MITSUBISHI

C-6479 C-6401

TABLE OF CONTENTS

MONITORS

TABLE OF CONTENTS (CONTINUED)

SECTION 1
SPECIFICATIONS

Mitsubishi Electric, MODEL C-6479 Series Color Display Monitor is a high resolution color display module for clear display of 4000 characters or less and for graphic symbols. This module is equipped with IN LINE GUNS/SHADOW MASK-CRT and PCBs with solid state active elements. MODEL C-6479 Series features stable convergence, easy maintenance, compact style. The standard model accepts ANALOG inputs for R.G.B. composite video signal, compositesync and HD/VD signals. This model is supplied without a cabinet but Mitsubishi is ready to supply one. This model complies with U.S. Department of Human and Health Service X-radiation Safety Rules, applicable at time of manufacture.

1.1 FEATURES

(A) Compact style

This model is so compact that it can be used as a stand-alone monitor or be built in a system.

(B) All solid state except for CRT

All active elements except for CRT are solid state elements e.g. IC or Transistor.

(C) Easy maintenance

PCB can be replaced without use of tools and most parts can be checked and replaced without disassembling any construction.

(D) Anti spark circuit

All circuits are designed to prevent damage caused by spark in the CRT.

(E) Stable convergence

Self-convergence assemblies are mounted on the CRT.

Complicated convergence procedures are not necessary, because electric convergence circuits are not used.

1.2 ELECTRICAL SPECIFICATIONS

1.2.1 AC Power Voltage : AC 100 ∿ 120 V or 220 ∿ 240 V
10 %, Tap Selectable

1.2.2 AC Power Frequency : 50 or 60 Hz

1.2.3 Power Consumption : 110 W

1.2.4 Input Signal

(a) Termination : 75 Ω or High Impedance are selected by termination switches.

(b) Connectors : BNC connectors for all inputs

(c) Sorts of inputs : Red -Video Signal
Green-Video Signal or Composite Video Signal
Blue -Video Signal

These three signals are positive white and Sync shall be composited in Green. Separate sync input (C-6479 only) shall be applied on Sync Input in case that Video signal is without Sync.

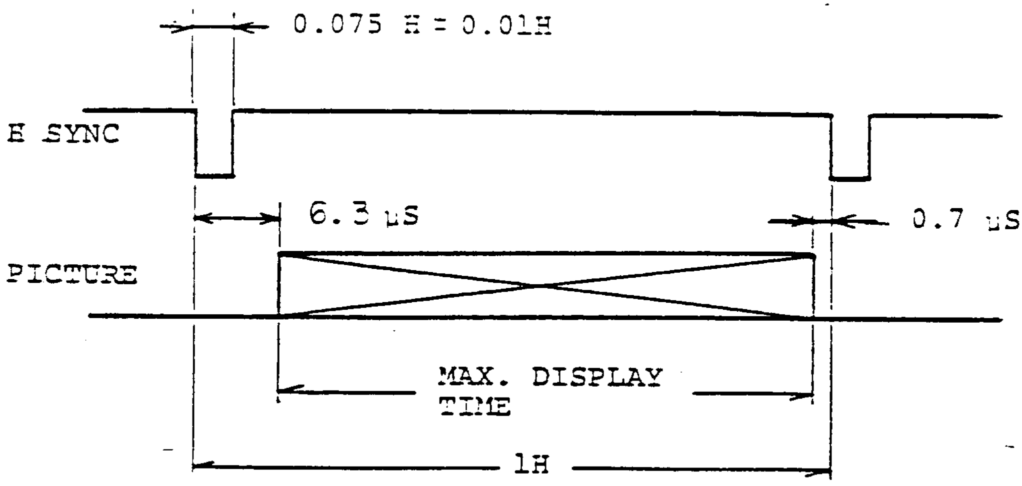
Sync-Composite, HD/VD sync, signal of TTL level and negative going (active low)

(d) Input levels : 0.7 - 1.5Vp-p for R,G,B inputs
1.0 - 5.0Vp-p for Sync signal

(e) Timing requirements

Fig. 1-1 shows Timing Chart for recommendation of input signals.

HORIZONTAL TIMING



VERTICAL TIMING

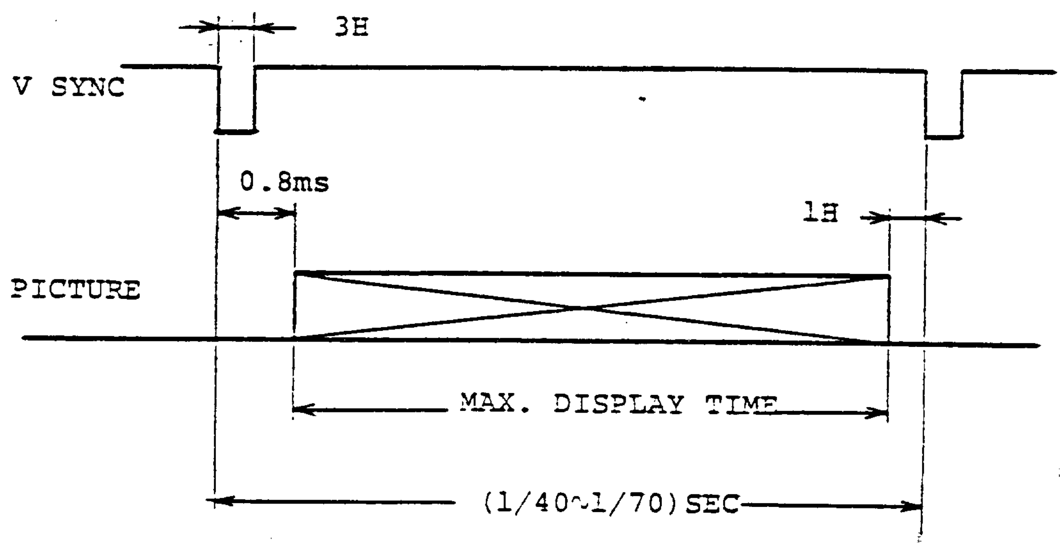


Fig. 1-1 Recommendable Timing Chart

1.2.5 Scanning Frequency.

Scanning Frequencies shall be specified by users before order is placed.

Vertical frequency : 40 - 70 Hz

Horizontal frequency : 31.5 kHz

1.2.6 CRT

"14" (13"V) Self-convergence type dot-phosphor shadow mask tube and in-line electron gun.
Phosphors are Red, Green and Blue for the standard model.
A Red, Green and White phosphor combination is abailable to order.
In order to reduce FLICKER, Long Persistance phosphors are recommended.

1.2.7 Max. Effective Screen Size: 250 (W) × 190 (H) mm
Users are requested to advise timings and actual area of use. In order to avoid trouble caused by timing, the manufacturer needs the signal source made by the user.

1.2.8 Ambient Temperature

Ambient Temperature on operating shall be -5 ∿ +40 °C for model with cover and 0 ∿ +45 °C without cover.

1.2.9 Warm-up Time

Warm-up time is 20 minutes max. At the end of the warm-up period, no adjustments or service is necessary to meet the specifications contained herein.

1.2.10 Package Environment

This equipment withstands room air temperature of -20 °C to +60 °C and 50 cm free drops encountered during transportation, handling and storage. This also withstands Relative Humidity of 0 % to 95 %.

1.2.11 Blanking Time

HORIZONTAL BLANKING TIME	:	LESS THAN 7.0 µS
VERTICAL BLANKING TIME	:	LESS THAN 0.8 mS

1.2.12 Video Amplifier

Video amplifier of these models are linear amplifiers and drives the cathode of the CRT.
Video signals shall be general compatible with the timing requirements of EIA-STD-RS-170.
The peak-to-peak inputs signal amplitude will be between 0.7 volts and 1.5 volts.
Composite video signal shall be composed of apx. 70 % video and apx. 30 % sync amplitude.

a) Frequency Response : ±3 dB or better between 50 Hz to 40 MHz

b) Pulse Response : Rise and Fall times are shorter than 12 ns respectively

c) Differential Gain : Better than 5 %

d) Black Level Stability

Pedestal clamp circuits are equipped.
Black level is maintained within 1 % at any Average Picture Level of 10 % to 90 %.

1.2.13 Convergence

Better than 0.4 mm in a centrally located area bounded by a circle. The diameter of this circle is equal to picture height. Elsewhere the deviation is better than 0.6 mm.

1.2.14 Raster Size Regulation

Raster Size change caused by change of CRT beam current 0 μA to 200 μA is less than 1 % of raster height.

1.2.15 Linearity and Geometry

Linearity measured and calculated by the following formula is better than 7 %.

$$\text{Formula : } \frac{\text{MAX} - \text{MIN}}{\text{MEAN}} \times \frac{1}{2} \times 100 \ (\%)$$

Raster distortion is better than 2 % of raster height.

1.3 MECHANICAL SPECIFICATIONS

1.3.1 BACK PANEL CONTROLS

Brigthtness controls are provided, which are easily accessible to the operator :

1.3.2 Configuration

1) Dimension mm (inch)

   Refer to attached Drawings Fig. 1-2 ∿ Fig. 1-3.

2) Weight

   13 kg without cover

1.4 MISCELLANEOUS SPECIFICATIONS

1.4.1 Identification and Marking

The following markings are provided :

1) DHHS warning labels on the CRT and chassis.
2) High voltage warning labels on the chassis or th cabinet.
3) Rating label on the cabinet or chassis to show power source, model number, UL recognized, etc.
4) Serial number label on the cover or chassis.

1.4.2 Spare Parts

Fuses (3A, 2 pcs) are furnished in the package.

1.4.3 DOCUMENTATION

The following documents are arranged and supplied to users :

1) Service manual containing circuit descriptions, operating procedures, maintenance instruction, parts list and schematic diagram.

2) Specification.

3) Drawings showing outline of equipment and details for installation.

SECTION 2
INSTALLATION

2.1 GENERAL

This section explains how to install the monitor and how to verify its basic operation. Like most commercial TV receivers, the monitor is thoroughly adjusted and checked out at the factory, but it may require certain minor adjustments to adapt it to a particular display generator or other controller and to compensate for minor adjustment disturbances caused during shipment. For convenient reference, complete adjustment procedures and other basic checks are consolidated in Section 3, but only selected, simple procedures should be necessary for initial installation.

2.2 UNPACKING

The monitor is normally packaged in a separate shipping container unless it is incorporated into a system by MITSUBISHI ELECTRIC CORPORATION. Carefully open the top of the container. Remove the inside packing material and lift out the monitor.

2.3 ASSEMBLY

The monitor is supplied completely assembled.

2.4 CAUTION BEFORE "POWER ON"

Please make sure that PCBs, wires, components and structures are in perfect mechanical order and not damaged during transportation.

Particular attention should be paid to the anode cap of the CRT and to ensure that the sync select switch (S301, 302) on PCB VIDEO is set according to the input signal (WS or WO, COMPOSITE or HD/VD).

2.5 VIDEO INPUTS

Connect Red, green and blue video to the appropriate video input connectors located on the rear connector panel. Refer to Table 2-1. Table video cables should be constructed with 75 Ω coaxial cable (type RG59/U, or equivalent) and terminated, at the monitor cable end, with standard BNC connector plugs. If the monitor is used without sync signal input, the green video signal input to the monitor must contain composite sync.

The Model C-6479 Series (13-inch) monitor contains two connectors for each video input to provide for loop-through operation. In addition, the input impedance of each input may be set to a high impedance or to 75 Ω by means of five input impedance selector switches, located next to the video input connectors. If the monitor is used in a loop-through position, these switches should be set to the high impedance position. For single unit operation, or when the monitor is the last unit in a loop-through string, these switches should be set to the 75 Ω position to terminate the video cable.

2.6 AC INPUT POWER

Before connecting the monitor to the power source, determine that the line voltage and frequency are proper (100∿120 V AC or 220∿240 V AC, 50/60 Hz). Check the position of the input voltage plug (P.) on the PCB-POWER. Make certain that the plug (P.) is in the proper position for the input line voltage (100∿120 V AC or 220∿240 V AC, 50/60 Hz). Plug the ac line cord into the power receptacle on the rear VIDEO panel.

2.7 DEGAUSSING AND BRIGHTNESS CONTROL

Turn on the 'POWER SWITCH' and adjust the brightness control. The raster will appear in approximately 20 seconds. The automatic degaussing works every power switch on. The other parts of the monitor may also need degaussing. Turn on the degaussing coil at a distance 1 meter from the monitor. For degaussing the frame, move it within about 10 cm from the top and side of the monitor. Move it in a circle a few times. Then move the degaussing coil gradually away from the monitor and turn off the coil.

Table 2-1 Rear Panel connectors (C-6479 only)

Connector	Function	Connector
J211	Red Video Output	BNC
J212	Red Video Input	BNC
J241	Blue Video Output	BNC
J242	Blue Video Input	BNC
J271	Green Video Output	BNC
J272	Green Video Input	BNC
J311	Composite/HD Sync Output	BNC
J312	Composite/HD Sync Input	BNC
J321	VD Sync Output	BNC
J322	VD Sync Input	BNC

2.8 EXTERNAL SYNC INPUTS

When the monitor is driven by the external sync signals, theGreen Video signal does not need a sync "Component".

1) When the composite sync signal is applied to the COMP/HD input,the sync selector sw S301 on PCB-VIDEO should be "EXT-SYNC" position.

2) When the horizontal sync and vertical sync signals are applied to the COMP/HD and VD inputs,respectively,the sync selector sw S301 and S302 on PCB-VIDEO should be "EXT/SYNC" and "COMP" position.

SW / SYNC	S301	S302
INT	INT	COMP
COMP	EXT	COMP
HD/VD	EXT	HD/VD

SECTION 3
CIRCUIT DESCRIPTION

3.1 DETAILED DESCRIPTION

This section contains detailed descriptions of circuits operation for the Model C-6479 Series Color Display Monitor. In reading this section, reference should be made to the monitor schematic diagrams.

3.2 PCB VIDEO CIRCUIT

3.2.1 Video Amplifiers

The color monitor contains three video amplifiers one for each primary color. These three amplifiers for the red, green and blue CRT guns are identical. Therefore, the operation of only one channel (RED) is described here.

Composite Video Signal input from J212 is applied to a buffer amplifier, Q212. The contrast control can be individually set to allow matching of the CRT color levels. The output of contrast control is supplied to Q201.

Q201 amplifies the video signal and the output from this transistor drives Q202. The bias voltage of Q201 is provided from Q202's emitter, so the DC voltage is stabilized by negative feed back.
D201 is a level shifter to shift the Base bias voltage of Q202 for effective use of +B voltage. The output of Q202 is coupled to an emitter follower Q203 for impedance change. The output from the Q203's emitter is coupled to the driver Q205 for pedistal clamping. The video signal is clamped by the clamper Q204 and then drives Q208 through Q206, Q207.

Q205's DC voltage is about 3.3 V and this voltage is the pedestal level. Q205, 206 and 207 construct the triple darlington for high impedance.

Q207 and Q208 form a cascade amplifier and generate enough amplitude of voltage to drive the the cathode of CRT. L201 is a peaking coil and R229 is a damping resistor. These form a High frequency compensation circuit with C213, R227.

Q209 is a constant current source for providing the cathode bias voltage of CRT, VR202 is a bias voltage control volume. When Q209's base voltage is lower the emitter current is higher, so Q209's collector voltage is higher.

Q210 and Q211 form a single ended push-pull to provide a drive current for the cathode of CRT.

3.2.2 Sync Separator

The sync separator is located on the PCB-VIDEO and operates from the green video input in the case of internal sync, or operates from the separate sync input. This selection is made by sync selection switch S301.

The green Video signal or separate sync signal is clamped by D301, 302 and amplified by Q301, Q302. This signal drives sync stripper Q303. When the negative going sync signal comes Q302's collector, Q303 is on through C303. When the positive video signal comes Q302's collector, Q303 is off. So the separated (positive) composite sync signal comes the collector of Q303. The attnuated sync signal (by R306, R307) is buffered by Q304 and fed to PCB-MAIN from the emitter (positive). The negative sync signal comes the collector of Q304 and this signal is differentiated by C304 and R312. Q305 is normally biased in OFF state. Positive edges of the negative sync signal (which are the trailing edges of the horizontal sync pulses) drive Q305 to ON state. The output across R313 and R314 is a negative pulse during the back porch interval, which drives (Q204, Q234, Q264) the pedestal clampers.

3.2.3 DC Restoration

A back porch pulse from the sync separator circuit drives the base of pedestal clamper Q204 through R215. During the back porch period, pedestal clamper Q204 is turned on by a negative pulse and provides bias to emitter-follower Q205 to maintain the pedestal level at the constant DC level.

3.2.4 Blanking Circuit

The blanking circuit provides negative blanking pulse to the CRT control grid, during the vertical and horizontal periods, to prevent the flyback retrace lines from appearing on the CRT.

This blanking function is performed by transistor Q306~ Q310 located on PCB-VIDEO.
The base of pulse amplifier transistor Q310 is driven by both horizontal and vertical pulses.
S301 is a selector for composite sync signal or HD/VD sync signal. In case the composite sync signal, Horizontal and Vertical sync signals appear at the collector of Q303. This signal is fed to Q306 through R315 and C305 (integrator), C306 and R317 (differentiator). So the Q306 turn on at the leading edge of Vertical sync signal.

The inverter transistor Q307 provides trigger pulses to one shot multivibrator constructed by Q308 and Q309.
In initial state Q308 is OFF and Q309 is ON.
Positive trigger pulse turns on Q308, so Q309 is OFF state. C309 is charged up through R327 and Q309 turns on, Q308 turns off. This blanking pulse is fed to Q310 to turn on during vertical blanking time.
Horizontal retrace pulse from PCB-MAIN is attenuated by R333, R332 and sliced by D307.
In the same way Q310 is driven into conduction during Horizontal retrace time and the grid of CRT is low.

3.3 HORIZONTAL DEFLECTION CIRCUIT

All signal processing is performed by IC401, which contains the Hor-AFC, Hor-OSC circuits.

The sync signal is applied on IC401, pin #16 and comparison voltage is applied on pin #14. Hor-OSC output pulse appears on pin #10.

The comparison voltage is formed by integrator (R506 and C505) from a horizontal output transformer (HOT) pulse.
The video phase circuit composed R505, VR501 and C504

determined the phase of comparison voltage corresponding to the relative position between the raster and picture positions.

Transistor Q502 drives interstage transformer T501 which couples the drive signal to the base of horizontal output transistor Q591. Capacitor C509 and resistor R514 provides wave damping for transient pulse.

Output transistor Q591 is driven into conduction for approximately 15 µs at the end of each horizontal sweep. Q591 is turned off at beginning of the retrace period. Retrace time is determined by the resonant frequency of the parallel circuit formed by inductance of the horizontal deflection yoke, the inductance of the HOT primary coil and C511. During retrace time, a half cycle of oscillation occurs at this resonant frequency with the collector of Q591 swinging positive.

When the half cycle is completed, the collector of Q591 begins to swing negative causing damper diode in Q591 to conduct. When damper diode conducts, the resonant frequency of the horizontal circuit is changed to produce the horizontal sweep, by the shorting of capacitors C511.

