

 PIONEER®

**ADJUSTMENT
PROCEDURES**

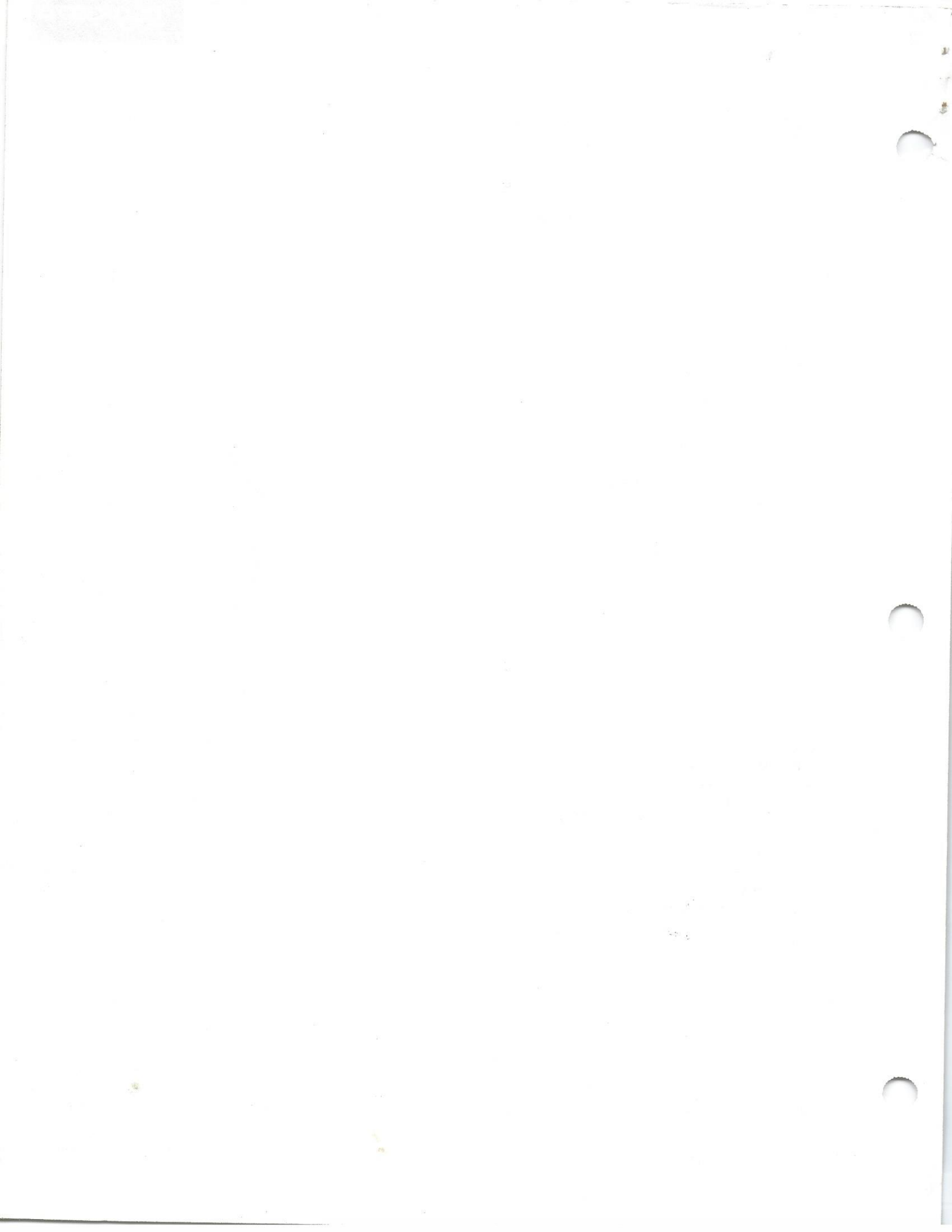
ORDER NO.
ADJ1701

CD CDV LD PLAYER

CLD-3070

NOTE:

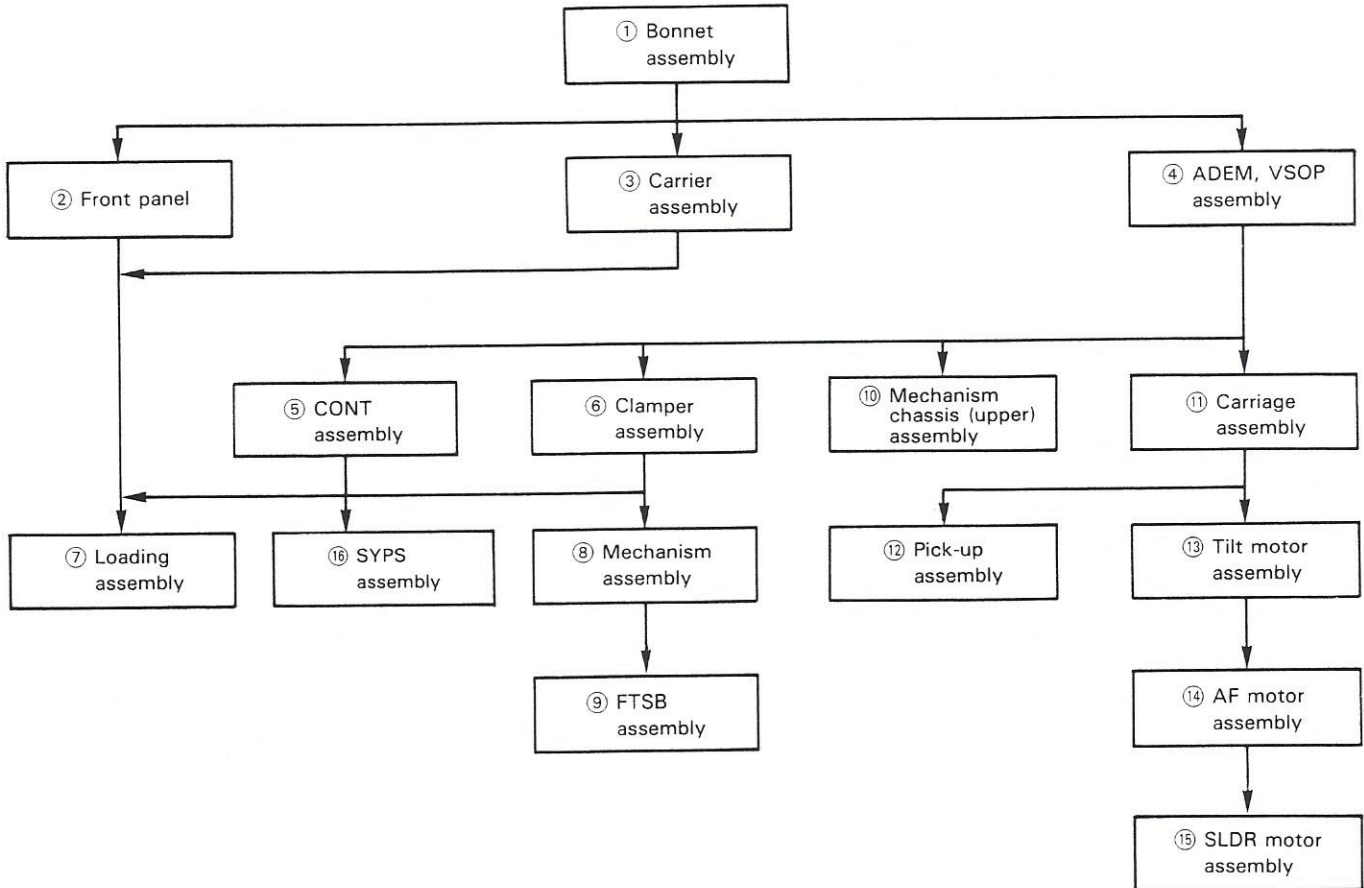
These Adjustment Procedures are the same as those in the Microfiche Service Manual (Order No. ARZ1701).



