

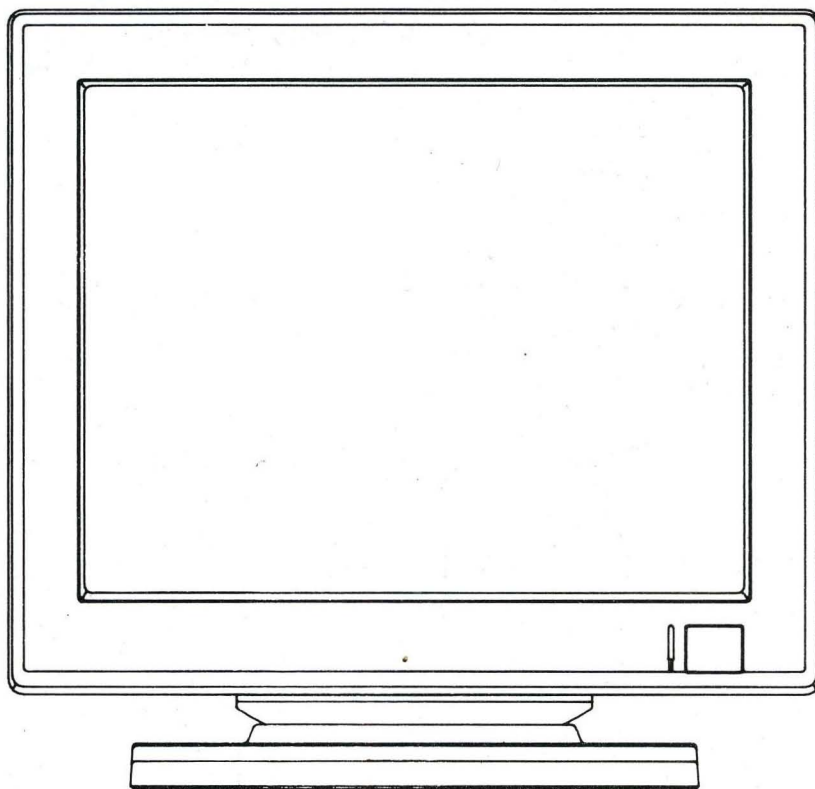


SERVICE MANUAL

MDA

MONO MONITOR

MA267*
MA467*



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SPECIFICATION

DESCRIPTION	NOMINAL	LIMIT
Power Input	AC 120V, 60Hz AC 220V, 50Hz AC 240V, 50Hz	+/- 10 % +/- 10 % +/- 10 %
Power Consumption	29 WATTS	MAX 40 WATTS
Video Input Signal	Separate TTL Signal	3.5Vp-p +/- 1.0 Vp-p
Video Bandwidth	20 MHz at -3 dB	
Video display Size	220 x 150 mm (MA267*) 230 x 170 mm (MA467*)	
Number of Characters	2000 Characters	80 Columns x 25 Rows
Resolution	720 Dots x 350 Lines	
CRT	12 / 14 Inch Diagonal, 90 Degree Deflection Non-Glare Flat Square type	Phosphor (*) 1. White 3. Green 5. Amber
Synchronous		
a) Horizontal	18.432 KHz	
b) Vertical	50 Hz	
Dimensions	MA267* Width : 384 mm Height : 324 mm Depth : 372 mm MA467* Width : 386 mm Height : 336 mm Depth : 384 mm	
Weight	MA267* : 8.6 Kg MA467* : 9.5 Kg	

Note : Nominal specifications represents the design specifications ; all units should be able to approximate these - some will exceed and some may drop slightly below these specifications.
Limit specifications represents the absolute worst condition which still might be considered acceptable ; in no case should a unit perform to less than within any limit specification.

IMPORTANT SERVICE SAFETY PRECAUTIONS

Service work should be performed only by qualified service technicians who are thoroughly familiar with all of the following safety checks and servicing guidelines:

WARNING

1. For continued safety, do not attempt to modify the circuit.
2. Disconnect the AC power before servicing.
3. Semiconductor heat sinks are potential shock hazards when the chassis is operating.

SERVICING THE HIGH VOLTAGE SYSTEM AND PICTURE TUBE

When servicing the high voltage system, remove the static charge by connecting a 10kohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead. (The AC line cord should be disconnected from the AC outlet.)

1. The picture tube in this display monitor employs integral implosion protection.
2. Replace with a tube of the same type and number for continued safety.
3. Do not lift the picture tube by the neck.
4. Handle the picture tube only when wearing shatter proof goggles and after discharging the high voltage anode completely.

X-RADIATION AND HIGH VOLTAGE LIMITS

1. Be sure all service personnel are aware of the procedures and instructions covering X-radiation. The only potential source of X-ray in a current solidstate display monitor is the tube. However, the picture tube does not emit measurable X-ray radiation if the high voltage is as specified in the "high voltage check" instruction.

It is only when high voltage is excessive that X-radiation is capable of penetrating the shell of the picture tube, including the lead in glass material. The important precaution is to keep

the high voltage below the maximum level specified.

2. It is essential that serviceman have available at all times an accurate high voltage meter. The calibration of this meter should be checked periodically.
3. High voltage should always be kept at the rated value - no higher. Operation at high voltages may cause a failure of the picture tube or high voltage circuitry and, also under certain conditions, may produce radiation in excess of desirable levels.
4. When the high voltage regulator is operating properly there is no possibility of an X-radiation problem.
Everytime a color chassis is serviced, the brightness should be tested while monitoring the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly.
5. Do not use a picture tube other than that specified or make unrecommended circuit modifications to the high voltage circuitry.
6. When troubleshooting taking test measurements on a display monitor with excessively high voltage, avoid being unnecessarily close to the display monitor. Do not operate the display monitor longer than is necessary to locate the cause of excessive voltage.

BEFORE RETURNING THE DISPLAY MONITOR

Fire and Shock Hazard

Before returning the display monitor to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the display monitor.

2. Inspect all protective devices such as non-metallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, checks for leakage current in the following manner:
 - Plug the AC line cord directly into a 120volt AC outlet. (Do not use an isolation transformer for this test)
 - Using two clips leads, connect 1.5 kohm, 10 watt resistor paralleled by a 1.5uF capacitor in series with all exposed metal cabinet parts and a known earth ground, such as electrical conduct or electrical ground connected to earth ground.
 - Use a SSVM or VOM with 1000 ohms per-volt or higher sensitivity to measure the AC voltage drop across the resistor. (See Figure 1.)
 - Connect the resistor to all exposed metal parts having a return path to the chassis (metal cabinet, screw heads, knobs and shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.
 - Any reading of 0.3volt RMS (this corresponds to 0.5milliamp.AC) or more is excessive and indicates a potential shock hazard which must be corrected before returning the display monitor to the user.

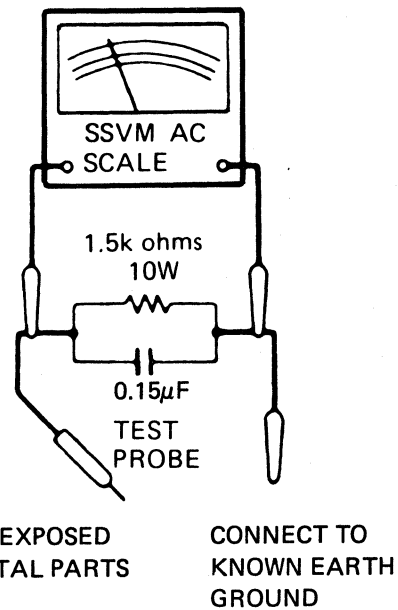


Figure 1. Leakage Current Test Circuit

SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special characteristics often pass unnoticed and the protection afforded by them can not necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.

Replacement parts that have these special safety characteristics are identified in this manual, and its supplement electrical components having such features are identified by a \triangle in the Parts List and Schematic Diagrams.

Before replacing any of these components, read the Parts List in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the Parts List may create shock, fire, or other hazards.

THEORY OF OPERATION

GENERAL

This monitor is a high resolution monochrome monitor using a amber, green and white phosphored CRT with etched faceplate.

It receives one video signal and intensity signal, separated sync signals by TTL level. It can operate in all of the MDA mode.

DESCRIPTION

1. MAIN BOARD

1-1, Power supply

This is a linear power supply using power trans(T701) and a monolithic integrated circuit voltage regulation(IC01: L123CB or LM723).

The output voltage regulation is achieved by means of the error amplifier contained in IC01.

The output voltage of this power supply is fed back into the pin4 of IC01.

This voltage compared to the reference voltage internally.

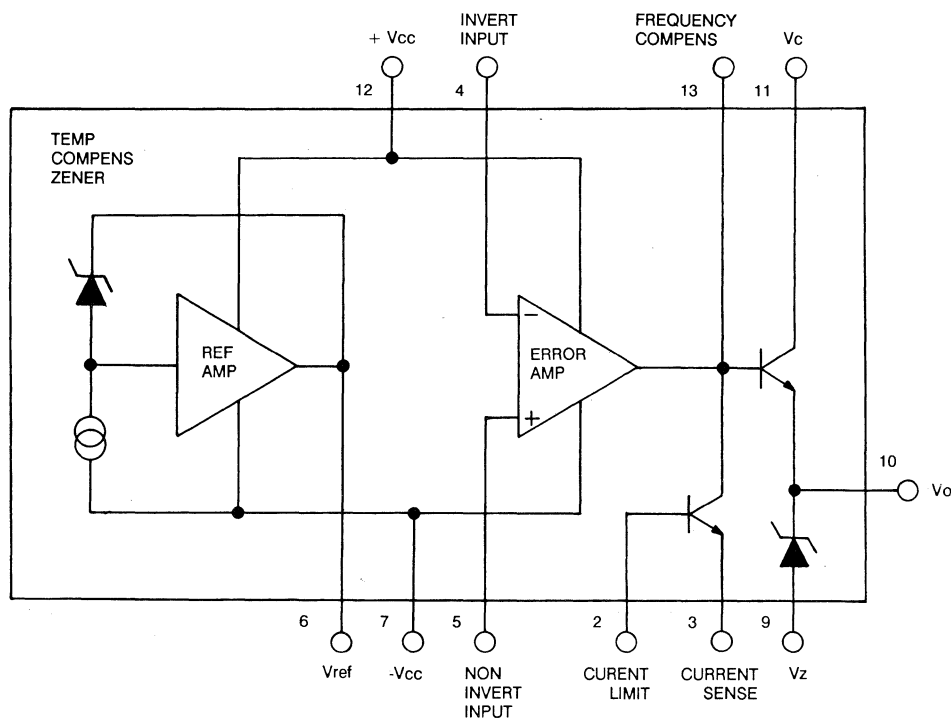
The difference of this voltage control the output current of error amplifier. D701 to D704 and C705 form DC supplier circuit.

Q701 is current amplifier. R701 is shunt resistor.

Q701 and R701 transfer current from DC circuit to load.

R703 is for minimum temperature drift. C707 and C708 is noise filter condenser.

Output voltage is fixed by adjusting VR701 variable resistor.



BLOCK DIAGRAM OF IC01 (LM723 OR L123CB)

1-2. Horizontal and Vertical processor IC03

1-2-1, Horizontal processor

IC03 performs following functions.

- Horizontal Oscillator
- Sync Separator
- Horizontal Predriver
- Horizontal AFC
- Shunt regulator

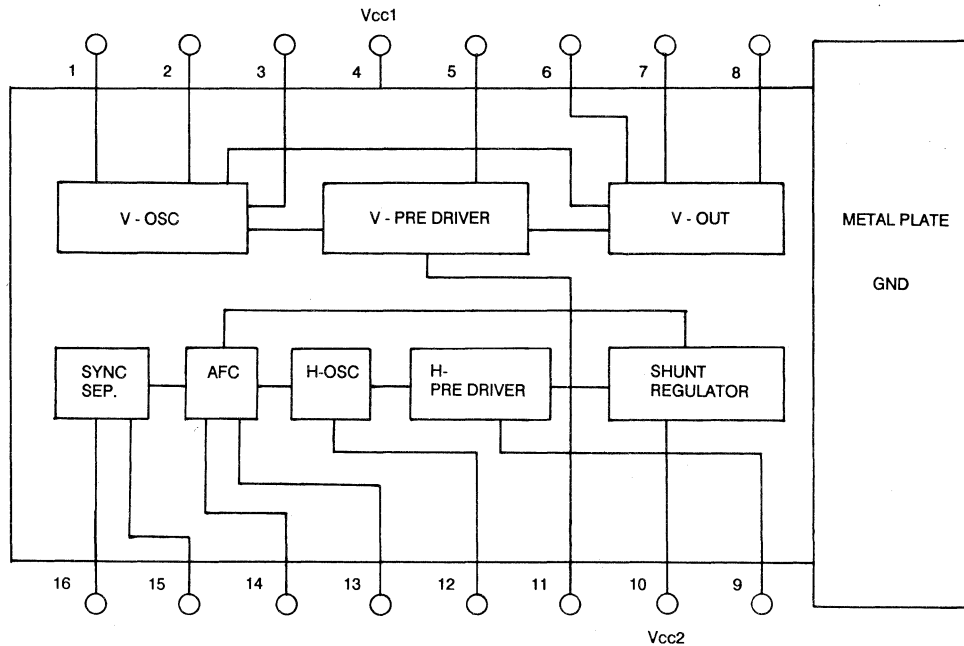
This sync signal is inverted by inverting transistor Q601 and is fed back into pin 15 of IC03, and flyback pulse into pin 14 of IC03. This two signal are compared and the circuit is locked to a correct frequency and phase.

