

SAMSUNG

COLOR MONITOR

CQA4147/CQA4147L (SyncMaster 3)

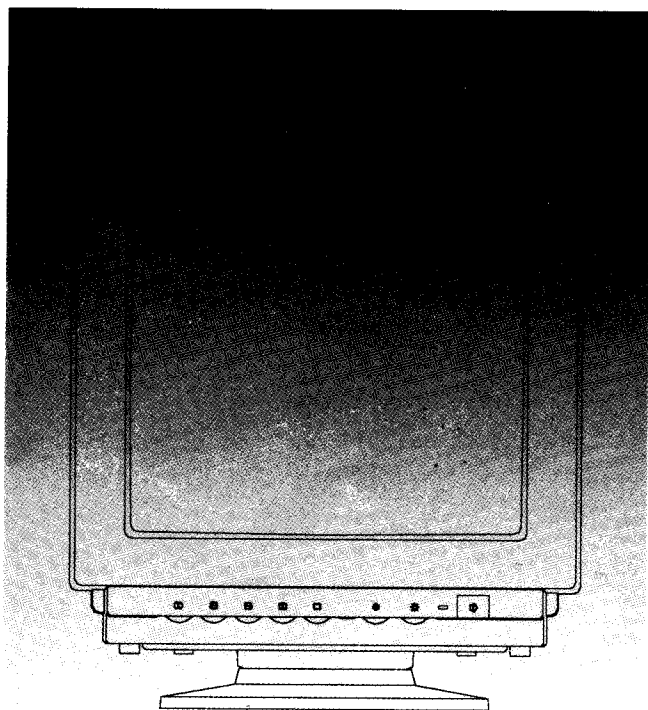
CQA4143/CQA4143L

CQA4157/CQA4157L

CQA4153/CQA4153L

SERVICE Manual

COLOR MONITOR



CONTENTS

1. Precautions
2. Reference Information
3. Product Specifications
4. User Controls
5. Disassembly and Reassembly
6. Alignments and Adjustments
7. Troubleshooting
8. Exploded View & Parts List
9. Servicing Diagrams
 - 9-1. Block Diagram
 - 9-2. Wiring Diagram
 - 9-3. PCB Layout and Electrical Parts List
 - 9-4. Schematic Diagram

1 Precautions

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock and X-rays.

1-1 Safety Precautions

1-1-1 Warnings

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

1-1-2 Servicing the High Voltage System and Picture Tube

1. When servicing the high voltage system, remove the static charge by connecting a 10k ohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead. (Disconnect the AC line cord from the AC outlet.)
2. Do not lift the picture tube by the neck.
3. Handle the picture tube only when wearing shatterproof goggles and after completely discharging the high voltage anode.

1-1-3 X-Rays and High Voltage Limits

1. Keep the high voltage below the specified maximum level. Be sure all service personnel are aware of the procedures and instructions covering X-rays.
The only potential source of X-ray in current solid state display monitors is the tube. However, the picture tube does not emit measurable X-ray radiation if the high voltage is as specified in the fire and shock hazard instruction. Only when high voltage is excessive are X-rays capable of penetrating the shell of the picture tube, including the lead in glass material.
2. It is essential that service technicians have an accurate high voltage meter available at all times. Check the calibration of this meter periodically.

3. High voltage should always be kept at the rated value, no higher. Operation at high voltages may cause failure of the picture tube or high voltage circuitry and, also under certain conditions, may produce X-rays in excess of acceptable levels.
4. When the high voltage regulator is operating properly there is no possibility of an X-ray problem. Test the brightness and use a meter to monitor the high voltage each time a color monitor comes in for service. Make sure the high voltage does not exceed its specified value and that it is regulating correctly.
5. The picture tube is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the picture tube only with one that is the same type or equivalent as the original. Carefully reinstall the picture tube shields and mounting hardware; these also provide X-ray protection.
6. When troubleshooting a monitor with excessively high voltage, avoid being unnecessarily close to the monitor. Do not operate the monitor longer than is necessary to locate the cause of excessive voltage.

1-1-4 Fire and Shock Hazard

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

1. Inspect each 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 monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment cover or shields, isolation resistor-capacitor networks, mechanical insulators, etc.

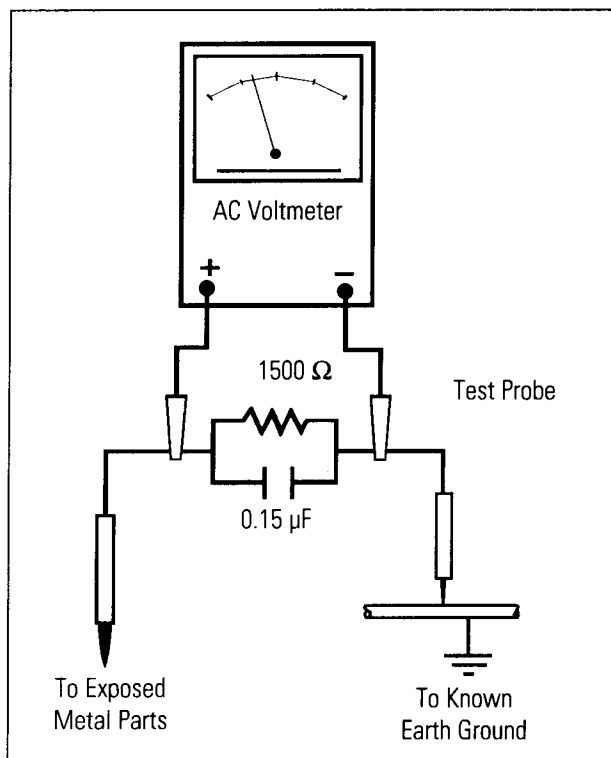


Figure1-1. Leakage Current Test Circuit

1-1-5 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by ⚠ on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and / or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

3. To be sure that no shock hazard exists, check for leakage current in the following manner:
 - a. Plug the AC line cord directly into a 120 Volt AC outlet. (Do not use an isolation transformer for this test)
 - b. Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15μF capacitor in series with an exposed metal cabinet part and a known earth ground, such as an electrical conduit or electrical ground connected to an earth ground.
 - c. Use a SSVM or VOM with 1000 ohms per-volt or higher sensitivity to measure the AC voltage drop across the resistor (see Figure 1-1).
 - d. Connect the resistor to an exposed metal part having a return path to the chassis (metal cabinet, screw heads, knobs, shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.
 - e. Any reading of 5.25 Volt RMS (this corresponds to 3.5 milliampere AC) or more is excessive and indicates a potential shock hazard. Correct the shock hazard before returning the monitor to the user.

1-2 Servicing Precautions

Warning: An electrolytic capacitor installed with the wrong polarity might explode.

Caution: Before servicing instruments covered by this service manual and its supplements, read and follow the Safety Precautions section of this manual.

Note: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions, always follow the safety precautions.


1-2-1 General Servicing Precautions

1. Servicing precautions are printed on the cabinet. Follow them.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect an electrical plug or connector, (c) connect a test component in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.

The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground *before* connecting the positive lead; always remove the instrument's ground lead last.

1-3 Electrostatically Sensitive Devices (ESD) Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an antistatic solder removal device. Some solder removal devices not classified as "antistatic" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.
9.  marks parts for ESDs on schematic diagrams and electrical parts list.

Caution : Be sure no power is applied to the chassis or circuit and observe all other safety precautions.

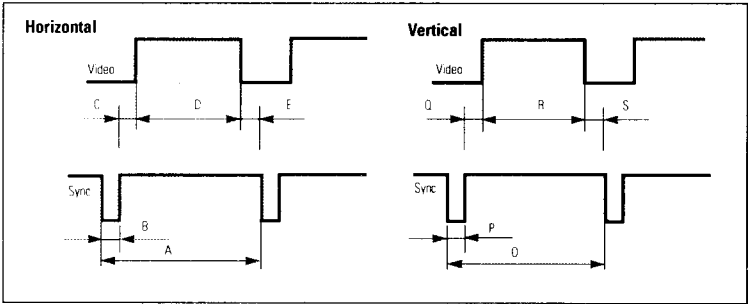
2 Reference Information

2-1 Timing Chart

This section of the service manual describes the timing that the computer industry recognizes as standard for computer-generated video signals.





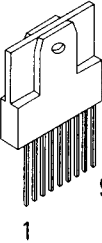
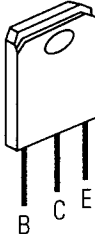
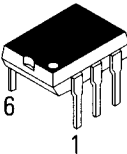
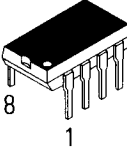
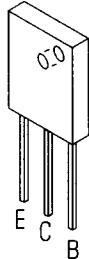
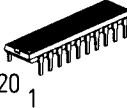

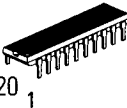
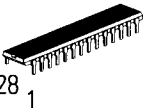
Table 4-1. Timing Chart

| Mode Timing | IBM | | | | VESA | | | |
|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|----------------------|
| | VGA1/70 Hz | VGA2/70 Hz | VGA3/60 Hz | XGA87hz | 640/72 Hz | 800/60 Hz | 800/56 Hz | 640/75 Hz |
| | 640x350 | 720x400 | 640x480 | 1024x768 | 640x480 | 800x600 | 800x600 | 640x480 |
| fH (kHz) | 31.469 | 31.469 | 31.469 | 35.522 | 37.861 | 37.879 | 35.156 | 37.500 |
| A μsec | 31.778 | 31.777 | 31.778 | 28.151 | 26.413 | 26.400 | 28.444 | 26.667 |
| B μsec | 3.813 | 3.813 | 3.813 | 3.920 | 1.270 | 3.200 | 2.000 | 2.032 |
| C μsec | 1.907 | 1.907 | 1.907 | 1.247 | 4.064 | 2.200 | 3.556 | 3.810 |
| D μsec | 25.422 | 25.422 | 25.422 | 22.806 | 20.317 | 20.000 | 22.222 | 20.317 |
| E μsec | 0.636 | 0.636 | 0.636 | 0.178 | 0.762 | 1.000 | 0.667 | 0.508 |
| fV (Hz) | 70.087 | 70.087 | 59.940 | 86.958 | 72.809 | 60.317 | 56.250 | 75.000 |
| O msec | 14.268 | 14.268 | 16.683 | 11.500 | 13.735 | 16.579 | 17.778 | 13.333 |
| P msec | 0.064 | 0.064 | 0.064 | 0.113 | 0.079 | 0.106 | 0.057 | 0.080 |
| Q msec | 1.907 | 1.080 | 1.048 | 0.563 | 0.739 | 0.607 | 0.626 | 0.427 |
| R msec | 11.122 | 12.711 | 15.253 | 10.810 | 12.678 | 15.840 | 17.067 | 12.800 |
| S msec | 1.176 | 0.413 | 0.318 | 0.014 | 0.237 | 0.026 | 0.028 | 0.027 |
| Clock Frequency (MHz) | 25.175 | 28.322 | 25.175 | 44.900 | 31.500 | 40.000 | 36.000 | 31.500 |
| Polarity H.Sync V.Sync | Positive Negative | Negative Positive | Negative Negative | Positive Positive | Negative Negative | Positive Positive | Neg/Pos Neg/Pos | Negative Negative |
| Remark | Separate | Separate | Separate | Separate | Separate | Separate | Separate | Separate |



| | |
|---------------------|----------------------|
| A : Line time total | O : Frame time total |
| B : Sync width | P : Sync width |
| C : Back porch | Q : Back porch |
| D : Active time | R : Active time |
| E : Front porch | S : Front porch |

2-2 Semiconductor Lead Identification

| PARTS | TYPE NO. | REF. NO. | PARTS | TYPE NO. | REF. NO. |
|---|--|--|---|----------------------|----------|
|  | KSC1008-Y | Q404 |  | KSC1507 | Q603 |
| | KSC733C-Y KTA1266-Y | Q401, Q405, Q407, Q410, Q501 | | | |
| | VN2222LL | Q205 |  | IRF9610 | Q408 |
|  | KSC945C-Y KTC1398-Y | Q201, Q202, Q203, Q204, Q206, Q402, Q409, Q502, Q601, Q607 |  | TDA4866 | IC301 |
|  | 2SC4744 2SC4762 KSC5086 2SC5149 | Q403 |  | CQY80-NG CQR80-XG | OP601 |
| | 6N80 2SK1358 | Q602 |  | KA3882 | IC601 |
|  | MTE800 KSE800 | Q406 |  | TDA4850 | IC401 |
|  | MC7805 KA7805 | IC202 |  | SL605 | IC201 |
| | KA317 LM317 | IC603 |  | LM1203 KA2139 | IC101 |
| | | | | LM2406T | IC102 |

3 Product Specifications

3-1 Specifications

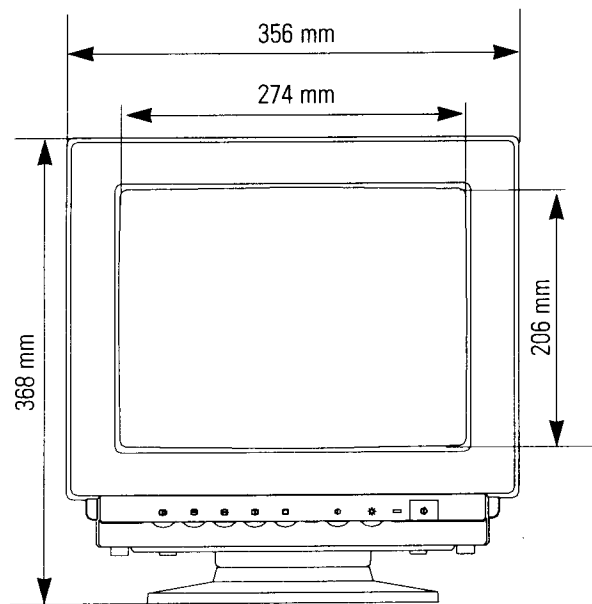
| Item \ Model | CQA4147/CQA4157 | CQA4143/CQA4153 |
|---|--|------------------------------|
| Picture Tube: | 14-inch (36 Cm), 13.2-inch (33.5Cm) visual; Full square/regular face tube, 90° Deflection; Antistatic silica coating; AK shadow mask | |
| | 0.28 mm Dot pitch; Non-glare | 0.39 mm Dot pitch; Non-Glare |
| Scanning Frequency Horizontal / Vertical | 31.47kHz/70 Hz, 31.47kHz/60 Hz,35.52kHz/87 Hz, 37.5kHz/75 Hz, 37.86kHz/72.8 Hz, 35.16kHz/56 Hz, 37.88kHz/60.3 Hz | |
| Display Colors Analog Input | Unlimited Colors | |
| Maximum Resolution | Horizontal : 1024 Dots Vertical : 768 Lines | |
| Input Signal Video Separate Sync | Analog 0.714 Vp-p Positive at 75 Ω Terminated TTL level Positive/Negative | |
| Maximum Pixel Clock | 45 MHz | |
| Active Display | Horizontal : 255 mm \pm 3 mm Vertical : 191 mm \pm 3 mm | |
| Input Voltage | AC 90-264 Volt, 60/50Hz \pm 3 Hz | |
| Power Consumption | 70 Watt (max) | |
| Dimensions | Unit (H x W x D) : 14.5 x 14 x 14.9 Inches (368 x 356 x 379.5 mm) Carton (H x W x D) : 18.2 x 18 x 15.7 Inches (462 x 457 x 398 mm) | |
| Weight | Net/Gross: 23.2 Lbs (10.5 kg) / 27.6 Lbs (12.5 kg) | |
| Environmental Considerations | Operating Temperature: 32° F to 104° F (0° C to 40° C) Humidity : 10 % to 80 % Storage Temperature : -4° F to 113° F (-20° C to 45° C) Humidity : 5 % to 95 % | |

- Notes : 1. Designs and specifications are subject to change without prior notice.
Model numbers with an "L" suffix comply with SWEDAC (MPRII) recommendations for reduced electromagnetic fields.
- Notes : 2. This manual covers the following models.

