

JVC

SERVICE MANUAL

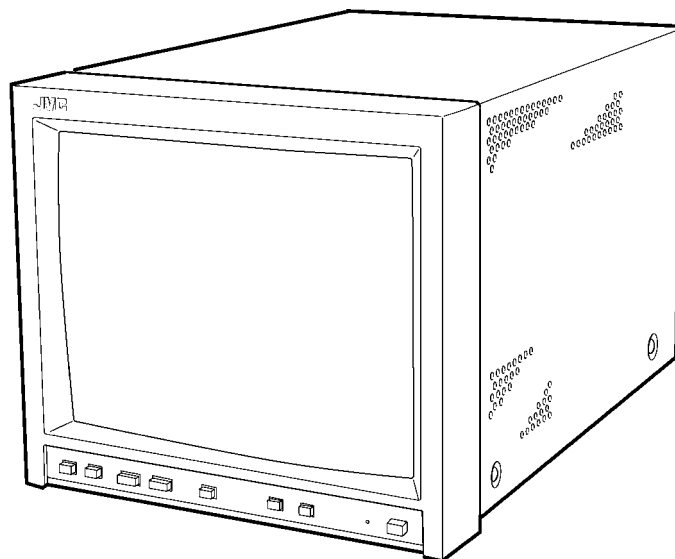
COLOUR VIDEO MONITOR

BASIC CHASSIS

S2M1

TM-A101G/E

TM-A101G/U



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SPECIFICATIONS

Item	Content
Dimension (W × H × D)	222mm × 220mm × 316.3mm / 8-3/4" × 8-11/16" × 12-1/2"
Mass	6.8kg / 15.0lbs
Colour system	PAL / NTSC 3.58
Picture tube	25cm / 9-7/8" measured diagonally Flat-square type 90° deflection, in-line gun trio-dot type (phosphor dot-trio pitch 0.5 mm)
Effective screen size	175mm × 137mm (W × H) / 222mm (Diagonal) 6-15/16" × 5-7/16" (W × H) / 8-3/4" (Diagonal)
Scanning frequency	(H)15.734 kHz (NTSC) 15.625 kHz (PAL)
	(V)59.94 Hz (NTSC) 50Hz (PAL)
Horizontal resolution	280TV line or more
Colour Temperature	6500K ; x = 0.313, y = 0.329
Power requirements	230V AC, 50/60 Hz [TM-A101G/E] 120V AC, 50/60 Hz [TM-A101G/U]
High Voltage	21.0kV~23.0kV
Power consumption	0.43A [TM-A101G/E] 0.61A [TM-A101G/U]
Signal input / output	
	VIDEO A Composite video signal : BNC terminal, 1V(p-p) 75Ω negative sync 1 bridge-connected output possible with automatic termination
	VIDEO B Composite video signal : BNC terminal, 1V(p-p) 75Ω negative sync 1 bridge-connected output possible with automatic termination
	AUDIO A Monaural, RCA pin, 500mV(rms) High-impedance, 1-bridge-connected output possible
	AUDIO B Monaural, RCA pin, 500mV(rms) High-impedance, 1-bridge-connected output possible
	REMOTE INPUT 1 line, RCA pin input
	REMOTE ASPECT 1 line, RCA pin input
Audio power output	1W (Monaural)
Speaker	8cm round × 1, impedance 8Ω
Operation temperature	0~40°C (32~104° F)
Operation humidity	20~80% (non-condensing)

Design & specifications are subject to change without notice.

SAFETY PRECAUTIONS

- 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.
- 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.
- 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 (Δ) 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.
- Use isolation transformer when hot chassis.**
The chassis and any sub-chassis contained 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.
- 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.
- If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See ADJUSTMENT OF B1 POWER SUPPLY).
- 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.
- 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.
- 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

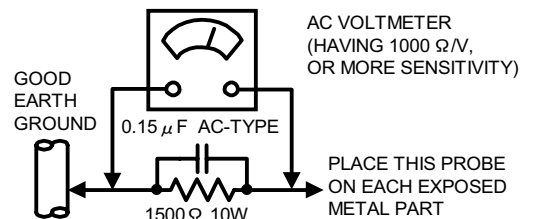
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).

However, in tropical area, this must not exceed 0.2mA 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 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).

However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



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".

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

POWER CORD REPLACEMENT WARNING.
Connecting the white line side of power cord to "WHT" character side.

SAFETY PRECAUTIONS

1. The design of this product contains special hardware and 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 product 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 product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessary 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 (Δ) on the Parts List in the 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. The leads in the products are routed and dressed with ties, clamps, tubing's, barriers and the like to be separated from live parts, high temperature parts, moving parts and / or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.

WARNING

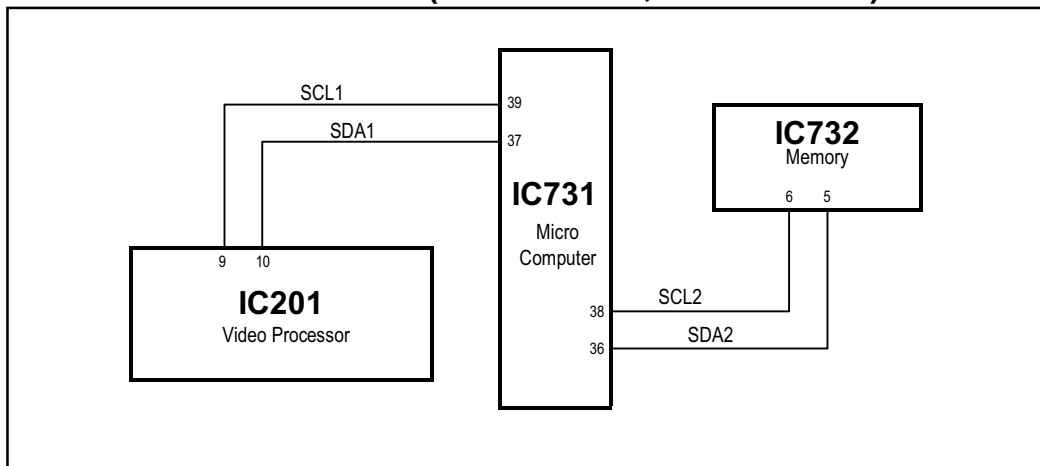
1. The equipment has been designed and manufactured to meet international safety standards.
2. It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
3. Repairs must be made in accordance with the relevant safety standards.
4. It is essential that safety critical components are replaced by approved parts.
5. If mains voltage selector is provided, check setting for local voltage.

FEATURES

MAIN MICOM (IC731) PIN ARRANGEMENT

PORT NUMBER	PIN NAME	PORT NUMBER	PIN NAME
1	H SYNC	27	VDD
2	V SYNC	28	OSC2
3	NC	29	OSC1
4	V CENTER	30	RESET
5	NC	31	NC
6	A VOLUME	32	NC
7	CUTOFF	33	KEY IN3
8	COMB SWITCH	34	KEY IN2
9	POWER ON/OFF	35	KEY IN1
10	AUDIO MUTE	36	SDA2
11	ASP REM	37	SDA1
12	NC	38	SCL2
13	Y/C SELECT	39	SCL1
14	POWER LED	40	NC
15	B1 PROTECT	41	NTSC / 0TH
16	REMOCON	42	SECAM / 0TH
17	P CHK	43	VIDEO B
18	INP REM	44	VIDEO A
19	VIDEO A MUTE	45	BUS FREE
20	VIDEO B MUTE	46	X RAY
21	Y/C MUTE	47	SDA3
22	NC	48	SCL3
23	NC	49	YS
24	X IN	50	B
25	X OUT	51	G
26	VSS	52	R

I2C BUS FLOW CHART (SCL1/SDA1, SCL2/SDA2)



SPECIFIC SERVICE INSTRUCTIONS

DISASSEMBLY PROCEDURE

CAUTION

Even with the power switch off, some parts of this unit are live. Be sure to disconnect the power plug from the AC outlet before disassembly and reassembly.

REMOVING THE TOP COVER

1. As shown in Fig.2, remove the 4 screws marked (A) .
2. Remove the 4 screws marked (B) .
3. Slightly spread the bottom of the top cover.
4. Shift the cover rearward and raise it upward to remove it.

REMOVING THE REAR PANEL

- After removing the top cover.
1. Remove the 4 screws marked (C) .
 2. Shift the top portion of the rear panel slightly rearward and raise it upward to remove it.

REMOVING THE TERMINAL BRACKET

- Remove the top cover and rear panel.
1. Remove the 4 screws marked (D) .
 2. Remove the screw marked (E) attached the FBT with the terminal bracket.
 3. As shown in Fig.1, remove the screws marked (F) and (G) . these screws attached the earth wires to terminal bracket.
(See the "Caution about the earth wire" as shown Fig.1)
 4. Slightly shift the terminal bracket rearward and raise it upward to remove it.

REMOVING THE CHASSIS BASE

- Remove the top cover, rear panel and terminal bracket.
1. As shown in Fig.3, while pushing raise the claw marked (H) , withdraw the chassis base toward you.
 2. Follow the same steps when removing the other hand chassis base.

REMOVING THE BOTTOM COVER

- Remove the chassis base.
1. Set the CRT front surface downward, and stand the bottom cover to facing it toward you.
At this time, care must be exercised not to damage the front panel and CRT surface.
 2. As shown in the Fig.2, remove the 2 screws marked (J) .
 3. Slightly raise the bottom cover, and then pull it out to upward.

REMOVING THE SPEAKER

- Remove the top cover.
1. Slightly spread the claws of the speaker holder, and pull up the speaker to remove it.

CHECKING THE PW BOARD

To check the PW board from back side.

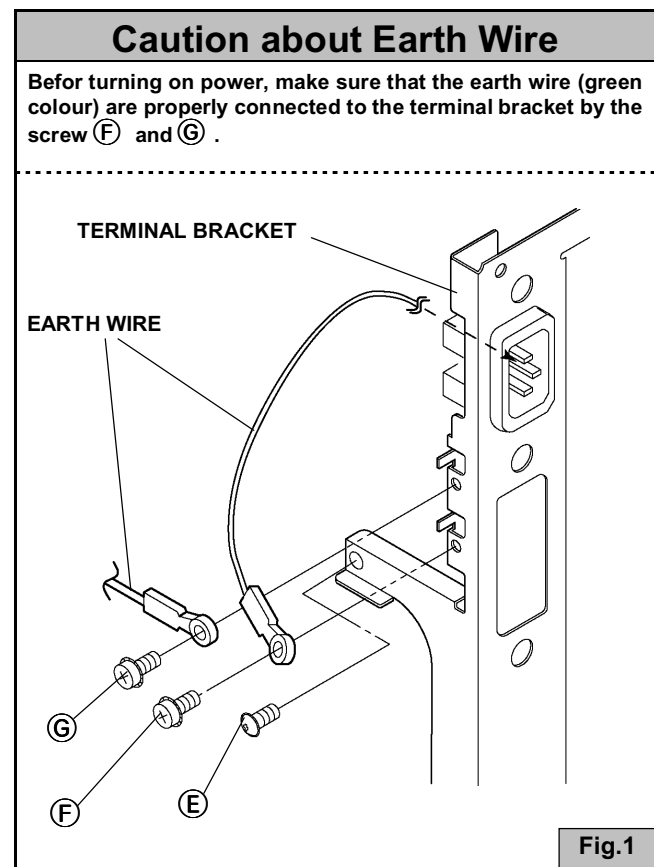
- (1) Remove the chassis base and the other PW boards.
- (2) Erect the chassis base vertically so that you can easily check the PW board from back side.

CAUTION

- When erecting the chassis base, be careful so that there will be no contacting with the other PW board.
- Before turning on power, make sure that the CRT earth wire and the other connectors are properly connected.

