

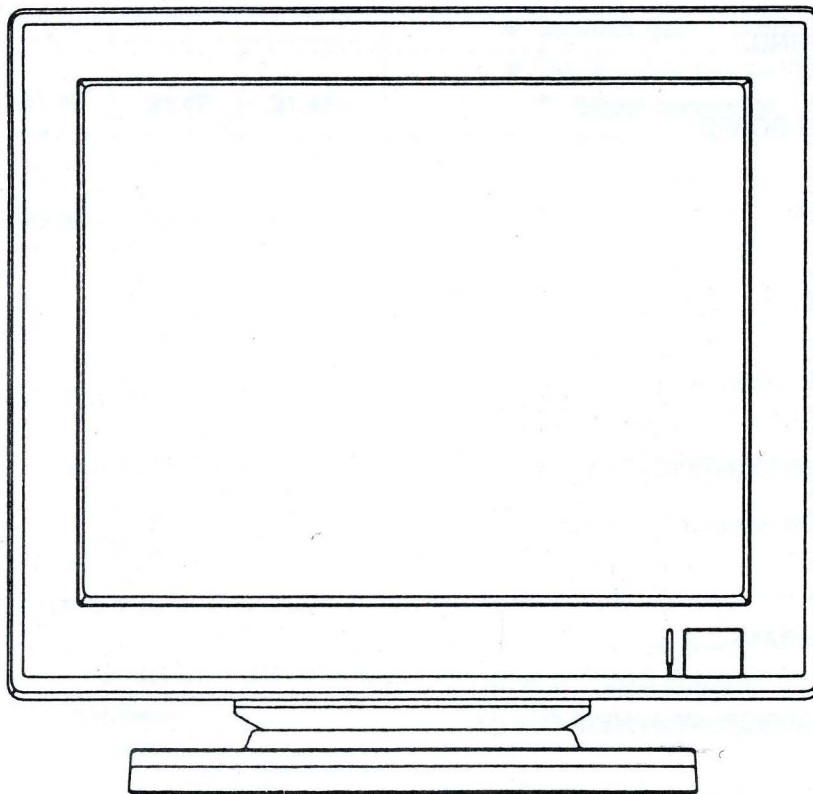


# SERVICE MANUAL

# VGA MONO MONITOR

**ML467 \***

**ML267 \***



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# SPECIFICATION

## 1. Monitor Descriptions

This CRT display monitor is operates in a separate drive mode input and is compatible with IBM PS/2.

## 2. Display Monitor Electrical Characteristics

- AC power input
  - \* Power supply :
    - 1) 110-120VAC 60HZ - USA version
    - 2) 220VAC 50HZ - Europe version
  - \* Power consumption :
    - 1) AC 0.6A MAX-USA version
    - 2) AC 0.4A MAX-Europe version
- Video
  - \* Input : 0.7Vp-p Separate ANALOG signal.
  - \* Band width : 30 MHZ at-3dB
  - \* Video gain : 20 Vp-p min.
- Synchronous
  - \* Type : Separate, TTL level,3-Mode
  - \* Input synchronizing signals :

	Mode 1	Mode 2	Mode 3
Horizontal			
1) Frequency(kHz)	31.47	31.47	31.47
2) Polarity	+	-	-
Vertical			
1) Frequency	70.08	70.08	59.95
2) Polarity	-	+	-
Resolution(H X V)	720x 350	720x 400	640x 480

- Recommendable display area

MODEL	Width[MM]	Height[MM]	Remark
ML2671	207±3	155±3	
ML4671	230±3	170±3	

- Cathode ray tube specification

MODEL	CRT size	Face radius	Remark
ML2671	12"	1200mm	
ML4671	14"	1524mm	

- \* Deflection angle : 90°
- \* Implosion protection :  
Shrinkage band with mounting lug.
- \* Phosphor : WD(paper white)
- \* Face : Direct etched

- High voltage
  - \* Anode voltage :  
12 KV±0.5KV at 1K= 0 uA
  - \* Voltage regulation :  
300V max.(1K = 0 to 40uA)
- Tilt : ±1° max.
- Picture linearity
  - Horizontal : 6% max.
  - Vertical : 6% max.
- Geometric distortion
  - Any horizontal and vertical lines should be within the horizontal and vertical 3.0mm slits.
- Brightness
  - \* Max.brightness : 80 F/L(USA)  
60 F/L(EUROPE)
- Contrast gain : 12dB min.
- Signal cable pin connection
  - \* Signal connector : 15 pin miniature "D" shell type.
  - \* Connection :
 

Pin 1 : no pin	Pin 9 : no Pin
Pin 2 : video signal	Pin 10 : no pin
Pin 3 : no pin	Pin 11 : no pin
Pin 4 : no pin	Pin 12 : digital ground.
Pin 5 : self test	Pin 13 : H-sync.
Pin 6 : no pin	Pin 14 : V-sync.
Pin 7 : video return	Pin 15 : no pin
Pin 8 : no pin	

## 3. Mechanical Characteristics

MODEL	Dimension <sub>s</sub> WxHxD[MM]	Weight [Kg]	Remarks
ML2671	309X251X307	7.5	W/STAND
ML4671	320X308.4X326	8.3	W/STAND

## IMPORTANT SERVICE SAFETY INFORMATION

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 servicemen 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 conduit 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.

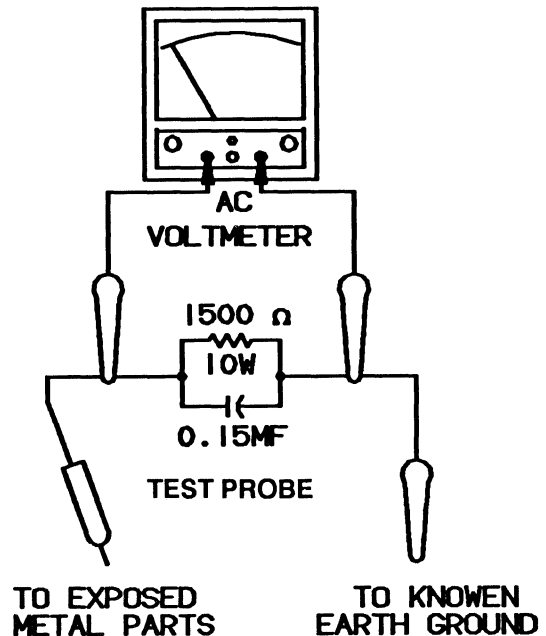


Figure 1. Leakage Current Test Circuit

### 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 ! 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 is a high-resolution monochrome display monitor, using a paper-white phosphored CRT with etched faceplate.

It uses one video signal input and separated sync signals.

It can operate in all of the VGA modes.

## DESCRIPTION

### 1. Main Board

#### 1-1. Power Supply

This is a constant-frequency switch-mode power supply using L4960 monolithic integrated circuit. The output voltage regulation is achieved by means of a variable duty cycle. The output voltage of this power supply is fed back into the pin 2 of L4960. This voltage is compared to reference voltage internally. The difference of these voltages control the duty cycle of output current. D401 to D404, and C404 to C405 from input DC supplier. C408, C409, R404 are the components for frequency compensation, R403, C406 are for oscillation of sawtooth wave. C407 is for soft start of this circuit. D405 is a flywheel diode for continuous flowing current. Output voltage is varied by adjusting VR401 potentiometer.

#### 1-2. Horizontal processor IC302

IC302 performs following functions.

- Horizontal oscillator
- Phase-locked loop for frequency and phase comparison.
- Phase-locked loop to compensate various delay times of the horizontal output transistor.

The sync signal from Q303 is fed into pin 3 of IC302 and flyback pulse into pin 4. These two signals are compared and the circuit is locked to a correct frequency and phase.

#### 1-3. Horizontal output stage Q305

Q305 is a horizontal output switch which is closed during the scan period and opened during the flyback. It sinks a driver signal from IC302 through Q304. The flyback period is determined by the resonance of C316 and deflection yoke. C316 makes the necessary S-correction.

Because of the losses in the deflection yoke, a linearity correction is required. This is achieved by L302.

The horizontal screen size can be varied by adjusting L303. The high voltage of 12.5KV for CRT anode is also generated in the flyback transformer by use of the flyback pulse.

#### 1-4. Vertical processor IC 201

IC201 performs following functions.

- Vertical oscillator
- Ramp generator
- Linearity control
- Output amplifier

There are three vertical size controls : VR202, VR203, and VR204. VR202 is for mode 3, VR203 for mode 2, and VR204 for mode 1. Each mode is automatically selected by IC301.

#### 1-5. Dynamic Focus

Q501 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.

### 2. CRT Board

IC101(M51392P) contains wide bandwidth video amplifier, gain control, pedestal clamp and brightness control circuit. Q103 and Q104 from a cascade video amplifier circuit of which its output is applied to the cathode pin of the CRT.

### **3. Line Filter Board**

This board contains fuse and EMI filter components.

**IMPORTANT :**

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

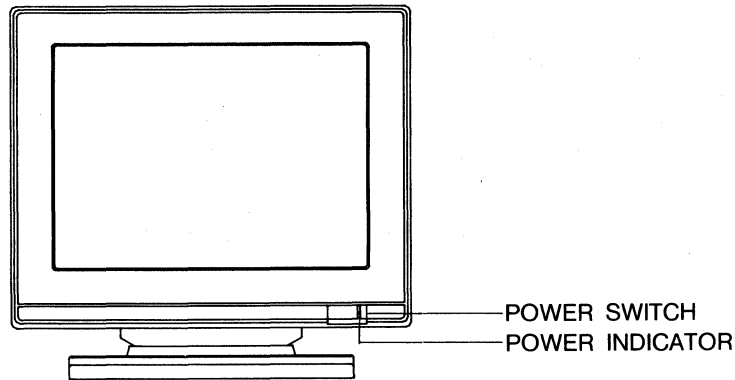
**\*NOTE :**

The adjustment requires the connection of a personal computer to the monitor. Although the monitor is adjusted before it is delivered, readjustment may be required when the setting position is changed or when a component is replaced.

# MAJOR OPERATING COMPONENTS

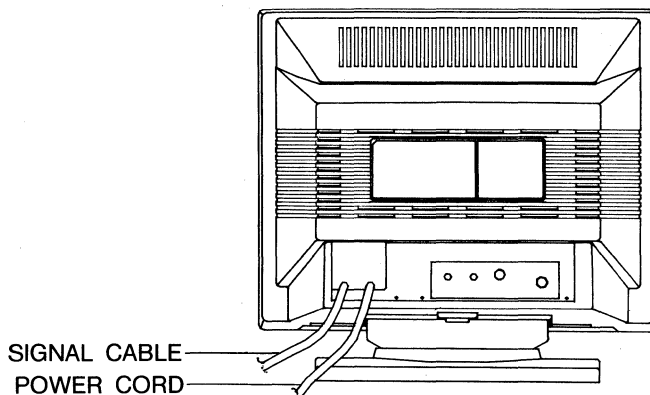
ML2671

## 1. FRONT VIEW



1) Power Switch : Push the power switch to turn the unit ON.

## 2. REAR VIEW



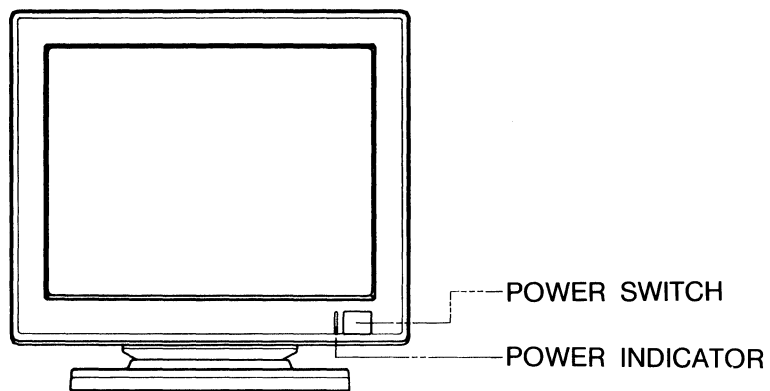
- 2) Power Indicator : When the monitor is on, the power indicator(Green) will light go on.
- 3) Brightness Control : Turning this control adjusts the overall brightness.
- 4) Contrast Control : Turning this control adjusts this display contrast.
- 5) Signal Cable : Connector to the terminal of CPU.
- 6) Power Cord : Connect with specified outlet



## MAJOR OPERATING COMPONENTS

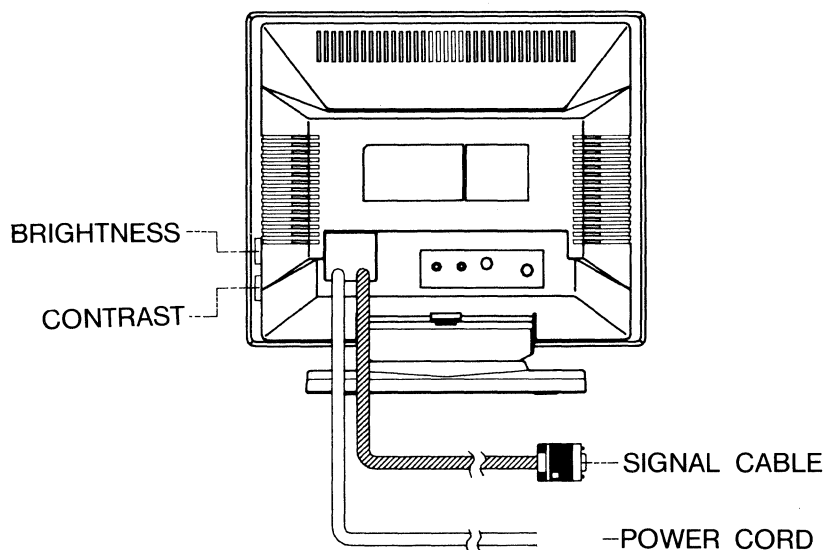
ML4671

### 1. FRONT VIEW



1) Power Switch : Push the power switch to turn the unit ON.

