presents the advantages of the alternate suggestions.

### 8-9. SERVICE TOOLS AND AIDS

#### 8-10. Service Accessory Kit

A service accessory kit, Hewlett-Packard accessory number 11714A, is required for servicing and troubleshooting the Signal Generator. The service kit contains extender boards, connectors, cables, adapters and other service aids. For more details on the service accessory kit, see Table 1-5 in the Operation and Calibration Manual.

#### 8-11. Parts Locations

The locations of individual components mounted on printed circuit boards or their assemblies are shown on the page facing the schematic diagram on the appropriate service sheet. The part reference designator is the assembly designator plus the part designator. For example A3A2R9 is R9 on the A3A2 assembly. For specific component descriptions and ordering information, refer to Table 6-3, Replaceable Parts in Volume 1. Chassis and frame parts, as well as mechanical parts, are identified on Figures 6-1 through 6-2.

#### 8-12. Test Points and Adjustment Locations

Most test points and adjustments are indicated on the top covers of the individual assemblies. Test points and adjustments can also be found on the component locator adjacent to the particular assembly's schematic.

#### 8-13. Service Aids on Printed Circuit Boards

Service aids on printed circuit boards include test points, indicator lights, transistor and integrated circuit and relay designations, adjustment names and assembly part numbers.

**8-14. Pozidriv Screwdrivers**

Many screws in the instrument appear to be Phillip's types, but are not. To avoid damage to the screw slots, Pozidriv screwdrivers should be used. HP 8710-0900 is the No. 2 Pozidriv.

**8-15. Tuning Tools**

For adjustments requiring non-metallic tuning tools, use the HP 8710-0033 blade tuning tool or the HP 8710-1010 (JFD Model No. 5284) hex tuning tool. For other adjustments an ordinary small screwdriver or suitable tool is sufficient. No matter which tool is used, never force any adjustment control. This is especially critical when adjusting variable inductors or capacitors.

**8-16. Silver Solder**

Silver solder must be used when soldering mono-block capacitors and resistors (small, leadless components) to printed circuit boards. This restriction is due to the lower temperature requirements of the components. A small amount of silver solder is first applied to the printed circuit board at the mono-block connection points. The component is then laid down on the board with its silvered ends touching the pre-soldered printed circuit traces. Just enough heat must then be applied to the solder to make it melt and adhere to the ends of the block.

**8-17. REPAIR****8-18. Factory-Selected Components(\*)**

Some component values are selected at the time of final checkout at the factory (see Table 5-1 in the Operation and Calibration Manual). These values are selected to provide optimum compatibility with associated components. These components are identified on individual schematics and the parts list by an asterisk (\*).

**8-20. Disassembly Procedures**

Procedures for removal of the top, bottom and side covers, and the front and rear panels of the instrument are described on the last foldout in Section 6. The descriptions for disassembly of the rear panel is accompanied with an IPB (that is, an Illustrated Parts Breakdown).

**8-21. Post-Repair Adjustments and Performance Tests**

Table 5-2 (in the Operation and Calibration Manual) describes the adjustment procedures that should be performed subsequent to repair or replacement of individual assemblies. Table 4-1 (also in the Operation and Calibration Manual) describes the performance tests that should be performed subsequent to repair or replacement of individual assemblies.

Table 8-101. Etched Circuit Soldering Equipment

Item	Use	Specification	Item Recommended	HP Part No.
Soldering Tool	Soldering, Heat Staking	Wattage: 35W Tip Temp.: 390°-440°C (735°-825°F)	Ungar No. 135 Ungar Division Eldon Ind. Corp. Compton, CA 90220	8690-0167
Soldering Tip	Soldering, Unsoldering	Shape: Chisel	Ungar PL113	8690-0007
Soldering Tip	Heat Staking	Shape: Cupped	HP 5020-8160 or modified Ungar PL111 (See figure 8-2)	5020-8160
De-Soldering Aid	To remove molten solder from connection	Suction Device	Soldapullt by Edsyn Co. Van Nuys, CA 91406	8690-0060
Rosin (flux) Solvent	To remove excess flux from soldered area before application of protective coating	Must not dissolve etched circuit base board.	Freon	8500-0232
Solder	Component replacement; Circuit Board repair wiring	Rosin (flux) core, high tin content (63/37 tin/lead), 18 gauge (SWG) 0.048 in. diameter preferred		8090-0607
Silver Solder	Mono-block replacement	Rosin (flux) core, silver saturated tin/lead alloy 0.031 in. diameter	X25 Rosin Core DIVCO 233 Division Lead Co. Summit, IL 60501	8090-0022

## 8-22. Post-Service Product Safety Checks

Visually inspect interior of instrument for any signs of abnormal internally generated heat, such as discolored printed circuit boards or components, damaged insulation, or evidence of arcing. Determine and remedy cause of any such condition.

Using a suitable ohmmeter, check resistance from instrument enclosure to ground pin on power cable plug. The reading must be less than one ohm. Flex the power cable while making this measurement to determine whether intermittent discontinuities exist.

Check any indicated front or rear panel ground terminals marked, using the above procedure.

check resistance from instrument enclosure to the line and neutral (tied together) with the power switch on and the power source disconnected. The minimum acceptable resistance is two megohms. Replace any component which results in a failure.

## 8-23. Etched Circuits (Printed Circuit Boards)

The etched circuit boards in the Generator have plated-through holes which make a solderable path through to both sides of the insulating material. Soldering can be done from either side of the board with equally good results. When soldering to any circuit board, keep in mind the following recommendations:

1. Avoid unnecessary component substitution. Substitution can result in damage to the circuit board and/or adjacent components.
2. Do not use a high-power soldering iron on etched circuit boards. Excessive heat may lift a conductor or damage the board.
3. Use a suction device or wooden toothpick to remove solder from component mounting holes. DO NOT USE A SHARP METAL OBJECT SUCH AS AN AWL OR TWIST DRILL FOR THIS PURPOSE. SHARP OBJECTS MAY DAMAGE THE PLATED-THROUGH CONDUCTOR.

## 8-24. MOS and CMOS Integrated Circuit Replacement

MOS and CMOS integrated circuits are used in this instrument. They are prone to damage from both static and transients and must be handled carefully. When working on the Generator, keep in mind the following recommendations to avoid damaging these sensitive components.

1. Do not remove any board unless the Generator has been turned off or unplugged.
2. When removing a socketed MOS or CMOS device from an assembly, be careful not to damage it. High-grip sockets are used throughout the instrument. Avoid removing devices from these sockets with pullers. Instead, use a small screwdriver to pry the device up from one end, slowly pulling it up one row of pins at a time.
3. Once a MOS or CMOS device has been removed from an assembly, immediately stick it into a pad of conductive foam or other suitable holding medium.
4. When replacing a MOS or CMOS device, ground the foam on which it resides to the instrument before removing it. If a device requires soldering, make sure that

the assembly is lying on a sheet of conductive foam, and that the foam and soldering iron tip are grounded to the assembly. Apply as little heat as possible.

5. Before turning the instrument off, remove any large ac sources which may be driving MOS switches.

## 8-25. LOGIC SYMBOLOGY

### 8-26. Basic Definitions

The logic symbols used in this manual are based on the American National Standard Institute (ANSI) Y32.14-1973, "Graphic Symbols for Logic Diagrams (Two State Devices)". A summary of this symbology is provided to aid in interpreting these symbols.

This section includes a brief description of the basic logic symbols used on the service sheets (see Figure 8-101), a summary of indicator symbols (see Figure 8-102), a discussion of contiguous blocks, control blocks, and dependency notation, and a summary of symbology for some of the more complex devices.

**Qualifiers.** Qualifiers are that portion of a device symbol that denotes the logic function. For example, "&" denotes the AND function. See Figure 8-101 for a summary of the basic logic symbols and their qualifiers.

Power supply and ground connections are not shown on the symbols. This information is tabulated on the right margins of the service sheets.

**Indicator Symbols.** Indicator symbols identify the active state of a device's input or output, as shown in Figure 8-102.

**Contiguous Blocks.** Two symbols may share a common boundary parallel or perpendicular to the direction of signal flow. Note that in the examples shown in Figure 8-103, there is generally no logic connection across a horizontal line, but there is always an implied logic connection across a vertical line. Notable exceptions to this rule are the horizontal lines beneath control blocks and between sections of shift registers and counters (dividers).

**Dependency Notation.** Dependency Notation simplifies symbols for complex integrated circuit elements by defining the interdependencies of inputs or outputs without actually showing all the elements and interconnections involved (see Figures 8-104 through 8-106). The following examples use the letter A for address, C for control, G for AND, V for OR, and F for free dependencies. The dependent input or output is labeled with a number that is either prefixed (e.g., 1X) or subscripted (e.g., X<sub>1</sub>). They both mean the same thing. Note that many times a controlled line may already be labeled with a number that indicates input or output weighting (for example, in a coder). In this case, the controlling or gating input will be labeled with a letter (see Figure 8-105).

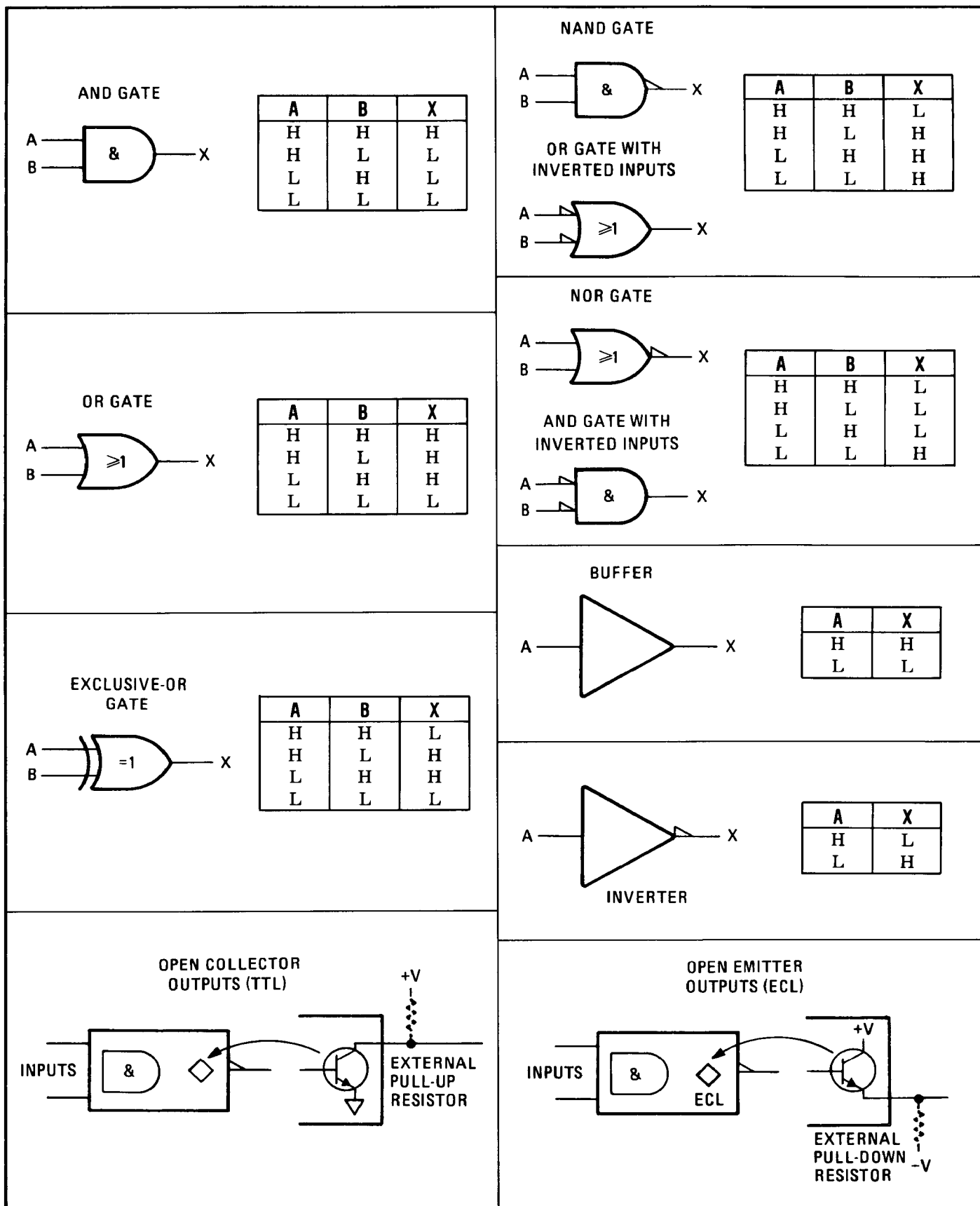


Figure 8-101. Basic Logic Symbols and Qualifiers

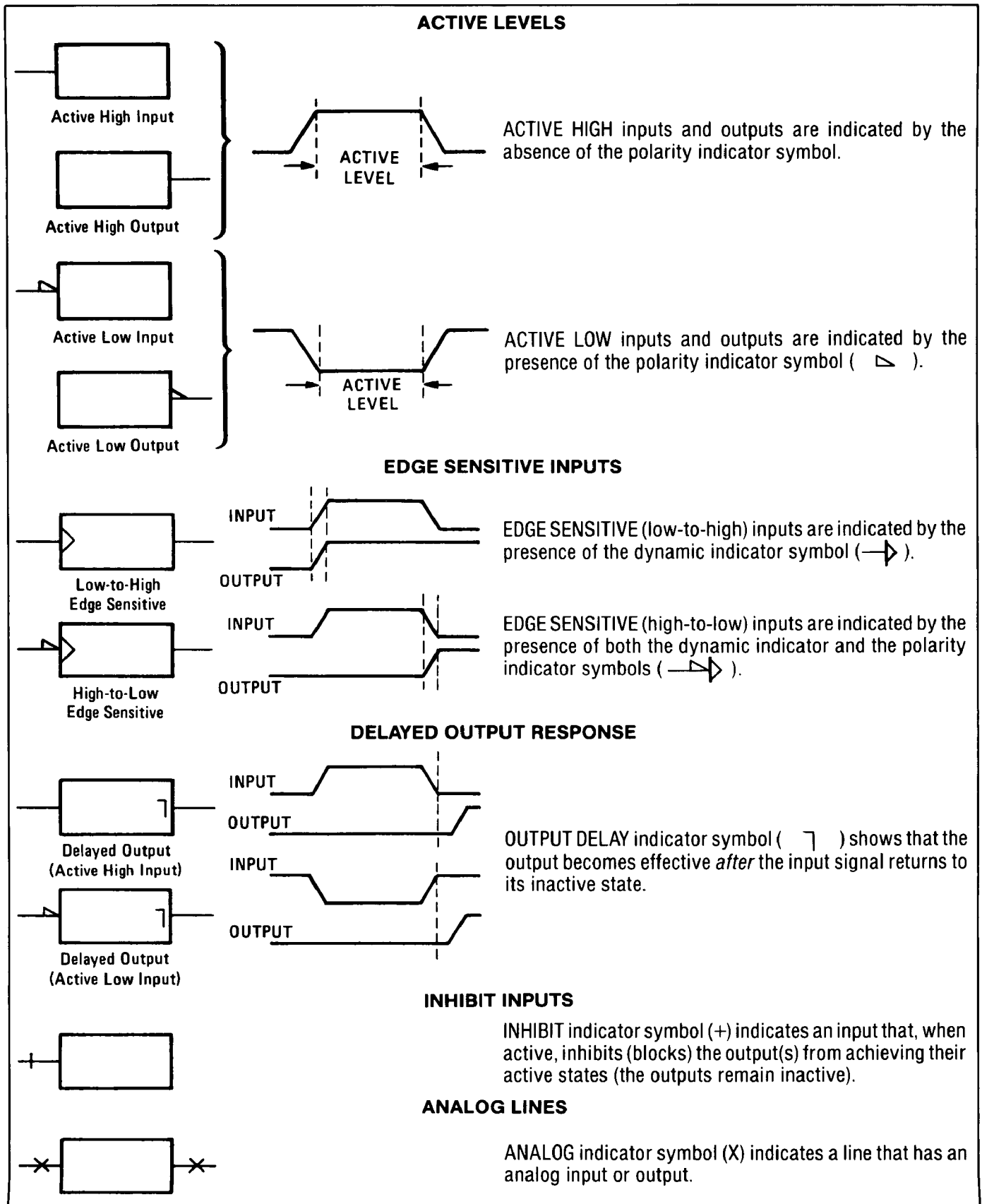


Figure 8-102. Indicator Symbols



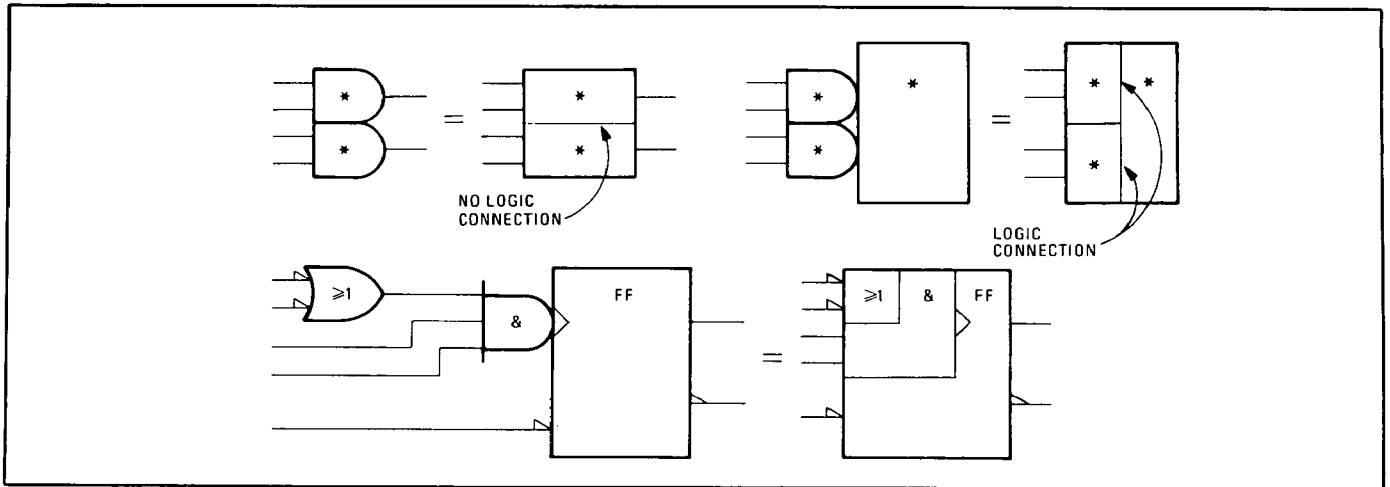


Figure 8-103. Contiguous Blocks

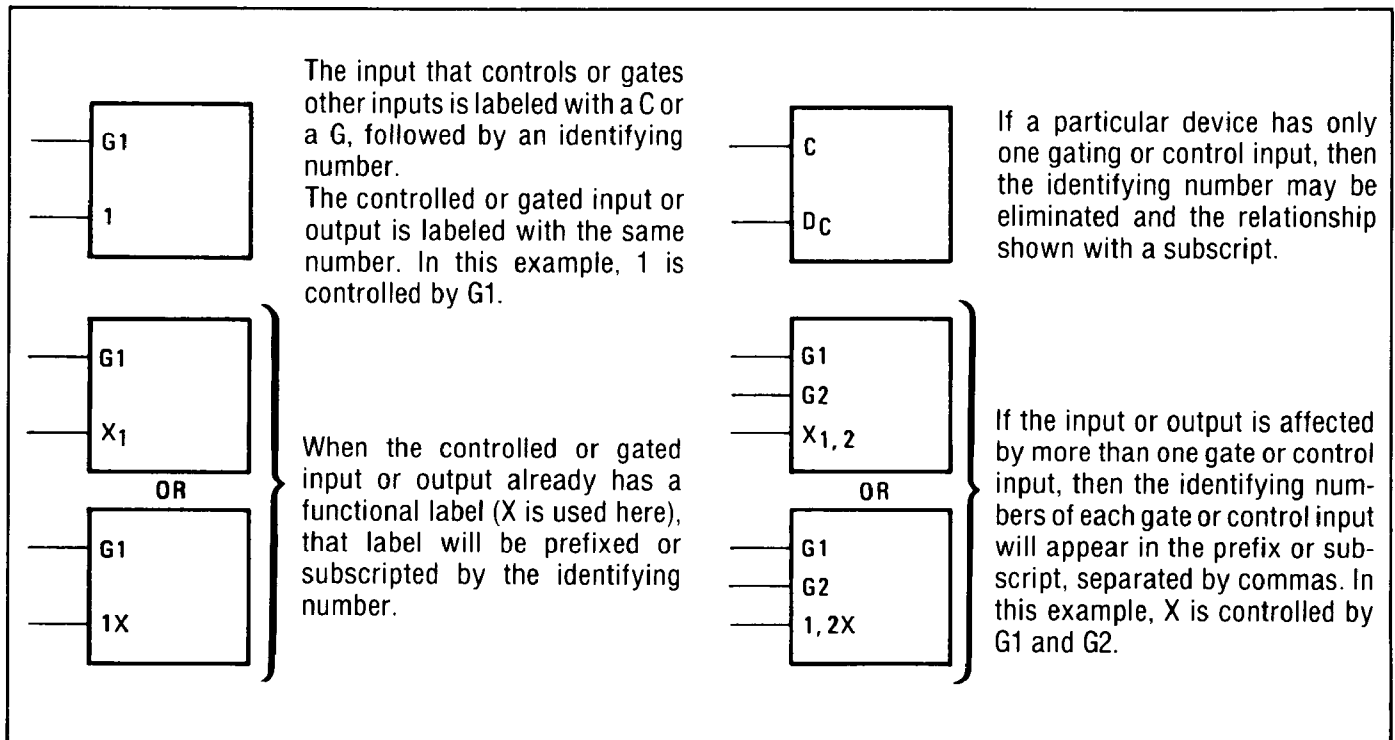


Figure 8-104. AND Dependency Notation

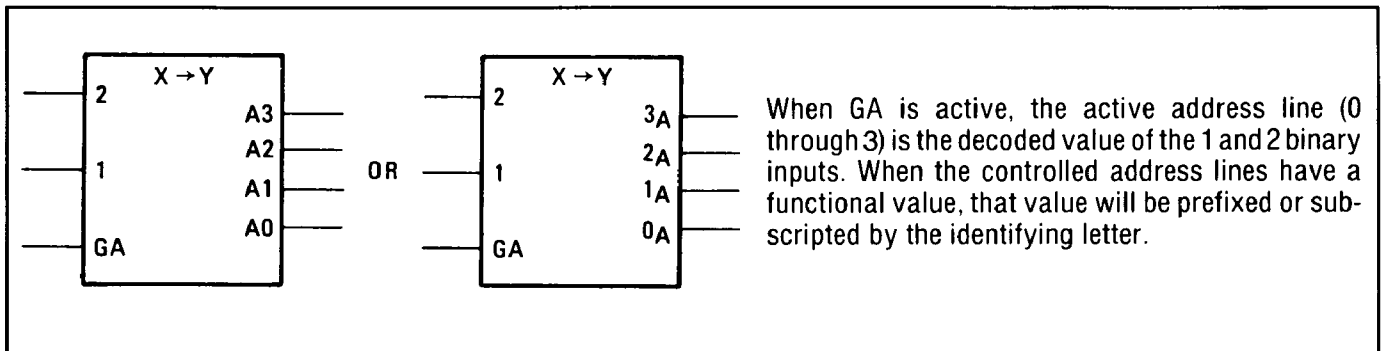


Figure 8-105. Address Dependency Notation: Coder Example Using Alpha Characters (letters)

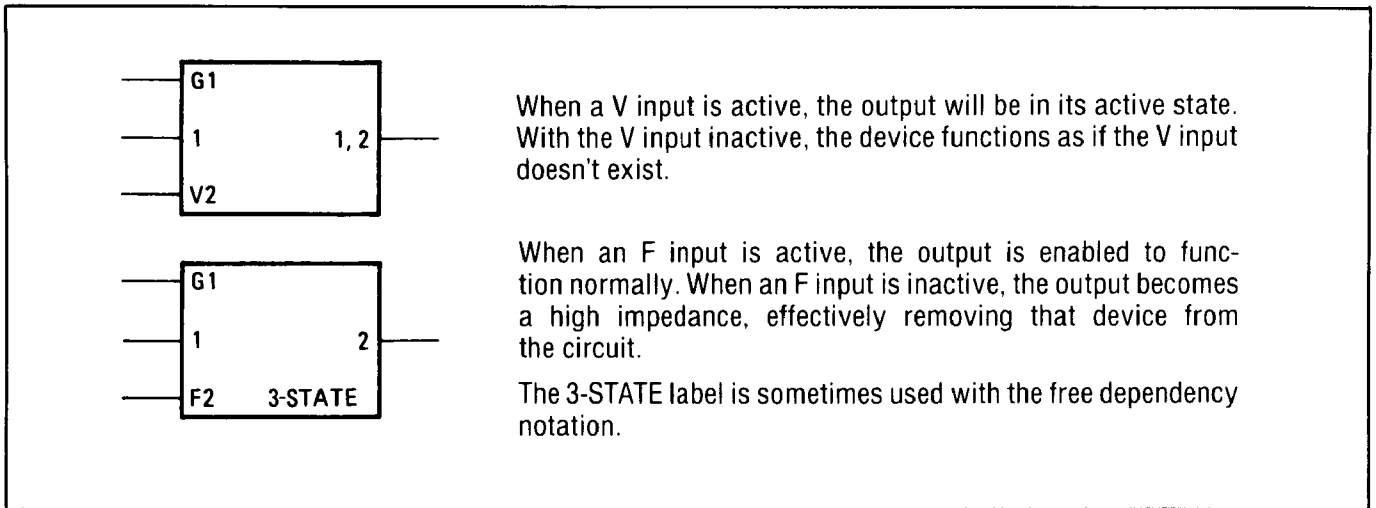


Figure 8-106. OR and Free Dependency Notation

**Common Control Block.** The Control block is used in conjunction with an array of related symbols in order to group common logic lines. Figure 8-107 shows how the Control block is usually represented. Figure 8-108 shows a quad D-type flip flop with reset. This can be redrawn as shown in Figure 8-109. Note that the more complex representation shown in Figure 8-108 can be used when the flip flops are functionally scattered around the schematic (i.e., not used as a quad unit).

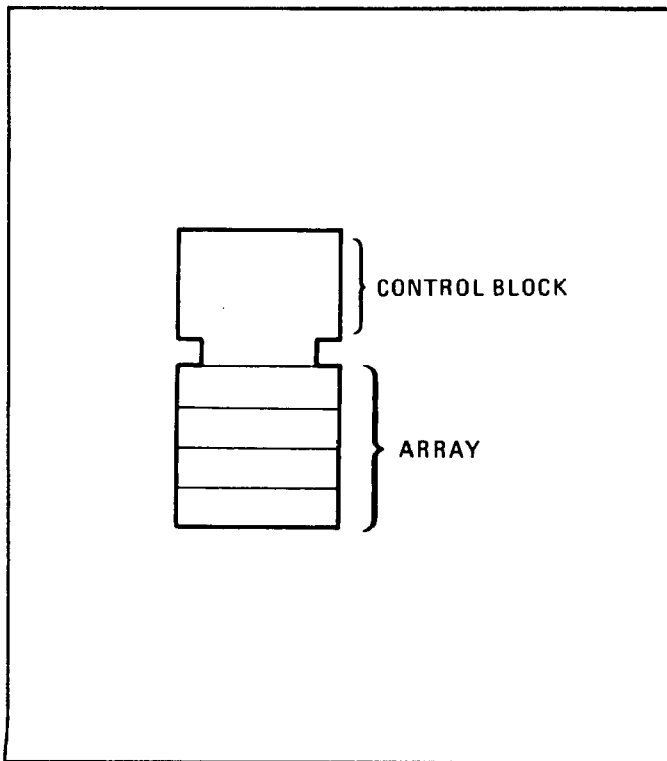


Figure 8-107. Common Control Block

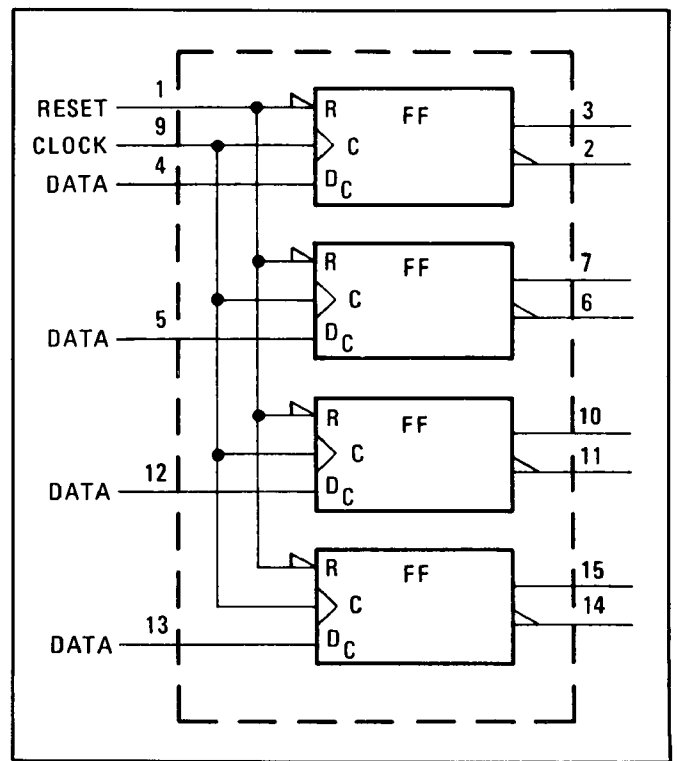


Figure 8-108. Quad D-Type Latch (Individual)

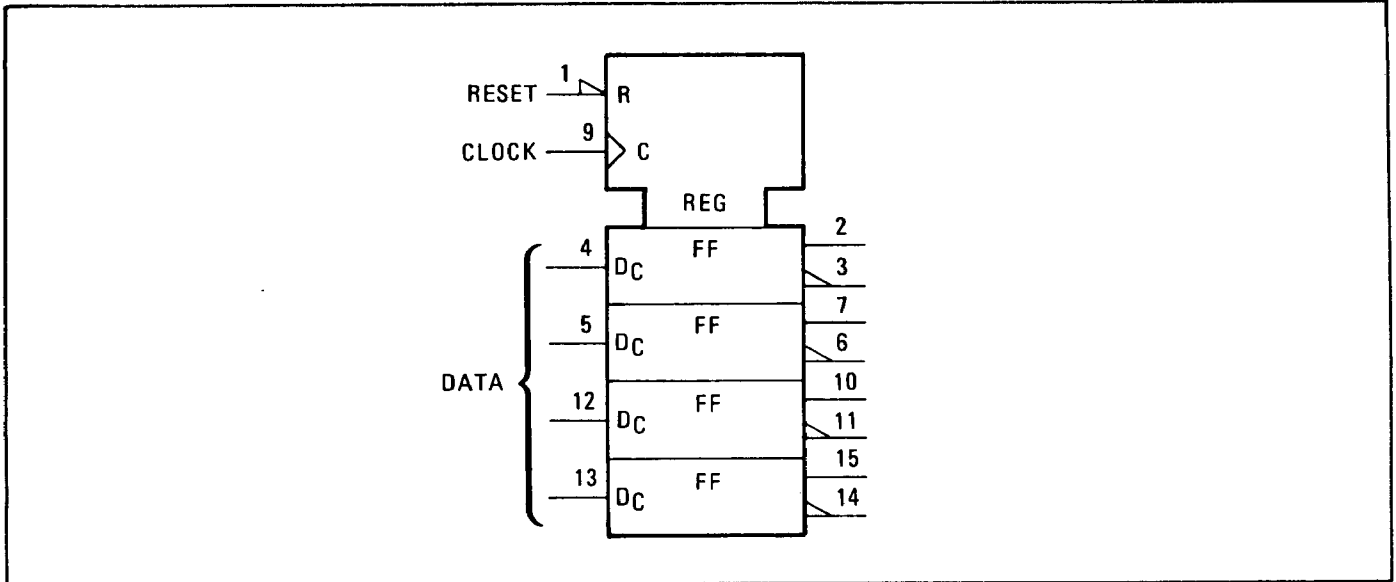


Figure 8-109. Quad D-Type Latch (Combined)

### 8-27. Complex Device Symbology

Figures 8-110 through 8-113 show how the basic symbols can be combined to illustrate behavior of fairly complex devices.

**Shift Register.** The Shift Register Control Block is used to show common inputs to a bidirectional shift register. Notice that "(right arrow)*m*" means shift the contents to the right or down by "*m*" units. And "(left arrow)*m*" means shift the contents to the left or up by "*m*" units. Note: If *m*=1, it may be omitted. Inputs "a" and "b" are each single IC pins that have two functions. Input "a" enables one of the inputs to the D-type flip-flop (1D) and also shifts the register contents down "*m*" units. Input "b" enables one of the inputs to the bottom flip-flop (2D), and also shifts the register contents up "*m*" units. Input "c" loads all four flip-flops in parallel (3D). Input "d" is a common reset. The output delay indicator is used because these are master slave flip-flops.

**AND-OR Selector.** The Selector Control Block is used to simplify the AND portion of a quad AND-OR select gate. When G1 is high, the data presented at the "1" inputs will be gated through. When G2 is high, the data presented at the "2" inputs will be gated through.

**Up/Down Counter.** The Counter Control Block is used to show common inputs to a Presettable Decade Up/Down Counter. Notice that "+*m*" means count up (increment the count) by "*m*"; "-*m*" means count down by "*m*". Note: if *m*=1, it may be omitted. Since the D-type flip-flops are master-slave, the output delay indicator is used. The "=9,+1" and "=0,-1" notation defines when the carry and borrow outputs are generated. They also define it as a decade counter; a binary counter would have the carry indicated with "=15,+1". Flip-flop weighting is indicated in parenthesis. Input "C1" allows all four "D1" flip-flops to be preset in parallel.

**Quad D-Type Latch.** The Register Control Block is used to illustrate a quad D-type latch. There is a common active-low reset (R), and a common edge-triggered control input (C). Since there is only one dependency relationship, the controlling input is not numbered and the controlled functions (D) are subscripted with a C.

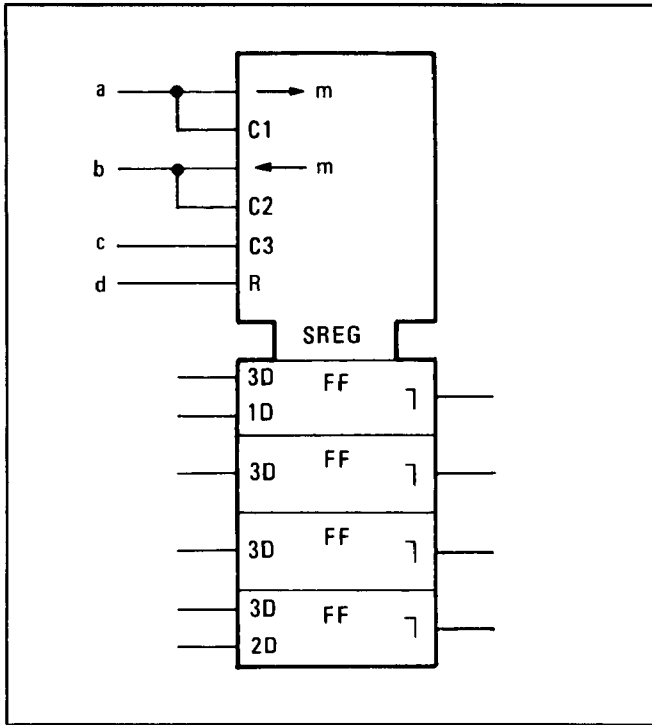


Figure 8-110. Shift Register

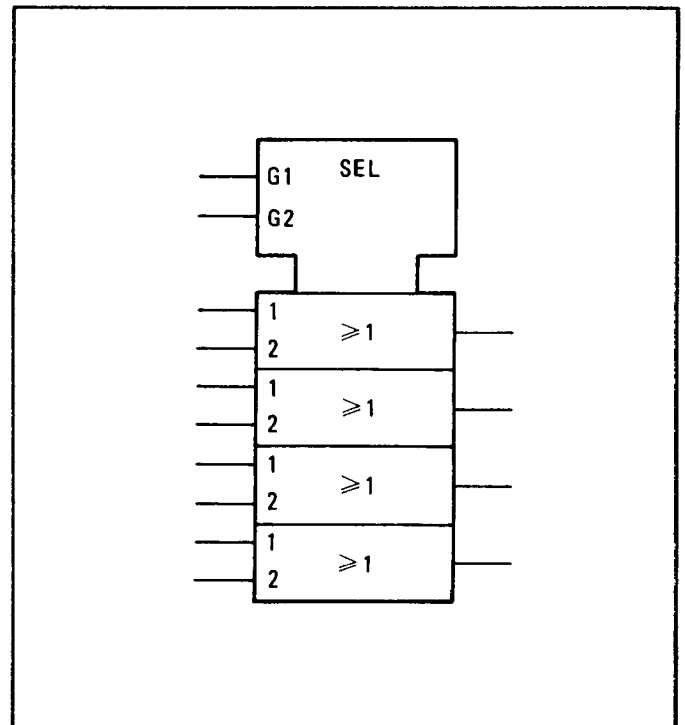


Figure 8-111. AND-OR Selector

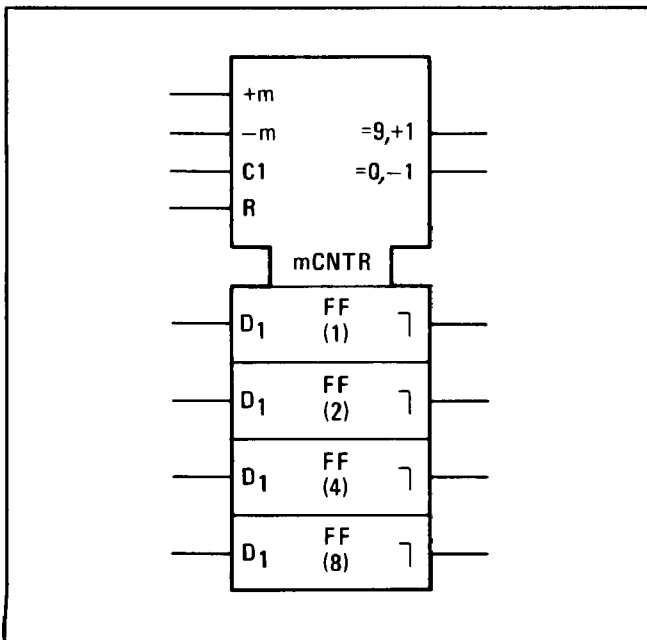


Figure 8-112. Up/Down Counter

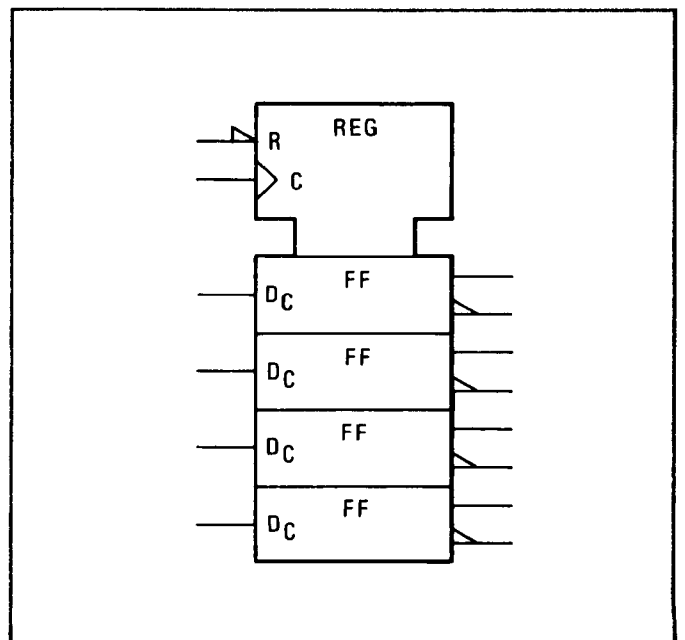


Figure 8-113. Quad D-Type Latch

8-28. LOGIC DEVICE THEORY

8-29. Schmitt Trigger

A typical Schmitt trigger is shown in Figure 8-114. Some Schmitt triggers have complimentary outputs. When the input signal increases in voltage, the device changes state as the input surpasses a voltage reference called the upper trip point. when the input signal is decreasing in voltage, the device changes back to its original state as the input voltage passes a voltage reference called the lower trip point.

8-30. One-Shot Multivibrator

The one-shot or monostable multivibrator, when triggered, produces a pulse of pre-programmed length. The length of the pulse is determined by the external resistor (R) and capacitor (C). See Figure 8-115.

8-31. D-Type Flip-Flop (Edge Triggered)

D-type flip-flops are used for temporary storage of one bit of binary data. The  $D_C$  input is stored and transferred to the output at X when the control input (C) undergoes a low-to-high transition. Y is the complement of X (i.e.,  $Y=X$ ). The S and R inputs set (S) and reset (R) the outputs independent of the control input status. Only one of these inputs is normally active at a time. If both are active, the X and Y are either both high or both low, depending on the particular device used. See Figure 8-116.

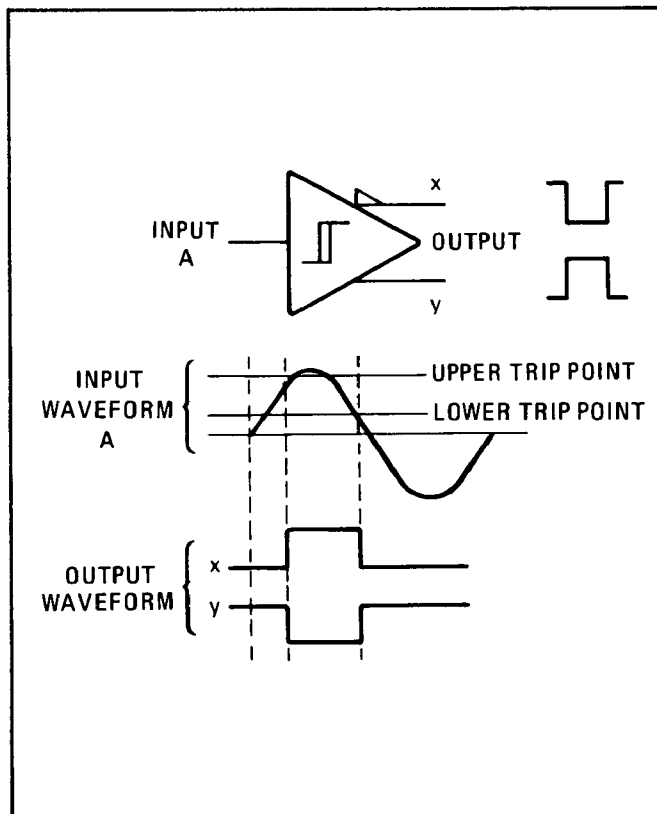


Figure 8-114. Schmitt Trigger

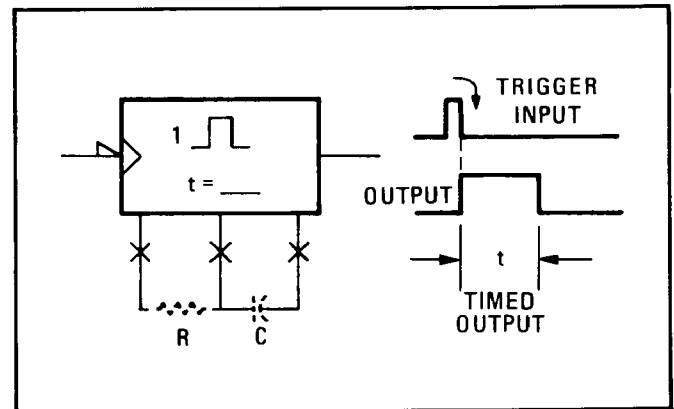


Figure 8-115. One-Shot Multivibrator

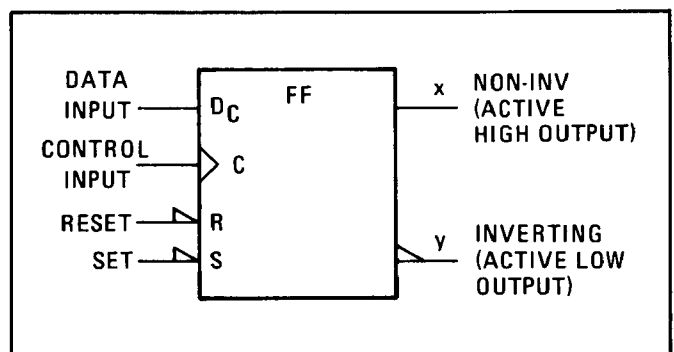


Figure 8-116. D-Type Flip-Flop (Edge-Triggered)

8-32. Four-Bit Register (Level-Triggered)

A four-bit register is used for temporarily storing four bits of binary data. Data at the  $D_1$  inputs are stored when clocked by the  $C_1$  control input. Data at the  $D_2$  inputs are stored when clocked by the  $C_2$  control input. The outputs follow the inputs as long as the control inputs remain high. When the control inputs are low, the data that was present at the D inputs (when the control inputs were low) are retained (latched) at the outputs until the control inputs go high again. See Figure 8-117.

8-33. Presetable Counter

Presetable counters consist of four D flip-flops which are internally connected to provide a divide-by-two and a divide-by-five counter for a BCD counter or a divide-by-two and a divide-by-eight for a hexadecimal counter. The outputs of these devices can be preset to any state by placing a low on the load/count (C) input and applying the desired data to the D inputs. As long as the load/count input is low, the outputs will follow the D inputs. When the load/count input is set high the outputs are latched to the preset values, and the output will advance one count with each low-to-high transistion of the clock. The reset (R) function is asynchronous. See Figure 8-118.

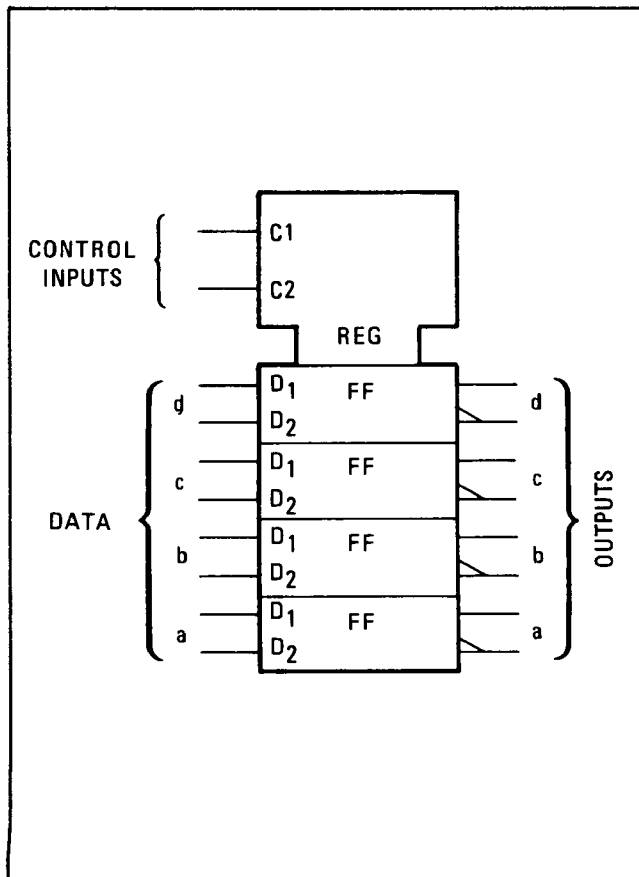


Figure 8-117. Four-Bit Register (Level-Triggered)

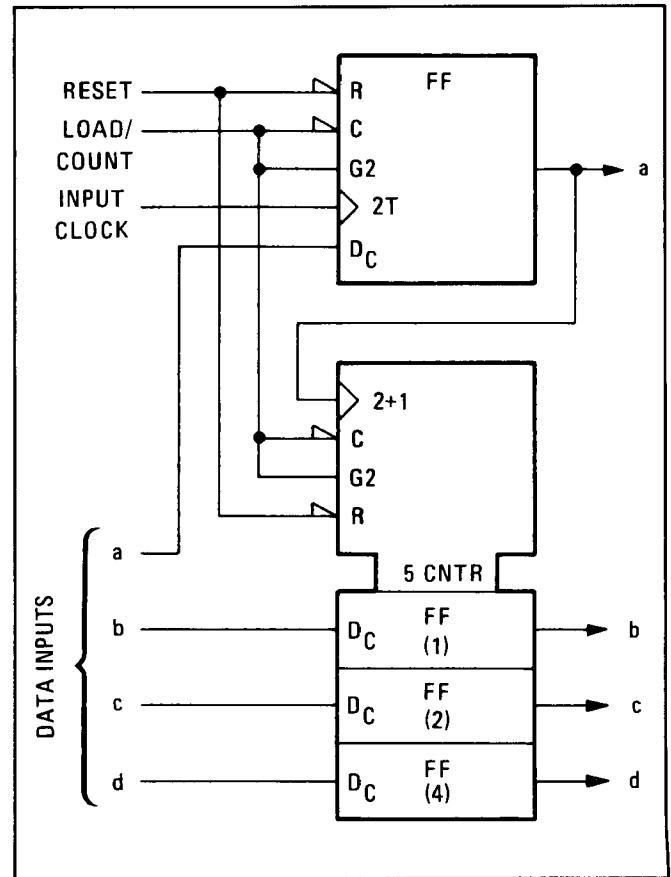


Figure 8-118. Presetable Counter

**8-34. Three-Bit Binary One-of-Eight Decoder**

This device selects an output line (1-of-8) corresponding to the value of the binary input. For example, to make the 5G output go low, a binary 101 must be presented to the select inputs. For the output to reflect the weighted binary input, all three lines to the control section must be active. See Figure 8-119.

**8-35. Analog Multiplexer**

this device is the electronic version of a single-pole-eight-throw (SP8T) switch. The binary code at the select inputs determines which analog input (1-of-8) will be routed to the output. The output is enabled by the F input. See Figure 8-120.

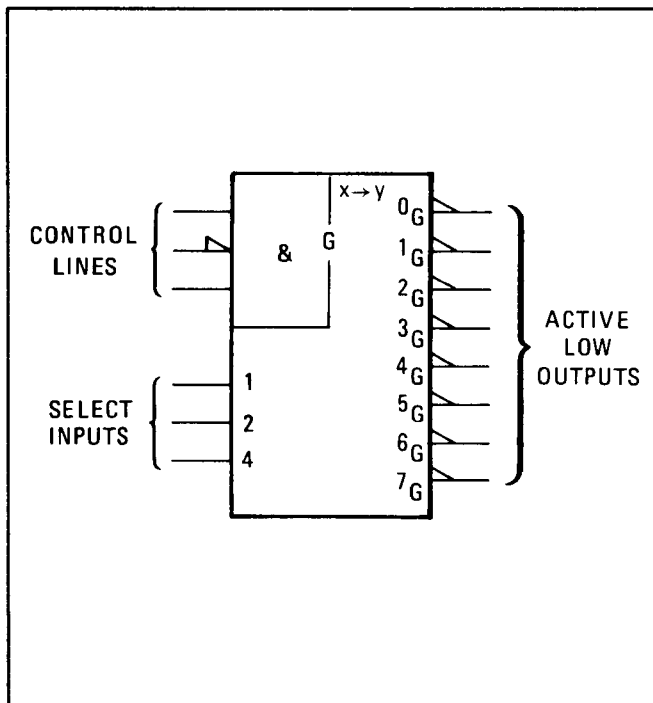


Figure 8-119. Three-Bit Binary One-of-Eight Decoder

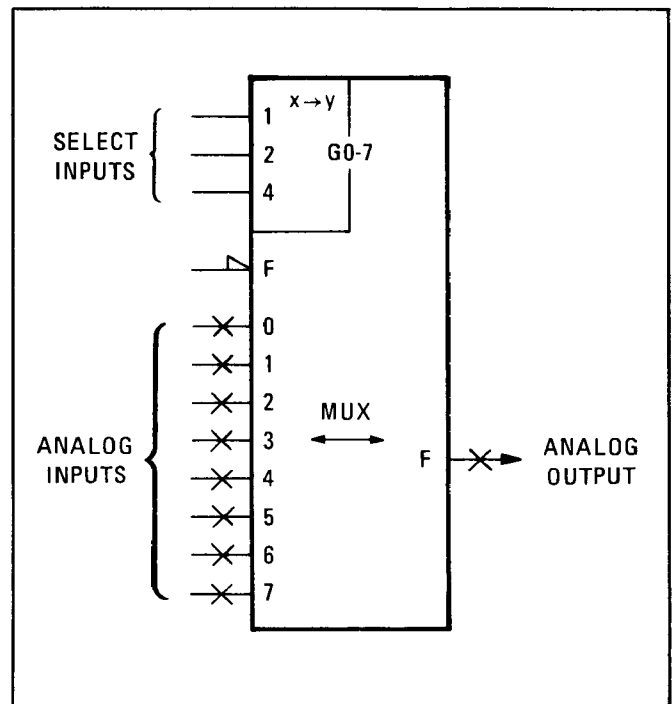


Figure 8-120. Analog Multiplexer

### 8-36. Digital-to-Analog Converter

The Digital-to-Analog Converter is used with an operational amplifier to provide digital control of an analog signal. The analog source (that is,  $V_{REF}$ ) can be either ac or dc. The Digital-to-Analog Converter produces a variable current output where maximum current is produced when  $Y=1000$ . The output of the operational amplifier is a voltage directly proportional to  $V_{REF}$  and the value of  $Y$ . See Figure 8-121.

### 8-37. Four-Bit BCD Summer

This device produces the BCD sum of two decimal numbers presented in the 8-4-2-1 weighted BCD format. Carry Output and Carry Input are provided for cascading. For valid BCD numbers (0 to 9) at the inputs the BCD sum is formed at the outputs. Input numbers 10 to 15 yield a valid BCD number plus a carry. See Figure 8-122.

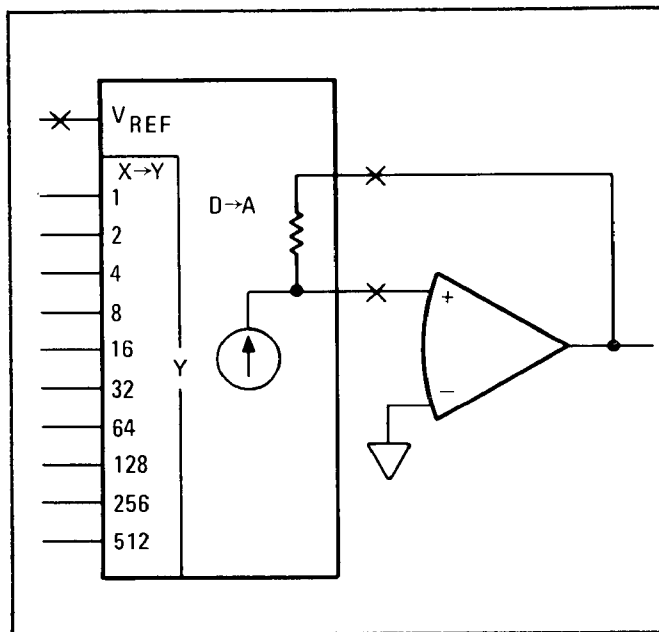


Figure 8-121. Digital-to-Analog Converter

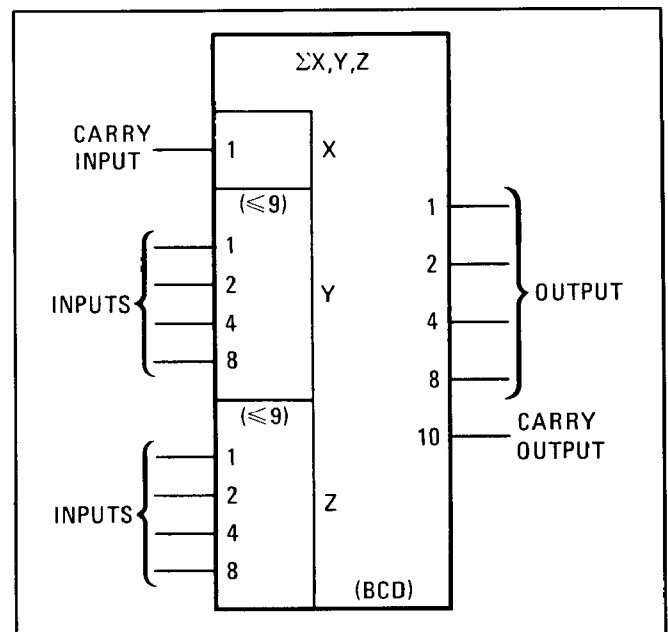


Figure 8-122. Four-Bit BCD Summer

### 8-38. Divide-by-10/11 Prescaler

The Divide-by-10/11 Prescaler will divide by 10 or 11 (see Figure 8-123). The mode control inputs (pins 2 and 3) control the division ratio. The Prescaler provides both ECL and TTL outputs. The bias input (pin 15) has a 400 ohm resistor connected internally to the  $V_{BB}$ . Connecting this resistor to the  $T_G$  input (pin 16) provides capacitive coupling and automatically centers the input signal about the switching threshold. An operating mode table is also provided in the Figure, showing the functions of the Gate and Set inputs.

### 8-39. Eight-to-Three Line Priority Encoder

The device shown in Figure 8-124 produces a three-line binary weighted output as a result of one active input. If more than one input line is active, the output will be the binary equivalent of the highest valued input (for example, if the input lines B4 and B6 are both active, the output would be 110 or binary 6). Two additional outputs are provided: one is active when any data line and GB are



active; the other output is active when only GB is active. All lines are active-low.

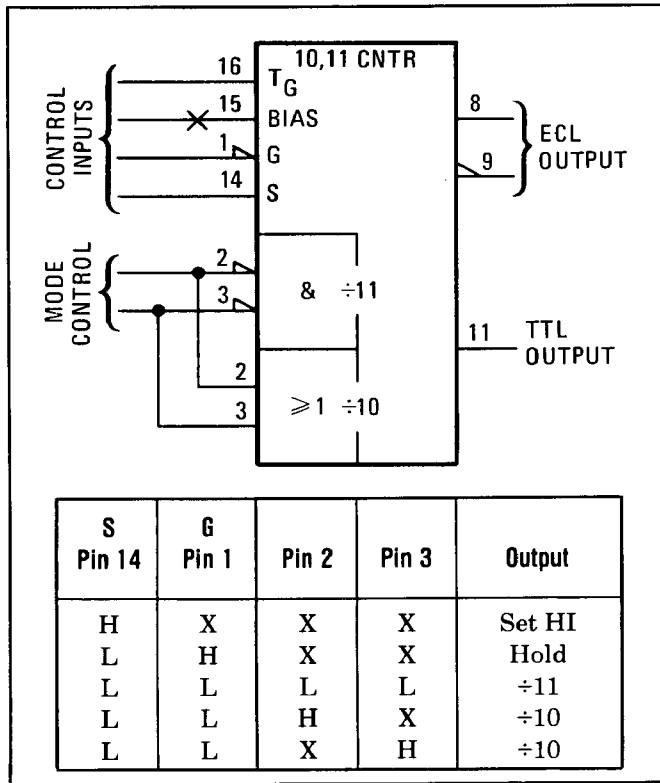


Figure 8-123. Divide-By-10/11 Prescaler

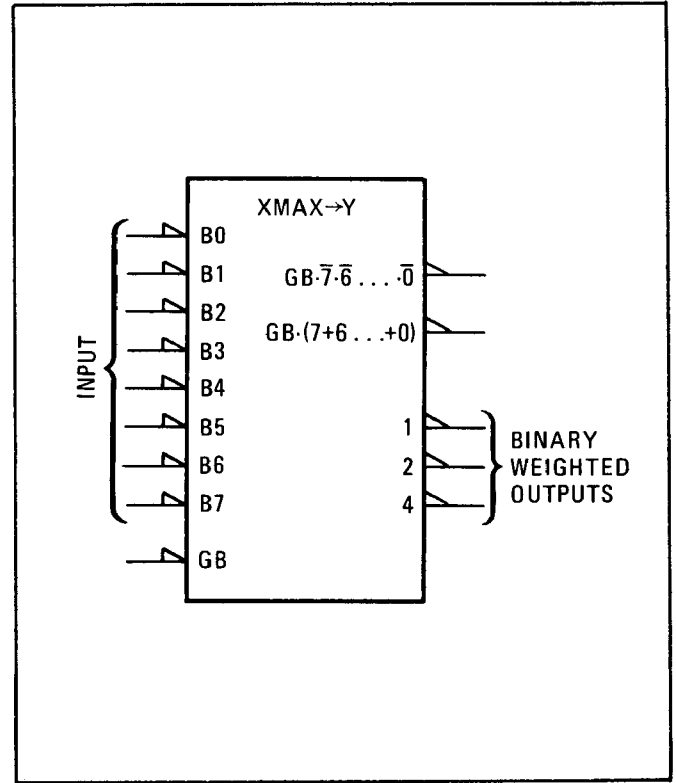


Figure 8-124. Eight-to-Three Line Priority Encoder

8-40. Random Access Memory (RAM)

The device shown in Figure 8-125 is a 256 by 4-bit static memory. Each of the 4-bit memory locations are addressed by the eight address lines. Both F inputs must be low to enable either memory mode (that is, "write" or "read"). When either F input is high the Data lines are in the three-state condition (that is, high impedance). The Data Inputs and Outputs are shown functionally as separate lines. However, each Input-Output function occurs physically on one pin.

**Write.** To "write" into memory from the Data lines, an address must be set and the F, G3, and G4 lines must be low.

**Read.** To "read" from memory to the output latches (FF) and then to the Data lines, an address must be set, G2 must be high, and the F and G4 lines must be low.

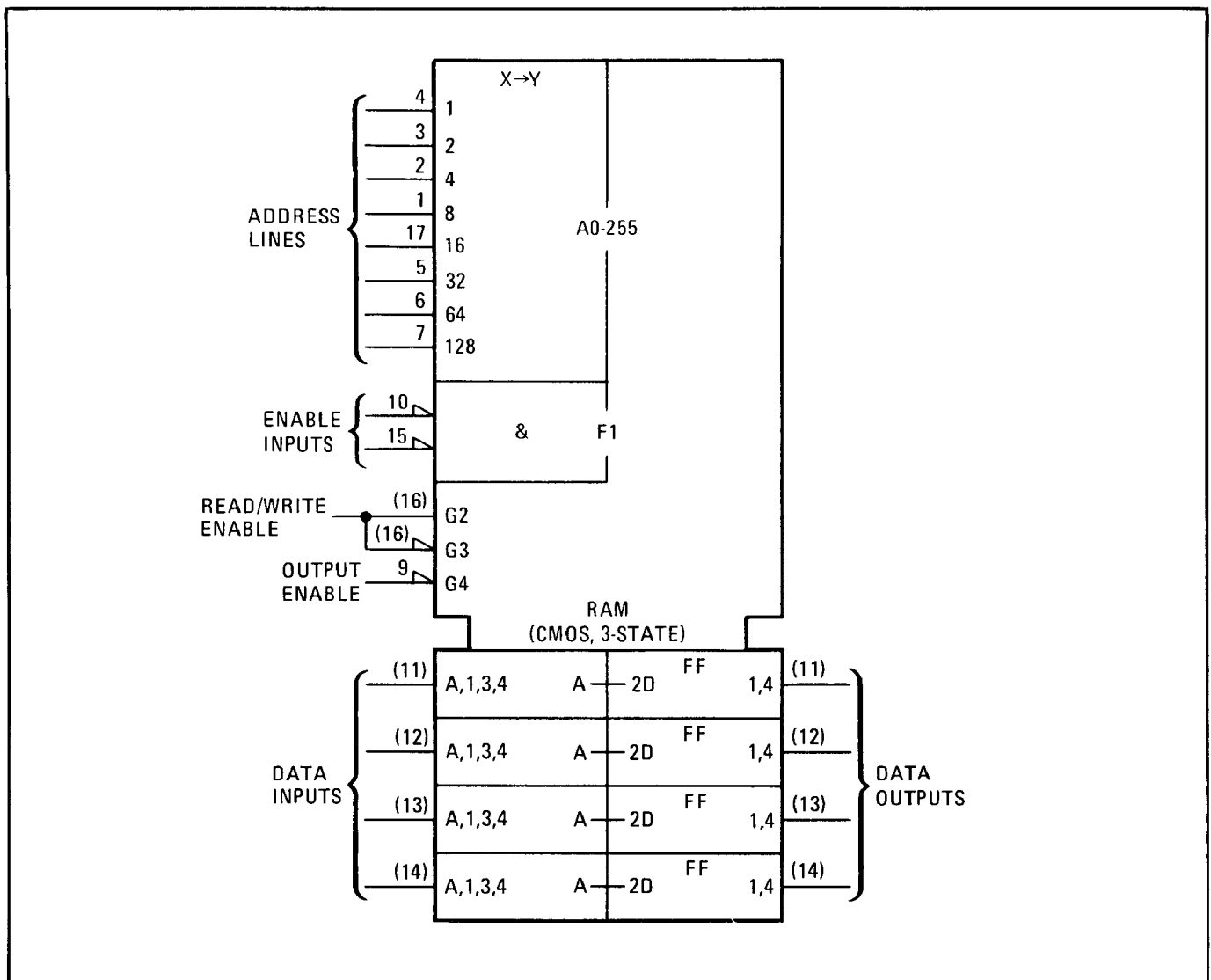


Figure 8-125. Random Access Memory (RAM)

8-41. Read-Only Memory (ROM)

The device shown in Figure 8-126 has 512 preprogrammed 8-bit memory locations. The memory locations are addressed by the nine binary address lines. The F input must be low to enable the Data Outputs. Otherwise the outputs are in the three-state condition (that is, high impedance).

8-42. Analog Switch

The Analog Switch is a bi-directional device, as is indicated by the double-headed arrow. the F1 input is the gate, F1 indicates the input and output (labeled with "1's") are dependent on this input. See Figure 8-127.

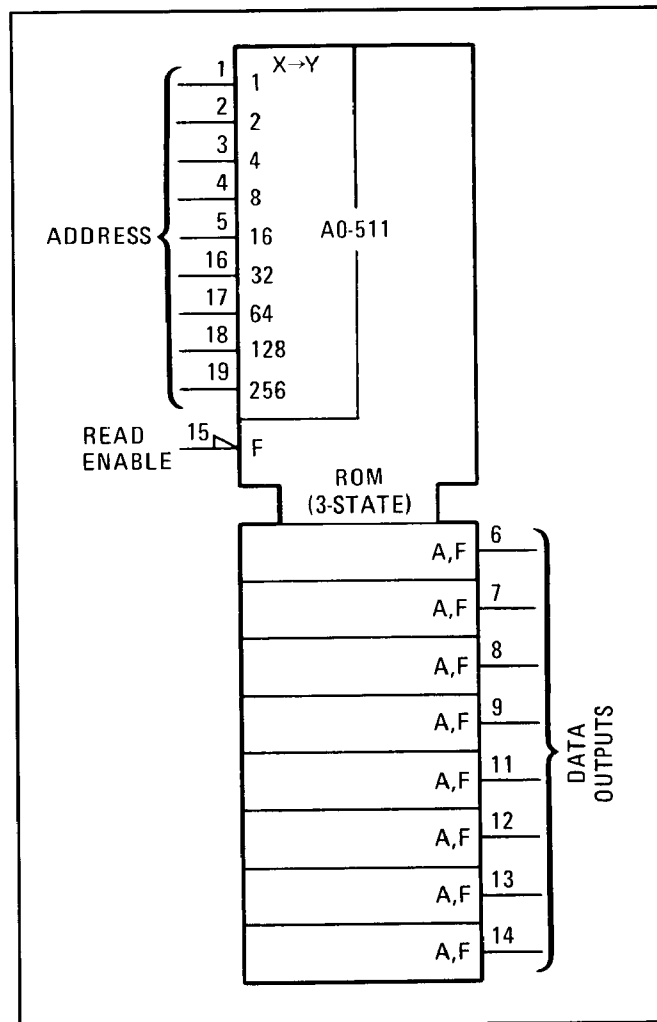


Figure 8-126. Read-Only Memory (ROM)

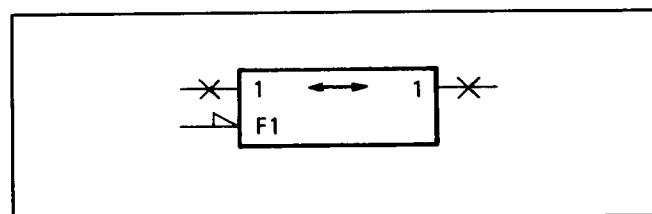


Figure 8-127. Analog Switch

### 8-43. Analog Multiplexer

The device shown in Figure 8-128 is an electronic version of a Single-Pole-Eight-Throw (SP8T) switch. The binary code at the Select Inputs determines which analog signal, 0 through 7, will be routed to the output. The F input must be low to enable the output. Otherwise, the output will be in the three-state condition (that is, high impedance).

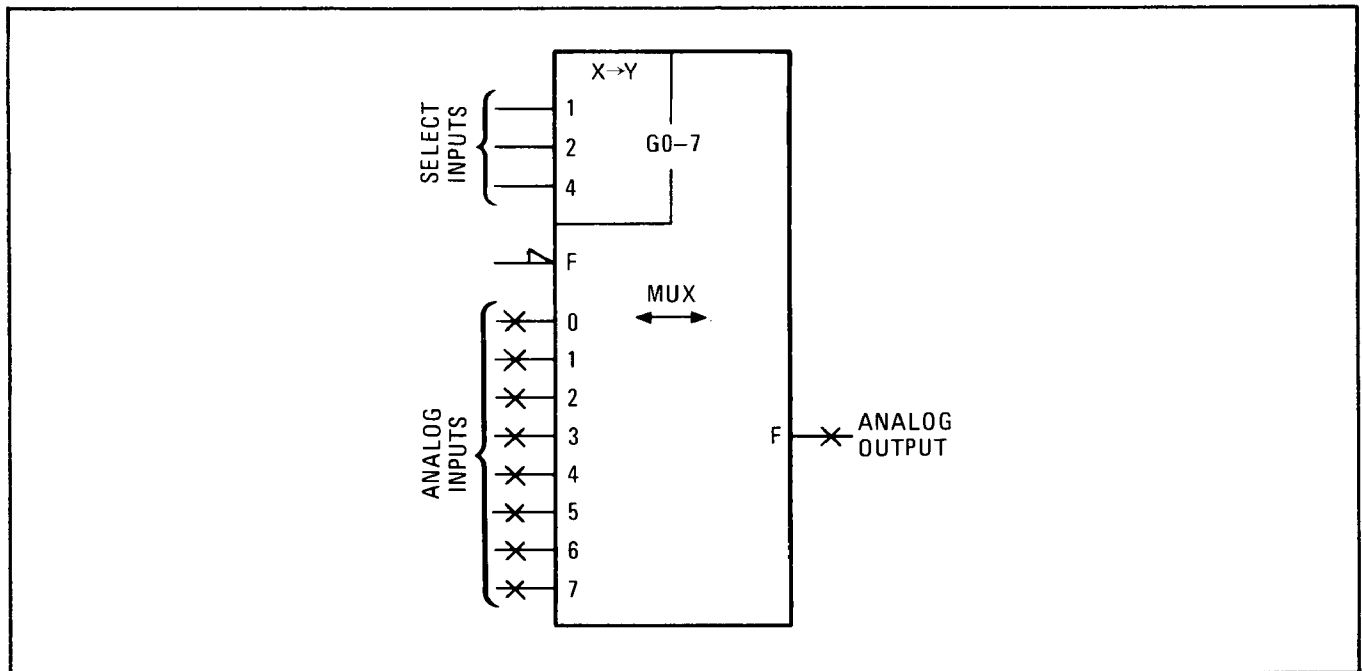


Figure 8-128. Analog Multiplexer

### 8-44. Phase-Frequency Detector

The device shown on the left side of Figure 8-129 can also be shown as it is on the right. It contains two RS flip-flops. The reference and variable signals drive the Set inputs. The latched outputs are AND'ed to reset the flip-flops.

The output signal for two out-of-phase input signals (or two signals of different frequency) would be a pulse on one line due to the first flip-flop being set. The pulse width would be equal to the time difference between the two active Set inputs.

When the second flip-flop is set, the AND function is completed and both flip-flops are reset. The second output would have a fast spike due to the small propagation delay of the AND and Reset functions.

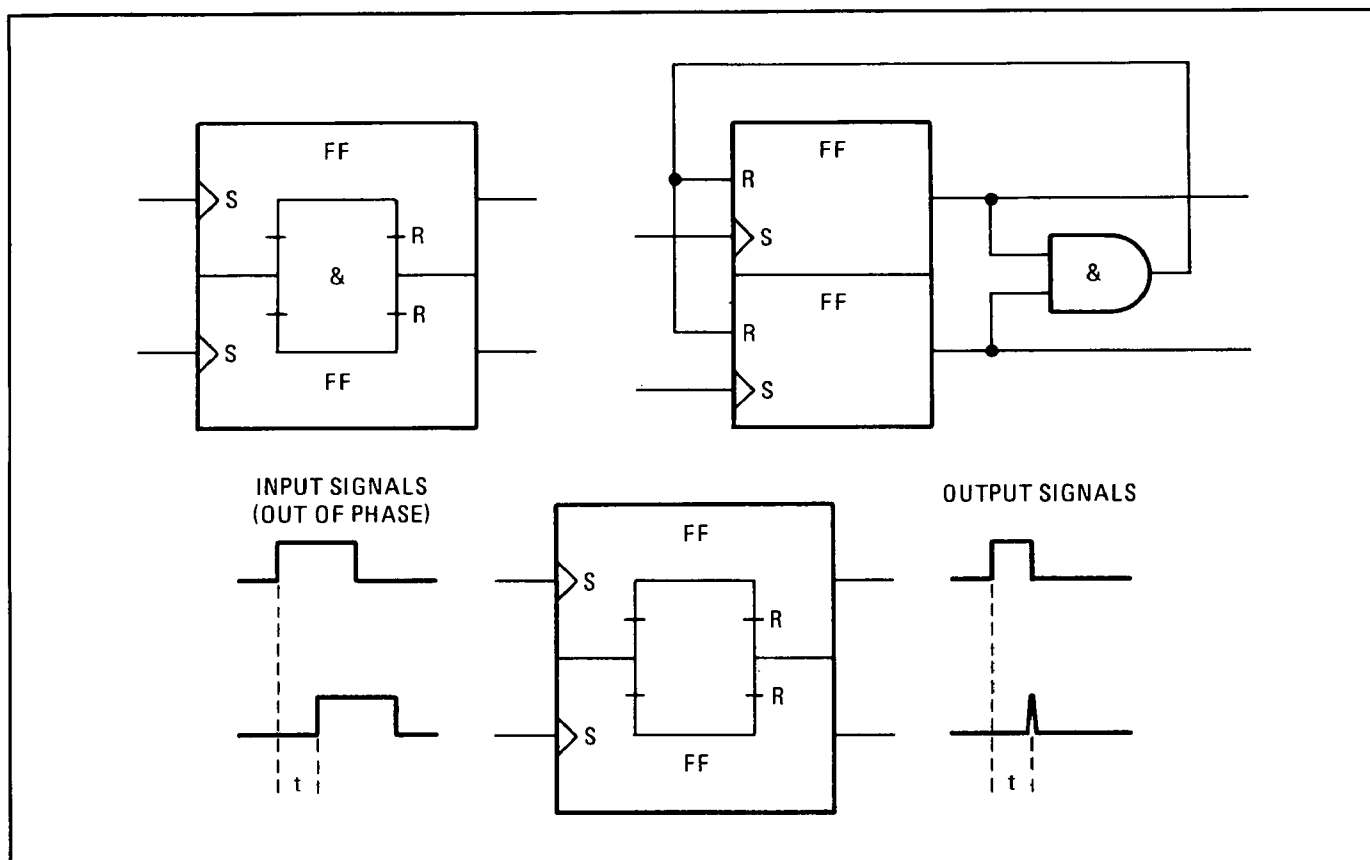


Figure 8-129. Phase-Frequency Detector

#### 8-45. LINEAR DIVICE THEORY

#### 8-46. Operational Amplifiers

The source of gain in an operational amplifier can be characterized as an ideal, differential voltage amplifier having low output impedance, high input impedance, and very high differential gain. The output of an operational amplifier is proportional to the difference in the voltages applied to the two input terminals. In use, the amplifier output drives the input voltage difference close to zero through a feedback path.

When troubleshooting an operational amplifier circuit, measure the voltages at the two inputs; the difference between these voltages should be less than 10mV. (Note: this troubleshooting procedure will not work for operational amplifiers which are configured as comparators.) A difference voltage much greater than 10mV indicates trouble in the amplifier or its external circuitry. Usually, this difference will be several volts and one of the inputs will be very close to one of the supply voltages.

Next, check the amplifier's output voltage. It will probably also be close to one of the supply voltages or ground. Check to see that the output conforms to the inputs. For example, if the inverting input is more positive than the non-inverting input, the output should be negative; if the non-inverting input is more positive than the inverting input, the output should be positive. If the output conforms to the inputs, check the amplifier's external circuitry. If the amplifier's output does not conform to its inputs, it is probably defective.

Figures 8-130, 131, and 132 show typical operational amplifier configurations. Figure 8-130 shows a non-inverting buffer amplifier with gain of 1. Figure 8-131 is a non-inverting amplifier with gain determined by R1 and R2. Figure 8-132 is an inverting amplifier with a gain determined by R1 and R2.

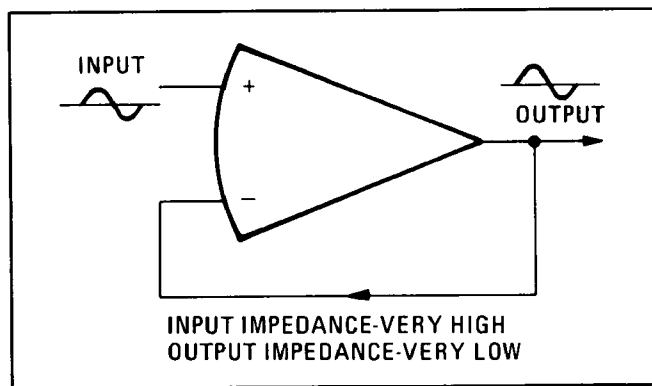


Figure 8-130. Non-Inverting Amplifier (Gain = 1)

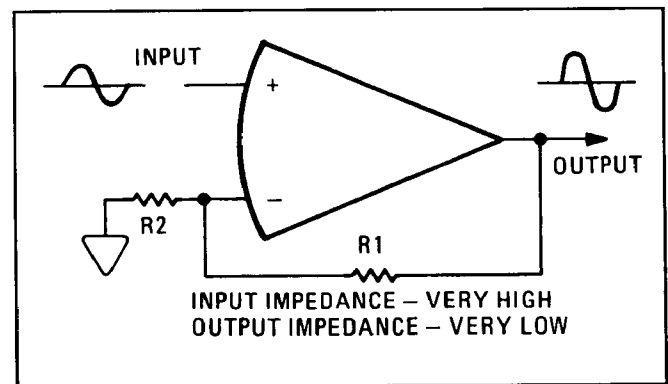


Figure 8-131. Non-Inverting Amplifier  
(Gain =  $1 + R1/R2$ )

#### 8-47. Comparators

Comparators are used as level sense amplifiers, switch drivers, pulse height discriminators, and voltage comparators. A voltage reference is connected to one of the amplifier's outputs as shown in Figures 8-133 and 134. When the input signal voltage crosses the reference, the output goes positive; the output remains positive until the signal re-crosses the reference.

#### 8-48. Limiter (Transistor Array)

The limiter shown in Figure 8-135 is simply a transistor array in a differential amplifier configuration. Its limiting characteristic is a function of its external biasing. The figure shows two of the common biasing arrangements and the internal circuitry of the device. The minus sign at pin 8 indicates signal inversion relative to the input. The plus sign at pin 5 (or the omission of the minus sign) indicates non-inversion.

#### 8-49. SCHEMATIC DIAGRAM NOTES

Table 8-102 summarizes the symbology used in presenting many of the devices on the schematics.

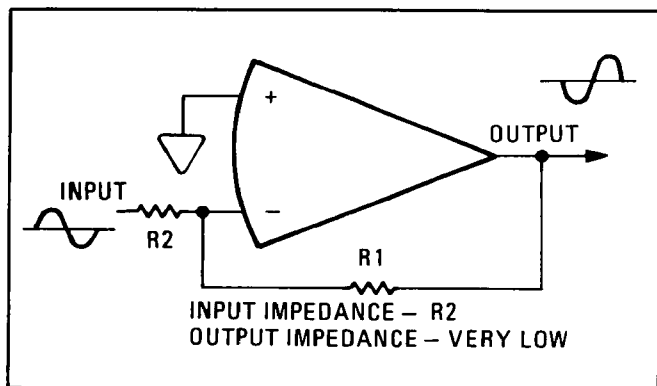


Figure 8-132. Inverting Amplifier (Gain =  $-R1/R2$ )

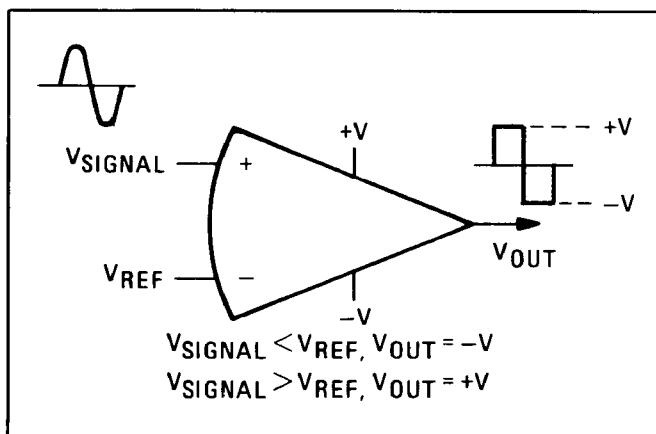


Figure 8-133. Non-Inverting Comparator

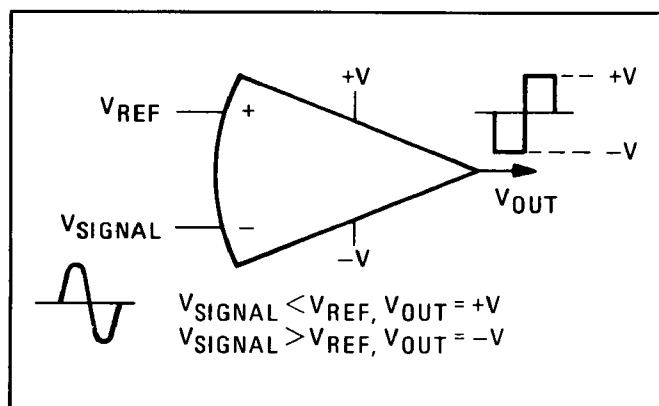


Figure 8-134. Inverting Comparator

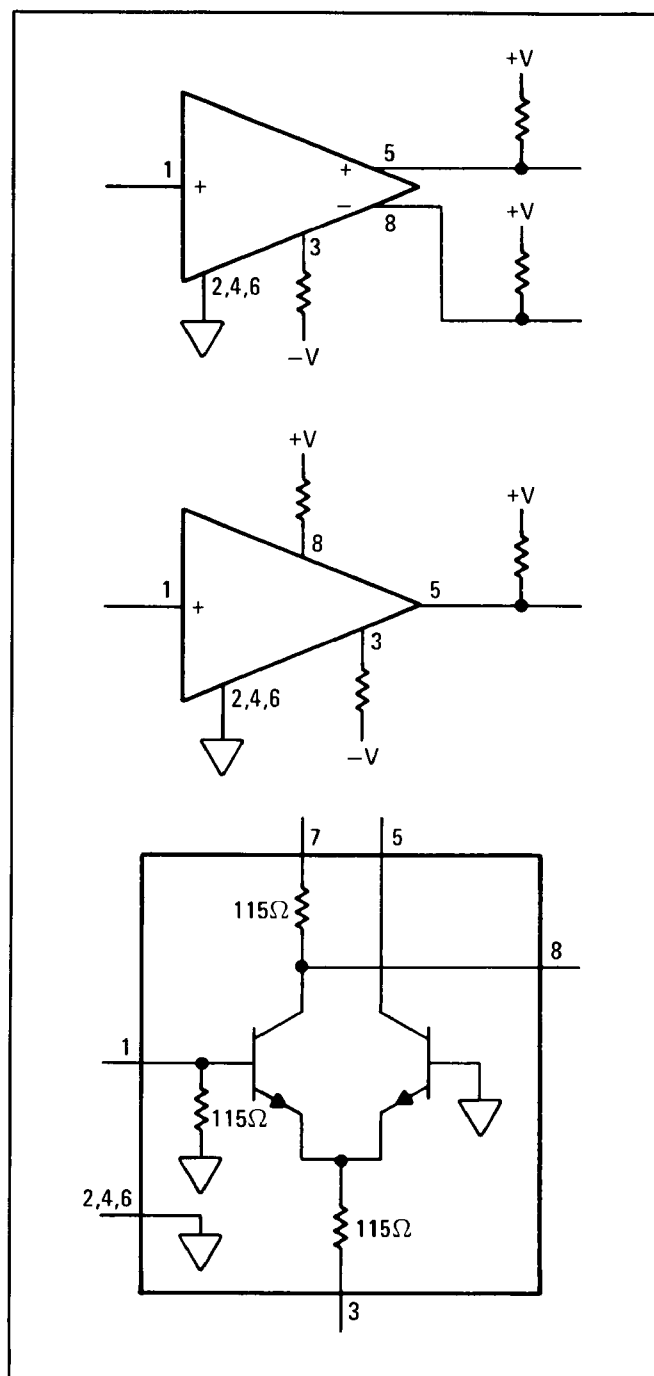


Figure 8-135. Limiter (Transistor Array)

Table 8-102. Schematic Diagram Notes (1 of 7)

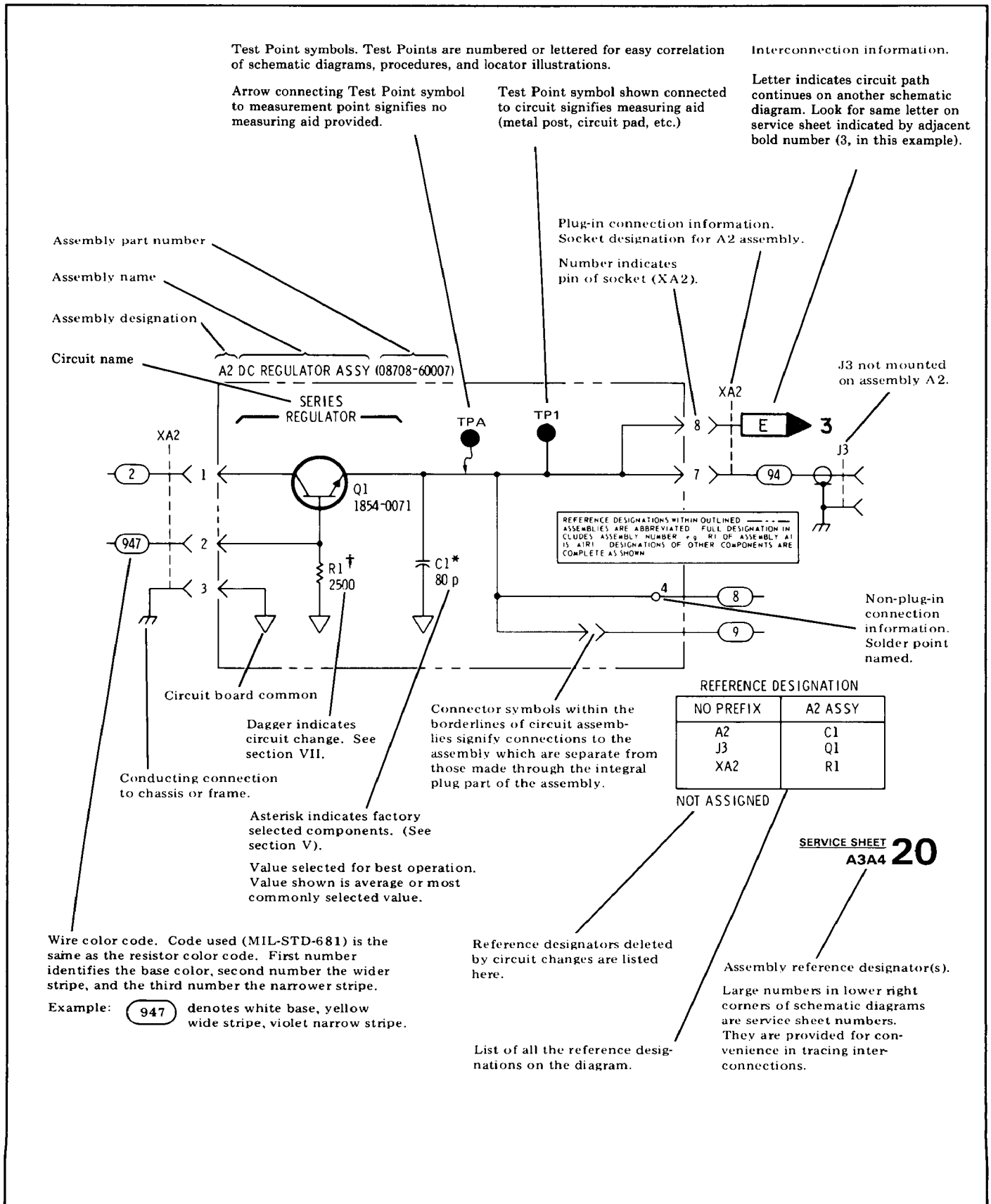




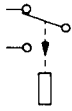
Table 8-102. Schematic Diagram Notes (2 of 7)

**SCHEMATIC DIAGRAM NOTES**

	Tool-aided adjustment.
	Manual control.
	Encloses front- or rear-panel designation
	Circuit assembly borderline.
	Other assembly borderline.
	Heavy line with arrows indicates path and direction of main signal.
	Heavy dashed line with arrows indicates path and direction of main feedback.
	Indicates stripline (i.e., RF transmission line above ground).
	Wiper moves toward cw with clockwise rotation of control (as viewed from shaft or knob).
	A direct conducting connection to earth, or a conducting connection to a structure that has a similar function (e.g., the frame of an air, sea, or land vehicle).
	A conducting connection to a chassis or frame.
	Common connections. All like-designation points are connected.
	Letters = off-page connection, e.g., Number = Service Sheet number for off-page connection, e.g., 3
	Indicates multiple paths represented by only one line. Letters or names identify individual paths. Numbers indicate number of paths represented by the line.
	Coaxial or shielded cable.

Table 8-102. Schematic Diagram Notes (3 of 7)

**SCHEMATIC DIAGRAM NOTES**



Relay. Contact moves in direction of arrow when energized.



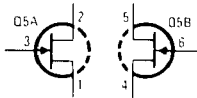
Indicates a PIN diode.



Indicates a Varactor diode.



Indicates a Schottky (hot-carrier) diode.



Multiple transistors in a single package—physical location of the pins is shown in package outline on schematic.



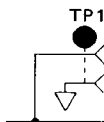
Identification of logic families as shown (in this case, ECL).



Numbered Test Point.  
Measurement aid provided.



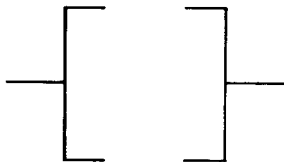
Lettered Test Point.  
No measurement aid provided.



Numbered RF Test Point. Requires ac-coupling adapter from service kit.

**DIGITAL SYMBOLOGY REFERENCE INFORMATION**

**Input and Output Indicators**

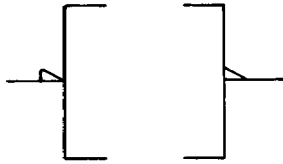


Implied Indicator—Absence of polarity indicator (see below) implies that the active state is a relative high voltage level. Absence of negation indicator (see below) implies that the active state is a relative high voltage level at the input or output.

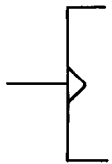
Table 8-102. Schematic Diagram Notes (4 of 7)

**DIGITAL SYMBOLOGY REFERENCE INFORMATION**

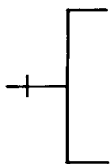
**Input and Output Indicators (Cont'd)**



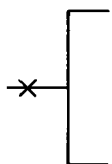
Polarity Indicator—The active state is a relatively low voltage level.



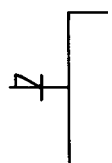
Dynamic Indicator—The active state is a transition from a relative low to a relative high voltage level.



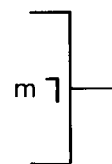
Inhibit Input—Input that, when active, inhibits (blocks) the active state outputs of a digital device.



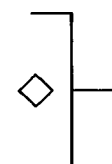
Analog Input—Input that is a continuous signal function (e.g., a sine wave).



Polarity Indicator used with Inhibit Indicator—Indicates that the relatively low level signal inhibits (blocks) the active state outputs of a digital device.



Output Delay—Binary output changes state only after the referenced input (m) returns to its inactive state (m should be replaced by appropriate dependency or function symbols).



Open Collector or Open Emitter output.

3-STATE

Three-state Output—Indicates outputs that can have a high impedance (disconnect) state in addition to the normal binary logic states.

**Combinational Logic Symbols and Functions**

&

AND—All inputs must be active for the output to be active.



≥1

OR—One or more inputs being active will cause the output to be active.

Table 8-102. Schematic Diagram Notes (5 of 7)

**DIGITAL SYMBOLOGY REFERENCE INFORMATION**

**Combinational Logic Symbols and Functions (Cont')**

$\geq m$	Logic Threshold—m or more inputs being active will cause the output to be active (replace m with a number).
$=1$	EXCLUSIVE OR—Output will be active when one (and only one) input is active.
$=m$	m and only m—Output will be active when m (and only m) inputs are active (replace m with a number).
=	Logic Identity—Output will be active only when all or none of the inputs are active (i.e., when all inputs are identical, output will be active).
$\Sigma m$	Arithmetic Summer—Performs arithmetic sum and difference, etc. per m and other internal notation.
	Amplifier—The output will be active only when the input is active (can be used with polarity or logic indicator at input or output to signify inversion).
X/Y	Signal Level Converter—Input level(s) are different than output level(s).
	Bilateral Switch—Binary controlled switch which acts as an on/off switch to analog or binary signals flowing in both directions. Dependency notation should be used to indicate affecting/affected inputs and outputs. Note: amplifier symbol (with dependency notation) should be read to indicate unilateral switching.
X→Y	Coder—Input code (X) is converted to output code (Y) per weighted values or a table.
(Functional Labels)	The following labels are to be used as necessary to ensure rapid identification of device function.
MUX	Multiplexer—The output is dependent only on the selected input.
DEMUX	Demultiplexer—Only the selected output is a function of the input.
CPU	Central Processing Unit
PIO	Peripheral Input/Output
SMI	Static Memory Interface

**Sequential Logic Functions**



	1 Monostable—Single shot multivibrator. Output becomes active when the input becomes active. Output remains active (even if the input becomes inactive) for a period of time that is characteristic of the device and/or circuit.
	G Oscillator—The output is a uniform repetitive signal which alternates between the high and low state values. If an input is shown, then the output will be active if and only if the input is in the active state.
FF	Flip-Flop—Binary element with two stable states, set and reset. When the flip-flop is set, its outputs will be in their active states. When the flip-flop is reset, its outputs will be in their inactive states.
T	Toggle Input—When active, causes the flip-flop to change states.

Table 8-102. Schematic Diagram Notes (6 of 7)

**DIGITAL SYMBOLOGY REFERENCE INFORMATION****Sequential Logic Functions (Cont'd)**

S	Set Input—When active, causes the flip-flop to set.
R	Reset Input—When active, causes the flip-flop to reset.
J	J Input—Analogous to set input.
K	K Input—Analogous to reset input.
D	Data Input—Always enabled by another input (generally a C input—see Dependency Notation). When the D input is dependency-enabled, a high level at D will set the flip-flop; a low level will reset the flip-flop. Note: strictly speaking, D inputs have no active or inactive states—they are just enabled or disabled.
+m	Count-Up Input—When active, increments the contents (count) of a counter by “m” counts (m is replaced with a number).
–m	Count-Down Input—When active, decrements the contents (count) of a counter by “m” counts (m is replaced with a number).
–m	Shift Right (Down) Input—When active, causes the contents of a shift register to shift to the right or down “m” places (m is replaced with a number).
–m	Shift Left (Up) Input—When active, causes the contents of a shift register to shift to the left or up “m” places (m is replaced with a number).

**NOTE**

*For the four functions shown above, if m is one, it is omitted.*

(Functional Labels)	The following functional labels are to be used as necessary in symbol build-ups to ensure rapid identification of device function.
mCNTR	Counter—Array of flip-flops connected to form a counter with modules m (m is replaced with a number that indicates the number of states: 5 CNTR, 10 CNTR, etc.).
REG	Register—Array of unconnected flip-flops that form a simple register or latch.
SREG	Shift Register—Array of flip-flops that form a register with internal connections that permit shifting the contents from flip-flop to flip-flop.
ROM	Read Only Memory—Addressable memory with read-out capability only.
RAM	Random Access Memory—Addressable memory with read-in and read-out capability.

**Dependency Notation**

mAm	Address Dependency—Binary affecting inputs of affected outputs. The m prefix is replaced with a number that differentiates between several address inputs, indicates dependency, or indicates demultiplexing and multiplexing of address inputs and outputs. The m suffix indicates the number of cells that can be addressed.
-----	--

Table 8-102. Schematic Diagram Notes (7 of 7)


**DIGITAL SYMBOLOGY REFERENCE INFORMATION****Dependency Notation (Cont'd)**

Gm	Gate (AND) Dependency—Binary affecting input with an AND relationship to those inputs or outputs labeled with the same identifier. The m is replaced with a number or letter (the identifier).
Cm	Control Dependency—Binary affecting input used where more than a simple AND relationship exists between the C input and the affected inputs and outputs (used only with D-type flip-flops).
Vm	OR Dependency—Binary affecting input with an OR relationship to those inputs or outputs labeled with the same identifier. The m is replaced with a number or the letter (the identifier).
Fm	Free Dependency—Binary affecting input acting as a connect switch when active and a disconnect when inactive. Used to control the 3-state behavior of a 3-state device.

**NOTE**

*The identifier (m) is omitted if it is one—that is, when there is only one dependency relationship of that kind in a particular device. When this is done, the dependency indicator itself (G, C, F, or V) is used to prefix or suffix the affected (dependent) input or output.*

**Miscellaneous**

	Schmitt Trigger—Input characterized by hysteresis; one threshold for positive going signals and a second threshold for negative going signals.
Active	Active State—A binary physical or logical state that corresponds to the true state of an input, an output, or a function. The opposite of the inactive state.
Enable	Enabled Condition—A logical state that occurs when dependency conditions are satisfied. Although not explicitly stated in the definitions listed above, functions are assumed to be enabled when their behavior is described. A convenient way to think of it is as follows: A function becomes active when: <ul style="list-style-type: none"> <li>• it is enabled (dependency conditions—if any—are satisfied)</li> <li>• and its external stimulus (e.g., voltage level) enters the active state.</li> </ul>

## VOLUME 2 CONTENTS

Schematic Service Sheet Number	Block Diagram	Assembly or Section	Theory/Trouble-Shooting Page Number	Parts List Page Number
BD1	—	Overall Block Diagram (Instrument Level)	8-201	—
BD2	—	Reference Section	8-213	—
BD3	—	High Frequency Loops Section	8-217	—
BD4	—	Fractional-N Loops Section	8-223	—
BD5	—	Low Frequency Loops Section	8-233	—
BD6	—	Output Section	8-241	—
BD7	—	Modulation Section	8-249	—
BD8	—	Phase Modulation Section	8-257	—
BD9	—	Digital Control Unit (DCU) Section	8-261	—
BD10	—	Power Supply Section	8-289	—
SS1	BD2	A8A3 10 MHz Reference Oscillator	8-301	6-176
	BD2	A8A4 Reference Buffer		
SS2	BD2	A6A1 Reference Section LF Multiplier	8-307	6-117
SS3	BD2	A6A3 Reference Section HF Multiplier	8-313	6-125
SS4	BD2	A6A2 Reference Section LO Drive	8-319	6-121
SS5	BD3	A6A9 HP Loops and Reference Sections Controller	8-325	6-155
SS6	BD3	A6A6 Reference Sum Loop RF Mixer	8-331	6-149
SS7	BD3	A6A5 Reference Sum Loop Phase Detector	8-337	6-133
SS8	BD3	A6A5 Reference Sum Loop Phase Detector	8-347	6-133
SS9	BD3	A6A7 RF Buffer	8-355	6-151
SS10	BD3	A6A8 Output Sum Loop RF Mixer	8-361	6-153
SS11	BD3	A6A4 Output Sum Loop Phase Detector	8-367	6-133
SS12	BD3	A6A4 Output Sum Loop Phase Detector	8-377	6-133

**SERVICE SHEET BD1  
OVERALL BLOCK DIAGRAM****REFERENCE:**

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

The basic frequency generating circuitry is composed of the Reference Section, phase lock loops and Output Section (in the upper-left, center and right hand portions of the block diagram respectively). All of the reference frequencies used within the instrument are obtained from the Reference Section. A total of seven phase lock loops work together to produce the fundamental frequency band of 320 to 640 MHz with a step resolution of 0.1 Hz. This fundamental (or basic) band is sent to the Output Section where it is doubled, passed straight through or down-converted to produce the entire frequency range at the RF output (.1 to 2560 MHz).

The Digital Control Unit (DCU) controls the operation of the unit. It accepts keyboard or remote inputs and generates internal data and control signals to control the signal at the RF output. Power for the instrument is supplied by a switching-regulated power supply.

**Reference Section**

All of the reference frequencies used within the instrument are obtained from the Reference Section. This block is composed of doublers, dividers, and mixers, all of which are driven by a single temperature-stabilized 10 MHz crystal oscillator. Outputs from the Reference Section are 10, 20, 120, 520, and 320-640 MHz (in 20 MHz steps). Signal levels vary depending on which section they are being sent to.

**Phase Lock Loops**

The Generator uses the indirect synthesis method for generating output frequencies. Phase lock loop (PLL) circuits are locked to signals from the Reference Section and generate signals which are combined to give the desired output frequency. All output frequencies retain the same accuracy and stability as the 10 MHz reference signal. PLL's are found in the High Frequency, Low Frequency, Fractional-N, and Modulation Sections.



### High Frequency Loops

The Reference Sum Loop and the Output Sum Loop are two nearly identical circuits. The Reference Sum Loop starts with 320-640 MHz and 10 or 20 MHz signals from the Reference Section. Together, these signals are related to digits D9 and D8 in the FREQUENCY readout (in the basic band only). These signals are combined in the Output Sum Loop with the low frequency loops output that has a 0.1 Hz resolution.

### Low Frequency Loops

The Low Frequency section consolidates several signals and produces an output signal having the characteristics of all of the inputs. This section has three phase lock loops: the N-Loop, the Low Frequency Sum Loop, and the FM Sum Loop.

The N-Loop generates a signal related to the D7 and D6 digits of the FREQUENCY readout (in the basic band). The other two loops combine this signal with outputs from the Fractional-N Loop. A 20 MHz signal is frequency modulated at the level needed to provide the desired amount of deviation at the front panel RF output.

### Fractional-N-Loop

The Fractional-N-Loop uses the 10 MHz reference signal to produce an output that is related to digits D5, D4, D3, D2, D1, and D0 of the FREQUENCY readout (in the 320-640 MHz "basic band"). The phase lock loop is called "Fractional-N" because the divider in the feedback circuit can divide by both integer and fractional values. This is accomplished by using digital dividers that by themselves only divide by integer values, but with extra control circuitry can switch the "divide-by" integer (N) between two values so that the average value of N contains a fractional part.

For example, to divide by 1300.455, the divider would divide by 1301 for 455 cycles and by 1300 for 545 cycles. Over 1000 cycles, the effective division is by 1300.455. The Fractional-N-Loop provides high resolution, fast switching, and low noise.

### Modulation Section and FM Loop

The Modulation Section has a Variable Modulation Oscillator (VMO) that produces modulation source signals at rates from 10.0 Hz to 99.9 kHz with 3 digit resolution. External modulating signals can be applied to the front panel AM IN, FM IN, and PM IN connectors. Simultaneous modulation is possible.

The FM Loop produces one of the reference signals for the FM Sum Loop. The signal is 20 MHz with FM. The phase lock loop is unlocked when a dc-coupled signal from the front panel's FM INPUT is selected. Thus, the 140 MHz Oscillator operates in a free run condition without any correction.

## Phase Modulation Section (Option 002 Only)

The Phase Modulation section provides phase modulation at up to 10 MHz rates from an external source. BPSK at RF output frequencies of 640 MHz and above are generated in this section.

## Output Section

The output section converts the basic band (320 to 640 MHz) from the High Frequency Section to all other frequencies by multiplying it, passing it through, or dividing it. This section also controls the RF level of the signal. It does this with a group of electromechanical attenuators. These attenuators reduce the amplitude in 5 dB increments from 5 dB through 140 dB. Electronic leveling keeps the output level constant and provides finer output step resolution.

Pulse modulation, AM, and BPSK (RF output frequencies < 640 MHz) are generated in the output section.

## Digital Control Unit

The Digital Control Unit (DCU) is a microprocessor based controller that is responsible for directing the operation of the instrument. It takes information from the keyboard, HP-IB interface or AUX connector. It stores data, calculates the required oscillator frequencies, determines internal switch settings, and exercises general control over the instrument. Although not shown on this block diagram, the DCU is a transfer point for digital data to all the sections.

## Power Supply

This instrument uses a switching-regulated power supply that provides high efficiency and low heat dissipation.

## TROUBLESHOOTING

### Introduction

Troubleshooting is structured into three levels:

1. Instrument (to identify a defective section)
2. Section (to identify a defective assembly)
3. Assembly (to identify a defective component)

The general procedure is to begin at the instrument level to isolate the problem to a section (Block Diagram BD1), then to an assembly within the section (Block Diagrams BD2-BD10), and finally to a component on the assembly (detailed schematics). There is troubleshooting information on the block diagrams which can be used

by someone who understands the theory of operation to isolate the problem to the next lower level. There is a troubleshooting procedure with each block diagram. These procedures are the recommended troubleshooting approach for someone who is inexperienced with servicing the Generator. To effectively use these procedures you need a basic understanding of the principles of operation. Read the theory before using the procedure so the procedure becomes a guide. Many short cuts are possible as more experience is gained.

**WARNING**

When working on the power supply, remember that high voltage is present at all times when the line cord is plugged in (that is, plus and minus 160 Vdc and line voltage). Unplug the line cord before doing anything to the power supply. The line switch has no effect on the high voltage.

When working near the rear panel, be careful to keep long hair from being drawn into the fan. This could cause personal injury.

**CAUTION**

DO NOT plug in or unplug any board assembly with the instrument line switch turned on. Always turn the line switch to STANDBY when removing or inserting a board. There are some components that could be damaged by transients generated this way.

The "LINE" fuse should not be replaced until the cause of its failure is determined. Replacing this fuse in a damaged Generator might cause additional damage. A qualified service person should first determine the cause of its failure, specifically with resistance checks in the power supply (see Service Sheet 65); repair the failure and then replace the fuse.

When measuring frequency, connect a cable from the Generator's 10 MHz Reference output (rear panel) to the counter's reference input and set the counter Reference switch to EXT. Since minor differences exist between time bases, using the 8663A's as a common reference will ensure that all correct frequency readings will be off only by the resolution error of the counter.

When measuring frequency or power level at an output connector, disconnect any cable that is normally connected so the measuring instrument is the only load on the output. If the cable must remain connected to make a valid measurement, this will be specifically stated.

All power level values given are as measured on a spectrum analyzer. Measurements made with a power meter might give a slightly higher reading. ECL signals will read approximately 2 dB higher with a

power meter because the harmonics are high and add to the power meter reading.

### Instrument Level Troubleshooting Procedure

The following procedure can be used to isolate an instrument malfunction to one of the sections.

1. Check power supply voltages. Remove the top cover of the instrument. The power supply is in the left-rear corner. Test points used to check each of the voltages are accessible through openings in the power supply top cover. Silkscreening on the cover identifies the test points. Measure each of the voltages and compare to the tolerances in Table 8-201.

Table 8-201. Power Supply Voltages

Supply Voltage	Tolerance
+5.2V	$\pm 0.02V$
+20V	$\pm 0.1V$
-10V	$\pm 0.04V$
-40V	$\pm 0.2V$

If a voltage is out of tolerance, adjust it. The voltage should be adjustable above and below the nominal value within the tolerance limits. If a voltage cannot be adjusted to within limits, there is a problem with the power supply. Continue troubleshooting on Service Sheet BD10.

If the Generator fails to turn on, check the power supply voltages first. If they are incorrect, continue on Service Sheet BD10. If the power supply voltages are correct, continue on Service Sheet BD9 (the Digital Control Unit).

2. STATUS light flashes. All sections contain self-check circuitry which can detect some malfunctions. When a malfunction is detected, the STATUS light flashes. Press the STATUS key and hold it down and the status code will be displayed in the frequency display (on the right). If 99 is displayed, press the Blue Key and then the STATUS key. The actual status code will be displayed. Table 8-203 defines the malfunction status codes and where to continue troubleshooting if one occurs.

There are many errors which cannot be detected by the self-check circuitry and it's also possible for the self-check circuitry to

malfunction. Therefore, use the status code only as a guide. Confirm that the problem indicated by the status code really exists.

#### NOTE

Under certain conditions, it is possible for Status Code 76, "Amplitude out of specification", to turn on when no amplitude error exists. This can happen during fast repetitive sweeps (for example, Auto Sweep or Remote Stepped Sweep, with the time/step less than 1 ms). Corrective action is not required unless code 76 persists under conditions other than those outlined above.

If no status code is present, continue with Step 3.

3. All malfunctions can be divided into eight general classifications as follows:
  - a) Front Panel, HP-IB and AUX malfunctions. This includes all improper operation of keys, display and indicators. Begin troubleshooting with Service Sheet BD9.
  - b) RF output frequency not correct. Begin troubleshooting with Step 4.
  - c) RF output power level not correct. Begin troubleshooting with Step 5.
  - d) AM and FM problems. Begin troubleshooting with Service Sheet BD7.
  - e) Phase modulation problems. Begin troubleshooting with Service Sheet BD8.
  - f) Pulse modulation and BPSK problems. Begin troubleshooting with Service Sheet BD6.
  - g) High spurs or phase noise. Begin troubleshooting with Step 6, below.
  - h) Problems associated with front and rear panel connectors (except RF output). Table 8-202, shows where to start troubleshooting when the signal from an output connector is not normal or the signal applied to an input connector does not produce the desired effect.

Table 8-202. Failures Associated With External Connectors

CONNECTOR	TROUBLESHOOT ASSEMBLY (SERVICE SHEET)
AM IN, FM IN, PM IN	A11A5 (41 and 42) A11A3 (44)
Rear Panel Connectors AUX SWP AM MKR Z/AXIS BLK/MKR PLS BPSK VMO OUT AUX FM IM (10 MHz Reference) OUTPUT (5 or 10 MHz Reference) INPUT	A2A1 (61 and 62) A2A2 (56 and 57) A2A2 (56 and 57) A2A2 (56 and 57) A4A1 (37) A11A1 (39 and 40) A11A2 (43) A8A4 (1) A8A4 (1)

## 4. RF Output Frequency Not Correct.

- a) Measure the RF output frequency with a counter. Run a cable from the Generator's 10 MHz reference output to the counter external time base input and set the counter time base switch to external.
- b) If the frequency is not stable (that is, it varies more than +1 count), there is a phase lock loop unlocked. Measure the output of each section containing phase lock loops shown on the block diagram until the bad section is found. Start at the bottom of the block diagram and move up. Then continue troubleshooting on the Service Sheet for the bad section.
- c) If the frequency is stable, measure the High Frequency Loops Section output frequency. If this frequency is normal, the problem is in the Output Section. Otherwise, measure the output of each section starting at the bottom of the block diagram until the bad section is found. Then continue troubleshooting on the service sheet for the bad section.

5. RF Power Level Not Correct. Measure the power level of the output signal from the High Frequency Loops Section. If this power level is not within the limits given on the block diagram, there is a problem in the High Frequency Loops Section so continue troubleshooting on Service Sheet BD3. If this power level is normal, the problem is in the Output Section, so continue troubleshooting on Service Sheet BD8.

6. High Sprus or Phase Noise. This is the most difficult type of problem to troubleshoot. Some troubleshooting experience and a thorough understanding of the theory of operation of the instrument are needed to be successful. The general procedure to follow is:
- a) Locate the section of the instrument in which the problem is originating.
  - b) Search for the cause. In the case of high phase noise it is now a matter of trying different approaches to narrow the range of possible causes. This is where experience helps. If the problem is spurs, identify the source of the spur. The location of the spur and how it moves in relation to the center frequency can provide a lot of information when the theory of operation of the Generator is understood. Removing cables or substituting signals from an external source are also useful techniques.
  - c) Once the source of the spur is known look for the coupling mechanism.

TABLE 8-203. HARDWARE MALFUNCTION STATUS CODE DESCRIPTION

STATUS CODE	DESCRIPTION	CONTINUE TROUBLESHOOTING ON SERVICE SHEET
00	No malfunction	---
01	Low reference oscillator signal level. (Check INT-EXT switches on rear panel).	1
02	Fractional-N Loop out on lock.	BD4
03	Low Frequency N Loop out of lock.	BD5
04	Low Frequency Sum Loop out of lock.	BD5
05	Low Frequency FM Sum Loop out of lock.	BD5
06	High Frequency Reference Sum Loop out of lock.	BD3
07	High Frequency Sum Loop out of lock.	BD3
08	FM Loop out of lock.	BD7
61	Variable Modulation Oscillator Loop out of lock.	BD7
76	RF Output amplitude not leveled.	BD8
95	ROM Malfunction.	BD9
96	RAM Malfunction.	BD9
98*	Memory Malfunction.	
99*	Hardware Malfunction.	

\* This is the general code for instrument malfunction. Press the BLUE KEY and then STATUS to obtain one of the other codes in the table which is the actual malfunction.

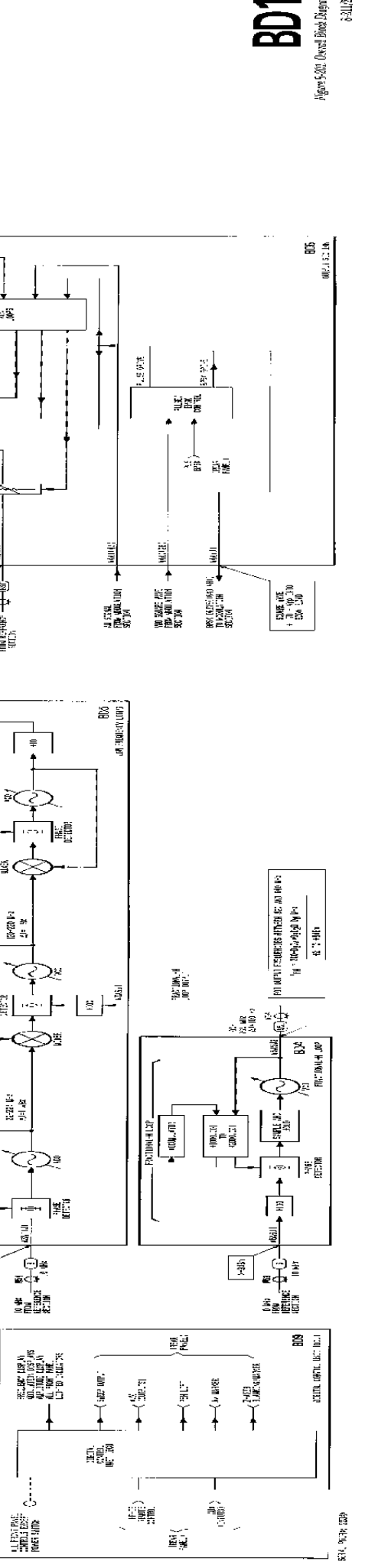
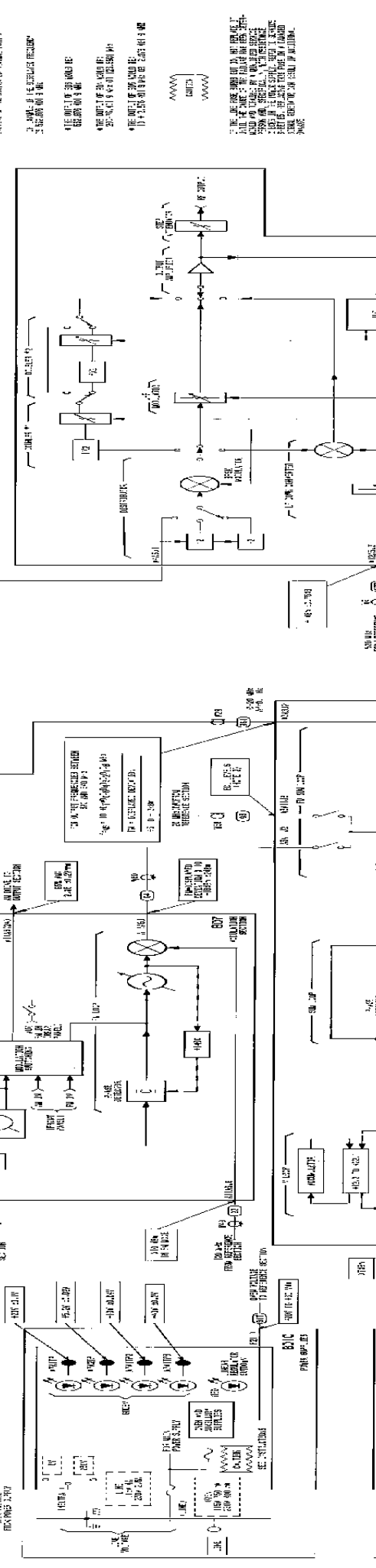
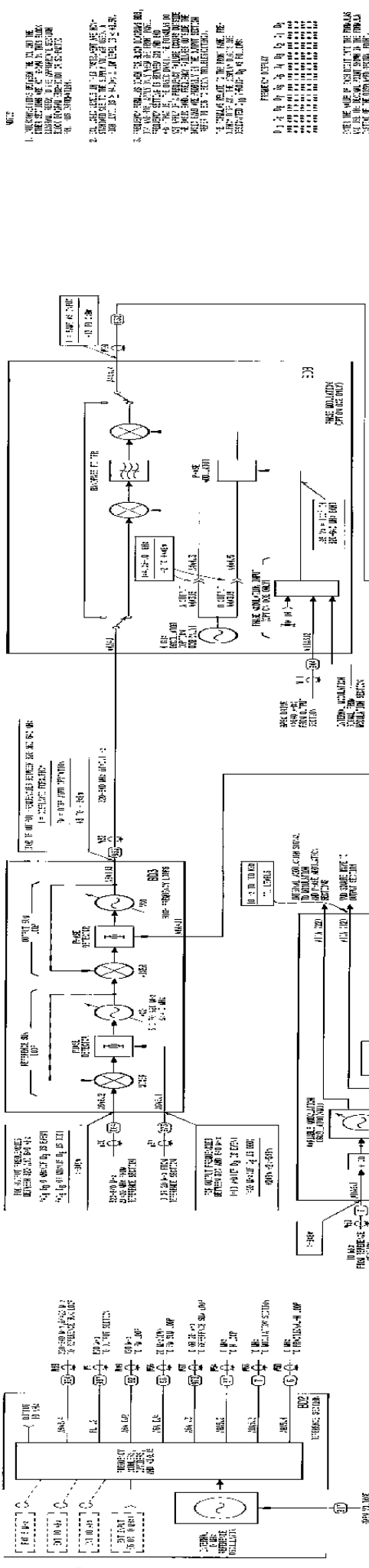
## NOTE

Errors 101-119, below, are generated by self-check circuitry in the Digital Control Unit (DCU). The Frequency, level and modulation data that is sent to other sections is also read back from the DCU output. Thus, when an error occurs, it could be that the data is bad, something could be pulling the signal line up or down, or the read-back circuitry is bad. The description of the code gives the reference designator of the latch where the bad data is stored.

TABLE 8-203. HARDWARE MALFUNCTION STATUS CODE DESCRIPTION  
(continued)

STATUS CODE	DESCRIPTION	CONTINUE TROUBLESHOOTING ON SERVICE SHEET
101	AM/FM Control (A2A4U15)	55
102	AM Control (A2A4U16)	55
103	VMO Rate (A2A4U17)	55
104	VMO Rate (A2A4U14)	55
105	FM Level (A2A4U13)	55
106	AM LEVEL (A2A4U12)	55
107	AM/FM Level (A2A4U11)	55
108	PM Level (A2A10U13)	54
109	PM Level (A2A10U14)	54
110	RF Off Control (A2A10U15)	54
111	RF Level (A2A10U12)	54
112	RF Level (A2A10U11)	54
113	Not used	
114	Frequency Range Control (A2A5U24)	52,53
115	Frequency DF0-DF1 (A2A5U23)	52,53
116	Frequency DF2-DF3 (A2A5U26)	52,53
117	Frequency DF4-DF5 (A2A5U25)	52,53
118	Frequency DF6-DF9 (A2A5U21,U22)	52,53
119	Frequency DFB7-DFB8 (A2A5U19,U20)	52,53





## SERVICE SHEET BD2 REFERENCE SECTION BLOCK DIAGRAM

### REFERENCE BD1

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

### PRINCIPLES OF OPERATION

The Reference Section provides the following output signals:

- FM Loop 10 MHz Reference Signal
- Fract. N 10 MHz Reference Signal
- N Loop Phase Detector Reference (10 MHz)
- RS Loop Phase Detector Reference (10 or 20 MHz)
- FMS Loop Phase Detector Reference (20 MHz CW)
- Down Converter Band Mixer RF (520 MHz)
- RS Loop Mixer RF (320-640 MHz,  $\Delta f = 20$  MHz)
- FM Loop Mixer LO (120 MHz)

These signals are distributed to other sections of the instrument. All of the Reference Section outputs are derived from either a 10 MHz internal source (temperature controlled quartz oscillator) or an external frequency standard of 5 MHz or 10 MHz. The accuracy and stability of all signals generated in the Generator are traceable to the outputs from the Reference Section. The various output signals are generated by employing several frequency translation techniques (multiplying, dividing and heterodyning).

### TROUBLESHOOTING

There are five signals generated in the Reference Section ( besides three 10 MHz signals) and sent to other sections of the instrument:

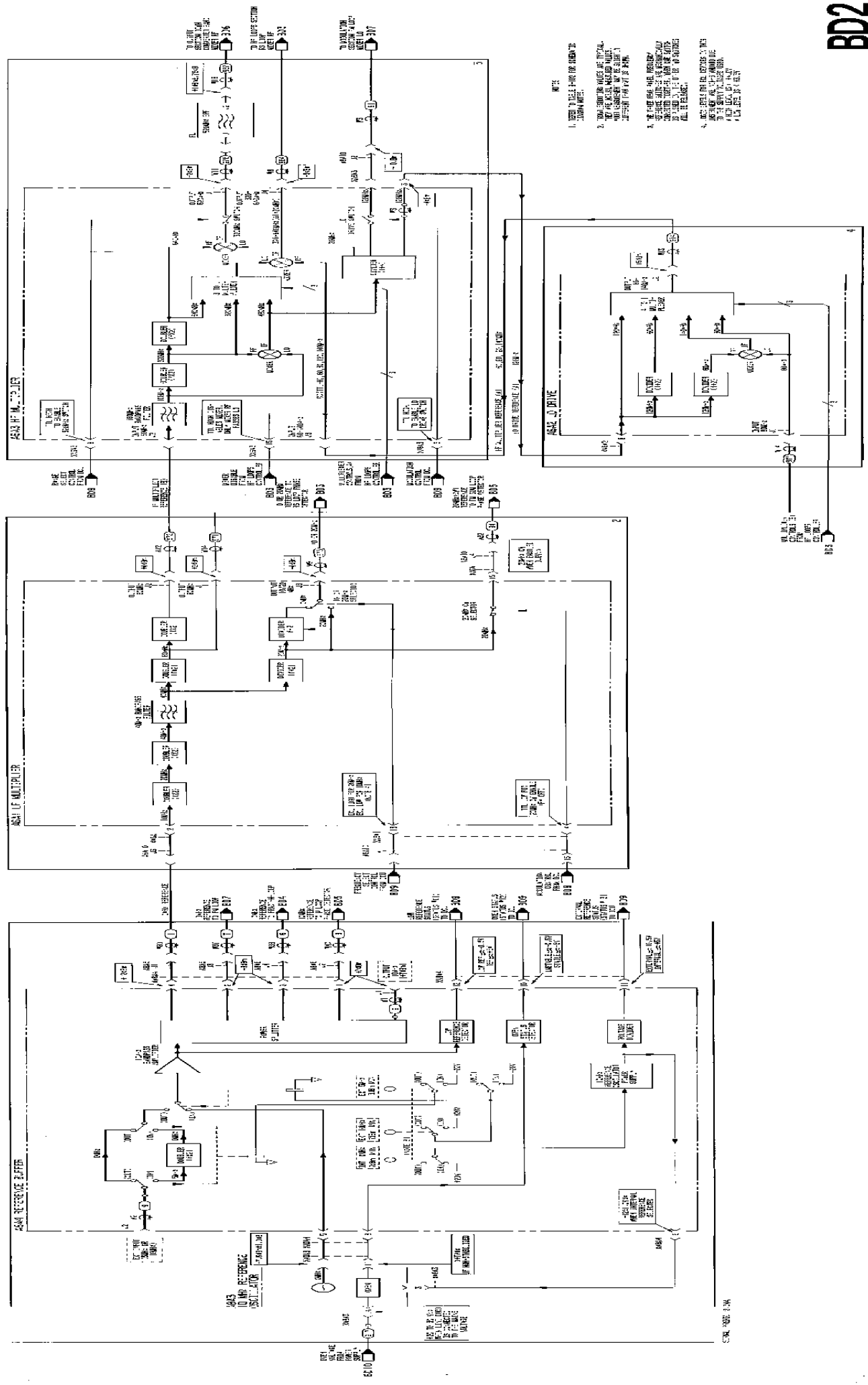
- 1) 320-640 MHz in 20 MHz steps (A6A3J4)
- 2) 520 MHz reference signal (A6A3J1)
- 3) 120 MHz reference signal (A6A10J2)
- 4) 10/20 MHz signal (A6A1J3)
- 5) 20 MHz reference signal when the instrument is in FM mode (A6A10J4)

When the frequency or level of one of these signals is not the value shown on the block diagram, the problem is in the Reference Section. Table 8-205 shows at what frequencies the variable frequency signals are for output frequencies in the basic band (that is, 320 to 640 MHz). Troubleshoot the Reference Section by backtracking until the bad assembly is found. Then continue troubleshooting with the service sheet for the defective assembly.

Table 8-205. Reference Section Variable Frequency Signals

Output Frequency (MHz)		Reference Section Variable Signals (MHz)		
≥	<	A6A3J4 (320-640)	A6A1J3 (10/20)	A6A2J2 <sup>1</sup> (60-140)
320.0	330.0	320.0	10.0	DC
330.0	340.0	340.0	20.0	140.0
340.0	350.0	340.0	10.0	140.0
350.0	360.0	360.0	20.0	120.0
360.0	370.0	360.0	10.0	120.0
370.0	380.0	380.0	20.0	60.0
380.0	390.0	380.0	10.0	60.0
390.0	400.0	400.0	20.0	80.0
400.0	410.0	400.0	10.0	80.0
410.0	420.0	420.0	20.0	60.0
420.0	430.0	420.0	10.0	60.0
430.0	440.0	440.0	20.0	120.0
440.0	450.0	440.0	10.0	120.0
450.0	460.0	460.0	20.0	140.0
460.0	470.0	460.0	10.0	140.0
470.0	480.0	480.0	20.0	DC
480.0	490.0	480.0	10.0	DC
490.0	500.0	500.0	20.0	140.0
500.0	510.0	500.0	10.0	140.0
510.0	520.0	520.0	20.0	120.0
520.0	530.0	520.0	10.0	120.0
530.0	540.0	540.0	20.0	60.0
540.0	550.0	540.0	10.0	60.0
550.0	560.0	560.0	20.0	80.0
560.0	570.0	560.0	10.0	80.0
570.0	580.0	580.0	20.0	60.0
580.0	590.0	580.0	10.0	60.0
590.0	600.0	600.0	20.0	120.0
600.0	610.0	600.0	10.0	120.0
610.0	620.0	620.0	20.0	140.0
620.0	630.0	620.0	10.0	140.0
630.0	640.0	640.0	20.0	DC

<sup>1</sup> The variable signal at A6A2J2 is used only within the Reference Section.



1. 100V, 10A RELAY: 100V, 10A RELAY.
2. 100V, 10A RELAY: 100V, 10A RELAY.
3. 100V, 10A RELAY: 100V, 10A RELAY.
4. 100V, 10A RELAY: 100V, 10A RELAY.

Figure 8-302

**SERVICE SHEET BD3  
HIGH FREQUENCY LOOPS BLOCK DIAGRAM****REFERENCE BD1**

Simplified Operation (Section III)

Operator's Checks (Section III)

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

The High Frequency Section generates the basic (fundamental) band which is sent to the Output section (Service Sheet BD6). This section employs two phase lock loops to generate the basic band. The 320 to 640 MHz and 10/20 MHz signals from the Reference Section are first mixed in the Reference Sum Loop to produce a 310 to 620 MHz, 10 MHz step resolution signal. This signal is then mixed in the Output Sum Loop with the 10 or 20 MHz, 0.1 Hz step resolution, signal from the Low Frequency Loops Section to produce the 320 MHz to 640 MHz, 0.1 Hz step resolution, basic band signal at the A8A1J3 output. Figure 8-203 is a block diagram of the basic high frequency loop. The only difference between the Reference Sum (RS) Loop and the Output Sum (OS) Loop is that, in the case of the RS Loop, the VCO output frequency is always less than the high frequency reference input at the mixer, whereas the opposite is true for the OS Loop. Coarse tuning and speedup is regulated by the Controller Board (Service Sheet 5) in the High Frequency Loops Section.

The frequency error circuits (Service Sheets 8 and 12) contain the frequency comparator and VCO correction circuitry. Under normal operating conditions, when the VCOs are locked, these lock acquisition circuits remain inactive. When the loop is un-locked, a beat note exists which is the difference between the loop IF down converted frequency and the reference frequency. If this beat note is within 200 kHz of the loop bandwidth (which is between 250 kHz and 500 kHz) the loop will acquire lock by itself. If the beat note is greater than the loop bandwidth by more than 200 kHz, the lock acquisition circuitry will be activated, coarsely tuning the VCO to within 200 kHz of the desired frequency. At this point, the phase lock loop will take over and complete the lock cycle.

**TROUBLESHOOTING**

When a problem has been traced to the High Frequency Loop section, this procedure can be used to isolate the problem to an assembly. The Reference Sum (RS) Loop must be locked before the Output Sum (OS) Loop will lock, therefore, work on the RS Loop first if both are unlocked.

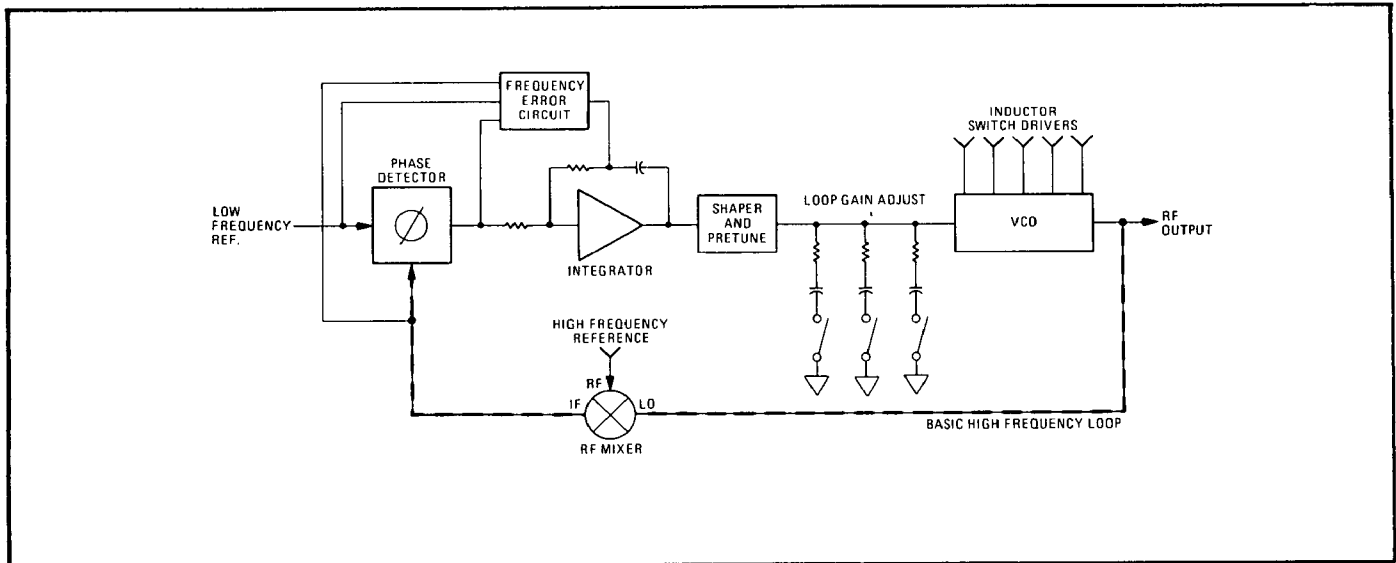


Figure 8-203. Basic High Frequency Loop  
Block Diagram

#### Procedure:

1. Set the front panel frequency to a value in the basic band (320.0 to 640.0 MHz). If the problem doesn't occur in this band, the fault is most likely in the Output Section (Service Sheet BD6) rather than the HF Loops Section.
2. Measure the input signals to the loop being tested. These input signals are described in Table 8-206. If any of the input signals are not normal, look for the problem at the source of the input signal.
3. Pull out the A6A4 (OS Loop) or A6A5 (RS Loop) assembly and move the slide switch to the TEST position. This opens the loop so the VCO can be checked. Use Table 8-207 or Table 8-208 depending on the loop being checked, and check the VCO output for the front panel frequency settings given in the table. If the VCO functions normally, continue troubleshooting with step 4. If the VCO output is not normal, check the two input signals to the VCO.
  - a) The tuning voltage should be the value given in the table. If the voltage is not normal, there is most likely a problem in the pretuning circuitry on A6A4 or A6A5 (whichever drives the VCO where the problem exists).
  - b) The inductor switch signals. The table states which inductor should be turned on. Service Sheet 5 shows the pin numbers where the switch signals can be measured and what the normal levels are. If the switch signals are not normal, the problem is most likely on A6A9.

If the input signals are normal and the VCO output is bad, then the VCO is defective. The VCOs are not field-repairable. Exchange assemblies are available.

Table 8-206. HF Loops Input Signals

Loop	Signal	Where to Measure	Frequency	Level
Reference Sum	HF Reference	W38 (964) to A6A6J2	Table 8-209	-3 dBm
	10/20 Reference	W37 (973) to A6A5J1	Table 8-209	-4 dBm
Output Sum	FM Sum Loop Output	W28 (961) to A6A4J1	10-20 MHz	-3 dBm
	RS Loop Output	W43 (965) to A6A7J1	Table 8-209	+3 to -13 dBm

Table 8-207 Output Sum Loop VCO Pretuning Check (A8A1)

Front Panel Frequency Setting (MHz)	VCO Frequency * (+ 3 MHz)	Bit On	Tuning Voltage (+1.0 Vdc) A6A4J2	Inductor On
524.0	527.5	None	-36.10	E
523.0	526.0	P1	-33.40	E
521.0	524.5	P2	-30.70	E
517.0	520.5	P4	-26.20	E
511.0	514.5	P8	-19.70	E
452.0	456.0	All	-13.00	D&C
330.0	334.0	None	-36.10	A
344.0	347.0	None	-36.10	B
370.0	375.0	None	-36.10	C
421.0	426.0	None	-36.10	D
524.0	527.5	None	-36.10	C

\*Measure at W32 (935) at A4A3J1 (STD or OPTION 001), W29 (932) at A4A3J1 (OPTION 002 ONLY) or W46 (967) at A6A8J1.

Table 8-208. Reference Sum Loop VCO Pretuning Check (A8A2)

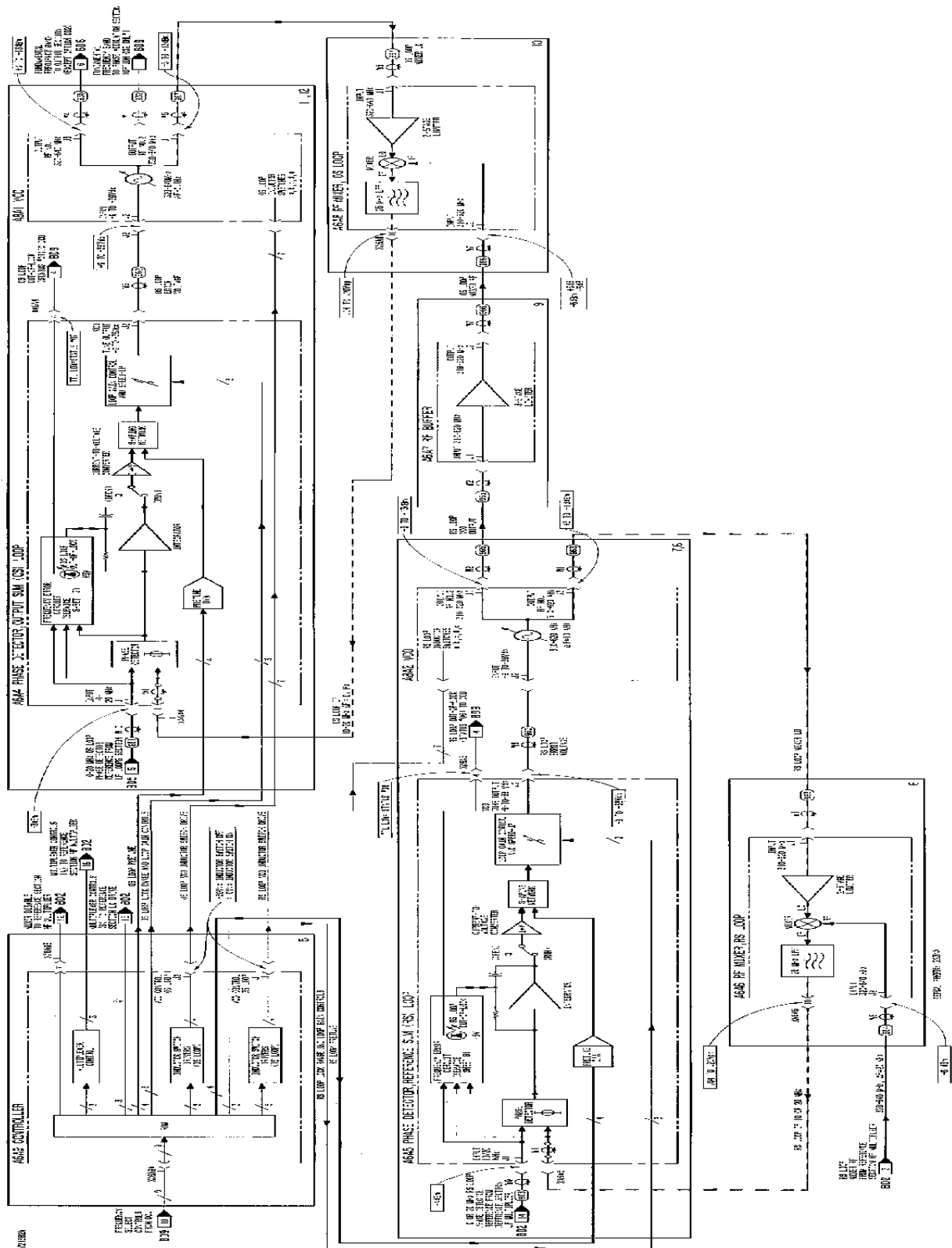
Front Panel Frequency Setting (MHz)	VCO Frequency* (+3 MHz)	Bit On	Tuning Voltage (+1.0 Vdc) A6A4J2	Inductor On
340.0	336.5	None	-36.10	A
350.0	346.5	P4	-26.60	B
380.0	376.0	None	-36.10	C
430.0	425.5	P1	-33.40	D
520.0	516.0	P8	-19.70	E
530.0	525.5	P2	-30.70	E

\*Measure at W46 (967) at A6A8J1 and W43 (965) at A6A7J1.

Table 8-209. Reference Sum Loop Variable Frequency Signals

Front Panel Frequency Setting (MHz)	Reference Sum Loop Output (MHz) W43 (965) to A6A7J1	10/20 MHz Reference W37 (973) to A6A5J1	HF Reference (MHz) W38 (964) to A6A6J2
32X.X	310.0	10.0	320.0
33X.X 34X.X	320.0 330.0	20.0 10.0	340.0
35X.X 36X.X	340.0 350.0	20.0 10.0	360.0
37X.X 38X.X	360.0 370.0	20.0 10.0	380.0
39X.X 40X.X	380.0 390.0	20.0 10.0	400.0
41X.X 42X.X	400.0 410.0	20.0 10.0	420.0
43X.X 44X.X	420.0 430.0	20.0 10.0	440.0
45X.X 46X.X	440.0 450.0	20.0 10.0	460.0
47X.X 48X.X	460.0 470.0	20.0 10.0	480.0
49X.X 50X.X	480.0 490.0	20.0 10.0	500.0
51X.X 52X.X	500.0 510.0	20.0 10.0	520.0
53X.X 54X.X	520.0 530.0	20.0 10.0	540.0
55X.X 56X.X	540.0 550.0	20.0 10.0	560.0
57X.X 58X.X	560.0 570.0	20.0 10.0	580.0
59X.X 60X.X	580.0 590.0	20.0 10.0	600.0
61X.X 62X.X	600.0 610.0	20.0 10.0	620.0
63X.X	620.0	20.0	640.0





## SERVICE SHEET BD4 FRACTIONAL-N LOOP BLOCK DIAGRAM

### REFERENCE BD1

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

### PRINCIPLES OF OPERATION

The Fractional-N Loop (FN Loop) generates frequencies from 100 to 200 MHz in 100 Hz steps using a 100 kHz reference. The 100 kHz reference is derived by dividing the 10 MHz output signal from the Reference Section. The output frequency from this section is a function of front panel frequency digits  $D_5$ ,  $D_4$ ,  $D_3$ ,  $D_2$ ,  $D_1$ , and  $D_0$  (that is, the six least significant digits) in the Generator's basic frequency band (that is, 320-640 MHz). The three least significant digits,  $D_2 - D_0$ , represent the fractional portion of the frequency while the next three digits ( $D_5 - D_3$ ) contain the integer portion of the frequency. To determine the FN Loop VCO frequency from the front panel frequency display (RF OUTPUT frequency) use the following formula:

$$\text{FN VCO Freq.} = (200 - \underbrace{D_5 \ D_4 \ D_3}_{\text{Integer Portion}} \ \underbrace{D_2 \ D_1 \ D_0}_{\text{Fractional Portion}}) \text{ MHz}$$

The Fractional-N Loop uses a frequency synthesis technique known as Fractional N. With only one phase lock loop the FN Loop can produce signals with far greater frequency resolution than the traditional N Loop. In an N Loop, the VCO is restricted to only work at frequencies N times the reference frequency. Therefore, it can only generate signals that are integer multiples of the reference frequency (VCO Freq. = N x Ref Freq.).

The FN Loop is very similar to the N Loop. It contains all the basic elements of the N Loop with the addition of several new elements. In fact, if the selected frequency does not have a fractional part (that is, when  $D_2 - D_0$  are zeros), the FN Loop works like the N Loop.

Figure 8-205 is a simplified block diagram of a Fractional-N phase lock loop with the shaded area containing the Fractional-N elements.

The major difference between the FN Loop and the N Loop is that the FN Loop VCO is not restricted to operating at only N times the reference frequency, but can also operate at frequencies that are fractional multiples of the reference frequency. The frequency resolution of the FN Loop is 100 Hz which means the FN VCO is capable of operating at a fractional multiple of 0.001 of the reference signal (0.001 of 100 kHz = 100 Hz).

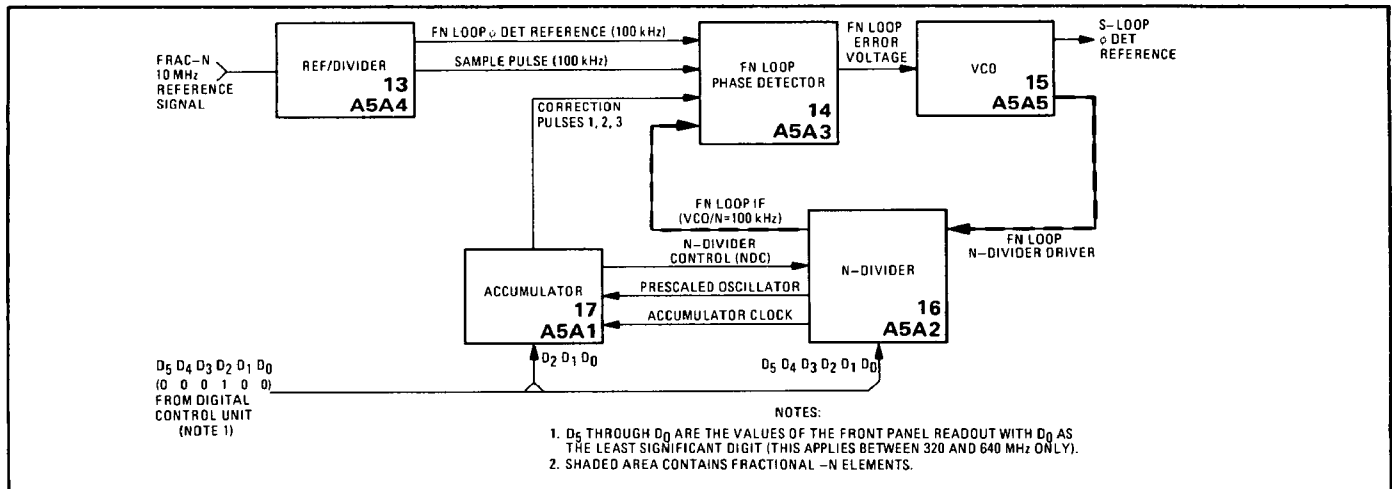


Figure 8-205. Simplified Block Diagram  
of Fractional-N Loop

Assume that the VCO frequency desired is 199.9900 MHz. In a traditional N Loop it would be impossible to phase lock the loop, since the desired VCO frequency, 199.9900 MHz, is a fractional multiple (1999.9) of the reference frequency. In order to phase lock the loop, the VCO frequency divided by N (VCO/N) must equal the 100 kHz reference signal. This would require an N that had a fractional component (N = 1999.9).

In the FN Loop, division by a fractional component is possible. The N Divider (A5A2) cannot divide by a fractional component directly but it is capable of changing from an N to an N-1 divider. Fractional division is accomplished by dividing by an integer (N) for the number of times and one less than the integer (N-1) for a number of times. The fractional N is then the average of N and N-1. For example, if an N of 1999.9 is required, the N Divider divides by 2000 (N) nine times and by 1999 (N-1) one time. This dividing between N and N-1 results in an average N of 1999.9.

A method of determining when to divide by N or N-1 is required. This is the purpose of the Accumulator (A5A1). When the FN Loop is operating with a fractional part, the VCO/N signal no longer equals the reference frequency, hence the phase difference between the two signals starts to increase. When analyzing the phase relationship between the reference and VCO/N signals, it is better to view it in terms of reference periods. A reference period is defined as the time required for the reference signal to complete one cycle (10 us). The Accumulator does not actually measure the phase difference but it computes what the phase difference should be after each reference period.

Since the phase difference is continuously increasing each reference period, the output from the phase detector is continuously increasing. In an N Loop the error voltage from the phase detector is used to tune the VCO frequency in a direction to reduce the phase difference or error. However, in the FN Loop, the phase difference is allowed to increase until the total or accumulated phase difference reaches or exceeds one full VCO cycle (360 degrees) of phase. Prior to the reference period that the phase difference

reaches or exceeds one full cycle, the Accumulator generates an N Divider Control (NDC) signal causing the N Divider to divide by one less than the previous N.

Dividing the FN VCO frequency by N-1 instead of N causes the N Divider to reach its terminal count one VCO period sooner. This effectively advances the VCO/N signal one VCO period which counteracts or cancels the previous phase advancement.

When the N Divider divides by a number N, the VCO/N signal starts to lag the reference signal. When the phase difference between the reference signal and the VCO/N signal reaches or exceeds one cycle of phase, the N Divider is programmed to divide by N-1 which now causes the VCO/N signal to lead the reference signal. The resulting averaged VCO/N signal equals the reference frequency and the loop can be phase-locked even though the instantaneous VCO frequency is not an integer-multiple of the reference.

In the example in Figure 8-206, the FN VCO is operating at 199.9900 MHz. That would require that the N Divider divide by an N equal to 1999.900. The N Divider is not capable of dividing by 1999.900 but it can divide by 2000 or 1999. The N Divider starts out dividing by 2000. Since the VCO operates at 199.9900 MHz and  $N = 2000$ , the VCO/N signal to the phase detector would be 99.9950 kHz. Note, the phase of the VCO/N signal starts to lag the 100 kHz reference frequency which causes the phase detector to output an ever increasing dc level.

As the reference signal goes through one cycle, the VCO (operating 1999.9 times faster) goes through 1999.9 cycles. For comparison, an N Loop circuit is also examined.

In an N Loop, if  $N = 2000$  and reference = 100 kHz, the VCO frequency must equal 200.0 MHz to maintain phase lock. This means the N Loop goes through 2000.0 cycles for each reference period. Note the phase difference between the FN and N Loop VCO's after one reference period. The FN Loop lags the N Loop by 0.1 cycle which represents the fractional part of the frequency. To put it another way, the FN Loop VCO decreases by one tenth of a cycle relative to its integer part (N Loop) for every reference period. After the passage of two reference periods the FN VCO will have gone through 3999.8 cycles and the phase difference will have increased to 0.2 cycles. After each reference period the phase difference will increase by another 0.1 cycle. Table 8-210 illustrates this point.

After ten reference periods, the phase difference between the VCO/N and reference signals will have increased exactly one VCO cycle. Prior to the reference period that the phase difference reaches one

VCO cycle, the N Divider receives an NDC command from the Accumulator. This causes the N Divider to divide by 1999 (one integer less than 2000). This has the effect of cancelling the previous phase difference, hence the VCO/N frequency averaged over ten reference periods now equals the 100 kHz reference and therefore the loop can be phase locked.

Table 8-210. Phase Difference Versus Reference Periods

Number of Reference Periods	Cycles Per Reference Period		Phase Difference (Cycles of Phase)
	N-Loop = 200 MHz	FN Loop = 199.99 MHz (Fraction N = 0.1)	
1	2000	1999.9	0.1
2	4000	3999.8	0.2
3	6000	5999.7	0.3
4	8000	7999.6	0.4
5	10000	9999.5	0.5
6	12000	11999.4	0.6
7	14000	13999.3	0.7
8	16000	15999.2	0.8
9	18000	17999.1	0.9
10	20000	19999.0	1.0

This example uses a fractional N of 0.1. As another example, suppose the FN Loop VCO frequency was equal to 150.0050 MHz. This represents a fractional N of 0.95. For this example, the N Divider divides by N-1 (1500) nineteen out of twenty reference periods.

Continuously dividing by N and N-1 causes the phase detector to output a sawtooth waveform riding on a dc level. As shown in Figure 8-206, the output from the phase detector increases linearly (ramps) as the phase difference increases. The output continues to increase until the N Divider divides by N-1 which cancels the previous phase difference. This causes the output of the phase detector to return to its initial level.

The dc voltage level on which the sawtooth waveform is riding represents the proper tune voltage to phase-lock the VCO to the reference. Any ac components (sawtooth) on the dc tune voltage would prevent phase-lock and cause frequency modulation. To counteract this sawtooth waveform, an equal but opposite ac signal is generated by the Fractional-N Correction Pulse Width-to-Current Converters. This signal is then summed with the phase detector output to cancel the sawtooth components, leaving only the desired dc tuning voltage.

The fractional portion of the VCO frequency contains the information needed to develop the signal that counteracts the changing phase detector output. The fractional part of the frequency is presented to the Accumulator in BCD form. Once during each reference period the contents of the Accumulator are incremented by the fractional part. The number stored in the Accumulator corresponds to the difference in phase between the VCO/N and the reference signal.

Since the Accumulator is incremented each reference period, its contents represent an instantaneous fractional sum which grows until one VCO cycle of phase difference has occurred. The contents of the Accumulator as viewed with respect to time is shown in Figure 8-207. The contents of the Accumulator can be represented by a staircase ramp resetting each reference period when the N Divider divides by N-1. Note that the contents of the Accumulator when viewed graphically have the same characteristics as the sawtooth output from the phase detector.

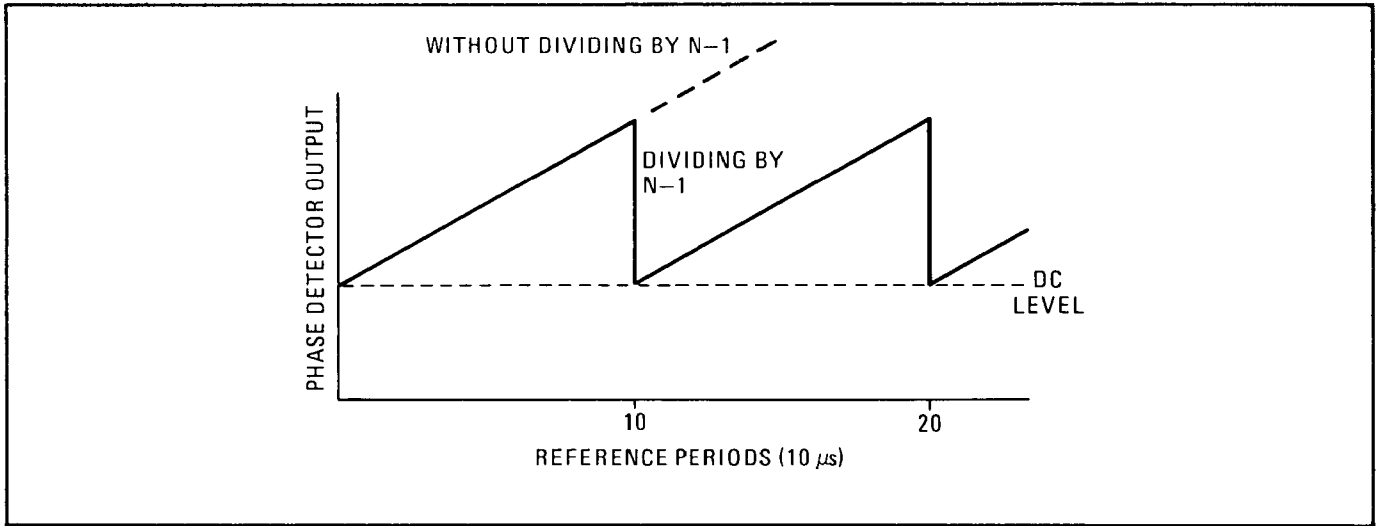


Figure 8-206. Phase Detector Output

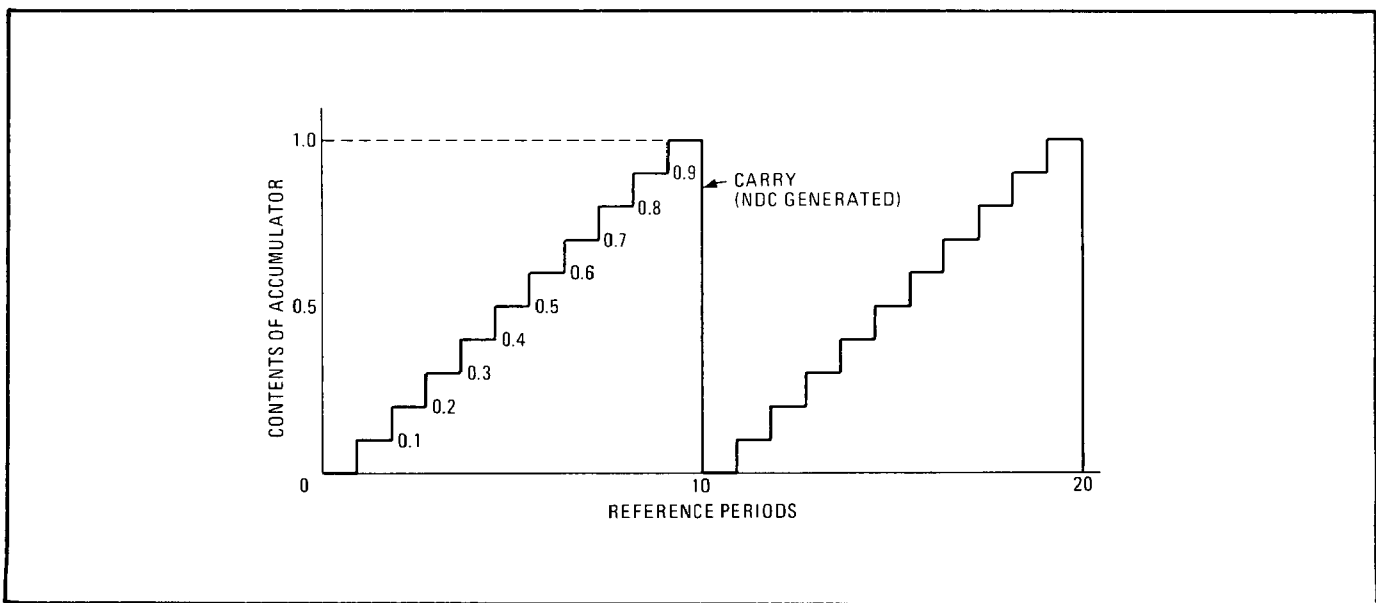


Figure 8-207. A Pictorial View of the Contents of the Accumulator

The numbers stored in the Accumulator are in BCD form. First the BCD information is inverted and then converted into signals with varying pulse widths. These signal lines are labeled Correction Pulse 1, 2, and 3. The Correction Pulses are then fed into the Pulse Width-to-Current Converter circuit which is located on the Fractional-N Loop Phase Detector Assembly (A5A3). The outputs from the Pulse Width-to-Current Converter circuit is then summed with the output from the phase detector. This cancels the sawtooth portion of the output from the phase detector leaving only a clean dc tuning voltage for the VCO.

## TROUBLESHOOTING

When a problem has been traced to the Fractional-N Loop or the instrument status code gives error 02, use the following procedure to isolate the problem to an assembly.

1. Check the 10 MHz reference signal at motherboard test point TP1. This signal should be the level shown on the block diagram.
2. Pull out the A5A1 Accumulator assembly. This removes the fractional part of the loop. Set the front panel frequency to 320.050 050 0 MHz. The loop should lock at a frequency of 149.0 MHz. Measure this frequency with a counter at A5A5J2. If the loop does lock, the Accumulator assembly is defective. If the loop doesn't lock, leave the Accumulator assembly out and continue with the next step.
3. Move the switch on the A5A3 Phase Detector Assembly to the TEST position. This opens the loop so that only the pretuning circuitry is driving the VCO. Set the Front panel frequency to the values in Table 8-211 and measure the VCO frequency at A5A5J2. This tests all the bits in the pretuning by turning on but one at a time.