1-2-2, Vertical processor

IC03 performs following functions

- Vertical oscillator
- Vertical predriver
- Vertical output
- Flyback generator

These are two vertical controls. One is V-size control VR502, The other is V-linearity control VR503.



BLOCK DIAGRAM OF IC03 (KA2133B OR μ PC1379C)

1-3, Horizontal Output Stage Q603

Q603 is horizontal output switching transistor which closed during the scan period and open during the flyback. It receives drive signal from IC03 through transistor Q602 and horizontal drive transistor T601. C616 makes the necessary S-correction. Because of the losses in the deflection yoke, a linearity correction is required. This is achieved by L603. The horizontal screen size can be varied by adjusting L602. The high voltage of 13KV for CRT anode is also generated in flyback transformer by using flyback pulse.

1-4, Dynamic Focus

Q604 (BUV46 or KSC5021) is used to provide dynamic focus voltage which is added to G4 voltage of the CRT. This voltage is needed to change G4 voltage according to the angle of the beam.

1-5, Video Circuit

This circuit performs following functions.

- Video input buffer (IC02 : 74LS266)
- Cascade amplifier (Q103, Q104, Q801)
- Contrast control circuit (Q102, Q101, VR101)

If only video signal input into the IC02, IC02 delivered to cascade amplifier (Q104, Q801).

If only dual signal input into the IC02, IC02 delivered to cascade amplifier (Q103, Q801).

CONTRAST CONTROL is operated by Q101, Q102, Q801, Q103, Q104 form a cascade video amplifier which circuit output is applied to cathode pin of the CRT.

1-6, CRT Board

It contains video amplifier transistor Q801 and CRT socket.

1-7, Power Board

This board contains fuse.

IMPORTANT : When replacing the power supply, make sure that the green ground wire is properly attached to the main chassis frame, and make sure that the fuse is of the same type and rating as original.

DISASSEMBLY INSTRUCTIONS

REAR COVER REMOVAL

1. Place the monitor upside down.
2. Remove 2 screw A (MA467*).
3. Remove 1 screw A (MA267*).
3. Pull the REAR COVER backward as pushing the 2points B in the direction of the arrows to separate from the FRONT COVER.

CRT ASSY/CHASSIS FRAME ASSY REMOVAL

1. Remove the CRT's anode cap 1 from the CRT.
2. Remove the CHASSIS FRAME from the FRONT CABINET.

NOTE : The CRT must be discharged according to the CRT discharge procedure in the important safety precaution.

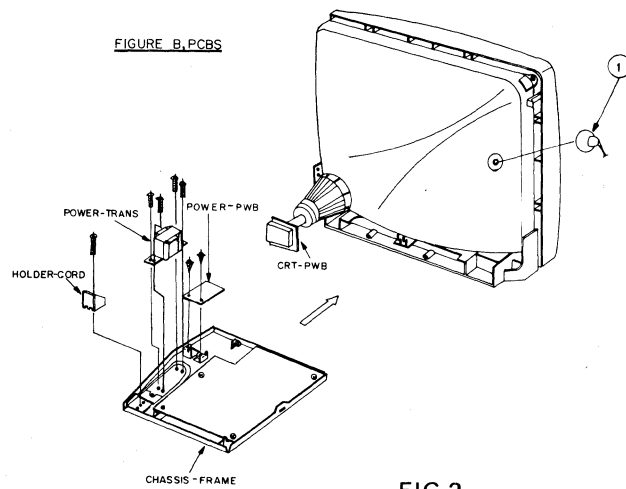


FIG 2

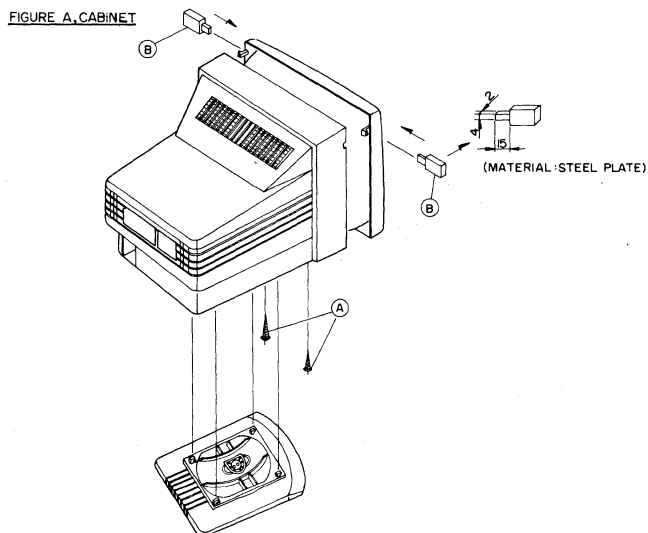
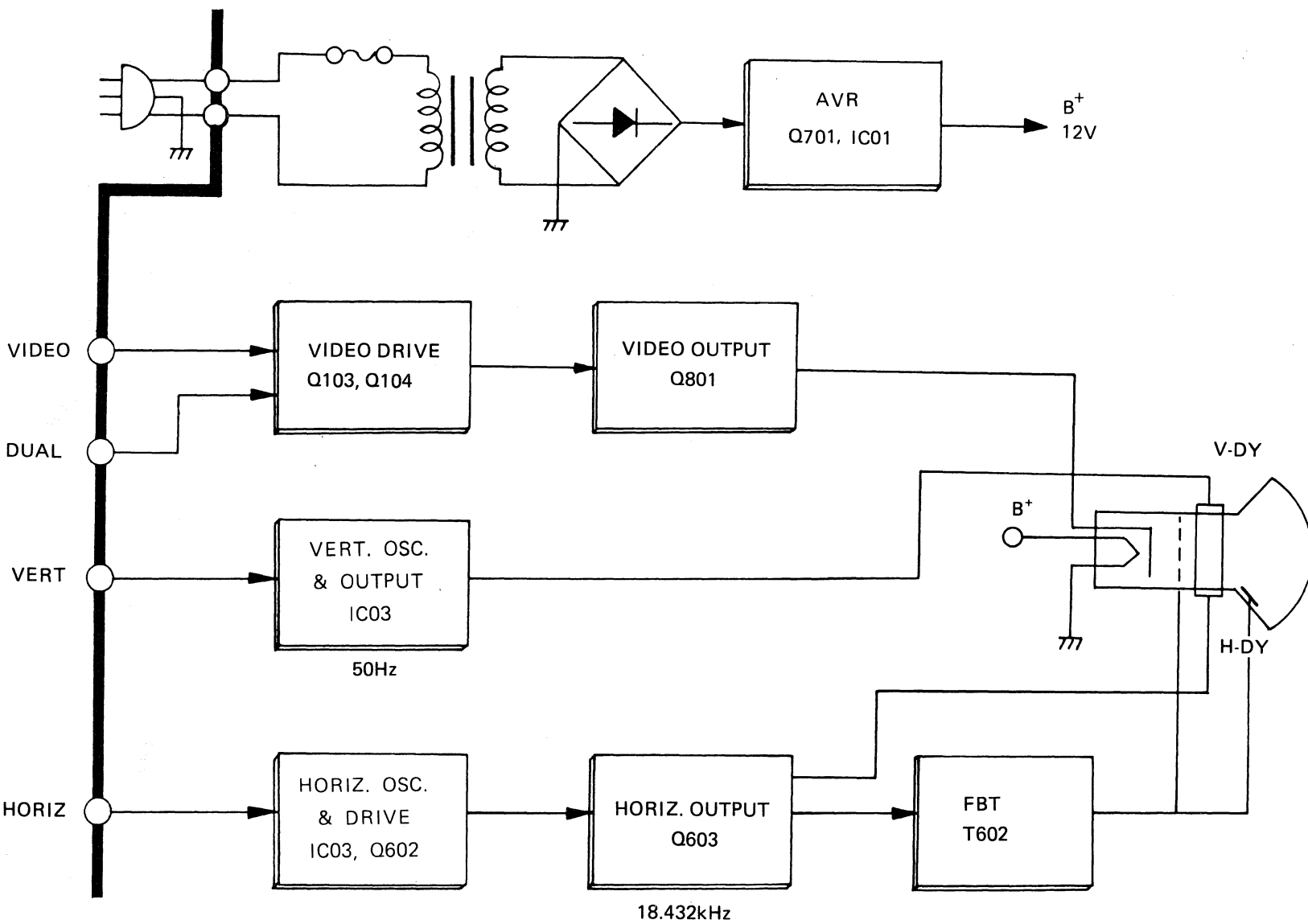


FIG 1



CHASSIS NO.: G. S. J.

BLOCK DIAGRAM

ALIGNMENT INSTRUCTION

PLEASE READ BEFORE ATTEMPTING SERVICE

1. Line voltage must be kept within $\pm 10\%$ of the rated voltage.
2. Do not discharge, ARC, or measure high voltage when high voltage lead is connected to CRT. Discharge 2nd anode of CRT only after high voltage lead has been disconnected. Do not discharge high voltage lead at anytime. This may results damage to transistor.
3. While the monitor is in operation, do not attempt to connect or disconnect any wires.
4. Disconnect all power before attempting any repair.
5. When the power is on, do not attempt to short any portion of the circuit. This shorting may cause damage to the transistors in the receiver.

ADJUSTMENT

Apply power and composite video signal (alphanumeric information) to the data display.

1. B+ ADJUSTMENT

- 1) Operate the monitor.
- 2) Connect the plus pole of DVM(Digital Multi Meter) to the R701(Shunt Resistor) pin connected to blue wire and connect the other pole(GND) to chassis ground.
- 3) Rotate the B+ voltage adjusting control VR(VR701) to provide a DC 12V.
- 4) Condition : Contrast, Brightness VR max.

2. VERTICAL FREQUENCY ADJUSTMENT

- 1) Instrument in use : Frequency counter, Scope probe
- 2) Connect the GND pole of the scope probe to chassis frame and the scope probe to DY pin connected to black wire.
- 3) At self raster, adjust VR501 so that the vertical frequency is 43 Hz. (Free running frequency : 43 ± 1 Hz)

3. HORIZONTAL FREQUENCY ADJUSTMENT

- 1) Instrument in use : Frequency Counter, Scope probe
- 2) Connect the GND pole of the scope probe to chassis frame and the scope probe to DYpin connected to brown wire.
- 3) At self raster, adjust VR601 so that the horizontal frequency is 18.432 KHz. (Free running frequency : 18432 ± 500 Hz)

4. HORIZONTAL POSITION ADJUSTMENT

Adjustment horizontal phase control (VR602 : Optional) so that the image(or test pattern) is placed on the center of the raster. If VR602 is not used, this adjustment is not necessity.

5. IMAGE CENTERING ADJUSTMENT

- 1) Loosen the Deflection Yoke (L401) clamp and carefully move the yoke on the neck of the CRT as far forward as possible Rotate the yoke until the top and bottom edges of the raster are straight. Tighten the clamp.
- 2) Center the raster by rotating the centering rings.

6. VERTICAL LINEARITY ADJUSTMENT

Adjust the vertical linearity control(VR503) until the vertical linearity is best.

7. VERTICAL SIZE ADJUSTMENT

Adjust the vertical size control (VR502) so that the vertical size of displayed pattern is 170 ± 1.5 mm (MA467*). If the monitor is MA267* the vertical size is 150 ± 1.5 mm.

8. HORIZONTAL WIDTH

Adjust the horizontal width control(L602) so that the horizontal width of displayed pattern is 230 ± 1.5 mm (MA467*). If the monitor is MA267*, the horizontal width is 220 ± 1.5 mm.