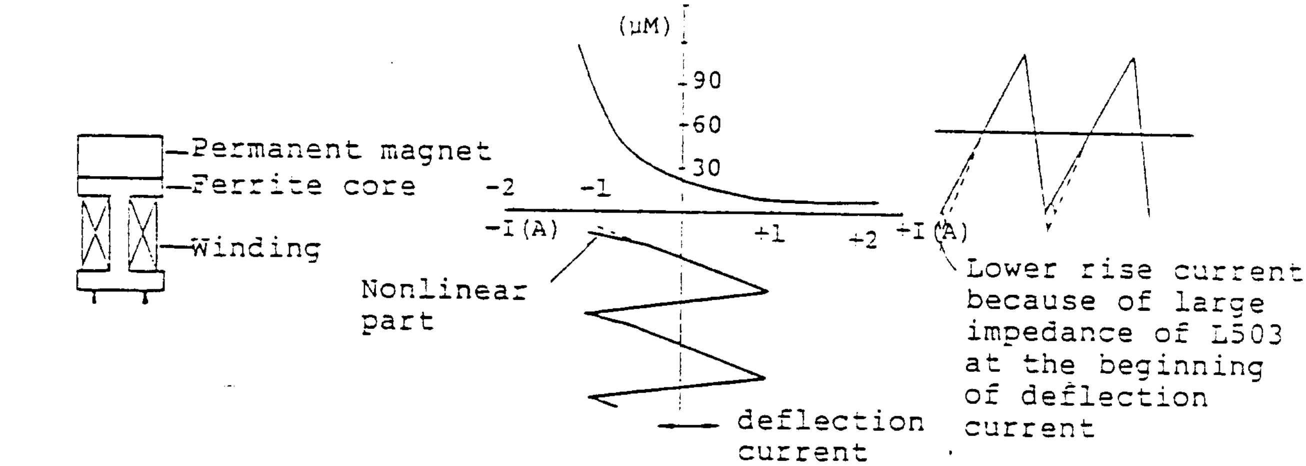
Current from the yoke flows through damper diode for approximately half of the horizontal sweep time, at which point, the current reaches zero and reverses. The reversed yoke current flows through Q591 (which is turned-on during the last half of the sweep time) until the next retrace period.

The horizontal yoke current is returned to ground through the side PCC transformer T503, Hor. linearity correction coil L503, Hor. width coil L502, and capacitor C517.

The inductance of width coil L502 is variable to provide horizontal width adjustment.

In the horizontal deflection circuit, require two kinds of horizontal linearity correction. The first is a sawtooth wave to offset the resistive losses in the scanning circuit. This correction is developed across saturable reactor L503. This is an inductor with a ferrite core which is prepolarized by a permanent magnet. The coil L503 may functions as shown in Fig. 3-1, particularly, to improve the horizontal linearity of the raster on the left side.

The secondary linearity correction required in a parabolic wave which is necessary because the picture tube screen is flatter than a sphere with its center at the deflection yoke position. This is obtained by passing the sawtooth yoke current through capacitor C517.



(a) Structure

(b) DC adding characteristics

Fig. 3-1 Horizontal Linearity Correction Coil

3.4 PCC CIRCUIT

The side pincushion correction circuit (Side PCC) modulates the raster width as a function of vertical deflection. The side PCC utilizes saturable reactor T503 to modulate the raster width. The control winding of T503 is driven by a vertical parabolic voltage from the PCC amplifier Q404.

A output winding inductance is modulated by a vertical parabolic current as shown in Fig. 3-4. This output windings are inserted in series with the horizontal deflection yoke.
Horizontal yoke current flows through the output windings of T503, which are connected in phase opposition to cancel the vertical parabolic signal. The horizontal yoke current and the control current produce core saturation, which unbalances the circuit, introducting a vertical correction voltage in the horizontal yoke circuit. The correction voltage modulates the horizontal yoke current to correct side pincushion distortion.
The modulated horizontal yoke current is shown in Fig. 3-2.

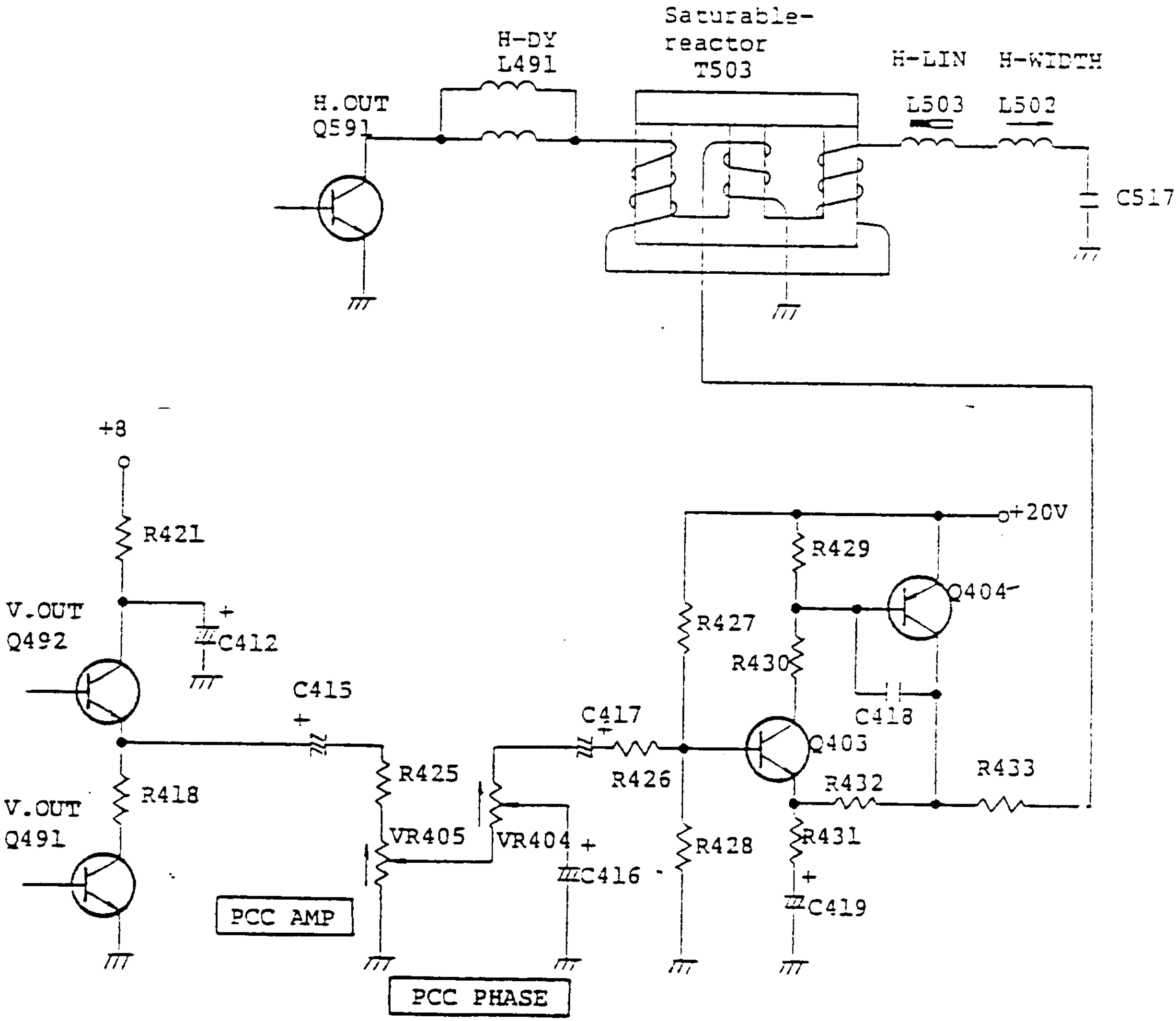
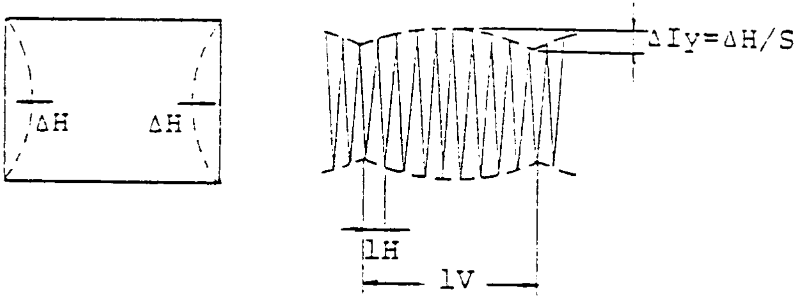
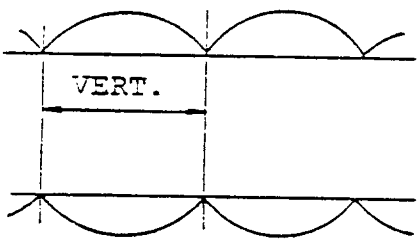


Fig. 3-2 Pincushion correction circuit



Δy: Incremental horizontal deflection current
S: Horizontal deflection sensitivity

Fig. 3-3 Modulated horizontal yoke current



a. Control Winding-Current Waveform.

b. Output Winding-Inductance.

Fig. 3-4 Saturable reactor.

3.5 HIGH VOLTAGE CIRCUIT

CRT anode voltage is produced by rectifying a horizontal retrace pulse obtained from the high voltage winding of fly-back transformer (FBT), T531.

High-voltage shall be independent of anode current, in order to obtain stable performance.

The operation of the high-voltage circuit is the same as that of the horizontal deflection output circuit.

The input horizontal pulse produced the IC401 is applied to the high voltage driver transistor Q531 through the buffer transistor Q530.
Transformer T530 which is load of Q531, is a impedance transformer and output of T530 drive the high-voltage output transistor Q592.

The collector pulse of Q592 is stepped up by FBT and high-voltage is obtained from the single rectifier.

The high-voltage is divided by R591 and R552.
The divided voltage is fed to the error amplifier, Q537 through the buffer amplifier Q536.
Error amplifier Q537 compares the divided high-voltage, applied to its base through the HV-ADJ Control, VR532, to the zener voltage of D531.

Q532 and Q593 two transistors jointly are called a Darlington configuration. The base of Q532 is controlled by error amplifier Q537.

If for any reason the high-voltage changes, there will be a change in the base voltage of Q537 representing the error, which is amplified by Q532 and fed to Q593 where it acts to correct the error. For example, if high-voltage to go more positive, the base of Q536 becomes more positive. The emitter of Q536 goes positive, turning Q537 on harder. As Q537 increases conduction, the base voltage of Q532 is reduced and Q593 effectively increase the impedance and dc power supply voltage of FBT will reduce to get normal high-voltage, 24 kV.

3.6 HIGH VOLTAGE SAFETY CIRCUIT

CRT anode voltage is produced by rectification of a horizontal retrace pulse obtained from the High Voltage winding of flyback transformer T531.
Fig. 3-5 shows high Voltage circuit and safety circuit.
If High Voltage reaches to a certain designed level above 24 kV, the safety circuit begins to operate and cuts off high-voltage drive circuit, so this circuit keep X-Radiation within permitted quantity.
In safety circuit, anode voltage is divided by R561, VR531, R555 and this divided voltage is fed to the base of Q539 through D538 and D539.

If high-voltage increases by some causes (for example, in case of dc power regulator circuit failure) the rectified voltage of D534 also increases, the voltage at the junction of D538 and VR531 will increase sufficiently to begin to saturate Q539.
This junction voltage exceeds zener voltage of D539, +6V, Q539 is turn on, and Q530 is turn off, Q531 is turn on, pulling down the base voltage of Q530 to the earth potential so that the horizontal drive circuit stop the operation.
As the result, high-voltage generation is dropped to zero due to no pulse generation.

HV AND SAFETY CIRCUIT

> Safety Circuit is provided to prevent occasional increase of the high voltage that may cause radiation of harmfull level. No modification shall be applied on the high voltage and safety circuit.

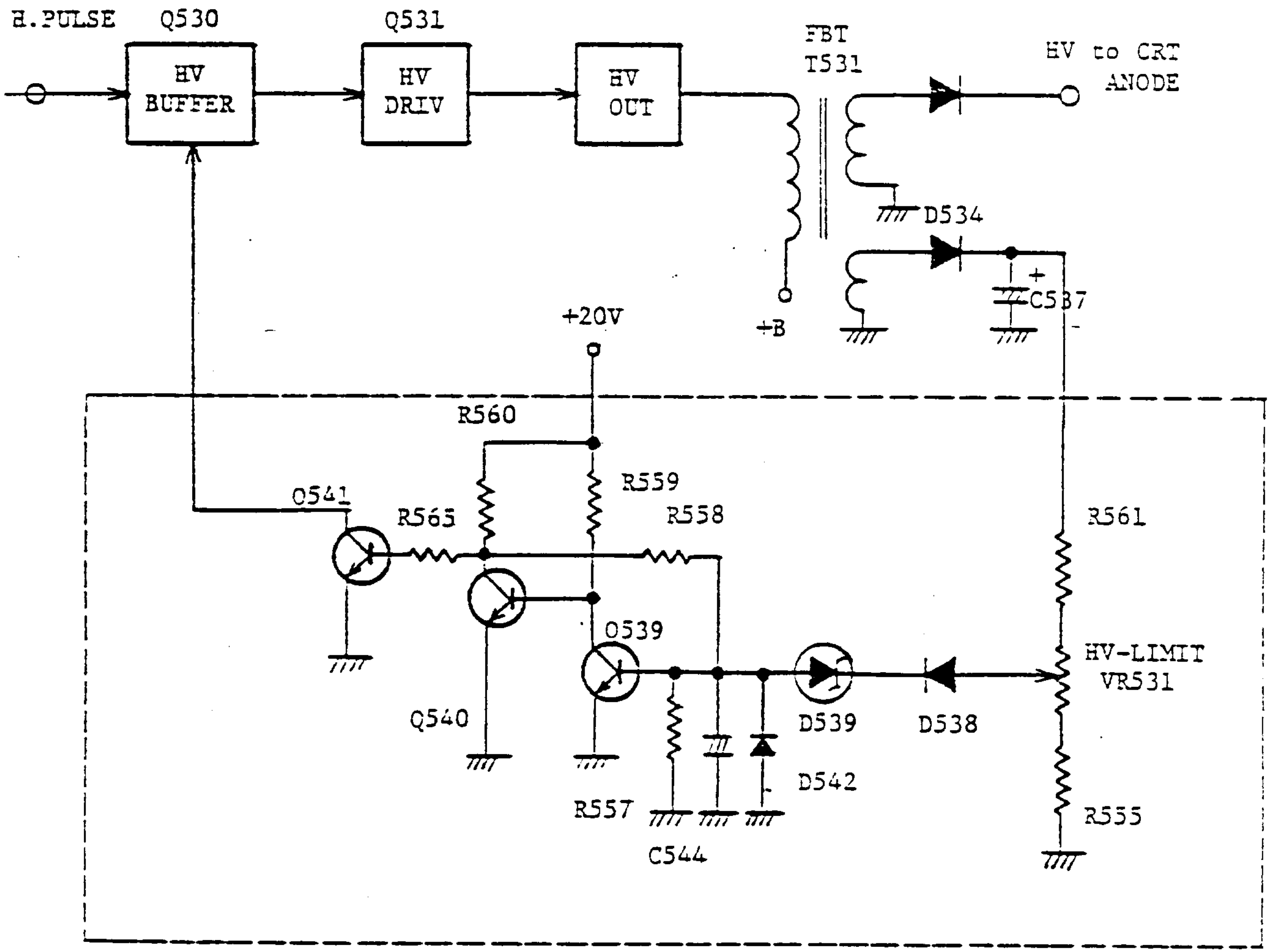


Fig. 3-5 High-voltage Safety Circuit

3.7 VERTICAL DEFLECTION CIRCUIT

The vertical deflection circuits consist of the IC401, (contains the vertical oscillator and vertical driver), vertical output stage and vertical centering circuit.

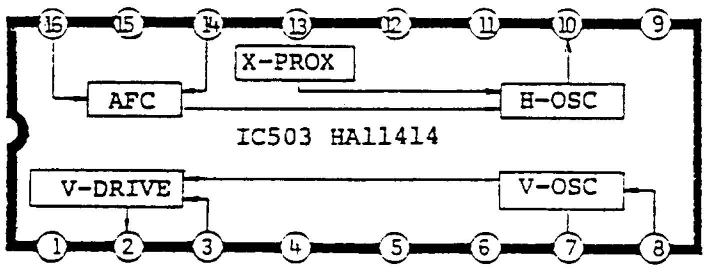


Fig. 3-6 Block Diagram of IC503

The vertical sync pulse is applied to pin #8 of IC401, and oscillator sawtooth wave generated in the IC401 is compared with the feed back deflection current wave developed across R410 and R411. Height control, VR401 adjusts the waveform of the feed back voltage.

The output voltage from IC401, pin #2 is applied to the base of driver Q492.

The vertical output amplifier Q491 and Q492 operates Class B push-pull. When scanning the upper half of the screen, deflection yoke current flows through +80V, Q491 and C411. When scanning the lower half of the screen, the yoke current reverse flowing through C411 and Q492.

Transistors Q491 and Q492 composed a complementary emitter-follower to supply slight dc current to the vertical deflection yoke to adjust centering the raster by Vert. Centering control, VR406 and tap selector, DH.

3.8 PCB-POWER UNIT

POWER REGURATOR CIRCUIT.

AC power from Line Filter is rectified by D901, and then chopped by Q903. This chopped wave voltage is transformed by T902 which secondary widing supplies power to D907 to generate dc power on connector J903. IC901 is a all in one PWM Power control IC. See Fig. 3-7. It includes an error amplifier, an oscillator, and a comparator, etc. Pin #1 and pin #2 are the input terminals of an error amplifier. Output voltage conducted on pin #1 is always compared with the voltage on pin #2 which is one-twice of pin #16 (reference voltage). When the output voltage is higher, the output of error amplifier is lower. So the output pulse width of a comparator which compares the output voltage of error amplifier with a sawtooth wave of Pin #7 is wider. Two outputs of three inputs NOR gates are high in case of three inputs are low. The outputs of driver transistors Q1 and Q2 are respectively. Finally the pulse width of Q904's base is narrower which makes the output voltage to lower.

Q901 is a triac to shorten R903 which decreases inrush current.

Q902 and T901 consist of a blocking oscillator to provide a power for control IC.