Table 8-211. Fractional-N Loop Troubleshooting

Front Panel Frequency Setting (MHz)	Pretuning Bit On	A5A5 VCO Frequency Measured at A5A5J2 (MHz $\pm$ 3 MHz)
320.011	All	102
320.080	D5-8	122
320.040	D5-4	162
320.020	D5-2	182
320.010	D5-1	192
320.008	D4-8	194
320.004	D4-4	198
320.0	None	202

If all these frequencies are within limits, the VCO and pretuning are good. This is most of the A5A5 assembly so proceed to the next step. If one or more frequencies are bad, the problem is on the A5A5 assembly.

4. Measure the PDV signal from the A5A2 N Divider Assembly at TP5 on the motherboard. The frequency of this signal should be 100 kHz  $\pm$  5 kHz. Use an oscilloscope to check that levels of this signal are valid TTL levels (high is greater than 2.4 Vdc and low is less than 0.8 Vdc). If this signal is correct, the A5A2 assembly is operating properly, otherwise, there is a problem on the A5A2.
5. Measure the PDR and SMP signals from the A5A4 Reference Divider Assembly on the motherboard at TP3 (PDR) and TP2 (SMP). The frequency of both these signals should be 100.0 kHz. Look at the waveforms on an oscilloscope to check for valid TTL levels and the timing relationship between the waveforms as shown in Figure 8-208.

If these signals are correct, the A5A4 is operating properly, otherwise, there is a problem on A5A4.

6. If all the previous checks do not show any problems, the A5A3 Phase Detector is the most likely cause of the problem.

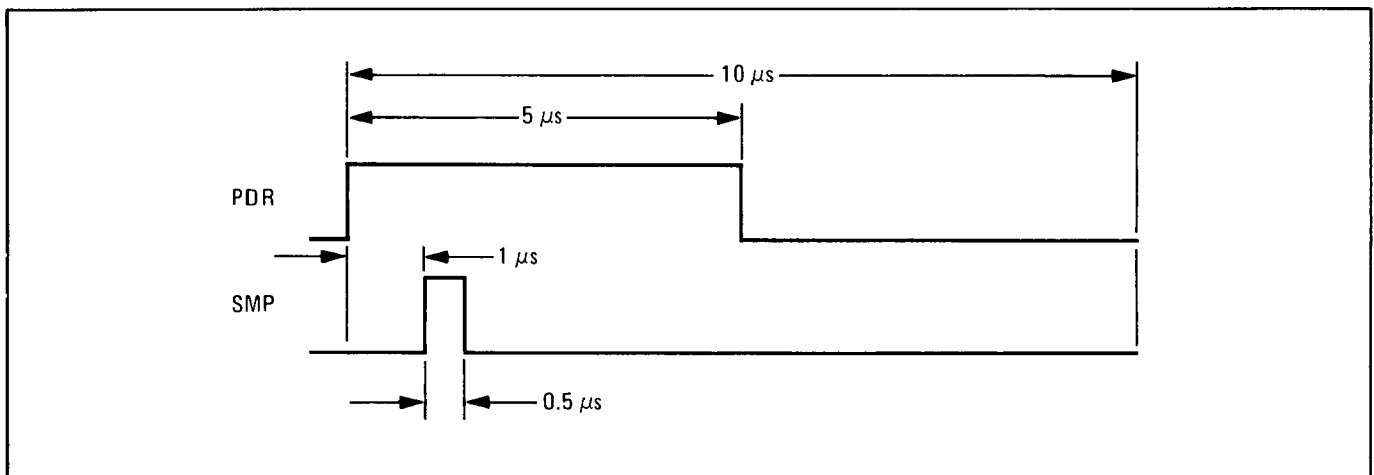
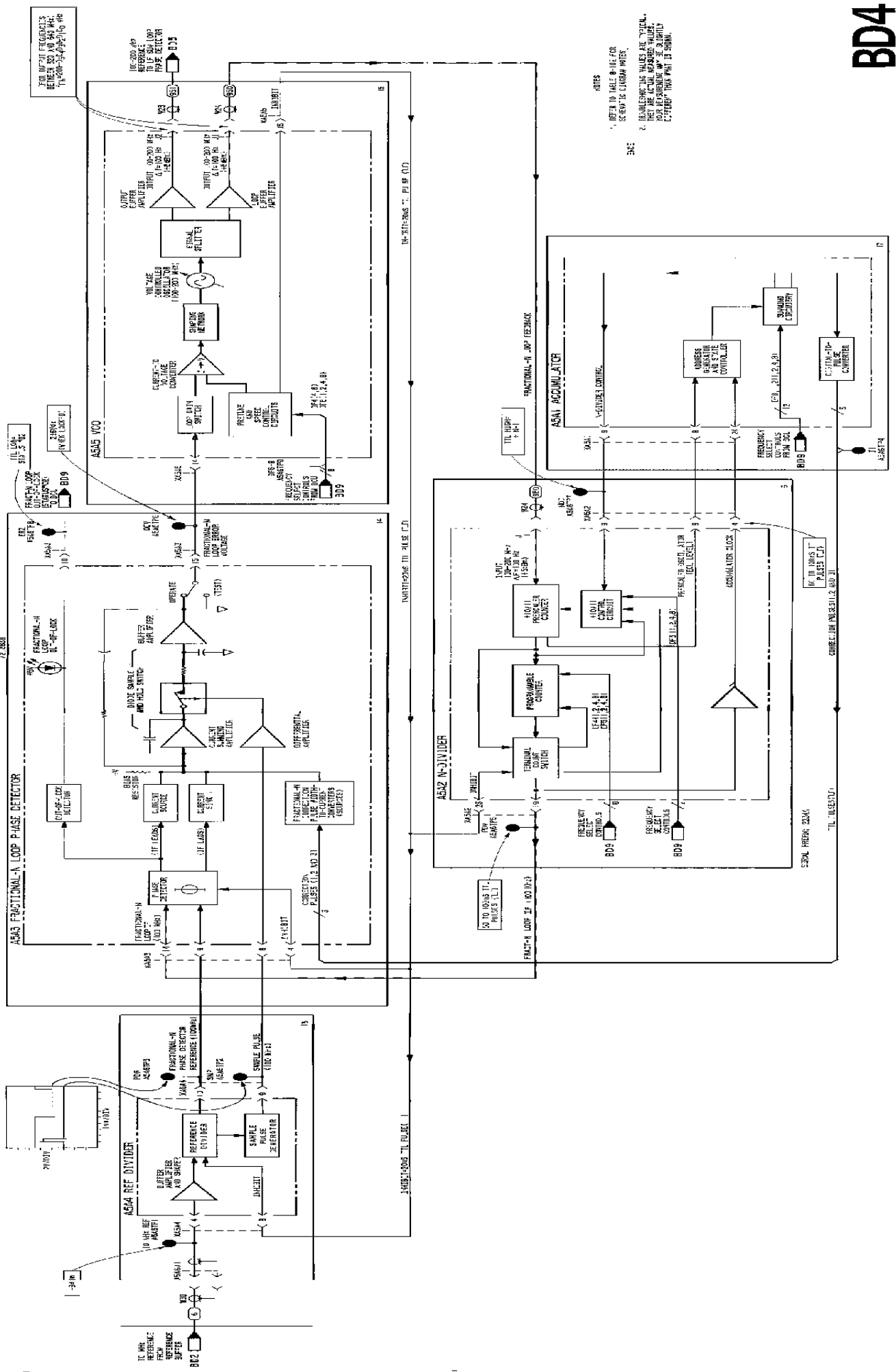


Figure 8-208. Timing Diagram for 100.0 kHz PDR and SMP Signals





NOTES  
1. REFER TO TABLE 2-106 FOR SCREENING CHARACTERISTICS.  
2. DIMENSIONAL VALUES ARE GIVEN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.  
3. DIMENSIONAL VALUES ARE GIVEN IN INCHES UNLESS OTHERWISE SPECIFIED.  
4. DIMENSIONAL VALUES ARE GIVEN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

**SERVICE SHEET BD5  
LOW FREQUENCY LOOPS BLOCK DIAGRAM****REFERENCE BD1**

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

The Low Frequency Loops Section serves two functions. First, it produces the 10 MHz to 20 MHz reference signal which is sent to the input of the phase detector (in the Output Sum Loop of the High Frequency Loops Section) so that the 320 MHz to 640 MHz, 0.1 Hz step resolution, fundamental frequency band can be generated. Secondly, if FM is desired at the output, it is summed in at this point.

The Low Frequency Loops are composed of three principal sections: the N Loop, the Low Frequency Sum Loop, and the FM Sum Loop. Each is a discrete phase lock loop. The N Loop takes the 10 MHz reference signal (which must be greater than +7 dBm) and multiplies it, using fractional-N synthesis, to a frequency band of 122 MHz to 221 MHz (1 MHz step resolution). This frequency is related to the 1 MHz and 0.1 MHz digits of the front panel frequency display (D7 and D6 in the basic frequency band).

The signal from the N Loop is sent to the Low Frequency Sum Loop where it is locked to the signal from the Fractional-N Loop (Service Sheet BD4). This signal varies between 100 MHz and 200 MHz (100 Hz step resolution), but is divided by two decade counters (divide by 100) in the Low Frequency Sum Loop so that it varies between 1 MHz and 2 MHz (with 1 Hz resolution) at the input of the phase detector. The output of the Low Frequency Sum Loop (120 MHz to 220 MHz, 1 Hz step resolution) is sent to the FM Sum Loop.

In the FM Sum Loop, the signal is summed with either a 20 MHz continuous wave (CW) signal from the Reference Section or a 20 MHz frequency modulated signal from the Modulation Section (Service Sheet BD7). The output of this loop is a 100 MHz to 200 MHz (1 Hz step resolution) signal which is passed through a decade divider before leaving the board. The output of the decade divider is a frequency band which extends from 10 MHz to 20 MHz in 0.1 Hz steps. This signal is sent to the phase detector in the Output Sum Loop of the High Frequency Loops Section at 0 dBm to +16 dBm.

## TROUBLESHOOTING

### General

There are three phase lock loops in this section. The hierarchy is:

- N Loop (Error code 03)
- Sum Loop (Error code 04)
- FM Sum Loop (Error code 05)

There is a separate troubleshooting procedure for each loop. If more than one of the loops is unlocked, always start with the highest order unlocked loop because it will cause the lower order loops to be unlocked. If the front panel status display gives a hardware malfunction code of 03, 04, or 05, then this code indicates at which loop to start troubleshooting.

### N-Loop Troubleshooting

When it has been determined that there is a problem in the Low Frequency N Loop by troubleshooting on the Overall Block Diagram (Service Sheet BD1) or the out-of-lock indicator being lit, perform the following sequence to isolate the defective assembly:

1. Unplug the A3A3 assembly and remove it from the instrument. This opens the loop and leaves the A3A4 assembly being driven by only the pretune voltage from A3A6. Set the front panel frequency to the values in the first column of the table on the block diagram. Measure the VCO frequency at A3A4J2 and compare it to the normal values given in the table. Each frequency setting turns on one bit of the eight which drive the pretune circuitry. If the VCO frequencies are correct, the A3A4 VCO assembly is operating properly and the A3A3 divider/phase detector assembly is the likely cause of the problem. In this case, proceed to Service sheet 18 and troubleshoot the A3A3 assembly.
2. When the VCO frequencies are not correct, proceed with the Sum Loop troubleshooting.

### Sum Loop Troubleshooting

When it has been determined that there is a problem in the Low Frequency Sum Loop by troubleshooting on the overall block diagram (Service Sheet BD1) or the out-of-lock indicator being lit, perform the following sequence to isolate the defective assembly:

1. Remove the two jumpers on the A3A7 VCO Assembly and plug the board back into its socket. Removing these jumpers opens the loop and the VCO is driven only by the pretuning voltage from the A3A6 assembly.

2. Set the front panel frequency to the values in the first column of the table on the block diagram. Measure the VCO frequency at A3A7J1 and compare to the normal values given in the table. Each frequency setting turns on one bit of the eight which drive the pretune circuitry. If the VCO frequencies are correct, the A3A7 VCO is operating properly so proceed to step 4 to continue troubleshooting.
3. When the VCO frequencies are not correct, try the following:
  - a) Perform the open-loop pretune adjustment procedure on the block diagram. If these adjustments can be made, repeat step 2. Otherwise, continue below.
  - b) Measure the pretune voltage (TP8 on the motherboard) for the front panel frequency settings given in the table on the block diagram. If these voltages are not normal, trace the problem starting with the pretune circuitry on A3A6.

If the open-loop pretune adjustments cannot be made but the pretune voltages (TP8) are normal, the A3A7 VCO is faulty.

4. Set the front panel frequency to 320.0 MHz. Adjust the GAIN control on A3A7 to set the VCO output frequency at A3A7J2 to 120.0  $\pm$ 0.5 MHz. The W23 cable must be in place on A3A7J2.

Check the following:

- a) a 2.0  $\pm$ 0.5 MHz signal at TP5 on the motherboard. Amplitude  $>3$  Vp-p.
  - b) A steady TTL low signal at TP7 on the motherboard. This is the frequency detector output.
  - c) A steady TTL low signal at pin 11 of A3A5. This is the out-of-lock signal from A3A6 which should be active (low) when the loop is open.
5. Turn the A3A7 GAIN adjustment counter-clockwise (CCW) while monitoring the frequency of the mixer output at TP5 on the motherboard. Turning the GAIN adjustment CCW increases the VCO frequency. The N Loop output is at 122 MHz so the mixer output (TP5) should decrease in frequency, reach zero and begin increasing. When the frequency reaches zero and begins to increase, check TP7 on the motherboard for positive going TTL pulses. This is the output of the frequency detector and pulses indicate that the VCO is higher than the N Loop output.

If any of these checks gives abnormal results, the problem is likely on the A3A5 assembly, otherwise, the A3A6 Phase Detector assembly is the likely cause of the problem.

## FM Sum Loop Troubleshooting

When it has been determined that there is a problem in the FM Sum Loop by troubleshooting on the overall block diagram (Service Sheet BD1) or the out-of-lock indicator being lit, perform the following sequence to isolate the defective assembly:

1. Pull the A3A9 Mixer assembly up far enough so that the bottom edge connector is completely out of the motherboard connector, but leave all the RF cables connected to the top of the assembly. This opens the loop by disconnecting the phase detector drive circuitry but leaves the mixer connected. In this condition, the VCO is only driven by the pretune voltage from A3A6. Set the front panel frequency to the values in the first column of the table in the block diagram. Measure the A3A8 VCO frequency at A3A8J3 and compare it to the normal values given in the table. Each frequency setting turns on one bit of the eight which drive the pretune circuitry.
2. If the VCO frequencies are correct, the A3A8 VCO is operating properly. Check that the outputs at A3A8J1 and A3A8J2 are the proper level as stated on the block diagram. Notice that the frequency at A3A8J2 is one-tenth that of the other outputs. Proceed to step 3 to continue troubleshooting. When the VCO frequencies are not correct, try the following:
  - a) Perform the open-loop pretune adjustment procedure on the block diagram. If these adjustments can be made, repeat the VCO check. Otherwise, continue below.
  - b) Measure the pretune voltage (TP8 on the motherboard) for the front panel frequency settings given in the table on the block diagram. If these voltages are not normal, trace the problem starting with the pretune circuitry on A3A6.

If the open-loop pretune adjustments cannot be made but the pretune voltages (TP8) are normal, the A3A8 VCO is faulty.

3. Measure the output of the mixer at A3A9J2. Set the front panel frequency to the values in the first column of the table on the block diagram. The loop should still be opened by having A3A9 out of the motherboard socket. The frequency output of the mixer should be  $20 \text{ MHz} \pm 4 \text{ MHz}$  for all front panel frequency settings, and the level should be as stated on the block diagram. If correct, the mixer portion of A3A9 is good. Connect cable W27 to A3A9J2 but leave A3A9 out of the cottom connector.
4. The phase detector on A3A10 is a double balanced mixer so the frequency of the output will be the difference between a 20 MHz reference signal and the nominal 20 MHz IF signal from the mixer on A3A9. Using any front panel frequency setting, vary the GAIN adjustment on the top of A3A8 VCO assembly to vary the frequency of the IF signal. Turning the GAIN adjustment clockwise increases the frequency of the IF signal. The normal cable must be connected to A3A9J2 but the IF signal can be monitored there with the high impedance of a counter by using a T adaptor. Vary

the input IF frequency above and below 20 MHz and look for the difference signal at A3A10 pin 14.

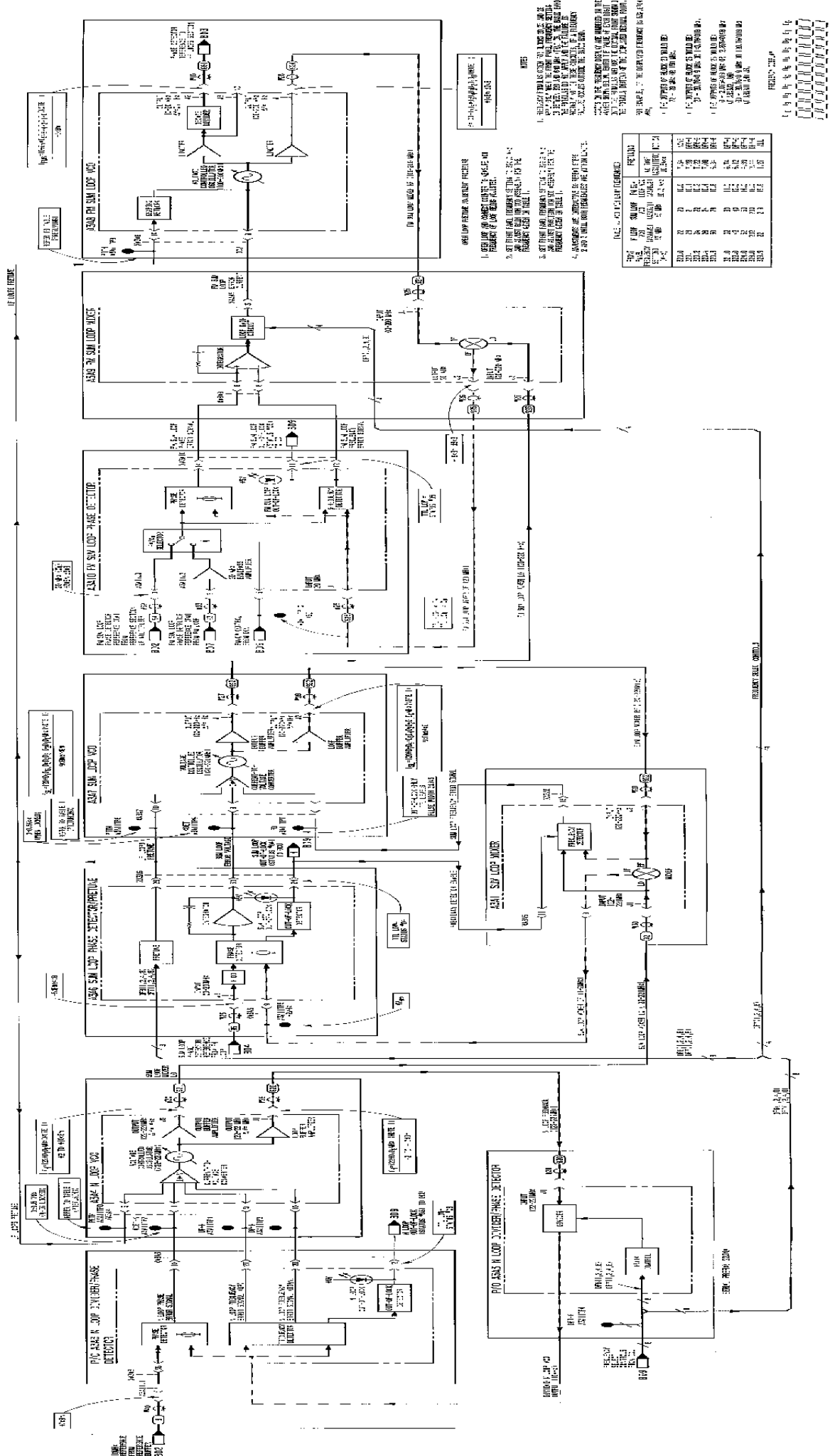
5. Monitor the frequency detector output at A3A10 pin 12. Vary the IF signal frequency using the A3A8 GAIN adjustment and check the frequency detector output with the values shown in Table 8-212.

The GAIN adjustment is coarse so the IF signal frequency cannot be controlled precisely. The IF signal frequency limits in the table should be considered approximations. It is important to verify that three different output states of the frequency detector exist but not that they occur at precise values of IF frequency.

Table 8-212. IF Signal vs Frequency Detector Output

IF Signal	Frequency Detector Output (A3A10 pin 12)
>21 MHz <19 MHz 20 $\pm$ 1 MHz	dc level > +1.5 Vdc dc level < -3.0 Vdc pulses high-low levels change as IF goes above and below 20 MHz

6. If both the phase detector and the frequency detector operate normally as described previously, the A3A10 assembly is probably normal. Therefore, the problem is most likely with the active circuitry on the A3A9 assembly.



# BD5

Figure 8-101. Low Voltage Large Motor Drives  
8-538(10)

RELAY SCHEDULE

- NOTES
1. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  2. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  3. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  4. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  5. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  6. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  7. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  8. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  9. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.
  10. ALL MOTOR DRIVES ARE TO BE PROVIDED WITH A STOP AND START BUTTON.

RELAY SCHEDULE

RELAY	NO.	FUNCTION
1	1	STOP
1	2	START
1	3	STOP
1	4	START
1	5	STOP
1	6	START
1	7	STOP
1	8	START
1	9	STOP
1	10	START
1	11	STOP
1	12	START
1	13	STOP
1	14	START
1	15	STOP
1	16	START
1	17	STOP
1	18	START
1	19	STOP
1	20	START
1	21	STOP
1	22	START
1	23	STOP
1	24	START
1	25	STOP
1	26	START
1	27	STOP
1	28	START
1	29	STOP
1	30	START
1	31	STOP
1	32	START
1	33	STOP
1	34	START
1	35	STOP
1	36	START
1	37	STOP
1	38	START
1	39	STOP
1	40	START
1	41	STOP
1	42	START
1	43	STOP
1	44	START
1	45	STOP
1	46	START
1	47	STOP
1	48	START
1	49	STOP
1	50	START
1	51	STOP
1	52	START
1	53	STOP
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1	59	STOP
1	60	START
1	61	STOP
1	62	START
1	63	STOP
1	64	START
1	65	STOP
1	66	START
1	67	STOP
1	68	START
1	69	STOP
1	70	START
1	71	STOP
1	72	START
1	73	STOP
1	74	START
1	75	STOP
1	76	START
1	77	STOP
1	78	START
1	79	STOP
1	80	START
1	81	STOP
1	82	START
1	83	STOP
1	84	START
1	85	STOP
1	86	START
1	87	STOP
1	88	START
1	89	STOP
1	90	START
1	91	STOP
1	92	START
1	93	STOP
1	94	START
1	95	STOP
1	96	START
1	97	STOP
1	98	START
1	99	STOP
1	100	START



## SERVICE SHEET BD6 OUTPUT SECTION BLOCK DIAGRAM

### REFERENCE BD1

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

### PRINCIPLES OF OPERATION

The Output Section translates the basic frequency band, 320-640 MHz which is generated by the phase lock loops, to the Signal Generator's complete output range, 0.1 - 2560 MHz. Table 8-213 lists the frequency bands. This section controls the amplitude of the RF output signal. Amplitude is controlled with an electromechanical step attenuator which can change in 5 dB steps and electronic leveling which can change the amplitude in 0.1 dB steps. Electronic leveling also keeps the amplitude constant. AM, pulse modulation, and BPSK (when RF output frequency is below 640 MHz) are generated within this section. The modulation signal sources come from other parts of the instrument.

Table 8-213. Output Section Frequency Bands.

BAND	FREQUENCY RANGE (MHz)
Down-Converter	0.1 - 119.9999999
Divide-by 4	120.0 - 159.9999999
Divide-by 2	160.0 - 319.9999999
Basic	320.0 - 639.9999999
Doubler #1	640.0 - 1279.9999998
Doubler #2	1280.0 - 2559.9999996

### TROUBLESHOOTING

This procedure covers the following Output Section problems:

1. RF output amplitude not correct (includes front panel STATUS code 76).
2. Harmonics too high.
3. Amplitude modulation (AM) problems.
4. Pulse modulation problems.
5. BPSK problems.

Each of these problems has a separate procedure. Use the procedure that best describes the problem.



## RF OUTPUT AMPLITUDE NOT CORRECT (Front Panel STATUS code 76)

1. Check the following input signals to the output section:

Signal	Measure at	Frequency	Level
320 to 640 MHz Fundamental Band Signal	Cable going to A4A3J1	Same as front panel frequency setting between 320.0 and 639.9999999 MHz	+3 to -13 dBm (varies with frequency)
520 MHz Reference	Cable W18(white/ orange/violet) going to A12A5J3	520.0 MHz	0 dBm +/- 1 dB (when front panel setting <120 MHz)

If these signals are normal, then the problem is in the output section. Continue troubleshooting with the steps below.

2. Enable special function 85 (amplitude correction off). Set the front panel AMPLITUDE setting to the values in the first column of Table 2-214, below. Measure the output level at A12A1J1 and compare measured values to the values in the table.

Table 8-214. Output Section Pre-Attenuated Levels

AMPLITUDE setting (dBm)	A12A1J1 output level (dBm)
+19.9	+19.9
+10.0	+10.0
+5.1	+5.1
+5.0	+10.0
0.0	+10.0
-10.0	+10.0
-30.0	+10.0
-70.0	+10.0

If the measured values are correct ( $\pm 2$  dB), then the problem is with the mechanical step attenuator. Continue troubleshooting with service sheet 34. If the measured values are not correct, there is a problem somewhere else in the output section. Continue troubleshooting with step 3.

3. Check the operation of the A4A3 Distributor assembly by setting the front panel frequency to the values in the first column of Table 8-215, below, and measuring at the output connector listed in the second column of the table. The signal should be the frequency given in the last column of the table and the level should be greater than 0 dBm.

Table 8-215. A4A3 Distributor Output Levels

FREQUENCY Setting (MHz)	Measure at A4A3	Frequency (MHz)
80.0	J3	600.0
150.0	J4	150.0
200.0	J4	200.0
300.0	J4	300.0
400.0	J4	400.0
600.0	J4	600.0
800.0	J2	400.0
1000.0	J2	500.0
2000.0	J2	500.0

If all the signals are normal, the problem is not on the A4A3 assembly. Continue troubleshooting with step 4, below. If any of the signals are not normal, troubleshoot the A4A3 assembly using Service Sheets 27 and 28.

4. Check to see if the problem occurs in all bands by setting the frequency to each band and checking the front panel RF output. Table 8-216, below, gives the frequency range of each band.

Table 8-216. Frequency Bands/Assemblies

FREQUENCY RANGE (MHz)	BAND	A12A1 INPUT
0.1 - 119.9999999	Down Converter	J2
120.0 - 639.9999999	Mid (UHF)	J3
640.0 - 1279.9999998	Doubler #1	J4
1280.0 - 2559.9999996	Doubler #2	J4

If the problem occurs in only one band, continue troubleshooting with step 5. Otherwise, substitute a signal from another signal generator into the A12A1 assembly. Table 8-216, above, shows which connector to use to check the different bands. Set the level of the signal which is substituted to 0 dBm. Set the 8663A being tested to a frequency in the band to be checked and set Amplitude to +10.0 dBm which will set the mechanical step attenuator to 0dB attenuation. The output level at the front panel should be +19 dBm or greater. If

this level is not obtained, there is a problem on the A12A1 assembly. Continue troubleshooting with service sheet 34 and 35. If the output level is normal, vary the amplitude of the substituted signal to produce the output levels in the first column of Table 8-217, below. Measure the detector voltage on the A12A6 motherboard at TP1 (remove the bottom cover of the instrument to reach this test point).

Table 8-217. A12A1 RF Detector Output Levels

OUTPUT LEVEL (dBm)	DETECTOR OUTPUT (A12A6TP1) (Vdc)
+ 5.0	0.920
+10.0	1.637
+15.0	2.912
+19.0	4.610

If these voltage readings are not normal, there is a problem with the A12A1 assembly. Continue troubleshooting with service sheets 34 and 35. If the voltage readings are normal, the A12A1 assembly is good. Continue troubleshooting with step 5, below.

- Remove the A4A1 ALC assembly from the instrument. Each of the bands has a modulator which controls the level. With the ALC assembly out of the instrument there is no drive signal to the modulators. Each modulator has two test points which can be shorted together to turn the modulator fully on. These test points are given in Table 8-218, below. To check the modulator for each band mount the assembly which contains the modulator on an extender board and short the test points listed in the table. Set the 8663A frequency to a setting in the band being checked. Use extender cables to connect all the normal cable connections to the assembly on the extender board.

Table 8-218. Output Modulator Test Points

BAND	FREQUENCY RANGE (MHz)	EXTEND ASSEMBLY	SHORT TEST POINTS
Down Converter	0.1 - 119.9999999	A12A5	TP9 and TP10
Mid (UHF)	120.0 - 639.9999999	A12A2	TP3 and TP4
Doubler #1	640.0 - 1279.9999998	A12A4	TP6 and TP9
Doubler #2	1280.0 - 2559.9999996	A4A2	TP5 and TP13

The amplitude of the signal at the front panel RF output connector should be +19 dBm or greater. If the signal level is normal, then the problem is in the ALC assembly. Remove the short on the test points, reinstall the A4A1 ALC assembly in the instrument, and continue troubleshooting with Service Sheets 36 and 37. If the output level is too low, trace back from the A12A1 Output Amplifier assembly to find where the signal level is lost and continue troubleshooting on the schematic diagram for that assembly.

#### HARMONICS TOO HIGH.

1. Check for excessive harmonic levels in all bands. If the harmonics are too high in the Down Converter and/or all other bands, the problem is most likely in the A12A1 Multiplexer and Power Amp Assembly. To test this, drive the A12A1 with an external signal source known to be low in harmonics. If harmonic levels at the output are still too high, then the A12A1 Assembly is the source of the problem. Continue troubleshooting with Service Sheet 34. The bias adjustment of the amplifiers should be checked first, as this is a primary cause of high harmonics.
2. If harmonics are too high in only one band, then the problem is most likely on one of the other assemblies in the output section. Look at the outputs of the A4A3 Distributor assembly.

If the outputs of A4A3 are good, then trace the signal through the other assemblies to find where the harmonics become too high. Use a T adapter to look at the outputs of the other assemblies and keep the normal cable connected and the AMPLITUDE setting less than +13 dBm because there will be a 3 dB loss due to using the T adapter. Check the bias settings of amplifiers when the bad assembly is located.

#### AMPLITUDE MODULATION (AM) PROBLEMS.

1. Check distortion and level of the AM modulating signal from the Modulation Section. Measure the signal at A4A5TP1 which is on the motherboard and is accessible with the instrument bottom cover removed. Level should be as specified on the block diagram (BD7) and distortion should be less than 0.4%.
2. Check that the Amplitude of the instrument will range from +5.1 to +19.0 dBm in .1 dB steps. Use a power meter to check this. Set special function 85 (amplitude correction off). If there are any problems, troubleshoot using the procedure, "RF Amplitude Not Correct", above. If amplitude is correct, then the problem must be on the A4A1 ALC assembly. Continue troubleshooting with Service Sheets 36 and 37.

#### PULSE MODULATION PROBLEMS.

1. Check the pulse drive signal at A12A6TP2 (motherboard test point is accessed by removing the bottom cover of the instrument). This should be a TTL digital signal at the internal modulation rate or the external rate depending on which source is being used. If this signal is not normal, then the problem is on the A4A1 ALC assembly. Continue troubleshooting with Service Sheets 36 and 37.

2. Check the signal out of the A4A3 Distributor assembly. The signal should be pulse modulated. If it is not, then the problem is on the A4A3 assembly. In the Mid Band (120.0 - 639.9999999 MHz) the A12A2 UHF Modulator also pulse modulates the signal so check the signal out of the A12A2 assembly in that band.
3. The A12A1 Multiplexer and Power Amp assembly has circuitry to sample the level of the signal when the pulse is on to generate the detector signal. Thus, if the pulse level is not correct, troubleshoot the A12A1 assembly using Service Sheets 34 and 35.



## SERVICE SHEET BD7 MODULATION SECTION BLOCK DIAGRAM

### REFERENCE BD1

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

### PRINCIPLES OF OPERATION

The Modulation Section controls the amplitude and frequency modulation modes of the Signal Generator. The two primary output signals from this section are the AM modulating signal (AM signal) and the FM modulating signal (FMS LOOP PH DET REFERENCE). In the AM mode, the modulating signal is routed to the Output Section where the actual amplitude modulation of the RF signal takes place. In the FM mode, a 20 MHz modulated signal is routed to the Low Frequency Loops Section where it is combined with other signals.

The Signal Generator can be amplitude and frequency modulated using internal or external modulating signals. The internal modulating signals are generated by a phase lock loop which is part of the A11A1 Variable Modulation Oscillator (VMO) in this section. The VMO produces modulating signals from 10.0 Hz to 99.9 kHz which are phase locked to the reference oscillator. External modulating signals are coupled into the Modulation Section from the front panel AM IN and FM IN connectors and the AUX FM IN connector on the rear panel. Simultaneous AM and FM operation is possible.

The frequency modulated 20 MHz signal is generated by applying the modulating signal to the varactor diode that forms part of the A11A2 FM VCO's tank circuit. The result is that the 140 MHz VCO output is frequency modulated. The 140 MHz FM VCO output is then heterodyned with the stable 120 MHz signal to produce the frequency modulated 20 MHz signal.

Phase-locked FM is possible down to a rate of 20 Hz with some limitations on peak deviation at modulation rates below 200 Hz. In EXTERNAL DC mode, phase-locked FM is not possible because this mode disables the FM Loop.

### TROUBLESHOOTING

#### General

There are four types of Modulation Section problems covered by this procedure:

1. FM loop unlocked and/or 20 MHz output (A11A6J5) level wrong.

2. Variable Modulation Oscillator (VMO) unlocked or output level incorrect.
3. Incorrect AM or FM depth, deviation or function.
4. AM or FM distortion too high.

There is a separate troubleshooting procedure for each of these problem types. If the problem symptoms fit more than one type, start troubleshooting with the symptom highest on the list.

### FM Loop Unlocked And/Or 20 MHz Output (A11A6J5) Level Wrong

When the front panel STATUS light flashes and the error code is 08, it indicates the FM loop is unlocked. The LED on top of the A11A2 assembly should light when this occurs.

1. Remove the A11A4 Phase Detector and A11A5 Modulation Drive Assemblies from the instrument. This leaves the FM VCO (A11A2) free-running. Check for the following:
  - a) Signal at A11A2J1 (top of A11A2 assembly) is  $140.0 \pm 0.1$  MHz at greater than -5 dBm.
  - b) Signal at A11A6J5 (20 MHz OUT on motherboard) should be  $20.0 \pm 0.1$  MHz. Level should be greater than -20 dBm when in FM mode and less than -50 dBm when not in FM mode.
  - c) The LED on top of A11A2 should not be lit.

If any of these conditions are not met, there is a problem on the A11A2 assembly. In this case, continue troubleshooting with Service Sheet 43.

2. Plug the Phase Detector Assembly (A11A4) into its connector in the instrument and connect the cable between A11A2 and A11A4. This closes the loop but no modulation is applied because the Modulation Drive (A11A5) is not installed. Check the following:
  - a) The LED on top of A11A2 should not be lit.
  - b) The signal at A11A4J2 (top of A11A4 assembly) should be  $14.0 \text{ MHz} \pm 1$  count.

If these conditions are met, the loop is locked and the A11A2 and A11A4 assemblies are probably good. The problem is most likely caused by the A11A5 assembly.

If the frequency at A11A4 is wrong, the loop is unlocked so continue troubleshooting with step 3. If the frequency at A11A4 is correct but the LED is lit, the loop is locked but the phase



lock detector on A11A2 is probably malfunctioning. Continue troubleshooting with Service Sheet 43.

3. Disconnect the white/yellow/black cable from A11A4J1. This removes the VCO signal from the phase detector. Check for:
  - a) Voltages at A11A4 pin 10 (motherboard TP2)  $>+7.5$  Vdc.
  - b) signal at A11A6J5  $>20.5$  MHz.

If both conditions are met, continue troubleshooting with step 4. If condition (a) is not met, A11A4 is bad or the 10 MHz reference signal is not reaching A11A4. Continue troubleshooting with Service Sheet 38.

4. Reconnect the cable to A11A4J1. Disconnect the violet cable from A11A6J1 (10 MHz input on motherboard). This removes the 10 MHz reference signal from the phase detector. Check for:
  - a) Voltages at A11A4 pin 10 (motherboard TP2) more negative than  $-6.5$  Vdc.
  - b) Signal at A11A6J5  $<19.5$  MHz. Measure with the cable connected using a T adapter. Use the high impedance input of the counter.

If condition (a) is not met, the A11A4 assembly is bad. If condition (a) is met but condition (b) is not, the A11A2 assembly is bad.

If both conditions are met, this procedure has failed to isolate the problem. In this case, continue troubleshooting the FM VCO with Service Sheet 43.

#### Variable Modulation Oscillator (VMO) Unlocked or Output Level Incorrect

When the front panel STATUS light flashes and the error code is 61, it indicates that the VMO is out of lock. When this error occurs, continue troubleshooting with Service Sheet 39.

To verify proper VMO operation, use the following procedure:

1. Connect a cable from the rear panel VMO OUT connector to the high impedance input of a frequency counter and an oscilloscope or DVM capable of measuring AC voltage up to 100 kHz.

- Set MOD FREQ from the front panel to the following values:

99 Hz  
999 Hz  
9.9 kHz  
31.9 kHz  
99.9 kHz

For each setting check that:

- \* The frequency is the exact value.
  - \* The level is approximately 1.4 Vrms or 2.0 Vp. The exact value depends on the LEVEL adjustment setting on the A11A1 assembly.
- If any of the readings are not correct, there is a problem on the A11A1 VMO assembly. Continue troubleshooting with Service Sheet 39. If all readings are normal, then the problem is probably not on the A11A1 assembly.

#### Incorrect AM or FM Depth, Deviation or Function

- Check the outputs of A11A5 Modulation Drive Assembly:

AM = A11A5 pin 24  
FM = A11A5 pin 25

- These signals should be the levels specified on the block diagram (Service Sheet BD7) and the frequency of the modulation source being used. If either signal is not normal, troubleshoot the A11A5 assembly (Service Sheets 41 and 42). If these signals are normal, the problem must be with the A11A2 FM VCO (FM) or the output section (AM). Continue troubleshooting with Service Sheet 43 (FM) or BD6 (AM).

#### AM or FM Distortion Too High

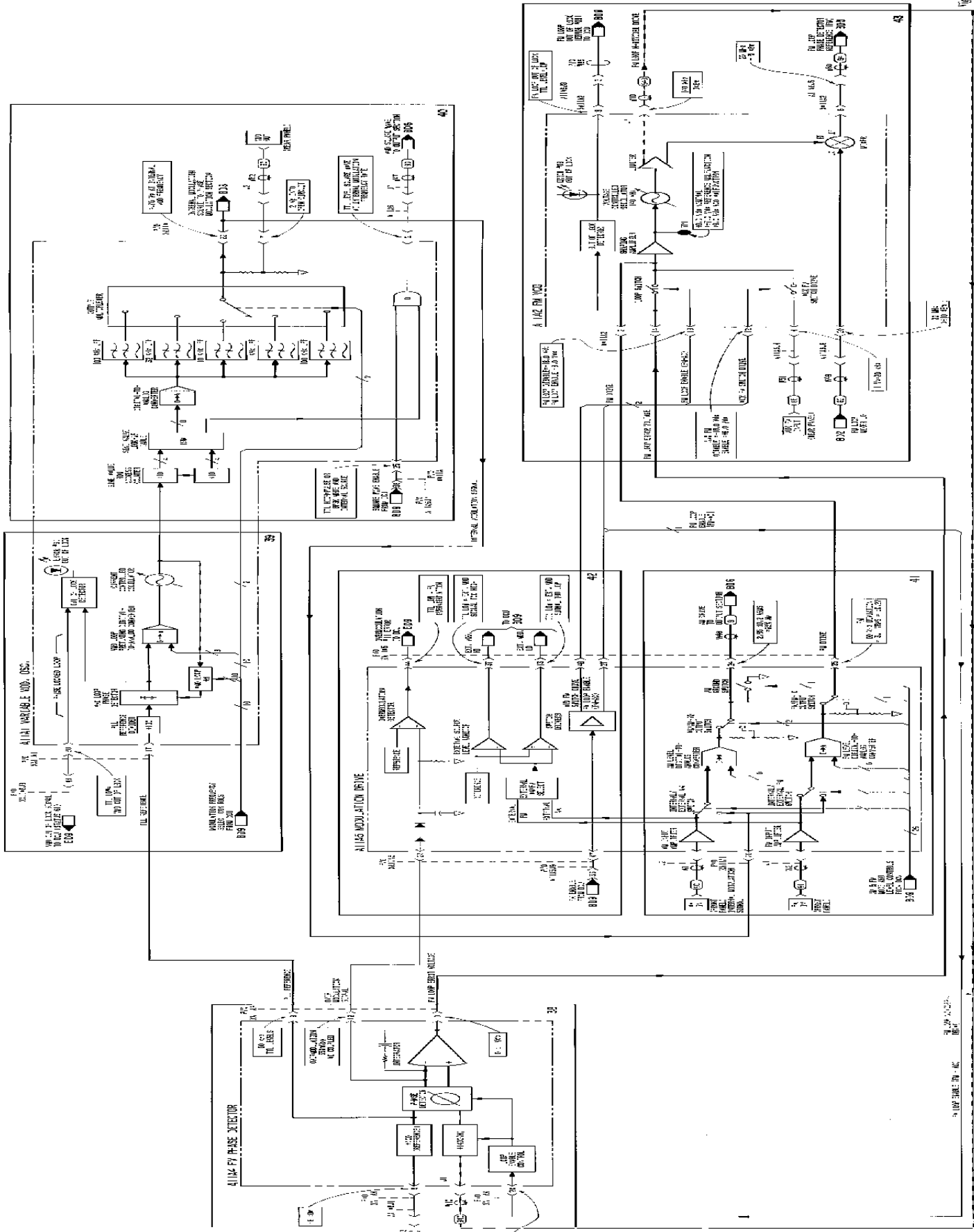
- Check to see if distortion is out of specifications at the output of the A11A5 assembly. Check distortion at:

AM = A11A1 pin 24  
FM = A11A1 pin 25

Distortion should be less than 0.4% at these points.

- If distortion is within specification at these points, the problem must be in the A11A2 FM VCO (FM) or the output section (AM). Continue troubleshooting with Service Sheet 43 (FM) or BD6 (AM).

If distortion is too high at only one of these points, the problem must be on the A11A5 assembly. Continue troubleshooting with Service Sheets 41 and 42. If distortion is too high at both points the problem could be the A11A5 assembly or the modulation source. Measure the distortion of the internal Variable Modulation Oscillator (VMO) at the rear panel VMO OUT connector. If distortion is above 0.4%, there is a problem with the VMO so continue troubleshooting with Service Sheets 39 and 40. If VMO distortion is normal, the problem must be on the A11A5 so continue troubleshooting with Service Sheets 41 and 42.



**SERVICE SHEET BD8  
PHASE MODULATION SECTION BLOCK DIAGRAM****REFERENCE BD1**

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

The Phase Modulation Section is only present in the instrument if Option 002 was ordered. The 320-640 MHz signal from the phase lock loops enters the Phase Modulation Section and is mixed with a 4 GHz signal from the A4A3 Assembly. The up-converted signal is then mixed with a phase modulated 4 GHz signal which down-converts the signal back to the original frequency and transfers the phase modulation to the signal. The 4 GHz signal is phase modulated by passing it through a circulator that has a phase modulator attached to its intermediate ports. The phase modulator consists of varactor diodes which terminate the coax lines from the circulator. This causes the signal to be reflected back to the circulator shifted in phase. The amount of the phase shift depends on the capacitance of the varactors which is in turn determined by the bias on the diodes. This bias is the modulating signal, so that the amount of phase shift is proportional to the amplitude of the modulating signal. This is phase modulation.

If phase modulation is not enabled, the signal from the phase lock loops bypasses the circuitry described, above, and is passed through a coax cable inside the A4A4 assembly.

**TROUBLESHOOTING**

1. Check that the RF output level at A4A4J4 is normal. To do this set the front panel frequency to any setting in the basic band (320.0 to 639.9999999 MHz). Enable phase modulation with EXT AC source but do not connect a signal to the PM IN connector. Measure the signal level A4A4J4. It should be the value specified on Block Diagram BD8. If the signal level is normal, continue with Step 3, otherwise, continue with Step 2.
2. If the output level is not normal, measure the level of the input signal at the cable which goes to A4A4J1. It should be the value specified on Block Diagram BD8. If this signal level is not normal, then there is a problem in some other section. If the input is normal, measure the 4 GHz signal levels from the A4A3 Assembly. If these signal levels are not the values specified on the block diagram, then there is a problem on the A4A3 Assembly. If the 4 GHz signals and the input signal are normal and the output signal level is not normal, then there is a problem in the Phase Modulation Section. Continue troubleshooting with Service Sheet 45.

3. If the output signal level is normal and phase modulation is not correct, then the problem is with the phase modulator. Check the modulating signal at the coax cable that connects to A4A4J6. It should be the frequency of the source being used at the level shown on Block Diagram BD8. If the signal is not correct, then there is a problem with the A11A3 Phase Mod Input Assembly. Continue troubleshooting with Service Sheet 44. Otherwise, the problem is in the A4A4 Phase Modulation Assembly and troubleshooting should continue with Service Sheet 45.

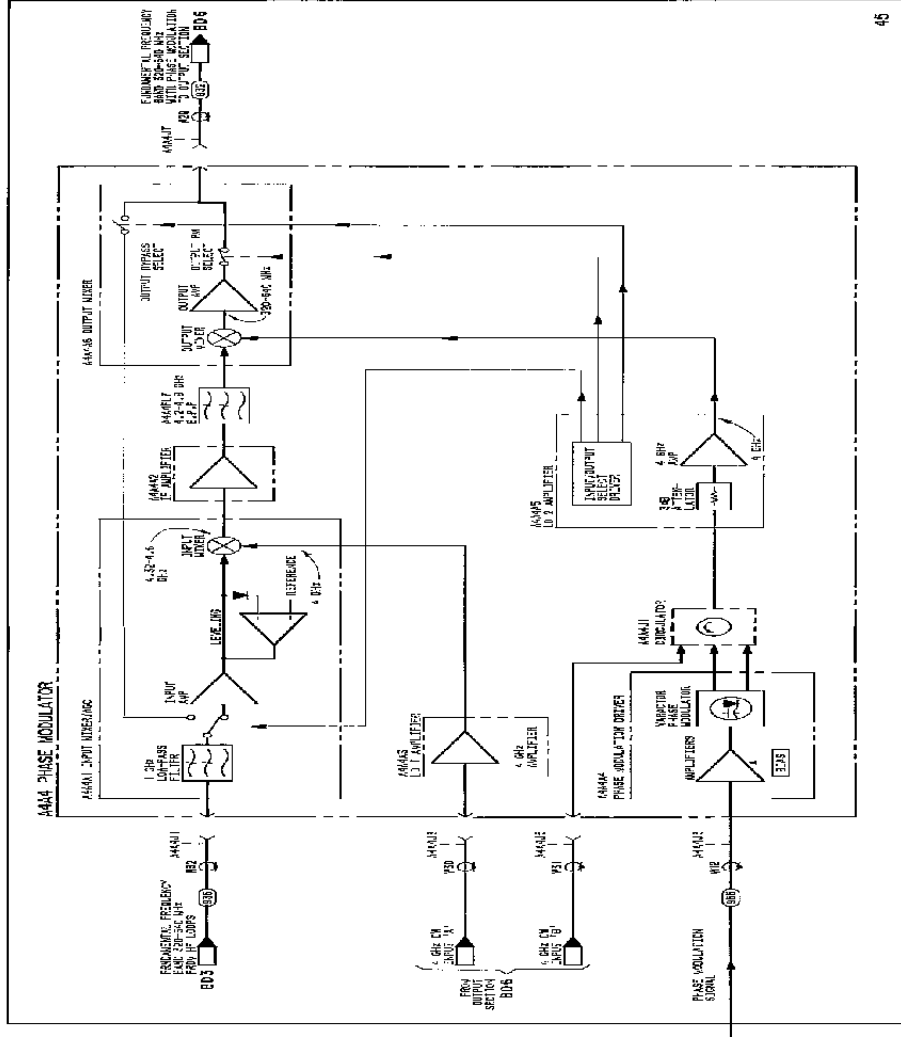
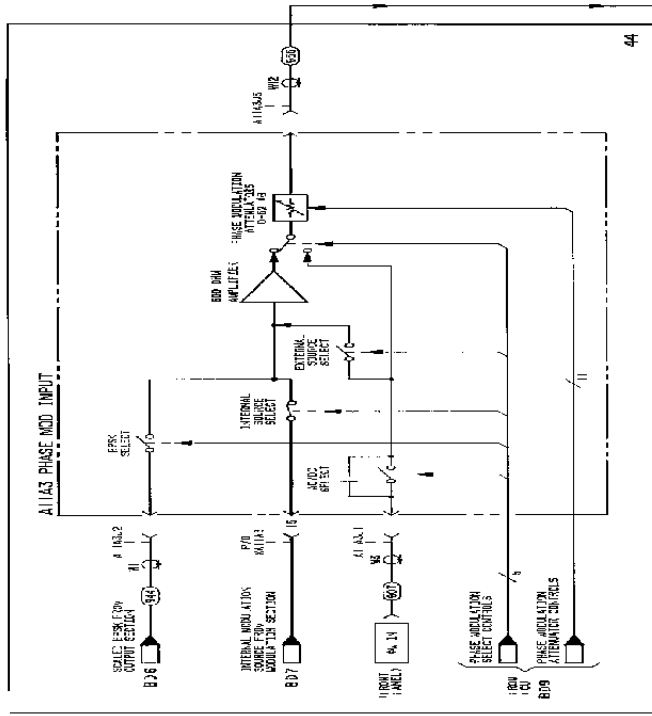


Figure 8-218. Phase Modulation Section

**SERVICE SHEET BD9**  
**DIGITAL CONTROL UNIT (DCU) BLOCK DIAGRAM**

**REFERENCE BDI**

- HP-IB Address Selection (Section II)
- HP-IB Connector (Section II)
- Memory Check (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs
- Table 5-2. Post Repair Adjustment Procedures

**PRINCIPLES OF OPERATION**

The function of the DCU is to control the operation of the Signal Generator in response to data and instructions received from the front panel keyboard, rear panel AUX connector, and the Hewlett-Packard Interface Bus (HP-IB).

The Microprocessor assembly maintains control of the system by implementing a master program stored permanently in read only memory (ROM). Temporary storage of data is located in random access memory (RAM) on the RAM/ROM assembly. Storage of front panel data is located on the Peripheral RAM assembly which has battery backup to keep stored data intact during power-down conditions.

The HP-IB assembly functions as the instrument interface to the IEEE488 interface bus which enables the instrument to be remotely controlled by an automated controller.

The DCU employs an eight-bit bi-directional data bus for the transfer of data between the Microprocessor assembly and the peripheral assemblies. The Frequency Control, Level Control, Modulation Control, Sweep Control, and Display assemblies receive and latch the data on the data bus from the Microprocessor. The outputs of the latches drive the analog portions of the Signal Generator. The Frequency Control, Level Control, and Modulation Control assemblies have read-back circuitry which can, under Microprocessor control, send the latched data back to the Microprocessor via the data bus. This read-back of data is a diagnostic feature which is used to verify normal operation.

The Keyboards are of the matrix type where pushing a key grounds one row and one column in the matrix. The Keycode assembly receives row and column information from the keyboards and encodes it to form a unique code for each key pressed. The Keycode assembly interrupts the Microprocessor which reads the code via the data bus and takes whatever action is required. Likewise, when a character is sent to the Signal Generator on the HP-IB, the HP-IB assembly interrupts the Microprocessor, which reads the character via the data bus. The Microprocessor then interprets the character and determines what action is required.



## TROUBLESHOOTING

There are two methods of troubleshooting the DCU:

1. Use internal diagnostic programs.
2. Use signature analysis which also requires use of the internal diagnostic programs to exercise the appropriate portions of the hardware.

Table 8-220, below, contains a list of all the diagnostic programs available in the 8663A.

Table 8-219. DCU Diagnostic Programs

TEST NUMBER	TITLE
0	System self check. Performs tests 1,3,5 and 8.
1	Single pass RAM test.
2	Continuous run RAM test.
3	Single pass ROM test.
4	Continuous run ROM test.
5	Peripheral RAM test.
6	Signature analysis stimulus of I/O circuitry.
7	Same as test #6 with delayed signature analysis clock.
8	Test of internal I/O circuitry.
9	Not used.
10	Allows direct control of RF output step attenuator from keyboard.
11	HP-IB signature analysis stimulus and output test.
12	Keyboard LED visual stimulus and signature analysis stimulus of Sweep assembly.
13	Readout visual stimulus and signature analysis stimulus.
14	Keycode assembly signature analysis stimulus.
15	Manual keyboard test.

### General DCU Troubleshooting Information

A complete description of each test is provided in the following pages. Since these tests are the tools that are available to troubleshoot the DCU, it is important to read this material carefully in order to gain an understanding of what each test actually does. Then, based on the problem symptoms observed, one or more of the tests can be run to determine the source of the problem.

Test 0 should normally be run first if there is any type of DCU problem. Then, if no failures are found, other tests can be run based on the problem symptoms.

### DCU Test Configurations

There are a minimum number of assemblies required in the DCU for each test. These assemblies are listed under REQUIRED ASSEMBLIES in each test description. The tests will run with all assemblies in the DCU. It is possible, however, for one of the assemblies not used in the test to affect a backplane line and cause a test to fail. Therefore, if a test fails, it is good practice to remove all the unused assemblies and run the test again. Then, if the test passes, add the other assemblies one at a time to determine which assembly causes the failure.

## SYSTEM SELF TEST

Test Number: 0

## Required

Assemblies: All DCU Assemblies.

Description: This test allows continuous execution of tests numbers 1, 3, 5, and 8. This sequence of tests will run until an error is found in one of the tests. Refer to the descriptions for each individual test for more details.

## Procedure:

1. Remove instrument top cover and DCU Covers.
2. Set the test number switch on A2A7 to 0.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test will now begin to run. The test number will be displayed in the left side of the FREQUENCY display in the format, " -XX- ". The pass number (the number of times the entire sequence has run) is displayed in the AMPLITUDE display. This is a two digit number which increments with each failure-free test sequence. The count will reset to 00 when incremented from a count of 99. If a failure occurs, the program will stop and display an error code in the right side of the frequency display. Refer to the operating instructions (Section III) for the test number being run and an explanation of the error code.

## RAM DIAGNOSTIC

**Test Number:** 1 (Single pass)  
2 (Continuous run)

**Required**

**Assemblies:** A2A7, A2A8.

**Description:** This test checks the A2A8 RAM/ROM assembly. Three types of data checks are performed:

1. All possible data patterns are written to all locations except one byte. The one byte that is not written to would cause the attenuator to switch, if exercised.
2. The address of each location is written into that location. Then the data is read back and checked. This checks for overwrite errors.
3. Data is written into all locations and, after a 30 second pause, the data is read back and checked. This checks for fade.

If test number 1 is selected, the test will run once and pause. If test number 2 is selected, the test will continuously repeat until an error is found or the test number is changed.

**Procedure:**

1. Remove instrument top cover and DCU covers.
2. Set the test number switch on A2A7 to 1 or 2.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test first checks that a small block of RAM is available for use by the test. If an error is detected in this block of RAM, the test halts with " -1 " displayed in the left side of the FREQUENCY display. The test cannot run until the source of the problem is found. Use signature analysis to troubleshoot the A2A8 RAM/ROM assembly if this happens. Use the troubleshooting procedure with the schematic for A2A8.

If everything is normal, the test will begin to run and " -01- " or " -02- " (the test number) will be displayed on the left side of the FREQUENCY display. During the first part of the test, keyboard LEDs will randomly flash and you will hear relays clicking. Then the relay clicking will stop and the LEDs will remain lit. Finally the LEDs will all be off during

the final portion of the test. If test number 2 was selected, the AMPLITUDE display will contain the number of times that the test has run. This is a two digit number and after 99 the number will reset to 00. If test number 1 is selected, the AMPLITUDE display will be blank.

## NOTE

If test number 2 (continuous run) is to be run for a long period of time, the A2A10 assembly should be removed from the DCU. This will prevent the relays from being exercised excessively.

8. The run time for the test is 1 minute, 10 seconds. If no failures are found, " 00 " will be displayed in the right side of the FREQUENCY display. If test number 1 was selected, the program will halt in this condition. If test number 2 was selected, " 00 " will not be displayed. The pass number will be incremented and the test will begin to run again.
9. If a failure is found, the test will halt with a two digit error code in the right side of the FREQUENCY display. Table 8-221, below, specifies which RAM IC is likely bad for each possible error code. The error code is generated when the data read back from a memory location is bad. The RAM IC is not the only possible source of the error. Frequency address decoding circuitry could also cause a failure. Thus, this diagnostic can narrow down the source of a problem, but further troubleshooting may be required to find the faulty component.

When the program halts because of an error, the actual and expected data is placed in the MODULATION display. The expected data is in the MOD FREQ display and the actual data is in the MOD LEVEL display.

Table 8-220. A2A8 RAM/ROM Diagnostic Test Failure Codes

ERROR CODE	LIKELY DEFECTIVE RAM IC
00 X0 X1 X2 X3	No Failure A2A8 U10 U11 U12 U13
Where: X is 1,2 or 3 which designates the data check during which the error was found. The data checks are defined in DESCRIPTION, above.	

**Test Number:** 3 (single pass)  
4 (continuous run)

**Required Assemblies:** A2A7, A2A8, A2A9.

**Description:** This test checks the ROMs on the A2A8 and A2A9 assemblies. Each ROM has a checksum which is a unique number in the range of 1 - 18. The test program reads the data from each ROM and calculates the checksum. If the checksum is not correct, the program stops and indicates an error.

**Procedure:**

1. Remove the instrument top cover and DCU covers.
2. Set the test number switch on A2A7 to 3 or 4.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test will begin to run. The test number "-03-" or "-04-" will be displayed in the left side of the FREQUENCY display. The test takes approximately one second to run. If no failures are found, test 3 will stop with "00" displayed in the right side of the FREQUENCY display. Test 4 displays a two digit pass number in the AMPLITUDE display. Each time the test is run without a failure, the pass number is incremented. When the count reaches 99, the next increment will cause it to reset to 00. If a failure is found, test 4 will stop with an error code displayed in the right side of the FREQUENCY display. Table 8-222, below, shows the ROM from which incorrect data was read for each error code. The actual and expected data is placed in the MODULATION display. The expected data is in the MOD FREQ display and the actual data is in the MOD LEVEL display. Test 3 will display the same information if an error is found, but will not halt. The information will be displayed for approximately 3 seconds and then the test will continue and look for other errors. All errors that are found will be displayed for approximately 3 seconds. When the test is complete, the program will halt with "99" displayed in the right side of the FREQUENCY display.

Test 3 should normally be used so that all errors are reported. Test 4 is useful for finding intermittent problems. Test 4 can be left running indefinitely and the test will stop when an error is detected with the error code displayed.

It is important to note that when a failure occurs, it is because the data that was read is not correct. The error code specifies from which ROM data was being read when the error was detected. Any bad component that could alter the data would cause an error code to be generated. So the ROM itself is not necessarily the source of the problem. Address decoding circuitry failures would also cause an error code to be generated. Thus, this diagnostic can narrow down the source of a problem, but additional troubleshooting may be required to find the bad component.

Table 8-221. A2A9 ROM Diagnostic Test Failure Codes

ERROR CODE	LIKELY DEFECTIVE ROM IC
01	A2A8 U1
02	U2
03	U3
04	U4
05	U5
06	U6
07	A2A9 U5
08	U11
09	U6
10	U12
11	U9
12	U3
13	U4
14	U10
15	U8
16	U2
18	U7

## PERIPHERAL RAM DIAGNOSTIC

**Test Number:** 5

**Required**

**Assemblies:** A2A7, A2A8, A2A3.

**Description:** This test checks the A2A3 Peripheral RAM Assembly. A data check is performed on the RAM and the entire assembly is stimulated for Signature Analysis (SA) testing. Only the data check is documented here. The SA capability of the test is documented in the troubleshooting procedure for the A2A3 assembly. Refer to Service Sheets 50 and 51.

- Procedure:**
1. Remove the instrument top cover and DCU covers.
  2. Set the test number switch on A2A7 to 5.
  3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
  4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
  5. Momentarily short TP3 and TP10 on the A2A7 assembly to reset the Microprocessor.
  6. Remove the jumper between TP4 and TP10.
  7. The test will begin to run. The test number, " -05- ", will be displayed in the left side of the FREQUENCY display. The test takes approximately two seconds to execute and runs continuously until an error is found or the test number switch is changed. The pass number (number of times the test has run) is displayed in the AMPLITUDE display. This is a two digit number that is incremented every time the test is run. When this number reaches 99, the next increment will reset the count to 00.

The test will stop when an error is detected. An error code will be displayed in the right side of the FREQUENCY display. Table 8-223, below, specifies which RAM is likely bad for each possible error code. The actual and expected data is placed in the MODULATION display. The expected data is in the MOD FREQ display and the actual data is in the MOD LEVEL display. It is important to note that when a failure occurs, it is because the data that was read is not correct. The error code specifies from which RAM data was being read when the error was detected. Any bad component which could alter the data would cause an error code to be generated. The RAM, therefore, is not always the source of the problem. Thus, this diagnostic can narrow down the source of a problem, but additional troubleshooting may be necessary to identify the defective component.



Table 8-222. A2A3 Peripheral RAM Diagnostic Test Failure Codes

ERROR CODE	LIKELY DEFECTIVE RAM IC
X0 X1 X2 X3 30 31	A2A3 U6 U8 U7 U9
Where: X is 1 or 2.	

## SIGNATURE ANALYSIS I/O DIAGNOSTIC

**Test Number:** 6 (Normal)  
7 (Delayed Clock)

**Required Assemblies:** A2A7, A2A8, A2A4, A2A5, A2A10.

**Required Test Equipment:** HP 5005A Signature Analyzer

**Description:** This test exercises the A2A4, A2A5 and A2A10 assemblies for signature analysis (SA) testing. A signature analyzer is required to use this diagnostic. The two test numbers perform exactly the same test. The SA clock is delayed in test number 7 to allow for the longer settling time when making measurements on the outputs of these assemblies. The longer settling time is caused by cables on the outputs.

This procedure specifies how to make measurements of the outputs of these assemblies to determine if the assembly is operating correctly. To use these diagnostics to troubleshoot an assembly, refer to the troubleshooting procedure included with the schematic diagram for the assembly.

- Procedure:**
1. Remove instrument top and bottom covers and DCU covers.
  2. Set the HP 5005A Signature Analyzer as follows:
 

SIGNATURE: NORM  
CLOCK: FALLING  
START: RISING  
STOP: FALLING  
THRESHOLD: TTL DATA
  3. Carefully position the 8663A on its side, exposing the A2A11 DCU Motherboard. This facilitates measurement at the underside of the instrument.
  4. Connect the signature analyzer to the 8663A as follows:
 

SIGNATURE ANALYZER	CONNECTION TO A2A7 AT
-----	-----
CLOCK	TP8
START	TP7
STOP	TP7
GND	TP10
  5. Set the test number switch on the 8663A A2A7 assembly to 7.
  6. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
  7. Connect a jumper between TP4 and TP10 on the A2A7 assembly.

8. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
9. Remove the jumper between TP4 and TP10.
10. The test should begin to run. The test number, " -07. ", should be displayed in the left side of the FREQUENCY display. Table 8-224 gives the output edge connector signatures for the assemblies stimulated by this diagnostic. These signatures are most easily read at the A2A11 DCU Motherboard on the underside of the instrument.

To confirm that the signature analyzer is connected correctly and that the diagnostic program is running, touch the signature analyzer probe to +5V (available on the DCU motherboard). The signature analyzer should read " 035P ". If this signature is not obtained, check the signature analyzer settings and connections. If no problems are found, use the Free Run Mode Troubleshooting (Section VIII) to check the Microprocessor assembly and the diagnostic ROM.

Table 8-223. Signature Analysis I/O Diagnostic; Signatures.

/----- SIGNATURES -----\						
Pin No.	XA2A4A	XA2A4B	XA2A5A	XA2A5B	XA2A10A	XA2A10B
1	035P	7838	035P	4U18	035P	37H1
2	9U1P	C437	2CC2	1HHA	035P	4F63
3	U1PH	0000	49H6	035P	035P	0000
4	069U	4378	71C8	0F29	035P	18HU
5	69U1	1HH6	3HCF	121C	035P	H929
6	P12A	HH68	0000	0000	9456	9298
7	12A3	F21H	PH1U	0000	4565	5AH9
8	U6P1	21HH	0000	0000	6H94	AH92
9	6P12	5698	54U1	0000	H945	008C
10	97AF	0000	FP97	0000	C5A8	0000
11	7AF6	0000	5P7H	0000	5A86	0000
12	5197	6984	4591	0208	C2C5	08C5
13	197A	C569	F459	FU13	2C5A	A008
14	1FP5	035P	7UC0	035P	5P65	035P
15	FP56	0000	1164	0000	P654	0000
16	631F	0000	F459	0000	435P	0000
17	31FP	0000	U116	0000	35P6	0000
18	HPOP	0000	0000	0000	8HU4	0000
19	035P	POP2	035P	HCP4	035P	HU44
20	7F7C	HOHP	956F	44HH	----	318H
21	F7C7	0000	5848	0000	----	0000
22	1A7F	OHPO	06C7	2H17	----	F637
23	A7F7	775A	3772	68P6	----	64A6
24	84A8	75A1	H5AC	0000	5159	4A63
25	4A8F	0877	C480	0000	1595	6C64
26	HC84	8775	8813	0000	C651	C64A
27	C84A	5A61	U01A	0000	6515	022H
28	5PC1	0000	91C5	0000	H6A1	0000
29	PC18	035P	9AC8	035P	6A1A	035P
30	465P	A610	1647	4C29	FAH6	22H6
31	65PC	H5A6	1164	7411	AH6A	8022
32	7395	0000	CF07	0000	7995	0000
33	395A	0000	8C25	0000	9950	0000
34	8F73	0000	0000	0000	0H79	0000
35	F739	0000	UF45	0000	H799	0000
36	3783	0000	0000	0000	637H	0000

## I/O SELF TEST DIAGNOSTIC

Test Number: 8

## Required

Assemblies: A2A7, A2A8, A2A4, A2A5, A2A10.

Description: This test checks the A2A4, A2A5 and A2A10 assemblies by writing data to the outputs of these assemblies and using the internal read-back capability to check that the data at the outputs is the same data that was sent.

## Procedure:

1. Remove instrument top cover and DCU covers.
2. Set the test number switch on A2A7 to 8.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test will begin to run. The test takes approximately four seconds to run and it will run continuously until an error is found or the test number switch is changed. The test number "-08-" will be displayed in the left side of the FREQUENCY display. A two digit pass number will be displayed in the AMPLITUDE display. This number is incremented each time the test runs. When it reaches 99, it will reset to 00 with the next increment.

When an error is detected, a two digit error code is displayed in the right side of the FREQUENCY display and the test stops. The actual and expected data is displayed in the MODULATION displays. The expected data is in the MOD FREQ display and the actual data is in the MOD LEVEL display. Table 8-225, below, shows which output pins are being checked for each error code. To determine the output assembly edge connector pin where the error was detected, do the following:

- A. Examine the actual and expected data and determine which bit(s) is bad.
- B. Table 8-225 gives the Error Code, Assembly, and edge connector pin number associated with the detected bit error.

Use the troubleshooting procedure with the schematic diagram for the defective assembly to find the source of the problem.

Table 8-224. I/O Self-Test Diagnostic; Bit Error/Pin Number Locations.

ERROR CODE	ASSEMBLY	EDGE CONNECTOR PIN NUMBERS							
		/----- DATA BIT -----\ 7 6 5 4 3 2 1 0							
10	A2A4	B2	B20	B4	B22	A36	A18	B1	B19
11	A2A4	B7	B25	B8	B26	B5	B23	B6	B24
12	A2A4	--	---	B13	B31	B9	B27	B12	B30
13	A2A4	A16	A34	A17	A35	A14	A32	A15	A33
14	A2A4	A12	A30	A13	A31	A10	A28	A11	A29
15	A2A4	A8	A26	A9	A27	A6	A24	A7	A25
16	A2A4	A4	A22	A5	A23	A2	A20	A3	A21
20	A2A10	B2	B20	B22	B4	A36	A18	B1	B19
21	A2A10	B7	B25	B8	B26	B5	B23	B6	B24
22	A2A10	--	--	B13	B31	B9	B27	B12	B30
23	A2A10	A16	A34	A17	A35	A14	A32	A15	A33
24	A2A10	A12	A13		A32	A10	A28	A11	A29
25	A2A10	A8	A26	A9	A27	A6	A24	A7	A25
32	A2A5	B9	B27	B26	B8	B24	B7	B25	B6
33	A2A5	A9	A29	A11	A28	A10	A32	A14	A27
34	A2A5	B31	B30	B13	B12	A35	A17	A16	A15
35	A2A5	B1	B19	B2	B23	B5	B20	B4	B22
36	A2A5	--	--	A25	A7	A13	A31	A12	A30
37	A2A5	--	A5	A4	A3	A2A	A21	A20	A33

## ATTENUATOR TEST DIAGNOSTIC

Test Number: 10 (Test Number Switch Setting = A)

Required  
Assemblies: All DCU Assemblies.

Required Test  
Equipment: HP 436A Power Meter  
HP 8482A Power Sensor

Description: The RF output of the 8663A is set to 50 Mhz at a level of +16dBm. The keyboard entries allow specific attenuator sections within the programable output step attenuators to be individually selected one at a time.

- Procedure:
1. Remove instrument top cover and DCU covers.
  2. Set the test number switch on the A2A7 to A, the hexadecimal equivalent of decimal 10.
  3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
  4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
  5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
  6. Remove the jumper between TP4 and TP10.
  7. Connect the 436A Power Meter to the 8663A RF output connector via the 8482A Power Sensor.
  8. The test number, " -10- ", will be displayed in the left side of the FREQUENCY display. " 0 " will be displayed in the MOD FREQ display. Keyboard data keys 0-6 are used to control the mechanical step attenuators as indicated in Table 8-225, below.  
  
Pushing one of these keys switches in the attenuator section controlled by that key. Pushing another key switches out the section that is in and switches in a new one. Only one section at a time can be in during the running of this test. The last key pressed is displayed in the MOD FREQ display.
  9. Use the 436A (or a spectrum analyzer) to measure the change in level as attenuator sections are switched in and out.

Table 8-225. Output Attenuator Sections Controlled by Data Entry Keys.

KEY	70dB OUTPUT ATTENUATOR AT1			65dB OUTPUT ATTENUATOR AT2		
	10dB	20dB	40dB	5dB	20dB	40dB
0		(none)			(none)	
1	X					
2		X				
3			X			
4				X		
5					X	
6						X

Where: X indicates attenuator section in.



## HP-IB STIMULUS DIAGNOSTIC

Test Number: 11 (Test Switch Number B)

## Required

Assemblies: A2A7, A2A8, A2A6.

## Required Test

Equipment: HP IB Controlling Computer (HP 85, 9825, or similar).

Description: This test performs the following tests of the A2A6 HP-IB assembly:

1. Displays the HP-IB address switch setting in the front panel FREQUENCY display.
2. Stimulates the A2A6 assembly for signature analysis testing. The procedure for using this capability will be included in the troubleshooting procedure for the A2A6 assembly with the schematic diagram .
3. Sends a fixed sequence of data bytes via HP-IB. An HP-IB controller can read these bytes. This confirms the 8663A talker capability.

## Procedure:

1. Remove instrument top cover and DCU covers.
2. Set the test number switch on the A2A7 to B, the hexadecimal equivalent of decimal 11.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test number, " -11- ", should be displayed in the left side of the FREQUENCY display. The HP-IB address switch (on A2A6) setting should be displayed in the right side of the FREQUENCY display. If the HP-IB address switch is changed the display should change. This checks the capability of the Microprocessor to read the address switch setting. If " -- " is displayed instead of the address switch setting, it means that the Microprocessor is not receiving a valid address switch reading. This would occur if the HP-IB assembly is not in its socket.

If an HP-IB controller is connected to the 8663A, there will be a delay (approximately 15 seconds) from the time the address switch setting is changed to the time the display changes.

## NOTE

Signature analysis testing cannot be performed with a controller connected to the HP-IB interface connector.

8. This test outputs a continuous sequence of data bytes. The sequence starts at 00 (binary all zeroes) and each byte is incremented until the value reaches 255 (binary all ones). The sequence then repeats, starting at 00. A controller can read this data and check for the correct sequence. This confirms that the talker capability of the 8663A is functioning correctly. A sample program to read and check the data is given in figure 8-214, below. This program is written for the HP-85 computer. Note that the 8663A is functioning as a talker. All that the controller must do therefore, is read from any address on the HP-IB and the data will be received. The first data byte read will depend on where the 8663A is in the sequence when the controller performs the read operation. The 8663A is free running and is not synchronized with the controller read operation.

```

10 OPTION BASE 1
20 DIM A$(300),A(257)
30 IOBUFFER A$
40 TRANSFER 719 TO A$ FHS
50 FOR I=1 TO 257
60 ENTER A$ USING "#,B" ; A(I)
70 NEXT I
80 FOR J=1 TO 256
90 IF A(J+1)=0 THEN 110
100 IF A(J)+1#A(J+1) THEN 150
110 NEXT J
120 BEEP
130 DISP "    PASSED ! "
140 GOTO 240
150 ! ERROR FOUND
160 BEEP
170 DISP
180 IF J<=10 THEN J1=J ELSE J1=J-10
190 FOR K=J1 TO J1+12
200 S$=DTB$(A(K))
210 DISP TAB(5);S$(9);A(K)
220 IF K=J+1 THEN DISP "< ERROR!" ELSE DISP
230 NEXT K
240 END

```

Figure 8-214. Sample Controller Program

## SWEEP CONTROL/KEYBOARD LED DIAGNOSTIC

Test Number: 12 (Test Switch Number C)

## Required

Assemblies: A2A7, A2A8, A2A2.

## Required Test

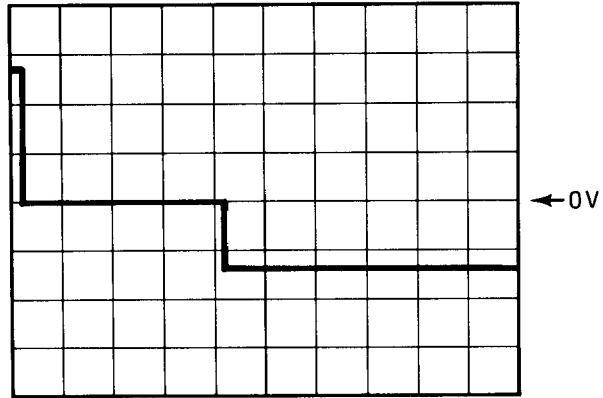
Equipment: HP 1740A Oscilloscope (or similar).

Description: This test checks the A2A2 Sweep Control Assembly as follows:

1. Stimulates the circuitry for signature analysis testing. Operating instructions will be included with the troubleshooting procedure for the A2A2 assembly and are not included here.
2. Turns all keyboard LEDs on and off at a slow rate so they can be visually checked.
3. Generates output waveforms on the rear panel Z/AXIS BLKG/MKR and SWP outputs.

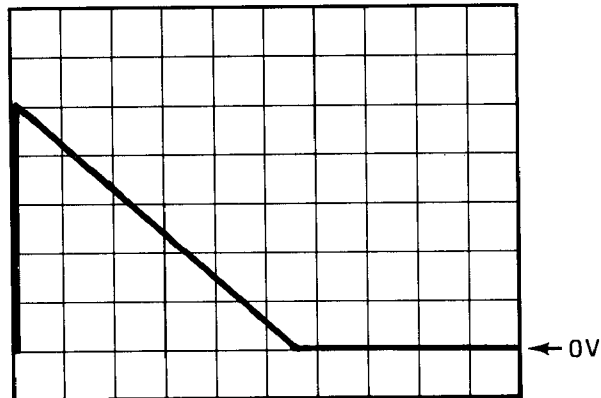
## Procedure:

1. Remove instrument top cover and DCU covers.
2. Set the test number switch to C, the hexadecimal equivalent of decimal 12.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test number, " -12- ", will be displayed in the left side of the FREQUENCY display. All the LEDs on the keyboard will blink at a slow rate.
8. Use an oscilloscope to view the outputs of the rear panel Z/AXIS BLKG/MKR and SWP connectors. Waveforms should be similar to those represented in figures 8-215 and 8-216, below.



Vertical: 2 V/division  
Horizontal: 2 ms/division

Figure 8-215. Z/AXIS BLKG/MKR Output;  
DCU Diagnostic Test 12



Vertical: 2 V/division  
Horizontal: 2 ms/division

Figure 8-216. Sweep Output;  
DCU Diagnostic Test 12

## FRONT PANEL DISPLAY DIAGNOSTIC

Test Number: 13 (Test Number Switch D)

## Required

Assemblies: A2A7, A2A8, A1A1.

Description: This test checks the A1A1 Display Assembly by stimulating the circuitry for signature analysis testing and changing the display at a slow rate for visual testing. Signature analysis testing is covered in the troubleshooting procedure for the A1A1 assembly.

- Procedure:
1. Remove instrument top cover and DCU covers.
  2. Set the test number switch to D, the hexadecimal equivalent of decimal 13.
  3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
  4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
  5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
  6. Remove the jumper between TP4 and TP10.
  7. The test will begin to run. The test number, " -13- ", will be displayed in the left side of the FREQUENCY display for approximately one second. The display will then change and go through a long sequence (55 seconds) during which all digits and annunciators are exercised.

This sequence is easily interpreted through observation of the front panel for one or two test sequences. It can then be readily determined if any annunciators or displays are malfunctioning.

KEYCODE STIMULUS DIAGNOSTIC

**Test Number:** 14 (Test Switch Number E)

**Required**

**Assemblies:** A2A7, A2A8, A2A1, A2A2.

**Description:** This test stimulates the A2A1 Keycode Assembly for signature analysis testing. Refer to Service Sheets 61 and 62 troubleshooting information for procedures and the use of this Diagnostic.

## MAIN AND SWEEP KEYBOARDS MANUAL TEST DIAGNOSTIC

Test Number: 15 (Test Number Switch F)

Required  
Assemblies: A2A7, A2A8, A2A1, A2A2.

Description: This test displays the keycode as Main or Sweep Keyboard keys are pressed. Thus, the keyboards and much of the A2A1 Keycode assembly is checked.

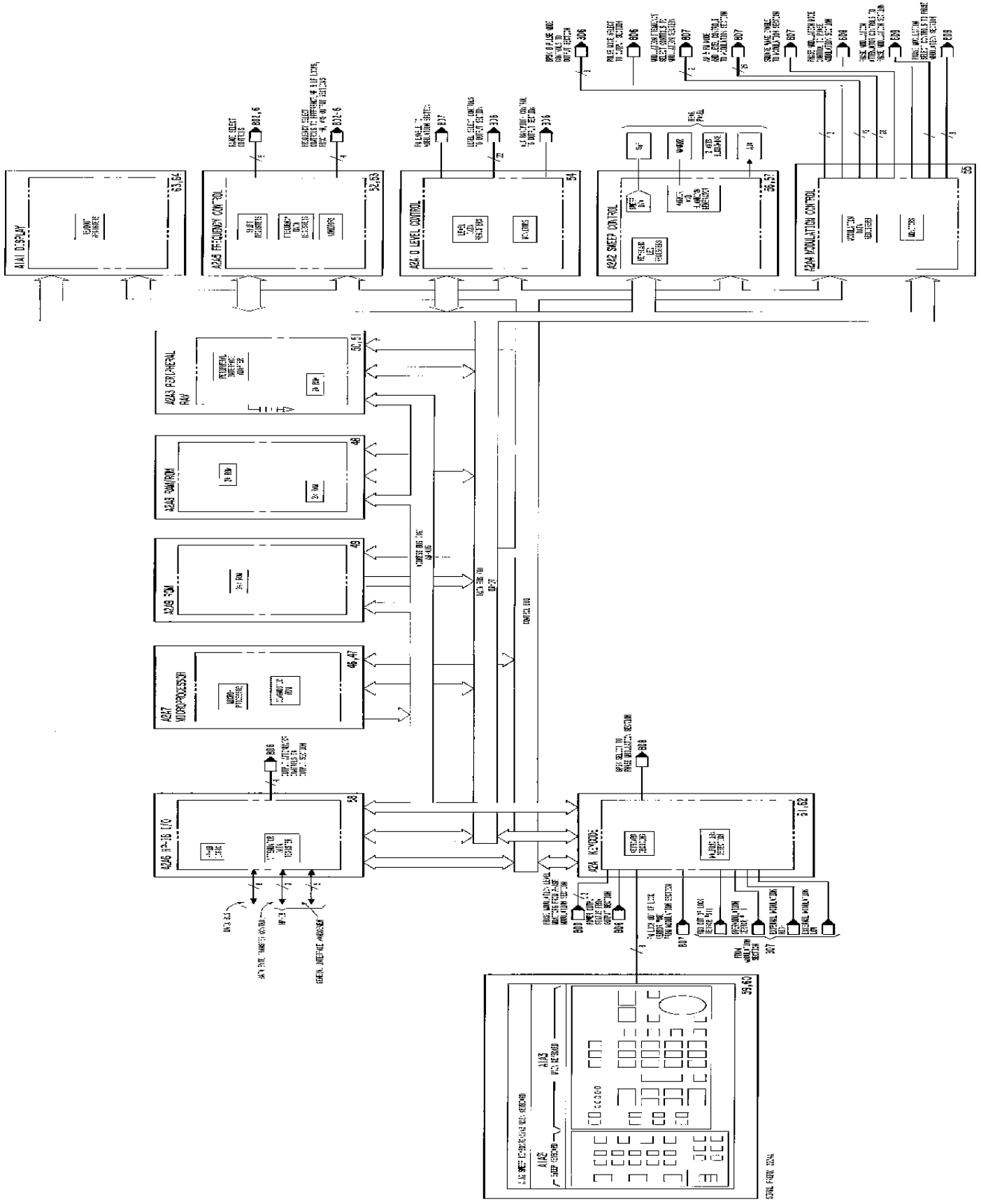
Procedure:

1. Remove instrument top cover and DCU covers.
2. Set the test number switch to F, the hexadecimal equivalent of decimal 15.
3. Install the shorting connector on the top edge connector of A2A7 (at A2A7J1).
4. Connect a jumper between TP4 and TP10 on the A2A7 assembly.
5. Momentarily short TP3 to TP10 on the A2A7 assembly to reset the Microprocessor.
6. Remove the jumper between TP4 and TP10.
7. The test number, " -15- ", will be displayed in the left side of the FREQUENCY display. The MOD FREQ display will contain " 000 " until a key is pressed. The display will then be the keycode of the key that was pressed. Keycodes are given in Table 8-226, below.

Table 8-226. Main and Sweep Keyboard Keycodes.

KEY	KEY-CODE	KEY	KEY-CODE	KEY	KEY CODE
NONE	000	AMPLITUDE	105	STORE	134
0	060	MOD FREQ	106	PULSE	135
1	061	BPSK	107	RECALL	136
2	062	START FREQ	110	SEQ	137
3	063	STOP FREQ	111	MODE OFF	140
4	064	MARKER 1	112	AUTO MODE	141
5	065	MARKER 2	113	MANUAL MODE	142
6	066	MARKER 3	114	SINGLE MODE	143
7	067	MARKER 4	115	0.5 ms	144
8	070	MARKER 5	116	1 ms	145
9	071	MARKER OFF	117	2 ms	146
FREQUENCY	072	" . "	120	10 ms	147
INCR SET	073	BACK SPACE	121	100 ms	150
UP ARROW	074	GHz	122	LIN 100	151
DOWN ARROW	075	MHz	123	LIN 1000	152
RESOLUTION		kHz	124	SET SIZE	153
OFF	076	Hz	125	LOG 10%	154
FCTN OFF	077	INT 400	126	LOG 1%	155
/10	100	INT 1K	127	SPAN FREQ	156
X10	101	EXT AC	130	KNOB CCW	160
AM	102	EXT DC	131	KNOB CW	161
FM	103	BLUE KEY	132		
PM	104	STATUS	133		





**SERVICE SHEET BD10  
POWER SUPPLY SECTION****REFERENCE BD1**

- Simplified Operation (Section III)
- Operator's Checks (Section III)
- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

The Signal Generator utilizes a switching power supply for reduced size, weight, and heat dissipation. The supply is made up of five major elements: an input rectifier/filter, the regulator switching transistors, a step-down/isolation transformer, output rectifiers (and associated L-C filters and IC regulators), and a pulse-width-modulated regulation network. The circuitry is on four boards. These are the Power Supply Motherboard, Inverter Board, Control Board, and the Linear Regulator Board. Supplementary circuits include current limiters, overvoltage protection networks, and a reference voltage supply.

At the power line receptacle, the instrument can be switched for use with 115 Vac or 220 Vac power. Following line filtering, the raw ac is rectified and coarsely filtered to produce plus and minus 160 Vdc. In the case of 115 Vac operation, voltage doubling occurs during rectification. The plus and minus 160 Vdc is then chopped at a 20 kHz rate to drive step-down/isolation transformer A7A3T3. Voltages at the tapped outputs of T3 are rectified and filtered. Sense lines from the +5.2 volt supply line are fed to the switching-regulator circuitry on the Control Board. The +5.2 volt line is the only line which is regulated by the switching action of the supply. The +20 Vdc, -10 Vdc, and -40 Vdc lines are maintained at constant voltage by linear regulators (Service Sheet 66)

The +5.2 volt line is regulated by a feedback network consisting of the constant voltage comparator, turn-on level comparator, 40 kHz oscillator, pulse-width modulator (duty-cycle control circuitry), and switch drivers. If the output voltage attempts to decrease, the feedback network senses the change and holds switching transistors A7A3Q3 and A7A3Q4 ON for longer periods of their switching cycles; an attempted increase is corrected by reducing the ON periods of the transistors. In this manner, the power delivered by the supply is matched to the requirements of the instrument, resulting in maximum operating efficiency.

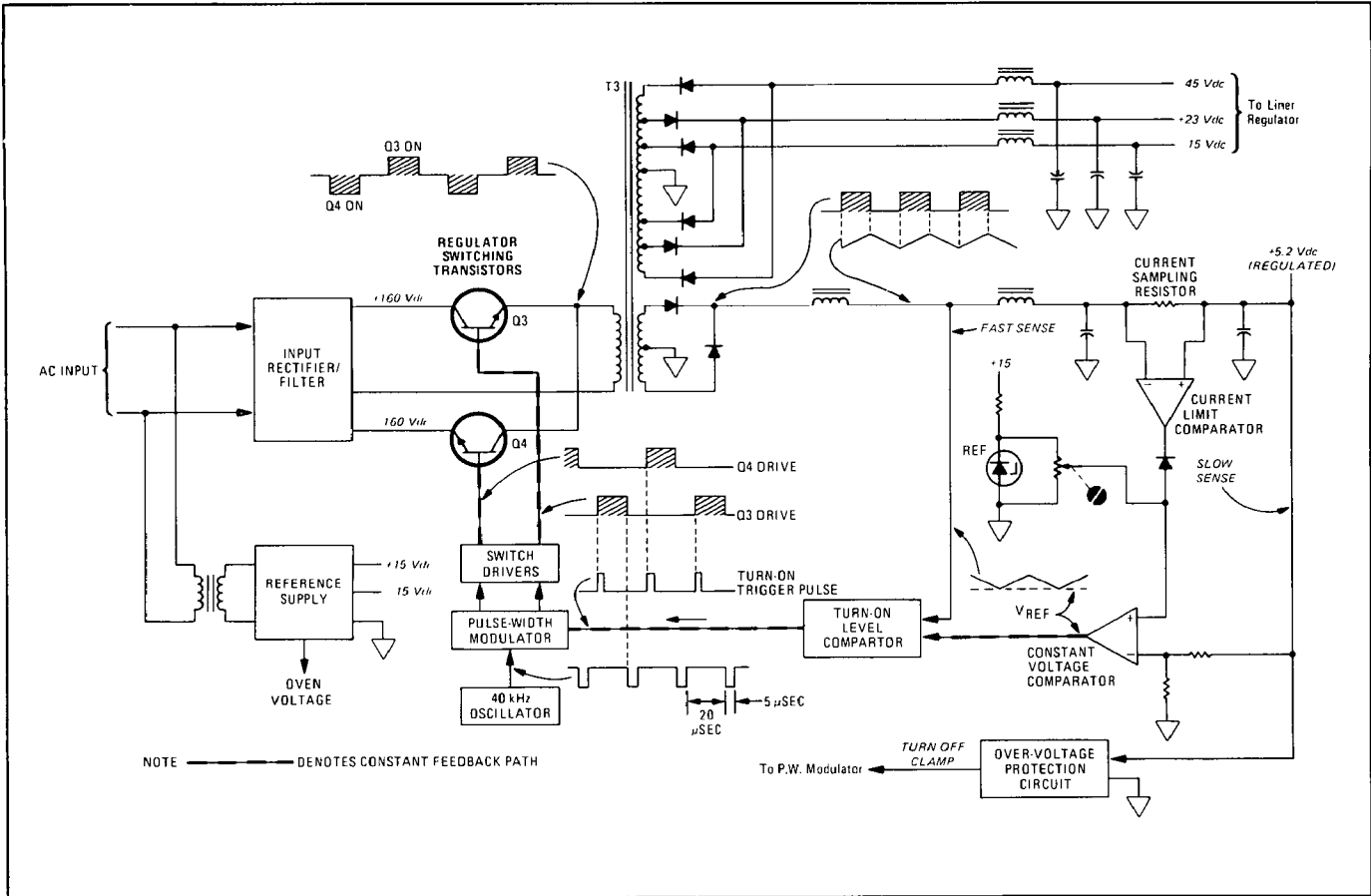


Figure 8-218. Simplified Power Supply Block Diagram

**TROUBLESHOOTING**

This procedure can be used to isolate a malfunction in the power supply. Once the problem is isolated to an assembly, continue troubleshooting on the service sheet for that assembly to find the bad component.

**WARNING**

Plus and minus 160 Vdc, and line voltage, are present whenever the power cable is plugged in. This high voltage exists on the red heatsink, on the other portions of the inverter board and on the motherboard. Be extremely careful when working in this area.

Before removing or inserting power supply plug-in boards, disconnect ac power cable and allow 30 seconds for filter capacitors to discharge.

Failure to observe these precautions may result in injury to personnel or damage to equipment.

CAUTION
---------

If the line fuse burns out, do not replace it until the cause of the failure has been determined and repaired (by a qualified service person only and specifically with resistance checks in the power supply. (See Service Sheet 65). Replacing this fuse in a damaged generator can cause additional damage.

## 1. General

Measure the +5.2V test point with a DVM. If the reading is not  $5.20 \pm 0.02$  Vdc and cannot be adjusted to bring the voltage within these limits, continue troubleshooting with the next step listed in Table 8-227, based on the DVM reading. The +5.2V supply should be operating normally before working on problems with the other supply voltages. If the +5.2V supply is normal and one of the other supply voltages is not, continue troubleshooting with step 5.

Table 8-227. +5.2V Test Point Conditions

DVM Reading	Condition	Next Step
$V < 0.05$	Shut down	2
$0.05 < V < 5.20$	Low Voltage	5
$5.18 < V < 5.22$	Normal	6
$V > 5.22$	High Voltage	7

## 2. Shut Down

Check the following:

- a) The linear regulator overvoltage shut-down LED visible through an opening in the top of the power supply. If this LED is lit, the overvoltage shut-down has triggered so continue troubleshooting with step 3.

- b) The fuses on the rear panel. If either fuse is blown, continue troubleshooting with Service Sheet 65.
- c) Disconnect the line cord from the rear panel of the Generator.
- d) Extend the A7A2 Control Board Assembly using the extender board from the service accessory kit. Connect the line cord and turn the Power switch to ON. Look at TP6 and TP7 on A7A2. These waveforms should be similar to those shown on the block diagrams pins 10 and 11). If these waveforms are not present (that is, only a dc level is present), the problem is most likely on A7A2 so continue troubleshooting on Service Sheet 67. If these waveforms are present, the problem is most likely on A7A3 so continue troubleshooting on Service Sheet 65.

### 3. Linear Regulator Overvoltage Shutdown

Turn the Power switch to STANDBY. Unplug the line cord from the rear panel. Remove the A7A1 Linear Regulator Assembly from the instrument. Mount the A7A2 Control Board Assembly on its extender board from the service kit. Connect a short jumper wire between TP5 and ground on A7A2. Connect the line cord and turn the Power switch to ON. Measure TP1 (5.2V supply) on A7A2.

If the voltage is  $5.20 \pm 0.02$  Vdc or can be adjusted to within the range, the problem is on the A7A1 assembly so continue troubleshooting on Service Sheet 66. Otherwise, refer to Table 8-228, and continue troubleshooting with the next step listed in the table based on the actual voltage reading at TP1. The jumper from TP1 to ground must remain connected and A7A1 must remain out of the power supply. Once the +5.2V supply is normal, remove the jumper and install A7A1. Measure all supplies. If there are any abnormalities, restart with step 1 of this procedure.

### 4. +5.2V Supply Low

Turn the Power switch to STANDBY and unplug the line cord from the rear panel. Mount the A7A2 Control Board Assembly on its extender board. Connect the line cord and turn the line switch to ON. Use a DVM with floating inputs and measure the voltage between pins 17 and 18 on the edge connector of A7A2. This voltage is the drop across the current sensing resistor in series with the output. If this voltage is greater than 0.070V, the load is drawing too much current and the supply is in current limit. Look for the cause of the excess current draw in the other sections of the instrument. If the problem is not current limiting, look at TP6 and TP7 with an oscilloscope. The waveforms should be as shown on the block diagram. The pulse width of the positive part of the waveform should be 20 $\mu$ s or more. If the pulse width is less, there is a problem on the A7A2 Control Board so continue troubleshooting on Service Sheet 67. If the pulse width is normal, the problem is most likely on the

A7A3 Inverter Board or the A7A4 motherboard so continue troubleshooting on Service Sheet 65.

#### 5. +5.2V Supply Normal, Linear Regulator Problem

Table 8-228 gives the normal input and output voltages for the A7A1 Linear Regulator Board and the test points where these voltages can be measured.

Table 8-228. Linear Regulator Voltages

Normal Output (Vdc)	Output	Input	Normal Input (Vdc)
20.0 $\pm$ 0.1	TP1	TP4	> +22.5
-10.0 $\pm$ 0.04	TP2	TP5	> -12.5
-40.0 $\pm$ 0.2	TP3	TP6	> -44.0

Measure the outputs and try to adjust any that are not within the normal range. If an output is too high, the problem is most likely on the A7A1 Linear Regulator. If an output voltage is low, measure the input. If the input is too low, the problem is likely to be on the A7A3 Inverter Assembly but if the input is normal, the A7A1 Linear Regulator is malfunctioning or the load is drawing too much current. Continue troubleshooting with the service sheet where the problem appears to be.

#### 6. +5.2V Supply Higher Than Normal

This is most likely a problem with A7A2 Control Assembly. Continue troubleshooting on Service Sheet 67.







**SERVICE SHEET 1**  
**A8A3 AND A8A4-10 MHz REFERENCE OSCILLATOR AND REFERENCE BUFFER ASSEMBLY**

**REFERENCE BLOCK DIAGRAM 2**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION**

**General**

The Reference Buffer amplifies and distributes the reference source signal to the rest of the instrument. The reference source can be the internal 10 MHz Reference Oscillator (A8A3) or an external frequency standard of 5 or 10 MHz. The outputs from the Reference Buffer are always 10 MHz, even when an external frequency standard of 5 MHz is selected. The internal reference oscillator is a high stability, temperature controlled, 10 MHz quartz oscillator.

**Doubler Circuit**

When an external frequency standard of 5 MHz is used, the 5 MHz signal is passed through a frequency doubler circuit. The doubler circuit is a full-wave rectifier, consisting of a center-tapped transformer (T1) and two Schottky diodes (CR1 and CR2). Following the doubler circuit is a 10 MHz bandpass amplifier which minimizes the feed through of the fundamental frequency (5 MHz).

**Power Splitters**

Transformers T2 through T9 and associated circuitry form a five-way power splitter. The 10 MHz input signal is applied to the primary of transformer T2. The resistors across the secondary windings of T4, T7, T8, and T9 provide a 50 ohm impedance match and also increase isolation between the five output ports.

**No Reference Detector**

The No Reference Detector monitors the output of Q2 to check for the presence of the 10 MHz signal. As long as the 10 MHz reference signal is present, capacitor C17 remains charged. In the absence of the 10 MHz signal due to the loss of the reference source (at its inverting input) the comparator goes low, signaling the DCU that no signal is present at the output of Q2.

### Oven Status Detector

The Oven Status Detector detects whether or not the internal oscillator's oven temperature has stabilized. From a cold start, that is, the instrument has not been plugged into the Main (line) voltage, the voltage at the oven monitor terminal (A8A3 pin 11) is high. This causes the comparator's output to go low, which signals the DCU that the oven temperature has not heat stabilized. As the oven temperature stabilizes the voltage at the oven monitor terminal drops. It takes approximately 15 minutes for the oven temperature to heat stabilize after the line cord has been plugged in. Power is still supplied to the oven (via A8A3 pin 14) when the LINE switch is in the STANDBY position. From a cold start, the oscillator should be within one hertz of its final value after 10 minutes.

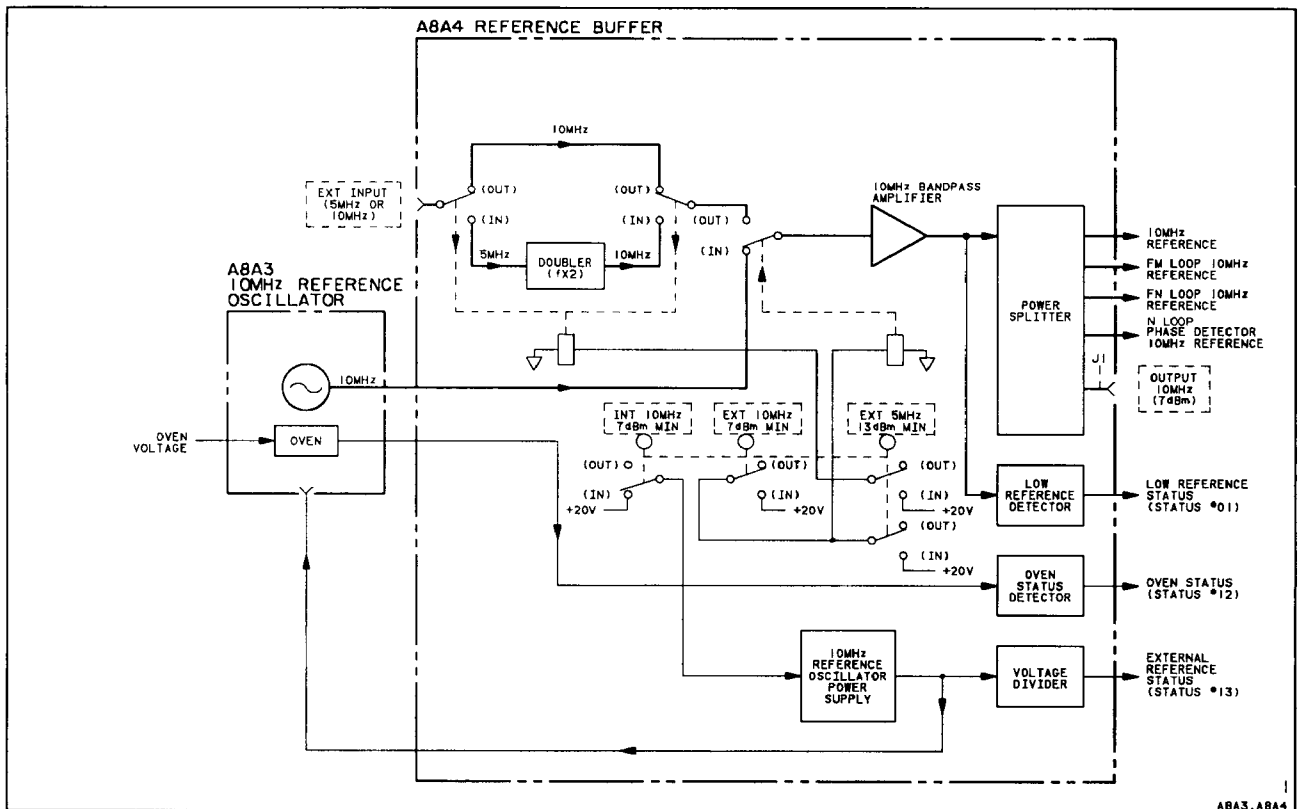
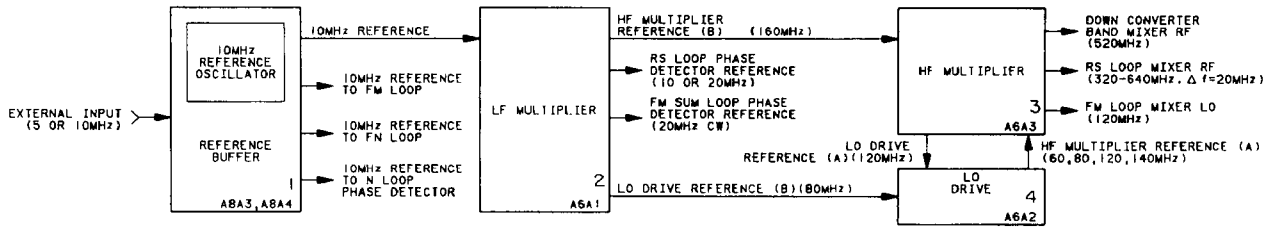
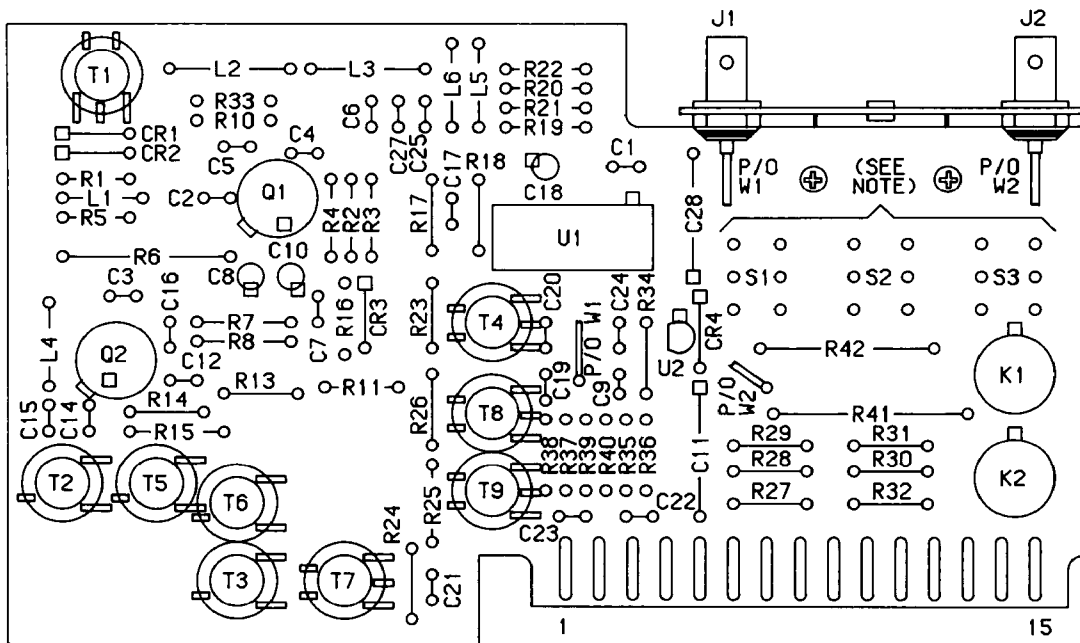


Figure 8-301. A8A3 and A8A4 10 MHz Reference Oscillator & Buffer Block Diagrams

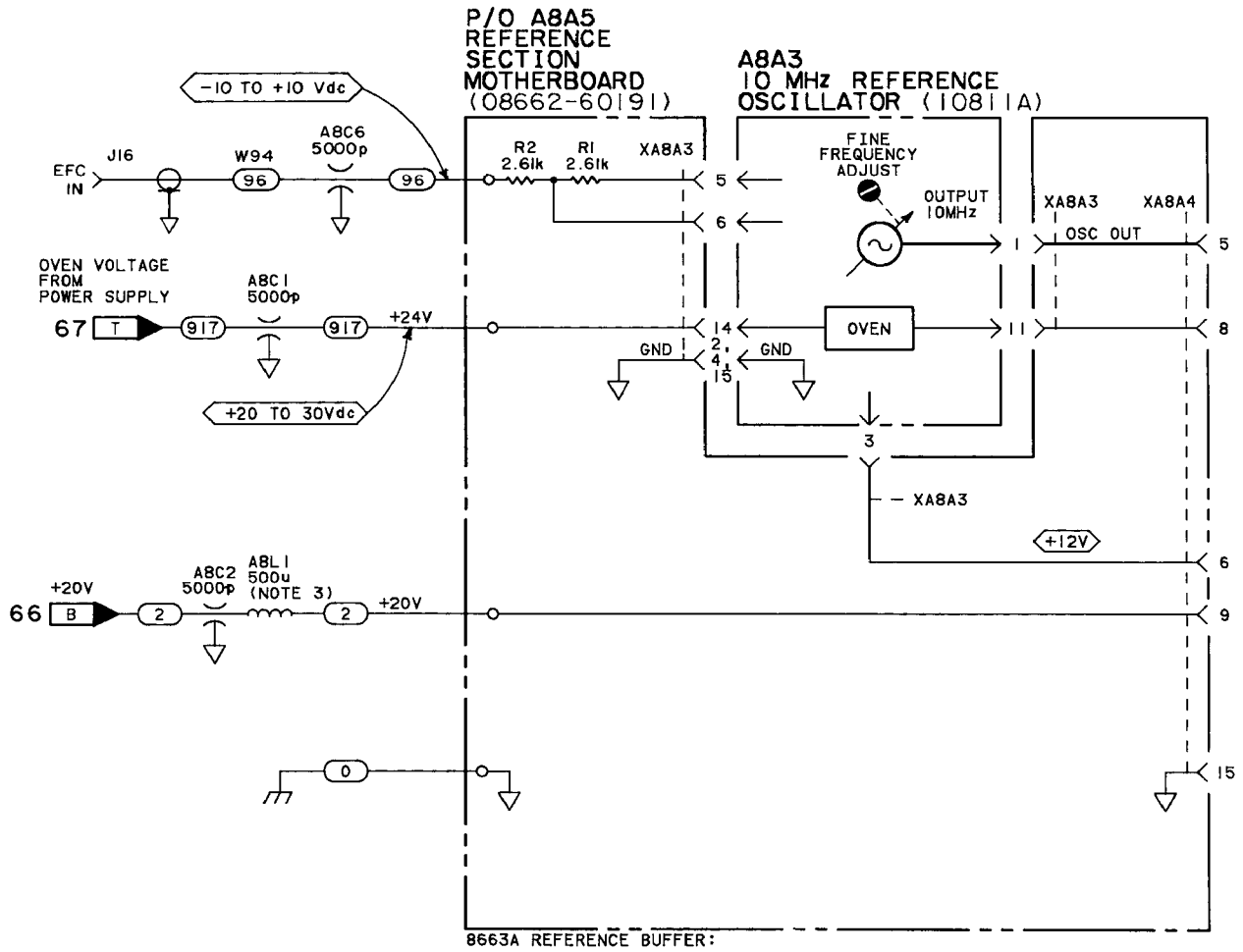


NOTE:  
 SWITCHES S1, S2, S3 ARE  
 MOUNTED ON CIRCUIT SIDE  
 OF BOARD

Figure 8-302. A8A4 Reference Buffer Component Locator

**CHANGES**

<b>All serial prefixes</b>	<b>On the A8A4 Component Locator:</b> <ul style="list-style-type: none"><li>• <b>U2</b> - Correct the position of U2 by turning it 180°s.</li></ul>
<b>2408A and above</b>	<b>On the A8A3 schematic:</b> <ul style="list-style-type: none"><li>• <b>J16, W94, W96, A8C6, A8A5R1-R2</b> - Use the partial schematic on page 8-304.3.</li></ul>
<b>2447A and above</b>	<b>On the A8A3 schematic:</b> <ul style="list-style-type: none"><li>• <b>10811-60111</b> - Change the part number of the A8A3 10 MHz REFERENCE OSCILLATOR to 10811-60111.</li></ul>



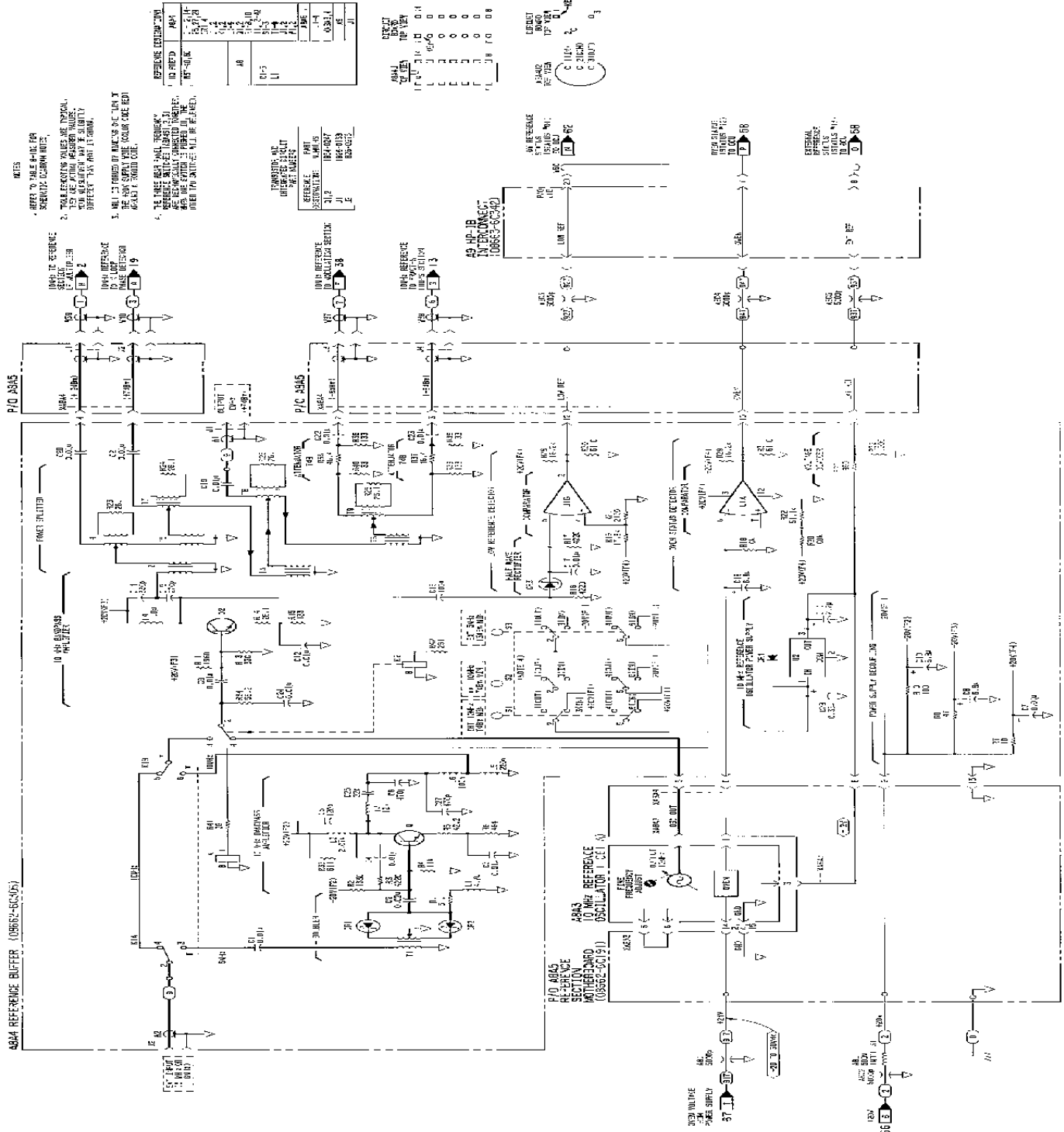
*P/O Figure 8-303. A8A3 and A8A4 10 MHz Reference Oscillator and Buffer Schematic (2408A)*

- NOTES**
- REFER TO TABLE P-10 FOR SCHEMATIC COLUMN INDEX.
  - WAVEFORMS SHOWN ARE TYPICAL. EXACT WAVEFORMS VARY WITH LOADS AND CIRCUMSTANCES. EFFECTS MAY VARY SLIGHTLY.
  - ALL POINTS FORMED BY INDICATED SYMBOLS ARE SHOWN WITH THE LOADS (SEE P-10) IN THE CIRCUIT.
  - THE THREE MAIN SIGNAL TRACKS, REFERENCE, MOTHERBOARD AND OSCILLATOR, ARE SHOWN IN THE CIRCUIT. OTHER TRACKS ARE NOT SHOWN.

REFERENCE	DESCRIPTION	UNIT
10-100	10-100	10-100
10-101	10-101	10-101
10-102	10-102	10-102
10-103	10-103	10-103
10-104	10-104	10-104
10-105	10-105	10-105
10-106	10-106	10-106
10-107	10-107	10-107
10-108	10-108	10-108
10-109	10-109	10-109
10-110	10-110	10-110
10-111	10-111	10-111
10-112	10-112	10-112
10-113	10-113	10-113
10-114	10-114	10-114
10-115	10-115	10-115
10-116	10-116	10-116
10-117	10-117	10-117
10-118	10-118	10-118
10-119	10-119	10-119
10-120	10-120	10-120

REFERENCE	DESCRIPTION	UNIT
10-121	10-121	10-121
10-122	10-122	10-122
10-123	10-123	10-123
10-124	10-124	10-124
10-125	10-125	10-125
10-126	10-126	10-126
10-127	10-127	10-127
10-128	10-128	10-128
10-129	10-129	10-129
10-130	10-130	10-130

REFERENCE	DESCRIPTION	UNIT
10-131	10-131	10-131
10-132	10-132	10-132
10-133	10-133	10-133
10-134	10-134	10-134
10-135	10-135	10-135
10-136	10-136	10-136
10-137	10-137	10-137
10-138	10-138	10-138
10-139	10-139	10-139
10-140	10-140	10-140



SERIAL PROFILE 233A

**SERVICE SHEET 2**  
**A6A1 LF MULTIPLIER ASSEMBLY**

**REFERENCE BLOCK DIAGRAM 2**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION**

The LF Multiplier (A6A1) provides output signals at 10 MHz, 20 MHz, 40 MHz, 80 MHz, and 160 MHz. The LF multiplier takes the 10 MHz signal from the reference buffer (A8A4) and by the use of frequency doubler and divider circuits it generates the other desired frequencies. Since all the output signals are derived from the 10 MHz Reference Buffer signals, they all retain the same accuracy and stability as the reference source signal.

Four frequency doubler circuits are cascaded in order to multiply the 10 MHz input up to 160 MHz. The other output signals are obtained by tapping various points in the doubler chain. The Doubler circuits are basically full-wave rectifier circuits, consisting of a center-tapped transformer and two Schottky diodes.

Following each Doubler circuit are Band-Pass Amplifiers which are tuned to the doubled frequency. This minimizes the feed through of the fundamental frequency and eliminates unwanted harmonics.

The 40 MHz Filter, FL1 is a narrow band crystal filter. This filter contributes significantly to the Signal Generator's single-sideband phase noise performance.



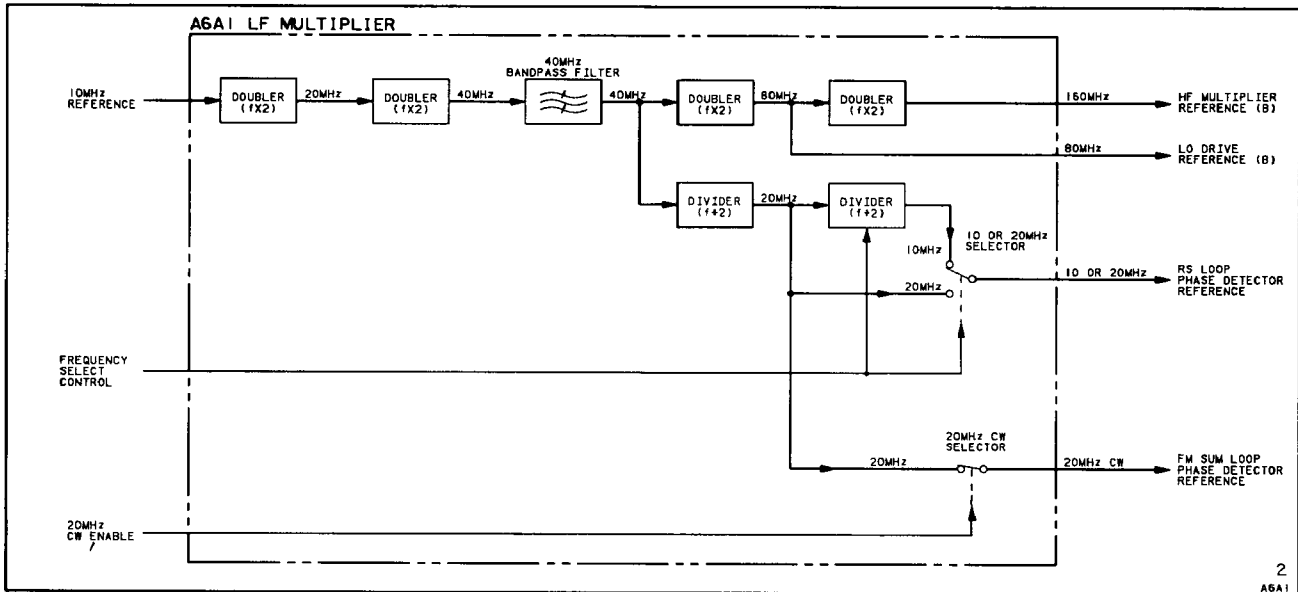
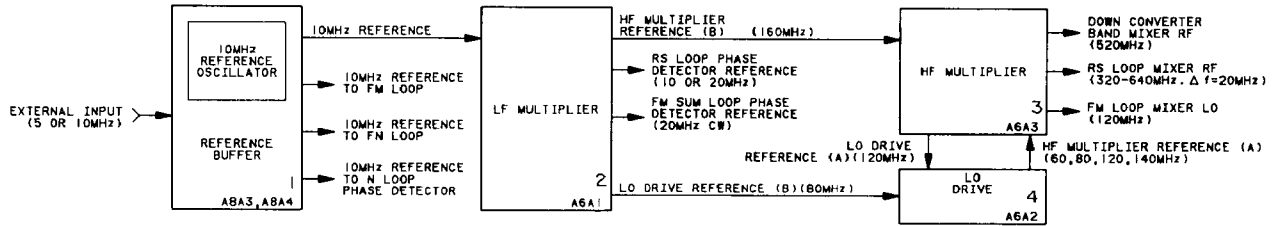


Figure 8-304. A6A1 Reference Section Low Frequency Multiplier Block Diagrams

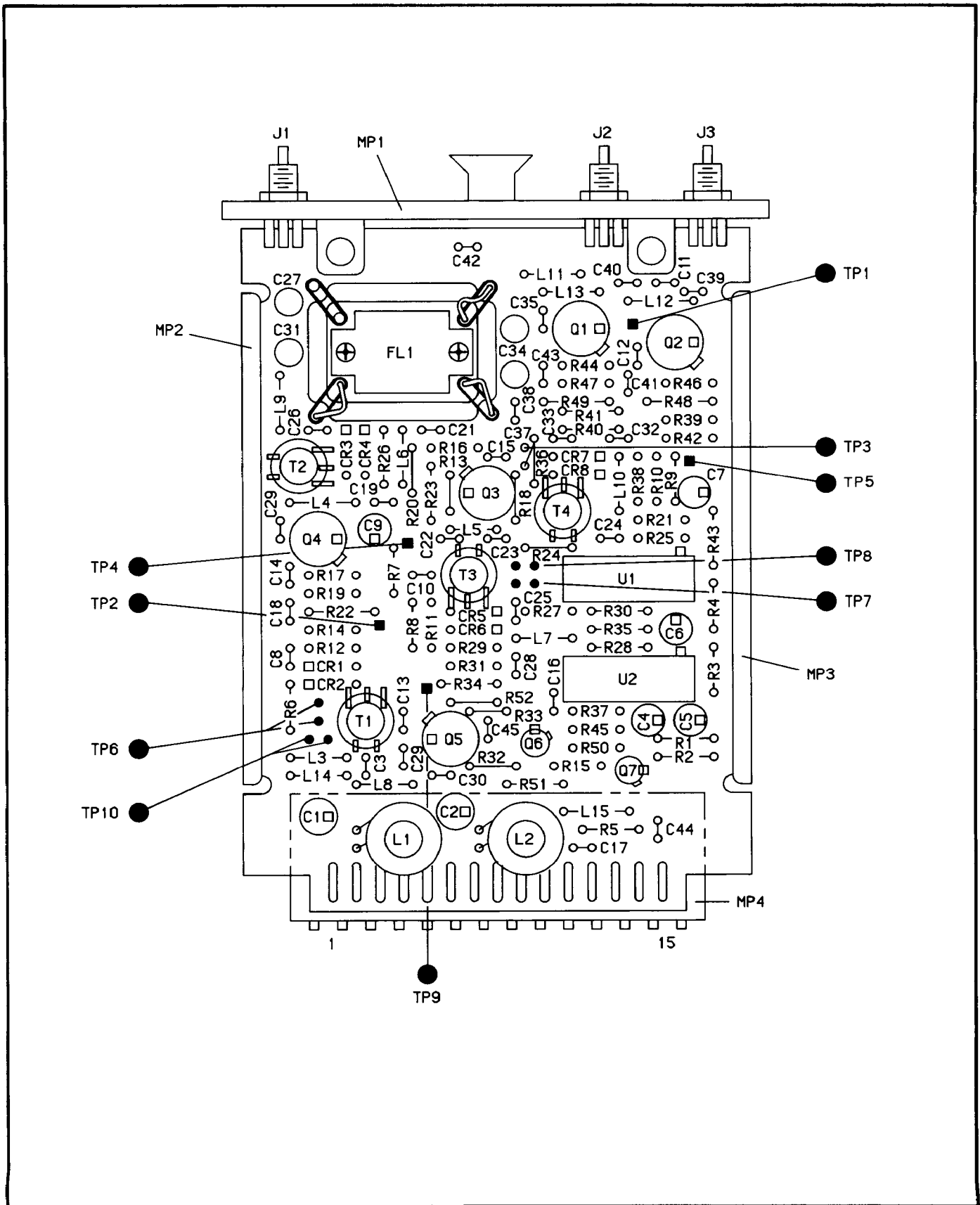


Figure 8-305. A6A1 Reference Section Low Frequency Multiplier Component Locator



SERVICE SHEET 3  
A6A3 HF MULTIPLIER ASSEMBLY

## REFERENCE BLOCK DIAGRAM 2

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The HF Multiplier (A6A3) generates four separate signals from its two input signals. Three of the output signals are fixed in frequency, while the fourth output varies from 320 to 640 MHz in 20 MHz steps.

The two 120 MHz output signals, the LO Drive Reference A and the FM Loop Mixer LO, are generated by multiplying, heterodyning, and dividing the 160 MHz input signal, the HF Multiplier Reference (B). The 160 MHz input signal is first passed through a 160 MHz Band-Pass Filter. The 160 MHz filter, FL1, is a narrow band crystal filter. This filter contributes significantly to the Signal Generator's single sideband phase noise performance. After the 160 MHz Band-Pass Filter, the signal path splits into two paths. One signal path goes to the LO port of Mixer U10, and the other goes to the 160 MHz Band-Pass Amplifier and Doubler circuit. The Doubler is a full-wave rectifier circuit, consisting of a center-tapped transformer and two schottky diodes. The 320 MHz Band-Pass Amplifier amplifies the doubled frequency while attenuating the fundamental and the undesired higher harmonics. Limiter U7 provides a constant signal level to the RF port of Mixer U10. Mixer U10 heterodynes the 320 MHz signal with the 160 MHz input signal and the resulting sum, 480 MHz, is then amplified by the 480 MHz Band-Pass Amplifier. The 480 MHz Band-Pass Amplifier and the 480 MHz Band-Pass Filter attenuate the residual LO and RF signals and the undesired difference signal. The 480 MHz signal is divided by counter U9, to obtain the 120 MHz output signal. U9 is an ECL device and has complimentary outputs. The two 120 MHz output signals from U9 are then amplified by the 120 MHz Band-Pass Amplifiers which remove the unwanted harmonics from the 120 MHz square wave outputs.

The 520 MHz output signal is generated by doubling the 320 MHz signal from the collector of Q5 and heterodyning the doubled signal (640 MHz) with the 120 MHz signal from U9. Mixer U1 is a double balanced mixer. The 520 MHz Switch and Band-Pass Amplifier can be turned off by cutting off the emitter current to Q1. The amplifier is tuned to amplify the difference signal and filter the sum signal and the residual input signals (LO and RF).

The 320 to 640 MHz ( $\Delta f = 20$  MHz) output is generated by heterodyning various combinations of input signals. Mixer U4 is a double balanced mixer (same as U1 and U10) but instead of normally feeding the two input signals into the RF and LO ports, one input signal is applied to the mixer's IF port and the output is taken at the mixer's RF port. In this configuration the mixer acts as a current-controlled switch (normal mixing action is disabled) when a dc current is applied to the mixer's IF port. That is, if a dc control current is applied to the IF port, the signal at the LO port is allowed to pass straight through to the RF port. The input signals to the IF port come from the LO drive (60, 80, 120, and 140 MHz) and the Controller (which supplies the dc control current to disable the mixer). The input signals to the LO port are derived from the HP multiplier Reference (B) (320, 480, and 640 MHz). The 3 to 1 Multiplexer circuit, which is comprised of four limiters (U2, U3, U6, and U8), directs one of the three signals to the LO port. Limiters U2, U6, and U8 can be switched on and off by controlling the bias current flowing into the limiters (via pin 3 of the limiters). The voltage at pin 3 is about -10 Vdc when the limiters are enabled.

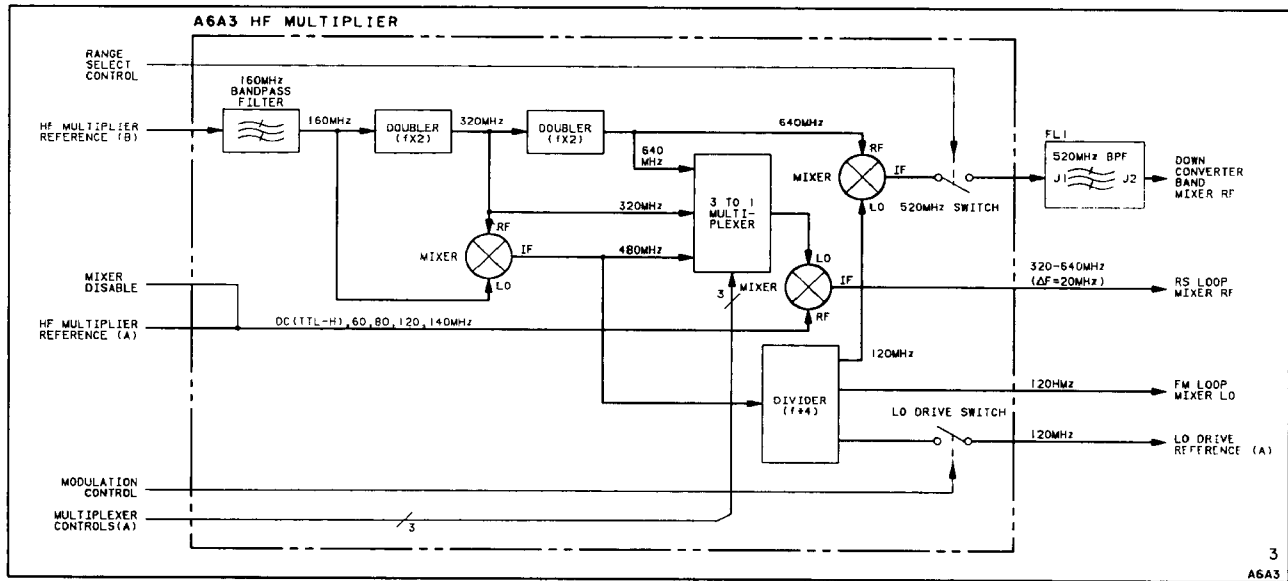
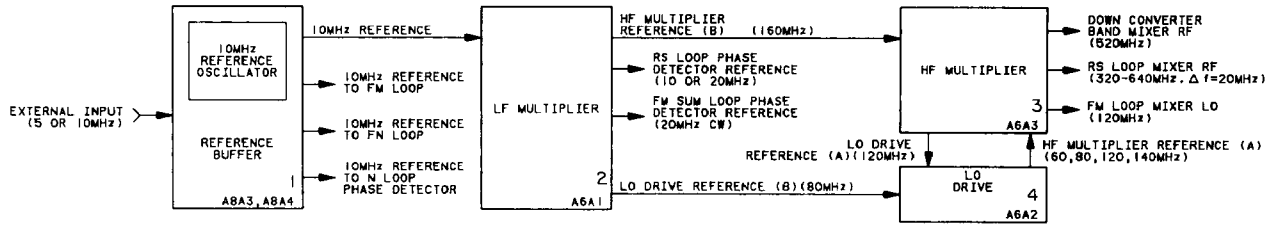


Figure 8-307. A6A3 Reference Section High Frequency Multiplier Block Diagrams

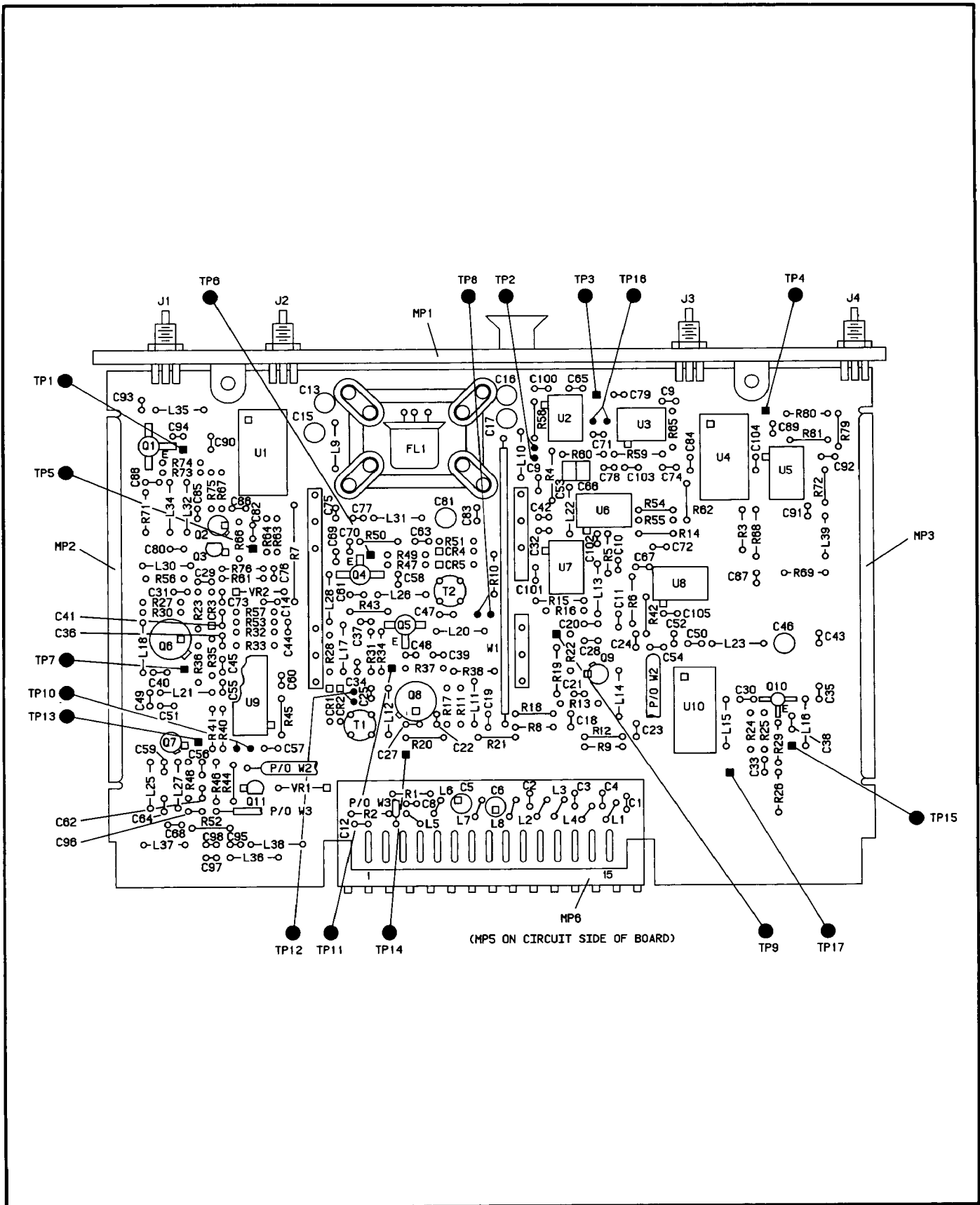


Figure 8-308. A6A3 Reference Section High Frequency Multiplier Component Locator

## CHANGES

### 2333A and Above

On the A6A3 component locator:

- A6A3R81-R83, C99 - Modify the component locator as shown in the partial component locator "P/O Figure 8-308. A6A3 Reference Section High Frequency Multiplier Component Locator (2333A)" on page 8-316.3

On the A6A3 schematic:

- A6A3R81-R83, C99 - Modify the schematic as shown in the partial schematic "P/O Figure 8-309. A6A3 Reference Section HF Multiplier Schematic" on page 8-316.3
- A6A3C38 - Change the value of C38 to 100p.
- Down Converter Band Mixer RF to Output Section (+1 dBm  $\pm$ .75 dB) Bullet "O" - On the right side of the page, find bullet "O". Change the label of this bullet to read, "Down Converter Band Mixer RF to Output Section (-1 dBm  $\pm$ 0.75 dB)"

### 2408A and Above

On the A6A3 schematic:

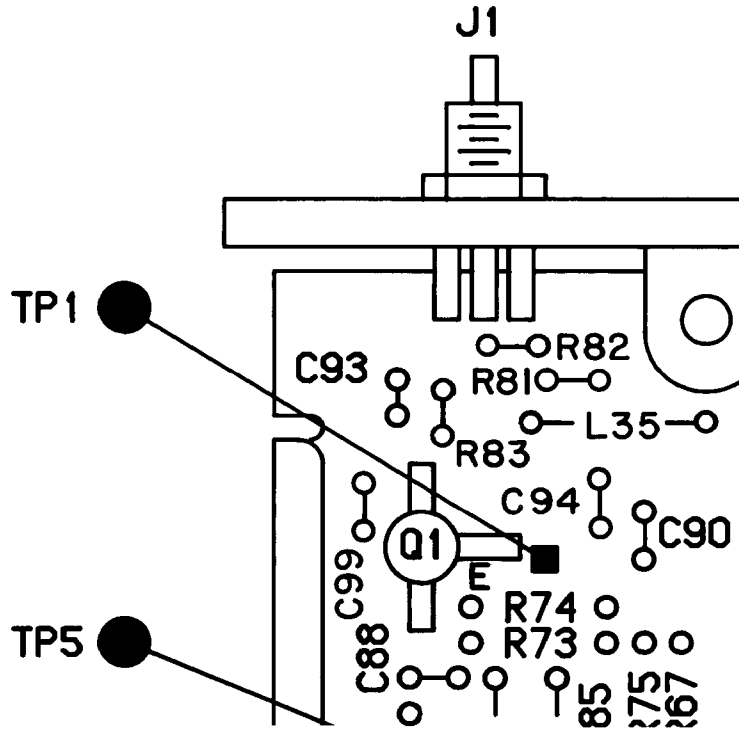
- AT2, J5, J15, TP2, W93, A6A3R84\* - Modify the schematic as shown in the partial schematic "P/O Figure 8-309. A6A3 Reference Section High Frequency Multiplier Schematic (2408A)" on page 8-316.4

### 2449A and Above

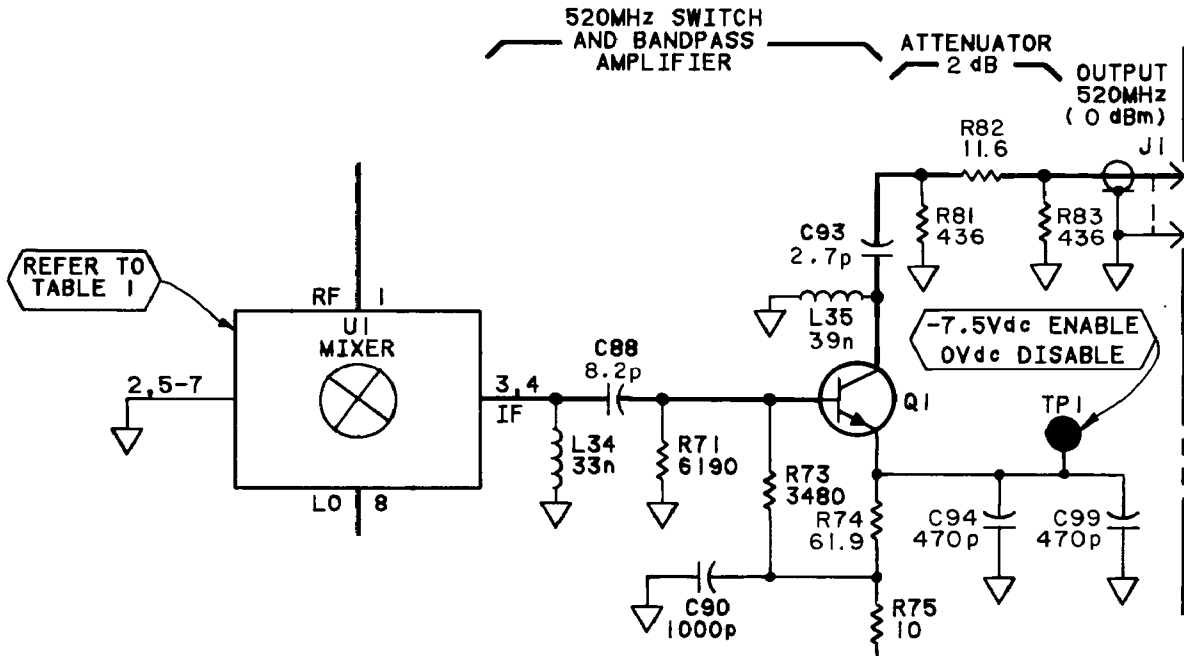
On the schematic:

- W93 - W93 was added on serial prefix 2408A. Refer to the partial schematic "P/O Figure 8-309. A6A3 Reference Section High Frequency Multiplier Schematic (2408A)" on page 8-316.4. Change the color code of W93 to "3".

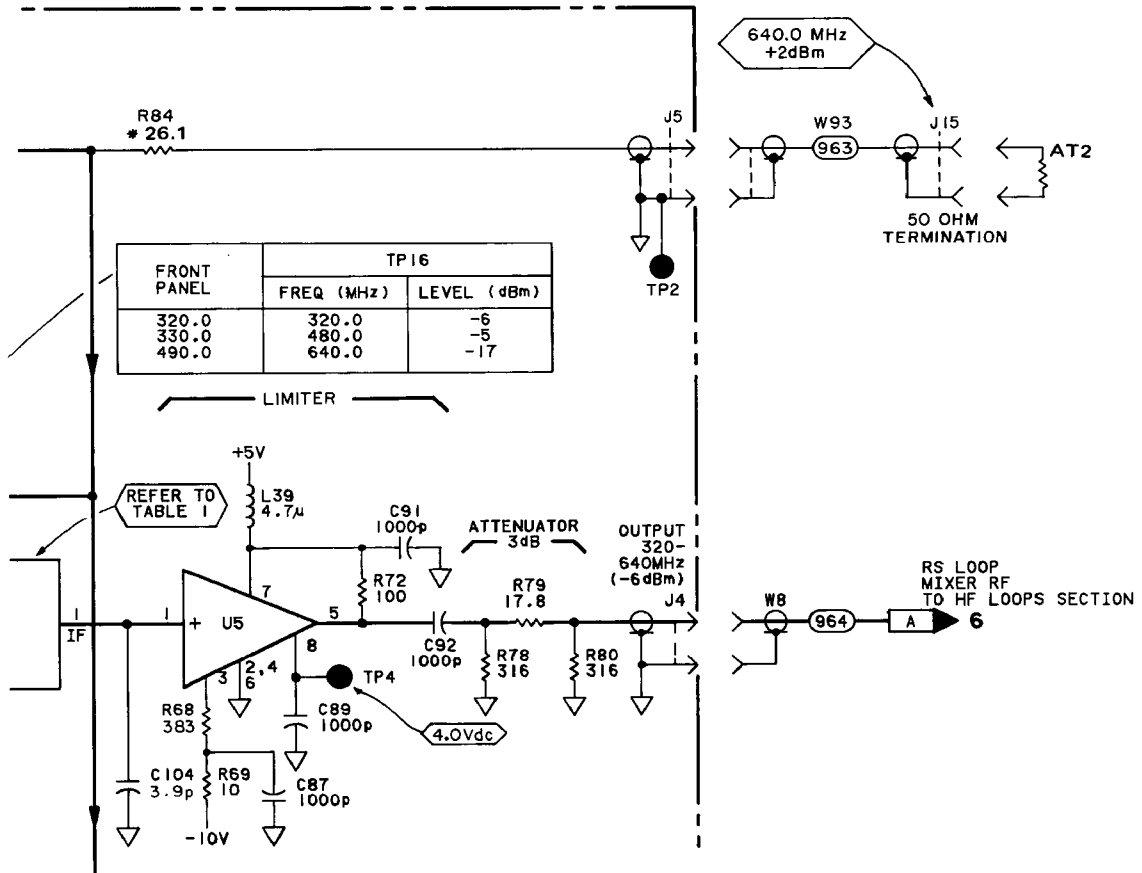




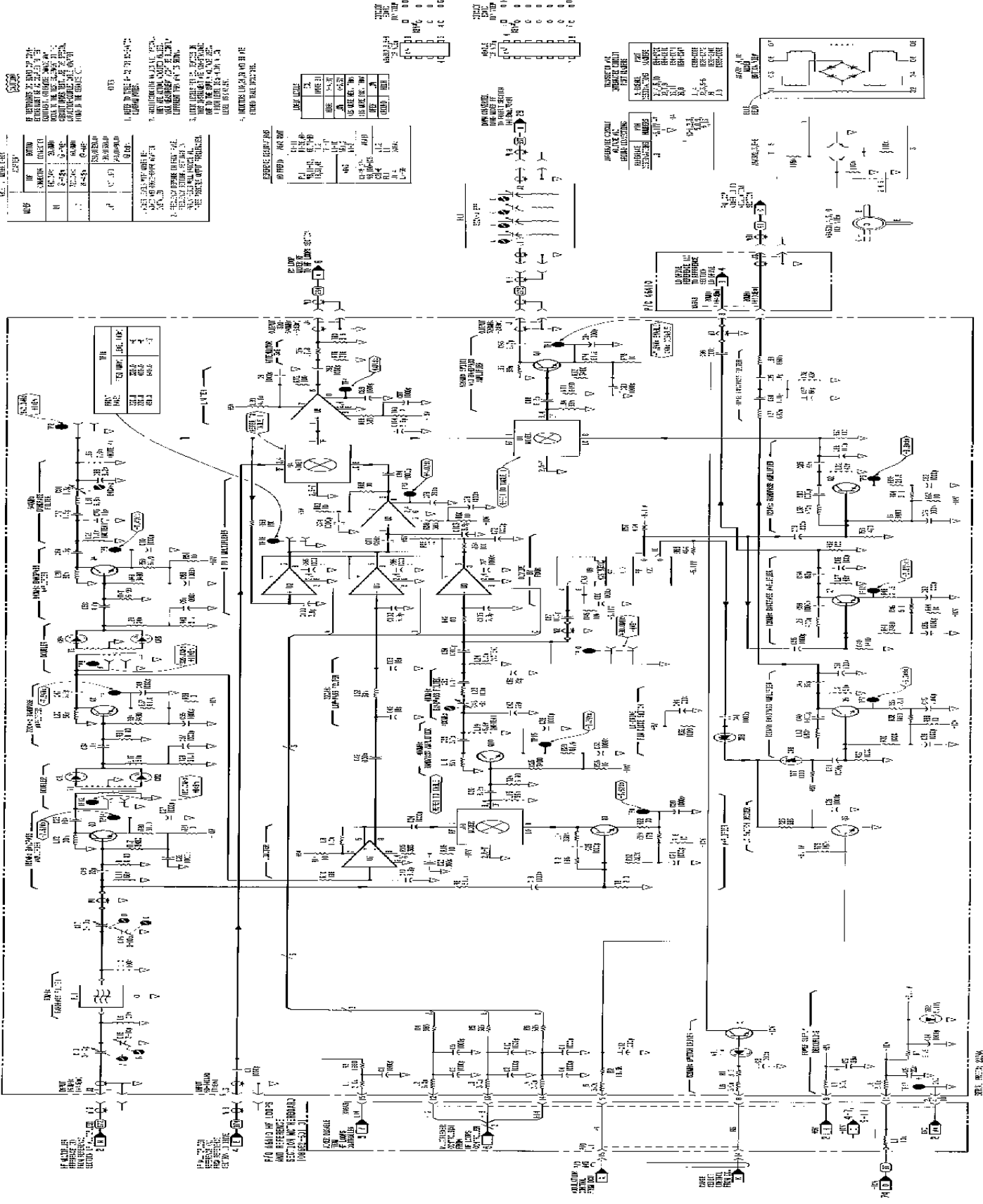
P/O Figure 8-308. A6A3 Reference Section HF Multiplier Component Locations (2333A)



P/O Figure 8-309. A6A3 Reference Section HF Multiplier Schematic (2333A)



P/O Figure 8-309. A6A3 Reference Section High Frequency Multiplier Schematic (2408A)



**TABLE 1**  
 PARTS LIST

QTY	DESCRIPTION	REF. DESIG.
1	VACUUM TUBE 6X4	1
1	VACUUM TUBE 6AV6	2
1	VACUUM TUBE 6BE6	3
1	VACUUM TUBE 6BD6	4
1	VACUUM TUBE 6X5	5
1	VACUUM TUBE 6X4	6
1	VACUUM TUBE 6AV6	7
1	VACUUM TUBE 6BE6	8
1	VACUUM TUBE 6BD6	9
1	VACUUM TUBE 6X5	10
1	VACUUM TUBE 6X4	11
1	VACUUM TUBE 6AV6	12
1	VACUUM TUBE 6BE6	13
1	VACUUM TUBE 6BD6	14
1	VACUUM TUBE 6X5	15
1	VACUUM TUBE 6X4	16
1	VACUUM TUBE 6AV6	17
1	VACUUM TUBE 6BE6	18
1	VACUUM TUBE 6BD6	19
1	VACUUM TUBE 6X5	20
1	VACUUM TUBE 6X4	21
1	VACUUM TUBE 6AV6	22
1	VACUUM TUBE 6BE6	23
1	VACUUM TUBE 6BD6	24
1	VACUUM TUBE 6X5	25
1	VACUUM TUBE 6X4	26
1	VACUUM TUBE 6AV6	27
1	VACUUM TUBE 6BE6	28
1	VACUUM TUBE 6BD6	29
1	VACUUM TUBE 6X5	30
1	VACUUM TUBE 6X4	31
1	VACUUM TUBE 6AV6	32
1	VACUUM TUBE 6BE6	33
1	VACUUM TUBE 6BD6	34
1	VACUUM TUBE 6X5	35
1	VACUUM TUBE 6X4	36
1	VACUUM TUBE 6AV6	37
1	VACUUM TUBE 6BE6	38
1	VACUUM TUBE 6BD6	39
1	VACUUM TUBE 6X5	40
1	VACUUM TUBE 6X4	41
1	VACUUM TUBE 6AV6	42
1	VACUUM TUBE 6BE6	43
1	VACUUM TUBE 6BD6	44
1	VACUUM TUBE 6X5	45
1	VACUUM TUBE 6X4	46
1	VACUUM TUBE 6AV6	47
1	VACUUM TUBE 6BE6	48
1	VACUUM TUBE 6BD6	49
1	VACUUM TUBE 6X5	50
1	VACUUM TUBE 6X4	51
1	VACUUM TUBE 6AV6	52
1	VACUUM TUBE 6BE6	53
1	VACUUM TUBE 6BD6	54
1	VACUUM TUBE 6X5	55
1	VACUUM TUBE 6X4	56
1	VACUUM TUBE 6AV6	57
1	VACUUM TUBE 6BE6	58
1	VACUUM TUBE 6BD6	59
1	VACUUM TUBE 6X5	60
1	VACUUM TUBE 6X4	61
1	VACUUM TUBE 6AV6	62
1	VACUUM TUBE 6BE6	63
1	VACUUM TUBE 6BD6	64
1	VACUUM TUBE 6X5	65
1	VACUUM TUBE 6X4	66
1	VACUUM TUBE 6AV6	67
1	VACUUM TUBE 6BE6	68
1	VACUUM TUBE 6BD6	69
1	VACUUM TUBE 6X5	70
1	VACUUM TUBE 6X4	71
1	VACUUM TUBE 6AV6	72
1	VACUUM TUBE 6BE6	73
1	VACUUM TUBE 6BD6	74
1	VACUUM TUBE 6X5	75
1	VACUUM TUBE 6X4	76
1	VACUUM TUBE 6AV6	77
1	VACUUM TUBE 6BE6	78
1	VACUUM TUBE 6BD6	79
1	VACUUM TUBE 6X5	80
1	VACUUM TUBE 6X4	81
1	VACUUM TUBE 6AV6	82
1	VACUUM TUBE 6BE6	83
1	VACUUM TUBE 6BD6	84
1	VACUUM TUBE 6X5	85
1	VACUUM TUBE 6X4	86
1	VACUUM TUBE 6AV6	87
1	VACUUM TUBE 6BE6	88
1	VACUUM TUBE 6BD6	89
1	VACUUM TUBE 6X5	90
1	VACUUM TUBE 6X4	91
1	VACUUM TUBE 6AV6	92
1	VACUUM TUBE 6BE6	93
1	VACUUM TUBE 6BD6	94
1	VACUUM TUBE 6X5	95
1	VACUUM TUBE 6X4	96
1	VACUUM TUBE 6AV6	97
1	VACUUM TUBE 6BE6	98
1	VACUUM TUBE 6BD6	99
1	VACUUM TUBE 6X5	100

NOTE: 1. ALL PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

2. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

3. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

4. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

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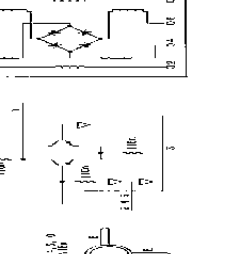
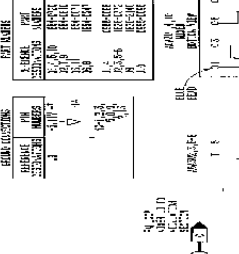
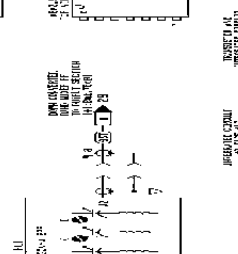
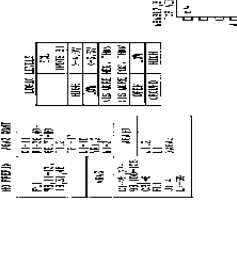
6. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

7. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

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9. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.

10. THE PARTS LISTED IN THIS TABLE ARE TO BE OBTAINED FROM THE SUPPLIER LISTED IN THE PARTS LIST.



SERVICE SHEET 4  
A6A2 LO DRIVE ASSEMBLY

## REFERENCE BLOCK DIAGRAM 4

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The LO Drive (A6A2) provides an output signal at either 60 MHz, 80 MHz, 120 MHz, or 140 MHz to the HF Multiplier (A6A3). A 4 to 1 multiplexer circuit is used to select one of the four frequencies. The primary inputs are the 80 MHz signal (LO Drive Reference (B)), and the 120 MHz signal (LO Drive Reference (A)). When either the 80 MHz or 120 MHz output frequency is selected the corresponding input signal is routed to the output jack, J2. The 60 MHz output is derived by dividing the 120 MHz input by two. For an output of 140 MHz, the 60 MHz signal and 80 MHz signal are mixed together.

## Mixer

Mixer U3 is a double balanced type which suppresses the input signals. The Mixer heterodynes the 60 MHz signals and 80 MHz signals to produce the 140 MHz signal (sum product). The difference signal and the residual input signal are attenuated by the 140 MHz Band-Pass Filter, leaving only the desired 140 MHz signal.

## 4 to 1 Multiplexer

The 4 to 1 Multiplexer consists of PIN diodes CR1 through CR8. PIN diodes act as current controlled resistors at RF frequencies. The Multiplexer Control, U2, supplies the control bias for the PIN diodes. The control bias is either switched on or off, hence, the PIN diodes act as RF switches. When the PIN diodes are forward biased the RF resistance is reduced, allowing the RF signal to pass. When the PIN diodes are reverse biased they offer high resistance to the RF signal.