8. DISASSEMBLY

8.1 DISASSEMBLY FLOW CHART

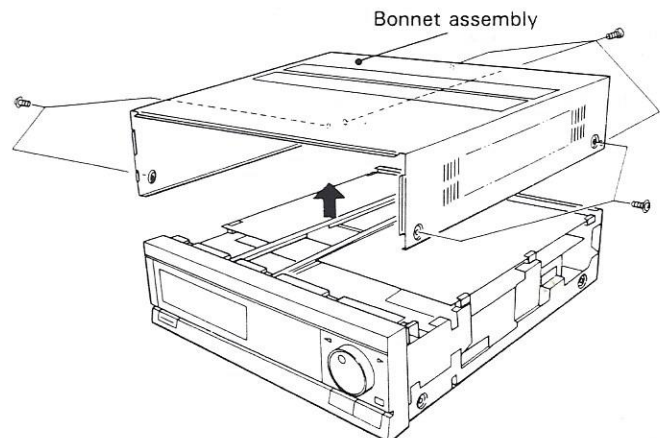
Note: The numbers in the flow chart correspond to the paragraph numbers in the explanatory text in Section 8.2.



8.2 EXPLANATION OF DISASSEMBLY PROCEDURES

1. Bonnet Assembly

Remove the two screws on each side of the unit (left and right) and then the three screws at the rear of the unit.

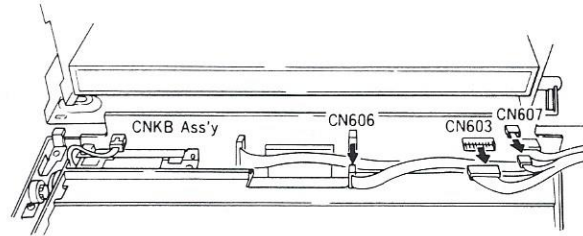
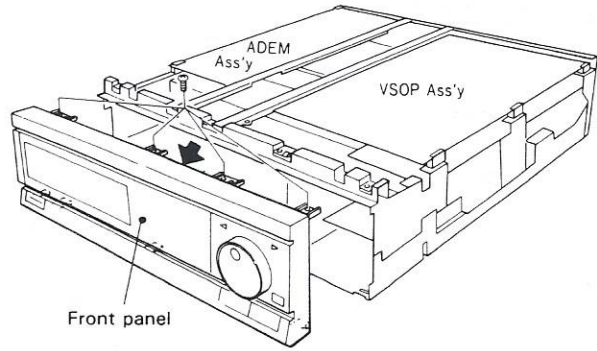


2. Front Panel

Note: The bonnet assembly should be removed first.

- ① Remove the four locking screws on the top of the front panel.
- ② Release the four catches on the bottom of the front panel.
- ③ Disconnect connectors CN603, CN606 and CN607 on the CNKB assembly.

Note: When reassembling the front panel, after connecting the CNKB connectors, engage the four catches under the front panel before tightening the screws.



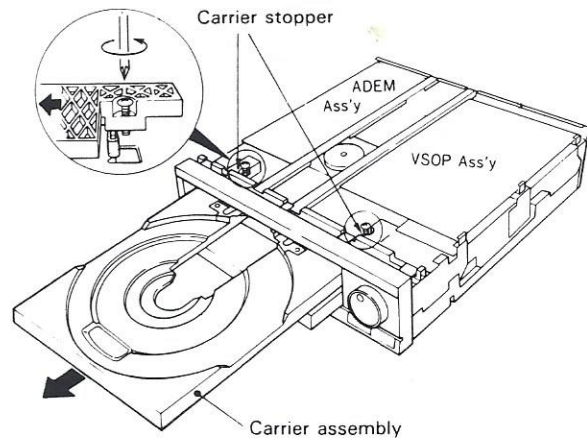
3. Carrier Assembly

Note: The bonnet should be removed first.

- ① Turn the power switch ON, and press the STOP (■)/OPEN(▲) key to open the carrier. (Carrier out operation)
- ② Disconnect the power cord.

Note: At this time, if the power switch is turned OFF, the carrier will be closed by the backup power supply.

- ③ Loosen the two carrier locking screws so that the tips of the screws almost touch the notches of the loading base.
- ④ Pull out the carrier assembly toward you gently to remove it.



— Inserting the carry assembly —

To install the carry assembly, confirm that the positions of the holes in gears (B) and (E) as well as the roller panel (R) assembly fixing screw are as shown in the diagram. Align the meshing section of the carry assembly with the teeth of the half-toothed gear (E) and slowly insert the assembly.

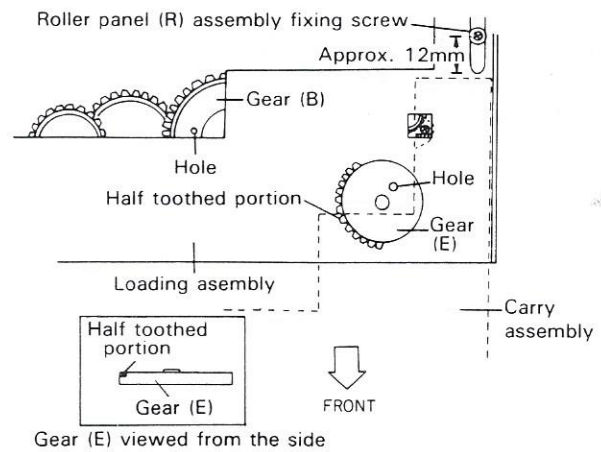


Diagram showing positions of holes in gears (B) and (E) and roller panel (R) assembly fixing screw

4. ADEM · VSOP Assembly

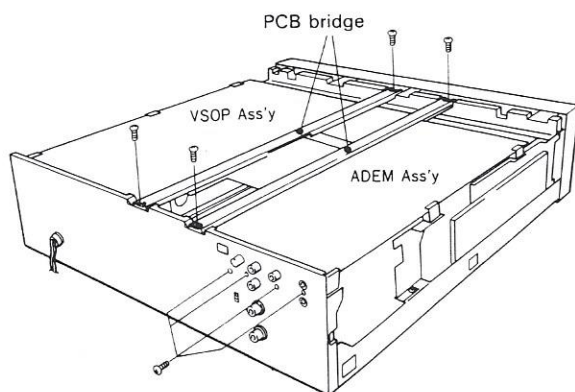
Note: The bonnet should be removed first.

— VSOP Assembly —

- ① Remove the two locking screws on the PCB bridge.

