

## SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.

To enter to the SERVICE MODE function, press and hold both buttons simultaneously on the main unit and on the remote control for more than a standard time (second).

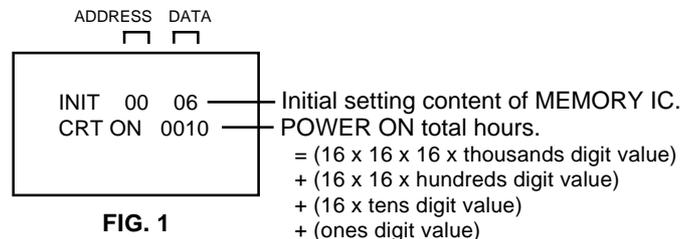
Set Key	Remocon Key	Standard Time (seconds)	Operations
VOL. (-) MIN	0	1	Releasing of V-CHIP PASSWORD.
VOL. (-) MIN	1	1	Initialization of the factory on TV. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours.
VOL. (-) MIN	4	1	Initialization of the factory on DVD. NOTE: Do not use this for the normal servicing. The function will only work at the DVD stop mode.
VOL. (-) MIN	6	1	POWER ON total hours are displayed on the screen. Refer to the "PREVENTIVE CHECKS AND SERVICE INTERVALS" (CONFIRMATION OF HOURS USED).  Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
VOL. (-) MIN	9	1	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).
STOP	7	3	Releasing of PARENTAL LOCK. Refer to the "PARENTAL CONTROL-RATING LEVEL" NOTE: The function will only work without the setting of DVD disc at DVD mode.
STOP	9	3	Tray cannot be opened. Refer to the "TRAY LOCK". NOTE: No indications on the screen when the Tray Lock is setting.

## CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

**NOTE: If you set a factory initialization, the total hours is reset to "0".**

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button (6) on the remote control for more than 2 second.
3. After the confirmation of using hours, turn off the power.



## WHEN REPLACING EEPROM (MEMORY) IC

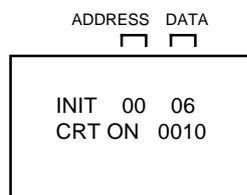
If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

**NOTE:** No need setting for after INI 27.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	06	0F	44	20	D0	35	30	25	15	50	01	00	C1	55	0F	47
10	30	50	50	04	15	77	23	50	20	77	52	00	02	11	00	00
20	0A	0D	10	12	14	16	18	1A	---	---	---	---	---	---	---	---

**Table 1**

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second. ADDRESS and DATA should appear as FIG 1.



**FIG. 1**

3. ADDRESS is now selected and should "blink". Using the VOL. UP/DOWN button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. UP/DOWN button until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input.

**After the data input, set to the initializing of shipping.**

9. Turn POWER on.
10. Press both VOL. DOWN button on the set and Channel button **(1)** on the remote control for more than 1 second.
11. After the finishing of the initializing of shipping, the unit will turn off automatically.

The unit will now have the correct DATA for the new MEMORY IC.

# ELECTRICAL ADJUSTMENTS

## 1. BEFORE MAKING ELECTRICAL ADJUSTMENTS

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

### CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor).

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. AC Voltmeter
4. Pattern Generator
5. Multi-Sound Signal Generator

### On-Screen Display Adjustment

1. Set the VOLUME to minimum.
2. Press the VOL. DOWN button on the set and the Channel button (9) on the remote control for more than 1 second to appear the adjustment mode on the screen as shown in Fig. 1-1.