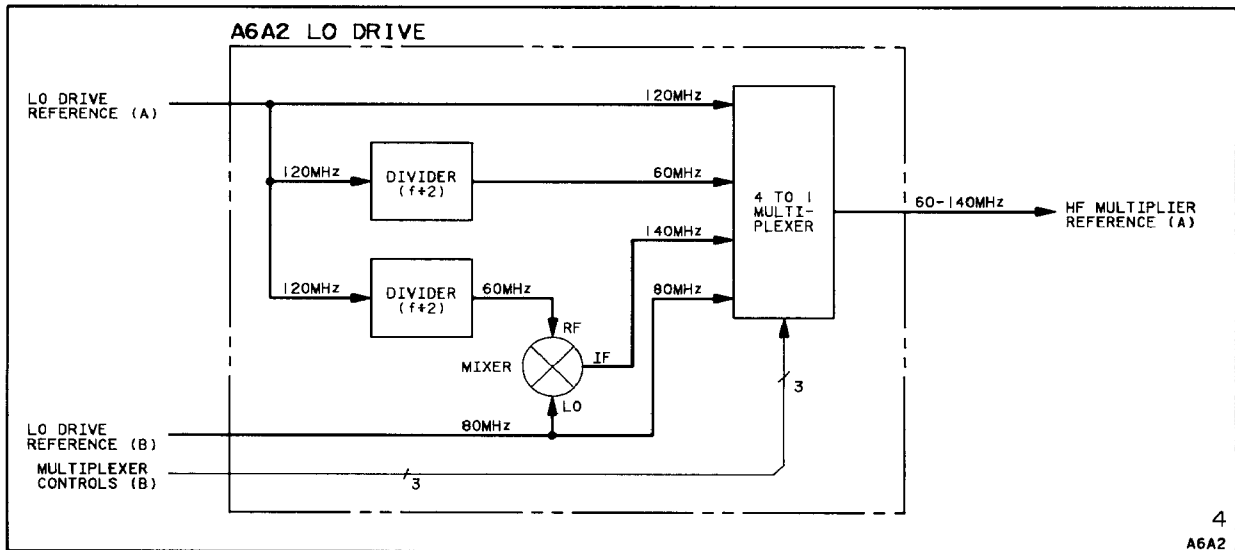
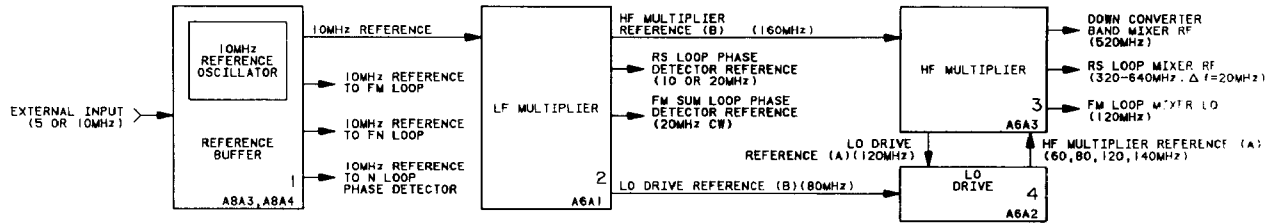


Figure 8-310. A6A2 Reference Section LO Drive Block Diagrams

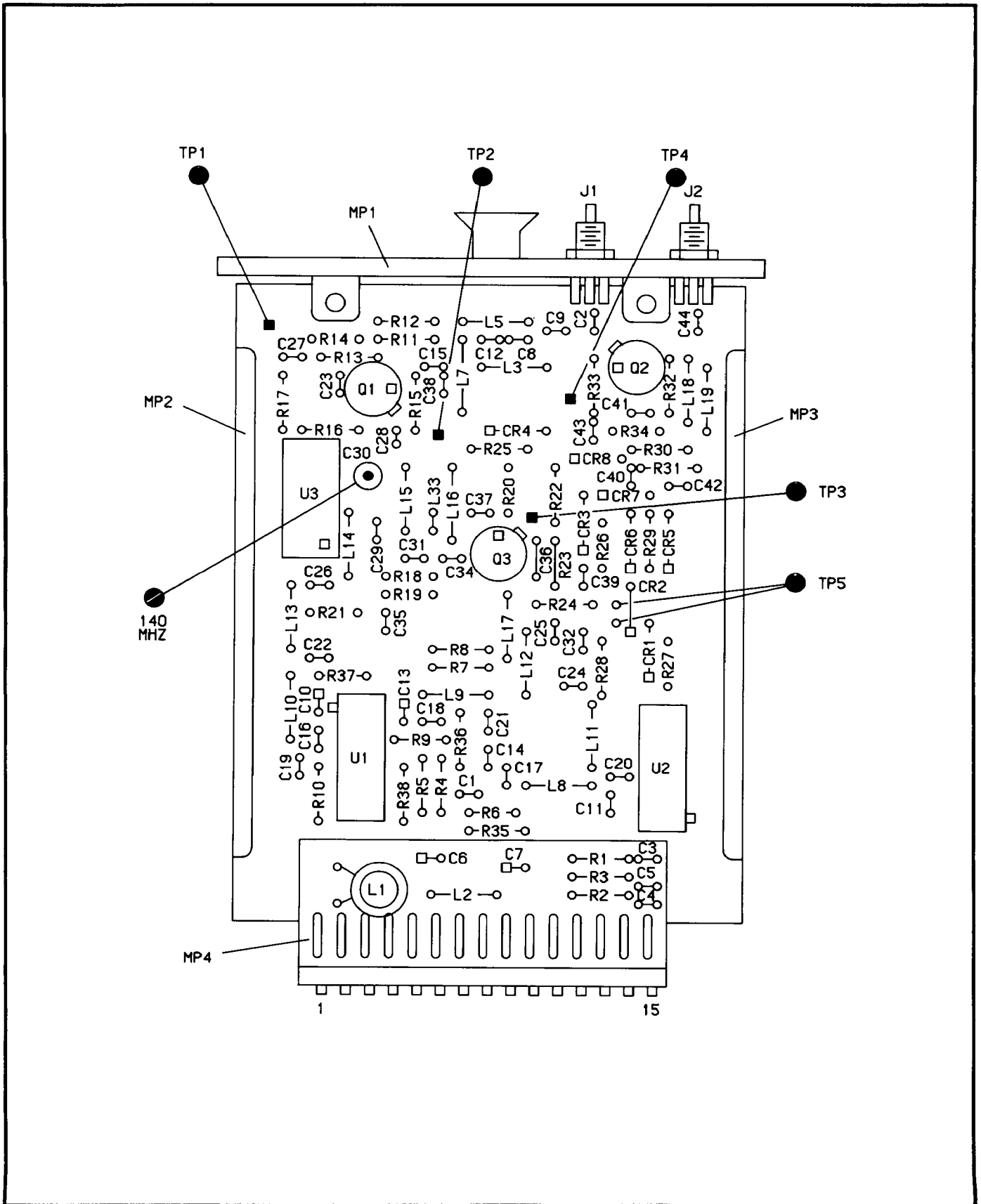


Figure 8-311. A6A2 Reference Section LO Drive Component Locator

**NOTES**

1. THE POINT OF BRIDGE OR OVERCROSSING MUST BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS TO THE ROADWAY. THE BRIDGE OR OVERCROSSING SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS TO THE ROADWAY. THE BRIDGE OR OVERCROSSING SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS TO THE ROADWAY.
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**NOTES**

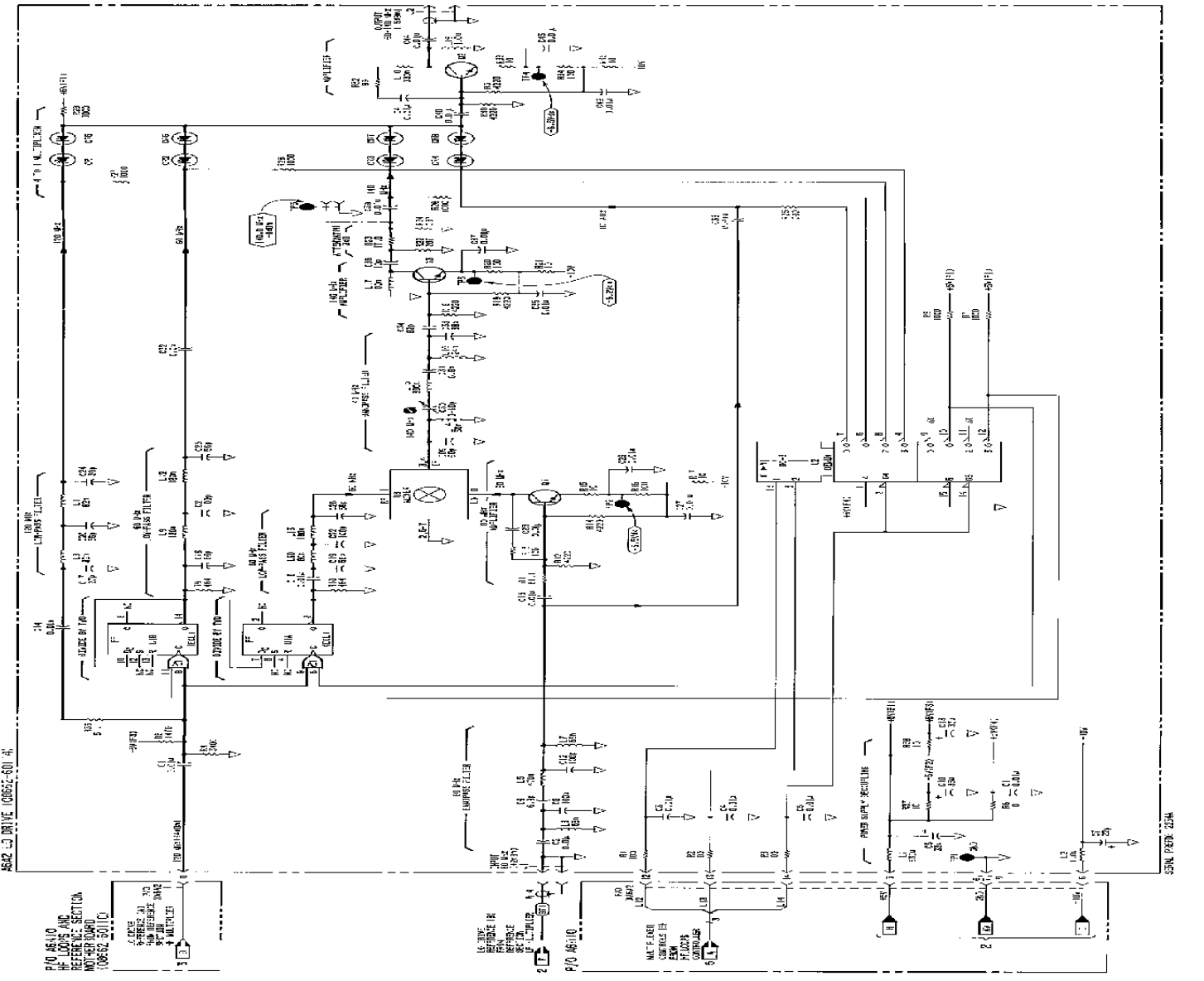
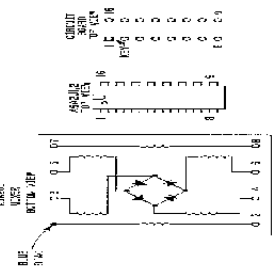
1. REFER TO THE DRAWING FOR THE LOCATION OF THE BRIDGE OR OVERCROSSING.
2. THE BRIDGE OR OVERCROSSING SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS TO THE ROADWAY. THE BRIDGE OR OVERCROSSING SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS TO THE ROADWAY. THE BRIDGE OR OVERCROSSING SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS TO THE ROADWAY.
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REVISION	DATE	BY
1	10/14	J.S.
2	10/14	J.S.
3	10/14	J.S.
4	10/14	J.S.
5	10/14	J.S.
6	10/14	J.S.
7	10/14	J.S.

REVISION	DATE	BY
1	10/14	J.S.
2	10/14	J.S.
3	10/14	J.S.
4	10/14	J.S.
5	10/14	J.S.
6	10/14	J.S.
7	10/14	J.S.

REVISION	DATE	BY
1	10/14	J.S.
2	10/14	J.S.
3	10/14	J.S.
4	10/14	J.S.
5	10/14	J.S.
6	10/14	J.S.
7	10/14	J.S.

REVISION	DATE	BY
1	10/14	J.S.
2	10/14	J.S.
3	10/14	J.S.
4	10/14	J.S.
5	10/14	J.S.
6	10/14	J.S.
7	10/14	J.S.



**SERVICE SHEET 4**  
**A6A2**

Figure 6-412. A6A2 Reference Section  
DC Drive Schematic  
9-827027





SERVICE SHEET 5  
A6A9 HF LOOPS AND REFERENCE SECTION CONTROLLER ASSEMBLY

## REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The ROMs on this board contain factory generated pre-tune and fine-tune information that provides precise control over loop gain, loop lock limits, high frequency switching, and VCO frequency in the high frequency section. BCD lines carrying information which corresponds to front panel digits DF7, DF8, and DF9 provide addressing for the ROMs on this board.

## Reference Sum (RS) and Output Sum (OS) Loop Inductor Switch Drivers

When a pair of inductor switch drivers is stimulated by a HI output from its respective ROM, the first transistor (for example, Q1) is turned OFF, turning Q2 ON to pull the inductor line to -30 volts. this shuts OFF the inductor being controlled. When the ROM output goes LO, Q1 is turned ON. This turns Q2 OFF. When Q2 turns OFF, current flows through the PIN diode in the VCO, turning the inductor ON.

All of the inductor driver circuits work in the same manner, except that different transistors are used for different current drive capabilities. The currents are: a, 15mA; b, 30mA; c, 30mA; d, 60mA; and e,120mA.

## TROUBLESHOOTING

The output of the ROMs (U1, U2, and U3) can be checked using Signature Analysis. Service sheet B1 contains operating instructions. The frequency data inputs (DB7-1 through DF9-2) are related to the front panel frequency display as explained in Note 1 on the schematic.

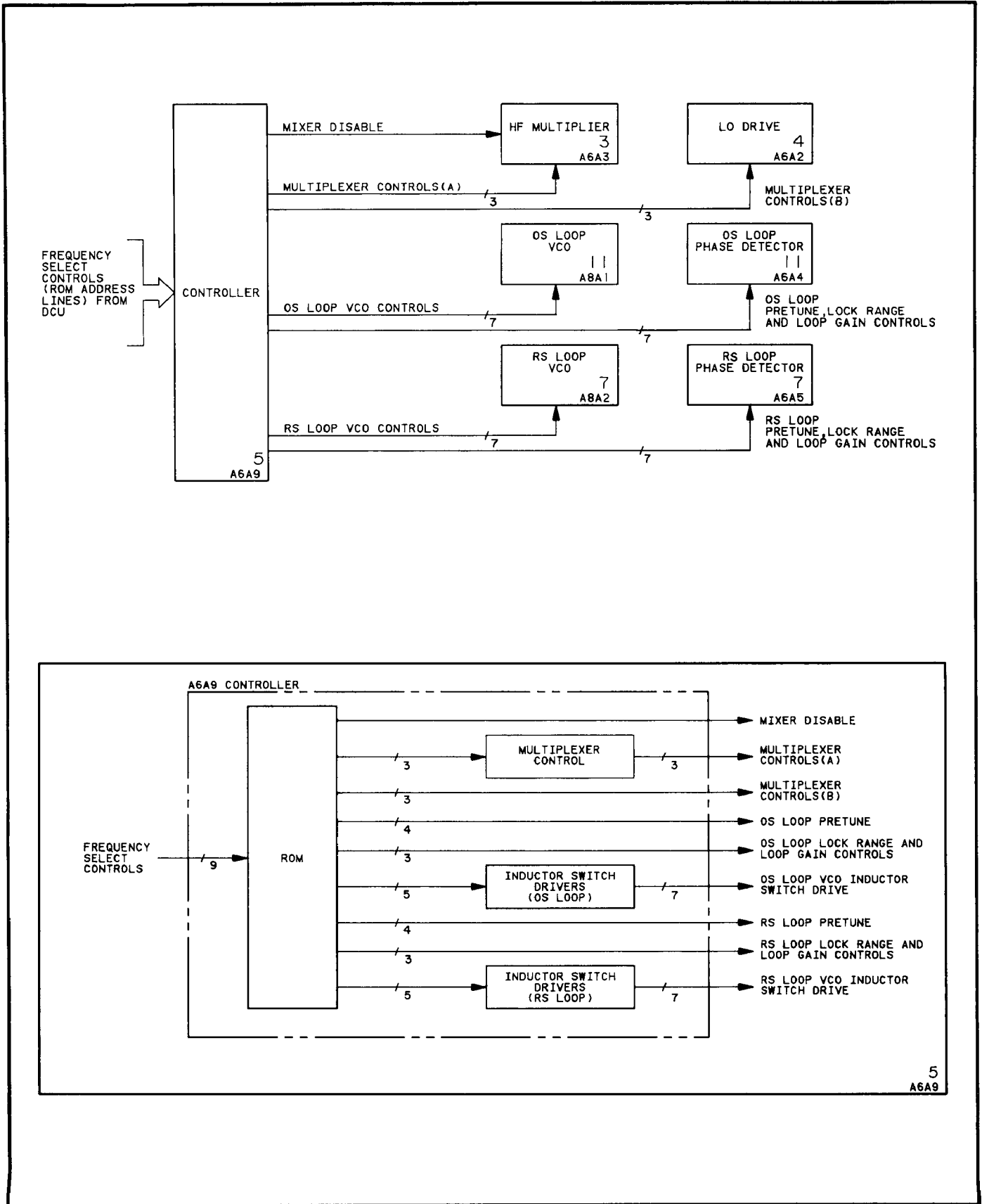


Figure 8-313. A6A9 Reference and High Frequency Loops Sections Controller Block Diagrams

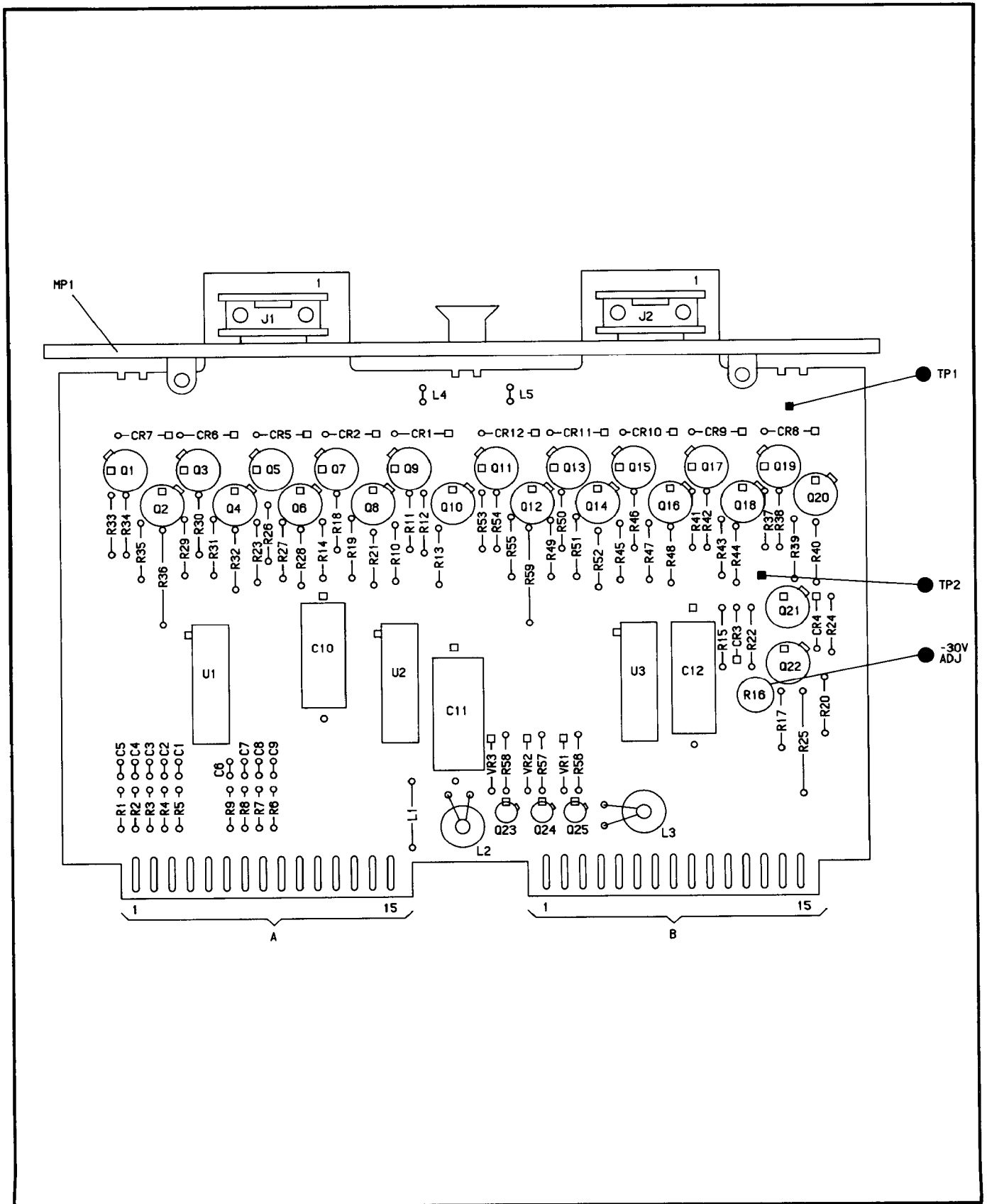


Figure 8-314. A6A9 Reference and High Frequency Loops Sections Controller Component Locator

## CHANGES

**All serial prefixes**

On the A6A9 schematic:

- A6A9R8, R9 - Change the value of R8 and R9 to 196 ohms.

**2552A and Above**

On the A6A9 schematic:

- A6A9 - Change the part number of the A6A9 CONTROLLER to 08662-60326.

- 1. REFER TO SHEET 417 FOR SUBSYSTEMS.
- 2. FOR INFORMATION ON THE PICTURE, REFER TO THE PICTURE KEY ON SHEET 417.
- 3. FOR INFORMATION ON THE PICTURE, REFER TO THE PICTURE KEY ON SHEET 417.

1. FOR INFORMATION ON THE PICTURE, REFER TO THE PICTURE KEY ON SHEET 417.

2. FOR INFORMATION ON THE PICTURE, REFER TO THE PICTURE KEY ON SHEET 417.

3. FOR INFORMATION ON THE PICTURE, REFER TO THE PICTURE KEY ON SHEET 417.

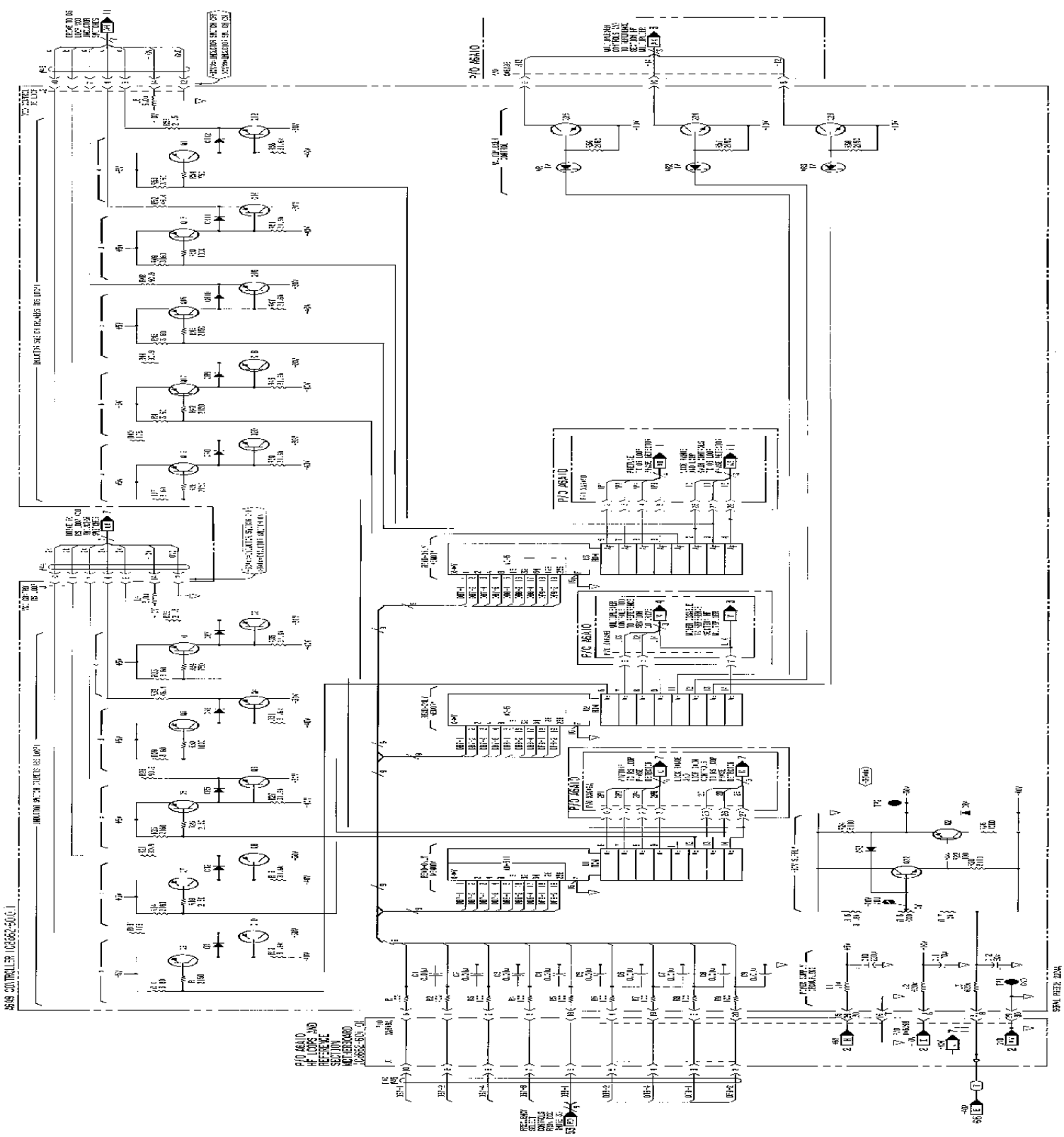
ITEM NO.	DESCRIPTION	QUANTITY
1	...	...
2	...	...
3	...	...

ITEM NO.	DESCRIPTION	QUANTITY
1	...	...
2	...	...
3	...	...

ITEM NO.	DESCRIPTION	QUANTITY
1	...	...
2	...	...
3	...	...

ITEM NO.	DESCRIPTION	QUANTITY
1	...	...
2	...	...
3	...	...

ITEM NO.	DESCRIPTION	QUANTITY
1	...	...
2	...	...
3	...	...



SERVICE SHEET 6  
A6A6 RF MIXER ASSEMBLY

## REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The Reference Sum Loop RF Mixer Board contains circuitry that combines the 310 MHz to 620 MHz and 320 MHz to 640 MHz inputs to produce the 10 MHz or 20 MHz loop IF output. The two limiter stages serve as buffers and also provide a constant output level to the linear amplifier. Each limiter stage has a gain of about 10 dB and limits at approximately +1 dBm.

The output of limiter U2 is fed to the single stage common emitter amplifier (Q1), which has a gain of about 8 dB. The mixer is a double balanced type (that is, both inputs are suppressed at the output). The output of the mixer contains the sum and difference frequencies of the two input signals at a power level of approximately -16 dBm. The sum signal is filtered by the 25 MHz low-pass filter, leaving only the desired difference signal at the output.

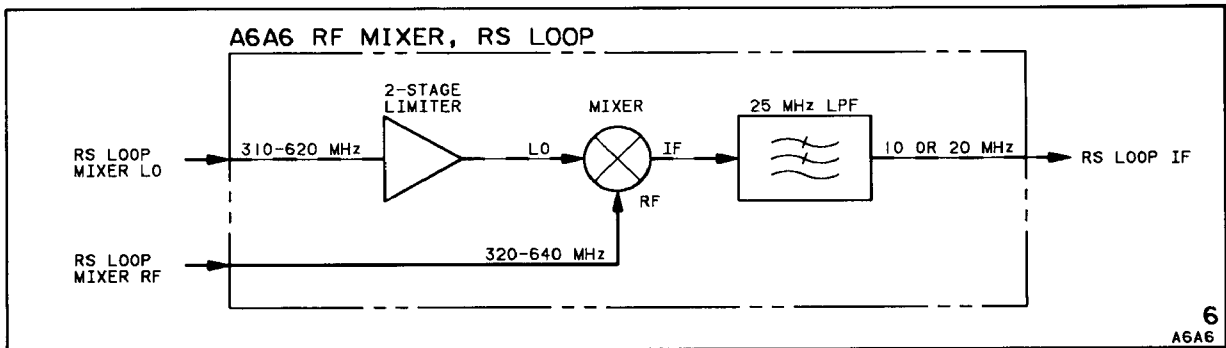
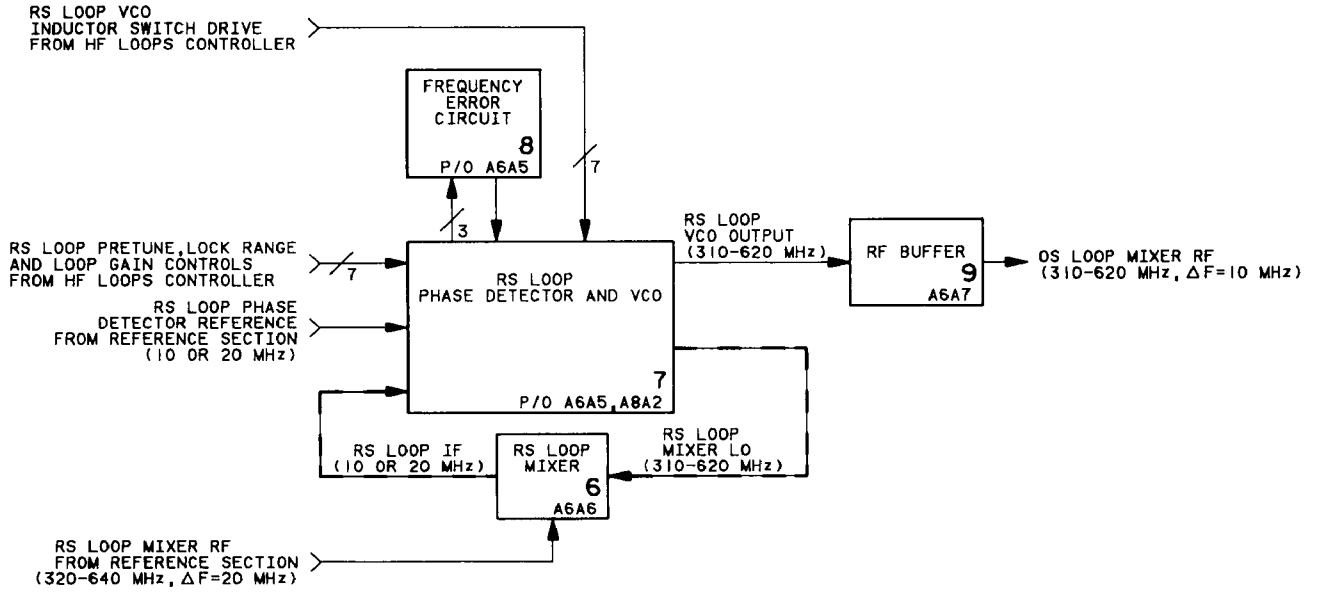


Figure 8-316. A6A6 Reference Sum Loop RF Mixer Block Diagrams

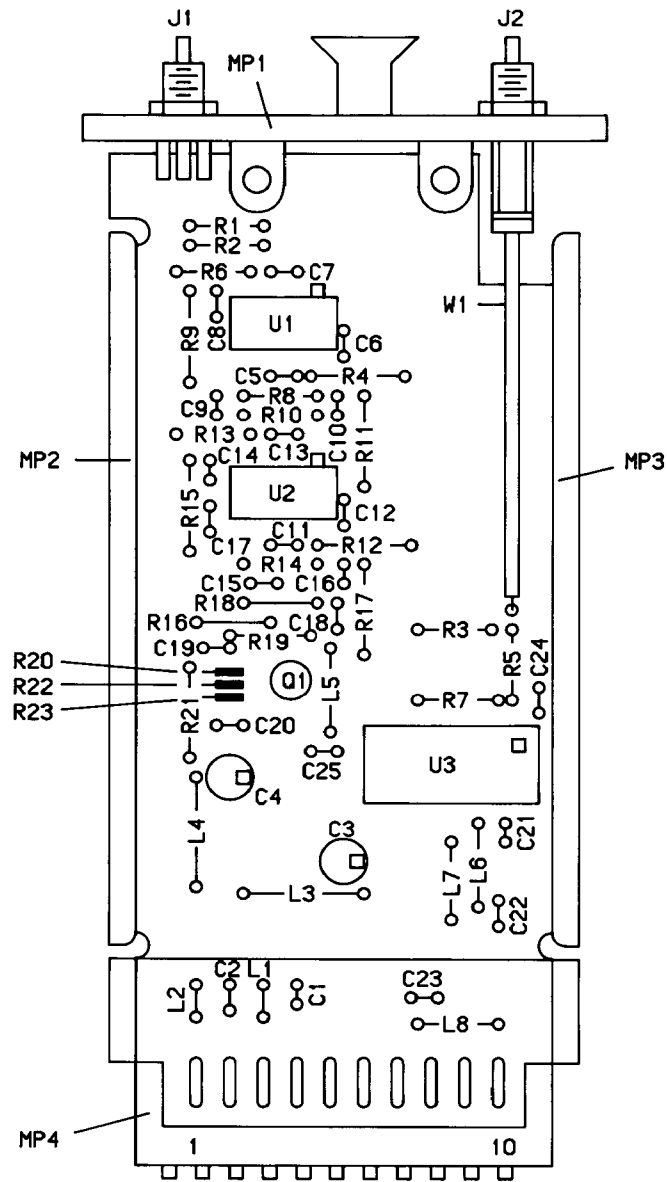


Figure 8-317. A6A6 Reference Sum Loop RF Mixer Component Locator



**CHANGES****2837A and above**

On the A6A6 schematic:

- C1, C2 - Under **POWER SUPPLY DECOUPLING** change the value of C1 and C2 to 1000pF.

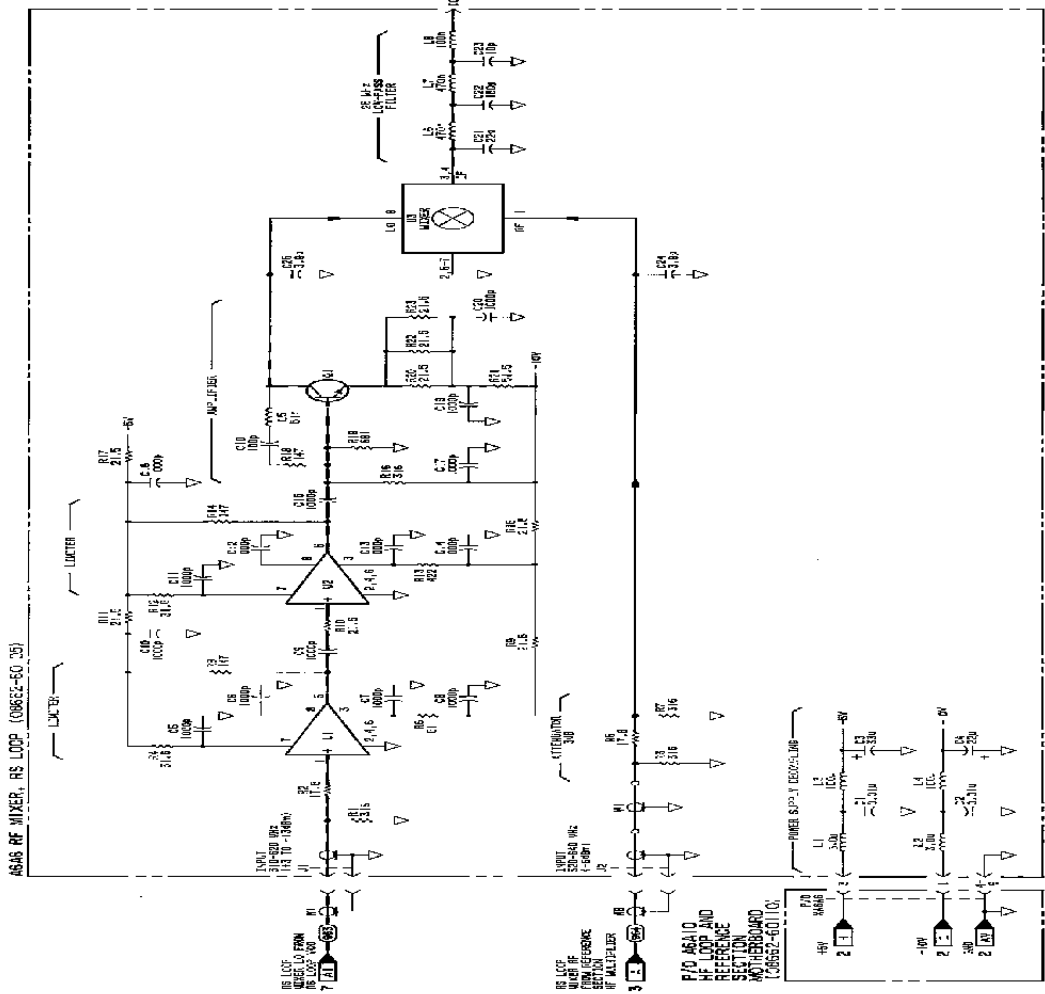
- NOTES**
1. REFER TO TABLE B-10 FOR SCHEDULED DIMENSION VALUES.
  2. DIMENSIONS ON THIS DRAWING ARE TYPICAL. CHECK FOR ACTUAL DIMENSION VALUES. DIMENSIONS MAY BE SLIGHTLY DIFFERENT FROM WHAT IS SHOWN.

**REFERENCE IDENTIFIERS**

PC-3872D	44410
M1.3	W6A5
C1-2B	
U1-2	
R1-2	
U1-3	
U1-4	

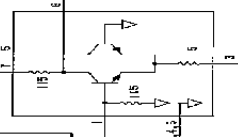
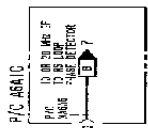
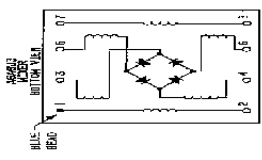
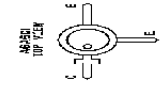
**TRANSISTOR AND INTERCONNECT PART NUMBERS**

REFERENCE DESIGNATORS	PART NUMBER
Q1	18A4-1202
U1-2	1224-2172
U1-3	1884-0096



**ASSEMBLY**

PC-3872D	44410
M1.3	W6A5
C1-2B	
U1-2	
R1-2	
U1-3	
U1-4	



ESK. PREP. 728A

## SERVICE SHEET 7

## P/O A6A5, A8A2 REFERENCE SUM LOOP PHASE DETECTOR AND VOLTAGE CONTROLLED OSCILLATOR ASSEMBLY

## REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The 10/20 MHz loop phase detector reference signal (at J1) and the 10/20 MHz loop IF signal (at board pin 1) are attenuated and amplified, respectively, and are sent to the phase detector formed by CR1, CR2, CR3, and CR4. The phase detector combines the two signals and outputs a difference signal which is filtered by a 5 MHz low-pass filter and a 19 MHz broadband notch filter before entering the integrator formed by Q7, Q8, and Q9.

The integrator output current is converted to voltage by Q10. This voltage is summed with a four-bit ROM-controlled BCD pretune current in the resistor-diode shaper. The resulting voltage is then filtered, buffered, and used to drive the VCO so that it produces linear tuning with constant loop gain.

The frequency range of the integrator voltage is automatically adjusted to maintain a constant lock range for the loop. The long time constants associated with switching the RC loop gain adjust are accelerated by the speed-up circuit during switching.

## Loop Reference and IF Limiters

Before the 10/20 MHz loop IF (from the RF mixer) is compared against the 10/20 MHz loop phase detector reference frequency within the double balanced phase detector, the two signals are passed through identical limiters. Prior to entering the limiters, the reference signal is attenuated by 3 db and the IF signal is amplified by 8 dB so that the two signals have amplitudes of about -3 dBm to -5 dBm. The limiters have adequate gain at this input level to produce sharp limiting action over the 10 MHz to 20 MHz frequency range. The outputs of the limiters are connected to the inputs of center-tapped transformers T1 and T2. These transformers, together with four PN junction diodes, form the high level mixer/phase detector.

## Phase Detector

A high level mixer is used as the phase detector on this board. Switching both sides of the phase detector hard generates a very linear slope. IF signals are suppressed by double balanced action so that the main components at the output are dc phase and two times the IF signal. The two signals from the limiters and the phase detector output signal operate the lock acquisition circuitry.

## Integrator

The phase detector's output signal passes through the 5 MHz low-pass filter and a 19 MHz notch filter. The signal which enters the integrator is either an ac difference frequency or a dc voltage (for signals of the same frequency). In this latter case, the dc varies between  $\pm 0.6$  volts. The integrator has a large dc gain with a zero located at about 7 kHz. The loop locks at a  $90^\circ$  phase difference when the dc voltage reaches 0 volts. The integrator has only one driving input when the difference frequency is less than 200 kHz. This input comes from the 5 MHz low-pass filter. If the difference signal is greater than 200 kHz, an additional drive current (the primary driver at this point) is supplied by the out-of-lock circuitry.

The integrator's output is proportional to the charge across its feedback capacitor. The output level will be between 0 volts and some positive level determined by the lock range limit control and limit detector (set by the controller).

The integrator is actually a discrete component op-amp. It produces output voltages in 8 ranges. These 8 ranges accommodate the widely differing voltage-frequency sensitivity of the VCO caused as various combinations of inductors are switched into the VCO. Gain of the integrator is maximum at dc, but reaches unity between 250 kHz and 500 kHz. The high gain for close-in signals suppresses VCO noise.

## Lock Range Limit Control and Out-Of-Lock Detector

As inductors in the VCO are switched ON in parallel, the VCOs sensitivity increases. As the VCO frequency is increased from 310 MHz to 640 MHz by progressively switching in inductors A, B, C, D, and E, the oscillators' gain increases by a factor of four (12dB). To maintain constant lock range, the positive voltage swing of the integrator is limited by a 3-bit D/A converter controlled by the signals that switch inductors C, D, and E, the most significant frequency bits. The output of the D/A resistive ladder drives the out-of-lock circuitry.

The out-of-lock detector (U4) compares the D/A output against the positive swing of the integrator. If the output becomes too positive, an out-of-lock signal is generated. Loss of signal or oscillator-drift, causing the integrator to reach its positive voltage limit, triggers this circuit and causes four things to happen. It lights the out-of-lock LED, sends TTL LO signals back through the motherboard to the microprocessor, enables the first dual CMOS switch and the two TTL trigger circuits, and enables the digital discriminator to clock the mixer beat note, producing a pulse-width modulated discriminator signal.

### Resistor Diode Shaping Network

The VCO is controlled by varying the reverse bias on a group of varactor diodes which form part of the oscillator's tank circuit. An increase in reverse bias causes a reduction in junction capacitance, which increases the frequency. However, the frequency characteristic of the tuning circuit is not a linear function of input voltage.

A shaping circuit on the Phase Detector Board is used to linearize the signal. The shaping circuit consists of a ladder of diodes which are reverse biased at successively higher voltages. As the signal level increases, the diodes become progressively forward biased, presenting a lower impedance to the drive source. The tuning curve of the VCO is thus approximated by the shaping circuits in a piecewise linear manner.

### 4-Bit BCD Pretune

The beat note of the difference of the loop IF down-converted frequency and the reference frequency passes through a 7 MHz low-pass filter to remove the RF sum frequency and leave only the difference frequency. The pretune ensures that this difference frequency will be less than 7 MHz by pretuning within 7 MHz of its locked frequency. The pretune D/A converter is formed by quad comparator U13, JFET switches Q17-Q20, and associated circuitry. The Reference Sum Loop pretune inputs accept TTL signals from the Controller Assembly (service sheet 5) to control the pretuning. The pretunes are weighted BCD currents of 0.63mA, 1.25mA, 2.50mA, and 5.00mA. R85 allows the pretune currents to be scaled up or down by 7% and allows for minimization of dc offset. The collector of Q12 injects the pretune current into the resistor-diode shaper.

### Loop Gain Adjust and Pretune (Speed-Up) Circuitry

The loop gain adjust circuit works on the same principle as the lock range circuit. VCO inductor lines C, D, and E control gates that activate the RC attenuator sections in the loop gain adjust circuit, ensuring that no phase shift occurs at the loop gain crossover frequency. Because of the low frequency and large capacitors, diodes CR29, CR30, CR31, and CR32 are used to speed up charging of these capacitors during switching. R95 and C49 keep loop gain as constant as possible with any combination of inductors A, B, C, D, and E switched on.

### VCO (A8A2)

The VCO in the high frequency loops section is a non-field-repairable assembly; it is sealed and can only be repaired at the factory. The VCO is coarsely tuned by a 5-bit code which switches inductors A, B, C, D, and E inside the VCO. A control voltage of -9 Vdc to -38 Vdc fine tunes the VCO to lock the loop. The output frequency of the VCO extends from 310 MHz to 620 MHz, at +3 dBm to -13 dBm (level depends on frequency).

### TROUBLESHOOTING

When a high frequency loops problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem.

1. Mount the A6A5 assembly on an extender board. Move the slide switch to the TEST position (up). This opens the loop.
2. Set the front panel frequency setting to 510.0 MHz. Connect a counter or spectrum analyzer to the A8A2 VCO output [disconnect cable W43 (965) from A6A7J1 and measure the signal at the end of the cable]. Connect the output of an adjustable power supply to A6A5TP14 (+) and A6A5TP1 (-).

3. Set the power supply output voltage to approximately 4 volts. The counter should read close to 510 MHz. Slowly decrease the power supply output to zero, and then increase the voltage to +8V. Check that the frequency changes as shown, but the amount and direction of change should be similar to these values.

Voltage to TP14 (Vdc)	TP2 (Vdc)	VCO Frequency (MHz)
0.0	-14.3	504
4.0	-11.8	498
8.0	-9.9	492

If these readings are correct, continue troubleshooting with step 4. Otherwise, there is a problem from TP14 to TP2. Troubleshoot to find the cause.

4. Monitor TP8 with the high impedance input of a counter. The counter should read the difference signal from the phase detector. Vary the adjustable power supply so the VCO frequency varies above and below 500 MHz. The counter should read the absolute frequency error.

If operation of this circuit is normal, continue troubleshooting with step 5. Otherwise, there is a problem with the phase detector circuitry.

5. Monitor TP7 (service sheet 8) with an oscilloscope or TTL logic probe. Vary the adjustable power supply so the VCO varies above and below 500 MHz. TP7 should be a TTL logic high (>2.4 Vdc) when the VCO is within 200 kHz of 500 MHz. At more than 500.2 and less than 499.2 MHz, TP7 should become a TTL logic low (<0.8 Vdc).

If operation of this circuit is normal, continue troubleshooting with step 6. Otherwise, there is a problem with the out-of-lock discriminator circuitry (bottom half of service sheet 8). Troubleshoot this circuitry to find the cause.

6. Monitor U3 pin 7 (service sheet 8) with a scope. Vary the adjustable power supply so the VCO is less than 499.7 MHz. The output of U3 should be less than 0.5 Vdc.

Increase the VCO frequency to more than 500.3 MHz. The output of U3 should be more than 3.5 Vdc.

If operation of this circuit is normal, continue troubleshooting with step 7. Otherwise, there is a problem with the frequency detector circuitry (top half of service sheet 8). Troubleshoot this circuitry to find the cause.

7. Monitor TP3 (service sheet 8) with an oscilloscope. Vary the adjustable power supply to increase the frequency of the VCO to more than 501.0 MHz. The signal at TP3 should be a dc level more negative than -3.0 Vdc. This level will become more negative as the RF output frequency increases.

Decrease the frequency of the VCO to less than 499.0 MHz. The signal at TP3 should be a series of pulses with slow rise and fall times at about a +4 Vdc level. The level increases and the pulses get smaller as the RF output frequency decreases.

If operation of this circuit is normal, continue troubleshooting with step 8. Otherwise, there is a problem with the CMOS switch (U7) or the circuitry that drives it. Troubleshoot this circuitry to find the cause.

8. Monitor TPA (output of integrator) with an oscilloscope. Vary the adjustable power supply to make the frequency of the VCO signal greater than 501.0 MHz. The waveform at TPA should be a dc level greater than +7.0 Vdc. Decrease the VCO frequency to less than 499.9 MHz. The waveform at TPA should be a dc level near ground. Pulse like those seen on TP3 may be visible on either of these levels.

If these waveforms are not normal, there is a problem with the integrator circuitry.



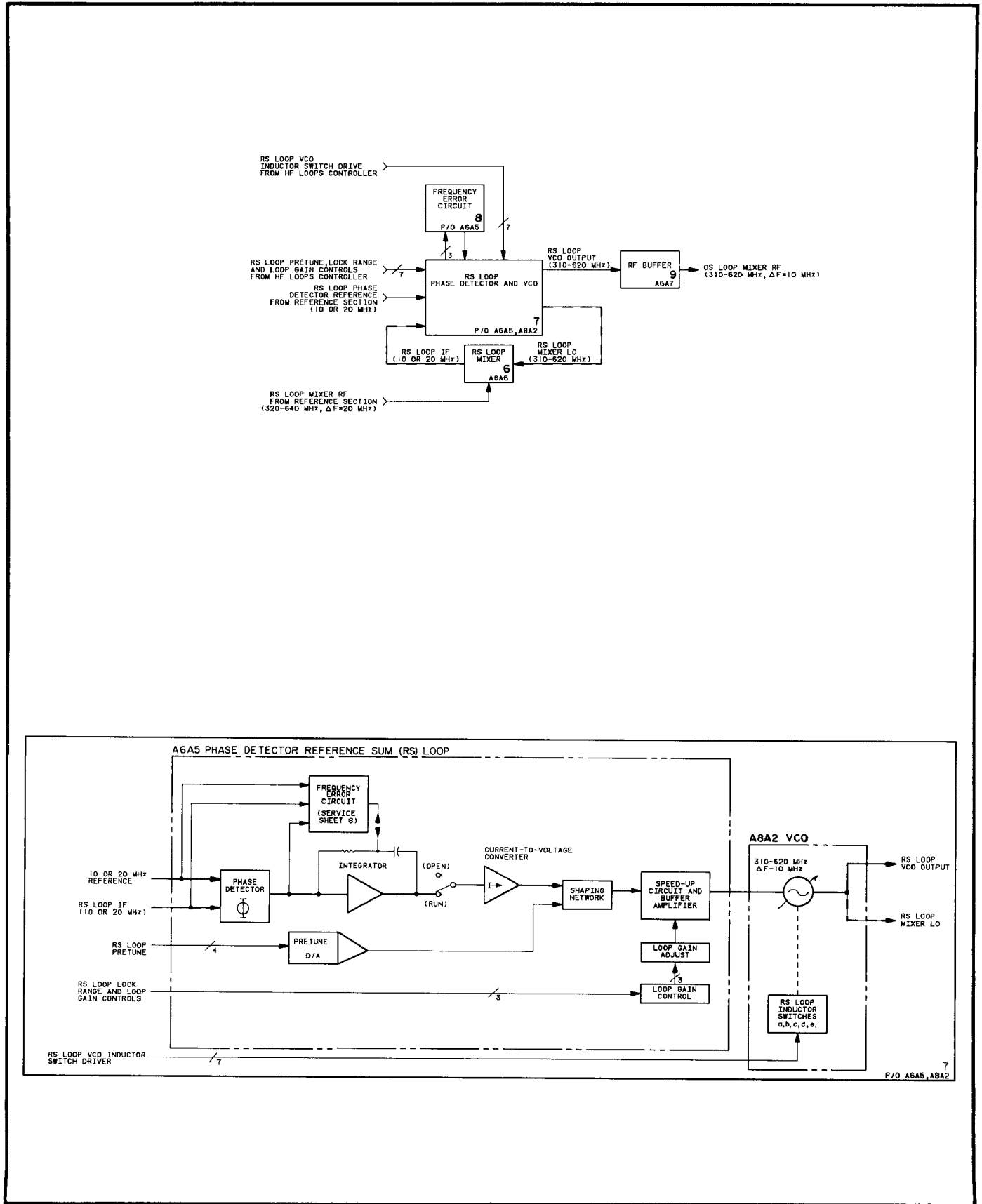


Figure 8-319. P/O A6A5 Reference Sum Loop Phase Detector Block Diagrams

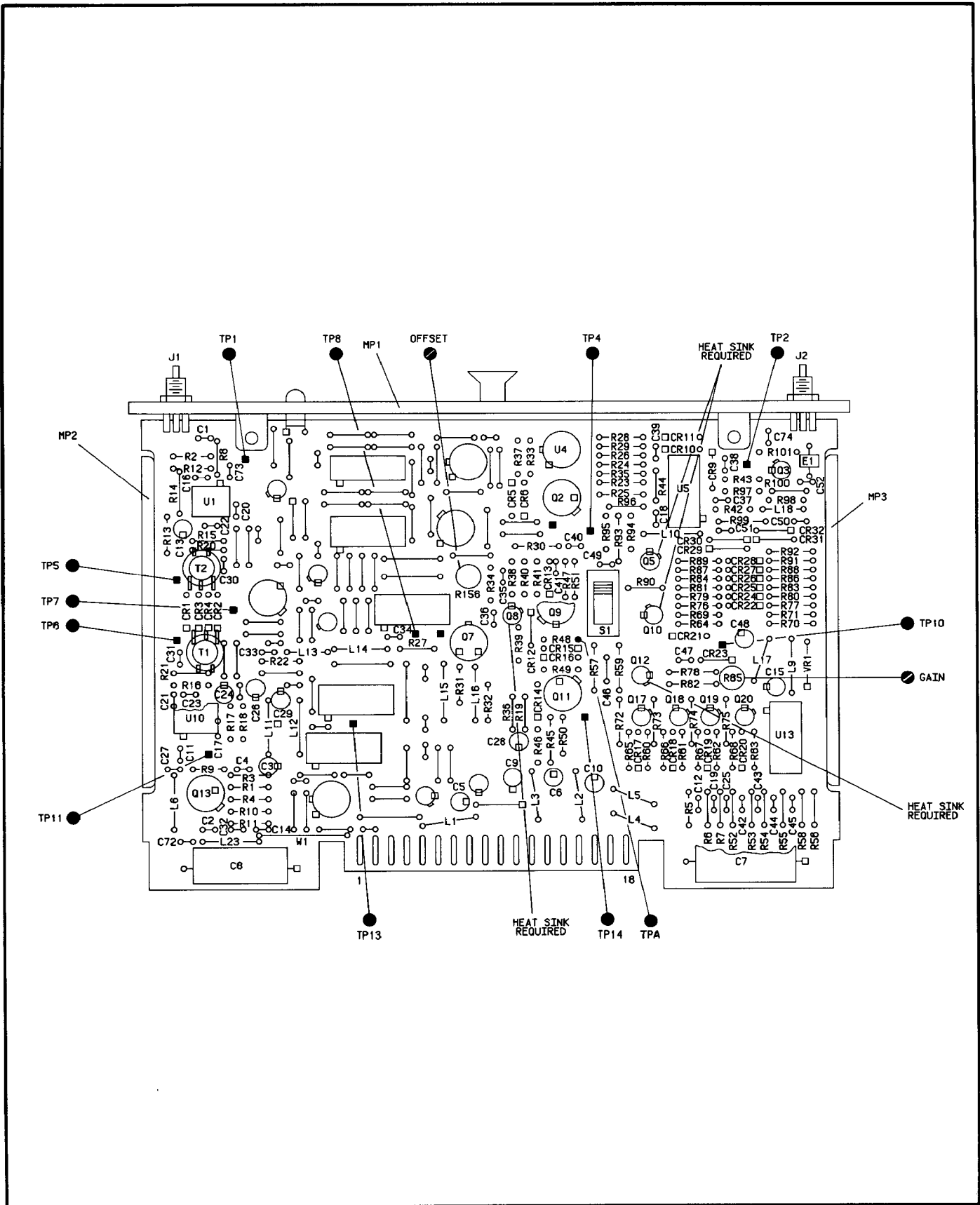
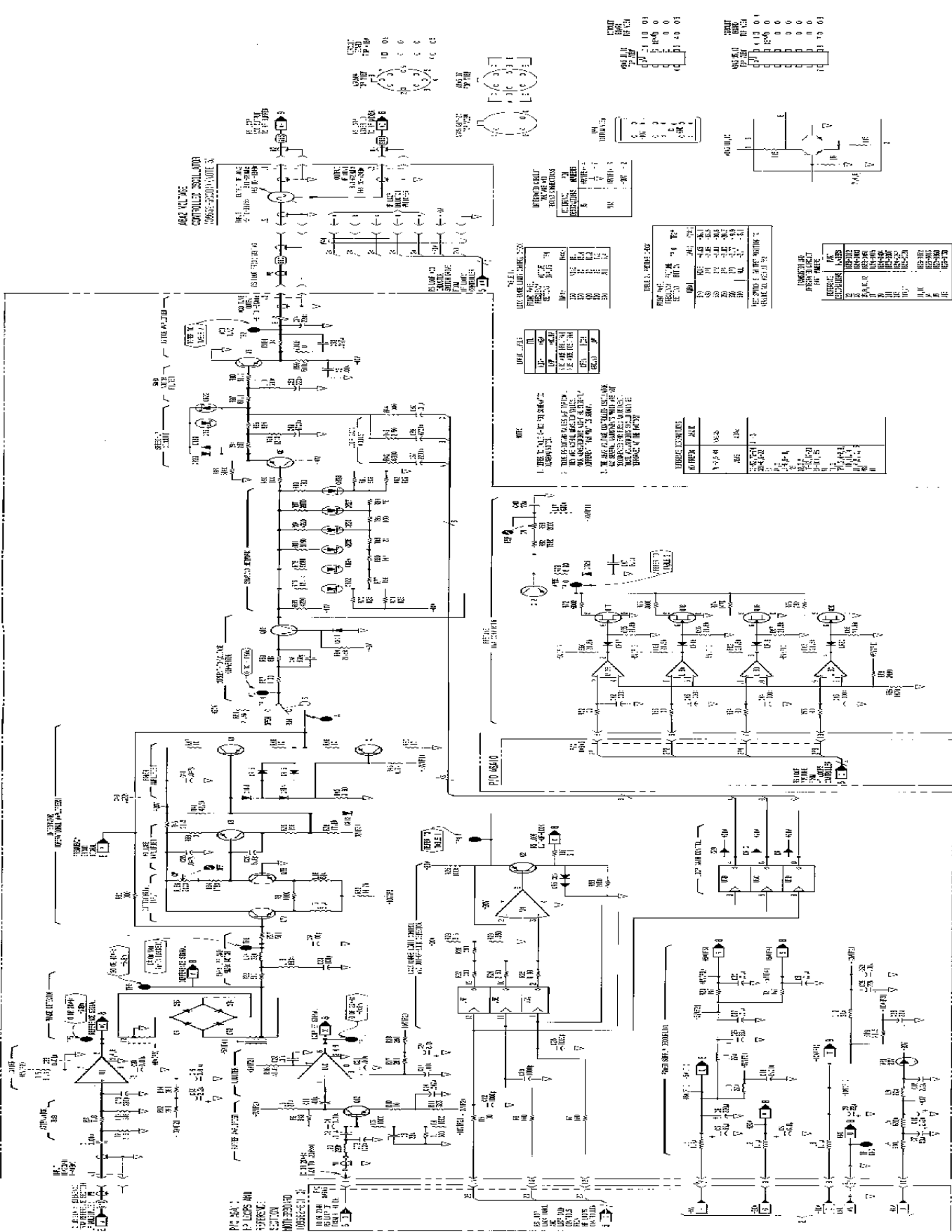


Figure 8-320. P/O A6A5 Reference Sum Loop Phase Detector Component Locator

**CHANGES**

<b>2319A and above</b>	<p>On the A8A2 schematic:</p> <ul style="list-style-type: none"> <li>• <u>A8A2</u> - Change the part number of the A8A2 Assembly to 08662-60317.</li> </ul>
<b>2601A and above</b>	<p>On the schematic:</p> <ul style="list-style-type: none"> <li>• <u>A6A5Q7</u> - In the "Table of Transistor and Integrated Circuit Part Numbers", change the part number of Q7 to 1854-1046.</li> </ul>
<b>2706A and above</b>	<p>On the A6A5 schematic:</p> <ul style="list-style-type: none"> <li>• <u>A6A5</u> - Change the part number of the A6A5 Assembly to 08662-60357.</li> </ul>
<b>2823A and above</b>	<p>On the A8A2 schematic:</p> <ul style="list-style-type: none"> <li>• <u>A8A2</u> - Change the part number of the A8A2 Assembly to 08662-60417.</li> </ul>
<b>2837A and above</b>	<p>On the A6A5 Component Locator:</p> <ul style="list-style-type: none"> <li>• <u>R2, R8, R12</u> - In the upper left hand corner of the component locator change R2 to C75, R8 to L24, and, delete R12.</li> </ul> <p>On the A6A5 schematic:</p> <ul style="list-style-type: none"> <li>• <u>R2, R8, R12</u> - In the upper left hand corner of the schematic change <b>ATTENUATOR 3dB</b> to <b>25 MHz LOW PASS FILTER</b>. Delete R2, R8, and, R12. Add C75 100p to ground in place of R2 and add L24 560nH in place of R8.</li> </ul>



ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

WIRE NO.	DESCRIPTION
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291	ASAS PULSE DRIVE 'S'
292	ASAS MOTOR
293	ASAS PULSE DRIVE 'S'
294	ASAS MOTOR
295	ASAS PULSE DRIVE 'S'
296	ASAS MOTOR
297	ASAS PULSE DRIVE 'S'
298	ASAS MOTOR
299	ASAS PULSE DRIVE 'S'
300	ASAS MOTOR

ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

WIRE NO.	DESCRIPTION
301	ASAS PULSE DRIVE 'S'
302	ASAS MOTOR
303	ASAS PULSE DRIVE 'S'
304	ASAS MOTOR
305	ASAS PULSE DRIVE 'S'
306	ASAS MOTOR
307	ASAS PULSE DRIVE 'S'
308	ASAS MOTOR
309	ASAS PULSE DRIVE 'S'
310	ASAS MOTOR

ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

WIRE NO.	DESCRIPTION
311	ASAS PULSE DRIVE 'S'
312	ASAS MOTOR
313	ASAS PULSE DRIVE 'S'
314	ASAS MOTOR
315	ASAS PULSE DRIVE 'S'
316	ASAS MOTOR
317	ASAS PULSE DRIVE 'S'
318	ASAS MOTOR
319	ASAS PULSE DRIVE 'S'
320	ASAS MOTOR

ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

WIRE NO.	DESCRIPTION
321	ASAS PULSE DRIVE 'S'
322	ASAS MOTOR
323	ASAS PULSE DRIVE 'S'
324	ASAS MOTOR
325	ASAS PULSE DRIVE 'S'
326	ASAS MOTOR
327	ASAS PULSE DRIVE 'S'
328	ASAS MOTOR
329	ASAS PULSE DRIVE 'S'
330	ASAS MOTOR

ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

WIRE NO.	DESCRIPTION
331	ASAS PULSE DRIVE 'S'
332	ASAS MOTOR
333	ASAS PULSE DRIVE 'S'
334	ASAS MOTOR
335	ASAS PULSE DRIVE 'S'
336	ASAS MOTOR
337	ASAS PULSE DRIVE 'S'
338	ASAS MOTOR
339	ASAS PULSE DRIVE 'S'
340	ASAS MOTOR

ASAS PULSE DRIVE 'S' CONTROL SCHEMATIC

WIRE NO.	DESCRIPTION
341	ASAS PULSE DRIVE 'S'
342	

SERVICE SHEET 8  
P/O A6A5 REFERENCE SUM LOOP PHASE DETECTOR ASSEMBLY

REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

PRINCIPLES OF OPERATION

General

The frequency error-correction circuitry on this board aids the phase lock loop (PLL) in acquiring lock. The first dual CMOS switch (U8) connects the outputs of the limiters to the trigger circuits. The trigger circuits produce TTL signals which are used by the ECL frequency detector when the loop is unlocked. These signals clock the frequency detector, which senses the direction of the frequency offset to determine whether the VCO (service sheet 7) should be driven up or down. The comparator produces a TTL logic level that controls the direction of the VCO frequency change.

The out-of-lock discriminator signal (pin 5 of U11) enables the digital discriminator to clock the mixer difference signal, producing a pulse-width modulated discriminator signal at the output of U12B. This signal is modulated at a frequency which varies from 200 kHz to 2.5 MHz. A resultant signal is generated, and one of the second dual CMOS switches (U7) is activated depending on the direction of the frequency offset.

If the loop is out of lock by more than 2.5 MHz, the correction current stays on continuously. From an offset of 2.5 MHz down to 200 kHz, the correction signals are not necessary and the lock acquisition circuitry is disabled.

Dual CMOS Switch No. 1 (U8)

This dual CMOS switch connects the reference and loop IF signal inputs to the TTL trigger circuits. The switch itself is controlled by the out-of-lock discriminator. It is disabled when the loops are locked, preventing the TTL trigger circuits from being clocked and reducing spurious loop mixer signals.

### ECL Frequency Detector

The two output signals from dual CMOS switch No. 1 clock the ECL frequency detector (U2) producing a HI at either pin 4 or pin 11 of the device. A HI at one of the input pins 6 or 9 will produce a HI at the respective output pin. The output pin will remain HI until reset by a HI on the opposite input pin. The output pin will remain HI until reset by a HI on the opposite input pin. It will again go HI with a HI input at its respective input and will reset the opposite output. Therefore, one of the output pins will be mostly HI (with some glitches) while the other will be LO (with some glitches). The output that is HI will depend upon which of the two frequencies is greater (that is, the direction of the frequency offset). The glitches are removed by the differential low-pass filter. When locked, the ECL frequency detector inputs are gated off by U9C and U9D and the two outputs end up in either a LO-HI, HI-LO or LO-LO state.

### Comparator

Comparator U3 converts the filtered ECL frequency signal to a clean TTL logic level. This TTL level in turn controls whether the VCO (service sheet 7) is driven up or down. R141 provides a small amount of positive feedback around the comparator. This serves to suppress oscillation by producing a dead zone and latches the comparator when the loop is locked.

### Programmable Inverter

The TTL frequency-direction logic level from the comparator is sent through an exclusive-OR gate which acts as a programmable inverter. The RS loop requires a logic inversion here to drive the loop into lock if the VCO frequency is below that required. The OS loop requires no inversion for the feedback level to lock the loop when the frequency is above that of the reference. This is the only difference between the two loops. The state of the programmable inverter is set at pin 5 of the RS and OS loop boards. Pin 5 is allowed to float HI for the Reference Sum Loop assembly (service sheet 8) and is tied LO for the Output Sum Loop assembly (service sheet 12).

### 7 MHz Low-Pass Filter

When the loop is out of lock, a beat note appears at the output of the mixer (service sheet 7). The 7 MHz low-pass filter removes the sum signal and other mixing products and only allows a beat note below 7 MHz to pass.

### 150 kHz Active High-Pass Filter

This circuit along with the dead zone in the TTL trigger circuit is used to prevent FM from triggering the out-of-lock circuitry.

### Out-Of-Lock Discriminator

The out-of-lock signal (pin 5 of U11) enables the final stage of the digital discriminator and clocks the difference signal from the mixer. If the difference signal is greater than 200 kHz (<5 us) pin 5 of U11 will always be high, enabling one-shot U12B.

If the loop is out of lock by more than 2.5 MHz (<400 ns) pin 12 of one-shot U12B will always be low enabling the dual-OR gates and current will be on continuously until the offset decreases to 2.5 MHz (400 ns). Between 2.5 MHz and 200 kHz U12B produces 400 ns pulses to modulate the correction current pumped into or out of the RC feedback node. As the offset decreases toward 200 kHz the pulse rate decreases.

When an offset of 200 kHz (5 us) is reached, one-shot U12A and flip flop U11 disable one-shot U12B and the inputs to the ECL frequency detector. At this point the difference signal from the mixer is within the loop bandwidth and the loop will acquire lock by itself.

### Dual CMOS Switch No. 2 (U7)

This circuit has one channel activated, depending on the out-of-lock direction of the VCO, by one of the two AND circuits being modulated by the discriminator signal. Thus, current is pumped into or out of the RC feedback node of the op-amp integrator (service sheet 7). This forces the output of the op-amp to ramp up or down in the correct direction toward lock.

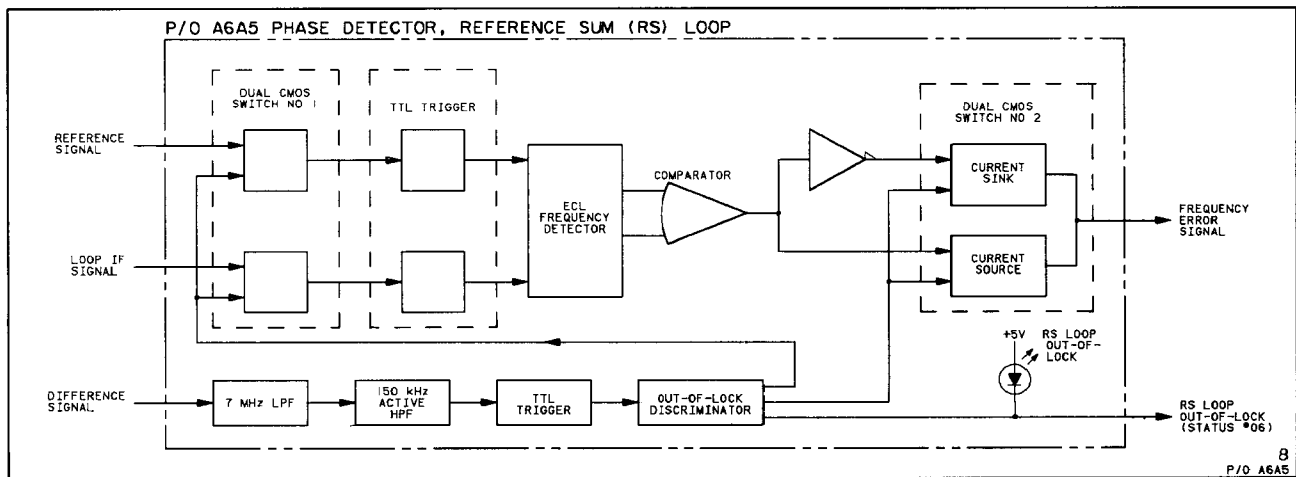
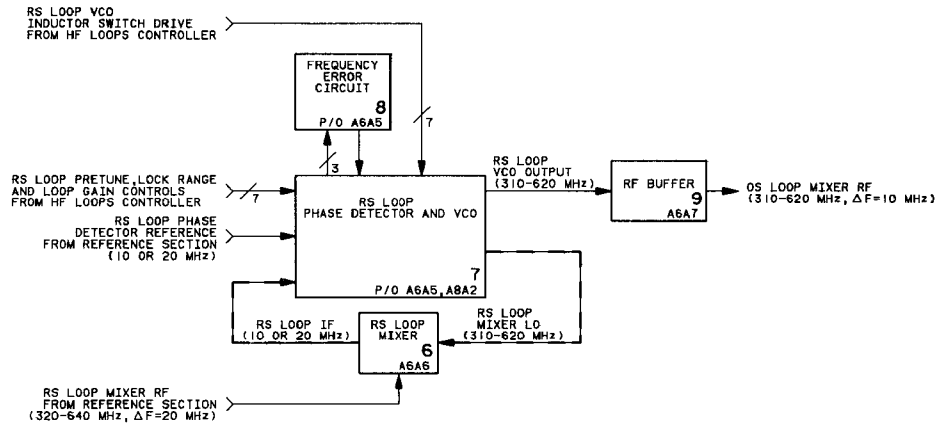


Figure 8-322. P/O A6A5 Reference Sum Loop Phase Detector Block Diagrams



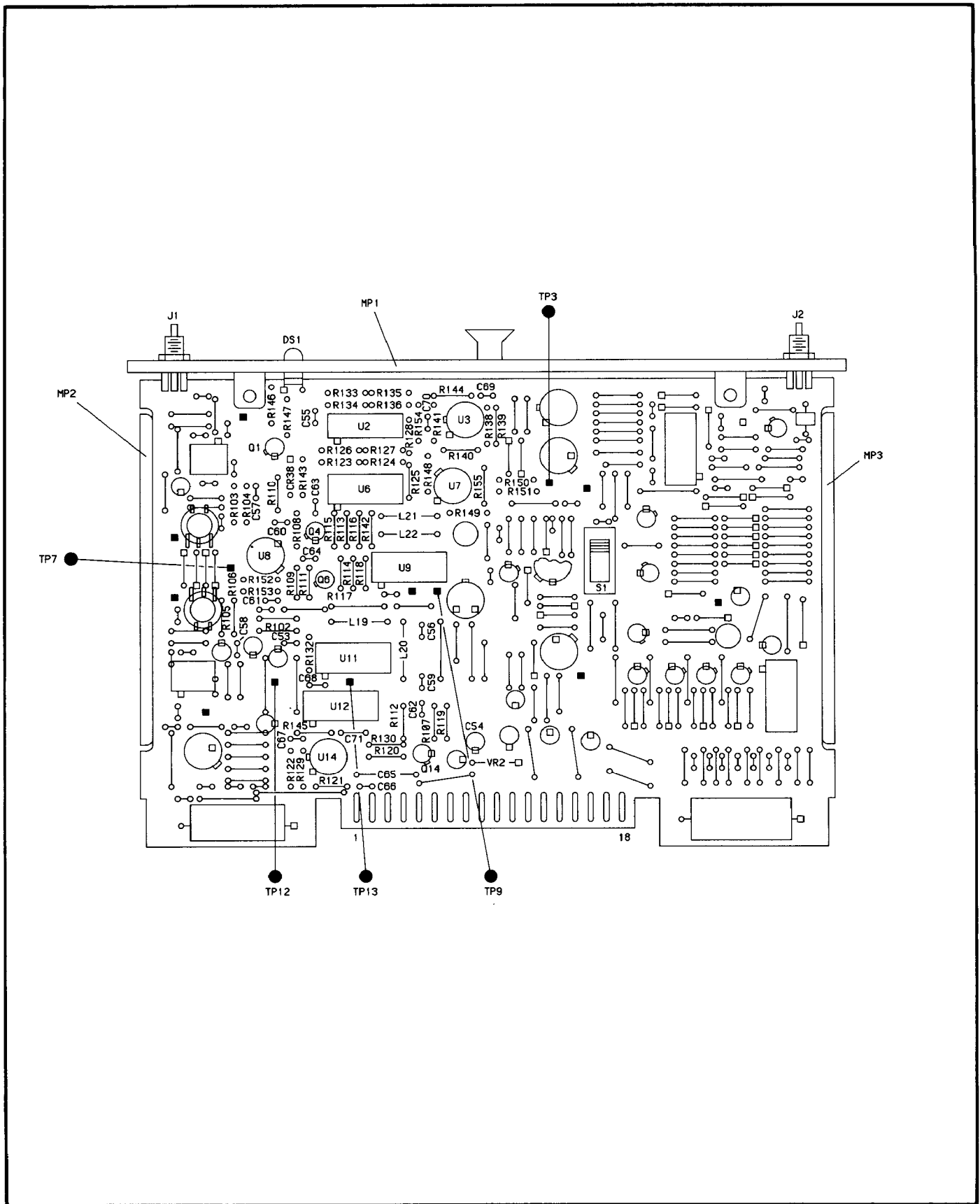


Figure 8-323. P/O A6A5 Reference Sum Loop Phase Detector Component Locator

## CHANGES

### 2516A and Above

On the A6A5 schematic:

- A6A5R148 - Change the value of R148 to 1.33k.
- A6A5VR2 - Change the value of VR2 to 7.5V.

### 2706A and Above

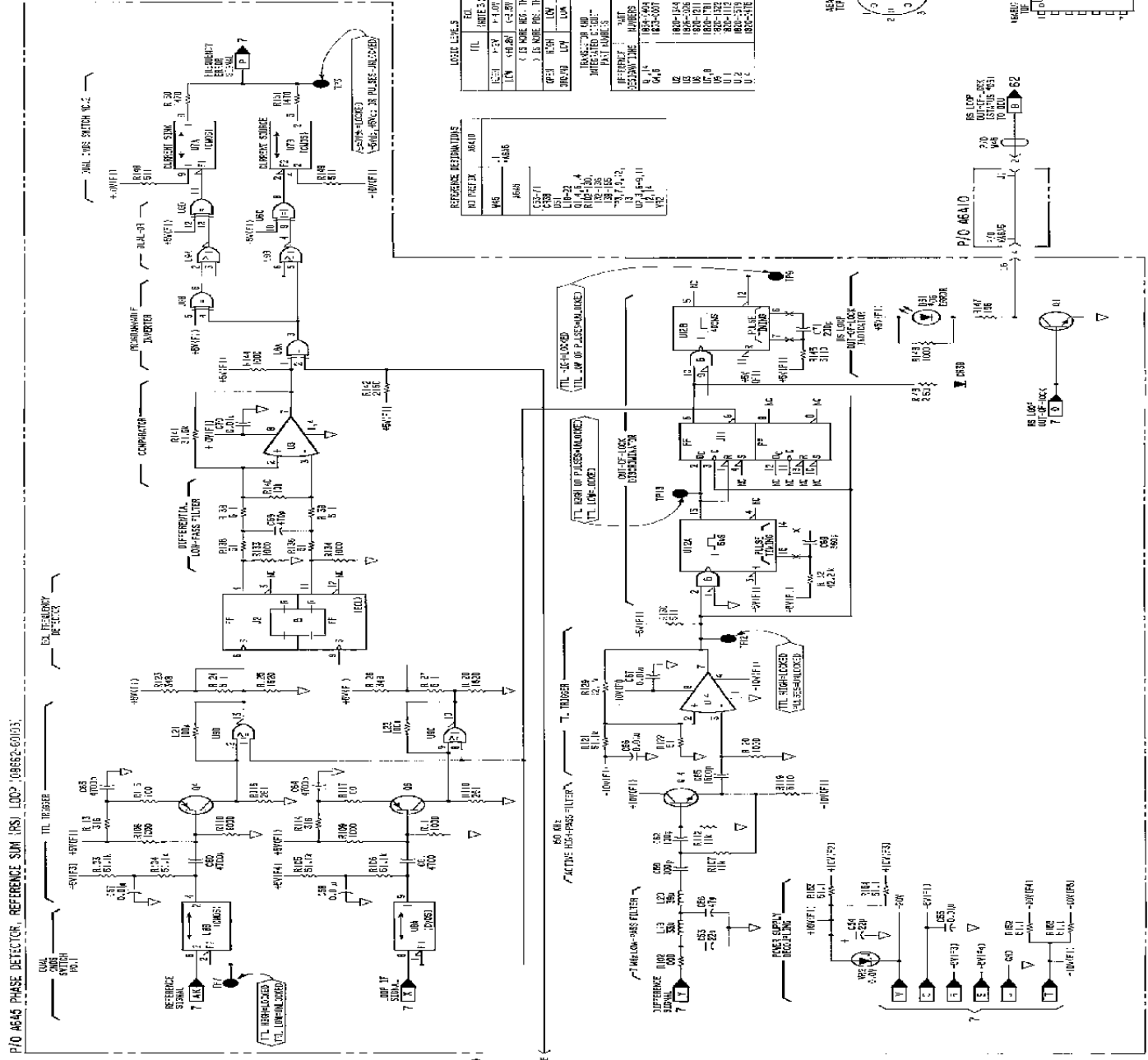
On the A6A5 schematic:

- A6A5 - Change the part number of the A6A5 schematic to 08662-60357.

Figure 8-924 P/O A6A5 Reference Sine Loop Phase Detector Schematic

**NOTES**

1. REFER TO TABLE F-1 OF THE SCHEMATIC SYMBOLS GUIDE.
2. TYPICAL VALUES ARE GIVEN IN PARENTHESES. ACTUAL VALUES MAY VARY SLIGHTLY DIFFERENT FROM THAT IS SHOWN.
3. CHECK VALUES FOR ALL DEVICES IN THIS SECTION. ALL VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED. A "K" DENOTES  $10^3$  AND AN "M" DENOTES  $10^6$ .



P/O A6A 0 HF LOOPS AND REFERENCE SECTION (NOT HERETOFORE)  
 (OR667-10, 0)

**UNIFIED CIRCUIT SYMBOLS**

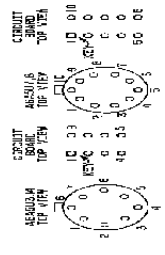
SYMBOL	DESCRIPTION	P/N NUMBER
U1	OP AMP	HE7511-H
U2	OP AMP	HE7511-H
U3	OP AMP	HE7511-H
U4	OP AMP	HE7511-H
U5	COMPARATOR	HE7511-H
U6	COMPARATOR	HE7511-H

**LOGIC LEVELS**

LEVEL	NAME	DESCRIPTION
1	REF	REFERENCE SIGNAL
2	PHASE	PHASE DETECTOR OUTPUT
3	CURRENT	CURRENT SENSE SIGNAL
4	LOCK	LOCK DETECTOR OUTPUT
5	ERROR	ERROR SIGNAL

**REFERENCE DESIGNATIONS**

REF. NO.	DESCRIPTION
1	REF. SIGNAL
2	PHASE DETECTOR OUTPUT
3	CURRENT SENSE SIGNAL
4	LOCK DETECTOR OUTPUT
5	ERROR SIGNAL



SERVICE SHEET 9  
A6A7 RF BUFFER ASSEMBLY

REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

PRINCIPLES OF OPERATION

General

The RF Buffer Assembly amplifies the 310 MHz to 620 MHz input signal before it is sent to the mixer in the Output Sum Loop. The RF Buffer consists of three limiter stages which provide gain and 75 dB of isolation. Each limiter stage has a gain of about 10 dB and limits at +1 dBm.

The output signal from limiter U3 is sent through a 700 MHz low-pass filter to minimize spurious signals. The level of the output signals from the RF buffer circuit varies from about -2 dBm to -5 dBm. This is due to the high frequency roll-off characteristic of the limiters and the insertion loss of the low-pass filter at higher frequencies.

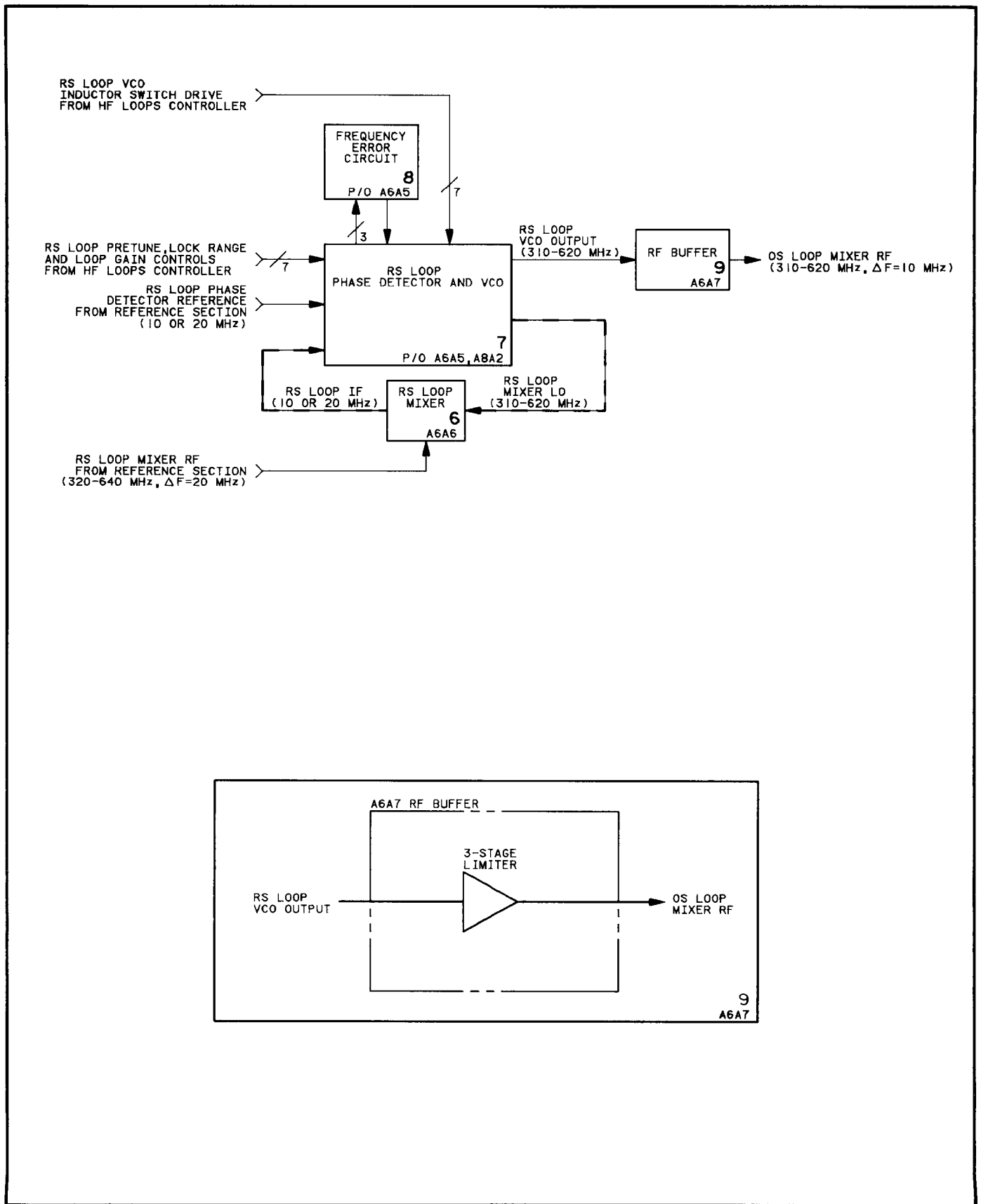


Figure 8-325. A6A7 RF Buffer Block Diagrams

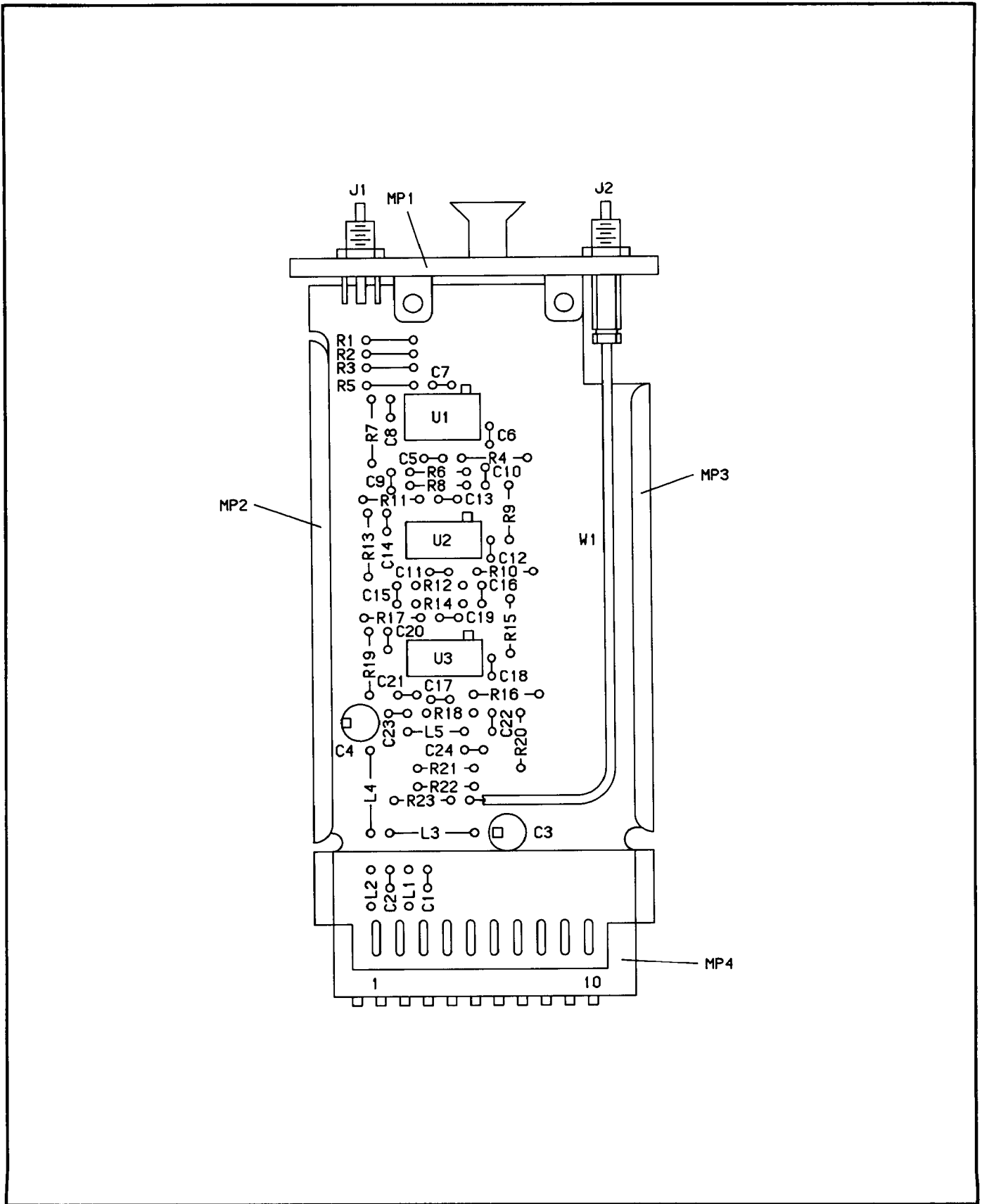
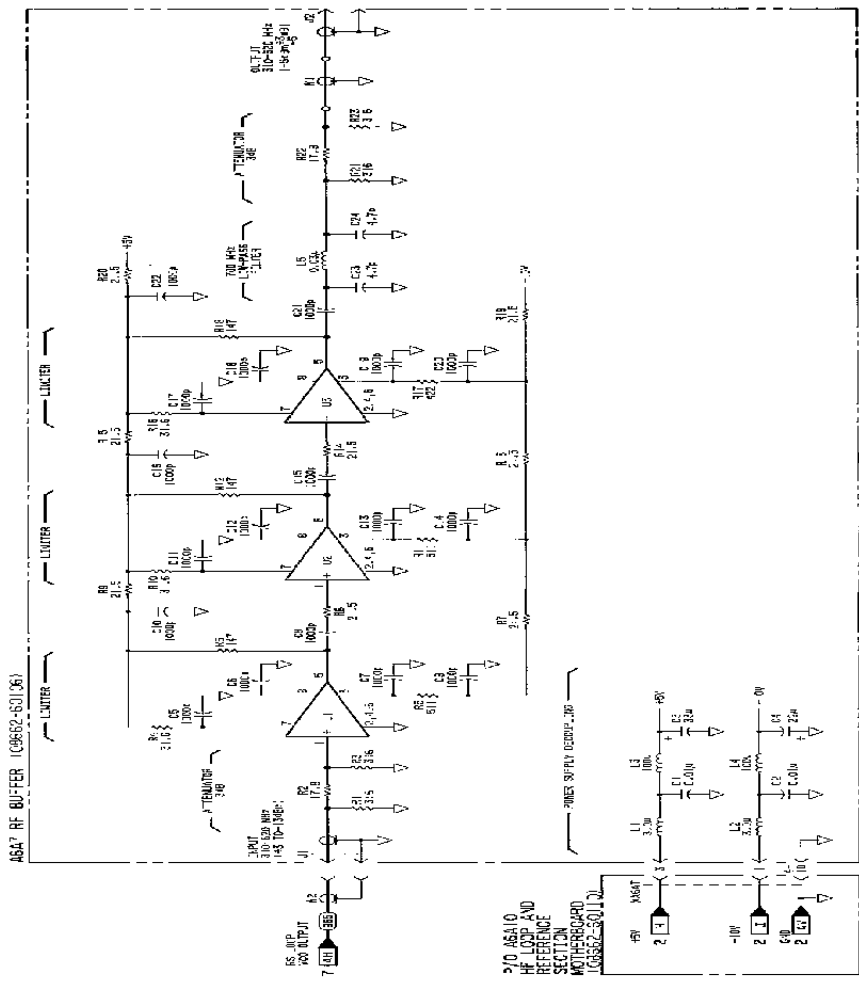


Figure 8-326. A6A7 RF Buffer Component Locator

- NOTES
1. REFER TO TABLE 4-102 FOR SCHEMATIC CLASSIFICATION.
  2. TOLERANCES UNLESS OTHERWISE SPECIFIED ARE AS SHOWN.

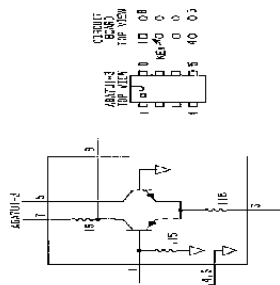


REFERENCE DESIGNATIONS

IC PREFIX	MANUFACTURER
4E7	8847
4E1	4841
1-24	1-24
1-15	1-15
1-43	1-43
1-13	1-13

INTERFACED CIRCUIT PARTS

REF. SYMBOL	MANUFACTURER	ADDRESS
01-53	1186-0272	



ASSEMBLY PARTS

QTY	DESCRIPTION	UNIT
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA
1	6BE6-1	EA

20 A6A10  
HF LOOP AND  
REFERENCE  
SECTION  
MOTHERBOARD  
C96B2-50136

SERIAL PREFIX: 2234A

SERVICE SHEET 10  
A6A8 RF MIXER ASSEMBLY

REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

PRINCIPLES OF OPERATION

General

The RF Mixer combines the 310 MHz to 620 MHz and the 320 MHz to 640 MHz inputs to produce the 10 MHz to 20 MHz loop IF output signal. The two limiter stages serve as buffers and provide a constant level output to amplifier Q1. Each of the limiter stages has a gain of 10 dB and limits at +1 dBm.

The output of limiter U2 is amplified by the single stage common-emitter amplifier, which has an approximate gain of 8 dB. The mixer is a double balanced type (that is, both input signals are suppressed at the output). The output of the mixer contains the sum and difference frequencies of the two input signals at a power level of approximately -16 dBm. The sum signal is filtered by the 25 MHz low-pass filter, leaving only the desired difference signal.



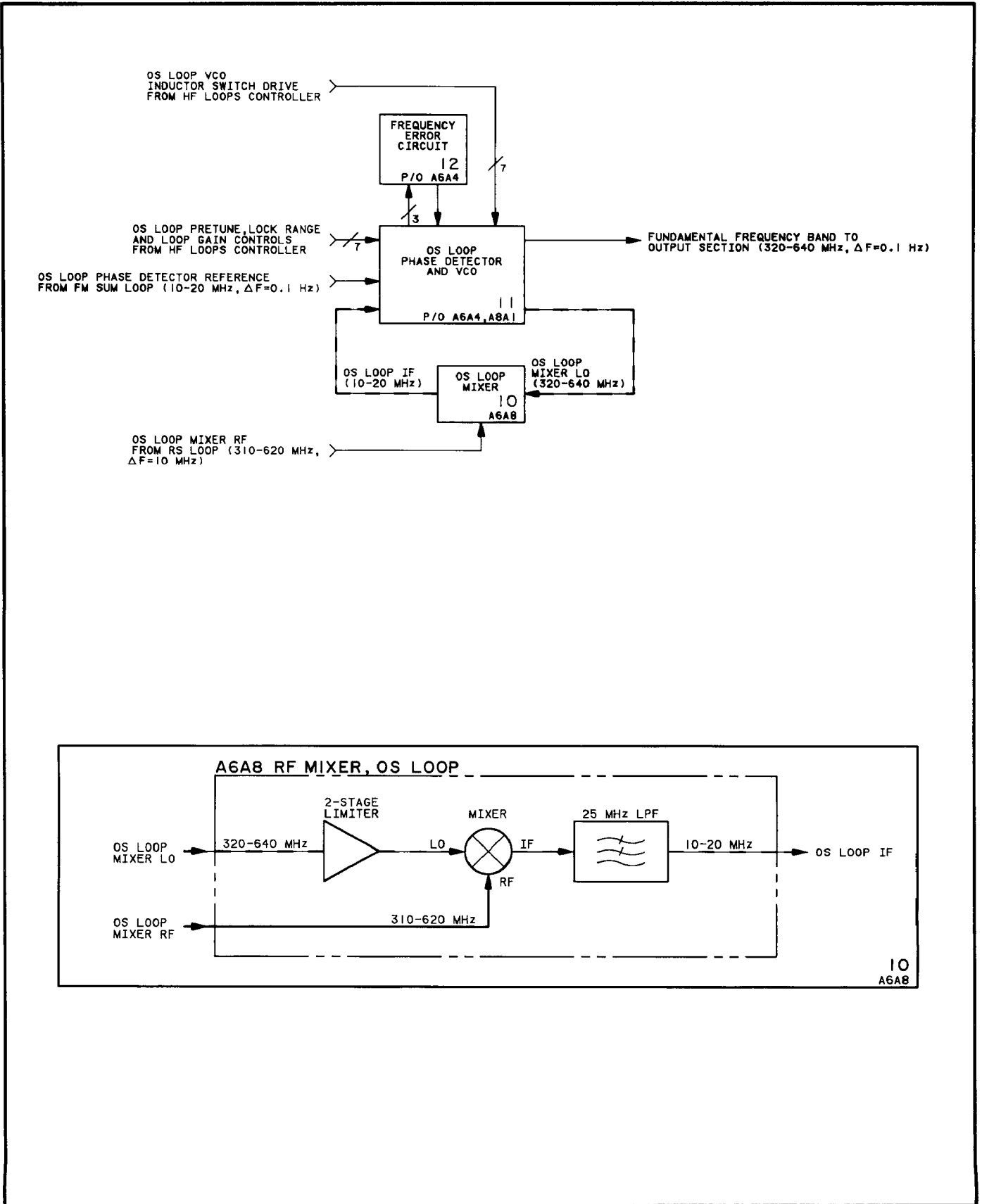


Figure 8-328. A6A8 RF Mixer Block Diagrams

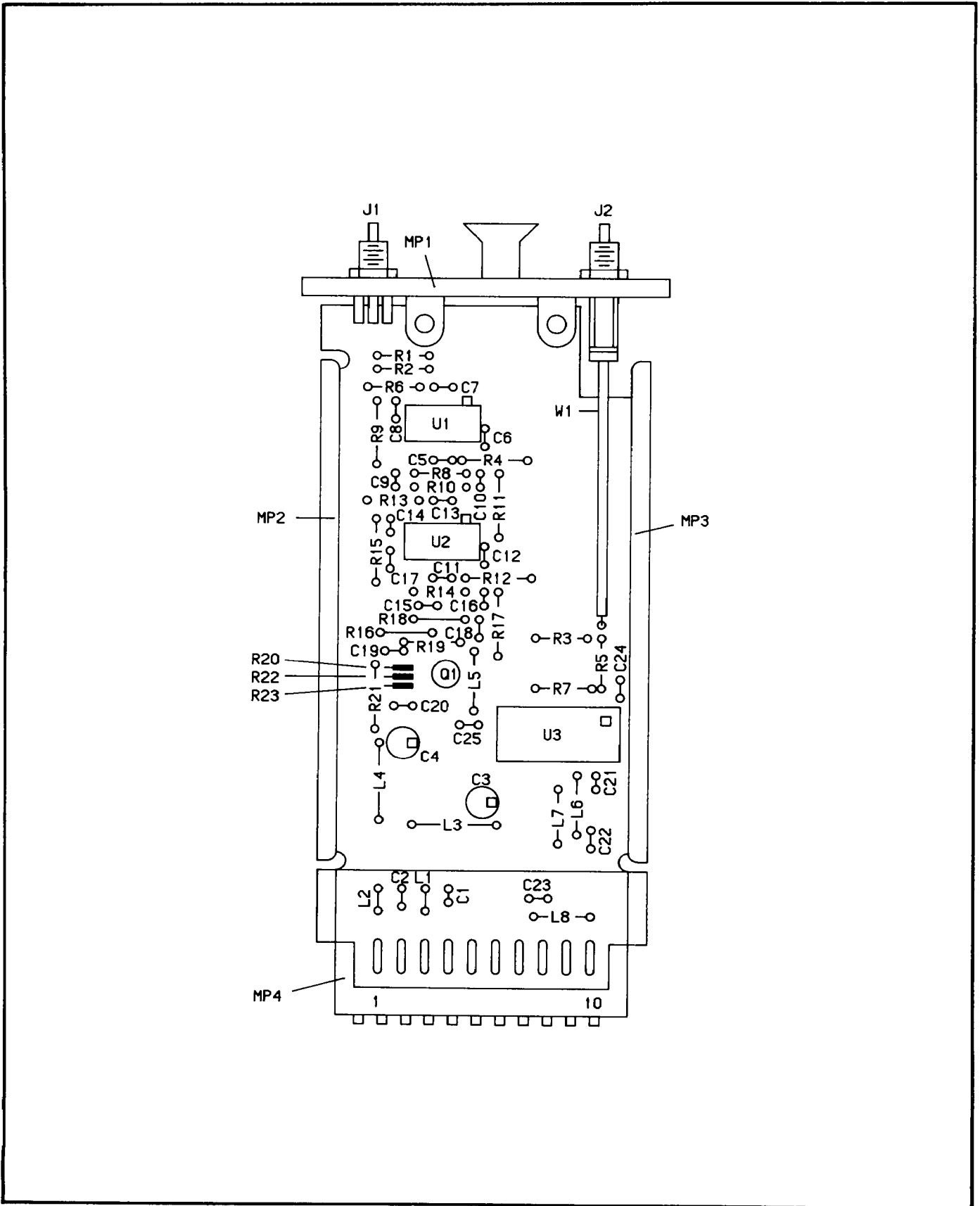


Figure 8-329. A6A8 RF Mixer Component Locator

**CHANGES****2748A to 2823A**

On the A6A8 schematic:

- C26 - Add C26 4.7p to ground between R10 and U2.

**2837A and above**

On the schematic:

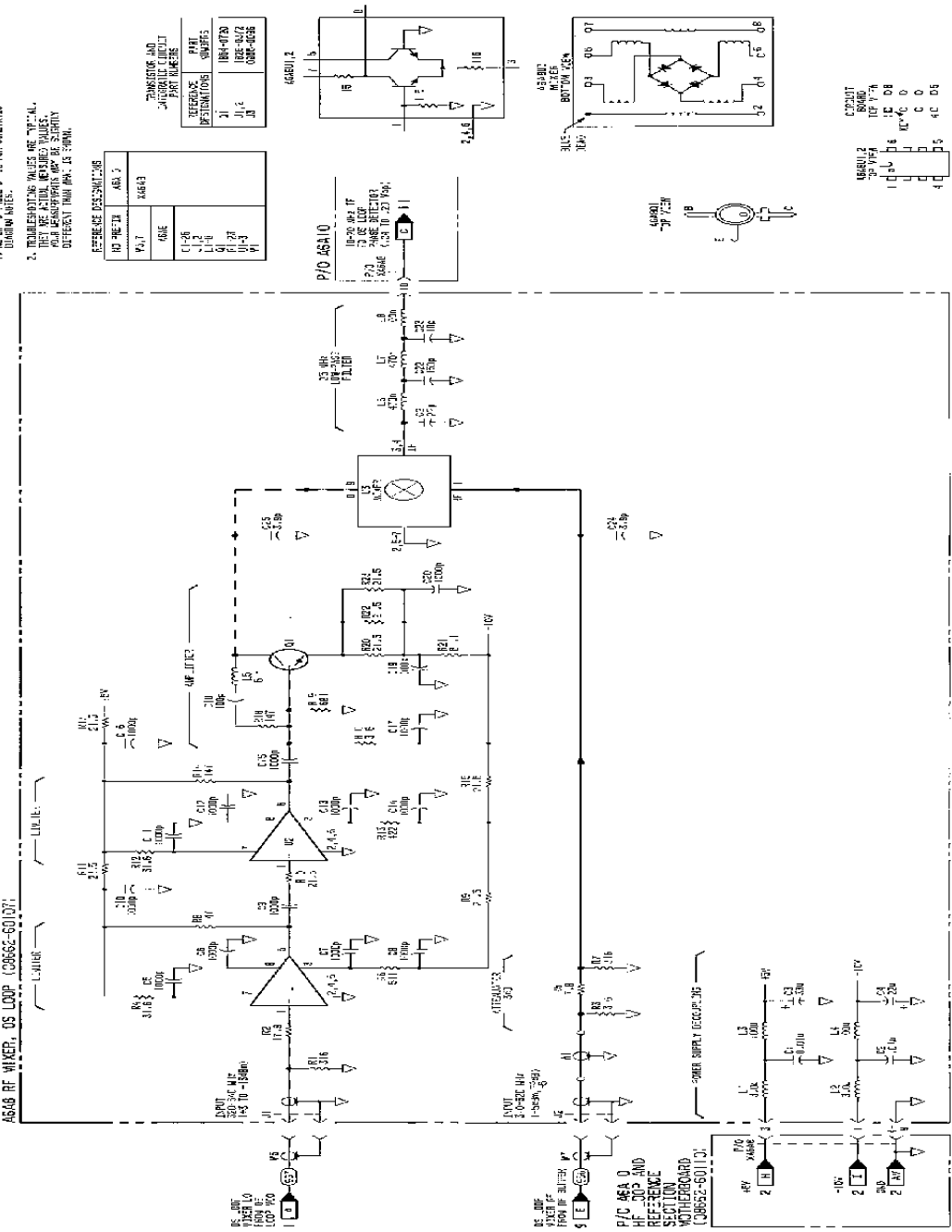
- C1, C2 - Under **POWER SUPPLY DECOUPLING** change C1 and C2 to 1000pF.
- C26, C27 - Under **LIMITER** change the value of C26 to 8.2pF and add C27 8.2pF from ground to the junction of U1 and R2.

**NOTES**

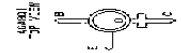
1. REFER TO TABLE 8-12 FOR SCHEMATIC DRAWING NOTES.
2. TRANSMISSION VALUES ARE TYPICAL. USE THE ACTUAL MEASURED VALUES. RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE INDICATED.

REFERENCE DESIGNATOR		DESCRIPTION
U1	AGA 2	AGA 2
U2	AGA 3	AGA 3
U3	AGA 4	AGA 4
U4	AGA 5	AGA 5
U5	AGA 6	AGA 6
U6	AGA 7	AGA 7
U7	AGA 8	AGA 8

TRANSISTOR AND DIODE PART VALUES		PART NUMBER
Q1	2N2222	2N2222
Q2	2N2222	2N2222
Q3	2N2222	2N2222
Q4	2N2222	2N2222
Q5	2N2222	2N2222
Q6	2N2222	2N2222
Q7	2N2222	2N2222
Q8	2N2222	2N2222
Q9	2N2222	2N2222
Q10	2N2222	2N2222
Q11	2N2222	2N2222
Q12	2N2222	2N2222
Q13	2N2222	2N2222
Q14	2N2222	2N2222
Q15	2N2222	2N2222
Q16	2N2222	2N2222
Q17	2N2222	2N2222
Q18	2N2222	2N2222
Q19	2N2222	2N2222
Q20	2N2222	2N2222
Q21	2N2222	2N2222
Q22	2N2222	2N2222
Q23	2N2222	2N2222
Q24	2N2222	2N2222
Q25	2N2222	2N2222
Q26	2N2222	2N2222
Q27	2N2222	2N2222
Q28	2N2222	2N2222
Q29	2N2222	2N2222
Q30	2N2222	2N2222
Q31	2N2222	2N2222
Q32	2N2222	2N2222
Q33	2N2222	2N2222
Q34	2N2222	2N2222
Q35	2N2222	2N2222
Q36	2N2222	2N2222
Q37	2N2222	2N2222
Q38	2N2222	2N2222
Q39	2N2222	2N2222
Q40	2N2222	2N2222
Q41	2N2222	2N2222
Q42	2N2222	2N2222
Q43	2N2222	2N2222
Q44	2N2222	2N2222
Q45	2N2222	2N2222
Q46	2N2222	2N2222
Q47	2N2222	2N2222
Q48	2N2222	2N2222
Q49	2N2222	2N2222
Q50	2N2222	2N2222
Q51	2N2222	2N2222
Q52	2N2222	2N2222
Q53	2N2222	2N2222
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Q55	2N2222	2N2222
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Q57	2N2222	2N2222
Q58	2N2222	2N2222
Q59	2N2222	2N2222
Q60	2N2222	2N2222
Q61	2N2222	2N2222
Q62	2N2222	2N2222
Q63	2N2222	2N2222
Q64	2N2222	2N2222
Q65	2N2222	2N2222
Q66	2N2222	2N2222
Q67	2N2222	2N2222
Q68	2N2222	2N2222
Q69	2N2222	2N2222
Q70	2N2222	2N2222
Q71	2N2222	2N2222
Q72	2N2222	2N2222
Q73	2N2222	2N2222
Q74	2N2222	2N2222
Q75	2N2222	2N2222
Q76	2N2222	2N2222
Q77	2N2222	2N2222
Q78	2N2222	2N2222
Q79	2N2222	2N2222
Q80	2N2222	2N2222
Q81	2N2222	2N2222
Q82	2N2222	2N2222
Q83	2N2222	2N2222
Q84	2N2222	2N2222
Q85	2N2222	2N2222
Q86	2N2222	2N2222
Q87	2N2222	2N2222
Q88	2N2222	2N2222
Q89	2N2222	2N2222
Q90	2N2222	2N2222
Q91	2N2222	2N2222
Q92	2N2222	2N2222
Q93	2N2222	2N2222
Q94	2N2222	2N2222
Q95	2N2222	2N2222
Q96	2N2222	2N2222
Q97	2N2222	2N2222
Q98	2N2222	2N2222
Q99	2N2222	2N2222
Q100	2N2222	2N2222



OUTPUT	BOARD	REF. DES.
1	1	1C D8
2	1	1C D8
3	1	1C D8
4	1	1C D8
5	1	1C D8
6	1	1C D8
7	1	1C D8
8	1	1C D8
9	1	1C D8
10	1	1C D8
11	1	1C D8
12	1	1C D8
13	1	1C D8
14	1	1C D8
15	1	1C D8
16	1	1C D8
17	1	1C D8
18	1	1C D8
19	1	1C D8
20	1	1C D8
21	1	1C D8
22	1	1C D8
23	1	1C D8
24	1	1C D8
25	1	1C D8
26	1	1C D8
27	1	1C D8
28	1	1C D8
29	1	1C D8
30	1	1C D8
31	1	1C D8
32	1	1C D8
33	1	1C D8
34	1	1C D8
35	1	1C D8
36	1	1C D8
37	1	1C D8
38	1	1C D8
39	1	1C D8
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41	1	1C D8
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59	1	1C D8
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61	1	1C D8
62	1	1C D8
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69	1	1C D8
70	1	1C D8
71	1	1C D8
72	1	1C D8
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74	1	1C D8
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76	1	1C D8
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81	1	1C D8
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83	1	1C D8
84	1	1C D8
85	1	1C D8
86	1	1C D8
87	1	1C D8
88	1	1C D8
89	1	1C D8
90	1	1C D8
91	1	1C D8
92	1	1C D8
93	1	1C D8
94	1	1C D8
95	1	1C D8
96	1	1C D8
97	1	1C D8
98	1	1C D8
99	1	1C D8
100	1	1C D8



SRNL-REVISION 2234A

## SERVICE SHEET 11

P/O A6A4, A8A1 OUTPUT SUM LOOP PHASE DETECTOR AND  
VOLTAGE CONTROLLED OSCILLATOR ASSEMBLY

## REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The 10/20 MHz loop phase detector reference signal (at J1) and the 10/20 MHz loop IF signal (at board pin 1) are attenuated and amplified, respectively, and are sent to the phase detector formed by CR1, CR2, CR3, and CR4. The phase detector combines the two signals and outputs a difference signal which is filtered by a 5 MHz low-pass filter and a 19 MHz broadband notch filter before entering the integrator formed by Q7, Q8, and Q9.

The integrator output current is converted to voltage by Q10. This voltage is summed with a four-bit ROM-controlled BCD pretune current in the resistor-diode shaper. The resulting voltage is then filtered, buffered, and used to drive the VCO so that it produces linear tuning with constant loop gain.

The frequency range of the integrator voltage is automatically adjusted to maintain a constant lock range for the loop. The long time constants associated with switching the RC loop gain adjust are accelerated by the speed-up circuit during switching.

## Loop Reference and IF Limiters

Before the 10/20 MHz loop IF (from the RF mixer) is compared against the 10/20 MHz loop phase detector reference frequency within the double balanced phase detector, the two signals are passed through identical limiters. Prior to entering the limiters, the reference signal is attenuated by 3 dB and the IF signal is amplified by 8 dB so that the two signals have amplitudes of about -3dBm to -5 dBm. The limiters have adequate gain at this input level to produce sharp limiting action over the 10 MHz to 20 MHz frequency range. The outputs of the limiters are connected to the inputs of center-tapped transformers, together with four PN junction diodes, form the high level mixer/phase detector.

## Phase Detector

A high level mixer is used as the phase detector on this board. Switching both sides of the phase detector hard generates a very linear slope. IF signals are suppressed by double balanced action so that the main components at the output are dc phase and two times the IF signal. The two signals from the limiters and the phase detector output signal operate the lock acquisition circuitry.

## Integrator

The phase detector's output signal passes through the 5 MHz low-pass filter and a 19 MHz notch filter. The signal which enters the integrator is either an ac difference frequency or a dc voltage (for signals of the same frequency). In this latter case, the dc varies between  $\pm 0.6$  volts. The integrator has a large dc gain with a zero located at about 7 kHz. The loop locks at a  $90^\circ$  phase difference when the dc voltage reaches 0 volts. The integrator has only one driving input when the difference frequency is less than 200 kHz. This input comes from the 5 MHz low-pass filter. If the difference signal is greater than 200 kHz, an additional drive current (the primary driver at this point) is supplied by the out-of-lock circuitry.

The integrator's output is proportional to the charge across its feedback capacitor. The output level will be between 0 volts and some positive level determined by the lock range limit control and limit detector (set by the controller).

The integrator is actually a discrete component op-amp. It produces output voltages in 8 ranges. These 8 ranges accommodate the widely differing voltage-frequency sensitivity of the VCO caused as various combinations of inductors are switched into the VCO. Gain of the integrator is maximum at dc, but reaches unity between 250 kHz and 500 kHz. The high gain for close-in signals suppresses VCO noise.

## Lock Range Limit Control and Out-Of-Lock Detector

As inductors in the VCO are switched ON in parallel, the VCOs sensitivity increases. As the VCO frequency is increased from 310 MHz to 640 MHz by progressively switching in inductors A, B, C, D, and E, the oscillators' gain increases by a factor of four (12dB). To maintain constant lock range, the positive voltage swing of the integrator is limited by a 3-bit D/A converter controlled by the signals that switch inductors C, D, and E, the most significant frequency bits. The output of the D/A resistive ladder drives the out-of-lock circuitry.

The out-of-lock detector (U4) compares the D/A output against the positive swing of the integrator. If the output becomes too positive, an out-of-lock signal is generated. Loss of signal or oscillator-drift, causing the integrator to reach its positive voltage limit, triggers this circuit and causes four things to happen. It lights the out-of-lock LED, sends TTL LO signals back through the motherboard to the microprocessor, enables the first dual CMOS switch and the two TTL trigger circuits, and enables the digital discriminator to clock the mixer beat note, producing a pulse-width modulated discriminator signal.

### Resistor Diode Shaping Network

The VCO is controlled by varying the reverse bias on a group of varactor diodes which form part of the oscillator's tank circuit. An increase in reverse bias causes a reduction in junction capacitance, which increases the frequency. However, the frequency characteristic of the tuning circuit is not a linear function of input voltage.

A shaping circuit on the Phase Detector Board is used to linearize the signal. The shaping circuit consists of a ladder of diodes which are reverse biased at successively higher voltages. As the signal level increases, the diodes become progressively forward biased, presenting a lower impedance to the drive source. The tuning curve of the VCO is thus approximated by the shaping circuits in a piecewise linear manner.

### 4-Bit BCD Pretune

The beat note of the difference of the loop IF down-converted frequency and the reference frequency passes through a 7 MHz low-pass filter to remove the RF sum frequency and leave only the difference frequency. The pretune ensures that this difference frequency will be less than 7 MHz by pretuning within 7 MHz of its locked frequency. The pretune D/A converter is formed by quad comparator U13, JFET switches Q17-Q20, and associated circuitry. The RS loop pretune inputs accept TTL signals from the Controller Assembly (service sheet 5) to control the pretuning. The pretunes are weighted BCD currents of 0.63mA, 1.25mA, 2.50mA, and 5.00mA. R85 allows the pretune currents to be scaled up or down by 7% and allows for minimization of dc offset. The collector of Q12 injects the pretune current into the resistor-diode shaper.

### Loop Gain Adjust and Pretune (Speed-Up) Circuitry

The loop gain adjust circuit works on the same principle as the lock range circuit. VCO inductor lines C, D, and E control gates that activate the RC attenuator sections in the loop gain adjust circuit, ensuring that no phase shift occurs at the loop gain crossover frequency. Because of the low frequency and large capacitors, diodes CR29, CR30, CR31, and CR32 are used to speed up charging of these capacitors during switching. R95 and C49 keep loop gain as constant as possible with any combination of inductors A, B, C, D, and E switched on.

### VCO (A8A2)

The VCO in the high frequency loop sections is a non-field-repairable assembly; it is sealed and can only be repaired at the factory. The VCO is coarsely tuned by a 5-bit code which switches inductors A, B, C, D, and E inside the VCO. A control voltage of -9 Vdc to -38 Vdc fine tunes the VCO to lock the loop. The output frequency of the VCO extends from 310 MHz to 620 MHz, at +3 dBm to -13 dBm (level depends on frequency).

### TROUBLESHOOTING

When a high frequency loops problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem.

1. Mount the A6A5 assembly on an extender board. Move the slide switch to the TEST position (up). This opens the loop.
2. Set the front panel frequency setting to 510.0 MHz. Connect a counter to the front panel RF output of the generator. Connect the output of an adjustable power supply to A6A4:
  - + terminal to TP14
  - terminal to TP1 (ground).
3. Set the power supply output voltage to approximately 4 volts. The counter should read close to 510 MHz. Slowly decrease the power supply output to zero, and then increase the voltage to +8V. Check that the frequency changes as shown in the table, below. Voltage and frequency readings may not be exactly as shown, but the amount and direction of change should be similar to these values.



Voltage to TP14 (Vdc)	TP2 (Vdc)	VCO Frequency (MHz)
0.0	-21.7	516.0
4.0	-17.1	509.6
8.0	-13.8	503.5

If these readings are correct, continue troubleshooting with step 4. Otherwise, there is a problem from TP14 to TP2. Troubleshoot to find the cause.

4. Monitor TP8 with the high impedance input of a counter. The counter should read the difference signal from the phase detector. Vary the adjustable power supply so the RF output frequency varies above and below 510 MHz. The counter should read the absolute frequency error.

If operation of this circuit is normal, continue troubleshooting with step 5. Otherwise, there is a problem with the phase detector circuitry.

5. Monitor TP7 (service sheet 12) with an oscilloscope or TTL logic probe. Vary the adjustable power supply so the RF output varies above and below 510 MHz. TP7 should be a TTL logic high (>2.4 Vdc) when the RF output is within 200 kHz of 510 MHz. At more than 510.2 and less than 509.8 MHz, TP7 should become a TTL logic low (<0.8 Vdc).

If operation of this circuit is normal, continue troubleshooting with step 6. Otherwise, there is a problem with the out-of-lock discriminator circuitry (bottom half of service sheet 12). Troubleshoot this circuitry to find the cause.

6. Monitor U3 pin 7 (service sheet 12) with a scope. Vary the adjustable power supply so the RF output is less than 510.3 MHz. The output of U3 should be less than 0.5 Vdc.

Increase the RF output frequency to more than 509.7 MHz. The output of U3 should be more than 3.5 Vdc.

If operation of this circuit is normal, continue troubleshooting with step 7. Otherwise, there is a problem with the frequency detector circuitry (top half of service sheet 12). Troubleshoot this circuitry to find the cause.

7. Monitor TP3 (service sheet 12) with an oscilloscope. Vary the adjustable power supply to increase the frequency of the RF output to more than 511.0 MHz. The signal at TP3 should be a dc level more negative than -3.0 Vdc. This level will become more negative as the RF output frequency increases.

Decrease the frequency of the VCO to less than 509.0 MHz. The signal at TP3 should be a series of pulses with slow rise and fall times at about a +4 Vdc level. The level increases and the pulses get smaller as the RF output frequency decreases.

If operation of this circuit is normal, continue troubleshooting with step 8. Otherwise, there is a problem with the CMOS switch (U7) or the circuitry that drives it. Troubleshoot this circuitry to find the cause.

8. Monitor TPA (output of integrator) with an oscilloscope. Vary the adjustable power supply to make the frequency of the VCO signal greater than 511.0 MHz. The waveform at TPA should be a dc level greater than +7.0 Vdc. Decrease the VCO frequency to less than 499.9 MHz. The waveform at TPA should be a dc level near ground. Pulse like those seen on TP3 may be visible on either of these levels.

If these waveforms are not normal, there is a problem with the integrator circuitry.

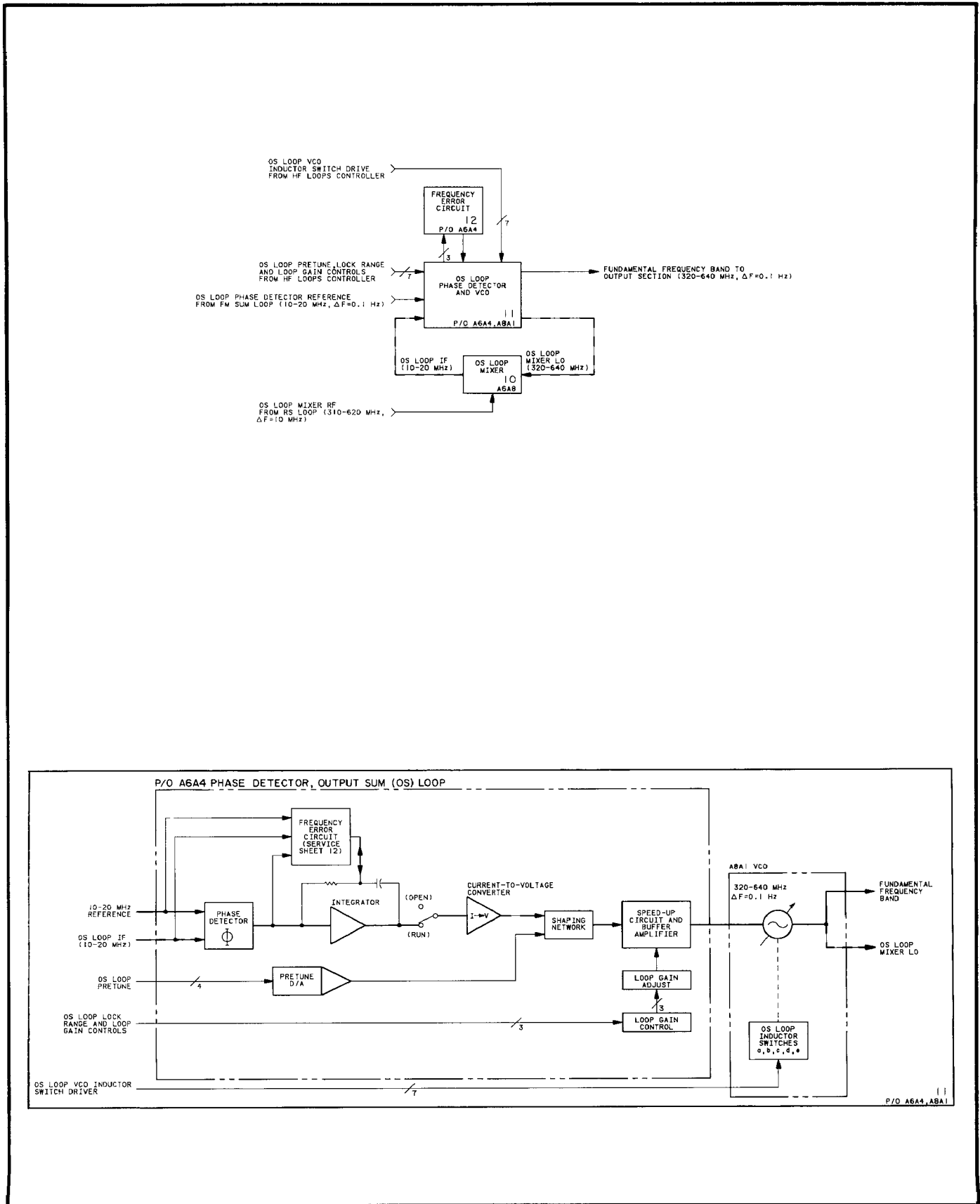


Figure 8-331. P/O A6A4, A8A1 Output Sum Loop Phase Detector & Voltage Controlled Oscillator Block Diagrams

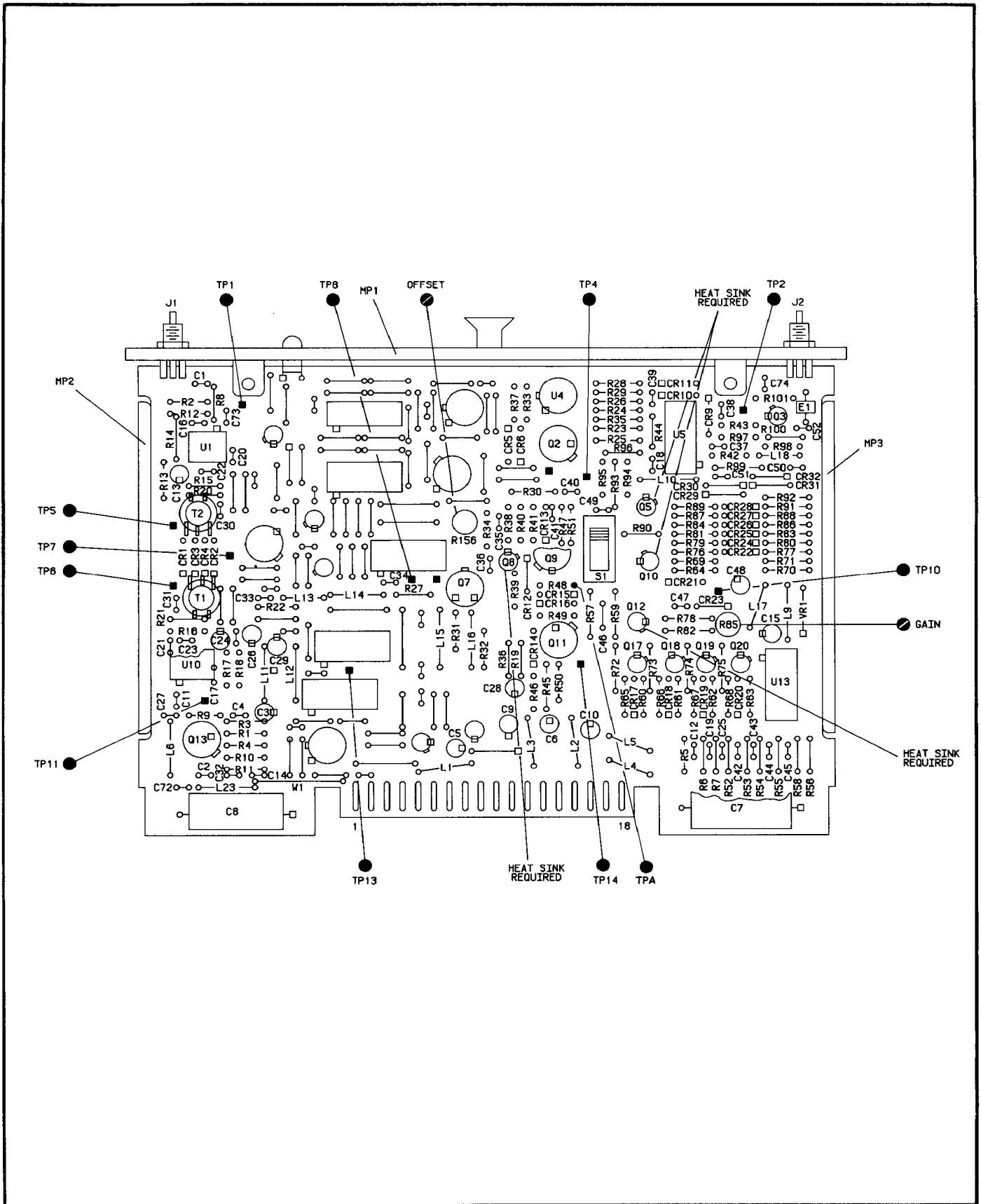
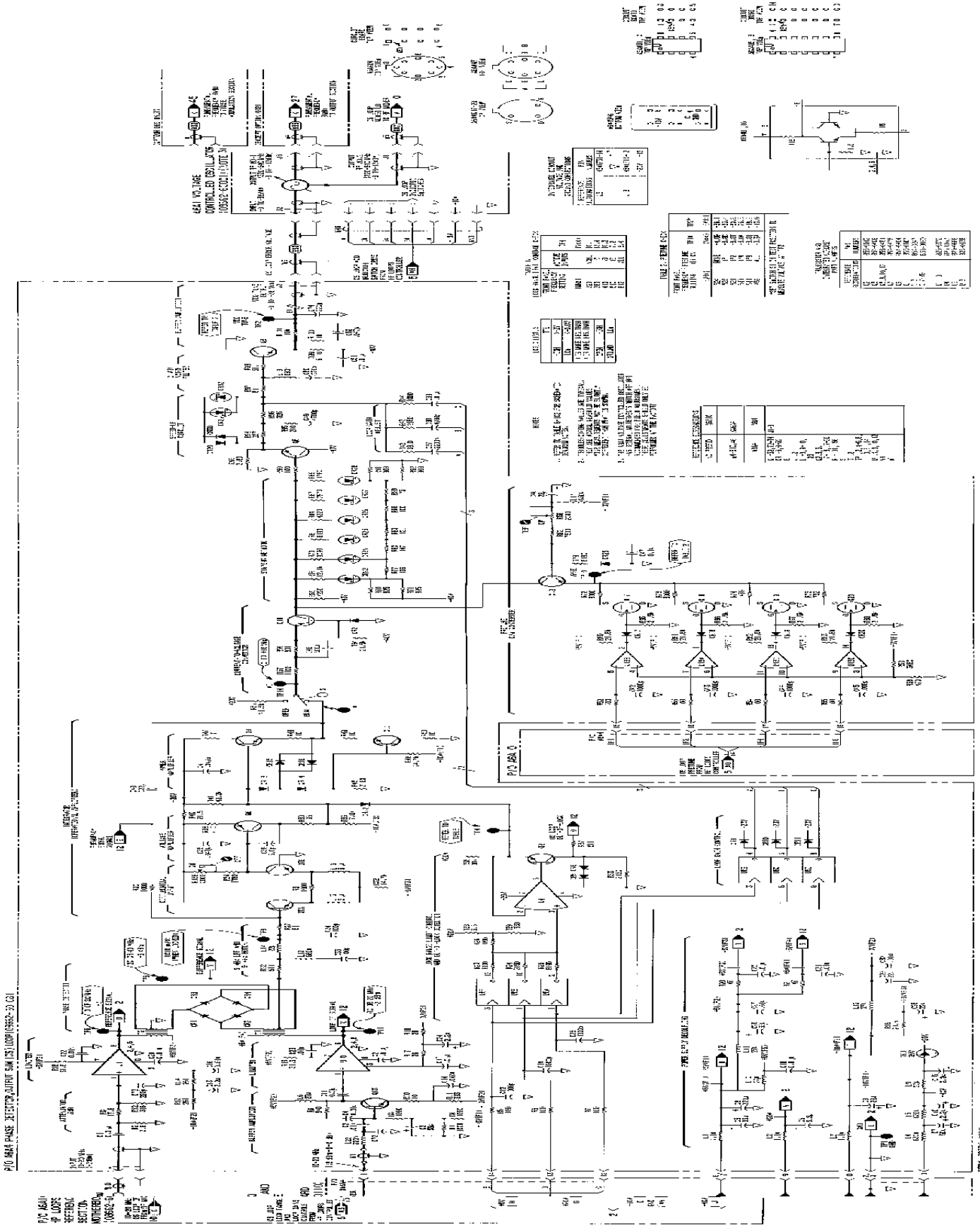


Figure 8-332. P/O A6A4, A8A1 Output Sum Loop Phase Detector & Voltage Controlled Oscillator Component Locator

**CHANGES**

<b>2601A and above</b>	On the A6A4 schematic: <ul style="list-style-type: none"><li>• <u>A6A4Q7</u> - In the "Table of Transistor and Integrated Circuit Part Numbers", change the part number of Q7 to 1854-1046.</li></ul>
<b>2706A and above</b>	On the A6A4 schematic: <ul style="list-style-type: none"><li>• <u>A6A4</u> - Change the part number of the A6A4 schematic to 08662-60358.</li></ul>
<b>2823A and above</b>	On the A8A1 schematic: <ul style="list-style-type: none"><li>• <u>A8A1</u> - Change the part number of the A8A1 schematic to 08662-60401.</li></ul>
<b>2837A and above</b>	On the A6A4 Component Locator: <ul style="list-style-type: none"><li>• <u>R2, R8, R12</u> - In the left hand corner of the component locator change R2 to C75, R8 to L24, and, delete R12.</li></ul> On the A6A4 schematic: <ul style="list-style-type: none"><li>• <u>R2, R8, R12</u> - In the upper left hand corner of the schematic change <b>ATTENUATOR 3dB to 25 MHz LOW PASS FILTER</b>. Delete R2, R8, and, R12. Add C75 100p to ground in place of R2 and add L24 560 nH in place of R8.</li></ul>



RESISTOR VALUES

RESISTOR	VALUE
R1	100K
R2	100K
R3	100K
R4	100K
R5	100K
R6	100K
R7	100K
R8	100K
R9	100K
R10	100K
R11	100K
R12	100K
R13	100K
R14	100K
R15	100K
R16	100K
R17	100K
R18	100K
R19	100K
R20	100K
R21	100K
R22	100K
R23	100K
R24	100K
R25	100K
R26	100K
R27	100K
R28	100K
R29	100K
R30	100K
R31	100K
R32	100K
R33	100K
R34	100K
R35	100K
R36	100K
R37	100K
R38	100K
R39	100K
R40	100K
R41	100K
R42	100K
R43	100K
R44	100K
R45	100K
R46	100K
R47	100K
R48	100K
R49	100K
R50	100K

RESISTOR VALUES

RESISTOR	VALUE
R51	100K
R52	100K
R53	100K
R54	100K
R55	100K
R56	100K
R57	100K
R58	100K
R59	100K
R60	100K
R61	100K
R62	100K
R63	100K
R64	100K
R65	100K
R66	100K
R67	100K
R68	100K
R69	100K
R70	100K
R71	100K
R72	100K
R73	100K
R74	100K
R75	100K
R76	100K
R77	100K
R78	100K
R79	100K
R80	100K

RESISTOR VALUES

RESISTOR	VALUE
R81	100K
R82	100K
R83	100K
R84	100K
R85	100K
R86	100K
R87	100K
R88	100K
R89	100K
R90	100K
R91	100K
R92	100K
R93	100K
R94	100K
R95	100K
R96	100K
R97	100K
R98	100K
R99	100K
R100	100K

RESISTOR VALUES

RESISTOR	VALUE
R101	100K
R102	100K
R103	100K
R104	100K
R105	100K
R106	100K
R107	100K
R108	100K
R109	100K
R110	100K
R111	100K
R112	100K
R113	100K
R114	100K
R115	100K
R116	100K
R117	100K
R118	100K
R119	100K
R120	100K

RESISTOR VALUES

RESISTOR	VALUE
R121	100K
R122	100K
R123	100K
R124	100K
R125	100K
R126	100K
R127	100K
R128	100K
R129	100K
R130	100K
R131	100K
R132	100K
R133	100K
R134	100K
R135	100K
R136	100K
R137	100K
R138	100K
R139	100K
R140	100K

RESISTOR VALUES

RESISTOR	VALUE
R141	100K
R142	100K
R143	100K
R144	100K
R145	100K
R146	100K
R147	100K
R148	100K
R149	100K
R150	100K
R151	100K
R152	100K
R153	100K
R154	100K
R155	100K
R156	100K
R157	100K
R158	100K
R159	100K
R160	100K

RESISTOR VALUES

RESISTOR	VALUE
R161	100K
R162	100K
R163	100K
R164	100K
R165	100K
R166	100K
R167	100K
R168	100K
R169	100K
R170	100K
R171	100K
R172	100K
R173	100K
R174	100K
R175	100K
R176	100K
R177	100K
R178	100K
R179	100K
R180	100K

RESISTOR VALUES

RESISTOR	VALUE
R181	100K
R182	100K
R183	100K
R184	100K
R185	100K
R186	100K
R187	100K
R188	100K
R189	100K
R190	100K
R191	100K
R192	100K
R193	100K
R194	100K
R195	100K
R196	100K
R197	100K
R198	100K
R199	100K
R200	100K

RESISTOR VALUES

RESISTOR	VALUE
R201	100K
R202	100K
R203	100K
R204	100K
R205	100K
R206	100K
R207	100K
R208	100K
R209	100K
R210	100K
R211	100K
R212	100K
R213	100K
R214	100K
R215	100K
R216	100K
R217	100K
R218	100K
R219	100K
R220	100K

RESISTOR VALUES

RESISTOR	VALUE
R221	100K
R222	100K
R223	100K
R224	100K
R225	100K
R226	100K
R227	100K
R228	100K
R229	100K
R230	100K
R231	100K
R232	100K
R233	100K
R234	100K
R235	100K
R236	100K
R237	100K
R238	100K
R239	100K
R240	100K

RESISTOR VALUES

RESISTOR	VALUE
R241	100K
R242	100K
R243	100K
R244	100K
R245	100K
R246	100K
R247	100K
R248	100K
R249	100K
R250	100K
R251	100K
R252	100K
R253	100K
R254	100K
R255	100K
R256	100K
R257	100K
R258	100K
R259	100K
R260	100K

RESISTOR VALUES

RESISTOR	VALUE
R261	100K
R262	100K
R263	100K
R264	100K
R265	100K
R266	100K
R267	100K
R268	100K
R269	100K
R270	100K
R271	100K
R272	100K
R273	100K
R274	100K
R275	100K
R276	100K
R277	100K
R278	100K
R279	100K
R280	100K

RESISTOR VALUES

RESISTOR	VALUE
R281	100K
R282	100K
R283	100K
R284	100K
R285	100K
R286	100K
R287	100K
R288	100K
R289	100K
R290	100K
R291	100K
R292	100K
R293	100K
R294	100K
R295	100K
R296	100K
R297	100K
R298	100K
R299	100K
R300	100K

RESISTOR VALUES

RESISTOR	VALUE
R301	100K
R302	100K
R303	100K
R304	100K
R305	100K
R306	100K
R307	100K
R308	100K
R309	100K
R310	100K
R311	100K
R312	100K
R313	100K
R314	100K
R315	100K
R316	100K
R317	100K
R318	100K
R319	100K
R320	100K

RESISTOR VALUES

RESISTOR	VALUE
R321	100K
R322	100K
R323	100K
R324	100K
R325	100K
R326	100K
R327	100K
R328	100K
R329	100K
R330	100K
R331	100K
R332	100K
R333	100K
R334	100K
R335	100K
R336	100K
R337	100K
R338	100K
R339	100K
R340	100K

RESISTOR VALUES

RESISTOR	VALUE
R341	100K
R342	100K
R343	100K
R344	100K
R345	100K
R346	100K
R347	100K
R348	100K
R349	100K
R350	100K
R351	100K
R352	100K
R353	100K
R354	100K
R355	100K
R356	100K
R357	100K
R358	100K
R359	100K
R360	100K

RESISTOR VALUES

RESISTOR	VALUE
R361	100K
R362	100K
R363	100K
R364	100K
R365	100K
R366	100K
R367	100K
R368	100K
R369	100K
R370	100K
R371	100K
R372	100K
R373	100K
R374	100K
R375	100K
R376	100K
R377	100K
R378	100K
R379	100K
R380	100K

RESISTOR VALUES

RESISTOR	VALUE
R381	100K
R382	100K
R383	100K
R384	100K
R385	100K
R386	100K
R387	100K
R388	100K
R389	100K
R390	100K
R391	100K
R392	100K
R393	100K
R394	100K
R395	100K
R396	100K
R397	100K
R398	100K
R399	100K
R400	100K

RESISTOR VALUES

RESISTOR	VALUE
R401	100K
R402	100K
R403	100K
R404	100K
R405	100K
R406	100K
R407	100K
R408	100K
R409	100K
R410	100K
R411	100K
R412	100K
R413	100K
R414	

SERVICE SHEET 12  
P/O A6A4 OUTPUT SUM LOOP PHASE DETECTOR ASSEMBLY

## REFERENCE BLOCK DIAGRAM 3

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The frequency error-correction circuitry on this board aids the phase lock loop (PLL) in acquiring lock. The first dual CMOS switch (U8) connects the outputs of the limiters to the trigger circuits. The trigger circuits produce TTL signals which are used by the ECL frequency detector when the loop is unlocked. These signals clock the frequency detector, which senses the direction of the frequency offset to determine whether the VCO (service sheet 11) should be driven up or down. The comparator produces a TTL logic level that controls the direction of the VCO frequency change.

The out-of-lock discriminator signal (pin 5 of U11) enables the digital discriminator to clock the mixer difference signal, producing a pulse-width modulated discriminator signal at the output of U12B. This signal is modulated at a frequency which varies from 200 kHz to 2.5 MHz. A resultant signal is generated, and one of the second dual CMOS switches (U7) is activated depending on the direction of the frequency offset.

If the loop is out of lock by more than 2.5 MHz (400 ns), the correction current stays on continuously. From an offset of 2.5 MHz down to 200 kHz, the discriminator modulates the correction current. This speeds up switching time by a factor of two or three. Under 200 kHz (5 us) the correction signals are not necessary and the lock acquisition circuitry is disabled.

## Dual CMOS Switch No. 1 (U8)

This dual CMOS switch connects the reference and loop IF signal inputs to the TTL trigger circuits. The switch itself is controlled by the out-of-lock discriminator. It is disabled when the loops are locked, preventing the TTL trigger circuits from being clocked and reducing spurious loop mixer signals.

### ECL Frequency Detector

The two output signals from dual CMOS switch No. 1 clock the ECL frequency detector (U2) producing a HI at either pin 4 or pin 11 of the device. A HI at one of the input pins 6 or 9 will produce a HI at the respective output pin. The output pin will remain HI until reset by a HI on the opposite input pin. It will again go HI with a HI input at its respective input and will reset the opposite output. Therefore, one of the output pins will be mostly HI (with some glitches) while the other will be LO (with some glitches). The output that is HI will depend upon which of the two frequencies is greater (that is, the direction of the frequency offset). The glitches are removed by the differential low-pass filter. When locked, the ECL frequency detector inputs are gated off by U9C and U9D and the two outputs end up in either a LO-HI, HI-LO or LO-LO state.

### Comparator

Comparator U3 converts the filtered ECL frequency signal to a clean TTL logic level. This TTL level in turn controls whether the VCO (service sheet 11) is driven up or down. R141 provides a small amount of positive feedback around the comparator. This serves to suppress oscillation by producing a dead zone and latches the comparator when the loop is locked.

### Programmable Inverter

The TTL frequency-direction logic level from the comparator is sent through an exclusive-or gate which acts as a programmable inverter. The RS loop requires a logic inversion here to drive the loop into lock if the VCO frequency is below that required. The OS loop requires no inversion for the feedback level to lock the loop when the frequency is above that of the reference. This is the only difference between the two loops. The state of the programmable inverter is set at pin 5 of the RS and OS loop boards. Pin 5 is allowed to float HI for the Reference Sum Loop assembly (service sheet 8) and is tied LO for the Output Sum Loop assembly (service sheet 12).



### 7 MHz Low-Pass Filter

When the loop is out of lock, a beat note appears at the output of the mixer (service sheet 11). The 7 MHz low-pass filter removes the sum signal and other mixing products and only allows a beat note below 7 MHz to pass.

### 150 kHz Active High-Pass Filter

This circuit along with the dead zone in the TTL trigger circuit is used to prevent FM from triggering the out-of-lock circuitry.

### Out-Of-Lock Discriminator

The out-of-lock signal (pin 5 of U11) enables the final stage of the digital discriminator and clocks the difference signal from the mixer. If the difference signal is greater than 200 kHz (<5 us) pin 5 of U11 will always be high, enabling one-shot U12B.

If the loop is out of lock by more than 2.5 MHz (<400 ns) pin 12 of one-shot U12B will always be low enabling the dual-OR gates and current will be on continuously until the offset decreases to 2.5 MHz (400 ns). Between 2.5 MHz and 200 kHz U12B produces 400 ns pulses to modulate the correction current pumped into or out of the RC feedback node. As the offset decreases toward 200 kHz the pulse rate decreases.

When an offset of 200 kHz (5 us) is reached, one-shot U12A and flip flop U11 disable one-shot U12B and the inputs to the ECL frequency detector. At this point the difference signal from the mixer is within the loop bandwidth and the loop will acquire lock by itself.

### Dual CMOS Switch No. 2 (U7)

This circuit has one channel activated, depending on the out-of-lock direction of the VCO, by one of the two AND circuits being modulated by the discriminator signal. Thus, current is pumped into or out of the RC feedback node of the op-amp integrator (service sheet 11). This forces the output of the op-amp to ramp up or down in the correct direction toward lock.

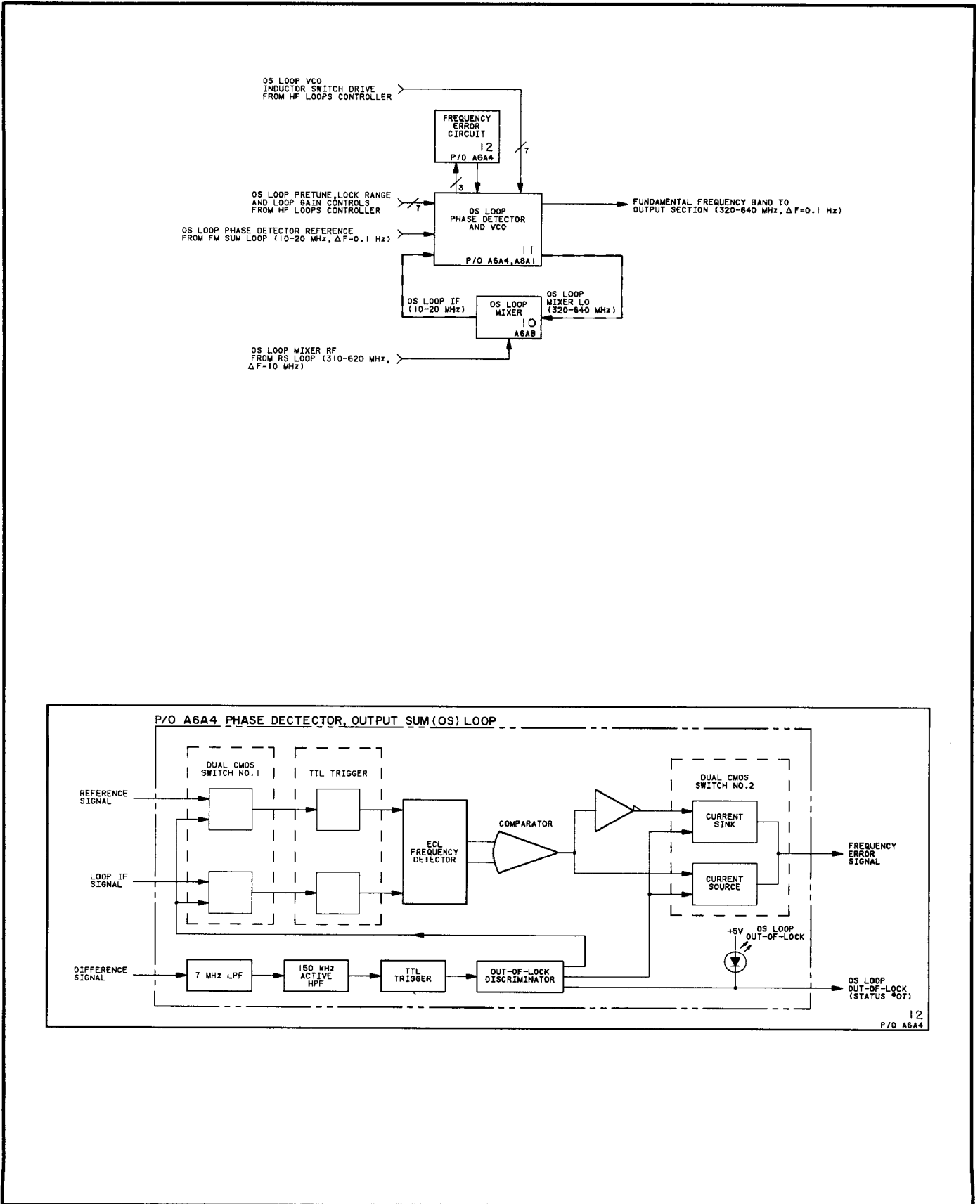


Figure 8-334. P/O A6A4 Output Sum Loop Phase Detector Block Diagrams

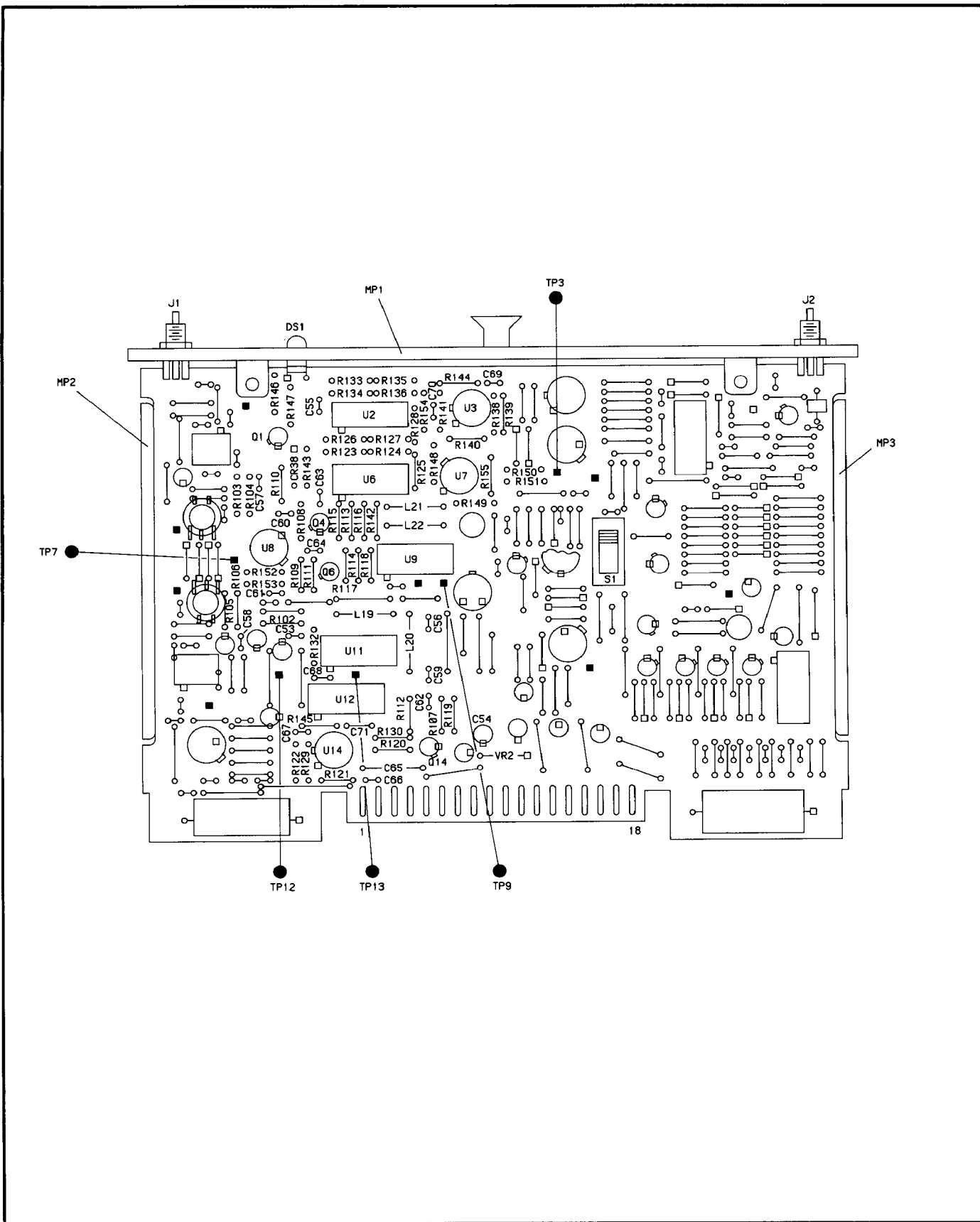


Figure 8-335. P/O A6A4 Output Sum Loop Phase Detector Component Locator

## CHANGES

### 2516A and Above

On the A6A4 schematic:

- A6A4R148 - Change the value of R148 to 1.33k.
- A6A4VR2 - Change the value of VR2 to 7.5V.

### 2706A and above

On the A6A4 schematic:

- A6A4 - Change the part number of the A6A4 schematic to 08662-60358.



## VOLUME 3 CONTENTS

Schematic Service Sheet Number	Block Diagram	Assembly or Section	Theory/Trouble- Shooting Page Number	Parts List Page Number
SS13	BD3	A5A4 Fractional N Loop Reference Divider	8-401	6-109
SS14	BD4	A5A3 Fractional N Loop Phase Detector	8-407	6-103
SS15	BD4	A5A5 Fractional N Loop VCO	8-417	6-111
SS16	BD4	A5A2 Fractional N Loop N Divider	8-425	6-101
SS17	BD4	A5A1 Fractional N Loop Accumulator	8-433	6-99
SS18	BD5	A3A3 N Loop Divider/Phase Detector	8-445	6-39
SS19	BD5	A3A3 N Loop Divider/Phase Detector	8-455	6-39
SS20	BD5	A3A4 N Loop VCO	8-461	6-45
SS21	BD5	A3A5 Sum Loop Mixer	8-467	6-49
SS22	BD5	A3A6 Sum Loop Phase Detector and Pretune	8-473	6-51
SS23	BD5	A3A7 Sum Loop VCO	8-479	6-55
SS24	BD5	A3A9 FM Sum Loop Mixer	8-485	6-63
SS25	BD5	A3A10 FM Sum Loop Phase Detector	8-491	6-65
SS26	BD5	A3A8 FM Sum Loop VCO	8-495	6-59
SS27	BD6	A4A3 Distributor	8-501	6-79
SS28	BD6	A4A3 Distributor	8-505	6-79
SS29	BD6	A12A5 Low Frequency Down Converter	8-509	6-223
SS30	BD6	A12A3 Low Frequency Amplifier	8-515	6-215
SS31	BD6	A12A2 UHF Modulator	8-521	6-211
SS32	BD6	A12A4 Doubler #1	8-525	6-219
SS33	BD6	A4A2 Doubler #2	8-533	6-75
SS34	BD6	A12A1 RF Multiplexer and Power Amplifier AT1 Output Attenuator AT2 Output Attenuator	8-537	6-205
SS35	BD6	A12A1 RF Multiplexer and Power Amplifier	8-541	6-205
SS36	BD6	A4A1 Automatic Level Control (ALC)	8-545	6-69
SS37	BD6	A4A1 Automatic Level Control (ALC)	8-549	6-69



**SERVICE SHEET 13**  
**A5A4 FRACTIONAL-N LOOP**

**REFERENCE BLOCK DIAGRAM 4**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION**

**General**

The Reference Divider divides the 10 MHz reference signal down to 100 kHz which is used as the reference signal to the phase detector. This assembly also generates the sample pulse signal that clocks the sample-hold circuit at the proper time.

**Shaper**

The shaper network consists of a diode clamping network and a differential amplifier. It provides the analog-to-TTL conversion.

**Reference Divider**

U1 and U4 form the divide-by-100 circuit which divides the 10 MHz input signal to produce the 100 kHz phase detector reference signal.

**Sample Pulse Generator**

The function of the sample pulse generator is to produce a 500 ns pulse that is delayed by 1 microsecond from the leading edge of the phase detector reference signal. This is accomplished by detecting a state in the divide-by-100 circuit which corresponds to the desired delay time.



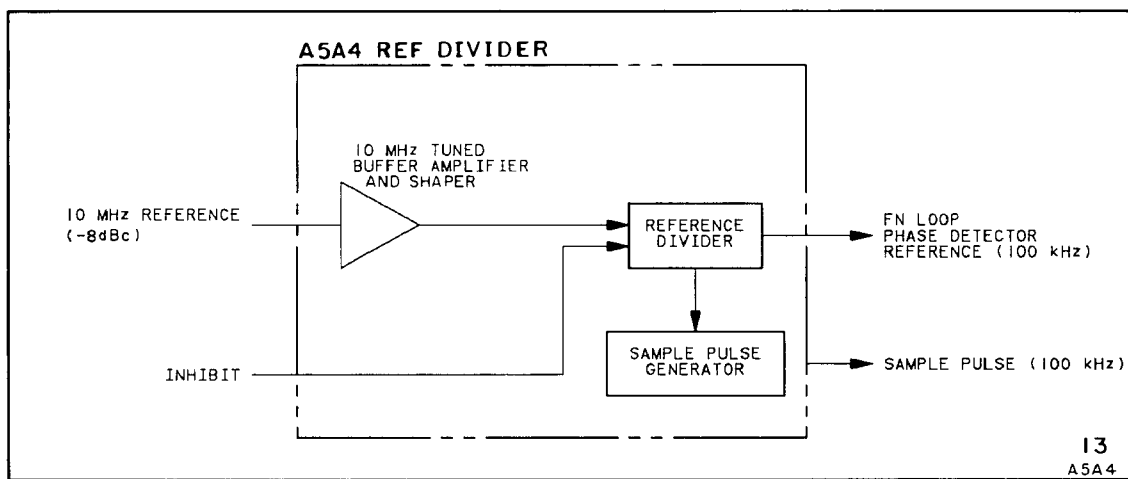
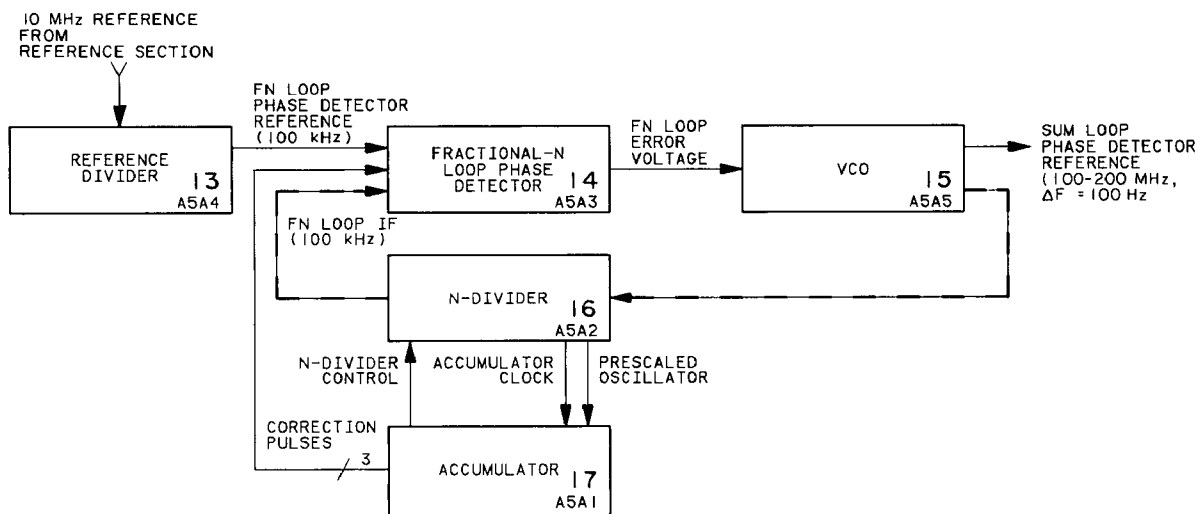


Figure 8-401. A5A4 Fractional-N Loop Reference Divider Block Diagrams

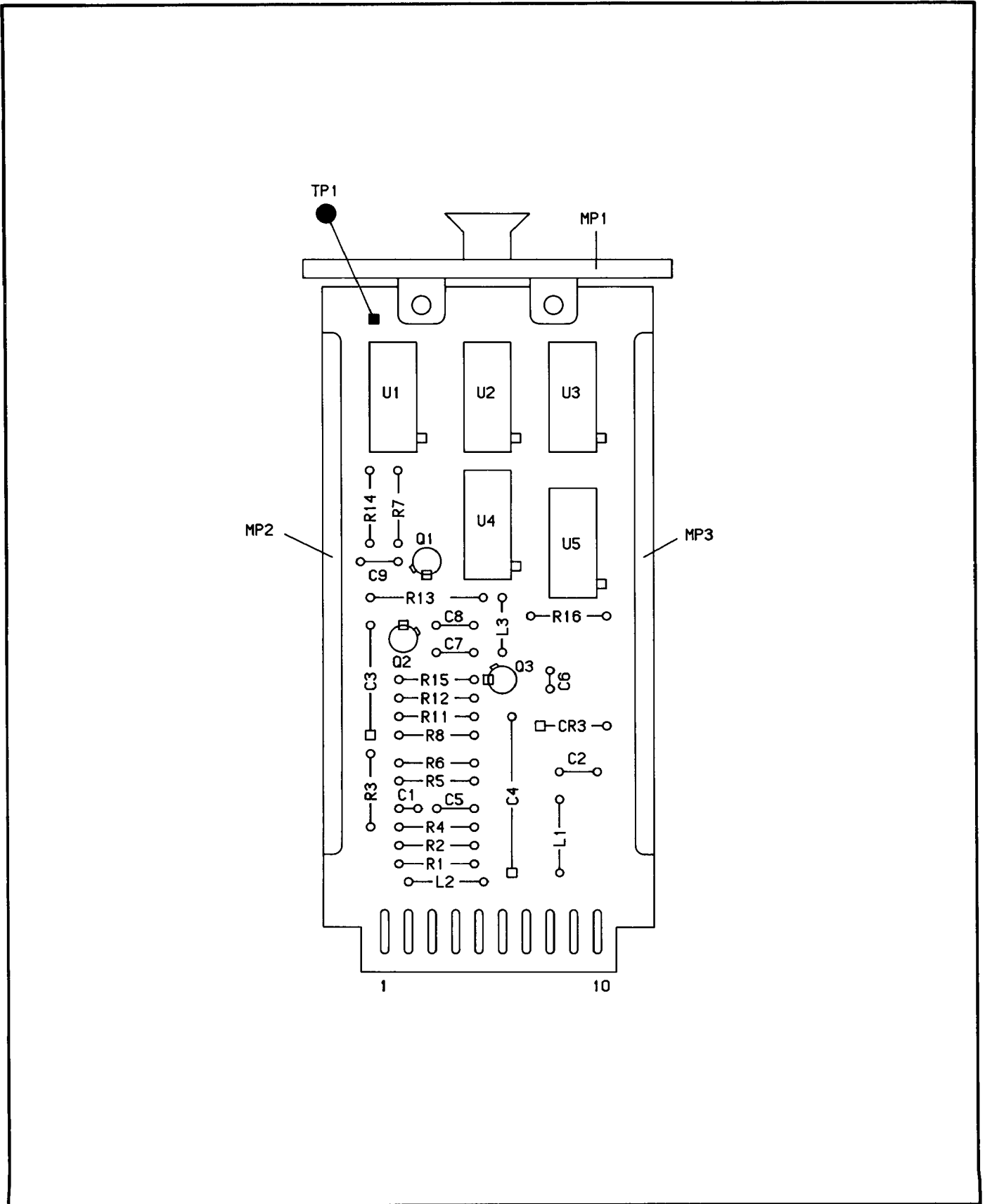


Figure 8-402. A5A4 Fractional-N Loop Reference Divider Component Locator



SERVICE SHEET 14  
A5A3 FRACTIONAL-N LOOP PHASE DETECTOR

## REFERENCE BLOCK DIAGRAM 4

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The purpose of the Fractional-N Loop Phase Detector (A5A3) is to develop the FN Loop Error Voltage which is used to tune the VCO. This FN Loop Error Voltage (tuning voltage) is developed by integrating currents from the Phase Detector circuit, the Fractional-N Correction Pulse Width to Current Converters, and the Bias Sink circuit. These currents are integrated together by the Current Summing Amplifier to develop a voltage. The Sample and Hold circuit samples the voltage output from the Current Summing Amplifier once each reference period and at the same time during each reference period. The sampled voltage becomes the FN Loop Error Voltage.

