

SERVICE MODE LIST

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

To enter the Service Mode, press both set key and remote control key.

Press both the VOL. key and remocon keys simultaneously for more than 1 second.

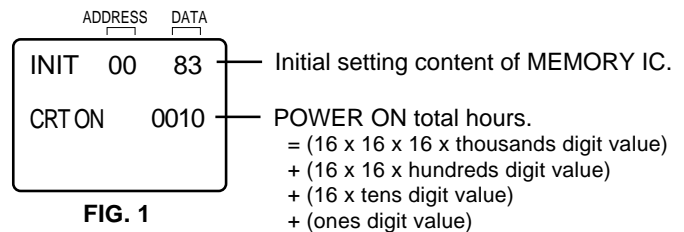
Press both the STOP key and remocon keys simultaneously for more than 3 seconds.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD.
VOL. (-) MIN	1	Initialization of the factory on TV. NOTE: No operation at DVD mode. Do not use this for the normal servicing.
VOL. (-) MIN	3	Initialization of the factory on DVD. NOTE: The operation will work only with STOP mode at DVD mode. Do not use this for the normal servicing.
VOL. (-) MIN	6	POWER ON total hours are displayed on the screen. Refer to the "CONFIRMATION OF USING HOURS". NOTE: No operation at DVD mode. Can be checked of the INITIAL DATA of MEMORY IC on TV. Refer to the "NOTE FOR THE REPLACING OF MEMORY IC". NOTE: No operation at DVD mode.
VOL. (-) MIN	8	Writing of EEPROM initial data on TV. NOTE: No operation at DVD mode. Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).
STOP	7	Releasing of PARENTAL LOCK. NOTE: The operation will work only with STOP mode at DVD mode.
STOP	9	Self-Diagnosis will operate. Refer to the "SELF-DIAGNOSIS"

CONFIRMATION OF USING HOURS

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

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 1 second.
3. After the confirmation of using hours, turn off the power.



SELF-DIAGNOSIS

The Self-Diagnosis function will operate when both STOP button on the set and Channel button (9) on the remote control are pressed simultaneously (for more than 3 seconds) at DVD LOGO screen with No Disc.

NOTE: No diagnosis of FL CHECK on the TV/DVD Player.

Diagnosis Items	Diagnosis Method/Result	Assumed Defects
1. FL CHECK	"FL" will appear on the TV Monitor. Then all indicators will turn on and go out. All light up (3 seconds) ---> All go out (1 second) ---> All light up all the time Sight check if all the indicators will turn on or go out.	AV PCB Power Block
2. SRAM CHECK	"SRAM" will appear on the TV Monitor. Then non-specific data will be read and written on the non-specific address. If no problem on read and write, "OK" will appear. If any problems, "NG" will appear.	Syscon PCB
3. VIDEO ENCODER CHECK	Color bar and Black/White bar will appear alternately on the TV Monitor. Color bar (1 second) ---> Black/White bar (1 second) ---> Color bar (1 second) Sight check if correct color appears or Color and Black/White bar appears alternately.	Syscon PCB Power Block
4. TRAY CHECK	"TRAY : OPEN" will appear on the TV Monitor. Then the tray will be opened completely and "TRAY : CLOSE" will appear. Then the tray will be closed. Sight check if the tray opens or closes correctly.	Syscon PCB Drive Unit Power Block
5. EEPROM CHECK	"EEPROM" will appear on the TV Monitor. Then non-specific data will be read and written on the non-specific address. If no problem on read and write, "OK" will appear. If any problems, "NG" will appear.	Syscon PCB
6. AUDIO DAC CHECK	"ADAC" will appear on the TV Monitor. Then the pink noise will output from RCA. Lch ---> Rch ---> Lch+Rch Check by ear if audio outputs correctly.	Syscon PCB AV PCB
7. SDRAM	"SDRAM" will appear on the TV Monitor. Then non-specific data will be read and written on the non-specific address. If no problem on read and write, "OK" will appear. If any problems, "NG" will appear.	Syscon PCB

After the diagnosis, the results only for the SRAM, EEPROM and SDRAM will appear on the TV Monitor.
In case of OK, "PASS" will appear for the each diagnosis.

RESULT

PASS : SRAM
PASS : EEPROM
PASS : SDRAM

To finish the Self-Diagnosis, turn off the power on the Main unit.

