

# ELECTRICAL ADJUSTMENT INSTRUCTIONS

**General Note: “CBA” is abbreviation for “Circuit Board Assembly.”**

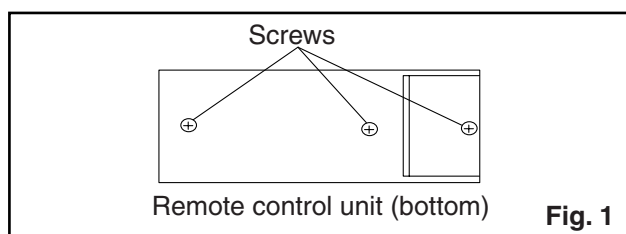
**Note:** Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

## 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: 0.001~50 V/Div, F-Range: DC~AC-60 MHz
6. Frequency Counter
7. Plastic Tip Driver
8. Color Analyzer

## How to make service remote control unit:

1. Prepare normal remote control unit (Part No. NE204UD or NE209UD). Remove 4 screws from the back lid (Fig. 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 enter 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. ▲ / ▼] buttons 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: BA4-0.16)

## X-Ray Protection Test

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

1. Short both ends of R2592 (on Sub CBA).
2. Confirm that the main power turns off.
3. If the main power does not turn off, then replace the following parts (D2591, Q2591, R2592, R2593, R2594 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
TP2501(+B) TP2504(GND)	VR1601	---	---
Tape	M. EQ.	Spec.	
---	DC Voltmeter	+114±1.0 V DC	

**Note:** TP2501(+B), TP2504(GND) --- Sub CBA, VR1601 --- Main CBA

1. Connect the unit to AC Power Outlet.
2. Connect DC Volt Meter to TP2501(+B) and TP2504(GND).
3. Adjust VR1601 so that the voltage of TP2501(+B) becomes +114±1.0 V DC.

## 2. Setting for CONTRAST, COLOR, TINT, V-TINT and SHARP Data Values

### General

1. Enter the Service mode. (See page 1-7-1.)
2. Press [PICTURE] button on the service remote control unit. Display changes “BRT,” “CNT,” “COL,” “TNT,” “V-T,” and “SHP” cyclically when [PICTURE] button is pressed.

### CONTRAST (CNT)

1. Press [PICTURE] button on the service remote control unit. Then select “CONTRAST (CNT)” display.
2. Press [CH. ▲ / ▼] buttons on the service remote control unit so that the value of “CONTRAST (CNT)” becomes 80.

### COLOR (COL)

1. Press [PICTURE] button on the service remote control unit. Then select “COLOR (COL)” display.
2. Press [CH. ▲ / ▼] buttons on the service remote control unit so that the value of “COLOR (COL)” becomes 58.

### TINT (TNT)

1. Press [PICTURE] button on the service remote control unit. Then select “TINT (TNT)” display.
2. Press [CH. ▲ / ▼] buttons on the service remote control unit so that the value of “TINT (TNT)” becomes 45.

### V-TINT (V-T)

1. Press [PICTURE] button on the service remote control unit. Then select “V-TINT (V-T)” display.
2. Press [CH. ▲ / ▼] buttons on the service remote control unit so that the value of “V-TINT (V-T)” becomes 49.

### SHARP (SHP)

1. Press [PICTURE] button on the service remote control unit. Then select “SHARP (SHP)” display.
2. Press [CH. ▲ / ▼] buttons on the service remote control unit so that the value of “SHARP (SHP)” becomes 46.

**Note:** **BRIGHT** data value does not need to be adjusted because this setting is performed in other setting.

## 3. H f<sub>0</sub> 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
R2583	[CH. ▲ / ▼] buttons	Video	---
Tape	M. EQ.	Spec.	
---	Frequency Counter	15.734 kHz±300 Hz	

**Note:** R2583 --- Sub CBA

1. Connect frequency counter to R2583.
2. Operate the unit for at least 20 minutes.
3. Enter the Service mode. (See page 1-7-1.) 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 15.734 kHz ± 300 Hz.

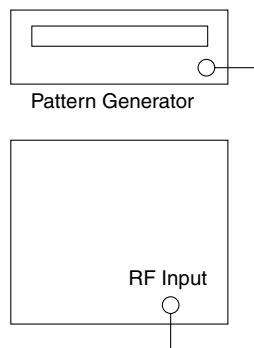
## 4. Cut-off Adjustment

**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 [CH. ▲ / ▼] buttons	RF	Black Raster
Tape	M. EQ.	Spec.	
---	Pattern Generator	See Reference Notes below.	