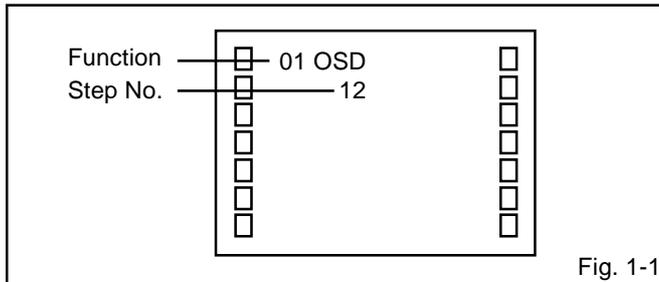


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button (1-0) on the remote control to select the options shown in Fig. 1-2.
4. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
01	OSD H	41	SUB BIAS
02	OSD CONTRAST	42	BRI. DVD(CENT.)
03	CUT OFF	43	BRI. DVD(MAX)
04	H POSITION	44	BRI. DVD(MIN)
05	H BLK L	45	CONT. DVD(CENT.)
06	H BLK R	46	CONT. DVD(MAX)
07	V SIZE	47	CONT. DVD(MIN)
08	V POSITION	48	COL. DVD(CENT.)
09	V LINEARITY	49	COL. DVD(MAX)
10	V S CORRECTION	50	COL. DVD(MIN)
11	V COMP	51	TINT DVD
12	R CUT OFF	52	SHARPNESS DVD
13	G CUT OFF	53	SUB BIAS
14	B CUT OFF	54	BRI. GAME(CENT.)
15	R DRIVE	55	BRI. GAME(MAX)
16	G DRIVE	56	BRI. GAME(MIN)
17	B DRIVE	57	CONT. GAME(CENT.)
18	BRIGHTNESS(CENT.)	58	CONT. GAME(MAX)
19	BRIGHTNESS(MAX)	59	CONT. GAME(MIN)
20	BRIGHTNESS(MIN)	60	SUB BIAS
21	CONTRAST(CENT.)	61	TUNING V MUTE
22	CONTRAST(MAX)	62	POWER ON V MUTE
23	CONTRAST(MIN)	63	INPUT LEVEL
24	COLOR(CENT.)	64	SEPARATION L
25	COLOR(MAX)	65	SEPARATION H
26	COLOR(MIN)	66	X-RAY TEST
27	TINT	67	H STOP
28	SHARPNESS	68	H FREQ
29	SUB BIAS	69	BAST/WEST DC
30	BRI. AV(CENT.)	70	BAST/WEST AMP
31	BRI. AV(MAX)	71	BAST/WEST TILT
32	BRI. AV(MIN)	72	BAST/WEST COR, TOP
33	CONT. AV(CENT.)	73	BAST/WEST COR, BOT
34	CONT. AV(MAX)	74	H SIZE COMP
35	CONT. AV(MIN)	75	H BLK L AV
36	COL. AV(CENT.)	76	H BLK R AV
37	COL. AV(MAX)		
38	COL. AV(MIN)		
39	TINT AV		
40	SHARPNESS AV		

Fig. 1-2

## 2. BASIC ADJUSTMENTS

### 2-1: CONSTANT VOLTAGE

1. Set condition is AV MODE without signal.
2. Using the remote control, set the brightness and contrast to normal position.
3. Connect the digital voltmeter to TP401.
4. Adjust the VR3800 until the digital voltmeter is  $135 \pm 0.5V$ .

### 2-2: FOCUS

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the Focus Volume until picture is distinct.

### 2-3: CUT OFF

1. Adjust the unit to the following settings.  
R CUT OFF=7F, G CUT OFF=7F, B CUT OFF=7F,  
R DRIVE=3F, G DRIVE=07, B DRIVE=3F
2. Place the set with Aging Test for more than 15 minutes.
3. Set condition is AV MODE without signal.
4. Using the remote control, set the brightness and contrast to normal position.
5. Activate the adjustment mode display of Fig. 1-1 and press the channel button (03) on the remote control to select "CUT OFF".
6. Adjust the Screen Volume until a dim raster is obtained.

# ELECTRICAL ADJUSTMENTS

## 2-4: WHITE BALANCE

**NOTE:** Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(16)** on the remote control to select "G DRV".
5. Press the CH. UP/DOWN button on the remote control to select the "R CUT OFF", "G CUT OFF", "B CUT OFF", "R DRIVE" or "B DRIVE".
6. Adjust the VOL. UP/DOWN button on the remote control to whiten the R CUT OFF, G CUT OFF, B CUT OFF, R DRIVE and B DRIV E at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

## 2-5: HORIZONTAL POSITION

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(04)** on the remote control to select "HPOSI".
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

## 2-6: VERTICAL POSITION

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(08)** on the remote control to select "VPOSI".
4. Check the step No. V POSI is "02".
5. Adjust the **VR401** until the horizontal line becomes fit to notch of the shadow mask.

## 2-7: VERTICAL SIZE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(07)** on the remote control to select "VSIZE".
4. Press the VOL. UP/DOWN button on the remote control until the Up/Down OVER SCAN Quantity becomes equal to the Right/Left OVER SCAN Quantity.
5. Receive a broadcast and check if the picture is normal.

## 2-8: VERTICAL LINEARITY

**NOTE:** Adjust after performing adjustments in section 2-7. After the adjustment of Vertical Linearity, reconfirm the Vertical Position and Vertical Size adjustments.