WIRE CLAMPING AND CABLE TYING

1. Be sure to clamp the wire.
2. Never remove the cable tie used for tying the wires together.
Should it be inadvertently removed, be sure to tie the wires with a new cable tie.



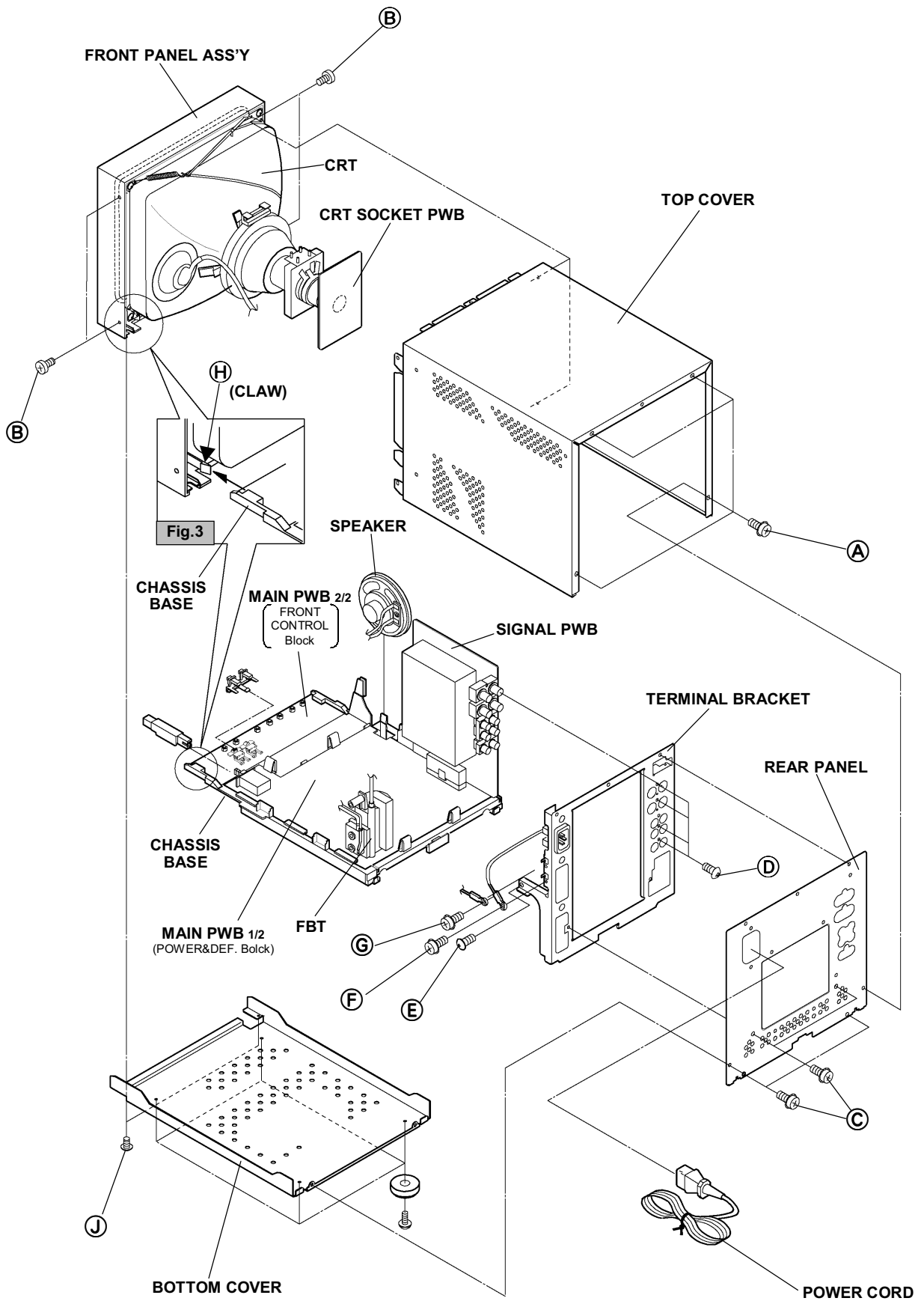


Fig.2

No.51921

REPLACEMENT OF MEMORY IC

1. MEMORY IC

This model uses memory IC. In the memory IC, memorized data for correctly operating for the video-chroma, deflection and the other control circuits.

When replacing memory IC, be sure to use the IC written with the initial values of data.

2. PROCEDURE FOR REPLACING MEMORY IC

(1) Power off

Turn the power off and unplug the power plug from the AC outlet.

(2) Replace IC

Be sure to use the memory IC written with the initial setting data.

(3) Power on

Connect the power plug into the AC outlet and turn the power on.

(4) Check and set SET-UP MENU items

- 1) Press the **MENU** key and the **CHROMA/PHASE** key simultaneously.
- 2) The SET-UP MENU screen (Fig. 1) will be displayed.
- 3) Check the setting value of the each item of the SET-UP MENU. If the value is different, select the item and set the correct value.
- 4) Press the **MENU** key, and return to the normal screen.

(5) Check and set MENU items

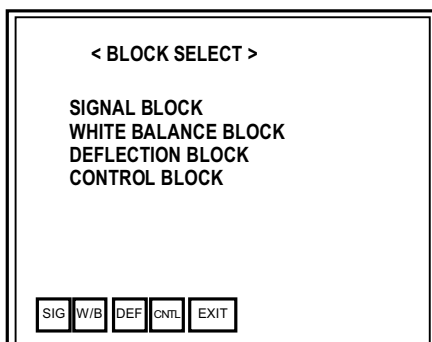
Press the **MENU** key and check the setting value of the each item. If the value is different, select the item and set the correct value.

(6) Adjust the front control items

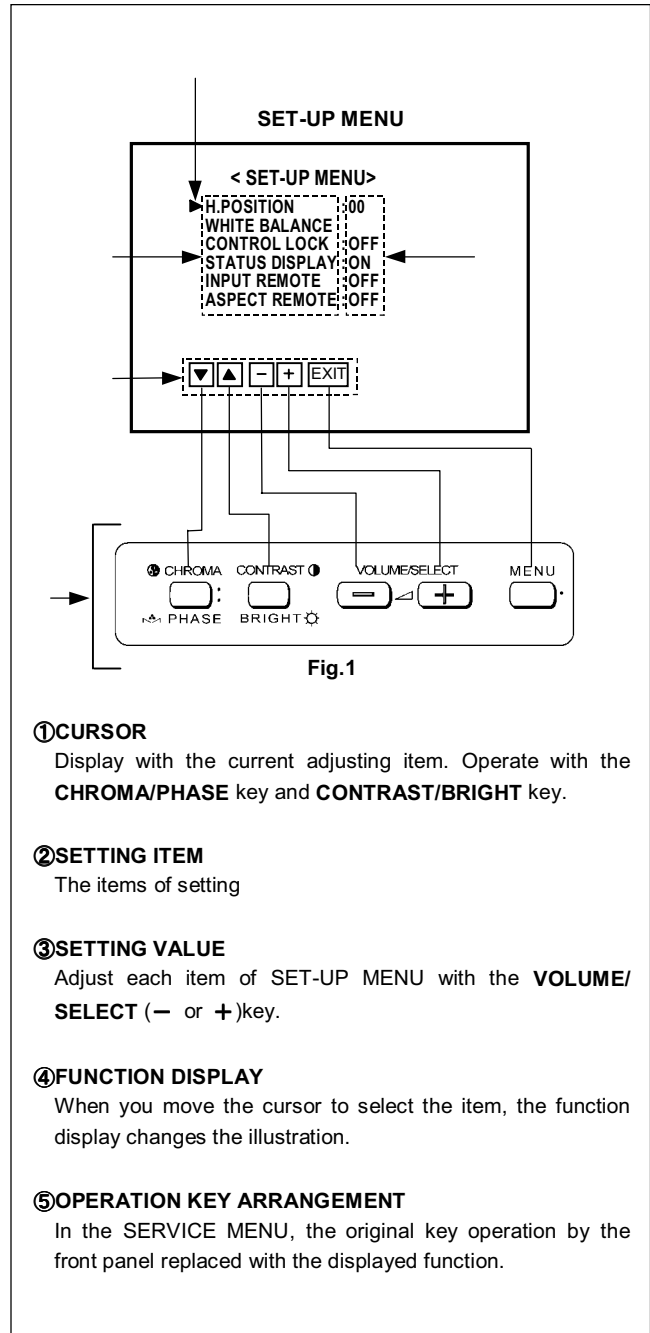
Adjust the CHROMA, PHASE, CONTRAST and BRIGHT.
Not all items can be adjusted as expected if the signal has not been input correctly in the adjustments.

(7) Confirm the items of SERVICE MENU

Confirm the each item of the SERVICE MENU. Refer to the corresponding page to operate the SERVICE MENU.



SERVICE MENU
<BLOCK SELECT> SCREEN



INITIAL SETTING OF THE SET-UP MENU TABLE

Setting item	Setting content / Range	Initial setting value
H. POSITION	-05 ~ +05	00
WHITE BALANCE	CUTOFF (R / G / B)	-09 ~ +09
	DRIVE (R / B)	-09 ~ +09
CONTROL LOCK	<input type="checkbox"/> ON → OFF <input type="checkbox"/>	OFF
STATUS DISPLAY	<input type="checkbox"/> ON → OFF <input type="checkbox"/>	ON
INPUT REMOTE	<input type="checkbox"/> ON → OFF <input type="checkbox"/>	OFF
ASPECT REMOTE	<input type="checkbox"/> ON → OFF <input type="checkbox"/>	OFF

INITIAL SETTING OF THE MENU SCREEN TABLE

Setting item	Setting content / Range	Initial setting value
SHARPNESS	00 ~ +05	03
COLOUR SYSTEM	<input type="checkbox"/> AUTO → NTSC → PAL <input type="checkbox"/>	AUTO
ASPECT RATIO	<input type="checkbox"/> 4-3 → 16-9 <input type="checkbox"/>	4-3

INITIAL SETTING OF FRONT PANEL CONTROLS

Control item	Initial setting value
INPUT SELECT	A
CHROMA	00
PHASE	00
CONTRAST	00
BRIGHT	00
VOLUME	20

BLOCK SELECT ADJUSTMENT ITEM

SIGNAL BLOCK

SERVICE ITEM	CONTENTS
S01	BRIGHT
S02	CONTRAST
S03	CHROMA(PAL)
S04	CHROMA(NTSC)
S05	CHROMA(SECAM)
S06	PHASE(NTSC)
S07	BRIGHT(16:9)
S08	CONTRAST(16:9)

DEFLECTION BLOCK

SERVICE ITEM	CONTENTS
D01	HORIZONTAL POSITION
D02	VERTICAL SIZE
D03	VERTICAL SIDE PIN CORRECTION
D04	VERTICAL CENTER
D05	VERTICAL LINEARITY

In addition to the ones listed above, the following DEFLECTION BLOCK are also available.

INPUT SIGNAL V. FREQ / ASPECT	SCREEN DISPLAY
50Hz / 4:3	D01~D05
60Hz / 4:3	DA1~DA5
50Hz / 16:9	DB1~DB5
60Hz / 16:9	DC1~DC5

WHITE BALANCE

SERVICE ITEM	CONTENTS
W01	R CUTOFF
W02	G CUTOFF
W03	B CUTOFF
W04	R DRIVE
W05	B DRIVE

CONTROL BLOCK (These are fixed values. Don't adjust them.)