**Figure**



**Fig. 2**

**Notes:** Screen Control --- FBT (Sub CBA),  
FBT = Fly Back Transformer,  
Use the Remote Control Unit.

1. Degauss the CRT and allow the unit to operate for 20 minutes before starting the alignment.
2. Input the Black raster signal from RF input.
3. Enter the Service mode. (See page 1-7-1.)
4. Press the [VOL ▼] button.  
(Press [VOL ▼] button then display will change "C/D", "7F" and Initial Setting.)
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. ▲ / ▼] buttons 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. ▲ / ▼] buttons 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. ▲ / ▼] buttons until the horizontal line becomes white.

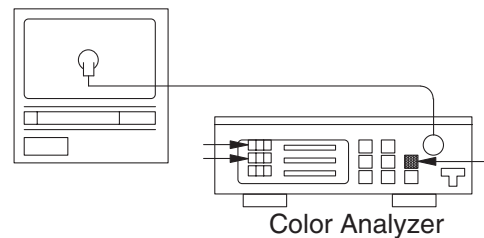
## 5. White Balance Adjustment

**Purpose:** To mix red, green and blue beams correctly for pure white.

**Symptom of Misadjustment:** White becomes bluish or reddish.

Test Point	Adj. Point	Mode	Input
Screen	[CH. ▲ / ▼] buttons	RF	White Raster (APL 100%)
Tape	M. EQ.	Spec.	
---	Pattern Generator, Color analyzer	See below	

**Figure**



**Fig. 3**

**Note:** Use service remote control unit

1. Operate the unit more than 20 minutes.
2. Face the unit to the east. Degauss the CRT using a degaussing coil.
3. Input the White Raster (APL 100%).
4. Set the color analyzer to the CHROMA mode and after zero point calibration, bring the optical receptor to the center on the tube surface (CRT).
5. Enter the Service mode. Press [VOL ▼] button on the service remote control unit and select "C/D" mode. (Display changes "C/D", "7F" and Initial Setting cyclically when [VOL ▼] button is pressed.)
6. Press [4] button on the service remote control unit for Red adjustment. Press [5] button on the service remote control unit for Blue adjustment.
7. In each color mode, press [CH. ▲ / ▼] buttons to adjust the values of color.
8. Adjust Red and Blue color so that the temperature becomes 9200K (x: 286 / y: 294) ±3%.
9. At this time, re-check that horizontal line is white. If not, re-adjust Cut-off Adjustment until the horizontal line becomes pure white.
10. Turn off and on again to return to normal mode. Receive APL 100% white signal and confirm that Chroma temperatures become 9200K (x: 286 / y: 294) ±3%.

**Note:** Confirm that Cut Off Adj. is correct after this adjustment, and attempt Cut Off Adj. if needed.

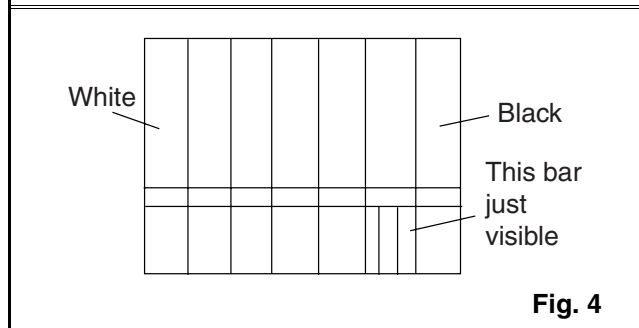
## 6. Sub-Brightness Adjustment

**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
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
---	Pattern Generator	See below	

**Figure**



**Note:** SMPTE Setup level --- 7.5 IRE

1. Enter the Service mode. (See page 1-7-1.) Then input SMPTE signal from RF input.
2. Press [PICTURE] button. (Press [PICTURE] button then display will change BRT, CNT, COL, TNT, V-T, and SHP). Select BRT and press [CH. ▲ / ▼] buttons so that the bar is just visible (See above figure).

## 7. 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
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
---	Pattern Generator	See below	

**Note:** Focus VR --- FBT (Sub 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 a clear picture.

## 8. H. Position Adjustment

**Purpose:** To obtain correct horizontal position of screen image.

**Symptom of Misadjustment:** H. position may not be properly displayed.

Test Point	Adj. Point	Mode	Input
---	[CH. ▲ / ▼] buttons	---	Monoscope
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
---	Pattern Generator	---	

1. Enter the Service mode. (See page 1-7-1.) 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.

## 9. 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 1-7-1.) 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.

## 10. 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 1-7-1.) 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.