— ADEM Assembly —

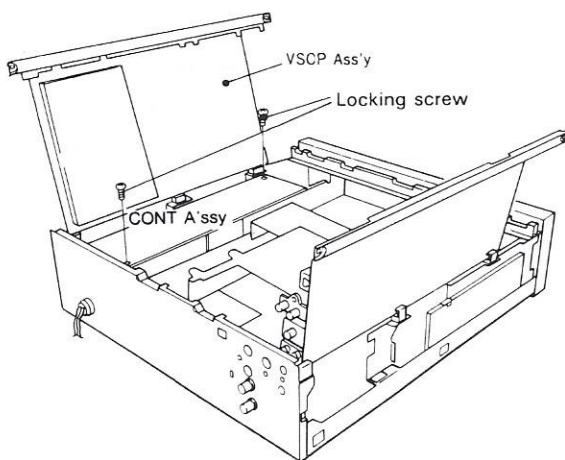
- ① Remove the locking screws for AUDIO, VIDEO, S-VIDEO output jacks and SR jack.
- ② Remove the two locking screws on the PCB bridge.



5. CONT Assembly

Note: The VSOP assembly should be removed.

- ① Remove the two PCB locking screws.



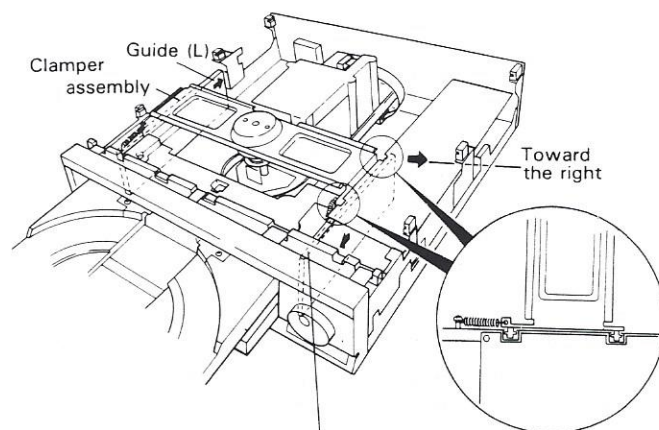
6. Clamper Assembly

Note: The ADEM and VSOP assemblies should be removed first.

- ① While pressing the catch of the guide (R) toward the right, pull the right guide toward you until the catch is released from the clamp base and inserted into the hole. (Refer to the "Note" in item 7. "Loading assembly".)

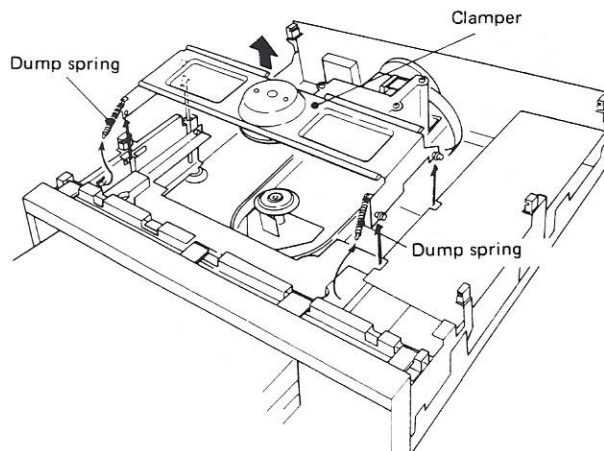
Note: Since the guide (L) and guide (R) are connected to each other by a joint plate, they move in opposite directions.

At this time, the relationship between the notches in the guide (R) and the clamp base assembly on the right should be as shown by the arrows in the diagram.



Guide (R) Relationship between notches in guide and in clamp base assembly.

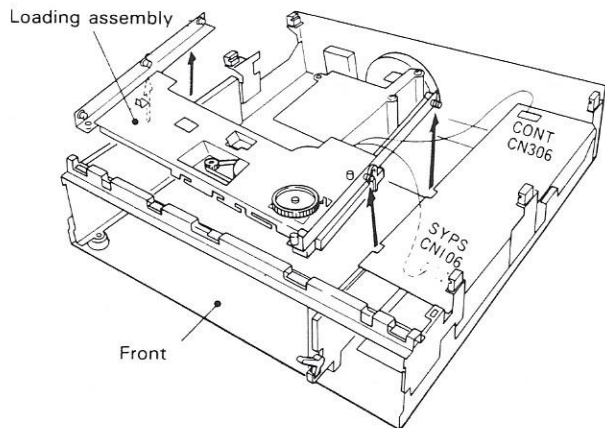
- ② Disengage the left and right dump springs from the clamp base and pull the clamper straight up.



7. Loading Assembly

Note: The front panel, bonnet, carrier and clamber should be removed.

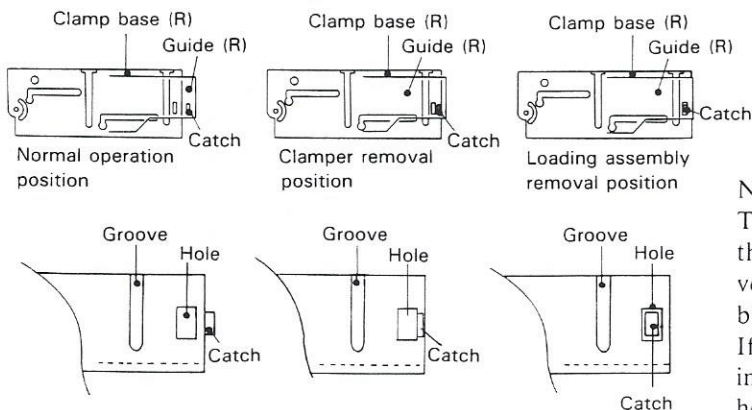
- ① Release the catch on the guide (R) from the clamp base hole, and set it in the middle position between the groove and the hole.
- ② Disconnect connector CN106 on the SYPS assembly and CN306 on the CONT assembly.



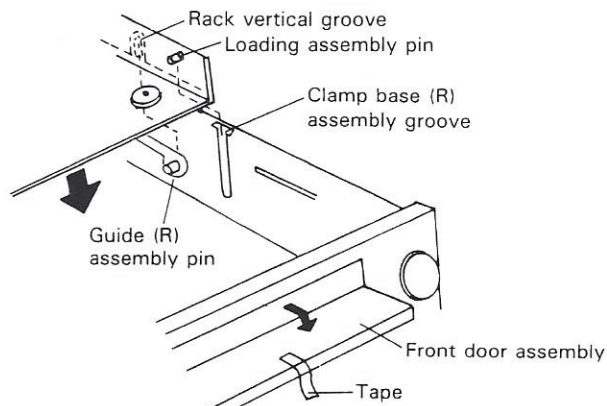
Note:

The catch of the guide (R) and the clamp base (R) should be positioned as follows in different operation modes.

- Catch is positioned at the edge in the clamp base (R) —Normal operation position
- Catch is in the hole in the clamp base (R) —When removing the clamber
- Catch is positioned in the middle between the groove and the clamp base (R) —When removing the loading assembly



— Installing the loading assembly —



- ① Open the front door assembly with your hand and tape it in place. (This is to keep the door lever in the proper position.)
 - ② Align the vertical groove in the the rack with the guide (R) pin and the loading assembly pin with the clamp base (R) assembly groove. Insert straight.
- Note: The guide (R) has about 10mm of leeway in front and back.
- ③ Attach the clamp. After confirming that loading operates properly, remove the tape from the front door.

