PREPARATION FOR SERVICING

How to Enter the Service Mode

Caution: 1

1. Optical sensors system are used for Tape Start and End Sensor on this equipment. Read this page carefully and prepare as described on this page before starting to service; otherwise, the unit may operate unexpectedly.

Preparing: 1

1. Cover Q202 (START SENSOR) and Q201 (END SENSOR) with Insulation Tape or enter the service mode to activate Sensor Inhibition automatically.

Note: Avoid playing, rewinding or fast forwarding the tape to its beginning or end, because both Tape End Sensors are not active.

How to Enter the Service Mode

1. Turn power on.
2. Use service remote control unit and press DISC MENU key. (See page 1-8-1)
3. When entering the service mode, one of the number (1, 2 or 4) will display at corners of the screen.
4. During the service mode, electrical adjustment mode can be selected by remote control key. (Service remote control unit).

   Details are as follows.

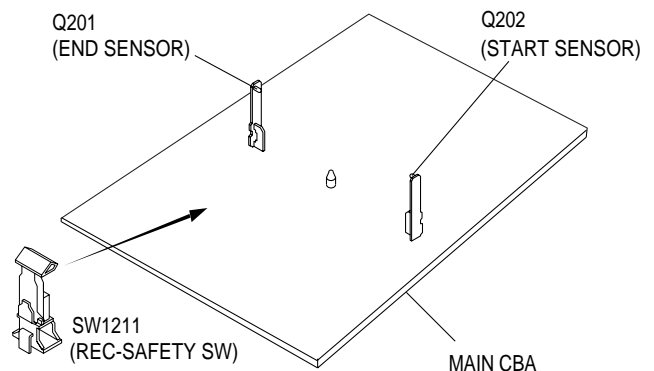| Key	Adjustment Mode
MENU	Picture adjustment mode: Press the MENU button to change from BRT (Bright), *CNT (Contrast), *COL (Color), *TNT(Tint) and *V-T. Press CH UP/DOWN key to display Initial Value. *Marked items are not necessary to adjust normally.
0	C-Trap adjustment mode: See adjustment instructions page 1-8-2.
1	No need to use.
2	H adjustment mode: See adjustment instructions page 1-8-2.
3	No need to use.
4	Auto record mode: Perform recording (15 Sec.)-->Stop-->Rewind (Zero return) automatically.
5	Head switching point adjustment mode: See adjustment instructions page 1-8-5.
6	No need to use.

Key	Adjustment Mode
7	Purity check mode: Shows Red, Green, Blue or White cyclically on the screen each time the "7" key is pressed.
8	H. Shift adjustment mode: See adjustment instructions page 1-8-2.
9	V.size/V. shift adjustment: See adjustment instructions page 1-8-2.
VOL ▼	Cut-off adjustment mode: See adjustment instructions page 1-8-3.
PICTURE	Sub-Brightness adjustment mode: See adjustment instructions page 1-8-4.

Caution: 2

1. The deck mechanism assembly is mounted on the Main CBA directly, and SW1211 (REC-SAFETY SW) is mounted on the Main CBA. When deck mechanism assembly is removed from the Main CBA due to servicing, this switch can not be operated automatically.
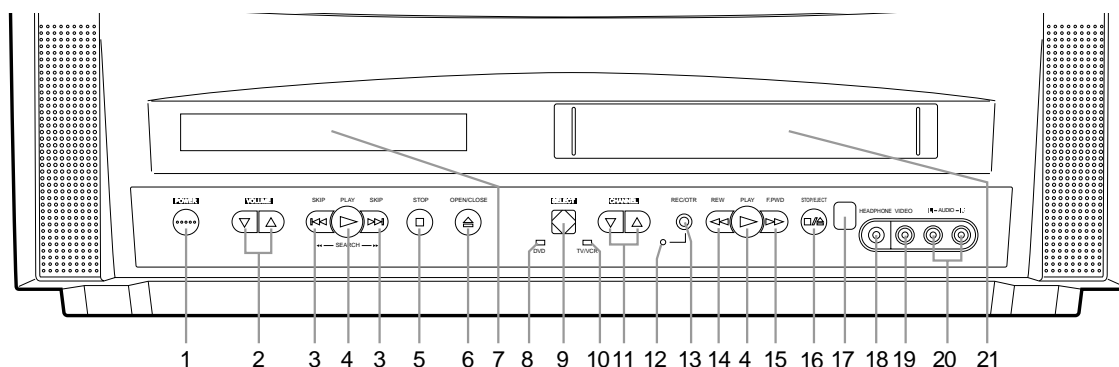
Preparing: 2