## 11. Head Switching Position Adjustment

**Purpose:** Determine the Head Switching Position 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 1-7-1.) 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

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.

## 12. 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

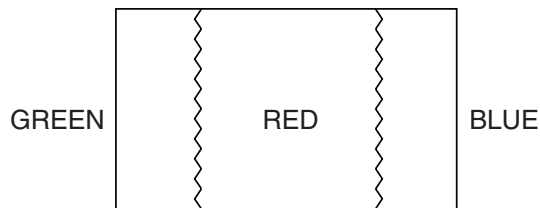


Fig. 5

\* This becomes RED COLOR if the [7] button is pressed while in service mode.

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.

## 13. 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

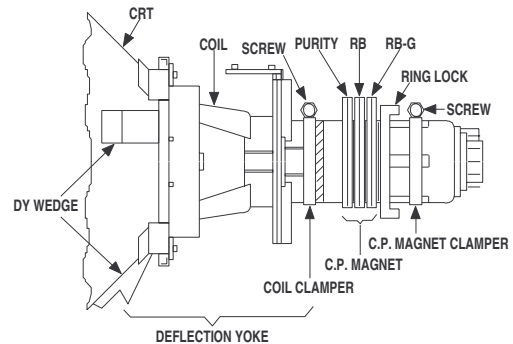


Fig. 6

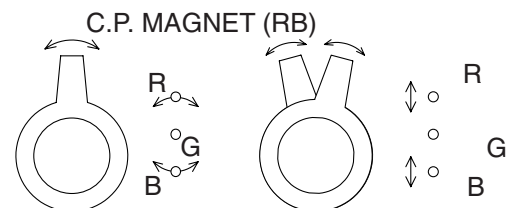


Fig. 7

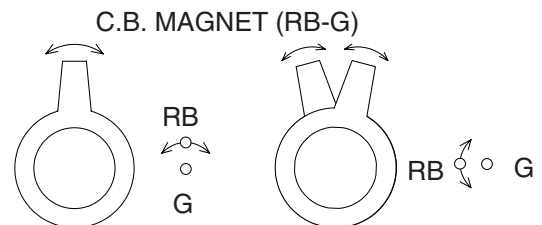


Fig. 8

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.
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.

# HOW TO INITIALIZE THE TV/DVD/VCR

To put the program back at the factory-default, initialize the TV/DVD/VCR as the following procedure.

## < DVD Section >

1. Turn the power on and press [SELECT] button on the remote control unit to put the TV/DVD/VCR into DVD mode.
2. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order. Fig. a appears on the screen.

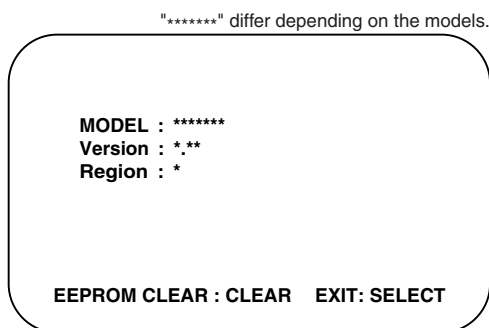


Fig. a

3. Press [CLEAR] button on the remote control unit. Fig. b appears on the screen.

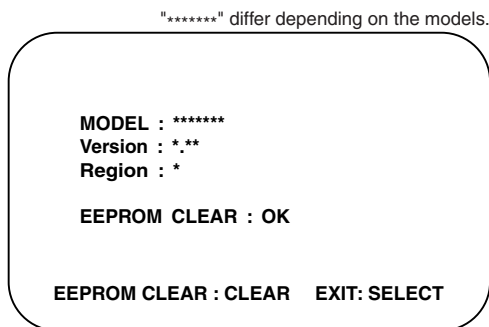


Fig. b

When "OK" appears on the screen, the factory default will be set.

4. To exit this mode, press [CH. ▲ / ▼] or [SELECT] button to go to TV mode, or press [POWER] button to turn the power off.

## < TV/VCR Section >

1. Use the service remote control unit.
2. Turn the power on. (Use main power on the TV unit.)
3. Press [DISC MENU] button on the service remote control unit to enter the Service mode. (Refer to "How to enter the Service mode" on page 1-7-1.)
4. Press [VOL ▼] button on the service remote control unit twice, and confirm that OSD indication is "7F = FF." If needed, set it to become "7F = FF" by pressing [CH. ▲ / ▼] buttons on the service remote control unit.
5. Confirm that OSD indication on the four corners on TV screen changes from on and off light indication to red by pressing a [DISPLAY] button. (It is necessary for one or two seconds.)
6. Turn the power off by pressing main power button on the TV unit, and unplug the AC cord from the AC outlet.



