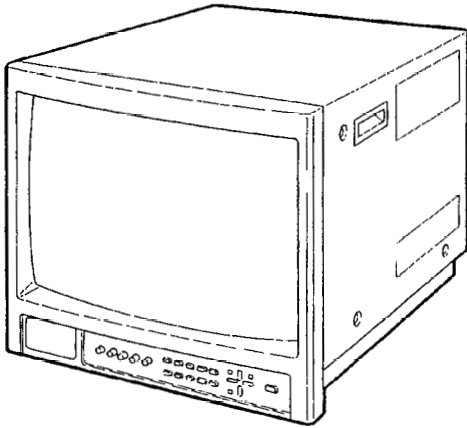# Service Manual

Color Video Monitor

BT-M1950Y

Chassis No. BM

Supplement added to end of PDF

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

> • For replacement parts list, refer to the supplement service manual intend to publish later.

Specifications

System: NTSC 3.58MHz/NTSC 4.43MHz/PAL

Power Source: AC 120V 50/60Hz

Max Amps: 0.9A

Picture Tube:
19" (47.5cm) diagonally measured, 90° deflection, in-line gun, medium-high-definition cathode-ray, "tube" trio-dot type (dot pitch of 0.4mm), SMPTE-C phosphor

Audio Power
Output: 1.6W

Built-in
Speaker: 3-9/16"×2" (9×5 cm) oval×1

Screen Size
(W×H): 15-11/16"×11-3/4"
(399mm×298mm)

Scanning Frequency:
H: 15.734kHz (NTSC 3.58/4.43MHz)
15.625kHz (PAL)
V: 59.94Hz (NTSC 3.58/4.43MHz)
50Hz (PAL)

Horizontal Resolution:
750 TV lines or more

Color
Temperature: 6500k ; x=0.313, y=0.329
9300k ; x=0.283, y=0.297
(selectable)

Video Inputs
Composite Video:
INPUT A, B (2 lines), BNC×2 each
(with 1 bridge-connected output)
Termination switches provided 1.0 Vp-p, 75Ω, negative sync

Y/C:
Y/C (1 line), DIN (4-pin)×2
(with 1 bridge-connected output)
Termination switches provided
Y; 1.0Vp-p, 75Ω, negative sync
C (NTSC 3.58/4.43MHz);
0.286Vp-p, 75Ω
C (PAL); 0.3Vp-p, 75Ω

Analog RGB:
RGB/COMPO
(1 line: common with Y, R−Y, B−Y component)
BNC×6
(with 3 bridge-connected output)
Termination switches provided
R, B; 0.7Vp-p, 75Ω
G; 0.7Vp-p, 75Ω
G on sync; 1.0Vp-p, 75Ω, negative sync

Y, R−Y, B−Y Component:
RGB/COMPO
(1 line: common with analog RGB)
Y; 1.0Vp-p, 75Ω, negative sync
R−Y, B−Y; 0.7Vp-p, 75Ω

Panasonic®

> **⚠ WARNING**
> This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

External Sync Input:
SYNC (1 line)
BNC×2 (with 1 bridge-connected output)
0.2~4.0Vp-p composite sync, 75Ω, negative
sync Termination switches provided

Audio inputs: AUDIO A, B RGB/COMPO (3 lines),
RCA×2 each
(with 1 bridge-connected output)
500mVrms, high impedance

Tally/Remote Terminal:
TALLY/REMOTE, DIN (8-pin)×1

Operation
Temperature: 32°F~104°F (0°C~+40°C)
(20~80% RH)

Dimensions
(W×H×D): 17-3/4"×17"×20-1/8"
(449mm×431mm×511mm)
Weight: 66lbs (30kg)
Provided
Accessory: Power Cord×1

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

Contents

● **PRODUCT COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J IN EFFECT AS OF DATE OF MANUFACTURE.**

IMPORTANT SAFETY NOTICE

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

SAFETY PRECAUTIONS

1. The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection,no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

2. Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual.** The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.

4. **Use isolation transformer when hot chassis.**
   The chassis and any sub-chassis contrained in some products are connected to one side of the AC power line. An isolation transformer of adequate capacity should be inserted between the product and the AC power supply point while performing any service on some products when the HOT chassis is exposed.

5. **Don't short between the LIVE side ground and ISOLATED(NEUTRAL) side ground or EARTH side ground when repairing.**
   Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND, the ISOLATED(NEUTRAL) : (⊥) side GND and EARTH : (⊕) side GND. Don't short between the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND and never measure with a measuring apparatus (oscilloscope etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND at the same time.
   If above note will not be kept, a fuse or any parts will be broken.

6. If any repair has been made to the chassis, it is recommended that the B_1 setting should be checked or adjusted (See ADJUSTMENT OF B_1 POWER SUPPLY).

7. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.

8. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10kΩ 2W resistor to the anode button.

9. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

10. **Isolation Check**
    (Safety for Electrical Shock Hazard)
    After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs,metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

    (1) **Dielectric Strength Test**
    The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1100V AC (r.m.s.) for a period of one second.
    (. . . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.)
   This method of test requires a test equipment not generally found in the service trade.

    (2) **Leakage Current Check**
    Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).
    • **Alternate Check Method**
    Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000 ohms per volt or more sensitivity in the following manner. Connect a 1500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.35V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).

AC VOLTMETER
(HAVING 1000Ω/V, OR MORE SENSITIVITY)

0.15μF AC-TYPE

1500Ω 10W

PLACE THIS PROBE ON EACH EXPOSED METAL PART
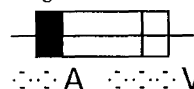
GOOD EARTH GROUND
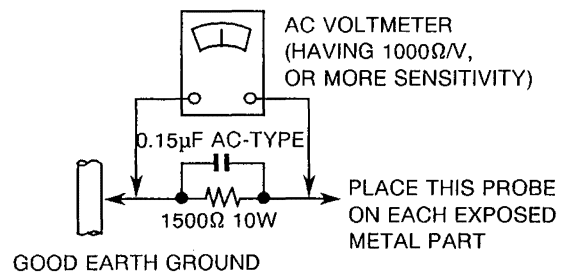
11. **High voltage hold down circuit check.**
    After repair of the high voltage hold down circuit, this circuit shall be checked to operate correctly.
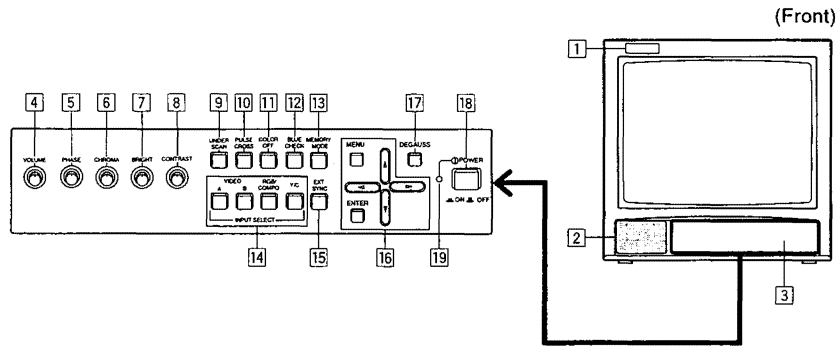   See item "**How to check the high voltage hold down circuit**". (See page 32.)

■ ONLY CANADA

This mark shows a fast operating fuse, the letters indicated below show the rating.

A   V

CONTROLS AND FEATURES (FRONT)

(Front)

TERMINALS AND FEATURES (REAR)

(Rear)

4

[1] Tally lamp

Glows to indicate when a tally signal is input to the TALLY/REMOTE terminal on the rear panel. (For terminal connection, see page 9.)

[2] Speaker

[3] Control panel

[4] VOLUME control

Turn to adjust speaker volume.

[5] PHASE control

Turn to adjust picture hue, using natural skin color as a reference.

[6] CHROMA control

Turn to adjust picture color density according to your requirements.

[7] BRIGHT control

Turn to adjust picture brightness according to your requirements.

[8] CONTRAST control

Turn to adjust the picture contrast according to your requirements.

[9] UNDER SCAN switch

Push to display the whole picture on screen by reducing display area dimensions.

[10] PULSE CROSS switch

Push to check the retrace period (sync signal) by delaying input signal phase.

[11] COLOR OFF switch

Push to eliminate color signals and display a black-and-white picture.

[12] BLUE CHECK switch

Push to eliminate red and green color signals and display a monochrome blue picture.

[13] MEMORY MODE switch

Push to adjust the picture by recalling the adjustment data that you stored in memory.

[14] INPUT SELECT switches

Push to select a rear terminal video signal input.

[15] EXT SYNC switch

Push to synchronize the monitor with an external sync signal. This function is effective regardless of signal input.

[16] MENU controls

Use to operate on-screen menu functions.
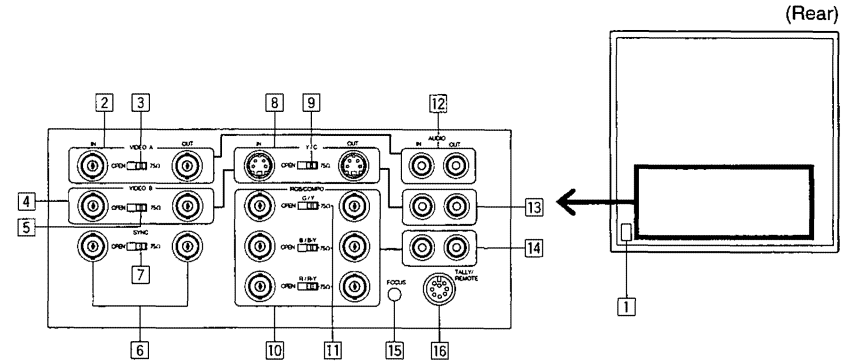
[17] DEGAUSS switch

Push to demagnetize the picture tube.

[18] POWER switch

Press to turn the power on or off.

[19] POWER indicator

Glows to indicate that power is on.

[1] Power socket

Connect to an AC outlet (120 V AC, 50/60 Hz) using the provided power cord.

[2] VIDEO A terminals

Composite video signal input terminal and bridge-connected output terminal.

[3] VIDEO A termination switch

Set to OPEN for bridged connection; set to 75Ω for input signal only.

[4] VIDEO B terminals

Composite video signal input terminal and bridge-connected output terminal.

[5] VIDEO B termination switch

Functions as for [3].

[6] SYNC terminals

External sync signal input terminal and bridge-connected output terminal. Input an external composite sync signal to these terminals when inputting a video signal without a sync signal, or when synchronizing the monitor with an external sync signal.

[7] SYNC termination switch

Functions as for [3].

[8] Y/C terminals

Input terminal of Y/C signals and bridge-connected output terminal.

[9] Y/C termination switch

Functions as for [3].

[10] RGB/COMPO terminals

Input terminal of analog RGB signals or Y/B-Y/R-Y signals and bridge-connected output terminal. For analog RGB signals, also accepts a G signal including a sync signal.

[11] RGB/COMPO termination switch

Functions as for [3].

[12] AUDIO A terminals

Audio signal input terminal and bridge-connected output terminal. Linked with the VIDEO A terminals so that AUDIO A terminals and VIDEO A terminals are selected simultaneously.

[13] AUDIO B terminals

Audio signal input terminal and bridge-connected output terminal. Linked with the VIDEO B or Y/C terminals so that AUDIO B terminals and VIDEO B or Y/C terminals are selected simultaneously.

[14] AUDIO RGB/COMPO terminals

Audio signal input terminal and bridge-connected output terminal. Linked with the RGB/COMPO terminals so that AUDIO RGB/COMPO terminals and RGB/COMPO terminals are selected simultaneously.

[15] FOCUS control

Adjustment hole exclusively for use by service personnel. Make sure to consult qualified service personnel for adjustment.

[16] TALLY/REMOTE terminal

External input terminal of a tally signal to make the tally lamp glow, or of a remote-control signal to switch input or picture control.

CONNECTION EXAMPLE

NOTE
●Be sure to turn off each component's power before connection.
●The connection shown below is only an example. Terminals and their functions differ in accordance with a component to be connected. Also read and follow the instructions for the component.
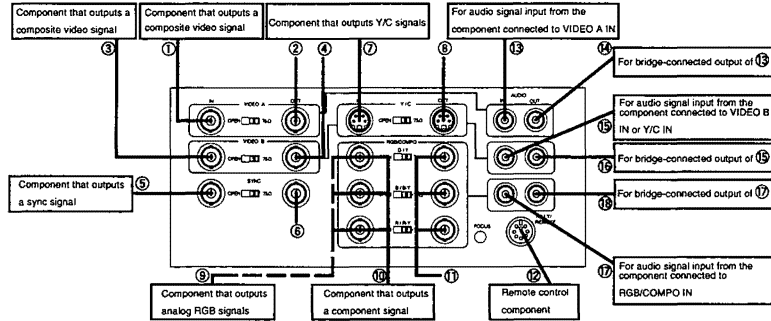
	Signal(s)	Terminal	Function
①	Composite video	VIDEO A IN	Input of a composite video signal
②	Composite video	VIDEO A OUT	Bridge-connected output of ①
③	Composite video	VIDEO B IN	Input of a composite video signal
④	Composite video	VIDEO B OUT	Bridge-connected output of ③
⑤	Composite sync	SYNC IN	Input of an external sync signal
⑥	Composite sync	SYNC OUT	Bridge-connected output of ⑤
⑦	Y/C	Y/C IN	Input of Y/C signals
⑧	Y/C	Y/C OUT	Bridge-connected output of ⑦
⑨	Analog RGB	RGB/COMPO IN	Input of analog RGB signals
⑩	Component	RGB/COMPO IN	Input of a component signal
⑪	Analog RGB or component	RGB/COMPO OUT	Bridge-connected output of ⑨ or ⑩
⑫	Tally/remote control	TALLY/REMOTE	Input of a tally signal or remote control signal

External/internal synchronization

Push the front panel EXT SYNC switch to ON, and the monitor operates to synchronize with an external sync signal input to the rear panel SYNC IN terminal.

Push the switch again to OFF, and the monitor operates to synchronize with a sync signal included in a video signal (if it includes a sync signal) input via a video input terminal.

RGB/COMPO terminal setting

Set RGB or COMPO. on screen to match the type of video signal input to the rear panel RGB/COMPO IN terminals.

To input analog RGB signals, set to RGB.

To input Y, B-Y or R-Y signal, set to COMPO..

Operation:

1. Press the front panel MENU button to call up the MENU display on screen.
2. Press the ▲ or ▼ button to select RGB/COMPONENT.
3. Press the ◄ or ► button to set RGB or COMPO..
4. Press the MENU button to complete.

```
      <MENU>
ASPECT RATIO   :4-3
FILTER SELECT  :COMB
PEAKING FREQ.  :2.6MHZ
PEAKING LEVEL  :0dB
AFC            :NORMAL
COLOR TEMP.    :6500
NTSC SETUP     :0
COMPO. LEVEL   :SMPTE
  <MEMORY MODE>
►RGB/COMPONENT :RGB
 ⊟ENTER        :⊟
```

BASIC OPERATION

1. To turn the power on:
Push the POWER switch.

The POWER indicator glows green. The mode and color system of an input signal are automatically discerned and displayed on screen for about 3 seconds. To turn off power, push the POWER switch again, and the POWER indicator goes off.

2. To select the input:
Push an INPUT SELECT switch.

Push VIDEO A, VIDEO B, RGB/COMPONENT or Y/C.The mode and color system of a selected input signal are automatically discerned and displayed on screen for about 3 seconds.

3. To adjust the audio level:

Turn the VOLUME control to the right to increase the level, or to the left to decrease the level.

```
VIDEO A ← Input mode
NTSC  ← Color system
```
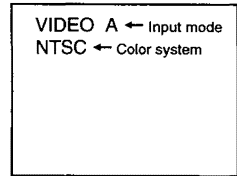
●Relation between input mode indication and signal input/terminal

Input mode indication	Signal input/terminal
VIDEO A	Composite video signal input to VIDEO A IN
VIDEO B	Composite video signal input to VIDEO B IN
Y/C	Y/C signal input to Y/C IN
RGB	Analog RGB signal input to RGB/COMPO IN
COMPONENT	Component signal input to RGB/COMPO IN

●Color system indication

Indication	Color system	Color sub-carrier frequency	Vertical scanning frequency
NTSC	NTSC	3.58 MHz	60 Hz
PAL	PAL	4.43 MHz	50 Hz
N4.43	NTSC	4.43 MHz	60 Hz
B/W	(Indicates when a black-and white signal is input)		
NO SYNC	(Indicates when no signal is input)		

To demagnetize the picture tube

After positioning near the monitor a speaker (non-magnet-shielded) or other equipment that generates a strong magnetic field, or after relocating the monitor, color patches could appear in the picture due to magnetization of the picture tube. If this occurs, push the DEGAUSS switch to demagnetize the picture tube.

NOTE
●This function is not effective if activated a second time after a very short time has elapsed. When degaussing must be repeated, proceed after at least 10 minutes have passed since first degaussing.
●The optional wireless remote control features a DEGAUSS key.

PICTURE ADJUSTMENTS

Turn a separate front panel control to adjust picture contrast, picture brightness, picture color density, and picture hue respectively:

CONTRAST (picture contrast) ————————————

Softer ◎ Clearer

BRIGHT (picture brightness) ————————————

Darker ◎ Brighter

CHROMA (picture color density) ————————————

Thinner ◎ Denser

PHASE (picture hue) ————————————

Purplish ◎ Greenish

Relation between picture adjustments and input video signals ——

Each picture adjustment is effective for the following video signal input:

Signal Control	Composite video, Y/C				RGB	COMPONENT
	NTSC	PAL	NTSC 4.43	B/W		
PHASE	Yes	No	Yes	No	No	No
CHROMA	Yes	Yes	Yes	No	No	Yes
BRIGHT	Yes	Yes	Yes	Yes	Yes	Yes
CONTRAST	Yes	Yes	Yes	Yes	Yes	Yes

NOTE

● To adjust the CHROMA and PHASE controls more precisely, input the color bar signal and operate the BLUE CHECK function as follows:

After inputting the color bar signal, push the front panel BLUE CHECK switch to display a monochrome blue picture without red/green signal components. Turn the CHROMA and PHASE controls so that all (four, in the example below) blue bars have the same density and brightness.

Blue	Black	Blue	Black	Blue	Black	Blue

VIDEO SIGNAL CONTROLS

Push each switch to ON or OFF for video signal control.

UNDER SCAN ————————————

Push the UNDER SCAN switch to reduce the dimensions of display area so the whole picture is displayed on screen. Use to check the picture frame.
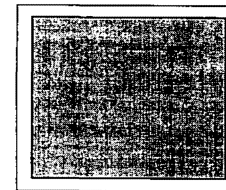
PULSE CROSS ————————————

Push the PULSE CROSS switch to simultaneously display two blank areas crossed horizontally and vertically on screen ("Pulse Cross" display) by delaying the phase of the input signal. Use to check the vertical retrace line period, equalizing pulse period, vertical sync period, horizontal sync pulse, or burst signal.
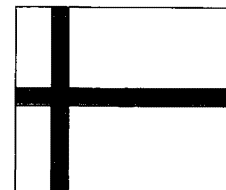
NOTE

● This function is not effective for analog RGB signal input.

COLOR OFF ————————————

Push the COLOR OFF switch to display a black-and-white picture by inputting a luminance signal only. Use to check the noise contained in a luminance signal or white balance.

NOTE

●This function is not effective for analog RGB signal input.

BLUE CHECK ————————————

Push the BLUE CHECK switch to display a monochrome blue picture by eliminating red and green signal components. Use to check or adjust the CHROMA and/or PHASE controls.

6

ON-SCREEN MENU CONTROLS

By calling up the menu display on screen, various functions can be selected and set as needed.

Calling up the menu display, selecting an item

1. Press the MENU button to call up the menu display on screen (see ① below). (Press again to make the display disappear.)
2. Press the ▲ or ▼ button to select an item to be set. " ▶" is indicated for the selected item.
3. Press the ◄ or ▶ button to change the setting.
4. After selecting another item by pressing the ▲ or ▼ button, repeat step 3. These settings are all kept in memory after power is turned off.
5. Press the MENU button to complete. The menu display disappears.

```
      <MENU>
 ASPECT RATIO   :4-3
 FILTER SELECT  :COMB
 PEAKING FREQ.  :2.6MHZ
 PEAKING LEVEL  :0dB
▶AFC            :NORMAL
 COLOR TEMP.    :6500
 NTSC SETUP     :0
 COMPO. LEVEL   :SMPTE
 <MEMORY MODE>
 RGB/COMPONENT  :RGB
 ⊟ENTER         :⊟
```
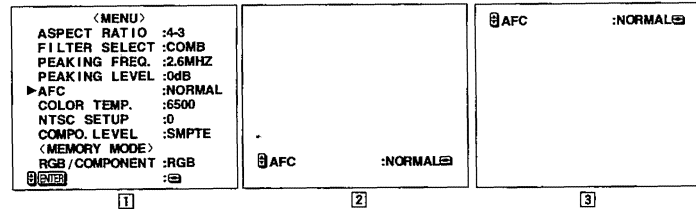①

```
⊟AFC          :NORMAL⊟



⊟AFC          :NORMAL⊟
```
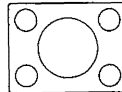②

```
⊟AFC          :NORMAL⊟
```
③

ASPECT RATIO (picture aspect ratio switching)

The aspect ratio of the picture can be switched between 4:3 and 16:9. When switching to "16-9" on screen, the height of the picture is slightly reduced (see right).

Setting	Function
4-3	Standard picture aspect ratio (4:3)
16-9	Displays the picture in 16:9 aspect ratio

● 4:3

● 16:9

FILTER SELECT (built-in filter selection)

When a composite video signal of the NTSC system (excluding NTSC 4.43) is input to the monitor, either or both of two filters in the monitor can be activated.

Setting	Function
COMB (comb filter)	Reduces color noise in NTSC video signals for clearer pictures.
BOTH (both filters)	Both comb and trap filters function at the same time.
NOTCH (Trap filter)	Eliminates dot interference that would show up in the vertical boundary between two different colors.

ON-SCREEN MENU CONTROLS (continued)

PEAKING FREQ./PEAKING LEVEL (picture quality improvement)

Corrects the luminance signal to improve picture quality by changing peak frequency and/or peak level depending on the video signal input to the monitor. Use PEAKING FREQ. to set correction frequency. Use PEAKING LEVEL to set correction level.

Setting (frequency)	Function
2.6 MHz	For composite video signal or Y/C signal.
5.0 MHz	For component video signal.

Setting (level)	Function
0 dB to +9 dBs	Set a higher level for correction to a higher degree.

AFC (switching of time constant for the AFC)

Use to set the time constant for the AFC (auto fine-frequency control) to correct skew distortion of video signals input via a videotape recorder or other video equipment.

Setting	Function
NORMAL	Normal-speed correction.
FAST	Faster correction.
SLOW	Slower correction.

COLOR TEMP. (color temperature switching)

Use to set the color temperature of white balance.

Setting	Function
9300	To 9300K.
6500	To 6500K.

NTSC SETUP (NTSC set-up level)

Use to set up the luminance signal level to match the configuration of the video signal input to the monitor.

Setting	Function
0	For video signal with 0% luminance signal
7.5	For video signal with 7.5% luminance signal

COMPO. LEVEL (chrominance level setting)

Use to set the chrominance level of a component video signal.

Setting	Function
SMPTE	For component video signal input via an MⅡ videotape recorder.
BETA00	For component video signal input (set-up level: 0%) via a BETACAM videotape recorder.
BETA75	For component video signal input (set-up level: 7.5%) via a BETACAM videotape recorder.

```
      <MENU>
 ASPECT RATIO   :4-3
 FILTER SELECT  :COMB
 PEAKING FREQ.  :2.6MHZ
 PEAKING LEVEL  :0dB
 AFC            :NORMAL
▶COLOR TEMP.    :6500∗
 NTSC SETUP     :0
 COMPO. LEVEL   :SMPTE
 <MEMORY MODE>
 RGB/COMPONENT  :RGB
 ⊟ENTER         :⊟
```

BI-M1950Y

7

MEMORY MODE

A set of picture settings can be programmed in memory for quick recall when necessary.

Recall/release of memory mode

Press the MEMORY MODE switch to recall a set of picture settings programmed in memory.

Pressing the switch locks the functions of the front-panel PHASE, CHROMA, BRIGHT, and CONTRAST controls not to be operated.

Press again to release memory mode.

NOTE

● If you attempt to operate a locked function, "MEMORY MODE ON!!" appears on screen for approx. 2 seconds to indicate the function cannot be operated.

Setting programming of the picture being monitored

The settings of the picture being monitored can be programmed in memory.

Settings programmable in memory mode:
● Settings of the CONTRAST, BRIGHT, CHROMA and PHASE controls on the front panel
● On-screen menu function settings (except RGB/COMPONENT)

1. Check the MEMORY MODE switch is off.
2. Press the MENU button.
3. Press the ▲ or ▼ button to select MEMORY MODE.
   Then press the ENTER button.
4. ● Press the ENTER button to program.
   ● Press the ◄ or ► button to cancel.

NOTE

● Programmed picture settings are kept in memory after the power is turned off.

```
⟨MEMORY MODE⟩

Are you sure ?

"Yes" then [ENTER]
"No" then ◄ or ►
```

Revision of memory mode

Programmed picture settings can be revised if necessary.
1. Press the MEMORY MODE switch to activate memory mode.
2. Press the MENU button to call up display ① on screen.

NOTE
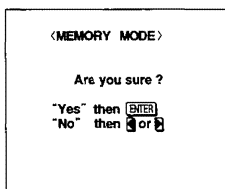
● No matter what video signal is input, all items appear on screen. However, depending on the type of input video signal, some functions might not operate even if their settings are made.
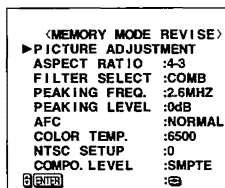
```
⟨MEMORY MODE REVISE⟩
►PICTURE ADJUSTMENT
 ASPECT RATIO  :4-3
 FILTER SELECT :COMB
 PEAKING FREQ. :2.6MHZ
 PEAKING LEVEL :0dB
 AFC          :NORMAL
 COLOR TEMP.   :6500
 NTSC SETUP    :0
 COMPO. LEVEL  :SMPTE
 B[ENTER]      :⊖
```
①

MEMORY MODE (continued)

3. Press the ▲ or ▼ button to select a function to be revised.

Press the ENTER button after selecting PICTURE ADJUSTMENT to call up display ②.
After making all settings on screen, press the MENU button to make display ① appear.

4. Press the ◄ or ► button to change the set level.

Adjustable CONTRAST, BRIGHT, CHROMA or PHASE range depends on each set level previously stored in memory. MAX appears to indicate maximum level that cannot be increased. MIN appears to indicate minimum level that cannot be decreased.

```
⟨MEMORY MODE REVISE⟩
►CONTRAST    : 0
 BRIGHT      : 0
 CHROMA      : 0
 PHASE       : 0
 B[ENTER]    :⊖
```
②

●Variable setting range

Function		Variable setting range	Initial (default) setting
PICTURE ADJUST-MENT	CONTRAST	-20 to +20	0
	BRIGHT	-20 to +20	0
	CHROMA	-20 to +20	0
	PHASE	-20 to +20	0
ASPECT RATIO		4:3 16:9	4:3
FILTER SELECT		COMB BOTH NOTCH	COMB
PEAKING FREQ.		2.6MHz 5.0MHz	2.6MHz
PEAKING LEVEL		0dB +1dB ··· +9dB	0dB
AFC		NORMAL FAST SLOW	NORMAL
COLOR TEMP.		9300 6500	6500
NTSC SETUP		0 7.5	0
COMPO. LEVEL		SMPTE BETA00 BETA7.5	SMPTE

NOTE
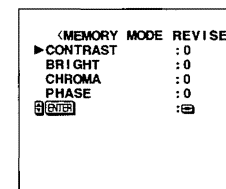
● If the ENTER button is pressed after a function other than PICTURE ADJUSTMENT is selected, the on-screen display changes into a single-line one. To select another function after making a change in function, press the MENU button to restore display ①.

● When the monitor was shipped from the factory, the NTSC SETUP had been set to 7.5 and the COMPO. LEVEL to BETA 7.5.

5. With display ① on screen, press the MENU button to make display ③ appear.
   ●Press the ENTER button to program.
   ●Press the ◄ or ► button to cancel.
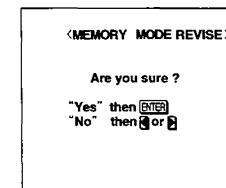
```
⟨MEMORY MODE REVISE⟩

Are you sure ?

"Yes" then [ENTER]
"No"  then ◄ or ►
```
③

SET-UP FOR MONITOR INSTALLATION

When installing the monitor, make set-up adjustments required for the picture settings to match conditions where the monitor is to be used.

To call up SET-UP MENU and select a function:

1. To make ① (SET-UP MENU) appear, with the ENTER button pressed, press the MENU button.

2. Press the ▲ or ▼ button to select an adjustment item.
   (To set STATUS DISPLAY or CONTROL LOCK, steps 3 and 4 are not necessary.)

3. Press the ENTER button to call up the adjustment menu ② of a selected item (e.g. WHITE BALANCE).

4. Press the ▲ or ▼ button to select a function to be adjusted.

5. Press the ◄ or ► button to change the setting.

6. With the display ① on screen, press the ▲ or ▼ button to select another function and repeat step 5.

7. Press the MENU button to complete. SET-UP MENU disappears.
   ● To make ① (SET-UP MENU) disappear:
     Press the MENU button.
   ● To make ② (e.g. WHITE BALANCE) disappear:
     Press the MENU button twice.

```
        〈SET-UP MENU〉
    SIZE/CENTERING
   ►WHITE BALANCE ADJUST
    REMOTE SELECT
    STATUS DISPLAY :ON
    CONTROL LOCK  :OFF
   ⊟ENTER          :⊜
```
①

```
        〈WHITE BALANCE〉
   ►RED DRIVE      : 0
    GREEN DRIVE    : 0
    BLUE DRIVE     : 0
    RED CUTOFF     : 0
    GREEN CUTOFF   : 0
    BLUE CUTOFF    : 0
   ⊟ENTER          :⊜
```
②

NOTE
● Each time the MENU button is pressed, the previous menu is restored.

SIZE/CENTERING (size/positioning adjustments of RGB signal pictures)

For analog RGB video signal pictures, horizontal size, vertical size, horizontal positioning and vertical positioning can be finely adjusted.

NOTE
● SIZE/CENTERING appears and the function is operable only when monitoring the picture of analog RGB video signals.

Adjustment (level)	Function
H. POSITION (-10, -9 ... 0 ... +9, +10)	+ moves the picture to right. - moves the picture to left.
V. POSITION (-10, -9 ... 0 ... +9, +10)	+ moves the picture down. - moves the picture up.
H. SIZE (-10, -9 ... 0 ... +9, +10)	+ makes the picture wider. - makes the picture narrower.
V. SIZE (-10, -9 ... 0 ... +9, +10)	+ makes the picture higher. - makes the picture lower.

SET-UP FOR MONITOR INSTALLATION (continued)

WHITE BALANCE ADJUST (white balance adjustments)

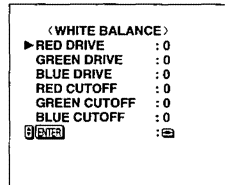Before making these adjustments, select the color temperature 9300K or 6500K on MENU.

Adjustment (level)	Function
RED DRIVE (-10, -9, ... 0 ... +9, +10)	Adjusts the drive level of a red signal component.
GREEN DRIVE (-10, -9, ... 0 ... +9, +10)	Adjusts the drive level of a green signal component.
BLUE DRIVE (-10, -9, ... 0 ... +9, +10)	Adjusts the drive level of a blue signal component.
RED CUTOFF (-10, -9, ... 0 ... +9, +10)	Sets the cut-off voltage of a red signal component.
GREEN CUTOFF (-10, -9, ... 0 ... +9, +10)	Sets the cut-off voltage of a green signal component.
BLUE CUTOFF (-10, -9, ... 0 ... +9, +10)	Sets the cut-off voltage of a blue signal component.

NOTE
● By making white balance adjustments on SET-UP MENU, ✳ appears to the right of the COLOR TEMP. setting on MENU (see page 7).

REMOTE SELECT (TALLY/REMOTE-terminal settings)

Via the TALLY/REMOTE terminal, the tally lamp can be turned on/off, or a function (selected from display ③ shown on the right) can be operated using an external control.
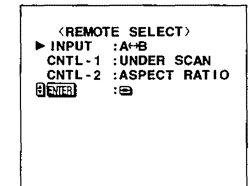
```
       〈REMOTE SELECT〉
   ► INPUT   :A↔B
     CNTL-1  :UNDER SCAN
     CNTL-2  :ASPECT RATIO
   ⊟ENTER     :⊜
```
③

INPUT setting indications and selected inputs

✳: indicates when deactivating the remote control via the TALLY/REMOTE terminal

Setting indication	NOT USE	A↔B	A↔Y/C	A↔RGB	A↔COMPO	B↔Y/C	B↔RGB	B↔COMPO	Y/C↔RGB	Y/C↔COMPO	RGB↔COMPO
Short-circuit	✳	A	A	A	A	B	B	B	Y/C	Y/C	RGB
Open-circuit	✳	B	Y/C	RGB	COMPO.	Y/C	RGB	COMPO.	RGB	COMPO.	COMPO.

CNTL-1/CNTL-2 setting indications and set positions

✳: indicates when deactivating the remote control via the TALLY/REMOTE terminal

Setting indication	NOT USE	UNDER SCAN	PULSE CROSS	COLOR OFF	BLUE CHECK	EXTERNAL SYNC	ASPECT RATIO	COLOR TEMP.	AUDIO MUTE
Short-circuit	✳	ON	ON	ON	ON	External	16-9	6500	ON
Open-circuit	✳	OFF	OFF	OFF	OFF	Internal	4-3	9300	OFF

●TALLY/REMOTE terminal functions

All controls via TALLY/REMOTE terminal are made by short-circuiting or open-circuiting any pin from Pin 1 to 4 and either Pin 7 or 8 (GND each) of this terminal.
When using this terminal, be sure to short-circuit Pin 5 and either Pin 7 or 8.
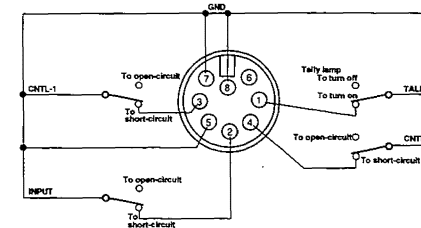
NOTE
● When the TALLY/REMOTE terminal is used, the following functions become deactivated (except when they are set to "NOT USE"):
  - Front INPUT SELECT and EXT SYNC switches
  - Front UNDER SCAN, PULSE CROSS, COLOR OFF and BLUE CHECK switches
  - On-screen MENU's ASPECT RATIO and COLOR TEMP. functions
  - Remote MUTE key
● If a function is applied to both CNTL-1 and CNTL-2, CNTL-1 has priority.

9

BT-M1950Y

SET-UP FOR MONITOR INSTALLATION (continued)

STATUS DISPLAY (setting the status display to on/off) ———

When the power is turned on or the input mode is switched, the status display (color system and input mode) appears on screen. The display can be set to on or off.

Setting	Function
ON	Status display appears.
OFF	Status display does not appear.

CONTROL LOCK (deactivation of front-control functions) ———

Set CONTROL LOCK to ON on screen to deactivate the front-control functions (front VOLUME control is operable).

Setting	Function
ON	Deactivates the front controls (except front/remote volume controls).
OFF	Releases deactivated functions.

NOTE

● If you attempt to operate a locked function, "CONTROL LOCK ON!!" appears on screen for approx. 2 seconds to indicate the function cannot be operated.
● Once CONTROL LOCK is deactivated, the current settings of the front-control knobs and buttons are activated.
● If the power is turned off with CONTROL LOCK activated, the function is kept in memory.

PICTURE SETTING INITIALIZATION

The MENU and/or SET-UP MENU settings, including changes added later by the user, can be reset (initialized) to their initial (default) settings.

To initialize MENU settings only ———

MENU settings (except MEMORY MODE and RGB/COMPONENT) can be exclusively reset:

1. With the ▼ button pressed, press the MENU button to display ① on screen.
2. ● Press the ENTER button to reset.
   ● Press the ◄ or ► button to cancel.

● MENU and PICTURE ADJUST settings (except MEMORY MODE and RGB/COMPONENT) can also be simultaneously reset.

1. Press the MENU key to display MENU on screen.
2. Press the RESET key to execute.

NOTE

● For initial (default) MENU settings, see page 11.

```
〈MENU〉 RESET


       Are you sure ?

    "Yes" then [ENTER]
    "No"  then [◄ or ►]
```
①
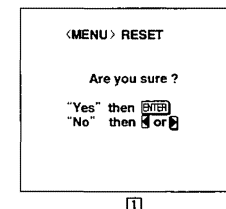
To initialize both MENU/SET-UP MENU settings ———

MENU and SET-UP MENU settings other than MEMORY MODE and RGB/COMPONENT can be reset at the same time.

1. Press the POWER switch to turn the power off.
2. With the ▼ and MENU buttons pressed, press the POWER switch to turn the power on. Keep pressing the ▼ and MENU buttons until ② appears on screen.
3. Press the ▲ or ▼ button to select SET-UP MENU RESET. Then press the ENTER button to display ③ on screen.
4. ● Press the ENTER button again to execute.
   ● Press the ◄ or ► button to cancel.

```
〈INITIALIZE MENU〉
ID NUMBER SET
►〈SET-UP MENU〉 RESET
🔲[ENTER]
```
②

```
〈SET-UP MENU〉 RESET


       Are you sure ?

    "Yes" then [ENTER]
    "No"  then [◄ or ►]
```
③
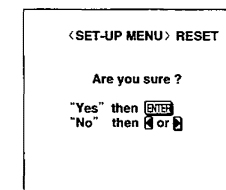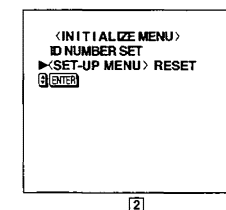
BEFORE CALLING FOR SERVICE

Before concluding a problem has occurred, check the following points. If the problem persists after carrying out the checks, disconnect the power cord from the AC outlet and consult the dealer from whom you purchased the monitor.

Problems	Points to be checked	Measures
Inoperable adjustment controls or buttons.	Is MEMORY MODE switched on?	Switch off.
	Is CONTROL LOCK activated?	Deactivate it.
Abnormal picture adjustments with all controls at center.	Are PICTURE ADJUST menu settings changed via remote control?	Reset to standard settings.
Inoperable picture synchronization.	Is EXT SYNC switched on?	Switch to off.
No sound via audio signal input.	Does the audio input terminal match the video input terminal?	Each audio input terminal is linked with a video input terminal.
No INITIALIZE MENU display.	Are you pressing the ▼ and MENU buttons until it appears?	Keep pressing these buttons until it appears.
Inoperable CNTL-2 external control via TALLY/REMOTE terminal.	Is a function applied common to CNTL-1 and CNTL-2?	Set other functions to CNTL-2.

MENU DISPLAY CHART

The initial (default) adjustments/settings are shown in the menus below.
When the monitor was shipped from the factory, the NTSC SETUP had been set to 7.5 and the COMPO. LEVEL to BETA 7.5.

MAIN PARTS LOCATION

TALLY PWB

DEFLECTION PWB

FRONT CONTROL PWB

V.SAW Module PWB

CRT SOCKET PWB

POWER PWB(2/2)

MICOM PWB
(MICRO COMPUTER)

POWER PWB(1/2)

INPUT PWB

SIGNAL PWB
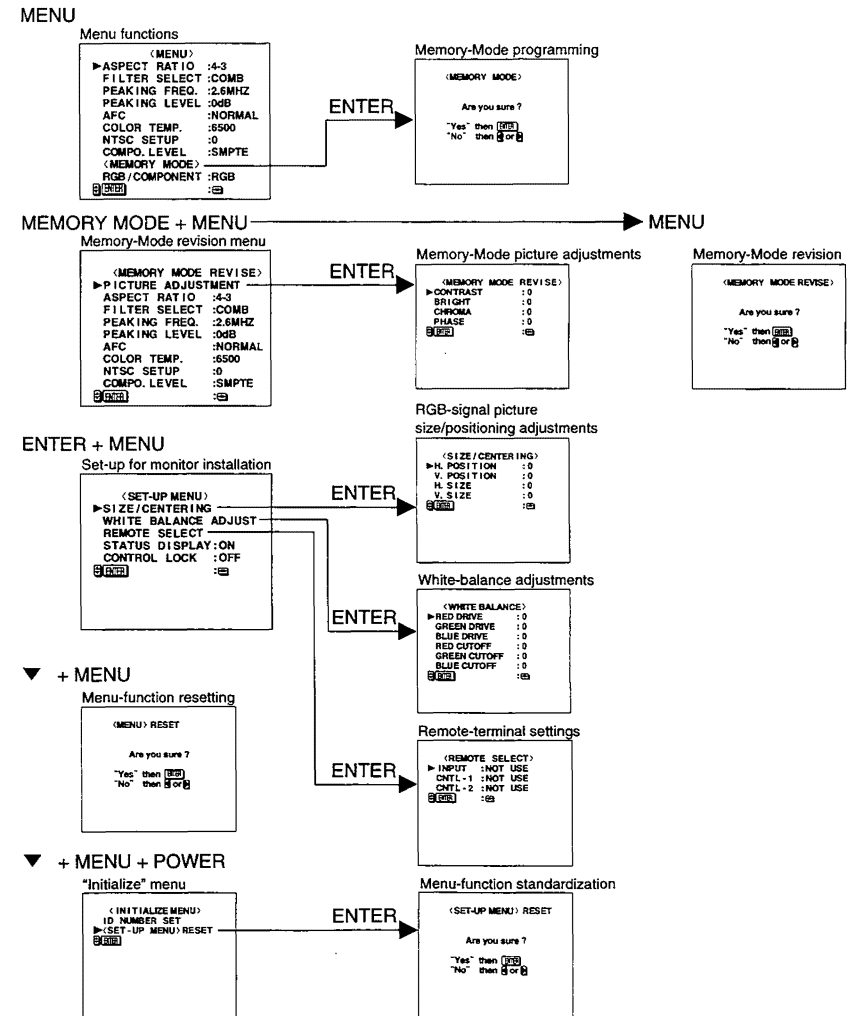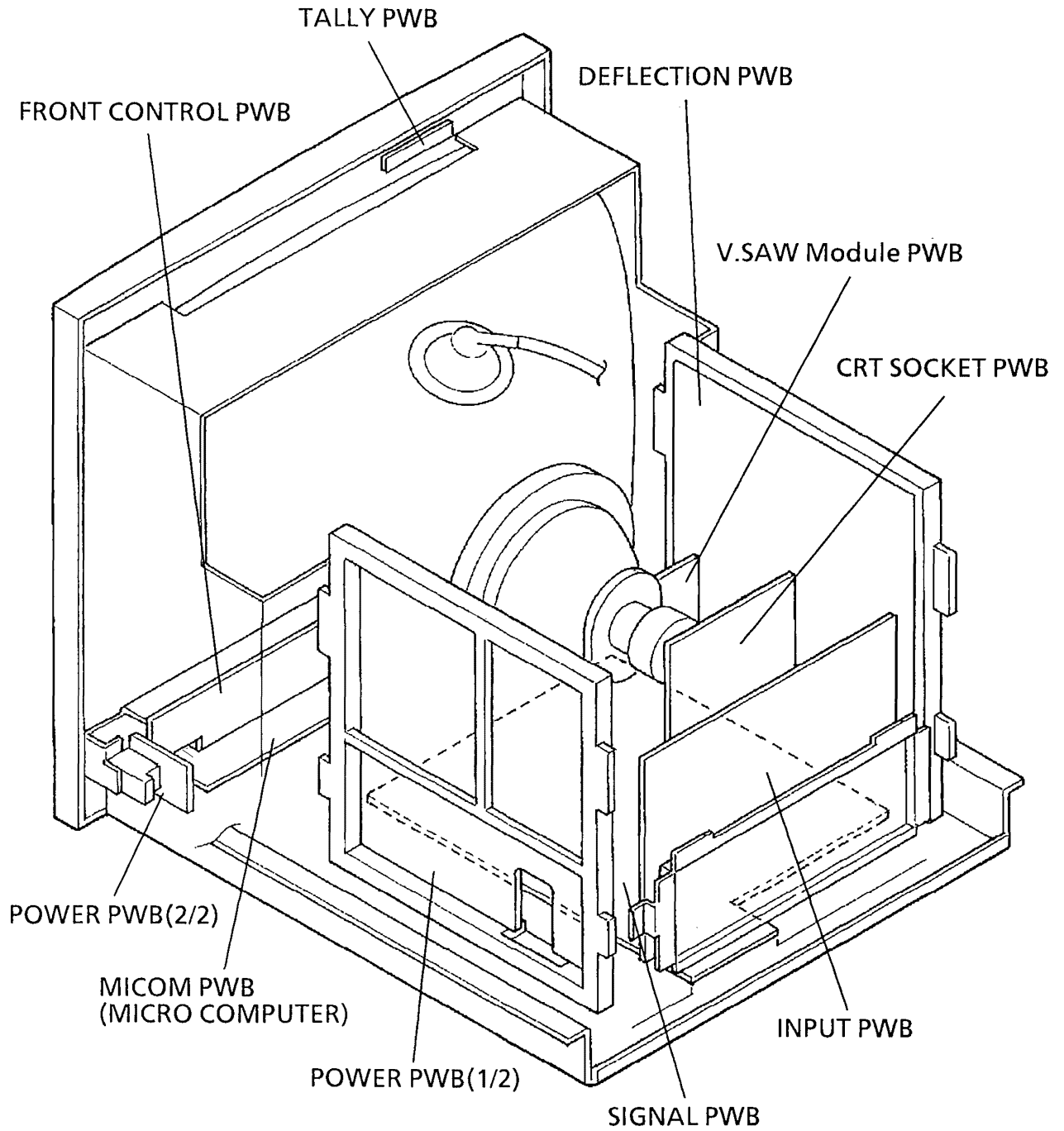
SPECIFIC SERVICE INSTRUCTIONS

Disassembly
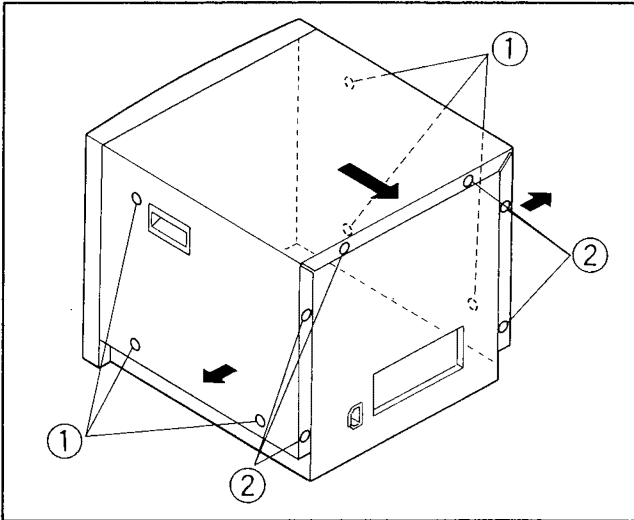
- Be sure to disconnect the power cord from the AC outlet before disassembly and reassembly. Use care since unless the power cord is disconnected, some parts may still be live even when the power switch is off.

■ Top cover

1. Take out 6 screws ① and 6 screws ②.
2. Slightly spread the bottom part of the cover, shift it rearward and raise the top cover to remove it.
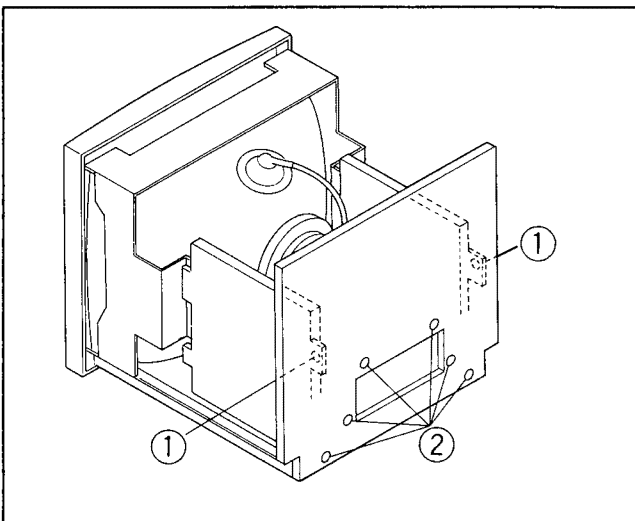
■ Rear panel

1. Remove the top cover.
2. Take out 2 screws ① and 6 screws ② to remove the rear panel.
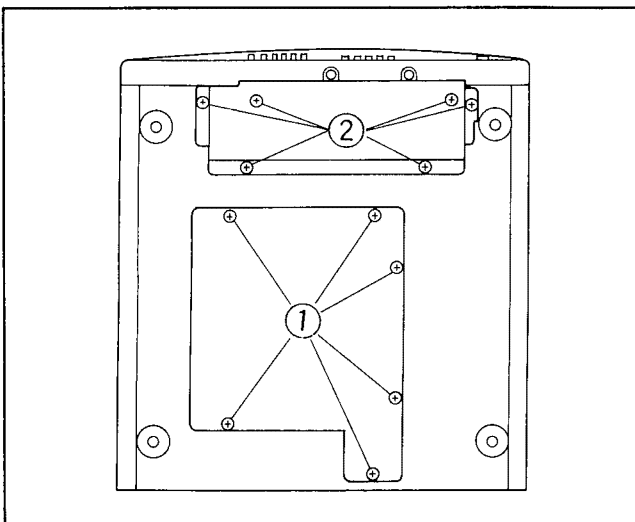
■ Bottom shield and shield cover

1. Remove the top cover and rear panel.
2. Take out 6 screws ① and remove the bottom shield.
3. Take out 6 screws ② and remove the shield cover.
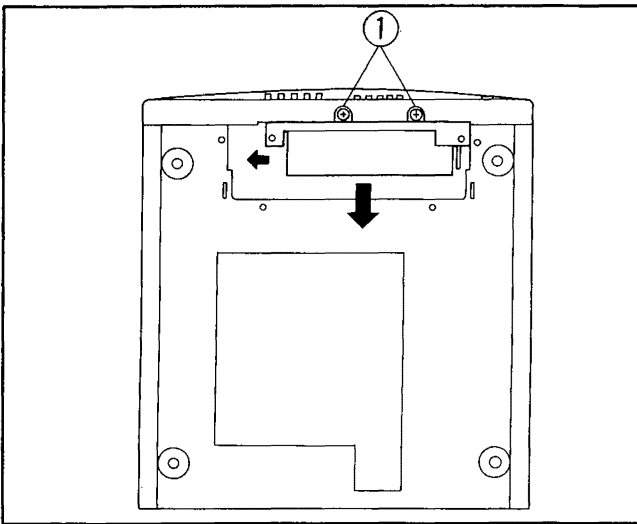
■ Front control brackets

1. Remove the shield cover.
2. Take out 2 screws ①.
3. Slide each bracket slightly toward the left, then pull downward to remove.
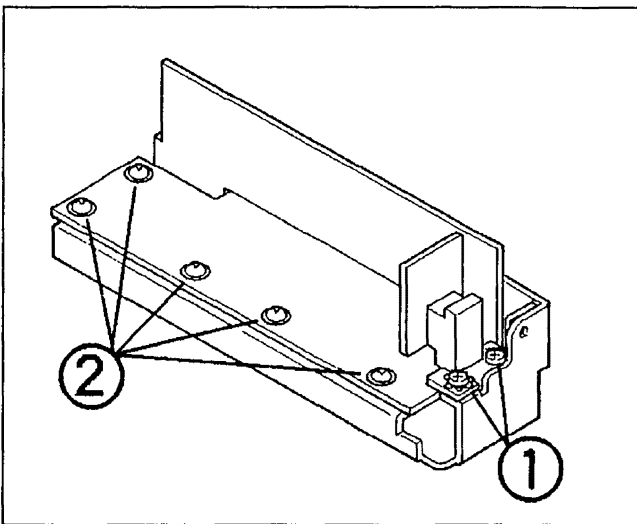
■ Power switch, front control PWB, CPU PWB

1. Remove the front control brackets (including CPU PWB).
2. Take out 2 screws ① and remove the power switch.
3. Take out 5 screws ② and remove the front control and CPU PWBs.
4. Disengage the connectors of the two PWBs.
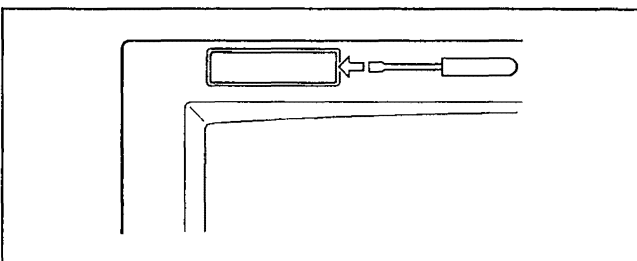
■ Tally PWB

1. While using care not to scratch the front panel, insert a flat blade screwdriver into the edge of the tally cover and remove the cover.
2. Since the tally PWB appears, press the top and bottom tabs downward with the screwdriver.
3. Pull the PWB downward to tilt and remove the PWB.
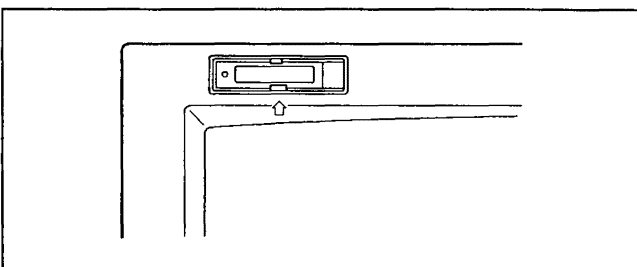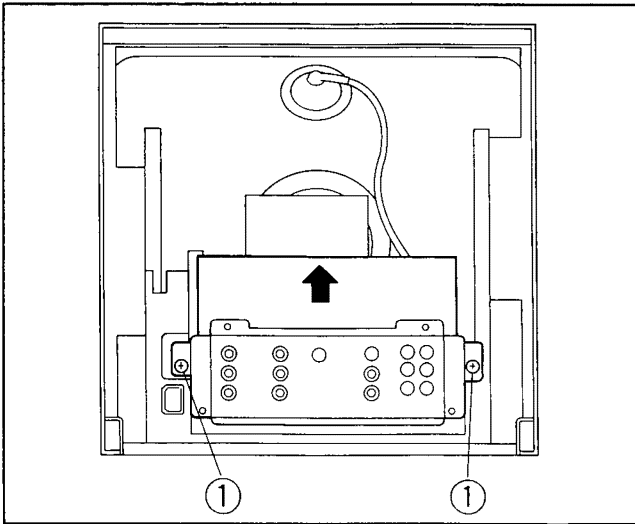
■ Input PWB

1. Remove the top cover and rear panel.
2. Take out 2 screws ①.
3. While pressing the lower signal PWB, pull upward and remove the input PWB. Use care regarding the tabs and engage the PWB to enable powered checks.
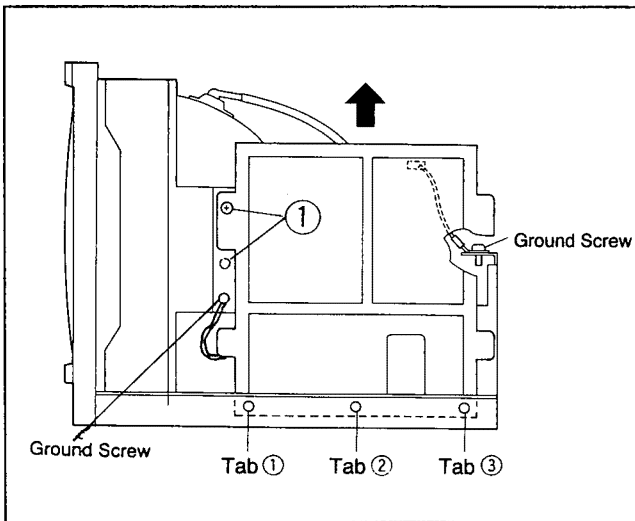
■ Power supply PWB

1. Remove the top cover and rear panel.
2. Take out 2 screw ①.
3. While raising the PWB, insert a screwdriver or similar tool to disengage tabs 1, 2 and 3, then remove the PWB.
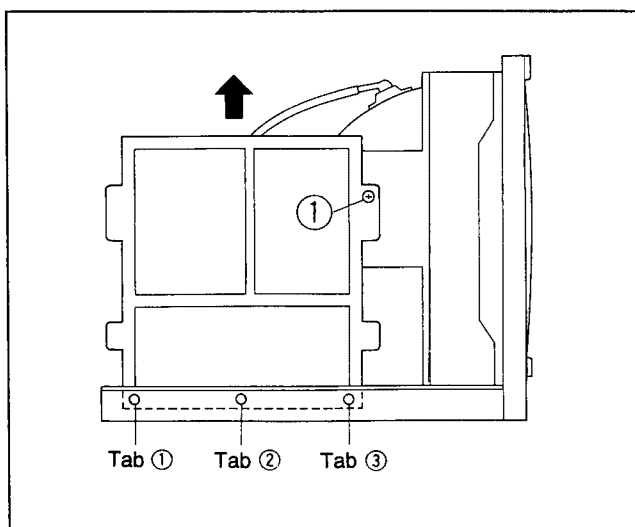
■ Deflection PWB

1. Remove the top cover and rear panel.
2. Take out 1 screw ①.
3. While raising the PWB, insert a screwdriver or similar tool to disengage tabs 1, 2 and 3, then remove the PWB.