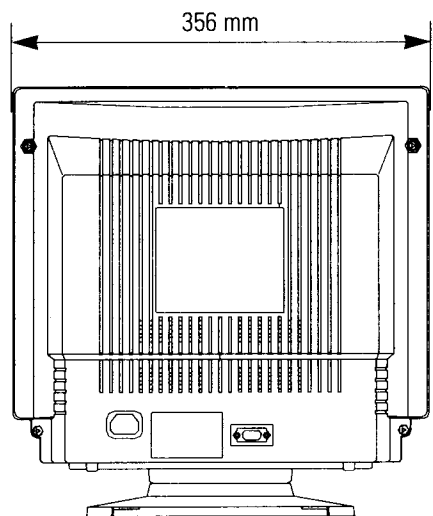
| CRT Screen | CRT Dot Pitch | 1414 Cabinet | | 1415 Cabinet | |
|---------------|------------------|--------------|----------|--------------|----------|
| Non Glare | 0.28 mm | CQA4147 | CQA4147L | CQA4157 | CQA4157L |
| | 0.39 mm | CQA4143 | CQA4143L | CQA4153 | CQA4153L |
| Remark | - | - | MPRII | - | MPRII |

3-2 Dimensions

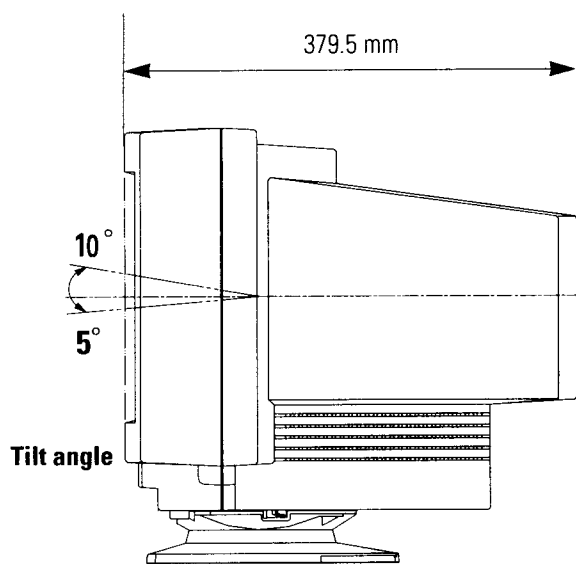
3-2-1 Front View



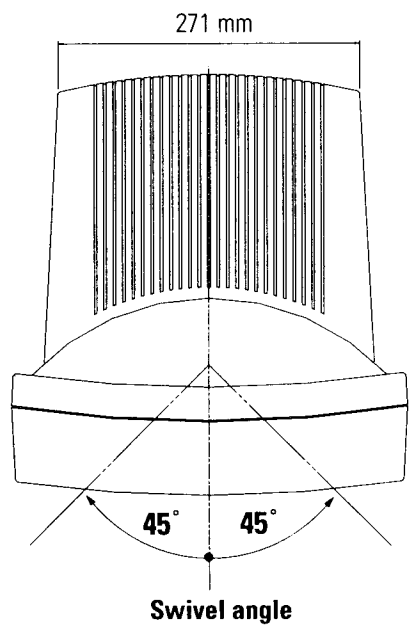
3-2-3 Rear View



3-2-2 Side View



3-2-4 Top View



3-3 Pin Assignments

| <div><div></div><div>Sync Type</div><div>Pin No.</div></div> | 9-Pin Signal Cable Connector (Figure 3-1) | 15-Pin Signal Cable Connector (Figure 3-2) |
|--|---|--|
| | Separate | Separate |
| 1 | Red | Red |
| 2 | Green | Green |
| 3 | Blue | Blue |
| 4 | H-Sync | GND |
| 5 | V-Sync | GND |
| 6 | GND-R | GND-R |
| 7 | GND-G | GND-G |
| 8 | GND-B | GND-B |
| 9 | GND-Sync | NC |
| 10 | - | GND-Sync |
| 11 | - | GND |
| 12 | - | NC |
| 13 | - | H-Sync |
| 14 | - | V-Sync |
| 15 | - | NC |

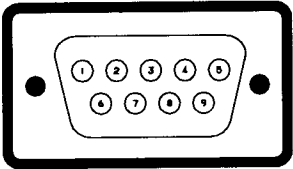


Figure 3-1. Female Type

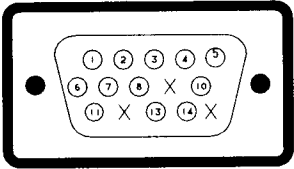


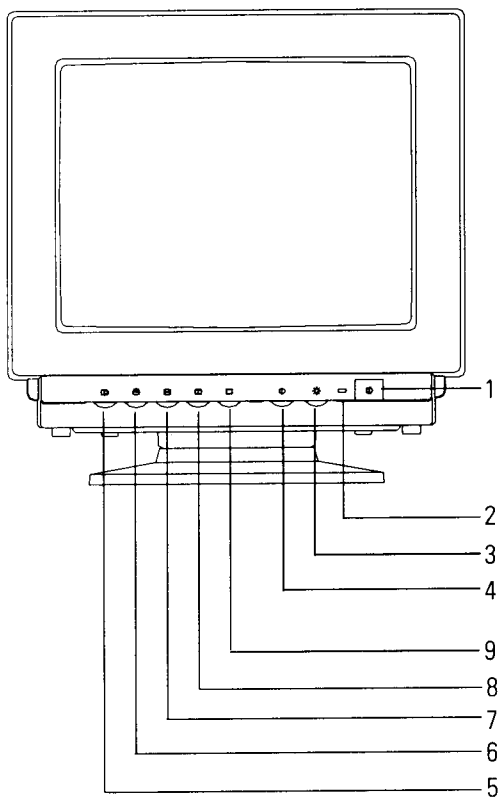
Figure 3-2. Female Type

Memo

4 User Controls

4-1 Front View and Controls

4-1-1. Front View



Note 1: When used with a computer equipped with DPMS (VESA), this monitor is EnergyStar compliant.

Note 2: The monitor automatically returns to the normal operation state when horizontal and vertical sync returns. This occurs when you move the mouse or press a key on the keyboard.

Table 4-1. Display Power Management Signaling (DPMS) Standard

| Items | State Normal Operation | Power saving function EPA/NUTEK | | |
|----------------------|------------------------------|---------------------------------|----------|--|
| | | Suspend Mode | | Power Off Mode |
| Horizontal Sync | Active | Inactive | Active | Inactive |
| Vertical Sync | Active | Active | Inactive | Inactive |
| Video | Active | Blanked | Blanked | Blanked |
| Power Indicator | Green | Orange | | Orange, Green Blinking (1Sec interval) |
| Power Consumption/hr | 70W | Less than 15W | | Less than 8W |

4-1-2 Front Control Panel

| Location | Symbol | Description |
|----------|--------|----------------------------------|
| 1 | | Power Button (Push) |
| 2 | | Power Indicator LED (Dual Color) |
| 3 | | Brightness Control |
| 4 | | Contrast Control |
| 5 | | Horizontal Position Control |
| 6 | | Vertical Position Control |
| 7 | | Horizontal Size Control |
| 8 | | Vertical Size Control |
| 9 | | Side Pin Cushion Control |

Memo

5 Disassembly and Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the CQA41** Series monitors.

WARNING: These monitors contain electrostatically sensitive devices. Use caution when handling any components.

5-1 Disassembly

Caution: Disconnect the monitor from the power source before disassembling the monitor.

5-1-1 Cabinet Disassembly

1. With a pad underneath it, stand the monitor on its front with the screen facing downward and the base closest to you. Make sure nothing will damage the screen.
2. Working from the back of the monitor, remove the four screws.
3. Tilt the Rear Cover away to release the two tabs and pull it up and away from the monitor.
4. Disconnect all accessible connectors from the Main PCB:
 - Horizontal/Vertical DY
 - Degaussing Coil
 - CRT ground wires (2)
5. Using pinch-nose pliers or long-nose pliers, carefully disconnect the Anode cap from the CRT.

Caution: Do not touch the anode on the CRT.

6. Using a knife, cut through the silicon bond and lift of the Video PCB.
7. Using a flat-head screwdriver, pop the two tabs at the front end on the bottom of the front Cover Assembly and lift the Main PCB away from the front Cover Ass'y.
8. Lift the Degaussing Coil Assembly up and away from the CRT.
9. Remove the four corner screws at the lift the 14" color CRT up and away from the Front Cover Assembly. Do Not lift the CRT by the Neck.

Caution : If you will be returning this CRT to the monitor, be sure to place the CRT face down on a protective pad.

10. Remove the CRT Ground Ass'y starting with the corner having the spring.

5-1-1 (a) Removing the Stand Assembly

1. Slid the Stand Assembly towards the back of the cabinet to free the two tabs and lift the Top Stand up and away from the rear Cover.
2. Slide the Top Stand so that the Bottom Stand tab is at the front end of the slot.
3. Rotate the Top Stand so that the stopper snap is fully exposed.
4. From the underside of the Bottom Stand, use your thumb to pull the stopper snap down and rotate the Top Stand until the Bottom Stand tab is free in the slot. Pull the Top Stand and Bottom Stand apart.

5-1-2 Removing the Video PCB

1. Follow steps 1 through 6 in "Removing the Cabinet," above.
2. Remove all remaining connectors:
 - Signal input
 - Screen (1-pin)
 - Lift the cap on the CRT Socket and desolder the Focus Wire
 - Video connector assembly
 - G2 wire connector
 - Grounding terminal
3. Desolder the four tabs on the underside of the Video Shield.
4. Lift the Video PCB out of the Video Shield Case and place it on a flat, level surface which is protected from static electricity.

5-1-3 Removing the Main PCB

1. Follow steps 1 through 7 in Removing the Cabinet," above.
2. If you have not already done so, disconnect the Video PCB Assembly from the Main PCB.
3. Lift the Main PCB away from the Front Cover Ass'y.
4. Remove the Left and Right PCB Brackets.
5. Set the Main PCB on a smooth, level surface that is protected from static electricity.

5-2 Reassembly

With the CRT facing downward on a protective pad, use the steps that follow to reassemble the monitor.

5-2-1 Replacing the CRT

1. Loop the CRT Ground Ass'y around the back of the CRT and under the four corner metal tabs. Position the corner with the spring last.
2. With the Front Cover Assembly lying face down on a protective pad, position the CRT so that the corner metal tabs fit properly in the Front Cover Assembly.
3. Secure the CRT Ground Ass'y and CRT at the each of the four corners with the CRT screws.
5. Replace the Degaussing Coil Assembly and wrap the Coil with the plastic coated metal ties to hold the Coil in place.

5-2-2 Replacing the Video PCB

1. Place the Video PCB in the Video Shield Case and solder it in place so that it is secured by the six tabs.
7. Reconnect the connectors:
 - Signal input
 - Screen (1-pin)
 - Lift the cap on the CRT Socket and desolder the Focus Wire
 - Video connector assembly
 - G2 wire connector
 - Grounding terminal

5-2-3 Replacing the Main PCB

1. Replace the Left and Right PCB Brackets.
2. Align the Main PCB Assembly in the guide slot along the left and right side in the front Cover Assembly.
3. Carefully push the Main PCB Ass'y until it is fully inserted and you hear click as the tabs engage on the Front Cover Ass'y.
4. Reconnect the following connectors:
 - Horizontal/Vertical DY
 - Degaussing Coil
 - CRT ground wires (2)
 - Anode Cap

5-2-4 Cabinet Reassembly

2. If you have not already done so, re-install the CRT following the directions given in "5-2-1 Replacing the CRT."
3. If you have not already done so, re-install the Video PCB following the directions given in "5-2-2 Replacing the Video PCB."
4. If you have not already done so, re-install the Main PCB following the directions given in "5-2-3 Replacing the Main PCB."
5. Position the Rear Cover making sure the tabs along the front edge are properly snapped in place. Replace the four screws.
6. Set the monitor on its Base and make sure that the CRT Screen was not scratched or otherwise damaged.

6 Alignments and Adjustments

This section of the service manual explains how to control the raster size, position, pincushion, and make convergency and color adjustments.

6-1 Adjustment Conditions

Direction

When servicing, always face the monitor toward the East and, whenever possible, use magnetic field isolation such as a helmholtz field around the monitor.

Caution: Other electrical equipment may cause external magnetic fields.

During servicing, use an external degaussing coil to limit magnetic build up. If an external degaussing coil is not available, use the internal degaussing circuit, but not more than once per minute.

After finishing all adjustments, test the monitor in all directions. If, for example, the monitor does not meet adjustment specifications when facing in a northerly direction, face the monitor eastward again and readjust the monitor to the smallest error possible within a reasonable time limit. Test the unit again in all directions. If the monitor again fails to meet specifications in a non-easterly direction, contact your region's main service center for possible CRT replacement.

Testing and Burn-in Mode

For testing and burn-in, remove the signal cable from the monitor. Power on the monitor and warm it up. Use the burn-in mode to age the monitor.

Power Supply Voltage

AC 90-264 Volt (60/50 Hz \pm 3 Hz).

High Voltage Control

Adjust VR407 to 26 kV \pm 0.2 kV.

Warm-Up Time

The display must be on for 30 minutes before starting alignment. Warm-up time is especially critical in color temperature and white balance adjustments.

Signal

Video analog 0.714 Vp-p positive at 75 ohm terminated.

Sync: Separate
(TTL level negative/positive).

Scanning Frequency

Horizontal/Vertical
31.47 kHz/70 Hz, 31.47 kHz/60 Hz,
35.52 kHz/87 Hz, 37.86 kHz/72.8 Hz,
35.16 kHz/56 Hz, 37.88 kHz/60.3 Hz,
37.50 kHz/75 Hz

6-2 Prepare Main PCB for Adjustment

+B 195V Line Adjustment

No beam, Contrast: Minimum,
Brightness: Minimum.

Adjust VR601 to DC 150 V \pm 1 V at T402 heat sink and GND.

High Voltage Adjustment

No beam, Contrast: Minimum,
Brightness: Minimum
Adjust VR407 to 26 kV \pm 0.2 kV.

Center Raster

Adjust VR403 (H-hold) for the horizontal frequency equal to 31.5 \pm 0.2 kHz.

6-3 Display Control Adjustments

Unless otherwise specified, adjust the EXT-VR:

Contrast : Max. (Fully clockwise)
Brightness : Max. (Fully clockwise)

6-3-1 Centering

Centering means to position the center point of the display in the middle of the display area.
Horizontal size and position and vertical size and position control the centering of the display.
Adjust the horizontal size and vertical size to their optimal settings: 255 mm (H) x 191 mm (V)
Adjust the horizontal position and vertical position to ≤4.0 mm of the center point of the screen.
| A - B | ≤ 4.0 mm.
| C - D | ≤ 4.0 mm.

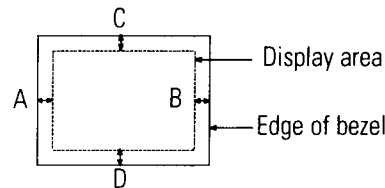


Figure 6-1. Centering

6-3-2 Horizontal Size Adjustment

Conditions
Scanning frequency: 37.8 kHz/60.3 Hz (800 x 600)
Display image: Crosshatch pattern
Brightness: Maximum
Contrast: Maximum
Adjust VR404 (H-size) to 255 ± 5mm.

6-3-3 Vertical Size Adjustment

Conditions
Scanning frequency: 37.8 kHz/60.3 Hz (800 x 600)
Display image: Crosshatch pattern
Brightness: Maximum
Contrast: Maximum
Adjust VR401 (V-size) to 191 ± 5mm.

6-3-4 Horizontal/Vertical Position Adjustment
Conditions

Scanning frequency: 37.8 kHz/60.3 Hz (800 x 600)
Display image: Crosshatch pattern
Adjust VR405 (H-shift) and VR301 (V-shift) to center the screen position.
Note : VR405 (H-shift), VR301 (V-shift), VR404 (H-size), VR401 (V-size), VR402 (Side-pin) are external controls. They are located along the lower edge of the front bezel.

6-3-5 Side Pincushion Adjustment
Conditions

Scanning frequency: 37.8 kHz/60.3 Hz (800 x 600)
Display image: Crosshatch pattern
Adjust VR402 (S-pin) to compensate for East/West distortion.

| C1 |, | C2 | ≤ 2 mm
| D1 |, | D2 | ≤ 2 mm

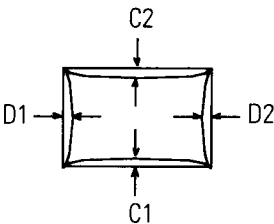


Figure 6-2. Pincushion

6-3-6 CRT Tilt Adjustment

Mechanical Adjustment:
Reassemble the CRT with fastening screws so that the measurements A and B are equal and the C and D measurements are equal.
If you are unable to correct the tilt, contact the regional service center for CRT replacement.

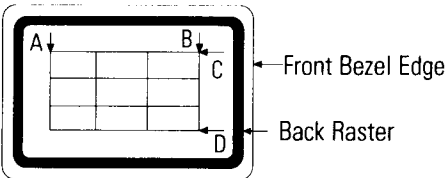


Figure 6-3. CRT Tilt Adjustment

6-4 Luminance Uniformity

Luminance uniformity means that the luminance at the position of the lowest brightness must be more than 75% of the luminance at the area with the highest brightness. Luminance is considered uniform only if the ratio of lowest to highest brightness is not less than 7.5:10.

Table 6-1. Computing Luminance Uniformity

| | |
|------------|---|
| Value | 75 % (Min) $\text{Variation} = \frac{C}{A} \times 100$ |
| Conditions | Display Image : White flat field. Luminance : Brightness cut off, Contrast max. A : Luminance at position of highest brightness. C : Luminance at position of lowest brightness. |

6-5 White Balance Adjustment

Conditions

Measurement instrument: Color analyzer
Scanning frequency: 37.5 kHz/75 Hz
(640x480)
Display image: 60 mm square
white pattern
Brightness: VR502, maximum

1. Adjust VR102R (R-BIAS) and VR102B (B-BIAS) so that the back raster color appears white to the unaided eye.
2. Set the brightness control (VR502) to the mechanical center position and the contrast control (VR501) to the maximum position.
3. Change the video signal to the 60mm square green pattern of the 37.5kHz/75kHz.
4. Adjust the VR101G (G-GAIN) so that the luminance of the green square is 40ft-L±2ft-L.
5. Change the video signal to the full white pattern of the 37.5kHz/75kHz.
6. Adjust the VR101R (R-GAIN) and VR101B (B-GAIN) to make the display color white. (X=0.283 ± 0.02, Y=0.298 ± 0.02)

7. Adjust the contrast control (VR501) so that the luminance is 3ft-L.
8. Adjust slightly VR102R (R-BIAS) and VR102B (B-BIAS) for the display color to be white.
9. Check the color coordinates at 20ft-L luminance. If there is some error, adjust the VR101R
10. Turn the contrast and the brightness controls fully clockwise.
11. Adjust the focus control of the FBT to display the sharpest image possible. (R-GAIN) and VR101B (B-GAIN) for the display color to be white.
12. Recheck the color coordinates at 3ft-L luminance and check the white color with rotating the contrast control (VR501). If there is some error, retry the adjustment from (2).
13. Recheck the back raster when signal cable is disconnected.
The luminance is between 3.5ft-L and 15ft-L

6-6 Focus Adjustment

Conditions

Scanning frequency: 35.5 kHz/59.9 Hz
(1024 x 768)
Display image: "H" character pattern
Brightness: Maximum
Contrast: Maximum

1. Adjust the focus control of the FBT to display the sharpest image possible.
2. Use locktite to seal the focus control in position.

6-7 Color Purity Adjustment

Color purity is the absence of undesired color. Conspicuous mislending (unexpected color in a uniform field) within the display area shall not be visible at a distance of 50 cm from CRT surface.

Conditions

Direction : Monitor facing east.
Display image : White flat field.
Luminance : Cutoff point at the center of display area.

Note: Color purity adjustments should only be attempted by qualified personnel.

6-8 Convergence Adjustments

Misconvergence occurs when one or more of the electron beams in a multi beam CRT fail to meet the other beams at a specified point.

