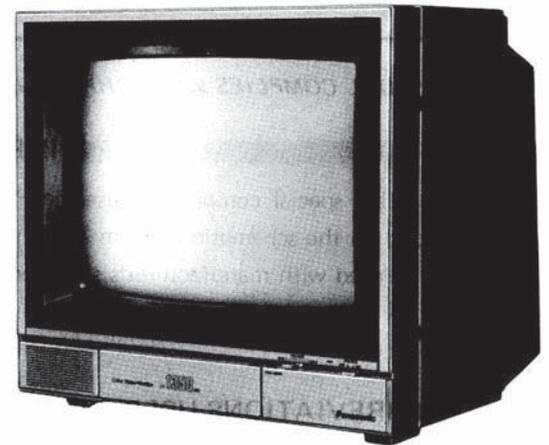


Service Manual

Color Video Monitor
CT-1350MG

Chassis
No. NMX-K S-1



The service technician is required to read and follow the "Safety Precautions" and "Important Safety Notice" in this service manual.

Specifications

Power Source:	120 volts, 60 Hz, AC	Speaker:	3 inches Round Type, Dynamic Voice Coil 16Ω
Power Consumption:	75 W Average	Automatic Control	
Video Input	1.0Vp-p, High Impedance or	Circuits:	Hor. Sync.Saw Tooth AFC
(Bridging):	75Ω Switchable, BNC-Type Bridging Connector		Automatic Frequency and Phase Control
Audio Input	RCA-Type Connector		Automatic Beam Limiter
(Bridging):	0 dB		Automatic Degaussing
Video/RGB Input:	8-Pin Connectors	Picture Tube:	370GHB22 89 Square inches
	5Vp-p maximum TTL Level		13 inches Measured Diagonal
Video/Audio Output:	BNC-Type Video and RCA-Type Audio Connectors	Dimensions:	90° Deflection, Quinrix II In-Line
Semiconductors:	21 Transistors		Height 14-3/8 inches (365 mm)
	32 Diodes		Width 14-15/16 inches (380 mm)
	1 High Voltage Rectifier	Weight:	Depth 15-13/32 inches (391 mm)
	1 Posistor	(Includes Front	31-5/16 lbs. (14.2 kg)
Integrated Circuits:	3	Screen Glass)	
Anode Voltage:	23.5 kV ± 1.5 kV	Weight and dimensions shown are approximate.	
	(Zero Beam Current)	Specifications are subject to change without notice.	
Sound Output:	1.0 W ± 0.2 W (10% Distortion)		

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THIS MODEL COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE

IMPORTANT SAFETY NOTICE

There are special components used in Panasonic Monitor sets which are important for safety, These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design without permission of Matsushita Electric.

ABBREVIATIONS USED IN THIS MANUAL

<p>ABL Automatic Beam Limiter</p> <p>ACC Automatic Color Control</p> <p>APF Active Power Filter</p> <p>APC Automatic Phase Control</p> <p>CRT Cathode Ray Tube</p> <p>DY Deflection Yoke</p>	<p>FBT Flyback Transformer</p> <p>OTL Output Transformerless</p> <p>SEPP Single-Ended Push-Pull Circuit</p> <p>VTVM Vacuum Tube Volt Meter</p> <p>ATT Attenuator</p>
--	---

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer in the AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress; especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields, and isolation R-C combinations, are properly installed.
4. Before turning the receiver on, measure the resistance between B+ line and chassis ground. Connect ⊖ side of an ohmmeter to the B+ lines, and ⊕ side to chassis ground. Each line should have more resistance than specified, as follows:

B+ Line	Minimum Resistance
115V	100kΩ
24V	280Ω
12V	280Ω

5. When the TV set is not used for a long period of time, unplug the power cord from the AC outlet.
6. Potentials, as high as 25.0 kV are present when this monitor is in operation. Operation of the monitor without the rear cover involves the danger of a shock hazard from the monitor power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment. Always discharge the anode of the picture tube to the receiver chassis before handling the tube.
7. After servicing make the following leakage current checks to prevent the customer from being exposed to shock hazards.

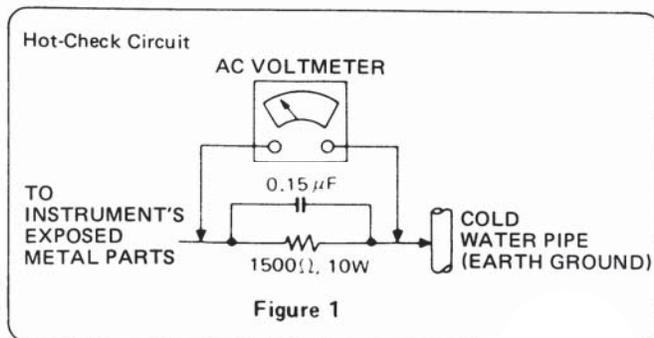
LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the receiver's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the receiver, such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 240 k Ω and 5.2 M Ω .

When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

LEAKAGE CURRENT HOT CHECK (See figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5 k Ω , 10 watts resistor, in parallel with a 0.15 μ F capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the receiver should be repaired and rechecked before it is returned to the customer.



X-RADIATION

- WARNING:**
1. The potential source of X-Radiation in TV sets is the High Voltage section and the picture tube.
 2. When using a picture tube test jig for service, ensure that jig is capable of handling 25.0 kV without causing X-Radiation.

NOTE: It is important to use an accurate periodically calibrated high voltage meter.

1. Turn the Brightness control fully counterclockwise.
2. Set the SERVICE switch to SERVICE.
3. Measure the High Voltage. The meter reading should indicate 23.5kV \pm 1.5kV. If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
4. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.

HORIZONTAL OSC. DISABLE CIRCUIT TEST

SERVICE WARNING: The test must be made as a final check before set is returned to the customer.

1. With the rear cover removed, supply a nominal 120V AC to the set and turn on the power switch.
2. Adjust the customer controls to normal operating positions.
3. Short between TP801 and TP802 on the F-Board with a jumper wire.
4. Confirm that the picture tube screen blacks out (horizontal oscillation stops).

Turn the power switch off as soon as picture blacks out, otherwise D814 and C816 will be damaged.

5. If this does not occur, the horizontal oscillator disable circuit is not operating.

Follow the Repair Procedures of Horizontal Oscillator Disable Circuit before the set is returned to customer.

REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

1. Connect a DC voltmeter between the cathode of D511 and chassis ground of the main circuit board.
2. If nearly +9.0V is not present that point, find the cause by checking R519, C535 and D511, and if it is, check IC401, C507 and R509.
3. Carefully check above specified parts, and related circuits and parts.

When the circuit is repaired, try the horizontal oscillator disable circuit test again.

DISASSEMBLY INSTRUCTIONS

REAR COVER REMOVAL

1. Remove 8 (A) screws shown in figure 2.
2. Pull the rear cover towards you.

VIDEO/RGB TERMINAL BOARD BLOCK REMOVAL

1. Loosen 2 (B) screws shown in figure 3.
2. Pull the VIDEO/RGB terminal board block towards you.

CONTROL BLOCK REMOVAL

1. Remove 3 (C) screws shown in figure 4.
2. Pull the control block towards you.

SPEAKER REMOVAL

1. Remove 1 (D) screw and remove speaker mounting spring (E).
2. Remove the speaker shown in figure 4.

CRT REMOVAL

1. Remove 4 (F) screws and remove the CRT shown in figure 4.

Note: During servicing, it is desirable to put the receiver at the service position for easier servicing as shown in figure 5.