When the Fractional-N Loop (FN Loop) is phase-locked, the tune voltage must be a constant dc value. This means the voltage output from the Current Summing Amplifier must be the same at every sample period. In order to meet this condition the total of the currents being integrated must be the same each reference period. To look at it another way, the currents entering the summing node must equal the currents leaving the summing node in order for the tune voltage to remain constant. This concept, that when the FN Loop is phase-locked, the currents entering the summing node equal the currents leaving the node is true for all conditions, that is, for the condition when the loop runs without a fractional part and for the condition when it has a fractional part. The difference is that when the loop operates with no fractional part the output from the Phase Detector circuit remains constant. However, when the loop operates with a fractional part, the output from the Phase Detector circuit no longer remains constant but varies from reference period to reference period. To compensate for the changing phase detector output the outputs from the Fractional-N Correction Pulse Width to Current Converters must also change. For example, if the Phase Detector circuit supplies less current to the summing node, the Fractional-N Correction Pulse Width to Current Converters must supply more current so that the current entering the summing node is always a constant value.

## Phase Detector

The Phase Detector consists of a pair of flip-flops, U5A and B, and gates U4D and U8C. The purpose of the Phase Detector is to generate a pulse width proportional to the phase difference between its two input signals, the FN Loop IF (VCO/N) and the FN Loop PM Det

Reference (reference). Normally the FN Loop operates with a slight phase offset when the loop is phase-locked. This phase offset is due to the constant current being drawn from the summing node by the Bias Sink circuit. Figure 8-404 shows the phase relationship between the VCO/N signal and the reference signal when the loop is phase-locked and has no fractional part. Note that the two signals are equal in frequency but are out of phase. This phase offset is normally about 250 ns.

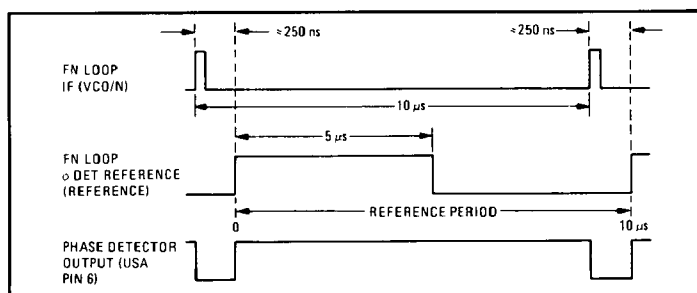


Figure 8-404. Fractional-N Loop Phase Detector Input and Output Waveforms  
(Phase Locked and No Fractional Part)

This phase offset causes the Phase Detector (U5A) to generate a 250 ns negative-going pulse every reference period (See Figure x-xx). The other Phase Detector output (U5B) is normally only a glitch (which is filtered out) when the loop is phase-locked. U5B should only generate a pulse output during the acquisition of lock.

In a phase-locked condition the amount of current drawn from the summing node is equal to current driven into the node. When the FN Loop operates without a fractional part, the phase detector generates a constant pulse width every reference period. This results in a constant amount of current being driven into the summing node from the phase detector current source ( $I_{DET}$ ) each reference period. Currents from the Fractional-N Correction circuit ( $I_1$ ,  $I_2$ , and  $I_3$ ,) also remain constant, therefore, the total current entering into the summing node is always a constant value each reference period.

Now when the loop operates with a Fractional part, the VCO/N signal and reference signal no longer equal each other, hence the phase detector no longer generates a constant pulse width each reference period.

**NOTE**

If the N-Divider (A5A2) is in the divide-by-N mode, the VCO/N signal starts to lag the reference frequency, which results in a series of decreasing pulse width signals from the phase detector. Conversely, if the N-Divider is dividing by N-1, the pulse width from the phase detector starts to increase.

For example, if the N-Divider is in the divide by N mode, the output pulses from the phase detector start to decrease in duration each reference period. This causes the phase detector current source,  $I_{DET}$ , to be connected to the summing node for shorter periods each reference period. At the same time correction current from the Fractional-N Correction circuit is increasing (Correction Pulses duration increasing). The net result is that the decreasing phase detector current is compensated by the increasing correction currents so that the total current contributions from the Phase Detector and the Fractional-N Correction circuits to the summing node are always a constant value.

**Level Translators, Diode Switches and Current Sources**

Following the Phase Detector are Level Translators, and Diode Switches and Current Sources. These circuits convert the digital outputs from the Phase Detector into currents. There are two types of Level Translators and Current Sources used. One type uses an active current source and a differential amplifier arrangement to switch the Diode Switch on and off. Q4 and U3 form an active current source while CR17 and CR19 form the Diode Switch. Q1, Q2 and Q3 make up the differential amplifier that translates the TTL levels to the appropriate levels required to drive the Diode Switch on and off. When the output from the Phase Detector goes LOW, CR17 is reverse-biased and CR19 is forward-biased, connecting the Current Source to the summing node. In the opposite state when the output is HIGH, CR17 is forward-biased and CR19 becomes reverse-biased, disconnecting the Current Source from the summing node.

The Levels Translator, Diode Switch and Current Source which follow the output of U5B word in a similar manner, as described previously. The major difference is that the active current source is replaced simply by a resistor, and that the level shifting is done with a diode string instead of a differential amplifier.

**Out-of-Lock Detector**

The Out-of-Lock Detector monitors the two outputs from the Phase Detector to determine if the loop is unlocked. The Out-of-Lock Detector detects two unlock conditions. One condition is when the pulse width from U5A exceeds about 700 ns. The other condition is when the output from U5B exceeds 100 ns. Note that the Loop should never be in a phase-locked condition when U5B generates a pulse. Monostable U7 stretches either the 100 ns or 700 ns pulse to give a continuous indication that an unlocked condition exists.

### Fractional-N Correction Pulse Width To Current Converters (Fractional-N Correction)

The purpose of the Fractional-N Correction circuit is to develop the signals that counteract the changing phase detector output when the loop is operating with a fractional part. The Fractional-N Correction circuit is comprised of Level Translators, Diode Switches and Current Sources. These circuits convert the Correction Pulses (TTL levels) from the Accumulator (A4A1) into currents. The Level Translators, Diode Switches and Current Sources are the same types which follow the Phase Detector circuit. For discussion of these circuits, refer to the Section titled Level Translators, Diode Switches and Current Sources.

Each one of the Correction Current Sources  $I_1$ ,  $I_2$ , and  $I_3$ , is connected to the summing node once during each reference period. The sequence of these currents are as follows: Correction current  $I_3$ , Correction current  $I_2$ , and Correction current  $I_1$ . How long each of the Current Sources remains connected to the summing node depends on the negative pulse duration of its corresponding Correction Pulse.

### Current Summing Amplifier

The Current Summing Amplifier is an integrator circuit. C34 is the integrating capacitor. When the loop is phase-locked the currents being integrated are:  $I_{DET}$ ;  $I_3$ ;  $I_2$ ;  $I_1$  and currents from the feedback network C32 and R54.

Due to the different magnitudes of the various current sources and the different times the current sources are connected to the summing node, the output from the Current Summing Amplifier is continuously ramping up and down. Figure 8-405 illustrates the integrator waveform showing the contribution of the different currents.

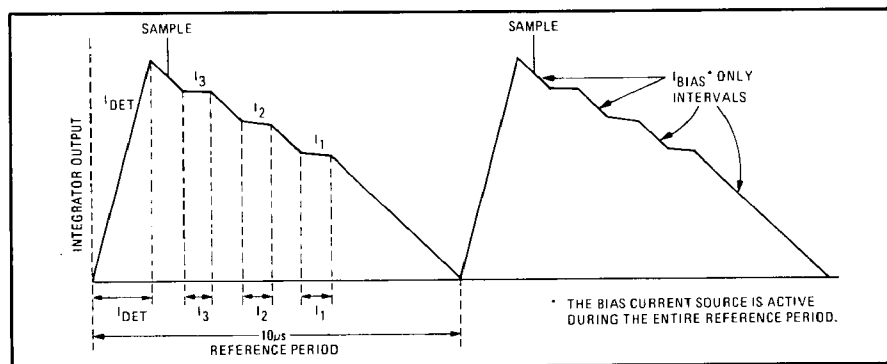


Figure 8-405. Current Summing Amplifier Output Waveform showing the contributions of the different currents

## Sample and Hold

The circuits which make up the Sample and Hold circuit are the Diode Switch, Differential Amplifier, Guard Voltage Network, and the Buffer Amplifier. During each reference period, the four diodes which comprise the Diode Switch are all forward-biased and the output of the Current Summing Amplifier is sampled. This sample voltage (VS) is stored in hold capacitor C47. During the hold period the Diode Switch is reversed-biased and the hold capacitor remains stored. The Buffer Amplifier, U1, which follows the hold capacitor, provides isolation and a low output impedance.

The Buffer Amplifier is a unity-gain, noninverting amplifier. Feedback from this output is fed back to the summing node through C32 and R54 for loop stabilizations.

Switching of the Diode Switch is controlled by the Differential Amplifier. During the sample period, the Sample Pulse line goes high, causing the Differential Amplifier to supply current to the Diode Switch. The Differential Amplifier also provides current to the Guard Voltage Network during the hold period.

The purpose of the Guard Voltage Network is to ensure that the voltage to be sampled does not itself forward-bias the Diode Switch during the hold period. The guard voltages (the collector voltages of Q7 and Q11) are balanced and centered around the last sample voltage. About 2 ma of current flows through the Guard Voltage network during the hold of current flows through the Guard Voltage network during the hold period. This causes a voltage drop of 4V (guard voltages) across CR28 and R82 and across CR27 and R81 the guard voltages equal +6V and -2V for a sample voltage of +2 Vdc (guard voltages =  $V_s \pm 4$  Vdc).

## TROUBLESHOOTING

When a Fractional-N Loop problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem.

1. Mount the A5A3 assembly on an extender board from the service kit. Move the slide switch on A5A3 to the TEST position (up) which opens the loop.
2. Monitor TP3 with an oscilloscope. The waveform should be a dc level with small spikes. Measure the frequency of the signal at pin 14 of the edge connector.

Turn the PRETUNE-GAIN adjustment on the top of the A5A5 VCO assembly while monitoring the frequency at pin 14. Move the frequency above and below 100 kHz and check that the voltage at TP3 goes to the values shown in the following table. If the voltages at TP3 are normal, continue troubleshooting with step 3. Otherwise, there is a problem with the basic phase detector circuitry so continue troubleshooting with step 4.



Edge Connector Pin 14 Frequency (kHz)	A5A3 TP3 (Vdc)	A5A3 TP2 (Vdc)	A5A3 TP1 (Vdc)
>100 kHz	+18	+16	+15
<100 kHz	-7	-7	-7

3. Repeat the measurement made in step 2 while monitoring TP2 and then TP1. Compare the measured values to the normal values in the table above.

If the voltage at TP2 is not normal, the differential amplifier or diode switch is bad. Shorting TP5 and TP5A together holds the amplifier and diode switch in the ON condition for troubleshooting.

If the voltage at TP1 is not normal but the voltage at TP2 is normal, the problem is in U1 or associated circuitry.

4. Turn the PRETUNE-GAIN adjustment on A5A5 so the frequency at pin 14 of the A5A3 edge connector is greater than 100 kHz. Check that there are pulses on A5A3 TP4.

Change the frequency at pin 14 to less than 100 kHz. Check that there are pulses on A5A3 TP8.

5. If pulses are not present at one of the test points, troubleshoot from U5 to find the cause of the problem. If both pulses are present, the problem is with U2 or associated components.

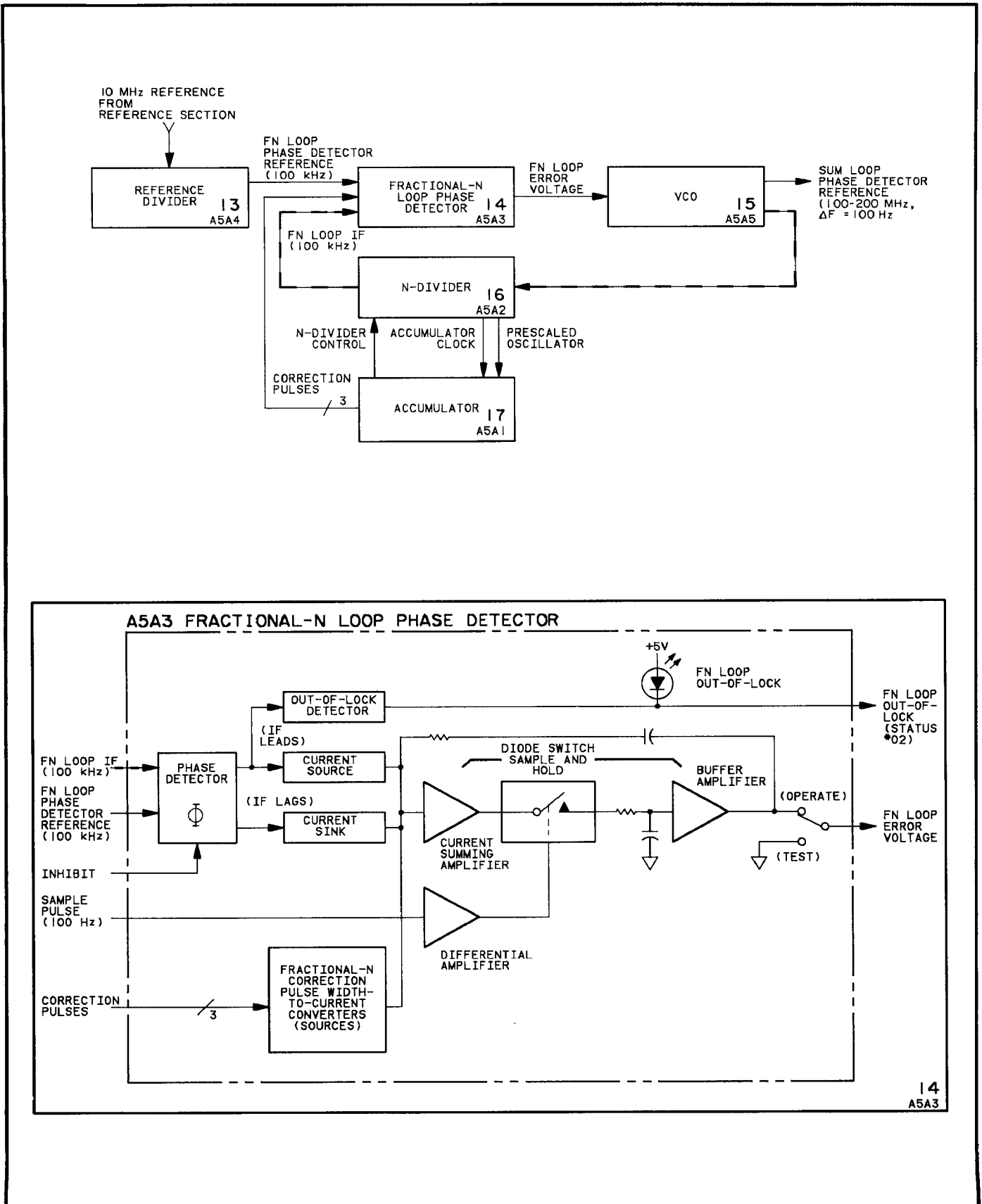


Figure 8-406. A5A3 Fractional-N Loop Phase Detector Block Diagrams





**SERVICE SHEET 15  
A5A5 FRACTIONAL-N LOOP VCO****REFERENCE BLOCK DIAGRAM 4**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repair

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION****General**

The purpose of the VCO (A4A4) is to generate an output frequency between 100 MHz and 200 MHz. The primary inputs are the pretune information, Digit Frequency DF4 and DF5, and the FN Loop Error Voltage. The output from the Pretune D/A Converter is used to tune the VCO close to the desired frequency and then the FN Loop Error Voltage is used to phase lock the loop.

**Voltage-Controlled Hartley Oscillator (VCO)**

Varactors CR10, CR11, and CR12, transistor Q11, and associated components comprise a voltage-controlled Hartley oscillator. Three varactors are used in parallel to provide the wide capacitance range required to tune the VCO. Feedback is obtained by tapping the inductive branch (L7) of the Tank Circuit. C32 and R84 couple the feedback signal back to the emitter of Q11 to sustain oscillation.

The VCO is both pretuned and phase locked by controlling the reverse bias voltage on the varactor diodes. An increase in the reverse bias voltage causes a reduction in the junction capacitance of the varactor diodes. This reduction increases the resonant frequency of the Tank Circuit, causing the VCO to oscillate at a higher frequency.

**Signal Splitter and Buffer Amplifiers**

The signal developed across the resonant Tank Circuit is coupled to Q6 by tapping inductor L7. Q6 amplifies the signal and applies the signal to the center tap winding of T1. T1 splits the power and adds isolation between the buffer amplifiers. The output from the Loop Buffer Amplifier is used to phase lock the loop. The output from the Output Buffer Amplifier goes to the Low Frequency Loop Section where it is combined with other signals.

**Shaping Network**

Due to the nonlinear tuning characteristics of the varactor diodes a Shaping Network is required. The Shaping Network conditions the pretune and error signals applied to the varactor in order to ensure that the frequency change is linear with the applied tuning voltage.

The Shaping Network consists of a ladder of diodes that are reverse-biased at successively higher voltage. As the voltage at the collector of Q12 increases, the diodes turn on consecutively and present a lower impedance to the tuning signal.

### Current to Voltage Converter

Common-base amplifier Q12 sums the output of the Pretune D/A Converter, current from the +20V source (R53) and the FN Loop Error Voltage from the phase detector. The voltage at the emitter (summing point) is always near zero volts since the base of Q12 is biased one diode drop below ground.

### Pretune D/A Converter

The output from the Pretune D/A Converter roughly tunes the VCO to a frequency within the capture range of the phase lock loop. The Pretune D/A Converter cannot, by itself, set the VCO precisely.

Op amp, U1, is connected in the inverting amplifier configuration. Its output voltage is programmed by Frequency Digits DF4 and DF5. Figure 8-409 is a simplified schematic of the Pretune D/A Converter Circuit.

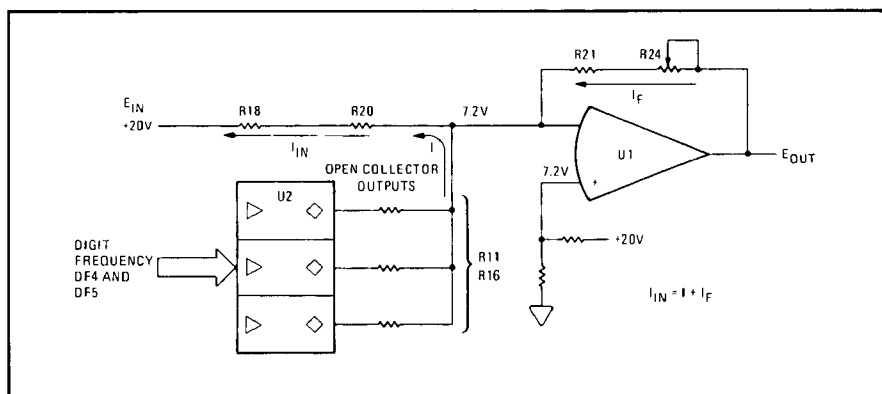


Figure 8-409. Simplified Pretune D/A Converter Circuit

To better analyze how this circuit works, assume that the op amp (U1) is ideal. That is, its gain and bandwidth are both infinity, the input currents and offset are both zero, and there is zero potential difference between the two input terminals. The output voltage,  $E_{OUT}$ , is dependent on the feedback current,  $I_F$ , that flows through R21 and R24. In the ideal inverting amplifier configuration the feedback current must equal the input current ( $I_{IN} = I_F$ ). The magnitude of the input current  $I_{IN}$  is dependent on the potential across R18 and R20. In this circuit the magnitude of  $I_{IN}$  remains constant at all times.

If the outputs of U2 are all HIGH (open), there is no current flowing through the pull-up resistors, R11-R16. Hence, the input and feedback currents equal each other. Now, when any of the outputs of U2 goes LOW, current starts flowing into the (-) input node through the pull-up resistors.  $I_{IN}$  is no longer equal to  $I_F$ ,  $I_{IN}$  now

equaling  $I_F + I$ . Since the value of  $I_{IN}$  has to remain constant, the feedback current has to decrease so equilibrium is maintained. A decrease in  $I_F$  causes the output voltage,  $E_{OUT}$ , to decrease in magnitude.

### Speed Control Circuit

The Speed Control Circuit monitors the output from the Pretune D/A Converter circuit. When a change in the pretune voltage is detected, the Speed Control Circuit drives the J-FET switch (Q9) ON. U4B and U4D are comparators. U4B detects a negative going transition while U4D detects a positive going transition. When either transition is detected, the monostable U3 is triggered. This causes comparator U4A to go HIGH which then turns ON J-FET switch Q9.

### Speed-Up Switch and Low-Pass Filter

J-FET Q9 is connected in parallel with R42, so when Q9 is turned ON C27 is allowed to charge or discharge at a faster rate. Hence, voltage stored on the capacitor tracks the pretune voltage at a faster rate. Q13 and Q14 form a buffer amplifier that couples the pretune voltage to the emitter of Q12.

To maintain the J-FET switch in the ON state, the gate is biased with a positive voltage. To turn the J-FET switch OFF, the gate is biased with a negative voltage.

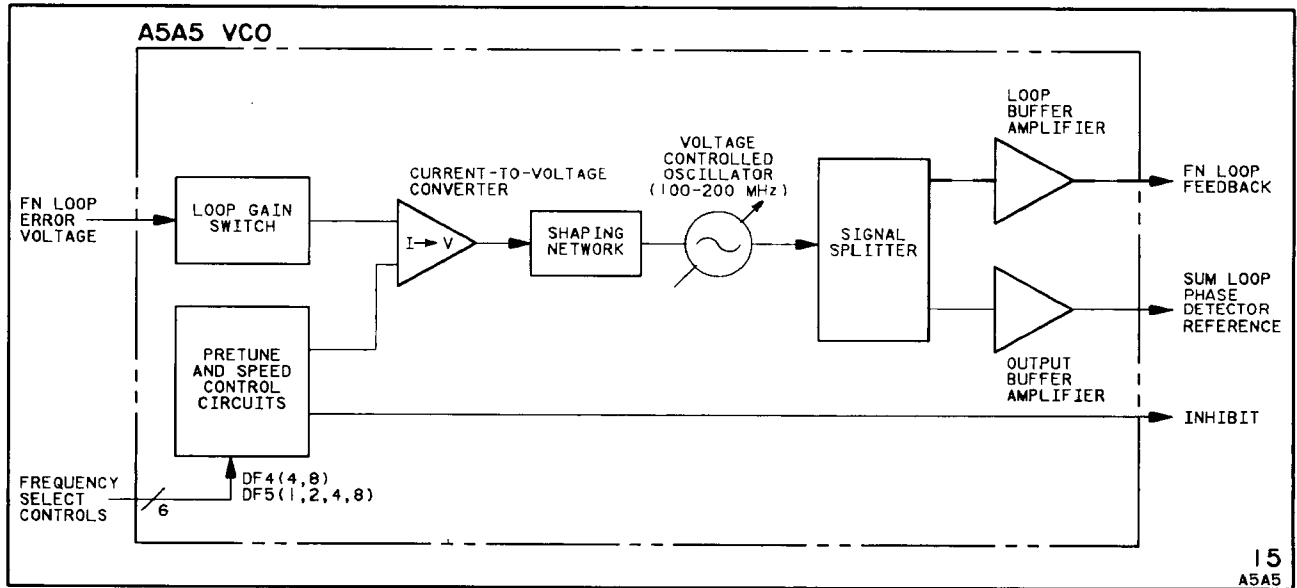
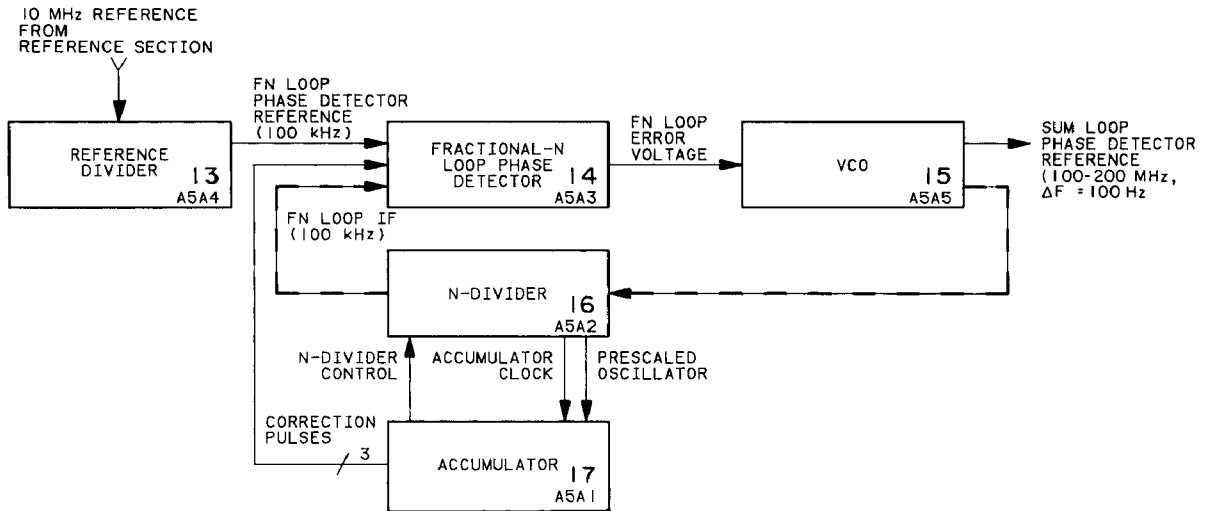


Figure 8-410. A5A5 Fractional-N Loop Voltage Controlled Oscillator Block Diagrams



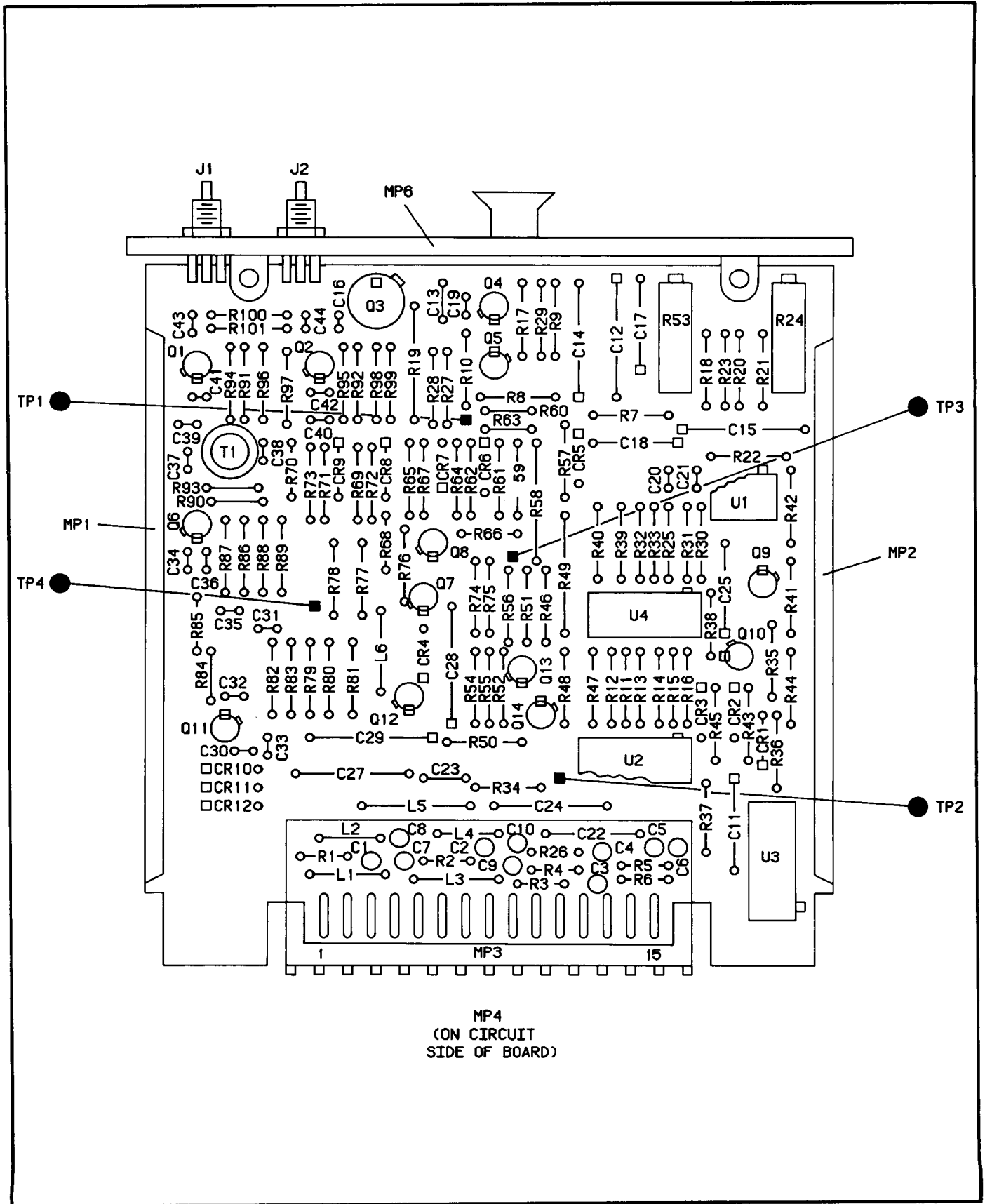


Figure 8-411. A5A5 Fractional-N Loop Voltage Controlled Oscillator Component Locator

## CHANGES

All serial prefixes

2604A and Above

On the A5A5 schematic:

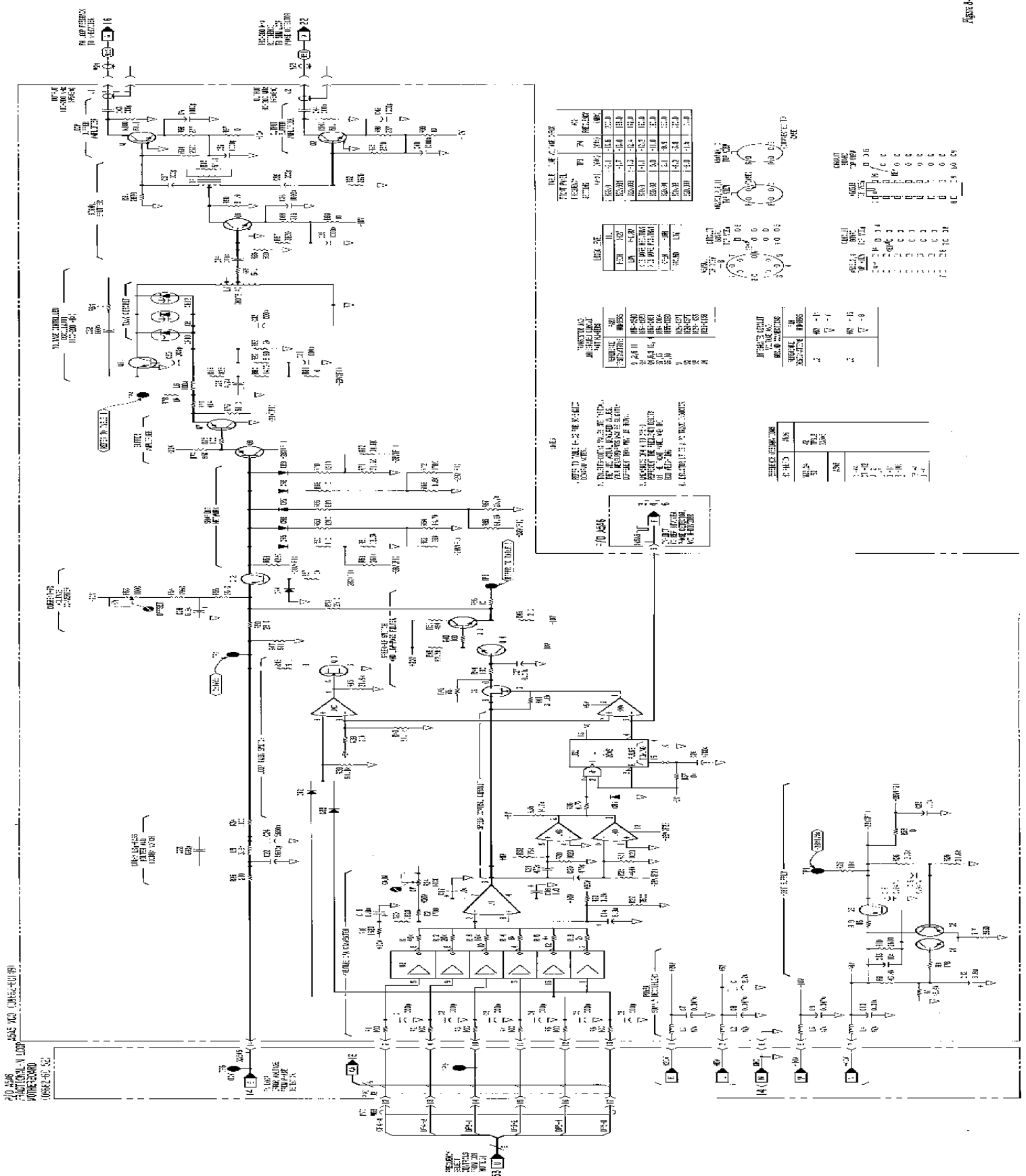
- A5A5R1-R6 - Change the value of R1-R6 to 178 ohms.

On the A5A5 schematic:

- A5A5CR6-CR9 - Delete CR6-CR9.
- A5A5R53, R54, R58-R61 - Change the values of these resistors to those shown below:

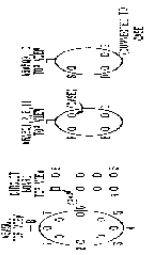
R53	3k
R54	100 ohms
R58	3.83k
R59	56.2k
R60	348 ohms
R61	5.62k

- A5A5R62-R73 - Delete R62-R73.



RESISTOR VALUE CHART

RESISTOR VALUE	WATTAGE	TYPE	REMARKS
500	0.5	1/2	RESISTOR
1000	1.0	1/2	RESISTOR
2000	2.0	1/2	RESISTOR
5000	5.0	1/2	RESISTOR
10000	10.0	1/2	RESISTOR
20000	20.0	1/2	RESISTOR
50000	50.0	1/2	RESISTOR
100000	100.0	1/2	RESISTOR
200000	200.0	1/2	RESISTOR
500000	500.0	1/2	RESISTOR
1000000	1000.0	1/2	RESISTOR



WIRE GAUGE CHART

WIRE GAUGE	DIAMETER (INCH)	CROSS-SECTIONAL AREA (SQ. IN.)	RESISTANCE PER 1000 FT. (OHMS)
14	0.0641	0.00128	2.06
16	0.0509	0.00080	3.27
18	0.0398	0.00050	5.21
20	0.0312	0.00031	8.08
22	0.0250	0.00019	12.86
24	0.0199	0.00012	19.95
26	0.0159	0.00008	30.07
28	0.0126	0.00005	45.37
30	0.0099	0.00003	68.97

WIRE GAUGE CHART

WIRE GAUGE	DIAMETER (INCH)	CROSS-SECTIONAL AREA (SQ. IN.)	RESISTANCE PER 1000 FT. (OHMS)
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26	0.0159	0.00008	30.07
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- NOTES:
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26	0.0159	0.00008	30.07
28	0.0126	0.00005	45.37
30	0.0099	0.00003	68.97

SERVICE SHEET 16  
A5A2 FRACTIONAL-N LOOP N-DIVIDER

## REFERENCE BLOCK DIAGRAM 4

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

## PRINCIPLES OF OPERATION

## General

The purpose of the N-Divider (A5A2) is to divide the Fractional N (FN) Loop VCO frequency (FN Loop N-Divider Drive) down to 100 kHz. The 100 kHz output signal, FN loop IF, is one input to the FN Loop's phase detector. The N-Divider consists of programmable digital dividers (counters) which divide down the VCO frequency. The N-Divider can divide by integers from 1001 through 2000. The frequency digits, DF3, DF4 and DF5, determine the divide-by-N number. In addition the divide by N number can be changed to N-1 by the N-Divider Control (NDC) signal from the Accumulator (A5A1).

Fractional division is accomplished by dividing by N for a number of times and then by N-1 for a number of times. The fractional N is then the average of N and N-1. The N-Divider can divide by a fractional part that has three significant places, for example, a fractional N of 1000.001.

## Divide-by-10/11 Prescaler Counter

The divide-by-10/11 Prescaler Counter, U1, is an ECL device which can be programmed to divide by 11 or 10. At the beginning of each reference period the divide-by-10/11 Prescaler Counter divides by 11. It later starts dividing by 10 and remains in the divide-by-10 mode until the end of the reference period. How long it continues to divide by 11 is determined by the divide-by-10/11 Control Circuit. One output from the divide-by-10/11 Prescaler Counter, the Prescaled Oscillator signal (PSO), goes to the Accumulator (A5A1) where it is used as a clock. Note during the time when the Correction Pulses are generated this clock equals the VCO frequency divided by 10.

### Divide-by-10/11 Control Circuit

The purpose of the divide-by-10/11 Control Circuit is to control the modulus (10 or 11) of U1. Frequency digit DF3 along with the NDC line determine how long U1 divides by 11 each reference period. Frequency digit DF3 presets the Programmable Decade Counter (U8) while the NDC line controls the terminal count of the Terminal Count Decoder (18). Normally the terminal count is 18 except when the NDC line goes high. When the NDC line goes high the terminal count changes from 18 to 17. Changing the terminal count of the Terminal Count Decoder (18) from 18 to 17 effectively causes the N-Divider to divide by N-1.

U8 starts to count up from its preset value to the terminal count. When counter U8 reaches the terminal count the Terminal Count Latch (U7B) is set and on the next clock the Terminal Count Latch output goes high. This causes counter U1 to start dividing by 10.

### Programmable Counters

The Programmable Counter counts all the pulses out of the divide-by-10/11 Prescaler Counter. Frequency digits DF4 and DF5 preset the Programmable Decade Counters U6 and U9 respectively. These counters count from the preset count to the count of 196. The count of 196 is determined by the Terminal Count Decoder (196). When the count reaches 196 the Terminal Count Switch is set up to change state on the next pulse from U1. The output from the Terminal Count Switch (U3B) is fed back to reset both the Programmable Counter and the divide-by-10/11 Control Circuit.

When the loop is phase-locked the output from the Terminal Count Switch is a 50 to 100 ns pulse with an average pulse repetition rate of 100 kHz.

### TROUBLESHOOTING

When a Fractional-N Loop problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem.

There are two types of procedures covered by this procedure.

1. No output pulses produced by A5A2 assembly. Begin troubleshooting with section I of the procedure.
2. Output pulses produced by A5A2 assembly are at the wrong frequency. Begin troubleshooting with section II of the procedure.

No output pulses.

1. Mount the A5A2 assembly on its extender board.

2. Use a logic probe and check for pulses at the outputs of U3B (pins 9 and 7). If pulses are present, the problem is between U3B and the edge connector. If no pulses are present, continue with step 3.
3. Check the output of U2A pin 12 (TP2). This signal should be a TTL pulse train. Check that the signal assumes valid high and low TTL logic levels. If this signal is not normal, the problem is in the prescaler (U1) or translator (U2A), or one of the counters (U6B, U8B, U3B) is pulling down the output of U2A. If this signal is normal, continue with step 4.
4. Connect a jumper between TP4 and TP4A which will allow counters U6 and U9 to free-run. Check that these counters are counting by touching a logic probe to the outputs. Flip-flop U3A should be set. The outputs of U5A (pin 12) and U5C (pin 8) should be normally low but go high when the counters reach the value they are decoding so a logic probe touched to these pins should blink.

If the counter circuitry is normal, the problem is with the terminal counter switch.

Output pulses of wrong frequency.

1. Mount the A5A2 assembly on its extender board.
2. Connect an extender cable from the service kit between A5A2J1 and A3A4J2. This cable routes the output of the LF N-loop to the input of the A5A2 N-divider assembly.
3. Set the 8663A front panel frequency to 327.8 MHz. This sets the LF N-loop output to 200.0 MHz.
4. Short test points TP4 and TP4A together. This holds flip-flop U7B in the set condition (TP1 high) which keeps counter U1 in the divide-by-10 mode. Measure the frequency at TP2 with the high impedance input of a frequency counter. The frequency should be exactly 20.0 MHz. If it is not, the problem is with flip-flop U7B, counter U1 or associated components.
5. Remove the short between TP4 and TP4A. Connect a jumper between TP3 and ground. This holds flip-flop U7B in the clear condition (TP1 low) which keeps counter U1 in the divide-by-11 mode. Measure the frequency at TP2. The frequency should be 18.181818 MHz (200 divided by 11). If it is not, the problem is with flip-flop U7B, counter U1 or associated components.
6. Remove the jumper from TP3. View the signal at TP1 on an oscilloscope. The waveform should be a TTL negative-going pulse approximately 1.1 microsec wide. Set the frequency increment to 100 Hz. Pushing the INCREMENT (up) key should decrease the pulse width in 55 microsec steps.

If there are no pulses on TP1, the problem could be the pulses coming from flip-flop U3B. Check TP3 for TTL negative going pulses (approximately 50 microseconds wide). The normal period

of these pulses is approximately 10 microseconds, but any period greater than 1.5 microseconds should allow the pulses on TP1, described above, to be produced. If the TP3 pulses are not normal, continue troubleshooting with step 7.

7. Remove the jumper from TP3. Short test points TP4 and TP4A together which makes the output of U2A (pin 12) exactly 20.0 MHz and puts counters U6 and U9 into a free-run mode. The output of U6 (pin 12) should be a 2.0 MHz signal and the output of U9 (pin 12) should be a 200.0 kHz signal.

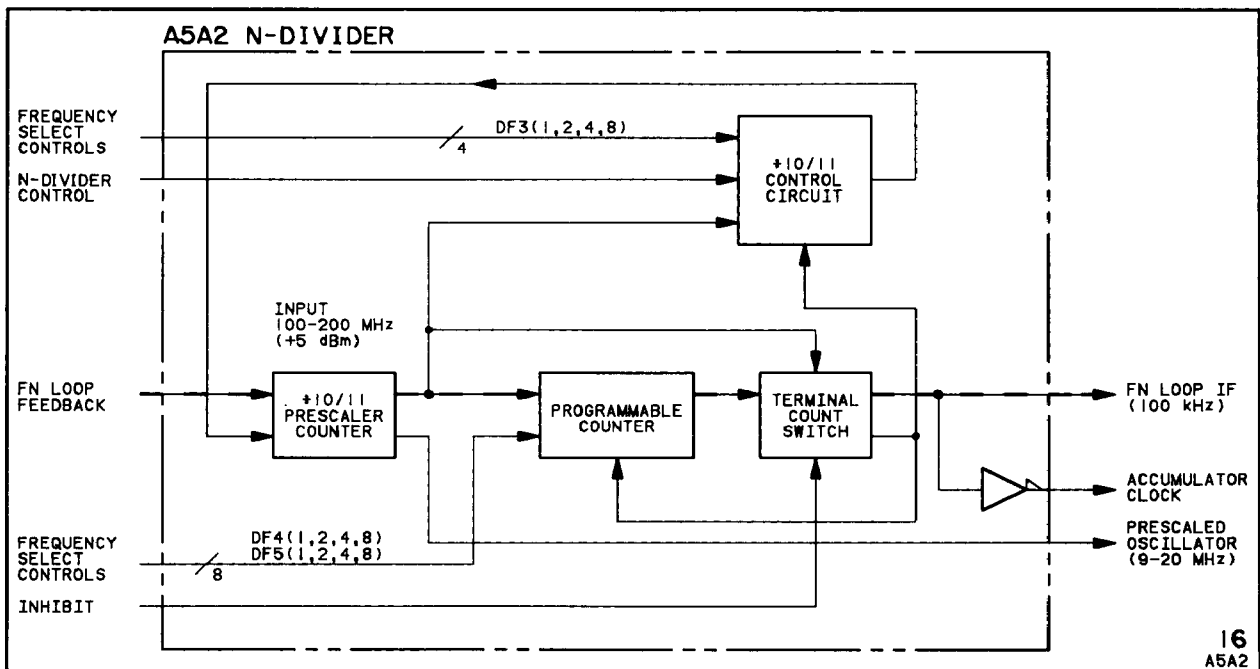
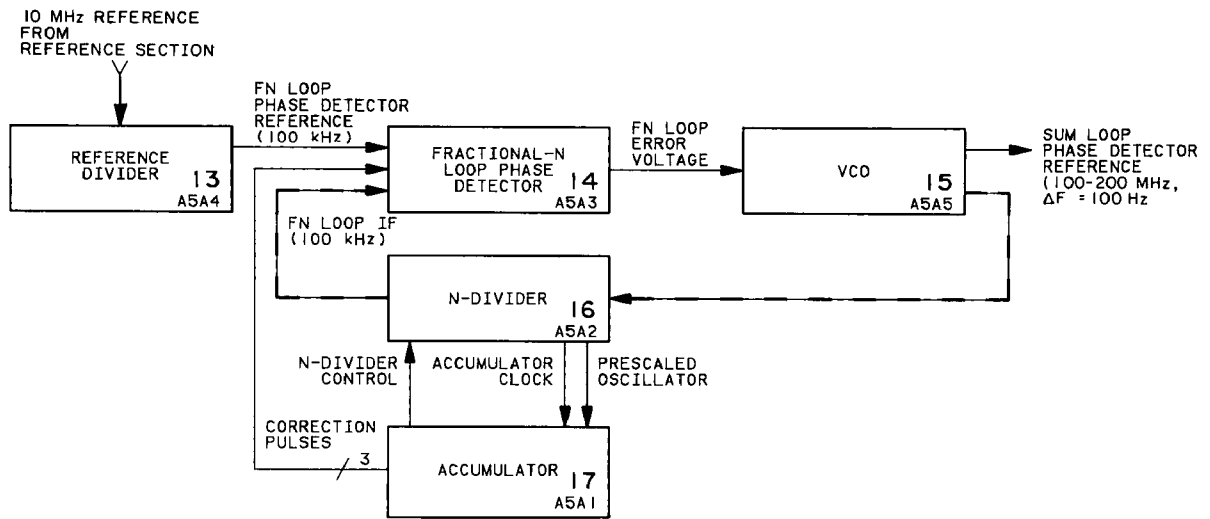


Figure 8-413. A5A2 Fractional-N Divider Block Diagrams



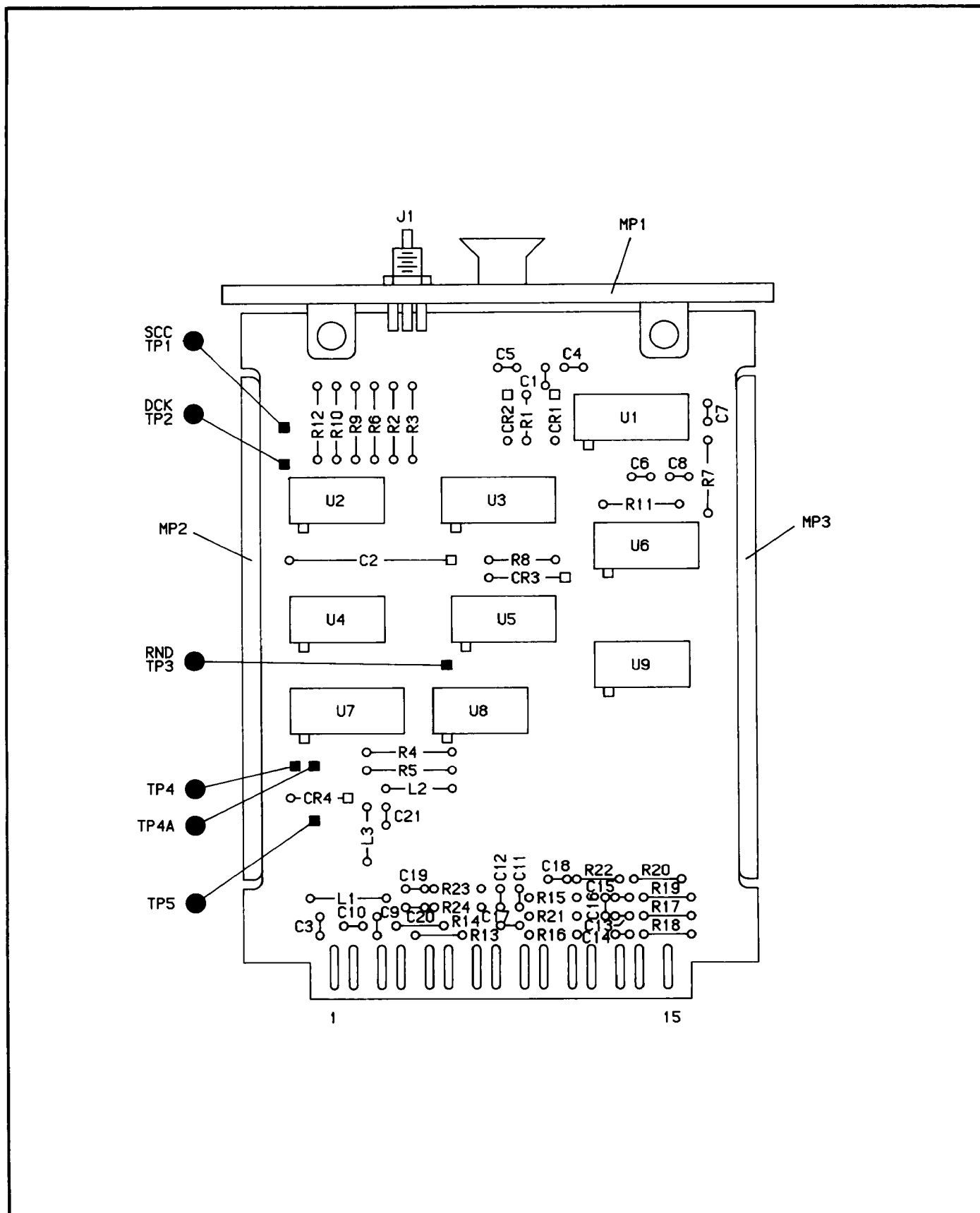


Figure 8-414. A5A2 Fractional-N Divider Component Locator

1. REFER TO TABLE 8-102 FOR EXHAUSTIVE DIMENSION NOTES.
2. TOLERANCE VALUES ARE TYPICAL UNLESS OTHERWISE SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.
4. DIMENSIONS IN PARENTHESES ARE FOR REFERENCE.
5. DIMENSIONS ARE FOR THE ASSEMBLY POSITION SHOWN.

REFERENCE DESIGNATOR

DESIGNATOR	QTY	DESCRIPTION
U1A	1	IC 741
U1B	1	IC 741
U1C	1	IC 741
U1D	1	IC 741
U1E	1	IC 741
U1F	1	IC 741
U1G	1	IC 741
U1H	1	IC 741
U1I	1	IC 741
U1J	1	IC 741
U1K	1	IC 741
U1L	1	IC 741
U1M	1	IC 741
U1N	1	IC 741
U1O	1	IC 741
U1P	1	IC 741
U1Q	1	IC 741
U1R	1	IC 741
U1S	1	IC 741
U1T	1	IC 741
U1U	1	IC 741
U1V	1	IC 741
U1W	1	IC 741
U1X	1	IC 741
U1Y	1	IC 741
U1Z	1	IC 741

LOGIC LEVELS

LEVEL	DESCRIPTION
1	LOW
2	HIGH
3	LOW
4	HIGH
5	LOW
6	HIGH
7	LOW
8	HIGH
9	LOW
10	HIGH
11	LOW
12	HIGH
13	LOW
14	HIGH
15	LOW
16	HIGH
17	LOW
18	HIGH
19	LOW
20	HIGH
21	LOW
22	HIGH
23	LOW
24	HIGH
25	LOW
26	HIGH
27	LOW
28	HIGH
29	LOW
30	HIGH
31	LOW
32	HIGH
33	LOW
34	HIGH
35	LOW
36	HIGH
37	LOW
38	HIGH
39	LOW
40	HIGH
41	LOW
42	HIGH
43	LOW
44	HIGH
45	LOW
46	HIGH
47	LOW
48	HIGH
49	LOW
50	HIGH
51	LOW
52	HIGH
53	LOW
54	HIGH
55	LOW
56	HIGH
57	LOW
58	HIGH
59	LOW
60	HIGH
61	LOW
62	HIGH
63	LOW
64	HIGH
65	LOW
66	HIGH
67	LOW
68	HIGH
69	LOW
70	HIGH
71	LOW
72	HIGH
73	LOW
74	HIGH
75	LOW
76	HIGH
77	LOW
78	HIGH
79	LOW
80	HIGH

TRANSISTOR

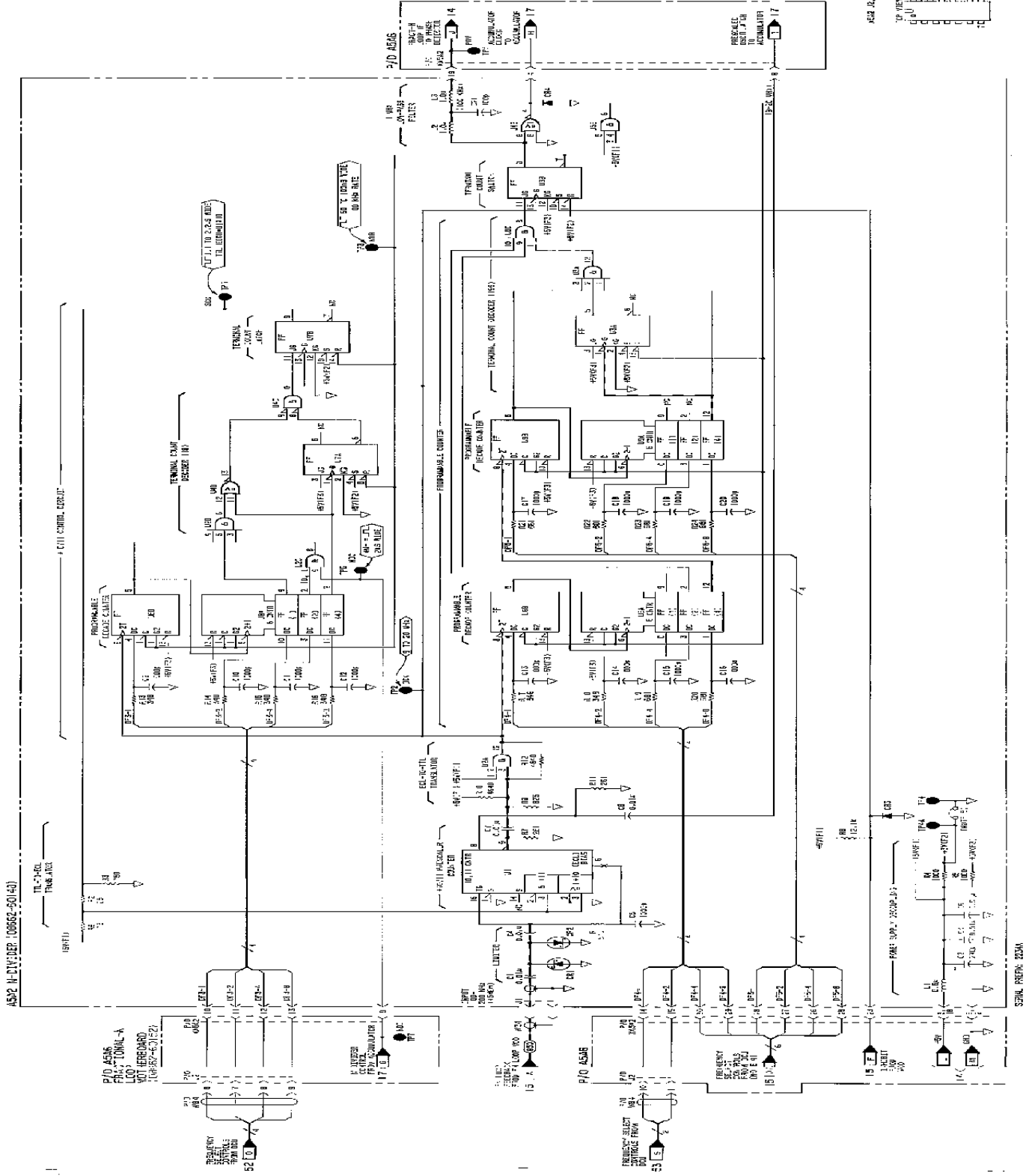
DESIGNATOR	QTY	DESCRIPTION
Q1	1	2N4333
Q2	1	2N4333
Q3	1	2N4333
Q4	1	2N4333
Q5	1	2N4333
Q6	1	2N4333
Q7	1	2N4333
Q8	1	2N4333
Q9	1	2N4333
Q10	1	2N4333
Q11	1	2N4333
Q12	1	2N4333
Q13	1	2N4333
Q14	1	2N4333
Q15	1	2N4333
Q16	1	2N4333
Q17	1	2N4333
Q18	1	2N4333
Q19	1	2N4333
Q20	1	2N4333
Q21	1	2N4333
Q22	1	2N4333
Q23	1	2N4333
Q24	1	2N4333
Q25	1	2N4333
Q26	1	2N4333
Q27	1	2N4333
Q28	1	2N4333
Q29	1	2N4333
Q30	1	2N4333
Q31	1	2N4333
Q32	1	2N4333
Q33	1	2N4333
Q34	1	2N4333
Q35	1	2N4333
Q36	1	2N4333
Q37	1	2N4333
Q38	1	2N4333
Q39	1	2N4333
Q40	1	2N4333
Q41	1	2N4333
Q42	1	2N4333
Q43	1	2N4333
Q44	1	2N4333
Q45	1	2N4333
Q46	1	2N4333
Q47	1	2N4333
Q48	1	2N4333
Q49	1	2N4333
Q50	1	2N4333
Q51	1	2N4333
Q52	1	2N4333
Q53	1	2N4333
Q54	1	2N4333
Q55	1	2N4333
Q56	1	2N4333
Q57	1	2N4333
Q58	1	2N4333
Q59	1	2N4333
Q60	1	2N4333
Q61	1	2N4333
Q62	1	2N4333
Q63	1	2N4333
Q64	1	2N4333
Q65	1	2N4333
Q66	1	2N4333
Q67	1	2N4333
Q68	1	2N4333
Q69	1	2N4333
Q70	1	2N4333
Q71	1	2N4333
Q72	1	2N4333
Q73	1	2N4333
Q74	1	2N4333
Q75	1	2N4333
Q76	1	2N4333
Q77	1	2N4333
Q78	1	2N4333
Q79	1	2N4333
Q80	1	2N4333
Q81	1	2N4333
Q82	1	2N4333
Q83	1	2N4333
Q84	1	2N4333
Q85	1	2N4333
Q86	1	2N4333
Q87	1	2N4333
Q88	1	2N4333
Q89	1	2N4333
Q90	1	2N4333
Q91	1	2N4333
Q92	1	2N4333
Q93	1	2N4333
Q94	1	2N4333
Q95	1	2N4333
Q96	1	2N4333
Q97	1	2N4333
Q98	1	2N4333
Q99	1	2N4333
Q100	1	2N4333

INTERCONNECTED POINTS

POINT	DESCRIPTION
1	POINT 1-5
2	POINT 1-12
3	POINT 1-14
4	POINT 1-7
5	POINT 1-6
6	POINT 1-8
7	POINT 1-9
8	POINT 1-10
9	POINT 1-11
10	POINT 1-13
11	POINT 1-15
12	POINT 1-16
13	POINT 1-17
14	POINT 1-18
15	POINT 1-19
16	POINT 1-20
17	POINT 1-21
18	POINT 1-22
19	POINT 1-23
20	POINT 1-24
21	POINT 1-25
22	POINT 1-26
23	POINT 1-27
24	POINT 1-28
25	POINT 1-29
26	POINT 1-30
27	POINT 1-31
28	POINT 1-32
29	POINT 1-33
30	POINT 1-34
31	POINT 1-35
32	POINT 1-36
33	POINT 1-37
34	POINT 1-38
35	POINT 1-39
36	POINT 1-40
37	POINT 1-41
38	POINT 1-42
39	POINT 1-43
40	POINT 1-44
41	POINT 1-45
42	POINT 1-46
43	POINT 1-47
44	POINT 1-48
45	POINT 1-49
46	POINT 1-50
47	POINT 1-51
48	POINT 1-52
49	POINT 1-53
50	POINT 1-54
51	POINT 1-55
52	POINT 1-56
53	POINT 1-57
54	POINT 1-58
55	POINT 1-59
56	POINT 1-60
57	POINT 1-61
58	POINT 1-62
59	POINT 1-63
60	POINT 1-64
61	POINT 1-65
62	POINT 1-66
63	POINT 1-67
64	POINT 1-68
65	POINT 1-69
66	POINT 1-70
67	POINT 1-71
68	POINT 1-72
69	POINT 1-73
70	POINT 1-74
71	POINT 1-75
72	POINT 1-76
73	POINT 1-77
74	POINT 1-78
75	POINT 1-79
76	POINT 1-80
77	POINT 1-81
78	POINT 1-82
79	POINT 1-83
80	POINT 1-84
81	POINT 1-85
82	POINT 1-86
83	POINT 1-87
84	POINT 1-88
85	POINT 1-89
86	POINT 1-90
87	POINT 1-91
88	POINT 1-92
89	POINT 1-93
90	POINT 1-94
91	POINT 1-95
92	POINT 1-96
93	POINT 1-97
94	POINT 1-98
95	POINT 1-99
96	POINT 1-100

ASSEMBLY POINTS

POINT	DESCRIPTION
1	POINT 1-1
2	POINT 1-2
3	POINT 1-3
4	POINT 1-4
5	POINT 1-5
6	POINT 1-6
7	POINT 1-7
8	POINT 1-8
9	POINT 1-9
10	POINT 1-10
11	POINT 1-11
12	POINT 1-12
13	POINT 1-13
14	POINT 1-14
15	POINT 1-15
16	POINT 1-16
17	POINT 1-17
18	POINT 1-18
19	POINT 1-19
20	POINT 1-20
21	POINT 1-21
22	POINT 1-22
23	POINT 1-23
24	POINT 1-24
25	POINT 1-25
26	POINT 1-26
27	POINT 1-27
28	POINT 1-28
29	POINT 1-29
30	POINT 1-30
31	POINT 1-31
32	POINT 1-32
33	POINT 1-33
34	POINT 1-34
35	POINT 1-35
36	POINT 1-36
37	POINT 1-37
38	POINT 1-38
39	POINT 1-39
40	POINT 1-40
41	POINT 1-41
42	POINT 1-42
43	POINT 1-43
44	POINT 1-44
45	POINT 1-45
46	POINT 1-46
47	POINT 1-47
48	POINT 1-48
49	POINT 1-49
50	POINT 1-50
51	POINT 1-51
52	POINT 1-52
53	POINT 1-53
54	POINT 1-54
55	POINT 1-55
56	POINT 1-56
57	POINT 1-57
58	POINT 1-58
59	POINT 1-59
60	POINT 1-60
61	POINT 1-61
62	POINT 1-62
63	POINT 1-63
64	POINT 1-64
65	POINT 1-65
66	POINT 1-66
67	POINT 1-67
68	POINT 1-68
69	POINT 1-69
70	POINT 1-70
71	POINT 1-71
72	POINT 1-72
73	POINT 1-73
74	POINT 1-74
75	POINT 1-75
76	POINT 1-76
77	POINT 1-77
78	POINT 1-78
79	POINT 1-79
80	POINT 1-80
81	POINT 1-81
82	POINT 1-82
83	POINT 1-83
84	POINT 1-84
85	POINT 1-85
86	POINT 1-86
87	POINT 1-87
88	POINT 1-88
89	POINT 1-89
90	POINT 1-90
91	POINT 1-91
92	POINT 1-92
93	POINT 1-93
94	POINT 1-94
95	POINT 1-95
96	POINT 1-96
97	POINT 1-97
98	POINT 1-98
99	POINT 1-99
100	POINT 1-100



## SERVICE SHEET 17 A5A1 FRACTIONAL-N LOOP ACCUMULATOR

### REFERENCE BLOCK DIAGRAM 4

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

### General

The purpose of the Accumulator (A5A1) is to determine when to divide by N or divide by N-1. The Accumulator computes the phase difference between the VCO/N (FN Loop IF) and the 100 kHz reference (FN Loop Reference). This information is used to develop the N Divider Control signal (NDC) and the Correction Pulses. The Accumulator consists of three major sections which are the Algorithmic State Machine, Summing Circuitry, and the Digital to Pulse Converter.

### Algorithmic State Machine

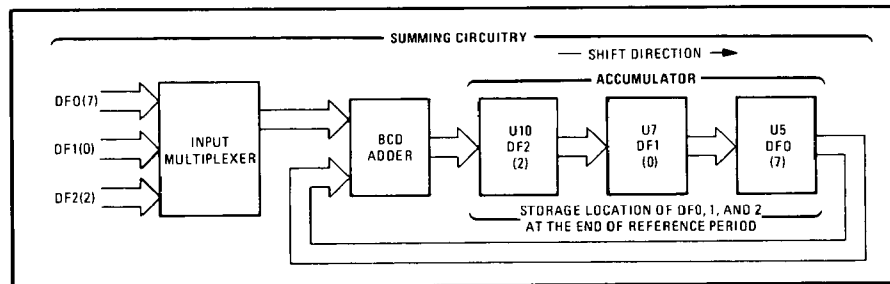
The Address Generator along with the State Controller form a small Algorithmic State Machine (ASM). The ASM generates a set of control signals or instructions which properly sequences the Summing Circuitry and the Digital to Pulse Converter. The control signals or instructions are determined by the program stored in ROM (U6).

The ASM generates a total of seventeen instructions. The seventeenth instruction is a halt command which resets and disables the Address Generator (U1 and U2). The ASM remains in the halt state until the end of a reference period. A clock pulse, labeled Accumulator Clock, is generated at the end of each reference period. This pulse restarts the Address Generator and the whole sequence is repeated again.

### Summing Circuitry

The fractional portion of the VCO frequency contains the information needed to develop the N Divider Control (NDC) and the Correction pulses. The fractional portion of the VCO frequency is entered into the Accumulator in BCD form (DF0 through DF2). These BCD lines, DF0 through DF2, carry information which corresponds to the front panel frequency digits D0 through D2. The Summing Circuitry takes the BCD data, adds it to the previous sum, and stores it in the Accumulator Registers (U19, U7, and U5). Each reference period the content of the Accumulator Registers is incremented by the fractional portion. The number stored in the Accumulator Registers corresponds to the difference in phase between the VCO signal and the reference signal. When the accumulated total reaches or exceeds unity an NDC signal is generated.

To better understand the operation of the Summing Circuit, let's go through an example. When analyzing the operating of the Summing Circuitry it is better to view it in terms of reference periods. Let's assume that the Accumulator Registers initially contains the number zero and the fractional portion equals the number 207, that is, DF0=7, DF1=0, and DF2=2. At the beginning of the reference period the Input Multiplexer selects the four BCD lines which corresponds to the DF0 and steers the BCD data to the BCD Adder. The BCD Adder adds the DF0 number (7) to the number stored in U5. Since U5 contains the number zero, the resulting sum is just the number DF0. The sum is then latched into U10. At the same time the previous content stored in U10 is shifted into U7 while the previous content of U7 is shifted into U5 (shift right). This sequence is then repeated for both DF1 and DF2, respectively. Figure 8-416 shows the content of the Accumulator Registers after the end of one reference period. Note at the end of the reference period, DF0 is stored in U5, DF1 is stored in U7, and DF2 is stored in U10.



*Figure 8-416. Summing Circuitry Simplified Block Diagram Showing the Content of the Accumulator after each Reference Period*

At the beginning of the next reference period DF0 is again selected first and steered to the BCD Adder. DF0 is added to the content stored in U5 which now contains the result of the previous addition of DF0. Again this sequence is repeated for DF1 and DF2. The net result is that the content of the Accumulator Registers is incremented by the fractional portion every reference period. Table 8-401 illustrates this point.

Table 8-401. Accumulator Registers Content Versus Reference Periods

Number of Ref. Periods	FRACTIONAL N LOOP									
				INTEGER PORTION			FRACTION PORTION (Accumulator Register)			
	DF9	...	DF6	DF5	DF4	DF3	DF2	DF2	DF0	
0	X		X	X	X	X	0	0	0	
1							2	0	7	
2							4	1	4	
3							6	2	1	
4							8	2	8	
5	Carry, NDC Command Generated --> 1							0	3	5
6							2	4	2	
7							4	4	9	

X = IRRELEVANT

Whenever the addition of DF0 and DF1 results in a carry, the carry is circulated back to the BCD Adder and is added to the next most significant digit. The NDC signal is generated only when the addition of DF2 results in a carry. During the interval when the addition of DF2 occurs the N Divider Control Detector receives a clock pulse. This pulse latches the carry information and outputs it to the N Divider (A4A2).

**Digital To Pulse Converter**

The purpose of the Digital to Pulse Converter is to develop the Correction Pulses 1, 2, and 3. The Correction Pulses are fed into the Fractional-N Loop Phase Detector (A5A3) which develop the signal that counteracts the changing phase detector output. The Digital to Pulse Converter converts the BCD information stored in the Accumulator Registers into pulses. These pulses occur only once during each reference period. The Decoder circuit controls the sequence in which the Correction Pulses are output while the Programmable Counter (U3) and the 15 Decoder (U4A and U4C) control the duration or width of the pulses.

The Decoder is comprised of three NAND gates (U12) which form a one to three multiplexer circuit. The Correction Pulses are generated one at a time. The Decoder steers the Correction Pulses to one of

the three outputs. The order in which the pulses are outputed is Correction Pulse 3, Correction Pulse 2, and Correction Pulse 1.

The Programmable Counter along with the 15 Decoder determines the pulse width (negative going) of each Correction Pulse. The 15 Decoder circuit causes the counter to reset when it reaches the count of 15. The Programmable Counter is preset by the complemented of the BCD number stored in register U5. The Program Counter is clocked by the Prescaled Oscillator (PSO) signal. During the interval when the Correction Pulses are being developed, the PSO frequency equals the FN Loop VCO frequency divided by ten. The time it takes for the Program Counter to count from its preset value to 15 determines the pulse width. The pulse width can be calculated by the following formula:

$$\text{Pulse Width} = 10 \times (\text{number in U5} + 1) \times \text{VCO Cycle Wide}$$

For example if U5 contains the number 0, a 10 VCO cycle wide pulse is generated. If U5 contains the number 9, a 100 VCO cycle wide pulse is generated. Note if the FN Loop operates with no fractional part, the pulse width of the Correction Pulses remains constant from reference period to reference period. However, if the loop is operating with a fractional part, the Correction Pulses will vary in duration every reference period. Also note, the pulse duration will be the longest when the phase difference is at its maximum value.

### TROUBLESHOOTING

When a Fractional-N Loop problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem. Signature analysis is used to troubleshoot this assembly. The normal operation of the A4A1 assembly provides the stimulus needed to drive the HP 5004A Signature Analyzer. Any special set-up requirements are listed under the signature tables.

#### Set-up

1. Mount the A5A1 assembly on an extender board from the service kit.
2. Set the Signature Analyzer switches as follows:

HP 5004A	Pushbuttons
START	(OUT)
STOP	(IN)
CLOCK	(OUT)
HOLD	(OUT)
SELF TEST	(OUT)

3. Connect the Signature Analyzer to the A5A1 assembly as follows:

HP 5004A	A5A1 Assembly
STOP	U11 pin 6
START	U11 pin 6
CLOCK	U2 pin 6
GND	TP4A

4. Run a cable from the Signal Generator rear panel 10 MHz reference output to the A5A2J1 connector.

**Initialization**

1. Set frequency to 320.0 MHz.
2. Short TP1 and TP1A. Remove any other jumpers connected to these test points.
3. Remove short and connect jumper from U11 pin 6 to TP1A.
4. Set frequency to test value.

**Test Procedure**

1. Touch the SA probe to +5V on the A5A1 assembly.

**signature: OHA5**

If this signature is correct, the set-up is correct so continue troubleshooting with step 2. Otherwise, there is a problem with the set-up or the state controller circuitry on A5A1. SA cannot be used until the +5V signature is correct. Troubleshoot the state controller using the information in the timing diagram (Figure 8-417).

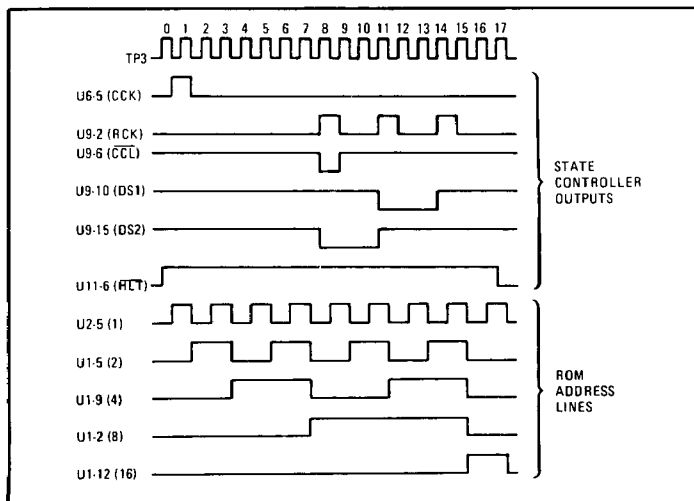


Figure 8-417. State Controller Timing Diagram

2. Check the state controller by verifying the signature at the output of U9. Correct signatures are shown in the signature tables.

If these signatures are correct, continue troubleshooting with step 3. Otherwise, there is a problem in the state controller so check the signatures at U9 (input), U6 and U1 to isolate the cause of the problem.

3. Set the 8663A front panel frequency to 320.0999596 MHz. Short TP1 and TP1A together. Check the signatures at the output of U7 and U10. Correct signatures are shown in the signature tables.

If these signatures are correct, continue troubleshooting with step 4. Otherwise, there is a problem in the summing circuitry so check the signatures at U14, U15 and U16 to isolate the cause of the problem.

4. Perform the initialization procedure for checking U5 specified in the signature table. Check signatures at frequency settings of 320.099960 and 320.099990 MHz. The initialization procedure must be performed each time the frequency setting is changed.

If these signatures are not correct, U5 is the likely cause. Otherwise, the problem is in one of the circuit elements that cannot be checked by signature analysis. Those elements not checked by this procedure are:

U13A	U8A	U12A
U13B	U8B	U12B
U11B	U3A	U12C
	U3B	

5. Set the 8663A front panel frequency to 320.0999596 MHz. This causes all the circuitry on the A5A1 assembly to be active and a logic probe or oscilloscope can be used to check proper circuit operation.



Accumulator (A5A1) Signatures

U1- 1	----	**U5- 9	2P86	U9- 1		U14- 7	CFF8
2	C2C5	10	7U39	2	2P8C	8	----
3	----	11	729F	3		9	C16H
4	----	12	C16H	4	P8C9	10	P560
5	1182	13	0000	5	A6H3	11	P8F5
6	----	14	OHA5	6	77F8	12	0000
7	----	15	0000	7	7A6H	13	P8F5
8	----	16	----	8		14	P560
9	3409			9	----	15	CFF8
10	----			10	CFF8	16	----
11	----	U6- 1	P8C9	11	C16H		
12	01UF	2	A6H3	12	1C79	U15- 1	----
13	----	3	1C79	13	5CA9	2	P560
14	----	4	5CA9	14	P560	3	----
		5	2C5F	15	P8F5	4	0000
		6	000U	16	----	5	OHA5
*U5- 1		7	----			6	OHA5
2	7U39	8	----	U10- 1	----	7	P8F5
3	729F	9	----	2	----	8	----
4	C16H	10	21H4	3	----	9	P560
5	0000	11	1182	4	P8F5	10	0000
6	OHA5	12	3409	5	P560	11	0000
7	0000	13	C2C5	6	CFF8	12	OHA5
8	----	14	01UF	7	C16H	13	----
9	2P86			8	----	14	C16H
10	0000			9	----		
11	OHA5	U7- 1	----	10	2P8C		
12	0000	2	----	11	----	U16- 1	----
13	C16H	3	----	12	59A8	2	P560
14	729F	4	CFF8	13	540H	3	----
15	7U39	5	C16H	14	C16H	4	OHA5
16	----	6	540H	15	CFF8	5	0000
		7	59A8	16	----	6	OHA5
		8	----			7	CFF8
		9	----			8	----
**U5- 1	----	10	2P8C	U14- 1	0000	9	C16H
2	0000	11	----	2	0000	10	0000
3	OHA5	12	P560	3	0000	11	OHA5
4	0000	13	P8F5	4	C16H	12	0000
5	C16H	14	59A8	5	----	13	----
6	729F	15	540H	6	0000	14	C16H
7	7U39	16	----				
8	----						

\* Test Frequency 320.09996 MHz

\*\* Test Frequency 320.09999 MHz

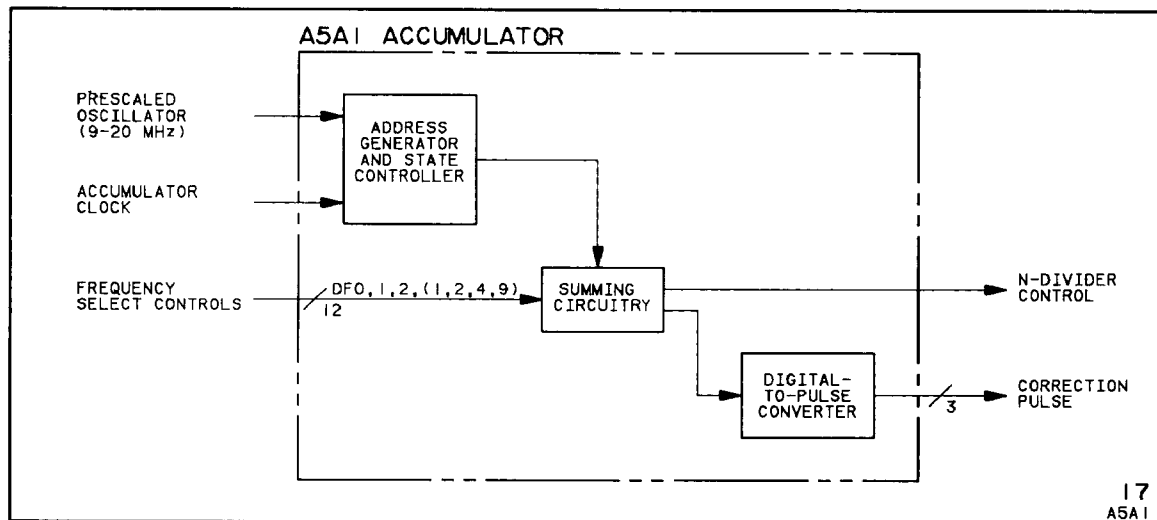
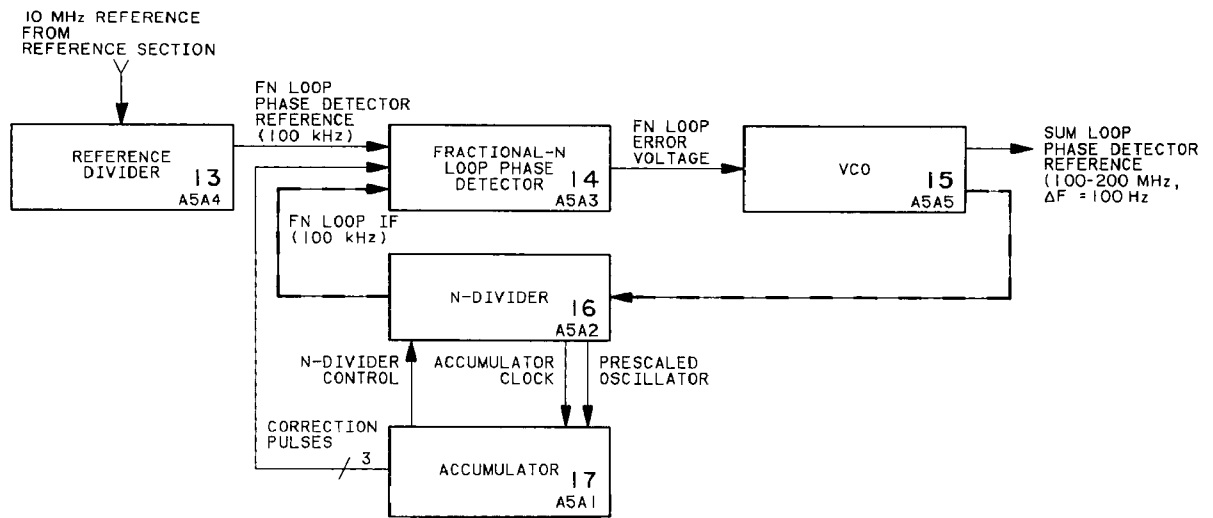


Figure 8-418. A5A1 Fractional-N Loop Accumulator Block Diagrams

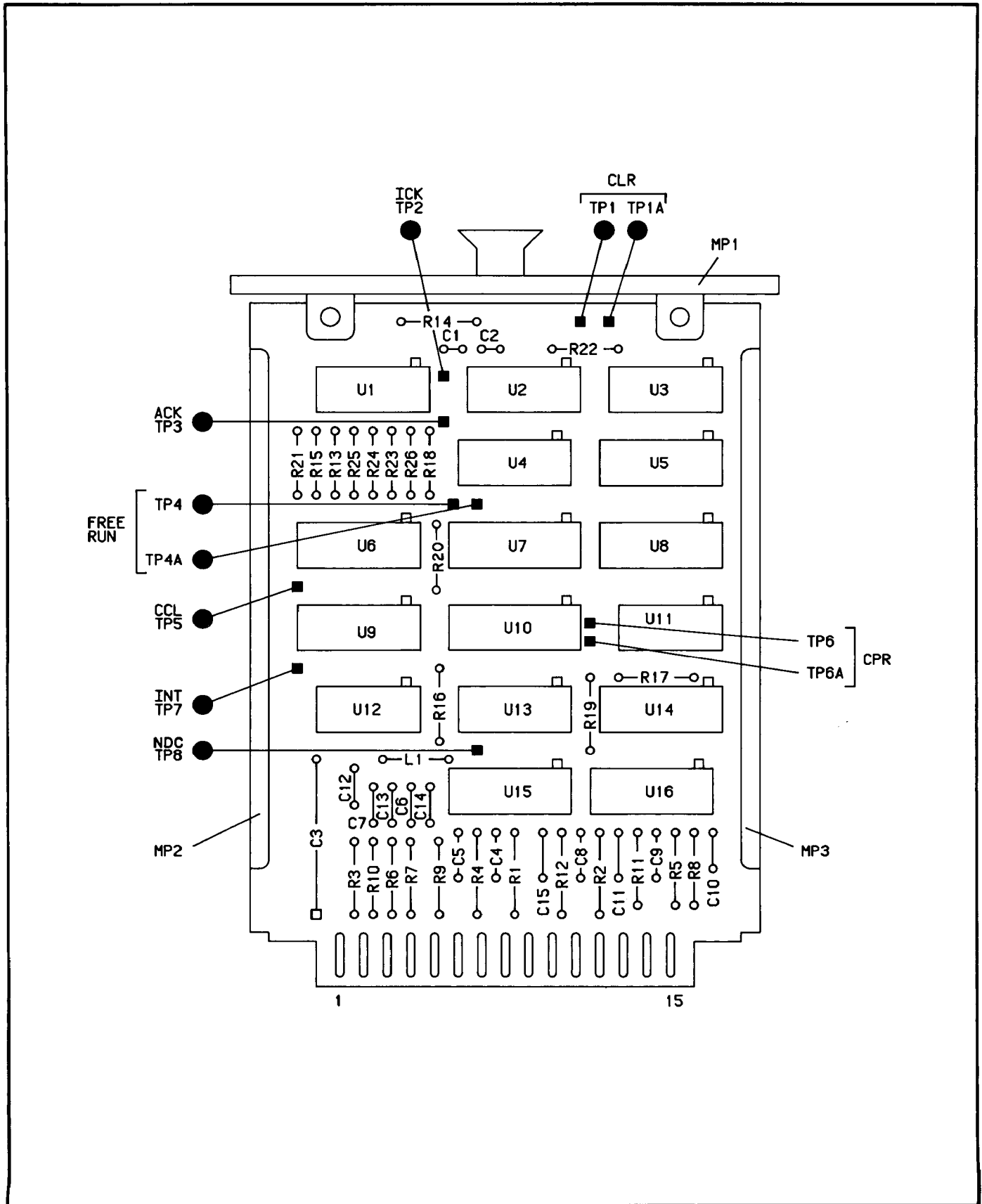
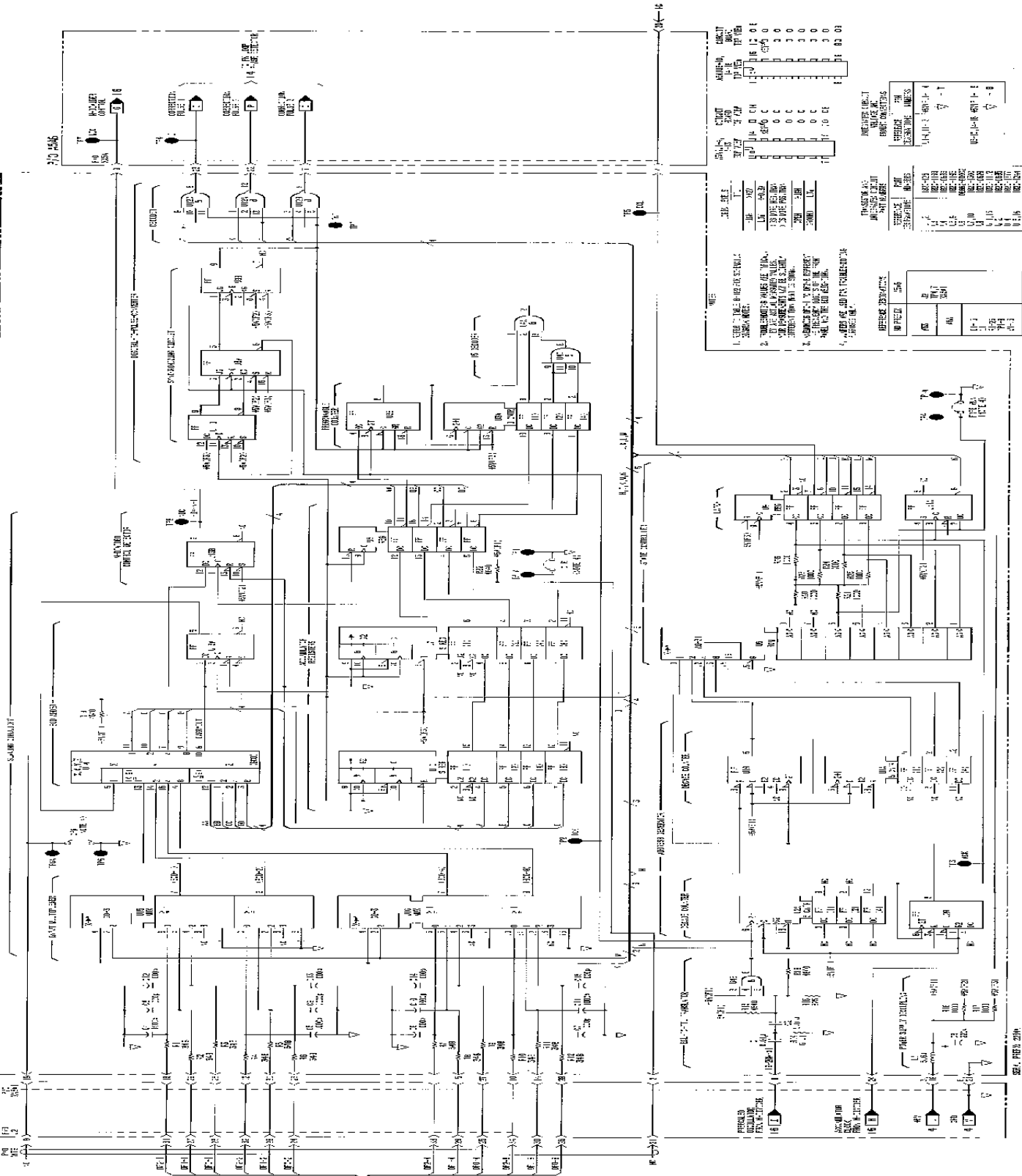


Figure 8-419. A5A1 Fractional-N Loop Accumulator Component Locator

P10 AS46  
FUNCTION-H LOOP  
NOTES:  
1. SEE DRAWING P10 AS46 FOR  
WIRING CONNECTIONS



WIRING CONNECTIONS

WIRE NO.	FROM	TO	TERMINAL
1	E-1	E-2	1
2	E-2	E-3	2
3	E-3	E-4	3
4	E-4	E-5	4
5	E-5	E-6	5
6	E-6	E-7	6
7	E-7	E-8	7
8	E-8	E-9	8
9	E-9	E-10	9
10	E-10	E-11	10
11	E-11	E-12	11
12	E-12	E-13	12
13	E-13	E-14	13
14	E-14	E-15	14
15	E-15	E-16	15
16	E-16	E-17	16
17	E-17	E-18	17
18	E-18	E-19	18
19	E-19	E-20	19
20	E-20	E-21	20
21	E-21	E-22	21
22	E-22	E-23	22
23	E-23	E-24	23
24	E-24	E-25	24
25	E-25	E-26	25
26	E-26	E-27	26
27	E-27	E-28	27
28	E-28	E-29	28
29	E-29	E-30	29
30	E-30	E-31	30
31	E-31	E-32	31
32	E-32	E-33	32
33	E-33	E-34	33
34	E-34	E-35	34
35	E-35	E-36	35
36	E-36	E-37	36
37	E-37	E-38	37
38	E-38	E-39	38
39	E-39	E-40	39
40	E-40	E-41	40
41	E-41	E-42	41
42	E-42	E-43	42
43	E-43	E-44	43
44	E-44	E-45	44
45	E-45	E-46	45
46	E-46	E-47	46
47	E-47	E-48	47
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87	E-87	E-88	87
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90	E-90	E-91	90
91	E-91	E-92	91
92	E-92	E-93	92
93	E-93	E-94	93
94	E-94	E-95	94
95	E-95	E-96	95
96	E-96	E-97	96
97	E-97	E-98	97
98	E-98	E-99	98
99	E-99	E-100	99

REVISIONS

NO.	DATE	DESCRIPTION
1	10/1/56	ISSUED FOR CONSTRUCTION
2	10/1/56	ISSUED FOR CONSTRUCTION
3	10/1/56	ISSUED FOR CONSTRUCTION
4	10/1/56	ISSUED FOR CONSTRUCTION
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97	10/1/56	ISSUED FOR CONSTRUCTION
98	10/1/56	ISSUED FOR CONSTRUCTION
99	10/1/56	ISSUED FOR CONSTRUCTION
100	10/1/56	ISSUED FOR CONSTRUCTION



**SERVICE SHEET 18**  
**P/O A3A3 N LOOP DIVIDER/PHASE DETECTOR**

**REFERENCE BLOCK DIAGRAM 5**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

**General**

This portion of the N Loop Divider/Phase Detector Assembly contains the N loop programmable divider circuitry. The output (which goes to service sheet 19) is the 10 MHz phase detector variable (VCO frequency divided by N). The inputs consist of the N loop divider drive from the N Loop VCO Assembly (service sheet 20) and the frequency select controls from the Digital Control Unit.

The circuitry on this service sheet takes the 122 MHz to 221 MHz N loop divider drive from the VCO (service sheet 20) and divides it down to 10 MHz by means of the programmable N loop divider. In order to produce the 10 MHz output, the divider circuitry must be capable of dividing the 122 MHz to 221 MHz input by 12.1 to 22.1 in one-tenth of a unit steps.

In order to fractionally divide between 12 and 23, fractional-N circuitry is utilized. The fractional-N divider employs a unique method for generating fractional division. Control circuitry causes the input frequency to be divided by one number for a measured number of cycles and then by another number for a second period of cycles. These two count cycles, when averaged over a period of time, result in a fractional divide count.

**Divider Circuitry**

The divide by 12 to 23 circuitry is composed of U1-U8 and U12. U1, U2, and U3 make up a divide by 3, divide by 4 circuit. The control circuitry looks at the output of this section and switches back and forth between the two divide modes in order to produce divide values between 12 and 23. For example, suppose a divide value of 17 is desired. The circuit divides by four, two times, and then by three, three times. Thus, for every 17 input pulses, one pulse is produced at the output of U12A.

**Control Circuitry (For Fractional-N)**

U13, U16, U18, U19, and U20 are the fractional-N control circuits. U13-U19 vary the control signal (TP10) to U20 so that fractional division can be accomplished. U13 adds two to the input. U18 and U19 form the accumulator circuit (U18 is a latch; U19 is an adder). The adder's outputs are at pins 6, 7, 9, 10, and 11. Each time there

is an output from the divider (pin 8 of U21), the count sum is added to the least significant digit programmed. Whenever a carry occurs, the divider is triggered to divide by a number that is one greater. In other words, the control circuitry tells the divide by 12 to 23 section when to shift up by one divide number to achieve fractional division.

For example, to obtain a divide by 12.1 value, the divide by 12 to 23 circuit must divide by 12 for 9 divider output cycles and then by 13 for 1 divider output cycle. The U16A output at pin 5 goes to pin 13 of U20. This is the N/N+1 line. It tells the divider whether it should divide by N or N+1. When the line is HI, the circuit is dividing by N+1, when it is LO, the circuit is dividing by N. (See Fractional-N Loops Section for a more detailed description of how Fractional-N works.)

### Shift Register and Decoder Circuitry

The shift register and decoder circuitry in the divider section is composed of U6, U7, and U8. U6 generates the appropriate output to control the divide by 3, divide by 4 circuitry. When TP4 is HI, the 3/4 circuit divides by 4. The 12/23 divide number is changed through pin 12 of U7 and pin 6 and 9 of U8 by data from the control section decoder formed by U12. This decoder decodes information from pin 2 and 14 of U20. Signals from gate U4D and pins 2, 3, 14, and 15 of U11 control U7 and U8, the outputs of which are decoded by U6.

### ECL to TTL Translator and Squaring Gates

Q3 and Q4 are buffers which convert the ECL output of U12A to TTL levels. The actual output of the divider passes through gates U4A, U4B, and U4C, which square up the output and change the 15% to 20% duty-cycle of the divider output signal to 50%.

### TROUBLESHOOTING

When a Low Frequency N Loop problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem.

#### Procedure

1. Mount the A3A3 assembly on an extender board from the service kit. Use an extender cable in place of the short cable running to this assembly. Look at TP15 with an oscilloscope. The signal should be a 10.0 MHz TTL signal (high 80 ns, low 20 ns). Check that the signal at U4C pin 14 is a 10.0 MHz ECL signal.

If the pulses are there and assume valid logic levels (even though the frequency may be wrong), continue with step 2, below. If there are no pulses (either point stuck high or low, or

doesn't assume valid logic levels), trace the signal back to find where the signal goes bad.

2. Set the front panel frequency to 323.3450 MHz. Connect a cable from A5A5J2 (disconnect the cable that is normally connected there) to A3A3J1. This connects the stable output of the fractional N loop to the input of the divider. Measure the frequency of the signal at TP15. The frequency should be 10.0 MHz (±1 count). If the frequency is correct, the divider is functioning normally so continue with step 6, below. Otherwise, there is a problem with the divider so continue troubleshooting with step 3.
3. Set the front panel frequency to 327.80 MHz. The frequency at TP15 should be 10.0 MHz. This frequency setting programs a divide number of 20.0 and input frequency (from fractional N loop) of 200.0 MHz. If the frequency at TP15 is correct, the problem is with the accumulator circuitry (U13, U19, U18 or U16). Otherwise, the problem is in the basic divider circuitry so continue troubleshooting with step 4.
4. Remove jumper W1 (to the left of U2). The frequency at TP5 should be 66.66667 MHz. The 34 counter is held in the divide-by-3 mode with the jumper removed.

Connect a jumper from +5V to the top pad where the jumper was connected. The frequency at TP5 should be 50.0 MHz. The 3/4 counter is held in the divide-by-4 mode with +5V applied.

If the counter operates normally, replace the jumper and continue troubleshooting with step 5. Otherwise, there is a problem with U1, U2, U3 or associated components.

5. Set the front panel frequency to 320.80 MHz. Set the frequency increment to 1 MHz. Press the INCREMENT (up) and INCREMENT (down) keys and check the frequency digit decoder outputs shown in the table below. If any outputs are wrong, troubleshoot to find the cause. Otherwise, the problem is in one of the shift registers (U7 or U8) or the U6 decoder.



**FREQUENCY DIGIT DECODER OUTPUTS**  
(Front-panel frequency setting = 320.80 MHz)

1 MHz DIGIT	U11-15	U11-2	U11-3	U4-15	U12-13	U12-9	U12-3
0	H	L	H	L	L	H	L
1	L	H	L	L	L	H	L
2	H	H	L	H	L	H	L
3	L	L	H	L	H	H	L
4	H	L	H	L	H	H	L
5	L	H	L	L	H	H	L
6	H	H	L	H	H	H	L
7	L	L	H	L	H	H	H
8	H	L	H	L	H	H	H
9	L	H	L	L	H	H	H

6. Set the front panel frequency to 326.810 MHz. This setting programs the fractional-N loop output to 190.0 MHz and the A3A3 divide number to 19.0, so the output of the divider should be 10.0 MHz. Set the front panel frequency increment to 0.1 Hz and press the INCREMENT (up) key. The ERROR LED on top of the A3A3 assembly should blink at a 100 Hz rate and the waveform at TP1 should be a 100 Hz square wave (amplitude  $\pm 0.7$  Vdc). Each time the frequency is incremented, the frequency of the blinking LED and the waveform at TP1 will increase by 100 Hz. Press the Increment (down) key until the frequency display is below 326.810 MHz. The LED and TP1 behave exactly the same as described, above. When the frequency is exactly 326.810 MHz, the signal at TP1 should be a dc value somewhere in the range of  $\pm 0.7$  Vdc (most likely value is +0.7 Vdc or -0.7 Vdc). The LED may be either lit or off but should not be blinking. If this circuitry is functioning normally, continue with step 7. Otherwise, there is a problem with the phase detector circuitry so continue troubleshooting this circuitry to find the cause.

**NOTE**

The waveforms shown on the schematic for TP12 and TP13 are taken with the Phase Lock Loop in an out-of-lock condition and are not representative of the waveforms for step 7 of this procedure.

7. Set the front panel frequency to 326.810 MHz an frequency increment to 10 Hz. Look at TP13 on an oscilloscope (DC coupled, 0.5 V/div vertical, 1 ms/div horizontal). There should be no waveform present and the level should be near ground ( $\pm 1/2$  division with the settings given).

Press the INCREMENT (up) key. Negative going pulses should appear on TP13 (amplitude of approximately 1.0 V). Pressing the

INCREMENT (up) key again should cause the frequency of the pulses to increase.

Set the front panel frequency to 326.810 MHz and look at TP12 with an oscilloscope. There should be no waveform present and the level should be near ground ( $\pm 1/2$  division). Press the INCREMENT (down) key. Positive pulses should appear on TP12 (amplitude of approximately 2.0 V). Look closely since they are faint at the scope settings given, above. Pressing the INCREMENT (down) key again should cause the frequency of the pulses to increase.

If either or both of these waveforms is not correct, there is a problem in the frequency detector circuitry. Troubleshoot this part of the circuitry to find the cause of the problem.

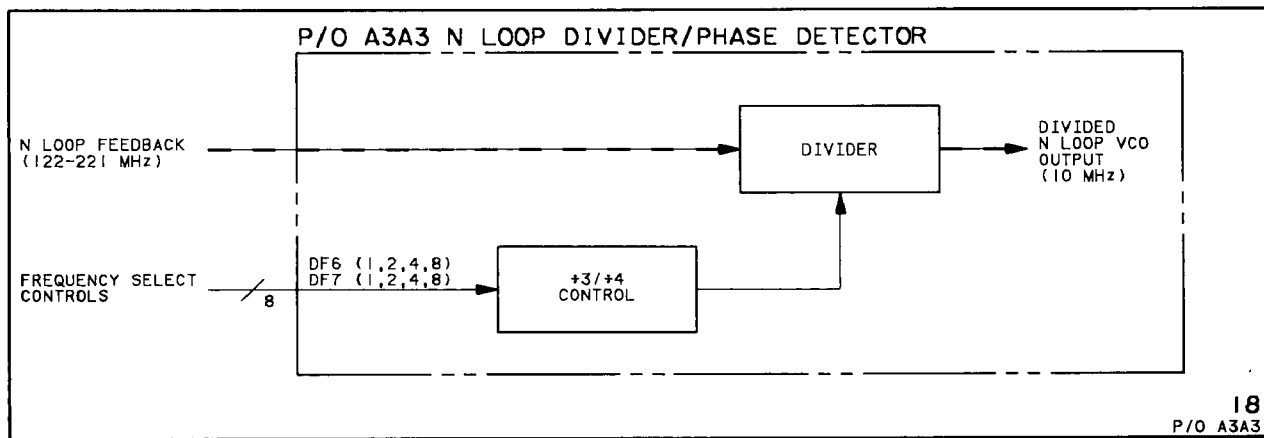
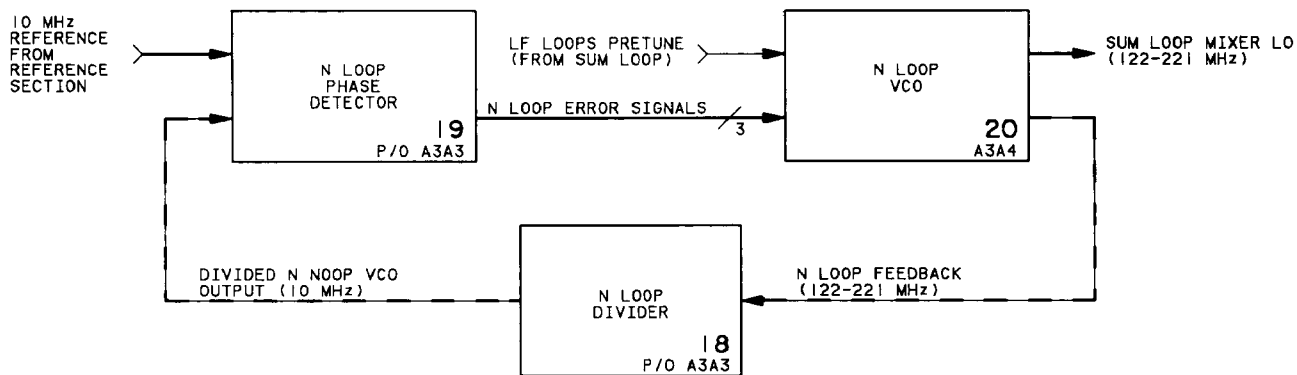


Figure 8-421. P/O A3A3 N Loop Divider/Phase Detector Block Diagrams

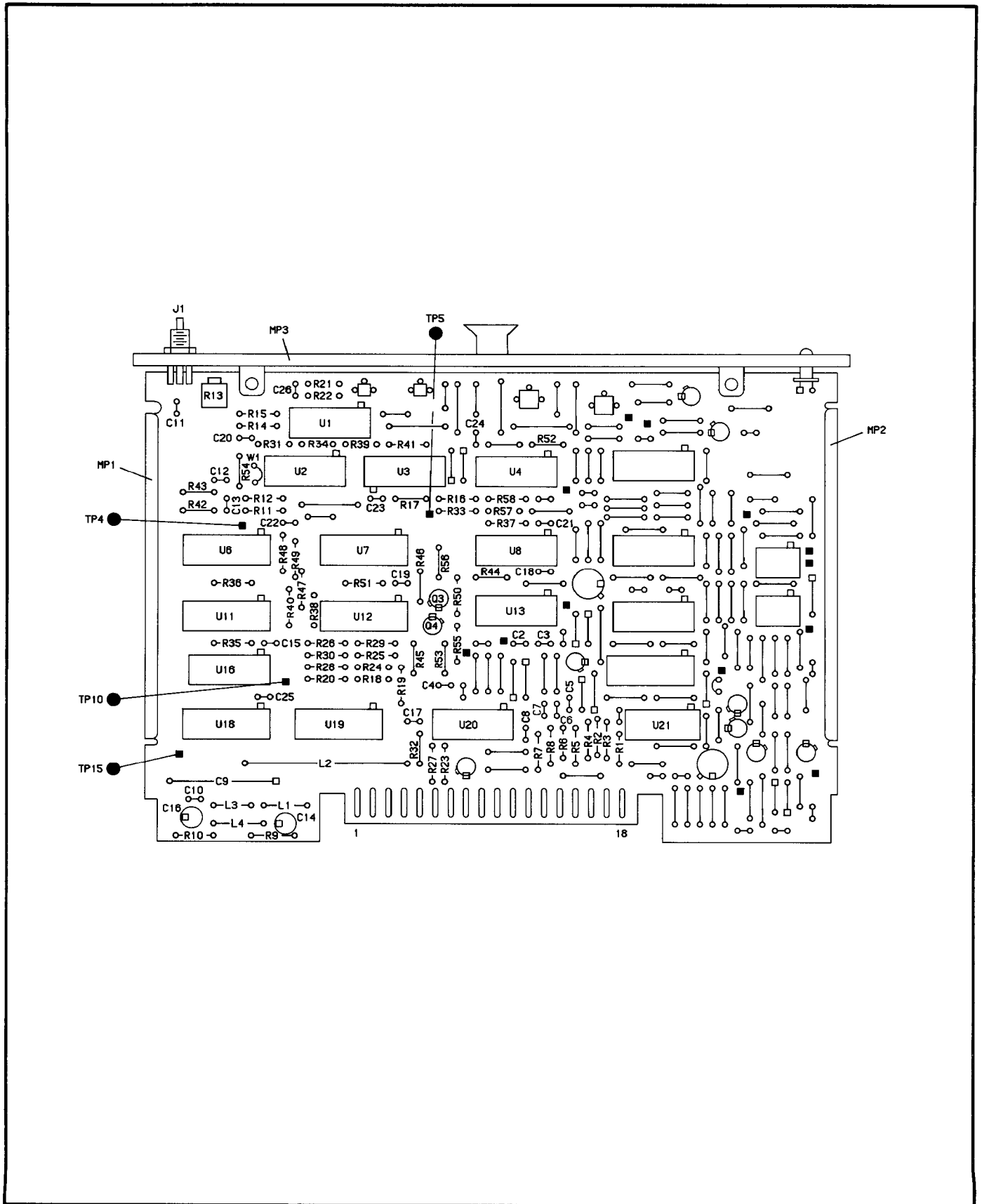


Figure 8-422. P/O A3A3 N Loop Divider/Phase Detector Component Locator

## CHANGES

All serial prefixes

On the A3A3 schematic:

- A3A3R1-R8 - Change the value of R1-R8 to 178 ohms.

1. 此圖係根據下列圖紙繪製  
 2. 此圖係根據下列圖紙繪製  
 3. 此圖係根據下列圖紙繪製  
 4. 此圖係根據下列圖紙繪製  
 5. 此圖係根據下列圖紙繪製  
 6. 此圖係根據下列圖紙繪製  
 7. 此圖係根據下列圖紙繪製  
 8. 此圖係根據下列圖紙繪製  
 9. 此圖係根據下列圖紙繪製  
 10. 此圖係根據下列圖紙繪製

圖號	圖名	圖號	圖名
1	...	1	...
2	...	2	...
3	...	3	...
4	...	4	...
5	...	5	...
6	...	6	...
7	...	7	...
8	...	8	...
9	...	9	...
10	...	10	...

圖號	圖名	圖號	圖名
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3	...	3	...
4	...	4	...
5	...	5	...
6	...	6	...
7	...	7	...
8	...	8	...
9	...	9	...
10	...	10	...

圖號	圖名	圖號	圖名
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10	...	10	...

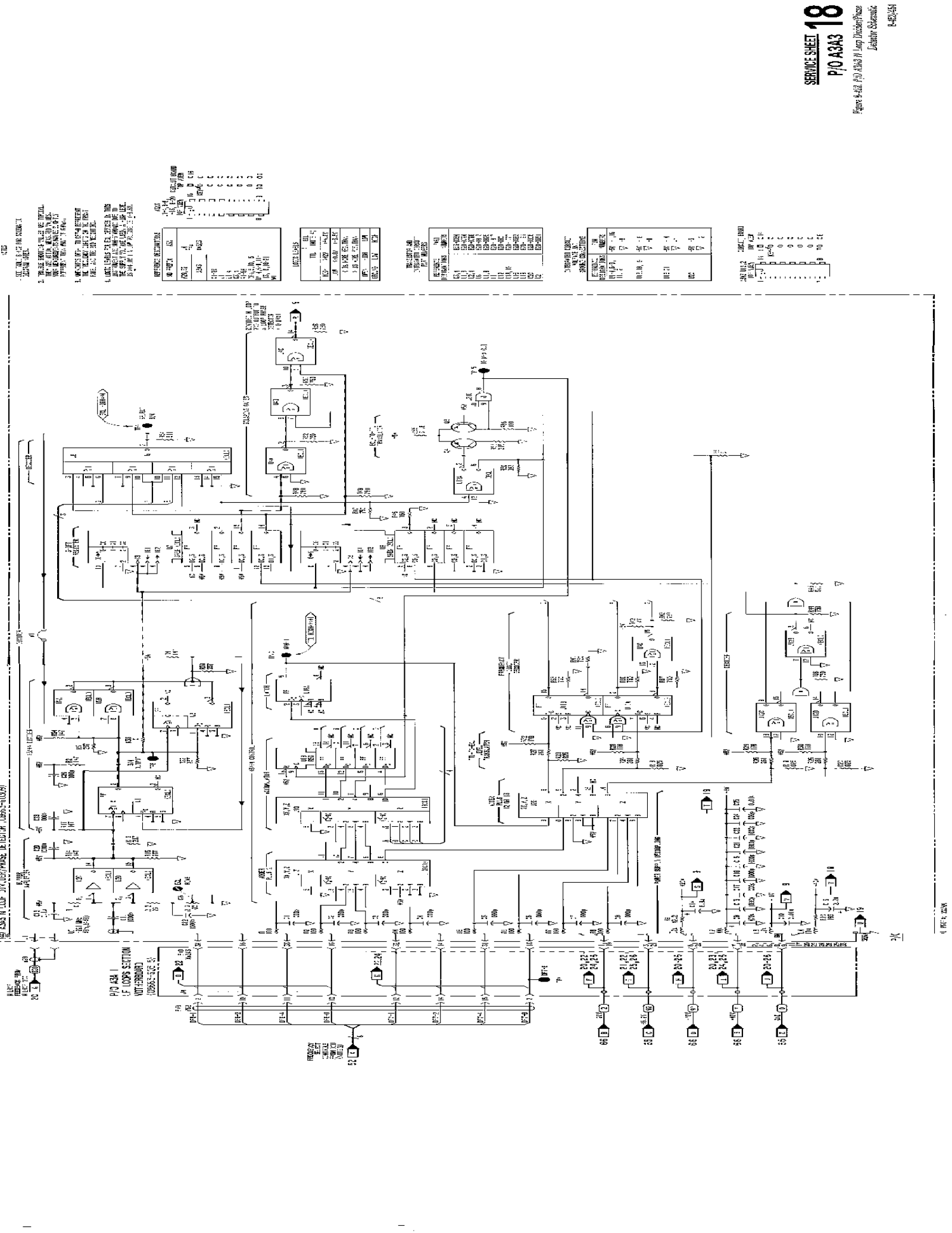
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圖號	圖名	圖號	圖名
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**SERVICE SHEET 19**  
**P/O A3A3 N LOOP DIVIDER/PHASE DETECTOR**

**REFERENCE BLOCK DIAGRAM 5**

- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.  
Table 5-3. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION**

**General**

This service sheet contains the circuitry for the phase detector portion of the N loop. Inputs include the 10 MHz N loop phase detector reference signal from the reference section (service sheet 1) and the 10 MHz phase detector variable from the N Loop Divider (service sheet 18). The phase detector reference signal splits and goes to both the phase and frequency detector circuits, as does the phase detector variable signal. The outputs from this section are phase and frequency error signals which are sent to the N Loop VCO (service sheet 20).

**Frequency Detector Circuitry**

The frequency detector circuitry determines if the frequency at the output of the N loop divider is above or below the 10 MHz reference signal. If the N loop frequency is more than several MHz from the reference, the loop won't lock by itself because the signal is out of the phase detector's range. The frequency detector section determines which direction to tune the frequency so that the signal is within the phase detector's range. Q1 and Q2 form the 45-degree phase shifter circuits. U5, U9 and U14 are used as dual exclusive-or gates.

Of the two 45-degree phase shifter circuits, one shifts the detector reference signal in the +45-degree direction and the other shifts in the -45-degree direction. This puts the resulting signals to the dual exclusive-or gates 90 degrees out of phase with each other. The exclusive-or gates function similarly to double-balanced mixers. The signals at their outputs are filtered by the 2 MHz low-pass filters. These filtered outputs are the difference frequencies between pin 10 on U5D and the reference divider inputs to Q1 and Q2. The signals sent to the comparators are triangle waves and are measurable at TP7 and TP9, where the phase difference is still 90 degrees. These triangle waves are converted to square waves by comparators U10 and U15. The outputs from these comparators enter U16, a control flip-flop.

If TP11 goes HI when TP8 is LO, then a LO is transferred to pin 9 of U16B to trigger monostable U17A. U17A produces a 4.5 microsecond pulse that turns OFF Q6 and causes CR11 and CR12 to turn ON. Q6 turns OFF when CR9 turns ON, which occurs when pin 13 goes HI and pin 4 goes LO. Current flows from the summing junction of the N Loop

VCO, causing the frequency to go up. At the same time, pin 5 of U17B is LO. This keeps CR10 OFF so that no current flows into the junction of R119 and R120. When the loop is locked, U17A and U17B are not triggered and there is no current flowing through R118, R119, or R121. When pin 5 of U17B goes HI, current is sent to the junction through CR10 and the frequency decreases.

### Phase Detector Circuitry

The input to the phase detector section is composed of limiters Q5 and Q10. These produce square waves at TP14 and TP16. From here the signals enter the phase detector formed by Q11 and Q12. This phase detector acts like an exclusive-or gate. When TP14 and TP16 have different voltages (either Q5 or Q10 is HI) one of the two phase detector transistors turns ON and sums current into R85 and R86, causing the emitter of Q9 to go HI. The output voltage from Q9 is LO when both inputs are the same.

Q9 is used in a low impedance emitter-follower configuration and acts to drive the 1 MHz and 6 MHz notch filters. The six notch filters (which follow Q9) filter the spurs generated in the N loop fractional-N circuitry. These spurs occur at sub-multiples of the reference frequency. CR5 and CR6 limit the phase range over which the phase detector can tune the oscillator. The phase error signal at pin 10 goes to the summing junction on the N Loop VCO Assembly (service sheet 48).

### Out-of-Lock Circuitry

When the output of the phase detector is HI (indicating an out-of-lock condition), the TTL level translator formed by Q8 and U21 turns ON Q7, causing the out-of-lock lamp to light.



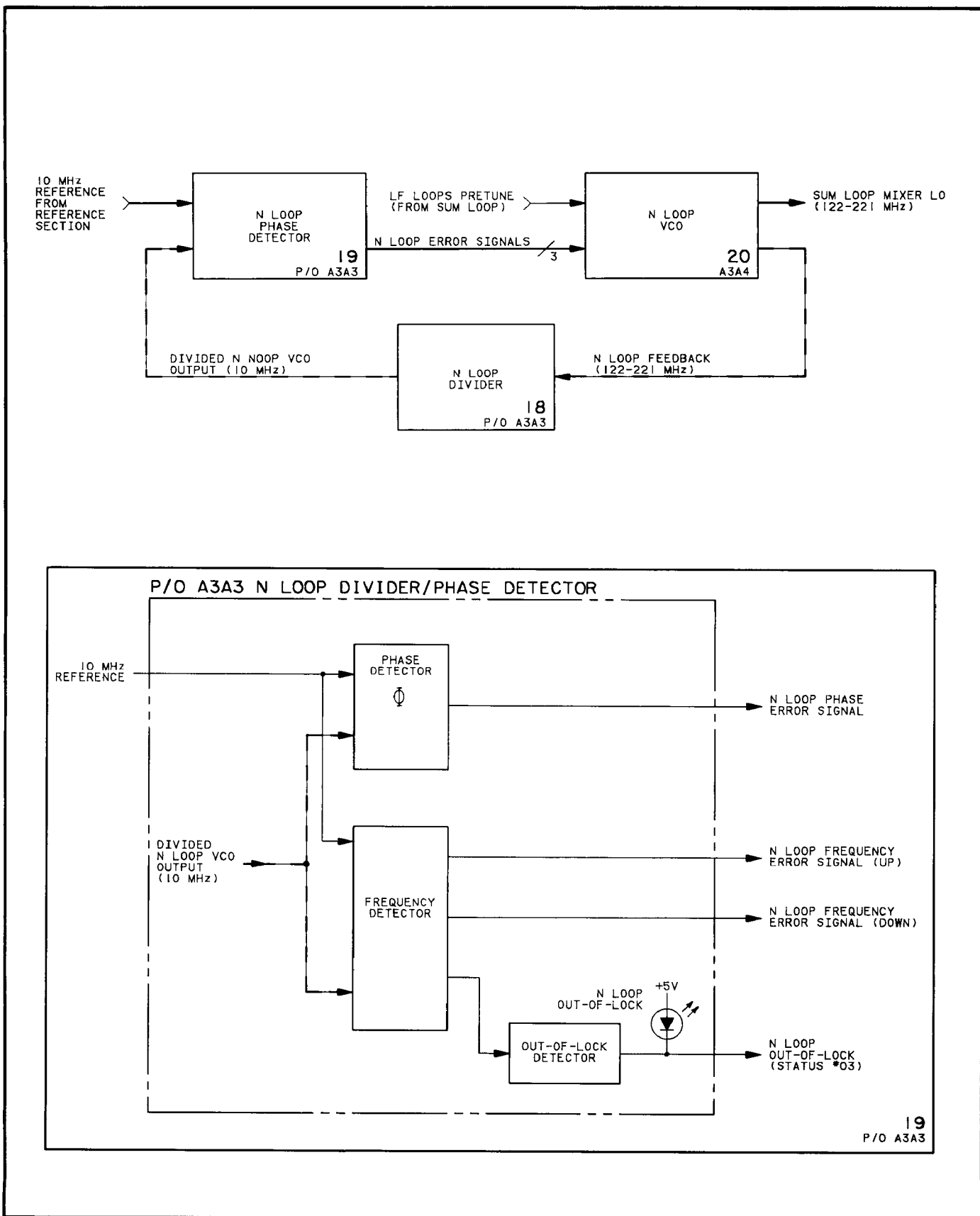


Figure 8-424. P/O A3A3 N Loop Divider/Phase Detector Block Diagrams

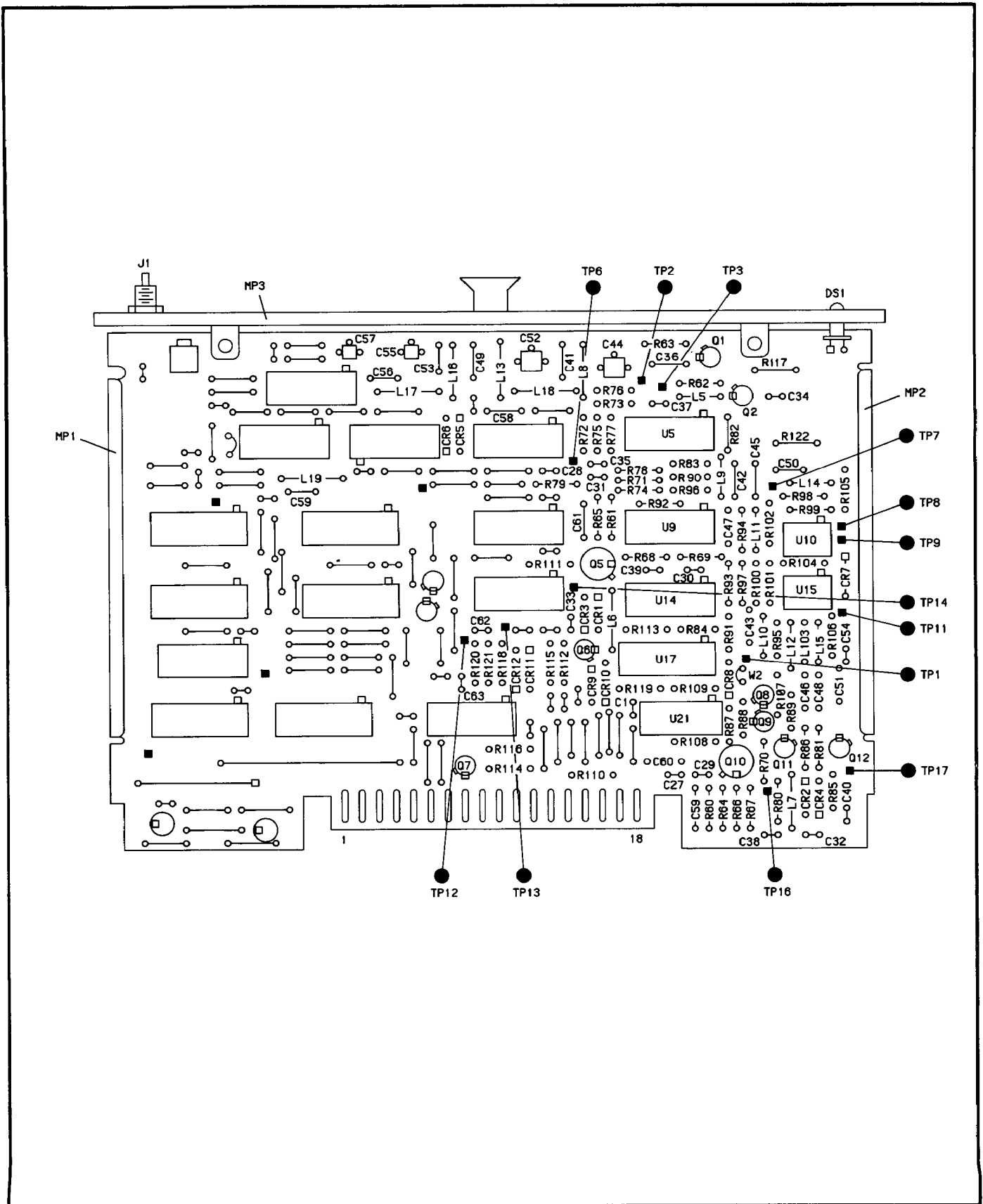


Figure 8-425. P/O A3A3 N Loop Divider/Phase Detector Component Locator

## CHANGES

### 2245A and Above

On the A3A3 component locator:

- A3A3R123 - Add resistor, R123, directly above edge connector pad 12.

On the A3A3 schematic:

- A3A3R123 - At the right edge of the schematic, in the circuitry labeled "N LOOP OUT-OF-LOCK INDICATOR", add resistor R123 (237 ohms) as a series resistor to the right of DS1 in the path leading to pin 12.



**SERVICE SHEET 20  
A3A4 N LOOP VCO****REFERENCE BLOCK DIAGRAM 5**

- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.  
Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION****General**

This service sheet contains the voltage controlled oscillator and associated circuitry for the Low Frequency N Loop. There are four frequency control inputs to this board and two outputs. The outputs extend from 122 MHz to 221 MHz. One output is the N loop N-divider drive, the other is the S loop mixer local oscillator input. The frequency control inputs are summed, shaped, amplified, and filtered before being used to control the frequency of the voltage controlled oscillator.

**Current Summing Junction**

The inputs to this assembly go through a summing junction and are amplified by Q10. Q10 converts the summed currents to a control voltage.

One of the four inputs is a pretune (pin 15) that coarsely tunes the oscillator to within a couple of MHz of the correct frequency for locking. The other three inputs are loop signals. The signal at pin 11 is the phase error signal from the phase detector that is located on the N Loop Divider Board. The other two signals are from the frequency detector circuitry on service sheets 46 and 47. One of them sums current into the summing junction and makes the frequency decrease, the other one removes current from the emitter of Q10 and makes the frequency increase. These inputs are at board pins 10 and 9, respectively. The pretune line has a gain adjustment which allows the range of the VCO to be set. The maximum tune range is approximately 100 MHz with the 7 volt (maximum) pretune voltage.

**Shaping Network and Buffer Amplifier**

The shaping network (in the collector circuit of Q10) is a diode-resistor network composed of CR2, CR3, R12, R13, R16, and R19. This network shapes the VCO pretune voltage so that a change in voltage causes a linear change in the VCO output frequency.

Following the shaping network is an emitter-follower stage formed by Q6. It drives the filter network that removes the spurious signals from the loop and drives the phase lag network consisting of R29, R31, and C19. The actual varactor voltage (at TP2) goes through R33 to the oscillator tank at CR7 and CR8. This is a negative voltage of

between -2 volts and -18 volts (-2 volts is the limit for the low frequency end and -18 volts is the limit for the high frequency end).

### Gain Set Switch

Q9 is a transistor switch that increases the loop gain voltage as determined by the conduction threshold of CR3. When Q9 turns ON, it shunts R25 so that the gain from the emitter of Q6 to TP2 is increased by approximately 6 dB. This causes loop gain to increase and compensate for the decrease in capacitance of the varactors, which occurs close to the high frequency end.

### Charge-Discharge Switch

Transistors Q5 and Q8 switch current into C19 through R26 and R31. These transistors are biased so that when the voltage at TP4 is 2 volts greater than the voltage on C19, either Q5 or Q8 turn ON and quickly charge C19. This increases switching speed.

### Voltage Controlled (Hartley) Oscillator

The oscillator itself is formed by Q7, which is a common gate FET amplifier. Capacitor C22 is a bypass capacitor for the varactors. L8 is a tapped inductor. The feedback loop feeds through C24 to the source of the FET. R27 and R28 set the dc current in the FET.

### Signal Splitter

The output of the VCO is tapped from inductor L8 very close to ground and goes through R34 to transformer T1, which is a power splitter. This splitter supplies half-power to each of the two amplifiers and provides substantial isolation between them.

### Output and Loop Buffer Amplifiers

The two buffer amplifiers are identical. The loop buffer amplifier consists of Q3 and Q1 and the output buffer amplifier consists of Q4 and Q2. The two transistors within each amplifier assembly are cascaded. The output of each amplifier is attenuated by a 3 dB pad before being output from the assembly. One of the outputs is sent to the N loop divider to provide feedback to the N loop phase detector; the other is sent to the sum loop mixer (LO input).

### Minus 26 Volt Supply

The -26 volt on-board supply is derived from the main -40 volt supply. It is used as a reference voltage (for the frequency breakpoints) by the shaping network.

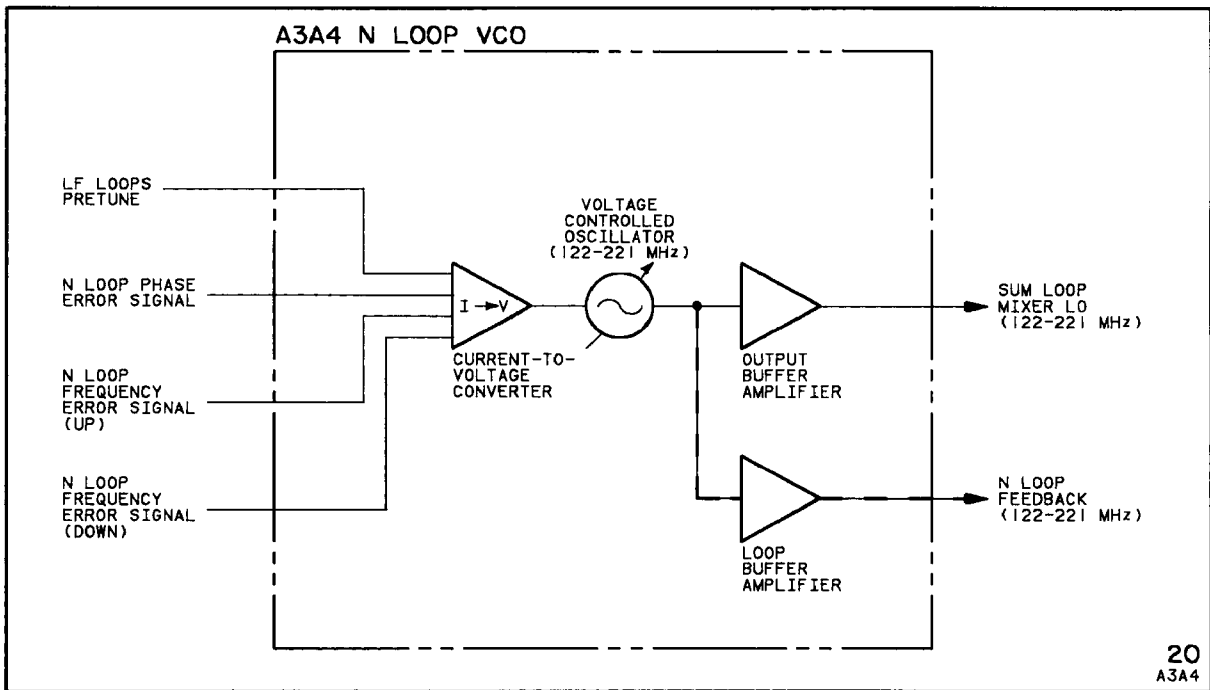
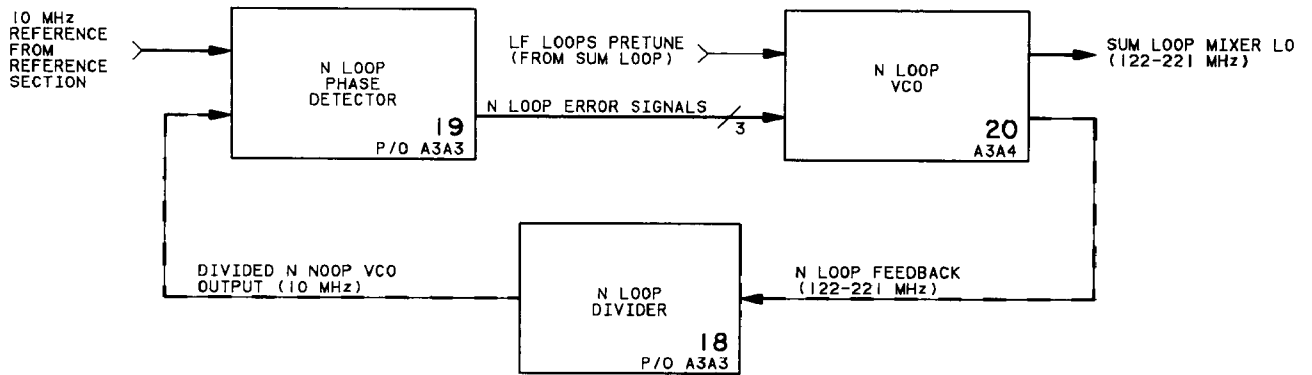


Figure 8-427. A3A4 N Loop Voltage Controlled Oscillator Block Diagrams

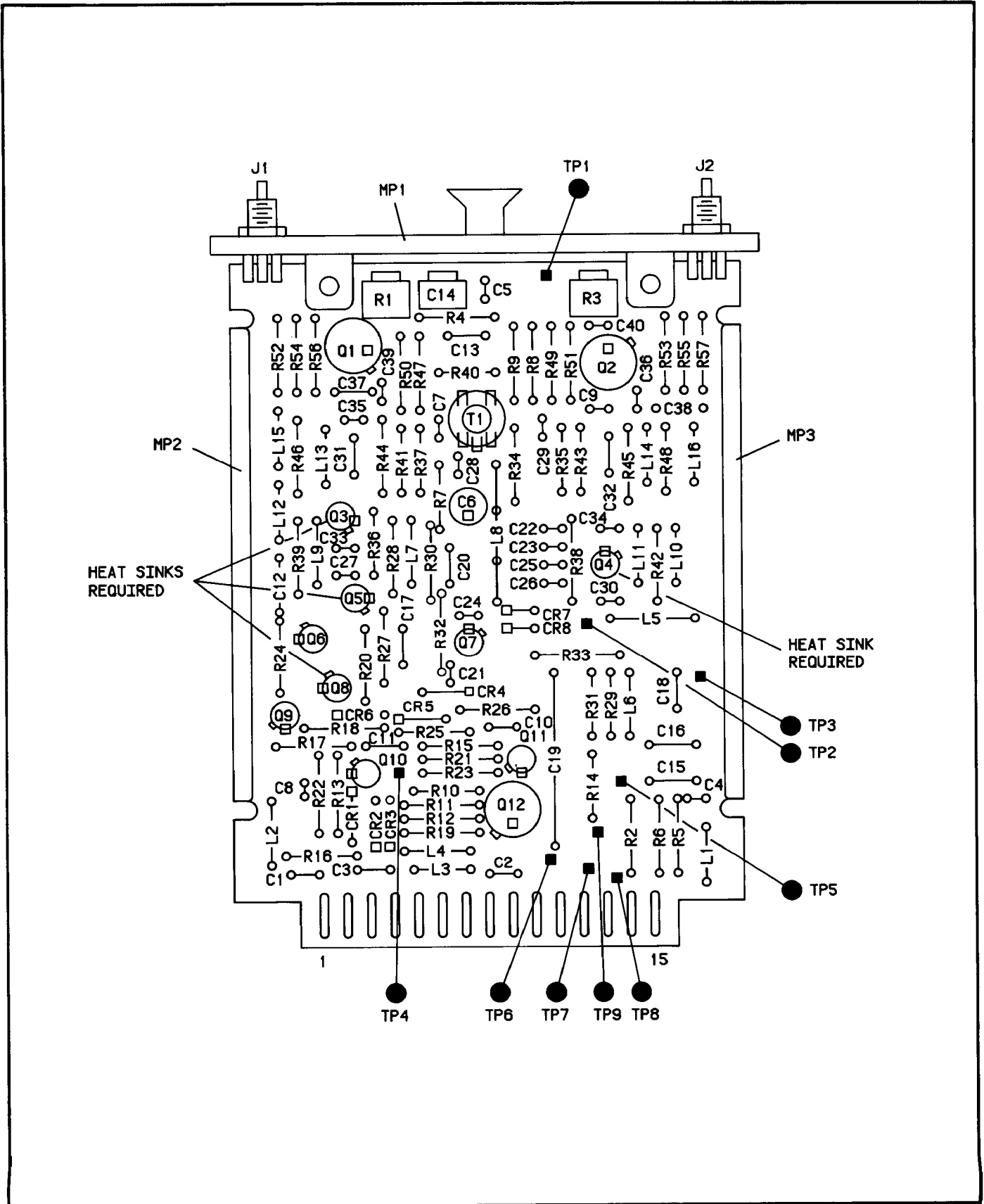


Figure 8-428. A3A4 N Loop Voltage Controlled Oscillator Component Locator



## CHANGES

<p><b>2441A and above</b></p>	<p><b>On the A3A4 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A4R10, R12, R13, R16, R19</u></b> - Change the values of these resistors to the new values shown below:  R10 to 3.83k  R12 to 17.8k  R13 to 21.5k  R16 to 14.7k  R19 to 75k</li> </ul>
<p><b>2549A and above</b></p>	<p><b>On the A3A4 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A4R1, R12, R13, R16, R24, R25</u></b> - Change the values of these resistors to the new values shown below:  R1 to 100k  R12 to 23.7k  R13 to 34.8k  R16 to 31.6k  R19 to 422 ohms  R25 to 1k</li> </ul>
<p><b>2619A and above</b></p>	<p><b>On the A3A4 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A4R24, R25</u></b> - Change the value of R24 to 26.1 ohms.  Change the value of R25 to 316 ohms.</li> </ul>
<p><b>2936A and above</b></p>	<p><b>On the A3A4 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A4R27, R28</u></b> - Change the value of R27 and R28 to 1k.</li> </ul>

- NOTES
1. REFER TO WIRE 5-102 PER SCHEMATIC DRAWING WIRE.
  2. TRANSISTORS WITH NUMBERS ARE IDENTICAL WITH RESPECTS TO PART NUMBER, EXCEPT THAT PART IS 500M.
  3. VALUES OF RESISTORS AND CAPACITORS ARE LISTED IN LIST. THE VALUES ARE LISTED IN LIST. REFER TO SECTION V FOR PROCEDURES.

REFERENCE DESIGNATIONS

NO	SYMBOL	VALUE
1	755-K	01-22-2
2	10	100K
3	11	100K
4	12	100K
5	13	100K
6	14	100K
7	15	100K
8	16	100K
9	17	100K
10	18	100K
11	19	100K
12	20	100K
13	21	100K
14	22	100K
15	23	100K
16	24	100K
17	25	100K
18	26	100K
19	27	100K
20	28	100K
21	29	100K
22	30	100K
23	31	100K
24	32	100K
25	33	100K
26	34	100K
27	35	100K
28	36	100K
29	37	100K
30	38	100K
31	39	100K
32	40	100K
33	41	100K
34	42	100K
35	43	100K
36	44	100K
37	45	100K
38	46	100K
39	47	100K
40	48	100K
41	49	100K
42	50	100K
43	51	100K
44	52	100K
45	53	100K
46	54	100K
47	55	100K
48	56	100K
49	57	100K
50	58	100K
51	59	100K
52	60	100K
53	61	100K
54	62	100K
55	63	100K
56	64	100K
57	65	100K
58	66	100K
59	67	100K
60	68	100K
61	69	100K
62	70	100K
63	71	100K
64	72	100K
65	73	100K
66	74	100K
67	75	100K
68	76	100K
69	77	100K
70	78	100K
71	79	100K
72	80	100K
73	81	100K
74	82	100K
75	83	100K
76	84	100K
77	85	100K
78	86	100K
79	87	100K
80	88	100K
81	89	100K
82	90	100K
83	91	100K
84	92	100K
85	93	100K
86	94	100K
87	95	100K
88	96	100K
89	97	100K
90	98	100K
91	99	100K
92	100	100K

TRANSISTOR PART NUMBERS

REFERENCE	PART NUMBER
1	2N4350
2	2N4350
3	2N4350
4	2N4350
5	2N4350
6	2N4350
7	2N4350
8	2N4350
9	2N4350
10	2N4350
11	2N4350
12	2N4350
13	2N4350
14	2N4350
15	2N4350
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99	2N4350
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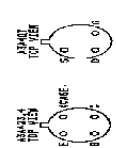
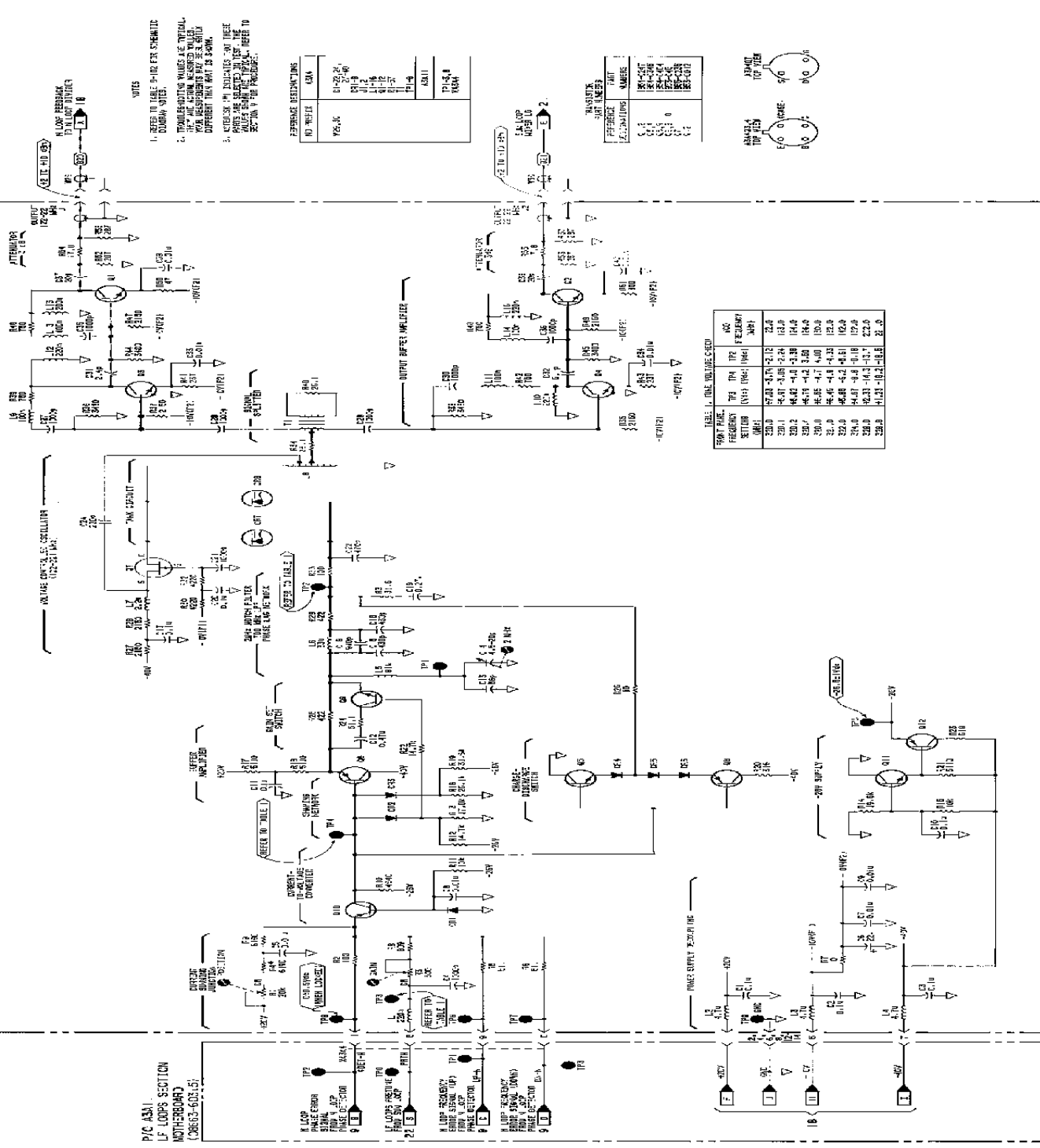


TABLE 1. ONE-WIRE CROCOD

FRONT PANEL POSITION	TYPE	NO.	VALUE
1	100K	1	100K
2	100K	2	100K
3	100K	3	100K
4	100K	4	100K
5	100K	5	100K
6	100K	6	100K
7	100K	7	100K
8	100K	8	100K
9	100K	9	100K
10	100K	10	100K
11	100K	11	100K
12	100K	12	100K
13	100K	13	100K
14	100K	14	100K
15	100K	15	100K
16	100K	16	100K
17	100K	17	100K
18	100K	18	100K
19	100K	19	100K
20	100K	20	100K
21	100K	21	100K
22	100K	22	100K
23	100K	23	100K
24	100K	24	100K
25	100K	25	100K
26	100K	26	100K
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28	100K	28	100K
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91	100K	91	100K
92	100K	92	100K
93	100K	93	100K
94	100K	94	100K
95	100K	95	100K
96	100K	96	100K
97	100K	97	100K
98	100K	98	100K
99	100K	99	100K
100	100K	100	100K



SEAL PRINT: 22M

SERVICE SF  
A3  
Figure 8-425 A3M4 N Loop 1

HEET 20  
A4  
Adaptive Controlled  
Oscillator Schematic  
8-465/466

A3M4 N LOOP VCO (0862-56131)

**SERVICE SHEET 21  
A3A5 SUM LOOP MIXER****REFERENCE BLOCK DIAGRAM 5**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION****General**

There are two main circuits on the Sum Loop Mixer Board. The mixer takes the Sum Loop VCO and N Loop VCO signals, mixes them down to a frequency band of 1 MHz to 2 MHz, and sends this band to the frequency detector. The frequency detector is composed of U2 through U6. This circuit detects when the sum loop frequency is greater than the N loop frequency and sends a Sum loop frequency error signal to the Sum Loop VCO Assembly (Service Sheet 23).

**Mixer Circuitry**

The sum loop mixer RF from the Sum Loop VCO (service sheet 23) and the sum loop mixer LO from the N Loop VCO (service sheet 20) enter the board via the J2 and J1 inputs, respectively. The S loop RF passes through a 10 dB pad and a limiter formed by U1. U1 has a gain of 10 dB and limits at +1 dBm. The output of this limiter stage is then capacitively coupled to the RF input of mixer U7.

The S loop LO signal from the N Loop VCO (service sheet 20) is limited by CR1 and CR3 and attenuated by the 3 dB pad formed by R7, R9, and R11. The signal is then applied to the LO input of the mixer. The output IF from the mixer varies between 1 MHz and 2 MHz. The output of the mixer is filtered by a 10 MHz low-pass filter formed by C14, L3, C15, L4, and C16, and then enters the limiter/buffer amplifier formed by transistors Q1 and Q2. The resulting signal is the sum loop IF signal. The level of this signal is approximately 4V p-p.

**Frequency Detecting Circuitry**

The frequency detecting circuit determines if the S loop frequency exceeds the N loop frequency. The S loop normally extends from 120 MHz to 220 MHz; the N loop's frequency range is from 122 MHz to 221 MHz. The S loop frequency should always be 1 MHz to 2 MHz below the N loop frequency. If it becomes more than 2 MHz above the N loop, the S loop will reverse and send the VCO in the wrong direction.

The frequency detecting circuit keeps the S Loop VCO frequency below that of the N loop. The decade divider circuits (U2 and U3) divide the outputs of the two VCOs by 10. The divided signals at TP1 and TP2 enter frequency detector U4, which determines when the S loop

frequency is greater than the N loop frequency. When the S loop frequency is greater, the output at pin 12 of U4 goes HI, causing a ramp voltage to be applied to pin 2 of comparator U5.

The ramp voltage at pin 2 of U5 is compared against the reference voltage at pin 3, and a TTL pulse is generated at the pin 7 output. This TTL pulse triggers monostable one-shot U6, producing a 3.4 microsecond pulse which is sent to the S Loop VCO as a frequency error signal. A pulse train is output from U6 as long as the S loop frequency is greater than the N loop frequency. This pulse train is filtered, summed with the S loop error and pretune currents, and converted to a voltage so that it can be used to help decrease the S Loop VCO frequency.

The frequency detector is disabled by the frequency detector enable line (at board pin 11) when the S Loop VCO is locked. The frequency detector enable line is also sent to pin 14 of U2 and U3, turning OFF the dividers to prevent spurs from being generated.

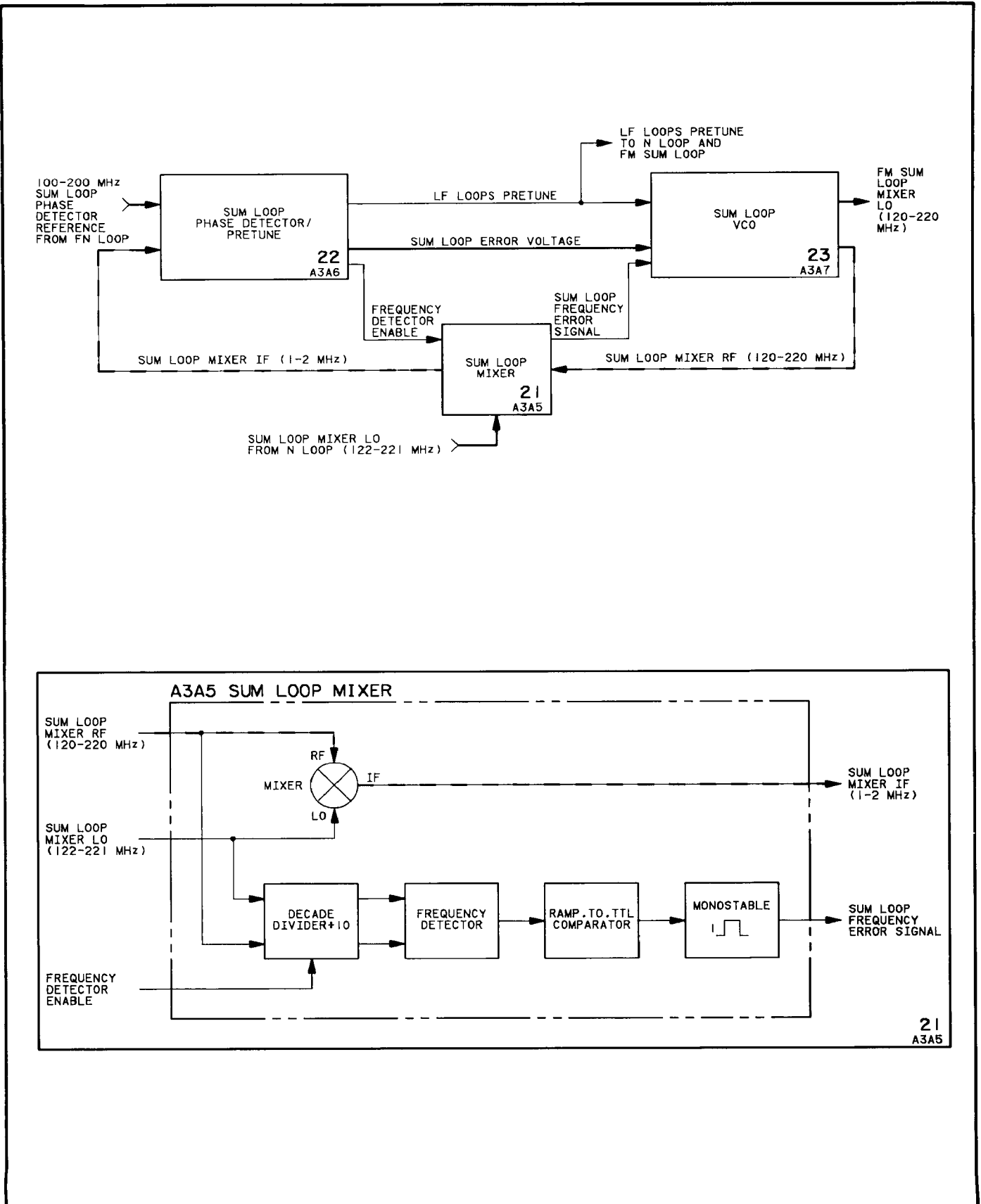


Figure 8-430. A3A5 Sum Loop Mixer Block Diagrams

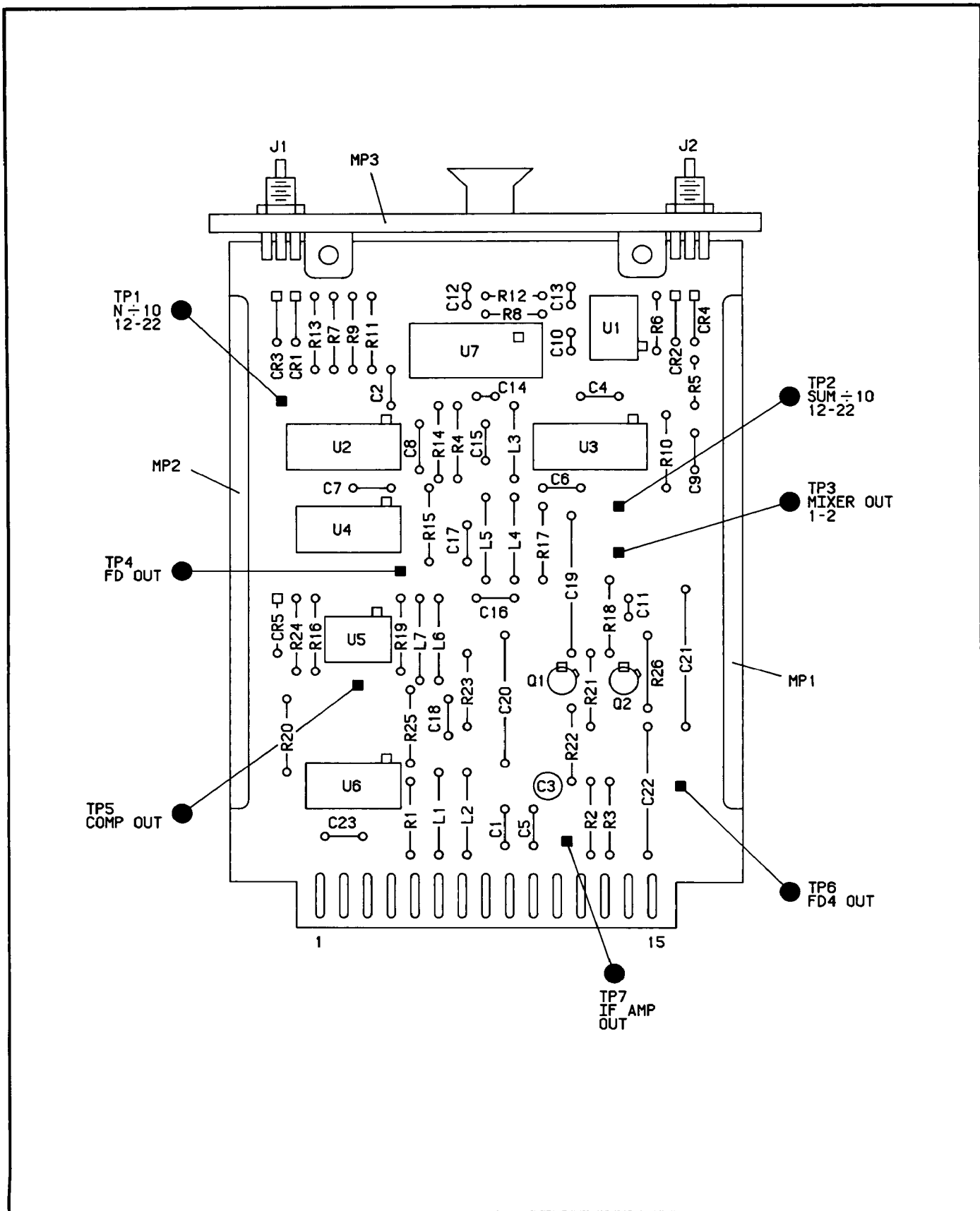


Figure 8-431. A3A5 Sum Loop Mixer Component Locator

## CHANGES

### 2234A to 2416A

On the schematic:

- NOTES - Add NOTE 4 as follows:
  4. For instruments with serial number prefixes lower than 2419A: A3A5U2 and A3A5U3 must be replaced as a set with HP part number 1820-3517. In addition to replacing both U2 and U3, R13 and R14 must be removed from the board and replaced with terminal studs. The studs should be soldered in the existing R13 and R14 holes and the new value of R13 and R14 (0698-3443) should be soldered to the studs along with capacitors C24 and C25 (0160-4803). C24 should be soldered in parallel to R13 and C25 should be soldered in parallel to R14.
- A3A5U2, U3 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of U2 and U3 to 1820-3517 and add the note, "Refer to NOTE 4."

On the A3A5 schematic:

- A3A5U2, U3 - Next to U2 and U3, add "(NOTE 4)".

### 2419A and Above

On the A3A5 component locator:

- A3A5C24, C25 - Add C24 parallel to R13. Add C25 parallel to R14.
- A3A4MP4-MP7 - Add MP4-7 in the mounting holes for R13 and R14. (MP4-7 are posts to which R13, R14, C24, and C25 are soldered.)

On the A3A5 schematic:

- A3A5C24, C25 - Add C24 (68p) in parallel with R13 and add C25 (68p) in parallel with R14.
- A3A5R13, R14 - Change the value of R13 and R14 to 287 ohms.





SERVICE SHEET 22  
A3A6 SUM LOOP PHASE DETECTOR AND PRETUNE

## REFERENCE BLOCK DIAGRAM 5

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

## General

There are two independent circuits on the Sum Loop Phase Detector Board. One is a pretune circuit that coarsely tunes the three oscillators in the low frequency loops to within 3 MHz of the correct frequency so that the search and lock time for the loop is decreased.

The upper portion of the service sheet shows the phase detector circuitry. This section has two inputs. One is the S loop IF signal input and the other is the fractional-N loop VCO output (S Loop phase detector reference). The S loop IF signal is compared against the reference signal, and error pulses are generated at the output to keep these two signals at the same frequency. The error pulses generate an error voltage which is sent to the S Loop VCO (service sheet 23).

## Pretune Circuitry

The pretune circuit consists of transistors Q1 through Q14. Q1 through Q8 are controlled by BCD lines from the Frequency Output Board via pins 10-13 and 25-28. The BCD weighted currents at the collectors of transistors Q1 through Q8 in the D/A converter are summed at TP4. These weighted currents are subtracted from the current that would normally flow through Q10 from R44 and R45. The net current out of Q10 appears as a voltage across R47. As more transistors are turned ON, less current flows through Q10 and the voltage across R47 approaches 0 volts.

Q9 sets a reference voltage that clamps the emitter of Q10 to 10 volts. Q11 and Q14 form a dual emitter-follower buffer amplifier. Its output range is 1.2 volts to 7.0 volts. After passing through a 1 MHz low-pass filter, this voltage is sent to the VCO summing junctions for the N loop, S loop and FMS loop. This pretunes the three oscillators to frequencies where the loops should lock.

## Phase Detector Circuitry

The reference signal for the phase detector circuitry comes from the Fractional-N Loop at 100 MHz to 200 MHz. It is divided by 100 by a circuit formed by U1 and U2 and is then sent to U4A.

The second input to the phase detector circuitry is the sum loop IF signal that comes from the S Loop Mixer Board (service sheet 21). This signal enters the board via pin 9 and goes to pins 1 and 2 of U3, a schmitt trigger. The input waveform is converted to a square wave by this circuit so that it can be used by the digital phase detector.

The phase detector is formed by flip-flops U4A, U4B and gate U3B. One flip-flop is latched HI by the S loop phase detector reference signal and one is latched HI by the S loop IF signal. Once both flip-flops are set, the output of U3B goes HI, resetting them. As a result, the output of the flip-flops is a signal with a pulse width equal to the time difference between the signals driving U4A and U4B. The pulse width is wide when there is a large phase or frequency difference and is narrow when both signals are in phase. A ramp shaped signal appears at TP3 and TP6 (only one; never both) depending on the direction of the frequency phase shift. The ramp waveform at either TP3 or TP6 is sent to the differential amplifier integrator formed by Q13, Q15, and Q12. The feedback loop for this circuit is composed of C31 and R57. The output of the integrator passes through R65 and R66 before leaving the board as the error voltage to the L Loop VCO (service sheet 23). When locked, this output (at pin 30) is  $0 \pm 0.5$  volts. Diodes CR2 through CR7 limit the total voltage at C31 (in the feedback loop) so that the charge time of C31 is not increased if a transient occurs during locking.

#### Out-of-Lock Detector Circuitry

The out-of-lock detector formed by U3C and U5C produces a pulse that triggers the monostable one-shot formed by U6 when the pulses from U4 are wide. U6 in turn lights the out-of-lock LED. A signal is also output from pin 25 and is sent to the Sum Loop IF Board, enabling the frequency detector circuitry.

