Errata

Title & Document Type: 59307A VHF Switch Operating and Service Manual

Manual Part Number: 59307-90004

Revision Date: June 1983

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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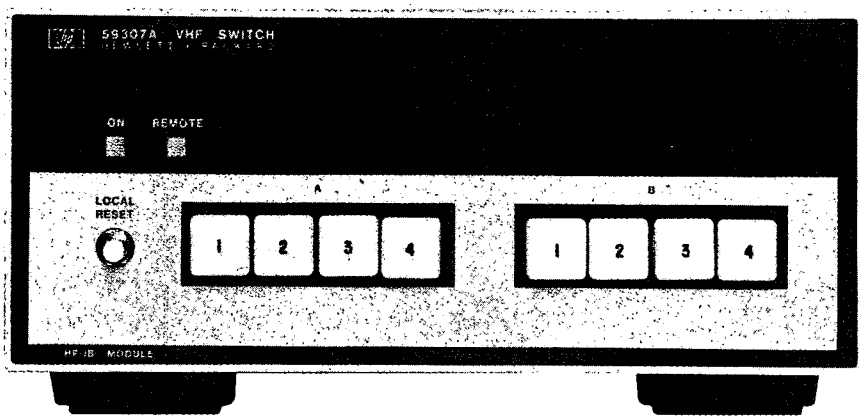
OPERATING AND SERVICE MANUAL

VHF SWITCH

59307A

DESIGNED FOR HP-IB SYSTEMS



HEWLETT PACKARD

OPERATING AND SERVICE MANUAL

59307A
VHF SWITCH

SERIAL NUMBER: 1920A

This manual applies directly to the Hewlett-Packard Model 59307A with serial number prefixed 1920A. For instruments with serial numbers prefixed above 1920A, a manual change sheet is supplied. For instruments with serial numbers prefixed below 1920A, refer to Section VII.

PRINTED: JUNE 1983

MANUAL PART NUMBER 59307-90004
Manual Microfiche Number 59307-90005

PRINTED IN U.S.A.

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SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This section provides general information on the HP 59307A VHF Switch including an instrument description, equipment supplied, and instrument specifications.

1-3. DESCRIPTION

1-4. The 59307A provides two dc-to-500 MHz, 50-ohm switches (relays) which are optimized for fast rise time (one nanosecond) pulse waveforms. These switches can be controlled either manually from front-panel pushbuttons or remotely from the HP Interface Bus. Under program control, the switches are operated by addressing the 59307A to listen on the bus and then sending either the ASCII character A or B followed by the switch number (1 through 4). This causes the common switch port to be connected to the selected switch position. A LOCAL RESET pushbutton lets the operator assume front-panel control of the instrument if a local lockout command has not been applied to the 59307A.

1-5. INSTRUMENT IDENTIFICATION

1-6. Each Hewlett-Packard instrument has a 10-character serial number (e.g., 0000A00000). The four-digit serial prefix identifies a group of identical instruments, and the five-digit suffix is a serial number unique to each instrument. If the serial prefix on your instrument is not on the title page of this manual, your instrument is different from this manual and a manual change sheet is included to describe the differences. If the manual change sheet is missing, request one from the nearest Hewlett-Packard Sales and Service Office listed at the back of this manual.

1-7. EQUIPMENT SUPPLIED

1-8. Table 1-1 lists the equipment supplied with the 59307A.

Table 1-1. Equipment Supplied

DESCRIPTION	HP PART NUMBER
Detachable Power Cord 7½ ft. long (231 cm)	8120-1378

1-9. SPECIFICATIONS

1-10. Specifications for the HP 59307A are given in Table 1-2.

Table 1-2. Specifications

ELECTRICAL:
- **Load on Bus:** 3.3 mA per line
- **Relay Settling Time:** 20 ms
- **Relay Contacts:** 0.5 amp at 25V; <1 nanosecond rise time
- **VSWR:** <1.25
- **Isolation:** >40 dB at 100 MHz
- **Power Requirements:** 115V or 230V ±10%, 48 to 440 Hz, 15 VA max.

ENVIRONMENTAL: Operating temperature 0 to 50°C.

DIMENSIONS:
- **Height:** 4″ (101,6 mm) including cabinet feet.
- **Width:** 8.38″ (212,9 mm)
- **Depth:** 11.6″ (294,6 mm)

WEIGHT:
- **Net Weight:** 5 lbs, 13 oz. (2,64 kg)
- **Shipping Weight:** 7 lbs, 2 oz. (3,23 kg)

1-11. SAFETY CONSIDERATIONS

1-12. The 59307A is a Safety Class I instrument (provided with a protective earth terminal), designed and tested according to International Safety Standards. To ensure safe operation and to keep the instrument in safe condition, the user must follow the information, cautions, and warnings provided below and throughout this Operating and Service Manual.

WARNING

BEFORE SWITCHING ON THIS INSTRUMENT, THE PROTECTIVE EARTH TERMINAL OF THE INSTRUMENT MUST BE CONNECTED TO THE PROTECTIVE CONDUCTOR OF THE (MAINS) POWER CORD. THE MAINS PLUG SHALL ONLY BE INSERTED IN A SOCKET OUTLET PROVIDED WITH A PROTECTIVE EARTH CONTACT. THE PROTECTIVE ACTION MUST NOT BE DEFEATED BY THE USE OF AN EXTENSION CORD (POWER CABLE) WITHOUT A PROTECTIVE CONDUCTOR (GROUNDING).

WHENEVER IT IS LIKELY THAT THE PROTECTION HAS BEEN IMPAIRED, THE INSTRUMENT MUST BE MADE INOPERATIVE AND BE SECURED AGAINST ANY UNINTENDED OPERATION.

ALL PROTECTIVE EARTH TERMINALS, EXTENSION CORDS, AUTOTRANSFORMERS, AND DEVICES CONNECTED TO THIS INSTRUMENT SHOULD BE CONNECTED TO A PROTECTIVE EARTH GROUNDED SOCKET. ANY INTERRUPTION OF THE PROTECTIVE EARTH GROUNDING WILL CAUSE A POTENTIAL SHOCK HAZARD THAT COULD RESULT IN PERSONAL INJURY.

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE THE LINE FUSE ONLY WITH A 250V FUSE OF THE SAME CURRENT RATING AND TYPE. DO NOT USE REPAIRED FUSES OR SHORT-CIRCUITED FUSEHOLDERS.

ANY MAINTENANCE OR SERVICE REQUIRING REMOVAL OF PROTECTIVE COVERS SHOULD BE PERFORMED BY SERVICE-TRAINED PERSONNEL WHO ARE AWARE OF THE HAZARD INVOLVED (FOR EXAMPLE, FIRE AND ELECTRICAL SHOCK).

CAPACITORS INSIDE THE INSTRUMENT MAY STILL BE CHARGED EVEN IF THE INSTRUMENT HAS BEEN DISCONNECTED FROM ITS SOURCE OF SUPPLY.

CAUTION

Before switch on this instrument, make sure that it is adapted to the voltage of the ac power source.

1-13. SIGNAL MNEMONICS

1-14. Table 1-3 is a list of signal mnemonics for the 59307A.

Table 1-3. Signal Mnemonics

MNEMONIC	NAME
ADDR	Address
BIT1	Bit 1
BIT2	Bit 2
CLK	Clock
$\overline{\text{CLK}}$	"Not" Clock
CLKA	Clock A
CLKB	Clock B
$\overline{\text{CLR}}$	"Not" Clear
DAC	Data Accepted
DAV	Data Valid
DIO	Data Input/Output
$\overline{\text{ENABLE}}$	"Not" Enable
BCL	Bus Clear
HSENABLE	Handshake Enable
HSOUT	Handshake Out
$\overline{\text{LLO}}$	"Not" Local Lockout
MRE	Multiple Response Enable
$\overline{\text{MRE}}$	"Not" Multiple Response Enable
REMOTE	Remote
REN	Remote Enable
RFD	Ready for Data

SECTION II
INSTALLATION

2-1. INTRODUCTION

2-2. This section contains information for unpacking, inspection, repacking, storage, and installation.

2-3. UNPACKING AND INSPECTION

2-4. If the shipping carton is damaged, ask that the carrier's agent be present when the instrument is unpacked. Inspect the instrument for damage. If the instrument is damaged or fails to meet electrical specifications, notify the carrier and the nearest Hewlett-Packard Sales and Service Office immediately (offices are listed at the back of this manual). Retain the shipping carton and padding material for the carrier's inspection. The Sales and Service Office will arrange for the repair or replacement of your instrument without waiting for the claim against the carrier to be settled.

2-5. STORAGE AND SHIPMENT

2-6. To protect the 59307A during storage or shipment, use good commerical packing methods. Reliable commercial packing and shipping companies have the facilities and materials to adequately repack an instrument.

NOTE

Before returning an instrument to Hewlett-Packard, contact the nearest Hewlett-Packard Sales and Service Office for instructions.

2-7. Conditions during storage and shipment should normally be limited as follows:

a. Maximum altitude: 25,000 feet.

b. Minimum temperature: -40°F (-40°C).

c. Maximum temperature: +167°F (+75°C).

2-8. POWER REQUIREMENTS

2-9. The 59307A operates from either 115 or 230 volts, 48 to 440 Hz. Before applying power, the screwdriver-operated switch mounted inside the 59307A must be set to the correct position (115 or 230) and the correct fuse (as labeled on the rear panel) must be installed.

SECTION III

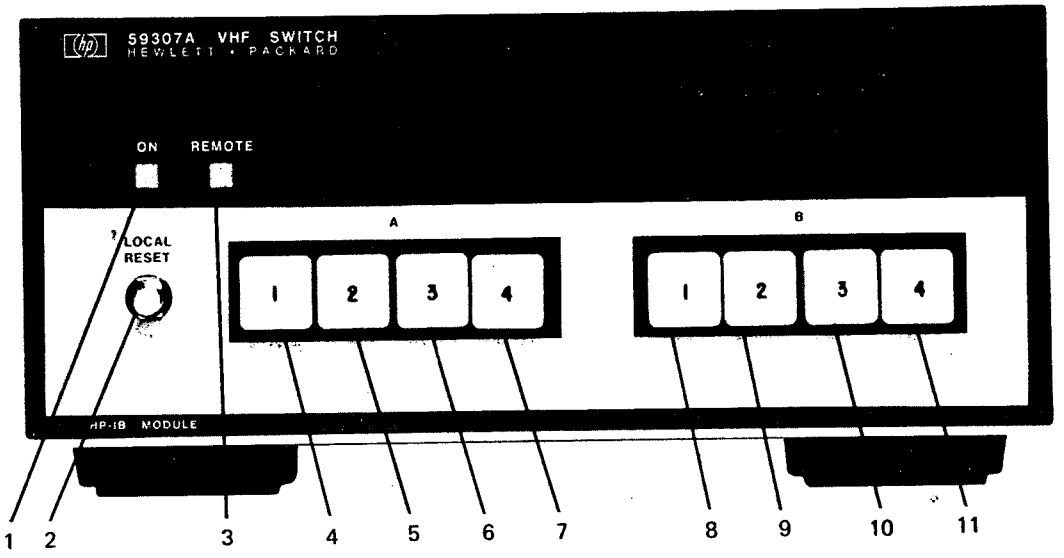
OPERATION AND PROGRAMMING

3-1. INTRODUCTION

3-2. This section contains operating information including a description of controls and indicators, programming, and programming examples.

3-3. CONTROLS, INDICATORS, AND CONNECTORS

3-4. Figure 3-1 identifies and describes the front-panel controls and indicators. Figure 3-2 shows the rear-panel connectors and controls.

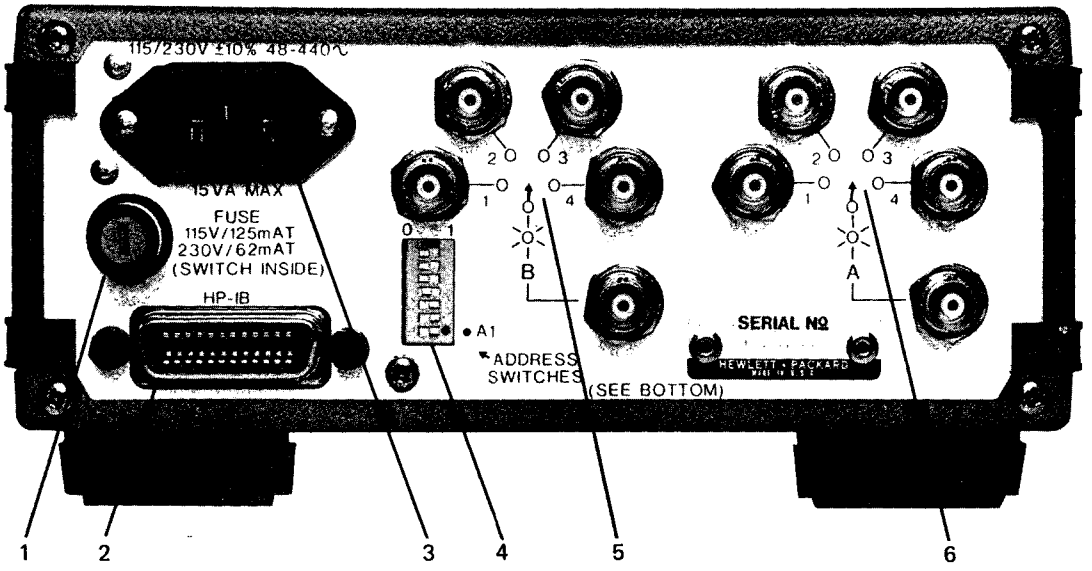


1. ON indicator: When illuminated, indicates instrument has primary power applied.
2. LOCAL RESET switch: When pressed, resets the 59307A to front-panel control if the local lockout bus command has not been sent to the 59307A (see paragraph 4-19).
3. REMOTE indicator: When illuminated, indicates the 59307A is not in local operation and has been addressed at some time. Instrument is not necessarily under the control of remote programming when this indicator is illuminated (see note that follows paragraph 4-17).
4. A1 switch-indicator: Control for switch A, position 1. When illuminated, connector 1 is connected to common connector A (located on rear panel).
5. A2 switch-indicator: Control for switch A, position 2. When illuminated, connector 2 is connected to common connector A.
6. A3 switch-indicator: Control for switch A, position 3. When illuminated, connector 3 is connected to common connector A.
7. A4 switch-indicator: Control for switch A, position 4. When illuminated, connector 4 is connected to common connector A.
8. B1 switch-indicator: Control for switch B, position 1. When illuminated, connector 1 is connected to common connector B (located on rear panel).

Figure 3-1. VHF Switch Front Panel

9. [B2] switch-indicator: Control for switch B, position 2. When illuminated, connector 2 is connected to common connector B.
10. [B3] switch-indicator: Control for switch B, position 3. When illuminated, connector 3 is connected to common connector B.
11. [B4] switch-indicator: Control for switch B, position 4. When illuminated, connector 4 is connected to common connector B.

Figure 3-1. VHF Switch Front Panel (Continued)



1. FUSE: A 125 mAT fuse is required for 115-volt operation and a 62 mAT fuse is required 230-volt operation.
2. HP-IB Connector: A 24-pin connector used to convey data and programming instructions to the 59307A.