NOTE FOR THE REPLACING OF 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.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	F9	43	05	01	F1	23	27	F7	81	CD	D9	3F	3F	40	61	63
10	64	26	67	69	2A	6B	6C	6D	6E	6F	70	71	52	72	53	73
20	54	74	55	75	75	56	56	76	76	57	57	77	77	58	58	78
30	78	59	59	79	79	5A	5A	7A	7A	5B	5B	7B	7B	5C	5C	7C
40	7C	5D	5D	7D	7D	5E	5E	7E	7E	5F	5F	5F	7F	7F	BF	B7
50	B9	AC	A1	C5	00	C7	00	00	00	97	AF	7F	A8	B8	B4	7A
60	D9	B0	84	88	9A	9F	2A	5A	00	00	00	10	---	---	---	---

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.

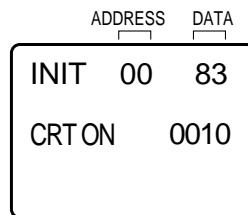


Fig. 1

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

SERVICE ADJUSTMENT

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.
Inferior silicon grease can damage IC's and transistors.
- When replacing IC's and transistors, use only specified silicon grease.
Remove all old silicon before applying new silicon.

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. AC Voltmeter
4. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen.
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**.

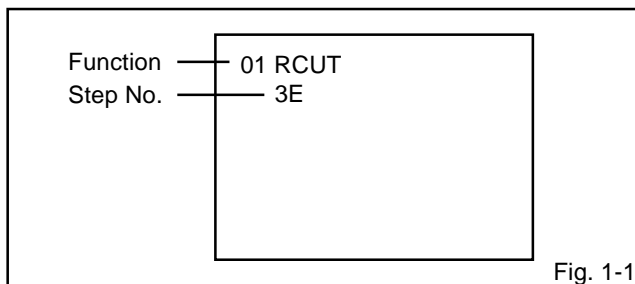


Fig. 1-1

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

NO.	FUNCTION	NO.	FUNCTION
01	R CUT OFF	37	BRI. AV(CENT.)
02	G CUT OFF	38	BRI. AV(MAX)
03	B CUT OFF	39	BRI. AV(MIN)
04	G DRIVE	40	COL. AV(CENT.)
05	B DRIVE	41	COL. AV(MAX)
06	BRIGHTNESS(CENT.)	42	COL. AV(MIN)
07	BRIGHTNESS(MAX)	43	TINT AV
08	BRIGHTNESS(MIN)	44	SUB CONTRAST AV
09	COLOR(CENT.)	45	CONT. AV(CENT.)
10	COLOR(MAX)	46	CONT. AV(MAX)
11	COLOR(MIN)	47	CONT. AV(MIN)
12	TINT	48	SHARPNESS AV
13	SUB CONTRAST	49	BRI. DVD(CENT.)
14	CONTRAST(CENT.)	50	BRI. DVD(MAX)
15	CONTRAST(MAX)	51	BRI. DVD(MIN)
16	CONTRAST(MIN)	52	COL. DVD(CENT.)
17	SHARPNESS	53	COL. DVD(MAX)
18	RGB CONTRAST	54	COL. DVD(MIN)
19	H POSITION	55	TINT DVD
20	V POSITION	56	SUB CONTRAST DVD
21	V SIZE	57	CONT. DVD(CENT.)
22	V LINEARITY	58	CONT. DVD(MAX)
23	V S CORRECTION	59	CONT. DVD(MIN)
24	EW PARABOLA CORR.	60	SHARPNESS DVD
25	EW TRAPEZIUM CORR.	61	BRI. GAME(CENT.)
26	H SIZE	62	BRI. GAME(MAX)
27	V EHT	63	BRI. GAME(MIN)
28	H EHT	64	CONT. GAME(CENT.)
29	RF AGC	65	CONT. GAME(MAX)
30	V CENTERING	66	CONT. GAME(MIN)
31	CORNER CORR. TOP	67	TUNING V MUTE
32	CORNER CORR. BTM	68	POWER ON V MUTE
33	OSD H	69	INPUT LEVEL
34	FM LEVEL	70	SEPARATION L
35	TEST PWM	71	SEPARATION H
36	TEST TONE CONTROL	72	CUT OFF

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 **VR502** until the digital voltmeter is $111 \pm 0.5V$.