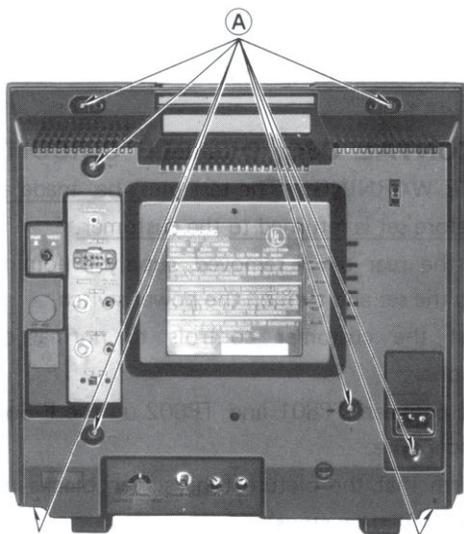


Figure 2

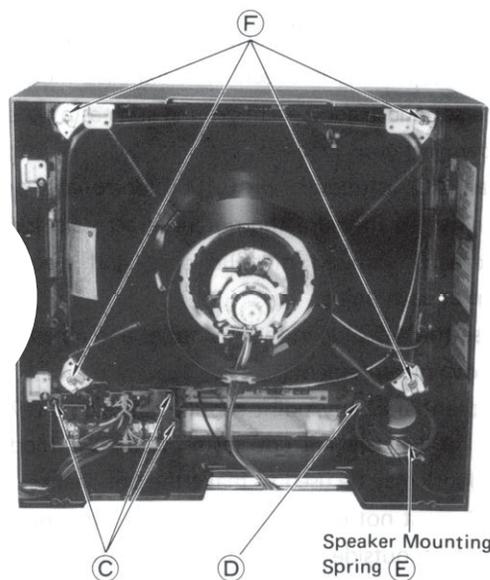


Figure 4

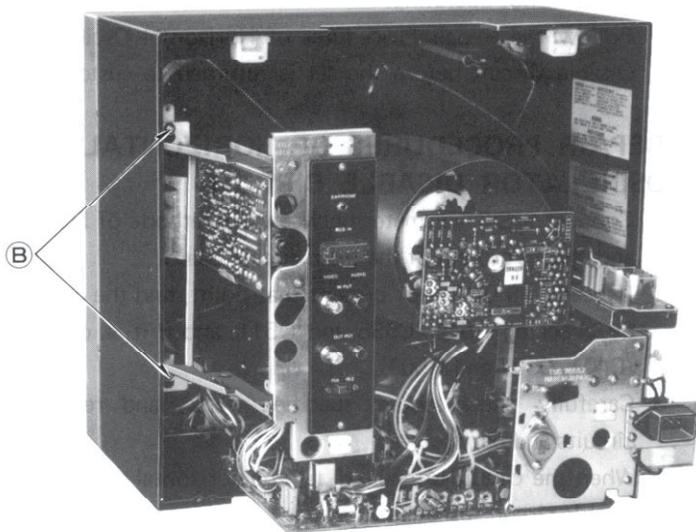


Figure 3

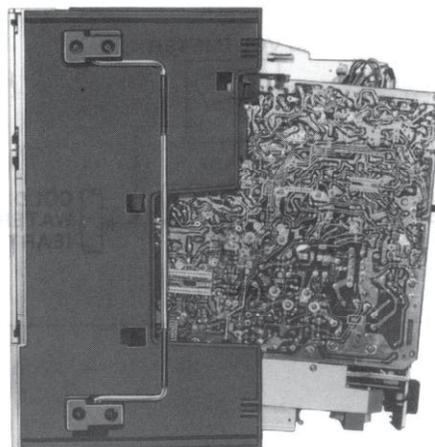


Figure 5

BASIC CONNECTIONS OF VIDEO/AUDIO TERMINALS

[Video/Audio Terminals]

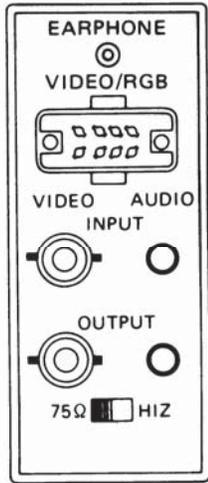


Figure 6

VIDEO/RGB Terminals

An 8 pin socket is provided to apply VIDEO/RGB signals.
Pin connections are as follows:

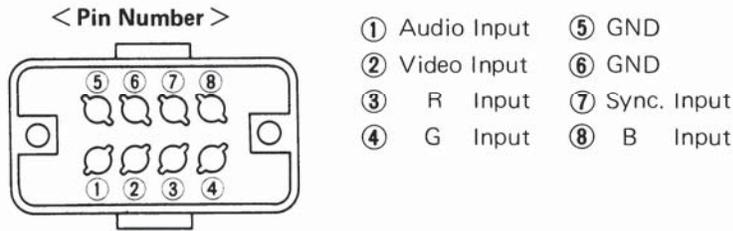


Figure 7

Signal level and Terminal Impedance

Terminal		Item	Level	Impedance	Remarks
VIDEO	INPUT		1Vp-p 2Vp-p	75Ω /HIZ	Video Signal includes Sync. Signal
	OUTPUT		1Vp-p 2Vp-p	75Ω /HIZ	
AUDIO	INPUT		0 dB	100kΩ	1V rms = 0 dB 400 Hz
	OUTPUT		0 dB	100kΩ	
VIDEO/RGB	VIDEO	VIDEO	1Vp-p 2Vp-p	75Ω /HIZ	Video Signal includes Sync. Signal
	INPUT	AUDIO	0 dB	100kΩ	1Vrms = 0 dB 400 Hz
	RGB and Sync. INPUT		TTL 2Vp-p 5Vp-p (MAX)		Video and Composite Sync. Signal are Separated.

Table 1

[Impedance Selector Switch] (75Ω or HIZ)

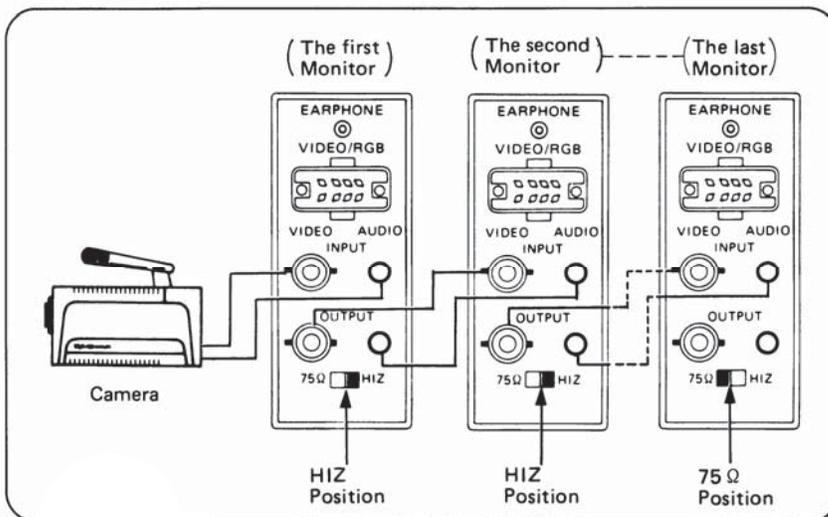


Figure 8

Video and Audio Input Terminals

Two BNC connectors are provided for the video signal input and two RCA sockets for the audio signal input. For bridge connection of signals, these video and audio terminals are respectively directly connected on the back panel. This makes it possible to take the signal out of the video and audio terminal which were applied to the input terminals.

For video signal bridge connection, however, the last set of the hookup must be terminated in 75Ω.

(For instance, if ten monitors are bridge-connected, impedance switches on the first to ninth sets must be set to

HIGH impedance (HIZ), and tenth set, it must be set to 75Ω.)

If terminated midway, ghosts will appear due to signal reflection or the picture will become otherwise abnormal due to degraded frequency response.

As the number of sets connected increases and the signal travels further, both gain and frequency response decrease. Degradation of chroma carrier level with RG-59/U cable is shown in below for reference.

Distance	Gain	Frequency Response
100 m	-0.5 dB	-2 dB
500 m	-1.4 dB	-10 dB
1000 m	-2.1 dB	-19 dB

Table 2

Note: 8-pin Video input terminal pin number ② is connected to BNC terminal and 8-pin Audio input terminal pin number ① is connected to RCA

terminal both is in series. Do not apply signals to both the 8-pin input terminal and BNC terminal simultaneously.

[Application with other equipment]

Terminal	Signal	Equipment	Remarks
INPUT	Line-in Signal from other equipment	VTR/Video Camera	Line-in and line-out connectors are bridged. (connected in parallel)
OUTPUT	Line-in Signal	Monitor or VTR	When this connectors is not used, impedance select switch should be set to 75 ohms position. When another monitor's line-in is connected to this monitor's line-out connector, the impedance select switch should be set to HIZ position. The last monitor in the series of monitors should then have it's switch set to 75 ohms.
VIDEO/RGB (8-pin)	VIDEO IN	Video/Audio Signal in from VTR	1/2 inch VTR, 1/2, 3/4 inch VCR and VHS VCR
VIDEO/RGB (8-Pin)	RGB IN	RGB Signal	Video and Composite (Horizontal and Vertical) Sync. Signal are Separated.

Table 3

[Connectors]

Video Input (Bridging): 1.0Vp-p, High impedance or 75Ω switchable, BNC-type bridging, connector.

Audio Input (Bridging): RCA-type connector
 VIDEO/RGB Input: 8-pin connector

FIELD ALIGNMENT OF VIDEO MONITOR

Note: Use Video pattern Generator for following alignments. (Video input should read 1.0Vp-p.)

A. WITHOUT TEST EQUIPMENT

Alignment can be accomplished by general procedures. The following describes simple alignment methods that do not require extensive service shop test equipment.

VERTICAL-HOLD ADJUSTMENT

Adjust the V-Hold control (R404) and set it at a point where vertical movement is stopped.

VERTICAL-HEIGHT ADJUSTMENT

Adjust the V-Height control (R407) until picture becomes symmetrical from top to bottom.

HORIZONTAL-HOLD ADJUSTMENT

Adjust the H-Hold control (R504) and set it at a point where horizontal movement is stopped.

SUB CONTRAST ADJUSTMENT

Adjust the Sub-Contrast control (R306) to the most desirable position.

FOCUS ADJUSTMENT

Adjust the Focus control to obtain a sharpest and clearest picture.

COLOR PURITY ADJUSTMENT

(See figures 9 and 10.)

1. Operate the receiver for 20 minutes, with the Brightness control at maximum to warm up the CRT.
2. Degauss the receiver fully by using an external degaussing coil.
3. Perform coarse convergence adjustment. (See page 8)
4. Apply black and white pattern.
5. Turn the Red and Blue Low Light controls fully counterclockwise to obtain a green field. Adjust the R. and B. Drive controls if the green field cannot be obtained.
6. Loosen the deflection yoke clamp screw and move the deflection yoke as close to the purity magnet as possible.
7. Loosen the purity magnet clamp (See figure 10) and adjust the purity magnet to set the vertical green raster precisely in the center of the screen. (See figure 12.) Tighten the clamp.
8. Slowly move the deflection yoke forward and adjust for best overall green screen.
9. Tighten the deflection yoke clamp screw.
10. Produce a Blue and Red raster with the Low Light controls and observe that good purity is obtained on the respective field.
11. Observe that a uniform white raster is obtained by adjusting the R.G.B. Low Light controls. If the screen is not uniformly white, repeat the above procedure.