SERVICE Number	ITEM	SERVICE Number	ITEM
C01	MODEL	C29	REMOCON
C02	BRIGHT POINT	C30	S-FIELD
C03		C31	SDC ATT
C04	CONTRAST POINT	C32	DEMP F0
C05		C33	V. ID. SW
C06	CHROMA POINT	C34	S. KILL
C07		C35	BELL. F0
C08	PHASE POINT	C36	ABL. GAIN
C09		C37	ABL. POINT
C10	OSD HORIZONTAL POSITION	C38	TRAP SW (NTSC)
C11	OSD VERTICAL FREQUENCY (50Hz)	C39	TRAP SW (PAL)
C12	OSD VERTICAL FREQUENCY (60Hz)	C40	TRAP Q (NTSC)
C13	VERTICAL DELAY (NTSC)	C41	TRAP Q (PAL)
C14	VERTICAL DELAY (PAL)	C42	TRAP F0(NTSC)
C15	VERTICAL DELAY (SECAM)	C43	TRAP F0(PAL)
C16	VERTICAL DELAY (BLACK AND WHITE)	C44	TOF SW (NTSC)
C17	S DELAY (NTSC)	C45	TOF SW (PAL)
C18	S DELAY (PAL)	C46	TOF Q (NTSC)
C19	S DELAY (SECAM)	C47	TOF Q (PAL)
C20	S DELAY (BLACK AND WHITE)	C48	TOF F0 (NTSC)
C21	BRIGHT (VERTICAL)	C49	TOF F0 (PAL)
C22	SHARP (CENTER VALUE)	C50	APA (V. NTSC)
C23	V-GUARD	C51	APA (V. PAL)
C24	HOUR METER	C52	APA (V. SECAM)
C25	AFC MODE	C53	APA (Y/C, B/W)
C26	BURST (NTSC / PAL)	C54	R-Y BLACK OFFSET
C27	BURST (SECAM)	C55	B-Y BLACK OFFSET
C28	COLOUR SYSTEM	C56	CONTRAST CONTROL

SERVICE ADJUSTMENTS

BEFORE STARTING SERVICE ADJUSTMENT

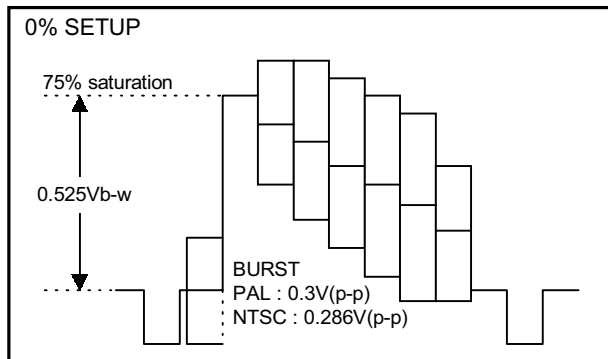
1. Confirm the proper AC power voltage is being supplied.
2. Supply power to the set and measuring instruments and allow to warm up for at least 30 minutes.
3. The setting is made on basis of the initial setting values. The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
4. Use care not to disturb controls and switches not mentioned in the adjustment items.

MEASURING INSTRUMENTS AND STANDARD SIGNAL

- DC voltmeter (digital voltmeter)
- Oscilloscope
- Signal generator (PAL/NTSC systems)
- Colour analyser
- High voltage meter

The wave form of signals refer following figure.

STANDARD VIDEO SIGNAL (PAL / NTSC COLOUR BAR)

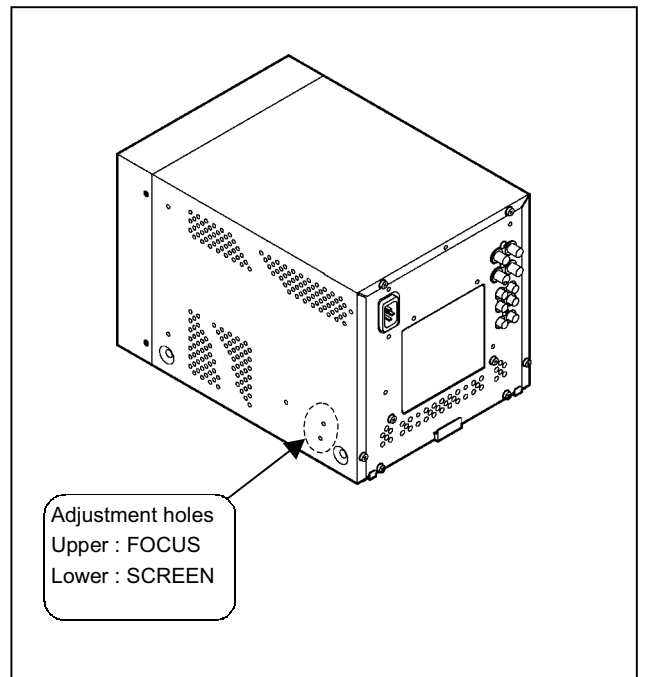


FOCUS AND SCREEN ADJUSTMENT HOLES

The FOCUS and SCREEN adjustment holes are on the side panel.

[CAUTION]

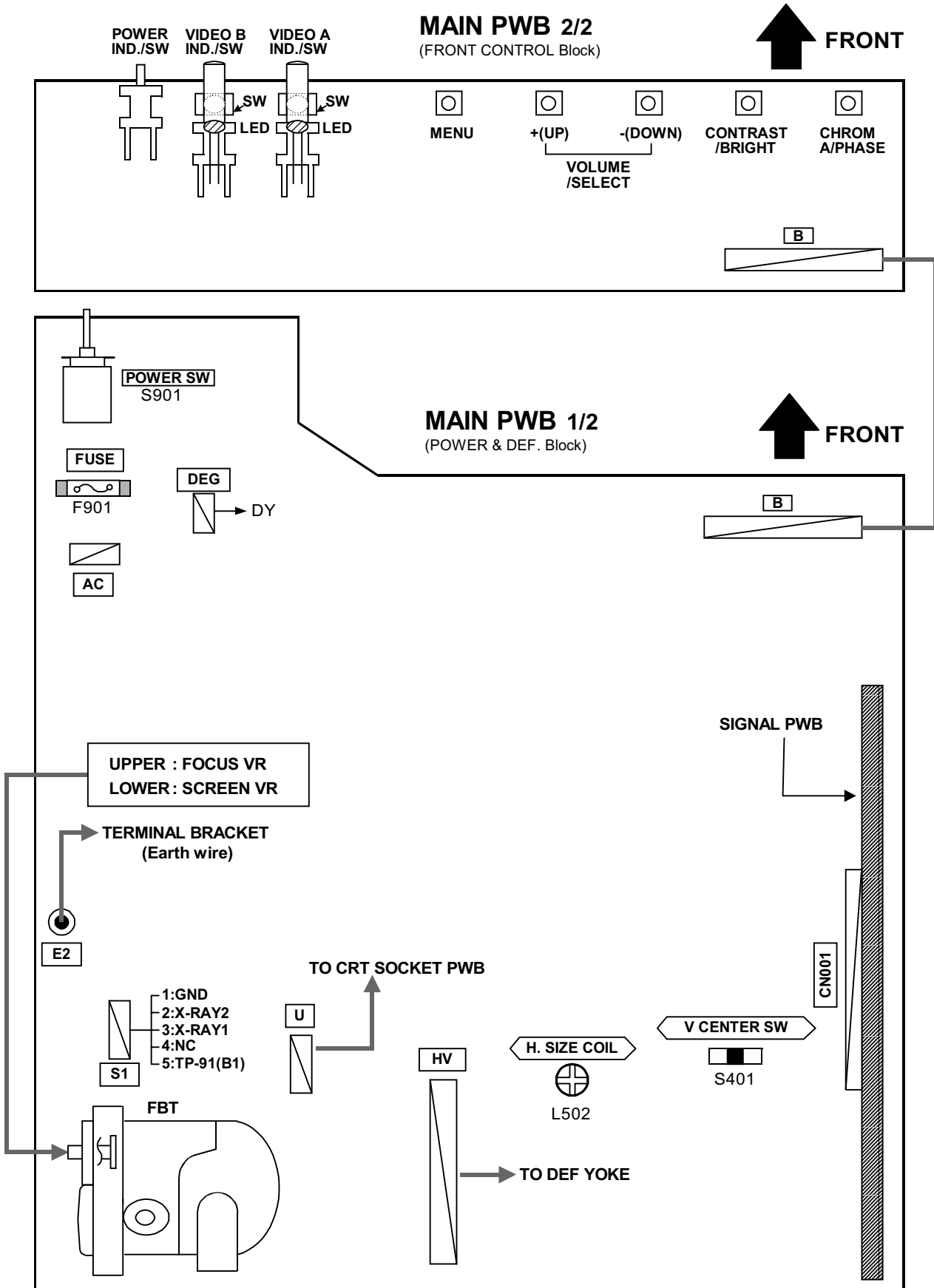
Be sure to use a non-metallic driver for adjusting there VRs. A metallic driver can cause damage by shorting.

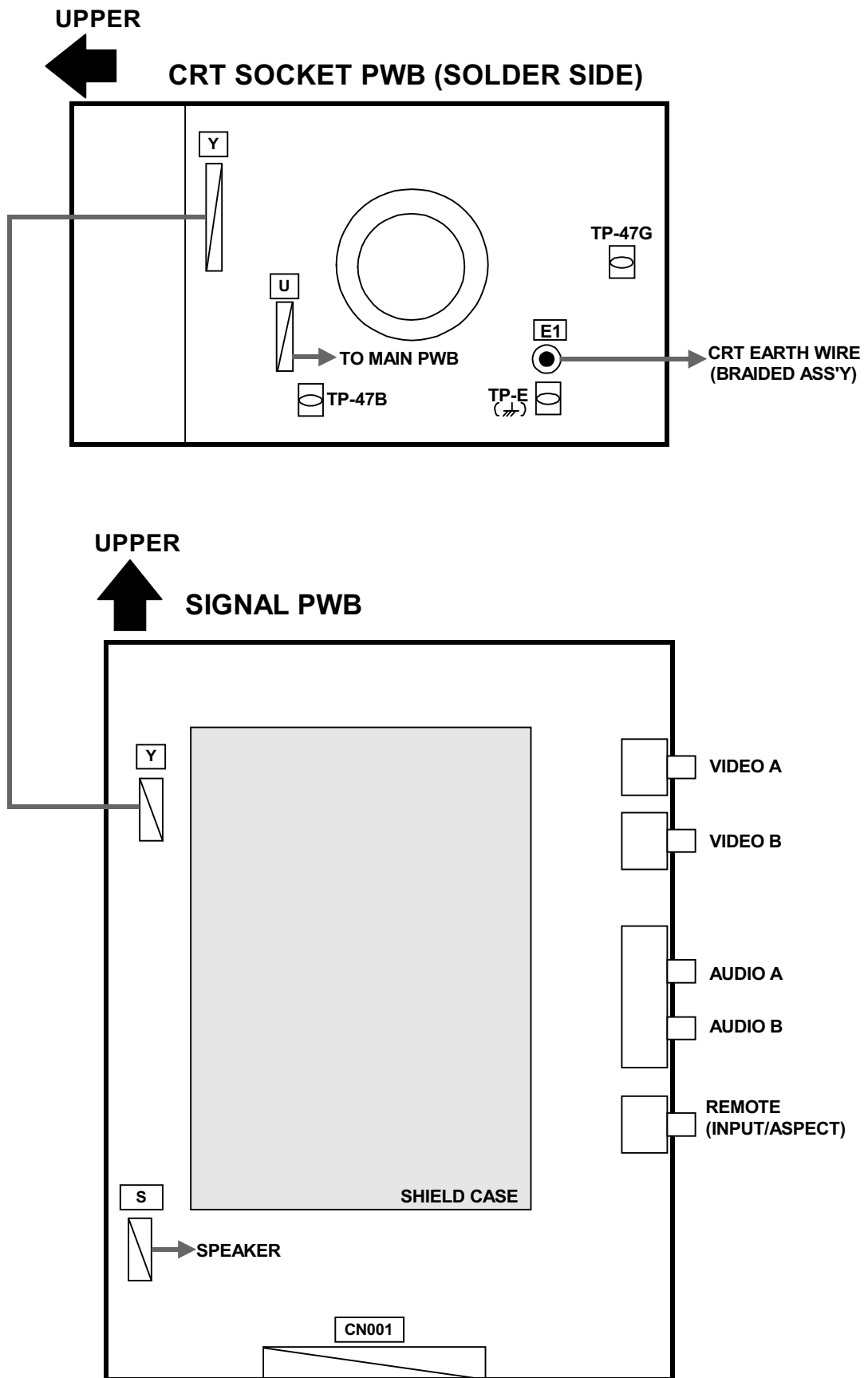


ADJUSTMENT ITEMS

■ Checking of B1 voltage	■ Chroma adjustment (PAL, NTSC)
■ Checking of High voltage	■ Phase adjustment (NTSC)
■ Focus adjustment	■ Horizontal center adjustment
■ White Balance (Low Light) adjustment	■ Horizontal size center adjustment
■ White Balance (High Light) adjustment	■ Vertical center adjustment
■ Bright adjustment	■ Vertical size adjustment
■ Contrast adjustment	■ Vertical side pin cushion and linearity adjustment

ADJUSTMENT LOCATIONS





BASIC OPERATION OF SERVICE MENU

1. SERVICE MENU ITEMS

With the SERVICE MENU, various settings can be made, and they are broadly classified in the following items of adjustments. It is no requirement for adjustment the portion of the DEFLECTION BLOCK and CONTROL BLOCK.