Table 6-1. Misconvergence Tolerance

| Position | Error in (mm) | CRT Dot Pitch | Model No. |
|------------|---------------|---------------|----------------------|
| Center (A) | 0.3 | 0.28 | CQA 4147 CQA 4157 |
| | 0.3 | 0.39 | CQA 4143 CQA 4153 |
| Corner (B) | 0.4 | 0.28 | CQA 4147 CQA 4157 |
| | 0.4 | 0.39 | CQA 4143 CQA 4153 |

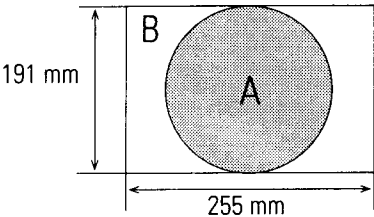
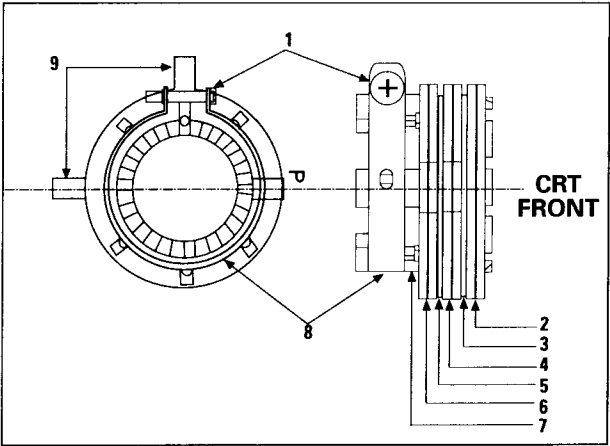


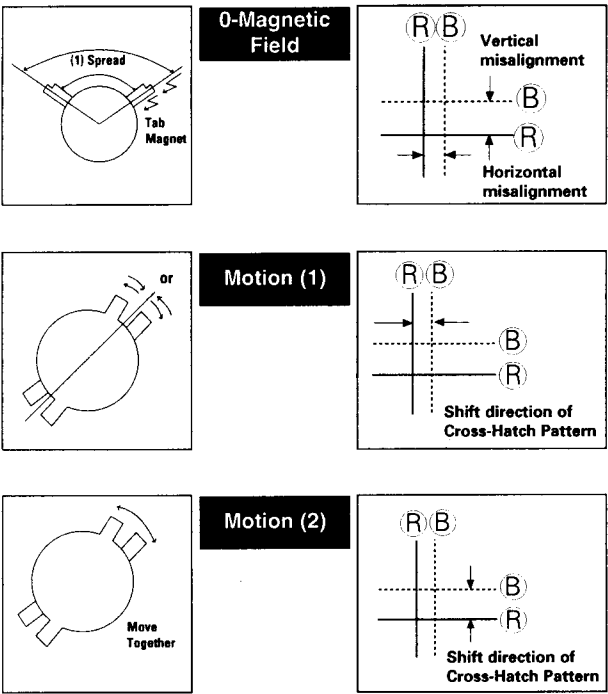
Figure 6-4. Convergence Measurement Areas



| SAMSUNG SDD CRT | | |
|------------------|------------------|------------------|
| 1: Setup Bolt | 2: 2-Pole Magnet | 3: Spacer |
| 4: 4-Pole Magnet | 5: Spacer | 6: 6-Pole Magnet |
| 7: Holder | 8: Band | 9: Tabs |

Figure 6-5. Magnet Configuration

Red and Blue Alignment
(4-pole magnet movement)



Red and Blue and Green Alignment
(6-pole magnet movement)

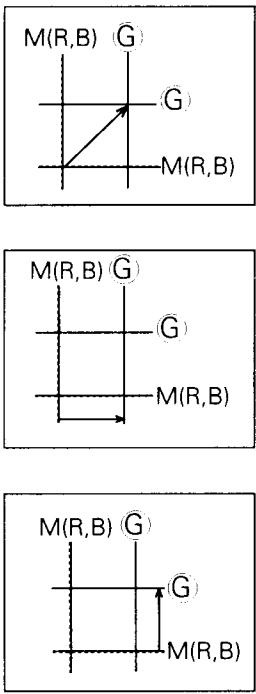


Figure 6-6. Magnet Movements

6-8-1 Static (Center) Convergence

Static convergence involves the alignment of the red, blue and green lines in the center area of the display.
See "Dynamic Convergence" for alignment of the color fields around the edges of the display.

- Condition
Direction : Monitor facing east
Warm-up : 30 minutes
Display image : Crosshatch pattern
Tolerances : See Table 6-1

As shown in Figures 6-5, CRTs used in these monitors all have the same magnet configuration as shown in table 6-2 below.

Table 6-2. Magnet Configurations

| CRT Manufacturer | Magnet Order from Front of CRT |
|------------------|------------------------------------|
| SDD CRTs | two-pole, four-pole six-pole |

Use the following steps to correct any static misconvergence:

1. Locate the pair of four-pole magnet rings.
2. Unlock the rings and rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue lines.
3. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue lines.
4. After completing the red and blue center convergence adjustment, locate the pair of 6-pole magnet rings.
5. Rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue (magenta) and green lines.
6. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue (magenta) and green lines. Don't rotate the 2-pole magnet because it is for purity adjustments.
7. Mark the correct position for the magnets and apply a small line of glue to hold the magnets in place. Lock the rings in place.

6-8-2 Dynamic (Edge) Convergence

Use the following procedure to correct minor dynamic (edge) misconvergence. If, after using this procedure, dynamic misconvergence is still greater than the 0.4 mm tolerance around the periphery of the display area, replace the CRT.

1. Make sure the display is not affected by external magnetic fields.
2. Make sure the static convergence is properly adjusted.
3. Strategically place small magnetic strips on the back of the CRT to correct the misconvergence. Be careful not to remove the paper protecting the adhesive on the magnetic strip until you are satisfied with their placement and the dynamic convergence.
4. When you are satisfied with the convergence around the edge of the CRT, permanently glue the magnets to the back of the CRT.

Table 6-3. Magnetic Strips

| Description | Size | Code Number |
|--------------|---------------|--------------|
| Magnet Sheet | 5 mm x 80 mm | 937 319004CA |
| Magnet Sheet | 10 mm x 80 mm | 937 319004AA |

Warning



Do not remove the factory installed wedges. These wedges were installed by the CRT manufacturer and are properly placed for this CRT. Removal may result in damage to the CRT.

6-8-3 Bow Convergence Adjustment

Conditions

Direction: Monitor Facing East.
Display Image: Crosshatch pattern mixed with RGB colors.

Bow convergence adjustments are not available for any of the CRTs used in the CQA** Series monitors. While all the CRTs have bow convergence magnets, they are sealed in the CRT factory and are not user or service technician adjustable. Do not touch these magnets (see Figure 6-5). If color convergence bow adjustment is out of alignment, replace the CRT.

Bow misconvergence should not exceed the values listed in Table 6-1: Misconvergence Tolerances.

6-8-4 Balance Convergence Adjustments

Balance Convergence involves the alignment of the red and blue lines when they are misaligned at one end more so than at the other (X). The deflection yoke holds the balance coils which can correct balance misconvergences.

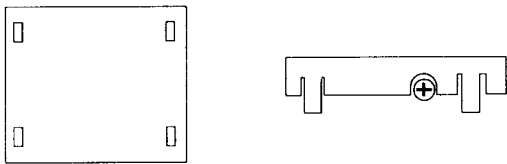


Figure 6-7. Saddle/Toroidal Deflection Coil

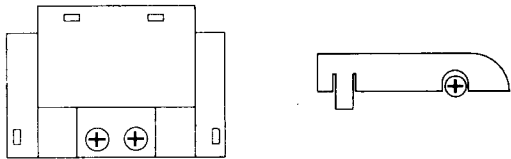


Figure 6-8. Saddle/Saddle Deflection Coil

6-8-4 (a) Horizontal Line Red and Blue Balance Convergence

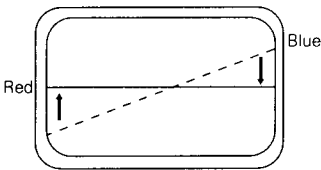


Figure 6-9. Horizontal Line Balance Misconvergence

Use a #0 hexdriver at the Horizontal Balance Coil (Xv). Turning the VR to the right raises the right end of the blue line and lowers the left end. Turning the VR to the left lowers the right end of the blue line and raises the left end.

6-8-4 (b) Vertical Red and Blue Balance Convergence

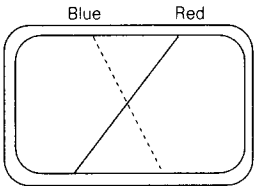


Figure 6-10. Vertical Line Balance Misconvergence

This adjustment is available only on Saddle/ Saddle DYs (see Figure 6-8). Use a #0 phillips screwdriver at the YH variable resistor. Turning the VR to the left tilts the blue line to the right. Turning it to the right tilts the blue line to the left.

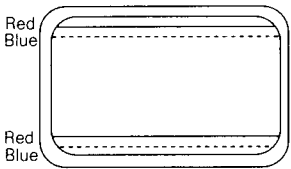
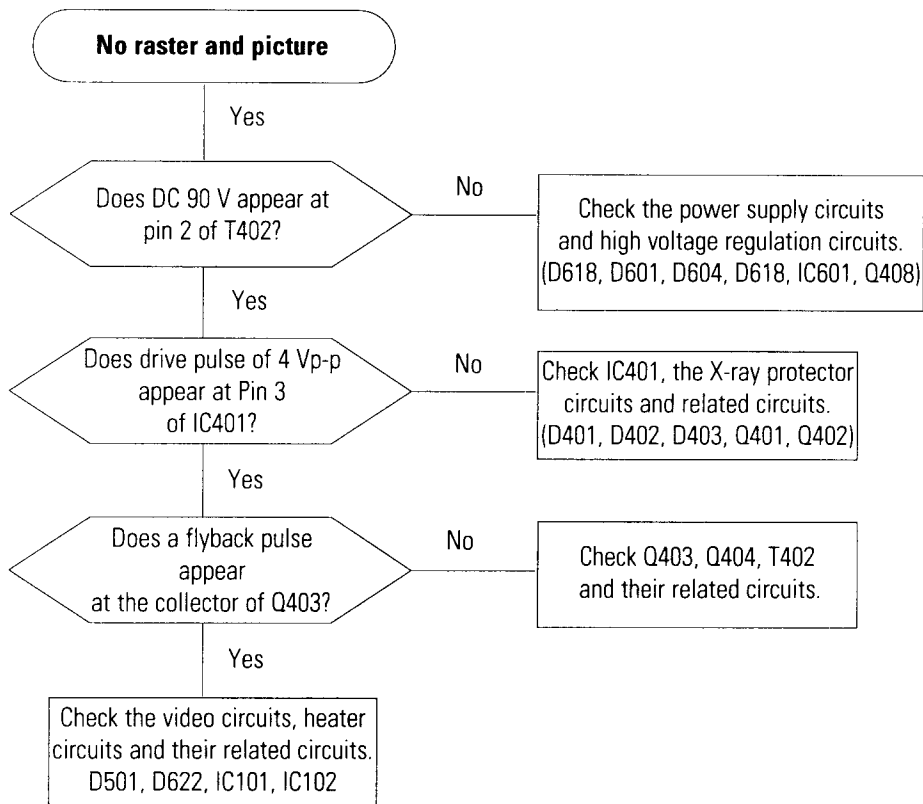


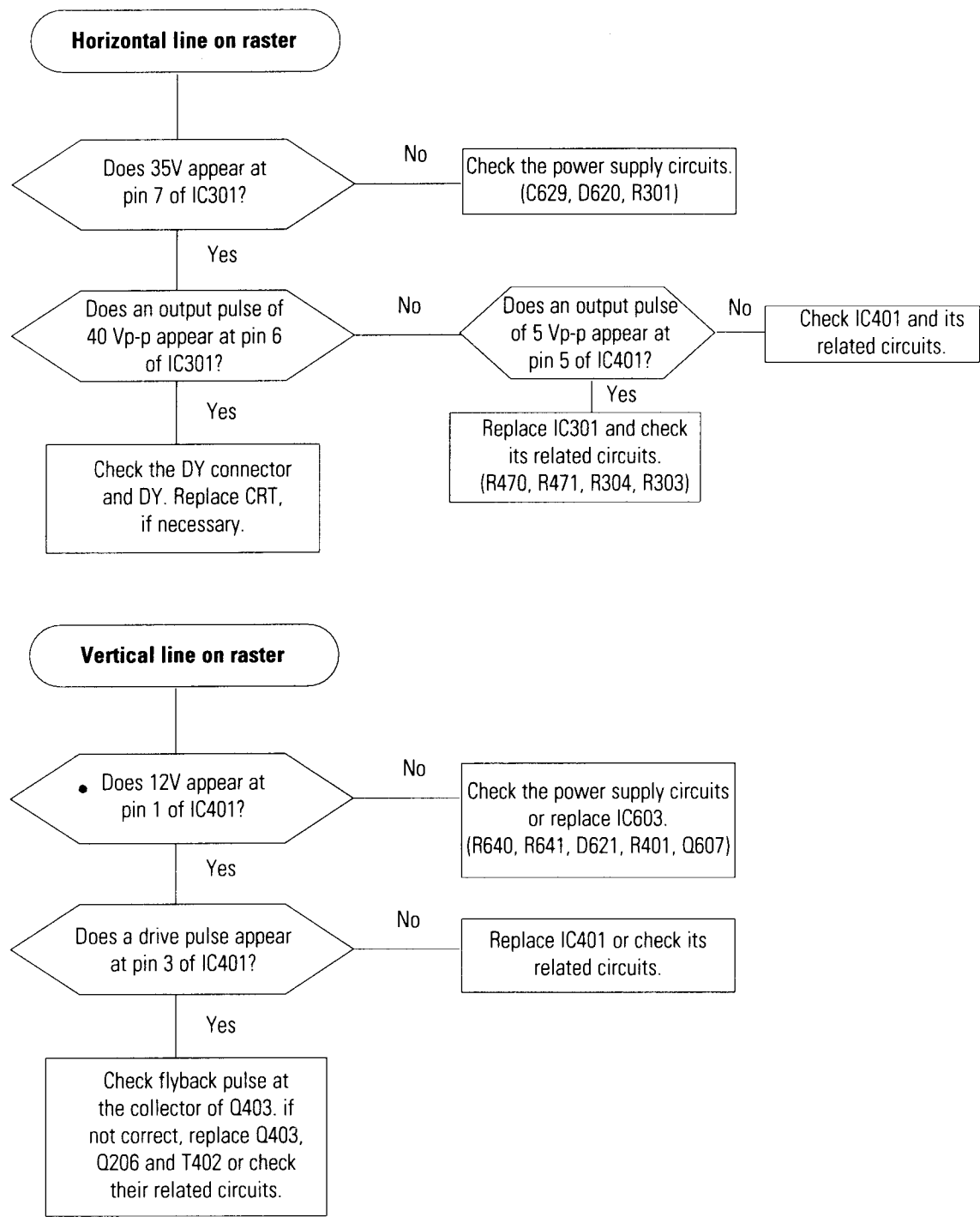
Figure 6-11. Upper and Lower Balance Misconvergence

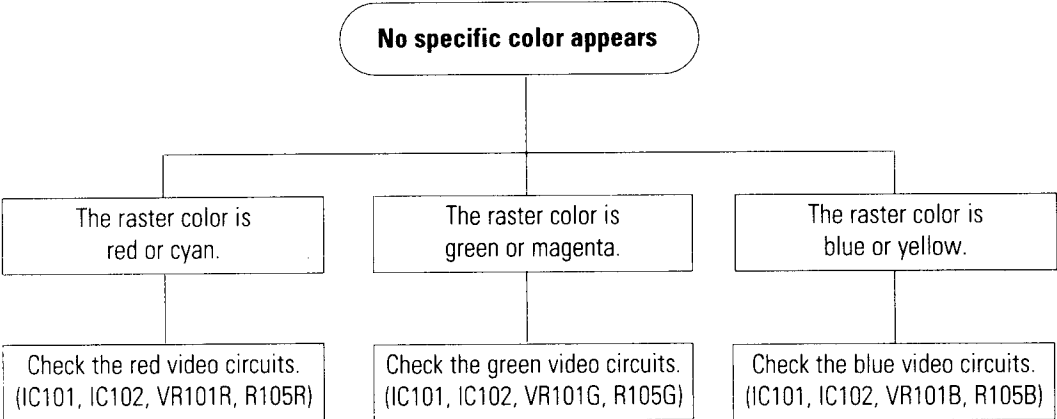
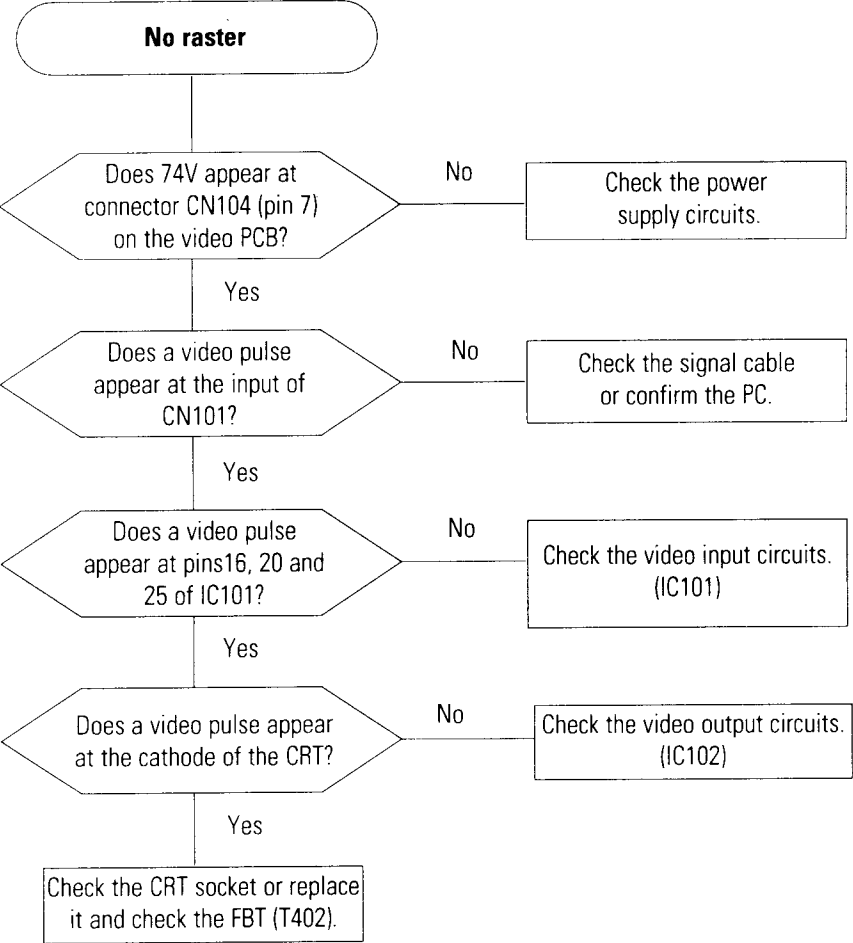
This adjustment is available only on Saddle/ Saddle DYs (see Figure 6-8). Use a #0 phillips screwdriver at the Yv variable resistor. Turning the VR to the left moves the blue line at the top upward and at the bottom, the line moves downward. Turning it to the right moves the blue line at the top downward and at the bottom, the line moves upward.

