HITACHI

MODELS VC-6023/6024
DIGITAL STORAGE OSCILLOSCOPES

SERVICE MANUAL

WARNING

TO AVOID ELECTRIC SHOCK , DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

IMPORTANT

READ RULE FOR SAFE INSTALLATION, OPERATION AND INSTRUCTION CAREFULLY.

RETAIN THIS MANUAL FOR FUTURE REFERENCE.

Hitachi Denshi,Ltd.

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READ THE IMPORTANT SAFETY-RELATED MARKINGS CAREFULLY BEFORE USE.

NOTE THE FOLLOWING SAFETY RELATED MARKINGS AND SYMBOLS.

(1) Terms

DANGER: Risk of hazard which causes serious injury to persons.

WARNING: Risk of hazard which may cause serious injury to persons.

CAUTION: Risk of hazard which may cause injury to persons, fire hazard or serious damage to the oscilloscope.

IMPORTANT: Important note not related to risk of hazard directly

NOTICE: Important note not related to risk of hazard, but observed for installation, operation, maintenance, etc.

(2) Symbols

! **DANGER** : DANGER

! **WARNING** : WARNING

! **CAUTION** : CAUTION

: PROTECTIVE GROUND TERMINAL

Note: The model and serial numbers of your OSCILLOSCOPE are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the rear of the oscilloscope. Please record these numbers in the spaces provided below, and **retain this manual for future reference.**

Model No _____ **Serial No.** _____

CONTENTS

IMPORTANT

SAFETY INSTRUCTIONS

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER.
NO USER - SERVICEABLE PARTS INSIDE.REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Explanation of Graphical Symbols

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the oscilloscope's enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the oscilloscope.

WARNING : TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS OSCILLOSCOPE TO RAIN OR MOISTURE.

IMPORTANT

SAFEGUARDS

Read Instructions

All the safety and operating instructions must be read before the oscilloscope is operated.

Retain Instructions

The safety and operating instructions must be retained for future reference.

Heed Warnings

All warnings on the oscilloscope and in the operating instructions must be adhered to.

Follow Instructions

All operating and use instructions must be followed.

Cleaning

Unplug this oscilloscope from the power source before cleaning.Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

! CAUTION

Attachments

Do not use attachments not recommended by the oscilloscope manufacturer as they may cause hazards.

! WARNING

Water and Moisture

Do not use this oscilloscope near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.

! WARNING

Accessories

Do not place this oscilloscope on an unstable cart, stand, tripod, bracket, or table. **The oscilloscope may fall, causing serious injury to a person, and serious damage to the oscilloscope.** Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the oscilloscope. Any mounting of the oscilloscope should follow the manufacturer's instructions, and must use a mounting accessory recommended by the manufacturer.

⚠CAUTION

Ventilation

Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the oscilloscope and to protect it from over-heating, and these openings must not be blocked or covered.

The openings must never be blocked by placing the oscilloscope on a bed, sofa, rug, or similar surface. This oscilloscope should never be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

Power Sources

This oscilloscope should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your oscilloscope dealer or local power company. The oscilloscopes are not intended to operate from battery power.

⚠WARNING

Plug

This item is applicable only to the oscilloscopes having the plug connected to the wall outlet.

Three-wire Grounding-Type Plug -This plug having a third (grounding) pin will only fit into a grounding-type power outlet. This is a safety feature.If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet.Do not defeat the safety purpose of the grounding-type plug.

Power-Cord Protection

Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying partic ular attention to cords at plugs, convenience receptacles, and the point where they exit from the oscilloscope.

Lightning

For added protection for this oscilloscope during a lightning storm, of when it is left unattended and unused for long periods of time, unplug it from the power source. This will prevent damage to the oscilloscope due to lightning and power-line surges.

⚠WARNING

Overloading

Do not overload power source and extension cords **as this can result in a risk of fire or electric shock.**

⚠WARNING

Object and Liquid Entry

Never push objects of any kind into this oscilloscope through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the oscilloscope.

⚠WARNING

Flammable and Explosive Substance

Avoid using this oscilloscope where there are gases, and also where there are flammable and explosive substances in the immediate vicinity.

Heavy Shock or Vibration

When carrying this oscilloscope around, do not subject the oscilloscope to heavy shock or vibration.

⚠WARNING

Servicing

Do not attempt to service this oscilloscope yourself as opening or removing covers may expose you to dangerous voltage or other hazards.Refer all servicing to qualified service personnel.

! WARNING

Damage Requiring Service

Unplug this oscilloscope from the power source and refer servicing to qualified service personnel under the following conditions:

a. When the power-supply cord or plug is damaged.
b. If liquid has been spilled, or objects have fallen into the oscilloscope.
c. If the oscilloscope has been exposed to rain or water.
d. If the oscilloscope does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qual ified technician to restore the oscilloscope to its normal operation.

⚠WARNING

Replacement Parts

When replacement parts ar required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. **Unauthorized substitutions may result in fire, electric shock or other hazards.**

Safety Check

Upon completion of any service or repairs to this oscilloscope, ask the service technician to perform safety checks to determine that the oscil loscope is in proper operating condition.

IMPORTANT

SAFETY OPERATIONS

Before operating the oscilloscope, be sure to check the following items.

⚠DANGER PROTECTIVE GROUND TERMINAL

Connection with the AC power source

Be sure to plug the power cord into an AC outlet provided with a protective ground terminal to avoid the risk of electric shock.

The oscilloscope is provided with the protective ground terminal and the three line power cord and plug to be connected to the AC power source.

The lead of the protective ground terminal is connected to the metallic part of the oscilloscope.

⚠WARNING

Replacement of fuse

Do not try to use any fuse other than the specified ones. Otherwise, further damage may occur and this could be dangerous.

Use only specified fuses. The oscilloscope is protected by the fuse on the primary side of the power supply. When this fuse blows, contact your nearest Hitachi Denshi representative.

(**IMPORTANT:** Use only the fuse of same size and rating as specified.)

Line voltage	Capacity	Diameter x Length	Type
100V AC 120V AC	2A	mm mm 5 .2 x 20 (0.2" x 0.8")	MQ4-2A UL.CSA 250V 2A
220V AC 240V AC	1A		MQ4-1A UL.CSA 250V 1A

⚠**DANGER**

Operation in gas

Do not use the oscilloscope in flammable gas or vapor to avoid possible explosion.

POWER switch

Before plugging in the AC cord, be sure to check that the POWER switch is set to OFF for protection of the oscilloscope.

⚠**WARNING**

Removal of the chassis cover

Do not remove the chassis cover to avoid the risk of electric shock since a high voltage presents inside the oscilloscope.

⚠**WARNING**

Line voltage

Ensure that the line selector switch on the rear panel is set for the correct range as below.

Line voltage selection	Voltage range(50/60Hz)
AC100V	AC90 – 110V
AC120V	AC108–132V
AC220V	AC198–242V
AC240V	AC216–264V

Use the oscilloscope within the specified line voltage.

If an abnormal operation occurs, turn off the power for a short time and check the line voltage. If the line voltage is the specified voltage, turn on the power back.

The oscilloscope operates normally with the above line voltage. If the line voltage is out of the above range (especially low voltage), the normal operation may not be restored even after the correct line voltage is applied.

IMPORTANT

WARNING MARKING

The caution label is printed on the rear of the oscilloscope. (Refer to Fig. A.)
The caution label is shown in Fig. B.
Observe the caution to assure proper handling.

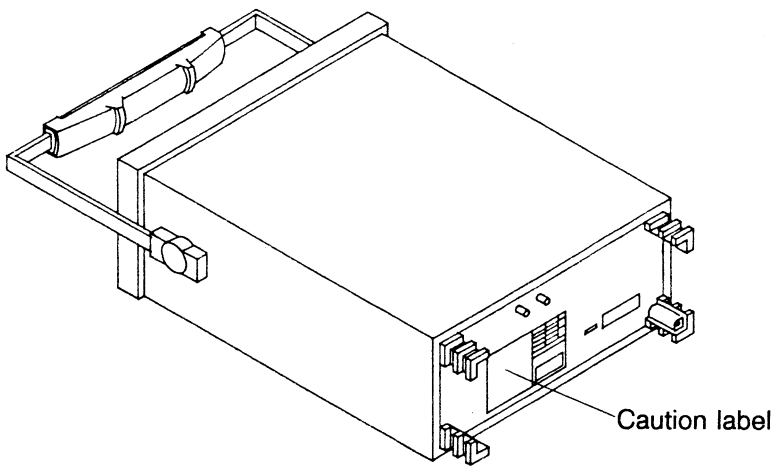


Fig. A

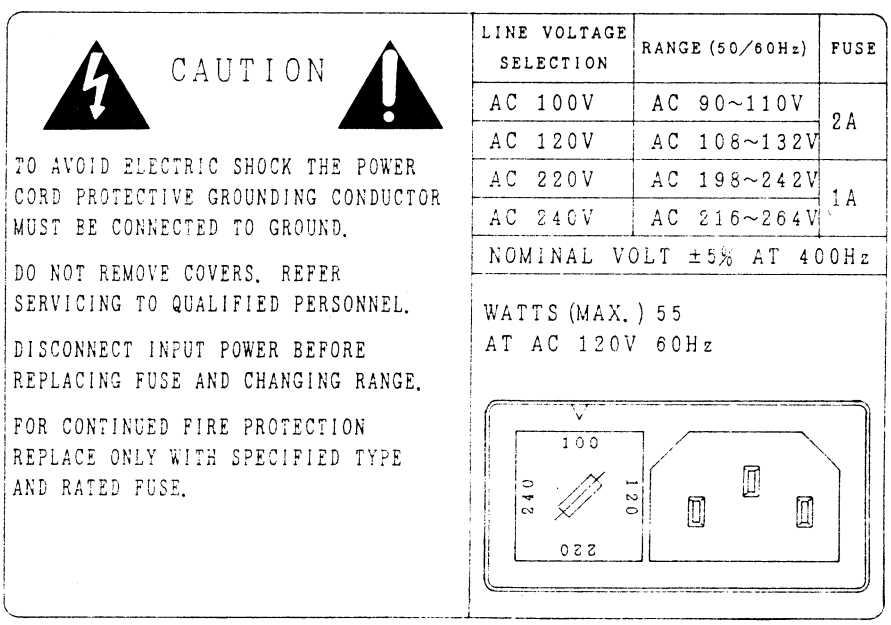


Fig. B

CONTENTS

1. SPECIFICATIONS

1.1 Functions and performance

The following specifications are applicable to the VC-6023 and the VC-6024 unless otherwise noted.

(1) Functions common to the real-time and storage modes (Items marked * are only for the real-time mode)

CRT

CRT	6", with internal graticule and % scale
Acceleration voltage	12kV approx. [2kV approx. for the VC-6023]
Effective range	8div x 10div (10mm/div)
Brightness adjustment	Provided
Focus adjustment	Provided (with focus correction circuit)
Trace rotation	Available

External intensity modulation

Voltage	Trace becomes dark with the positive signal of 5V or more.
Bandwidth	DC-2MHz
Input impedance	33kΩ(typ) [47kΩ(typ) for the VC-6023]
Withstand voltage	30V (DC +AC peak)

Vertical axis

Input sensitivity	X1 5mV/div to 5V/div (10 steps in 1-2-5 sequence) X5 1mV/div to 1V/div
Sensitivity error ratio	X1 ±3% X5 ±5%
Continuously variable sensitivity	Attenuated more than 2.5 times of the indicated value for each range (with lock)
Frequency bandwidth	X1 DC-50MHz (20MHz for the VC-6023) $^{+1}_{-3}$dB (at 6div as reference) X5 DC-7MHz $^{+1}_{-3}$dB (at 6div as reference)
Rise time	7ns approx. [17.5ns for the VC-6023] X5: 50ns approx.
Signal delay line	Leading edge is measurable. (VC-6024 only)
Input impedance	Direct 1MΩ approx,, 25pF approx.
Input withstand voltage	500Vp-p or 300V (DC+AC peak at 1kHz)
Input coupling	AC-GND-DC
Magnifying function	X5 available
Operation mode	CH1, CH2, ALT, CHOP (Switching frequency 250kHz approx.) ADD (DIFF mode can be established when CH2 is in INV mode.)
Dynamic range DC	More than 6div ±1 to ±100V (direct)
OFFSET function	Provided (not calibrated in V.UNCAL and V.MAG mode) [VC-6024 only]

Voltage read terminal	Voltage can be read by connecting a digital multimeter. (VC-6024 only)

X-Y Operation

X input	CH1
Y input	CH2
Sensitivity	Same as the vertical axis
X bandwidth	DC-500kHz
Phase error	Less than 3^{o} (DC-50kHz)

Horizontal axis

Sweep system	Trigger sweep, auto trigger sweep, TV-V, TV-H
Sweep time	0.2μs/div - 0.2s/div (19 steps in 1-2-5 sequence)
Maximum sweep time	20ns/div (at MAG X10) [10ns/div (20ns/div - 50ns/div is not calibrated) for the VC-6023.]
Fine adjustment of sweep time	More than 2.5 times (with lock)
* Sweep time error	±3%
* Sweep magnification	X10, error ±5%
* ALT MAG function	Provided (VC-6024 only)
* Position adjustment	Available

Triggering system

Trigger modes	AUTO, NORM, TV-V, TV-H
Trigger coupling	AC
Trigger source	INT (CH1, CH2, V-MODE), LINE, EXT
Trigger slope	±

Trigger sensitivity and frequency

	Frequency	Internal	External
VC-6024	20Hz-5MHz	0.5div (2.0div)	200mV
	5MHz-40MHz	1.5div (3.0div)	800mV
	40MHz-50MHz	2.0div (3.5div)	1V
VC-6023	20Hz-2MHz	0.5div (2.0div)	200mV
	2MHz-20MHz	1.5div (3.0div)	800mV

Note) ( ): V-MODE trigger mode

TV sync Internal	1div or more (vertical sync signal)
External	200mVp-p or more (vertical sync signal)
AUTO low band	25Hz
External trigger input	Provided
Impedance	1MΩ approx., 25pF approx.
Input withstand voltage	300V (DC+AC peak at 1kHz)

Readout function

<Panel setting display>

Vertical axis	V/DIV, UNCAL, MAG (converted value)
Sweep speed	S/DIV, UNCAL, MAG (converted value)

<Cursor readout function>

Voltage difference	
ΔV	Δ-REF
Time difference	
ΔT	Δ-REF
Frequency 1/ΔT	Δ-REF
Cursor measurement effective range	From center of CRT Vertical within ±3DIV Horizontal within ±4DIV

CH1 OUTPUT

Output voltage	20mV/DIV or more
Frequency response	50Hz to 5MHz (-3dB)
Output impedance	50 ohms approx.

Calibrator

Waveform	1kHz ±20%, square wave (duty 48:52 or more)
Voltage	0.5 V ±3%

(2) Digital storage functions

Waveform data storage

Memory capacity	
Display memory	1000 words/CH x2
Save memory	1000 words/CH x2
Acquisition memory	5μs/DIV to 20s/DIV --- 2000 words/CH x2 0.2μs/DIV to 2s/DIV --- 1000 words/CH x2
Vertical resolution	250 points/10 DIV
Horizontal resolution	100 points/DIV
Maximum sampling rate	20Msps (Alternate sample in 2-channel mode) Sampling rate depends on the time range.
Maximum storage frequency	
A single-shot signal (Maximum amplitude error: 30% or less)	5MHz (4 sample/cycle)
A repetitive signal	
VC-6023	20MHz (7MHz at Y axis x 5MAG)
VC-6024	50MHz (7MHz at Y axis x 5MAG)

Data acquisition

NORM storage mode	Updates data at each triggering.
AVG mode	Averages input signals by the selected number of average and displays the result after the averaging has reached the selected number. (Number of average: 4, 16, 64 and 256)
ROLL mode	Adds new data to the right of the CRT and shifts data from right to left continuously on the CRT.
HOLD mode	Holds the waveform displayed on the CRT.
SINGLE sweep	Performs an operation of the NORM storage, or AVG mode once at each

by receiving the Si command from the personal computer through the RS-232C interface and updates a picture.

Data save

Up to two waveforms can be saved. Two stored waveforms can be displayed with the two sampling waveforms.

Pretrigger

Variable (in 0.1 DIV steps)

Plotter output

Hard copy is available by the HP-GL through RS-232C.
6 colors are switchable.

External input/output

Provided with the RS-232C interface as standard.

Magnifying display

A storage waveform can be magnified up to 10 times in the horizontal direction.

X-Y operation

Single trace X-Y	X-axis=CH1, Y-axis=CH2
Dual trace X-Y	X-axis=CH1, Y-axis=CH2 X-axis=SA, Y-axis=SB
Sensitivity	X-axis: CH1 1mV to 5V/DIV ±5% Y-axis: CH2 1mV to 5V/DIV ±5%
Phase error	3^{o} or less from DC to 50kHz

Horizontal deflection system

Sweep time	0.2µs/DIV to 20s/DIV 0.2µs/DIV to 2µs/DIV is effective only for repetitive waveform. 0.5µs/DIV to 20s/DIV is only for roll mode. (0.2µs/DIV to 0.5ms/DIV: ALT sampling 1ms/DIV to 20s/DIV: CHOP sampling)

Readout function

<Panel setting display>

Vertical axis:	V/DIV, UNCAL, MAG and probe conversion of CH1 and CH2
Sweep speed:	S/DIV, UNCAL, MAG (converted value)
Others:	X-Y, TRIGGER POINT, No. of averaging, roll mode, smoothing, interpolation method, save memory information, probe setting

<Cursor readout>

Voltage difference ΔV : Δ-REF
Time difference ΔT : Δ-REF
Frequency 1/ΔT : Δ-REF

External output

RS-232C	Adaptable to HP-GL

1.2 Dimensions, environments, etc.

Power supply

Voltage	100/120/220/240V AC
Frequency	50/60/400Hz
Power consumption	50W approx.

Environment

Operating temperature	0 to 40°C
Operating humidity	35 to 85%
Specification guaranteed temperature	10 to 35°C
Specification guaranteed humidity	45 to 85%
Safe storage temperature	-20 to +70°C
Safe storage humidity	35 to 85% (70% or less in the ambient temperature of 50°C)

Construction

Dimensions	310(W) x 130(H) x 370(D)mm approx. (excluding projections)
Weight	8kg approx.

2. ACCCESSORIES

This instrument is shipped along with following accessories.

2 Probes (AT-10AK1.5)
1 AC Power Cord
1 Operation Manual

3. PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent instrument breakdown and may improve the relia- bility of the oscilloscope. The severity of environment to which this instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is just prior to the recalibration of the instrument.

Always disconnect the oscilloscope from the AC supply before performing preventive maintenance for any reason.

3.1 Disassembly

Remove all of the screws on the top cover of the instrument, then gently remove the top cover.

Take the same procedure for the bottom cover. Most of the internal parts of the instrument are now accessible.

(See section 11. Exploded view)

3.2 Cleaning

The instrument should be cleaned as often as the operating conditions require, since the accumulation of dirt in the instrument may cause the component breakdown.

The covers can provide protection against dust in the interior of the instrument. Loose dust accumulated on these covers can be removed with a soft cloth or small brush.

Dirt that remains can be removed with a soft cloth applying in a mild detergent and water solution. Abrasive cleaners should not be used. Cleaning the interior should be only occasionally necessary. The best way to clean the interior is to blow off the dust with a dray, low-velocity stream of air. A soft-bristle brush or a cotton-tipped applicator is useful for cleaning narrow spaces or for cleaning more delicate components.

3.3 Visual inspection

The instrument should be inspected occasionally for such defects as broken connections, improperly seated transistors, damaged circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is apparent; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of the overheating is important to prevent recurrence of the damage.

4. CALIBRATION

Hitachi Denshi, Ltd. provides complete instrument repair and recalibration at our office, and authorized dealer. Contact your local Hitachi Denshi sales office or representative.

4.1 Calibration interval

To maintain instrument accuracy, perform the calibration of the VC-6023/6024 at least every 1000 hours of operation or every six months if used infrequently.

4.2 Test equipment required

The following test equipment and accessories, or its equivalent, are required for the complete calibration of the VC-6023/6024. Specifications given for the test equipment are the minimum necessary for accurate calibration. Therefore, the specifications of any test equipment used must meet or exceed the listed specifications. All the test equipment is assumed to be correctly calibrated an operated within the listed specification. Operating instructions for the test equipment are not given in this procedure. Refer to the instruction manual for the test equipment if more information is needed.

Table 4-1
TEST EQUIPMENT AND ACCESSORIES REQUIRED

	Description	Specifications	Applications	Examples of Applicable Test Equipment
1	Constant Amplitude Signal Generator	Reference frequency: 50kHz, Maximum frequency: 150MHz, Amplitude: variable	Check horizontal, vertical and trigger bandwidths.	TEKTRONIX SG503
2	Standard Amplitude Calibrator	Amplitude accuracy: 0.25%, Variable amplitude: 5mV to 40V, Frequency: 1kHz square wave	Check horizontal and vertical gains.	TEKTRONIX PG506
3	Square-wave Generator	Variable freuqency: 10Hz to 1MHz, Output amplitude: 10mV to 100V	Check probe and vertical compensation.	TEKTRONIX PG506
4	Digital Multimeter	Accuracy: 0.1%	Check power supply.	TEKTRONIX DM501A
5	Digital Frequency Counter	Accuracy: 0.1%	Check CAL frequency.	
6	Time Mark Generator	Accuracy: 0.1%	Check sweep time.	TEKTRONIX TG501
7	Cable	Impedance: 50 ohms, Type: RG-58/U, Length: 42 inches, Connectors: BNC	This cable is used for almost all adjustment.	Hitachi Part No. 4202
8	Termination	Impedance: 50 ohms, Connectors: BNC Feed through	Check vertical amplifier compensation.	
9	Attenuator	Ratio: 10X, Connectors: BNC, Impedance: 50 ohms	Check vertical amplifier bandwidth.	
10	T-Connector	Connectors: BNC	Check X-Y operation.	Hitachi Part No.1301

4.3 Preliminary procedure

This instrument should be calibrated at an ambient temperature of +20°C (±5°C) for the best overall accuracy.

1. Check that the oscilloscope is not connected to AC line source.
2. Ensure that the line selector switch on the rear panel is set for the correct range.
3. Set the instrument controls as follows (Table 4-2), when starting the calibration procedures.

4.4 Initial starting procedure

1. Connect the oscilloscope to the AC line source.
2. Set the POWER switch to ON.
3. Wait a few seconds for the cathode ray tube (CRT) to warm up. A trace should appear on the CRT.
4. If trace disappears, increase (clockwise) the INTENsity control setting until the trace is easily observed, or roughly check/adjust the DC balance to get a trace as same as 13 .
5. Allow at least fifteen minutes of warm up before proceeding.
6. Adjust the FOCUS control for the best focused display.
7. Readjust the POSITION controls if necessary, to center the trace.

4.5 Calibration procedures

Refer to the adjustment locations in the pullout pages.

Table 4-2 PRELIMINARY CONTROL SETTINGS

Controls	Settings	Controls	Settings
POWER	OFF	PULLx10 MAG	Normal, Pushed in
INTENsity	Midrange	TIME/DIV	1ms
FOCUS	Midrange	SWP VAR	Fully clockwise
TRACE ROTATION	As desired	CH1 ALT MAG	Normal (Button Out)
- VERT -		- TRIG -	
V.POSITION	Midrange, pushed in	LEVEL	Midrange, Normal
V.VARIABLE	CAL, fully clockwise	SLOPE	+Normal
INPUT COUPLING	GND (AC-GND-DC)	MODE	AUTO
VOLTS/DIV	5mV/DIV	SOURCE	INT
V.MODE	CH1	INT TRIG	CH1
CH2 INV	Normal, Pushed in		
- HORZ -			
H.POSITION	Midrange		

Note: Set the CH1 ALT MAG switch of the VC-6024 to the normal state (button out).

POWER SUPPLY

Preset the controls as given in the preliminary control setting.

(1) Check low-voltage supply, if necessary.

PEF-621

a. Connect the digital voltmeter (DVM) between the +8V line (P1105-2) and ground.
: 7.7 to 8.3V

b. Connect the DVM between the -8V line (P1105-4) and ground.
: -8.3 to -7.7V

c. Connect the DVM between the +5V line (P1105-3) and ground.
: +4.8 to +5.2V

d. Connect the DVM between the +120V/+75V line (P1105-1) and ground.
VC-6023 : +110 to +130V
VC-6024 : +67.5 to +82.5V

PEF-761

e. Connect the DVM between the +5Vd (J1702) and the DG(J1702).
: +4.8 to +5.2V

f. Connect the DVM between the +12V (J1702) and the DG (J1702).
: +11.80 to +12.20V

g. Connect the DVM between the -12V (J1702) and the DG (J1702).
: -12.20 to -11.80V

(2) Check high voltage supply. (PEF-621)

a. Measure the voltage of the lead at the D1024 cathode side of NL1024 by the DVM, using the high voltage probe.
VC-6023 : -1995 to -1805V
VC-6024 : -1732 to -1568V

b. Measure the voltage of the anode cap by the DVM, using the high voltage probe. (VC-6024 only)
: +9 to +11kV

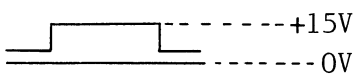
DISPLAY

Preset the controls as given in the preliminary control setting.

(3) Check/adjust CRT bias.

a. Set.
(Trigger) MODE : AUTO
V MODE : CH1
TIME/DIV : 1ms

b. Adjust INTEN RV1301 (PEF-625) so that the voltage at the D1022 anode side of R904 (PEF-621) is +15V.



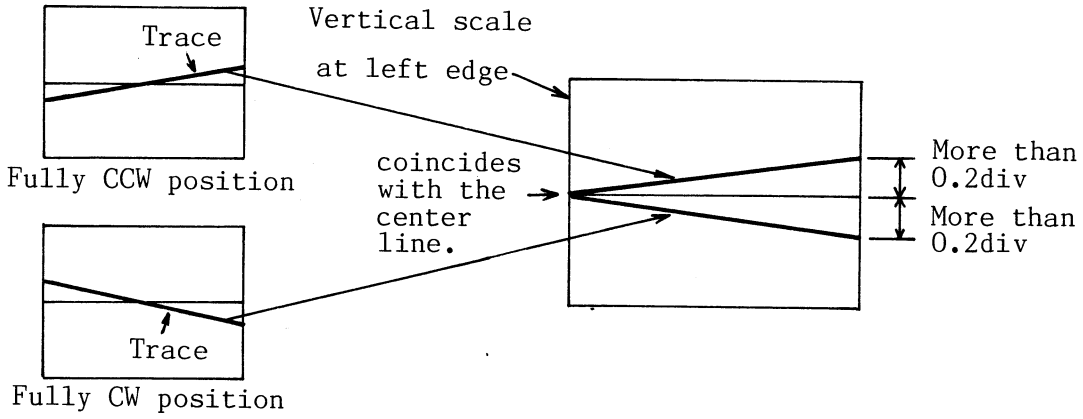
c. Adjust CRT BIAS RV1021 (PEF-621) to the position just before a trace starts to appear.

(4) Check/adjust trace rotation.

a. Set.
V MODE : CH1
TIME/DIV : 1ms

b. Adjust the CH1 V POS and H POS controls on the front panel so that the left edge of the trace coincides with that of the horizontal center line.

c. Adjust the TRACE ROTATION on the front panel so that the trace becomes horizontal.

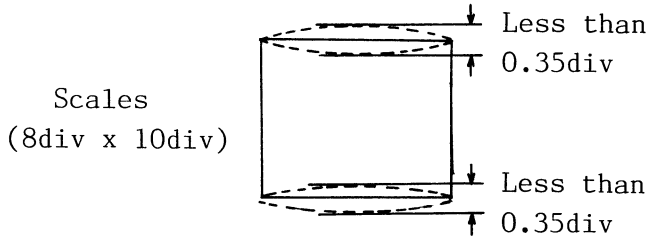


Note) Check that the distance between the horizontal center line and the trace is more than 0.2div at the right edge when the TRACE ROTATION control is turned fully cw or ccw.

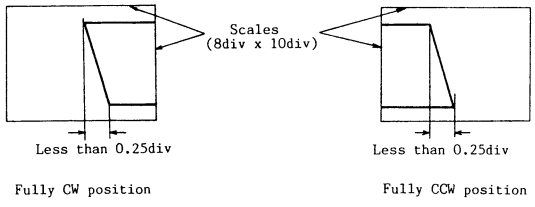
(5) Check/GEOMetry

a. Set.
(CH1)AC-GND-DC : DC
TIME/DIV : 0.1ms
CH1 input : Sine wave, 1MHz
Amplitude : 8div

b. Pattern distortion of horizontal axis
Check that the distortion is within ± 3.5div as illustrated.



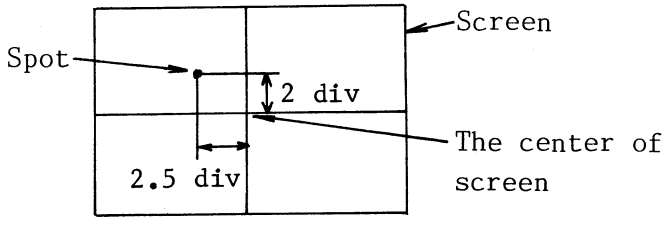
c. Pattern distortion of vertical axis
Check that the distortion is less than 0.25div as illustrated when the (H) POSIITION control is turned fully CW or CCW.



(6) Check/adjust ASTIGmatism and FOCUS.

a. Set
(CH1)AC-GND-DC : GND
(CH2)AC-GND-DC : GND
V.MODE : CH1
TIME/DIV : X-Y

b. Locate a spot as illustrated in the following figure.

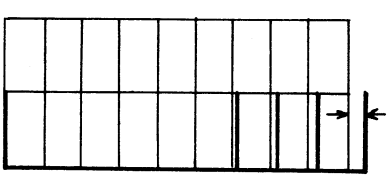


c. Adjust INTEN control RV1301 (Front Panel) just before halation starts to occur.
d. Rotate FOCUS control RV1401 (Front Panel) fully clock-wise.
e. Adjust ASTIG control RV1035 (PEF-621) so that the spot is a circle as true as possible.
f. Adjust FOCUS control RV1401 (Front Panel) to obtain the smallest spot.
g. Repeat e. and f. appropriately so that the spot is as true circle as possible and minimum.

HORIZONTAL

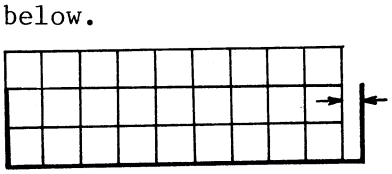
(7) H GAIN RV824 (PEF-621)

a. Set
(CH1)AC-GND-DC : DC
V MODE : CH1
TIME/DIV : 1ms
b. Connect a 1ms time marker.
c. Adjust H GAIN RV824 (PEF-621) so that the sweep accuracy becomes 0% as illustrated below.



(8) X10 MAG GAIN RV831 (PEF-621)

a. Set : Same as (7)
b. Connect a 1ms time marker.
c. Pull the inner shaft of the (H) POSITION control to establish the X10 MAG state.
d. Adjust X10 MAG GAIN RV831 (PEF-621) so that the MAG sweep accuracy is 0% as illustrated below.



Note) After completion of adjustment, push the inner shaft of the (H) POSITION control.

(9) MAG CENT RV821 (PEF-621)

a. Set : Same as (7)
b. Connect a 1ms time marker.
c. Pull the inner shaft of the (H) POSITION control to establish the X10 MAG state, and adjust so that the left side of trace coincides with the vertical scale line at the center.
d. Push the inner shaft of the (H) POSITION control.
e. Adjust MAG CENT RV821(PEF-621) so that the left end of trace coincides with the vertical scale line at the center.

(10) Low speed sweep accuracy 10ms/div RV542 (PEF-621)

a. Set:
TIME/DIV : 10ms
Others : Same as (7)
b. Connect a 10ms time marker.
c. Like (7), adjust 10ms/div RV542 (PEF-621) so that error becomes zero.

(11) High speed sweep error ratio CV520 (PEF-621)

a. Set:
TIME/DIV : 2μs
Others : Same as (7)
b. Connect a 2μs time marker.
c. Like (7), adjust CV520 (PEF-621) so that a sweep error becomes zero.

(12) High speed sweep error in the X10 MAG mode CV840 (PEF-621)

a. Set:
Same as (11)
b. Connect a 2μs time marker.

c. Same as (8) c.
d. Like (8) d, adjust CV840 (PEF-621) so that a sweep error becomes zero.

VERTICAL

(13) CH1 DC BAL RV22 (PEF-620)

a. Set:
(CH1) AC-GND-DC : GND
(CH1) VOLTS/DIV : 5mV
V MODE : CH1
TIME/DIV : 1ms

b. Adjust CH1 DC BAL RV22 (PEF-620) so that the shift of trace is within ±0.05div when the (CH1) VOLTS/DIV switch is switched from 5mV to 10mV.

(14) CH2 DC BAL RV122 (PEF-620)

a. Set:
(CH2) AC-GND-DC : GND
(CH2) VOLTS/DIV : 5mV
V MODE : CH2
TIME/DIV : 1ms

b. Adjust CH2 DC BAL RV122 (PEF-620) so that the shift of trace is whithin ±0.05div when the (CH2) VOLTS/DIV switch is switched from 5mV to 10mV.

(15) ADD BAL RV339 (PEF-620)

a. Set:
(CH1) AC-GND-DC : GND
(CH2) AC-GND-DC : GND
V MODE : ALT or CHOP

b. Adjust the (V) POSITION control of each channel so that the traces of CH1 and CH2 coincide with the horizontal scale at the center.

c. Adjust ADD BAL RV339 (PEF-620) so that the shift of trace is less than 0.2div when the V MODE switch is switched to ADD.

(16) CH1 POS CENT RV63 (PEF-620)
VC-6023

a. Set:
(CH1 V) POSITION : Midrange
V MODE : CH1
(CH1) AC-GND-DC : GND

b. Adjust the CH1 POS CENT control (PEF-620) so that the trace coincides with the horizontal scale at the center.

VC-6024

a. Set:
(CH1 V) POSITION : Button out (PULL DC OFFSET)
V MODE : CH1
(CH1) AC-GND-DC : GND

b. Connect a DVM to the DC OFFSET VOLT OUT connector on the front panel, and adjust the (CH1 V) POSITION control so that the voltage becomes zero volts.

c. In this state, adjust CH1 POS CENT RV63 (PEF-620) so that the trace coincides with the horizontal scale at the center.

(17) CH2 POS CENT RV163 (PEF-620)

a. Set:
(CH2 V) POSITION : Midrange
V MODE : CH2
(CH2) AC-GND-DC : GND

b. Adjust CH2 POS CENT RV163 (PEF-620) so that the trace coincides with the horizontal scale at the center.

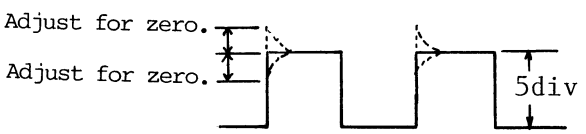
(18) (CH1) AC GAIN RV33 (PEF-620)

a. Set:
V MODE : CH1
(CH1) AC-GND-DC : DC
(Trigger) SOURCE : INT
INT TRIG : CH1
(CH1) VOLTS/DIV : 10mV
TIME/DIV : 1ms

b. Place the Tektronix PG506 Pulse Generator in the FAST RISE mode, and connect a 1kHz (1ms) square wave to CH1.

c. Adjust the PG506 so that the display amplitude on the CRT becomes 5div.

d. Adjust (CH1) AC GAIN RV33 (PEF-620) so that a sag becomes zero.



(19) (CH2 AC GAIN) RV133 (PEF-620)

a. Set:

V MODE	: CH2
(CH2) AC-GND-DC	: DC
(Trigger) SOURCE	: INT
INT TRIG	: CH2
(CH2) VOLTS/DIV	: 10mV
TIME/DIV	: 1ms

b. Connect the same square wave as (7) b. to CH2.

c. Same as (7) c.

d. Adjust (CH2 AC GAIN) RV133 (PEF-620) so that a sag becomes zero.

(20) CH1 GAIN RV62 (PEF-620)

a. Set:

V MODE	: CH1
(CH1) AC-GND-DC	: DC
(Trigger) SOURCE	: INT
INT TRIG	: CH1
(CH1) VOLTS/DIV	: 10mV
TIME/DIV	: 1ms

b. Place the PG506 in the STANDARD mode, and connect a 1kHz (1ms) calibration square wave of 50mVp-p to CH1.

c. Adjust CH1 GAIN RV62 (PEF-620) so that the amplitude at the center of the CRT becomes 5div.

(21) CH2 GAIN RV162 (PEF-620)

a. Set:

V MODE	: CH2
(CH2) AC-GND-DC	: DC
(Trigger) SOURCE	: INT
INT TRIG	: CH2
(CH2) VOLTS/DIV	: 10mV/DIV
TIME/DIV	: 1ms

b. Connect the same square wave as (20) b. to CH2

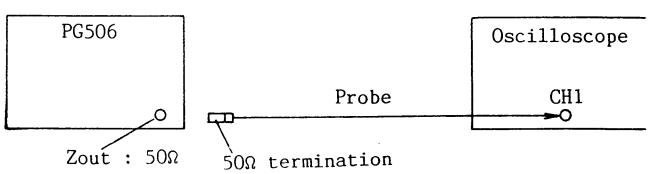
C. Adjust CH2 GAIN RV162 (PEF-620) so that the amplitude at the center of the CRT becomes 5div.

(22) Check of probe combination characteristics

a. Set:

Probe	: AT-10AP1.5
V MODE	: CH1
(CH1) AC-GND-DC	: DC
(Trigger) SOURCE	: INT
INT TRIG	: CH1
(CH1) VOLTS/DIV	: 50mV
TIME/DIV	: 1ms

b. Connect as follows.



c. Place the PG506 in the HIGH AMPL mode, and set to 1kHz (1ms) and 5div.

d. Connect the square wave output of the PG506 to CH1.

e. Correct the probe by the trimmer capacitor provided for the probe.

f. Change the setting of the PG506 from 1kHz to 100Hz.

g. Check that the sag of the 100Hz square wave is within ±1.5%.

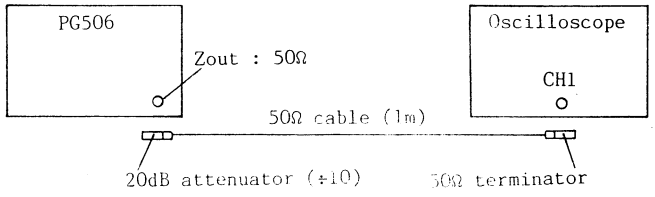
h. Similarly check CH2.

(23) Square wave characteristics adjustment CV161, CV337, CV355, CV366 (PEF-620)

a. Set:

V MODE : CH1
(CH1) AC-GND-DC : DC
(Trigger) SOURCE : INT
INT TRIG : CH1
(CH1) VOLTS/DIV : 5mV

b. Connect as follows.



c. Set the PG506 to FAST RISE, 1MHz (1μs) and 5div.

d. Allow the square wave output of the PG506 to appear at the center of the CRT.

(1) VC-6023

d1. Set the TIME/DIV switch to 2μs.

e1. Adjust CV366 (PEF-620) so that the middle-pass section becomes flat.

f1. Set the TIME/DIV switch to 1μs.

g1. Adjust CV337 (PEF-620) so that the overshoot at the high-pass section becomes +0.2div. (+4%)

h1. Set the TIME/DIV switch to 0.5μs.

i1. Set:

V MODE : CH2
(CH2) AC-GND-DC : DC
INT TRIG : CH2
(CH2) VOLTS/DIV : 5mV

j1. Connect the output of the PG506 to CH2.

k1. Like CH1, adjust CV161 (PEF-620) so that the overshoot at the high-pass section of CH2 becomes +0.2div.

(2) VC-6024

d2. Set the TIME/DIV switch to 2μs.

e2. Adjust CV355 (PEF-620) and CV366 (PEF-620) so that the middle-and high-pass-sections become flat.

f2. Set the TIME/DIV switch to 1μs.

g2. Adjust CV337 (PEF-620) so that the overshoot at the high-pass section becomes +0.2div (+4%).

h2. Set the TIME/DIV switch to 0.5μs.

i2. Same as (1) i1.

j2. Same as (1) j1.

K2. Same as (1) k1.

(24) ATTN adjustment CV4, CV7, CV104, CV107 (PEF-620)

a. Set:

V MODE : CH1 or CH2 (See table below.)
(CH1) AC-GND-DC : DC
(CH2) AC-GNE-DC : DC
(Trigger) SOURCE: INT
INT TRIG : CH1 or CH2 (See table below.)
(CH1) VOLTS/DIV : See table below.
(CH2) VOLTS/DIV : See table below.
TIME/DIV : 1ms
PG506 : FAST RISE or HIGH AMPL mode (See table below.)

PG506 mode	Attenuation ratio of CH1 or CH2	VOLTS/DIV of CH1 or CH2	CH1			CH2		
			V MODE	INT TRIG	Adjustment	V MODE	INT TRIG	Adjustment
FAST RISE	÷10	0.1V	CH1	CH1	CV4	CH2	CH2	CV104
HIGH AMPL	÷100	1V			CV7			CV107

b. Set the PG506 to 1kHz, and 5div.
c. Adjust each control so that the sag becomes zero, if possible.
d. Check that the sag is within ±5% at X5 MAG (CH1 and CH2).

(25) Input capacitance adjustment
CV3, CV6, CV103, CV106 (PEF-620)
Adjust the trimmer capacitors listed below under the settings listed below so that the input capacitance for ÷10 and ÷100 is the same as that for ÷1. (Use LC meter.)

Attenuation ratio	VOLTS/DIV	Trimmer capacitor	
		CH1	CH2
÷1	5mV	———	———
÷10	0.1V	CV3	CV103
÷100	1V	CV6	CV106

X - Y

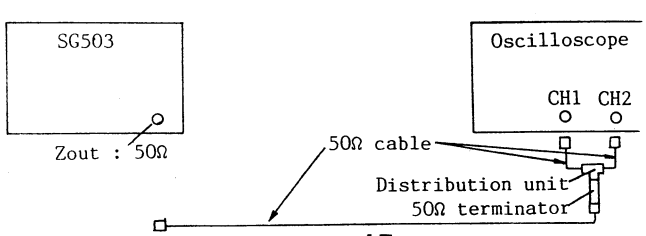
(26) X GAIN RV550 (PEF-621)
a. Set:
V MODE : Anywhere
(Trigger) : As is
(CH1) AC-GND-DC : AC
(CH1) VOLTS/DIV : 10mV
TIME/DIV : X-Y
b. Set the PG506 to STD AMPL, 1kHz and 50mV, and connect the signal to CH1.
c. Adjust X GAIN RV550 (PEF-621) so that the amplitude on the CRT becomes 5div.

(27) X CENT RV85 (PEF-620)
a. Set:
V MODE : Anywhere
(CH1) AC-GND-DC : GND
TIME/DIV : X-Y
(H) POSITION : Midrange
b. Adjust RV85 (PEF-620) so that the horizontal position of the spot is within ±0div with respect to the vertical scale at the center.

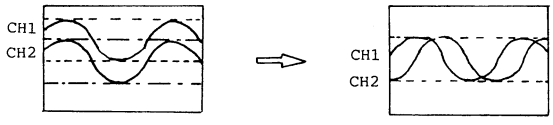
TRIGGER

(28) TRIG LEVEL CENT RV420 (PEF-621)
a. Set:
V MODE : CH1
(CH1) AC-GND-DC : AC
(Trigger) SOURCE: INT
INT TRIG : CH1
(CH1) VOLTS/DIV : 50mV
TIME/DIV : 10µs
(Trigger) SLOPE : (-)
(Trigger) LEVEL : Midrange
b. Set the Tektronix SG503 Leveled Sine Wave Generator to 50kHz and 5div.
c. Connect the sine wave output of the SG503 to CH1.
d. Adjust TRIG CENT RV420 (PEF-621) so that the waveform on the CRT is triggered.
e. Set (Trigger) SLOPE from - to +, and check that the trigger is applied.

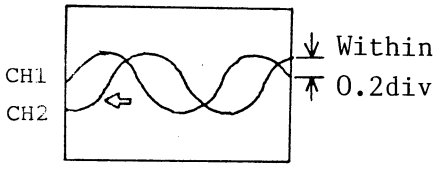
(29) (CH2 TRIG BAL) RV185 (PEF-620)
a. Set:
V MODE : ALT
(CH1) AC-GND-DC : AC
(CH2) AC-GND-DC : AC
(Trigger) SOURCE: INT
INT TRIG : VERT
(CH1) VOLTS/DIV : 5mV
(CH2) VOLTS/DIV : 5mV
TIME/DIV : 10µs
b. Connect as follows.



c. Set the SG503 to 50kHz and 5div.
d. Connect the sine wave output of the SG503 to CH1 and CH2 according to the connection diagram (b).
e. Adjust the (CH1) POSITION control so that the CH1 waveform is dis-played at the center of the CRT.
f. Adjust the (CH2) POSITION control so that the vertical position of the CH2 waveform coincides with that of the CH1 waveform.



g. Adjust CH2 TRIG BAL RV185 (PEF-620) so that the displacement between CH1 and CH2 waveforms becomes less than 0.2div as shown below.



CALIBRATION

(30) Check of CAL frequency
a. Set:
V MODE : CH1
(CH1) AC-GND-DC : DC
(Trigger) SOURCE: INT
INT TRIG : CH1
(CH1) VOLTS/DIV : 10mV
TIME/DIV : 1ms
b. Check that the output signal at the CAL 0.5 terminal on the front panel is a square wave of 1kHz approx.

(31) CAL ADJ RV1201 (PEF-620)
a. Set:
Same as (30) a.
b. Short pins (1) and (2) of connector P1206 (PEF-620). Then, the oscillation stops and the measurement of DC voltage becomes possible.
c. Measure the voltage at the CAL 0.5V terminal by DVM, and adjust CAL ADJ RV1201 (PEF-620) so that the voltage becomes 0.5V.

STORAGE

(32) (Storage) V CENT RV5501 (PEF-886)
a. Set:
STORAGE : On (The STORAGE switch LED at the lower left of front panel lights.)
SELECTOR: Select ΔV cursor. (The MEASURE LED lights and two ΔV cursors appear.)
b. Adjust V CENT RV5501 (PEF-880) so that the positions of the two cursors are symmetrical with respect to the horizontal center of the CRT.

(33) (Storage) V GAIN RV5502 (DEF-880)
a. Set:
Same as (32) a.
b. Adjust V GAIN RV5502 (PEF-880) so that the distance between the cursors becomes 6 div.
c. Perform the adjustment (32) b. again.

(34) (Storage) H CENT RV5503 (PEF-880)
a. Set:
STORAGE : On
SELECTOR: Select ΔT cursor (The MEASURE LED lights and two ΔT cursors appear.)

b. Adjust H CENT RV5503 (PEF-880) so that the positions of the two cursors are symmetrical with respect to the vertical center of the CRT.

(35) (Storage) H GAIN RV5504 (PEF-880)

a. Set:
Same as (34) a.

b. Adjust H GAIN RV5504 (PEF-880) so that the distance between the two cursors becomes 8 div.

c. Perform the adjustment (34) b. again.

(36) (RTO CURSOR OFFSET when the V MODE switch is set to the mode other than ADD) RV2001 (PEF-916)

a. Set:
V MODE : CH1
STORAGE : Off (RTO mode)
SELECTOR : Select ΔV cursor. (See (32) a.)

b. Adjust RV2001 (PEF-916) so that the cursor positions in the RTO mode coincide with those in the DSO mode.

c. Switch between DSO and RTO, and check that the cursor positions coincide.

(37) (RTO ADD CURSOR OFFSET) RV2002 (PEF-916)

a. Set:
V MODE : ADD
Others : Same as (36) a.

b. Adjust RV2002 (PEF-916) so that the cursor positions in the RTO mode coincide with those in the DSO mode.

c. Same as (36) c.

[A/D]

(38) S/H ADJ RV8060 (PEF-880)

a. Set:
V MODE : CH1
(CH1) AC-GND-DC: GND
STORAGE : Off (The STORAGE switch LED at the lower left of the front panel goes off, and the RTO mode is established.)

b. Adjust the (CH1V) POSITION control so that the trace coincides with the center scale of the CRT. After this adjustment, do not adjust the control.

c. Set the STORAGE switch to on (LED lights) to establish the DSO mode.

d. Connect a DVM between DC LEVEL 1 and 2 on PEF-883 through the two guide holes silk-screened "DC LEVEL 1" and "DC LEVEL 2" on PEF-880.

e. Adjust S/H ADJ RV8060 (PEF-880) so that the voltage difference between the two points is within ±10mV.

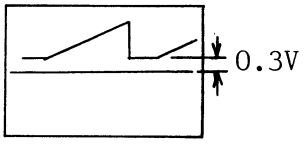
(39) EQS CENT RV5301 (PEF-880)

a. Set:
Storage : On (DSO mode)
V MODE : CH1
(CH1) AC-GND-DC : GND
(Trigger) SOURCE: INT
INT MODE : CH1
(Trigger) MODE : AUTO
TIME/DIV : 0.2 μs

b. Adjust the (Trigger) LEVEL control so that the waveform is not triggered.

c. Measure the R5310 side of R5313 (PEF-880) by another oscilloscope.

d. Adjust EQS CENT RV5301 (PEF-880) so that the equivalent sample start voltage becomes 0.3V.



(40) EQS GAIN RV5302 (PEF-880)

a. Set:
(CH1) AC-GND-DC : DC
Others : Same as (39) a.

b. Connect a 0.2μs marker signal to CH1, and apply trigger by the (Trigger) LEVEL control.

c. Adjust EQS GAIN RV5302 (PEF-880) so that the distance between markers becomes 1div.

(41) AD1 GAIN RV5201 (PEF-880)

a. Set:
V MODE : CH1
(CH1) AC-GND-DC : DC
(Trigger) SOURCE: INT
INT MODE : CH1
(CH1) VOLTS/DIV : 10mV
TIME/DIV : 1ms

b. Set the STORAGE switch to off to establish the RTO mode.

c. Set the PG506 to the STD AMPL mode and 50mV.

d. Connect the 1kHz square wave output of the PG506 to CH1, and check that the amplitude is 5div.

e. Set the STORAGE switch to on to establish the DSO mode.

f. Adjust AD1 GAIN RV5202 (PEF-880) so that the amplitude on the CRT is 5div.

(42) AD1 NORM OFFSET RV5202 (PEF-880)

a. Set:
(CH1) AC-GND-DC : GND
(Trigger) MODE : AUTO
Others : Same as (41) a.

b. Set the STORAGE switch to off to establish the RTO mode.

c. Adjust the (CH1 V) POSITION control so that the trace is at the center of the CRT.

d. Set the STORAGE switch to on to establish the DSO mode.

e. Adjust AD1 NORM OFFSET RV5202 (PEF-880) so that the trace is at the center of the CRT.

(43) AD2 GAIN RV5251 (PEF-880)

a. Set:
V MODE : ALT or CHOP
(CH1) AC-GND-DC : GND
(CH2) AC-GND-DC : DC
(Trigger) SOURCE: INT
INT MODE : CH2
(CH2) VOLTS/DIV : 10mV
TIME/DIV : 1ms

b. Set the STORAGE switch to off to establish the RTO mode.

c. Set the PG506 to the STD AMPL mode and 50mV.

d. Connect the 1kHz square wave output of the PG506 to CH2 and check that the amplitude on the CRT is 5div.

e. Set the STORAGE switch to on to establish the DSO mode.

f. Adjust AD2 GAIN RV5251 (PEF-880) so that the amplitude on the CRT becomes 5div.

(44) AD2 OFFSET RV5252 (PEF-880)

a. Set:
(CH2) AC-GND-DC : GND
(Trigger) MODE : AUTO
Others : Same as (43) a.

b. Set the STORAGE switch to off to establish the RTO mode.

c. Adjust the (CH2 V) POSITION control so that the trace is at the center of the CRT.

d. Set the STORAGE switch to on to establish the DSO mode.

e. Adjust AD2 OFFSET RV5252 (PEF-880) so that the trace is at the center of the CRT.

(45) AD1 EQ OFFSET RV5203 (PEF-880)
Both channels are the same. The adjustment of CH1 is described below.

a. Set:
   STORAGE : On (DSO mode)
   V MODE : Anywhere
   (CH1) AC-GND-DC : GND
   (Trigger) SOURCE: INT
   INT MODE : Anywhere
   (Trigger) MODE : AUTO
   TIME/DIV : 2µs

b. Adjust AD1 EQ OFFSET RV5203 (PEF-880) so that the trace is at the center of the CRT.

5. CIRCUIT DESCRIPTION

5.1 General

Fig. 5-9 is the BLOCK DIAGRAM (1/2) of this circuit, and Fig. 5-10 is the BLOCK DIAGRAM (2/2). Refer to these block diagrams.

The symbol ◇n◇ in the BLOCK DIAGRAM indicates the number of a schematic diagram.

PEF-nnn indicates the number of a printed circuit board. (n) indicates that the same numbers are connected. The boarder between the number ◇n◇ of different schematic diagrams is indicated by a dot-and-dash line. The schematic of a printed circuit board may be expressed in a single schematic diagram or in plural schematic diagrams.

Normally, the upper half of the BLOCK DIAGRAM (1/2) describes the vertical system, and the lower half describes the trigger, horizontal and Z-axis systems. The BLOCK DIAGRAM (2/2) describes the control system (microprocessor, time-base, etc.) and the power supplies.

5.2 Vertical system

5.2.1 The CH1 SIG is connected to the connector CH1 OR [X] on the front panel. In the X-Y mode, the X SIG is connected to the connector.

The CH1 SIG is supplied to the CH1 V PREAMP via the AC-GND-DC, ATTN (1a), CH1 V INPUT AMP and ATTN (1b). The differential CH1 V SIG fed from the CH1 V PREAMP is supplied to the V AMP (1) via the CH1 V TR SW (1) and diode gates.

The CH2 SIG is connected to the connector CH2 OR [Y] on the front panel. In the X-Y mode, the Y SIG is connected to the connector.