### 2. REAR VIEW



- 2) Power Indicator : When the monitor is on, the power indicator(Green) will light go on.
- 3) Brightness Control : Turning this control adjusts the overall brightness.
- 4) Contrast Control : Turning this control adjusts this display contrast.
- 5) Signal Cable : Connector to the terminal of CPU.
- 6) Power Cord : Connect with specified outlet

# DISASSEMBLY INSTRUCTIONS

## 1. Fig. A (CABINET)

Loosen two screws (A) holding Cover-Rear and Cover-Front, and the screw (B) in order to release the Cover-Rear from the Chassis-Frame, and the screw (C) in order to release Cover-Rear from the Back-Holder, Cord.

Remove the Cover-Rear by pulling Cover-Rear backward while pushing the inner latches in direction of (E), using two jigs(D).

## 2. Fig. B (PWB's)

1) The CRT must be discharged firstly. Refer to the high voltage discharge procedure for important safety precautions.

2) Remove the CRT's anode cap(a) from the CRT.

3) Disconnect the ground lead and remove the PWB-CRT

from the Chassis-Frame.

4) Remove Chassis-Frame from the Cover-Front by loosening screws (b).

5) Loosen two screws (c) holding the Chassis-frame and Back-Holder, Cord.

6) Loosen five screws (d) from the Chassis-Frame and remove PWB-Main.

7) Loosen two screws (e) from the Chassis-Frame and remove PWB-Power.

8) Loosen four screws (f) to remove Trans-Power from the Chassis-Frame.

9) Remove the lug-terminal from the Chassis-Frame by unscrewing (g).

FIGURE A, CABINET

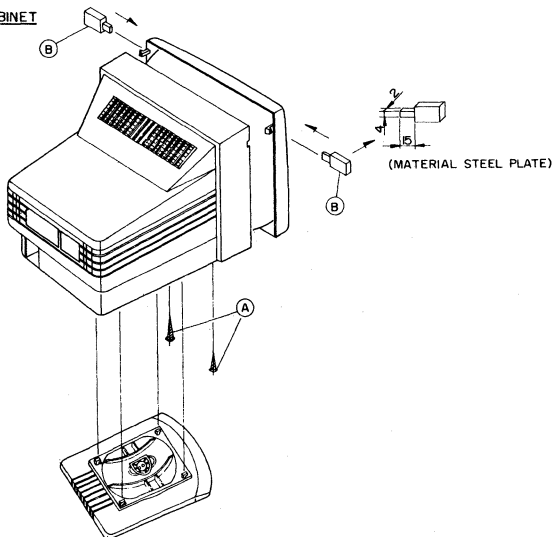


FIG 1

FIGURE B, PCBS

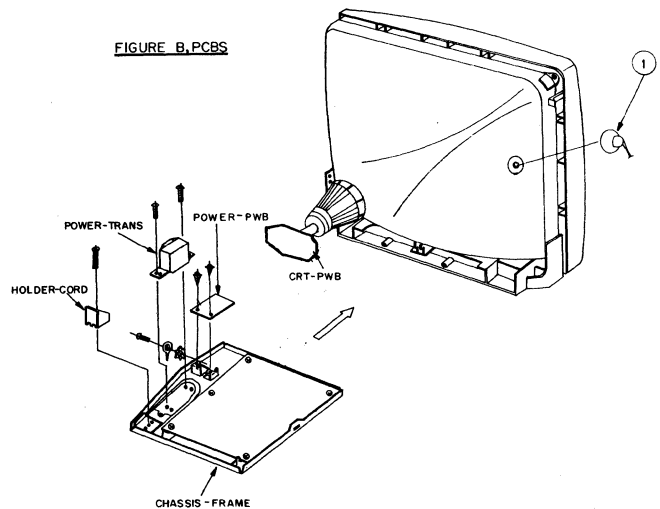
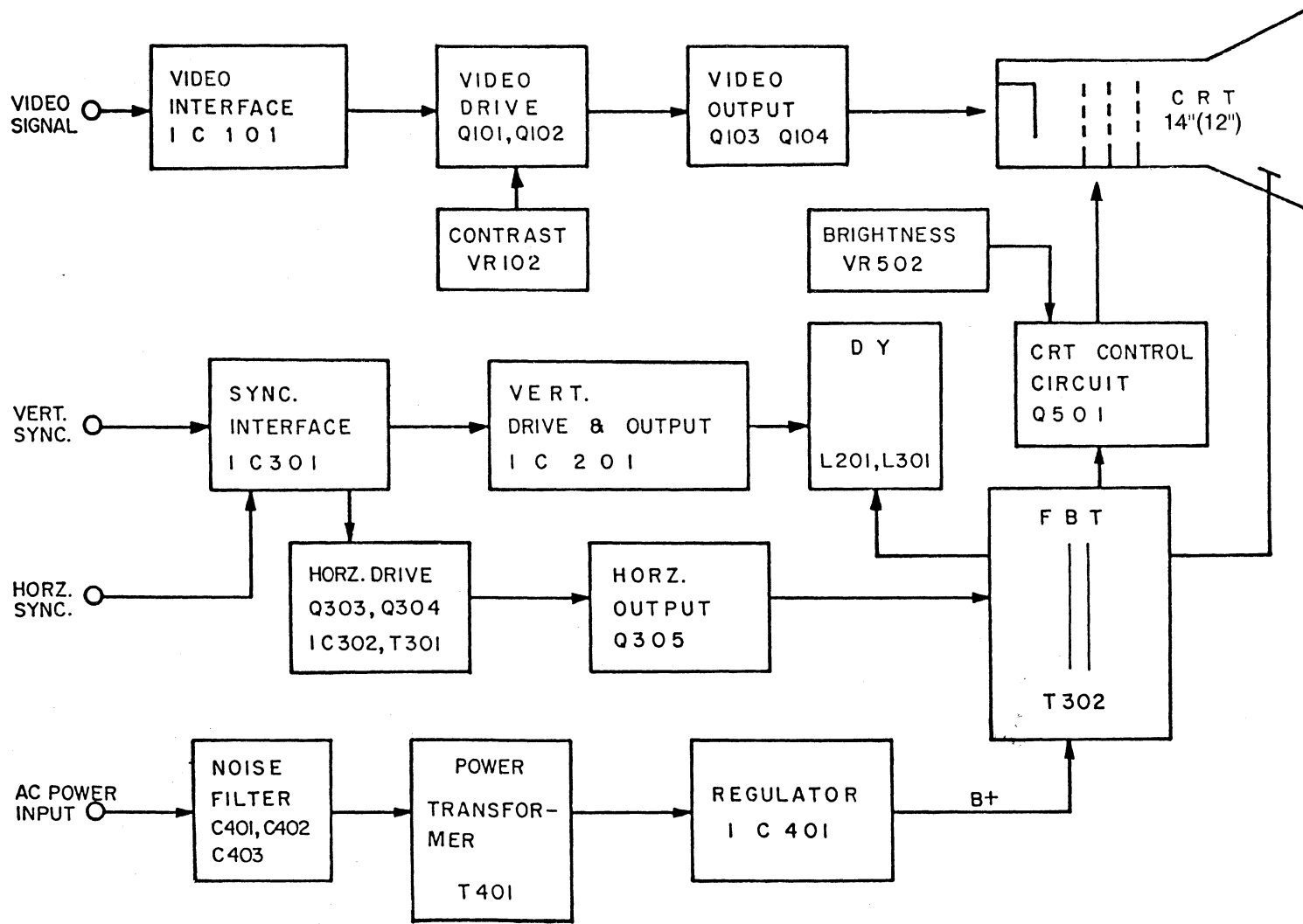


FIG 2



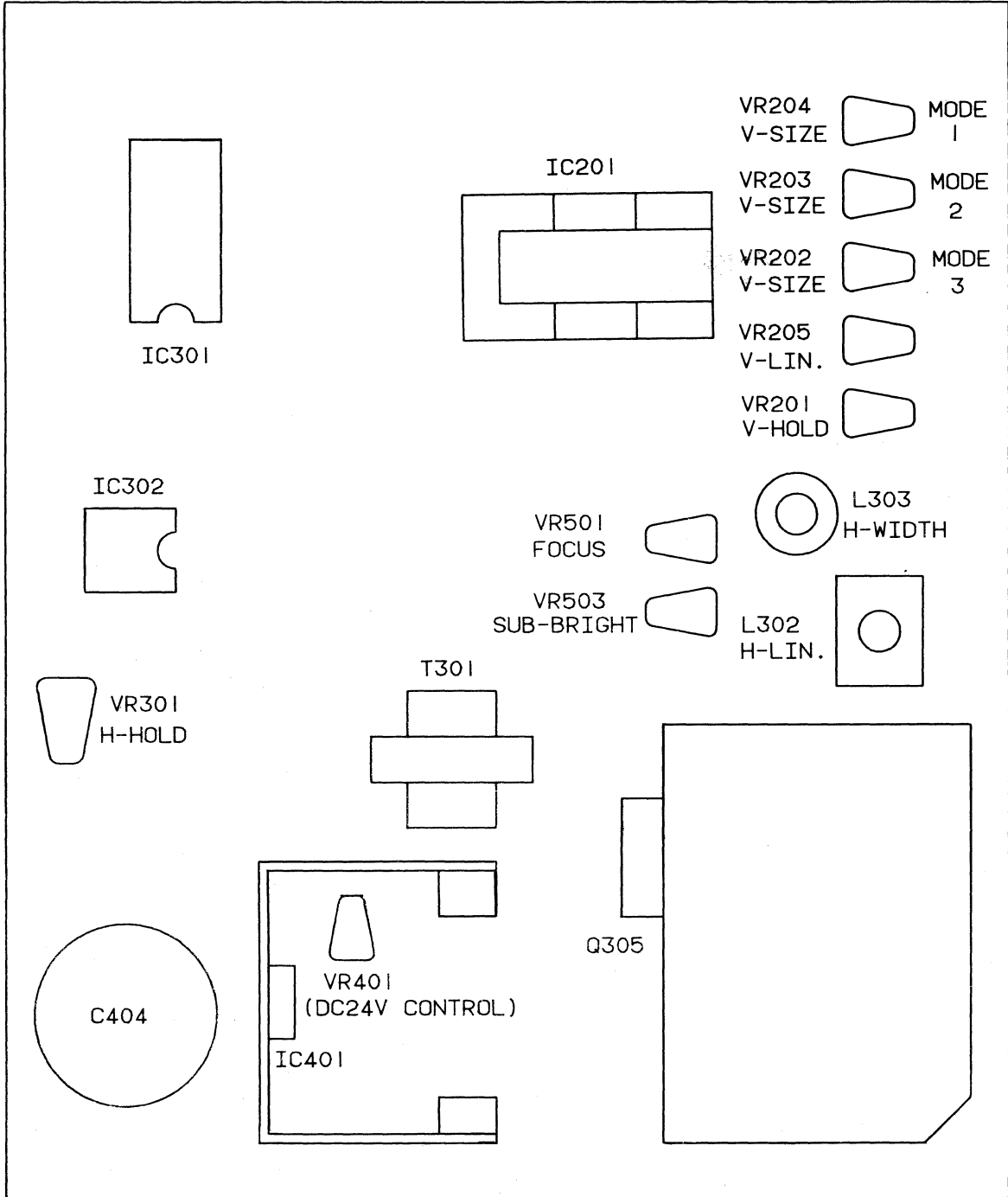
BLOCK DIAGRAM

## ADJUSTMENT METHOD

SEQUENCE	ITEM	ADJUSTED BY	GOAL	ADJ.CONDITION	REMARKS
1	B + (FBT SUPPLY VOLTAGE)	VR401 (V-ADJST)	+ 24 ± 0.2V		
2	H - HOLD	VR301 (H-HOLD)	Adjust screen at horizontal center position of raster.		
3	H-LINEARITY	L302 (H-LIN)	A same character size of horizontal axis.	FULL CROSS HATCH PATTERN or FULL "H" PATTERN.	
4	H-WIDTH	L303	Refer to the page 4.	(MODE3) Set FULL WHITE PATTERN and brightness 30F/L. Next, change to CROSS HATCH PATTERN	
5	V-HOLD	VR201	Vertical free running Frequency: 54 ± 2(Hz).	No signal.	
6	V-LINEARITY	VR205	A same character size of Vertical axis	FULL CROSS-HATCH PATTERN or FULL "H" PATTERN	
7	V-SIZE	1)VR202 (V-SIZE1) 2)VR203 (V-SIZE2) 3)VR204 (V-SIZE3)	Refer to the page 4. (MODE3) A same sequence 7-1.(MODE2) A same sequence 7-1.(MODE1)	A same condition as the adjustment method sequence #4.	
8	CENTERING	CENTERING MAGNET OF DEFLECTION YOKE	Adjust screen at central point.		
9	TILT	DEFLECTION YOKE	Turn the DY in order to adjust within ± 1 deg of tilt.		
10	GEOMETRIC	G/D COMPENSATION MAGNET	Adjust G/D by magnet in order to enter within overlay jig.		
11	BRIGHTNESS	VR503 (SUB-BRT.)	Adjust VR503 in order to instantly disappear the back-raster.	Center = position (detent) of VR502 (EXT-BRT.)	
12	CONTRAST	VR101 (SUB-CONT.)	Adjust VR101 in order to make brightness to 40 ± 5F/L.	Set FULL WHITE PATTERN(MODE3). Next, set VR102 (CONTRAST) to max.	
13	FOCUS	VR501	Adjust VR501 in (FOCUS)	FULL "H" PATTERN order to make the total focus of the screen to optimal status.	