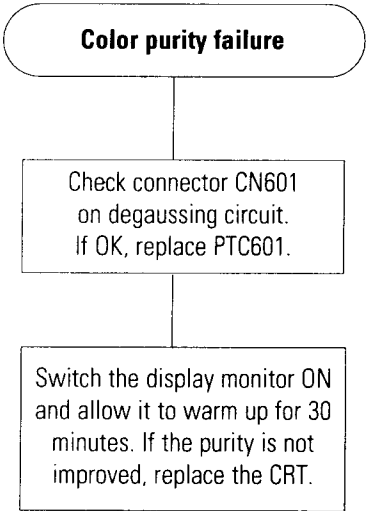
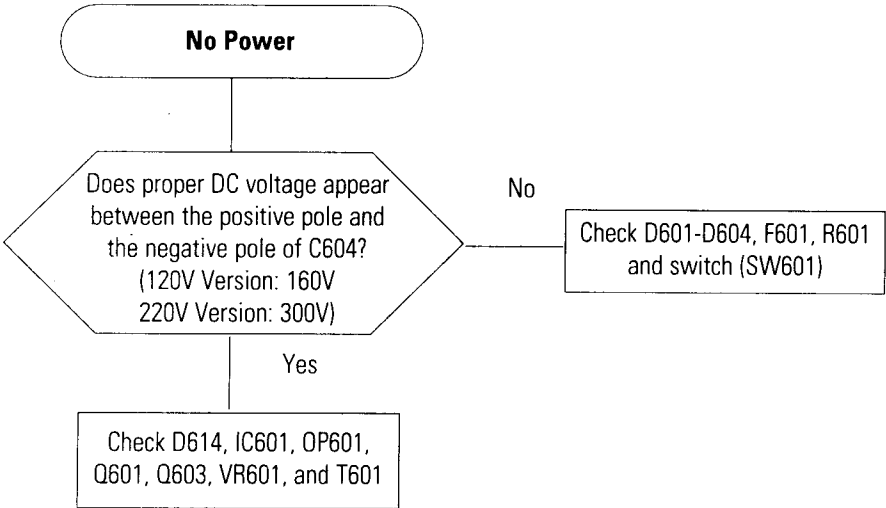
7 Troubleshooting

- Notes:**
- 1. If picture does not appear, fully rotate the brightness and contrast controls clockwise before inspection.
 - 2. Check the following circuits:
 - No raster appears: Power circuit, horizontal output circuit, H/V control circuit and H/V output circuit.
 - High voltage develops but no raster appears: Video output circuits.
 - High voltage does not develop: Horizontal output circuits.

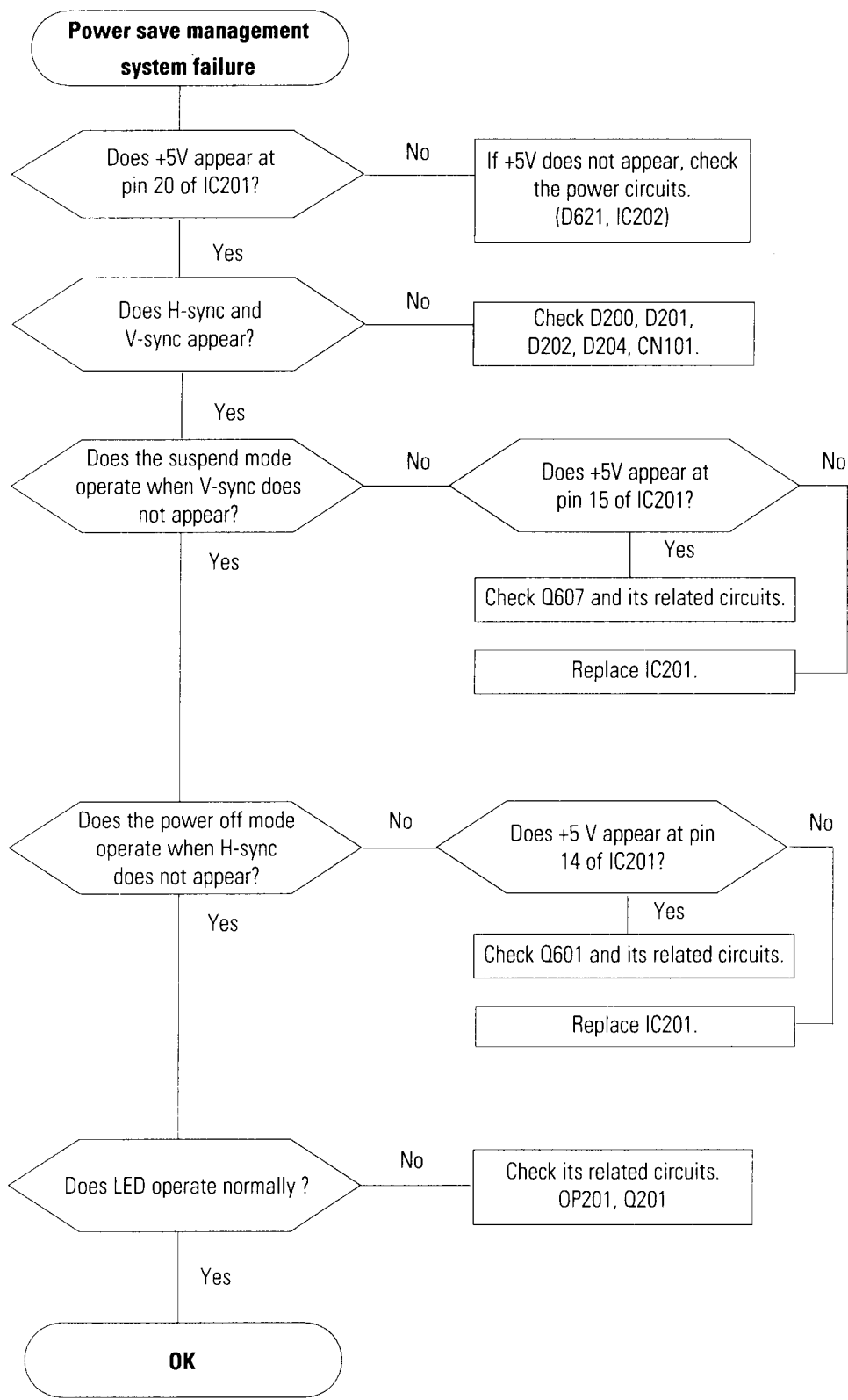




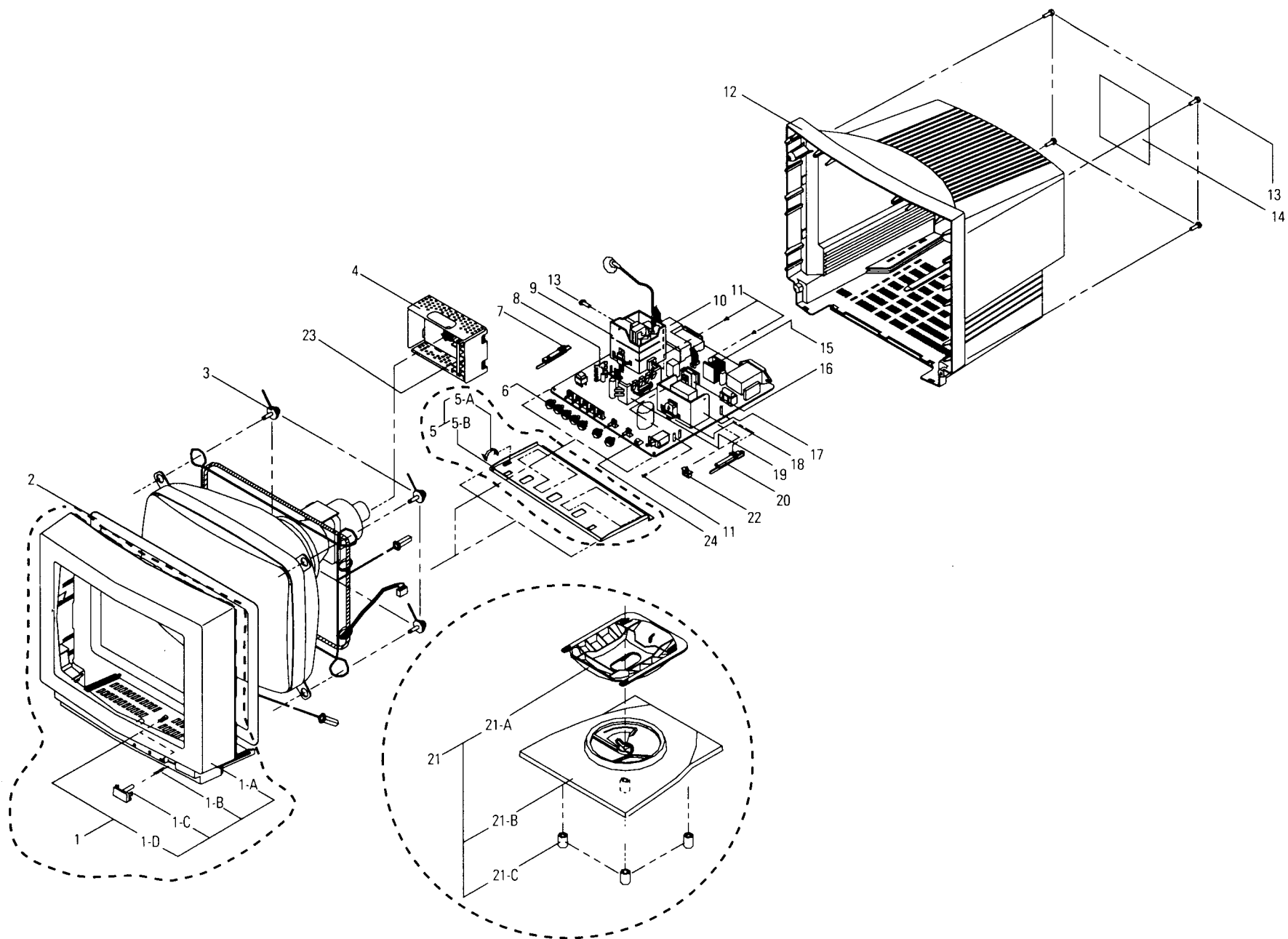




NOTE : If color purity is not normal, manually degauss the monitor using an external degaussing coil before inspection.



Memo

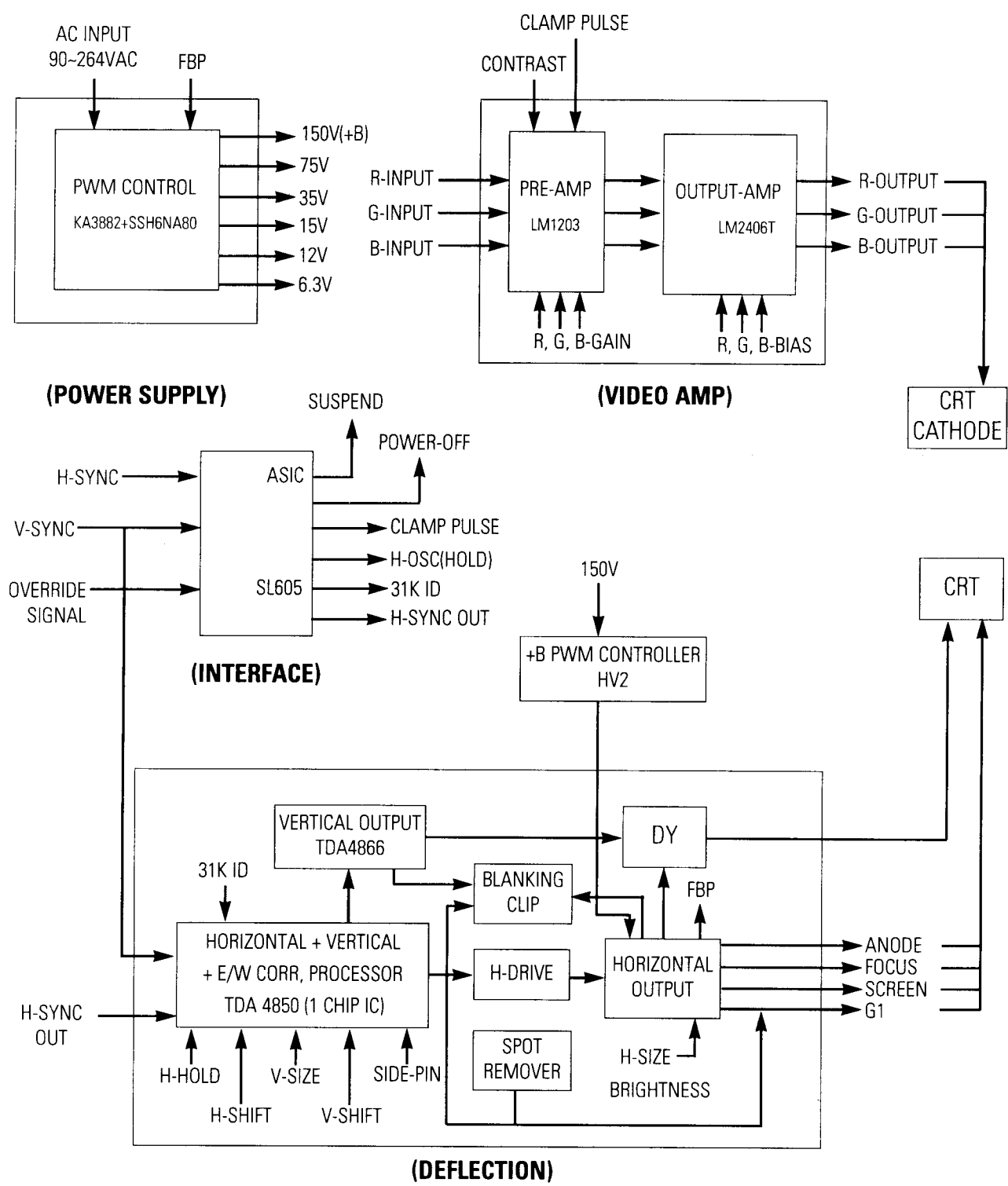


⚠ : Caution ● : Specialty part for this monitor only

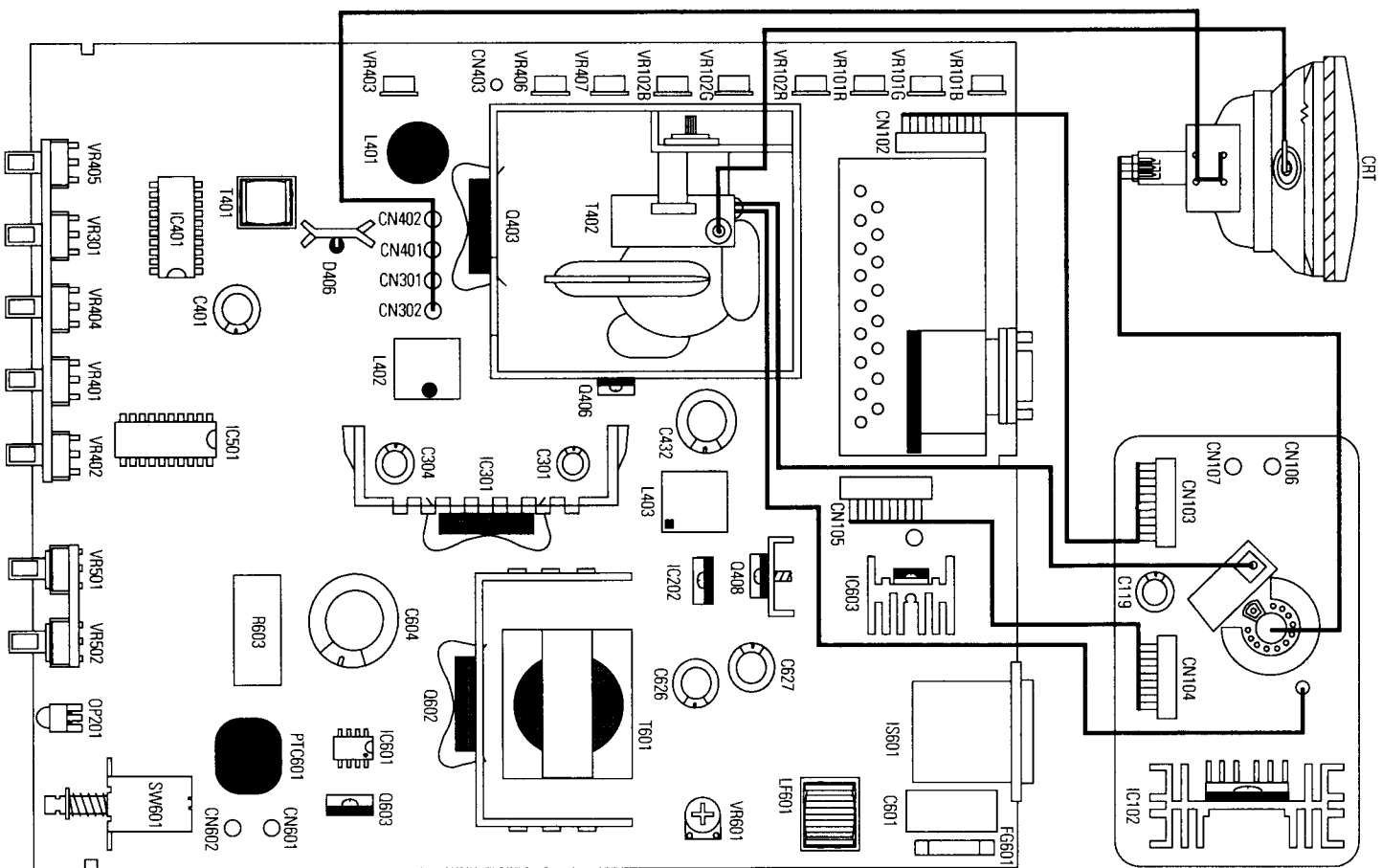
| No. | Description | Code No. | Specification | Q'TY | Remark |
|------|------------------|--------------|---------------------------|------|--------|
| 1 | COVER/FRONT-ASSY | BH75-10027A | CQA4147 | 1 | ● |
| | COVER/FRONT-ASSY | BH75-10072B | CQA4157 | 1 | ● |
| 1-A | COVER-FRONT | BH72-60046A | ABS VO IV01, CQA4147 | 1 | ● |
| | COVER-FRONT | BH72-60054A | ABS VO IV01, CQA4157 | 1 | ● |
| 1-B | SPRING-COIL | 831 522013AA | SUS-302 WPA, CQA4147/4157 | 1 | |
| 1-C | KNOB-POWER | BH64-10024A | ABS VO IV01, CQA4147 | 1 | ● |
| | KNOB-POWER | BH64-10026A | ABS VO IV01, CQA4157 | 1 | ● |
| 1-D | LENS-LED | BH67-10007A | ACRYL CLEAR, CQA4147 | 1 | ● |
| | LENS-LED | BH67-10008A | ACRYL CLEAR, CQA4157 | 1 | ● |
| 2 | SHIELD/F-ASSY | 831 522013AA | CQA4147, CQA4157 | 1 | ● |
| 3 | TAPPING,CRT | 6006-000001 | BH,+,1,M5,L30,ZPC3,W/W | 4 | |
| 4 | SHIELD-CRT,PCB | BH70-10009A | SPTE TO 3 | 1 | ● |
| 5 | B/CHASSIS-ASSY | BH75-10047A | CQA4147, CQA4157 | 1 | ● |
| 5-A | BRKT-BOTTOM | BH70-10010A | SECC-1 TI 0 | 1 | ● |
| 5-B | SPRING-PLATE | BH61-70002A | SUS-401 1/2H T0.2 | 1 | ● |
| 6 | KNOB-VR | BH64-10023A | ABS VO IV01 | 7 | ● |
| 7 | BRKT/G-PCB (L) | BH72-60052A | ABS VO IV01 | 1 | ● |
| 8 | H/SINK-DIODE | BH62-30009A | BS TI 0 TIN COATING | 1 | ● |
| 9 | H/SINK-FBT | 831 514510AA | A1050S HI4 TI 0 | 1 | |
| 10 | S/MAIN-PCB | 815 464124AA | SPTE TO 3 | 1 | |
| 11 | SCREW-TAPTITE | 847 502005AA | BH,+,1,M3,L10,ZPC3,W/W | 4 | |
| 12 | COVER-REAR | BH72-60047A | ABS VO IV01 | 1 | ● |
| 13 | SCREW-TAPTITE | 847 501007FC | B,BH,+,M4,L16,ZPC3,SWCH | 5 | |
| 14 | LABEL-RATING | BH68-30025A | POLYESTER TO 0173 | 1 | ● |
| 15 | H/SINK-IC (317) | 6203-000001 | A6063 EXTR H35 | 1 | ● |
| 16 | H/SINK-TR (408) | BH62-30014A | SPC-1 TI 0 | 1 | |
| 17 | H/SINK-POWER | 831 513523EA | A1250S HI4 T2 0 | 1 | ● |
| 18 | SPRING-TR | 813 468062AC | SUS-304 1/2H 0.17/T0.5 | 3 | |
| 19 | H/SINK-IC (4866) | BH62-30010A | A1050S HI4 T3.0 | 1 | ● |
| 20 | BRKT/G-PCB (R) | BH72-60053A | ABS VO IV01 | 1 | ● |
| 21 | STAND-ASSY | BH75-10031A | CQA4147, CQA4157 | 1 | ● |
| 21-A | STAND-TOP | BH72-60048A | ABS VO IV01 | 1 | ● |
| 21-B | STAND-BASE | BH72-60049A | ABS VO IV01 | 1 | ● |
| 21-C | RUBBER-FOOT | 821 463092AA | NEOPRENE VO GRAY | 4 | |
| 22 | PCB-MOUNT | 857 150054AB | NYLON 66 | 2 | |
| 23 | H/SINK-IC (102) | 6203-000008 | A6063 EXTR H35 | 1 | |
| 24 | HOLDER-LED | BH67-3001A | ABS VO IV01 | 1 | ● |