2-2: RF AGC

1. Receive the VHF HIGH (63dB).
2. Place the set with Aging Test for more than 15 minutes.
3. Connect the digital voltmeter between the **pin 5 of CP101** and the **pin 1 of CP101**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button (29) on the remote control to select "AGC".
5. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is $2.7 \pm 0.05V$.

2-3: CUT OFF

1. Adjust the unit to the following settings.
G DRIVE=3F, B DRIVE=3F, R CUT OFF=7F, G CUT OFF=7F, B CUT OFF=7F
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 (72) 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 white 100% signal from the Pattern Generator.
3. Using the adjustment control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "RCUT".
5. Using the VOL. UP/DOWN button on the remote control, adjust the RCUT.
6. Press the CH. UP/DOWN button on the remote control to select the "GDRV", "BDRV", "GCUT" or "BCUT".
7. Using the VOL. UP/DOWN button on the remote control, adjust the GDRV, BDRV, GCUT or BCUT.
8. Perform the above adjustments 6 and 7 until the white color is looked like a white.

2-5: FOCUS

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

2-6: HORIZONTAL POSITION

1. Receive the center cross signal from the Pattern Generator.
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 **(19)** on the remote control to select "HPOSI".
4. Press the VOL. UP/DOWN button on the remote control until the right and left screen size of the vertical line becomes the same.

2-7: HORIZONTAL SIZE

NOTE: Adjust after performing adjustments in section 2-6.

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 **(26)** on the remote control to select "WIDS".
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes $10 \pm 2\%$.

2-8: VERTICAL LINEALITY

NOTE: Adjust after performing adjustments in section 2-7.

1. Receive the center cross signal from the Pattern Generator.
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 **(22)** on the remote control to select "VLIN".
4. Press the VOL. UP/DOWN button on the remote control until the upside and downside screen size of the horizontal line becomes the same.

2-9: VERTICAL SHIFT

NOTE: Adjust after performing adjustments in section 2-8.

1. Receive the center cross signal from the Pattern Generator.
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 **(20)** on the remote control to select "VPOSI".
4. Press the VOL. UP/DOWN button on the remote control until the horizontal line becomes fit to the notch of the shadow mask.

2-10: VERTICAL SIZE

NOTE: Adjust after performing adjustments in section 2-9.

1. Receive the crosshatch signal from the Pattern Generator.
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 **(21)** on the remote control to select "VSIZE".
4. Press the VOL. UP/DOWN button on the remote control until the rectangle on the center of the screen becomes square.
5. Receive a broadcast and check if the picture is normal.

2-11: PARABOLA CORR

1. Receive the crosshatch signal from the Pattern Generator.
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 **(24)** on the remote control to select "DPCS".
4. Press the VOL. UP/DOWN button on the remote control until the right and left vertical lines are straight.

2-12: TRAPEZIUM

1. Receive the crosshatch signal from the Pattern Generator.
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 **(25)** on the remote control to select "KEYS".
4. Press the VOL. UP/DOWN button on the remote control until the both vertical lines of the screen become parallel.

2-13: CORNER CORR TOP

1. Receive the crosshatch signal from the Pattern Generator.
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 **(31)** on the remote control to select "CNRT".
4. Press the VOL. UP/DOWN button on the remote control until the upper section of the both ends vertical lines are straight.

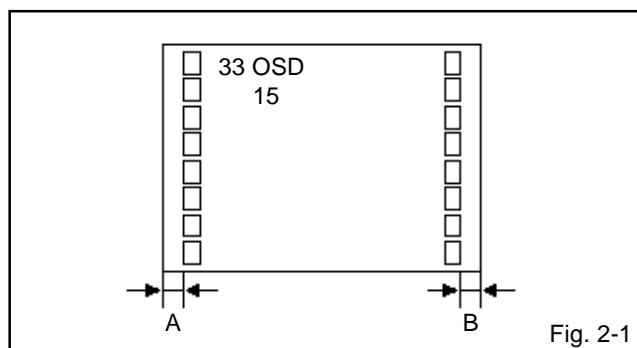
ELECTRICAL ADJUSTMENTS

2-14: CORNER CORR BOTTOM

1. Receive the crosshatch signal from the Pattern Generator.
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 **(32)** on the remote control to select "CNRB".
4. Press the VOL. UP/DOWN button on the remote control until the bottom section of the both ends vertical lines are straight.