1. To eject the tape, press the STOP/EJECT button on the unit (or Remote Control).
2. When you want to record during the Service mode, press the Rec button while depressing SW1211 (REC-SAFETY SW) on the Main CBA.
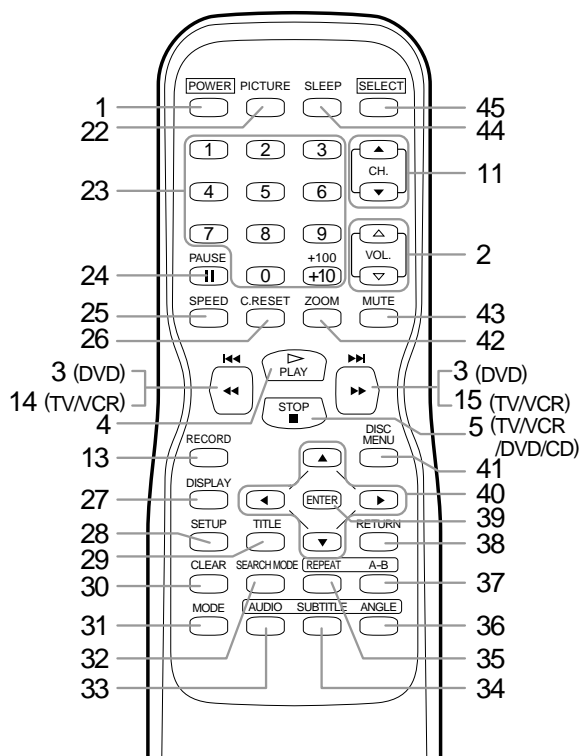
OPERATING CONTROLS AND FUNCTIONS

- TV/DVD/VCR FRONT PANEL - [Fig.1]

- REMOTE CONTROL - [Fig. 2]

1. POWER Button
Press to turn the power on and off.

2. VOLUME △/ ▽ Buttons
Press to control the volume level for the DVD and TV.

3. SKIP Buttons (for DVD)
Press once to skip chapters or tracks to a desired point.
Press and hold to change forward or reverse playback speed.

4. PLAY Button
Starts playback of the disc or tape contents.

5. STOP Button
Front panel
Press to stop the disc motion.
Remote Control
● **DVD mode**
Press to stop the disc motion.
● **TV/VCR mode**
Press to stop the tape motion.

6. OPEN/CLOSE Button
Press to insert discs into or remove them from the tray.

7. Disc loading tray

8. DVD Indicator
Lights on during DVD mode.

9. SELECT Button
Press to change to TV/VCR mode, Front A/V input mode or DVD mode.

10. TV/VCR Indicator
Lights on during TV/VCR mode.

11. CHANNEL ▲/▼ Buttons
Press to select memorized channel.

12. Recording Indicator
Flashes during recording. Lights up in the Stand-by mode for Timer Recording.

13. REC/OTR (RECORD)Button
Press for manual recording. Activates One Touch Recording. (OTR is only during TV/VCR mode.)

14. REW Button (for TV/VCR)
Press to rewind the tape, or to view the picture rapidly in reverse during playback mode. (Rewind Search)

15. FWD Button (for TV/VCR)
Press to rapidly advance the tape, or to view the picture rapidly in forward during playback mode. (Forward Search)

16. STOP/EJECT Button
Press to stop the tape motion. Press in the Stop mode to remove tape from the TV/VCR/DVD.

17. Remote control sensor window

18. HEADPHONE Jack
To connect headphone (not supplied) for personal listening.

19. VIDEO input Jack
Connect to the video output jack of a video camera, VCR, or video game system.
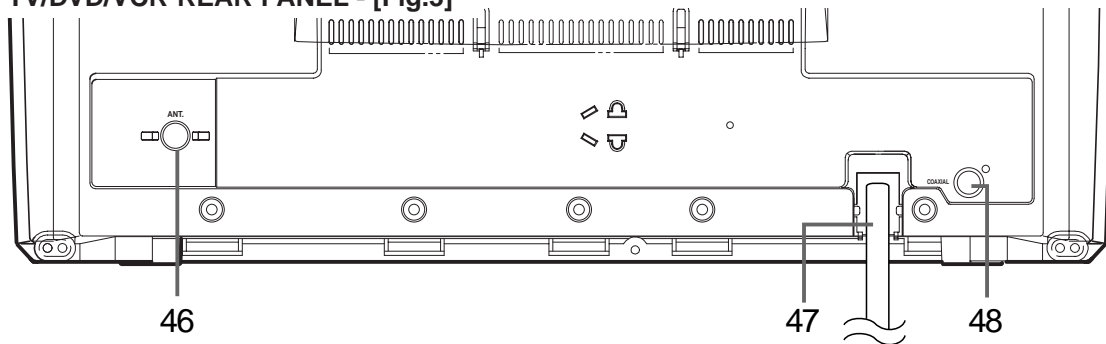
20. AUDIO L/R input Jacks
Connect to the audio output jacks of a video camera, VCR, or video game system.