# FIRMWARE RENEWAL MODE

1. Turn the power on and press [SELECT] button on the remote control unit to put the TV/DVD/VCR into DVD mode. Then remove the disc on the tray. (It is possible to move to F/W version up mode only when the TV/DVD/VCR is in DVD mode with the tray open.)
2. To put the TV/DVD/VCR into F/W version up mode, press [9], [8], [7], [6], and [MODE] buttons on the remote control unit in that order. Fig. a appears on the screen.

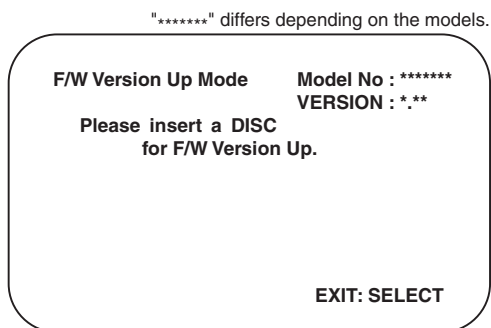


Fig. a Version Up Mode Screen

The TV/DVD/VCR 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 TV/DVD/VCR enters the F/W version up mode automatically. Fig. b appears on the screen. If you enter the F/W for different models, "Disc Error" will appear on the screen, then the tray will open automatically.

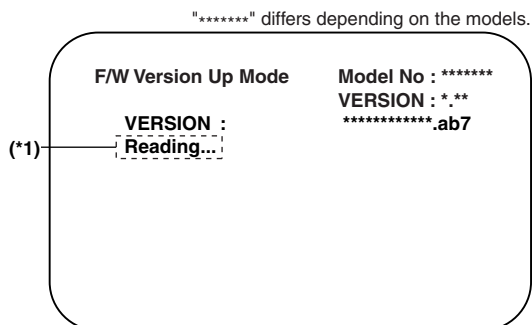


Fig. b Programming Mode Screen

The appearance shown in (\*1) 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 and the checksum will be shown in (\*2) of Fig. c.

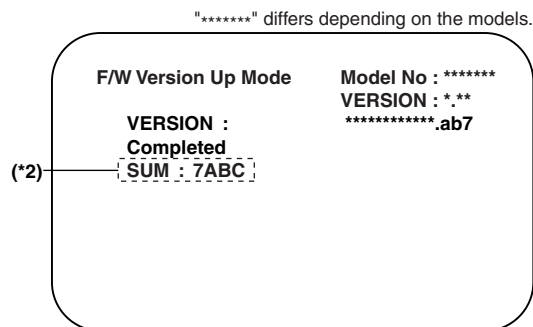


Fig. c Completed Program Mode Screen

At this time, no button is available.

6. Remove the disc on the tray.
7. Press [SELECT] button on the remote control unit to go to TV mode, or press [POWER] button on the unit to turn the power off.
8. Press [SELECT] button on the remote control unit to put the TV/DVD/VCR into DVD mode again.
9. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order. Fig. d appears on the screen.

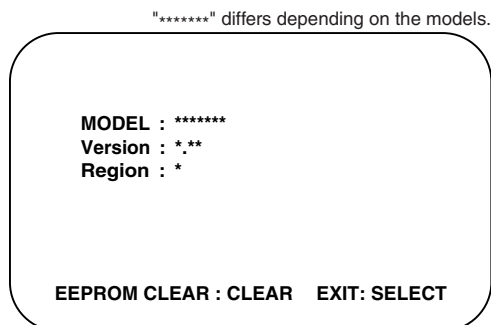


Fig. d

10. Press [CLEAR] button on the remote control unit. Fig. e appears on the screen.

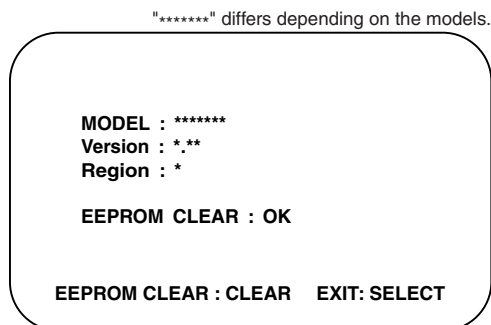


Fig. e

When "OK" appears on the screen, the factory default will be set. Then the firmware renewal mode is complete.

11. To exit this mode, press [CH. ▲ / ▼] or [SELECT] button to go to TV mode, or press [POWER] button to turn the power off.