9. FOCUS ADJUSTMENT

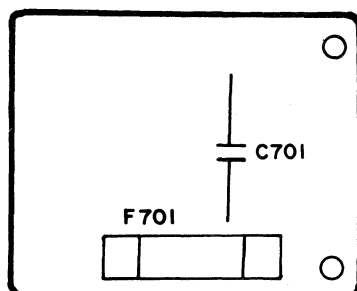
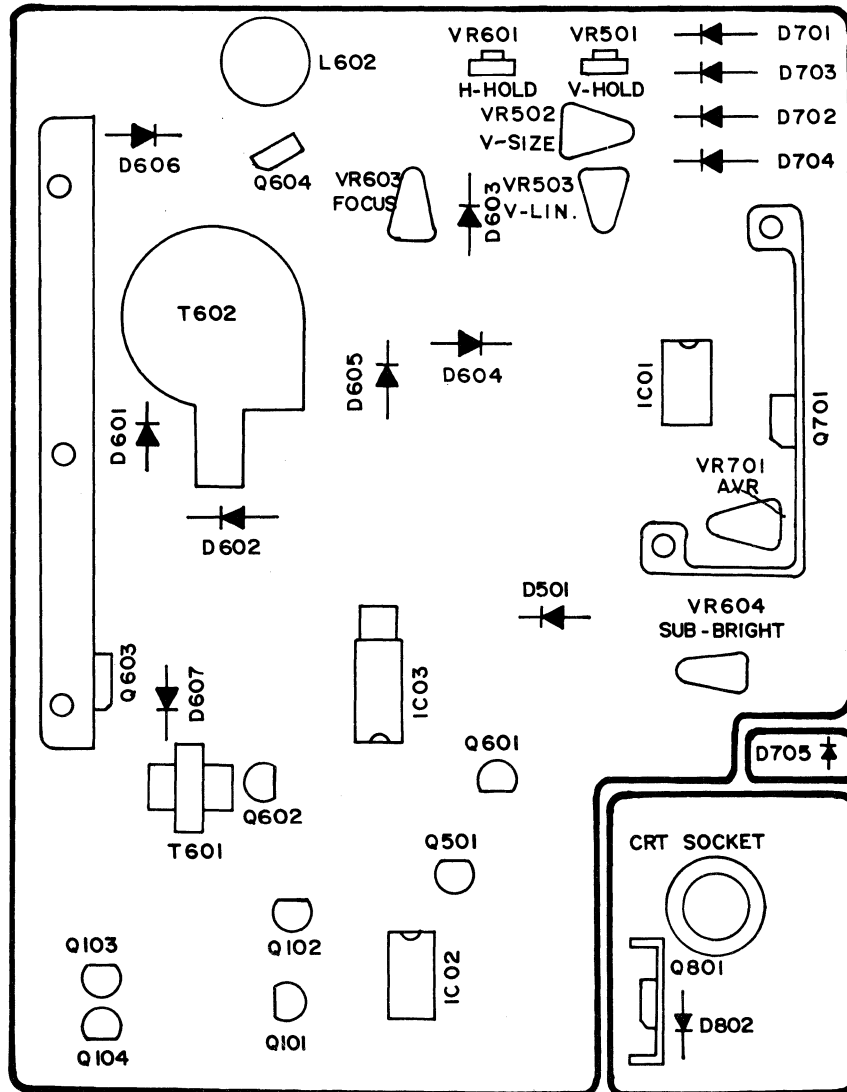
Adjust the focus control (VR603) for providing the best focus.

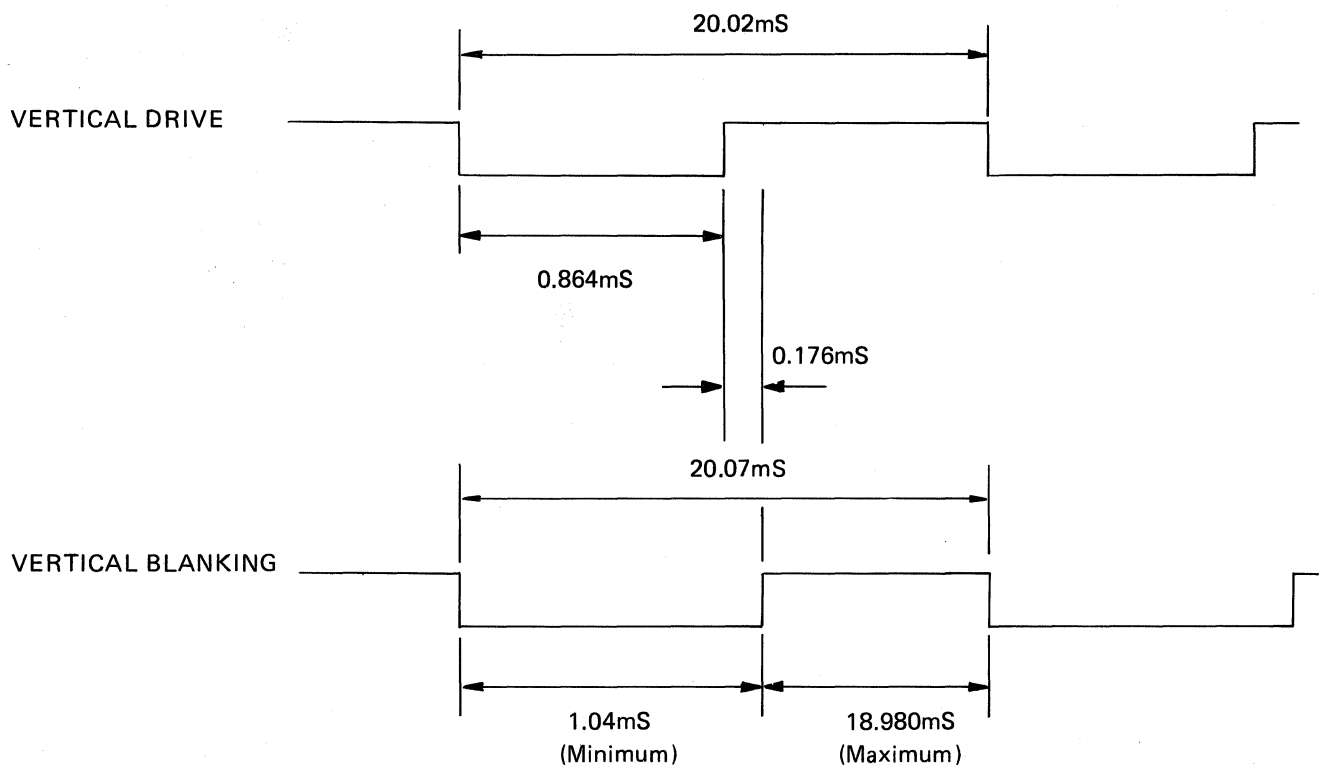
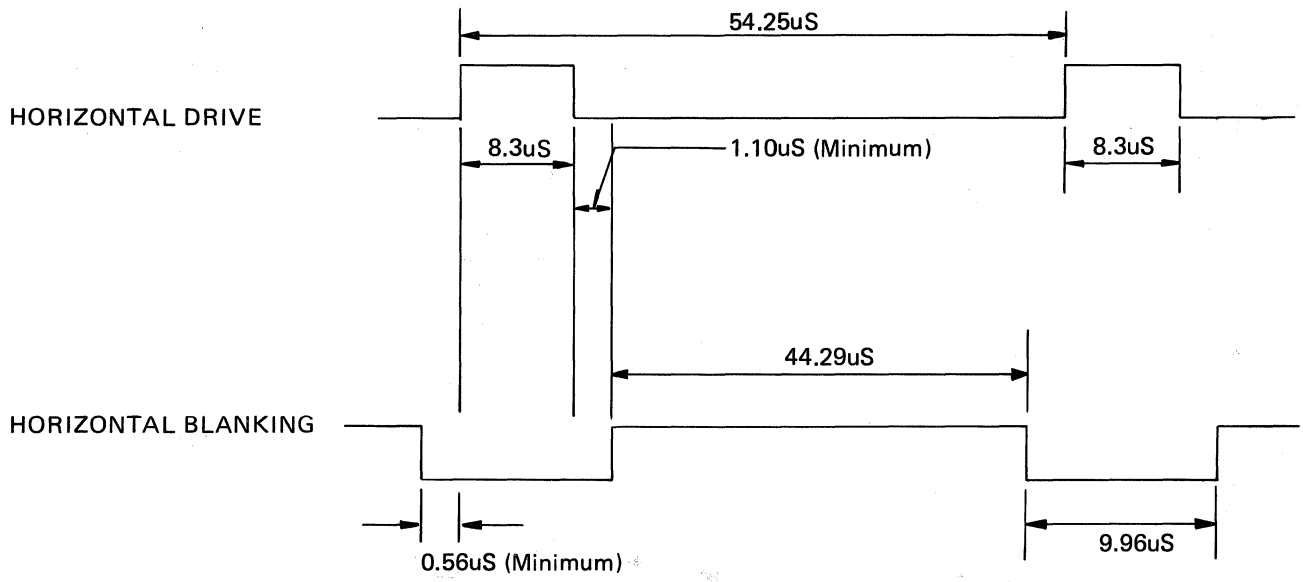
10. SUB-BRIGHTNESS ADJUSTMENT

- 1) Set the CONTRAST VR (VR101) and BRIGHTNESS VR (VR605) to maximum position.
- 2) Adjust the sub-brightness control (VR604) so that the brightness is below;

* is WHITE CRT (1) : 18 +/- 5 F/L.
 GREEN CRT (3) : 28 +/- 5 F/L.
 AMBER CRT (5) : 25 +/- 5 F/L.

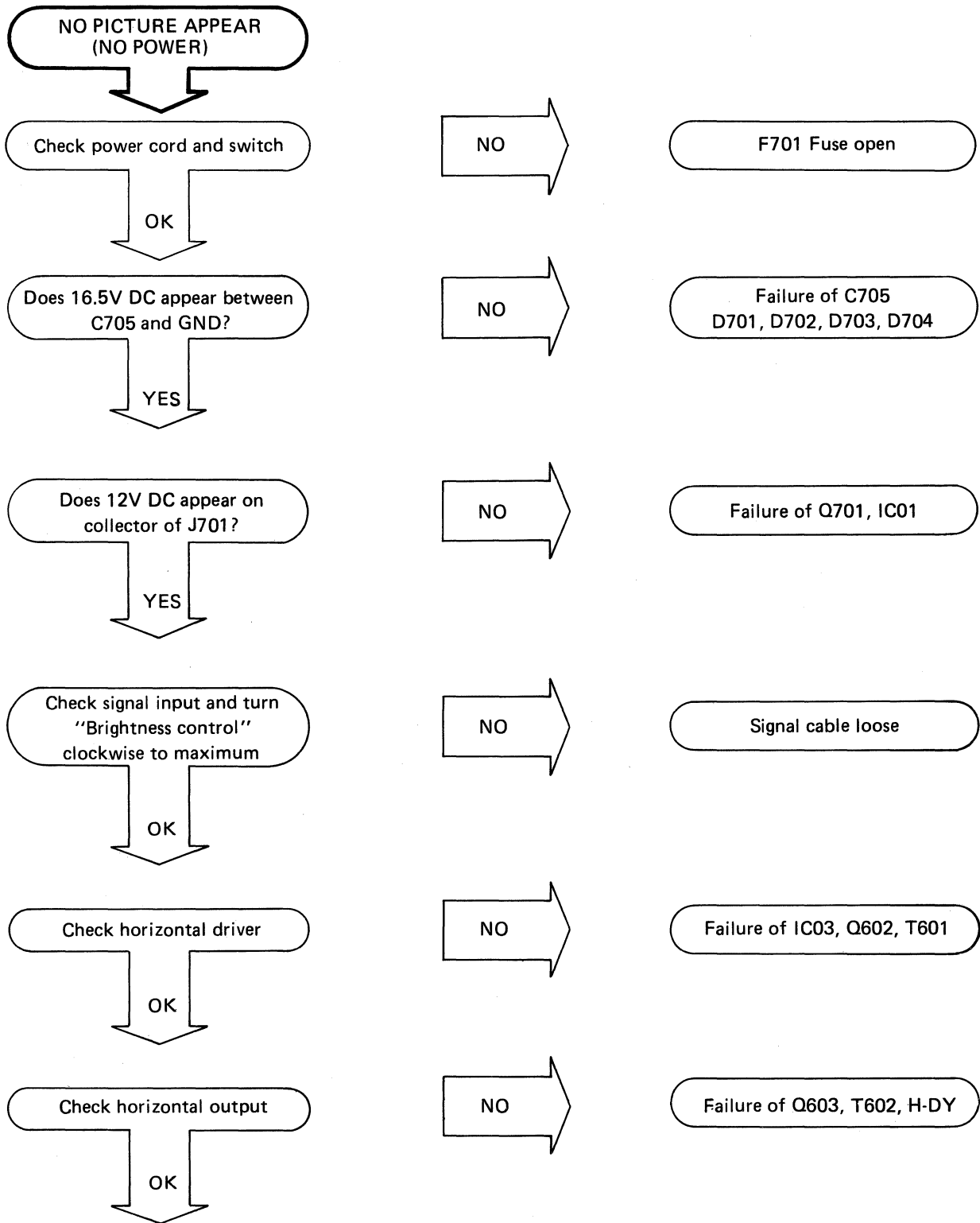
PARTS LOCATION



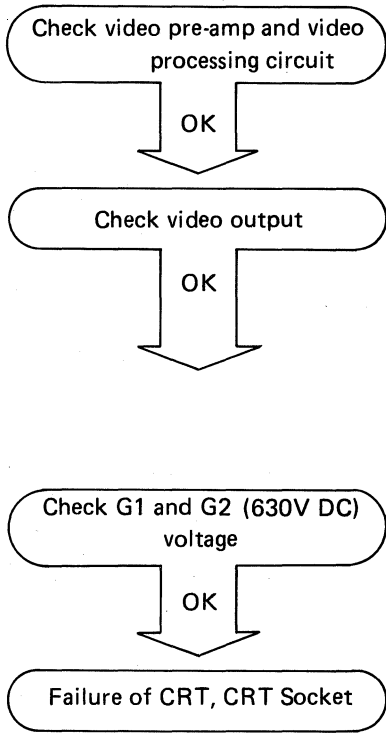


SIGNAL TIMING CHART

TROUBLESHOOTING GUIDE



— Continued —



NO

Failure of Q103, Q104
IC03

NO

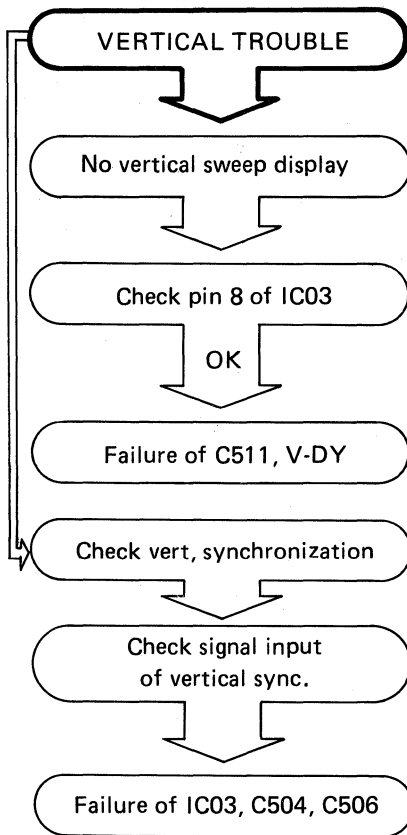
Does VDC appear between collector of Q801 and GND?