Ground Screw

Ground Screw   Tab ①   Tab ②   Tab ③

Tab ①   Tab ②   Tab ③

REPLACEMENT OF CHIP COMPONENT

■CAUTIONS

1. Avoid heating for more than 3 seconds.
2. Do not rub the electrodes and the resist parts of the pattern.
3. When removing a chip part, melt the solder adequately.
4. Do not reuse a chip part after removing it.

■SOLDERING IRON

1. Use a high insulation soldering iron with a thin pointed end of it.
2. A 30w soldering iron is recommended for easily removing parts.

■REPLACEMENT STEPS

1. How to remove Chip parts

●Resistors, capacitors, etc

(1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.
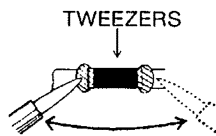
(2) Shift with tweezers and remove the chip part.
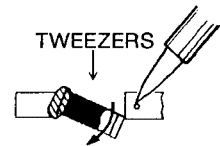
●Transistors, diodes, variable resistors, etc

(1) Apply extra solder to each lead.
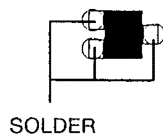
(2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.
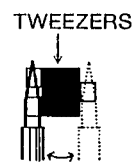
Note: After removing the part, remove remaining solder from the pattern.

2. How to install Chip parts

●Resistors, capacitors, etc

(1) Apply solder to the pattern as indicated in the figure.
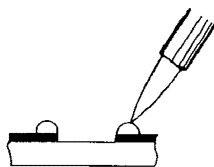
(2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.
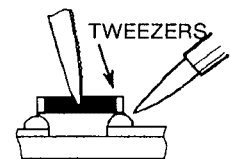
●Transistors, diodes, variable resistors, etc

(1) Apply solder to the pattern as indicated in the figure.

(2) Grasp the chip part with tweezers and place it on the solder.

(3) First solder lead A as indicated in the figure.

(4) Then solder leads B and C.
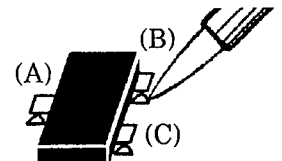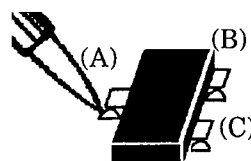
Service menu entry

1. While holding Enter depressed, press Degauss.
2. The letter S appears at the upper left of the screen.
3. While holding Enter depressed, press Menu.
4. The screen display changes to < SERVICE MENU >
   PLEASE, DON'T TOUCH!
5. Press the left [←] or right arrow [→] to display the service
   menu.
   If Step 4 state continues for more than 5 seconds without
   a further operation, the display extinguishes and the mode
   is released.

Item selection

● While the service main menu is displayed:
1. Press the up [↑] or down arrow [↓] to select the item.
2. After selecting the item, press Enter.
3. The adjustment mode menu is displayed.

Setting value change

● While the adjustment mode menu is displayed:
1. Press the right arrow [→] to change the setting value in
   the + direction.
2. Press the left arrow [←] to change the setting value in the
   - direction.
3. Press the up [↑] or down arrow [↓] to change the
   adjustment item number.

Service menu exit

1. When settings are completed, press Menu.
2. The service main menu returns.
3. Again press Menu.
4. The screen display extinguishes and the service mode is
   exited.

S

< SERVICE MENU >

PLEASE, DON'T TOUCH !

< SERVICE MENU >

▸ SIGNAL BLOCK
  WITE BALANCE BLOCK
  DEFLECTION BLOCK
  CONTROL BLOCK

Service main menu

SERVICE (S01) : 015

Adjustment mode menu

SERVICE (S01) : 015
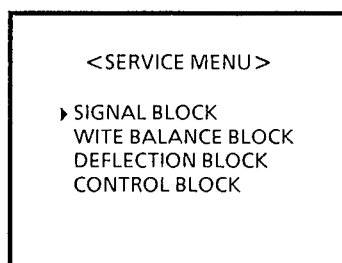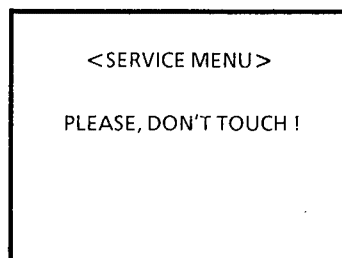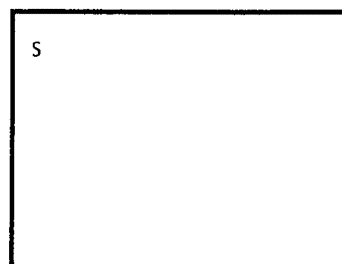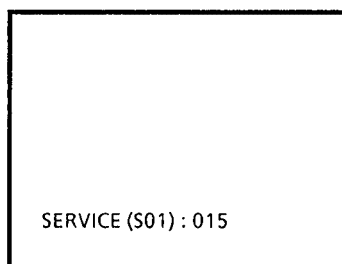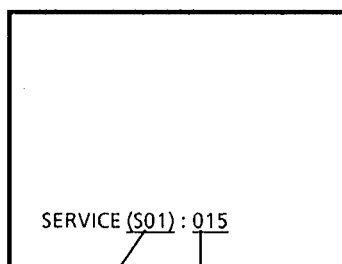
Adjustment item number

Setting value

■ Signal system settings

No.	Input	Signal	Item	Data type	Variable range	Initial value
S01			Bright	Standard value	0~63	15
S02	Video	NTSC	Chroma	Standard value	0~63	32
S03	Video	NTSC	Phase	Standard value	0~63	32
S04	Video	NTSC	Contrast	Standard value	0~63	32
S05	Video	PAL	Chroma	Standard value	0~63	32
S06	Video	PAL N443	Contrast	Standard value	0~63	32
S07	Video Y/C	N443	Phase	Standard value	0~63	32
S08	Y/C	NTSC	Chroma	Standard value	0~63	32
S09	Y/C	NTSC	Phase	Standard value	0~63	32
S10	Y/C	NTSC PAL N443	Contrast	Standard value	0~63	32
S11	Y/C	PAL	Chroma	Standard value	0~63	32
S12	Color difference	N10/ SMPTE	Chroma	Standard value	0~63	32
S13	Color difference		Contrast	Standard value	0~63	32
S14	RGB		Contrast	Standard value	0~63	32
S15	Video	N443	Chroma	Correction value	0~255	3
S16	Y/C	N443	Chroma	Correction value	0~255	3
S17	Color difference	BETA	Chroma	Correction value	0~255	247
S18			Bright →pulse cross	Correction value	0~255	20
S19			Contrast →pulse cross	Correction value	0~255	236
S20			Bright →underscan	Correction value	0~255	0
S21			Contrast →underscan	Correction value	0~255	252
S22			Bright →16 : 9	Correction value	0~255	0
S23			Contrast →16 : 9	Correction value	0~255	250
S24	Video	SECAM	Chroma	Standard value	0~63	32
S25	Video	SECAM	Contrast	Standard value	0~63	32
S26	Y/C	SECAM	Chroma	Standard value	0~63	32

No.	Input	Signal	Item	Data type	Variable range	Initial value
S27	Y/C	SECAM	Contrast	Standard value	0~63	32
S28			Peak Drive Limit	Fixed value	0~255	45
S29			Control Reg - 1	Fixed value	0~255	193
S30			Control Reg - 2	Fixed value	0~255	0
S31	Video	NTSC,B/W 60	Y Delay	Fixed value	0~255	65
S32	Y/C	NTSC,B/W 60	Y Delay	Fixed value	0~255	73
S33	Video	PAL,B/W 50	Y Delay	Fixed value	0~255	82
S34	Y/C	PAL,B/W 50	Y Delay	Fixed value	0~255	82
S35	Video	N443	Y Delay	Fixed value	0~255	82
S36	Y/C	N443	Y Delay	Fixed value	0~255	82
S37	Video	SECAM	Y Delay	Fixed value	0~255	82
S38	Y/C	SECAM	Y Delay	Fixed value	0~255	82
S39	Color difference		Y Delay	Fixed value	0~255	64

■ White balance settings

No.	Color temperature	Scan	Item	Data type	Variable range	Initial value
W01	9300	Normal	R - Cutoff	Standard value	0~63	37
W02	9300	Normal	G - Cutoff	Standard value	0~63	25
W03	9300	Normal	B - Cutoff	Standard value	0~63	23
W04	9300	Normal	R - Drive	Standard value	0~63	34
W05	9300	Normal	G - Drive	Standard value	0~63	32
W06	9300	Normal	B - Drive	Standard value	0~63	30
W07	6500	Normal	R - Cutoff	Standard value	0~63	48
W08	6500	Normal	G - Cutoff	Standard value	0~63	25
W09	6500	Normal	B - Cutoff	Standard value	0~63	12
W10	6500	Normal	R - Drive	Standard value	0~63	37
W11	6500	Normal	G - Drive	Standard value	0~63	32
W12	6500	Normal	B - Drive	Standard value	0~63	24

No.	Color temperature	Scan	Item	Data type	Variable range	Initial value
W13	3200	Normal	R - Cutoff	Standard value	0~63	Not used(32)
W14	3200	Normal	G - Cutoff	Standard value	0~63	Not used(32)
W15	3200	Normal	B - Cutoff	Standard value	0~63	Not used(32)
W16	3200	Normal	R - Drive	Standard value	0~63	Not used(32)
W17	3200	Normal	G - Drive	Standard value	0~63	Not used(32)
W18	3200	Normal	B - Drive	Standard value	0~63	Not used(32)
W19		Under	R - Cutoff	Correction value	0~255	0
W20		Under	G - Cutoff	Correction value	0~255	0
W21		Under	B - Cutoff	Correction value	0~255	0
W22		Under	R - Drive	Correction value	0~255	0
W23		Under	G - Drive	Correction value	0~255	0
W24		Under	B - Drive	Correction value	0~255	0
W25		16 : 9	R - Cutoff	Correction value	0~255	0
W26		16 : 9	G - Cutoff	Correction value	0~255	0
W27		16 : 9	B - Cutoff	Correction value	0~255	0
W28		16 : 9	R - Drive	Correction value	0~255	0
W29		16 : 9	G - Drive	Correction value	0~255	0
W30		16 : 9	B - Drive	Correction value	0~255	0

■Deflection system settings

No.	Scan	Input	V. frequency	Item		Variable range	Initial value
D01	Normal	Video	60Hz	V-Size	→Standard value	0~63	38
D02	Normal	Video	60Hz	V-Shift	→Standard value	0~63	32
D03	Normal	Video	60Hz	V-Linearity	→Standard value	0~15	7
D04	Normal	Video	60Hz	S-Correction	→Standard value	0~15	15
D05	Normal	Video	60Hz	H-Size	→Standard value	0~63	26
D06	Normal	Video	60Hz	H-Shift	→Standard value	0~63	32
D07	Normal	Video	60Hz	Pin-AMP	→Standard value	0~63	41
D08	Normal	Video	50Hz/60Hz	HV-COMP-V	→Standard value	0~7	7
D09	Normal	Video	50Hz/60Hz	HV-COMP-H	→Standard value	0~7	0
D10	Normal	Video	50Hz	V-Size	→Standard value	0~255	40
D11	Normal	Video	50Hz	V-Shift	→Standard value	0~255	29
D12	Normal	Video	50Hz	V-Linearity	→Standard value	0~255	8
D13	Normal	Video	50Hz	S-Correction	→Standard value	0~255	15
D14	Normal	Video	50Hz	H-Size	→Standard value	0~255	29
D15	Normal	Video	50Hz	H-Shift	→Standard value	0~255	32
D16	Normal	Video	50Hz	Pin-AMP	→Standard value	0~255	40
D17	Under	Video	50Hz/60Hz	V-Size	→Correction value	0~255	230
D18	Under	Video	50Hz/60Hz	V-Shift	→Correction value	0~255	0
D19	Under	Video	50Hz/60Hz	V-Linearity	→Correction value	0~255	0
D20	Under	Video	50Hz/60Hz	S-Correction	→Correction value	0~255	0
D21	Under	Video	50Hz/60Hz	H-Size	→Correction value	0~255	0
D22	Under	Video	50Hz/60Hz	H-Shift	→Correction value	0~255	0
D23	Under	Video	50Hz/60Hz	Pin-AMP	→Correction value	0~255	2
D24	Under	Video	50Hz/60Hz	HV-COMP-V	→Correction value	0~255	0
D25	Under	Video	50Hz/60Hz	HV-COMP-H	→Correction value	0~255	0
D26	16 : 9	Video	50Hz/60Hz	V-Size	→Correction value	0~255	0
D27	16 : 9	Video	50Hz/60Hz	V-Shift	→Correction value	0~255	0
D28	16 : 9	Video	50Hz/60Hz	V-Linearity	→Correction value	0~255	0
D29	16 : 9	Video	50Hz/60Hz	S-Correction	→Correction value	0~255	0
D30	16 : 9	Video	50Hz/60Hz	H-Size	→Correction value	0~255	0

No.	Scan	Input	V. frequency	Item		Variable range	Initial value
D31	16 : 9	Video	50Hz/60Hz	H-Shift	→Correction value	0~255	0
D32	16 : 9	Video	50Hz/60Hz	Pin-AMP	→Correction value	0~255	0
D33		RGB	60Hz	V-Shift	→Correction value	0~255	0
D34		RGB	60Hz	H-Shift	→Correction value	0~255	0
D35		RGB	50Hz	V-Shift	→Correction value	0~255	0
D36		RGB	50Hz	H-Shift	→Correction value	0~255	0
D37	Pulse Cross		50Hz/60Hz	V-Shift	→Correction value	0~255	0
D38	Pulse Cross		50Hz/60Hz	H-Shift	→Correction value	0~255	0
D39	External SYNC		50Hz/60Hz	V-Shift	→Correction value	0~255	0
D40	External SYNC		50Hz/60Hz	H-Shift	→Correction value	0~255	0
D41	TILT		50Hz/60Hz	TILT	→Fixed value	0~255	16
D42	U/L Cornner Pin		50Hz/60Hz	U/L CORNER PIN	→Fixed value	0~255	255
D43	V-BOW/V-ANGLE		50Hz/60Hz	V-BOW/V-ANGLE	→Fixed value	0~255	136

■Control system setting

No.	Item	Variable range	Initial value	Remarks
C01	Color TEMP. Default	0~255	1	Color temperature initial setting 1:6500K,2:9300K
C02	Menu display time	0~255	0	Menu display time 0: extinguish after 5 minutes, 1: continuous
C03	OSDC Color	0~255	7	On-screen color setting, power off/on needed after changing (see table next page)
C04	OSDC H.Position	0~255	5	On-screen H. position 0 - 15
C05	OSDC V.Position (60Hz)	0~255	1	On-screen V. position (60 Hz) 0 - 15
C06	OSDC V.Position (50Hz)	0~255	2	On-screen V. position (50 Hz) 0 - 15
C07	Bright Data to MAX	0~255	20	Effective brightness range from center detent to maximum
C08	Bright Data to MIN	0~255	20	Effective brightness range from center detent to minimum

No.	Item	Variable range	Initial value	Remarks
C09	Chroma Data to MAX	0～255	30	Effective chroma range from center detent to maximum
C10	Chroma Data to MIN	0～255	50	Effective chroma range from center detent to minimum
C11	Contrast Data to MAX	0～255	~~20~~ 10	Effective contrast range from center detent to maximum
C12	Contrast Data to MIN	0～255	20	Effective contrast range from center detent to minimum
C13	Phase Data to MAX	0～255	30	Effective phase range from center detent to maximum
C14	Phase Data to MIN	0～255	30	Effective phase range from center detent to minimum
C15	Signal	0～255	10	Signal Status display check time when signal change or display after data x 32 ms when counter is 0 - 127, not displayed when 127 - 255
C16	System detect	0～255	0	0: automatic, 1: 3.58 MHz, 2: 4.43 MHz

No.	On-screen color setting data	No.	On-screen color setting data
129	Blue	0	Black (darkens during blue check)
130	Green	1	Black (brightens during blue check)
131	Aqua	2	Green (darkens during blue check)
132	Red	3	Green (brightens during blue check)
133	Magenta	4	Red (darkens during blue check)
134	Yellow	5	Red (brightens during blue check)
135	White	6	Orange (darkens during blue check)
136	Black	7	Orange (brightens during blue check)

Set-up menu entry

1. While holding Enter depressed, press Menu.
2. The Set-up menu is displayed on the screen.

Item selection

■ Size/centering, white balance adjust, remote select

- Size/centering items are displayed only when RGB input is selected.
1. Press the up [↑] or down arrow [↓] to select Size/Centering items.
2. After selecting the item, press Enter.
3. The adjustment mode menu is displayed.
4. Again press Enter to display the adjustment mode sub-menu for each adjustment item (select adjustment item with up [↑] or down arrow [↓]).
5. Press Menu to display the original adjustment mode menu.
6. Perform in the same manner for White balance adjust and Remote select.

■ Status display

1. Press the up [↑] or down arrow [↓] to select the status display items.
2. Press the left [←] or right arrow [→] to select on/off.

■ Control lock

- Except for sound volume, all control operations are inhibited from the front control buttons, Phase, Chroma, Bright and Contrast controls, and the remote controller (sound volume remains operational).
1. Press the up [↑] or down arrow [↓] to select Control Lock.
2. Press the left [←] or right arrow [→] to select on/off.
3. The status just prior to selecting On is held and after exiting the set-up main menu, control adjustment is inhibited.
4. To release the control lock, press Enter and Menu to display the set-up main menu, then set Control Lock to Off.

```
<SET-UP MENU>

▶ SIZE/CENTERING
  WHITE BALANCE ADJUST
  REMOTE SELECT
  STATUS DISPLAY  :ON
  CONTROL LOCK    :OFF
```

Set-up main menu

```
<SIZE/CENTERING>

▶ H.SIZE        : +05
  V.SIZE        : -05
  H.POSITION    : +03
  V.POSITION    : -07 .
```

Adjustment mode menu

```
H.SIZE    : +05

V.SIZE    : -05

H.POSITION    : +03

V.POSITION    : -07
```
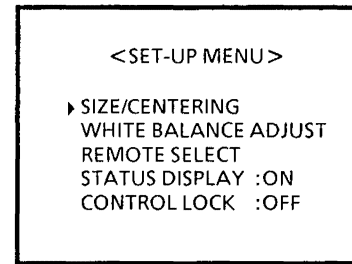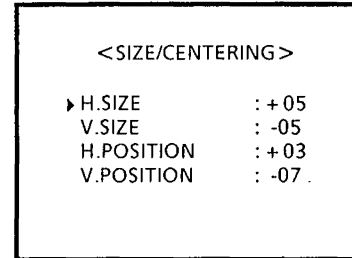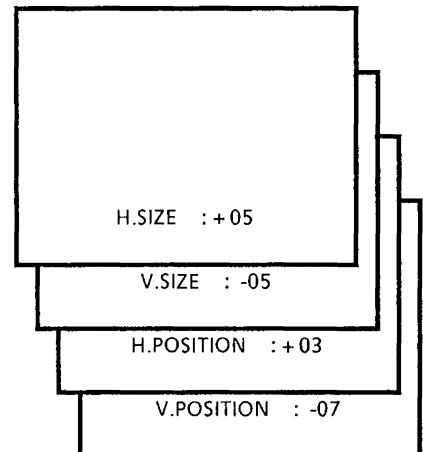
Adjustment mode sub-menu

H.SIZE→V.SIZE→H.POSITION→V.POSITION

Setting value change

- Set for displaying the adjustment mode menu or the adjustment mode sub-menu.
1. Press the right arrow [→] to change the adjustment value in the + direction.
2. Press the left arrow [←] to change the adjustment value in the - direction.
3. Press the up [↑] or down arrow [↓] to change the adjustment item.
4. Press Menu to return the set-up main menu. (At the adjustment mode sub-menu, again press Menu.)

Set-up menu exit

1. When settings are complete, press Menu.
2. The screen display extinguishes and the set-up menu is exited.

Set-up menu checks

■ White balance

To check if adjustment has changed:
1. Press Menu to display the user main menu.
2. If an asterisk (*) appears at the Color Temp. item, the setting has been changed.

■ Set-up menu initialize

To return changed Size/Centering and White Balance Adjust to original status (initialize);
1. Hold the mainframe down arrow [↓] and Menu depressed, and set power on (inoperable from remote controller).
2. The initialize menu is displayed (hold depressed until menu appears).
3. Select Set-up Menu Reset and press Enter.
4. The set-up reset menu is displayed.
5. Press Enter to return the standard settings. Note that Remote Elect, Status Display and Control Lock are initialized and ID No. is cleared to 0.

```
        < MENU >

ASPECT RATIO     :4-3

COLOR TEMP.      :6500*

RGB/COMPONENT :RGB
```
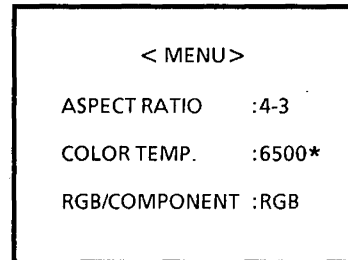
User main menu

```
       < INITIALIZE MENU >

   ID NUMBER SET
 ▶ < SET-UP MENU > RESET
```

Initialize menu

```
   < SET-UP MENU > RESET
       Are you sure ?
   "Yes" then [ENTER]
   "No" then [←]or[→]
```
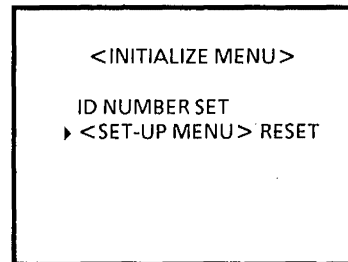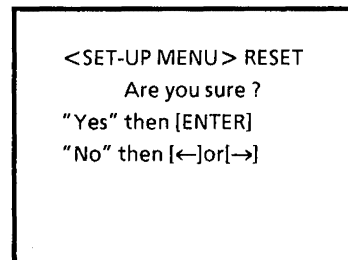
Set-up reset menu

Memory IC replacement notes

This model uses non-volatile memory ICs. When these are replaced, the data must be reset.

Video and deflection system data are stored in IC103. If this is replaced without entering the data, a normal picture will not be obtained. When replacing, be sure to use an IC(ST24BM-1400) containing the (initial value) data.

■ Set-up menu record

Press Menu and at the menu display, check if an asterisk (*) appears after Color Temp. If the asterisk appears, the user has set the values according to personal preference. To the extent possible, make a memo of the setting values before replacing the IC.

■ IC replacement steps

1. To the extent possible, make a memo of the set-up menu and adjustment mode menu contents.
2. Switch off the power and disconnect the power cord from the outlet.
3. Replace IC103.
4. Reconnect the power cord to the outlet and switch power on.
5. Refer to the memo and enter the setting values.
6. Perform adjustments according to the adjustment items.

SERVICE ADJUSTMENTS

PRIOR TO STARTING ADJUSTMENT

1. Supply power to the set and measuring instruments and allow to warm up for at least 30 minutes.
2. Confirm the proper AC power voltage is being supplied.
3. Use care not to disturb controls and switches not mentioned in the adjustment items.
4. Refer to adjustment settings and set user operated controls (bright, contrast, hue, tint, etc.) to the indicated positions.

TOOLS AND FIXTURES FOR ADJUSTMENT

- DC voltmeter (digital voltmeter)
- Oscilloscope
- Signal generator (PAL/NTSC systems)
  - Color bar and split color bar patterns
  - Crosshatch pattern
  - Cross pattern
  - Red raster pattern
  - Green raster pattern
  - Blue raster pattern
  - Philips pattern (including R-Y and B-Y)   Desirable
  - TV resolution pattern   Desirable
- Color analyzer   Desirable
- High voltage meter   Desirable

ADJUSTMENT SETTINGS

1. **Front controls**

CONTRAST	Detent
CONTRAST	Detent
BRIGHT	Detent
CHROMA	Detent
PHASE	Detent
VOLUME MIN	Detent

2. **Front switches**

INPUT SELECT	VIDEO A	
EXT SYNC	INT	Switched not depressed
UNDER SCAN	OVER	″
PULSE CROSS	OFF	″
COLOR OFF	COLOR	″
BLUE CHECK	OFF	″
MEMORY MODE	OFF	″

3. **Menu screen**

ASPECT RATIO	4 - 3
FILTER SELECT	COMB
PEAKING FREQ.	2.6MHz
PEAKING LEVEL	0dB
AFC	NORMAL
COLOR TEMP.	9300
NTSC SETUP	0
COMPO. LEVEL	SMPTE
RGB/COMPONENT	RGB

ADJUSTMENT LOCATIONS

■ Deflection PWB (pattern side)

Top

R313
SCREEN

R612
HVC

TP-SC

TP-B1

TP-HV

R582
H PHASE

R503
H HOLD

R416
V CENTER

←H FREE→
NORMAL   FREE
S501

■ **Power PWB (pattern side)**

Top

F001

⊕ R038
B1 ADJ

● TP-B1
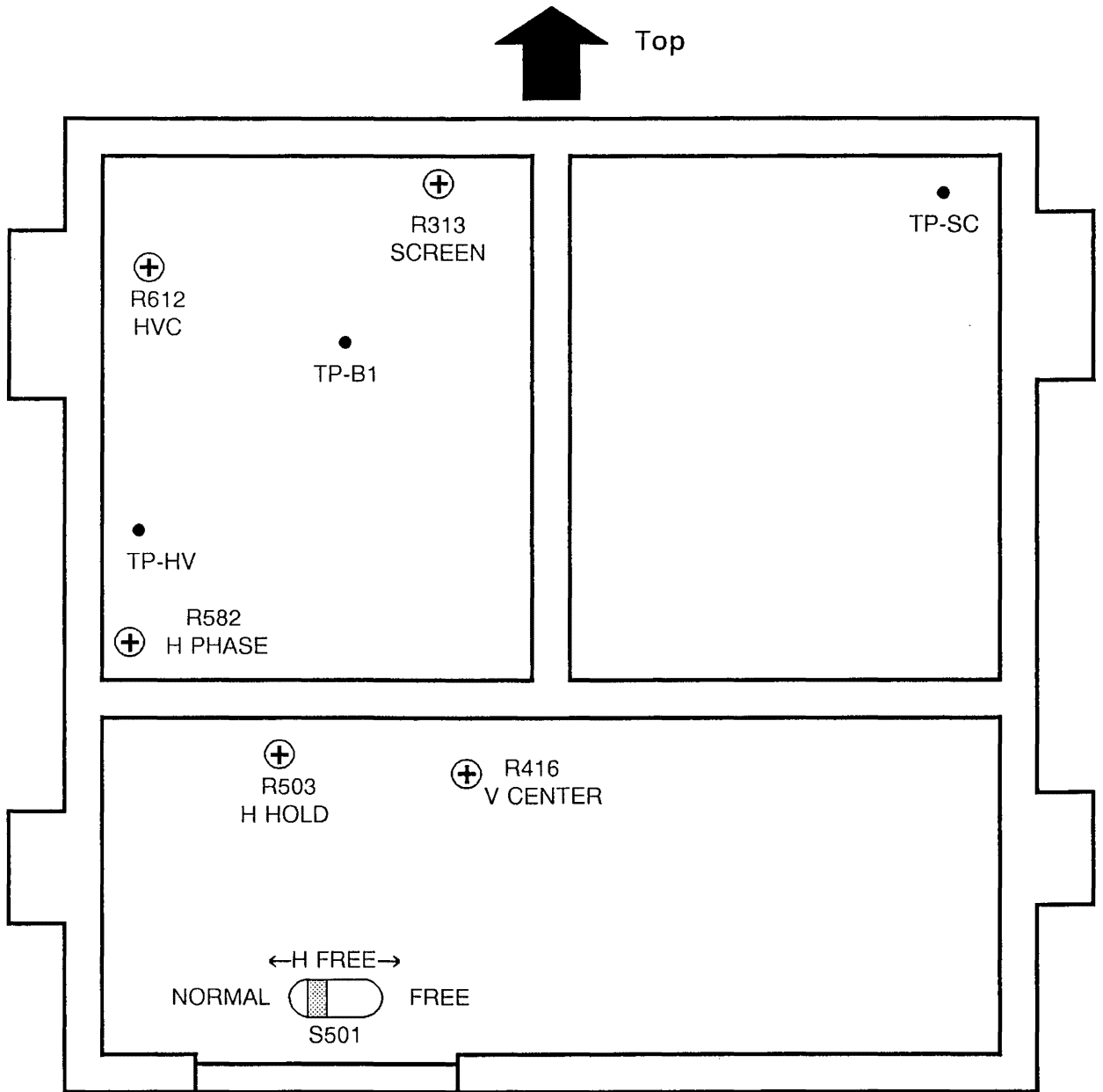
● TP-E
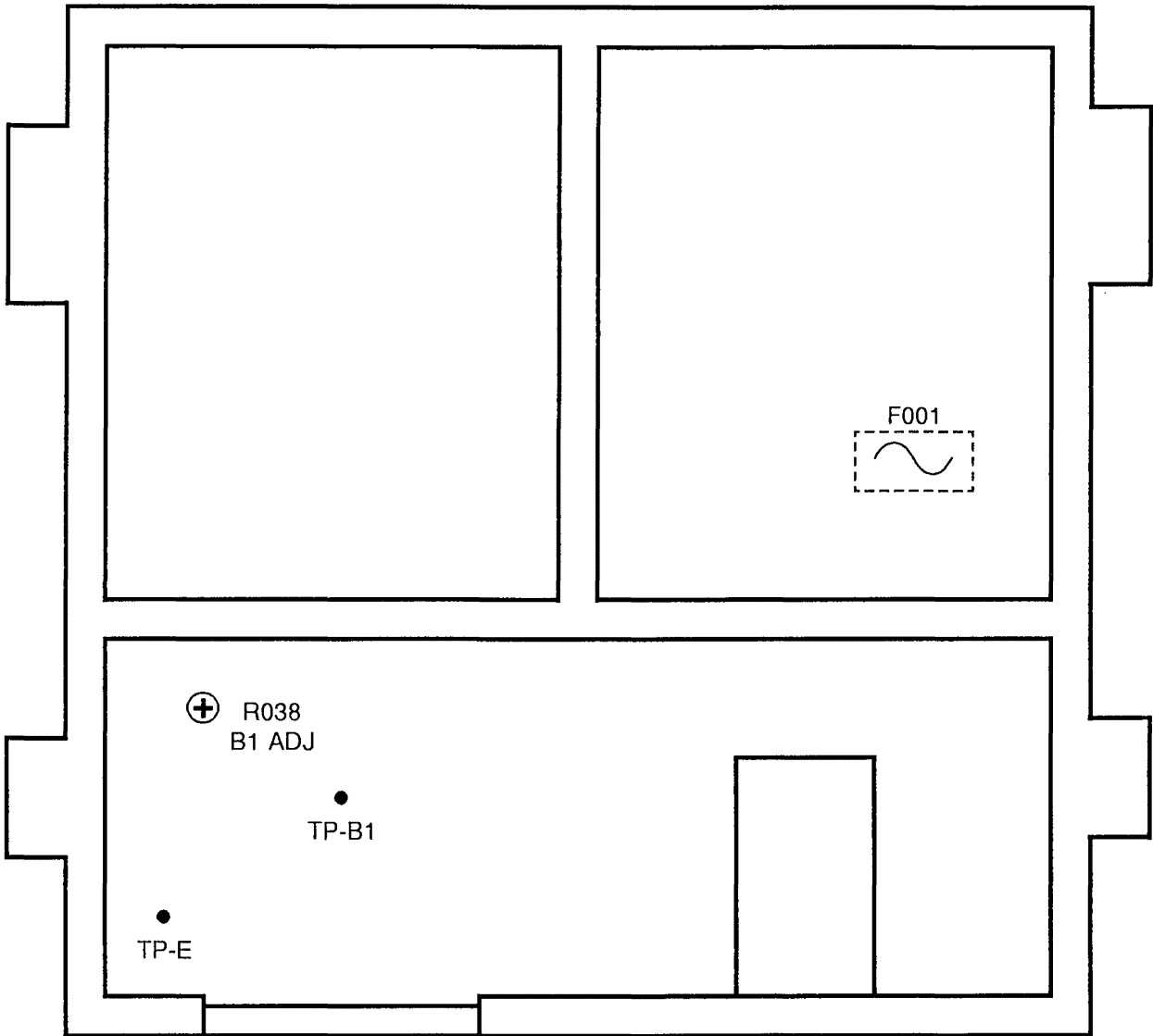
■CRT socket PWB (pattern side)

Top

TP-B1

TP-E

TP-R

TP-B

TP-SCREEN

TP-G

TP-G1

TP-R1

■**Signal PWB (parts side)**

Front

TP-Y

TP-B-Y

TP-R

TP-G

TP-R-Y

TP-B

TP-C SYNC

TP-SCP

TP-E

TP-49   TP-48

TP-V SYNC

C224   C222
4.43APC 3.58APC

R570
V.SYNC

C206
LISSAJOUS3

C209
LISSAJOUS1

R210
DL AMP

C207
LISSAJOUS2

● TP-C

● TP-64B

R120
COMB2
PHASE

T102 COMB1 PHASE

● TP-64A

R117
COMB2 LEVEL

C117
NTSC NOTCH

R107
COMB1 LEVEL

FOCUS

●TP-65

C122
PAL NOTCH
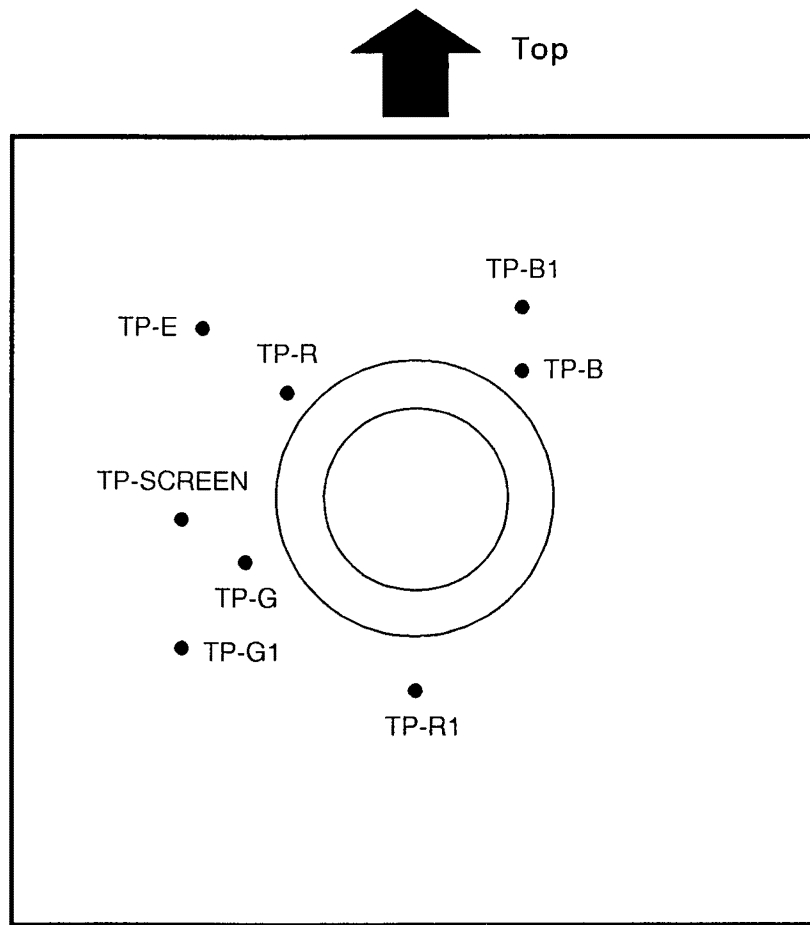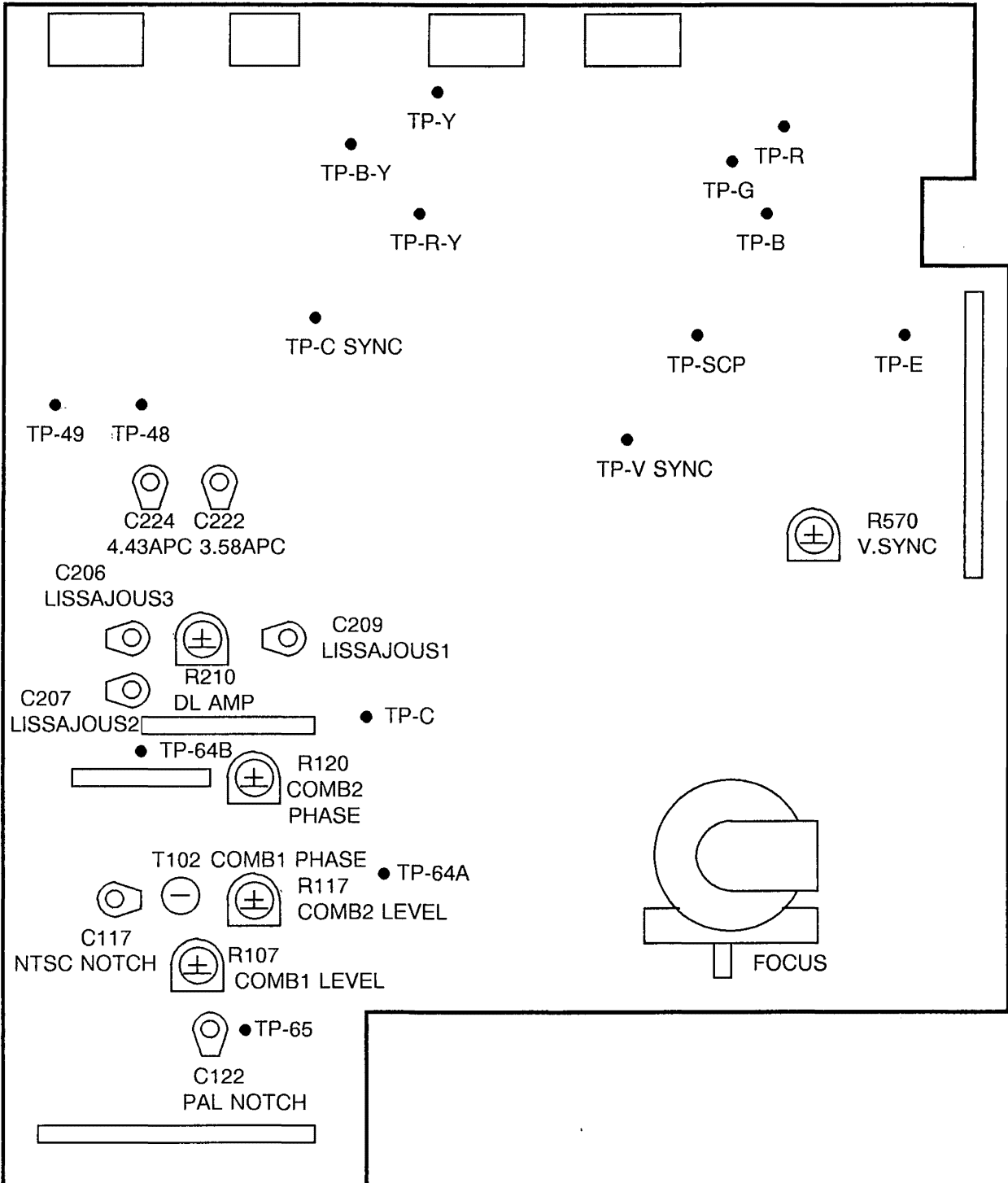
■HOW TO CHECK THE HIGH VOLTAGE HOLD CIRCUIT

1. HIGH VOLTAGE HOLD DOWN CIRCUIT

After repairing of the high voltage hold down circuit shown in Fig. 1.
This circuit shall be checked to operate correctly.

Fig. 1

11) Turn the service equipment #1 switch OFF then disconnect the equipment from the G1 connector.
12) Disconnect the service equipment #2 from the G connector then put the G connector back the original condition.

Fig. 2

2. CHECKING OF THE HIGH VOLTAGE HOLD DOWN CIRCUIT

1) Make sure that power switch is at OFF position.
2) Connect the High Voltage Meter to the CRT Anode.
3) Input the NTSC crosshatch pattern.
4) Turn the power switch ON.
5) Turn Brightness and Contrast controls to the minimum.
6) Turn the power switch OFF.
7) Remove the G connector in the Deflection PB and connect the self-making service equipment #2.
8) Connect the self-making service equipment #1 to the G1 connector than turn the power switch of the monitor ON.
   Be sure that the switch of the equipment must be OFF position.
9) Set the DC power supply 85V then turn the equipment switch ON.
10) Gradually increase the DC voltage from 85V. Confirm the High Voltage will disappear at the voltage between 27.0~29.0kV. After confirming, turn the power switch of the monitor OFF.

＊Notice
● While checking, sometimes the picture may roll vertically or the picture may be back. It is no effect to check this circuit.
● Self-making service equipments.
  ● Service equipment #1:
    The DC power supply requires to have over 1A DC current.
    Use the diode RG4C/RU30/RU3AM/RU4AM or the same type.
  ● Service equipment #2:
    The total resistance must be 660Ω.
    The total reted power (W; wattage) must be over 12W.

ADJUSTING STEP

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
B1 voltage check	Voltmeter Variable transformer	TP-B1 TP-E	R038 (B1 adj) [Power PBW]	1. Set power supply voltage to 90 V. 2. Set contrast and bright to minimum and produce a black screen. 3. Connect voltmeter between TP-B1 and TP-E. Switch on power. 4. Adjust R038 (B1 adj) to set the B1 voltage to 85.0 ± 0.2 V. 5. Set the power supply voltage to 264 V. 6. Check for B1 voltage of 85.0 ± 0.2 V. 7. Return the contrast and bright controls to the detent positions.
High voltage check	High voltage meter Signal generator (All-black signal)			1. Set the Ext Sync switch to Ext. 2. Connect a synchronization signal to Ext Sync. 3. When the raster appears, reduce the bright control. 4. Connect the high voltage meter to the anode and check for 24.0 - 25.0 KV. 5. Return the Ext Sync switch to Int.
v.deflection center	Signal generator (Resolution pattern)		D02(NTSC V SHIFT) [SERVICE MENU] R416(V CENTER) [Deflection PWB]	● Perform after purity adjustment. ● Adjust deflection yoke inclination. 1. At service menu, set D02 to 32. 2. Adjust R416 (V phase) to align the picture center with the CRT center.
Screen	Oscilloscope Signal generator (Color bar)	TP-SC	R313 (SCREEN) [Deflection PWB]	1. Connect oscilloscope to TP-SC. 2. Adjust R313 (Screen) to set the screen voltage to 450 ± 10 V.
Focus	Signal generator (Resolution pattern)		FOCUS VR [HVT]	1. Adjust the Focus VR for optimum focus where moire is not apparent. 2. Darken the picture and and adjust the focus by turning counter-clockwise from the position where focus is poor. 3. Alternately repeat the above steps to obtain the optimum position. ● Focus can be adjusted easily by displaying the menu.
H frequency	Signal generator (Resolution pattern)		D06(H SHIFT) [SERVICE MENU] S501 (H FREE SW) R503(H HOLD) [Deflection PWB]	1. At the service menu, set D06 to 32. 2. Set S501 (H Free SW) to Free. 3. Adjust screen sync with R503 (H Hold). 4. Set S501 (H Free SW) to Normal. 5. Change the signal, then return the previous signal. Confirm absence of sync disturbance.
H center (NTSC)	Signal generator (Resolution pattern)		D06(H SHIFT) [SERVICE MENU] R582(H PHASE) [Deflection PWB]	1. At the service menu, set D06 to 32. 2. Adjust R582 (H Phase) to align the picture center with the CRT center.
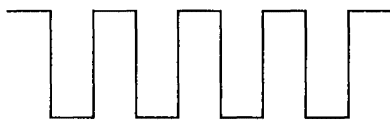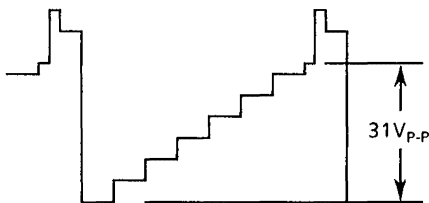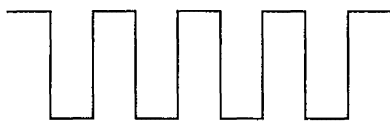
Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
HVC	Voltmeter Signal generator (All-black signal)	TP-HV	R612(HVC) [Deflection PWB]	1. Set Ext Sync to Ext and supply a horizontal sync signal input. 2. When the raster appears, reduce the Bright control. 3. Connect the voltmeter to TP-HV. 4. Adjust R612 (HVC) for 2.0 ± 0.1 V.
H gain (NTSC)	Signal generator (Resolution or crosshatch pattern)		D05(H SIZE) D21(H SIZE) D22(H SHIFT) [SERVICE MENU]	1. At the service menu, set D05 to adjust the horizontal size to 95 %. 2. Set the Scan Size to Under. 3. Set D21 to 00. 4. Set D22 to 253. 5. Return the Scan Size to normal.
H center H gain (PAL)	Signal generator (Resolution or crosshatch pattern)		D15(H SHIFT) D14(H SIZE) [SERVICE MENU]	1. Adjust D15 to align the picture center with the CRT center. 2. Adjust D14 to set the horizontal size to 95 %.
V gain, V center, V linearity (NTSC)	Signal generator (Resolution pattern)		D03(V LINEARITY) D01(V SIZE) D17(V SIZE) D19(V LINEARITY) D18(V SHIFT) [SERVICE MENU]	1. Check that the horizontal line of the video signal center is at the CRT center (if shifted, adjust R416). 2. Adjust the picture vertical linearity (scan ratio) with D03. 3. Adjust the screen top and bottom edges to 95 % with D01. 4. Set the Scan Size to Under. 5. Set D17 to 230. 6. Set D19 to 00. 7. Set D18 to 00. 8. Return the Scan Size to normal.
V gain, V center, V linearity (PAL)	Signal generator (Resolution pattern)		D11(V SHIFT) D12(V LINEARITY) D10(V SIZE) [SERVICE MENU]	1. Adjust D11 to align the video signal center with the CRT center. 2. Adjust the picture vertical linearity (scan ratio) with D12. 3. Adjust the screen top and bottom edges to 95 % with D10.
Side pincushion (NTSC/PAL)	Signal generator (Crosshatch NTSC/PAL)		D07(PIN AMP) D23(PIN AMP) D16(PIN AMP) [SERVICE MENU]	1. Adjust side pincushion with D07 so that A = B. 2. Set the Scan Size to Under. 3. Adjust side pincushion with D23 so that A = B. 4. Supply a PAL crosshatch input. 5. Return the Scan Size to normal. 6. Adjust side pincushion with D16 so that A = B.
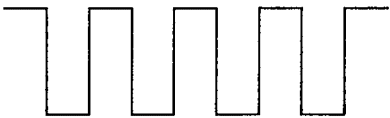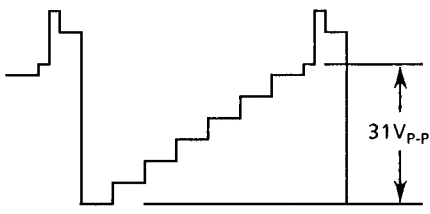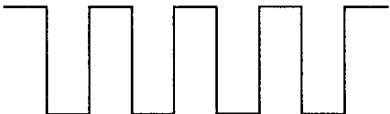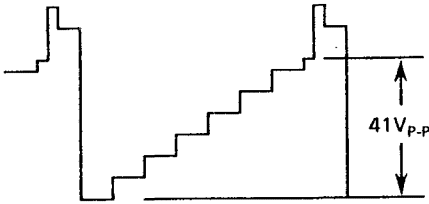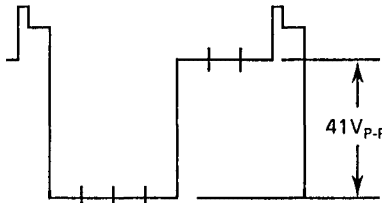
Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Comb filter (NTSC)	Oscilloscope Signal generator (Color bar)	TP-64A TP-64B	R107 (COMB1 LEVEL) T102 (COMB1 PHASE) R117(COMB2 LEVEL) R120(COMB2 PHASE) [Signal PWB]	1. Set the menu Filter Select to Comb. 2. Connect oscilloscope to TP-64A. 3. Alternately adjust R107 and T102 to minimize the chroma component. Minimize chroma component 4. Connect oscilloscope to TP-64. 5. Alternately adjust R117 and R120 to minimize the chroma component. Minimize chroma component
Notch filter	Oscilloscope Signal generator (Color bar NTSC/PAL)	TP-65	C117 (NTSC NOTCH) C122 (PAL NOTCH) [Signal PWB]	1. Set the menu Filter Select to Notch. 2. Connect oscilloscope to TP-65. 3. Adjust C117 to minimize the chroma component. 4. Supply a PAL color bar input. 5. Adjust C122 to minimize the chroma component. Minimize chroma component
Color sync (NTSC)	Signal generator (Color bar) 10 KΩ resistor Shorting fixture		C222(3.58APC) [Signal PWB]	1. Connect a 10 KΩ resistor between IC201 pin 13 and +B (12 V). 2. Connect a shorting fixture between IC201 pin 14 and ground. 3. Adjust to synchronize the color bar with C222. 4. Remove the resistor and shorting fixture. 5. Change the input signal, then return the color bar. Confirm absence of sync disturbance.

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
APC (PAL)	Oscilloscope Signal generator (Color bar, split color bar) 10 KΩ resistor 5.6KΩ resistor Shorting fixture	TP-48 TP-49	C224(4.43APC) R210(DL AMP) C206(LISSAJOUS 3) C207(LISSAJOUS 2) C209 [Signal PWB]	1. Connect a 10 KΩ resistor between IC201 pin 13 and +B (12 V). 2. Connect a shorting fixture between IC201 pin 14 and ground. 3. Connect a 5.6KΩ resistor between IC201 pin 8 and ground. 4. Adjust to synchronize the color bar with C224. 5. Remove the resistor and shorting fixture. 6. Connect an oscilloscope to TP-48 and TP-49 and display X-Y coordinates. 7. Adjust R210 and C206 to obtain the waveform indicated in the figure. If inadequate, adjust C207 and C209. 8. Supply a PAL split color bar input and adjust C224 to minimize coloration in the R-Y and B-Y components.
Pulse cross	Signal generator (Color bar NTSC/PAL)		R570(V.SYNC) [Signal PWB]	1. Set the pulse cross switch to on. 2. Adjust R570 to eliminate luminance and burst signal variation in the V blanking period. 3. Supply a PAL color bar input. 4. Confirm absence of luminance and burst signal variation in the V blanking period. 5. Again supply an NTSC color bar input and again confirm absence of luminance and burst signal variation in the V blanking period. 6. If variation is present, again adjust R570. 7. Set the pulse cross switch to off.
Chroma and phase (Video input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-B [CRT socket PWB]	S02(CHROMA) S03(PHASE) [SERVICE MENU]	1. Supply an NTSC color bar to Video A. 2. Set the menu Filter Select to Notch. 3. Connect oscilloscope to TP-B. 4. Alternately adjust S02 and S03 to obtain a straight line waveform. 5. Set Filter Select to Comb.
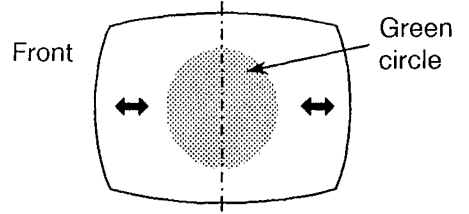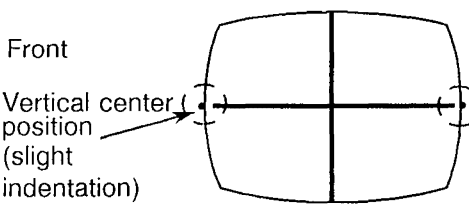
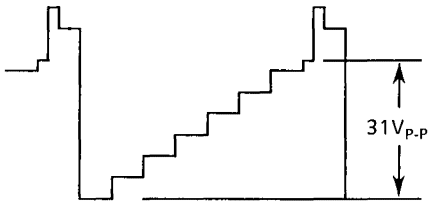| Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Contrast (Video input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-G [CRT socket PWB]	S04 (CONTRAST) [SERVICE MENU]	1. Supply an NTSC color bar input to Video A. 2. Set the Color Off switch to off. 3. Connect oscilloscope to TP-G. 4. Adjust the waveform level to 31 Vp-p with S04. 5. Set the Color Off switch to Color. $31V_{P-P}$
Chroma (Video input, PAL)	Oscilloscope Signal generator (Color bar)	TP-B [CRT socket PWB]	S05 (CHROMA) [SERVICE MENU]	1. Supply an NTSC color bar input to Video A. 2. Connect oscilloscope to TP-G. 3. Adjust S05 to obtain a straight line waveform.
Contrast (Video input, PAL)	Oscilloscope Signal generator (Color bar)	TP-G [CRT socket PWB]	S06 (CONTRAST) [SERVICE MENU]	1. Supply an NTSC color bar input to Video A. 2. Set the Color Off switch to off. 3. Connect oscilloscope to TP-G. 4. Adjust the waveform level to 31 Vp-p with S06. 5. Set the Color Off switch to Color. $31V_{P-P}$
Phase (Video input, NTSC 4.43)	Oscilloscope Signal generator (Color bar NTSC 4.43)	TP-B [CRT socket PWB]	S07 (PHASE) [SERVICE MENU]	1. Supply an NTSC 4.43 color bar input to Video A. 2. Connect oscilloscope to TP-G. 3. Adjust S07 to obtain a straight line waveform.

— 37 —

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Chroma and phase (Y/C input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-B [CRT socket PWB]	S08 (CHROMA) S09(PHASE) [SERVICE MENU]	1. Supply an NTSC color bar input to Y/C In. 2. Set the menu Filter Select to Notch. 3. Connect oscilloscope to TP-B. 4. Alternately adjust S08 and S09 to obtain a straight line waveform. 5. Set Filter Select to Comb.
Contrast (Y/C input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-G [CRT socket PWB]	S10 (CONTRAST) [SERVICE MENU]	1. Supply an NTSC color bar input to Video A. 2. Set the Color Off switch to off. 3. Connect oscilloscope to TP-G. 4. Adjust the waveform level to 31 Vp-p with S10. 5. Set the Color Off switch to Color. $31V_{P-P}$
Chroma (Y/C input, PAL)	Oscilloscope Signal generator (Color bar)	TP-B [CRT socket PWB]	S11 (CHROMA) [SERVICE MENU]	1. Supply a PAL color bar input to Video A. 2. Connect oscilloscope to TP-B. 3. Adjust S11 to obtain a straight line waveform.
Chroma (Component input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-B [CRT socket PWB]	S12 (CHROMA) [SERVICE MENU]	1. Set the menu RGB/Component to Component. 2. Supply an NTSC color bar input to Component In. 3. Connect oscilloscope to TP-B. 4. Adjust S12 to obtain a straight line waveform. 5. Return the menu RGB/Component to original setting.

