

JVC

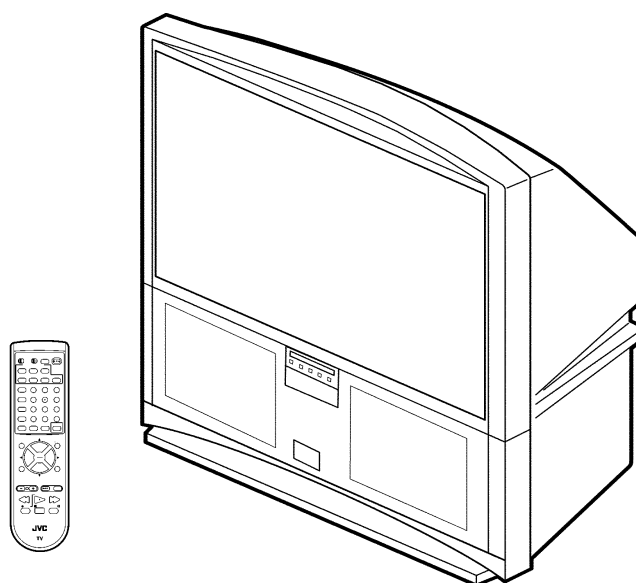
SERVICE MANUAL

REAR PROJECTION TELEVISION

AV-48WP30

BASIC CHASSIS

SB2



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SPECIFICATIONS

Items	Contents
Dimensions (W × H × D)	120.0cm × 124.4cm × 60.9cm (47-1/4" × 49" × 24")
Mass	81.0 kg (179.0 lbs)
TV RF System Color System Sound System	CCIR (M) NTSC BTSC System (Multi Channel Sound)
TV Receiving Channels and Frequency VL Band VH Band UHF Band	(02~06) 54MHz~88MHz (07~13) 174MHz~216MHz (14~69) 470MHz~806MHz
CATV Receiving Channels and Frequency Low Band High Band Mid Band Super Band Hyper Band Ultra Band Sub Mid Band	<div> <div> (02~06, A-8) by (02~06&01) (07~13) by (07~13) (A~1) by (14~22) (J~W) by (23~36) (W+1~W+28) by (37~64) (W+29~W+84) by (65~125) (A8, A4~A1) by (01, 96~99) </div> <div>(54MHz~804MHz)</div> </div>
TV/CATV Total Channel	180 Channels
Antenna Terminal	75 Ω (VHF/UHF) F-type connector
Intermediate Frequency Video IF Carrier Sound IF Carrier	45.75MHz 41.25MHz (4.5MHz)
Color Sub Carrier	3.58MHz
Power Input Power Consumption	120V AC, 60Hz 248W
Screen Screen Size Projection Tube High Voltage	Transparent screen (unitized fresnel lens / double lenticular lens) 48" (122cm) Measured diagonally, 16:9 ratio (W:106.3cm, H:59.8cm) 17cm (6.7") tube × 3 (R / G / B) 31kV±1.0kV (at zero beam current)
Speaker Audio Power Output	φ 13cm round × 2, φ 5.5cm round × 2 10W+10W
External Input Video Input Audio Input S-Video Component Input	1Vp-p, 75 Ω (RCA pin jack × 4) 500mVrms (-4dBs), high impedance (RCA pin jack × 8) Y: 1Vp-p positive (negative sync provided, when terminated with 75 Ω) C: 0.286Vp-p (burst signal, when terminated with 75 Ω) Mini-DIN 4pin connector × 2 PB: ±0.35Vp-p, 75 Ω (RCA pin jack × 2) PR: ±0.35Vp-p, 75 Ω (RCA pin jack × 2) Y: 1Vp-p, 75 Ω (RCA pin jack × 2) 1080i DTV (digital broadcast) ready
Audio Output	Fix : 500mVrms(-4dBs) low impedance (1kHz when modulated 100%)
Digital-Input	DVI-D signal link 19pin connector (Digital-input terminal is not compatible with computer signal.)
Speaker Input	45W 16 Ω (maximum input)
AV Compulink III	φ 3.5mm mini jack
Remote Control Unit	RM-C322G (AA/R6/UM-3 battery × 2)

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 that 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 test equipment not generally found in the service trade.

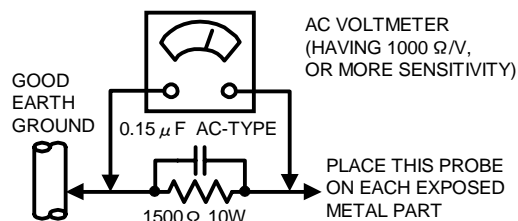
(2) Leakage Current Check

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.

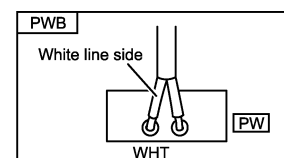
After repair of the high voltage hold down circuit, this circuit shall be checked to operate correctly.

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.

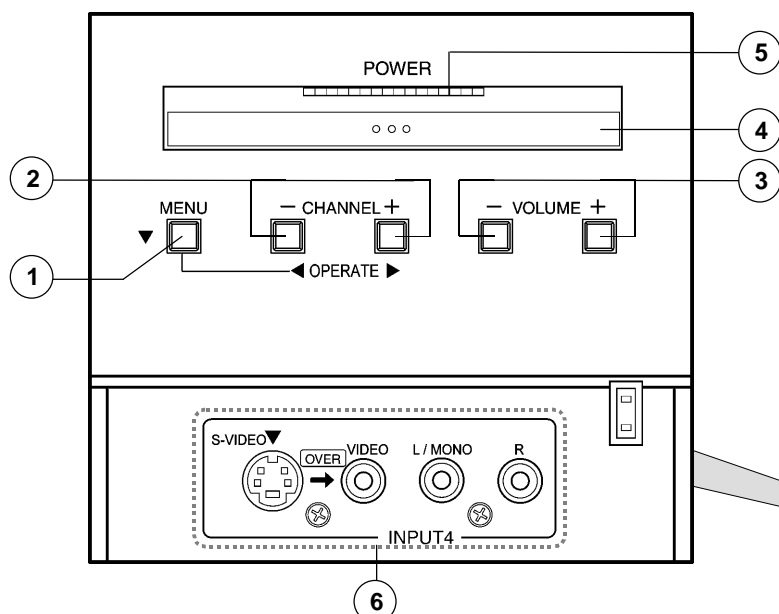


FEATURES

- New chassis design enable use of an interactive on screen control.
- 2-3PULL DOWN : You can enjoy DVD movies at the highest picture quality.
- MOTION COMPENSATION : With this function, the seamless reproduction of dynamic motion on the screen has been realized.
- Bullet-in DSD (Digital Supper Detail) circuit and 3 dimension Y/C separate circuit.
- Receive DTV broadcast (1080i / 720p / 480p / 480i)
- Built-in HDCP / Component (Y / P_B / P_R)
- Built-in Hyper Sound, BBE circuit.

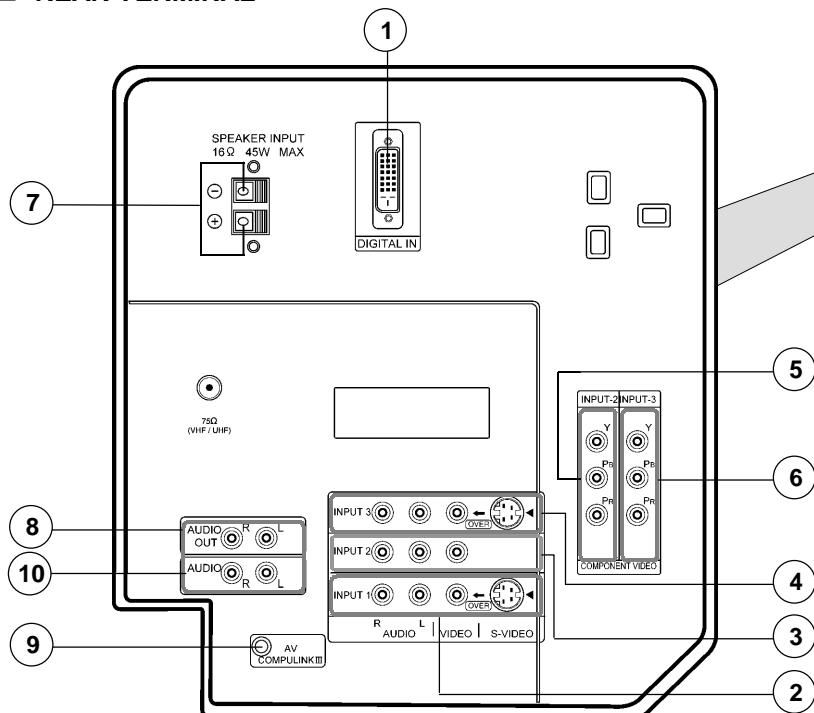
FUNCTIONS

■ FRONT CONTROL KEY & TERMINAL



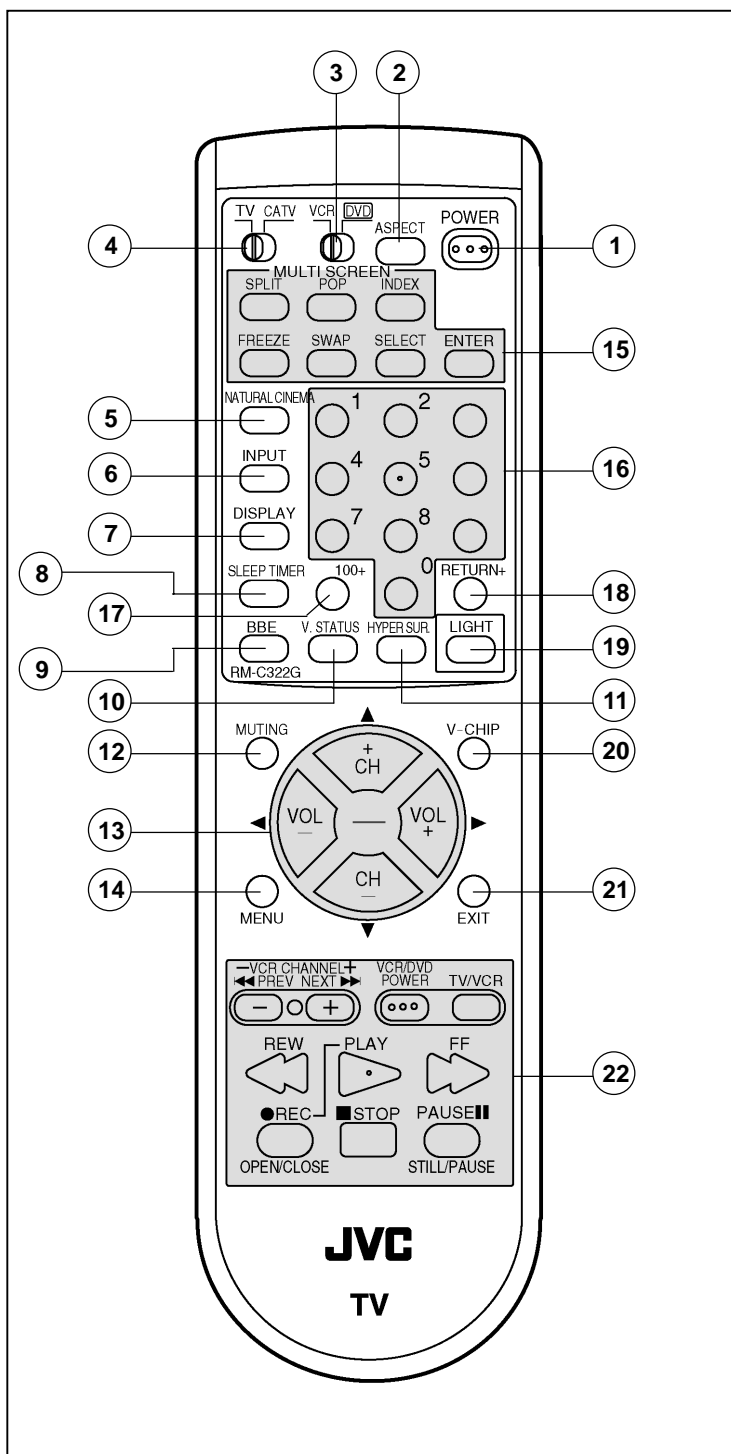
- | | |
|---|---------------------------------------|
| 1 | MENU Button (OPERATE ▼) |
| 2 | Channel +/- Button (OPERATE ◀/▶) |
| 3 | VOLUME +/- Button |
| 4 | MAIN POWER SW Button |
| 5 | POWER LAMP (BLUE) |
| 6 | INPUT4
(AUDIO / VIDEO / S-VIDEO) |

■ REAR TERMINAL



- | | |
|---|---|
| 1 | DIGITAL IN
(DVI-D Signal Link 19pin) |
| 2 | INPUT 1
(AUDIO / VIDEO / S- VIDEO) |
| 3 | INPUT 2
(AUDIO / VIDEO) |
| 4 | INPUT 3
(AUDIO / VIDEO / S- VIDEO) |
| 5 | INPUT 2
(COMPONENT VIDEO) |
| 6 | INPUT 3
(COMPONENT VIDEO) |
| 7 | SPEAKER INPUT |
| 8 | AUDIO OUT |
| 9 | AV COMPULINK III |
| A | AUDIO INPUT(For DIGITAL IN) |

■ REMOTE CONTROL UNIT [RM-C322G]

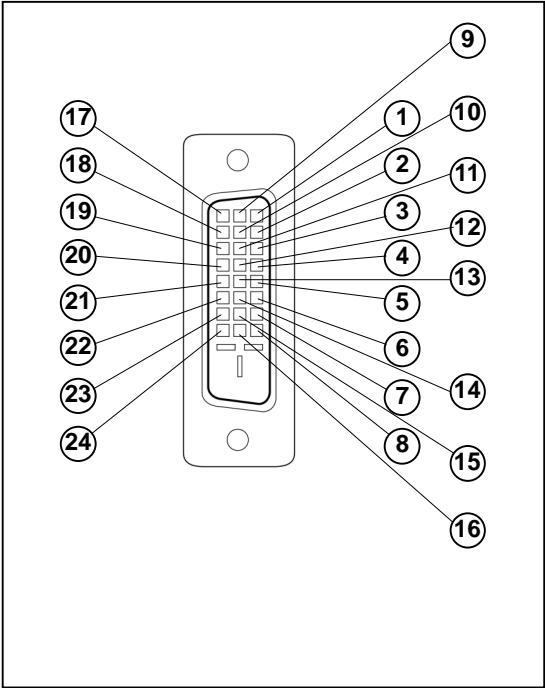


- | | |
|---|--------------------------------|
| 1 | POWER Key |
| 2 | ASPECT Key |
| 3 | VCR / DVD Key |
| 4 | TV / CATV Key |
| 5 | NATURAL CINEMA Key |
| 6 | INPUT Key |
| 7 | DISPLAY Key |
| 8 | SLEEP TIMER Key |
| 9 | BBE Key |
| A | V.STATUS Key |
| B | HYPER SURROUND Key |
| C | MUTING Key (memory Key) |
| D | FUNCTION Key (▲ / ▼ / ► / ◄) |
| E | MENU Key |
| F | MULTI SCREEN Key |
| G | NUMBERS Key |
| H | 100+ Key |
| I | RETURN+ Key |
| J | LIGHT Key |
| K | V-CHIP Key |
| L | EXIT Key |
| M | VCR / DVD Key |

DIGITAL-IN TERMINAL FUNCTIONS

PIN No.	PIN NAME	PIN No.	PIN NAME
1	RX2-	13	RX3+
2	RX2+	14	5V
3	GND2/ 4	15	GND
4	RX4-	16	HTPLG
5	RX4+	17	RX0-
6	SCL	18	RX0+
7	SDA	19	GND0/5
8	NC	20	RX5-
9	RX1-	21	RX5+
10	RX1+	22	GNDC
11	GND1/3	23	TXC+
12	RX3-	24	TXC-

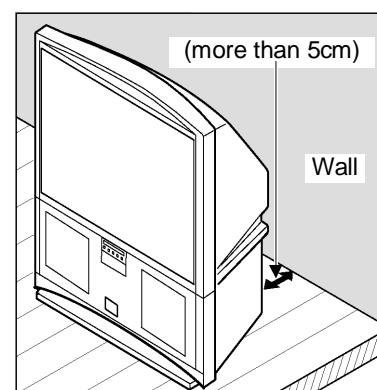
PIN ASSIGNMENT



INSTALLATION

1. INSTALLATION SITE

1. The rear of this set is provided with ventilation openings. Install the set more than 5 cm from a wall and in a location with good ventilation.
2. Avoid the following types of locations.
 - (1) Unstable locations (location must be able to withstand heavy weight).
 - (2) Locations subjected to direct sunlight.
 - (3) Near stoves or other heating devices.
 - (4) Locations subjected to humidity or oily smoke.
 - (5) Dusty locations.
 - (6) Locations with strong vibration.



VENTILATION OPENING

2. INSTALLATION ADJUSTMENT

When installing, moving or changing the orientation of the set, perform static convergence adjustment according to the following procedure.

1. Press the MENU key of the remote control unit.
2. Select the "CONVERGENCE" in the INITIAL SETUP menu with Function ▲/▼ key.
3. Press the Function ◀/▶ key, the convergence adjustment screen appears with crosses (+) displayed in 9 locations.

Locations where the crosses appear in 3 colours:

Convergence adjustment is required. Perform steps 4 to 5.

Locations where the crosses are white:

The convergence is adjusted correctly.

- If all the crosses are white, no convergence adjustment is needed.
4. The locations of the crosses correspond to the positions of the number keys on the remote control. A box appears around the selected cross.
 5. Press the SELECT button to change the color of the box to the color of the cross you want to adjust (red or blue).
 - You cannot adjust the green cross.
 6. Use the ▲/▼ and ◀/▶ buttons to adjust the position of the cross.
 - To cancel the adjustments before completing the procedure, press the EXIT button.
 7. Press the ENTER button to end the convergence adjustment procedure.
 - If you do not use the TV controls for roughly one minute, the convergence adjustment screen automatically disappears.