# ALIGNMENT INSTRUCTIONS

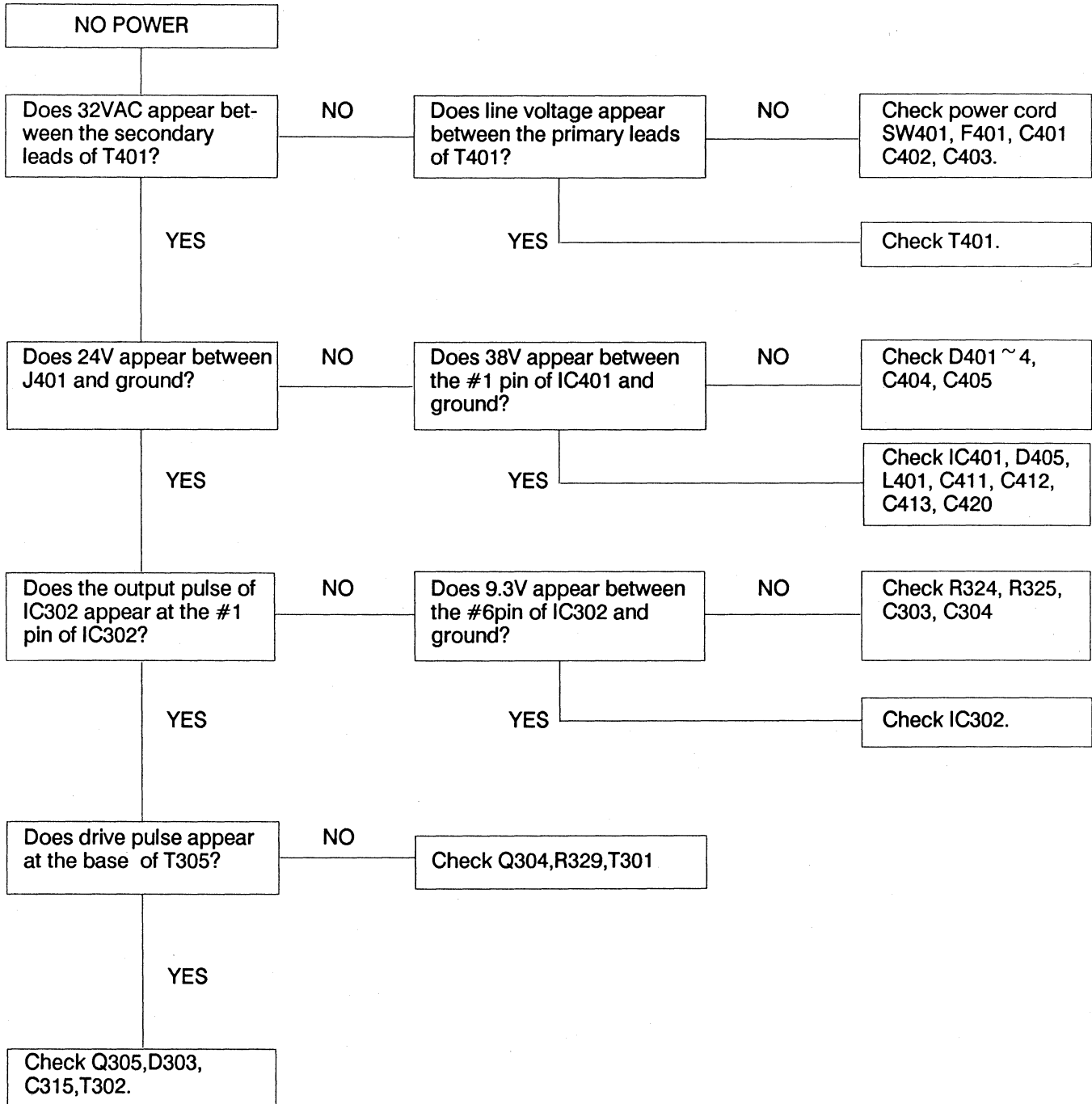
## Alignment Parts and Locations



# TROUBLE SHOOTING

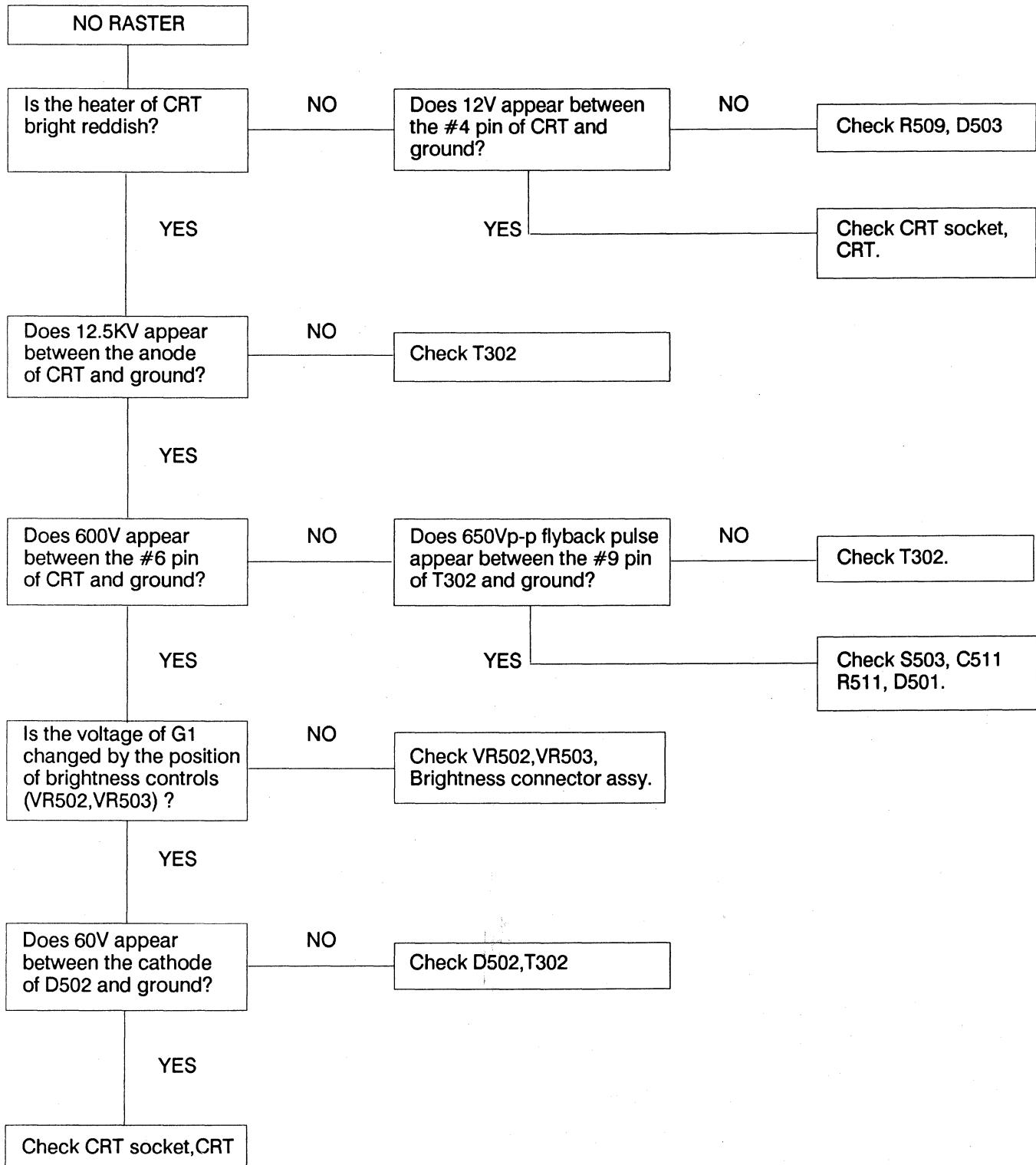
## 1. NO POWER

No raster appears and power indicator is not ON in spite of supplying rated AC power input.



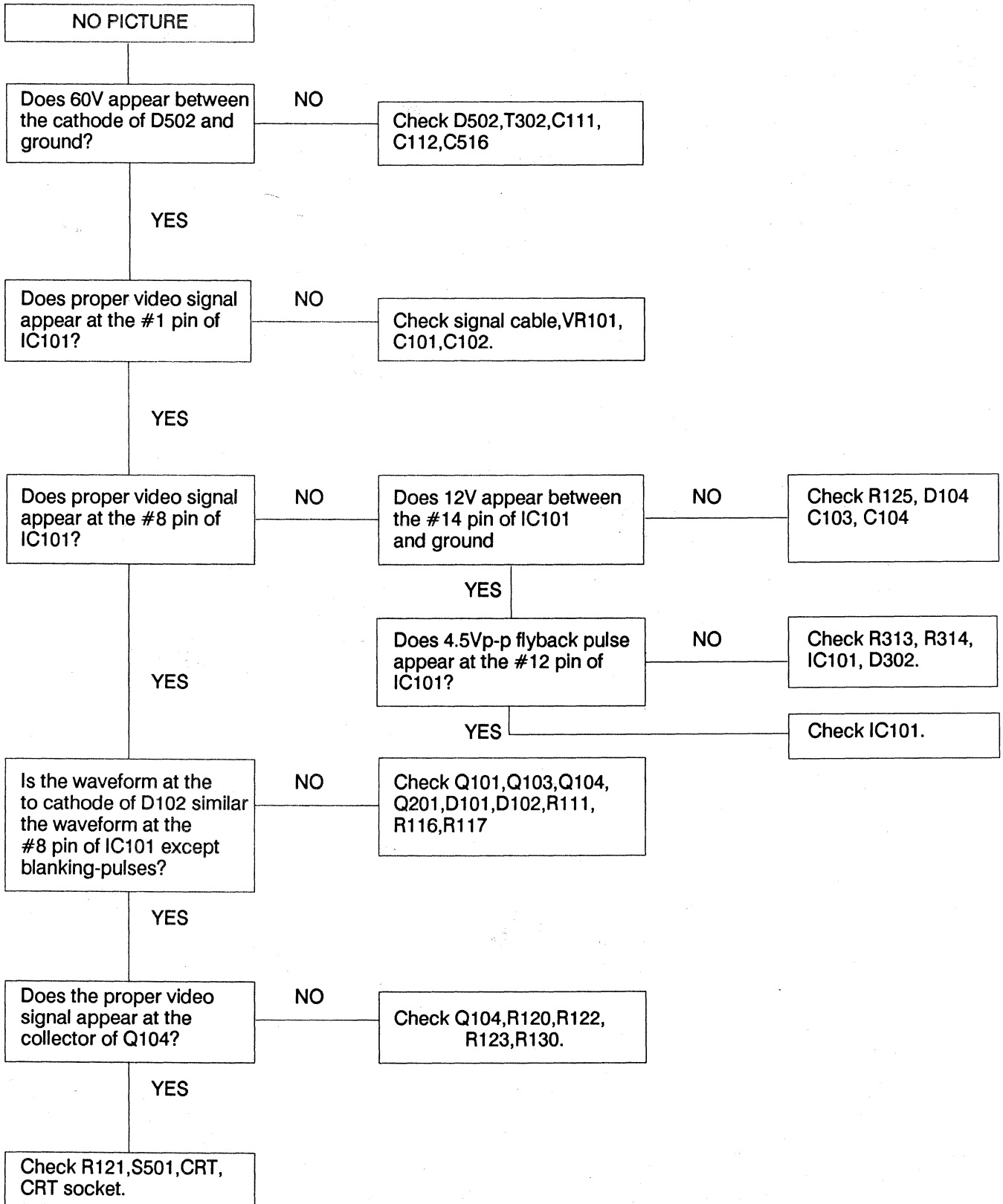
## 2. NO RASTER

Power supply and horizontal circuits operate normally, but there is no raster.



### 3. NO PICTURE

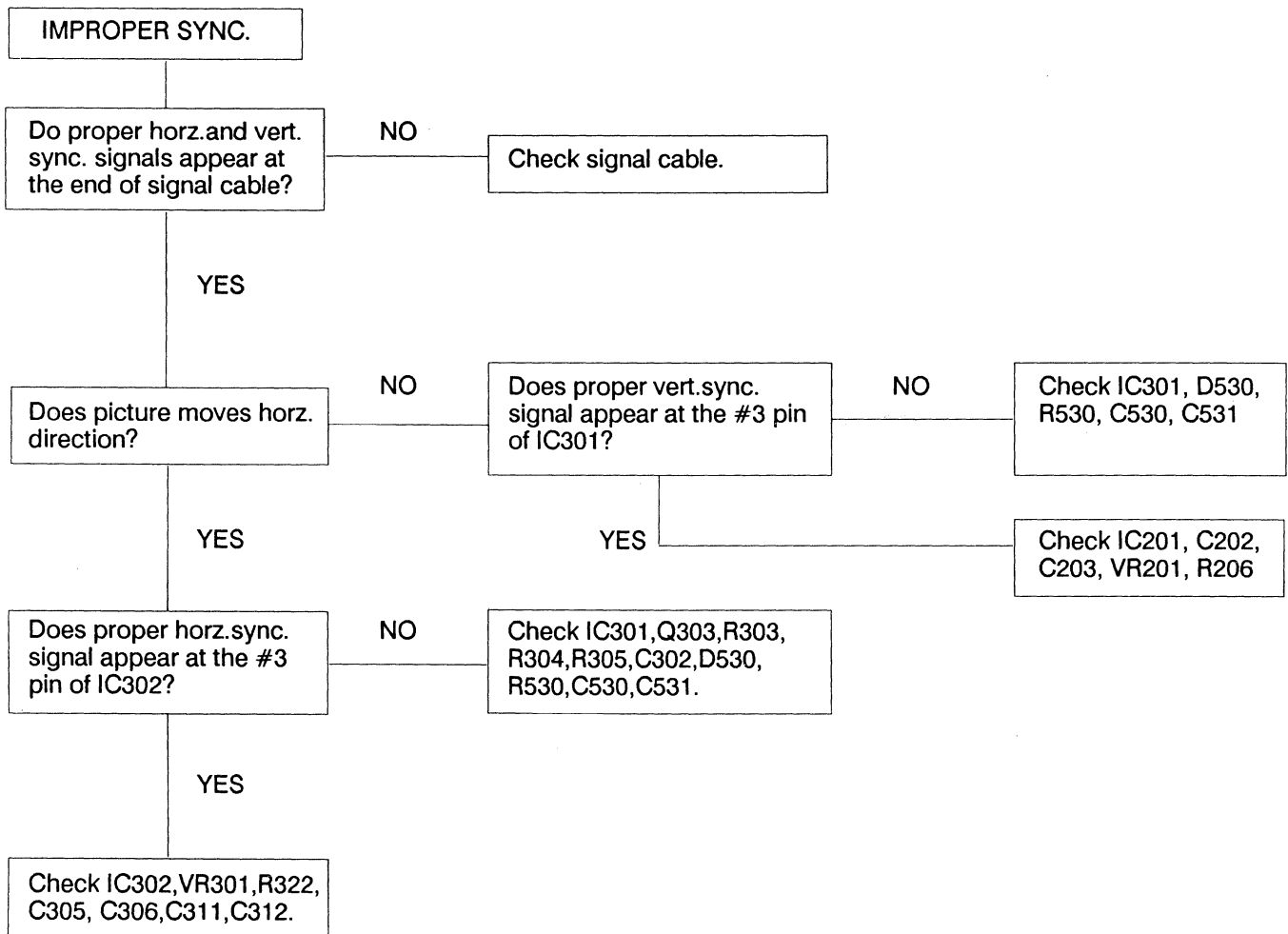
No picture on screen video signal source is properly connected.