NOTE

Metric hardware supplied by HP for HP-IB connectors can be identified by the black finish. If metric tools are not available, a 9/32-inch hex socket will fit the 7mm hex stud.

Conversion Kits for converting earlier instruments to use the metric lock screws are available through any HP Sales or Service office.

CAUTION

The threads of the metric hardware will not fit the 6-32 UNC threads on hardware with a silver finish. The threads will strip if the hardware is intermixed.

3. AC Input Connector: AC power receptacle. IEC type with offset pin connected to the chassis. Accepts 115-volts or 230 volts ±10%, 48 to 440 Hz. Maximum power draw is 15 volt amperes.
4. Address Switches: The bottom five switches are used to assign an address code to the 59307A. Switches 6 and 7 are not used. Allowable codes and their ASCII equivalents are identified on the decal on the botton panel. (See table next page.)

Figure 3-2. VHF Switch Rear Panel

A_5	A_4	A_3	A_2	A_1	ASCII ADDRESS	A_5	A_4	A_3	A_2	A_1	ASCII ADDRESS
0	0	0	0	0	SP	1	0	0	0	0	0
0	0	0	0	1	!	1	0	0	0	1	1
0	0	0	1	0	"	1	0	0	1	0	2
0	0	0	1	1	#	1	0	0	1	1	3
0	0	1	0	0	$	1	0	1	0	0	4
0	0	1	0	1	%	1	0	1	0	1	5
0	0	1	1	0	&	1	0	1	1	0	6
0	0	1	1	1	'	1	0	1	1	1	7
0	1	0	0	0	(	1	1	0	0	0	8
0	1	0	0	1	)	1	1	0	0	1	9
0	1	0	1	0	*	1	1	0	1	0	:
0	1	0	1	1	+	1	1	0	1	1	;
0	1	1	0	0	,	1	1	1	0	0	<
0	1	1	0	1	-	1	1	1	0	1	=
0	1	1	1	0	.	1	1	1	1	0	>
0	1	1	1	1	/						

5. Switch B Input/Output Connectors: Front-panel switch positions or remote programming determines the connection of connectors 1, 3, 3, or 4 to common connector B.
6. Switch A Input/Output Connectors: Front-panel switch positions or remote programming determines the connection of connectors 1, 2, 3, or 4 to common connector A.

Figure 3-2. VHF Switch Rear Panel (Continued)

3-5. PROGRAMMING

3-6. The 59307A operates in response to a specific set of programming codes. These codes, shown in Table 3-1, determine whether connectors 1, 2, 3, or 4 are connected to the appropriate common connector (A or B). The 59307A also responds to a set of special action codes. These codes, shown in Table 3-2, determine the operating state (i.e., local or remote) of the 59307A. A sample program depicting the use of both sets of codes is shown in Table 3-3.

NOTE
The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code.

3-7. When the 59307A is switched to remote operation (as listed in Sequence 2, Table 3-3) switches A and B stay in the state they were in under LOCAL. If other states are desired, they must be programmed. When switched to LOCAL from REMOTE (as listed in Sequence 9, Table 3-3) switches A and B assume states indicated by the position of the front panel switches.

Table 3-1. Programming Codes

DIO Lines 7	6	5	4	3	2	1	ASCII Equiv.	59307A Response
1	0	0	0	0	0	1	A	Programs instrument to connect one of the A group connectors 1, 2, 3, or 4 to common connector A. Specific connection depends on the succeeding code in program sequence.
1	0	0	0	0	1	0	B	Programs instrument to connect one of the B group connectors 1, 2, 3, or 4 to common connector B. Specific connection depends on the succeeding code in the program sequence.
0	1	1	0	0	0	1	1	These codes select which connector (1, 2, 3, or 4) is to be connected to the appropriate common connector A or B. For example, if an ASCII A is succeeded by an ASCII 2, connector 2 and common connector A are connected together.
0	1	1	0	0	1	0	2	
0	1	1	0	0	1	1	3	
0	1	1	0	1	0	0	4	

Table 3-2. Special Action Codes

Name	MRE	REN	DIO Lines 7	6	5	4	3	2	1	ASCII Equiv.	59307A Response
*Unlisten	L	H	0	1	1	1	1	1	1	?	Clears instrument as a listener.
Address Code	L	L	0	1	A_5†	A_4†	A_3†	A_2†	A_1†		Addresses instrument as a listener which enables it to respond to data on DIO lines.
‡Local Lockout	L	L	0	0	1	0	0	0	1	DC1	Disables LOCAL RESET switch on front-panel. Unit responds to remote programming only.

*The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code.
†A_5 through A_1 must coincide with the code set on the 59307A address switches.
‡Local lockout is one of the Universal Commands used on the interface bus. The 59307A responds to this command only when in remote operation. The primary use for the local lockout command is as a troubleshooting aid. The command is overridden by setting REN high.

Table 3-3. 59307A Programming Example

Sequence	Control Lines BCL	REN	MRE	DIO Lines ASCII Code	Description of Program Sequence
1	H	H	L	?	Clears all listeners.
2	H	L	L	$(see note)	59307A addressed to listen. Front-panel REMOTE indicator illuminates.
3	H	L	H	A	Activates switch A.
4	H	L	H	2	Switch A connects connector 2 to common connector A. Pushbutton A2 illuminates.
5	H	L	H	3	Switch A disconnects connector 2 and connects connector 3 to common connector A. Pushbutton A3 illuminates and pushbutton A2 extinguishes.
6	H	L	H	B	Activates switch B.
7	H	L	H	1	Switch B connects connector 1 to common connector B. Pushbutton B1 illuminates.
8	H	L	H	4	Switch B disconnects connector 1 and connects connector 4 to common connector B. Pushbutton B4 illuminates and pushbutton B1 extinguishes.
9	H	H	H		REN = H; 59307A reset to local control (front-panel pushbutton control switch positions). REMOTE light extinguishes.

Note: Bits 1 thru 5 must correspond with switch settings of address switch on rear panel.

59307A

PROGRAMMING SUMMARY SHEET

Possible Listen Addresses: Any ASCII code of the form $01A_5A_4A_3A_2A_1$ when A_5–A_1 can be any combination of 1's and 0's other than 11111. A_5–A_1 are set by address switches on the back panel of the 59307A.

NOTE: The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code. When the 59307A is switched to remote operation (as listed in Sequence 2 of programming example below) all the relays stay in the state they were in under LOCAL. If other states are desired, they must be programmed. When switched to LOCAL from REMOTE, (as listed in Sequence 9 of programming example below) all relays assume states indicated by the position of the front panel switches.

SPECIFICATIONS:

Electrical: 1.0 Bus Loads; Relay settling time, 20 ms; Relay contacts, 0.5 amp at 28V; Power requirements, 115V or 230V ±10%, 48 to 440 Hz, 15 VA max.

Special Action Codes

Name	MRE	REN	DIO Lines 7	6	5	4	3	2	1	ASCII Equiv.	59307A Response
*Unlisten	L	H	0	1	1	1	1	1	1	?	Clears instrument as a listener.
Address Code	L	L	0	1	A_5†	A_4†	A_3†	A_2†	A_1†		Addresses instrument as a listener which enables it to respond to data on DIO lines.
‡Local Lockout	L	L	0	0	1	0	0	0	1	DC1	Disables LOCAL RESET switch on front-panel. Unit responds to remote programming only.

*The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code.

†A_5 through A_1 must coincide with the code set on the 59307A address switches.

‡Local lockout is one of the Universal Commands used on the interface bus. The 59307A responds to this command only when in remote operation. The primary use for the local lockout command is as a troubleshooting aid. The command is overridden by setting REN high.

Programming Codes

DIO Lines 7	6	5	4	3	2	1	ASCII Equiv.	59307A Response
1	0	0	0	0	0	1	A	Programs instrument to connect one of the A group connectors 1, 2, 3, or 4 to common connector A. Specific connection depends on the succeeding code in program sequence.
1	0	0	0	0	1	0	B	Programs instrument to connect one of the B group connectors 1, 2, 3, or 4 to common connector B. Specific connection depends on the succeeding code in the program sequence.
0	1	1	0	0	0	1	1	These codes select which connector (1, 2, 3, or 4) is to be connected to the appropriate common connector A or B. For example, if an ASCII A is succeeded by an ASCII 2, connector 2 and common connector A are connected together.
0	1	1	0	0	1	0	2	
0	1	1	0	0	1	1	3	
0	1	1	0	1	0	0	4	

59307A Programming Example

Sequence	Control Lines			DIO Lines ASCII Code	Description of Program Sequence
	BCL	REN	MRE		
1	H	H	L	?	Clears all listeners.
2	H	L	L	$(see note)	59307A addressed to listen. Front-panel REMOTE indicator illuminates.
3	H	L	H	A	Activates switch A, deactivates switch B.
4	H	L	H	2	Switch A connects connector 2 to common connector A. Pushbutton A2 illuminates.
5	H	L	H	3	Switch A disconnects connector 2 and connects connector 3 to common connector A. Pushbutton A3 illuminates and pushbutton A2 extinguishes.
6	H	L	H	B	Activates switch B, deactivates switch A.
7	H	L	H	1	Switch B connects connector 1 to common connector B. Pushbutton B1 illuminates.
8	H	L	H	4	Switch B disconnects connector 1 and connects connector 4 to common connector B. Pushbutton B4 illuminates and pushbutton B1 extinguishes.
9	H	H	H		REN = H; 59307A reset to local control (front-panel pushbutton control switch positions). REMOTE light extinguishes.

Note: Bits 1 thru 5 must correspond with switch settings of address switch on rear panel.

Digital Bus Pin Summary

Digital Bus Connector Pin Number	Line Name	Use
1-4, 13-15	DIO1-7	Carries characters to 59307A for relay control or for processing as bus commands.
16	DIO8	Not monitored or driven, terminated by resistive network.
6 7 8	DAV RFD DAC	These three lines make up the "handshake" system on the HP Interface Bus. DAV is monitored and RFD and DAC are driven by 59307 to control rate of data transferred on DIO lines.
9	BCL	Unconditionally clears Listen F/F, halting remote operation. Does not return control to front panel pushbuttons.
11	MRE	Indicates to 59307 whether character on DIO lines is Bus command or for relay control.
17	REN	When low is one of the conditions necessary to put 59307 in REMOTE operation. When high 59307 is in local control.
5	EOI	Not monitored or driven, terminated by resistive network.
10	SRQ	Not monitored or driven, terminated by resistive network.
12	Shield	Connected to chassis ground.
18-24	Grounds	Connected to circuit ground.

SECTION IV

THEORY OF OPERATION

4-1. INTRODUCTION

4-2. This section explains the operation of integrated circuits and the overall block diagram theory for the 59307A VHF Switch.

4-3. INTEGRATED CIRCUIT OPERATION

4-4. The following paragraphs describe one of the IC's used in the 59307A. The remaining IC's that are used are common gates and flip-flops which can be found in standard text books or IC catalogs.

4-5. Low Power TTL 5-Bit Comparator, 1820-0904

4-6. This IC (Figure 4-1) provides a comparison between two 5-bit words and gives one of three outputs; "less than", "greater than", or "equal to". A high level on the enable input forces all three outputs low. A low on the enable input allows a comparison to take place. The comparator function is shown in Table 4-1. Typical power dissipation is 52 milliwatts.

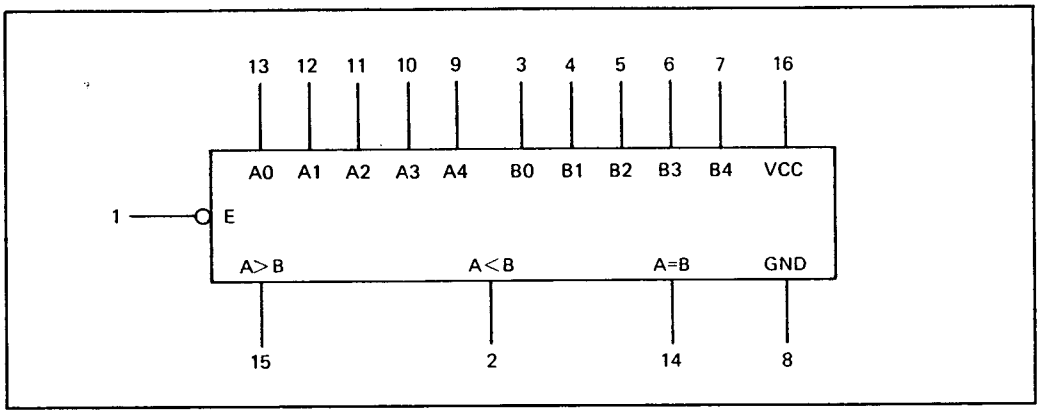


Figure 4-1. 5-Bit Comparator, 1820-0904

Table 4-1. 5-Bit Comparator 1820-0904, Truth Table

$\overline{E}$	A	B	A < B	A > B	A = B
H	X	X	L	L	L
L	Word A =	Word B	L	L	H
L	Word A >	*Word B*	L	H	L
L	Word A <	Word B	H	L	L

L = LOW Voltage Level
H = HIGH Voltage Level
X = Either HIGH or LOW Voltage Level

4-7. FUNCTIONAL BLOCK DIAGRAM THEORY

4-8. Figure 4-3 illustrates the functional block diagram for the 59307A VHF Switch. The 59307A consists of six major circuit groups: Handshake Logic, Bus Logic, Decode Logic, Local Lockout Logic, and Relay Select Logic. Definitions for the signal mnemonics used in this section are listed in Table 1-3.

4-9. Handshake Logic

4-10. The three-wire handshake lines to the Handshake Logic circuits synchronize the operation of the 59307A. The lines are: Ready for Data (RFD), Data Valid (DAV), and Data Accepted (DAC). The handshake logic processes the DAV signal and produces the Handshake Out (HSOUT) signal for use by the Bus Logic and the Local Lockout Logic. The DAV signal and the Handshake Enable (HSENABLE) signal combine to output the RFD and DAC signals on the bus. The basic purpose of this logic is to signal the other 59307A circuits that the DIO lines contain a character for possible processing and to interface the circuits to the HP Interface Bus three-wire handshake system.

4-11. Bus Logic

4-12. The Bus Logic accepts inputs from the Data Input/Output (DIO) lines and the Multiple Response Enable (MRE) signal from the Interface Bus. These inputs, in conjunction with the HSOUT signal, enable the Remote/Local Logic and the Local Lockout Logic. In addition, the Bus Logic processes the relay state codes and relay select codes present on the DIO lines, and combines them with the HSOUT and REMOTE signals to output the CLK and $\overline{\text{CLK}}$ signals to the Decode Logic.

4-13. The Bus Logic serves the additional function, in conjunction with the Remote/Local Logic, of placing the 59307A into remote operation or taking it out of remote operation on command from instructions on the Interface Bus.

4-14. Decode Logic

4-15. The Decode Logic receives the CLK and $\overline{\text{CLK}}$ signals from the Bus Logic and receives relay select codes and relay state codes from the DIO lines. These signals are decoded and output to the Relay Select Logic to select switch A or B and to connect the selected switch to one of four terminals. The CLKA or CLKB signal selects the corresponding switch (A or B) and the BIT1 or BIT2 signal selects one of four terminals for connection to the common connector A or B (as listed in Table 3-1).