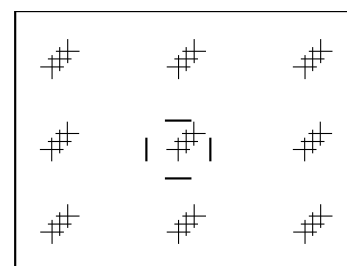


Fig.1

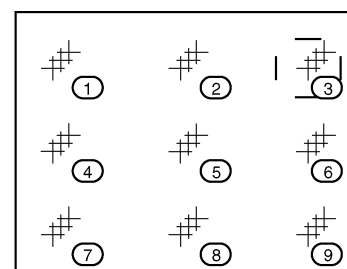


Fig.2

TECHNICAL INFORMATION

■ MAIN MICRO COMPUTER (CPU) FUNCTION

(MIN102H57K)

PIN No.	PIN NAME	I/O	FUNCTION
1	CONV. SW	0	CONVERGENCE SW
2	/VSYNC	I	V.SYNC IN for OSD
3	LB PRO	I	LOW B Protection
4	NC	—	NC
5	/RST	I	Micon Reset input
6	CONV. BUSY	0	CONV.
7	/TEST	I	+3.3V
8	YS	0	OSD YS OUT
9	NC	0	Micon test pin
10	NC	0	NC
11	A_MUTE	0	TV Sound Muting
12	/HSYNC	I	H.sync input for OSD
13	M_MUTE	0	Monitor Out Muting
14	OSDXI	—	_____
15	OSDXO	—	_____
16	SDA2	0	I ² C BUS (SDA) for MTS
17	AC_IN	I	AC 50/60Hz in
18	SCL2	0	I ² C BUS (SCL) for MTS
19	TU_POW	0	Tuner Power Control
20	VCOI	I	LPF input
21	PDO	0	LPF output
22	/IP_RESET	0	_____
23	YM	0	OSD YM out
24	B	0	OSD Blue out
25	LED_POWER	0	LED for Power
26	G	0	OSD Green Out
27	R	0	OSD Red Out
28	VREF	I	_____
29	IP_ERR	I	AMDP program load det.
30	IREF	I	_____
31	COMP	I	_____
32	AVDD	I	+3.3V
33	CLL	I	For Sub CCD
34	VREFLS	I	STD VOL in for Sub CCD
35	SUB_CCD	I	For Sub CCD
36	NC	—	NC
37	VSS	I	GND
38	MAIN_CCD	I	For main CCD
39	VREFHS	I	STD VOL in for CCD
40	CLH	I	For main CCD
41	VDD	0	+3.3V
42	LED_DATA	0	Front control Data

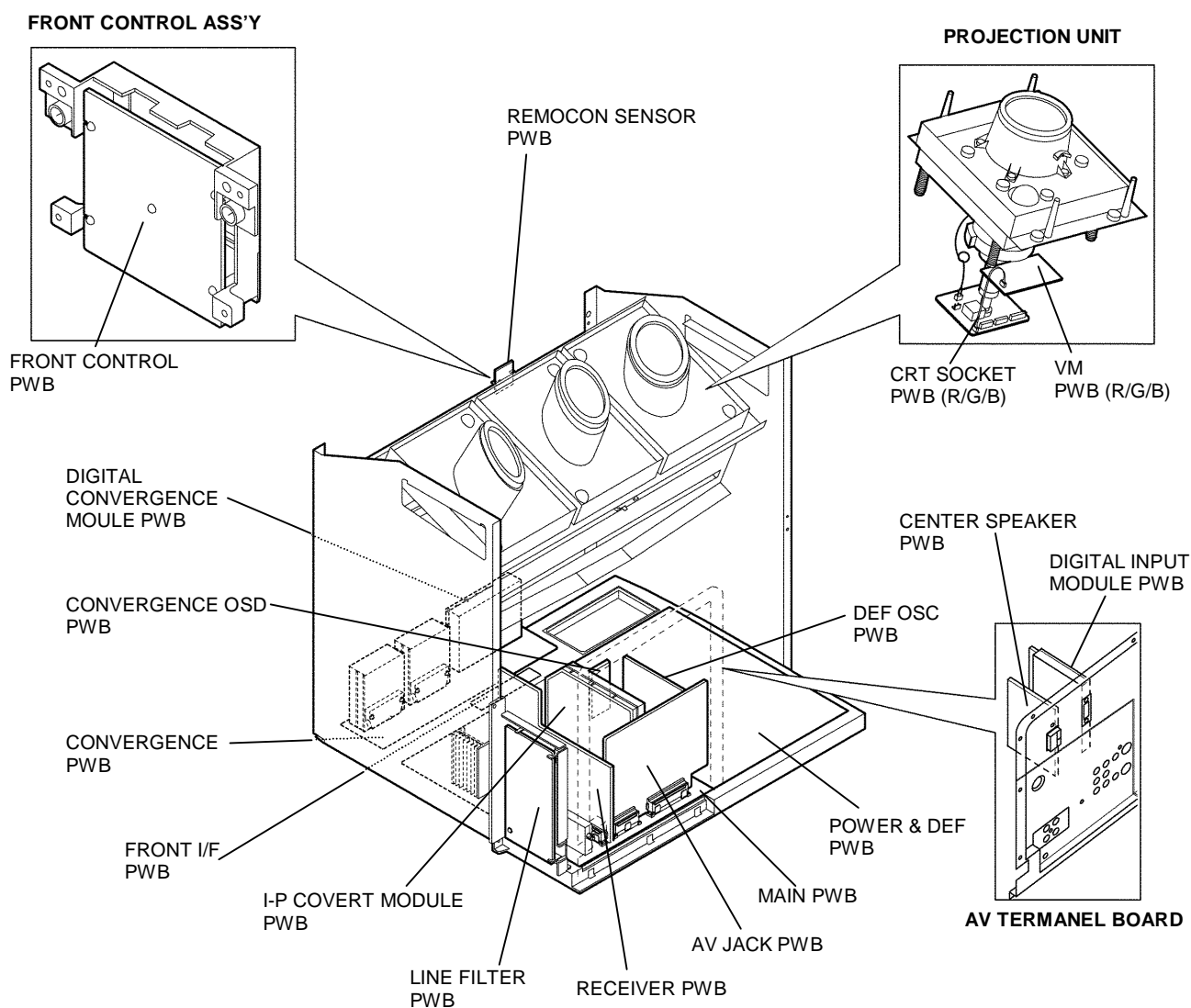
PIN No.	PIN NAME	I/O	FUNCTION
43	LED_CLOCK	0	F. LED CLK
44	LED_ON_TIMER	0	LED on timer
45	SBO0	—	_____
46	SBD0	—	_____
47	AP DATA	—	_____
48	INC	—	_____
49	ECO RST	0	Eco Reset
50	ROT COIL L	0	Picture rotation
51	ROT COIL R	0	Picture rotation
52	H BLK	0	H.BLK
53	SN COIL_R	0	Terrestrial Magnetism Sensor
54	SN COIL_L	0	↑
55	BS POW	0	BS power control
56	I ² C STOP	0	I ² C BUS STOP
57	NC	—	_____
58	/LOB_POW	0	LOB power control
59	COMPULINK	I	AV CompulinkⅢ Input
60	/POWERGOOD	I	Power Condition Check
61	/MECA_ON	I	Machine SW Interrupt
62	/MAIN_POW	0	MAIN POWER CONTROL
63	NC	—	NC
64	/B1 POW	0	B1 POWER CONTROL
65	C / N	—	_____
66	X-RAY	I	X-ray detection
67	EE CDS	—	_____
68	KEY2	I	Front Key input 2
69	KEY1	I	Front Key input 1
70	SCL1	0	I ² C BUS (CLK) for E ² PROM
71	SDA1	I/O	I ² C BUS (SDA) for E ² PROM
72	REMO	I	Remocon IN
73	AP REQ	—	_____
74	VSS	I	GND
75	OSC2	0	4MHz OSC
76	OSC1	I	4MHz OSC
77	VDD	I	+3.3V
78	SCL0	0	I ² C BUS (CLK) for General
79	AP CLK	—	_____
80	SDA0	I/O	I ² C BUS (SDA) for General
81	NC	—	_____
82	NC	—	_____
83	NC	—	NC
84	P MUTE	0	Picture muting

MAIN PARTS LOCATION

■ PWB ASS'Y ARRANGEMENT

The PWB ASS'Y is indicated below.

- MAIN PWB ASS'Y (SSB-1051A-M2)
- POWER & DEF PWB ASS'Y (SSB-2051A-M2)
- R CRT SOCKET PWB ASS'Y (SSB-3151A-M2)
- G CRT SOCKET PWB ASS'Y (SSB-3251A-M2)
- B CRT SOCKET PWB ASS'Y (SSB-3351A-M2)
- R VM PWB ASS'Y (SSB-7151A-M2)
- G VM PWB ASS'Y (SSB-7251A-M2)
- B VM PWB ASS'Y (SSB-7351A-M2)
- FRONT CONTROL PWB ASS'Y (SSB0L051A-M2)
- REMOCON SENSOR PWB ASS'Y (SSB-8051A-M2)
- CONVERGENCE PWB ASS'Y (SSB-5051A-M2)
- CONVERGENCE OSD PWB ASS'Y (SSB0T051A-M2)
- CENTER SPEAKER PWB ASS'Y (SSB0A051A-M2)
- DIGITAL CONVERGENCE MODULE PWB ASS'Y
(Included in CONVERGENCE PWB)
- LINE FILTER PWB ASS'Y (SSB-9051A-M2)
- DEF OSC PWB ASS'Y (SSB0H051A-M2)
- I-P CONVERT MODULE PWB ASS'Y (SSB0D051A-M2)
- FRONT I/F PWB ASS'Y (SSB0L251A-M2)
- AV JACK PWB ASS'Y (SSB0J051A-M2)
- RECEIVER PWB ASS'Y (SSB0R251A-M2)
- DIGITAL INPUT MODULE PWB ASS'Y (SSB-7851A-M2)



(This figure is only MAIN UNIT)

SPECIFIC SERVICE INSTRUCTIONS

SCREEN HANDLING CAUTIONS

■ SCREEN STORAGE

Store the SCREEN ASS'Y in a standing position in order to avoid deformation. If the screen is stored horizontally, there is risk of deforming the screen face.

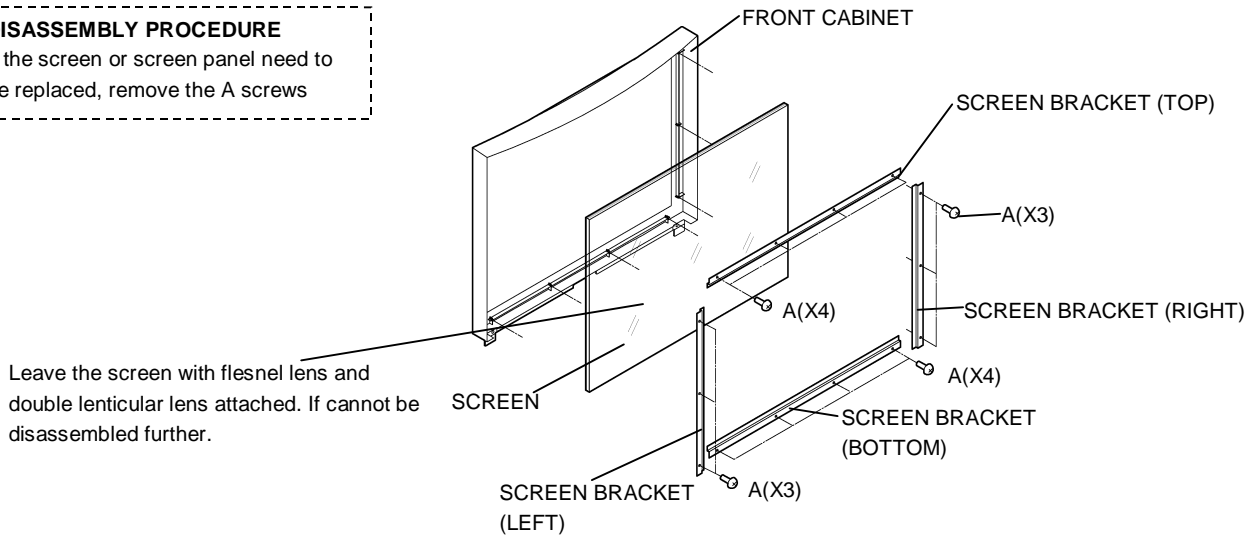
When necessary to place the SCREEN ASS'Y horizontally, position the screen side upwards and sure to place spacers between the screen and resting site (floor or stand etc.) to prevent the screen from sagging.

■ SCREEN SURFACE

Since the screen surface is easily scratched or soiled, use ample care when handling.

■ DISASSEMBLY PROCEDURE

If the screen or screen panel need to be replaced, remove the A screws



PROJECTION UNIT REPLACEMENT

■ ADJUSTMENT DURING REPLACEMENT

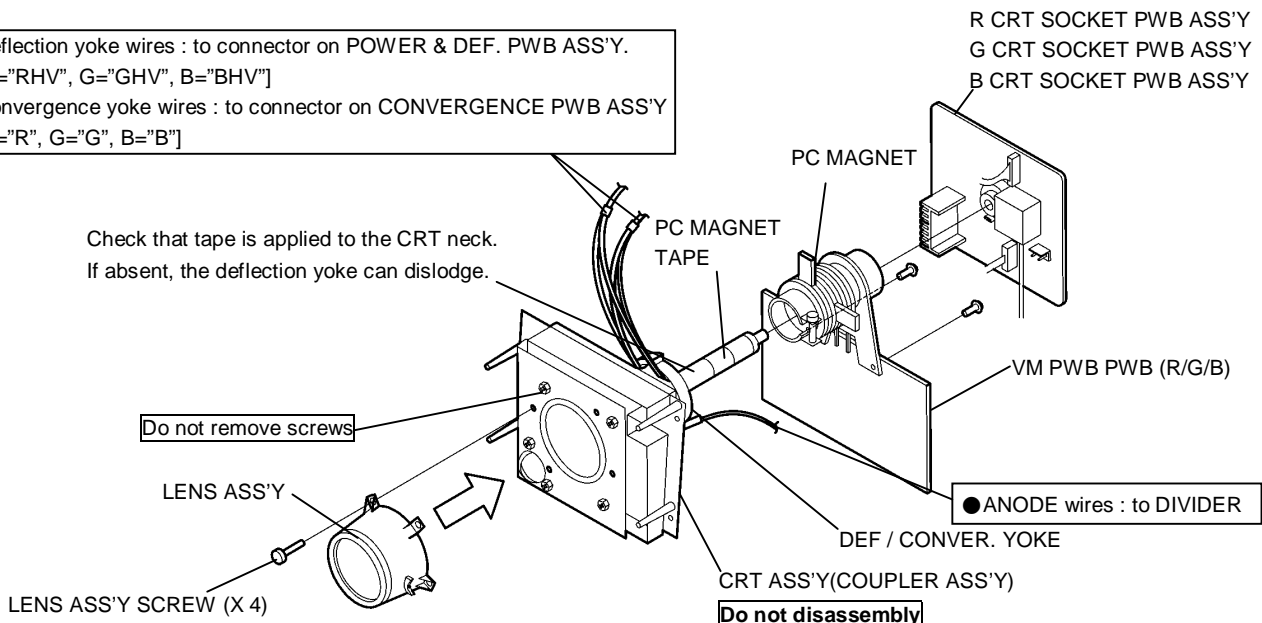
When replcing the three R, G and B projection units, first replace the R and B units and perform focus / screen / raster centering adjustments with reference to the G unit. Then replace the G unit and perform G focus / screen / convergence adjustment. Finally perform R & B . Convergence adjustments. **Use care to simultaneously removes all three-projection units.**

■ DISASSEMBLY CAUTION

The projection units include locations that are not to be disassembled during service. When replacing projection unit parts, disassemble to the state indicated in the figure below.

The figure indicates screws and wires that are not to be removed. Use care not to remove these.

- Deflection yoke wires : to connector on POWER & DEF. PWB ASS'Y.
[R="RHV", G="GHV", B="BHV"]
- Convergence yoke wires : to connector on CONVERGENCE PWB ASS'Y
[R="R", G="G", B="B"]



DISASSEMBLY PROCEDURE

■ SPEAKER GRILLE

1. Remove 4 screws **A** from rear side.
2. Remove the SPEAKER GRILLE.

■ SPEAKER (WOOFER)

- Remove the SPEAKER GRILLE

 1. Remove 4 screws **B**.
 2. Take out the WOOFER.
 3. Disconnect the speaker wire from speaker terminal.

■ SPEAKER (TWEETER)

- Remove the SPEAKER GRILLE

 1. Remove 2 screws **C**.
 2. Take out the TWEETER.
 3. Disconnect the speaker wire from speaker terminal.

■ FRONT BOARD

- Remove the SPEAKER GRILLE.

 1. Remove 4 screws **D**.
 2. Remove the FRONT BOARD.

■ FRONT CONTROL BOX

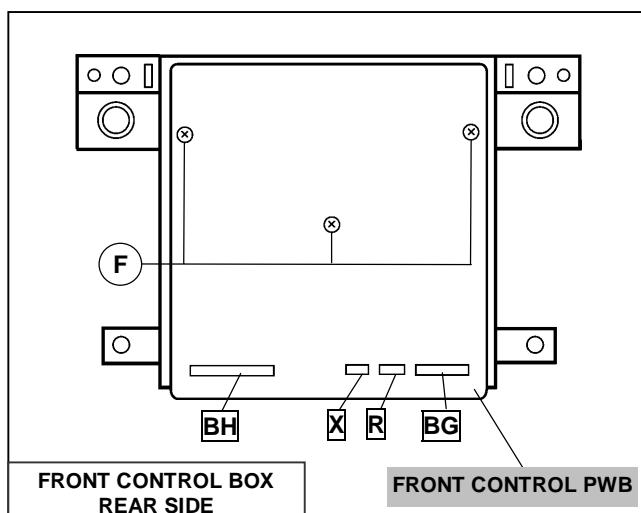
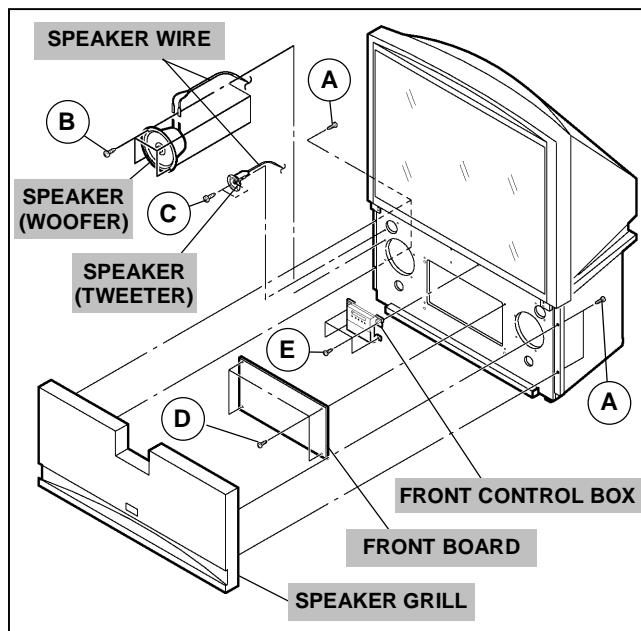
- Remove the SPEAKER GRILLE.

 1. Remove 4 screws **E** attaching the FRONT CONTROL BOX.
 2. Disconnect the connector **BH**, **X**, **R**, **BG** on the FRONT CONTROL PWB.
 3. Remove the FRONT CONTROL BOX.

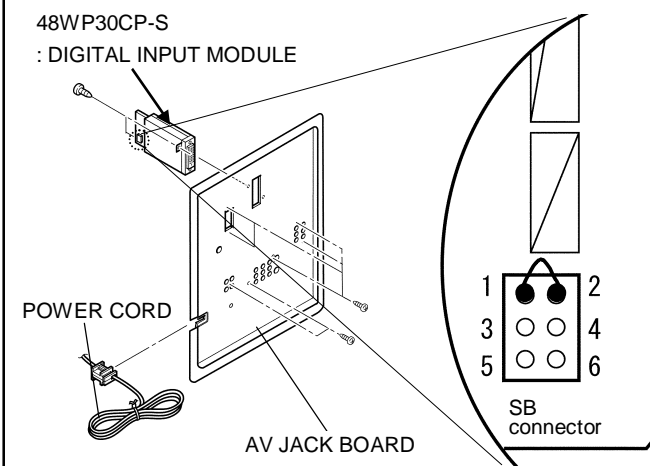
■ FRONT CONTROL PWB

- Remove the SPEAKER GRILLE.
- Remove the FRONT CONTROL BOX.