21. Cassette compartment

22. PICTURE Button
Press to adjust the picture.

- TV/DVD/VCR REAR PANEL - [Fig.3]

46   47   48

23. Number Buttons
   TV Mode:
   Press two digits to directly access the desired channel.
   Remember to press a "0" before a single digit channel.
   +100 Button–
   Press to select cable channels which are equal or greater than number 100.
   DVD Mode:
   Press to enter the desired number.
   +10 Button–
   Press to enter the desired numbers which are equal or greater than number 10.

24. PAUSE Button
   Pauses the current disc or tape operation.

25. SPEED Button
   Press to choose the desired recording speed: SP/SLP.

26. C.RESET Button
   Press to reset counter to 0:00:00.
   Press to cancel a setting of timer program.

27. DISPLAY Button
   TV/VCR Mode:
   Display the counter or the current channel number and current time on the TV screen.
   DVD Mode:
   Displays the current status on the TV screen for checking purposes.

28. SETUP Button
   Press to enter or exit the TV menu or DVD setup mode.

29. TITLE Button
   Displays the title menu.

30. CLEAR Button
   Resets a setting.

31. MODE Button
   Activates program playback or random playback mode.

32. SEARCH MODE Button
   Press to locate a desired point.

33. AUDIO Button
   Press to select a desired audio language or sound mode.

34. SUBTITLE Button
   Press to select a desired subtitle language.

35. REPEAT Button
   Repeats playback of the current disc, title, chapter or track.

36. ANGLE Button (DVD mode)
   Press to change the camera angle to see the sequence being played back from a different angle.

37. A-B REPEAT Button
   Repeats playback of a selected section.

38. RETURN Button
   Returns to the previous operation in the DVD setup mode.

39. ENTER Button
   Press to accept a setting.

40. Arrow Buttons
   TV/VCR Mode:
   Press to select a setting mode from the menu on the TV screen.
   Press to select or adjust from a particular menu.
   DVD Mode:
   Use when making settings while watching the display on a TV screen.

41. DISC MENU Button
   Displays the menus in the DVD.

42. ZOOM Button
   Enlarges part of a DVD-reproduced image.

43. MUTE Button
   Mutes the sound. Press it again to resume sound.

44. SLEEP Button
   Sets the Sleep Timer.

45. SELECT Button
   Press to switch TV/VCR and DVD mode. You can see the mode (TV/VCR or DVD) on the front panel indicator.

46. ANT. in Jack
   Connect to an antenna, cable system, or satellite system.

47. Power cord
   Connect to a standard AC outlet (120V/60Hz).
   NOTE: Remove the power cord from the hook to avoid breaking a wire before you connect to a standard AC outlet.

48. COAXIAL digital audio out Jack
   Connect to the digital input of an external Home theater audio system (Not supplied)

ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note:

"CBA" is abbreviation for "Circuit Board Assembly."

NOTE:

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed.
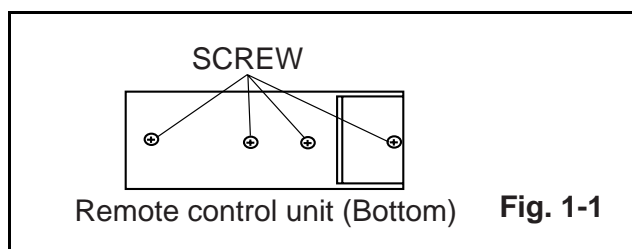Also, do not attempt these adjustments unless the proper equipment is available.