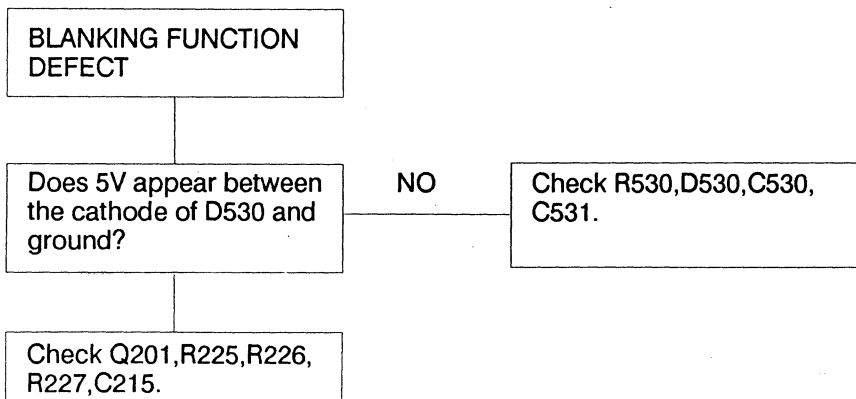
#### 4. IMPROPER HORIZONTAL OR VERTICAL SYNCHRONIZATION

There is no stable. It moves horizontal or vertical direction.



#### 5. BLANKING FUNCTION DEFECT.

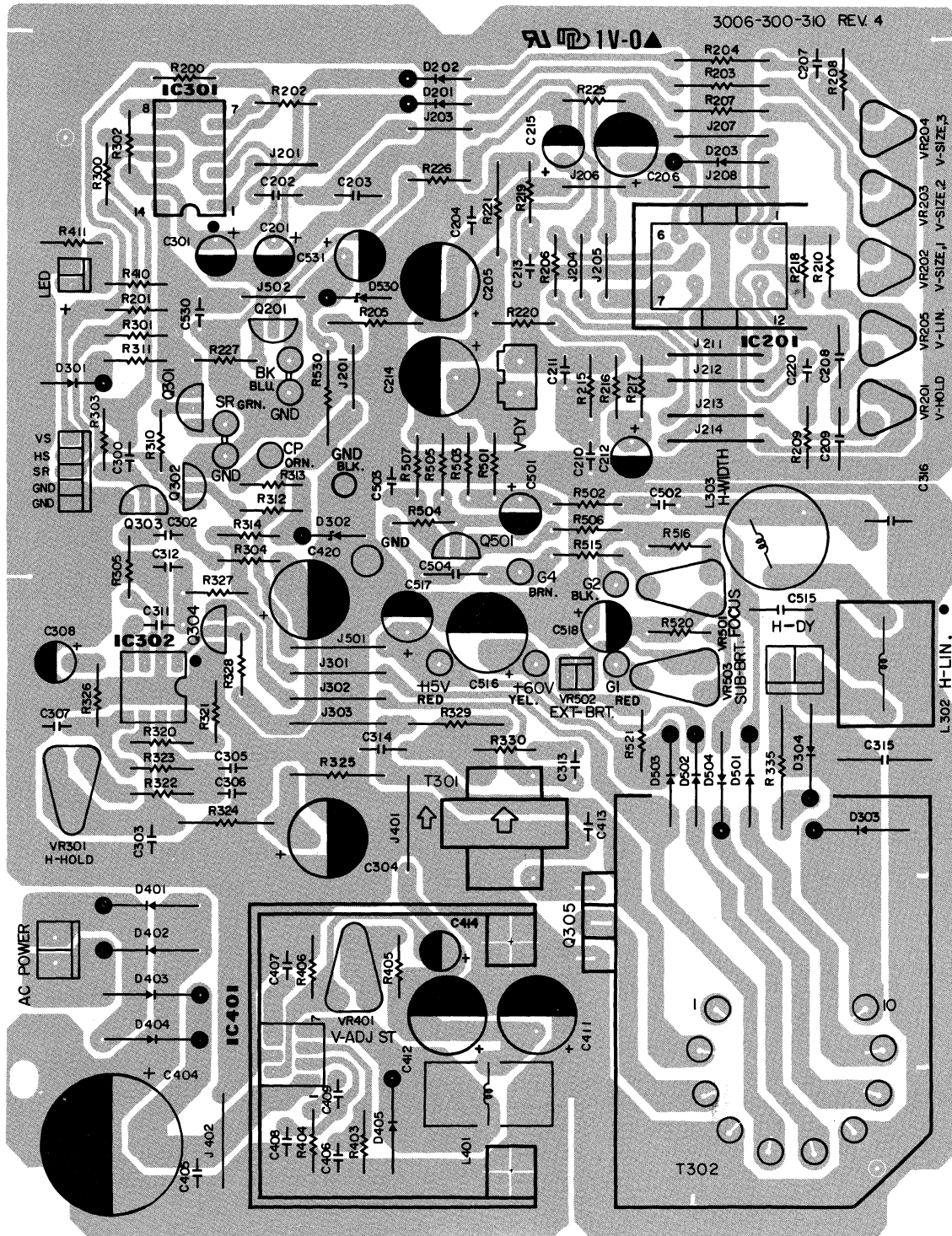
Vertical retrace line appears on the screen when the external brightness control(VR502) is set to the high range.



# P.C.BOARD VIEWS

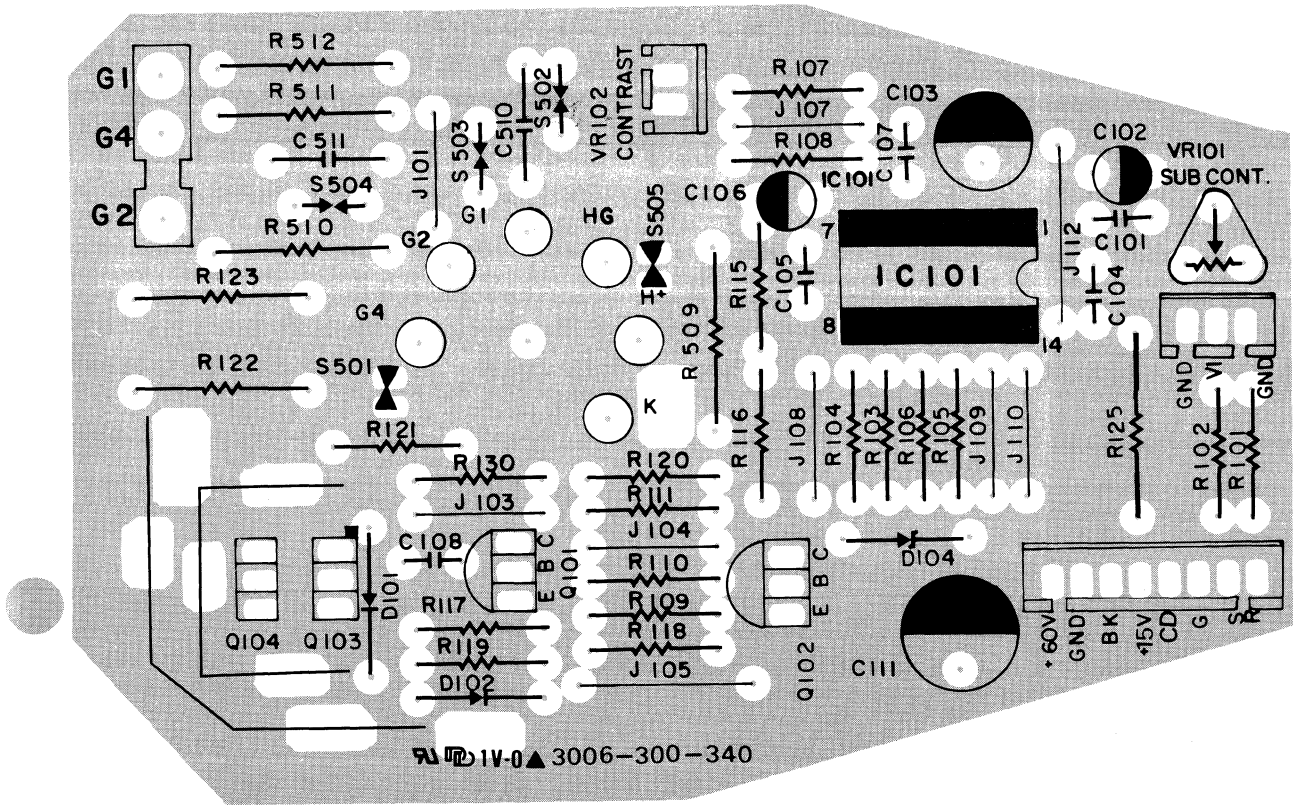
## Main PCB

Top View



# Video PCB

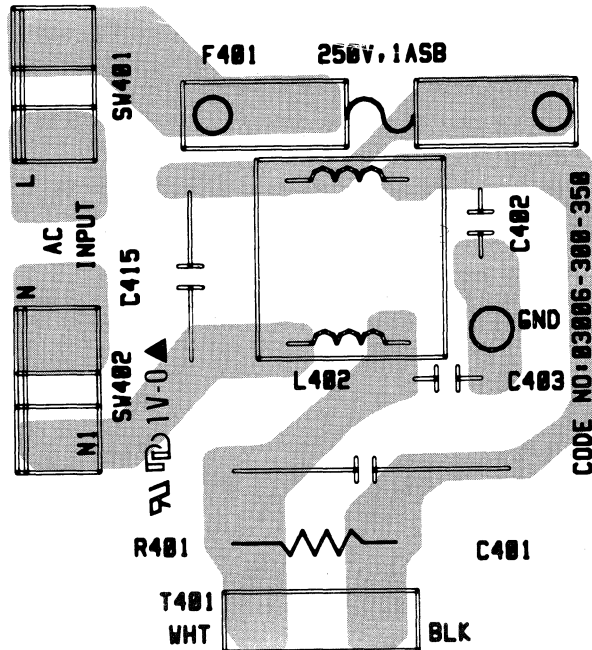
Top View



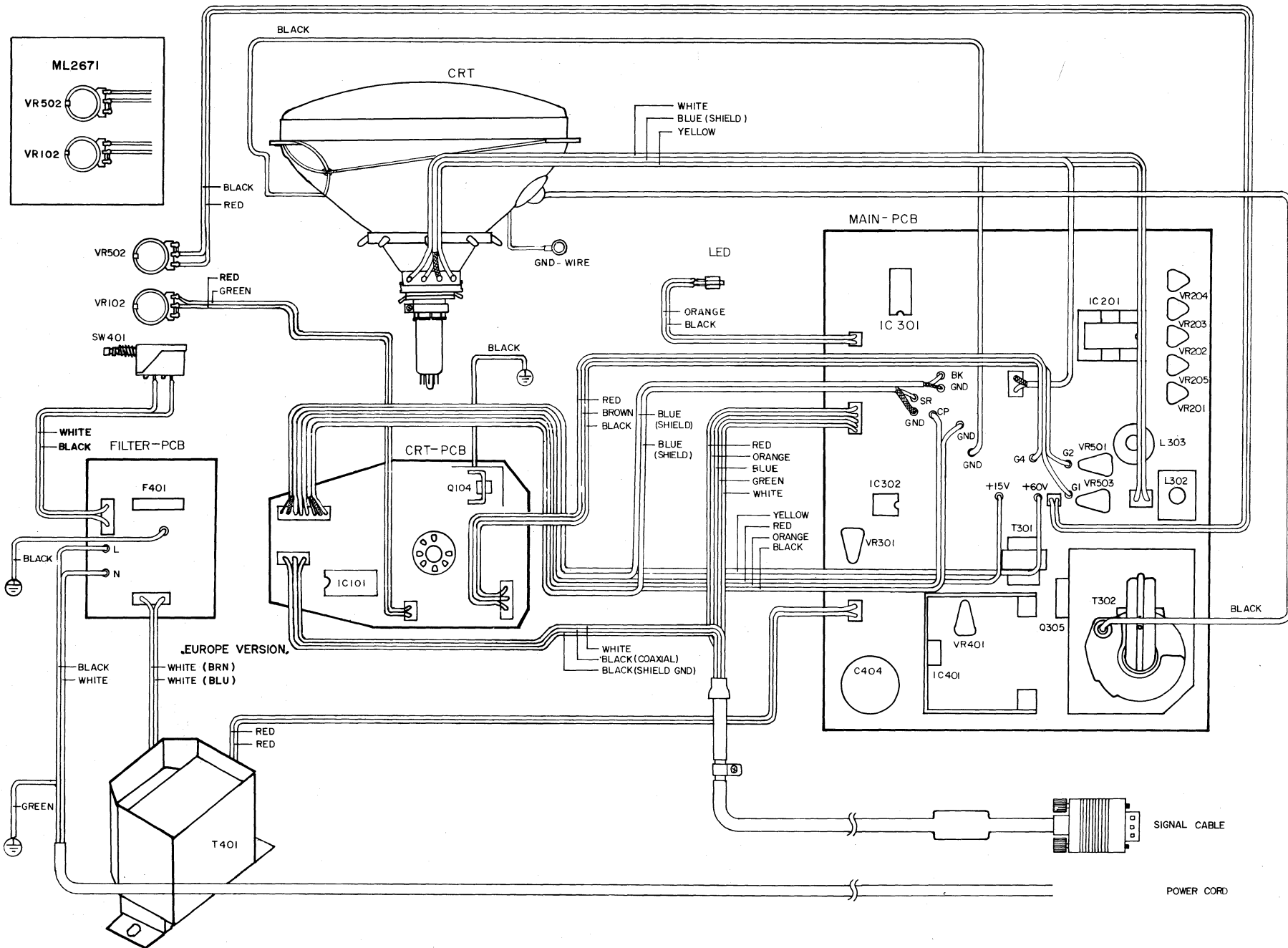
Bottom View

## Power PCB

CAUTION: CONTINUED PROTECTION AGAINST  
FIRE HAZARD, REPLACE ONLY WITH  
SAME TYPE AND SAME RATING.