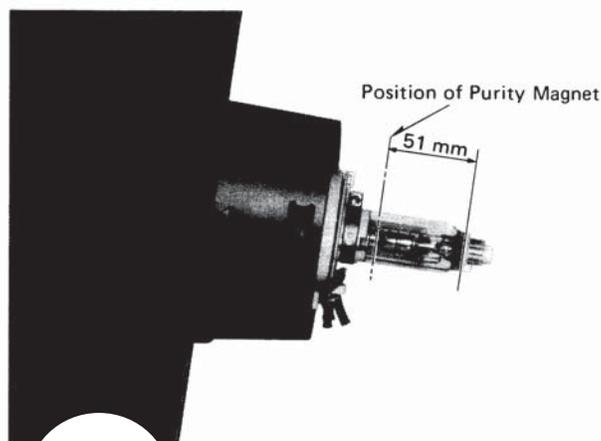


Figure 9

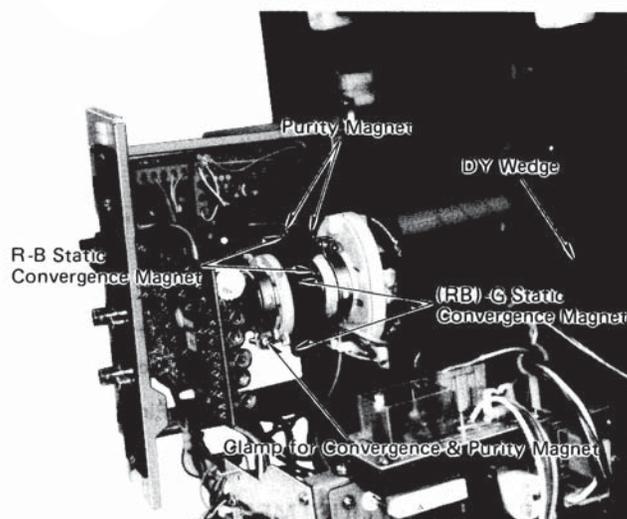


Figure 10

COLOR TEMPERATURE ADJUSTMENT

(See figures 11 and 12.)

1. Use a black and white video pattern.
2. Turn the R.G. and B Low Light controls fully counterclockwise, and then turn each forward (clockwise) 90°.
3. Turn the Screen Control (R373) fully counterclockwise and set the service switch to Service position.
4. Turn the Screen control clockwise slowly, until any one of the R.G. or B lines just becomes visible. (See figure 13.)

5. Turn the other two Low Light controls (for the colors which did not appear on the screen) slowly clockwise, so they also become just visible.
(Adjust one control and color line at a time.)
6. Set the service switch to Normal position.
7. Turn the Brightness and Panabrite control to maximum.
8. Adjust the drive controls to obtain a white raster at maximum brightness.

4. Align the convergence red/blue dots with the green dots in the center of the screen, by rotating the (RB)-G Static Convergence Magnet. (See figures 10 and 14.)
5. Tighten the convergence magnet clamp.
6. Remove the DY wedges (See figure 10) and slightly tilt (do not rotate) the deflection yoke horizontally and vertically to obtain good overall convergence.
7. Secure the deflection yoke by reinserting the wedges. (See figure 14.)
8. If purity error is found, repeat the purity adjustments.

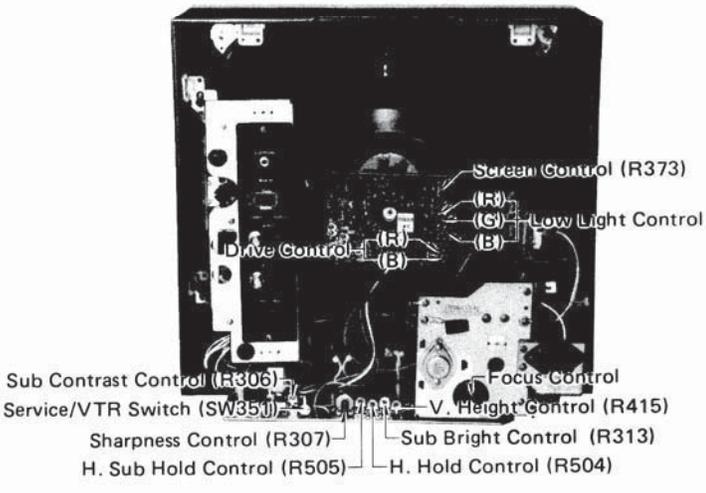


Figure 11

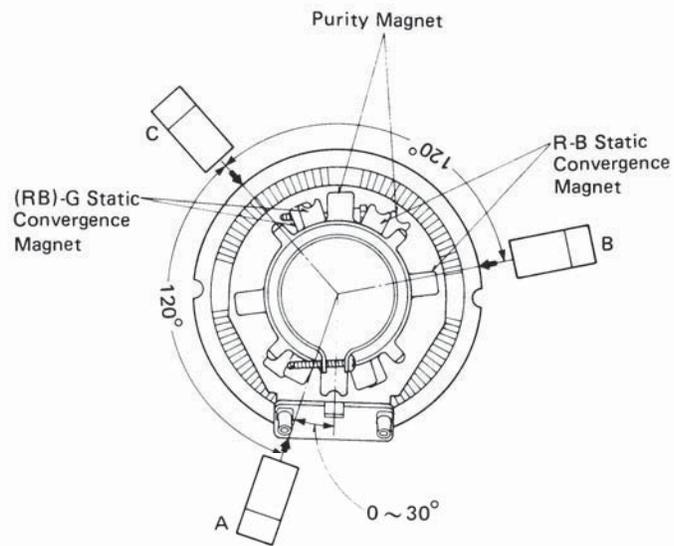
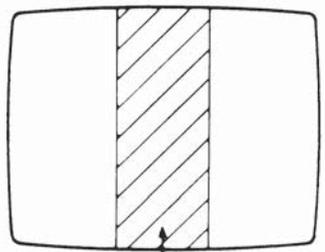
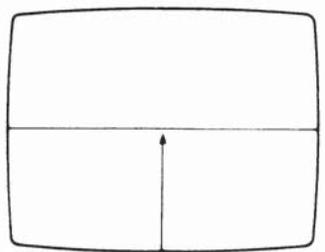


Figure 14



Green Raster

Figure 12



Horizontal Line

Figure 13

CONVERGENCE ADJUSTMENT

Note: Before any convergence adjustments are made vertical height and focus adjustment must be completed.

1. Use a dot pattern to complete this adjustment.
2. The brightness level should be no higher than necessary to obtain a clear pattern.
3. Loosen the convergence magnet clamp and align the red and blue dots at the center of the screen, by rotating the R-B Static Convergence Magnet. (See figures 10 and 14.)

NOTE:

1. Wedge A shown in figure 14 should be fixed within a range of 0° ~ 30° to the left of the vertical line as shown.
2. After inserting wedge A, insert wedges B and C. The wedges should be set 120° apart from each other.
3. Be certain that the three wedges are firmly fixed and the Deflection Yoke is tightly clamped in place. Otherwise the Deflection Yoke may shift its position and cause a loss of convergence and purity.

GENERAL ALIGNMENT

Note: Use Video Pattern Generator for following alignments. (Video input should read 1.0Vp-p.)

APC ALIGNMENT

Preparation

1. Connect oscilloscope to TP46B.
2. Connect C-jumper and R-jumper as shown in figure 16.
3. Set Color (R603) and Panabrite (R309) controls to maximum position.
4. Set Tint (R606) control to center position.

Alignment Procedure

1. Use a studio color bar signal.
2. Turn C614 to keep color synchronization. (Adjust it at point where waveform is just stopped on oscilloscope.)
3. Disconnect C-jumper and R-jumpers and confirm that color synchronization is retained.