The CH2 SIG is supplied to the V AMP (1) via the circuits similar to the CH1 SIG. In case of the CH2 SIG, two TR SW circuits are provided, and the inverted CH2 SIG is supplied to the V AMP (1) by switching the two TR SW circuits. These TR SW circuits are switched by the INVERT switch.

The timing that the CH1 SIG and the CH2 SIG are supplied to the V AMP (1) is determined by the V MODE.

The V SIG output of the V AMP (1) is supplied to the STORAGE switch directly (VC-6023) or via the ANALOG DLY LINE (VC-6024). This STORAGE switch is provided to select the RTO operation or the DSO operation, and controlled by the DSO signal.

As the VC-6024 has the wider bandwidth than the VC-6023 has, the signal is delayed by 145ns approx. by the ANALOG DLY LINE. Thus, the input signal reaches the vertical deflection board of the CRT behind a certain time, and it is possible to measure the rise and fall of a waveform. See Fig. 5-1.

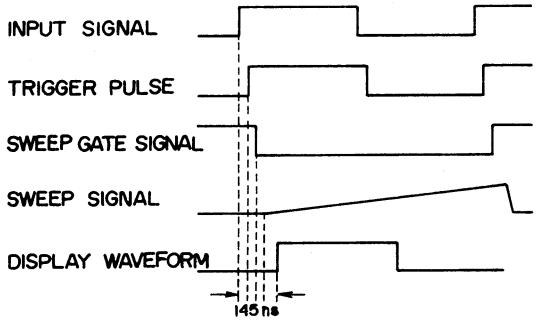


Fig. 5-1

In the RTO mode, the DSO signal goes low, and the STORAGE switch is connected to the RTO side. Thus, the V SIG is supplied to the V AMP (2). The output of the V AMP (2) is supplied to the V OUTPUT AMP directly (VC-6023) or via the V AMP (3) (VC-6024). This signal is the waveform signal in the RTO operation mode. The character signals in the RTO operation are the CHR-Y and $\overline{\text{CHR-Y}}$ signals, and these signals are supplied to the V OUTPUT AMP directly.

In the DSO operation mode, the DSO signal goes high, and the STORAGE switch is connected to the DSO side. As a result, V SIG is supplied to the V STR AMP (1), and the output signal is supplied to the S/H circuit via the V STR AMP (2).

The offset voltage (center voltage) at the input point of the V STR AMP (1) is 4.2V DC. The gain (±1V) and the offset voltage (OV) of the S/H circuit input are matched by the V STR AMP (1) and the V STR AMP (2). V SIG supplied to the S/H circuit is sampled by the SH CLK and its voltage value is held by the hold capacitor.

The S/H SIG output signal of the S/H circuit is supplied to the path from the A/D (1) PREAMP to the A/D (1) to the ACQ MEM (1) and the path from the A/D (2) PREAMP to the A/D (2) to the ACQ MEM (2) simultaneously.

In the DSO operation mode, the CLK is always supplied to both A/D circuits. The two A/D CLK may be in phase or not. In any case, the A/D conversion is always performed by the two A/D circuits.

Further, data is always written in both ACQ MEM's. The V MODE and TIME/DIV settings determine the phases of the two AD CLK signals and the timing of data read from the ACQ MEM's. See Table 5-1.

Table 5-1

TIME/DIV / V MODE	*1 20s - 1ms		0.5ms - 0.2µs	
CH1	A/D(1) → ACQ MEM(1)		A/D(1) → ACQ MEM(1)	
CH2	A/D(1) → ACQ MEM(1)		A/D(1) → ACQ MEM(1)	
*2 ALT or CHOP	CH1	A/D(1) → ACQ MEM(1)	CH1	A/D(1) → ACQ MEM(1)
	CH2	A/D(2) → ACQ MEM(2)	CH2	A/D(1) → ACQ MEM(1)

Chop mode → The polarities of A/D CLK's of A/D(1) and A/D(2) are reversed.

ALT mode →

*1 Though the scale of TIME/DIV is up to 0.2s, in the ROLL mode, the maximum scale becomes 20s. The ROLL mode is usable within the scale ranging from 0.2s to 5ms. The ROLL mode can be set by the MENU switch on the front panel.

*2 In the DSO operation mode, the ALT mode or the CHOP mode is automatically selected by the TIME/DIV switch provided that the V MODE switch is set to ALT or CHOP.
CHOP mode ... 20s/DIV - 1ms/DIV
ALT mode .... 0.5ms/DIV - 0.2μs/DIV
Therefore, the CHOP operation mode is established even when the V MODE switch is set to ALT, or the ALT operation mode is established even when the V MODE switch is set to CHOP. (In case of the RTO operation mode, these phenomena do not occur, and the operation corresponding to the selected V MODE is always performed.)

The data output from the ACQ MEM (1) or the ACQ MEM (2) to the DATA BUS is the information of the waveform in the direction of Y in the DSO operation mode. This data is finally input to the V OUTPUT AMP as the CHR-Y and $\overline{\text{CHR-Y}}$ signals. The information on the characters in the direction of Y is also input to the V OUTPUT AMP as the CHR-Y and $\overline{\text{CHR-Y}}$ signals.
In other words, the waveform signal in the direction of Y and the character signal in the direction of Y are supplied to the CHR-Y and $\overline{\text{CHR-Y}}$ signal lines, respectively.

5.2.2 Diode gates

Fig. 5-2 is the comprehensive schematic diagram including the connections. Refer to Fig. 5-2 and the ⟨11⟩ section at the top left of Fig. 5-9 BLOCK DIAGRAM (1/2) to read the following description.

(1) When displaying characters in the RTO operation mode
$\overline{\text{CHR EN}}$ goes low and TR2201 emitter of 11 goes low, too. Because of this, D2211 and D2212 are shorted, and D2215 and D2216 are open. Therefore, CH1 SIG is not supplied to the V AMP (1) in the latter stage.
Similarly, D2205 and D2206 are shorted, and D2208 and D2210 become open. Therefore, CH2 SIG is not supplied to the V AMP (1) in the latter stage.

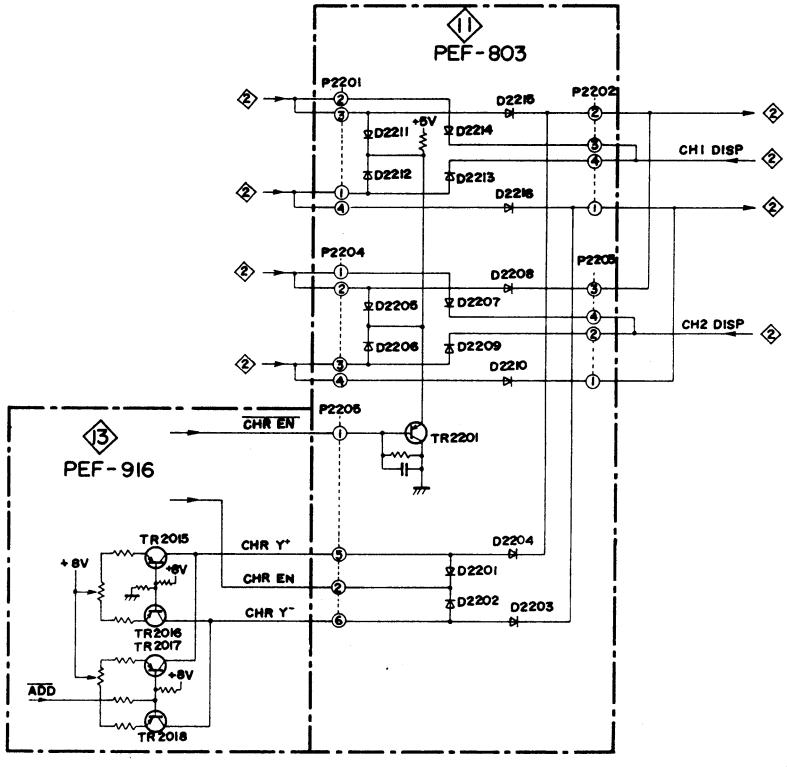


Fig. 5-2

The DC balance at the input side of the V AMP (1) is lost according to the above circuit operation. This DC balance is adjusted by the CHR bias circuit (two DIFF AMP's shown in the ◇13 section of Fig. 5-2).

When the V MODE switch is set to the mode other than ADD, only one DIFF AMP (TR2015 and TR2016) operates, and the other DIFF AMP (TR2017 and TR2018) also operates in the ADD mode.

As the CHR EN goes high when characters are displayed in the RTO operation mode, D2201 and D2202 become open. Thus, D2203 and D2204 are shorted, and CHR Y^+ and CHR Y^- enter the V AMP (1) at its input side. As a result, the DC balance is maintained. Finally, CHR-Y and $\overline{\text{CHR-Y}}$ signals become the character signal (Y direction) in the RTO operation mode.

(2) When displaying characters in the RSO operation mode

In this operation mode, $\overline{\text{CHR EN}}$ is always high. Therefore, TR2201 in ◇11 becomes off and its emitter goes high. As a result, "D2211 and D2212," and "D2205 and D2206" become open, and CH1 SIG and CH2 SIG are supplied to the V AMP (1).

CHR EN goes low only when delivering characters. Therefore, D2201 and D2202 are shorted, and D2204 and D2203 become open. As a result, the CHR bias circuit is separated from the input side of the V AMP (1).

Finally, CHR-Y and $\overline{\text{CHR-Y}}$ become the character signal (Y direction) and the waveform signal (Y signal) in the DSO operation mode.

5.2.3 V MODE switch and TRIG SW CONTROLLER

The setting information of the V MODE switch is notified to a microprocessor by ⑮ and ⑱-㉑. The state of the Q output CH1 DISP of IC226 and the $\overline{Q}$ output CH2 DISP is determined by the setting position of the V MODE switch and the fact that the operating mode is X-Y or not.

When displaying CH1, CH1 DISP goes high, and when displaying CH2, CH2 DISP goes high. Both CH1 DISP and CH2 DISP go high only when the V MODE switch is set to ADD.

The specific descriptions of the above operation follow.

(i) In case CH1 DISP goes high, D2213 and D2214 become open, and D2215 and D2216 are shorted. As a result, CH1 SIG is supplied to the V AMP (1) in the latter stage, and it is possible to display CH1.

(ii) In case CH2 DISP goes low, D2207 and D2209 are shorted. As a result, D2208 and D2210 become open, and CH2 SIG is not supplied to the V AMP (1). Therefore, it is impossible to display CH2.

(iii) When the V MODE switch is set to ADD, both R ans S of IC226 go low. Therefore, both of the Q output (CH1 DISP) and the $\overline{Q}$ output (CH2 DISP) go high, and CH1 SIG and CH2 SIG are added. The resultant signal is supplied to the V AMP (1).

In the ADD mode, the current flows from the V AMP (1) to D221 to the ADD terminal of V MODE switch to -8V to control the DC balance of the V AMP (1).

(iv) In the X-Y operation mode, the $\overline{\text{X-Y}}$ signal goes low. Therefore, IC226 is reset and TR232 becomes on. When IC226 is reset, the $\overline{\text{Q}}$ output (CH2 DISP) goes high, and the Q output (CH1 DISP) goes low. As a result, CH2 SIG or only Y SIG is supplied to the V AMP (1). When TR232 becomes on, its collector goes high, and the V-MODE switch becomes null regardless of its position.

Table 5-2 shows the operating state at each setting position of the V MDOE switch.

Table 5-2

V MODE	RTO	DSO
CH1	CH1 operation	CH1 operation
CH2	CH2 operation	CH2 operation
ALT	ALT operation	0.2μs/DIV - 0.5ms/DIV *1 ALT operation
CHOP	CHOP operation	1ms/DIV - 20s/DIV *2 CHOP operation
ADD	ADD operation	ADD operation

*3

*1 ALT CK (channel selection signal which performs the ALT sampling of CH1 SIG and CH2 SIG) is delivered from a microprocessor.

*2 Though the maximum scale of TIME/DIV is 0.2s, it becomes 20s/DIV in the ROLL mode.

*3 The ALT or CHOP operation is automatically switched by the setting position of the TIME/DIV switch regardless of the setting position of the V MODE switch.

When the INT position is selected by the TRIG SOURCE switch in ◇4◇, whether the trigger switch is delivered to CH1 SIG or CH2 SIG is determined by the INT TRIG switch in ◇2◇ (regardless of the V MODE switch). The state of the output signals ($\overline{\text{CH1 TRIG}}$ and $\overline{\text{CH2 TRIG}}$) of the TRIG SW CONTROLLER is determined by the setting position of the INT TRIG switch, and the content of the INT trigger signal is also determined. When the INT TRIIG switch is set to CH1, $\overline{\text{CH1 TRIG}}$ goes low, $\overline{\text{CH2 TRIG}}$ goes high, and the INT trigger signal becomes CH1 SIG.

When the INT TRIG switch is set to VERT, $\overline{\text{CH1 TRIG}}$ and $\overline{\text{CH2 TRIG}}$ goes low alternately by CH SW PULSE.

Only the VC-6023 is provided with the DIGITAL DLY LINE (250ns), because the VC-6023 does not delay the input signal by the ANALOG DLY LINE as used in the VC-6024. Therefore, the DIGITAL DLY LINE is used not to perform sampling at the channel switching point in the CHOP mode in the DSO operation mode. The detailed description is made, using Fig. 5-3.

CH SW PULSE fed to terminal T of IC226 is the pulse fed out from the CHOP OSC in ⑤ in the CHOP mode in the RTO operation mode. However, in the CHOP mode in the DSO operation mode, it is the CKA pulse fed out from ⑯.

When the CKA pulse is supplied to IC226, the CH2 DISP pulse having the half frequency of the CKA frequency is fed out from terminal $\overline{Q}$. The CKB pulse is obtained by delaying the CH2 DISP pulse by the DIGITAL DLY LINE. This CKB pulse becomes AD1 CLK. In the CHOP mode, the $\overline{\text{AD1 CLK}}$ which is obtained by reversing the polarity of AD1 CLK becomes AD2 CLK. Both AD1 CLK and AD2 CLK are sampled at their rising points. As a result, sampling is performed at points other than the channel switching point as shown in Fig. 5-3.

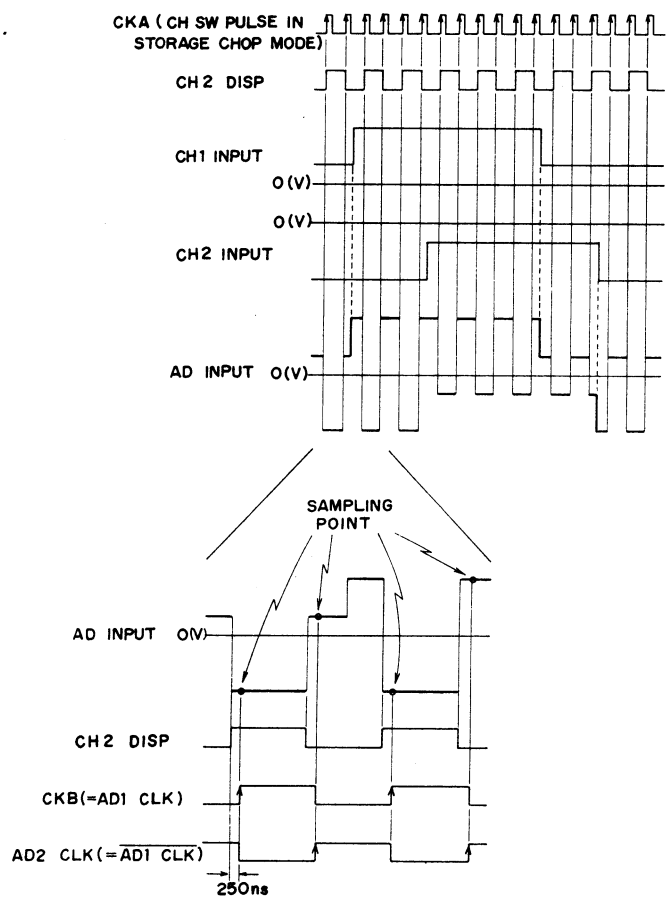


Fig. 5-3 CHOP mode in DSO operation mode

5.2.4 PULL X10 MAG and (push) CH1 ALT MAG switches

Mainly refer to the top right side of Fig. 5-9 BLOCK DIAGRAM (1/2). Also refer to the H AMP section at the lower right section appropriately.

Prior to the operating description of these switch circuits, the summary of these circuits is described in (1)-(iv).

(i) The PULL X10 MAG function magnifies all the displayed waveform (regardless of the number of displayed channels) 10 times in the horizontal direction as shown in Fig. 5-4.

In this case, the functions (CH1 X5 MAG and CH2 X5 MAG) that magnifies the displayed waveform 5 times in the vertical direction work effectively.

The character signals (CHR-Y and $\overline{\text{CHR-Y}}$) in the vertical direction and the character signals (CHR X^+ and CHR X^-) in the horizontal direction are supplied directly to the V OUTPUT AMP and the H OUTPUT AMP, respectively.

Therefore, the displayed characters are not effected by the above magnification functions.

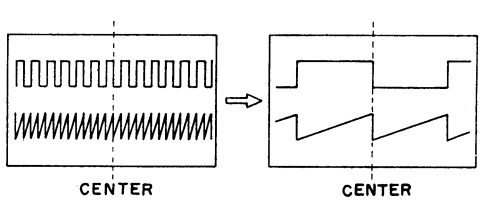


Fig. 5-4

(ii) The (PUSH) CH1 ALT MAG function displays the CH1 waveform magnified 10 times horizontally at its center at the position 3DIV below the CH1 waveform.

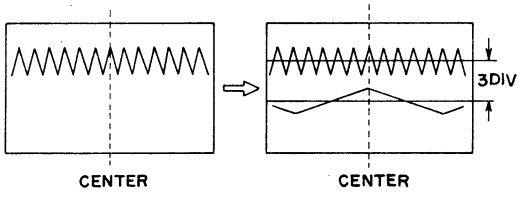


Fig. 5-5

This function is provided only for the VC-6024. In case of the VC-6023, the switch function is made null by grounding the terminal of the (PUSH) CH1 ALT MAG switch.

(iii) When the V MODE switch and the (PUSH) CH1 ALT MAG switch of the VC-6024 are set to CH1 and ALT MAG, respectively,

a. The PULL X10 MAG switch is null.

b. The CH1 X5 MAG switch is effective.

(iv) One of the three differential amplifiers X1 H AMP (◇6 at the lower right of Fig. 5-9), X10 H AMP (◇6 at the lower right of Fig. 5-9) and CHR X AMP (◇13 of Fig. 5-10) is always activated, and the remaining amplifiers are not activated. TR860, TR861 and TR2006 (◇13 of Fig. 5-10) are connected to the X1 H AMP, the X10 H AMP and the CHR X AMP, respectively.

The $\overline{Q}$ output of IC801 (◇6 at the top right of Fig. 5-9) is connected to TR860 base. The Q output of IC801 is connected to TR861 base. $\overline{\text{CHR EN2}}$ is connected to TR2006. These three signals control the above three differential amplifiers.

For example, if the $\overline{Q}$ and Q outputs are low and $\overline{\text{CHR EN2}}$ is high, the X1 H AMP is activated, and the X10 H AMP and the CHR X AMP are not activated.

(v) The vertical positions of the original waveform and the magnified waveform are displaced by 3DIV in the CH1 ALT MAG mode by changing the current flowing across TR390 in ◇2.

(vi) When the V MODE switch is set to the position other than CH1, the CH1 ALT MAG function is made null by TR396 in ◇2.

TR396 becomes off only when the V MODE switch is at CH1, and its collector (ALT MAG CONT2 signal) becomes in the open state.

When the V MODE switch is set to the position other than CH1, TR396 becomes on, and its collector (ALT MAG CONT2 signal) goes low.

The following is the description on the switch circuit. This description is related to the VC-6024 unless otherwise noted.

(1) When the (PUSH) CH1 ALT MAG switch is set at the normal state

The common terminal of the PULL X10 MAG switch is grounded by the (PUSH) CH1 ALT MAG switch. Therefore, when the PULL X10 MAG switch is set to X1, the terminal S of IC801 is low. As a result, the $\overline{Q}$ output of IC801 goes low and the X1 H AMP becomes active.

When the PULL X10 MAG switch is set to X10, the terminal R is

low. The Q output of IC801 goes low and the X10 H AMP becomes active.

(2) When the (PUSH) CH1 ALT MAG switch is set at the ALT MAG state and the V MODE switch is set to CH1

TR396 base is grounded, and TR396 becomes off. Therefore, the TR396 side of the ALT MAG CONT2 signal line is in the open state. The (PUSH) CH1 ALT MAG switch side of this signal line is also in the open state.
As a result, the terminals S and R of IC801 are in the open state regardless of the setting position of the PULL X10 MAG switch. In other words, the PULL X10 MAG switch becomes null.
The terminals S and R in the open state go high by the internal charging of IC801 itself.
When both the terminals go high, IC801 latches the state of D at the rising edge of the pulse supplied to the terminal T.
In case Q is high and $\overline{Q}$ (i.e. D) is low, $\overline{Q}$ and Q (i.e. D) go low (state of D is latched) and high, respectively, at the rising edge of CH SW PULSE. Thus, the X10 H AMP becomes active. Q and $\overline{Q}$ go high (state of D is latched) and low, respectively, at the rising edge of CH SW PULSE.
The outputs of Q and $\overline{Q}$ are inverted at each rising edge of CH SW PULSE, and the X1 H AMP and the X10 H AMP become active alternately. The current of the ALT MAG SEP PULSE signal changes whenever the output state of Q changes at each rising edge of CH SW PULSE. As a result, the current flowing across TR390 changes at each rising edge of CH SW PULSE, and the vertical positions of the X1 waveform and the X10 waveform are displaced by 3 DIV.

(3) When the (PUSH) CH1 ALT MAG switch is in the ALT MAG state and the V MODE switch is set to the position other than CH1.

TR396 becomes on, the ALT MAG CONT2 signal is always high regardless of the setting position of the (PUSH) CH1 ALT MAG switch. As a result, the PULL X10 MAG switch becomes effective, and the (PUSH) CH1 ALT MAG switch becomes null.
When the PULL X10 MAG switch is set to X1, IC801 is in the set state, and the X1 H AMP becomes active.
When this switch is set to X10, IC801 is in the reset state, and the X10 H AMP becomes active.

(4) Character display in the CH1 ALT MAG operation mode

When displaying characters in this operation mode, $\overline{\text{CHR}}$ $\overline{\text{EN3}}$ goes low. Because of this, D820 and D821 in ◇6◇ are shorted and the terminals S and R of IC801 go low the high signal are delivered from Q and $\overline{Q}$ of IC801 and TR390 becomes off. Neither of the X1 H AMP nor the X10 H AMP are operated.
When displaying characters, $\overline{\text{CHR}}$ $\overline{\text{EN2}}$ also goes low. Therefore,

TR2006 in ◇13◇ of Fig. 5-10 BLOCK DIAGRAM (2/2) becomes on, and the CHR X AMP becomes active. The character signals CHR X^+ and CHR X^- are delivered from this amplifier to the H OUTPUT AMP in ◇6◇ directly.

CHR X^+ and CHR X^- include the character signal in the direction of X in the RTO operation mode and the character and waveform signals in the direction of X in the DSO operation mode.

As Q of IC801 remains high, TR390 continues to be off. Therefore, the bias of the V AMP (1) remains unchanged and the vertical position of displayed characters remains unchanged.

5.3 Trigger system

Refer to the lower left side of Fig. 5-9 BLOCK DIAGRAM (1/2).

Part of the CH1 V SIG delivered from the ATTN (1b) is supplied to teh CH1 OUTPUT AMP and D243.

The CH1 V SIG supplied to the CH1 OUTPUT AMP is devided into two circuits. One signal is supplied to the CH1 OUTPUT connector on the rear panel as CH1 V SIG, and the other is supplied to analog switch IC550 in ◇5◇ as X SIG in the X-Y operation mode.

The CH2 V SIG delivered from the ATTN (2b) is supplied to D244 via the CH2 TRIG PICKOFF.

The output of the TRIG CH SW is controlled by $\overline{\text{CH1 TRIG}}$ and $\overline{\text{CH2 TRIG}}$. When $\overline{\text{CH1 TRIG}}$ goes low, D243 becomes on by the output of the TRIG CH SW, and CH1 V SIG is supplied to the terminal INT of the TRIG SOURCE switch via the TRIG PREAMP.

When $\overline{\text{CH2 TRIG}}$ goes low, D244 becomes on, and CH2 V SIG is supplied to the terminal INT of the TRIG SOURCE.

5.4 Sweep circuit and Z-axis circuit

Refer to the lower right side of Fig. 5-9 BLOCK DIAGRAM (1/2).

The SWEEP signal is delivered from the SWP GEN (◇5◇) circuit by the TRIG PULSE signal supplied to the SWP GATE GEN (◇5◇) circuit. This SWEEP signal is supplied to analog switch IC550 (◇5◇), TR2014 (◇14◇), etc.

IC550 is switched by the TIME/DIV switch. When the TIME/DIV switch is set to the position other than the X-Y position, the SWEEP signal is delivered from IC550 and used as the SWEEP signal in the RTO operation mode. When the TIME/DIV switch is set to the X-Y position, X SIG is delivered from IC550.

The SWEEP signal supplied to TR2014 is used as the SWEEP signal in the DSO operation mode.

The SELECTOR (◇5◇) is controlled by the $\overline{\text{CHOP CONT}}$ signal. The SELECTOR delivers the sweep gate signal as CH SW PULSE in the mode other than CHOP, and the chop pulse as CH SW PULSE in the CHOP mode.

The $\overline{\text{X-Y}}$ signal is generated from the TIME/DIV switch (◇5◇). The sweep gate signal is not generated in the X-Y operation mode by the $\overline{\text{X-Y}}$ signal supplied to the SWP GATE GEN.

The $\overline{\text{X-Y}}$ signal added to the UNBLANKING signal enables the trace to light continuously in the X-Y operation mode of RTO. In the X-Y

operation mode of RTO, characters are not displayed, and the trace continues to light. However, characters are displayed in the X-Y operation mode of DSO (the X-Y operation is available only in the HOLD mode).
Therefore, the switching point between waveform and characters must be blanked in the X-Y operation of DSO. For this purpose, the application effect of the $\overline{\text{X-Y}}$ signal is made null by adding the DSO signal to the UNBLANKING signal. Thus, the switching pointis blanked by the $\overline{\text{CHR Z}}$ signal supplied to BUFFER TR901 (◇9◇) via D920 (◇7◇).
The function of the $\overline{\text{CHR Z}}$ signal supplied to BUFFER TR901 is summarized below.

(i) RTO operation
Other than X-Y operation
The switching point between waveform and characters is blanked. ($\overline{\text{CHR Z}}$ at switching point : High)
X-Y operation
Always in the unblanking state ($\overline{\text{CHR Z}}$: Low)

(ii) DSO operation
The switching point between waveform and characters is blanked regardless of the X-Y operation. ($\overline{\text{CHR Z}}$ at switching point : High)

5.5 Panel setting information and CPU CKT

Refer to the left side of Fig. 5-10 BLOCK DIAGRAM (2/2).
The panel setting information shown in ◇11◇ is latched by the LATCH (1) to the LATCH (5) in ◇12◇. These latch circuits are controlled by the TR REQ signal and the CKS signal. The latched information is supplied to the CPU CKT as the RXS signal.
The setting information including the MENU, PLOT, etc. of ◇19◇ (PEF-882) is also supplied to the CPU CKT. The RS-232C CONNECTOR is connected to the CPU CKT via the LEVEL SHIFT & INVERTER circuit.
The CPU CKT consists of MPU (IC5501, CMOS 8-bit microprocessor), ROM (IC5502, 64KB), RAM (IC5503, 32KB), TIMER (IC5504, I/O CONTROLLER (IC5506), ADDRESS DECODER (IC5507, IC5508), BUFFER (IC5509), etc.

5.6 Time-base circuit

Refer to Fig. 5-6. This is the detailed schematic of the time-base circuit in ◇16◇ of Fig. 5-10 BLOCK DIAGRAM (2/2).
A 20MHz pulse output is always delivered from the terminal F of OSC X5301, and the pulse obtained by dividing the 20MHz pulse is delivered from the terminal D. The dividing ratio is determined by the setting position of the TIME/DIV switch. In other words, the state of the OSC A, OSC B and OSC C is determined by the setting position of the TIME/DIV switch, and the dividing ratio is determined. Table 5-3 shows their relationship. This table shows the master oscillation frequencies of COUNTER IC5310 in the next stage, and the frequencies do not always correspond to all the setting positions of the TIME/DIV switch. The 20MHz and 10MHz sampling clock pulses are obtained directly from OSC X5301. The sampling clock below 5MHz is obtained via COUNTER/TIMER IC5310.

The CKB pulse (the pulse obtained by dividing the CKA pulse by two) delivered from $\overline{Q}$ of IC226 in ◇2 is used as the sampling clock in the CHOP mode of the DSO operation. The maximum input frequency and the maximum output frequency of COUNTER/TIMER IC5310 is 10MHz and 5MHz, respectively. Though this IC incorporates three counter circuits, two counter circuits are used. The COUNTER 0 is used as a divider, and the COUNTER 1 is used as a pre-trigger timer.

Data D0 to D7 incorporate the dividing ratios determined by the setting positions of the TIME/DIV switch. The COUNTER 0 is divided by this dividing ratio.

When 1024 clock pulses are supplied to the CLK1 input after the GATE 1 input of the COUNTER 1 goes high, the OUT 1 output goes high. The OUT 1 output is the signal which controls WR CLK. When the OUT 1 Output goes low, WR CLK can be supplied to the ACQ memory. When the OUT 1 output goes high, WR CLK is not supplied to the ACQ memory.

(1) CH1 mode of RTO

IC226 is in the set state by setting the V MODE switch to CH1. As a result, CH1 DISP goes high, and CH1 is displayed.

(2) CH2 mode of RTO

IC226 is in the reset state by setting the V MODE switch to CH2. As a result, CH2 DISP goes high, and CH2 is displayed.

(3) ADD mode of RTO

The terminals S and R of IC226 go low simultaneously by setting the V MODE switch to ADD. As a result, both of CH1 DISP and CH2 DISP go high, and CH1 and CH2 are in the displayed state.

(4) CHOP mode of RTO

$\overline{\text{CHOP CONT}}$ goes low by setting the V MODE switch to CHOP, and CHOP PULSE is delivered as the CH SW PULSE signal from SELECTOR IC571 (1/4) in ◇5.

This CHOP PULSE is supplied to the terminal T of IC226 in ◇2 via the logic circuit in ◇12. (The CKA signal does not pass the logic circuit in ◇12.)

As a result, CH1 and CH2 are displayed alternately at the half frequency of CHOP PULSE.

(5) ALT mode of RTO

The $\overline{\text{GATE}}$ signal is used as CH SW PULSE and supplied to the terminal T of IC226. As a result, CH1 and CH2 are displayed alternately at each rising edge of the $\overline{\text{GATE}}$ signal.

(6) CH1 mode of DSO

IC226 is in the set state by setting the V MODE switch to CH1, and CH1 DISP goes low. As a result, the input channel to AD becomes CH1.

Note) In case of the DSO operation, the display channel is controlled by the MPU. The CH1 DISP and CH2 DISP signals are not related to the display channel.

(7) CH2 mode of DSO

IC226 is in the reset state by setting the V MODE switch to CH2, and CH2 DISP goes high. As a result, the input channel to ADD becomes CH2.

(8) ADD mode of DSO

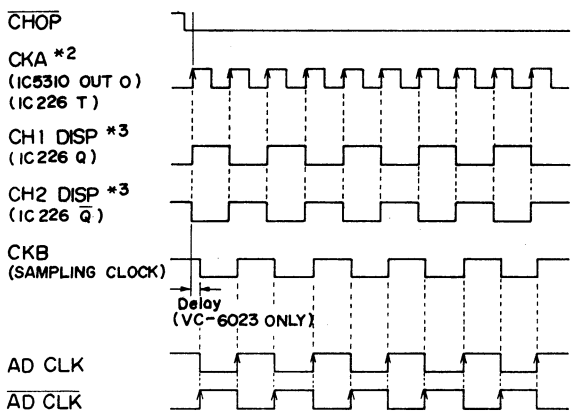
Both CH1 DISP and CH2 DISP go high by setting the V MODE switch to ADD. As a result, the input channel to AD becomes CH1 and CH2.

(9) CHOP operation of DSO (Refer to the waveform shown in Fig. 5-7.)

This operation is performed only when the following settings are made.

RTO/DSO : DSO
TIME/DIV : 1ms - 20s
V MODE : ALT or CHOP

The $\overline{\text{CHOP}}$ signal supplied to SELECTOR (1) IC5550 in ⟨16⟩ goes low only when the above conditions are established, and the switch circuit IC5550 is connected to the terminal A side. Therefore, the OUT 0 output of IC5310 in ⟨16⟩ becomes the CKA signal. This CKA signal is supplied to the terminal T of IC226 in ⟨2⟩ via the logic circuit in ⟨12⟩. CH1 DISP and CH2 DISP go high alternately at each rising edge of the CKA signal, and the input channel to AD is switched. CKB is the pulse obtained by dividing the CKA delivered from $\overline{Q}$ of IC226 by two. This CKB becomes a sampling clock via SELECTOR (1) IC5550 in ⟨16⟩.



*2 ---- FREQUENCY OF TWO TIMES THE SAMPLING CLOCK

*3 ---- SWITCHING SIGNAL OF INPUT CHANNEL TO IN CASE OF DSO. DISPLAY CHANNEL IS NOT SWITCHED BY THIS SIGNAL.

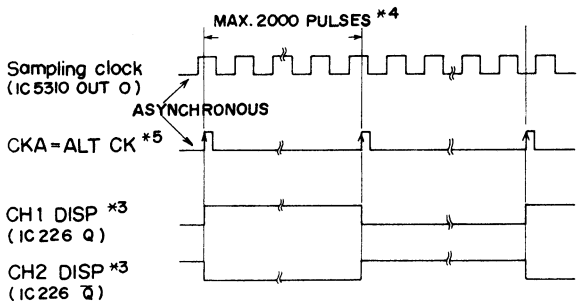
Fig. 5-7

(10) ALT operation of DSO (Refer to the waveforms shown in Fig. 5-8.)

This operation is performed when the following settings are made.

RTO/DSO : DSO
TIME/DIV : 0.2μs - 0.5ns
V MODE : ALT or CHOP

ALT CK is supplied from the microprocessor to SELECTOR (1) IC5550 in ⟨16⟩ when the above settings are made. This ALT CK is supplied, as the CKA signal, to the terminal T of IC226 via the logic circuit in ⟨12⟩. As a result, CH1 DISP and CH2 DISP go high alternately at each rising edge of ALT CK, and the input to the AD is switched.



*4 ---- NO. OF PULSES CHANGES ACCORDING TO EQUIVALENT SAMPLING PULSE OR NOT, TIME DIV SETTING, ETC

*5 ---- DIRECTLY OUTPUT FROM MICROPROCESSOR.

Fig. 5-8

In case of the DSO operation, the input channel to the AD is made by the V MODE switch except for the CHOP and ALT operation modes.

5.7 CHARACTER (characters and DSO waveforms) DISPLAY circuit

Refer to ⟨18⟩ of Fig. 5-10 BLOCK DIAGRAM (2/2).

5.7.1 Waveform display in the DSO mode

The waveform data is supplied to OUTPUT CONTROLLER IC5518 via the DATA BUS. The address is latched by the LATCH (2) and LATCH (3). The GATE (1) controls all the addresses (upper addresses and lower addresses), and the GATE (2) controls the lower addresses.
When the waveforms are displayed, no signal is supplied from the PC port of the OUTPUT CONTROLLER to the D/A (4).
The waveform signal in the direction of Y in the DSO mode is delivered from the PA port of the OUTPUT CONTROLLER to the D/A (1). The waveform signal in the direction of X in the DSO mode is delivered from the LATCH (2) and the LATCH (3) to the D/A (4). The Z signal is controlled by the GATE (3). When the waveform of the DSO is displayed, the pins 10 and 11 of the GATE (3) go low, and the data is bright only while the DREQ on the pin 9 is low.

5.7.2 Character display both in the RTO and DSO modes

One character consists of 3 bits in the direction of Y and 3 bits in the direction of X. The 3 bits in the direction of Y are delivered from the terminals PB0 - PB2 of the OUTPUT CONTROLLER to the D/A (2). The 3 bits in the direction of X are delivered from the terminals PB3 - PB5 to the D/A (3).
Whether each dot forming characters is brightened or not is determined by the $\overline{\text{CHR EN}}$ signal delivered from the terminal 6 of the OUTPUT CONTROLLER.
As described above, 7 bits are used for one character. However, the character pattern for each character is stored in the ROM at the unit of 8 bits.
The character display position signal in the direction of Y which determines the line on the CRT on which characters are displayed is delivered from the terminals PA0 - PA7 to the D/A (1).
The character display position signal (upper 5 bits of A5 - A9) in the direction of X which determines the position in the line on which characters are displayed is delivered from the LATCH (3) to the D/A (4). In this case, the LATCH (2) is in the inhibit state.

5.7.3 Cursor display both in the RTO and DSO modes

Like the character patterns, the cursor patterns are also stored in the ROM.
In case of the horizontal cursors, the character display position signals in the direction of Y delivered from the terminals PA0 - PA7 are constant. The character display position signals in the direction of X delivered from the terminals PC0 - PC7 change.
In case of the vertical cursors, the character display position signals in the direction of Y change and the character display position signals in the direction of X are constant.

5.7.4 X-Y operation in the DSO mode

In this operation, the CH2 and CH1 signals becomes the Y and X signals, respectively. The Y signal is delivered from the PA port to the D/A (1) like the waveform display.

The X signal is delivered from the PC port to the D/A (4). In this case, the outputs of the LATCH (2) and the LATCH (3) are in the high impedance state, and not connected to the D/A (4) electrically.

5.7.5 SW & MULTIPLEXER

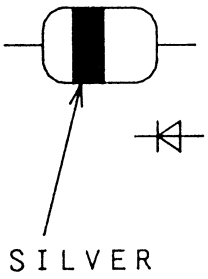
The 40MADC and DSO signals in ◇18◇ are not used. As the $\overline{\text{DSO}}$ signal is fixed to low, both MULTIPLEXER's are always connected to the DSO side.

Both analog SW's are controlled by the $\overline{\text{DOT j}}$ signal to provide the smooth on and off switching. When the smooth on is established, the signal passes the LPF.

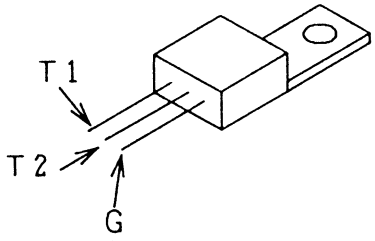
The smooth on and off switching is performed by the MENU switch at the lower left on the front panel.

7. ELECTRICAL PARTS LEAD CONFIGURATIONS

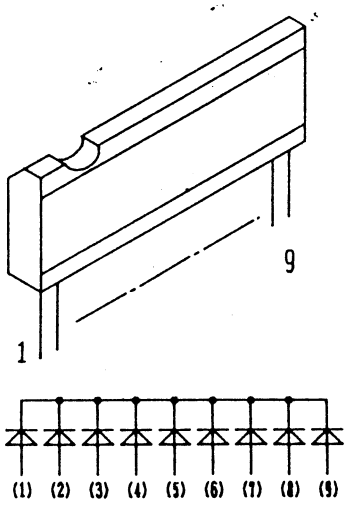
Diode



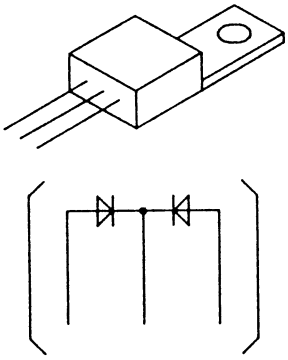
AU01
AU01A



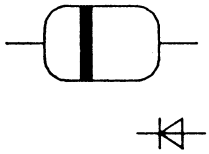
DTA10E



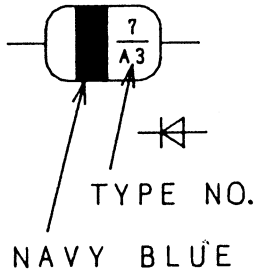
DAN803



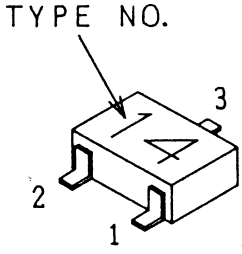
FMB-24
FMB-26



GZB 2.4B
GZB 3.0B
GZB 6.8B



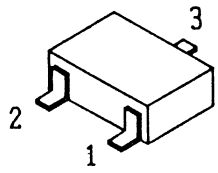
HZ7A1
HZ7A3



HZM SERIES

1.ANODE
2.ANODE
3.CATHODE

TYPE NO.14 HZM 4B
TYPE NO.17 HZM 5B
TYPE NO.24 HZM 7C

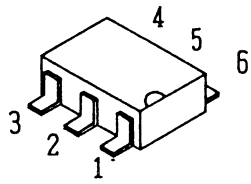


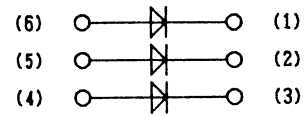
1. CATHODE 1

2. ANODE 2

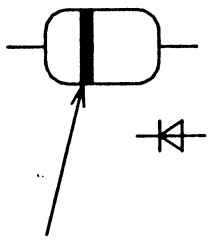
3. CATHODE 2,
ANODE 1

HSM88S



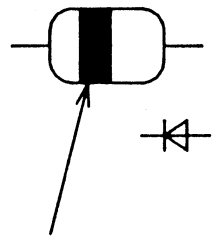


IMN10



GREEN

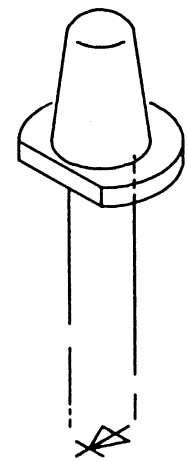
MA161



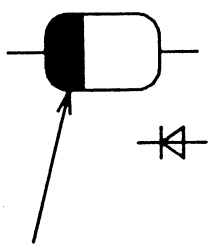
CATHODE BAND

1SS83
1SS110
1SS123
1SS133
1SS153

1SS165
1SS286
MTZ SERIES

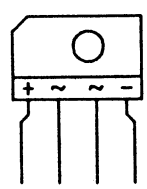


PG5534SY



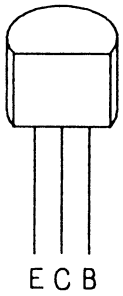
BROWN

RU3AMLF

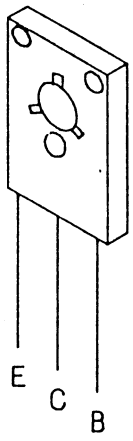


RBV-406

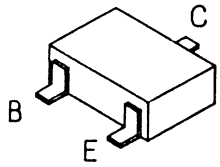
Transistor



2SA778AK
2SA1029D
2SA1188E
2SC535C
2SC641K
2SC1213AC
2SC1906
2SC2853E
2SC3068
2SC458C



2SA1210S
2SC2912S



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2SA1226E4
2SA1245
2SA1462
2SB624BV3
2SC1621B4
2SC2462LC
2SC2620QC
2SC2759-T2
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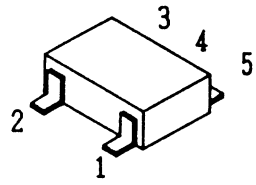
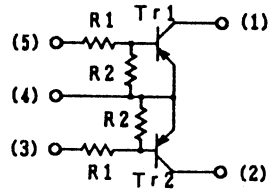
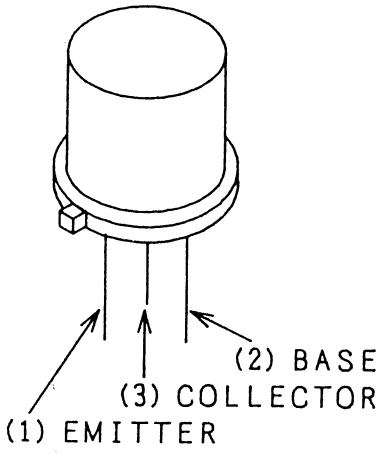
2SC3772LY4
2SC3775OY-4
2SD596DV3



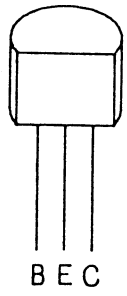
DTA124EK



(1) Tr1 OUT
(2) Tr2 OUT
(3) Tr2 IN
(4) GND (+)
(5) Tr1 IN

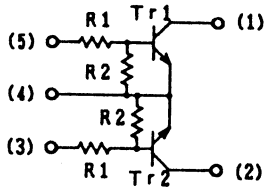


2SC1252

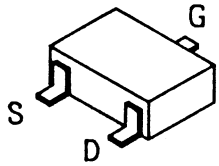


2SC2407 (1)

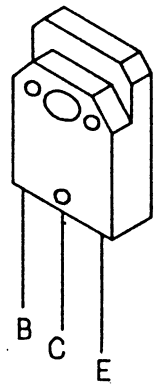
DTC124K



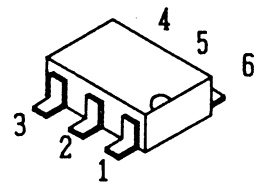
(1) Tr1 OUT
(2) Tr2 OUT
(3) Tr2 IN
(4) GND
(5) Tr1 IN



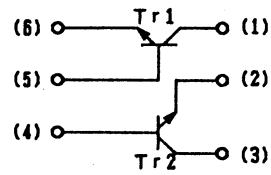
2SK303V4
2SK436A20
2SK508K52



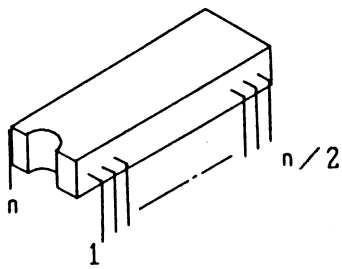
2SC3089



IMX3



IC



8PINS

MN3102

14PINS

HD74LS00P
HD74LS04P
HD74LS10P
HD74LS74AP
HD74LS164P
HD74LS393P
HD74HC00P
HD74HC02P
HD74HC04P
HD74HC08P
HD74HC32P
HD74HC74P
TC40H000P
TC40H002P
TC40H164P
SN74AS00N
SN74AS74N
TL064CN
NJM319D

16PINS

HD14040BP
HD14051BP
HD14053BP
HD74HC138P
HD74HC155P
HD74HC4040P
HD74LS157P
MC10H116L
MC74HC4052N
MC74HC4053N
SN74LS594N
TC40H151P

20PINS

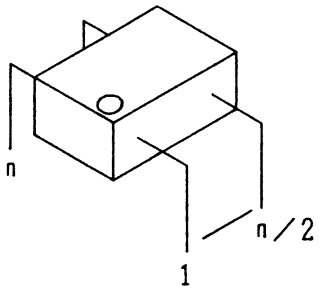
HD74HC573P
HD74HC574P

28PINS

HN27256G-25
HM63021P

64PINS

μPD78C10G-36

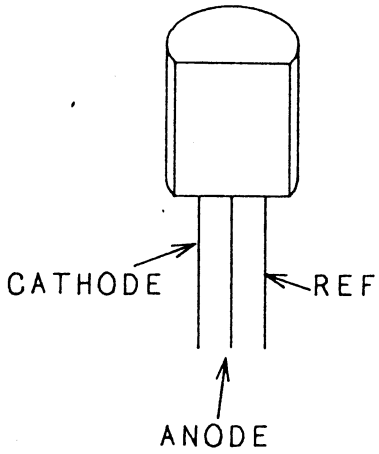


6PINS

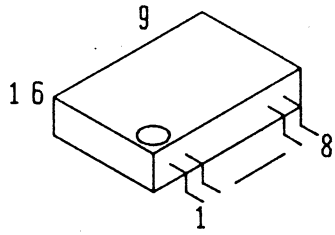
PC714U

8PINS

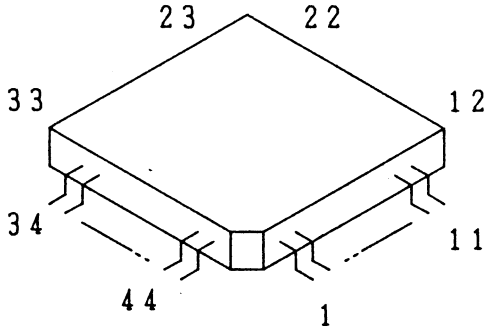
TL081CP



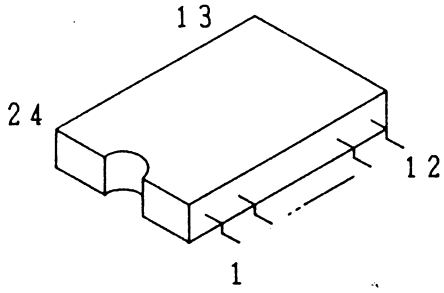
TL431CLP-B



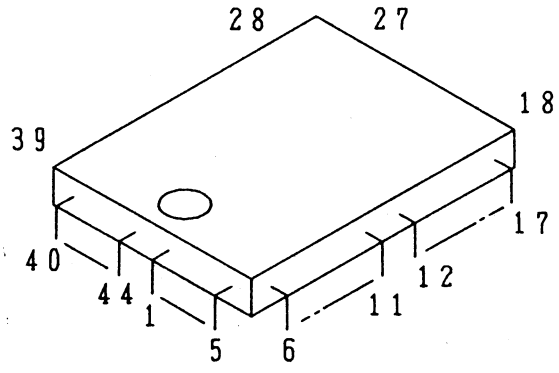
MC145406F
HD74HC153FP
TC74HC157AF



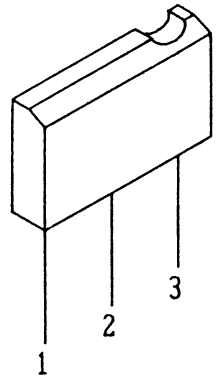
TMP182C55AF-10



TMP82C54M-2

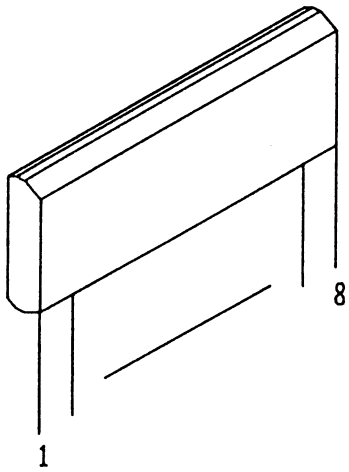


HA19211MP



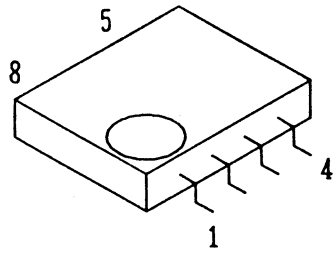
1. Vss
2. VDD
3. OUT

MN1280R

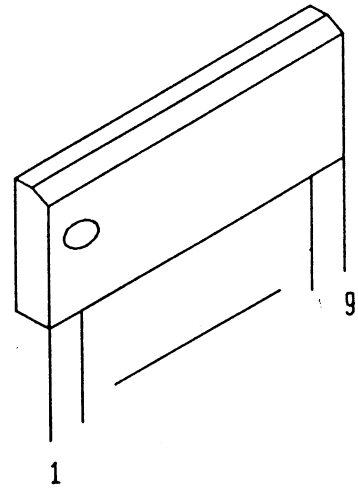


8PINS

M5201L

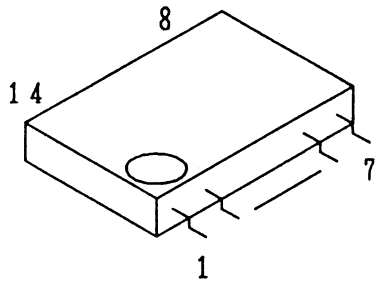


μA741PS
M5201FP

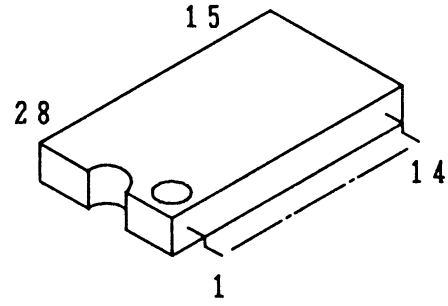


9PINS

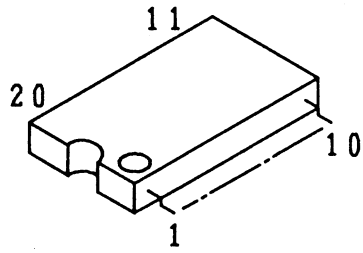
NJM072S



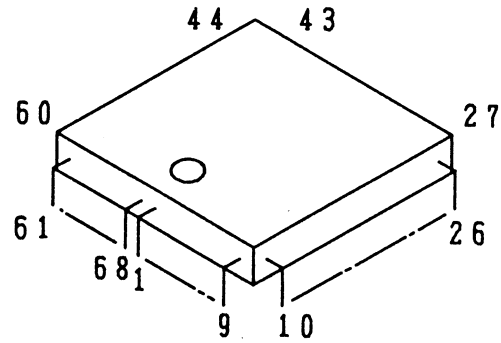
NJM319M
NJM2902M
HD74HC27FP
HD74HC32FP
TC74HC00F
TC74HC86F



HM62256LPF-10T
HM6264ALP-15



HD74HC377FP
TC74HC244F
TC74HC574AF



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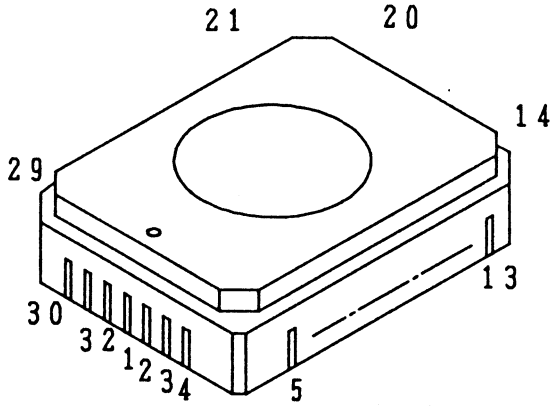