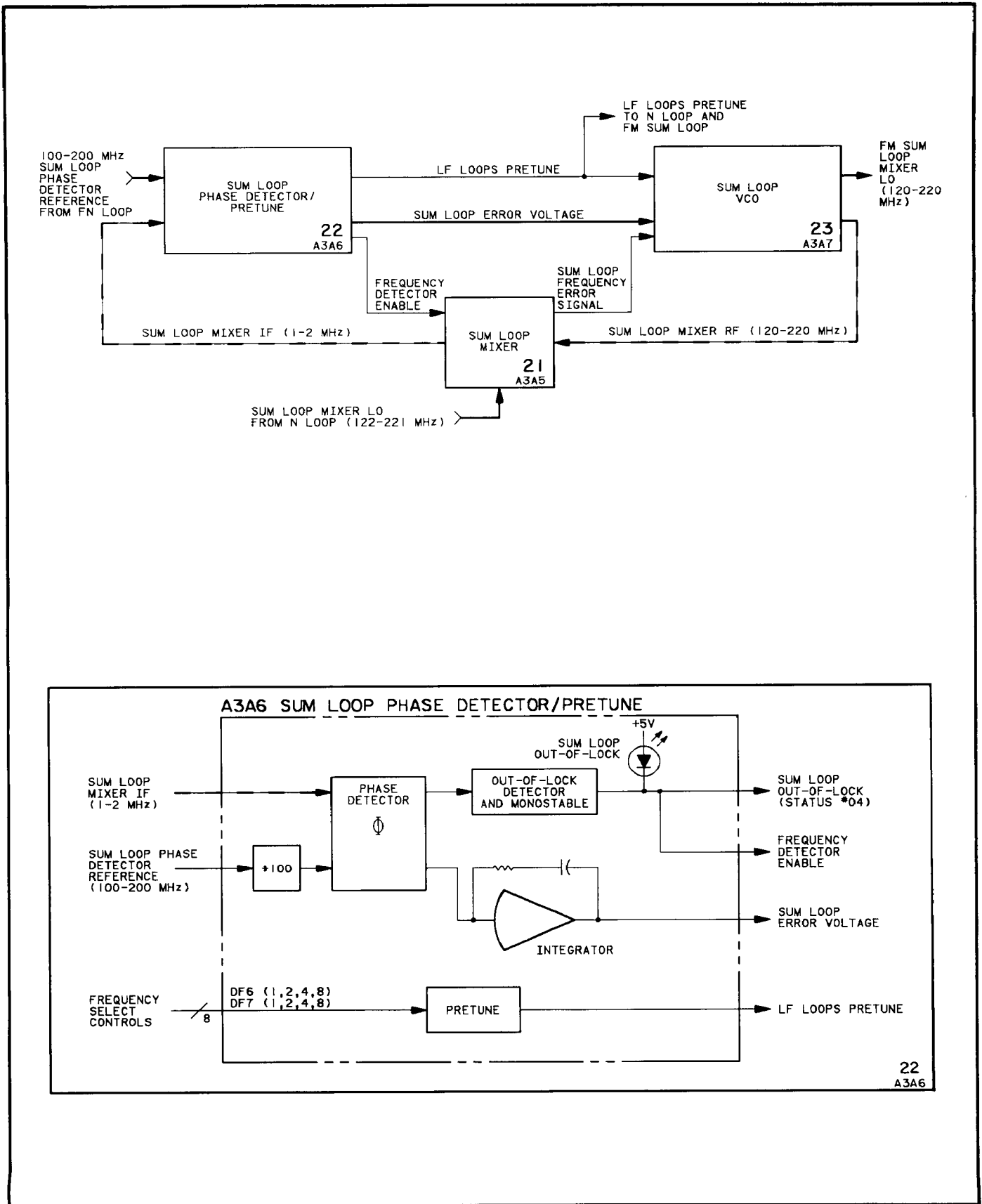


Figure 8-433. A3A6 Sum Loop Phase Detector Block Diagrams

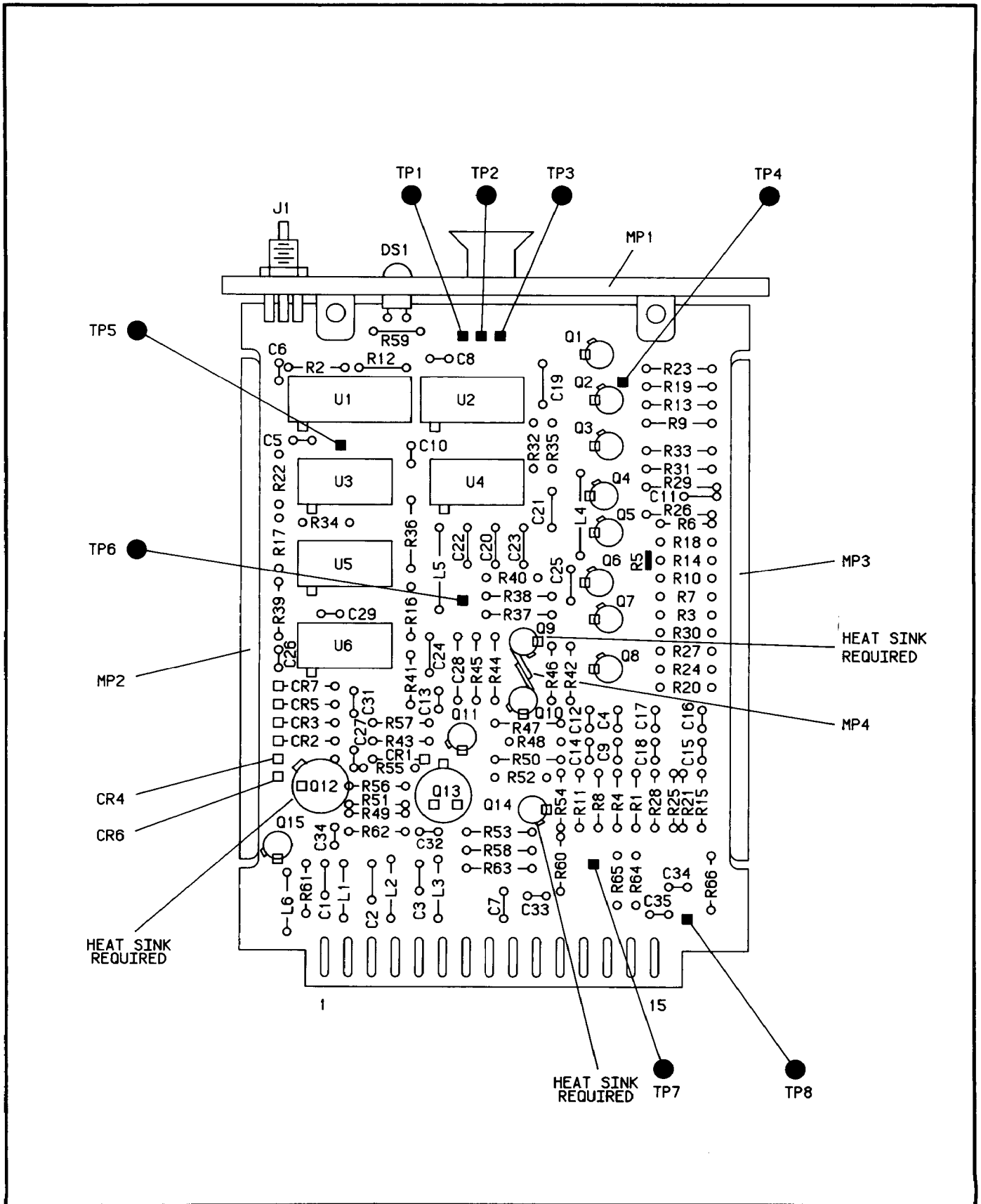


Figure 8-434. A3A6 Sum Loop Phase Detector Component Locator

**CHANGES****All serial prefixes**

On the A3A6 schematic:

- A3A6R1, R4, R8, R11, R15, R21, R25, R28 - Change the value of these resistors to 909 ohms.
- A3A6R3, R7, R10, R20, R24, R27, R30 - Change the value of these resistors to 2.37k.
- A3A6R14 - Change the value of R14 to 681 ohms.

**2601A and Above**

On the schematic:

- A3A6Q13 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of Q13 to 1854-1046.



**SERVICE SHEET 23  
A3A7 SUM LOOP VCO****REFERENCE BLOCK DIAGRAM 5**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

**PRINCIPLES OF OPERATION****General**

This board contains the voltage controlled oscillator and associated circuitry for the FM Sum Loop. There are three frequency control inputs to this board and two outputs. One output is the FM sum loop mixer RF; the other goes to the high frequency loops section. The frequency control inputs are summed, shaped, amplified and filtered before being used to control the frequency of the voltage controlled oscillator.

**Current Summing Junction**

The inputs are combined at the summing junction before entering amplifier Q10. Q10 amplifies the summed currents from the three frequency control inputs and converts them to a control voltage.

One of the three inputs is the sum loop frequency error signal (pin 11) which comes from the Sum Loop Mixer Board (service sheet 49). The other two are the pretune signal (pin 10) and the sum loop error signal (pin 9). Both come from the Sum Loop Phase Detector Board (service sheet 22). The pretune line has a gain adjustment which allows the range of the VCO to be set. The maximum tune range is approximately 100 MHz (+1.2 to +7.0 Vdc pretune voltage range).

**Shaping Network and Buffer Amplifier**

The shaping network in the collector of Q10 is a diode-resistor network composed of CR5, CR6, R13, R15, R17, and R20. This network shapes the pretune voltage so that a change in voltage produces a linear change in output frequency. Normally, varactors CR13 and CR14 in the VCO give it a non-linear output. The diode network, however, cancels out the non-linearity by switching in the diodes at the appropriate points.

Following the shaping network is an emitter-follower stage formed by Q7. This stage drives the filter network that removes the spurious signals from the loop and drives the phase lag network consisting of R32 and C20. The varactor voltage (at TP3) goes through R34 to the oscillator tank at CR13 and CR14. This is a negative voltage of -2 volts to -18 volts (-2 volts is the limit for the low frequency end and -18 volts is the limit for the high frequency end).

### Gain Set Switch

Q6 is a transistor switch which increases the loop gain voltage as determined by the threshold point of CR6. Q6 turns on and shunts R26 so that the gain of Q7 at TP3 is increased by approximately 6dB. This causes the loop gain to increase and compensate for the decrease in gain of the varactors, which occurs close to the high frequency end.

### Charge-Discharge Switch

Transistors Q5 and Q9 switch current into C20 through R24. These transistors are biased so that when the voltage at TP4 is two volts greater than the voltage at C20, either Q5 or Q9 turn on to quickly charge C20. This increases switching speed.

### Voltage Controlled (Hartley) Oscillator

The oscillator itself is formed by Q8, which is a common gate FET amplifier. Capacitor C23 is a bypass capacitor for the varactors. L8 is a tapped inductor. The feedback loop feeds through C25 to the source of the FET. R28 and R30 set the dc current in the FET. R31 and R33 set the dc voltage at the gate.

### Signal Splitter

The output of the VCO is tapped from L8 very close to ground and goes through R36 to transformer T1, which is a power splitter. This splitter supplies half power to each of the two amplifiers and provides substantial isolation between them.

### Output and Loop Buffer Amplifiers

The loop buffer amplifier consists of Q1 and Q3. The output buffer amplifier consists of Q2 and Q4. The two transistors within each amplifier assembly are cascaded. The output of each amplifier is attenuated by a 3 dB pad before being output from the assembly. One of the outputs is sent to the FM sum loop mixer (LO input), the other to the sum loop mixer (RF input).

### Minus 26 Volt Supply

The -26 volt on-board supply is powered by the main -40 volt supply. It is used as a reference voltage for the frequency breakpoints by the shaping network consisting of CR5 and CR6.



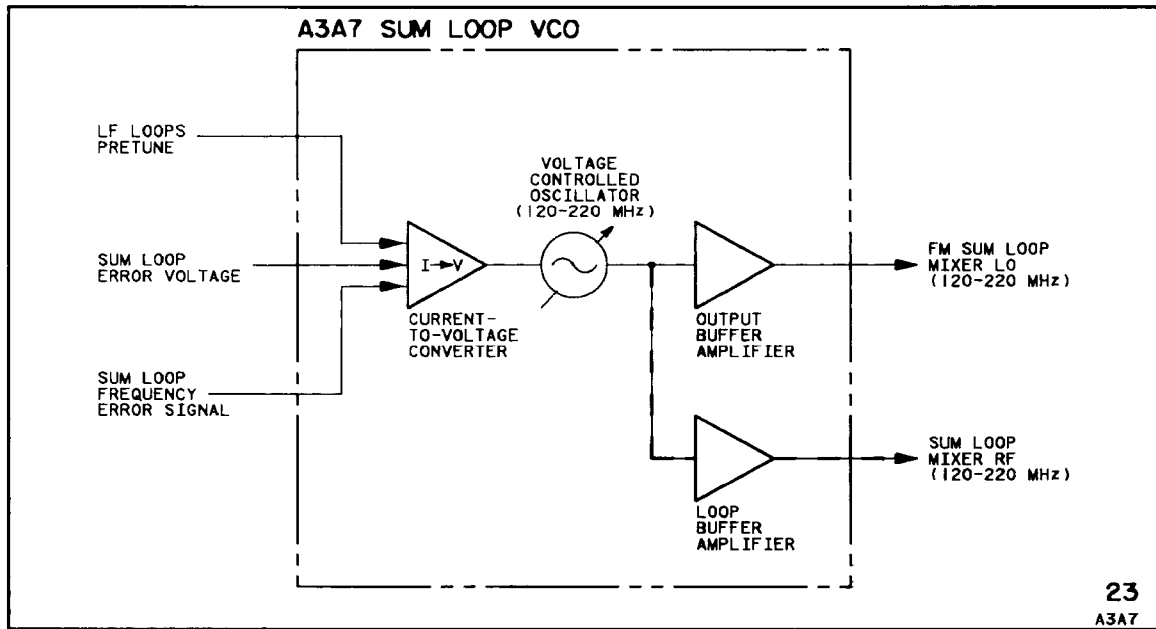
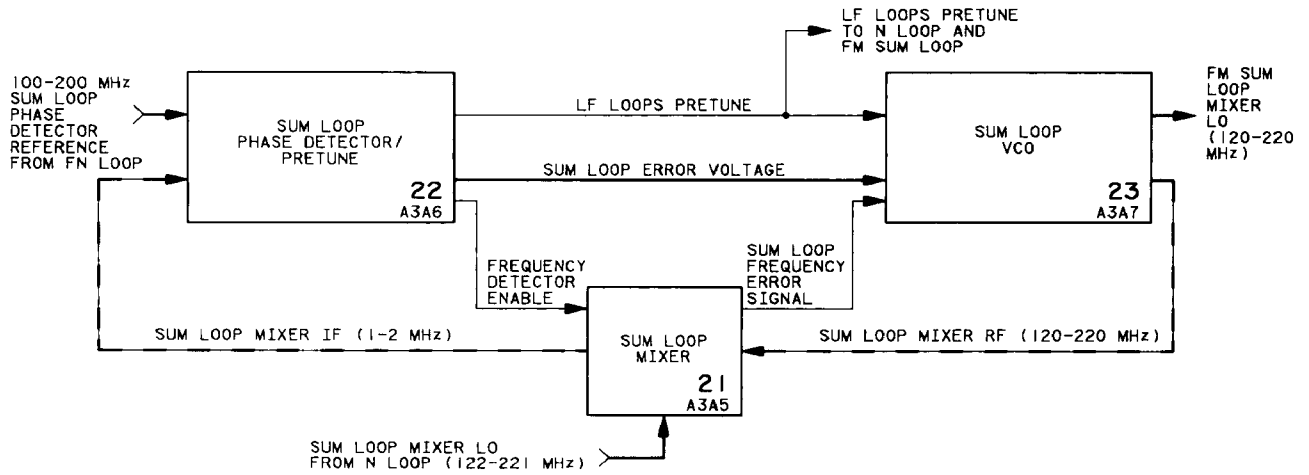


Figure 8-436. A3A7 Sum Loop Voltage Controlled Oscillator Block Diagrams

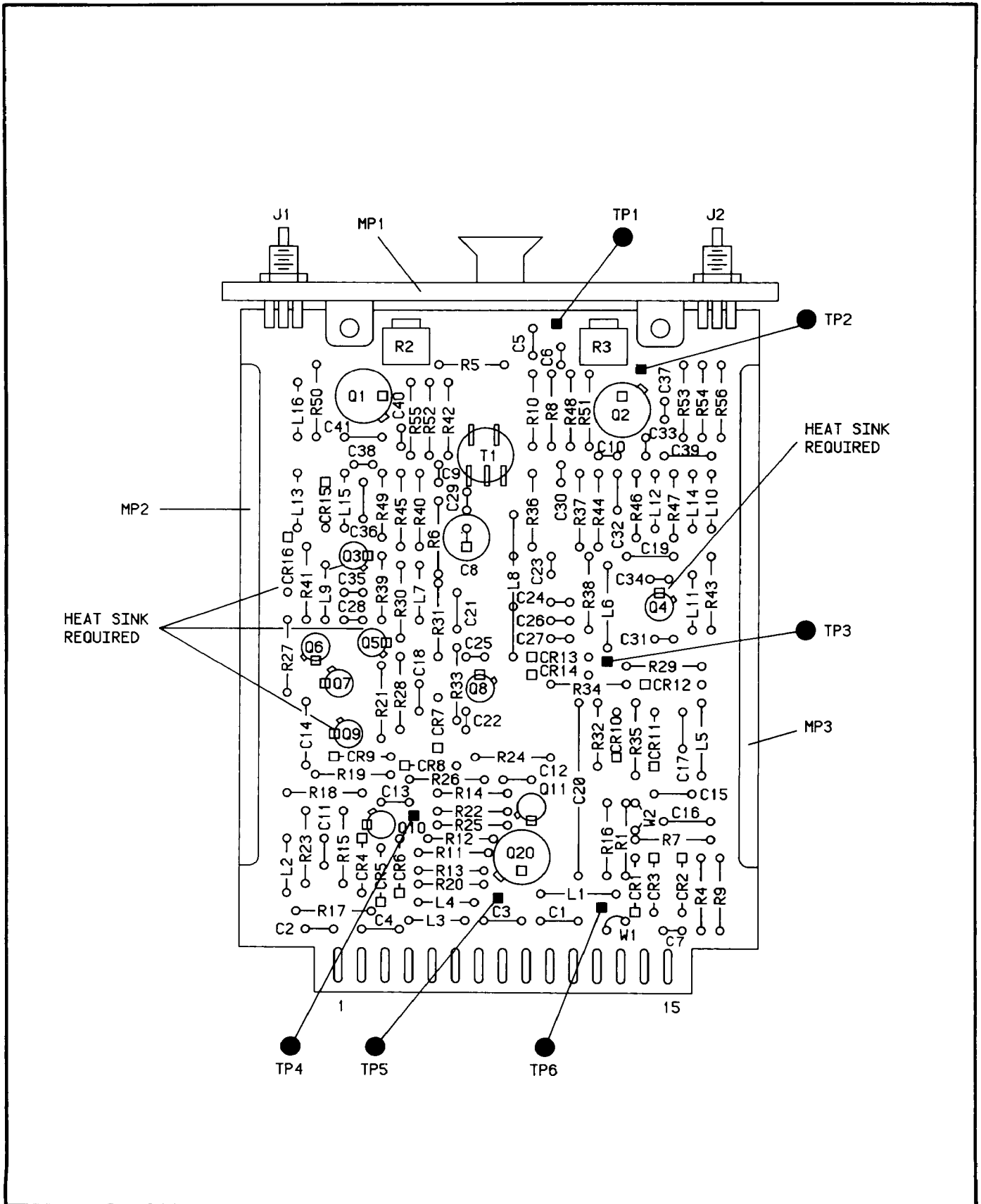


Figure 8-437. A3A7 Sum Loop Voltage Controlled Oscillator Component Locator

## CHANGES

<p><b>All Serial Prefixes</b></p>	<p><b>On the A3A7 Component Locator:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A7C23, C24, C26, C27</u></b> - Delete A3A7C23, C24, and C26. Change the existing C27 to C23.</li> </ul>
<p><b>2441A and above</b></p>	<p><b>On the A3A7 Schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A7R12, R13, R15, R17, R20</u></b> - Change the values of these resistors to the new values shown below:  R12 to 3.83k  R13 to 17.8k  R15 to 21.5k  R17 to 14.7k  R20 to 75k</li> </ul>
<p><b>2449A and above</b></p>	<p><b>On the A3A7 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A7R28, R30</u></b> - Change the value of R28 and R30 to 1.21k.</li> </ul>
<p><b>2549A and above</b></p>	<p><b>On the A3A7 Schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A7R5*, R10, R12, R13, R15, R17, R20</u></b> - Change the values of these resistors to the new values shown below:  R5* to 5.11k  R10 to 5.11k  R12 to 4.22k  R13 to 21.5k  R15 to 34.8k  R17 to 26.1 ohms  R20 to 90.9k</li> </ul>
<p><b>2936A and above</b></p>	<p><b>On the A3A7 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b><u>A3A7R28, R30</u></b> - Change the value of R28 and R30 to 1k.</li> </ul>

P10 A3A1  
A3A7 SIM LOOP VCO (08652-60140)  
LF LOOPS SECTION  
MOTHERBOARD  
(08653-603 51)

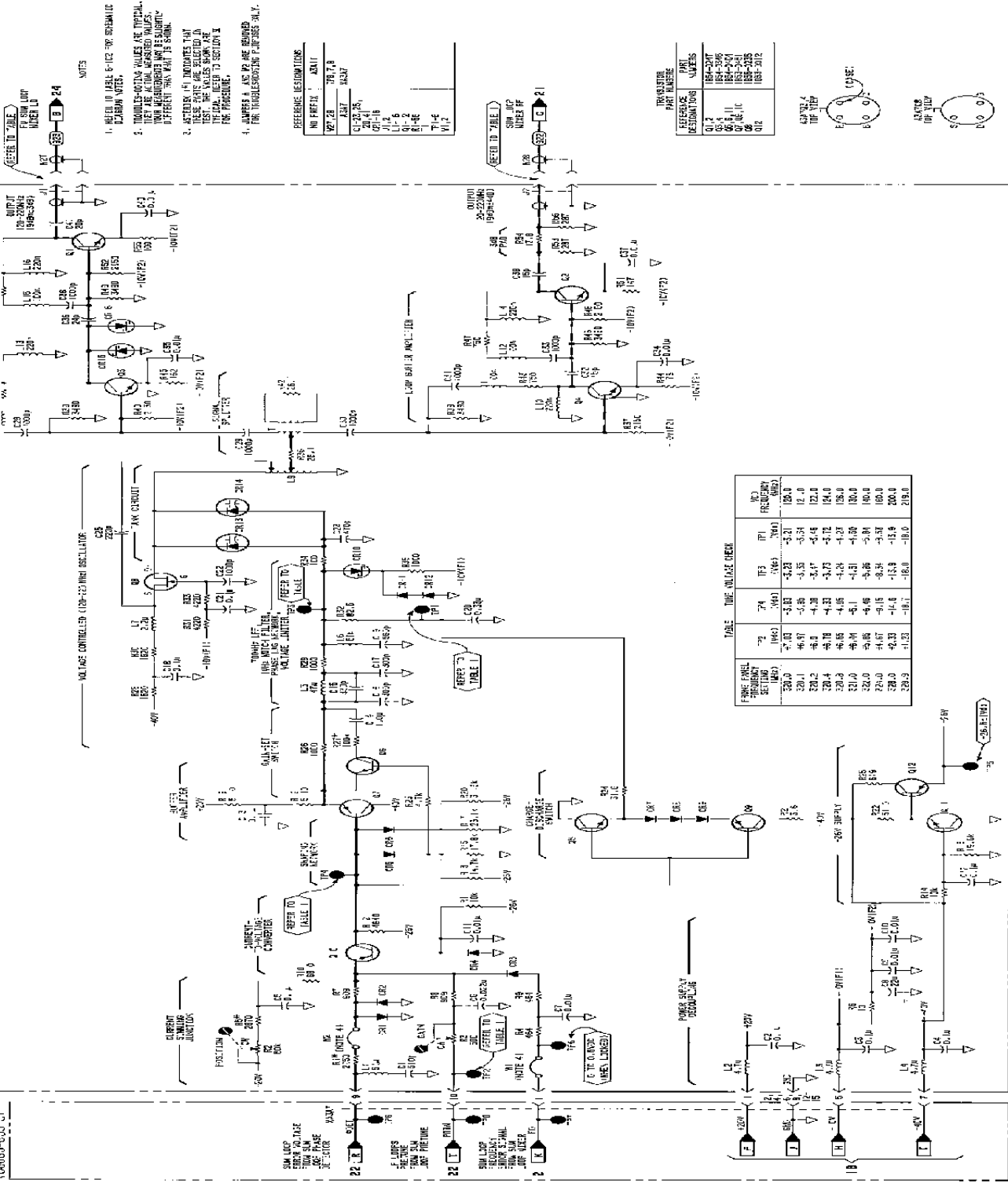


TABLE TIME-VOLTAGE CHECK

FREQUENCY SETTING (MHz)	74 (V6)	73 (V6)	72 (V6)	71 (V6)	70 (V6)
230.0	-3.23	-3.23	-3.21	-3.21	125.0
230.1	-5.26	-5.26	-5.24	-5.24	12.0
230.2	-4.28	-5.47	-5.45	-5.45	12.0
230.3	-4.33	-5.73	-5.72	-5.72	125.0
230.4	-4.05	-4.25	-4.23	-4.23	125.0
231.0	-5.1	-4.51	-4.51	-4.51	125.0
232.0	-5.05	-5.05	-5.05	-5.05	125.0
233.0	-4.67	-5.15	-5.15	-5.15	125.0
234.0	-4.33	-4.6	-4.59	-4.59	125.0
235.0	-4.33	-4.6	-4.59	-4.59	125.0

NOTES

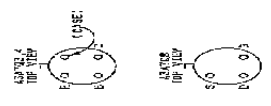
1. REFER TO LABEL 6-102 FOR SCHEMATIC FOR MAIN VOLTAGE.
2. DIMENSIONAL VALUES ARE TYPICAL. THEY ARE ACTUAL MEASURED VALUES. DIMENSIONS SHOWN ARE SUBJECT TO VARIATION FOR PART TOLERANCE.
3. ASTRISK (\*) INDICATES THAT THESE PARTS ARE SELECTED IN THE SCHEMATIC FOR THE TYPICAL PARTS TO SECTION 3 FOR PRODUCTION.
4. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

REFERENCE DESIGNATIONS

NO PREFIX	UNIT
R1-R14	RES
C1-C10	CAP
U1-U4	IC
S1-S2	SW
W1-W2	W
W3-W4	W
W5-W6	W
W7-W8	W
W9-W10	W
W11-W12	W
W13-W14	W

TRANSISTOR PART NUMBER

REFERENCE DESIGNATION	PART NUMBER
Q1-Q2	2N4347
Q3-Q4	2N4347
Q5-Q6	2N4347
Q7-Q8	2N4347
Q9-Q10	2N4347
Q11-Q12	2N4347
Q13-Q14	2N4347
Q15-Q16	2N4347
Q17-Q18	2N4347
Q19-Q20	2N4347
Q21-Q22	2N4347
Q23-Q24	2N4347
Q25-Q26	2N4347
Q27-Q28	2N4347
Q29-Q30	2N4347
Q31-Q32	2N4347
Q33-Q34	2N4347
Q35-Q36	2N4347
Q37-Q38	2N4347
Q39-Q40	2N4347
Q41-Q42	2N4347
Q43-Q44	2N4347
Q45-Q46	2N4347
Q47-Q48	2N4347
Q49-Q50	2N4347
Q51-Q52	2N4347
Q53-Q54	2N4347
Q55-Q56	2N4347
Q57-Q58	2N4347
Q59-Q60	2N4347
Q61-Q62	2N4347
Q63-Q64	2N4347
Q65-Q66	2N4347
Q67-Q68	2N4347
Q69-Q70	2N4347
Q71-Q72	2N4347
Q73-Q74	2N4347
Q75-Q76	2N4347
Q77-Q78	2N4347
Q79-Q80	2N4347
Q81-Q82	2N4347
Q83-Q84	2N4347
Q85-Q86	2N4347
Q87-Q88	2N4347
Q89-Q90	2N4347
Q91-Q92	2N4347
Q93-Q94	2N4347
Q95-Q96	2N4347
Q97-Q98	2N4347
Q99-Q100	2N4347



SERVICE SHEET 24  
A3A9 FM SUM LOOP MIXER

## REFERENCE BLOCK DIAGRAM 5

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

## General

There are two separate circuits on this service sheet. The upper portion of the schematic shows the integrator. The integrator takes the FM sum loop phase and frequency error signals from the FM Sum Loop Phase Detector Board (service sheet 25) and generates an FM sum loop error current which is sent to the FM Sum Loop VCO Board (service sheet 26).

The lower portion of the schematic shows the mixer circuitry. This section takes the FM sum loop VCO signal (service sheet 26) and the sum loop VCO signal (service sheet 23) and mixes them to produce the FM sum loop IF which is sent to the FM sum loop phase detector (service sheet 25).

## Mixer Circuitry

The FM sum loop mixer RF (FMS loop VCO output) enters the board via J1, passes through the 3 dB attenuator pads and a 250 MHz low-pass filter before entering pin 1 of mixer U1. The FM sum loop mixer LO (sum loop VCO output) enters the board via J3 and is passed through a 300 MHz low-pass filter before entering pin 8 of the mixer. The signal outputs from pins 3 and 4 of the mixer are passed through a 3 dB pad and a 40 MHz low-pass filter before leaving the board as the FM sum loop IF at J2. The output level of this 20 MHz IF signal is -16 dBm  $\pm$ 3 dB.

## Integrator Circuitry

Q1A and Q1B form a discrete differential amplifier within the integrator circuitry. One input to the amplifier is a frequency error signal (pin 8); the other is a phase error signal (pin 6). The signal at pin 8 should normally be at 0 volts when locked. At 0 volts, CR1 and CR2 are biased OFF and the base of Q1B is close to 0 volts. The phase error signal at pin 6 operates the differential amplifier to control the phase of the signal. The output voltage of the differential amplifier is amplified by Q7 and Q4 and is used to drive the voltage to current converter (Q3). The constant current source for the converter is formed by Q6.

The FM sum loop error current which flows through pin 3 of the board is the difference between the current flowing through Q6 and the

current flowing through Q3. The current flowing through Q3 is dependent on the voltage at the output of the integrator. The output of the integrator is controlled by feedback. When Q5 turn OFF, less current flows through Q3 for a given voltage at TP3. Q5 is turned ON and OFF by digital lines from the Microprocessor Board which enter the FM Sum Loop Mixer/Assembly via pins 9, 10, 19, and 20.

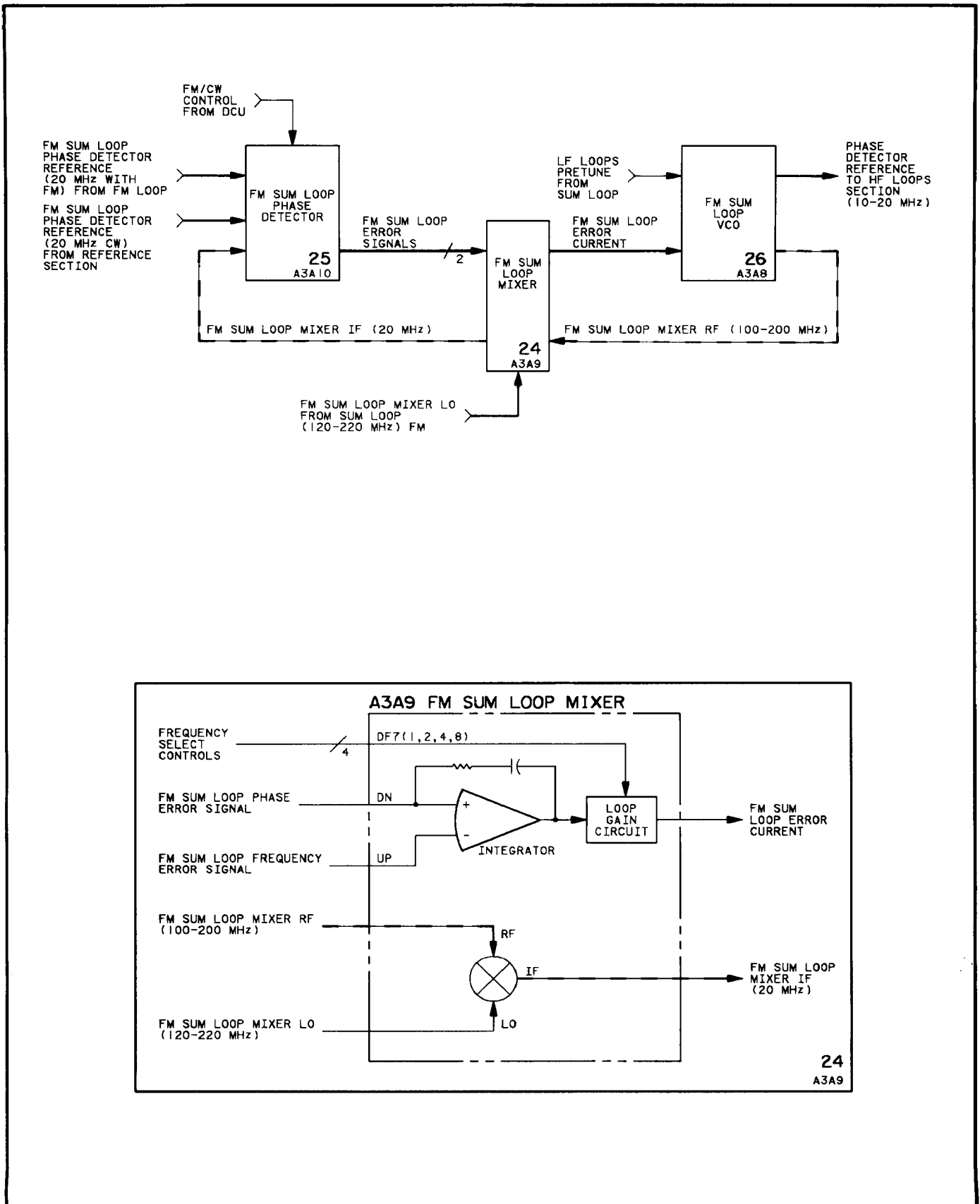


Figure 8-439. A3A9 FM Sum Loop Mixer Block Diagrams

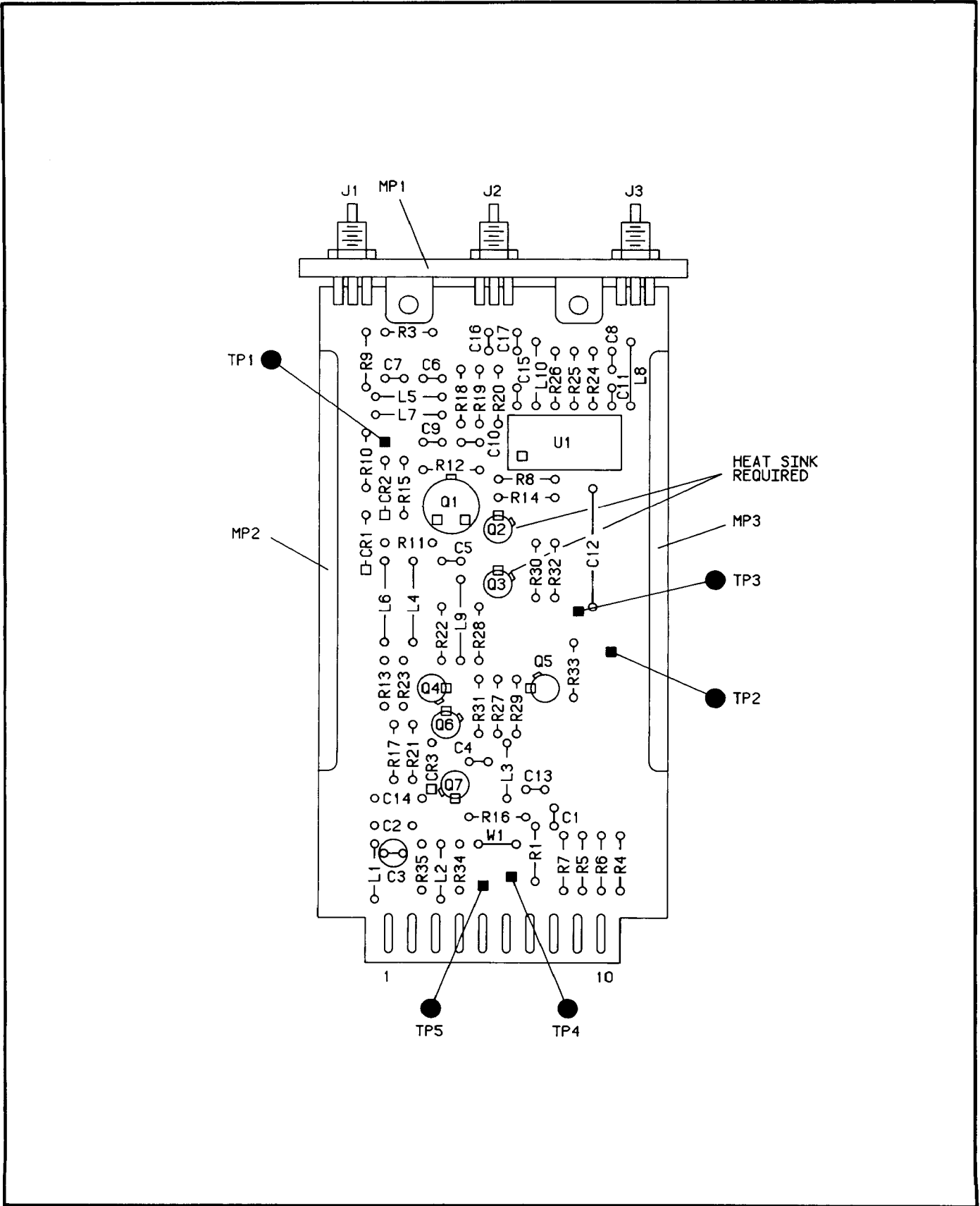


Figure 8-440. A3A9 FM Sum Loop Mixer Component Locator



**CHANGES****2533A and Above**

On the A3A9 schematic:

- A3A9R7, R9-R12 - Change the value of these resistors to those shown below:

R7	2.87k
R9	1k
R10	7.5k
R11	28.7k
R12	196k

**2601A and Above**

On the schematic:

- A3A9Q1 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of Q1 to 1854-1046.

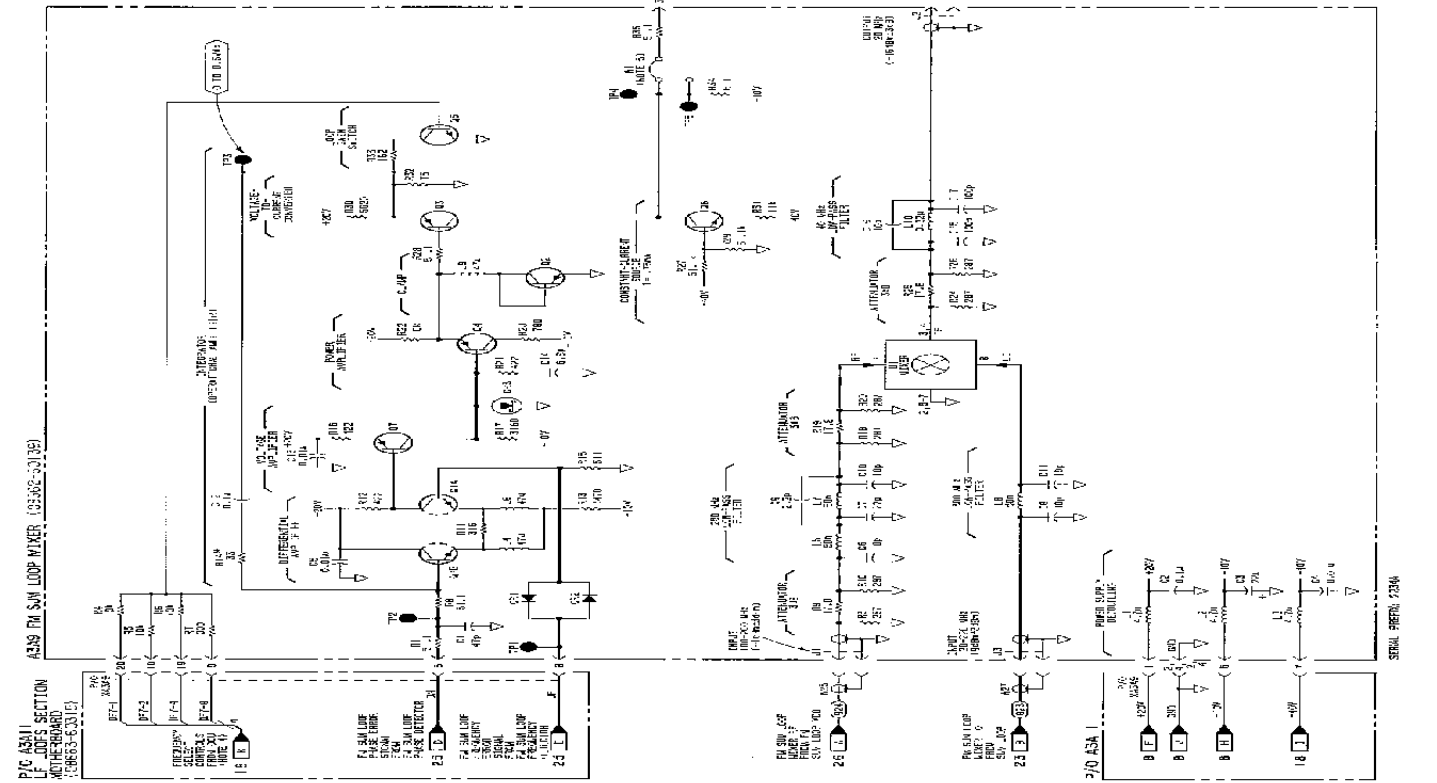
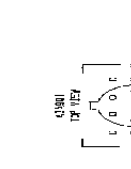
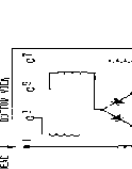
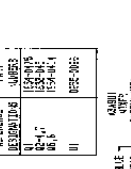
- NOTES
1. REFER TO TABLE B-107 FOR SCHEMATIC SYMBOLS AND VALUES.
  2. DIMENSIONS AND VALUES ARE TYPICAL. THEY ARE GIVEN AS APPROXIMATIONS. DIMENSIONS AND VALUES ARE NOT TO BE USED TO REPRODUCE THIS DRAWING.
  3. DIMENSIONS AND VALUES ARE GIVEN AS APPROXIMATIONS. THEY ARE NOT TO BE USED TO REPRODUCE THIS DRAWING.
  4. DIMENSIONS AND VALUES ARE GIVEN AS APPROXIMATIONS. THEY ARE NOT TO BE USED TO REPRODUCE THIS DRAWING.
  5. DIMENSIONS AND VALUES ARE GIVEN AS APPROXIMATIONS. THEY ARE NOT TO BE USED TO REPRODUCE THIS DRAWING.

REFERENCE EXPLANATION

NO.	DESCRIPTION	ASSEMBLY
1	ASSEMBLY	ASSEMBLY
2	ASSEMBLY	ASSEMBLY
3	ASSEMBLY	ASSEMBLY
4	ASSEMBLY	ASSEMBLY
5	ASSEMBLY	ASSEMBLY

TRANSFORMER PART NUMBER

NO.	DESCRIPTION	ASSEMBLY
1	ASSEMBLY	ASSEMBLY
2	ASSEMBLY	ASSEMBLY
3	ASSEMBLY	ASSEMBLY
4	ASSEMBLY	ASSEMBLY
5	ASSEMBLY	ASSEMBLY



SERVICE SHEET 25  
A3A10 FM SUM LOOP PHASE DETECTOR

## REFERENCE BLOCK DIAGRAM 5

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

## General

It is on the FM Sum Loop Phase Detector Board that either the 20 MHz continuous wave (CW) signal from the reference section or the 20 MHz FM signal (generated within the modulation section) is summed with the 120 MHz to 220 MHz (1 Hz step resolution) Low Frequency Sum Loop signal. The net result is a 100 MHz to 200 MHz CW or FM signal at the output of the FM Sum Loop VCO (service sheet 26). This signal is divided by the decade divider on the same board to produce the 10 MHz to 20 MHz (0.1 Hz step resolution) reference signal that is used by the Output Sum Loop Phase Detector in the high frequency loops section.

Inputs to the Phase Detector Board include the FM sum loop CW and FM phase detector reference signals (pins 10 and 8), the FM sum loop IF from the Sum Loop Mixer at J1 and the FM/CW control at pin 15. Outputs include the FM sum loop phase error signal (pin 14) and the FM sum loop frequency error signal (pin 12).

## Phase Detector Circuitry

The FM sum loop IF signal passes through a 20 MHz low-pass filter and through 60 MHz and 100 MHz notch filters before being amplified by the 20 MHz bandpass amplifier formed by Q1. The notch filters eliminate spurious signals from the FM Sum Loop Mixer Board. Following the bandpass amplifier, the signal passes through a 3 dB pad before splitting in two directions. One path is through Q2, which toggles one flip-flop of the frequency detector formed by U1. The other path is to the RF input of phase detector U2 (the LO input will be discussed subsequently). The output of the phase detector passes through R30 and a 20 MHz low-pass filter before leaving the board to be sent as an error signal to the integrator on the FM Sum Loop Mixer Board (service sheet 24).

## FM/CW Selector Circuitry

Selection of either the FM or CW sum loop phase detector reference signals is handled by the FM/CW selector circuitry formed by U4. This selector is controlled by the FM/CW control line which enters the board via pin 15. The outputs of the selector are at pins 6 and 3. These two outputs are wire ORed and the resulting signal is sent

to the L0 input of phase detector U2 and the second toggle input (pin 6) of frequency detector U1.

### Frequency Detector Circuitry

The frequency detector outputs a pulse whenever the FM sum loop IF frequency differs from either the FM or CW sum loop phase detector reference signals (whichever happens to be selected). The output from the frequency detector is sent to comparators U3A and U3B. The square wave outputs of the comparators are sent to an inverter circuit that sums the currents to produce a voltage at the junction of R39 and R42. This voltage outputs as the FM sum loop frequency error signal at pin 12. When the system is in lock, the output at this point is about  $\pm 0.5$  volts. Q5 is used as an OR gate for the outputs of the two comparators. Whenever either of the comparators goes HI, Q5 turns on and lights the out-of-lock LED indicator.

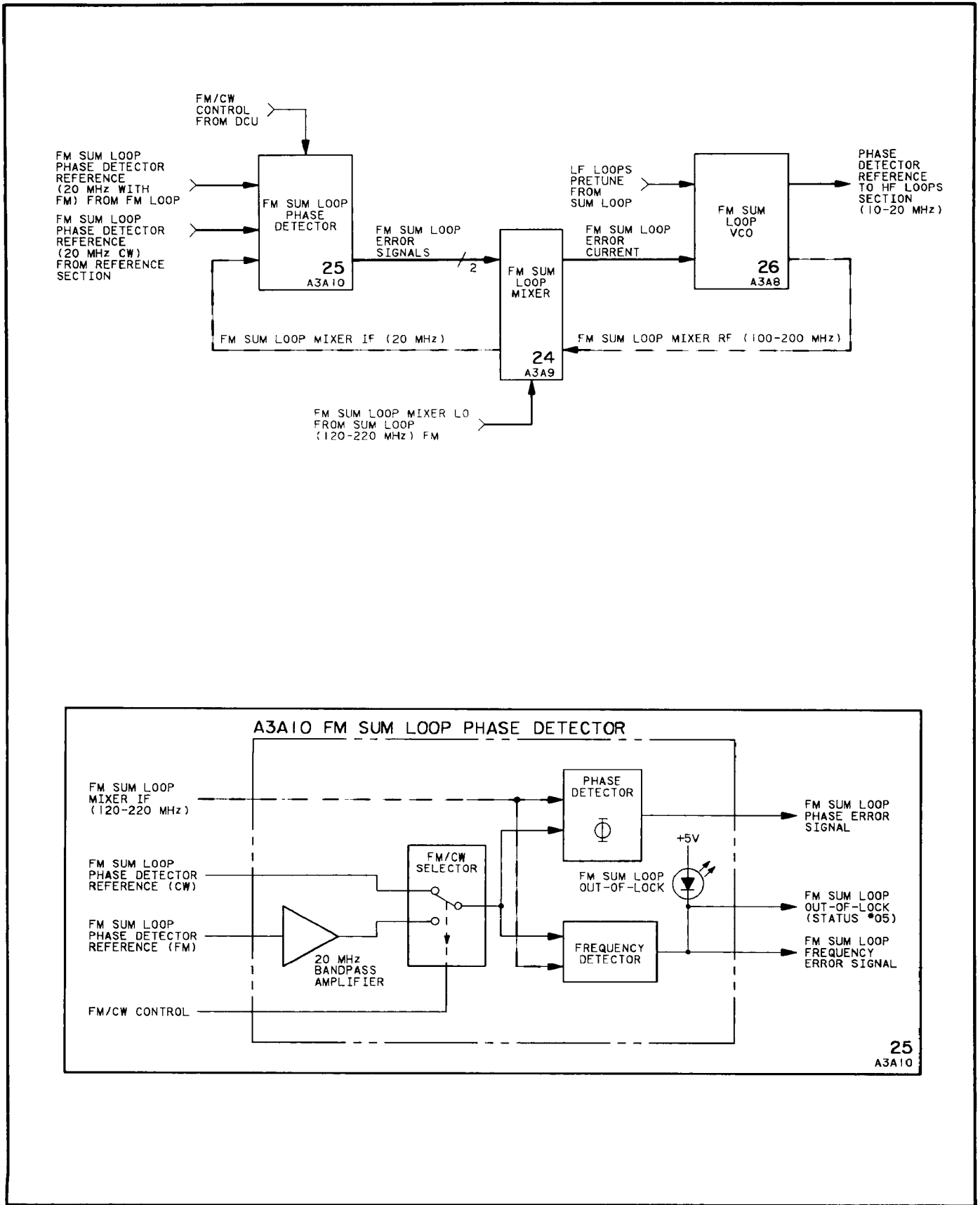


Figure 8-442. A3A10 FM Sum Loop Phase Detector Block Diagrams

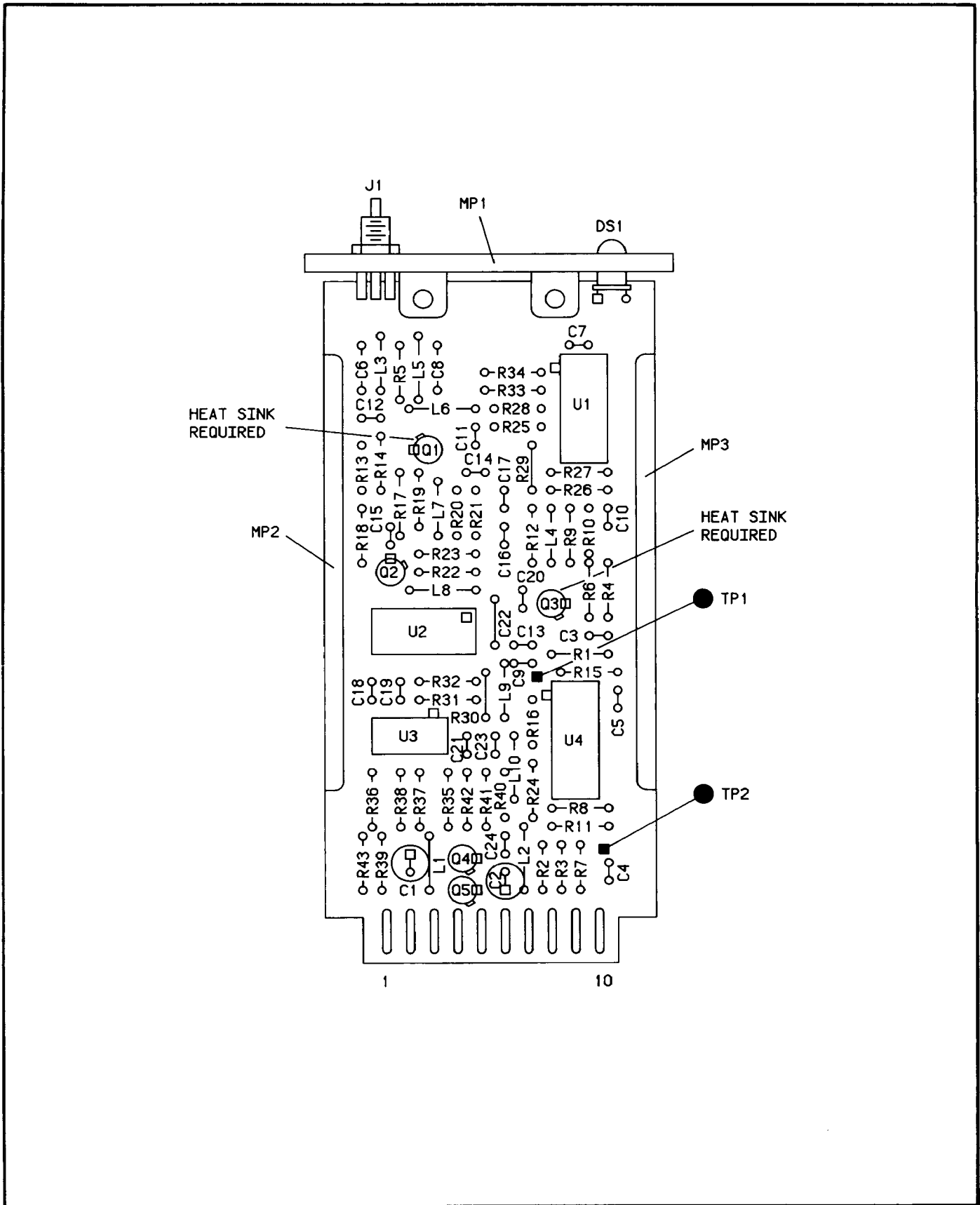


Figure 8-443. A3A10 FM Sum Loop Phase Detector Component Locator

## CHANGES

All serial prefixes

On the A3A5 schematic:

- A3A10C9 - Change the value of C9 to 110p.





SERVICE SHEET 26  
A3A8 FM SUM LOOP VCO

## REFERENCE BLOCK DIAGRAM 5

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.

Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

## General

The FM Sum Loop VCO utilizes back-to-back varactors instead of bypass capacitors used on the other two VCO assemblies. This allows greater bandwidth and higher frequency modulation of the oscillator.

There are two inputs to the Sum Loop VCO Board. One is a pretune from the Sum Loop Phase Detector Board which enters the FM Sum Loop Board via pin 10. This input is fed through a linearizer circuit and is then buffered by Q3 and Q4. The resulting voltage at TP3 is used to pretune the voltage controlled oscillator within lock range. The FM sum loop error current enters the board via pin 9 and passes through a 40 MHz low-pass filter, formed by L7 and C8, before being summed with the loop pretune signal. This signal provides fine tuning to the VCO and guides it to final lock.

Signal splitter T1 (in the output section of this board) divides the power of the signal tapped at L12 and distributes it to limiters U2 and U1. Limiter U2 has two outputs. One of them is a test output with a frequency range of 100 MHz to 200 MHz. The other output is passed through a divide-by-ten circuit to provide the 10 MHz to 20 MHz phase detector reference (0.1 Hz step resolution) signal needed by the Output Sum Loop in the high frequency loops section. The output of limiter U1 passes through a 300 MHz low-pass filter and outputs from the board to the FM Sum Loop Mixer (service sheet 24), providing feedback for the FM Sum Loop.

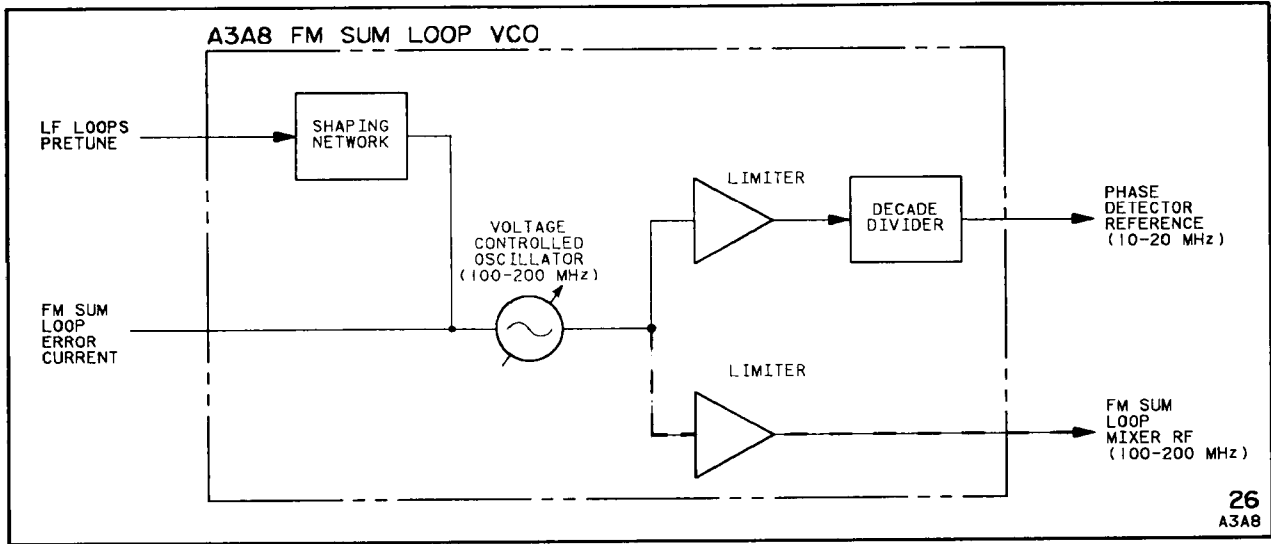
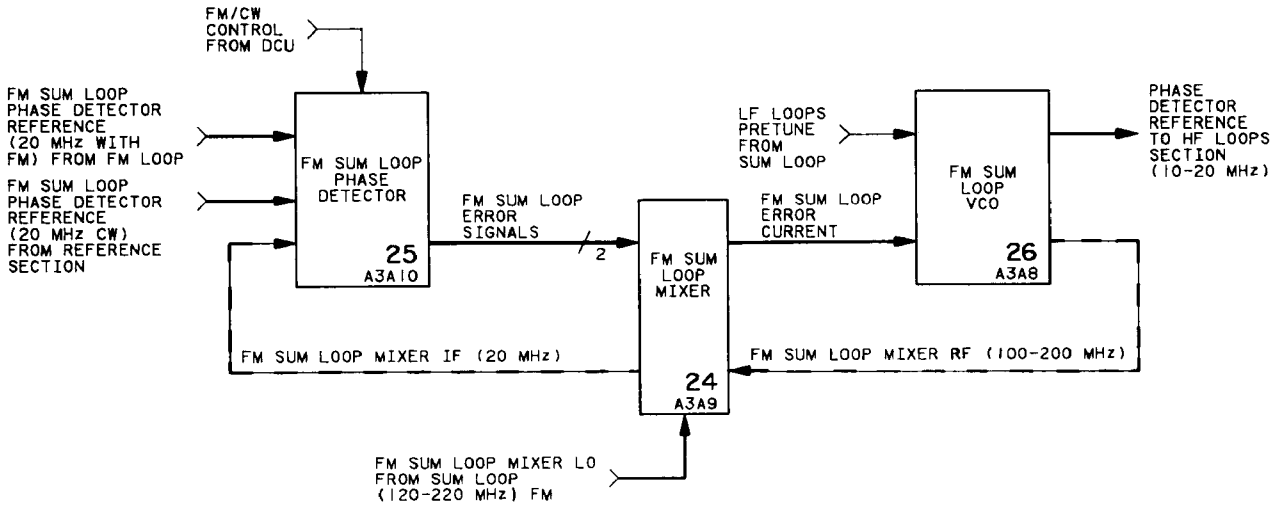


Figure 8-445. A3A8 FM Sum Loop Voltage Controlled Oscillator Block Diagrams

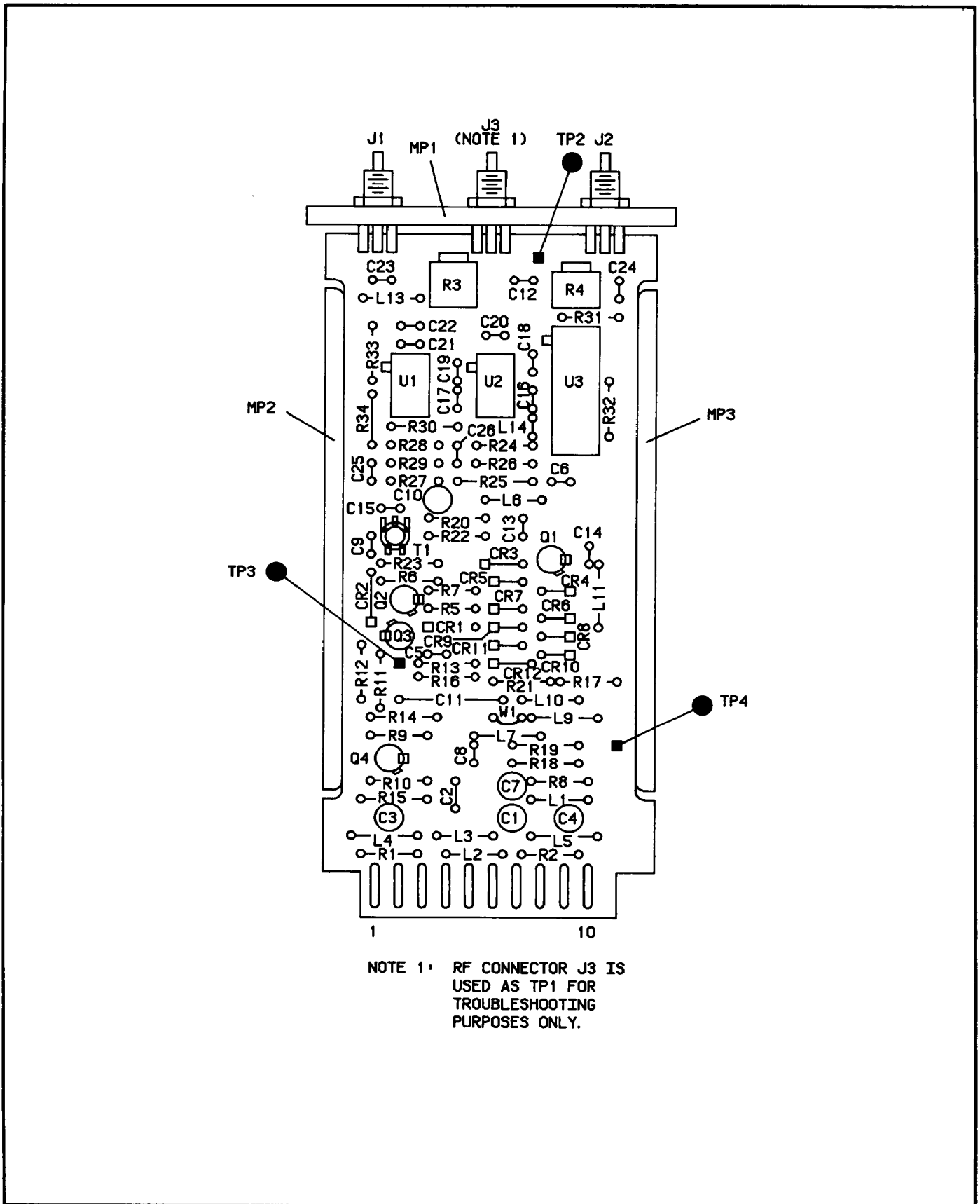


Figure 8-446. A3A8 FM Sum Loop Voltage Controlled Oscillator Component Locator

**CHANGES****2533A and Above**

On the A3A8 schematic:

- A3A8R4-6, R14, R32, R33- Change the value of these resistors to those shown below:

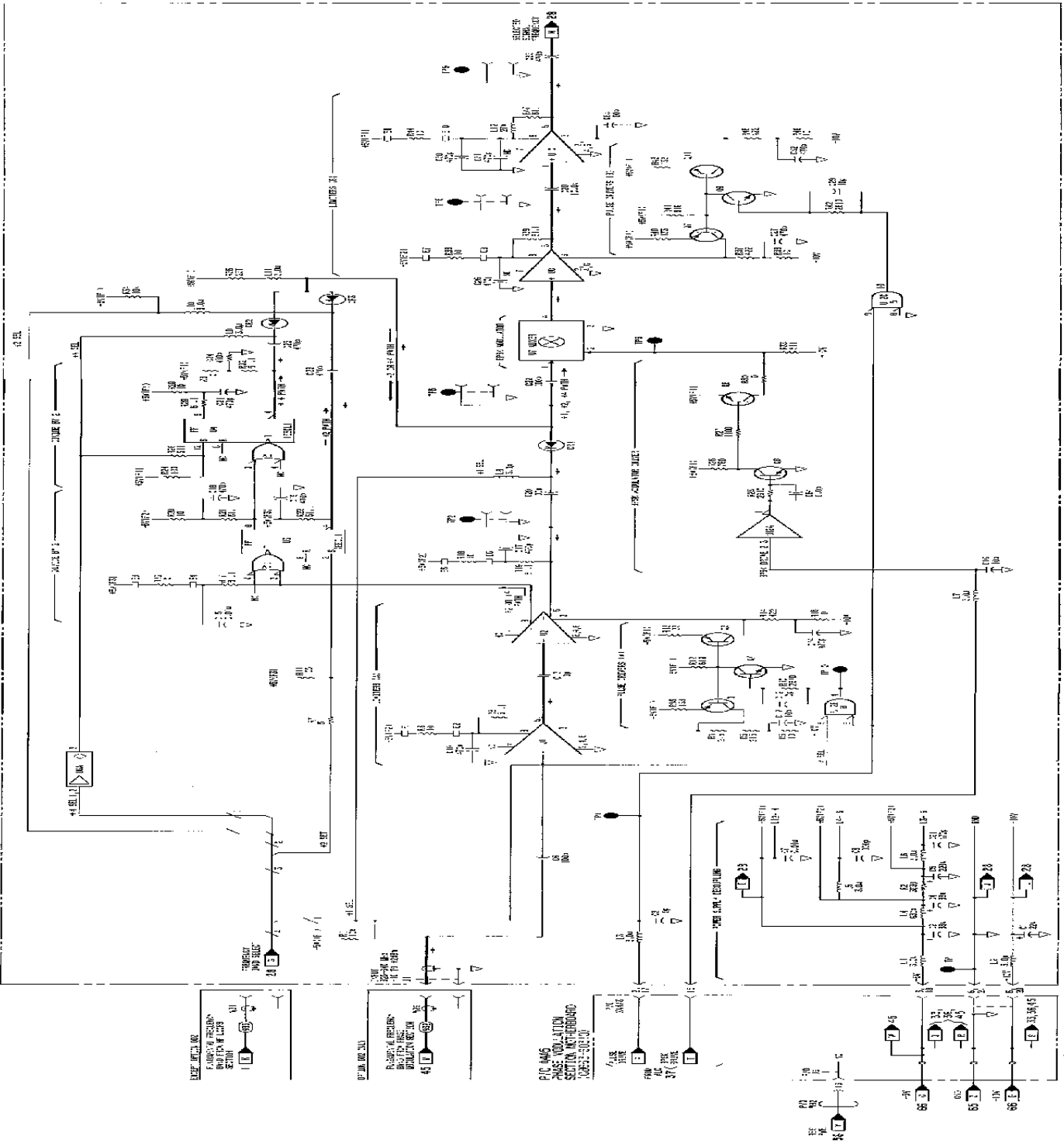
R4	5.11k
R5	3.48k
R6	1k
R14	147 ohms
R32	90.9 ohms
R33	75 ohms

**2748A and Above**

On the A3A8 schematic:

- A3A8R6, R12 - Under **CURRENT-TO-VOLTAGE CONVERTER** locate R6 and change its value to 6.8k ohms. Under **SHAPING NETWORK** locate R12 and change its value to 261 ohms.

**PIO 4443 DISTRIBUTOR ASSEMBLY (ORANGE-RED-RED-RED OPTION 120)**



1. REFER TO PAGES 8.50 THROUGH 8.59 FOR THE DISTRIBUTOR MOTOR ASSEMBLY.
2. REFER TO PAGES 8.61 THROUGH 8.69 FOR THE DISTRIBUTOR CONTROL ASSEMBLY.
3. REFER TO PAGES 8.70 THROUGH 8.79 FOR THE DISTRIBUTOR MOTOR ASSEMBLY.
4. REFER TO PAGES 8.80 THROUGH 8.89 FOR THE DISTRIBUTOR CONTROL ASSEMBLY.
5. REFER TO PAGES 8.90 THROUGH 8.99 FOR THE DISTRIBUTOR MOTOR ASSEMBLY.
6. REFER TO PAGES 9.00 THROUGH 9.09 FOR THE DISTRIBUTOR CONTROL ASSEMBLY.
7. REFER TO PAGES 9.10 THROUGH 9.19 FOR THE DISTRIBUTOR MOTOR ASSEMBLY.
8. REFER TO PAGES 9.20 THROUGH 9.29 FOR THE DISTRIBUTOR CONTROL ASSEMBLY.
9. REFER TO PAGES 9.30 THROUGH 9.39 FOR THE DISTRIBUTOR MOTOR ASSEMBLY.
10. REFER TO PAGES 9.40 THROUGH 9.49 FOR THE DISTRIBUTOR CONTROL ASSEMBLY.

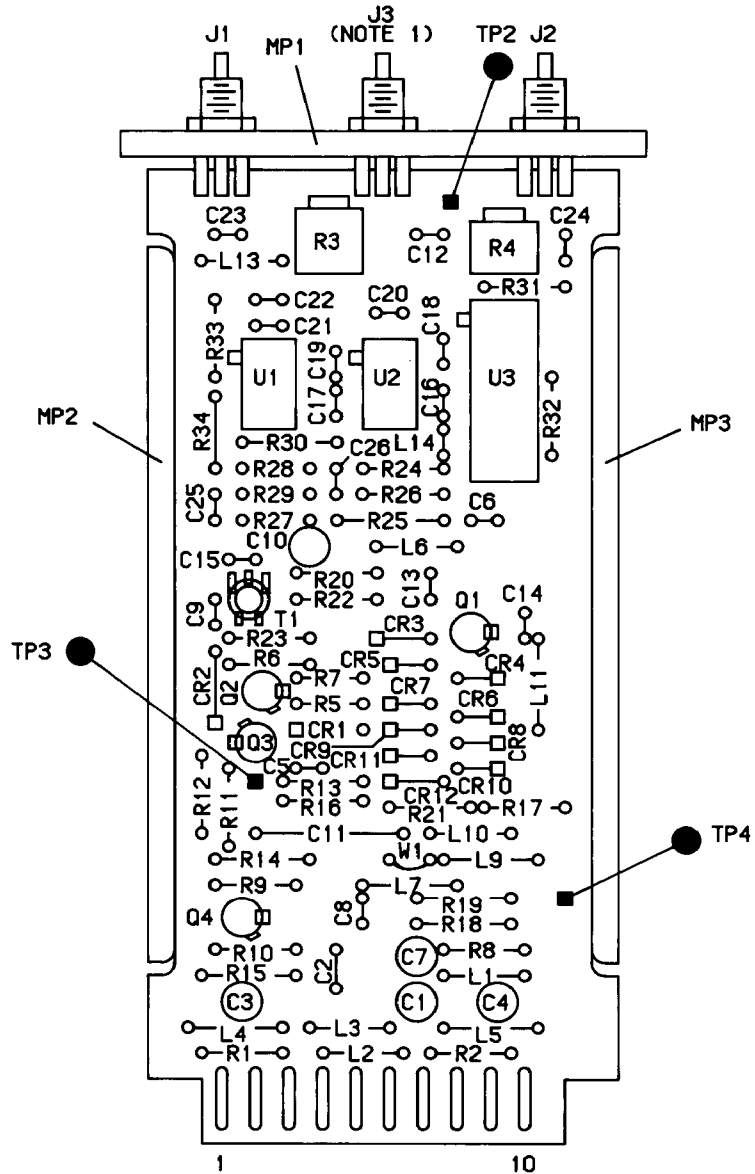
WIRE	TO	FROM
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NOTE 1: RF CONNECTOR J3 IS USED AS TP1 FOR TROUBLESHOOTING PURPOSES ONLY.

8-446. A3A8 FM Sum Loop Voltage Controlled Oscillator Component Locator.

## CHANGES

<p><b>All serial prefixes</b></p>	<p><b>On the A3A8 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>SS26</b> - On service sheet 26 delete the page number and add a revision date in its place of <i>rev.20DEC88</i>.</li> </ul>
<p><b>2533A and above</b></p>	<p><b>On the A3A8 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>R4-6, R14, R32, R33</b> - Change the value of these resistor to those shown below:  R4 5.11K  R5 3.48K  R6 1K  R14 147 ohm  R32 90.9 ohm  R33 75 ohm</li> </ul>
<p><b>2706A and above</b></p>	<p><b>On the A3A8 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>R6 - R12</b> - Under CURRENT-TO-VOLTAGE CONVERTER locate R6 and change its value to 6.8K ohm. Under SHAPING NETWORK locate R12 and change its value to 261 ohm.</li> </ul>
<p><b>2846A and above</b></p>	<p><b>On the A3A8 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>R31</b> - In the upper right corner of the schematic change the value of R31 to 1K ohm.</li> </ul>



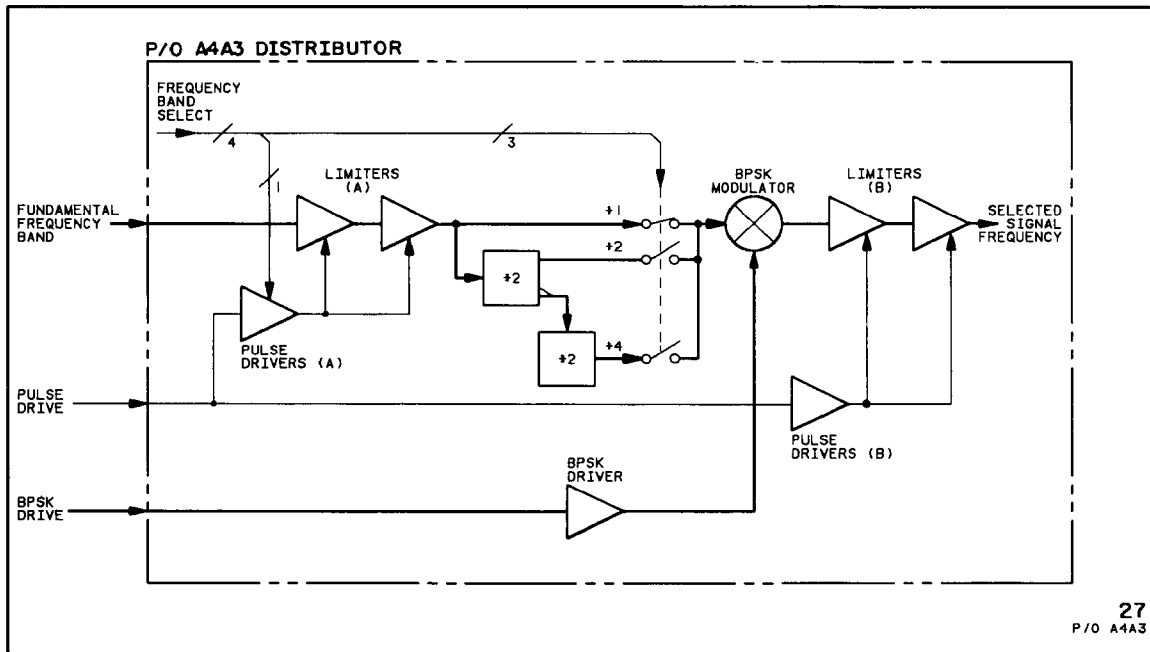
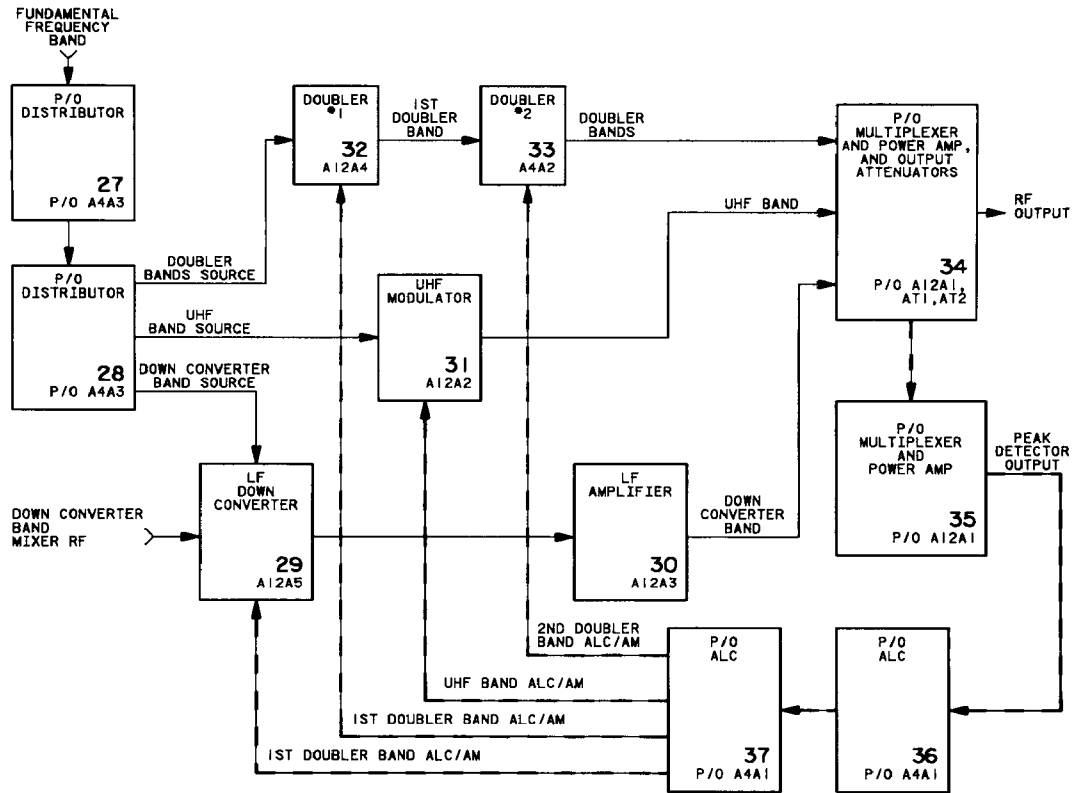


Figure 8-501. P/O A4A3 Distributor Block Diagrams

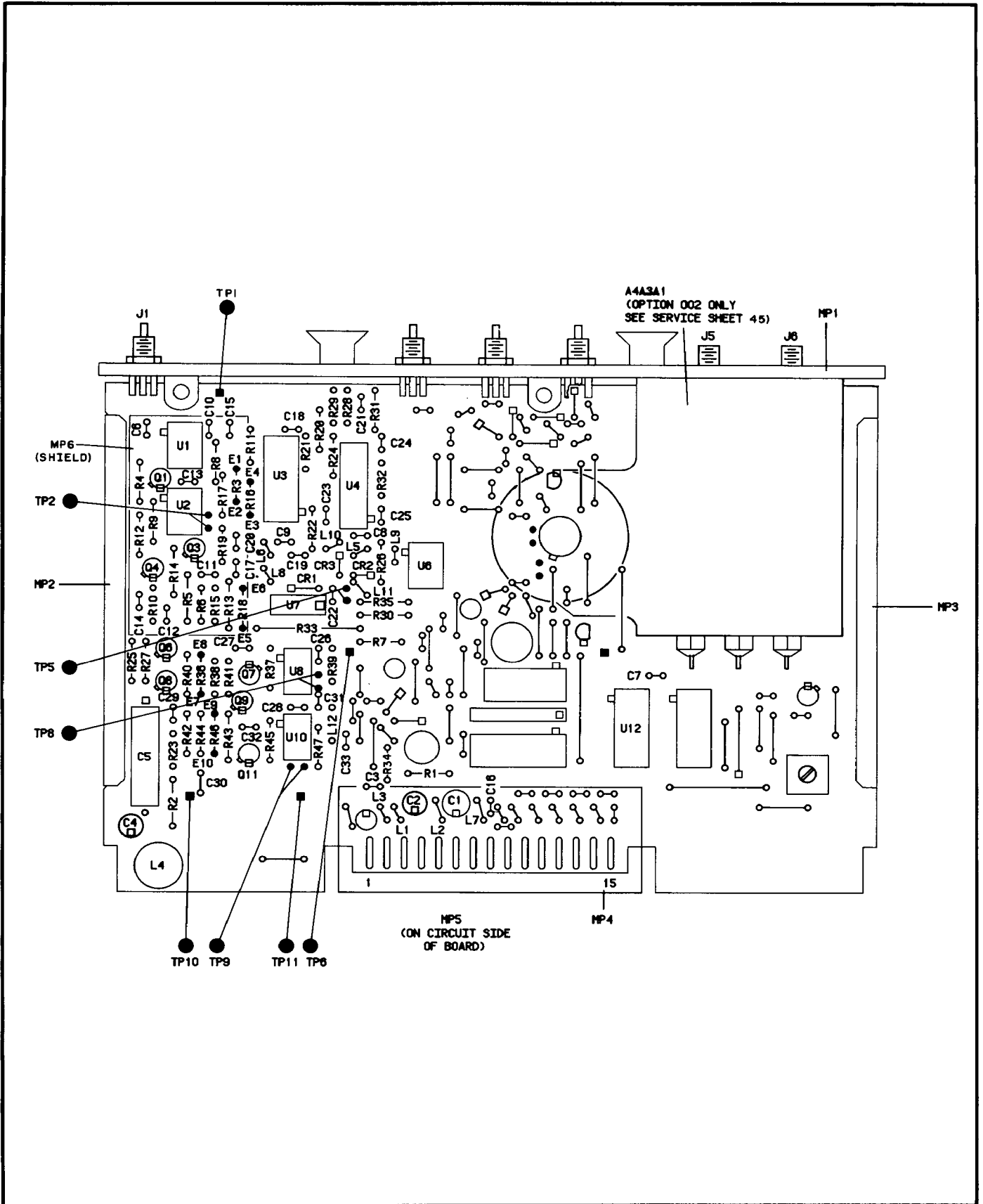


Figure 8-502. P/O A4A3 Distributor Component Locator

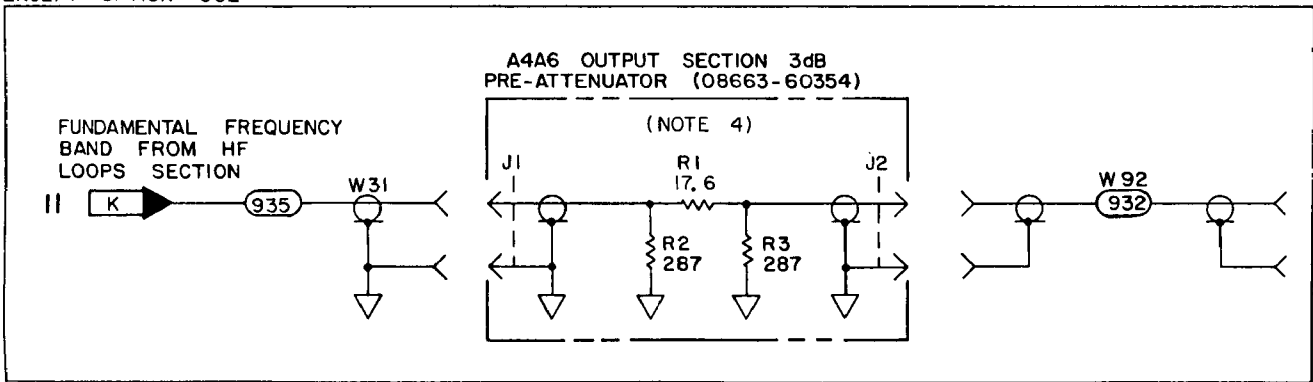
## CHANGES

<p><b>All Serial Prefixes</b></p>	<p><b>On the schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>+5V Bullet "C"</b> - On the left side of the A4A3 schematic, change the service sheet reference for the bullet labeled "C" to 65.</li> </ul> <p><b>On the A4A3 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>A4A3R2</b> - Change the value of R2 to 3.83 ohms.</li> <li>• <b>A4A3C24</b> - The symbol shown for C24 (470p) is a resistor. Change the symbol to a capacitor symbol.</li> <li>• <b>A4A3L11</b> - On the upper right-hand side of the schematic, change the symbol for L11 to an inductor.</li> </ul>
<p><b>2245A and above</b></p>	<p><b>On the schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>A4A6</b> - On the left side of the schematic, add A4A6 as shown in the figure "P/O Figure 8-503. P/O Distributor Schematic (2245A and above)" on page 8-502.3.</li> <li>• <b>NOTES</b> - On the right side of the schematic under NOTES, add note 4 as follows: <ul style="list-style-type: none"> <li>4. The small chip components of this assembly require low-temperature soldering techniques. Use silver solder.</li> </ul> </li> </ul>
<p><b>2350A and above</b></p>	<p><b>On the A4A3 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>W2</b> - Modify the schematic as shown in the partial schematic, "P/O Figure 8-502. P/O Distributor Schematic (2350A and above)," on page 8-502.4.</li> <li>• <b>NOTES</b> - On the right side of the schematic under NOTES, add note 5 as follows: <ul style="list-style-type: none"> <li>5. W2 is a quarter wavelength open-circuit coaxial stub used to attenuate a 4 MHz spur.</li> </ul> </li> </ul> <p><b>On the A4A3 component locator:</b></p> <ul style="list-style-type: none"> <li>• <b>W2</b> - Use the component locator "P/O Figure 8-502. P/O A4A3 Distributor Component Locator (2350A and above)," on page 8-502.3.</li> </ul>

## CHANGES

<b>2401A and above</b>	<p><b>On the A4A3 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>A4A3C65</b> - Add capacitor C65 (100p) from the node of R34 and L10 to ground.</li> </ul> <p><b>On the A4A3 component locator:</b></p> <ul style="list-style-type: none"> <li>• <b>A4A3C65</b> - Add capacitor C65 between U4 and L10. (Use component locator on page 8-502.3.)</li> </ul>
<b>2451A and above</b>	<p><b>On the A4A3 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>A4A3</b> - Change the part number of the A4A3 Assembly to 08663-60362 (standard) and 08663-60361 (option 002)</li> <li>• <b>A4A3</b> - Modify the schematic as shown in the partial schematic, "P/O Figure 8-503. P/O Distributor Schematic (2451A and above)," on page 8-502.5.</li> <li>• <b>W2, NOTES</b> - W2 and NOTE 5 were added on serial break 2350A. W2 is no longer used; in its place is an open circuit stub (printed circuit trace). Change NOTE 5 to read: 5. A quarter wavelength open-circuit coaxial stub is used to attenuate a 4 MHz spur. The stub is a printed circuit trace.</li> <li>• <b>A4A3C65</b> - Change the value of C65 to 10p.</li> <li>• <b>A4A3L10</b> - Change the value of L10 to 120<math>\mu</math>.</li> </ul> <p><b>On the A4A3 component locator:</b></p> <ul style="list-style-type: none"> <li>• <b>A4A3</b> - Modify the component locator as shown in the partial component locator, "P/O Figure 8-502. P/O A4A3 Distributor Component Locator (2451A and above)," on page 8-502.5.</li> </ul>

EXCEPT OPTION 002



P/O Figure 8-503. P/O Distributor Schematic (2245A and above)

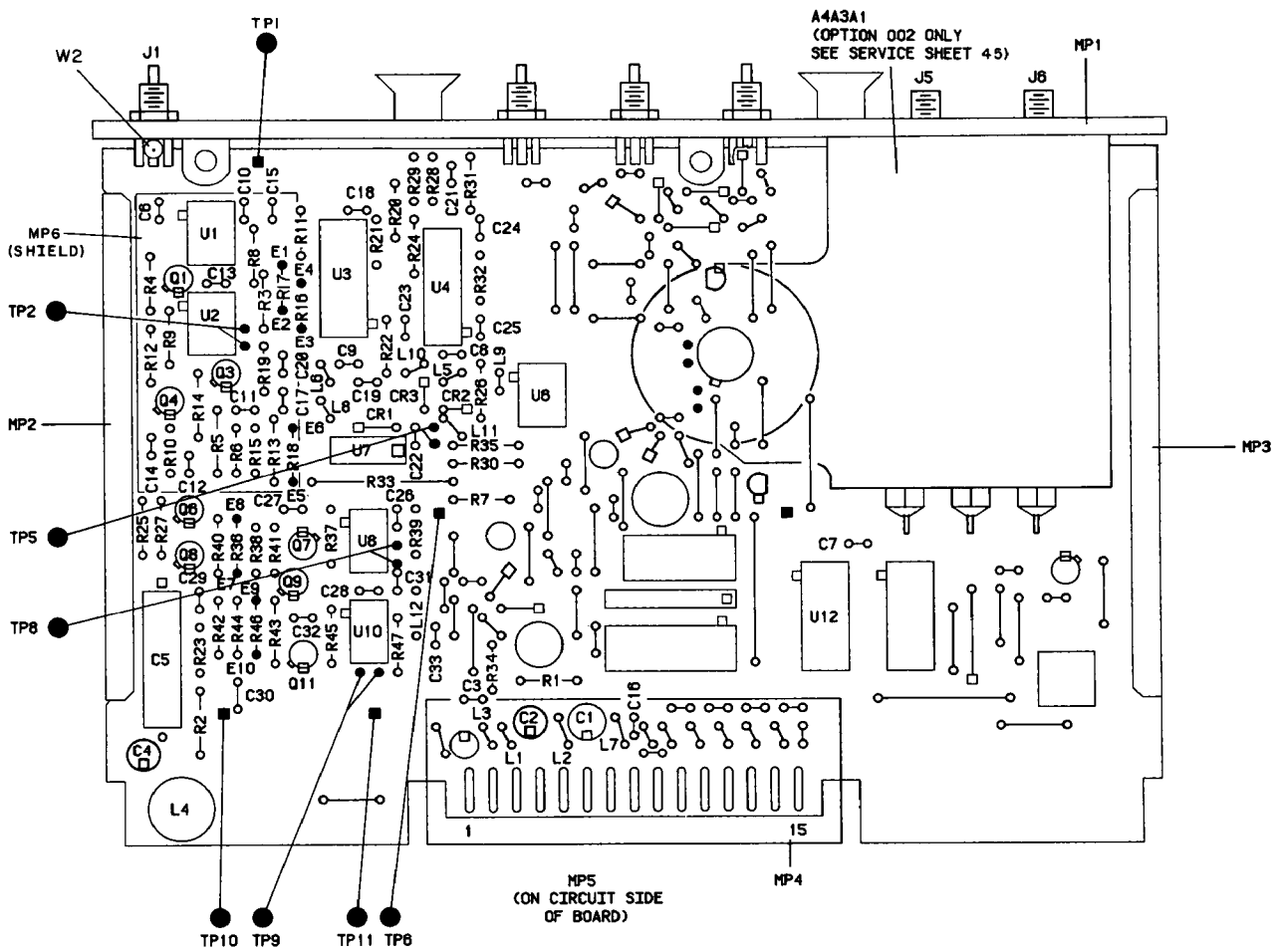


Figure 8-502. P/O A4A3 Distributor Component Locator (2350A and above)

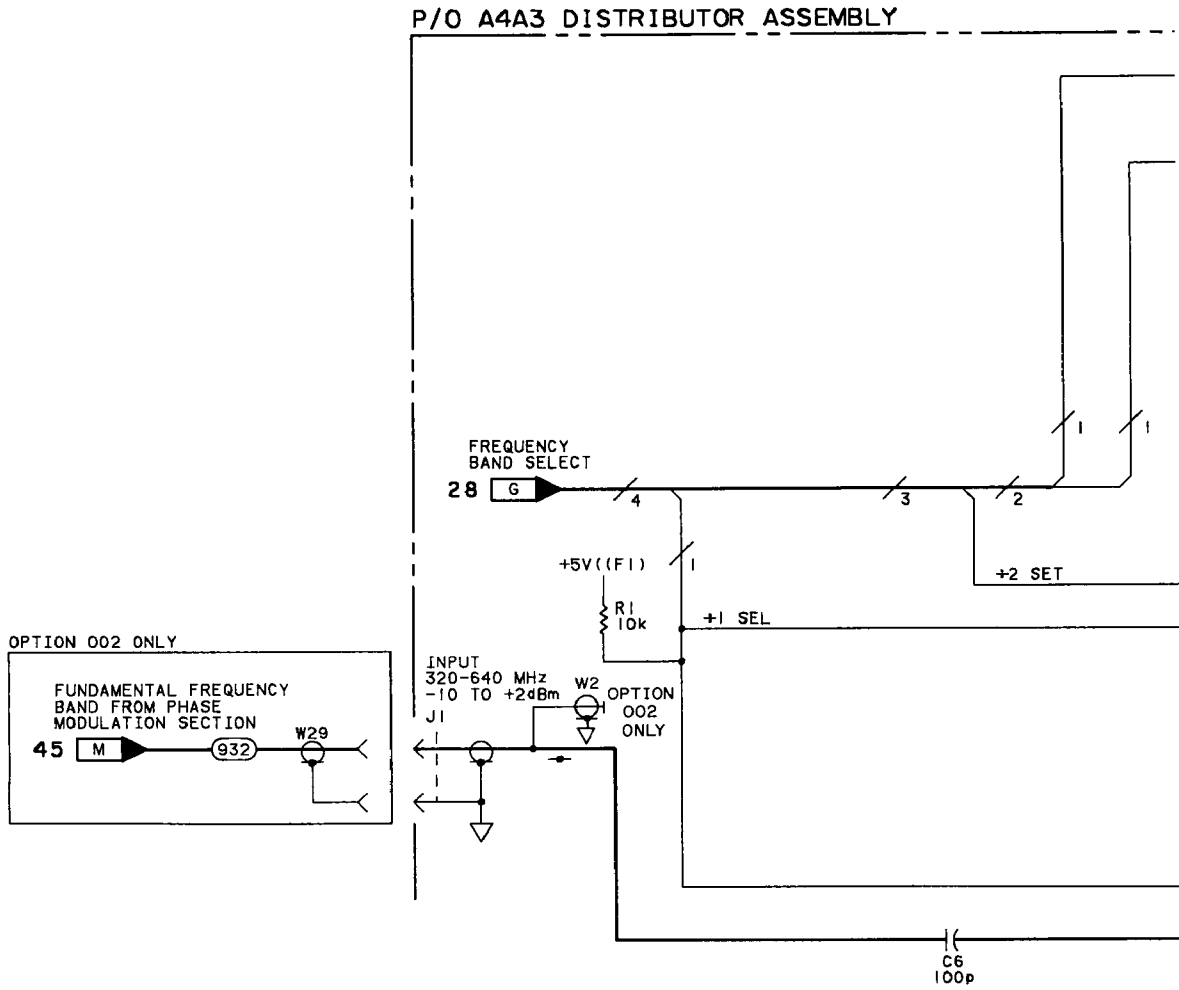


Figure 8-503. P/O Distributor Schematic (2350A and above)

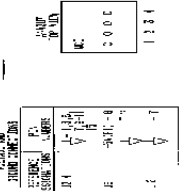


1. 检查所有接线是否正确。
2. 检查所有保险丝是否完好。
3. 检查所有继电器是否动作正常。
4. 检查所有接触器是否动作正常。
5. 检查所有开关是否动作正常。
6. 检查所有指示灯是否完好。
7. 检查所有仪表是否完好。
8. 检查所有保护装置是否完好。
9. 检查所有报警装置是否完好。
10. 检查所有控制回路是否完好。

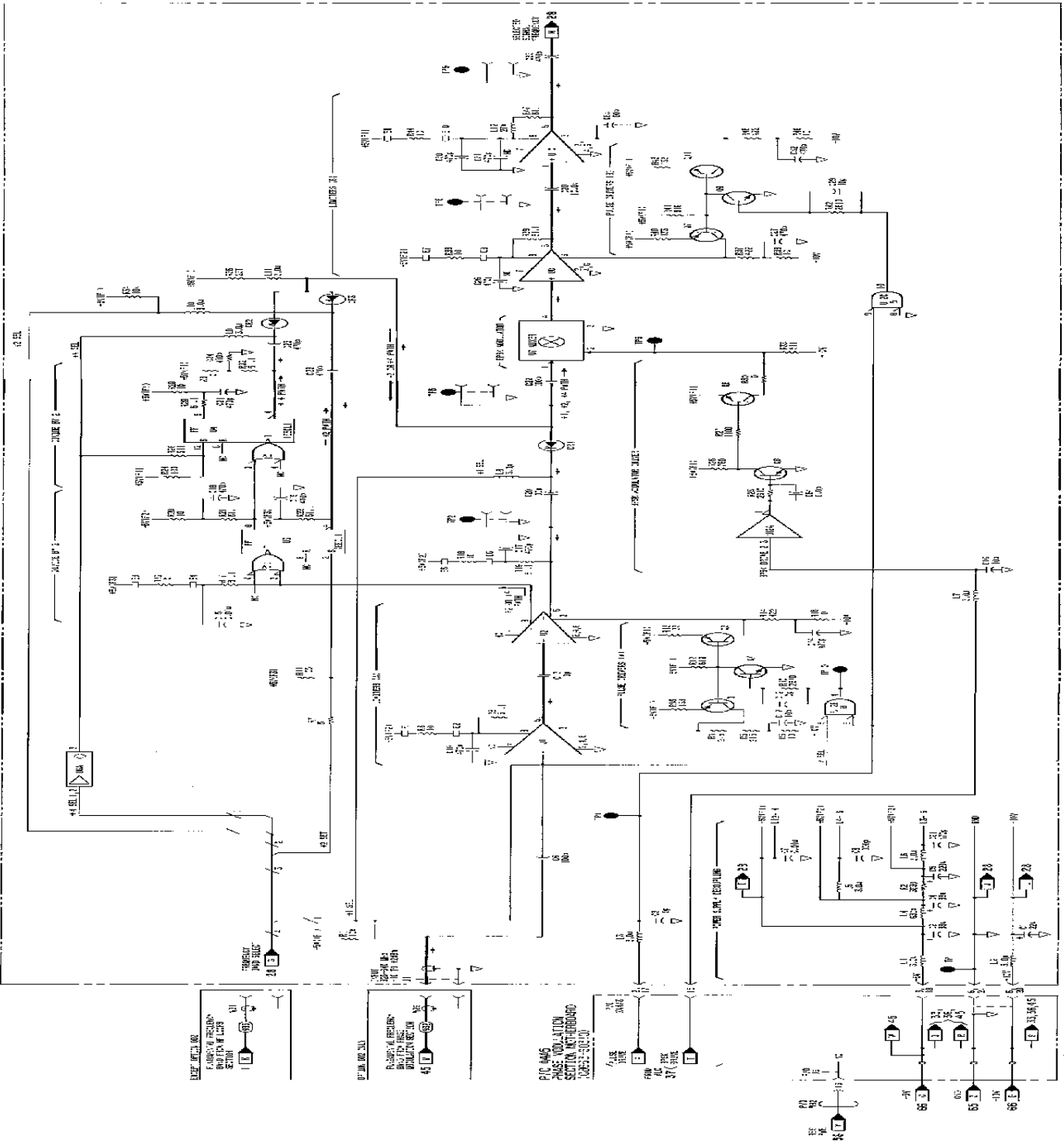
名称	规格	数量
熔断器	10A	1
继电器	JR1	1
接触器	CJ1	1
开关	QS1	1
指示灯	HL1	1
仪表	PI1	1
保护装置	PI1	1
报警装置	PI1	1
控制回路	PI1	1

名称	规格	数量
熔断器	10A	1
继电器	JR1	1
接触器	CJ1	1
开关	QS1	1
指示灯	HL1	1
仪表	PI1	1
保护装置	PI1	1
报警装置	PI1	1
控制回路	PI1	1

名称	规格	数量
熔断器	10A	1
继电器	JR1	1
接触器	CJ1	1
开关	QS1	1
指示灯	HL1	1
仪表	PI1	1
保护装置	PI1	1
报警装置	PI1	1
控制回路	PI1	1



**PIO 4443 DISTRIBUTOR ASSEMBLY (ORANGE-RED-WHITE OPTION 120)**







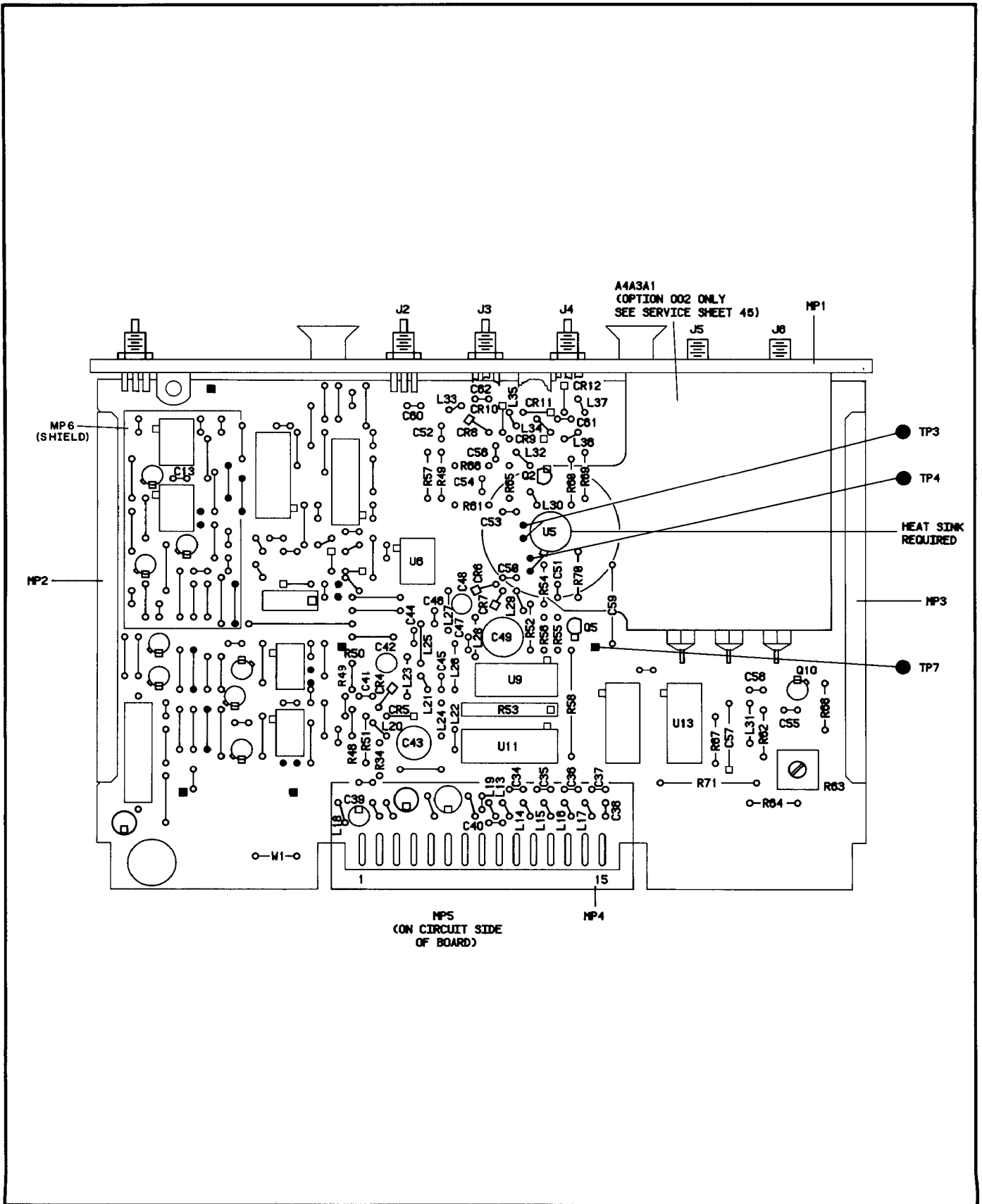


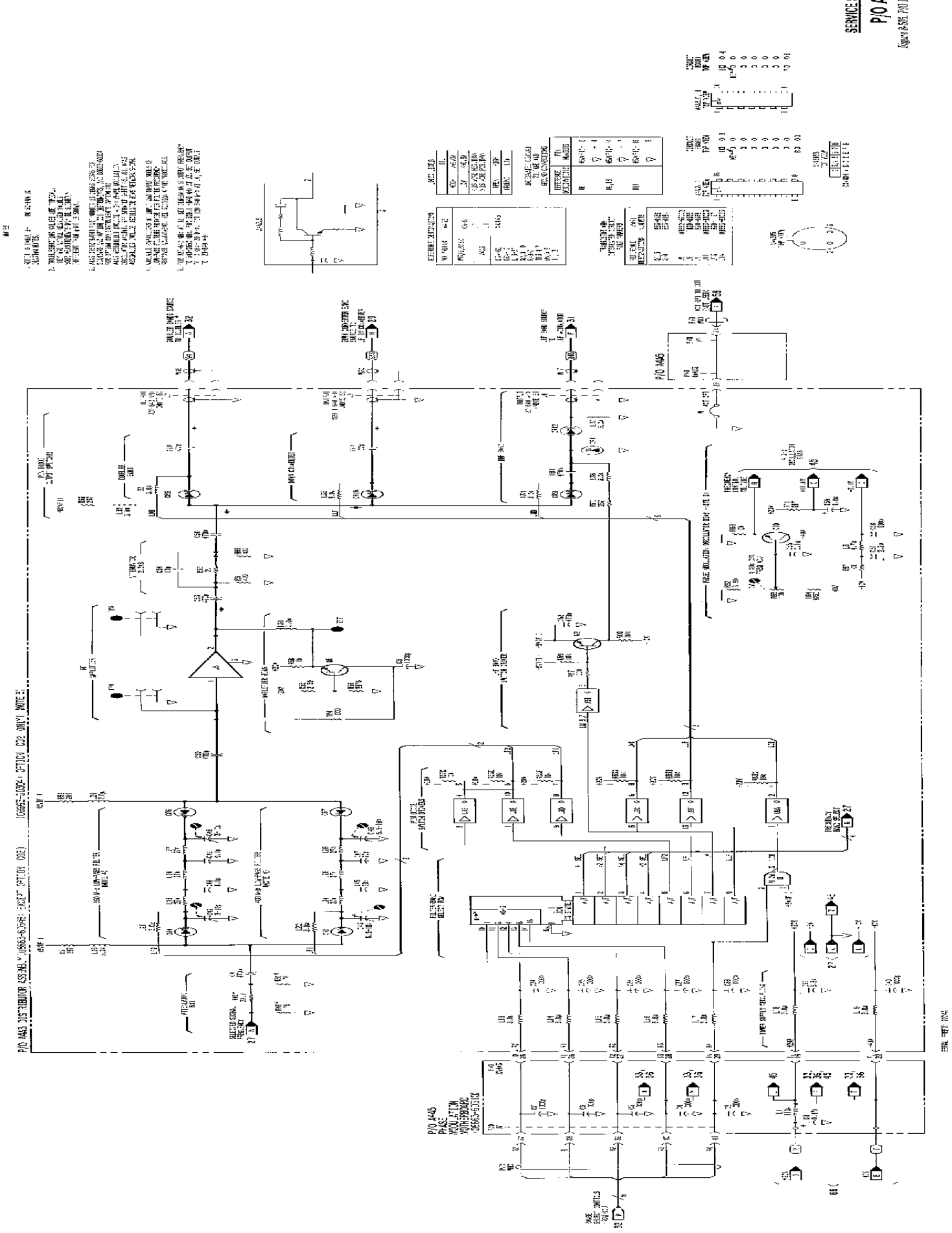
Figure 8-505. P/O A4A3 Distributor Component Locator

## CHANGES

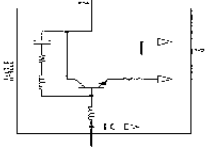
### 2350A and Above

On the A4A3 component locator:

- A4A3R63 - Change R63 to show side adjustment rather than top adjustment.



- NOTE
1. ALL ELECTRICAL COMPONENTS ARE TO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
  2. THE DISTRIBUTOR ADVANCE SYSTEM IS A POSITIVE LOCKING SYSTEM. THE DISTRIBUTOR ADVANCE SYSTEM IS NOT TO BE USED TO START THE ENGINE.
  3. THE DISTRIBUTOR ADVANCE SYSTEM IS A POSITIVE LOCKING SYSTEM. THE DISTRIBUTOR ADVANCE SYSTEM IS NOT TO BE USED TO START THE ENGINE.
  4. THE DISTRIBUTOR ADVANCE SYSTEM IS A POSITIVE LOCKING SYSTEM. THE DISTRIBUTOR ADVANCE SYSTEM IS NOT TO BE USED TO START THE ENGINE.
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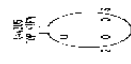


REFERENCE DESIGNATIONS

SYMBOL	DESCRIPTION
SW	SWITCH
COIL	SOLENOID COIL
RELAY	RELAY
SOLENOID	SOLENOID
VALVE	VALVE
ARMATURE	ARMATURE
SPRING	SPRING
PLATE	PLATE
CONTACT	CONTACT
TERMINAL	TERMINAL
WIRE	WIRE
GROUND	GROUND

WIRE GAUGE

WIRE NO.	GAUGE
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## SERVICE SHEET 29 A12A5 LOW FREQUENCY DOWN CONVERTER

### REFERENCE BLOCK DIAGRAM 6

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

### PRINCIPLES OF OPERATION

#### General

The Low Frequency Down Converter Board generates the 10 kHz to 120 MHz low frequency RF band. It does this by mixing the 520.1 MHz to 640 MHz down converter source signal from the Distributor Board (service sheet 28) with the 520 MHz down converter band mixer RF from the reference section.

The 520.1 MHz to 640 MHz down converter source signals from the distributor enter the Down Converter Board by way of J1. This signal is boosted from +1.75 dBm to approximately +11 dBm by microcircuit amplifier U1. The signal is then coupled, via C14, to a narrow-band tuned amplifier formed by Q2. Tuning is accomplished by variable capacitor C16 in conjunction with L9. The gain of this stage is approximately 10 dB, boosting the signal to +20 dBm.

The 680 MHz low-pass filter reduces harmonics present in the output to 40 dB below signal level. The 3 dB attenuator attenuates the signal output to +17 dBm and creates a better broadband match to the LO input of the mixer.

The 520 MHz input from the reference section enters the Down Converter Board via the J3 input at +1 dBm. To compensate for the insertion loss of the AM modulator, the signal is amplified to +10 dBm by the +9 dB amplifier formed by Q6. This amplifier is biased from the negative supply.

#### PIN Modulator

The PIN diode AM modulator formed by CR1, CR2, CR3, and CR4, modulates the 520 MHz input signal with the signal from the ALC Board (service sheet 37). The ALC signal enters the Down Converter Board via pin 9 and is injected between CR2 and CR3. The signal splits and goes through both the right and left set of diodes. The more current that flows in the line, the lower the impedance of the diodes. This results in lower insertion loss and a greater amplitude output signal.

Following modulation, the signal is amplified by the +9 dB amplifier formed by Q5. The output of this amplifier is approximately -5 dBm. The signal then passes through a 680 MHz low-pass filter and a 3 dB

attenuator and is fed into the RF input of the mixer at approximately -8 dBm.

### Mixer

The mixer takes the 520.1 MHz to 640 MHz down converter source signal and heterodynes it with the 520 MHz reference RF to produce the 10 kHz to 120 MHz low level down converter band. The 25 dB difference between the LO and RF inputs of the mixer is necessary to reduce the effect of spurs. If the difference is greater than 25 dB, the signal will become buried in noise. Part of the effect of the ALC loop is to ensure that the mixer operates within the 25 dB range.

The output of the mixer is about -16 dBm. Before being sent to the output amplifier stages, it is amplified by the Low Frequency Amplifier (service sheet 30).

### Bias Regulators and Down Converter Enable

The bias regulators for the two down converter source amplifiers are formed by Q3 and Q4. The down converter enable line from the MULTIPLEXER/POWER AMP (service sheet 34) is used to switch the Down Converter Board ON and OFF through transistor Q4, which is the ground source for the bias regulators.

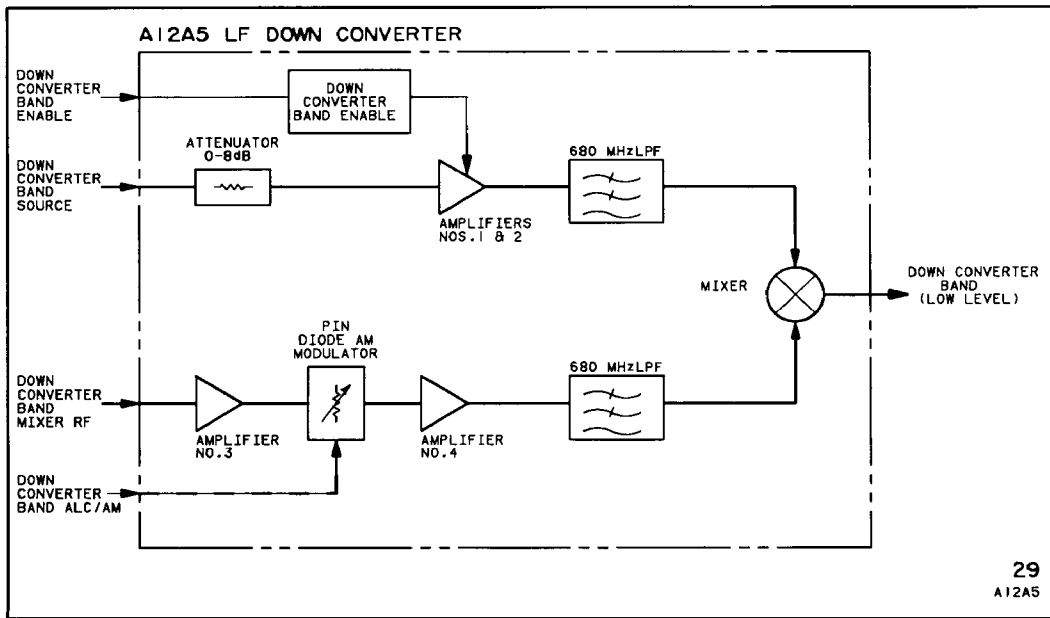
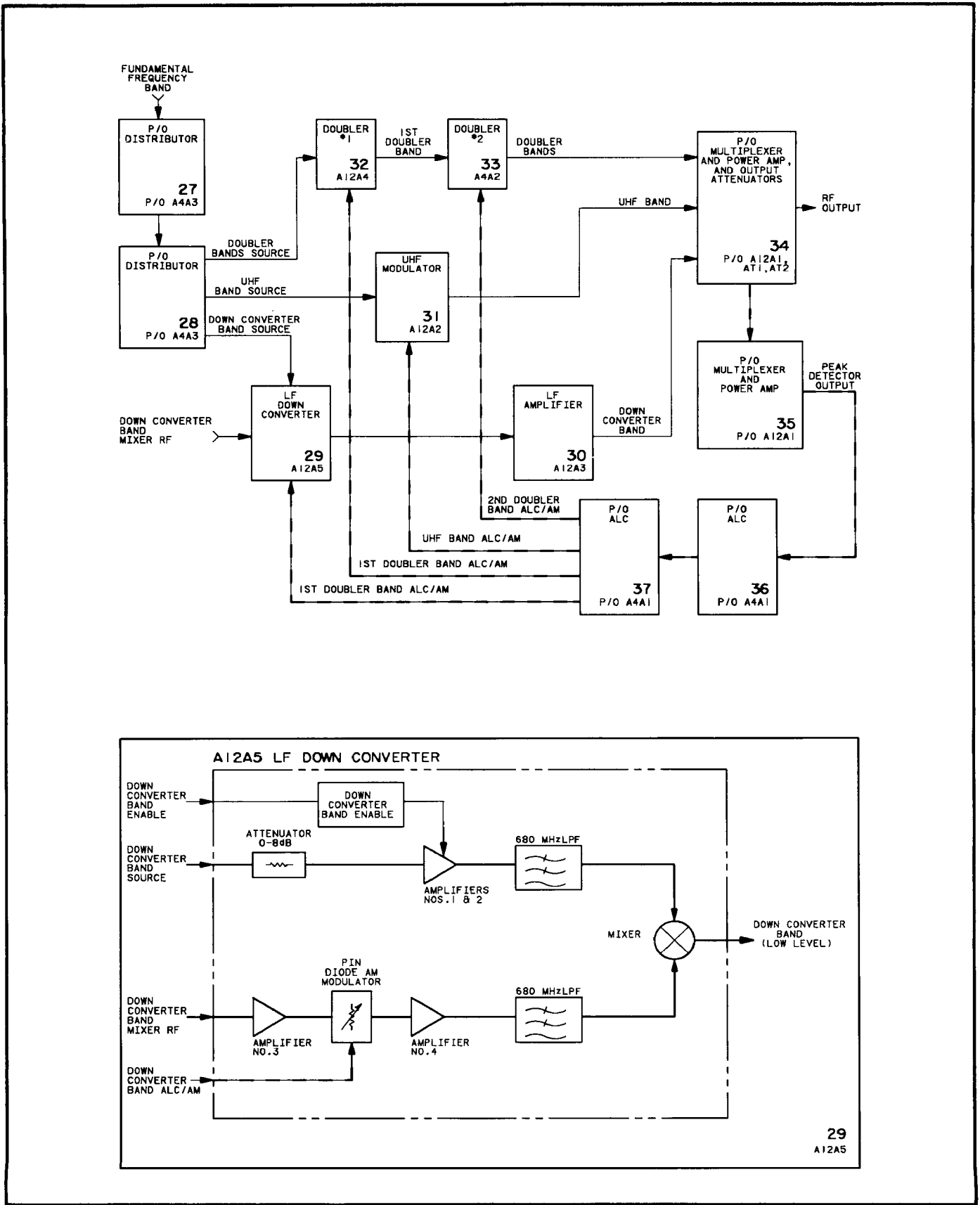


Figure 8-507. A12A5 LF Down Converter Block Diagrams

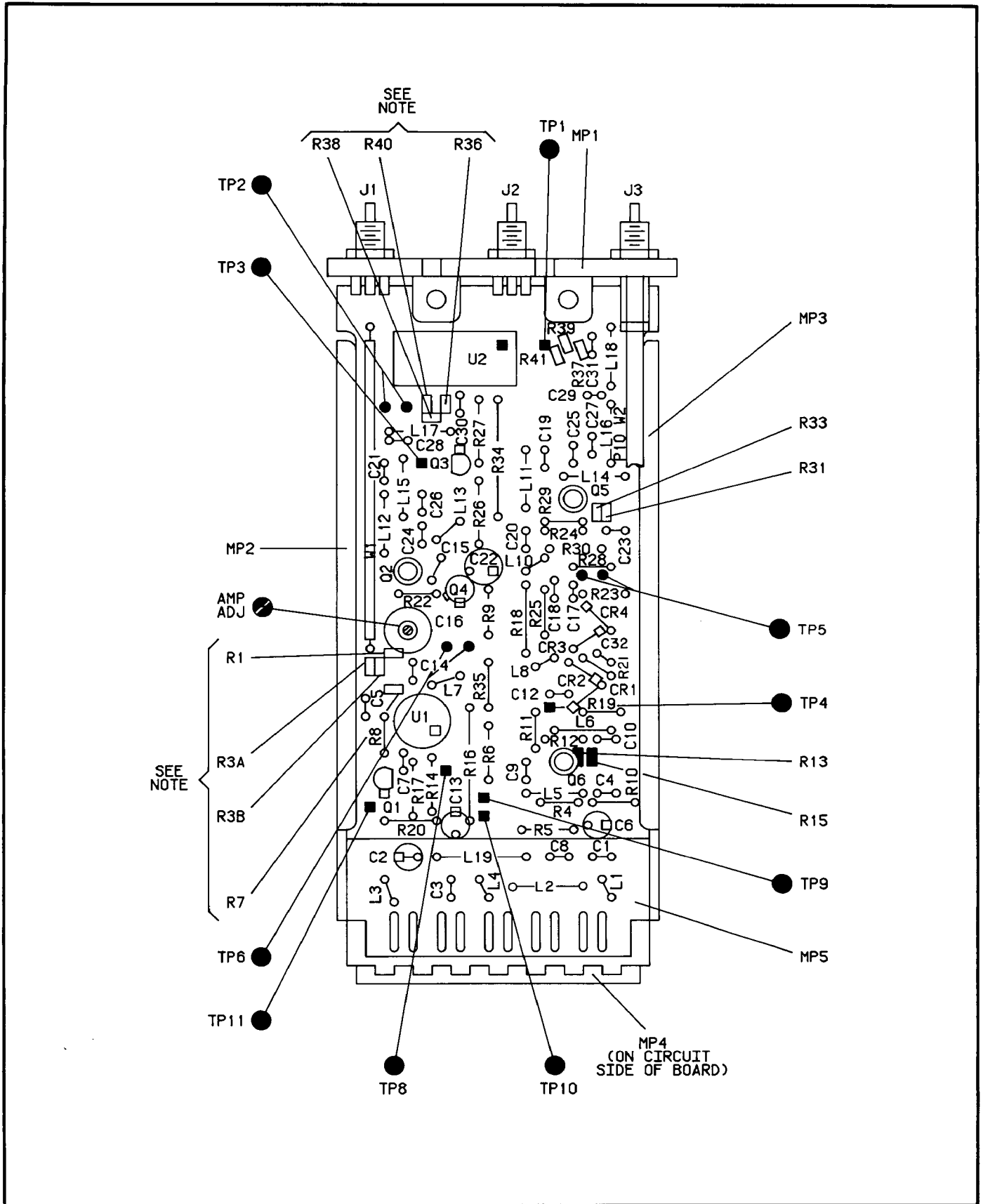


Figure 8-508. A12A5 LF Down Converter Component Locator



## CHANGES

**All serial prefixes**

On the A12A5 schematic:

- A12A5R42 - Delete R42.

**2333A and Above**

On the A12A5 schematic:

- A12A5J3 - In the middle of the left side of the schematic, above A12A5J3, change the label to read, "Input 520 MHz (-1 dBm  $\pm$  7.5 dBm)".



**SERVICE SHEET 30**  
**A12A3 LOW FREQUENCY AMPLIFIER**

**REFERENCE BLOCK DIAGRAM 6**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION**

**General**

The low level (-16 dBm typical) 0.1 to 120 MHz output from the Low Frequency Down Converter (service sheet 29) is pre-amplified by the Low Frequency Amplifier before it is sent to the final output amplifiers.

**Low-Pass Input Filter**

The signal from the Low Frequency Down Converter enters the Low Frequency Amplifier at J1. Here, the mixer sum frequency signal is terminated by a 50 ohm load so that it will not reflect back into the mixer. The desired difference frequency is passed through 120 MHz and 140 MHz low-pass filters, preventing any RF or LO signals from entering the amplifier.

**Amplifier Section**

The two feedback amplifiers formed by Q1 and Q3 are low in noise. The amplifier formed by Q1 has a gain of approximately 13 dB. Buffer amplifier Q2 minimizes loading of Q1 and matches impedance to the next stage. The signal level at the output of this buffer is -3 dBm. The second feedback amplifier (formed by Q3) provides 7 dB of gain and has an output signal level of about +4 dBm.

**Switchable Attenuators**

The switchable attenuators following Q3 control the output signal level. The attenuators attenuate at 2 dB, 4 dB, and 8 dB so that any desired attenuation between 2 dB and 14 dB can be accomplished in 2 dB steps. These attenuators are switched in and out by the low frequency amplifier level-control lines, which come from the DCU. The output of the Low Frequency Amplifier Board is sent to the Multiplexer and Power Amp Board (service sheets 34 and 35).

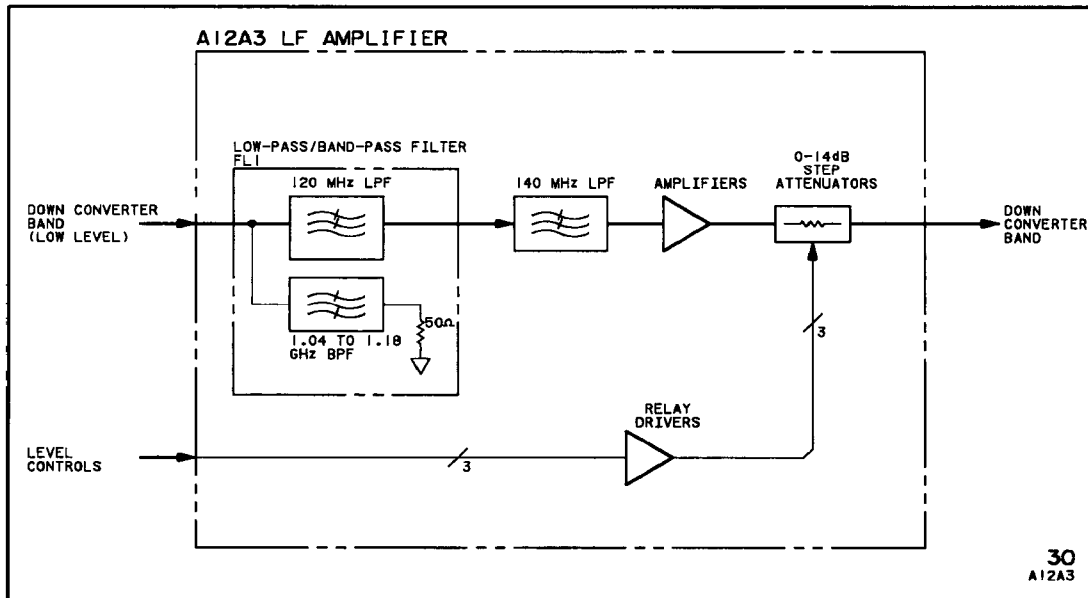
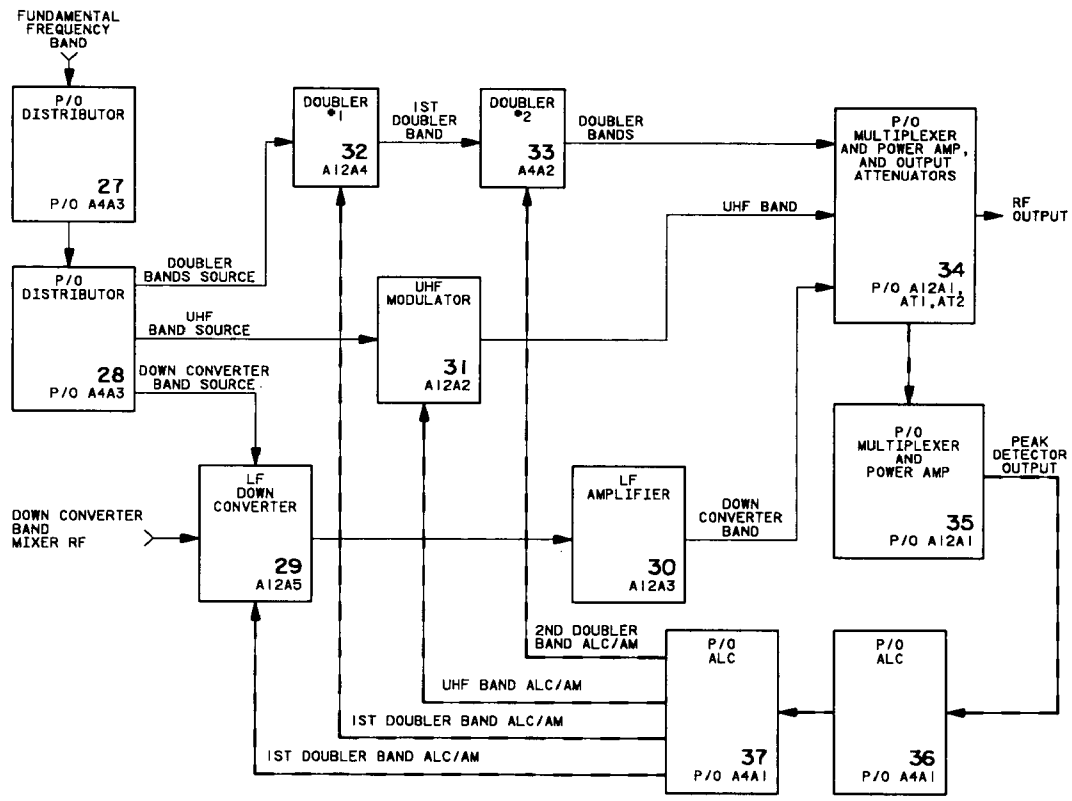


Figure 8-510. A12A3 LF Amplifier Block Diagrams

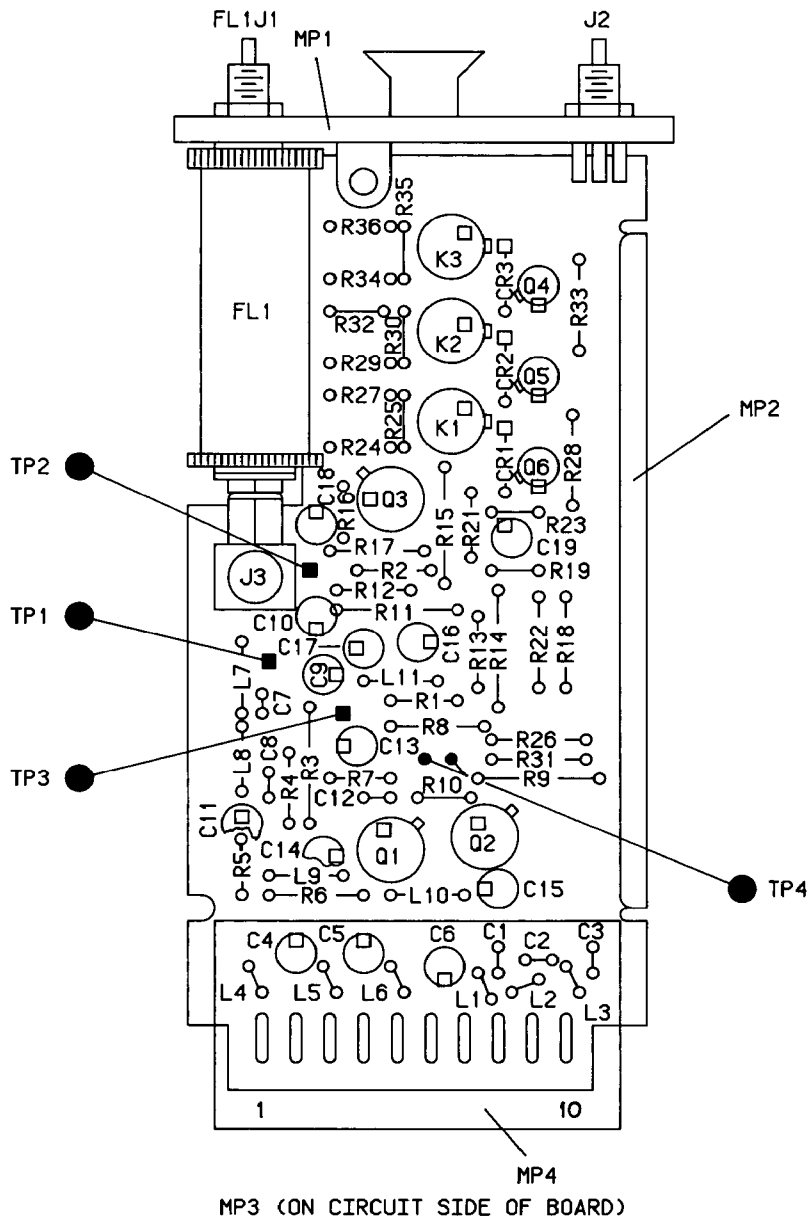


Figure 8-511. A12A3 LF Amplifier Component Locator

**CHANGES****All serial prefixes**

On the A12A3 schematic:

- A12A3L4, L6 - Change the value of L4 and L6 to 630u.

**2339A and Above**

On the A12A3 schematic:

- A12A3C20 - On the right side of the schematic, add C20 (22p) from the node of R35 and K3A pin 2, to ground.
- A12A3L9 - Change the value of L9 to 0.39u.
- A12A3R19\*, R23\* - Change the value of R19\* and R23\* to 464 ohms.
- A12A3R21\* - Change the value of R21\* to 12.1 ohms.
- A12A3R24, R27 - Change the value of R24 and R27 to 383 ohms.
- A12A3R29, R32 - Change the value of R29 and R32 to 215 ohms.
- A12A3R30 - Change the value of R30 to 26.1 ohms.
- A12A3R34, R36 - Change the value of R34 and R36 to 110 ohms.



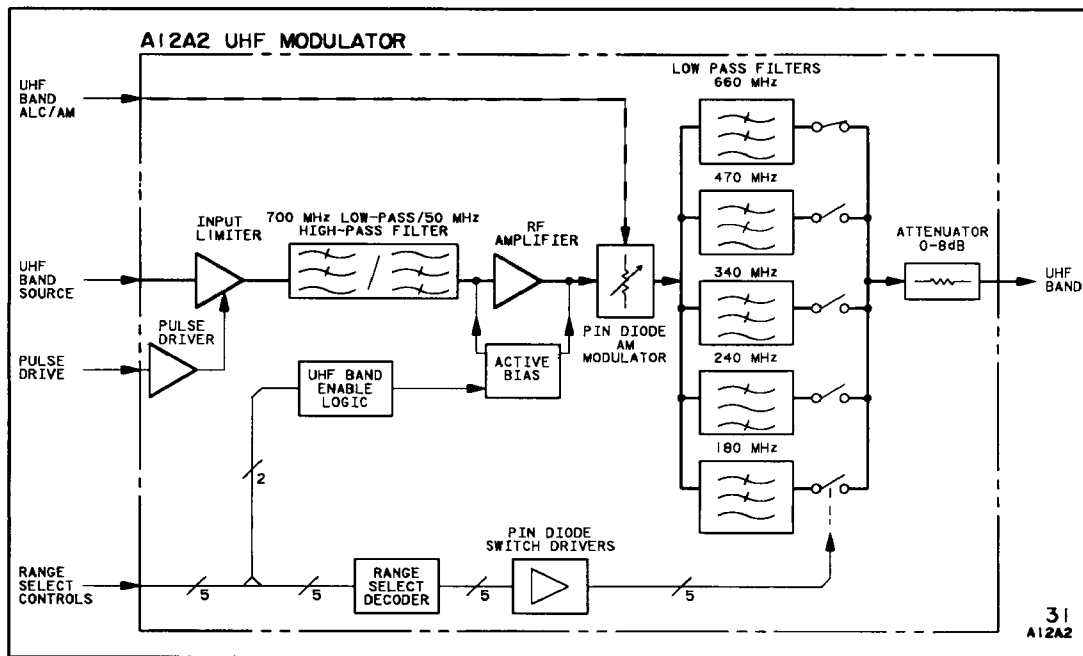
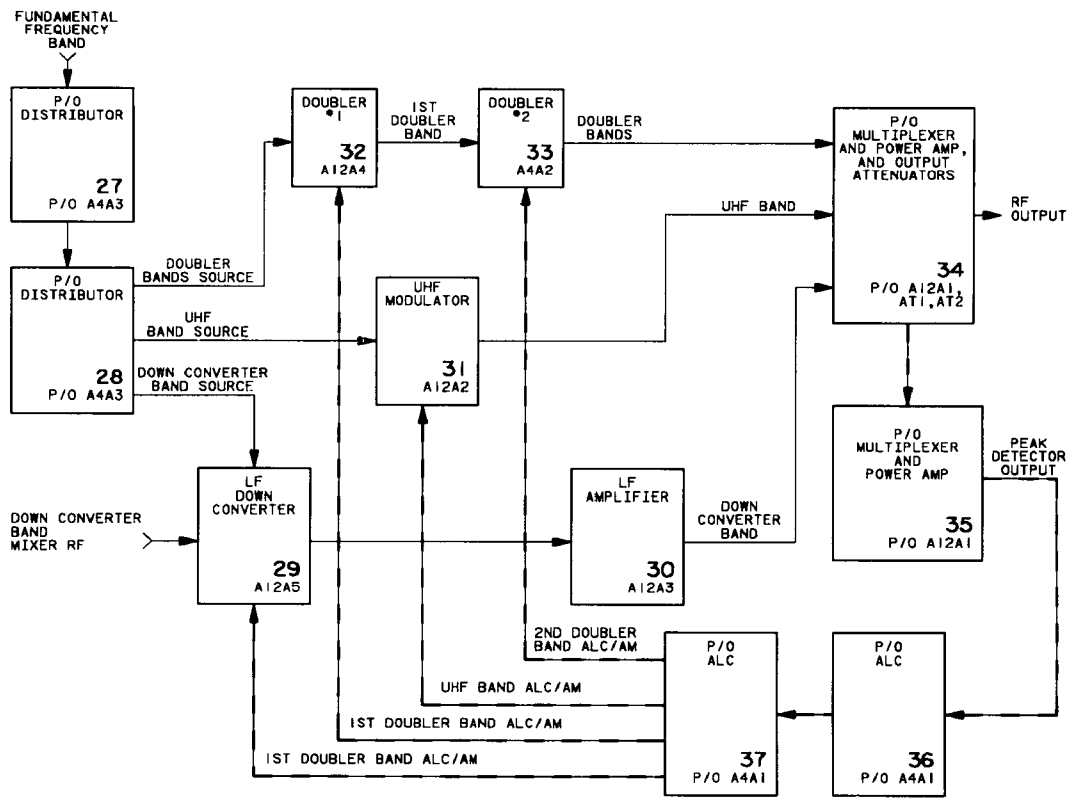


Figure 8-513. A12A2 UHF Modulator Block Diagrams



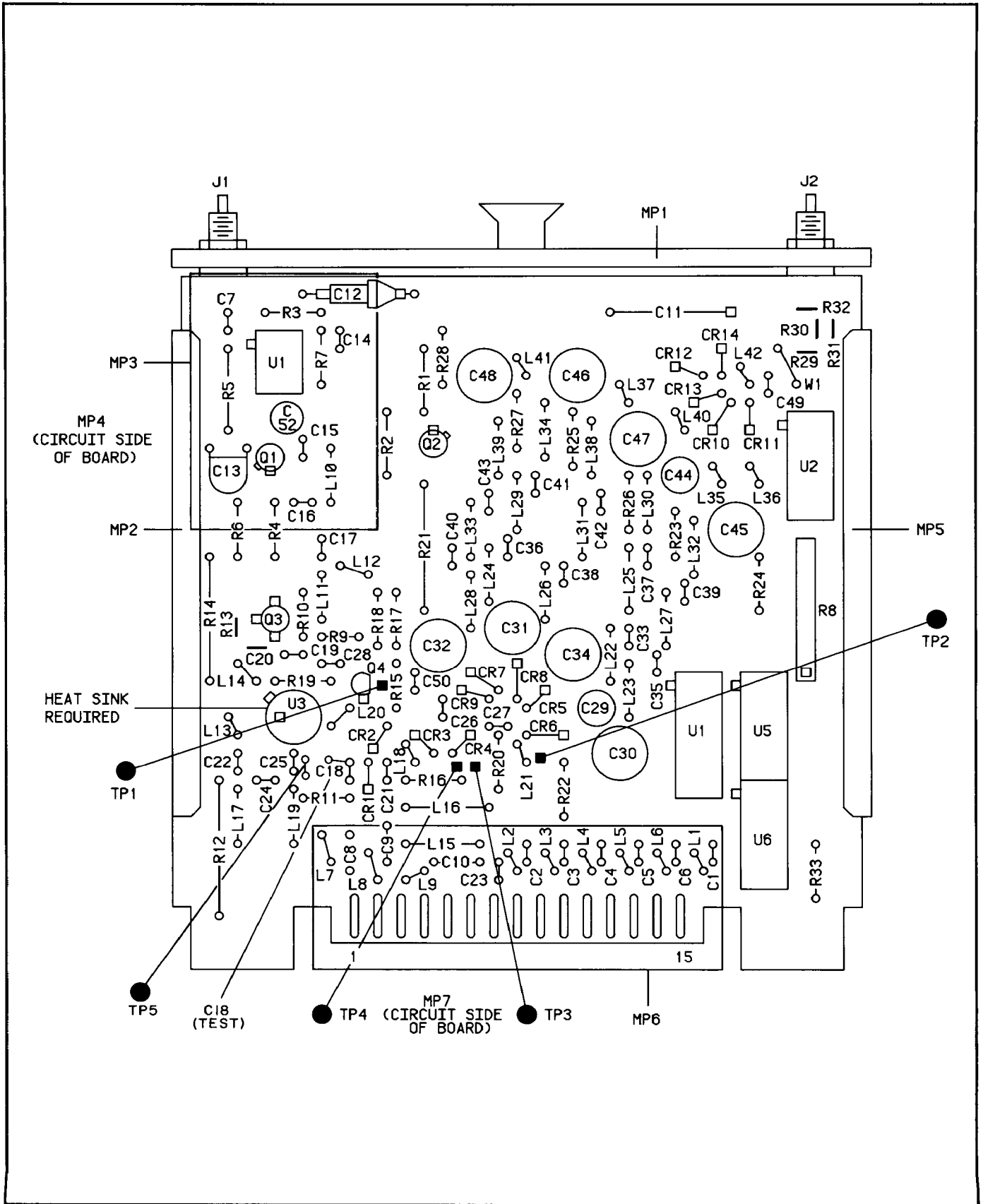


Figure 8-514. A12A2 UHF Modulator Component Locator

## CHANGES

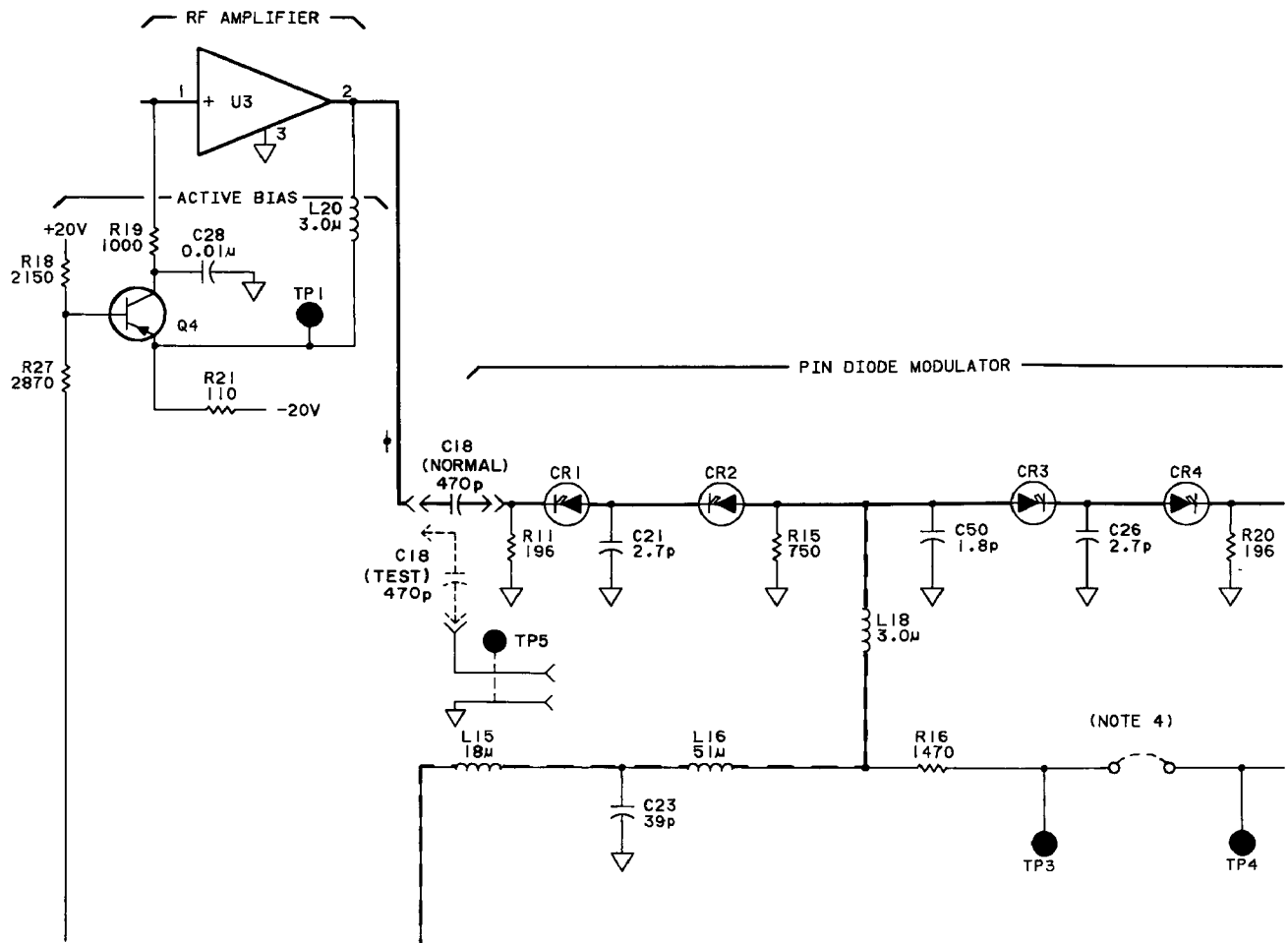
### All serial prefixes

On the A12A2 schematic:

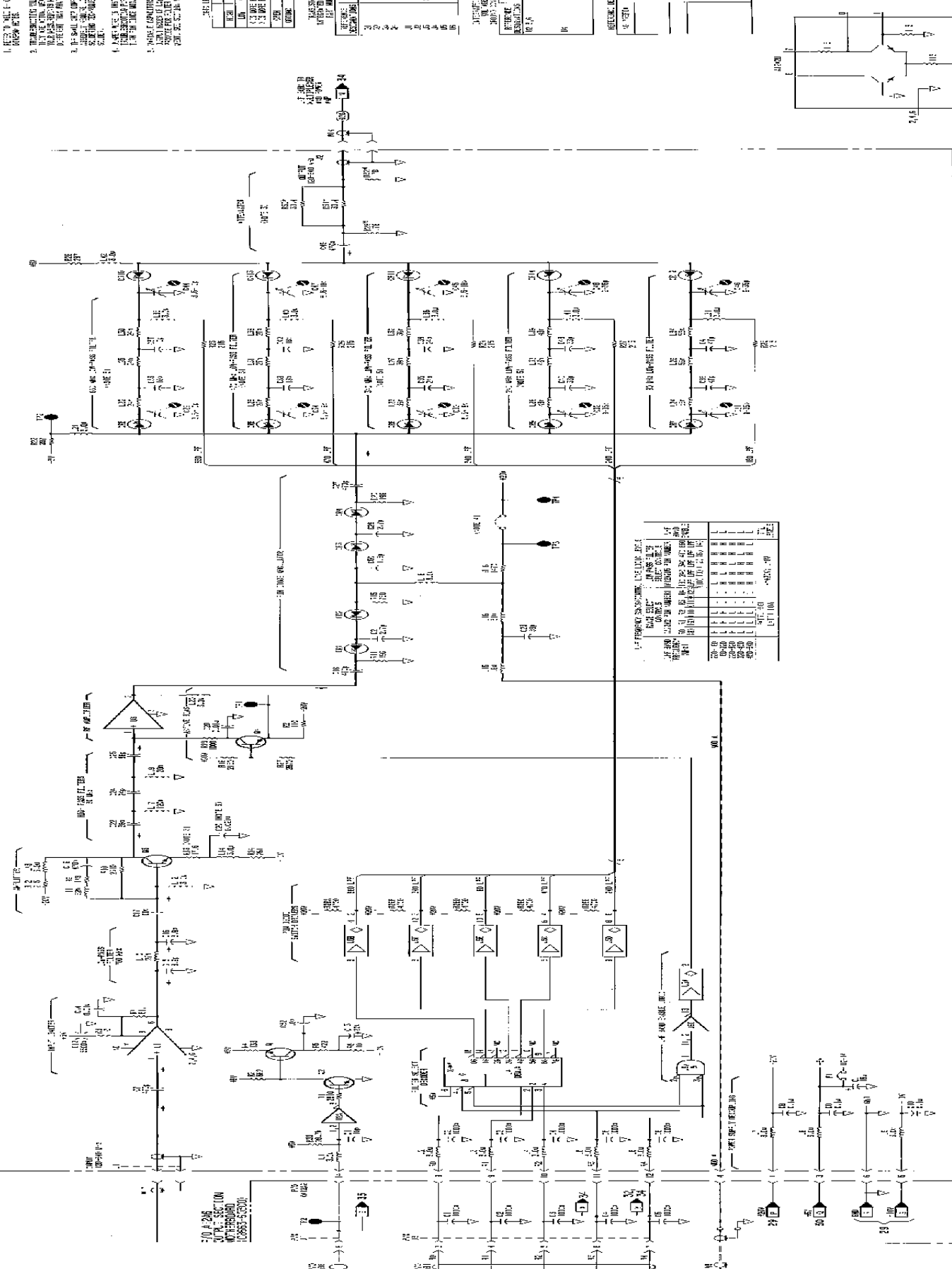
- A12A2 - Modify the schematic as shown in the partial schematic "P/O Figure 8-515. UHF Modulator Schematic" on page 8-522.3.
- A12A2C51 - Delete C51.
- A12A2R16 - Change the value of R16 to 3.16k.
- A12A2R18 - Change the value of R18 to 1.1k.
- A12A2R27 (R17) - There are two resistors labeled R27. Change the label of the R27 resistor connected to the base of Q4 to R17 and change its value to 1.47k.
- A12A2L11, R9, R11 - Add an asterisk (\*) to L11, R9, and R11, to indicate factory selected components.
- A12A2L11\*, R9\*, R11\* - Add "(NOTE 6)" next to the reference designators R9, L11, and R11.

On the schematic:

- NOTES - Add note 6 as follows:
  6. These factory selected components are connected to circuit by sockets.



P/O Figure 8-515. A12A2 UHF Modulator Schematic



NO.	DESCRIPTION	QTY.	UNIT
1	RELAY	1	PCB
2	SWITCH	1	PCB
3	LAMP	1	PCB
4	MOTOR	1	PCB
5	WIRE	1	PCB
6	TERMINAL	1	PCB
7	CONNECTOR	1	PCB
8	PLATE	1	PCB
9	SCREW	1	PCB
10	WASHER	1	PCB
11	SPACER	1	PCB
12	INSULATOR	1	PCB
13	BRACKET	1	PCB
14	FLANGE	1	PCB
15	WASHER	1	PCB
16	SCREW	1	PCB
17	WASHER	1	PCB
18	SCREW	1	PCB
19	WASHER	1	PCB
20	SCREW	1	PCB
21	WASHER	1	PCB
22	SCREW	1	PCB
23	WASHER	1	PCB
24	SCREW	1	PCB
25	WASHER	1	PCB
26	SCREW	1	PCB
27	WASHER	1	PCB
28	SCREW	1	PCB
29	WASHER	1	PCB
30	SCREW	1	PCB
31	WASHER	1	PCB
32	SCREW	1	PCB
33	WASHER	1	PCB
34	SCREW	1	PCB
35	WASHER	1	PCB
36	SCREW	1	PCB
37	WASHER	1	PCB
38	SCREW	1	PCB
39	WASHER	1	PCB
40	SCREW	1	PCB
41	WASHER	1	PCB
42	SCREW	1	PCB
43	WASHER	1	PCB
44	SCREW	1	PCB
45	WASHER	1	PCB
46	SCREW	1	PCB
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92	SCREW	1	PCB
93	WASHER	1	PCB
94	SCREW	1	PCB
95	WASHER	1	PCB
96	SCREW	1	PCB
97	WASHER	1	PCB
98	SCREW	1	PCB
99	WASHER	1	PCB
100	SCREW	1	PCB

NO.	DESCRIPTION	QTY.	UNIT
1	RELAY	1	PCB
2	SWITCH	1	PCB
3	LAMP	1	PCB
4	MOTOR	1	PCB
5	WIRE	1	PCB
6	TERMINAL	1	PCB
7	CONNECTOR	1	PCB
8	PLATE	1	PCB
9	SCREW	1	PCB
10	WASHER	1	PCB
11	SPACER	1	PCB
12	INSULATOR	1	PCB
13	BRACKET	1	PCB
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86	SCREW	1	PCB
87	WASHER	1	PCB
88	SCREW	1	PCB
89	WASHER	1	PCB
90	SCREW	1	PCB
91	WASHER	1	PCB
92	SCREW	1	PCB

**SERVICE SHEET 32  
A12A4 DOUBLER #1****REFERENCE BLOCK DIAGRAM 6**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION****General**

The Doubler #1 Board doubles the basic band frequency from the Distributor Board so that the 640 MHz to 1280 MHz frequency range can be generated.

**Doubler Filter Microcircuit (A12A4U2)**

The doubler band frequency enters the doubler filter (a microcircuit which is located on the A12A4 board) at J1. The input frequency is 320 MHz to 640 MHz (at +1.75 dBm) The signal is first amplified and then sent to the doubler. Following the doubler is a voltage-tuned filter. This is a bandpass filter made of varactor diodes in a back-to-back arrange (to minimize harmonic generation).

The last block in A12A4U2 is the final amplifier stage. The signal enters it from the voltage-tuned filter at 0 dBm and is amplified to +10 dBm. The output of this amplifier is sent to the modulator filter (A12A4U3) through a coaxial cable.

**Modulator Filter (A12A4U3)**

The output signal from J2 of A12A4U2 enters A12A4U3J1. The first stage in this microcircuit is the voltage-tuned filter. Following this is a pi-type PIN modulator. The PIN diodes behave as RF resistors. Their resistance is controlled by the amount of dc bias current flowing through them. The amount of control current used by the modulator varies from 0mA to 5mA. Following the modulator is another amplifier. The output from it is 640 MHz to 1280 MHz at +5 dBm maximum (depending on the modulator settings).

**ALC and Doubler Enable Circuitry**

The ALC circuitry controls the gain of the modulator in microcircuit A12A4U3 so that the Generator's RF output is constant. The ALC signal comes from the ALC board (service sheet 37) and enters the Doubler Assembly via pin 6. The doubler in microcircuit A12A4U2 is enabled by the Doubler #1 enable circuitry found on the Doubler #1 Board. The signals which control this circuit come from the DCU.

## Filter Tuning Circuitry

The tune voltages for the two voltage-tuned filters, one in the Doubler-Filter U2 and the other in the Modulator-Filter U3, are developed by the ROM U4 and the D/A Converter U5 working in conjunction with the Doubler-Filter Tracking Amplifier U1A and the Modulator-Filter Tracking Amplifier U1B.

Information for the automatic correction of the tuning curves for each of the voltage-tuned filters is stored in the ROM U4. This information is used to determine which frequencies will be passed or rejected by the two voltage-tuned filters. Each filter can be programmatically advanced in 2 MHz steps from 640 MHz to 1280 MHz. The actual frequency selection signals that address the data stored in ROM come from the DCU. The ROM output is enabled at the same time as the doubler in U2. Although the addresses that select the ROM outputs to the D/A Converter cannot be listed in a truth table. The ROM address lines can be incremented by placing the instrument in the sweep mode. Verification can be made by stepping the frequency in 2 MHz increments from 640 MHz to 1280 MHz while monitoring the doubler band output on a spectrum analyzer at J2. It should be noted that the frequency will still increment even if the filter is not working.



CAUTION

The output of J2 is at a dc level of about +12 Vdc. Some spectrum analyzers are dc coupled and cannot be connected directly to this output. If the input of the spectrum analyzer is dc coupled, a blocking capacitor adapter must be used in series with the input or damage will occur.

### NOTE

Any time either one or both of the microcircuits U2 or U3 are replaced, a new ROM U4 must also be replaced. Any non-linearities that exist within the two microcircuits are accounted for when the ROM is programmed. The data stored in the ROM is unique to the two microcircuits. Therefore, a new ROM must be programmed whenever either microcircuit is replaced.

Transistor Q3 forms a constant reference voltage source which can be adjusted by the DOUBLER-FILTER TRACKING HIGH pot R29. This source provides the voltage reference to the D/A Converter U5 which determines the maximum frequency pass band of the voltage-tuned filter in the Doubler-Filter U2. The ROM output is used by the D/A Converter to attenuate this reference voltage and produce a current which will track the tuning curves of the voltage-tuned filters.

This current is coupled to the input of the Doubler-Filter Tracking Amplifier U1A where it is converted into the tune voltage for the

voltage-tuned filter in the Doubler-Filter U2. The DOUBLER-FILTER TRACKING LOW pot R40 sets the lower limit for this tune voltage.

The tune voltage from the Doubler-Filter Tuning Amplifier U1A is also coupled to the input of the Modulator-Filter Tracking Amplifier U1B. The MODULATOR-FILTER TRACKING LOW pot R56 sets the lower limit for the tune voltage to the voltage-tuned filter in the Modulator-Filter U3, while the MODULATOR-FILTER TRACKING HIGH pot R58 sets the upper limit.

#### TROUBLESHOOTING

This assembly contains a unique ROM (U4) which is programmed at the factory to match the voltage-tuned filters in the two microcircuits. If the ROM or either microcircuit fails, the entire A12A4 Doubler #1 assembly must be replaced. A rebuilt assembly is available (see section VI, Replaceable Parts, for part number). All other parts can be replaced. It is more economical to replace components where possible.