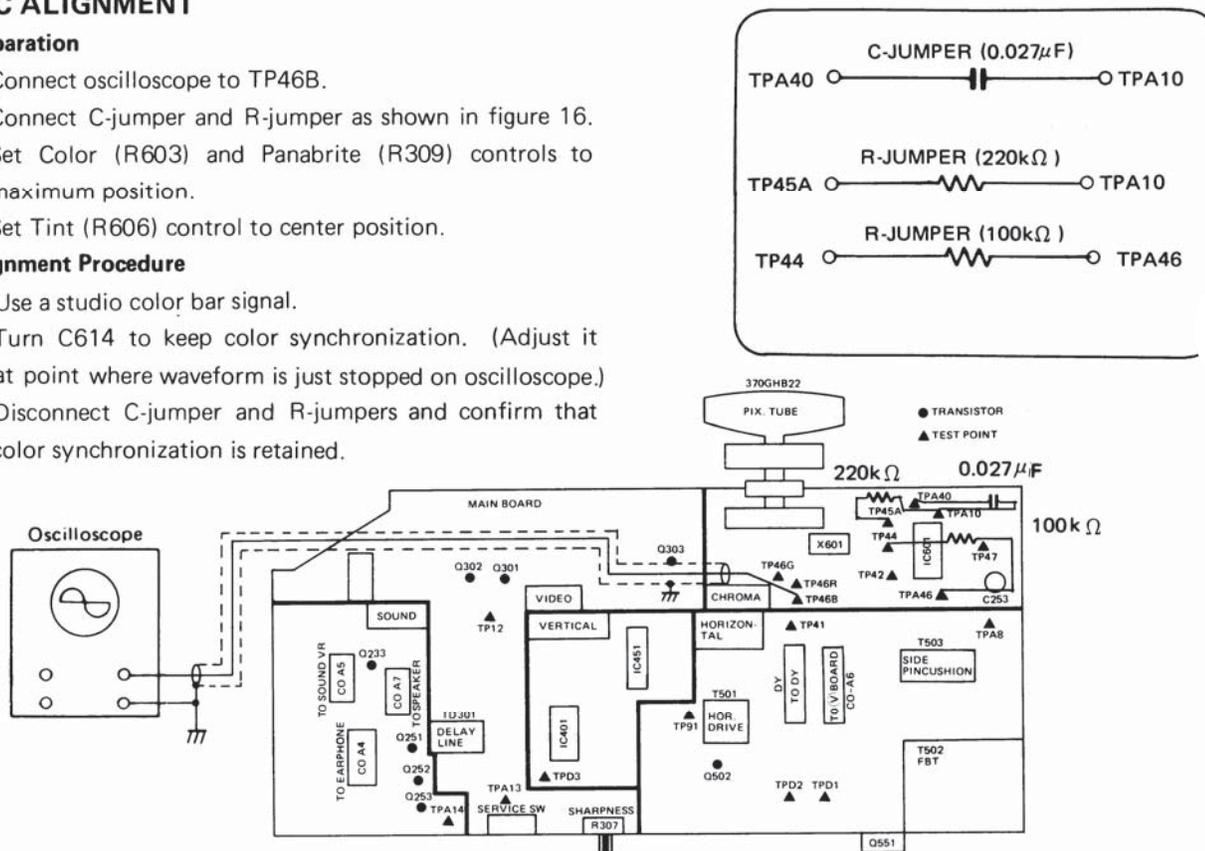


Figure 16

COLOR PHASE ALIGNMENT

Alignment Procedure

1. Use a studio color bar signal.
2. Connect oscilloscope to TP46B.
3. Adjust Panabright control (R309) to obtain 4V from the white level to pedestal level.
4. Adjust Tint (R306) and Color (R603) controls to achieve the waveform shown in figure 17.
5. Connect oscilloscope to TP46R.
6. Confirm the amplitude of R-Y output is shown in figure 18.
7. Connect oscilloscope to TP46G.
8. Confirm the amplitude of G-Y output is shown in figure 19.
9. Reconnect oscilloscope to TP46B.
10. When Tint control (R306) is turned to either fully clockwise or fully counterclockwise, confirm that the waveform at TP46B is as shown in figure 20 and figure 21, or exceeded to the direction of arrow mark at each color levels.

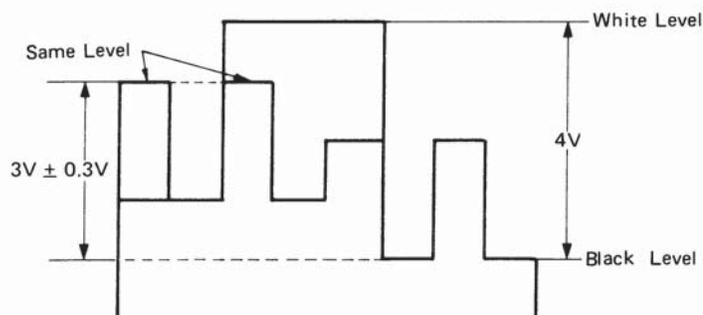


Figure 17 Waveform at TP46B

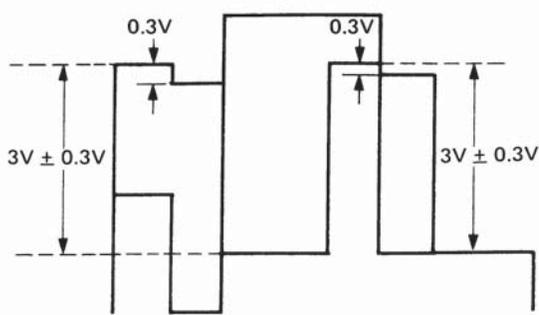


Figure 18 Waveform at TP46R

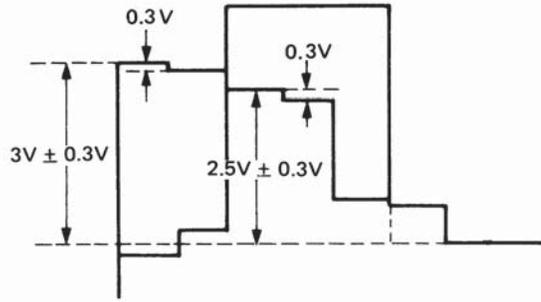


Figure 19 Waveform at TP46G

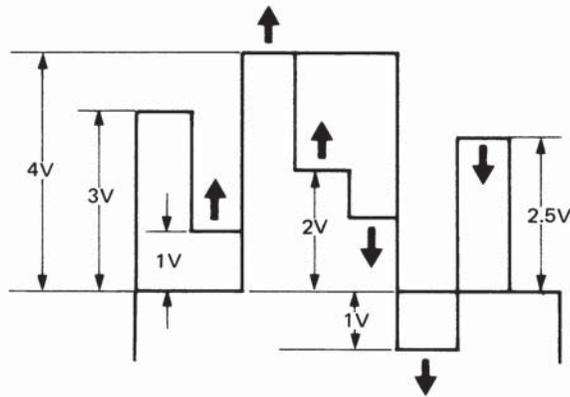


Figure 20 When Tint control (R306) is turned clockwise (-25°)

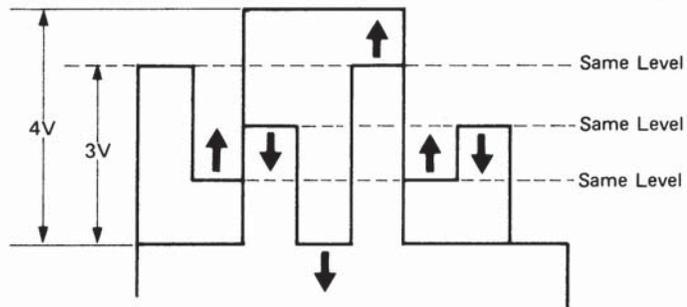


Figure 21 When Tint control (R306) is turned counterclockwise (+25°)

SUB CONTRAST ALIGNMENT

1. Use a studio color bar signal.
2. Set Color control (R603) to minimum and Panabrite (R309) control to maximum position.
3. Connect oscilloscope to TP46B.
4. Adjust Sub Contrast control (R306) to obtain 4.5V. from the white level to pedestal level shown in figure 22.

