

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).

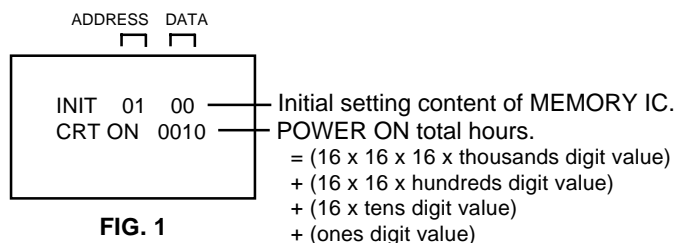
Set Condition	Set Key	Remocon Key	Standard Time	Operations
TV mode	VOL. DOWN (Minimum)	0	2 sec.	Reset the user setting items (PICTURE, VOLUME, LANGUAGE and NICAM AUTO/OFF) to the initial state for delivery.
TV mode	VOL. DOWN (Minimum)	1	2 sec.	Initialization of the factory on TV. NOTE: Do not use this 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.
DVD mode (No disc)	VOL. DOWN (Minimum)	4	2 sec.	Initialization of the factory on DVD. NOTE: Do not use this for the normal servicing. The function will only work without the setting of DVD disc at DVD mode.
TV mode	VOL. DOWN (Minimum)	6	2 sec.	POWER ON total hours are displayed on the screen. Refer to the "CONFIRMATION OF HOURS USED" Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
ALL mode	VOL. DOWN (Minimum)	9	2 sec.	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).
DVD mode (No disc)	STOP	7	3 sec.	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.
DVD mode (Stop)	STOP	9	3 sec.	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 seconds.
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 to set data for after position INI 16 due to the adjustment value.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	---	00	01	02	36	B0	82	4E	F6	03	FF	0C	13	01	00	08
10	50	00	00	00	50	22	C3	---	---	---	---	---	---	---	---	---

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 2 seconds. ADDRESS and DATA should appear as FIG 1.

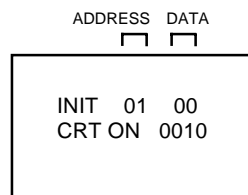


FIG. 1

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 2 seconds.
 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 with a heat sink, apply 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

On-Screen Display Adjustment

1. Set the volume level to minimum.
2. Press the VOL. DOWN button on the set and the channel button (9) on the remote control for more than 2 seconds to display adjustment mode on the screen as shown in Fig. 1-1.

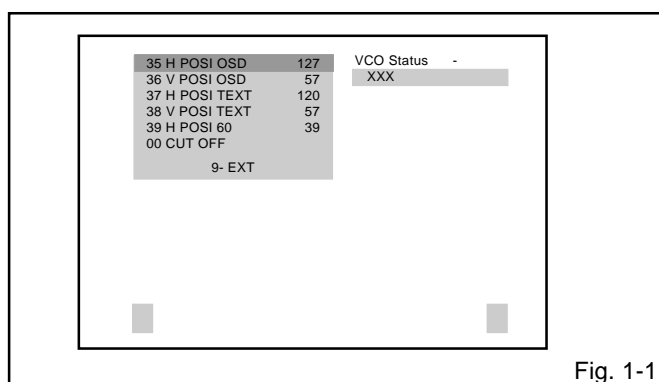


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button (0-9) 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
00	CUT OFF	20	TINT
01	RF AGC	21	SHARP
02	AGC GAIN	22	CONTRAST CENT
03	R DRIVE	23	CONTRAST MAX
04	R CUT OFF	24	CONTRAST MIN
05	G DRIVE	25	COLOR CENT
06	G CUT OFF	26	COLOR MAX
07	B DRIVE	27	COLOR MIN
08	H POSI 50	28	M R CUT OFF
09	V POSI 50	29	M G CUT OFF
10	V POSI 60	30	M B CUT OFF
11	V SIZE 50	31	CVBS OUT
12	V SIZE 60	32	APR THR
13	VCO COARSE	33	BELL FILTER
14	VCO FINE	34	BANDPASS
15	---	35	H POSI OSD
16	---	36	V POSI OSD
17	BRIGHT CENT	37	H POSI TXT
18	BRIGHT MAX	38	V POSI TXT
19	BRIGHT MIN	39	H POSI 60

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Place the set in AV MODE without signal.
2. Using the remote control, set the brightness and contrast to normal position.
3. Connect the digital voltmeter to **TP402**.
4. Adjust the **VR3801** until the digital voltmeter is $114 \pm 0.5V$.