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(09)** on the remote control to select "VLIN".
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

## 2-9: SEPARATION L, H

**Please do the method (1) or method (2) adjustment.**

### Method (1)

1. Set the multi-sound signal generator for each different L-ch and R-ch frequency (Ex. L-ch=2KHz, R-ch=400Hz) and receive the RF signal.
2. Connect the oscilloscope to the **Audio Out Jack**.
3. Press the AUDIO button on the remote control to set to the stereo mode.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(64)** on the remote control to select "SEPAL".
5. Press the VOL. UP/DOWN button on the remote control to adjust it until the audio output wave becomes a fine sine wave.
6. Press the CH UP button 1 time to set to "SEPAH" mode.
7. Press the VOL. UP/DOWN button on the remote control to adjust it until the audio output wave becomes a fine sine wave.

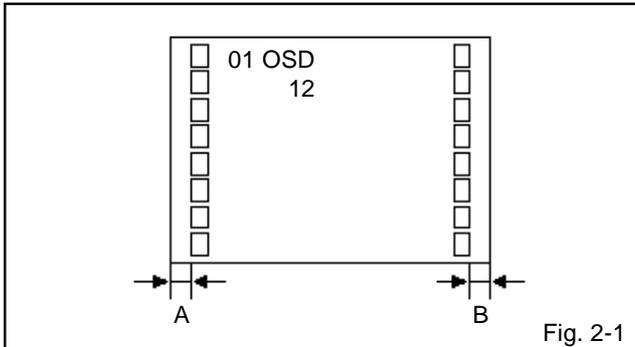
### Method (2)

1. Set the multi-sound signal generator L-ch=1KHz, R-ch=Non input and receive the RF signal.
2. Connect the oscilloscope to the **Audio Out Jack (R-ch)**.
3. Press the AUDIO button on the remote control to set to the stereo mode.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(64)** on the remote control to select "SEPAL".
5. Press the VOL. UP/DOWN button on the remote control to adjust it until the R-ch output becomes minimum.
6. Press the CH UP button 1 time to set to "SEPAH" mode.
7. Press the VOL. UP/DOWN button on the remote control to adjust it until the R-ch output becomes minimum.
8. Set the multi-sound signal generator L-ch=Non input, R-ch=1KHz and receive the RF signal.
9. Connect the oscilloscope to the **Audio Out Jack (L-ch)**. Then perform the above adjustments 3~7.

# ELECTRICAL ADJUSTMENTS

## 2-10: OSD POSITION

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-1)**



## 2-11: LEVEL

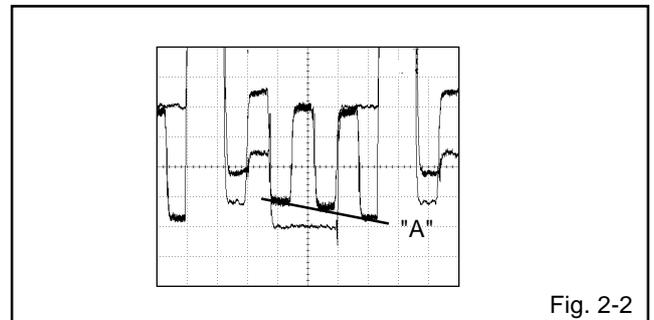
1. Receive the VHF HIGH (70dB).
2. Connect the AC voltmeter to **pin 6 of CP101**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(63)** on the remote control to select "LVL".
4. Press the VOL. UP/DOWN button on the remote control until the AC voltmeter is  $75 \pm 2\text{mV}$ .

## 2-12: BRIGHT CENTER

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(18)** on the remote control to select "BRTC".
2. Press the VOL. UP/DOWN button on the remote control until the white 10% is starting to be visible.
3. Receive a broadcast and check if the picture is normal.
4. Press the INPUT SELECT button on the remote control to set to the AV mode.
5. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(30)** on the remote control to select "BRTCA".
6. Press the VOL. UP/DOWN button on the remote control until the white 10% is starting to be visible.
7. Receive a broadcast and check if the picture is normal.
8. Press the TV/DVD button on the remote control to set to the DVD mode.
9. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(42)** on the remote control to select "BRTCD".
10. Press the VOL. UP/DOWN button on the remote control to set the same step numbers as the AV.