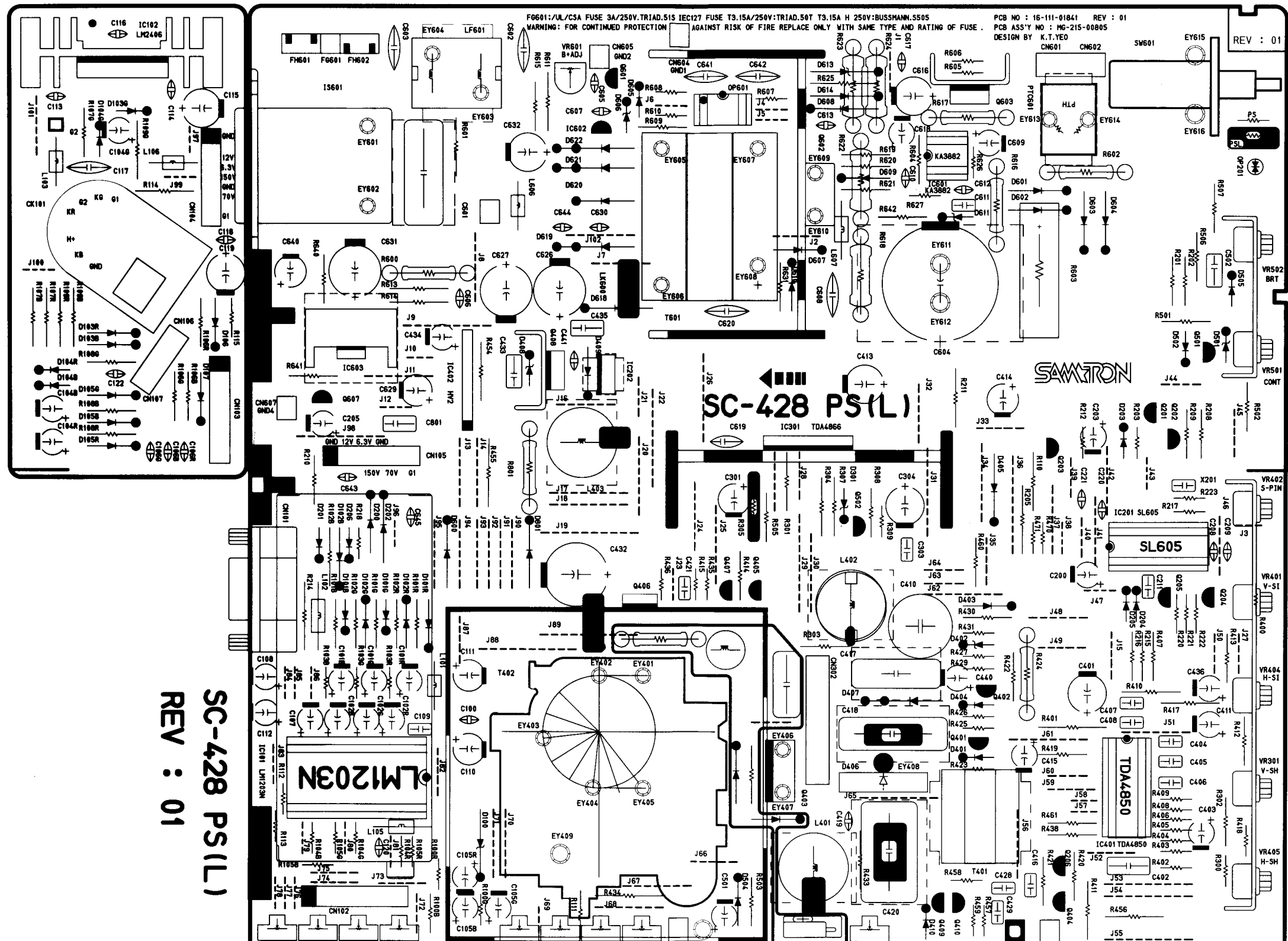
9 Servicing Diagrams

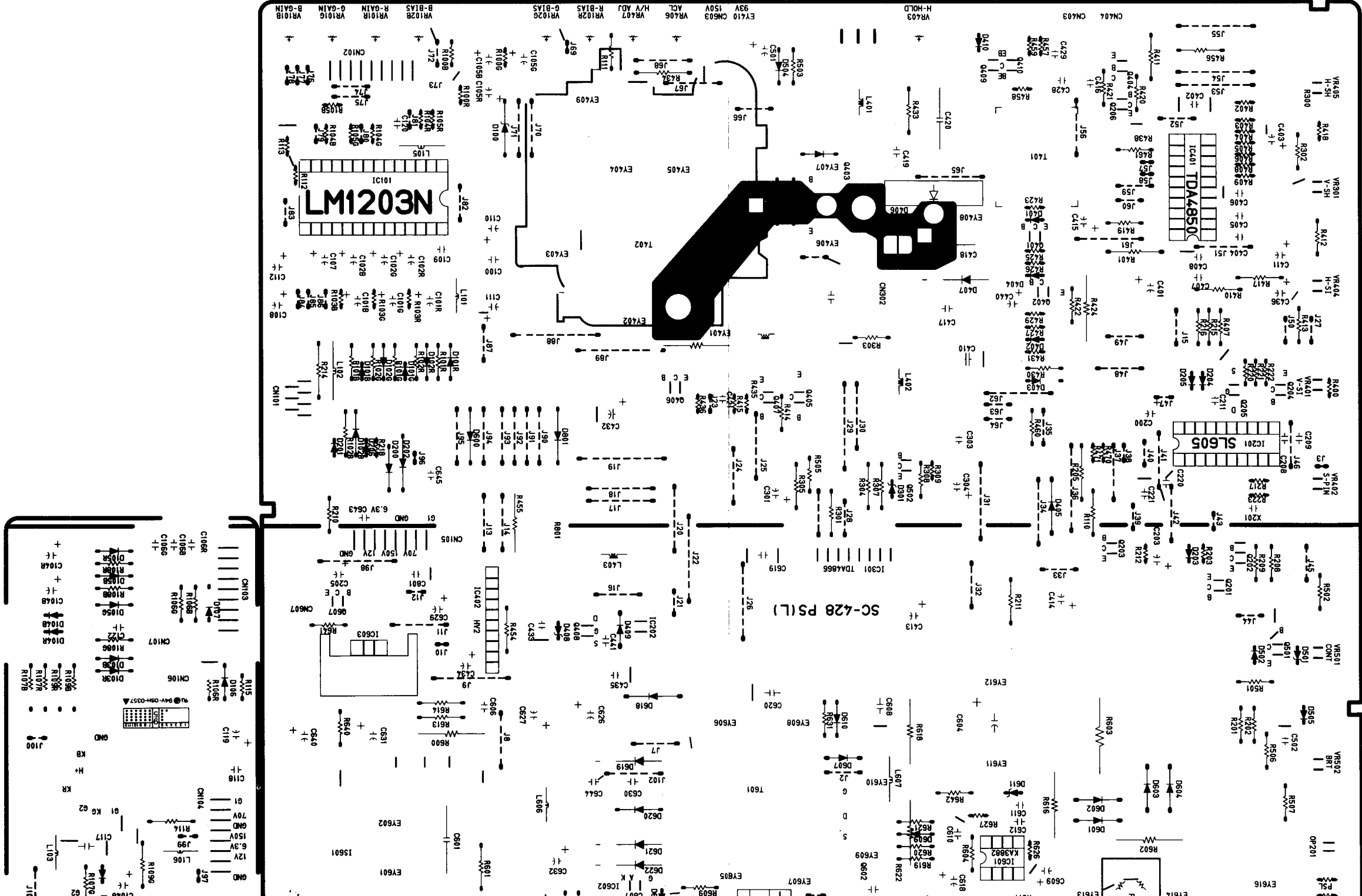
9-1 Block Diagram



9-2 Wiring Diagram







9-3-2 Main & CRT Socket PCB Parts List (⚠ : Caution, ● : Specialty part for this monitor only, ⚡ : ESD Caution)

| Loc. No. | Description | Code No. | Remarks |
|------------|-----------------------------|----------------|---------|
| CAPACITORS | | | |
| C100 | C-CERAMIC 0.1UF 50V | 915 336100HZVH | |
| C101B | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C101G | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C101R | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C102B | C-AL-ELE.GP 4.7UF 50V | 917 121470HM | |
| C102G | C-AL-ELE.GP 4.7UF 50V | 917 121470HM | |
| C102R | C-AL-ELE.GP 4.7UF 50V | 917 121470HM | |
| C104B | C-AL-ELE.GP 1UF 160V | 917 121100NM | |
| C104G | C-AL-ELE.GP 1UF 160V | 917 121100NM | |
| C104R | C-AL-ELE.GP 1UF 160V | 917 121100NM | |
| C105B | C-AL-ELE.GP 10UF 100V | 917 122100LM | |
| C105G | C-AL-ELE.GP 10UF 100V | 917 122100LM | |
| C105R | C-AL-ELE.GP 10UF 100V | 917 122100LM | |
| C106B | C-CERAMIC CK 0.01UF 500V | 915 325100VZVH | |
| C106G | C-CERAMIC CK 0.01UF 500V | 915 325100VZVH | |
| C106R | C-CERAMIC CK 0.01UF 500V | 915 325100VZVH | |
| C107 | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C108 | C-AL-ELE.GP 100UF 16V | 917 123100CM | |
| C109 | C-POLYESTER 104J 100V | 916 166100LJAH | |
| C110 | C-AL-ELE.GP 100UF 16V | 917 123100CM | |
| C111 | C-AL-ELE.GP 100UF 16V | 917 123100CM | |
| C112 | C-AL-ELE.GP 100UF 16V | 917 123100CM | |
| C113 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C114 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C115 | C-AL-ELE.GP 47UF 100V 105 | 917 742470LM | |
| C116 | C-CERAMIC CK 0.01UF 500V | 915 325100VZVH | |
| C117 | C-CERAMIC 103K 1KV | 915 325100XKPX | |
| C118 | C-CERAMIC CK 0.01UF 500V | 915 325100VZVH | |
| C119 | C-AL-ELE.GP 3.3UF 250V | 917 121330QM | |
| C120 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C121 | C-MAYER 104J 100V | 916 166100LJAH | |
| C122 | C-CERAMIC CK | 915 325100VZVH | |
| C200 | C-AL-ELE.GP 16V | 917 122470CM | |
| C203 | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C205 | C-AL-ELE.GP 100UF 16V | 917 123100CM | |
| C208 | C-CERAMIC CC 47PF 50V | 915 312470HJXH | |
| C209 | C-CERAMIC CC 47PF 50V | 915 312470HJXH | |
| C211 | C-POLYESTER 222J 100V | 916 164220LJAH | |
| C220 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C221 | C-CERAMIC CC45 33PF 50V | 915 312330HJXH | |
| C301 | C-AL-ELE.GP 100UF 50V | 917 123100HM | |
| C303 | C-POLYESTER 223J 100V | 916 165220LJAH | |
| C304 | C-AL-ELE.GP 470UF 25V | 917 863470EMAH | |
| C401 | C-AL-ELE.GP 1000UF 16V | 917 864100CMAH | |
| C402 | C-METAL POLYESTER 224K 100V | 2305-000004 | |
| C403 | C-AL-ELE.GP 1UF 50V | 917 121100HM | |
| C404 | C-POLYESTER 473K 100V | 916 165470LKAH | |
| C405 | C-POLYESTER 102J 100V | 916 164100LJAH | |
| C406 | C-POLYESTER 104J 100V | 916 166100LJAH | |
| C407 | C-PP 332J 100V | 916 354330LJAL | |
| C408 | C-POLYESTER 682J 100V | 916 164680LJAH | |







(⚠ : Caution, ● : Specialty part for this monitor only, ⚡ : ESD Caution)

| Loc. No. | Description | Code No. | Remarks |
|----------|-------------------------------|----------------|---------|
| C410 | C-AL-ELE.GP 3.3UF 25V NP | 2401-000020 | |
| C411 | C-AL-ELE.GP 1UF 50V | 917 121100HM | |
| C413 | C-AL-ELE.GP 470UF 16V | 917 863470CMAH | |
| C414 | C-AL-ELE.GP 100UF 50V | 917 123100HM | |
| C415 | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C416 | C-POLYESTER 472J 100V | 916 164470LJAH | |
| C417 | C-PP 822J 400V | 2303-000002 | |
| C418 | C-PP 542J 1.6KV | 2303-000003 | |
| C419 | C-CERAMIC CK-45 560PF 500V | 915 323560VKPH | |
| C420 | C-MPPF824J 200V | 2306-000001 | ⚠ |
| C421 | C-POLYESTER 222J 100V | 916 164220LJAH | |
| C428 | C-POLYESTER 103J 100V | 916 165100LJAH | |
| C429 | C-POLYESTER 473K 100V | 916 165470LKAH | |
| C432 | C-AL-ELE.GP 68UF 160V | 917 122680NM | |
| C433 | C-METAL POLYESTER 104J 250V | 916 556100QJAL | |
| C434 | C-AL-ELE.GP 47UF 16V | 917 122470CM | |
| C435 | C-METAL POLYESTER 104J 250V | 916 556100QJAL | |
| C436 | C-AL-ELE.GP 1UF 50V | 917 121100HM | |
| C440 | C-AL-ELE.GP 1UF 50V | 917 121100HM | |
| C441 | C-CERAMIC CK-45 560PF 500V | 915 323560VKPH | |
| C501 | C-AL-ELE.GP 50V | 917 121100HM | |
| C502 | C-METAL POLYESTER 104J 250V | 916 556100QJAL | |
| C601 | C-MPPF 474K 250V AC | 918 146470QK | ⚠ |
| C602 | C-CERAMIC CK 2200PF 400VAC | 915 344220MMVH | ⚠ |
| C603 | C-CERAMIC CK 2200PF 400VAC | 915 344220MMVH | ⚠ |
| C604 | C-ELEC 220UF 400V 20% -25/105 | 917 793220TMFX | |
| C605 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C606 | C-CERAMIC CK-45 2200PF 500V | 915 324220VKPH | |
| C607 | C-CERAMIC CK 102K 50V | 915 324100HKPH | |
| C608 | C-CERAMIC 103K 1KV | 915 325100KKPX | |
| C609 | C-AL-ELE.GP 10UF 50V | 917 122100HM | |
| C610 | C-CERAMIC CK 1000PF 50V | 915 324100HKPH | |
| C611 | C-PP 102J 100V | 916 354100LJAL | |
| C612 | C-CERAMIC CK 102K 500V | 915 324100HKPH | |
| C613 | C-CERAMIC CK 331J 1KV | 915 323330KKPH | |
| C616 | C-AL-ELE.GP 47UF 100V | 917 742470LM | |
| C617 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C618 | C-AL-ELE.GP 22UF 25V | 917 122220EM | |
| C619 | C-CERAMIC CK 4700PF 400VAC | 915 344470MMVH | ⚠ |
| C620 | C-CERAMIC CK 4700PF 400VAC | 915 344470MMVH | ⚠ |
| C626 | C-AL-ELE.GP 100UF 100V | 917 123100LM | |
| C627 | C-AL-ELE.GP 220UF 100V | 917 123220LM | |
| C629 | C-AL-ELE.GP 100UF 50V | 917 123100HM | |
| C630 | C-CERAMIC CK 0.01UF 500V | 915 325100VZVH | |
| C631 | C-AL-ELE.GP 1000UF 25V | 917 124100EM | |
| C632 | C-AL-ELE.GP 1000UF 16V | 917 864100CMAH | |
| C634 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C640 | C-AL-ELE.GP 220UF 16V | 917 123220CM | |
| C642 | C-CERAMIC CK 2200PF 250VAC | 915 344220MMVH | ⚠ |
| C644 | C-CERAMIC CK 220PF 1KV | 915 323220KKPH | |
| C645 | C-CERAMIC CK 0.1UF 50V | 915 336100HZVH | |
| C801 | C-MP 104J 250V | 916 556100QJAL | |