MBM27C512-20 (LCC)

INPUT, OUT, CAL(PEF-620)
VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION	
8397023 A	IC16	IC.ANALOG	LF411CN-S1
8397023 A	IC116	IC.ANALOG	LF411CN-S1
IDH0467	IC222	IC.DIGITAL	HD74LS00P
IDH1238	IC226	IC.DIGITAL	HD74LS74AP/SN74LS74AN
HDS0437	D16	DIODE	1SS133
HDS0477	D20	DIODE	1SS110
HDS0477	D21	DIODE	1SS110
HDS0477	D22	DIODE	1SS110
HDH0024	D97	DIODE.ZEN	HZ3B
HDS0437	D116	DIODE	1SS133
HDS0477	D120	DIODE	1SS110
HDS0477	D121	DIODE	1SS110
HDS0477	D122	DIODE	1SS110
HDS0437	D221	DIODE	1SS133
HDS0437	D224	DIODE	1SS133
HDS0437	D225	DIODE	1SS133
HDS0437	D226	DIODE	1SS133
HDS0437	D230	DIODE	1SS133
HDS0437	D231	DIODE	1SS133
HDS0437	D243	DIODE	1SS133
HDS0437	D244	DIODE	1SS133
HDH0029	D245	DIODE.ZEN	HZ5B
HDS0129	D358	DIODE	1S2268
HDH0029	D374	DIODE.ZEN	HZ5B
HDH0029	D375	DIODE.ZEN	HZ5B
HDH0029	D377	DIODE.ZEN	HZ5B
HDS0437	D394	DIODE	1SS133
HDS0437	D395	DIODE	1SS133
HDS0437	R222	DIODE	1SS133
8360551	RT359	THERMISTOR	TMD1410H
HTK0099	TR24	TRANSISTOR	2SK404E
HTC0148	TR30	TRANSISTOR	2SC458C
HTC0557	TR30	TRANSISTOR	2SC1674K
HTA0099	TR40	TRANSISTOR	2SA781K
HTA0224	TR40	TRANSISTOR	2SA1029D
HTC0168	TR61	TRANSISTOR	2SC535C
HTC0168	TR62	TRANSISTOR	2SC535C
HTA0099	TR63	TRANSISTOR	2SA781K
HTA0224	TR63	TRANSISTOR	2SA1029D
HTA0099	TR64	TRANSISTOR	2SA781K
HTA0224	TR64	TRANSISTOR	2SA1029D
HTC0168	TR85	TRANSISTOR	2SC535C
HTC0168	TR86	TRANSISTOR	2SC535C
HTC0148	TR87	TRANSISTOR	2SC458C
HTK0099	TR124	TRANSISTOR	2SK404E
HTC0148	TR130	TRANSISTOR	2SC458C
HTC0557	TR130	TRANSISTOR	2SC1674K
HTA0099	TR140	TRANSISTOR	2SA781K
HTA0224	TR140	TRANSISTOR	2SA1029D
HTC0168	TR161	TRANSISTOR	2SC535C
HTC0168	TR162	TRANSISTOR	2SC535C

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION			
RCE0757	R18	R.CARBON	1/4W	100	OHM +-5%
RCE0793	R19	R.CARBON	1/4W	100	KOHM +-5%
RCE0793	R20	R.CARBON	1/4W	100	KOHM +-5%
RSE0434	R21	R.SOLID	1/4W	10	MOHM +-5%
RCE0777	R23	R.CARBON	1/4W	4.7	KOHM +-5%
RCE0755	R25	R.CARBON	1/4W	68	OHM +-5%
RCE0757	R25	R.CARBON	1/4W	100	OHM +-5%
RME1079	R26	R.METAL	1/4W	3.92	KOHM +-1%
RME1081	R26	R.METAL	1/4W	5.62	KOHM +-1%
RCR3004	R28	R.CARBON	1/4W	10	OHM +-5%
RCE0773	R30	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0775	R30	R.CARBON	1/4W	3.3	KOHM +-5%
RCE0762	R33	R.CARBON	1/4W	270	OHM +-5%
RME1145	R34	R.METAL	1/4W	60.0	OHM +-0.5%
RCE0766	R35	R.CARBON	1/4W	560	OHM +-5%
RME1113	R35	R.METAL	1/4W	365	OHM +-1%
RME1154	R36	R.METAL	1/4W	600	OHM +-0.5%
RCE0745	R40	R.CARBON	1/4W	10	OHM +-5%
RCE0745	R41	R.CARBON	1/4W	10	OHM +-5%
RCE0764	R42	R.CARBON	1/4W	390	OHM +-5%
RCE0767	R43	R.CARBON	1/4W	680	OHM +-5%
RCE0765	R44	R.CARBON	1/4W	470	OHM +-5%
RCE0745	R45	R.CARBON	1/4W	10	OHM +-5%
RME1157	R46	R.METAL	1/4W	16.0	KOHM +-0.5%
RME1162	R47	R.METAL	1/4W	80.0	KOHM +-0.5%
RME1157	R48	R.METAL	1/4W	16.0	KOHM +-0.5%
RME1155	R49	R.METAL	1/4W	4.00	KOHM +-0.5%
RME1157	R50	R.METAL	1/4W	16.0	KOHM +-0.5%
RCE0769	R51	R.CARBON	1/4W	1.0	KOHM +-5%
RME1069	R52	R.METAL	1/4W	562	OHM +-1%
RCE0777	R53	R.CARBON	1/4W	4.7	KOHM +-5%
RCE0769	R54	R.CARBON	1/4W	1.0	KOHM +-5%
RCE0771	R55	R.CARBON	1/4W	1.5	KOHM +-5%
RME1157	R56	R.METAL	1/4W	16.0	KOHM +-0.5%
RME1155	R57	R.METAL	1/4W	4.00	KOHM +-0.5%
RCE0759	R59	R.CARBON	1/4W	150	OHM +-5%
RCE0761	R59	R.CARBON	1/4W	220	OHM +-5%
RCE0795	R60	R.CARBON	1/4W	150	KOHM +-5%
RCE0797	R60	R.CARBON	1/4W	220	KOHM +-5%
RCE0745	R61	R.CARBON	1/4W	10	OHM +-5%
RCE0753	R62	R.CARBON	1/4W	47	OHM +-5%
RCE0755	R62	R.CARBON	1/4W	68	OHM +-5%
RCE0773	R63	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0775	R63	R.CARBON	1/4W	3.3	KOHM +-5%
RCE0773	R64	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0775	R64	R.CARBON	1/4W	3.3	KOHM +-5%
RCE0781	R65	R.CARBON	1/4W	10	KOHM +-5%
RCE0785	R66	R.CARBON	1/4W	22	KOHM +-5%
RCE0758	R67	R.CARBON	1/4W	120	OHM +-5%
RCE0749	R68	R.CARBON	1/4W	22	OHM +-5%
RCE0767	R69	R.CARBON	1/4W	680	OHM +-5%
RCE0770	R69	R.CARBON	1/4W	1.2	KOHM +-5%
RCE0767	R70	R.CARBON	1/4W	680	OHM +-5%
RCE0770	R70	R.CARBON	1/4W	1.2	KOHM +-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION
HTA0099	TR163	TRANSISTOR 2SA781K
HTA0224	TR163	TRANSISTOR 2SA1029D
HTA0099	TR164	TRANSISTOR 2SA781K
HTA0224	TR164	TRANSISTOR 2SA1029D
HTA0099	TR165	TRANSISTOR 2SA781K
HTA0224	TR165	TRANSISTOR 2SA1029D
HTA0099	TR166	TRANSISTOR 2SA781K
HTA0224	TR166	TRANSISTOR 2SA1029D
HTC0168	TR185	TRANSISTOR 2SC535C
HTC0168	TR186	TRANSISTOR 2SC535C
HTC0338	TR201	TRANSISTOR 2SC1906
HTC0338	TR202	TRANSISTOR 2SC1906
HTA0224	TR232	TRANSISTOR 2SA1029D
HTC0192	TR241	TRANSISTOR 2SC641KC
HTC0192	TR242	TRANSISTOR 2SC641KC
HTA0099	TR246	TRANSISTOR 2SA781K
HTA0224	TR246	TRANSISTOR 2SA1029D
HTA0099	TR331	TRANSISTOR 2SA781K
HTC0192	TR331	TRANSISTOR 2SC641KC
HTA0099	TR332	TRANSISTOR 2SA781K
HTC0192	TR332	TRANSISTOR 2SC641KC
HTC0721	TR349	TRANSISTOR 2SC2901
HTC0721	TR350	TRANSISTOR 2SC2901
HTC0721	TR365	TRANSISTOR 2SC2901
HTC0721	TR366	TRANSISTOR 2SC2901
HTC0669	TR371	TRANSISTOR 2SC2912S
HTC0925	TR371	TRANSISTOR 2SC3601E
HTC0669	TR372	TRANSISTOR 2SC2912S
HTC0925	TR372	TRANSISTOR 2SC3601E
HTA0258	TR375	TRANSISTOR 2SA1210S
HTA0364	TR375	TRANSISTOR 2SA1407E
HTA0258	TR376	TRANSISTOR 2SA1210S
HTA0364	TR376	TRANSISTOR 2SA1407E
HTA0099	TR377	TRANSISTOR 2SA781K
HTA0099	TR378	TRANSISTOR 2SA781K
HTC0148	TR390	TRANSISTOR 2SC458C
HTC0148	TR396	TRANSISTOR 2SC458C
HTA0224	TR1201	TRANSISTOR 2SA1029D
HTC0148	TR1208	TRANSISTOR 2SC458C
HTC0148	TR1209	TRANSISTOR 2SC458C
RME0912	JP1	R.METAL 1/8W 0 OHM
RME0860	R2	R.METAL 1/8W 47 OHM +-5%
RMS0043	R4	R.METAL 1/4W 900 KOHM +-0.5%
RME1163	R5	R.METAL 1/4W 111 KOHM +-0.5%
RMS0044	R7	R.METAL 1/4W 990 KOHM +-0.5%
RME1156	R8	R.METAL 1/4W 10.1 KOHM +-0.5%
RME0852	R9	R.METAL 1/8W 10 OHM +-5%
RME0864	R10	R.METAL 1/8W 100 OHM +-5%
RCE0749	R12	R.CARBON 1/4W 22 OHM +-5%
RCE0757	R15	R.CARBON 1/4W 100 OHM +-5%
RME1168	R16	R.METAL 1/4W 500 KOHM +-0.5%
RME1168	R17	R.METAL 1/4W 500 KOHM +-0.5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION			
RCE0749	R71	R.CARBON	1/4W	22	OHM +-5%
RCE0753	R72	R.CARBON	1/4W	47	OHM +-5%
RME1070	R73	R.METAL	1/4W	681	OHM +-1%
RME1191	R73	R.METAL	1/4W	432	OHM +-1%
RME1070	R74	R.METAL	1/4W	681	OHM +-1%
RME1191	R74	R.METAL	1/4W	432	OHM +-1%
RCE0775	R75	R.CARBON	1/4W	3.3	KOHM +-5%
RCE0765	R76	R.CARBON	1/4W	470	OHM +-5%
RCE0753	R77	R.CARBON	1/4W	47	OHM +-5%
RCE0693	R81	R.CARBON	1/2W	100	OHM +-5%
RME1107	R82	R.METAL	1/4W	86.6	OHM +-1%
RCE0757	R83	R.CARBON	1/4W	100	OHM +-5%
RCE0759	R84	R.CARBON	1/4W	150	OHM +-5%
RCE0783	R85	R.CARBON	1/4W	15	KOHM +-5%
RCE0757	R86	R.CARBON	1/4W	100	OHM +-5%
RCE0771	R86	R.CARBON	1/4W	1.5	KOHM +-5%
RCE0751	R87	R.CARBON	1/4W	33	OHM +-5%
RCE0755	R87	R.CARBON	1/4W	68	OHM +-5%
RCE0773	R88	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0777	R88	R.CARBON	1/4W	4.7	KOHM +-5%
RCE0773	R89	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0777	R89	R.CARBON	1/4W	4.7	KOHM +-5%
RCE0745	R90	R.CARBON	1/4W	10	OHM +-5%
RCE0763	R90	R.CARBON	1/4W	330	OHM +-5%
RCE0761	R91	R.CARBON	1/4W	220	OHM +-5%
RCE0763	R91	R.CARBON	1/4W	330	OHM +-5%
RCE0773	R93	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0777	R93	R.CARBON	1/4W	4.7	KOHM +-5%
RCE0771	R94	R.CARBON	1/4W	1.5	KOHM +-5%
RME1070	R94	R.METAL	1/4W	681	OHM +-1%
RCE0753	R95	R.CARBON	1/4W	47	OHM +-5%
RCE0753	R96	R.CARBON	1/4W	47	OHM +-5%
RCE0755	R96	R.CARBON	1/4W	68	OHM +-5%
RCE0773	R97	R.CARBON	1/4W	2.2	KOHM +-5%
RCE0781	R97	R.CARBON	1/4W	10	KOHM +-5%
RCE0767	R98	R.CARBON	1/4W	680	OHM +-5%
RCE0767	R98	R.CARBON	1/4W	680	OHM +-5%
RCE0767	R99	R.CARBON	1/4W	680	OHM +-5%
RCE0767	R99	R.CARBON	1/4W	680	OHM +-5%
RME0860	R102	R.METAL	1/8W	47	OHM +-5%
RMS0043	R104	R.METAL	1/4W	900	KOHM +-0.5%
RME1163	R105	R.METAL	1/4W	111	KOHM +-0.5%
RMS0044	R107	R.METAL	1/4W	990	KOHM +-0.5%
RME1156	R108	R.METAL	1/4W	10.1	KOHM +-0.5%
RME0852	R109	R.METAL	1/8W	10	OHM +-5%
RME0864	R110	R.METAL	1/8W	100	OHM +-5%
RCE0749	R112	R.CARBON	1/4W	22	OHM +-5%
RCE0757	R115	R.CARBON	1/4W	100	OHM +-5%
RME1168	R116	R.METAL	1/4W	500	KOHM +-0.5%
RME1168	R117	R.METAL	1/4W	500	KOHM +-0.5%
RCE0757	R118	R.CARBON	1/4W	100	OHM +-5%
RCE0793	R119	R.CARBON	1/4W	100	KOHM +-5%
RCE0793	R120	R.CARBON	1/4W	100	KOHM +-5%
RSE0434	R121	R.SOLID	1/4W	10	MOHM +-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION
RCE0791	R122	R.CARBON 1/4W 68 KOHM +-5%
RCE0777	R123	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0755	R125	R.CARBON 1/4W 68 OHM +-5%
RCE0757	R125	R.CARBON 1/4W 100 OHM +-5%
RME1079	R126	R.METAL 1/4W 3.92KOHM +-1%
RME1081	R126	R.METAL 1/4W 5.62KOHM +-1%
RCR3004	R128	R.CARBON 1/4W 10 OHM +-5%
RCE0773	R130	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R130	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0762	R133	R.CARBON 1/4W 270 OHM +-5%
RME1145	R134	R.METAL 1/4W 60.0 OHM +-0.5%
RCE0766	R135	R.CARBON 1/4W 560 OHM +-5%
RME1113	R135	R.METAL 1/4W 365 OHM +-1%
RME1154	R136	R.METAL 1/4W 600 OHM +-0.5%
RCE0745	R140	R.CARBON 1/4W 10 OHM +-5%
RCE0745	R141	R.CARBON 1/4W 10 OHM +-5%
RCE0764	R142	R.CARBON 1/4W 390 OHM +-5%
RCE0767	R143	R.CARBON 1/4W 680 OHM +-5%
RCE0766	R144	R.CARBON 1/4W 560 OHM +-5%
RCE0767	R144	R.CARBON 1/4W 680 OHM +-5%
RCE0745	R145	R.CARBON 1/4W 10 OHM +-5%
RME1157	R146	R.METAL 1/4W 16.0 KOHM +-0.5%
RME1162	R147	R.METAL 1/4W 80.0 KOHM +-0.5%
RME1155	R148	R.METAL 1/4W 4.00KOHM +-0.5%
RCE0769	R151	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0759	R159	R.CARBON 1/4W 150 OHM +-5%
RCE0761	R159	R.CARBON 1/4W 220 OHM +-5%
RCE0795	R160	R.CARBON 1/4W 150 KOHM +-5%
RCE0797	R160	R.CARBON 1/4W 220 KOHM +-5%
RCE0745	R161	R.CARBON 1/4W 10 OHM +-5%
RCE0745	R161	R.CARBON 1/4W 10 OHM +-5%
RCE0753	R162	R.CARBON 1/4W 47 OHM +-5%
RCE0755	R162	R.CARBON 1/4W 68 OHM +-5%
RCE0773	R163	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R163	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0773	R164	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R164	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0781	R165	R.CARBON 1/4W 10 KOHM +-5%
RCE0785	R166	R.CARBON 1/4W 22 KOHM +-5%
RCE0758	R167	R.CARBON 1/4W 120 OHM +-5%
RCE0749	R168	R.CARBON 1/4W 22 OHM +-5%
RCE0767	R169	R.CARBON 1/4W 680 OHM +-5%
RCE0770	R169	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0767	R170	R.CARBON 1/4W 680 OHM +-5%
RCE0770	R170	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0749	R171	R.CARBON 1/4W 22 OHM +-5%
RCE0753	R172	R.CARBON 1/4W 47 OHM +-5%
RME1070	R173	R.METAL 1/4W 681 OHM +-1%
RME1191	R173	R.METAL 1/4W 432 OHM +-1%
RME1070	R174	R.METAL 1/4W 681 OHM +-1%
RME1191	R174	R.METAL 1/4W 432 OHM +-1%
RCE0775	R175	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0765	R176	R.CARBON 1/4W 470 OHM +-5%
RCE0765	R177	R.CARBON 1/4W 470 OHM +-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION
RCE0775	R178	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0753	R179	R.CARBON 1/4W 47 OHM +-5%
RCE0757	R181	R.CARBON 1/4W 100 OHM +-5%
RCE0759	R184	R.CARBON 1/4W 150 OHM +-5%
RCE0783	R185	R.CARBON 1/4W 15 KOHM +-5%
RCE0757	R186	R.CARBON 1/4W 100 OHM +-5%
RCE0771	R186	R.CARBON 1/4W 1.5 KOHM +-5%
RCE0751	R187	R.CARBON 1/4W 33 OHM +-5%
RCE0755	R187	R.CARBON 1/4W 68 OHM +-5%
RCE0773	R188	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0777	R188	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0773	R189	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0777	R189	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0745	R190	R.CARBON 1/4W 10 OHM +-5%
RCE0763	R190	R.CARBON 1/4W 330 OHM +-5%
RCE0775	R191	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0776	R191	R.CARBON 1/4W 3.9 KOHM +-5%
RCE0770	R192	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0773	R192	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0770	R201	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0773	R201	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0770	R202	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0773	R202	R.CARBON 1/4W 2.2 KOHM +-5%
RME1063	R203	R.METAL 1/4W 182 OHM +-1%
RME1066	R203	R.METAL 1/4W 332 OHM +-1%
RME1063	R204	R.METAL 1/4W 182 OHM +-1%
RME1066	R204	R.METAL 1/4W 332 OHM +-1%
RCE0766	R205	R.CARBON 1/4W 560 OHM +-5%
RCE0769	R205	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0769	R206	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0782	R207	R.CARBON 1/4W 12 KOHM +-5%
RCE0785	R207	R.CARBON 1/4W 22 KOHM +-5%
RCE0792	R207A	R.CARBON 1/4W 82 KOHM +-5%
RME1064	R208	R.METAL 1/4W 221 OHM +-1%
RME1066	R208	R.METAL 1/4W 332 OHM +-1%
RME1064	R209	R.METAL 1/4W 221 OHM +-1%
RME1066	R209	R.METAL 1/4W 332 OHM +-1%
RCE0789	R210	R.CARBON 1/4W 47 KOHM +-5%
RCE0791	R210	R.CARBON 1/4W 68 KOHM +-5%
RCE0766	R211	R.CARBON 1/4W 560 OHM +-5%
RCE0768	R211	R.CARBON 1/4W 820 OHM +-5%
RCE0766	R212	R.CARBON 1/4W 560 OHM +-5%
RCE0768	R212	R.CARBON 1/4W 820 OHM +-5%
RCE0753	R213	R.CARBON 1/4W 47 OHM +-5%
RME1107	R213	R.METAL 1/4W 86.6 OHM +-1%
RCE0753	R214	R.CARBON 1/4W 47 OHM +-5%
RME1107	R214	R.METAL 1/4W 86.6 OHM +-1%
RCE0772	R215	R.CARBON 1/4W 1.8 KOHM +-5%
RCE0773	R215	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0772	R216	R.CARBON 1/4W 1.8 KOHM +-5%
RCE0773	R216	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0761	R217	R.CARBON 1/4W 220 OHM +-5%
RCE0748	R221	R.CARBON 1/4W 18 OHM +-5%
RCE0758	R222	R.CARBON 1/4W 120 OHM +-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION
RCE0748	R223	R.CARBON 1/4W 18 OHM +-5%
RCE0758	R224	R.CARBON 1/4W 120 OHM +-5%
RCE0789	R225	R.CARBON 1/4W 47 KOHM +-5%
RCE0761	R227	R.CARBON 1/4W 220 OHM +-5%
RCE0789	R228	R.CARBON 1/4W 47 KOHM +-5%
RCE0776	R229	R.CARBON 1/4W 3.9 KOHM +-5%
RCE0777	R230	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0777	R231	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0768	R232	R.CARBON 1/4W 820 OHM +-5%
RCE0769	R232	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0781	R233	R.CARBON 1/4W 10 KOHM +-5%
RCE0781	R234	R.CARBON 1/4W 10 KOHM +-5%
RCE0789	R235	R.CARBON 1/4W 47 KOHM +-5%
RCE0789	R236	R.CARBON 1/4W 47 KOHM +-5%
RCE0789	R237	R.CARBON 1/4W 47 KOHM +-5%
RCE0773	R238	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0773	R239	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0777	R241	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0777	R242	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0765	R243	R.CARBON 1/4W 470 OHM +-5%
RCE0765	R244	R.CARBON 1/4W 470 OHM +-5%
RCE0766	R245	R.CARBON 1/4W 560 OHM +-5%
RCE0770	R245	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0766	R246	R.CARBON 1/4W 560 OHM +-5%
RCE0770	R246	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0765	R247	R.CARBON 1/4W 470 OHM +-5%
RCE0768	R247	R.CARBON 1/4W 820 OHM +-5%
RCE0753	R248	R.CARBON 1/4W 47 OHM +-5%
RCE0769	R249	R.CARBON 1/4W 1.0 KOHM +-5%
RME1060	R331	R.METAL 1/4W 100 OHM +-1%
RME1062	R331	R.METAL 1/4W 150 OHM +-1%
RME1060	R332	R.METAL 1/4W 100 OHM +-1%
RME1062	R332	R.METAL 1/4W 150 OHM +-1%
RCE0777	R333	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0754	R336	R.CARBON 1/4W 56 OHM +-5%
RCE0758	R336	R.CARBON 1/4W 120 OHM +-5%
RCE0745	R337	R.CARBON 1/4W 10 OHM +-5%
RCE0753	R337	R.CARBON 1/4W 47 OHM +-5%
RCE0759	R338	R.CARBON 1/4W 150 OHM +-5%
RCE0775	R338	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0765	R339	R.CARBON 1/4W 470 OHM +-5%
RCE0766	R339	R.CARBON 1/4W 560 OHM +-5%
RCE0765	R340	R.CARBON 1/4W 470 OHM +-5%
RCE0766	R340	R.CARBON 1/4W 560 OHM +-5%
RCE0745	R341	R.CARBON 1/4W 10 OHM +-5%
RMR2784	R342	R.METAL 1 W 22 KOHM +-5%
RMR2784	R343	R.METAL 1 W 22 KOHM +-5%
RCE0755	R344	R.CARBON 1/4W 68 OHM +-5%
RCE0753	R345	R.CARBON 1/4W 47 OHM +-5%
RCE0753	R346	R.CARBON 1/4W 47 OHM +-5%
RCE0759	R347	R.CARBON 1/4W 150 OHM +-5%
RCE0759	R348	R.CARBON 1/4W 150 OHM +-5%
RCE0759	R349	R.CARBON 1/4W 150 OHM +-5%
RCE0759	R350	R.CARBON 1/4W 150 OHM +-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	DESCRIPTION
RCE0758	R355	R.CARBON 1/4W 120 OHM +-5%
RCE0758	R355	R.CARBON 1/4W 120 OHM +-5%
RCE0757	R356	R.CARBON 1/4W 100 OHM +-5%
RCE0777	R359	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0766	R360	R.CARBON 1/4W 560 OHM +-5%
RCE0766	R361	R.CARBON 1/4W 560 OHM +-5%
RCE0781	R362	R.CARBON 1/4W 10 KOHM +-5%
RME1065	R363	R.METAL 1/4W 267 OHM +-1%
RME1066	R363	R.METAL 1/4W 332 OHM +-1%
RME1065	R364	R.METAL 1/4W 267 OHM +-1%
RME1066	R364	R.METAL 1/4W 332 OHM +-1%
RCE0764	R365A	R.CARBON 1/4W 390 OHM +-5%
RCE0765	R365	R.CARBON 1/4W 470 OHM +-5%
RCE0769	R365	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0764	R366A	R.CARBON 1/4W 390 OHM +-5%
RCE0765	R366	R.CARBON 1/4W 470 OHM +-5%
RCE0769	R366	R.CARBON 1/4W 1.0 KOHM +-5%
RMR3724	R367	R.METAL 1 W 10 KOHM +-5%
RMR3778	R367	R.METAL 1 W 6.8 KOHM +-5%
RMR3724	R368	R.METAL 1 W 10 KOHM +-5%
RMR3778	R368	R.METAL 1 W 6.8 KOHM +-5%
RCE0749	R369	R.CARBON 1/4W 22 OHM +-5%
RCE0751	R371	R.CARBON 1/4W 33 OHM +-5%
RCE0751	R372	R.CARBON 1/4W 33 OHM +-5%
RCE0749	R373	R.CARBON 1/4W 22 OHM +-5%
RCE0749	R374	R.CARBON 1/4W 22 OHM +-5%
RCE0751	R375	R.CARBON 1/4W 33 OHM +-5%
RCE0751	R376	R.CARBON 1/4W 33 OHM +-5%
RCE0769	R377	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0769	R378	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0711	R381	R.CARBON 1/2W 3.3 KOHM +-5%
RCE0715	R381	R.CARBON 1/2W 6.8 KOHM +-5%
RCE0711	R382	R.CARBON 1/2W 3.3 KOHM +-5%
RCE0715	R382	R.CARBON 1/2W 6.8 KOHM +-5%
RCE0749	R383	R.CARBON 1/4W 22 OHM +-5%
RCE0749	R384	R.CARBON 1/4W 22 OHM +-5%
RCE0757	R385	R.CARBON 1/4W 100 OHM +-5%
RCE0761	R385	R.CARBON 1/4W 220 OHM +-5%
RCE0757	R386	R.CARBON 1/4W 100 OHM +-5%
RCE0761	R386	R.CARBON 1/4W 220 OHM +-5%
RCE0711	R387	R.CARBON 1/2W 3.3 KOHM +-5%
RCE0715	R387	R.CARBON 1/2W 6.8 KOHM +-5%
RCE0711	R388	R.CARBON 1/2W 3.3 KOHM +-5%
RCE0715	R388	R.CARBON 1/2W 6.8 KOHM +-5%
RCE0721	R389	R.CARBON 1/2W 22 KOHM +-5%
RCE0723	R389	R.CARBON 1/2W 33 KOHM +-5%
RCE0781	R390	R.CARBON 1/4W 10 KOHM +-5%
RCE0781	R390	R.CARBON 1/4W 10 KOHM +-5%
RCE0765	R391	R.CARBON 1/4W 470 OHM +-5%
RCE0777	R392	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0778	R392	R.CARBON 1/4W 5.6 KOHM +-5%
RCE0767	R393	R.CARBON 1/4W 680 OHM +-5%
RCE0775	R394	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0775	R395	R.CARBON 1/4W 3.3 KOHM +-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0785	R396	R.CARBON 1/4W 22 KOHM +-5%
RCE0414	R398	
RCE0414	R399	
RME1174	R1201	R.METAL 1/4W 2.00KOHM +-1%
RME1065	R1202	R.METAL 1/4W 267 OHM +-1%
RCE0783	R1203	R.CARBON 1/4W 15 KOHM +-5%
RCE0781	R1204	R.CARBON 1/4W 10 KOHM +-5%
RCE0783	R1205	R.CARBON 1/4W 15 KOHM +-5%
RCE0789	R1206	R.CARBON 1/4W 47 KOHM +-5%
RCE0781	R1207	R.CARBON 1/4W 10 KOHM +-5%
RCE0787	R1208	R.CARBON 1/4W 33 KOHM +-5%
RCE0781	R1209	R.CARBON 1/4W 10 KOHM +-5%
RCE0745	R1210	R.CARBON 1/4W 10 OHM +-5%
3173846 B	RM43	R.BLOCK FOR ATT
3173846 B	RM143	R.BLOCK FOR ATT
CCC1027		C.CERAMIC 50 V 220 PF+-10%
CCG0132	C2	C.CERAMIC 50 V 22 PF+-5%
CCG0139	C5	C.CERAMIC 50 V 47 PF+-5%
CCG0144	C9	C.CERAMIC 50 V 220 PF+-5%
CCG0142	C10	C.CERAMIC 50 V 82 PF+-5%
CCD0286	C16	C.CERAMIC 500 V 1000 PF+100-0%
CCD0328	C16	C.CERAMIC 500 V 1000 PF+100-0%
CCC0996	C18	C.CERAMIC 50 V 2 PF+-0.25PF
CCC1014	C20	C.CERAMIC 50 V 47 PF+-5%
CQA0117	C23	C.PLASTIC 50 V 1000 PF+-10%
CCC1014	C25	C.CERAMIC 50 V 47 PF+-5%
CES0541	C26	C.AL ELYC 10 V 47 UF+-20%
CES0541	C30	C.AL ELYC 10 V 47 UF+-20%
CCC0999	C32	C.CERAMIC 50 V 5 PF+-0.25PF
CCC1030	C35	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C40	C.AL ELYC 10 V 47 UF+-20%
CCC1007	C42	C.CERAMIC 50 V 22 PF+-5%
CES0541	C44	C.AL ELYC 10 V 47 UF+-20%
CES0492	C53	C.AL ELYC 16 V 10 UF+-20% BP
CCC1011	C61	C.CERAMIC 50 V 33 PF+-5%
CQA0097	C67	C.PLASTIC 50 V10000 PF+-10%
CQA0099	C67	C.PLASTIC 50 V22000 PF+-10%
CCC1365	C69	C.CERAMIC 50 V 680 PF+-10%
CCC1365	C71	C.CERAMIC 50 V 680 PF+-10%
CCC1030	C72	C.CERAMIC 50 V10000 PF+80-20%
CCC0997	C77	C.CERAMIC 50 V 3 PF+-0.25PF
CES0541	C83	C.AL ELYC 10 V 47 UF+-20%
CCC1034	C86	C.CERAMIC 50 V 68 PF+-5%
CCC1365	C86	C.CERAMIC 50 V 680 PF+-10%
CCC1365	C90	C.CERAMIC 50 V 680 PF+-10%
CCC1365	C91	C.CERAMIC 50 V 680 PF+-10%
CES0541	C94	C.AL ELYC 10 V 47 UF+-20%
CCC1030	C96	C.CERAMIC 50 V10000 PF+80-20%
CQA0131	C97	C.PLASTIC 50 V 0.22UF+-10%
CCG0132	C102	C.CERAMIC 50 V 22 PF+-5%
CCG0139	C105	C.CERAMIC 50 V 47 PF+-5%
CCG0144	C109	C.CERAMIC 50 V 220 PF+-5%

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
CCG0142	C110	C.CERAMIC 50 V 82 PF+-5%
CCD0286	C116	C.CERAMIC 500 V 1000 PF+100-0%
CCD0328	C116	C.CERAMIC 500 V 1000 PF+100-0%
CCC0996	C118	C.CERAMIC 50 V 2 PF+-0.25PF
CCC1014	C120	C.CERAMIC 50 V 47 PF+-5%
CQA0117	C123	C.PLASTIC 50 V 1000 PF+-10%
CCC1014	C125	C.CERAMIC 50 V 47 PF+-5%
CES0541	C126	C.AL ELYC 10 V 47 UF+-20%
CES0541	C130	C.AL ELYC 10 V 47 UF+-20%
CCC0999	C132	C.CERAMIC 50 V 5 PF+-0.25PF
CES0541	C140	C.AL ELYC 10 V 47 UF+-20%
CCC1007	C142	C.CERAMIC 50 V 22 PF+-5%
CES0541	C144	C.AL ELYC 10 V 47 UF+-20%
CQA0097	C167	C.PLASTIC 50 V10000 PF+-10%
CQA0099	C167	C.PLASTIC 50 V22000 PF+-10%
CCC1365	C169	C.CERAMIC 50 V 680 PF+-10%
CCC1365	C171	C.CERAMIC 50 V 680 PF+-10%
CCC1030	C179	C.CERAMIC 50 V10000 PF+80-20%
CCC1034	C186	C.CERAMIC 50 V 68 PF+-5%
CCC1365	C186	C.CERAMIC 50 V 680 PF+-10%
CCC1365	C190	C.CERAMIC 50 V 680 PF+-10%
CCC1030	C201	C.CERAMIC 50 V10000 PF+80-20%
CCC1014	C207	C.CERAMIC 50 V 47 PF+-5%
CCC1026	C207	C.CERAMIC 50 V 150 PF+-10%
CCC1027	C207A	C.CERAMIC 50 V 220 PF+-10%
CQA0124	C207A	C.PLASTIC 50 V 0.1 UF+-10%
CEX0189	C210	C.AL ELYC 16 V 10 UF+-20% B
CCC1002	C217	C.CERAMIC 50 V 10 PF+-5PF
CCC1365	C221	C.CERAMIC 50 V 680 PF+-10%
CES0541	C222	C.AL ELYC 10 V 47 UF+-20%
CCC1365	C223	C.CERAMIC 50 V 680 PF+-10%
CES0541	C224	C.AL ELYC 10 V 47 UF+-20%
CCC1030	C241	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C242	C.AL ELYC 10 V 47 UF+-20%
CCC1007	C243	C.CERAMIC 50 V 22 PF+-5%
CCC1007	C244	C.CERAMIC 50 V 22 PF+-5%
CQA0097	C245	C.PLASTIC 50 V10000 PF+-10%
CCC1025	C248	C.CERAMIC 50 V 100 PF+-10%
CCC1032	C248	C.CERAMIC 50 V 82 PF+-5%
CCC0999	C249	C.CERAMIC 50 V 5 PF+-0.25PF
CES0541	C270	C.AL ELYC 10 V 47 UF+-20%
CES0541	C271	C.AL ELYC 10 V 47 UF+-20%
CET0033	C301	C.AL ELYC 160 V 1UF
CES0541	C302	C.AL ELYC 10 V 47 UF+-20%
CES0541	C303	C.AL ELYC 10 V 47 UF+-20%
CES0541	C304	C.AL ELYC 10 V 47 UF+-20%
CES0541	C305	C.AL ELYC 10 V 47 UF+-20%
CCC1009	C337	C.CERAMIC 50 V 27 PF+-5%
CCC1032	C337	C.CERAMIC 50 V 82 PF+-5%
CCC1011	C338	C.CERAMIC 50 V 33 PF+-5%
CCC1029	C345	C.CERAMIC 50 V 1000 PF+80-20%
CCC1029	C346	C.CERAMIC 50 V 1000 PF+80-20%
CCC1002	C355	C.CERAMIC 50 V 10 PF+-5PF
CCC1002	C355	C.CERAMIC 50 V 10 PF+-5PF

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
CCC1032	C358	C.CERAMIC 50 V 82 PF+-5%
CCC1030	C363	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C364	C.AL ELYC 10 V 47 UF+-20%
CCC1007	C365	C.CERAMIC 50 V 22 PF+-5%
CCC1034	C365	C.CERAMIC 50 V 68 PF+-5%
CCC1002	C366	C.CERAMIC 50 V 10 PF+-5PF
CCC1014	C366	C.CERAMIC 50 V 47 PF+-5%
CCD0273	C367	C.CERAMIC 500 V 2 PF+-0.25PF
CCD0273	C367	C.CERAMIC 500 V 2 PF+-0.25PF
CCD0273	C368	C.CERAMIC 500 V 2 PF+-0.25PF
CCD0273	C368	C.CERAMIC 500 V 2 PF+-0.25PF
CCD0217	C379	C.CERAMIC 500 V 1000 PF+-10%
CCD0217	C380	C.CERAMIC 500 V 1000 PF+-10%
CCC0591	C385	C.CERAMIC 500 V10000 PF+100-0%
CCC0591	C386	C.CERAMIC 500 V10000 PF+100-0%
CCD0287	C389	C.CERAMIC 500 V 4700 PF+100-0%
CCC1002	C1201	C.CERAMIC 50 V 10 PF+-5PF
CQA0091	C1202	C.PLASTIC 50 V 1000 PF+-10%
CQA0099	C1208	C.PLASTIC 50 V22000 PF+-10%
CES0541	C1210	C.AL ELYC 10 V 47 UF+-20%
3180017 A		CABLE.ASSY 3180017 AA
3180017 Q		CABLE.ASSY 3180017 QA
3180017 Q		CABLE.ASSY 3180017 QB
8529028 G		CABLE ASSY 8529028 GA
8529028 G		CABLE ASSY 8529028 GB
8529028 V		CABLE ASSY 8529028 VB
8529028 X		CABLE ASSY 8529028 XA
841221 A		CORE L1-RH0303
JBB0030		CONNECTOR B4P-SHF-GB
JBB0055		CONNECTOR B7P-SHF-GB
8402067	ATT1	SW.ROTARY ADR-255S-2A
8402067	ATT101	SW.ROTARY ADR-255S-2A
CVE0059	CV3	C.VARIABLE ECR-HA010A41
CVE0065	CV4	C.VARIABLE ECR-HA007A41
CVE0059	CV6	C.VARIABLE ECR-HA010A41
CVE0064	CV7	C.VARIABLE ECR-HA003A41
CVE0059	CV103	C.VARIABLE ECR-HA010A41
CVE0065	CV104	C.VARIABLE ECR-HA007A41
CVE0059	CV106	C.VARIABLE ECR-HA010A41
CVE0064	CV107	C.VARIABLE ECR-HA003A41
CVE0060	CV161	C.VARIABLE ECR-HA020D41
CVE0062	CV161	C.VARIABLE ECR-HA040E41
CVE0060	CV337	C.VARIABLE ECR-HA020D41
CVE0062	CV337	C.VARIABLE ECR-HA040E41
CVE0062	CV355	C.VARIABLE ECR-HA040E41
CVE0060	CV366	C.VARIABLE ECR-HA020D41
CVE0062	CV366	C.VARIABLE ECR-HA040E41
TLE0107	L34	COIL ELE-Y-R47MA
TLF0067	L98	COIL FL5H 100 UH +-10%
TLE0107	L134	COIL ELE-Y-R47MA

VC-6023, VC-6024 PEF-620 INPUT, V-OUT, CAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
841221 A	L171	CORE L1-RH0303
TLE0091	L385	COIL ELE-Y 2R2MA
TLE0109	L385	INDUCTOR ELE-Y R68 MA
TLE0091	L386	COIL ELE-Y 2R2MA
TLE0109	L386	INDUCTOR ELE-Y R68 MA
JBB0021	P2	CONNECTOR B3B-XH-A
JBB0022	P3	CONNECTOR B6B-XH-A
JBB0021	P50	CONNECTOR B3B-XH-A
JBB0021	P90	CONNECTOR B3B-XH-A
JBB0021	P102	CONNECTOR B3B-XH-A
JBB0021	P201	CONNECTOR B3B-XH-A
JBB0021	P202	CONNECTOR B3B-XH-A
JBB0021	P203	CONNECTOR B3B-XH-A
JBB0021	P211	CONNECTOR B3B-XH-A
JBB0021	P301	CONNECTOR B3B-XH-A
JBB0021	P302	CONNECTOR B3B-XH-A
JBB0021	P304	CONNECTOR B3B-XH-A
JBB0021	P311	CONNECTOR B3B-XH-A
JBB0021	P1201	CONNECTOR B3B-XH-A
JBB0021	P1206	CONNECTOR B3B-XH-A
8363311 A	R52	
8363311 A	R226	
BSA0031	R337	
RNE0057	RV22	VR.METAL EVN 49C00YB54(50K)
RNE0048	RV33	VR.METAL EVN 39C00YB22(200)
RDE0003	RV61	VR.CARBON EVH-YK3325B14
8348452	RV61	VR.CARBON EVH-CCAK20B14 10 KOHM
RNE0049	RV62	VR.METAL EVN 39C00YB12(100)
RNE0047	RV63	VR.METAL EVN 39C00YB54(50K)
RNE0042	RV85	VR.METAL EVN-39C 00Y B14 10KOHM
RNE0057	RV122	VR.METAL EVN 49C00YB54(50K)
RNE0048	RV133	VR.METAL EVN 39C00YB22(200)
RDE0003	RV161	VR.CARBON EVH-YK3325B14
RNE0049	RV162	VR.METAL EVN 39C00YB12(100)
RNE0047	RV163	VR.METAL EVN 39C00YB54(50K)
RNE0042	RV185	VR.METAL EVN-39C 00Y B14 10KOHM
RNE0048	RV339	VR.METAL EVN 39C00YB22(200)
RNE0050	RV339	VR.METAL EVN 39C00YB52(500)
RNE0058	RV1201	VR.METAL EVN 39C00YB13(1K)
3165210	S201	SW.ROTARY SBU 1025

SEP, H, Z, POWER, HV(PEF-621)

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
IDH0403	IC401	IC,DIGITAL HD74S00P
IDH0467	IC401	IC,DIGITAL HD74LS00P
IDH0429	IC501	IC,DIGITAL HD74S74P
IDH1238	IC501	IC,DIGITAL HD74LS74AP/SN74LS74AN
IDH1223	IC502	IC,DIGITAL HD74LS03P/SN74LS03N
IDH0802	IC550	IC,DIGITAL HD14053BP/MC14053BCP
IDH1222	IC571	IC,DIGITAL HD74LS02P/SN74LS02N
IDH1238	IC801	IC,DIGITAL HD74LS74AP/SN74LS74AN
IPM0012	IC1111	IC UPC7808HF
ILM0342	IC1121	IC,ANALOG UPC7908
IPM0011	IC1131	IC UPC7805HF
HDS0437	D401	DIODE 1SS133
HDS0437	D444	DIODE 1SS133
HDS0437	D501	DIODE 1SS133
HDM0051	D520	DIODE MA161
HDM0051	D521	DIODE MA161
HDM0051	D522	DIODE MA161
HDS0437	D530	DIODE 1SS133
HDM0051	D535	DIODE MA161
HDS0437	D536	DIODE 1SS133
HDS0437	D541	DIODE 1SS133
HDS0437	D571	DIODE 1SS133
HDS0437	D572	DIODE 1SS133
HDS0437	D573	DIODE 1SS133
HDS0437	D574	DIODE 1SS133
HDS0437	D820	DIODE 1SS133
HDS0437	D821	DIODE 1SS133
HDS0437	D851	DIODE 1SS133
HDS0437	D852	DIODE 1SS133
HDS0437	D853	DIODE 1SS133
HDS0437	D854	DIODE 1SS133
HDS0437	D901	DIODE 1SS133
HDS0437	D902	DIODE 1SS133
HDS0437	D910	DIODE 1SS133
HDS0437	D920	DIODE 1SS133
HDS0437	D921	DIODE 1SS133
HDY0031	D1012	DIODE Y10GA
HDY0031	D1013	DIODE Y10GA
HDH0072	D1020	DIODE,ZEN HZ22
HDS0250	D1021	DIODE 1SS83
HDS0250	D1022	DIODE 1SS83
HDS0250	D1023	DIODE 1SS83
HDS0250	D1024	DIODE 1SS83
HDH0072	D1038	DIODE,ZEN HZ22
HDS0476	D1101	DIODE S5566J
HDS0476	D1102	DIODE S5566J
HDS0476	D1103	DIODE S5566J
HDS0476	D1104	DIODE S5566J
HDS0476	D1105	DIODE S5566J
HDS0476	D1106	DIODE S5566J
HDS0475	D1111	DIODE S5566B
HDS0475	D1112	DIODE S5566B
HDS0475	D1113	DIODE S5566B

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
HDS0475	D1114	DIODE S5566B
HTK0099	TR401	TRANSISTOR 2SK404E
HTC0148	TR402	TRANSISTOR 2SC458C
HTC0168	TR431	TRANSISTOR 2SC535C
HTC0168	TR432	TRANSISTOR 2SC535C
HTA0224	TR441	TRANSISTOR 2SA1029D
HTK0099	TR470	TRANSISTOR 2SK404E
HTA0224	TR503	TRANSISTOR 2SA1029D
HTC0148	TR514	TRANSISTOR 2SC458C
HTK0081	TR520	TRANSISTOR 2SK304E
HTC0148	TR521	TRANSISTOR 2SC458C
HTC0148	TR522	TRANSISTOR 2SC458C
HTC0148	TR532	TRANSISTOR 2SC458C
HTC0148	TR544	TRANSISTOR 2SC458C
HTC0148	TR545	TRANSISTOR 2SC458C
HTC0148	TR811	TRANSISTOR 2SC458C
HTC0148	TR812	TRANSISTOR 2SC458C
HTA0099	TR821	TRANSISTOR 2SA781K
HTA0099	TR822	TRANSISTOR 2SA781K
HTA0099	TR831	TRANSISTOR 2SA781K
HTA0099	TR832	TRANSISTOR 2SA781K
HTA0224	TR843	TRANSISTOR 2SA1029D
HTA0224	TR844	TRANSISTOR 2SA1029D
HTC0649	TR851	TRANSISTOR 2SC2610
HTC0722	TR851	TRANSISTOR 2SC2909S
HTC0649	TR852	TRANSISTOR 2SC2610
HTC0722	TR852	TRANSISTOR 2SC2909S
HTC0649	TR853	TRANSISTOR 2SC2610
HTC0722	TR853	TRANSISTOR 2SC2909S
HTC0649	TR854	TRANSISTOR 2SC2610
HTC0722	TR854	TRANSISTOR 2SC2909S
HTA0224	TR860	TRANSISTOR 2SA1029D
HTA0224	TR861	TRANSISTOR 2SA1029D
HTC0192	TR901	TRANSISTOR 2SC641KC
HTC0148	TR906	TRANSISTOR 2SC458C
HTA0277	TR910	TRANSISTOR 2SA1207S
HTC0722	TR912	TRANSISTOR 2SC2909S
HTA0104	TR931	TRANSISTOR 2SA778AK
HTK0081	TR1001	TRANSISTOR 2SK304E
HTK0081	TR1001	TRANSISTOR 2SK304E
HTA0224	TR1002	TRANSISTOR 2SA1029D
HTD0155	TR1006	TRANSISTER 2SD313E
HTA0104	TR1101	TRANSISTOR 2SA778AK
HTC0671	TR1102	TRANSISTOR 2SC1505L
HTA0224	TR1103	TRANSISTOR 2SA1029D
HTC0148	TR1104	TRANSISTOR 2SC458C
HTC0148	TR1348	TRANSISTOR 2SC458C
HTA0224	TR1349	TRANSISTOR 2SA1029D
RCE0800	R401	R.CARBON 1/4W 470 KOHM +-5%
RCE0755	R402	R.CARBON 1/4W 68 OHM +-5%
RCE0764	R404	R.CARBON 1/4W 390 OHM +-5%
RCE0800	R406	R.CARBON 1/4W 470 KOHM +-5%

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0761	R407	R.CARBON 1/4W 220 OHM +-5%
RCE0757	R408	R.CARBON 1/4W 100 OHM +-5%
RCE0777	R409	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0779	R409	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0772	R410	R.CARBON 1/4W 1.8 KOHM +-5%
RCE0769	R417	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0779	R418	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0781	R420	R.CARBON 1/4W 10 KOHM +-5%
RCE0745	R425	R.CARBON 1/4W 10 OHM +-5%
RCE0757	R430	R.CARBON 1/4W 100 OHM +-5%
RCE0767-	R432	R.CARBON 1/4W 680 OHM +-5%
RCE0768	R433	R.CARBON 1/4W 820 OHM +-5%
RCE0769	R433	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0689	R434	R.CARBON 1/2W 47 OHM +-5%
RCE0765	R434A	R.CARBON 1/4W 470 OHM +-5%
RCE0774	R435	R.CARBON 1/4W 2.7 KOHM +-5%
RCE0775	R436	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0775	R437	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0789	R438	R.CARBON 1/4W 47 KOHM +-5%
RCE0789	R439	R.CARBON 1/4W 47 KOHM +-5%
RCE0769	R441	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0789	R443	R.CARBON 1/4W 47 KOHM +-5%
RCE0771	R444	R.CARBON 1/4W 1.5 KOHM +-5%
RCE0777	R445	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0777	R450	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0785	R452	R.CARBON 1/4W 22 KOHM +-5%
RCE0745	R460	R.CARBON 1/4W 10 OHM +-5%
RCE0749	R460	R.CARBON 1/4W 22 OHM +-5%
RCE0745	R501	R.CARBON 1/4W 10 OHM +-5%
RCE0765	R502	R.CARBON 1/4W 470 OHM +-5%
RCE0769	R502	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0777	R503	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0789	R504	R.CARBON 1/4W 47 KOHM +-5%
RCE0775	R505	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0789	R506	R.CARBON 1/4W 47 KOHM +-5%
RCE0781	R507	R.CARBON 1/4W 10 KOHM +-5%
RCE0745	R508	R.CARBON 1/4W 10 OHM +-5%
RCE0773	R509	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0753	R510	R.CARBON 1/4W 47 OHM +-5%
RCE0780	R513	R.CARBON 1/4W 8.2 KOHM +-5%
RCE0771	R514	R.CARBON 1/4W 1.5 KOHM +-5%
RCE0783	R515	R.CARBON 1/4W 15 KOHM +-5%
RCE0781	R516	R.CARBON 1/4W 10 KOHM +-5%
RCE0773	R519	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0773	R520	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0789	R521	R.CARBON 1/4W 47 KOHM +-5%
RCE0761	R522	R.CARBON 1/4W 220 OHM +-5%
RCE0777	R523	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0789	R524	R.CARBON 1/4W 47 KOHM +-5%
RCE0793	R524	R.CARBON 1/4W 100 KOHM +-5%
RCE0753	R525	R.CARBON 1/4W 47 OHM +-5%
RCE0779	R526	R.CARBON 1/4W 6.8 KOHM +-5%
RSE0434	R527	R.SOLID 1/4W 10 MOHM +-5%
RCE0736	R528	R.CARBON 1/2W 1.5 MOHM +-5%

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0757	R529	R.CARBON 1/4W 100 OHM +-5%
RCE0765	R530	R.CARBON 1/4W 470 OHM +-5%
RME1174	R531	R.METAL 1/4W 2.00KOHM +-1%
RME1243	R531	R.METAL 1/4W 3.01KOHM +-1%
RME1078	R532	R.METAL 1/4W 3.32KOHM +-1%
RME1080	R532	R.METAL 1/4W 4.75KOHM +-1%
RCE0774	R533	R.CARBON 1/4W 2.7 KOHM +-5%
RCE0775	R533	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0785	R534	R.CARBON 1/4W 22 KOHM +-5%
RCE0773	R535	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0773	R536	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0774	R536	R.CARBON 1/4W 2.7 KOHM +-5%
RCE0773	R537	R.CARBON 1/4W 2.2 KOHM +-5%
RCR3306	R538	R.CARBON 1/4W 15 KOHM +-5%
RCE0766	R540	R.CARBON 1/4W 560 OHM +-5%
RCE0764	R541	R.CARBON 1/4W 390 OHM +-5%
RCE0770	R542	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0783	R544	R.CARBON 1/4W 15 KOHM +-5%
RCE0780	R545	R.CARBON 1/4W 8.2 KOHM +-5%
RCE0773	R546	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R547	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0778	R548	R.CARBON 1/4W 5.6 KOHM +-5%
RCE0781	R549	R.CARBON 1/4W 10 KOHM +-5%
RCE0778	R550	R.CARBON 1/4W 5.6 KOHM +-5%
RCE0777	R551	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0775	R552	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0781	R553	R.CARBON 1/4W 10 KOHM +-5%
RCE0765	R554	R.CARBON 1/4W 470 OHM +-5%
RCE0765	R555	R.CARBON 1/4W 470 OHM +-5%
RCE0767	R556	R.CARBON 1/4W 680 OHM +-5%
RCE0769	R571	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0776	R572	R.CARBON 1/4W 3.9 KOHM +-5%
RCE0765	R573	R.CARBON 1/4W 470 OHM +-5%
RCE0783	R574	R.CARBON 1/4W 15 KOHM +-5%
RCE0745	R576	R.CARBON 1/4W 10 OHM +-5%
RCE0776	R578	R.CARBON 1/4W 3.9 KOHM +-5%
RCE0769	R581	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0798	R582	R.CARBON 1/4W 330 KOHM +-5%
RCE0779	R801	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0761	R802	R.CARBON 1/4W 220 OHM +-5%
RCE0781	R804	R.CARBON 1/4W 10 KOHM +-5%
RCE0765	R805	R.CARBON 1/4W 470 OHM +-5%
RCE0753	R806	R.CARBON 1/4W 47 OHM +-5%
RCE0761	R807	R.CARBON 1/4W 220 OHM +-5%
RCE0769	R808	R.CARBON 1/4W 1.0 KOHM +-5%
RME1076	R811	R.METAL 1/4W 2.21KOHM +-1%
RME1076	R812	R.METAL 1/4W 2.21KOHM +-1%
RCE0770	R813	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0770	R814	R.CARBON 1/4W 1.2 KOHM +-5%
RCE0769	R821	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0773	R821	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0769	R822	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0773	R822	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0745	R823	R.CARBON 1/4W 10 OHM +-5%