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Contrast (Component input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-G [CRT socket PWB]	S13 (CONTRAST) [SERVICE MENU]	1. Set the Brightness control to minimum. 2. Set the menu RGB/Component to Component. 3. Supply an NTSC color bar input to Component In. 4. Set the Color Off switch to off. 5. Connect oscilloscope to TP-G. 6. Adjust the waveform level to 41 Vp-p with S13. 7. Set the Color Off switch to Color. 8. Return the menu RGB/Component to original setting. $41V_{P-P}$
Contrast (RGB input, NTSC)	Oscilloscope Signal generator (Color bar)	TP-G [CRT socket PWB]	S14 (CONTRAST) [SERVICE MENU]	1. Supply an NTSC color bar input to RGB In. 2. Connect oscilloscope to TP-G. 3. Adjust the waveform level to 41 Vp-p with S14. $41V_{P-P}$
Color temperature (9300 K)	Signal generator (Resolution pattern, color bar) Color analyzer or color temperature meter		W01 (R CUTOFF) W02 (G CUTOFF) W03 (B CUTOFF) W04(R DRIVE) W05(G DRIVE) W06(B DRIVE) [SERVICE MENU]	1. Supply a resolution pattern input. 2. Check that the menu Color Temp. is 9300. 3. Set the Color Off switch to off. 4. Set W01 to 18, W03 to 21, W05 to 32, and W02 to 25. 5. Adjust W04 and W06 for the specified color temperature (reference: W04 = 25, W06 = 25) (X = 0.283, Y = 0.297) 6. Supply a color bar input (black and white). 7. Check for proper white balance tracking. If deviated in the dark components, adjust with W01 and W03. ● Adjustment with color temperature meter: Apply the sensor to the CRT, adjust and measure. If deviated, repeatedly adjust and measure to obtain the specified color temperature.
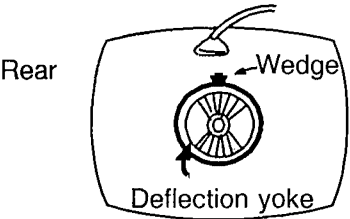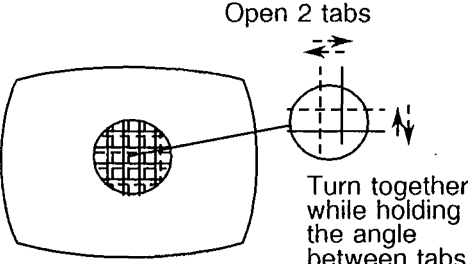
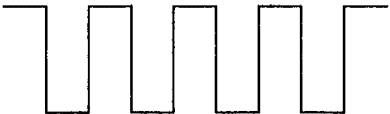| Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Color temperature (6500 K)	Signal generator (Resolution pattern, color bar) Color analyzer or color temperature meter		W07 (R CUTOFF) W09 (B CUTOFF) W10(R DRIVE) W11 (G DRIVE) W12(B DRIVE) [SERVICE MENU]	1. Supply a resolution pattern input. 2. Set the menu Color Temp. to 6500. 3. Set the Color Off switch to off. 4. Set W07 to 25, W09 to 11, and W08 to 25. 5. Set W11 to 32. 6. Adjust W10 and W12 for the specified color temperature (reference: W10 = 28, W12 = 21) (X = 0.313, Y = 0.329) 7. Supply a color bar input (black and white). 8. Check for proper white balance tracking. If deviated in the dark components, adjust with W07 and W09. 9. Return the menu Color Temp. to original setting. • Adjustment with color temperature meter: Apply the sensor to the CRT, adjust and measure. If deviated, repeatedly adjust and measure to obtain the specified color temperature.
Bright	Signal generator (Split color bar)		S01 (BRIGHT) [SERVICE MENU]	1. Adjust S01 to where the split color 0 % black component faintly brightens. 2. Supply another signal and confirm absence of black deviation.
On screen menu	Signal generator (color bar)		NTSC SETUP COMPO. LEVEL COLOR TEMP. [Menu screen]	1. Press the MENU button to display the menu screen. 2. Set the NTSC SETUP item to 7.5. 3. Set the COMPO. LEVEL item to BETA75. 4. set the COLOR TEMP. item to 6500. 5. Again press the MENU button to release the menu screen.
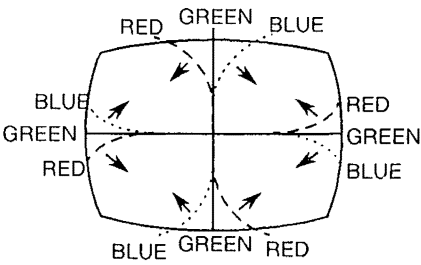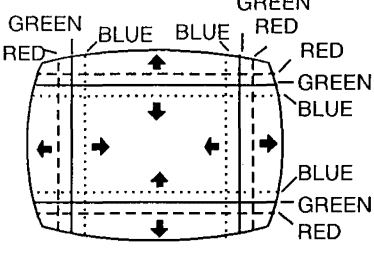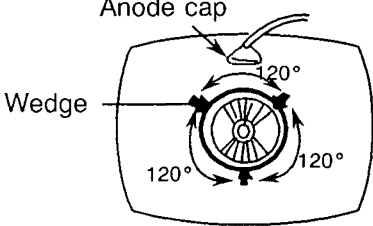
Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Purity adjustment	Degaussing coil Signal generator(green raster, red raster,blue raster , cross pattern signals)		Purity magnets Convergence magnets	1. Be sure to degauss using the degaussing coil. 2. Carefully remove the wedges. 3. Peel the adhesive from the 6 magnets to allow turning the magnets. 4. Supply an green raster signal input. 5. Loosen the deflection yoke securing screw and ,slide the yoke fully rearward to produce a red circle display. 6. Overlap the long with short tabs of the 2 purity magnets and position these horizontally.

(Example)   Yv, Ybh, Yht controls

Deflection yoke   DY securing screw

Wedges (3)   4 pole convergence magnets

Adhesiv

Magnet lock

6 pole convergence magnets

Purity magnets

(Fig.1)

Note: Do not disturb Yv, Ybh and Yht controls.

*Set the 2 purity magnets horizontally.

Long-short   Short-long

Align horizontally

(Fig.2)

7. Adjust the rotational angle between the tabs to produce a green circle at the center of the screen.

Front   Green circle

Set the green area at the

(Fig.3)

8. Supply a cross pattern input and check for deviation of the vertical center position.If deviated, while maintaining the angle between the tabs, rotate the magnets to center the vertical position to the extent possible.

Front

Vertical center position (slight indentation)

Set the indentations near the horizontal line(tolerance about ± 5 mm)

(Fig.4)

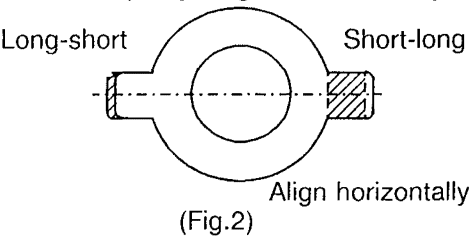| Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
				9. Repeat steps 7 and 8. 10. Supply an all green signal input and shift the deflection yoke forward to where he overall screen is a green single color. 11. Also check the red and blue single color rasters. 12. Suitably tighten the deflection yoke securing screw to prevent forward to rearward shifting.
Static (center) convergence adjustment	Signal generator(crosshatch)		Deflection yoke Wedges Convergence magnets	1. Supply a crosshatch pattern input. 2. Move the deflection yoke up, down, left and right to roughly adjust the perimeter convergence.Temporarily secure with one wedge at the top. (Fig.5) 3. Use the 4 pole magnets to overlap red and blue at the picture center to produce magenta. 4. Use the 6 pole magnets to overlap the green lines with the magenta. 5. If required, repeat steps 1 and 2. (Fig.6)

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Dynamic (perimeter) convergence adjustment	Signal generator(crosshatch)		Wedges Deflection yoke	1. Supply a crosshatch pattern input. 2. Remove the wedge temporarily securing the deflection yoke. 3. Wobble the deflection yoke vertically and set the convergence deviation as indicated in Fig.7.Again temporarily secure by inserting a wedge at the top. 4. Wobble the deflection yoke left and right and set the convergence deviation as indicated in Fig.8. 5. Alternately repeat steps 2 and 3 and adjust for minimum convergence deviation. Front Arrow directions when yoke is tilted upward (opposite directions when tilted downward) (Fig.7) Front Arrow directions when yoke is tilted rightward (opposite directions when tilted leftward) (Fig.8)
After completing convergence adjustment	Double sided tape Adhesive		Wedges Magnet lock	1. Insert the wedges as shown in Fig.9. Anode cap Wedge Securing with 3 wedges (Fig.9) Note: Double sided tape is applied to the wedges.Peel off the covering to secure.Do not reuse old wedges, replace them. Wedge part number: CE40764-00A 2. Tighten the deflection yoke securing screw. 3. Apply adhesive to secure the 6 magnets as indicated in Fig.1.

Schematic Diagram and P.C. Boards

■NOTE ON USING CIRCUIT DIAGRAMS

1.SAFETY

The components identified by the ⚠ symbol and shading are critical for safety. For continued safety replace safety critical components only with manufactures recommended parts.

2.SPECIFIED VOLTAGE AND WAVEFORM VALUES

The voltage and waveform values have been measured under the following conditions.

(1)Input signal	:NTSC Color bar signal (Composite Video / Input A)
(2)Setting positions of each knob/button and variable resistor	:Original setting position when shipped
(3)Internal resistance of tester	:DC 20kΩ/V
(4)Oscilloscope sweeping time	:H ⇒20µS/div
	:V ⇒5mS/div
	:Others ⇒ Sweeping time is specified
(5)Voltage values	:All DC voltage values

* Since the voltage values of signal circuit vary to some extent according to adjustments, use them as reference values.

3.INDICATION OF PARTS SYMBOL[EXAMPLE]

●In the PW board   :R1209→R209

4.INDICATIONS ON THE CIRCUIT DIAGRAM

(1)**Resistors**

●Resistance value

No unit	:[Ω]
K	:[KΩ]
M	:[MΩ]

●Rated allowable power

No indication	:1/6[W]
Others	:As specified

●Type

No indication	:Carbon resistor
OMR	:Oxide metal film resistor
MFR	:Metal film resistor
MPR	:Metal plate resistor
UNFR	:Uninflammable resistor
FR	:Fusible resistor

* Composition resistor 1/2 [W] is specified as 1/2S or Comp.

(2)**Capacitors**

●Capacitance value

1or higher	:[pF]
less than 1	:[µF]

●Withstand voltage

No indication	:DC50[V]
Others	:DC withstand voltage[V]
AC indicated	:AC withstand voltage[V]

* Electrolytic Capacitors
47/50[Example]:Capacitance value[µF]/withstand voltage[V]

●Type

No indication	:Ceramic capacitor
MY	:Mylar capacitor
MM	:Metalized mylar capacitor
PP	:Polypropylene capacitor
MPP	:Metalized polypropylene capacitor
MF	:Metalized film capacitor
TF	:Thin film capacitor
BP	:Bipolar electrolytic capacitor
TAN	:Tantalum capacitor

(3)**Coils**

No unit	:[µH]
Others	:As specified

(4)**Power Supply**

▬▬▬▬▬	:B1(85V)
▬▬▬▬▬	:B2(12V)
⌐⌐⌐⌐	:5V
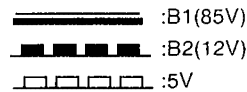
* Respective voltage values are indicated.

(5)**Test Point**

●	: Test point
○	: Only test point display

(6)**Connecting method**

□	: Connector
○	: Wrapping or soldering
→>— →>‖—	: Receptacle

(7)**Ground symbol**

⊥	: LIVE side ground
⊥	: ISOLATED(NEUTRAL) side ground
⏚	: EARTH ground
▽	: DIGITAL ground
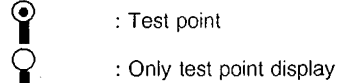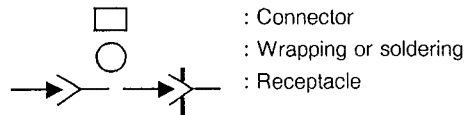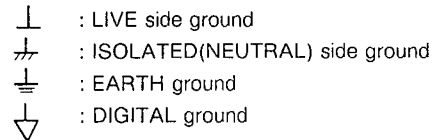
5.NOTE FOR REPAIRING SERVICE

This model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : ($\perp$) side GND and the ISOLATED(NEUTRAL) : ($\not\perp$) side GND. Therefore, care must be taken for the following points.
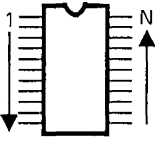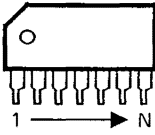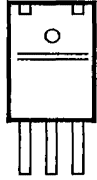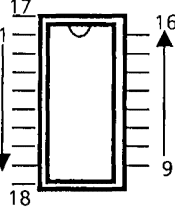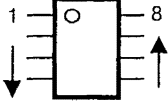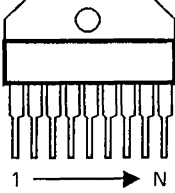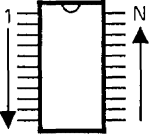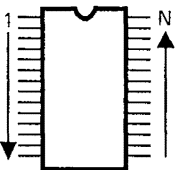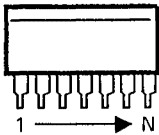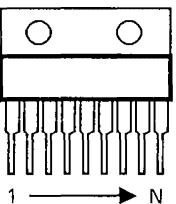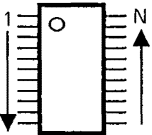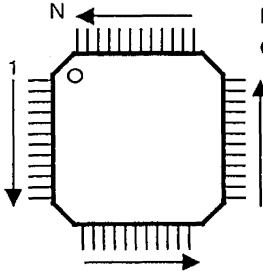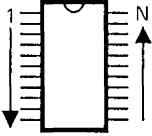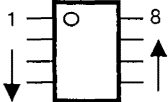
(1) Do not touch the LIVE side GND or the LIVE side GND and the ISOLATED(NEUTRAL) side GND simultaneously. If the above caution is not respected, an electric shock may be caused. Therefore, make sure that the power cord is surely removed from the receptacle when, for example, the chassis is pulled out.

(2) Do not short between the LIVE side GND and ISOLATED(NEUTRAL) side GND or never measure with a measuring apparatus (oscilloscope, etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND at the same time. If the above precaution is not respected, a fuse or any parts will be broken.
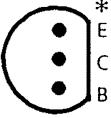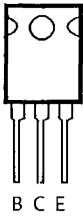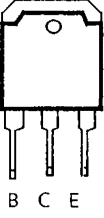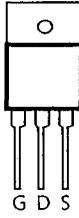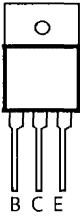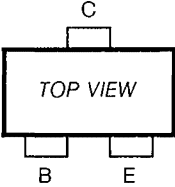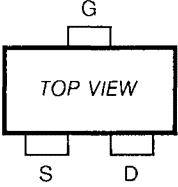
◇ **Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.**

■ SEMICONDUCTOR SHAPES
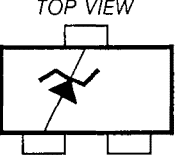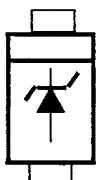
● IC

TC4053BP TC4066BP HD74LS04P TC4538BP HD74LS05P HD74LS00P AN5640	LA7016	AN7808 AN7812F TA79012S AN7805F IN E OUT
HA11423	NJM4560D μPC358 ST24BM-1400	μPC1498H
FA5301P	TDA4680 TDA4670 AN5625N	μPC358HA
AN5265	MB90077PF-109	(Flat package IC) MB89647PF-125 CXD2018Q
(Flat package IC) HD74HC32FP HD74HC158FP	(Flat package IC) μPC4558G-W	

● TRANSISTOR

[Bottom View] ＊E C B 2SC1740S(R) 2SC3311A(Q)-T	＊E C B [Bottom View] 2SC3334 2SA1321 2SC1472K 2SA1370(E) 2SA562TM 2SC3187-T 2SC1959(Y) 2SA1309 2SC1815(YG)-T	2SC4632 B C E
2SC4589-C1 B C E	2SD1408 2SD1409 B C E	2SK1118 G D S
2SC4544 B C E	2SC4502 E C B	(CHIP TRANSISTOR) C TOP VIEW B E 2SC2712(YG) 2SA1162(YG)
(CHIP FET) G TOP VIEW S D 2SK374(Q)		

● DIODE

(CHIP DIODE) TOP VIEW MA3056(L)-W MA3150(M)-W MA151K-W	(CHIP DIODE) TOP VIEW MA8054-W MA8130-W	

■ ALIGNMENT LOCATION

● SIGNAL PWB (PARTS SIDE)

FRONT

TP-Y

TP-B-Y

TP-R
TP-G
TP-R-Y
TP-B

TP-C SYNC

TP-SCP   TP-E

TP-49   TP-48

TP-V SYNC

C224   C222
4.43APC 3.58APC

R570
V.SYNC

C206
LISSAJOUS3

C209
LISSAJOUS1

R210

C207   DL AMP

LISSAJOUS2

● TP-C

● TP-64B
R120
COMB2
PHASE

T102 COMB1 PHASE
R117
COMB2 LEVEL

● TP-64A

C117
NTSC NOTCH

R107
COMB1 LEVEL

FOCUS

●TP-65

C122
PAL NOTCH

● DEFLECTION PWB (PATTERN SIDE)

TOP

⊕ R313 SCREEN

• TP-SC

⊕ R612 HVC

• TP-B1

• TP-HV

R582
⊕ H PHASE

⊕ R503 H HOLD

⊕ R416 V CENTER

←H FREE→

NORMAL FREE

S501

● POWER PWB (PATTERN SIDE)

TOP

F001

⊕ R038 B1 ADJ

• TP-B1

• TP-E

■ BLOCK DIAGRAM

CRT PB

- VIDEO A
- VIDEO B
- From MPU
- IC 201 VIDEO A/B SWITCH

- PAL — Q113, Q114, Q116, Q118 — CHROMA TRAP — PAL Y
- DL101, DL102, Q104~9 — COMB FILTER — NTSC Y
- Q117, Q110, Q111 — AMP, BUFFER
- From MPU
- IC101 — SWITCH — Q118 — BUFFER — Y
- TP-65
- Q305, Q301, Q302 — PULSE CROSS

- Q303, Q306, Q309, Q312 — R. OUT
- Q301, Q304, Q307, Q310 — B. OUT
- Q302, Q305, Q308, Q311 — G. OUT
- CRT
- HV
- FOCUS
- SCREEN
- IK

- FUSE — LINE FILTER LF001
- AC INLET

- Q301 — BUFFER — C
- Y/C
- Q203, Q206 — BUFFER — Y

- Q201, Q202, T201 — CHROMA BPF
- PAL C
- NTSC C
- SWITCH — NTSC C — Q201, Q203 — BUFFER
- IC202
- from MPU
- NTSC/PAL C
- IC 201 — CHROMA PROCESSOR
- Q204, Q205 — AMP, BUFFER — B-Y
- AMP, BUFFER — R-Y
- Q206, Q207

- IC 305 — SWITCH
- IC 402 — VIDEO PROCESSOR
- R / G / B
- Q002, Q003 — SWITCHING DRI
- Q001 — BUFFER
- SW. REGULATOR
- POWER C

- IC 701 RGB/COMPONENT SWITCH
- Q706 — BUFFER
- G/Y
- B/B-Y
- R/R-Y
- Q712, Q713, Q714 — AMP, BUFFER — B-Y
- Q707, Q708, Q709 — AMP, BUFFER — R-Y
- Q717 — BUFFER — G
- Q719 — BUFFER — B
- BUFFER — R — Q718
- Q361, Q362 — PULSE CROSS
- Q331, Q332 — PULSE CROSS
- IC304 — SWITCH
- Q364 — BUFFER — B-Y
- Q334 — BUFFER — R-Y
- R/G/B
- IC401 — APERTURE & DELAY
- G on sync
- From MPU

- V. SAW MODULE PB
- IC 001 — V. GENERATOR
- PARABOLA OUT
- IC403 (2/2) — AMP — IC 301 — AMP
- Q510, Q511, Q504, Q507 — DIODE MODULATOR AMP.

- DEG. COIL
- POWER PB

- SWITCH — Y
- IC501
- Q704 — BUFFER — SYNC
- From MPU

- AUDIO A (For VIDEO A) — Q601 — BUFFER
- AUDIO B (For VIDEO B) — Q602 — BUFFER
- AUDIO C (For RGB/COMP.) — Q603 — BUFFER
- AUDIO SWITCH
- From MPU

- Q515, Q501, Q502 — AMP, BUFFER
- Q503 ~ Q512 — SYNC. SEPARATION
- TP-C SYNC
- Q514 — AMP
- Q513 — AMP
- IC507 — DELAY
- IC502 — DELAY
- IC509 — SWITCH
- From MPU
- I²C BUS

- FREE RUN SW
- Q402 — BUFFER
- IC403 (1/2) — AMP — IC401 — V. OUT
- IC501 H. AFC H. OSC
- Q501, T502 — H. DRIVE — H. OUT
- D. MODULATOR
- L502 — H. LINEARITY
- FBT T701
- FOCUS PACK
- HV To CRT ANODE
- FOCUS To CRT PB
- ABL
- B1 From POWER PB

- IC601 — AUDIO AMP. — SPEAKER
- SIGNAL PB
- To IC402
- REMOTE ENABLE
- CONTROL 1-1
- CONTROL 1-2
- INPUT SEL.
- INVERTER — IC 801
- TALLY LED
- TALLY/EXT. CONTROL

- SIGNAL PB
- DEFLECTION PB
- SIGNAL PB
- I²C BUS
- I²C BUS
- DY
- H V

- INPUT PB

- REMOTE CONTROL RX UNIT
- EXT. CONTROL
- CONTROL SIGNALS
- I²C BUS
- KEY SCANS
- FRONT CONTROLS
- MICRO PROCESSOR IC 101
- I²C MEMORY IC103
- MEMORY IC102
- ON-SCREEN
- R G B
- ON-SCREEN
- Q201~Q210

- FRONT PB
- MICOM (MPU) PB

CRT PB

Q303, Q306, Q309, Q312 — R. OUT
Q301, Q304, Q307, Q310 — B. OUT
Q302, Q305, Q308, Q311 — G. OUT

CRT
HV
FOCUS
SCREEN
1K

From MPU
IC101 — SWITCH
Q118 — BUFFER
TP-65
Y
Q305, Q301, Q302 — PULSE CROSS

T201 BPF
NTSC C
Q201, Q203 — BUFFER
NTSC C

Q204, Q205 — AMP, BUFFER — B-Y
Q206, Q207 — AMP, BUFFER — R-Y

IC304 — SWITCH
Q364 — BUFFER — B-Y
Q334 — BUFFER — R-Y

IC305 — SWITCH
B-Y
R-Y
IC402 — VIDEO PROCESSOR
R G B
From MPU

IC401 — APERTURE & DELAY
I²C BUS

R
G
B
1K

V. SAW MODULE PB

IC 001 — V. GENERATOR
PARABOLA OUT
IC403 (2/2) — AMP
IC301 — AMP
Q510, Q511, Q504, Q507 — DIODE MODULATOR AMP.

Q515, Q501, Q502 — AMP, BUFFER
TP-C SYNC
Q503 ~ Q512 — SYNC. SEPARATION
Q514 — AMP
Q513 — AMP
IC507 — DELAY
IC502 — DELAY
IC509
SWITCH
From MPU
I²C BUS
FREE RUN SW

Q402 — BUFFER
V
IC403 (1/2) — AMP
IC401 — V. OUT
IC501 — H. AFC, H. OSC
Q501, T502 — H. DRIVE
H. OUT

D. MODULATOR
L502 — H. LINEARITY
B1 From POWER PB

FBT T701
FOCUS PACK
HV To CRT ANODE
FOCUS To CRT PB
ABL
DY
H V

SIGNAL PB
DEFLECTION PB
SIGNAL PB

SPEAKER
To IC402

I²C MEMORY
IC103

CONTROL SIGNALS
I²C BUS
ON-SCREEN

MICOM (MPU) PB

POWER PB — **LIVE** — **ISOLATED**

POWER SWITCH
FUSE
LINE FILTER LF001
LINE FILTER LF002
D001
T001 SW. TRANSFORMER
+130V To CRT PB
+15V To DEFLECTION PB
-15V
AC INLET

Q002, Q003 — SWITCHING DRIVE
Q004 — SWITCHING OUT
Q001 — BUFFER
Q008 — OVER CURRENT PROTECTOR
B1
B1 ADJ.

SW. REGULATOR
V. REF
PWM
OSC.
VOLTAGE FEED BACK
POWER CONTROL IC001
SYNC
SYNC
From FBT (HEATER)

DEG. COIL
DEGAUSSING CONTROL
+15V
RELAY DRIVE Q012
From MPU

POWER PWB PATTERN DIAGRAM (FX-9042A)

FRONT CONTROL PWB CIRCUIT DIAGRAM / PATTERN DIAGRAM (FX-4039A)

POWER PWB CIRCUIT DIAGRAM

POWER PB ASS'Y
⑨ ⓪ FX-9042A (1/2)

AC INLET ASS'Y

POWER PB ASS'Y
FX-9042A (2/2)

CRT SOCKET PB ASS'Y

DEF PB ASS'Y

DEF PB ASS'Y

■ NOTICE
OPT: No part mounted

LIVE (⏚)   ISOLATED (⏚)
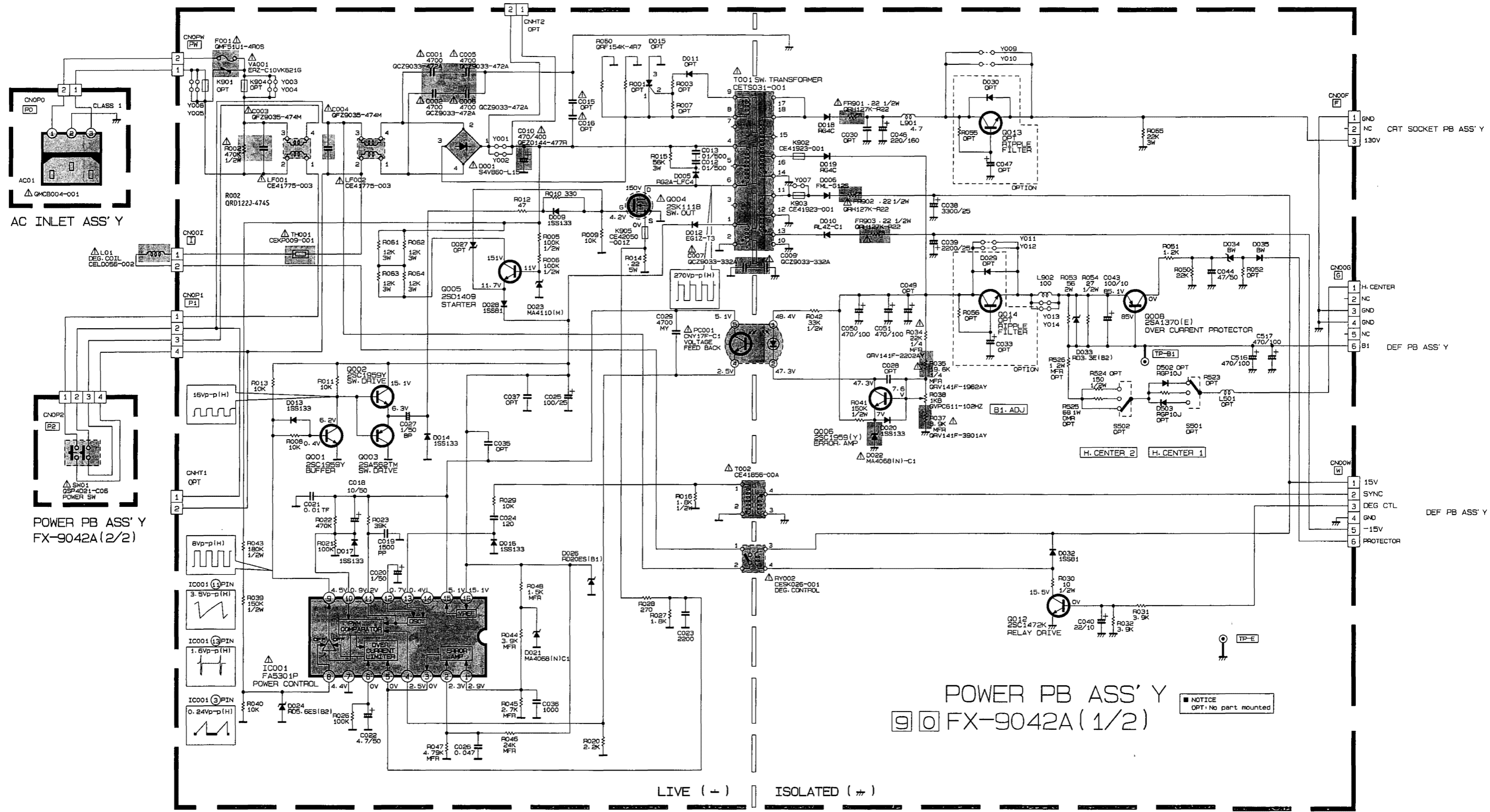
INPUT PWB PATTERN DIAGRAM (FX-6047A)
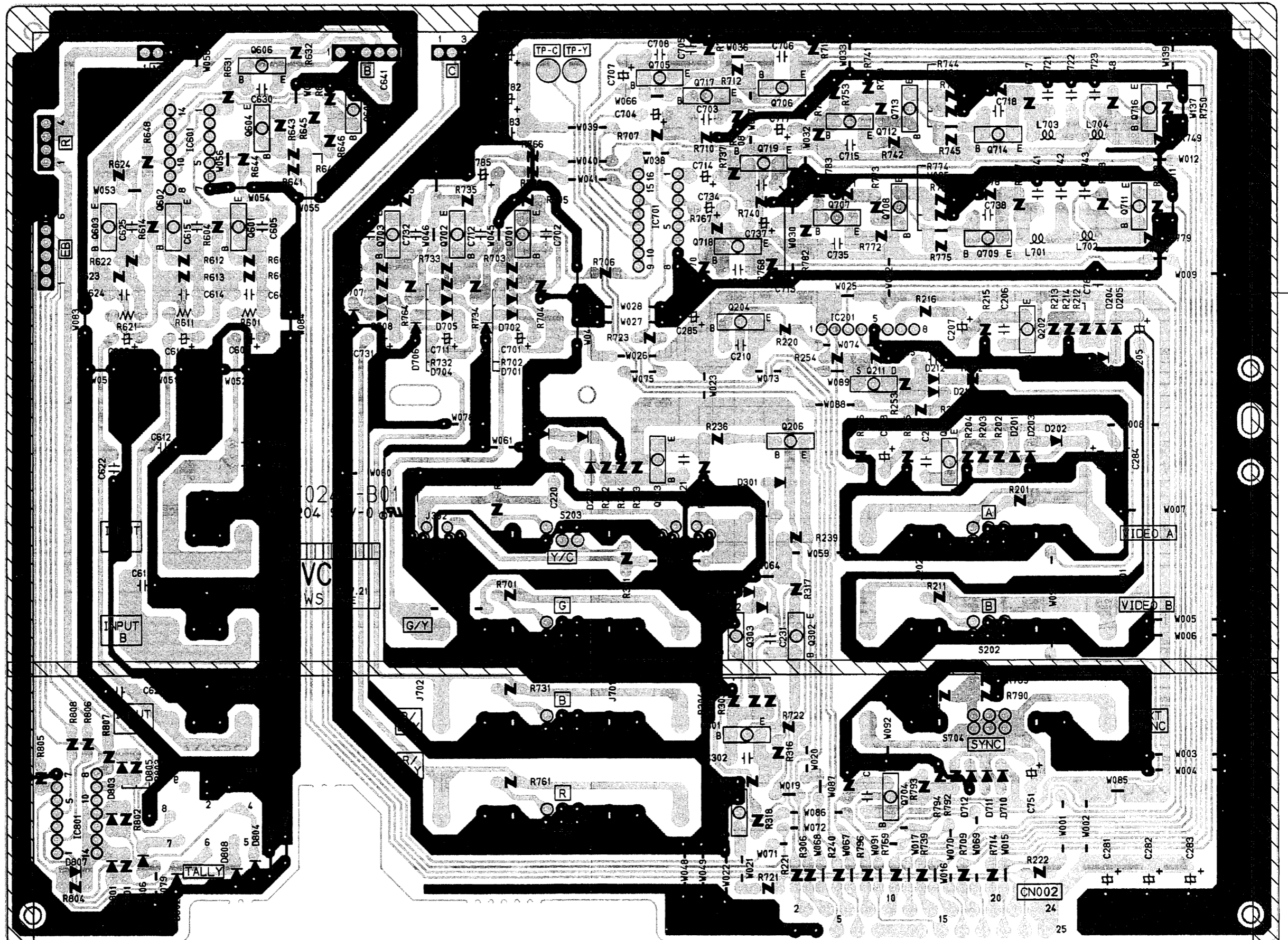
INPUT PWB CIRCUIT DIAGRAM
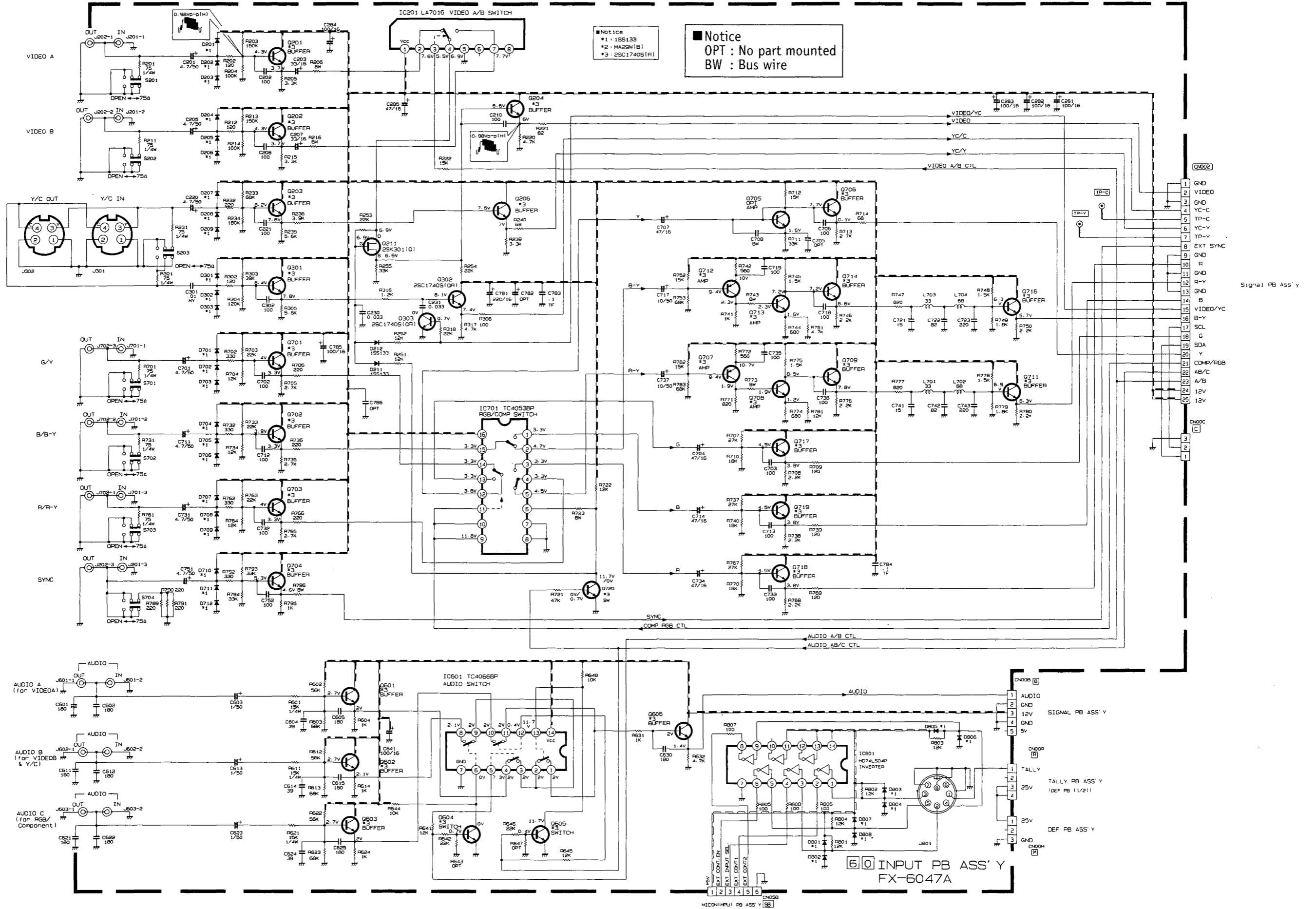
MICOM (MPU) PWB PATTERN DIAGRAM (FX-5015A)
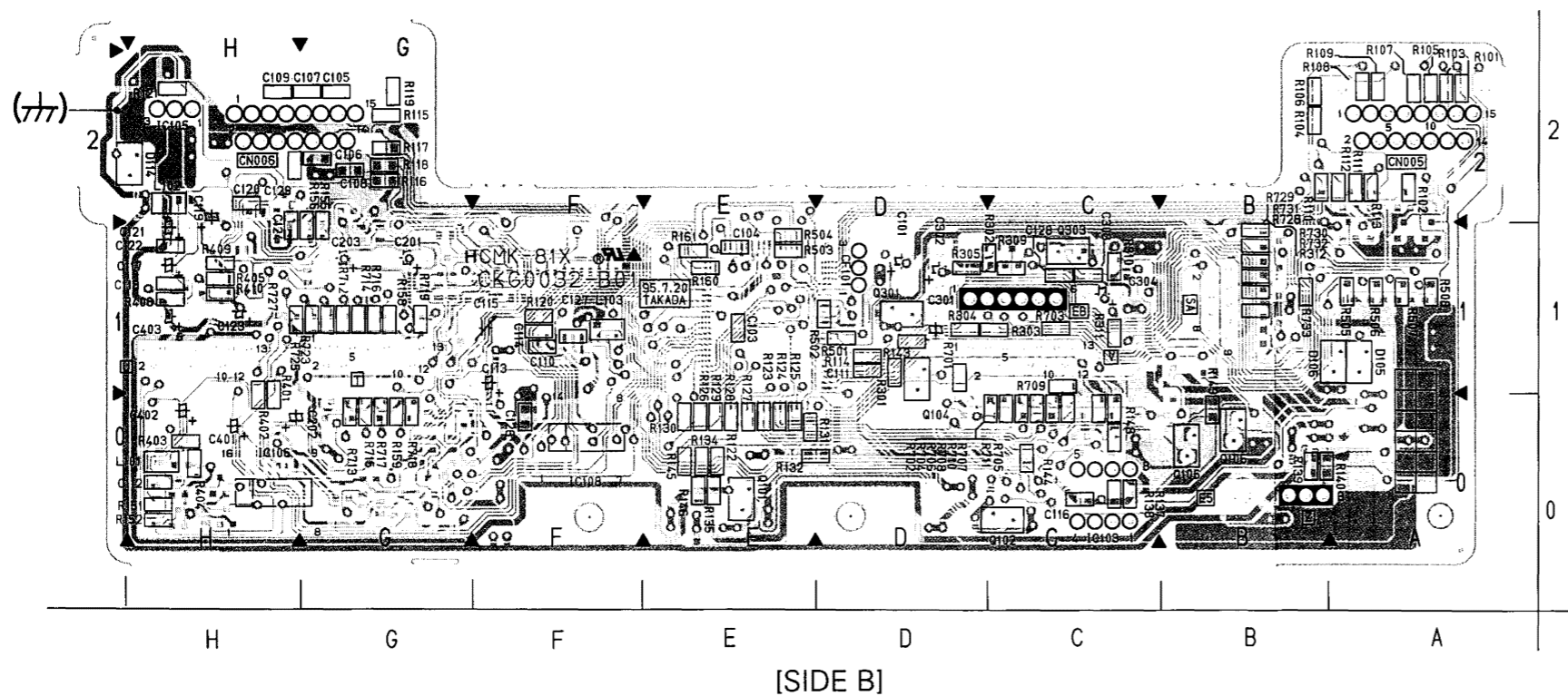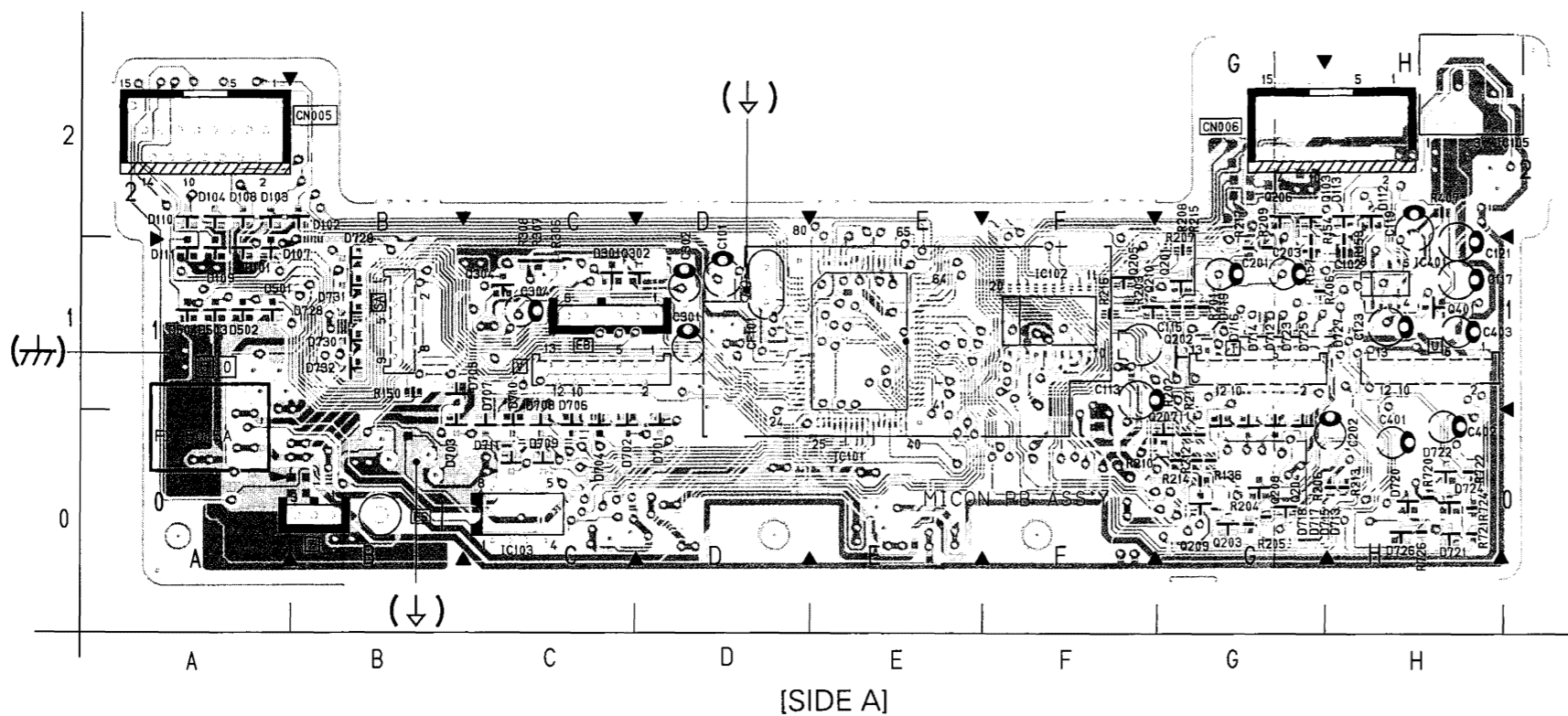
[SIDE A]

[SIDE B]

■ ADDRESS TABLE

SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE
C102	H1	A	D724	H0	A	R127	E0	B	R405	H1	B
C103	E1	B	D725	G1	A	R128	E0	B	R406	G1	B
C104	E1	B	D726	H0	A	R129	E0	B	R407	H2	A
C105	G2	B	D727	H1	A	R130	E0	B	R408	H1	B
C106	G2	B	D728	B1	A	R131	E0	B	R409	H1	B
C107	G2	B	D729	B1	A	R132	E0	B	R410	H1	B
C108	G2	B	D730	B1	A	R134	E0	B	R501	D1	B
C109	H2	B	D731	B1	A	R135	E0	B	R502	D1	B
C110	F1	B	D732	B1	A	R136	G0	A	R503	E1	B
C111	D1	B	IC101	E1	A	R137	C0	B	R504	E1	B
C112	H0	B	IC102	F1	B	R138	C0	B	R505	A1	B
C114	F1	B	IC106	H0	B	R139	B0	B	R506	A1	B
C116	C0	B	IC108	F0	B	R140	B0	B	R507	A1	B
C118	H1	B	IC401	H1	B	R143	D1	B	R508	A1	B
C120	H2	B	L101	H0	B	R144	C0	B	R701	D1	B
C122	H1	B	L102	H2	B	R145	E0	B	R702	C0	B
C124	H1	B	L103	F1	B	R146	E0	B	R703	C1	B
C126	F0	B	Q101	E0	B	R148	C0	B	R704	C0	B
C127	F1	B	Q102	C0	B	R149	B0	B	R705	C0	B
C128	C1	B	Q103	G2	A	R150	B1	B	R706	C0	B
C129	H2	B	Q104	D1	B	R151	H0	B	R707	C0	B
C303	C1	B	Q105	B0	B	R152	H0	B	R708	C0	B
D101	A1	A	Q106	B0	B	R153	H1	B	R709	C1	B
D102	B2	A	Q201	G1	A	R154	G1	B	R710	C0	B
D103	A2	A	Q202	G1	A	R155	G1	B	R711	C0	B
D104	A2	A	Q203	G0	A	R156	G1	B	R712	G1	B
D105	A1	B	Q204	G0	A	R157	G1	B	R713	G0	B
D106	A1	B	Q205	F1	A	R158	G1	B	R714	G1	B
D107	A1	A	Q206	G2	A	R159	G0	B	R715	G1	B
D108	A2	A	Q207	G0	A	R160	E1	B	R716	G1	B
D109	A1	A	Q208	G0	A	R161	E1	B	R717	G0	B
D110	A1	A	Q209	G0	A	R201	G1	A	R718	G0	B
D111	A1	A	Q210	F1	A	R202	G0	A	R719	G1	B
D112	H2	A	Q301	D1	B	R203	F1	A	R720	H0	A
D113	H2	A	Q302	D1	A	R204	G0	A	R721	H0	A
D114	H2	B	Q303	C1	A	R205	G0	A	R722	H0	A
D301	C1	A	Q304	C1	A	R206	H0	A	R723	G1	B
D501	A1	A	Q401	H1	A	R207	G1	A	R724	H0	A
D502	A1	A	R101	A2	A	R208	G1	A	R725	G1	B
D503	A1	A	R102	A2	B	R209	G1	A	R726	H0	A
D504	A1	A	R103	A2	A	R210	G0	A	R727	H1	B
D701	D0	A	R104	B2	B	R211	G0	A	R728	B1	B
D702	C0	A	R105	A2	B	R212	G0	A	R729	B1	B
D703	B0	A	R106	B2	A	R213	H0	A	R730	B1	B
D704	C0	A	R107	A2	A	R214	G0	A	R731	B1	B
D705	B1	A	R108	A2	B	R215	G1	A	R732	B1	B
D706	C0	A	R109	A2	B	R216	F1	A	R733	B1	B
D707	C0	A	R110	B2	B	R217	G1	A			
D708	C0	A	R111	A2	B	R301	D1	B			
D709	C0	A	R112	A2	B	R302	C1	B			
D710	C0	A	R113	A2	B	R303	D1	B			
D711	C0	A	R114	D1	B	R304	D1	B			
D712	G1	A	R115	G2	B	R305	D1	B			
D713	G0	A	R116	G2	B	R306	C1	B			
D714	G1	A	R117	G2	B	R307	C1	A			
D715	G0	A	R118	G2	B	R308	C1	A			
D716	G1	A	R119	G2	B	R309	C1	B			
D717	G0	A	R120	F1	B	R310	C1	B			
D718	G0	A	R121	H2	B	R311	C1	B			
D719	G1	A	R122	E0	B	R312	B1	B			
D720	H0	A	R123	E0	B	R401	H0	B			
D721	H0	A	R124	E0	B	R402	H0	B			
D722	H0	A	R125	E0	B	R403	H0	B			
D723	G1	A	R126	E0	B	R404	H0	B			

※This table shows only chip components

IC101 MB89647PF-125 MPU

(SOFT WARE : IS101 CED80213-00D)

RESET

NOTICE
OPT : NO PART MOUNTED

IC102 MB90077PF-109 ON-SCREEN

IC106 HD74HC158FP

IC108 HD74HC32FP

INPUT PB ASS'Y

FRONT PB ASS'Y

VOLTAGE DIFFRENCE LIST

IC101 PIN NO.	NTSC	PAL
28	0V	4.8V
31	0.5V	4.6V
32	4.5V	0V
33	4.5V	0.3V
34	0V	4.7V
36	0V	4.9V
46	4.9V	0V
53	11.6V	0V

Q105		
B	1V	0V
C	8.4V	0V

MICOM(MPU) PB ASS'Y   FX-5015A

MICOM (MPU) PB ASS'Y   FX-5015A

SIGNAL PWB PATTERN DIAGRAM (FX-1072A)

Y/C SEPARATOR **CHROMA** **ARATOR**

CKF0241-B01-1
CMK-81X

JVC
PWS 95. 7.21 TIJIMA

FBT

Heater

■ ADDRESS TABLE

SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE	SYMBOL No.	ADDRESS	SIDE
C102	D7	B	C569	H2	B	Q507	I6	B	R140	C8	B	R313	L7	B	R507	I8	B
C103	D7	B	C570	H1	B	Q508	I7	B	R141	C8	B	R314	M6	B	R508	I7	B
C104	C8	B	C571	I2	B	Q509	H6	B	R142	E8	B	R315	K8	B	R509	I7	B
C105	C8	B	C575	I7	B	Q510	I6	B	R143	E8	B	R316	L8	B	R510	H8	B
C106	D8	B	C602	N2	B	Q511	I6	B	R144	C9	B	R317	L8	B	R511	I8	B
C107	D8	B	C606	N1	B	Q512	J7	B	R145	E9	B	R318	L7	B	R512	I7	B
C108	D8	B	C611	N2	B	Q513	I6	B	R146	E8	B	R319	M6	B	R513	I7	B
C109	D8	B	D101	E8	B	Q514	I6	B	R147	C9	B	R320	M6	B	R514	I7	B
C110	D8	B	D201	H6	B	Q515	I8	B	R148	C8	B	R321	M6	B	R515	I7	B
C111	E7	B	D202	H6	B	Q551	I1	B	R149	F6	B	R322	M7	B	R516	I7	B
C112	D7	B	D203	G6	B	R002	D9	B	R150	E6	B	R331	K8	B	R517	I7	B
C113	D7	B	D451	L2	B	R003	D9	B	R151	B7	B	R332	K8	B	R518	I7	B
C115	D9	B	D452	N4	B	R004	D7	B	R201	G6	B	R333	K8	B	R519	I6	B
C116	D9	B	D453	L4	B	R005	E6	B	R202	F6	B	R334	K8	B	R520	H6	B
C118	C8	B	D454	K4	B	R006	E8	B	R203	E8	B	R335	L8	B	R521	I6	B
C121	C8	B	D455	K5	B	R008	H8	B	R204	F5	B	R336	L8	B	R522	I6	B
C123	C8	B	D456	L5	B	R010	K6	B	R205	F5	B	R337	L8	B	R523	I6	B
C124	E7	B	D501	I7	B	R011	J6	B	R206	F6	B	R338	L8	B	R524	I6	B
C125	D7	B	D502	I5	B	R012	J6	B	R207	F7	B	R339	L7	B	R525	I7	B
C201	F6	B	D554	H2	B	R013	M6	B	R208	F7	B	R340	K8	B	R526	I7	B
C202	F6	B	Q101	D7	B	R015	J8	B	R209	F8	B	R341	K7	B	R527	I7	B
C203	F7	B	Q102	D8	B	R020	I3	B	R211	G7	B	R342	L6	B	R528	I6	B
C204	G8	B	Q103	D8	B	R021	H2	B	R212	G7	B	R343	K7	B	R529	J7	B
C205	F8	B	Q104	D7	B	R022	H4	B	R213	F7	B	R344	L6	B	R530	I6	B
C208	F7	B	Q105	D7	B	R023	H1	B	R214	F7	B	R345	L6	B	R531	H6	B
C210	F7	B	Q106	D7	B	R024	H4	B	R215	F6	B	R346	L6	B	R532	H5	B
C211	F8	B	Q107	D7	B	R025	H4	B	R216	F6	B	R361	J8	B	R533	I6	B
C212	G8	B	Q108	E7	B	R026	I4	B	R217	G7	B	R362	J8	B	R534	I6	B
C213	G7	B	Q109	E8	B	R027	J4	B	R218	H6	B	R363	K8	B	R535	I6	B
C217	G6	B	Q110	E9	B	R028	H4	B	R219	G6	B	R364	J8	B	R536	I6	B
C220	G6	B	Q111	D9	B	R029	J4	B	R220	G7	B	R365	K8	B	R537	I6	B
C221	H7	B	Q112	C9	B	R030	J4	B	R221	G7	B	R366	K8	B	R538	I8	B
C223	H7	B	Q113	C8	B	R031	K3	B	R222	G7	B	R367	K8	B	R539	I8	B
C225	G7	B	Q114	C8	B	R033	M4	B	R223	G8	B	R368	K8	B	R540	I6	B
C226	G8	B	Q115	C9	B	R034	B9	B	R224	G8	B	R369	K7	B	R541	I6	B
C227	G8	B	Q116	C8	B	R035	B9	B	R225	G8	B	R370	J8	B	R542	I6	B
C228	G8	B	Q117	E8	B	R036	B9	B	R226	G8	B	R371	J7	B	R543	K4	B
C229	G8	B	Q118	C8	B	R037	B9	B	R227	G8	B	R372	K7	B	R544	L4	B
C230	H8	B	Q201	F6	B	R038	B9	B	R228	G8	B	R373	J7	B	R545	M5	B
C231	G8	B	Q202	E6	B	R051	F6	B	R229	G8	B	R374	K6	B	R546	J3	B
C234	H6	B	Q203	G5	B	R052	F7	B	R230	G8	B	R375	K6	B	R547	L2	B
C235	H6	B	Q204	G8	B	R053	M4	B	R231	G8	B	R376	K6	B	R548	I7	B
C237	G6	B	Q205	H8	B	R055	F7	B	R232	H7	B	R381	K7	B	R551	H4	B
C238	G6	B	Q206	H8	B	R056	N3	B	R233	H8	B	R382	K6	B	R552	I4	B
C239	F5	B	Q207	H8	B	R057	F7	B	R234	H8	B	R383	J6	B	R553	H3	B
C240	G5	B	Q208	H6	B	R058	F7	B	R235	G8	B	R401	K4	B	R554	H3	B
C242	F6	B	Q209	G7	B	R101	D7	B	R236	G8	B	R402	K5	B	R555	H4	B
C309	L8	B	Q210	F6	B	R102	D7	B	R237	H5	B	R403	K4	B	R556	J2	B
C382	J7	B	Q212	H5	B	R103	D8	B	R238	H6	B	R404	K4	B	R558	H4	B
C383	K6	B	Q301	L8	B	R104	C8	B	R239	H6	B	R405	K4	B	R559	H3	B
C402	L5	B	Q302	N8	B	R105	D8	B	R240	H6	B	R406	L3	B	R560	J2	B
C452	K3	B	Q303	N8	B	R106	C8	B	R241	G6	B	R407	L4	B	R561	J2	B
C453	K3	B	Q304	N6	B	R108	D8	B	R242	G6	B	R408	L4	B	R562	J2	B
C454	K3	B	Q305	L8	B	R109	D7	B	R243	G6	B	R409	L4	B	R563	J3	B
C462	K3	B	Q306	J6	B	R110	D7	B	R244	G6	B	R410	L4	B	R564	J3	B
C467	I1	B	Q307	M7	B	R111	D8	B	R245	G6	B	R451	K4	B	R565	J3	B
C469	K2	B	Q308	M7	B	R112	D7	B	R246	G6	B	R453	K4	B	R566	H2	B
C470	I1	B	Q331	K8	B	R113	D7	B	R247	G6	B	R454	K3	B	R567	H2	B
C502	I7	B	Q332	L8	B	R114	D8	B	R248	H5	B	R455	K3	B	R568	H1	B
C505	H7	B	Q333	L8	B	R115	D8	B	R249	H5	B	R456	K4	B	R569	H1	B
C508	I8	B	Q334	L6	B	R116	D7	B	R250	F6	B	R457	K4	B	R571	H1	B
C509	I6	B	Q361	J8	B	R118	D7	B	R251	F6	B	R458	K3	B	R572	I2	B
C511	I6	B	Q362	K8	B	R119	D7	B	R252	G7	B	R459	K3	B	R573	I4	B
C512	I6	B	Q363	K8	B	R121	E7	B	R253	G7	B	R460	I1	B	R574	J4	B
C513	I6	B	Q364	K6	B	R122	E8	B	R254	H6	B	R461	I0	B	R575	I1	B
C514	I8	B	Q451	L3	B	R123	D6	B	R255	G6	B	R462	K2	B	R576	I4	B
C516	I7	B	Q452	K3	B	R124	E7	B	R256	H6	B	R463	K2	B	R577	H2	B
C517	H8	B	Q453	K3	B	R125	D8	B	R257	H6	B	R464	K2	B	R578	H2	B
C552	I1	B	Q454	K3	B	R126	E8	B	R258	H7	B	R465	K2	B	R579	L2	B
C553	I4	B	Q455	L4	B	R127	D7	B	R259	H7	B	R466	K2	B	R580	I4	B
C555	H4	B	Q456	L4	B	R128	E8	B	R260	H6	B	R467	K2	B	R581	G7	B
C556	H4	B	Q457	L4	B	R129	E8	B	R301	L8	B	R469	I6	B	R582	H1	B
C557	J2	B	Q458	L4	B	R130	E9	B	R302	L8	B	R470	L4	B	R583	I1	B
C558	J2	B	Q459	L4	B	R131	D9	B	R303	L8	B	R471	L4	B	R601	N1	B
C559	H4	B	Q460	L4	B	R132	D9	B	R304	L8	B	R472	L4	B	R602	N1	B
C561	H3	B	Q461	L4	B	R133	D9	B	R305	L8	B	R473	L4	B	R603	N1	B
C562	J2	B	Q501	I8	B	R134	C8	B	R306	M8	B	R474	L2	B	R604	N1	B
C563	J2	B	Q502	I8	B	R135	C8	B	R307	M8	B	R501	I8	B	R605	N1	B
									R308	M8	B	R502	I8	B	R606	N3	B