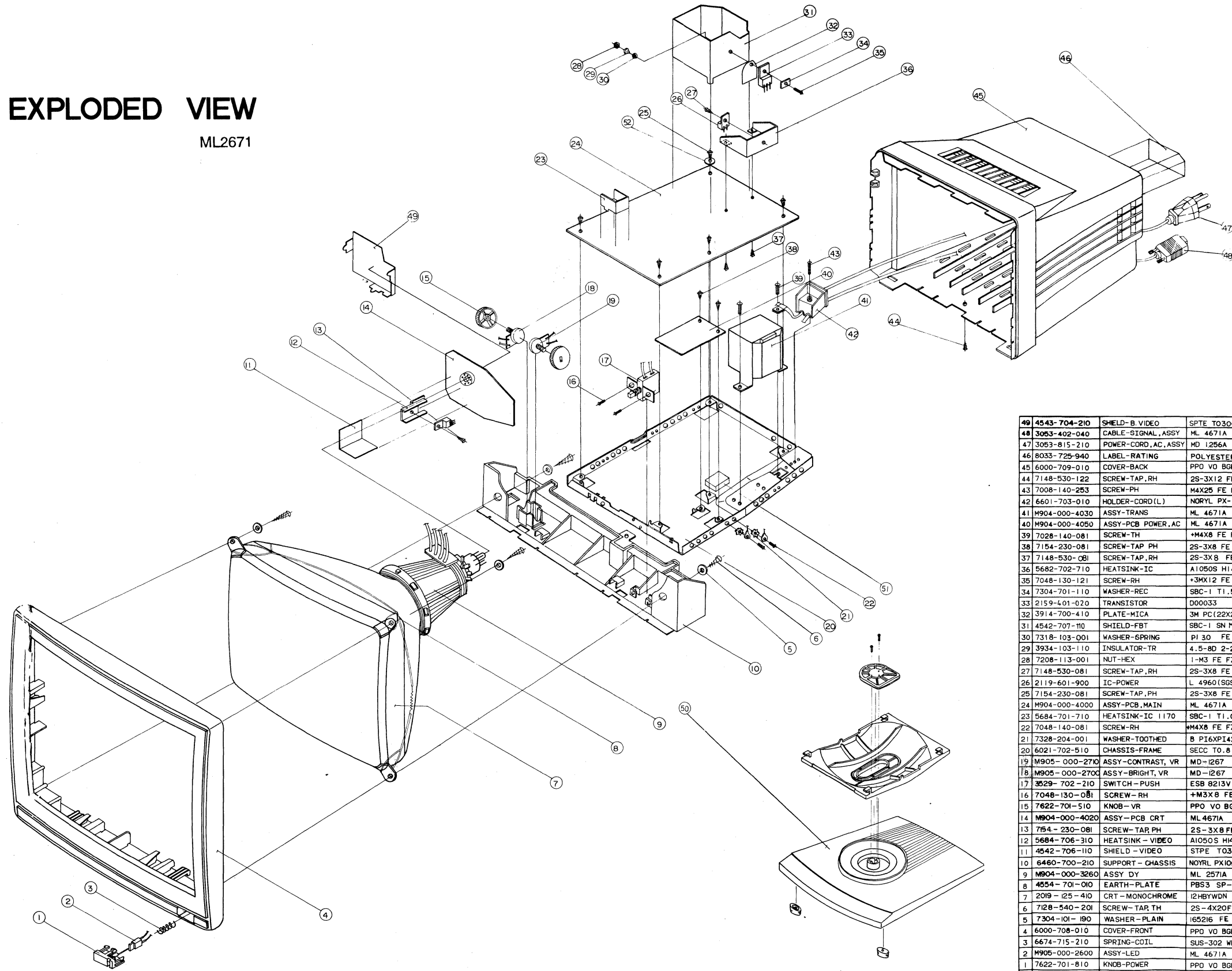


# WIRING DIAGRAM



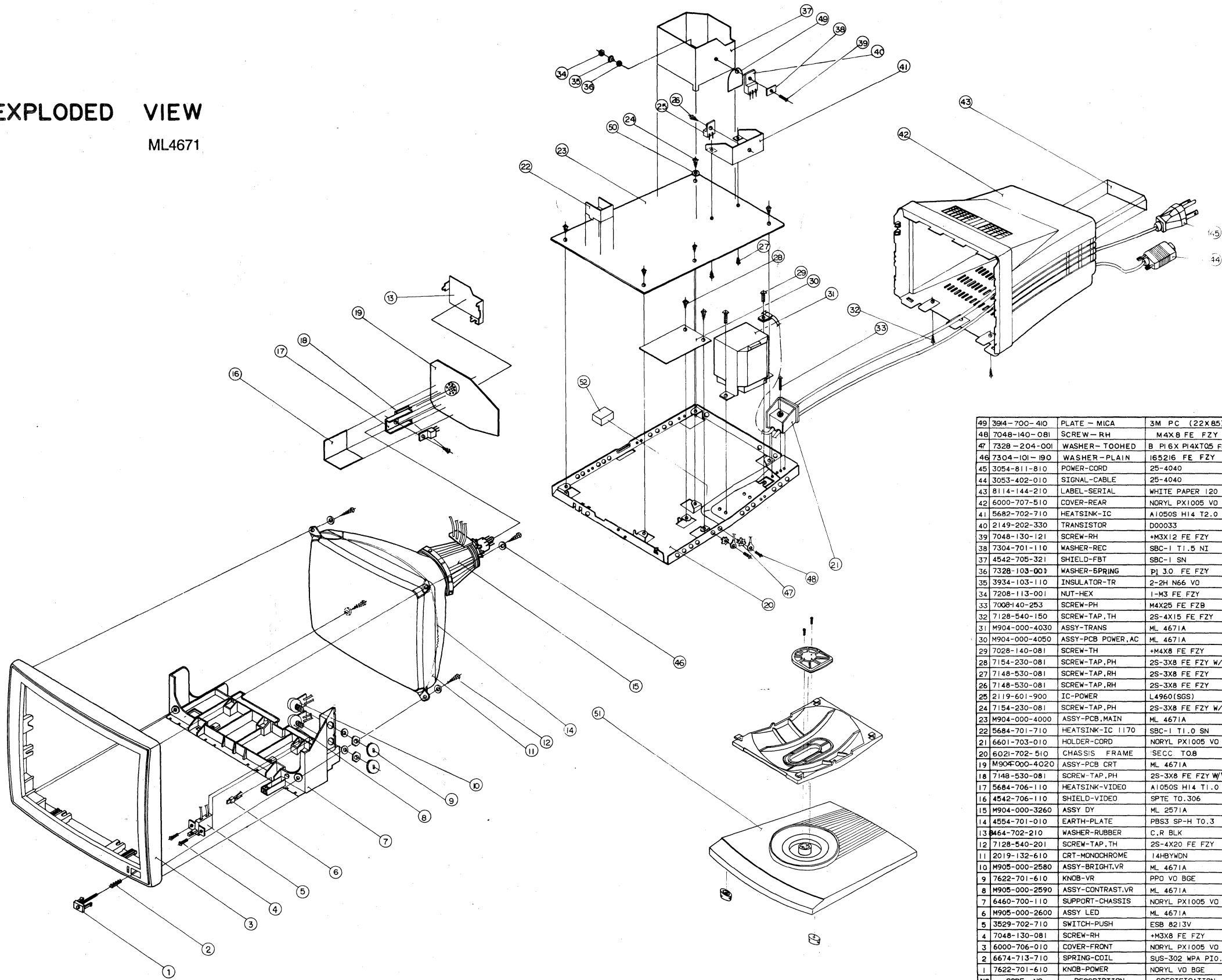
# EXPLODED VIEW

ML2671



49	4543-704-210	SHIELD-B,VIDEO	SPT E T0306	1
48	3053-402-040	CABLE-SIGNAL, ASSY	ML 4671A	1
47	3053-815-210	POWER-CORD, AC, ASSY	MD 1256A	1
46	8033-725-940	LABEL-RATING	POLYESTER T0186 ML2671	1
45	6000-709-010	COVER-BACK	PPD VO BGE MD-1267	1
44	7148-530-122	SCREW-TAP, RH	2S-3X12 FE FZY	1
43	7008-140-253	SCREW-PH	M4X25 FE FZB	1
42	6601-703-010	HOLDER-CORD(L)	NORYL PX-1005 VO BGE 00	1
41	M904-000-4030	ASSY-TRANS	ML 4671A	1
40	M904-000-4050	ASSY-PCB POWER, AC	ML 4671A	1
39	7028-140-081	SCREW-TH	+M4X8 FE FZY	2
38	7154-230-081	SCREW-TAP PH	2S-3X8 FE FZY W/WASHER	2
37	7148-530-081	SCREW-TAP, RH	2S-3X8 FE FZY	2
36	5682-702-710	HEATSINK-IC	Al050S H14 T2.0 WHT	1
35	7048-130-121	SCREW-RH	+3MX12 FE FZY	1
34	7304-701-110	WASHER-REC	SBC-1 T1.5 NI	1
33	2159-401-020	TRANSISTOR	D00033	1
32	3914-700-410	PLATE-MICA	3M PC(22X28.5)	1
31	4542-707-110	SHIELD-FBT	SBC-1 SN ML4671	1
30	7318-103-001	WASHER-SPRING	PI 30 FE FZY	1
29	3934-103-110	INSULATOR-TR	4.5-BD 2-2H N66 V-0	1
28	7208-113-001	NUT-HEX	1-M3 FE FZY	1
27	7148-530-081	SCREW-TAP, RH	2S-3X8 FE FZY	1
26	2119-601-900	IC-POWER	L 4960(SGS)	1
25	7154-230-081	SCREW-TAP, PH	2S-3X8 FE FZY W/WASHER	5
24	M904-000-4000	ASSY-PCB, MAIN	ML 4671A	1
23	5684-701-710	HEATSINK-IC 1170	SBC-1 T1.0 SN	1
22	7048-140-081	SCREW-RH	M4X8 FE FZY	2
21	7328-204-001	WASHER-TOOTHED	B PI6PX14X10.5 FE FZY	2
20	6021-702-510	CHASSIS-FRAME	SECC T0.8	1
19	M905-000-2700	ASSY-CONTRAST, VR	MD-1267	1
18	M905-000-2700	ASSY-BRIGHT, VR	MD-1267	1
17	3529-702-210	SWITCH-PUSH	ESB 8213V	1
16	7048-130-081	SCREW-RH	+M3X8 FE FZY	2
15	7622-701-510	KNOB-VR	PPD VO BGE	2
14	M904-000-4020	ASSY-PCB CRT	ML 4671A	1
13	7154-230-081	SCREW-TAP, PH	2S-3X8 FE FZY W/WASHER	1
12	5684-706-310	HEATSINK-VIDEO	Al050S H14 T1.0 WHT	1
11	4542-706-110	SHIELD-VIDEO	SPT E T0306	1
10	6460-700-210	SUPPORT-CHASSIS	NORYL PX1005 PPO VO BGE	1
9	M904-000-3260	ASSY-DY	ML 2571A	1
8	4554-701-010	EARTH-PLATE	PBS3 SP-H T03	2
7	2019-125-410	CRT-MONOCROME	I2HBYW0N	1
6	7128-540-201	SCREW-TAP, TH	2S-4X20FE FZY	4
5	7304-101-180	WASHER-PLAIN	I65216 FE FZY	1
4	6000-708-010	COVER-FRONT	PPD VO BGE 000ZZZBC	1
3	6674-715-210	SPRING-COIL	SUS-302 WPA P10.5	1
2	M906-000-2600	ASSY-LED	ML 4671A	1
1	7622-701-810	KNOB-POWER	PPD VO BGE MD-1267	1
NO	CODE NO.	DESCRIPTION	SPECIFICATION	Q'TY