Test Equipment Required

1. NTSC Pattern Generator (Color Bar W/White Window, Red Color, Dot Pattern, Gray Scale, Monoscope, Multi-Burst)

2. AC Milli Voltmeter (RMS)

3. Alignment Tape (FL8A, FL8N), Blank Tape

4. DC Voltmeter

5. Oscilloscope: Dual-trace with 10:1 probe,
     V-Range: 0.001~50V/Div,
     F-Range: DC~AC-60MHz

6. Frequency Counter

7. Plastic Tip Driver

How to make service remote control unit:

1. Prepare normal remote control unit (Part No. NE200UD). Remove 4 screws from the back lid (Fig. 1-1).

SCREW

Remote control unit (Bottom)   **Fig. 1-1**

2. Cut off pin 10 of the remote control microprocessor and short circuit pins 10 and 17 of the microprocessor with a jumper wire

How to Set up the Service mode:

Service Mode:

1. Use the service remote control unit.

2. Turn the power on. (Use main power on the TV unit.)

3. To enter the TV mode, press CH UP or CH DOWN button on the TV unit.

4. Press "DISC MENU" button on the service remote control unit. (Version of micro computer will display on the CRT. (Ex: 057-001)

X-Ray Protection Test

X-Ray protection test should be done when replacing any parts of this chassis.

1. Short test points J551 and J552 (on H.V. CBA).

2. Confirm that the main power turns off.

3. If the main power does not turn off, then replace the following parts (D591, Q591, R592, R593, R594 and IC1201).

4. Perform steps 1 to 3 again.

1. DC 114V (+B) Adjustment

Purpose: To obtain correct operation.

Symptom of Misadjustment: The picture is dark and unit does not operate correctly.

Test point	Adj. Point	Mode	Input
J533 (+B) HEAT SINK (on H.V. CBA) (GND)	VR2601	---	-----
Tape	M. EQ.	Spec.	
---	DC Voltmeter	+114±0.5V DC	

Note: J533(+B), HEAT SINK --- H.V. CBA
,VR2601 --- Power Supply/AV CBA

1. Connect the unit to AC Power Outlet.

2. Connect DC Volt Meter to J533(+B) and HEAT SINK (on H.V. CBA)(GND).

3. Adjust VR2601 so that the voltage of J533(+B) becomes +114±0.5V DC.

2. H Adjustment

Purpose: To get correct horizontal position and size of screen image.

Symptom of Misadjustment: Horizontal position and size of screen image may not be properly displayed.

Test point	Adj. Point	Mode	Input
R583	CH ▲ / ▼ buttons	Video	---
Tape	M. EQ.	Spec.	
---	Frequency Counter	15.734kHz±300Hz	

Note: R583 --- H.V. CBA

1. Connect Frequency Counter to R583.

2. Operate the unit for at least 20 minutes.

3. Enter the Service mode. (See page 1-8-1.) Press "2" button on the remote control unit and select H-ADJ Mode.

4. Press CH ▲ / ▼ buttons on the remote control unit so that the display will change "0" to "7."

5. At this moment, choose display "0" to "7" when the Frequency counter display is closest to 15.734kHz±300Hz.
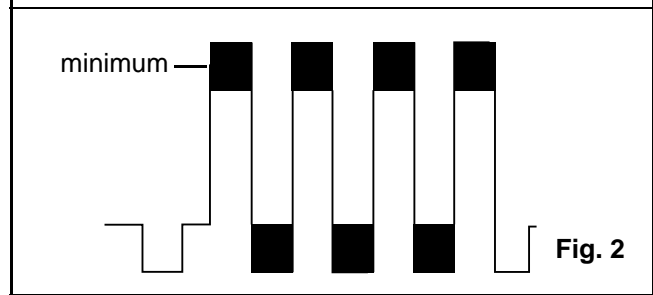
6. Turn the power off and on again.

3. C-Trap Adjustment

Purpose: To get minimum leakage of the color signal carrier.

Symptom of Misadjustment: If C-Trap Adjustment is incorrect, stripes will appear on the screen.

Test point	Adj. Point	Mode	Input
D1304 (Cathode) (B-OUT)	CH ▲ / ▼ buttons	---	Color Bar
Tape	M. EQ.	Spec.	
---	Oscilloscope Pattern Generator	---	
Figure			

Fig. 2

Note: D1304 (Cathode) (B-Out)--- Main CBA

1. Connect Oscilloscope to D1304 (Cathode).

2. Input a color bar signal from RF input. Enter the Service mode. (See page 1-8-1.)

3. Press "0" button on the remote control unit and select C-TRAP Mode.

4. Press CH ▲ / ▼ buttons on the remote control unit so that the carrier leakage B-Out (3.58MHz) value becomes minimum on the oscilloscope.