 1. Remove 3 screws **F** from rear side of FRONT CONTROL BOX.
 2. Remove the FRONT CONTROL PWB.



CAUTION AT DISASSEMBLY



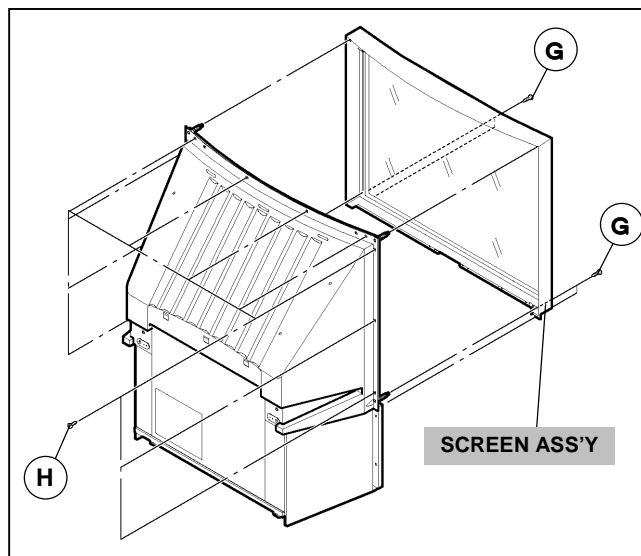
- Prior to disassembly, unplug the power cord from the AC outlet without fail. (Turn the power "off".)
 - Short the SB connector (1) pin and (2) pin of the DIGITAL INPUT MODULE. (At the time of assembling)
 - Before the rear panel is inserted into the cabinet, release the short-circuit between the SB connector (1) pin and (2) pin of the DIGITAL INPUT MODULE.
 - After releasing the short-circuit between the SB connectors, do not turn the power on until the rear panel is inserted into the cabinet.
- * Negligence in carrying out the above steps may cause the inactivation of the TV.

■ SCREEN ASS'Y

- Remove the SPEAKER GRILLE.
 - Remove the FRONT CONTROL BOX.
1. Remove 4 screws **G** under the SCREEN ASS'Y from front side.
 2. Remove 10 screws **H** from rear side.
 3. Remove the SCREEN ASS'Y.

NOTE :

- Place the screen with face upwards on a flat stand.
- Because of the large size, at least two persons are recommended for removal and reassemble.
- Use core not to scratch the screen during work.
- During assembly, be sure to engage the left and right tabs with the cabinet mounting positions.
- When than sporting the SCREEN ASS'Y, avoid grasping the top of the screen panel, instead grasp the left and right areas.

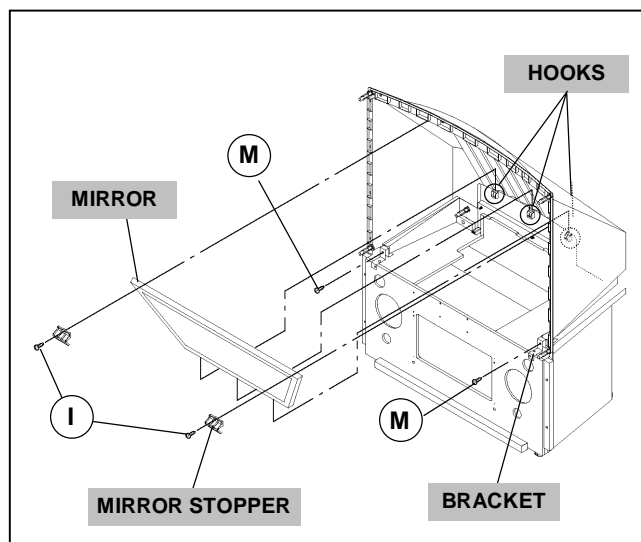


■ MIRROR

- Remove the SPEAKER GRILLE.
 - Remove the FRONT CONTROL BOX.
 - Remove the SCREEN ASS'Y.
1. Remove 2 screws **I** attaching the mirror stopper.
 2. Raise slightly to disengage of the mirror from the hooks.
 3. Remove the MIRROR.

NOTE :

- The MIRROR is front-coated. Do not touch the front of the MIRROR.
- At least 2 persons are recommended for removable and reassemble.



■ REAR PANEL

1. Loosen 7 screws **J**.
2. Remove 4 screws **K**.
3. Raise slightly REAR PANEL upward.
4. Remove the REAR PANEL.

NOTE :

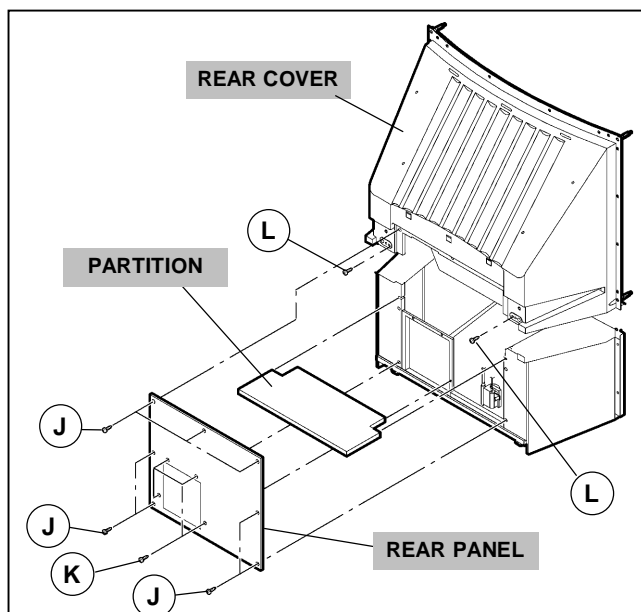
- Before the rear panel is inserted into the cabinet, release the short-circuit between the SB connector (1) pin and (2) pin of the digital input unit
- After releasing the short-circuit between the SB connectors, do not turn the power on until the rear panel is inserted into the cabinet

■ PARTITION

- Remove the REAR PANEL.
1. Pull out the PARTITION back ward.

■ REAR COVER

- Remove the SPEAKER GRILLE.
 - Remove the FRONT CONTROL BOX.
 - Remove the SCREEN ASS'Y.
1. Remove 2 screws **L**.
 2. Remove 2 screws **M** from front side
 3. Slightly pull for backside to disengage of the REAR COVER from hooks.
 4. Remove the REAR COVER.

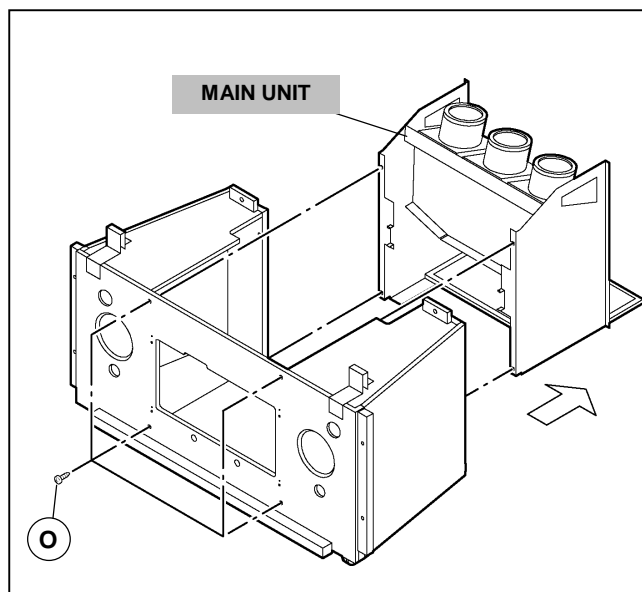


■ MAIN UNIT

- Remove the SPEAKER GRILLE.
 - Remove the connector **BH** , **X** , **R** , **BG** on the FRONT CONTROL PWB.
 - Remove the REAR PANEL.
1. Remove 4 screws **O** from front side.
 2. Pull out the MAIN UNIT rear side.

NOTE :

- Except for confirmation of projection of images on the screen and audio output through the speakers, the removed main unit is still workable in the same state as if it is still built in the TV set. Therefore, the main unit can be removed, if necessary, for board diagnosis, electric testing, etc. apart from confirmation of screen images and audio output.
- When wire clamps are removed during work, use care to restore them precisely to their original positions. Performance can be affected if these are not returned to the original positions.
- Because of the large size, at least two persons are recommended for removal and reassemble.
- When carrying the main unit, use care not to drop, shock or shake it.
- Do not stain or damage the lens of the projection unit.
- Do not look through the projection unit.

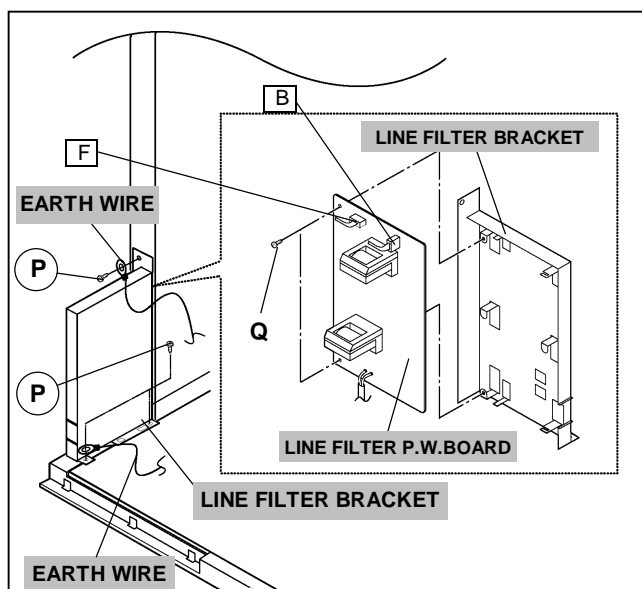


◆ CHECKING THE P.W. BOARD

When checking the MAIN PWB, POWER & DEF PWB, etc., raise the MAIN UNIT with the DIVIDER side down for the sake of convenience. You can check the MAIN P.W.B.

■ LINE FILTER P.W. BOARD

- Remove the REAR PANEL.
 - Remove the AV JACK BOARD.
1. Disconnect the connector **B** **F** on the LINE FILTER P.W. BOARD.
 2. Remove 3 screws **P** attaching the LINE FILTER BRACKET and earth wire.
 3. Remove 2 screws **Q** attaching LINE FILTER P.W. BOARD.
 4. Remove the LINE FILTER P.W. BOARD.

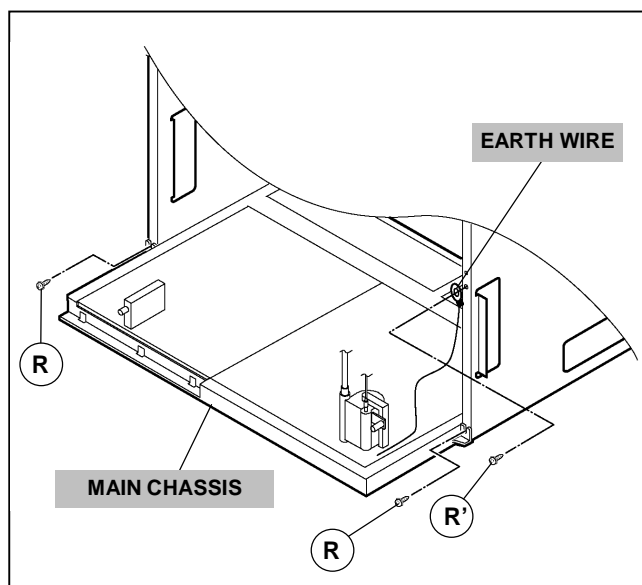


■ MAIN CHASSIS

- Remove the REAR PANEL.
 - Remove the AV JACK BOARD.
 - Remove the LINE FILTER BRACKET.
1. Remove 2 screws **R** both side of the MAIN CHASSIS.
 2. Remove 1 screws **R'** attaching the earth wire.
 3. Pull out the MAIN CHASSIS for back side.

NOTE :

- If necessary, remove the anode wires, connectors, respectively.

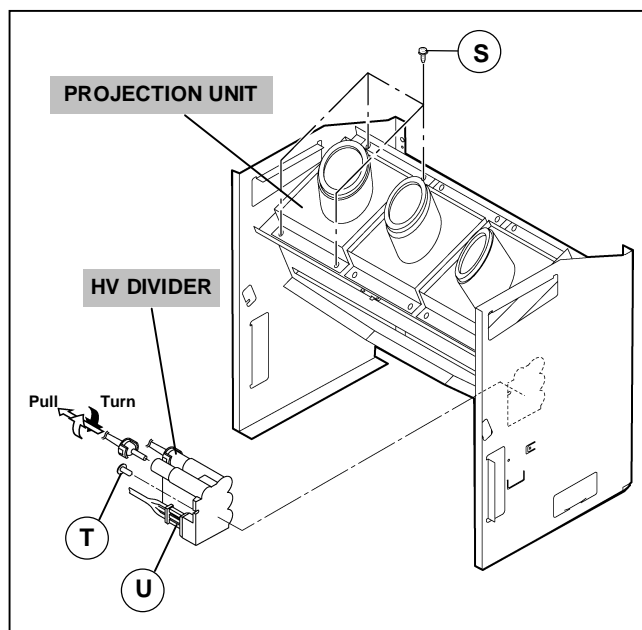


■ PROJECTION UNIT

- Remove the SPEAKER GRILLE
 - Remove the FRONT CONTROL BOX
 - Remove the REAR PANEL
 - Remove the MAIN UNIT.
1. Remove the CRT SOCKET PWB.
 2. Remove 4 screws **S** attaching the PROJECTION UNIT.
 3. Pull out the PROJECTION UNIT, upward.

NOTE :

- Refer to "PROJECTION UNIT REPLACEMENT" on page 8 when taking out and replacing the PROJECTION UNIT.
- When wire clamps are removed during work, use care to restore them precisely to their original positions. Performance can be affected if these are not returned to the original positions.



■ HV DIVIDER

- Remove the REAR PANEL
1. Remove 1 screws **T** attaching the DIVIDER.
 2. Remove the HV DIVIDER.
- * Wires of the transformer (FBT) and CRT of each PROJECTION UNIT can be removed by turning the connector portions.

NOTE :

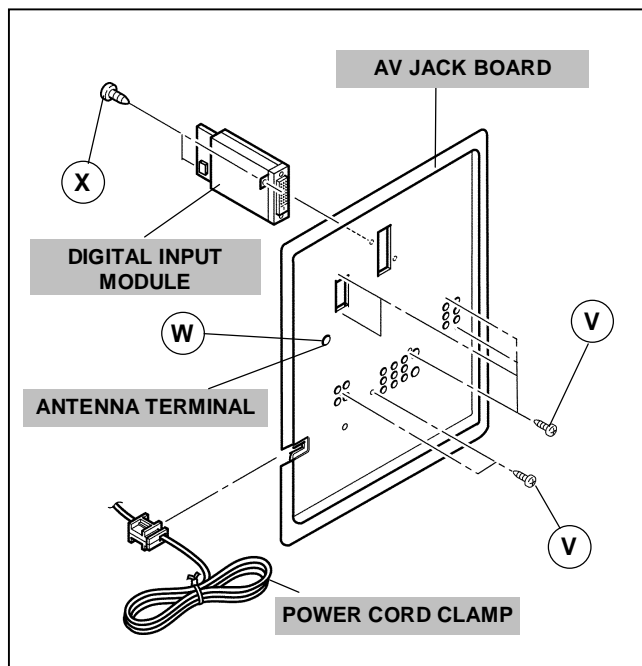
- If necessary, remove the anode wires, and replacing the HV DIVIDER, take care to correctly engage the **U** connector.

■ AV JACK BOARD

- Remove the REAR PANEL
1. Remove 7 screws **V**.
 2. Pull out the POWER CORD CLAMP from AV JACK BOARD left side.
 3. Remove nut **W** attaching the antenna terminal.
 4. Remove the AV JACK BOARD.

■ DIGITAL INPUT MODULE

- Remove the REAR PANEL
1. Remove 2 screws **X** from rear side of the AV JACK BOARD.
 2. Remove the DIGITAL INPUT MODULE.



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

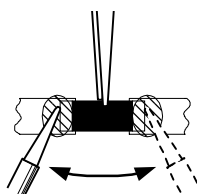
1. Use a high insulation soldering iron with a thin pointed end of it.
2. A 30w soldering iron is recommended for easily removing parts.

■ REPLACEMENT STEPS

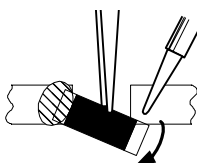
1. How to remove Chip parts

◆ Resistors, capacitors, etc

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

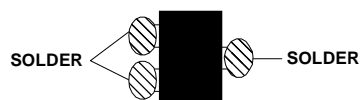


- (2) Shift with tweezers and remove the chip part.

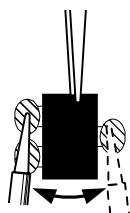


◆ Transistors, diodes, variable resistors, etc

- (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.

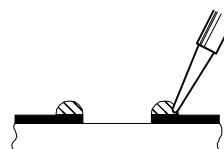


Note : After removing the part, remove remaining solder from the pattern.

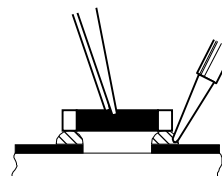
2. How to install Chip parts

◆ Resistors, capacitors, etc

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

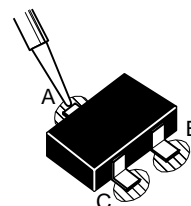


- (2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

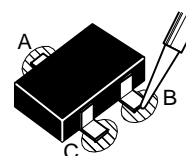


◆ Transistors, diodes, variable resistors, etc

- (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**.



MEMORY IC REPLACEMENT

1. Memory IC

This model use a memory IC.

This memory IC stores data for proper operation of the video and deflection circuits.

When replacing, be sure to use an IC containing this (initial value) data.

2. Memory IC replacement procedure

(1) Power off

Switch off the power and disconnect the power cord from the wall outlet.

(2) Replace the memory IC

Initial value must be entered into the new IC.

(3) Power on

Connect the power cord to the wall outlet and switch on the power.

(4) SERVICE MENU setting

1) Press **SLEEP TIMER** key and, while the indication of **SLEEP TIMER 0 MIN** is being displayed, press **DISPLAY** key and **VIDEO STATUS** key on the remote control unit (Fig.2) simultaneously.

2) The SERVICE MENU screen of Fig.1 is displayed.

3) Verify what to set in the SERVICE MENU, and set whatever is necessary (Fig.1).

Refer to the SERVICE ADJUSTMENT for setting.

4) Press the EXIT key twice to return normal screen.

(5) Receive channel setting

Refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the receive channels (Channels Preset) as described.

(6) User settings

Check the user setting items according to after page.

Where these do not agree, refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the items as described.