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0774	R824	R.CARBON 1/4W 2.7 KOHM +-5%
RCE0779	R824	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0757	R831	R.CARBON 1/4W 100 OHM +-5%
RCE0762	R831	R.CARBON 1/4W 270 OHM +-5%
RCE0749	R832	R.CARBON 1/4W 22 OHM +-5%
RME1073	R833	R.METAL 1/4W 1.21KOHM +-1%
RME1076	R833	R.METAL 1/4W 2.21KOHM +-1%
RME1073	R834	R.METAL 1/4W 1.21KOHM +-1%
RME1076	R834	R.METAL 1/4W 2.21KOHM +-1%
RCE0761	R840	R.CARBON 1/4W 220 OHM +-5%
RCE0765	R840	R.CARBON 1/4W 470 OHM +-5%
RME1074	R841	R.METAL 1/4W 1.50KOHM +-1%
RME1079	R841	R.METAL 1/4W 3.92KOHM +-1%
RME1074	R842	R.METAL 1/4W 1.50KOHM +-1%
RME1079	R842	R.METAL 1/4W 3.92KOHM +-1%
RCE0773	R843	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R843	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0773	R844	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R844	R.CARBON 1/4W 3.3 KOHM +-5%
RMR3726	R845	R.METAL 1 W 22 KOHM +-5%
RMR3779	R845	R.METAL 1 W 100 KOHM +-5%
RMR3726	R846	R.METAL 1 W 22 KOHM +-5%
RMR3779	R846	R.METAL 1 W 100 KOHM +-5%
RCE0755	R847	R.CARBON 1/4W 68 OHM +-5%
RCE0714	R851	R.CARBON 1/2W 5.6 KOHM +-5%
RCE0721	R851	R.CARBON 1/2W 22 KOHM +-5%
RCE0714	R852	R.CARBON 1/2W 5.6 KOHM +-5%
RCE0721	R852	R.CARBON 1/2W 22 KOHM +-5%
RCE0714	R853	R.CARBON 1/2W 5.6 KOHM +-5%
RCE0721	R853	R.CARBON 1/2W 22 KOHM +-5%
RCE0714	R854	R.CARBON 1/2W 5.6 KOHM +-5%
RCE0721	R854	R.CARBON 1/2W 22 KOHM +-5%
RCE0714	R855	R.CARBON 1/2W 5.6 KOHM +-5%
RCE0721	R855	R.CARBON 1/2W 22 KOHM +-5%
RCE0714	R856	R.CARBON 1/2W 5.6 KOHM +-5%
RCE0721	R856	R.CARBON 1/2W 22 KOHM +-5%
RCE0763	R857	R.CARBON 1/4W 330 OHM +-5%
RCE0763	R858	R.CARBON 1/4W 330 OHM +-5%
RZZ0031	R859	R.FUSING 1/4W 220 OHM +-5%
RZZ0032	R859	R.FUSING 1/4W 470 OHM +-5%
RCE0775	R860	R.CARBON 1/4W 3.3 KOHM +-5%
RME1089	R860	R.METAL 1/4W 26.7 KOHM +-1%
RCE0777	R861	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0777	R862	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0777	R863	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0765	R864	R.CARBON 1/4W 470 OHM +-5%
RCE0765	R865	R.CARBON 1/4W 470 OHM +-5%
RME1085	R866	R.METAL 1/4W 12.1 KOHM +-1%
RME1090	R866	R.METAL 1/4W 33.2 KOHM +-1%
RCE0745	R869	R.CARBON 1/4W 10 OHM +-5%
RCE0757	R871	R.CARBON 1/4W 100 OHM +-5%
RCE0757	R872	R.CARBON 1/4W 100 OHM +-5%
RCE0761	R873	R.CARBON 1/4W 220 OHM +-5%
RCE0761	R874	R.CARBON 1/4W 220 OHM +-5%

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PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0761	R880	R.CARBON 1/4W 220 OHM +-5%
RCE0761	R881	R.CARBON 1/4W 220 OHM +-5%
RCE0787	R901	R.CARBON 1/4W 33 KOHM +-5%
RCE0789	R901	R.CARBON 1/4W 47 KOHM +-5%
RCE0779	R902	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0779	R903	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0784	R903	R.CARBON 1/4W 18 KOHM +-5%
RCE0723	R904	R.CARBON 1/2W 33 KOHM +-5%
RCE0725	R904	R.CARBON 1/2W 47 KOHM +-5%
RCE0792	R905	R.CARBON 1/4W 82 KOHM +-5%
RCE0793	R906	R.CARBON 1/4W 100 KOHM +-5%
RCE0793	R906	R.CARBON 1/4W 100 KOHM +-5%
RCE0757	R907	R.CARBON 1/4W 100 OHM +-5%
RCE0771	R908	R.CARBON 1/4W 1.5 KOHM +-5%
RCE0773	R908	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0797	R909	R.CARBON 1/4W 220 KOHM +-5%
RCE0798	R909	R.CARBON 1/4W 330 KOHM +-5%
RCE0783	R910	R.CARBON 1/4W 15 KOHM +-5%
RCE0793	R910	R.CARBON 1/4W 100 KOHM +-5%
RCE0769	R911	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0781	R911	R.CARBON 1/4W 10 KOHM +-5%
RCE0745	R912	R.CARBON 1/4W 10 OHM +-5%
RCE0745	R912	R.CARBON 1/4W 10 OHM +-5%
RCE0761	R915	R.CARBON 1/4W 220 OHM +-5%
RCE0777	R921	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0779	R921	R.CARBON 1/4W 6.8 KOHM +-5%
RCE0776	R930	R.CARBON 1/4W 3.9 KOHM +-5%
RCE0776	R930	R.CARBON 1/4W 3.9 KOHM +-5%
RCE0787	R931	R.CARBON 1/4W 33 KOHM +-5%
RCE0787	R931	R.CARBON 1/4W 33 KOHM +-5%
RMS0018	R1001	R.METAL 1/4W 1 MOHM +-1%
RMS0023	R1001	R.METAL 1/4W 1.43MOHM +-0.5%
RCE0777	R1002	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0781	R1002	R.CARBON 1/4W 10 KOHM +-5%
RCE0797	R1003	R.CARBON 1/4W 220 KOHM +-5%
RCE0769	R1004	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0775	R1005	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0777	R1005	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0757	R1006	R.CARBON 1/4W 100 OHM +-5%
RCE0789	R1012	R.CARBON 1/4W 47 KOHM +-5%
RCE0715	R1014	R.CARBON 1/2W 6.8 KOHM +-5%
RCE0745	R1016	R.CARBON 1/4W 10 OHM +-5%
RCE0800	R1016	R.CARBON 1/4W 470 KOHM +-5%
RMV0004	R1017	R.METAL 1/2W 22.1 MOHM +-1%
RCE0798	R1020	R.CARBON 1/4W 330 KOHM +-5%
RCE0773	R1021	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0785	R1021	R.CARBON 1/4W 22 KOHM +-5%
RCE0777	R1023	R.CARBON 1/4W 4.7 KOHM +-5%
RSE0434	R1024	R.SOLID 1/4W 10 MOHM +-5%
RCE0781	R1033	R.CARBON 1/4W 10 KOHM +-5%
RCE0785	R1034	R.CARBON 1/4W 22 KOHM +-5%
RCE0793	R1038	R.CARBON 1/4W 100 KOHM +-5%
RCE0798	R1038	R.CARBON 1/4W 330 KOHM +-5%
RCE0729	R1101	R.CARBON 1/2W 100 KOHM +-5%

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0425	R1102	R.CARBON 1/4W 1K OHM +-5%
RCE0774	R1103	R.CARBON 1/4W 2.7 KOHM +-5%
RCE0775	R1103	R.CARBON 1/4W 3.3 KOHM +-5%
RME1091	R1104	R.METAL 1/4W 39.2 KOHM +-1%
RME1096	R1104	R.METAL 1/4W 100 KOHM +-1%
RCE0775	R1105	R.CARBON 1/4W 3.3 KOHM +-5%
RCE0777	R1105	R.CARBON 1/4W 4.7 KOHM +-5%
RME1084	R1106	R.METAL 1/4W 10.0 KOHM +-1%
RME1086	R1106	R.METAL 1/4W 15.0 KOHM +-1%
RCE0785	R1107	R.CARBON 1/4W 22 KOHM +-5%
RCE0769	R1109	R.CARBON 1/4W 1.0 KOHM +-5%
RCE0761	R1110	R.CARBON 1/4W 220 OHM +-5%
RZZ0031	R1111	R.FUSING 1/4W 220 OHM +-5%
RZZ0031	R1121	R.FUSING 1/4W 220 OHM +-5%
RCE0783	R1124	R.CARBON 1/4W 15 KOHM +-5%
RCE0753	R1125	R.CARBON 1/4W 47 OHM +-5%
RCE0685	R1131	R.CARBON 1/2W 22 OHM +-5%
RCE0689	R1131	R.CARBON 1/2W 47 OHM +-5%
RCE0689	R1132	R.CARBON 1/2W 47 OHM +-5%
RCE0800	R1141	R.CARBON 1/4W 470 KOHM +-5%
RCE0787	R1142	R.CARBON 1/4W 33 KOHM +-5%
RCE0749	R1350	R.CARBON 1/4W 22 OHM +-5%
3173847 B	RM520	R.BLOCK FOR TIMING
CCD0279	C402	C.CERAMIC 500 V 22 PF+-5%
CQX0068	C403	C.PLASTIC 400 V47000 PF+-20%
CCC1029	C404	C.CERAMIC 50 V 1000 PF+80-20%
CCC0999	C407	C.CERAMIC 50 V 5 PF+-0.25PF
CES0541	C408	C.AL ELYC 10 V 47 UF+-20%
CES0213	C417	C.AL ELYC 16 V 10 UF+-20% BP
CCC1030	C418	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C425	C.AL ELYC 10 V 47 UF+-20%
CES0249	C442	C.AL ELYC 50 V 1 UF+-20% BP
CES0541	C444	C.AL ELYC 10 V 47 UF+-20%
CES0541	C460	C.AL ELYC 10 V 47 UF+-20%
CCC1030	C501	C.CERAMIC 50 V10000 PF+80-20%
CCC1133	C505	C.CERAMIC 50 V 1 PF+-0.25PF
CES0541	C507	C.AL ELYC 10 V 47 UF+-20%
CCC1030	C508	C.CERAMIC 50 V10000 PF+80-20%
CCC1030	C510	C.CERAMIC 50 V10000 PF+80-20%
CES0036	C511	C.AL ELYC 25 V 22 UF+-20%
CES0541	C519	C.AL ELYC 10 V 47 UF+-20%
CCC1032	C520	C.CERAMIC 50 V 82 PF+-5%
CCC1001	C524	C.CERAMIC 50 V 8 PF+-0.5PF
CQE0049	C525	C.PLASTIC 100 V 1 UF+-5%
CQE0050	C526	C.PLASTIC ECQ-P1103JZ (100V0.01MF)
CCC1030	C527	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C528	C.AL ELYC 10 V 47 UF+-20%
CCC1025	C530	C.CERAMIC 50 V 100 PF+-10%
CCC1011	C538	C.CERAMIC 50 V 33 PF+-5%
CCC1014	C538	C.CERAMIC 50 V 47 PF+-5%
CQA0099	C544	C.PLASTIC 50 V22000 PF+-10%
CES0249	C545	C.AL ELYC 50 V 1 UF+-20% BP
CCC1014	C550	C.CERAMIC 50 V 47 PF+-5%

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
CCC1030	C551	C.CERAMIC 50 V10000 PF+80-20%
CCC1030	C552	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C553	C.AL ELYC 10 V 47 UF+-20%
CES0541	C554	C.AL ELYC 10 V 47 UF+-20%
CCC1030	C571	C.CERAMIC 50 V10000 PF+80-20%
CCC1014	C572	C.CERAMIC 50 V 47 PF+-5%
CCC1027	C573	C.CERAMIC 50 V 220 PF+-10%
CCC1027	C575	C.CERAMIC 50 V 220 PF+-10%
CCC1030	C576	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C577	C.AL ELYC 10 V 47 UF+-20%
CES0028	C801	C.AL ELYC 10 V 47 UF+-20%
CCC1030	C805	C.CERAMIC 50 V10000 PF+80-20%
CES0028	C806	C.AL ELYC 10 V 47 UF+-20%
CES0028	C808	C.AL ELYC 10 V 47 UF+-20%
CCC0996	C811	C.CERAMIC 50 V 2 PF+-0.25PF
CCC1002	C811	C.CERAMIC 50 V 10 PF+-5PF
CCC0996	C812	C.CERAMIC 50 V 2 PF+-0.25PF
CCC1002	C812	C.CERAMIC 50 V 10 PF+-5PF
CCC1004	C823	C.CERAMIC 50 V 15 PF+-5%
CCC1007	C832	C.CERAMIC 50 V 22 PF+-5%
CCD0273	C845	C.CERAMIC 500 V 2 PF+-0.25PF
CCD0331	C845	C.CERAMIC 500 V 3 PF+-0.25PF
CCD0273	C846	C.CERAMIC 500 V 2 PF+-0.25PF
CCD0331	C846	C.CERAMIC 500 V 3 PF+-0.25PF
CCC1007	C847	C.CERAMIC 50 V 22 PF+-5%
CCC1007	C848	C.CERAMIC 50 V 22 PF+-5%
CCD0287	C857	C.CERAMIC 500 V 4700 PF+100-0%
CCC1030	C861	C.CERAMIC 50 V10000 PF+80-20%
CCC1025	C873	C.CERAMIC 50 V 100 PF+-10%
CCC1025	C874	C.CERAMIC 50 V 100 PF+-10%
CCC1030	C880	C.CERAMIC 50 V10000 PF+80-20%
CES0541	C901	C.AL ELYC 10 V 47 UF+-20%
CCD0272	C904	C.CERAMIC 500 V 1 PF+-0.25PF
CCD0287	C908	C.CERAMIC 500 V 4700 PF+100-0%
CET0033	C912	C.AL ELYC 160 V 1UF
CQA0099	C1001	C.PLASTIC 50 V22000 PF+-10%
CQA0101	C1001	C.PLASTIC 50 V47000 PF+-10%
CES0035	C1002	C.AL ELYC 50 V 47 UF+-20%
CQA0101	C1005	C.PLASTIC 50 V47000 PF+-10%
CCD0231	C1012	C.CERAMIC 2000 V 4700 PF+80-20%
CCD0231	C1013	C.CERAMIC 2000 V 4700 PF+80-20%
CCD0231	C1014	C.CERAMIC 2000 V 4700 PF+80-20%
CCD0231	C1014A	C.CERAMIC 2000 V 4700 PF+80-20%
CCD0246	C1016	C.CERAMIC 2000 V 1000 PF+-10%
CCD0286	C1020	C.CERAMIC 500 V 1000 PF+100-0%
CET0033	C1021	C.AL ELYC 160 V 1UF
CCD0246	C1023	C.CERAMIC 2000 V 1000 PF+-10%
CCD0231	C1025	C.CERAMIC 2000 V 4700 PF+80-20%
CCD0287	C1034	C.CERAMIC 500 V 4700 PF+100-0%
CCD0287	C1035	C.CERAMIC 500 V 4700 PF+100-0%
CCD0287	C1038	C.CERAMIC 500 V 4700 PF+100-0%
CES0201	C1101	C.AL ELYC 160 V 47 UF+-20%
CES0203	C1102	C.AL ELYC 250 V 47 UF+-20%
CES0202	C1109	C.AL ELYC 160 V 10 UF+-20%

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
CQA0118	C1110	C.PLASTIC 50 V 1500 PF+-10%
CES0204	C1111	C.AL ELYC 25 V 2200 UF+-20%
CES0541	C1112	C.AL ELYC 10 V 47 UF+-20%
CES0204	C1121	C.AL ELYC 25 V 2200 UF+-20%
CES0541	C1122	C.AL ELYC 10 V 47 UF+-20%
CES0036	C1131	C.AL ELYC 25 V 22 UF+-20%
CES0541	C1138	C.AL ELYC 10 V 47 UF+-20%
3180017 B		CABLE.ASSY 3180017 BA
3180017 F		CABLE.ASSY 3180017 FD
3180017 F		CABLE.ASSY 3180017 FM
3180017 H		CABLE.ASSY 3180017 HB
3180017 L		CABLE.ASSY 3180017 LA
8355704 4		CORD
8529028 F		CABLE ASSY 8529028 FB
8529028 I		CABLE ASSY 8529028 IB
8529028 L		CABLE ASSY 8529028 LA
8529028 V		CABLE ASSY 8529028 VA
4057669 A		
CVE0062	CV520	C.VARIABLE ECR-HA040E41
CVE0059	CV840	C.VARIABLE ECR-HA010A41
CVE0062	CV840	C.VARIABLE ECR-HA040E41
EFL0147	F1001	FUSE TSCR UL.CSA 125V 0.5A
EFL0148	F1001	FUSE TSCR UL.CSA 125V 0.25A
EFZ0013	F1301	ICPROTECT ICP-F10 (0.4A)
TLE0120	L432	INDUCTOR ELE-Y 6R8 KA
TLE0092	L537	COIL 330 UH+-10%
TLE0138	L537	INDUCTOR ELE-Y 681 KA
8363311 A	L571	
TLE0138	L852	INDUCTOR ELE-Y 681 KA
TLF0148	L852	COIL FL-7H 6.8MH+-5%
3180009	MUT1001	MULTIPLIER 10KV X5
ELS0032	NL1025	LAMP SA-200DSS-ON-1
JBB0021	P401	CONNECTOR B3B-XH-A
JBB0021	P404	CONNECTOR B3B-XH-A
JBB0021	P471	CONNECTOR B3B-XH-A
JBB0021	P501	CONNECTOR B3B-XH-A
JBB0021	P502	CONNECTOR B3B-XH-A
JBB0021	P503	CONNECTOR B3B-XH-A
JBB0021	P901	CONNECTOR B3B-XH-A
JBB0021	P902	CONNECTOR B3B-XH-A
JBB0021	P1001	CONNECTOR B3B-XH-A
JBB0021	P1002	CONNECTOR B3B-XH-A
JBB0021	P1033	CONNECTOR B3B-XH-A
JBB0021	P1034	CONNECTOR B3B-XH-A
JBX0703	P1101	CONNECTOR 1-171825-0
JBB0022	P1104	CONNECTOR B6B-XH-A
JBB0022	P1105	CONNECTOR B6B-XH-A

VC-6023, VC-6024 PEF-621 SEP, H, Z, POWER, HV

PARTS CODE	SYMBOL	..... DESCRIPTION .....
JBB0021	P1111	CONNECTOR B3B-XH-A
JBB0021	P1131	CONNECTOR B3B-XH-A
JBB0021	P1301	CONNECTOR B3B-XH-A
JBB0021	P1303	CONNECTOR B3B-XH-A
JBB0021	P1305	CONNECTOR B3B-XH-A
JBB0021	P1350	CONNECTOR B3B-XH-A
RDE0003	RV418	VR.CARBON EVH-YK3325B14
RNE0042	RV420	VR.METAL EVN-39C 00Y B14 10KOHM
RNE0047	RV473	VR.METAL EVN 39C00YB54(50K)
8397021	RV540	VR.CARBON V16L5(7X6.5)- 20KC-B2KOHM
RNE0052	RV542	VR.METAL EVN 39C00YB23(2K)
RNE0058	RV550	VR.METAL EVN 39C00YB13(1K)
RDE0003	RV805	VR.CARBON EVH-YK3325B14
RNE0050	RV821	VR.METAL EVN 39C00YB52(500)
RNE0052	RV821	VR.METAL EVN 39C00YB23(2K)
RNE0053	RV824	VR.METAL EVN 39C00YB24(20K)
RNE0070	RV824	VR.METAL EVN 39C00YB53(5K)
RNE0048	RV831	VR.METAL EVN 39C00YB22(200)
RNE0050	RV831	VR.METAL EVN 39C00YB52(500)
RNE0054	RV1021	VR.METAL EVN 39C00YB15(100K)
RNE0054	RV1033	VR.METAL EVN 39C00YB15(100K)
RNE0054	RV1035	VR.METAL EVN 39C00YB15(100K)
RNE0055	RV1035	VR.METAL EVN 39C00YB25(200K)
RNH0066	RV1348	RV.METAL 0.5W 22KOHM
8374067 D	S401	SW.LEVER SLR024 (LEVER 12 MM)
8374067 D	S403	SW.LEVER SLR024 (LEVER 12 MM)
8404097	S501	SW.ROTARY S21P2YL
8376780 A	S502	SW.PB SPJ222N (LOCK)
3180008	T1001	XFMR FOR V-211.212.222.422

INPUT(PEF-622)

VC-6023, VC-6024 PEF-622 INPUT

PARTS CODE	SYMBOL	..... DESCRIPTION .....
CQX0068	C1	C.PLASTIC 400 V47000 PF+-20%
CQX0068	C101	C.PLASTIC 400 V47000 PF+-20%
3180017 E		CABLE.ASSY 3180017 EB
3180017 F		CABLE.ASSY 3180017 FB
3180017 R		CABLE.ASSY 3180017 RA
8393985	S1	SW.LEVER SLE623
8393985	S101	SW.LEVER SLE623
8393985	S202	SW.LEVER SLE623

DLY LINE(PEF-624)

VC-6024 PEF-624 DLY LINE

PARTS CODE	SYMBOL	..... DESCRIPTION .....
8311741 B	DL201	DELAY LINE CD-3A
JBB0021	P211	CONNECTOR B3B-XH-A
JBB0021	P311	CONNECTOR B3B-XH-A

CRT(20M) (PEF-626)

VC-6023 PEF-626 CRT(20M)

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0738	R1018	R.CARBON 1/2W 2.2 MOHM +-5%
RCE0781	R1030	R.CARBON 1/4W 10 KOHM +-5%
RCE0793	R1031	R.CARBON 1/4W 100 KOHM +-5%
8390152	J1001	SOCKET 1339
JBB0021	P1031	CONNECTOR B3B-XH-A
JBB0021	P1032	CONNECTOR B3B-XH-A
JBB0021	P1035	CONNECTOR B3B-XH-A

CRT(50M) (PEF-767)

VC-6024 PEF-767 CRT(50M)

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0738	R1018	R.CARBON 1/2W 2.2 MOHM +-5%
RMV0009	R1018	R.METAL 1/2W 6.8 MOHM +-5%
RCE0777	R1030	R.CARBON 1/4W 4.7 KOHM +-5%
RCE0781	R1030	R.CARBON 1/4W 10 KOHM +-5%
RCE0793	R1031	R.CARBON 1/4W 100 KOHM +-5%
RCE0793	R1031	R.CARBON 1/4W 100 KOHM +-5%
RCE0757	R1032	R.CARBON 1/4W 100 OHM +-5%
121948		PCB PB-43
8390152	J1001	SOCKET 1339
JBB0021	P1031	CONNECTOR B3B-XH-A
JBB0021	P1032	CONNECTOR B3B-XH-A
JBB0021	P1035	CONNECTOR B3B-XH-A

FOCUS, ILLUM, INTEN(PEF-625)

VC-6023, VC-6024 PEF-625 FOCUS, ILLUM, INTEN

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RCE0733	R932	R.CARBON 1/2W 470 KOHM +-5%
RCE0737	R932	R.CARBON 1/2W 1.8 MOHM +-5%
RCE0738	R932	R.CARBON 1/2W 2.2 MOHM +-5%
RMV0008	R933	R.METAL 1/2W 15 MOHM +-5%
RCE0793	R1019	R.CARBON 1/4W 100 KOHM +-5%
RCE0798	R1019	R.CARBON 1/4W 330 KOHM +-5%
RCE0800	R1019	R.CARBON 1/4W 470 KOHM +-5%
RCE0773	R1301	R.CARBON 1/4W 2.2 KOHM +-5%
RCE0775	R1301	R.CARBON 1/4W 3.3 KOHM +-5%
3180017 C		CABLE.ASSY 3180017 CA
3180017 D		CABLE.ASSY 3180017 DD
8348452	RV1301	VR.CARBON EVH-CCAK20B14 10 KOHM
RNE0059	RV1401	VR.METAL EVM-NDG K20 B26

DIGITAL(PEF-880)

VC-6023, VC-6024 PEF-880 DIGITAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
IYX0041		SOCKET.IC 10628-01-445
IDH1215	IC5301	IC.DIGITAL HD14053BFP/MC14053BFP
IDH1386	IC5302	IC.DIGITAL HD74HC4040FP
ILM0497	IC5303	IC UA741CPS
ILN0082	IC5304	IC.ANALOG NJM319M
IDH1300	IC5305	IC.DIGITAL HD74HC04FP
IDH1297	IC5306	IC.DIGITAL HD74HC02FP
IDH1388	IC5307	IC.DIGITAL HD74HC377FP
IDH1303	IC5308	IC.DIGITAL HD74HC74FP
IDH1289	IC5309	IC.DIGITAL HD74HC153FP
IDT0261	IC5310	IC.DIGITAL TMP82C54M-2
IDH1303	IC5311	IC.DIGITAL HD74HC74FP
IDH1301	IC5312	IC.DIGITAL HD74HC08FP
IDH1299	IC5313	IC.DIGITAL HD74HC32FP
IDH1299	IC5314	IC.DIGITAL HD74HC32FP
IDT0147	IC5315	IC.DIGITAL TC74HC86F
IDT0162	IC5316	IC.DIGITAL TC74HC00AF
IDH1303	IC5317	IC.DIGITAL HD74HC74FP
IDH1303	IC5318	IC.DIGITAL HD74HC74FP
ILN0081	IC5320	IC.ANALOG NJM2902M
IZH0030	IC5321	IC HA19211BMP
IZH0030	IC5322	IC HA19211BMP
INH0003	IC5323	IC HM63021P-34
INH0003	IC5324	IC HM63021P-34
IMH0006	IC5501	IC HD64180R1CP10
INM0012	IC5502	IC MBM27C512-20 (DIP)
INM0027	IC5502	IC MBM27C512P-20(DIP28PIN)
INH0012	IC5503	IC HM62256LFP-10T
IDT0261	IC5504	IC.DIGITAL TMP82C54M-2
IDT0260	IC5506	IC.DIGITAL TMP82C55AF-10
IDH1304	IC5507	IC.DIGITAL HD74HC138FP
IDH1304	IC5508	IC.DIGITAL HD74HC138FP
IDT0186	IC5509	IC.DIGITAL TC74HC244AF
IDT0190	IC5510	IC.DIGITAL TC74HC574F
IDM0822	IC5511	IC.DIGITAL MC145406F
IDT0162	IC5512	IC.DIGITAL TC74HC00AF
IDH1300	IC5513	IC.DIGITAL HD74HC04FP
IDH1387	IC5514	IC.DIGITAL HD74HC27FP
IDH1299	IC5515	IC.DIGITAL HD74HC32FP
IDH1299	IC5516	IC.DIGITAL HD74HC32FP
IDH1388	IC5517	IC.DIGITAL HD74HC377FP
IDT0260	IC5518	IC.DIGITAL TMP82C55AF-10
IDT0190	IC5519	IC.DIGITAL TC74HC574F
IDT0190	IC5520	IC.DIGITAL TC74HC574F
IDH1215	IC5521A	IC.DIGITAL HD14053BFP/MC14053BFP
ILM0496	IC5521	IC.ANALOG M5201FP
IDH1215	IC5522A	IC.DIGITAL HD14053BFP/MC14053BFP
ILM0496	IC5522	IC.ANALOG M5201FP
IDT0179	IC5550	IC.DIGITAL TC74HC157F
IDT0162	IC5560	IC.DIGITAL TC74HC00AF
IDH1300	IC5561	IC.DIGITAL HD74HC04FP
ILT0091	IC8060	IC.ANALOG TL431CLP-B

VC-6023, VC-6024 PEF-880 DIGITAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
HDS0437	D5210	DIODE 1SS133
HDH0236	D5211	DIODE.ZEN HZM7C (24)
HDS0437	D5260	DIODE 1SS133
HDH0236	D5261	DIODE.ZEN HZM7C (24)
HDS0437	D5560	DIODE 1SS133
HDS0538	D8080	DIODE 1SS153
HDI0007	D5501,02	DIODE IMN10
HTI0012	TR5202	TRANSISTOR IMX3
HTI0012	TR5252	TRANSISTOR IMX3
HTC0848	TR5315	TRANSISTOR 2SC2759-U23
HTD0161	TR8040	TRANSISTOR DTC124EK
RCE0771	R5206	R.CARBON 1/4W 1.5 KOHM +-5%
RME1077	R5208	R.METAL 1/4W 2.67KOHM +-1%
RME1437	R5208A	R.METAL 0.1W 820 OHM+-5%
RME1414	R5212	R.METAL 0.1W 10 OHM+-5%
RME1437	R5213	R.METAL 0.1W 820 OHM+-5%
RME1430	R5216	R.METAL 0.1W 220 OHM+-5%
RME1430	R5256	R.METAL 0.1W 220 OHM+-5%
RME1077	R5258	R.METAL 1/4W 2.67KOHM +-1%
RME1437	R5258A	R.METAL 0.1W 820 OHM+-5%
RME1414	R5262	R.METAL 0.1W 10 OHM+-5%
RME1437	R5263	R.METAL 0.1W 820 OHM+-5%
RME1096	R5301	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5302	R.METAL 1/4W 100 KOHM +-1%
RME1060	R5303	R.METAL 1/4W 100 OHM +-1%
RME1238	R5304	R.METAL 1/4W 24.9 KOHM +-1%
RME1078	R5305	R.METAL 1/4W 3.32KOHM +-1%
RME1068	R5306	R.METAL 1/4W 475 OHM +-1%
RME1221	R5307	R.METAL 1/4W 1.37KOHM +-1%
RME1442	R5309	R.METAL 0.1W 2.2 KOHM+-5%
RME1127	R5310	R.METAL 1/4W 6.19KOHM +-1%
RME1464	R5311	R.METAL 0.1W 220 KOHM+-5%
RME1446	R5312	R.METAL 0.1W 4.7 KOHM+-5%
RME1426	R5313	R.METAL 0.1W 100 OHM+-5%
RME1437	R5314	R.METAL 0.1W 820 OHM+-5%
RME1426	R5315	R.METAL 0.1W 100 OHM+-5%
RME1426	R5316	R.METAL 0.1W 100 OHM+-5%
RME1442	R5317	R.METAL 0.1W 2.2 KOHM+-5%
RME1438	R5318	R.METAL 0.1W 1.0 KOHM+-5%
RME1426	R5319	R.METAL 0.1W 100 OHM+-5%
RME1438	R5320	R.METAL 0.1W 1.0 KOHM+-5%
RME1446	R5321	R.METAL 0.1W 4.7 KOHM+-5%
RME1464	R5323	R.METAL 0.1W 220 KOHM+-5%
RME1458	R5325	R.METAL 0.1W 47 KOHM+-5%
RME1074	R5330	R.METAL 1/4W 1.50KOHM +-1%
RME1074	R5331	R.METAL 1/4W 1.50KOHM +-1%
RME1174	R5332	R.METAL 1/4W 2.00KOHM +-1%
RME1438	R5333	R.METAL 0.1W 1.0 KOHM+-5%
RME1425	R5334	R.METAL 0.1W 82 OHM+-5%
RME1418	R5335	R.METAL 0.1W 22 OHM+-5%
RME1437	R5336	R.METAL 0.1W 820 OHM+-5%
RME1437	R5337	R.METAL 0.1W 820 OHM+-5%

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PARTS CODE	SYMBOL	..... DESCRIPTION .....
RME1074	R5555	R.METAL 1/4W 1.50KOHM +-1%
RME1100	R5556	R.METAL 1/4W 221 KOHM +-1%
RME1088	R5557	R.METAL 1/4W 22.1 KOHM +-1%
RME1413	R5558	R.METAL 0.1W 0 OHM
RME1413	R5558A	R.METAL 0.1W 0 OHM
RME1458	R5561	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5562	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5563	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5564	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5565	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5566	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5567	R.METAL 0.1W 47 KOHM+-5%
RME1458	R5568	R.METAL 0.1W 47 KOHM+-5%
RME1413	R5571	R.METAL 0.1W 0 OHM
RME1413	R5572	R.METAL 0.1W 0 OHM
RME1413	R5573	R.METAL 0.1W 0 OHM
RME1413	R5574	R.METAL 0.1W 0 OHM
RME1413	R5575	R.METAL 0.1W 0 OHM
RME1413	R6001	R.METAL 0.1W 0 OHM
RME1413	R6002	R.METAL 0.1W 0 OHM
RME1413	R6003	R.METAL 0.1W 0 OHM
RME1413	R6004	R.METAL 0.1W 0 OHM
RME1413	R6005	R.METAL 0.1W 0 OHM
RME1413	R6006	R.METAL 0.1W 0 OHM
RME1413	R6007	R.METAL 0.1W 0 OHM
RME1413	R6008	R.METAL 0.1W 0 OHM
RME1413	R6009	R.METAL 0.1W 0 OHM
RME1446	R8116	R.METAL 0.1W 4.7 KOHM+-5%
RME1454	R8120	R.METAL 0.1W 22 KOHM+-5%
RME1438	R8130	R.METAL 0.1W 1.0 KOHM+-5%
RME1413	R8140A	R.METAL 0.1W 0 OHM
RME1413	R8140B	R.METAL 0.1W 0 OHM
RME1413	R8141A	R.METAL 0.1W 0 OHM
RME1413	R8141B	R.METAL 0.1W 0 OHM
RZA0332	RM5301	R.BLOCK EXK-F20Z2075
RZA0332	RM5501	R.BLOCK EXK-F20Z2075
RZA0332	RM5502	R.BLOCK EXK-F20Z2075
CCG0295	C5203	C.CERAMIC 25 V 0.1 UF+80-20%
CEK0146	C5204	C.AL ELYC 16 V 10 UF+-20% BP
CCG0274	C5210	C.CERAMIC 50 V 100 PF+-5%
CCG0295	C5253	C.CERAMIC 25 V 0.1 UF+80-20%
CEK0146	C5254	C.AL ELYC 16 V 10 UF+-20% BP
CCG0274	C5260	C.CERAMIC 50 V 100 PF+-5%
CCG0246	C5330	C.CERAMIC 50 V 1 PF+-0.25PF
CES0133	C5343	C.AL ELYC 16 V 47 UF+-20%
CCG0292	C5344	C.CERAMIC 50 V10000 PF+-10%
CES0133	C5345	C.AL ELYC 16 V 47 UF+-20%
CCG0292	C5346	C.CERAMIC 50 V10000 PF+-10%
CES0133	C5347	C.AL ELYC 16 V 47 UF+-20%
CCG0295	C5348	C.CERAMIC 25 V 0.1 UF+80-20%
CES0133	C5349	C.AL ELYC 16 V 47 UF+-20%
CCG0292	C5350	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5351	C.CERAMIC 50 V10000 PF+-10%

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PARTS CODE	SYMBOL	..... DESCRIPTION .....
RME1444	R5338	R.METAL 0.1W 3.3 KOHM+-5%
RME1444	R5339	R.METAL 0.1W 3.3 KOHM+-5%
RME1444	R5340	R.METAL 0.1W 3.3 KOHM+-5%
RME1444	R5341	R.METAL 0.1W 3.3 KOHM+-5%
RME1426	R5350	R.METAL 0.1W 100 OHM+-5%
RME1426	R5351	R.METAL 0.1W 100 OHM+-5%
RME1426	R5352	R.METAL 0.1W 100 OHM+-5%
RME1426	R5354	R.METAL 0.1W 100 OHM+-5%
RME1450	R5501	R.METAL 0.1W 10 KOHM+-5%
RME1450	R5502	R.METAL 0.1W 10 KOHM+-5%
RME1450	R5503	R.METAL 0.1W 10 KOHM+-5%
RME1450	R5504	R.METAL 0.1W 10 KOHM+-5%
RME1450	R5505	R.METAL 0.1W 10 KOHM+-5%
RME1413	R5510A	R.METAL 0.1W 0 OHM
RME1458	R5510	R.METAL 0.1W 47 KOHM+-5%
RME1096	R5511	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5512	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5513	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5514	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5515	R.METAL 1/4W 100 KOHM +-1%
RME1464	R5516	R.METAL 0.1W 220 KOHM+-5%
RME1083	R5517	R.METAL 1/4W 8.25KOHM +-1%
RME1590	R5518	R.METAL 1/4W 243 OHM +-%
RME1461	R5519	R.METAL 0.1W 82 KOHM+-5%
RME1084	R5520	R.METAL 1/4W 10.0 KOHM +-1%
RME1155	R5521	R.METAL 1/4W 4.00KOHM +-0.5%
RME1711	R5521A	R.METAL 1/4W 1.00 KOHM +-0.5%
RME1285	R5522	R.METAL 1/4W 4.99KOHM +-0.5%
RME1285	R5522A	R.METAL 1/4W 4.99KOHM +-0.5%
RME1084	R5523	R.METAL 1/4W 10.0 KOHM +-1%
RME1084	R5524	R.METAL 1/4W 10.0 KOHM +-1%
RME1450	R5530	R.METAL 0.1W 10 KOHM+-5%
RME1096	R5531	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5532	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5533	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5534	R.METAL 1/4W 100 KOHM +-1%
RME1096	R5535	R.METAL 1/4W 100 KOHM +-1%
RME1464	R5536	R.METAL 0.1W 220 KOHM+-5%
RME1443	R5537	R.METAL 0.1W 2.7 KOHM +-5%
RME1083	R5538	R.METAL 1/4W 8.25KOHM +-1%
RME1064	R5539	R.METAL 1/4W 221 OHM +-1%
RME1461	R5540	R.METAL 0.1W 82 KOHM+-5%
RME1084	R5541	R.METAL 1/4W 10.0 KOHM +-1%
RME1285	R5543	R.METAL 1/4W 4.99KOHM +-0.5%
RME1285	R5543A	R.METAL 1/4W 4.99KOHM +-0.5%
RME1084	R5544	R.METAL 1/4W 10.0 KOHM +-1%
RME1084	R5545	R.METAL 1/4W 10.0 KOHM +-1%
RME1450	R5546	R.METAL 0.1W 10 KOHM+-5%
RME1450	R5547	R.METAL 0.1W 10 KOHM+-5%
RME1078	R5550	R.METAL 1/4W 3.32KOHM +-1%
RME1074	R5551	R.METAL 1/4W 1.50KOHM +-1%
RME1436	R5552	R.METAL 0.1W 680 OHM+-5%
RME1438	R5553	R.METAL 0.1W 1.0 KOHM+-5%
RME1078	R5554	R.METAL 1/4W 3.32KOHM +-1%

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PARTS CODE	SYMBOL	..... DESCRIPTION .....
CCG0286	C5400	C.CERAMIC 50 V 1000 PF+-10%
CCG0292	C5401	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5402	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5403	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5404	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5405	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5406	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5407	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5408	C.CERAMIC 50 V10000 PF+-10%
CCG0278	C5409	C.CERAMIC 50 V 220 PF+-5%
CCG0292	C5501	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5502	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5503	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5504	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5505	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5506	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5507	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5508	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5509	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5510	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5511	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5512	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5513	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5514	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5515	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5516	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5517	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5518	C.CERAMIC 50 V10000 PF+-10%
CES0133	C5518A	C.AL ELYC 16 V 47 UF+-20%
CCG0292	C5519	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5520	C.CERAMIC 50 V10000 PF+-10%
CCG0282	C5521	C.CERAMIC 50 V 470 PF+-5%
CCG0282	C5522	C.CERAMIC 50 V 470 PF+-5%
CCG0282	C5523	C.CERAMIC 50 V 470 PF+-5%
CCG0255	C5524	C.CERAMIC 50 V 10 PF+-0.5PF
CCG0250	C5525	C.CERAMIC 50 V 5 PF+-0.25PF
CCG0283	C5526	C.CERAMIC 50 V 560 PF+-5%
CCG0283	C5527	C.CERAMIC 50 V 560 PF+-5%
CCG0283	C5528	C.CERAMIC 50 V 560 PF+-5%
CCG0259	C5532	C.CERAMIC 50 V 15 PF+-5%
CES0133	C5540	C.AL ELYC 16 V 47 UF+-20%
CES0133	C5541	C.AL ELYC 16 V 47 UF+-20%
CES0379	C5542	C.AL ELYC 10 V 470 UF +-20%
CES0379	C5543	C.AL ELYC 10 V 470 UF +-20%
CCC1011	C5546	C.CERAMIC 50 V 33 PF+-5%
CCG0292	C5550	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5560	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C5561	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C8081	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C8082	C.CERAMIC 50 V10000 PF+-10%
CCG0295	C8083	C.CERAMIC 25 V 0.1 UF+80-20%
CES0133	C8084	C.AL ELYC 16 V 47 UF+-20%
CCG0292	C8111	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C8112	C.CERAMIC 50 V10000 PF+-10%

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PARTS CODE	SYMBOL	..... DESCRIPTION .....
CCG0292	C8113	C,CERAMIC 50 V10000 PF+-10%
CCG0292	C5300~12	C,CERAMIC 50 V10000 PF+-10%
CCG0292	C5314~16	C,CERAMIC 50 V10000 PF+-10%
CCG0292	C5320~24	C,CERAMIC 50 V10000 PF+-10%
8529028 C		CABLE ASSY 8529028 CA
8529028 P		CABLE ASSY 8529028 PB
8529934 B		CABLE ASSY 8529934 BA
ETP0149		PIN DP-10 (10MM)
JBP0407	CN1	PIN PM-1-14P
JBP0406	CN2	PIN PM-1-4P
AAE0024	IC5505	XTAL EXO-3(18.432MHZ)
SRK0007	K8060	RLY,LATCH G5A-237P 12VDC
TLN0036	L5352	COIL 40MA 100 UH+-10%
TLN0036	L5354	COIL 40MA 100 UH+-10%
TLN0036	L5355	COIL 40MA 100 UH+-10%
TLN0036	L5356	COIL 40MA 100 UH+-10%
TLT0085	L5506	COIL 47 UH+-10% 0.94A
TLT0085	L5507	COIL 47 UH+-10% 0.94A
TLE0058	L8060	COIL EL0606SKI 10 UH+-10%
TLN0004	L8140B	COIL 450MA 100 NH+-20%
TLN0004	L8141B	COIL 450MA 100 NH+-20%
JBB0021	P492A	CONNECTOR B3B-XH-A
JBB0060	P501A	CONNECTOR B5B-XH-A
JBB0022	P5400	CONNECTOR B6B-XH-A
JBB0024	P5501	CONNECTOR B15B-XH-A
JBB0060	P5503	CONNECTOR B5B-XH-A
JBB0060	P5504	CONNECTOR B5B-XH-A
JBB0026	P5601	CONNECTOR B10B-XH-A
JBB0028	P5602	CONNECTOR B4B-XH-A
JBB0058	P5701	CONNECTOR B12B-XH-A
RNE0070	RV5201	VR,METAL EVN 39C00YB53(5K)
RNE0058	RV5202	VR,METAL EVN 39C00YB13(1K)
RNE0058	RV5203	VR,METAL EVN 39C00YB13(1K)
RNE0070	RV5251	VR,METAL EVN 39C00YB53(5K)
RNE0058	RV5252	VR,METAL EVN 39C00YB13(1K)
RNE0054	RV5301	VR,METAL EVN 39C00YB15(100K)
RNE0070	RV5302	VR,METAL EVN 39C00YB53(5K)
RNE0047	RV5501	VR,METAL EVN 39C00YB54(50K)
RNE0042	RV5502	VR,METAL EVN-39C 00Y B14 10KOHM
RNE0047	RV5503	VR,METAL EVN 39C00YB54(50K)
RNE0042	RV5504	VR,METAL EVN-39C 00Y B14 10KOHM
RNE0047	RV8060	VR,METAL EVN 39C00YB54(50K)
AAE0018	X5301	XTAL EXO-3(20MHZ)

VC-6023, VC-6024 PEF-882 PANEL DIGITAL

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RME1432	R1601	R,METAL 0.1W 330 OHM+-5%
RME1435	R1602	R,METAL 0.1W 560 OHM+-5%
RME1435	R1603	R,METAL 0.1W 560 OHM+-5%
RME1435	R1604	R,METAL 0.1W 560 OHM+-5%
RME1435	R1605	R,METAL 0.1W 560 OHM+-5%
RME1435	R1606	R,METAL 0.1W 560 OHM+-5%
3225001 H		CABLE,ASSY 3225001-HA
SSP0624	S1601	SW,PB SKHQFG (GREEN)
SSP0611	S1602	SW,PB SKHQFF (RED)
SSP0611	S1603	SW,PB SKHQFF (RED)
SSP0611	S1604	SW,PB SKHQFF (RED)
SSP0611	S1605	SW,PB SKHQFF (RED)
SSP0611	S1606	SW,PB SKHQFF (RED)

S/H(PEF-883)

VC-6023, VC-6024 PEF-883 S/H

PARTS CODE	SYMBOL	..... DESCRIPTION .....
HDH0236	D5202	DIODE,ZEN HZM7C (24)
HDH0236	D5252	DIODE,ZEN HZM7C (24)
HDH0224	D8043	DIODE HSM88S
HDH0236	D8060	DIODE,ZEN HZM7C (24)
HDH0224	D8061	DIODE HSM88S
HDH0224	D8062	DIODE HSM88S
HDH0224	D8063	DIODE HSM88S
HDH0224	D8064	DIODE HSM88S
HDS0496	D8065	DIODE 1SS123
HDH0224	D8066	DIODE HSM88S
HDS0496	D8067	DIODE 1SS123
HDS0538	D8068	DIODE 1SS153
HDH0230	D8069	DIODE,ZEN HZM5B (17)
HDS0538	D8070	DIODE 1SS153
HDH0235	D8071	DIODE,ZEN HZM4B (14)
HDH0232	D8072	DIODE,ZEN HZM6A (19)
HTD0202	TR5201	TRANSISTOR 2SD596DV3
HTD0202	TR5202	TRANSISTOR 2SD596DV3
HTD0202	TR5203	TRANSISTOR 2SD596DV3
HTA0263	TR5206	TRANSISTOR 2SA1052D (MD)
HTC0686	TR5207	TRANSISTOR 2SC2462C (LC)
HTD0202	TR5251	TRANSISTOR 2SD596DV3
HTD0202	TR5252	TRANSISTOR 2SD596DV3
HTD0202	TR5253	TRANSISTOR 2SD596DV3
HTA0263	TR5256	TRANSISTOR 2SA1052D (MD)
HTC0686	TR5257	TRANSISTOR 2SC2462C (LC)
HTC0884	TR8060	TRANSISTOR 2SC3775-0Y4
HTC0884	TR8061	TRANSISTOR 2SC3775-0Y4
HTC0884	TR8062	TRANSISTOR 2SC3775-0Y4
HTK0127	TR8063	TRANSISTOR 2SK508K52/2SK508K52NV
HTK0127	TR8064	TRANSISTOR 2SK508K52/2SK508K52NV
HTC0848	TR8065	TRANSISTOR 2SC2759-U23
HTA0318	TR8066	TRANSISTOR 2SA1462Y34
HTC0848	TR8067	TRANSISTOR 2SC2759-U23
HTC0848	TR8068	TRANSISTOR 2SC2759-U23
HTC0848	TR8069	TRANSISTOR 2SC2759-U23
HTC0848	TR8070	TRANSISTOR 2SC2759-U23
HTA0318	TR8071	TRANSISTOR 2SA1462Y34
HTA0318	TR8072	TRANSISTOR 2SA1462Y34
HTC0871	TR8075	TRANSISTOR 2SC3772LY4
HTD0161	TR8076	TRANSISTOR DTC124EK
RME1430	R5201	R,METAL 0.1W 220 OHM+-5%
RME1445	R5202	R,METAL 0.1W 3.9 KOHM+-5%
RME1443	R5203	R,METAL 0.1W 2.7 KOHM +-5%
RME1418	R5204	R,METAL 0.1W 22 OHM+-5%
RME1426	R5205	R,METAL 0.1W 100 OHM+-5%
RCE0771	R5206	R,CARBON 1/4W 1.5 KOHM +-5%
RME1438	R5207	R,METAL 0.1W 1.0 KOHM+-5%
RME1446	R5210	R,METAL 0.1W 4.7 KOHM+-5%
RME1446	R5211	R,METAL 0.1W 4.7 KOHM+-5%
RME1449	R5214	R,METAL 0.1W 8.2 KOHM+-5%
RME1443	R5215	R,METAL 0.1W 2.7 KOHM +-5%

VC-6023, VC-6024 PEF-883 S/H

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RME1440	R5216	R,METAL 0.1W 1.5 KOHM+-5%
RME1426	R5217	R,METAL 0.1W 100 OHM+-5%
RME1426	R5218	R,METAL 0.1W 100 OHM+-5%
RME1430	R5251	R,METAL 0.1W 220 OHM+-5%
RME1445	R5252	R,METAL 0.1W 3.9 KOHM+-5%
RME1443	R5253	R,METAL 0.1W 2.7 KOHM +-5%
RME1418	R5254	R,METAL 0.1W 22 OHM+-5%
RME1426	R5255	R,METAL 0.1W 100 OHM+-5%
RCE0771	R5256	R,CARBON 1/4W 1.5 KOHM +-5%
RME1438	R5257	R,METAL 0.1W 1.0 KOHM+-5%
RME1446	R5260	R,METAL 0.1W 4.7 KOHM+-5%
RME1446	R5261	R,METAL 0.1W 4.7 KOHM+-5%
RME1449	R5264	R,METAL 0.1W 8.2 KOHM+-5%
RME1443	R5265	R,METAL 0.1W 2.7 KOHM +-5%
RME1440	R5266	R,METAL 0.1W 1.5 KOHM+-5%
RME1426	R5267	R,METAL 0.1W 100 OHM+-5%
RME1426	R5268	R,METAL 0.1W 100 OHM+-5%
RME1413	R5326	R,METAL 0.1W 0 OHM
RME1413	R5327	R,METAL 0.1W 0 OHM
RME1413	R5328	R,METAL 0.1W 0 OHM
RME1438	R8031	R,METAL 0.1W 1.0 KOHM+-5%
RME1418	R8032	R,METAL 0.1W 22 OHM+-5%
RME1413	R8035	R,METAL 0.1W 0 OHM
RME1413	R8036	R,METAL 0.1W 0 OHM
RME1413	R8037	R,METAL 0.1W 0 OHM
RME1434	R8040	R,METAL 0.1W 470 OHM+-5%
RME1426	R8041	R,METAL 0.1W 100 OHM+-5%
RME1422	R8042	R,METAL 0.1W 47 OHM+-5%
RME1429	R8060	R,METAL 0.1W 180 OHM+-5%
RME1430	R8061	R,METAL 0.1W 220 OHM+-5%
RME1429	R8062	R,METAL 0.1W 180 OHM+-5%
RME1427	R8063	R,METAL 0.1W 120 OHM+-5%
RME1430	R8064	R,METAL 0.1W 220 OHM+-5%
RME1440	R8065	R,METAL 0.1W 1.5 KOHM+-5%
RME1421	R8066	R,METAL 0.1W 39 OHM+-5%
RME1425	R8066	R,METAL 0.1W 82 OHM+-5%
RME1469	R8067	R,METAL 0.1W 4.7 OHM +-10%
RME1444	R8070	R,METAL 0.1W 3.3 KOHM+-5%
RME1429	R8071	R,METAL 0.1W 180 OHM+-5%
RME1434	R8072	R,METAL 0.1W 470 OHM+-5%
RME1431	R8073	R,METAL 0.1W 270 OHM+-5%
RME1438	R8074	R,METAL 0.1W 1.0 KOHM+-5%
RME1413	R8075A	R,METAL 0.1W 0 OHM
RME1414	R8075	R,METAL 0.1W 10 OHM+-5%
RME1418	R8078	R,METAL 0.1W 22 OHM+-5%
RME1420	R8079	R,METAL 0.1W 33 OHM+-5%
RME1419	R8080	R,METAL 0.1W 27 OHM+-5%
RME1426	R8081	R,METAL 0.1W 100 OHM+-5%
RME1420	R8088	R,METAL 0.1W 33 OHM+-5%
RME1414	R8089	R,METAL 0.1W 10 OHM+-5%
RME1445	R8090	R,METAL 0.1W 3.9 KOHM+-5%
RME1413	R8091	R,METAL 0.1W 0 OHM
RME1442	R8092	R,METAL 0.1W 2.2 KOHM+-5%
RME1426	R8093	R,METAL 0.1W 100 OHM+-5%