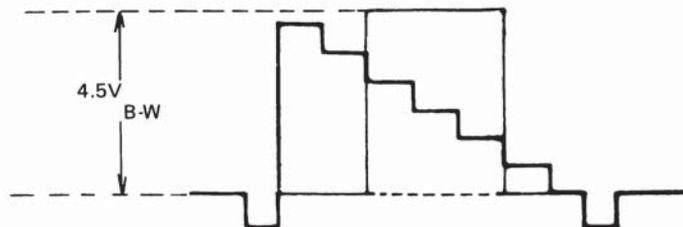


Figure 22

CIRCUIT EXPLANATION

HORIZONTAL OSC. DISABLE CIRCUIT

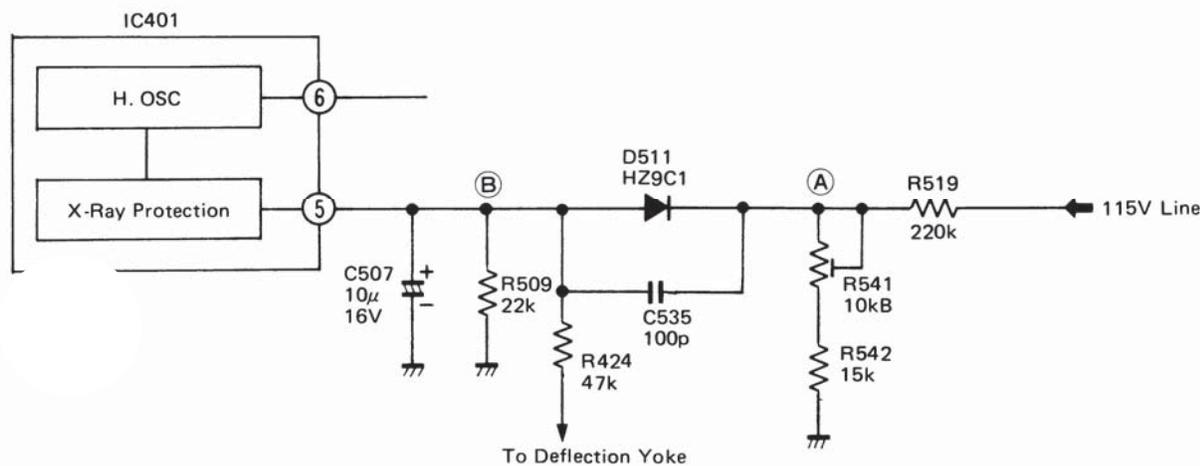


Figure 23

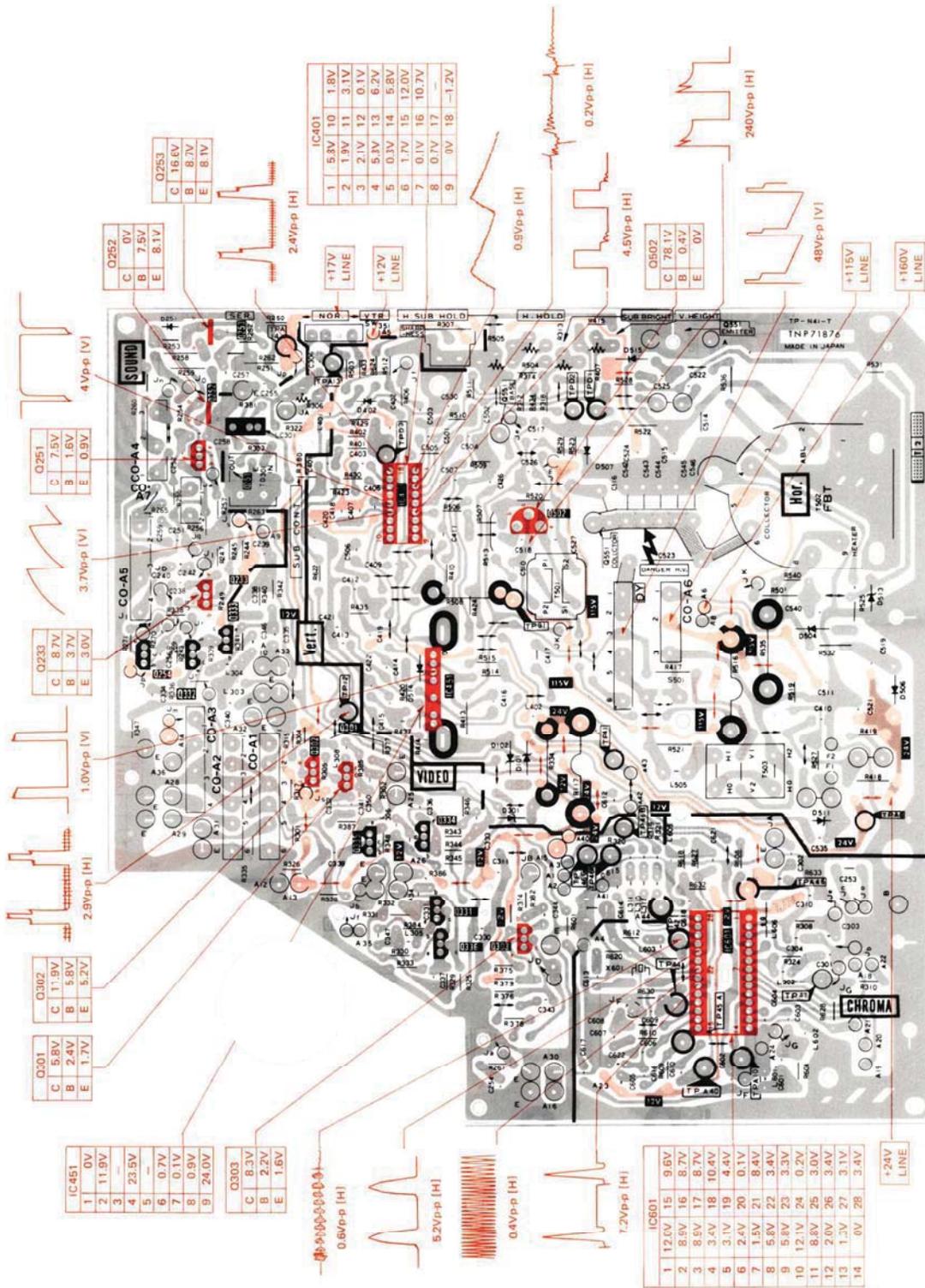
1. OPERATING DESCRIPTIONS

1. When the 115V line voltage rises abnormally, the voltage at point (A) also rises.
2. When the voltage at point (A) exceeds a certain level, D511 is turned on and the voltage at point (B) rises. As a result, the X-ray protection circuit connected to pin (5) of IC401 functions, stopping horizontal oscillation and high voltage generation.

2. DRIVE FUNCTION

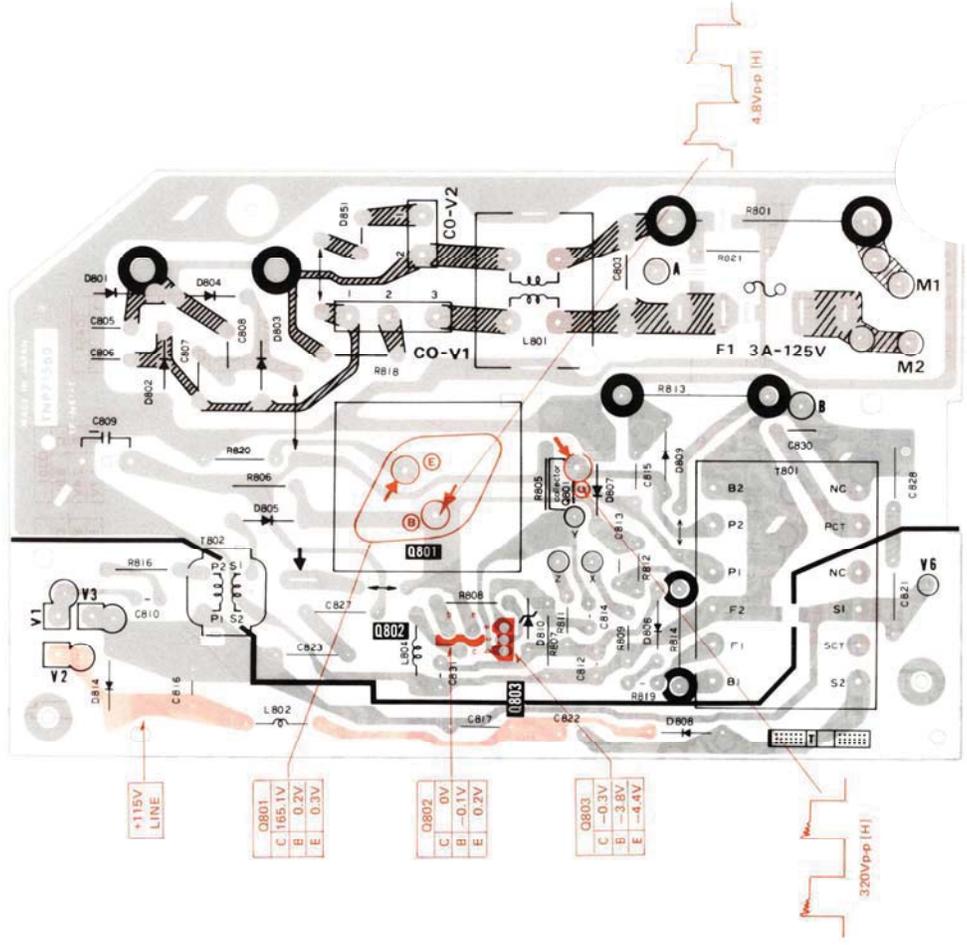
1. R519, R541 and R542 divide the 115V line voltage, and apply it to the cathode of D511.
2. D511 prevents the voltage at point (B) from rising until the voltage at point (A) exceeds a certain level.
3. C507 removes noise at point (B) to prevent erroneous operations.
4. R509 provides a bias to the circuit connected to pin (5) of IC401 to help the overvoltage protection circuit of IC401 function easier.
5. C535 reduces noise at D511.
6. R424 applies voltage to point (B) to actuate the X-ray protection circuit when the deflection yoke is defective.