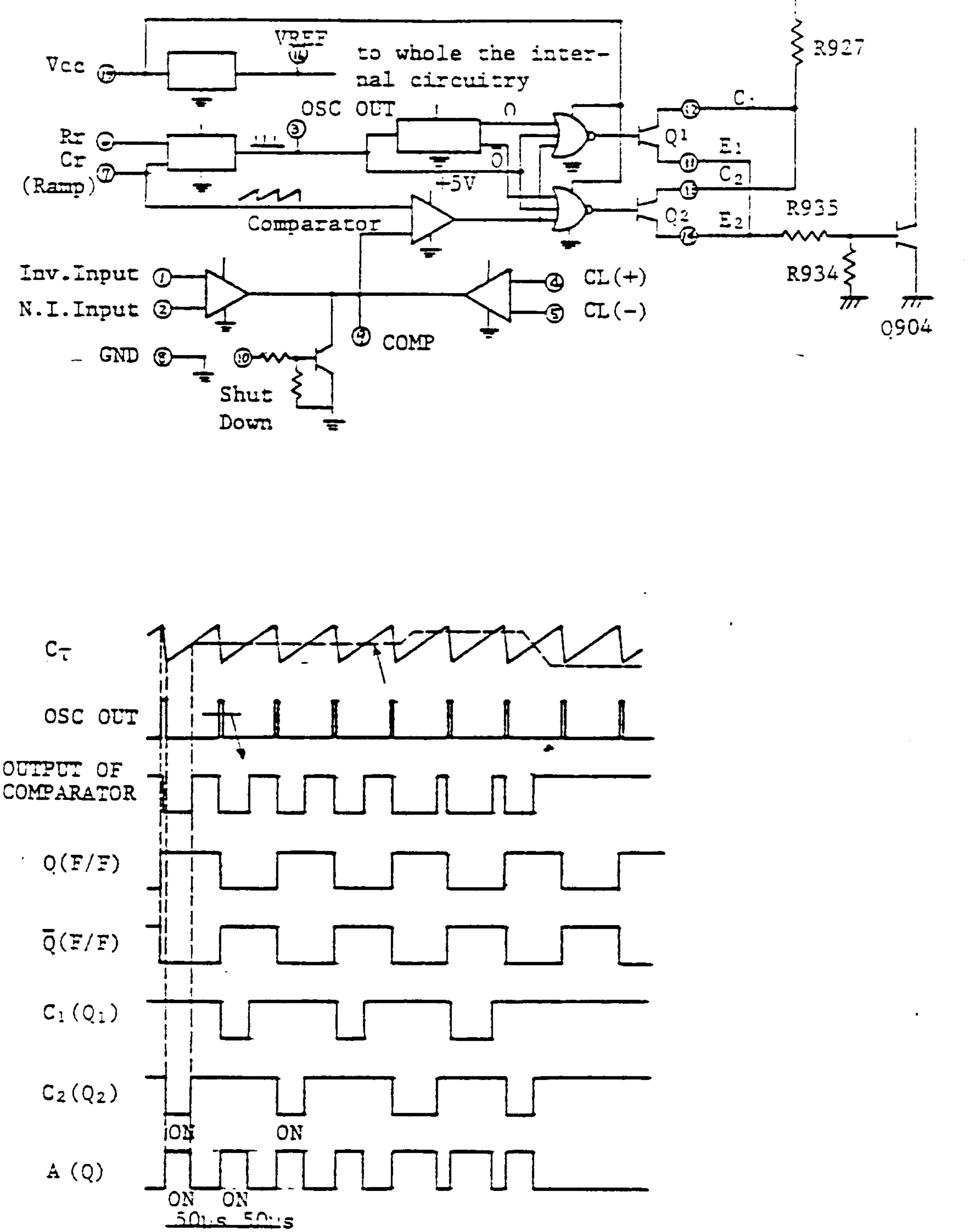


Fig. 3-7 IC901 Block Diagram and operational timing

3.9 DEGAUSSING CIRCUIT

Posistor RP901 and RP902, and degaussing coil L991 compose a digaussing circuit to demagnetic the CRT holder. Resistance of posistor increase rapidly when voltages are applied.

3.10 LOW VOLTAGE DC POWER SUPPLIES

The primary dc power source is +B1 (+90V) switching regulator on the PCB-POWER. Other power sources (+20 volts dc, CRT Heater (6.3V), H-CENT, +B2 (+180V) are shown in Fig. 3-9.
These power sources obtained from horizontal output transformer T502 by pulse rectification.

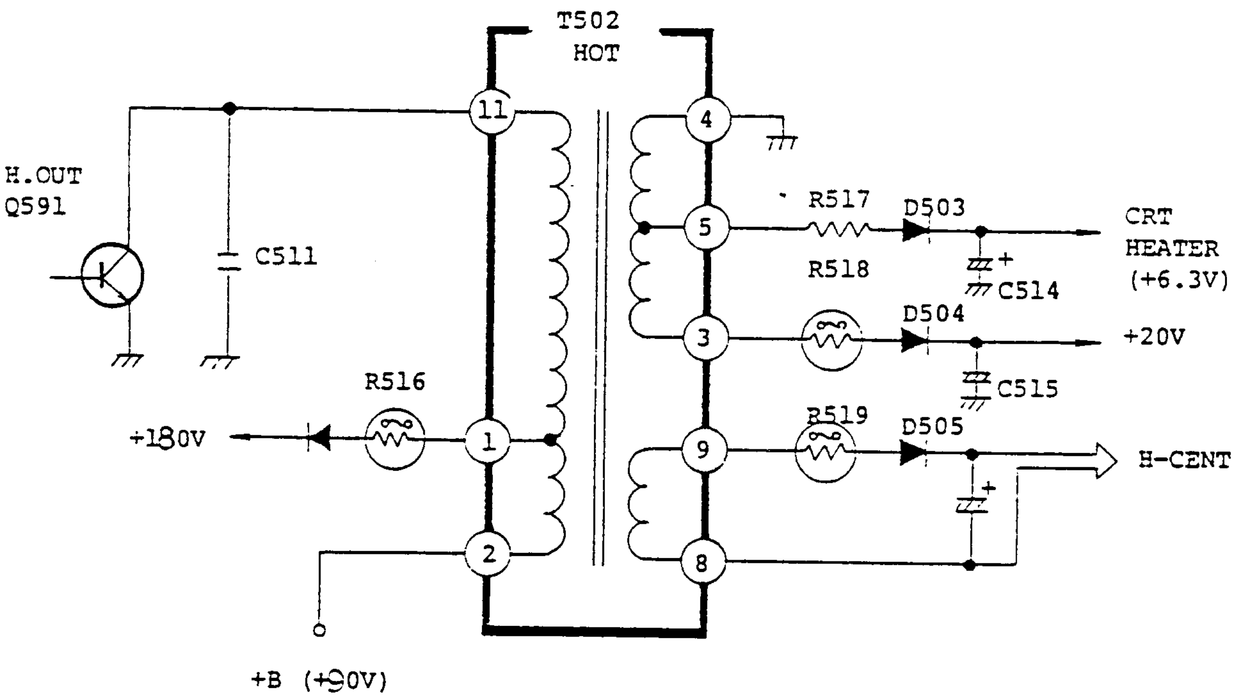


Fig. 3-8 Low Voltage Power Supply Circuits

SECTION 4
MAINTENANCE

SAFETY PRECAUTIONS

(NOTICE) Observe all cautions and safety related notes located inside the monitor cabinet and on the monitor chassis.

WARNING

1. Operation of these monitors outside the cabinet or with the cover removed, involves a shock hazard from the monitor power supplies. Work on the monitor should not be attempted by anyone who is not throughly familiar with precautions necessary when working on high voltage equipment.

2. Do not install, remove or handle the picture tube in any manner unless shatter-proof goggles are worn.
People not so equipped should be kept away while handling picture tube. Keep picture tube away from the body while handling.

X-RADIATION WARNING

The surface of picture tube may X-Radiation. Precaution during servicing and if it possible use of a lead apron of metal for shielding is recommended.
To avoid possible exposure to X-Radiation and electrical shock hazard, the high voltage compartment must be kept in place whenever the chassis is in operation. When replacing picture tube, use only designated replacement part since it is a critical component with regard to X-Radiation at noted above.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in color display monitor have special safety related characteristics.
These characteristics are often not evident form visual inspection not can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.

Replacement parts which have these special safety characteristics are identified in this service manual.

Electrical components having such features are identified by shading on the schematic diagram and the parts list of this service manual and by marking on the supplementary sheet for this chassis to be issued subsequently, therefore replacement of any safety parts should be identical invalue and characteristics.

ALIGNMENT PROCEDURE

Monitor alignment procedures contained in this section should be follow whenever a major component is replaced: such as a CRT, deflection yoke, or circuit board.
Some alignment may also be required periodically to correct for component ageing. Degaussing should be performed periodically whenever it is suspected that degaussing is required. These alignment procedures should be performed in the order given herein. Due to interaction, some portions of the alignment procedures may require repeating.

For quick reference, all maintenance adjustments are listed in Table 4-1, together with the location, circuit designator and related paragraph for each control. Figure 4-1 through 4-3 shows the location of all adjustments.

In the following alignemnt procedures it is assumed that proper line voltage and frequency are available. A video source with proper line rate is required for application to the red, green, and blue inputs. The green video must contain composite sync or a proper signal supplied to the external sync input. After all inputs have been connected, the Horizontal Hold (VR502) and the Vertical Hold (VR401) must be adjusted for a stable picture. Approximately 30 minutes should be allowed for warm-up before proceeding.

Table 4-1 MAINTENANCE ADJUSTMENTS

FUNCTION	LOCATION	DISIGNATION	PARAGRAPH
Hor. Hold	PCB-MAIN	VR502	4.3
Vert. Hold	"	VR403	4.3
90 V DC	PCB-POWER	VR901	4.4
HIGH VOLTAGE	PCB-MAIN	VR532	4.5
HV Limit	PCB-MAIN	VR531	4.5
Hor. Width	PCB-MAIN	L502	4.6
Vert. Hight	PCB-MAIN	VR401	4.6
Vert. Lineality	PCB-MAIN	VR402	4.7
SIDE PCC	PCB-MAIN	VR404,VR405	4.8
Raster Position	PCB-MAIN		
Hor. Centering		VR503	4.9
Vert.Centering		VR406	4.10
Video Phase	PCB-MAIN	VR501	4.11
R Bias	PCB-VIDEO	VR202	4.12
G "	"	VR262	4.12
B "	"	VR232	4.12
R Contrast	"	VR201	4.12
G "	"	VR261	4.12
B "	"	VR231	4.12
R Peaking	PCB-VIDEO	L201	4.12
G "	"	L261	4.12
B "	"	L231	4.12
V Blanking	"	VR301	
Brightness	Back Panel	VR530	

4.1 SETTING

4.1.1 Set the Control VRs as following.

a. Center position

PCB-MAIN	VR401	VR402
	VR403	VR404
	VR405	VR406
	VR501	VR502
	VR503	FOCUS
	VR532	
	SCREEN	
PCB-POWER	VR901	
MISSELANEOUS	VR530	(BRIGHTNESS)

b. Full counter clockwise position

PCB-MAIN	VR531	(HV-LIMIT)
PCB-VIDEO	VR202	VR232
	VR262	
	VR201	VR231
	VR261	

4.1.2 Insert a connector (PE) on the PCB-POWER to the AC line input voltage (100 ∿ 120 V or 220 ∿ 240 V AC)

4.2 DEGAUSSING

The display monitor should be degaussed before set-up and adjustment procedure are performed. The display monitor is equipped with Automatic Degaussing Circuit.

Other parts of the monitor may also require degaussing. This would be indicated by poor color purity or convergence which cannot be corrected by normal alignment. Degaussing of the monitor chassis is performed manually by using a commercial degaussing coil. The following procedure should be adhered to when using a degaussing coil:

a. With coil switch in the OFF position and the degaussing coil 6 to 8 feet from, and perpendicular to the screen, turn the switch to the ON position.

b. Turn the coil parallel to the screen and, with a circular motion, slowly bring the coil to the monitor.

c. Continuing the circular motion, pass the coil over the front, top, and sides of the monitor for approximately two minutes.

d. Then, moving in a circular motion and with the coil perpendicular to the monitor, slowly back away 6 to 8 feet and turn the coil switch OFF.

NOTE: Degaussing Coil - HOZAN, Type HC-21

4.3 HORIZONTAL AND VERTICAL HOLD CONTROLS

Ensure that video, HD and VD signals are applied to the connector (VA).

Set Hor. Hold (VR502) and Vert. Hold (VR403) on the PCB-MAIN for stable picture.

4.4 DC SOURCE VOLTAGE ADJUSTMENT

a. Check the AC input line voltage is within 100 ∿ 120 V AC or 220 ∿ 240 V AC.

b. Supply a line voltage to the PCB-POWER through the connector (PA).

c. Connect the DC voltmeter to the collector of Q593 on the RADIATOR-D and the chassis. Adjust +B1 Control (VR901) on the PCB-POWER at DC +90 V.

4.5 HIGH VOLTAGE AND HV LIMITER ADJUSTMENT

a. Remove a line voltage.

b. Connect a high voltage meter between the anode cap of CRT and the chassis.

c. Supply a line voltage.

d. Turn High Voltage Control (VR532) on the PCB-MAIN gradually clockwise until a reading of 27.0 ± 0.3 kV is achieved.

If High Voltage value cannot be obtained, adjust the +B1 Control (VR901) to get 27.0 ± 0.3 kV.

e. Turn High Voltage Limiter Control (VR531) gradually clockwise to operate the High Voltage Safety Circuit and goes out the raster.

f. Remove a line voltage.

g. Reset the High Voltage Control (VR532) to the center position and supply a line voltage.

h. Adjust High Voltage Control (VR532) for 24 ± 0.3 kV at anode cap of CRT.

NOTICE

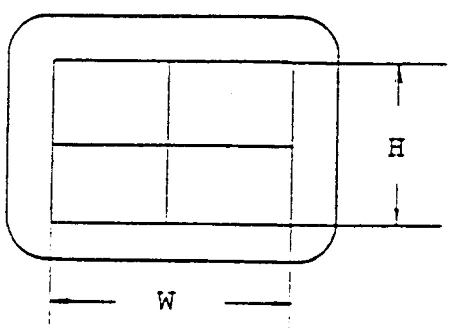
High Voltage Control (VR532) and HV Limiter Control (VR531) are critical components and never adjust or replace these components in the field servicing.

4.6 WIDTH AND HEIGHT ADJUSTMENT

a. Select a OUT-LINE test pattern.

b. Adjust Hor. Width Control (L503) and Vert. Height Control (VR401) for a OUT-LINE pattern size.

WIDTH × HEIGHT : 240 ± 2 × 180 ± 2 (mm)



4.7 VERTICAL LINEARITY ADJUSTMENT

a. Select a cross-hatch test pattern.

b. Adjust Vert. Linearity Control (VR402) for uniform spacing of cross-hatch at top/bottom and center of viewing area.

4.8 SIDE PCC ADJUSTMENT

a. Select a cross-hatch test pattern.

b. Observe the vertial lines at the left and right sides, adjust PCC Phase Control (VR404) and PCC Amp Control (VR405) on the PCB-MAIN to obtain straight vertical edges at the right and left sides of the screen.

4.9 HORIZONTAL CENTERING ADJUSTMENT

a. Select a OUT-LINE test pattern.

b. Adjust Hor. Centering Control (VR503) to center the raster on the screen.

4.10 VERTICAL CENTERING ADJUSTMENT

a. Select a OUT-LINE test pattern.

b. Vertical centering correction is selected by the position of connector (DH).

Three selections of vertical centering are provided. To select no vertical centering correction, the connector (DH) is plugged into connector (DH) receptacle pin 2. Plugging the connector (DH) into pin 1 or pin 3 will-deflect the entire raster vertically.

The direction of raster movement may be reversed by selecting the connector (DH) when plugged into pin 1 or pin 3.

c. Adjust Vert. Centering Control (VR406) to center the raster on the screen

4.11 VIDEO PHASE ADJUSTMENT

a. Select a OUT-LINE test pattern.

b. Ensure Hor. Hold Control (VR502) has been adjusted.

c. Adjust Brightness Control (VR530) for a picture of suitable contrast with the dim raster.

d. Adjust Hor. Phase Control (VR501) to center the OUT-LINE picture on the raster.

4.12 GRAY SCALE TRACKING ADJUSTMENT.

4.12.1 Cathode Bias and Screen Bias adjustment

a. Select a NO-VIDEO signal pattern.

b. Connect the DC voltmeter to the cathode of D281, D282 or D283 on the PCB-CRT. Set the R, B, G-Bias Controls (VR202, VR232 and VR262) on the PCB-CRT at DC + 150 ± 3 V.

c. Turn Screen Bias Control (R591) located High Voltage resistor block.
Observe the raster color to determine which CRT beams are visible.

d. Adjust the R, B, G - Bias Controls (VR202, VR232 and VR262) as required to equalize the three beam intensities resulting a grey raster.

4.12.2 Video Drive adjustment

a. Prior to performing the video drive adjustment, the cathode bias and screen bias adjustment must be proper.

b. Select a WHITE-FIELD test pattern.

c. Set the three Contrast Controls (VR201, VR231 and VR261) on the PCB-CRT fully clockwise position.

d. Observe the highlight color and adjust the three Contrast Controls (VR201, VR231 and VR261) to obtain white highlights.

4.12.3 Frequency Characteristics

a. Apply composite sweep signal of 1Vp-p to the input terminal of the Red and GREEN channels.

b. Connect a 10 : 1 probe of an oscilloscope through a coupling capacitor (1pF) to R on PCB-CRT.

c. Adjust L201 in order that variations in the frequency range 1-40MHz to be ± 3dB.

d. Adjust the BLUE channel and GREEN channel in the same way.

GREEN - Channel	L261
BLUE - Channel	L231

4.13 FOCUS ADJUSTMENT

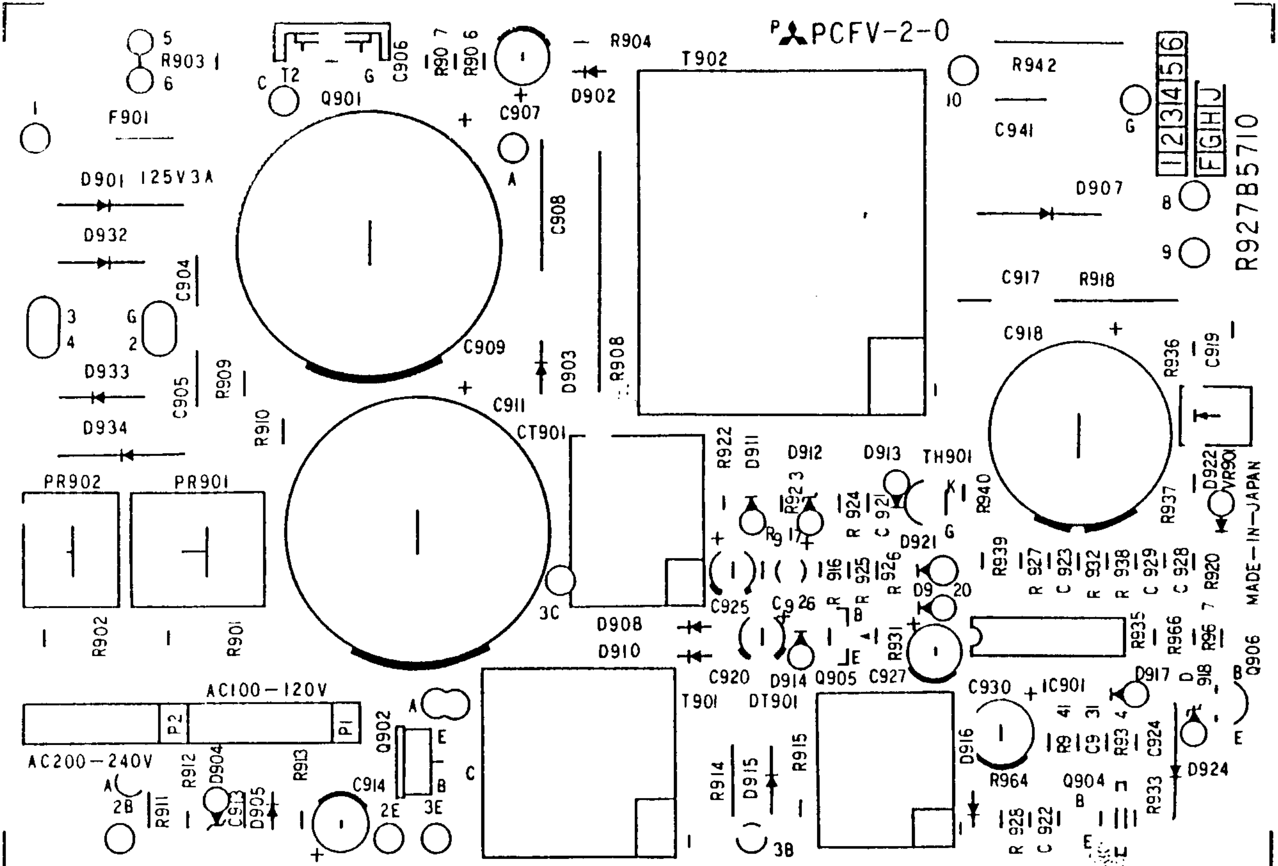
a. Select a DOT test pattern.