CKF0241-B01-1
GMK-81X

JVC
PWS
95.7.21
IIJIMA

FBT

PCB layout — CKF0241-B01-1 / GMK-81X / JVC PWS 95.7.21 IIJIMA / FBT / PULSE GENERATOR / Heater / COL / ABL

Grid reference (top to bottom): 6 5 4 3 2 1 0
Grid reference (left to right): H G F E D C B A

Component location table (chip components)

Ref	Loc		Ref	Loc		Ref	Loc		Ref	Loc		Ref	Loc		Ref	Loc	
C211	F8	B	Q107	D7	B	R025	H4	B	R216	G7	B	R361	J8	B	R533	I6	B
C212	G8	B	Q108	E7	B	R026	I4	B	R217	G7	B	R362	J8	B	R534	I6	B
C213	G7	B	Q109	E8	B	R027	J4	B	R218	H6	B	R363	K8	B	R535	I6	B
C217	G6	B	Q110	E9	B	R028	H4	B	R219	G6	B	R364	J8	B	R536	I6	B
C220	G6	B	Q111	D9	B	R029	J4	B	R220	G7	B	R365	K8	B	R537	I6	B
C221	H7	B	Q112	C9	B	R030	J4	B	R221	G7	B	R366	K8	B	R538	I8	B
C223	H7	B	Q113	C8	B	R031	K3	B	R222	G7	B	R367	K8	B	R539	I8	B
C225	G7	B	Q114	C8	B	R032	M4	B	R223	G8	B	R368	K8	B	R540	I6	B
C226	G8	B	Q115	C9	B	R033	M4	B	R224	G8	B	R369	K7	B	R541	I6	B
C227	G8	B	Q116	C8	B	R034	B9	B	R225	G8	B	R370	J8	B	R542	I6	B
C228	G8	B	Q117	E8	B	R035	B9	B	R226	G8	B	R371	J7	B	R543	K4	B
C229	G8	B	Q118	C8	B	R036	B9	B	R227	G8	B	R372	K7	B	R544	L4	B
C230	H8	B	Q201	F6	B	R037	B9	B	R228	G8	B	R373	J7	B	R545	M5	B
C231	G8	B	Q202	E6	B	R038	B9	B	R229	G8	B	R374	K6	B	R546	J3	B
C234	H6	B	Q203	G5	B	R051	F6	B	R230	G8	B	R375	K6	B	R547	L2	B
C235	H6	B	Q204	G8	B	R052	F7	B	R231	G8	B	R376	K6	B	R548	I7	B
C237	G6	B	Q205	G8	B	R053	G6	B	R232	H8	B	R381	K7	B	R551	H4	B
C238	G6	B	Q206	H8	B	R055	F7	B	R233	H8	B	R382	K6	B	R552	I4	B
C239	F5	B	Q207	H8	B	R056	M3	B	R234	G8	B	R383	J6	B	R553	H3	B
C240	G5	B	Q208	H6	B	R057	F7	B	R235	G8	B	R401	K4	B	R554	H3	B
C242	F6	B	Q209	G7	B	R058	F7	B	R236	G8	B	R402	K5	B	R555	H4	B
C309	L8	B	Q210	F6	B	R101	D7	B	R237	H5	B	R403	K4	B	R556	J2	B
C382	J7	B	Q212	H5	B	R102	D7	B	R238	H6	B	R404	K4	B	R558	H4	B
C383	K6	B	Q301	L8	B	R103	D8	B	R239	H6	B	R405	K3	B	R559	J2	B
C402	L5	B	Q302	M8	B	R104	C8	B	R240	H6	B	R406	L3	B	R560	J2	B
C452	K3	B	Q303	M8	B	R105	D8	B	R241	G8	B	R407	L4	B	R561	J2	B
C453	K3	B	Q304	M6	B	R106	C8	B	R242	G6	B	R408	L4	B	R562	J2	B
C454	K3	B	Q305	L8	B	R108	D8	B	R243	G6	B	R409	L4	B	R563	J3	B
C462	K3	B	Q306	J6	B	R109	D7	B	R244	G6	B	R410	L4	B	R564	J3	B
C467	I1	B	Q307	M7	B	R110	D7	B	R245	G6	B	R451	K4	B	R565	J3	B
C469	K2	B	Q308	M7	B	R111	D8	B	R246	F6	B	R453	K3	B	R566	H2	B
C470	I1	B	Q331	K8	B	R112	D7	B	R247	G6	B	R454	K3	B	R567	H2	B
C502	I7	B	Q332	L8	B	R113	D7	B	R248	H5	B	R455	K2	B	R568	H1	B
C505	H7	B	Q333	L8	B	R114	D8	B	R249	H5	B	R456	K4	B	R569	H1	B
C508	I8	B	Q334	L6	B	R115	D8	B	R250	F6	B	R457	K4	B	R571	H1	B
C509	I6	B	Q361	J8	B	R116	D7	B	R251	F6	B	R458	K3	B	R572	I2	B
C511	I6	B	Q362	K8	B	R118	D7	B	R252	G7	B	R459	K3	B	R573	I4	B
C512	I6	B	Q363	K8	B	R119	E7	B	R253	G7	B	R460	I1	B	R574	J4	B
C513	I6	B	Q364	K6	B	R121	E7	B	R254	H6	B	R461	I0	B	R575	I1	B
C514	I8	B	Q451	L3	B	R122	E8	B	R255	G6	B	R462	K2	B	R576	I4	B
C516	I7	B	Q452	K3	B	R123	D6	B	R256	H6	B	R463	K2	B	R577	H2	B
C517	H8	B	Q453	K3	B	R124	E8	B	R257	H6	B	R464	K2	B	R578	H2	B
C552	I1	B	Q454	K3	B	R125	D8	B	R258	H7	B	R465	K2	B	R579	L2	B
C553	I4	B	Q455	L4	B	R126	E8	B	R259	H7	B	R466	K2	B	R580	I4	B
C554	H4	B	Q456	L4	B	R127	D7	B	R260	H6	B	R469	I6	B	R581	G7	B
C555	I4	B	Q457	L4	B	R128	E8	B	R301	L8	B	R470	L4	B	R582	H1	B
C556	H4	B	Q458	L4	B	R129	E8	B	R302	L8	B	R471	L4	B	R583	I1	B
C557	J2	B	Q459	L4	B	R130	E9	B	R303	L8	B	R472	L4	B	R601	M1	B
C558	J2	B	Q460	L4	B	R131	D9	B	R304	L8	B	R473	L4	B	R602	M1	B
C559	H4	B	Q461	L4	B	R132	D9	B	R305	L8	B	R474	L2	B	R603	M1	B
C561	H3	B	Q462	L3	B	R133	D9	B	R306	M8	B	R501	I8	B	R604	M1	B
C562	J2	B	Q501	I7	B	R134	C8	B	R307	M8	B	R502	I8	B	R605	M1	B
C563	J2	B	Q502	I8	B	R135	C8	B	R308	M8	B	R503	I7	B	R606	M3	B
C564	J3	B	Q503	I8	B	R136	C8	B	R309	L7	B	R504	I8	B			
C565	J3	B	Q504	I7	B	R137	C8	B	R310	L8	B	R505	I8	B			
C566	J3	B	Q505	I7	B	R138	C8	B	R311	L7	B	R506	I8	B			
C568	H2	B	Q506	I7	B	R139	C8	B	R312	L7	B						

※This table shows only chip components

SIGNAL PWB CIRCUIT DIAGRAM

SIGNAL PB ASS'Y
FX-1072A

CHROMA

NTSC

SYNC SEPARATOR

PULSE GENERATOR

DEFLECTION PWB PATTERN DIAGRAM (FX-2033A)

高圧注意 CAUTION CL004

JVC PWS 95.7.21 AKIBA

CN003
15   10   5   1

R435   W218   D603

R439   R401   CL005   X2   W219
B Q405 E   R33   W229   3   1   24   25

R438   R607   R221   20
R437   W226   W227   W228

IC408   IN OUT   C408   W005   CN001
15

W230   W006   W231 W232
W233   10
W234
R565
Q402   W235   R434
B C E   W236   C Q601   2

IC401
8   5   1   W007   R608

W008   W237   W238
R417   C412   C614   W239   D308
C406   W240   D309

D402   W009   W241   CMK-54XT
R415   CL003   C603

H002   R521   Q502   C Q503 B E

D505   C532   D504   D501   C523   C525

D511   W103 W104   W105   W203 W204   HV   R422   C410   D406

W201 W202   W217   D310   Q302 B E   R436 R317

W205   D705   R712   R316   W222   R420   W223   R320

CL015   W206   T502   R318 R319

C519   TP-B   W207 W208   H001

C518 C520   L502   R532   W101 W102

T505   L501   C513   B C E Q501   R518   D305 R318   Q304   C415   R417   C412

R519   C528   IC555 IN OUT   C406   C414

C704   W210   D402   C416   D407 D408   R405   D405   C402   R542

C538 C514   D709 R710 R713 W123 W124   C533   R419   W211   IC406 IN E OUT   V CENTER   Q401   R413 R410 W002

C537 C526   R520 W010   R709 R708   D703 Q701 B C E   C421   IC404 IN OUT   R416   D401   R406   R402 R403

W011 R548   C702   R530 W212 W213   W214   W215   R407 R408   C411   R411 R412 R404   C413   C417

FR704   W125 W126 W127   W320 W321   IC403   R428   C409   W343   NORMAL   S501

FR525 R550   D706 R515   D704   W128 W305 W308   D711   W319   W322   W348 W349 W350 W351 W352   R517   R430   R421 R429   IC405 IN OUT   R564

CKF0061-C04-1/3 CMK-54XT

CKF0061-C04 2/3 CMK-54XT

CKF0061-C04 3/3 CMK-54XT

JVC
PWS   95.7.21
AKIBA

CL015
TP-B
T502
L502
T505
L501
C518 C519 C520
W101 W102
R532

HV1
HV2
CL006

NORMAL ▶ FREE
H FREE
V CENTER
H HOLD
H PHASE
TP-HV

DEFLECTION PWB CIRCUIT DIAGRAM
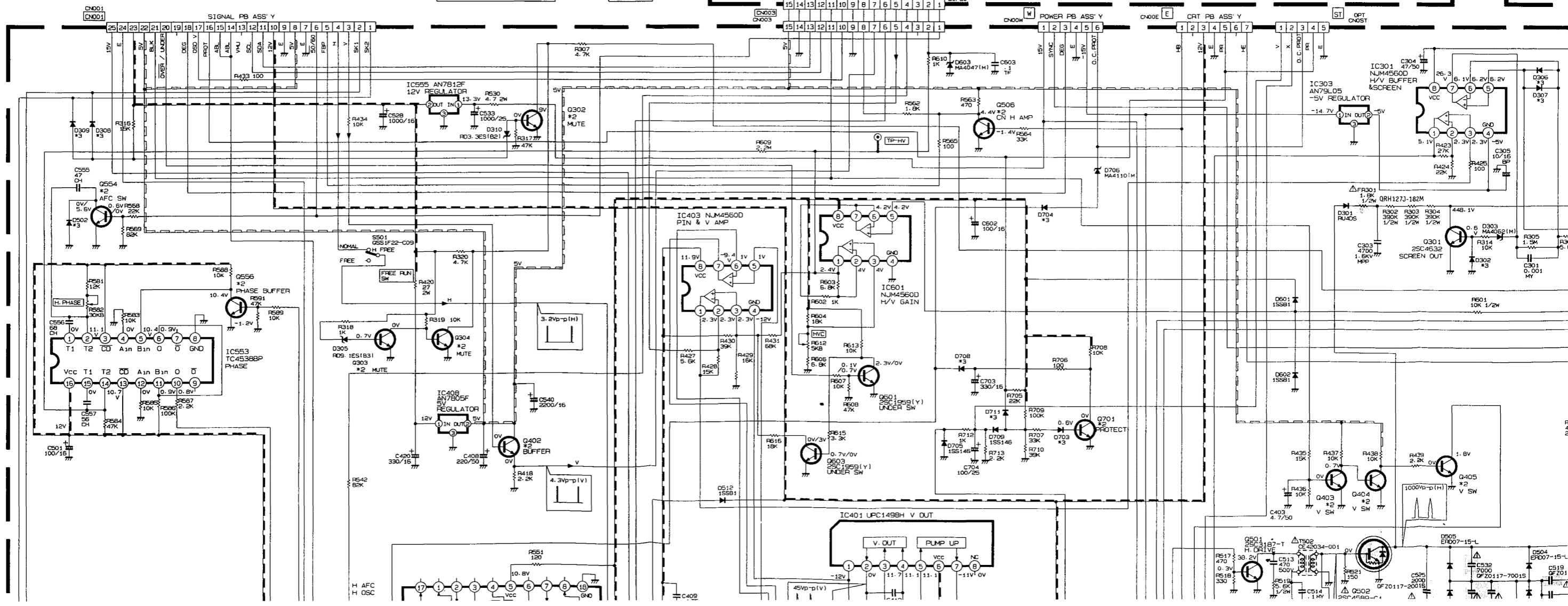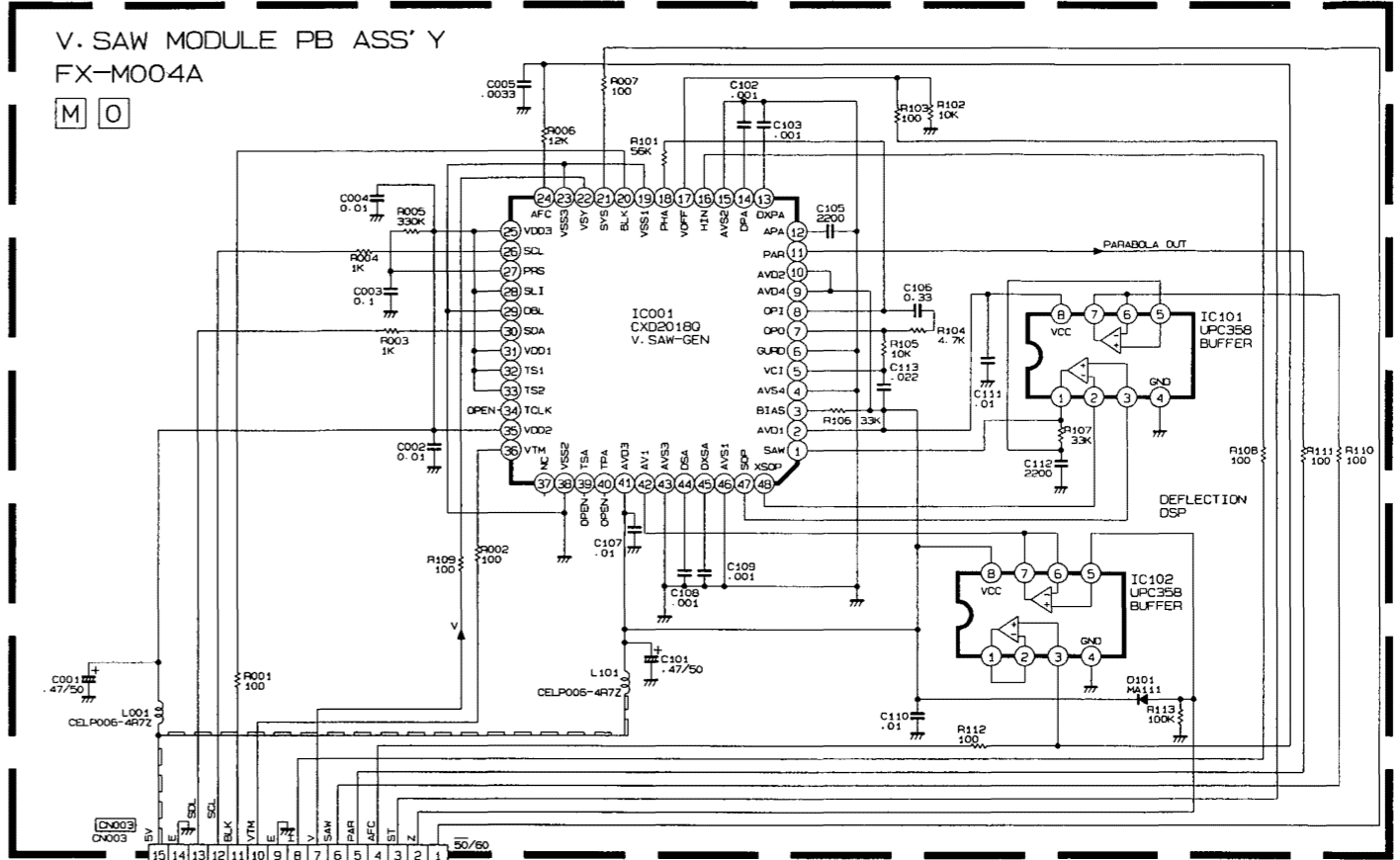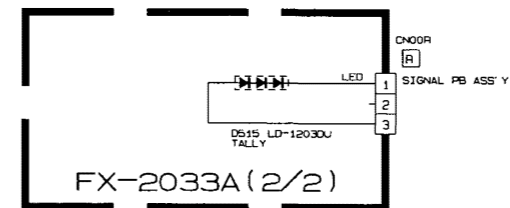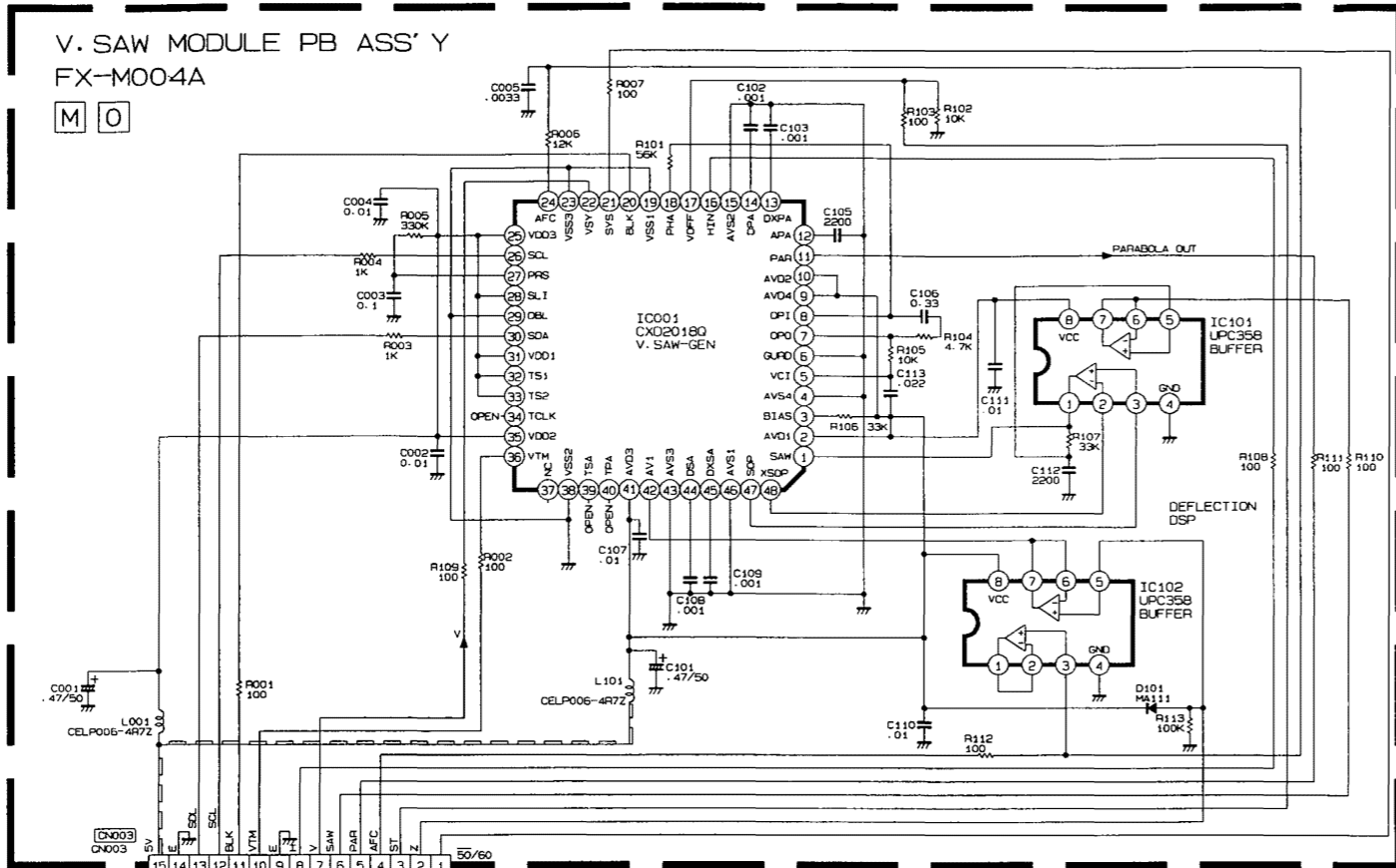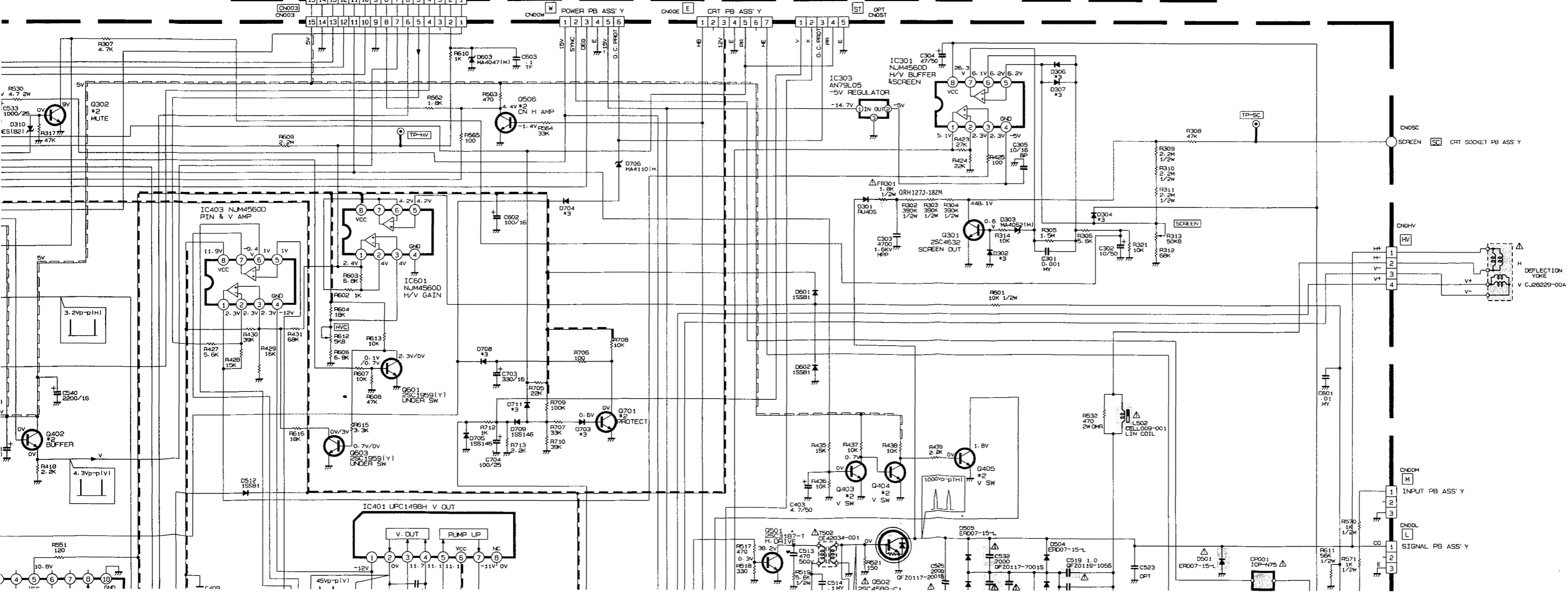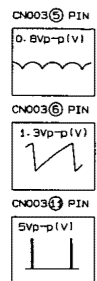
DEFLECTION PB ASS'Y ② ⓪ FX-2033A(1/2)

CRT SOCKET CIRCUIT DIAGRAM / PATTERN DIAGRAM (FX-3037A)

⚠ PICTURE TUBE

M4BJBY02X/C

CRT SOCKET
PB ASS'Y
FX-3037A

⚠ PICTURE TUBE

M4BJBY02X/C

HEATER
GND
R
G
B

TP-G
SG501 OPT   TP-R

G1
G2

R326 680 1/2S
SG502 OPT   SG503 OPT
R327 680 1/2S
⚠ CRT SOCKET CE42446-001

HV

L305 18
TP-G1

L306 22

R311 10K 2W   R314 10K 2W
Q311 2SC3334   137.7V
81.3V
79.7V

R312 10K 2W   R315 10K 2W
Q312 2SC3334   137.7V
85.1V   84V

TP-R1

FOCUS

R502 1K 1/2S
C501 1/250
D501 RGP10J(C1)
D502 RGP10J(C1)
R501 1M 1/2S
R503 470K 1/2S
TP-SCREEN

SCREEN
CNOSC
SC

L302 4.7
D311 BW   R317 BW
D308 1SS120   R320 BW
79.7V
Q308 2SA1321   80.6V
6.7V

L303 3.9
L501 5.6mH

D312 BW   R318 BW
D309 1SS120   R321 BW
Q309 2SA1321   84V   85.1V
6.7V

R507 8.2K 2W

C505 .56/400
C502 BW   R504 BW

C322 OPT
Q305 2SC4544
R323 1K 1/4W
D149J -102S

11.2V G

11.2V R
R324 1K 1/4W
D306 1SS244
Q306 2SC4544
11.2V
QAD149J-102S

R506 270K

C323 OPT

D504 1SS146   116.4V
Q501 2SC1505(MLK)
-0.3V

CRT EARTH

3.4V
Q302 2SC4502
2.6V
D302 MA165

C302 220

3.2V
Q303 2SC4502
2.5V
D303 MA165

Q502 OPT

C509 OPT
R508 1BK
D503 1SS146 C506 560

R305 180   R308 BW
R343 3.3K
R306 180   R309 BW
C303 180

R509 4.7K
D505 OPT
R511 OPT

C508 OPT

CNODS
FBT SCREEN
R520 2.2M 1/2S
ORANGE

Q503 OPT

C504 OPT   R505 OPT   R510 OPT
C507 OPT

Q314 OPT   R337 BW   R329 OPT   D314 BW   C314 OPT
Q315 OPT   R330 OPT   D315 BW   C315 OPT
R334 BW
R335 OPT
TP-E

D506 OPT

075(M)

(777)

CKF0062-001 CMK-81X ®🆄▲

R307   C301   D301   R341
R328   C313
R304   Q301   D304
W011   B   E
W010 R301
D313
R334   R504
C501

Q304
C321
D307
D310   R310
D502
W005
R501
C5

Q307   Q310
R322   R316   L301
R319   L304
TP-B

D310   R310
TP-B1   R313
R325
505   R506
SB

C324
R507   L501
002
C504   Q501
502   B   E
W001
C509
R505
C508   R511
E D503   D503
R510
C507

R503
SG5   R520   512
502   R511

TP-SCREEN
SG502   R326
SC

TP-G
R502
C322   D308
Q305   R311
L302   TP-G1
W008   R314
D311   R317   Q309 Q312
R320   Q311   L305
Q308   R321 R306   R318
C323   L303
D302 D306   R312   TP-R1
R342   R343   Q306
W009   R302   Q303   D309
E Q302   R303 D312   R336
R315
L307   L306

D305   D501   W025
W006
C316
SB

R503

CRT
EARTH

R327

GND
EAR

W015

W023
W024
DS

003

L305

D505
R510
C507
R511
512

F   W016   W

W022
W020
W021   R332   R331

3   7   E

R323
R324   R337   R314
R338   Q302   R302
R303

POWER PB ASS'Y

3
2
1

L307 BW

CE42446-001

TP-B1

TP-G1

TP-R1

FOCUS

SCREEN

CNOSC
SC

TP-SCREEN

C501 1/250

R502 1K 1/2S

D501 RGP10J(C1)
D502 RGP10J(C1)

R503 470K 1/2S

C503 1000

C502 BW

R504 BW

C324 OPT

R310 10K 2W
R313 10K 2W
Q310 2SC3334
137.7V
89.3V
86.8V

L304 22
L301 5.6

R311 10K 2W
R314 10K 2W
Q311 2SC3334
137.7V
81.3V
79.7V

L305 18
L302 4.7

R312 10K 2W
R315 10K 2W
Q312 2SC3334
137.7V
85.1V
84V

L306 22
L303 3.9

L501 5.6mH

C505 .56/400

R501 1M 1/2S

R506 270K

C321 1/250
D310 BW
D307 1SS120
R316 BW
R319 BW

88.7V

D304 1SS244
Q304 2SC4544
11.2V
Q307 2SA1321
86.8V
6.7V

R322 1K 1/4W
QRD149J -102S

B

D305 1SS244
Q305 2SC4544
11.2V
D311 BW
D308 1SS120
R317 BW
R320 BW
Q308 2SA1321
80.5V
6.7V
C322 OPT

R323 1K 1/4W
QRD149J -102S

G

D306 1SS244
Q306 2SC4544
11.2V
D312 BW
D309 1SS120
R318 BW
R321 BW
Q309 2SA1321
85.1V
84V
6.7V
C323 OPT

R324 1K 1/4W
QRD149J -102S

R

R507 8.2K 2W

D504 1SS146
116.4V
Q501 2SC1505(MLK)

CRT EARTH

48Vp-p(H)

SIGNAL PB ASS'Y

CNOOK
K

B 8
GND 7
G 6
GND 5
R 4
GND 3
Ik 2
1

2.55Vp-p(H)

R301 150

R302 150

R303 150

R512 BW

D301 MA165
3.1V
Q301 2SC4502
2.4V

R341 3.3K

C301 220

R304 180
R307 BW

D302 MA165
3.4V
Q302 2SC4502
2.6V

R342 3.3K

C302 220

R305 180
R308 BW

D303 MA165
3.2V
Q303 2SC4502
2.5V

R343 3.3K

C303 180

R306 180
R309 BW

C509 OPT
Q502 OPT

C508 OPT

R509 4.7K
D505 OPT
D503 1SS146
R511 OPT
C507 OPT

C506 560
R508 18K

Q503 OPT

C504 OPT
R505 OPT
R510 OPT

-0.3V

CNODS
1

FBT SCREEN
ORANGE

R520 2.2M 1/2S

CRT SOCKET PB ASS'Y
FX-3037A
3 0

R332 OPT
R331 1K
Q313 OPT
R328 OPT
C313 OPT

D313 BW

Q314 OPT
R337 BW
R329 OPT
C314 OPT

D314 BW

Q315 OPT
R330 OPT
C315 OPT

D315 BW
R334 OPT

R335 OPT

TP-E

Q316 OPT
R338 BW
R333 OPT

D316 MA4075(M)

D506 OPT

CNOOE
E

7 6 5 4 3 2 1
HEATER PROTECT GND 12V H BLK

DEF PB ASS'Y

■Notice
BW: Bus Wire
OPT: No Part mounted

CE42446-001

L305
18
L306
22
TP-G1

R311 10K 2W
R314 10K 2W
137.7V
Q311 2SC3334
81.3V
79.7V
L302 4.7

R312 10K 2W
R315 10K 2W
137.7V
Q312 2SC3334
85.1V
84V
TP-R1

C501 1/250
R502 1K 1/2S

D501 RGP10J(C1)
D502 RGP10J(C1)
FOCUS

R503 470K 1/2S
TP-SCREEN
SC
SCREEN
CNOSC

D311 BW
R317 BW
R320 BW
D308 1SS120
79.7V
Q308 2SA1321
80.6V
6.7V
C323 OPT

D312 BW
R318 BW
R321 BW
D309 1SS120
84V
Q309 2SA1321
85.1V
6.7V

R501 1M 1/2S
L303 3.9
L501 5.6mH
R506 270K
C505 .56/400
C503 1000
C502 BW
R504 BW

Q305 2SC4544
11.2V
3.4V
QRD149J -102S
R323 3K 1/4W

D306 1SS244
Q306 2SC4544
11.2V
3.2V
QRD149J-102S
R324 1K 1/4W

R507 8.2K 2W

CRT EARTH

Q302 2SC4502
2.6V

D303 MA165
Q303 2SC4502
2.5V
R343 3.3K

D504 1SS146
Q501 2SC1505(MLK)
116.4V
-0.3V

R305 180
R308 BW
C302 220

R306 180
R309 BW
C303 180
C509 OPT
Q502 OPT

C508 OPT
C504 OPT
R505 OPT
R510 OPT
D505 OPT
C507 OPT

R509 4.7K
D503 1SS146
C506 560
R511 OPT

R508 18K

CNODS
FBT SCREEN
ORANGE
R520 2.2M 1/2S

Q503 OPT

Q314 OPT
R337 BW
R329
C314 OPT
D314 BW

Q315 OPT
R330 OPT
C315 OPT
D315 BW
R334 OPT
R335 OPT
TP-E

D506 OPT

7 6 5 4 3 2 1
E CN00E
HEATER PROTECT GND 12V H BLK
DEF PB ASS'Y

■Notice
BW: Bus Wire
OPT: No Part mounted

— 79 —

— 80 —

CIRCUIT DESCRIPTION

CONTENTS

Note: The top bar indicating negative logic is used in the block diagrams and schematics, but not in the text. In the text, this is indicated by a minus sign.

Example:

VIDEO MUTE   - VIDEO MUTE
Block diagrams,   schematics Text, tables

Features

●Multiple video inputs

Composite video A/B, Y/C 4-pin, Component (common with analog RGB), analog RGB (sync on green enabled), external sync (common bridge connection usable for each input)

●Automatic signal system detection

Automatic selection for NTSC, PAL and NTSC 4.43. Signal system shown on-screen.

●Speaker facilities

Audio input terminals (3 lines, bridge connection) provided.

●Horizontal resolution

More than 750 TV lines horizontal resolution.

●Dot-trio type CRT

The dot-trio type CRT has 0.4 mm pitch. Finer picture detail can be achieved compared to a stripe type CRT.
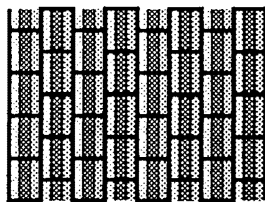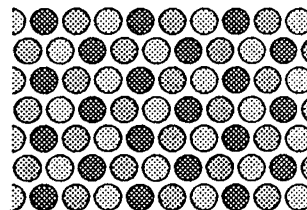
Stripe type CRT	Dot-trio type CRT

●Phosphor (high resolution type only)

The BT-M1950Y USA model uses SMPTE phosphor.
The color reproduction range is wide and better picture fidelity can be obtained.

●Selectable comb/trap filters.

●I-K feedback

CRT current and voltage are continuously controlled. Over long term usage, pictures are reproduced with stable white balance and stable black level.

●Deflection control type size regulator

Picture size fluctuations due to such causes as input video luminance variations are suppressed to allow continuously stable picture reproduction.

●Bus control system

Circuit internal control resistors are reduced in number and bus control is used for each system. Aging changes are suppressed to enable always stable images.

●Large array of control functions

The broad variety of control functions indispensable for video signal monitoring includes pulse cross, color off, blue check, underscan, aperture correction frequency selection, AFC time constant selection, color temperature selection, aspect selection, RGB input position and size fine adjustment, user mode settings, tally, and others.

●Important functions for flexible applications

Front key control lock, status display control and external remote terminal are provided.

Signal PB ASS'Y

Composite video, Y/C, component and RGB signal inputs from the input PB ASS'Y are applied via connector 002 (CN002). The input signals are not differentiated between PAL and NTSC systems.

1. Y/C separator circuit

The composite video signal input via CN002 pin 2 is branched in three lines. The first goes through the chroma trap of Q113, Q114, Q116 and Q118 to produce the PAL Y (PAL Y) signal applied to IC101 pin 2. The second is applied as the PAL chroma (PAL C) signal to IC202 pin 12. In the third line, the NTSC Y/C separator circuit of DL101, DL102 and Q104 - Q109 separates the NTSC Y (NTSC Y) and NTSC chroma (NTSC C) signals. The NTSC Y signal is applied through the Q117, Q110 and Q118 amplifier and buffer to IC101 pin 1. The NTSC C signal is applied to IC202 pin 13.

●Y signal flow

The 358 signal from the MPU selects between the NTSC and PAL Y signals at IC101 pins 1 and 2. NTSC is selected when the 358 signal is High level. This output goes from pin 15 to pin 13. The Y signal from the S input terminal (YC Y) via CN002 pin 6 goes to pin 12. The signals at pins 12 and 13 are then selected. When the V/-YC signal from the MPU is Low level, YC Y is selected. The output from pin 14 is sent through Q108 to pin 12 of the IC305 analog switch.

●C signal flow

The 358 signal from the MPU selects between the NTSC and PAL C signals at IC202 pins 12 and 13. NTSC is selected when the 358 signal is High level. This output goes from pin 14 to pin 1. The C signal from the S input terminal (YC C) via CN002 pin 4 goes to pin 2. The signals at pins 1 and 2 are then selected. When the V/-YC signal from the MPU is Low level, YC C is selected. The pin 15 output is sent through Q201, Q202, T01 and Q203 to pin 3 if NTSC and to pin 5 if PAL. These are selected by the -443 signal from the MPU and applied to the demodulator IC201 via pin 4. The color difference signals are then sent via amplifier and buffer circuits to the IC305 analog switch.
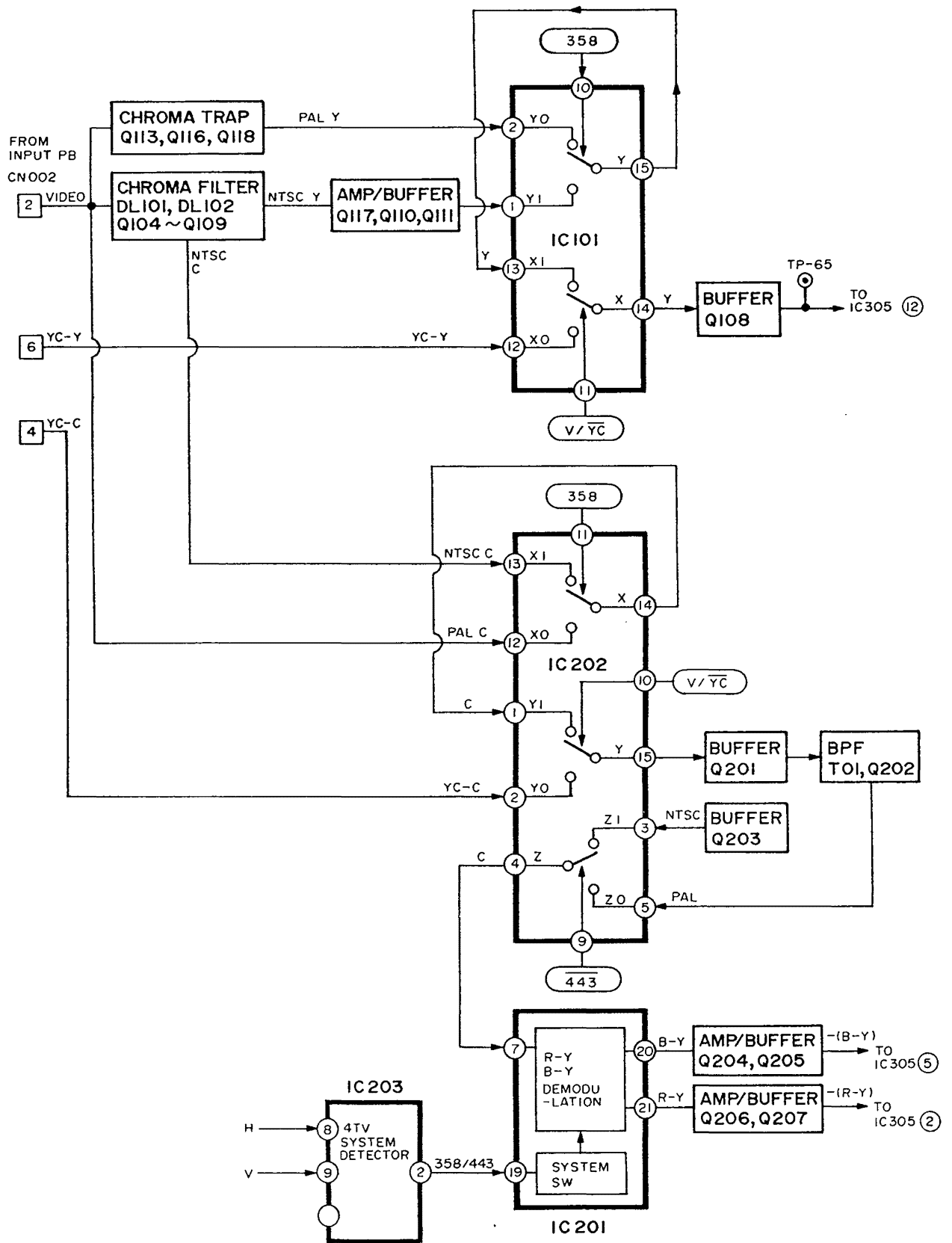
Fig. 1-1 Y/C separator circuit

2. Color difference signal processor

The Y, R-Y and B-Y signals from the component input terminals are supplied to CN002 pins 20, 16 and 12.

The Y signal goes to pin 13 of the IC305 analog switch.

The B-Y signal is inverted through the amplifier and buffer circuit of Q361 and Q362 and supplied to IC304 pin 5. The signal is switched with the pulse cross signal via pin 3 (refer to separate description of the pulse cross and switching signals). The signal output from pin 4 is sent through buffer Q364 to IC305 pin 3.

The R-Y signal is inverted through the amplifier and buffer circuit of Q331 and Q332 and supplied to IC304 pin 2. The signal is switched with the pulse cross signal via pin 1. The signal output from pin 15 is sent through buffer Q334 to IC305 pin 1.

IC305 selects between the Y, -(R-Y) and -(B-Y) color difference signals via the Y/C separate circuit and the component input terminals. When COMP/-V and YC from the MPU are High level, the signals from the component input terminals are selected. The selected Y, -(B-Y) and -(R-Y) signal outputs are obtained respectively from pins 14, 4 and 15.

The Y signal is sent through the Q305, Q301 and Q302 amplifier and buffer circuit to IC304 pin 12. The signal is switched with the cross pulse signal via pin 13. The output signal from pin 14 goes through buffer Q304 to IC401 pin 16. The timing is delayed to match the -(B-Y) and -(R-Y) color difference signals. The delay amount is variable by the I2C bus SDA and SCL. The output from pin 12 is applied to pin 8 of the IC402 video processor. Also, the -(B-Y) is applied to IC402 pin 6 and the -(R-Y) signal to IC402 pin 7.
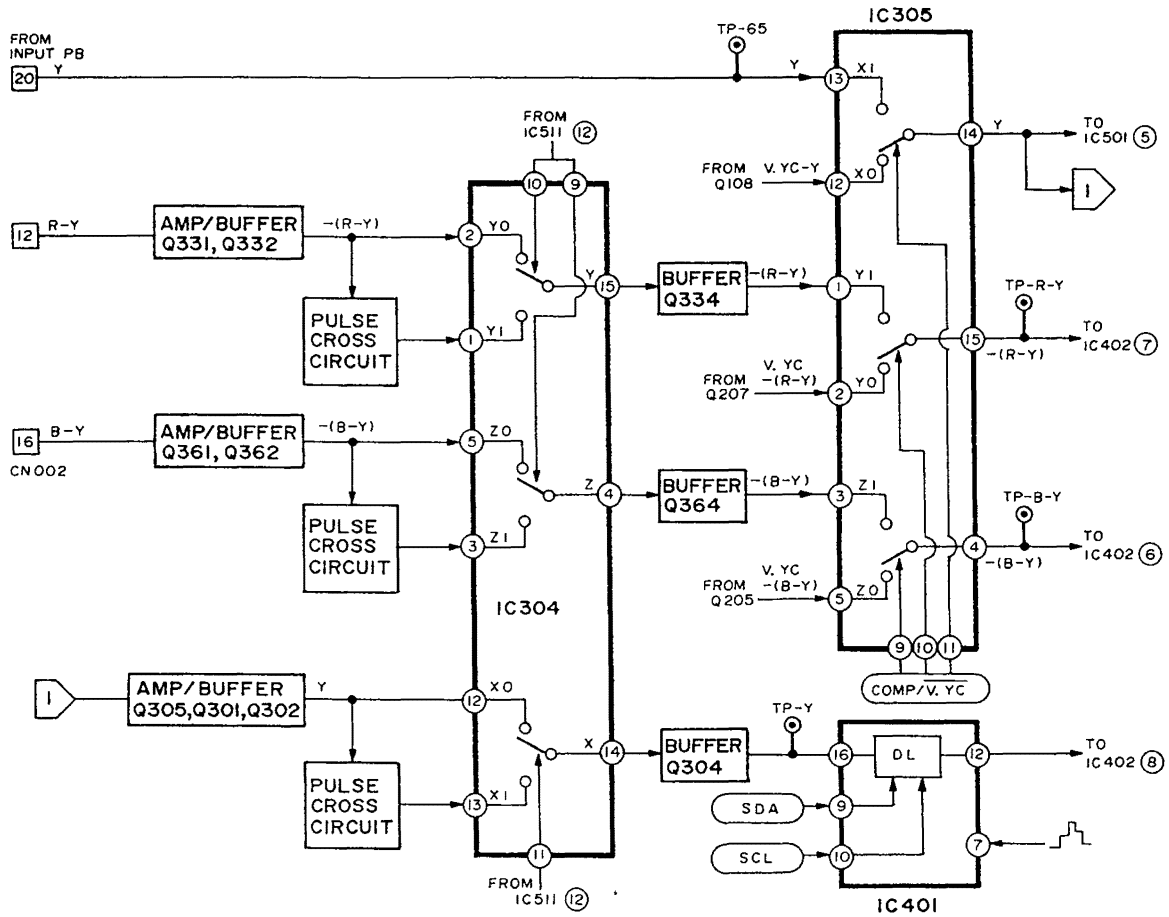
Fig. 2-1 Color difference signal processor

3. Video processor

The Y and color difference signal inputs to IC402 are applied to a matrix circuit to produce RGB (V.Y/V/RGB). The RGB signal inputs from the RGB input terminals and on-screen RGB signals (OSD RGB) from the MPU are switched by VOB and RGB/-OTHER from the MPU. The relationship between switching and selected signals is indicated in Table 3-1.

VOB	RGB/-OTHER	OSD RGB	RGB	V.Y/C RGB
L	L			O
L	H		O	
H	×	O		

Table 3-1

The respective R, G and B outputs from pins 24, 22 and 20 are sent through buffers Q451, Q452 and Q453 to the CRT socket PB ASS'Y.

●Blue check circuit

The blue check function cuts off the red and green signals to leave only the blue signal. The function is used for chroma and phase checks and adjustments. When the front Blue Check button is pressed, the blue check signal from the MPU goes High to switch on Q460 and Q459. The red and green signals are grounded and only the blue signal goes to the CRT socket PB ASS'Y to produce the blue check screen.

●Video mute circuit

When an input is absent, the video mute function produces a black screen. Q462 switches off when -VIDEO MUTE from the MPU is Low level. High base potential then switches Q455, Q456 and Q457 on. The red, green and blue signals are grounded, and absence of output to the CRT socket PB ASS'Y produces a black screen.

●On-screen V sync circuit

The OSD V SYNC signal is applied via CN001. At the V blanking rising edge, Q458 and Q461 switch on. Low base potential switches off Q455, Q456 and Q457, and Q459 and Q460. Muting is applied to the upper portion of the screen in order to avoid sync disruption.