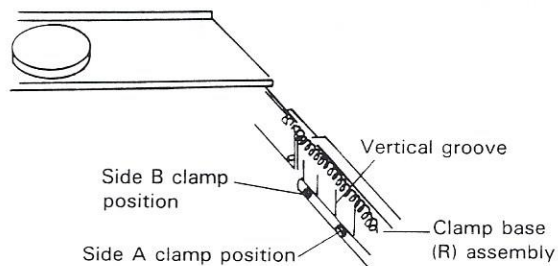


Diagram showing positions of side A and side B clamps and guide (R) pin

Note: Position of disc clamps

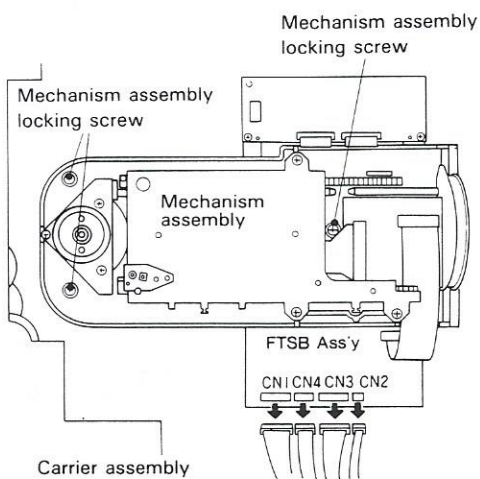
The positions of the disc clamps can be determined from the positions of the guide (R) assembly pin and the four vertical grooves engraved in the clamp base (R) assembly (see diagram).

If the positions of the clamps differ from those shown in the diagram, fine adjust the fixing position of the gear holder assembly (see page 10).

8. Mechanism Assembly

Note: The bonnet, VSOP, ADEM assembly and the clamper should be removed first.

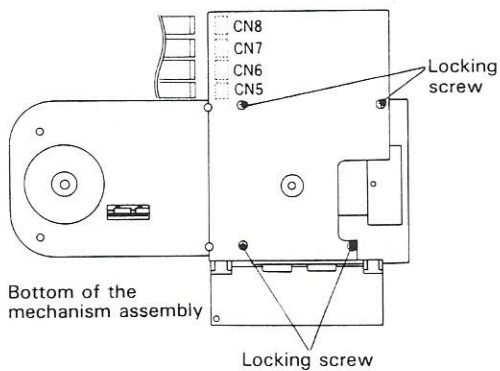
- ① Move the carrier assembly to the "loading out" position.
- ② Disconnect connectors CN1 to CN4 on the FTSB assembly.
- ③ Remove the three locking screws on the mechanism assembly.



9. FTSB Assembly

Note: The mechanism assembly should be removed first.

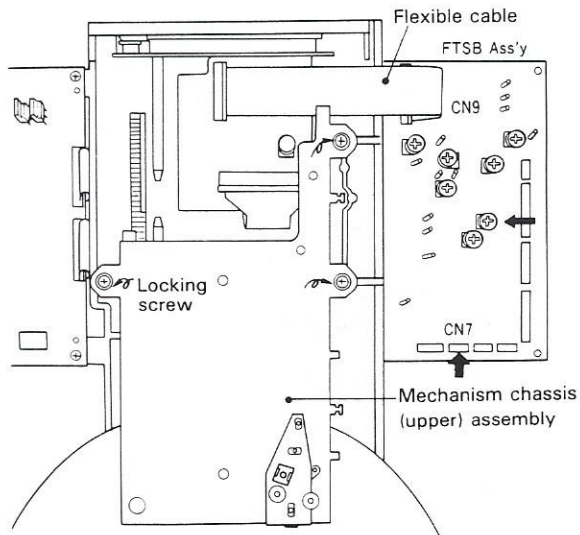
- ① Remove connectors CN5 through CN8 on the FTSB assembly.
- ② Remove the four locking screws on the bottom of the mechanism assembly.



10. Upper Mechanism Chassis Assembly

Note: The bonnet, VSOP and ADEM assemblies should be removed first.

- ① Remove connector CN7 on the FTSB assembly.
- ② Remove the three locking screws.



11. Carriage Assembly

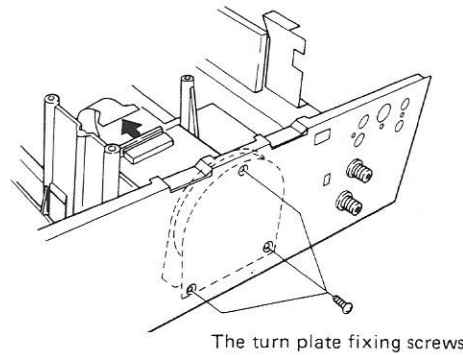
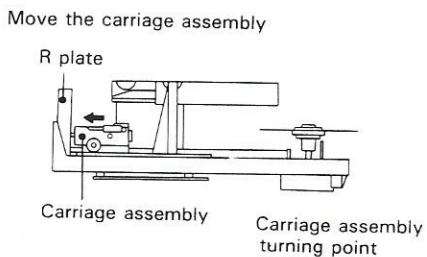
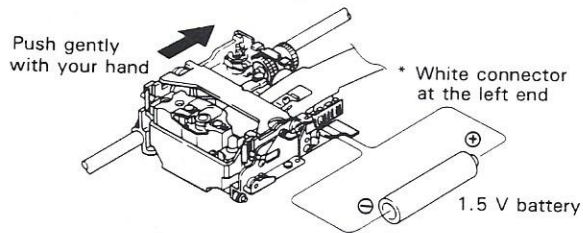
Note: The bonnet, ADEM and VSOP assemblies should be removed first.

Note: In this section, the R plate, G plate and the internal gear assembly are together called the "turn plate".

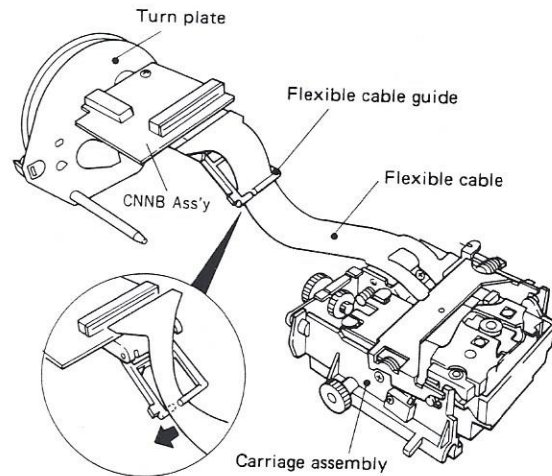
- ① Move the carriage assembly to the position of the turn plate shaft.

— How to move the carriage assembly —

Move the carriage assembly by pushing the end of the slider shaft gently with your hand, or by connecting a 1.5 V battery to the slider motor connector.