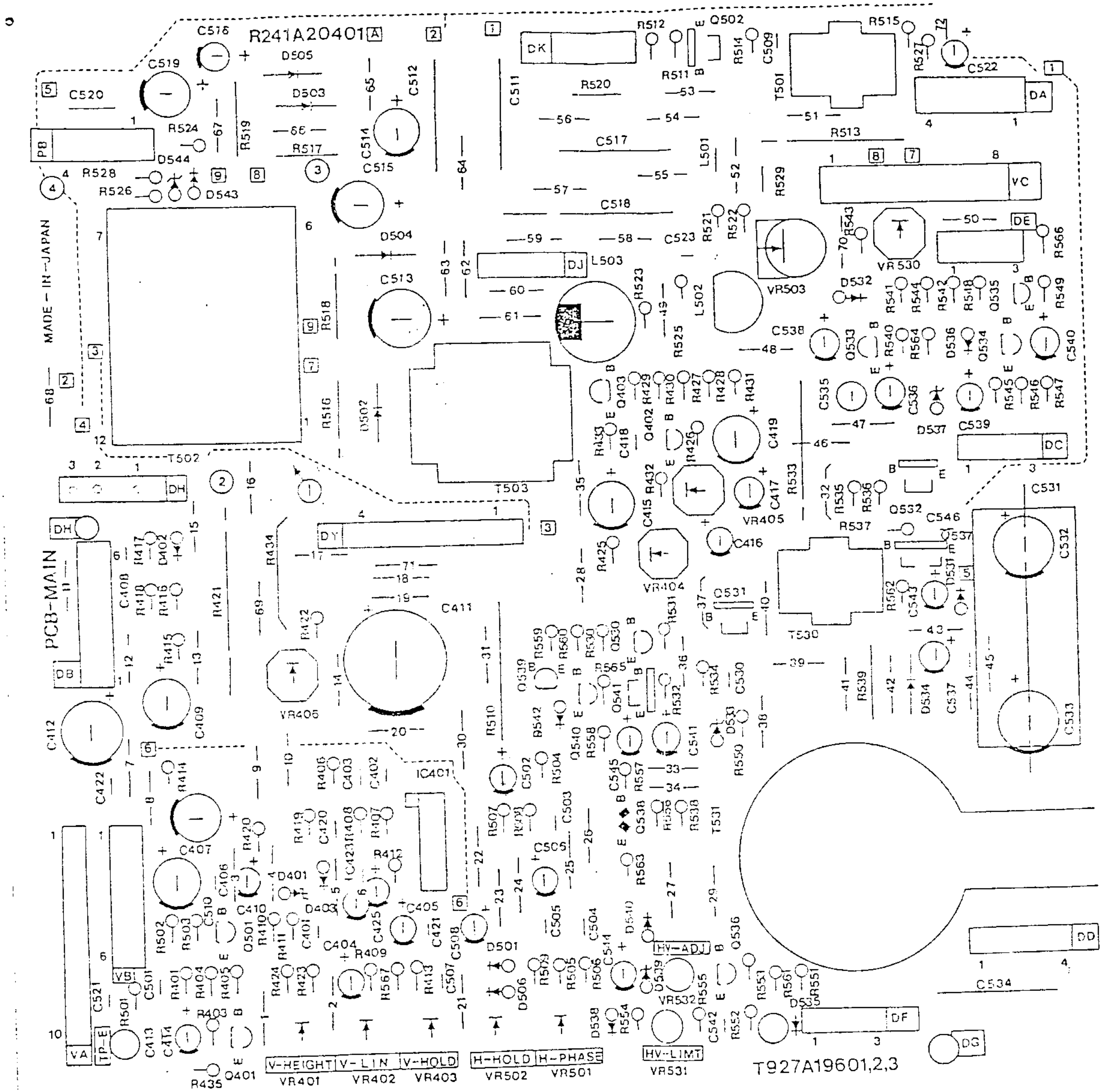
b. Adjust the BRIGHTNESS Control (VR530) for a normal display.

c. Adjust the Focus Control (R591) located High voltage resistor block best overall focus, observating both the center and corners of the screen.

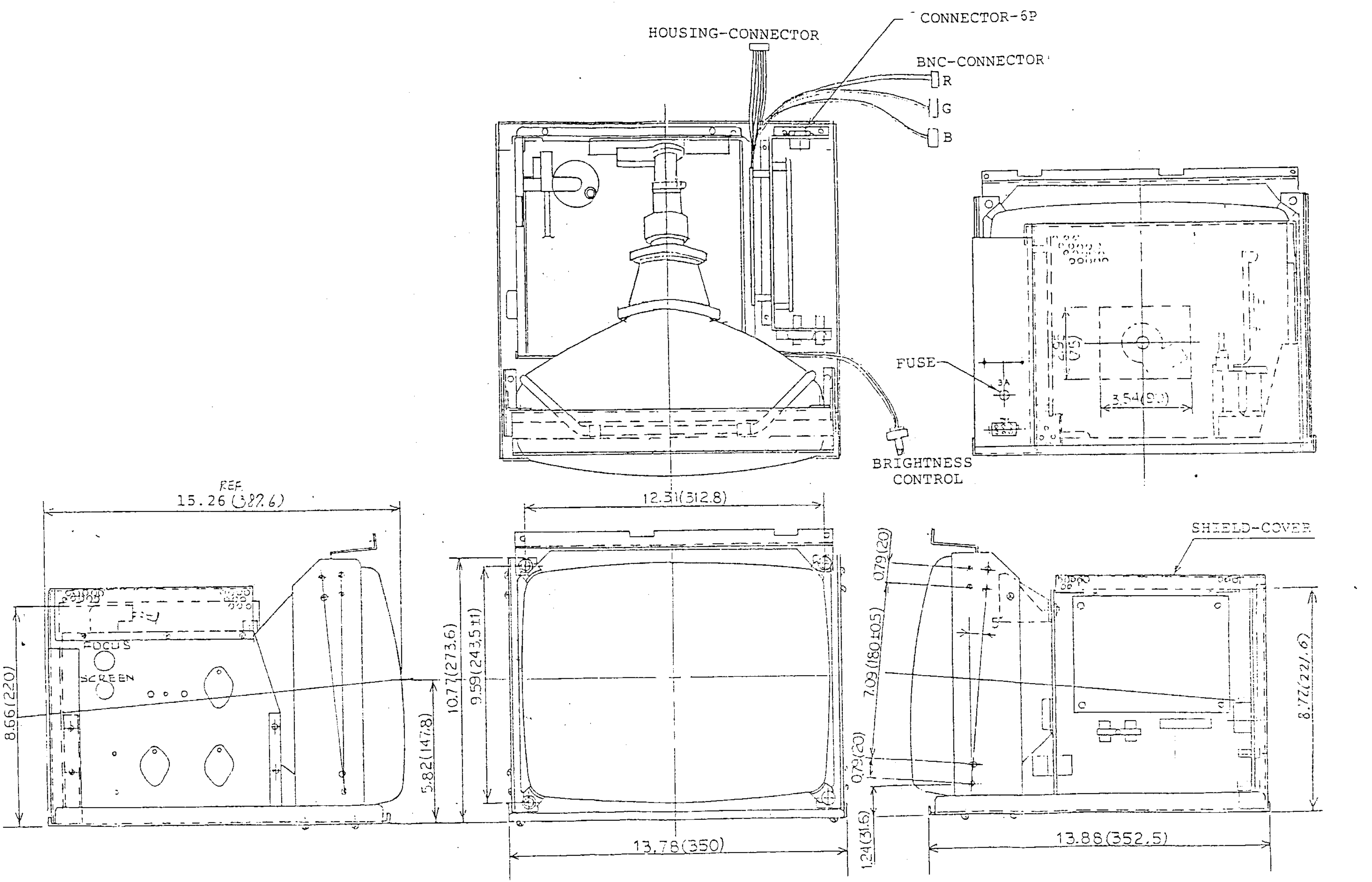
D83 − 8M
CB3 3M
B83 1M
A82 − 10M

R241B270D SP

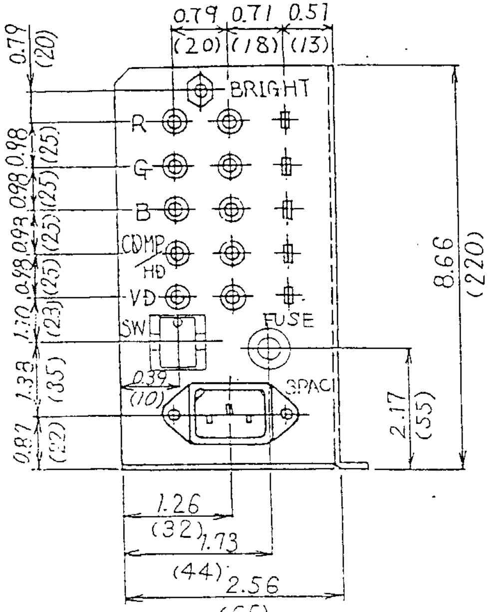




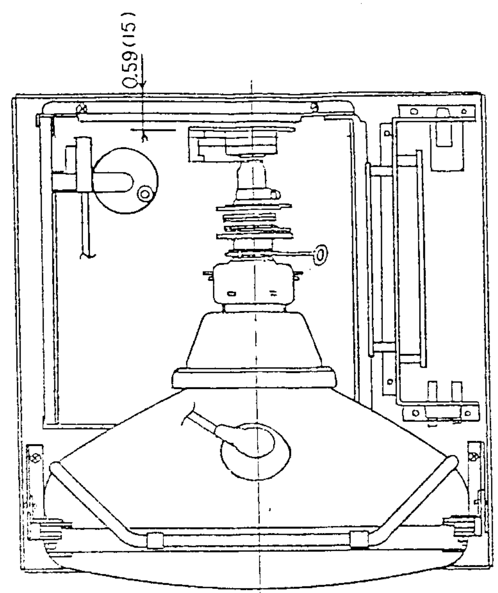
シルク R241A204

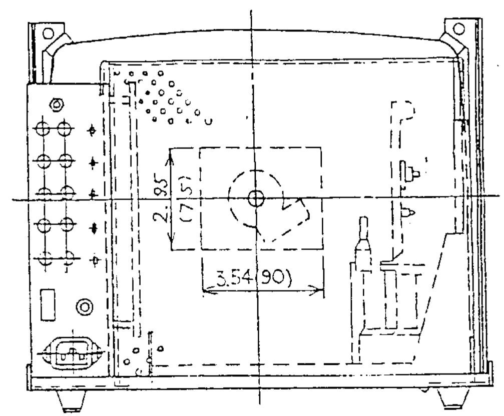


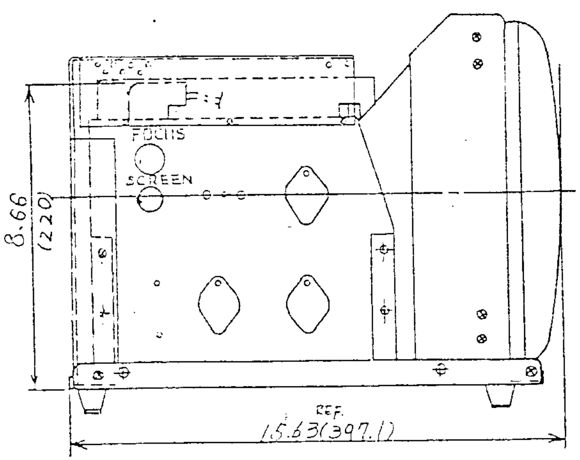
HOUSING-CONNECTOR
CONNECTOR-6P
BNC-CONNECTOR
R
G
B
FUSE
3A
2.95
(75)
3.54(90)
BRIGHTNESS
CONTROL
REF.
15.26 (387.6)
12.31(312.8)
SHIELD-COVER
FOCUS
SCREEN
8.66(220)
5.82(147.8)
10.77(273.6)
9.59(243.5±1)
0.79(20)
7.09(180±0.5)
0.79(20)
1.24(31.6)
8.72(221.6)
13.78(350)
13.88(352.5)

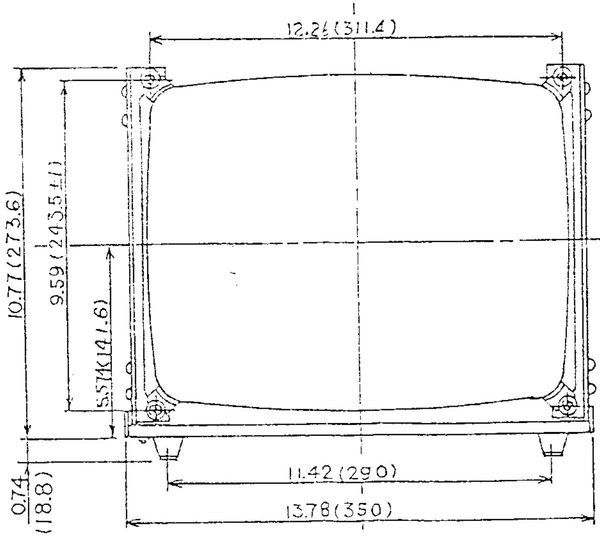


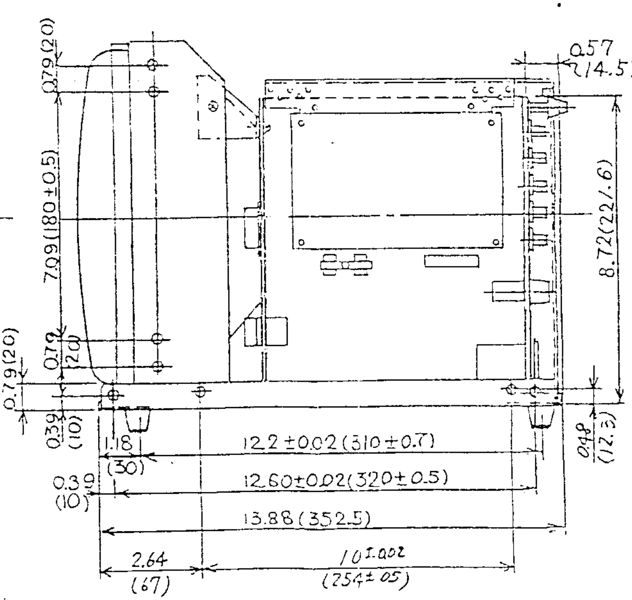
Rear Panel Detail

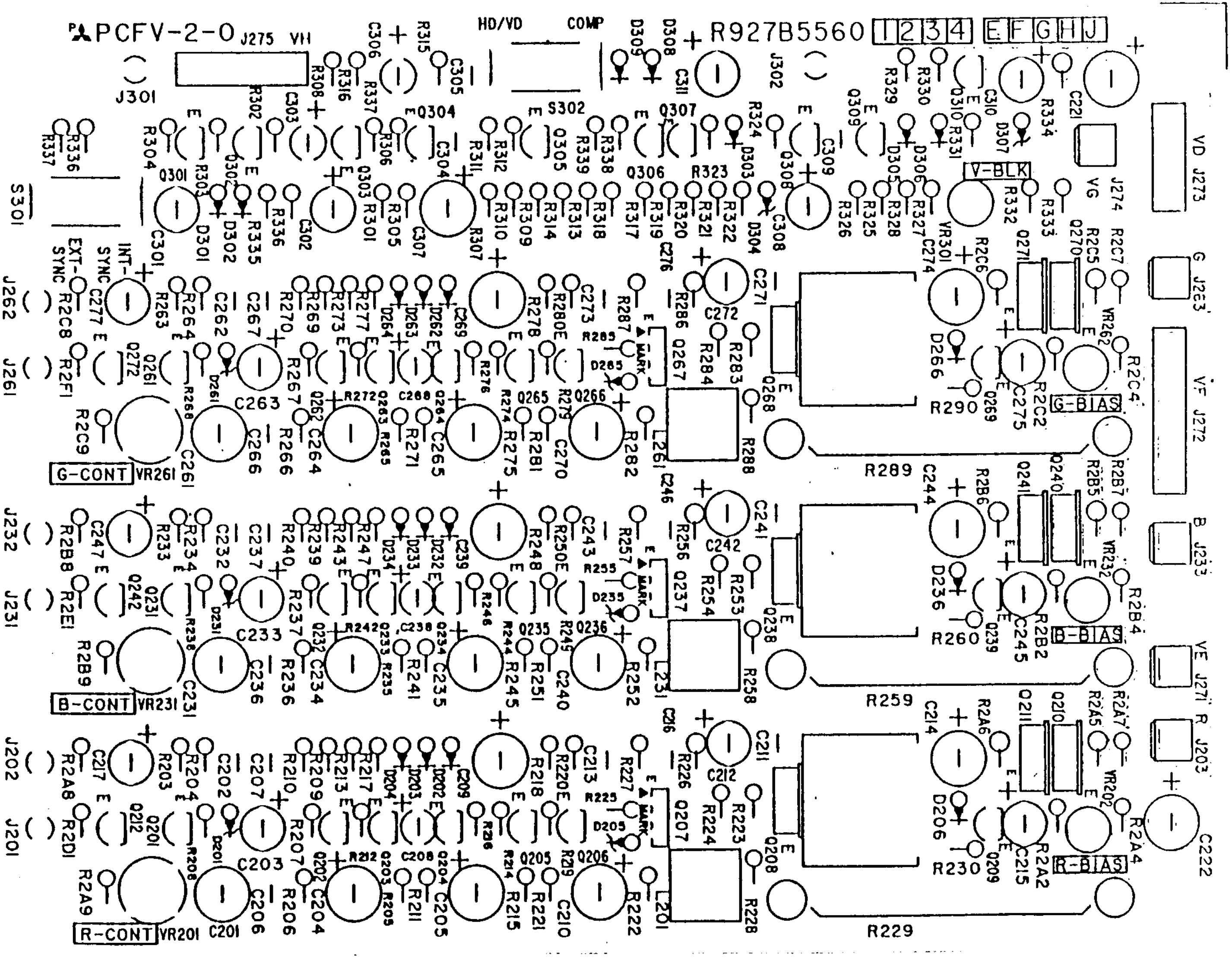


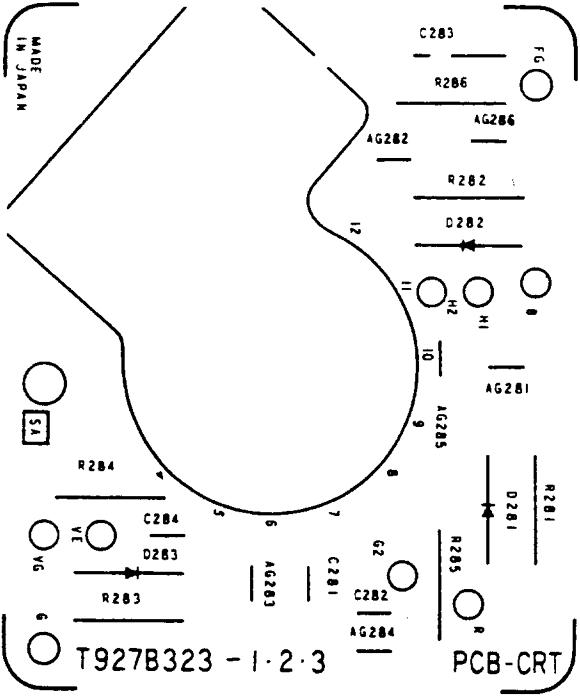









PCFV-2-0
R927B5560
1 2 3 4
E F G H J
J275 VH
HD/VD
COMP
J301
J302
S301
S302
V-BLK
VD J273
VG J274
G J263
VF J272
B J233
VE J271
R J203
INT-SYNC
EXT-SYNC
J262
J261
J232
J231
J202
J201
G-CONT
VR261
B-CONT
VR231
R-CONT
VR201
G-BIAS
B-BIAS
R-BIAS
VR301
R289
R259
R229
C221
C222