CONDUCTOR VIEWS
MAIN BOARD TNP71876



CT-1350MG CT-1350MG

V-BOARD TNP71560

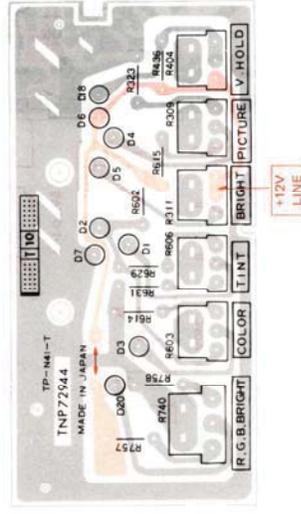


+115V LINE

Q801
C 165.1V
B 0.2V
E 0.3V

Q802
C 0V
B -0.1V
E 0.2V

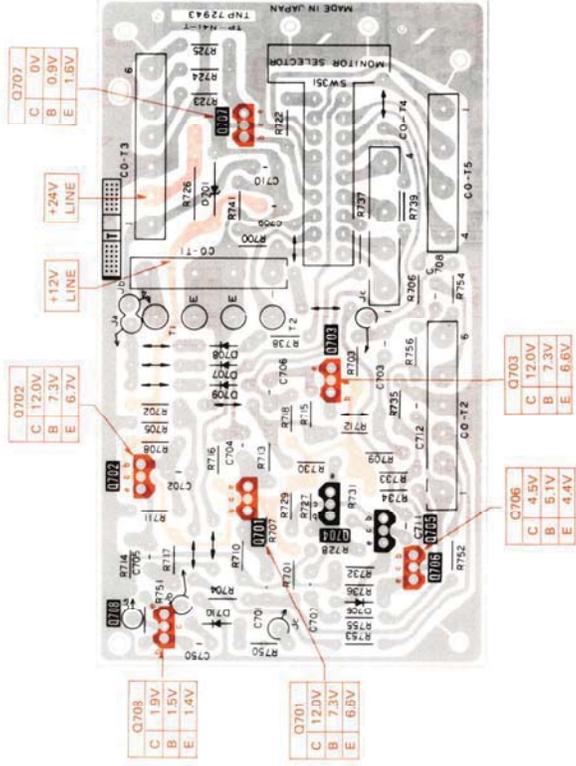
Q803
C -0.3V
B -3.8V
E -4.4V



D-BOARD TNP72944

+12V LINE

T-BOARD TNP72943



Q703
C 1.9V
B 1.5V
E 1.4V

Q701
C 12.0V
B 7.3V
E 6.5V

C706
C 4.5V
B 5.1V
E 4.4V

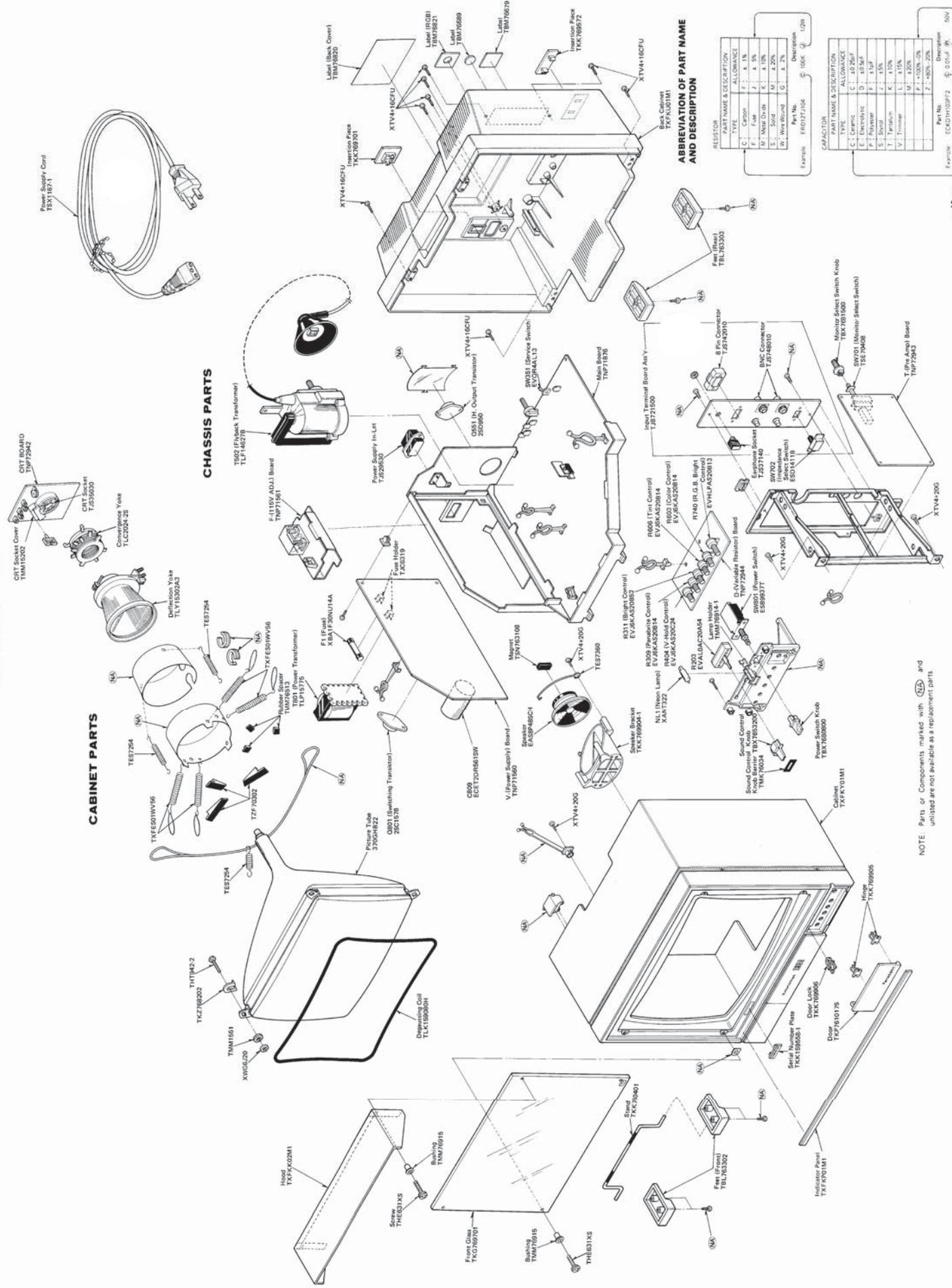
Q703
C 12.0V
B 7.3V
E 6.6V

Q702
C 12.0V
B 7.3V
E 6.7V

+12V LINE

+24V LINE

EXPLODED VIEWS



CABINET PARTS

CHASSIS PARTS

ABBREVIATION OF PART NAME AND DESCRIPTION

REGISTOR		PART NAME & DESCRIPTION	
TYPE	ALLOWANCE	TYPE	ALLOWANCE
C	CADON	F	F. A. 1%
F	Fair	J	J. A. 5%
M	Metal Dr. Or.	K	K. A. 10%
S	Sold	L	L. A. 20%
I	Wire Board	G	G. A. 2%

GABRICTOR		PART NAME & DESCRIPTION	
TYPE	ALLOWANCE	TYPE	ALLOWANCE
C	Ceramic	D	D. 10.25%
E	Electro-lytic	F	F. 1.5%
P	Polymer	K	K. 15%
S	Spool	L	L. 15%
T	Titanium	K	K. 15%
V	Vinyl	M	M. 25%
I	Insulator	P	P. 100% - 20%
Z	Zinc	Z	Z. 80% - 20%

NOTE: Parts or Components marked with (NA) and unshaded are not available as a replacement parts.

REPLACEMENT PARTS LIST

Important Safety Notice

Components identified by shaded area have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	RESISTORS				
R 117	ERF5AJ680	W 680HM, J, 5W	R 351	EVTS0AA00B32	CONTROL 3000HMB
R 203	EVAL0AC20A54	CONTROL 50KOHMA	R 352	EVTS0AA00B32	CONTROL 3000HMB
R 244	ERD25TJ393	C 39KOHM, J, 1/4W	R 353	EVTS0AA00B14	CONTROL 10KOHMB
R 245	ERD25TJ183	C 18KOHM, J, 1/4W	R 354	EVTS0AA00B14	CONTROL 10KOHMB
R 247	ERD25TJ681	C 6800HM, J, 1/4W	R 355	EVTS0AA00B14	CONTROL 10KOHMB
R 249	ERD25TJ821	C 8200HM, J, 1/4W	R 356	ERD25TJ121	C 1200HM, J, 1/4W
R 251	ERQ12HJ8R2	F 8.2OHM, J, 1/2W	R 360	ERD25TJ471	C 4700HM, J, 1/4W
R 252	ERD25TJ181	C 1800HM, J, 1/4W	R 362	ERC12ZGK185	S 1.8MOHM, K, 1/2W
R 254	ERD25TJ822	C 8.2KOHM, J, 1/4W	R 363	ERG1ANJ103H	M 10KOHM, J, 1W
R 255	ERD25TJ563	C 56KOHM, J, 1/4W	R 364	ERG1ANJ103H	M 10KOHM, J, 1W
R 256	ERD25TJ223	C 22KOHM, J, 1/4W	R 365	ERG1ANJ103H	M 10KOHM, J, 1W
R 257	ERD25TJ121	C 1200HM, J, 1/4W	R 366	ERD25TJ272	C 2.7KOHM, J, 1/4W
R 258	ERD12FJ1R0	C 10HM, J, 1/2W	R 367	ERD25TJ272	C 2.7KOHM, J, 1/4W
R 259	ERD12FJ1R0	C 10HM, J, 1/2W	R 368	ERD25TJ272	C 2.7KOHM, J, 1/4W
R 260	ERD25TJ680	C 680HM, J, 1/4W	R 370	ERD25TJ222	C 2.2KOHM, J, 1/4W
R 261	ERD25TJ181	C 1800HM, J, 1/4W	R 371	ERD25TJ222	C 2.2KOHM, J, 1/4W
R 262	ERD25TJ821	C 8200HM, J, 1/4W	R 372	ERD25TJ222	C 2.2KOHM, J, 1/4W
R 264	ERD25TJ101	C 1000HM, J, 1/4W	R 373	EVME0U00MB46	CONTROL 4MOHMB
R 265	ERD25TJ101	C 1000HM, J, 1/4W	R 374	ERD25TJ393	C 39KOHM, J, 1/4W
R 301	ERD25TJ103	C 10KOHM, J, 1/4W	R 375	ERD25TJ103	C 10KOHM, J, 1/4W
R 302	ERD25TJ391	C 3900HM, J, 1/4W	R 376	ERD25TJ181	C 1800HM, J, 1/4W
R 303	ERD25TJ122	C 1.2KOHM, J, 1/4W	R 379	ERD25TJ471	C 4700HM, J, 1/4W
R 304	ERD25TJ101	C 1000HM, J, 1/4W	R 380	ERD25TJ561	C 5600HM, J, 1/4W
R 305	ERD25TJ152	C 1.5KOHM, J, 1/4W	R 381	ERD25TJ682	C 6.8KOHM, J, 1/4W
R 306	EVTS0AA00B14	CONTROL 10KOHMB	R 382	ERD25TJ104	C 100KOHM, J, 1/4W
R 307	EVH4TAS20B14	CONTROL 10KOHMB	R 385	ERD25TJ103	C 10KOHM, J, 1/4W
R 308	ERD25TJ103	C 10KOHM, J, 1/4W	R 387	ERD25TJ101	C 1000HM, J, 1/4W
R 309	EVJ6KAS20B14	CONTROL 10KOHMB	R 389	ERD25TJ223	C 22KOHM, J, 1/4W
R 310	ERD25TJ103	C 10KOHM, J, 1/4W	R 401	ERD25TJ471	C 4700HM, J, 1/4W
R 311	EVJ6KAS20B52	CONTROL 5000HMB	R 402	ERD25TJ684	C 680KOHM, J, 1/4W
R 312	ERD25TJ682	C 6.8KOHM, J, 1/4W	R 404	EVJ6KAS20C24	CONTROL 20KOHMC
R 313	EVTS0AA00B14	CONTROL 10KOHMB	R 406	ERD25TJ622	C 6.2KOHM, J, 1/4W
R 314	ERD25TJ183	C 18KOHM, J, 1/4W	R 407	EVTS0AA00B52	CONTROL 5000HMB
R 315	ERD25TJ561	C 5600HM, J, 1/4W	R 410	ERD25TJ682	C 6.8KOHM, J, 1/4W
R 317	ERD25TJ393	C 39KOHM, J, 1/4W	R 413	ERD50TJ3R9	C 3.9OHM, J, 1/2W
R 318	ERD25TJ563	C 56KOHM, J, 1/4W	R 414	ERD25TJ183	C 18KOHM, J, 1/4W
R 319	ERD25TJ391	C 3900HM, J, 1/4W	R 415	ERD25TJ121	C 1200HM, J, 1/4W
R 320	ERD25TJ391	C 3900HM, J, 1/4W	R 417	ERD50TJ471	C 4700HM, J, 1/2W
R 321	ERD25TJ391	C 3900HM, J, 1/4W	R 418	ERD50TJ182	C 1.8KOHM, J, 1/2W
R 322	ERD25TJ222	C 2.2KOHM, J, 1/4W	R 419	ERD25TJ562	C 5.6KOHM, J, 1/4W
R 323	ERD25TJ222	C 2.2KOHM, J, 1/4W	R 420	ERD25TJ392	C 3.9KOHM, J, 1/4W
			R 424	ERD25TJ473	C 47KOHM, J, 1/4W
			R 429	ERD25TJ393	C 39KOHM, J, 1/4W
			R 430	ERD25TJ181	C 1800HM, J, 1/4W
			R 433	ERD25TJ102	C 1KOHM, J, 1/4W