The turn plate fixing screws

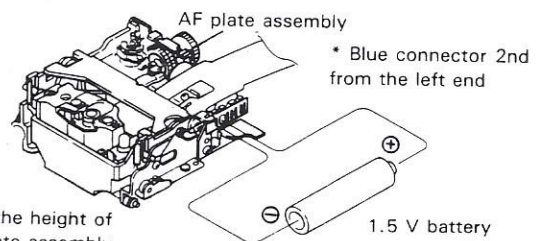


- ② Disengage the flexible cable connecting the FTSB and CNNB assemblies from FTSB assembly CN9.
- ③ Disengage the flexible cable connecting the pickup and CNNB assemblies from the CNNB assembly.
- ④ Insert a screwdriver into the hole in the rear panel and remove the turn plate fixing screws (3 screws).
- ⑤ Remove the carriage assembly together with the turn plate.
- ⑥ Disengage the carriage assembly from the turn plate.
- ⑦ Disengage the flexible cable from the flexible cable guide on the back of the CNNB assembly. Take care not to expose the unit to static electricity.

12. Pick-up Assembly

Note: The carriage assembly should be removed first.

- ① Check that the AF plate assembly is in the middle or bottom position of the shaft of the AF gear assembly. If not, connect the battery to the AF motor connectors to so the AF gear assembly shaft rotates so that the AF plate assembly comes to the middle or bottom of the shaft.
- ② Remove the height springs on both sides.
- ③ Remove the AF stopper locking screw.
- ④ Remove the E-ring holding the pick-up holder assembly.
- ⑤ Remove the E-ring from the AF plate assembly.
- ⑥ While slightly lifting the AF arm on the AF gear assembly side, slide the AF arm to remove it.
- ⑦ Remove the two pick-up connector locking screws.
- ⑧ Remove all four connectors from the connector PC board on the flexible cable.
- ⑨ Remove the pick-up locking screw.



* Adjust the height of the AF plate assembly

1.5 V battery

13. Tilt Motor

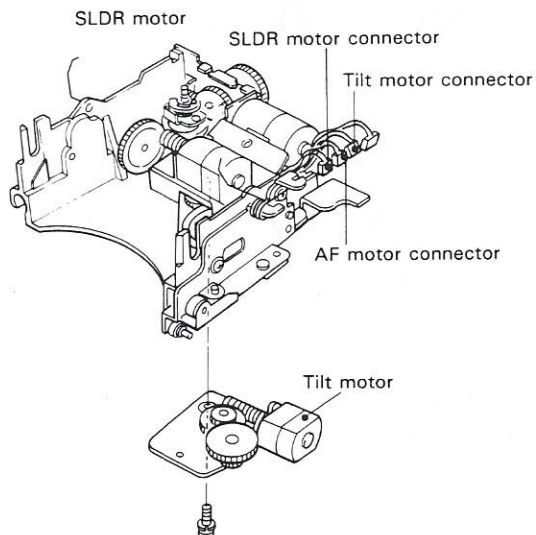
Note: The carriage assembly should be removed first.

- ① Remove the tilt motor connector.
- ② Remove the screw holding the tilt motor assembly-S and the carriage assembly from the bottom of the carriage assembly.

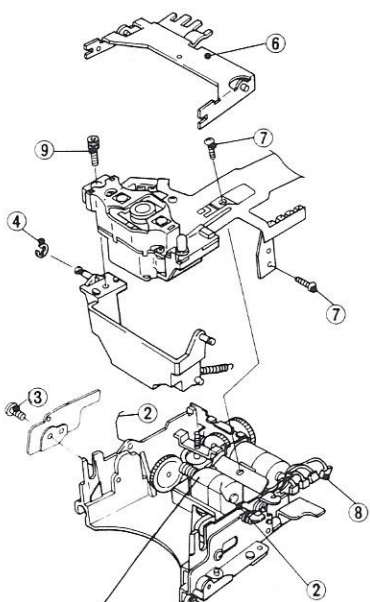
14. AF Motor

Note: The pick-up assembly and the tilt motor assembly should be removed first.

- ① Remove the AF motor connector.
- ② Remove the screw holding the AF motor assembly and the carriage assembly.

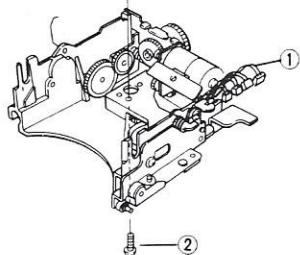
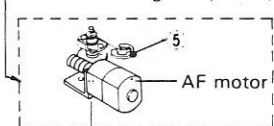


13. Removing the tilt motor
15. Removing the SLDR motor



Note: The numbers in the diagram correspond to the numbers in the disassembly procedure.

12. Removing the pick-up assembly



14. Removing the AF motor

15. SLDR Motor

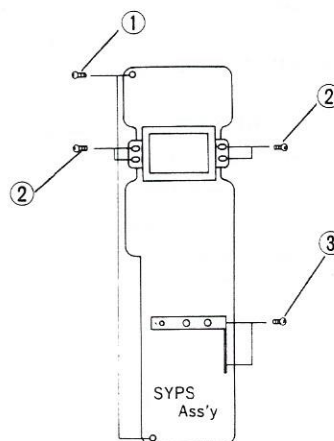
Note: The pick-up assembly, AF motor assembly and the tilt motor assembly should be removed first.

- ① Remove the SLDR motor connector.
- ② Remove the wire harness wrapped around the slider base.
- ③ Remove the two screws fixing the SLDR motor.

16. SYPS Assembly

Note: The VSOP assembly and the CONT assembly should be removed first.

- ① Remove the two screws holding the SYPS assembly.
- ② Remove the four screws holding the transformer.
- ③ Remove the two screws holding the heat sink.



9. ADJUSTMENTS

9.1 JIGS AND INSTRUMENTS REQUIRED FOR ADJUSTMENT

- Small \ominus screwdriver (about 7 cm long)
- Small Phillips head screwdriver (at least 15 cm long)
- Hexagonal wrenches (2.0 mm and 2.5 mm)
- L-shaped eccentric screwdriver (GGV-129)
- 1.5 V battery with lead wires
- Low-pass filter (100k ohms + 1 μ F)
- Dual-trace oscilloscope (with delay)
- AF generator
- Frequency counter
- LD test disc (GGV1002 or 8-inch F2)
- LDD disc (buy locally)
- CD test disc (YEDS-7)
- Shorting clip
- Digital voltmeter

9.2 PREPARATIONS FOR ADJUSTMENT AND PRECAUTIONS

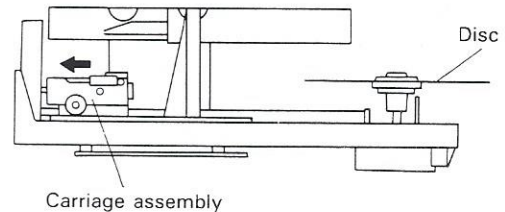
1.) When replacing the pick-up assembly, adjust in the following way:

— Carriage assembly in forward condition —

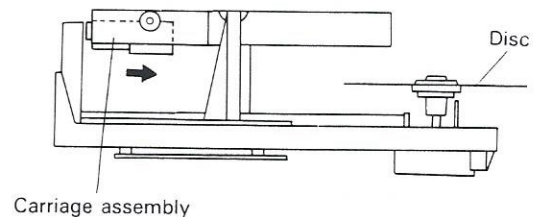
1. Coarse grating adjustment, tracking balance adjustment
 2. Crosstalk adjustment
 - 1) Adjustment of inclination of the pick-up in the tangential direction and tilt servo balance adjustment
 - 2) LD focus error balance adjustment
 3. Spindle motor eccentricity adjustment
 4. Spindle motor eccentricity adjustment
 5. Fine grating adjustment
 6. RF gain adjustment
 7. Focus sum level adjustment
 8. FOCS servo loop gain adjustment
 9. TRKG servo loop gain adjustment
- Carriage assembly in reverse condition —
10. Centering adjustment for side B play
 11. Pick-up tangential direction angle adjustment for side B play
 12. Fine centering adjustment for side B play

Note: The forward status of carriage assembly is when the carriage assembly is in the position to play side A of the disc. The reverse status is when it is in the position to play side B of the disc.