4-16. Remote/Local Logic

4-17. The Remote/Local Logic receives the Remote Enable (REN) signal from the Interface Bus along with the $\overline{\text{ENABLE}}$ and ADDR signals from the Bus Logic to produce the REMOTE signal. This action puts the 59307A in remote operation. When the REMOTE signal is removed (by closing the LOCAL/RESET switch or setting REN high) the 59307A is taken out of remote operation. The LOCAL/RESET switch is disabled and cannot take the 59307A out of remote operation when the $\overline{\text{LLO}}$ signal is received from the Local Lockout Logic.

NOTE

When the REMOTE indicator is illuminated, the 59307A front-panel pushbutton switches are disabled. This indicator does not imply that the A and B switches are presently being changed remotely. This indicator may be illuminated even though the 59307A is not listening to the bus, e.g., the 59307A automatically unaddresses itself (see note that follows paragraph 3-6).

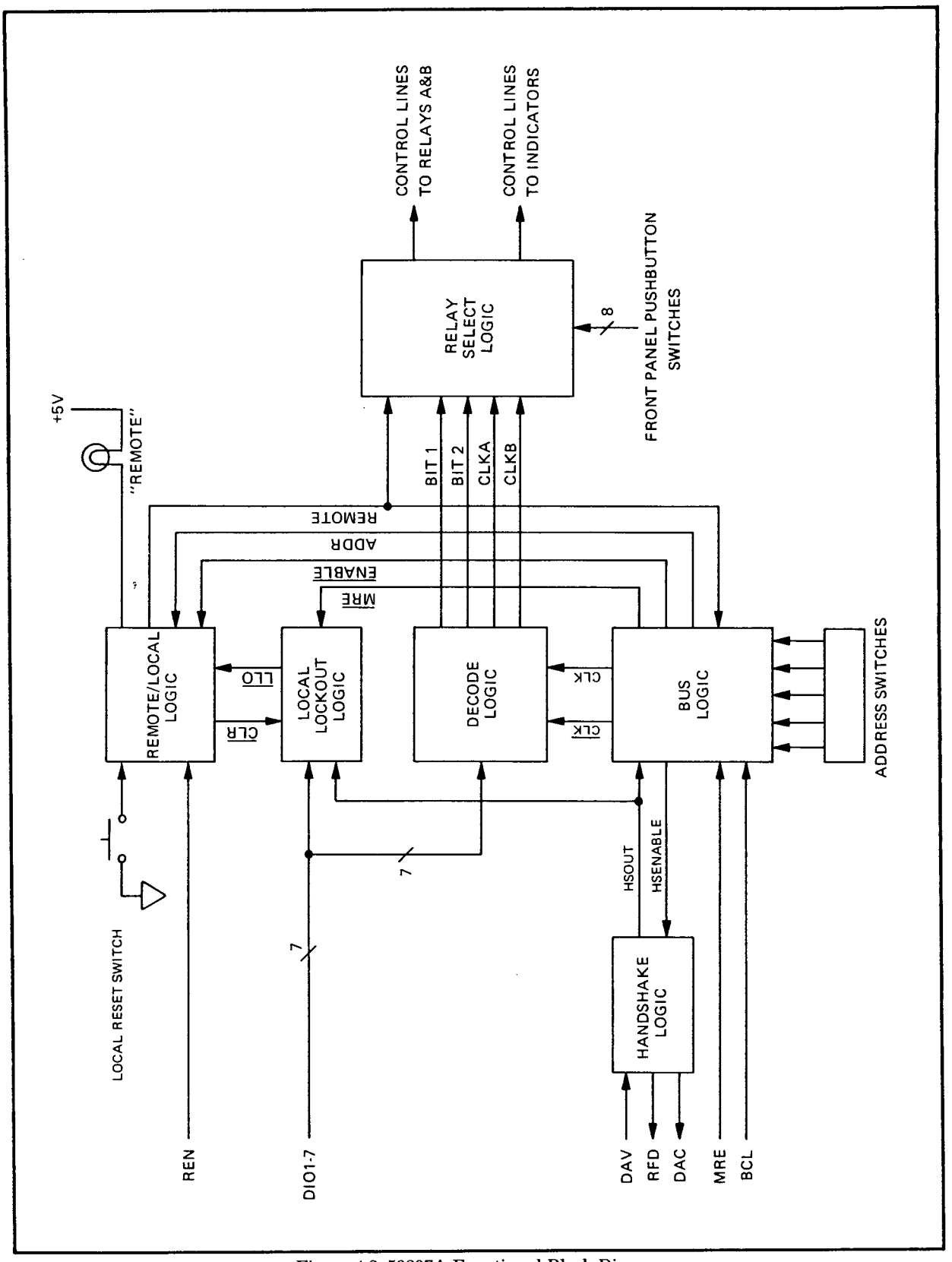


Figure 4-2. 59307A Functional Block Diagram

4-18. Local Lockout Logic

4-19. The Local Lockout Logic locks the 59307A in remote operation by disabling the LOCAL/RESET switch with the $\overline{LLO}$ signal. The function of this logic is to hold the 59307A in remote until the REN signal on the Interface Bus is high to return it to local operation. The logic monitors the DIO lines for the ASCII character DC1 which is processed along with the $\overline{MRE}$ and HSOUT signals to produce $\overline{LLO}$. $\overline{LLO}$ is cleared by the $\overline{CLR}$ signal from the Remote/Local Logic. The Local Lockout Logic will lock the 59307A in remote operation only when the unit is already in remote. If the 59307A is not in remote, this logic will have no affect on the operation or programming.

4-20. Relay Select Logic

4-21. The Relay Select Logic controls the state of the A and B switches. The state is determined by which of the four terminals is connected to the common connector A or B. Control is accomplished by signals from the Decode Logic (in remote) or by front panel pushbutton switches (in local). For remote control the REMOTE signal must be high and for local control the REMOTE signal must be low. To connect switch A common to terminal 1 (by remote control) the CLKA pulse must occur, BIT1 must be high and BIT2 low as determined by the ASCII code on the DIO lines. The codes and signals for each switch connection are shown in Table 4-2.

Table 4-2. Switch Connection Codes

DIO Lines ASCII Code	Bit 1	Bit 2	Clock Signal	Switch Connection
1	1	0	CLKA	A to 1
2	0	1	CLKA	A to 2
3	1	1	CLKA	A to 3
4	0	0	CLKA	A to 4
1	1	0	CLKB	B to 1
2	0	1	CLKB	B to 2
3	1	1	CLKB	B to 3
4	0	0	CLKB	B to 4

4-22. FLOW DIAGRAMS

4-23. The major processes performed by the 59307A are shown in Figures 4-3 through 4-6.