EXPLODED VIEW  
ML4671



49	394-700-410	PLATE - MICA	3M PC (22X85)	1
48	7048-140-081	SCREW - RH	M4X8 FE FZY	2
47	7328-204-001	WASHER - TOOTHED	B PI6X PI4XT05 FE FZY	2
46	7304-101-190	WASHER - PLAIN	I65216 FE FZY	4
45	3054-811-810	POWER-CORD	25-4040	1
44	3053-402-010	SIGNAL-CABLE	25-4040	1
43	8114-144-210	LABEL-SERIAL	WHITE PAPER 120	1
42	6000-707-510	COVER-REAR	NORYL PX1005 VO BGE	1
41	5682-702-710	HEATSINK-IC	A1050S HI4 T2.0 WHT	1
40	2149-202-330	TRANSISTOR	D00033	1
39	7048-130-121	SCREW-RH	+M3X12 FE FZY	1
38	7304-701-110	WASHER-REC	SBC-1 T1.5 NI	1
37	4542-705-321	SHIELD-FBT	SBC-1 SN	1
36	7328-103-001	WASHER-SPRING	PI 3.0 FE FZY	1
35	3934-103-110	INSULATOR-TR	2-2H N66 VO	1
34	7208-113-001	NUT-HEX	1-M3 FE FZY	1
33	7008-140-253	SCREW-PH	MAX25 FE FZB	1
32	7128-540-150	SCREW-TAP, TH	2S-4X15 FE FZY	2
31	M904-000-4030	ASSY-TRANS	ML 4671A	1
30	M904-000-4050	ASSY-PCB POWER, AC	ML 4671A	1
29	7028-140-081	SCREW-TH	+M4X8 FE FZY	2
28	7154-230-081	SCREW-TAP, PH	2S-3X8 FE FZY W/WASHER	2
27	7148-530-081	SCREW-TAP, RH	2S-3X8 FE FZY	2
26	7148-530-081	SCREW-TAP, RH	2S-3X8 FE FZY	1
25	2119-601-900	IC-POWER	L4960(SGS)	1
24	7154-230-081	SCREW-TAP, PH	2S-3X8 FE FZY W/WASHER	5
23	M904-000-4000	ASSY-PCB, MAIN	ML 4671A	1
22	5684-701-710	HEATSINK-IC 1170	SBC-1 T1.0 SN	1
21	6601-703-010	HOLDER-CORD	NORYL PX1005 VO BGE	1
20	6021-702-510	CHASSIS FRAME	SECC TO8	1
19	M904-000-4020	ASSY-PCB CRT	ML 4671A	1
18	7148-530-081	SCREW-TAP, PH	2S-3X8 FE FZY W/WASHER	1
17	5684-706-110	HEATSINK-VIDEO	A1050S HI4 T1.0 WHT	1
16	4542-706-110	SHIELD-VIDEO	SPTT TO.306	1
15	M904-000-3260	ASSY DY	ML 2571A	1
14	4554-701-010	EARTH-PLATE	PBS3 SP-H TO.3	2
13	464-702-210	WASHER-RUBBER	C.R BLK	4
12	7128-540-201	SCREW-TAP, TH	2S-4X20 FE FZY	4
11	2019-132-610	CRT-MONochrome	14HYNDN	1
10	M905-000-2580	ASSY-BRIGHT,VR	ML 4671A	1
9	7622-701-610	KNOB-VR	PPD VO BGE	2
8	M905-000-2590	ASSY-CONTRAST,VR	ML 4671A	1
7	6460-700-110	SUPPORT-CHASSIS	NORYL PX1005 VO BGE	1
6	M905-000-2600	ASSY LED	ML 4671A	1
5	3529-702-710	SWITCH-PUSH	ESB 8213V	1
4	7048-130-081	SCREW-RH	+M3X8 FE FZY	2
3	6000-706-010	COVER-FRONT	NORYL PX1005 VO BGE	1
2	6674-713-710	SPRING-COIL	SUS-302 WPA P10.5	1
1	7622-701-610	KNOB-POWER	NORYL VO BGE	1
NO	CODE NO.	DESCRIPTION	SPECIFICATION	QTY

## REPLACEMENT PARTS LIST

PRODUCT SAFETY SHOULD BE CONSIDERED WHEN A COMPONENT REPLACEMENT IS MADE IN ANY AREA OF THIS UNIT WITH A COMPONENT INDICATED BY A SAFETY-CRITICAL MARK. THIS PARTS LIST AND THE SCHEMATIC DIAGRAM SHOW COMPONENTS WHOSE VALUE HAVE SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. IT IS PARTICULARLY RECOMMENDED THAT ONLY PARTS SPECIFIED ON THE FOLLOWING PARTS LIST BE USED FOR COMPONENT REPLACEMENT POINTED OUT BY THE SAFETY CRITICAL MARK.

Ref No.	Part No.	Description	Remark
<b>ASSY-PWB,MAIN</b>			
	0509-400-116	WIRE-SO,COPPER;TA 0.6SN	
8P	3053-605-310	CONN-8P ASSY;ML4671	
C201	1416-318-471	C-CERAMIC,HK;CK45 B 50V 470-K	
C202	1509-121-260	C-POLYESTER;CQ921M 100V 0.1M-J	
C203	1509-121-750	C-POLYESTER;CQ921M 100V 0.15M-J	
C204	1417-344-104	C-CERAMIC,HK;CK45(T)F50V 0.1M-Z	
C205	1609-401-720	C-ELECTROLYTIC;CE04W 25V 1000M	
C206	1609-402-100	C-ELECTROLYTIC;CE04W 35V 100M	
C207	1505-724-332	C-POLYESTER;CQ921M(T) 100V 0.0033-K	
C208	1517-383-104	C-M,POLYESTER;CF922M 250V 0.1M-J	
C209	1517-383-104	C-POLYESTER;CF922M 250V 0.1M-J	
C210	1608-904-470	C-ELECTROLYTIC;CE04W(T) 25V 47M	
C211	1417-318-101	C-CERAMIC,HK;CK45(T) B50V 100-K	
C212	1608-905-220	C-ELECTROLYTIC;CE04W(T) 35V 22M	
C213	1505-723-104	C-POLYESTER;CQ921M(T) 100V 0.1M-J	
C214	1609-401-510	C-ELECTROLYTIC;CE04W 16V 1000M	
C215	1608-908-068	C-ELECTROLYTIC;CE04W(T) 100V 0.68M	
C220	1417-318-221	C-CERAMIC,HK;CK45(T) B50V 220-K	
C300	1417-318-101	C-CERAMIC,HK;CK45(T) B50V 100-K	
C301	1608-906-047	C-ELECTROLYTIC;CE04W(T) 50V 0.47M	
C302	1509-121-070	C-POLYESTER;CQ921M 100V 0.0027M-J	
C303	1417-344-104	C-CERAMIC,HK;CK45(T) F50V 0.1M-Z	
C304	1609-402-120	C-ELECTROLYTIC;CE04W 35V 330M	
*C305	1509-452-180	C-POLYSYTYRENE;CQ09S 50V 1500-J	



Ref No.	Part No.	Description	Remark
*C306	1505-725-102	C-POLYESTER;CQ921M(T) 100V 0.001-K	
C307	1505-724-332	C-POLYESTER;CQ921M(T) 100V 0.0033-K	
C308	1608-906-109	C-ELECTROLYTIC;CE04W(T) 50V 1M	
C311	1509-121-260	C-POLYESTER;CQ921M 100V 0.1M-J	
C312	1505-723-103	C-POLYESTER;CQ921M(T) 100V 0.01-J	
C313	1509-121-070	C-POLYESTER;CQ921M 100V 0.0027M-J	
*C314	1509-121-260	C-POLYESTER;CQ921M 100 0.1M-J	
*C315	1507-553-183	C-POLYPROPYLENE;CQ922M 630V 0.018M-J	
*C316	1539-001-250	C-M,PAPER;CH021H 250V 2.5M-K	
*C404	1603-957-222	C-ELECTROLYTIC;CE04W 63V 2200UF(22X30)	
C405	1417-344-104	C-CERAMIC,HK;CK45(T) F 50V 0.1M-Z	
C406	1505-723-222	C-POLYESTER;CQ921M(T) 100V 0.0022-J	
C407	1417-329-102	C-CERAMIC,HK;CK45(T) D 50V 1000-M	
C408	1417-318-331	C-CERAMIC,HK;CK45(T) B 50V 330-K	
C409	1505-723-103	C-POLYESTER;CQ921M(T) 100V 0.01-J	
C411	1603-905-471	C-ELECTROLYTIC;CE04W 35V 470M	
C412	1603-905-471	C-ELECTROLYTIC;CE04W 35V 470M	
C413	1417-344-104	C-CERAMIC,HK;CK45(T) F50V 0.1M-Z	
C414	1608-904-100	C-ELECTROLYTIC;CE04W(T) 25V 10M	
C420	1603-905-471	C-ELECTROLYTIC;CE04W 35V 470M	
C501	1609-402-250	C-ELECTROLYTIC;CE04W 50V 10M	
C502	1505-723-104	C-POLYESTER;CQ921M(T) 100V 0.1M-J	
C503	1505-723-562	C-POLYESTER;CQ921M(T) 100V 0.0056M-J	
C504	1517-353-223	C-M,POLYESTER;CF922M 630V 0.022M-J	
C515	1419-901-100	C-CERAMIC,HK;CK45B 1KV 0.01M-K	
C516	1609-403-100	C-ELECTROLYTIC;CE04W 100V 100M	
C517	1609-401-700	C-ELECTROLYTIC;CE04W 25V 330M	
C518	1609-403-180	C-ELECTROLYTIC;CE04W 160V 2.2M	
C530	1417-344-104	C-CERAMIC,HK;CK(45(T) F 50V 0.1M-Z	
C531	1608-903-101	C-ELECTROLYTIC;CE04W (T) 16V 100M	
D201	2169-301-410	DIODE;1N4148	
D202	2169-301-410	DIODE;1N4148	



Ref No.	Part No.	Description	Remark
D203	2169-206-100	DIODE;RGP10G	
D301	2169-301-410	DIODE;1N4148	
D302	2169-403-697	DIODE-ZENER;RD 6.8EB1(T)	
*D303	2169-206-190	DIODE;RGP30G	
D304	2169-206-100	DIODE;RGP10G	
*D401	2169-201-240	DIODE;1N5402(200V 3A)	
*D402	2169-201-240	DIODE;1N5402(200V 3A)	
*D403	2169-201-240	DIODE;1N5402(200V 3A)	
*D404	2169-201-240	DIODE;1N5402(200V 3A)	
D405	2169-219-330	DIODE;RG2Y/BYW 100-100	
D501	2169-206-020	DIODE;RGP 01-12 RGP02-12	
D502	2169-206-170	DIODE;RGP 15J	
D503	2169-206-170	DIODE;RGP 15J	
D504	2169-206-100	DIODE;RGP 10G	
D530	2169-403-557	DIODE-ZENER;RD 5.1EB1(T)	
EX-BRT	3344-153-010	CONNECTOR-PIN,BASE;B2B-XH-A(JST)	
G1G2G4	3054-614-910	CONNECTOR-3P ASSY;JST HOUS 3P-SVF(300MM)	
H+IC	7108-530-061	SCREW-TAP PH;2S-3x6 FE FZY	
H-DY	3344-112-010	CONNECTOR-WAFER;5273-02A MOLEX	
H/V	3344-153-040	CONNECTOR-PIN,BASE;B5B XH-A(JST)	
*IC201	2119-101-270	IC;TDA1170N KA2136	
*IC301	2109-104-700	IC;KS74HCTLS86N	
*IC302	2119-103-130	IC;MC1391P	
*IC401	2119-601-900	IC-POWER;L4960	
IC401	5682-702-710	HEATSINK-IC;A1050S H14 T2.0 WHT	
*L302	2449-733-210	COIL-H,LINEARITY;5.0-18.3UH	
*L303	2449-433-310	COIL-H,WIDTH;7.0-29.9UH	
*L401	2429-060-110	COIL-CHOKE;200UH	
LED	3344-153-010	CONNECTOR-PIN,BASE;B2B-XH-A(JST)	
PCB	3006-300-310	PCB-MAIN(ML4671);197x153x1.6T	
Q201	2139-301-070	TRANSISTOR;2N3904	
Q301	2139-301-070	TRANSISTOR;2N3904	
Q302	2139-301-070	TRANSISTOR;2N3904	

Ref No.	Part No.	Description	Remark
Q303	2139-301-070	TRANSISTOR;2N3904	
*Q304	2149-301-437	TRANSISTOR;KSC1008-Y(T)	
*Q305	2149-304-120	TRANSISTOR;SGS F461	
Q305	3914-700-410	PLATE MICA;3M PC(22x28.50)	
Q305	3934-103-110	INSULATOR-TR;4.5-8D 2-2H N66 C-0	
Q305	4542-707-110	SHIELD-FBT;SBC-1 SN ML4671	
T302	2859-129-010	TRANS-FBT;FMG-1235EL	
*Q501	2139-204-070	TRANSISOR;MPS A45	
R200	1018-277-331	R-CARBON;RD 1/4T 330-J	
R201	1018-277-273	R-CARBON;RD 1/4T 27K-J	
R202	1018-277-331	R-CARBON;RD 1/4T 330-J	
R203	1018-277-274	R-CARBON;RD 1/4T 270K-J	
R204	1018-277-103	R-CARBON;TD 1/4T 10K-J	
R205	1018-377-100	R-CARBON;RD 1/2T 10-J	
R206	1018-277-563	R-CARBON;RD 1/4T 56K-J	
R207	1018-277-304	R-CARBON;RD 1/4T 270K-J	
R208	1018-277-274	R-CARBON;RD 1/4T 270K-J	
R209	1018-277-125	R-CARBON;RD 1/4T 1.2M-J	
R210	1018-277-563	R-CARBON;RD 1/4T 56K-J	
R215	1018-277-823	R-CARBON;RD 1/4T 82K-J	
R216	1018-277-272	R-CARBON;RD 1/4T 2.7K-J	
R217	1018-277-273	R-CARBON;RD 1/4T 27K-J	
R218	1018-277-473	R-CARBON;RD 1/4T 47K-J	
R219	1018-277-339	R-CARBON;RD 1/4T 3.3-J	
R220	1018-277-123	R-CARBON;RD 1/4T 12K-J	
R221	1018-377-109	R-METAL,FILM;RM 1/2T 1-J	
R225	1018-277-222	R-CARBON;TD 1/4T 2.2K-J	
R226	2028-377-182	R-CARBON;TD 1/4T 1.8K-J	
R227	1018-277-100	R-CARBON;RD 1/4T 10-J	
R240	1018-277-683	R-CARBON;RD 1/4T 68K-J	
R300	1018-277-331	R-CARBON;RD 1/4T 330-J	
R301	1018-277-273	R-CARBON;RD 1/4T 27K-J	