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| Loc. No. | Description | Code No. | Remarks |
|------------|---|----------------|------------------|
| CONNECTORS | | | |
| CN101 | CONNECTOR D-SUB 2.77 15P MALE 9P 2.29 15P | 935 100109AL | ● ● ● ● |
| CN102 | SUB ASS'Y CONNECTOR 210MM 10P | BH39-40010A | |
| CN103 | SUB ASS'Y CONNECTOR 210MM 10P | BH39-40010A | |
| CN104 | SUB ASS'Y CONNECTOR 210MM 9P | BH39-40009A | |
| CN105 | SUB ASS'Y CONNECTOR 210MM 9P | BH39-40009A | |
| CN106 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN107 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN301 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN302 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN401 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN402 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN403 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN404 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN601 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN602 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN603 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN604 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN605 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN606 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| CN607 | BEAD PIN D2.36*14.1 BRASS SN | 31-131-00012 | |
| DIODES | | | |
| D100 | Z-DIODE UZ12B | 893 290031BB | |
| D101B | DIODE 1N4148 | 893 114148AANM | |
| D101G | DIODE 1N4148 | 893 114148AANM | |
| D101R | DIODE 1N4148 | 893 114148AANM | |
| D102B | DIODE 1N4148 | 893 114148AANM | |
| D102G | DIODE 1N4148 | 893 114148AANM | |
| D102R | DIODE 1N4148 | 893 114148AANM | |
| D103B | DIODE 1N4148 | 893 114148AANM | |
| D103G | DIODE 1N4148 | 893 114148AANM | |
| D103R | DIODE 1N4148 | 893 114148AANM | |
| D104B | DIODE BAV21 | 893 190021AANA | |
| D104G | DIODE BAV21 | 893 190021AANA | |
| D104R | DIODE BAV21 | 893 190021AANA | |
| D105B | DIODE 1N4148 | 893 114148AANM | |
| D105G | DIODE 1N4148 | 893 114148AANM | |
| D105R | DIODE 1N4148 | 893 114148AANM | |
| D106 | DIODE 1N4007 | 893 314007BA | |
| D107 | DIODE 1N4007 | 893 314007BA | |
| D200 | DIODE 1N4148 | 893 114148AANM | |
| D201 | DIODE 1N4148 | 893 114148AANM | |
| D202 | DIODE 1N4148 | 893 114148AANM | |
| D203 | DIODE 1N4148 | 893 114148AANM | |
| D204 | DIODE 1N4148 | 893 114148AANM | |
| D205 | DIODE 1N4148 | 893 114148AANM | |
| D206 | DIODE 1N4148 | 893 114148AANM | |
| D301 | Z-DIODE UZ16B | 893 290031HB | |
| D302 | DIODE 1N4937 | 893 314937AC | |
| D401 | DIODE 1N4148 | 893 114148AANM | |
| D402 | DIODE 1N4148 | 893 290031AA | |
| D403 | DIODE 1N4937 | 893 314937AC | |

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| Loc. No. | Description | Code No. | Remarks | |
|----------|--|----------------|---|---|
| D404 | DIODE 1N4148 | 893 114148AANM | | |
| D405 | DIODE 1N4937 | 893 314937AC | | |
| D406 | DIODE RU4DS | 893 390045AA | | |
| D408 | Z-DIODE UZ9.1B | 893 290035AF | | |
| D409 | DIODE RG10 / RG2 | 893 399016AA | | |
| D410 | DIODE 1N4148 | 893 114148AANM | | |
| D501 | Z-DIODE UZ6.2B | 893 290031SB | | |
| D502 | DIODE 1N4148 | 893 114148AANM | | |
| D504 | DIODE 1N4148 | 893 114148AANM | | |
| D505 | DIODE BAV21 | 893 190021AANA | | |
| D601 | DIODE 1N5399GP | 893 315399AA | | |
| D602 | DIODE 1N5399GP | 893 315399AA | | |
| D603 | DIODE 1N5399GP | 893 315399AA | | |
| D604 | DIODE 1N5399GP | 893 315399AA | | |
| D605 | DIODE 1N4148 | 893 114148AANM | | |
| D606 | Z-DIODE UZ12B | 893 290031BB | | |
| D607 | DIODE RGP02-12E | 02169-206-297 | | |
| D608 | DIODE RGP02-12E | 02169-206-297 | | |
| D609 | Z-DIODE UZ16B | 893 290031HB | | |
| D610 | DIODE 1N4007 | 893 314007BA | | |
| D611 | Z-DIODE UZ5.1B | 893 290031FB | | |
| D613 | Z-DIODE UZ16B | 893 290031HB | | |
| D614 | DIODE UF4007 | 893 394007AA | | |
| D620 | DIODE RGP15G/FF1504 | 893 390015AD | | |
| D407 | RECTIFIER DIODE UF5404 | 893 399044AA | | |
| D618 | DIODE 1R5NU41 / UR1M-5704 | 893 399032AA | | |
| D619 | RECTIFIER DIODE UF5408 | 893 395408AA | | |
| D621 | RECTIFIER DIODE UF5404 | 893 399044AA | | |
| D622 | RECTIFIER DIODE UF5404 | 893 399044AA | | |
| D801 | DIODE 1N4937 | 893 314937AC | | |
| ICS | | | | |
| IC101 | IC-LINEAR 1203 RGB VIDEO AMP 28 | 881 101203AA | |      |
| IC102 | LM2406T | 1204-000010 | | |
| IC201 | IC-CUSTOM SL605 ASIC DIP-20 | 885 460008AA | | |
| IC202 | IC REGULATOR 78M05 0.5A 5V | 881 307805KANE | | |
| IC301 | TDA4866 | 1204-000009 | | |
| IC401 | IC-LINEAR DIP-20 TDA4850 HV DEF CONTROLLER | 1204-000011 | | |
| IC402 | IC HYBRID SC-428VS(VI) HV2 | BH13-10002A | | |
| IC601 | IC-LINEAR DIP-8 KA3882 PWA CONTROLLER | 881 903882AA | | |
| IC602 | IC-REGULATOR 431C PROGRAMMABLE PRECISION | 881 300431TANB | | |
| IC603 | KA317,(LM317) | 881 300317KANC | | |
| COILS | | | | |
| L101 | FILTER CORE 130 OHM | 02429-048-017 |  | |
| L102 | FILTER CORE 2.4UH,5.5MM,BEAD,0.032OHM | 937 120211AA | | |
| L103 | FILTER CORE 2.4UH,5.5MM,BEAD,0.032OHM | 937 120211AA | | |
| L105 | FILTER CORE 2.4UH,5.5MM,BEAD,0.032OHM | 937 120211AA | | |
| L106 | FILTER CORE 2.4UH,5.5MM,BEAD,0.032OHM | 937 120211AA | | |
| L401 | COIL H-LIN 10UH 30% | BH27-20006A | | |
| L402 | COIL CHOKE 200UH 10% | BH27-20004A | | |
| L403 | COIL CHOKE 3.2MH 10% | 925 460181SA | | |

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| Loc. No. | Description | Code No. | Remarks |
|-------------|---------------------------------------|----------------|---------|
| L606 | FILTER CORE 2.4UH 5.5MM,BEAD 0.032OHM | 937 120211AA | |
| L607 | FILTER CORE 2.4UH 5.5MM,BEAD 0.032OHM | 937 120211AA | |
| TRANSISTORS | | | |
| Q201 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q202 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q203 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q204 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q205 | FET-N VN2222LL,0.23A,60V,TO-92" | 891 892222AA | |
| Q206 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q401 | TR-NPN KSA733C-G | 891 190733AD | |
| Q402 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q403 | TR-2SC51491 | 891 465149AA | ⚠ |
| Q404 | TR-NPN KSC1008Y /KTA1266Y /1015Y | 891 391008XA | |
| Q405 | TR-NPN KSA733C-G | 891 190733AD | |
| Q406 | MJE800 / KSE800 | 21-115-00131 | |
| Q407 | TR-NPN KSA733C-G | 891 190733AD | |
| Q408 | IRF9610 | 891 799610AA | ⚠ |
| Q409 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q410 | TR-NPN KSA733C-G | 891 190733AD | |
| Q501 | TR-NPN KSA733C-G | 891 190733AD | |
| Q502 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q603 | TR KSC1507Y 0.2A 300V 15W | 891 491507AB | |
| Q601 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| Q602 | STH6NA80FI | 891 890680AA | |
| Q607 | TR-NPN KSC945CY /KTC3198Y /1815Y | 891 390006BCNA | |
| RESISTORS | | | |
| R100B | R-CARBON 22K 1/6W 5% | 911 152207YA | |
| R100G | R-CARBON 22K 1/6W 5% | 911 152207YA | |
| R100R | R-CARBON 22K 1/6W 5% | 911 152207YA | |
| R101B | R-CARBON 47 1/4W 5% | 911 124707DA | |
| R101G | R-CARBON 47 1/4W 5% | 911 124707DA | |
| R101R | R-CARBON 47 1/4W 5% | 911 124707DA | |
| R102B | R-CARBON 75 1/4W 5% | 911 127507DA | |
| R102G | R-CARBON 75 1/4W 5% | 911 127507DA | |
| R102R | R-CARBON 75 1/4W 5% | 911 127507DA | |
| R103B | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R103G | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R103R | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R104B | R-CARBON 200 1/6W 5% | 911 132007YA | |
| R104G | R-CARBON 200 1/6W 5% | 911 132007YA | |
| R104R | R-CARBON 200 1/6W 5% | 911 132007YA | |
| R105B | R-CARBON 390 1/6W 5% | 911 133907YA | |
| R105G | R-CARBON 390 1/6W 5% | 911 133907YA | |
| R105R | R-CARBON 390 1/6W 5% | 911 133907YA | |
| R106B | R-CARBON 47 1/4W 5% | 911 124707DA | |
| R106G | R-CARBON 47 1/4W 5% | 911 124707DA | |
| R106R | R-CARBON 47 1/4W 5% | 911 124707DA | |
| R107B | R-CARBON 27 1/4W 5% | 911 122707DA | |
| R107G | R-CARBON 27 1/4W 5% | 911 122707DA | |
| R107R | R-CARBON 27 1/4W 5% | 911 122707DA | |
| R108B | R-CARBON 470K 1/4W 5% | 911 164707DA | |

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| Loc. No. | Description | Code No. | Remarks |
|----------|-------------------------|--------------|---------|
| R108G | R-CARBON 470K 1/4W 5% | 911 164707DA | |
| R108R | R-CARBON 470K 1/4W 5% | 911 164707DA | |
| R109B | R-CARBON 100 1/2W 5%(S) | 911 131007FF | |
| R109G | R-CARBON 100 1/2W 5%(S) | 911 131007FF | |
| R109R | R-CARBON 100 1/2W 5%(S) | 911 131007FF | |
| R110 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R111 | R-CARBON 5.6K 1/4W 5% | 911 145607DA | |
| R112 | R-CARBON 82K 1/6W 5% | 911 158207YA | |
| R113 | R-CARBON 11K 1/6W 5% | 14-121-01137 | |
| R114 | R-CARBON 100 1/4W 5% | 911 131007DA | |
| R115 | R-CARBON 2.2M 1/6W 5% | 911 172207YA | |
| R201 | R-CARBON 330 1/4W 5% | 911 133307DA | |
| R202 | R-CARBON 330 1/4W 5% | 911 133307DA | |
| R203 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R205 | R-CARBON 10K 1/6W 5% | 911 142707YA | |
| R208 | R-CARBON 4.7K 1/4W 5% | 911 144707DA | |
| R209 | R-CARBON 47K 1/4W 5% | 911 154707DA | |
| R210 | R-CARBON 10K 1/4W 5% | 911 151007DA | |
| R211 | R-CARBON 10K 1/4W 5% | 911 151007DA | |
| R212 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R214 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R215 | R-CARBON 33K 1/4W 5% | 911 153307DA | |
| R216 | R-CARBON 56K 1/4W 5% | 911 155607DA | |
| R217 | R-CARBON 1.8M 1/6W 5% | 911 141807YA | |
| R218 | R-CARBON 1K 1/6W 5% | 911 141007YA | |
| R220 | R-CARBON 2.2K 1/6W 5% | 911 142207YA | |
| R221 | R-CARBON 3.3K 1/6W 5% | 911 143307YA | |
| R222 | R-CARBON 2.2K 1/6W 5% | 911 142207YA | |
| R223 | R-CARBON 220 1/6W 5% | 911 132207YA | |
| R301 | R-CARBON 100 1/2W 5%(S) | 911 131007FF | |
| R302 | R-CARBON 68K 1/6W 5% | 911 156807YA | |
| R303 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R304 | R-CARBON 1 1/2W (S)5% | 911 111007FF | |
| R305 | R-CARBON 2.2K 1/4W 5% | 911 142207DA | |
| R307 | R-CARBON 0.5 1/2W (S)5% | 911 105007FF | |
| R308 | R-CARBON 390 1/4W 5% | 911 133907DA | |
| R309 | R-CARBON 1K 1/6W 5% | 911 141007YA | |
| R400 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R401 | R-CARBON 33 1/2W 5%(S) | 911 123307FF | |
| R402 | R-CARBON 180K 1/6W 5% | 911 161807YA | |
| R403 | R-CARBON 470K 1/6W 5% | 911 164707YA | |
| R404 | R-CARBON 120K 1/6W 5% | 911 161207YA | |
| R405 | R-CARBON 150K 1/6W 5% | 911 161507YA | |
| R406 | R-CARBON 220K 1/6W 5% | 911 162207YA | |
| R407 | R-CARBON 100K 1/4W 5% | 911 161007DA | |
| R408 | R-CARBON 56K 1/6W 5% | 911 155607YA | |
| R409 | R-CARBON 18K 1/6W 5% | 911 151807YA | |
| R410 | R-CARBON 10K 1/4W 5% | 911 151007DA | |
| R411 | R-CARBON 7.5K 1/4W 5% | 911 147507DA | |
| R412 | R-CARBON 56K 1/4W 5% | 911 155607DA | |
| R413 | R-CARBON 100K 1/4W 5% | 911 161007DA | |
| R414 | R-CARBON 1.8K 1/4W 5% | 911 141807DA | |

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| Loc. No. | Description | Code No. | Remarks |
|----------|--------------------------|--------------|---------|
| R415 | R-CARBON 100K 1/6W 5% | 911 161007YA | |
| R417 | R-CARBON 68K 1/4W 5% | 911 156807DA | |
| R418 | R-CARBON 68K 1/6W 5% | 911 156807YA | |
| R419 | R-CARBON 2.2K 1/4W 5% | 911 142207DA | |
| R420 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R421 | R-CARBON 180 1/4W 5% | 911 131807DA | |
| R422 | R-CARBON 470 1/4W 5% | 911 134707DA | |
| R423 | R-CARBON 820 1/6W 5% | 911 138207YA | |
| R424 | R-M.O 47 1W 5% 63MM(T) | 911 324707GA | |
| R425 | R-CARBON 1K 1/6W 5% | 911 141007YA | |
| R426 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R427 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R429 | R-CARBON 1K 1/6W 5% | 911 141007YA | |
| R430 | R-CARBON 4.7K 1/4W 5% | 911 144707DA | |
| R431 | R-CARBON 7.5K 1/6W 5% | 911 147507YA | |
| R433 | R-CARBON 330 1/2W 5%(S) | 911 133307FF | |
| R434 | R-CARBON 100K 1/2W 5%(S) | 911 161007FF | |
| R435 | R-CARBON 33K 1/6W 5% | 911 153307YA | |
| R436 | R-CARBON 1K 1/6W 5% | 911 141007YA | |
| R438 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R454 | R-CARBON 22 1/2W 5%(S) | 911 122207FF | |
| R455 | R-CARBON 10K 1/4W 5% | 911 151007DA | |
| R456 | R-CARBON 680K 1/6W 5% | 911 166807YA | |
| R457 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R458 | R-CARBON 39K 1/6W 5% | 911 153907YA | |
| R459 | R-CARBON 1.8K 1/6W 5% | 911 141807YA | |
| R460 | R-CARBON 1.2K 1/4W 5% | 911 141207DA | |
| R461 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R470 | R-CARBON 1.5K 1/6W 5% | 911 141507YA | |
| R471 | R-CARBON 1.5K 1/6W 5% | 911 141507YA | |
| R501 | R-CARBON 2.7K 1/4W 5% | 911 142707DA | |
| R502 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R503 | R-CARBON 22K 1/4W 5% | 911 152207DA | |
| R505 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R506 | R-CARBON 2.2M 1/4W 5% | 911 172207DA | |
| R507 | R-CARBON 12K 1/4W 5% | 911 151207DA | |
| R600 | R-M.O 100 1W 5% | 911 331007GF | |
| R601 | R-CARBON 1M 1/2W 5%(S) | 911 171007FF | |
| R602 | R-M.O(S) 220 1W 5% | 911 332207GF | |
| R603 | R-CEMENT 3.3 7W | 911 613307QP | |
| R604 | R-CARBON 100K 1/4W 5% | 911 161007DA | |
| R605 | R-CARBON 10K 1/6W 5% | 911 151007YA | |
| R606 | R-CARBON 2.7K 1/6W 5% | 911 142707YA | |
| R607 | R-CARBON 2.2M 1/6W 5% | 911 172207YA | |
| R608 | R-CARBON 1.2K 1/6W 5% | 911 141207YA | |
| R609 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R610 | R-CARBON 56K 1/6W 5% | 911 155607YA | |
| R611 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R613 | R-CARBON 6.8K 1/4W 5% | 911 146807DA | |
| R614 | R-CARBON 100K 1/2W 5%(S) | 911 161007FF | |
| R615 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R616 | R-M.O 100K 1W 5% 63MM(T) | 911 361007GF | |
| R617 | R-M.O 100K 1W 5% 63MM(T) | 911 361007GF | |