- SIGNAL BLOCK** This block adjusts the data of the various signal circuit controls.
- WHITE BALANCE BLOCK**... This block adjusts the data of the WHITE BALANCE adjustment.
- DEFLECTION BLOCK**..... This block adjusts the data of the DEFLECTION circuit.
- CONTROL BLOCK** This block adjusts the whole of the systems
(This block is a fixed value. Don't adjust it.)

2. BASIC OPERATION OF THE SERVICE MENU

(1) HOW TO ENTER THE SERVICE MENU

- ① Press **MENU** key and **VOLUME/SELECT + (UP)** key simultaneously (Fig. 1).
The letter "S" appears at the upper left of the screen (Fig. 2).
- ② While displaying the letter "S", press **MENU** key and **CHROMA/PHASE** key simultaneously (Fig.1).
The screen display "PLEASE DON'T TOUCH" (Fig. 3).
- ③ WHILE displaying the letters above-mentioned, press **VOLUME/SELECT + (UP) key** or **– (DOWN) key** to display the SERVICE MENU as shown in Fig. 4.
If above-mentioned steps or state continues for more than 5 seconds without a further operation, the display extinguishes and the mode is released.

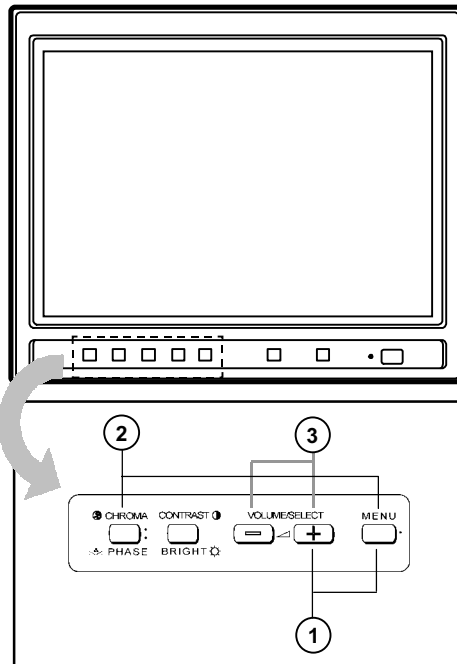


Fig.1

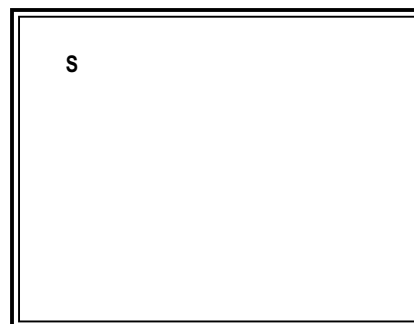


Fig. 2



Fig. 3

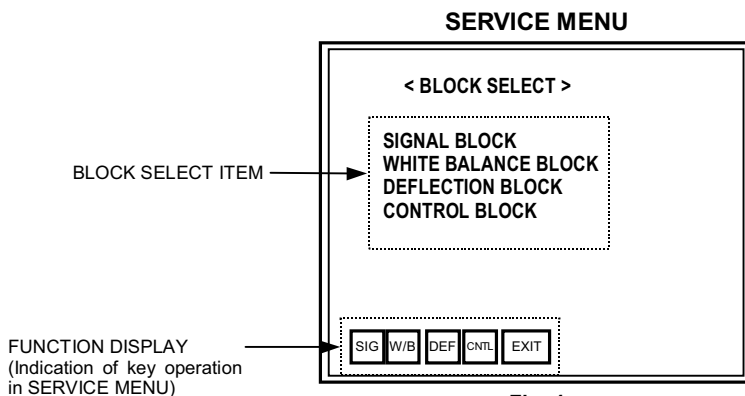


Fig. 4

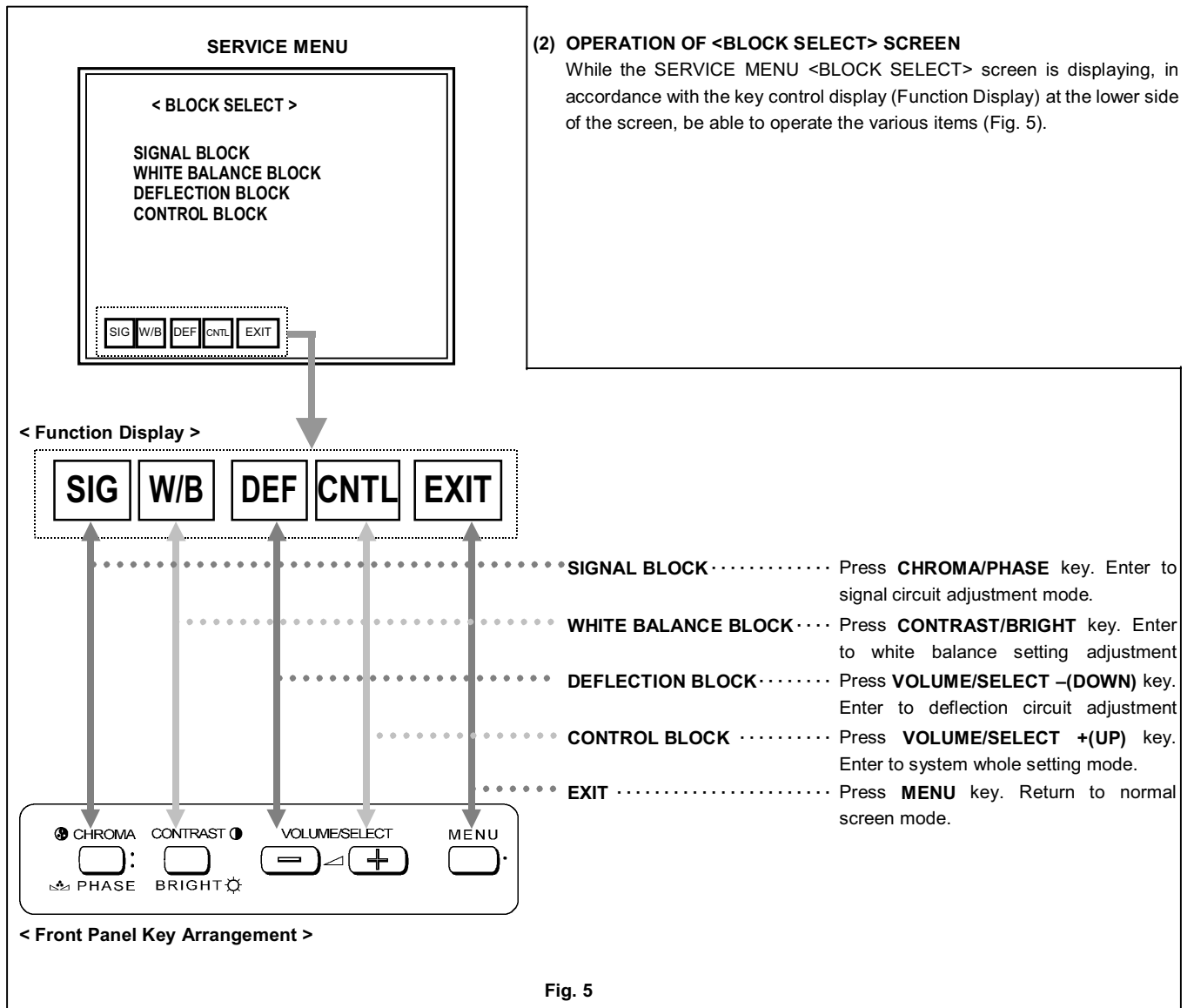


Fig. 5

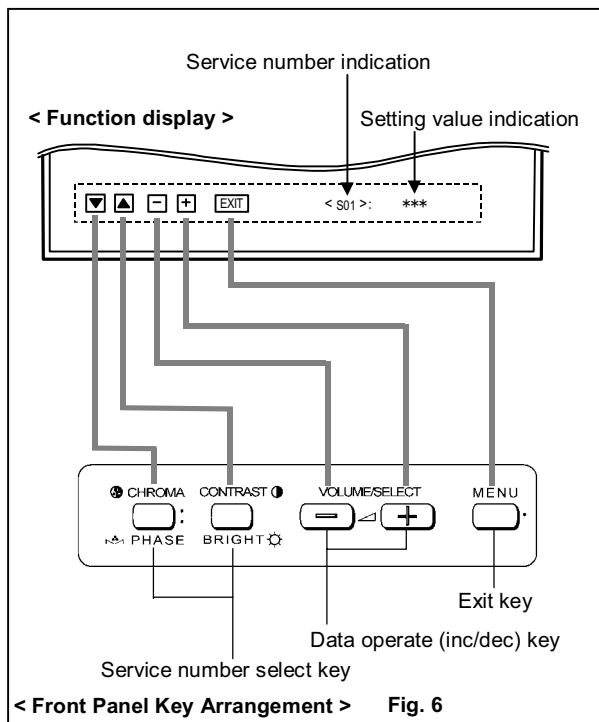


Fig. 6

< For example as following, explaining about SIGNAL BLOCK key operations. >

- (3) SELECT THE SERVICE NUMBER**
Press the **CHROMA/PHASE** or **CONTRAST/BRIGHT** key to select the service number.
- (4) ADJUSTMENT DATA OPERATION**
Press the **VOLUME/SELECT + (UP)** key to change the setting value in the + direction.
Press the **VOLUME/SELECT – (DOWN)** key to change the setting value in the - direction.
- (5) EXIT SERVICE MENU**
When adjustments are completed, press **MENU** key then return to the **BLOCK SELECT** screen. Again press **MENU** key then return to the normal screen.

3. HOW TO OPERATE EACH SERVICE MENU ITEMS

■ SIGNAL BLOCK

- ① In the <BLOCK SELECT> screen , press the **CHROMA/PHASE** key.
- ② Then SIGNAL BLOCK adjustment mode screen is displayed (Fig. 7).
- ③ The original front key function replaced with the different function displayed at the lower side of the screen as shown below.
Refer to the illustration given below, the function about each key in this mode.
- ④ In this mode, **CONTRAST/BRIGHT** key is the switch of the screen display. If necessary, you can shut off the display. Carefully, values of adjustment items are changed while shut off the screen display.
- ⑤ Press the **MENU** key, then exit the SIGNAL BLOCK screen to return to the <BLOCK SELECT> screen.