SERVICE MENU

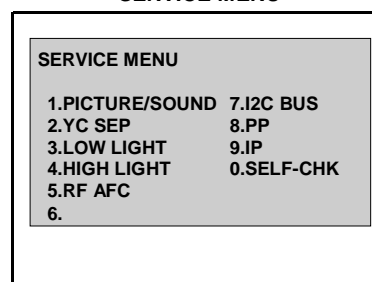


Fig.1

SERVICE MENU SELECT KEY

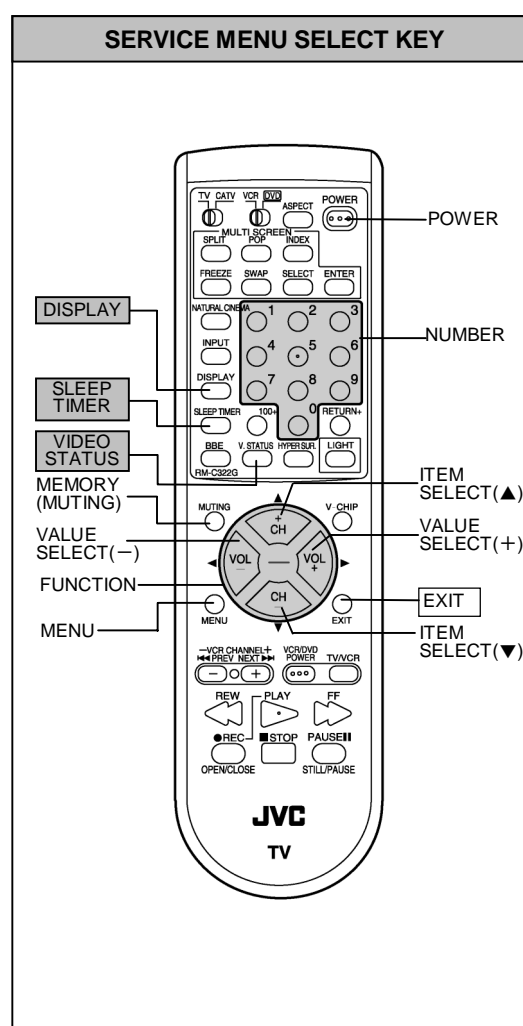


Fig.2

SHIPPING FACTORY SETTING**VIDEO STATUS MEMORY (NTSC / 480p)**

Item	SETTING VALUE				
	TINT	COLOR	PICTURE	BRIGHT	DETAIL
STANDARD	00	00	00	00	00
THATER	00	00	00	00	00
DYNAMIC	00	00	+10	00	+1

(HD)

Item	SETTING VALUE				
	TINT	COLOR	PICTURE	BRIGHT	DETAIL
STANDARD	00	00	00	00	00
THATER	00	00	00	00	00
DYNAMIC	00	00	+2	00	00

CHANNEL SETTING (CHANNEL SUMMARY)

BAND	CH Display		Setting	BAND	CH Display		Setting
VHF _L	02		○	SUPER	N	27	
	03				O	28	○
	04		○		P	29	
	05		○		Q	30	
	06		○		R	31	○
VHF _H	07		○		S	32	○
	08				T	33	
	09		○		U	34	
	10				V	35	
	11		○		W	36	○
	12			SUBMID	A-7	93	
UHF	13		○		A-6	394	
	14		○		A-5	95	
	36		○		A-4	96	○
	41				A-3	97	○
	46				A-2	98	○
MID	63		○		A-1	99	
	69		○		A-8	01	
	A	14	○	HYPER	W+11	47	○
	B	15	○		W+12	48	○
	C	16	○		W+17	53	○
	D	17	○				
	E	18	○	ULTRA	W+23	59	○
	F	19					
	G	20			W+29		
SUPER	H	21	○				
	I	22			W+51		
	J	23					
	K	24	○		W+78		
	L	25					
	M	26			W+84		

**SHIPPING FACTORY SETTING
(USER SETTING)**

Setting item	Setting value	Setting item	Setting value
POWER	OFF	TINT / COLOR / PICTURE	Refer to setting of Video status memory at shipping factory setting
CHANNEL	CABLE-02	/BRIGHT / DETAIL	
BBE	ON	COLOR TEMPERATURE	HIGH
VOLUME	10	DIG. NOISE CLEAR	CENTER
INPUT	TV	NOISE MUTING	ON
DISPLAY	OFF	BASS / TREBLE / BALANCE	CENTER
NATURAL CINEMA	AUTO		
SLEEP TIMER	0		
ASPECT	REGULAR		
VIDEO STATUS	DYNAMIC		
HYPER SURROUND	OFF	MTS	STEREO
SPLIT SOURCE	LEFT SIDE : CH 02 RIGHT SIDE : CH 04	SET CLOCK	Unnecessary to set
		ON / OFF TIMER	NO
POP SOURCE	LEFT SIDE : CH 02 RIGHT UPPER : CH 04 RIGHT CENTER : CH 05 RIGHT BOTTOM : CH 07	LANGUAGE	ENG
		CLOSED CAPTION	OFF (CC1 / T1)
		FRONT PANEL LOCK	OFF
		AUTO SHUT OFF	OFF
		AUTO TUNER SET UP	Unnecessary to set
		DIGITAL-IN (at 480p signal input)	SIZE 1
VERTICAL POSITION	CENTER	CHANNEL SUMMARY	Refer to Last memory (CH. summary)
CENTER CH INPUT	OFF		
XDS ID	ON	V-CHIP	OFF
CONVERGENCE	OPTIMUM CONDITION	SET LOCK CODE	Unnecessary to set
POWER INDICATOR	HIGH	AUTO DEMO	OFF

SERVICE ADJUSTMENTS

ADJUSTMENT PREPARATION

1. You can make the necessary adjustments for this unit with either the Remote Control Unit or With the adjustment tools and parts as given below.
2. Adjustment with the Remote Control Unit is made on the basis of the initial setting values, however, the new setting values which set the screen to its optimum condition may differ from the initial settings.
3. Make sure that AC power is turned on correctly.
4. Turn on the power for set and test equipment before use, and start the adjustment procedures after waiting at least 30 minutes.
5. Unless otherwise specified, prepare the most suitable reception or input signal for adjustment.
6. **Never touch any adjustment setting value which are not specified in the list for this adjustment.**
7. Presetting before adjustment
Unless otherwise specified in the adjustment instructions, preset the following functions with the remote control unit:

ADJUSTMENT EQUIPMENT

1. DC voltmeter (or digital voltmeter)
2. Oscilloscope
3. Signal generator (Pattern generator)
[NTSC / 480i / 480p / 720p / 1080i / HDCP]
4. Remote control unit
5. TV audio multiplex signal generator
6. Frequency counter

ADJUSTMENT ITEMS

Adjustment items	
1	Check (× 4)
2	FOCUS & BEAM SPOT adjustment
3	CONVERGENCE & DEFLECTION adjustment
4	VIDEO adjustment
5	MTS adjustment

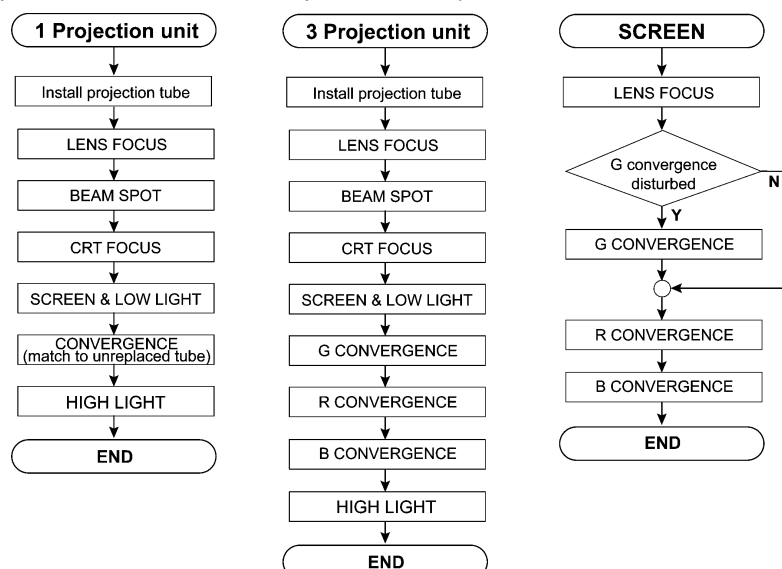
● SETTING POSITION

SETTING ITEM	SETTING POSITION	SETTING ITEM	SETTING POSITION
VIDEO STATUS	STANDARD	ASPECT	FULL
BASS, TREBLE, BALANCE	CENTER	VERTICAL POSITION	CENTER
HYPERSURROUND	OFF	BBE	ON
TINT, COLOR, PICTURE, BRIGHT, DETAIL	CENTER	ON/OFF TIMER	NO
COLOR TEMPERATURE	HIGH	AUTO SHUTOFF	OFF
DIGITAL NOISE CLEAR	CENTER		

ADJUSTMENT FLOWCHART

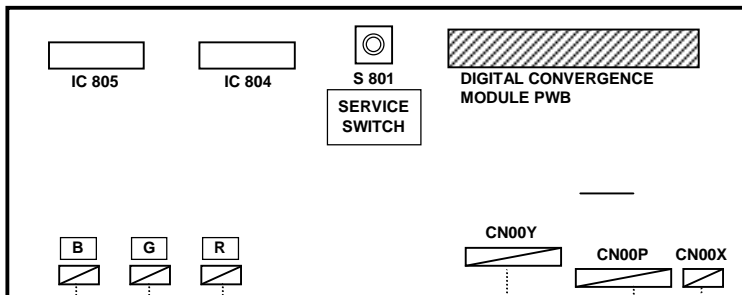
WHEN REPLACING SCREEN AND PROJECTION UNIT

- Contains only the main adjustments. Also confirm other adjustments as required.



ADJUSTMENT LOCATION (1/2)

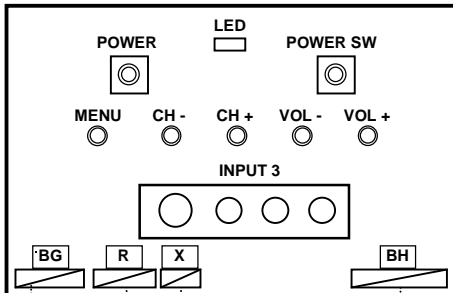
CONVERGENCE PWB



FRONT

TOP

FRONT CONTROL PWB

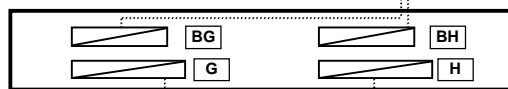


CONVERGENCE OSD PWB

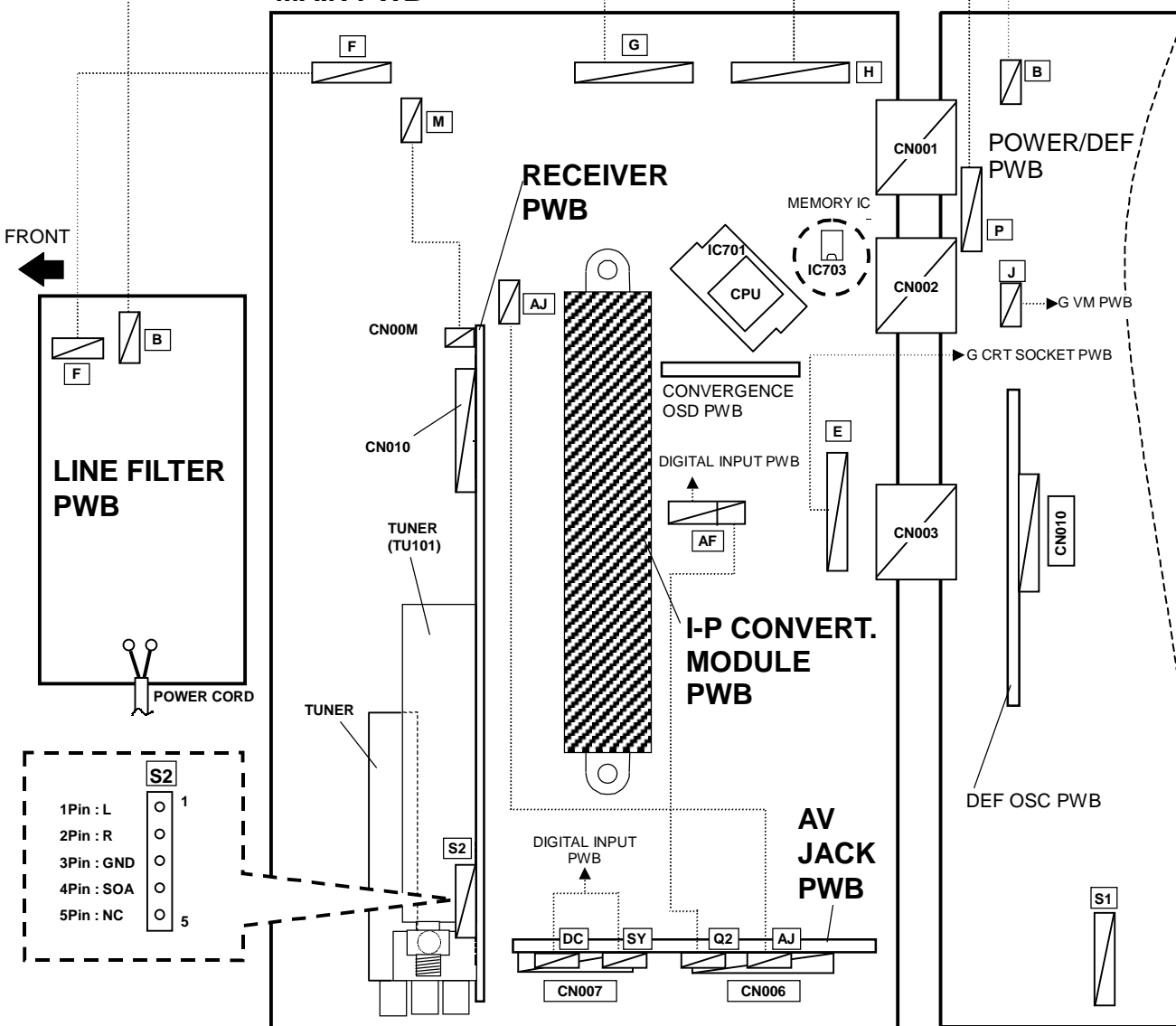
REMOCON SENSOR PWB

R/G/B CRT SOCKET PWB

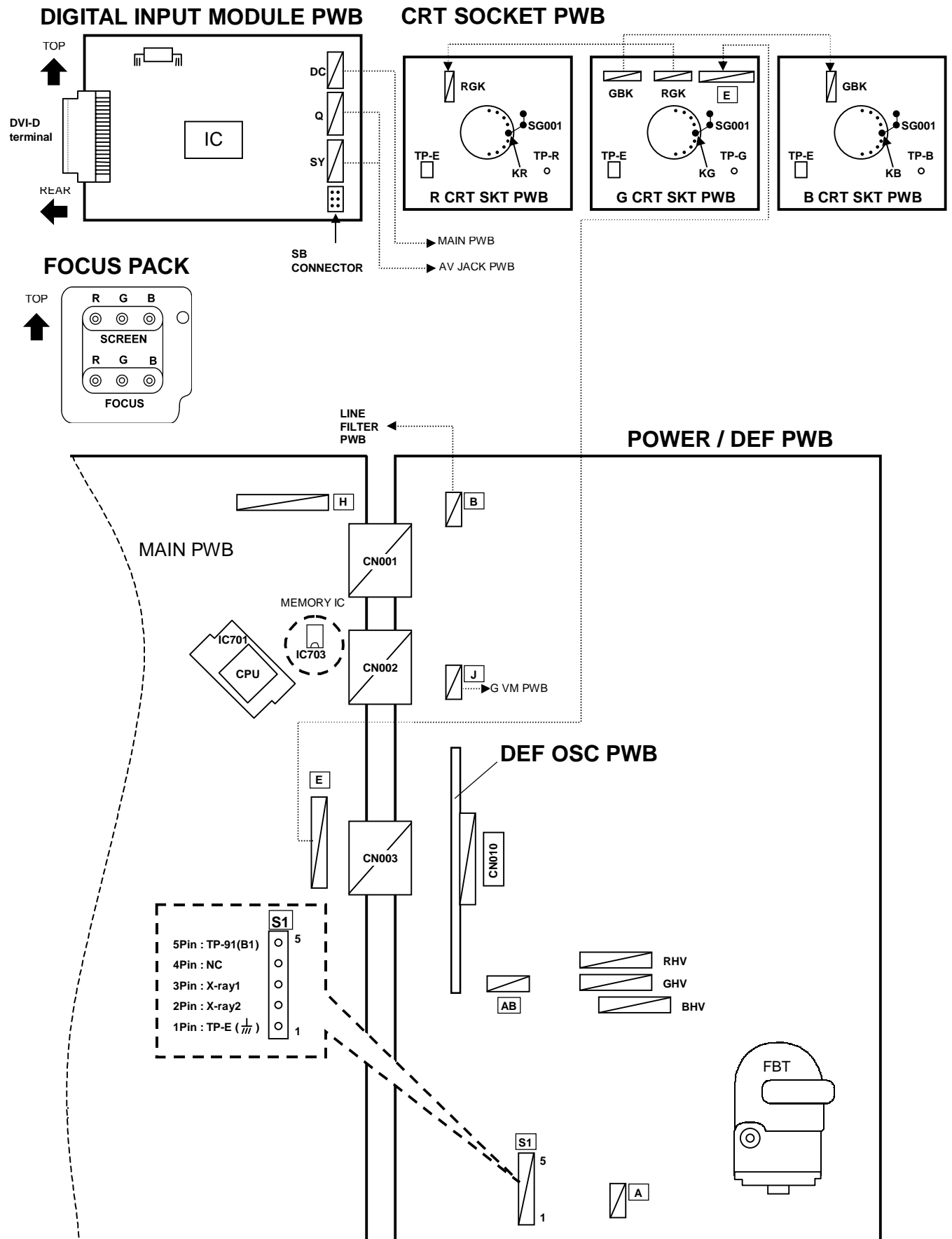
FRONT I/F PWB



MAIN PWB



ADJUSTMENT LOCATION (2/2)



BASIC OPERATION OF SERVICE MENU

1. TOOL OF SERVICE MENU OPERATION

Operate the SERVICE MENU with the REMOTE CONTROL UNIT.

2. SERVICE MENU ITEMS

In general, basic setting (adjustments) items or verifications are performed in the SERVICE MENU.

1. PICTURE / SOUND This sets the setting values of the VIDEO/CHROMA /AUDIO and DEFLECTION circuits.
2. YC SEP This is used when the YC mode is adjusted. **[Do not adjust]**
3. LOW LIGHT This sets the setting values of the WHITE BALANCE circuit.
4. HIGH LIGHT This sets the setting values of the WHITE BALANCE circuit.
5. RF AFC This is used when the IF VCO is adjusted. **[Do not adjust]**
6. (BLANK)
7. I2C BUS This is used when ON/OFF if the I²C BUS control is stop. **[Do not adjust]**
8. PP This sets the setting value of the output of P&P data.
9. IP This sets the setting value of the IP circuit. **[Do not adjust]**
0. SELF-CHK This sets the self checking of the TV circuit.

3. BASIC OPERATIONS OF THE SERVICE MENU

(1) How to enter the SERVICE MENU.

Press **SLEEP TIMER** key and, while the indication of "**SLEEP TIMER 0 MIN.**" is being displayed, press **DISPLAY** key and **VIDEO STATUS** key on the remote control unit simultaneously to enter the **SERVICE MENU** screen as shown in the fig.1.

(2) SERVICE MENU screen selection

Press the number key to select any of the following items.