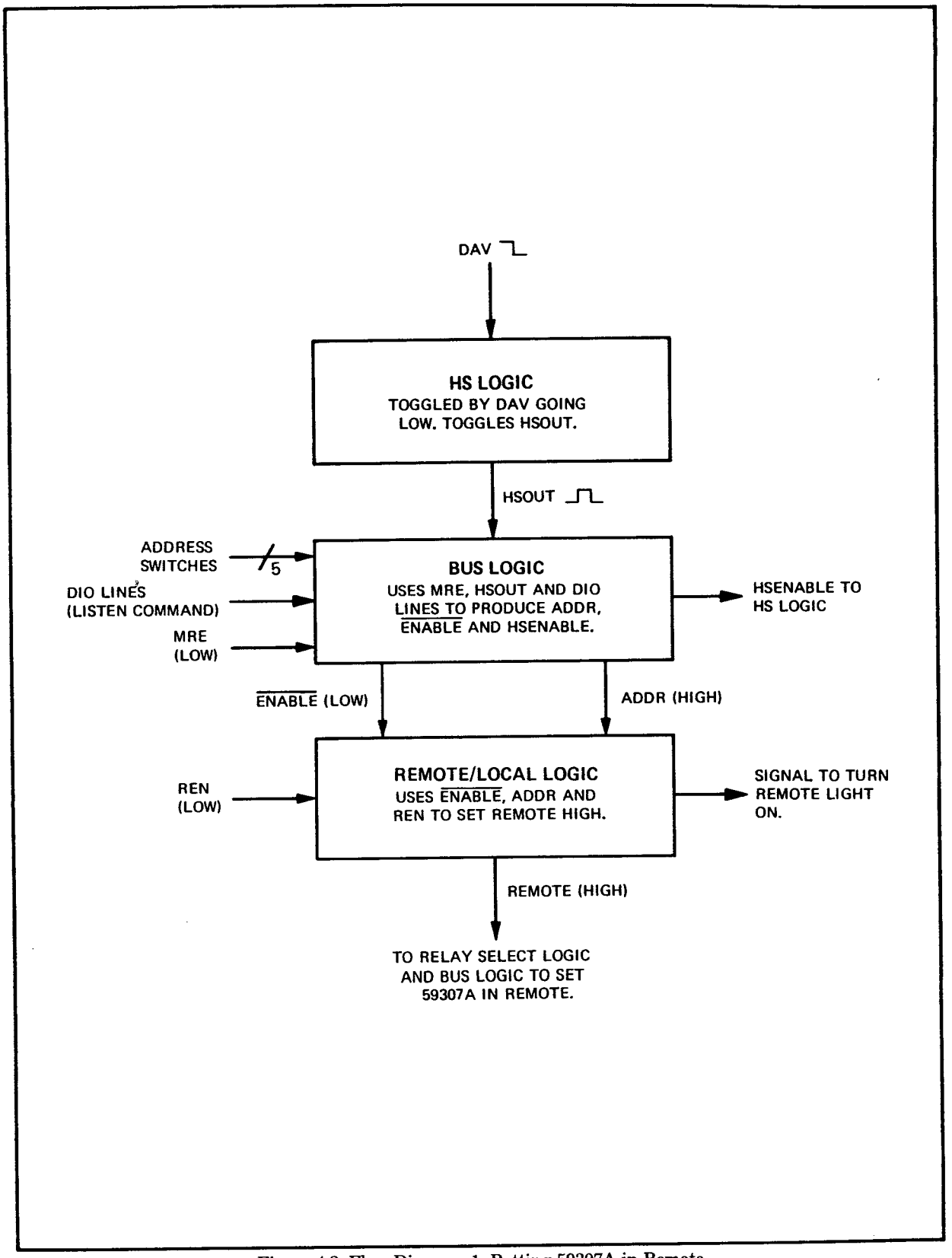


Figure 4-3. Flow Diagram 1, Putting 59307A in Remote

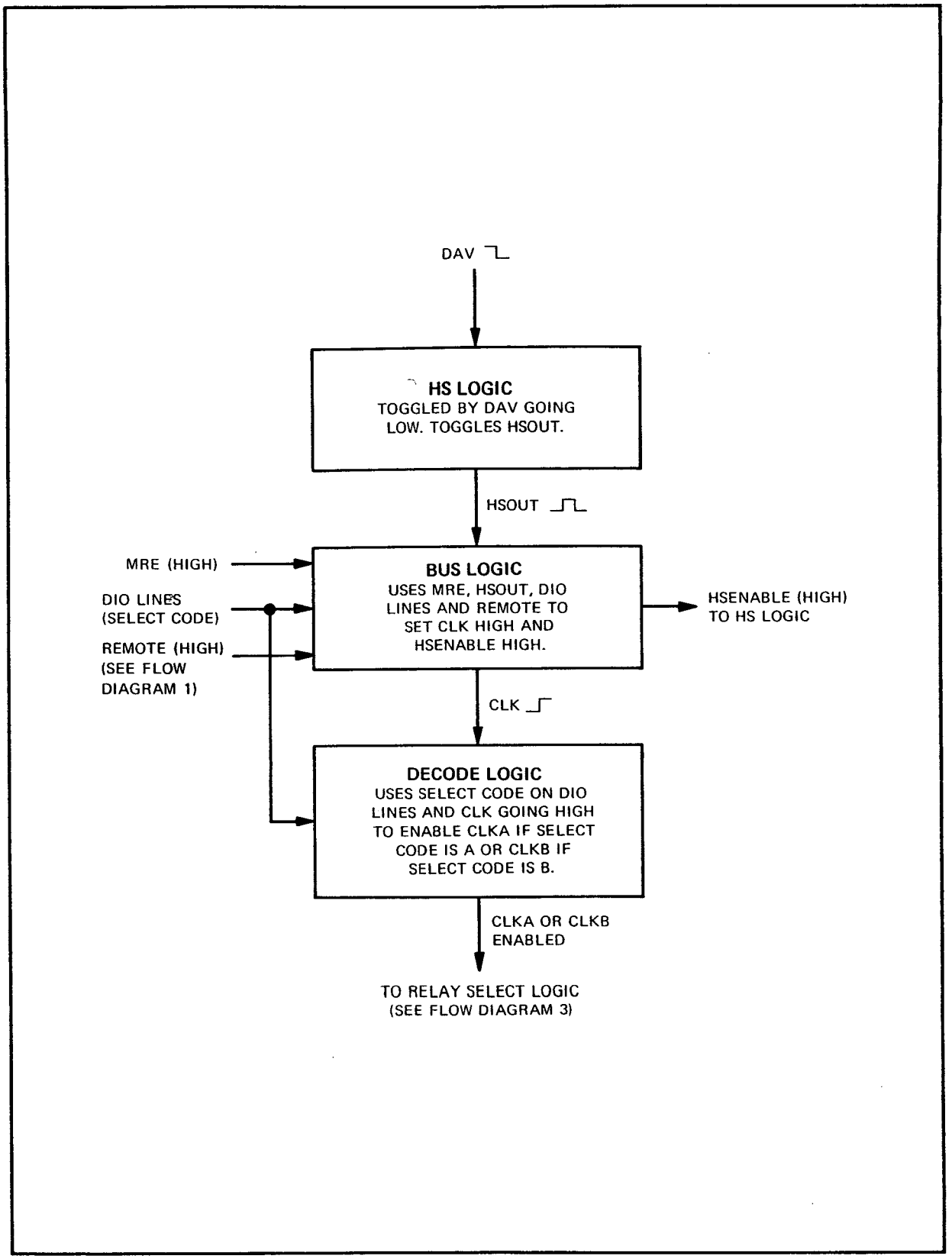


Figure 4-4. Flow Diagram 2, Processing Relay Select Codes

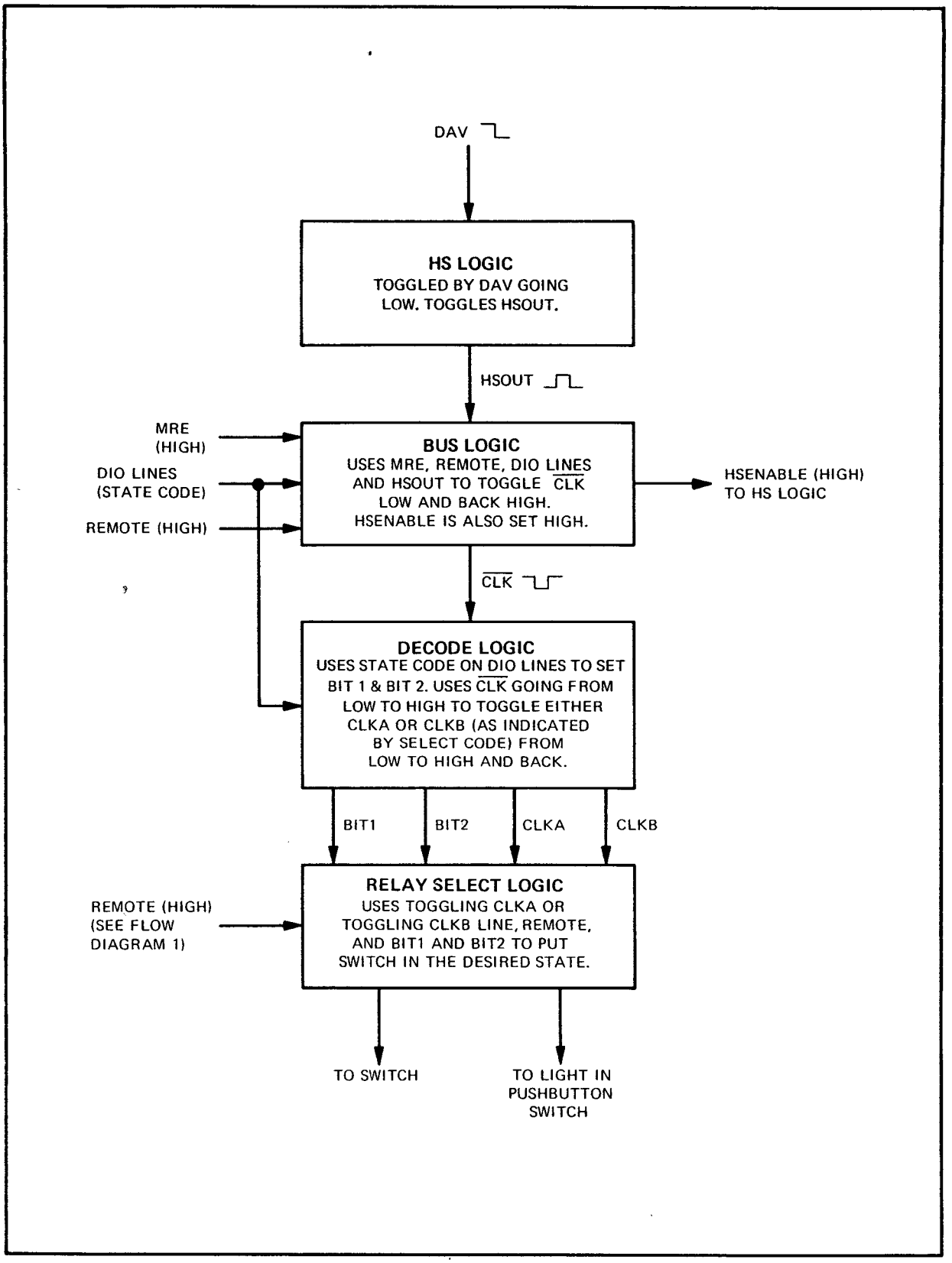


Figure 4-5. Flow Diagram 3, Processing Relay State Codes

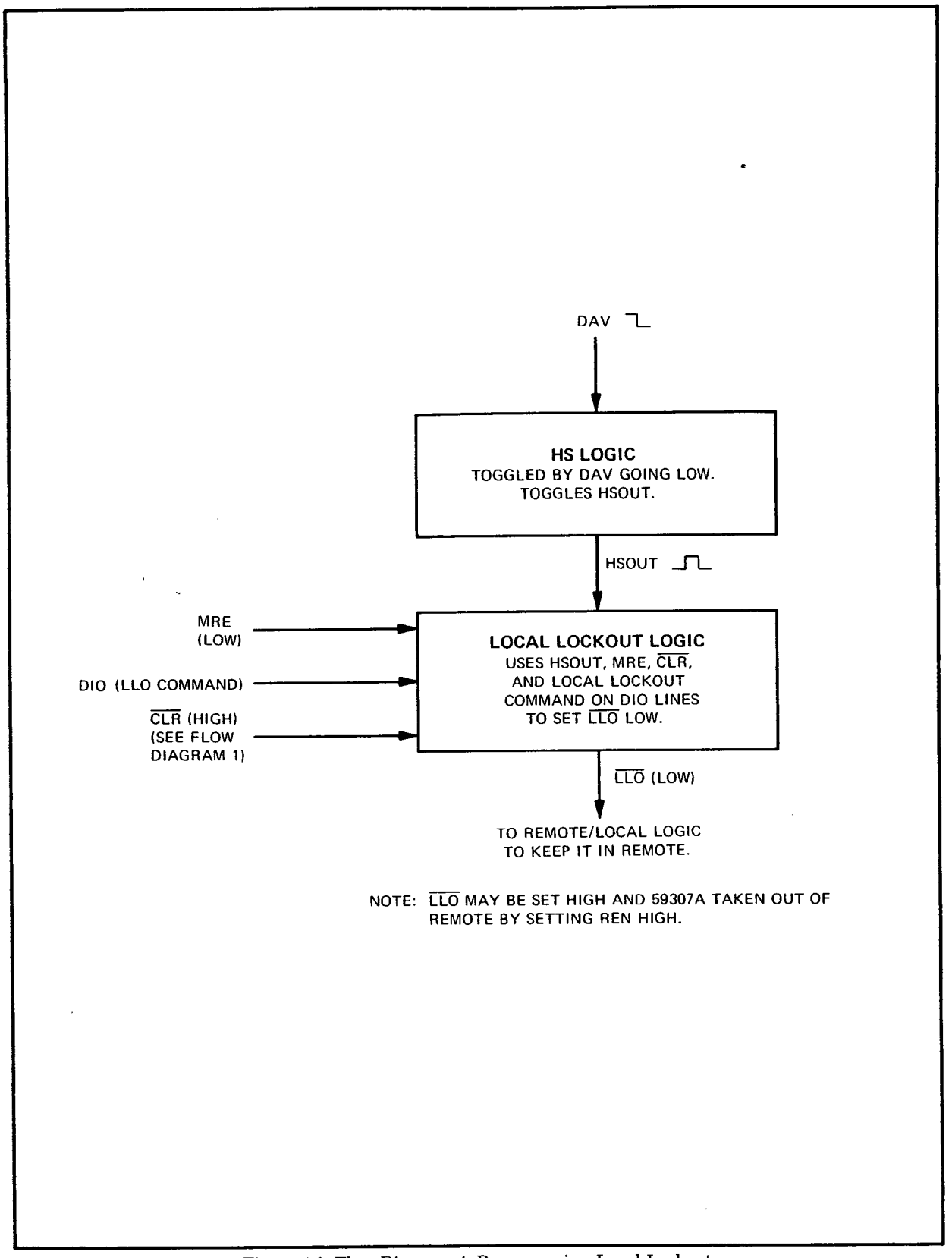


Figure 4-6. Flow Diagram 4, Programming Local Lockout

SECTION V

PERFORMANCE TESTS

5-1. INTRODUCTION

5-2. This section contains information to verify proper HP-IB and manual operation of the 59307A, including a table of recommended test equipment.

5-3. TEST EQUIPMENT

5-4. Table 5-1 lists test equipment recommended for checking and maintaining the performance of the 59307A. Test equipment having equivalent characteristics may be substituted for the equipment listed.

Table 5-1. Recommended Test Equipment

INSTRUMENT	RECOMMENDED
HP-IB Controller	HP 9825A
ROM Expansion	HP 98213A or HP 98214A
HP-IB Interface	HP 98034A
Test Tape	HP P/N 59300-10001

5-5. HP-IB VERIFICATION

5-6. The following program checks the 59307A for proper operation of the HP-IB I/O only. To provide a complete functional check of the 59307A, a continuity check of the rear panel jacks is recommended. (See paragraph 5-22.)

5-8. Verification Using the 9825A Calculator

5-9. Set up the 9825A Calculator with the 98213A General I/O-Extended I/O ROM or the 98214A Plotter-General I/O-Extended I/O ROM, 98034A HP-IB Calculator Interface (set to Address 7), and 59307A VHF Switch for operation.

5-10. Set the 59307A controls as follows:

1. Address Switches to 0010001 (21 octal =17 decimal).
2. Front Panel Switches A1 and B4 in.

5-11. Initialize 59307A by removing ac power, then reapplying power.

5-12. Insert the Data Cartridge (P/N 59300-10001) into the 9825A. Load and run file Ø (ldpØ).

5-13. Program Sequence of Events and Check Points

5-14. File Ø onthe Data Cartridge contains the main program that accesses the individual programs for each of the HP-IB Programmable Modules. For example, typing in "59307" from the main program causes file 7 to be loaded and run. File 7 contains the verification program (V.P.) for the 59307A VHF Switch (see V.P. listing Figure 5-2 and facsimile of 9825A printer output Figure 5-3). Press CONTINUE after verifying each check point below.

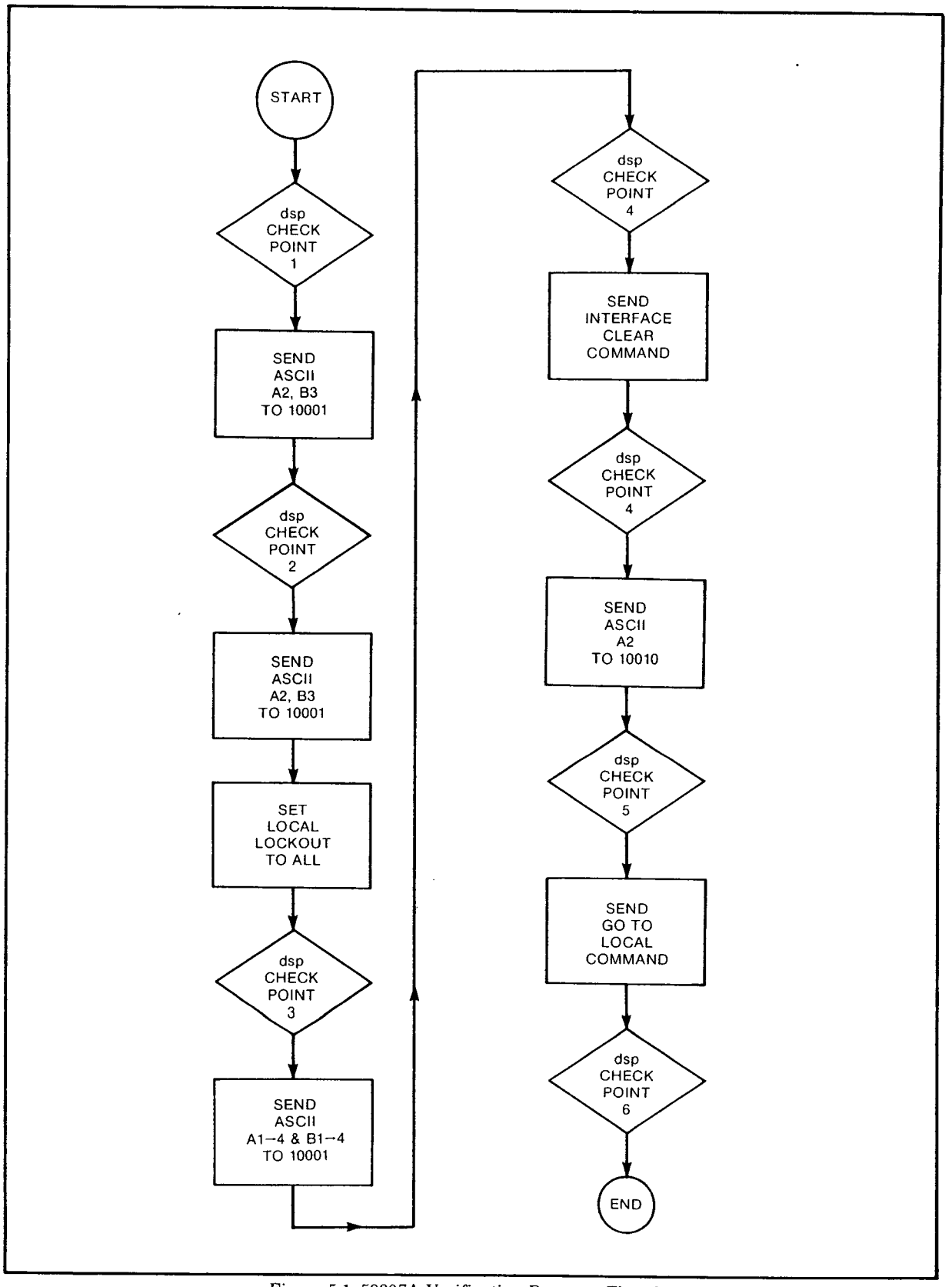


Figure 5-1. 59307A Verification Program Flowchart

```
0: dsp "Model 59307A VHF Switch";wait 2000
1: prt "59307A","VHF Switch","Verification","Test";spc 2
2: prt "----------------"
3: prt "CHECK POINT 1"
4: prt "Setup Check:"
5: prt "*ON      on","*REMOTE off","*A1,B4   on";spc 2
6: dsp "CHECK POINT 1"
7: stp
8: prt "----------------","CHECK POINT 2"
9: rem 7
10: wrt 717,"A2B3"
11: prt "Address 59307A","Send data A2B3:"
12: prt "*REMOTE  on","*A2,B3   on";spc 1
13: prt "Press LOCAL RST","and verify:"
14: prt "*REMOTE off","*A1,B4   on";spc 2
15: dsp "CHECK POINT 2"
16: stp
17: wrt 717,"A2B3"
18: llo 7
19: prt "----------------","CHECK POINT 3"
20: prt "Verify LOCAL","LOCKOUT logic:"
21: prt "*REMOTE  on","*A2,B3   on";spc 1
22: prt "Press LOCAL RST:","*No change";spc 1
23: prt "When CONTINUE is","pressed, lights","A1→4 and B1→4","should light"
24: prt "sequentially";spc 2
25: dsp "CHECK POINT 3"
26: stp
27: 1→X
28: wrt 717,"A"
29: fmt 1,f.0
30: wrt 717.1,X
31: wait 500
32: X+1→X
33: if X<=4;gto 30
34: X-4→X
35: wrt 717,"B"
36: wrt 717.1,X
37: wait 500
38: X+1→X
39: if X<=4;gto 35
40: prt "----------------","CHECK POINT 4"
41: prt "Verify:","*REMOTE  on","*A4,B4   on";spc 1
42: prt "When CONTINUE is","pressed, the IFC","command is sent:"
43: prt "*No change";spc 2
44: dsp "CHECK POINT 4"
45: stp
46: cli 7
47: dsp "CHECK POINT 4"
48: stp
49: wrt 718,"A2"
50: prt "----------------","CHECK POINT 5"
51: prt "Address logic","check. Send code","A2 to address","10010. Verify:"
52: prt "*REMOTE  on","*A4,B4   on";spc 2
53: dsp "CHECK POINT 5"
54: stp
55: prt "----------------","CHECK POINT 6"
56: prt "Return to local","Verify:"
57: prt "*REMOTE off","*A1,B4   on";spc 2
58: dsp "CHECK POINT 6"
59: lcl 7
60: stp
61: prt "END OF TEST";spc 3
62: rew
63: end
*16116
```

Figure 5-2. 59307A VHF Switch Verification Program Listing

```
59307A
VHF Switch
Verification
Test


----------------
CHECK POINT 1
Setup Check:
*ON       on
*REMOTE   on
*A1,B4    on


----------------
CHECK POINT 2
Address 59307A
Send data A2B3:
*REMOTE   on
*A2,B3    on

Press LOCAL RST
and verify:
*REMOTE off
*A1,B4    on


----------------
CHECK POINT 3
Verify LOCAL
LOCKOUT logic:
*REMOTE   on
*A2,B3    on

Press LOCAL RST:
*No change

When CONTINUE is
pressed, lights
A1->4 and B1->4
should light
sequentially


----------------
CHECK POINT 4
Verify:
*REMOTE   on
*A4,B4    on

When CONTINUE is
pressed, the IFC
command is sent:
*No change


----------------
CHECK POINT 5
Address logic
check. Send code
A2 to address
10010. Verify:
*REMOTE   on
*A4,B4    on


----------------
CHECK POINT 6
Return to local
Verify:
*REMOTE off
*A1,B4    on


END OF TEST
```

Figure 5-3. 59307A VHF Switch Verification Program Sample Output

5-15. The V.P. halts to verify the initial state of the 59307A:

CHECK POINT 1:	ON light	on (remainder of the test)
	REMOTE light	off
	A1, B4 lights	on

5-16. The V.P.: (1) address the 59307A (Bus, Remote, and Handshake Logic), (2) sends ASCII A2B3 (Decode and RElay Select Logic), and (3) halts to verify:

CHECK POINT 2:	REMOTE light	on
	A2, B3 lights	on

To partially check the Local Lockout Logic, press the LOCAL RESET (59307A) and verify:

REMOTE light	off
A1, B4 lights	on

5-17. The V.P. repeats the sequence in paragraph 5-16 and, in addition, sends the Local Lockout command (Local Lockout Logic). Verify:

CHECK POINT 3:	REMOTE light	on
	A2, B3 lights	on

Press the LOCAL RESET and verify that no change in state occurs.