NO

Failure of D604, Q801

NO

Failure of D603, D605



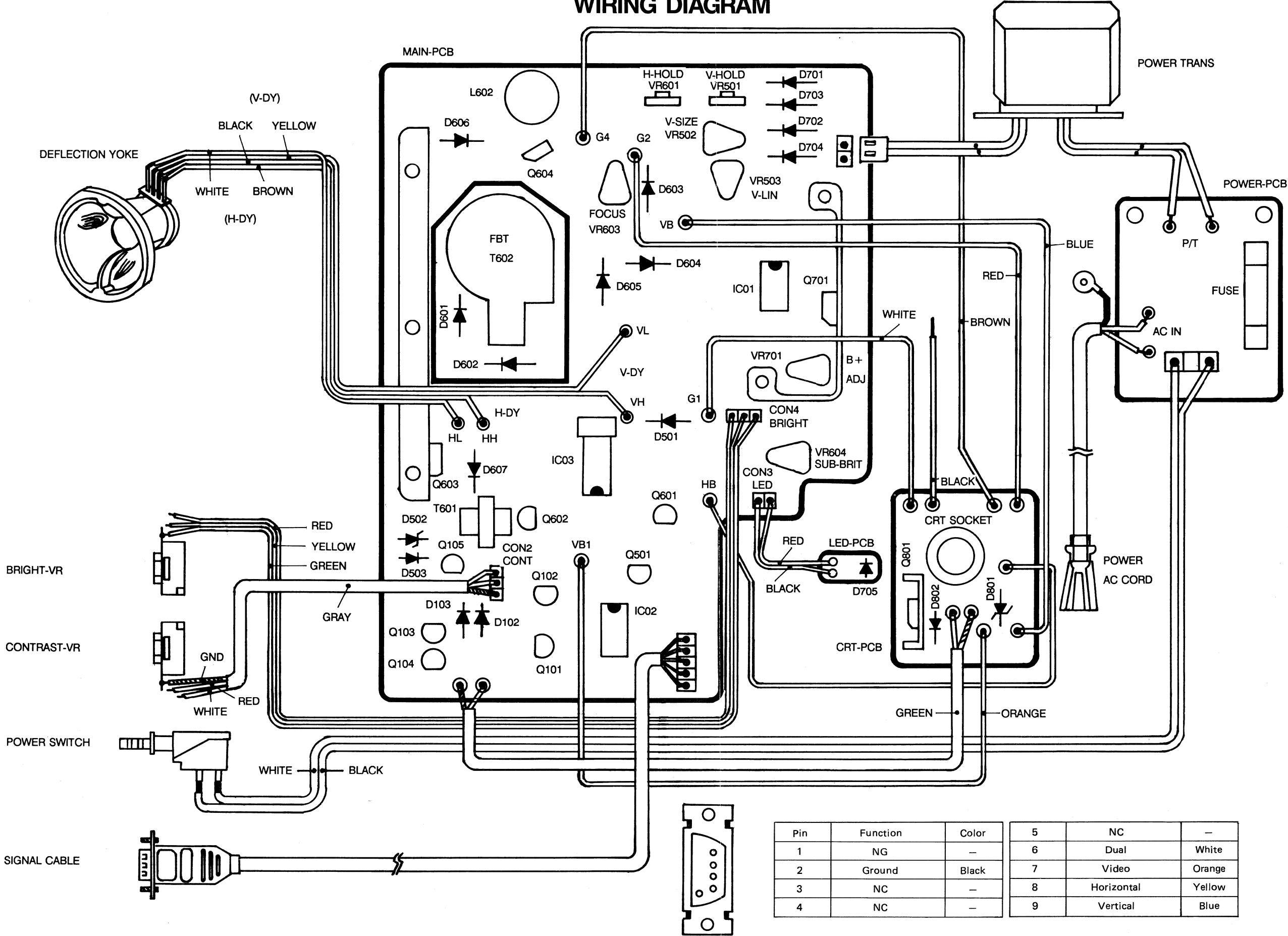
NO

Failure of IC03

NO

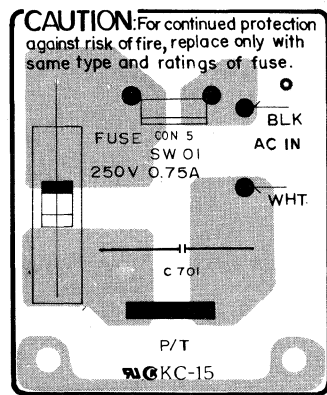
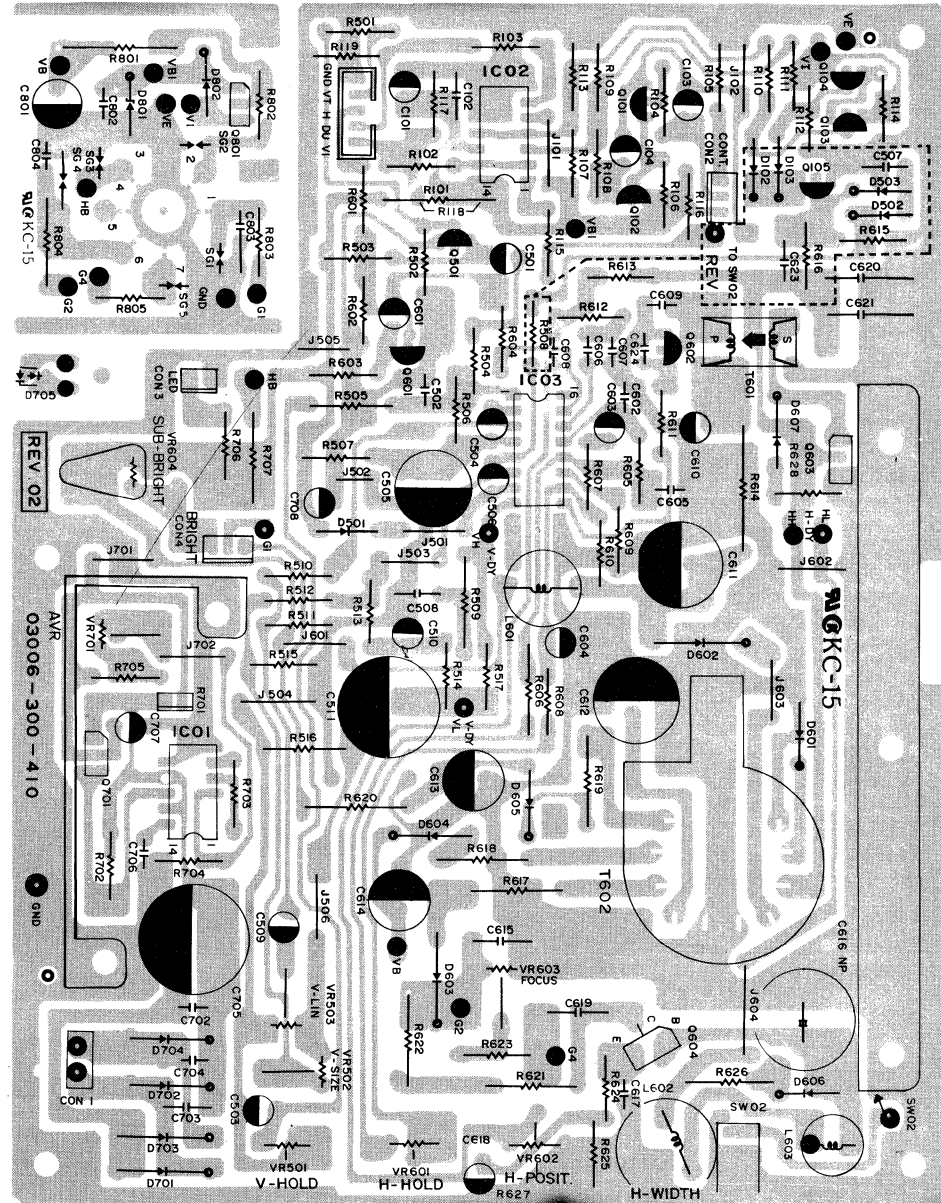
Signal cable loose or bad

WIRING DIAGRAM

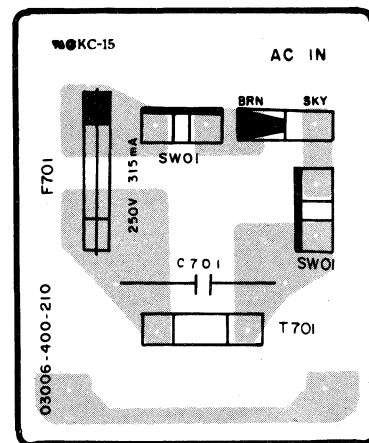


Pin	Function	Color	5	NC	-
1	NG	-	6	Dual	White
2	Ground	Black	7	Video	Orange
3	NC	-	8	Horizontal	Yellow
4	NC	-	9	Vertical	Blue

CIRCUIT BOARD DIAGRAM (PARTS SIDE)

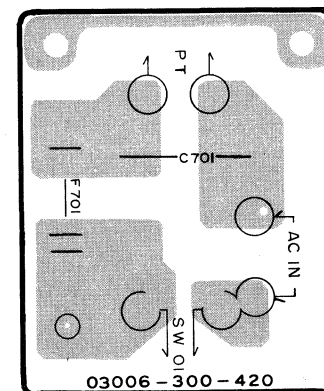
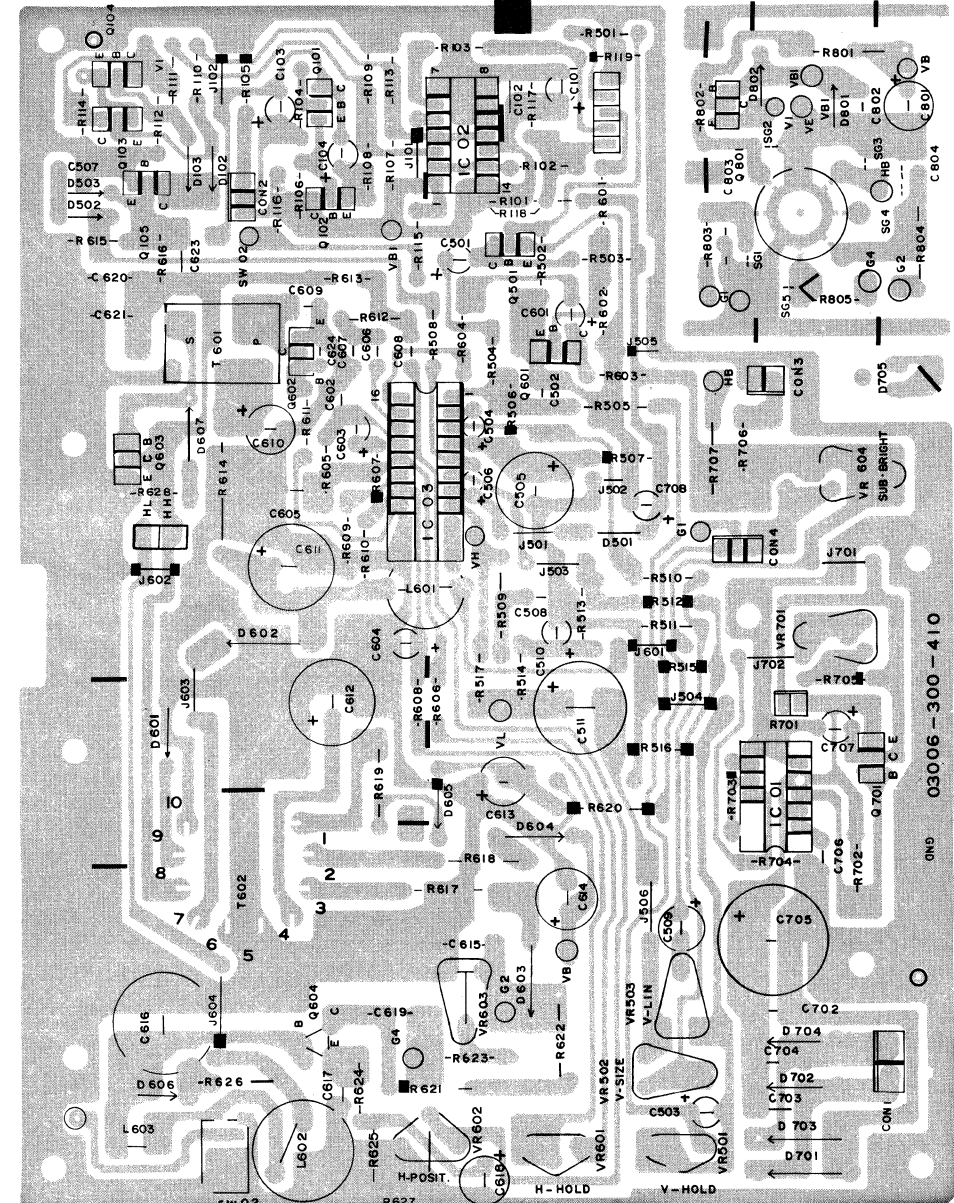