5. Turn the power off and on again.

4. V. Size Adjustment

Purpose: To obtain correct vertical height of screen image.

Symptom of Misadjustment: If V. Size is incorrect, vertical height of image on the screen may not be properly displayed.

Test point	Adj. Point	Mode	Input
---	CH ▲ / ▼ buttons	---	Monoscope
Tape	M. EQ.	Spec.	
---	Pattern Generator	90±5%	

1. Enter the Service mode. (See page 1-8-1.)
   Press "9" button on the remote control unit and select V-S Mode. (Press "9" button then display will change to V-P and V-S).

2. Input monoscope pattern.

3. Press CH ▲ / ▼ buttons on the remote control unit so that the monoscope pattern is 90±5% of display size and the circle is round.

5. V. Shift Adjustment

Purpose: To obtain correct vertical position of screen image.

Symptom of Misadjustment: If V. position is incorrect, vertical position of image on the screen may not be properly displayed.

Test point	Adj. Point	Mode	Input
---	CH ▲ / ▼ buttons	---	Monoscope
Tape	M. EQ.	Spec.	
---	Pattern Generator	---	

1. Enter the Service mode. (See page 1-8-1.)
   Press "9" button on the remote control unit and select V-P Mode. (Press "9" button then display will change to V-P and V-S).

2. Input monoscope pattern.

3. Press CH ▲ / ▼ buttons on the remote control unit so that the top and bottom of the monoscope pattern are equal to each other.

6. H. Shift Adjustment

Purpose: To obtain correct horizontal position and size of screen image.

Symptom of Misadjustment: Horizontal position and size of screen image may not be properly displayed.

Test point	Adj. Point	Mode	Input
---	CH ▲ / ▼ buttons	---	Monoscope
Tape	M. EQ.	Spec.	
---	Pattern Generator	---	

1. Enter the Service mode. (See page 1-8-1.)
   Press "8" button on the remote control unit and select H-P Mode.

2. Input monoscope pattern.

3. Press CH ▲ / ▼ buttons on the remote control unit so that the left and right side of the monoscope pattern are equal to each other.

4. Turn the power off and on again.

7. Cut-off Adjustment

Purpose: To adjust the beam current of R, G, B, and screen voltage.

Symptom of Misadjustment: White color may be reddish, greenish or bluish.

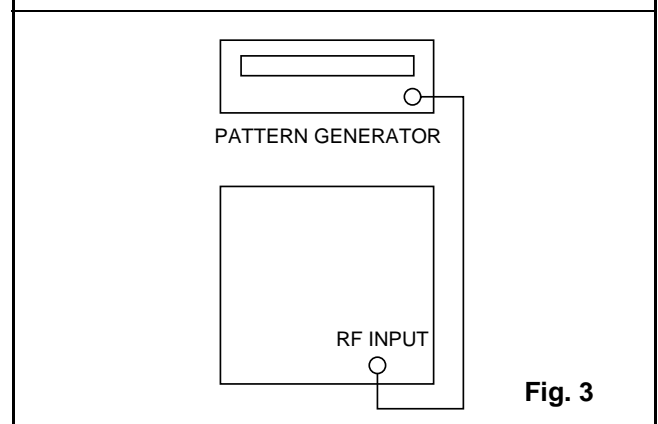| Test point	Adj. Point	Mode	Input
---	Screen-Control	Ext.	Black Raster / White Raster
Tape	M. EQ.	Spec.	
---	Pattern Generator	See Reference Notes below	
Figure			

PATTERN GENERATOR

RF INPUT

Fig. 3

Notes: Screen Control FBT --- H.V. CBA
　　　　 FBT= Fly Back Transformer
　　　　 Use the Remote Control Unit