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R 434	ERD50FJ151	C 1500HM, J, 1/2W	R 615	ERD25TJ101	C 1000HM, J, 1/4W
R 435	ERD25TJ331	C 3300HM, J, 1/4W	R 618	ERD25TJ152	C 1.5KOHM, J, 1/4W
R 436	ERD25TJ822	C 8.2KOHM, J, 1/4W	R 620	ERD25TJ821	C 8200HM, J, 1/4W
R 437	ERD25TJ184	C 180KOHM, J, 1/4W	R 622	ERD25TJ222	C 2.2KOHM, J, 1/4W
R 440	ERD25TJ821	C 8200HM, J, 1/4W	R 624	ERD25TJ102	C 1KOHM, J, 1/4W
R 503	ERD25TJ223	C 22KOHM, J, 1/4W	R 627	ERD25TJ272	C 2.7KOHM, J, 1/4W
R 504	EVTSOAA00B22	CONTROL 2000HMB	R 629	ERD25TJ562	C 5.6KOHM, J, 1/4W
R 505	EVTSOAA00B13	CONTROL 1KOHMB	R 630	ERD25TJ225	C 2.2MOHM, J, 1/4W
R 506	ERD25TJ331	C 3300HM, J, 1/4W	R 631	ERD25TJ562	C 5.6KOHM, J, 1/4W
R 507	ERD25TJ681	C 6800HM, J, 1/4W	R 632	ERD25TJ563	C 56KOHM, J, 1/4W
R 508	ERG2ANJ103H	M 10KOHM, J, 2W	R 633	ERD25TJ224	C 220KOHM, J, 1/4W
R 509	ERD25TJ223	C 22KOHM, J, 1/4W	R 635	ERD25TJ471	C 4700HM, J, 1/4W
R 510	ERD25TJ183	C 18KOHM, J, 1/4W	R 704	ERD25TJ221	C 2200HM, J, 1/4W
R 511	ERD25TJ272	C 2.7KOHM, J, 1/4W	R 705	ERD25TJ221	C 2200HM, J, 1/4W
R 512	ERD25TJ392	C 3.9KOHM, J, 1/4W	R 706	ERD25TJ221	C 2200HM, J, 1/4W
R 513	ERG1ANJ472H	M 4.7KOHM, J, 1W	R 707	ERD25TJ473	C 47KOHM, J, 1/4W
R 514	ERD25TJ103	C 10KOHM, J, 1/4W	R 708	ERD25TJ473	C 47KOHM, J, 1/4W
R 515	ERD25TJ273	C 27KOHM, J, 1/4W	R 709	ERD25TJ473	C 47KOHM, J, 1/4W
R 516	ERG3CJ102	M 1KOHM, J, 3W	R 710	ERD25TJ124	C 120KOHM, J, 1/4W
R 519	ERD25TJ224	C 220KOHM, J, 1/4W	R 711	ERD25TJ124	C 120KOHM, J, 1/4W
R 520	ERD50TJ220	C 220HM, J, 1/2W	R 712	ERD25TJ124	C 120KOHM, J, 1/4W
R 521	ERG1ANJ102	M 1KOHM, J, 1W	R 713	ERD25TJ681	C 6800HM, J, 1/4W
R 522	ERD12FG2202	C 22KOHM, G, 1/2W	R 714	ERD25TJ681	C 6800HM, J, 1/4W
R 523	ERD25TJ394	C 390KOHM, J, 1/4W	R 715	ERD25TJ681	C 6800HM, J, 1/4W
R 525	ERD50FJ1R0P	C 10HM, J, 1/2W	R 716	ERD25TJ473	C 47KOHM, J, 1/4W
R 528	ERD25TJ183	C 18KOHM, J, 1/4W	R 717	ERD25TJ473	C 47KOHM, J, 1/4W
R 529	ERD25TJ224	C 220KOHM, J, 1/4W	R 718	ERD25TJ473	C 47KOHM, J, 1/4W
R 531	ERD25TJ101	C 1000HM, J, 1/4W	R 722	ERD25TJ103	C 10KOHM, J, 1/4W
R 532	ERQ12HJ1R0	F 10HM, J, 1/2W	R 723	ERD25TJ271	C 2700HM, J, 1/4W
R 535	ERQ2CJA2R4	F 2.40HM, J, 2W	R 724	ERD25TJ271	C 2700HM, J, 1/4W
R 536	ERQ12HJ1R0	F 10HM, J, 1/2W	R 725	ERD25TJ271	C 2700HM, J, 1/4W
R 540	ERD25TJ561	C 5600HM, J, 1/4W	R 726	ERG2ANJ181H	M 1800HM, J, 2W
R 541	EVTV3US15B14	CONTROL 10KOHMB	R 733	ERD25TJ473	C 47KOHM, J, 1/4W
R 542	ERD25TJ153	C 15KOHM, J, 1/4W	R 734	ERD25TJ681	C 6800HM, J, 1/4W
R 601	ERD25TJ560	C 560HM, J, 1/4W	R 735	ERD25TJ124	C 120KOHM, J, 1/4W
R 602	ERD25TJ103	C 10KOHM, J, 1/4W	R 736	ERD25TJ391	C 3900HM, J, 1/4W
R 603	EVJ6KAS20B14	CONTROL 10KOHMB	R 737	ERD25TJ151	C 1500HM, J, 1/4W
R 604	ERD25TJ562	C 5.6KOHM, J, 1/4W	R 738	ERD25TJ151	C 1500HM, J, 1/4W
R 606	EVJ6KAS20B14	CONTROL 10KOHMB	R 739	ERD25TJ151	C 1500HM, J, 1/4W
R 608	ERD25TJ101	C 1000HM, J, 1/4W	R 740	EWHLPAS20B13	CONTROL 1KOHMB
R 609	ERD25TJ224	C 220KOHM, J, 1/4W	R 741	ERD25TJ153	C 15KOHM, J, 1/4W
R 610	ERD25TJ102	C 1KOHM, J, 1/4W	R 750	ERD25TJ472	C 4.7KOHM, J, 1/4W
R 612	ERD25TJ222	C 2.2KOHM, J, 1/4W	R 751	ERD25TJ331	C 3300HM, J, 1/4W
R 614	ERD25TJ272	C 2.7KOHM, J, 1/4W	R 752	ERD25TJ101	C 1000HM, J, 1/4W
			R 753	ERD25TJ101	C 1000HM, J, 1/4W