(AC120V)

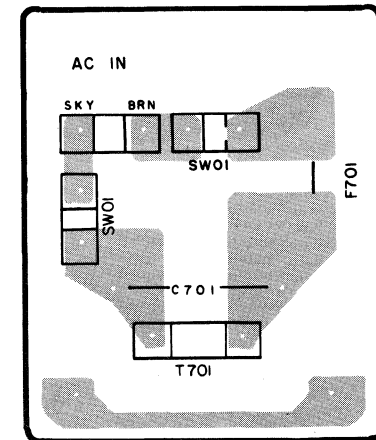


(AC220/240V)

CIRCUIT BOARD DIAGRAM (Foil Side)

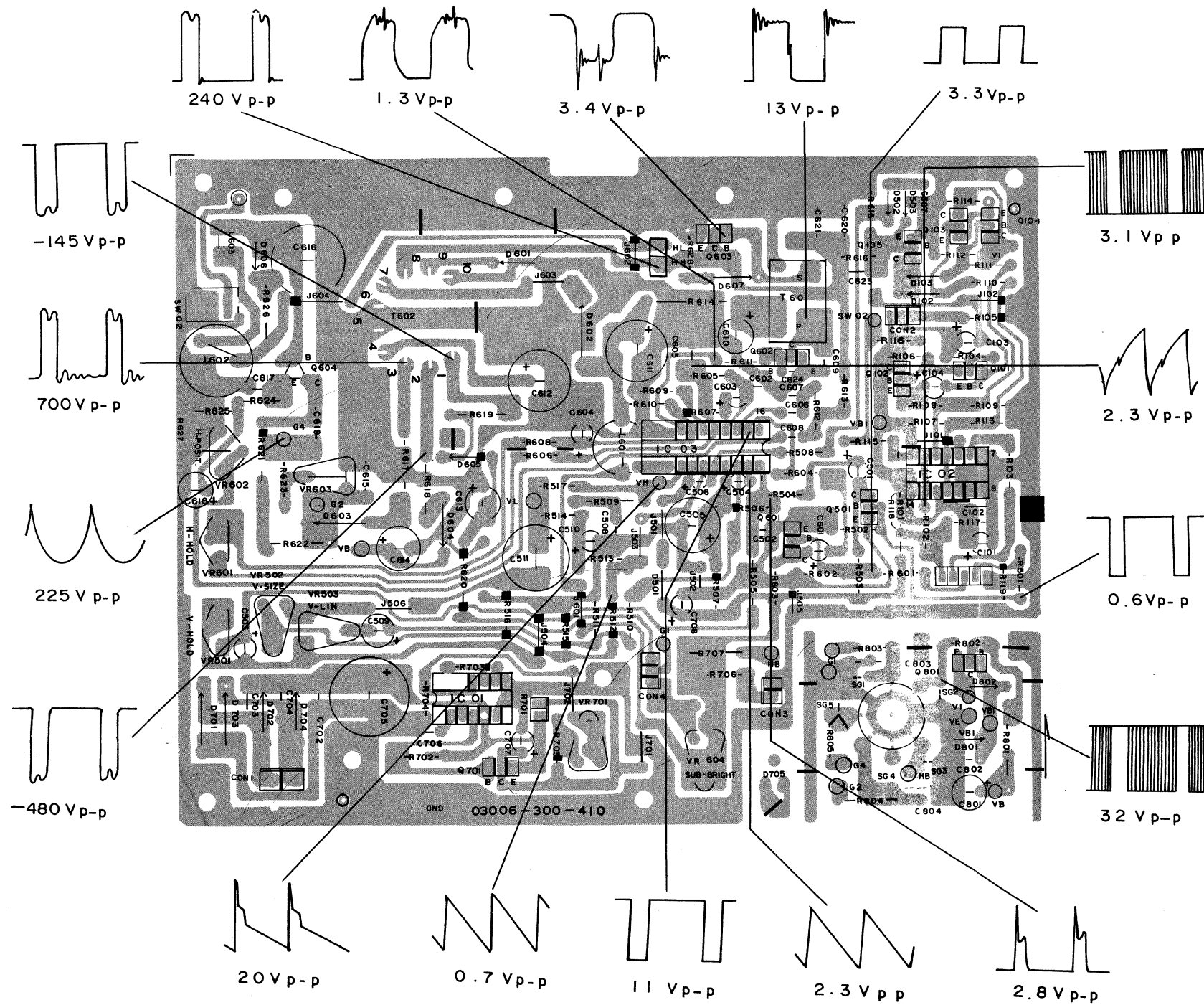


(AC120V)



(AC220/240V)

MONITOR PC BOARD ASSEMBLY (SOLDER SIDE)



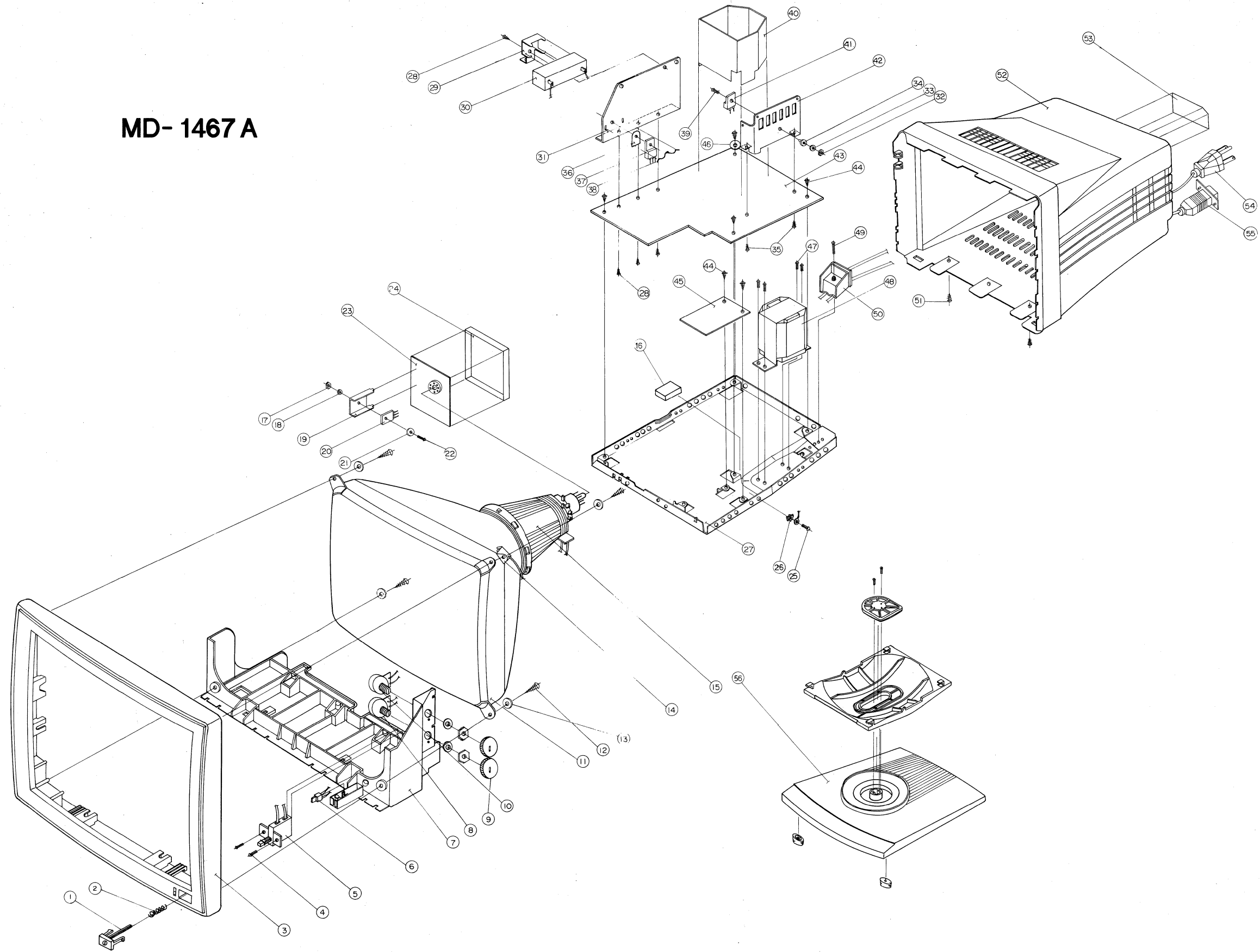
Measured with high impedance V.T.V.M. or circuit tester under line voltage 120V/220V/240VAC Voltage reading may vary ±10%. UNIT: Volts

TR. NO.	TR. TYPE	FUNCTION	B	C	E
Q501	KSC 815-Y	V-INPUT	0.65	0.3	0
Q601	KSC 815-Y	H-INPUT	0.14	9.7	0
Q602	2SD400F	H-DRIVE	0.36	9.28	14.6
Q603	BU406	H-OUT	0.06	18.4	4.5
Q701	TIP 42C	AVR	13.9	12	0
Q801	C2682	VI-OUT	5.1	44	0

ICS PIN NO.	IC03 VERT. OSC. & OUT	IC03 HOR. DRIVE	IC02 INVERTER	IC01 POWER REGULATOR
1	4.4	-	0	5.1
2	6.2	-	0	1.23
3	3.3	-	0	1.2
4	10.4	-	7.34	0
5	1.13	-	7.34	5.1
6	1.77	-	7.34	0
7	11.57	-	0	0
8	6.29	-	0	0
9	-	0.5	0	0
10	-	0.82	0	0
11	0.15	-	14.78	0
12	-	3.51	14.78	5.1
13	-	3.27	10.15	1.2
14	-	2.32	0	5.1
15	-	9.24	0	0
16	-	0	0	0

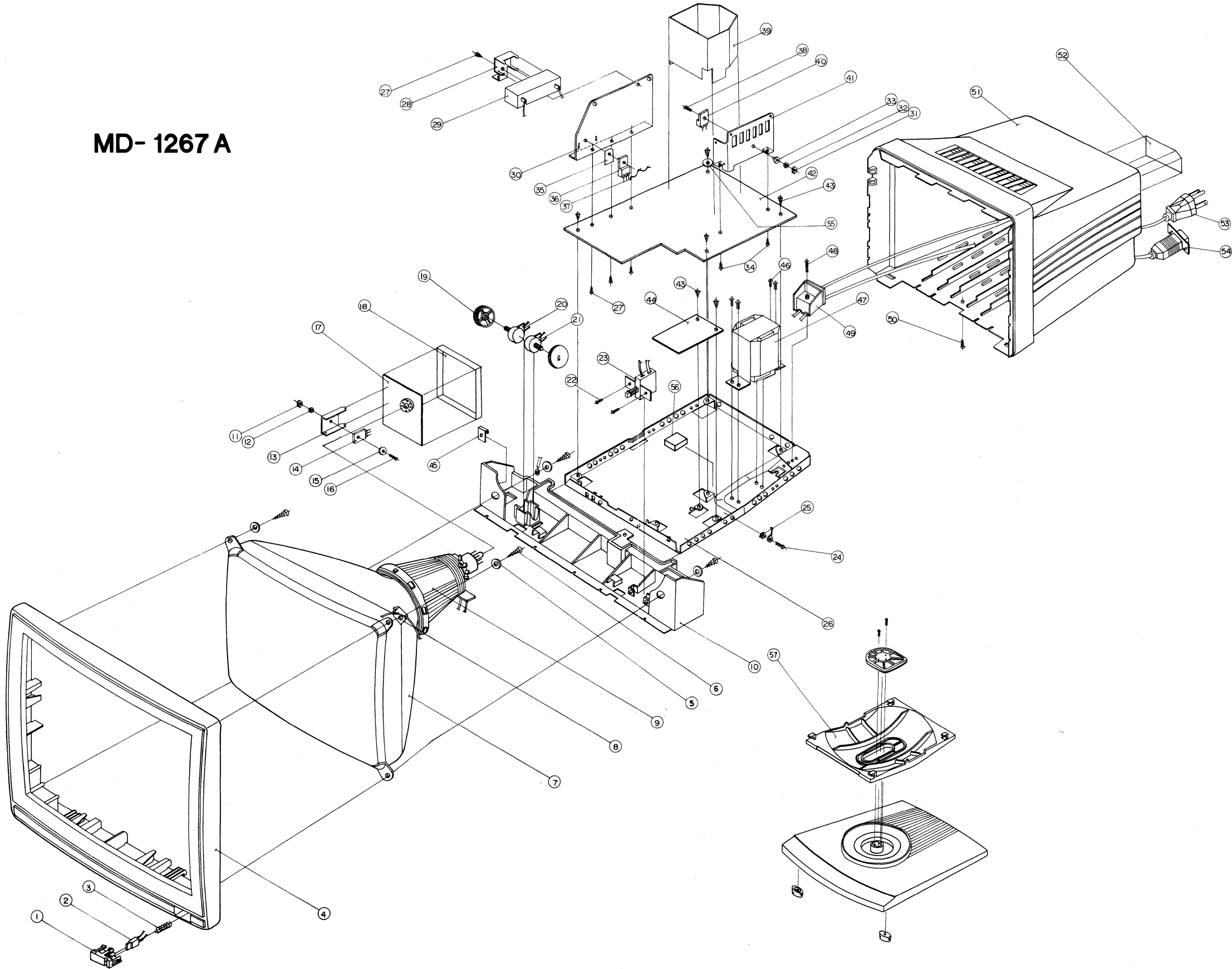
EXPLODED VIEW

MD-1467 A



EXPLODED VIEW

MD- 1267 A



EXPLODED VIEW PARTS LIST(MA467*)