When the CONTINUE key on the 9825A is pressed, switch indicator lights A1 through A4 and B1 through B4 should light sequentially; the program addresses the 59307A, sends ASCII A, and then sends ASCII 1 through 4 with a 0.5 second pause between characters. Immediately following, the same program steps are executed for switch B.

5-18. The V.P. halts to verify:

CHECK POINT 4:	REMOTE light	on
	A4, B4 lights	on

When the CONTINUE key on the 9825A is pressed, the Interface Clear (cli) command is sent. Verify that no change in state occurs.

5-19. The V.P.: (1) addresses a nonexistent device (address 10010 binary = 18 decimal), (2) sends ASCII A2, and (3) halts to verify:

CHECK POINT 5:	REMOTE light	on
	A4, B4 lights	on

5-20. The V.P. sends the Clear Lockout/Set Local (lcl) command and halts to verify:

CHECK POINT 6:	REMOTE light	off
	A1, B4 lights	on

5-21. End of Test. To repeat this test press RUN.

5-22. RELAY CONTROL, MANUAL MODE CHECK

5-23. Ensure that 59307A is in manual mode (unplug and reconnect if necessary).

5-24. Press front panel switch A1 to the latched (ON) position. Check that A1 indicator illuminates and that all other A indicators are extinguished.

5-25. Connect a continuity check or ohmmeter to rear panel terminals 1 and A on switch A and check for continuity.

5-26. Repeat paragraphs 5-23 and 5-24 for switches A2 through A4 and B1 through B4.

SECTION VI

REPLACEABLE PARTS

6-1. INTRODUCTION

6-2. This section contains information for ordering replaceable parts. Table 6-1 lists replaceable parts for the VHF Switch. Table 6-2 lists the cabinet parts. Figure 6-1 identifies the cabinet parts. Table 6-3 contains a list of manufacturers and their respective codes.

6-3. Parts are listed in alpha-numerical order of their reference designator starting with A1 and ending with chassis and miscellaneous parts. The replaceable parts table includes the following information.

a. Reference designator (when applicable).
b. HP part number.
c. Total quantity (Qty) used in the instrument.
d. Description of the part (see abbreviations below).

6-4. ORDERING INFORMATION

6-5. To obtain replacement parts, address order of inquiry to your local Hewlett-Packard Sales and Service Office. Identify parts by their Hewlett-Packard part number.

6-6. To obtain a part that is not listed, include:

a. Instrument model number.
b. Instrument serial number.
c. Description of the part.
d. Function and location of the part.

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	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–piezoelectric
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	avg	= average	CHAN	= channel	dc	= direct current
ac	= alternating current	AWG	= American wire gauge	cm	= centimeter	deg	= degree (temperature interval or difference)
ACCESS	= accessory	BAL	= balance	CMO	= cabinet mount only		
ADJ	= adjustment	BCD	= binary coded decimal	COAX	= coaxial	...°	= degree (plane angle)
A/D	= analog-to-digital	BD	= board	COEF	= coefficient	°C	= degree Celsius (centigrade)
AF	= audio frequency	BE CU	= beryllium copper	COM	= common	°F	= degree Fahrenheit
AFC	= automatic frequency control	BFO	= beat frequency oscillator	COMP	= composition	°K	= degree Kelvin
AGC	= automatic gain control	BH	= binder head	COMPL	= complete	DEPC	= deposited carbon
AL	= aluminum	BKDN	= breakdown	CONN	= connector	DET	= detector
ALC	= automatic level control	BP	= bandpass	CP	= cadmium plate	diam	= diameter
AM	= amplitude modulation	BPF	= bandpass filter	CRT	= cathode-ray tube	DIA	= diameter (used in parts list)
AMPL	= amplifier	BRS	= brass	CTL	= complementary transistor logic	DIFF AMPL	= differential amplifier
APC	= automatic phase control	BWO	= backward-wave oscillator	CW	= continuous wave	div	= division
ASSY	= assembly	CAL	= calibrate	cw	= clockwise	DPDT	= double-pole, double-throw
AUX	= auxiliary	ccw	= counterclockwise	cm	= centimeter	DR	= drive
		CER	= ceramic	D/A	= digital-to-analog		
				dB	= decibel		
				dBm	= decibel referred to 1 mW		

ABBREVIATIONS

DSB	= double sideband
DTL	= diode transistor logic
DVM	= digital voltmeter
ECL	= emitter coupled logic
EMF	= electromotive force
EDP	= electronic data processing
ELECT	= electrolytic
ENCAP	= encapsulated
EXT	= external
F	= farad
FET	= field-effect transistor
F/F	= flip-flop
FH	= flat head
FIL H	= fillister head
FM	= frequency modulation
FP	= front panel
FREQ	= frequency
FXD	= fixed
g	= gram
GE	= germanium
GHz	= gigahertz
GL	= glass
GND	= ground(ed)
H	= henry
h	= hour
HET	= heterodyne
HEX	= hexagonal
HD	= head
HDW	= hardware
HF	= high frequency
HG	= mercury
HI	= high
HP	= Hewlett-Packard
HPF	= high pass filter
HR	= hour (used in parts list)
HV	= high voltage
Hz	= Hertz
IC	= integrated circuit
ID	= inside diameter
IF	= intermediate frequency
IMPG	= impregnated
in	= inch
INCD	= incandescent
INCL	= include(s)
INP	= input
INS	= insulation
INT	= internal
kg	= kilogram
kHz	= kilohertz
kΩ	= kilohm
kV	= kilovolt
lb	= pound
LC	= inductance-capacitance
LED	= light-emitting diode
LF	= low frequency
LG	= long
LH	= left hand
LIM	= limit
LIN	= linear taper (used in parts list)
lin	= linear
LK WASH	= lock washer
LO	= low; local oscillator
LOG	= logarithmic taper (used in parts list)
log	= logarithm(ic)
LPF	= low pass filter
LV	= low voltage
m	= meter (distance)
mA	= milliampere
MAX	= maximum
MΩ	= megohm
MEG	= meg (10^6) (used in parts list)
MET FLM	= metal film
MET OX	= metal oxide
MF	= medium frequency; microfarad (used in parts list)
MFR	= manufacturer
mg	= milligram
MHz	= megahertz
mH	= millihenry
mho	= mho
MIN	= minimum
min	= minute (time)
... '	= minute (plane angle)
MINAT	= miniature
mm	= millimeter
MOD	= modulator
MOM	= momentary
MOS	= metal-oxide semiconductor
ms	= millisecond
MTG	= mounting
MTR	= meter (indicating device)
mV	= millivolt
mVac	= millivolt, ac
mVdc	= millivolt, dc
mVpk	= millivolt, peak
mV p-p	= millivolt, peak-to-peak
mVrms	= millivolt, rms
mW	= milliwatt
MUX	= multiplex
MY	= mylar
μA	= microampere
μF	= microfarad
μH	= microhenry
μmho	= micromho
μs	= microsecond
μV	= microvolt
μVac	= microvolt, ac
μVdc	= microvolt, dc
μVpk	= microvolt, peak
μVp-p	= microvolt, peak-to-peak
μVrms	= microvolt, rms
μW	= microwatt
nA	= nanoampere
NC	= no connection
N/C	= normally closed
NE	= neon
NEG	= negative
nF	= nanofarad
NI PL	= nickel plate
N/O	= normally open
NOM	= nominal
NORM	= normal
NPN	= negative-positive-negative
NPO	= negative-positive zero (zero temperature coefficient)
NRFR	= not recommended for field replacement
NSR	= not separately replaceable
ns	= nanosecond
nW	= nanowatt
OBD	= order by description
OD	= outside diameter
OH	= oval head
OP AMPL	= operational amplifier
OPT	= option
OSC	= oscillator
OX	= oxide
oz	= ounce
Ω	= ohm
P	= peak (used in parts list)
PAM	= pulse-amplitude modulation
PC	= printed circuit
PCM	= pulse-code modulation; pulse-count modulation
PDM	= pulse-duration modulation
pF	= picofarad
PH BRZ	= phosphor bronze
PHIL	= Phillips
PIN	= positive-instrinsic-negative
PIV	= peak inverse voltage
pk	= peak
PL	= phase lock
PLO	= phase lock oscillator
PM	= phase modulation
PNP	= positive-negative-positive
P/O	= part of
POLY	= polystyrene
PORC	= porcelain
POS	= positive; position(s) (used in parts list)
POSN	= position
POT	= potentiometer
p-p	= peak-to-peak
PP	= peak-to-peak (used in parts list)
PPM	= pulse-position modulation
PREAMPL	= preamplifier
PRF	= pulse-repetition frequency
PRR	= pulse repetition rate
ps	= picosecond
PT	= point
PTM	= pulse-time modulation
PWM	= pulse-width modulation
PWV	= peak working voltage
RC	= resistance capacitance
RECT	= rectifier
REF	= reference
REG	= regulated
REPL	= replaceable
RF	= radio frequency
RFI	= radio frequency interference
RH	= round head; right hand
RLC	= resistance-inductance-capacitance
RMO	= rack mount only
rms	= root-mean-square
RND	= round
ROM	= read-only memory
R&P	= rack and panel
RWV	= reverse working voltage
S	= scattering parameter
s	= second (time)
..."	= second (plane angle)
S-B	= slow-blow (fuse) (used in parts list)
SCR	= silicon controlled rectifier; screw
SE	= selenium
SECT	= sections
SEMICON	= semiconductor
SHF	= superhigh frequency
SI	= silicon
SIL	= silver
SL	= slide
SNR	= signal-to-noise ratio
SPDT	= single-pole, double-throw
SPG	= spring
SR	= split ring
SPST	= single-pole, single-throw
SSB	= single sideband
SST	= stainless steel
STL	= steel
SQ	= square
SWR	= standing-wave ratio
SYNC	= synchronize
T	= timed (slow-blow fuse)
TA	= tantalum
TC	= temperature compensating
TD	= time delay
TERM	= terminal
TFT	= thin-film transistor
TGL	= toggle
THD	= thread
THRU	= through
TI	= titanium
TOL	= tolerance
TRIM	= trimmer
TSTR	= transistor
TTL	= transistor-transistor logic
TV	= television
TVI	= television interference
TWT	= traveling wave tube
U	= micro (10^{-6}) (used in parts list)
UF	= microfarad (used in parts list)
UHF	= ultrahigh frequency
UNREG	= unregulated
V	= volt
VA	= voltampere
Vac	= volts, ac
VAR	= variable
VCO	= voltage-controlled oscillator
Vdc	= volts, dc
VDCW	= volts, dc, working (used in parts list)
V(F)	= volts, filtered
VFO	= variable-frequency oscillator
VHF	= very-high frequency
Vpk	= volts, peak
Vp-p	= volts, peak-to-peak
Vrms	= volts, rms
VSWR	= voltage standing wave ratio
VTO	= voltage-tuned oscillator
VTVM	= vacuum-tube voltmeter
V(X)	= volts, switched
W	= watt
W/	= with
WIV	= working inverse voltage
WW	= wirewound
W/O	= without
YIG	= yttrium-iron-garnet
Zo	= characteristic impedance