## 2-13: TINT

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the oscilloscope to **TP024**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(27)** on the remote control to select "TNTC".
5. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-2)**
6. Receive the color bar pattern. (Audio Video Input)
7. Press the INPUT SELECT button on the remote control to set to the AV mode.
8. Using the remote control, set the brightness, contrast, color and tint to normal position.
9. Connect the oscilloscope to **TP024**.
10. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(39)** on the remote control to select "TNTCA".
11. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-2)**
12. Press the TV/DVD button on the remote control to set to the DVD mode.
13. Using the remote control, set the brightness, contrast, color and tint to normal position.
14. Connect the oscilloscope to **TP024**.
15. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(51)** on the remote control to select "TNTCD".
16. Press the VOL. UP/DOWN button on the remote control until the same step numbers as the AV.



## 2-14: SHARPNESS

1. Receive the monoscope pattern.
2. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(28)** on the remote control to select "SHARP".
3. Check if the step No. SHARP is "18".
4. Press the INPUT SELECT button on the remote control to set to the AV mode.
5. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(40)** on the remote control to select "SHARPA".
6. Check if the step No. SHARP is "10".
7. Press the TV/DVD button on the remote control to set to the DVD mode.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(52)** on the remote control to select "SHARPD".
9. Press the VOL. UP/DOWN button on the remote control to set the same step numbers as the AV.

# ELECTRICAL ADJUSTMENTS

## 2-15: OSD CONTRAST

1. Receive the monoscop pattern.
2. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(02)** on the remote control to select "OSDC".
3. Check the step No. OSDC is "03".

## 2-16: COLOR CENTER

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the oscilloscope to **TP022**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(24)** on the remote control to select "COLC".
5. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales on the screen of the oscilloscope.
6. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to  $110 \pm 5\%$  of the white level. **(Refer to Fig. 2-3)**
7. Receive the color bar pattern. (Audio Video Input)
8. Press the INPUT SELECT button on the remote control to set to the AV mode.
9. Using the remote control, set the brightness, contrast, color and tint to normal position.
10. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(36)** on the remote control to select "COLCA".
11. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales on the screen of the oscilloscope.
12. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to  $110 \pm 5\%$  of the white level. **(Refer to Fig. 2-3)**
13. Press the TV/DVD button on the remote control to set to the DVD mode.
14. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(48)** on the remote control to select "COLCD".
15. Press the VOL. UP/DOWN button on the remote control to decrease the step numbers by 8 steps to the AV.

## 2-17: CONTRAST MAX

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "CNTX".
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "5A"
3. Receive a broadcast and check if the picture is normal.
4. Press the INPUT SELECT button on the remote control to set to the AV mode.
5. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(34)** on the remote control to select "CNTXA".
6. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "5A"
7. Receive a broadcast and check if the picture is normal.
8. Press the TV/DVD button on the remote control to set to the DVD mode.
9. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(46)** on the remote control to select "CNTXD".
10. Press the VOL. UP/DOWN button on the remote control to set the same step numbers as the AV.

## 2-18: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below.

NO.	FUNCTION	STEP NO.	NO.	FUNCTION	STEP NO.
05	H BLK L	04	47	CONT. DVD(MIN)	10
06	H BLK R	02	49	COL. DVD(MAX)	70
10	V S CORRECTION	08	50	COL. DVD(MIN)	10
11	V COMP	03	53	SUB BIAS	00
16	G DRIVE	07	55	BRI. GAME(MAX)	70
19	BRIGHTNESS(MAX)	70	56	BRI. GAME(MIN)	2A
20	BRIGHTNESS(MIN)	2A	57	CONT. GAME(CENT.)	40
21	CONTRAST(CENT.)	40	59	CONT. GAME(MIN)	10
23	CONTRAST(MIN)	10	60	SUB BIAS	00
25	COLOR(MAX)	70	61	TUNING V MUTE	00
26	COLOR(MIN)	10	62	POWER ON V MUTE	40
29	SUB BIAS	00	68	H FREQ	3F
31	BRI. AV(MAX)	70	69	BAST/WEST DC	00
32	BRI. AV(MIN)	2A	70	BAST/WEST AMP	00
33	CONT. AV(CENT.)	40	71	BAST/WEST TILT	00
35	CONT. AV(MIN)	10	72	BAST/WEST COR, TOP	00
37	COL. AV(MAX)	70	73	BAST/WEST COR, BOT	00
38	COL. AV(MIN)	10	74	H SIZE COMP	00
41	SUB BIAS	00	75	H BLK L AV	07
43	BRI. DVD(MAX)	70	76	H BLK R AV	05
44	BRI. DVD(MIN)	2A			
45	CONT. DVD(CENT.)	40			