- | | |
|-----------------|------------|
| 1.PICTURE/SOUND | 7.I2C BUS |
| 2.YC SEP | 8.PP |
| 3.LOW LIGHT | 9.IP |
| 4.HIGH LIGHT | 0.SELF-CHK |
| 5.RF AFC | |

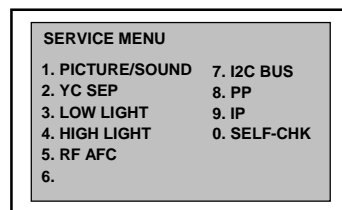


Fig. 1

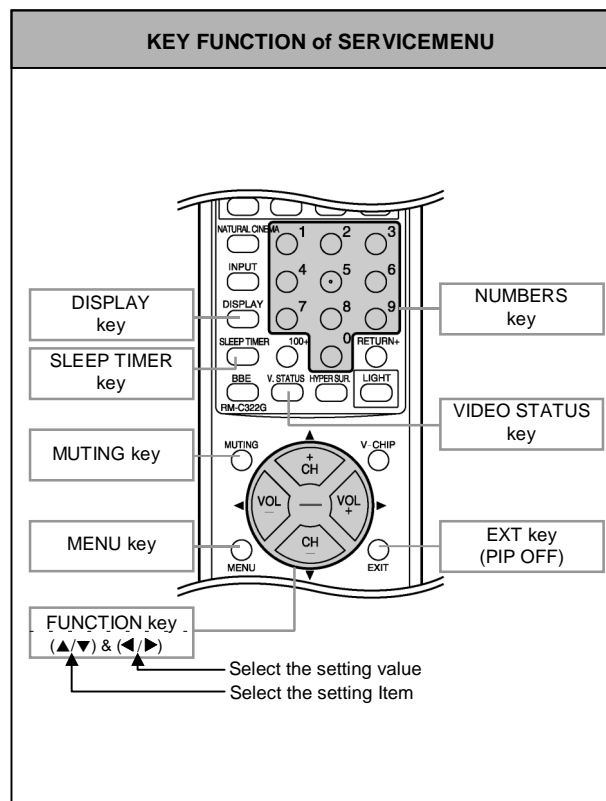
(3) Enter the any setting mode

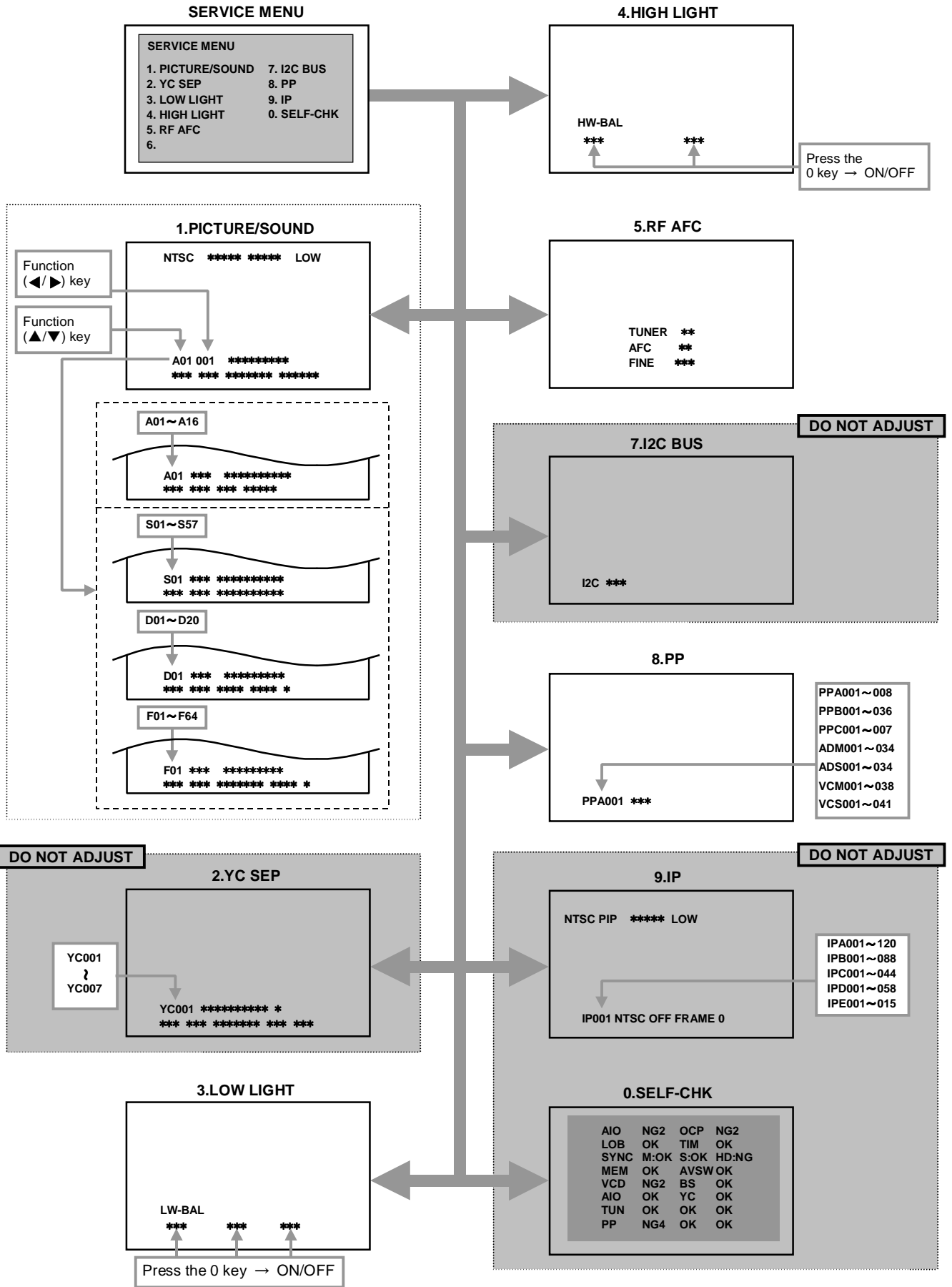
● 1. PICTURE / SOUND mode

- 1) Select the 1. PICTURE / SOUND items with the number key, and the FUNCTION (▲/▼) key is pressed the 1. PICTURE / SOUND mode, the screen will be displayed as shown in figure page later.
- 2) Then the settings or verifications can be performed.

● 2.YC SEP, 3.LOW LIGHT, 4.HIGH LIGHT, 5.RF AFC, 7.I²C BUS, 8.PP, 9.IP and 0.SELF-CHK mode

- 1) If you select any of 2.YC SEP 3.LOW LIGHT 4.HIGH-LIGHT 5.RF AFC 7.I²C BUS, 8.PP, 9.IP and 0.SELF-CHK mode items, and the numbers key is pressed from SERVICE MENU, the each screens will be displayed as shown in figure page later.
- 2) Then the settings or verifications can be performed.



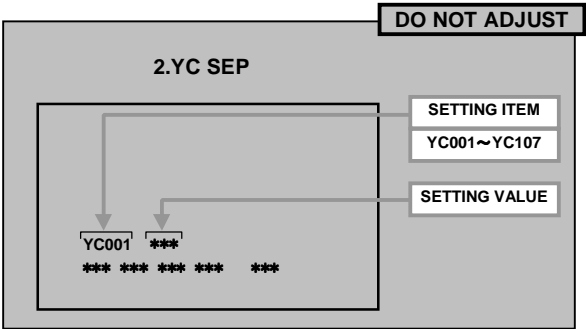
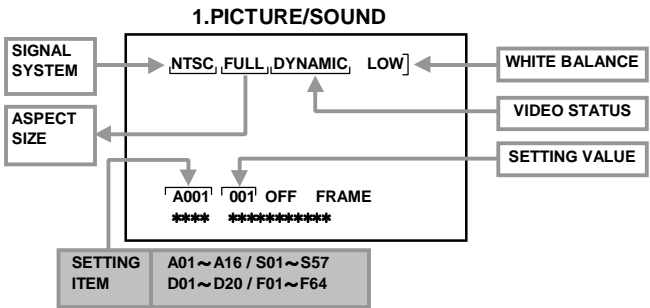


(4) Setting method

- 1) UP / DOWN (▲/▼) FUNCTION key
Select the SETTING ITEM.
- 2) LEFT / RIGHT (◀/▶) FUNCTION key
Setting (adjust) the setting value of the SETTING ITEM.
When the MUTING key is pressed the setting value will be stored (memorized).
- 3) EXIT key
Returns to the previous screen.

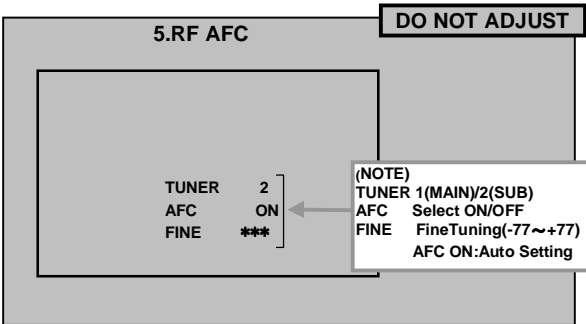
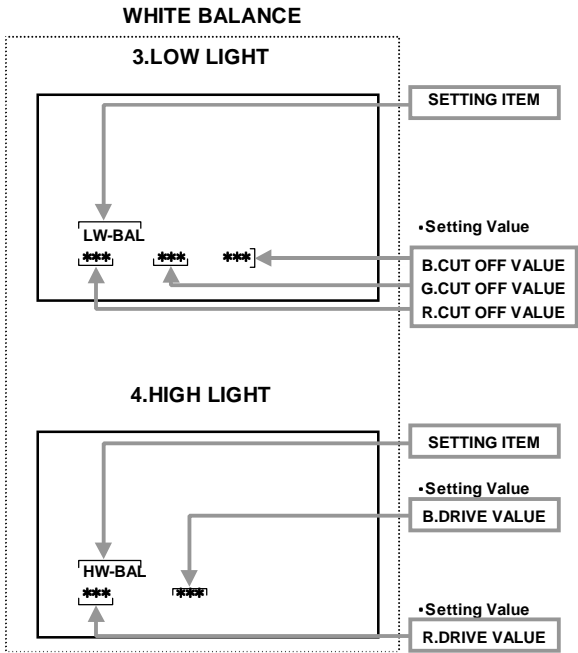
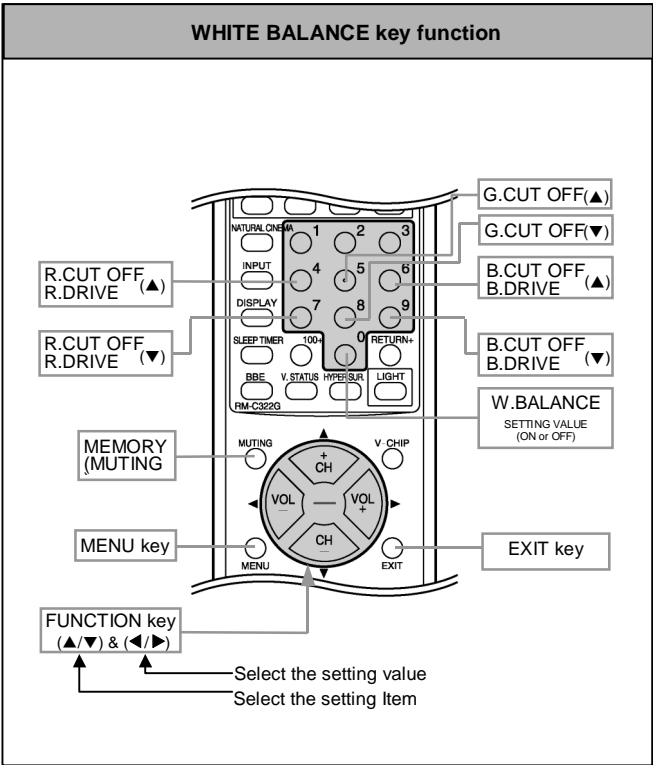
(5) Releasing SERVICE MENU

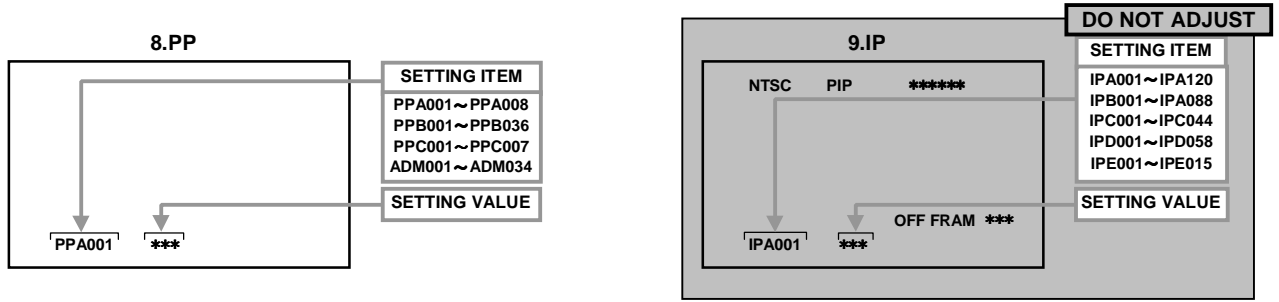
- 1) After returning to the SERVICE MENU upon completion of the setting work, press the EXIT key again.



● WHITE BALANCE setting

The setting for 3.LOW LIGHT and 4.HIGH LIGHT are described in the WHITE BALANCE page of ADJUSTMENT.





8.PP / 9.IP setting

- 1) FUNCTION(▲/▼) key..... Select the setting Item
- 2) FUNCTION (◀/▶) key Select the setting value.
- 3) SLEEP TIMER key Skip the each setting Item.
- 4) MUTING Key Setting value will be stored.
- 5) EXIT key Returns to the service menu.

* Press the EXIT key again, then releasing the service menu.

0.SELF-CHK DISPLAY

Press 0 key of remote control that checks the circuit operating status and in event of malfunction displays stores the data in memory. (shown in figure)

0.SELF-CHK

XRAY	NG	OCF	NG2
LOB	OK	TIM	OK
SYNC	M:OK	S:OK	HD:NG
MEM	OK	AVSW	OK
VCD	NG2	BS	OK
AIO	OK	TC	OK
TUN	OK	GCR	OK
PP	NG4	IP	OK

INITIAL SETTING VALUE OF SERVICE MENU

1. Adjustment of the SERVICE MENU is made on the basis of the initial setting values; however, the new setting values which set the screen in its optimum condition may differ from the initial setting.
2. Do not change the initial setting values of the setting items NOT LISTED IN ADJUSTMENT.
3. The (*1 or *2)marked items in following table, it is NO REQUIREMENT for adjustment. If values had change by the missing, set the initial values in the following table.

CAUTION

Never change the initial setting value any adjustments **except** for those that are designated in the adjustment procedures.

In case where you have made undesigned adjustments by mistake, never press the MUTING key on the remote control unit.

Whenever you had not pressed the MUTING key, you would be able to recover the initial value by switching the POWER SW (on/off) key.

1. PICTURE / SOUND

■ SOUND SYSTEM

Item No.	Item name	Variable range	Initial setting value	Item No.	Item name	Variable range	Initial setting value
A01	NOISE DET.	0 / 1	000	A09	5TH MON	0 / 1	000
A02	INPUT LEVEL	0 ~ 63	027	A10	SAP VCO	0 ~ 63	035
A03	FH MONITOR	0 / 1	000	A11	INPUT GAIN	0 / 1	000
A04	STEREO VCO	0 ~ 63	035	A12	FIL OFFSET	-128 ~ +127	000
A05	PILOT CAN	0 / 1	000	A13	BBE BASS	-128 ~ +127	+007
A06	FILTER	0 ~ 63	032	A14	BBE TREBLE	-128 ~ +127	000
A07	LOW SEP	0 ~ 63	027	A15	BASS	-128 ~ +127	-012
A08	HI SEP	0 ~ 63	028	A16	TREBLE	-128 ~ +127	-008

■ DEFLECTION SYSTEM

Item No.	Item name	Variable range	Initial setting value	Item No.	Item name	Variable range	Initial setting value
D01	V.HEIGHT	0~127	027	D11	H EHT	0~7	001
D02	EW PARABORA	0~63	022	D12	EHT GAIN	0~7	002
D03	H.WIDTH	0~63	051	D13	ADJUSTMENT	0~15	000
D04	V.S-CORR	0~63	040	D14	H CENTER	0~255	172
D05	V.LINEARITY	0~63	039	D15	HORI FREQ ADJUSTMENT	0~255	141
D06	V.CENTER	0~63	023	D16	H. BLK	0~255	080
D07	TRAPEZIUM	0~63	029	D17	OSD OFFSET	0~127	044
D08	EW CORNER LOWER	0~15	008	D18	COMPULSION TWIN SCREEN	0~7	000
D09	EW CORNER UPPER	0~15	008	D19	COMPULSION DEF RST OUTPUT	0 / 1	000
D10	V.EHT	0~7	003	D20	COMPULSION 1080i	0 / 1	000

PICTURE SYSTEM

(NTSC / 480i / 480p)

(1/2)

Item No.	Item name	Variable range	NTSC		480i		480p	
			Standard	Theater	Standard	Theater	Standard	Theater
S01	SUB COLOR	0~127	078	058	078	058	080	062
S02	SUB TINT	0~127	078	069	078	069	070	060

(720p / 1080i / HDCP)

(2/2)

Item No.	Item name	Variable range	720p / 1080i		HDCP			
			Standard	Theater	480p		1080i / 720p	
					Standard	Theater	Standard	Theater
S01	SUB COLOR	0~127	065	060	070	069	059	058
S02	SUB TINT	0~127	078	063	070	074	070	066

(NTSC / 480i)

(1/2)

Item No.	Item name	Variable range	NTSC		480i	
			Standard	Theater	Standard	Theater
S03	SUB BRIGHT	0~255	134	133	134	133
S04	SUB CONTRAST	0~127	079	045	079	045
S05	SUB BRIGHT OFFSET	-128~127	—	—	—	—
S06	SUB CONTRAST OFFSET	-128~127	—	—	—	—

(480p / 720p / 1080i / HDCP)

(2/2)

Item No.	Item name	Variable range	480p / 720p / 1080i		HDCP		SPLIT / FREEZE	
			Standard	Theater	Standard	Theater	Standard	Theater
S03	SUB BRIGHT	0~255	132	134	—	—	—	—
S04	SUB CONTRAST	0~127	082	047	—	—	—	—
S05	SUB BRIGHT OFFSET	-128~127	—	—	000	000	000	000
S06	SUB CONTRAST OFFSET	-128~127	—	—	000	000	-010	000

(NTSC / 480i / 480p / 720p / 1080i / HDCP)

Item No.	Item name	Variable range	NTSC		480i		480p		720p / 1080i / HDCP	
			Standard	Theater	Standard	Theater	Standard	Theater	Standard	Theater
S07	B-Y DEMODURATION	0~63	005	002	005	002	020	048	011	020
S08	R-Y DEMODULATION	0~7	007	000	007	000	007	000	003	000
S09	G-Y MATRIX SW	0~3	001	003	001	003	003	003	002	003

(NTSC / 480i)

(1/3)

Item No.	Item name	Variable range	NTSC				480i			
			Standard		Theater		Standard		Theater	
			High	Low	High	Low	High	Low	High	Low
S10	R DRIVE	0~255	—	080	—	—	—	080	—	—
S11	R DRIVE OFFSET	-128~+127	+003	000	000	+008	+003	000	000	+008
S12	B DRIVE	0~255	—	074	—	—	—	074	—	000
S13	B DRIVE OFFSET	-128~+127	+006	000	000	-025	+060	000	000	-025

(480p / 720p / 1080i)

(2/3)

Item No.	Item name	Variable range	480p				720p / 1080i			
			Standard		Theater		Standard		Theater	
			High	Low	High	Low	High	Low	High	Low
S10	R DRIVE	0~255	—	—	—	—	—	145	—	—
S11	R DRIVE OFFSET	-128~+127	000	000	000	000	+004	000	000	+007
S12	B DRIVE	0~255	—	—	—	—	—	150	—	—
S13	B DRIVE OFFSET	-128~+127	000	000	000	000	+006	000	000	-008

(HDCP)

(3/3)

Item No.	Item name	Variable range	HDCP			
			Standard		Theater	
			High	Low	High	Low
S10	R DRIVE	0~255	—	—	—	—
S11	R DRIVE OFFSET	-128~+127	+004	000	000	+005
S12	B DRIVE	0~255	—	—	—	—
S13	B DRIVE OFFSET	-128~+127	+005	000	-010	-023

(NTSC / 480i / 480p / 720p / 1080i)

Item No.	Item name	Variable range	NTSC		480i		480p / 720p / 1080i		HDCP	
			Standard	Theater	Standard	Theater	Standard	Theater	Standard	Theater
S14	R CUT OFF	0~255	211	—	211	—	215	—	—	—
S15	R CUT OFF OFFSET	-128~+127	000	+003	000	+003	000	-001	000	+007
S16	G CUT OFF	0~255	050	—	050	—	050	—	—	—
S17	G CUT OFF OFFSET	-128~127	000	000	000	000	000	000	000	000
S18	B CUT OFF	0~255	052	—	052	—	059	—	—	—
S19	B CUT OFF OFFSET	-128~+127	000	+004	000	+004	000	-003	000	+005
S20	R CUT OFF SW	0~3	000	—	000	—	000	—	—	—
S21	B CUT OFF SW	0~3	001	—	001	—	001	—	—	—

(NTSC / 480i / OTHERS SIGNAL)

Item No.	Item name	Variable range	NTSC	480i	OTHERS SIGNAL
S22	BLACK GRAD CORR START LEVEL	0~15	015	015	015
S23	BLACK GRAD CORR GAIN	0~15	008	008	008
S24	WHITE GRAD CORR START LEVEL	0~15	000	000	000
S25	WHITE GRAD CORR GAIN	0~15	015	015	015
S26	WHITE CHARA CORR START LEVEL	0~15	002	002	000
S27	WHITE CHARA CORR GAIN	0~15	000	000	000