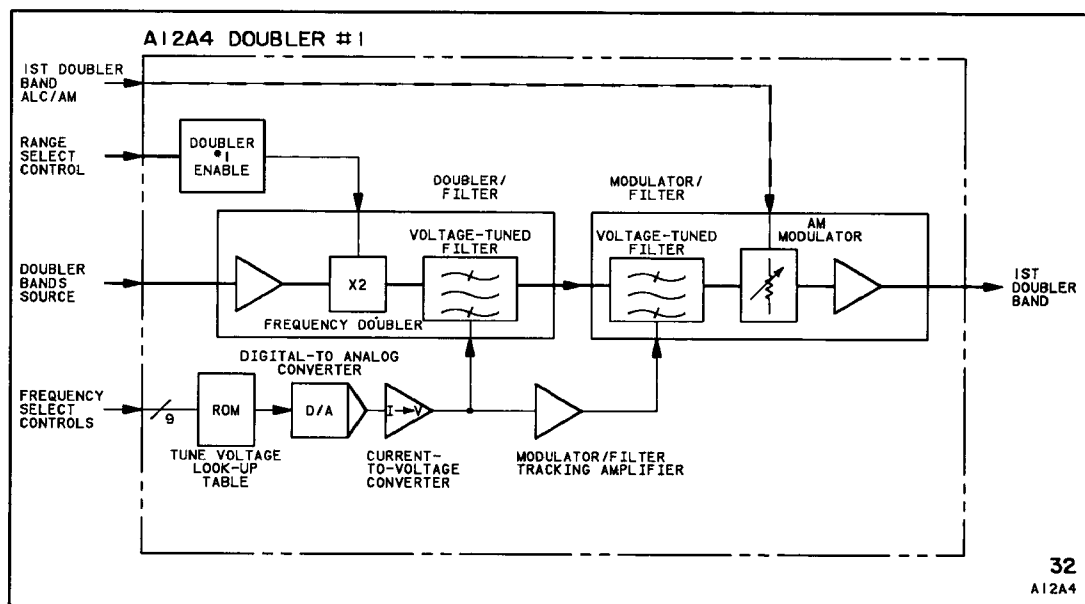
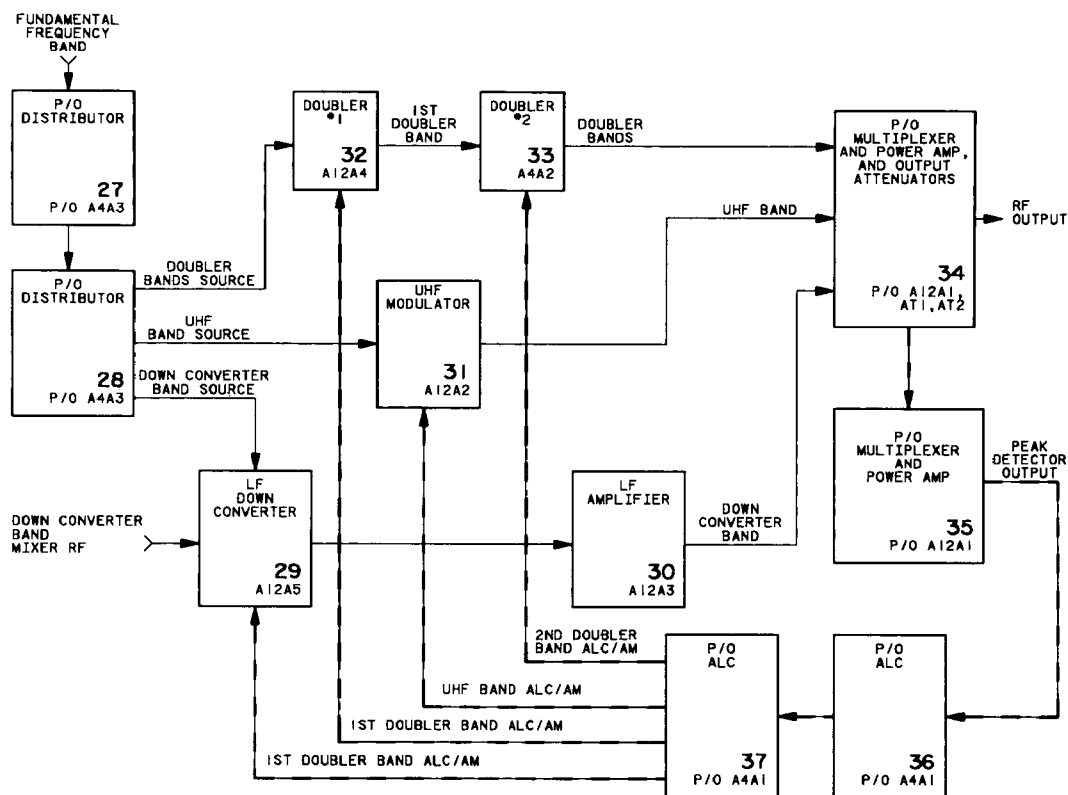


Figure 8-516. A12A4 Doublers #1 Block Diagrams



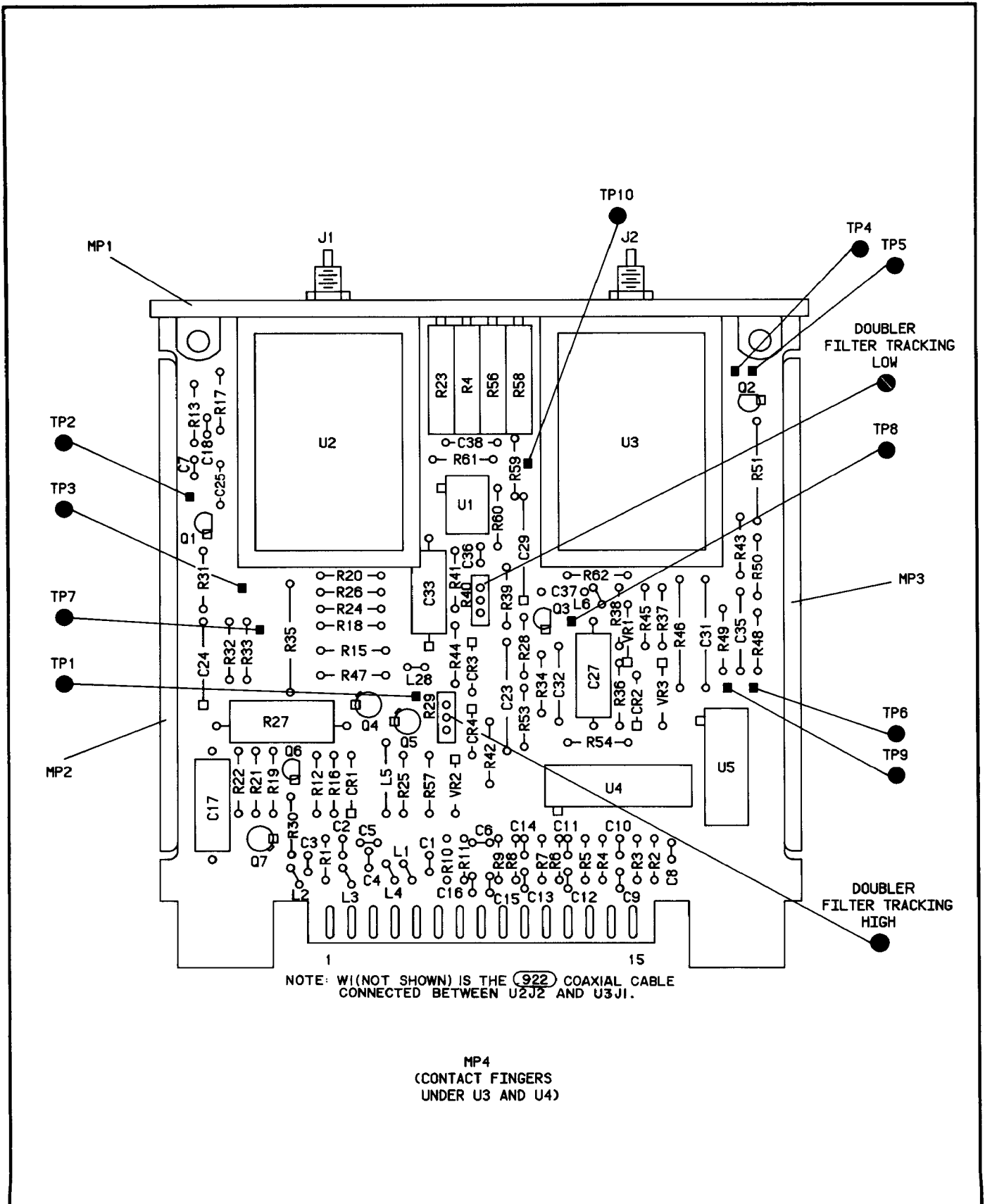


Figure 8-517. A12A4 Doubler #1 Component Locator

## CHANGES

**2824A and above**

On the schematic:

- A12A4R43 - In the upper right hand corner of the schematic locate R43 under **BIAS** and change its value to 4.22K.



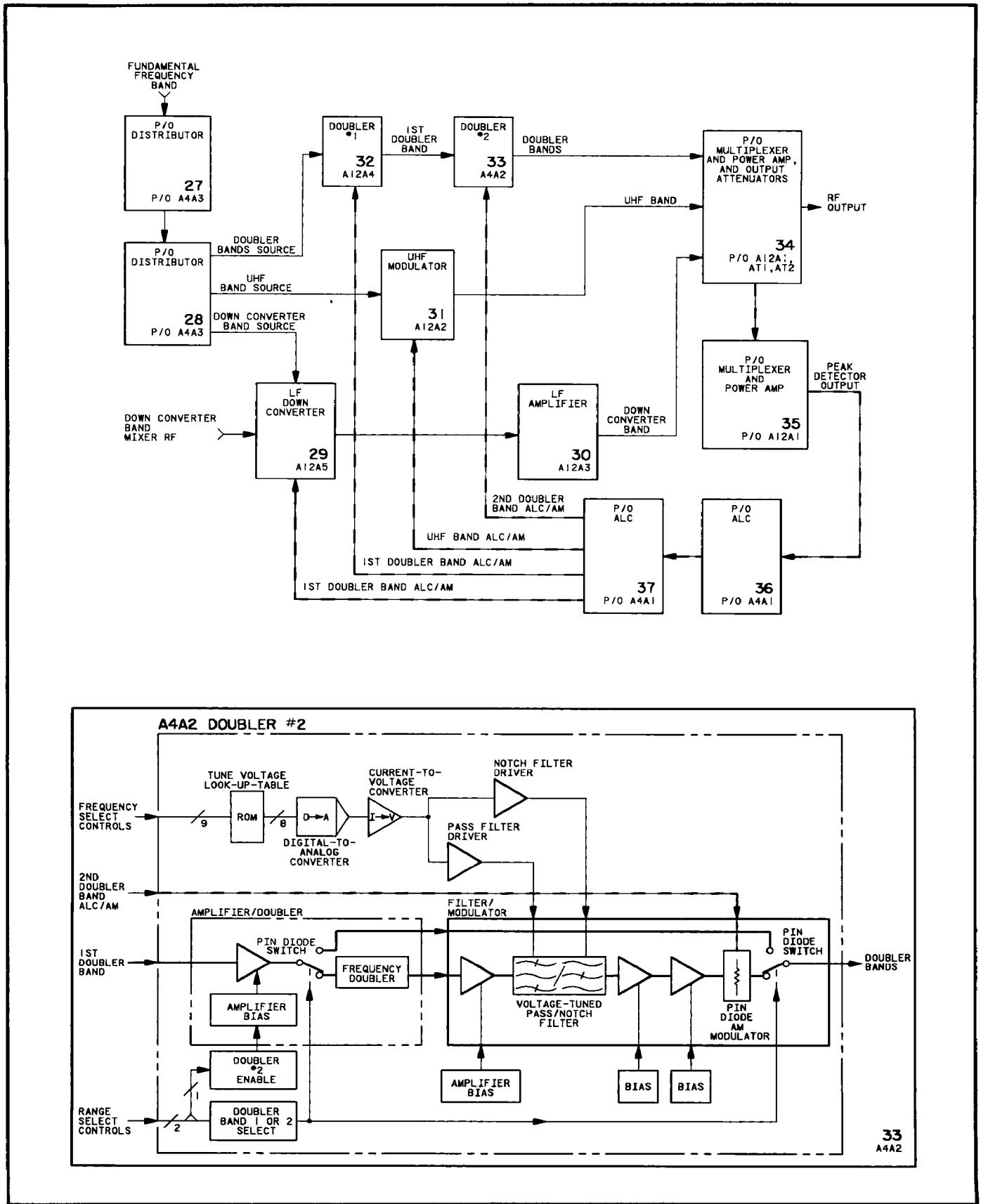


Figure 8-519. A4A2 Doubler #2 Block Diagrams

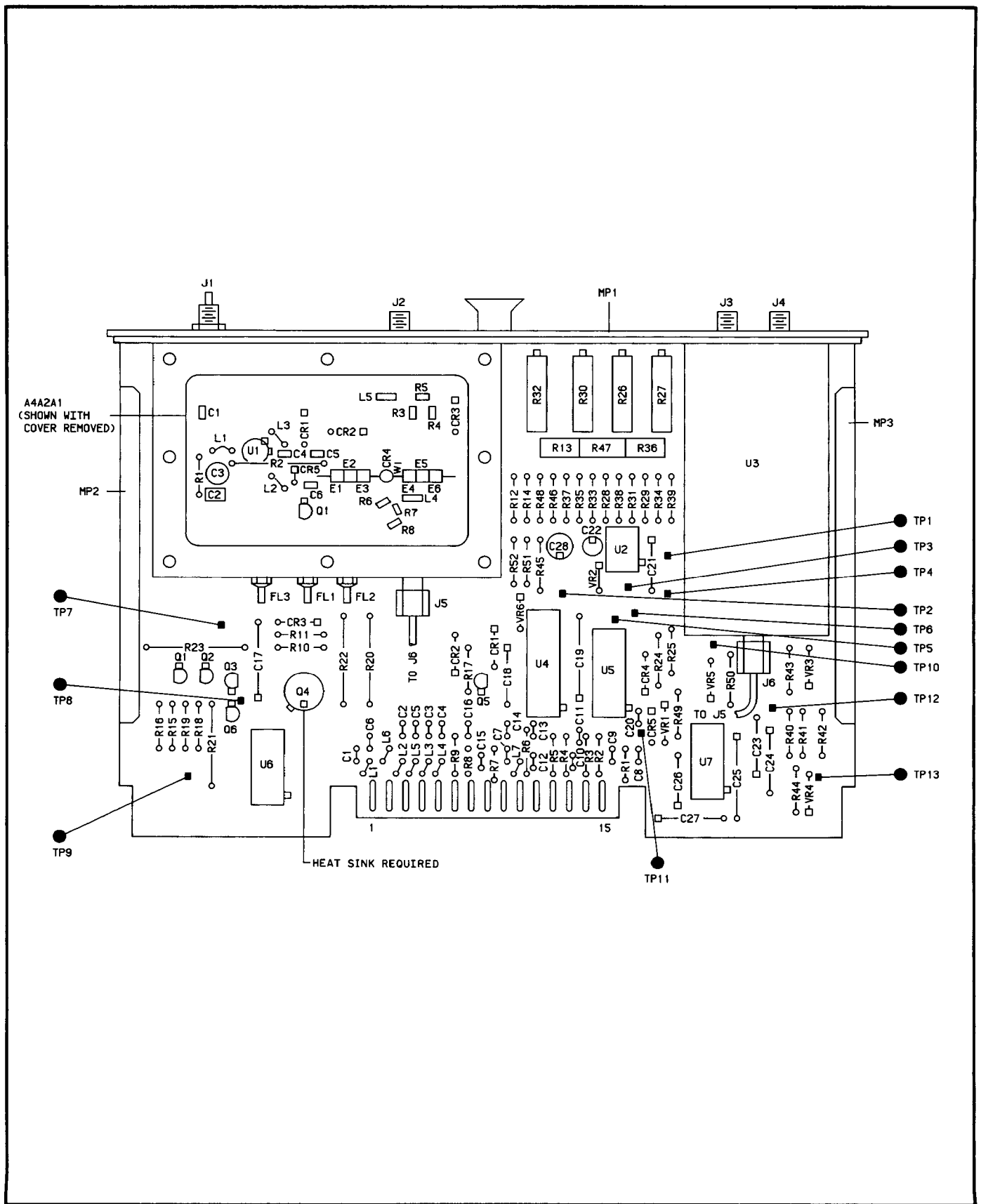


Figure 8-520. A4A2 Doupler #2 Component Locator

## CHANGES

### All serial prefixes

On the A4A2 schematic:

- A4A2U5 - In the table of Transistor and Integrated Circuit Part Numbers, change the part number of U5 to 1826-0921.
- W39 - Assign reference designator W39 to the coaxial cable connecting A4A2A1 FREQ X1 output to U3 640-1280 MHz input.
- W1 - Assign reference designator W1 to the coaxial cable connecting A4A3A1 FREQ X2 output to U3 1280-2560 MHz input.
- U3 - On U3 (AMP/FILT/MOD) locate *OUTPUT AMPLIFIER* and change U3 pin 2 signal path to U7D pin 12. Change U3 pin 9 signal path (FET gate) to U7D pin 14 (through R50).
- U7B - Under **DRIVER AMPLIFIER BIAS REGULATOR**, connect U7B pin 8 to the gate of the *U3 DRIVER AMPLIFIER* and connect U7B pin 3 to the drain of the *U3 DRIVER AMPLIFIER*.

### 2248A and above

On the A4A2 Component Locator:

- - Use the A4A2 component locator on page 8-534.3.

On the A4A2 schematic:

- - Change the part number of the A4A2 Assembly to 08663-60351.

### 2840A and above

On the A4A2 schematic:

- R26, R28, R33, R38 - In the center of the schematic under **PASS FILTER DRIVER**, locate and change the value of R26 to 20K, R28 to 13.3K, R33 to 42.2K, and, R38 to 17.8K.

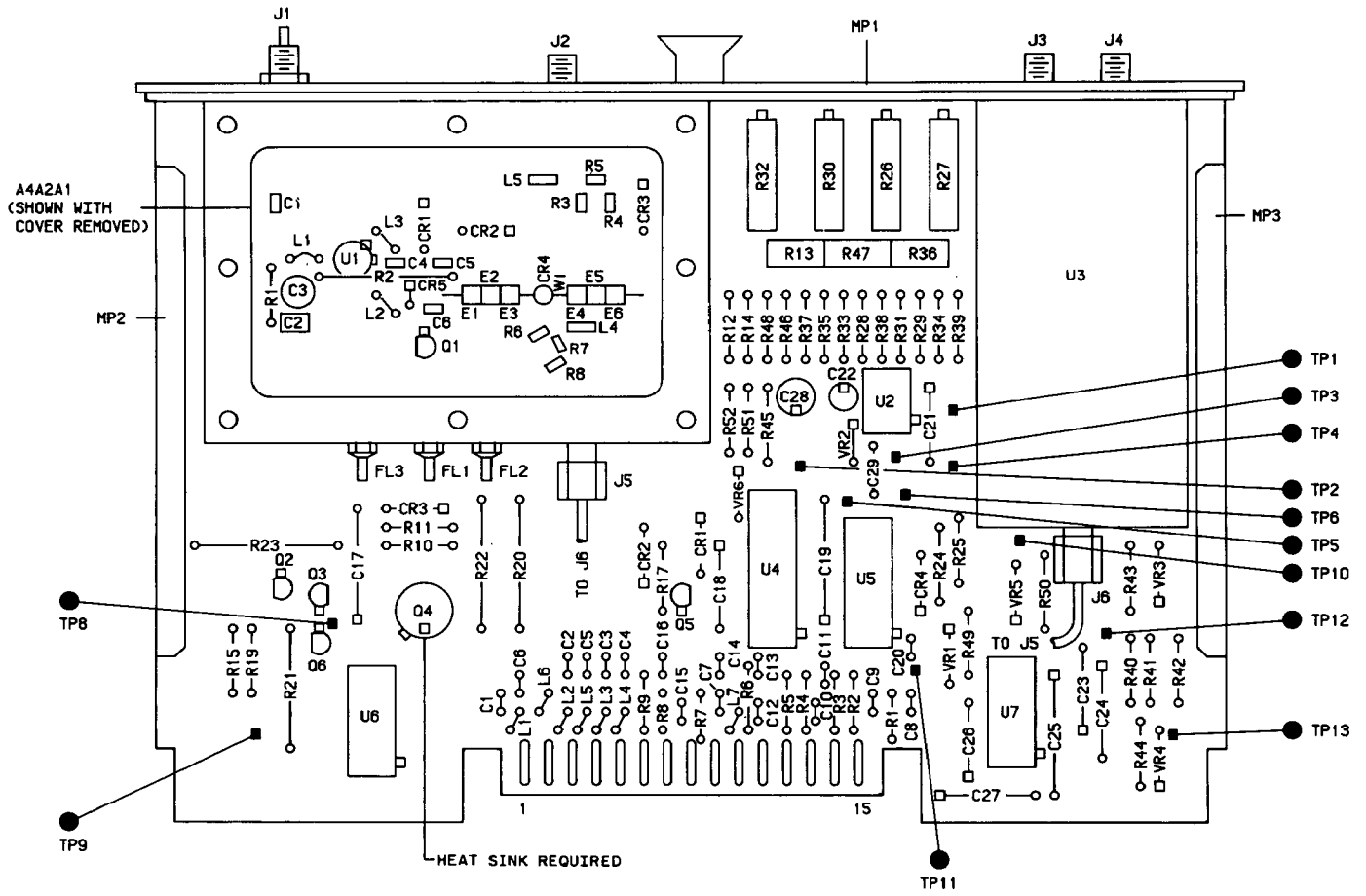


Figure 8-520. A4A2 Doupler #2 Component Locator (2248A)





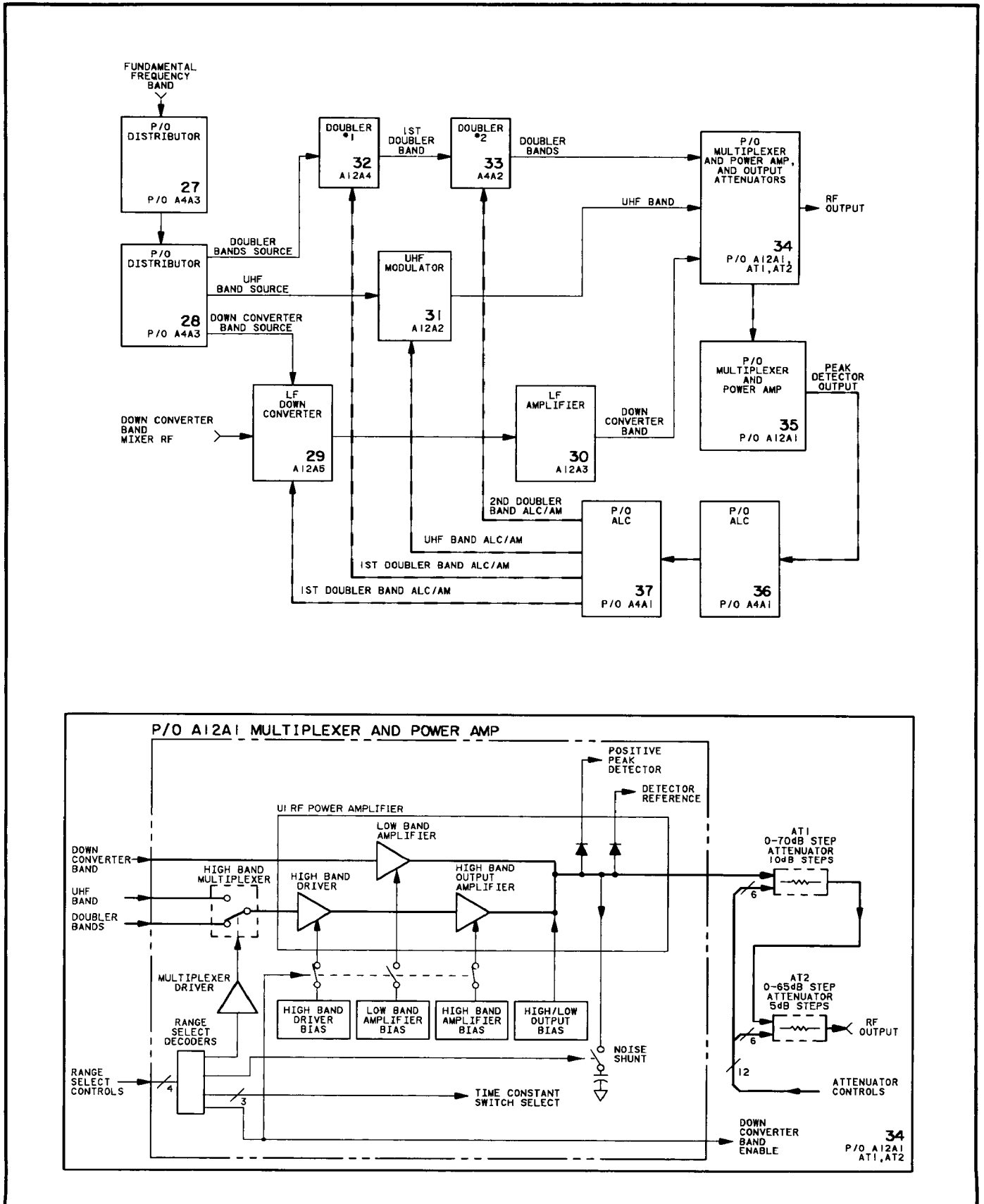


Figure 8-522. P/O A12A1 RF Multiplexer/Power Amplifier and Output Attenuators Block Diagrams

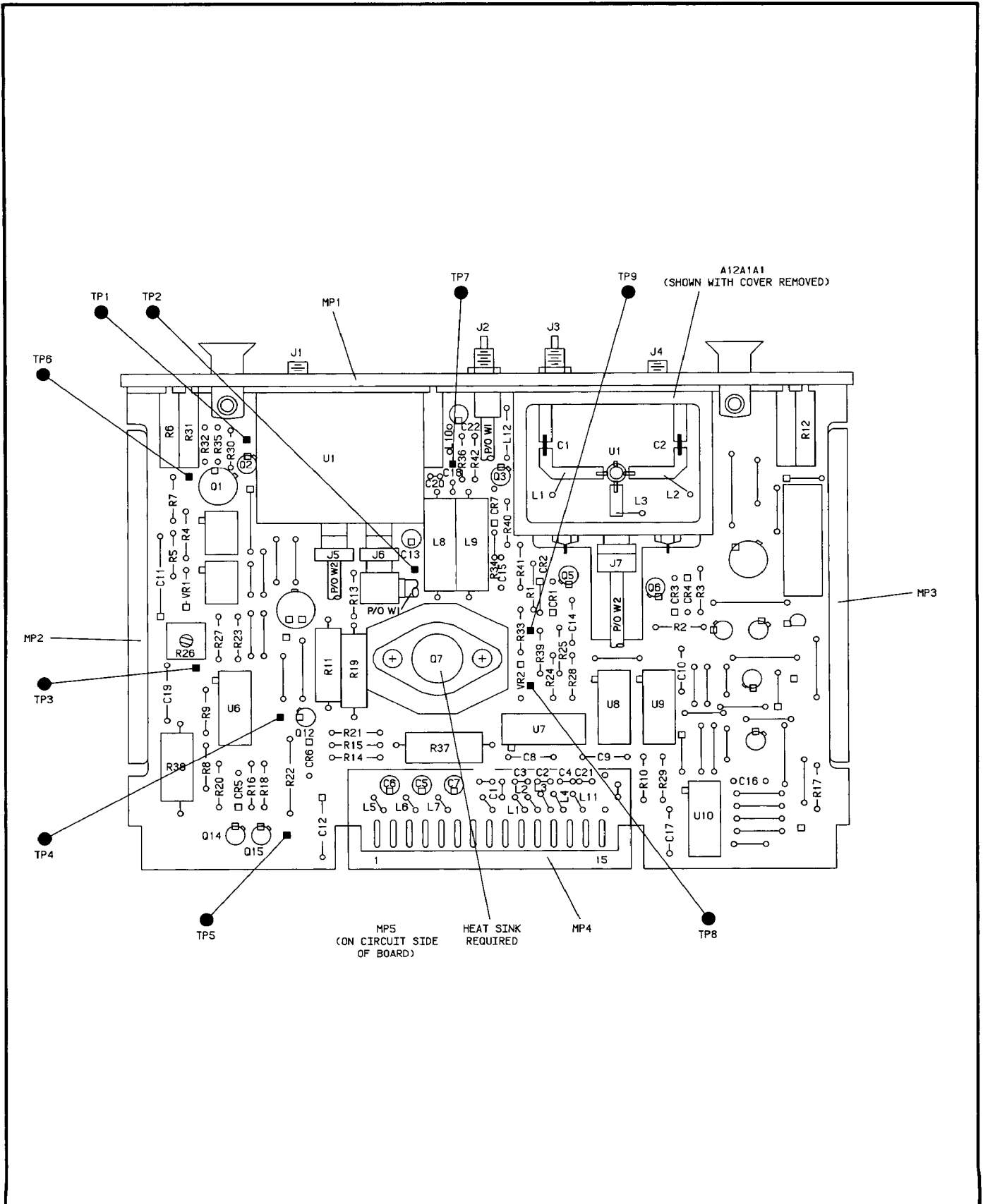


Figure 8-523. P/O A12A1 RF Multiplexer/Power Amplifier and Output Attenuators Component Locator

## CHANGES

### All serial prefixes

On the A12A1 schematic:

- A12A1E1-10 - Add E1-10, ferrite beads, to W7.
- A12A1L10 - Change the value of L10 to 3u.
- A12A1R41 - Change the value of R41 to 10k.

### 2451A and Above

On the A12A1 schematic:

- A12A1L7 - Change the value of L7 to 630u.



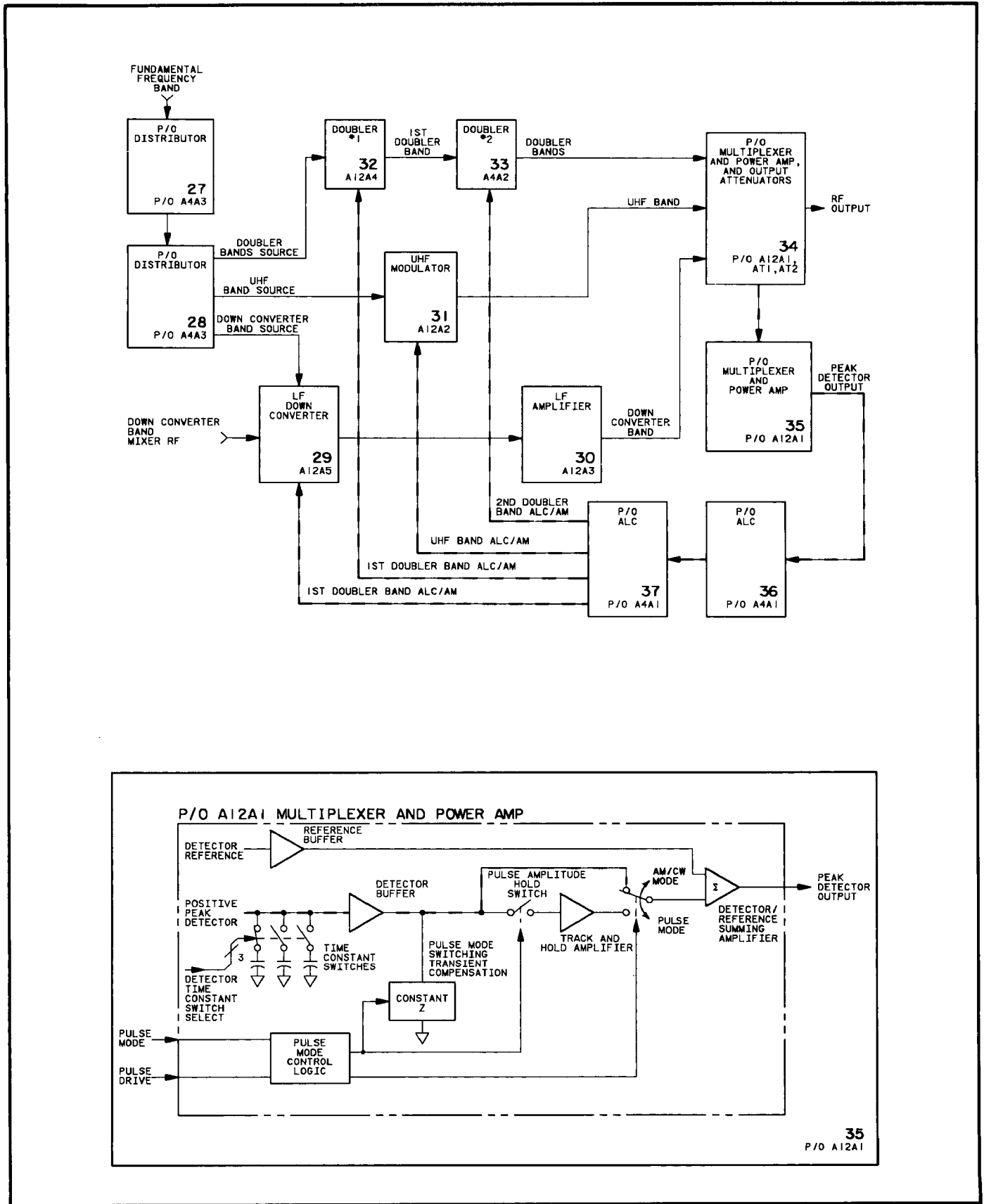


Figure 8-525. P/O A12A1 RF Multiplexer/Power Amplifier Block Diagrams

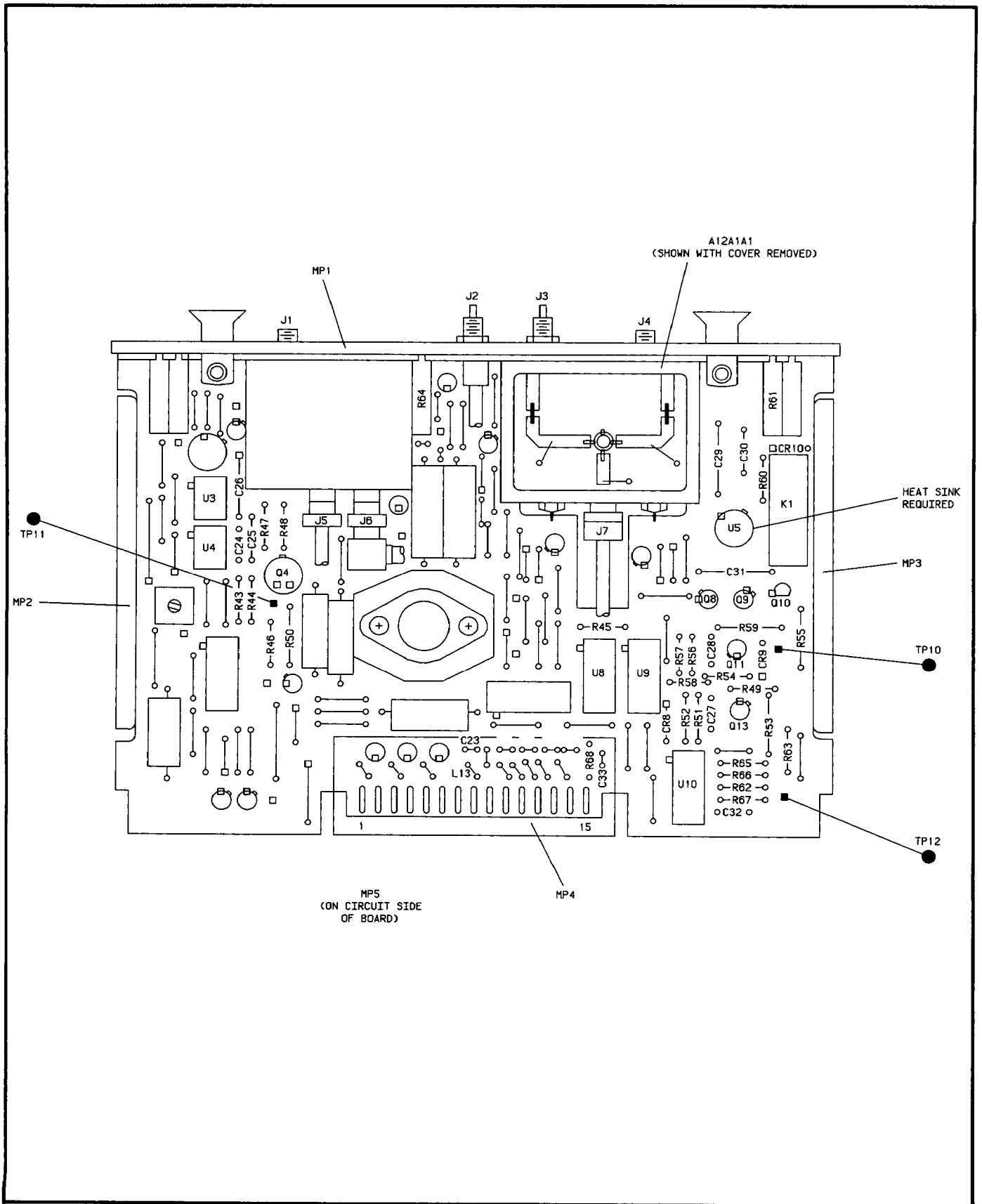


Figure 8-526. P/O A12A1 RF Multiplexer/Power Amplifier Component Locator

## CHANGES

### All serial prefixes

On the A12A1 schematic:

- A12A1C24, C25 - Change the value of C24 to 4700p. Change the value of C25 to 2200p.

### 2326A and Above

On the A12A1 schematic:

- A12A1R65 - Change the value of R65 to 464k.

### 2405A and Above

On the A12A1 component locator:

- A12A1C34 - In the bottom left corner of the A12A1 component locator, add C34 between R67 and C32.

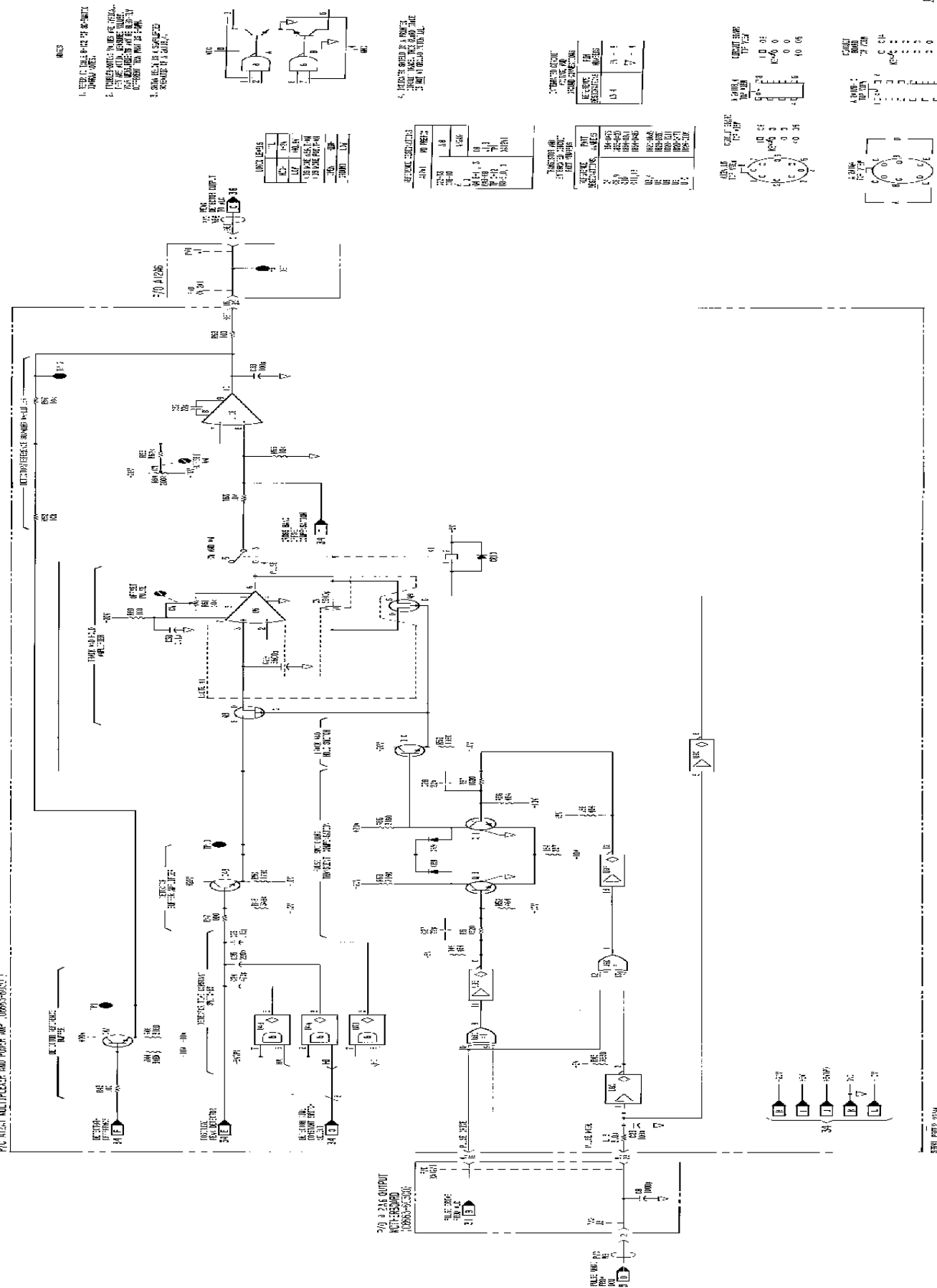
On the A12A1 schematic:

- A12A1C34 - In the top right corner of the schematic, in the circuitry labeled "DETECTOR/REFERENCE SUMMING AMPLIFIER", add C34 (100p) in parallel with R67.

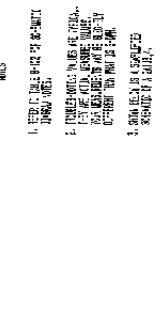
### 2601A and Above

On the schematic:

- A12A1Q4 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of Q4 to 1854-1046.



1. CHECK THE PHASE SEQUENCE OF THE AC INPUT.
2. CHECK THE PHASE SEQUENCE OF THE AC OUTPUT.
3. CHECK THE PHASE SEQUENCE OF THE AC INPUT AND OUTPUT.



REFLECTED CURRENTS

THYRISTOR	DIODE	INDUCTOR
T1	D1	L1
T2	D2	L2
T3	D3	L3
T4	D4	L4
T5	D5	L5
T6	D6	L6
T7	D7	L7
T8	D8	L8
T9	D9	L9
T10	D10	L10
T11	D11	L11
T12	D12	L12

REFLECTED CURRENTS

THYRISTOR	DIODE	INDUCTOR
T1	D1	L1
T2	D2	L2
T3	D3	L3
T4	D4	L4
T5	D5	L5
T6	D6	L6
T7	D7	L7
T8	D8	L8
T9	D9	L9
T10	D10	L10
T11	D11	L11
T12	D12	L12

REFLECTED CURRENTS

THYRISTOR	DIODE	INDUCTOR
T1	D1	L1
T2	D2	L2
T3	D3	L3
T4	D4	L4
T5	D5	L5
T6	D6	L6
T7	D7	L7
T8	D8	L8
T9	D9	L9
T10	D10	L10
T11	D11	L11
T12	D12	L12

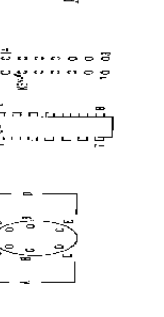
REFLECTED CURRENTS

THYRISTOR	DIODE	INDUCTOR
T1	D1	L1
T2	D2	L2
T3	D3	L3
T4	D4	L4
T5	D5	L5
T6	D6	L6
T7	D7	L7
T8	D8	L8
T9	D9	L9
T10	D10	L10
T11	D11	L11
T12	D12	L12



REFLECTED CURRENTS

THYRISTOR	DIODE	INDUCTOR
T1	D1	L1
T2	D2	L2
T3	D3	L3
T4	D4	L4
T5	D5	L5
T6	D6	L6
T7	D7	L7
T8	D8	L8
T9	D9	L9
T10	D10	L10
T11	D11	L11
T12	D12	L12





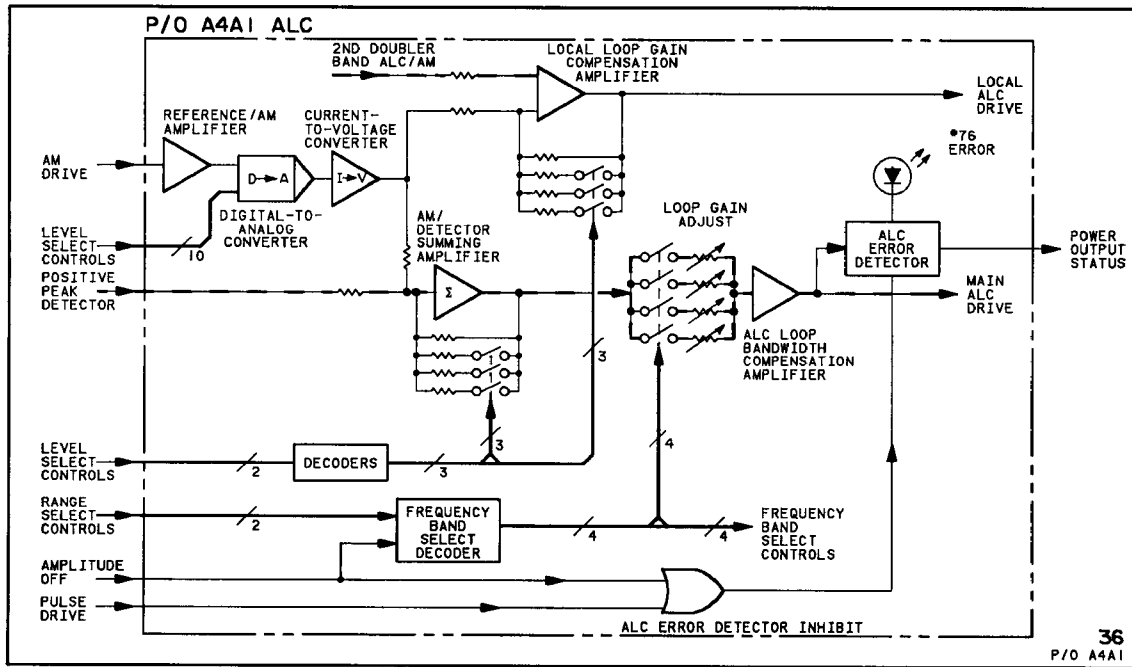
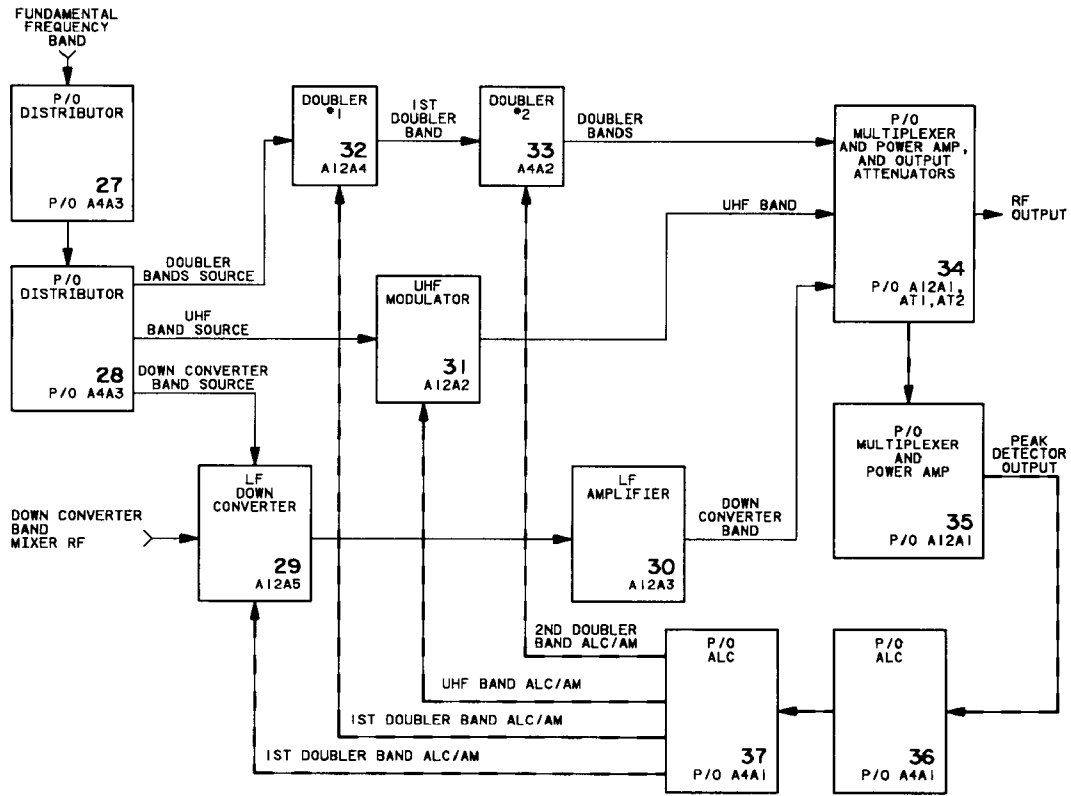


Figure 8-528. P/O A4A1 Automatic Level Control Block Diagrams

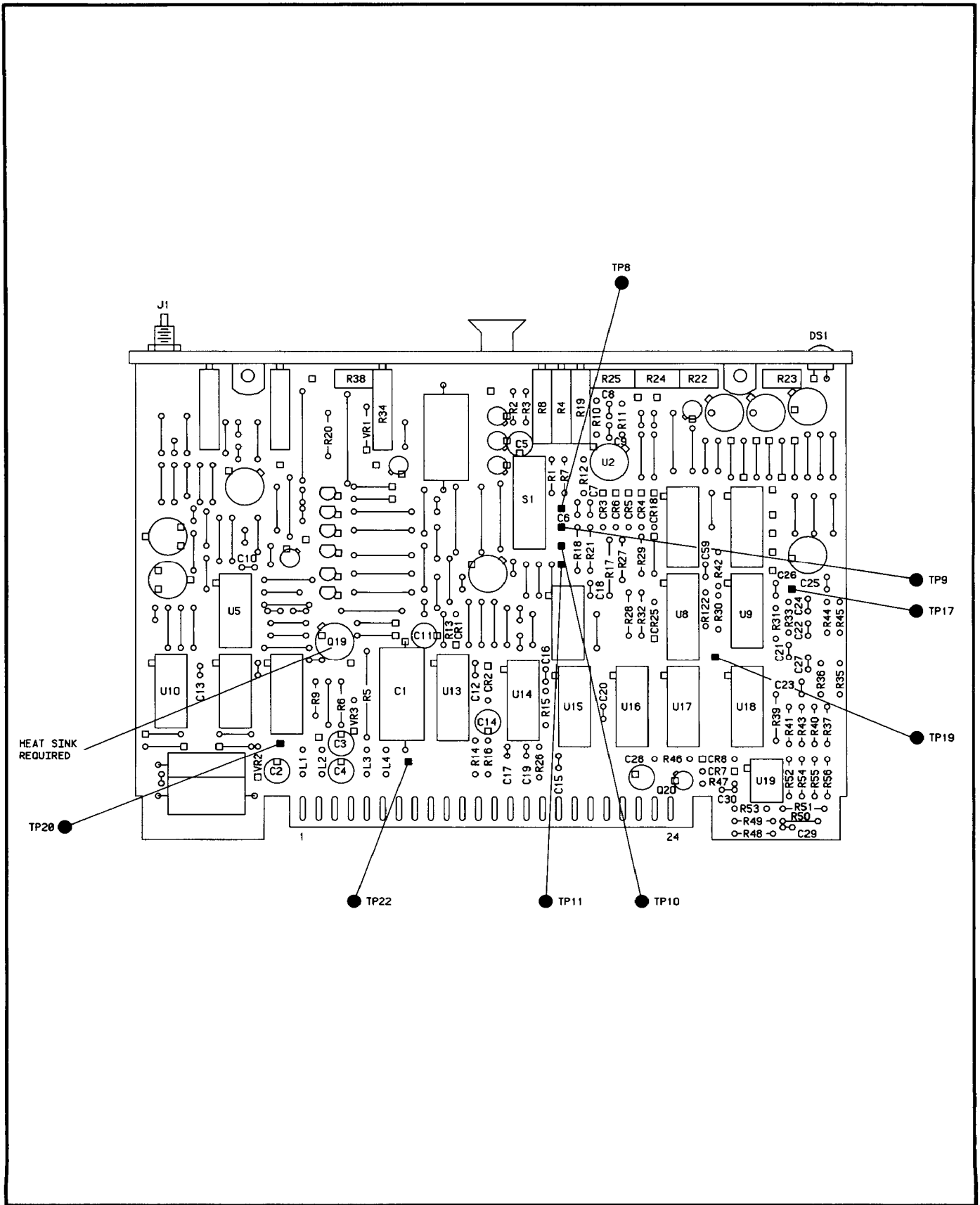


Figure 8-529. P/O A4A1 Automatic Level Control Component Locator

- NOTES
1. 所有電線均須按圖樣之顏色標記。
  2. 所有電線均須按圖樣之規格。
  3. 所有電線均須按圖樣之長度。
  4. 所有電線均須按圖樣之佈局。

RESISTOR VALUES

RESISTOR	VALUE
R1	100K
R2	100K
R3	100K
R4	100K
R5	100K
R6	100K
R7	100K
R8	100K
R9	100K
R10	100K
R11	100K
R12	100K
R13	100K
R14	100K
R15	100K
R16	100K
R17	100K
R18	100K
R19	100K
R20	100K
R21	100K
R22	100K
R23	100K
R24	100K
R25	100K
R26	100K
R27	100K
R28	100K
R29	100K
R30	100K
R31	100K
R32	100K
R33	100K
R34	100K
R35	100K
R36	100K
R37	100K
R38	100K
R39	100K
R40	100K
R41	100K
R42	100K
R43	100K
R44	100K
R45	100K
R46	100K
R47	100K
R48	100K
R49	100K
R50	100K
R51	100K
R52	100K
R53	100K
R54	100K
R55	100K
R56	100K
R57	100K
R58	100K
R59	100K
R60	100K
R61	100K
R62	100K
R63	100K
R64	100K
R65	100K
R66	100K
R67	100K
R68	100K
R69	100K
R70	100K
R71	100K
R72	100K
R73	100K
R74	100K
R75	100K
R76	100K
R77	100K
R78	100K
R79	100K
R80	100K
R81	100K
R82	100K
R83	100K
R84	100K
R85	100K
R86	100K
R87	100K
R88	100K
R89	100K
R90	100K
R91	100K
R92	100K
R93	100K
R94	100K
R95	100K
R96	100K
R97	100K
R98	100K
R99	100K
R100	100K

INDUCTOR VALUES

INDUCTOR	VALUE
L1	100UH
L2	100UH
L3	100UH
L4	100UH
L5	100UH
L6	100UH
L7	100UH
L8	100UH
L9	100UH
L10	100UH
L11	100UH
L12	100UH
L13	100UH
L14	100UH
L15	100UH
L16	100UH
L17	100UH
L18	100UH
L19	100UH
L20	100UH
L21	100UH
L22	100UH
L23	100UH
L24	100UH
L25	100UH
L26	100UH
L27	100UH
L28	100UH
L29	100UH
L30	100UH
L31	100UH
L32	100UH
L33	100UH
L34	100UH
L35	100UH
L36	100UH
L37	100UH
L38	100UH
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L40	100UH
L41	100UH
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L44	100UH
L45	100UH
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L67	100UH
L68	100UH
L69	100UH
L70	100UH
L71	100UH
L72	100UH
L73	100UH
L74	100UH
L75	100UH
L76	100UH
L77	100UH
L78	100UH
L79	100UH
L80	100UH
L81	100UH
L82	100UH
L83	100UH
L84	100UH
L85	100UH
L86	100UH
L87	100UH
L88	100UH
L89	100UH
L90	100UH
L91	100UH
L92	100UH
L93	100UH
L94	100UH
L95	100UH
L96	100UH
L97	100UH
L98	100UH
L99	100UH
L100	100UH

DIODE VALUES

DIODE	VALUE
D1	1N4001
D2	1N4001
D3	1N4001
D4	1N4001
D5	1N4001
D6	1N4001
D7	1N4001
D8	1N4001
D9	1N4001
D10	1N4001
D11	1N4001
D12	1N4001
D13	1N4001
D14	1N4001
D15	1N4001
D16	1N4001
D17	1N4001
D18	1N4001
D19	1N4001
D20	1N4001
D21	1N4001
D22	1N4001
D23	1N4001
D24	1N4001
D25	1N4001
D26	1N4001
D27	1N4001
D28	1N4001
D29	1N4001
D30	1N4001
D31	1N4001
D32	1N4001
D33	1N4001
D34	1N4001
D35	1N4001
D36	1N4001
D37	1N4001
D38	1N4001
D39	1N4001
D40	1N4001
D41	1N4001
D42	1N4001
D43	1N4001
D44	1N4001
D45	1N4001
D46	1N4001
D47	1N4001
D48	1N4001
D49	1N4001
D50	1N4001
D51	1N4001
D52	1N4001
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D56	1N4001
D57	1N4001
D58	1N4001
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D60	1N4001
D61	1N4001
D62	1N4001
D63	1N4001
D64	1N4001
D65	1N4001
D66	1N4001
D67	1N4001
D68	1N4001
D69	1N4001
D70	1N4001
D71	1N4001
D72	1N4001
D73	1N4001
D74	1N4001
D75	1N4001
D76	1N4001
D77	1N4001
D78	1N4001
D79	1N4001
D80	1N4001
D81	1N4001
D82	1N4001
D83	1N4001
D84	1N4001
D85	1N4001
D86	1N4001
D87	1N4001
D88	1N4001
D89	1N4001
D90	1N4001
D91	1N4001
D92	1N4001
D93	1N4001
D94	1N4001
D95	1N4001
D96	1N4001
D97	1N4001
D98	1N4001
D99	1N4001
D100	1N4001

TRANSISTOR VALUES

TRANSISTOR	VALUE
Q1	2N2222
Q2	2N2222
Q3	2N2222
Q4	2N2222
Q5	2N2222
Q6	2N2222
Q7	2N2222
Q8	2N2222
Q9	2N2222
Q10	2N2222
Q11	2N2222
Q12	2N2222
Q13	2N2222
Q14	2N2222
Q15	2N2222
Q16	2N2222
Q17	2N2222
Q18	2N2222
Q19	2N2222
Q20	2N2222
Q21	2N2222
Q22	2N2222
Q23	2N2222
Q24	2N2222
Q25	2N2222
Q26	2N2222
Q27	2N2222
Q28	2N2222
Q29	2N2222
Q30	2N2222
Q31	2N2222
Q32	2N2222
Q33	2N2222
Q34	2N2222
Q35	2N2222
Q36	2N2222
Q37	2N2222
Q38	2N2222
Q39	2N2222
Q40	2N2222
Q41	2N2222
Q42	2N2222
Q43	2N2222
Q44	2N2222
Q45	2N2222
Q46	2N2222
Q47	2N2222
Q48	2N2222
Q49	2N2222
Q50	2N2222
Q51	2N2222
Q52	2N2222
Q53	2N2222
Q54	2N2222
Q55	2N2222
Q56	2N2222
Q57	2N2222
Q58	2N2222
Q59	2N2222
Q60	2N2222
Q61	2N2222
Q62	2N2222
Q63	2N2222
Q64	2N2222
Q65	2N2222
Q66	2N2222
Q67	2N2222
Q68	2N2222
Q69	2N2222
Q70	2N2222
Q71	2N2222
Q72	2N2222
Q73	2N2222
Q74	2N2222
Q75	2N2222
Q76	2N2222
Q77	2N2222
Q78	2N2222
Q79	2N2222
Q80	2N2222
Q81	2N2222
Q82	2N2222
Q83	2N2222
Q84	2N2222
Q85	2N2222
Q86	2N2222
Q87	2N2222
Q88	2N2222
Q89	2N2222
Q90	2N2222
Q91	2N2222
Q92	2N2222
Q93	2N2222
Q94	2N2222
Q95	2N2222
Q96	2N2222
Q97	2N2222
Q98	2N2222
Q99	2N2222
Q100	2N2222

RELAY VALUES

RELAY	VALUE
R1	100UH
R2	100UH
R3	100UH
R4	100UH
R5	100UH
R6	100UH
R7	100UH
R8	100UH
R9	100UH
R10	100UH
R11	100UH
R12	100UH
R13	100UH
R14	100UH
R15	100UH
R16	100UH
R17	100UH
R18	100UH
R19	100UH
R20	100UH
R21	100UH
R22	100UH
R23	100UH
R24	100UH
R25	100UH
R26	100UH
R27	100UH
R28	100UH
R29	100UH
R30	100UH
R31	100UH
R32	100UH
R33	100UH
R34	100UH
R35	100UH
R36	100UH
R37	100UH
R38	100UH
R39	100UH
R40	100UH
R41	100UH
R42	100UH
R43	100UH
R44	100UH
R45	100UH
R46	100UH
R47	100UH
R48	100UH
R49	100UH
R50	100UH
R51	100UH
R52	100UH
R53	100UH



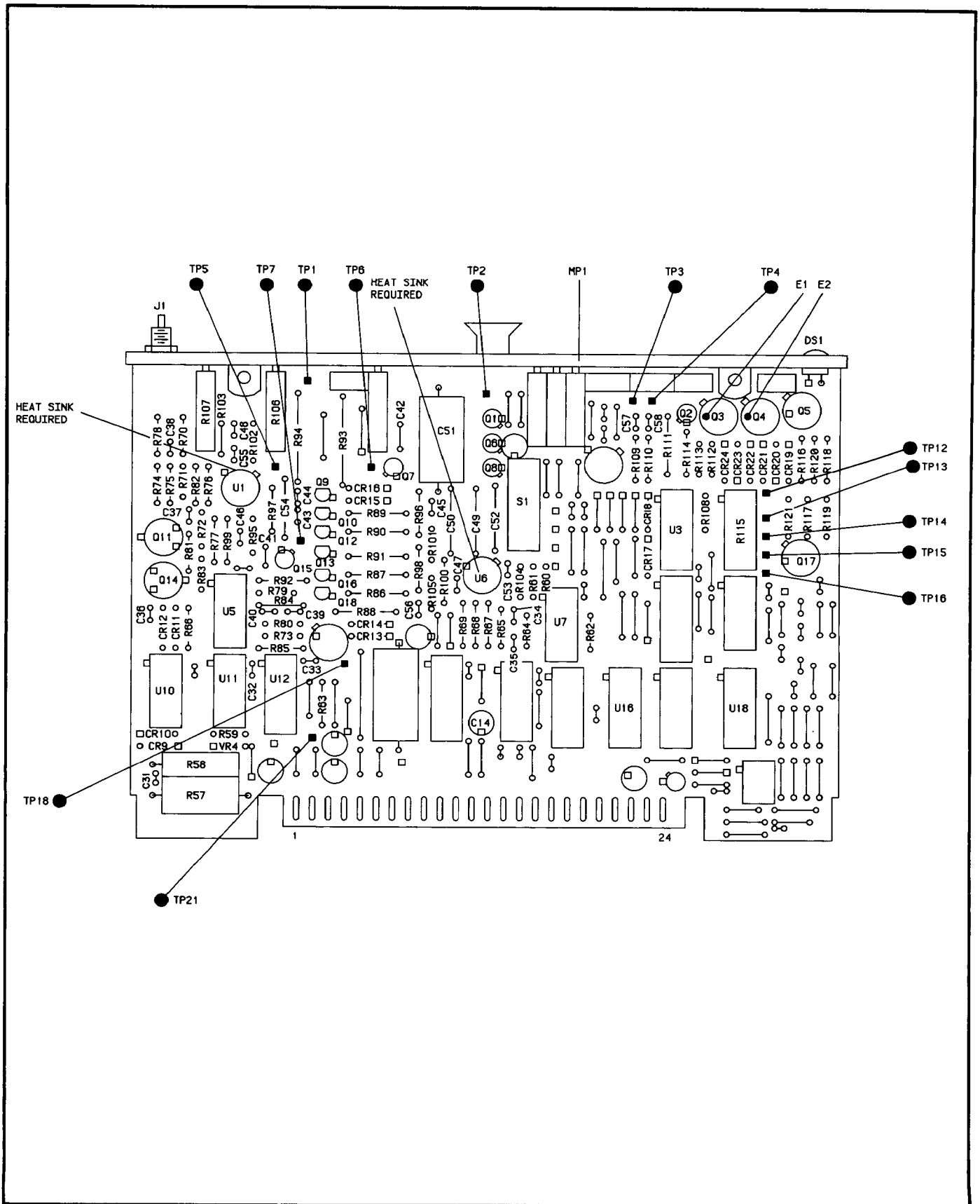


Figure 8-532. P/O A4A1 Automatic Level Control Component Locator



## VOLUME 4 CONTENTS

Schematic Service Sheet Number	Block Diagram	Assembly or Section		Theory/Trouble- Shooting Page Number	Parts List Page Number
SS38	BD7	A11A4	FM Phase Detector	8-601	6-197
SS39	BD7	A11A1	P/O A11A1 Variable Modulation Oscillator	8-607	6-185
SS40	BD7	A11A1	P/O A11A1 Variable Modulation Oscillator	8-611	6-185
SS41	BD7	A11A5	P/O A11A5 Modulation Drive	8-615	6-199
SS42	BD7	A11A5	P/O A11A5 Modulation Drive	8-619	6-199
SS43	BD7	A11A2	FM VCO	8-623	6-189
SS44	BD8	A11A3	P/O Phase Modulation Input	8-631	6-193
SS45	BD8	A4A4	Phase Detector	8-635	6-87
SS46	BD9	A2A7	P/O A2A7 Microprocessor	8-701	6-27
SS47	BD9	A2A7	P/O A2A7 Microprocessor	8-705	6-27
SS48	BD9	S2A8	RAM/ROM (Serial Prefix 2537A)	8-709	6-31
SS48	BD9	S2A8	RAM/ROM (Serial Prefix 2234A to 2536A)	8-711	6-29
SS49	BD9	A2A9	ROM	8-713	6-33
SS50	BD9	A2A3	P/O A2A3 Peripheral RAM	8-717	6-19
SS51	BD9	A2A3	P/O A2A3 Peripheral RAM	8-721	6-19
SS52	BD9	A2A5	P/O A2A5 Frequency Control Assembly	8-725	6-23
SS53	BD9	A2A5	P/O A2A5 Frequency Control Assembly	8-729	6-23
SS54	BD9	A2A10	Level Control Assembly	8-733	6-35
SS55	BD9	A2A4	Modulation Assembly	8-737	6-21
SS56	BD9	A2A2	P/O Sweep Control Assembly	8-741	6-17
SS57	BD9	A2A2	P/O Sweep Control Assembly	8-745	6-17
SS58	BD9	A2A6	HP-IB Assembly	8-749	6-25
SS59	BD9	A1A3	Main Keyboard	8-753	6-13
SS60	BD9	A1A2	Sweep Keyboard	8-757	6-11
SS61	BD9	A2A1	P/O Keycode Assembly	8-761	6-15
SS62	BD9	A2A1	P/O Keycode Assembly	8-765	6-15
SS63	BD9	A1A1	P/O Display Assembly	8-769	6-7
SS64	BD9	A1A1	P/O Display Assembly	8-773	6-7
SS65	BD10	A7A3	Inverter	8-901	6-169
SS65	BD10	A7A4	Power Supply Motherboard	8-901	6-174
SS66	BD10	A7A1	Linear Regulator Assembly	8-911	6-161
SS67	BD10	A7A2	Control Assembly	8-919	6-165





**SERVICE SHEET 38**  
**A11A4 FM PHASE DETECTOR**

**REFERENCE BLOCK DIAGRAM 7**

Table 4-1. Recommended Performance Tests  
 After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION**

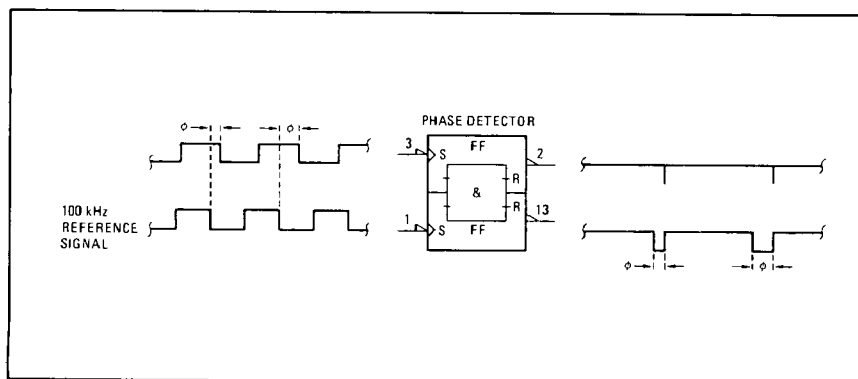
**General**

The purpose of the FM Phase Detector (A11A4) is to develop the FM Loop Error Voltage. This is accomplished by comparing the VCO output with a 10 MHz reference signal.

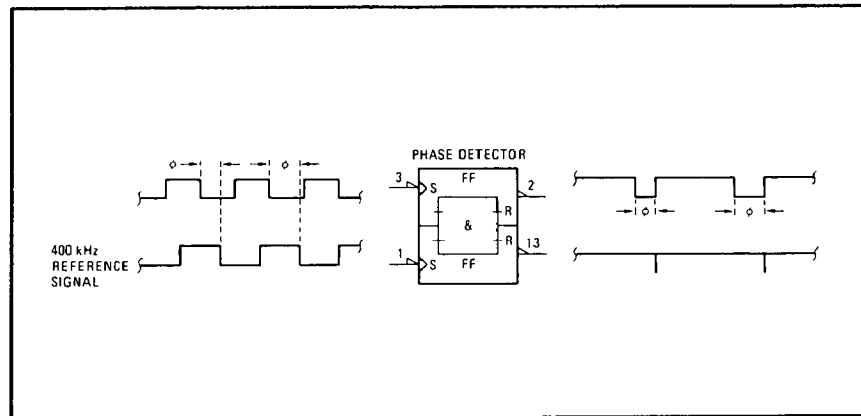
**Phase Detector Circuitry**

The Phase Detector Circuitry compares the phase difference between the reference signal (FM 10 MHz Reference Signal) and the output of the VCO (FM Loop N-Divider Drive), then generates a voltage proportional to the phase error. Both input signals are first divided down to 100 kHz before they are compared by the FM Loop Phase Detector, U4. The 10 MHz signal from the Reference Section is divided by a total of 100. This signal becomes the reference input to the phase detector. The 140 MHz VCO output is divided by a total of 1400. This signal becomes the variable input to the phase detector.

The Phase Detector, U4, is a digital phase detector that generates output pulse widths proportional to the phase difference between the two input signals. If the variable 100 kHz signal is lower in frequency or lags the reference input in phase, the output on pin 13 generates a pulse (See Figure 8-601). When the variable input is higher in frequency or leads the input in phase the output on pin 2 generates a pulse (see Figure 8-602).



*Figure 8-601. Phase Detector Operation*  
*(Variable Input is Lower in Frequency than Reference Signal)*



*Figure 8-602. Phase Detector Operation  
(Variable Input is Higher in Frequency than Reference Signal)*

Following the FM Loop Phase Detector are the Switch, Low-Pass Filter, and Integrator circuits. In a phase-locked condition the switch circuit (gates U3A and U3D) is enabled, allowing the output pulses from the phase detector to pass through. The Low-Pass Filter and the Integrator convert the pulses into a voltage. This becomes the FM Loop Error Voltage. Each pulse causes a given amount of charge to be stored in the integrating capacitors, C11 and C12.

When the FM Loop is disabled the switch circuit prevents the phase detector output pulses from reaching the Integrator. To prevent the Integrator's output from slewing against the power supply rails when the FM Loop is disabled, R20 is shunted across the integrating capacitors.

When no modulation signal is applied, the error voltage developed by the Phase Detector Circuit is dependent on the frequency and phase of the 140 MHz VCO. In the phase-locked FM mode the error voltage is also dependent on the instantaneous frequency deviation. The FM Loop's bandwidth is about 6 Hz, however, phase-locked FM is only possible down to modulation rates of 20 Hz. Modulation rates below 20 Hz result in the gradual cancellation of the modulating signal because the phase-locked loop can now start responding to the modulation signal.

An overmodulation condition exists when the peak deviation of the 140 MHz VCO exceeds the limit or range of the phase detector, U4. This overmodulation condition is detected by monitoring the output of the phase detector. The output is first filtered by a Low Pass Filter consisting of R11 and C7. The output waveform from the low pass filter is similar to a half wave rectified sine wave. This signal is monitored by the Overmodulation Detector (located on the Modulation Drive) which is a peak detector circuit. If the output waveform from the low pass filter exceeds 1 volt peak, the Overmodulation Detector is triggered.

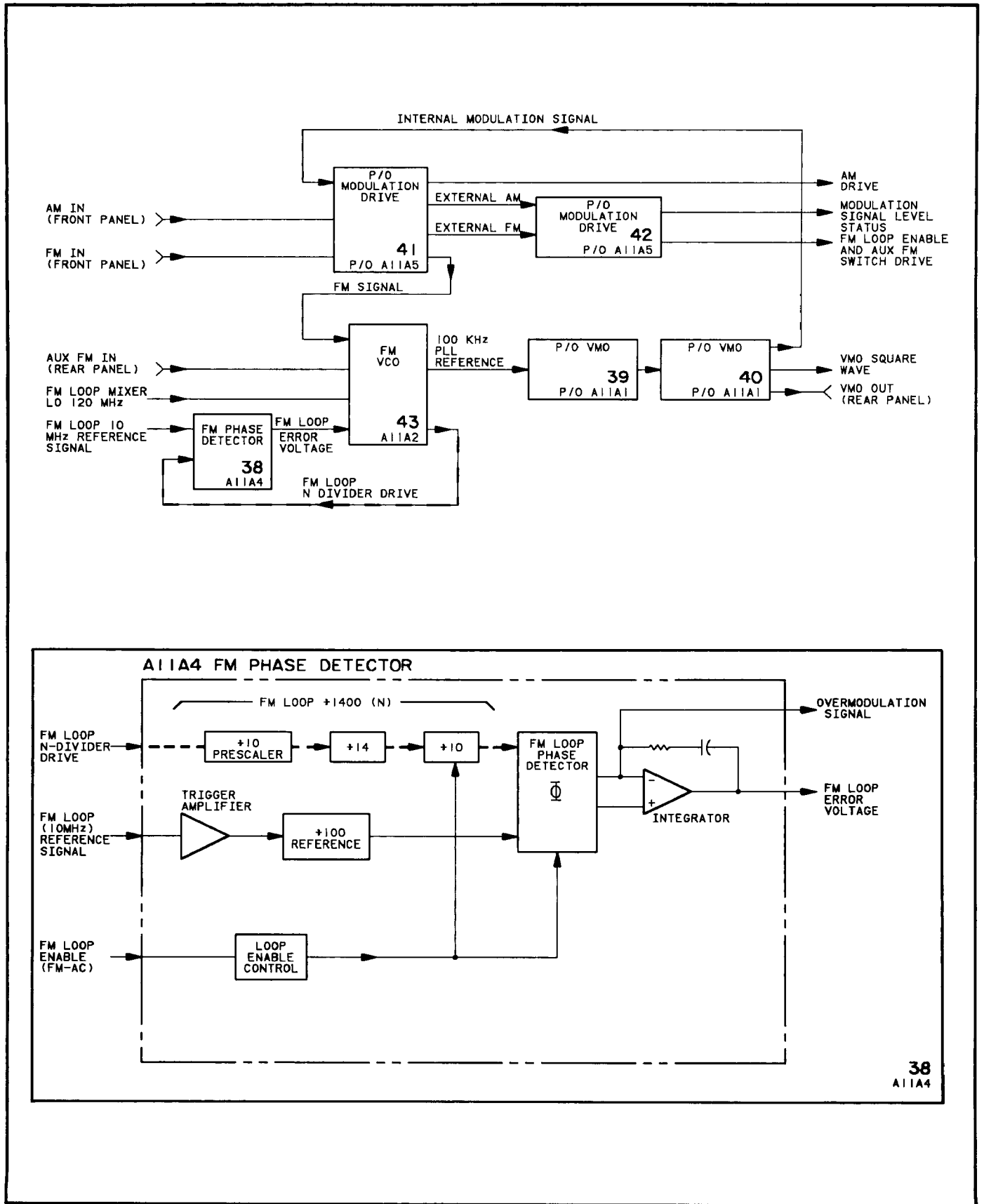


Figure 8-603. A11A4 FM Phase Detector Block Diagrams



## CHANGES

### All serial prefixes

On the schematic:

- Bullet "I" FM LOOP ENABLE (FM-AC) FROM MODULATION DRIVE - In the lower left portion of the schematic, change the line label of bullet "I" from "TTL HIGH=ENABLE" to "Special Levels, +9V=Enable, -19V=Disable".

1114A 3V PHASE DETECTOR W/RES-5034A1

1. 3V PHASE DETECTOR W/RES-5034A1
2. 3V PHASE DETECTOR W/RES-5034A1
3. 3V PHASE DETECTOR W/RES-5034A1
4. 3V PHASE DETECTOR W/RES-5034A1
5. 3V PHASE DETECTOR W/RES-5034A1

PRINCIPAL PARTS LIST

QTY	DESCRIPTION	REF. DESIG.
1	RES-5034A1	1
1	RES-5034A1	2
1	RES-5034A1	3
1	RES-5034A1	4
1	RES-5034A1	5

PERIODIC CHECKS

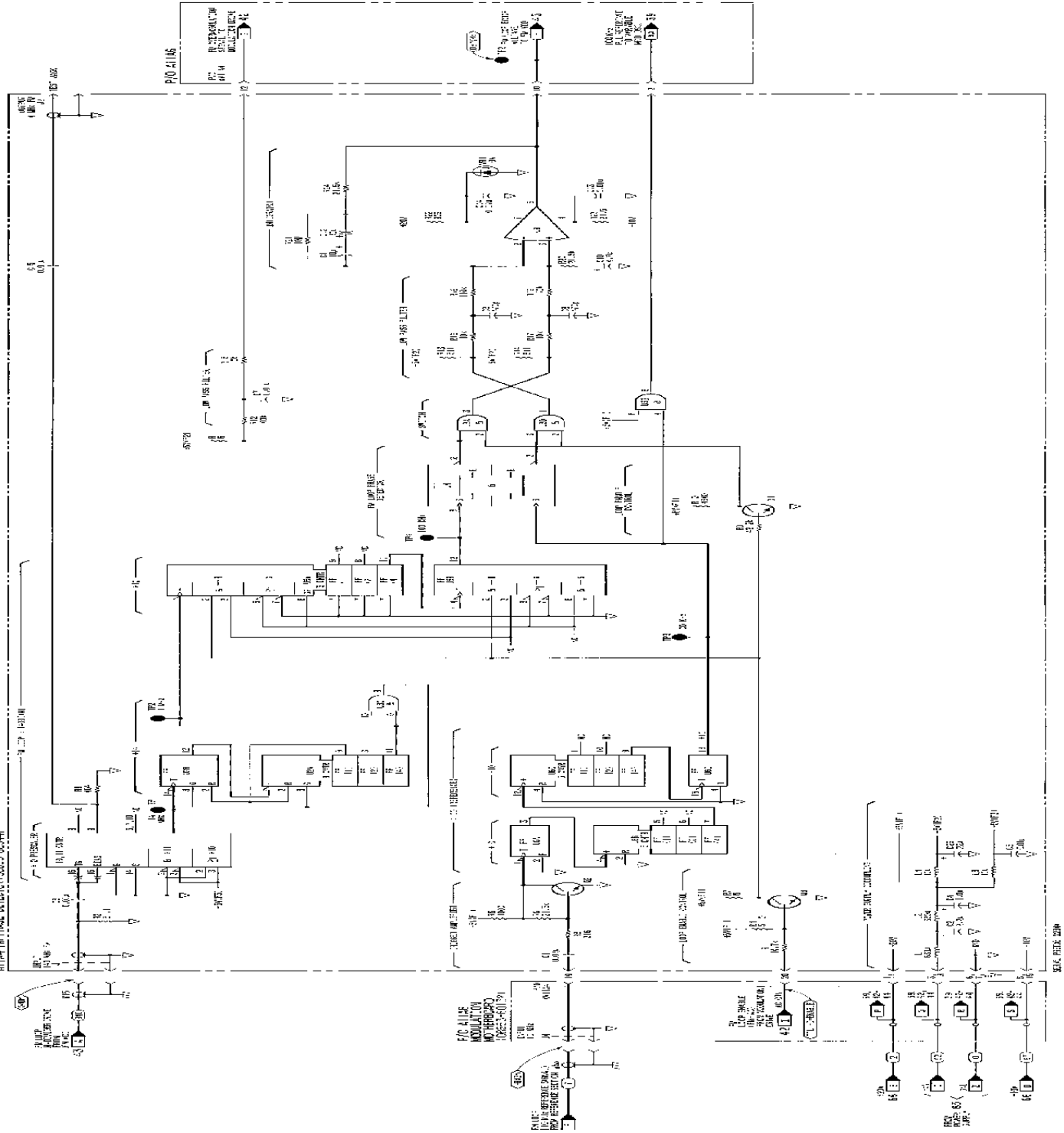
NO.	DESCRIPTION	TEST POINTS
1	RES-5034A1	1, 2, 3
2	RES-5034A1	4, 5, 6
3	RES-5034A1	7, 8, 9
4	RES-5034A1	10, 11, 12
5	RES-5034A1	13, 14, 15
6	RES-5034A1	16, 17, 18

TEST POINTS

NO.	DESCRIPTION	TEST POINTS
1	RES-5034A1	1, 2, 3
2	RES-5034A1	4, 5, 6
3	RES-5034A1	7, 8, 9
4	RES-5034A1	10, 11, 12
5	RES-5034A1	13, 14, 15
6	RES-5034A1	16, 17, 18

WAVEFORMS

NO.	DESCRIPTION	TEST POINTS
1	RES-5034A1	1, 2, 3
2	RES-5034A1	4, 5, 6
3	RES-5034A1	7, 8, 9
4	RES-5034A1	10, 11, 12
5	RES-5034A1	13, 14, 15
6	RES-5034A1	16, 17, 18



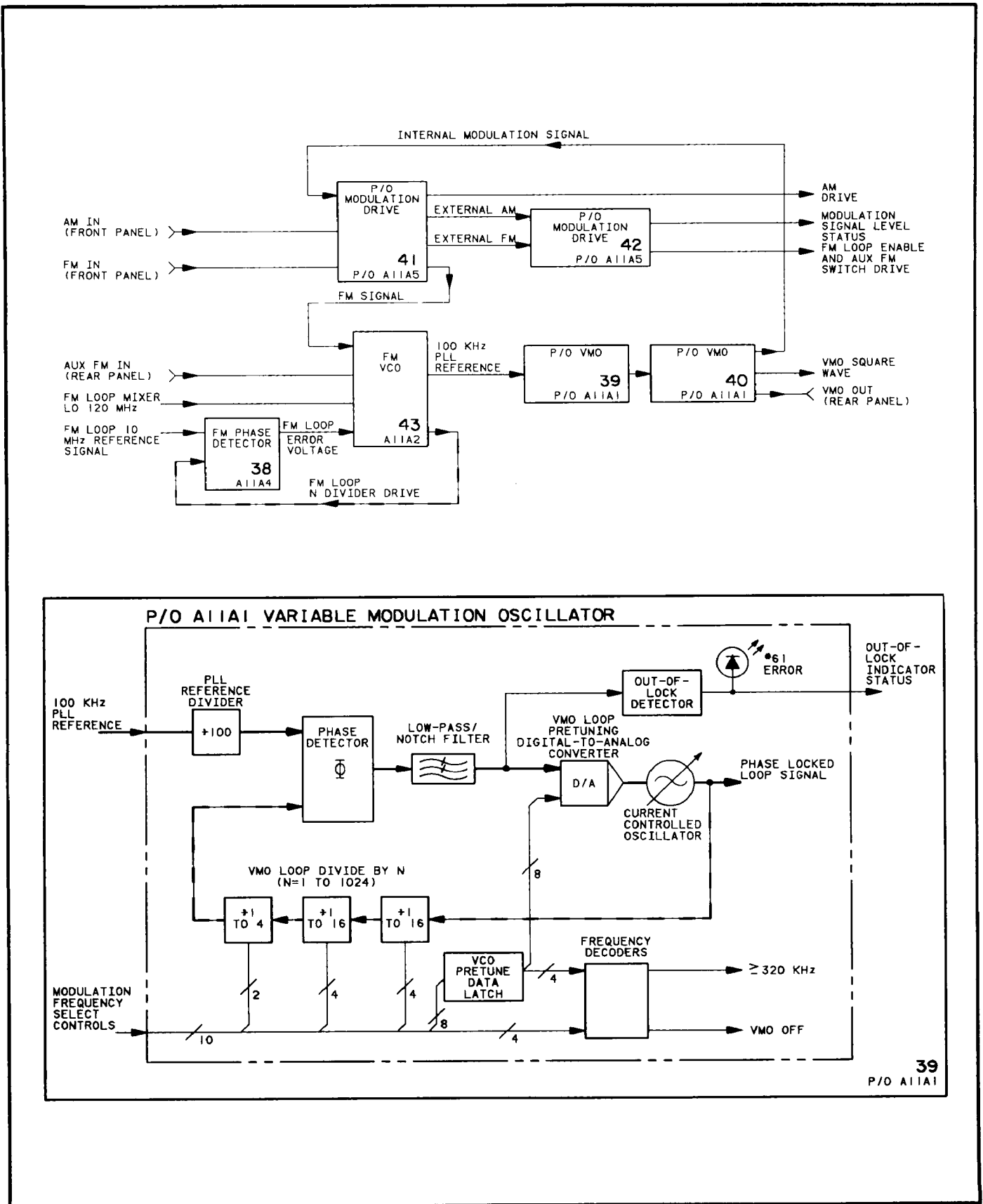


Figure 8-606. P/O A11A1 Variable Modulation Oscillator Block Diagrams

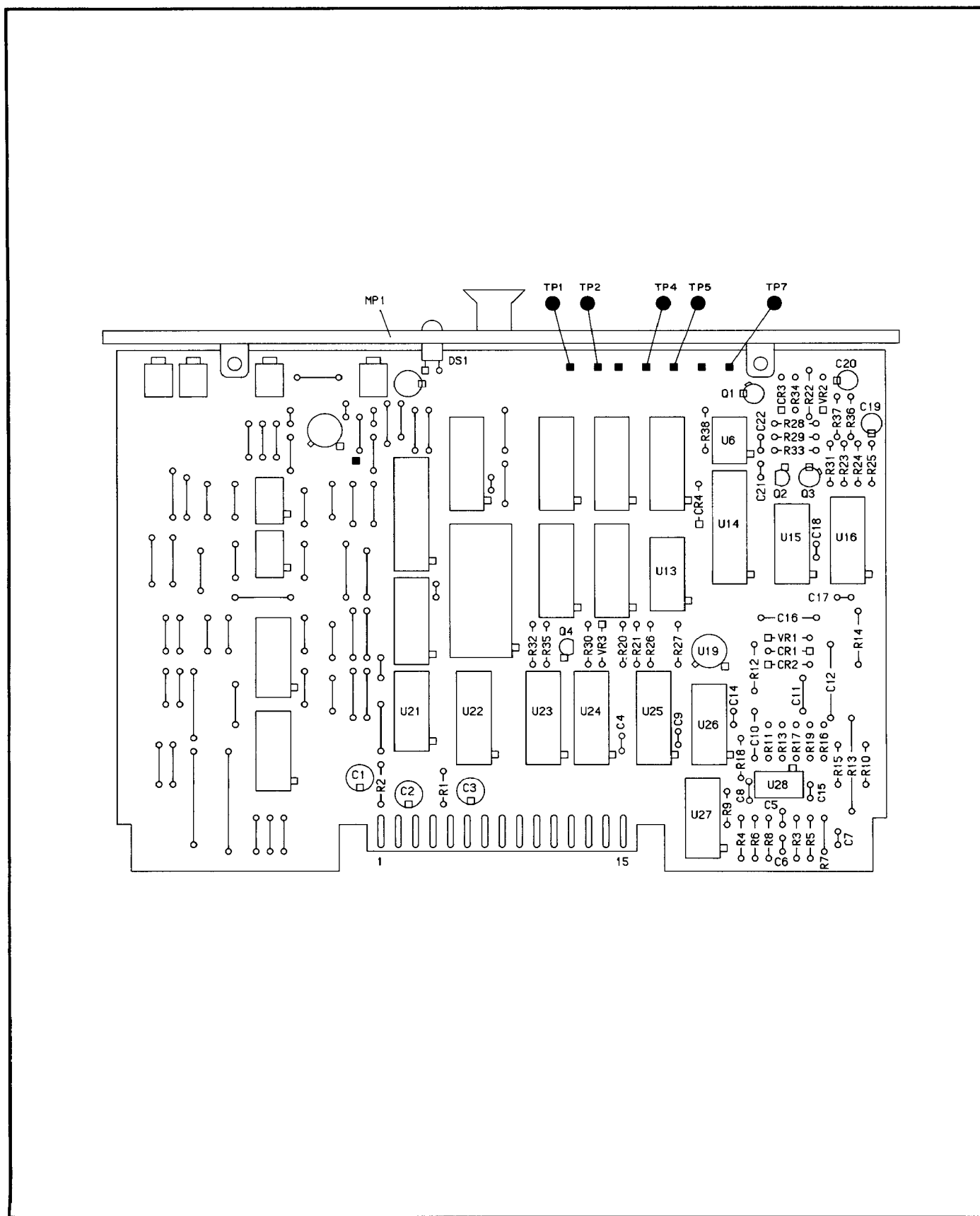


Figure 8-607. P/O A11A1 Variable Modulation Oscillator Component Locator



**CHANGES****All serial prefixes**

On the schematic:

- A11A1U28 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of U28 to 1826-0785.
- A11A1Q1 - Add Q1, 1854-0477 to the Table of Transistor and Integrated Circuit Part Numbers.

On the A11A1 schematic:

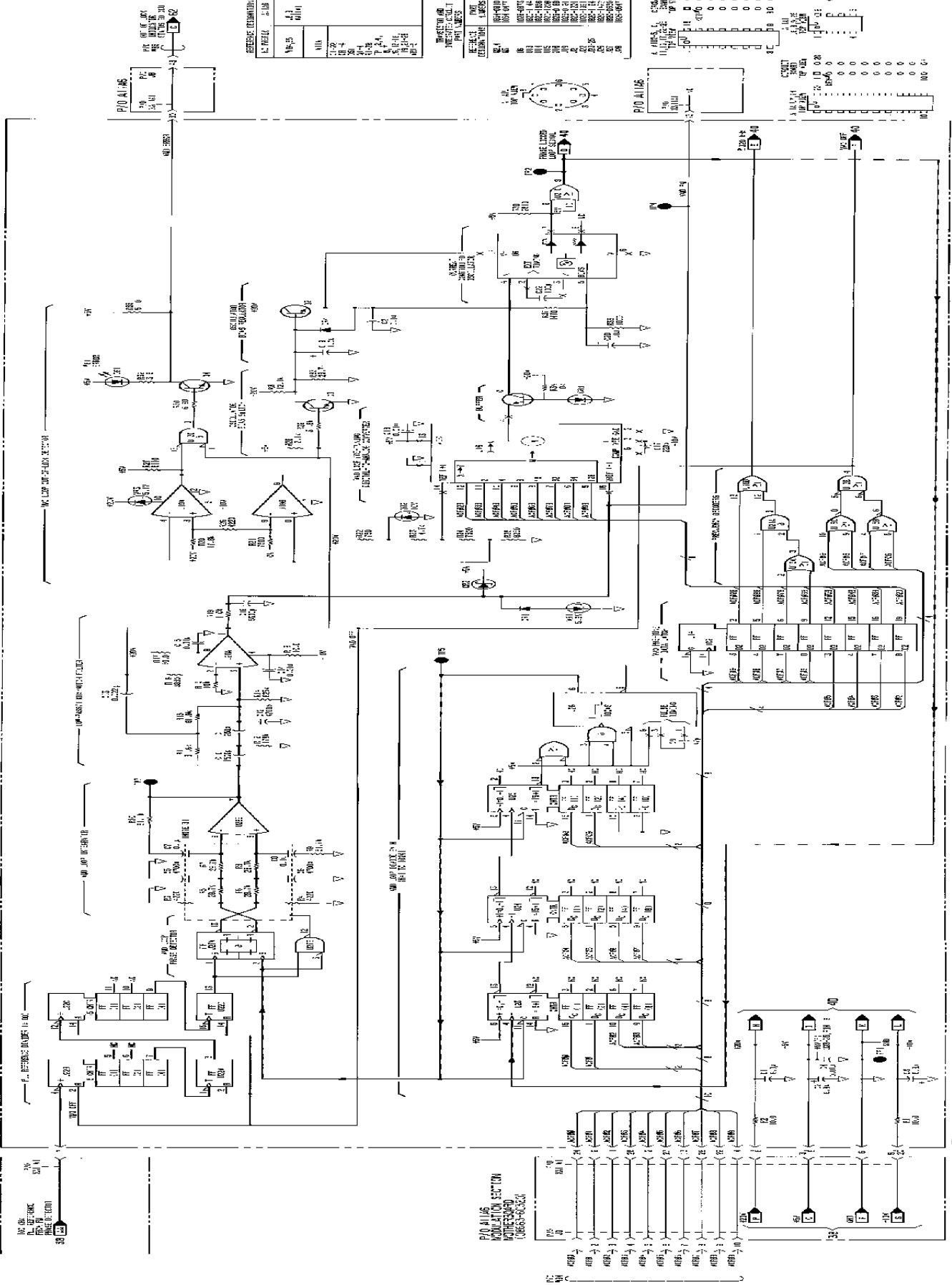
- A11A1U26 - Move the low-level-active polarity indicator (triangle) from U26 pin 8 to U26 pin 6.

On the Component Locator:

- A11A1C13 - On the component locator, change R13 to C13, between R15 and R10

REV. NO. 01  
 DATE 07/08/2009  
 BY: [Signature]

PID ALIAS MOD. (28653-0020)



1. IDENTIFY THE ADDRESS-BUS...
2. IDENTIFY THE ADDRESS-BUS...
3. IDENTIFY THE ADDRESS-BUS...

LOG LOGS

LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6

ADDRESS-BUS LOGS

LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6

ADDRESS-BUS LOGS

LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6
LOG 1	LOG 2	LOG 3	LOG 4	LOG 5	LOG 6



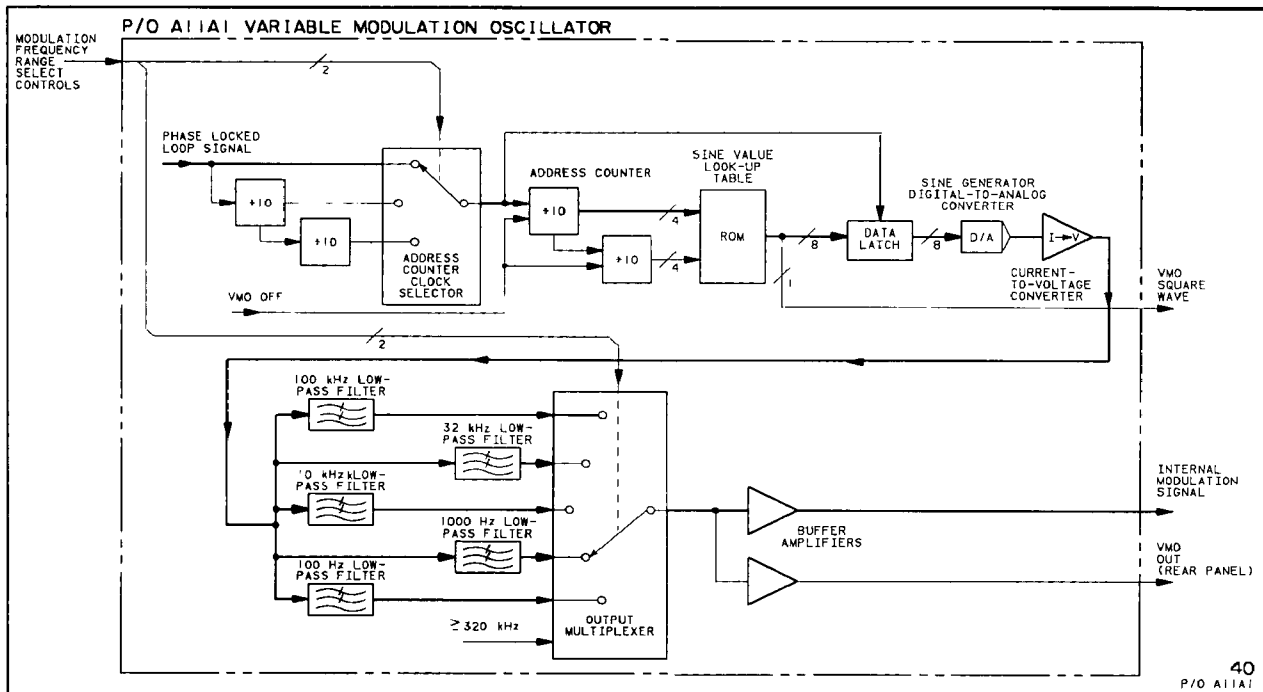
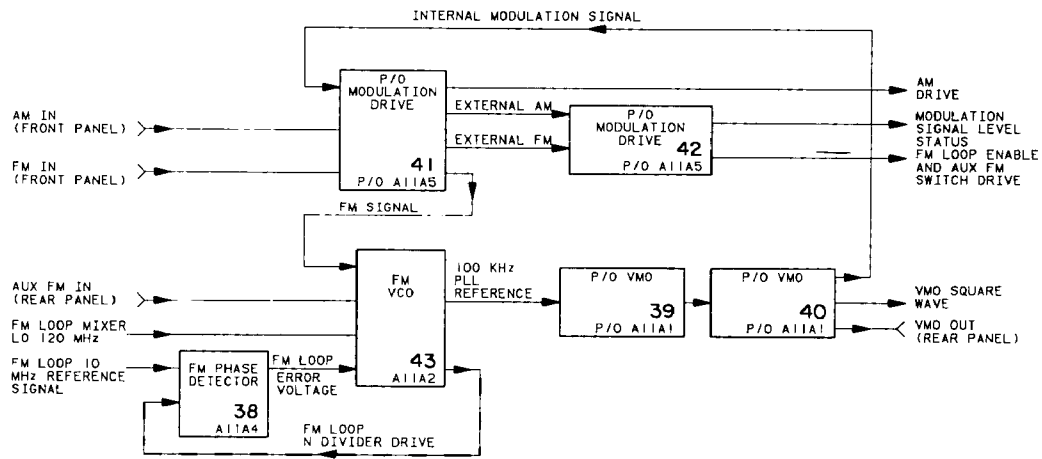


Figure 8-609. P/O A11A1 Variable Modulation Oscillator Block Diagrams

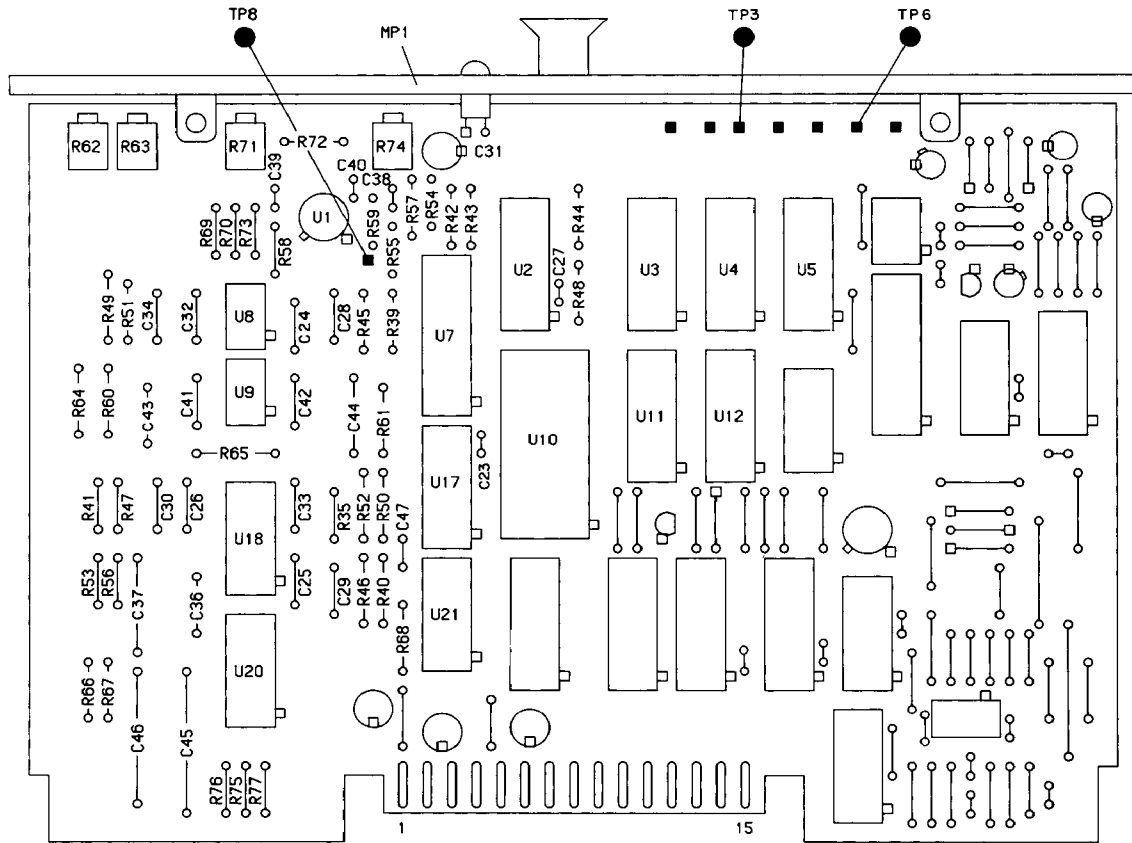


Figure 8-610. P/O A11A1 Variable Modulation Oscillator Component Locator



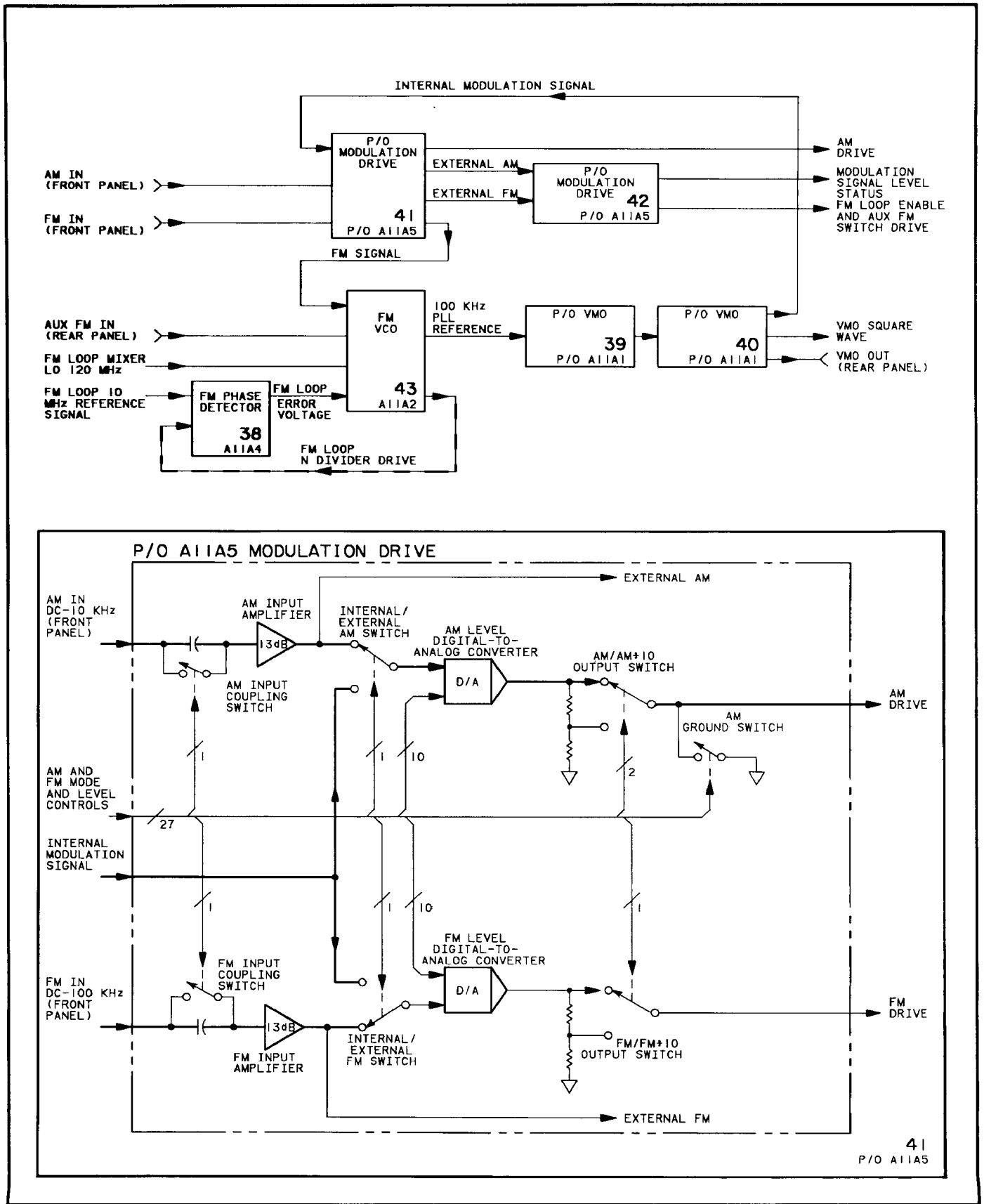


Figure 8-612. P/O A11A5 Modulation Drive Block Diagrams

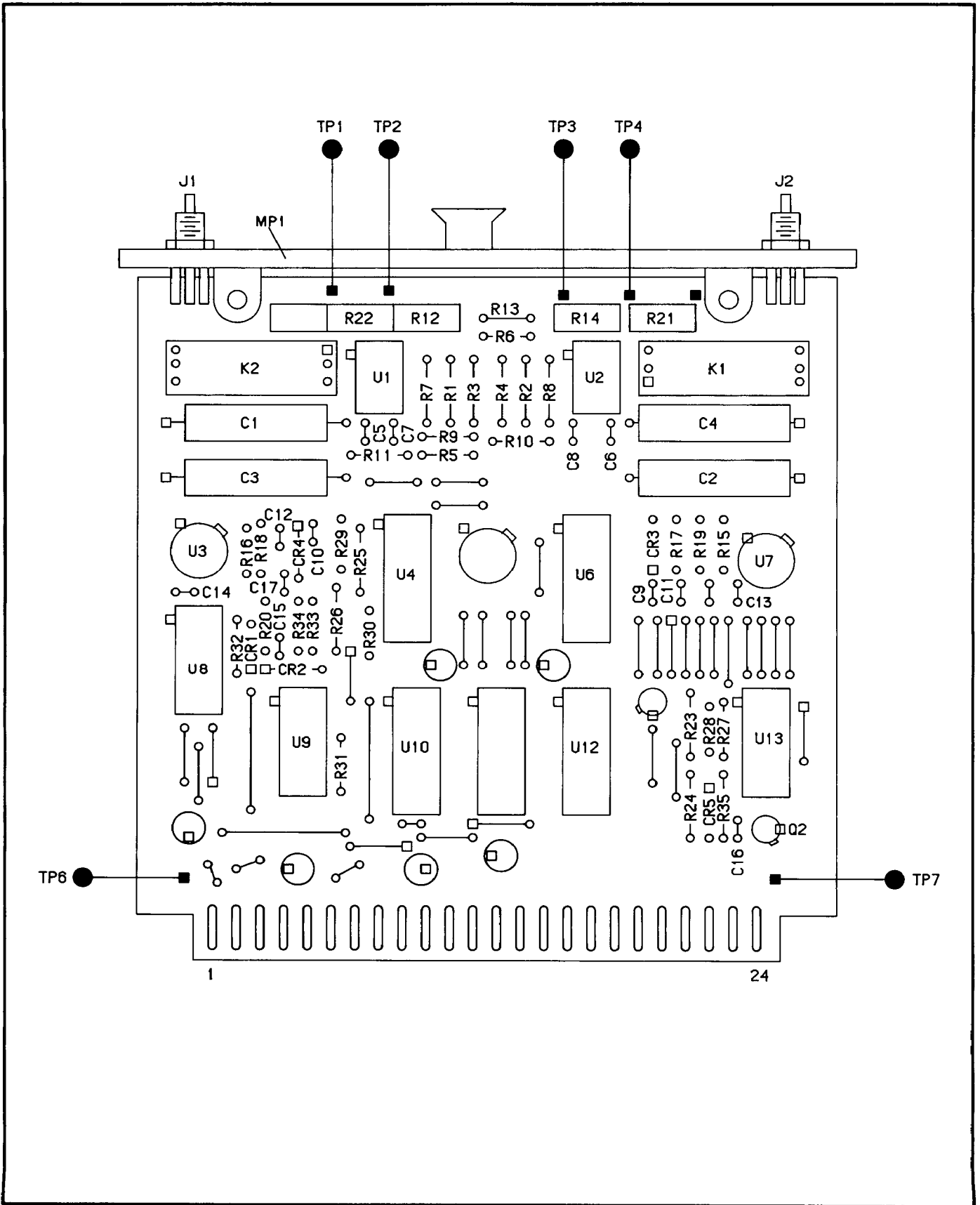


Figure 8-613. P/O A11A5 Modulation Drive Component Locator

**CHANGES****All serial prefixes**

On the A11A5 schematic:

- A11A1R1 - R1 is incorrectly shown connected between output pin 6 of U1 and ground. R1 should be connected between inverting input, U1 pin 2, and ground.
- A11A1R2 - R2 is incorrectly shown connected between output pin 6 of U2 and ground. R2 should be connected between inverting input, U2 pin 2, and ground.
- A11A1R29, R30 - Change the value of R29 to 90.9 ohms. Change the value of R30 to 10 ohms.

**2333A and Above**

On the A11A5 component locator:

- A11A5CR8 - Delete CR 8.

On the A11A5 schematic:

- A11A5CR8 - Delete CR 8.

On the A2A2 component locator:

- A2A2CR5 - Delete CR 5.

On the A2A2 schematic:

- A2A2CR5 - Delete CR 5.



1. 所有之零件均須有圖號。
2. 所有之零件均須有圖號。

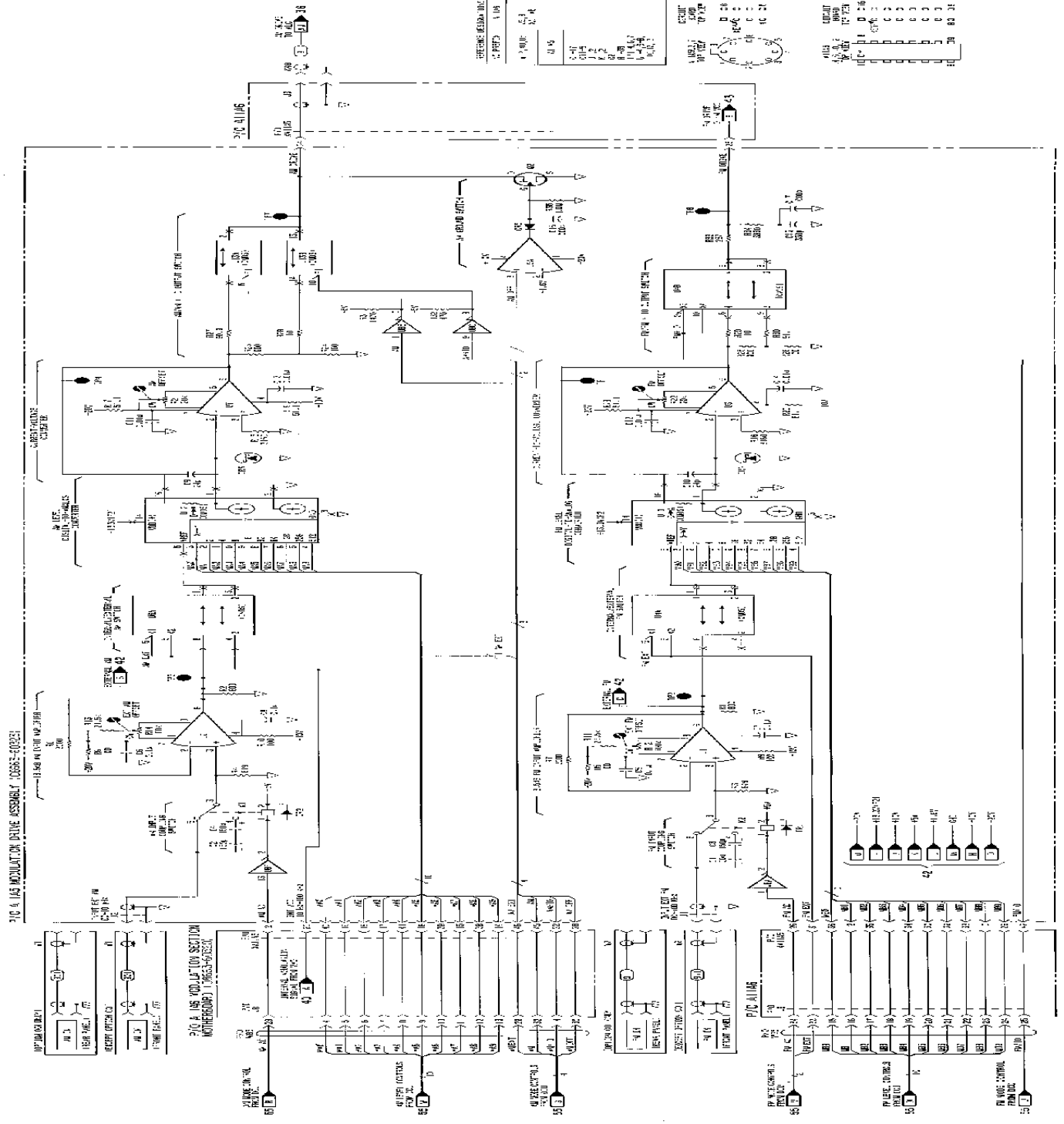
零件名稱	圖號
...	...

零件名稱	圖號
...	...

零件名稱	圖號
...	...

零件名稱	圖號
...	...

零件名稱	圖號
...	...



P10 A11A5 MODULATION DRIVE ASSEMBLY - 06553-00223

P10 A11A5 MODULATION DRIVE SECTION MOTOR DRIVE SECTION

P10 A11A5

SPR. P10A. 2004

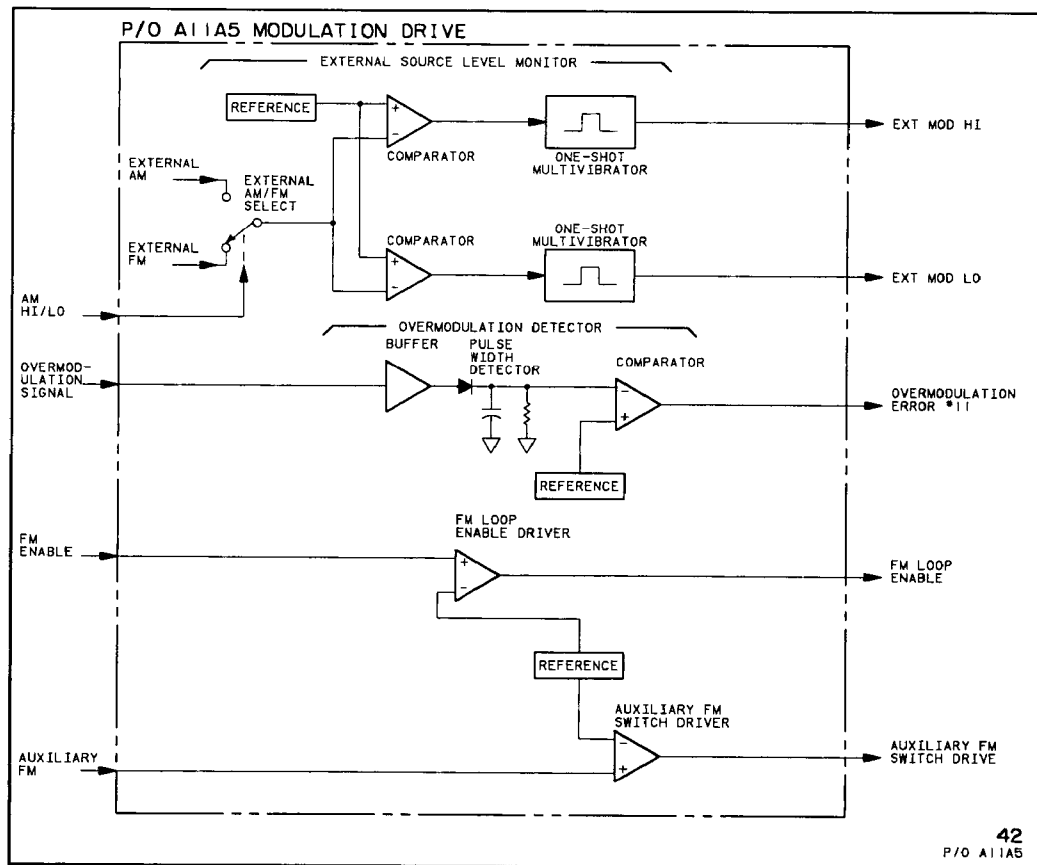
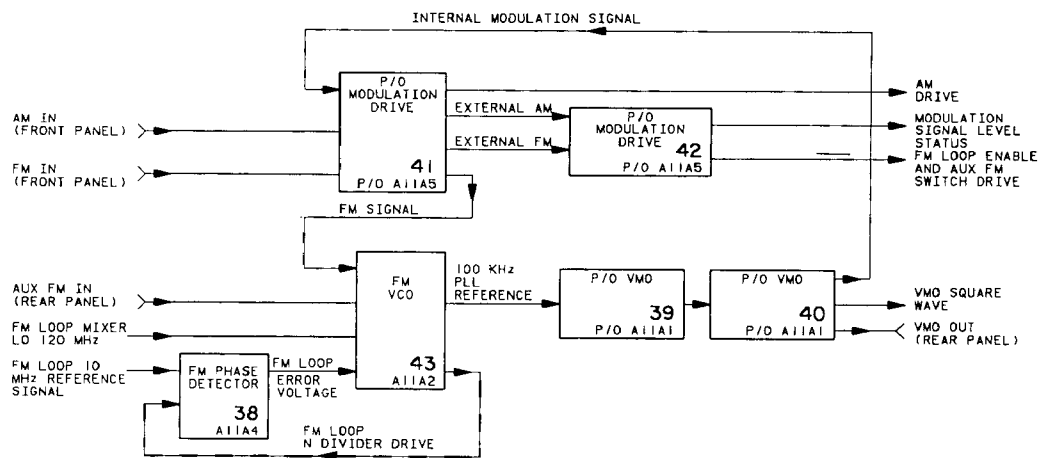


Figure 8-615. P/O A11A5 Modulation Drive Block Diagrams

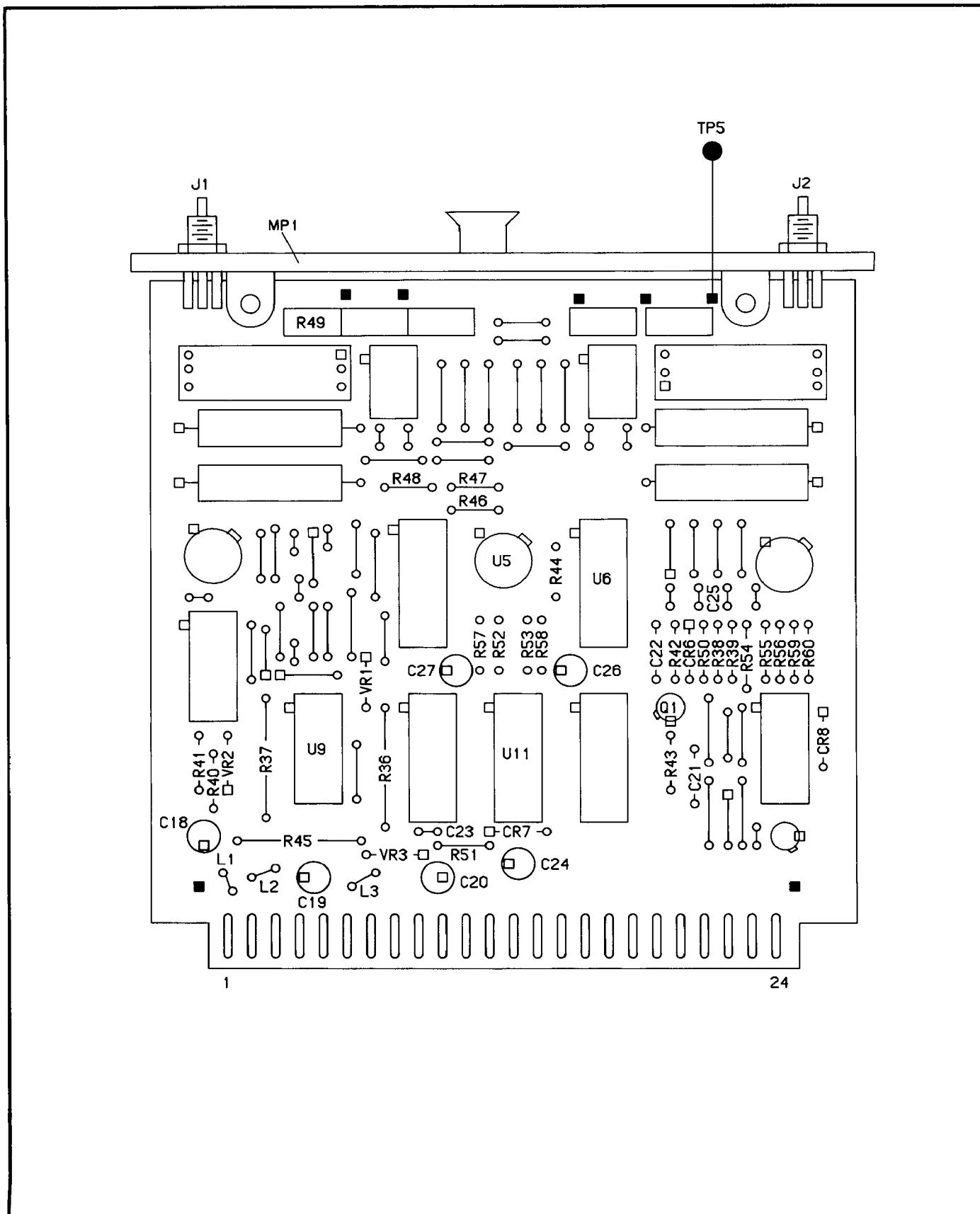


Figure 8-616. P/O A11A5 Modulation Drive Component Locator

## CHANGES

### All serial prefixes

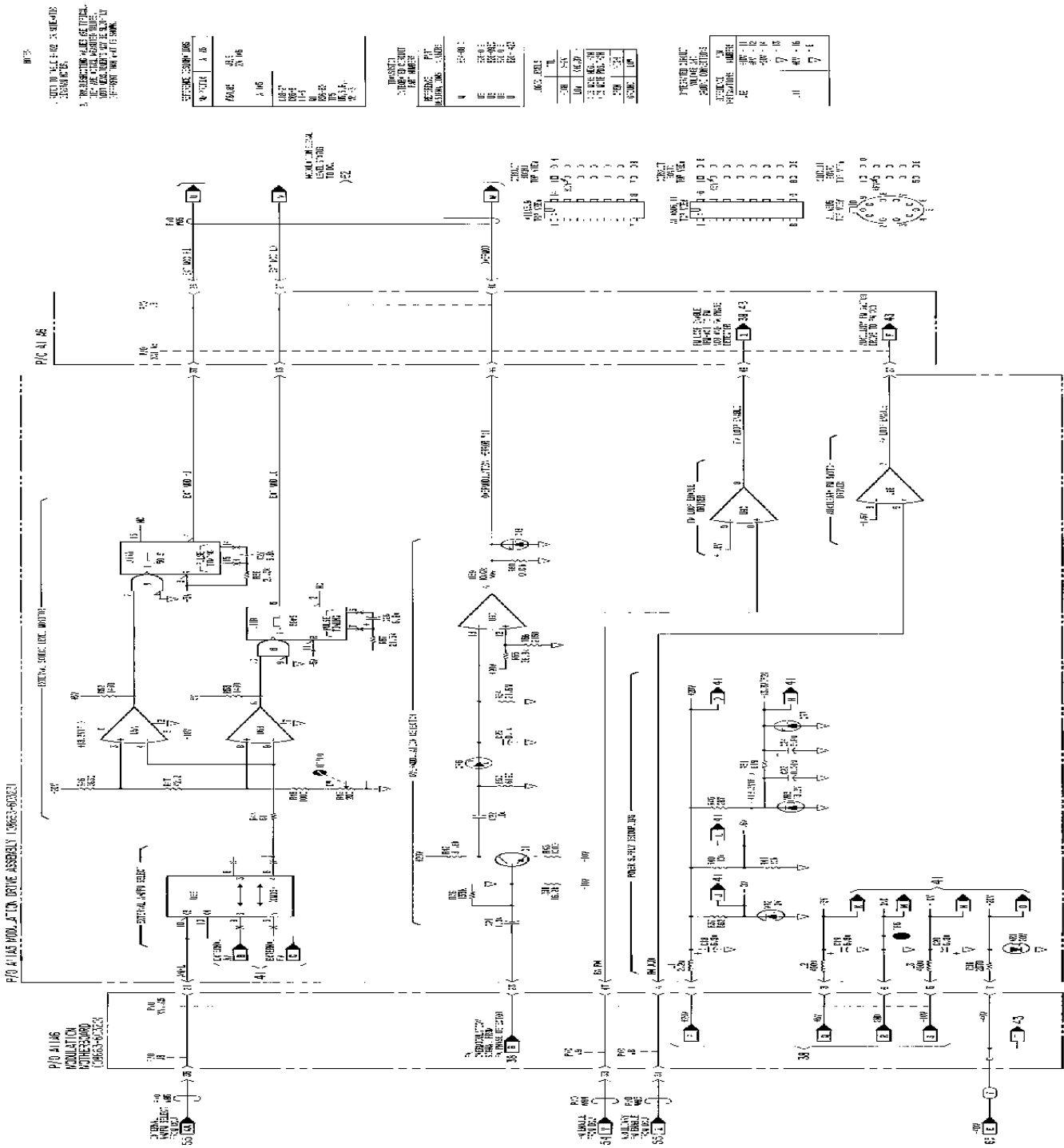
On the A11A5 schematic:

- The output line U9B pin 7 is incorrectly labeled FM LOOP ENABLE. Change the label to AUXILIARY FM SWITCH DRIVE.

### 2601A and Above

On the A11A5 schematic:

- A11A5R36 - Change the value of R36 to 1.33k.
- A11A5U9 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of U9 to 1826-0753.



1. THIS IS A SERVICE SHEET.  
 2. THIS SHEET IS FOR THE P/O A11A5.  
 3. THIS SHEET IS FOR THE P/O A11A5.  
 4. THIS SHEET IS FOR THE P/O A11A5.  
 5. THIS SHEET IS FOR THE P/O A11A5.

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

ITEM NO.	DESCRIPTION	QTY
1	6X4	1
2	6BA6	2
3	6X4	1
4	6X4	1
5	6X4	1
6	6X4	1
7	6X4	1
8	6X4	1
9	6X4	1
10	6X4	1

STD. PRINT. 1254

**SERVICE SHEET 43**  
**A11A2 FM VCO****REFERENCE BLOCK DIAGRAM 7**

Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs

Table 5-2. Post-Repair Adjustment Procedures

**PRINCIPLES OF OPERATION****General**

The FM VCO (A11A2) generates the frequency modulated 20 MHz signal. The FM signal is generated by applying the modulation signal to the varactor diode that forms part of the oscillator's tank circuit. The FM VCO has two primary outputs. One is the 140 MHz VCO output which is used to lock the loop and the other output is the frequency modulated 20 MHz signal. The 20 MHz FM signal is developed by heterodyning the 140 MHz VCO output with the 120 MHz signal from the Reference Section. The primary inputs are the modulation signals and the FM Loop Error Voltage which is used to lock the loop.

**140 MHz Voltage Controlled Butler Oscillator (VCO)**

Q1, Q2 and associated components form the 140 MHz Voltage Controlled Oscillator. Q1 is a common-gate FET amplifier with the tank circuit located in its drain circuit. The signal developed in the tank circuit is coupled to the gate of Q2 by C13. Q2 acts as a source follower in the feedback circuit, providing a high impedance at its gate and a low output impedance at its drain. Q2 amplifies the feedback signal and feeds the signal back to Q1 to sustain oscillation.

The 140 MHz VCO is both frequency modulated and phase locked by varying the reverse-bias voltage across the varactor diode. An increase in the reverse-bias voltage reduces the junction capacitance, which increases the resonant frequency of the tank circuit. This causes the VCO to oscillate at a higher frequency. When the FM Loop is phase locked the center frequency is always 140 MHz.

**Gain Limiting and Mixer Circuit**

The 140 MHz signal developed across the tank is coupled to Limiter, U1. The Limiter acts as a buffer amplifier for the VCO and provides a constant level output. One output from the Limiter is used to phase lock the loop. The other output is applied to the RF port of the double balanced mixer, U2. The Mixer heterodynes the 140 MHz VCO output with the 120 MHz signal to produce the 20 MHz FM signal.

### Shaping Network and Shaping Network Bias

Due to the nonlinear tuning characteristic of the varactor diode and the large amount of shunt capacity used in the resonant circuit, a Shaping Network is required. The Shaping Network conditions the modulation signal applied to the varactor to ensure that the frequency change is linear with the applied voltage.

The Shaping Network consist of a ladder of diodes that are reverse biased, in sequence, at a voltage higher than the reverse bias on the diode previous to it. As the input signal level increases (negative direction) the diodes successively become forward biased, in sequence, and present a lower impedance to the input signal.

The Shaping Network Bias circuit acts as a voltage supply for the resistor-diode network and for Q3. The bias voltage is about +14.1 Vdc.

### Voltage to Current Converter

The various input signals (the FM Loop Error Voltage, DC Offset and the modulating signals) are summed at the emitter of Q5. Q5 operates in a common-base mode with the inputs applied at its emitter. The base is biased one diode drop above ground, therefore the voltage at the emitter is approximately zero volts.

### Loop and Aux FM Switch

Q6 and Q7 are JFETs used as analog switches. The FM Loop Enable and the Aux FM Switch Drive lines are the control lines that drive the JFET switches either ON or OFF. To maintain the JFET switches in the ON state, the control lines are biased to approximately +9 Vdc. This reverse biases both diodes, CR1 and CR2, and the gates are essentially left floating. To turn the JFET switches OFF, the control lines are biased to approximately -19 Vdc. This voltage forward biases both diodes, and clamps the gates at a negative voltage. This negative voltage at the gates effectively pinches off the JFETs (OFF state).

Loop switch, Q6, is used to disable the FM Loop Error Voltage. The Aux FM switch, Q7, isolates the modulation signal from the Aux FM Input.

### Phase Lock Detector

The Phase Lock Detector consists of two comparators that form a window comparator circuit. This circuit determines if the FM Loop Error Voltage lies between two preset voltage limits (the window). R41, R42, and R43 form a voltage divider that establishes the upper and lower voltage limits. The upper and lower voltage limits, +1.39 Vdc and -1.34 Vdc respectively, are applied to the inverting input of comparator U3A and U3B. When the error voltage is within the voltage window, indicating the FM Loop is phase locked, the output from the

comparators will remain high. If the error voltage lies outside the voltage window, one of the comparators will go low, turning the Out of Lock Indicator on.

#### TROUBLESHOOTING

If any components in the 140 MHz Voltage Controlled Butler Oscillators fail, the A11A2 assembly may have to be replaced. Resistors R21-R24 are selected to match the characteristics of the oscillator. Changing a component in the oscillator could change the characteristics enough to require new selected resistors. The selection process requires a special test fixture and is very time consuming; therefore, it cannot be done in the field.

To determine whether or not a new assembly is needed, replace the defective component and measure FM distortion with 100 kHz deviation. If FM distortion is within the specifications listed in Table 1-1, the repair is successful. However, if FM is not within the specifications, the assembly will have to be replaced. The varactor diode, CR9, is the most critical component.



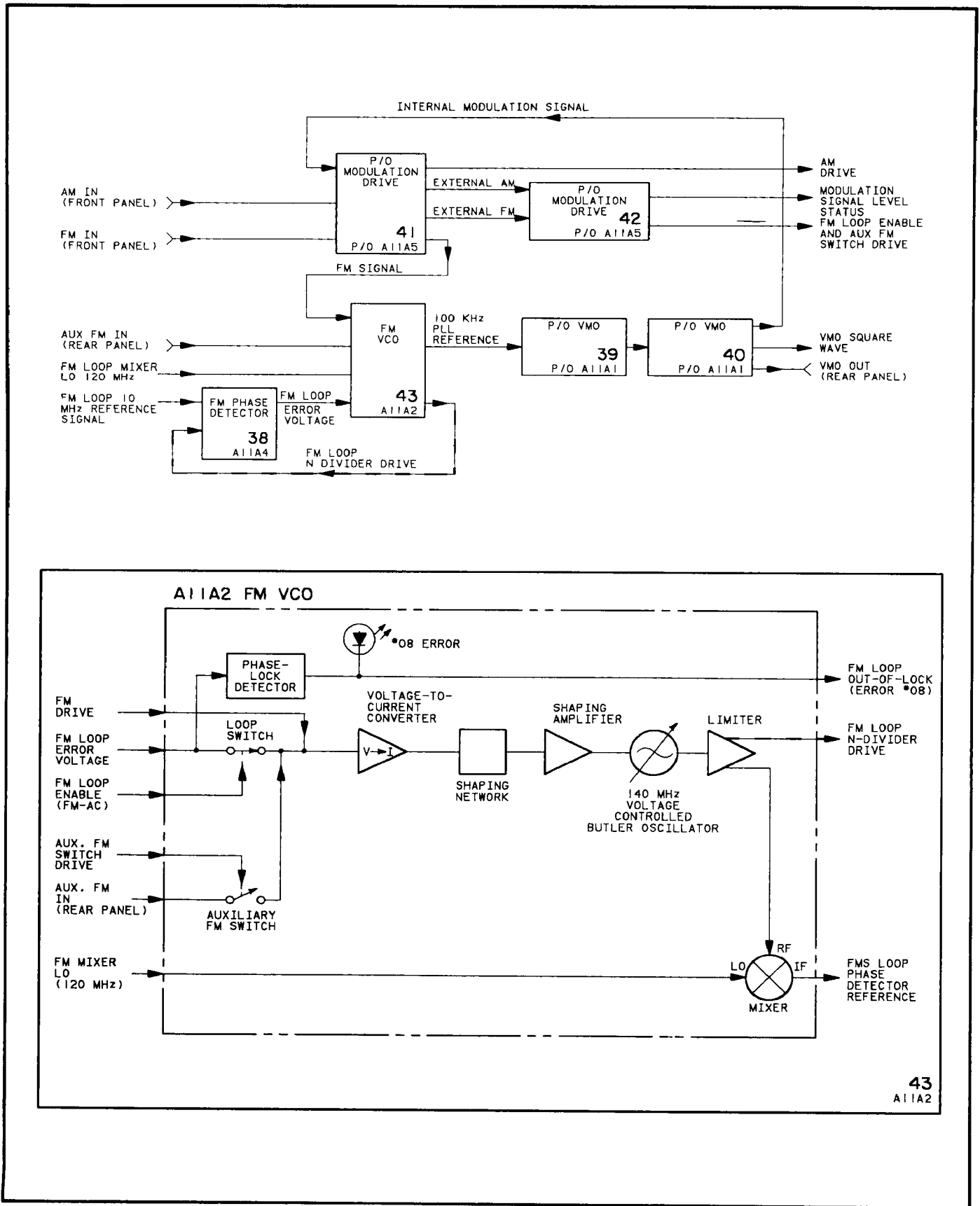


Figure 8-618. A11A2 FM Loop Voltage Controlled Oscillator Block Diagrams

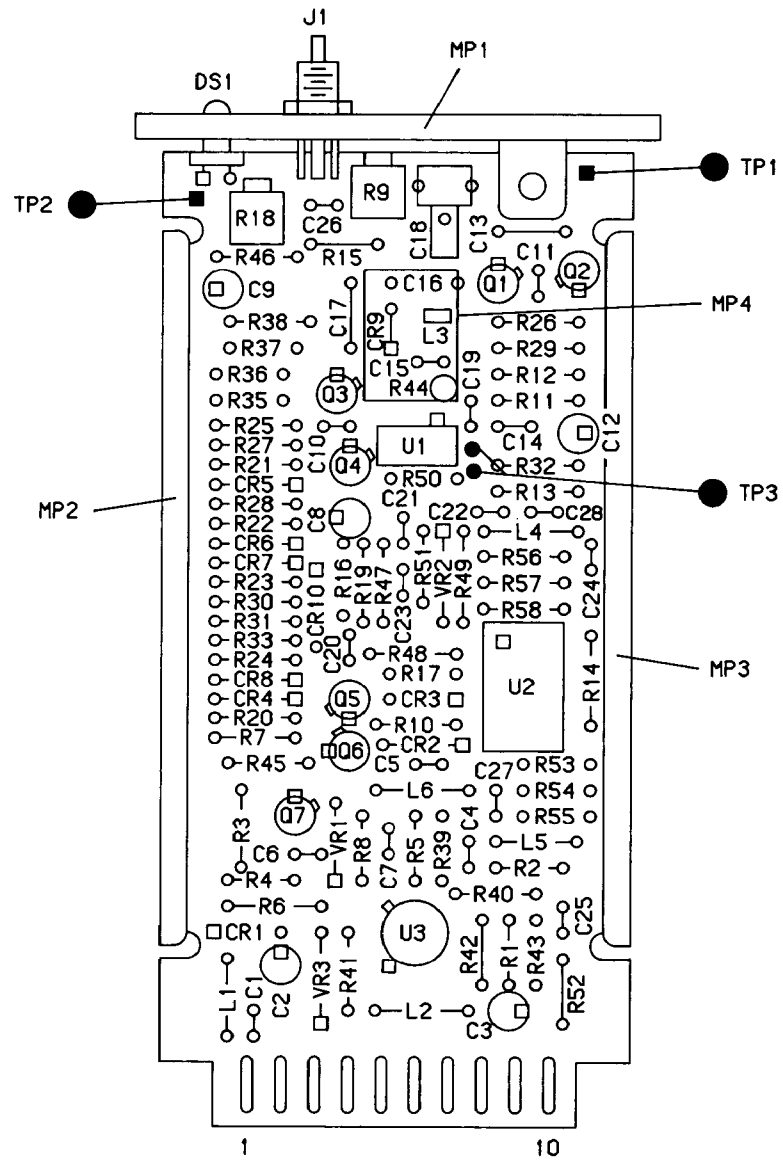


Figure 8-619. A11A2 FM Loop Voltage Controlled Oscillator Component Locator

**CHANGES****All serial prefixes**

On the A11A2 schematic:

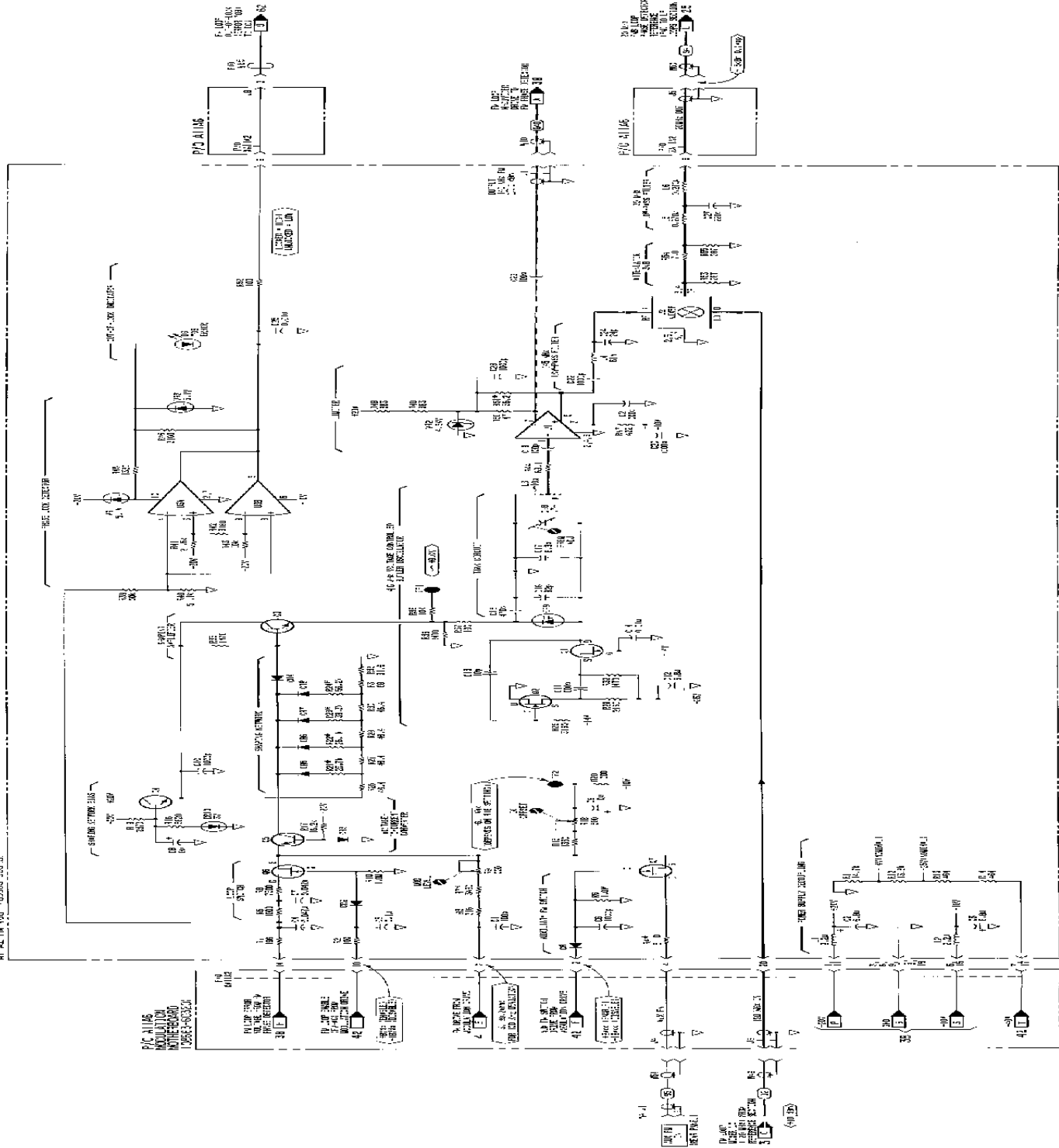
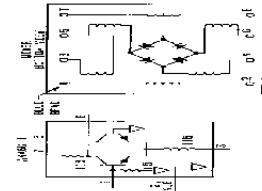
- A11A2R4\*, R7\* - Change the value of R4\* to 5.62k. Change the value of R7\* to 5.11k.

1. 检查下列零件是否完好
2. 检查下列零件是否完好
3. 检查下列零件是否完好

零件名称	数量
电阻	1
电容	1
二极管	1
三极管	1
继电器	1
开关	1
连接器	1
其他	1

零件名称	数量
电阻	1
电容	1
二极管	1
三极管	1
继电器	1
开关	1
连接器	1
其他	1

零件名称	数量
电阻	1
电容	1
二极管	1
三极管	1
继电器	1
开关	1
连接器	1
其他	1



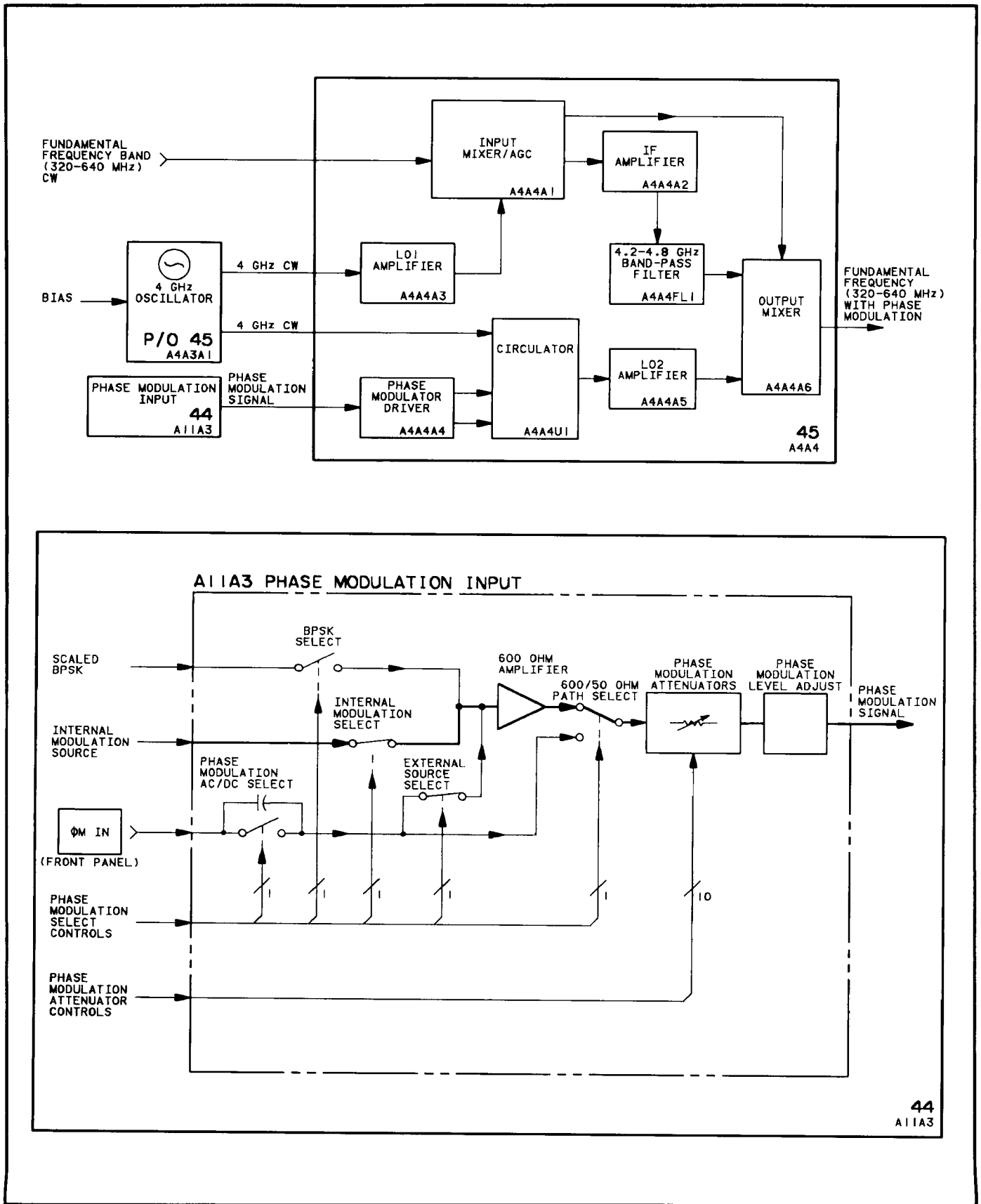


Figure 8-621. A11A3 Phase Modulation Input Block Diagrams

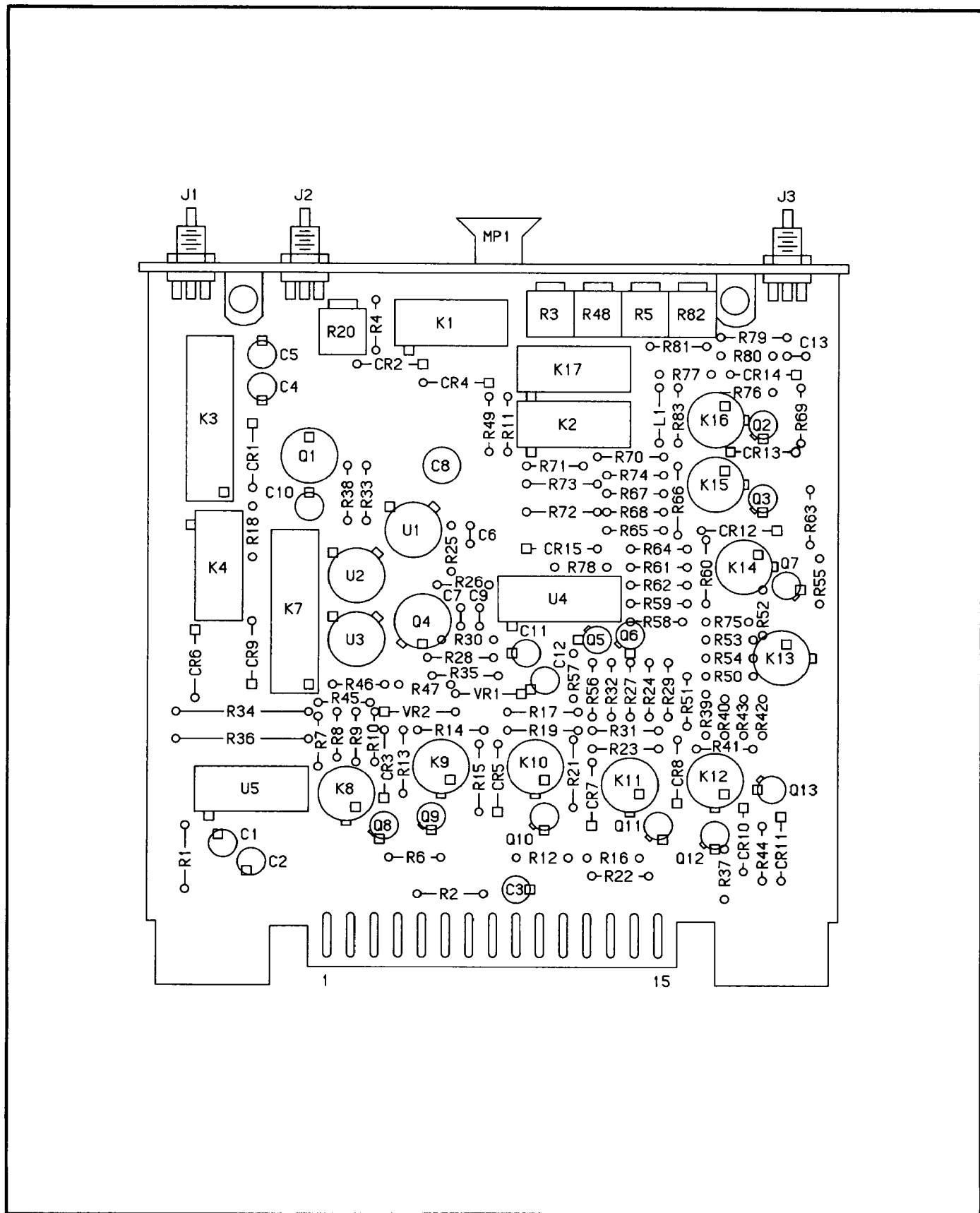


Figure 8-622. A11A3 Phase Modulation Input Component Locator

**CHANGES****All serial prefixes**

On the A11A3 schematic:

- A11A3U3 - On the U3 symbol, reverse the "+" and "-" symbols at the inputs. Pin 3 should be inverting (-) and pin 2 should be non-inverting (+).

- NOTE:**
1. 此圖乃根據最新之零件規格繪製。
  2. 凡圖中註明之零件號碼均須與零件清單中之零件號碼相符。
  3. 凡圖中註明之零件號碼均須與零件清單中之零件號碼相符。
  4. 凡圖中註明之零件號碼均須與零件清單中之零件號碼相符。

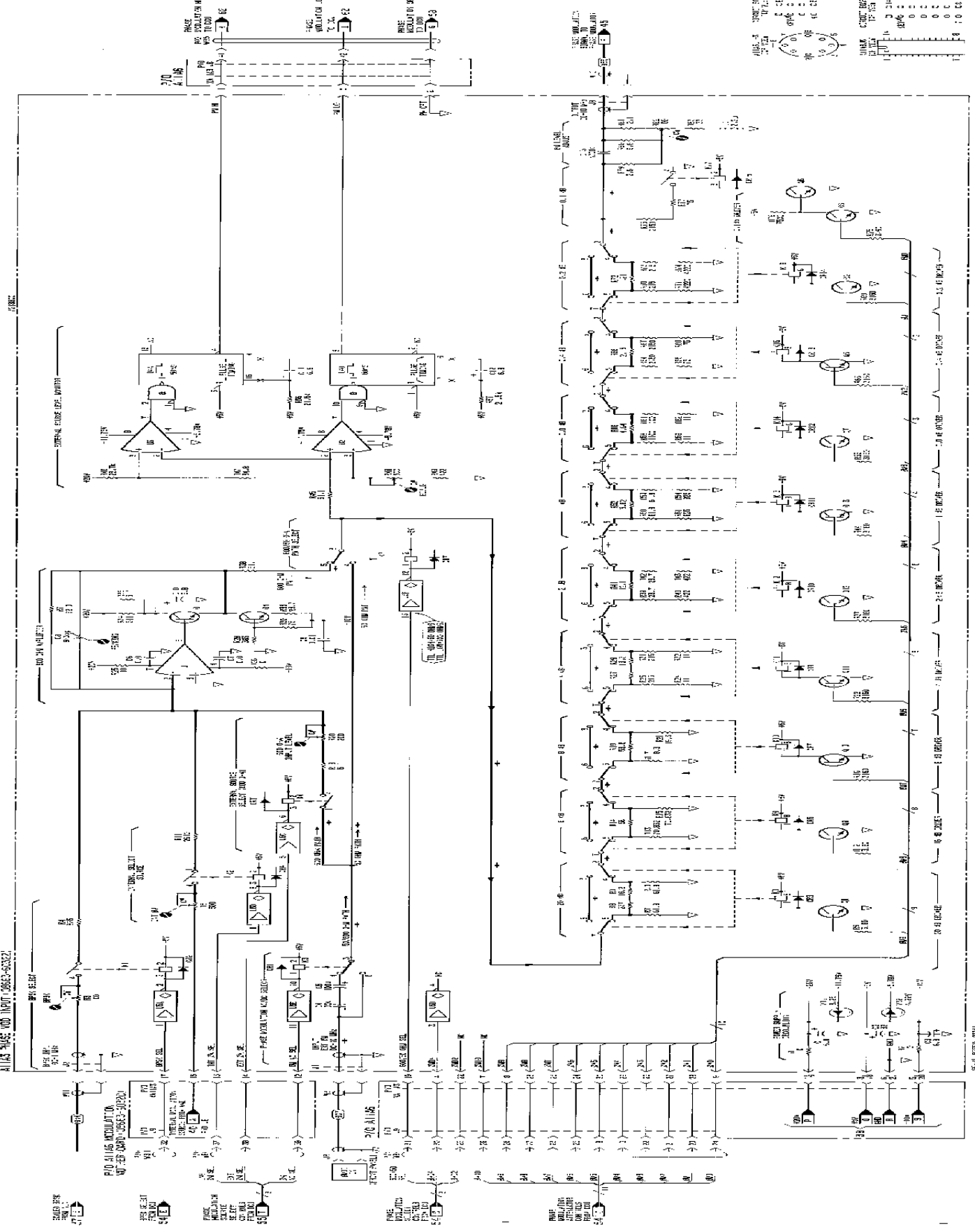
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零件號碼	零件名稱	數量
...	...	...

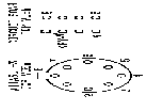
零件號碼	零件名稱	數量
...	...	...

零件號碼	零件名稱	數量
...	...	...

零件號碼	零件名稱	數量
...	...	...



零件號碼	零件名稱	數量
...	...	...





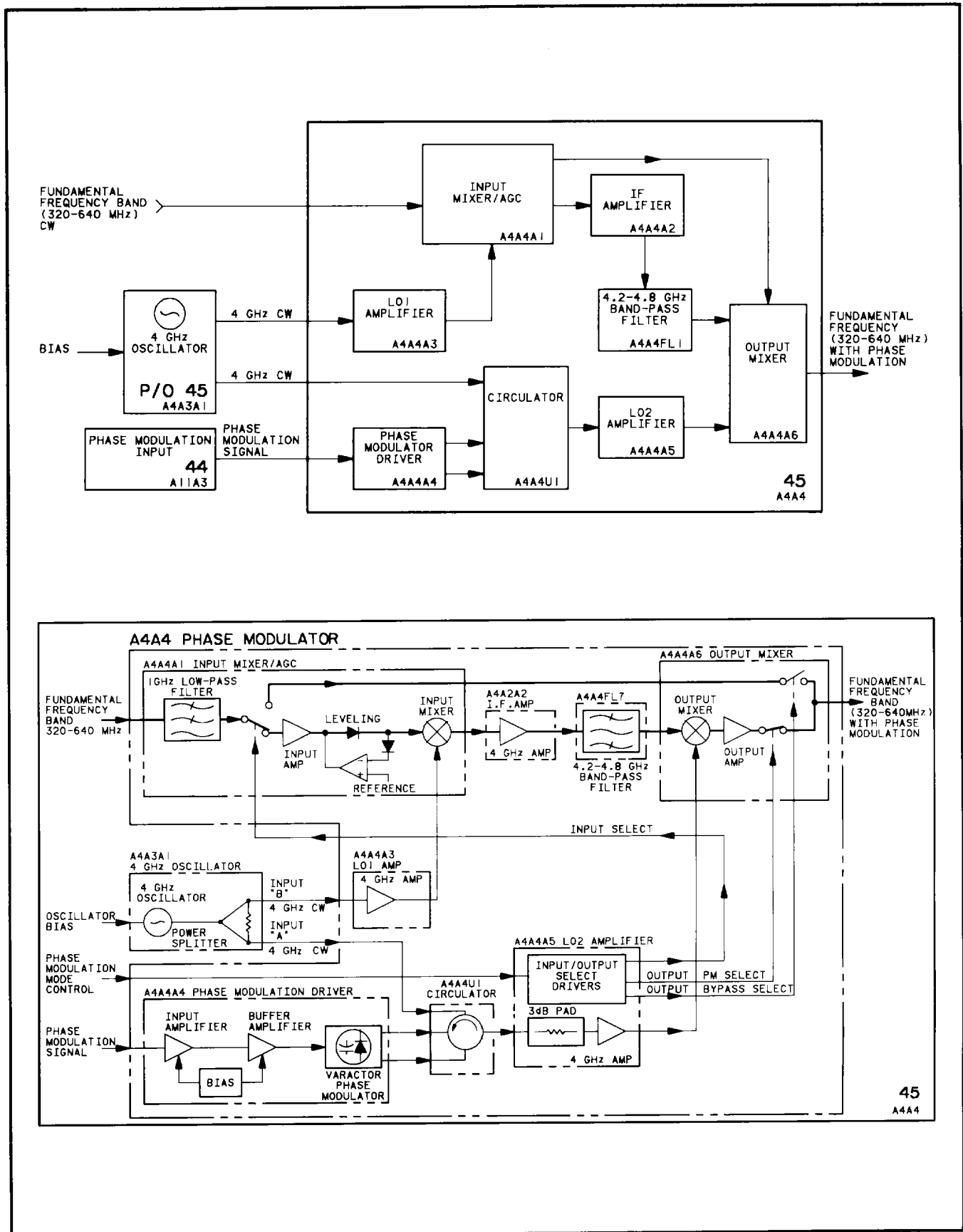
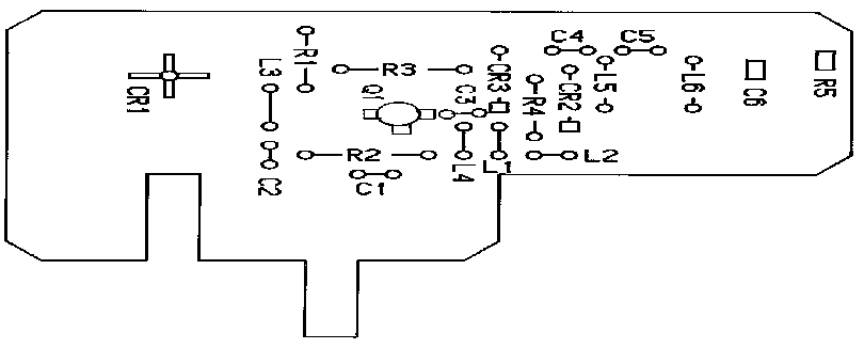
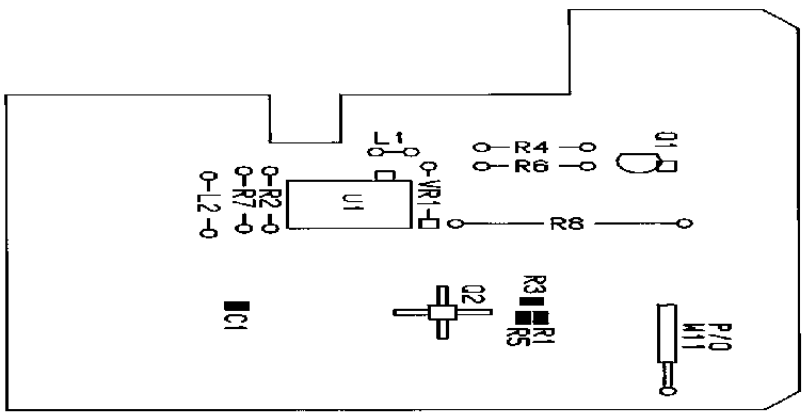


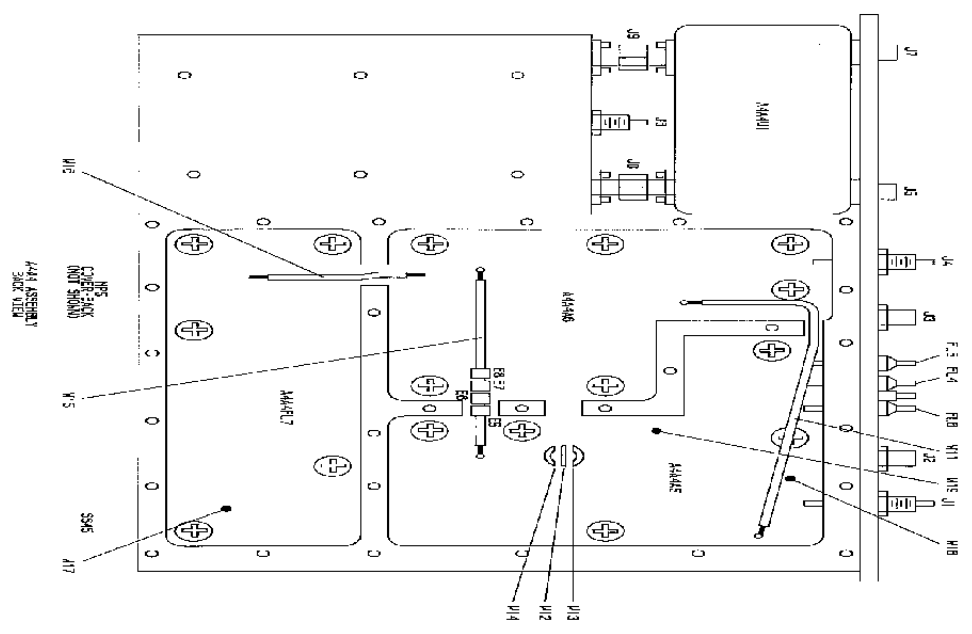
Figure 8-624. A4A4 Phase Modulator Block Diagrams



AAA4A6



AAA4A5



AAA ASSEMBLY COVER BOX (NOT SHOWN) SIDE VIEW

Figure 8-325 AAA4 Power Modulator Component Layout (1 of 2)

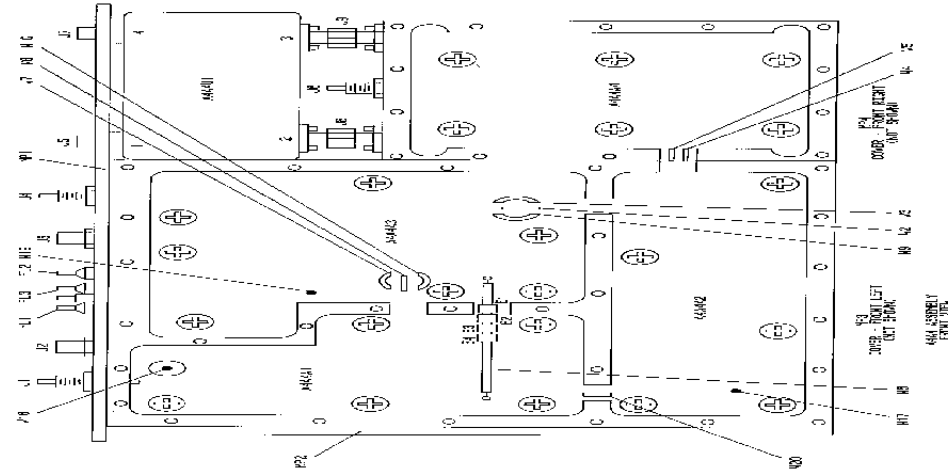
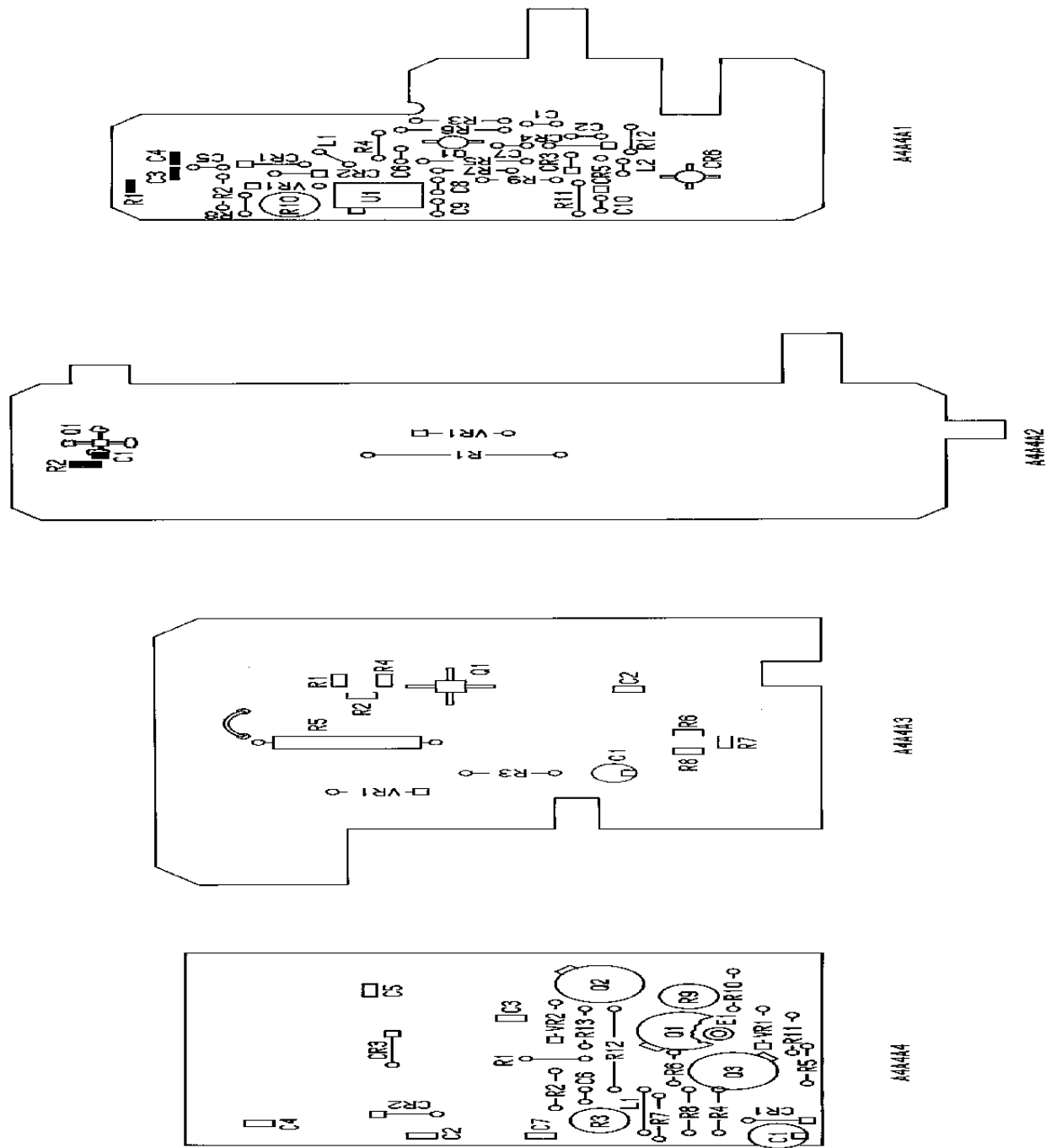


Figure 6-25. A444 Phase Inverter Components Location (2 of 2)

## CHANGES

### All serial prefixes

#### On the schematic:

- W1 (W19) - In the upper left portion of the schematic, change the **W1** to **W19**.