VC-6023, VC-6024 PEF-883 S/H

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RME1434	R8094	R.METAL 0.1W 470 OHM+-5%
RME1426	R8095	R.METAL 0.1W 100 OHM+-5%
RME1426	R8096	R.METAL 0.1W 100 OHM+-5%
RME1418	R8098	R.METAL 0.1W 22 OHM+-5%
RME1442	R8099	R.METAL 0.1W 2.2 KOHM+-5%
RME1428	R8100	R.METAL 0.1W 150 OHM+-5%
RME1427	R8101	R.METAL 0.1W 120 OHM+-5%
RME1442	R8102	R.METAL 0.1W 2.2 KOHM+-5%
RME1418	R8103	R.METAL 0.1W 22 OHM+-5%
RME1426	R8105	R.METAL 0.1W 100 OHM+-5%
RME1426	R8106	R.METAL 0.1W 100 OHM+-5%
RME1428	R8107	R.METAL 0.1W 150 OHM+-5%
RME1426	R8108	R.METAL 0.1W 100 OHM+-5%
RME1426	R8109	R.METAL 0.1W 100 OHM+-5%
RME1434	R8110	R.METAL 0.1W 470 OHM+-5%
RME1430	R8111	R.METAL 0.1W 220 OHM+-5%
RME1438	R8112	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R8113	R.METAL 0.1W 1.0 KOHM+-5%
RME1414	R8114	R.METAL 0.1W 10 OHM+-5%
RME1432	R8115	R.METAL 0.1W 330 OHM+-5%
RME1447	R8117	R.METAL 0.1W 5.6 KOHM+-5%
RME1427	R8118	R.METAL 0.1W 120 OHM+-5%
RME1450	R8119	R.METAL 0.1W 10 KOHM+-5%
RME1428	R8120	R.METAL 0.1W 150 OHM+-5%
RME1428	R8121	R.METAL 0.1W 150 OHM+-5%
RME1414	R8122	R.METAL 0.1W 10 OHM+-5%
RME1454	R8150	R.METAL 0.1W 22 KOHM+-5%
RME1424	R8043,44	R.METAL 0.1W 68 OHM+-5%
RME1440	R8068,69	R.METAL 0.1W 1.5 KOHM+-5%
RME1428	R8076,77	R.METAL 0.1W 150 OHM+-5%
RME1435	R8082,85	R.METAL 0.1W 560 OHM+-5%
RME1432	R8083,84	R.METAL 0.1W 330 OHM+-5%
RME1450	R8086,87	R.METAL 0.1W 10 KOHM+-5%
RME1413	R8124,25	R.METAL 0.1W 0 OHM
CCG0286	C5201	C.CERAMIC 50 V 1000 PF+-10%
CCG0257	C5202	C.CERAMIC 50 V 12 PF+-5%
CCG0263	C5207	C.CERAMIC 50 V 22 PF+-5%
CCG0286	C5251	C.CERAMIC 50 V 1000 PF+-10%
CCG0257	C5252	C.CERAMIC 50 V 12 PF+-5%
CCG0263	C5257	C.CERAMIC 50 V 22 PF+-5%
CCG0275	C8049	C.CERAMIC 50 V 120 PF+-5%
CCG0286	C8060	C.CERAMIC 50 V 1000 PF+-10%
CCG0265	C8061	C.CERAMIC 50 V 27 PF+-5%
CCG0286	C8062	C.CERAMIC 50 V 1000 PF+-10%
CCC1009	C8063	C.CERAMIC 50 V 27 PF+-5%
CCC1014	C8063	C.CERAMIC 50 V 47 PF+-5%
CCG0254	C8064	C.CERAMIC 50 V 9 PF+-0.5PF
CCG0259	C8065	C.CERAMIC 50 V 15 PF+-5%
CCG0255	C8066	C.CERAMIC 50 V 10 PF+-0.5PF
CCG0292	C8067	C.CERAMIC 50 V10000 PF+-10%
CCG0286	C8068	C.CERAMIC 50 V 1000 PF+-10%
CCC1355	C8070	
CCG0294	C8071	C.CERAMIC 50 V47000 PF+80-20%

VC-6023, VC-6024 PEF-883 S/H

PARTS CODE	SYMBOL	..... DESCRIPTION .....
CCG0295	C8072	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0255	C8073	C.CERAMIC 50 V 10 PF+-0.5PF
CCG0295	C8074	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0294	C8075	C.CERAMIC 50 V47000 PF+80-20%
CCG0286	C8076	C.CERAMIC 50 V 1000 PF+-10%
CCG0294	C8077	C.CERAMIC 50 V47000 PF+80-20%
CCG0270	C8080	C.CERAMIC 50 V 47 PF+-5%
CCG0295	C8081	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0292	C8082	C.CERAMIC 50 V10000 PF+-10%
CCG0257	C8083	C.CERAMIC 50 V 12 PF+-5%
CCG0267	C8083	C.CERAMIC 50 V 33 PF+-5%
CCG0295	C8102	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0295	C5205,06	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0295	C5255,56	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0295	C8078,79	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0295	C8100,01	C.CERAMIC 25 V 0.1 UF+80-20%
CCG0295	C8103,04	C.CERAMIC 25 V 0.1 UF+80-20%
8529028 Q		CABLE ASSY 8529028 QB
8529934 A		CABLE ASSY 8529934 AA
JB00002	CN1	PIN OY-003-14P
JB00001	CN2	PIN OY-003-4P

VC-6023, VC-6024 PEF-916 I/F

PARTS CODE	SYMBOL	..... DESCRIPTION .....
IDH1172	IC2001	IC.DIGITAL HD74HC165P
IDH1172	IC2002	IC.DIGITAL HD74HC165P
IDH1172	IC2003	IC.DIGITAL HD74HC165P
IDH1172	IC2004	IC.DIGITAL HD74HC165P
IDH1172	IC2005	IC.DIGITAL HD74HC165P
IDH1017	IC2009	IC.DIGITAL HD74HC02P
IDH0999	IC2010	IC.DIGITAL HD74HC04P/TC74HC04P
IDH1000	IC2011	IC.DIGITAL HD74HC08P/TC74HC08P
IDH1024	IC2012	IC.DIGITAL HD74HC123AP/TC74HC123AP
IDT0272	IC2013	IC.DIGITAL TC74HC4066P
IDH1017	IC2015	IC.DIGITAL HD74HC02P
IDH0982	IC2018	IC.DIGITAL HD74HC00P/TC74HC00P
IDH0999	IC2020	IC.DIGITAL HD74HC04P/TC74HC04P
HDS0437	D2001	DIODE 1SS133
HDS0437	D2002	DIODE 1SS133
HDS0437	D2003	DIODE 1SS133
HDS0437	D2004	DIODE 1SS133
HDS0437	D2005	DIODE 1SS133
HDH0029	D2006	DIODE.ZEN HZ5B
HTA0263	TR2002	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2003	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2004	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2005	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2006	TRANSISTOR 2SA1052D (MD)
HTC0807	TR2007	TRANSISTOR 2SC2462C / 2SC2412KR
HTC0807	TR2008	TRANSISTOR 2SC2462C / 2SC2412KR
HTA0263	TR2012	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2013	TRANSISTOR 2SA1052D (MD)
HTC0807	TR2014	TRANSISTOR 2SC2462C / 2SC2412KR
HTA0263	TR2015	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2016	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2017	TRANSISTOR 2SA1052D (MD)
HTA0263	TR2018	TRANSISTOR 2SA1052D (MD)
RME1458	R2001	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2002	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2003	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2004	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2005	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2006	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2007	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2008	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2009	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2010	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2011	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2012	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2013	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2014	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2015	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2016	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2017	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2018	R.METAL 0.1W 47 KOHM+-5%

VC-6023, VC-6024 PEF-916 I/F

PARTS CODE	SYMBOL	..... DESCRIPTION .....
RME1458	R2019	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2020	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2021	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2022	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2023	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2024	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2025	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2026	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2027	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2028	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2031	R.METAL 0.1W 47 KOHM+-5%
RME1458	R2032	R.METAL 0.1W 47 KOHM+-5%
RME1441	R2035	R.METAL 0.1W 1.8 KOHM+-5%
RME1426	R2036	R.METAL 0.1W 100 OHM+-5%
RME1442	R2037	R.METAL 0.1W 2.2 KOHM+-5%
RME1426	R2038	R.METAL 0.1W 100 OHM+-5%
RME1090	R2039	R.METAL 1/4W 33.2 KOHM +-1%
RME1447	R2040	R.METAL 0.1W 5.6 KOHM+-5%
RME1438	R2041	R.METAL 0.1W 1.0 KOHM+-5%
RME1442	R2042	R.METAL 0.1W 2.2 KOHM+-5%
RME1444	R2043	R.METAL 0.1W 3.3 KOHM+-5%
RME1445	R2044	R.METAL 0.1W 3.9 KOHM+-5%
RME1450	R2045	R.METAL 0.1W 10 KOHM+-5%
RME0883	R2046	R.METAL 1/8W 3.9 KOHM +-5%
RME1438	R2047	R.METAL 0.1W 1.0 KOHM+-5%
RME1090	R2048	R.METAL 1/4W 33.2 KOHM +-1%
RME1155	R2049	R.METAL 1/4W 4.00KOHM +-0.5%
RME1243	R2050	R.METAL 1/4W 3.01KOHM +-1%
RME1450	R2053	R.METAL 0.1W 10 KOHM+-5%
RME1440	R2055	R.METAL 0.1W 1.5 KOHM+-5%
RME1440	R2056	R.METAL 0.1W 1.5 KOHM+-5%
RME1438	R2057	R.METAL 0.1W 1.0 KOHM+-5%
RME1448	R2058	R.METAL 0.1W 6.8 KOHM+-5%
RME1436	R2059	R.METAL 0.1W 680 OHM+-5%
RME1426	R2060	R.METAL 0.1W 100 OHM+-5%
RME1430	R2060	R.METAL 0.1W 220 OHM+-5%
RME1456	R2061	R.METAL 0.1W 33 KOHM+-5%
RME1076	R2062	R.METAL 1/4W 2.21KOHM +-1%
RME1244	R2062	R.METAL 1/4W 3.65KOHM +-1%
RME1076	R2063	R.METAL 1/4W 2.21KOHM +-1%
RME1244	R2063	R.METAL 1/4W 3.65KOHM +-1%
RME1433	R2064	R.METAL 0.1W 390 OHM+-5%
RME1433	R2065	R.METAL 0.1W 390 OHM+-5%
RME1426	R2066	R.METAL 0.1W 100 OHM+-5%
RME1450	R2067	R.METAL 0.1W 10 KOHM+-5%
RME1446	R2068	R.METAL 0.1W 4.7 KOHM+-5%
RME1438	R2069	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2070	R.METAL 0.1W 1.0 KOHM+-5%
RME1429	R2071	R.METAL 0.1W 180 OHM+-5%
RME1439	R2072	R.METAL 0.1W 1.2 KOHM+-5%
RME1453	R2072	R.METAL 0.1W 18 KOHM+-5%
RME1438	R2073	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2074	R.METAL 0.1W 1.0 KOHM+-5%
RME1434	R2075	R.METAL 0.1W 470 OHM+-5%

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PARTS CODE	SYMBOL	DESCRIPTION
RME1436	R2076	R.METAL 0.1W 680 OHM+-5%
RME1450	R2077	R.METAL 0.1W 10 KOHM+-5%
RME1450	R2078	R.METAL 0.1W 10 KOHM+-5%
RME1462	R2079	R.METAL 0.1W 100 KOHM+-5%
RME1426	R2081	R.METAL 0.1W 100 OHM+-5%
RME1426	R2082	R.METAL 0.1W 100 OHM+-5%
RME1426	R2083	R.METAL 0.1W 100 OHM+-5%
RME1442	R2084	R.METAL 0.1W 2.2 KOHM+-5%
RME1428	R2085	R.METAL 0.1W 150 OHM+-5%
RME1428	R2086	R.METAL 0.1W 150 OHM+-5%
RME1431	R2087	R.METAL 0.1W 270 OHM+-5%
RME1433	R2087	R.METAL 0.1W 390 OHM+-5%
RME1435	R2088	R.METAL 0.1W 560 OHM+-5%
RME1435	R2089	R.METAL 0.1W 560 OHM+-5%
RME1442	R2090	R.METAL 0.1W 2.2 KOHM+-5%
RME1442	R2091	R.METAL 0.1W 2.2 KOHM+-5%
RME1458	R2094	R.METAL 0.1W 47 KOHM+-5%
RME1442	R2095	R.METAL 0.1W 2.2 KOHM+-5%
RME1434	R2096	R.METAL 0.1W 470 OHM+-5%
RME1452	R2097	R.METAL 0.1W 15 KOHM+-5%
RME1068	R2101	R.METAL 1/4W 475 OHM +-1%
RME1068	R2102	R.METAL 1/4W 475 OHM +-1%
RME1079	R2103	R.METAL 1/4W 3.92KOHM +-1%
RME1079	R2104	R.METAL 1/4W 3.92KOHM +-1%
RME1068	R2106	R.METAL 1/4W 475 OHM +-1%
RME1068	R2107	R.METAL 1/4W 475 OHM +-1%
RME1079	R2108	R.METAL 1/4W 3.92KOHM +-1%
RME1079	R2109	R.METAL 1/4W 3.92KOHM +-1%
RME1458	R2111	R.METAL 0.1W 47 KOHM+-5%
RME1413	R2112	R.METAL 0.1W 0 OHM
RME1440	R2114	R.METAL 0.1W 1.5 KOHM+-5%
RME1426	R2115	R.METAL 0.1W 100 OHM+-5%
RME1440	R2116	R.METAL 0.1W 1.5 KOHM+-5%
RME1418	R2117	R.METAL 0.1W 22 OHM+-5%
RME1442	R2118	R.METAL 0.1W 2.2 KOHM+-5%
RME1430	R2120	R.METAL 0.1W 220 OHM+-5%
RME1446	R2121	R.METAL 0.1W 4.7 KOHM+-5%
RME1438	R2123	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2124	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2125	R.METAL 0.1W 1.0 KOHM+-5%
RME1413	R2126	R.METAL 0.1W 0 OHM
RME1413	R2127	R.METAL 0.1W 0 OHM
RME1413	R2127	R.METAL 0.1W 0 OHM
RME1413	R2128	R.METAL 0.1W 0 OHM
CCG0292	C2002	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2003	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2004	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2005	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2006	C.CERAMIC 50 V10000 PF+-10%
CCG0278	C2007	C.CERAMIC 50 V 220 PF+-5%
CCG0292	C2010	C.CERAMIC 50 V10000 PF+-10%
CCG0286	C2011	C.CERAMIC 50 V 1000 PF+-10%
CCG0286	C2012	C.CERAMIC 50 V 1000 PF+-10%

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PARTS CODE	SYMBOL	DESCRIPTION
CCG0263	C2013	C.CERAMIC 50 V 22 PF+-5%
CCG0265	C2014	C.CERAMIC 50 V 27 PF+-5%
CCG0366	C2016	C.CERAMIC 50 V 680 PF+-5%
CCG0273	C2017	C.CERAMIC 50 V 82 PF+-5%
CES0131	C2018	C.AL ELYC 16 V 10 UF+-20%
CCG0294	C2022	C.CERAMIC 50 V47000 PF+80-20%
CCG0292	C2023	C.CERAMIC 50 V10000 PF+-10%
CCG0279	C2024	C.CERAMIC 50 V 270 PF+-5%
CES0133	C2025	C.AL ELYC 16 V 47 UF+-20%
CES0133	C2026	C.AL ELYC 16 V 47 UF+-20%
CCG0292	C2027	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2028	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2029	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2030	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2031	C.CERAMIC 50 V10000 PF+-10%
CES0379	C2032	C.AL ELYC 10 V 470 UF +-20%
CES0133	C2033	C.AL ELYC 16 V 47 UF+-20%
CEK0091	C2034	C.AL ELYC 25 V 47 UF+-20%
CES0133	C2035	C.AL ELYC 16 V 47 UF+-20%
CES0379	C2036	C.AL ELYC 10 V 470 UF +-20%
CCG0292	C2037	C.CERAMIC 50 V10000 PF+-10%
CCG0292	C2038	C.CERAMIC 50 V10000 PF+-10%
CCG0280	C2039	C.CERAMIC 50 V 330 PF+-5%
CCG0259	C2040	C.CERAMIC 50 V 15 PF+-5%
CCG0261	C2041	C.CERAMIC 50 V 18 PF+-5%
TLE0076	L2001	COIL ELQ6026SKI 100 UH+-10%
TLF0058	L2002	COIL FL3H 2.2 UH +-20%
TLT0085	L2003	COIL 47 UH+-10% 0.94A
TLT0085	L2004	COIL 47 UH+-10% 0.94A
TLE0128	L2005	INDUCTOR ELE-Y 330 KA
JBB0022	P2001	CONNECTOR B6B-XH-A
JBB0026	P2002	CONNECTOR B10B-XH-A
JBB0024	P2003	CONNECTOR B15B-XH-A
JBB0022	P2004	CONNECTOR B6B-XH-A
JBB0023	P2005	CONNECTOR B8B-XH-A
JBB0021	P2006	CONNECTOR B3B-XH-A
JBB0028	P2007	CONNECTOR B4B-XH-A
JBB0023	P2008	CONNECTOR B8B-XH-A
JBB0022	P2009	CONNECTOR B6B-XH-A
JBB0021	P2012	CONNECTOR B3B-XH-A
JBB0021	P2013	CONNECTOR B3B-XH-A
JBB0028	P2014	CONNECTOR B4B-XH-A
JBB0021	P2015	CONNECTOR B3B-XH-A
JBB0028	P2016	CONNECTOR B4B-XH-A
JBB0028	P2017	CONNECTOR B4B-XH-A
JBB0091	P2018	CONNECTOR B7B-XH-A
JBB0021	P2019	CONNECTOR B3B-XH-A
RNE0052	RV2001	VR.METAL EVN 39C00YB23(2K)
RNE0052	RV2002	VR.METAL EVN 39C00YB23(2K)

TIME READOUT(PEF-918)

VC-6023, VC-6024 PEF-918 TIME READOUT

PARTS CODE	SYMBOL	DESCRIPTION
JBS0024	P2021	CONNECTOR S8B-XH-A
JBS0032	P2022	CONNECTOR S2B-XH-A

CH1 ATT READOUT(PEF-919)

VC-6023, VC-6024 PEF-919 CH1 ATT READOU

PARTS CODE	SYMBOL	DESCRIPTION
RME1438	R2130	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2131	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2132	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2133	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2134	R.METAL 0.1W 1.0 KOHM+-5%
RME1438	R2135	R.METAL 0.1W 1.0 KOHM+-5%
JBB0091	P2023	CONNECTOR B7B-XH-A
JBB0027	P2024	CONNECTOR B2B-XH-A

CH2 ATT READOUT(PEF-920)

VC-6023, VC-6024 PEF-920 CH2 ATT READOUT

PARTS CODE	SYMBOL	DESCRIPTION		
RME1438	R2137	R.METAL	0.1W	1.0 KOHM+-5%
RME1438	R2138	R.METAL	0.1W	1.0 KOHM+-5%
RME1438	R2139	R.METAL	0.1W	1.0 KOHM+-5%
RME1438	R2140	R.METAL	0.1W	1.0 KOHM+-5%
RME1438	R2141	R.METAL	0.1W	1.0 KOHM+-5%
RME1438	R2142	R.METAL	0.1W	1.0 KOHM+-5%
JBB0023	P2025	CONNECTOR	B8B-XH-A	
JBB0027	P2026	CONNECTOR	B2B-XH-A	

RS-232C(PEF-887)

VC-6023, VC-6024 PEF-887 RS-232C

PARTS CODE	SYMBOL	DESCRIPTION	
HDD0174	D5500	DIODE	DAN803
JBS0025	P5505	CONNECTOR	S15B-XH-A
JBX2450	P5506	CONNECTOR	17LE-13250-27(D3AB)
SSL0079	S5501	SW.LEVER	DNT-8

CORSOR SW(PEF-792)

VC-6023, VC-6024 PEF-792 CORSOR SW

PARTS CODE	SYMBOL	DESCRIPTION	
RCE0781	R2101	R.CARBON	1/4W 10 KOHM +-5%
3208802		CABLE ASSY	FOR V-225.425 (B)
JBB0026		CONNECTOR	B10B-XH-A
RNE0042	RV2101	VR.METAL	EVN-39C 00Y B14 10KOHM
8468961	S2101	SW	KHJ10901(KEY TOP)
8468961	S2102	SW	KHJ10901(KEY TOP)
8495674 C	S2103	SW	FOR V-425/V-225 WITH KEYT
8495674 D	S2104	SW	FOR V-425/V-225 WITH KEYT
8495674 D	S2105	SW	FOR V-425/V-225 WITH KEYT
8495674 C	S2106	SW	FOR V-425/V-225 WITH KEYT

V CHR CONT(PEF-803)

VC-6023, VC-6024 PEF-803 V CHR CONT

PARTS CODE	SYMBOL	DESCRIPTION	
HDS0437	D2201	DIODE	1SS133
HDS0437	D2202	DIODE	1SS133
HDS0437	D2203	DIODE	1SS133
HDS0437	D2204	DIODE	1SS133
HDS0437	D2205	DIODE	1SS133
HDS0437	D2206	DIODE	1SS133
HDS0437	D2207	DIODE	1SS133
HDS0437	D2208	DIODE	1SS133
HDS0437	D2209	DIODE	1SS133
HDS0437	D2210	DIODE	1SS133
HDS0437	D2211	DIODE	1SS133
HDS0437	D2212	DIODE	1SS133
HDS0437	D2213	DIODE	1SS133
HDS0437	D2214	DIODE	1SS133
HDS0437	D2215	DIODE	1SS133
HDS0437	D2216	DIODE	1SS133
HTA0224	TR2201	TRANSISTOR	2SA1029D
RCE0777	R2201	R.CARBON	1/4W 4.7 KOHM +-5%
RCE0781	R2202	R.CARBON	1/4W 10 KOHM +-5%
CCC1365	C2201	C.CERAMIC	50 V 680 PF+-10%
CCC1014	C2202	C.CERAMIC	50 V 47 PF+-5%
CCC1030	C2203	C.CERAMIC	50 V10000 PF+80-20%
8529028 W		CABLE ASSY	8529028 WA
ETP0141		PIN	DP-2
JBS0064	P2201	CONNECTOR	SQ-4-AP-GB-C
JBS0064	P2202	CONNECTOR	SQ-4-AP-GB-C
JBS0064	P2203	CONNECTOR	SQ-4-AP-GB-C
JBS0064	P2204	CONNECTOR	SQ-4-AP-GB-C

H CHR CONT(PEF-804)

VC-6023, VC-6024 PEF804 H CHR CONT

PARTS CODE	SYMBOL	DESCRIPTION	
HDS0437	D2501	DIODE	1SS133
HDS0437	D2502	DIODE	1SS133
HDS0437	D2503	DIODE	1SS133
HDS0437	D2504	DIODE	1SS133
HTA0290	TR2501	TRANSISTOR	2SA1206
RCE0779	R2501	R.CARBON	1/4W 6.8 KOHM +-5%
RCE0782	R2501	R.CARBON	1/4W 12 KOHM +-5%
RCE0772	R2502	R.CARBON	1/4W 1.8 KOHM +-5%
ETP0002		PIN	171255-1
ETP0141		PIN	DP-2
JBB0021	P2501	CONNECTOR	B3B-XH-A

VC-6023, VC-6024 PANEL(RTO) + OTHER

PARTS CODE	SYMBOL	DESCRIPTION	
8338351		TERMINAL	Z-048(EARTH)
4044797 E		TERMINAL	C5
JHB0088	J1	COAX.CON	BNC071
JJT0035	J5	TIP JACK	TJ-10A BLACK
JHB0117	J9	CONNECTOR	BNC355
JHB0117	J80	CONNECTOR	BNC355
JHB0088	J101	COAX.CON	BNC071
JHB0088	J403	COAX.CON	BNC071
JJG0003	J1103	CONNECTOR	GSS42R34
8397022	J1201	TEST POINT	Z069
8400067	S1101	SW.PB	SDV 3P (UL.CSA)
8529913	T1001	XFMR	8529913
DPX0076	V1001	CRT	150BTB31(IG)
8446918	V1001	CRT	150CTB31

PANEL(RTO) + OTHER

VC-6023, VC-6024 PANEL(RTO) + OTHER

PARTS CODE	SYMBOL	DESCRIPTION	
HDL0047	D1110	LED	LN31GPHL(GREEN)
RCE0753	R13	R.CARBON	1/4W 47 OHM +-5%
RCE0753	R113	R.CARBON	1/4W 47 OHM +-5%
CCC1004	C13	C.CERAMIC	50 V 15 PF+-5%
CCC1004	C113	C.CERAMIC	50 V 15 PF+-5%
BBA0337		WIRE	PVC UL-1007 #24 GRN
BBA0341		WIRE	PVC UL-1007 #24 WHT
BBA1145		WIRE.VINYL	UL-1015#22 7/0.26TA-SC B
BBA1146		WIRE.VINYL	UL-1015#22 7/0.26TA-SC W
BBA1201		WIRE.VINYL	UL-1015 #18 GRN
BBE0044		WIRE	PVC UL-1007 #26 WHT
3180016 G		CABLE.ASSY	FOR V-225
3180016 J		CABLE.ASSY	FOR V-425
3180017 F		CABLE.ASSY	3180017 FH
3180017 J		CABLE.ASSY	3180017 JA
3180017 J		CABLE.ASSY	3180017 JB
3180017 L		CABLE.ASSY	3180017 LA
3180017 R		CABLE.ASSY	3180017 RA
3180017 S		CABLE.ASSY	3180017 SB
3180017 T		CABLE ASSY	3180017 TD
3180017 T		CABLE.ASSY	3180017 TE
3180017 T		CABLE ASSY	3180017 TF
3180017 T		CABLE ASSY	3180017 TH
3180017 U		CABLE ASSY	3180017 UA
3180017 W		CABLE ASSY	3180017 WA
3180017 W		CABLE ASSY	3180017 WC
3180017 W		CABLE ASSY	3180017 WD
3180017 W		CABLE ASSY	3180017 WE
8402043		CONNECTOR	FOR ROTATION-COIL
8478324 D		CABLE.ASSY	8478324-D
8478324 E		CABLE.ASSY	8478324-E
8478324 F		CABLE.ASSY	8478324-F
8529028 D		CABLE ASSY	8529028 DA
8529028 E		CABLE ASSY	8529028 EA
8529028 H		CABLE ASSY	8529028 HA
8529028 K		CABLE ASSY	8529028 KA
8529028 N		CABLE ASSY	8529028 NA
8529028 R		CABLE ASSY	8529028 RA
8529028 S		CABLE ASSY	8529028 SA
8529028 T		CABLE ASSY	8529028 TA
8529028 T		CABLE ASSY	8529028 TB
8529028 T		CABLE ASSY	8529028 TC
BMD0051		MAGNETWIRE	2 BL-3 UEW 0.18
BSE0001		WIRE	DIA 0.75 TIN PLATED
ERD0043		TUBING	IRRAX 0.7PHI YEL
ERD0044		TUBING	IRRAX 1.0PHI YEL
ERH0014		TAPE	POLYESTER NO.56 W=12MM YE
ERL0002		CABLE TIE	UNITY 3~35MM
ERL0089		CABLE TIE	PLTIM-XMR
ERL0093		CABLE TIE	SKB-4M/T50L
324662 D		TERMINAL	D3

POWER(PEF-761)

VC-6023, VC-6024 PEF-761 POWER

PARTS CODE	SYMBOL	DESCRIPTION	
IPM0011	IC1701	IC	UPC7805HF
8338426 B	IC1702	IC	HA17812P
ILM0327	IC1703	IC.ANALOG	UPC7912H
HDM0033	D1705	DIODE	STACK M4C-1
HDD0158	D1701~4	DIODE	DSA3A1
RME1365	R1707	R.METAL	2W 100 OHM +-5%
CES0137	C1701	C.AL ELYC	25 V 2200 UF+-20%
CEK0184	C1702	C.AL ELYC	25 V 47 UF+-20%
CES0045	C1703	C.AL ELYC	35 V 2200 UF+-20%
CEK0184	C1704	C.AL ELYC	25 V 47 UF+-20%
CES0045	C1705	C.AL ELYC	35 V 2200 UF+-20%
CEK0184	C1706	C.AL ELYC	25 V 47 UF+-20%
CES0419	C1707	C.AL ELYC	50 V 47 UF+-20%
8529028 I		CABLE ASSY	8529028 IA
8529028 Q		CABLE ASSY	8529028 QC
EOF0118	B1	MOTOR.FAN	DF36A12-101B (CONNECTOR)
EFL0162	F1701	FUSE	TSCR UL.CSA 125V 3.15A
JBX1909	P1701	CONNECTOR	171826-5
JBB0060	P1702	CONNECTOR	B5B-XH-A
JBB0021	P1704	CONNECTOR	B3B-XH-A

CKB DLY(PEF-928)

VC-6023, VC-6024 PEF-928 CKB DLY

PARTS CODE	SYMBOL	..... DESCRIPTION .....
IDH0586	IC3001	IC.DIGITAL HD74LS74AP
RME1430	R3001	R.METAL 0.1W 220 OHM+-5%
RME1413	R3002	R.METAL 0.1W 0 OHM
CES0541	C3001	C.AL ELYC 10 V 47 UF+-20%
ETP0141		PIN DP-2
JBB0055		CONNECTOR B7P-SHF-GB
JBB0055		CONNECTOR B7P-SHF-GB
EDH0002	DL3001	DELAY LINE HS-250
JBS0067	P3001	CONNECTOR SQ-7-AP-GB-C
JBS0067	P3002	CONNECTOR SQ-7-AP-GB-C
JBB0027	P3003	CONNECTOR B2B-XH-A

11. MECHANICAL PARTS LIST AND EXPLODED VIEW

Symbol	Part Code		Description	Q'ty A	Q'ty B
G01	62M0042		COVER (BOTTOM) ASSY		1
G01	62M0049		COVER (BOTTOM) ASSY FOR VC-6024(C) ONLY		1
G02	62M0043		CHASSIS (FRONT) ASSY	1	
G02	62M0048		CHASSIS (FRONT) ASSY		1
G03	62M0044		CHASSIS (C) ASSY	1	1
G04	61M0001		CHASSIS (P) ASSY	1	
G04	61M0002		CHASSIS (P) ASSY		1
G05	61M0003		BRACKET (SW2) ASSY	1	1
G06	62M0045		BRACKET (CRT HD) ASSY	1	1
G07	62M0046		BEZEL ASSY	1	
G07	62M0047		BEZEL ASSY		1
G08	61X0001		CRT ASSY	1	1
1	3229943	B	COVER (TOP)	1	1
2	3233769	B	COVER (BOTTOM)	1	
2	3238134	A	COVER (BOTTOM) FOR VC-6023(C), ONLY	1	
4	2114597	CC	CHASSIS (REAR)	1	1
7	2119562	BB	CHASSIS (L)	1	1
8	3177959	A	BRACKET (SW)	1	1
10	8398471	A	BRACKET (SW)	1	1
12	8398473	A	BRACKET (CRT)	1	1
13	8398474	A	BAND (CRT 1)	1	
13	8438037	A	BAND (CRT 1)		1
14	8398475	A	BAND (CRT 2)	1	
14	8448099	A	BAND (CRT 2)		1
15	8398476	A	NUT (PLATE)	2	2
16	8398477	A	SPACER (BNC)	2	2
17	8398479	A	EARTH (SPRING)		1
19	3180079	A	SHIELD CASE	1	1
20	8400305	A	SHIELD COVER	1	1
22	8405457~59	A	HEAT SINK (A)	1	1
23	8529656	A	HEAT SINK (B)	1	1
27	8406477	A	STOPPER	1	1
30	8405457~58	B	HEAT SINK (A')	1	1
32	8446132	A	EARTH (PLATE)	1	1
34	8505143	A	BRACKET (CONNECTOR)	1	1
35	8524030	A	BRACKET L (μCOM)	1	1
36	8524031	A	BRACKET R (μCOM)	1	1
37	8529669	A	BRACKET (PW)	1	1
39	8533857	A	BRACKET (CUR)	1	1
51	3233781	D	PANEL (FRONT)	1	
51	3233781	D	PANEL (FRONT)		1
52	3216318	E	PANEL (REAR)	1	1
54	121381	C	FRAME (FRONT)	1	1
56	8395445	A	FILTER	1	1
58	8498217	A	CUSHION		1
59	8441112	E	SPACER	1	1
61	3208902	C	HANDEL	1	1

Symbol	Part Code		Description	Q'ty	
				A	B
62	8377076	A	STOPPER (HANDEL)	2	2
63	3149317	C	FOOT (REAR)	4	4
64	3022087	A	FOOT (BOTTOM)	4	4
66	8395432	A	SHIELD (BAND)	1	
66	8316268	C	SHIELD (BAND)		1
68	3144055	A	RUBBER	2	
68	3144055	B	RUBBER		2
72	8396868	D	SPACER (SW)	4	4
75	3180083	BB	KNOB (PW)	1	1
76	3180084	FF	KNOB (L)	2	2
77	3140804	C	KNOB (S22)	1	1
78	3149321	G	KNOB (S18)	1	1
79	3149324	J	KNOB (S18B)	3	3
80	3149324	H	KNOB (S18B)	4	4
81	3196622	F	KNOB (ATS)	2	2
82	8383451	A	KNOB (SW)		1
84	8401613	A	INSULATOR (1)	1	1
85	8401614	B	INSULATOR (2)	1	1
86	8383455	E	WIRE SADDLE	4	4
88	ERL0007		BAND		4
89	8420813	A	INSULATOR (H)	1	1
92	XCI0020		SPACER	1	1
94	3221974	B	SHIELD CASE (CRT)	1	
94	2128659	B	SHIELD CASE (CRT)		1
96	8360723	C	SUPPORT	2	2
97	8489066	A	BUSH	2	2
98	8505145	A	BUTTON	6	6
100	8533853	A	BRACKET (FAN)	1	1
101	8533854	A	CUSHION	1	1
301	XCA0661		SCREW SEMS 3×8	21	22
302	8340167	C	SCREW SEMS 4×20	4	4
303	XCA1369		SCREW 3×4	6	6
304	XCA6005		SCREW 2.6×5	3	3
305	XCA6006		SCREW 2.6×6	5	5
306	XCA6308		SCREW 3×8	31	31
307	XCA6316		SCREW 3×16	6	6
308	XCA6412		SCREW 4×12	2	2
310	XCA1820		SCREW 3×10	2	2
312	XCA7306		SCREW FLAT 3×6	15	15
313	XCA7410		SCREW FLAT 4×10	4	4
314	XCA7412		SCREW FLAT 4×12	4	4
316	8340167	L	SCREW SEMS 4×8	1	1
319	XCA7304		SCREW FLAT 3×4	1	1
320	XCA1857		WASHER 4	4	4
321	XCA1881		WASHER SPRING 4	4	4
322	XCA1707		NUT 4	4	4

Table 5-3

TIME/DIV	OSC A	OSC B	OSC C	D OUTPUT
0.2μS – 2μS	—	—	—	
5μS	L	L	L	10MHz
0.2S – 5S	H	H	L	1.25MHz
10S	L	L	H	625KHz
20S *1	H	L	H	312.5KHz

*1. THOUGH THE TIME/DIV SCALE IS UP TO 0.2S, 20S IS INDICATED BECAUSE THE SCALE IS X100 IN ROLL MODE.

Table 5-4

TIME/DIV	SAMPLING CLOCK FREQUENCY	SAMPLING METHOD	CK SEL A	CK SEL B	IC5309 CONNECTION 1Y	IC5309 CONNECTION 2Y
0.2μS – 2μS	———	EQUIVALENT	H	H	IC3	2C3
5 μS	20 MHz	REAL TIME	L	L	IC0	2C0
10 μS	10 MHz		H	L	IC1	2C1
20μS – 0.2S	5MHz – 500Hz		L	H	IC2	2C2
0.5S – 20S *1	200Hz – 5Hz	REAL TIME (ROLL MODE)				

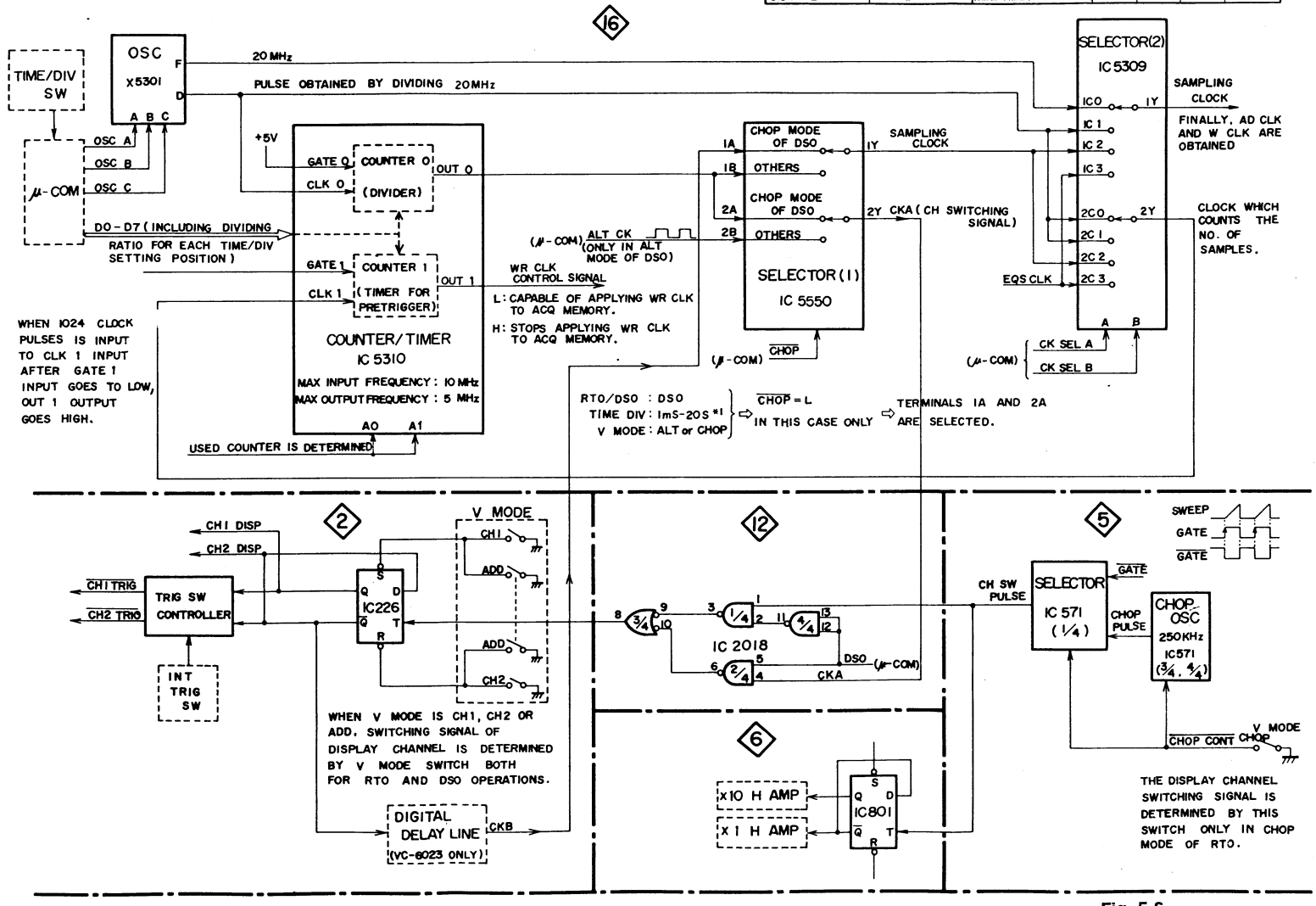
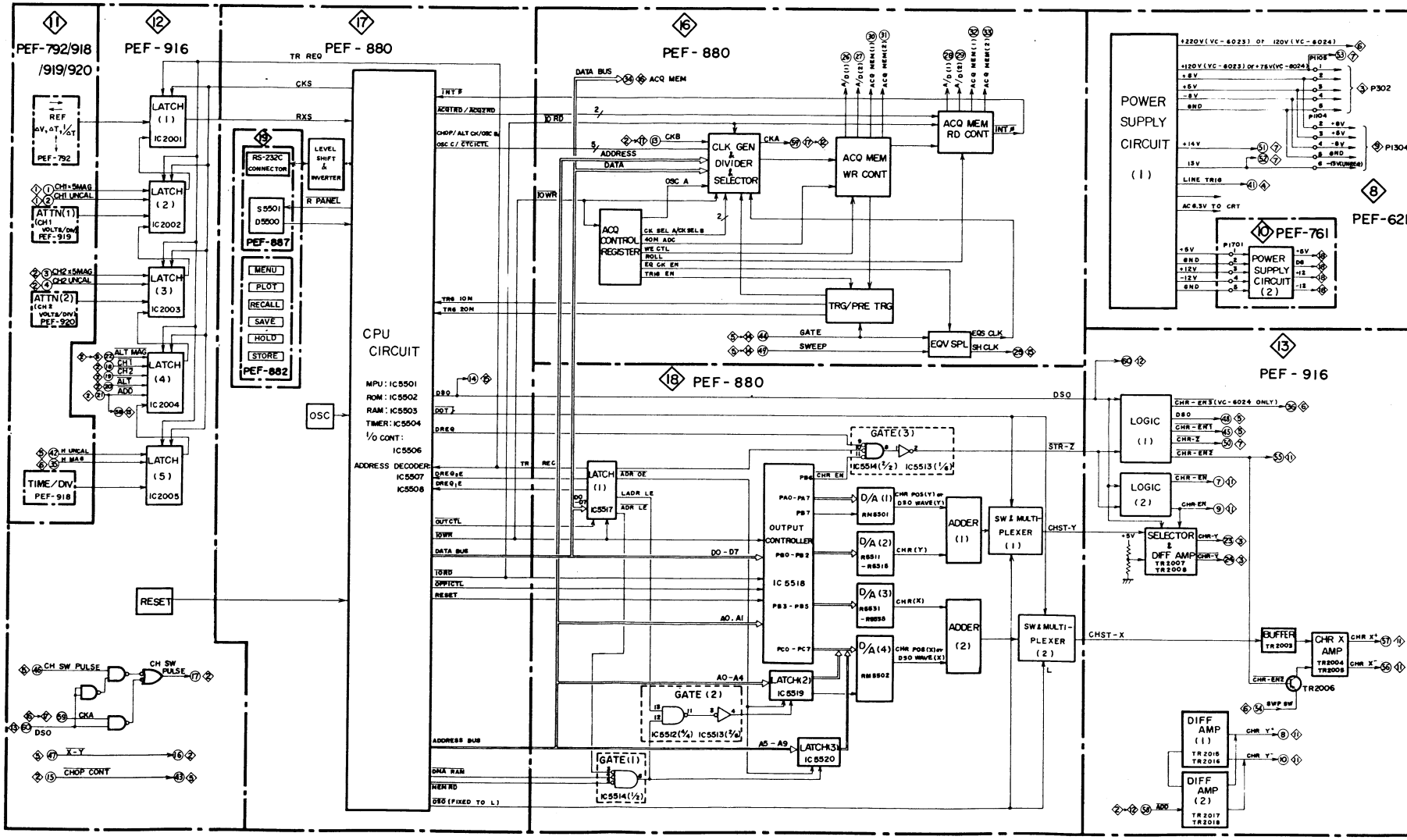
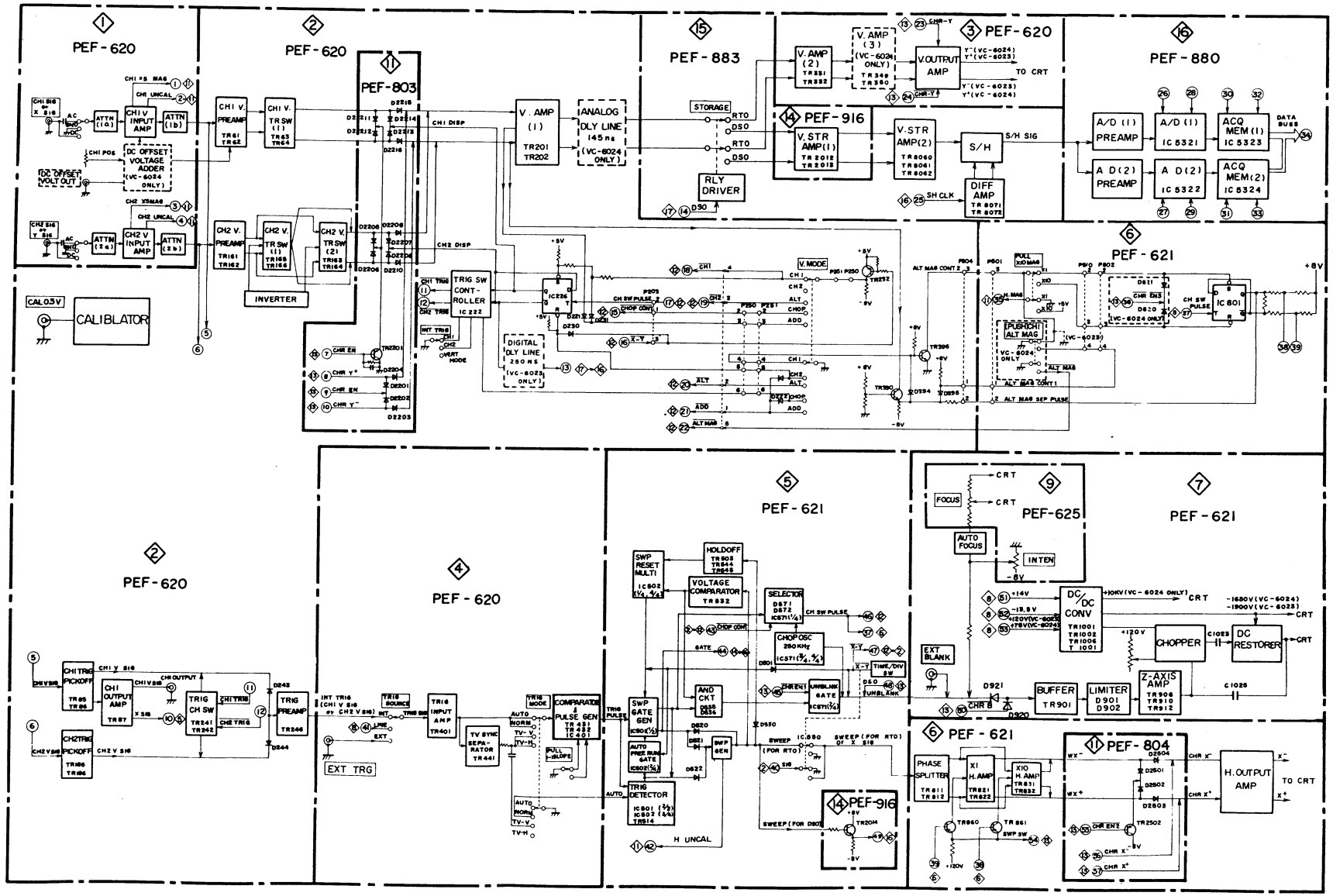
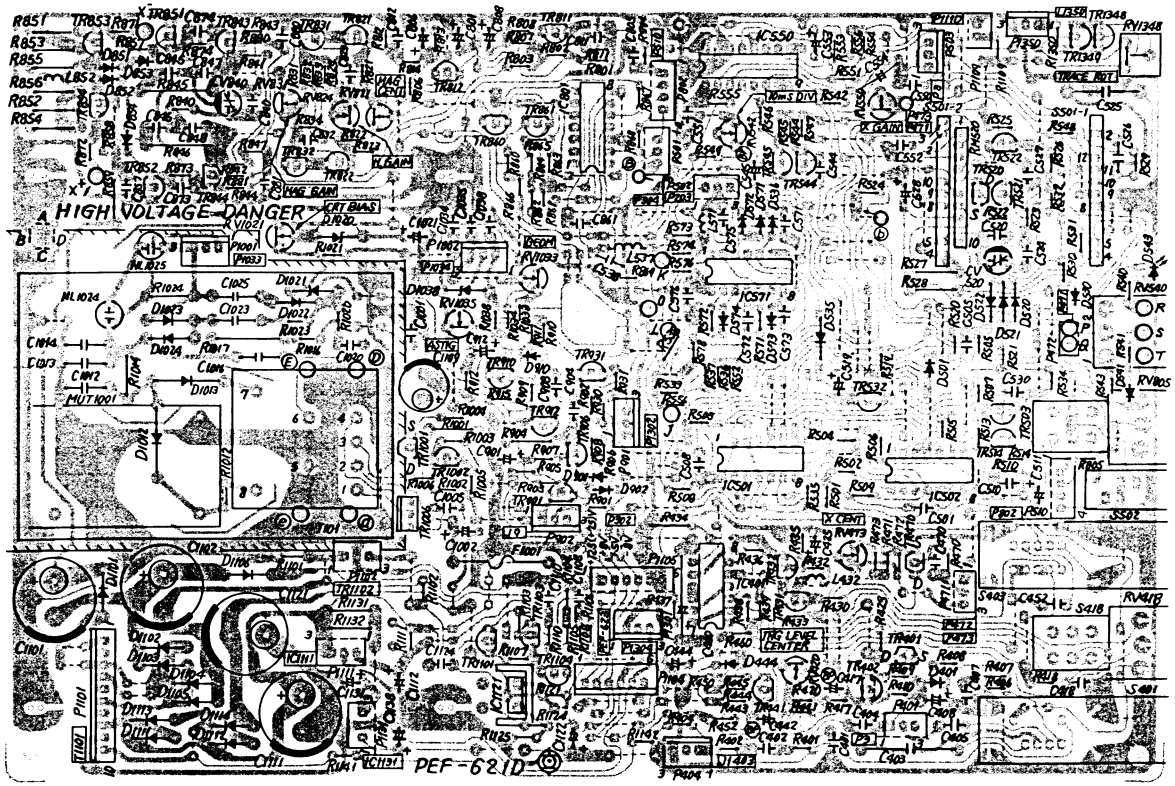


Fig. 5-6

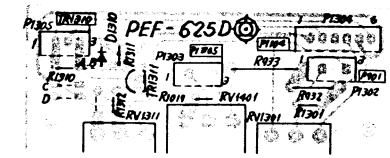

PEF-792/918/919/920
PEF-916
PEF-880
PEF-880
POWER SUPPLY CIRCUIT (1)
PEF-621
PEF-761
PEF-916
PEF-880
CPU CIRCUIT
MPU : IC5501
ROM : IC5502
RAM : IC5503
TIMER : IC5504
I/O CONT : IC5506
ADDRESS DECODER : IC5507 IC5508
OSC
RESET
CLK GEN & DIVIDER & SELECTOR
ACQ MEM WR CONT
ACQ MEM RD CONT
ACQ CONTROL REGISTER
TRG/PRE TRG
EQV SPL
OUTPUT CONTROLLER
IC 5518
D/A (1)
D/A (2)
D/A (3)
D/A (4)
ADDER (1)
ADDER (2)
SW & MULTI-PLEXER (1)
SW & MULTI-PLEXER (2)
LOGIC (1)
LOGIC (2)
SELECTOR & DIFF AMP
BUFFER
CHR X AMP
DIFF AMP (1)
DIFF AMP (2)
RS-232C CONNECTOR
LEVEL SHIFT & INVERTER
R PANEL
MENU
PLOT
RECALL
SAVE
HOLD
STORE
PEF-887
PEF-882
LATCH (1) IC2001
LATCH (2) IC2002
LATCH (3) IC2003
LATCH (4) IC2004
LATCH (5) IC2005
ATTN(1) CH1 VOLTS/DIV PEF-919
ATTN(2) CH2 VOLTS/DIV PEF-920
TIME/DIV PEF-918
REF PEF-792
DATA BUS
ACQ MEM
ADDRESS
DATA
CKB
CKA
OSC A
IORD
IOWR
GATE
SWEEP
EQS CLK
SH CLK
DSO
DOT J
DREQ
TRG ION
TRG ZON
OUTCTL
IOWR
DATA BUS
IORD
OPRCTL
RESET
ADDRESS BUS
DMA RAM
MEMRD
DSO (FIXED TO L)
DO - D7
AO, A1
A0 - A4
A5 - A9
CH SW PULSE
CKA
DSO
X-Y
CHOP CONT
STR-Z
CHST-Y
CHST-X
+220V (VC-6023) OR 120V (VC-6024)
+120V (VC-6023) OR +75V (VC-6024)
+8V
+5V
-8V
GND
+14V
-15V
LINE TRIG
AC 6.3V TO CRT
P302
P1304
P1701
POWER SUPPLY CIRCUIT (2)


PEF-620
PEF-620
PEF-803
PEF-883
PEF-916
PEF-620
PEF-880
PEF-621
CALIBLATOR
CAL 0.5V
INVERTER
CH1 V. PREAMP
CH2 V. PREAMP
CH1 V INPUT AMP
CH2 V INPUT AMP
DC OFFSET VOLTAGE ADDER (VC-6024 ONLY)
CH1 V. TR SW (1)
CH2 V. TR SW (1)
CH2 V. TR SW (2)
V. AMP (1) TR201 TR202
ANALOG DLY LINE 145 ns (VC-6024 ONLY)
TRIG SW CONT-ROLLER IC 222
DIGITAL DLY LINE 250 NS (VC-6023 ONLY)
V. AMP (2) TR331 TR332
V. AMP (3) (VC-6024 ONLY) TR349 TR350
V. OUTPUT AMP
TO CRT
STORAGE
RLY DRIVER
V. STR AMP(1) TR2012 TR2013
V. STR AMP(2) TR8060 TR8061 TR8062
S/H
S/H SIG
DIFF AMP TR807 TR8072
SH CLK
A/D (1) PREAMP
A/D (1) IC 5321
ACQ MEM (1) IC 5323
A D(2) PREAMP
A D(2) IC 5322
ACQ MEM(2) IC 5324
DATA BUSES
V. MODE
CH SW PULSE
CHOP CONT
ALT MAG
ALT MAG CONT 2
PUSH CH/ ALT MAG
ALT MAG CONT 1
ALT MAG SEP PULSE
PEF-620
PEF-620
PEF-621
PEF-625
PEF-621
CH1 TRIG PICKOFF TR85 TR86
CH2 TRIG PICKOFF TR186 TR186
CH1 OUTPUT AMP TR87
TRIG CH SW TR241 TR242
TRIG PREAMP TR246
EXT TRG
TRIG INPUT AMP TR401
TV SYNC SEPA-RATOR TR441
COMPARATOR & PULSE GEN TR 421 TR 422 IC 421
SWP RESET MULTI IC 602
HOLDOFF TR803 TR844 TR848
VOLTAGE COMPARATOR TR832
SELECTOR D871 D872 IC571(1/4)
CHOP OSC 250 KHz IC571(3/4, 4/4)
SWP GATE GEN IC 601
AND CKT D838 D836
AUTO FREE RUN GATE IC 602(1/4)
TRIG DETECTOR IC 601 (1/2) IC 602 (3/4) TR814
SWP GEN
UNBLANK GATE IC 871(1/4)
TIME/DIV SW
H UNCAL
SWEEP (FOR RTO)
SWEEP (FOR DSO)
PEF-916
FOCUS
AUTO FOCUS
INTEN
DC/DC CONV TR1001 TR1002 TR1004 TR 1001
CHOPPER
DC RESTORER
Z-AXIS AMP TR906 TR910 TR912
EXT BLANK
BUFFER TR901
LIMITER D901 D902
PEF-621
PEF-804
PHASE SPLITTER TR811 TR812
X1 H. AMP TR821 TR822
X10 H. AMP TR831 TR832
H. OUTPUT AMP
TO CRT
SWP SW