REF NO.	DESCRIPTION	PARTS NO.	QTY	REMARK
1	KNOB-POWER;PPO VO BGE MD1467	07622-701-610	1	
2	SPRING-COIL;SUS-302 WPA PI0.5	06674-713-710	1	
3	COVER-FRONT;PPO VO BGE 000ZZZZBC	06000-706-010	1	#50924
4	SCREW-RH;M3X8 FE FZY	07048-130-081	2	
5	SWITCH-PUSH	ELEC. PARTS	1	ELEC. PARTS LIST
6	ASSY-LED	0M905-000-2750	1	
7	SUPPORT-CHASSIS;NOYRL PX-1005 PPO VO BGE	06460-700-210	1	#50924
8	ASSY-CONRAST,VR;MD1467	0M905-000-2820	1	
9	KNOB-VR;PPO VO BGE	07622-701-610	2	
10	ASSY-BRIGHT,VR;MD1467	0M905-000-2830	1	
11	CRT-MONOCHROME	ELEC. PARTS	1	ELEC. PARTS LIST
12	SCREW-TAP,TH;2S-4X20 FE FZY	07128-540-201	4	
13	WASHER-PLAIN;165216 FE FZY	07304-101-190	4	
14	EARTH-PLATE;PBS3 SP-H T0.3	04554-701-010	1	
15	DY;DMK1493AL	02439-056-710	1	
16	RUBBER-CRT;CR BLK	08464-702-210	4	
17	NUT-HEX;1-M3 FE FZY	07208-113-001	1	
18	WASHER-SPRING;PI 3.0 FE FZY	07318-103-001	1	
19	HEATSINK-TR VIDEO;A1050P H14 T1	05683-706-010	1	
20	TRANSISTOR;KSC2682	02149-301-540	1	
21	WASHER-PLAIN;103210 SPC-1 FZY	07304-101-020	1	
22	SCREW-RH; + M3X10 FE FZY	07048-130-101	1	
23	CRT PCB		1	
24	SHIELD-CASE;SPTE T0.3 06	04543-703-110	1	
25	SCREW-RH;M4X8 FE FZY	07048-140-081	2	
26	WASHEW-TOOTHED;B PI6XPI4	07328-204-001	2	
27	CHASSIS-FRAME;SECC T0.8	06021-702-510	1	
28	SCREW-TAP,RH;2S-3X8 FE FZY	07148-530-081	4	
29	HOLDER-CEMENT,R;SHBG-1/SECC-1 T0.8	06604-117-432	1	
30	R-CEMENT,WIRE;RP 20P 11-J	01039-927-110	1	
31	HEATSINK-TR,HORIZ;SECC-1 T1.0	05682-703-110	1	
32	NUT-HEX;1-M3 FE FZY	07028-113-001	2	
33	WASHER-SPRING;PI3.0 FE FZY	07328-103-001	2	
34	INSULATOR-TR;4.5-8D 2-2H N66 V-O	03934-103-110	2	
35	SCREW-TAP,RH;2S-3X8 FE FZY	07148-530-081	2	
36	PLATE-MICA;5-13X9 T0.09 RECT	03914-100-340	1	
37	TRANSISTOR;BU406	02159-301-411	1	
38	WASHEW-REC;SBC-1 T1.5 NI	07304-701-110	1	
39	SCREW-RH; + M3X10 FE FZY	07048-130-101	2	
40	SHIELD-FBT;SPTE T0.306	04542-701-114	1	
41	TRANSISTOR;TIP42C	02149-401-480	1	

REF NO.	DESCRIPTION	PARTS NO.	QTY	REMARK
42	HEATSINK-TR,POWER;SECC-1 T1.0	05683-705-920	1	
43	ASSY-MAIN.PCB	ELEC. PARTS	1	ELEC. PARTS LIST
44	SCREW-TAP,RH;2S-3X8 FE FZY W/WASHER	07154-230-081	7	
45	PCB-POWER	ELEC. PARTS	1	ELEC. PARTS LIST
46	CLAMP-CABLE;A1050S H14 T0.8	06634-704-210	1	
47	SCREW-TH; + M4X8 FE FZY	07028-140-081	4	
48	TRANS-POWER	ELEC. PARTS	1	ELEC. PARTS LIST
49	SCREW-PH;M4X25 FE FZB	07008-140-253	1	
50	HOLDER-CORD(A);NORYL PX-1005 VO BGE 00	06601-703-050	1	
51	SCREW-TAP,FH;2S-4X15 FE FZW	07118-540-152	2	
52	COVER-BACK;PPO VO BGE MD1467	06000-709-010	1	
53	LABEL-RATING;POLYESTER T0.166		1	
54	POWER-CORD,AC ASSY	ELEC. PARTS	1	ELEC. PARTS LIST
55	CABLE-SIGNAL,ASSY	ELEC. PARTS	1	ELEC. PARTS LIST
56	STAND-ASSY	08302-700-910	1	

EXPLODED VIEW PARTS LIST(MA267*)

REF NO.	DESCRIPTION	PARTS NO.	QTY	REMARK
1	KNOB-POWER;PPO VO BGE MD1267	07622-701-810	1	
2	ASSY-LED	0M905-000-2750	1	
3	SPRING-COIL;SUS-302 WPA PI0.5	06674-713-710	1	
4	COVER-FRONT;PPO VO BGE 000ZZZZBC	06000-708-010	1	
5	WASHER-PLAIN;162516 FE FZY	07304-101-190	4	
6	SCREW-TAP, TH;2S-4X20 FE FZY	07128-540-201	4	
7	CRT-MONOCHROME	ELEC. PARTS	1	ELEC. PARTS LIST
8	EARTH-PLATE;PBS3 SP-H T0.3	04554-701-010	1	
9	DY;DMK1493AL	02439-056-710	1	
10	SUPPORT-CHASSIS;NORYL PX-1005 PPO VO BGE	06460-700-210	1	
11	NUT-HEX;1-M3 FE FZY	07208-113-001	1	
12	WASHER-SPRING;PI 3.0 FE FZY	07318-103-001	1	
13	HEATSINK-TR, VIDEO;A1050P H14 T1	05683-706-010	1	
14	TRANSISTOR;KSC2682	02149-301-540	1	
15	WASHER-PLAIN;103210 SPC-1 FZY	07304-101-020	1	
16	SCREW-RH; + M3X10 FE FZY	07048-130-101	1	
17	CRT-PCB		1	
18	SHIELD-CASE;SPTE T0.306	04543-703-110	1	
19	KNOB-VR;PPO VO BGE	07622-701-610	2	
20	ASSY-BRIGHT, VR;MD1267	0M905-000-2730	1	
21	ASSY-CONTRAST, VR;MD1267	0M905-000-2740	1	
22	SCREW-RH;M3X8 FE FZY	07048-130-081	2	
23	SWITCH-PUSH	ELEC. PARTS	1	ELEC. PARTS LIST
24	SCREW-RH;M4X8 FE FZY	07048-140-081	2	
25	WASHER-TOOTHED	07328-204-001	2	
26	CHASSIS-FRAME;SECC T0.8	06021-702-510	1	
27	SCREW-TAP, RH;2S-3X8 FE FZY	07148-530-081	4	
28	HOLDER-CEMENT, R;SHBG-1/SECC-1 T0.8	06604-117-432	1	
29	R-CEMENT, WIRE;RP 20P 11-J	01039-927-110	1	
30	HEATSINK-TR, HORIZ;SECC-1 T1.0	05682-703-110	1	
31	NUT-HEX;1-M3 FE FZY	07028-113-001	2	
32	WASHER-SPRING;PI3.0 FE FZY	07328-103-001	2	
33	INSULATOR-TR;4.5-8D 2-2H N66 V-O	03934-103-110	2	
34	SCREW-TAP, RH;2S-3X8 FE FZY	07148-530-081	2	
35	PLATE-MICA;5-13X9 T0.09 RECT	03914-100-340	1	
36	TRANSISTOR;BU406	02159-301-411	1	
37	WASHER-REC;SBC-1 T1.5 NI	07304-701-110	2	
38	SCREW-RH; + M3X10 FE FZY	07048-130-101	2	
39	SHIELD-FBT;SPTE T0.306	04542-701-114	1	
40	TRANSISTOR;TIP42C	02149-401-480	1	
41	HEATSINK-TR, POWER;SECC-1 T1.0	05683-705-920	1	

REF NO.	DESCRIPTION	PARTS NO.	QTY	REMARK
42	PCB-MAIN	ELEC. PARTS	1	ELEC. PARTS LIST
43	SCREW-TAP,PH;2S-3X8 FE FZY W/WASHER	07154-230-081	7	
44	PCB-POWER	ELEC. PARTS	1	ELEC. PARTS LIST
45	CLAMP-CABLE;A1050S H14 T0.8	06634-704-210	1	
46	SCREW-TH; + M4X8 FE FZY	07028-140-081	4	
47	TRANS-POWER	ELEC. PARTS	1	ELEC. PARTS LIST
48	SCREW-PH;M4X25 FE FZB	07008-140-253	1	
49	HOLDE-CORD(A);NORYL PX-1005 VO BGE 00	06601-703-050	1	
50	SCREW-TAP,RH;2S-3X12 FE FZY	07148-530-122	1	
51	COVER-BACK;PPO VO BGE MD1267	06000-709-050	1	
52	LABEL-RATING		1	
53	POWER-CORD,AC ASSY	ELEC. PARTS	1	ELEC. PARTS LIST
54	CABLE-SIGNAL,ASSY	ELEC. PARTS	1	ELEC. PARTS LIST
57	STAND-ASSY	08302-700-910	1	

ELECTRICAL PARTS LIST

PRODUCT SAFETY GUIDE : Components marked with a Δ have special characteristic important to safety. Before replacing any of these components. Read carefully the SAFETY NOTICE on page of this service manual. Do not degrade the safety of the product through improper servicing. Component marked with an \blacktriangle are related to the X-ray protection circuit.

PARTS LIST

LOC No.	PARTS No.	DESCRIPTION
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ASSY - MAIN PCB

CAPACITORS

C101	01608-902-101	C-ELECTROLYTIC	CE04W(T) 10V 100M
C102	01505-723-104	C-POLYESTER	CQ921M(T) 100V 0.1M-J
C103	01608-904-100	C-ELECTROLYTIC	CE04W(T) 25V 10M
C104	01608-902-101	C-ELECTROLYTIC	CE04W(T) 10V 100M
C501	01608-906-109	C-ELECTROLYTIC	CE04W(T) 50V 1M
C502	01505-724-102	C-POLYESTER	CQ921M(T) 100V 0.001M-K
C503	01608-902-101	C-ELECTROLYTIC	CE04W(T) 10V 100M
C504	01629-201-140	C-TANTALIUM,SOLID	CS 25V 1M-K
C505	01603-904-471	C-ELECTROLYTIC	CE04W 25V 470M
C506	01608-904-470	C-ELECTROLYTIC	CE04W(T) 25V 47M
C507	NOT USED		
C508	01509-121-620	C-POLYESTER	CQ921M(T) 100V 0.22M-K
C509	01608-906-109	C-ELECTROLYTIC	CE04W(T) 50V 1M
C510	01608-904-100	C-ELECTROLYTIC	CE04W(T) 25V 10M
C511	01603-904-681	C-ELECTROLYTIC	CE04W 25V 680M
C601	01608-906-109	C-ELECTROLYTIC	CE04W(T) 50V 1M
C602	01505-723-682	C-POLYESTER	CQ921M(T) 100V 0.0068M-J
C603	01608-906-109	C-ELECTROLYTIC	CE04W(T) 50V 1M
C604	01608-904-100	C-ELECTROLYTIC	CE04W(T) 25V 10M
C605	01502-613-562	C-POLYPROPYLENE	CQ922M 50V 0.0056M-J
C606	01505-724-332	C-POLYESTER	CQ921M(T) 100V 0.0033M-K
C607	01505-723-273	C-POLYESTER	CQ921M(T) 100V 0.027M-J
C608	01505-724-332	C-POLYESTER	CQ921M(T) 100V 0.0033M-K
C609	01416-318-103	C-CERAMIC,HK	CK45B 50V 0.01M-K
C610	01608-904-101	C-ELECTROLYTIC	CE04W 25V 100M
C611	01603-904-471	C-ELECTROLYTIC	CE04W 25V 470M
C612	01603-904-471	C-ELECTROLYTIC	CE04W 25V 470M
C613	01609-403-240	C-ELECTROLYTIC	CE04W 160V 47M
C614	01609-403-100	C-ELECTROLYTIC	CE04W 100V 100M