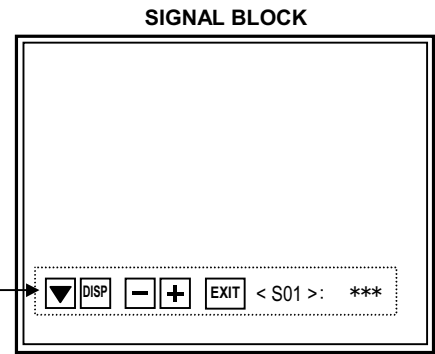
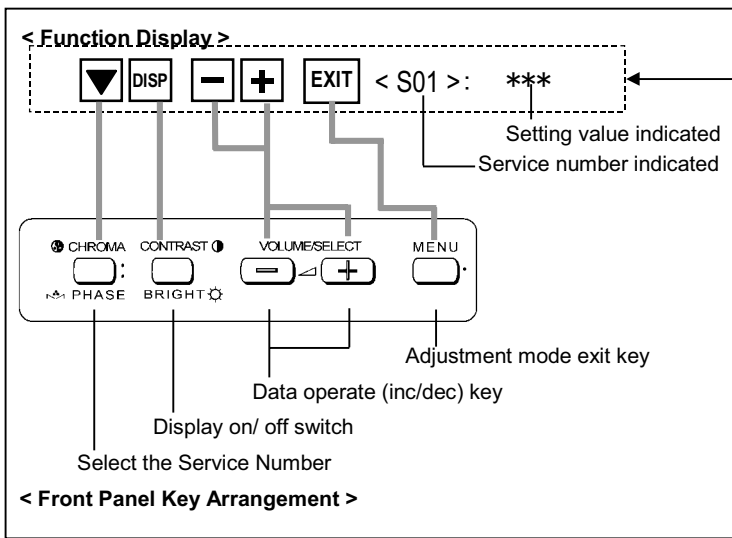


Fig. 7



■ WHITE BALANCE BLOCK

- ① In the <BLOCK SELECT> screen, press the **CONTRAST/BRIGHT** key.
- ② Then WHITE BALANCE menu screen is displayed (Fig. 8).
- ③ In this case, key function is replaced as shown below. There are several modes of WHITE BALANCE adjustment. Select the various WHITE BALANCE mode from this menu screen.
- ④ Press the **MENU** key few times, then exit from the WHITE BALANCE BLOCK screen to return to the <BLOCK SELECT> screen.

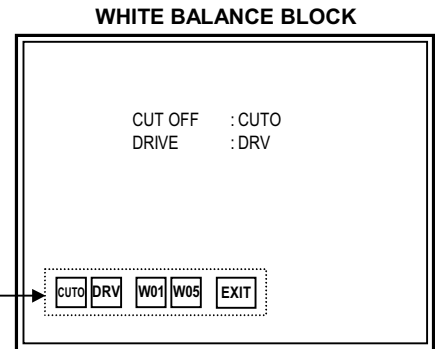
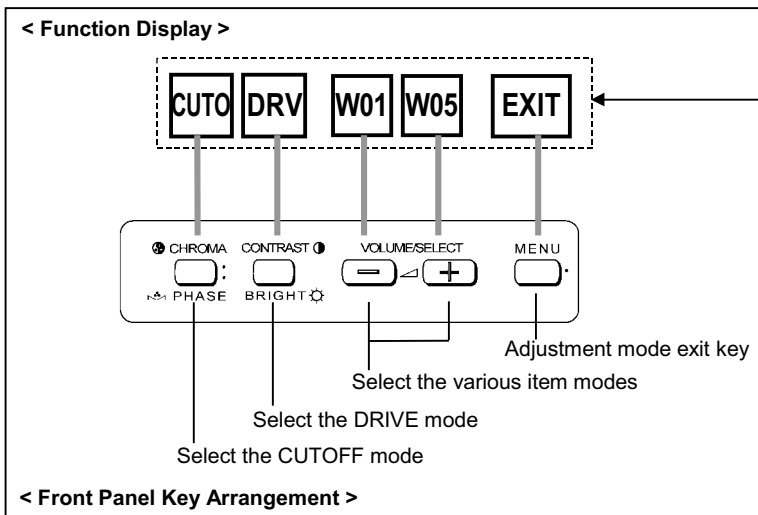


Fig. 8



[**WHITE BALANCE Adjustment : METHOD 1**]

Accordance with the screen display, select the each WHITE BALANCE mode following below.

CUTOFF adjustment mode (Low light adjustment)

- ① In the WHITE BALANCE menu screen, press the **CHROMA/PHASE** key to enter to the CUTOFF adjustment mode (Fig. 9). In this case, key function is replaced as shown below.
- ② Whenever press the **CHROMA/PHASE** key, change the adjustment colour of R, G and B.
- ③ The single horizontal line service screen appears if press the **CONTRAST/BRIGHT** key (Fig. 10).
 - Refer to the "Low-Light adjustment" corresponding page about detailed adjustment steps.

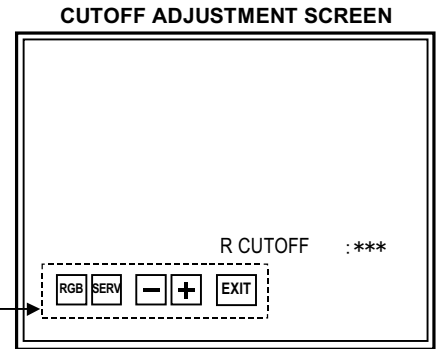
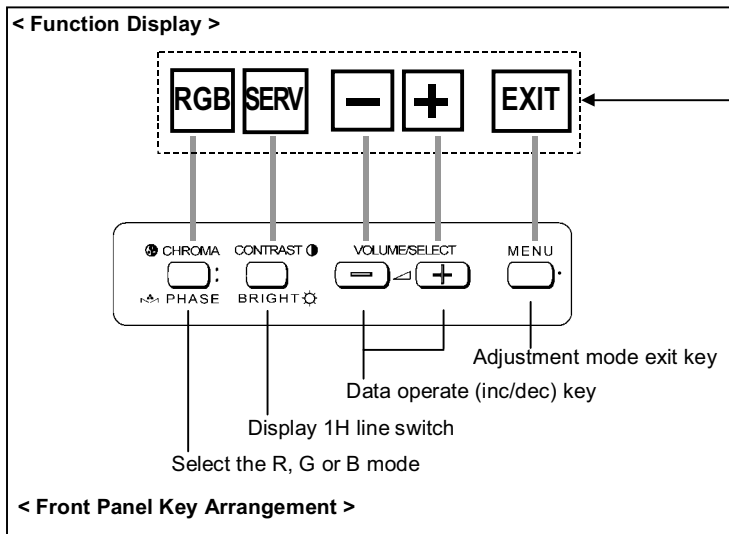


Fig. 9

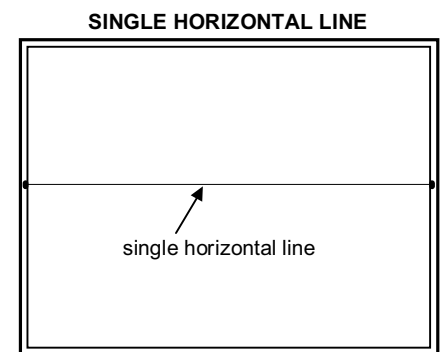


Fig. 10

DRIVE adjustment mode (HIGH LIGHT)

- ① In the WHITE BALANCE menu screen, press the **CONTRAST/BRIGHT** key to enter to the DRIVE adjustment mode (Fig. 11). In this case, key function is replaced as shown below.
- ② Whenever press the **CHROMA/PHASE** key, change the "R DRIVE" or "B DRIVE" adjustment mode.
- ③ **CONTRAST/ BRIGHT** key is the switch of the screen display. If necessary, you can shut off the display. Carefully, values of adjustment items are changed while shut off the screen display.
 - Refer to the "High-Light adjustment" corresponding page about detailed adjustment steps.

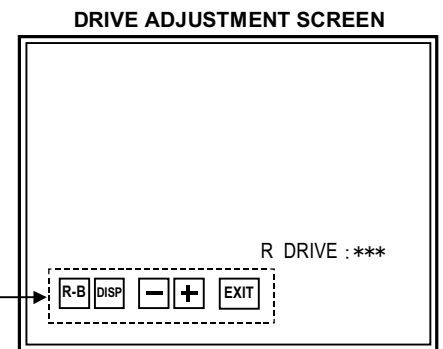
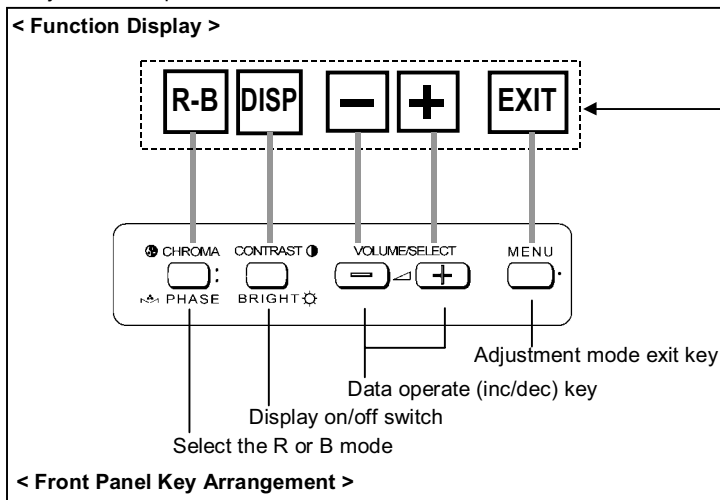
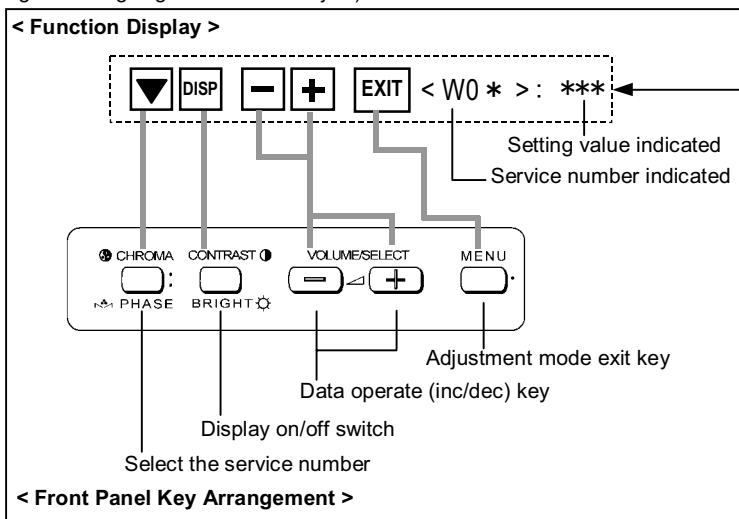


Fig. 11

[WHITE BALANCE Adjustment : METHOD 2]

SERVICE MENU has the other method for adjusting the WHITE BALANCE about above-mentioned method.

- ① In the WHITE BALANCE menu screen, press the **VOLUME/SELECT + (UP)** key or **-(DOWN)** key, then enter to the "W01" or "W05" adjustment mode (Fig. 12, 13). In this case, key operation is changed as shown below. The operation of this mode is as same as SIGNAL BLOCK adjustment operation.
- ② In the case of select the "W01" mode, able to adjust the "R CUTOFF". But in order to adjust in correct condition must be adjust the other colour (G or B). Therefore, necessary to change the service numbers and adjusts each value.
- ③ Press the **CHROMA/PHASE** key to select the service number. This mode is WHITE BALANCE BLOCK full adjustment mode (both Low light and High light are able to adjust).