(⚠ : Caution, ● : Specialty part for this monitor only, ⚡ : ESD Caution)

| Loc. No. | Description | Code No. | Remarks |
|--------------------|--|----------------|---------|
| R618 | R-M.O 68K 3W 5% 63MM(T) | 911 356807LF | |
| R619 | R-CARBON 6.8 1/4W 5% | 911 116807DA | |
| R620 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R621 | R-CARBON 100K 1/4W 5% | 911 161007DA | |
| R622 | R-W.W 0.27 1W 5% | 911 602707GU | |
| R623 | R-M.O 8.2K 3W 5% 63MM(T) | 911 348207LF | |
| R624 | R-M.O 8.2K 3W 5% 63MM(T) | 911 348207LF | |
| R625 | R-CARBON 10K 1/2W 5%(S) | 911 151007FF | |
| R626 | R-CARBON 62K 1/6W 5% | 911 156207YA | |
| R627 | R-CARBON 100K 1/6W 5% | 911 161007YA | |
| R631 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R640 | R-CARBON 220 1/4W 2% | 14-133-02214 | |
| R641 | R-CARBON 1.8K 1/4W 2% | 14-133-01826 | |
| R642 | R-CARBON 390 1/4W 2% | 911 133907DA | |
| R801 | R-M.O 100K 1W 5% 63MM(T) | 911 361007GF | |
| VARIABLE RESISTORS | | | |
| VR101B | VAR.NO-HANDLE H-TYPE 200 ,B,0.1W | 913 432008BF | |
| VR101G | VAR.NO-HANDLE H-TYPE 200 ,B,0.1W | 913 432008BF | |
| VR101R | VAR.NO-HANDLE H-TYPE 200 ,B,0.1W | 913 432008BF | |
| VR102B | VAR.NO-HANDLE H-TYPE 50K,B,0.1W | 913 455008BF | |
| VR102G | VAR.NO-HANDLE H-TYPE 50K,B,0.1W | 913 455008BF | |
| VR102R | VAR.NO-HANDLE H-TYPE 50K,B,0.1W | 913 455008BF | |
| VR-ARRY-5 | VR-ARRY H-TYPE 100K*5 0.05W | 2105-000001 | |
| VR403 | VAR.NO-HANDLE H-TYPE 2K ,B,0.1W | 913 442008BF | |
| VR406 | VAR.NO-HANDLE H-TYPE 200K,B,0.1W | 913 462008BF | |
| VR407 | VAR.NO-HANDLE H-TYPE 1K ,B,0.1W | 913 441008BF | |
| VR-ARRY-2 | VR-ARRY H-TYPE 10K/5K 0.05W | 2105-000002 | |
| VR601 | VAR.NO-HANDLE H-TYPE 500 ,B,0.1W | 913 435008BH | |
| TRANSFORMER | | | |
| T401 | TRANS H-DRIVE 10MH/70UH | BH26-30009A | ● ⚠ |
| T402 | FBT FCO-14A042 | 923 460164DA | ● ⚠ |
| T601 | TRANS POWER 115/230V | BH26-20001A | ● ⚠ |
| OTHERS | | | |
| X201 | RESONATOR 8.000MHZ 2P | 941 210030AA | ● |
| CRT/GND | CDT GND.471P/472P 660mm,400mm,2P,255mm | BH39-40006A | |
| D/COIL | COIL DEGAUSSING 115+/-ITS,0.45,13.7UH,1040mm | BH27-10001A | |
| P/CORD | CORD POWER NOR DETACH 1850mm,IVY | BH39-10001A | ● |
| S/CABLE | CABLE SIGNAL DETACH 1300mm 15P 9P IVORY | 955 460512AAAA | |
| FBT-CORE | CORE-RING FERRITE CORE | 3301-000001 | ● |
| FG601 | FUSE TIME-LUG W/O LEAD 3.15A 250V 5*20MM | 949 115105THNA | ⚠ |
| FH601 | FUSE CLIP 5.20*20MM,(T) | 953 260023BC | |
| FH602 | FUSE CLIP 5.20*20MM,(T) | 953 260023BC | |
| IS601 | FILTER EMI SOCKET 250V 3A 1.2MH | 943 150034BA | |
| J1-101 | JUMPER CU+SN+PB 1ST 1x0.6 SAD | 955 005001AAAA | |
| LF601 | FILTER LINE 15MH MIN | BH27-20012A | ● |
| OP201 | LED GREEN/RED SPR-39MVVW3 25MA | 0601-000003 | |
| OP601 | IC PTO-COUPLER CQY80XG | 895 520080AB | |
| PTC601 | POSISTOR POSI,14 OHM,SQUARE | 1404-000003 | ● |
| PCB | PCB-MAIN 247*330,FR-1,1.6T | BH41-10004A | ● |
| SW601 | SWITCH PUSH SPST 5A/80A 250VAC | 3403-000001 | ● |
| SK1 | CON-JACK CRT SOCKETPH129-HIGH FOCUS | 935 720901AESA | |

(⚠ : Caution, ● : Specialty part for this monitor only, ⚡ : ESD Caution)

| Loc. No. | Description | Code No. | Remarks |
|--------------------|--|----------------|---------|
| R618 | R-M.O 68K 3W 5% 63MM(T) | 911 356807LF | |
| R619 | R-CARBON 6.8 1/4W 5% | 911 116807DA | |
| R620 | R-CARBON 1K 1/4W 5% | 911 141007DA | |
| R621 | R-CARBON 100K 1/4W 5% | 911 161007DA | |
| R622 | R-W.W 0.27 1W 5% | 911 602707GU | |
| R623 | R-M.O 8.2K 3W 5% 63MM(T) | 911 348207LF | |
| R624 | R-M.O 8.2K 3W 5% 63MM(T) | 911 348207LF | |
| R625 | R-CARBON 10K 1/2W 5%(S) | 911 151007FF | |
| R626 | R-CARBON 62K 1/6W 5% | 911 156207YA | |
| R627 | R-CARBON 100K 1/6W 5% | 911 161007YA | |
| R631 | R-CARBON 1.5K 1/4W 5% | 911 141507DA | |
| R640 | R-CARBON 220 1/4W 2% | 14-133-02214 | |
| R641 | R-CARBON 1.8K 1/4W 2% | 14-133-01826 | |
| R642 | R-CARBON 390 1/4W 2% | 911 133907DA | |
| R801 | R-M.O 100K 1W 5% 63MM(T) | 911 361007GF | |
| VARIABLE RESISTORS | | | |
| VR101B | VAR.NO-HANDLE H-TYPE 200 ,B,0.1W | 913 432008BF | |
| VR101G | VAR.NO-HANDLE H-TYPE 200 ,B,0.1W | 913 432008BF | |
| VR101R | VAR.NO-HANDLE H-TYPE 200 ,B,0.1W | 913 432008BF | |
| VR102B | VAR.NO-HANDLE H-TYPE 50K,B,0.1W | 913 455008BF | |
| VR102G | VAR.NO-HANDLE H-TYPE 50K,B,0.1W | 913 455008BF | |
| VR102R | VAR.NO-HANDLE H-TYPE 50K,B,0.1W | 913 455008BF | |
| VR-ARRY-5 | VR-ARRY H-TYPE 100K*5 0.05W | 2105-000001 | |
| VR403 | VAR.NO-HANDLE H-TYPE 2K ,B,0.1W | 913 442008BF | |
| VR406 | VAR.NO-HANDLE H-TYPE 200K,B,0.1W | 913 462008BF | |
| VR407 | VAR.NO-HANDLE H-TYPE 1K ,B,0.1W | 913 441008BF | |
| VR-ARRY-2 | VR-ARRY H-TYPE 10K/5K 0.05W | 2105-000002 | |
| VR601 | VAR.NO-HANDLE H-TYPE 500 ,B,0.1W | 913 435008BH | |
| TRANSFORMER | | | |
| T401 | TRANS H-DRIVE 10MH/70UH | BH26-30009A | ● ⚠ |
| T402 | FBT FCO-14A042 | 923 460164DA | ● ⚠ |
| T601 | TRANS POWER 115/230V | BH26-20001A | ● ⚠ |
| OTHERS | | | |
| X201 | RESONATOR 8.000MHZ 2P | 941 210030AA | ● |
| CRT/GND | CDT GND.471P/472P 660mm,400mm,2P,255mm | BH39-40006A | |
| D/COIL | COIL DEGAUSSING 115+/-ITS,0.45,13.7UH,1040mm | BH27-10001A | |
| P/CORD | CORD POWER NOR DETACH 1850mm,IVY | BH39-10001A | ● |
| S/CABLE | CABLE SIGNAL DETACH 1300mm 15P 9P IVORY | 955 460512AAAA | |
| FBT-CORE | CORE-RING FERRITE CORE | 3301-000001 | ● |
| FG601 | FUSE TIME-LUG W/O LEAD 3.15A 250V 5*20MM | 949 115105THNA | ⚠ |
| FH601 | FUSE CLIP 5.20*20MM,(T) | 953 260023BC | |
| FH602 | FUSE CLIP 5.20*20MM,(T) | 953 260023BC | |
| IS601 | FILTER EMI SOCKET 250V 3A 1.2MH | 943 150034BA | |
| J1-101 | JUMPER CU+SN+PB 1ST 1x0.6 SAD | 955 005001AAAA | |
| LF601 | FILTER LINE 15MH MIN | BH27-20012A | ● |
| OP201 | LED GREEN/RED SPR-39MVVW3 25MA | 0601-000003 | |
| OP601 | IC PTO-COUPLER CQY80XG | 895 520080AB | |
| PTC601 | POSISTOR POSI,14 OHM,SQUARE | 1404-000003 | ● |
| PCB | PCB-MAIN 247*330,FR-1,1.6T | BH41-10004A | ● |
| SW601 | SWITCH PUSH SPST 5A/80A 250VAC | 3403-000001 | ● |
| SK1 | CON-JACK CRT SOCKETPH129-HIGH FOCUS | 935 720901AESA | |




(⚠ : Caution, ● : Specialty part for this monitor only, ⚡ : ESD Caution)

| Loc. No. | | Description | Code No. | Remarks |
|---------------|-----|--|----------------|-----------------|
| CRT | S/T | M34KRH35 X 01, CQA41**, SAMSUNG SDD | 897 250177BA | ⚠ 0.28 Northern |
| CRT | S/T | M34KRH35 X 01(M), CQA41**, SAMSUNG SDD | 897 250177CA | ⚠ 0.28 Equator |
| CRT | S/T | M34KRH35 X 01(R), CQA41**, SAMSUNG SDD | 897 250177DA | ⚠ 0.28 Southern |
| CRT | S/T | M34KRH35 X 01(B), CQA41**, SAMSUNG SDD | 897 250177AA | ⚠ 0.28 Bio |
| CRT | S/S | M34KUH35 X 02, CQA41**, SAMSUNG SDD MPRII | 897 250178CA | ⚠ 0.28 Northern |
| CRT | S/S | M34KUH35 X 02(M), CQA41**, SAMSUNG SDD MPRII | 897 250178DA | ⚠ 0.28 Equator |
| CRT | S/S | M34KUH35 X 02(R), CQA41**, SAMSUNG SDD MPRII | 897 250178EA | ⚠ 0.28 Southern |
| CRT | S/T | M34KRK55 X 13, CQA41**, SAMSUNG SDD | 897 250069AA | ⚠ 0.39 Northern |
| CRT | S/T | M34KRK55 X 13(M), CQA41**, SAMSUNG SDD | 897 250143AA | ⚠ 0.39 Equator |
| CRT | S/T | M34KUK55 X 01/11, CQA41**, SAMSUNG SDD VLMF | 897 250109AA | ⚠ 0.39 Northern |
| CRT | S/S | M34KUK55 X 02/12, CQA41**, SAMSUNG SDD MPRII | 897 250105AA | ⚠ 0.39 Northern |
| MAIN-PCB ASSY | | NORMAL CRT, S/T TYPE | BH92-50003A | |
| MAIN-PCB ASSY | | MPRII CRT, S/S TYPE | BH92-50026A | |
| C420 | | C-MPPF 824J 200V | 2306-000001 | NORMAL |
| C420 | | C-MPPF 774J 200V | 2306-000002 | MPRII |
| C418 | | C-PP 542J 1.6KV | 2303-000003 | NORMAL |
| C418 | | C-PP 472J 1.6KV | 916 354470YJAX | MPRII |
| CRT-GND | | CRT GND 471P/472P; 660mm, 400mm | BH39-40006A | NORMAL |
| CRT-GND | | CRT GND 471P/472P; 660mm, 400mm | BH39-40007A | MPRII |
| R303 | | R-CARBON 1K 1/4W 5% | 911 141007DA | NORMAL |
| R303 | | R-CARBON 470 1/2W (S) | 911 134707FF | MPRII |
| R305 | | R-CARBON 2.2K 1/4W 5% | 911 142207DA | NORMAL |
| R305 | | R-CARBON 1.5K 1/4W 5% | 911 141507DA | MPRII |
| R405 | | R-CARBON 75K 1/6W 5% | 911 157507YA | NORMAL |
| R405 | | R-CARBON 150K 1/6W 5% | 911 161507YA | MPRII |


Note: This monitor has two different Main PCB Assembly types. The appropriate Main PCB Ass’y depends on the CRT and Deflection Yoke type. The Main PCB Assembly design is the same for both types; only a few individual parts are different. Be sure to refer to the list above for the appropriate code number.

9-4 Schematic Diagrams

Caution

1. The areas shaded or marked with  on the schematic diagram and parts list designate components which have special characteristics important for safety. Replace these parts only with parts identical to those in the original circuit or specified in the parts list. Before replacing any of these components carefully read the "Product Safety Notice."
2. When taking measurements, pay special attention to the following:
 - 1) Do not use your instrument between primary ground (symbol ) and secondary circuit.
 - 2) Do not use your instrument between secondary ground (symbol ) and primary circuit.





Warning

This equipment contains safety critical components. All parts shown with the  mark on the schematic are safety critical.

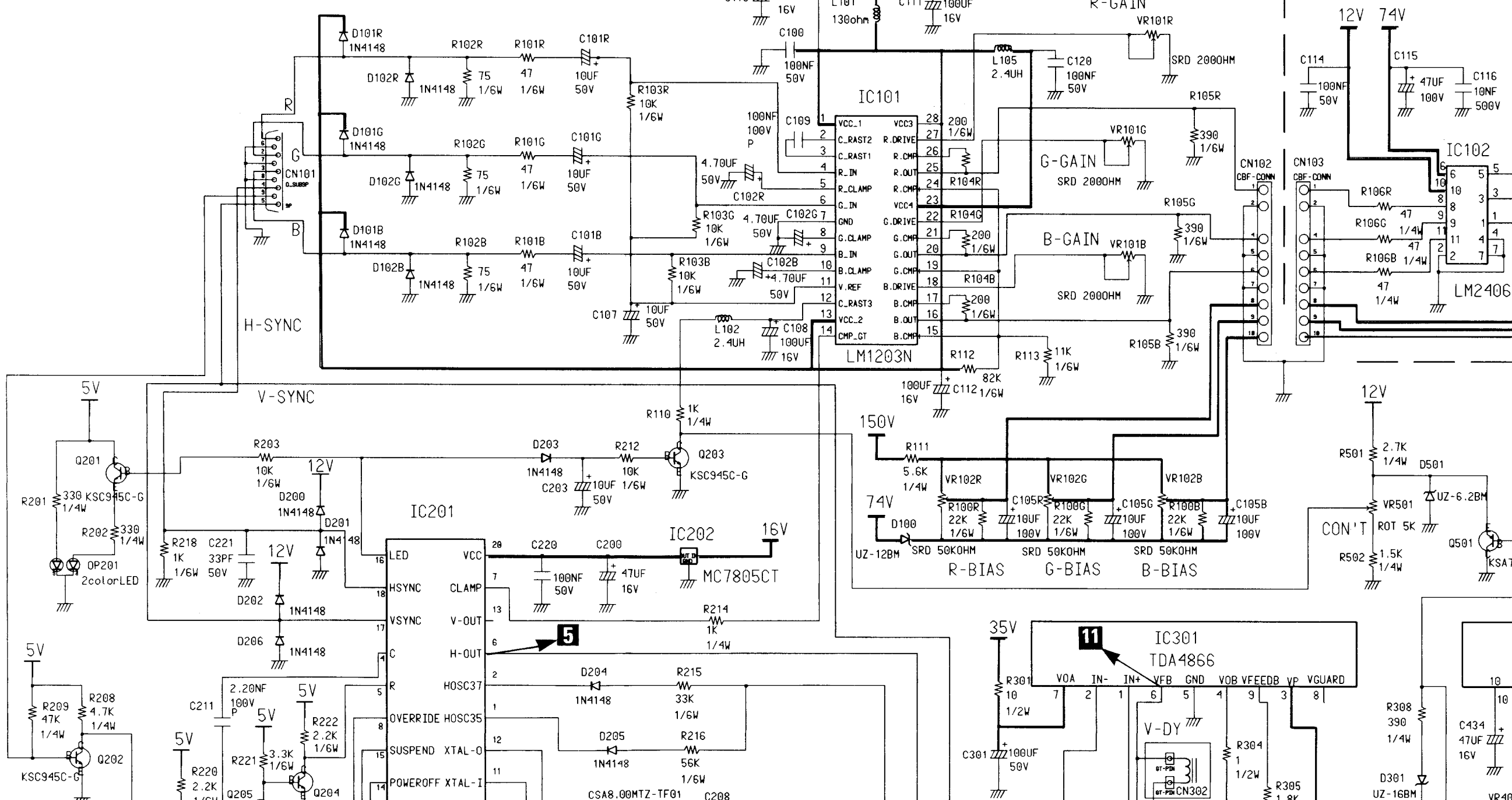
Replace safety critical parts with only manufacturers recommended parts. See parts list for exact replacements.