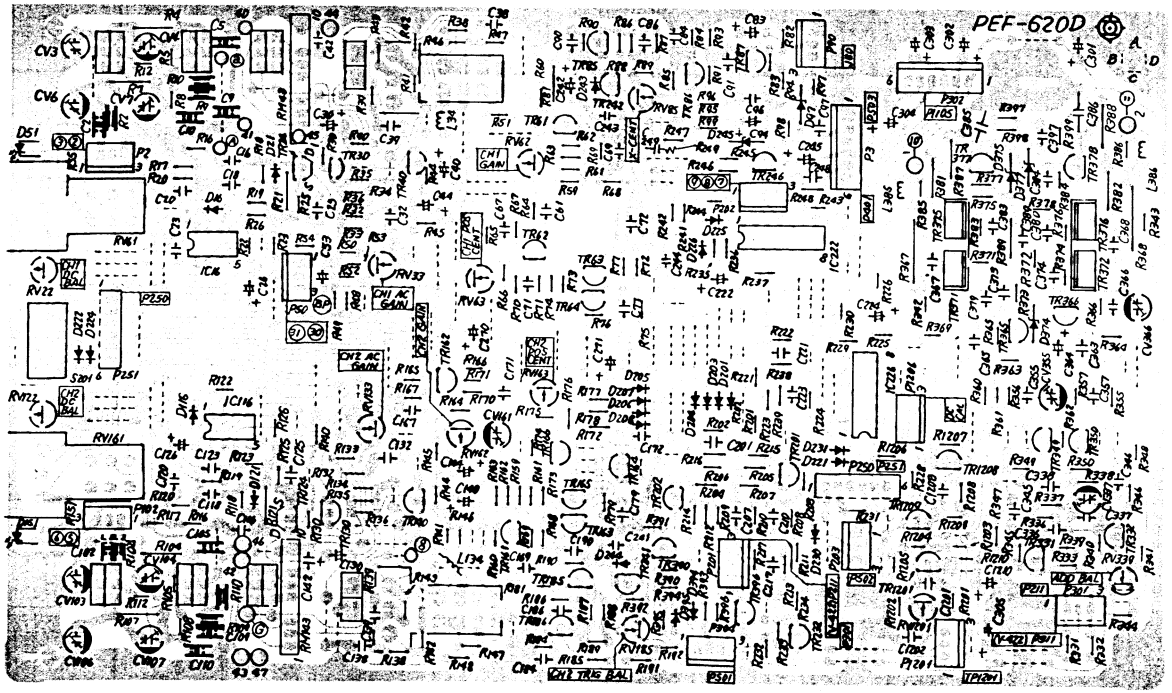
6. ELECTRICAL PARTS ARRANGEMENT



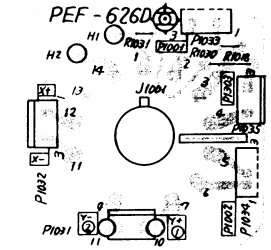
PEF-621 PCB



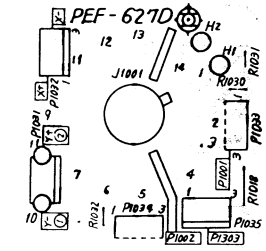
PEF-625 PCB



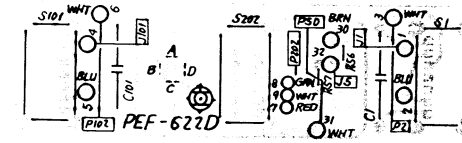
PEF-620 PCB



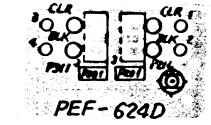
PEF-626 PCB



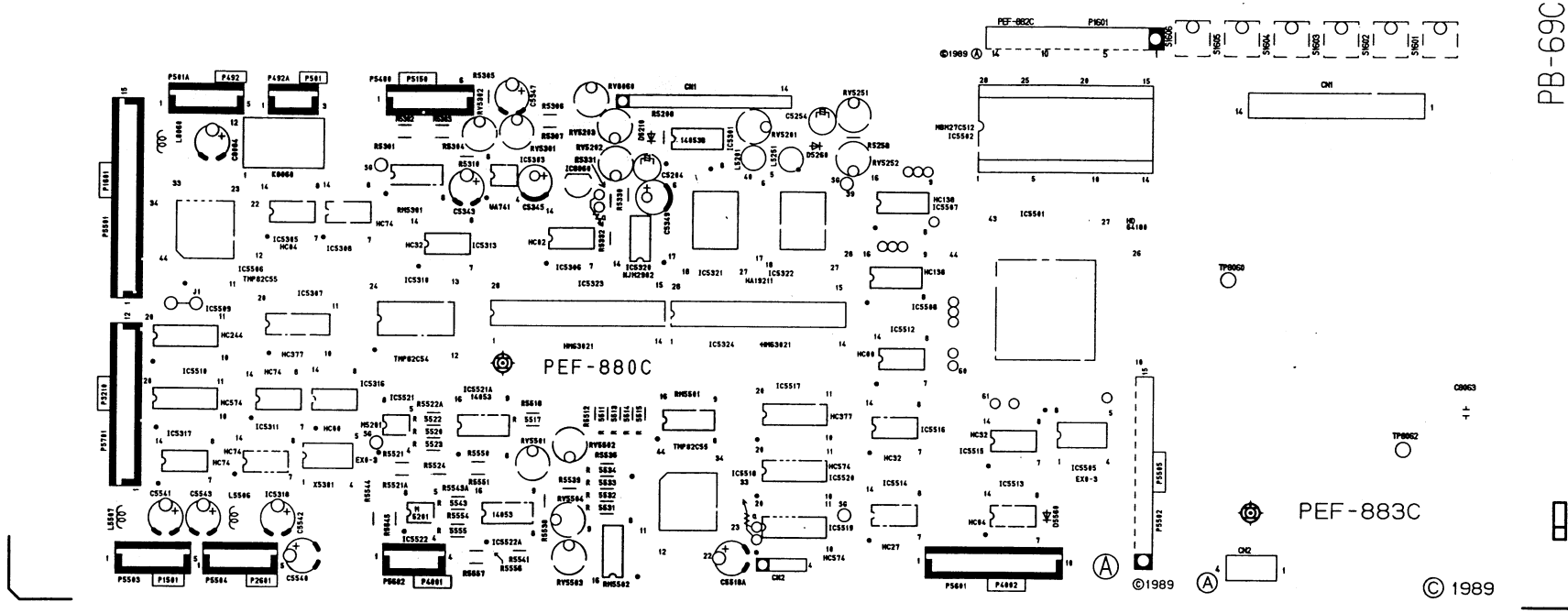
PEF-627 PCB



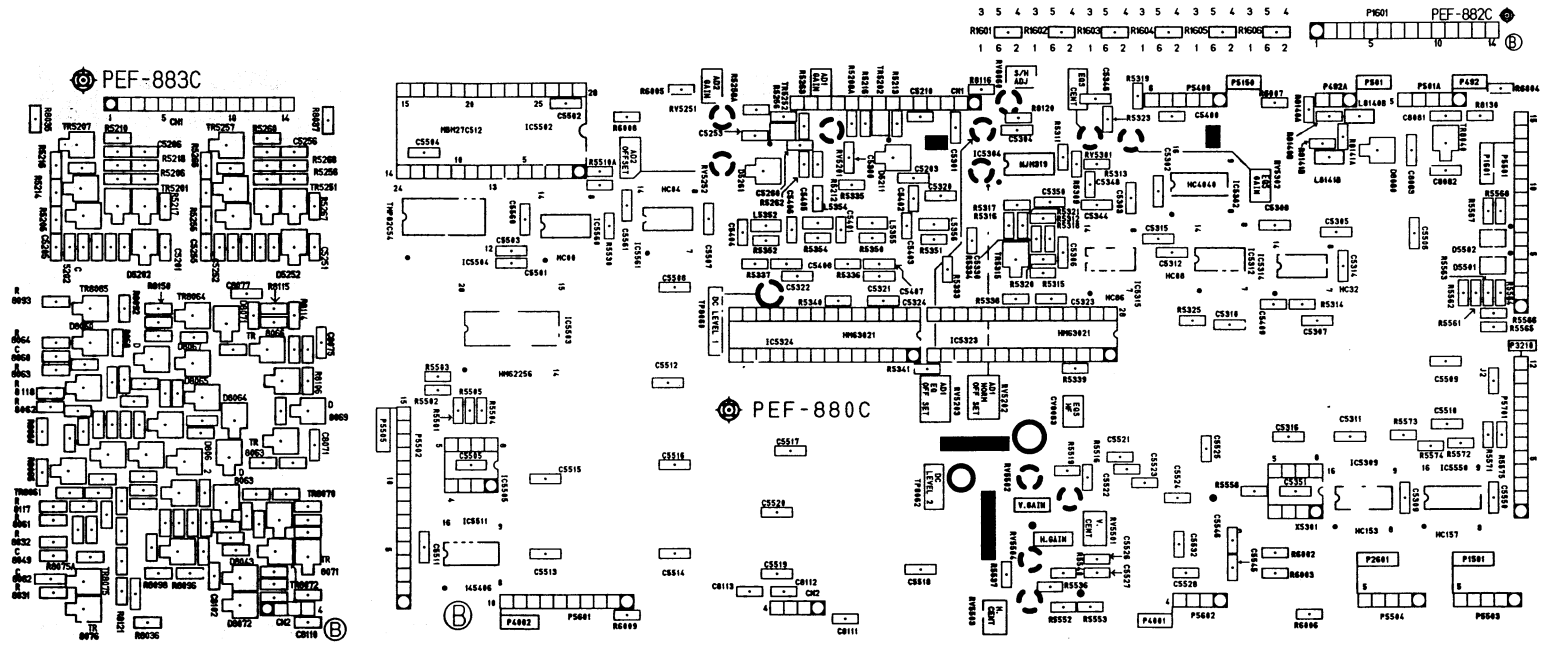
PEF-622 PCB



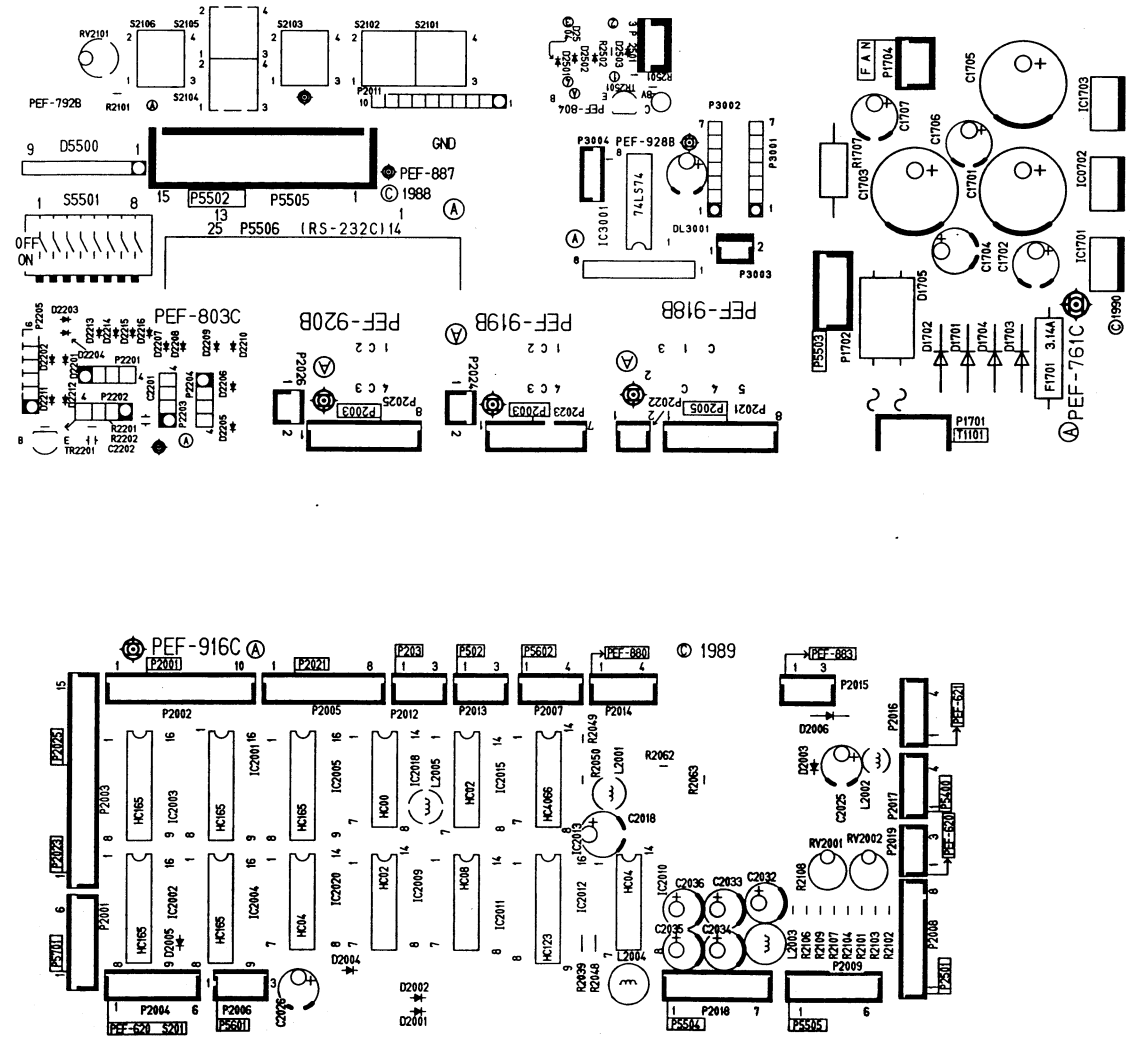
PEF-624 PCB



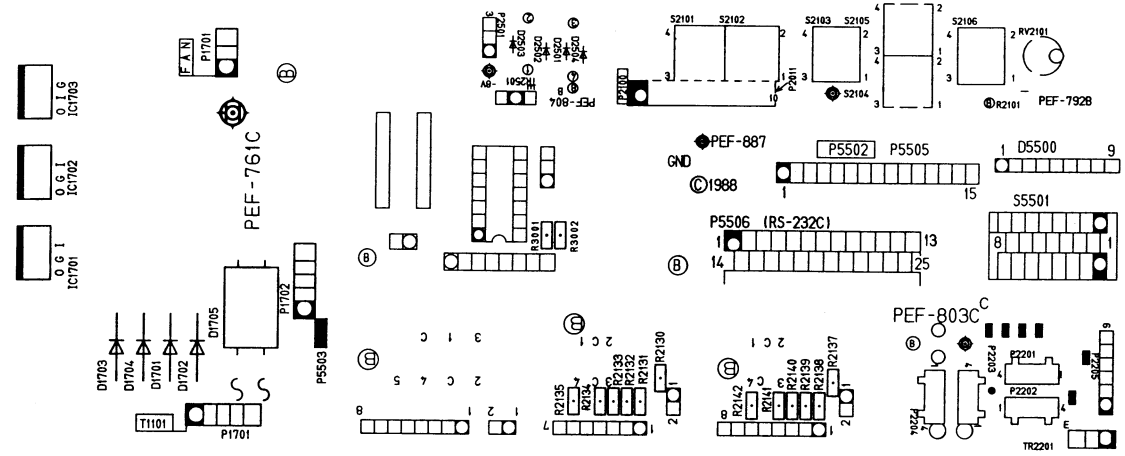
PEF-880C, 882C, 883C, (Parts side)

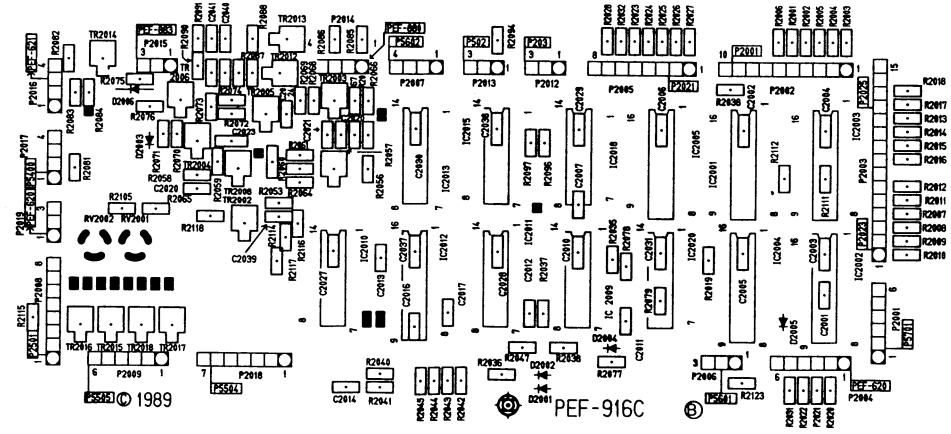


PEF-880C 882C 883C (Soldering side)



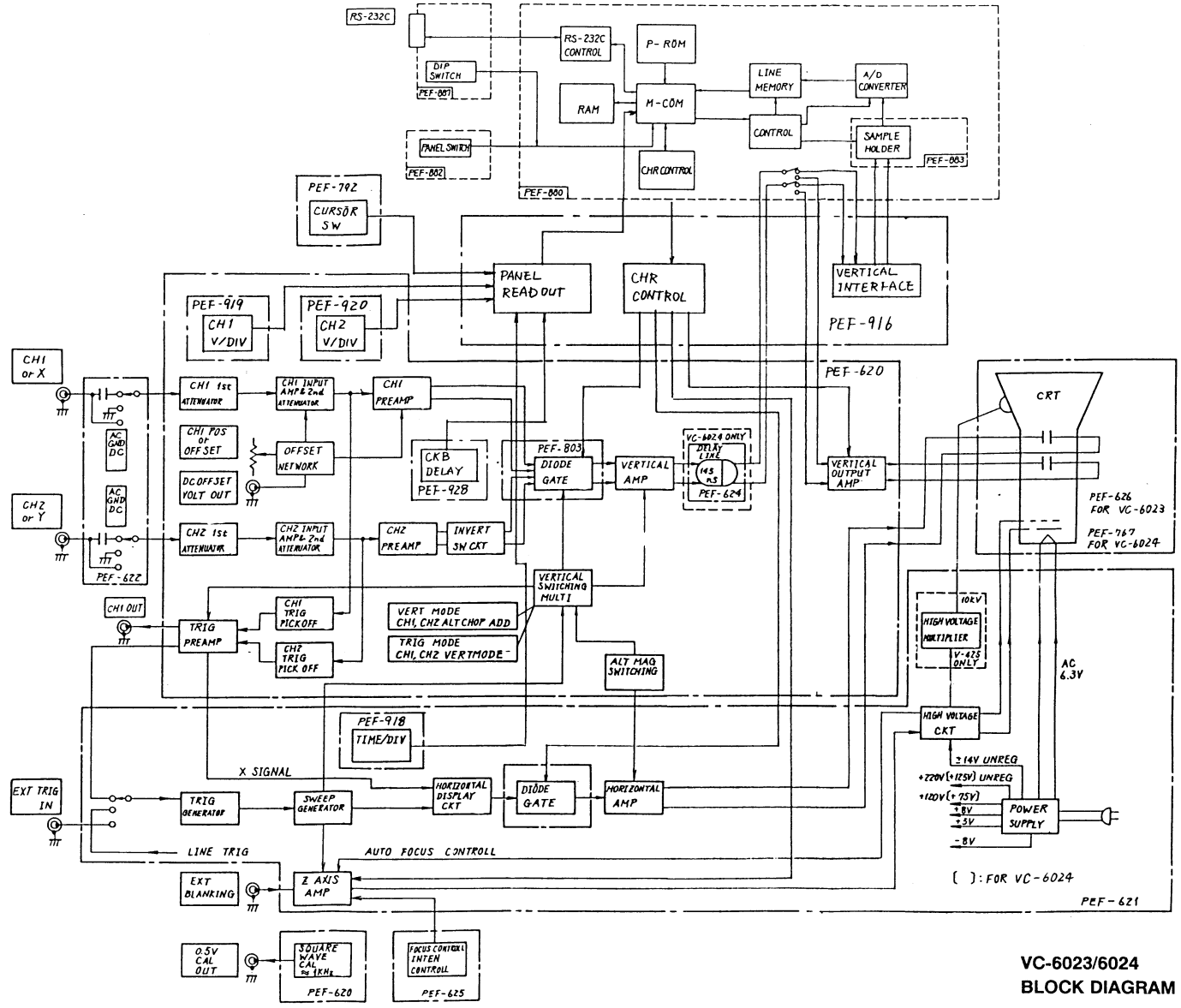
PEF-792B, 804, 887, 928B, 803C, 920B, 919B, 918B, 761C(Parts side)





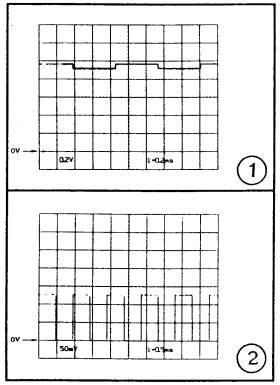
PEF-792B, 804, 887, 928B, 803C, 920B, 919B, 918B, 761C(Soldering side)

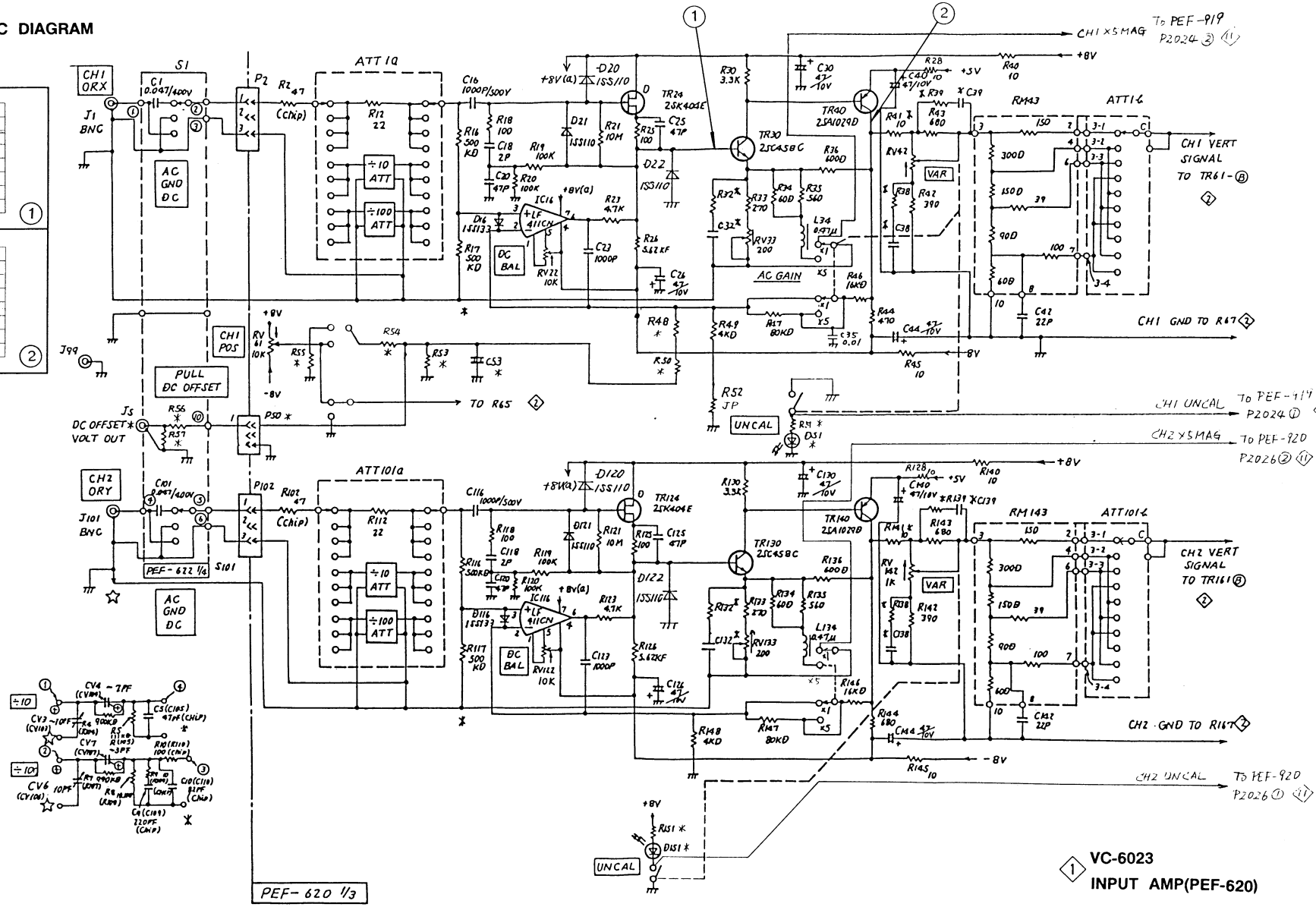
9. GENERAL BLOCK DIAGRAM



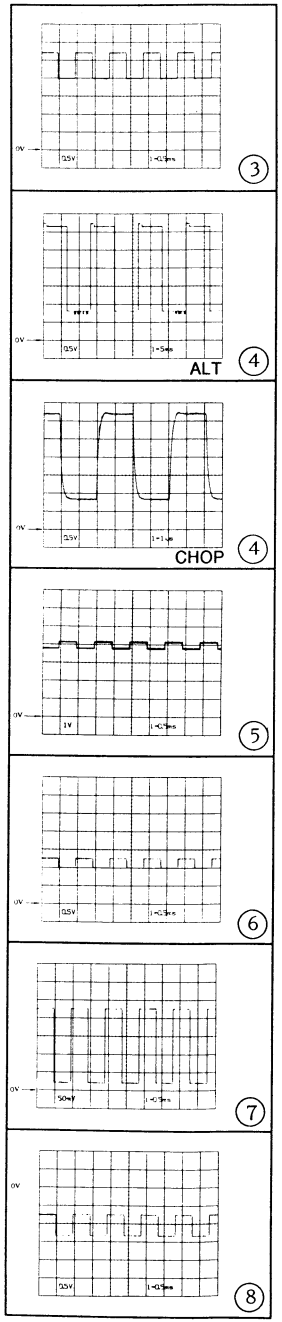
VC-6023/6024
BLOCK DIAGRAM

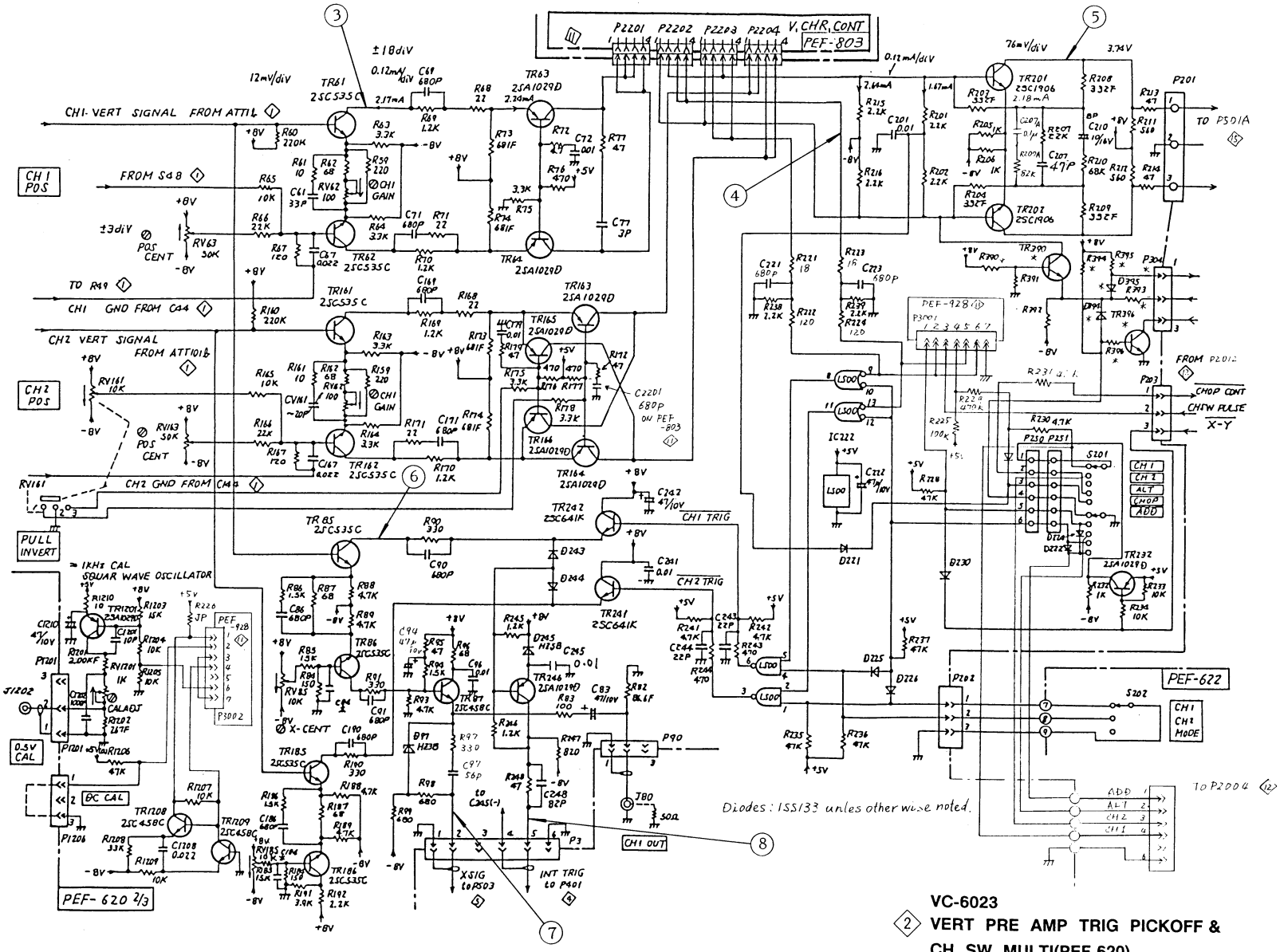
10. SCHEMATIC DIAGRAM





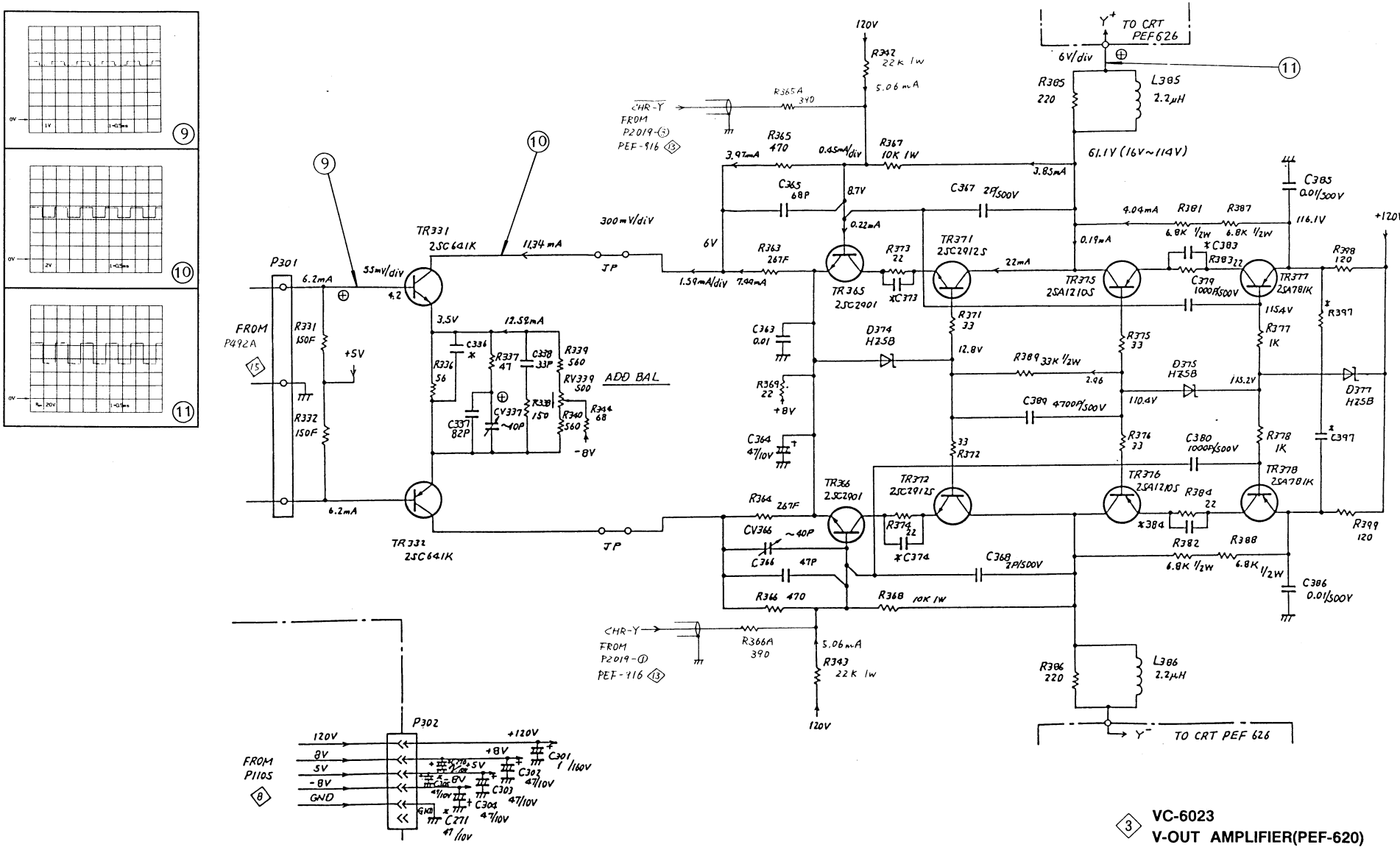
VC-6023
INPUT AMP(PEF-620)



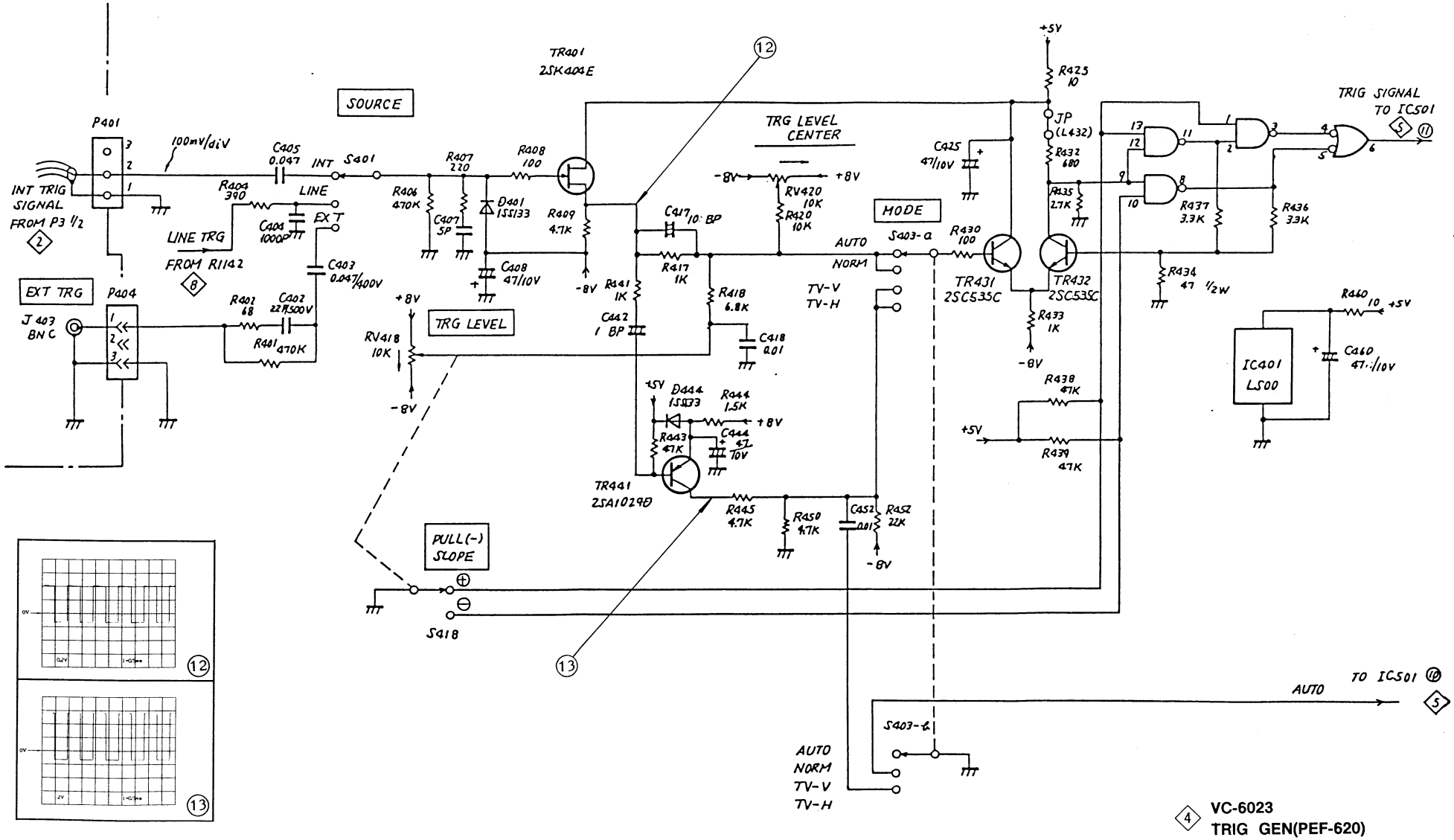


VC-6023

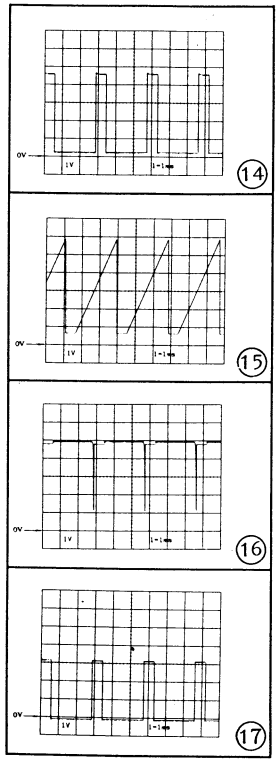
◇2 VERT PRE AMP TRIG PICKOFF & CH SW MULTI(PEF-620)

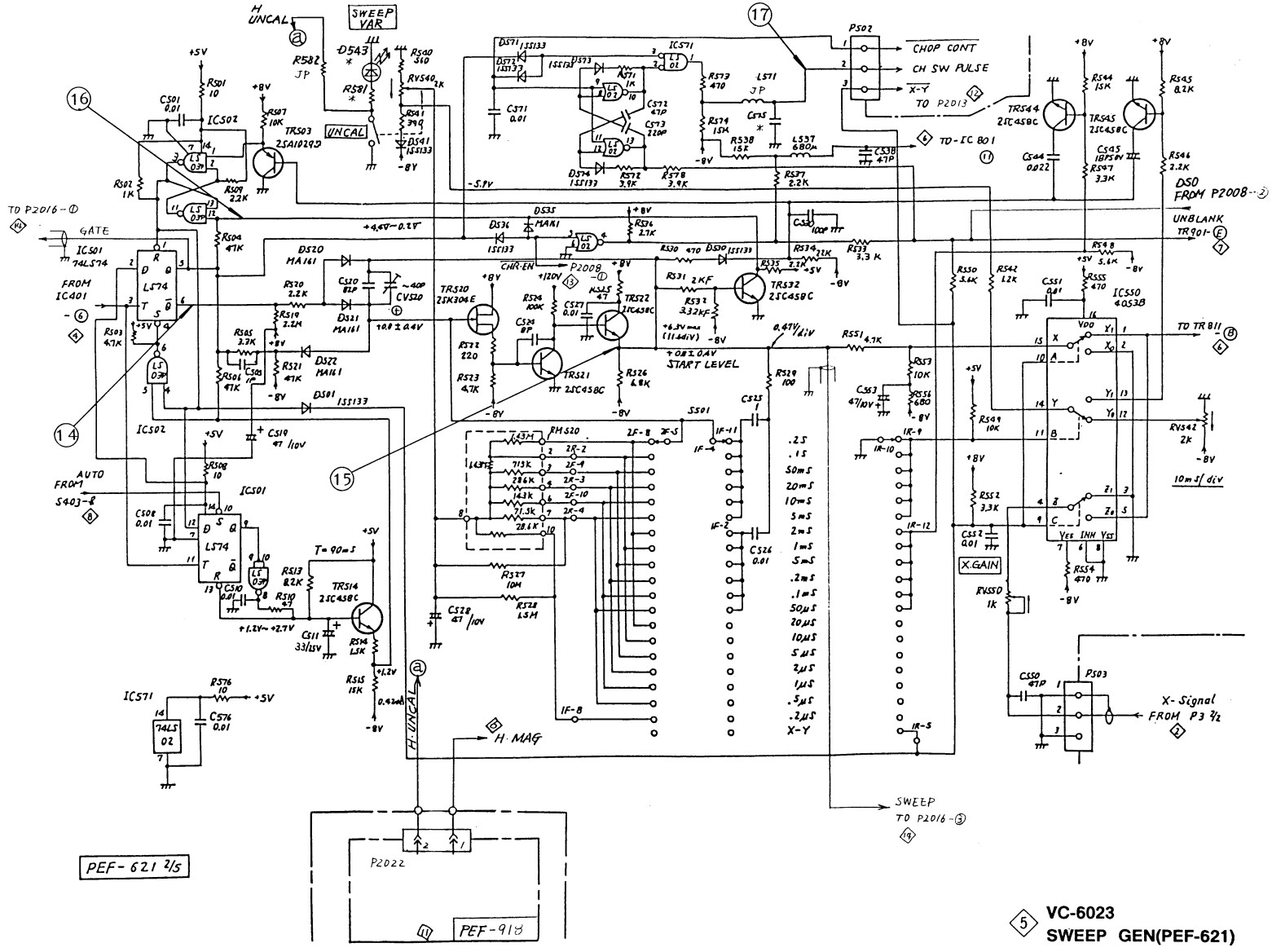


③ **VC-6023**
V-OUT AMPLIFIER(PEF-620)

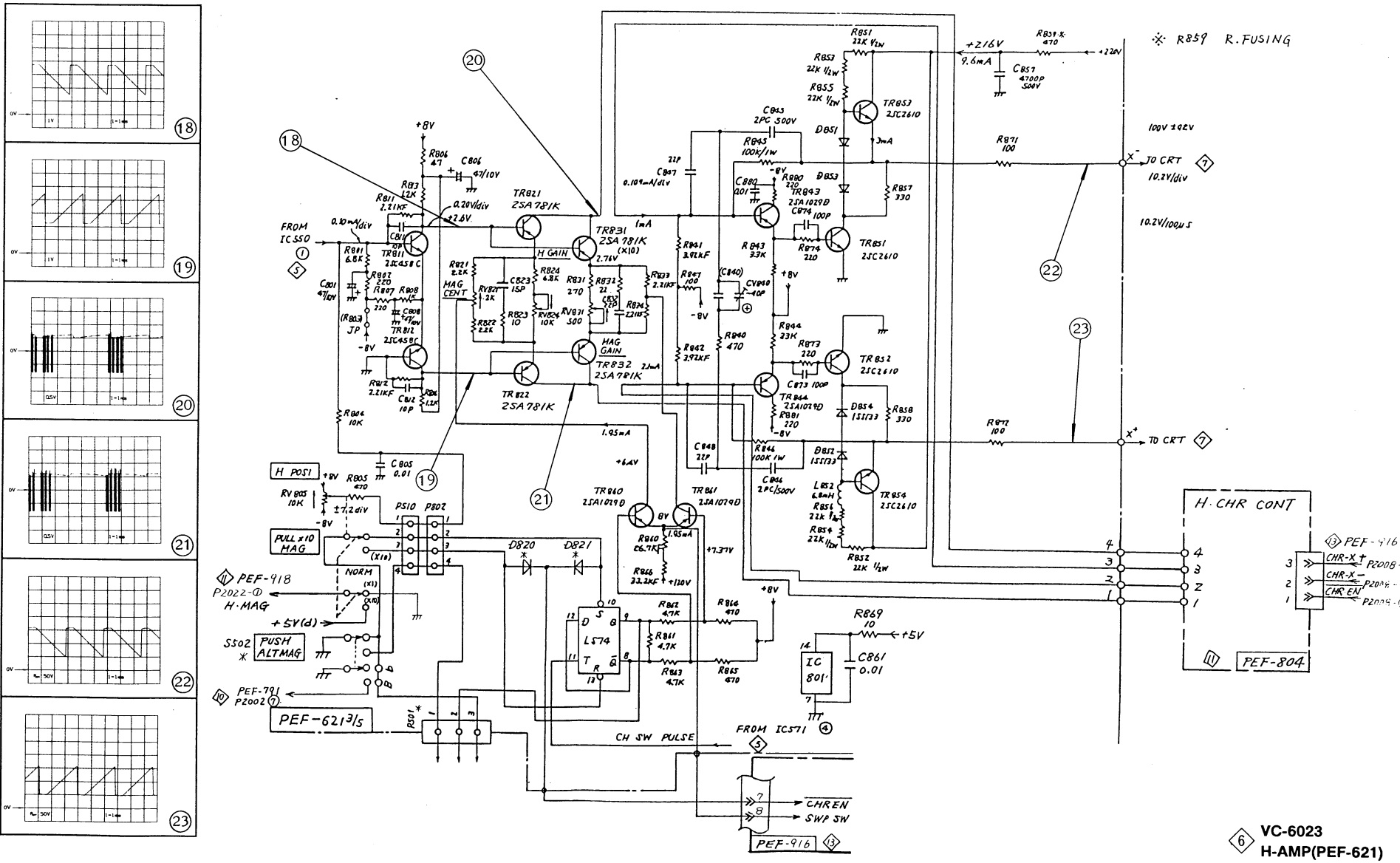


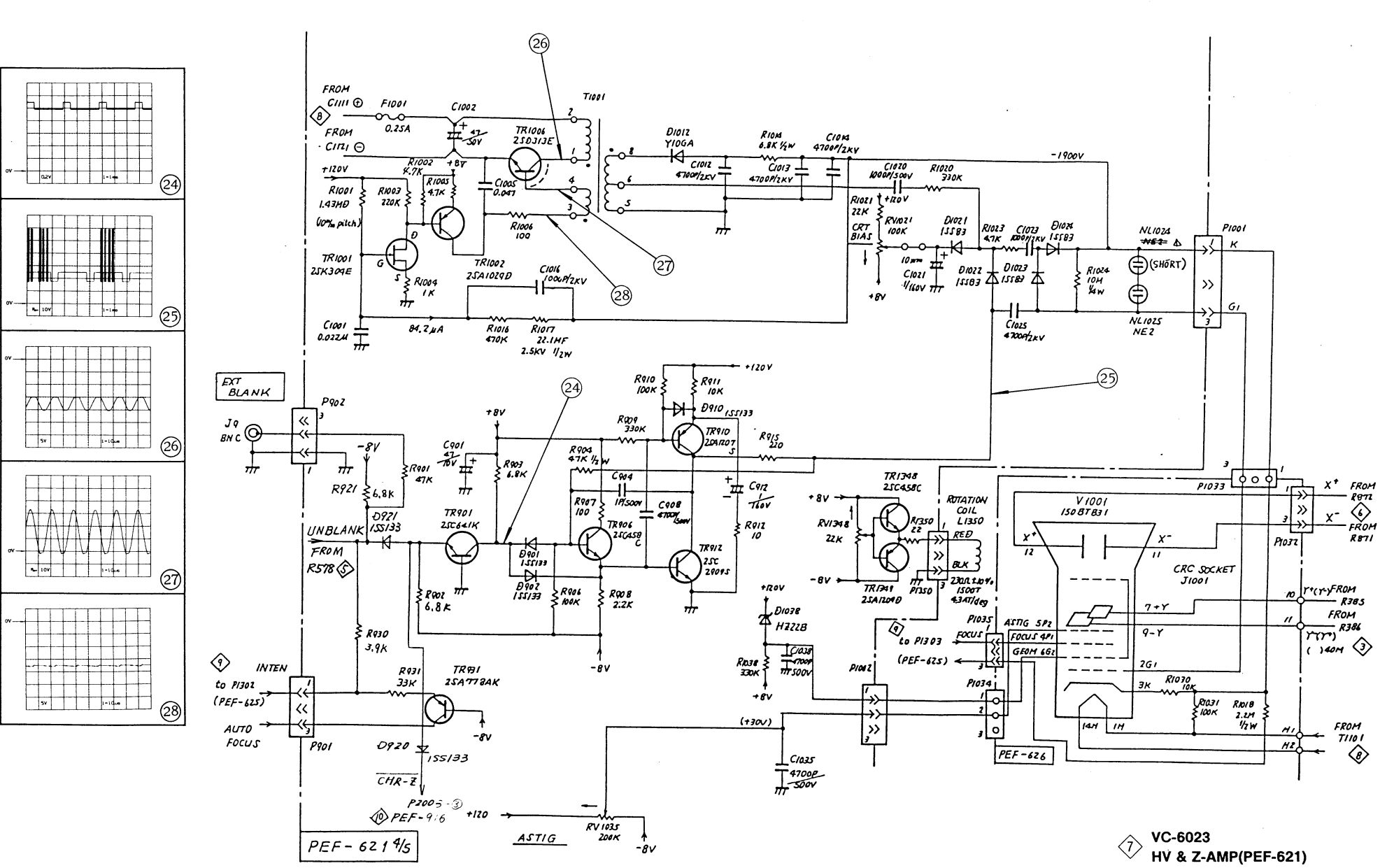
VC-6023
TRIG GEN(PEF-620)

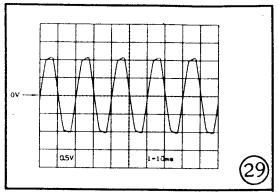


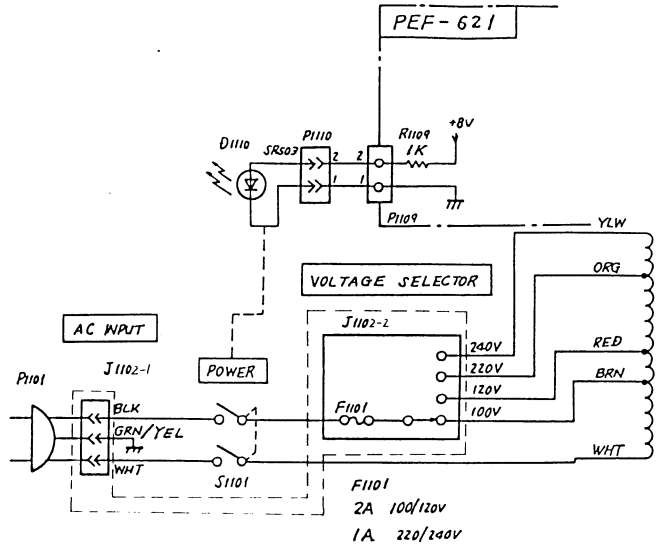


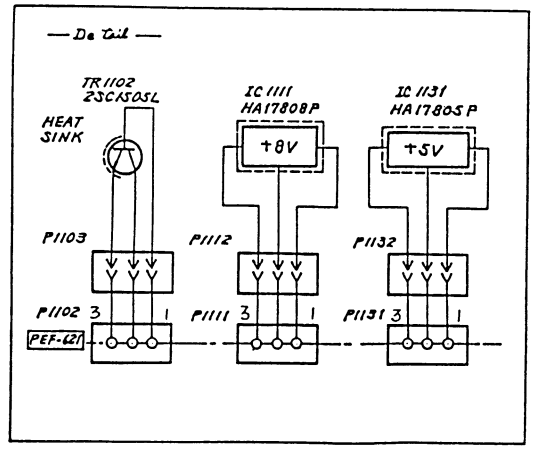
5 VC-6023
SWEEP GEN(PEF-621)