Ref No.	Part No.	Description	Remark
R302	1018-277-331	R-CARBON;TD 1/4T 330-J	
R303	1018-277-103	R-CARBON;RD 1/4T 10K-J	
R304	1018-277-222	R-CARBON;RD 1/4T 2.2K-J	
R305	1018-277-273	R-CARBON;RD 1/4T 27K-J	
R310	1018-277-272	R-CARBON;RD 1/4T 2.7K-J	
R312	1018-277-472	R-CARBON;TD 1/4T 4.7K-J	
R313	1018-277-472	R-CARBON;TD 1/4T 4.7K-J	
R314	1018-277-102	R-CARBON;TD 1/4T 1K-J	
R320	1018-277-182	R-CARBON;RD 1/4T 1.8K-J	
R321	1018-277-102	R-CARBON;RD 1/4T 1K-J	
R322	1018-277-153	R-CARBON;RD 1/4T 15K-J	
R323	1018-277-104	R-CARBON;TD 1/4T 100K-J	
R324	1018-377-331	R-CARBON;RD 1/2T 330-J	
R325	1018-277-331	R-CARBON;RD 1/2T 330-J	
R326	1018-277-123	R-CARBON;RD 1/4T 12K-J	
R327	1018-277-332	R-CARBON;RD 1/4T 3.3K-J	
*R328	1018-277-103	R-CARBON;RD 1/4T 10K-J	
*R329	1016-377-829	R-CARBON;RD 1/2T 8.2-J	
R330	1018-277-101	R-CARBON;RD 1/4T 100-J	
R331	1018-277-471	R-CARBON;RD 1/4T 470-J	
R355	1045-527-391	R-METAL,OXIDE;RS2P 390-J	
R403	1018-277-152	R-CARBON;RD 1/4T 1.5K-J	
R404	1018-277-153	R-CARBON;RD 1/4T 15K-J	
*R405	1018-277-392	R-CARBON;RD 1/4T 3.9K-J	
*R406	1018-277-122	R-CARBON;RD 1/4T 1.2K-J	
R410	1018-277-331	R-CARBON;RD 1/4T 330-J	
R411	1018-277-102	R-CARBON;RD 1/4T 1K-J	
R502	1018-277-103	R-CARBON;RD 1/4T 10K-J	
R503	1018-277-472	R-CARBON;RD 1/4T 4.7K-J	
R504	1018-277-685	R-CARBON;RD 1/4T 6.8M-J	
R505	1018-277-124	R-CARBON;RD 1/4T 120K-J	
R506	1018-277-334	R-CARBON;RD 1/4T 330K-J	

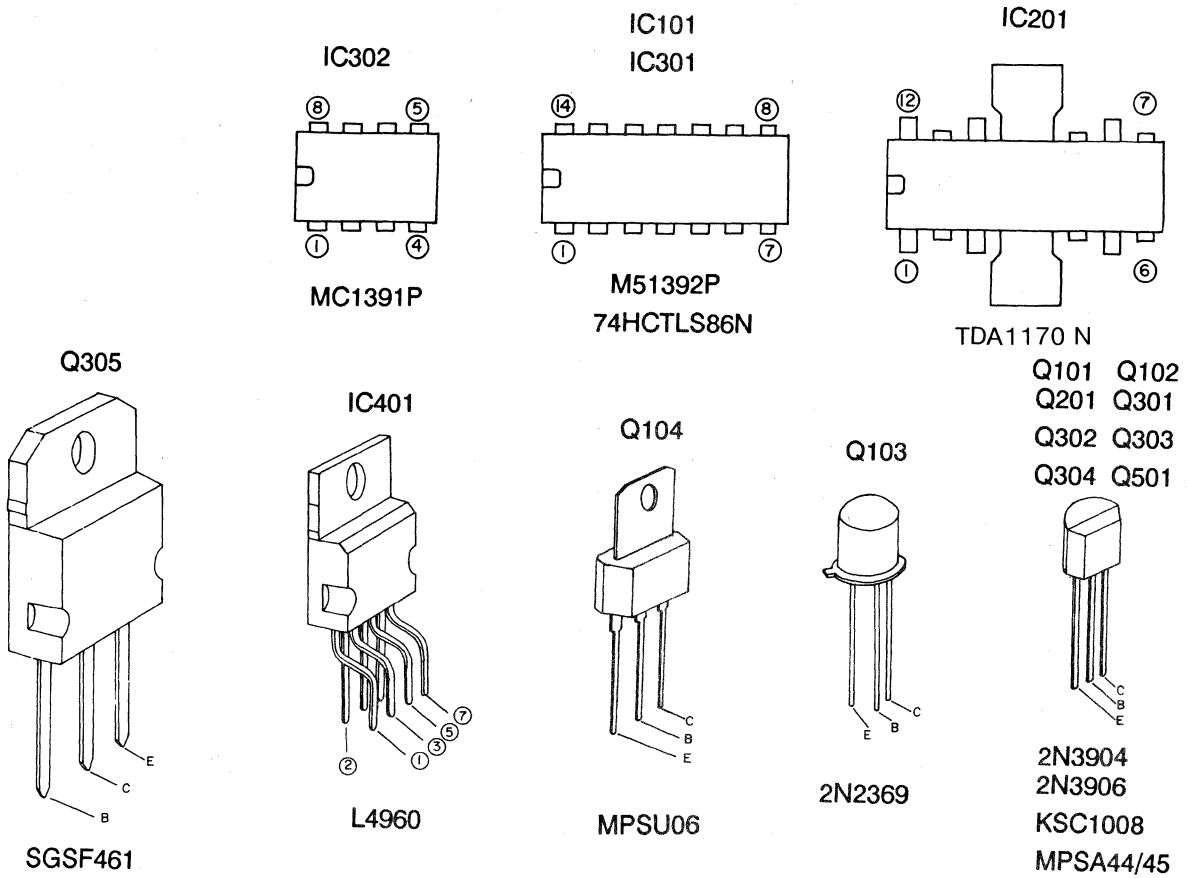
Ref No.	Part No.	Description	Remark
R507	1018-277-182	R-CARBON;RD 1/4T 1.8K-J	
R515	1018-277-125	R-CARBON;RD 1/4T 1.2M-J	
R516	1018-277-225	R-CARBON;RD 1/4T 2.2M-J	
R520	1018-277-823	R-CARBON;RD 1/4T 82K-J	
R521	1018-277-103	R-CARBON;RD 1/4T 10K-J	
R530	1049-427-221	R-METAL,OXIDE;RS1P 220-J	
*T301	2849-031-611	TRANS-H,DRIVE;19x7.6MM	
TR	7304-701-110	WASHER REC;SBC-1 T1.5NI	
TR	7208-113-001	NUT-HEX;1 M3 FE FZY	
TR	7048-130-121	SCREW-RH; + M3Z12 FE FZY	
TR	7304-700-920	WASHER-PLAIN;954810 FE PZW	
V-DY	3344-127-710	CONNECTOR-PIN,BASE;JST RTB-1.5-2F	
VR201	1241-110-010	VR-SEMI;CET 117A B100K	
VR202	1241-110-014	VR-SEMI;CET 117A B200K	
VR203	1241-110-006	VR-SEMI;CET 117A B500K	
VR204	1241-110-006	VR-SEMI;CET 117A B500K	
VR205	1241-110-005	VR-SEMI;CET 117A B50K	
*VR301	1241-108-003	VR-SEMI;CET 92A B5K	
*VR401	1241-108-011	VR-SEMI;CET 92A B1K	
VR501	1241-108-012	VR-SEMI;CET 92A B2.5M	
VR503	1241-108-010	VR-SEMI;CET 92A B250K	
<b>PCB CRT / FILTER</b>			
	0509-400-116	WIRE-SO,COPPER;TA 0.6 SN	
C101	1509-121-260	C-POLYESTER;CQ921M 100V 0.01M-J	
C102	1609-401-680	C-ELECTROLYTIC;CE04W 25V 10M	
C103	1609-401-480	C-ELECTROLYTIC;CE04W 16V 220M	
C104	1419-204-820	C-CERAMIC,HK;CK45 F 50V 0.1M-Z	
C105	1419-204-820	C-CERAMIC,HK;CK45 F 50V 0.1M-Z	
C106	1609-402-230	C-ELECTROLYTIC;CE04W 50V 3.3M	
C107	1419-109-140	C-CERAMIC,HK;CK45 B 50V 0.01M-Z	
C108	1417-318-101	C-CERAMIC,HK;CK45(T) B 50V 100-K	
C111	1609-403-090	C-ELECTROLYTIC;CE04W 100V 47M	

Ref No.	Part No.	Description	Remark
C112	1419-204-820	C-CERAMIC,HK;CK45 F 50V 0.1M-Z	
C510	1419-106-250	C-CERAMIC,HK;CK45 B 500V 0.01M-K	
C511	1419-901-100	C-CERAMIC,HK;CK45 B 1KV 0.01M-K	
CONTRAST	3344-153-010	CONNECTOR-PIN,BASE;B2B-XH-A(JST)	
D101	2169-301-410	DIODE;1N4148	
D102	2169-301-410	DIODE;1N4148	
D104	2169-406-020	DIODE-ZENER;1N4741A(11V)	
G1G2G4	3344-120-810	PIN-BASE;JST RTB-1.5-3 VO WHT	
H + V	7108-530-061	SCREW-TAP PH;2S-3x6 FE FZY	
*IC101	2109-104-610	IC;M51392P	
IN-SIGNAL	3344-120-060	CONNECTOR-PIN,BASE;B8B-XH-A	
PCB	3006-300-340	PCB-CRT(ML4671);105x67x1.6T	
Q101	2139-401-750	TRANSISTOR;2N3906(SST)	
Q102	2139-301-070	TRANSISTOR;2N3904	
*Q103	2149-301-360	TRANSISTOR;2N2369	
Q104	4543-704-210	SHIELD-B VIDEO;SPTE T0.306	
Q104	5684-706-310	HEAT-SINK,VIDEO;SBC-1 T1.0 FE FT-2	
*Q104	2149-302-300	TRANSISTOR;MPS-U06	
R101	1018-277-561	R-CARBON;RD 1/4T 560-J	
R102	1018-277-121	R-CARBON;RD 1/4T 120-J	
R103	1018-277-302	R-CARBON;RD 1/4T 3K-J	
R104	1018-277-332	R-CARBON;RD 1/4T 3.3K-J	
R105	1018-277-222	R-CARBON;RD 1/4T 2.2K-J	
R106	1018-277-333	R-CARBON;RD 1/4T 33K-J	
R107	1018-277-472	R-CARBON;RD 1/4T 4.7K-J	
R108	1018-277-222	R-CARBON;RD 1/4T 2.2K-J	
R109	1018-277-102	R-CARBON;RD 1/4T 1K-J	
R110	1018-277-222	R-CARBON;RD 1/4T 2.2K-J	
R111	1018-277-471	R-CARBON;RD 1/4T 470-J	
R115	1018-277-472	R-CARBON;RD 1/4T 4.7K-J	
R116	1018-277-470	R-CARBON;RD 1/4T 47-J	
R117	1018-277-470	R-CARBON;RD 1/4T 47-J	
R118	1018-277-560	R-CARBON;RD 1/4T 56-J	

Ref No.	Part No.	Description	Remark
R119	1018-277-101	R-CARBON;RD 1/4T 100-J	
R120	1018-277-102	R-CARBON;RD 1/4T 1K-J	
R121	1018-277-820	R-CARBON;RD 1/4T 82-J	
R122	1045-527-471	R-METAL,OXIDE;2P 470-J	
R123	1045-527-471	R-METAL,OXIDE;2P 470-J	
R125	1045-427-680	R-METAL,OXIDE;RS 1P 68-J	
R130	1018-277-102	R-CARBON;RD 1/4T 1K-J	
R509	1045-427-680	R-METAL,OXIDE;RS 1P 68-J	
R510	1018-377-102	R-CARBON;RD 1/2T 1K-J	
R511	1018-377-473	R-CARBON;RD 1/2T 47K-J	
R512	1018-377-102	R-CARBON;RD 1/2T 1K-J	
R501	2029-010-010	LAMP-NEON;DMS 90-130V DC	
S505	2029-010-010	LAMP-NEON;DMS 90-130V DC	
S502	4569-001-110	SPARK-GAS;S-23(1KV)	
S503	4569-001-110	SPARK-GAS;S-23(1KV)	
S504	4569-001-110	SPARK-GAS;S-23(1KV)	
SOCKET	3353-700-910	SOCKET-CRT;7PIN	
VIDEO	3344-153-020	CONNECTOR-PIN,BASE;B3B-XH-A(JST)	
VR101	1241-110-004	VR-SEMI;CET 117A B200	
<b>POWER - PCB</b>			
PCB	3006-300-350	PCB-POWER,AC(ML4671);62.5x50x1.6T	
	3344-131-020	CONNECTOR-WAFER;B3P-VH(3P 3.96MM)	
R401	1018-377-684	R-CARBON;RD 1/2T 680K-J	
C401	1565-523-224	C-M,POLYESTER,AC;CQS 922M 250V 0.22M-M	
C402	1461-137-806	C-CERAMIC,AC;DE 7100F 222 MVAI	
C403	1461-137-806	C-CERAMIC,AC;DE 7100F 222 MVAI	
C415	1565-523-473	C-M,POLYESTER,AC;CQS922M 250V 0.047M-M	
GND	3124-700-810	PIN-GT;14.2MM 2.35PI	
F401	3364-700-210	HOLDER-FUSE;FC51E,20M/M FUSE	
F401	4709-088-050	FUSE;51S,250V 1A 20MM	
F401	4709-060-010	FUSE;T250V 0.5A 20MM SEMCO	
L402	2429-646-510	COIL-LINE,FILTER;6MH(11x16MM)	