Item No.	Item name	Variable range	Standard	Theater
S28	ABL GAIN	0~15	015	015
S29	ABC START	0~15	015	008
S30	ACL GAIN	0~15	015	000
S31	ACL START	0~15	000	015
S32	CONTRAST LINK	0 / 1	000	000
S33	BLACK GRADIATION CORRECTION OFF	0 / 1	000	001
S34	WHITE GRADIATION CORRECTION OFF	0 / 1	000	001

(NTSC / 480i / 480p / 720p / 1080i / HDCP)

Item No.	Item name	Variable range	NTSC / 480i	480p	720p / 1080i	HDCP	
						480p	720p / 1080i
S35	TINT HD / NTSC	0 / 1	001	001	001	001	001

Item No.	Item name	Variable range	Standard	Theater
S36	ABL OFF	0 / 1	000	000
S37	ACL OFF	0 / 1	000	000
S38	DC TRANSMIT POLARITY	0 / 1	001	000
S39	DC TRANSMIT CORR	0 / 1	000	000
S40	BLAKING ON / OFF	0 / 1	000	000

(NTSC / 480i / OTHERS)

Item No.	Item name	Variable range	NTSC		480i		OTHERS SIGNAL	
			Standard	Theater	Standard	Theater	Standard	Theater
S41	DC REPRODUCE RATE	0~255	160	140	160	140	160	72

Item No.	Item name	Variable range	SPLIT	Regular	Theater	OTHERS SIGNAL
S42	ACL CONTROL	0~255	160	072	072	072

Item No.	Item name	Variable range	Setting Value	
			Standard	Theater
S43	CONTRAST LOWER LIMIT	-128~+127	-070	-127
S44	CONTRAST UPPER LIMIT	-128~+127	+017	+127
S45	BRIGHT LOWER LIMIT	-128~+127	-020	-127

(NTSC / 480i / OTHERS)

Item No.	Item name	Variable range	NTSC	480i	OTHERS SIGNAL
S46	EE THEATER BRIGHT	-128~+127	000	000	000
S47	EE THEATER CONTRAST	-128~+127	000	000	000

(ALL SIGNAL)

Item No.	Item name	Variable range	Setting value
S48	BRIGHT EE CONT. CORRECTION	0~31	008
S49	REFRAIN EE CONT. CORRECTION	0~31	027
S50	REFRAIN EE BRIGH OFFSET CORR (MAX)	0~127	004
S51	BRIGHT EE ACL CORR. COEFF.	0~255	085
S52	REFRAIN EE ACL CORR. COEFF.	0~255	140
S53	No use	0 / 1	000
S54	No use	0 / 1	000
S55	No use	0 / 1	000
S56	No use	0 / 1	000
S57	No use	0 / 1	000

OTHERS

Item No.	Item name	Variable Range	Setting Value	Item No.	Item name	Variable Range	Setting Value
F01	EEPROM Ver 1	0~255	051	F32	DIRECT SELECT 2 PIC.	0 / 1	000
F02	EEPROM Ver 2	0~255	001	F33	CAPTION OSD OSCSELECT	0~7	002
F03	H.LINE ON (BRIGHT)	0~255	133	F34	4 PIC. HIGH SPEED SEARCH	0~255	040
F04	H.LINE OFF (BRIGHT)	0~255	140	F35	4 PIC. AGC REFRESH	0~255	000
F05	H.LINE CONTRAST	0~127	000	F36	4 PIC. HIGH SPEED WAIT 1	0~255	040
F06	C38 / C41 SW	0 / 1	001	F37	4 PIC. HIGH SPEED WAIT 2	0~255	020
F07	MODEL SELECT	0~255	000	F38	4 PIC. HIGH SPEED WAIT 3	0~255	040
F08	_____	_____	_____	F39	VSM SHIPPING MODE	0 / 1	000
F09	AUTO SCROLL ADJUST 1	0~15	002	F40	DVD	0~3	000
F10	AUTO SCROLL ADJUST 2	0~15	004	F41	2 PICTURE 16:9 MODE	0 / 1	000
F11	AUTO SCROLL ADJUST 3	0~15	004	F42	V/C DECODE H.MASK SETTING	0 / 3	000
F12	AUTO SCROLL ADJUST 4	0~15	005	F43	POWER OFF WHITE	0 / 1	000
F13	AUTO SCROLL ADJUST 5	0~15	006	F44	WHITE BACK ON/OFF	0 / 1	000
F14	AUTO SCROLL ADJUST 6	0~15	007	F45	_____	_____	_____
F15	AUTO SCROLL ADJUST 7	0~15	007	F46	_____	_____	_____
F16	Not use	0 / 1	000	F47	_____	_____	_____
F17	Not use	0 / 1	000	F48	_____	_____	_____
F18	Not use	0 / 1	000	F49	_____	_____	_____
F19	Not use	0 / 1	000	F53	S / N (RF) CORR.WIDTH	0~255	000
F20	Not use	0 / 1	000	F54	S / N (RF) CORR.START	0~255	000
F21	Not use	0 / 1	000	F55	S / N (BS) CORR.WIDTH	0~255	000
F22	Not use	0 / 1	000	F56	S / N (BS) CORR.START	0~255	000
F23	Not use	0 / 1	000	F57	S / N (COMP.) CORR.WIDTH	0~255	000
F24	V-CHIP ON/OFF (CANADA)	0 / 1	000	F58	S / N (COMP.) CORR.START	0~255	000
F25	EARTH MAGNETIC CORR. PICTURE	0~127	127	F59	S / N (S) CORR.WIDTH	0~255	000
F26	OSD OFFSET (480p / 720p) (HDCP / 480p)	0~63	033	F60	S / N (S) START	0~255	000
F27	OSD OFFSET (1080i / HDCP1080i)	0~63	018	F61	OCD OFFSET (HORI.)	0~127	048
F28	CH.PROGRAM SEARCH CYCLE	0~255	011	F62	ATT GAIN	0 / 1	000
F29	PIP FUNCTION ON / OFF	0 / 1	000	F63	V.HEIGHT OFFSET	-128~+127	000
F30	PIP 2 PICTURE	0 / 1	000	F64	TEXT MODE CONT.CORR.	-128~+127	000
F31	V.CHIP ON OFF	0 / 1	001				

(1/2)



Item No.	Item name	Variable Range	Setting Value				
			NTSC	480i	480p	1080i	720p
F50	SEP.LEVEL	0~3	000	002	002	002	002
F51	CLAMP PLUS	0 / 1	000	000	000	000	000
F52	HD PHASE	0~63	038	035	026	039	024

(2/2)

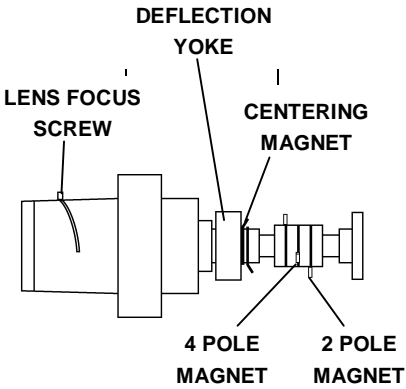
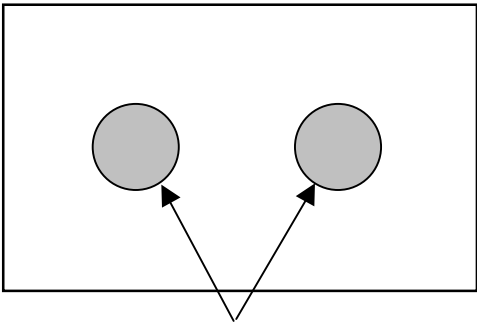
Item No.	Item name	Variable Range	Setting Value			
			HDCP 480p SIZE 1	HDCP 480p SIZE 2	HDCP720p	HDCP1080i
F50	SEP.LEVEL	0~3	002	002	002	002
F51	CLAMP PLUS	0 / 1	000	000	000	000
F52	HD PHASE	0~63	042	017	047	044

ADJUSTMENT

CHECK ITEMS

Item	Measuring Instrument	Test point	Adjustment Item	Description
B1 POWER SUPPLY check	Signal generator DC Voltmeter	S1 connector 5 pin:TP-91 1 pin:TP-E()		<ol style="list-style-type: none"> 1. Receive a black and white signal (color off). 2. Connect the DC voltmeter to S1 connector 5 pin (TP-91) and TP-E() (S1 connector 1 pin). 3. Confirm that the voltage is DC140V\pm2V.
HIGH VOLTAGE check	Signal generator High Voltage meter	CRT Anode		<ol style="list-style-type: none"> 1. Receive a white black signal. 2. Connect the high voltage meter between CRT anode and GND. 3. Check that the High Voltage DC 31.0kV \pm1.0kV.
X-RAY PROTECTOR check	Resistor 6.8k Ω 1/6W \pm 5%	S1 connector 2 pin:X-Ray2 3 pin:X-Ray1		<ol style="list-style-type: none"> 1. Connect resistor 6.8kΩ (1/6W, \pm5%) between 2. 2 pin & 3 pin of the connector S1. 3. Confirm that the X-RAY protector functions operated.
H.FREQUENCY check	Signal generator Remote control unit		D15 : H.FREQ. D19 : DEF.RST	<ol style="list-style-type: none"> 1. Receive the black & white signal. 2. Preset from 0 to 1 for D19<DEF RST>, to adjust D15: H.FREQ. and memorize data with MUTING key. 3. After adjustment, to preset from 1 to 0 for D19: DEF RST and Press the MUTING key to memorize data.

FOCUS & BEAM SPOT ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS & BEAM SPOT adjustment	Signal generator Similar adhesive (Securing adhesive)		G Def. Yoke (DY) R Def. Yoke (DY) B Def. Yoke (DY) [Projection unit] R LENS FOCUS screw G LENS FOCUS screw B LENS FOCUS screw [Projection unit (LENS ASS'Y)] R SCREEN VR G SCREEN VR B SCREEN VR [FOCUS PACK] 4 pole magnet 2 pole magnet [Projection unit (CRT neck)] R FOCUS VR G FOCUS VR B FOCUS VR [FOCUS PACK]	1. Receive a cross-hatch signal. 2. Press the ASPECT and select the FULL mode. 3. If the picture tilted, adjust the R, G and B DY position to mark straight horizontal line. ■ LENS FOCUS 4. Makes a red single color. NOTE : When making a single color, It squeezes SCREEN VR in each one, or it does a lid to the lens in of the adjustment color and it makes it single color. 5. By turning the LENS FOCUS screw (in LENS ass'y), for optimum focus at the screen center. Check for absence of difference in the peripheral focus. If the peripheral focus is poor, slightly shift the center focus to obtain overall balanced focus. 6. In the same manner, produce green and blue single color and adjust their respective focus. 7. After adjustment, it fixes a screw. NOTE : There is not a difference in the focus in the top and the bottom, on either side, in the diagonal. When the difference of the focus is big, it removes a main lens, and it puts a washer between the main lens and the coupler and it adjusts it. ■ BEAM SPOT 8. Receive a dot pattern signal. 9. Makes a red single color. NOTE : When making a single color, It squeezes SCREEN VR in each one, or it does a lid to the lens in of the adjustment color and it makes it single color. 10. Turn the R FOCUS VR to set the dot diameter to about ϕ 30mm. 11. Turn the 4 pole magnet of the projection unit CRT neck and to where the dots at the screen center are nearly circular. 12. Return the R FOCUS VR to its original position (just focus). 13. Turn the 2 pole magnet of the CRT neck to minimize expansion of the dots. 14. Receive a crosshatch signal. 15. Adjust the overall screen focus. 16. In the same manner, adjust for the green and blue single color focus. 17. Secure the 4 and 2 pole magnets with similar adhesive. ■ CRT FOCUS 18. Receive a crosshatch signal. 19. Makes a red single color. NOTE : When making a single color, It squeezes SCREEN VR in each one, or it does a lid to the lens in of the adjustment color and it makes it single color. 20. Adjust the R FOCUS VR for optimum focus at the position indicated in the figure. 21. In the same manner, adjust for the green and blue single color focus. 22. After adjustment, return the SCREEN VRs to their original positions. NOTE : When moving screen VR, always return to original.
	 <p>PROJECTION UNIT & LENS ASS'Y (CRT adjustment location)</p>			
	 <p>CRT FOCUS adjustment point</p>			

CONVERGENCE & DEFLECTION ADJUSTMENT

- The adjustment using the remote control unit is made on the 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.
- At first the adjustment in FULL mode should be done, then the data for the other ASPECT mode is corrected in the respective value at the same time.

FLOWCHART OF ADJUSTMENT

CAUTION

All adjustments of the DEF circuit for this model should be carried out under the status without convergence operation. To enter the status without convergence operation turn the power on while pressing the service switch **S801** on the CONVERGENCE PWB. As a result, you can get the screen as shown in Fig.1. Adjust the DEF circuit in order of the steps indicated by the downward arrows.

Note: When every adjustment of the DEF circuit has completed, start the adjustment of convergence.

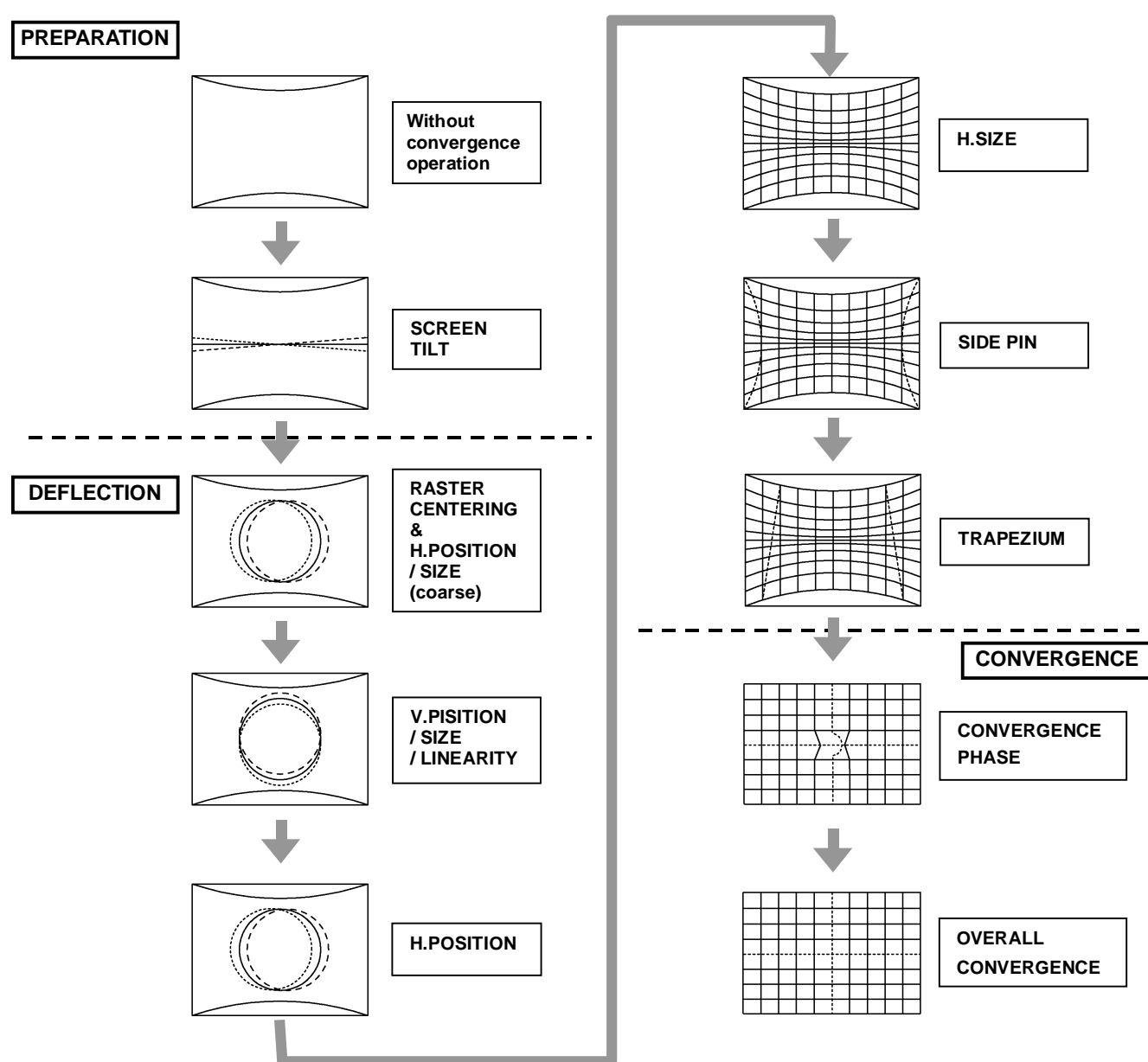
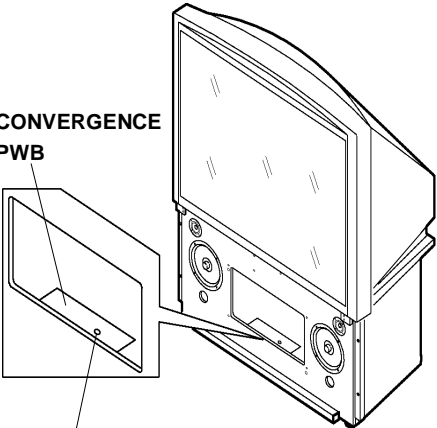
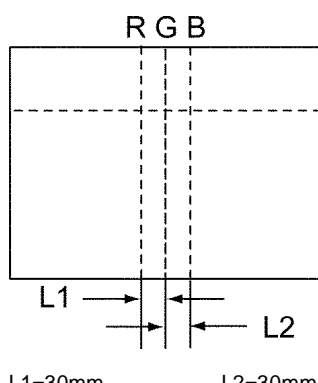


Fig.1

Item	Measuring instrument	Test point	Adjustment part	Description
SCREEN TILT adjustment  <p>CONVERGENCE PWB</p> <p>SERVICE SW (S801) [CONVERGENCE PWB]</p>	Signal generator		SERVICE SW (S801) [CONVERGENCE PWB] G DEF. YOKE R DEF. YOKE B DEF. YOKE [PROJECTION UNIT]	<ul style="list-style-type: none"> Confirm correct FOCUS adjustment. <ol style="list-style-type: none"> It pushes a power switch while pushing SERVICE SW S801 on the CONVERGENCE PWB then it makes picture without convergence operation. Receive a cross-hatch signal. Makes a green single color. NOTE : When making a single color, It squeezes SCREEN VR in each one, or it does a lid to the lens in the adjustment color and it makes it single color. Temporarily secure the G deflection yoke to the top of the neck and adjust the tilt of the deflection yoke so that the horizontal line at the center becomes flat. After adjustment, fasten the temporal screw. Adjust the tilt of the R and B deflection yokes in the same manner as for green. NOTE : Make sure that the adjustment of CRT FOCUS is optimized at the center and at the fringe of the center in turn. If the proper adjustment has not been done, adjust FOCUS VR again.
RASTER CENTERING & H.POSITION / SIZE (coarse) adjustment	Signal generator Remote control unit		SERVICE SW (S801) [CONVERGENCE PWB] G CENTERING magnet R CENTERING magnet B CENTERING magnet [DEF. YOKE] D03 : H-SIZE D14 : H-CENTER	<ol style="list-style-type: none"> It pushes a power switch while pushing SERVICE SW S801 on the CONVERGENCE PWB then it makes picture without convergence operation. Receive a circle & cross-hatch signal. Makes a green single color. NOTE : When making a single color, it squeezes SCREEN VR in each one, or it does a lid to the lens in the adjustment color and it makes it single color. Select 1.PICTURE/SOUND from SERVICE MENU. Select D03<H-SIZE> and shorten the level until and perpendicular amplitude of vibration with until the blanking in Left and Right and on either side can be seen. Select D14<H-CENTER> and adjust H-CENTER to make the screen center and signal center. Select D03 < H-SIZE > and adjust H-SIZE to make screen picture approx. 92% of H-SIZE. Press the MUTING key on the remote control unit and memorized all data. Adjust the G CENTERING magnet to make horizontal and vertical line center as mechanical center of screen. Red and blue color, too, are reflected by it. Using R CENTERING magnet and B CENTERING magnet, adjusts for the line of the red and the blue to become the position of the left figure.