W2 - Label the -10V line connecting A4A4A3 and P/O A4A4A2 **W2**.

W3 - Label the +20V line connecting A4A4A3 and P/O A4A4A2 **W3**.

W4 - Label the -10V line connecting P/O A4A4A2 and A4A4A4 **W4**.

W5 - Label the +20V line connecting P/O A4A4A2 and A4A4A4 **W5**.

W6 - Label the coaxial cable connecting A4A4A3 and A4A4A1 (associated with E1-4) **W6**.

W7 - Label the **INPUT BYPASS SEL** line connecting A4A4A3 and A4A4A1 **W7**.

W8 - Label the +20V line connecting A4A4A3 and A4A4A1 **W8**.

W9 - Label the +5V line connecting A4A4A3 and P/O A4A4A2 **W9**.

W10 - Label the -10V line connecting A4A4A3 and A4A4A1 **W10**.

W12 - Label the **OUTPUT BYPASS SEL 1** line connecting A4A4A5 and A4A4A6 **W12**.

W13 - Label the **OUTPUT BYPASS SEL 2** line connecting A4A4A5 and A4A4A6 **W13**.

W14 - Label +20V line connecting A4A4A5 and A4A4A6 **W14**.

W15 - Label the coaxial cable connecting A4A4A5 and A5A5A6 (associated with E5-8) **W15**.

W16 - Label the coaxial cable connecting A4A4FL7 and A4A4A6 **W16**.

W17 - Label the line connecting A4A4A2 and A4A4FL7 **W17**.

W20 - Label the line connecting A4A4A1Z2 to A4A4A2Z1 **W20**.

**CHANGES****2323A and Above**

A4A4A4 component locator:

- A4A4A4 - Use the new component locator "P/O Figure 8-625. A4A4 Phase Modulator Component Locator (2 of 2) (2323A)" on page 8-638.3.

On the A4A4A4 schematic:

- A4A4A4R10, R11 - Add an asterisk (\*) to R10 and R11 to indicate a factory selected component.

**2535A and Above**

A4A4A2, A4A4A3, and A4A4A5 component locators:

- A4A4A2, A4A4A3, A4A4A5 - Use the component locators "A4A4A2, A4A4A3, and A4A4A5 Component Location Diagrams (2535A)" on page 8-638.4.

A4A4A2 schematic:

- A4A4A2 - Use the A4A4A2 schematic "P/O Figure 8-626. A4A4A2 Schematic (2535A)" on page 8-638.5.

A4A4A3 schematic:

- A4A4A3 - Use the A4A4A3 schematic "P/O Figure 8-626. A4A4A3 Schematic (2535A)" on page 8-638.5.

A4A4A5 schematic:

- A4A4A5 - Use the A4A4A5 schematic "P/O Figure 8-626. A4A4A5 Schematic (2535A)" on page 8-638.6.

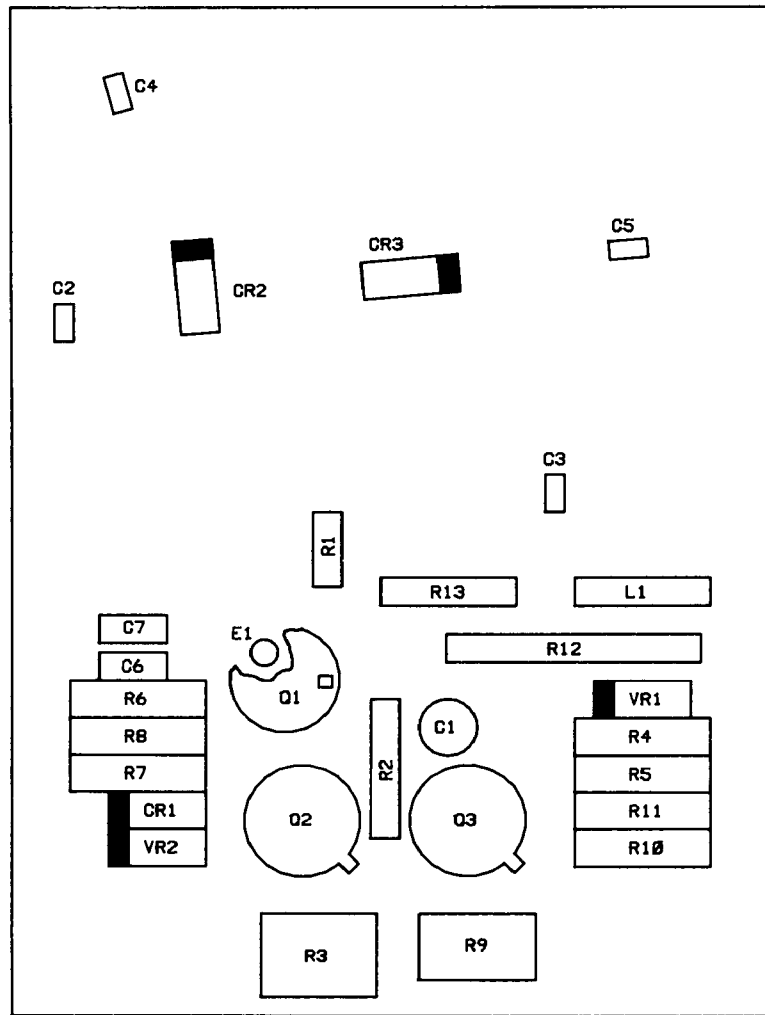
**2545A and Above**

On the A4A4A6 component locator:

- A4A4A6C7 (R5) - Change R5 to C7.

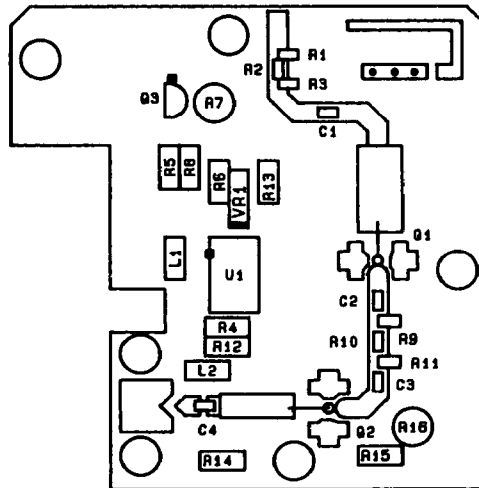
On the A4A4A6 schematic:

- A4A4A6C6 - Change the value of C6 to 4.7p.
- A4A4C7 (R5) - Replace R5 with a capacitor, C7 (4.7p)

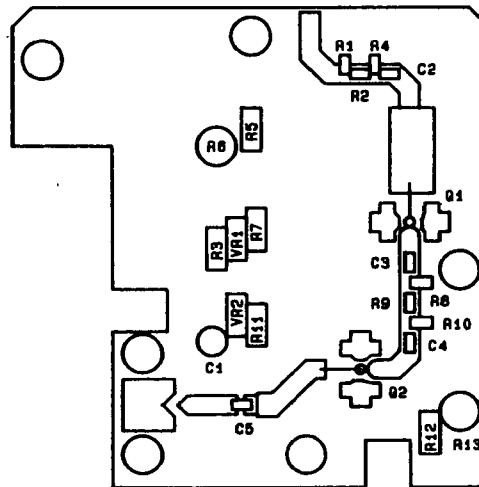


A4A4A4

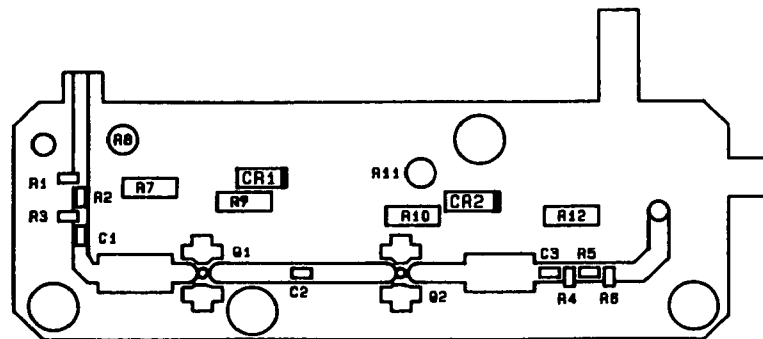
P/O Figure 8-625. A4A4 Phase Modulator Component Locator (2 of 2) (2323A)



60366

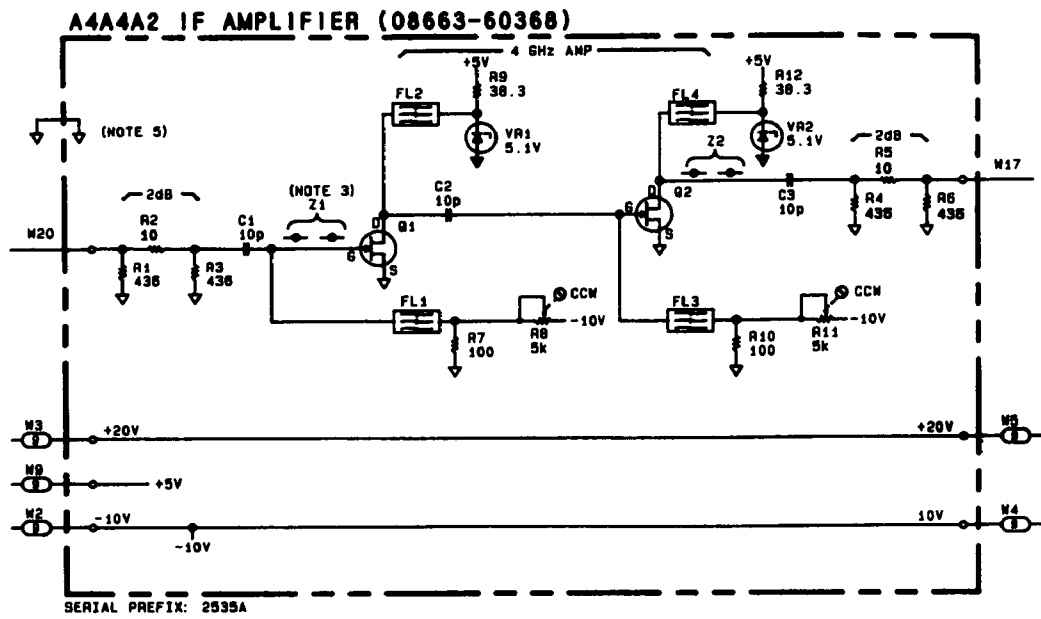


60367

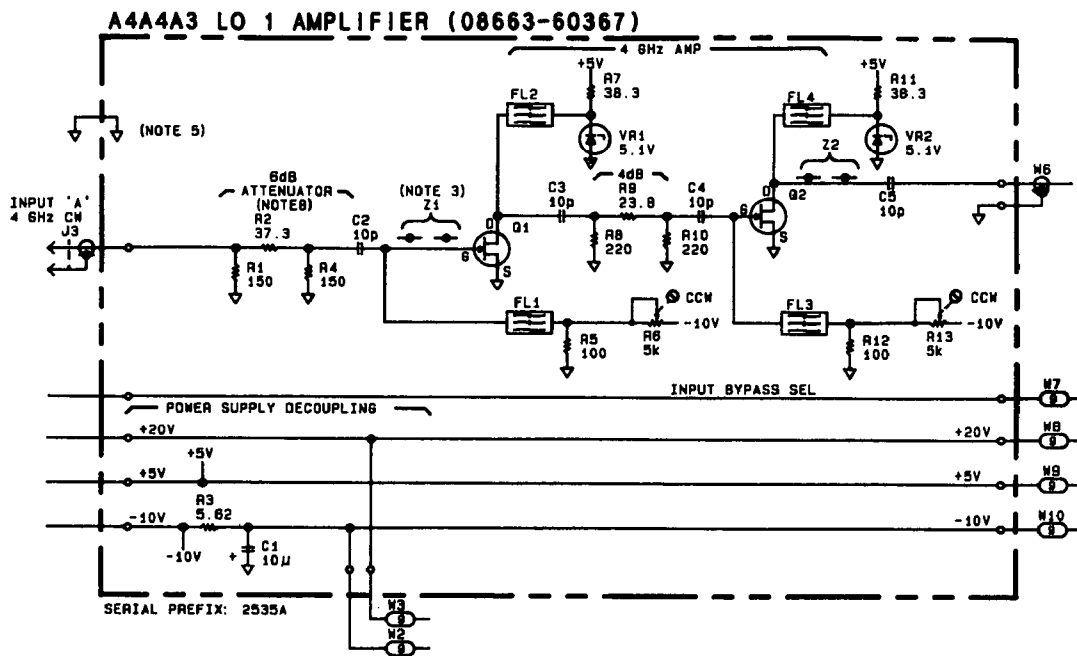


60368

A4A4A2, A4A4A3, and A4A4A5 Component Location Diagrams (2535A)

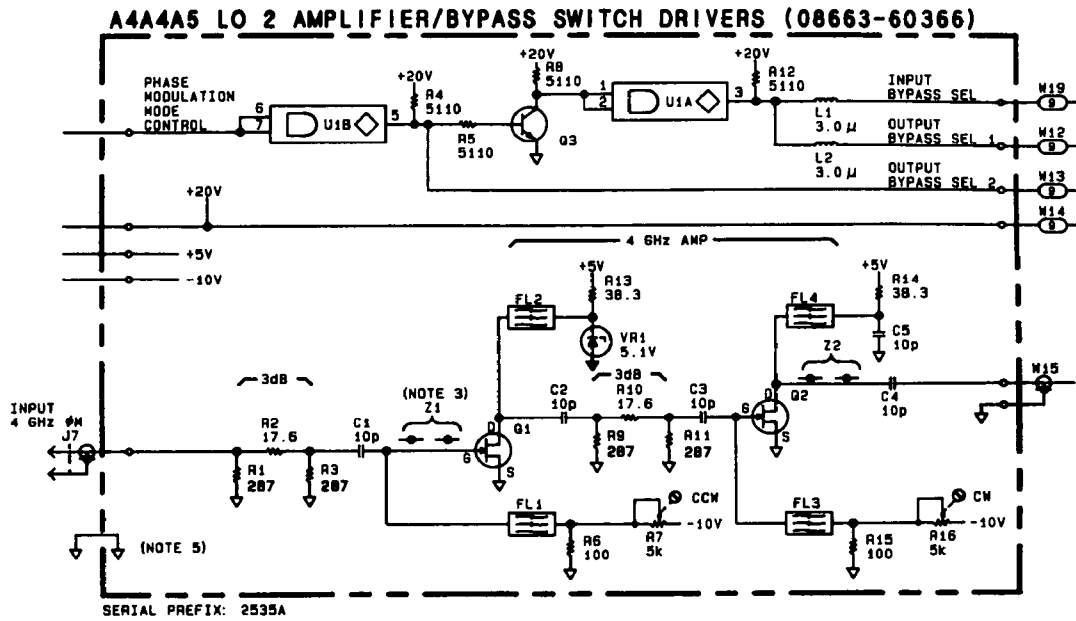


P/O Figure 8-626. A4A4A2 Schematic (2535A)



P/O Figure 8-626. A4A4A3 Schematic (2535A)





P/O Figure 8-626. A4A4A5 Schematic (2535A)





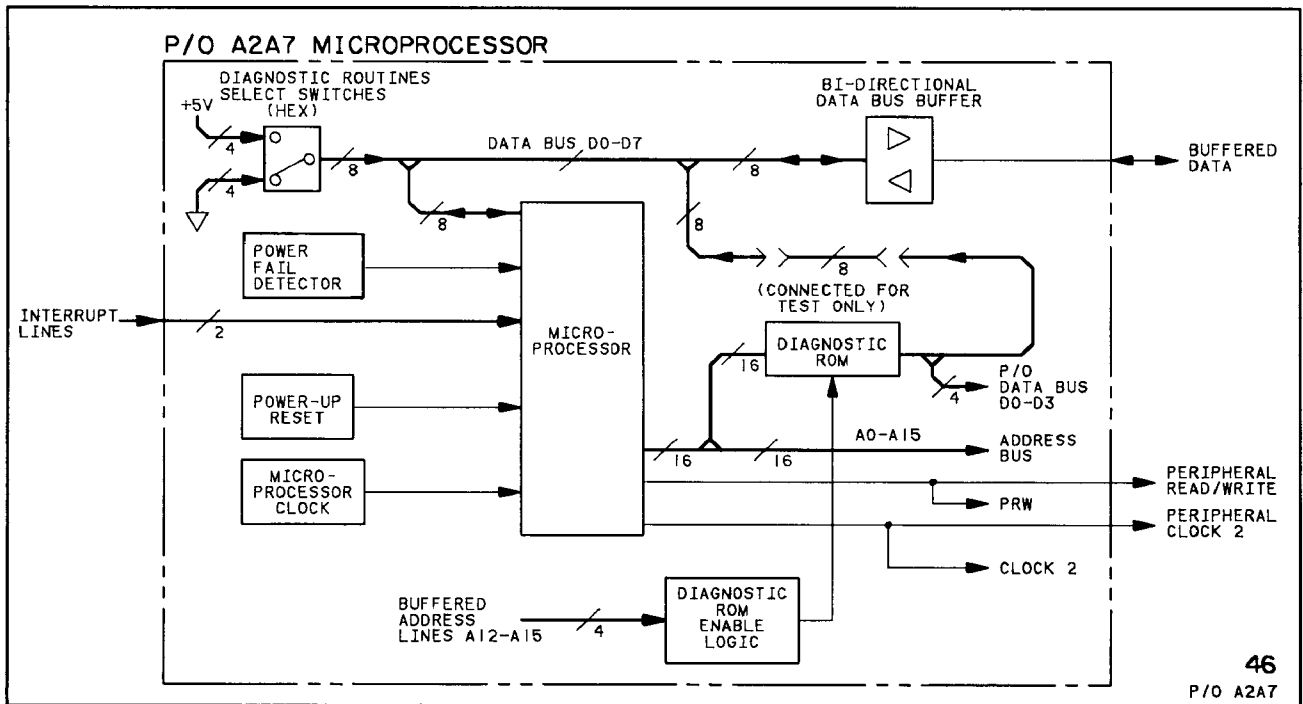
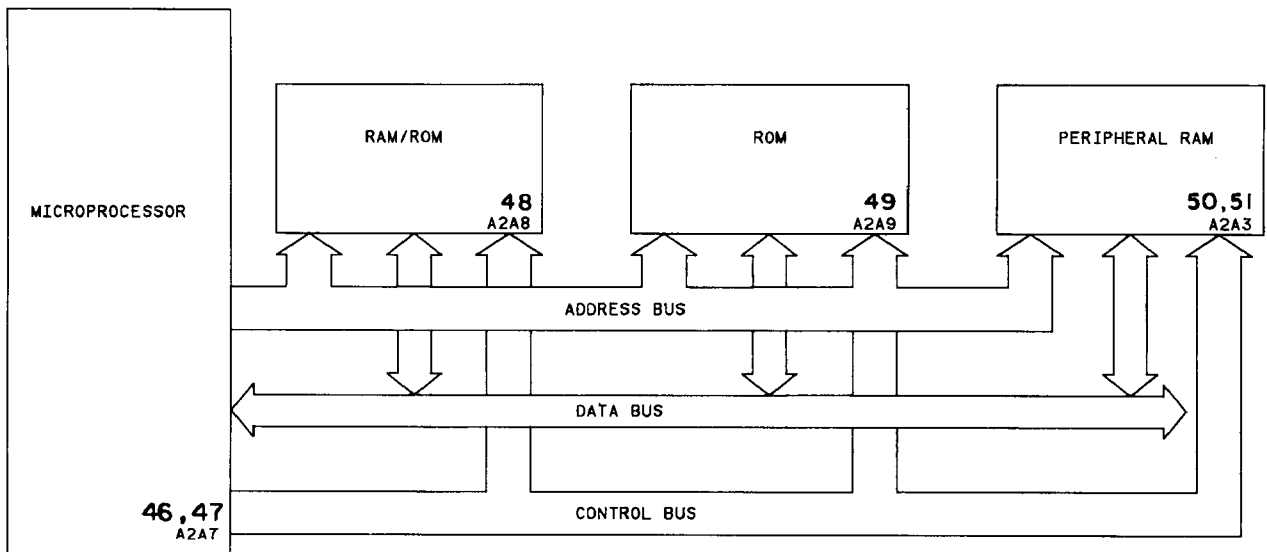


Figure 8-701. P/O A2A7 Microprocessor Block Diagrams

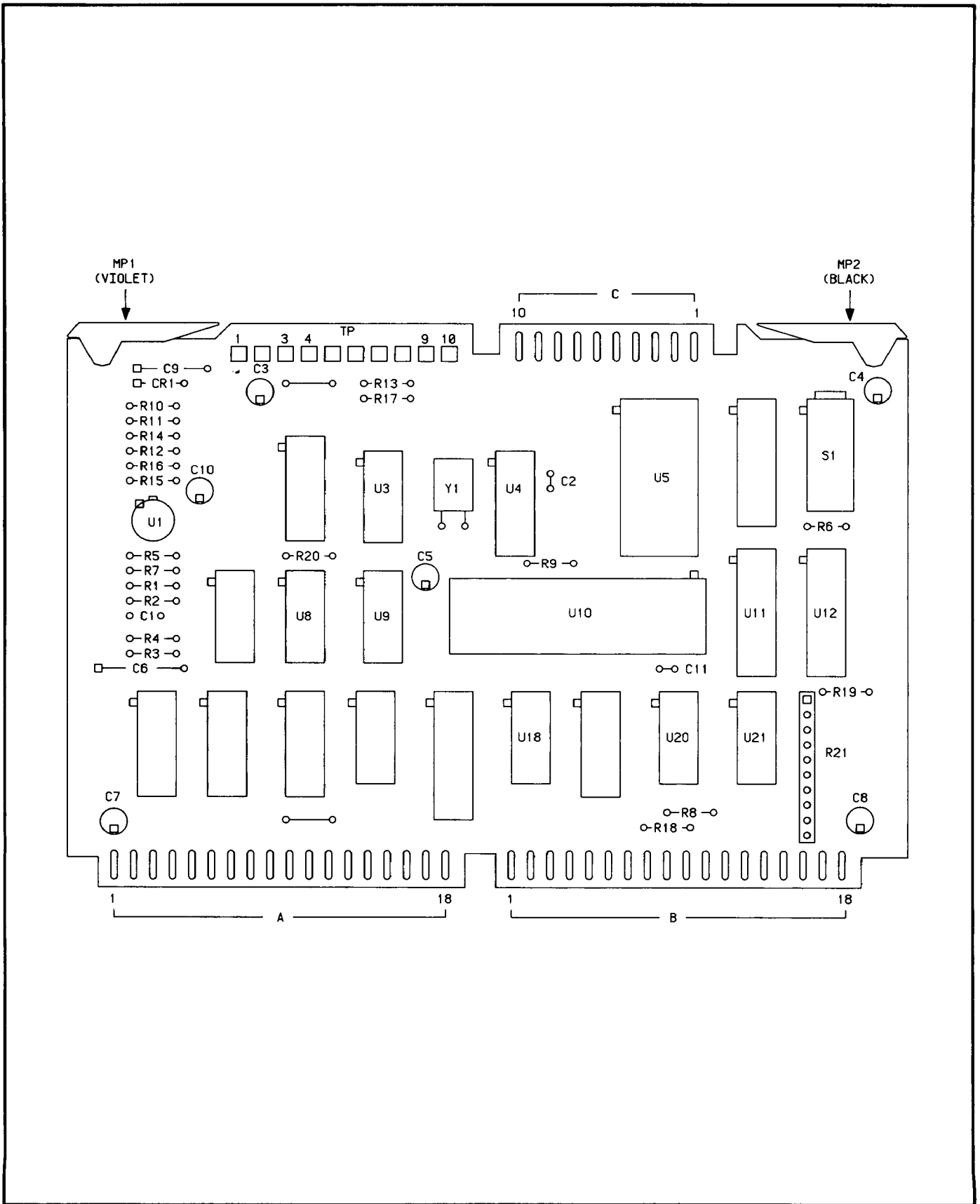


Figure 8-702. P/O A2A7 Microprocessor Component Locator

**CHANGES****All serial prefixes**

On the A2A7 schematic:

- A2A7C9 - Change the value of C9 to 2.2u.
- A2A7R15 - Change the value of R15 to 121k.

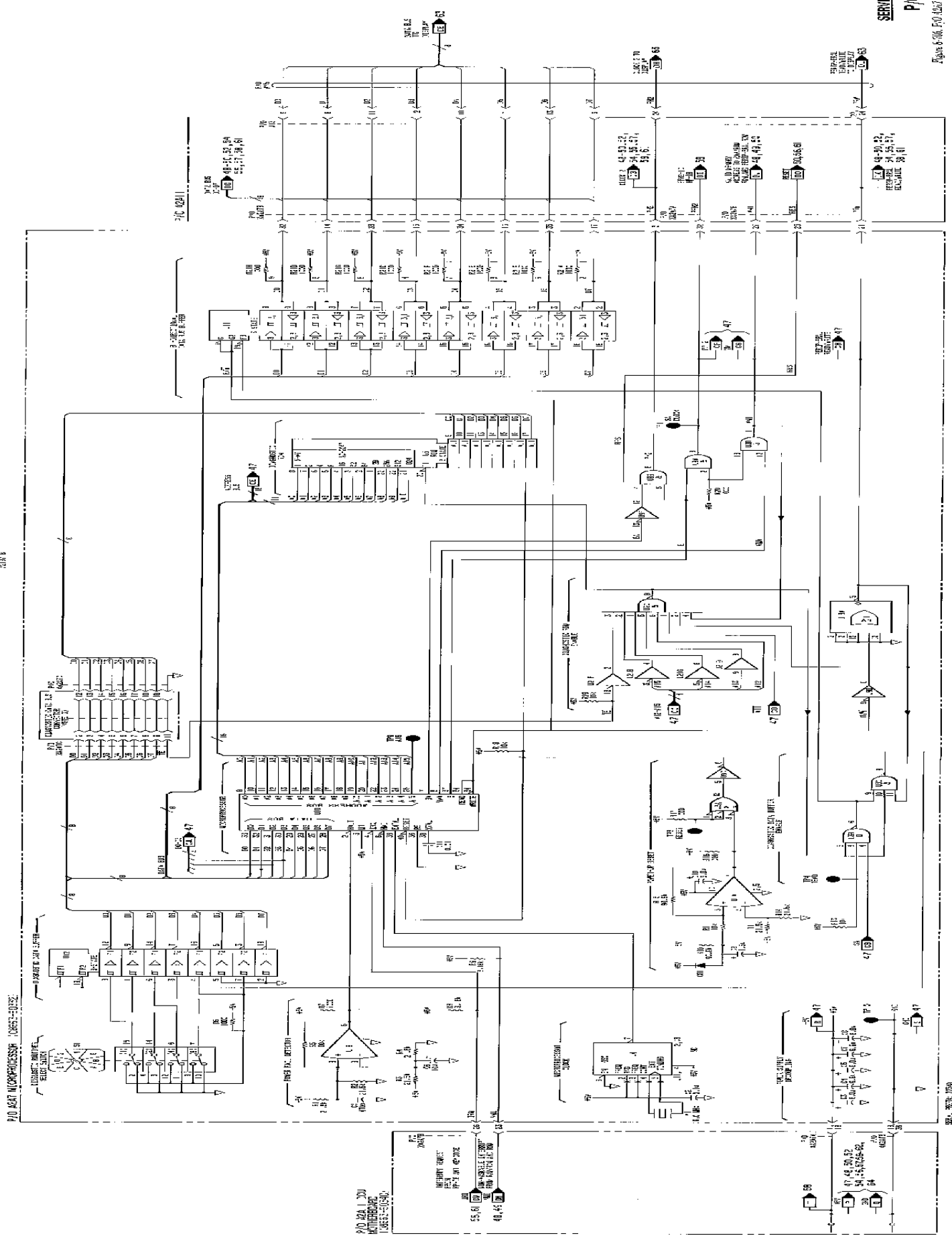
**2346A and Above**

On the A2A7 component locator:

- A2A7C12 - Add chip capacitor C12. C12 is added to the circuit side of the board, soldered in parallel with pins 4 and 5 of U4. (Use a dotted outline to indicate that this component is on the circuit side of the board.)

On the A2A7 schematic:

- A2A7C12 - Add capacitor C12 (22p) in parallel with Y1 and pins 4 and 5 of U4.



4-106-105

PIO AZAY MICROPROCESSOR (U1) (SEE FIG. 4-106-105)

PIO AZAY MICROPROCESSOR (U2) (SEE FIG. 4-106-105)

PIO AZAY MICROPROCESSOR (U3) (SEE FIG. 4-106-105)

PIO AZAY MICROPROCESSOR (U4) (SEE FIG. 4-106-105)

4-106-105

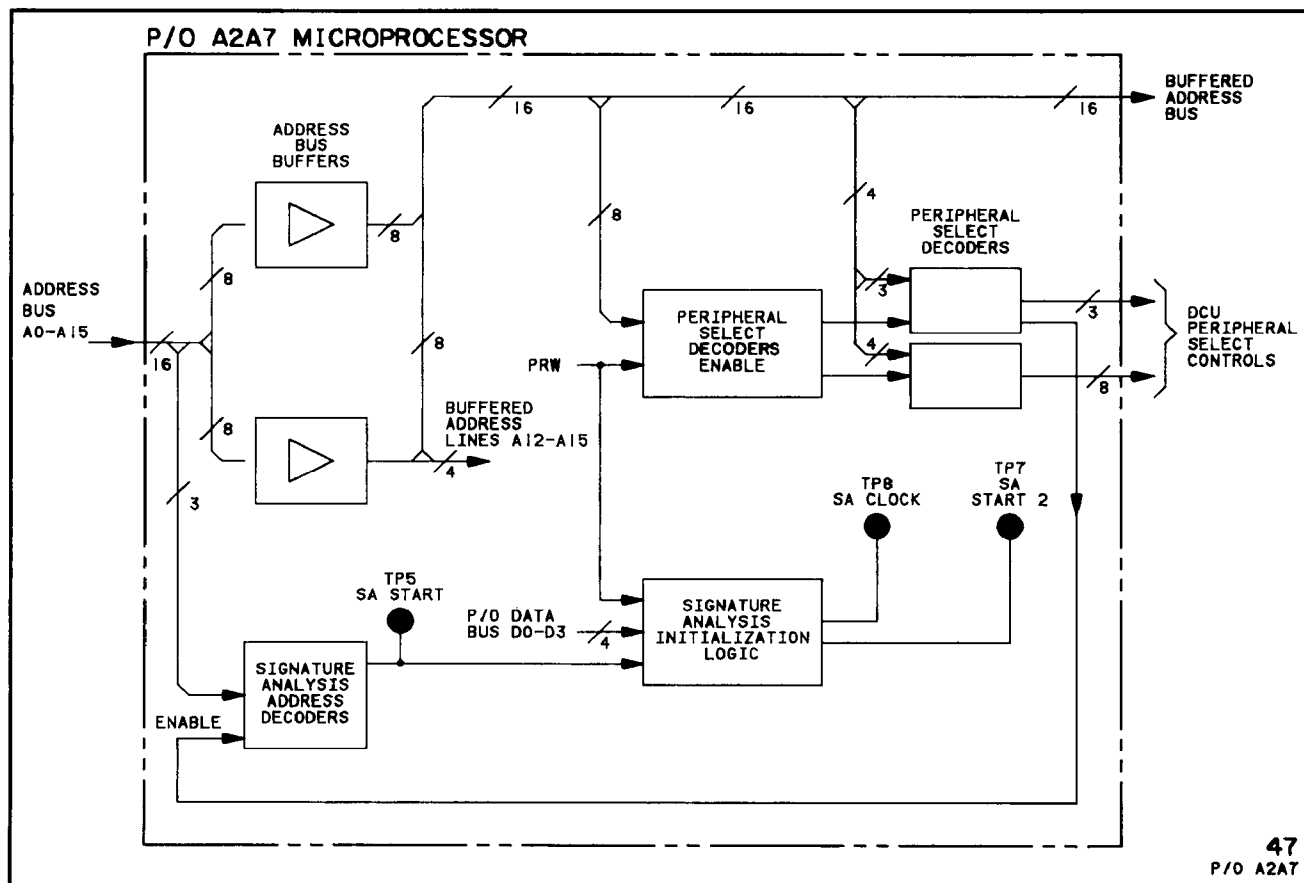
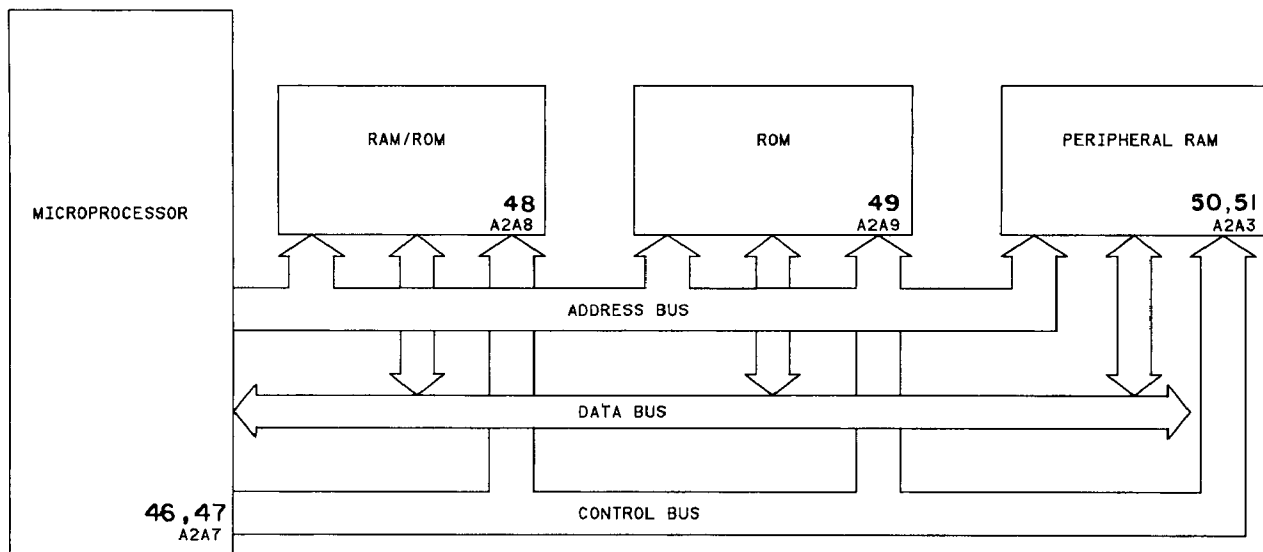


Figure 8-704. P/O A2A7 Microprocessor Block Diagrams



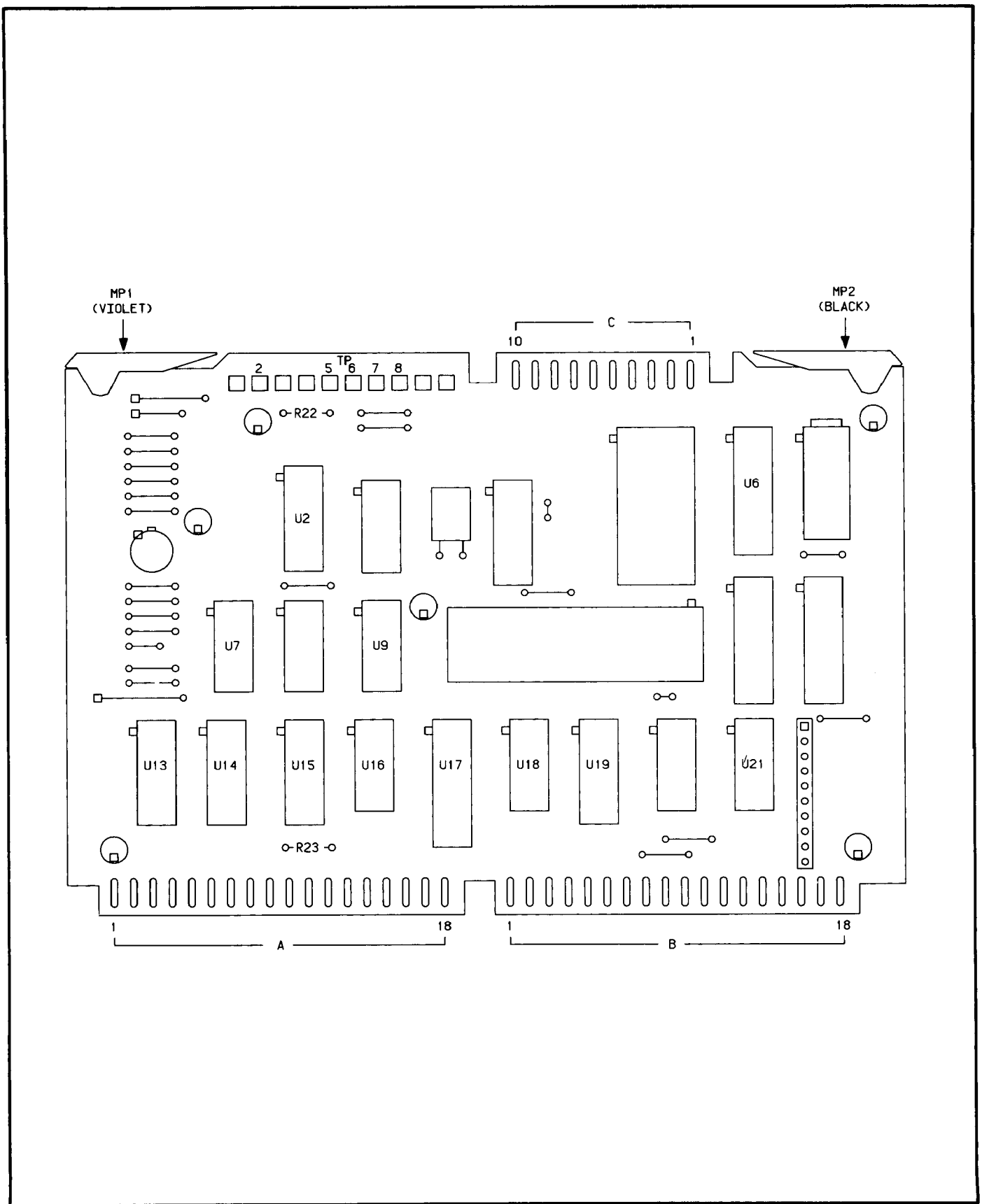


Figure 8-705. P/O A27 Microprocessor Component Locator



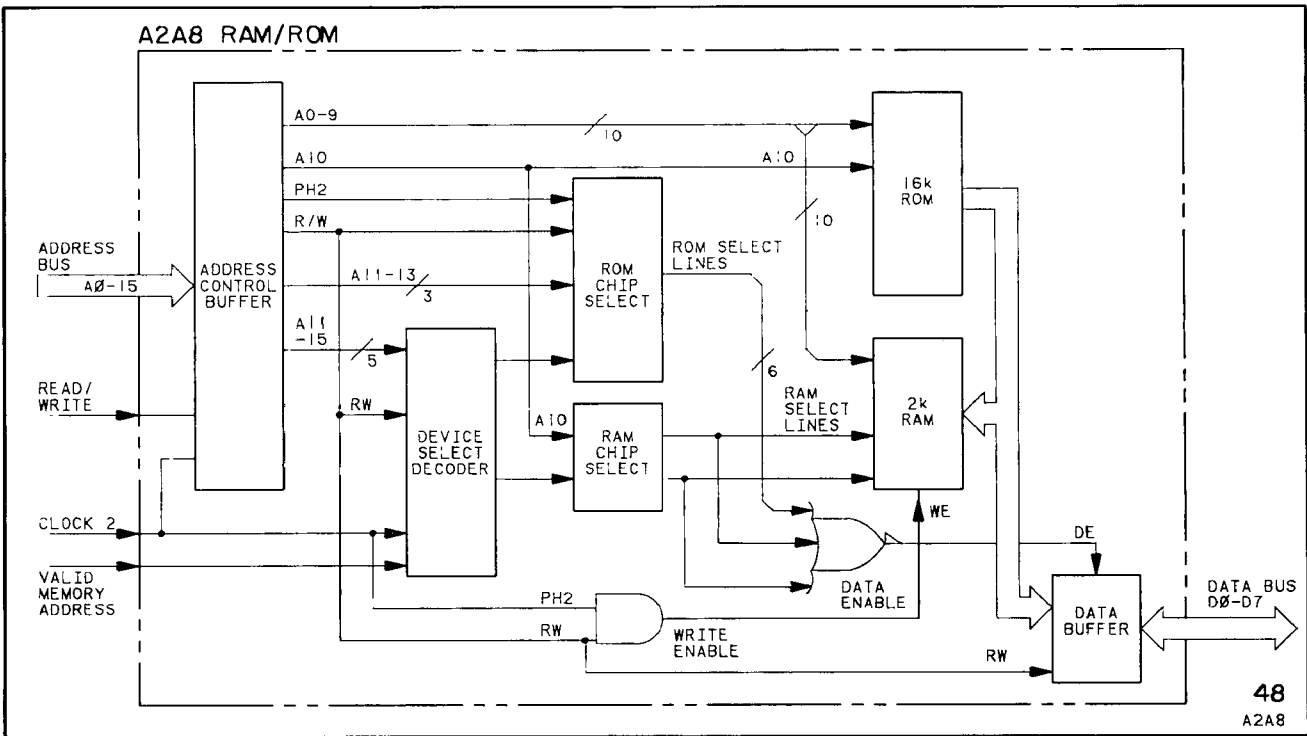
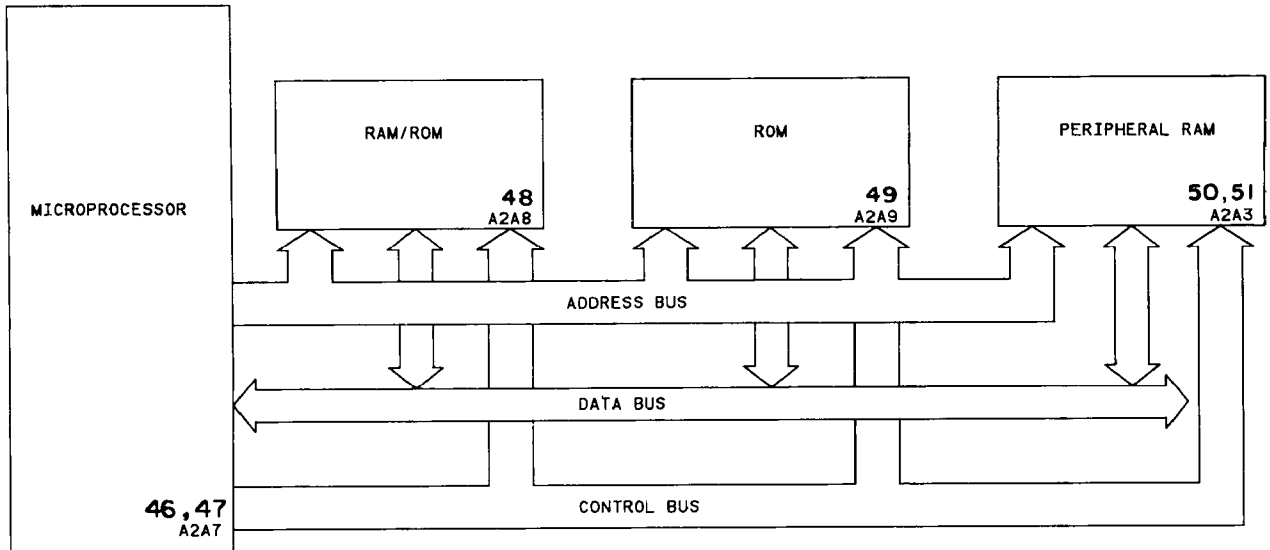


Figure 8-707. A2A8 RAM/ROM Block Diagrams

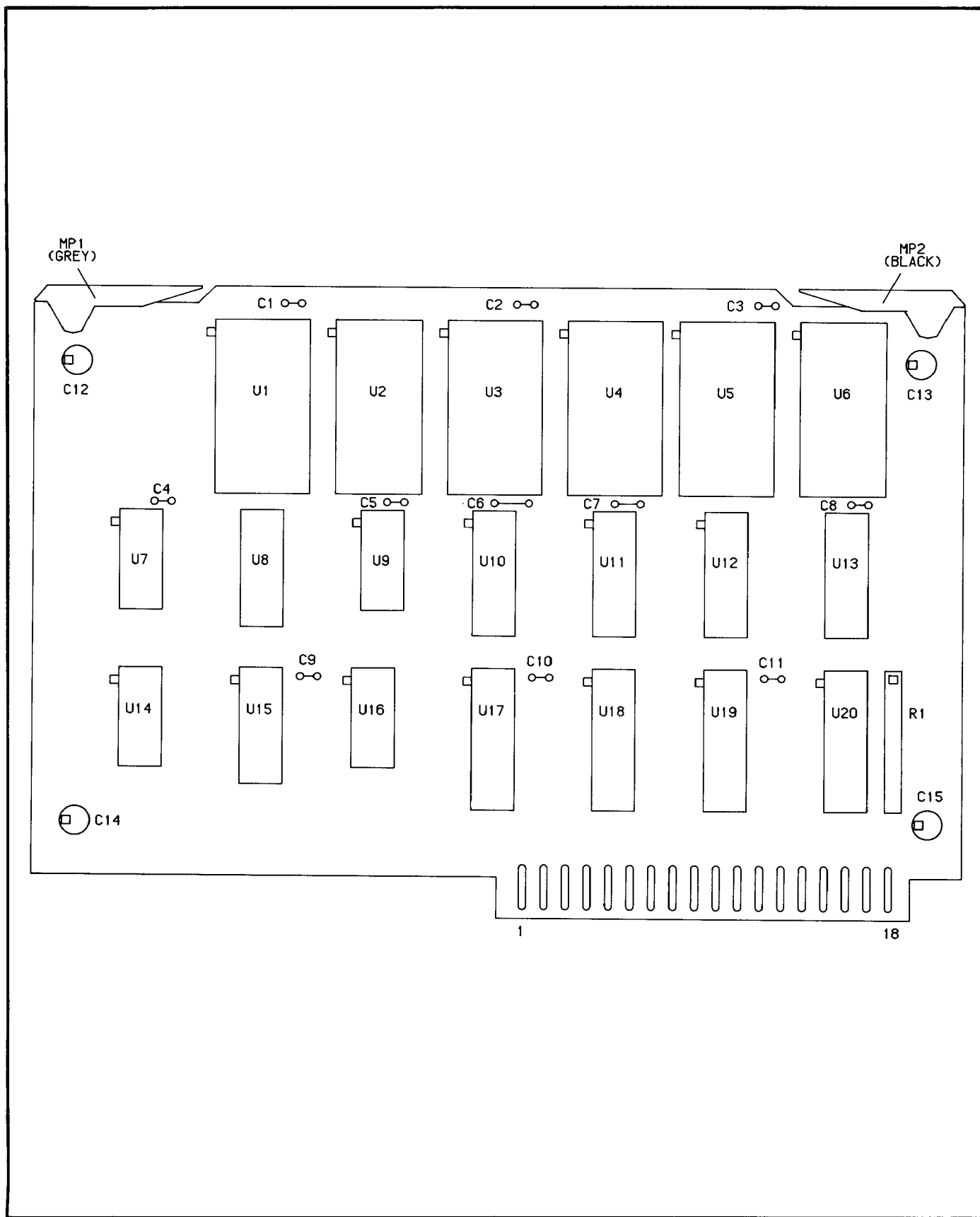


Figure 8-708. A2A8 RAM/ROM Component Locator

## CHANGES

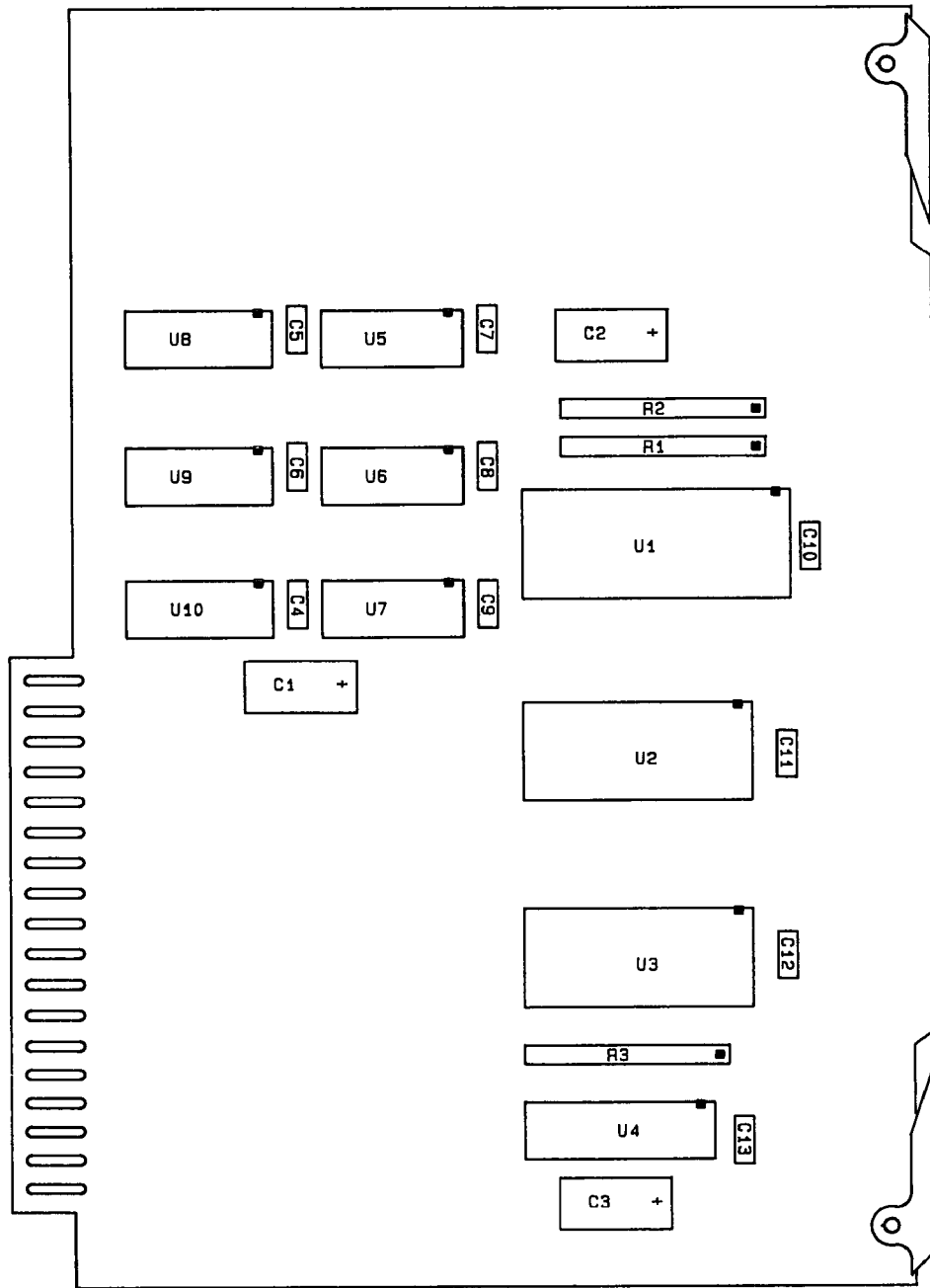
### 2537A and Above

#### A2A8 component locator:

- A2A8 - Use the component locator "Figure 8-708. A2A8 RAM/ROM Component Locator (2537A)" on page 8-710.3.

#### A2A8 schematic:

- A2A8 - Use the schematic "Figure 8-709. A2A8 RAM/ROM Schematic (2537A)" on page 8-710.5



**A2A8**

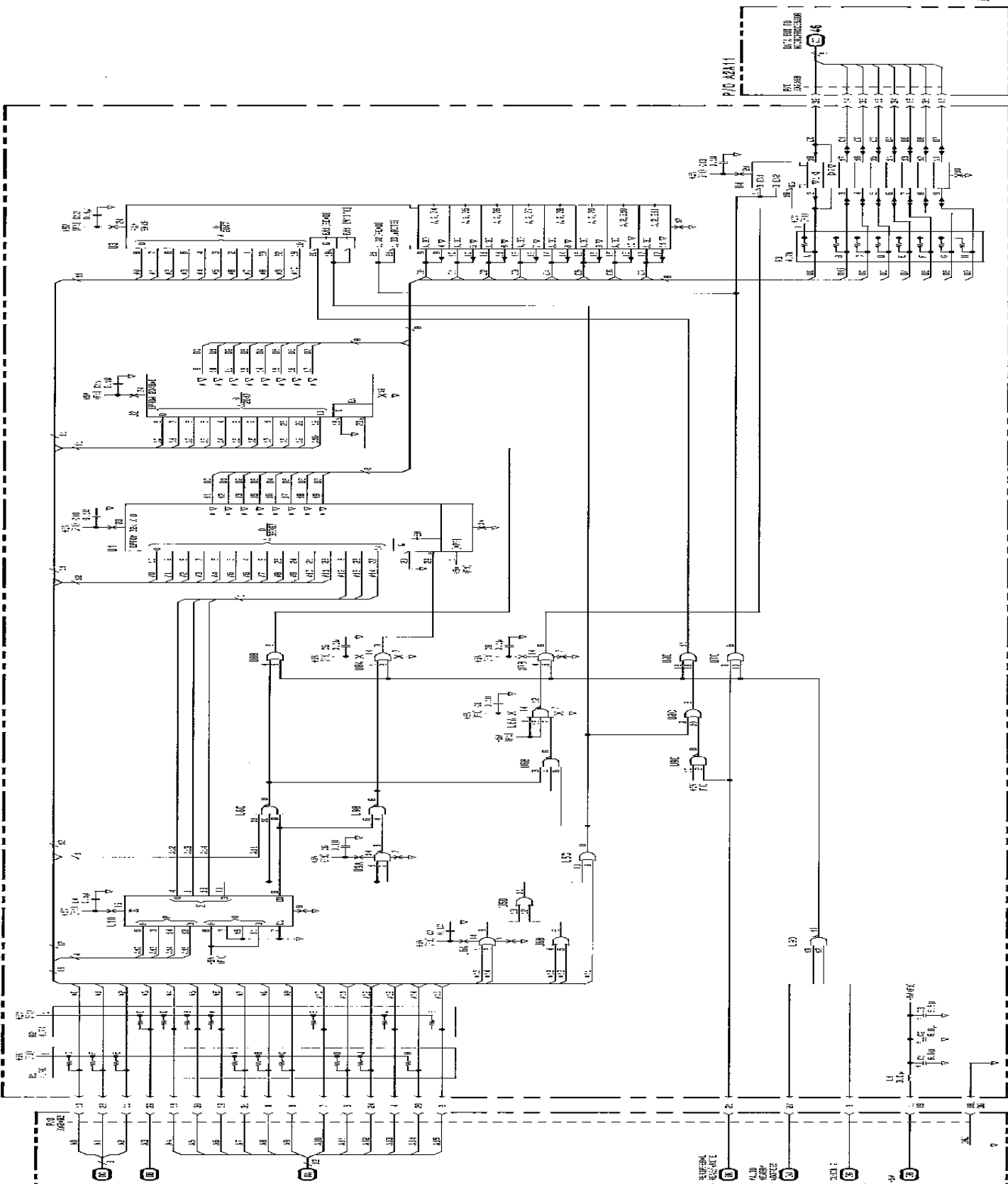
*Figure 8-708. A2A8 RAM/ROM Component Locator (2537A)*

AZ48 RAM/ROM MEMORY (06683-00365)

P/O AZ411 DCU  
NOTE: ERRO/NO  
(06683-00340)

UNLESS  
NOTED OTHERWISE

RAM MEMORY (06683-00365)  
ROM MEMORY (06683-00340)







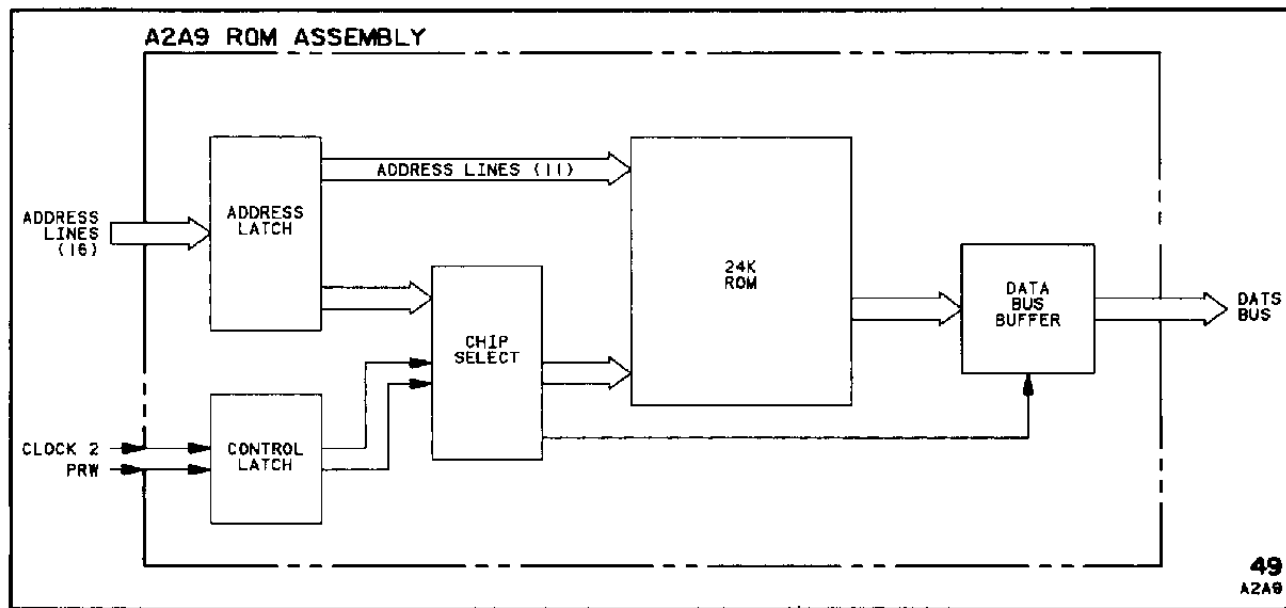
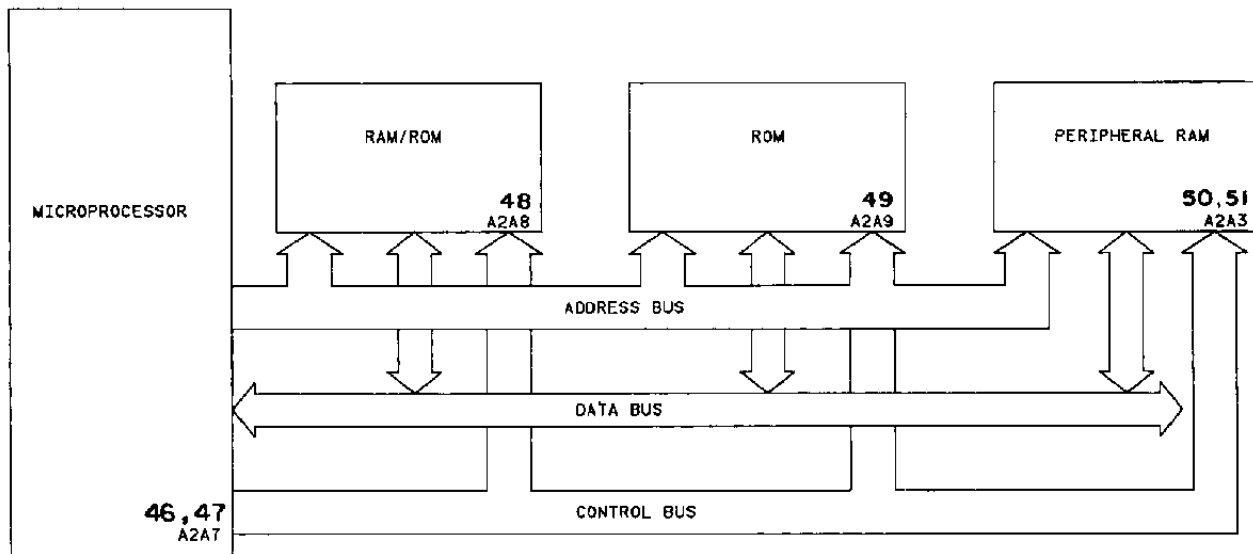


Figure 8-710. A2A9 ROM Block Diagrams

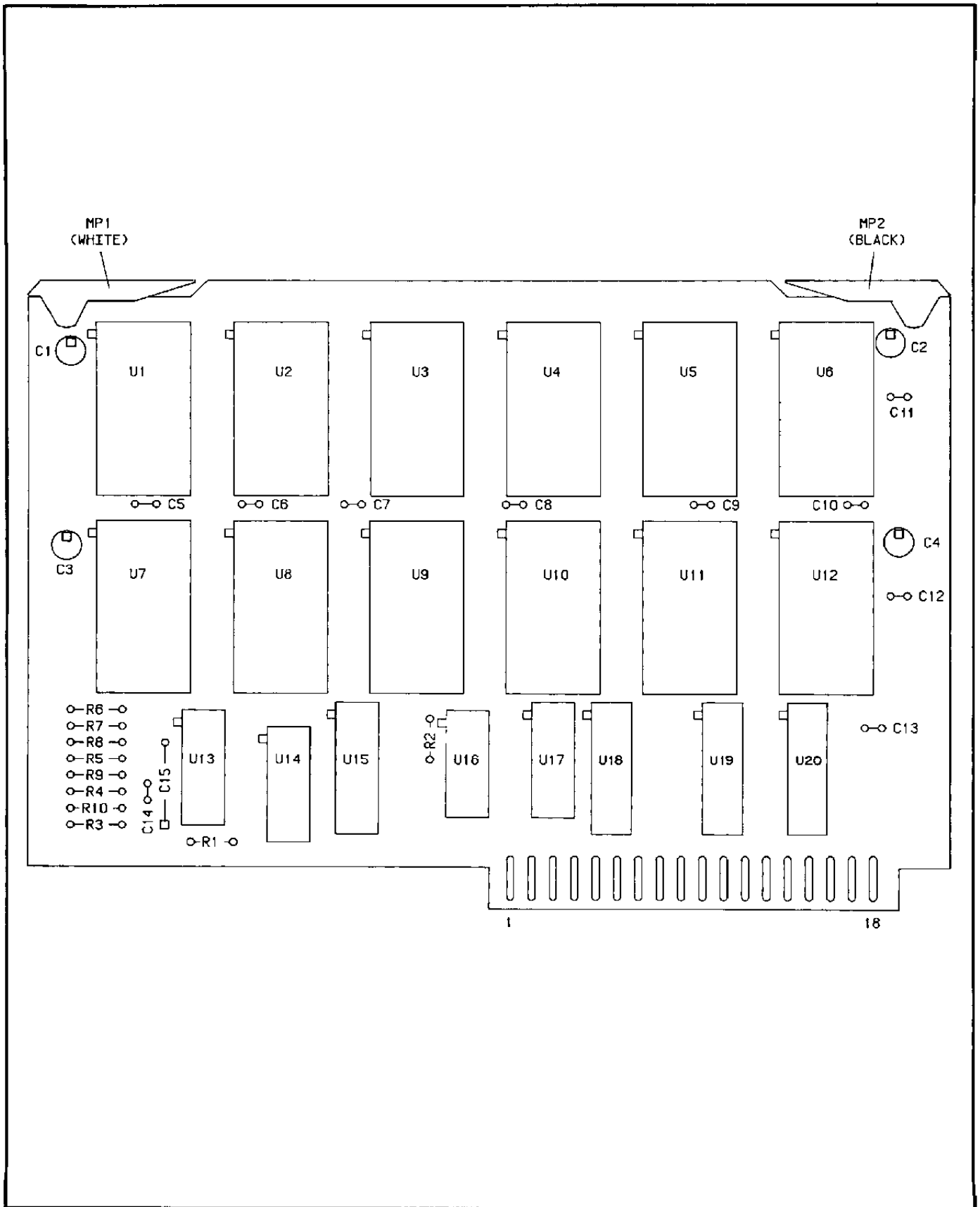
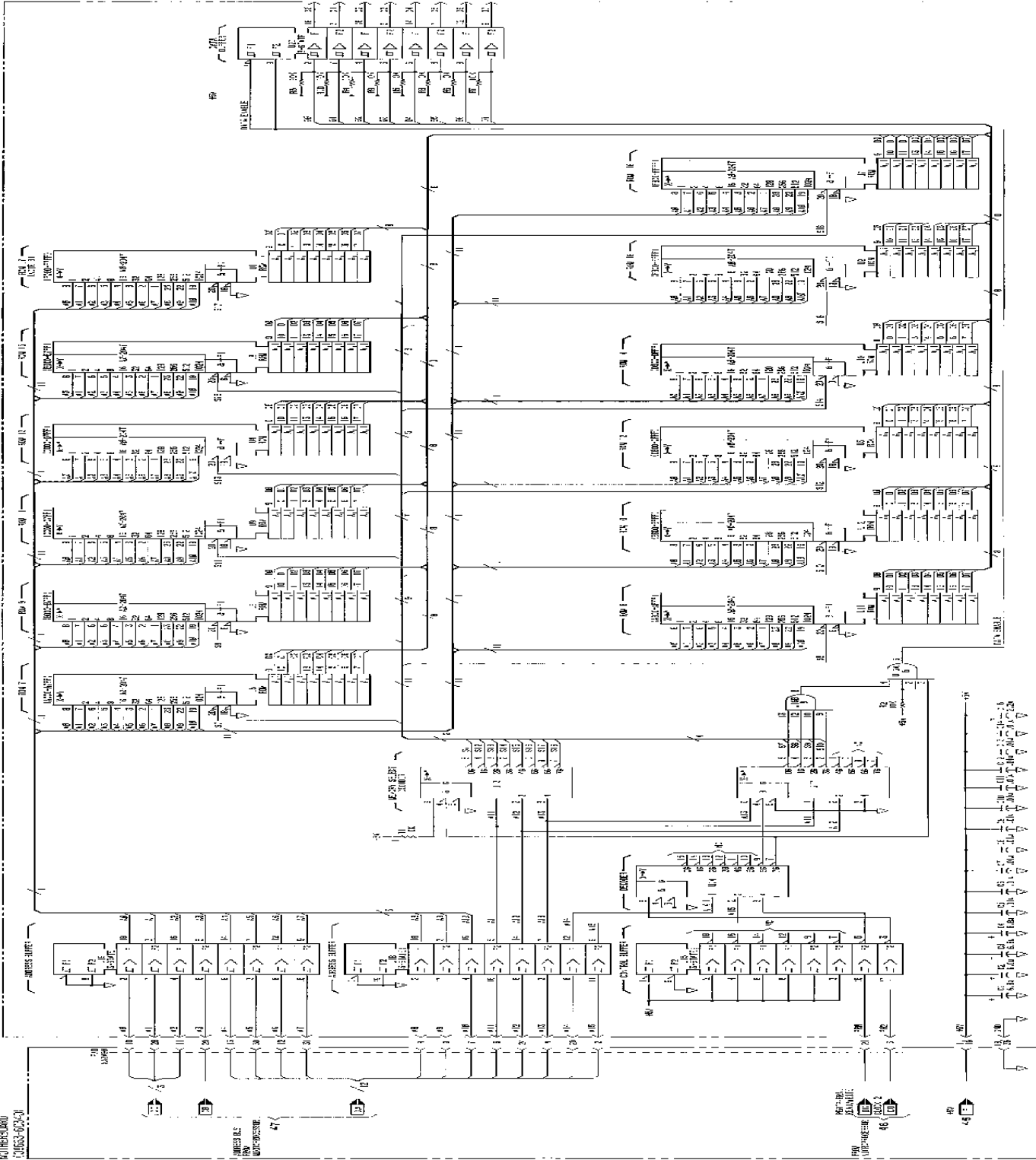


Figure 8-711. A2A9 ROM Component Locator



- 1. 此圖為 42411-001 的組裝圖。
- 2. 此圖為 42411-001 的組裝圖。
- 3. 此圖為 42411-001 的組裝圖。
- 4. 此圖為 42411-001 的組裝圖。
- 5. 此圖為 42411-001 的組裝圖。

備註

300 42411  
 300 42411

零件號	數量	備註
300 42411	1	
300 42411	1	

零件號	數量	備註
300 42411	1	
300 42411	1	

零件號	數量	備註
300 42411	1	
300 42411	1	

零件號	數量	備註
300 42411	1	
300 42411	1	

零件號	數量	備註
300 42411	1	
300 42411	1	

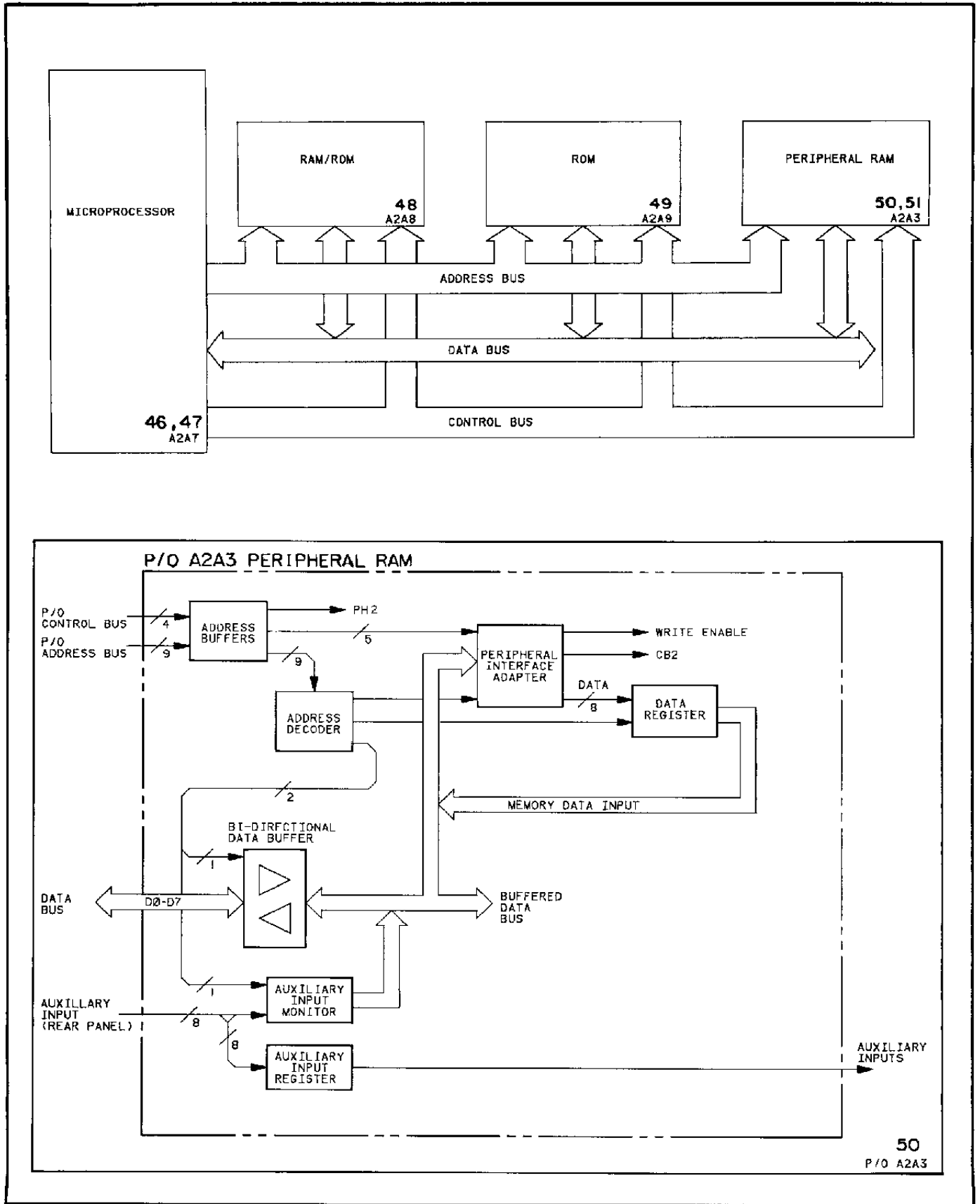
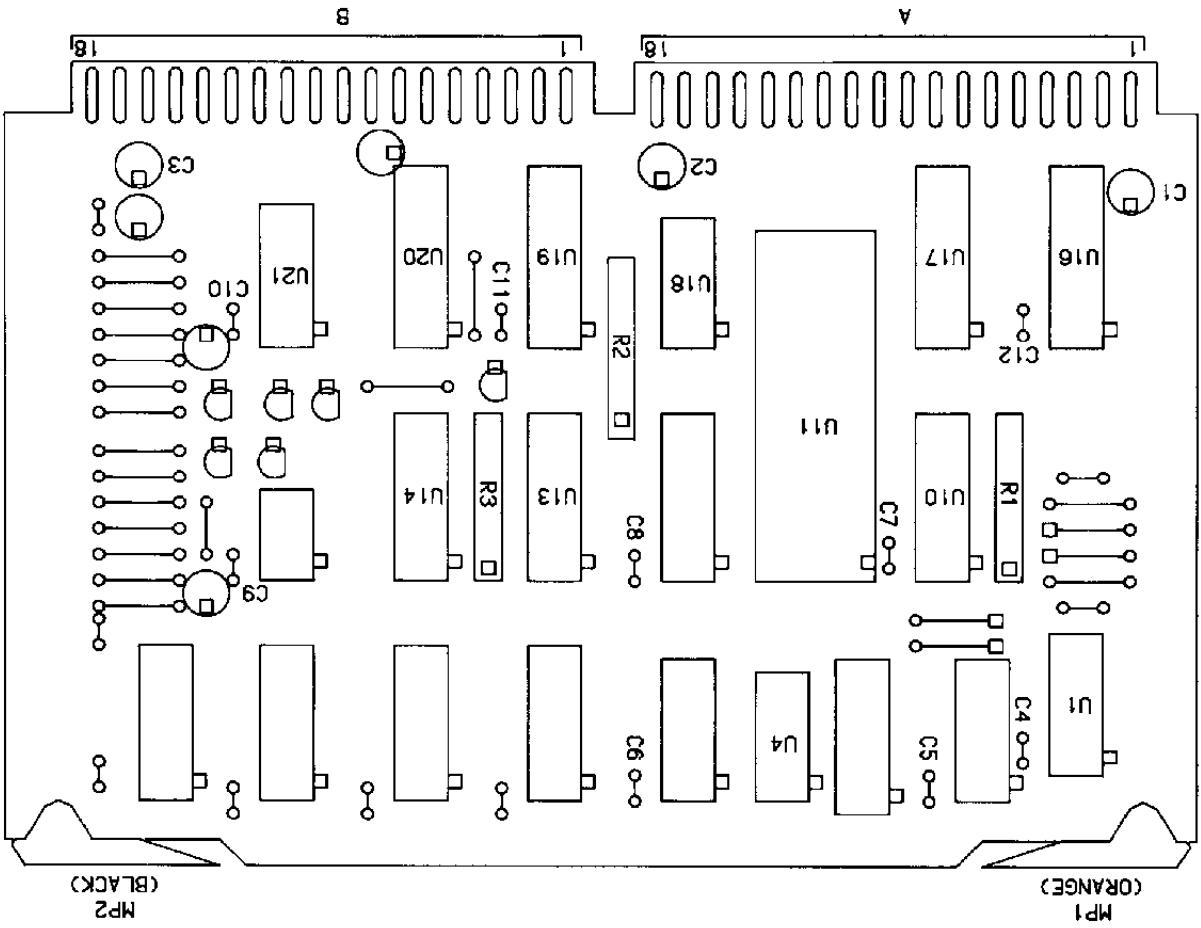
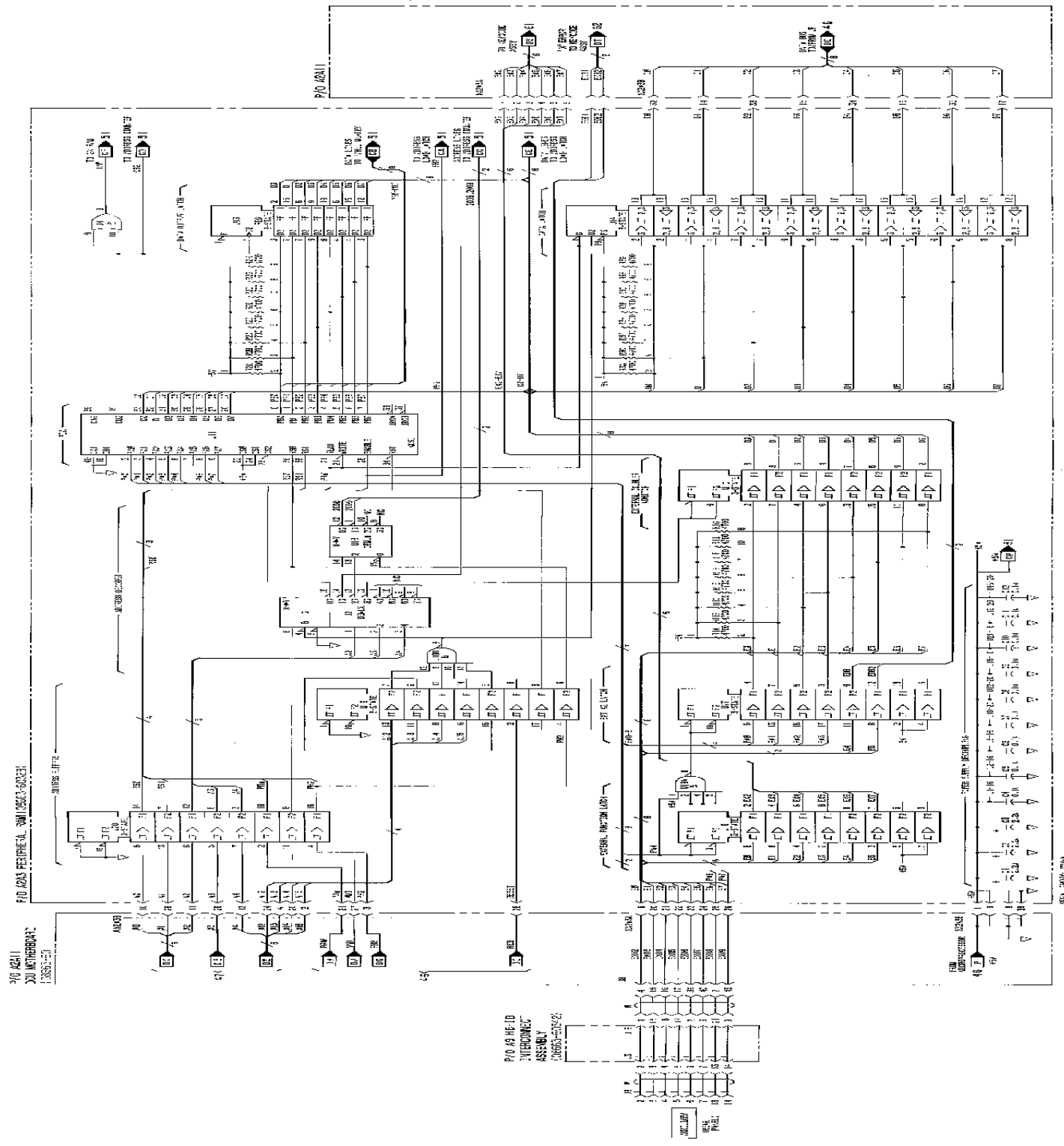


Figure 8-713. P/O A2A3 Peripheral RAM Block Diagrams

Figure 8-714. P/O A2A3 Peripheral RAM Component Locator





P/O AZ43 PERIPHERAL TERMINAL SOCKET  
 2X01-50

P/O AZ43 ID INTERCONNECT ASSEMBLY  
 2X02-50

501-301-200

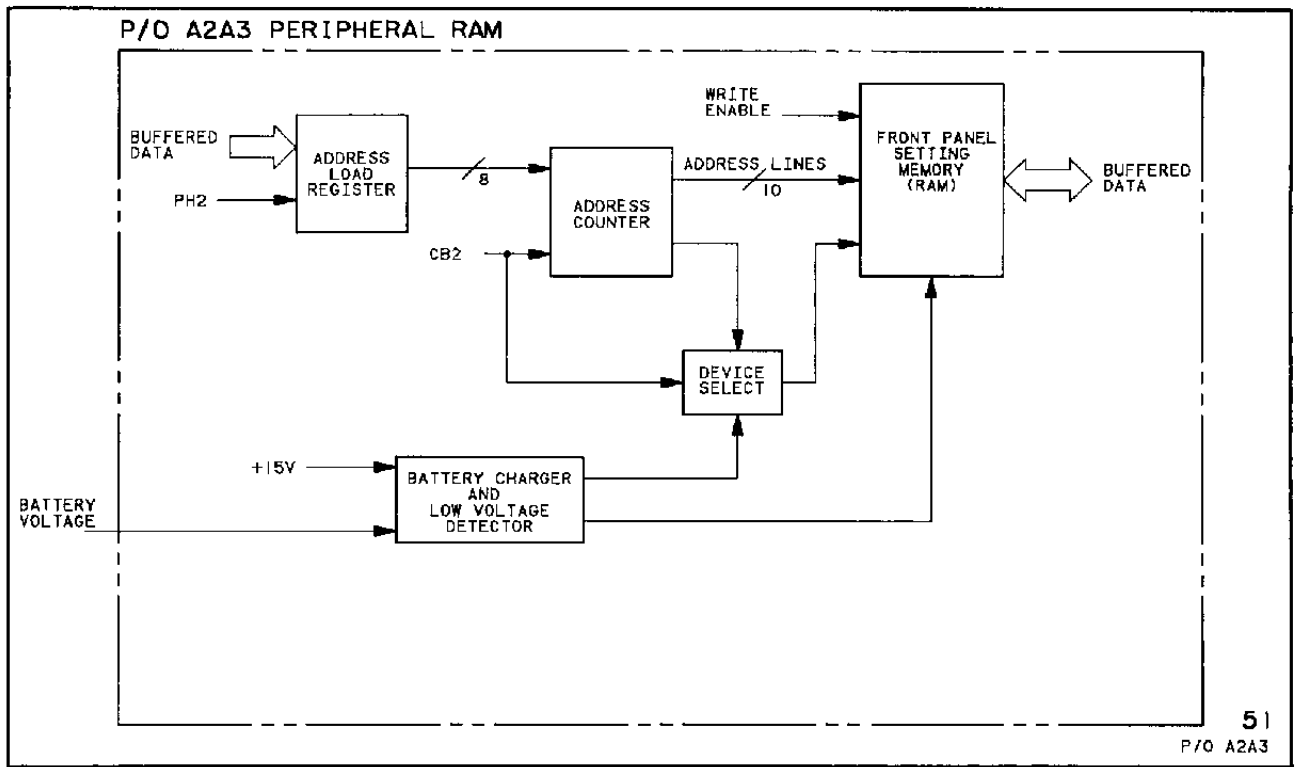
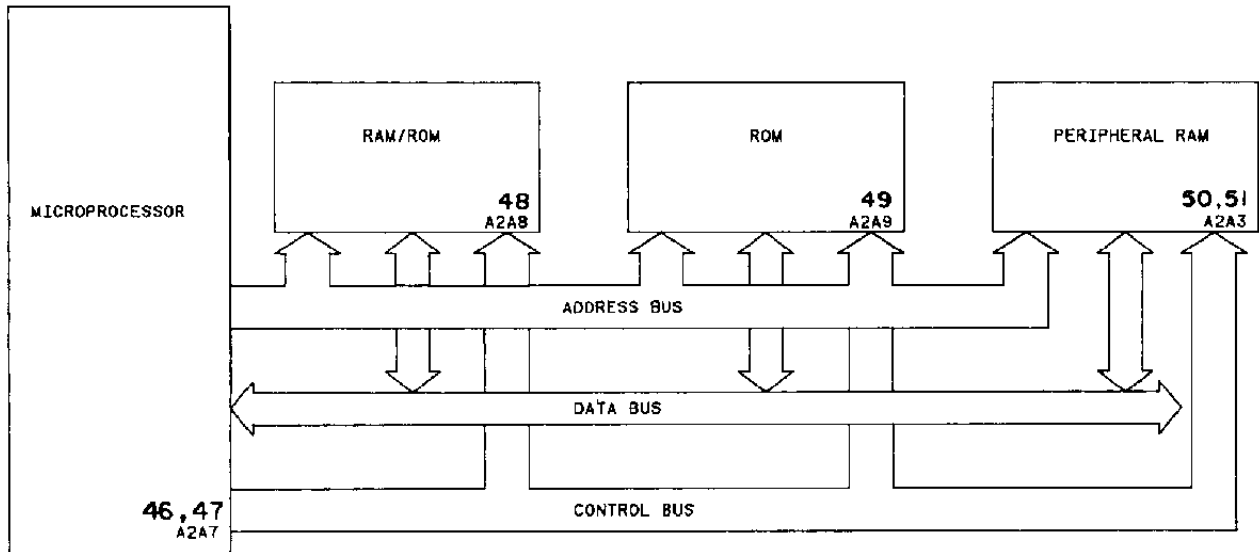


Figure 8-716. P/O A2A3 Peripheral RAM Block Diagrams

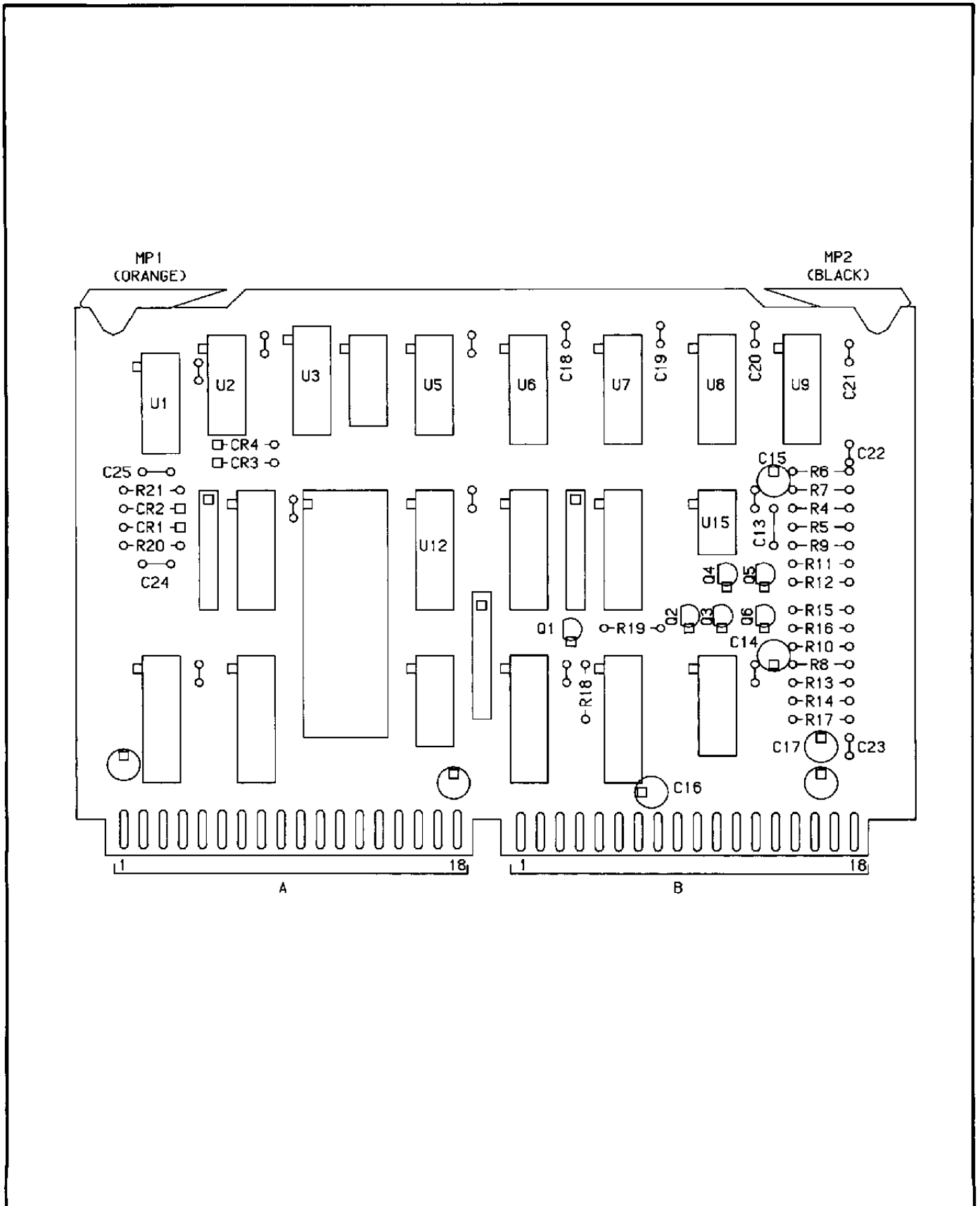


Figure 8-717. P/O A2A3 Peripheral RAM Component Locator

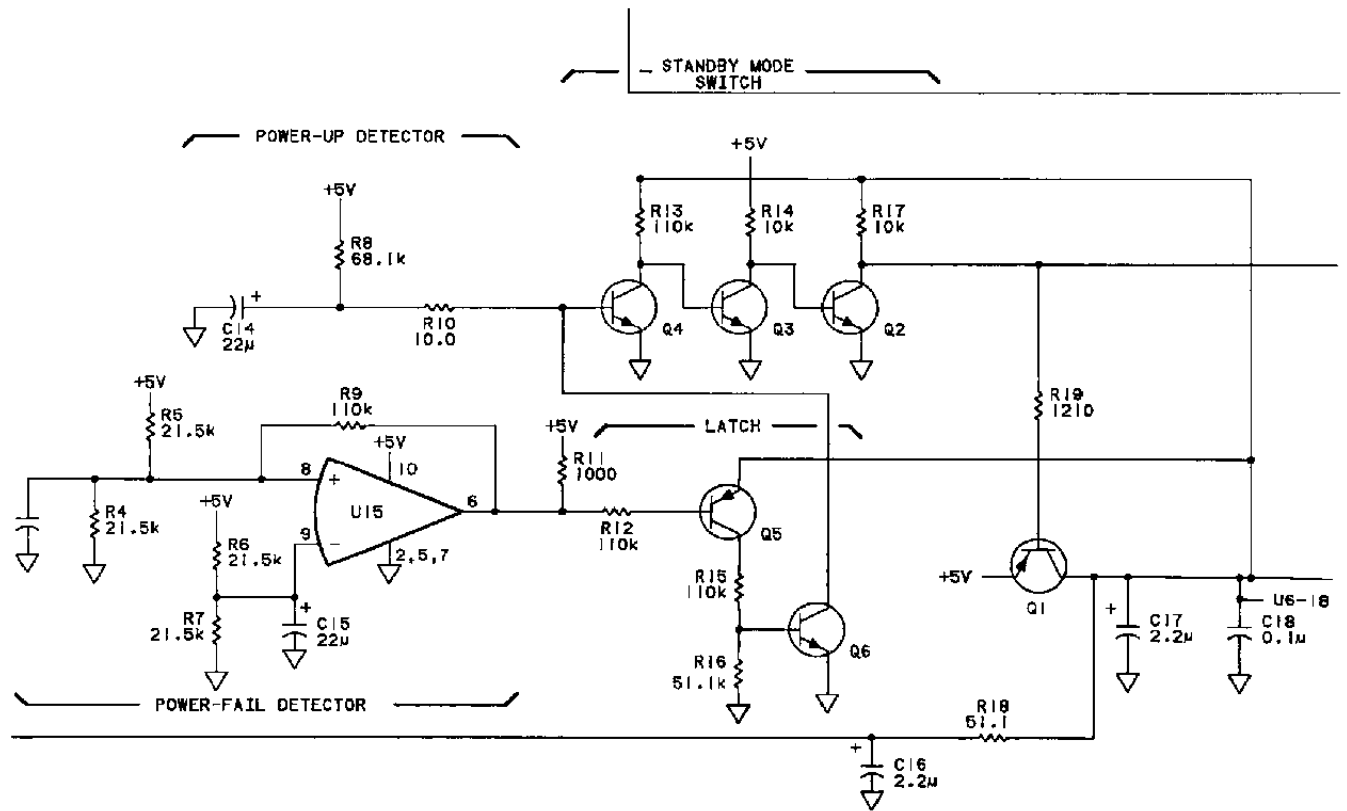


## CHANGES

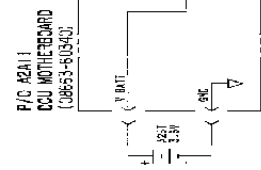
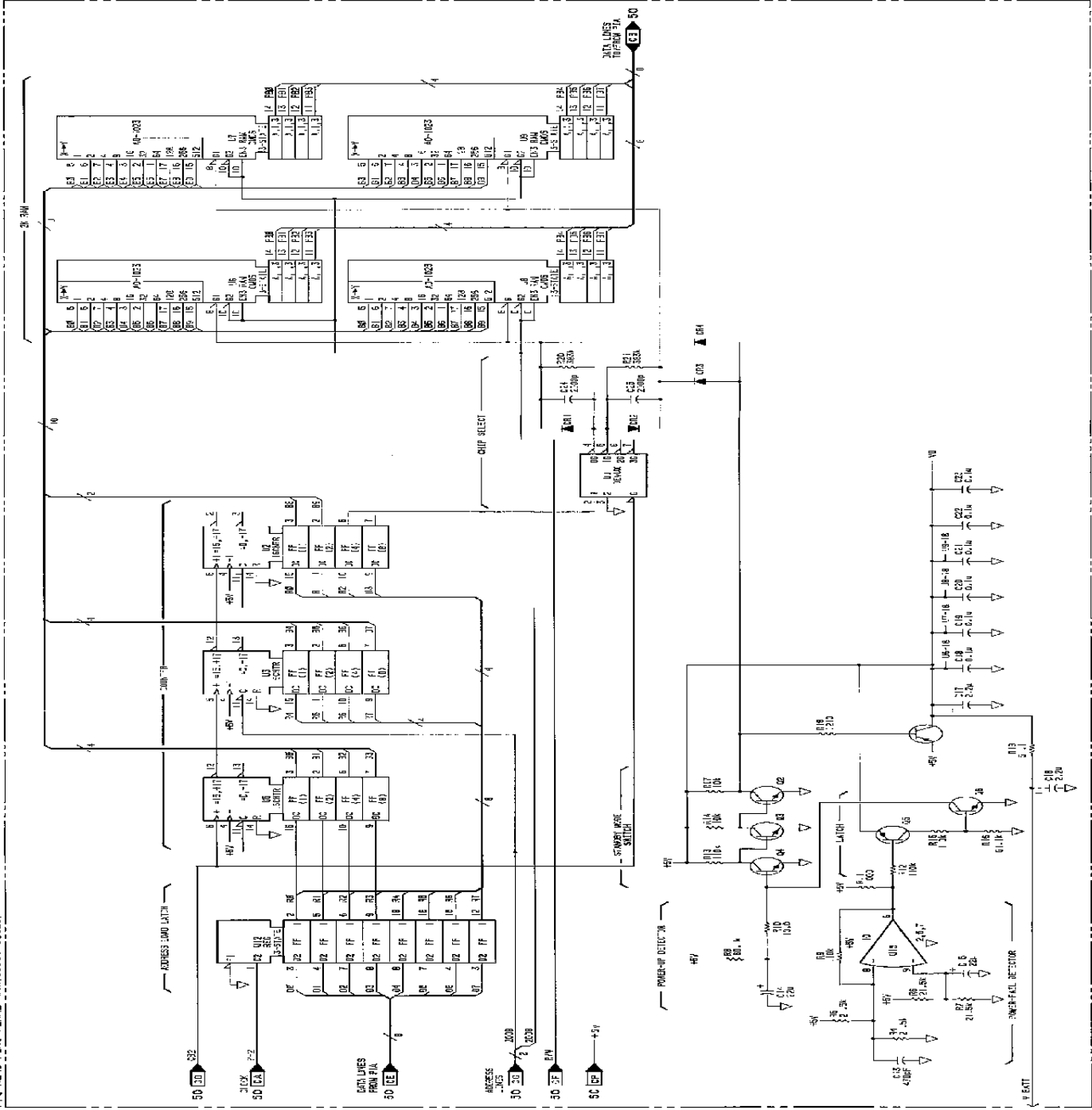
### All serial prefixes

On the A2A3 schematic:

- A2A3 - Modify the schematic as shown in the partial schematic "P/O Figure 8-718. Peripheral RAM Schematic" on page 8-722.3.



P/O Figure 8-718. Peripheral RAM Schematic



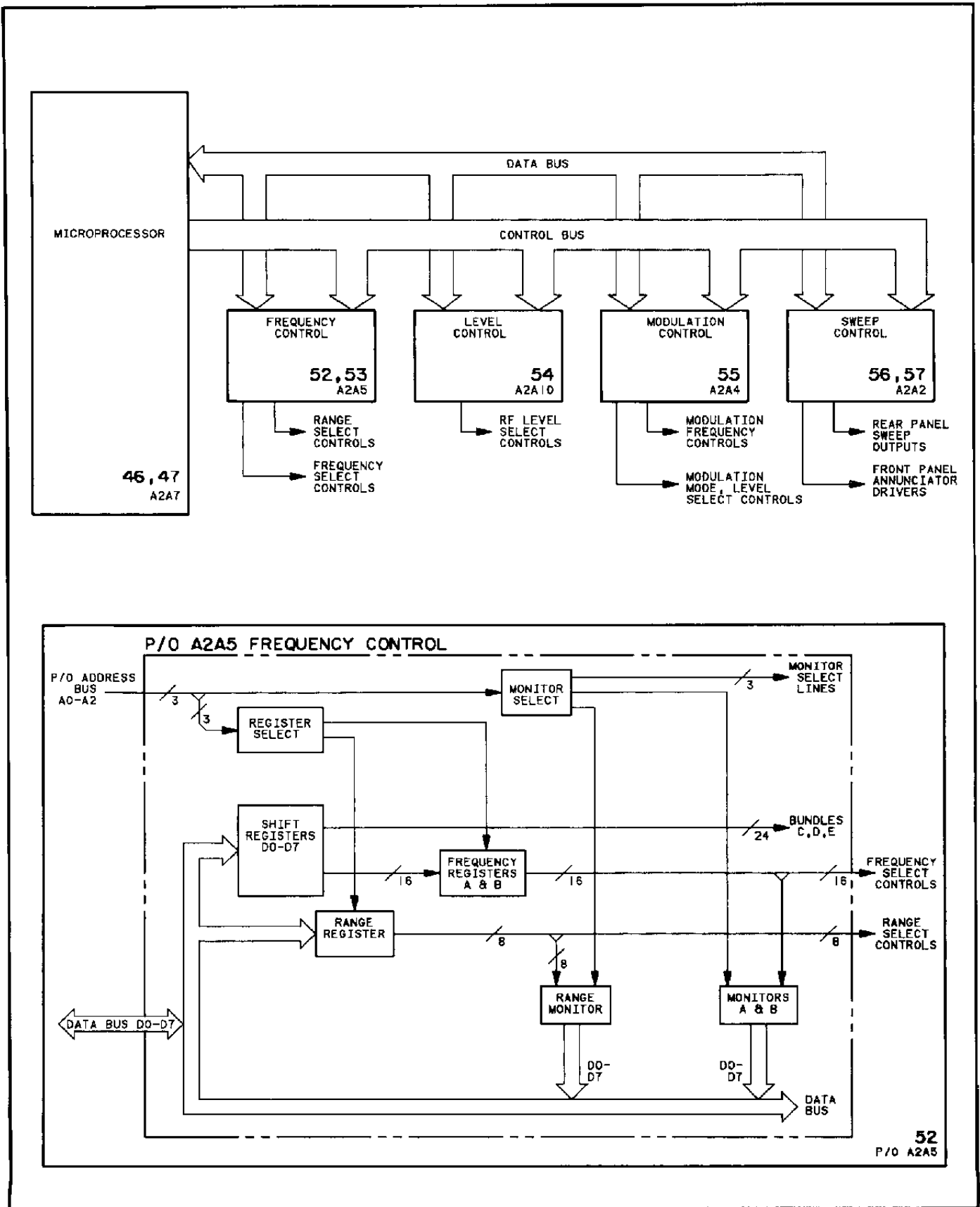


Figure 8-719. P/O A2A5 Frequency Control Assembly Block Diagrams

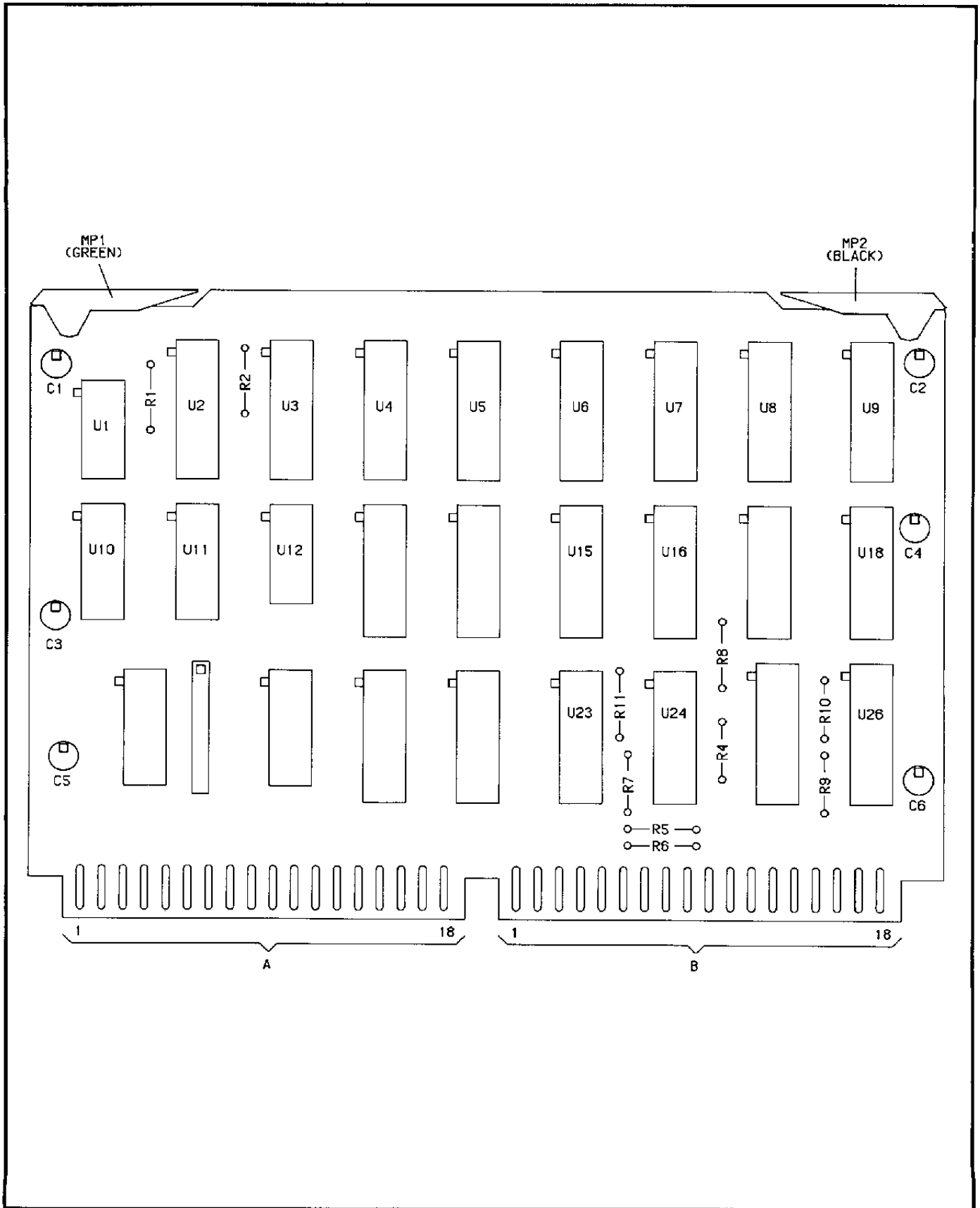
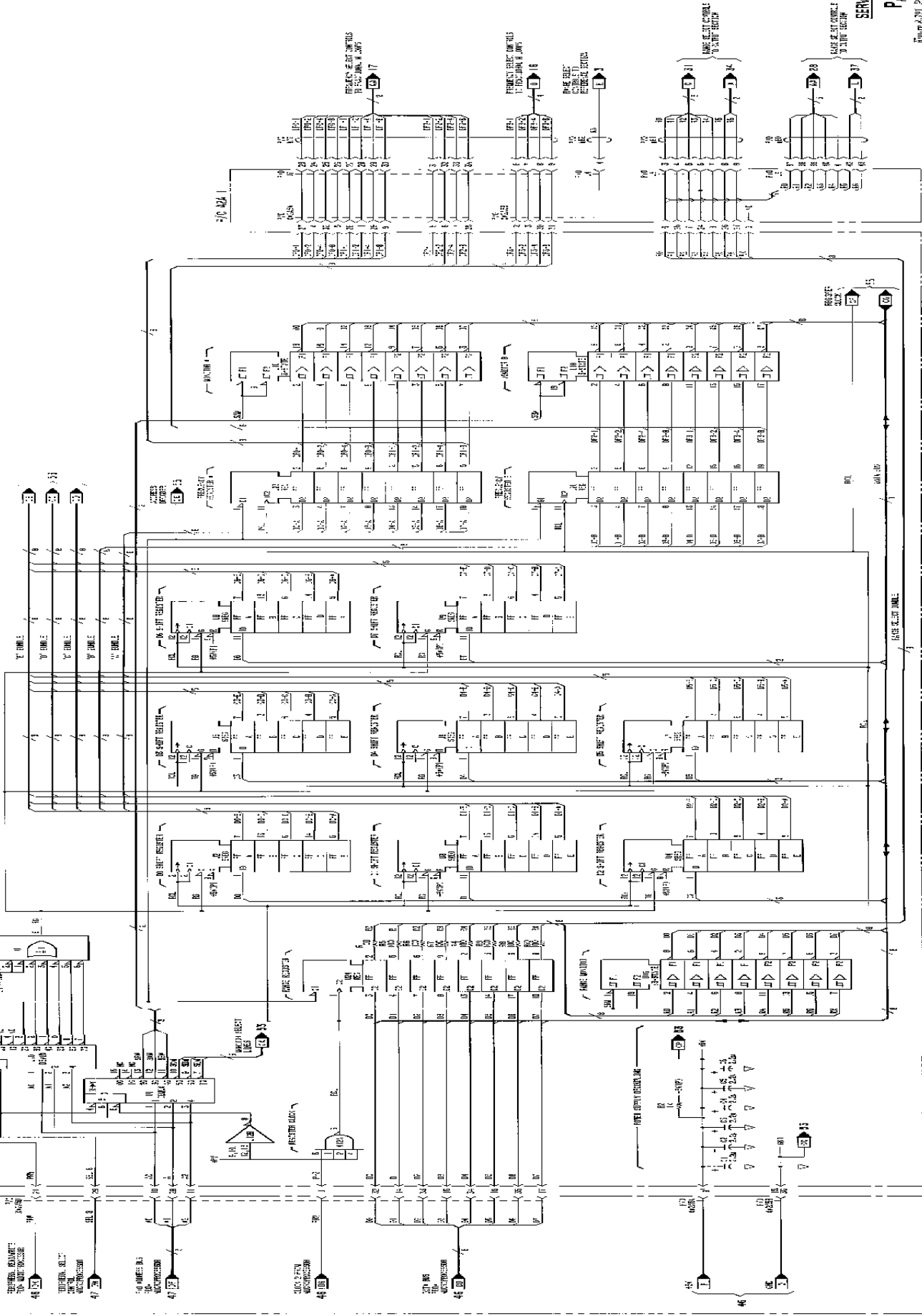


Figure 8-720. P/O A2A5 Frequency Control Assembly Component Locator

P10 AZAS FREQUENCY CONTROL CABLES DATA

300 AZAS 100  
W/RECORD  
LOGS-6040



SERVICE SHEET  
P10 AZAS 52

Figure 4-21 P10 AZAS Frequency Control Assembly Schematic  
5-7573700

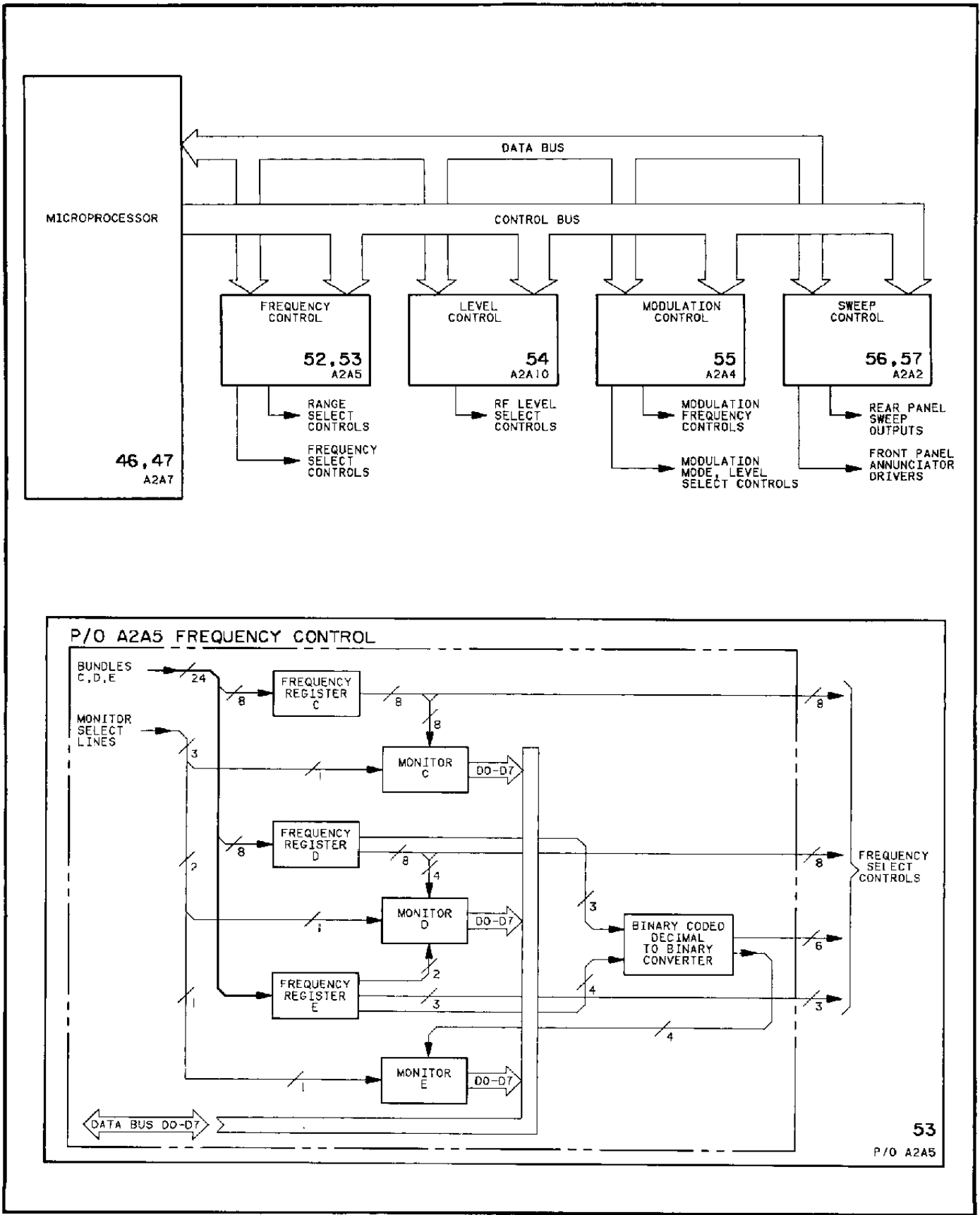


Figure 8-722. P/O A2A5 Frequency Control Assembly Block Diagrams

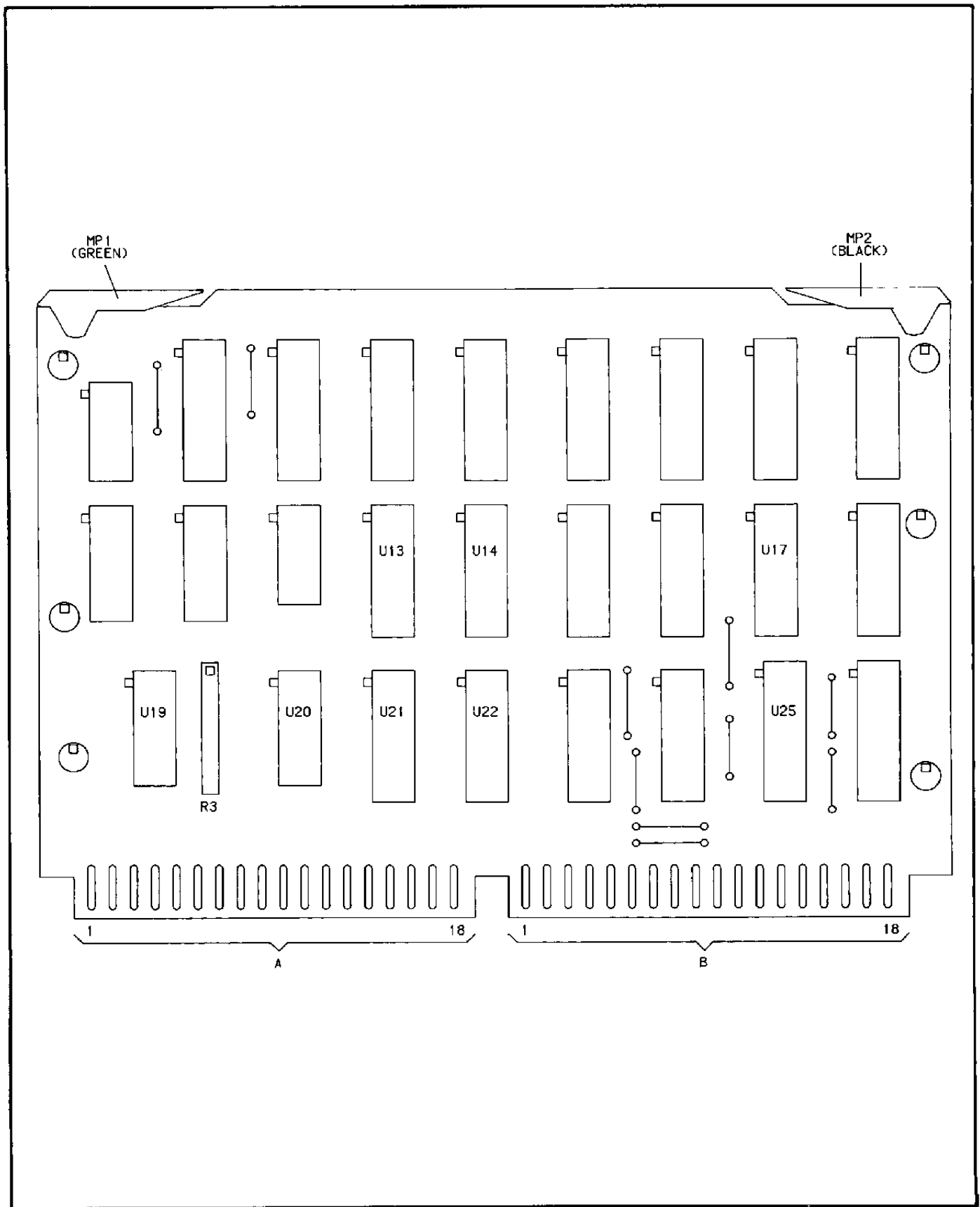
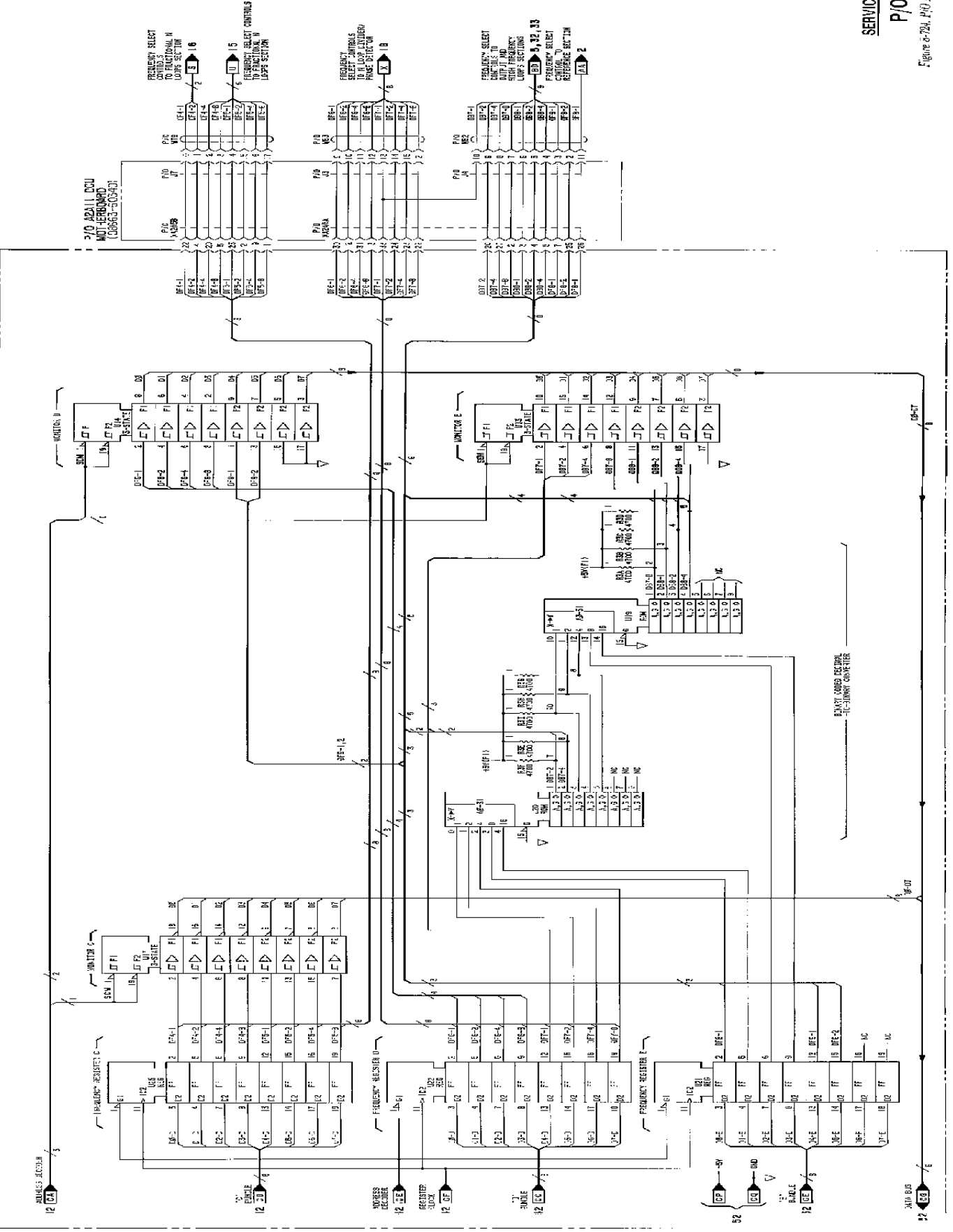


Figure 8-723. P/O A2A5 Frequency Control Assembly Component Locator





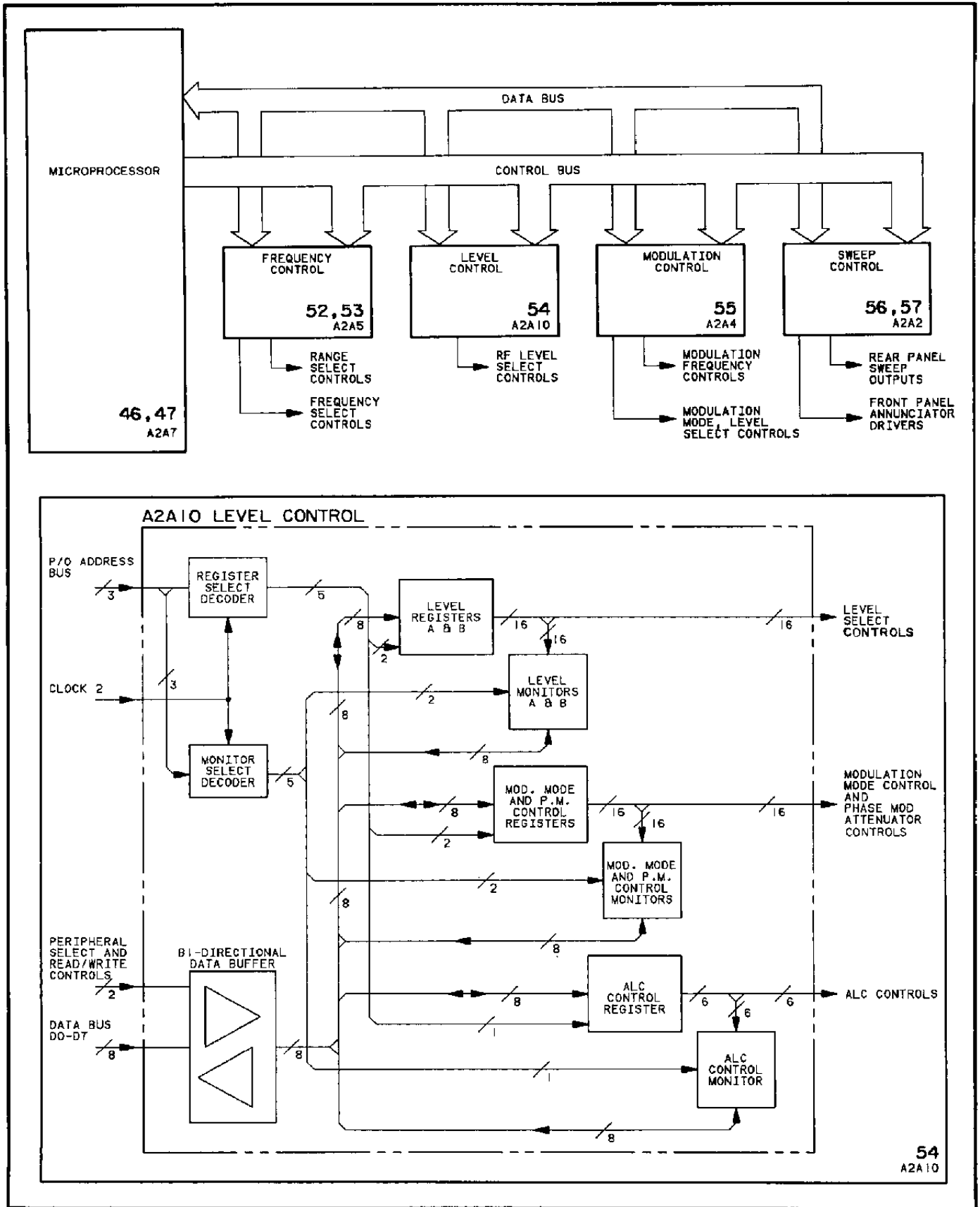


Figure 8-725. A2A10 Level Control Assembly Block Diagrams

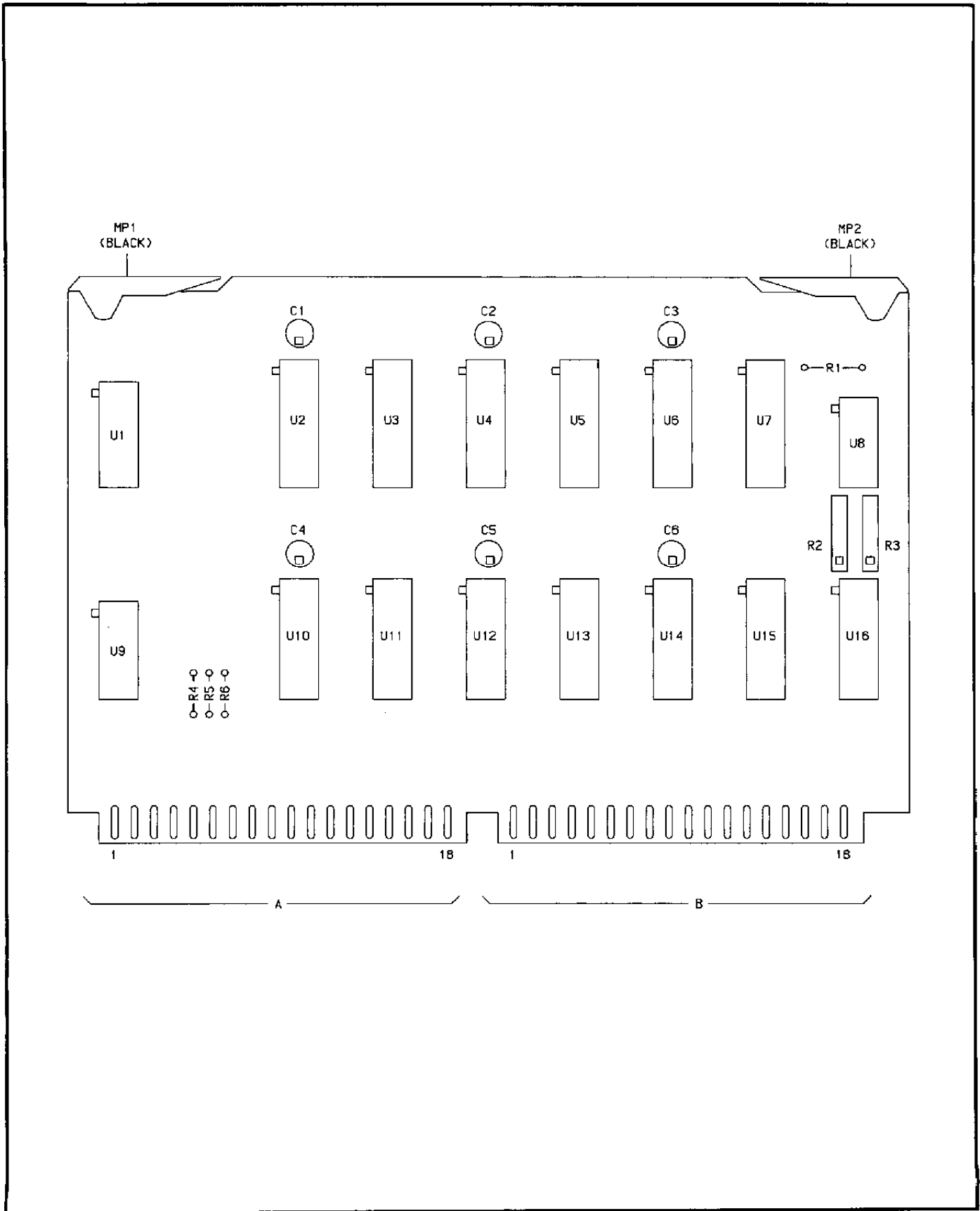
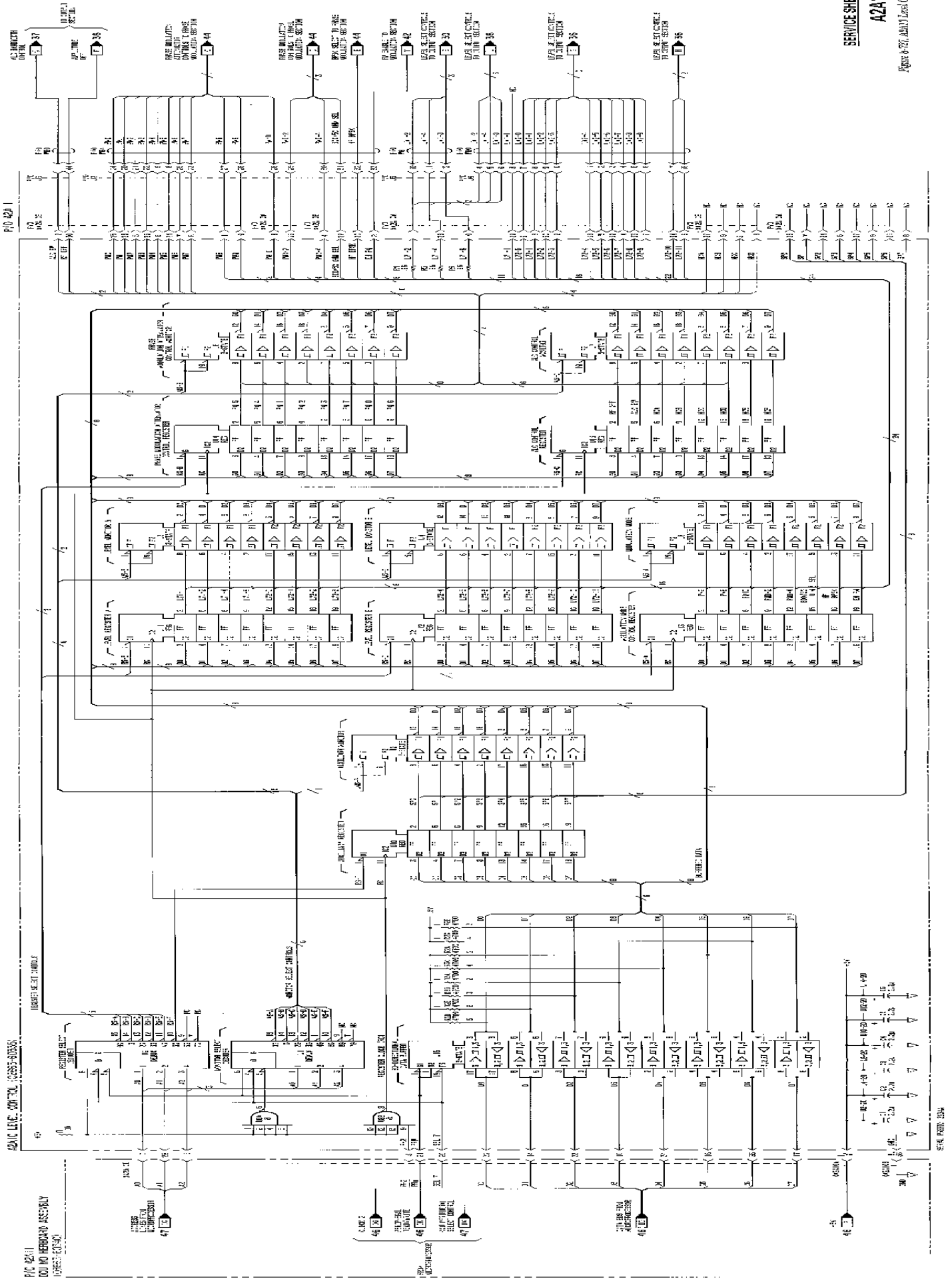


Figure 8-726. A2A10 Level Control Assembly Component Locator



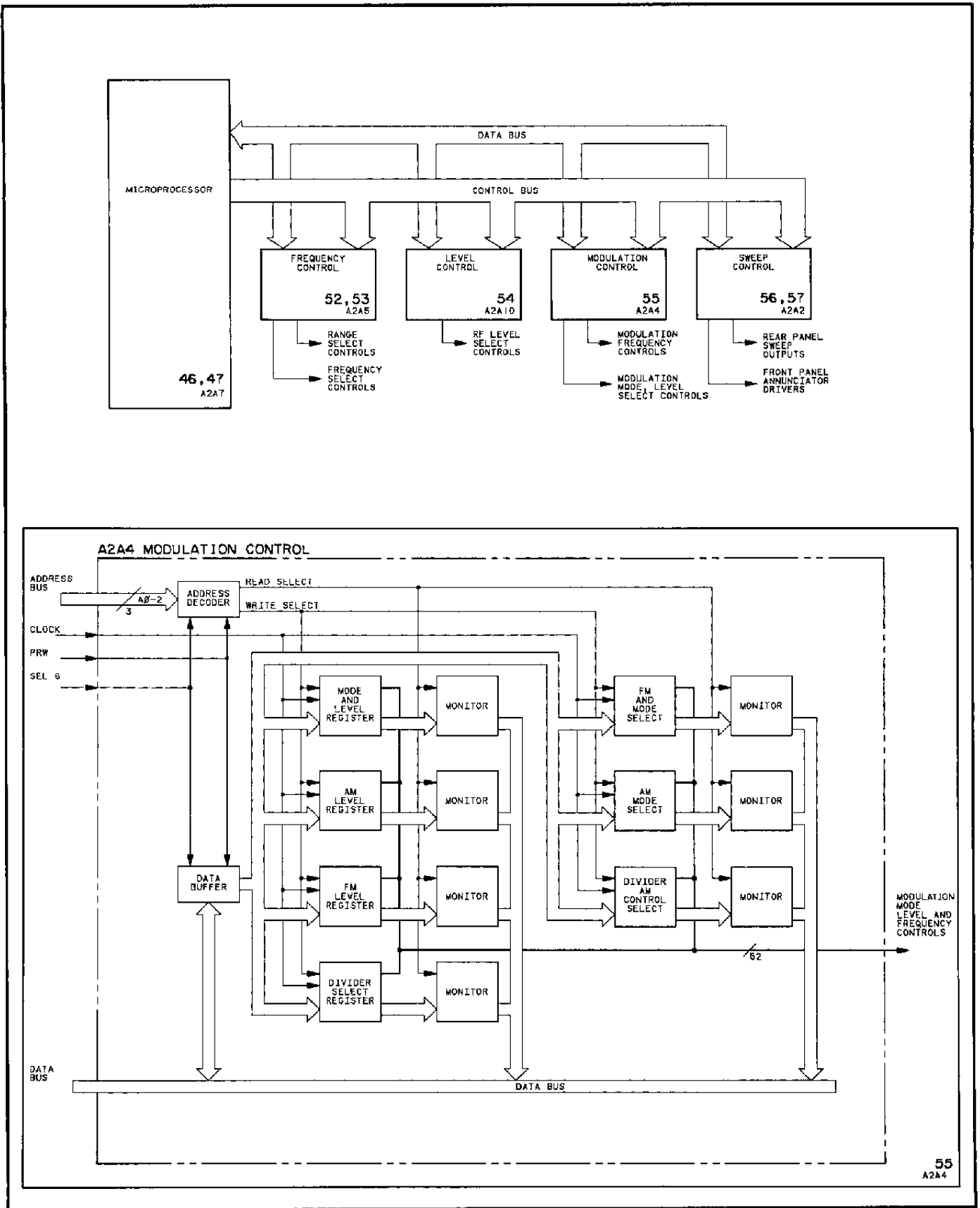


Figure 8-728. A2A4 Modulation Assembly Block Diagrams

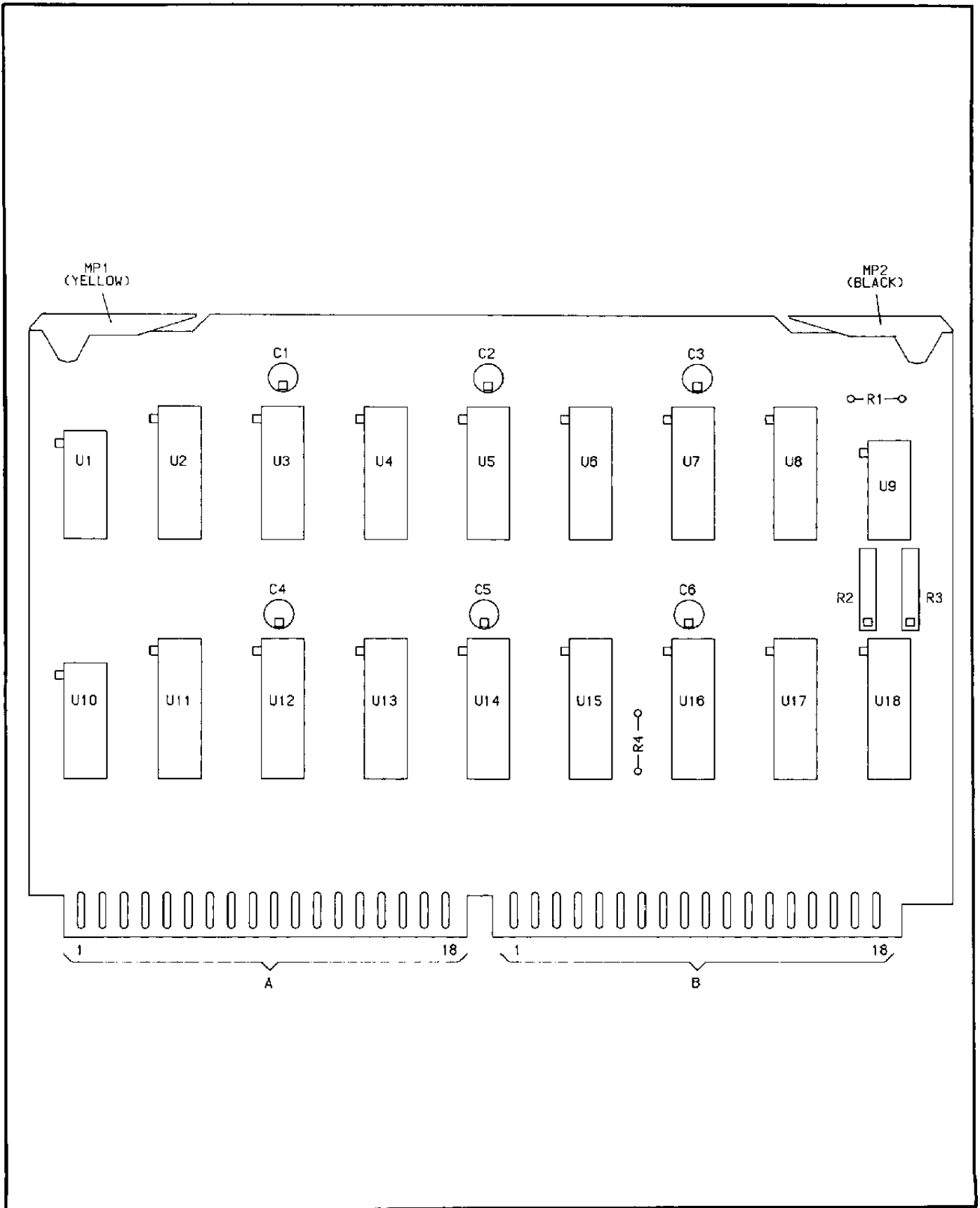


Figure 8-729. A2A4 Modulation Assembly Component Locator



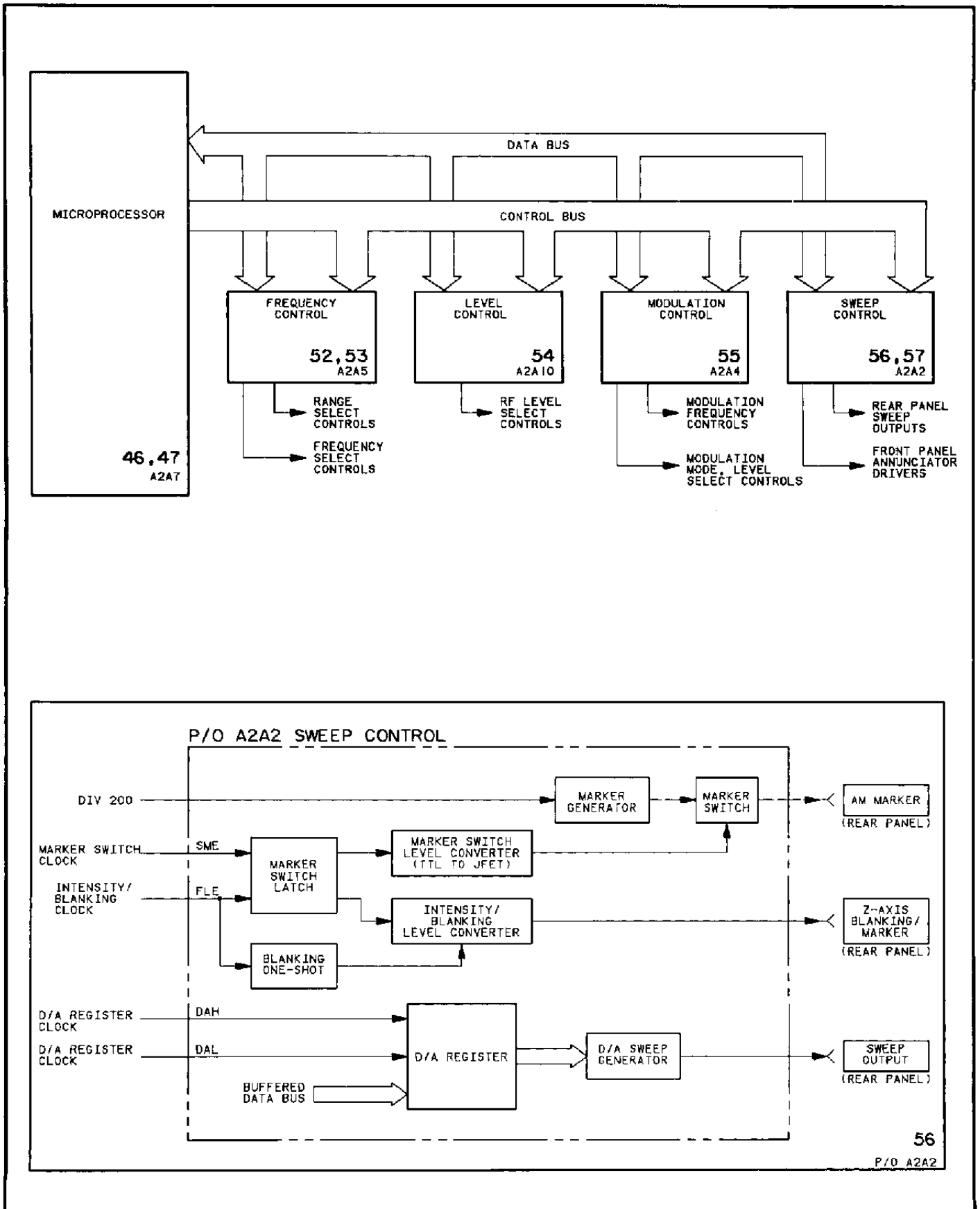


Figure 8-731. P/O A2A2 Sweep Control Assembly Block Diagrams



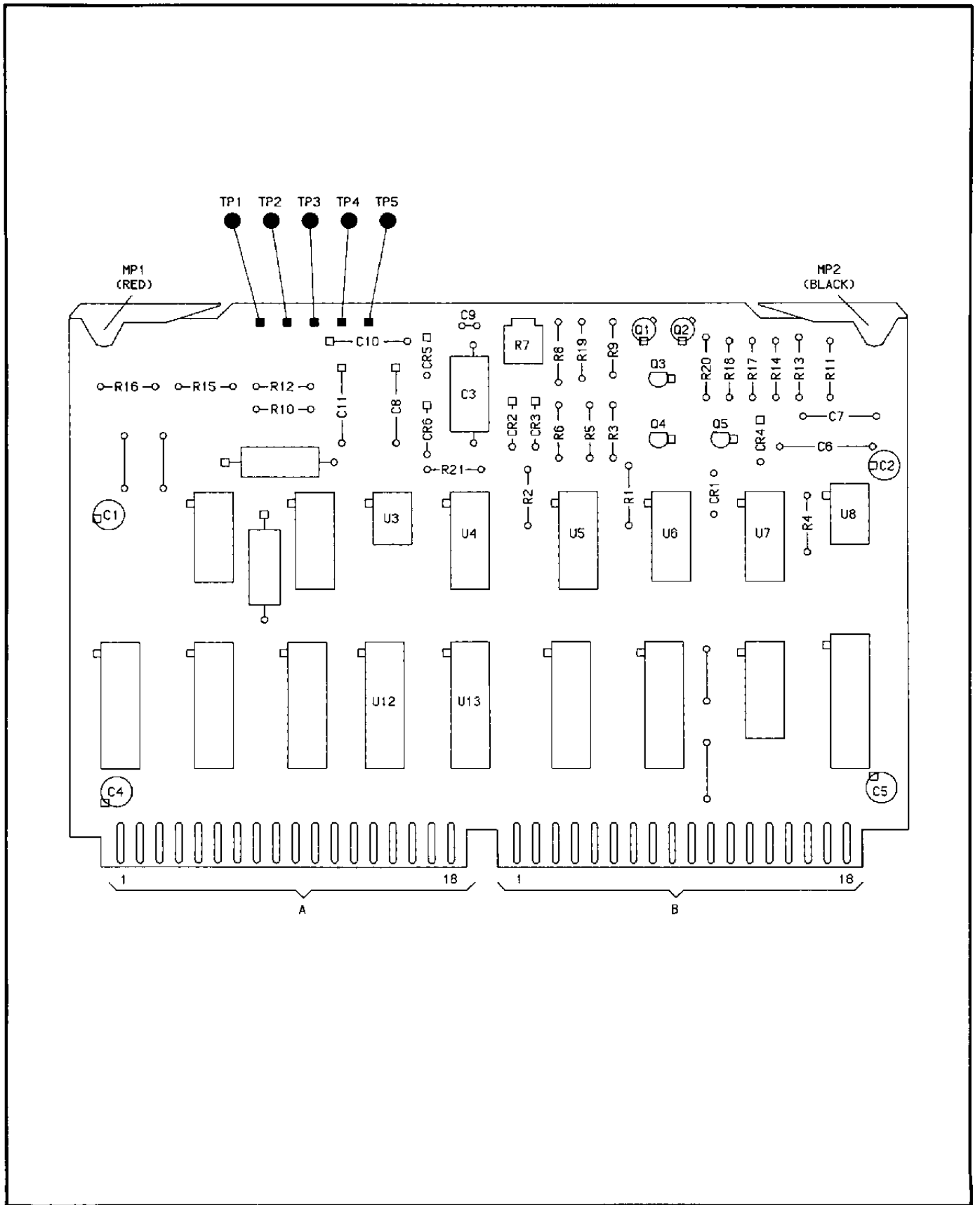
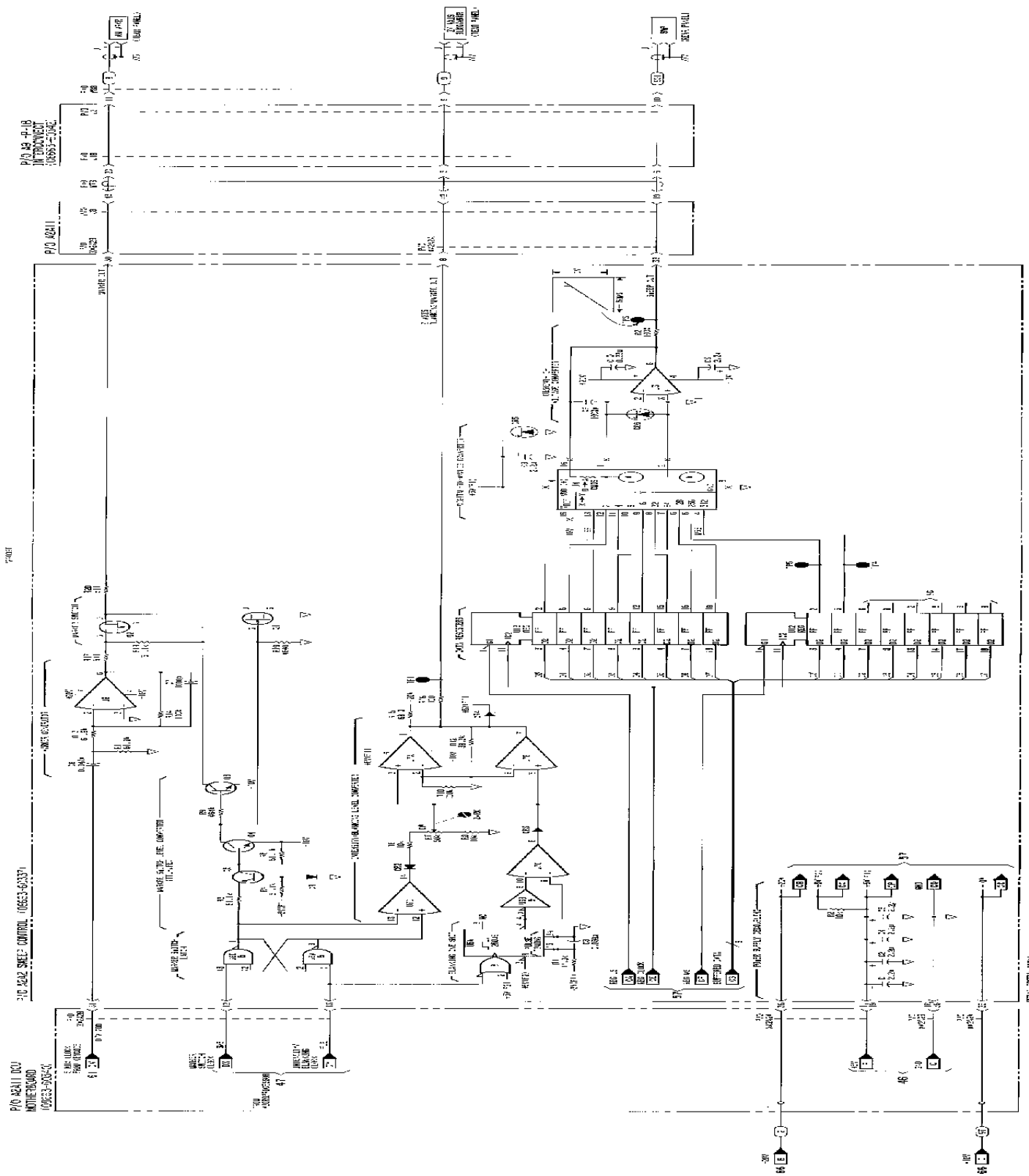


Figure 8-732. P/O A2A2 Sweep Control Assembly Component Locator



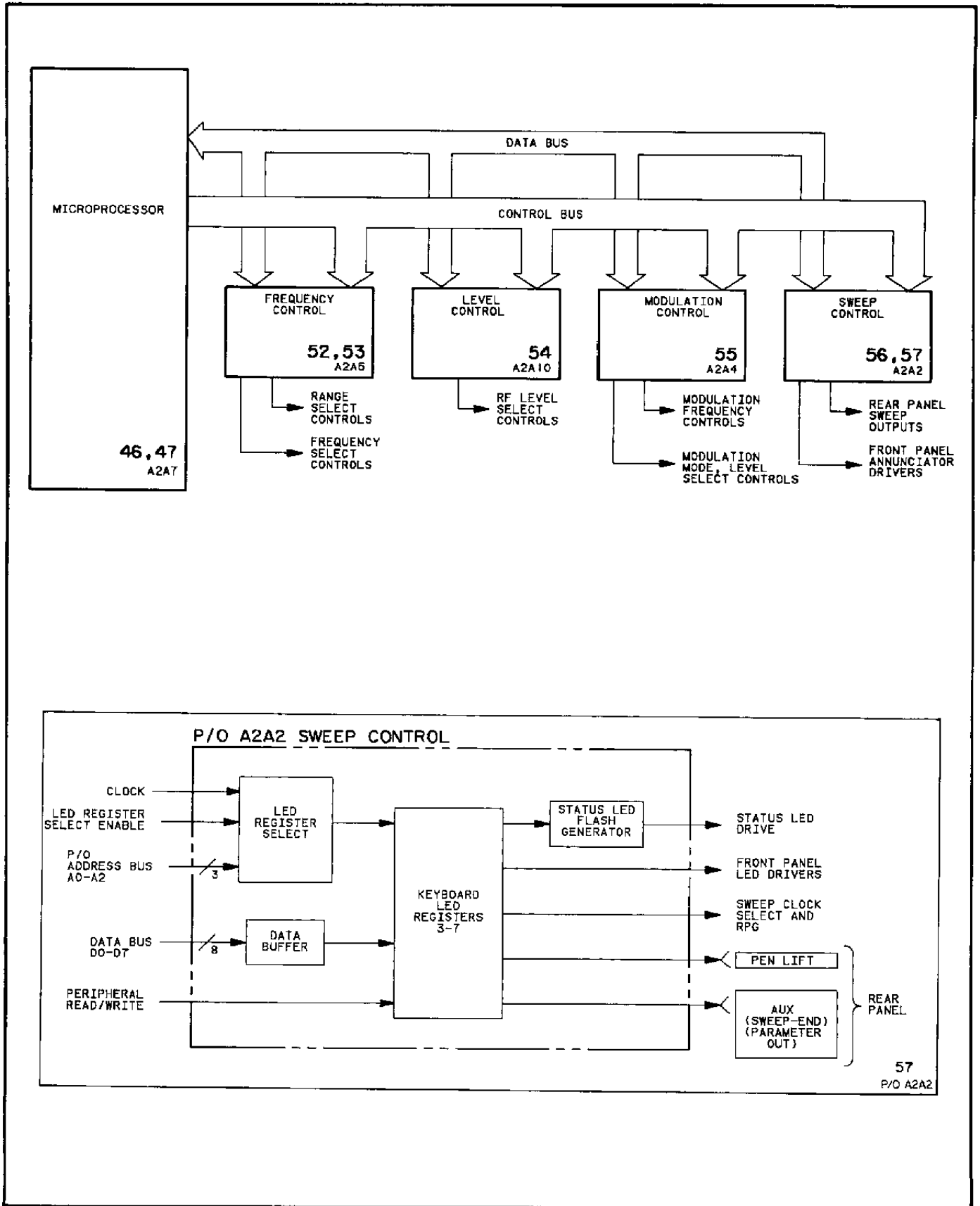


Figure 8-734. P/O A2A2 Sweep Control Assembly Block Diagrams

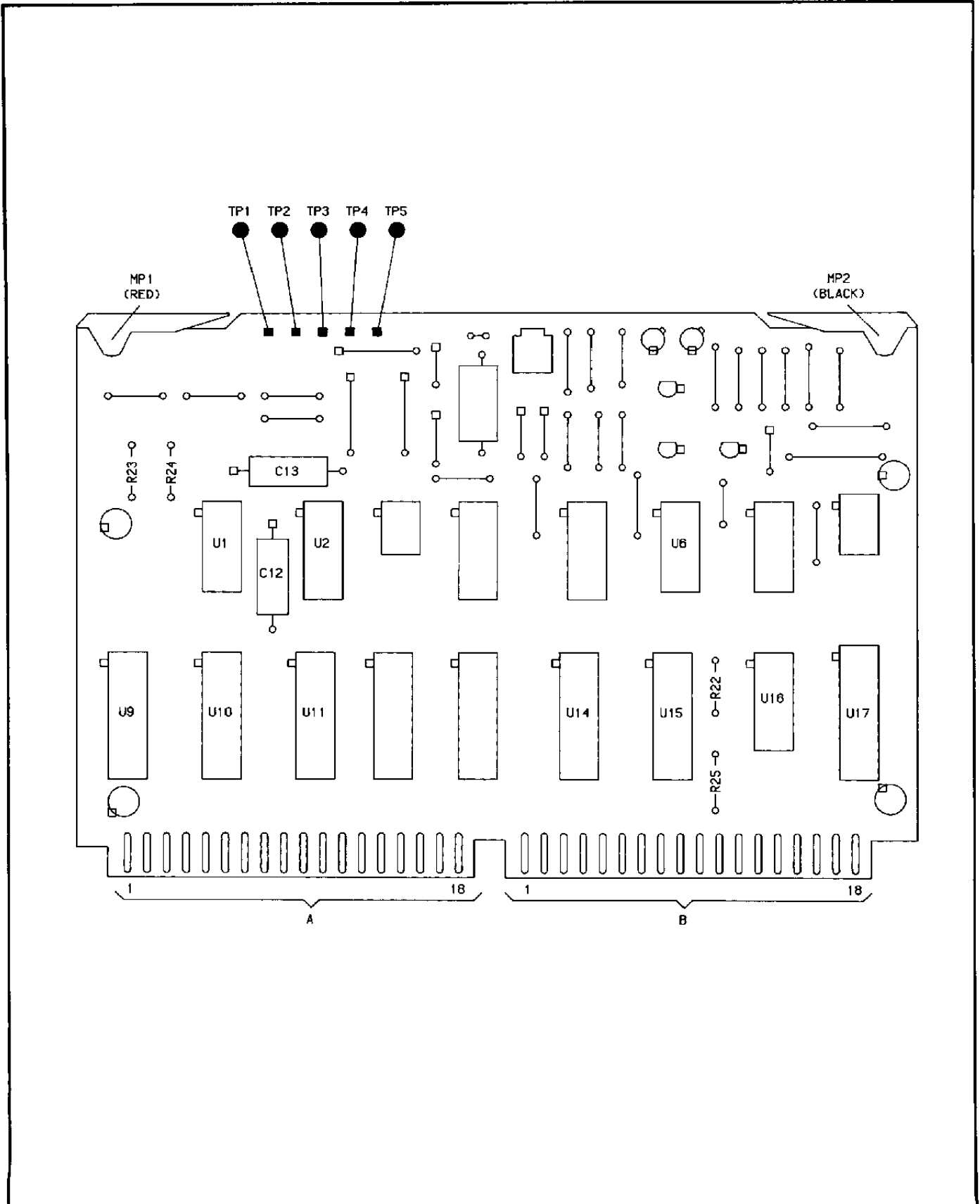


Figure 8-735. P/O A2A2 Sweep Assembly Component Locator

P/O DVU  
MOTHERBOARD  
(08655-6374C)

P/O A242  
SWEEP CONTROL (08655-60337)

P/O A242A11  
INTERCONNECT  
(C9563 60342)

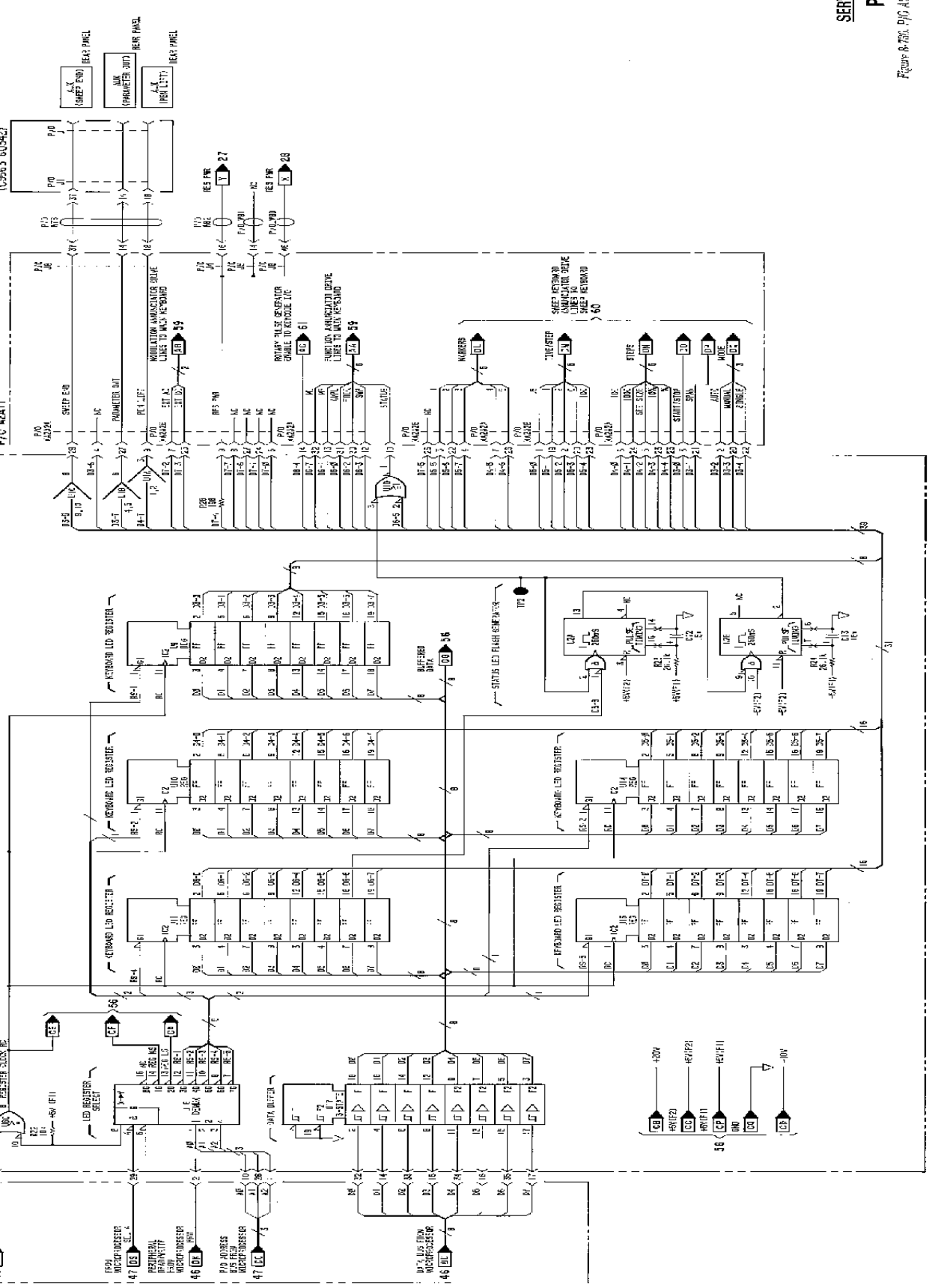
P/O A9 HP-3  
INTERCONNECT  
(C9563 60342)

P/O A242A  
SWEEP END

P/O A242A  
PARAMETER UNIT

P/O A242A  
PARAMETER UNIT

P/O A242A  
PARAMETER UNIT



REV. 10/78

Figure 8-759. P/O A242 Sweep Control Assembly  
Schematic

8-747749

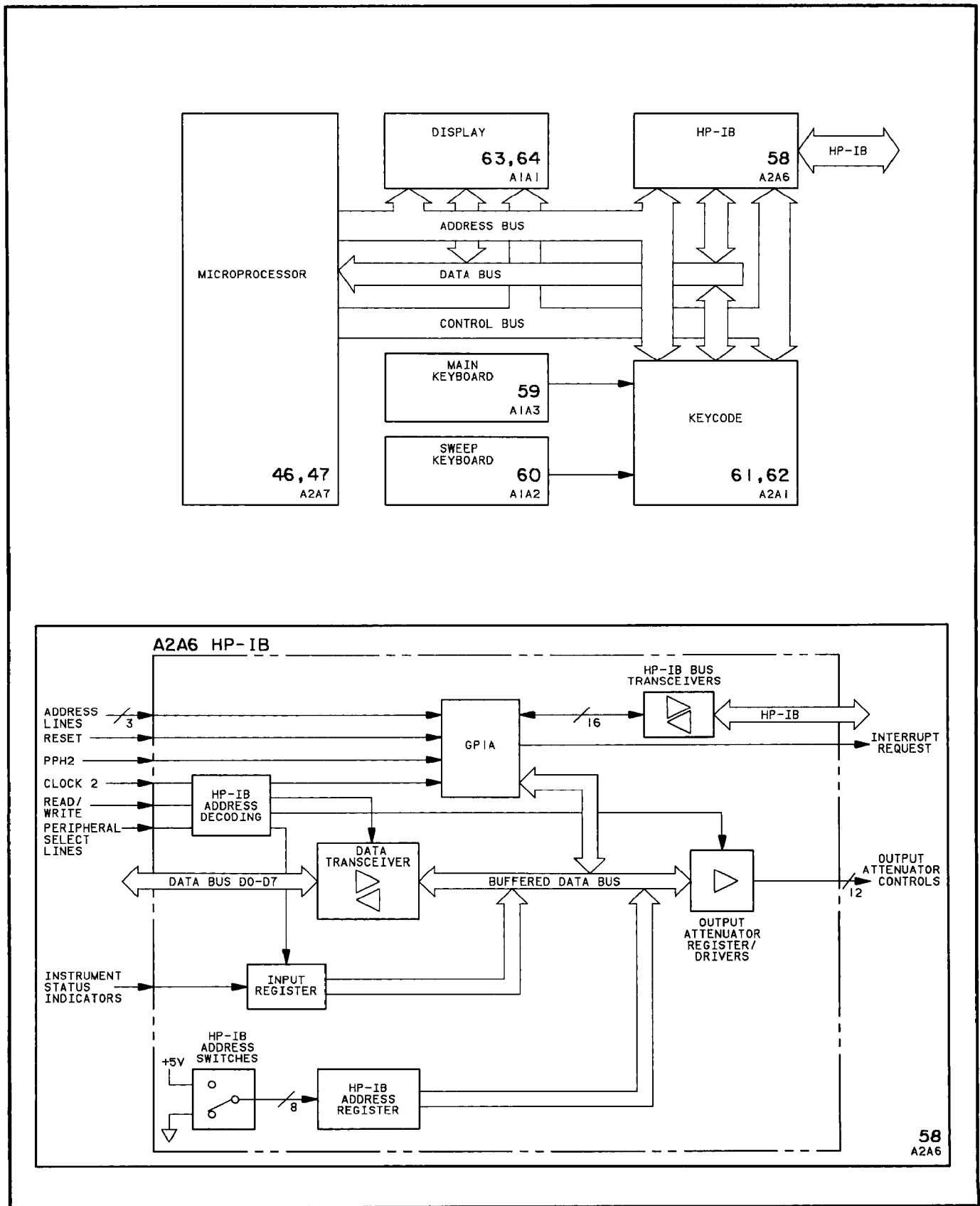


Figure 8-737. A2A6 HP-IB Assembly Block Diagrams

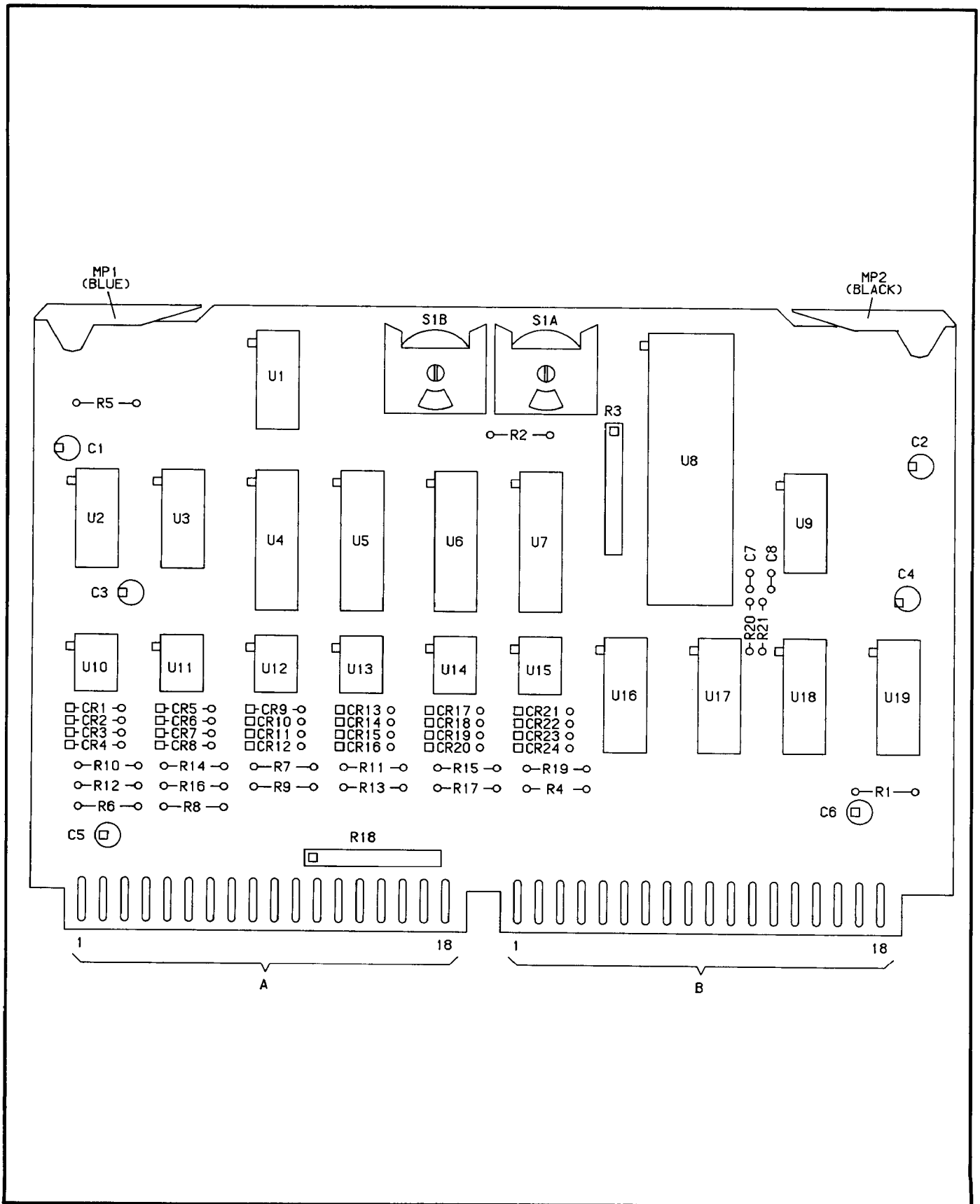
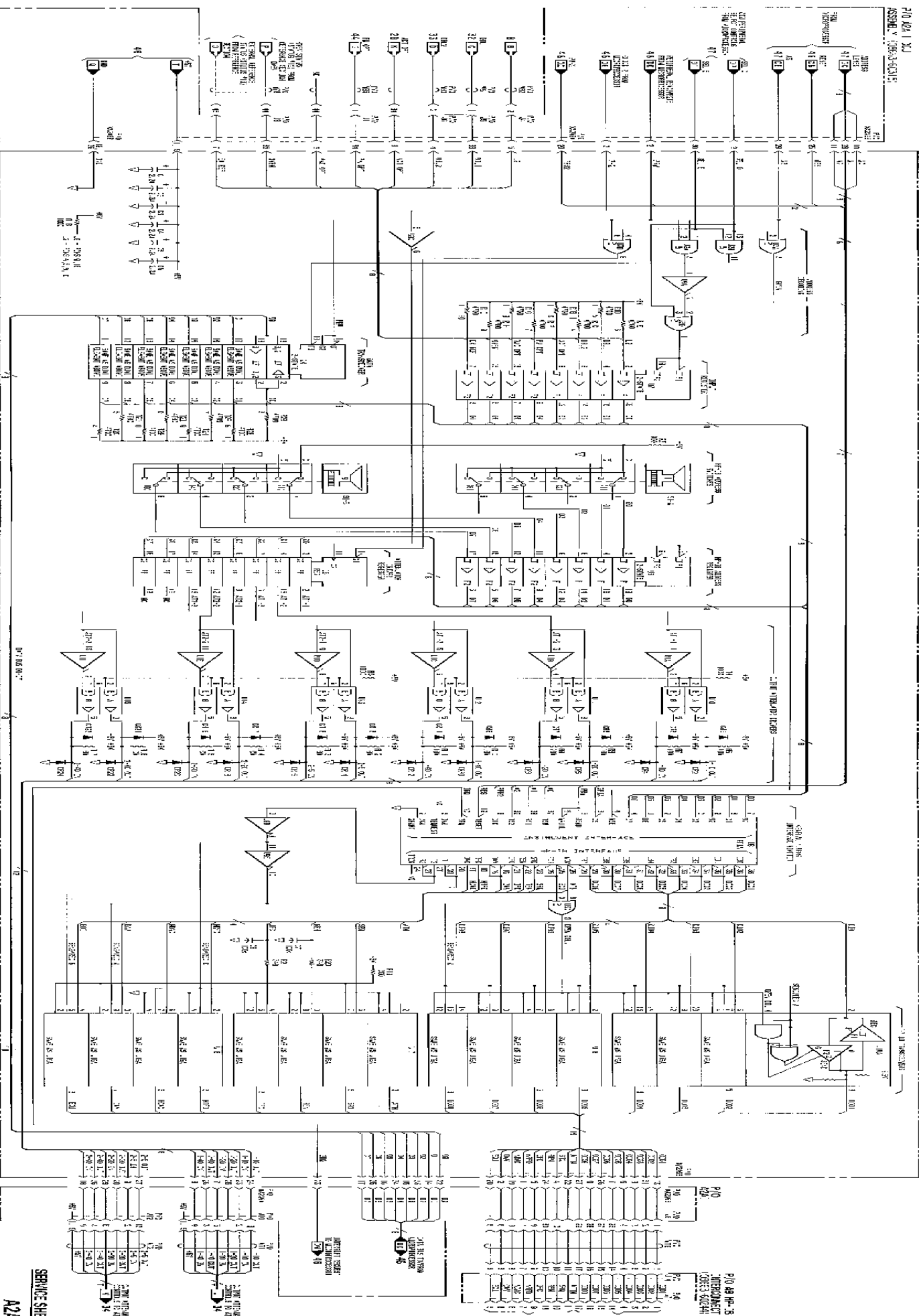


Figure 8-738. A2A6 HP-IB Assembly Component Locator



P10 A216-3  
INTERCONNECT  
CIRCUITRY

NO.	QTY	DESCRIPTION	REF. NO.
1	1	...	...
2	1	...	...
3	1	...	...
4	1	...	...
5	1	...	...
6	1	...	...
7	1	...	...
8	1	...	...
9	1	...	...
10	1	...	...
11	1	...	...
12	1	...	...
13	1	...	...
14	1	...	...
15	1	...	...
16	1	...	...
17	1	...	...
18	1	...	...
19	1	...	...
20	1	...	...
21	1	...	...
22	1	...	...
23	1	...	...
24	1	...	...
25	1	...	...
26	1	...	...
27	1	...	...
28	1	...	...
29	1	...	...
30	1	...	...