WHITE BALANCE W01 mode

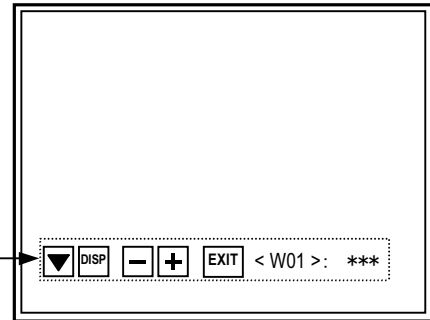


Fig. 12

WHITE BALANCE W05 mode

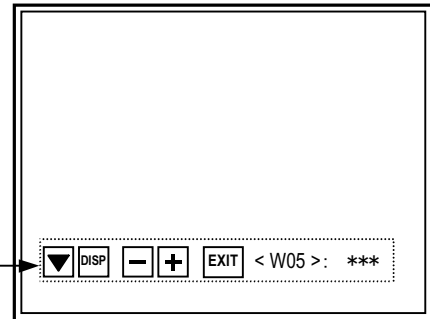


Fig. 13

DEFLECTION BLOCK

- ① In the <BLOCK SELECT> screen, press the **VOLUME/SELECT** **-(DOWN)** key.
- ② Then the DEFLECTION BLOCK adjustment screen is displayed (Fig. 14).
- ③ The original front key function replaced with the other function displayed at the lower side of the screen as shown below.
- ④ **CONTRAST/BRIGHT** key is the switch of the screen display. If necessary, you can shut off the display. Carefully, values of adjustment items are changed while shut off the screen display.
- ⑤ The indication of service numbers are changed by the signal that uses for adjustment (Vertical frequency and screen aspect ratio Fig. 15).

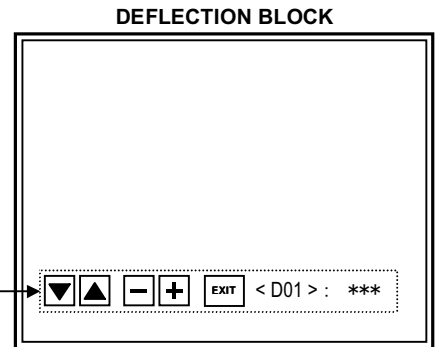
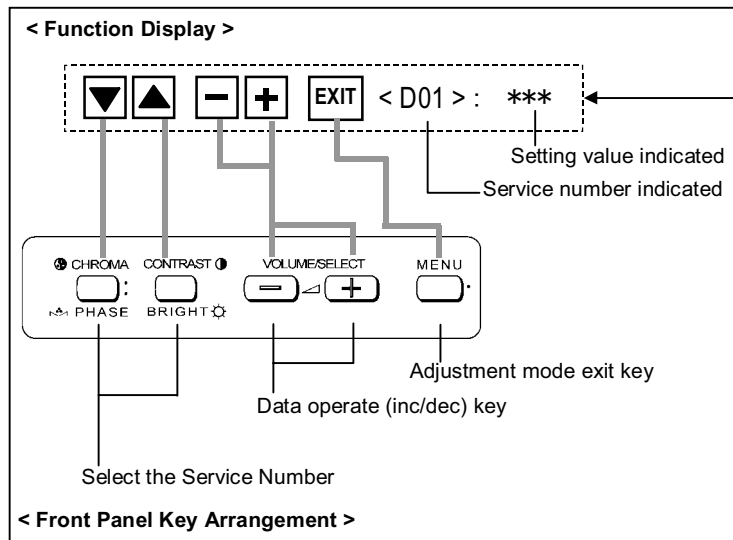


Fig. 14



SIGNAL	SCREEN DISPLAY
50Hz 4:3	D01~D05
60Hz 4:3	DA1~DA5
50Hz 16:9	DB1~DB5
60Hz 16:9	DC1~DC5

Fig. 15

CONTROL BLOCK (This is a fixed value. Don't adjust it).

- ① In the <BLOCK SELECT> screen, press the **VOLUME/SELECT** **+(UP)** key.
- ② Then the CONTROL BLOCK adjustment screen is displayed (Fig. 16).
- ③ The original front key function replaced with the other function displayed at the lower side of the screen as shown below.

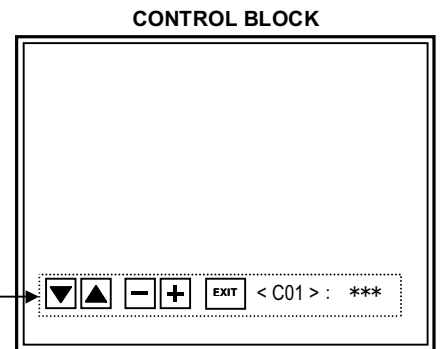
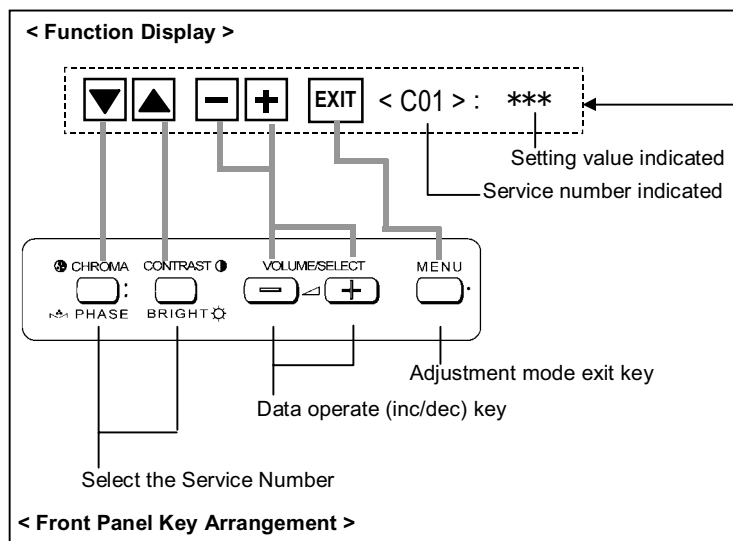
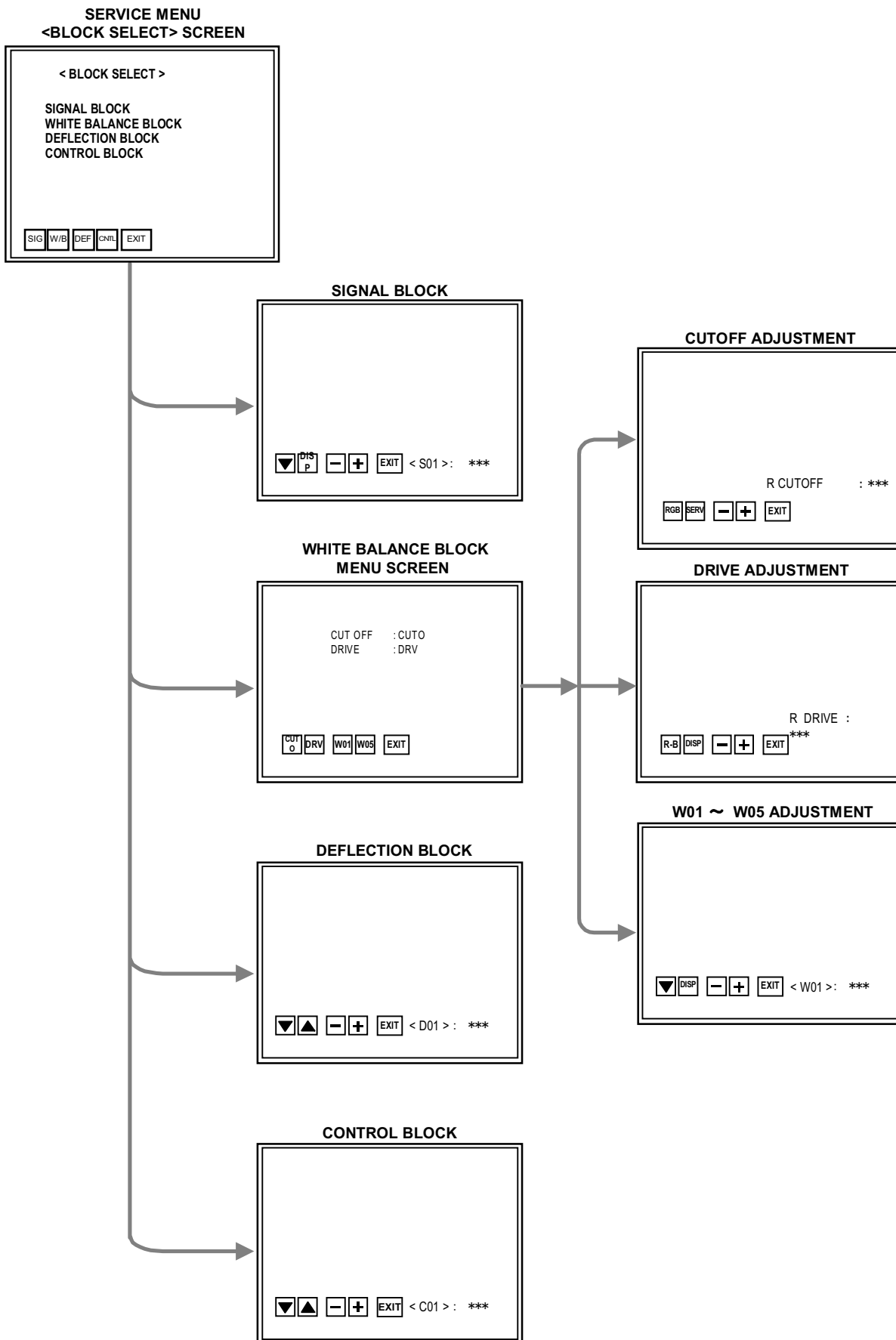


Fig. 16



4. SERVICE MENU FLOW CHART



INITIAL SETTINGS OF THE SERVICE MENU

SIGNAL BLOCK

SERVICE Number	CONTENTS	INITIAL SETTING VALUE
S01	BRIGHT	120
S02	CONTRAST	095
S03	CHROMA(PAL)	129
S04	CHROMA(NTSC)	131
S05	CHROMA(SECAM)	135
S06	PHASE(NTSC)	067
S07	BRIGHT(16:9)	-001
S08	CONTRAST(16:9)	-015

WHITE BALANCE BLOCK

SERVICE Number	CONTENTS	INITIAL SETTING VALUE
W01	R CUTOFF	120
W02	G CUTOFF	120
W03	B CUTOFF	120
W04	R DRIVE	150
W05	B DRIVE	065

DEFLECTION BLOCK

SERVICE Number	ASPECT RATIO	VERTICAL FREQUENCY	CONTENTS	INITIAL SETTING VALUE
D01	4:3	50Hz	HORIZONTAL POSITION	006
D02			VERTICAL SIZE	060
D03			VERTICAL SIDE PIN CORRECTION	034
D04			VERTICAL CENTER	000
D05			VERTICAL LINEARITY	007
DA1	4:3	60Hz	HORIZONTAL POSITION	004
DA2			VERTICAL SIZE	001
DA3			VERTICAL SIDE PIN CORRECTION	002
DA4			VERTICAL CENTER	000
DA5			VERTICAL LINEARITY	-002
DB1	16:9	50Hz	HORIZONTAL POSITION	000
DB2			VERTICAL SIZE	-036
DB3			VERTICAL SIDE PIN CORRECTION	000
DB4			VERTICAL CENTER	000
DB5			VERTICAL LINEARITY	000
DC1	16:9	60Hz	HORIZONTAL POSITION	000
DC2			VERTICAL SIZE	-034
DC3			VERTICAL SIDE PIN CORRECTION	000
DC4			VERTICAL CENTER	000
DC5			VERTICAL LINEARITY	000

CONTROL BLOCK (This is a fixed value. Don't adjust it.)