2-2: VCO

1. Place the set in Aging Test for more than 10 minutes.
2. Connect the oscillator (38.9MHz) to **TP101**.
3. Activate the adjustment mode display of Fig. 1-1 and press the channel button (13) on the remote control to select "VCO COARSE".
4. Press the LEFT/RIGHT button on the remote control until the "OK" appear on the screen. If the "OK" is not displayed, select the "-" side on the changed from "+" to "-".
5. Press the CH UP button once to set to "VCO FINE" mode.
6. Press the LEFT/RIGHT button on the remote control to select the 6 step down point from the upper limit on the "OK".
(Example: In case of the "OK" point 41, select 35.)

2-3: RF AGC

1. Receive the UHF (63dB).
2. Place the set in 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 (01) on the remote control to select "RF AGC".
5. Press the LEFT/RIGHT button on the remote control until the digital voltmeter is $2.5 \pm 0.05V$.

2-4: FOCUS

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

ELECTRICAL ADJUSTMENTS

2-5: HORIZONTAL POSITION

1. Receive the monoscope pattern 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 **(08)** on the remote control to select "H POSI 50".
4. Press the LEFT/RIGHT button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.
5. Receive the cross hatch signal of NTSC. (Audio Video Input)
6. Press the AV button on the remote control to set to the AV mode.
7. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(39)** on the remote control to select "H POSI 60".
8. Press the LEFT/RIGHT button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-6: VERTICAL POSITION

NOTE: Adjust after performing adjustments in section 2-5.

1. Receive the monoscope pattern 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 **(09)** on the remote control to select "V POSI 50".
4. Check if the step No. V POSI 50 is "10".
5. Adjust the **VR402** until the horizontal line becomes fit to notch of the shadow mask.
(Refer to **Fig. 2-1**)
6. Receive the cross hatch signal of NTSC. (Audio Video Input)
7. Press the AV button on the remote control to set to the AV mode.
8. Using the remote control, set the brightness and contrast to normal position.
9. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(10)** on the remote control to select "V POSI 60".
10. Check if the step No. V POSI 50 is "05".

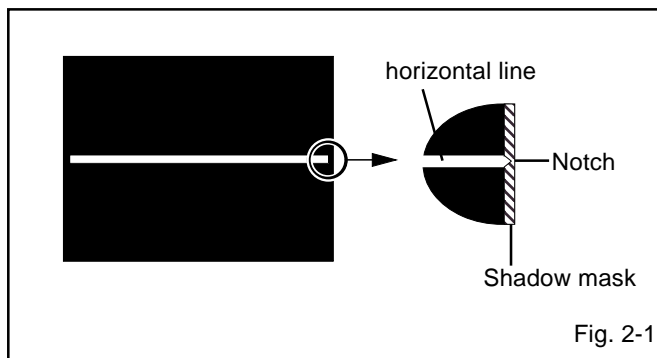


Fig. 2-1

2-7: VERTICAL SIZE

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

1. Receive the monoscope pattern 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 **(11)** on the remote control to select "V SIZE 50".
4. Adjust by using the LEFT/RIGHT button on the remote control so that 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.
6. Receive the cross hatch signal of NTSC. (Audio Video Input)
7. Press the AV button on the remote control to set to the AV mode.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(12)** on the remote control to select "V SIZE 60".
9. Adjust by using the LEFT/RIGHT button on the remote control so that the Up/Down OVER SCAN Quantity becomes equal to the Right/Left OVER SCAN Quantity.
10. 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. Adjust the **VR401** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-9: HORIZONTAL POSITION OSD

1. Using the remote control, set the brightness and contrast to normal position.
2. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(35)** on the remote control to select "H POSI OSD".
3. Press the RIGHT/LEFT button on the remote control until the difference of A and B becomes minimum.
(Refer to **Fig. 2-2**)