Carriage assembly forward status



Carriage assembly reverse status

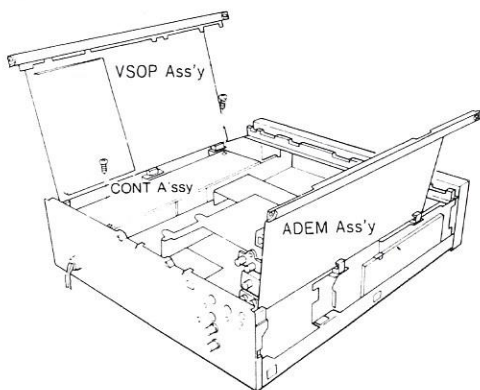


2.) Condition of the unit when adjusting

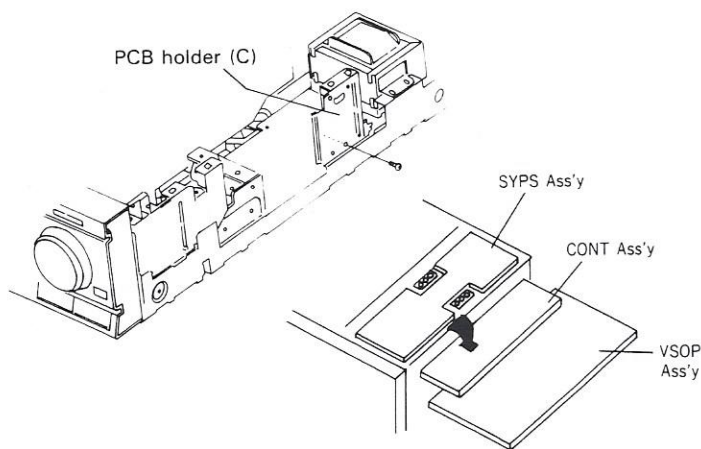
Mechanical adjustments are to be done with the bonnet and the carrier assembly removed, with the VSOP and ADEM assemblies open.

Electrical adjustments are to be done with the corresponding circuit boards open.

When adjusting the SYPS assembly (power supply board), open the circuit boards by swining them up as shown in the figure (below), to measure voltages, etc.



- When turning the SYPS assembly upside down, with the carrier moved out, remove connectors CN1 and CN4 from the FTSB assembly, and set the SYPS assembly to its correct position, then re-connect the connectors. If the PCB holder (C) is removed, the CONT assembly will be stabilized. (For PCB holder (C), refer to page 8.)

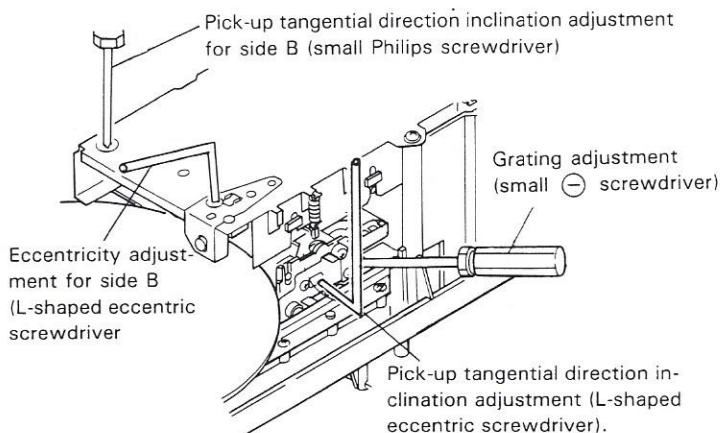


3.) Precautions when reversing the carriage assembly

- The carriage assembly cannot be reversed unless it is advanced by playing a disc.
- If the power switch is turned OFF with the carriage assembly reversed, the backup power supply functions to resume the forward status of the carriage assembly.

4.) Where to insert the screwdriver when adjusting the pick-up assembly

— Carriage assembly in forward condition —



5.) Test disc

The LD test disc used for mechanical adjustment and FTSB assembly adjustment may either be the GGV1002 or 8-inch F2. The frame numbers given in the text are for the GGV1002 while those enclosed in parentheses are for the F2.

The LD test disc used for electrical adjustments can be either N series or F series. The frame numbers given in the text are for the N series while those enclosed in parentheses are for the F series.

6.) Abbreviation in the text indicate the following

- FOCS = Focus
- TRKG = Tracking
- SPDL = Spindle
- SLDR = Slider
- TAN = Tangential

7.) Replacement of IC10 program PROM-S (VYW1370) on the CONT assembly

In the test mode, pressing the key combination **CX** + **8** on the remote control clears the external RAM. (Refer to "Test Mode" on page 86.)

8.) Numbers given in connection diagram correspond to those in the text covering the adjustment procedure.

9.) Test Mode

This unit has a Test Mode function with which the tracking servo can be opened and closed easily while various switch setting conditions can be monitored on the TV screen.

— Test Mode —

1. Activating the Test Mode

Test Mode can be activated in the following manner:

- 1) Open the door and turn the power switch ON. (Except when the disc is in the player, the door is opened by the carrier during opening, ejecting and loading operations.)

2. Releasing the Test Mode

There are two ways to release the Test Mode:

1. Press the **CX** + **9** keys on the remote control unit.
2. Turn the power switch OFF.

Notes:

- ① In the Test Mode, lifting the clamper or ejecting the disc is impossible as they would be dangerous. However, if there is no disc on the tray, ejecting is possible.
- ② Be careful of the clamper as it will rise up when changing the play mode from side B to side A.
- ③ In the Test Mode, the Emergency port (expansion I/O No. 21) cannot be observed.
- ④ In the Test Mode, the initial search function can be released with the Clear key.
- ⑤ When an LD disc is placed on the tray in the Test Mode, the power will be switched off about 20 seconds after the POWER button is pressed to OFF.

3. Functions

After the Test Mode is activated, the following functions will be engaged by pressing a combination of the **CX** key and a numeric key.

- CX** + **0**: The FL display and LEDs light, and the ROM version will be displayed on the screen of the monitor TV.
- CX** + **1**: Error rate measurement. Either an LD or CD will be measured for 15 seconds, then the result will be displayed on the screen of the monitor TV.
- CX** + **2**: Alternately opens and closes the tracking servo. (Toggle switch)
- CX** + **3**: Alternates the CX (noise reduction) circuit between CX default and default. (Toggle switch)
- CX** + **4**: Turns the tilt OFF forcibly.
- CX** + **5**: Sets the tilt to the normal position.
- CX** + **6**:
- CX** + **7**:
- CX** + **8**: Clears the external RAM. (The RAM is not cleared when these keys are pressed, but the contents of the RAM will be cleared the next time the power is turned ON.)