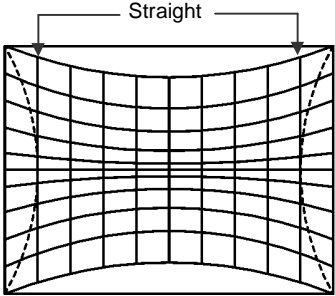
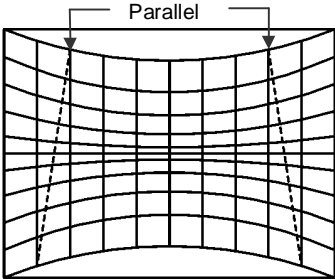
R G B

L1 → ← L2

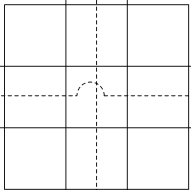
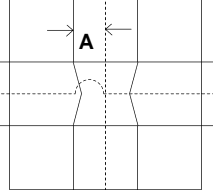
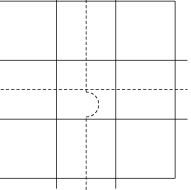
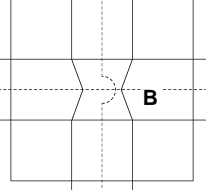
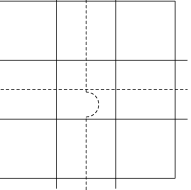
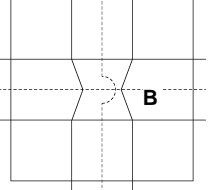
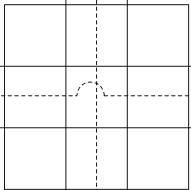
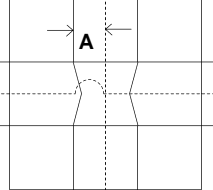
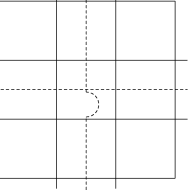
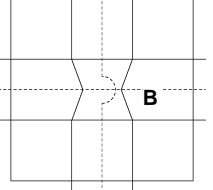
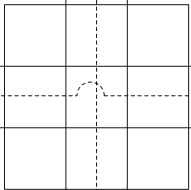
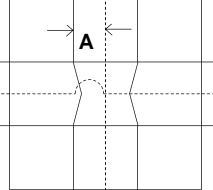
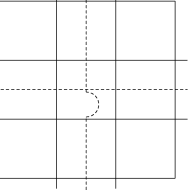
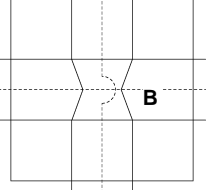
L1=30mm L2=30mm

DEFLECTION CIRCUIT ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
V. POSITION / SIZE / LINEARITY adjustment	Signal generator		D01 : V. SIZE D05 : V. LINEARITY D06 : V. CENTER SERVICE SW (S801) [CONVERGENCE PWB]	<ol style="list-style-type: none"> 1. It pushes a power switch while pushing SERVICE SW S801 on the CONVERGENCE PWB then it makes picture without convergence operation. 2. Set the FULL mode. 3. Receive a circle pattern signal. 4. Select 1.PICTURE/SOUND from the SERVICE MENU. 5. Select D01<V SIZE >, D05<V LINEARITY>, D06<V CENTER> with the FUNCTION (▲/▼) key. 6. Adjust D06, D02 to make A = B (precision $\pm 2\text{mm}$), and adjust to make C = 45mm 7. Press the MUTING key and memorize the set value. <p>NOTE : To memorize every time after finish adjustment on each mode. Do not adjust D04<V. S-CORRECTION> If it is different V position after adjust V linearity, to adjust V position.</p>
	Remote control unit			
H. POSITION adjustment			D14 : H-CENTER	<ol style="list-style-type: none"> 8. Select D14<H-CENTER> with FUNCTION (▲/▼) key. 9. Adjust D14 with FUNCTION (◀/▶) key and make D = E as shown figure. 10. Press the MUTING key and memorize the set value.
H. SIZE adjustment			D03 : H-SIZE	<ol style="list-style-type: none"> 11. Receive a cross-hatch signal. 12. Select D03<H-SIZE> with the FUNCTION (▲/▼) key. 13. Adjust D03 and make sure that the vertical screen size of the picture size is 92%. 14. Press the MUTING key and memorize the set value.

Item	Measuring instrument	Test point	Adjustment part	Description
SIDE PIN adjustment			D02: EW PARABOLA D08: EW CORNER LOWER D09: EW CORNER UPPER	<div>11. Select D02<EW PARABOLA>, D08<EW CORNER LOWER>, D09<EW CORNER UPPER> with FUNCTION (▲/▼) key respectively.</div> <div>16. Adjust D02, D08, D09 with FUNCTION (◀/▶) key and make the vertical lines at the left and right edges of the screen straight.</div> <div>17. Press the MUTING key and memorize the set value.</div> <div></div>
TRAPEZIUM adjustment			D07: TRAPEZIUM	<div>18. Select D07<TRAPEZIUM> with the FUNCTION (▲/▼) key.</div> <div>19. Adjust D07 with (◀/▶)key and bring the vertical lines at the right and left edges of the screen parallel.</div> <div>20. Press the MUTING key and memorize the set value.</div> <div></div>

CONVERGENCE ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
CONVERGENCE PHASE adjustment	Signal generator Remote control unit		SERVICE SW (S801) [CONVERGENCE PWB]	<div><div><div>Dynamic adjustment mode</div><div>Phase adjustment mode</div></div><div><div></div><div></div></div><div><div></div><div></div></div><div><div><div>Dynamic adjustment mode</div><div>Phase adjustment mode</div></div><div><div></div><div></div></div></div><div><div>Dynamic adjustment mode</div><div>Phase adjustment mode</div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div>Dynamic adjustment mode</div><div>Phase adjustment mode</div></div> <div><div></div><div></div></div> <div><div></div><div></div></div>

Dynamic adjustment mode

Phase adjustment mode









Dynamic adjustment mode

Phase adjustment mode









Dynamic adjustment mode

Phase adjustment mode









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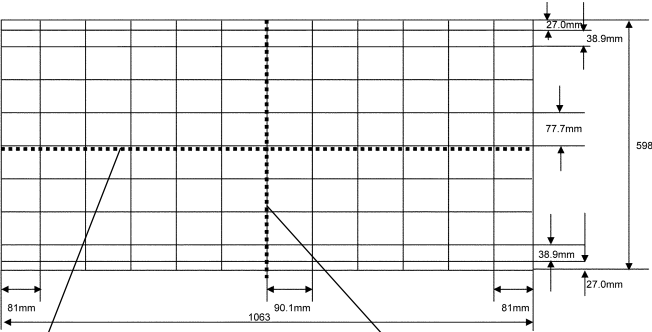
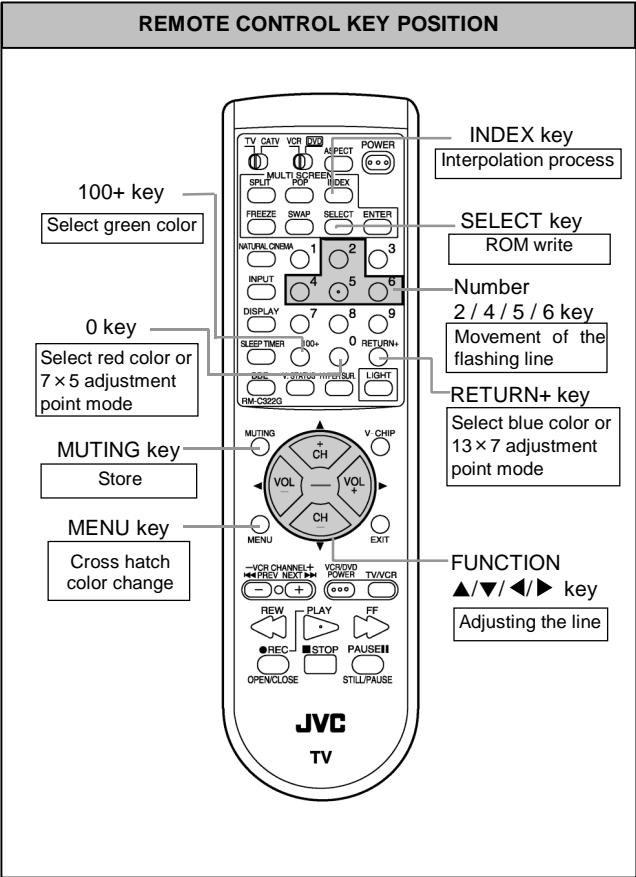




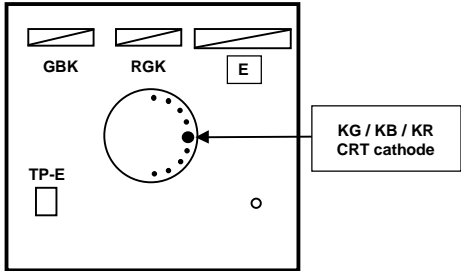
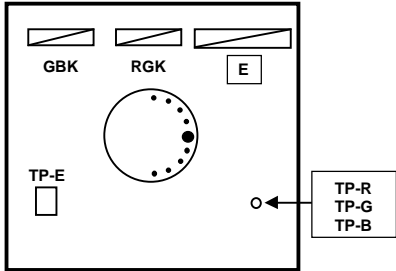


Dynamic adjustment mode

Phase adjustment mode

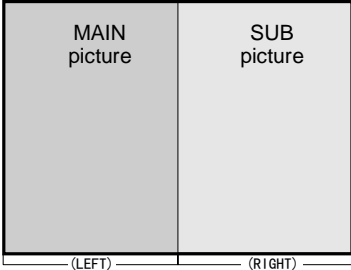
Item	Measuring instrument	Test point	Adjustment part	Description
OVERALL CONVERGENCE adjustment	Signal generator Remote control unit		SERVICE SW (S801) [CONVERGENCE PWB]	<div>1. Receive a NTSC signal.</div> <div>2. Press the SERVICE SW S801 on the CONVERGENCE PWB.</div> <div>3. Appear the flashing cross-hatch pattern.</div> <div>4. Press the 100+ key on the remote control unit to select green color.</div> <div>5. Press MENU key to let green cross-hatch pattern to appear on screen.</div> <div>6. Using the 2(up) / 4(left) / 5(down) / 6(right) of remote control key, move the flashing line.</div> <div>7. Using the FUNCTION (▲/▼),(◀/▶) key, adjust the position on the screen as shown in Fig.1.</div> <div>8. Sometime press INDEX key to do interpolation process. After finishing the adjustment press SELECT key twice to memorize.</div> <div>9. Press 0 key on the remote control unit to select red color.</div> <div>10. Repeat steps 5~8.</div> <div>11. Press RETURN+ key on the remote control unit to select blue color.</div> <div>12. Repeat steps 5~8.</div> <div>13. When the adjustment has been completed, press the MUTING key and store the data on the memory.</div> <div>14. Press 0 keys on the remote control unit five times and it changes a screen to the 7×5 adjustment point mode.</div> <div>15. Repeat steps 4~13.</div> <div>16. Press RETURN+ keys on the remote control unit five times and it changes a screen to the 13×7 adjustment point mode.</div> <div>17. Repeat steps 4~13.</div> <div>18. Press the SERVICE SW S801 again.</div>
<div><p>Horizontal flashing line</p><p>Vertical flashing line</p><p>Fig.1</p></div> <div><p>REMOTE CONTROL KEY POSITION</p><p>100+ key Select green color</p><p>0 key Select red color or 7×5 adjustment point mode</p><p>MUTING key Store</p><p>MENU key Cross hatch color change</p><p>INDEX key Interpolation process</p><p>SELECT key ROM write</p><p>Number 2 / 4 / 5 / 6 key Movement of the flashing line</p><p>RETURN+ key Select blue color or 13×7 adjustment point mode</p><p>FUNCTION ▲/▼/◀/▶ key Adjusting the line</p></div>				

VIDEO ADJUSTMENT

Item	Measuring Instrument	Test point	Adjustment Item	Description
A-D CONVERTER OFFSET adjustment	Signal generator	KG [G CRT SOCKET PWB]	ADM013: G OFFSET	* Select the STANDARD mode for the VIDEO STATUS. ----- 1. Receive a whole black (0%) signal. 2. Select REGULAR mode of ASPECT mode. 3. Select that COLOR TEMP in set at the LOW mode. 4. Connect the oscilloscope to KG (G cathode) on the G CRT SOCKET PWB. 5. Select 8.PP from the SERVICE MENU. 6. Select ADM013<G OFFSET>. 7. Adjust ADM013 as 0% signal and outside from are set to same values. 8. Connect the oscilloscope to KB (B cathode) on the B CRT SOCKET PWB 9. Select ADM014<B OFFSET>. 10. Adjust ADM014 < B OFFSET > as 0% signal and outside from are set to same values. 11. Connect the oscilloscope to KR (R cathode) on the R CRT SOCKET PWB 12. Select ADM012<R OFFSET>. 13. Adjust ADM012 < R OFFSET > as 0% signal and outside from are set to same values. 14. Press the MUTING key to memorize. 15. After adjustment, data of ADM012, ADM013, ADM014 are used to adjustment of other signal.
	Remote control unit	KB [B CRT SOCKET PWB] KR [R CRT SOCKET PWB]	ADM012: R OFFSET ADM014: B OFFSET	
<div></div> <p style="text-align: center;">CRT SOCKET PWB</p>				
RGB CUTOFF adjustment	Signal generator	TP-R [R CRT SOCKET PWB]	S14: R CUTOFF	* Select the STANDARD mode for the VIDEO STATUS. ----- 1. Receive half color bar signal (include -3%). 2. Select that COLOR TEMP in set at the LOW mode. 3. Connect the oscilloscope to TP-G. 4. Adjust S16<G CUTOFF> to mach -3% DC level to 180V. 5. Press the MUTING key to memorize. NOTE : Adjusting S16, change the only up. If DC level is low at the initial value of CUTOFF, adjust S03 (brightness). 6. Input 1080i black level pattern signal and input the value adjusted at NTSC to S16<G CUTOFF>. 7. Press the MUTING key to memorize. 8. Input 480i black level pattern signal and input the value adjusted at NTSC to S16<G CUTOFF>. 9. Press the MUTING key to memorize. 10. In case of TP-R, TP-B, repeat step 4.~6 above. If the value of S14 or S18 is max or min, change S20<R CUTOFF SW >, S21<B CUTOFF SW > and then adjust S14, S18. 11. Adjust each R / G / B screen VR on the FOCUS PACK, and glimmer +3% point of each R / G / B on the screen.
	Oscilloscope	TP-G [G CRT SOCKET PWB] TP-B [B CRT SOCKET PWB]	S16: G CUTOFF S18: B CUTOFF	
<div></div> <p style="text-align: center;">CRT SOCKET PWB</p>				

Item	Measuring Instrument	Test point	Adjustment Item	Description																											
WHITE BALANCE (Low Light) adjustment	Signal generator		S14 : R CUTOFF S16 : G CUTOFF S18 : B CUTOFF S20 : R CUTOFF SW S21 : B CUTOFF SW	* Select the STANDARD mode (all “000”) for the VIDEO STATUS.																											
	Remote control unit			1. Receive the NTSC black and white pattern signal (color off). 2. Select that COLOR TEMP is set at the LOW mode. 3. Set the initial setting values of the white balance (S14, S16, S18, S20, & S21 of Low Light) on the SERVICE MENU. 4. Select the 3.LOW LIGHT mode from the SERVICE MENU. 5. Press the 0 key, then setting values appear. 6. In crease the bright level to confirm low-light with FUNCTION key (▶). 7. Adjust low-light white balance with 4/7(R CUTOFF), 6/9 (B CUTOFF) key of number key. 8. Press the MUTING key for memorize. 9. Receive the 1080i black and white pattern signal. 10. Repeat steps 5. ~8. above. 11. Receive the 480i black and white signal. 12. Repeat steps 5. ~8. above.																											
<div><div><div><div><div>Setting item</div><div>LOW BAL</div><div>R. CUTOFF setting value</div><div>G. cutoff setting value</div><div>B. cutoff setting value</div></div><div>Press 0 key then appear</div></div></div></div> <div><div>REMOTE CONTROL UNIT</div><div><div><div>1</div><div>2</div><div>3 EXIT</div></div><div><div>R CUTOFF ▲</div><div>G CUTOFF ▲</div><div>B CUTOFF ▲</div></div><div><div>4</div><div>5</div><div>6</div></div><div><div>R CUTOFF ▼</div><div>G CUTOFF ▼</div><div>B CUTOFF ▼</div></div><div><div>7</div><div>8</div><div>9</div></div><div><div>OSD ON/OFF</div><div>0</div></div></div></div> <table><tr><th rowspan="2">Setting item</th><th colspan="3">Setting value</th></tr><tr><th>NTSC</th><th>480i</th><th>1080i</th></tr><tr><td>S14</td><td>211</td><td>211</td><td>215</td></tr><tr><td>S16</td><td>050</td><td>050</td><td>050</td></tr><tr><td>S18</td><td>052</td><td>052</td><td>059</td></tr><tr><td>S20</td><td>000</td><td>000</td><td>000</td></tr><tr><td>S21</td><td>001</td><td>001</td><td>001</td></tr></table>					Setting item	Setting value			NTSC	480i	1080i	S14	211	211	215	S16	050	050	050	S18	052	052	059	S20	000	000	000	S21	001	001	001
Setting item	Setting value																														
	NTSC	480i	1080i																												
S14	211	211	215																												
S16	050	050	050																												
S18	052	052	059																												
S20	000	000	000																												
S21	001	001	001																												

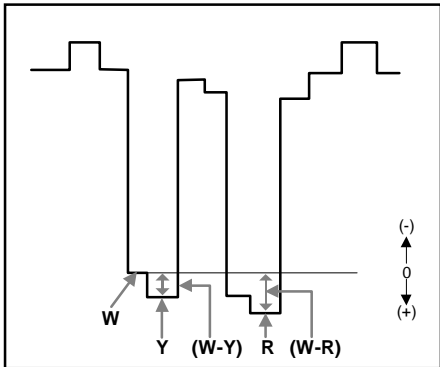
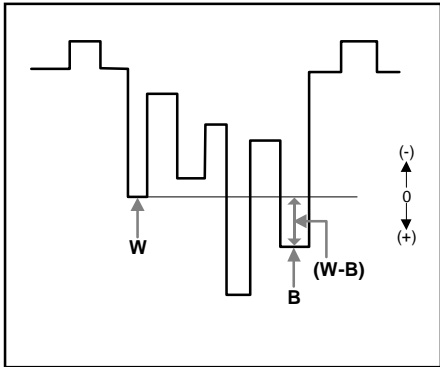
Item	Measuring Instrument	Test point	Adjustment Item	Description
WHITE BALANCE (High Light) adjustment	Signal generator Remote control unit		S10 : R DRIVE S12 : B DRIVE	<div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><d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Item	Measuring Instrument	Test point	Adjustment Item	Description
SPLIT WHITE BALANCE (High Light) adjustment	Signal generator Remote control unit		ADS012 : R OFFSET ADS014 : B OFFSET	<ol style="list-style-type: none"> 1. Select SPLIT mode. 2. Receive the NTSC black & white signal both the picture. 3. At first to adjust ADS012<R OFFSET> and ADS014 <B OFFSET>, next to adjust the white level on right picture same as left screen (Fig.1). 4. Press the MUTING key and memorize the set values.
<p style="text-align: center;">TWIN PICTURE</p>  <p style="text-align: center;">Fig.1</p>				