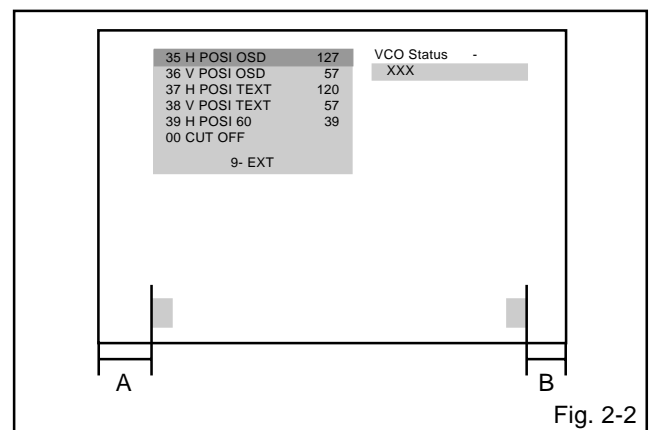


Fig. 2-2

ELECTRICAL ADJUSTMENTS

2-10: CUT OFF

1. Place the set in AV MODE without signal.
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set in Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(00)** on the remote control to select "CUT OFF".
5. Adjust the **Screen Volume** until a dim raster is obtained.

2-11: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set in Aging Test for more than 15 minutes.
2. Receive the gray scale pattern from the Pattern Generator with Burst On.
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 **(03)** on the remote control to select "R DRIVE".
5. Press the CH. UP/DOWN button on the remote control to select the "R DRIVE", "G DRIVE", "M R CUT OFF" or "M G CUT OFF".
6. Adjust the LEFT/RIGHT button on the remote control to whiten the R DRIVE, G DRIVE, M R CUT OFF, and M G CUT OFF at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is achieved.

2-12: BRIGHT CENT

1. Receive the PAL black 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 **(17)** on the remote control to select "BRIGHT CENT".
4. Press the LEFT/RIGHT button on the remote control until the screen begin to shine.
5. Receive the PAL black pattern*. (Audio Video Input)
6. Press the AV button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.
7. Press the 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 **(17)** on the remote control to select "BRIGHT CENT".
9. Press the LEFT/RIGHT button on the remote control to set the same step numbers as the AV mode.

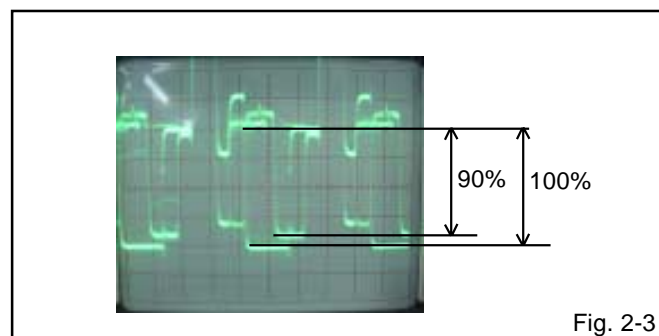
*The Black Pattern means the whole black raster signal. Select the "RASTER" of the pattern generator, set to the OFF position for each R, G and B.

2-13: CONTRAST CENT

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "CONTRAST CENT".
2. Press the LEFT/RIGHT button on the remote control until the contrast step No. becomes "43".
3. Receive a broadcast and check if the picture is normal.
4. Press the AV 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 **(22)** on the remote control to select "CONTRAST CENT".
6. Press the LEFT/RIGHT button on the remote control until the contrast step No. becomes "38".
7. Receive a broadcast and check if the picture is normal.
8. Press the 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 **(22)** on the remote control to select "CONTRAST CENT".
10. Press the LEFT/RIGHT button on the remote control to set the same step numbers as the AV mode.