The OSD V SYNC signal also goes to the MPU to determine the on-screen timing at the V falling edge.
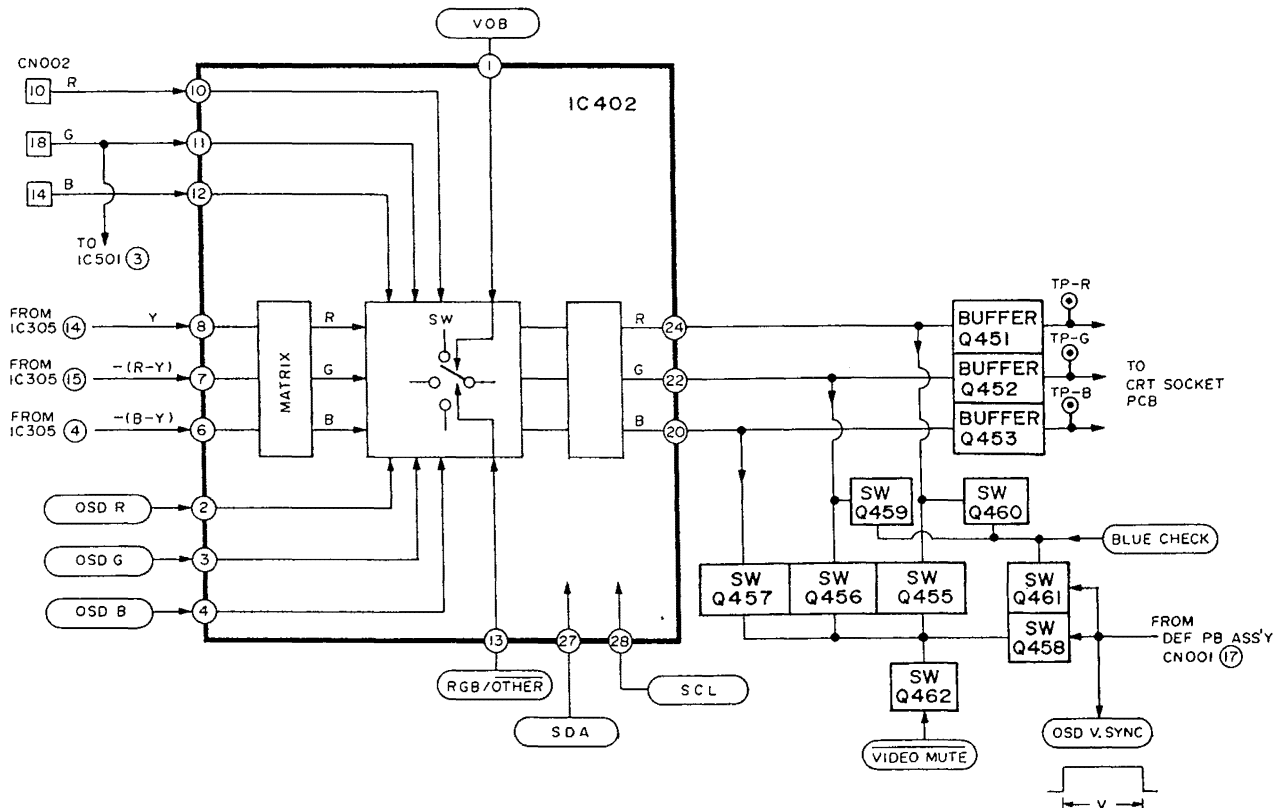
Fig. 3-1 Video process circuit

4. Pulse generator circuit

The Y signal from IC305 pin 14 is supplied to IC501 pin 5. The signal is switched with the G component (G ON SYNC) of the RGB signal via pin 3 by the RGB/-OTHER signal from the MPU. The selected signal goes from pin 4 to pin 2.
An external sync signal input from the Ext Sync terminal goes via CN002 pin 8 IC501 pin 1. Selection is by the SYNC - INT/EXT signal from the MPU. The selected signal is sent from pin 15 through the Q151, Q501 and Q502 amplifier and buffer circuit to the sync separator circuit of Q503 - Q514 where H and V sync are separated.
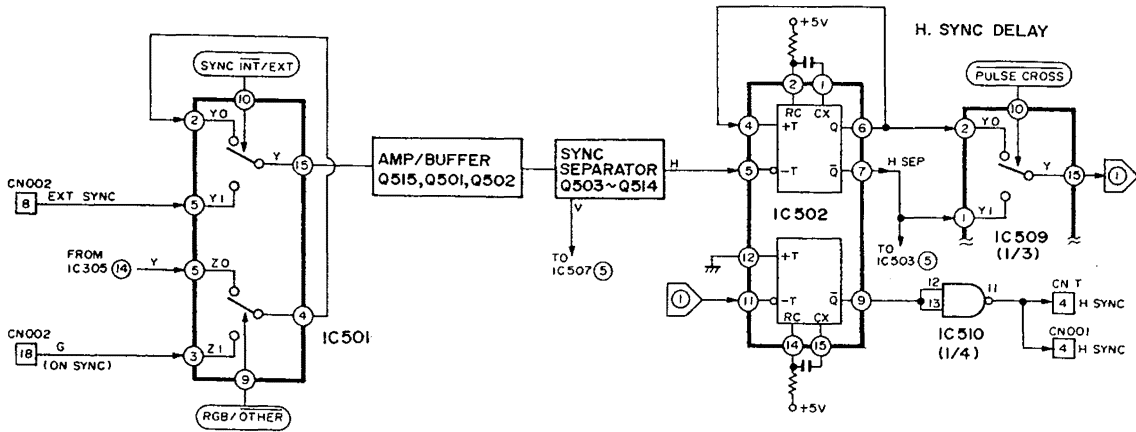
Fig. 4-1 Pulse generator and H separator circuits

●H separation

The signal from Q513 collector goes to IC502 pin 5, then from pins 6 and 7 to IC509 pins 2 and 1. The signal is switched by -PULSE CROSS from the MPU. The selected signal is sent from pin pin 15 to IC502 pin 11, then from IC502 pin 9 to IC510 where it is inverted to produce H sync. The H sync position changes according to the Pulse Cross switch on/off state.
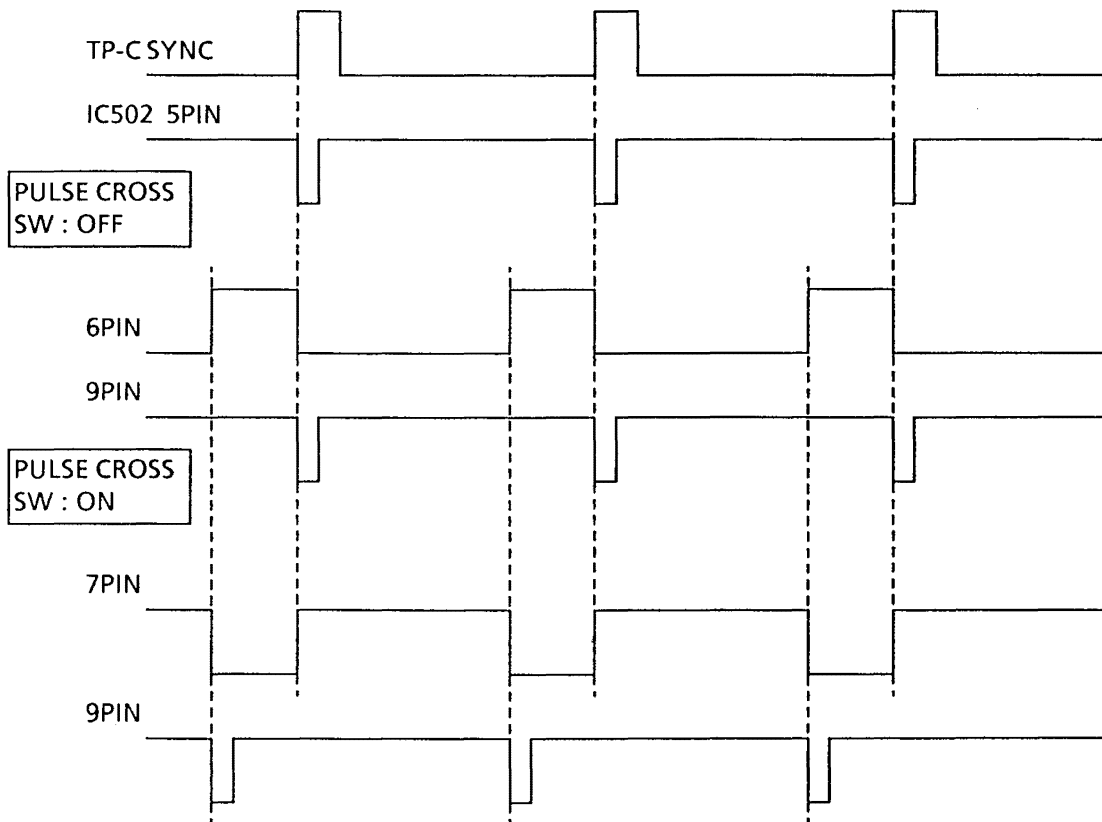
Fig. 4-2 H separator circuit timing

●V sync

The signal from Q514 collector goes to IC509 pin 13 and to IC507 pin 5, then from IC 507 pin 6 to IC509 pin 12 and IC508 pin 11. The IC509 signal inputs are switched by -PULSE CROSS from the MPU. The selected signal goes from pin 14 to IC507 pin 11, then as V sync from pin 10. The V sync position changes according to the Pulse Cross switch on/off state. (When the switch is off, the IC507 pin 5 signal is obtained from pin 11.
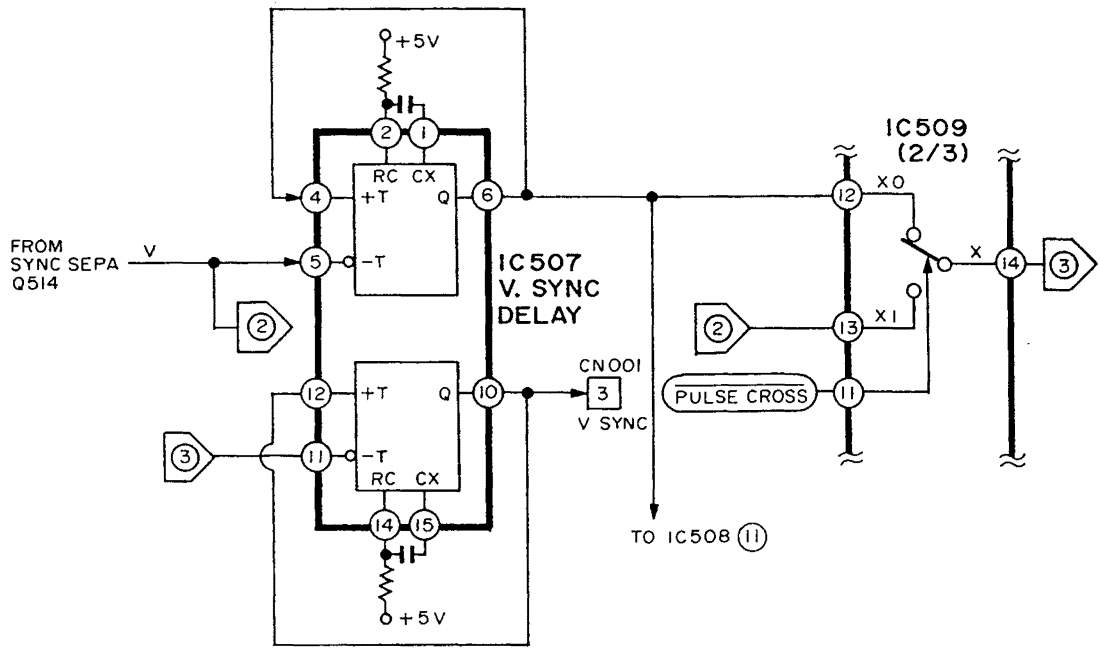
Fig. 4-3 V sync circuit
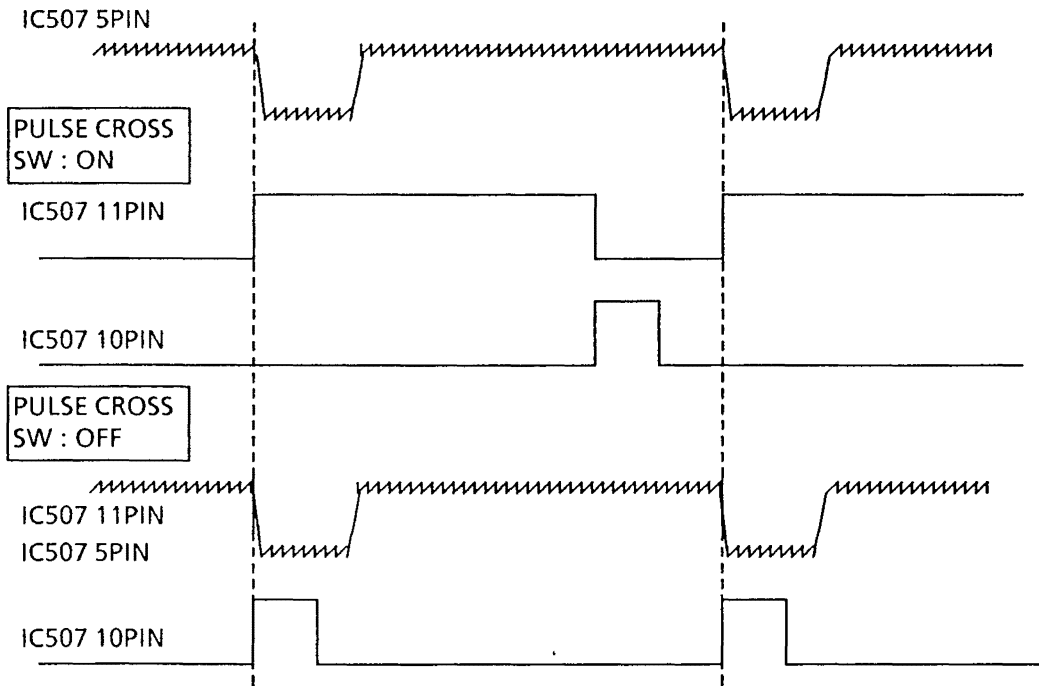
Fig. 4-4 V sync timing 1

The IC508 pin 11 input signal is sent via pins 10, 5 and 6 to IC511, where it is inverted and sent as V sync to IC203 pin 9.
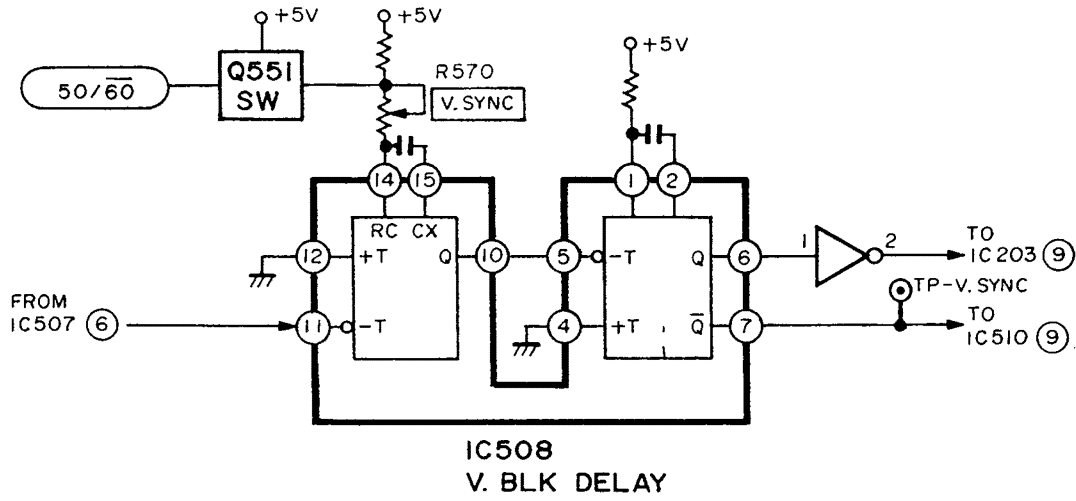
Fig. 4-5 V blanking sync circuit
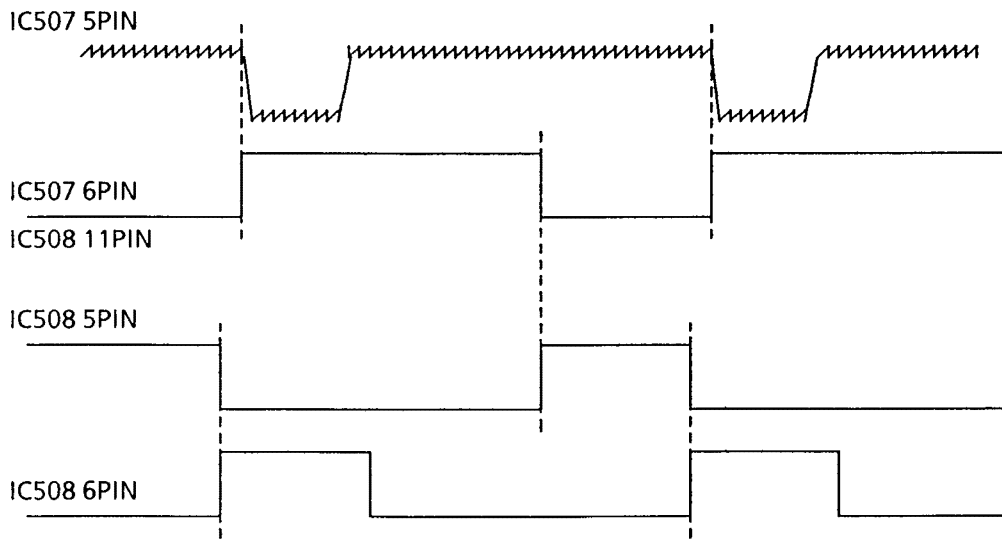
Fig. 4-6 V sync timing 2

●V sync delay

The blanking signal from the deflection PB ASS'Y goes to IC405 pin 4, then from pin 7 to IC509 pin 3. (Although the circuit is capable of switching with the OSD V sync signal from the deflection PB ASS'Y, the underscan/-overscan switching signal at pin 9 is held at Low level by a resistor also connected to pin 9 and is not switched.) The signal from pin 4 goes to IC504 pin 12, then to the pin 9 output.
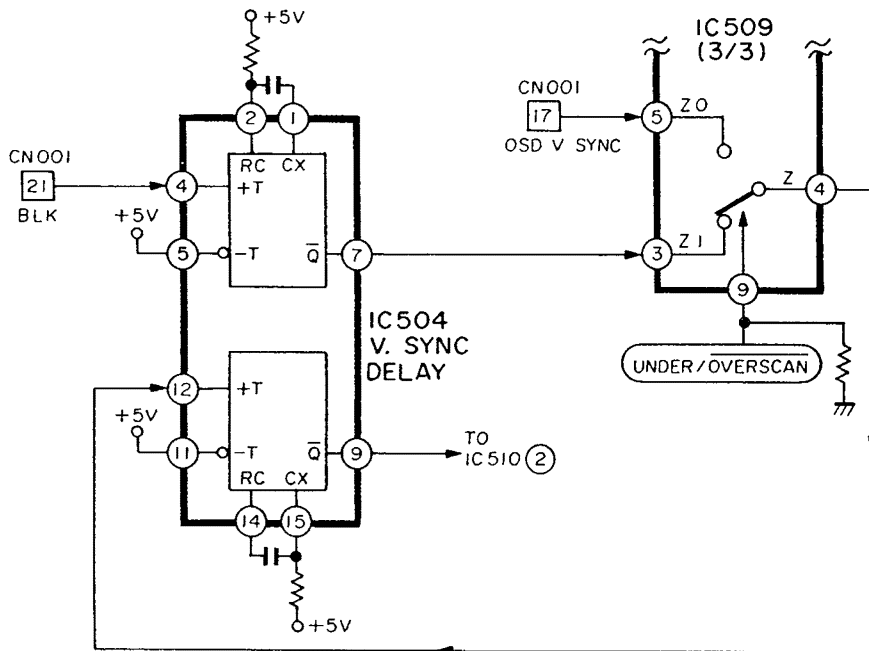
Fig. 4-7 V sync and H blanking delay circuits
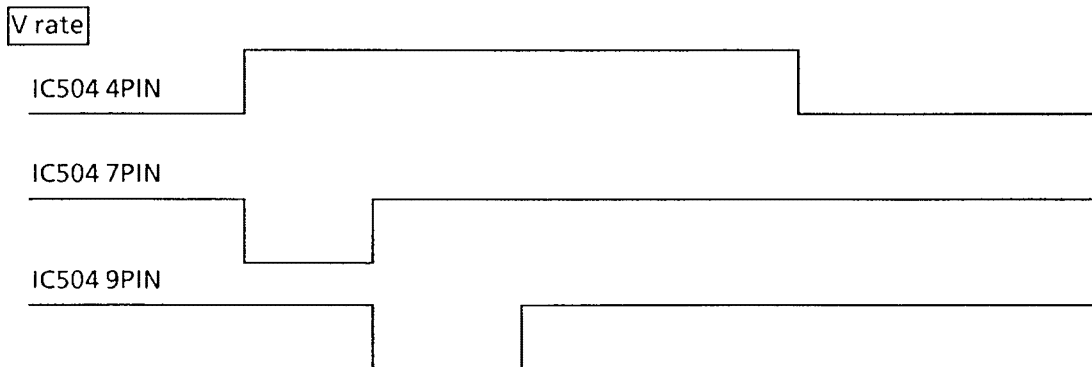
Fig. 4-8 V sync delay circuit timing

●H blanking delay

The horizontal blanking pulse is produced from the FBP signal from the deflection PB ASS'Y. The signal is used as the IC304 switching signal. Since the FBP signal is delayed by the pulse cross signal, the H blanking pulse is also delayed, and the pulse cross signal can be produced.
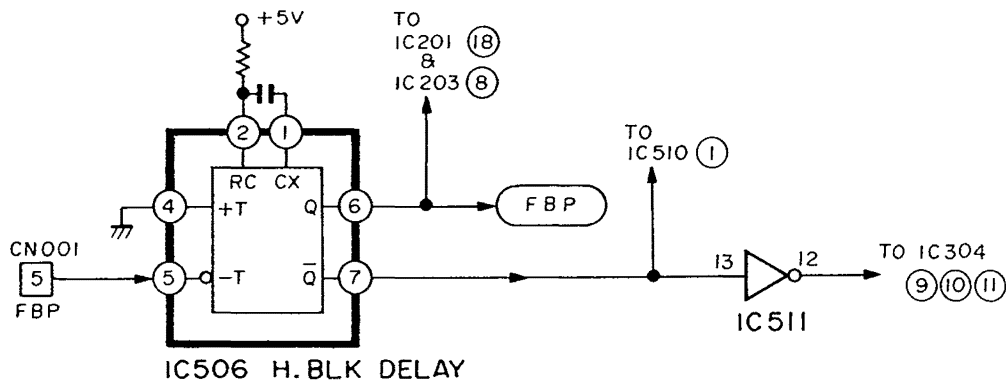
Fig. 4-9 V sync delay and H blanking delay circuits
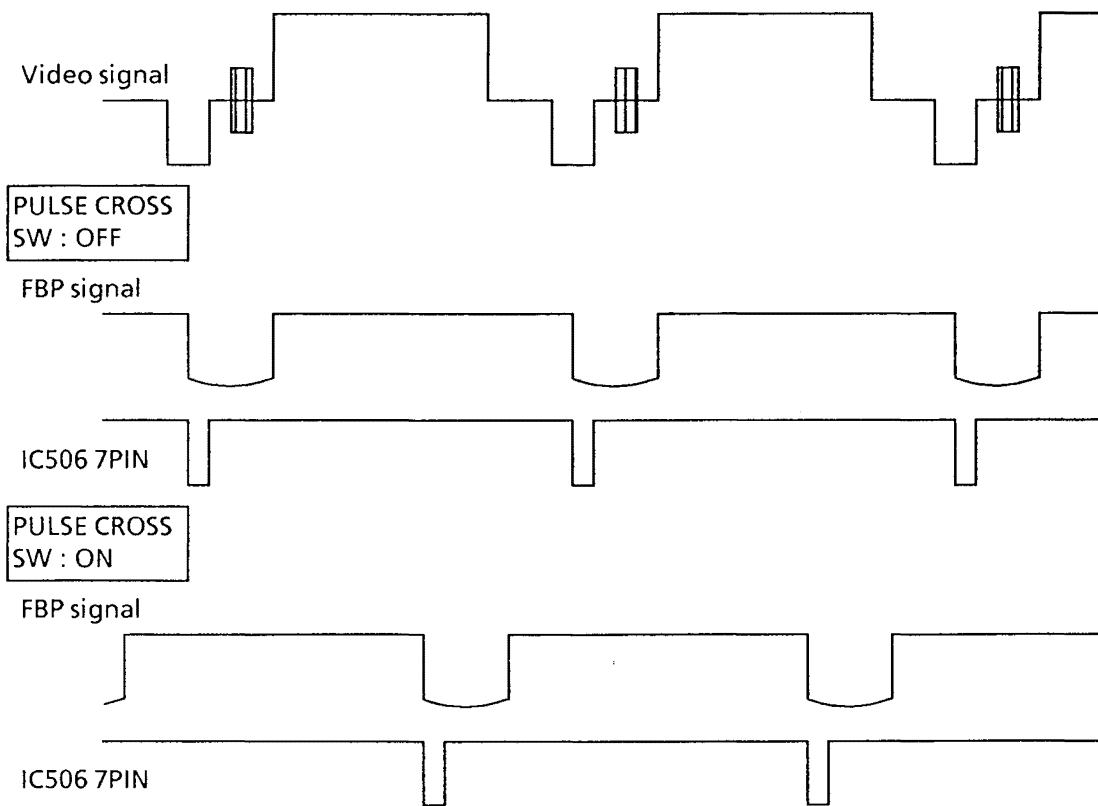
Fig. 4-10 H blanking delay circuit timing

●Clamp pulse

The clamp pulse is produced from the FBP signal from the deflection PB ASS'Y. The signal is used as a sandcastle pulse. Since the FBP signal is delayed by the pulse cross signal, a delayed clamp pulse signal is also produced.
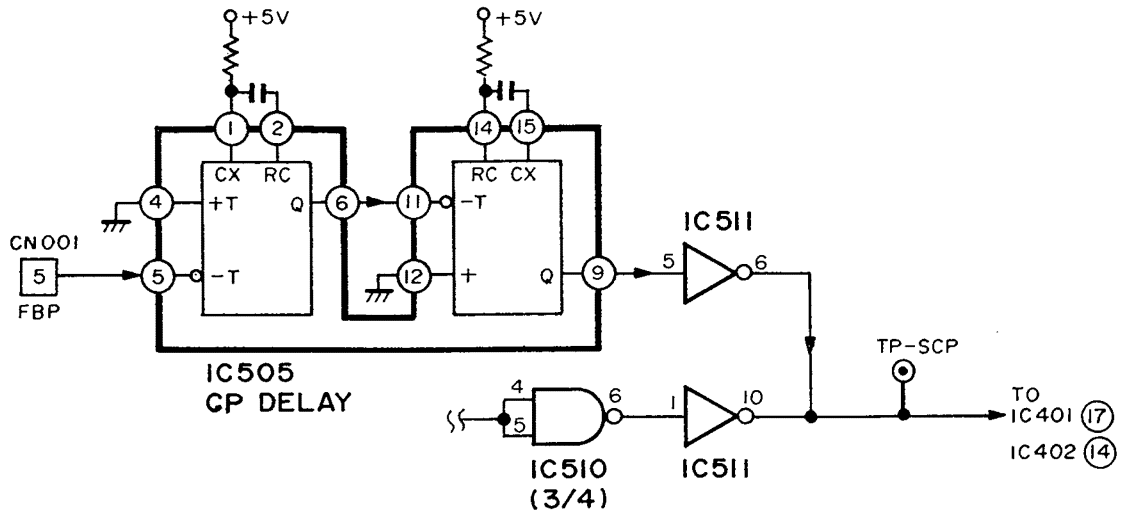
Fig. 4-11 Clamp pulse circuit
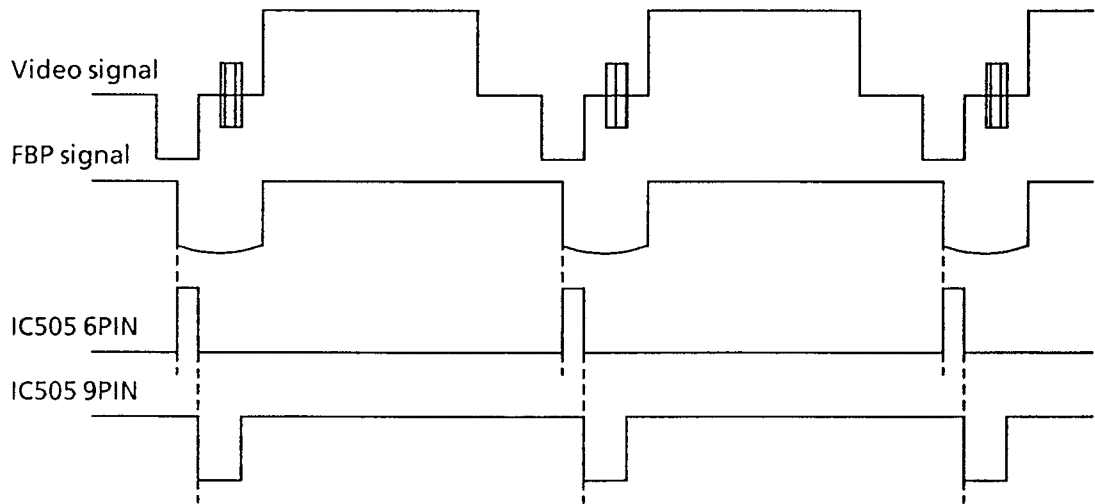
Fig. 4-12 Clamp pulse circuit timing

●Burst gate pulse

The signal from IC502 pin 7 is used to produce a pulse having a width equivalent to the burst signal component.
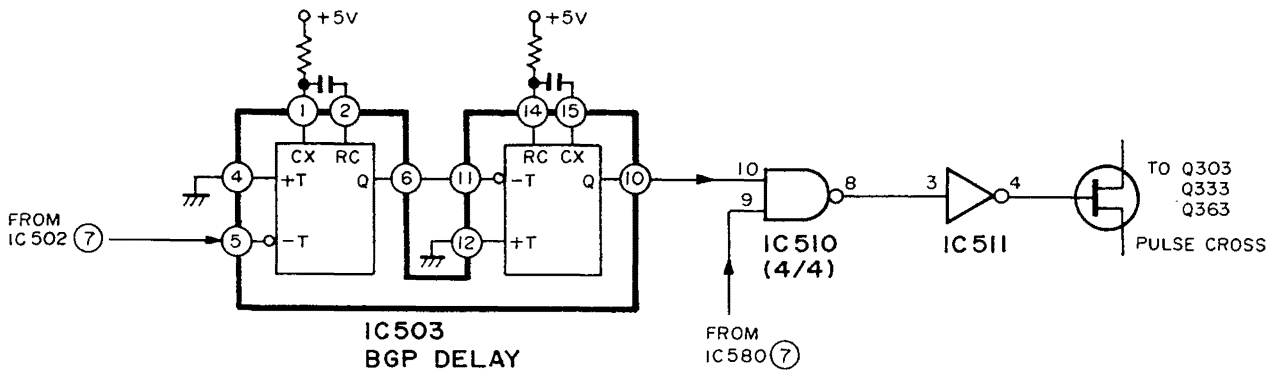
Fig. 4-13 Burst gate pulse circuit
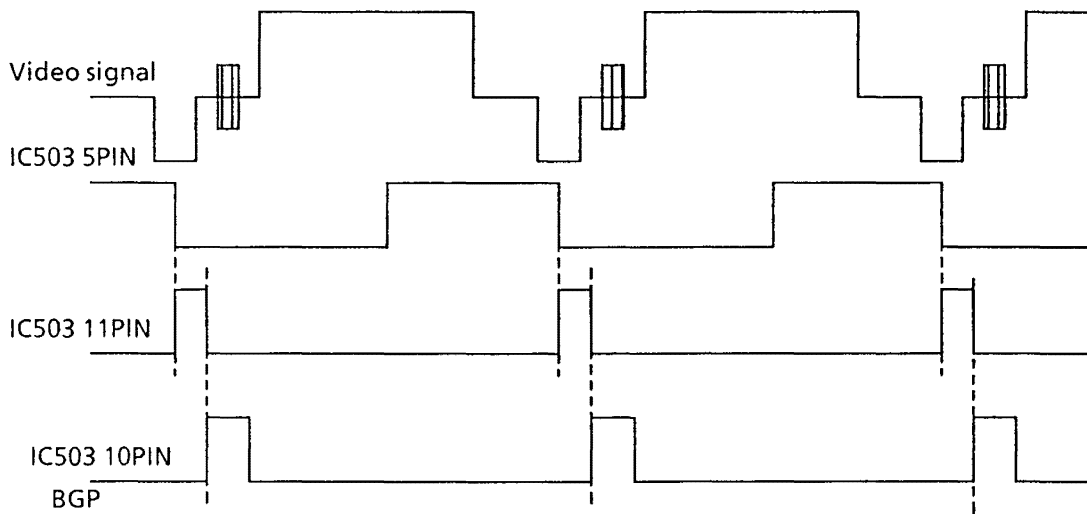
Fig. 4-14 Burst gate pulse circuit timing

●Sandcastle pulse

The V sync signal produced by IC405 and H blanking signal produced by IC506 are added by IC510 and sent to IC511. The clamp pulse signal produced by IC506 is inverted by IC511 and added to these signals. The sandcastle pulse is then produced.
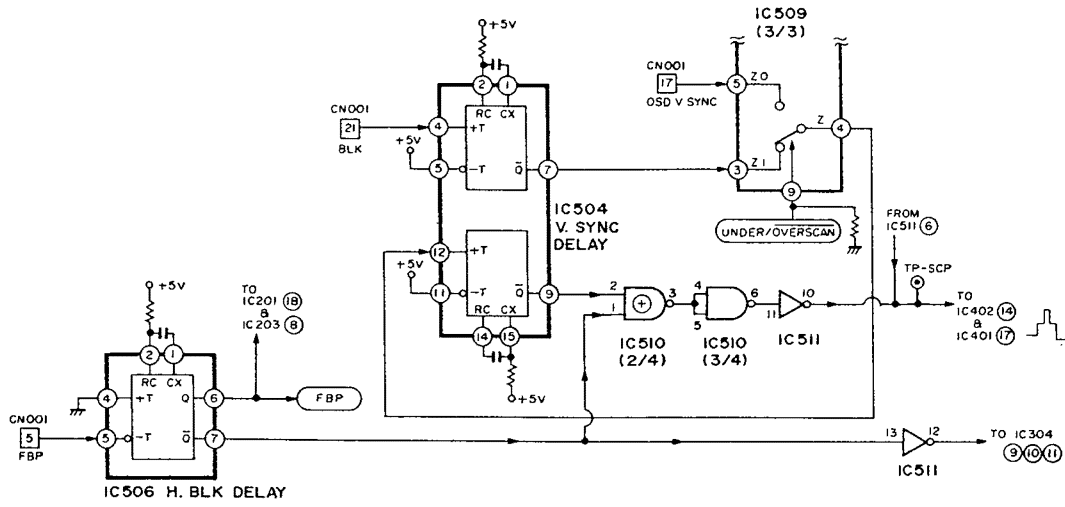
Fig. 4-15 Sandcastle pulse circuit
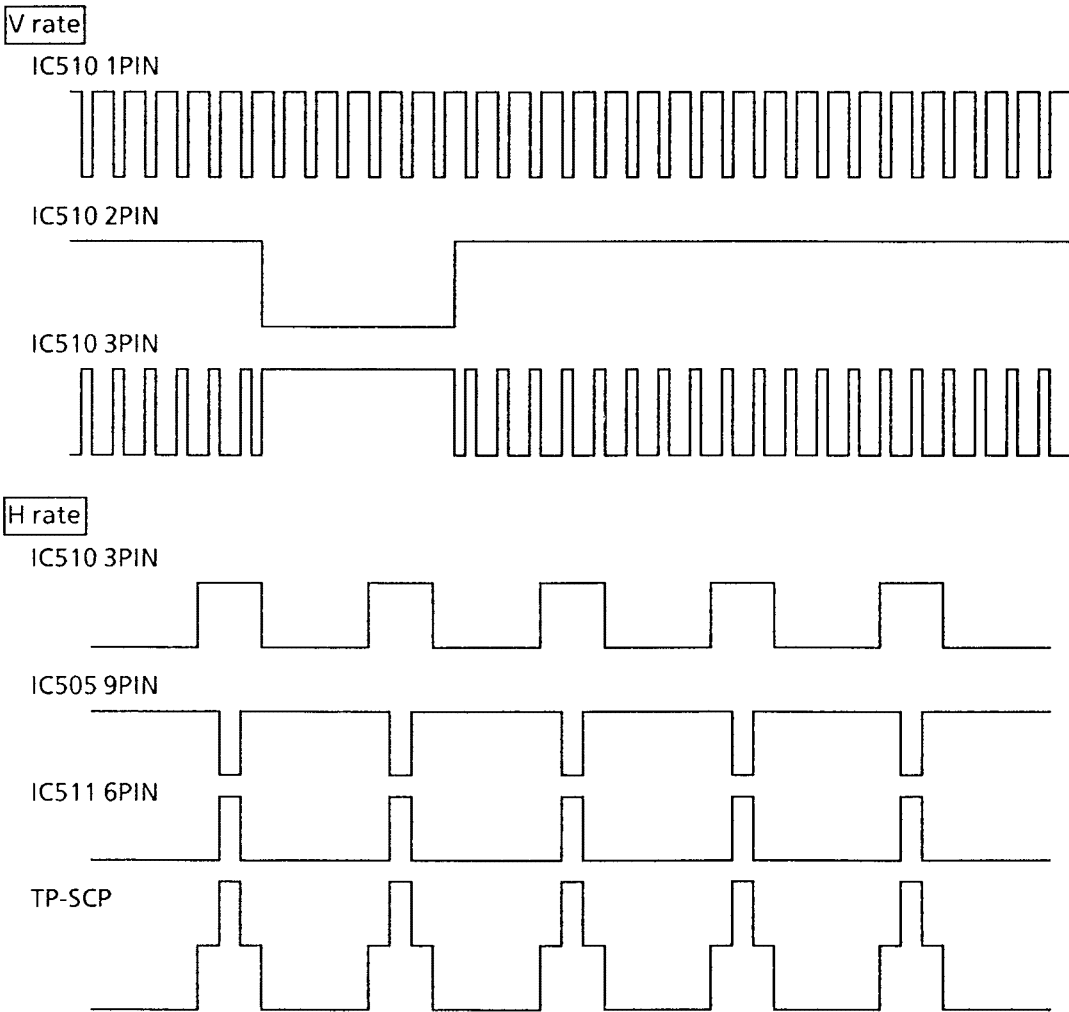
Fig. 4-16 Sandcastle pulse circuit timing

5. Pulse cross circuit

The same type circuits are used for the Y and color difference signals. The pulse cross circuit for the Y signal system is described below.

The Y signal through amplifier and buffer circuits Q305, Q301 and Q302 goes in one line directly to IC304 pin 12 and in another line to Q303. The burst gate pulse is applied to Q303 gate and the gate opens only during this period to determine the pedestal DC level (sampling hold). The signal goes to IC301 pin 3, where it is compared with the 5 V reference voltage of R311 and C304, and provides feedback to Q302 base. The DC voltage is supplied to IC301 pin 6 and IC304 pin 13. The signals at pins 12 and 13 are switched by the H blanking delay signal produced by IC506. When the Pulse Cross switch is on, the output signal indicated in Fig. 5-2 is obtained from pin 14.
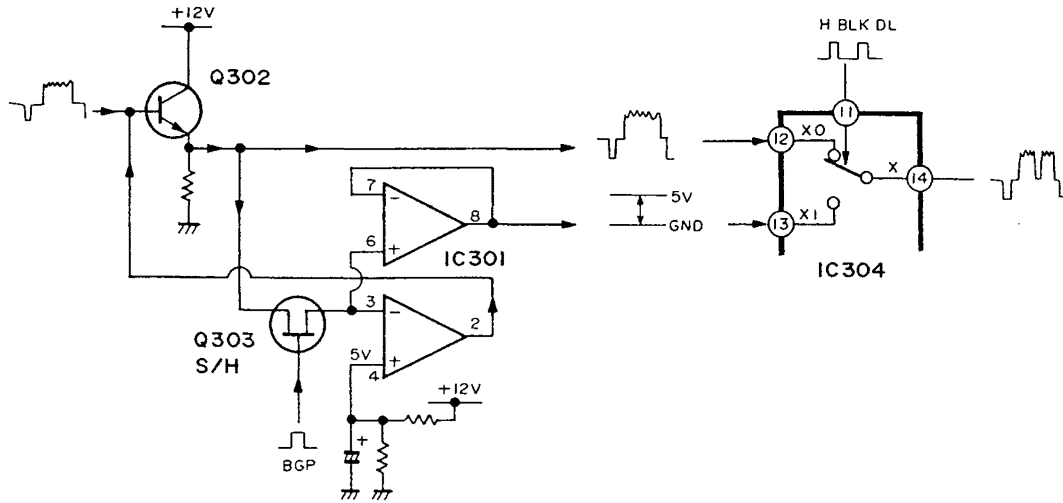
Fig. 5-1 Pulse cross circuit
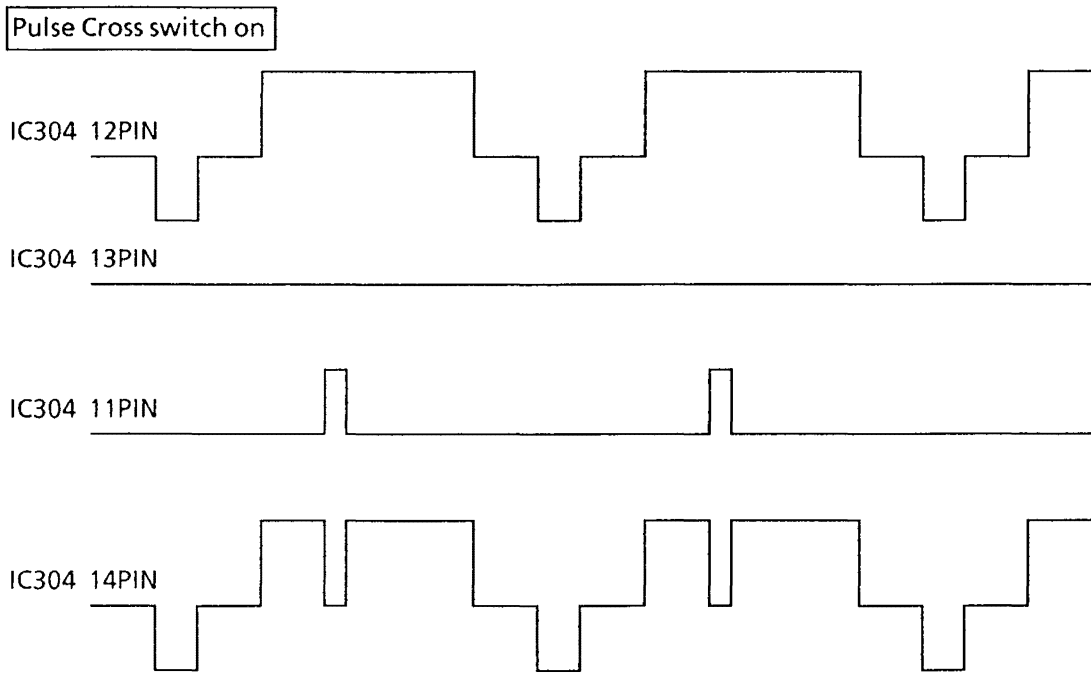
Fig. 5-2 Pulse cross circuit timing

MICOM(MICRO COMPUTER) PB ASS'Y

The MICOM PB ASS'Y uses an MB89647 MPU IC with I2C (Inter-IC) bus for controlling the video and deflection systems. The user interface functions are controlled from the front control PB ASS'Y.

1. MPU IC (MICRO COMPUTER)

The MPU uses a Fujitsu MB89647. The specifications are indicated below.

- ROM: 32 K
- RAM:.1 K
- Ports: 65
- Package: QFP 80 pin
- Clock: 8 MHz
- A/D converter: 8 channels (5 channels used)
  (bright, contrast, color, tint, volume)
- PWM (pulse width modulation): 2 channels (1 channel used, audio control)
- PWC (pulse width count): 1 channel (remote controller optical receiver)
- 8 bit serial: 2 channels
- D/A converter: 2 channels (not used)

1-1 Pin functions

Pin No.	Signal name (- is negative logic)	Signal functions	I/O
1	SWIN3	Front control switch data line	I
2	SWIN2	Front control switch data line	I
3	SWIN1	Front control switch data line	I
4	SWIN0	Front control switch data line	I
5	-V SYNC	Vertical sync signal	I
6	EXT INPUT SEL	External control input selection	I
7	-H SYNC	Horizontal sync signal	I
8	EXT CONT EN	External control enable	I
9	NC	Not connected (grounded)	—
10	NC	Not connected	—
11	D. GND	Digital ground	—
12	D. GND	Digital ground	—
13	X0	Clock oscillator (8 MHz)	—
14	X1	Clock oscillator (8 MHz)	—
15	D.GND	Digital ground	—
16	-RST	Reset terminal	I
17	NC	Not connected	—
18	NC	Not connected	—
19	NC	Not connected	—
20	SCAN4	Front control switch scan line	O
21	SCAN3	Front control switch scan line	O
22	SCAN2	Front control switch scan line	O
23	SCAN1	Front control switch scan line	O

Table 1-1

Pin No.	Signal name (- is negative logic)	Signal functions	I/O
24	SCAN0	Front control switch scan line	O
25	LED DRIVE	LED lighting	O
26	OPT2	System detect force mode 2	O
27	BLUE CHECK	Blue check switch	O
28	-443	4.43MHz MPU detect signal	O
29	-KILLER	Killer detect	I
30	-SYNC DET	Sync detect input	I
31	50/-60 DET	50/60 Hz detect signal	I
32	358/-443 DET	3.58/4.43 MHz detect signal	I
33	NOTCH -ON/OFF	Notch switch	O
34	COMB -ON/OFF	Comb filter switch	O
35	SYNC -INT/EXT	Internal/external sync select	O
36	50/-60	50/60 Hz MPU select	O
37	-PULSE CROSS	Pulse cross switch	O
38	DEGAUSS	Demagnetizer switch	O
39	525CTRL	16:9 and 4:3 select	O
40	UNDER/-OVERSCAN	Underscan/overscan select	O
41	SETUP	Setup level output	O
42	SECAM DET	SECAM detect	O
43	REMOTE CONTROL IN	Infrared detector element pulse signal input	I
44	SECAM/-OTHERS	SECAM source/other source select	O
45	OPT1	System detect force mode 1	O
46	SIN	Data line (on-screen)	O
47	SCLK	Clock line (on-screen)	O
48	STB	Strobe line (on-screen)	O
49	AUDIO C	Audio C channel select	O
50	RGB/-COMPONENT	RGB signal source/component source select	O
51	INPUT A/-B	A/B input select	O
52	VIDEO/-YC	Video source/YC source select	O
53	358	3.58 MHz MPU detect signal	O
54	RGB/-OTHERS	RGB source/other source select	O
55	D.+5V	5 V power supply	—
56	COMPONENT/-VIDEO·YC	Component/video YC source select	O
57	-VIDEO MUTE	Video mute switch	O
58	D.GND	Digital ground	—
59	D.GND	Digital ground	—
60	D.GND	Digital ground	—
61	AUDIO MUTE	Audio mute switch	O
62	SKEW2	AFC select switch 2	O

Table 1-1

Pin No.	Signal name (- is negative logic)	Signal functions	I/O
63	SKEW1	AFC select switch 1	O
64	VOLUME	Audio signal (PWM OUT)	O
65	SCL	I2C bus clock line	O
66	SDA	I2C bus data line	I/O
67	+5V	+5 V power supply	—
68	+5V	+5 V power supply	—
69	+5V	+5 V power supply	—
70	GND	Analog ground	—
71	GND	Analog ground	—
72	OSD ORANGE	On-screen orange color signal	O
73	EXT CONT2	Control 2	I
74	EXT CONT1	Control 1	I
75	VOLUME	Audio A/D input line	I
76	PHASE (TINT)	Phase A/D input line	I
77	CHROMA (COLOR)	Chroma A/D input line	I
78	CONTRAST	Contrast A/D input line	I
79	BRIGHT	Bright A/D input line	I
80	D.GND	Digital ground	—

Table 1-1

2. On-screen IC

The on-screen IC uses a Fujitsu MB90077PF for controlling the character display position on the monitor CRT.

- Maximum character quantity: 24 characters x 12 lines (288 characters)
- Character types: 128 characters, character code 00H - 7FH stored in internal character generator ROM
- Character composition: 12 x 18 dots per character
- Colors: 8 (character units), with edging, blink and back color functions using control ports (VOG, VOR, VOB, VBG, VBR and VBB)
- Display synchronized to H and V sync; characters can be displayed regardless of signal system.

The IC102 MPU and interface connection is with three lines: clock (SCLK), data (SIN) and strobe (STB). Data are transferred at 1 byte per 8 clock cycles and checked by the strobe pulse.

An LC oscillator circuit is connected to pins 8 and 9. Since the dot clock is produced with reference to -V SYNC and -H SYNC (active Low) at pins 18 and 19, use is enabled regardless of the signal system.

The display outputs are TTL level R, G and B signals (VOG, VOR and VOB), enable signals (superimposed on source signals) VBG, VBR and VBB applied to the IC108 OR circuit, and OSD ENABLE signal sent to the signal PB ASS'Y.

2-1 Block diagram
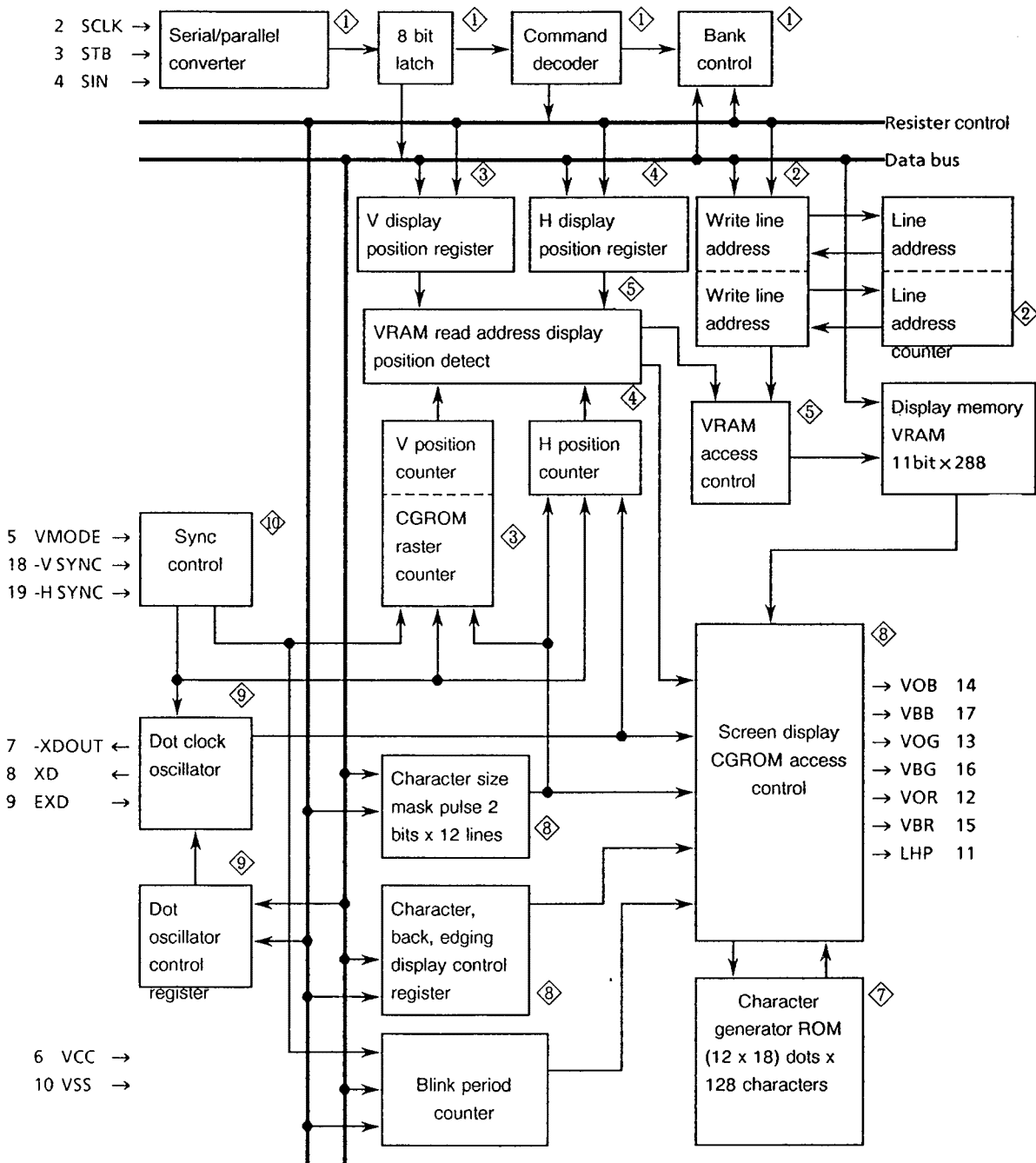
Signals ① - ⑪ are grouped according to function. Numbers correspond to the Block Diagram Description.

2-2 Block diagram description

1) Command and data inputs

The input commands and display data are supplied by 8 bit serial transfer. The commands are decoded and the control registers are set.

2) VRAM (display memory) write address count

VRAM write address control. Addresses can be set by the write address setting command. Automatic increment during character code write to the VRAM.

Write address count is in the range of 0 - 23 horizontal columns by 0 - 11 vertical lines. Column 23 is followed by column 0; line 11 is followed by line 0.

3) Vertical display position control

The -H sync signal is counted from -V sync. The vertical display start position and VRAM read line address are controlled.

4) Horizontal display position control

The dot clock from the -H sync rising edge is counted. The horizontal display start position and VRAM read column address are controlled.

5) VRAM access control

VRAM read/write control. During write, used as the VRAM address for writing from the write address block. During read, the address from the horizontal and vertical control blocks is used.

Since write to VRAM needs to be synchronized to the display operation in order to avoid disrupting the displayed picture, the dot clock is used for timing adjustment during write. The dot clock oscillation is stopped and write to VRAM is not performed during the horizontal sync period or at the dot clock stop command. Consequently, writing interrupted by dot clock stoppage, or a write request during dot clock stoppage, is performed after restarting the dot clock oscillation.

However, if an unexecuted write request is present, other write requests are not recognized until processing is complete. Therefore, even if multiple write requests are produced during dot clock stoppage, only the first of these is recognized.

6) VRAM

The video random access memory stores 11 bit display data. The data storage capacity is 24 characters x 12 lines (288 characters).

7) Character generator ROM (CGROM)

The read only memory stores 128 types of character patterns. The CGROM is read by the VRAM output character code and scan counter.

8) Screen display and CGROM access control

Screen display selection, such as character display on/off, edging, background, etc., and data read from the CGROM are controlled.

9) Dot clock generator

The reference clock (dot clock) signal is generated during character display. An LC oscillator circuit is connected externally. Since the dot clock phase needs to be synchronized to the video signal phase, oscillation stop/restart is controlled by the horizontal sync signal (-H sync). The oscillation can also be stopped by the oscillation control command.

Although an external clock can be input directly, as shown in Fig. 2-1, at least three clock cycles must also be input after the -H sync falling edge.

Fig. 2-1

10) Sync control

The phases of externally supplied horizontal and vertical sync signal inputs are matched to signals synchronized to internal circuits.

11) Blink period counter

The 6 bit counter counts the vertical sync signal (-V sync) for counting the blink period. The blink period is approximately one second (-V sync x 64) and the blink ratio can be selected for 1:1, 1:3 or 3:1.

3. ICs connected to the I2C bus

3-1 EEPROM

The ST24C02A (ST24BM-1400) non-volatile 256 byte electrically erasable programmable read only memory is used in order to hold the status at the time of the previous system startup. The ROM can be accessed externally via a Z connector provided with pins for EXT SCL, EXT SDA and GND. The I2C bus can be controlled from the Z connector by the remote control code F8H (in practice, the monitor code 1FH header is needed). (The signal from the MPU is stopped at this time.) Release is by F9H (in practice, the monitor code 1FH header is needed). Although data are contained in the ROM when supplied as a service part, in production, the data are entered from the Z connector.

3-2 Video processor (TDA4672) and picture signal improvement (TDA4680)

Video signal control ICs used for the signal PB ASS'Y. IC control is from the MPU via the bus connecting the MPU and signal PB ASS'Ys. Refer to the signal PB ASS'Y description.

3-3 TV V DEF processor (CXD-2018Q)

Deflection control IC used on the deflection PB ASS'Y. Connect via the signal PB ASS'Y. Data from the MPU are transmitted by a bus. Refer to the deflection PB ASS'Y description.

4. Front panel

User interfaces controlled by the MPU are located on the front panel. The five control knobs are Volume, Phase, Chroma, Bright and Contrast. Adjustments are converted from analog to digital form and controlled by the MPU. The 17 buttons are Input Select (4), Underscan, Pulse Cross, Color Off, Blue Check, Memory Mode, Ext Sync, Menu Control (6) and Degauss. The set status is indicated by LEDs.

5. Infrared detector element (remote control receiver)

The pulse signal from the infrared detector element goes to the MPU PWC port. The pulse width is measured and data are read from the 0 and 1 serial bit train.

Poor shield case grounding can impede element performance. Also, a pullup resistance of about 10 Kohms needs to be inserted between the 3 pin terminal (-OUT) and the MPU port. Signals are not detected if the resistance is absent.

6. Audio volume circuit

The audio volume circuit converts the PWM pulse from the MPU into a 0 - 12 V DC level pulse. Duty is 0 % at volume 0 and 99.6 % at maximum. Resolution is 500 ns, period is 1.28 us and frequency is 7.81 kHz.

7. Sync detector circuit

A Low output is produced when a Y sync input is present and a High output when absent. The output goes as the -sync detector signal to the MPU pin 30 and No Sync is detected from the signal. The signal also goes to the SA connector pin 9. In absence of sync, No Sync is displayed on the screen.

8. On-screen signal converter (OSDC signal generator)

The MPU OSD orange signal selects between the orange color level (R:G:B = 1:0, 7:0) ratio setting circuit and the on-screen TTL level RGB output 0/52 Vp-p setting circuit.

When the OSD orange signal is High, Q207, Q208 and Q209 switch on. The IC102 on-screen IC pin 12, 13 and 14 outputs are 0.52 Vp-p. As a result, the R202 : R205 : R217 resistance ratio sets the T connector OSD R : OSD G : OSD B = 0.52 Vp-p : 0.36 Vp-p : 0 Vp-p, which is the on-screen orange color setting at the factory. The display on the screen is controlled by the video processor IC402 of the signal PB ASS'Y from the OSD enable signal from IC108 pin 6. The color can be changed by selecting the service mode. If changed, the on-screen IC102 pin 12, 13 and 14 outputs are not 0.52 Vp-p.

When the Blue Check button is pressed, the blue check signal from the MPU is sent to sync selector IC106 pins 13 and 14. The negative logic -blue up signal from pin 12 switches Q210 off and sets the OSD N signal level from 0.52 Vp-p to 0.62 Vp-p.

When the OSD orange signal is Low level (changeable in the service mode), Q207, Q208 and Q209 are off. As a result, R202 + R211, R205 + R213, and R217 + R215 are respectively set to 290 ohms and the on-screen IC102 pin 12, 13 and 14 outputs go directly to the T connector OSD R, OSD G and OSD B.

The on-screen color is set by the service mode control block C03. Nos. 0 - 7 are when the OSD orange signal is High level, while Nos. 129 - 139 are when the OSD orange signal is Low level. In Table 8-1, the R, G, B column indicates the No. column in binary form. The lower 3 digits indicate presence or absence of the on-screen IC102 pin 12, 13 and 14 outputs. For example, since C03 is set to 7 at the factory, R, G, B is 1, 1, 1 and the on-screen IC102 pin 12, 13 and 14 output signals are all present.

No.	Display color	R,G,B	No.	Display color	R,G,B
0	Black (blue check: dark)	0,0,0	129	Blue	1,0,0,0,0,0,1
1	Black (blue check: bright)	0,0,1	130	Green	1,0,0,0,0,1,0
2	Green (blue check: dark)	0,1,0	131	Cyan	1,0,0,0,0,1,1
3	Green (blue check: bright)	0,1,1	132	Red	1,0,0,0,1,0,0
4	Red (blue check: dark)	1,0,0	133	Magenta	1,0,0,0,1,0,1
5	Red (blue check: bright)	1,0,1	134	Yellow	1,0,0,0,1,1,0
6	Orange (blue check: dark)	1,1,0	135	White	1,0,0,0,1,1,1
7	Orange (blue check: bright)	1,1,1	136	Black	1,0,0,1,0,0,0

Table 8-1

9. Reset circuit

In event of power supply abnormality, the reset circuit functions to quickly inform the MPU and avoid damage to the system.

Reset operates when cutoff of the + 12 V power supply line is detected. Quick detection is possible since the + 5 V and + 8 V power supply lines are regulated by the + 12 V power supply line. The function is important since sudden cutoff or failure of power can cause abnormal operation of the signal PB ASS'Y video processor IC.

Normally, the MPU pin 16 (-RST) is High level and goes Low during reset. Reset may not operate unless the Low level is below VCC x 0/2 V. The MPU is operable at VCC = 2.2 V (block 1M) and -RST below 2.2 x 0.2 = 0.4 V is required. If the reset voltage is higher than the specification, MPU operating error can destroy the EEPROM data.

10. Clock oscillator

The 8 MHz clock signal is applied to the MPU pins 12 and 13.

11. Power supply lines

Power supply lines are supplied via the signal PB ASS'Y pins 7 (+ 12 V), 5 (+ 5 V), 6 (GND) and 8 (GND). In order to avoid MPU output interference, separate power supply lines (digital + 5V and GND, and analog + 5 V and GND) are provided on the MPU PB ASS'Y (source same as U connector pin 5).

12. Connectors

Resistors and zener diodes are inserted in the lines of connectors connecting other PB ASS'Ys as measures against sparks and noise. The connector signal names and functions are indicated in Table 12-1.