2-15: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(33)** on the remote control to select "OSD".
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)



2-16: LEVEL

1. Receive the VHF HIGH (70dB).
2. Connect the AC voltmeter to **TP901**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(69)** on the remote control to select "LVL".
4. Press the VOL. UP/DOWN button on the remote control until the AC voltmeter is $75 \pm 2\text{mV}$.

2-17: SEPARATION L/H

1. Receive the stereo signal (L=2KHz, R=400Hz).
2. Connect the AC voltmeter to **AUDIO OUT JACK** through stereo filter (L=400Hz, R=2KHz).
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 **(70)** on the remote control to select "SEPAL".
5. Press the VOL. UP/DOWN button on the remote control until the output of L-CH and R-CH become minimum.
6. Press the CH UP button once the set to "SEPAH" mode.
7. Press the VOL. UP/DOWN button on the remote control until the output of L-CH and R-CH become minimum.
8. Press the CH DOWN button once the set to "SEPAL" mode.
9. Repeat step 5 to step 8 several times.
The output difference of the between with Filter and without Filter should be more than 20dB for both L and R.

2-18: SUB BRIGHT CENTER

1. Receive the monoscope pattern. (RF Input)
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 **(06)** on the remote control to select "BRTC".
4. Press the VOL. UP/DOWN button on the remote control until the white 15% is starting to be visible
5. Receive the monoscope pattern. (Audio Video Input)
6. Press the INPUT button on the remote control to set to the AV mode.
7. Using the remote control, set the brightness and contrast to normal position.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(37)** on the remote control to select "BRTCA".
9. Press the VOL. UP/DOWN button on the remote control until the white 15% is starting to be visible
10. Press the TV/DVD button on the remote control to set to the DVD mode.
11. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(49)** on the remote control to select "BRTCD".
12. Press the VOL. UP/DOWN button on the remote control to set the same step numbers as the AV.

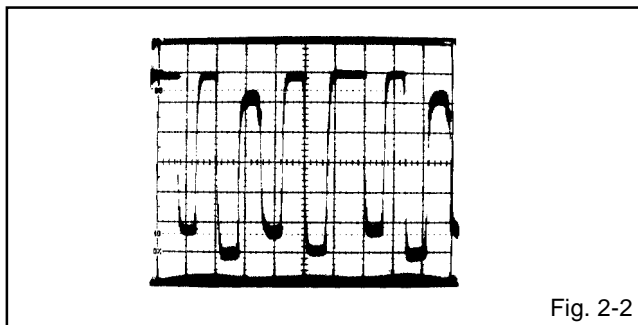
2-19: SUB CONTRAST MAX

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(15)** on the remote control to select "CNTX".
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "6F"
3. Press the INPUT button on the remote control to set to the AV mode.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(46)** on the remote control to select "CNTXA".
5. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "71"
6. Press the TV/DVD button on the remote control to set to the DVD mode.
7. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(58)** on the remote control to select "CNTXD".
8. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "71"

ELECTRICAL ADJUSTMENTS

2-20: SUB TINT 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 **TP803**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button (**12**) on the remote control to select "TNTC".
5. Press the VOL. UP/DOWN button on the remote control until the waveform becomes as shown in **Fig. 2-2**.
6. Receive the color bar pattern. (Audio Video Input)
7. Press the INPUT 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. Activate the adjustment mode display of **Fig. 1-1** and press the channel button (**43**) on the remote control to select "TNTCA".
10. Press the VOL. UP/DOWN button on the remote control until the waveform becomes as shown in **Fig. 2-2**.
11. Press the TV/DVD button on the remote control to set to the DVD mode.
12. Activate the adjustment mode display of **Fig. 1-1** and press the channel button (**55**) on the remote control to select "TNTCD".
13. Press the VOL. UP/DOWN button on the remote control until the waveform becomes as shown in **Fig. 2-2**.



2-21: SUB 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 **TP801**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button (**09**) 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 $120 \pm 5\%$ of the white level. (**Refer to Fig. 2-3**)
7. Receive the color bar pattern. (Audio Video Input)
8. Press the INPUT 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 (**40**) 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 $120 \pm 5\%$ 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 (**52**) on the remote control to select "COLCD".
15. Press the VOL. UP/DOWN button on the remote control to increase the step numbers by 3 steps to the AV.