NOTE

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

MULTIPLIERS

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

Table 6-1. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	59307-60001	6	1	BOARD ASSEMBLY-CONTROL SERIES 1920	28480	59307-60001
A1C1	0180-2101	8	1	CAPACITOR-FXD 4000UF+75-10% 15VDC AL	28480	0180-2101
A1C2	0180-1701	2	1	CAPACITOR-FXD 6.8UF+-20% 6VDC TA	56289	150D685X0006A2
A1C3	0180-0094	4	2	CAPACITOR-FXD 100UF+75-10% 25VDC AL	56289	30D107G025DD2
A1C4	0140-0149	6	1	CAPACITOR-FXD 470PF +-5% 300VDC MICA	72136	DM15F471J0300WV1CR
A1C5	0160-4084	8	2	CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1C6	0180-0094	4		CAPACITOR-FXD 100UF+75-10% 25VDC AL	56289	30D107G025DD2
A1C7	0140-0192	9	2	CAPACITOR-FXD 68PF +-5% 300VDC MICA	72136	DM15F680J0300WV1CR
A1C8	0140-0192	9		CAPACITOR-FXD 68PF +-5% 300VDC MICA	72136	DM15E680J0300WV1CR
A1C9	0160-3879	7	4	CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1C10	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1C11	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1C12	0160-3879	7		CAPACITOR-FXD .01UF +-20% 100VDC CER	28480	0160-3879
A1C13	0160-4084	8		CAPACITOR-FXD .1UF +-20% 50VDC CER	28480	0160-4084
A1C14	0180-1735	2	1	CAPACITOR-FXD .22UF+-10% 35VDC TA	56289	150D224X9035A2
A1CR1	1901-0040	1	1	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A1CR2	1901-0029	6	6	DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
A1CR3	1901-0029	6		DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
A1CR4	1901-0029	6		DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
A1CR5	1901-0029	6		DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
A1CR6	1901-0029	6		DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
A1CR7	1901-0029	6		DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
A1DS1	2140-0043	1	2	LAMP-INCAND 1730 6VDC 40MA T-1-3/4-BULB	08806	1730D
A1DS2	2140-0043	1		LAMP-INCAND 1730 6VDC 40MA T-1-3/4-BULB	08806	1730D
A1DS3	2140-0311	6	8	LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS4	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS5	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS6	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS7	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS8	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS9	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1DS10	2140-0311	6		LAMP-INCAND 7333 5VDC 60MA T-1-3/4-BULB	08806	7333
A1J1	1251-3283	1	1	CONNECTOR 24-PIN F MICRORIBBON	28480	1251-3283
A1J2	1200-0423	8	1	SOCKET-IC 16-CONT DIP DIP-SLDR	28480	1200-0423
A1Q1	1854-0071	7	1	TRANSISTOR NPN SI PD=300MW FT=200MHZ	28480	1854-0071
A1R1	1810-0136	3	2	NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0136
A1R2	1810-0136	3		NETWORK-RES 10-SIP MULTI-VALUE	28480	1810-0136
A1R3	1810-0041	9	1	NETWORK-RES 9-SIP2.7K OHM X 8	28480	1810-0041
A1R4	0683-2725	8	1	RESISTOR 2.7K 5% .25W FC TC=-400/+700	01121	CB2725
A1R5	0683-1215	9	3	RESISTOR 120 5% .25W FC TC=-400/+600	01121	CB1215
A1R6	0683-1215	9		RESISTOR 120 5% .25W FC TC=-400/+600	01121	CB1215
A1R7	0683-2035	3	4	RESISTOR 20K 5% .25W FC TC=-400/+800	01121	CB2035
A1R8	0683-2035	3		RESISTOR 20K 5% .25W FC TC=-400/+800	01121	CB2035
A1R9	0683-2035	3		RESISTOR 20K 5% .25W FC TC=-400/+800	01121	CB2035
A1R10	0683-5125	8	1	RESISTOR 5.1K 5% .25W FC TC=-400/+700	01121	CB5125
A1R11	0683-2035	3		RESISTOR 20K 5% .25W FC TC=-400/+800	01121	CB2035
A1R12	0683-1025	9	3	RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
A1R13	0683-1025	9		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
A1R14	0683-1025	9		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
A1R15	1810-0055	5	1	NETWORK-RES 9-SIP10.0K OHM X 8	28480	1810-0055
A1R16	0683-1215	9		RESISTOR 120 5% .25W FC TC=-400/+600	01121	CB1215
A1S1A	3101-0572	0	2	SWITCH-PB 4-STATION 15.88MM C-C SPACING	28480	3101-0572
A1S1B	3101-0572	0		SWITCH-PB 4-STATION 15.88MM C-C SPACING	28480	3101-0572
A1S2	3101-0537	7	1	SWITCH-SL DPDT STD 1.5A 250VAC PC	28480	3101-0537
A1T1	9100-3062	3	1	TRANSFORMER-POWER 115/230V 48-440HZ	28480	9100-3062
A1TP1	0360-0124	3	3	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A1TP2	0360-0124	3		CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A1TP3	0360-0124	3		CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A1U1	1820-0070	5	1	IC GATE TTL NAND 8-INP	01295	SN7430N
A1U2	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
A1U3	1820-1416	5	2	IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A1U4	1820-0904	4	1	IC COMPTR TTL L MAGTD 5-BIT	07263	93L24PC
A1U5	1820-1415	4	1	IC SCHMITT-TRIG TTL LS NAND DUAL 4-INP	01295	SN74LS13N
A1U6	1820-0054	5	4	IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
A1U7	1820-1053	6	1	IC SCHMITT-TRIG TTL INV HEX	01295	SN7414N
A1U8	1820-1202	7	2	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A1U9	1820-1202	7		IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
A1U10	1820-0515	3	1	IC MV TTL MONOSTBL RETRIG/RESET DUAL	04713	MC8602P

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-1. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1U11	1820-1112	8	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A1U12	1820-0621	2	3	IC BFR TTL NAND QUAD 2-INP	01295	SN7438N
A1U13	1820-1416	5		IC SCHMITT-TRIG TTL LS INV HEX 1-INP	01295	SN74LS14N
A1U14	1820-1112	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
A1U15	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
A1U16	1820-0077	2	2	IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
A1U17	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
A1U18	1820-0077	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
A1U19	1820-0621	2		IC BFR TTL NAND QUAD 2-INP	01295	SN7438N
A1U20	1820-0621	2		IC BFR TTL NAND QUAD 2-INP	01295	SN7438N
A1U21	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
A1U22	1820-0174	0	1	IC INV TTL HEX	01295	SN7404N
A1U23	1820-1204	9	1	IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20N
A1U24	1820-1211	8	1	IC GATE TTL LS EXCL-OR QUAD 2-INP	01295	SN74LS86N
A1U25	1826-0099	0	1	IC V RGLTR TO-220	07263	7812UC
A1U26	1826-0122	0	1	IC 7805 V RGLTR TO-220	07263	7805UC
				MISCELLANEOUS		
MP1	59307-00006	5	1	BKT-ANNUN	28480	59307-00006
MP2	05330-40002	1	1	BLOCK-ANNUN	28480	05330-40002
	0380-0342	9	2	STANDOFF-RVT-ON .125-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
	0380-0906	1	6	STANDOFF-RVT-ON .1-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
	1530-1098	4	2	CLEVIS 0.070-IN W SLT: 0.454-IN PIN CTR	00000	ORDER BY DESCRIPTION

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-1. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2	59307-60002	7	1	BOARD ASSEMBLY: VHF SERIES 1524	28480	59307-60002
A2C1	0180-0210	6	2	CAPACITOR-FXD 3.3UF+-20% 15VDC TA	56289	150D335X0015A2
A2C2	0180-0210	6		CAPACITOR-FXD 3.3UF+-20% 15VDC TA	56289	150D335X0015A2
A2C3	0160-3875	3	8	CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C4	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C5	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C6	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C7	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C8	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C9	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2C10	0160-3875	3		CAPACITOR-FXD 22PF +-5% 200VDC CER 0+-30	28480	0160-3875
A2CR1	1901-0040	1	4	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2CR2	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2CR3	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2CR4	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
A2J1	1200-0423	8	1	SOCKET-IC 16-CONT DIP DIP-SLDR	28480	1200-0423
A2J2	1200-0638	7	1	SOCKET-IC 14-CONT DIP DIP-SLDR	28480	1200-0638
A2J3	1250-1163	0	10	CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J4	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J5	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J6	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J7	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J8	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J9	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J10	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J11	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2J12	1250-1163	0		CONNECTOR-RF BNC FEM SGL-HOLE-RR 50-OHM	28480	1250-1163
A2K1	0490-0508	2	4	RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-0508
A2K2	0490-0508	2		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-0508
A2K3	0490-0508	2		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-0508
A2K4	0490-0508	2		RELAY 2C 12VDC-COIL .5A 28VDC	28480	0490-0508
A2R1	0698-5841	6	4	RESISTOR 11 5% .25W FC TC=-400/+500	01121	CB1105
A2R2	0698-5841	6		RESISTOR 11 5% .25W FC TC=-400/+500	01121	CB1105
A2R3	0698-5841	6		RESISTOR 11 5% .25W FC TC=-400/+500	01121	CB1105
A2R4	0698-5841	6		RESISTOR 11 5% .25W FC TC=-400/+500	01121	CB1105
A2S1				NOT ASSIGNED		
A2S2	3101-1973	7	1	SWITCH-SL 7-1A DIP-SLIDE-ASSY .1A 50VDC	28480	3101-1973
A2U1	1820-0618	7	1	IC BFR TTL NON-INV HEX	01295	SN7417N
				CHASSIS AND MISCELLANEOUS PARTS		
C1	0160-4281	7	2	CAPACITOR-FXD 2200PF +-20% 250VAC(RMS)	C0633	PME271Y422
C2	0160-4281	7		CAPACITOR-FXD 2200PF +-20% 250VAC(RMS)	C0633	PME271Y422
F1	2110-0311	3	1	FUSE .062A 250V TD 1.25X.25 UL	75915	313.062
F1	2110-0318	0	1	FUSE .125A 250V TD 1.25X.25 UL	28480	2110-0318
S1	3101-1261	6	1	SWITCH-PB SPDT MOM 1A 115VAC	28480	3101-1261
W1	8120-0616	8	1	CABLE ASSY 26AWG 16-CNDCT	28480	8120-0616
XF1	2110-0564	8	1	FUSEHOLDER BODY 12A MAX FOR UL	H9027	031.1657
	0362-0187	2	1	CAP-WIRE TERMINAL	28480	0362-0187
	0380-0644	4	2	STANDOFF-HEX .327-IN-LG 6-32THD	00000	ORDER BY DESCRIPTION
	1251-2357	8	1	CONNECTOR-AC PWR HP-9 MALE FLG-MTG	28480	1251-2357
	2110-0565	9	1	FUSEHOLDER CAP 12A MAX FOR UL	28480	2110-0565
	2110-0569	3	1	FUSEHOLDER COMPONENT NUT; THREAD M12.7	28480	2110-0569
	2420-0022	0	4	NUT-SPCLY 6-32 THD .23-IN-THK .354-OD	28480	2420-0022
	3101-1820	3	1	CAP-PUSHBUTTON WHITE; .2-IN DIA; .155-IN	28480	3101-1820
	7120-3760	8	1	LABEL-INFORMATION 3-IN-WD 5-IN-LG AL	28480	7120-3760
	7120-4006	7	1	LABEL-WARNING .4-IN-WD 3.15-IN-LG VINYL	28480	7120-4006
	7120-4835	0	1	LABEL-INFORMATION .75-IN-WD 2-IN-LG PPR	28480	7120-4835
	7120-8732	4	1	LABEL-WARNING 2-IN-WD 3-IN-LG MYLAR	28480	7120-8732
	7122-0058	5	1	PLATE-SERIAL .5-IN-WD 1.5-IN-LG AL	28480	7122-0058
	5040-0270	7	2	LAMPHOLDER:WHITE	28480	5040-0270
	59307-00004	3	1	BRACKET-SWITCH	28480	59307-00004
	59308-60007	3	1	STRAP-GROUND 2 IN	28480	59308-60007
	8120-1378	1	1	PWR CORD SET 18-AWG 3-COND 90-IN-LG	01746	13E67-1HP

See introduction to this section for ordering information
*Indicates factory selected value

Table 6-2. 59307A Cabinet Parts

	HP PART NO.	QTY.	DESCRIPTION	MFR. CODE	MFR. PART NO.
1	5040-7203	1	TRIM, TOP	28480	5040-7203
2	59307-00001	1	PANEL, FRONT	28480	59307-00001
3	59307-00002	1	PANEL, SUB	28480	59307-00002
4	5020-8813	1	FRAME, FRONT	28480	5020-8813
5	5001-0438	2	TRIM, SIDE	28480	5001-0438
6	5040-7201	4	FOOT	28480	5040-7201
7	5040-7209	1	COVER-BOTTOM	28480	5040-7209
8	59307-00005	2	BRACKET, MOUNTING	28480	59307-00005
9	5040-7212	2	COVER-SIDES	28480	5040-7212
10	59306-00003	1	PANEL, REAR	28480	59306-00003
11	5040-7208	1	COVER-TOP	28480	5040-7208
12	59307-00007	1	PANEL, FRONT (OPTION 001)	28480	59307-00007

Table 6-3. Manufacturers Code List

MFR. NO.	MANUFACTURER'S NAME AND ADDRESS	ZIP CODE
C0633	RIFA, BROMMA, SE	
H9027	SCHURTER A G H, LUZERN, SW	
00000	ANY SATISFACTORY SUPPLIER	
01121	ALLEN BRADLEY CO., MILWAUKEE, WI.	53212
01295	TEXAS INSTR. INC. SEMICOND. COMPNT DIV., DALLAS, TEXAS	75231
01746	PHILLIP J INDUSTRIES, INC.,CHICAGO, IL	
04713	MOTOROLA SEMICONDUCTOR PRODUCTS, PHOENIX, AZ	85008
07263	FAIRCHILD SEMICONDUCTOR DIV., MOUNTAIN VIEW, CA	94040
08806	GE CO MINIATURE LAMP PROD DEPT., CLEVELAND, OH	44112
28480	HEWLETT-PACKARD CO., CORPORATE HQ., PALO ALTO, CA	94304
56289	SPRAGUE ELECTRIC CO., NORTH ADAMS, MA	01247
72136	ELECTRO MOTIVE MFG. CO. INC., WILLIMANTIC, CT	06226
75915	LITTELFUSE INC., DES PLAINES, IL	60016

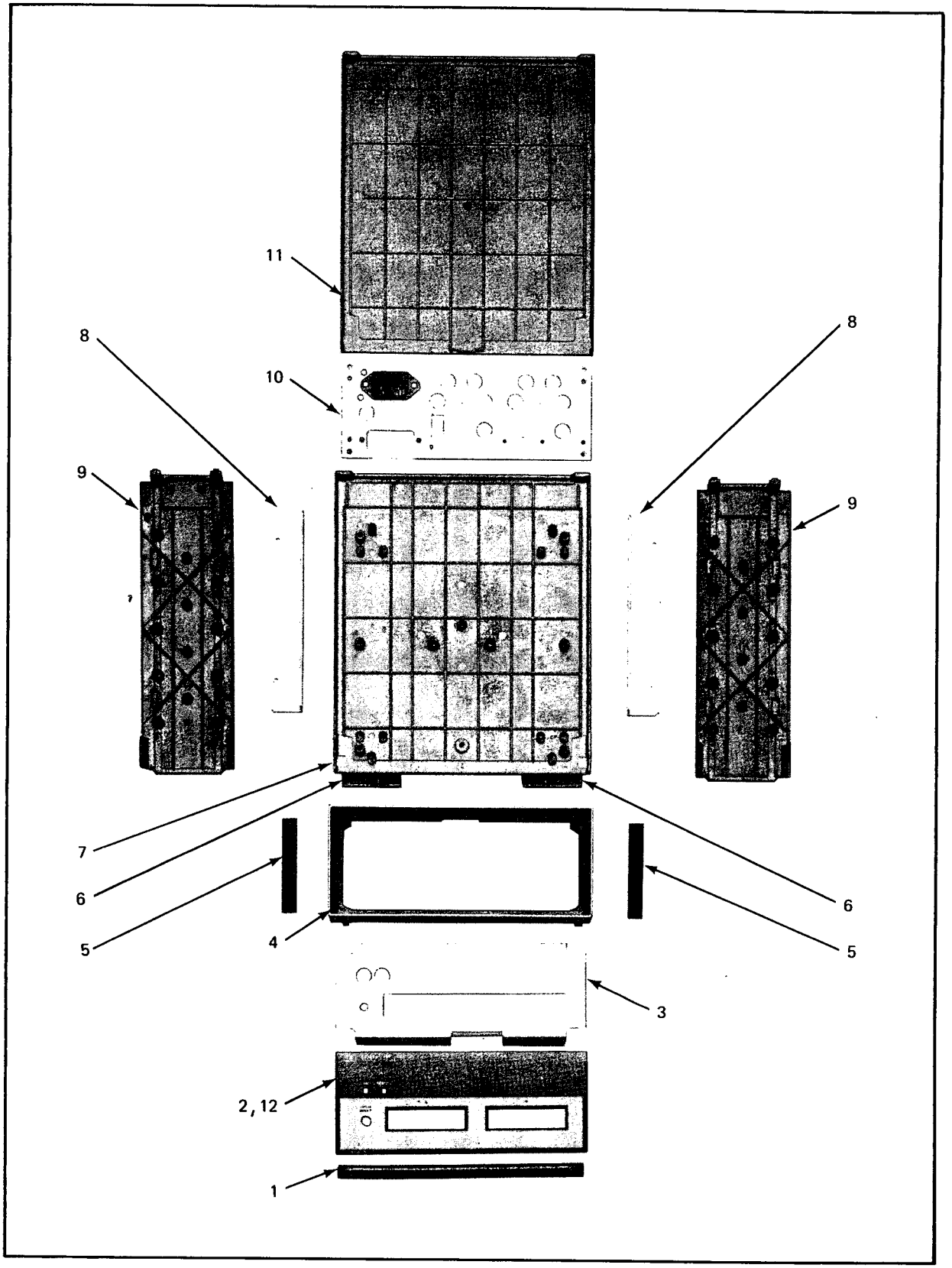


Figure 6-1. 59307A Cabinet Parts

SECTION VII
MANUAL CHANGES

7-1. INTRODUCTION

7-2. This section contains information necessary to adapt this manual to older instruments and to improve the operation of older instruments.