SERVICE Number	CONTENTS		INITIAL SETTING VALUE
C01	MODEL		001
C02	BRIGHT POINT	UPPER	063
C03		LOWER	063
C04	CONTRAST POINT	UPPER	040
C05		LOWER	035
C06	CHROMA POINT	UPPER	000
C07		LOWER	030
C08	PHASE POINT	UPPER	050
C09		LOWER	050
C10	OSD HORIZONTAL POSITION		012
C11	OSD VERTICAL FREQUENCY (50Hz)		005
C12	OSD VERTICAL FREQUENCY (60Hz)		000
C13	VERTICAL DELAY (NTSC)		001
C14	VERTICAL DELAY (PAL)		001
C15	VERTICAL DELAY (SECAM)		004
C16	VERTICAL DELAY (BLACK AND WHITE)		001
C17	S DELAY (NTSC)		001
C18	S DELAY (PAL)		001
C19	S DELAY (SECAM)		001
C20	S DELAY (BLACK AND WHITE)		001
C21	BRIGHT (VERTICAL)		120
C22	SHARP (CENTER VALUE)		012
C23	V-GUARD		001
C24	HOUR METER		001
C25	AFC MODE		000
C26	BURST (NTSC / PAL)		000
C27	BURST (SECAM)		000
C28	COLOUR SYSTEM		000
C29	REMOCON		000
C30	S-FIELD		001
C31	SDC ATT		000
C32	DEMP F0		000
C33	V. ID. SW		000
C34	S. KILL		000
C35	BELL. F0		000
C36	ABL. GAIN		003
C37	ABL. POINT		001
C38	TRAP SW (NTSC)		001
C39	TRAP SW (PAL)		000
C40	TRAP Q (NTSC)		001

SERVICE Number	CONTENTS	INITIAL SETTING VALUE
C41	TRAP Q (PAL)	002
C42	TRAP F0(NTSC)	002
C43	TRAP F0(PAL)	003
C44	TOF SW (NTSC)	000
C45	TOF SW (PAL)	000
C46	TOF Q (NTSC)	000
C47	TOF Q (PAL)	000
C48	TOF F0 (NTSC)	001
C49	TOF F0 (PAL)	000
C50	APA (V. NTSC)	000
C51	APA (V. PAL)	000
C52	APA (V. SECAM)	000
C53	APA (Y/C, B/W)	000
C54	R-Y BLACK OFFSET	008
C55	B-Y BLACK OFFSET	008
C56	CONTRAST CONTROL	002

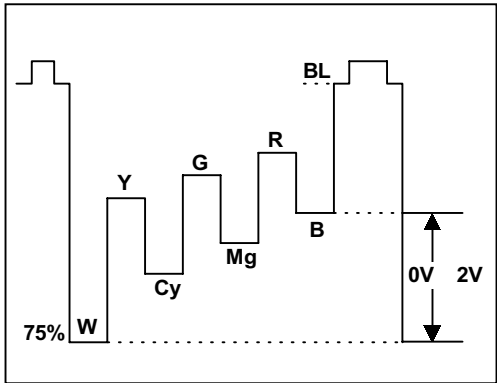
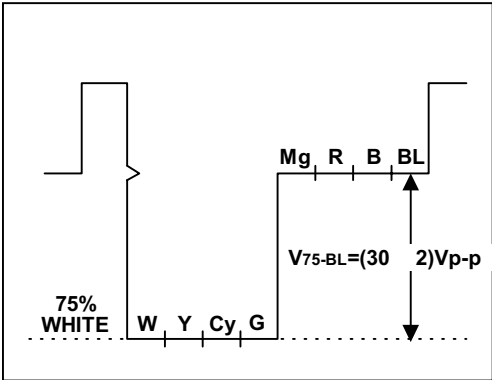
ADJUSTMENT

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Checking of the B1 power supply	DC Voltmeter	TP-91(B1) : (S1 ① pin) TP-E(GND) : (S1 ⑤ pin) [MAIN PWB]	SCREEN VR [Lower knob : in FBT]	<ol style="list-style-type: none"> 1. Set power supply voltage to AC230V±5V (TM-A101G/E) / AC120V±5V (TM-A101G/U). 2. Select WHITE BALANCE BLOCK mode from <BLOCK SELECT> screen. 3. Select CUTOFF adjustment mode (Low light mode). 4. Press "SERV" switch to display the horizontal line. 5. Adjust the SCREEN VR to disappear the horizontal line. 6. Check the B1 voltage as 114.8V±2V. 7. Readjust the SCREEN VR to appear the horizontal line faintly, and cancel the horizontal line to press the "SERV" switch.
Checking of the High voltage	High voltage meter	CRT Anode	SCREEN VR [Lower knob : in FBT]	<ol style="list-style-type: none"> 1. Set power supply voltage to AC230V±5V (TM-A101G/E) / AC120V±5V (TM-A101G/U). 2. Select WHITE BALANCE BLOCK mode from <BLOCK SELECT> screen. 3. Select CUTOFF adjustment mode (Low light mode). 4. Press "SERV" switch to display the horizontal line. 5. Adjust the SCREEN VR to disappear the horizontal line. 6. Connect the high voltage meter to the CRT anode and check it as 21.0~23.0kV. 7. Readjust the SCREEN VR to appear the horizontal line faintly, and cancel the horizontal line to press the "SERV" switch.
Focus adjustment	Signal generator (Resolution pattern)		FOCUS VR [Upper knob : in FBT]	<ol style="list-style-type: none"> 1. Input the resolution pattern signal. 2. Adjust the Focus VR for optimum focus where moire is not apparent. 3. Darken the picture and adjust the focus by turning counter-clockwise from the position where focus is poor. 4. Alternately repeat the above steps to obtain the optimum position.

It must be set the composite VIDEO signal input and 4:3 scan mode when adjust the white balance. It is no required to adjust in the under scan screen mode.

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
White Balance (Low light) adjustment	Signal generator (Monoscope pattern)		SCREEN VR [Lower knob : in FBT] W01 R CUTOFF W02 G CUTOFF W03 B CUTOFF [SERVICE MENU]	<ul style="list-style-type: none"> ● Under the condition that B1 voltage adjustment has been finished. <ol style="list-style-type: none"> 1. Input the monoscope pattern signal. 2. Select the WHITE BALANCE BLOCK mode from <BLOCK SELECT> screen. 3. Confirm the initial setting value of W01, W02, W03 in the SERVICE MENU are 120. 4. Select the CUTOFF adjustment mode. 5. Press "SERV" switch to display the single horizontal line. Carefully adjust the SCREEN VR to horizontal line appears faintly, not to shine much. 6. Gradually turn the SCREEN VR from the left to the right direction to bring one of the red, green and blue colours faintly visible. 7. Then select the CUTOFF switch (R, G or B) that colour except for appears first, and adjusting 2 colours CUTOFF values by pressing the +key, and make horizontal line visible white. 8. Readjust the SCREEN VR to appear the horizontal line faintly, and cancel the horizontal line to press the "SERV" switch.
White Balance (High light) 6500K adjustment	Signal generator (Monoscope pattern) Colour Analyser or Colour temperature meter		W04 R DRIVE W05 B DRIVE [SERVICE MENU]	<ul style="list-style-type: none"> ● Under the condition that Low light adjustment has been correctly finished. <ol style="list-style-type: none"> 1. Input the monoscope pattern signal. 2. Select the WHITE BALANCE BLOCK mode from <BLOCK SELECT> screen. 3. Select the DRIVE adjustment mode (High light mode). 4. Apply the sensor of the colour temperature meter to the CRT surface, portion of the 100% white, adjust the W04 (R DRIVE) or W05 (B DRIVE) to setting 6500K (x=0.313, y=0.329). 5. Exit the SERVICE MENU by pressing the "EXIT" key. 6. Check the white balance tracking is finest when CONTRAST and BRIGHT are up and down.

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
Bright adjustment	Signal generator (Sprit colour bar)		S01 (BRIGHT) [SERVICE MENU]	<ul style="list-style-type: none"> Under the condition that Low light adjustment has been correctly finished. 1. Input a sprit colour bar signal. 2. Select the SIGNAL BLOCK mode from <BLOCK SELECT> screen. 3. Select the S01 item. 4. Adjust the S01 to where the sprit colour bar 0% black component faintly brightens. 5. Check it to on and off the screen display by turning the "DISP" switch.
Contrast adjustment	Signal generator (Full colour bar) Oscillo-scope	TP-47G TP-E(↗) [CRT SOCKET PWB]	S02 (CONTRAST) [SERVICE MENU]	<ol style="list-style-type: none"> 1. Input the full colour bar signal. (75 / 0 / 75 / 0 set-up level signal) 2. Connect the oscillo-scope probe to TP-47G and TP-E(↗). 3. Select the SIGNAL BLOCK mode from <BLOCK SELECT> screen. 4. Select the S02 item. 5. Adjust the S02 to become the voltage different between 75% white and 0% black to 30V±2Vp-p as shown in figure.
PAL CHROMA Saturation adjustment	Signal generator (Full colour bar) Oscillo-scope	TP-47B TP-E(↗) [CRT SOCKET PWB]	S03(PAL CHROMA) [SERVICE MENU]	<ol style="list-style-type: none"> 1. Input a PAL full colour bar signal. 2. Connect the oscillo-scope probe to TP-47B and TP-E(↗). 3. Select the SIGNAL BLOCK mode from <BLOCK SELECT> screen. 4. Select the S03 item. 5. Adjust the S03 to become the voltage different between 75% white and blue to 0V±2Vp-p as shown in figure.



Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
<p>NTSC 3.58 CHROMA Saturation adjustment</p>	<p>Signal generator (Full colour bar) Oscillo-scope</p>	<p>TP-47B TP-E(↗) [CRT SOCKET PWB]</p>	<p>S04 (NTSC CHROMA) [SERVICE MENU]</p>	<ol style="list-style-type: none"> 1. Input a NTSC 3.58 full colour bar signal. 2. Connect the oscillo-scope probe to TP-47B and TP-E(↗). 3. Select the SIGNAL BLOCK mode from <BLOCK SELECT> screen. 4. Select the S04 item. 5. Adjust the S04 to become the voltage different between 75% white and blue to 0V±2Vp-p as shown in figure.
<p>NTSC 3.58 PHASE adjustment</p>	<p>Signal generator (Full colour bar) Oscillo-scope</p>	<p>TP-47B TP-E(↗) [CRT SOCKET PWB]</p>	<p>S06 (NTSC PHASE) [SERVICE MENU]</p>	<ol style="list-style-type: none"> 1. Input a NTSC 3.58 full colour bar signal. 2. Connect the oscillo-scope probe to TP-47B and TP-E(↗). 3. Select the SIGNAL BLOCK from SERVICE MENU. 4. Select the S06 item. 5. Adjust the S06 to become the voltage different between 75% white and magenta to 0V±2Vp-p as shown in figure.

DEFLECTION CIRCUIT ADJUSTMENT

There are 4 modes of DEFLECTION adjustment depending upon the kind of input signals.

The adjustments must always be carried out in regular sequence given below.

SIGNAL MODE		SERVICE NUMBER	SETTING VALUE
4:3	50Hz (PAL)	D0 *	D0 *
	60Hz (NTSC)	DA *	D0 * + DA *
16:9	50Hz (PAL)	DB *	D0 * + DB *
	60Hz (NTSC)	DC *	D0 * + DA * + DC *

If you change the figures in the course of the adjustments by returning to the preceding steps, all adjustments come to nothing. The screen aspect ratio 4 : 3 at 50Hz (PAL) is regarded as the reference value for all adjustments. The other values obtained in the adjustments using other signals become the offset values as opposed to the reference values.