CX + **9**: Releases the Test Mode

Note: Only the following two functions are directly connected to this Service Manual. The other items are listed for reference.

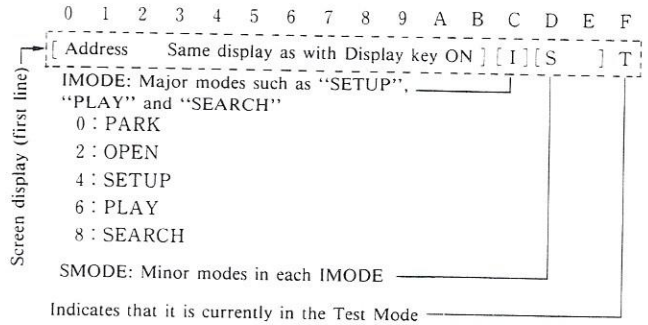
CX + **2**: Tracking servo ON/OFF

CX + **8**: External RAM clear

4. Display

In the Test Mode, the statuses of switches and other data are displayed on the screen of the monitor TV.

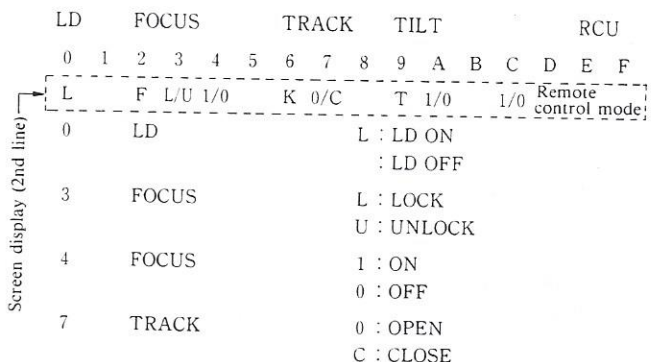
[1st line]



[2nd line]

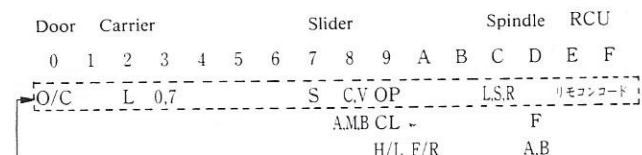
Five indications are displayed on the second line, and the contents displayed will be changed according to the priority of each item.

- a. Searching object input mode (same as the normal search input mode)
 - b. Error rate indication (ERR _____)
 - c. ROM version indication (VYW-_____ 88 _____)
 - d. Pick-up status indication (LD, FOCUS, TRKG, TILT)
 - e. Mechanism status indication (Door SW, Carry, 8 steps of Loading position)
- * When the Test Mode is activated from the remote control, the "d" indication will appear.
 - * When the Test Mode is activated while opening the door with the Power switch ON, the "c" indication will appear, in the same way when activated by pressing the **CX** + **0** keys.
 - * Indications of "d" and "e" can be changed by pressing the Display key.



- A TILT 1 : ON
0 : OFF
- B HEIGHT MOTOR U : UP
D : DOWN
S : STOP
- C HEIGHT SW 1 : ON
0 : OFF

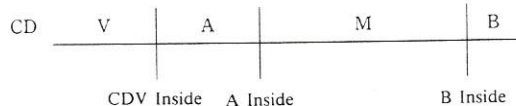
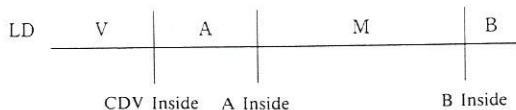
E, F. Remote Control, Main Unit, Key Code



Display (2nd line)

- 0 DOOR SW O : OPEN
C : CLOSE
- 3 CARRY LOADING POSITION
0 : LD OUT
1 : CD OUT
2 :
3 : PARK
4 : TURN
5 :
6 : A CLAMP
7 : B CLAMP

8 SLIDER POSITION



- 9, A SLIDER SPEED, DIRECTION OP : OPEN
CL : CLOSE
H : HIGH SCAN
L : LOW SCAN
F : FWD
R : REV
- C SPINDLE (status) L : LOCK
R : RUN
S : STOP
- D SPINDLE (control) F : FREE RUN
A : ACCEL
B : BRAKE

* SPINDLE display is for LD only.

Reference:

Code	Function	Code	Function
00	0	4B	(Audio 1/L)
01	1	4C	Program
02	2	4D	Side A
03	3	4E	Side B
04	4	4F	Not used
05	5	50	Step REV (reverse)
06	6	51	Not used
07	7	52	Chapter Skip FWD (forward)
08	8		
09	9	53	Chapter Skip REV (reverse)
0A	(A)		
0B	(B)	54	Step FWD (forward)
0C	Digital/Analog	55	Multi-Speed REV (reverse)
0D	Custom File		
0E	CX	56	Not used
0F	(TV/LVP)	57	Not used
10	Scan FWD (forward)	58	Multi-Speed FWD (forward)
11	Scan REV (reverse)		
12	Not used	59	Not used
13	Chapter/Frame	5A	Not used
14	Not used	5B	Still & Sound
15	(Side toggle)	5C	Not used
16	Stop/Open	5D	One-shot Memory
17	Play	5E	(LED Test)
18	Pause	5F	(ESC)
19	Not used		
1A	(Power ON)		
1B	(Power OFF)		
1C	Power toggle		
1D	Not used		
1E	Audio Monitor		
1F	+ 10		
40	(Chapter)		
41	(Frame)		
42	Search/Memory		
43	Display		
44	Repeat B		
45	Clear		
46	Speed DOWN		
47	Speed UP		
48	Repeat A		
49	(Audio 2R/R)		
4A	(Audio Stereo)		

Codes in brackets () are not generated with the normal remote control keys or keys on the front panel, but they will be accepted. "Not used" codes will not be accepted.

9.3 MECHANISM ADJUSTMENT

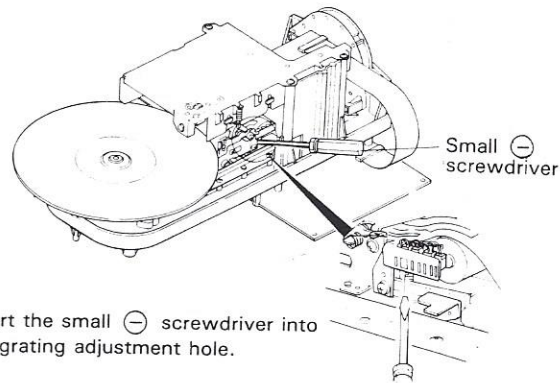
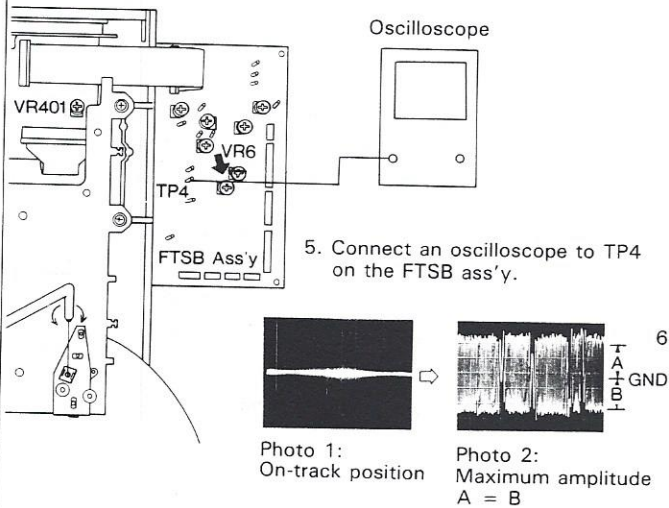
1. Coarse Grating and Tracking (TRKG) Balance Adjustment

9.3 Mechanical Adjustment

- Purpose: To adjust the laser beam which is divided into three by the grating to the optimum position on the track. Set the TRKG servo offset voltage to 0 V.
- When not properly adjusted: Disc playback will be impossible. During play, tracks may be skipped.