7-3. MANUAL CHANGES

7-4. This manual applies directly to Model 59307A having Serial Prefix 1920A (refer to paragraph 1-6).

7-5. Newer Instruments

7-6. As changes are made, newer instruments may have serial prefixes that are not listed in this manual. The manuals for these instruments are supplied with a manual change sheet, containing the required information. Contact the nearest Hewlett-Packard Sales and Service Office for information if this sheet is missing.

7-7. Older Instruments

7-8. To adapt this manual to the following series numbers, use the corresponding changes as indicated in Table 7-1.

Table 7-1. Manual Changes

SERIES NUMBER	CHANGE
1740A	1 and 9
1644A	1, 2 and 10
1632A	1, 2, 3 and 10
1604A	1, 2, 3, 4 and 10
1600A	1 through 5 and 11
1524A	1 through 6 and 11
1332A	1 through 7 and 11
1316A	1 through 8 and 12

CHANGE 1

Page 1-2, Table 1-2. Specifications:
Change "Power Requirements:" to: 115V or 230V ±10%, 50 to 400 Hz, 10 VA max.
Page 3-2, Figure 3-2. Rear View:
Change "15VA MAX" to 6VA MAX.
Change "125maT/62maT" to 115/230V (1A) in photograph and in line 1 below photograph.
Page 6-3, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change A1 SERIES number to 1740.
Change A1C13 (0160-4084) to 0140-0192; CAPACITOR-FXD 68 PF ±5% 300WVDC MICA.
Delete A1C14 (0180-1745).
Page 8-5, Figure 8-3. 59307A Schematic Diagram:
Change SERIES number at the top of the A1 schematic to 1740.
Change A1C13 from .1UF to 68PF.
Delete A1C14.
In the REFERENCE DESIGNATIONS table, change the A1 capacitor listing to C1-13.

CHANGE 2

Page 6-3, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change A1 SERIES number to 1644.
Change A1C4 and C5 to 0140-0192; CAPACITOR-FXD 68PF ±5% 300WVDC MICA.
Change the following parts:
A1U2 to 1820-0054; IC:DGTL:GATE (SN7400N)
A1U3, U7, and U13 to 1820-0174; IC:DGTL:INVERTER (SN7404N)
A1U5 to 1820-0537; IC:DGTL:SCHMITT TRIGGER (SN7413N)
A1U8 and U9 to 1820-0068; IC:DGTL:GATE (SN7410N)
A1U14 to 1820-0077; IC:DGTL:FLIP-FLOP (SN7474N)
A1U23 to 1820-0069; IC:DGTL:GATE (SN7420N)
A1U24 to 1820-0282; IC:DGTL:GATE (SN7486N)
Page 8-3, Figure 8-2. Digital Bus Connector Pin Designations:
Change both references to Pin 12 from: "CHASSIS GROUND" to: "NOT CONNECTED".
Page 8-5, Figure 8-3. 59307A Schematic Diagram:
Change SERIES number at the top of the A1 schematic to 1644.
Change the values of A1C4 and C5 to 68PF.
On A1J1 DIGITAL BUS, remove the line connecting pin 12 to chassis ground.
In the ACTIVE ELEMENTS table, change the part numbers for A1U2, U3, U5, U7-9, U13-14, and U23-24 as instructed in step A.3 of CHANGE 2.

CHANGE 3

Page 6-3, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change A1 SERIES number to 1632.
Change A1T1 to 9100-3024; TRANSFORMER-PWR.
Page 8-5, Figure 8-3. 59307A Schematic Diagram:
Change SERIES number at the top of the A1 schematic to 1632.
Change the wire colors of A1T1 secondary:
BLK to WHT/BLK
BLK/YEL to WHT/BLK/YEL
BLK/GRN to WHT/BLK/GRN
BLK/RED to WHT/BLK/RED

CHANGE 4

Page 6-3, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change A1 SERIES number to 1604.
Change A1C4 to 0160-2150; CAPACITOR-FXD 33PF ±5% 300WVDC.
Change A1C5 to 0140-0191; CAPACITOR-FXD 56PF ±5% 300WVDC.
Delete A1C13 (0140-0192).
Change A1R6 to 0683-3915; RESISTOR-FXD 390 OHM 5% .25W CC.
Delete A1R16 (0683-1215).
Change A1U11 to 1820-0596; IC:DGTL:TTL LP DUAL D (DM74L74N)
Page 8-5. Figure 8-3. 59307A Schematic Diagram:
Change the SERIES number at the top of the A1 schematic to 1604.
Change A1C4 to 33PF.
Change A1C5 to 56PF.
Delete A1C13 and A1R16 from U13B, pin 4.
Change A1R6 to 390 ohms.
In the REFERENCE DESIGNATIONS table, change:
A1 capacitor listing to C1-12
A1 resistor listing to R1-15.
In the ACTIVE ELEMENTS table, change A1U11 to 1820-0596; DM74L74N.

CHANGE 5

Page 1-2, Table 1-1. Equipment Supplied:
Add "HP Interface Bus Interconnect Cable"; "10631A".

CHANGE 6

Page 6-5, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Under "CHASSIS AND MISCELLANEOUS PARTS", change 0380-0644 to 0380-0513; SPACER/STANDOFF.

CHANGE 7

Page 6-5, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change A2 SERIES number to 1332.
Change A2S2 (3101-1973) to 3101-1826; SWITCH ASSY: ROCKER DIP 7 SPST.
Add to "CHASSIS AND MISCELLANEOUS PARTS":
3101-0558; COVER: DIP SWITCH 7-POSITION ROCKER.
Page 8-5, Figure 8-3. 59307A Schematic Diagram:
Change SERIES number at the top of the A2 schematic to 1332.

CHANGE 8

Page 6-3, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change A1 SERIES number to 1316.
Delete A1C9, A1C10,A1C11,and A1C12 (0160-3879).
Page 8-5, Figure 8-3. 59307A SCHEMATIC DIAGRAM:
Change SERIES number at the top of the A1 schematic to 1316.
Delete A1C9, A1C10, A1C11, and A1C12 from the schematic.
In the REFERENCE DESIGNATIONS table, change the A1 capacitor listing to C1-8.

CHANGE 9

Page 6-5, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change C1 (0160-4281) to C1A/B; 0160-0676; CAPACITOR-FXD DUAL .0018 UF 10% CERAMIC.
Delete C2 (0160-4281).
Page 8-5, Figure 8-3. 59307A SCHEMATIC DIAGRAM:
Change C1 to C1A, .0018 UF.
Change C2 to C1B, .0018 UF.
In the REFERENCE DESIGNATIONS table, change "NO PREFIX" listing from C1-2 to C1A/B.

CHANGE 10

Page 6-5, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change C1 (0160-4281) to C1; 0160-3333; CAPACITOR-FXD .005 UF 20% 250WVAC CER.
DELETE C2 (0160-4281).
Page 8-5, Figure 8-3. 59307A SCHEMATIC DIAGRAM:
Replace C1 and C2 with a single .005 UF capacitor (C1) connected between the two outer terminals of the AC power connector. Remove the common connection between C1, C2, and chassis ground.
In the REFERENCE DESIGNATIONS table, change "NO PREFIX" listing from C1-2 to C1.

CHANGE 11

Page 6-5, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Change C1 (0160-4281) to C1A/B; 0160-3043; CAPACITOR-FXD DUAL .005UF 300 WVDC.
Delete C2 (0160-4281).
Page 8-5, Figure 8-3. 59307A SCHEMATIC DIAGRAM:
Change C1 to C1A, .005 UF.
Change C2 to C1B, .005 UF.
In the REFERENCE DESIGNATIONS table, change "NO PREFIX" listing from C1-2 to C1A/B.

CHANGE 12

Page 6-5, Table 6-1. Replaceable Parts, 59307A VHF Switch:
Delete C1 and C2 (0160-4281).
Page 8-5, Figure 8-3. 59307A SCHEMATIC DIAGRAM:
Delete C1 and C2 (2200 PF) from schematic.
In the REFERENCE DESIGNATIONS table, delete the "NO PREFIX" listing for C1-2.

7-9. INSTRUMENT IMPROVEMENT MODIFICATIONS

7-10. Older versions of the 59307A have exhibited a tendency to drop out of REMOTE due to excessive noise. The following modifications are suggested to decrease the noise sensitivity of those versions.

Serial Number 1332A00180 and below:

Add a ground strap (HP P/N 59308-60007) connecting the front panel frame (HP P/N 5020-8813) to one of the mounting brackets (HP P/N 59307-00005). (Previously described in Service Note 59307A-1.)

Serial Number 1632A00571 and below:

Modify the A1 Control assembly by adding A1C16 and A1C13 as shown in the schematic diagram (Figure 8-3). A trace connecting U13 pin 4 to U23 pin 5 will have to be cut to install R16. C13 can be soldered directly across pins 5 and 7 of U23 on the noncomponent side of the circuit board. (Previously described in Service Note 59307A-2.)

Serial Prefixes 1644A and below:

1. ' Change the following parts to the new part numbers listed in Table 6-1:

A1U2-3	A1C4-5
A1U5	A1C13 (added in previous change listed above)
A1U7-9	
A1U13-14	
A1U23-24	

2. Series prefixed 1600A should already have a dual (.005 μF) capacitor installed across the ac input lines (shown as C1 and C2 on the existing schematic diagram in Figure 8-3). For other configurations, modify by mounting two capacitors (2200 pF, HP P/N 0160-4281) directly onto the input power receptacle as shown in the schematic diagram in Figure 8-3.

3. Add a 0.22 μF capacitor (HP P/N 0180-1736) to the input terminals of U26. The positive lead of this capacitor (A1C14) should be soldered to the input pin and the negative lead to the common pin. It is acceptable to solder the capacitor directly to the pins of U26.

4. Add a length of wire from pin 12 (currently unterminated) of the HP-IB connector (A1J1) to the solder lug on the rear panel in order to ground the HP-IB ground shield. The power line EARTH is already connected to this solder lug.

   (Previously described in Service Note 59307A-4.)

SECTION VIII

SCHEMATIC DIAGRAMS

8-1. INTRODUCTION

8-2. This section includes schematic diagram notes (Figure 8-1), digital bus connector pin designations, component location and schematic diagrams for the 59307A VHF Switch.

8-3. SCHEMATIC DIAGRAM NOTES, ASSEMBLY NUMBERS, AND REFERENCE DESIGNATORS

8-4. Figure 8-1 shows the symbols used on the schematic diagram. At the bottom of Figure 8-1, the system for reference designators, assemblies, and subassemblies are shown. On the schematic, a table of active elements is included which lists the HP part number and manufacturer's part number for IC's, diodes and transistors.

8-5. Reference Designations

8-6. Assemblies such as printed circuit boards are assigned numbers in sequence: A1, A2, etc. As shown in Figure 8-1, subassemblies within an assembly are given a subordinate A number. For example, rectifier subassembly A1 has the complete designator of A25A1. For individual components, the complete designator is determined by adding the assembly number and subassembly number, if any. For example, CR1 on the rectifier assembly is designated A25A1CR1. On the schematic, a table of reference designators is included, which lists the number of designations assigned.

8-7. Identification Markings on Printed-Circuit Boards

8-8. HP printed circuit boards (see Figure 8-1) have four identification numbers: an assembly part number, a series number, a revision letter, and a production code.

8-9. The assembly part number has 10 digits (such as 05340-60037) and is the primary identification. All assemblies with the same part number are interchangeable. When a production change is made on an assembly that makes it incompatible with previous assemblies, a change in part number is required. The series number (such as 1332A) is used to document minor electrical changes. As changes are made, the series number is incremented. When replacement boards are ordered, you may receive a replacement with a different series number. If there is a difference between the series number marked on the board and the schematic in this manual, a minor electrical difference exists. If the number on the printed-circuit board is lower than that on the schematic, refer to Section VII for backdating information. If it is higher, refer to the loose leaft manual change sheets for this manual. If the manual change sheets are missing, contact your local Hewlett-Packard Sales and Service Office. See the listing on the back cover of this manual.

8-10. Revision letters (A, B, etc.) denote changes in printed circuit layout. For example, if a capacitor type is changed (electrical value may remain the same) and requires different spacing for its leads, the printed circuit board layout is changed and the revision letter is incremented to the next letter. When a revision letter changes, the series number is also usually changed. The production code is the four digit, seven segment number used for production purposes.

8-11. COMPONENT LOCATORS

8-12. Component locators for each printed circuit assembly are located next to the schematic diagram.

SYMBOLS

FRONT PANEL

REAR PANEL

INTERIOR AND PC BOARDS

WIPER MOVES TOWARD "CW" WHEN CONTROL IS ROTATED CLOCKWISE

POWER LINE GROUND

CIRCUIT COMMON GROUND

FLOATING GROUND

CHASSIS GROUND

KNOB CONTROL

SCREWDRIVER ADJUST

MAIN SIGNAL PATH

FEEDBACK PATH

OR 8 TEST POINT

"AND" GATE

"OR" GATE

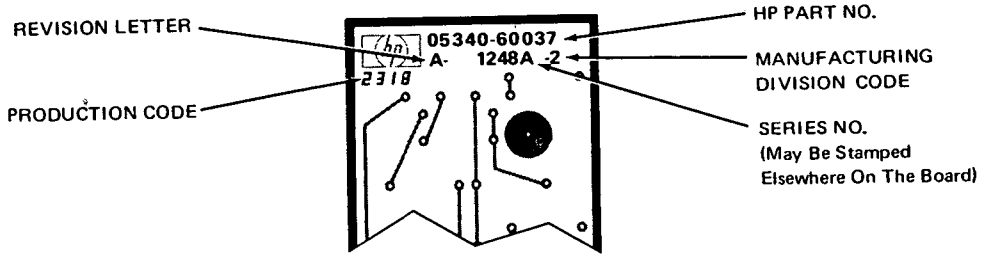
INVERTER

NAND GATE

NOR GATE

EXCLUSIVE NOR

PRINTED CIRCUIT BOARD IDENTIFICATION



REFERENCE DESIGNATIONS

REFERENCE DESIGNATIONS WITHIN ASSEMBLIES ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION. JACKS ARE THE STATIONARY CONNECTORS AND PLUGS ARE THE MORE MOVEABLE OF TWO CONNECTORS.