Item	Measuring Instrument	Test point	Adjustment Item	Description		
SUB BRIGHT adjustment	Remote control unit		S03 : SUB BRIGHT	1. Receive the NTSC black & white signal. 2. Select 1.PICTURE/SOUND from SERVICE MENU. 3. Select S03<SUB BRIGHT> with FUNCTION (▲/▼) key. 4. Set the initial setting value with the FUNCTION (◀/▶) key. (Table1) 5. Adjust S03, not to flash part of black on the screen. 6. Press the MUTING key and memorize the set values. 7. Select THEATER / LOW white balance, and then repeat steps 3~7 above. 8. Receive 1080i black and white and select STANDARD / LOW, and then repeat steps 3~7 above. 9. Receive 1080i black and white signal and select THEATER / LOW mode, and then repeat steps 3~7 above. 10. Input 480i black and white signal, and select STANDARD / LOW mode, and then repeat steps 3~7 above. 11. And then select THEATER / LOW mode, repeat steps 3 ~7 above.		
S03:SUB BRIGHT						
Signal Item	INITIAL SETTING VALUE					
	NTSC		480i		1080i	
Setting value	STANDARD	THEATER	STANDARD	THEATER	STANDARD	THEATER
	134	133	134	133	132	134
Table1						

Item	Measuring Instrument	Test point	Adjustment Item	Description		
SUB CONTRAST adjustment	Remote control unit		S04 : SUB CONT.	1. Receive the NTSC black & white signal. 2. Enter the SERVICE MENU of 1.PICTURE/SOUND Item. 3. Select S04 <SUB CONT> with FUNCTION (▲/▼) key. 4. Set the Initial setting value with FUNCTION (◀/▶) key. (Table2) 5. If the contrast is not the best with the initial setting value, make fine adjustment of the S04<SUB CONT.> until you get the optimum contrast. 6. Press the MUTING key and memorize the set values. 7. Select THEATER / LOW. 8. Receive the 1080i black and white signal and then repeat steps 3~7 above. 9. Input the 480p black and white signal and then repeat steps 3~7 above.		
S04:SUB CONTRAST						
Signal Item	INITIAL SETTING VALUE					
	NTSC		480i		1080i	
Setting value	STANDARD	THEATER	STANDARD	THEATER	STANDARD	THEATER
	078	045	079	045	082	047
Table2						

Item	Measuring Instrument	Test point	Adjustment Item	Description
SPLIT SUB BRIGHT / SUB CONTRAST adjustment	Remote control unit		ADS013 : SUB BRIGHT VCS008 : SUB CONTRAST	<ol style="list-style-type: none"> 1. Select SPLIT mode and then receive the NTSC black & white signal to both pictures. 2. Enter the SERVICE MENU of 1.PICTURE/SOUND Item. 3. Adjust ADS013<SUB BRIGHT> to right picture is same as left picture. 4. Adjust VCS008<SUB CONTRAST> to right picture is same as left picture. 5. Press the MUTING key and memorize the set values.

Item	Measuring Instrument	Test point	Adjustment Item	Description				
SUB COLOR / SUB TINT / B-Y GAIN adjustment	Signal generator	TP-R	S01 : SUB COLOR	<ol style="list-style-type: none">Input the 480i color bar from computer terminal.Select STANDARD and FULL mode.Enter the SERVICE mode of 1.PICTURE/SOUND.Connect the Oscilloscope to TP-R.Adjust S01<SUB COLOR> and S02<SUB TINT> to be following setting value A[V]. (Refer to the bellow table)Select THEATER and then adjust S01<SUB COLOR> and S02<SUB TINT> to be following setting value B[V] same as above. (Refer to the bellow table)Connect the Oscilloscope to TP-B.Select STANDARD and then adjust S07<B-Y GAIN> to be setting value C[V]. (Refer to the bellow table)Select THEATER and then adjust S07<B-Y GAIN> to be setting value D[V]. (Refer to the bellow table)Receive 1080i color bar and then repeat steps 3.~8. above.Receive 480p color bar and then repeat steps 3.~8. above.Confirm that low-light is not different after adjusting color, Tint and B-Y Gain. If it is green or magenta, to adjust low-light again. If adjust again, to set offset value again.Press the MUTING key and memorize the set values.				
	Oscilloscope	TP-B	S02 : SUB TINT					
	Remote control unit	TP-E(↲)	S07 : B-Y GAIN					
<div></div> <p>Fig.1</p>								
<div></div> <p>Fig.2</p>								
Setting item Signal	Setting value A[V]		Setting value B[V]		Setting value C[V]		Setting value D[V]	
	Standard		Theater		Standard		Theater	
	S01(W-R)	S02(W-Y)	S01(W-R)	S02(W-Y)	S07(W-B)	S07(W-B)		
	NTSC	+28	+16	+19	+7	+7	+8	
1080i	+7	+6	+5	+7	+7	-24		
480i	+22	+13	+7	+1	+1	-24		
480p	+19	+16	+11	+2	+2	-30		
Table								

Item	Measuring Instrument	Test point	Adjustment Item	Description
DIGITAL INPUT (HDCP) SUB COLOR / SUB TINT/ B-Y GAIN adjustment	Signal generator Remote control unit	TP-R TP-B TP-E(↗)	S01:SUB COLOR S02:SUB TINT	<ul style="list-style-type: none"> COLOR, TINT, B-Y GAIN adjustment at 1080i and 480p should be finished. <hr/> <ol style="list-style-type: none"> Input HDCP (digital) 1080i signal. Select STANDARD on VIDEO STATUS. Enter to SERVICE MENU. Input the same value adjusted at 1080i STANDARD to the setting value S01, S02. Select THEATER on VIDEO STATUS. Input the same value adjusted at 1080i THEATER to setting value S01, S02. Input HDCP 480p 720 × 480 dots signal. Select STANDARD on VIDEO STATUS. Input the same value adjusted at 480p STANDARD to the setting value S01, S02. Select THEATER on VIDEO STATUS. Input the same value adjusted at 480p THEATER to the setting value S01, S02. Press the MUTING key and memorize the set values.

Item	Measuring Instrument	Test point	Adjustment Item	Description
SPLIT SUB COLOR / SUB TINT adjustment	Signal generator Oscilloscope Remote Control unit	TP-R	VCS004: SUB DECODER COLOR VCS001: SUB DECODER TINT	<ol style="list-style-type: none"> Select SPLIT mode. Receive COLOR BAR signal to sub (right) screen and PEDESTAL signal to main (left) screen (Fig.1). Enter the SERVICE MENU of 8.PP Item. Connect the oscilloscope to TP-R. Adjust VCS004<SUB DECODER COLOR>, VCS001<SUB DECODER TINT> to adjustment point (A)[V] (Fig.2). Press the MUTING key and memorize the set values.

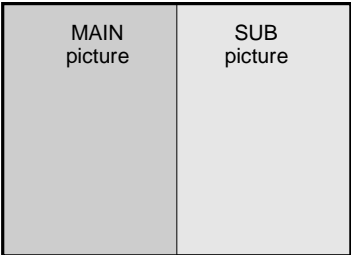


Fig.1

Fig.2

setting value

	Adjustment Point (A[V])	
(A)	VCS004(W-R)	VCS001C(W-Y)
	+37V	+7V

MTS adjustment

Item	Measuring Instrument	Test point	Adjustment Item	Description
MTS INPUT LEVEL check	Remote control unit		A02 : IN LEVEL	<ol style="list-style-type: none"> 1. Select 1.PICTURE / SOUND from SERVICE MENU. 2. Select the A02<IN LEVEL> with FUNCTION (▲/▼) key. 3. Verify that the A02<IN LEVEL> is set at its initial setting value.
MTS STEREO VCO adjustment	TV audio multiplex signal generator Frequency counter Remote control unit	AUDIO OUT R output	A03 : FH MONITOR A04 : STEREO VCO	<ol style="list-style-type: none"> 1. Receive the RF signal (non-modulated sound signal) from the antenna terminal. 2. Select the A03<FH MONITOR> with FUNCTION (▲/▼) key, and change the setting value from 0 to 1. 3. Connect the frequency counter to R output pin of the AUDIO OUT. 4. Select the A04<STEREO VCO> with FUNCTION (▲/▼) key. 5. Set the initial setting value of the No.4 STEREO VCO with the FUNCTION (◀/▶) key. 6. Adjust the A04<STEREO VCO> so that the frequency counter will display $15.73\text{kHz} \pm 0.1\text{kHz}$. * The frequency counter indication should be stable. 7. Select the A03<FH MONITOR> with FUNCTION (▲/▼) key, and reset the setting value from 1 to 0.
MTS SAP VCO adjustment	TV audio multiplex signal generator Frequency counter Remote control unit	S2 Connector 3-pin:GND 4-pin:SOA [RECEIVER PWB] AUDIO OUT R output	A09 : 5FH MON. A10 : SAP VCO	<ol style="list-style-type: none"> 1. Receive the RF signal (non-modulated sound signal) from the antenna terminal. 2. Connect between pin ④ of S2 connector and GND (Pin ③ of S2 connector) through $1\text{M}\Omega$ resistor. 3. Select the A09<5FH MON> with FUNCTION (▲/▼) key, and reset the setting value from 0 to 1. 4. Connect the frequency counter to R output pin of the AUDIO OUT. 5. Select the A10<SAP VCO> with FUNCTION (▲/▼) key. 6. Set the initial setting value of A10<SAP VCO> with of FUNCTION (◀/▶) key. 7. Adjust the A10<SAP VCO> so that the frequency counter will display $78.67\text{kHz} \pm 0.5\text{kHz}$. * The frequency counter indication should be stable. 8. Select the A09<5FH MON> with FUNCTION (▲/▼) key, and reset the setting value from 1 to 0.
MTS FILTER check	TV audio multiplex signal generator Oscilloscope Remote control unit	S2 Connector 2-pin:R [RECEIVER PWB]	A05 : PILOT A06 : FILTER	<ol style="list-style-type: none"> 1. Receive the RF signal (MTS pilot signal) from the antenna terminal. 2. Select the A05<PILOT> with FUNCTION (▲/▼) key, and reset the setting value from 1 to 0. 3. Connect the oscilloscope to ② pin of S2 connector. 4. Select the A06<FILTER> with FUNCTION (▲/▼) key. 5. Adjust the A06: FILTER so that the waveform will be minimum. 6. Select the A05<PILOT> with FUNCTION (▲/▼) key, and reset the setting value from 1 to 0.

Item	Measuring Instrument	Test point	Adjustment Item	Description
MTS SEPARATION adjustment	TV audio multiplex signal generator Oscilloscope Remote control unit	AUDIO OUT L output R output	A07 : LOW SEP. A08 : HI SEP.	<div>1. Input the stereo L signal (300Hz) from the TV audio multiplex signal generator to the antenna terminal.</div> <div>2. Connect an oscilloscope to L OUTPUT pin of the AUDIO OUT, and display one cycle portion of the 300Hz signal.</div> <div>3. Change the connection of the oscilloscope to R OUTPUT pin of the AUDIO OUT, and enlarge the voltage axis.</div> <div>4. Select the A07<LOW SEP.> with FUNCTION (▲/▼)key.</div> <div>5. Set the initial setting value of the A07<LOW SEP.> with the FUNCTION (◀/▶) key.</div> <div>6. Adjust the A07 <LOW SEP.> so that the stroke element of the 300Hz signal will become minimum.</div> <div>7. Change the signal to 3kHz, and similarly adjust the A08 <HI SEP.>.</div>

L-Channel
signal waveform

R-Channel
crosstalk portion

1 cycle

Minimum

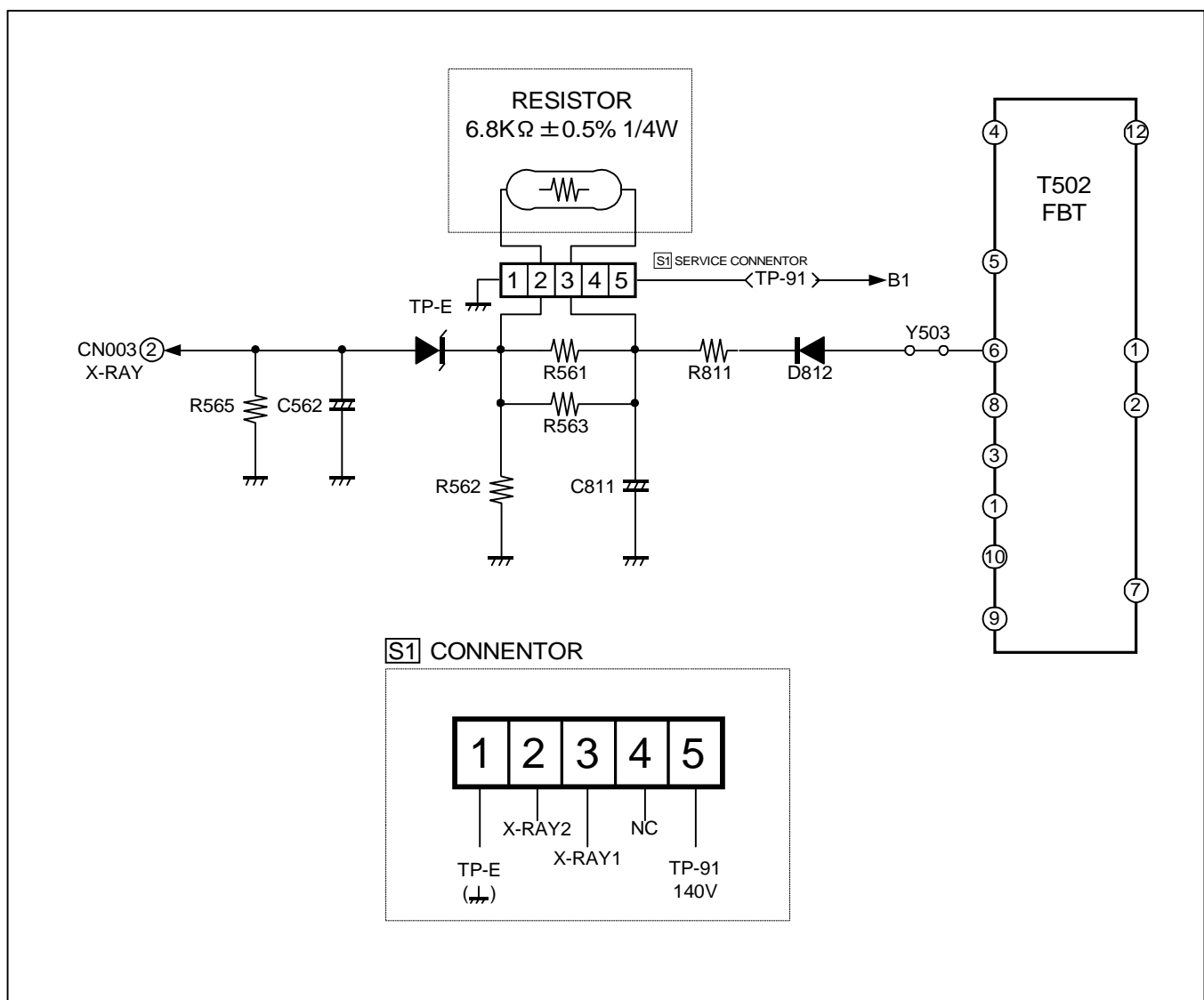
HOW TO CHECK THE HIGH VOLTAGE HOLD DOWN CIRCUIT

1. HIGH VOLTAGE HOLD DOWN CIRCUIT

After repairing the high voltage hold down circuit.
This circuit shall be checked to operate correctly.

2. CHECKING OF THE HIGH VOLTAGE HOLD DOWN CIRCUIT

- (1) Turn the power sw ON.
- (2) As shown in figure bellow, set the resistor (between **S2** connector 1 & 5).
- (3) Make sure that the screen picture disappears (no raster).
- (4) Temporarily unplug the power cord.
- (5) Remove the resistor (between **S2** connector 1 & 5).
- (6) Again plug the power cord, make sure that normal pictures is displayed on the screen.



TROUBLESHOOTING

SELF CHECK FUNCTIONS

This model has self-check functions that inform of the failure of the TV by detecting abnormality. Operational state is always monitored and the identified is memorized on the record.

How to enter the SELF-CHECK mode

1. During the stand-by mode, turn the power on while pressing the volume (▼) button on the TV set.

How to exit from the SELF-CHECK mode

1. By using the remote control unit, turn the power off. At this time, the failure record is cleared.
2. Take off the AC plug from the wall outlet. At this time, the failure record is not cleared.

● SELF CHECK DISPLAY

The self-check results are shown on the following display.

Method of indication when the raster is not displayed (Fig.1).

Each failure is shown by turning POWER LED on and off at specified intervals.

Item	POWER LED ON / OFF intervals
X-ray protection	Turning on and off 0.1-second intervals
B1 Over-current protection	Turning on and off 1-second intervals
Low B short protection	Turning on and off 2-second intervals

● Explanation for activation of self-check functions

For X-ray protection, B1 over-current protection and low-B protection, the power of the TV is turned off if NG is detected. Immediately after the power is turned off, POWER LED will be turning on and off.

When the power is turned off, you cannot turn the power on again until the AC plug is taken out and put in again.

- Because of the timing of Vcc start-up and shut-down of the IC connecting to the I²C bus during which the power is turned on and off, the operation may be interpreted as an error. In order to avoid the misinterpretation, the self-check functions should be started at about 3 seconds after the power is turned on.
- The latest failure is stored on the record at the end. The failure record for each check item is counted to the number of 9 at the maximum, When more than 9 failures are stored on the record, the counter remains stopped at 9.

ITEM	RESULT	COUNT	
AIO	NG2	OCP	NG2
LOB	OK	TIM	OK
SYNC	M:OK	S:OK	HD:NG
MEM	OK	AVSW	OK
VCD	NG2	BS	OK
AIO	OK	YC	OK
TUN	OK	OK	OK
PP	NG4	OK	OK

SELF-CHECK SCREEN

Indication	Check item	Details of detection	Method of detection
XRAY	X-ray protection	Operation of X-ray protection circuit.	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected for 200ms, the power is turned off automatically.
OCP	B1 Over-current protection	An B1 over-current is detected.	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected for 200ms, the power is turned off automatically.
LOB	Low B protection	Operation of low B short protection circuit.	At about 3 seconds after the power is turned on, the self-check function starts. If NG is detected for 200ms, the power is turned off automatically.
SYNC	Presence or absence of synchronized signal	Presence of synchronized signal. HD : HD system M : NTSC main S : NTSC sub	When entering the self-check mode, "OK" is shown. While running the mode with picture signal, if the synchronized signal is disappeared, "NG" is shown.
MEM	E ² PROM memory	ACK is returned when I ² C traffic is carried out.	The state is monitored every time when I ² C traffic is carried out. Then the state is counted as a failure if ACK is not returned.
AVSW	AV switch	Ditto, MM1519 and CXA2069Q	Ditto
VCD	Video chroma	Ditto, AN5392	Ditto
BS	BS tuner	Ditto, BS tuner module	Ditto
AIO	Audio	Ditto, BD3869	Ditto
YC	3DY/C	Ditto, upd64083	Ditto
TUN	RF tuner	Ditto, RF tuner	Ditto
PP	P & P	Ditto, AMDP2(TMX57128)	Ditto
IP	IP	Ditto, JCC5054	Ditto
GCR	GCR	Not used	Ditto
TIM	Timer	The power frequency is changed as follows : 50Hz→60Hz 60Hz→50Hz	Periodically check the power frequency by counting the AC pulse and monitor whether or not the frequency is changed except for the time immediately after resetting.

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