LOC No.	PARTS No.	DESCRIPTION	
C615	01519-005-010	C-M,POLYESTER	CF922M 1KV 0.01M-K
C616	01609-802-020	C-ELECTROLYTIC,NPHF	CE04P 25V 6.8M
C617	01417-318-222	C-CERAMIC,HK	CK45(T)B 50V 2200-K
C618	01608-906-109	C-ELECTROLYTIC	CE04W(T) 50V 1M
C619	01519-005-010	C-M,POLYESTER	CF922M 1KV 0.01M-K
C620	01509-339-450	C-POLYPROPYLENE	CQ922M 630V 0.01M-K
C621	01502-653-332	C-POLYPROPYLENE	CQ922M 630V 0.0033M-J
C622	NOT USED		
C623	NOT USED		
C624	01416-318-103	C-CERAMIC,HK	CK45B 50V 0.01M-K
C701	NOT USED		
C702	01417-344-103	C-CERAMIC,HK	CK45(T)B 50V 0.01M-Z
△ C703	01417-344-103	C-CERAMIC,HK	CK45(T)B 50V 0.01M-Z
△ C704	01417-344-103	C-CERAMIC,HK	CK45(T)B 50V 0.01M-Z
C705	01609-401-750	C-ELECTROLYTIC	CE04W 25V 3300M
C706	01505-723-682	C-POLYESTER	CQ921M(T) 100V 0.0068-J
C707	01608-906-479	C-ELECTROLYTIC	CE04W(T) 50V 4.7M
C708	01608-904-100	C-ELECTROLYTIC	CE04W(T) 25V 10M
RESISTORS			
R101	01085-527-121	R-METAL,OXIDE	RS 2P 120-J(S)
R102	01018-277-101	R-CARBON	RD 1/4T 100-J
R103	01018-277-101	R-CARBON	RD 1/4T 100-J
R104	01018-277-271	R-CARBON	RD 1/4T 270-J
R105	01018-277-391	R-CARBON	RD 1/4T 390-J
R106	01018-277-222	R-CARBON	RD 1/4T 2.2K-J
R107	01018-277-511	R-CARBON	RD 1/4T 510-J
R108	01018-277-391	R-CARBON	RD 1/4T 390-J
R109	01018-277-182	R-CARBON	RD 1/4T 1.8K-J
R110	01018-277-470	R-CARBON	RD 1/4T 47-J
R111	01018-277-470	R-CARBON	RD 1/4T 47-J
R112	01018-277-821	R-CARBON	RD 1/4T 820-J
R113	01018-277-102	R-CARBON	RD 1/4T 1K-J
R114	01018-277-820	R-CARBON	RD 1/4T 82-J
R115	01018-277-101	R-CARBON	RD 1/4T 100-J
R116	01018-277-472	R-CARBON	RD 1/4T 4.7K-J
R117	01018-277-102	R-CARBON	RD 1/4T 1K-J
R118	01018-277-102	R-CARBON	RD 1/4T 1K-J
R119	01018-277-102	R-CARBON	RD 1/4T 1K-J
R501	01018-277-152	R-CARBON	RD 1/4T 1.5K-J
R502	01018-277-332	R-CARBON	RD 1/4T 3.3K-J
R503	01018-277-103	R-CARBON	RD 1/4T 10K-J
R504	01018-277-153	R-CARBON	RD 1/4T 15K-J

LOC No.	PARTS No.	DESCRIPTION	
R505	01018-277-472	R-CARBON	RD 1/4T 4.7K-J
R506	01018-277-103	R-CARBON	RD 1/4T 10K-J
R507	01016-377-151	R-CARBON	RD 1/2T 150-J(S)
R508	REVERSE FUNCTION		
R509	NOT USED		
R510	01018-277-153	R-CARBON	RD 1/4T 15K-J
R511	01018-277-183	R-CARBON	RD 1/4T 18K-J
R512	01018-277-123	R-CARBON	RD 1/4T 12K-J
R513	01018-277-153	R-CARBON	RD 1/4T 15K-J
R514	01018-277-153	R-CARBON	RD 1/4T 15K-J
R515	01018-277-151	R-CARBON	RD 1/4T 150-J
R516	01016-377-339	R-CARBON	RD 1/2T 3.3-J(S)
R517	01018-277-561	R-CARBON	RD 1/4T 560-J
R601	01018-277-471	R-CARBON	RD 1/4T 470-J
R602	01018-277-271	R-CARBON	RD 1/4T 270-J
R603	01018-277-102	R-CARBON	RD 1/4T 1K-J
R604	01018-277-331	R-CARBON	RD 1/4T 330-J
R605	01018-277-473	R-CARBON	RD 1/4T 47K-J
R606	01018-277-103	R-CARBON	RD 1/4T 10K-J
R607	01018-277-153	R-CARBON	RD 1/4T 15K-J
R608	01018-277-152	R-CARBON	RD 1/4T 1.5K-J
R609	01018-277-222	R-CARBON	RD 1/4T 2.2K-J
R610	01018-277-471	R-CARBON	RD 1/4T 470-J
R611	01018-277-471	R-CARBON	RD 1/4T 470-J
R612	01018-277-822	R-CARBON	RD 1/4T 8.2K-J
R613	01018-277-223	R-CARBON	RD 1/4T 22K-J
R614	01085-527-390	R-METAL,OXIDE	RS 2P 39-J(S)
R615	REVERSE FUNCTION		
R616	REVERSE FUNCTION		
R617	01016-377-339	R-CARBON	RD 1/2T 3.3-J(S)
R618	01016-377-339	R-CARBON	RD 1/2T 3.3-J(S)
R619	01016-377-479	R-CARBON	RD 1/2T 4.7-J(S)
R620	01018-277-683	R-CARBON	RD 1/4T 68K-J
R621	01016-377-274	R-CARBON	RD 1/2T 270K-J(S)
R622	01016-377-274	R-CARBON	RD 1/2T 270K-J(S)
R623	01018-277-684	R-CARBON	RD 1/4T 680K-J
R624	01018-277-472	R-CARBON	RD 1/4T 4.7K-J
R625	01018-277-183	R-CARBON	RD 1/4T 18K-J
R626	01016-377-221	R-CARBON	RD 1/2T 220-J(S)
R627	01018-277-102	R-CARBON	RD 1/4T 1K-J
R628	01018-277-330	R-CARBON	RD 1/4T 33-J
R701	01039-927-110	R-CEMENT,WIRE	RP 20P 11-J
R702	01018-277-680	R-CARBON	RD 1/4T 68-J

LOC No.	PARTS No.	DESCRIPTION	
R703	01018-277-392	R-CARBON	RD 1/4T 3.9K-J
R704	01018-277-822	R-CARBON	RD 1/4T 8.2K-J
R705	01018-277-392	R-CARBON	RD 1/4T 3.9K-J
R706	01018-277-122	R-CARBON	RD 1/4T 1.2K-J
R707	01016-377-339	R-CARBON	RD 1/2T 3.3-J(S)
SEMI-CONDUCTORS			
IC01	02119-601-080	IC-REGULATOR	L123CB
IC01	02119-601-980	IC-REGULATOR	LM723C
IC02	02109-104-790	IC-TTL	74LS266N
IC03	02119-101-370	IC	uPC1379C
IC03	02119-102-281	IC	KA2133
Q101	02139-103-387	TRANSISTOR	KSA733-Y(T)
Q102	02159-301-187	TRANSISTOR	KSC815-Y(T)
Q103	02139-301-347	TRANSISTOR	2N3904(T)
Q104	02139-301-347	TRANSISTOR	2N3904(T)
Q501	02159-301-187	TRANSISTOR	KSC815-Y(T)
Q601	02159-301-187	TRANSISTOR	KSC815-Y(T)
Q602	02139-401-390	TRANSISTOR	2SD400F
Q603	02159-301-411	TRANSISTOR	BU406
Q604	02139-401-730	TRANSISTOR	BUV46
Q604	02159-301-200	TRANSISTOR	KSC5021-R
Q701	02419-401-480	TRANSISTOR	TIP42C(SST)
D501	02169-201-067	DIODE	1N4002(T)
D601	02169-206-177	DIODE	RGP15J(T)
D602	02169-206-190	DIODE	RGP30G
D603	02169-206-020	DIODE	RGP01-12
D603	02169-206-297	DIODE	RGP02-12
D604	02169-206-177	DIODE	RGP15J(T)
D605	02169-206-107	DIODE	RGP10G(T)
D606	02169-206-107	DIODE	RGP10G(T)
D607	02169-301-417	DIODE	1N4148(T)
△ D701	02169-206-160	DIODE	GP15D
△ D702	02169-206-160	DIODE	GP15D
△ D703	02169-206-160	DIODE	GP15D
△ D704	02169-206-160	DIODE	GP15D
D705	02309-110-090	LED	KLG208E

LOC No.	PARTS No.	DESCRIPTION
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VARIABLE RESISTORS

VR501	01241-122-002	VR-SEMI	TVP 111 B5K
VR502	01241-123-017	VR-SEMI	TVP 085 B200
VR502	01244-102-301	VR-SEMI	CER8 92A B200
VR503	01241-123-017	VR-SEMI	TVP 085 B200
VR503	01244-102-301	VR-SEMI	CER8 92A B200
VR601	01241-122-012	VR-SEMI	TVP 111 B3K
VR603	01241-108-012	VR-SEMI	CET 92A B2.5M
VR604	01241-123-012	VR-SEMI	TVP 085 B200K
VR604	01241-108-008	VR-SEMI	CET 92A B200K
VR701	01241-108-005	VR-SEMI	CET 92A B3K

COILS AND TRANSFORMERS

L601	02429-856-710	COIL-CHOKE	145uH (+/- 10 %)MOLDING
L602	02449-434-510	COIL-H,WIDTH	33uH (+/- 40 %)
L603	02449-734-110	COL-LINEARITY	8.0uH/0A
△ T601	02849-032-310	TRANS-HORIZ,DRIVE	EI 19 X 5.5 mm(A)
△ T602	02859-128-911	TRANS-FLYBACK	FMH-1245AL(Z)

MISCELLANEOUS

CON1	03344-112-010	CONNECTOR-WAFER	5273-02A(MOLEX)
CON2	03349-062-020	CONNECTOR-WAFER	5045-03A(MOLEX)
CON3	03344-106-810	CONNECTOR-WAFER	5045-02A(MOLEX)
CON4	03349-062-020	CONNECTOR-WAFER	5045-03A(MOLEX)
SIGNAL	03344-154-040	CONNECTOR-PIN,BASE	B5B XH-A(JST)
LED(WIRE)	03054-612-070	CONNECTOR-LAMP,ASSY	MD1251K(LED)
PCB	03006-400-410	PWB-MAIN(WITH CRT)	197 X 153 MM (MD1258A)

ASSY - VR CONTROL

CONTROLS

VR101	01201-102-904	VR-ROUND SGL	18SN 10SK B1K
VR605	01201-102-905	VR-ROUND SGL	18SN 10SK B100K
VR101(WIRE)	03053-605-810	CONNECTOR-3P ASSY	2405 26T,GRY 300MM (MOLEX)
VR605(WIRE)	03054-612-640	CONNECTOR-BRT,ASSY	MD-1251G/MD1254G
△ S/W 01	03529-703-610	SWITCH-PUSH	ESB 90702V (240VAC REGION)
△ S/W 01	03529-702-210	SWITCH-PUSH	ESB 8213V (120VAC/220VAC REGION)
S/W(WIRE)	03054-617-040	CONNECTOR-AC ASSY	CONNECTOR-REP ASSY (120VAC REGION)

LOC No.	PARTS No.	DESCRIPTION	
S/W(WIRE)	03054-648-310	CONNECTOR-2P ASSY	H-YHR-3N L150MM (220VAC/240VAC REGION)
S/W(WIRE)	03054-648-320	CONNECTOR-2P ASSY	H-YHR-3N L100MM (WEST GERMANY)
ASSY - POWER			
C701	01566-513-224	C-M,POLYESTER,AC	CQS 922M 250V 0.22M (U/C)(NEMKO/FEMKO REGION)
C701	01565-512-224	C-M,POLYFILM	250 VAC 0.2uF (MUA)(W/GERMANY)
PCB	03006-300-420	PCB-POWER	MD1258A (120VAC REGION)
PCB	03006-400-210	PCB-POWER	MD1451A/UK (220VAC/240VAC REGION)
SW01	03344-131-020	CONNECTOR-WAFER	B3P-VH
△ FUSE	04709-083-621	FUSE	NMP 250V 0.75A 21MM-LEAD (120VAC REGION)
△ FUSE	04709-080-020	FUSE	250V T 315 mA 20MM (220VAC/240VAC REGION)
P/PCB	03093-700-310	BARRIER-POWER	PVC SHEET T0.8 VO BLK (ONLY 240VAC REGION)
POWER	07148-530-081 03124-700-810	SCREW-TAP,RH PIN-GT	2S 3 X 8 FE FZY 14.2 MM 2.35PIN
ASSY - CRT PCB			
Q801	02149-301-540	TRANSISTOR	KSC2682
D801	02169-404-767	DIODE-ZENER	RD 5.1EB1(T)
D802	02169-103-167	DIODE	1S2473(T)
C801	01409-403-060	C-ELECTROLYTIC	CE04W 100V 10M
C802	01416-318-103	C-CERAMIC,HK	CK45 B50V 0.01M-K
C803	01416-618-102	C-CERAMIC,HK	CK45 B1KV 1000-K
C804	01416-618-102	C-CERAMIC,HK	CK45B 1KV 1000-K
C805	01609-403-450	C-ELECTROLYTIC	CE04W 250V 1M
R801	01045-627-102	R-METAL,OXIDE	RS 3P 1K-J
R802	01018-277-101	R-CARBON	RD 1/4T 100-J
R803	01018-277-103	R-CARBON	RD 1/4T 10K-J
R804	01018-377-564	R-CARBON	RD 1/2T 560K-J
R805	01018-277-103	R-CARBON	RD 1/4T 10K-J
SG1	04569-001-110	SPARK-GAP	S-23(1KV)
SG2	02029-010-010	LAMP-NEON	DMS 90-130 VDC