1. Degauss the CRT and allow CRT to operate for 20 minutes before starting the alignment.
2. Input the Black raster signal from EXT. input.
3. Enter the Service mode. (See page 1-8-1.)
4. Press the "VOL ▼" button.
   (Press "VOL ▼" then display will change CUT OFF/DRIVE, 7Fh adjustment and DVD-KEY).
5. Choose CUT OFF/DRIVE mode then press "1" button. This adjustment mode is CUT OFF (R).
6. Increase the screen control so that the horizontal line just appears on the CRT.
7. Press the "CH ▲ / ▼" button until the horizontal line becomes white.
8. Choose CUT OFF/DRIVE mode then press "2" button. This adjustment mode is CUT OFF (G). Press "CH ▲ / ▼" until the horizontal line becomes white.
9. Choose CUT OFF/DRIVE mode then press "3" button. This adjustment mode is CUT OFF (B). Press "CH ▲ / ▼" until the horizontal line becomes white.
10. Choose CUT OFF/DRIVE mode then press "4" button.
11. Input the White Raster Signal from Video In.
12. Adjust the RED DRIVE as needed with the CH ▲ / ▼ buttons to get the following value, X= 286, Y= 294.
13. Choose CUT OFF/DRIVE mode then press "5." Adjust the BLUE DRIVE as needed with the CH ▲ / ▼ buttons to get the following value, X= 286, Y= 294.
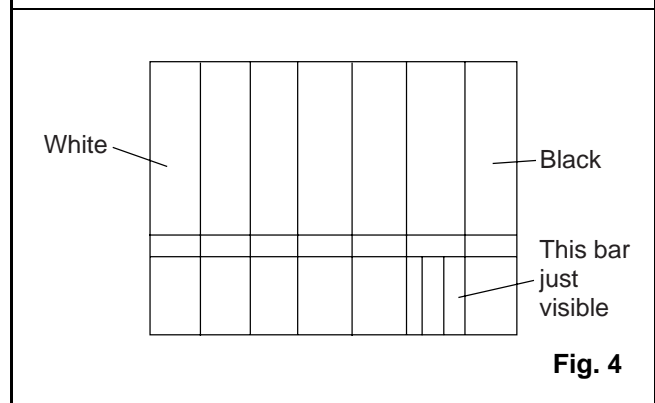14. Turn the power off and on again.

8. Sub-Brightness Adjustment

Purpose: To get proper brightness.

Symptom of Misadjustment: If Sub-Brightness is incorrect, proper brightness cannot be obtained by adjusting the Brightness Control.

Test point	Adj. Point	Mode	Input
---	CH ▲ / ▼ buttons	---	SMPTE 7.5IRE
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below	
Figure			

Fig. 4

Note: SMPTE Setup level --- 7.5 IRE

1. Enter the Service Mode. (See page 1-8-1.) Then input SMPTE signal from RF input.
2. Press PICTURE button. (Press PICTURE button then display will change BRT, CNT, COL, TNT, and V-T). Select BRT and press CH ▲ / ▼ buttons so that the bar is just visible (See above figure).
3. Turn the power off and on again.

9. Focus Adjustment

Purpose: Set the optimum Focus.

Symptom of Misadjustment: If Focus Adjustment is incorrect, blurred images are shown on the display.

Test point	Adj. Point	Mode	Input
---	Focus Control	---	Monoscope
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below.	

Note: Focus VR (FBT) --- H.V. CBA

     FBT= Fly Back Transformer

1. Operate the unit more than 30 minutes.
2. Face the unit to the East and degauss the CRT using a Degaussing Coil.
3. Input the monoscope pattern.
4. Adjust the Focus Control on the FBT to obtain clear picture.

10. SIF Adjustment

Purpose: To set the SIF (Sound Intermediate Frequency).

Symptom of Misadjustment: Audio may not sound correctly.

Note: This adjustment automatically done by the chrominance IC (IC1301).

11. CCS Text Box Location

Note: This adjustment automatically done by the microcomputer.

12. Head Switching Position Adjustment

Purpose: Determine the Head Switching Point during Playback.

Symptom of Misadjustment: May cause Head Switching Noise or Vertical Jitter in the picture.

Note: Unit reads Head Switching Position automatically and displays it on the screen (Upper Left Corner).

1. Playback test tape (FL8A, FL8N).
2. Enter the Service Mode. (See page 1-8-1.) Then press the number 5 button on the remote control unit.
3. The Head Switching position will display on the screen; if adjustment is necessary follow step 4. 6.5H(412.7µs) is preferable.

4. Press "CH ▲" or "CH ▼" button on the remote control unit if necessary. The value will be changed in 0.5H steps up or down. Adjustable range is up to 9.5H. If the value is beyond adjustable range, the display will change as:
       Lower out of range: 0.0H
       Upper out of range: -.-H
5. Turn the power off and on again.