Connector name	No.	Signal name (- is negative logic)	Signal function	I/O
V	1	SYNC Y	Y sync for sync detection	I
	2	RGB / -OTHERS	RGB signal/other source switching	O
	3	SYNC -INT / EXT	Internal/external sync select	O
	4	-KILLER	Killer detect	I
	5	358/ -443DET	3.58/4.43 MHz detector signal	I
	6	50 / -60DET	50/60 Hz detector signal	I
	7	358	3.58 MHz MPU detector signal	O
	8	VIDEO / -YC	Video/YC source select	O
	9	COMB -ON/OFF	Comb filter switch	O
	10	NOTCH -ON/OFF	Notch switch	O
	11	INPUT A / -B	A/B input select	O
	12	RGB / -COMPONENT	RGB/component source select	O
	13	AUDIO C	Audio volume channel C select	O
T	1	-443	4.43 MHz MPU detector signal	O
	2	DEGAUSS	Demagnetizer switch	O
	3	-PULSE CROSS	Pulse cross switch	O
	4	H SYNC	Horizontal sync	I
	5	50/ -60	50/60 Hz MPU select	O
	6	-VIDEO MUTE	Video mute switch	O
	7	SDA	I^{2}C bus data line	I/O
	8	SCL	I^{2}C bus clock line	O
	9	OSDB	On-screen blue line	O
	10	OSDG	On-screen green line	O
	11	OSDR	On-screen red line	O
	12	VOB	On-screen enable	O
	13	COMPONENT / -VIDEO-YC	Component/video YC source select	O
SB	1	+ 5V	+ 5 V power supply	—
	2	EXT CONT EN	External control enable	I
	3	EXT INPUTSEL	External control input select	I
	4	EXT CONT1	Control 1	I
	5	EXT CONT2	Control 2.	I
	6	GND	Ground	—
Z	1	GND	Ground	—
	2	EXT SCL	External I^{2}C bus clock line	I
	3	EXT SDA	External I^{2}C bus data line	I/O

Table 12-1

Connector name	No.	Signal name (- is negative logic)	Signal function	I/O
U	1	BLUE CHECK	Blue check switch	O
	2	FBP	Flyback pulse (used as V sync)	I
	3	VOLUME	Audio volume signal (0 - 12 V)	O
	4	AUDIO MUTE	Audio mute switch	O
	5	+5V	+5 V power supply	—
	6	GND	Ground	—
	7	+12V	+12 V power supply	—
	8	GND	Ground	—
	9	UNDER / -OVERSCAN	Underscan/overscan select	O
	10	SKEW1	AFC select switch 1	O
	11	SKEW2	AFC select switch 2	O
	12	OSD V SYNC	Vertical sync	I
	13	525CTRL	16 : 9 and 4 : 3 select	O
SA	1	SECAM DET	SECAM detect	I
	2	SECAM / -OTHERS	SECAM/other source select	O
	3	OPT1	System detect force mode 1	O
	4	SETUP	Setup level output	I
	5	OPT2	System detect force mode 2	O
	6	GND	Ground	—
	7	GND	Ground	—
	8	GND	Ground	—
	9	-SYNC DET	Sync detect	O
CN005	1	LED OUT	LED lighting	O
	2	GND	Ground	—
	3	SCAN0	Front control switch scan line	O
	4	SCAN1	Front control switch scan line	O
	5	SCAN2	Front control switch scan line	O
	6	SCAN3	Front control switch scan line	O
	7	SCAN4	Front control switch scan line	O
	8	GND	Ground	—
	9	GND	Ground	—
	10	SWIN0	Front control switch data line	I
	11	SWIN1	Front control switch data line	I
	12	SWIN2	Front control switch data line	I
	13	SWIN3	Front control switch data line	I
	14	GND	Ground	—
	15	GND	Ground	—

Table 12-1

Connector name	No.	Signal name (- is negative logic)	Signal function	I/O
CN006	1	BRIGHT	Bright A/D input line	I
	2	CONTRAST	Contrast A/D input line	I
	3	CHROMA (COLOR)	Chroma A/D input line	I
	4	PHASE (TINT)	Phase A/D input line	I
	5	VOLUME	Audio volume A/D input line	I
	6	GND	Ground	—
	7	GND	Ground	—
	8	NC	Not connected	—
	9	NC	Not connected	—
	10	GND	Ground	—
	11	GND	Ground	—
	12	GND	Ground	—
	13	GND	Ground	—
	14	+5V	+5V 5 V power supply	—
	15	GND	Ground	—

Table 12-1

MICOM(MICRO COMPUTER) PB ASS'Y BLOCK DIAGRAM

— 106 —
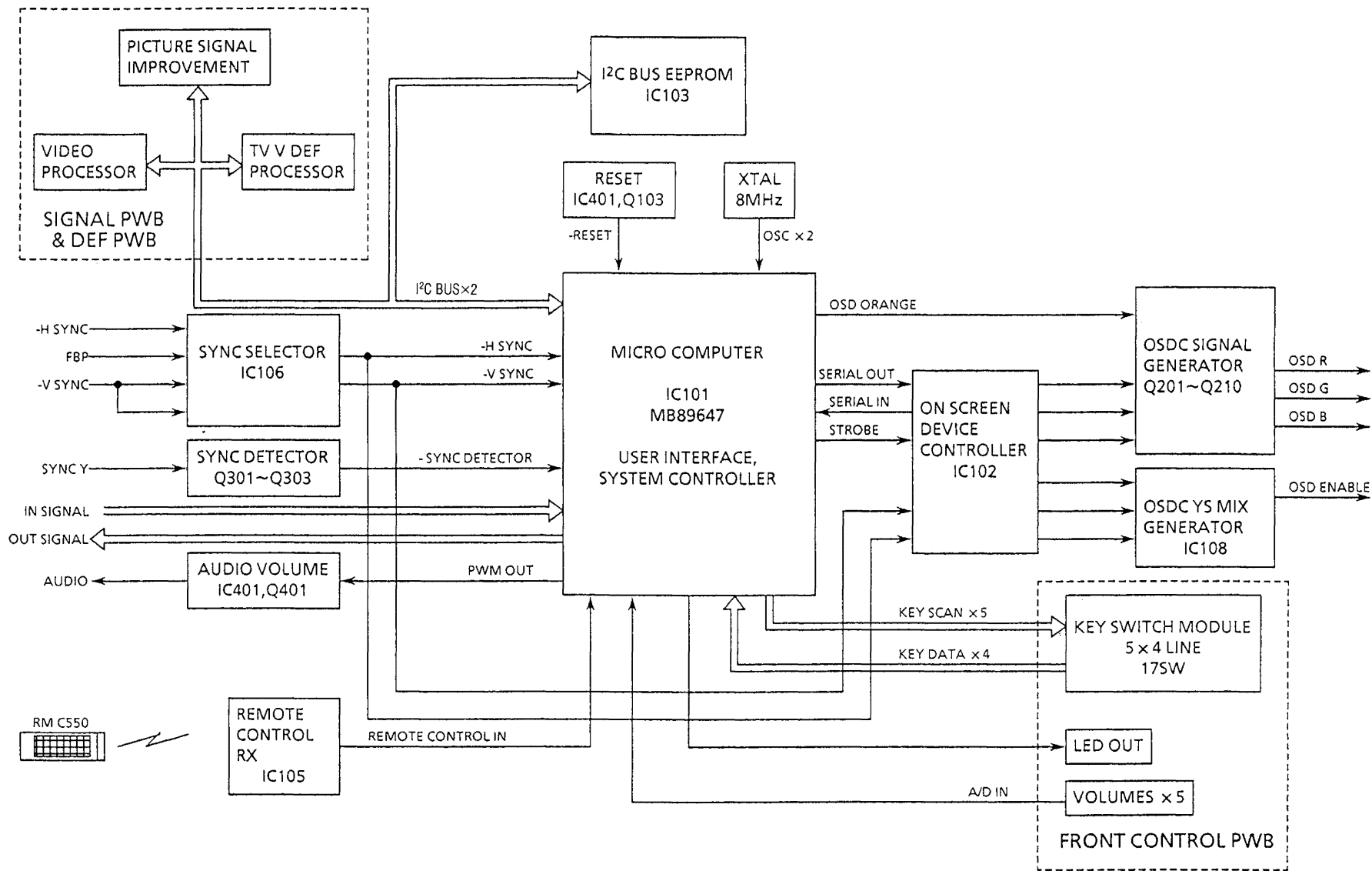
Deflection PB ASS'Y

1. Horizontal oscillator circuit

The horizontal sync signal from the signal PB ASS'Y is supplied via CN001 pin 4 to IC501 pin 9. The signal goes through the sync separator to the AFC circuit. The flyback pulse waveform is shaped by the IC553 monostable multivibrator and supplied as the sync signal for comparison to IC501 pin 11.
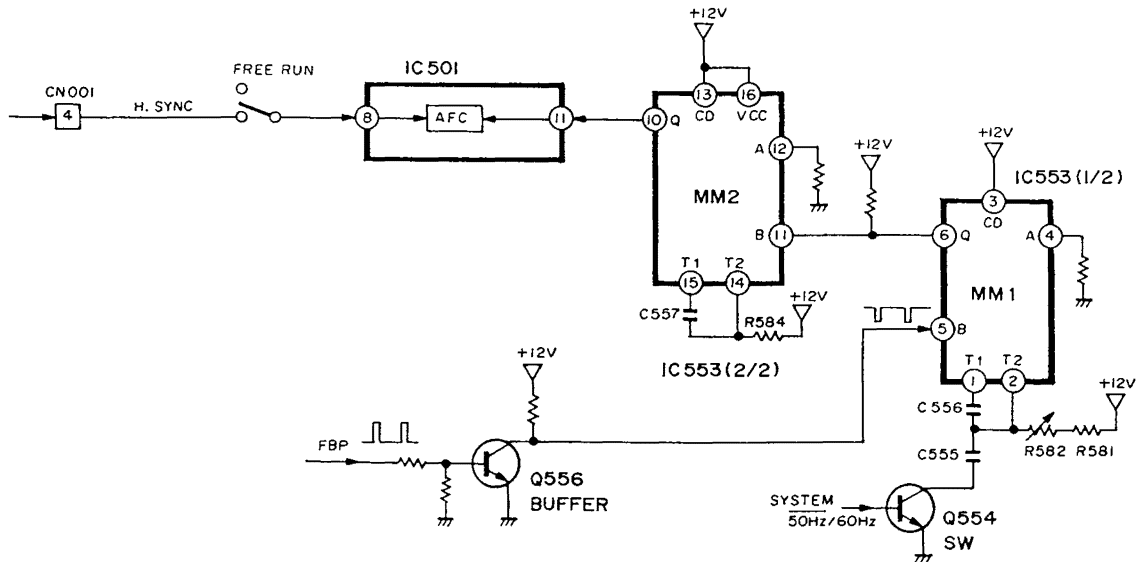
Fig. 1-1 H AFC circuit

●Monostable multivibrator operation

IC553 contains two monostable multivibrators. Both are triggered when input A is Low and at the falling edge of input B.

The flyback pulse is applied through inverting buffer Q556 to IC553 pin 5. The output pulse width is determined by R581, R582, C556 and C555. C555 is effective when Q554 is on. Q554 switches on when IC001 detects the system (NTSC/PAL) and produces a High(NTSC) output. C555 is used to prevent horizontal raster position change when the system is changed.

One monostable multivibrator output is sent from pin 6 to the other monostable multivibrator input at pin 11. The pulse width is determined by the time constant of R584 and C557.

●AFC time constant selection

The AFC time constant is normally fixed, but in the BM series, this can be selected by user control for slow, normal and fast.

These are selected by capacitors and control signals from the MPU. The control signal and mode relationships are indicated in Table 1-1.

MODE	SKEW 1	SKEW 2
Fast	High	Low
Normal	Low	High
Slow	Low	Low

Table 1-1 AFC and skew signal relationship

C561, C504 and C562 are respectively selected during fast, normal and slow. The horizontal sync signal is sent through AFC, oscillator and drive circuits of IC501 to produce the horizontal drive pulse output from pin 15.
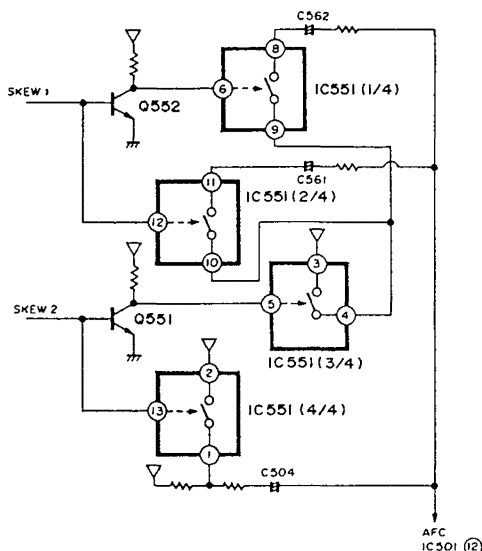
Fig. 1-2 AFC time constant selection

2. Horizontal output circuit

The drive pulse from IC501 pin 15 is sent via Q501 (horizontal drive) and T502 (drive transformer) to Q502 (horizontal output) to produce the output pulse.

A diode modulator circuit is used in the horizontal output section. The parabolic waveform from IC001 is amplified by Q510, Q504 and Q511, and side pincushion distortion corrected.

The center point DC of the diode modulator is controlled for controlling the horizontal size. C518 and C519 are used for S correction.
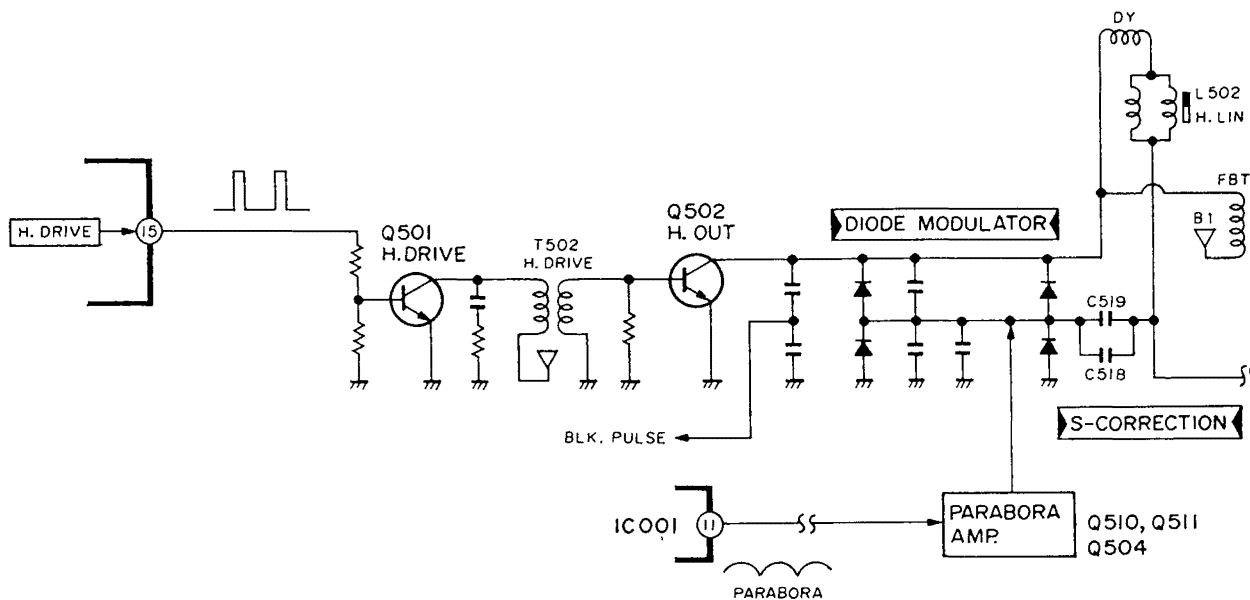
Fig. 2-1 Horizontal output circuit

3. Side pincushion and size regulation control

Following is a somewhat more detailed description of side pincushion correction and size regulation.

The parabolic signal for correcting side pincushion distortion is produced by IC001 and goes it out from pin 11.

The parabolic signal is inverted and amplified by the IC403 opamp, amplified by IC301 and sent via Q510, Q511 and Q504 to the diode modulator. Size is regulated by controlling the center point DC of the diode modulator.

The overscan and underscan size is first selected by the overscan/-underscan signal from the MPU. This control signal is used for the Q601 and Q603 switches. During overscan, Q601 is off and Q603 is on. Conversely, Q601 is off and Q603 is on during underscan. The DC voltage applied to IC403 pin 3 is thereby controlled (overscan: approx. 2.2 V, underscan: approx. 3 V).

The DC voltage divided from the anode is applied as feedback to IC403 pin 3. The divided DC voltage is applied through the IC 601 buffer (pins 5, 6 and 7) to the IC601 amplifier (pins 1, 2 and 3). The output DC voltage from IC601 pin 1 is applied through R431 to IC403 pin 3. The HVC control adjusts to prevent the IC601 offset voltage from deviating from the specification.

IC403 amplifies the parabolic signal for side pincushion correction and controls the DC voltage for correcting size regulation. In general, the size expands when the DC voltage decreases and compresses when the voltage increases.
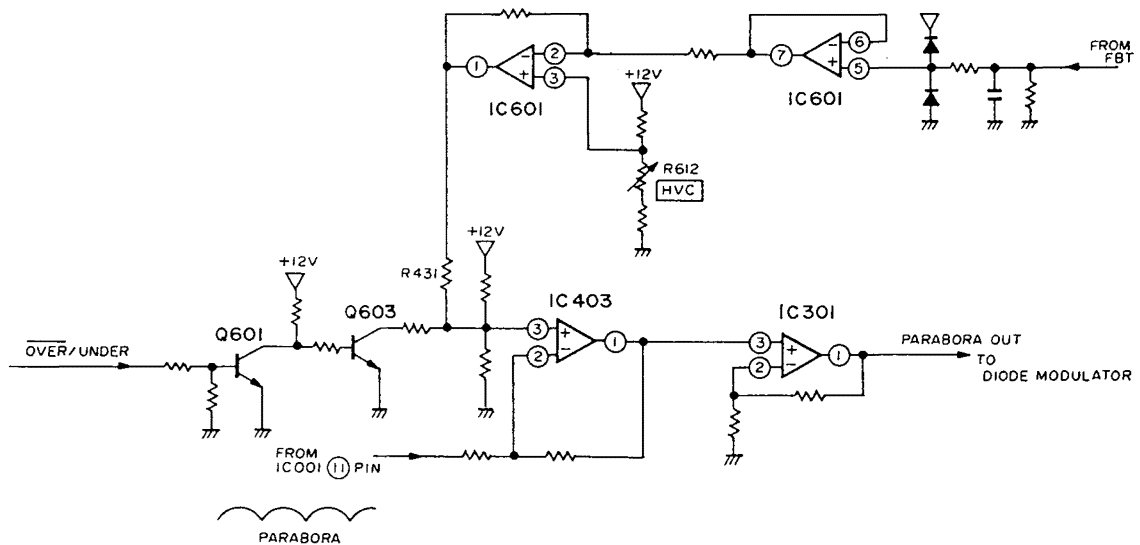
Fig. 3-1 Side pincushion and size regulation control

4. Screen control

Ordinarily, screen voltage is supplied from the FBT, but in this series, a separate circuit is provided for improving screen regulation.

The H-OUT collector pulse is rectified by D301 and C303, and is used as the DC screen voltage for controlling Q301. This control is performed in the following manner.

DC reference voltage determined by zener diode D305 is applied via R307 to pin 6 of opamp IC301. This DC voltage comes from D404.

The screen voltage is divided and applied as DC voltage to pin 5. Since IC301 functions as a differential amplifier, if the pin 5 voltage exceeds pin 6 (screen voltage increases), a High output is produced from pin 7. This increases the Q301 base current and the screen output voltage can be reduced. The screen control (R313) determines the Q301 operating point.
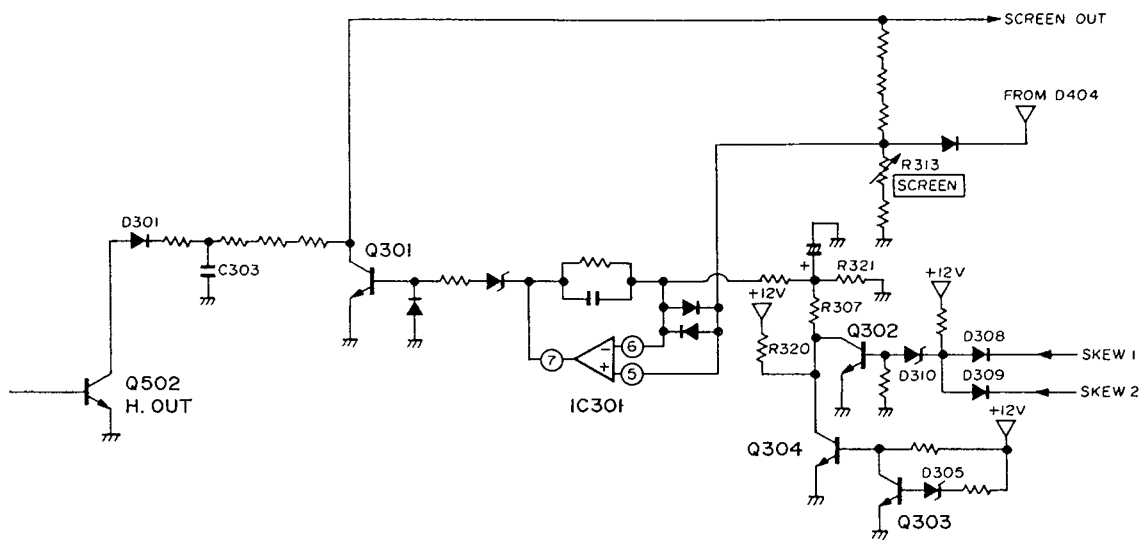
Fig. 4-1 Screen control and reset

●Screen reset

The screen voltage is reset at the time of power supply startup. This is in order to prevent an unstable CRT output in the period before the power supply reaches stable operation.

IC302 prevents screen glow. Until D305 switches on, IC302 holds IC301 pin 6 at Low potential. High potential from IC301 pin 7 prevents the screen voltage output.

Q302 prevents picture disturbance. During power supply startup, skew 1 and skew 2 signals from the MPU are both High. Normally, since at least one of these is Low, either D308 or D309 is on and consequently D310 and Q302 are off. Since both are High during power supply startup, D308 and D309 are off, while D310 and Q302 are on. The power supply is diverted to prevent screen voltage output.

5. Vertical circuit

The vertical sync signal processed by the signal PB ASS'Y is sent via CN001 pin 3 and buffer Q402 to IC001 pin 22. IC001 produces a sawtooth waveform which goes via the IC101 buffer and CN003 pin 6 to IC403 pin 5. The V. out waveform of the deflection yoke is also returned to pin 5. The DC offset voltage is applied to pin 6. When the pin 6 DC voltage changes, the output DC level and IC401 input DC level also change. Since this DC level change varies the vertical position, it is adjusted by the V center control.
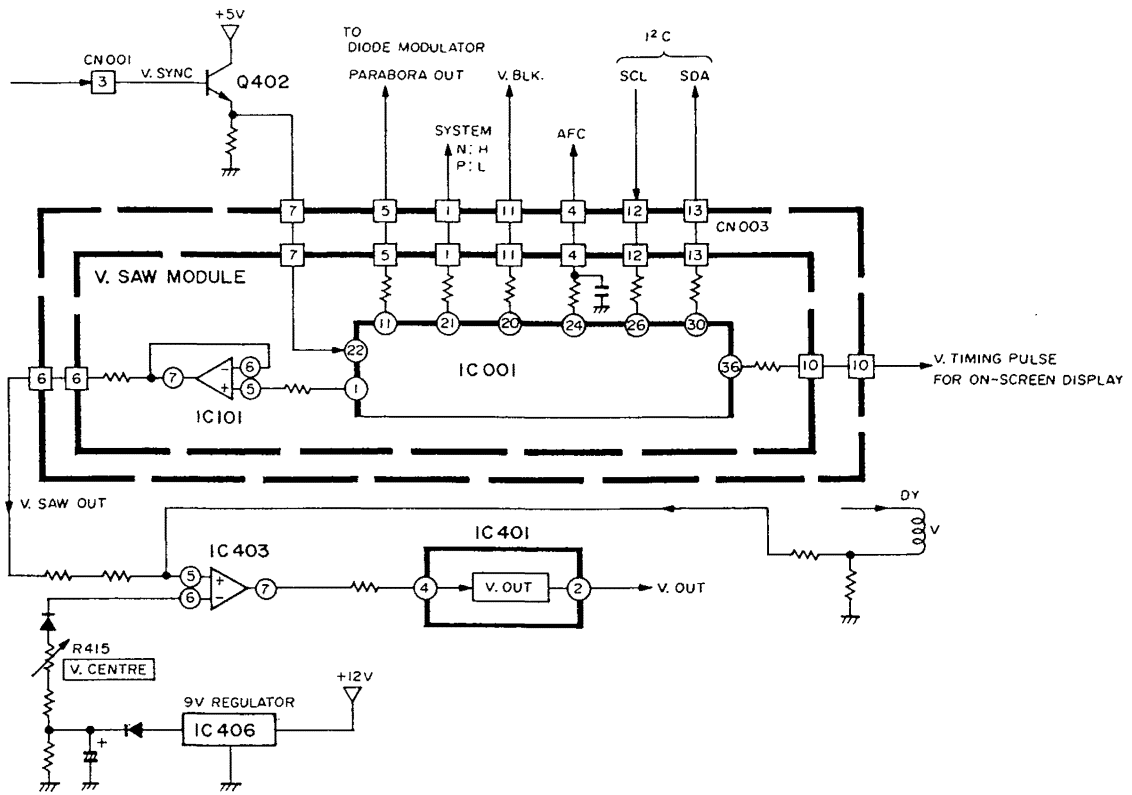
Fig. 5-1 Vertical circuit

6. Vertical deflection processor IC

IC001 processes the waveforms required by the vertical deflection circuit. The IC can be controlled by the I2C bus. The main pin functions are as follows;

Pin   Function
1   Sawtooth output
11   Parabola output
20   V blanking pulse output
21   System detector output (High: NTSC, Low: PAL)
22   Vertical sync input
24   AFC correction signal output
26   I2C bus serial clock input
30   I2C bus data input/output
31   Power supply (+ 5 V)
35   Power supply (+ 5 V)
36   Vertical sync timing pulse output
42   Zooming correction input

Power supply PB ASS'Y

1. Outline

The power supply circuit block diagram is shown in Fig. 1-1. The power supply circuit produces 1) 130 V for the CRT cathode, 2) 54 V B1 voltage and 3) plus and minus 15 V for other functions. An over-current protector circuit is also provided to stop the horizontal oscillation in event of deflection circuit malfunction.
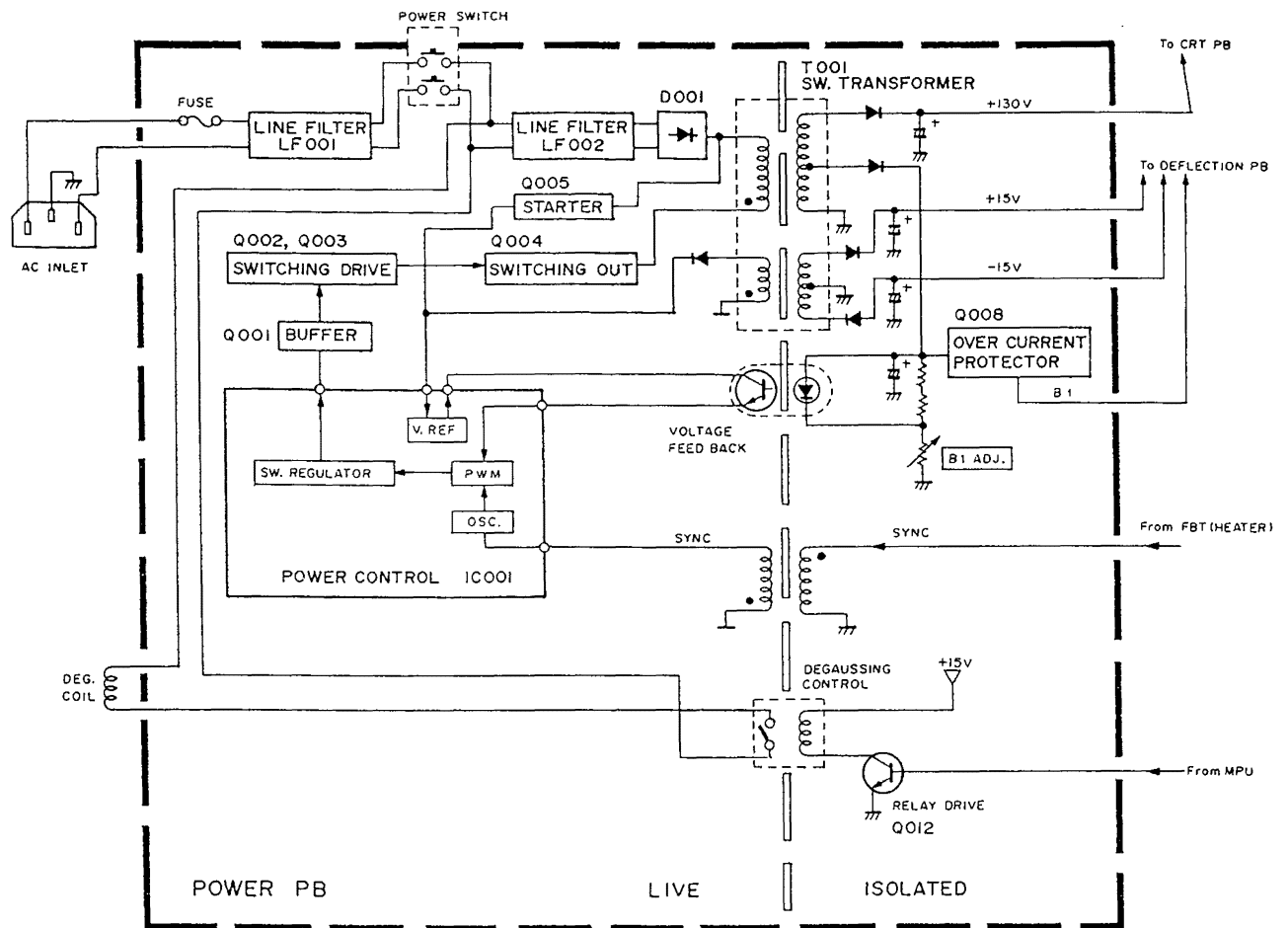
Fig. 1-1 Power supply circuit block diagram

2. Operation

●Surge protection

A varistor (VA001) is used for surge protection. Compared to a discharge tube or spark gap, the varistor has the following advantages with respect to surge voltage occurring from lightning or other cause.

● Large nonohmic response and wide voltage range. Voltage can be stabilized and surge absorbed in a wide range.

● Excellent surge absorption and fast response.

A rush resistor (R060) is provided for rush current protection.

●PWM switching regulator

Power on to switching start

AC voltage through the line filter is rectified by diode bridge D001. The rectified DC voltage via starter transistor Q005 forms the initial power supply of the switching control IC001.

The DC voltage is also applied from the switching transformer to the drain of FET Q004. In this state, the FET begins switching operation when the switching pulse is applied to the FET gate.

The IC001 internal oscillator begins operation when power is supplied to pin 16. Although the oscillator is synchronized to the external sync input at pin 13, in the initial state, the oscillation is free running. The free running frequency is determined by C019 and R023 at pin 11.

A squarewave output from the internal comparator is sent via pin 9 and buffer Q001 to drive transistors Q002 and Q003. A totem pole connection is used for Q002 and Q003. When the base potential is High, Q002 switches on; and when Low, Q003 switches on. The resulting output allows adequate current to flow in the FET drain.

When switching operation reaches normal, the IC001 power supply is rectified by D012 and DC voltage can be used.
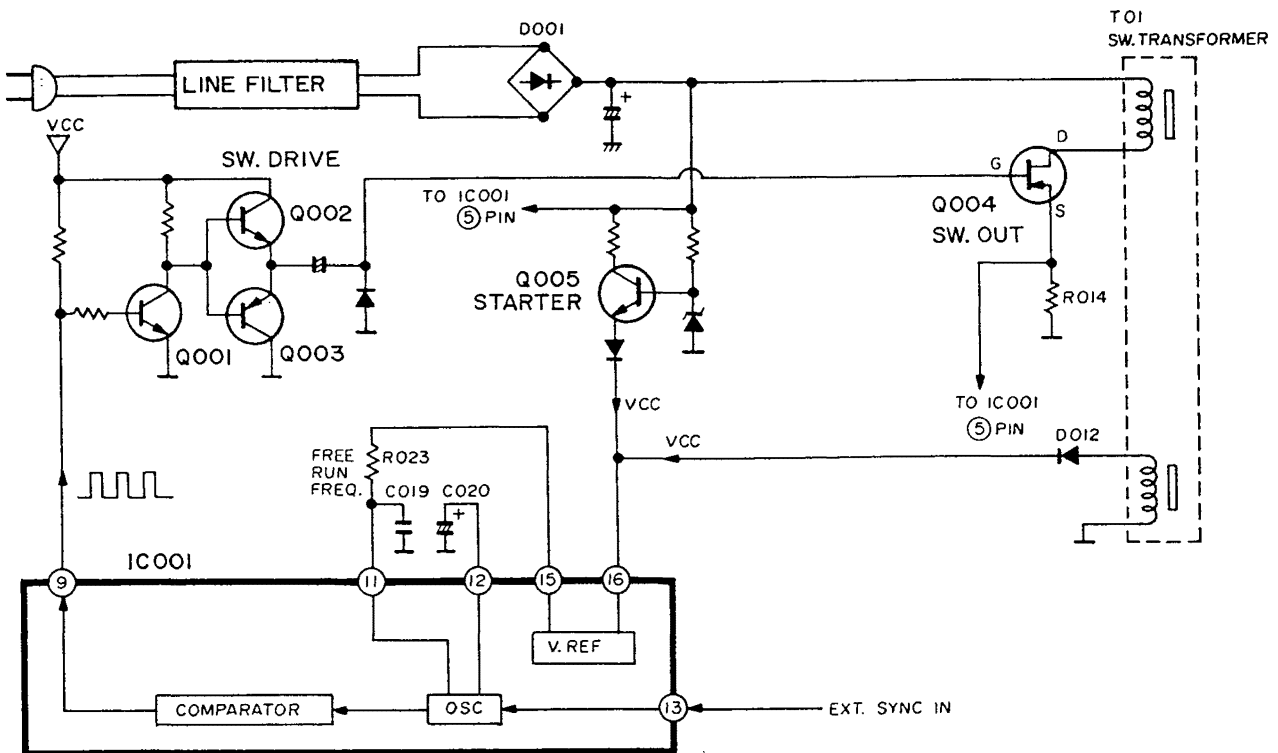
Fig. 2-1 PWM switching regulator

IC001 peripheral circuits

The power supply input at pin 16 is used to produce the 5 V reference voltage. The reference voltage from pin 15 is used as the power supply for the feedback, free run and soft start circuits.

Voltage divided from the IC power supply is applied to pin 2, where it is compared with the pin 1 reference voltage. If the pin 2 voltage exceeds pin 1, an error voltage is sent from pin 3 to pin 5. The output transistor Q004 drain current is also applied as DC voltage through R014 to pin 5. When the pin 5 voltage exceeds a fixed value, detector current from pin 6 charges C022. When the pin 6 voltage reaches 2.2 V, the IC output (pin 9) is latched.
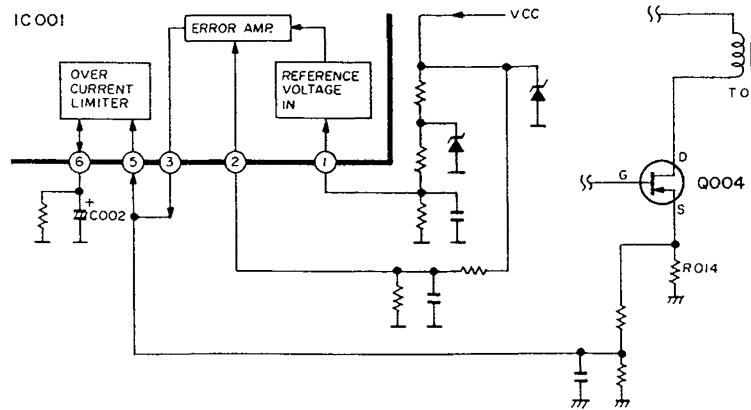
Fig. 2-2 IC001 peripheral circuits

The DC voltage directly after rectifying by D001 is divided by R043, R039 and R040, and applied to pin 8 for detecting AC voltage decline. When the AC input declines below approximately 60 V, the IC output stops. The output resumes when the voltage rises above approximately 70 V.
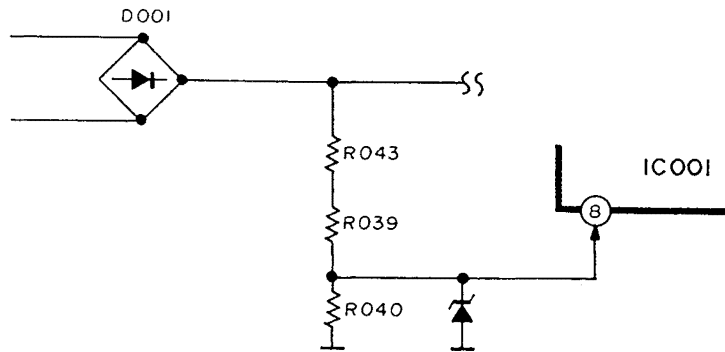
Fig. 2-3 Voltage loss detector circuit

The capacitor C020 at pin 20 is for applying external sync to the oscillator.

Pin 10 is for soft start. The squarewave duty from pin 9 is increased until capacitor C018 reaches full charge. This shortens the FET switch on time and protects the FET.

Output FET

An FET is used for the output element and offers the following advantages.

- Fast switching speed .... Reduced power loss
- Drive transformer not required .... Reduced cost
- Element itself can be made smaller .... Reduced cost

— 114 —

Overcurrent protection

B1 malfunction

In event of voltage circuit malfunction causing abnormal B1 current, the horizontal oscillation is stopped. Abnormally large B1 current (twice normal, 1.0 - 1.2 A) switches Q008 on. The collector goes High and switches on deflection PB ASS'Y zener diode D706. The deflection PB ASS'Y IC501 pin 16 then goes High. Pin 16 is the Xray protector terminal and when the input voltage exceeds 0.7 V, horizontal oscillation is stopped.
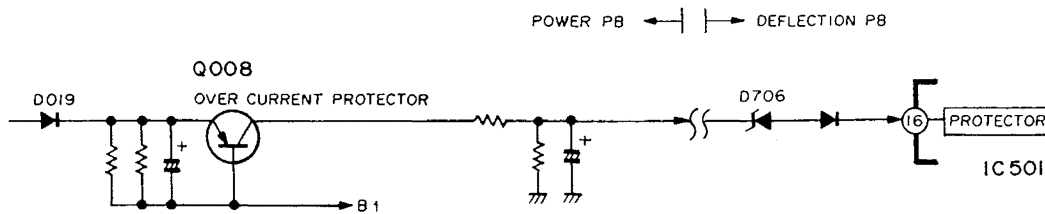
Fig. 2-4 Overcurrent protector circuit

Abnormal Q004 drain current

In event of damage to the above circuit system, rise in the primary side FET drain current is detected and the switching power supply oscillation is stopped (see Fig. 2-2).

The drain current is converted into DC and applied to IC001 pin 5. When the DC voltage exceeds 0.6 V, the pulse duty is increased to suppress the drain current, thus providing a current limiter function.

At the same time, C022 at pin 6 begins charging. If the excess current state continues intermittently, C022 continues charging. When the pin voltage reaches 2.2 V (typical), the pin 9 output is latched to provide an overcurrent cutoff function.

CRT

1. CRT outline

The cathode ray tube is an in-line dot trio type used in computer displays in order to obtain high resolution. The dot pitch is 0.40 mm.

A finer dot pitch is related to horizontal resolution. In addition, when the circuit frequency response fully matches the CRT performance, the horizontal resolution is increased.

Dot pitch

R G B R G B R G B
B R G B R G B R G
R G B R G B R G B

Pa: Dot pitch

Pth: Horizontal pitch

$$P_{th} = \frac{\sqrt{3}}{2} \times Pa$$
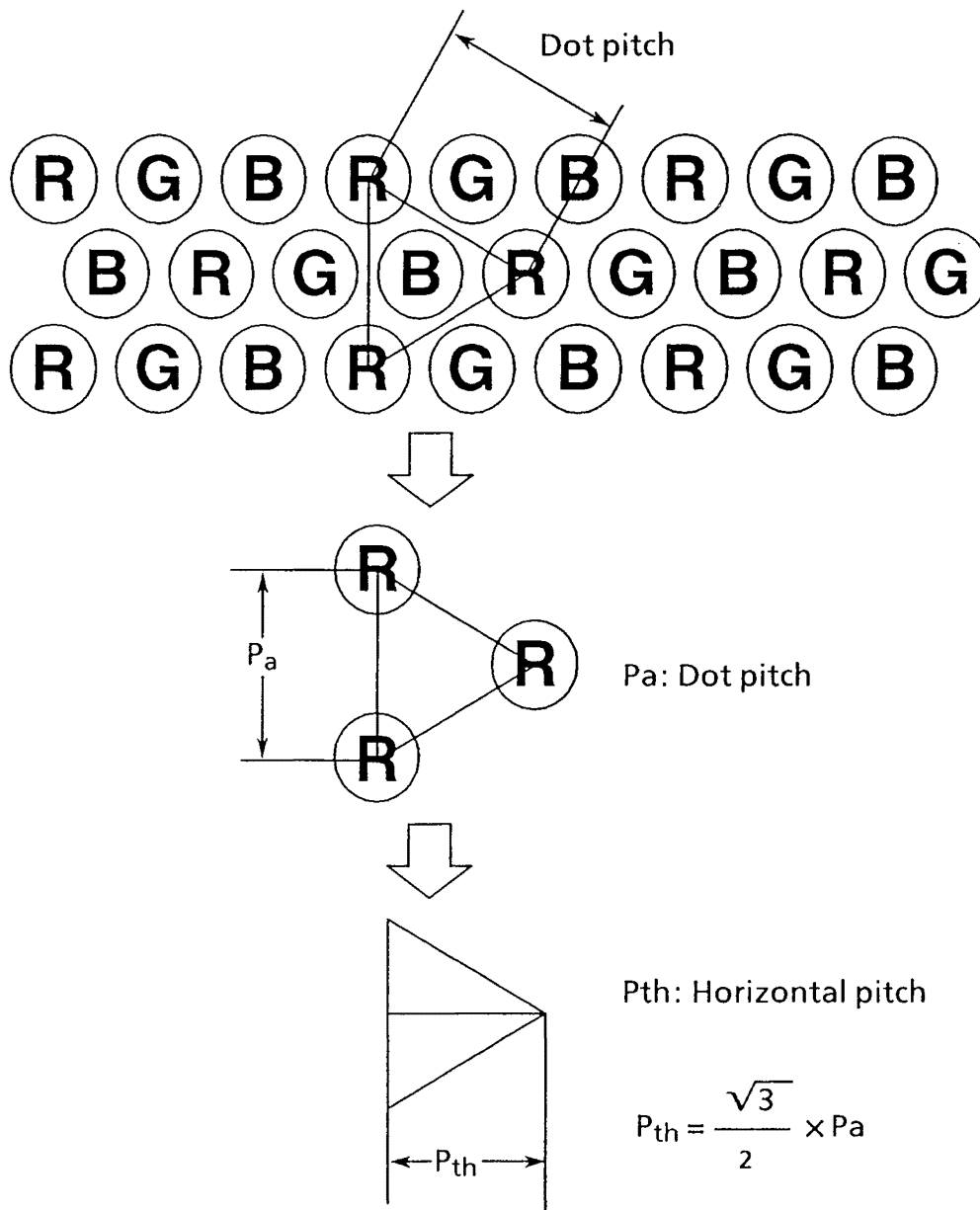
In this case, the horizontal resolution (TV lines) can be derived by the following formula.

$N = (Wh/Pth) \times (V/H)$

    Wh : Effective horizontal screen (mm)

    Pth: Horizontal dot pitch (mm)

    V/H: Screen aspect ratio (3/4)

These are derived as follows.

Horizontal dot pitch (Pth):

    $Pth = (\sqrt{3}/2) \times Pa = (\sqrt{3}/2) \times 0.40 = $ Approx. 0.346

    $N = (399/0.346) \times (3/4) = $ Approx. 865 TV lines

Althouth the BT-M1950Y CRT's can produce 865 lines, in practice, due to the monitor frequency response, these become 750 lines.

2. Phosphor

The BT-M1950T phosphor is SMPTE.

There are more than 50 types of phosphors classified according to type and applications. Of these, the P22 phosphor is used for color TV receivers and monitors.

The EBU is a type of P22 phosphor standardized for the EBU (European Broadcast Union).

The SMPTE (Society of Motion Picture and Television Engineers) phosphor is widely used in the United States.

Although the respective phosphors differ slightly in the RGB light emitting points on the CIE chromaticity chart, unless directly compared, the differences are not very apparent.

Service Manual

Supplement
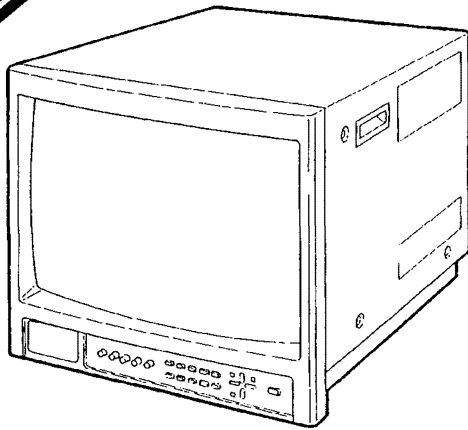
Color Video Monitor

BT-M1950Y

Chassis No. BM

Subject:
Exploded Views & Replacement Parts List

Please file and use this supplement manual together with the service manual for Model No. BT-M1950Y, Oder No. VED9604217C1.

⚠ **WARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

■ **CORRECTION OF SCHEMATIC DIAGRAM & PWB PATTERN DIAGRAM**

· **DEFLECTION PWD (page 72, 76, 77)**

DEFLECTION PWB PATTERN DIAGRAM (FX-2033A)

⇩

DEFLECTION PWB PATTERN DIAGRAM (FX-2044A)
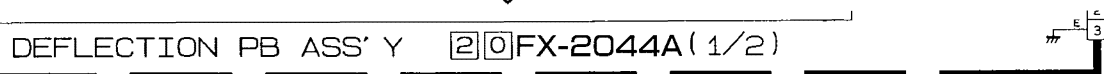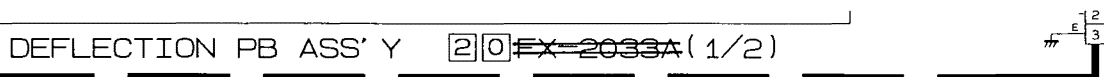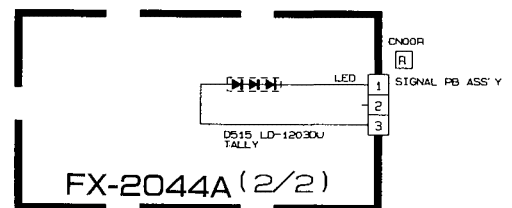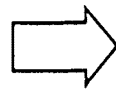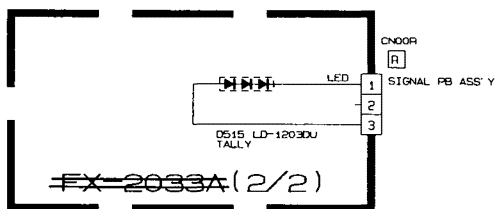
FX-2033A (2/2)

FX-2044A (2/2)

DEFLECTION PB ASS'Y ②⓪ FX-2033A (1/2)

⇩

DEFLECTION PB ASS'Y ②⓪ FX-2044A (1/2)

Panasonic®

Exploded Views 1

K15

DEFLECTION PW
BOARD ASS'Y (2 / 2)

K37

K35

K36

K34

K5

K11

K1

K10

K38

K12

K13

K39

K14

K2

K3

K16

K17

K8

K7

K18

MICOM PW
BOARD ASS'Y

CRT SOCKET
PW BOARD ASS'Y

K19

FRONT CONTROL
PW BOARD ASS'Y

INPUT PW
BOARD ASS'Y

POWER PW
BOARD ASS'Y (2 / 2)

K24

K26

K25

K12

K6

K20

K27

K9

K33

K12

K22

K23

K12

K21

K12

K12

K6
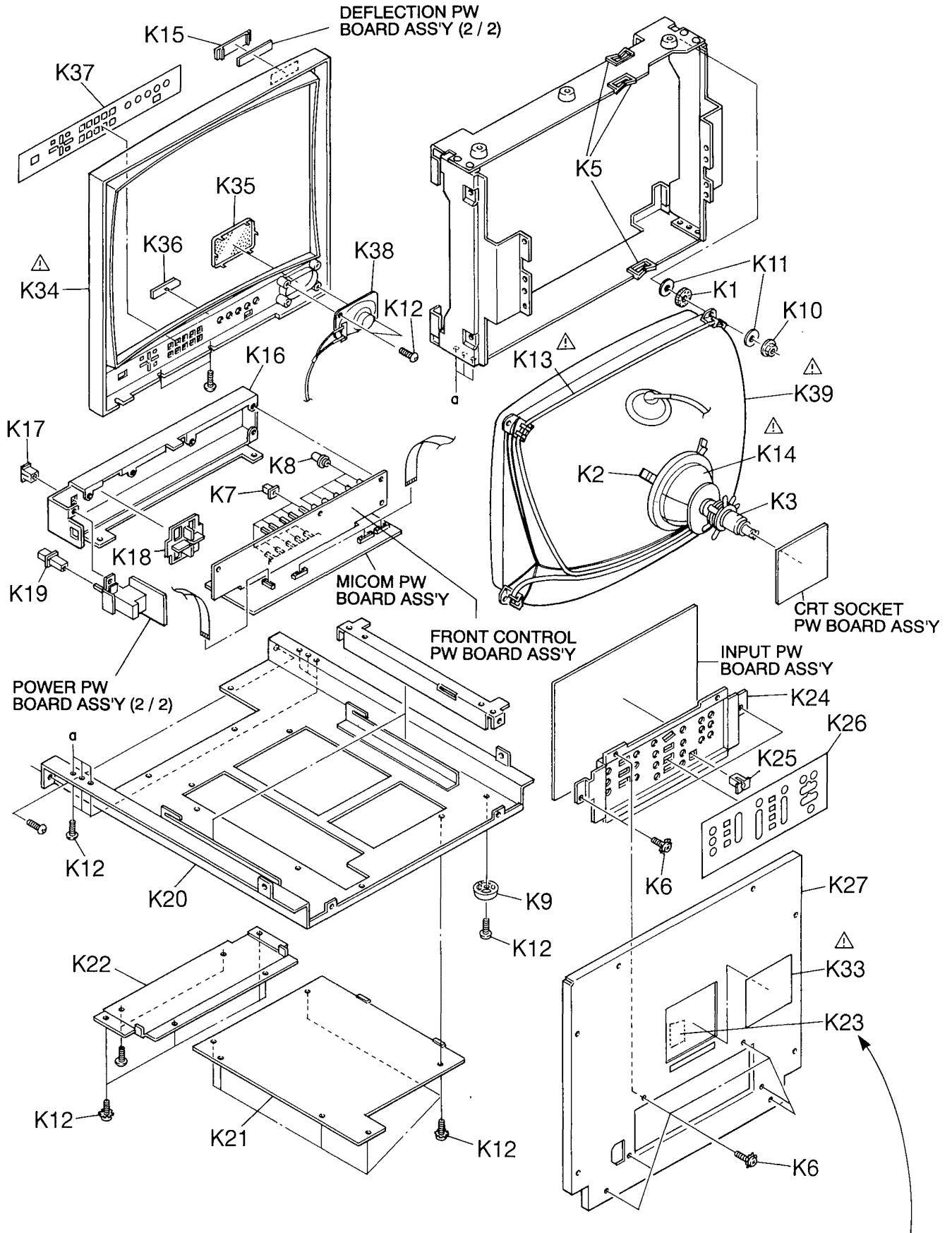
*Affixed to the inner side of the Rear Panel.

Exploded Views 2

K29

K28

K6

K6

K28

V.SAW
MODULE PW
BOARD ASS'Y

K4

POWER PW
BOARD ASS'Y (1 / 2)

K30

DEFLECTION PW
BOARD ASS'Y (1 / 2)

⚠

K31

K4

K32

SIGNAL PW BOARD ASS'Y
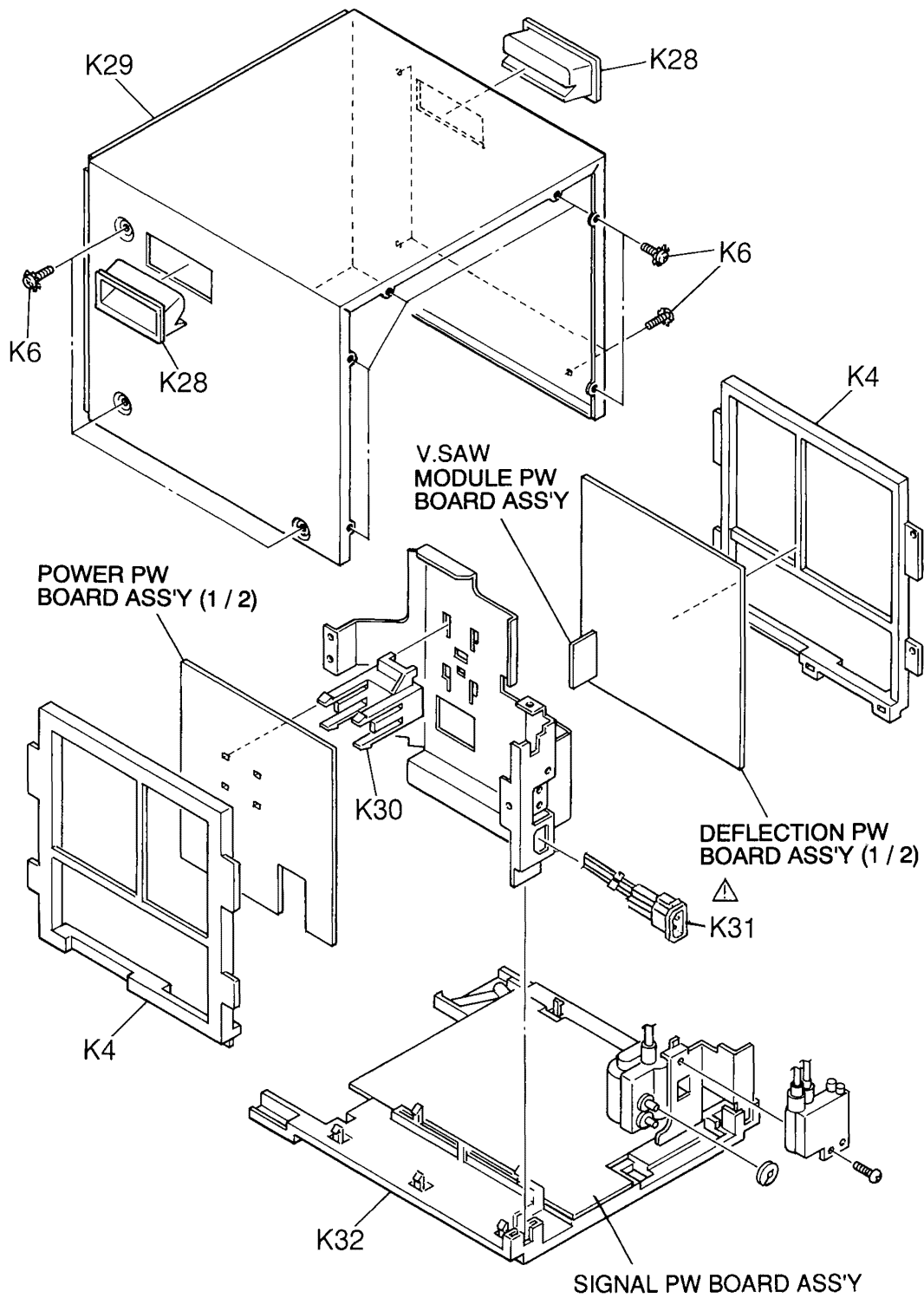
REPLACEMENT PARTS LIST

```
┌──────────────────── Important Safety Notice ────────────────────┐
│  Components identified by the International symbol ⚠ have special characteristics important for safety.  │
│  When replacing any of these components, use only manufacturer's specified parts.                        │
└──────────────────────────────────────────────────────────────────┘
```

Abbreviation of Part Name and Description

1. Resistor

Example:

ERD25TJ104 <u>C</u> 100KOHM, <u>J</u>, 1/4W

           TYPE   ALLOWANCE

TYPE		ALLOWANCE	
C :	Carbon	F :	±1%
F :	Fuse	G :	±2%
M :	Metal Oxide	J :	±5%
	Metal Film	K :	±10%
S :	Solid	M :	±20%
W :	Wire Wound		

2. Capacitor

Example:

ECKF1H103ZF <u>C</u> 0.01PF, <u>Z</u>, 50V

           TYPE   ALLOWANCE

TYPE		ALLOWANCE	
C :	Ceramic	C :	±0.25pF
E :	Electrolytic	D :	±0.5pF
P :	Polyester	F :	±1pF
PP:	Polypropylene	J :	±5%
S :	Styrol	K :	±10%
T :	Tantalum	L :	±15%
		M :	±20%
		P :	+100%, −0%
		Z :	+80%, −20%

Note: For G ○○ of Ref. No., not indicate illustration of it part on "Exploded Views".
Printed wiring board assembly with mark (RTL) is no longer available after production discontinuation of the complete set.

	Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
		MECHANICAL PARTS			K30	CM22752001V0	TRANS HOLDER
				⚠	K31	QMCB004-001	AC SOCKET
	G1	AP3756-23	BAG		K32	CM12531001V0	CHASSIS BASE
	K1	A48094-1	RUBBER CUSHION	⚠	K33	CM23064001(R	LABEL
	G2	CEMG002-001Z	FUSE HOLDER		K34	CM1269700DM0	FRONT PANEL
	K2	CE40764-00A	DY WEDGE		K35	CM47947-002	SPEAKER NET
	K3	CE42378-00B	MAGNET		K36	CM48199-001	PANASONIC BADGE
	K4	CM12530B01V0	PB BASE		K37	CM22912-002	CONTROL SHEET
	K5	CM41393-001	CLAMPER		K38	9050-03T	SPEAKER (SP01)
	K6	CM44287-00C	SCREW	⚠	K39	M48JBY02X/C	PICTURE TUBE (V01)
	K7	CM46044-002	PUSH KNOB		G5	CP11224-034	CARTON
	K8	CM47853-003	VOLUME KNOB		G6	CP11441-A0A	CUSHION
	G3	CM48038-001	LED HOLDER	⚠	G7	QMP1110-244K	AC POWER CORD
	K9	CN40054-00F	FOOT		G8	QPGA01203005	BAG
	K10	NFS5000Z	NUT		G9	QPGA02503505	BAG
	K11	Q03091-152	WASHER				
	K12	SBSF4012Z	SCREW				
⚠	K13	CELD056-002	DEGAUSSING COIL (L01)			**INTEGRATED CIRCUITS**	
⚠	K14	CJ28229-00A	DEFLECTION YOKE (DY01)				
⚠	G4	TQZB219	FAN BAG		ICM001	CXD2018Q	IC
	K15	CM44530-E01	PLATE		ICM101	UPC358G-W	IC
	K16	CM22909-A01	CONTROL BRACKET		ICM102	UPC358G-W	IC
	K17	CM48005-001	LINKAGE BUSHING		IC1101	TC4053BP	MOS IC (CMOS LOGIC)
	K18	CM36251-002	CURSOR KNOB		IC1201	AN5625N	LINEAR IC
	K19	CM46115-003	POWER KNOB		IC1202	TC4053BP	MOS IC (CMOS LOGIC)
	K20	CM12694-A0A	BOTTOM BASE		IC1203	AN5640	LINEAR IC
	K21	CM22919-001	BOTTOM SHIELD		IC1204	UPC358HA	IC
	K22	CM36249-A01	SHIELD COVER		IC1301	UPC358HA	IC
	K23	CM36241-003	WARNING LABEL		IC1302	UPC358HA	IC
	K24	CM35946-A01	TERMINAL PANEL		IC1303	UPC358HA	IC
	K25	CM48005-001	LINKAGE BUSHING		IC1304	TC4053BP	MOS IC (CMOS LOGIC)
	K26	CM35944-A01	TERMINAL SHEET		IC1305	TC4053BP	MOS IC (CMOS LOGIC)
	K27	CM12692-00A	REAR PANEL		IC1401	TDA4672	IC
	K28	CM35326-002	HANDLE		IC1402	TDA4680/V6	IC
	K29	CM12690-002	TOP COVER				

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
IC1403	AN7808	IC		Q1207	2SC2712	TRANSISTOR
IC1501	TC4053BP	MOS IC (CMOS LOGIC)		Q1208	2SC2712	TRANSISTOR
IC1502	TC4538BP	MOS IC (CMOS LOGIC)		Q1210	2SC2712	TRANSISTOR
IC1503	TC4538BP	MOS IC (CMOS LOGIC)		Q1212	2SC2712	TRANSISTOR
IC1504	TC4538BP	MOS IC (CMOS LOGIC)		Q1301	2SC2712	TRANSISTOR
IC1505	TC4538BP	MOS IC (CMOS LOGIC)		Q1302	2SC2712	TRANSISTOR
IC1506	TC4538BP	MOS IC (CMOS LOGIC)		Q1303	2SK374	FET
IC1507	TC4538BP	MOS IC (CMOS LOGIC)		Q1304	2SC2712	TRANSISTOR
IC1508	TC4538BP	MOS IC (CMOS LOGIC)		Q1305	2SC2712	TRANSISTOR
IC1509	TC4053BP	MOS IC (CMOS LOGIC)		Q1306	2SC2712	TRANSISTOR
IC1510	HD74LS00P	IC		Q1307	2SA1162YG	TRANSISTOR
IC1511	HD74LS05P	IC		Q1308	2SC2712	TRANSISTOR
IC1601	AN5265	LINEAR IC		Q1331	2SC2712	TRANSISTOR
IC2301	NJM4560D	IC		Q1332	2SC2712	TRANSISTOR
IC2303	AN79L05-Y	IC		Q1333	2SK374	FET
IC2401	UPC1498H	LINEAR IC		Q1334	2SC2712	TRANSISTOR
IC2403	NJM4560D	IC		Q1361	2SC2712	TRANSISTOR
IC2404	AN7812F	LINEAR IC		Q1362	2SC2712	TRANSISTOR
IC2405	TA79012S	IC		Q1363	2SK374	FET
IC2406	TA78L009APY	IC		Q1364	2SC2712	TRANSISTOR
IC2407	AN7812F	LINEAR IC		Q1451	2SC2712	TRANSISTOR
IC2408	AN7805F	LINEAR IC		Q1452	2SC2712	TRANSISTOR
IC2501	HA11423	IC		Q1453	2SC2712	TRANSISTOR
IC2551	TC4066BP	MOS IC (CMOS LOGIC)		Q1454	2SA1162YG	TRANSISTOR
IC2553	TC4538BP	MOS IC (CMOS LOGIC)		Q1455	2SC2712	TRANSISTOR
IC2554	LM2940CT-12	IC		Q1456	2SC2712	TRANSISTOR
IC2555	AN7812F	LINEAR IC		Q1457	2SC2712	TRANSISTOR
IC2601	NJM4560D	IC		Q1458	2SC2712	TRANSISTOR
IC5101	MB89647PF138	IC		Q1459	2SC2712	TRANSISTOR
IC5102	MB90077PF109	IC		Q1460	2SC2712	TRANSISTOR
IC5103	AT24BT-M1950	IC		Q1461	2SC2712	TRANSISTOR
IC5105	GP1U781Q	IC		Q1462	2SC2712	TRANSISTOR
IC5106	HD74HC158FP	IC		Q1501	2SA1162YG	TRANSISTOR
IC5108	HD74HC32FP	IC		Q1502	2SC2712	TRANSISTOR
IC5401	UPC4558G-W	IC		Q1503	2SC2712	TRANSISTOR
IC6201	LA7016	LINEAR IC		Q1504	2SC2712	TRANSISTOR
IC6601	TC4066BP	MOS IC (CMOS LOGIC)		Q1505	2SC2712	TRANSISTOR
IC6701	TC4053BP	MOS IC (CMOS LOGIC)		Q1506	2SA1162YG	TRANSISTOR
IC6801	HD74LS04P	IC		Q1507	2SC2712	TRANSISTOR
⚠ IC9001	FA5301P	IC		Q1508	2SC2712	TRANSISTOR
				Q1509	2SC2712	TRANSISTOR
				Q1510	2SA1162YG	TRANSISTOR
				Q1511	2SC2712	TRANSISTOR
		TRANSISTORS		Q1512	2SC2712	TRANSISTOR
				Q1513	2SC2712	TRANSISTOR
Q1101	2SC2712	TRANSISTOR		Q1514	2SC2712	TRANSISTOR
Q1102	2SC2712	TRANSISTOR		Q1515	2SC2712	TRANSISTOR
Q1103	2SC2712	TRANSISTOR		Q1551	2SA1162YG	TRANSISTOR
Q1104	2SC2712	TRANSISTOR		Q2301	2SC4632	TRANSISTOR
Q1105	2SC2712	TRANSISTOR		Q2302	2SC1815	TRANSISTOR
Q1106	2SA1162YG	TRANSISTOR		Q2303	2SC1815	TRANSISTOR
Q1107	2SA1162YG	TRANSISTOR		Q2304	2SC1815	TRANSISTOR
Q1108	2SC2712	TRANSISTOR		Q2401	2SC3311A	TRANSISTOR
Q1109	2SC2712	TRANSISTOR		Q2402	2SC1815	TRANSISTOR
Q1110	2SC2712	TRANSISTOR		Q2403	2SC1815	TRANSISTOR
Q1111	2SC2712	TRANSISTOR		Q2404	2SC1815	TRANSISTOR
Q1112	2SC2712	TRANSISTOR		Q2405	2SC1815	TRANSISTOR
Q1113	2SC2712	TRANSISTOR		Q2501	2SC3187	TRANSISTOR
Q1114	2SC2712	TRANSISTOR	⚠	Q2502	2SC4589	TRANSISTOR
Q1115	2SC2712	TRANSISTOR		Q2504	2SA1309A	TRANSISTOR
Q1116	2SA1162YG	TRANSISTOR		Q2506	2SC1815	TRANSISTOR
Q1117	2SA1162YG	TRANSISTOR		Q2510	2SA1309A	TRANSISTOR
Q1118	2SC2712	TRANSISTOR		Q2511	2SD1408	TRANSISTOR
Q1201	2SC2712	TRANSISTOR		Q2551	2SC1815	TRANSISTOR
Q1202	2SC2712	TRANSISTOR		Q2552	2SC1815	TRANSISTOR
Q1203	2SC2712	TRANSISTOR		Q2554	2SC1815Y	TRANSISTOR
Q1204	2SC2712	TRANSISTOR		Q2556	2SC1815	TRANSISTOR
Q1205	2SC2712	TRANSISTOR		Q2601	2SC1959	TRANSISTOR
Q1206	2SC2712	TRANSISTOR		Q2603	2SC1959	TRANSISTOR

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
Q2701	2SC1815	TRANSISTOR		Q9003	2SA562TM	TRANSISTOR
Q3301	2SC4502	TRANSISTOR	⚠ Q9004	2SK1118	FET
Q3302	2SC4502	TRANSISTOR		Q9005	2SD1409	TRANSISTOR
Q3303	2SC4502	TRANSISTOR		Q9006	2SC1959	TRANSISTOR
Q3304	2SC4544	TRANSISTOR		Q9008	2SA1370	TRANSISTOR
Q3305	2SC4544	TRANSISTOR		Q9012	2SC1472	TRANSISTOR
Q3306	2SC4544	TRANSISTOR				
Q3307	2SA1321	TRANSISTOR				
Q3308	2SA1321	TRANSISTOR			DIODES	
Q3309	2SA1321	TRANSISTOR				
Q3310	2SC3334	TRANSISTOR		DM101	MA111	DIODE
Q3311	2SC3334	TRANSISTOR		D1101	MA151K	DIODE
Q3312	2SC3334	TRANSISTOR		D1201	MA151K	DIODE
Q3501	2SC1505	TRANSISTOR		D1202	MA151K	DIODE
Q5101	2SC2712	TRANSISTOR		D1203	MA151K	DIODE
Q5102	2SC2712	TRANSISTOR		D1451	MA3082M	DIODE
Q5103	2SC2712	TRANSISTOR		D1452	MA3082M	DIODE
Q5104	2SC2712	TRANSISTOR		D1453	MA3082M	DIODE
Q5105	2SC2712	TRANSISTOR		D1454	MA3082M	DIODE
Q5106	2SC2712	TRANSISTOR		D1455	MA3082M	DIODE
Q5201	2SC2712	TRANSISTOR		D1456	MA3082M	DIODE
Q5202	2SA1162YG	TRANSISTOR		D1501	MA151K	DIODE
Q5203	2SC2712	TRANSISTOR		D1552	1SS133	DIODE
Q5204	2SA1162YG	TRANSISTOR		D1553	1SS133	DIODE
Q5205	2SC2712	TRANSISTOR		D1554	MA151K	DIODE
Q5206	2SA1162YG	TRANSISTOR		D1702	1SS81	DIODE
Q5207	2SC2712	TRANSISTOR		D2301	RU4DS	DIODE
Q5208	2SC2712	TRANSISTOR		D2302	1SS133	DIODE
Q5209	2SC2712	TRANSISTOR		D2303	MA4062M	ZENER DIODE
Q5210	2SC2712	TRANSISTOR		D2304	1SS133	DIODE
Q5301	2SA1162YG	TRANSISTOR		D2305	RD9.1ESB3	DIODE
Q5302	2SA1162YG	TRANSISTOR		D2306	1SS133	DIODE
Q5303	2SA1162YG	TRANSISTOR		D2307	1SS133	DIODE
Q5304	2SC2712	TRANSISTOR		D2308	1SS133	DIODE
Q5401	2SC2712	TRANSISTOR		D2309	1SS133	DIODE
Q6201	2SC1740S	TRANSISTOR		D2310	RD3.3ESB2	DIODE
Q6202	2SC1740S	TRANSISTOR		D2401	1SS133	DIODE
Q6203	2SC1740S	TRANSISTOR		D2402	TVSRGP10J	DIODE
Q6204	2SC1740S	TRANSISTOR		D2404	RU30	DIODE
Q6206	2SC1740S	TRANSISTOR		D2405	RD3.9ESB2	DIODE
Q6211	2SK301	FET		D2406	RD75EB	DIODE
Q6301	2SC1740S	TRANSISTOR		D2407	1SS133	DIODE
Q6302	2SC1740S	TRANSISTOR		D2408	1SS133	DIODE
Q6303	2SC1740S	TRANSISTOR	⚠ D2501	ERD07-15	DIODE
Q6601	2SC1740S	TRANSISTOR		D2502	1SS133	DIODE
Q6602	2SC1740S	TRANSISTOR		D2503	RD10ESB3	DIODE
Q6603	2SC1740S	TRANSISTOR		D2504	ERD07-15	DIODE
Q6604	2SC1740S	TRANSISTOR		D2505	ERD07-15	DIODE
Q6605	2SC1740S	TRANSISTOR		D2506	RU3AM	DIODE
Q6606	2SC1740S	TRANSISTOR		D2507	RU3AM	DIODE
Q6701	2SC1740S	TRANSISTOR		D2509	RU4AM	DIODE
Q6702	2SC1740S	TRANSISTOR		D2510	MA165	DIODE
Q6703	2SC1740S	TRANSISTOR		D2511	RU3AM	DIODE
Q6704	2SC1740S	TRANSISTOR		D2512	1SS81	DIODE
Q6706	2SC1740S	TRANSISTOR		D2513	MA4220M	ZENER DIODE
Q6707	2SA933S	TRANSISTOR		D2515	LD-1203DU	LED
Q6708	2SC1740S	TRANSISTOR		D2601	1SS81	DIODE
Q6709	2SC1740S	TRANSISTOR		D2602	1SS81	DIODE
Q6711	2SC1740S	TRANSISTOR		D2603	MA4047M	ZENER DIODE
Q6712	2SA933S	TRANSISTOR	⚠ D2701	MA4068N	DIODE
Q6713	2SC1740S	TRANSISTOR		D2702	1SS82	DIODE
Q6714	2SC1740S	TRANSISTOR		D2703	1SS133	DIODE
Q6716	2SC1740S	TRANSISTOR		D2704	1SS133	DIODE
Q6717	2SC1740S	TRANSISTOR		D2705	1SS146	DIODE
Q6718	2SC1740S	TRANSISTOR		D2706	MA4110M	ZENER DIODE
Q6719	2SC1740S	TRANSISTOR		D2708	1SS133	DIODE
Q6720	2SC1740S	TRANSISTOR		D2709	1SS146	DIODE
Q9001	2SC1959	TRANSISTOR		D2711	1SS133	DIODE
Q9002	2SC1959	TRANSISTOR				

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
D3301	MA165	DIODE		D5714	MA8056	DIODE
D3302	MA165	DIODE		D5715	MA3056L	DIODE
D3303	MA165	DIODE		D5716	MA8056	DIODE
D3304	1SS244	DIODE		D5717	MA3150M	DIODE
D3305	1SS244	DIODE		D5718	MA3056L	DIODE
D3306	1SS244	DIODE		D5719	MA8130	DIODE
D3307	1SS120	DIODE		D5720	MA3056L	DIODE
D3308	1SS120	DIODE		D5721	MA3056L	DIODE
D3309	1SS120	DIODE		D5722	MA3056L	DIODE
D3316	MA4075M	ZENER DIODE		D5723	MA8056	DIODE
D3501	TVSRGP10J	DIODE		D5724	MA3150M	DIODE
D3502	TVSRGP10J	DIODE		D5725	MA8130	DIODE
D3503	1SS146	DIODE		D5726	MA3056L	DIODE
D3504	1SS146	DIODE		D5727	MA8056	DIODE
D4101	MA165	DIODE		D5728	MA3056L	DIODE
D4102	MA165	DIODE		D5729	MA3056L	DIODE
D4103	MA165	DIODE		D5730	MA3056L	DIODE
D4104	MA165	DIODE		D5731	MA3056L	DIODE
D4105	MA165	DIODE		D5732	MA3056L	DIODE
D4106	MA165	DIODE		D6201	1SS133	DIODE
D4107	MA165	DIODE		D6202	1SS133	DIODE
D4108	MA165	DIODE		D6203	1SS133	DIODE
D4109	MA165	DIODE		D6204	1SS133	DIODE
D4110	MA165	DIODE		D6205	1SS133	DIODE
D4111	MA165	DIODE		D6206	1SS133	DIODE
D4112	MA165	DIODE		D6207	1SS133	DIODE
D4113	MA165	DIODE		D6208	1SS133	DIODE
D4114	MA165	DIODE		D6209	1SS133	DIODE
D4115	RD5.6ESB3	DIODE		D6211	1SS133	DIODE
D4116	RD5.6ESB3	DIODE		D6212	1SS133	DIODE
D4117	RD5.6ESB3	DIODE		D6301	1SS133	DIODE
D4118	RD5.6ESB3	DIODE		D6302	1SS133	DIODE
D4119	RD5.6ESB3	DIODE		D6303	1SS133	DIODE
D4120	GL5KG8	LED		D6701	1SS133	DIODE
D4121	MA165	DIODE		D6702	1SS133	DIODE
D4122	MA165	DIODE		D6703	1SS133	DIODE
D4123	MA165	DIODE		D6704	1SS133	DIODE
D5101	MA3056L	DIODE		D6705	1SS133	DIODE
D5102	MA3056L	DIODE		D6706	1SS133	DIODE
D5103	MA3056L	DIODE		D6707	1SS133	DIODE
D5104	MA3056L	DIODE		D6708	1SS133	DIODE
D5105	MA3056L	DIODE		D6709	1SS133	DIODE
D5106	MA3056L	DIODE		D6710	1SS133	DIODE
D5107	MA3056L	DIODE		D6711	1SS133	DIODE
D5108	MA3056L	DIODE		D6712	1SS133	DIODE
D5109	MA3056L	DIODE		D6801	1SS133	DIODE
D5110	MA3056L	DIODE		D6802	1SS133	DIODE
D5111	MA3056L	DIODE		D6803	1SS133	DIODE
D5112	MA3043	DIODE		D6804	1SS133	DIODE
D5113	MA151K	DIODE		D6805	1SS133	DIODE
D5114	MA151K	DIODE		D6806	1SS133	DIODE
D5301	MA151K	DIODE		D6807	1SS133	DIODE
D5501	MA3056L	DIODE		D6808	1SS133	DIODE
D5502	MA3056L	DIODE	⚠	D9001	S4VB60	DIODE
D5503	MA3056L	DIODE		D9005	TVSRG2A	DIODE
D5504	MA3056L	DIODE		D9006	FML-G12S	DIODE
D5701	MA3150M	DIODE		D9009	1SS133	DIODE
D5702	MA3056L	DIODE		D9010	RL4Z	DIODE
D5703	MA3056L	DIODE		D9012	EG1Z	DIODE
D5704	MA3056L	DIODE		D9013	1SS133	DIODE
D5705	MA3150M	DIODE		D9014	1SS133	DIODE
D5706	MA3150M	DIODE		D9016	1SS133	DIODE
D5707	MA3056L	DIODE		D9017	1SS133	DIODE
D5708	MA3056L	DIODE		D9018	RG4C	DIODE
D5709	MA3150M	DIODE		D9019	RG4C	DIODE
D5710	MA3150M	DIODE		D9020	1SS133	DIODE
D5711	MA3150M	DIODE		D9021	MA4068N	DIODE
D5712	MA8130	DIODE	⚠	D9022	MA4068N	DIODE
D5713	MA3056L	DIODE		D9023	MA4110M	ZENER DIODE

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
D9024	RD5.6ESB2	DIODE		RM101	QRSA08J563YL	M 56KOHM, J, 1/10W
D9026	RD18ESB3	DIODE		RM102	QRSA08J103YL	M 10KOHM, J, 1/10W
D9028	1SS81	DIODE		RM103	QRSA08J101YL	M 100 OHM, J, 1/10W
D9032	1SS81	DIODE		RM104	QRSA08J472YL	M 4.7KOHM, J, 1/10W
D9033	TVSRD3.3EB2	DIODE		RM105	QRSA08J103YL	M 10KOHM, J, 1/10W
				RM106	QRSA08J333YL	M 33KOHM, J, 1/10W
	COILS			RM107	QRSA08J333YL	M 33KOHM, J, 1/10W
				RM108	QRSA08J101YL	M 100 OHM, J, 1/10W
DL1101	CE41577-002	DELAY LINE		RM109	QRSA08J101YL	M 100 OHM, J, 1/10W
DL1102	CE40959-001	DELAY LINE		RM110	QRSA08J101YL	M 100 OHM, J, 1/10W
DL1201	CE41489-001	DELAY LINE		RM111	QRSA08J101YL	M 100 OHM, J, 1/10W
LM001	CELP006-4R7Z	PEAKING COIL 4.7		RM112	QRSA08J101YL	M 100 OHM, J, 1/10W
LM101	CELP006-4R7Z	PEAKING COIL 4.7		RM113	QRSA08J104YL	M 100KOHM, J, 1/10W
L1101	CELP026100Z	PEAKING COIL 10U		R1052	QRSA08J332YL	M 3.3KOHM, J, 1/10W
L1102	CELP026150Z	PEAKING COIL 15U		R1057	QRSA08J822YL	M 8.2KOHM, J, 1/10W
L1103	CELP0265R6Z	PEAKING COIL 5.6		R1058	QRSA08J123YL	M 12KOHM, J, 1/10W
L1104	CELP026270Z	PEAKING COIL 27U		R1101	QRSA08J222YL	M 2.2KOHM, J, 1/10W
L1201	CELP0268R2Z	PEAKING COIL 8.2		R1102	QRSA08J102YL	M 1KOHM, J, 1/10W
L1202	CELP0268R2Z	PEAKING COIL 8.2		R1103	QRSA08J472YL	M 4.7KOHM, J, 1/10W
L1203	CELP026390Z	PEAKING COIL 39U		R1104	QRSA08J122YL	M 1.2KOHM, J, 1/10W
L1204	CELP0264R7Z	PEAKING COIL 4.7		R1105	QRSA08J561YL	M 560 OHM, J, 1/10W
L1206	CELP026820Z	PEAKING COIL 82U		R1106	QRSA08J681YL	M 680 OHM, J, 1/10W
L1207	CELP026820Z	PEAKING COIL 82U		R1107	QVPC611202HZ	CONTROL 2KOHMB
L1601	CELP0264R7Z	PEAKING COIL 4.7		R1108	QRSA08J470YL	M 47 OHM, J, 1/10W
L2501	CELC009003	CHOKE COIL		R1109	QRSA08J271YL	M 270KOHM, J, 1/10W
⚠ L2502	CELL009001	LINIARITY COIL		R1110	QRSA08J122YL	M 1.2KOHM, J, 1/10W
L2701	CJ30030026	HEATER CHOKE		R1111	QRSA08J271YL	M 270KOHM, J, 1/10W
L3301	CELP026-5R6Z	PEAKING COIL 5.6		R1112	QRSA08J102YL	M 1KOHM, J, 1/10W
L3302	CELP026-4R7Z	PEAKING COIL		R1113	QRSA08J681YL	M 680 OHM, J, 1/10W
L3303	CELP026-3R9Z	PEAKING COIL 3.9		R1114	QRSA08J102YL	M 1KOHM, J, 1/10W
L3304	CELP026-220Z	PEAKING COIL 22U		R1115	QRSA08J681YL	M 680 OHM, J, 1/10W
L3305	CELP026-180Z	PEAKING COIL 18U		R1116	QRSA08J122YL	M 1.2KOHM, J, 1/10W
L3306	CELP026-220Z	PEAKING COIL 22U		R1117	QVPC611501HZ	CONTROL 500 OHMB
L3501	A49468-562	PEAKING COIL 560		R1118	QRSA08J102YL	M 1KOHM, J, 1/10W
L5101	CELP008100YL	CHIP COIL		R1119	QRSA08J102YL	M 1KOHM, J, 1/10W
L5102	CELP008100YL	CHIP COIL		R1120	QVPC611202HZ	CONTROL 2KOHMB
L5103	CELP008330YL	COIL		R1121	QRSA08J471YL	M 470 OHM, J, 1/10W
L6701	CELP026-330Z	PEAKING COIL 33U		R1122	QRSA08J102YL	M 1KOHM, J, 1/10W
L6702	CELP026-680Z	PEAKING COIL 68U		R1123	QRSA08J681YL	M 680 OHM, J, 1/10W
L6703	CELP026-330Z	PEAKING COIL 33U		R1124	QRSA08J182YL	M 1.8KOHM, J, 1/10W
L6704	CELP026-680Z	PEAKING COIL 68U		R1125	QRSA08J681YL	M 680 OHM, J, 1/10W
L9901	CELP006-4R7Z	PEAKING COIL 4.7		R1126	QRSA08J562YL	M 5.6KOHM, J, 1/10W
L9902	CJ30030-100	HEATER CHOKE		R1127	QRSA08J182YL	M 1.8KOHM, J, 1/10W
				R1128	QRSA08J822YL	M 8.2KOHM, J, 1/10W
				R1129	QRSA08J183YL	M 18KOHM, J, 1/10W
				R1130	QRSA08J182YL	M 1.8KOHM, J, 1/10W
				R1131	QRSA08J122YL	M 1.2KOHM, J, 1/10W
	TRANSFORMERS			R1133	QRD162J562	C 5.6KOHM, J, 1/6W
				R1134	QRSA08J183YL	M 18KOHM, J, 1/10W
⚠ T701	CJ28256-00A	FLYBACK TRANS		R1135	QRSA08J223YL	M 22KOHM, J, 1/10W
T1101	CE41072001	TRANS		R1136	QRSA08J561YL	M 560 OHM, J, 1/10W
T1102	CE40176001	TRANS		R1137	QRSA08J561YL	M 560 OHM, J, 1/10W
T1201	CELT034002	TRANS		R1139	QRSA08J562YL	M 5.6KOHM, J, 1/10W
⚠ T2502	CE42034001	H DRIVE TRANS		R1140	QRSA08J102YL	M 1KOHM, J, 1/10W
⚠ T9001	CETS031-001	SWITCHING TRANS		R1141	QRSA08J102YL	M 1KOHM, J, 1/10W
⚠ T9002	CE41856-00A	TRANS		R1142	QRSA08J102YL	M 1KOHM, J, 1/10W
				R1143	QRSA08J102YL	M 1KOHM, J, 1/10W
				R1144	QRSA08J472YL	M 4.7KOHM, J, 1/10W
				R1145	QRSA08J272YL	M 2.7KOHM, J, 1/10W
	RESISTORS			R1146	QRSA08J273YL	M 27KOHM, J, 1/10W
				R1147	QRSA08J472YL	M 4.7KOHM, J, 1/10W
RM001	QRSA08J101YL	M 100 OHM, J, 1/10W		R1148	QRSA08J332YL	M 3.3KOHM, J, 1/10W
RM002	QRSA08J101YL	M 100 OHM, J, 1/10W		R1149	QRSA08J683YL	M 68KOHM, J, 1/10W
RM003	QRSA08J102YL	M 1KOHM, J, 1/10W		R1150	QRSA08J273YL	M 27KOHM, J, 1/10W
RM004	QRSA08J102YL	M 1KOHM, J, 1/10W		R1151	QRSA08J101YL	M 100 OHM, J, 1/10W
RM005	QRSA08J334YL	M 330KOHM, J, 1/10W		R1201	QRSA08J392YL	M 3.9KOHM, J, 1/10W
RM006	QRSA08J123YL	M 12KOHM, J, 1/10W		R1202	QRSA08J392YL	M 3.9KOHM, J, 1/10W
RM007	QRSA08J101YL	M 100 OHM, J, 1/10W		R1203	QRSA08J102YL	M 1KOHM, J, 1/10W
				R1204	QRSA08J102YL	M 1KOHM, J, 1/10W

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R1205	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1316	QRSA08J183YL	M 18KOHM, J, 1/10W
R1206	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R1317	QRSA08J182YL	M 1.8KOHM, J, 1/10W
R1207	QRSA08J391YL	M 390 OHM, J, 1/10W	R1318	QRSA08J332YL	M 3.3KOHM, J, 1/10W
R1208	QRSA08J681YL	M 680 OHM, J, 1/10W	R1319	QRSA08J274YL	M 270KOHM, J, 1/10W
R1209	QRSA08J471YL	M 470 OHM, J, 1/10W	R1320	QRSA08J123YL	M 12KOHM, J, 1/10W
R1210	QVPC611202HZ	CONTROL 2KOHMB	R1321	QRSA08J123YL	M 12KOHM, J, 1/10W
R1211	QRSA08J562YL	M 5.6KOHM, J, 1/10W	R1322	QRSA08J123YL	M 12KOHM, J, 1/10W
R1212	QRSA08J682YL	M 6.8KOHM, J, 1/10W	R1331	QRSA08J273YL	M 27KOHM, J, 1/10W
R1213	QRSA08J273YL	M 27KOHM, J, 1/10W	R1332	QRSA08J153YL	M 15KOHM, J, 1/10W
R1214	QRSA08J273YL	M 27KOHM, J, 1/10W	R1333	QRSA08J102YL	M 1KOHM, J, 1/10W
R1215	QRSA08J123YL	M 12KOHM, J, 1/10W	R1334	QRSA08J391YL	M 390 OHM, J, 1/10W
R1216	QRSA08J562YL	M 5.6KOHM, J, 1/10W	R1335	QRSA08J102YL	M 1KOHM, J, 1/10W
R1217	QRSA08J224YL	M 220KOHM, J, 1/10W	R1336	QRSA08J102YL	M 1KOHM, J, 1/10W
R1218	QRSA08J103YL	M 10KOHM, J, 1/10W	R1337	QRSA08J105YL	M 1MOHM, J, 1/10W
R1219	QRSA08J223YL	M 22KOHM, J, 1/10W	R1338	QRSA08J103YL	M 10KOHM, J, 1/10W
R1220	QRSA08J684YL	M 680KOHM, J, 1/10W	R1339	QRSA08J103YL	M 10KOHM, J, 1/10W
R1221	QRSA08J102YL	M 1KOHM, J, 1/10W	R1340	QRSA08J123YL	M 12KOHM, J, 1/10W
R1222	QRSA08J681YL	M 680 OHM, J, 1/10W	R1341	QRSA08J103YL	M 10KOHM, J, 1/10W
R1223	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1342	QRSA08J103YL	M 10KOHM, J, 1/10W
R1224	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R1343	QRSA08J102YL	M 1KOHM, J, 1/10W
R1225	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1344	QRSA08J272YL	M 2.7KOHM, J, 1/10W
R1226	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R1345	QRSA08J123YL	M 12KOHM, J, 1/10W
R1227	QRSA08J102YL	M 1KOHM, J, 1/10W	R1346	QRSA08J393YL	M 39KOHM, J, 1/10W
R1228	QRSA08J102YL	M 1KOHM, J, 1/10W	R1361	QRSA08J273YL	M 27KOHM, J, 1/10W
R1229	QRSA08J152YL	M 1.5KOHM, J, 1/10W	R1362	QRSA08J153YL	M 15KOHM, J, 1/10W
R1230	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R1363	QRSA08J102YL	M 1KOHM, J, 1/10W
R1231	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R1364	QRSA08J391YL	M 390 OHM, J, 1/10W
R1232	QRSA08J102YL	M 1KOHM, J, 1/10W	R1365	QRSA08J102YL	M 1KOHM, J, 1/10W
R1233	QRSA08J152YL	M 1.5KOHM, J, 1/10W	R1366	QRSA08J102YL	M 1KOHM, J, 1/10W
R1234	QRSA08J152YL	M 1.5KOHM, J, 1/10W	R1367	QRSA08J105YL	M 1MOHM, J, 1/10W
R1235	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R1368	QRSA08J103YL	M 10KOHM, J, 1/10W
R1236	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R1369	QRSA08J103YL	M 10KOHM, J, 1/10W
R1237	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R1370	QRSA08J123YL	M 12KOHM, J, 1/10W
R1238	QRSA08J153YL	M 15KOHM, J, 1/10W	R1371	QRSA08J103YL	M 10KOHM, J, 1/10W
R1239	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R1372	QRSA08J103YL	M 10KOHM, J, 1/10W
R1240	QRSA08J104YL	M 100KOHM, J, 1/10W	R1373	QRSA08J102YL	M 1KOHM, J, 1/10W
R1241	QRSA08J153YL	M 15KOHM, J, 1/10W	R1374	QRSA08J272YL	M 2.7KOHM, J, 1/10W
R1242	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R1375	QRSA08J153YL	M 15KOHM, J, 1/10W
R1243	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R1376	QRSA08J333YL	M 33KOHM, J, 1/10W
R1244	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1381	QRSA08J123YL	M 12KOHM, J, 1/10W
R1245	QRSA08J123YL	M 12KOHM, J, 1/10W	R1382	QRSA08J123YL	M 12KOHM, J, 1/10W
R1246	QRSA08J182YL	M 1.8KOHM, J, 1/10W	R1383	QRSA08J273YL	M 27KOHM, J, 1/10W
R1247	QRSA08J104YL	M 100KOHM, J, 1/10W	R1401	QRSA08J101YL	M 100 OHM, J, 1/10W
R1248	QRSA08J123YL	M 12KOHM, J, 1/10W	R1402	QRSA08J101YL	M 100 OHM, J, 1/10W
R1249	QRSA08J822YL	M 8.2KOHM, J, 1/10W	R1403	QRSA08J102YL	M 1KOHM, J, 1/10W
R1250	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1404	QRSA08J102YL	M 1KOHM, J, 1/10W
R1251	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1405	QRSA08J102YL	M 1KOHM, J, 1/10W
R1252	QRSA08J222YL	M 2.2KOHM, J, 1/10W	R1406	QRSA08J123YL	M 12KOHM, J, 1/10W
R1254	QRSA08J683YL	M 68KOHM, J, 1/10W	R1407	QRSA08J273YL	M 27KOHM, J, 1/10W
R1256	QRSA08J123YL	M 12KOHM, J, 1/10W	R1408	QRSA08J273YL	M 27KOHM, J, 1/10W
R1257	QRSA08J123YL	M 12KOHM, J, 1/10W	R1409	QRSA08J273YL	M 27KOHM, J, 1/10W
R1258	QRSA08J123YL	M 12KOHM, J, 1/10W	R1410	QRSA08J273YL	M 27KOHM, J, 1/10W
R1259	QRSA08J123YL	M 12KOHM, J, 1/10W	R1451	QRSA08J272YL	M 2.7KOHM, J, 1/10W
R1260	QRSA08J273YL	M 27KOHM, J, 1/10W	R1453	QRSA08J103YL	M 10KOHM, J, 1/10W
R1301	QRSA08J273YL	M 27KOHM, J, 1/10W	R1454	QRSA08J222YL	M 2.2KOHM, J, 1/10W
R1302	QRSA08J153YL	M 15KOHM, J, 1/10W	R1455	QRSA08J823YL	M 82KOHM, J, 1/10W
R1303	QRSA08J102YL	M 1KOHM, J, 1/10W	R1456	QRSA08J102YL	M 1KOHM, J, 1/10W
R1304	QRSA08J471YL	M 470 OHM, J, 1/10W	R1457	QRSA08J102YL	M 1KOHM, J, 1/10W
R1305	QRSA08J102YL	M 1KOHM, J, 1/10W	R1458	QRSA08J392YL	M 3.9KOHM, J, 1/10W
R1306	QRSA08J102YL	M 1KOHM, J, 1/10W	R1460	QRSA08J183YL	M 18KOHM, J, 1/10W
R1307	QRSA08J105YL	M 1MOHM, J, 1/10W	R1461	QRSA08J153YL	M 15KOHM, J, 1/10W
R1308	QRSA08J103YL	M 10KOHM, J, 1/10W	R1462	QRSA08J122YL	M 1.2KOHM, J, 1/10W
R1309	QRSA08J103YL	M 10KOHM, J, 1/10W	R1463	QRSA08J122YL	M 1.2KOHM, J, 1/10W
R1310	QRSA08J123YL	M 12KOHM, J, 1/10W	R1464	QRSA08J122YL	M 1.2KOHM, J, 1/10W
R1311	QRSA08J103YL	M 10KOHM, J, 1/10W	R1465	QRSA08J101YL	M 100 OHM, J, 1/10W
R1312	QRSA08J103YL	M 10KOHM, J, 1/10W	R1466	QRSA08J101YL	M 100 OHM, J, 1/10W
R1313	QRSA08J102YL	M 1KOHM, J, 1/10W	R1467	QRSA08J101YL	M 100 OHM, J, 1/10W
R1314	QRSA08J152YL	M 1.5KOHM, J, 1/10W	R1469	QRSA08J393YL	M 39KOHM, J, 1/10W
R1315	QRSA08J273YL	M 27KOHM, J, 1/10W	R1470	QRSA08J273YL	M 27KOHM, J, 1/10W

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R1471	QRSA08J273YL	M 27KOHM, J, 1/10W	R1572	QRSA08J823YL	M 82KOHM, J, 1/10W
R1472	QRSA08J273YL	M 27KOHM, J, 1/10W	R1573	QRSA08J392YL	M 3.9KOHM, J, 1/10W
R1473	QRSA08J123YL	M 12KOHM, J, 1/10W	R1574	QRSA08J392YL	M 3.9KOHM, J, 1/10W
R1474	QRSA08J273YL	M 27KOHM, J, 1/10W	R1575	QRSA08J153YL	M 15KOHM, J, 1/10W
R1501	QRSA08J273YL	M 27KOHM, J, 1/10W	R1576	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R1502	QRSA08J153YL	M 15KOHM, J, 1/10W	R1578	QRSA08J273YL	M 27KOHM, J, 1/10W
R1503	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R1579	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R1504	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R1580	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R1505	QRSA08J473YL	M 47KOHM, J, 1/10W	R1581	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R1506	QRSA08J393YL	M 39KOHM, J, 1/10W	R1582	QRSA08J273YL	M 27KOHM, J, 1/10W
R1507	QRSA08J182YL	M 1.8KOHM, J, 1/10W	R1583	QRSA08J560YL	M 56 OHM, J, 1/10W
R1508	QRSA08J123YL	M 12KOHM, J, 1/10W	R1601	QRSA08J102YL	M 1KOHM, J, 1/10W
R1509	QRSA08J271YL	M 270OHM, J, 1/10W	R1602	QRSA08J221YL	M 220 OHM, J, 1/10W
R1510	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R1603	QRSA08J123YL	M 12KOHM, J, 1/10W
R1511	QRSA08J820YL	M 82 OHM, J, 1/10W	R1604	QRSA08J100YL	M 10 OHM, J, 1/10W
R1512	QRSA08J820YL	M 82 OHM, J, 1/10W	R1605	QRSA08J272YL	M 2.7KOHM, J, 1/10W
R1513	QRSA08J121YL	M 120 OHM, J, 1/10W	R1606	QRSA08J391YL	M 390 OHM, J, 1/10W
R1514	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R2005	QRD121J152SY	C 1.5KOHM, J, 1/2W
R1515	QRSA08J333YL	M 33KOHM, J, 1/10W	R2302	QRC121K394Z	C 390KOHM, K, 1/2W
R1516	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R2303	QRC121K394Z	C 390KOHM, K, 1/2W
R1517	QRSA08J222YL	M 2.2KOHM, J, 1/10W	R2304	QRC121K394Z	C 390KOHM, K, 1/2W
R1518	QRSA08J331YL	M 330 OHM, J, 1/10W	R2305	QRD161J155Y	C 1.5KOHM. J, 1/6W
R1519	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R2306	QRD161J562Y	C 5.6KOHM, J, 1/6W
R1520	QRSA08J102YL	M 1KOHM, J, 1/10W	R2307	QRD161J472Y	C 4.7KOHM, J, 1/6W
R1521	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R2308	QRC121K473Z	C 47KOHM, K, 1/2W
R1522	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R2309	QRC121K225Z	C 2.2MOHM, K, 1/2W
R1523	QRSA08J473YL	M 47KOHM, J, 1/10W	R2310	QRC121K225Z	C 2.2MOHM, K, 1/2W
R1524	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R2311	QRC121K225Z	C 2.2MOHM, K, 1/2W
R1525	QRSA08J101YL	M 100 OHM, J, 1/10W	R2312	QRD161J683Y	C 68KOHM, J, 1/6W
R1526	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R2313	QVPC611503HZ	CONTROL 50KOHMB
R1527	QRSA08J103YL	M 10KOHM, J, 1/10W	R2314	QRD161J103Y	C 10KOHM, J, 1/6W
R1528	QRSA08J102YL	M 1KOHM, J, 1/10W	R2316	QRD161J153Y	C 15KOHM, J, 1/6W
R1529	QRSA08J273YL	M 27KOHM, J, 1/10W	R2317	QRD161J473Y	C 47KOHM, J, 1/6W
R1530	QRSA08J682YL	M 6.8KOHM, J, 1/10W	R2318	QRD161J102Y	C 1KOHM, J, 1/6W
R1531	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R2319	QRD161J103Y	C 10KOHM, J, 1/6W
R1532	QRSA08J103YL	M 10KOHM, J, 1/10W	R2320	QRD161J472Y	C 4.7KOHM, J, 1/6W
R1533	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R2321	QRD161J103Y	C 10KOHM, J, 1/6W
R1534	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R2401	QRD161J182Y	C 1.8KOHM, J, 1/6W
R1535	QRSA08J103YL	M 10KOHM, J, 1/10W	R2402	QRD161J822Y	C 8.2KOHM, J, 1/6W
R1536	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R2403	QRD161J104Y	C 100KOHM, J, 1/6W
R1537	QRSA08J101YL	M 100 OHM, J, 1/10W	R2404	QRD161J222Y	C 2.2KOHM, J, 1/6W
R1538	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R2405	QRV141F2611A	M 2.61KOHM, F, 1/4W
R1539	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R2406	QRD161J101Y	C 100 OHM, J, 1/6W
R1540	QRSA08J332YL	M 3.3KOHM, J, 1/10W	R2407	QRD161J471Y	C 470 OHM, J, 1/6W
R1541	QRSA08J103YL	M 10KOHM, J, 1/10W	R2408	QRV141F8871A	M 8.87KOHM, F, 1/4W
R1542	QRSA08J823YL	M 82KOHM, J, 1/10W	R2409	QRD161J104Y	C 100KOHM, J, 1/6W
R1543	QRSA08J221YL	M 220 OHM, J, 1/10W	R2410	QRD161J102Y	C 1KOHM, J, 1/6W
R1544	QRSA08J221YL	M 220 OHM, J, 1/10W	R2411	QRD161J182Y	C 1.8KOHM, J, 1/6W
R1545	QRSA08J221YL	M 220 OHM, J, 1/10W	R2412	QRD161J104Y	C 100KOHM, J, 1/6W
R1547	QRSA08J221YL	M 220 OHM, J, 1/10W	R2413	QRD161J822Y	C 8.2KOHM, J, 1/6W
R1548	QRSA08J102YL	M 1KOHM, J, 1/10W	R2414	QRD161J682Y	C 6.8KOHM, J, 1.6W
R1551	QRSA08J104YL	M 100KOHM, J, 1/6W	R2415	QRD161J820Y	C 82 OHM, J, 1/6W
R1552	QRSA08J123YL	M 12KOHM, J, 1/10W	R2416	QVPC611102HZ	CONTROL 1KOHMB
R1553	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R2417	QRD161J103Y	C 10KOHM, J, 1/6W
R1554	QRSA08J273YL	M 27KOHM, J, 1/10W	R2418	QRD161J222Y	C 2.2KOHM, J, 1/6W
R1555	QRSA08J273YL	M 27KOHM, J, 1/10W	R2419	QRX029J1R0	M 1 OHM, J, 2W
R1556	QRSA08J184YL	M 180KOHM, J, 1/10W	R2420	QRG029J270	M 27 OHM, J, 2W
R1558	QRSA08J223YL	M 22KOHM, J, 1/10W	R2422	QRG019J221S	M 220 OHM, J, 1W
R1559	QRSA08J223YL	M 22KOHM, J, 1/10W	R2423	QRD161J273Y	C 27KOHM, J, 1/6W
R1560	QRSA08J124YL	M 120KOHM, J, 1/10W	R2424	QRD161J223Y	C 22KOHM, J, 1/6W
R1561	QRSA08J562YL	M 5.6KOHM, J, 1/10W	R2425	QRD161J101Y	C 100 OHM, J, 1/6W
R1562	QRSA08J183YL	M 18KOHM, J, 1/10W	R2427	QRD161J562Y	C 5.6KOHM, J, 1/6W
R1563	QRSA08J563YL	M 56KOHM, J, 1/10W	R2428	QRD161J153Y	C 15KOHM, J, 1/6W
R1564	QRSA08J473YL	M 47KOHM, J, 1/10W	R2429	QRD161J183Y	C 18KOHM, J, 1/6W
R1566	QRSA08J564YL	M 560KOHM, J, 1/10W	R2430	QRD161J393Y	C 39KOHM, J, 1/6W
R1567	QRSA08J154YL	M 150KOHM, J, 1/10W	R2431	QRD161J683Y	C 68KOHM, J, 1/6W
R1569	QRSA08J563YL	M 56KOHM, J, 1/10W	R2433	QRD161J101Y	C 100 OHM, J, 1/6W
R1570	QVPC611503HZ	CONTROL 50KOHMB	R2434	QRD161J103Y	C 10KOHM, J, 1/6W
R1571	QRSA08J124YL	M 120KOHM, J, 1/10W	R2435	QRD161J153Y	C 15KOHM, J, 1/6W

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
R2436	QRD161J103Y	C 10KOHM, J, 1/6W		R2602	QRD161J102Y	C 1KOHM, J, 1/6W
R2437	QRD161J103Y	C 10KOHM, J, 1/6W		R2603	QRD161J682Y	C 6.8KOHM, J, 1.6W
R2438	QRD161J103Y	C 10KOHM, J, 1/6W		R2604	QRD161J183Y	C 18KOHM, J, 1/6W
R2439	QRD161J222Y	C 2.2KOHM, J, 1/6W		R2606	QRD161J682Y	C 6.8KOHM, J, 1.6W
R2501	QRD161J683Y	C 68KOHM, J, 1/6W		R2607	QRD161J103Y	C 10KOHM, J, 1/6W
R2502	QRD121J103SY	C 10KOHM, J, 1/2W		R2608	QRD161J473Y	C 47KOHM, J, 1/6W
R2503	QVPC611502HZ	CONTROL 5KOHMB		R2609	QRD161J225Y	C 2.2MOHM, J, 1/6W
R2505	QRD161J225Y	C 2.2MOHM, J, 1/6W		R2610	QRD161J102Y	C 1KOHM, J, 1/6W
R2506	QRD161J101Y	C 100 OHM, J, 1/6W		R2611	QRD121J563SY	C 56KOHM, J, 1/2W
R2509	QRD161J225Y	C 2.2MOHM, J, 1/6W		R2612	QVPC611502HZ	CONTROL 5KOHMB
R2510	QRD161J102Y	C 1KOHM, J, 1/6W		R2613	QRD161J103Y	C 10KOHM, J, 1/6W
R2511	QRD121J272SY	C 2.7KOHM, J, 1/2W		R2615	QRD161J332Y	C 3.3KOHM, J, 1/6W
R2512	QRF074K4R7	F 4.7 OHM, K, 7W		R2616	QRD161J223Y	C 22KOHM, J, 1/6W
R2513	QRF074K4R7	F 4.7 OHM, K, 7W		R2701	QRD161J104Y	C 100KOHM, J, 1/6W
R2514	QRD121J472SY	C 4.7KOHM, J, 1/2W		R2705	QRD161J223Y	C 22KOHM, J, 1/6W
R2515	QRG029J272	M 2.7KOHM, J, 2W		R2706	QRD161J101Y	C 100 OHM, J, 1/6W
R2516	QRD121J392SY	C 3.9KOHM, J, 1/2W		R2707	QRD161J333Y	C 33KOHM, J, 1/6W
R2517	QRD161J471Y	C 470 OHM, J, 1/6W		R2708	QRD161J103Y	C 10KOHM, J, 1/6W
R2518	QRD161J331	C 330 OHM, J, 1/6W		R2709	QRD161J104Y	C 100KOHM, J, 1/6W
R2519	QRD121J562SY	C 5.6KOHM, J, 1/2W		R2710	QRD161J393Y	C 39KOHM, J, 1/6W
R2520	QRG029J102	M 1KOHM, J, 2W		R2712	QRD161J102Y	C 1KOHM, J, 1/6W
R2521	QRD161J151Y	C 150 OHM, J, 1/6W		R2713	QRD161J222Y	C 2.2KOHM, J, 1/6W
R2522	QRD121J104SY	C 100KOHM, J, 1/2W	⚠	R2714	QRV141F1962A	M 19.6KOHM, F, 1/4W
R2524	QRX029J1R8	M 1.8 OHM, J, 2W	⚠	R2715	QRV141F6801A	M 6.8KOHM, F, 1/4W
R2526	QRD161J513	C 51KOHM, J, 1/6W		R2801	QRG029J100	M 10 OHM, J, 2W
R2527	QRD161J473Y	C 47KOHM, J, 1/6W		R3301	QRD161J151Y	C 150 OHM, J, 1/6W
R2528	QRD121J272SY	C 2.7KOHM, J, 1/2W		R3302	QRD161J151Y	C 150 OHM, J, 1/6W
R2529	QRD161J102Y	C 1KOHM, J, 1/6W		R3303	QRD161J151Y	C 150 OHM, J, 1/6W
R2530	QRX029J4R7	M 4.7 OHM, J, 2W		R3304	QRD161J181Y	C 180 OHM, J, 1/6W
R2531	QRX029J4R7	M 4.7 OHM, J, 2W		R3305	QRD161J181Y	C 180 OHM, J, 1/6W
R2532	QRG029J471	M 470 OHM, J, 2W		R3306	QRD161J181Y	C 180 OHM, J, 1/6W
R2542	QRD161J823Y	C 82KOHM, J, 1/6W		R3310	QRG029J103	M 10KOHM, J, 2W
R2548	QRG029J102	M 1KOHM, J, 2W		R3311	QRG029J103	M 10KOHM, J, 2W
R2549	QRG029J102	M 1KOHM, J, 2W		R3312	QRG029J103	M 10KOHM, J, 2W
R2550	QRG029J222	M 2.2KOHM, J, 2W		R3313	QRG029J103	M 10KOHM, J, 2W
R2551	QRD161J121Y	C 120 OHM, J, 1/6W		R3314	QRG029J103	M 10KOHM, J, 2W
R2552	QRD161J101Y	C 100 OHM, J, 1/6W		R3315	QRG029J103	M 10KOHM, J, 2W
R2553	QRD161J101Y	C 100 OHM, J, 1/6W	⚠	R3322	QRD149J102S	C 1KOHM, J, 1/4W
R2554	QRD161J103Y	C 10KOHM, J, 1/6W	⚠	R3323	QRD149J102S	C 1KOHM, J, 1/4W
R2555	QRD161J473Y	C 47KOHM, J, 1/6W	⚠	R3324	QRD149J102S	C 1KOHM, J, 1/4W
R2558	QRD161J473Y	C 47KOHM, J, 1/6W		R3325	QRC121K681Z	C 680 OHM, K, 1/2W
R2559	QRD161J103Y	C 10KOHM, J, 1/6W		R3326	QRC121K681Z	C 680 OHM, K, 1/2W
R2562	QRD161J182Y	C 1.8KOHM, J, 1/6W		R3327	QRC121K681Z	C 680 OHM, K, 1/2W
R2563	QRD161J471Y	C 470 OHM, J, 1/6W		R3331	QRD161J102Y	C 1KOHM, J, 1/6W
R2564	QRD161J333Y	C 33KOHM, J, 1/6W		R3341	QRD161J332Y	C 3.3KOHM, J, 1/6W
R2565	QRD161J101Y	C 100 OHM, J, 1/6W		R3342	QRD161J332Y	C 3.3KOHM, J, 1/6W
R2568	QRD161J223Y	C 22KOHM, J, 1/6W		R3343	QRD161J332Y	C 3.3KOHM, J, 1/6W
R2569	QRD161J823Y	C 82KOHM, J, 1/6W		R3501	QRC121K105Z	C 1MOHM, K, 1/2W
R2570	QRD121J102SY	C 1KOHM, J, 1/2W		R3502	QRC121K102Z	C 1KOHM, K, 1/2W
R2571	QRD121J102SY	C 1KOHM, J, 1/2W		R3503	QRC121K474Z	C 470KOHM, K, 1/2W
R2573	QRD161J184Y	C 180KOHM, J, 1/6W		R3506	QRD122J274S	C 270KOHM, J, 1/2W
R2574	QRD161J184Y	C 180KOHM, J, 1/6W		R3507	QRG029J822	M 802KOHM, J, 2W
R2575	QRD161J184Y	C 180KOHM, J, 1/6W		R3508	QRD161J183Y	C 18KOHM, J, 1/6W
R2576	QRD161J822Y	C 8.2KOHM, J, 1/6W		R3509	QRD161J472Y	C 4.7KOHM, J, 1/6W
R2577	QRD161J222Y	C 2.2KOHM, J, 1/6W		R3520	QRC121K225Z	C 2.2MOHM, K, 1/2W
R2578	QRD161J103Y	C 10KOHM, J, 1/6W		R4001	QVGA003CB14A	CONTROL (BRIGHT)
R2579	QRD161J471Y	C 470 OHM, J, 1/6W		R4002	QVGA003CB14A	CONTROL (CONTRAST)
R2580	QRD161J332Y	C 3.3KOHM, J, 1/6W		R4003	QVGA003CB14A	CONTROL (CHROMA)
R2581	QRD161J123Y	C 12KOHM, J, 1/6W		R4004	QVGA003CB14A	CONTROL (PHASE)
R2582	QVPC611303HZ	CONTROL 30KOHMB		R4005	QVGA004CB14A	CONTROL (VOLUME)
R2583	QRD161J103Y	C 10KOHM, J, 1/6W		R4101	QRD161J181Y	C 180 OHM, J, 1/6W
R2584	QRD161J473Y	C 47KOHM, J, 1/6W		R4102	QRD161J333Y	C 33KOHM, J, 1/6W
R2585	QRD161J103Y	C 10KOHM, J, 1/6W		R4103	QRD161J333Y	C 33KOHM, J, 1/6W
R2586	QRD161J104Y	C 100KOHM, J, 1/6W		R4104	QRD161J333Y	C 33KOHM, J, 1/6W
R2587	QRD161J222Y	C 2.2KOHM, J, 1/6W		R4105	QRD161J333Y	C 33KOHM, J, 1/6W
R2588	QRD161J103Y	C 10KOHM, J, 1/6W		R4106	QRD161J333Y	C 33KOHM, J, 1/6W
R2589	QRD161J103Y	C 10KOHM, J, 1/6W		R5101	QRSA08J101YL	M 100 OHM, J, 1/10W
R2591	QRD161J473Y	C 47KOHM, J, 1/6W		R5102	QRSA08J101YL	M 100 OHM, J, 1/10W
R2601	QRD121J103SY	C 10KOHM, J, 1/2W		R5103	QRSA08J101YL	M 100 OHM, J, 1/10W