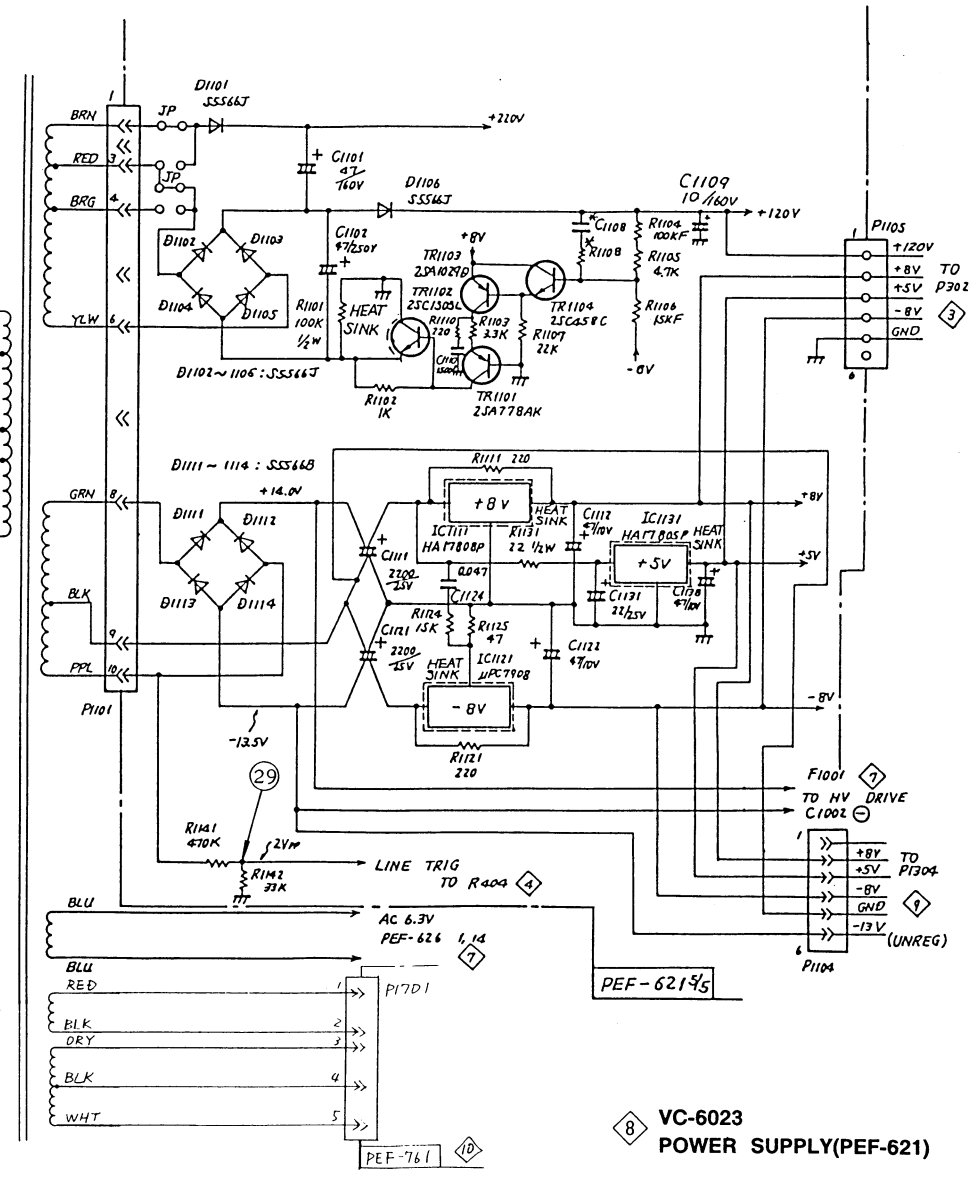

※ R859 R.FUSING
+216V
9.6mA
+22V
TO CRT
10.2V/div
10.2V/100μS
TO CRT
FROM IC550
H GAIN
MAG CENT
MAG GAIN
H POSI
PULL ×10 MAG
NORM
PUSH ALTMAG
PEF-918
H·MAG
PEF-791
PEF-621 3/5
FROM IC571
CH SW PULSE
CHREN
SWP SW
PEF-916
H·CHR CONT
PEF-804
CHR-X+
CHR-X−
CHR EN
TR831 2SA781K (×10)
TR832 2SA781K
TR821 2SA781K
TR822 2SA781K
TR811 2SC458C
TR812 2SC458C
TR841 2SA1079D
TR842 2SA1079D
TR843 2SA1029D
TR844 2SA1029D
TR851 2SC2610
TR852 2SC2610
TR853 2SC2610
TR854 2SC2610
L574
IC 801
VC-6023
H-AMP(PEF-621)


24
25
26
27
28
FROM C111 ⊕
FROM C1171 ⊖
F1001 0.25A
C1002 47 50V
TR1006 2SD313E
T1001
+8V
+120V
R1001 1.43MΩ (10% pitch)
R1003 220K
R1002 4.7K
R1005 4.7K
C1005 0.047
R1006 100
TR1001 2SK304E
R1004 1K
TR1002 2SA1029D
C1016 1000P/2KV
C1001 0.022μ
84.2μA
R1016 470K
R1017 22.1MΩ 2.5KV 1/2W
D1012 Y10GA
C1012 4700P/2KV
R1014 6.8K 1/2W
C1013 4700P/2KV
C1014 4700P/2KV
-1900V
C1020 1000P/500V
R1020 330K
R1021 22K
CRT BIAS
RV1021 100K
C1021 1/160V
D1021 1SS83
D1022 1SS83
D1023 1SS83
D1024 1SS83
R1023 4.7K
C1023 1000P/2KV
R1024 10M 1/4W
C1025 4700P/2KV
NL1024 NE2 (SHORT)
NL1025 NE2
P1001 K G1
EXT BLANK
J9 BNC
P902
R901 47K
R921 6.8K
D921 1SS133
UNBLANK FROM R578
C901 47 16V
R903 6.8K
R904 4.7K 1/2W
R909 330K
R910 100K
R911 10K
D910 1SS133
TR910 2SA1207
R915 220
C904 1P/500V
C908 4700P/500V
R907 100
TR906 2SC458C
C912 1 160V
R912 10
TR901 2SC641K
D901 1SS133
D902 1SS133
R902 6.8K
R906 100K
R908 2.2K
TR912 2SC2909S
-8V
R930 3.9K
R931 33K
TR911 2SA778AK
INTEN to P1302 (PEF-625)
AUTO FOCUS
P901
D920 1SS133
CHR-Z
P2005-③ ⑩ PEF-916
+120
ASTIG
RV1035 200K
PEF-621 4/5
TR1348 2SC458C
TR1349 2SA1209D
RV1348 22K
ROTATION COIL L1350
RED
BLK
230Ω±10% 1500T 43ATT/deg
P1350
P1033
V1001 1S0BTB31
X+ FROM R872
X- FROM R871
CRC SOCKET J1001
Y+(Y+) FROM R385
Y-(Y-) FROM R386
7+Y
9-Y
2G1
3K
R1030 10K
R1031 100K
R1018 2.2M 1/2W
1.4M
1M
H1
H2
FROM T1101
D1038 H722B
C1038 4700P 500V
R1038 330K
C1035 4700P 500V
(+30V)
P1035
ASTIG SP2
FOCUS 4P1
GEOM 6G1
to P1303 (PEF-625)
P1002
P1034
PEF-626
⑦ VC-6023
HV & Z-AMP(PEF-621)

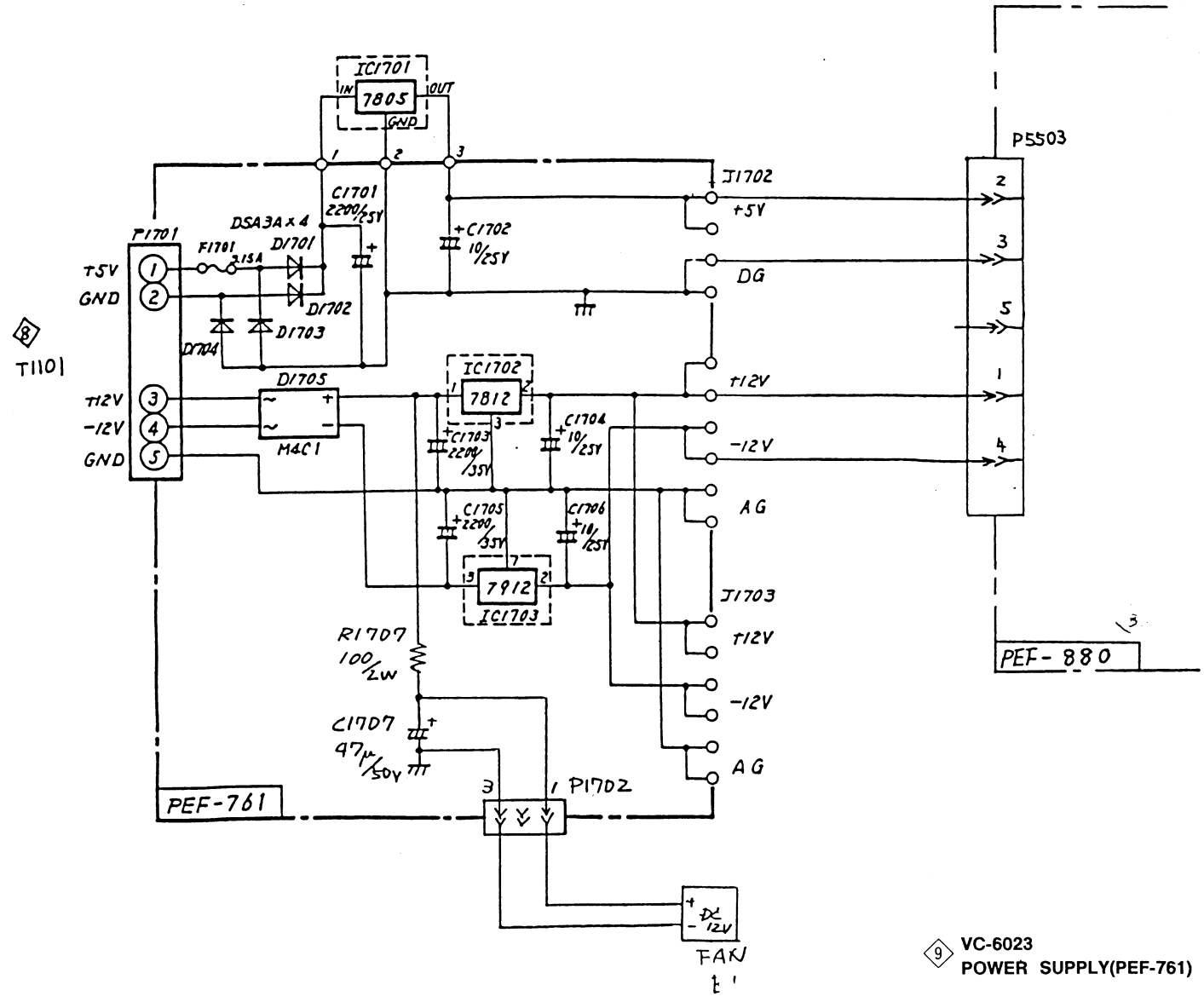




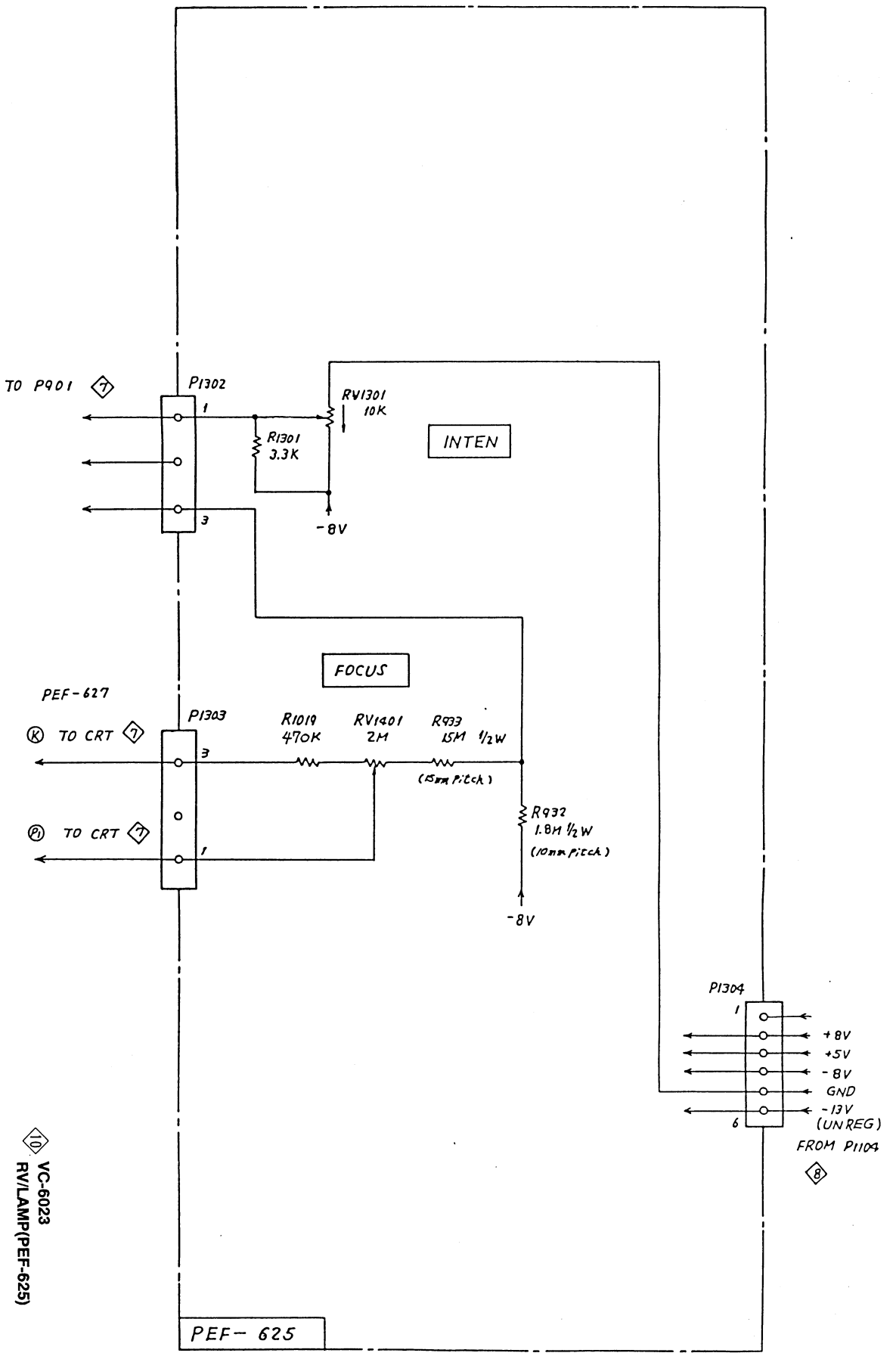


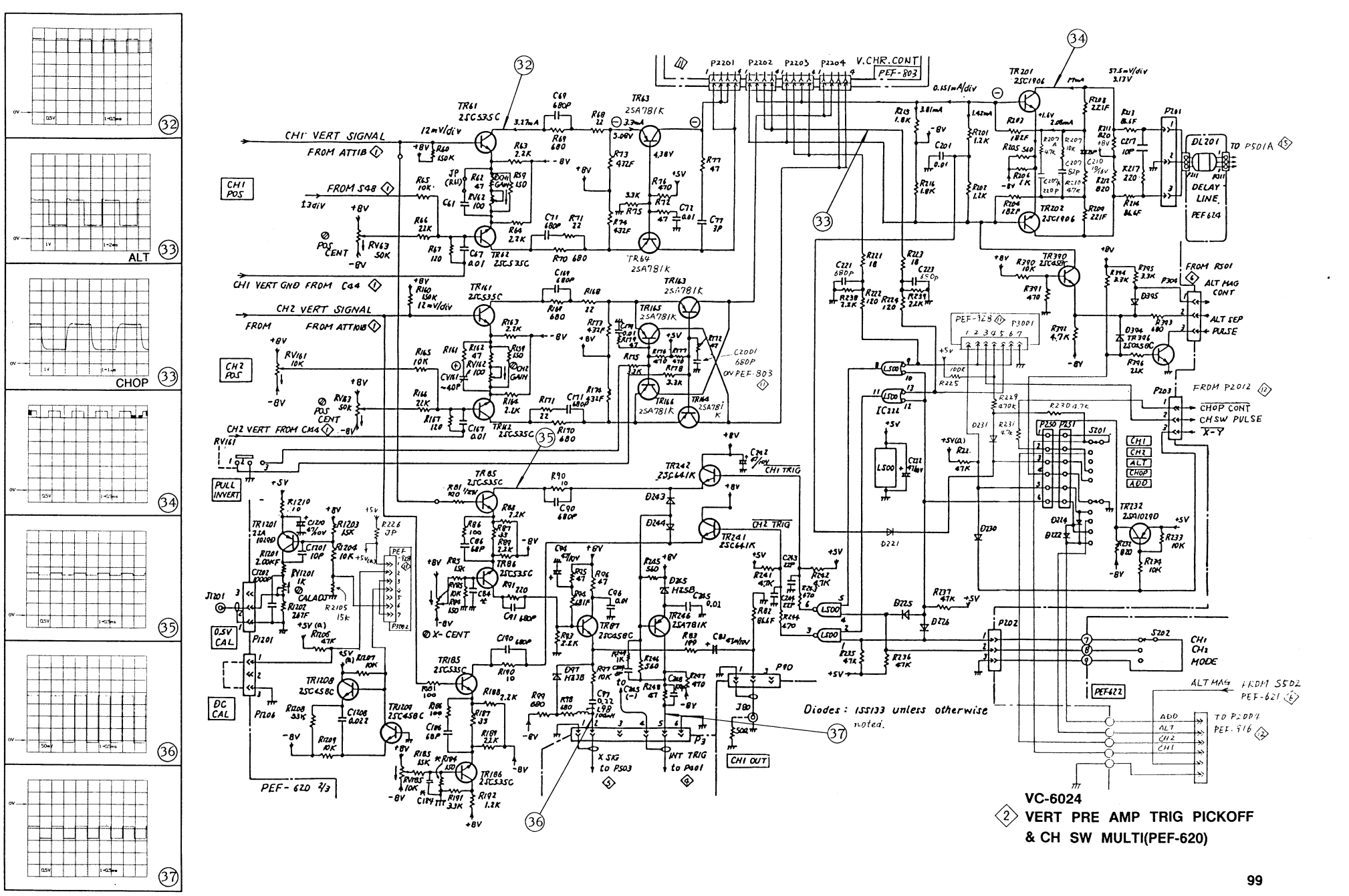


8 VC-6023
POWER SUPPLY(PEF-621)



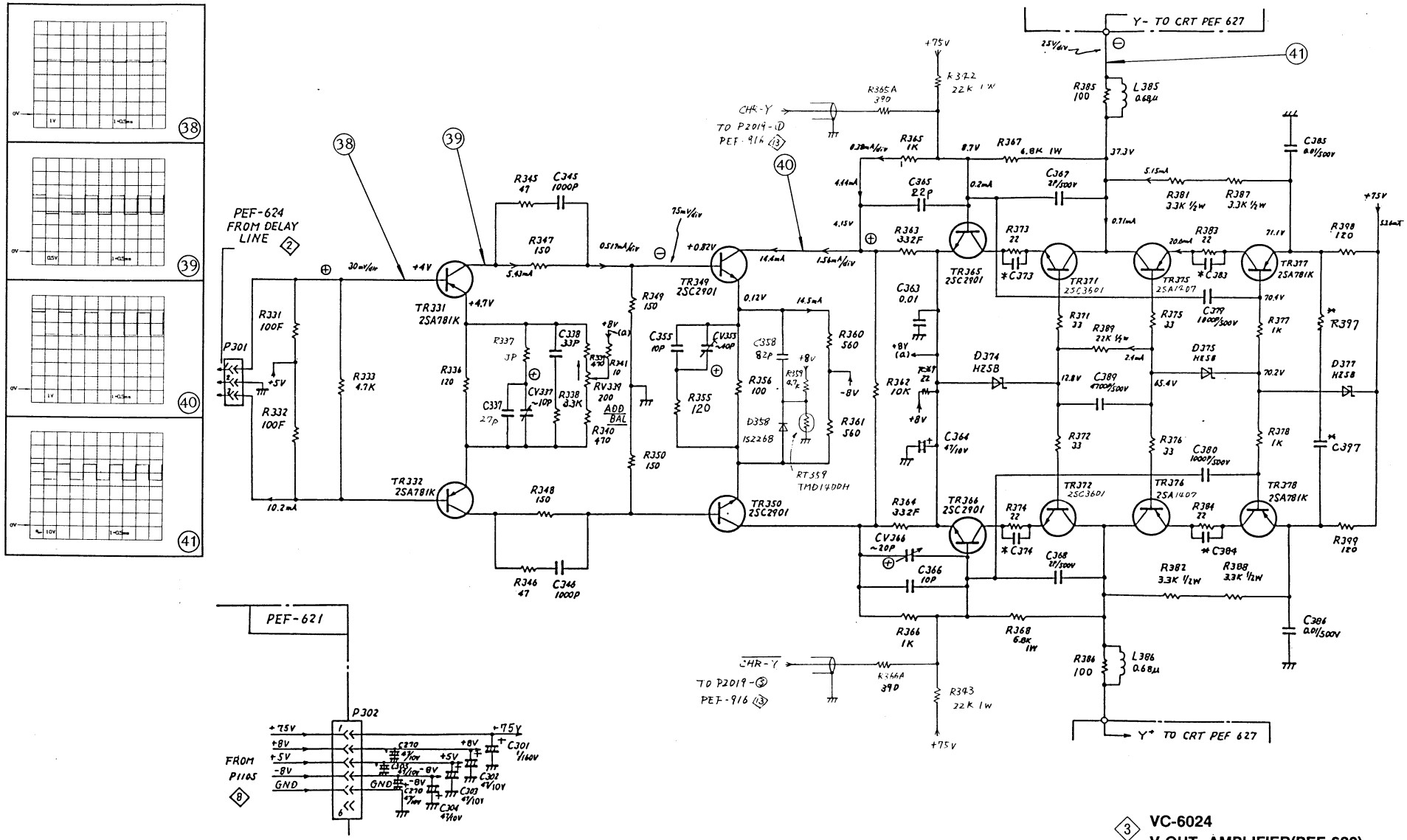
VC-6023
POWER SUPPLY(PEF-761)

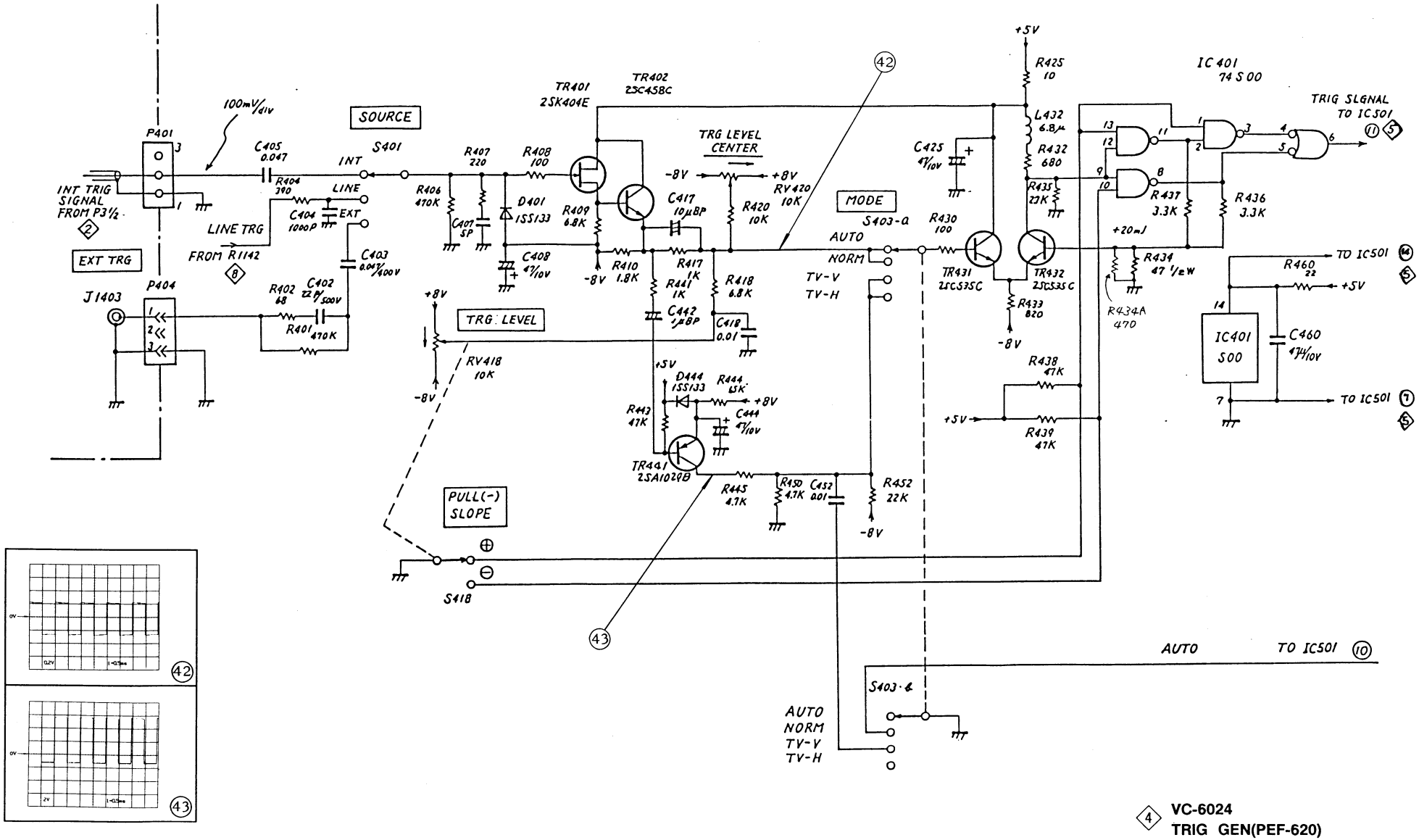

TO P901
7
P1302
1
3
RV1301
10K
R1301
3.3K
-8V
INTEN
FOCUS
PEF-627
P1303
K TO CRT
7
3
R1019
470K
RV1401
2M
R933
15M 1/2W
(15mm Pitch)
R932
1.8M 1/2W
(10mm pitch)
-8V
Pi TO CRT
7
1
P1304
1
+8V
+5V
-8V
GND
-13V
(UNREG)
6
FROM P1104
8
10
VC-6023
RV/LAMP(PEF-625)
PEF- 625



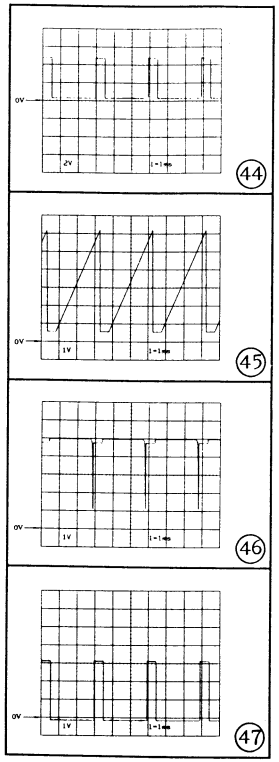
VC-6024

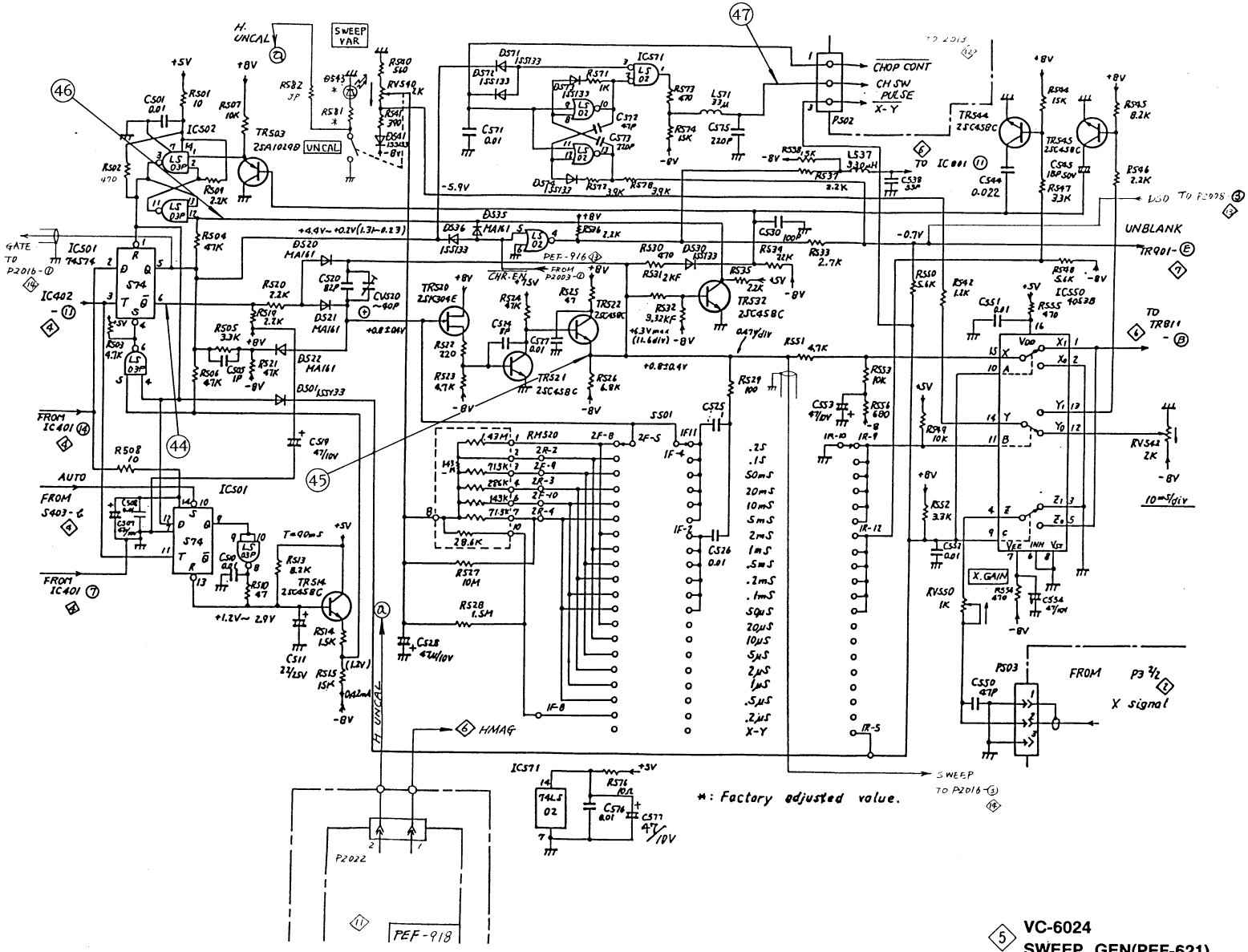
② VERT PRE AMP TRIG PICKOFF & CH SW MULTI(PEF-620)


PEF-624
FROM DELAY LINE
2
P301
R331 100F
R332 100F
R333 4.7K
TR331 2SA781K
TR332 2SA781K
R336 120
R337 JP
C337 27P
CV337 ~10P
C338 33P
R338 3.3K
RV339 200 ADD BAL
R340 470
R341 10
R345 47
C345 1000P
R346 47
C346 1000P
R347 150
R348 150
R349 150
R350 150
TR349 2SC2901
TR350 2SC2901
C355 10P
CV355 ~40P
R355 120
C358 82P
R356 100
D358 1S2268
R359 4.7K
RT359 TMD1400H
R360 560
R361 560
R362 10K
C363 0.01
TR365 2SC2901
TR366 2SC2901
R363 332F
R364 332F
C364 47/16V
CV366 ~20P
C366 10P
R366 1K
R368 6.8K 1W
R372 22K 1W
R343 22K 1W
R365A 390
R365 1K
R367 6.8K 1W
C365 22P
C367 27/500V
R385 100
L385 0.68μ
C385 0.01/500V
R381 3.3K 1/2W
R387 3.3K 1/2W
R373 22
R383 22
*C373
*C383
TR371 2SC3601
TR375 2SA1407
TR377 2SA781K
R371 33
R375 33
R377 1K
R389 22K 1/2W
C379 10000/500V
D374 HZ5B
D375 HZ5B
D377 HZ5B
C389 47000/500V
R372 33
R376 33
R378 1K
C380 10000/500V
C397
R397
R399 120
TR372 2SC3601
TR376 2SA1407
TR378 2SA781K
R374 22
R384 22
*C374
*C384
C368 27/500V
R382 3.3K 1/2W
R388 3.3K 1/2W
C386 0.01/500V
R386 100
L386 0.68μ
Y- TO CRT PEF 627
Y+ TO CRT PEF 627
41
CHR-Y
TO P2019-①
PEF-916 ⑬
R365A 390
R366A 390
CHR-Y
TO P2019-②
PEF-916 ⑬
PEF-621
P302
FROM P1105
8
+75V
+8V
+5V
-8V
GND
C270 4/10V
C271 4/10V
C272 4/10V
C273 4/10V
C274 4/10V
C301 1/160V
C302 4/10V
C303 4/10V
C304 4/10V
38
39
40
+4V
+4.7V
+0.82V
0.12V
+8V
-8V
+5V
10.2mA
5.43mA
14.4mA
14.5mA
1.58mA/div
0.51mA/div
0.38mA/div
30mV/div
75mV/div
2.5V/div
4.44mA
4.15V
0.2mA
8.7V
37.3V
5.15mA
0.71mA
20.8mA
71.1V
70.4V
70.2V
65.4V
12.8V
2.4mA
2.3mA
+75V
3
VC-6024
V-OUT AMPLIFIER(PEF-620)

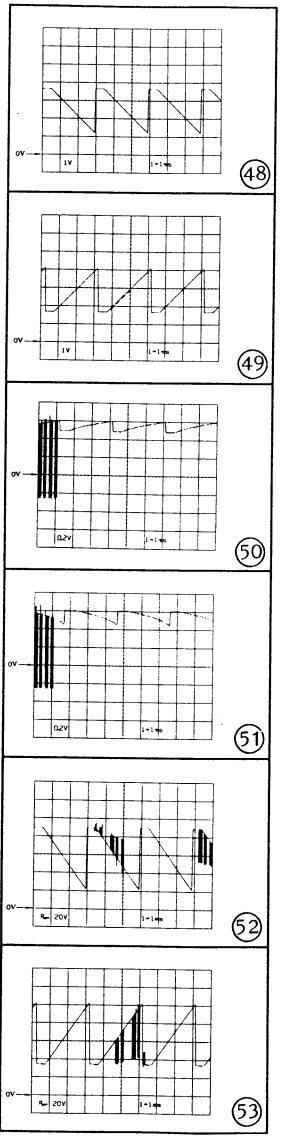


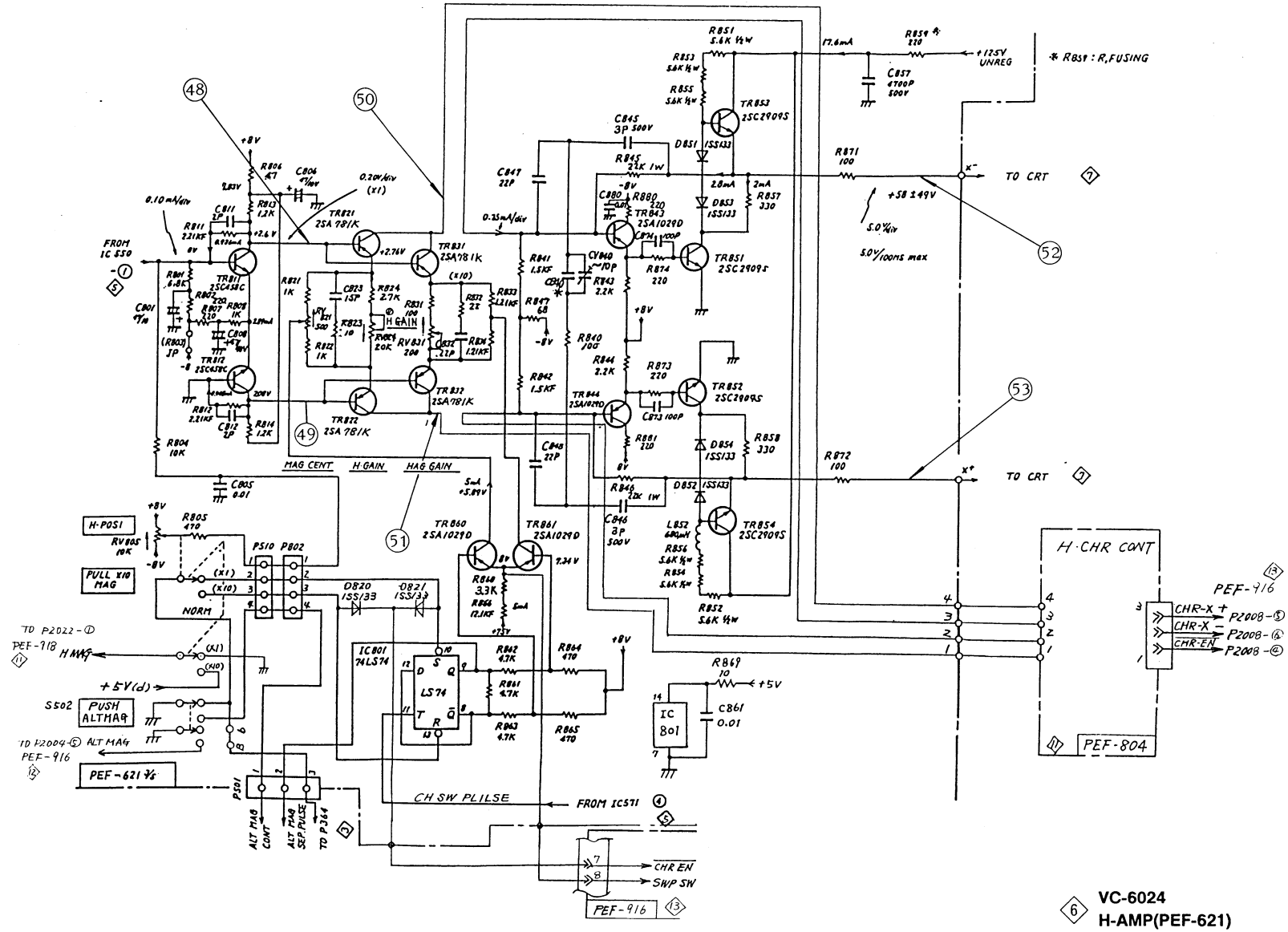
4 VC-6024
TRIG GEN(PEF-620)



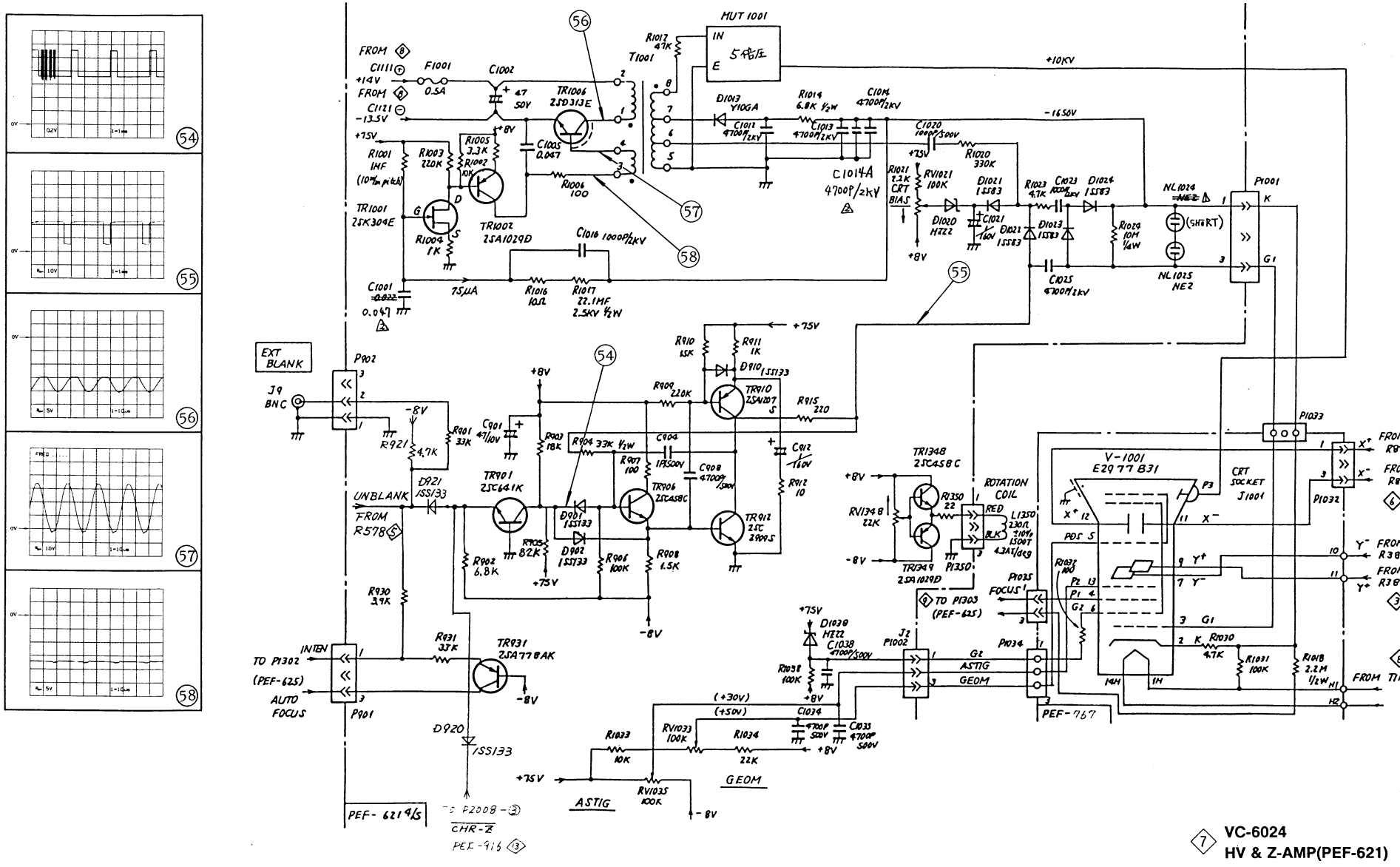


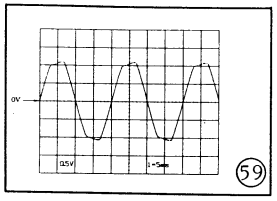
VC-6024
SWEEP GEN(PEF-621)

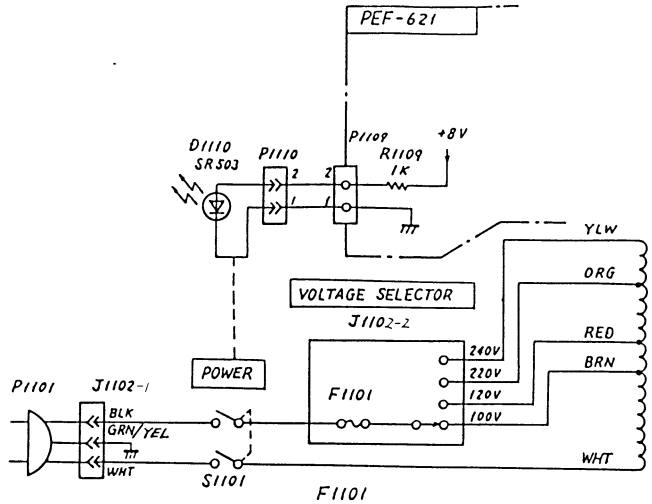




VC-6024
H-AMP(PEF-621)


54
55
56
57
58
MUT 1001
T1001
TR1006 2SD313E
TR1001 2SK304E
TR1002 2SA1029D
TR901 2SC641K
TR910 2SA1207S
TR912 2SC2909S
TR1348 2SC458C
TR1349 2SA1029D
TR931 2SA778AK
D910 1SS133
D920 1SS133
D921 1SS133
D901 1SS133
D902 1SS133
D1013 Y10GA
D1020 HZ22
D1021 1SS83
D1022 1SS83
D1023 1SS83
D1024 1SS83
C1014A 4700P/2kV
C1016 1000P/2kV
C1020 1000P/500V
C1025 4700P/2kV
C1038 4700P/500V
NL1014 NE2
NL1025 NE2
V-1001 E29778B1
CRT SOCKET J1001
ROTATION COIL
FOCUS
ASTIG
GEOM
EXT BLANK
UNBLANK
AUTO FOCUS
+10KV
-1650V
+75V
+8V
-8V
PEF-621
PEF-767
VC-6024
HV & Z-AMP(PEF-621)

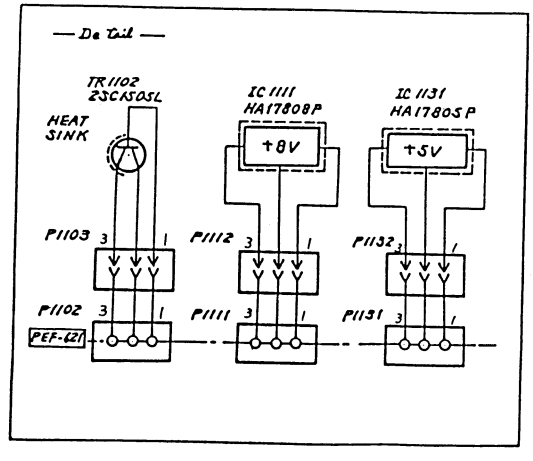


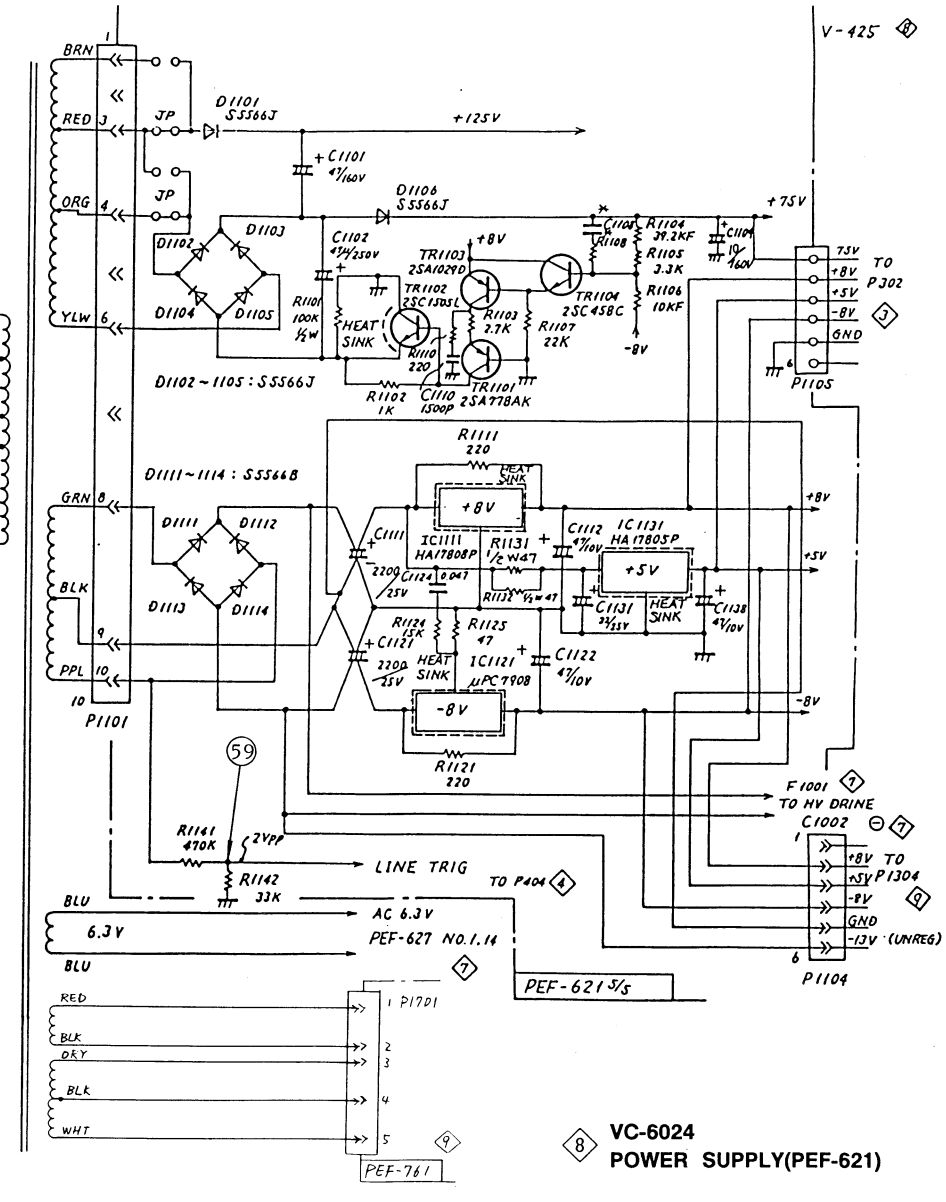


F1101

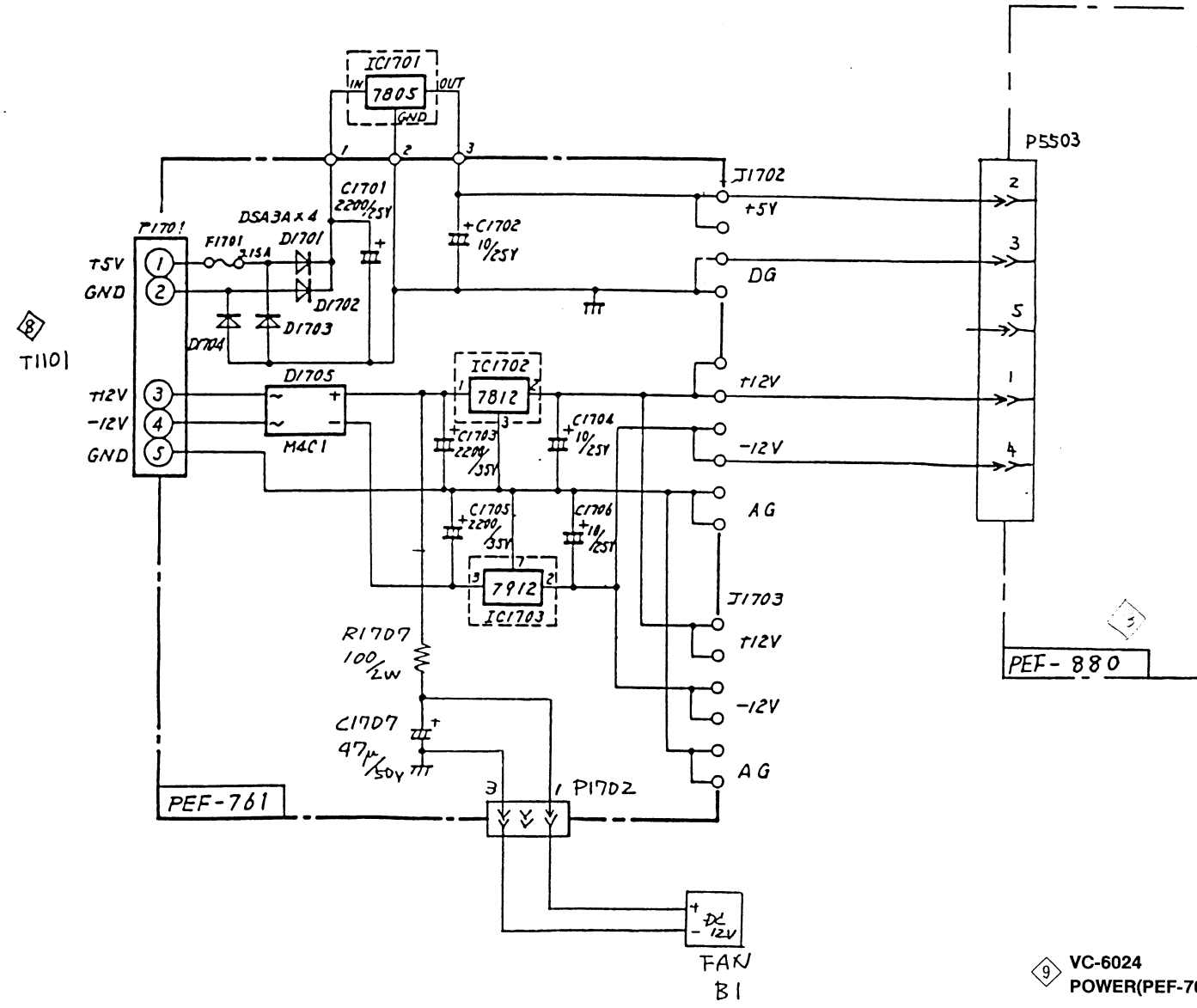
2A 100/120V

1A 220/240V

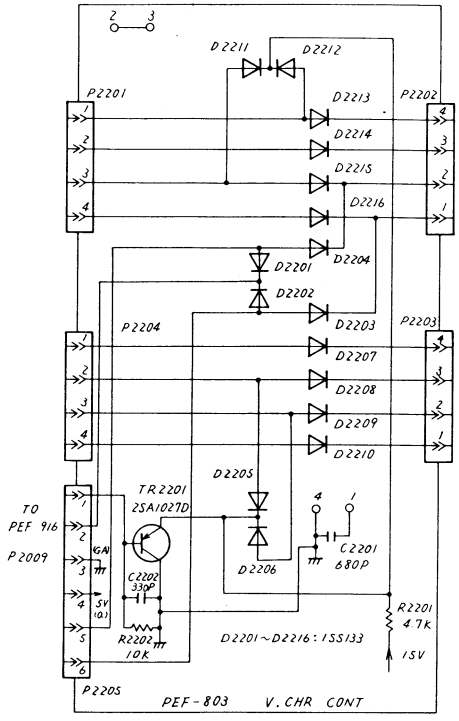


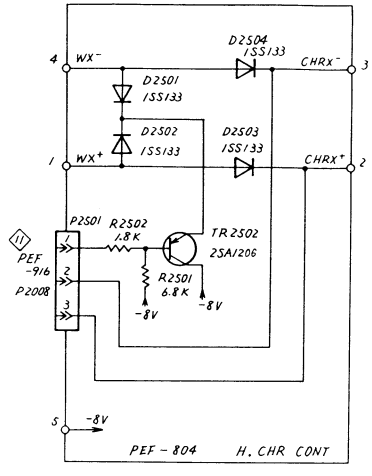


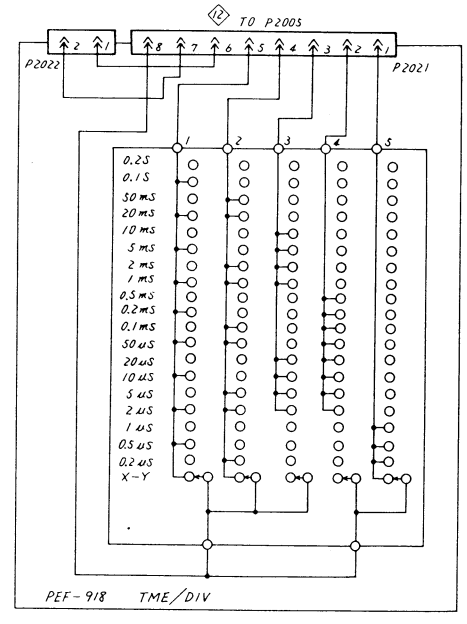
VC-6024
POWER SUPPLY(PEF-621)