The following 2 adjustments normally are not attempted in the field. They should be done only when replacing the CRT then adjust as a preparation.
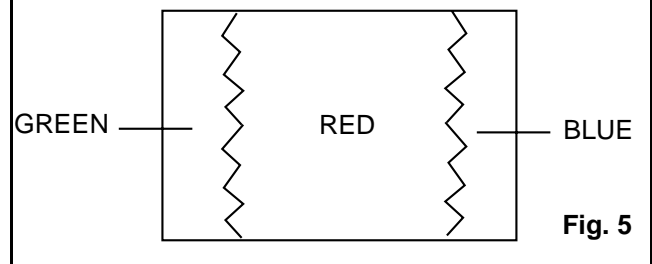
13. Purity Adjustment

Purpose: To obtain pure color.

Symptom of Misadjustment: If Color Purity Adjustment is incorrect, large areas of color may not be properly displayed.

Test point	Adj. Point	Mode	Input
---	Deflection Yoke Purity Magnet	---	Red Color
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below.	
Figure			

GREEN ------ RED ------ BLUE

Fig. 5

1. Set the unit facing east.
2. Operate the unit for over 30 minutes before adjusting.
3. Fully degauss the unit using an external degaussing coil.
4. Set the unit to the AUX Mode which is located before CH2 then input a red raster from video in.
5. Loosen the screw on the Deflection Yoke Clamper and pull the Deflection Yoke back away from the screen. (See Fig. 6.)
6. Loosen the Ring Lock and adjust the Purity Magnets so that a red field is obtained at the center of the screen. Tighten Ring Lock. (See Fig. 5,6.)
7. Slowly push the Deflection Yoke toward the bell of the CRT and set it where a uniform red field is obtained.
8. Tighten the clamp screw on the Deflection Yoke.

14. Convergence Adjustment

Purpose: To obtain proper convergence of red, green and blue beams.

Symptom of Misadjustment: If Convergence Adjustment is incorrect, the edge of white letters may have color edges.

Test point	Adj. Point	Mode	Input
---	C.P. Magnet (RB), C.P. Magnet (RB-G), Deflection Yoke	---	Dot Pattern or Crosshatch
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below.	
Figure			

Fig. 6

C.P. MAGNET (RB)

Fig. 7

C.P. MAGNET (RB-G)

Fig. 8

5. Remove the DY Wedges and slightly tilt the Deflection Yoke horizontally and vertically to obtain the best overall convergence.

6. Fix the Deflection Yoke by carefully inserting the DY Wedges between CRT and Deflection Yoke.
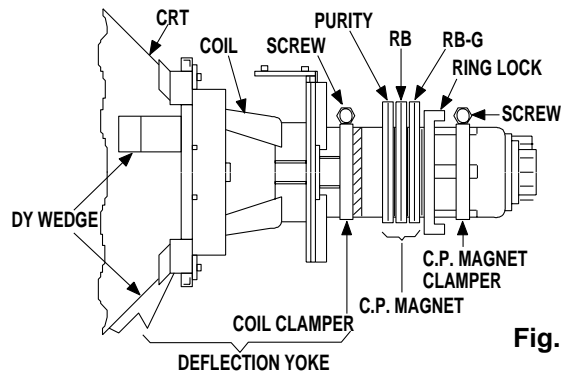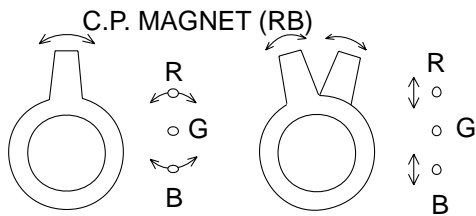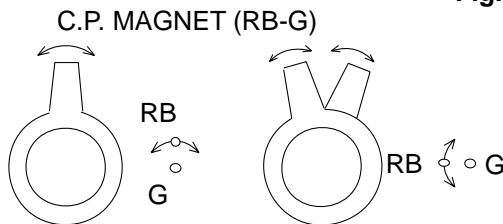
1. Set the unit to the AUX Mode which is located before CH2, then input a Dot or crosshatch pattern.

2. Loosen the Ring Lock and align red with blue dots or Crosshatch at the center of the screen by rotating (RB) C.P. Magnets. (See Fig. 7.)