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R5104	QRSA08J101YL	M 100 OHM, J, 1/10W	R5302	QRSA08J184YL	M 180KOHM, J, 1/10W
R5105	QRSA08J101YL	M 100 OHM, J, 1/10W	R5303	QRSA08J562YL	M 5.6KOHM, J, 1/10W
R5106	QRSA08J101YL	M 100 OHM, J, 1/10W	R5304	QRSA08J104YL	M 100KOHM, J, 1/10W
R5107	QRSA08J101YL	M 100 OHM, J, 1/10W	R5305	QRSA08J684YL	M 680KOHM, J, 1/10W
R5108	QRSA08J101YL	M 100 OHM, J, 1/10W	R5306	QRSA08J223YL	M 22KOHM, J, 1/10W
R5109	QRSA08J101YL	M 100 OHM, J, 1/10W	R5307	QRSA08J103YL	M 10KOHM, J, 1/10W
R5110	QRSA08J103YL	M 10KOHM, J, 1/10W	R5308	QRSA08J103YL	M 10KOHM, J, 1/10W
R5111	QRSA08J103YL	M 10KOHM, J, 1/10W	R5309	QRSA08J223YL	M 22KOHM, J, 1/10W
R5112	QRSA08J103YL	M 10KOHM, J, 1/10W	R5310	QRSA08J183YL	M 18KOHM, J, 1/10W
R5113	QRSA08J103YL	M 10KOHM, J, 1/10W	R5311	QRSA08J103YL	M 10KOHM, J, 1/10W
R5114	QRSA08J103YL	M 10KOHM, J, 1/10W	R5312	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R5115	QRSA08J101YL	M 100 OHM, J, 1/10W	R5401	QRSA08J222YL	M 2.2KOHM, J, 1/10W
R5116	QRSA08J101YL	M 100 OHM, J, 1/10W	R5402	QRSA08J272YL	M 2.7KOHM, J, 1/10W
R5117	QRSA08J101YL	M 100 OHM, J, 1/10W	R5403	QRSA08J222YL	M 2.2KOHM, J, 1/10W
R5118	QRSA08J101YL	M 100 OHM, J, 1/10W	R5404	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R5119	QRSA08J101YL	M 100 OHM, J, 1/10W	R5405	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R5120	QRSA08J122YL	M 1.2KOHM, J, 1/10W	R5406	QRSA08J223YL	M 22KOHM, J, 1/10W
R5121	QRSA08J103YL	M 10KOHM, J, 1/10W	R5407	QRSA08J273YL	M 27KOHM, J, 1/10W
R5122	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R5408	QRSA08J102YL	M 1KOHM, J, 1/10W
R5123	QRSA08J103YL	M 10KOHM, J, 1/10W	R5409	QRSA08J563YL	M 56KOHM, J, 1/10W
R5124	QRSA08J103YL	M 10KOHM, J, 1/10W	R5410	QRSA08J103YL	M 10KOHM, J, 1/10W
R5125	QRSA08J103YL	M 10KOHM, J, 1/10W	R5501	QRSA08J101YL	M 100 OHM, J, 1/10W
R5126	QRSA08J103YL	M 10KOHM, J, 1/10W	R5502	QRSA08J101YL	M 100 OHM, J, 1/10W
R5127	QRSA08J103YL	M 10KOHM, J, 1/10W	R5503	QRSA08J101YL	M 100 OHM, J, 1/10W
R5128	QRSA08J472YL	M 4.7KOHM, J, 1/10W	R5504	QRSA08J101YL	M 100 OHM, J, 1/10W
R5129	QRSA08J103YL	M 10KOHM, J, 1/10W	R5701	QRSA08J221YL	M 220 OHM, J, 1/10W
R5130	QRSA08J103YL	M 10KOHM, J, 1/10W	R5702	QRSA08J221YL	M 220 OHM, J, 1/10W
R5131	QRSA08J103YL	M 10KOHM, J, 1/10W	R5703	QRSA08J221YL	M 220 OHM, J, 1/10W
R5132	QRSA08J103YL	M 10KOHM, J, 1/10W	R5704	QRSA08J221YL	M 220 OHM, J, 1/10W
R5134	QRSA08J103YL	M 10KOHM, J, 1/10W	R5705	QRSA08J221YL	M 220 OHM, J, 1/10W
R5135	QRSA08J103YL	M 10KOHM, J, 1/10W	R5706	QRSA08J221YL	M 220 OHM, J, 1/10W
R5136	QRSA08J102YL	M 1KOHM, J, 1/10W	R5707	QRSA08J221YL	M 220 OHM, J, 1/10W
R5137	QRSA08J103YL	M 10KOHM, J, 1/10W	R5708	QRSA08J221YL	M 220 OHM, J, 1/10W
R5138	QRSA08J103YL	M 10KOHM, J, 1/10W	R5709	QRSA08J221YL	M 220 OHM, J, 1/10W
R5139	QRSA08J221YL	M 220 OHM, J, 1/10W	R5710	QRSA08J221YL	M 220 OHM, J, 1/10W
R5140	QRSA08J221YL	M 220 OHM, J, 1/10W	R5711	QRSA08J221YL	M 220 OHM, J, 1/10W
R5143	QRSA08J103YL	M 10KOHM, J, 1/10W	P.5712	QRSA08J221YL	M 220 OHM, J, 1/10W
R5144	QRSA08J273YL	M 27KOHM, J, 1/10W	R5713	QRSA08J221YL	M 220 OHM, J, 1/10W
R5145	QRSA08J273YL	M 27KOHM, J, 1/10W	R5714	QRSA08J221YL	M 220 OHM, J, 1/10W
R5146	QRSA08J273YL	M 27KOHM, J, 1/10W	R5715	QRSA08J102YL	M 1KOHM, J, 1/10W
R5148	QRSA08J273YL	M 27KOHM, J, 1/10W	R5716	QRSA08J221YL	M 220 OHM, J, 1/10W
R5149	QRSA08J103YL	M 10KOHM, J, 1/10W	R5717	QRSA08J221YL	M 220 OHM, J, 1/10W
R5150	QRSA08J222YL	M 2.2KOHM, J, 1/10W	R5718	QRSA08J221YL	M 220 OHM, J, 1/10W
R5151	QRSA08J103YL	M 10KOHM, J, 1/10W	R5719	QRSA08J221YL	M 220 OHM, J, 1/10W
R5153	QRSA08J103YL	M 10KOHM, J, 1/10W	R5720	QRSA08J221YL	M 220 OHM, J, 1/10W
R5154	QRSA08J183YL	M 18KOHM, J, 1/10W	R5721	QRSA08J221YL	M 220 OHM, J, 1/10W
R5155	QRSA08J562YL	M 5.6KOHM, J, 1/10W	R5722	QRSA08J221YL	M 220 OHM, J, 1/10W
R5156	QRSA08J153YL	M 15KOHM, J, 1/10W	R5723	QRSA08J221YL	M 220 OHM, J, 1/10W
R5157	QRSA08J103YL	M 10KOHM, J, 1/10W	R5724	QRSA08J221YL	M 220 OHM, J, 1/10W
R5158	QRSA08J220YL	M 22 OHM, J, 1/10W	R5725	QRSA08J221YL	M 220 OHM, J, 1/10W
R5159	QRSA08J220YL	M 22 OHM, J, 1/10W	R5726	QRSA08J102YL	M 1KOHM, J, 1/10W
R5160	QRSA08J103YL	M 10KOHM, J, 1/10W	R5727	QRSA08J221YL	M 220 OHM, J, 1/10W
R5161	QRSA08J103YL	M 10KOHM, J, 1/10W	R5728	QRSA08J221YL	M 220 OHM, J, 1/10W
R5201	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R5729	QRSA08J221YL	M 220 OHM, J, 1/10W
R5202	QRSA08J391YL	M 390 OHM, J, 1/10W	R5730	QRSA08J103YL	M 10KOHM, J, 1/10W
R5203	QRSA08J182YL	M 1.8KOHM, J, 1/10W	R5731	QRSA08J221YL	M 220 OHM, J, 1/10W
R5204	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R5732	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R5205	QRSA08J271YL	M 270KOHM, J, 1/10W	R5733	QRSA08J472YL	M 4.7KOHM, J, 1/10W
R5206	QRSA08J182YL	M 1.8KOHM, J, 1/10W	R6201	QRV141F75R0Y	M 75 OHM, F, 1/4W
R5207	QRSA08J272YL	M 2.7KOHM, J, 1/10W	R6202	QRD161J121Y	C 120 OHM, J, 1/6W
R5208	QRSA08J471YL	M 470 OHM, J, 1/10W	R6203	QRD161J154Y	C 150KOHM, J, 1/6W
R5209	QRSA08J182YL	M 1.8KOHM, J, 1/10W	R6204	QRD161J104Y	C 100KOHM, J, 1/6W
R5210	QRSA08J273YL	M 27KOHM, J, 1/10W	R6205	QRD161J332Y	C 3.3KOHM, J, 1/6W
R5212	QRSA08J273YL	M 27KOHM, J, 1/10W	R6211	QRV141F75R0Y	M 75 OHM, F, 1/4W
R5213	QRSA08J121YL	M 120 OHM, J, 1/10W	R6212	QRD161J121Y	C 120 OHM, J, 1/6W
R5214	QRSA08J273YL	M 27KOHM, J, 1/10W	R6213	QRD161J154Y	C 150KOHM, J, 1/6W
R5215	QRSA08J391YL	M 390 OHM, J, 1/10W	R6214	QRD161J104Y	C 100KOHM, J, 1/6W
R5216	QRSA08J273YL	M 27KOHM, J, 1/10W	R6215	QRD161J332Y	C 3.3KOHM, J, 1/6W
R5301	QRSA08J683YL	M 68KOHM, J, 1/10W	R6220	QRD161J472Y	C 4.7KOHM, J, 1/6W

Ref. No.	Part No.	Description
R6221	QRD161J820Y	C 82 OHM, J, 1/6W
R6222	QRD161J153Y	C 15KOHM, J, 1/6W
R6231	QRV141F75R0Y	M 75 OHM, F, 1/4W
R6232	QRD161J221Y	C 220 OHM, J, 1/6W
R6233	QRD161J683Y	C 68KOHM, J, 1/6W
R6234	QRD161J184Y	C 180KOHM, J, 1/6W
R6235	QRD161J562Y	C 5.6KOHM, J, 1/6W
R6236	QRD161J392Y	C 3.9KOHM, J, 1/6W
R6239	QRD161J332Y	C 3.3KOHM, J, 1/6W
R6240	QRD161J680Y	C 68 OHM, J, 1/6W
R6251	QRD161J123Y	C 12KOHM, J, 1/6W
R6252	QRD161J123Y	C 12KOHM, J, 1/6W
R6253	QRD161J223Y	C 22KOHM, J, 1/6W
R6254	QRD161J223Y	C 22KOHM, J, 1/6W
R6255	QRD161J333Y	C 33KOHM, J, 1/6W
R6301	QRV141F75R0Y	M 75 OHM, F, 1/4W
R6302	QRD161J121Y	C 120 OHM, J, 1/6W
R6303	QRD161J393Y	C 39KOHM, J, 1/6W
R6304	QRD161J124Y	C 120KOHM, J, 1/6W
R6305	QRD161J562Y	C 5.6KOHM, J, 1/6W
R6306	QRD161J101Y	C 100 OHM, J, 1/6W
R6316	QRD161J122Y	C 1.2KOHM, J, 1/6W
R6317	QRD161J472Y	C 4.7KOHM, J, 1/6W
R6318	QRD161J223Y	C 22KOHM, J, 1/6W
R6601	QRD143J153SX	C 15KOHM, K, 1/4W
R6602	QRD161J563Y	C 56KOHM, J, 1/6W
R6603	QRD161J683Y	C 68KOHM, J, 1/6W
R6604	QRD161J102Y	C 1KOHM, J, 1/6W
R6611	QRD143J153SX	C 15KOHM, K, 1/4W
R6612	QRD161J563Y	C 56KOHM, J, 1/6W
R6613	QRD161J683Y	C 68KOHM, J, 1/6W
R6614	QRD161J102Y	C 1KOHM, J, 1/6W
R6621	QRD143J153SX	C 15KOHM, K, 1/4W
R6622	QRD161J563Y	C 56KOHM, J, 1/6W
R6623	QRD161J683Y	C 68KOHM, J, 1/6W
R6624	QRD161J102Y	C 1KOHM, J, 1/6W
R6631	QRD161J102Y	C 1KOHM, J, 1/6W
R6632	QRD161J472Y	C 4.7KOHM, J, 1/6W
R6641	QRD161J123Y	C 12KOHM, J, 1/6W
R6642	QRD161J223Y	C 22KOHM, J, 1/6W
R6644	QRD161J103Y	C 10KOHM, J, 1/6W
R6645	QRD161J123Y	C 12KOHM, J, 1/6W
R6646	QRD161J223Y	C 22KOHM, J, 1/6W
R6648	QRD161J103Y	C 10KOHM, J, 1/6W
R6701	QRV141F75R0Y	M 75 OHM, F, 1/4W
R6702	QRD161J331	C 330 OHM, J, 1/6W
R6703	QRD161J223Y	C 22KOHM, J, 1/6W
R6704	QRD161J123Y	C 12KOHM, J, 1/6W
R6705	QRD161J272Y	C 2.7KOHM, J, 1/6W
R6706	QRD161J221Y	C 220 OHM, J, 1/6W
R6707	QRD161J273Y	C 27KOHM, J, 1/6W
R6708	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6709	QRD161J121Y	C 120 OHM, J, 1/6W
R6710	QRD161J183Y	C 18KOHM, J, 1/6W
R6711	QRD161J333Y	C 33KOHM, J, 1/6W
R6712	QRD161J153Y	C 15KOHM, J, 1/6W
R6713	QRD161J272Y	C 2.7KOHM, J, 1/6W
R6714	QRD161J680Y	C 68 OHM, J, 1/6W
R6721	QRD161J473Y	C 47KOHM, J, 1/6W
R6722	QRD161J123Y	C 12KOHM, J, 1/6W
R6731	QRV141F75R0Y	M 75 OHM, F, 1/4W
R6732	QRD161J331	C 330 OHM, J, 1/6W
R6733	QRD161J223Y	C 22KOHM, J, 1/6W
R6734	QRD161J123Y	C 12KOHM, J, 1/6W
R6735	QRD161J272Y	C 2.7KOHM, J, 1/6W
R6736	QRD161J221Y	C 220 OHM, J, 1/6W
R6737	QRD161J273Y	C 27KOHM, J, 1/6W
R6738	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6739	QRD161J121Y	C 120 OHM, J, 1/6W

Ref. No.	Part No.	Description
R6740	QRD161J183Y	C 18KOHM, J, 1/6W
R6741	QRD161J102Y	C 1KOHM, J, 1/6W
R6742	QRD161J561	C 560 OHM, J, 1/6W
R6744	QRD161J681Y	C 680 OHM, J, 1/6W
R6745	QRD161J152Y	C 1.5KOHM, J, 1/6W
R6746	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6747	QRD161J821Y	C 820 OHM, J, 1/6W
R6748	QRD161J152Y	C 1.5KOHM, J, 1/6W
R6749	QRD161J182Y	C 1.8KOHM, J, 1/6W
R6750	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6751	QRD161J472Y	C 4.7KOHM, J, 1/6W
R6752	QRD161J153Y	C 15KOHM, J, 1/6W
R6753	QRD161J683Y	C 68KOHM, J, 1/6W
R6761	QRV141F75R0Y	M 75 OHM, F, 1/4W
R6762	QRD161J331	C 330 OHM, J, 1/6W
R6763	QRD161J223Y	C 22KOHM, J, 1/6W
R6764	QRD161J123Y	C 12KOHM, J, 1/6W
R6765	QRD161J272Y	C 2.7KOHM, J, 1/6W
R6766	QRD161J221Y	C 220 OHM, J, 1/6W
R6767	QRD161J273Y	C 27KOHM, J, 1/6W
R6768	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6769	QRD161J121Y	C 120 OHM, J, 1/6W
R6770	QRD161J183Y	C 18KOHM, J, 1/6W
R6771	QRD161J821Y	C 820 OHM, J, 1/6W
R6772	QRD161J561	C 560 OHM, J, 1/6W
R6774	QRD161J681Y	C 680 OHM, J, 1/6W
R6775	QRD161J152Y	C 1.5KOHM, J, 1/6W
R6776	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6777	QRD161J821Y	C 820 OHM, J, 1/6W
R6778	QRD161J152Y	C 1.5KOHM, J, 1/6W
R6779	QRD161J182Y	C 1.8KOHM, J, 1/6W
R6780	QRD161J222Y	C 2.2KOHM, J, 1/6W
R6781	QRD161J123Y	C 12KOHM, J, 1/6W
R6782	QRD161J153Y	C 15KOHM, J, 1/6W
R6783	QRD161J683Y	C 68KOHM, J, 1/6W
R6789	QRD161J221Y	C 220 OHM, J, 1/6W
R6790	QRD161J221Y	C 220 OHM, J, 1/6W
R6791	QRD161J221Y	C 220 OHM, J, 1/6W
R6792	QRD161J331	C 330 OHM, J, 1/6W
R6793	QRD161J333Y	C 33KOHM, J, 1/6W
R6794	QRD161J333Y	C 33KOHM, J, 1/6W
R6795	QRD161J102Y	C 1KOHM, J, 1/6W
R6801	QRD161J123Y	C 12KOHM, J, 1/6W
R6802	QRD161J123Y	C 12KOHM, J, 1/6W
R6803	QRD161J123Y	C 12KOHM, J, 1/6W
R6804	QRD161J123Y	C 12KOHM, J, 1/6W
R6805	QRD161J101Y	C 100 OHM, J, 1/6W
R6806	QRD161J101Y	C 100 OHM, J, 1/6W
R6807	QRD161J101Y	C 100 OHM, J, 1/6W
R6808	QRD161J101Y	C 100 OHM, J, 1/6W
⚠ R9002	QRD122J474S	C 470KOHM, J, 1/2W
R9005	QRD123J104SX	C 100KOHM, J, 1/2W
R9006	QRD123J104SX	C 100KOHM, J, 1/2W
R9008	QRD161J103Y	C 10KOHM, J, 1/6W
R9009	QRD161J103Y	C 10KOHM, J, 1/6W
R9010	QRD161J561	C 560 OHM, J, 1/6W
R9011	QRD161J103Y	C 10KOHM, J, 1/6W
R9012	QRD161J470Y	C 47 OHM, J, 1/6W
R9013	QRD161J103Y	C 10KOHM, J, 1/6W
R9014	QRM059KR22	M 0.22 OHM, K, 5W
R9015	QRG039J563A	M 56KOHM, J, 3W
R9016	QRD123J182SX	C 1.8KOHM, J, 1/2W
R9020	QRD161J222Y	C 2.2KOHM, J, 1/6W
R9021	QRD161J104Y	C 100KOHM, J, 1/6W
R9022	QRD161J474Y	C 470KOHM, J, 1/6W
R9023	QRD161J393Y	C 39KOHM, J, 1/6W
R9026	QRD161J104Y	C 100KOHM, J, 1/6W
R9027	QRD161J182Y	C 1.8KOHM, J, 1/6W
R9028	QRD161J271Y	C 270 OHM, J, 1/6W

Ref. No.	Part No.	Description
R9029	QRD161J103Y	C 10KOHM, J, 1/6W
R9030	QRD123J100SX	C 10 OHM, J, 1/2W
R9031	QRD161J392Y	C 3.9KOHM, J, 1/6W
R9032	QRD161J392Y	C 3.9KOHM, J, 1/6W
R9034	QRV141F2202A	M 22KOHM, F, 1/4W
⚠ R9035	QRV141F1962A	M 19.6KOHM, F, 1/4W
⚠ R9037	QRV141F3901A	M 3.9KOHM, F, 1/4W
R9038	QVPC611102HZ	CONTROL 1KOHMB
R9039	QRD123J154SX	C 150KOHM, J, 1/2W
R9040	QRD161J103Y	C 10KOHM, J, 1/6W
R9041	QRD123J154SX	C 150KOHM, J, 1/2W
R9042	QRD123J183SX	C 18KOHM, J, 1/2W
R9043	QRD123J184SX	C 180KOHM, J, 1/2W
R9044	QRV141F3901A	M 3.9KOHM, F, 1/4W
R9045	QRV141F2701A	M 2.7KOHM, F, 1/4W
R9046	QRD161J563Y	C 56KOHM, J, 1/6W
R9047	QRD161J103Y	C 10KOHM, J, 1/6W
R9048	QRV141F1501A	M 1.5KHOM, F, 1/4W
R9050	QRD161J223Y	C 22KOHM, J, 1/6W
R9051	QRD161J683Y	C 68KOHM, J, 1/6W
R9053	QRX029JR56A	M 0.56 OHM J, 2W
R9054	QRD123J270SX	C 27 OHM, J, 1/2W
R9060	QRF154K4R7	F 4.7 OHM, K, 1/5W
R9061	QRG039J123	M 12KOHM, J, 3W
R9062	QRG039J123	M 12KOHM, J, 3W
R9063	QRG039J123	M 12KOHM, J, 3W
R9064	QRG039J123	M 12KOHM, J, 3W
R9065	QRG039J223	M 22KOHM, J, 3W

CAPACITORS

Ref. No.	Part No.	Description
CM001	QETC1HM474Z	E 0.47UF, M, 50V
CM002	NCB21HK103AY	C 0.01UF, K, 50V
CM003	NCB21EK104AY	C 0.1UF, K, 25V
CM004	NB21HK103AY	C 0.01UF, K, 50V
CM005	NCB21HK332AY	C 3300PF, K, 50V
CM101	QETC1HM474Z	E 0.47UF, M, 50V
CM102	NCB21HK102AY	C 1000PF, K, 50V
CM103	NCB21HK102AY	C 1000PF, K, 50V
CM105	NCB21HK222AY	C 2200PF, K, 50V
CM106	QFV71HJ334MZ	F 0.33UF, J, 50V
CM107	NCB21HK103AY	C 0.01UF, K, 50V
CM108	NCB21HK102AY	C 1000PF, K, 50V
CM109	NCB21HK102AY	C 1000PF, K, 50V
CM110	NCB21HK103AY	C 0.01UF, K, 50V
CM111	NCB21HK103AY	C 0.01UF, K, 50V
CM112	NCB21HK222AY	C 2200PF, K, 50V
CM113	NCB21EK223AY	C 0.022UF, K, 25V
C1101	QETC1CM476Z	E 47UF, M, 16V
C1102	NCB21HK103AY	C 0.01UF, K, 50V
C1103	NCB21HK103AY	C 0.01UF, K, 50V
C1104	NCB21HK103AY	C 0.01UF, K, 50V
C1105	NCB21HK103AY	C 0.01UF, K, 50V
C1106	NCB21HK103AY	C 0.01UF, K, 50V
C1107	NCT03CH121AY	C 120PF, H, 1.6KV
C1108	NCT03CH470AY	C 47PF, H, 1.6KV
C1109	NCB21HK103AY	C 0.01UF, K, 50V
C1110	NCB21HK103AY	C 0.01UF, K, 50V
C1111	NCT03CH560AY	C 56PF, H, 1.6KV
C1112	NCB21HK103AY	C 0.01UF, K, 50V
C1113	NCB21HK103AY	C 0.01UF, K, 50V
C1114	QEN61CM476Z	E 47UF, M, 16V
C1115	NCT03CH120AY	C 12PF, H, 1.6KV
C1116	NCT03CH560AY	C 56PF, H, 1.6KV
C1117	QAT3110300A	T 33PF
C1118	NCB21HK103AY	C 0.01UF, K, 50V
C1119	QETC1CM476Z	E 47UF, M, 16V

Ref. No.	Part No.	Description
C1120	QETC1CM476Z	E 47UF, M, 16V
C1122	QAT3110300A	T 33PF
C1123	NCT03CH101AY	C 100PF, H, 1.6KV
C1124	NCB21HK822AY	C 8200PF, K, 50V
C1125	NCT03CH8R0AY	C 8PF, H, 1.6KV
C1201	NCB21HK103AY	C 0.01UF, K, 50V
C1202	NCB21HK103AY	C 0.01UF, K, 50V
C1203	NCT03CH680AY	C 68PF, H, 1.6KV
C1204	NCB21HK103AY	C 0.01UF, K, 50V
C1205	NCT03CH101AY	C 100PF, H, 1.6KV
C1206	QAT3110450A	T 45PF
C1207	QAT3110450A	T 45PF
C1208	NCT03CH121AY	C 120PF, H, 1.6KV
C1209	QAT3110450A	T 45PF
C1210	NCB21HK103AY	C 0.01UF, K, 50V
C1211	NCT03CH221AY	C 220PF, H, 1.6KV
C1212	NCB21HK273AY	C 0.027UF, K, 50V
C1213	NCB21HK103AY	C 0.01UF, K, 50V
C1214	QETC1HM105Z	E 1UF, M, 50V
C1215	QETC1HM474Z	E 0.47UF, M, 50V
C1216	QETC1CM107Z	E 100UF, M, 16V
C1217	NCB21HK103AY	C 0.01UF, K, 50V
C1218	QEN61CM106Z	E 10UF, M, 16V
C1219	QFLC1HJ153MZ	M 0.015UF, J, 50V
C1220	NCB21HK103AY	C 0.01UF, K, 50V
C1221	NCT03CH270AY	C 27PF, H, 1.6KV
C1222	QAT3110300A	T 33PF
C1223	NCT03CH270AY	C 27PF, H, 1.6KV
C1224	QAT3110300A	T 33PF
C1225	NCT03CH470AY	C 47PF, H, 1.6KV
C1226	NCT03CH390AY	C 39PF, H, 1.6KV
C1227	NCT03CH6R0AY	C 6PF, H, 1.6KV
C1228	NCT03CH181AY	C 180PF, H, 1.6KV
C1229	NCT03CH390AY	C 39PF, H, 1.6KV
C1230	NCT03CH6R0AY	C 6PF, H, 1.6KV
C1231	NCT03CH181AY	C 180PF, H, 1.6KV
C1233	QETC1HM335Z	E 3.3UF, M, 50V
C1234	NCB21HK473AY	C 0.047UF, K, 50V
C1235	NCB21HK103AY	C 0.01UF, K, 50V
C1236	QETC1CM476Z	E 47UF, M, 16V
C1237	NCB21HK103AY	C 0.01UF, K, 50V
C1238	NCB21HK223AY	C 0.022UF, K, 50V
C1239	NCB21HK103AY	C 0.01UF, K, 50V
C1240	NCT03CH151AY	C 150PF, H, 1.6KV
C1241	QETC1HM106Z	E 10UF, M, 16V
C1242	NCT03CH680AY	C 68PF, H, 1.6KV
C1301	QETC1CM476Z	E 47UF, M, 16V
C1302	QFV71HJ104MZ	F 0.1UF, J, 50V
C1303	QETC1HM105Z	E 1UF, M, 50V
C1304	QETC1CM476Z	E 47UF, M, 16V
C1305	QETC1CM476Z	E 47UF, M, 16V
C1306	QFV71HJ104MZ	F 0.1UF, J, 50V
C1307	QETC1HM105Z	E 1UF, M, 50V
C1308	QETC1CM476Z	E 47UF, M, 16V
C1309	NCT03CH8R0AY	C 8PF, H, 1.6KV
C1331	QETC1CM476Z	E 47UF, M, 16V
C1332	QFV71HJ104MZ	F 0.1UF, J, 50V
C1333	QETC1HM105Z	E 1UF, M, 50V
C1334	QETC1CM476Z	E 47UF, M, 16V
C1335	QETC1CM476Z	E 47UF, M, 16V
C1336	QFV71HJ104MZ	F 0.1UF, J, 50V
C1337	QETC1HM105Z	E 1UF, M, 50V
C1338	QETC1CM476Z	E 47UF, M, 16V
C1361	QETC1CM476Z	E 47UF, M, 16V
C1362	QFV71HJ104MZ	F 0.1UF, J, 50V
C1363	QETC1HM105Z	E 1UF, M, 50V
C1364	QETC1CM476Z	E 47UF, M, 16V
C1365	QETC1CM476Z	E 47UF, M, 16V
C1366	QFV71HJ104MZ	F 0.1UF, J, 50V

Ref. No.	Part No.	Description			
C1367	QETC1HM105Z	E	1UF,	M,	50V
C1368	QETC1CM476Z	E	47UF,	M,	16V
C1381	QETC1CM476Z	E	47UF,	M,	16V
C1382	NCB21HK473AY	C	0.047UF,	K,	50V
C1383	NCB21HK103AY	C	0.01UF,	K,	50V
C1401	QETC1CM476Z	E	47UF,	M,	16V
C1402	NCB21HK103AY	C	0.01UF,	K,	50V
C1403	QEN61HM105Z	E	1UF,	M,	50V
C1404	QETC1HM105Z	E	1UF,	M,	50V
C1405	QETC1HM105Z	E	1UF,	M,	50V
C1406	QFV71HJ104MZ	F	0.1UF,	J,	50V
C1407	QFV71HJ104MZ	F	0.1UF,	J,	50V
C1408	QETC1HM105Z	E	1UF,	M,	50V
C1409	QETC1HM105Z	E	1UF,	M,	50V
C1410	QFV71HJ104MZ	F	0.1UF,	J,	50V
C1451	QETC1CM476Z	E	47UF,	M,	16V
C1452	NCB21HK103AY	C	0.01UF,	K,	50V
C1453	NCB21HK473AY	C	0.047UF,	K,	50V
C1454	NCB21HK473AY	C	0.047UF,	K,	50V
C1455	QETC1HM105Z	E	1UF,	M,	50V
C1456	QETC1HM105Z	E	1UF,	M,	50V
C1457	QETC1HM105Z	E	1UF,	M,	50V
C1458	QETC1HM105Z	E	1UF,	M,	50V
C1459	QETC1HM105Z	E	1UF,	M,	50V
C1460	QETC1HM105Z	E	1UF,	M,	50V
C1461	QFV71HJ334MZ	F	0.33UF,	J,	50V
C1462	NCB21HK102AY	C	1000PF,	K,	50V
C1463	QFV71HJ224MZ	F	0.22UF,	J,	50V
C1464	QFV71HJ224MZ	F	0.22UF,	J,	50V
C1465	QFV71HJ224MZ	F	0.22UF,	J,	50V
C1466	QETC1CM477Z	E	470UF,	M,	16V
C1467	NCB21HK103AY	C	0.01UF,	K,	50V
C1468	QETC1CM107Z	E	100UF,	M,	16V
C1469	NCB21HK103AY	C	0.01UF,	K,	50V
C1471	QETC1HM106Z	E	10UF,	M,	50V
C1501	QETC1CM476Z	E	47UF,	M,	16V
C1502	NCB21HK103AY	C	0.01UF,	K,	50V
C1503	QEN61CM476Z	E	47UF,	M,	16V
C1504	QEN61HM105Z	E	1UF,	M,	50V
C1505	NCB21HK222AY	C	2200PF,	K,	50V
C1506	QETC1HM335Z	E	3.3UF,	M,	50V
C1507	QETC1HM335Z	E	3.3UF,	M,	50V
C1508	NCB21HK103AY	C	0.01UF,	K,	50V
C1509	NCB21HK103AY	C	0.01UF,	K,	50V
C1510	QETC1HM106Z	E	10UF,	M,	50V
C1511	NCB21HK222AY	C	2200PF,	K,	50V
C1512	NCB21HK102AY	C	1000PF,	K,	50V
C1513	NCT03CH101AY	C	100PF,	H,	1.6KV
C1516	NCT03CH181AY	C	180PF,	H,	1.6KV
C1517	NCT03CH820AY	C	82PF,	H,	1.6KV
C1551	QETC1AM107Z	E	100UF,	M,	10V
C1552	NCB21HK473AY	C	0.047UF,	K,	50V
C1553	NCB21HK473AY	C	0.047UF,	K,	50V
C1554	NCB21HK473AY	C	0.047UF,	K,	50V
C1555	NCT03CH391AY	C	390PF,	H,	1.6KV
C1556	NCT03CH331AY	C	330PF,	H,	1.6KV
C1557	NCB21HK222AY	C	2200PF,	K,	50V
C1558	NCB21HK222AY	C	2200PF,	K,	50V
C1559	NCT03CH180AY	C	18PF,	H,	1.6KV
C1560	QAT3110450A	T	45PF		
C1561	NCT03CH680AY	C	68PF,	H,	1.6KV
C1562	NCT03CH271AY	C	270PF,	H,	1.6KV
C1563	NCT03CH680AY	C	68PF,	H,	1.6KV
C1564	NCT03CH121AY	C	120PF,	H,	1.6KV
C1567	QFP31HJ153SZ	P	0.015UF,	J,	50V
C1568	NCB21HK222AY	C	2200PF,	K,	50V
C1569	QFV71HJ563MZ	F	0.056UF,	J,	50V
C1571	NCB21HK472AY	C	4700PF,	K,	50V
C1572	QETC1HM106Z	E	10UF,	M,	50V

Ref. No.	Part No.	Description			
C1601	QEHC1CM107MZ	E	100UF,	M,	16V
C1602	NCB21HK103AY	C	0.01UF,	K,	50V
C1603	QEHC1HM105MZ	E	1UF,	M,	50V
C1604	QETC1HM106Z	E	10UF,	M,	50V
C1605	QFV71HJ104MZ	F	0.1UF,	J,	50V
C1607	QEHC1CM227MZ	E	220UF,	M,	16V
C1608	QETB1EM228	E	2200UF,	M,	25V
C1609	QETC1HM106Z	E	10UF,	M,	50V
C1610	QFV71HJ104MZ	F	0.1UF,	J,	50V
C1611	NCB21HK333AY	C	0.033UF,	K,	50V
C1612	QEHC1HM475MZ	E	4.7UF,	M,	50V
C1702	QFLC1HK473MZ	M	0.047UF,	K,	50V
C2301	QFLC1HK102MZ	M	1000PF,	K,	50V
C2302	QEHC1HM106MZ	E	10UF,	M,	50V
C2303	QFZ01174701S	P	4700PF		
C2304	QEHC1HM476MZ	E	47UF,	M,	50V
C2305	QEN61CM106Z	E	10UF,	M,	16V
C2402	QFLC1HK823MZ	M	0.082UF,	K,	50V
C2403	QEHC1HM475Z	E	4.7UF,	M,	50V
C2406	QEHC1CM107MZ	E	100UF,	M,	16V
C2408	QEHC1HM227MZ	E	220UF,	M,	50V
C2409	QFV71HJ104MZ	F	0.1UF,	J,	50V
C2410	QFLB2AK154M	M	0.15UF,	K,	100V
C2411	QCS31HJ821AZ	C	820PF,	J,	50V
C2412	QFLC2AJ102MZ	M	1000PF,	J,	100V
C2413	QFLC1HK153MZ	M	0.015UF,	K,	50V
C2414	QCS32HJ330AZ	C	33PF,	J,	500V
C2415	QEHC1VM107MZ	E	100UF,	M,	35V
C2416	QEHC1EM108MZ	E	1000UF,	M,	25V
C2417	QEHC1EM108MZ	E	1000UF,	M,	25V
C2418	QEHC1EM477MZ	E	470UF,	M,	25V
C2419	QEHC1EM227MZ	E	220UF,	M,	25V
C2420	QEHC1CM337MZ	E	330UF,	M,	16V
C2421	QEHC1EM477MZ	E	470UF,	M,	25V
C2422	QEHB1VM108M	E	1000UF,	M,	35V
C2423	QEHC1CM107MZ	E	100UF,	M,	16V
C2501	QETC1CM107Z	E	100UF,	M,	16V
C2502	QFP31HJ332SZ	P	3300PF,	J,	50V
C2503	QFLC1HJ222MZ	M	2200PF,	J,	50V
C2504	QFV71HJ824MZ	F	0.82UF,	J,	50V
C2505	QFLC1HJ822MZ	M	8200PF,	J,	50V
C2511	QFLC1HK563MZ	M	0.056UF,	K,	50V
C2512	QFLC1HK153MZ	M	0.015UF,	K,	50V
C2513	QCS32HJ471AZ	C	470PF,	J,	500V
C2514	QFLC2AK104MZ	M	0.1UF,	K,	100V
△ C2519	QFZ0119105S	P	1UF		200V
△ C2520	QFZ0119304S	P	0.3UF		200V
△ C2525	QFZ01172001S	P	2000PF		
C2526	QEHC1EM108MZ	E	1000UF,	M,	25V
C2527	QFLC1HK473MZ	M	0.047UF,	K,	50V
C2528	QEHC1CM108MZ	E	1000UF,	M,	16V
C2529	QEHC1EM108MZ	E	1000UF,	M,	25V
△ C2530	QFZ01177001S	P	7000PF		
△ C2531	QFZ01174701S	P	4700PF		
△ C2532	QFZ01177001S	P	7000PF		
C2533	QEHC1EM108MZ	E	1000UF,	M,	25V
C2538	QEZ0195475MZ	E	4.7UF,	M,	50V
C2539	QEHB1CM228M	E	2200UF,	M,	16V
C2540	QETC1AM228Z	E	2200UF,	M,	10V
C2541	QETC1CM337	E	330UF,	M,	16V
C2555	QCT25CH470Z	C	47PF,	J,	50V
C2556	QCT25CH680Z	C	68PF,	J,	50V
C2557	QCT25CH560	C	56PF,	J,	50V
C2558	QFV71HJ104MZ	F	0.1UF,	J,	50V
C2559	QETC1CM107Z	E	100UF,	M,	16V
C2561	QEN61HM474Z	E	0.47UF,	M,	50V
C2562	QEN61HM475Z	E	4.7UF,	M,	50V
C2601	QFLC1HJ103MZ	M	0.01UF,	J,	50V

Ref. No.	Part No.	Description			
C2602	QEHC1CM107MZ	E	100UF,	M,	16V
C2603	QFV71HJ104MZ	F	0.1UF,	J,	50V
C2701	QETC1HM106Z	E	10UF,	M,	50V
C2702	QEHC1HM107MZ	E	100UF,	M,	50V
C2703	QETC1HM337MZ	E	330UF,	M,	16V
C2704	QEHC1EM107MZ	E	100UF,	M,	25V
C2705	QEN61EM107Z	E	100UF,	M,	25V
C2801	QEHB1VM108M	E	1000UF,	M,	35V
C3301	QCS31HJ221AZ	C	220PF,	J,	50V
C3302	QCS31HJ221AZ	C	220PF,	J,	50V
C3303	QCS31HJ181AZ	C	180PF,	J,	50V
C3313	QFLC1HK122MZ	M	1200PF,	K,	50V
C3321	QETC2EM105Z	E	1UF,	M,	250V
C3501	QETC2EM105Z	E	1UF,	M,	250V
C3503	QCZ0121102M	C	1000PF		
C3505	QFP32GK563M	P	0.056UF,	K,	400V
C3506	QCS31HJ561AZ	C	560PF,	J,	50V
C4101	QEKC0JM107MZ	E	100UF,	M,	6.3V
C4102	QCZ0207104AZ	C	0.1UF		
C5101	QEKC1CM476MZ	E	47UF,	M,	16V
C5102	NCB21HK103AY	C	0.01UF,	K,	50V
C5103	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5104	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5105	NCB21HK103AY	C	0.01UF,	K,	50V
C5106	NCB21HK103AY	C	0.01UF,	K,	50V
C5107	NCB21HK103AY	C	0.01UF,	K,	50V
C5108	NCB21HK103AY	C	0.01UF,	K,	50V
C5109	NCB21HK103AY	C	0.01UF,	K,	50V
C5110	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5111	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5112	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5113	QEKC1CM476Z	E	47UF,	M,	16V
C5114	NCT03CH330	C	33PF,	H,	1.6KV
C5116	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5117	QEKC0JM107MZ	E	100UF,	M,	6.3V
C5118	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5119	QEKC0JM107MZ	E	100UF,	M,	6.3V
C5120	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5121	QEKC0JM107MZ	E	100UF,	M,	6.3V
C5122	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5123	QEKC1CM476Z	E	47UF,	M,	16V
C5124	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5126	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5127	NCT03CH7R0AY	C	7PF,	H,	1.6KV
C5128	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5129	NCF21HZ104AY	C	0.1UF,	Z,	50V
C5201	QEKC1HM105GM	E	1UF,	M,	50V
C5202	QEKC1HM105GM	E	1UF,	M,	50V
C5203	QEKC1HM105GM	E	1UF,	M,	50V
C5301	QEKC1CM106GM	E	10UF,	M,	16V
C5302	QEKC1HM224GM	E	0.22UF,	M,	50V
C5303	NCB21HK223AY	C	0.022UF,	K,	50V
C5304	QEKC1HM105GM	E	1UF,	M,	50V
C5401	QEKC1HM105GM	E	1UF,	M,	50V
C5402	QEKC1HM105GM	E	1UF,	M,	50V
C5403	QEKC1HM105GM	E	1UF,	M,	50V
C6201	QEKC1HM475GM	E	4.7UF,	M,	50V
C6202	QCS31HJ101AZ	C	100PF,	J,	50V
C6203	QEKC1CM336MZ	E	33UF,	M,	16V
C6205	QEKC1HM475GM	E	4.7UF,	M,	50V
C6206	QCS31HJ101AZ	C	100PF,	J,	50V
C6207	QEKC1CM336MZ	E	33UF,	M,	16V
C6210	QCS31HJ101AZ	C	100PF,	J,	50V
C6220	QEKC1HM475GM	E	4.7UF,	M,	50V
C6221	QCS31HJ101AZ	C	100PF,	J,	50V
C6230	QFLC1HK333MZ	M	0.033UF,	K,	50V
C6231	QFLC1HK333MZ	M	0.033UF,	K,	50V
C6281	QEKC1CM107MZ	E	100UF,	M,	16V
C6282	QEKC1CM107MZ	E	100UF,	M,	16V

Ref. No.	Part No.	Description			
C6283	QEKC1CM107MZ	E	100UF,	M,	16V
C6284	QEKC1CM107MZ	E	100UF,	M,	16V
C6285	QETC1CM476Z	E	47UF,	M,	16V
C6301	QFLC1HJ103MZ	M	0.01UF,	J,	50V
C6302	QCS31HJ101AZ	C	100PF,	J,	50V
C6601	QCS31HJ181AZ	C	180PF,	J,	50V
C6602	QCS31HJ181AZ	C	180PF,	J,	50V
C6603	QETC1HM105Z	E	1UF,	M,	50V
C6604	QCS31HJ390AZ	C	39PF,	J,	50V
C6605	QCS31HJ181AZ	C	180PF,	J,	50V
C6611	QCS31HJ181AZ	C	180PF,	J,	50V
C6612	QCS31HJ181AZ	C	180PF,	J,	50V
C6613	QETC1HM105Z	E	1UF,	M,	50V
C6614	QCS31HJ390AZ	C	39PF,	J,	50V
C6615	QCS31HJ181AZ	C	180PF,	J,	50V
C6621	QCS31HJ181AZ	C	180PF,	J,	50V
C6622	QCS31HJ181AZ	C	180PF,	J,	50V
C6623	QETC1HM105Z	E	1UF,	M,	50V
C6624	QCS31HJ390AZ	C	39PF,	J,	50V
C6625	QCS31HJ181AZ	C	180PF,	J,	50V
C6630	QCS31HJ181AZ	C	180PF,	J,	50V
C6641	QETC1CM107Z	E	100UF,	M,	16V
C6701	QETC1HM475Z	E	4.7UF,	M,	50V
C6702	QCS31HJ101AZ	C	100PF,	J,	50V
C6703	QCS31HJ101AZ	C	100PF,	J,	50V
C6704	QETC1CM476Z	E	47UF,	M,	16V
C6707	QETC1CM476Z	E	47UF,	M,	16V
C6711	QETC1HM475Z	E	4.7UF,	M,	50V
C6712	QCS31HJ101AZ	C	100PF,	J,	50V
C6713	QCS31HJ101AZ	C	100PF,	J,	50V
C6714	QETC1CM476Z	E	47UF,	M,	16V
C6715	QCS31HJ101AZ	C	100PF,	J,	50V
C6717	QETC1HM106Z	E	10UF,	M,	50V
C6718	QCS31HJ101AZ	C	100PF,	J,	50V
C6721	QCS31HJ150AZ	C	15PF,	J,	50V
C6722	QCS31HJ820AZ	C	82PF,	J,	50V
C6723	QCS31HJ221AZ	C	220PF,	J,	50V
C6731	QETC1HM475Z	E	4.7UF,	M,	50V
C6732	QCS31HJ101AZ	C	100PF,	J,	50V
C6733	QCS31HJ101AZ	C	100PF,	J,	50V
C6734	QETC1CM476Z	E	47UF,	M,	16V
C6735	QCS31HJ101AZ	C	100PF,	J,	50V
C6737	QETC1HM106Z	E	10UF,	M,	50V
C6738	QCS31HJ101AZ	C	100PF,	J,	50V
C6741	QCS31HJ150AZ	C	15PF,	J,	50V
C6742	QCS31HJ820AZ	C	82PF,	J,	50V
C6743	QCS31HJ221AZ	C	220PF,	J,	50V
C6751	QEKC1HM475GM	E	4.7UF,	M,	50V
C6752	QCS31HJ101AZ	C	100PF,	J,	50V
C6781	QETC1CM227Z	E	220UF,	M,	16V
C6783	QFLC1HJ104MZ	M	0.1UF,	J,	50V
C6784	QFLC1HJ104MZ	M	0.1UF,	J,	50V
C6785	QETC1CM107Z	E	100UF,	M,	16V
△ C9001	QCZ9033472A	C	4700PF,	M,	125V
△ C9002	QCZ9033472A	C	4700PF,	M,	125V
△ C9003	QFZ9035474M	M	0.47UF,	M,	125V
△ C9004	QFZ9035474M	M	0.47UF,	M,	125V
△ C9005	QCZ9033472A	C	4700PF,	M,	125V
△ C9006	QCZ9033472A	C	4700PF,	M,	125V
△ C9007	QCZ9033332A	C	3300PF,	M,	125V
△ C9009	QCZ9033332A	C	3300PF,	M,	125V
△ C9010	QEZ0144477R	E	470UF		
C9012	QCY32HK103A	C	0.01UF,	K,	500V
C9013	QCY32HK103A	C	0.01UF,	K,	500V
C9018	QEHC1HM226MZ	E	22UF,	M,	50V
C9019	QFP31HJ152SZ	P	1500PF,	J,	50V
C9020	QEHC1HM105MZ	E	1UF,	M,	50V
C9021	QFLC1HJ103MZ	M	0.01UF,	J,	50V
C9022	QEHC1HM475MZ	E	4.7UF,	M,	50V

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description
C9023	QFLC1HK222MZ	M 2200PF, K, 50V		S6201	QSS4C22-C02	SWITCH
C9024	QCS31HJ121MZ	C 120PF, J, 50V		S6202	QSS4C22-C02	SWITCH
C9025	QEHC1EM107MZ	E 100UF, M, 25V		S6203	QSS4C22-C02	SWITCH
C9026	QFLC1HK473MZ	M 0.047UF, K, 50V		S6701	QSS4C22-C02	SWITCH
C9027	QEN61HM105Z	E 1UF, M, 50V		S6702	QSS4C22-C02	SWITCH
C9029	QFLC1HK472MZ	M 4700PF, K, 50V		S6703	QSS4C22-C02	SWITCH
C9036	QFLC1HJ103MZ	M 0.01UF, J, 50V		S6704	QSS4C22-C02	SWITCH
C9038	QEHB1EM338M	E 3300UF, M, 25V	⚠ SK3001	CE42446-001	CRT SOCKET
C9039	QEHB1EM228M	E 2200UF, M, 25V	⚠ SW01	QSP4D21-C06	SWITCH
C9040	QETC1AM227Z	E 220UF, M, 10V	⚠ TH9001	CEKP009-001	THERMISTOR
C9043	QETC1AM107Z	E 100UF, M, 10V	⚠ VA9001	ERZC10VK621G	VARISTOR
C9044	QETC1HM476Z	E 47UF, M, 50V		X1201	CE40668-001	CRYSTAL
C9046	QEHB2CM227M	E 220UF, M, 160V		X1202	CE41953-001	CRYSTAL OSC
C9049	QEHB2AM477M	E 470UF, M, 100V				
C9050	QEHB2AM477M	E 470UF, M, 100V				
C9051	QEHB2AM477M	E 470UF, M, 100V				
C9516	QETB2AM477	E 470UF, M, 100V				
C9517	QETB2AM477	E 470UF, M, 100V				

	OTHERS	
CF5101	CST8.00MTW	RESONATOR
⚠ CP2001	ICP-N75-Y	PROTECTOR
⚠ F9001	QMF51U1-4R0S	FUSE 4.0A
⚠ FR2301	QRH127J182M	F 1.8KOHM, J, 1/2W
⚠ FR2426	QRH127KR22M	F 0.22 OHM, K, 1/2W
⚠ FR2525	QRH127J1R0M	F 1 OHM, J, 1/2W
⚠ FR2702	QRH127KR22M	F 0.22 OHM, K, 1/2W
⚠ FR2704	QRH127J4R7M	F 4.7 OHM, J, 1/2W
⚠ FR9901	QRH127K-R22M	F 0.22 OHM, K, 1/2W
⚠ FR9902	QRH127K-R22M	F 0.22 OHM, K, 1/2W
⚠ FR9903	QRH127K-R22M	F 0.22 OHM, K, 1/2W
J6201	CEMB010-004	BNC CONNECTOR
J6202	CEMB010-004	BNC CONNECTOR
J6301	QMCC006-C01	CONNECTOR
J6302	QMCC006-C01	CONNECTOR
J6601	CEMN070-001	JACK
J6602	CEMN070-001	JACK
J6603	CEMN070-001	JACK
J6701	CEMB010-004	BNC CONNECTOR
J6702	CEMB010-004	BNC CONNECTOR
J6801	QMCC502-C01	JACK
K9902	CE41923-001	CORE
K9903	CE41923-001	CORE
K9905	CE42050-001Z	CORE
⚠ LF9001	CE41775-003	LINE FILTER
⚠ LF9002	CE41775-003	LINE FILTER
⚠ PC9001	CNY17F-C1	IC
RTL	FX-M004A	CIRCUIT BOARD (V. SAW MODULE)
RTL	FX-1072A	CIRCUIT BOARD (SIGNAL)
RTL	FX-2044A	CIRCUIT BOARD (DEFLECTION)
RTL	FX-3037A	CIRCUIT BOARD (CRT SOCKET)
RTL	FX-4039A	CIRCUIT BOARD (FRONT CONTROL)
RTL	FX-5015A	CIRCUIT BOARD (MICOM)
RTL	FX-6047A	CIRCUIT BOARD (INPUT)
RTL	FX-9042A	CIRCUIT BOARD (POWER)
⚠ RY9002	CESK026-001	RELAY
S2501	QSS1F22-C09	SWITCH
S4101	QSTL535-C01	SWITCH
S4102	QSTL535-C02	SWITCH
S4103	QSP4H11-C12Z	SWITCH
S4104	QSP4H11-C12Z	SWITCH
S4105	QSP4H11-C12Z	SWITCH
S4106	QSP4H11-C12Z	SWITCH
S4107	QSP4H11-C12Z	SWITCH
S4108	QSP4H11-C12Z	SWITCH
S4109	QSP4H11-C12Z	SWITCH

Panasonic.

BT-M1950Y
Color Video Monitor
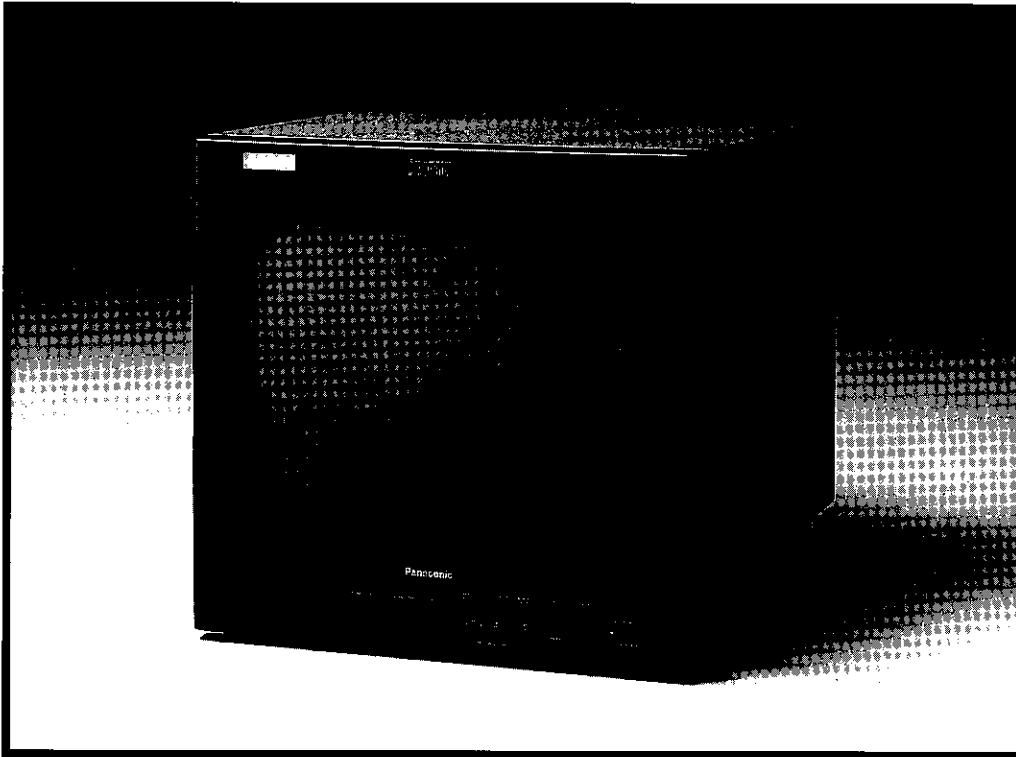
Features

- For multiple applications with various video systems; equipped with external source component terminals that can be bridge-connected

- Compatible with NTSC-3.58/4.43 MHz or PAL color systems

- The BT-M1950Y has a medium-high-definition picture tube that reproduces pictures with a horizontal resolution of 750 TV lines or more.

- Auto white-balance stabilizer (I/K feedback circuit) maintains stable color reproduction over long-term use

- A range of flexible functions include picture aspect ratio switching (between 4:3 and 16:9), memory mode and control lock

- On-screen menu controls; By calling up the menu display on screen, various functions can be selected and set as needed.

Panasonic
Broadcast & Digital Systems Company

BT-M1950Y
Color Video Monitor

Specifications

Type:	Color video monitor		Analog RGB
Color Systems:	NTSC 3.58MHz, NTSC 4.43MHz, PAL		RGB/COMPONENT

Type: Color video monitor

Color Systems: NTSC 3.58MHz, NTSC 4.43MHz, PAL

Picture Tube: 19" (47.5 cm) diagonally measured, 90° deflection, in-line gun, medium-high-definition cathode-ray tube, triodot type (dot pitch of 0.4mm), SMPTE-C phosphor

Screen Size (WxH): 15-11/16" x 11-3/4" (399mm x 298mm)

Scanning Frequency: H: 15.734kHz (NTSC 3.58/4.43MHz)
15.625kHz (PAL)
V: 59.94Hz (NTSC 3.58/4.43MHz)
50Hz (PAL)

Horizontal Resolution: 750 TV lines or more

Color Temperature: 6500K; x=0.313, y=0.329
9300K; x=0.283, y=0.297
(selectable)

Video Inputs: Composite video
INPUT A, B (2 lines), BNC x 2 each
(with 1 bridge-connected output)
Termination swicthes provide
1.0Vp-p, 75Ω, negative sync
Y/C
Y/C (1 line), DIN (4-pin) x 2
(with 1 bridge-connected output)
Termination switch provided
Y: 1.0Vp-p, 75Ω, negative sync
C (NTSC 3.58/4.43MHz):
0.286Vp-p, 75Ω
C (PAL): 0.3Vp-p, 75Ω

Analog RGB
RGB/COMPONENT
(1 line: common with Y, R-Y, B-Y, component), BNC x 6
(with 3 bridge-connected outputs)
Y: 1.0Vp-p, 75Ω, negative sync
R-Y, B-Y: 0.7Vp-p, 75Ω

External Sync Inputs: SYNC (1 line),
BNC x 2 (with 1 bridge-connected output)
0.2 - 4.0Vp-p, composite sync, 75Ω, negative sync
Termination switch provided

Audio Inputs: AUDIO A, B RGB/COMPONENT
(3 lines), RCA x 2 each
(with 1 bridge-connected output)
500mV rms, high impedance

Tally/Remote Terminal: TALLY/REMOTE, DIN (8-pin) x 1

Audio Power Output: 1.6W

Built-in Speaker: 3-9/16" x 2" (9 x 5cm) oval x 1

Operation Temperature: 0 – 40°C (20 – 80% RH)

Power Requirements: 120V AC, 50/60Hz

Power Consumption: 0.9A

Dimensions (WxHxD): 17-3/4" x 17" x 20-1/8"
(449mm x 431mm x 511mm)

Weight: 66 lbs (30kg)

Provided Acccessory: Power cord x 1

Weight and dimensions shown are approximate..
Specifications subject to change without notice.

VSD 7211B [07156.2] (10K)