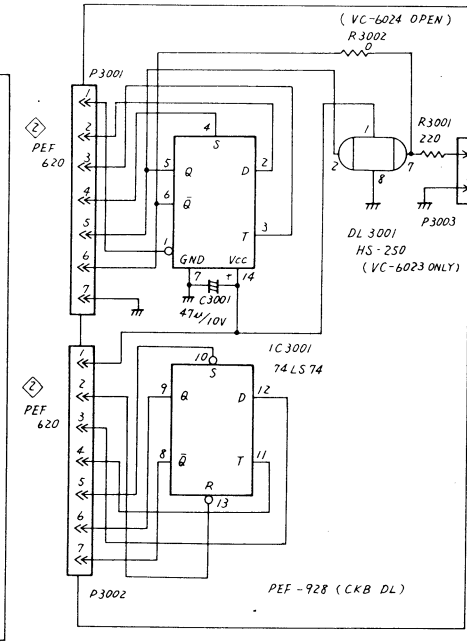


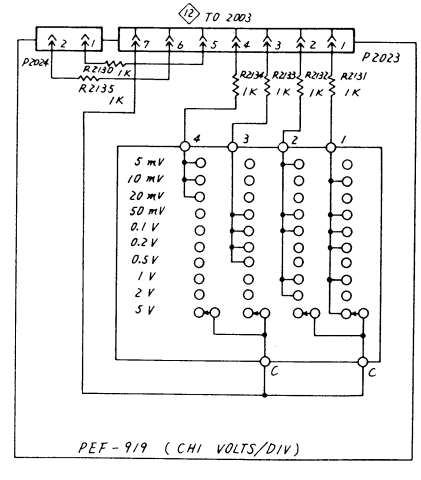
9 VC-6024
POWER(PEF-761)

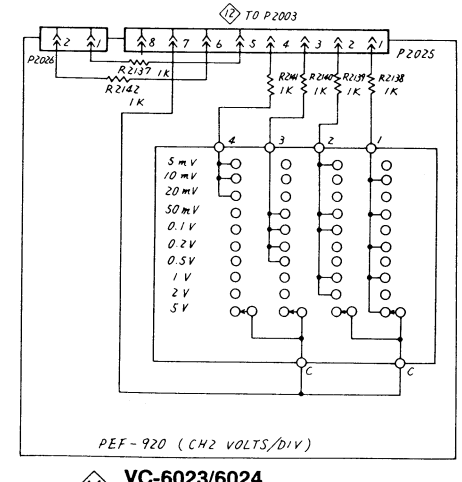


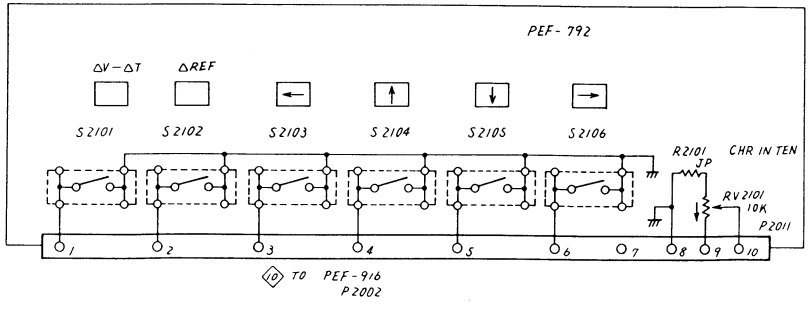




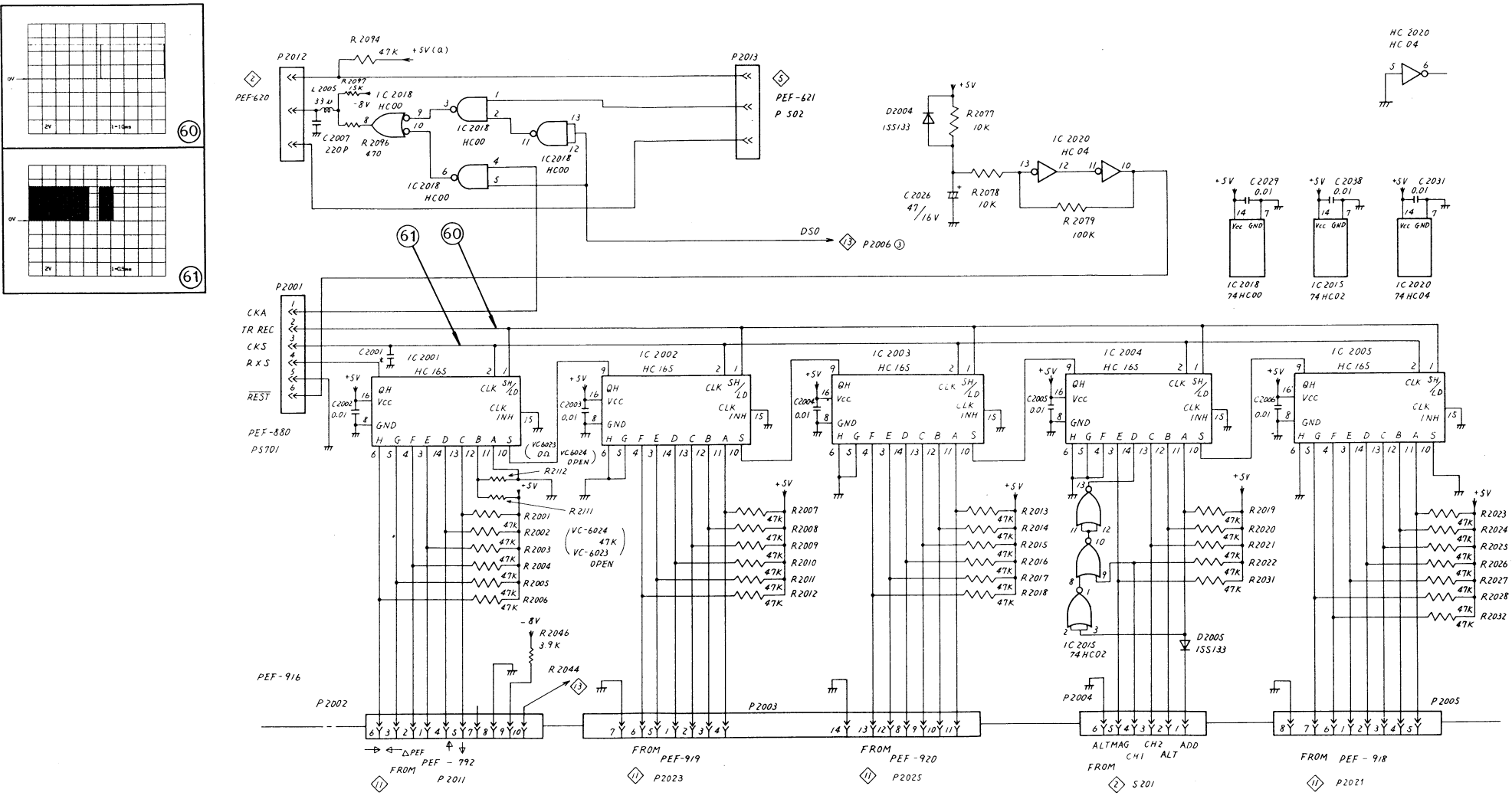






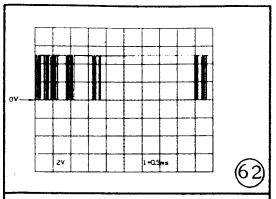


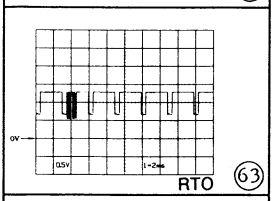
VC-6023/6024
READOUT CIRCUIT & CKB DL

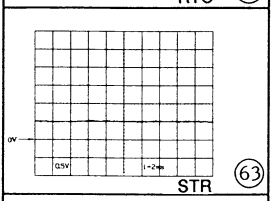


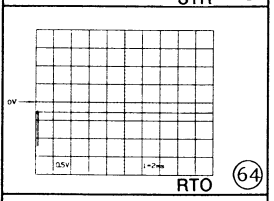
MODEL / PARTS NO	VC-6023	VC-6024
R 2111	OPEN	47K
R 2112	0	OPEN

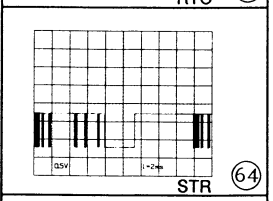
12 VC-6023/6024 I/F(PEF-916 1/3)

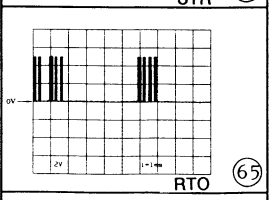


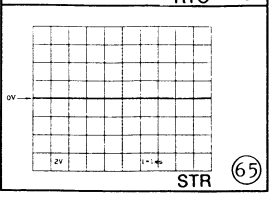


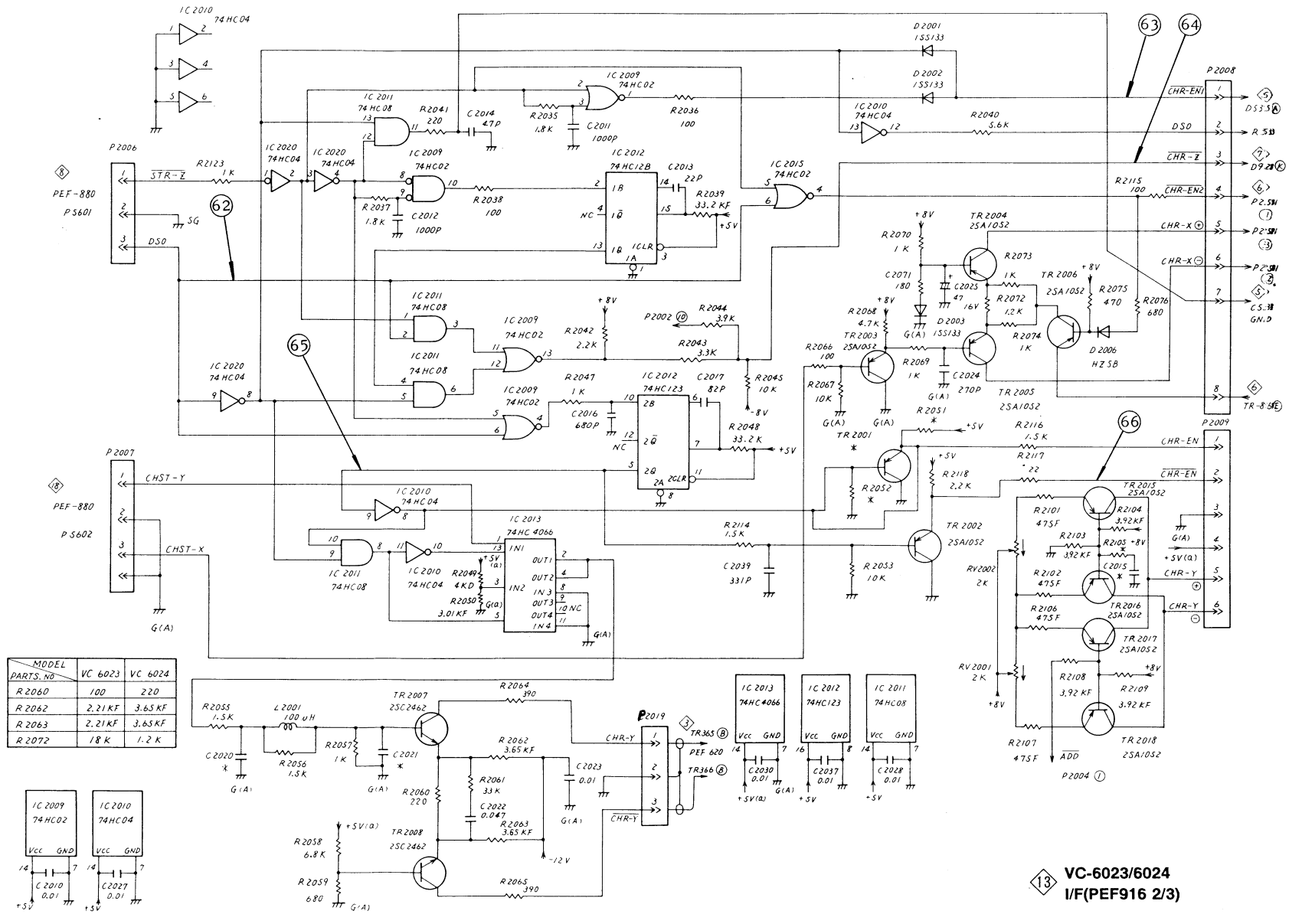






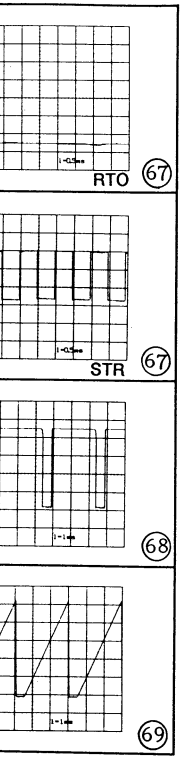


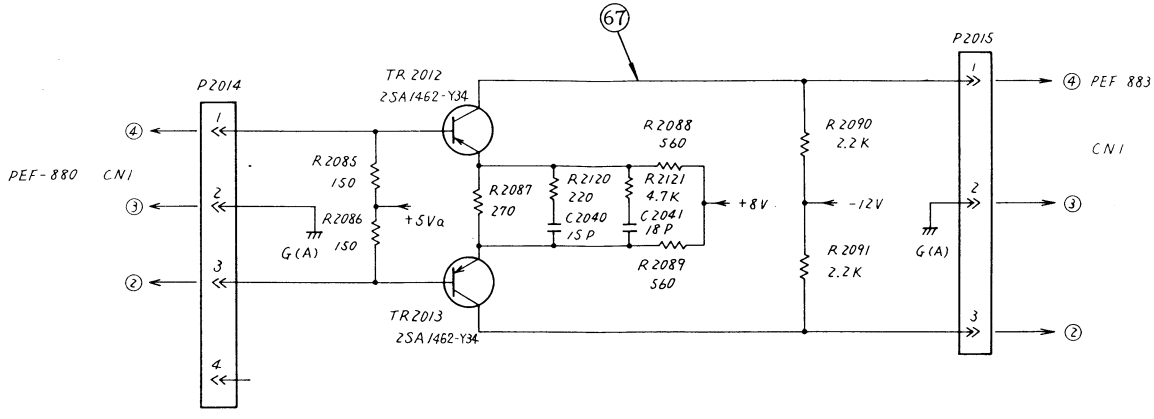




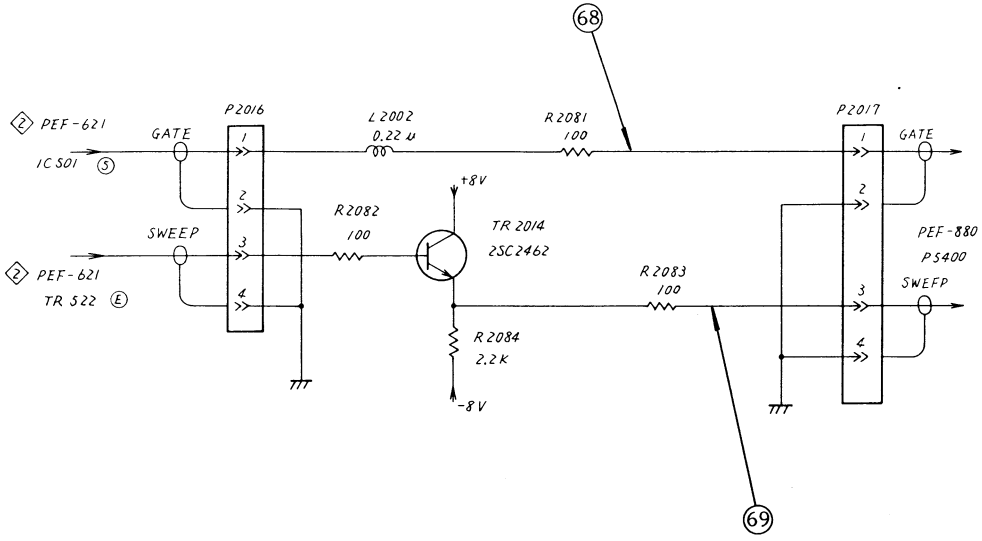
MODEL / PARTS. NO	VC 6023	VC 6024
R 2060	100	220
R 2062	2.21 KF	3.65 KF
R 2063	2.21 KF	3.65 KF
R 2072	18 K	1.2 K

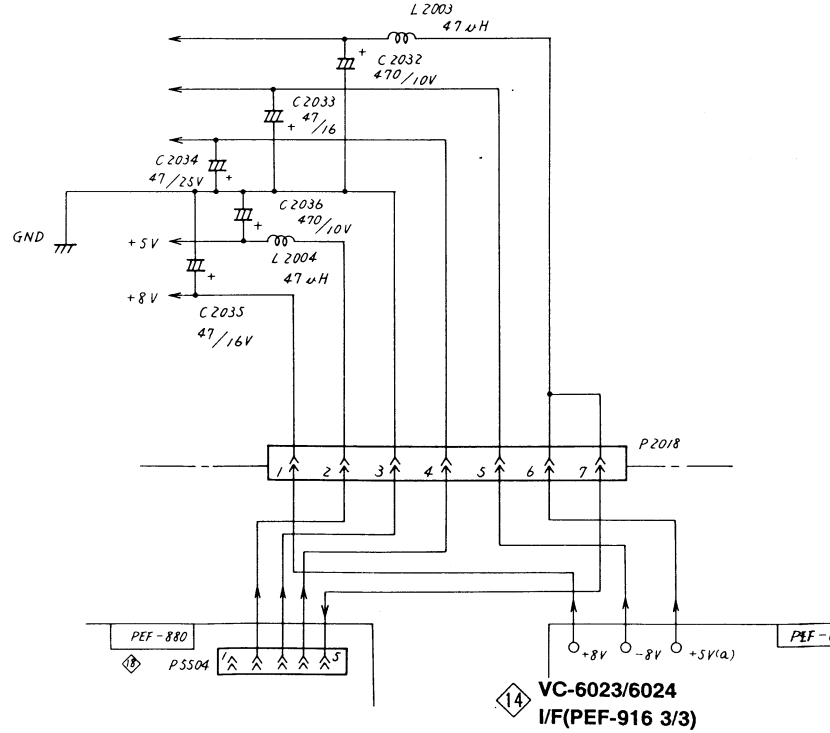
VC-6023/6024
I/F(PEF916 2/3)



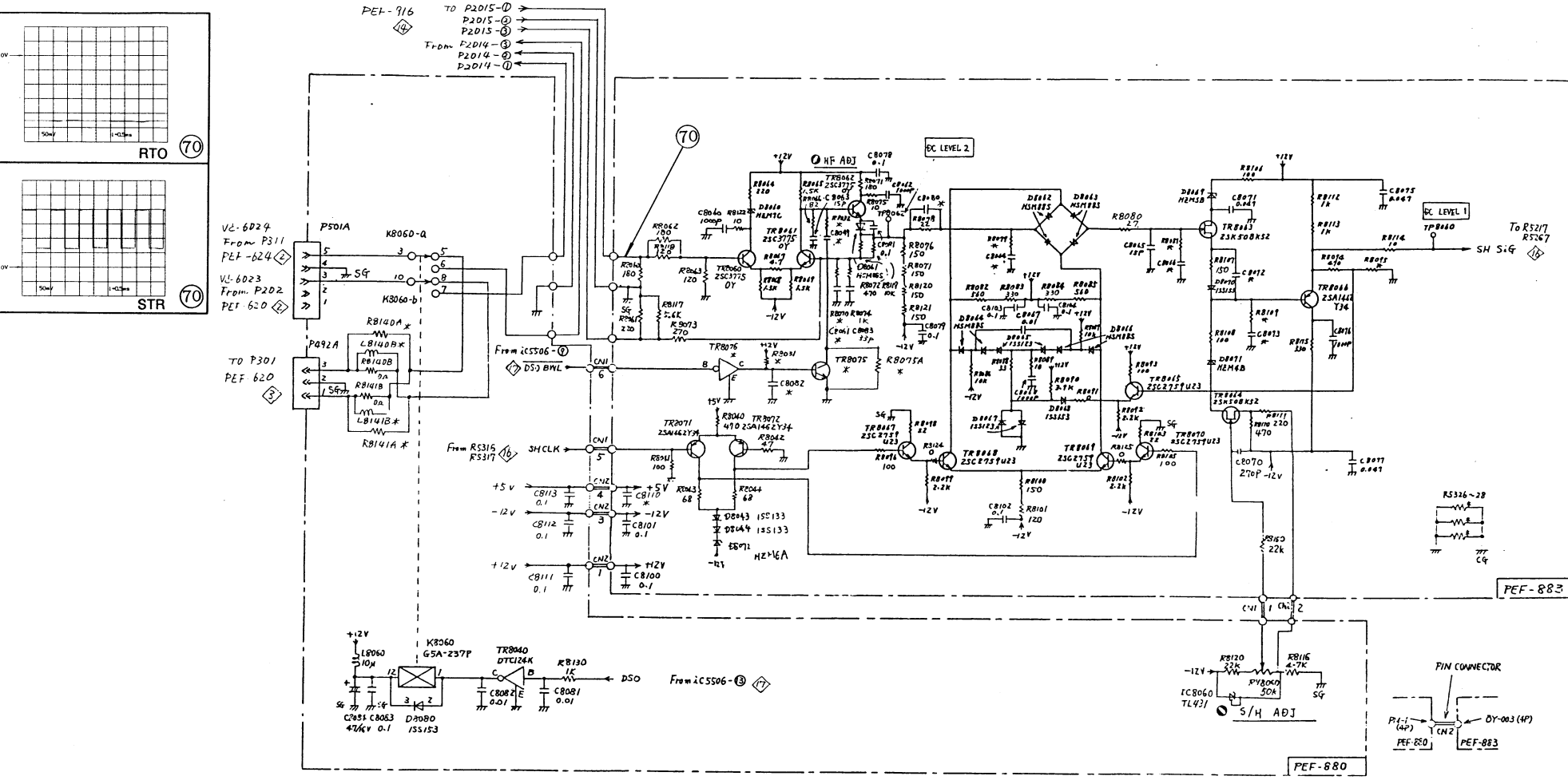


PARTS \ MODEL NO	VC-6023	VC-6024
R2087	390	270
R2120	—	220
R2121	—	4.7K
C2040	—	15P
C2041	—	18P
TR2012	2SA1052MD	2SA1462Y34
TR2013	2SA1052MD	2SA1462Y34



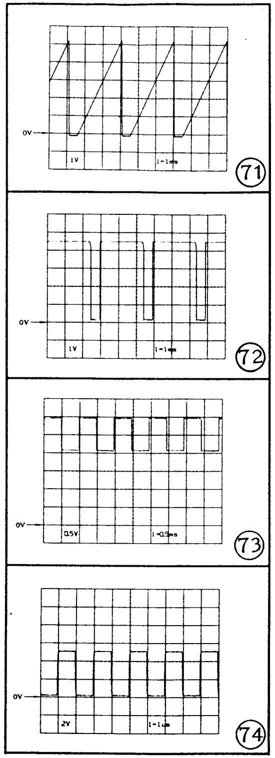


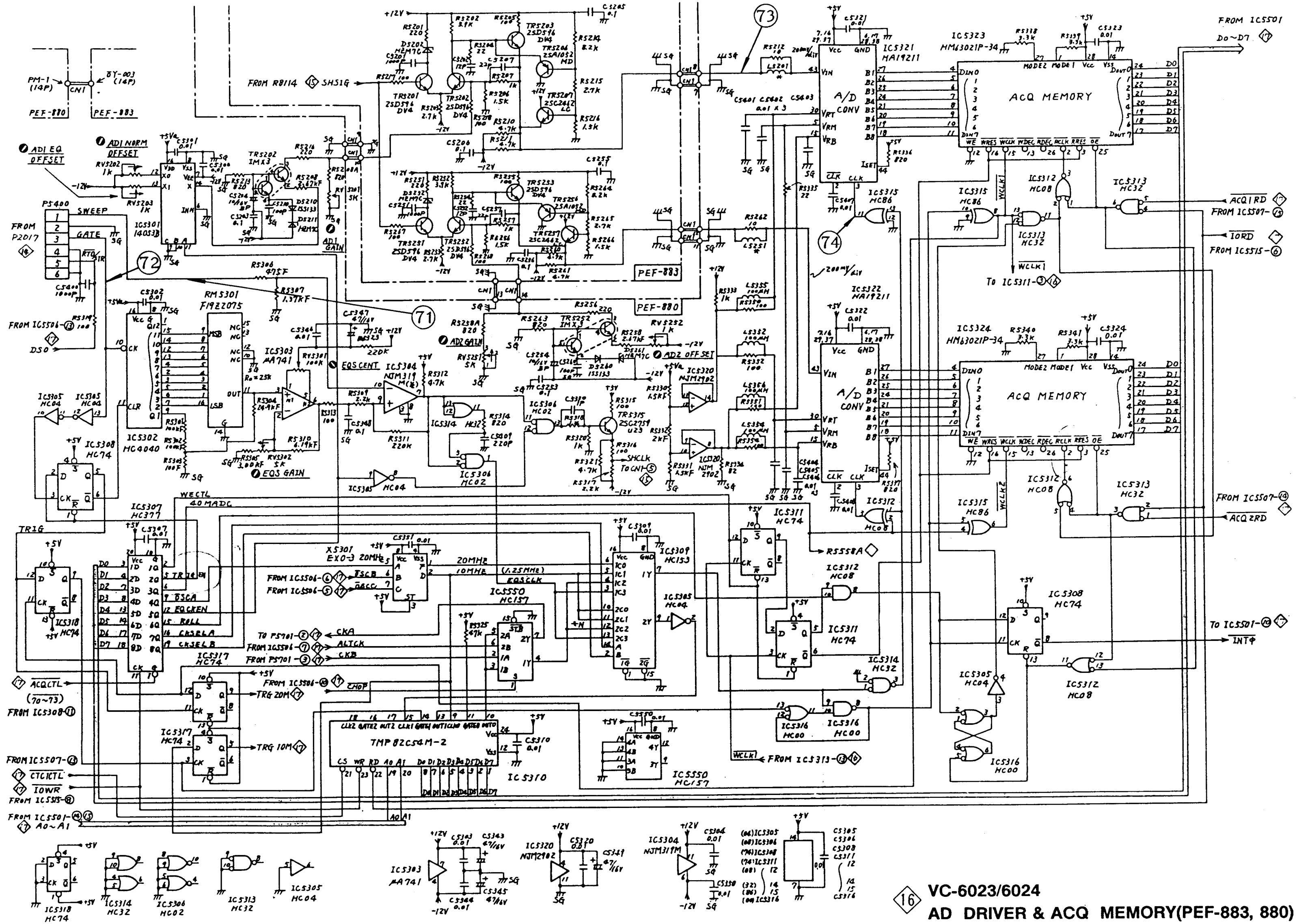
⑭ **VC-6023/6024 I/F(PEF-916 3/3)**



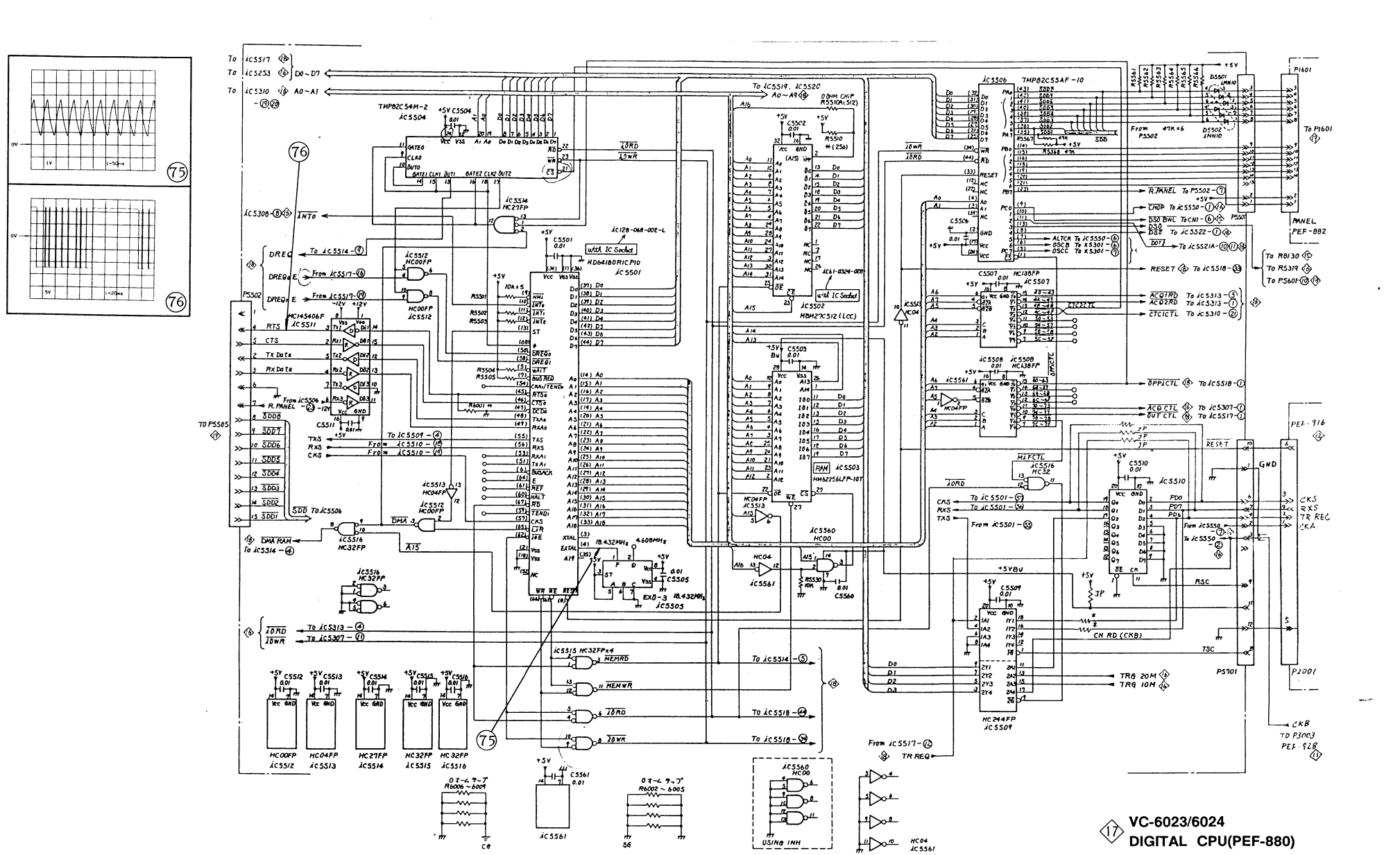
PARTS NO	MODEL	VC-6023	VL-6024
PEF-880	R8140A	0Ω	OPEN
	R8140B	DIET	0Ω
	R8141A	0Ω	OPEN
	R8141B	OPEN	0Ω
PEF-883	C8047	120P	OPEN
	C8061	27P	OPEN
	C8063	4.7P	15P
	C8083	12P	33P
	R8066	39Ω	82Ω
	R8070	3.3K	OPEN
	R8032	22Ω	OPEN
	R8075A	0Ω	OPEN

⑮ VC-6023/6024
S/H(PEF-883, 880)

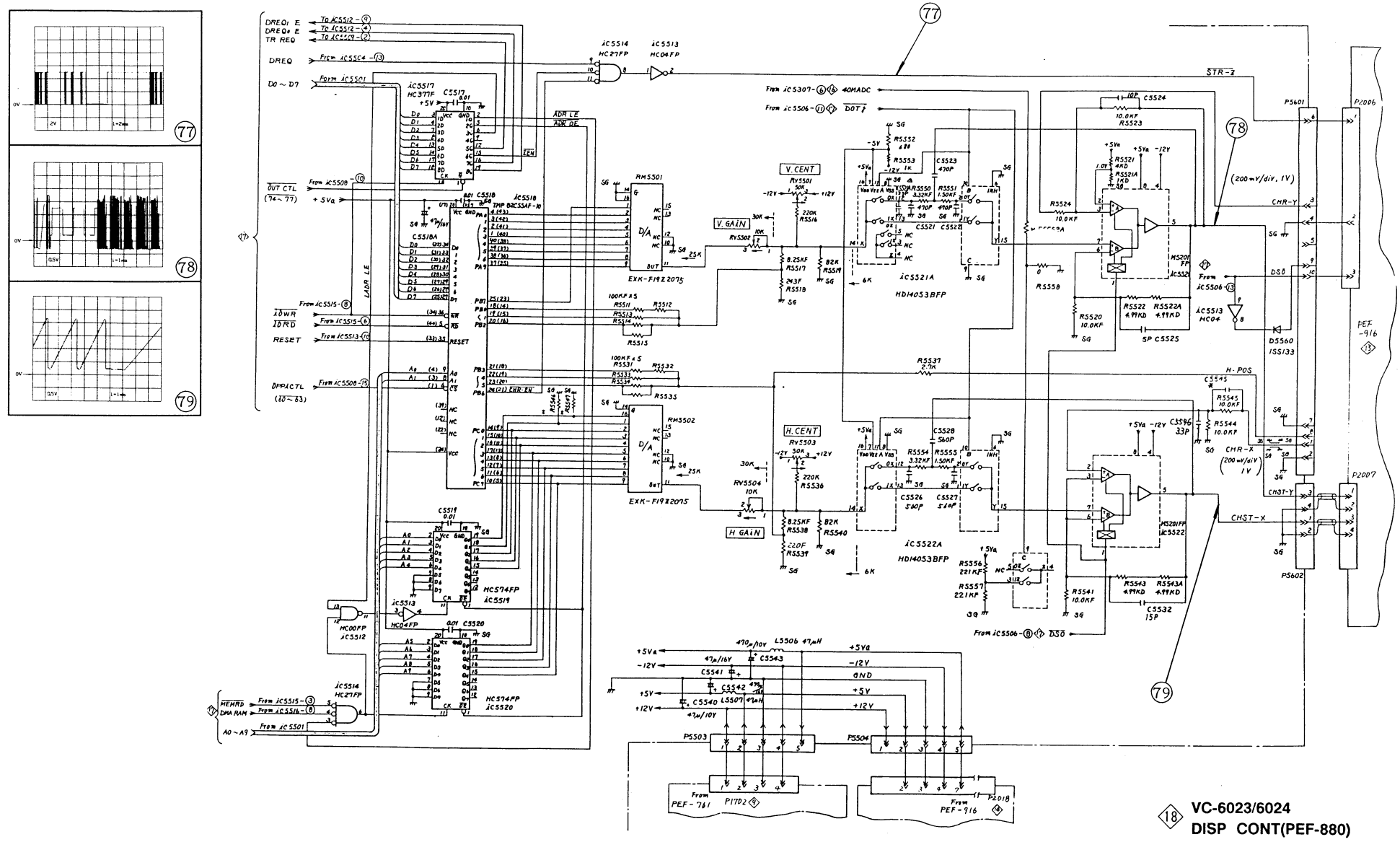


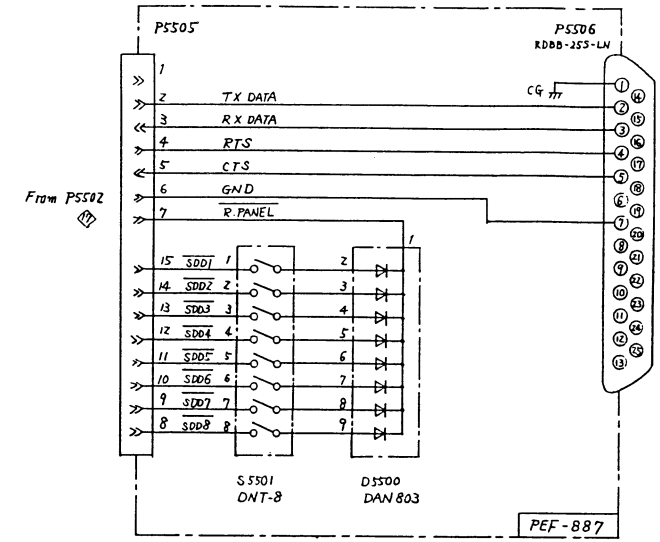


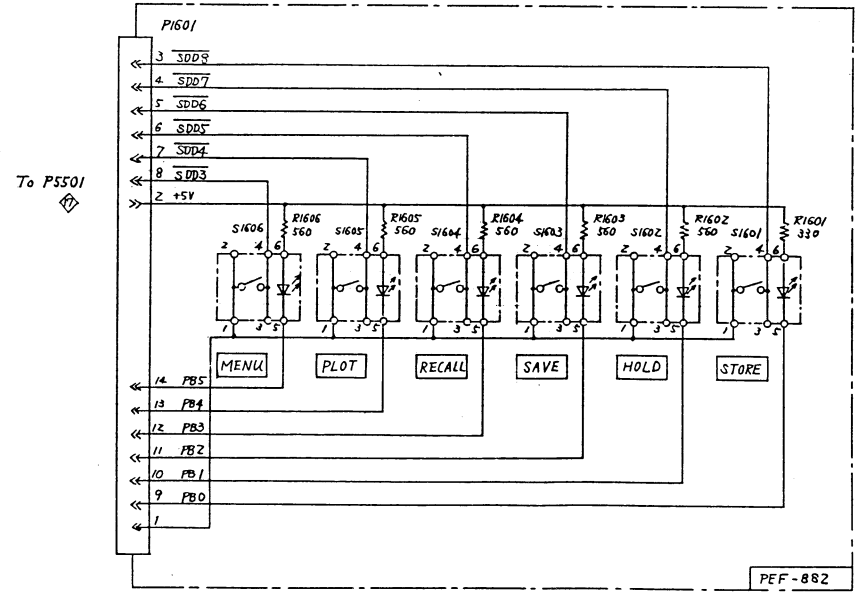
⑯ VC-6023/6024
AD DRIVER & ACQ MEMORY(PEF-883, 880)



17 VC-6023/6024
DIGITAL CPU(PEF-880)

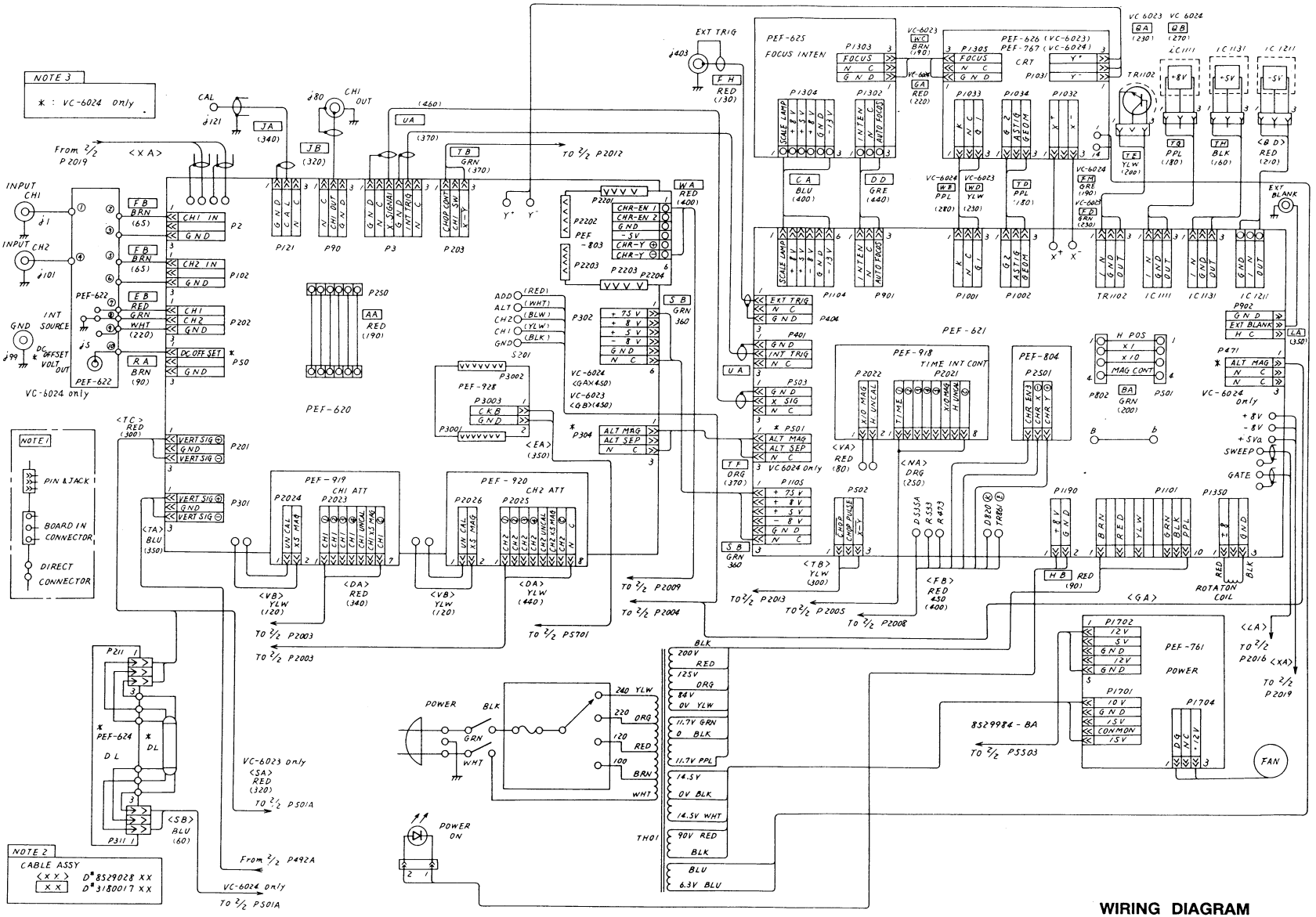

77
78
79
DREQi E
DREQo E
TR REQ
DREQ
D0 ~ D7
OUT CTL
(74~77)
+5Va
IOWR
IORD
RESET
DFFACTL
(80~83)
ADR LE
ADR OE
EXK-F19Z2075
HC574FP
HC00FP
HC04FP
HC27FP
HC377F
HDI4053BFP
V. CENT
V. GAIN
H. CENT
H GAIN
STR-Z
CHR-Y
CHR-X
CHST-Y
CHST-X
H-POS
DSO
40MADC
DOT
P5601
P2006
P2007
P5602
P5503
P5504
PEF-916
PEF-761
L5506 47μH
L5507 47μH
GND
18
VC-6023/6024
DISP CONT(PEF-880)



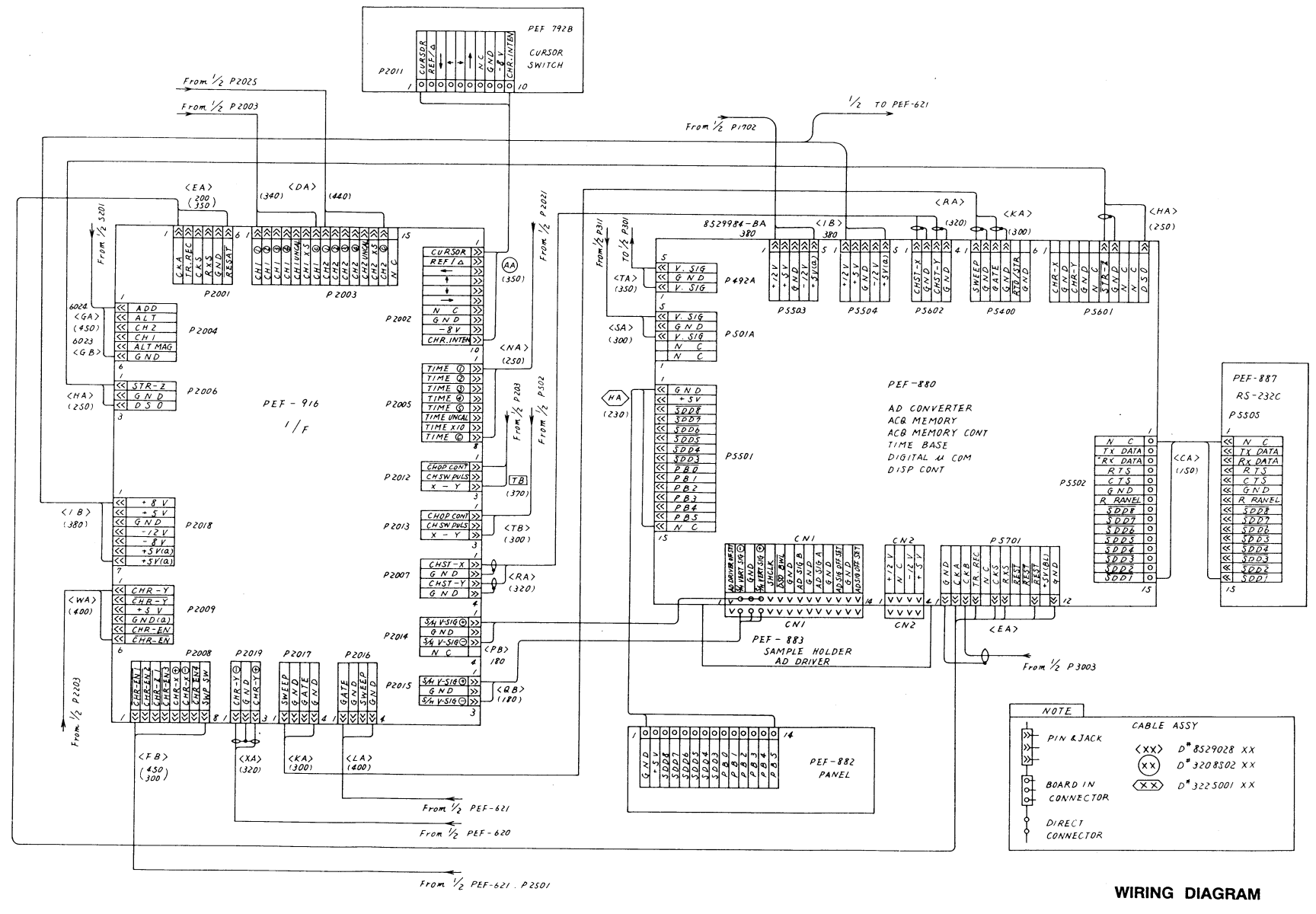


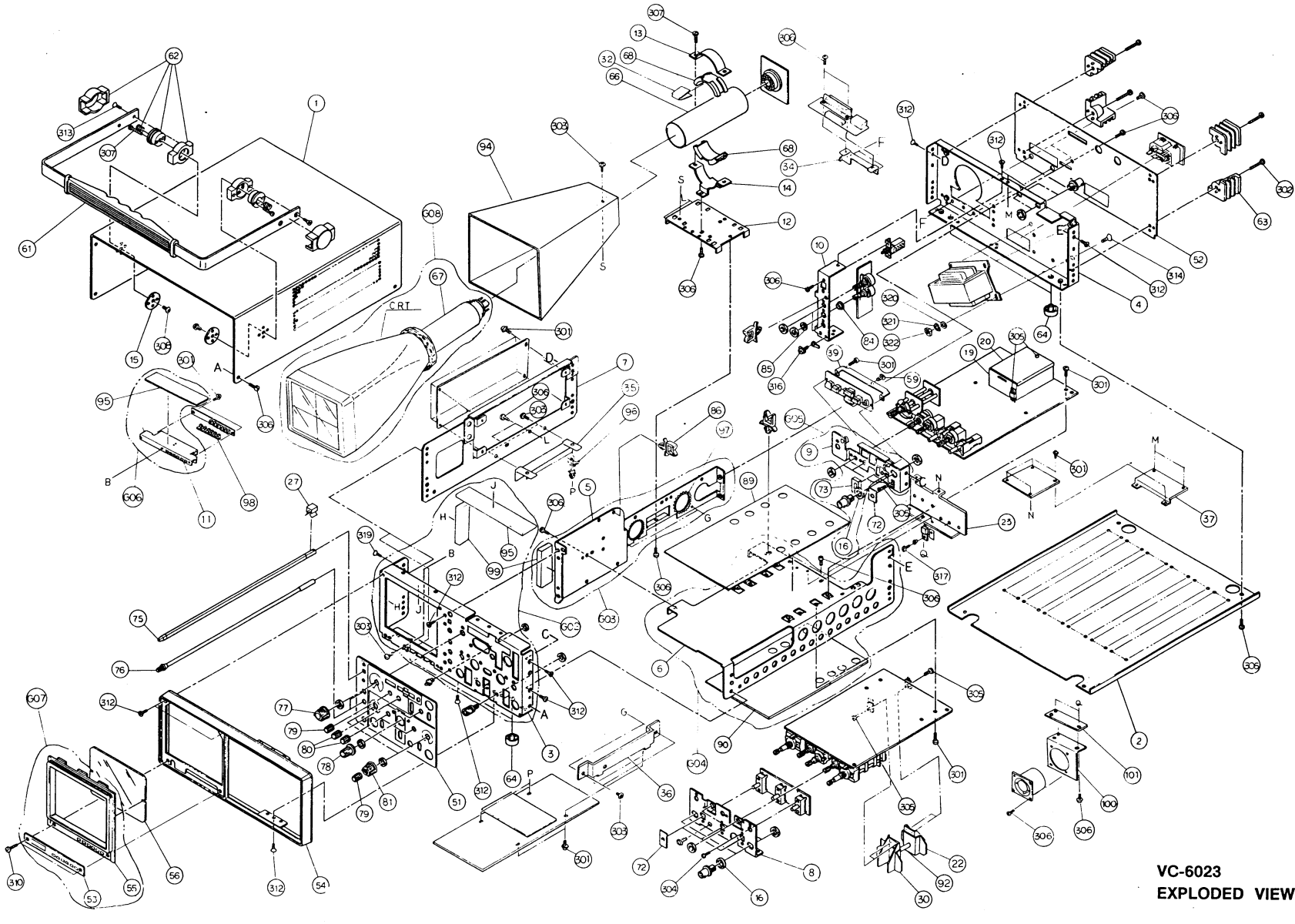
S1601 : SKHQFG (GREEN)
S1602 ~ 06 : SKHQFF (RED)

VC-6023/6024
RS-232C & FRONT PANEL(DSO)
(PEF-887, PEF-882)

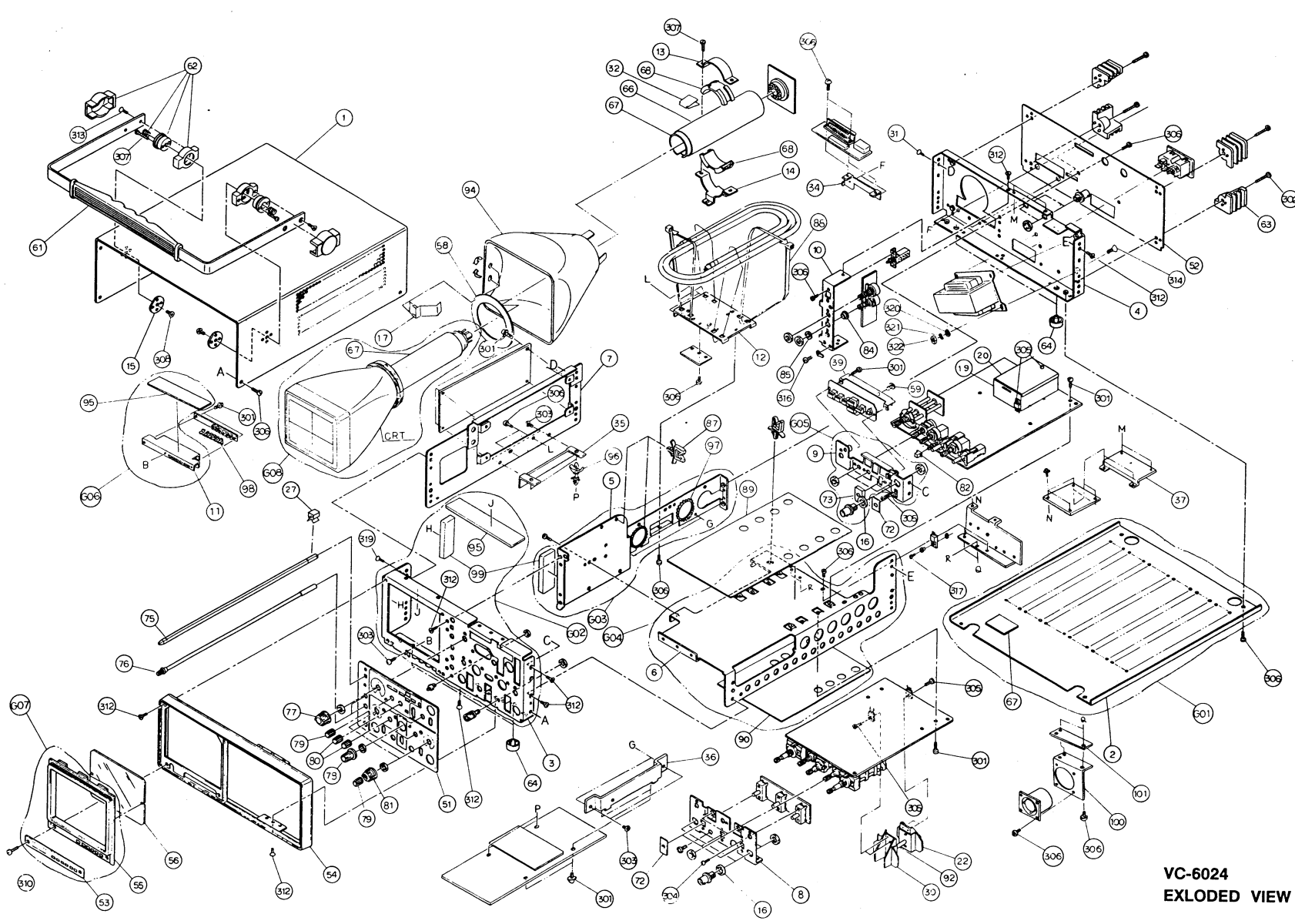


WIRING DIAGRAM


PEF 792B
CURSOR SWITCH
P2011
From 1/2 P2025
From 1/2 P2003
From 1/2 P1702
1/2 TO PEF-621
PEF-916
I/F
PEF-880
AD CONVERTER
ACB MEMORY
ACB MEMORY CONT
TIME BASE
DIGITAL μ COM
DISP CONT
PEF-887
RS-232C
PEF-883
SAMPLE HOLDER
AD DRIVER
PEF-882
PANEL
8529984-BA
NOTE
CABLE ASSY
PIN & JACK
BOARD IN CONNECTOR
DIRECT CONNECTOR
WIRING DIAGRAM



VC-6023
EXPLODED VIEW



VC-6024
EXLODED VIEW