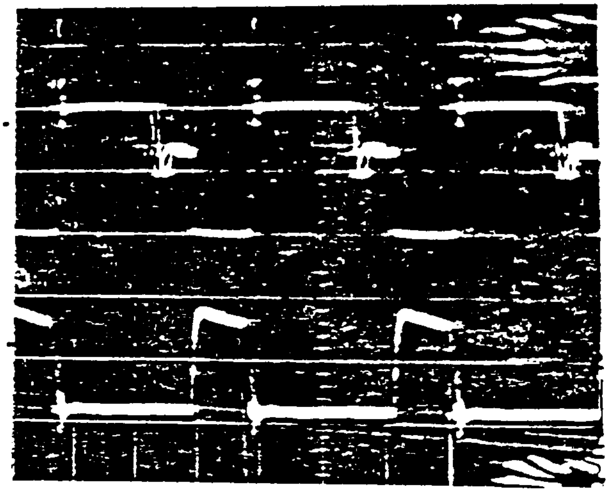

MADE IN JAPAN
C283
FG
R286
AG286
AG282
R282
D282
12
11
H2
H1
B
10
AG281
AG285
9
8
R281
D281
R284
SA
4
5
6
7
C284
VE
VG
D283
AG283
C281
G2
R285
C282
R283
G
AG284
R
T927B323 -1·2·3
PCB-CRT

4.14 WAVEFORM DATA

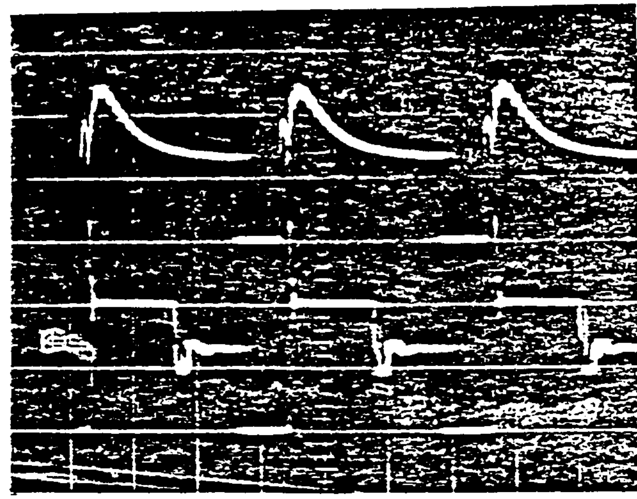
Each waveform, in Fig. 4-5a through 4-5l, is labeled with the waveform number, the vertical scaling in volts per division and the horizontal scaling in time per division. The waveforms are referenced by waveform number in the schematic diagram contained in Fig. 5-1. When measuring waveforms proper line voltage and video, HD and VD inputs must be applied to the monitor. Connect the vertical sync pulse to the oscilloscope external-trigger-input and adjust the time base to that specified on the waveform label. The vertical sync pulse may be obtained from the video source or from vertical circuit in the monitor at R410/R411 on the PCB-MAIN.

When observing horizontal circuit waveforms, sync may be obtained from horizontal pulse at CONNECTOR-PB #3 on the PCB-MAIN.

Note : When measuring waveforms of primary power circuit, Oscilloscope GND terminal must be connected to primary GND point, for example, emitter of Q903.

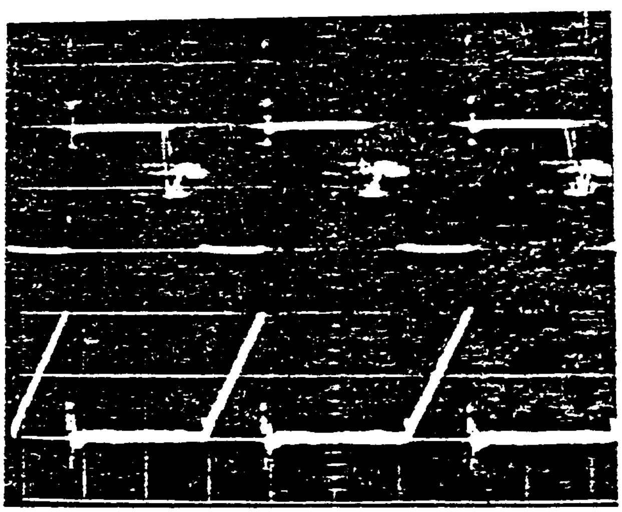


(1) a. D903 Anode
b. D915 Cathode

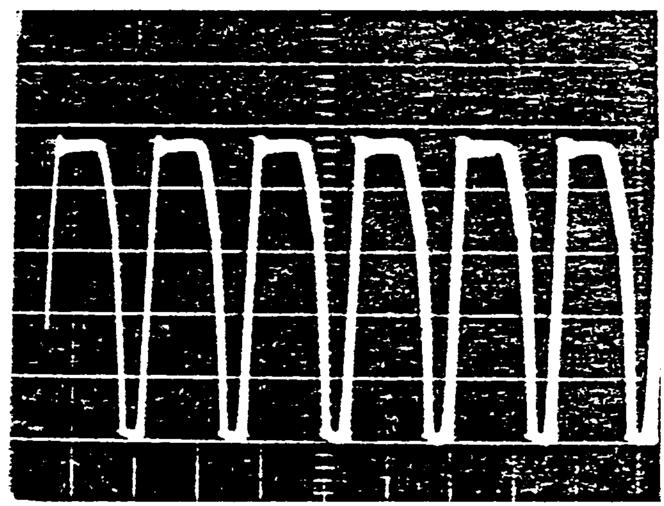


(2) a. D904 Collector
b. D903 Anode

Fig. 4-5 a. Waveforms (PCB-POWER)

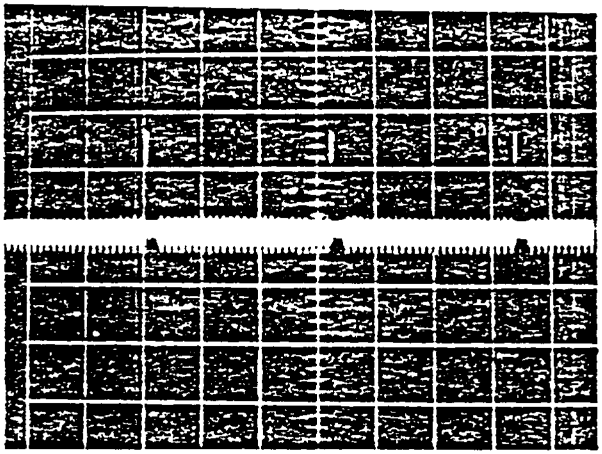


(3) a. D903 Anode
b. Q903 Collector current

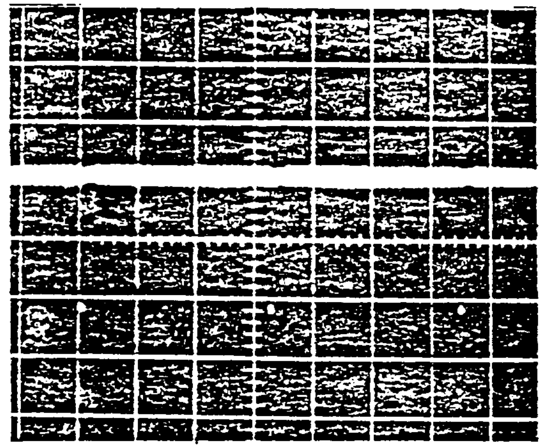


(4) Q902 Collector

Fig. 4-5 b. Waveforms (PCB-POWER)

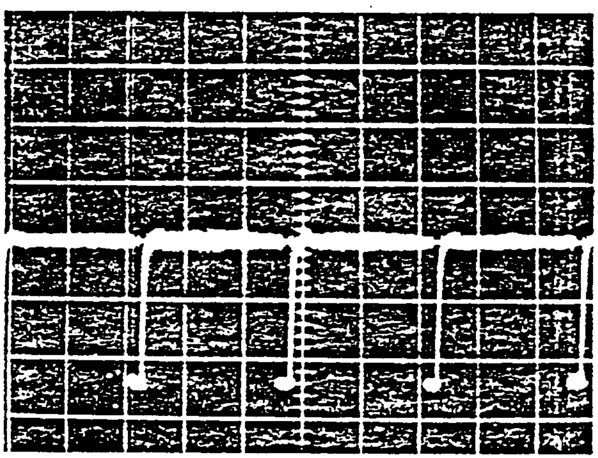


(5) CONNECTOR-VA #9, VD, 1V, 5ms

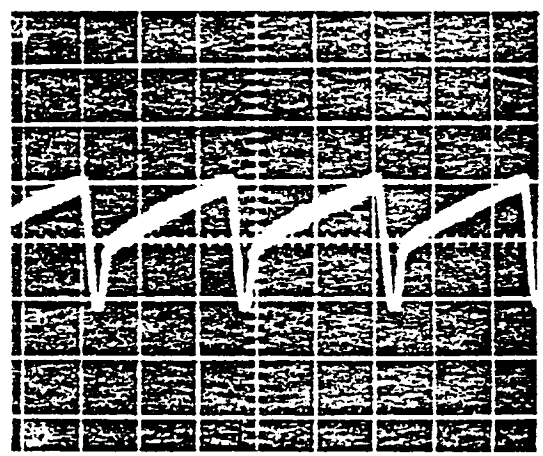


(6) Q401 COLL, 1V, 5ms

Fig. 4-5 c. Waveforms (PCB-MAIN)

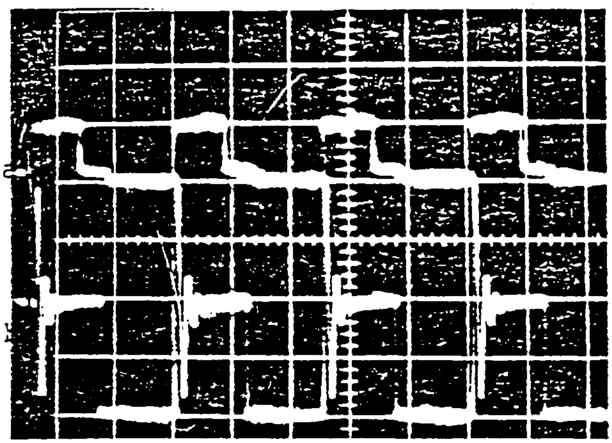


(7) Q501 COLL, 5V, 20μs

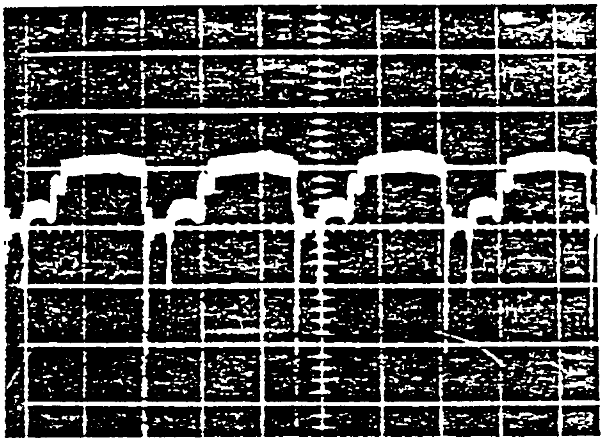


(8) IC401 #14, 2V, 20μs

Fig. 4-5 d. Waveforms (PCB-MAIN)

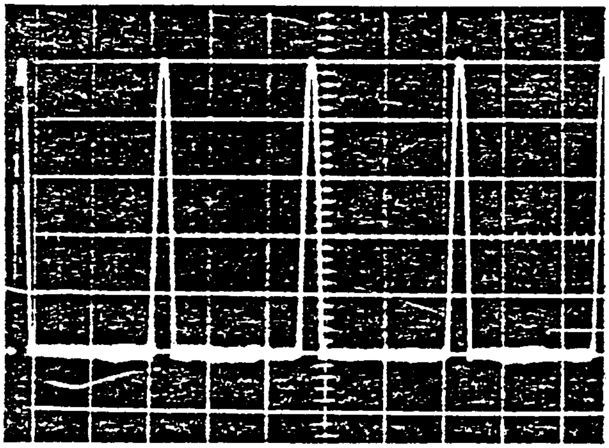


(9) a. IC401 #10, 5V, 20μs
b. Q502 COLL, 50V

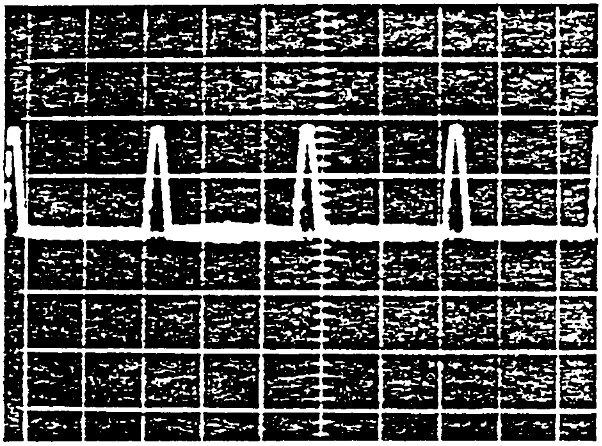


(10) Q591 BASE, 2V, 20μs

Fig 4-5 e. Waveforms (PCB-MAIN)

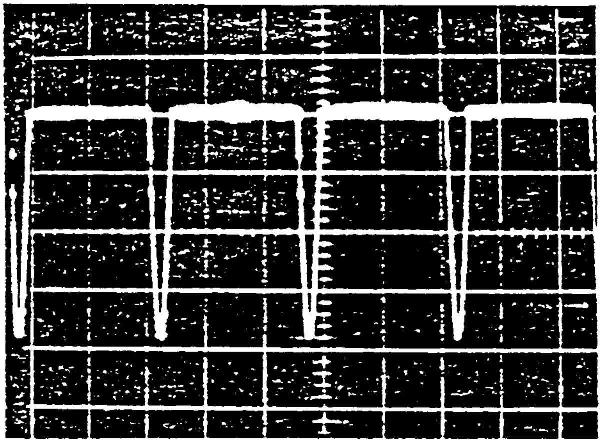


(11) Q591 COLL, 800 Vp-p, 20μs

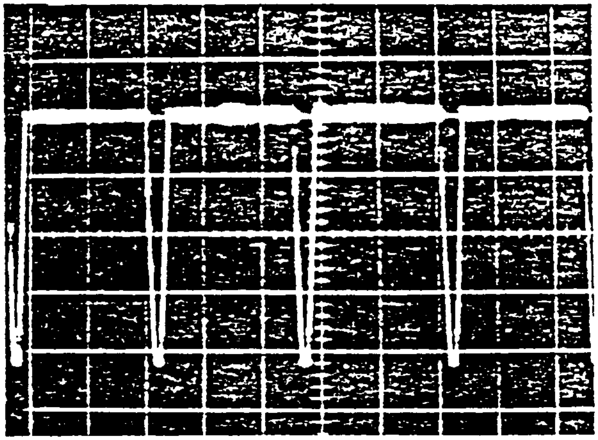


(12) T502 #1, 50V, 20μs

Fig 4-5 f. Waveforms (PCB-MAIN)

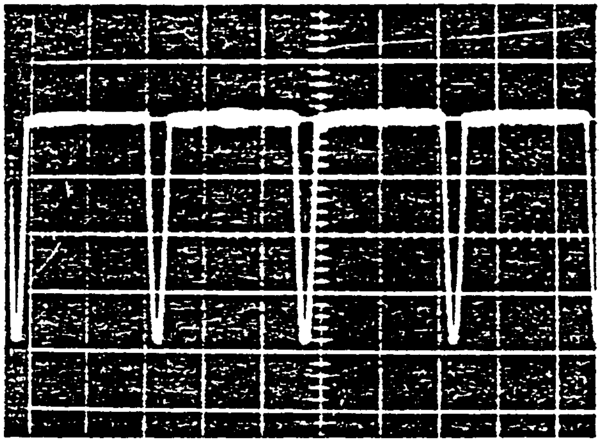


(13) T502 #3, 50V, 20μs

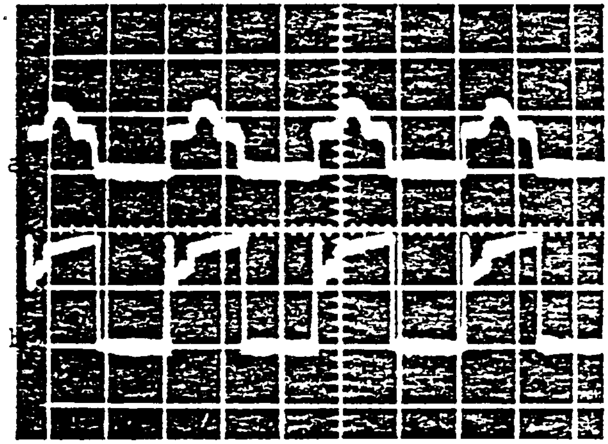


(14) T502 #5, 20V, 20μs

Fig 4-5 g. Waveforms (PCB-MAIN)