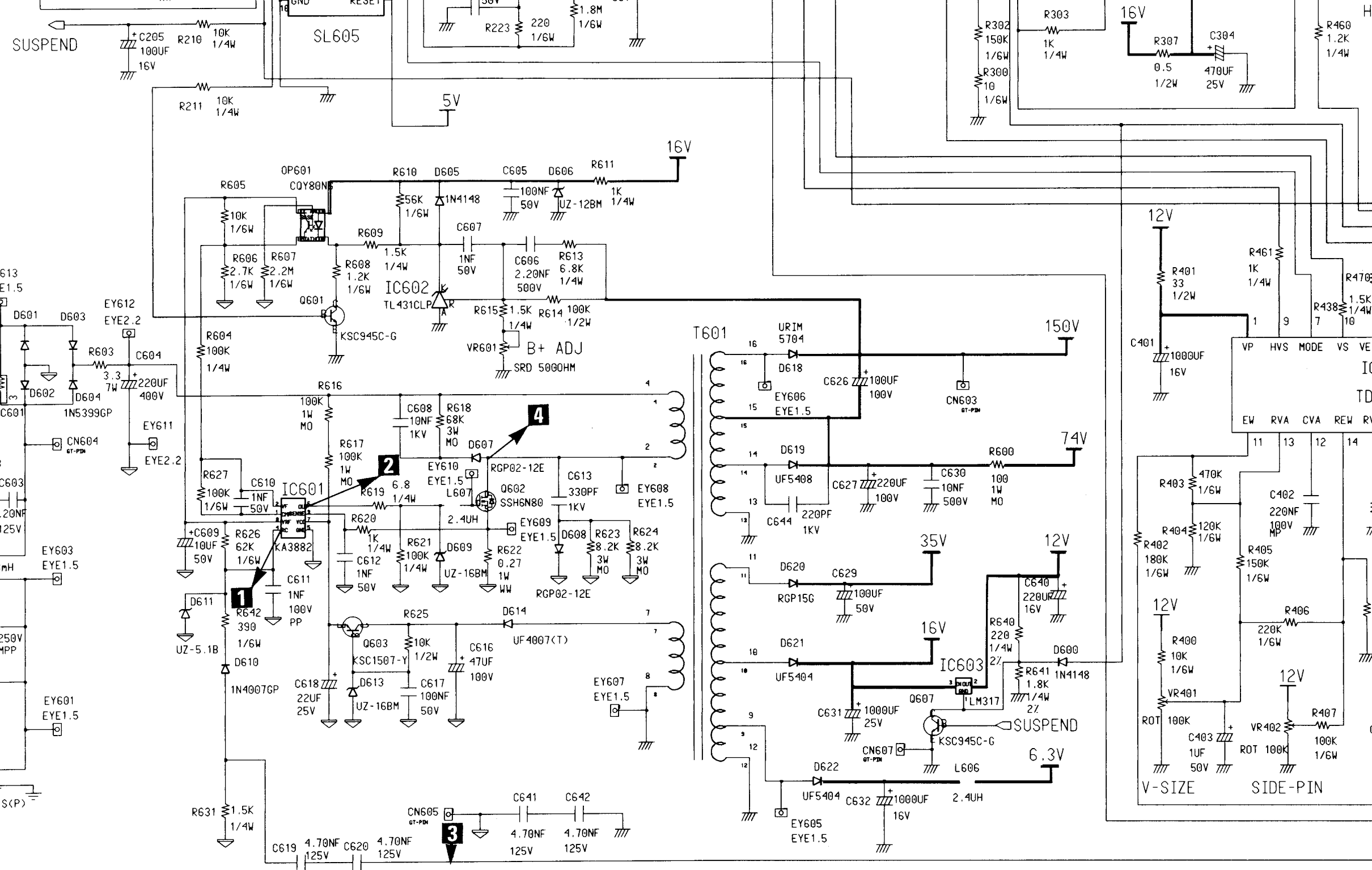
Note

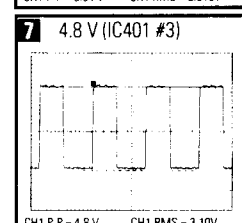
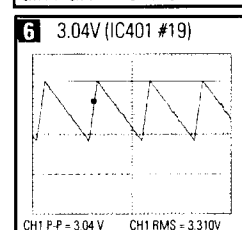
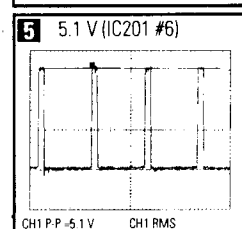
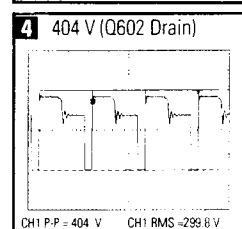
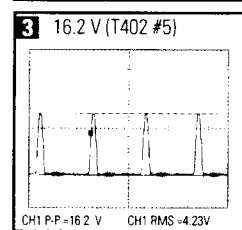
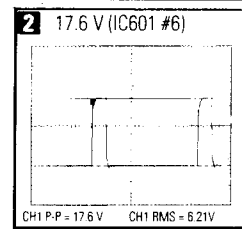
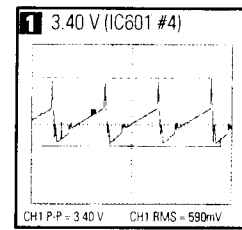
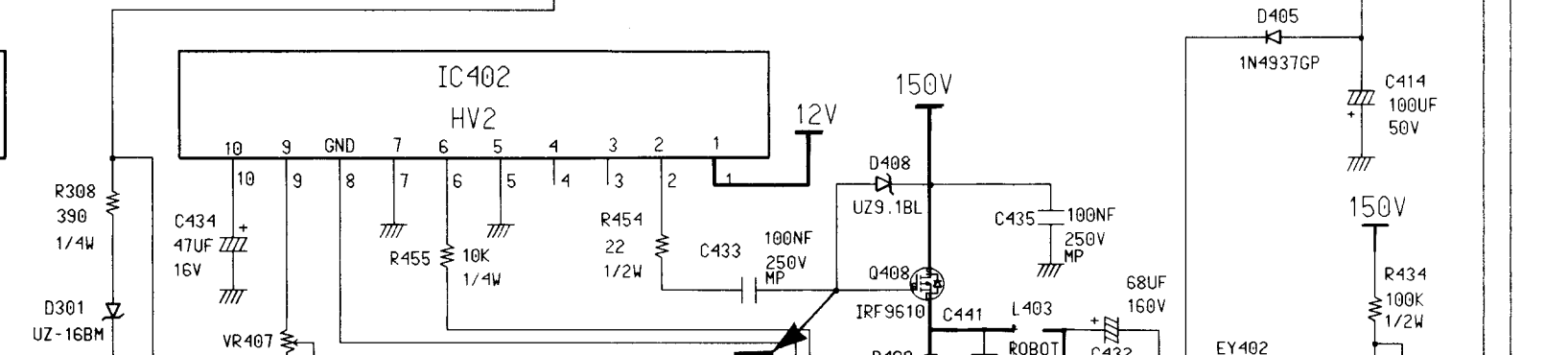
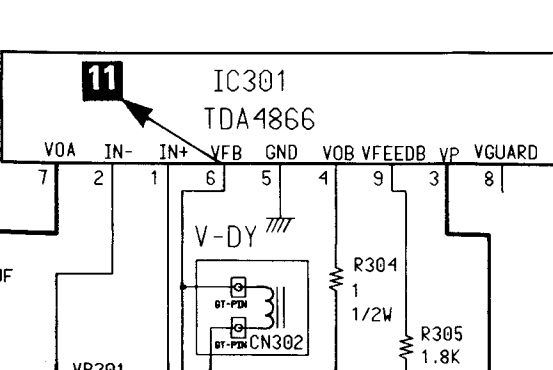
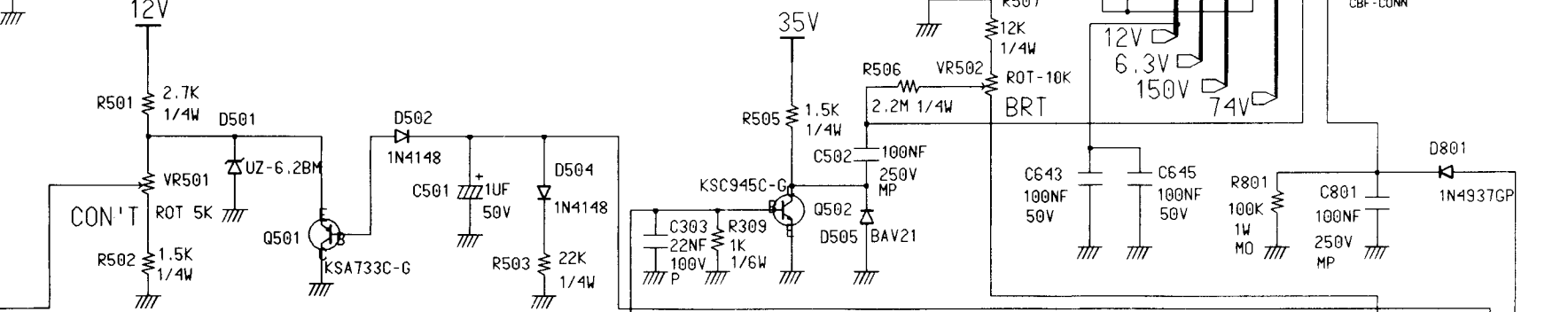
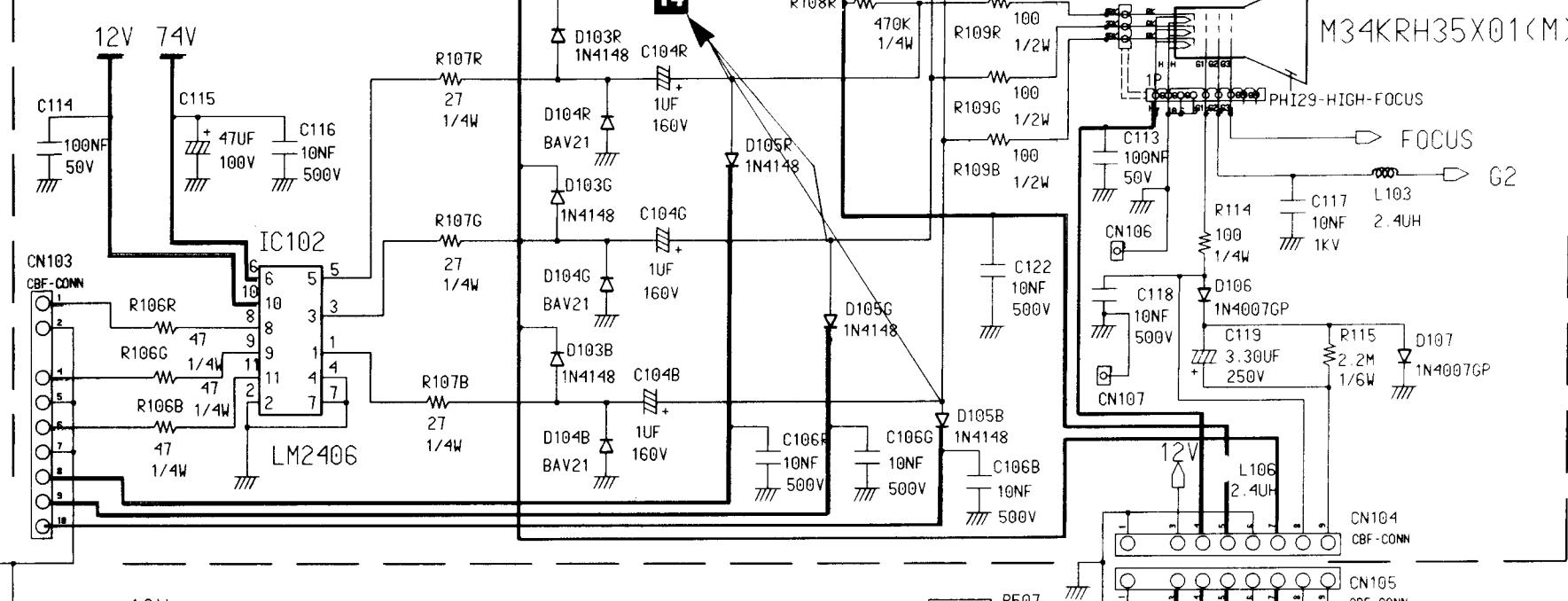
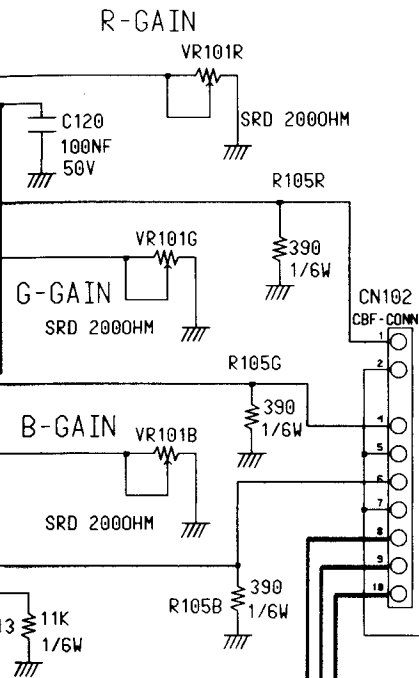
1. Resistance is shown in OHM. K = 1000 M = 1,000,000 and the rated power of resistors not noted in schematic diagram is 1/4W.
2. Capacitance is shown in μ F. Capacitances not otherwise noted are shown in pF (1 μ F = 1,000,000 pF). Rated voltage of condensers not otherwise noted in schematic diagram is 50 V.
3. Abbreviations and Symbols

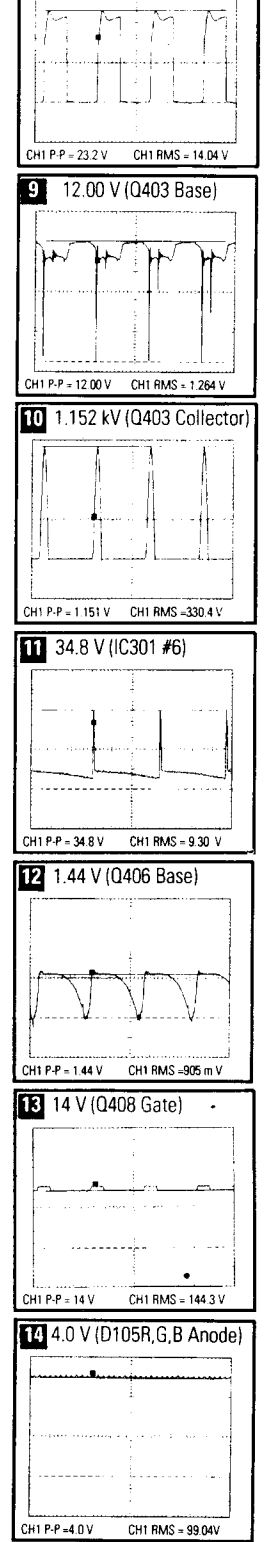
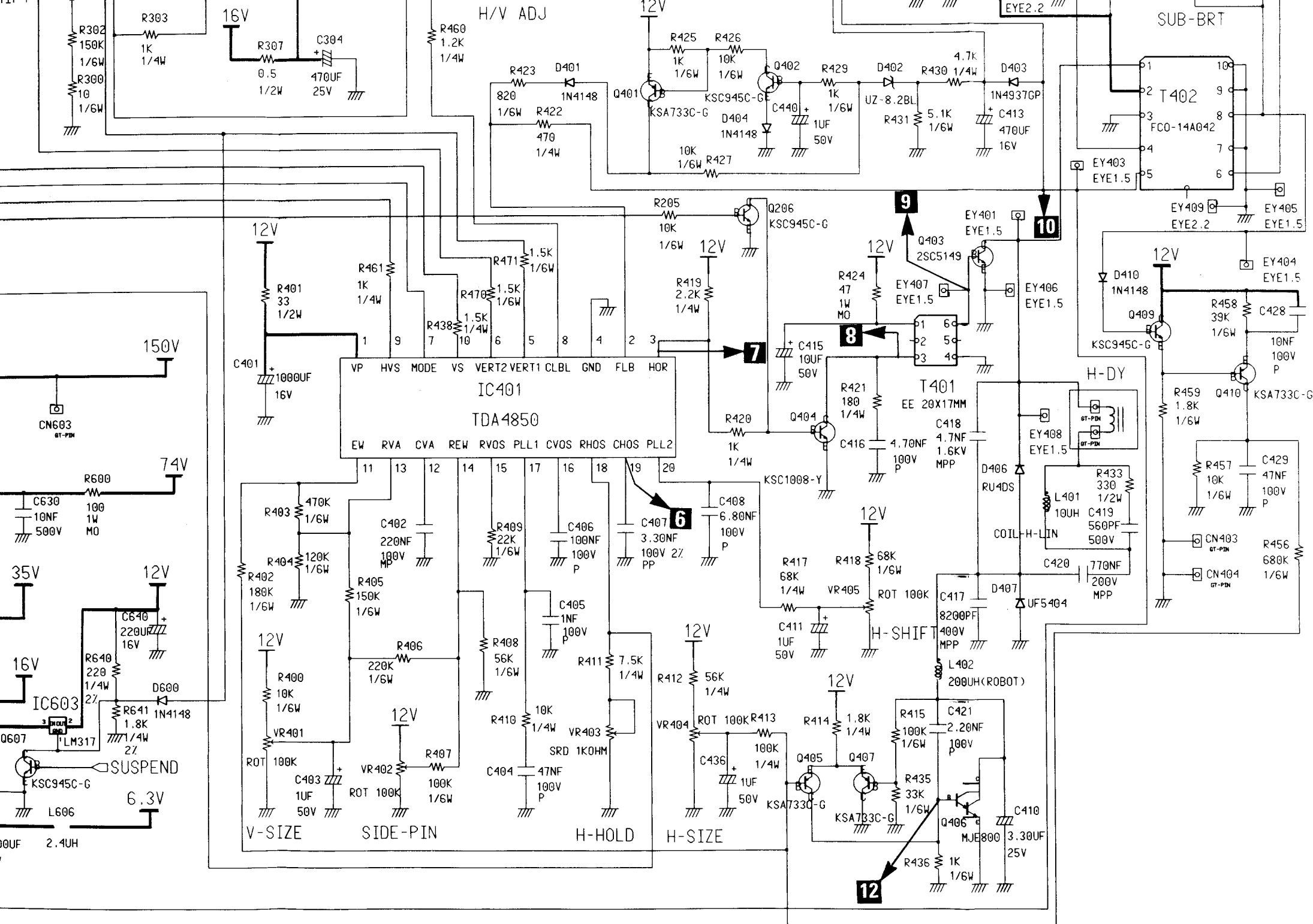
| | | | |
|---|----------------------------------|---|-----------------|
| MO | R-METAL OXIDE | WW | R-WIRE WOUND |
| FU | FUSIBLE | C | R-COMPOSITION |
| CM | R-CEMENT MPP METAL POLYPROPYLENE | | |
| MP | C-METAL POLYESTOR | PP | C-POLYPROPYLENE |
| P | C-POLYESTOR | T | C-TANTALIUM |
|  | HOT GROUND |  | COLD GROUND |
4. The secondary voltage is read with an SSVM from the indicated point to cold ground ().
The primary voltage is read with an SSVM from the indicated point to hot ground ().
5. This schematic diagram is subject to change without notice.

9-4-1 Main and CRT Socket Schematic Diagram and Waveforms











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