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
H. Center H. Size Adjustment	Signal generator (Crosshatch pattern)		D01 (H.POSITION) [SERVICE MENU] L502(H. SIZE COIL) [MAIN PWB]	<ol style="list-style-type: none"> 1. Input a PAL (50Hz) crosshatch pattern signal. 2. Select DEFLECTION BLOCK mode from <BLOCK SELECT> screen. 3. Select D01 item. 4. Adjust D01 to align the picture center with the CRT center. 5. Adjust L502 to set horizontal size to 90%. 6. Repeat above step 4 and 5 to adjust correctly.
V. Center Adjustment	Signal generator (Circle pattern)		S401 (V.CENTER SW) [MAIN PWB]	<ol style="list-style-type: none"> 7. Input the circle pattern signal. 8. Adjust S401 to agree with CRT center and signal center of vertical direction.

Item	Test equipment	Test points	Adjustment locations	Adjustment procedure
<p>V. Size Adjustment</p>	<p>Signal generator (Crosshatch pattern)</p>		<p>D02 (V.SIZE) [SERVICE MENU]</p>	<p>9. Input the crosshatch signal. 10. Select D02 item, and adjust it to the vertical scan size to 95%.</p>
<p>The diagram shows a grid of 10x10 squares. On the left side, a vertical double-headed arrow spans the height of the grid and is labeled '95%' and 'Screen size'. On the right side, a vertical double-headed arrow spans the height of the grid and is labeled '100%' and 'Picture size'. Dashed lines extend from the top and bottom of the grid to indicate the full 100% picture size.</p>				
<p>V. SIDE PINCUSHION</p> <p>V. LINEARITY Adjustment</p>	<p>Signal generator (Crosshatch pattern)</p>		<p>D03 (V. S-CR) D05 (V. LIN) [SERVICE MENU]</p>	<p>●Should not adjustment except for in case of under the condition that remarkably bad about vertical linearity,</p> <p>11. Input the crosshatch pattern signal. 12. Adjust the D03 to the all square in the crosshatch screen become true square. 13. Adjust the D05 to the all vertical lines become straight.</p>
<p>The three diagrams show a 10x10 grid with different distortions: 1. Side pincushion (Reel): The vertical lines curve inward at the top and bottom, making the grid narrower at those points. 2. Side Pincushion (Barrel): The vertical lines curve outward at the top and bottom, making the grid wider at those points. 3. Vertical Linearity: The vertical lines are straight, but the horizontal lines are curved, making the grid wider in the middle.</p>				
				<p>If necessary, repeat the above steps (DEFLECTION adjustment) many times. And improve the adjustment level.</p>

PURITY / CONVERGENCE ADJUSTMENT

PURITY ADJUSTMENT

1. Demagnetize CRT with the demagnetizer.
2. Loosen the retainer screw of the deflection yoke.
3. Remove the wedges.
4. Input a green raster signal from the signal generator, and turn the screen to green raster.
5. Move the deflection yoke backward.
6. Bring the long lug of the purity magnets on the short lug and position them horizontally. (Fig.2)
7. Adjust the gap between two lugs so that the GREEN RASTER will come into the center of the screen. (Fig.3)
8. Move the deflection yoke forward, and fix the position of the deflection yoke so that the whole screen will become green.
9. Insert the wedge to the top side of the deflection yoke so that it will not move.
10. Input a crosshatch signal.
11. Verify that the screen is horizontal.
12. Input red and blue raster signals, and make sure that purity is properly adjusted.

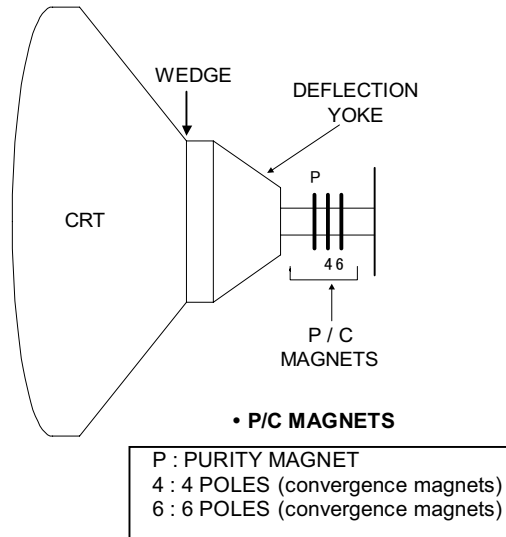


Fig.1

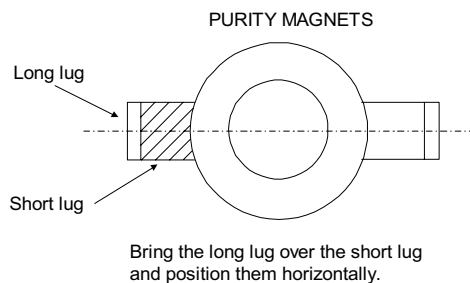


Fig.2

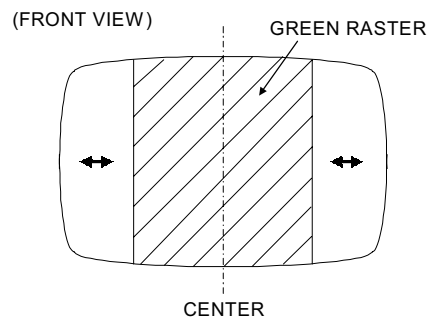


Fig.3

STATIC CONVERGENCE ADJUSTMENT

1. Input a crosshatch signal.
2. Using 4-pole convergence magnets, overlap the red and blue lines in the center of the screen (Fig.1) and turn them to magenta (red/blue).
3. Using 6-pole convergence magnets, overlap the magenta(red/blue) and green lines in the center of the screen and turn them to white.
4. Repeat 2 and 3 above, and make best convergence.

DYNAMIC CONVERGENCE ADJUSTMENT

1. Move the deflection yoke up and down and overlap the lines in the periphery. (Fig. 2)
2. Move the deflection yoke left to right and overlap the lines in the periphery. (Fig. 3)
3. Repeat 1 and 2 above, and make best convergence.

- After adjustment, fix the wedge at the original position.
Fasten the retainer screw of the deflection yoke.
Fix the 6 magnets with glue.

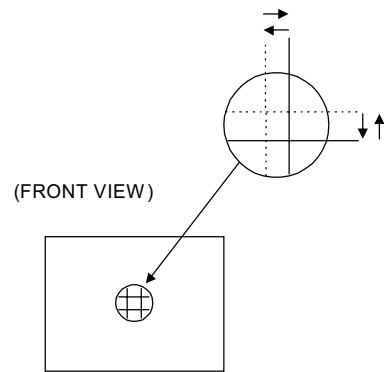


Fig.1

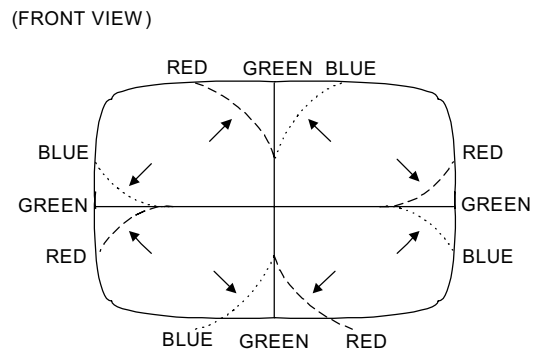


Fig.2

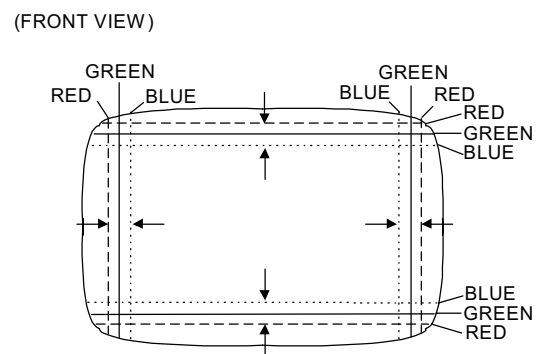


Fig.3

REPLACE OF THE 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

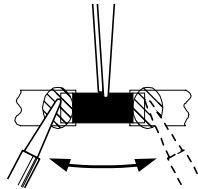
1. Use a high insulation soldering iron with a thin pointed end of it.
2. A 30w soldering iron is recommended for easily removing parts.

■ REPLACEMENT STEPS

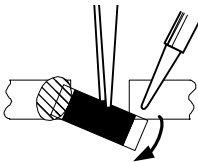
1. How to remove Chip parts

◆ Resistors, capacitors, etc.

- (1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.

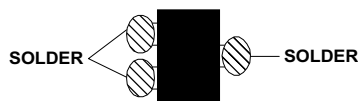


- (2) Shift with tweezers and remove the chip part.

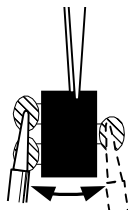


◆ Transistors, diodes, variable resistors, etc.

- (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.

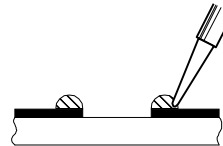


Note : After removing the part, remove remaining solder from the pattern.

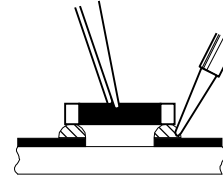
2. How to install Chip parts

◆ Resistors, capacitors, etc.

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

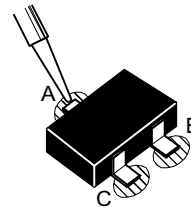


- (2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

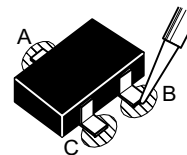


◆ Transistors, diodes, variable resistors, etc.

- (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**.



SELF DIAGNOSIS FUNCTION

1. OUTLINE

This model includes a SELF DIAGNOSIS FUNCTION that checks the circuit operating status and in event of malfunction, displays and stores the data in a memory. The data are stored in an I²C memory.
 Fault detection starts with the I²C bus and is performed according to the input states of the control lines connected to the MAIN CPU.

2. USAGE

SELF DIAGNOSIS FUNCTION mode entry

- (1) While press the **MENU** key and **CONTRAST/BRIGHT** key simultaneously, and push the MAIN POWER switch on.
- (2) Then displays the SELF DIAGNOSIS FUNCTION screen. The screen indicates as shown in the table and the SELF DIAGNOSIS FUNCTION mode is entered. If in event a malfunction at RASTER not display, at this time POWER LED flashes.

CAUSE	LED FLASHING CYCLE
X-RAY PROTECTOR	Quickly (0.1 sec on / 0.1 sec off cycles)
OVER CURRENT PROTECTOR	Slowly (1.0 sec on / 1.0 sec off cycles)

SELF DIAGNOSIS SCREEN

PROTECTION	
B1	: × 3
X-RAY	: ○
P-CHK	: ○
V-NECK	: × 3
BUS	
MEMORY	: ○
TV-PRO	: ○

SELF DIAGNOSIS FUNCTION mode release

Turn the power switch to off or disconnect the power cord from AC outlet.
 In this way, not to clear the error counts.

Reset the error count

While entered in this mode, press the **MENU** key **CHROMA/PHASE** key and simultaneously. Then clear the error count of the each item.

Fault history

The fault history counts up to a maximum of 9 times for each item. If the number of times exceeds 9, the display remains at 9. The fault history remains stored in the memory until deleted.

SELF DIAGNOSIS RESET

<SET-UP MENU> RESET	
Are you sure?	
"Yes"	then <+>
"No"	then <MENU>

3. CONTENTS

DISPLAY	DETECT CONTENTS
B1	Power and deflection circuit
X-RAY	X-Ray protection circuit action
P-CHK	Program action in Micom
V-NECK	CRT neck protector circuit action
MEMORY	Stored data in memory IC
TV-PRO	_____