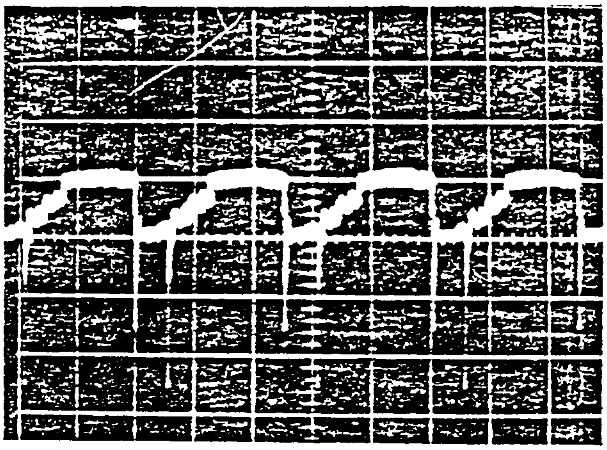


(15) T502 #8(GND)-#9, 5V, 20μs

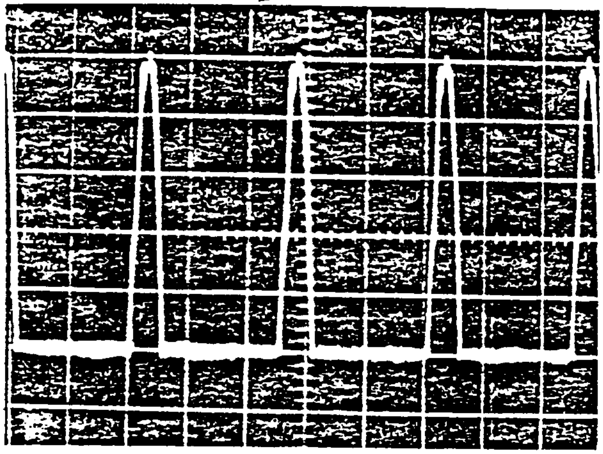


(16) a. Q531 BASE, 1V, 20μs
b. Q531 COLL, 50V

Fig. 4-5 h. Waveforms (PCB-MAIN)

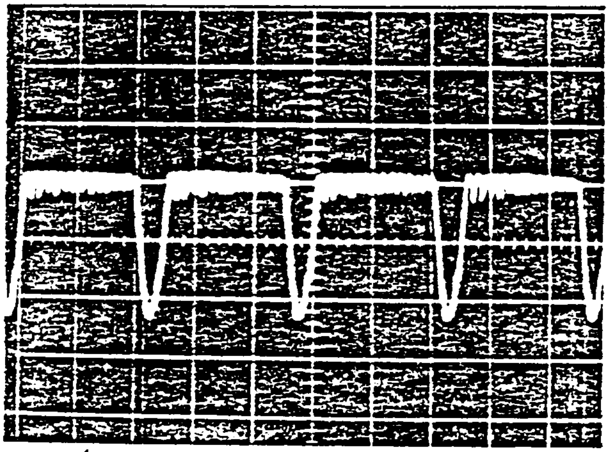


(17) Q592 BASE, 2V, 20µs

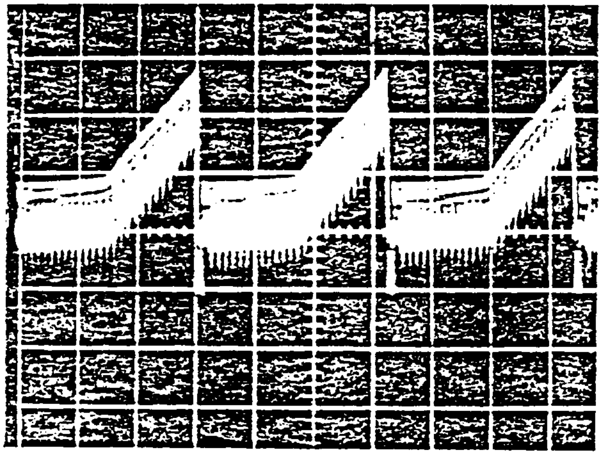


(18) Q592 COLL, 100V, 20µs

Fig. 4-5 i. Waveforms (PCB-MAIN)

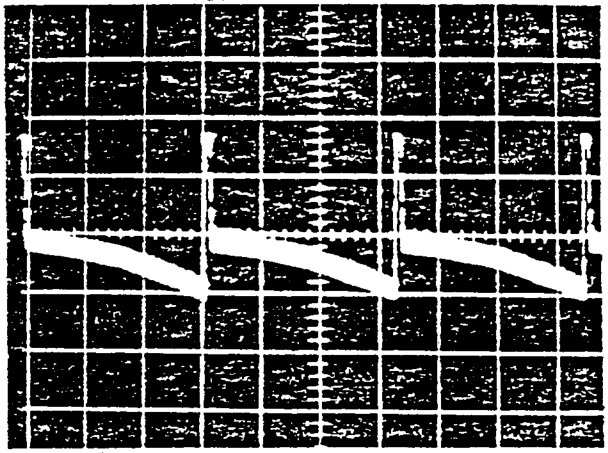


(19) T531 #3, 50V, 20µs

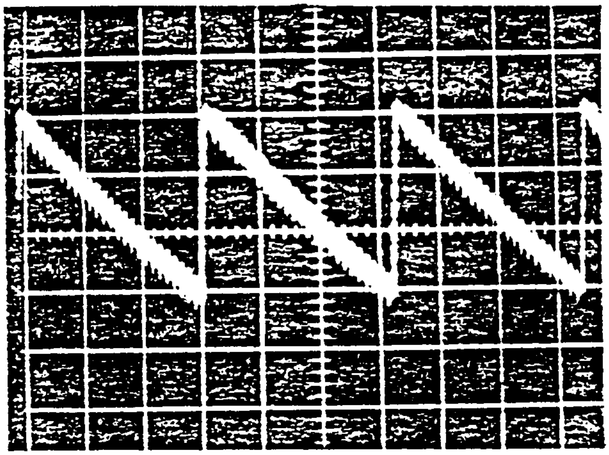


(20) IC401 #2, 0.5V, 5ms

Fig. 4-5 j. Waveforms (PCB-MAIN)

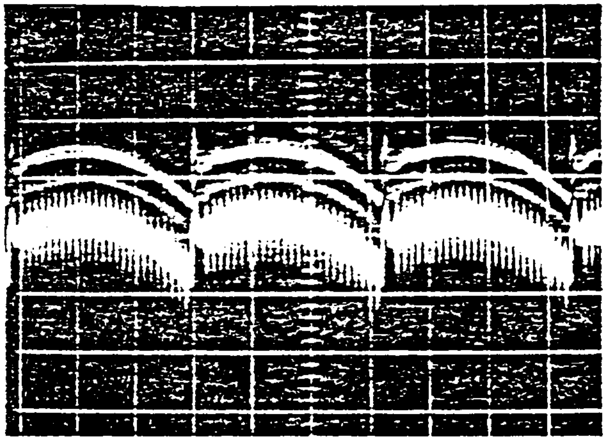


(21) Q492 COLL, 20V, 5ms

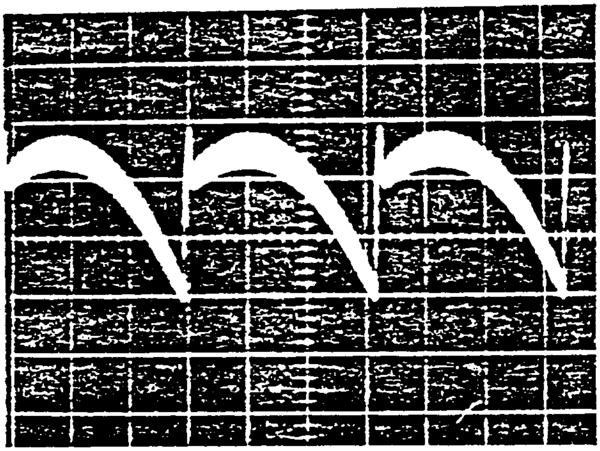


(22) R410/R411, 1V, 5ms

Fig. 4-5 k. Waveforms (PCB-MAIN)



(23) Q402 BASE, 0.2V, 5ms



(24) Q403, COLL, 2V, 5ms

Fig 4-5 l. Waveforms (PCB-MAIN)

SECTION 5
SCHEMATIC DIAGRAMS

MODEL: C-6479 Series
C-6401

The complete schematic diagram for the monitor is contained in four sections.

Fig.5-1	SCHEMATIC DIAGRAM MODEL C-6479 SERIES COLOR DISPLAY MONITOR
Fig.5-2	SCHEMATIC DIAGRAM MODEL C-6401 SERIES COLOR DISPLAY MONITOR

The numbered references on the schematic diagrams are the waveform designators for the waveforms contained in Fig. 4.5a through Fig. 4.5 ℓ

NOTE 1:

1. The unit of resistance "ohm" entirely omitted.
   Accordingly, K=1000 ohms,
   M=1000K ohms

2. The wattage of resistor, not specifically designated, is 1/4 Watt.

3. Resistors, not specifically designated, are: Fixed carbon film resistor.

4. The marks of resistor are as follow:

   S : Composition (Solid type) resistor
   CE : Cemented resistor
   MB : Metal oxide film resistor (type B)
   W : Wire wound resistor

5. The tolerance of resistor value, not specifically designated, is ±5%, K = ±10%, M = ±20%

6. The unit of capacitance, not specifically designated,

   a) µF, for numbers less than 1
   b) pF, for numbers great than 1

7. Capacitors, not specifically designated are: ceramic Capacitors except electrolytic capacitors.

8. The marks of capacitors are as follow:

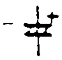
   (MF) : Polyester film capacitor

   (PC) : Paper capacitor (type C)

   (PP) : Polypropylene film capacitor

   (PL) : Plastic film capacitor

   (TAN) : Tantalum capacitor

    : Electrolytic capacitor

9. The PC work voltage of capacitor, not specifically designed is 50V.

10. The tolerance of capacitor value, not specifically designated,

    is: ±10% for polyester capacitor

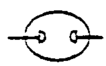
    ±5% for ceramic capacitor

    and J=±5%, K=±10%, M=±20%, $P=\pm^{100}_{0}\%$

    C=±0.25pF, D=±0.5pF, F=±1pF, $Z=^{+80}_{-20}\%$

11. Specific Symbol

     Zener Diode,  SCR (Thyristor)

     Triac,  Air Gap

Posistor

NOTE 2:

1. DC voltage were measured from points indicated to the circuit ground with a VTVM. Line voltage at 100V AC on signal applied.

2. This is a basic schematic diagram. Some sets may be subject to modification according to engineering improvement.

SECTION 6
PARTS LIST

MODEL: C-6479/C-6401

The following table contains a list of replaceable sub-assemblies, and Chassis piece parts. In order to expedite delivery of replacement part orders.

Specify: 1. Model Number
2. Part Number and Description
3. Quantity

Unless full information is supplies, delay in execution of orders will result.

RESISTOR

MARK	TOLERANCE
J	±5%
K	±10%
M	±20%
F	±1%

CAPACITOR

MARK	TOLERANCE	MARK	TOLERANCE
J	±5%	Z	+80% -20%
K	±10%	C	±0.25pF
M	±20%	P	±0.5pF
P	+100% -0%	F	±1pF

R100 : Critical component

Table 6-1 PARTS LIST C-6479/C-6401

SYMBOL	PART NO.	DESCRIPTION	
IC401	266P50101	IC	HA11414
IC901	277P56001	IC	SG3524
Q201Q231Q261	260P17106	TRANSISTOR	2SC710-D,E
Q202Q232Q262	"	"	"
Q203Q233Q263	"	"	"
Q204Q234Q264	270P16504	"	2SA628-F
Q205Q235Q265	260P17106	"	2SC710-D,E
Q206Q236Q266	"	"	"
Q207Q237Q267	260P36804	"	2SC2024G,B
Q208Q238Q268	270P51406	"	2SC1505L
Q209Q239Q269	270P51002	"	2SA949Y
Q210Q240Q270	270P52601	"	2SD758B
Q211Q241Q271	270P52501	"	2SB718B
Q212Q242Q272	260P17106	"	2SC710-D,E
Q301	260P17106	TRANSISTOR	2SC710-D,E
Q302	270P52401	"	2SA781K
Q303	"	"	"
Q304	260P17106	"	2SC710-D,E
Q305	"	"	"
Q306	"	"	"
Q307	"	"	"
Q308	"	"	"
Q309	"	"	"
Q310	270P511A2	"	2SC2229Y

Table 6-1 PARTS LIST C-6479/C-6401

SYMBOL	PART NO.	DESCRIPTION	
Q401	260P17105	TRANSISTOR	2SC710-D
Q402	260P17706	"	2SC711-E,F
Q403	260P18603	"	2SB647A
Q491 Q492	270P50701	"	2SC2168
Q501	260P17105	TRANSISTOR	2SC710-D
Q502	270P51401	"	2SC1507
Q530	260P04003	TRANSISTOR	2SC620-D
Q531	270P51401	"	2SC1507
Q532	270P51201	"	2SC2317
Q533	260P35301	"	2SC1515K
Q536	260P17703	TRANSISTOR	2SC711A-G
Q537	260P35203	"	2SC1749-D
Q539	260P17105	"	2SC710-D
Q540	260P17105	"	2SC710-D
Q591	270P52101	TRANSISTOR	2SD870
Q592	270P52101	"	2SD870
Q593	260P21909	"	2SC1106
Q594	277P51903	IC	HA17806
Q595	277P51904	"	HA17815
Q901	275P50201	SCR-TR	BCR10AM-10R
Q902	270P53901	TRANSISTOR	2SC3178
Q903	270P50201	"	2SC2027
Q904	270P54303	"	2SC2331
Q905	270P54401	"	2SC2311
Q906	260P17102	"	2SC710-C,D
Q541	260P35203	TRANSISTOR	2SC1749-D

Table 6-1 PARTS LIST C-6479/C6401

SYMBOL	PART NO.	DESCRIPTION	
D201D231D261	264P19303	DIODE	MZ305B
D202D203D204	264P04502	"	IS2076A
D232D233D234	"	"	"
D262D263D264	"	"	"
D205D235D265	264P19303	"	MZ305B
D206D236D266	264P20901	"	RC-2
D301D302D303	264P04502	DIODE	IS2076A
D304	264P19303	"	MZ305B
D305D306	264P04502	"	IS2076A
D308D309	264P04502	"	IS2076A
D310	264P19303	"	MZ305B
D401	264P19306	DIODE	MZ312B
D402	264P04502	"	IS2076A
D403	"	"	"
D501D506	264P04502	DIODE	IS2076A
D502D503	264P19601	"	RU-2
D504D505	"	"	"
D531	264P22006	DIODE	MZ310B
D532	264P19601	"	RU-2

Table 6-1 PARTS LIST C-6479/C6401

SYMBOL	PART NO.	DESCRIPTION	
D535	264P15101	LED	GL-3AR2
D534	260P19601	DIODE	RU-2
D538	264P04502	"	1S2076A
D539	264P22004	"	MZ306B
D542	264P04502	DIODE	1S2076A
D543	264P19601	DIODE	RU-2
D544	264P22108	"	MZ336B
D901D932	264P14701	DIODE	RM2C
D933D934	"	"	"
D902	274P52601	DIODE	F114B
D903	274P52604	"	F114F
D904	274P50501	"	MZ318A
D905	274P52601	"	F114B
D907	274P52704	"	ERC2506
D908	274P52601	"	F114B
D910	274P52601	DIODE	F114B
D911	5B1653401	"	MD236
D912	264P19305	"	MZ303B
D913	"	"	"
D914	264P04502	"	1S2076A
D915	274P52601	"	F114B
D916	"	"	"
D917	264P04502	"	IS2076A
D918	264P19303	"	MZ305B

Table 6-1 PARTS LIST C-6479/C-6401

SYMBOL	PART NO.	DESCRIPTION	
D920	264P04502	DIODE	IS2076A
D921	"	"	"
D922	"	"	"
D923	264P19303	"	MZ305B
D924	274P52601	"	F114B
TH901	264P08208	SCR	CR02AM-2
D281D282D283	264P20901	DIODE	RC-2
L201L231L261	349D06002	COIL-PEAKING	
L501	409P00605	COIL-FILTER	
L502	409C51601	H-L-WIDTH	
L503	409C50801	COIL-LINEARITY	
T501	336P00504	H-T-DRIVE	
T502	409P50501	TRANS-H-O	
T503	349C00902	T-PCC	
T530	336P00504	H-T-DRIVE	
T531	334P51801	FBT	
T901	355P53001	TRANS	
T902	355P53 01	"	
CT901	355P52901	TRANS-CURRENT	
DT901	355P52801	TRANS-DRIVE	

Table 6-1 PARTS LIST C-6479/C-6401

SYMBOL	PART NO.	DESCRIPTION	
PR901	275P50401	POSISTOR	
PR902	275P50402	"	
R229R259R289	103D16200	R-METAL	5W-1.2K-J
R421	103D15005	R-METAL	4W-47-J
R434	103C07208	R-METAL	2W-1.8K-J
R513	103C05108	"	3W-560 -K
R516	109P01307	R-FUSE	1/2W-4.7-K
R517	109D03809	R-WIRE	3W-1-K
R518	109P01305	R-FUSE	1/2W-1.2-K
R519	109P01307	"	1/2W-4.7-K
R520	109D51701	R-WIRE	3W-0.56-K
R521,R522	103D14001	R-METAL	1W-10-J
R523	103D09109	"	2W-330-J
R533	103C05208	"	3W-3.9K-J
R908	103D11208	R-METAL	4W-3.9K-J
R914	109D03801	R-WIRE	3W-2.2-K

Table 6-1 PARTS LIST C-6479/C-6401

SYMBOL	PART NO.	DESCRIPTION
C411	185D02709	C-ELECT. 100V 680MF
C511	189D51006	C-PLASTIC-PP 1.2kV 8200PF
C517	189D07202	C-M-MF 200V 0.68M-K
C518		
C531	189D07205	" 200V 6.8M-K
C534	189D50909	C-PLASTIC-PP 1.2kV 4700pF
C537		C-ELECT. 50V 10MF
C544		C-ELECT. 50V 3.3MF
C550		C-ELECT 16V 47MF
C909 C911	185D04803	C-ELECT 200V 470µF
C918	189D53207	" 160V 330µF
C916	180P04109	// 160V47µF
C942	189P03303	C-M-POLY-AC 125V 0.1µF-M
AG281 ~ AG286	224D01901	AIR-GAP
L901	409D52201	COIL-CHOKE
LF901	499P50802	LINE-FILTER FN332 C-6401
//	499P50702	" FN322 C-6479
LF902	499P50901	//

Table 6-1 PARTS LIST C-6479/C-6401

SYMBOL	PART NO.	DESCRIPTION
	T947B45205	ASSY-PCB-MAIN-UNIT C-6401
	T947B45205	" C-6479
	T947A41803	ASSY-POWER-UNIT C-6401
	T947A42003	" C-6479
	T927B32305	ASSY-PCB-CRT C-6401
	T927B32304	" C-6479
	T927B55601	ASSY-PCB-VIDEO C-6401
	T927B55602	" C-6479
	T409C05205	COIL-DEGAUSSING