Ref No.	Part No.	Description	Remark
T401	3344-156-320	CONNECTOR-WAFER;B2P-LV,TN	
<b>MISCELLANEOUS</b>			
CRT-G	3054-224-210	GND-CRT ASSY;ML2671,3/16/0.2	
CRT-G	3054-224-220	GND-CRT ASSY;ML4671,3/16/0.12 T815	
VR102	1201-102-902	VR-ROUND;18SN 10SK B5K	
CONTRAST	3054-617-620	CONNECTOR,2P ASSY;JST-2(2.5) L=340	
CONTRAST	4049-032-011	FERRITE-CORE;RING 18 Ø	
VR502	1201-102-961	VR-ROUND;18SNC1 10SK B50K	
BRIT	3051-640-610	CONNECTOR,2P ASSY;JST HOUS XHP-2(2.5)BRT	
LED	2309-110-090	LED;KLG 208E	
LED	0659-422-500	TUBE-HISHI U/C;SUMITUBE F2 DIA 3.2 FD5 BLK	
LED	3054-640-810	CONNECTOR,2P ASSY;JST XHP-2,B +	
LED	0659-410-021	TUBE-VINYL,U/C;AWG0 300V 105°C C-CLR	
LED	0659-410-621	TUBE-VINYL,U/C;AWG6 300V 105°C C-CLR	
SW401	3529-702-210	SWITCH-PUSH;ESB8213V	
SW401	0659-422-500	TUBE-HISHI U/C;SUMITUBE F2 DIA3.2 FD5 BLK	
SW401	3054-648-310	CONN-2P ASSY;H-YHR-3N L-150M/M	
SW401	3054-617-040	CONNECTOR-AC,ASSY;REP,ASSY	
SW401	0659-410-021	TUBE-VINYL,U/C;AWG0 300V 105°C C-CLR	
	3054-402-040	CABLE-SIGNAL;ML4671	
DY	2439-054-230	DEFL-YOKE;DMK-1294EL(3)	
V-DY	3054-613-750	CONNECTOR-DY,ASSY;CONNECTOR V-DY	
H-DY	3054-618-810	CONN-HORZ DY ASSY;2x22AWG	
CRT	2019-125-410	CRT-MONOCHROME;12ABY WDN (ML2671 ONLY)	
CRT	2019-132-610	CRT-MONOCHROME;14HBY WDN (ML4671 ONLY)	
T401	2869-298-030	TRANS-POWER,ASSY;P:115V,S:30V	
T401	2869-298-040	TRANS-POWER,ASSY;P:230V,S:30V (FOR EUROPE VERSION)	
Q104	3054-223-730	LUG-TERMINAL ASSY;AWG 18 BLK L-150	
AC	3054-815-210	POWER CORD,AC,ASSY;K0101A5213	
AC	3054-812-310	POWER CORD,AC ASSY;LP34 H05 VVF (FOR EUROPE VERSION)	
GND	3054-302-210	GND-WIRE ASSY;BLK L-150MM 1015#18(T)	

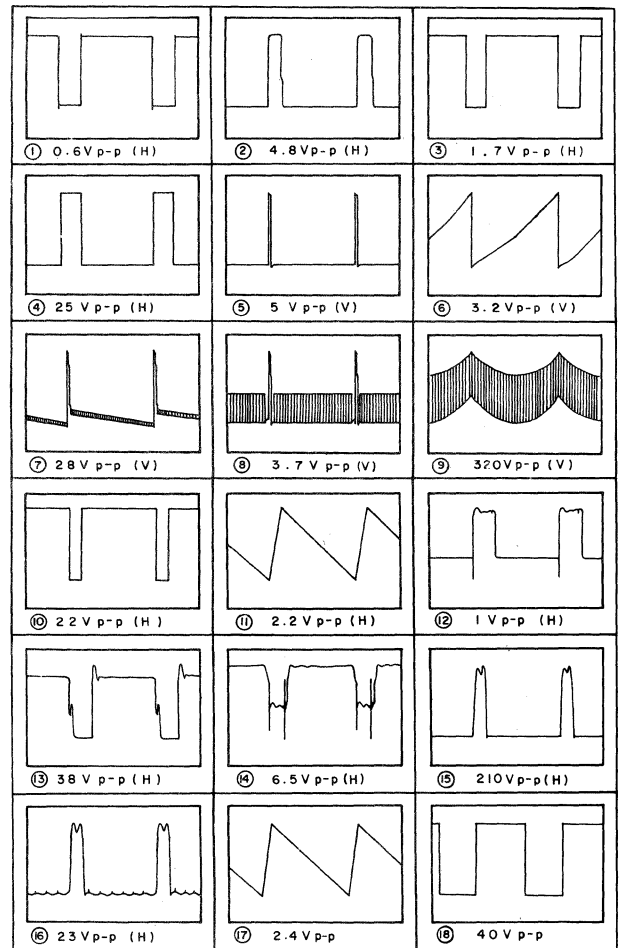
■ SEMICONDUCTOR IDENTIFICATION



WAVEFORMS

Waveform Measurement Conditions :

1. The voltage level and waveform at each point are given below on the rated input power when this set is connected to a personal computer with a video signal input at a white pattern with contrast max.
2. ○→ indicates the waveform check points. (In the chart, waveforms are measured from the point indicated to chassis ground.)





**SCHEMATIC DIAGRAM**

MODEL NO: ML4671(ML2671)

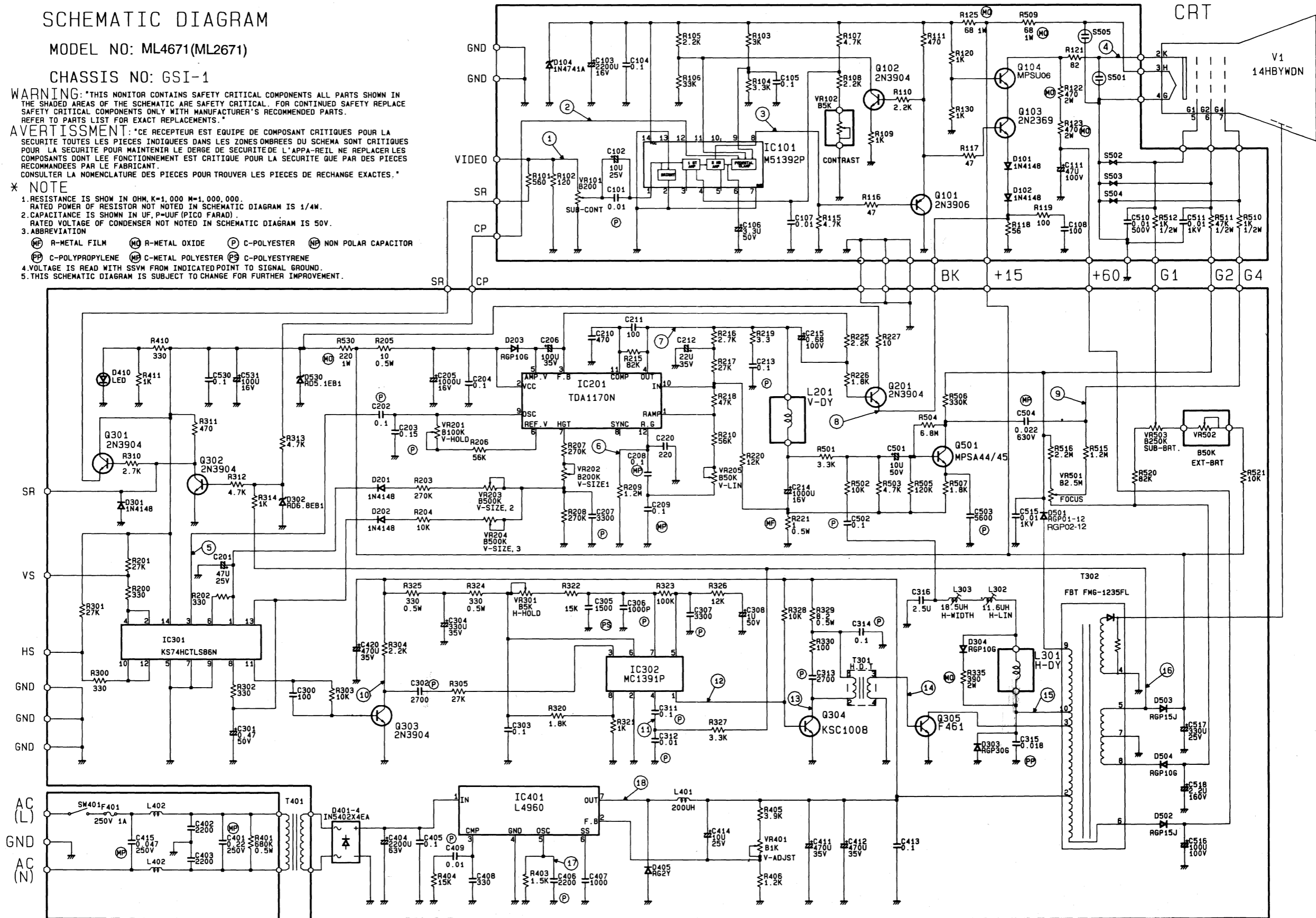
CHASSIS NO: GSI-1

**WARNING:** \*THIS MONITOR CONTAINS SAFETY CRITICAL COMPONENTS ALL PARTS SHOWN IN THE SHADED AREAS OF 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.\*

**AVERTISSEMENT:** \*CE RECEPTEUR EST EQUIPE DE COMPOSANT CRITIQUES POUR LA SECURITE TOUTES LES PIECES INDIQUEES DANS LES ZONES OMBREES DU SCHEMA SONT CRITIQUES POUR LA SECURITE POUR MAINTENIR LE DEGRÉ DE SECURITE DE L'APPA-REIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT. CONSULTER LA NOMENCLATURE DES PIECES POUR TROUVER LES PIECES DE RECHANGE EXACTES.\*

**\* NOTE**

1. RESISTANCE IS SHOWN IN OHM, K=1,000 M=1,000,000.
2. CAPACITANCE IS SHOWN IN UF, P=UF (PICO FARAD).
3. ABBREVIATION  
 (MF) R-METAL FILM (MO) R-METAL OXIDE (P) C-POLYESTER (NP) NON POLAR CAPACITOR  
 (PP) C-POLYPROPYLENE (MP) C-METAL POLYESTER (PS) C-POLYESTYRENE
4. VOLTAGE IS READ WITH SSVW FROM INDICATED POINT TO SIGNAL GROUND.
5. THIS SCHEMATIC DIAGRAM IS SUBJECT TO CHANGE FOR FURTHER IMPROVEMENT.



**CIRCUIT DIAGRAM DISPLAY SYMBOLS**

- 1. Resistor**
- Resistance value  
When no unit is provided : [ Ω ]  
K : [K- Ω ]  
M : [M- Ω ]
  - Rated permissible power capacity  
When no display is mode : 1/4[W]  
Others : Display are provided
  - Resistor type  
Under than 1/2[W] : Carbon resistor  
Over than 1[W] : Oxidized metal film resistor

- 2. Capacitor**
- Capacitance  
When no unit is provided:  
1) Electrolytic - [μF]  
2) E.T.C - [pF]  
Others: Display are provided
  - Withstand voltage  
No display :  
1) Polyester - DC 100[V]  
2) E.T.C - DC 50[V]  
Others : DC withstand voltage[V]  
AC display : AC withstand voltage[V]
  - Capacitor type  
No type display : Ceramic and electrolytic capacitor  
P : Polyester capacitor  
MP : Metallized polyester capacitor  
PS : Polystyrene capacitor

**RMS MEASUREMENT RESULTS OF THE IC'S**

Measured with high impedance V.T.V.M. or circuit tester under the rated line voltage. Voltage reading may vary ±10%. Video signal is a white pattern and mode 3.

Unit: Volts

ICS PIN NO.	IC101 M51392P	IC201 TDA1170N	IC301 74LS86	IC302 MC1391P	IC401 L4960
1	3.8	2.3	4.8	0.2	38.5
2	0	14.5	4.7	0	5.0
3	2.3	1.8	0.4	2.6	2.6
4	6.7	7.6	4.7	2.3	0
5	0	14.0	0	2.9	2.0
6	3.7	6.5	4.8	9.3	4.8
7	0	6.8	0	4.1	51.0
8	3.1	0.4	4.5	3.1	*
9	6.0	2.9	0	*	*
10	0	2.0	3.7	*	*
11	4.8	0.6	1.3	*	*
12	1.4	1.5	3.7	*	*
13	0	*	4.2	*	*
14	11.8	*	4.8	*	*

**Memo**