3. Align red / blue with green dots at the center of the screen by rotating (RB-G) C.P. Magnet. (See Fig. 8.)

4. Fix the C.P. Magnets by tightening the Ring Lock.

FIRMWARE RENEWAL MODE

1. Turn the power on and remove the disc on the tray.
2. To put the DVD player into version up mode, press [9], [8], [7], [6], and [SEARCH MODE] buttons on the remote control unit in that order. The tray will open automatically.
   Fig. a appears on the screen.

```
F/W Version Up Mode

   Please insert a DISC
         for F/W Version Up.




                         EXIT: SELECT
```
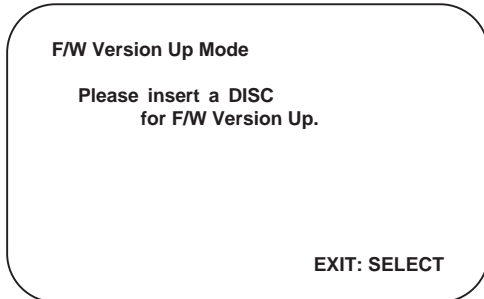
Fig. a Version Up Mode Screen

The DVD player can also enter the version up mode with the tray open. In this case, Fig. a will be shown on the screen while the tray is open.

3. Load the disc for version up.
4. The DVD player enters the F/W version up mode automatically. Fig. b appears on the screen.
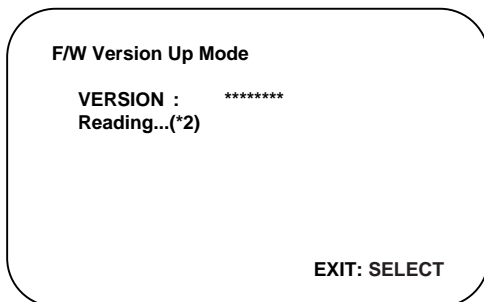
```
F/W Version Up Mode

   VERSION :      ********
   Reading...(*2)



                         EXIT: SELECT
```

Fig. b Programming Mode Screen

The appearance shown in (*2) of Fig. b is described as follows:

No.	Appearance	State
1	Reading...	Sending files into the memory
2	Erasing...	Erasing previous version data
3	Programming...	Writing new version data

5. After programming is finished, the tray opens automatically. Fig. c appears on the screen.

```
F/W Version Up Mode

   VERSION :      ********
   Completed
   SUM : 7abc (*3)




```
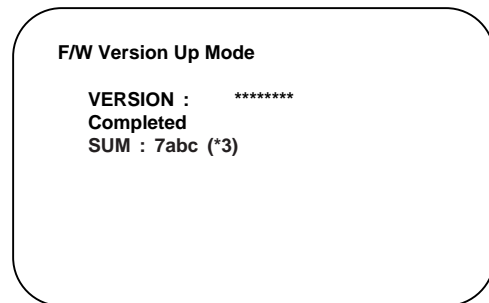
Fig. c Completed Program Mode Screen

At this time, no buttons are available.

6. Unplug the AC cord from the AC outlet. Then plug it again.
7. Turn the power on by pressing the power button and the tray will close.
8. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order.
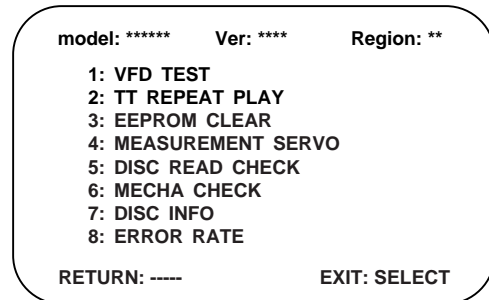   Fig. d appears on the screen.

```
model: ******     Ver: ****      Region: **

   1: VFD  TEST
   2: TT  REPEAT  PLAY
   3: EEPROM  CLEAR
   4: MEASUREMENT  SERVO
   5: DISC  READ  CHECK
   6: MECHA  CHECK
   7: DISC  INFO
   8: ERROR  RATE

RETURN: -----            EXIT: SELECT
```

Fig. d

9. Press [3] button on the remote control unit.
   Fig. e appears on the screen.

```
model: ******     Ver: ****      Region: **

TEST 3: EEPROM CLEAR
EEPROM CLEAR: OK




RETURN: -----            EXIT: SELECT
```
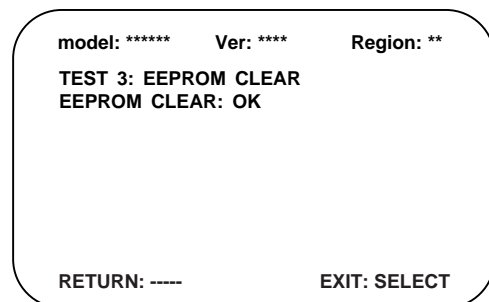
Fig. e

10. To finish this mode, press [POWER] button.