Table 6-1 PARTS LIST C-6479/C-6401

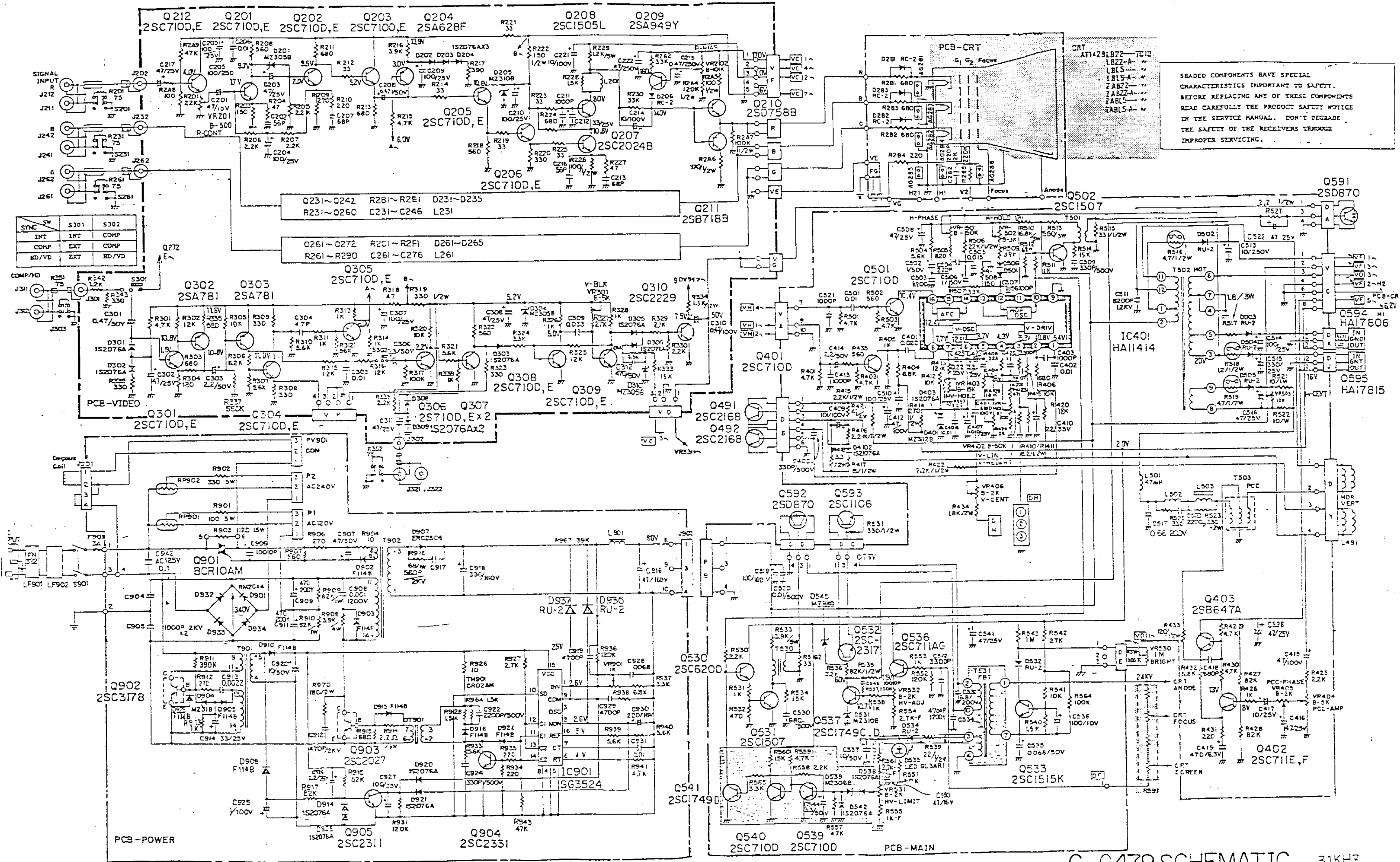
SYMBOL	PART NO.	DESCRIPTION	
R539	103P14005	R-CARBON	1/2W-22-K
R555	103P30205	R-METAL	1/4W-1K-F
R558	103P32209	R-CARBON	1/4W-2.2K-J
R559	103P32303	"	1/4W-4.7K-J
R560	103P32309	"	1/4W-15K-J
R561	103P30305	R-METAL	1/4W-2.7K-F
R565	103P32301	R-CARBON	1/4W-3.3K-J
VR531	129C50706	VR-SF	1/2W-B-2K
VR532	129C50706	VR-SF	1/2W-B-2K

Table 6-2 CRT VARIATION LIST FOR C-6479

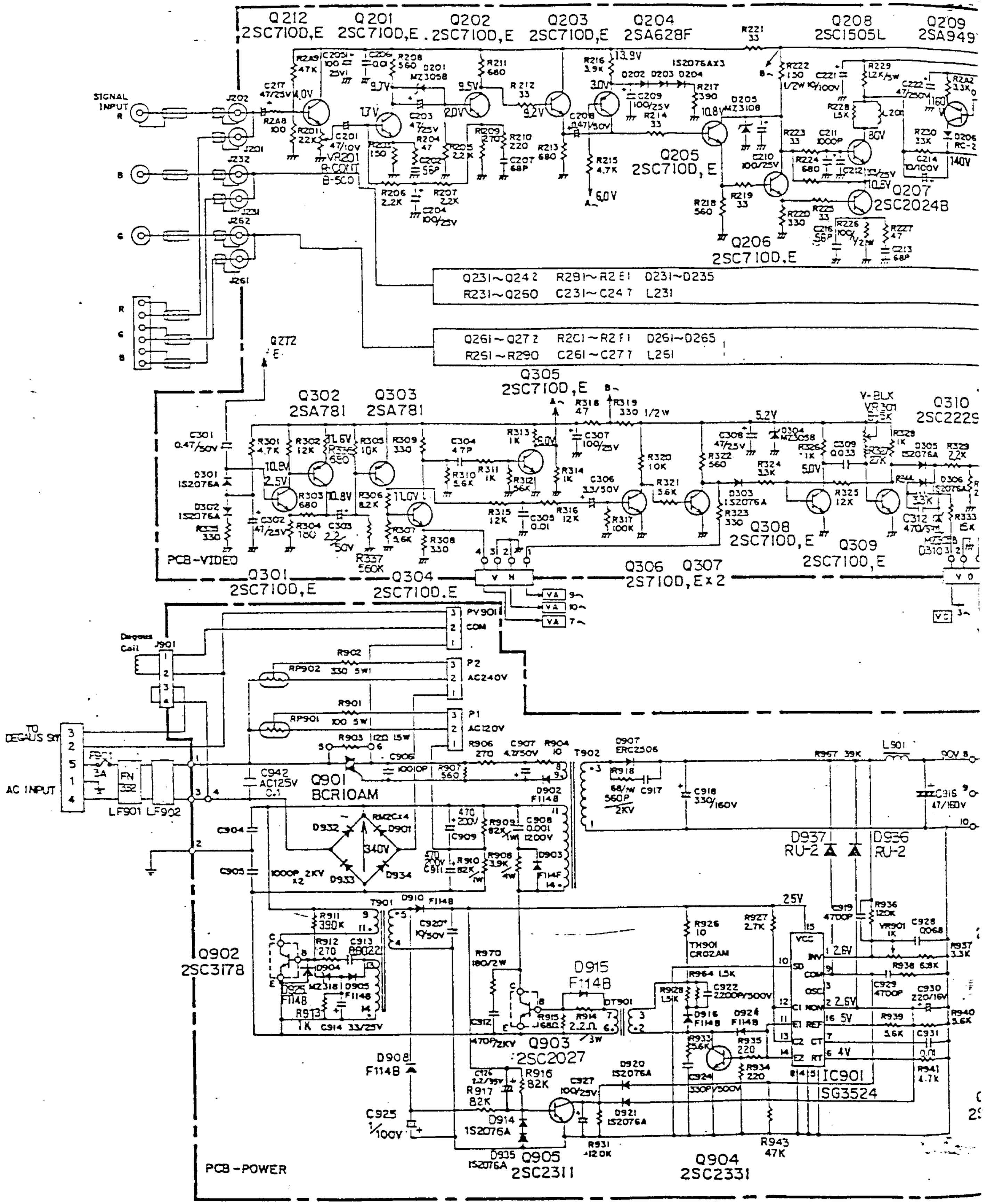
SYMBOL	CRT NO.	MODEL NO.
CRT	AT1429LB22-TC12	C-6479
CRT	AT1429LB22-A-TC12	C-6479A
CRT	AT1429ZAB22-TC12	C-6479G
CRT	AT1429ZAB22-A-TC12	C-6479AG
CRT	AT1429LBL5-TC12	C-6479LP
CRT	AT1429LBL5-A-TC12	C-6479LPA
CRT	AT1429ZABL5-TC12	C-6479LPG
CRT	AT1429ZABL5-A-TC12	C-6479LPAG

Table 6-2 CRT VARIATION LIST FOR C-6401

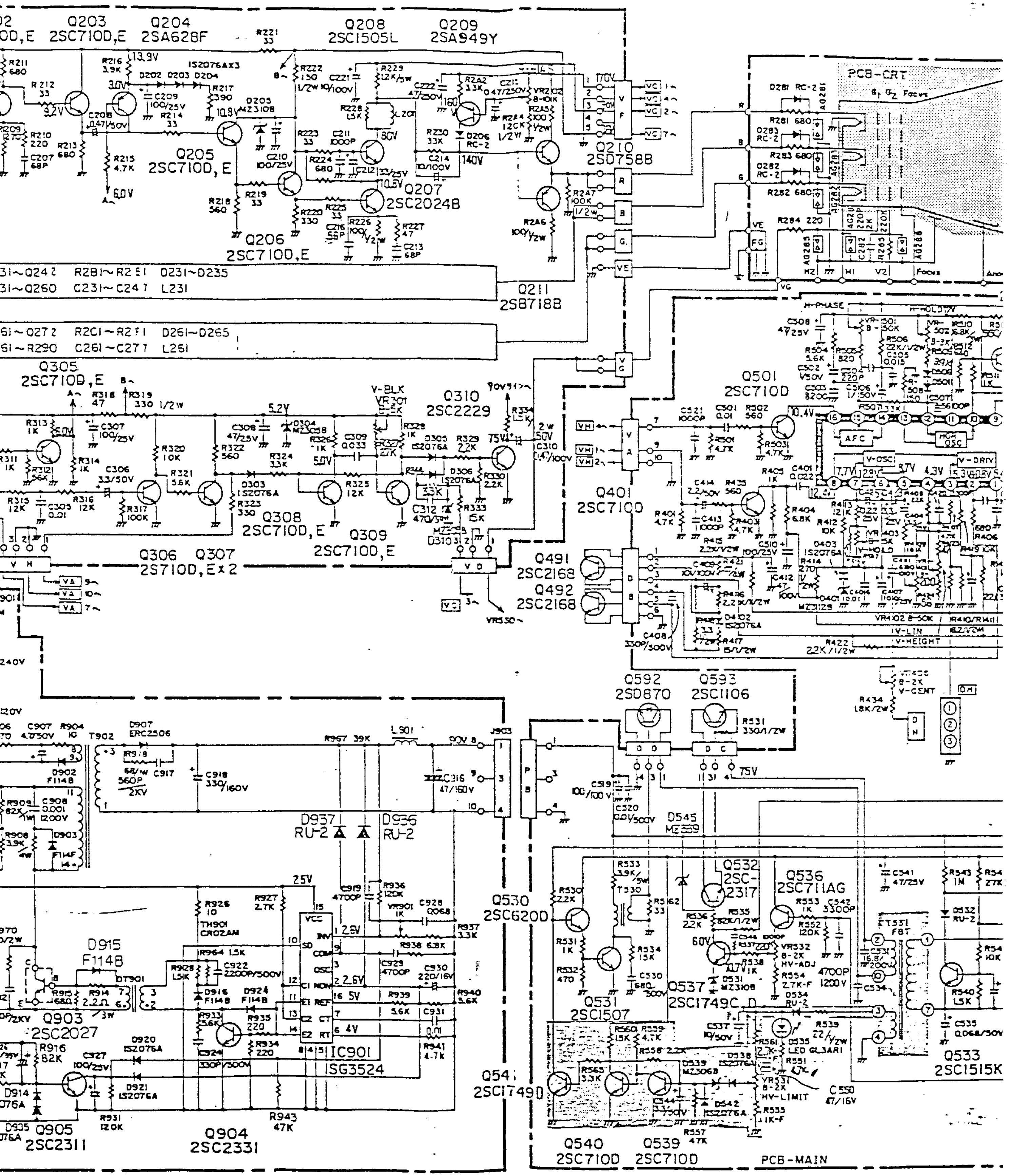
SYMBOL	CRT NO.	MODEL NO.
CRT	AT1429LB22-TC12	C-6401
CRT	AT1429LB22-A-TC12	C-6401A
CRT	AT1429ZAB22-TC12	C-6401G
CRT	AT1429ZAB22-A-TC12	C-6401AG
CRT	AT1429LBL5-TC12	C-6401LP
CRT	AT1429LBL5-A-TC12	C-6401LPA
CRT	AT1429ZABL5-TC12	C-6401LPG
CRT	AT1429ZABL5-A-TC12	C-6401LPAG



C-6479 SCHEMATIC 31KHz
-DIAGRAM (R982A650) REV-C

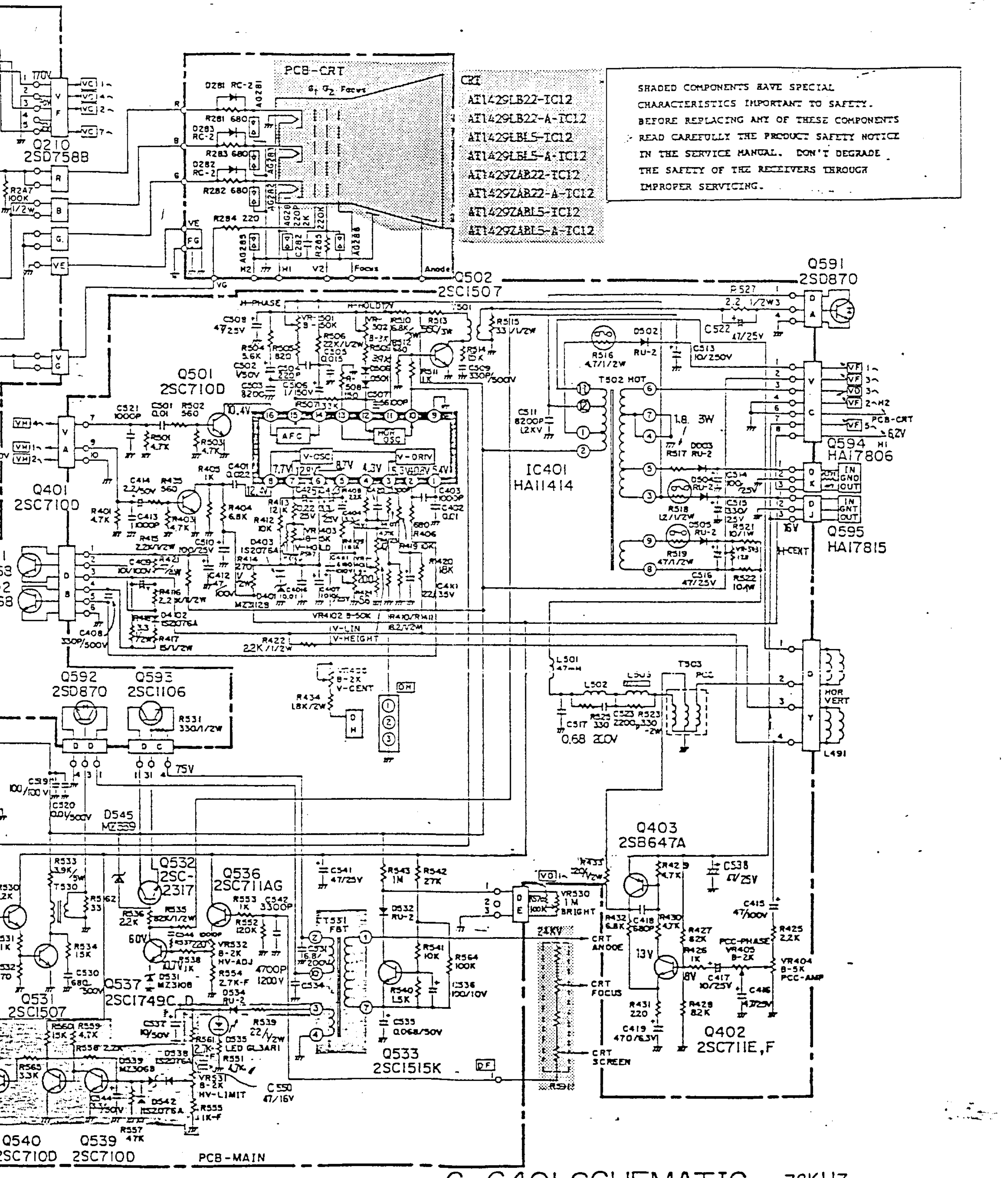


Q212 2SC7100,E
Q201 2SC7100,E
Q202 2SC7100,E
Q203 2SC7100,E
Q204 2SA628F
Q208 2SC1505L
Q209 2SA949
SIGNAL INPUT
J202
J201
J232
J231
J262
J261
Q205 2SC7100,E
Q206 2SC7100,E
Q207 2SC2024B
Q231~Q242 R281~R2E1 D231~D235
R231~Q260 C231~C247 L231
Q261~Q272 R2C1~R2F1 D261~D265
R251~R290 C261~C277 L251
Q305 2SC7100,E
Q302 2SA781
Q303 2SA781
Q310 2SC2229
Q308 2SC7100,E
Q309 2SC7100,E
Q306 Q307 2S7100,E×2
Q301 2SC7100,E
Q304 2SC7100,E
PCB-VIDEO
PV901
P2 AC240V
P1 AC120V
Degauss Coil
J901
TO DEGAUS SW
AC INPUT
LF901 LF902
Q901 BCR10AM
T902
D907 ERC2506
L901
D937 RU-2
D936 RU-2
T901
Q902 2SC3178
D915 F114B
Q903 2SC2027
IC901 ISG3524
Q905 2SC2311
Q904 2SC2331
PCB-POWER