LOC No.	PARTS No.	DESCRIPTION	
SG3	02029-010-010 03354-700-910	LAMP-NEON SOCKET-CRT	DMS 90-130 VDC 7 PIN
MISCELLANEOUS			
POWER TRANS			
△ T701	02869-302-010	TRANS-POWER	P:120VAC S:16.5VDC (120VAC REGION)
△ T701	02869-302-810	TRANS-POWER	P:220VAC S:16.8VDC (220VAC REGION)
△ T701	02869-303-210	TRANS-POWER	P:240VAC S:16.5VDC (240VAC REGION)
SIGNAL CABLE			
SIGNAL	03053-403-910 06634-704-210	CABLE-SIGNAL ASSY CLAMP-CABLE	MA457* A 1050S T 0.8
POWER-CORD			
△ 120VAC	03053-819-310	POWER-CORD AC ASSY	25-3012 (120VAC REGION/ONLY MA467*)
△ 120VAC	03053-819-510	POWER-CORD ASSY	MA2675 (120VAC REGION/ONLY MA267*)
△ 220VAC	03053-819-410	POWER-CORD AC ASSY	LP34 MA256* (220VAC REGION/ONLY MA467*)
△ 220VAC	03054-812-310	POWER-CORD AC ASSY	LP34 HO5VVF
△ 240VAC	03054-644-610	CONN-POWER AC ASSY	CD1468W3 (240VAC REGION/ONLY MA467*)
△ 240VAC	03054-644-620	POWER-CORD ASSY	CD1453M1 (240VAC REGION/ONLY MA267*)
△ AUSTR.	03054-813-410	POWER-CORD ASSY	LP23 GFC-3R (ONLY AUSTRALIA)
ASSY-DY			
△ DY	02439-056-710	DEFL-YOKE	DMK-1294AL
CRT			
△ CRT	02019-125-210	CRT-MONOCHROME-U/C	12HBY LAN (MA2675)
△ CRT	02019-125-910	CRT-MONOCHROME-U/C	M29 EAB 2LA/PD (MA2675)
△ CRT	02019-125-310	CRT-MONOCHROME-U/C	12 HBY P39N (MA2673)
△ CRT	02019-125-810	CRT-MONOCHROME-U/C	M29 EAB 2GR/PD (MA2673)
△ CRT	02019-126-010	CRT-MONOCHROME-U/C	M29 EAB 2WD/PD (MA2671)
△ CRT	02019-133-910	CRT-MONOCHROME-U/C	M32 ECB 2LA/PD (MA4675)
△ CRT	02019-133-810	CRT-MONOCHROME-U/C	M32 ECB 2GR/PD (MA4673)
△ CRT	02019-133-710	CRT-MONOCHROME-U/C	M32 ECB 2WD/PD (MA4671)

LOC No.	PARTS No.	DESCRIPTION	
REVERSE FUNCTION (OPTIONAL)			
Q105	02139-302-747	TRANSISTOR	KSC945-Y(T)
C507	01509-121-300	C-POLYESTER	CQ921M 100V 0.22M-J
C623	01407-012-809	C-CERAMIC,TEMP	CC45(T) SL 50V 8-C
R508	01018-277-101	R-CARBON	RD 1/4T 100-J
R615	01018-277-222	R-CARBON	RD 1/4T 2.2K-J
R616	01018-277-563	R-CARBON	RD 1/4T 56K-J
VR602	01246-101-175 05104-707-011	VR-SEMI(SHAFT) VR-SHAFT	SN8285 B2K CTS(201-S0021) NYLON DL-94V-2
D102	02169-103-167	DIODE	1S2473(T)
D103	02169-103-167	DIODE	1S2473(T)
D502	02169-404-767	DIODE-ZENER	UZ5.1B(T)
D503	02169-103-167	DIODE	1S2473(T)
SW02	03529-704-310	SWITCH-PUSH	MPB-1A-2-2N
ASSY - COMBINATED PARTS			
120VAC	0M905-000-3500	ASSY-POWER SWITCH	SWITCH (120VAC REGION)
220VAC	0M905-000-3290	ASSY-POWER SWITCH	SWITCH (220VAC REGION)
240VAC	0M905-000-3580	ASSY-POWER SWITCH	SWITCH (240VAC REGION)
MA467*	0M905-000-2820	ASSY-CONTRAST VR	MA4675A(120VAC REGION)
MA467*	0M905-000-2830	ASSY-BRIGHT VR	MA4675A(120VAC REGION)
MA467*	0M905-000-3300	ASSY-BRIGHT VR	MA4675G (220VAC/240VAC REGION)
MA467*	0M905-000-3310	ASSY-CONTRAST VR	MA4675G (220VAC/240VAC REGION)
MA267*	0M905-000-2730	ASSY-BRIGHT VR	MD1267A(COMMON)
MA267*	0M905-000-2740	ASSY-CONTRAST VR	MD1267A(COMMON)
COMMON	0M905-000-1590	ASSY-TR(POWER)	BD534L (TIP42C:B +)
COMMON	0M905-000-1600	ASSY-TR(HORIZ)	BU406 (HORIZ. OUTPUT)
COMMON	0M905-000-1610	ASSY-R,CEMENT	PB1272A(SHUNT REGISTOR)
COMMON	0M905-000-2220	ASSY-TR(VIDEO)	KSC2682(VIDEO OUTPUT)

SCHEMATIC DIAGRAM

CHASSIS NO: GSJ

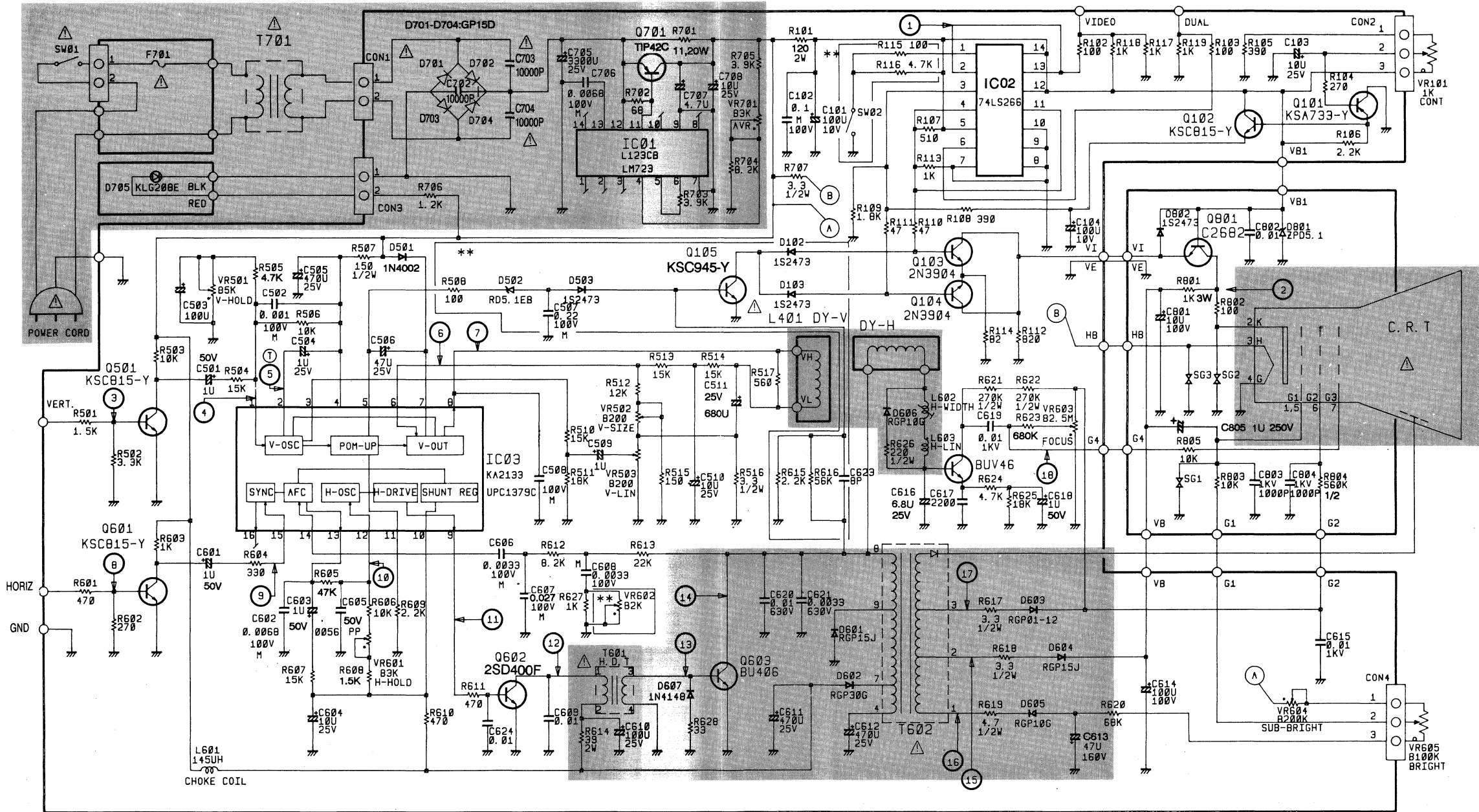
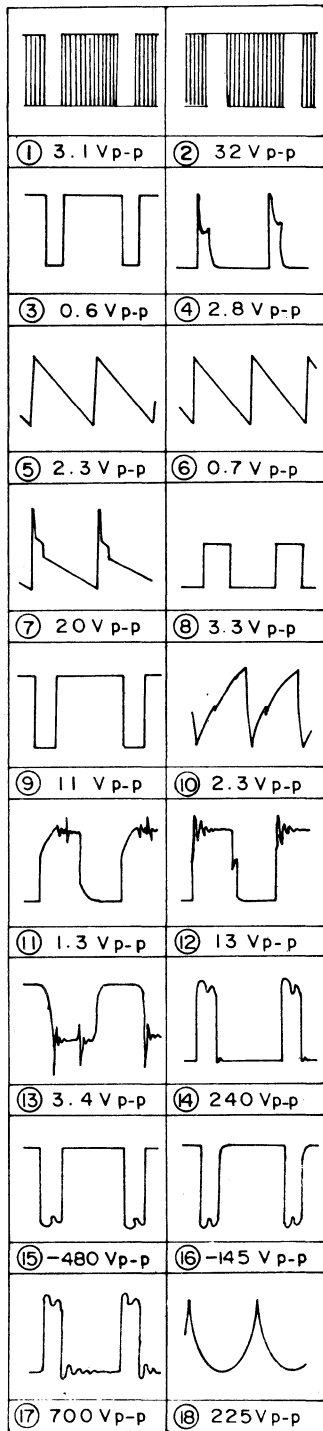
- * : CRT PHOSPHOR TYPE
1-WHITE 3-GREEN 5-AMBER
- ** : ADDITION FOR USING REVERSE MODE.

NOTES






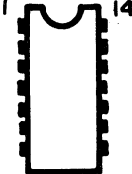
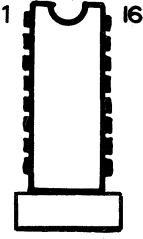
1. RESISTOR VALUES ARE IN (OHM)
K=1,000 (OHM) M=1,000,000 (OHM)
2. ALL RESISTORS ARE 1/4W EXCEPT WHERE OTHERWISE INDICATED.
3. ALL CAPACITORS ARE 50V EXCEPT WHERE OTHERWISE INDICATED.
4. CAPACITOR VALUES ARE UF UNLESS OTHERWISE INDICATED.
5. " \perp ": THE SYMBOL OF GROUND.

WARNING

"THE EQUIPMENT CONTAINS SAFETY CRITICAL COMPONENTS. ALL PARTS SHOWN IN THE SHSDED AREAS ON THE SCHEMATIC ARE SAFETY CRITICAL FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS. REFER TO PARTS LIST FOR EXACT REPLACEMENTS."



SEMICONDUCTOR LEAD IDENTIFICATION

SEMICONDUCTORS	DESCRIPTION	REF. NO.	SEMICONDUCTORS	DESCRIPTION	REF. NO.
	2SD 400-F	Q602		BD 534-L TIP 42C BUV 46 KSC 5021	Q701 Q604
	KSC 945-Y KSA 733-Y KSC 815-Y 2N 3904	Q101 Q102 Q103 Q104 Q501 Q601 Q105		KSC2682-O	Q801
	BU 406	Q603		L123CB LM723 74LS266N	IC01 IC02
	UPC1379C KA2133	IC03			



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