2-14: COLOR CENTER

1. Receive the pal color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast and color to normal position.
3. Connect the oscilloscope to **TP803**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(25)** on the remote control to select "COLOR CENT".
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 LEFT/RIGHT button on the remote control until the red color level is adjusted to $90 \pm 10\%$ of the white level. (**Refer to Fig. 2-3**)
7. Receive the PAL color bar pattern. (Audio Video Input)
8. Press the AV button on the remote control to set to the AV mode. Then perform the above adjustment 2~6.
9. Press the DVD button on the remote control to set to the DVD mode.
10. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(25)** on the remote control to select "COLOR CENT".
11. Press the LEFT/RIGHT button on the remote control to set the same step numbers as the AV mode.



ELECTRICAL ADJUSTMENTS

2-15: TINT

1. Receive the PAL color bar pattern. (Audio Video Input)
2. Press the AV button on the remote control to set to the AV mode.
3. Using the remote control, set the brightness, contrast, color and tint to normal position.
4. Connect the oscilloscope to **TP801**.
5. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(20)** on the remote control to select "TINT".
6. Press the LEFT/RIGHT button on the remote control until the section "A" becomes a straight line.
(Refer to Fig. 2-4)
7. Press the 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 **(20)** on the remote control to select "TINT".
9. Press the LEFT/RIGHT button on the remote control to set the same step numbers as the AV mode.

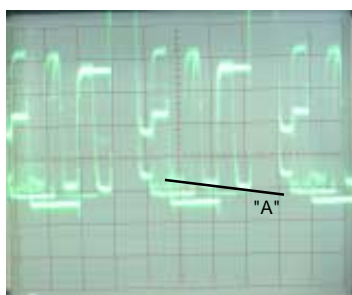


Fig. 2-4

2-16: 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.
02	AGC GAIN	00
04	R CUT OFF	31
06	G CUT OFF	31
07	B DRIVE	45
18	BRIGHT MAX	30
19	BRIGHT MIN	00
21	SHARP	04
23	CONTRAST MAX	60
24	CONTRAST MIN	10
26	COLOR MAX	50
27	COLOR MIN	10
30	M B CUT OFF	100
31	CVBS OUT	20
32	APR THR	15
33	BELL FILTER	18
34	BANDPASS	00
36	V POSI OSD	57
37	H POSI TXT	120
38	V POSI TXT	57

ELECTRICAL ADJUSTMENTS

3. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

3-2: PURITY

NOTE

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue colors.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

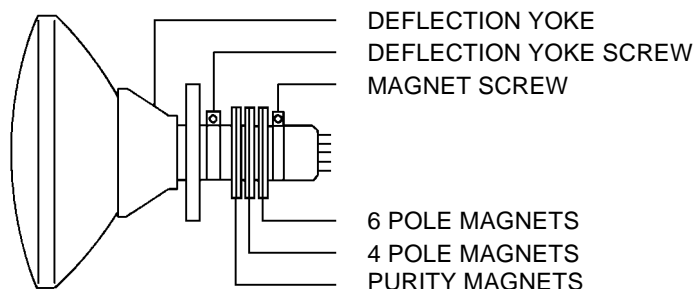


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

3-4: DYNAMIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

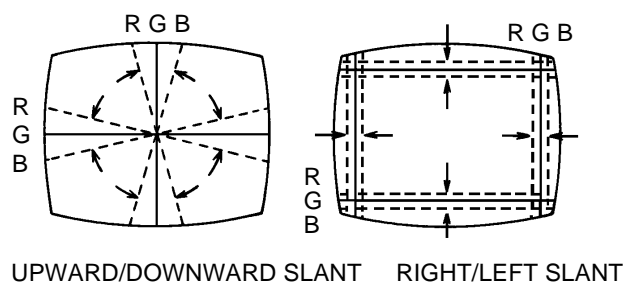


Fig. 3-2-a

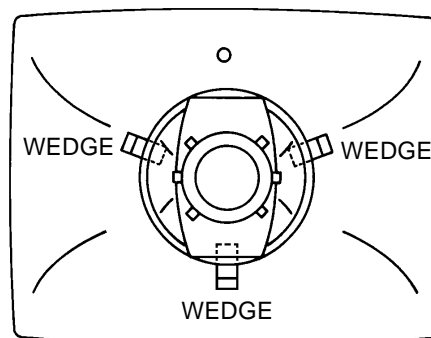


Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)