ASSEMBLY	ABBREVIATON	COMPLETE DESCRIPTION
A25	C1	A25C1
A25A1	CR1	A25A1CR1
NO PREFIX	J3	J3

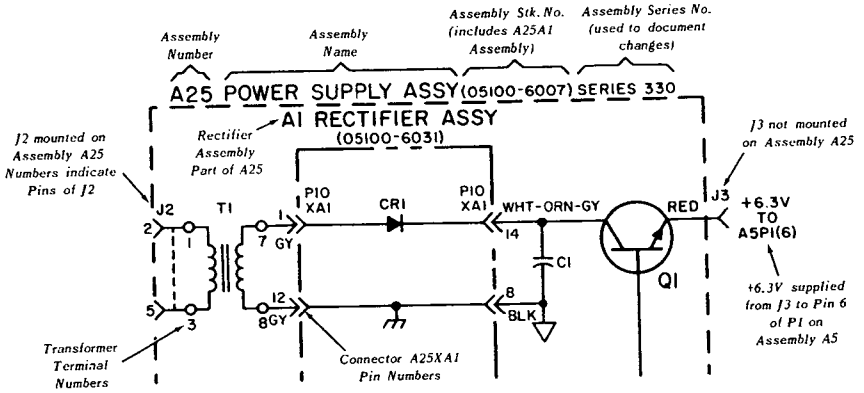
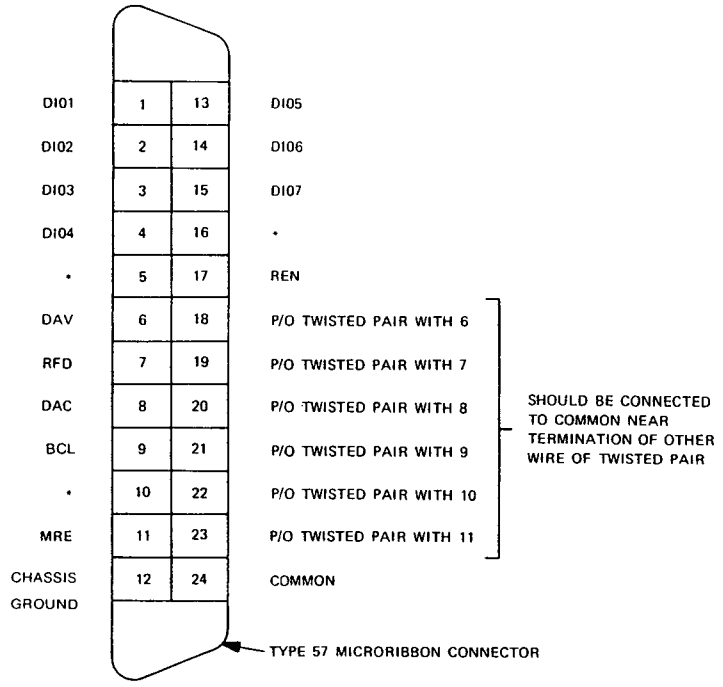


Figure 8-1. Schematic Diagram Notes



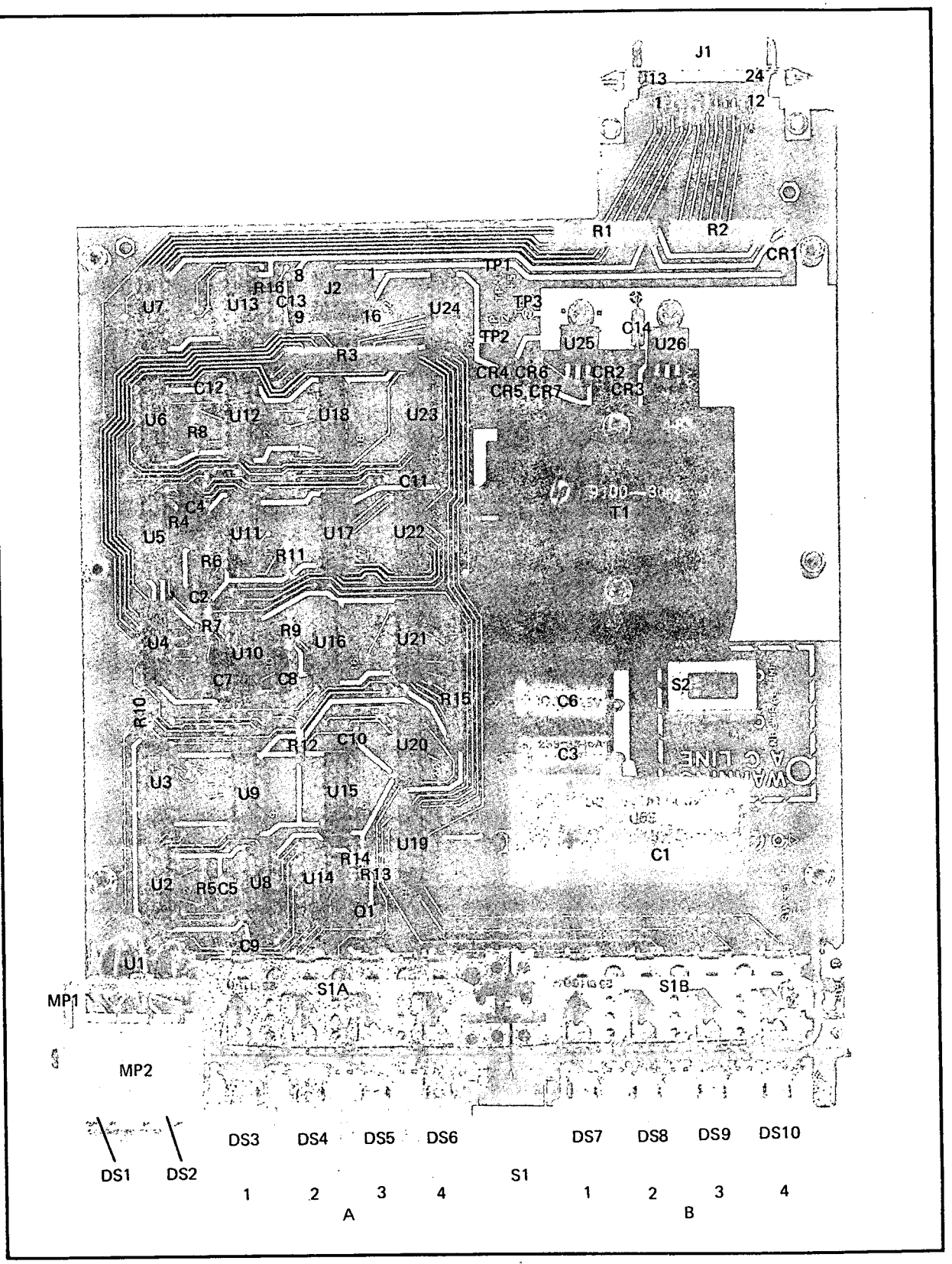
*THESE PINS ARE TERMINATED WITH RESISTIVE NETWORKS (SEE SCHEMATIC) AND NORMALLY FLOAT AT APPROXIMATELY 3V.

NOTE 1: PINS 18 THROUGH 23 SHOULD BE CONNECTED TO COMMON NEAR THE TERMINATION OF THE OTHER WIRE OF ITS TWISTED PAIR. PIN 12 IS CONNECTED TO COMMON ONLY AT THE CONTROLLER.

DIGITAL BUS PIN SUMMARY

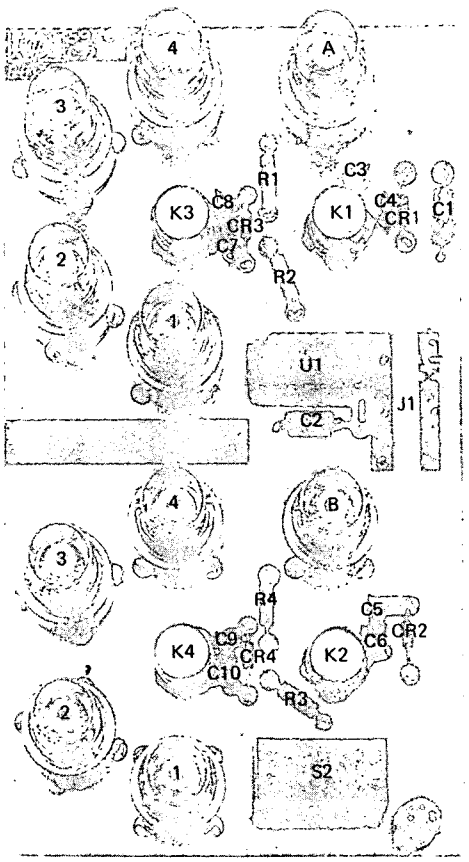
Digital Bus Connector Pin Number	Line Name	Use
1-4, 13-15	DIO1—7	Carries characters to 59307A for relay control or for processing as Bus commands.
16	DIO8	Not monitored or driven, terminated by resistive network.
6 7 8	DAV RFD DAC	These three lines make up the "handshake" system on the HP Interface Bus. DAV is monitored and RFD and DAC are driven by 59307 to control rate of data transferred on DIO lines.
9	BCL	Unconditionally clears Listen F/F, halting remote operation. Does not return control to front panel pushbuttons.
11	MRE	Indicates to 59307 whether character on DIO lines is Bus command or for relay control.
17	REN	When low is one of the conditions necessary to put 59307 in Remote operation. When High 59307 is in local control.
5	EOI	Not monitored or driven, terminated by resistive network.
10	SRQ	Not monitored or driven, terminated by resistive network.
12	Shield	Connected to chassis ground.
18-24	Grounds	Connected to circuit ground.

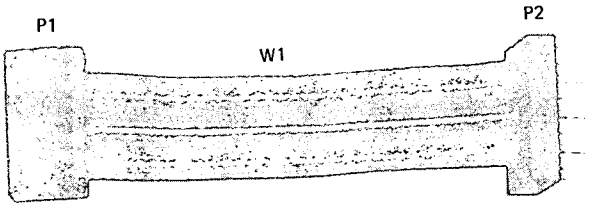
Figure 8-2. Digital Bus Connector Pin Designations



P/O Figure 8-3. 59307A Schematic Diagram (Component Locator)

A 2





Δ OR ⊡ IDENTIFIES:

PIN 1 OF DIP & FLAT-PACK IC's
TAB OF "TO" CASES
+ SIDE OF ELECTROLYTIC CAPACITORS
PIN 1 OF RESISTOR PACKS
CATHODE OF DIODES
SECTION 1 OF DIP SWITCHES

REFERENCE DESIGNATIONS

NO PREFIX	A1	A2
C1-2 F1 S1 W1	C1-14 CR1-7 DS1-10 J1, 2 Q1 R1-16 S1A, B, S2 T1 TP1-3 U1-26	C1-10 CR1-4 J1-12 K1-4 R1-4 S2 U1 NOT USED: S1

ACTIVE ELEMENTS

REFERENCE DESIGNATIONS	PART NUMBER
A1 ASSY	
U1	1820-0070 SN7430N
U2	1820-1197 SN74LS00N
U3, 13	1820-1416 SN74LS14N
U4	1820-0904 93L24DC
U5	1820-1415 SN74LS13N
U6, 15, 17, 21	1820-0054 SN7400N
U7	1820-1053 SN7414N
U8, 9	1820-1202 SN74LS10N
U10	1820-0515 9602DC
U11, 14	1820-1112 SN74LS74N
U12, 19, 20	1820-0621 SN7438N
U16, 18	1820-0077 SN7474N
U22	1820-0174 SN7404N
U23	1820-1204 SN74LS20N
U24	1820-1211 SN74LS86N
U25	1826-0099 7812UC
U26	1826-0122 7805UC
A2 ASSY	
U1	1820-0618 SN7417N

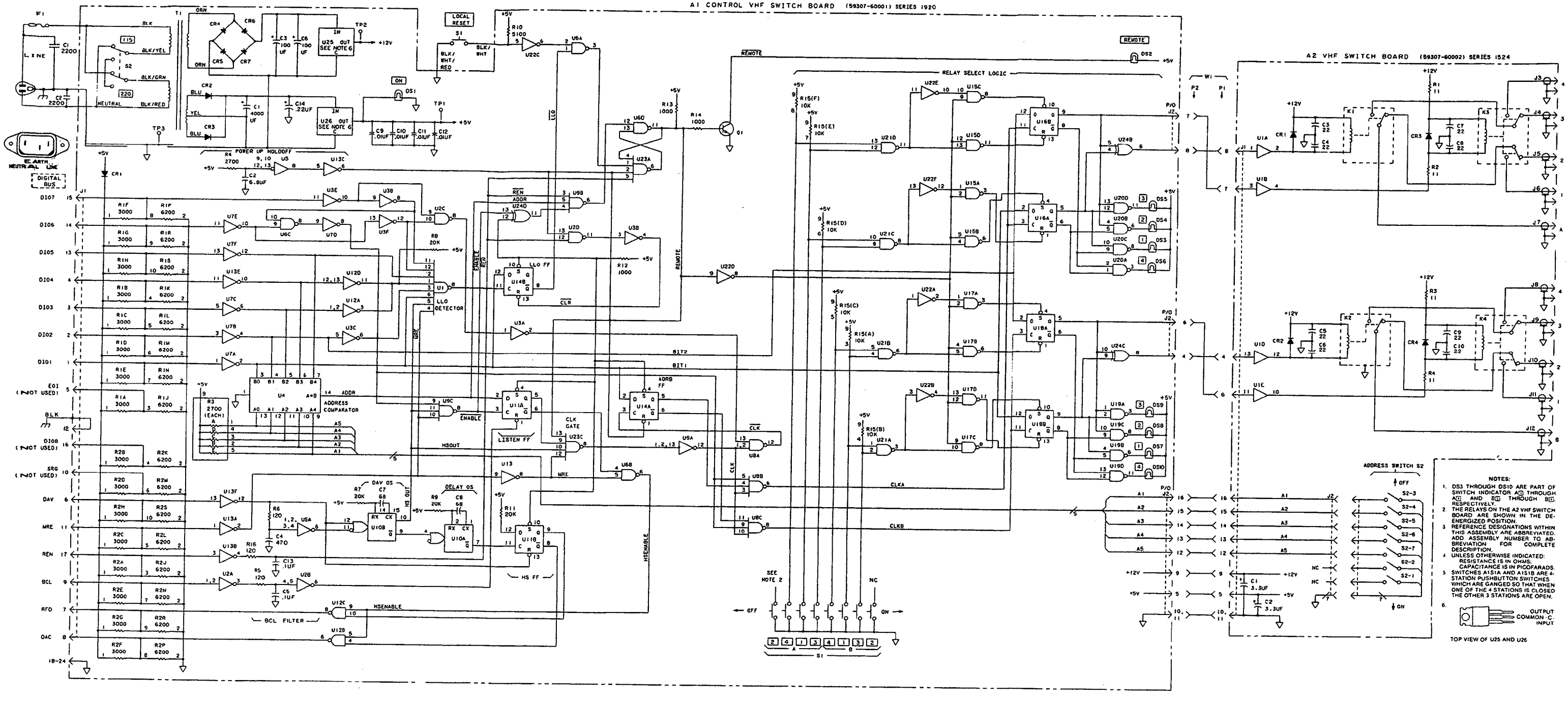


Figure 8-3
59307A SCHEMATIC DIAGRAM