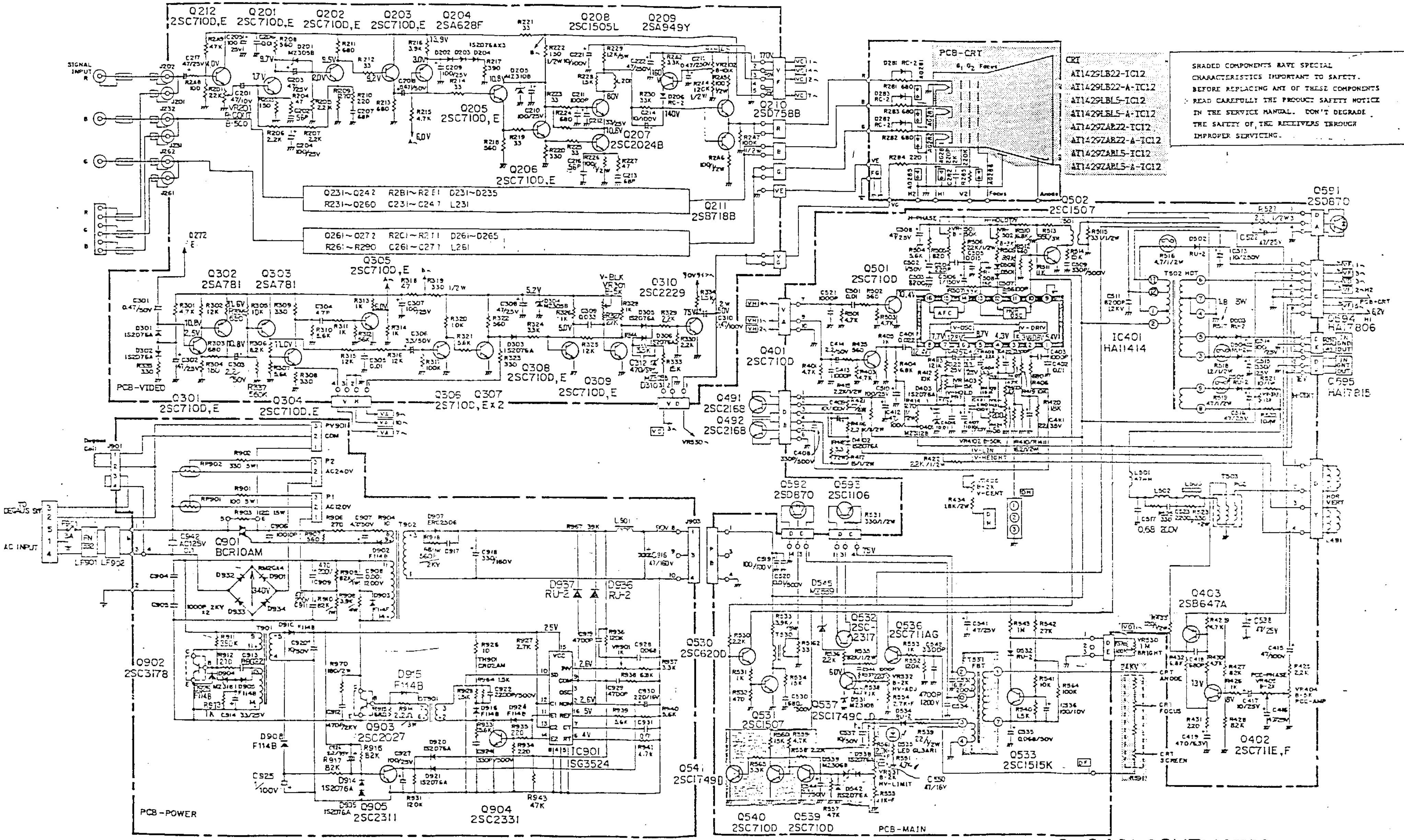


Q203
2SC710D,E
Q204
2SA628F
Q208
2SC1505L
Q209
2SA949Y
Q205
2SC710D, E
Q207
2SC2024B
Q206
2SC710D,E
Q210
2SD758B
Q211
2SB718B
PCB-CRT
Q305
2SC710D,E
Q310
2SC2229
Q308
2SC710D,E
Q309
2SC710D,E
Q306 Q307
2S710D,E×2
Q501
2SC710D
Q401
2SC710D
Q491
2SC2168
Q492
2SC2168
Q592
2SD870
Q593
2SC1106
D937
RU-2
D936
RU-2
D915
F114B
IC901
ISG3524
Q903
2SC2027
Q905
2SC2311
Q904
2SC2331
Q530
2SC620D
Q531
2SC1507
Q532
2SC-2317
Q536
2SC711AG
Q537
2SC1749C,D
Q541
2SC1749D
Q533
2SC1515K
Q540
2SC710D
Q539
2SC710D
PCB-MAIN

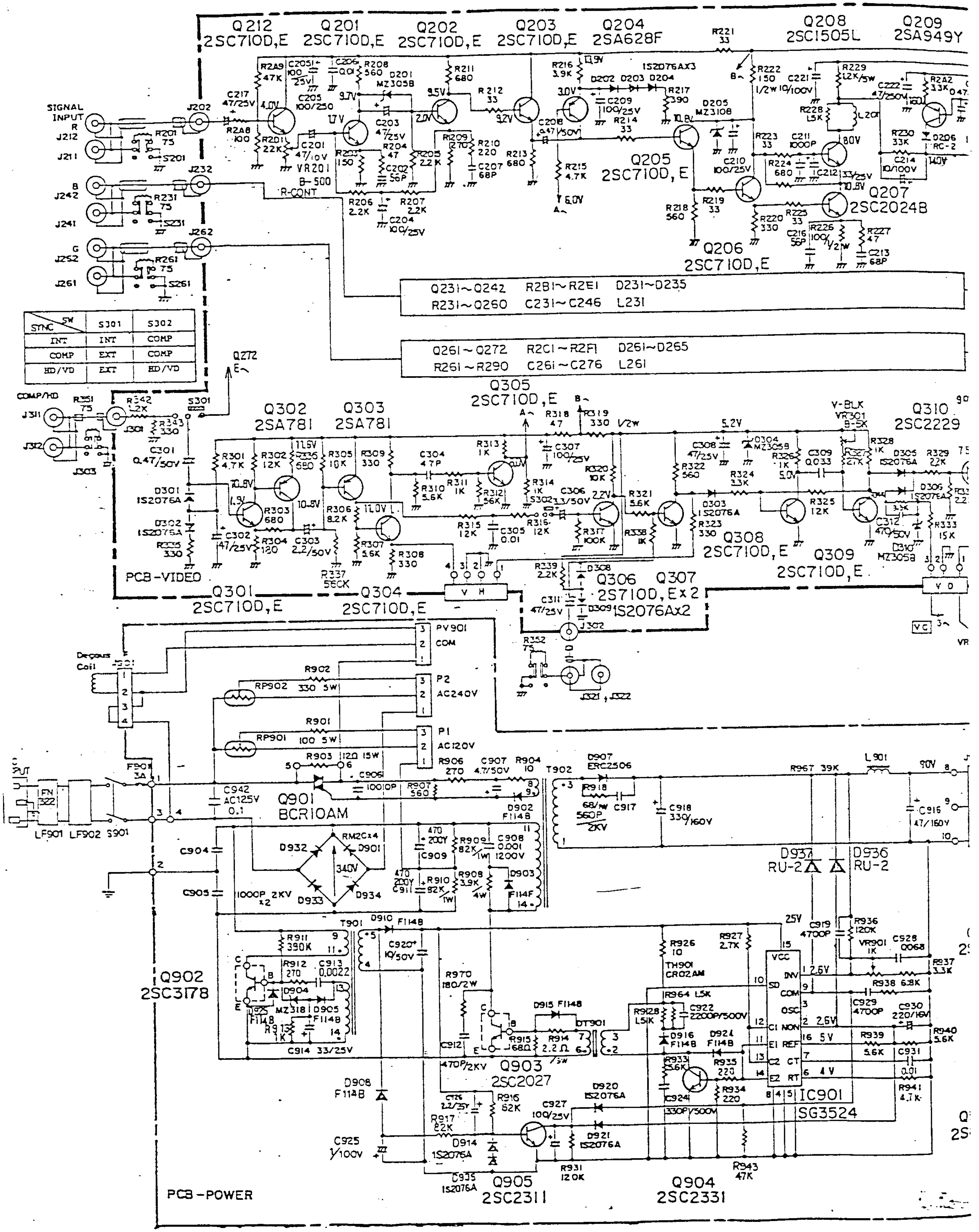
SHADED COMPONENTS HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS READ CAREFULLY THE PRODUCT SAFETY NOTICE IN THE SERVICE MANUAL. DON'T DEGRADE THE SAFETY OF THE RECEIVERS THROUGH IMPROPER SERVICING.



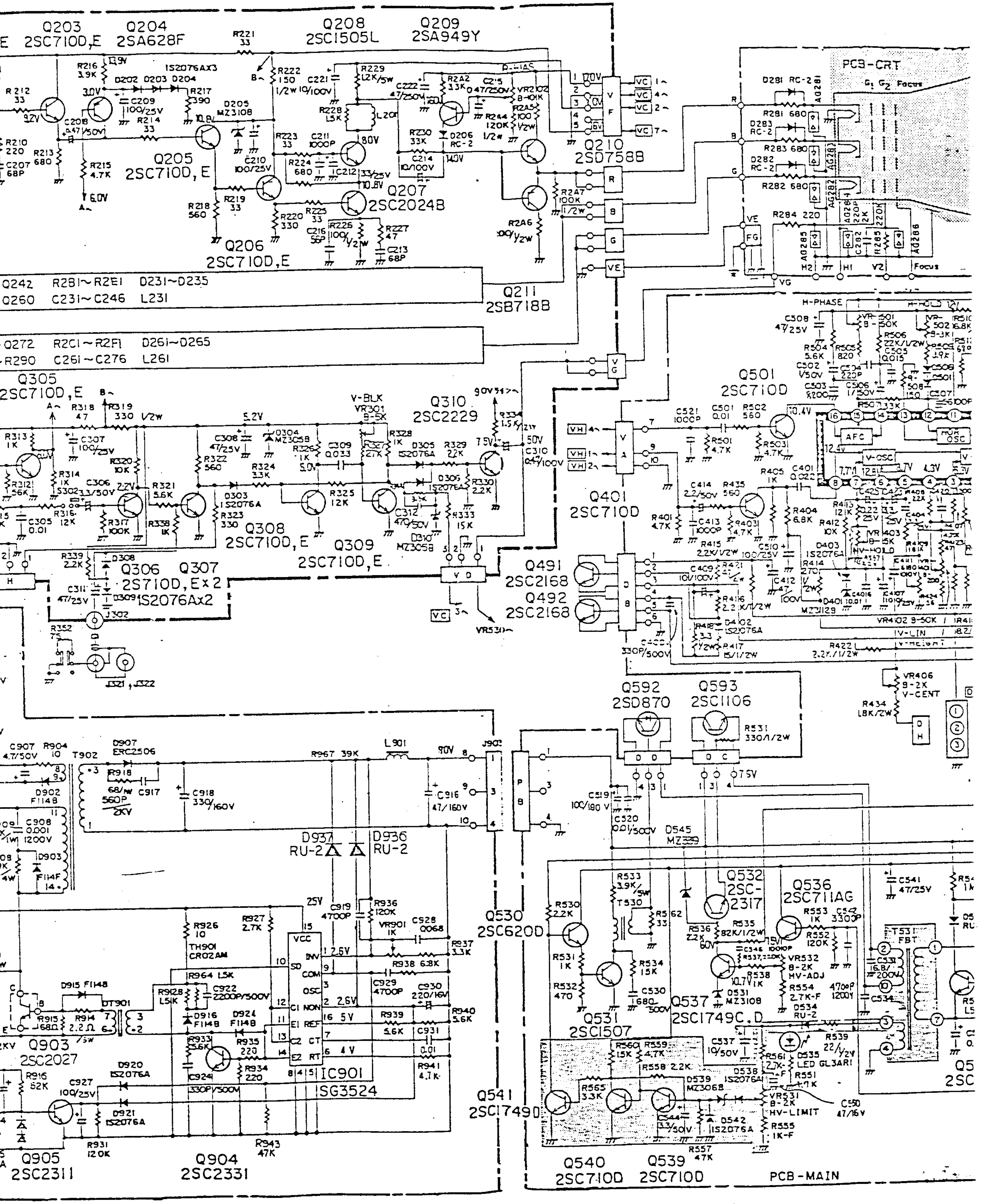
C-6401 SCHEMATIC 32KHZ
DIAGRAM

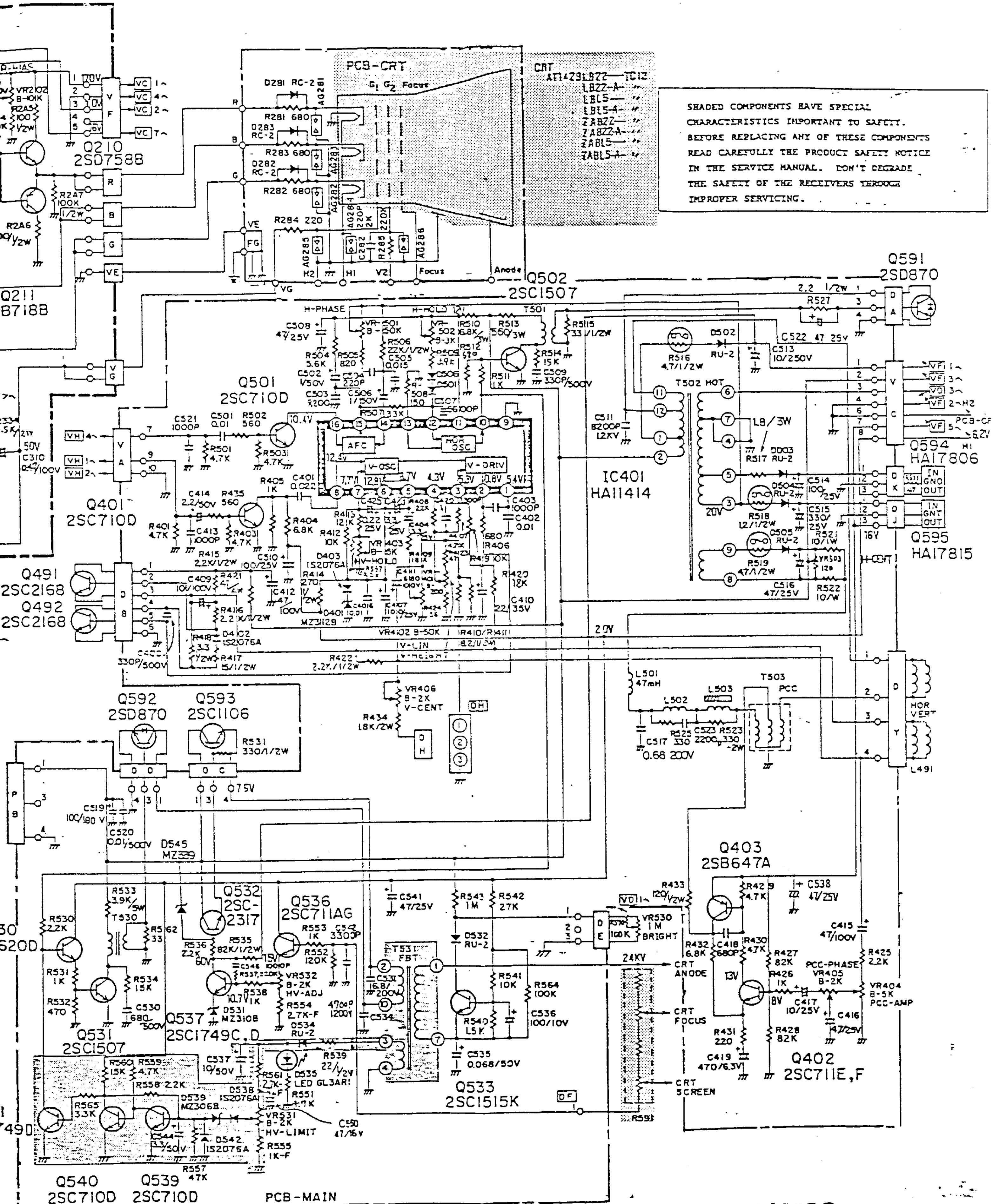


C-6401 SCHEMATIC DIAGRAM (R982A649) 32KHz REV-C



Q212 2SC710D,E
Q201 2SC710D,E
Q202 2SC710D,E
Q203 2SC710D,E
Q204 2SA628F
Q208 2SC1505L
Q209 2SA949Y
Q205 2SC710D,E
Q206 2SC710D,E
Q207 2SC2024B
SIGNAL INPUT
R
G
B
J202
J212
J211
J232
J242
J241
J262
J252
J261
S201
S231
S261
VR201 B-500
R-CONT
1S2076AX3
MZ3058
MZ3108
Q231~Q242 R281~R2E1 D231~D235
R231~Q260 C231~C246 L231
Q261~Q272 R2C1~R2F1 D261~D265
R261~R290 C261~C276 L261
SYNC
SW
S301
S302
INT
COMP
EXT
HD/VD
COMP/HD
J311
J312
J303
Q272 E
Q305 2SC710D,E
Q302 2SA781
Q303 2SA781
Q310 2SC2229
V-BLK VR301 B-5K
D301 1S2076A
D302 1S2076A
Q308 2SC710D,E
Q309 2SC710D,E
Q306 Q307 2S710D,Ex2
D309 1S2076Ax2
PCB-VIDEO
Q301 2SC710D,E
Q304 2SC710D,E
J302
J321, J322
Degous Coil
PV901
COM
P2
AC240V
P1
AC120V
RP902 330 5W
RP901 100 5W
R902
R901
R903 120 15W
F901 3A
C942 AC125V 0.1
Q901 BCR10AM
LF901 LF902 S901
D907 ERC2506
T902
L901
90V
C918 330/160V
C916 47/160V
D937 RU-2
D936 RU-2
RM2Cx4
D932
D901
D933
D934
340V
C904
C905
1000P 2KV x2
T901
D910 F114B
Q902 2SC3178
MZ318
Q903 2SC2027
DT901
TH901 CR02AM
IC901 SG3524
VCC
INV
SD
COM
OSC
NON
REF
CT
RT
D908 F114B
C925 1/100V
Q905 2SC2311
Q904 2SC2331
D920 1S2076A
D921 1S2076A
D914 1S2076A
D935 1S2076A
PCB-POWER


Q203 2SC710D,E
Q204 2SA628F
Q205 2SC710D,E
Q206 2SC710D,E
Q207 2SC2024B
Q208 2SC1505L
Q209 2SA949Y
Q210 2SD758B
Q211 2SB718B
PCB-CRT
Q242 R2B1~R2E1 D231~D235
Q260 C231~C246 L231
Q272 R2C1~R2F1 D261~D265
R290 C261~C276 L261
Q305 2SC710D,E
Q306 Q307 2S710D,Ex2
1S2076Ax2
Q308 2SC710D,E
Q309 2SC710D,E
Q310 2SC2229
Q401 2SC710D
Q491 2SC2168
Q492 2SC2168
Q501 2SC710D
Q592 2SD870
Q593 2SC1106
Q903 2SC2027
Q904 2SC2331
Q905 2SC2311
IC901 SG3524
D937 RU-2
D936 RU-2
Q530 2SC620D
Q531 2SC1507
Q532 2SC-2317
Q536 2SC711AG
Q537 2SC1749C,D
Q541 2SC1749D
Q540 2SC710D
Q539 2SC710D
PCB-MAIN



C-6479 SCHEMATIC 31KHZ
-DIAGRAM (R982A650) REV-C