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R 754	ERD25TJ101	C 100OHM, J, 1/4W	C 350	ECCF1H620JC	C 62PF, J, 50V
R 756	ERD25TJ101	C 100OHM, J, 1/4W	C 351	ECKF1H471KB	C 470PF, K, 50V
R 757	ERD25TJ153	C 15KOHM, J, 1/4W	C 352	ECKF1H471KB	C 470PF, K, 50V
R 760	ERD25TJ223	C 22KOHM, J, 1/4W	C 353	ECKF1H471KB	C 470PF, K, 50V
			C 354	ECQE10222MV	P 2200PF, M, 1KV
R 801	ERF7AK1R5	W 1.50HM, K, 7W			
R 806	ERG1ANJ683H	M 68KOHM, J, 1W	C 358	ECEA2ES100	E 10UF, 250V
R 807	ERG1ANJ151H	M 150OHM, J, 1W	C 359	ECQE10152MV	P 1500PF, M, 1KV
R 808	ERG1ANJ331H	M 330OHM, J, 1W	C 361	ECQM1H683KZ	P 0.068UF, K, 50V
R 809	ERD25TJ122	C 1.2KOHM, J, 1/4W	C 401	ECEA1HS010	E 1UF, 50V
R 810	EVTV3US15B23	CONTROL 2KOHMB	C 402	ECKF1H821KB	C 820PF, K, 50V
R 811	ERD25TJ272	C 2.7KOHM, J, 1/4W	C 406	ECQM1H393KZ	P 0.039UF, K, 50V
R 812	ERD25TJ471	C 470OHM, J, 1/4W	C 407	ECSZ16EF3R3V	T 3.3UF, 16V
R 813	ERG3ANJ123H	M 12KOHM, J, 3W	C 409	ECSF35E3R3K	T 3.3UF, 35V
R 814	ERG2ANJ330H	M 330HM, J, 2W	C 410	ECEA25N22Q	E 22UF, 25V
R 816	ERG1ANJ222H	M 2.2KOHM, J, 1W	C 411	ECEA1ES100	E 10UF, 25V
R 818	ERD50TJ683	C 68KOHM, J, 1/2W	C 413	ECEA50ZR1	E 0.1UF, 50V
R 819	ERQ12HJ1R0	F 10HM, J, 1/2W	C 414	ECKF1H471KB	C 470PF, K, 50V
R 820	ERW12PKR56	W 0.56OHM, K, 1/2W	C 415	ECEA1HS3R3	E 3.3UF, 50V
R 900	ERD25TJ750	C 750HM, J, 1/4W	C 416	ECEA1VS221	E 220UF, 35V
	CAPACITORS		C 417	ECEA1ES102	E 1000UF, 25V
C 238	ECEA1CS100	E 10UF, 16V	C 418	ECQM1H273KZ	P 0.027UF, K, 50V
C 242	ECEA1HS010	E 1UF, 50V	C 419	ECEA1VS221	E 220UF, 35V
C 251	ECQM1H474KZ	P 0.47UF, K, 50V	C 420	ECEA1CS102	E 1000UF, 16V
C 252	ECQM1H123KZ	P 0.012UF, K, 50V	C 421	ECQM1H103KZ	P 0.01UF, K, 50V
C 253	ECEA1ES102	E 1000UF, 25V	C 422	ECEA1HS010	E 1UF, 50V
C 254	ECEA1CS101	E 100UF, 16V	C 501	ECQM1H103KZ	P 0.01UF, K, 50V
C 255	ECEA1ES470	E 47UF, 25V	C 502	ECQM1H682KZ	P 6800PF, K, 50V
C 257	ECEA1ES220	E 22UF, 25V	C 503	ECEA50Z4R7	E 4.7UF, 50V
C 259	ECQM1H103KZ	P 0.01UF, K, 50V	C 504	ECQM1H392KZ	P 3900PF, K, 50V
C 301	ECCF1H121K	C 120PF, K, 50V	C 505	ECQF6332KZ	P 3300PF, K, 600V
C 302	ECEA1EN4R7S	E 4.7UF, 25V	C 506	ECEA16Z100	E 100UF, 16V
C 303	ECEA1ES3R3	E 3.3UF, 25V	C 507	ECEA1CS100	E 10UF, 16V
C 304	ECEA1HS2R2	E 2.2UF, 50V	C 510	ECKD2H122KB2	C 1200PF, K, 500V
C 306	ECCF1H390K	C 39PF, K, 50V	C 511	ECEA2ES4R7	E 4.7UF, 250V
C 310	ECEA1CS471	E 470UF, 16V	C 515	ECEA2ES3R3	E 3.3UF, 250V
C 311	ECEA1CS471	E 470UF, 16V	C 516	ECKD3D152KBU	C 1500PF, K, 2KV
C 320	ECCF1H150K	C 15PF, K, 50V	C 517	ECQM1H562KZ	P 5600PF, K, 50V
C 321	ECCF1H150K	C 15PF, K, 50V	C 518	ECCD2H150K	C 15PF, K, 500V
C 322	ECCF1H150K	C 15PF, K, 50V	C 519	ECKD2H122KB2	C 1200PF, K, 500V
C 332	ECEA1CN220S	E 22UF, 16V	C 521	ECEA1VS221	E 220UF, 35V
C 343	ECEA1CS221	E 220UF, 16V	C 522	ECCF1H390J	C 39PF, J, 50V
C 344	ECEA1HS010	E 1UF, 50V	C 523	ECQF2H304JZA	P 0.3UF, J, 200V
			C 524	ECEA1ES221	E 220UF, 25V
			C 525	ECCD2H221K2	C 220PF, K, 500V

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	DIODES		Q 351	2SC2258	B-OUTPUT
			Q 352	2SC2258	R-OUTPUT
D 101	TVSQB106P	ZENER DIODE	Q 353	2SC2258	G-OUTPUT
D 102	TVSQB106P	ZENER DIODE	Q 502	2SC1573A	H-DRIVE
D 251	MA27W	DIODE	Q 551	2SD950	H-OUTPUT
D 301	TVSQA112R	DIODE			
D 402	MA150	DIODE	Q 701	2SC1685-R	R-BUFFER
D 504	TVSRH1S	DIODE	Q 702	2SC1685-R	G-BUFFER
D 506	TVSRU2M	DIODE	Q 703	2SC1685-R	B-BUFFER
D 507	TVSERB12-01	DIODE	Q 706	2SC1685-R	H. SYNC. BUFFER
D 511	TVSHZ9C1	ZENER DIODE	Q 707	2SA564A-R	BLANKING
D 513	TVSQA111S	ZENER DIODE			
D 514	TVSERB12-01	DIODE	Q 708	2SC1685-R	BRIGHT CONTROL
D 515	TVSRH1S	DIODE	Q 801	2SC1578	SWITCHING
D 701	TVSQA111S		Q 802	2SA900	+B ADJ.
D 707	MA150	DIODE	Q 803	2SC1685-R	+B ADJ.
D 708	MA150	DIODE			
D 709	MA150	DIODE			
D 710	MA150	DIODE			
D 711	TVSQA112R	DIODE			
D 712	TVSQA112R	DIODE			
D 713	TVSQA112R	DIODE			
D 714	TVSQA112R	DIODE			
D 801	TVSC0510	DIODE			
D 802	TVSC0510	DIODE			
D 803	TVSC0510	DIODE			
D 804	TVSC0510	DIODE			
D 805	TVSRH1S	DIODE			
D 806	TVSRH1S	DIODE			
D 807	TVSRH1S	DIODE			
D 808	TVSRU2AM	DIODE			
D 809	TVSRU2AM	DIODE			
D 810	TVSQA107R	ZENER DIODE			
D 814	TVSSR2K	DIODE			
D 851	ERPF5B0M080F	POSISTOR			
	I.C				
IC 401	AN5436	H, V-OSC/DRIVE			
IC 451	AN5512	V-OUTPUT			
IC 601	AN5310	VIDEO/CHROMA			
	TRANSISTORS				
Q 233	2SC1685-R	AUDIO AMP.			
Q 251	2SC1685-R	AUDIO AMP.			
Q 252	2SA885-PQ	AUDIO OUTPUT			
Q 253	2SC1846-PQ	AUDIO OUTPUT			
Q 301	2SC1685-R	VIDEO INVERTER			
Q 302	2SC1685-R	VIDEO BUFFER			
Q 303	2SC1685-R	AUDIO AMP.			
				OTHERS	
				EAS8P48SCH	SPEAKER
				TBL763302	FEET (FRONT)
				TBL763303	FEET (REAR)
				TBM76679	LABEL
				TBM76689	LABEL
				TBM76820	LABEL (BACK CABINET)
				TBM76821	LABEL (RGB)
				TBX7653200	SOUND CONTROL KNOB
				TBX7680800	POWER SWITCH KNOB
				TBX7681500	MONITOR SELECT SWITCH KNOB
				TES7254	SPRING (CRT)
				TXFES01WV56	SPRING (SHIELD CASE)
				TES7360	SPRING (SPEAKER)
				THT942-2	SCREW
				TJB721500	INPUT TERMINAL BOARD
				THE631XS	SCREW
				TJC6319	FUSE HOLDER
				TJS29530	POWER SUPPLY IN-LET
				TJS35030	CRT SOCKET
				TJS37140	EARPHONE SOCKET
				TJS742010	8 PIN CONNECTOR
				TJS748010	BNC CONNECTOR
				TJT487	1P HOUSING
				TJT488A	3P HOUSING
				TJT581A	6P HOUSING
				TJT662	2P HOUSING
				TJT683A	4P HOUSING
				TJT885	PIN CONNECTOR
				TKG769701	FRONT GLASS
				TKK159558-1	SERIAL NO. PLATE

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	TKK760401	STAND	SW 801	ESB9937T	POWER SWITCH
	TKK769572	INSERTION PIECE	X 601	TSS816M	CRYSTAL OSCILATOR
	TXFKK02M1	HOOD			
	TKK769701	INSERTION PIECE			
	TKK769904-1	SPEAKER BRACKET			
	TKK769905	HINGE			
	TKK769906	DOOR LOCK			
	TKP7610175	DOOR			
	TKZ768202	CRT MOUNTING			
	TLC2024-2S	CONVERGENCE YOKE			
	TLK159080H	DEGAUSSING COIL			
	TLY15302A3	DEFLECTION COIL			
	TMK76034	SOUND VR KNOB BARRIER			
	TMM76915	BUSHING			
	TMM15202	CRT SOCKET COVER			
	TMM1551	CRT CUSHION			
	TMM76513	RUBBER SPACER			
	TMM76914-1	LAMP HOLDER			
	TNP71560	V-(POWER SUPPLY) BOARD			
	TNP71561	F-(115V ADJ.) BOARD			
	TNP71876	MAIN BOARD			
	TNP72942	CRT BOARD			
	TNP72943	T-(PRE AMP.) BOARD			
	TNP72944	D-(VARIABLE RESISTOR) BOARD			
	TPC761471	PACKING CASE			
	TPD961016	CUSHION (TOP)			
	TPD962016	CUSHION (BOTTOM)			
	TPE744009	POLYETHYLEN BAG			
	TQB611611	FAN BAG KIT			
	TSN763108	MAGNET			
	TSX1167-1	POWER SUPPLY CORD			
	TXFKP01M1	INDICATOR PANEL			
	TXFKU01M1	BACK CABINET			
	TXFKY01M1	CABINET			
	TZF70302	DY ADJUSTMENT KIT			
	XTV4+16CFU	SCREW			
	XTV4+20G	SCREW			
	XWG6J20	WASHER			
	370GHB22	PICTURE TUBE			
F 1	XBA1F30NU14A	FUSE 125V 3A			
NL 1	XANT322	NEON LAMP			
S 501	TGPS152G1	SPARK GAP			
SW 351	EVQR4AL13	SWITCH (SVC-VTR)			
SW 701	TSE70408	MONITOR SELECT SWITCH			
SW 702	ESD1411B	IMPEDANCE SELECT SWITCH			