NO.	QTY	DESCRIPTION	REF. NO.
31	1	...	...
32	1	...	...
33	1	...	...
34	1	...	...
35	1	...	...
36	1	...	...
37	1	...	...
38	1	...	...
39	1	...	...
40	1	...	...
41	1	...	...
42	1	...	...
43	1	...	...
44	1	...	...
45	1	...	...
46	1	...	...
47	1	...	...
48	1	...	...
49	1	...	...
50	1	...	...

SERVICE SHEET  
A216  
58



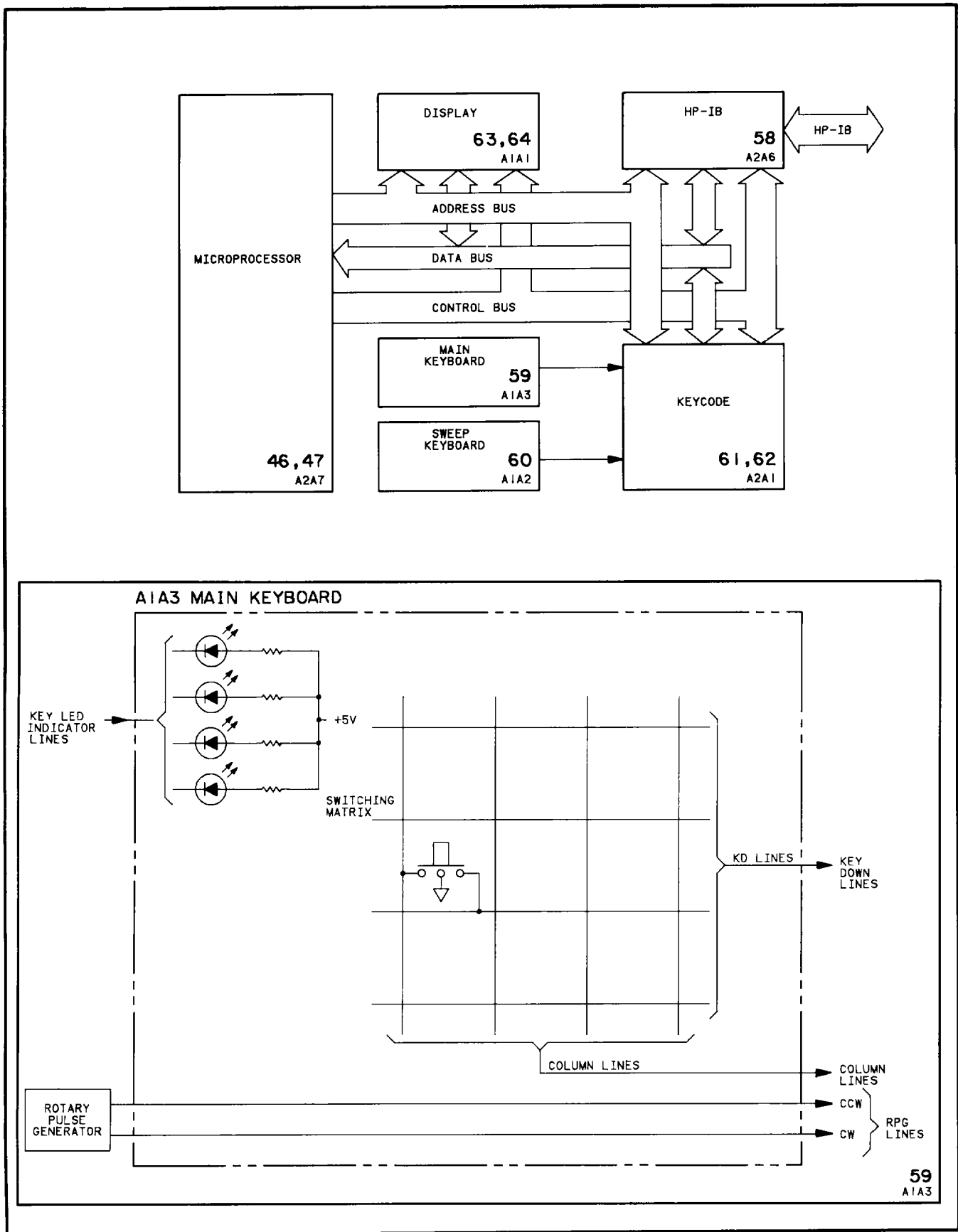
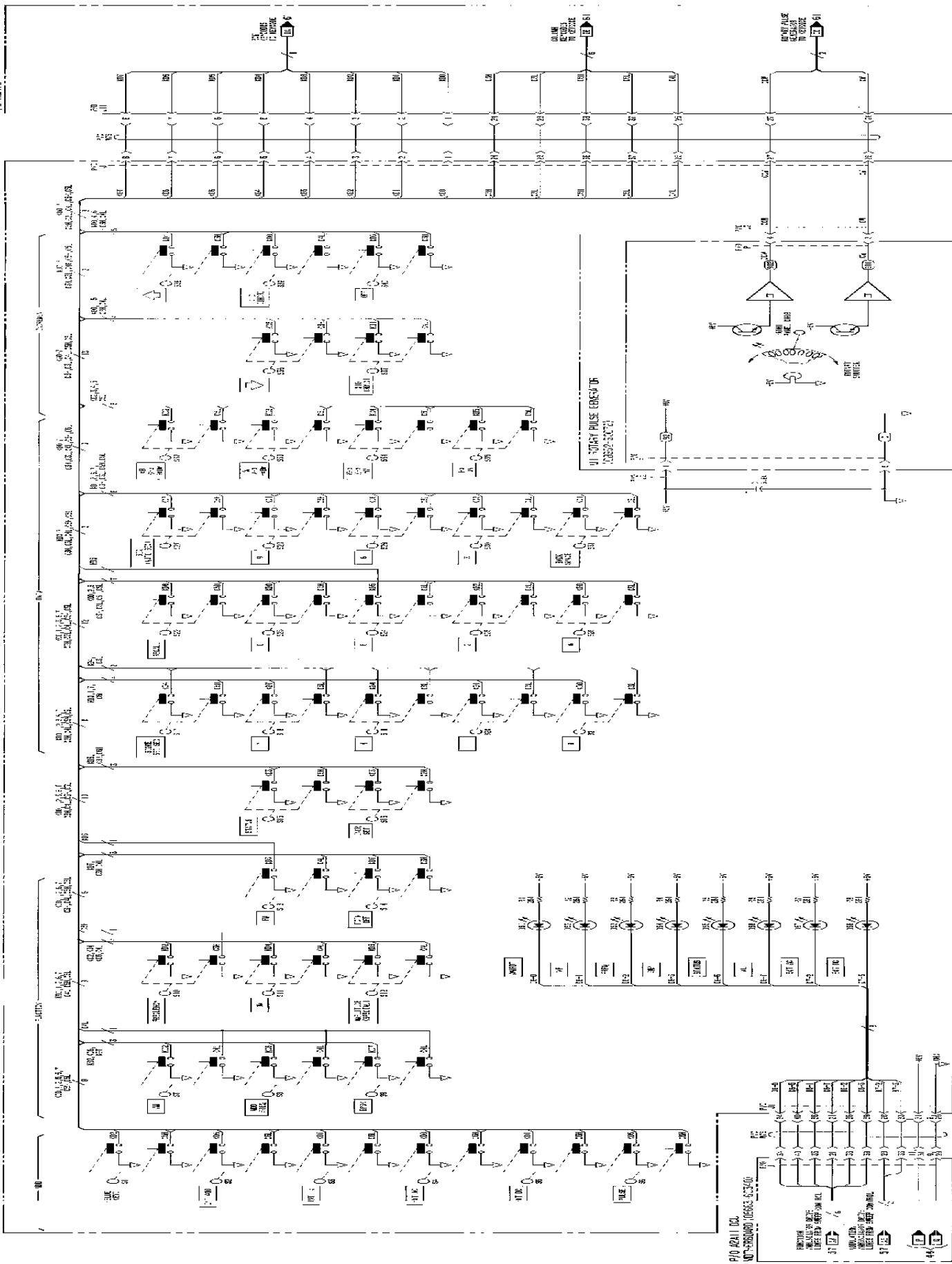


Figure 8-740. A1A3 Main Keyboard Block Diagrams





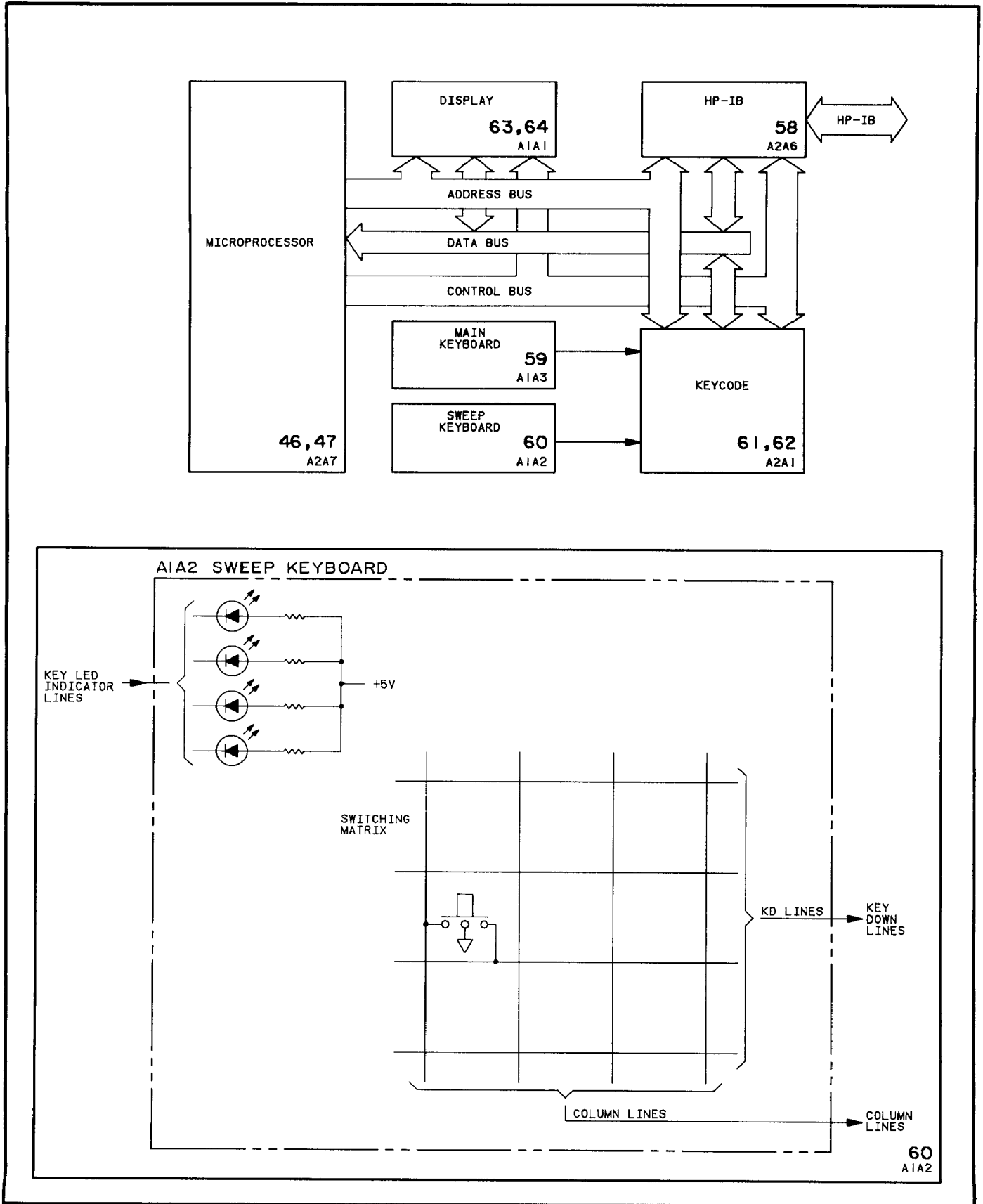


Figure 8-743. A1A2 Sweep Keyboard Block Diagrams

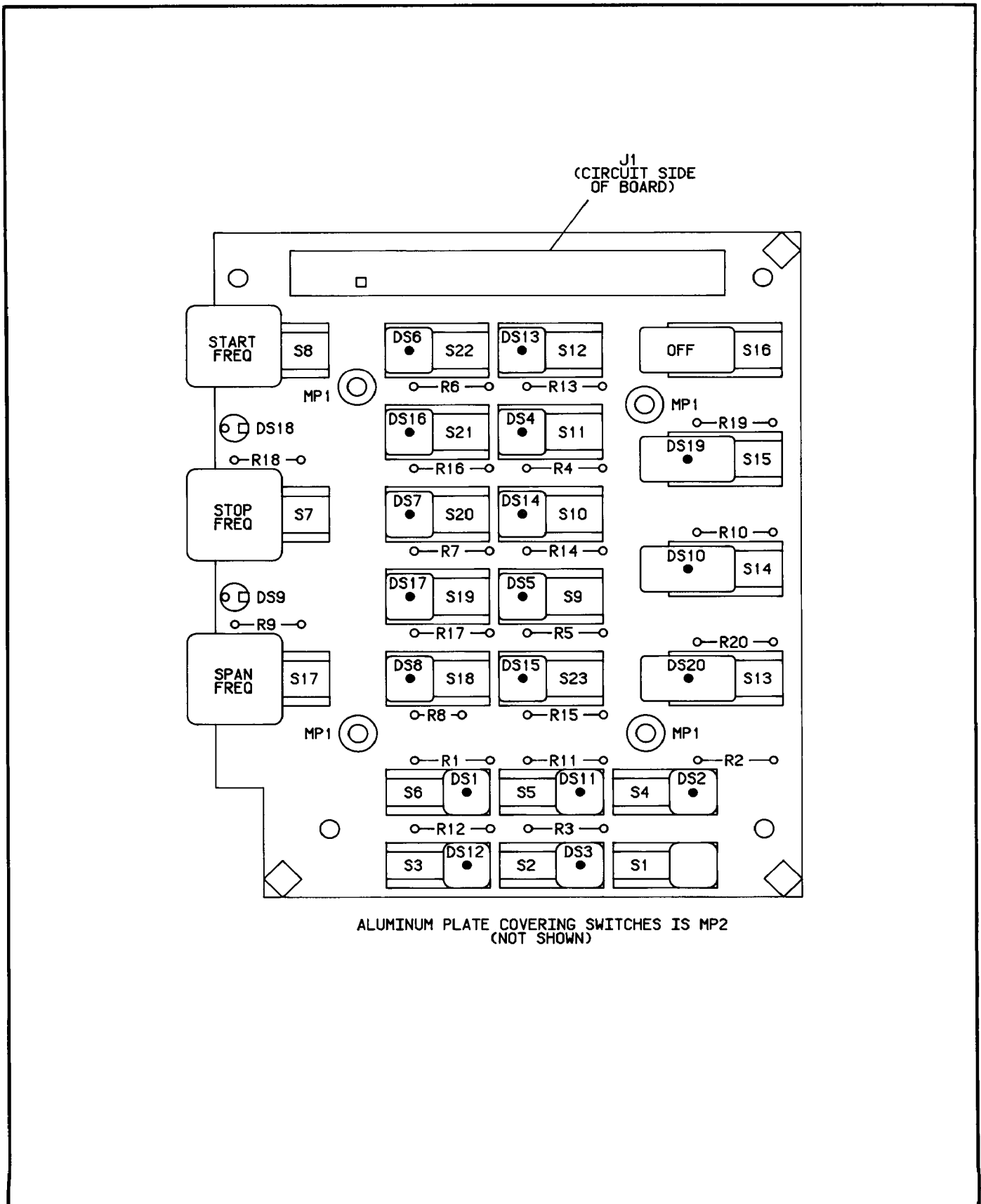


Figure 8-744. A1A2 Sweep Keyboard Component Locator



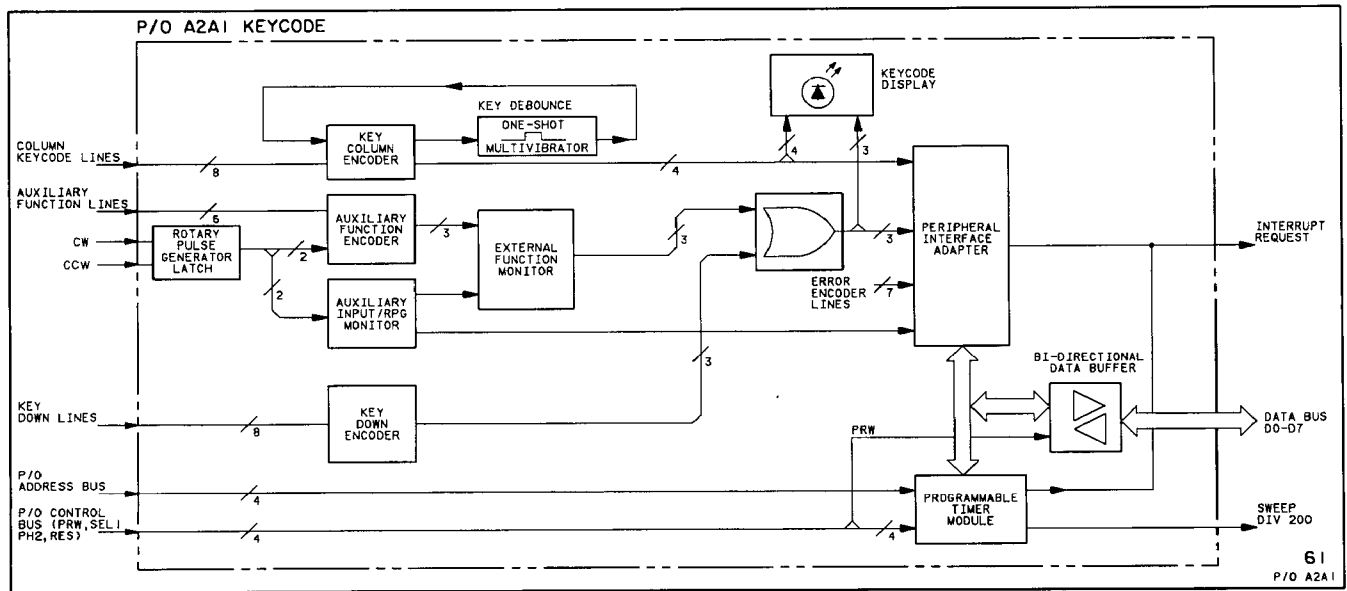
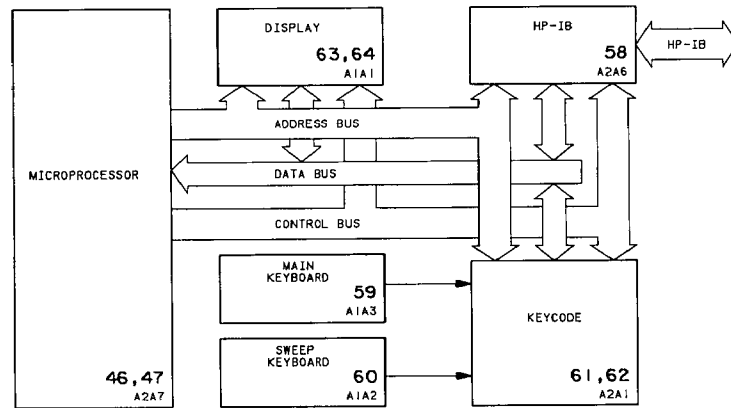


Figure 8-746. P/O A2A1 Keycode Assembly Block Diagrams

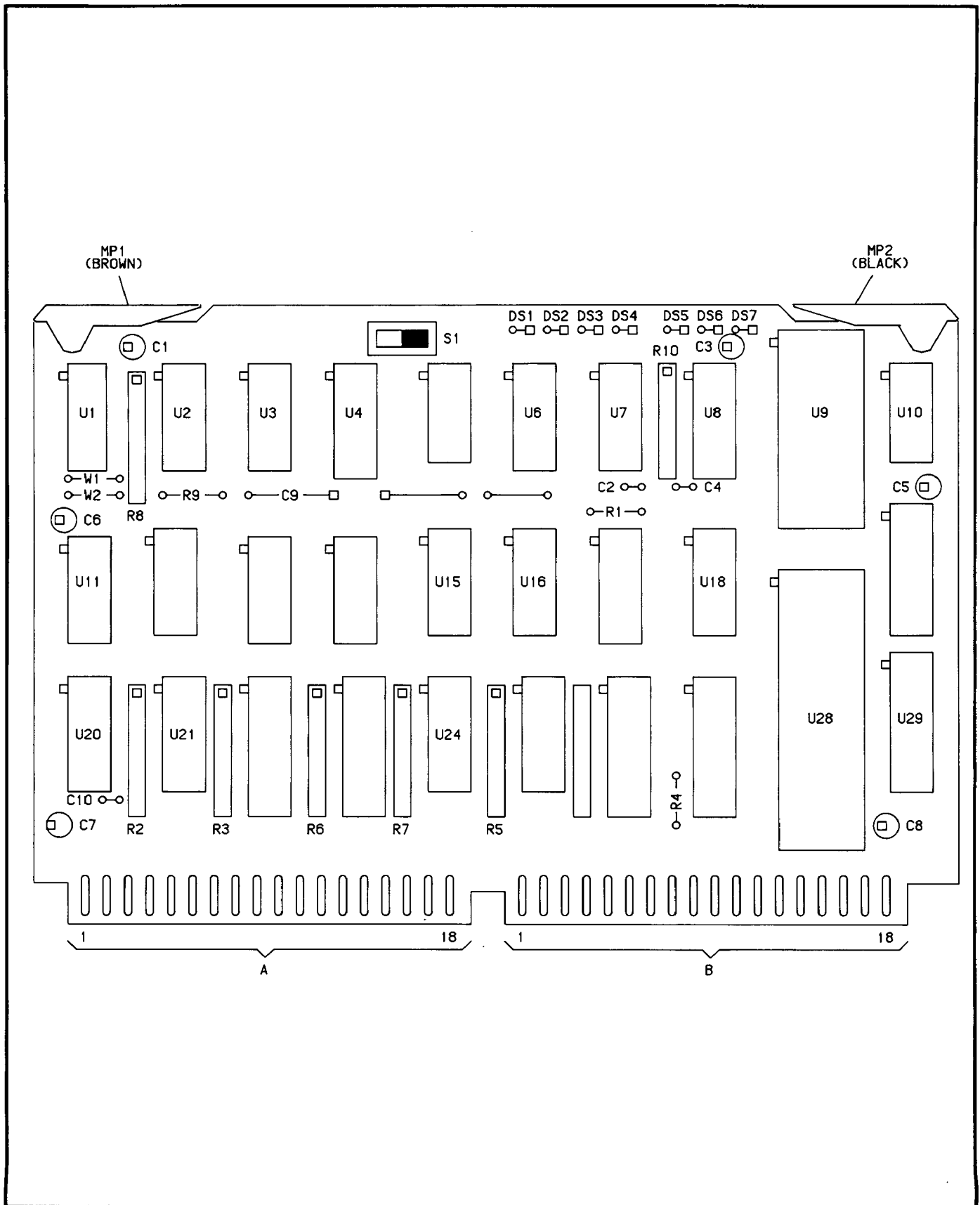
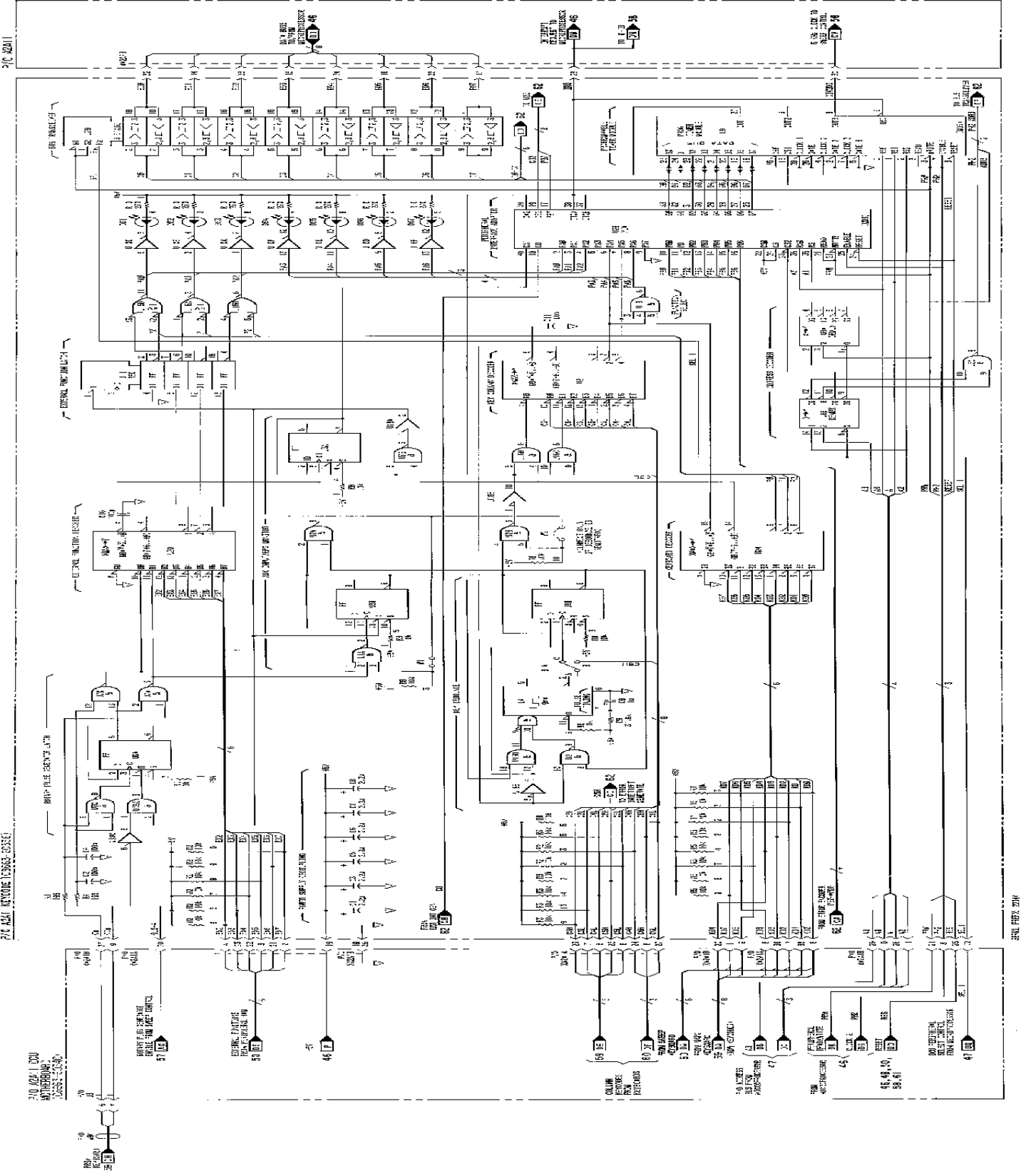


Figure 8-747. P/O A2A1 Keycode Assembly Component Locator





P/O A241 KEYLESS ASSEMBLY

P/O A241  
KEYLESS ASSEMBLY  
8-7801-001

END PAGE 2014

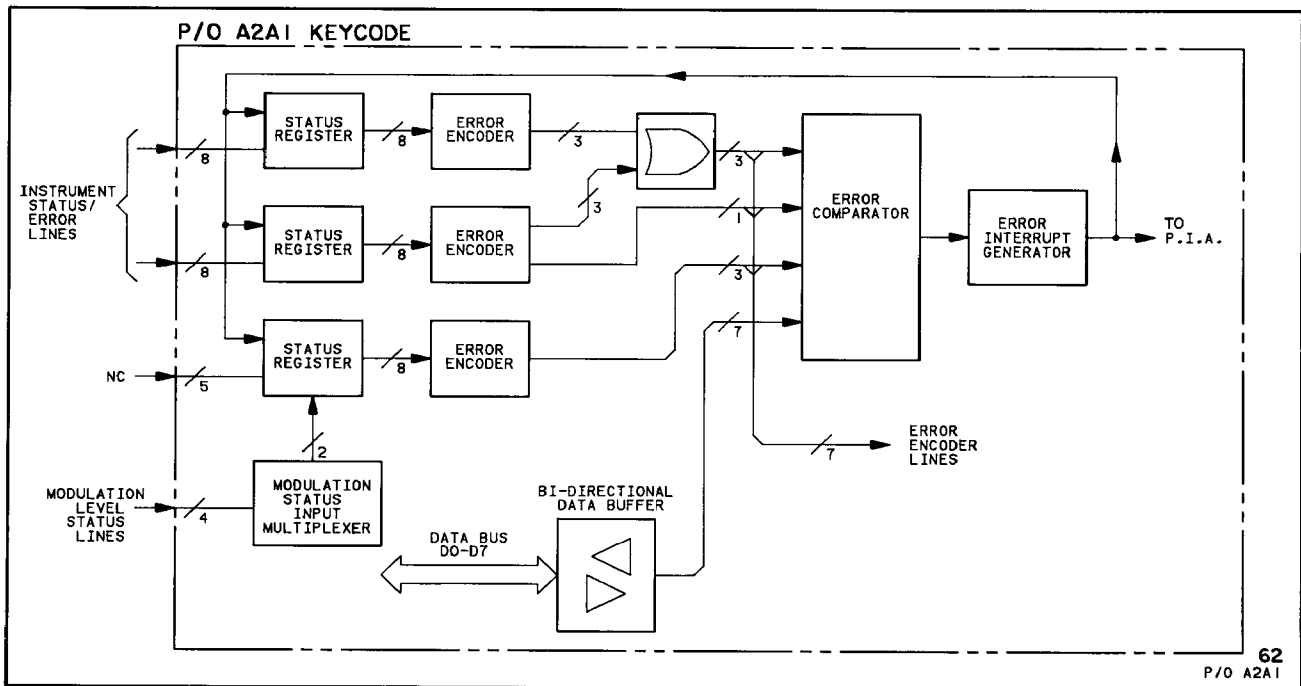
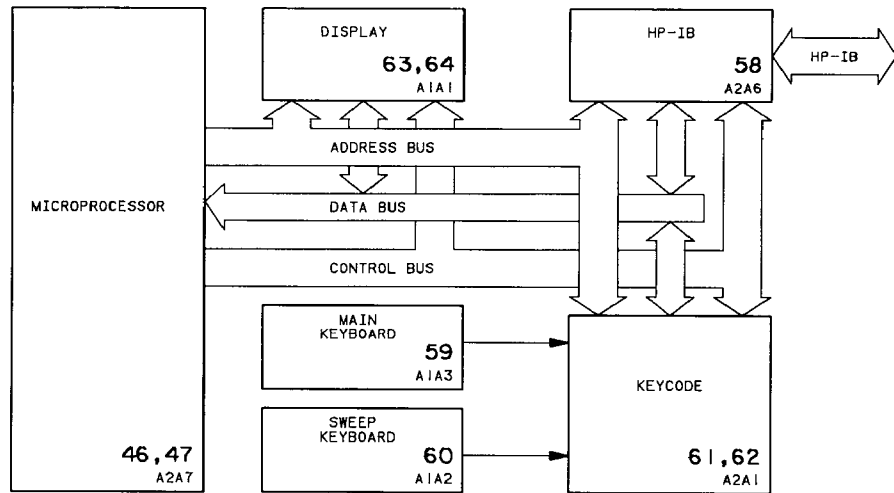


Figure 8-749. P/O A2A1 Keycode Assembly Block Diagrams

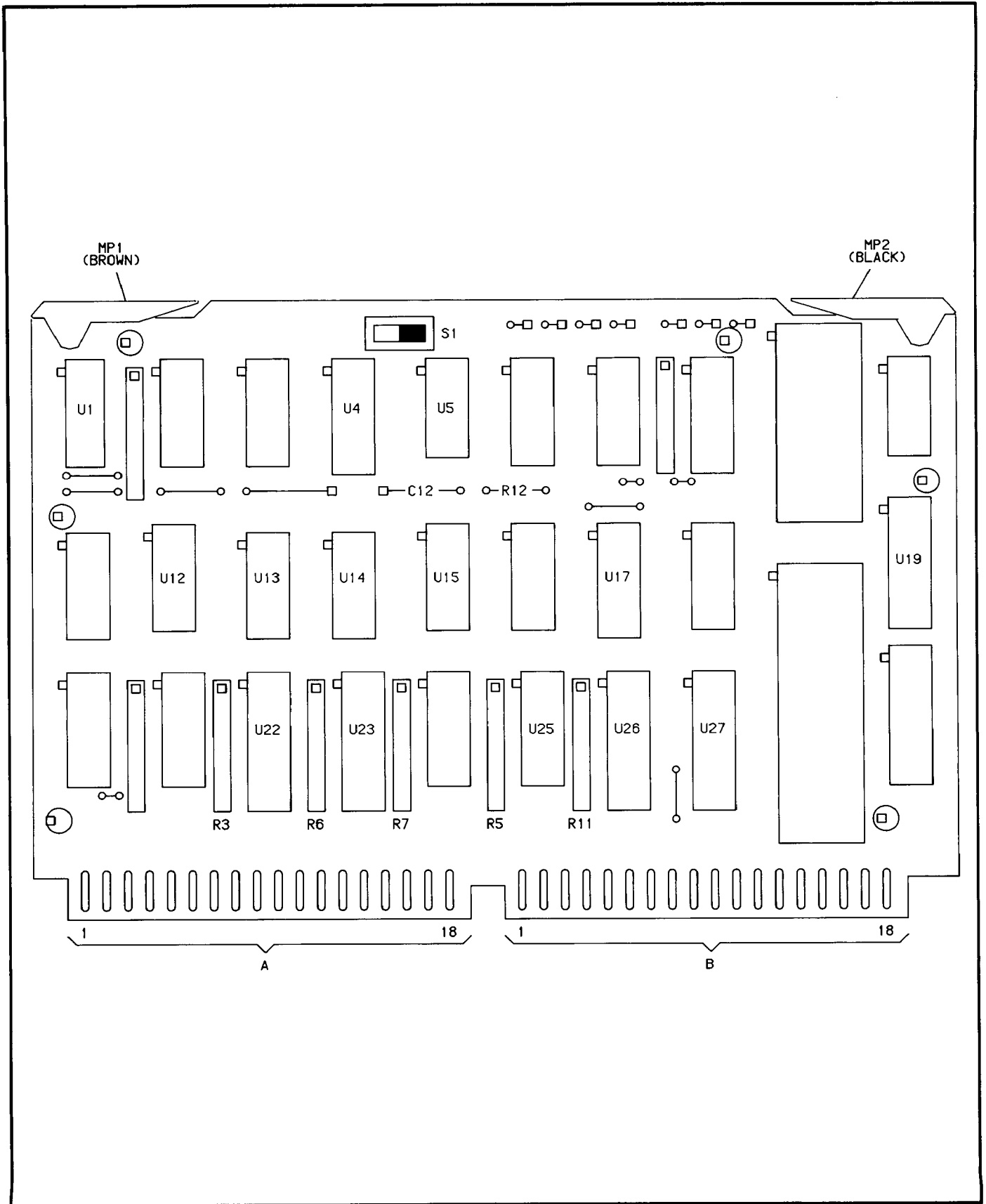
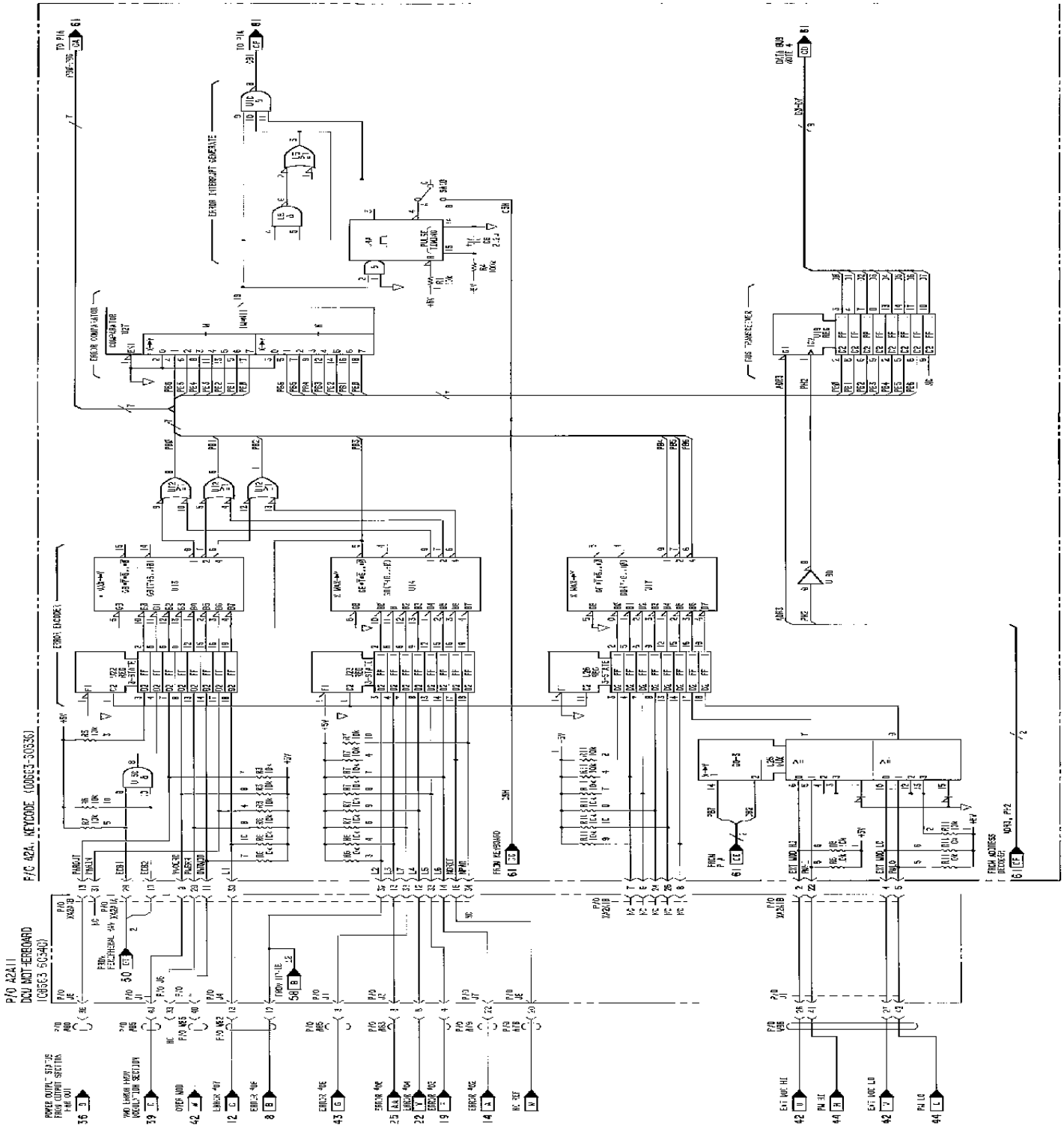


Figure 8-750. P/O A2A1 Keycode Assembly Component Locator



P/O A2A1 I  
 DCU NOT REBOARD  
 (8863-5054Q)

P/O A2A, KEYCODE (8863-5053G)

FROM ADDRESS  
 ADDRESS P1, P2  
 6 [ ]

SERIAL  
 SERIAL P1, P2  
 6 [ ]

TO P/O  
 TO P/O  
 6 [ ]

FROM REBOARD  
 FROM REBOARD  
 6 [ ]

DECODE INTERRUPT SUBSTATE  
 DECODE INTERRUPT SUBSTATE  
 6 [ ]

COMPARATOR  
 COMPARATOR  
 6 [ ]

RES 1  
 RES 1  
 6 [ ]

RES 2  
 RES 2  
 6 [ ]

RES 3  
 RES 3  
 6 [ ]

RES 4  
 RES 4  
 6 [ ]

RES 5  
 RES 5  
 6 [ ]

RES 6  
 RES 6  
 6 [ ]

RES 7  
 RES 7  
 6 [ ]

RES 8  
 RES 8  
 6 [ ]

RES 9  
 RES 9  
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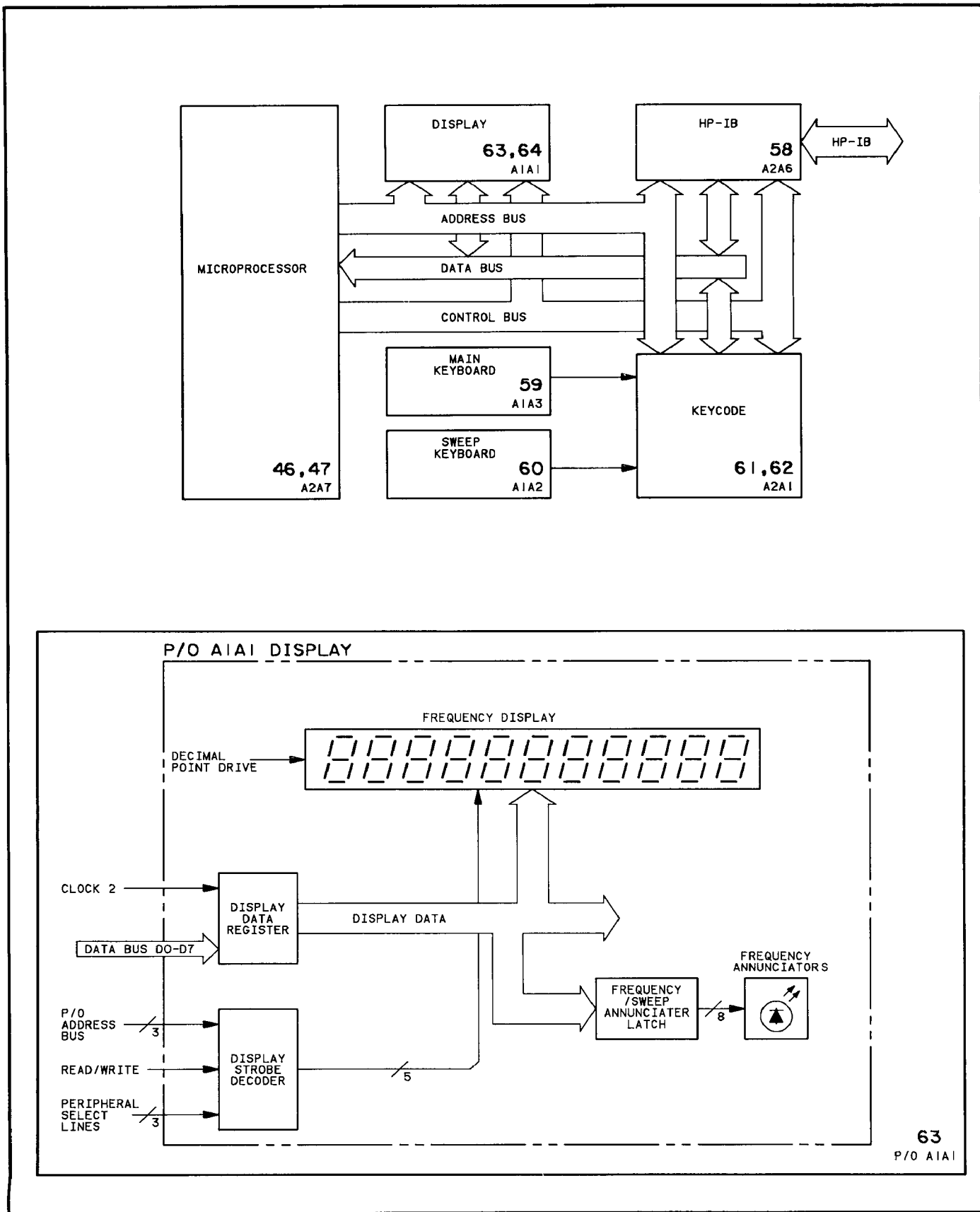


Figure 8-752. P/O A1A1 Display Assembly Block Diagrams

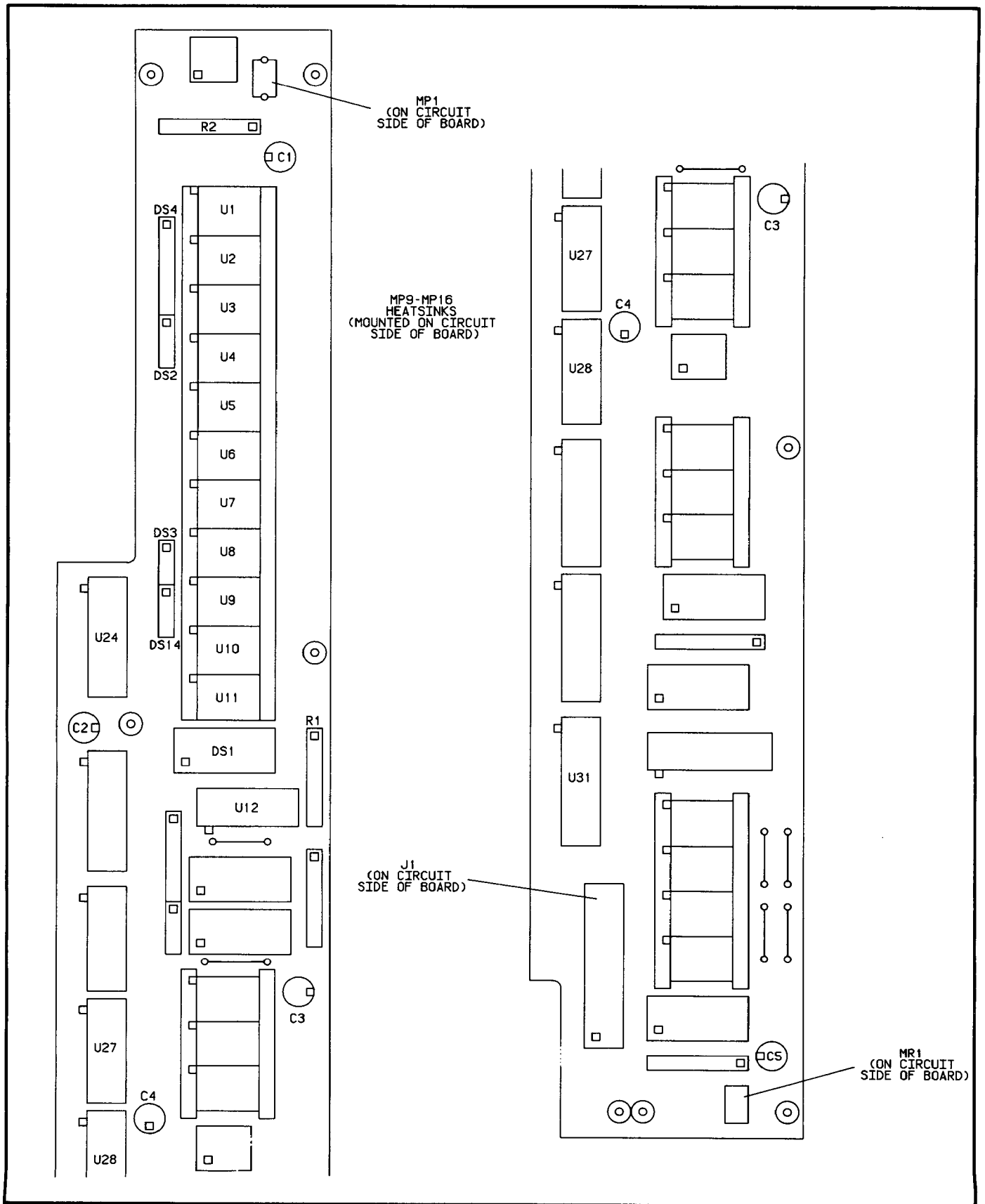


Figure 8-753. P/O A1A1 Display Assembly Component Locator

## CHANGES

### All serial prefixes

On the A1A1 component locator:

- A1A1C6 - Add C6 to the right of and slightly below connector J1.

On the A1A1 schematic:

- A1A1C6 - In the lower left portion of the schematic, in the circuitry labeled POWER SUPPLY DECOUPLING, add capacitor C6 (2200p) from +5V to ground.





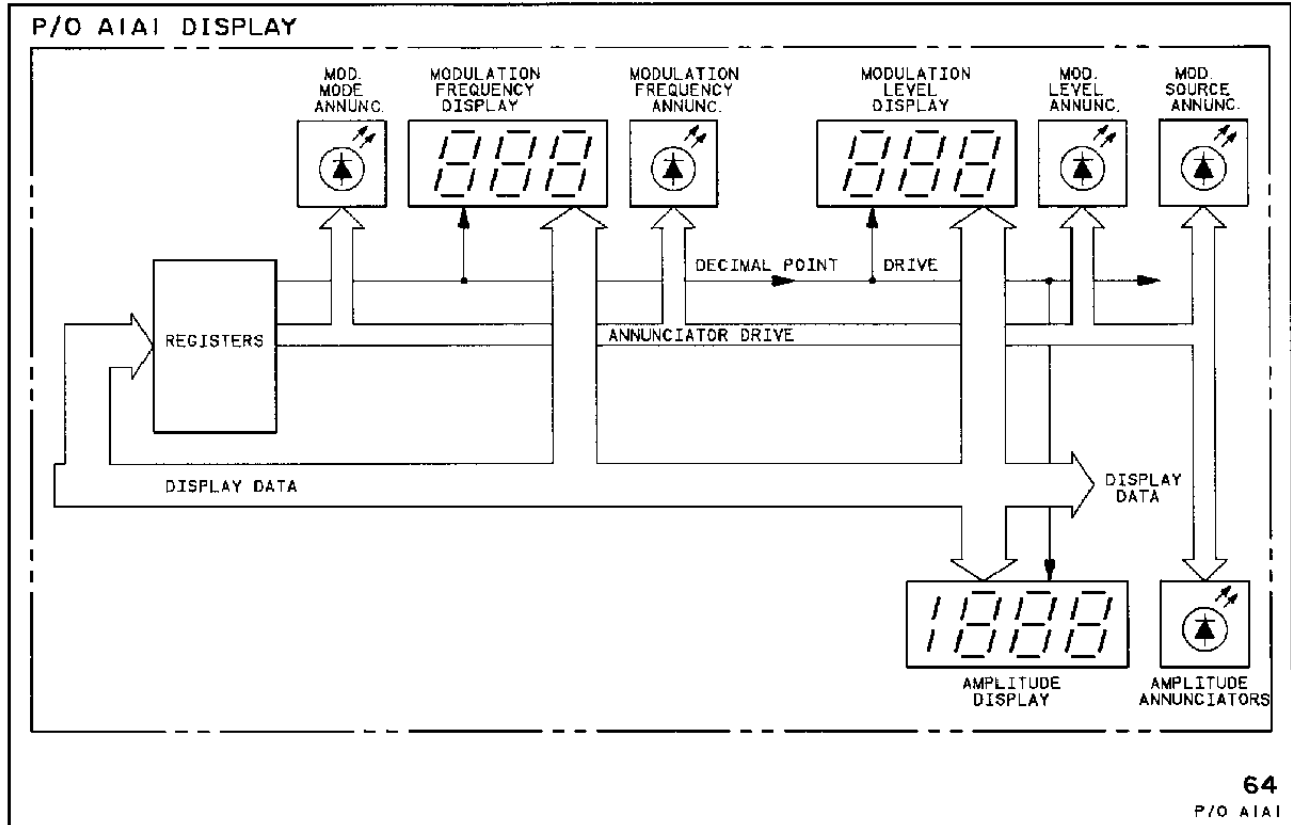
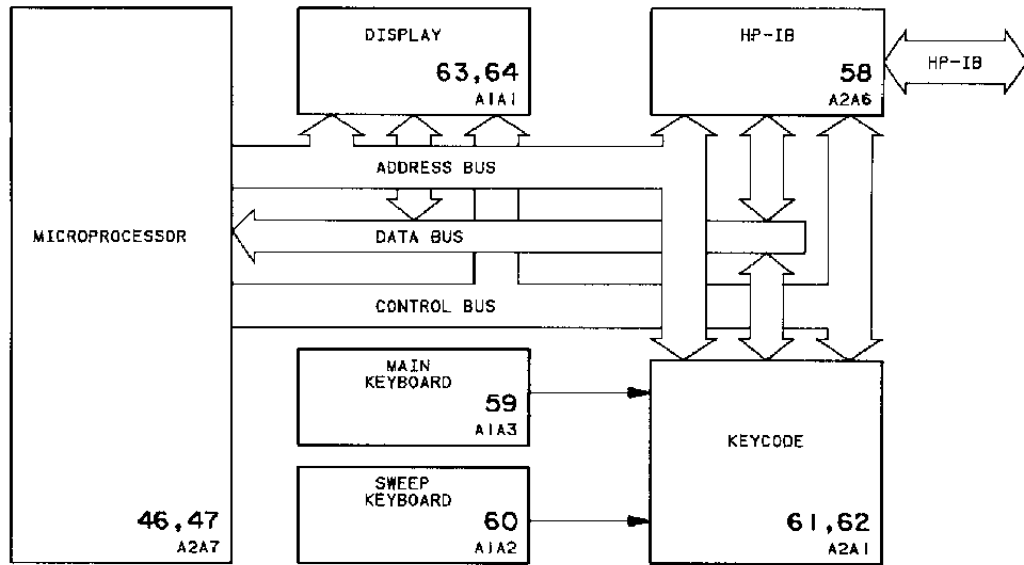


Figure 8-755. P/O A1A1 Display Assembly Block Diagrams

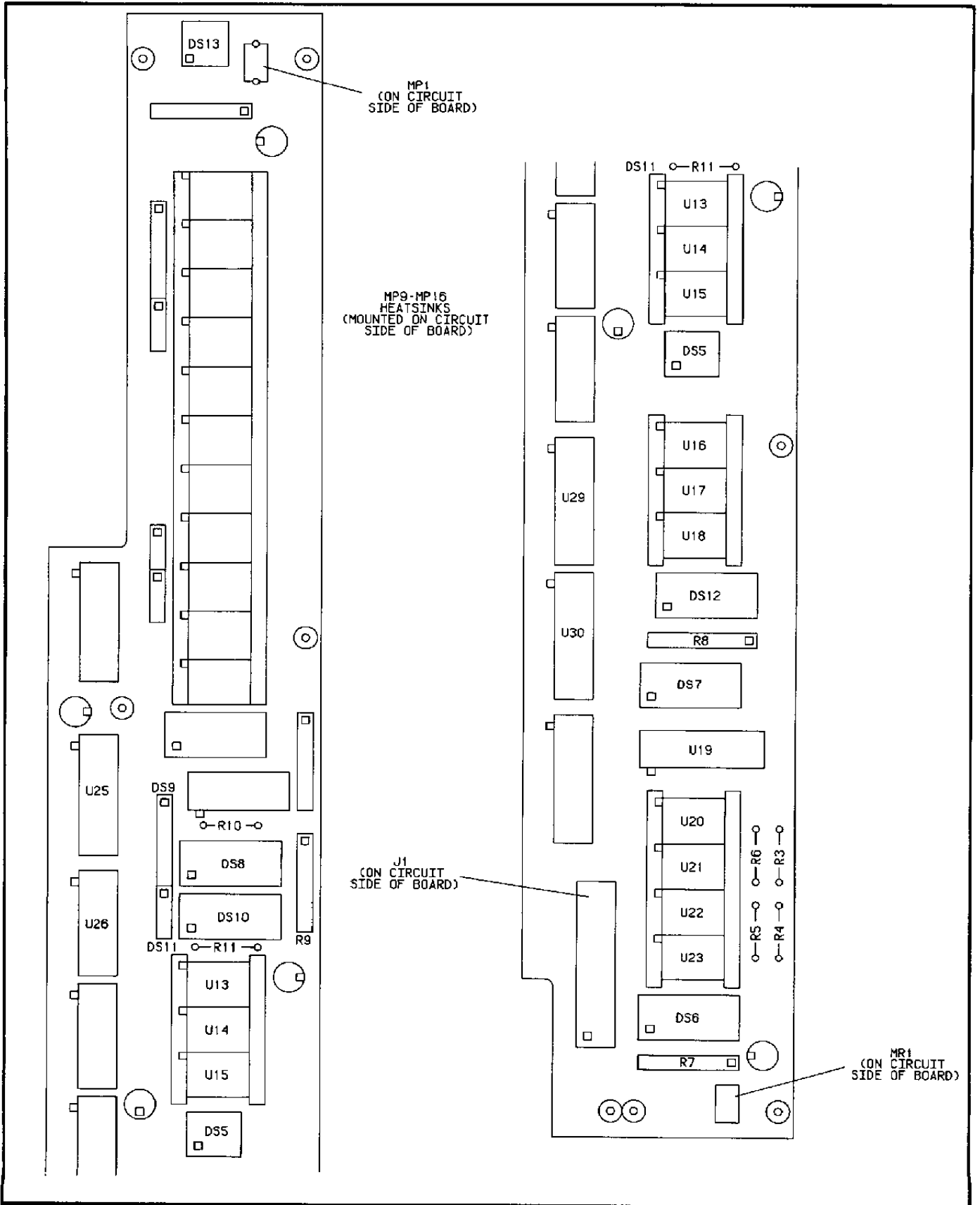


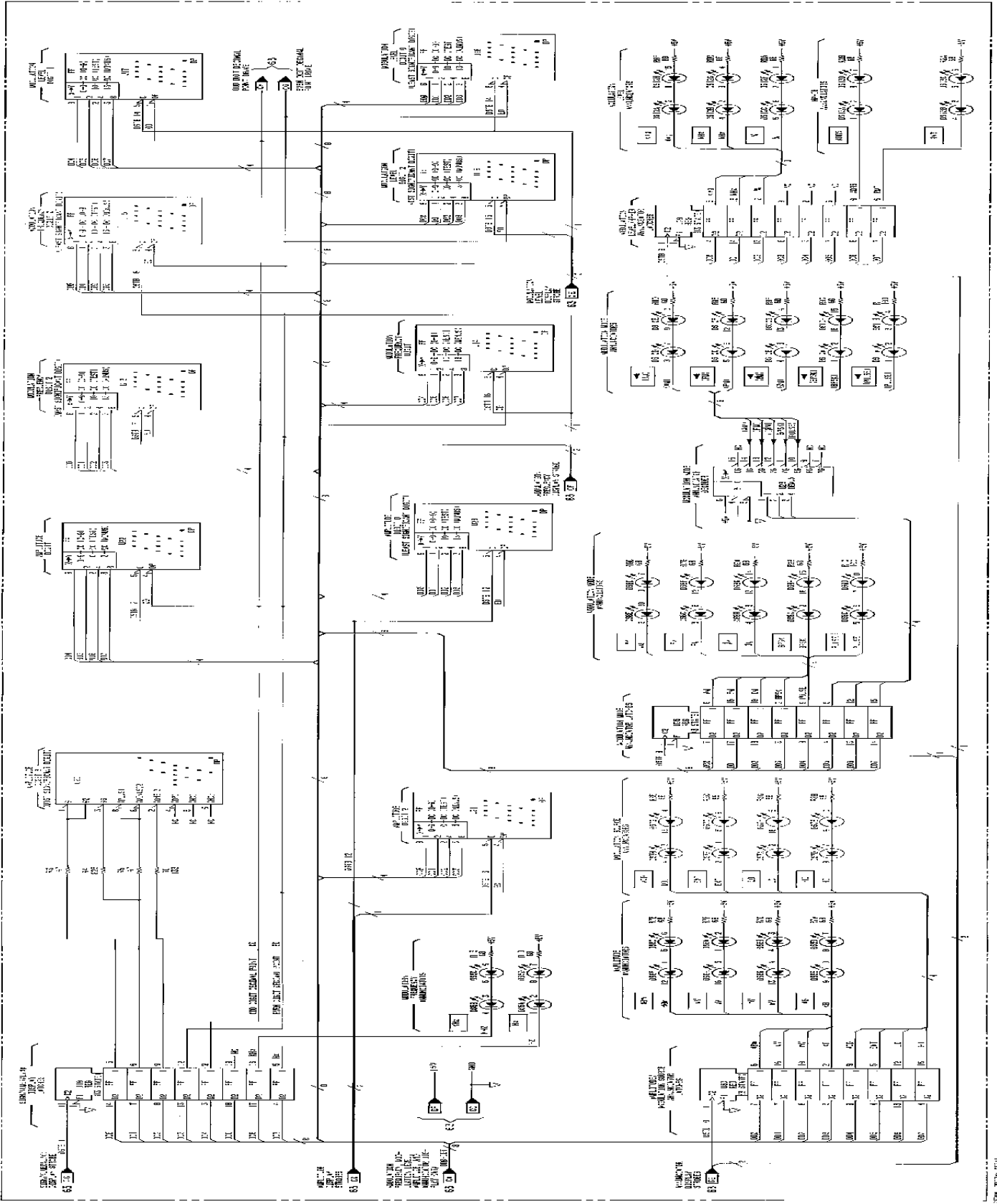
Figure 8-756. P/O A1A1 Display Assembly Component Locator

## CHANGES

**On the schematic**

On the A1A1 schematic:

- A1A1 - Under **MODULATION MODE ANNUNCIATORS**, change R7G to R1G.





SERVICE SHEET 65  
A7A3 AND A7A4 POWER SUPPLY MOTHERBOARD AND INVERTER

## REFERENCE BLOCK DIAGRAM 10

- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.  
Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

## General

Circuitry on the Power Supply Motherboard and Inverter Board rectify and invert the ac line voltage prior to regulation. Before reaching these boards, the line voltage is passed through a filter assembly (A10) and a voltage selection switch (S2), which allow operation at 115 Vac or 220 Vac. Power entering the Supply Motherboard via pins 7-9 is rectified and coarsely filtered to produce +160 Vdc. In the case of 115 Vac operation, voltage doubling is implemented during rectification. The +160 Vdc is then chopped by inverter/regulator switches Q3 and Q4 to drive the main power supply transformer (A7A3T3).

The ac voltages at the multiple secondary taps of the transformer are rectified, filtered, and sent to the Linear Regulator Board (Service Sheet 66). The +5.2 Vdc line is regulated exclusively by the switching action of the supply. Fast and slow sense lines, as well as foldback and feedback sense lines, are derived from various points along the +5.2 Vdc line. These sense lines are sent to the Control Board (Service Sheet 67) which uses the information they provide to generate two pulse-width modulated signals (180° out of phase) that are fed back to drive the inverter/regulator circuitry (formed by Q1, Q2, Q3, and Q4) on the Inverter Assembly.

The output voltage of the 30 Vac transformer (T1) is rectified, filtered, and regulated to supply the dc oven heater voltage for the 10 MHz reference crystal oscillator and to power sections of the Linear Regulator and Control Boards. Circuitry within the auxiliary regulator section on the Control Board (Service Sheet 67) prevents the instrument from being operated when the line voltage falls below 80 Vac (for 115 Vac operation), or 160 Vac (for 220 Vac operation).

## Rectifier, Filter, and Voltage Doubler Circuitry (A7A4)

With the input voltage selection switch in the 220 Vac position, input voltage is full-wave rectified by the bridge formed by CR1, CR2, CR3 and CR4 and is coarsely filtered by capacitors C2 and C3 to produce  $\pm 160$  Vdc. When the selection switch is in the 115 Vac position, CR2 and CR3 form a bridge rectifier and voltage doubler. Here again, the result is  $\pm 160$  Vdc. CR5 and CR6 serve to protect capacitors C2 and C3 from reverse voltage generated during foldback current limiting.

## Overvoltage Crowbar

The overvoltage protection circuitry (crowbar) disables the instrument in the event that the rectified dc voltage exceeds  $+185$  Vdc. At this point Q1 fires and switches 5 ohms across the input line, blowing line fuse F1.

## Switch Drivers and Inverter/Regulator Switches (A7A3)

In order to drive T3, pulses from the pulse-width modulation circuitry (duty-cycle control logic) on the Control Board are transformer coupled (via A7A3T1 and A7A3T2) to the inverter/regulator switch driver circuitry formed by Q1 and Q2. Q1 and Q2 are turned alternately ON and OFF to drive Q3 and Q4  $180^\circ$  out of phase. This action switches the  $+160$  Vdc to produce a 20 kHz alternating drive current through the primary of T3 (see Figure 8-901 below). Q3 and Q4 are turned on by about 350 mA of current at their bases. To reduce the turn-off time of the two transistors, however, two amperes of reverse current is required to turn them off.

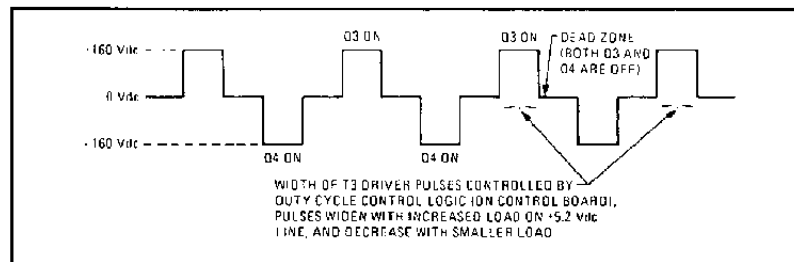


Figure 8-901. Switching Waveform at the primary of T3  
(See also Figure 8-218, Simplified Power Supply Block Diagram)

A resistive-capacitive divider formed by R1, R2, C1, and C2 indirectly references the primary of T3 to ground, isolating the high voltage section from chassis ground and preventing T3 from overheating due to dc currents caused by imbalances in the switching circuits that drive T3. The circuit formed by R11, R12, and C5 serves to lower the Q of the inductance associated with T3, cutting down on ringing at the emitter of Q3 and the collector of Q4.

## Secondary Isolation/Stepdown Transformer (T3) Outputs

Voltages at the secondary taps of T3 are referenced to the  $+5.2$  Vdc supply ground. They are full-wave rectified, coarsely filtered, preregulated, and sent to the Linear Regulator Assembly for final regulation. These unregulated voltages are  $+23$  volts,  $-13$  volts, and  $-45$  volts.

The fast and slow sense lines, as well as the foldback and feedback sense lines, are derived from the  $+5.2$  Vdc supply line. The duty cycle control logic on the Control Board regulates the  $+5.2$  Vdc supply by varying the duty cycle of the signals which drive

inverter/regulator switches Q3 and Q4. Regulation of the +5.2 Vdc supply is accomplished exclusively through the switching action of the supply; no linear regulators are used on this line.

### TROUBLESHOOTING

When a power supply problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to isolate the cause of the problem.

#### CAUTION

If the LINE fuse is blown, do not insert a new fuse until the cause of the failure has been determined. Inserting a new fuse could cause additional damage if the problem is a shorted diode or transistor on the Power Supply Inverter Assembly (A7A3). Perform steps 1 through 6 before inserting a new FUSE.

1. Disconnect the line cord from the rear panel of the Generator.
2. Remove the top cover of the instrument.
3. Remove the top cover of the power supply (at left-rear of instrument).
4. Pull out the A7A3 Inverter Assembly.
5. Use an ohm meter or continuity checker to check the following components for shorts:

CR5	CR9	CR13
CR6	CR10	Q3
CR7	CR11	Q4
CR8	CR12	

6. If none of these components is shorted, it is safe to install another LINE fuse and continue normal troubleshooting.
7. Disconnect the line cord from the rear panel of the Generator.

#### WARNING

When the A7A3 Inverter Assembly is mounted on its extender board, +160V and -160V are exposed on the traces on this board. Use extreme care.

#### CAUTION

Removing and installing power supply boards with the line cord plugged in can damage these boards because high voltage is present whenever the line cord is plugged in.



Remove the A7A3 Inverter Assembly from the power supply. Insert the extender board for A7A3 (set the switch on the extender board to the "in" position to allow high voltage to appear on the top edge connector of the extender board). Plug in the line cord. Measure the high voltage at the edge connector of the extender board. Use a DVM with the common lead connected to the chassis.

$$\text{Pin 5 V} = -160 \pm 20 \text{ Vdc}$$

$$\text{Pin 7 V} = +160 \pm 20 \text{ Vdc}$$

These values are for 115 VAC line voltage. Higher or lower line voltages produce proportionally more or less dc voltage. If this voltage is not correct, the problem is with the high voltage rectifiers and associated circuitry on A7A4. Troubleshoot this circuitry to find the cause. Otherwise, the problem is on the A7A3 assembly so continue troubleshooting with Step 8.

8. Look at the waveform at pin 3 of transformer T3. This is the output of the switching transistors. The waveform should be as shown in the Figure 8-902, below.

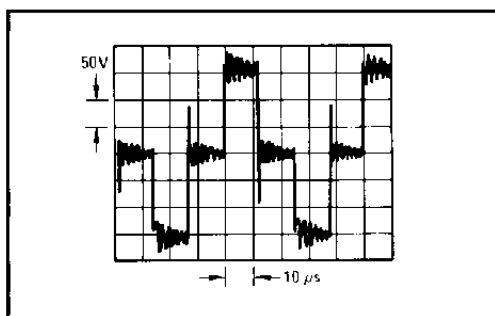


Figure 8-902. Waveform at Pin 2 of T3

If this waveform is normal, the problem is on the secondary side of transformer T3 so continue troubleshooting with step 10 below. If this waveform is not correct, the problem is with the switching transistor circuitry so continue troubleshooting with step 9.

9. Disconnect the line cord from the rear panel of the Generator. Set the switch on the A7A3 extender board to the "out" position. With the switch in this position, no high voltage reaches the A7A3 assembly and the drive signals to the switching transistors can be observed. Compare the actual waveforms to those in Figure 8-903 below.

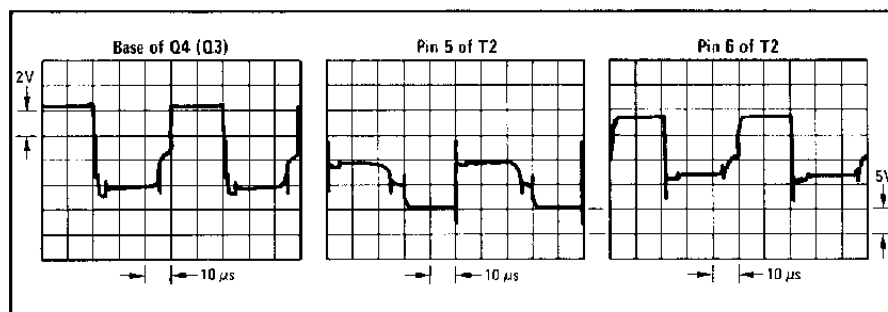


Figure 8-903. Switching Transistor Drive Signals

- Compare the waveforms at the outputs of the rectifiers on the secondary of transformer T3 to those shown in Figure 8-904 below.

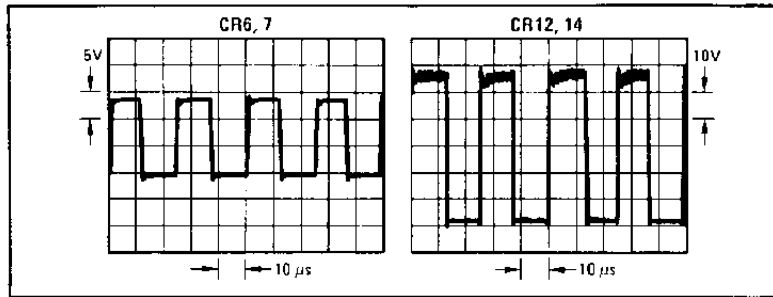


Figure 8-904. Transformer (T3) Secondary Waveforms

If any waveform is different, there is a problem with rectifier diodes or the transformer. The magnitude and duty cycle of the pulses will vary with line voltage, but the pulse width at the output of all rectifiers should be the same.

- Measure the outputs of the rectifier filters at the bottom edge connector of A7A3. Normal values are:

Rectifier Filter Outputs

A7A3 Connector Pin	DVM DC Reading	DVM AC Reading
21	>+22.5	<0.05
22	More Negative than -12.50	<0.20
20	More Negative than -44.00	<0.20
17	>+5.40	<0.040
14, 15, 16	≥+5.20	<0.025

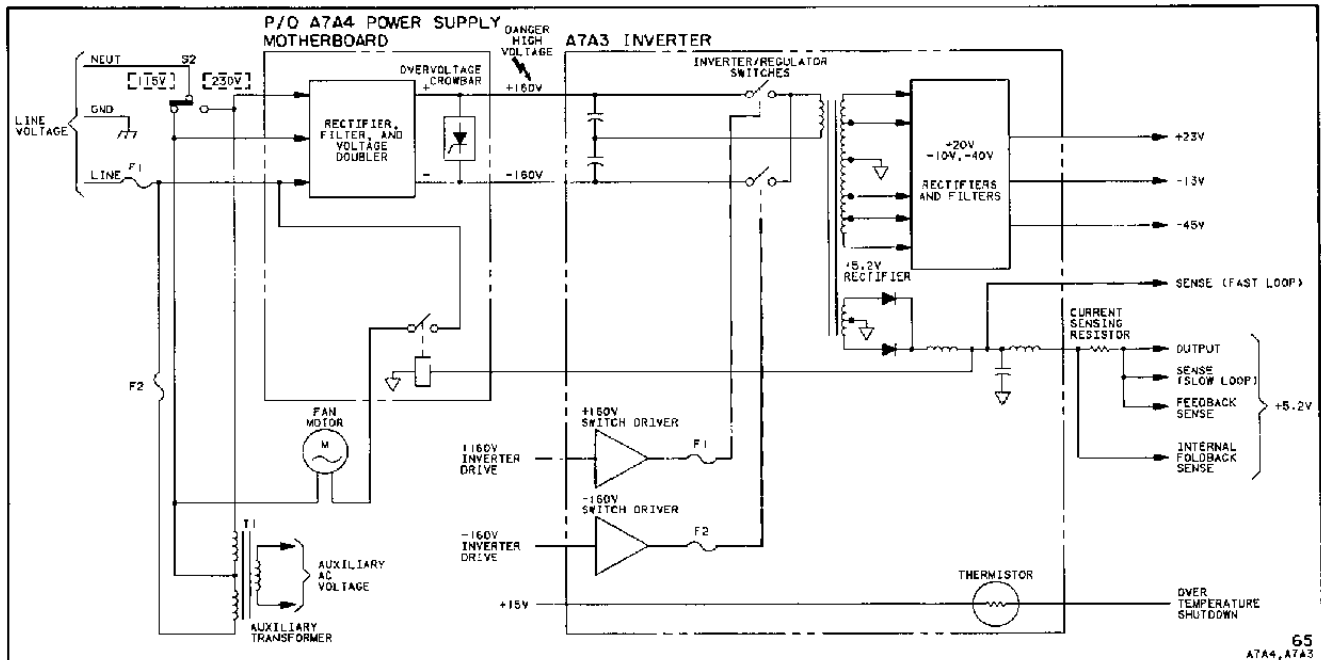
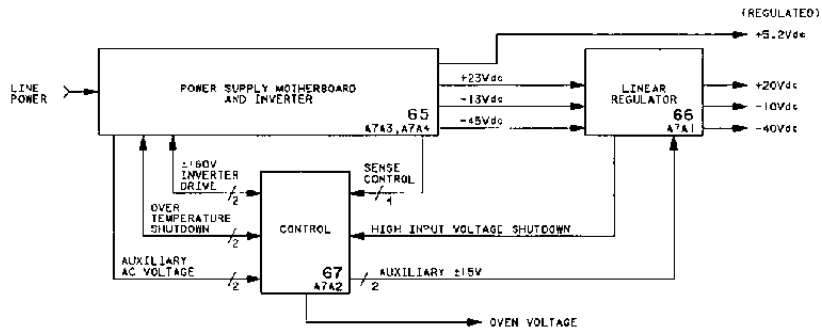


Figure 8-905. Power Supply Inverter, Motherboard & Line Filter Block Diagrams

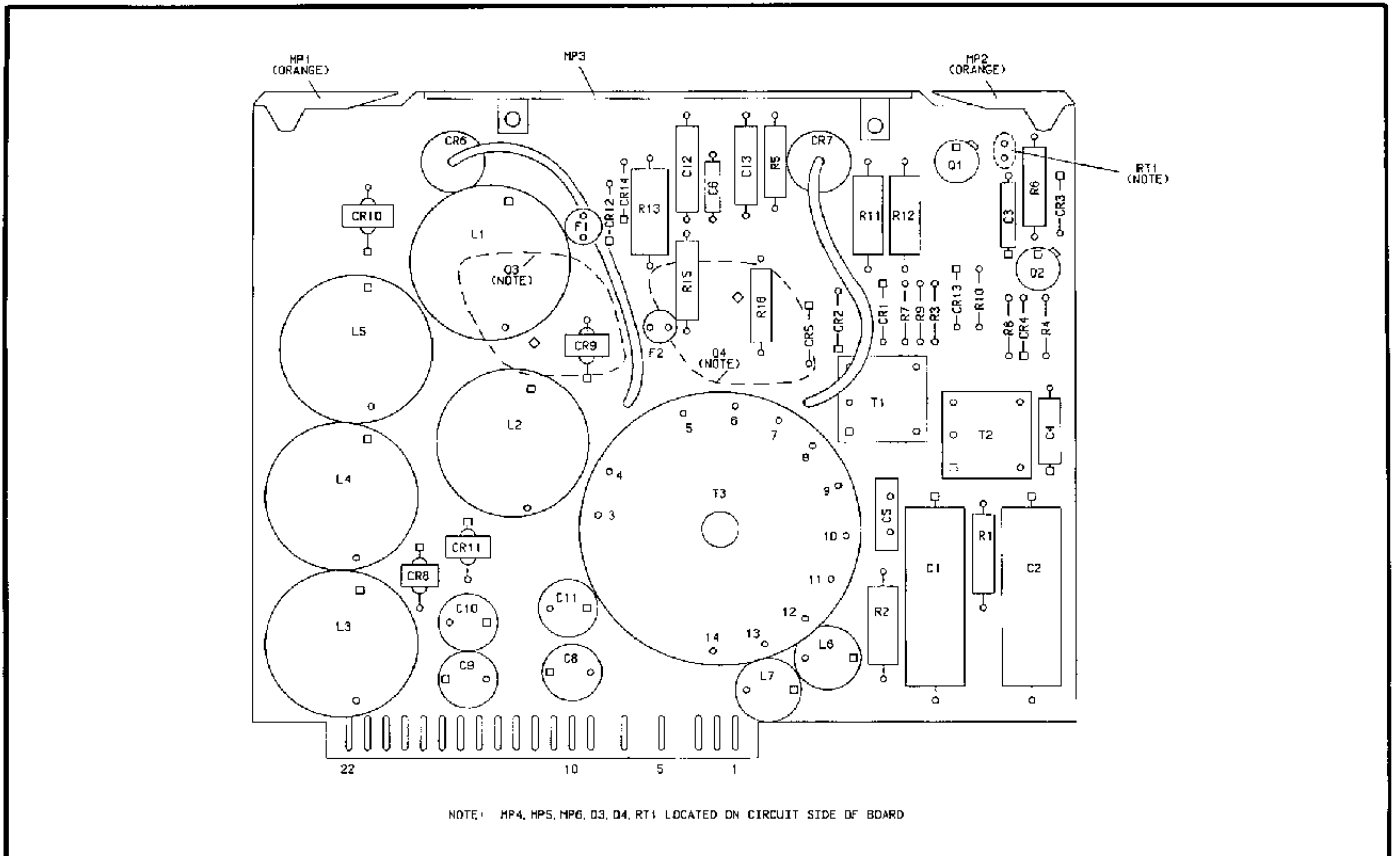


Figure 8-906. A7A3 Power Supply Inverter Component Locator

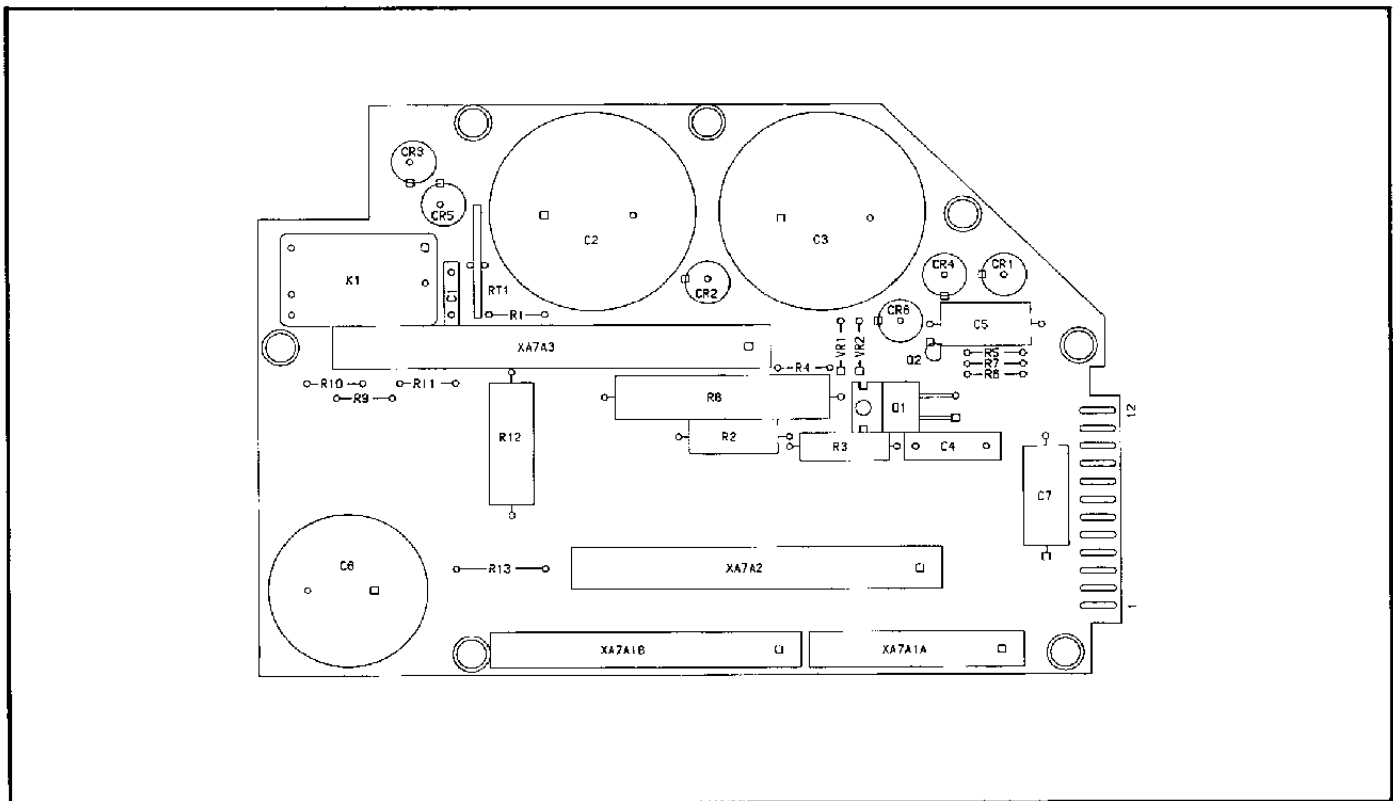


Figure 8-907. A7A4 Power Supply Motherboard Component Locator

# INSTALLATION INSTRUCTIONS

November 14, 1985

## HP MODEL 8662A/8663A SYNTHESIZED SIGNAL GENERATORS

Serial Prefix 2537A and Below

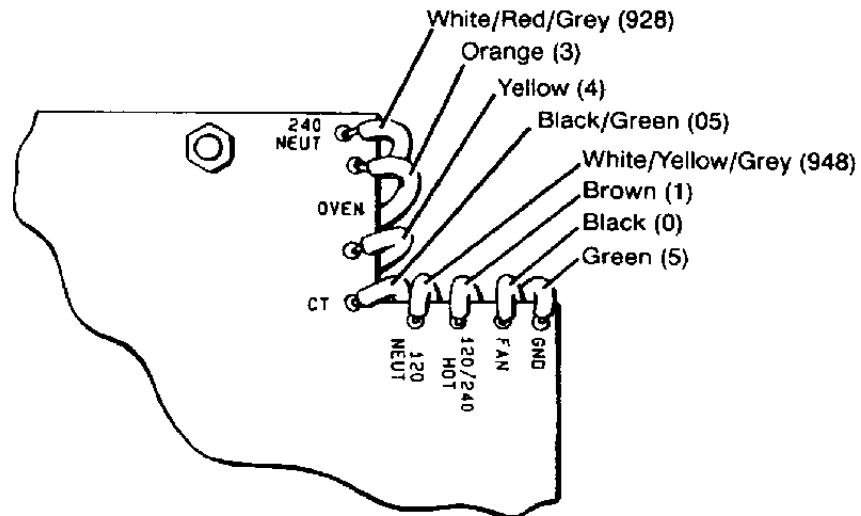
### INSTRUCTIONS FOR INSTALLING NEW STYLE A7A4 POWER SUPPLY MOTHERBOARD HP PART NUMBER 08662-60376 (REPLACES 08662-60156)

#### WARNING

*Due to wiring configuration changes, product damage or shock hazard could result if the following installation procedure is not followed. Before attempting this procedure, remove the power cord from the signal generator.*

#### PROCEDURE

The input power wiring configuration for HP Part Number 08662-60156 (Serial Prefixes 2537A and below) is different from the wiring configuration of HP Part Number 08662-60376 (Serial Prefixes 2545A and above). Figure 1 (below) shows the proper wiring configuration when installing the new A7A4 Power Supply Motherboard, HP part number 08662-60376.



**Figure 1.** Wiring Connections for 08662-60376 Power Supply Motherboard (A7A4)

Printed in U.S.A.  
HP Part Number 08662-90069



SS65

# INSTALLATION INSTRUCTIONS

November 14, 1985

## HP MODEL 8662A/8663A SYNTHESIZED SIGNAL GENERATORS

Serial Prefix 2537A and Below

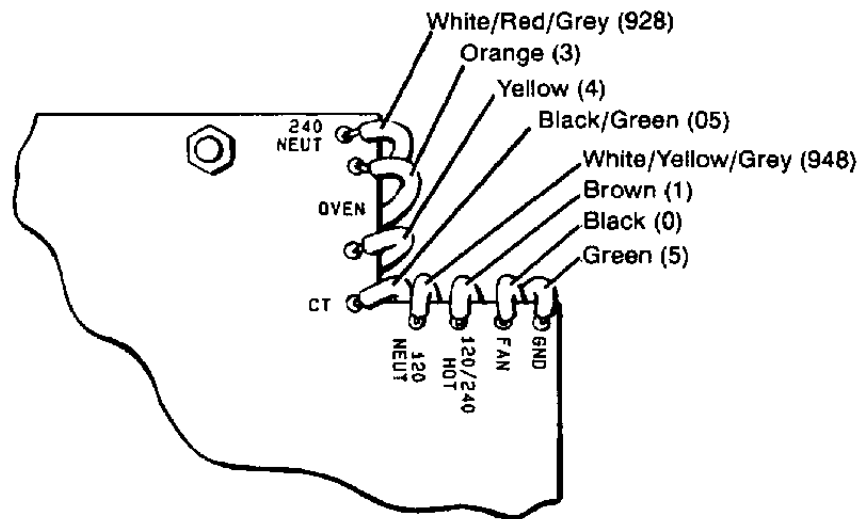
### INSTRUCTIONS FOR INSTALLING NEW STYLE A7A4 POWER SUPPLY MOTHERBOARD HP PART NUMBER 08662-60376 (REPLACES 08662-60156)

#### WARNING

*Due to wiring configuration changes, product damage or shock hazard could result if the following installation procedure is not followed. Before attempting this procedure, remove the power cord from the signal generator.*

#### PROCEDURE

The input power wiring configuration for HP Part Number 08662-60156 (Serial Prefixes 2537A and below) is different from the wiring configuration of HP Part Number 08662-60376 (Serial Prefixes 2545A and above). Figure 1 (below) shows the proper wiring configuration when installing the new A7A4 Power Supply Motherboard, HP part number 08662-60376.



**Figure 1.** Wiring Connections for 08662-60376 Power Supply Motherboard (A7A4)

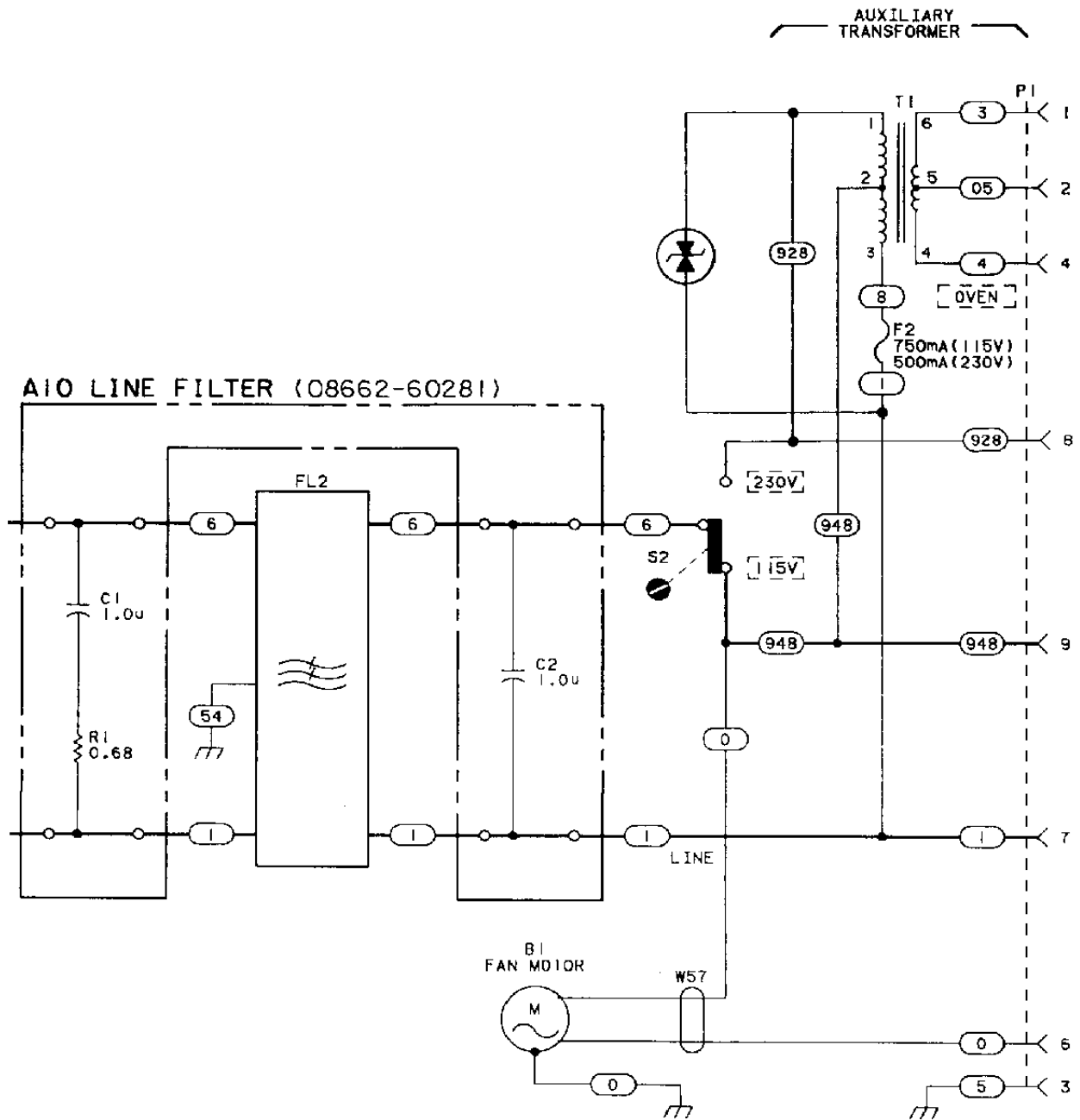
**CHANGES**

<p><b>2342A to 2846A</b></p>	<p><b>On the A7A3 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>A7A3</b> - Modify the schematic as shown in the partial schematic "P/O Figure 8-908, A7A3 Power Supply Inverter, Motherboard &amp; Line Filter Schematic (2342A to 2846A)" on page 8-908.5</li> </ul>
<p><b>2510A to 2846A</b></p>	<p><b>On the A7A3 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>A7A3</b> - Modify the schematic as shown in the partial schematic "P/O Figure 8-908, A7A3 Power Supply Inverter, Motherboard &amp; Line Filter Schematic (2510A to 2846A)" on page 8-908.6</li> </ul>
<p><b>2545A and above</b></p>	<p><b>On the A7A4 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>08662-60376</b> - Change the part number of the A7A4 Assembly to 08662-60376.</li> </ul> <p style="text-align: center;"><b>NOTE</b></p> <p><i>If replacing the old A7A4 power supply motherboard with the new board (08662-60376), extreme care should be exercised as the connections are arranged in a different order on the 08662-60376 board. For information regarding installing a new A7A4 Assembly (08662-60376) in an older instrument, refer to Installation Instructions on page 8-908.1 - HP Part number 08662-90069. The wiring codes and board labels shown on the schematic are correct.</i></p>
<p><b>2651A and above</b></p>	<p><b>On the A7A1 schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>08662-60347</b> - Change the part number of the A7A1 Assembly to 08662-60347.</li> <li>• <b>Q4, Q6, Q8</b> - Change the part number of Q4, Q6, and Q8 to 1884-0330 in the "Table of Transistor and Integrated Circuit Part Numbers."</li> </ul>
<p><b>2846A and below</b></p>	<p><b>On the schematic:</b></p> <ul style="list-style-type: none"> <li>• <b>B1</b> - This assembly is not individually backwards compatible except as a total kit - the Fan Replacement Kit is available as HP part number 08662-60383.</li> </ul> <p>If your rear panel frame is damaged and your fan needs to be replaced, order the Rear Panel Kit, HP part number 08662-60384. See section 7 for further information.</p>

**CHANGES**

<b>2918A and above</b>	<p><b>On the schematic:</b></p> <ul style="list-style-type: none"><li>• <b>B1</b> - Use the partial schematic on page 8-908.7.</li><li>• <b>A7A3</b> - In A7A3 INVERTER, under FULL-WAVE RECTIFIERS AND RIPPLE FILTERS, draw an on-page connector extending upward from the node of C9. Label it "A" +23 V. "A" connects to the partial schematic on page 8-908.7.</li></ul>

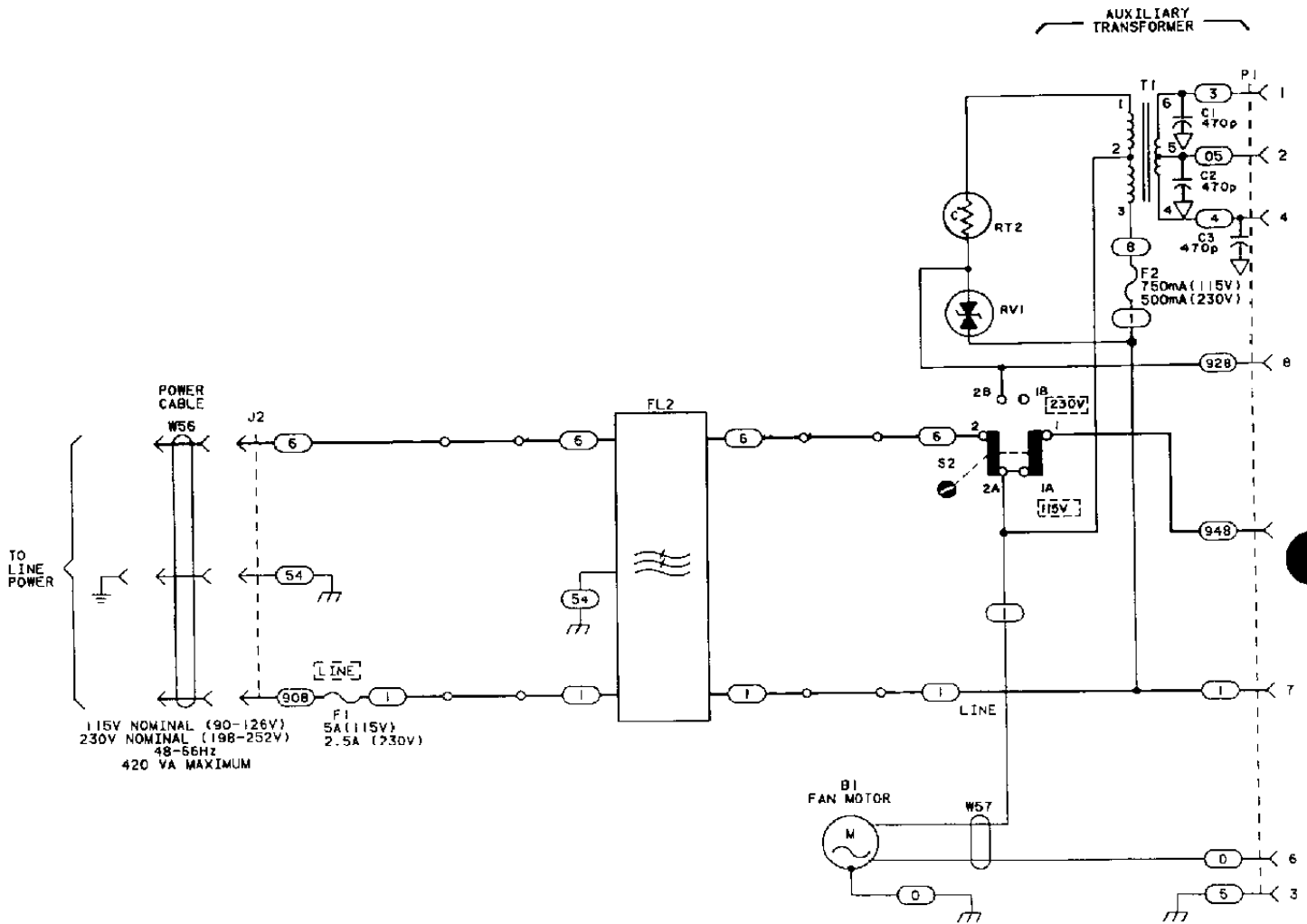




A7A3 Schematic Partial, (2342A to 2510A).

**NOTE**

The circuitry shown on this page for the B1 Fan Motor is no longer accurate. For the current circuitry, see page 8-908.7, 2918A and above. See section 7 for more details.



Schematic Partial, (RT2 was added). See section 7 (2510A and above).

**NOTE**

The circuitry shown on this page for the B1 Fan Motor is no longer accurate. For the current circuitry, see page 8-908.7, 2918A and above. See section 7 for more details.





## SERVICE SHEET 66 A7A1 LINEAR REGULATOR ASSEMBLY

### REFERENCE BLOCK DIAGRAM 10

- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

### General

The Linear Regulator board regulates the rectified and coarsely filtered dc voltages sent from the Inverter Board (Service Sheet 65). There are three series regulator circuits on this board, the outputs of which are +20 Vdc (at 2.5 amperes), -10 Vdc (at 2.5 amperes), and -40 Vdc (at 0.5 amperes). Additional features incorporated into the regulator circuits are foldback current limiting, transient and high input voltage shutdown, and bi-directional crowbar protection.

### Linear Regulator Circuits

Each of the series regulators is designed around an integrated comparator amplifier (regulator). U1 and U2 are LM204 equivalents; U3 is a LM305 equivalent. A compound PNP/NPN transistor pair is used in each circuit to boost its current handling capability. Potentiometers R18, R20, and R39 are adjusted to trim the output voltages of the -40 Vdc, -10 Vdc, and +20 Vdc lines, respectively. Transistors Q11 and Q10 control the current limiting action of U2 and U1 in the -10 Vdc and -40 Vdc regulator circuits. Current limiting for the +20 Vdc line is sensed by a resistive divider formed by R23, R24, R27, and R28. Each regulator circuit has a green LED lamp which indicates that voltage is present at its output.

### Bi-Directional Crowbar Protection

A crowbar circuit shunts the output of each of the three linear regulators found on this assembly. Each crowbar protects the circuitry fed by its respective regulator should the regulator fail. When the output of a regulation circuit exceeds its nominal output voltage by more than 3 to 4 volts, or falls more than one volt below ground (one volt above ground for the negative supplies), a triac is turned ON, shorting the output to ground. This puts the supply in a current-limit mode.

### High Input Voltage Shutdown Circuitry

The high input voltage detector circuitry protects the regulators against excessive input voltage resulting from transients, open circuit conditions, or malfunctions in the switching-regulator circuitry. If the input line voltage even momentarily exceeds a

preset value, the high input-voltage shutdown lamp will latch ON and a signal will be sent to the inverter-drive circuitry, shutting down the power supply.

## TROUBLESHOOTING

When a power supply problem has been traced through the block diagram troubleshooting procedure to this assembly, use the procedure below to isolate the cause of the problem.

There are two basic types of problems that are covered by this procedure:

1. If red LED in the upper left hand corner of the board is lit indicating the input voltage from the A7A3 Inverter Assembly was too high, and the supply was shut down, it is most likely a problem with the regulator not drawing enough current.
2. The input voltage is normal, but the output voltage is not regulated.

### Inverter Input Voltage High

1. Disconnect the line cord from the rear panel of the 8663A.

CAUTION

Removing and installing power supply boards with the line cord plugged in can damage these boards because high voltage is present whenever the line cord is plugged in.

Install the A7A1 Linear Regulator Assembly on its extender board. Then plug in the line cord.

If the red LED in the upper left hand corner lights when the POWER switch is turned on, continue troubleshooting with step 2. Otherwise, continue troubleshooting with step 3.

2. Connect a short jumper between the collector of Q16 and ground. This will allow the control board to turn on. Turn the line switch to ON and measure the voltage at the test points in the table below, to identify which supply is malfunctioning.

Linear Regulator Inputs

Measure	Normal Voltage
TP4	<+30.0
TP5	<-16.0*
TP6	<-55.0*

\*The sign < in this case means lower magnitude or more positive than.

When the malfunctioning supply is identified, troubleshoot the regulator circuitry to find the cause of the problem.

### Inverter Input Voltage Normal

3. Turn the POWER switch to ON. To determine if any of the supplies are in current limit, measure the voltage across the current sensing resistors specified in the table below.

#### Current Limiting Check

Resistor	Max Reading (VDC)	Supply
R27, 28	1.25	+20V
R36	0.60	-10V
R37	0.60	-40V

If any reading is above the maximum value given in the table, that supply is current limited so continue troubleshooting with step 4. If the readings are normal, there is a problem with the regulator circuitry so troubleshoot to find the cause.

4. The supply could be in current limit because the load is drawing too much current or because the overvoltage crowbar has triggered. Turn the POWER switch to STANDBY and monitor the output of the supply being tested with an oscilloscope. Set the scope to trigger when the supply turns on and watch how high the voltage rises when the line switch is turned on. Compare this value to the numbers in the table below.

#### Crowbar Trigger Voltage

Supply	Crowbar Trigger Voltage
+20V	23.7V
-10V	11.0V
-40V	46.4V

If the actual supply voltage exceeded the trigger voltage, the regulator is defective so troubleshoot the regulator circuitry to find the cause of the problem. Otherwise, the load is drawing too much current so look for the problem in one of the other sections of the instrument.

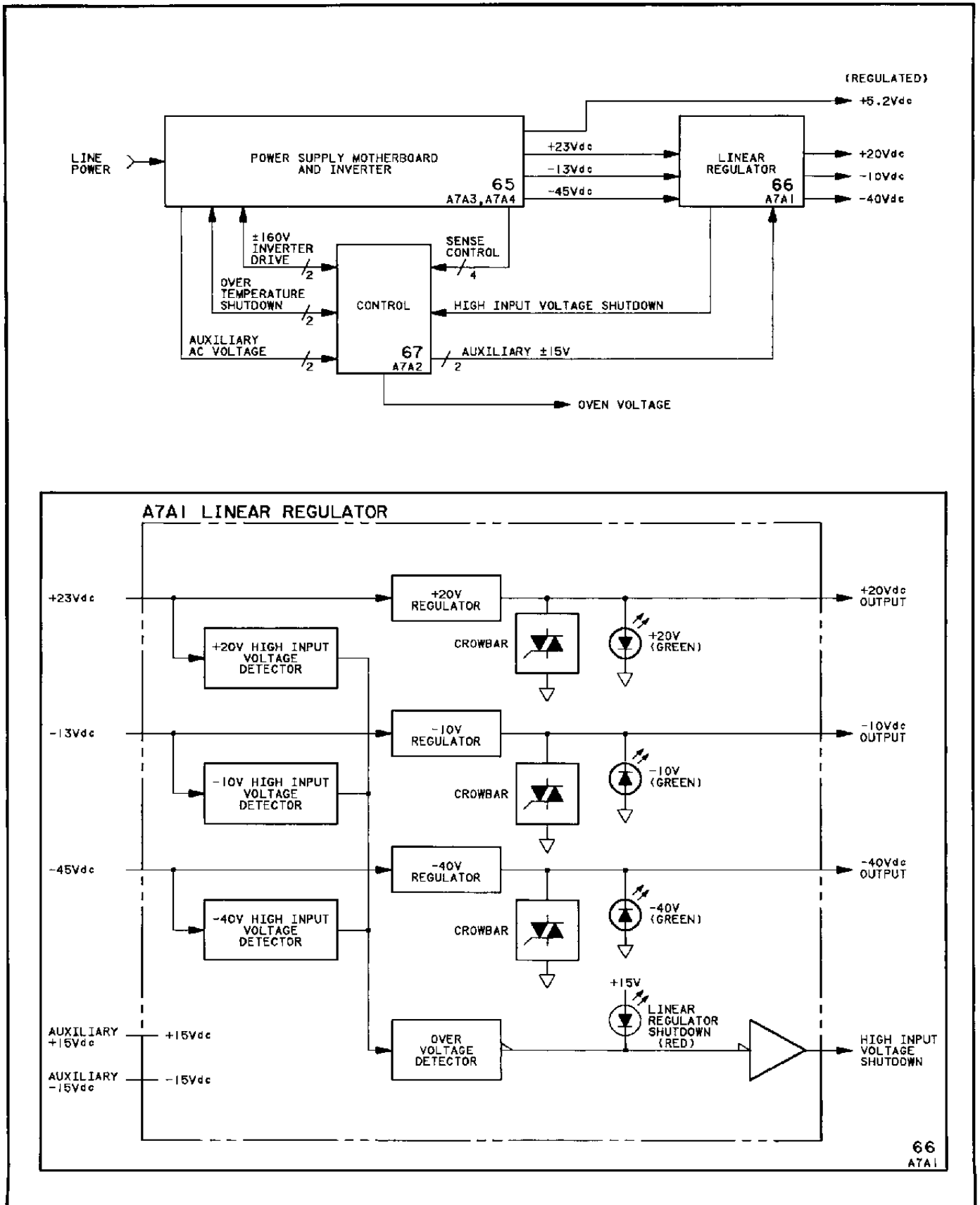


Figure 8-909. A7A1 Power Supply Linear Regulator Block Diagrams



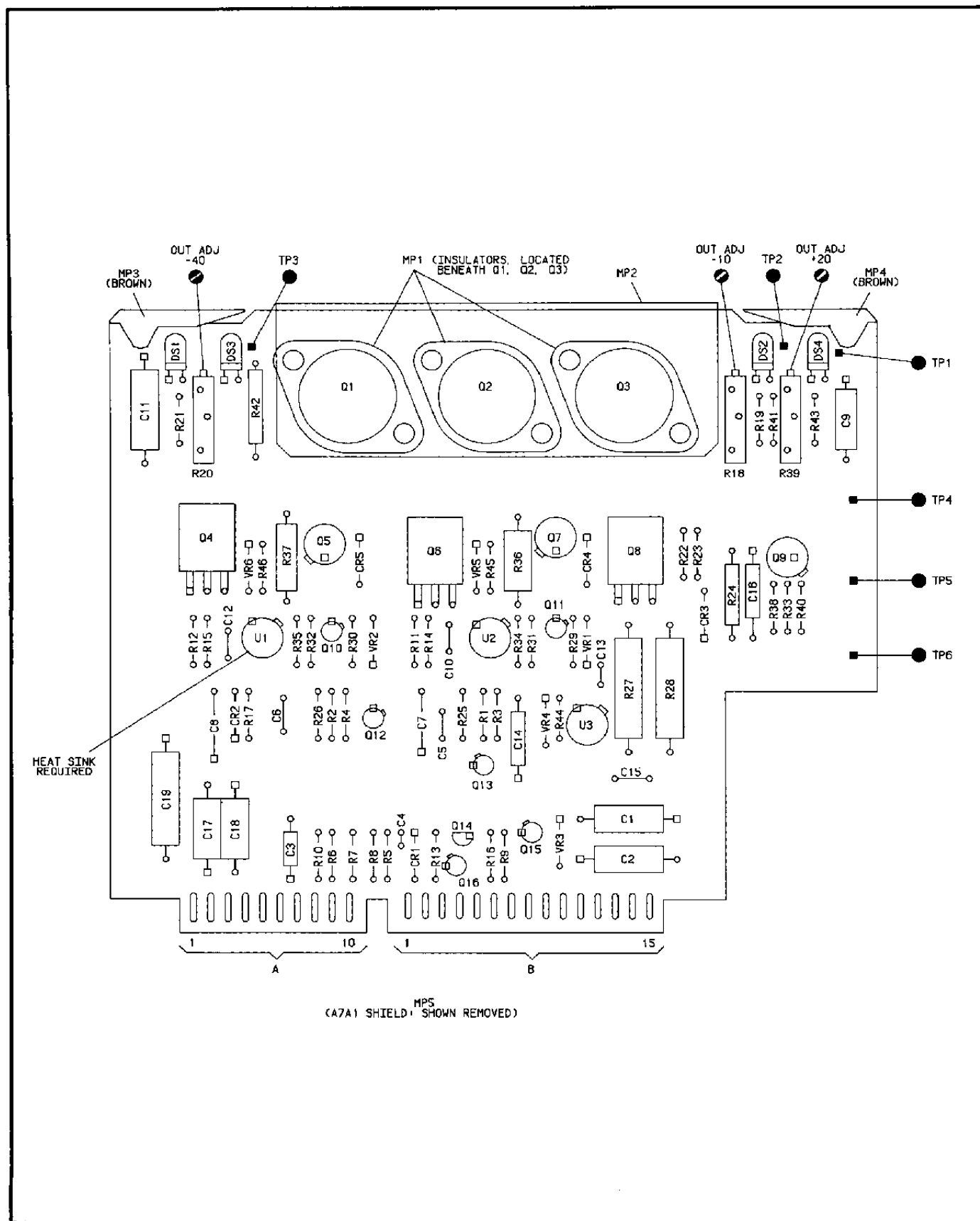


Figure 8-910. A7A1 Power Supply Linear Regulator Component Locator

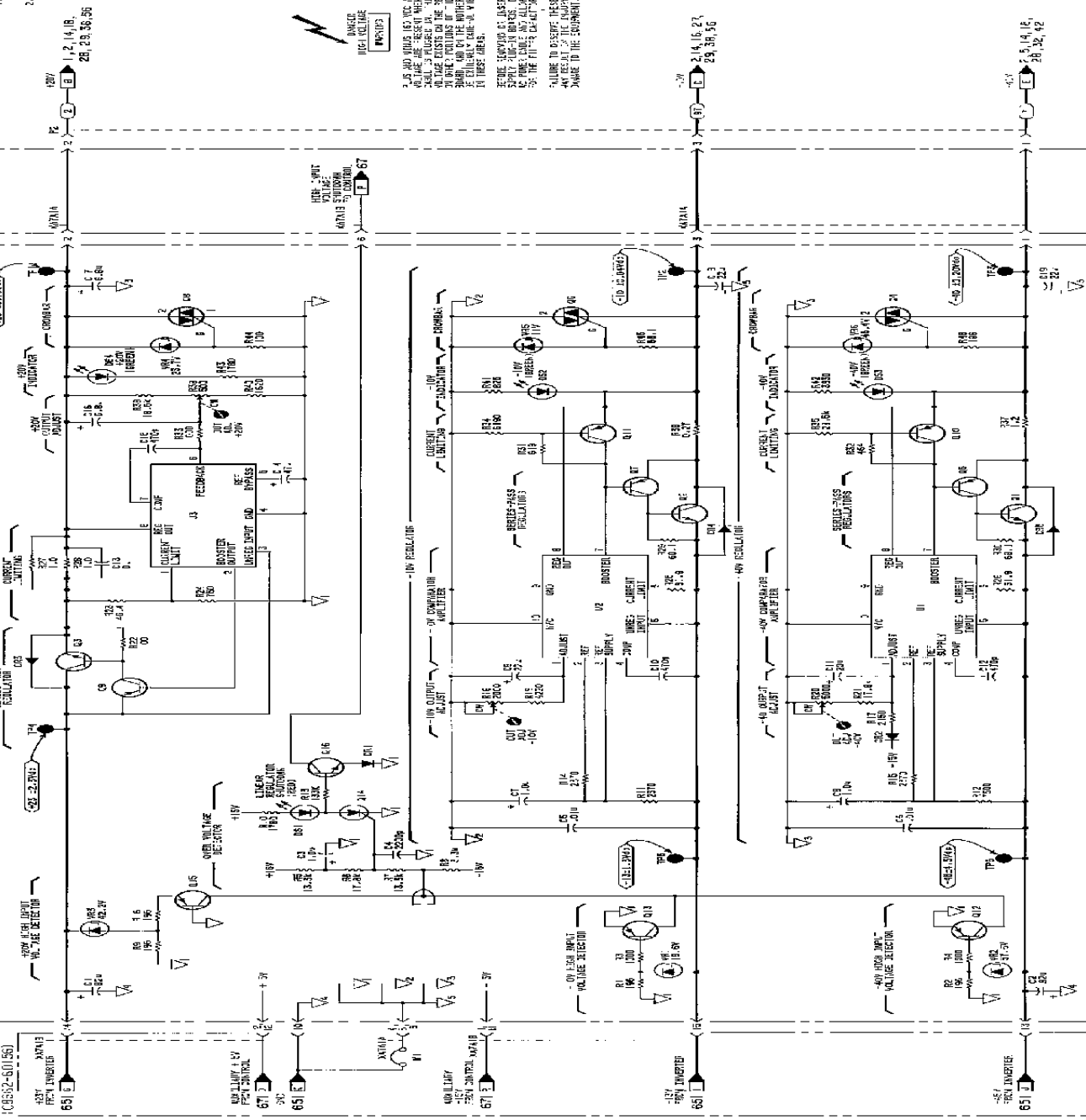
**CHANGES****2419A and Above**

On the schematic:

- A7A1U1 - In the table of Transistor and Integrated Circuit Part Numbers, change the part number for U1 to 1826-0016.

ATA1 LINEAR REGULATOR (09652-90157)

P/O 174A  
POWER SUPPLY  
MOTHERBOARD  
(09652-90156)



- NOTES
- SEE FIGURE 8-91 FOR SCHEMATIC DATA NOTES.
  - THE RESISTOR VALUES ARE TYPICAL. THE RESISTOR VALUES MAY BE Slightly DIFFERENT THAN THAT SHOWN.

NO.	DESCRIPTION	QTY	REF. DESIG.
1	RESISTOR	1	R1
2	RESISTOR	1	R2
3	RESISTOR	1	R3
4	RESISTOR	1	R4
5	RESISTOR	1	R5
6	RESISTOR	1	R6
7	RESISTOR	1	R7
8	RESISTOR	1	R8
9	RESISTOR	1	R9
10	RESISTOR	1	R10

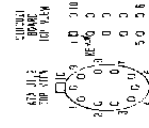
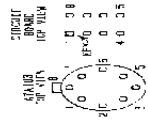


2.5 AND 500K RESISTOR AND LINE VOLTAGE REGULATOR ARE TYPICAL. THE RESISTOR VALUES MAY BE Slightly DIFFERENT THAN THAT SHOWN.

2.5 AND 500K RESISTOR AND LINE VOLTAGE REGULATOR ARE TYPICAL. THE RESISTOR VALUES MAY BE Slightly DIFFERENT THAN THAT SHOWN.

2.5 AND 500K RESISTOR AND LINE VOLTAGE REGULATOR ARE TYPICAL. THE RESISTOR VALUES MAY BE Slightly DIFFERENT THAN THAT SHOWN.

TRANSISTOR AND DIODE PART NUMBER	QTY	REF. DESIG.
7805	1	U1
7812	1	U2
7905	1	U3



## SERVICE SHEET 67 A7A2 CONTROL ASSEMBLY

### REFERENCE BLOCK DIAGRAM 10

- Table 4-1. Recommended Performance Tests  
After Adjustments or Repairs.
- Table 5-2. Post-Repair Adjustment Procedures.

## PRINCIPLES OF OPERATION

### General

The Control Board contains the 40 kHz oscillator circuitry, duty-cycle control logic, inverter/regulator drivers, malfunction-disable circuitry, and auxiliary supply regulators.

### Oscillator Circuitry

The switching frequency of the supply is established by a free-running multivibrator (U2) which generates a 40 kHz asymmetrical waveform having a 4:1 duty cycle (20  $\mu$ s to 5  $\mu$ s). The 2.5 MHz clock formed by U1 provides update clocking for flip-flops U4A and U4B. The 40 kHz generator is locked to a sub-multiple of the 2.5 MHz oscillator frequency by trigger pulses which reach pin 6 via C21. This assures synchronous operation of the two oscillators, eliminating spurs at the operating frequency of the synthesizer.

Within the pulse-width modulator (duty-cycle control logic formed by U6A and U6B), the 5  $\mu$ s "off" period of the 40 kHz oscillator serves two functions. First, it alternates routing of turn-on trigger pulses from the turn-on level comparator (formed by Q15 and Q18) to the switching transistors. Second, it establishes a 5  $\mu$ s "safety band" which disables both drive signals, assuring that both switching transistors are never turned ON at the same time. Any time during the 20  $\mu$ s period, a drive signal can be started by a turn-on trigger pulse, but it will always be terminated at the next 5  $\mu$ s period. The period of the drive signals depends on the position of the turn-on trigger pulse in the 20  $\mu$ s frame. If it occurs early in the frame, the drive pulse will be wide. If it occurs late in the frame, the drive pulses will be narrow.

### Duty Cycle Control Logic

The duty cycle control logic generates the pulse-width modulated signals that ultimately drive A7A3T3 (service sheet 65). This circuitry is composed of buffer flip-flops U4A and U4B, driver flip-flops U6A and U6B, and associated NAND gate circuitry (U5 and U7). Flip-flops U4A and U4B act as switching buffers between the duty cycle generator, loop gain amplifier, current foldback limiter, malfunction disable gate, and the driver flip-flops. They assure that control signals to the driver flip-flops are synchronized to occur at the proper times.

The pulse-width modulator circuitry is set up in a quad-state logic arrangement. U4B disables the  $\pm 160$  volt driver flip-flops whenever it changes state. U4A enables one of the two driver flip-flops whenever it changes state, but never allows both flip-flops to turn on at the same time. Furthermore, no driver flip-flop is allowed to turn ON twice in a row.

### Fast and Slow Sense Circuits

Whenever a change in power demand occurs, the fast and slow loops effect a change in power delivered to the input of T3 by varying the duty cycle of the 20 kHz inverter. The fast sense circuit is a direct duty cycle modulated loop which turns the level comparator (Q15 and Q18) ON and OFF for fast and slow reactions to load changes; it also helps to diminish the 120 Hz component on the +5.2 volt line.

The slow sense circuit is an analog loop which senses the output of the +5.2 volt section. The slow loop provides precise (and relatively slow) regulation of the output, while the fast loop handles faster regulation demands. (See the two following circuit descriptions.)

### Turn-On Level Comparator (Duty Cycle Trigger)

The turn-on trigger pulses are generated by the level comparator formed by Q15 and Q18. This circuit compares the fast sense line at the junction of the first L-C filter on the +5.2 volt line (Service Sheet 65) with the dc reference voltage obtained from the loop gain amplifier (U9). The voltage on the +5.2 volt fast sense line has a triangular ripple component which slopes positively when a switching transistor is ON and negatively when both transistors are OFF. When the sense voltage falls slightly below the reference voltage, the comparator generates a turn-on trigger pulse. Immediately, one of the switching transistors turns ON and the output starts to rise again. If load demands increase, the sensed voltage drops more rapidly, the trigger pulses are generated earlier, and the switching transistors stay ON for longer periods to supply the increased power demand. Conversely, a reduced load lengthens the negative slope, causing the turn-on trigger pulses to occur later, and the switching transistors conduct for shorter periods.

### Constant Voltage Comparator (Loop Gain Amplifier)

To improve regulation of the +5.2 volt supply, losses occurring between the fast sense point on the +5.2 volt line and the final dc output are factored into a level comparison voltage by the loop gain amplifier (U9). This circuit compares the +5.2 volt zener reference voltage with the +5.2 volt output slow loop sense line (Service Sheet 65). Any difference between the two voltages is amplified, slowly varying the dc reference to the turn-on level comparator.

### Current Foldback Limiter

The current limit comparator (U8) monitors the output current of the supply by sensing the voltage drop across R12 (service sheet 65). If the load current exceeds a preset limit (due to a short-circuit condition) the circuit is energized and acts to reduce the dc reference voltage applied to the level comparator. This in turn causes the output voltage to drop to a level that holds the supply current at a maximum of 3 amperes.

### Stabilizing Waveform Shaper (Exponentiator)

The exponentiator (U10) generates a limit-cycle-regulation waveform which is applied to the base of Q18 in the level comparator. If the output of U6A were HI and duty cycle control logic was producing a duty cycle of less than 50% at the 40 kHz rate, the system would become unstable and oscillator U2 could be forced to drop to 20 kHz operation (resulting in a 10 kHz switching rate). Summation of the output of the stabilizing waveform exponentiator shaper with the +5.2 volt slow loop sense line at the base of Q18 causes the trip point of the comparator to be changed just enough to make sure that comparison is made at 40 kHz rather than 20 kHz as would otherwise happen.

### Malfunction Disable Gate

Signals from the overvoltage and overtemperature detector circuits are gated by U5B to disable the inverter drive circuitry whenever a shutdown condition arises. This results in power being turned off to all parts of the system except those powered by the auxiliary supply.

### Auxiliary Supply

The auxiliary supply circuitry receives 45 Vac from transformer T1 (Service Sheet 65) located within the power supply on the rear panel of the Signal Generator. The ac is rectified, producing a dc voltage that powers the A8A3 Reference Oscillator oven and drives the  $\pm 15$  volt regulators. CR1 through CR4 form a bridge rectifier which produces a positive and negative voltage with reference to ground. The front panel line switch has no effect on this circuitry and these voltages will be present whenever the Signal Generator is connected to the ac power lines.

When the POWER switch is in the STANDBY position, Q6 is ON, turning Q7 OFF. When Q7 is OFF, Q3, Q4, and Q5 are also OFF, shutting down the  $\pm 15$  volt supplies. When the POWER switch is turned ON, Q6 turns OFF and allows current (flowing through Q8) to turn ON Q7 and thus turn ON Q3, Q4, and Q5, which brings up the  $\pm 15$  volt supplies. If the ac line voltage decreases, a point will be reached where Q8 is biased OFF. This will turn OFF Q7, which shuts down the  $\pm 15$  volt supplies.

**TROUBLESHOOTING**

When a power supply problem has been traced through the block diagram troubleshooting procedure to this assembly, use the following procedure to find the defective component. Problem symptoms can be divided into two classes:

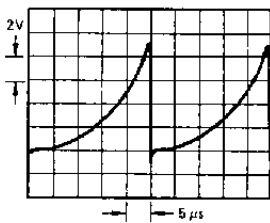
1. No pulses at TP6 and TP7 (shutdown).
2. +5.2V supply not regulated (too high or too low).

**No Pulses at TP6 or TP7.**

Check	Normal Condition	If Abnormal.
1. Edge connector A7A2 pin 9	+15.0 ± 1.0 Vdc	Troubleshoot auxiliary supply.
2. Edge connector A7A2 pin 8	-15.0 ± 1.0 Vdc	Troubleshoot auxiliary supply.
3. U1 pin 5	CMOS logic high (+10 Vdc)	Either the overtemperature or 5.2V overvoltage detector has triggered. The overvoltage detector is the most likely. Remove Q9. If U1 pin 5 is still low, Q19 has triggered which means the +5.2 V supply voltage went above 6V. This is an indication that the A7A2 Control board is not regulating properly. If the overtemperature detector has triggered, determine if the detector circuitry is faulty or if the heat sink on the A7A3 is really overheating. Turning the instrument off for awhile will cool everything and the detector shouldn't trigger when the instrument is first turned on.
4. Waveforms on TP2, TP3, TP9	As shown in the figure below	Troubleshoot the digital circuitry which produces these waveforms.
<div style="text-align: center;"> <p><b>Maximum Duty Cycle Generator Waveforms</b></p> </div>		
5. U5 Pin 5	COMS logic high (+10 Vdc when 5.2 V supply = 0)	Comparator circuitry is defective. Continue troubleshooting in the +5.2 V supply.
6. Waveforms on U7 pins 3 and 11	As shown in the figure below	The problem is in the duty cycle control logic. Inputs are correct and outputs defective.
<div style="text-align: center;"> <p><b>Duty Cycle Control Logic Outputs</b></p> </div>		
<p>7. At this point if there are no pulses on TP6 and TP7, the problem is in the inverter/regulator drivers on A7A2 or the switch circuits on A7A3. Remove the line cord and then remove the A7A3 assembly from the power supply. Now the waveforms at TP6 and TP7 should be like the waveforms in Figure 2 except amplitude should be +15 V. If there are still no waveforms, the drive circuits are defective. If the waveforms are there now, the problem is in the switch circuitry on A7A3. So continue troubleshooting with service sheet 55.</p>		

## 5.2V Supply Not Regulated

1. Turn the line switch to STANDBY, remove the power cord, and remove the A7A3 Inverter Assembly from the power supply.
2. Remove the bottom cover from the 8663A. Remove the small pc board that connects the wiring harness to the Power Supply Motherboard. This disconnects the power supply from the rest of the instrument.
3. Install the A7A2 Control Board on its extender board. Connect a jumper from TP8 to ground (the top [negative] leads of capacitors C3,4,9,10 in the center of the board make good ground points). Having this jumper connected is the same as turning the line switch on.
4. Set an adjustable power supply to  $+5.2 \pm 0.1$  Vdc and connect the "+" terminal to TP1 and the "-" terminal to ground on A7A2.
5. Plug in the power cord and follow the procedure in the following table.

Check	Normal Condition	If Abnormal,
1. Q17 Emitter	>5.4 Vdc	Current foldback limiter circuit is defective. No current should be flowing through the current sensing resistor on A7A4 so U8 should produce a positive output.
2. U9 Pin 3	$5.20 \pm 0.02$ Vdc	If the voltage is between 4.6 and 5.8 Vdc, adjust the 5.2V supply pot to bring the voltage into spec. If the voltage is not close or cannot be adjusted, troubleshoot the reference circuit to find the cause of the problem.
3. Waveform on TP11	As shown in the figure below	There is a problem with U10 or associated circuitry.
 <p style="text-align: center;">Exponentiator Waveform</p>		
4. Set power supply connected to TP1 $\leq 5.10$ Vdc U9 pin 6 U4 pin 5	>13.0 Vdc CMOS logic high (+10 Vdc)	Loop gain amplifier defective. Comparator circuitry defective.
5. Set power supply connected to TP1 $\geq 5.30$ Vdc U9 pin 6 U4 pin 5	< 0V CMOS logic low (0V)	Loop gain amplifier defective. Comparator circuitry defective.



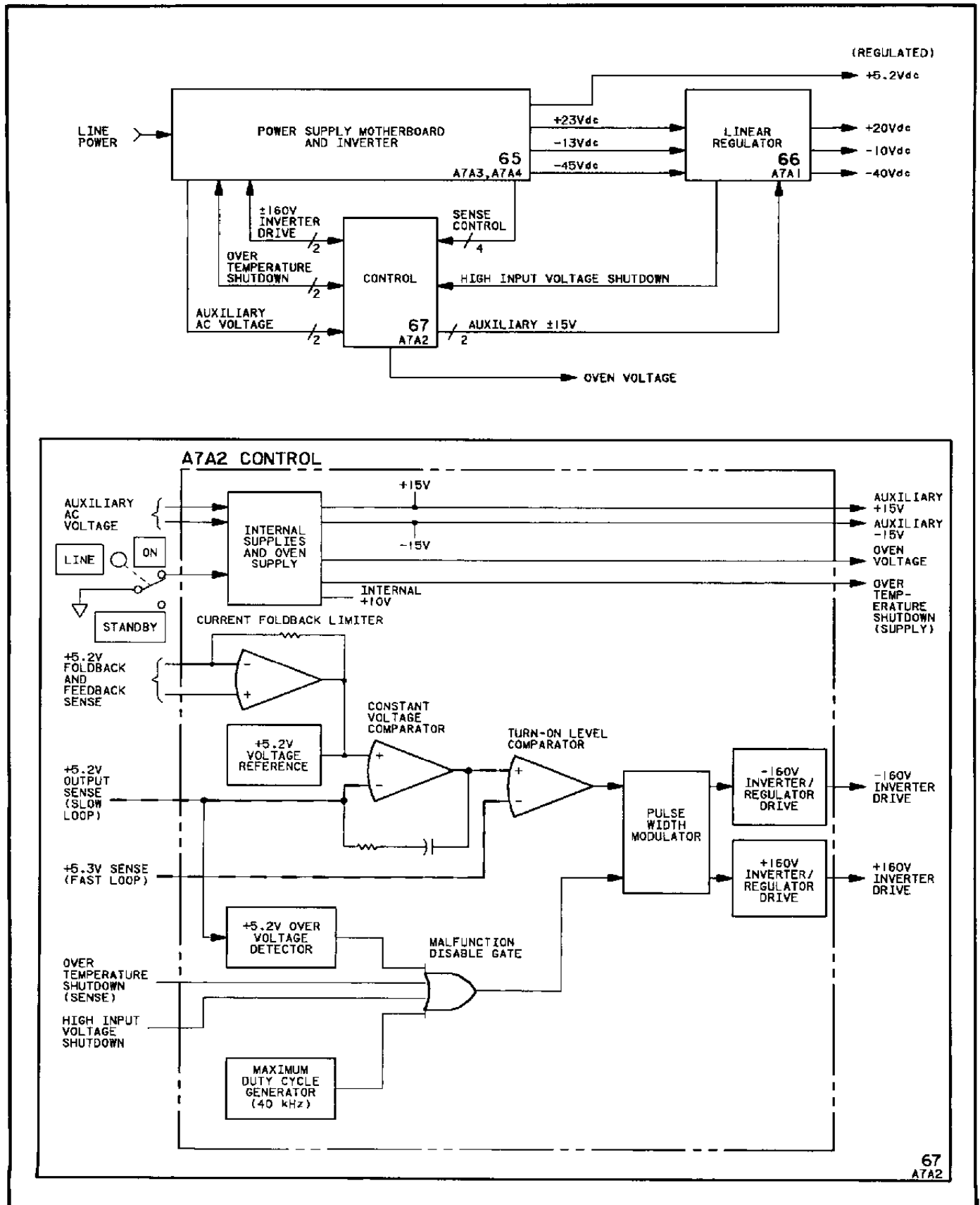


Figure 8-912. A7A2 Power Supply Control Board Block Diagrams

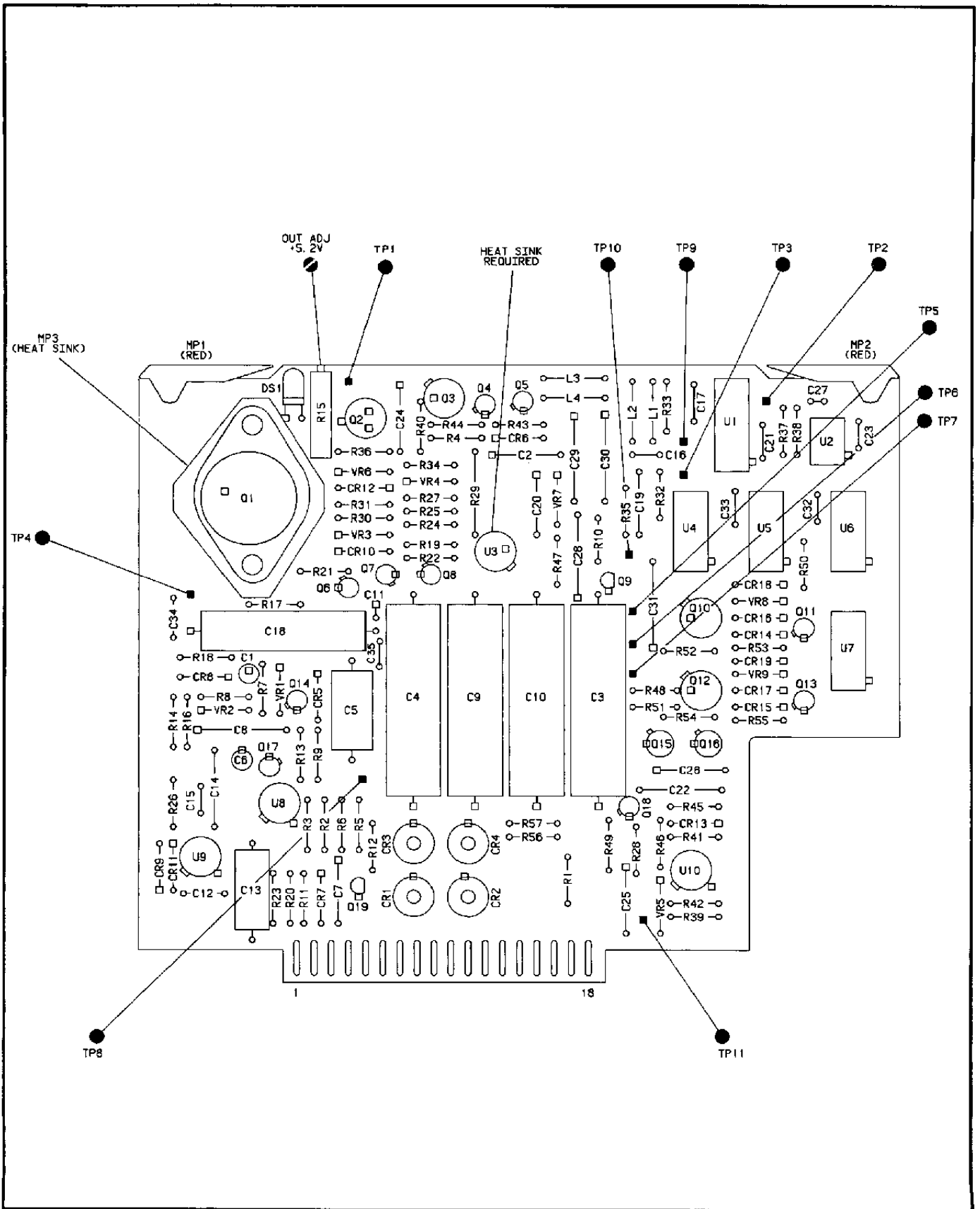


Figure 8-913. A7A2 Power Supply Control Board Component Locator

**CHANGES**

All serial prefixes

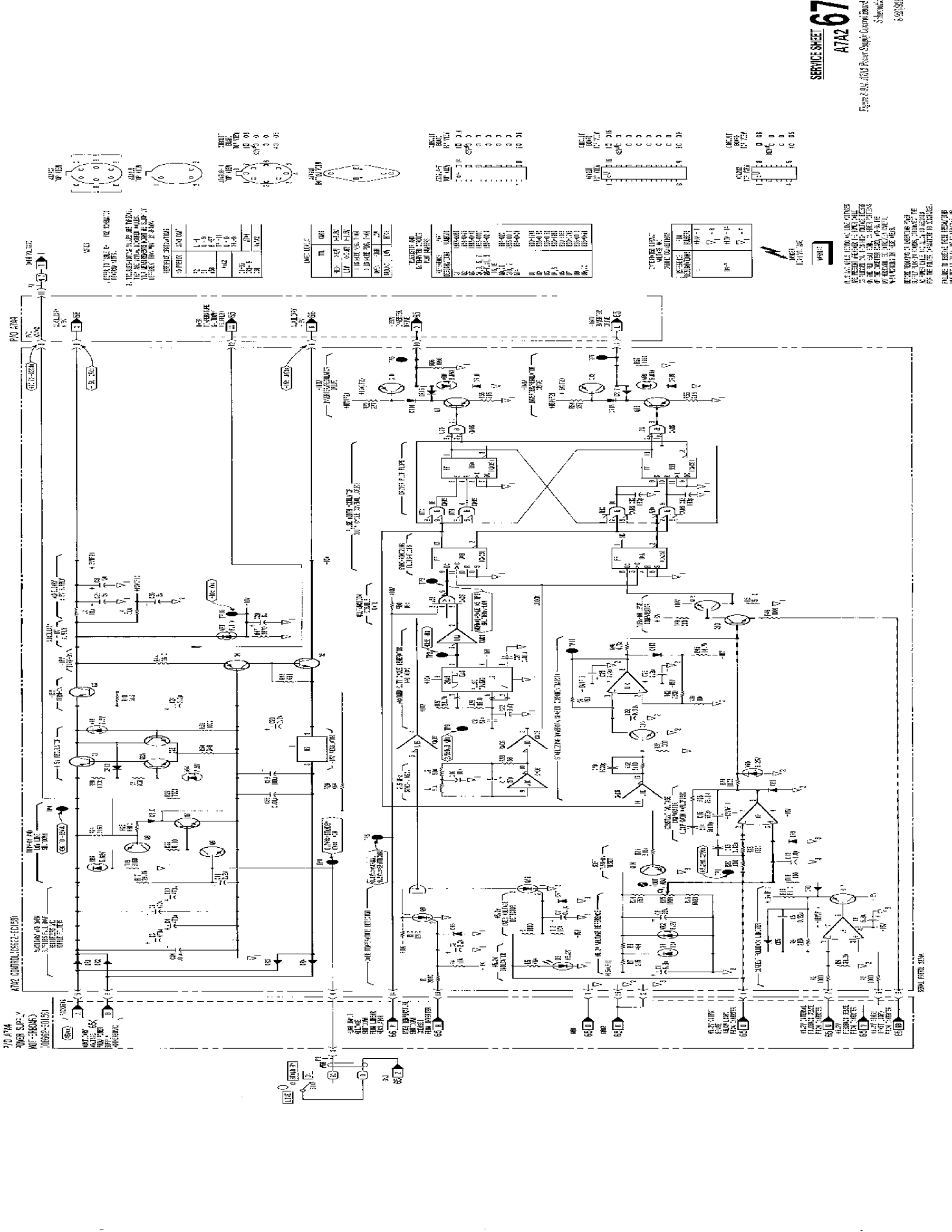
On the A7A2 schematic:

- A7A2R37 - Change the value of R37 to 21.5k.

2601A and Above

On the schematic:

- A7A2Q2 - In the Table of Transistor and Integrated Circuit Part Numbers, change the part number of Q2 to 1854-1046.



RESISTOR VALUES - RESISTORS WITH  
 NO TOLERANCE SPECIFIED ARE 1% TOLERANCE  
 UNLESS OTHERWISE SPECIFIED.  
 CAPACITOR VALUES - CAPACITORS WITH  
 NO TOLERANCE SPECIFIED ARE 5% TOLERANCE  
 UNLESS OTHERWISE SPECIFIED.

RESISTOR VALUES

RESISTOR	VALUE
R1	100K
R2	100K
R3	100K
R4	100K
R5	100K
R6	100K
R7	100K
R8	100K
R9	100K
R10	100K

RESISTOR VALUES

RESISTOR	VALUE
R11	100K
R12	100K
R13	100K
R14	100K
R15	100K
R16	100K
R17	100K
R18	100K
R19	100K
R20	100K

RESISTOR VALUES

RESISTOR	VALUE
R21	100K
R22	100K
R23	100K
R24	100K
R25	100K
R26	100K
R27	100K
R28	100K
R29	100K
R30	100K

RESISTOR VALUES

RESISTOR	VALUE
R31	100K
R32	100K
R33	100K
R34	100K
R35	100K
R36	100K
R37	100K
R38	100K
R39	100K
R40	100K

RESISTOR VALUES

RESISTOR	VALUE
R41	100K
R42	100K
R43	100K
R44	100K
R45	100K
R46	100K
R47	100K
R48	100K
R49	100K
R50	100K

RESISTOR VALUES - RESISTORS WITH  
 NO TOLERANCE SPECIFIED ARE 1% TOLERANCE  
 UNLESS OTHERWISE SPECIFIED.  
 CAPACITOR VALUES - CAPACITORS WITH  
 NO TOLERANCE SPECIFIED ARE 5% TOLERANCE  
 UNLESS OTHERWISE SPECIFIED.