- | | |
|--|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode • Positions to be adjusted | <ul style="list-style-type: none"> • Small ⊖ screwdriver (flat blade) • Oscilloscope • FTSB assembly TP4 (TRKG error) • 8-inch LD test disc GGV1002 ... #6,500, (#300) • Still mode • Test Mode (TRKG servo: Open) • The carriage assembly should be in the forward position. • Grating • FTSB assembly VR6 (TRKG balance) |
|--|---|

Connection diagram



Adjustment Procedure

< Coarse Grating Adjustment >

1. Play the LD test disc.
2. Press the DISPLAY key to display the frame # (No.) on the TV screen.
3. Move the pick-up to frame #6,500 (#300) by scanning or searching.
4. Open the TRKG servo. (See p. 86.)
5. Connect an oscilloscope to TP4 of the FTSB assembly and observe the waveform.
6. Insert the small ⊖ screwdriver into the grating adjustment hole. Turning the grating will allow you to vary the amplitude of the TRKG error waveform. Find the position where the waveform amplitude becomes minimum with a smooth envelope. (Photo 1) (This indicates that the 3-way split laser beams are directed onto the track. This is called the "on-track" position.)

7. Slowly turn the grating counterclockwise from the on-track position until the waveform amplitude becomes maximum. (Photo 2)
 8. Close the TRKG servo and check that a normal picture is displayed on the TV screen.
- ##### < TRKG Balance Adjustment >
1. Align the oscilloscope GND so that it comes to the center of the oscilloscope screen.
 2. Adjust VR6 on the FTSB assembly so that the positive and negative amplitude of the TRKG error waveform become equal. (Photo 2)

2. Crosstalk Adjustment

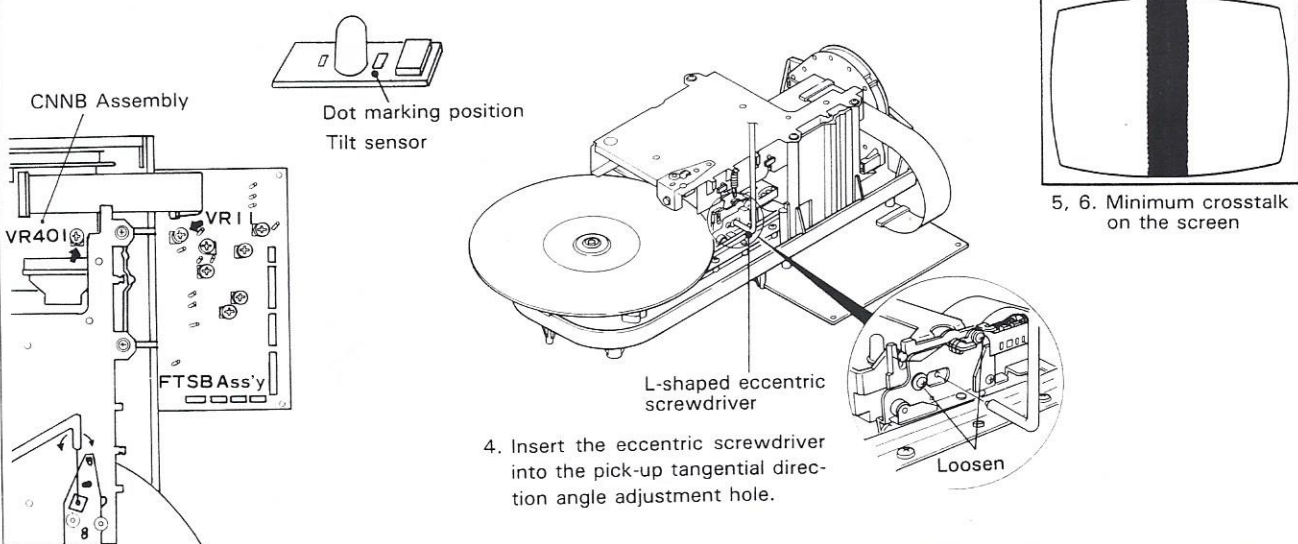
9.3 Mechanical Adjustments

(1) Pick-up Tangential Direction Angle Adjustment and Tilt Servo Balance Adjustment (Pick-up TRKG direction angle adjustment)

- Purpose: To adjust the pick-up tangential direction angle so as to minimize crosstalk.
- If not properly adjusted: Noticeable crosstalk will appear.

- Measuring instruments and jigs:
 - TV monitor
 - L-shaped eccentric screwdriver (GGV-129)
 - Oscilloscope
- Measuring point:
 - Crosstalk on the screen
- Test disc and player mode:
 - 8-inch LD test disc GGV1002 ... #115 (#104)
 - Still mode
 - Test Mode (TRKG servo: Open/Close)
 - Carriage assembly must be in the forward position.
- Positions to be adjusted:
 - Pick-up tangential direction angle adjustment screw
 - FTSB assembly VR11 (TILT gain), CNNB assembly VR401 (TILT balance).

Connection diagram



Adjustment Procedure

1. Check the color of the dot marked on the top of the tilt sensor, at the side of the post.
Some players have red and blue dots. According to the color of the dot, adjust the FTSB assembly VR11 as follows:
Red dot : Turn VR11 fully clockwise.
Blue dot: Turn VR11 fully counterclockwise.
No dot : Set VR11 to the center position.
- Pick-up Tangential Direction Angle Adjustment —
2. Loosen the two locking screws shown in the figure.
3. Play the 8-inch LD test disc, and search frame #115 (#104).
4. Insert the eccentric screwdriver into the pick-up tangential direction angle adjustment hole.
5. While watching the TV monitor screen, adjust the pick-up tangential direction angle adjustment screw so that the crosstalk on the TV screen becomes minimum.

— Tilt Servo Balance Adjustment —

- (Pick-up TRKG Direction Angle Adjustment)
6. In the condition in 5, adjust VR401 on the CNNB assembly so that the crosstalk on the TV screen becomes minimum or the left and right halves become equal. (Turn VR401 to alter the tilt of the pickup assembly TRKG direction.)
 7. If there is still noticeable crosstalk on the TV screen, repeat adjustment steps 5 and 6.
 8. After adjustment is complete, tighten the two locking screws.
- Note: When the pick-up tangential angle is changed in the side A play mode, be sure to perform "3. Spindle Motor Centering Check", "10. Centering Adjustment for Side B" and "11. Pick-up Tangential Direction Angle Adjustment for Side B".

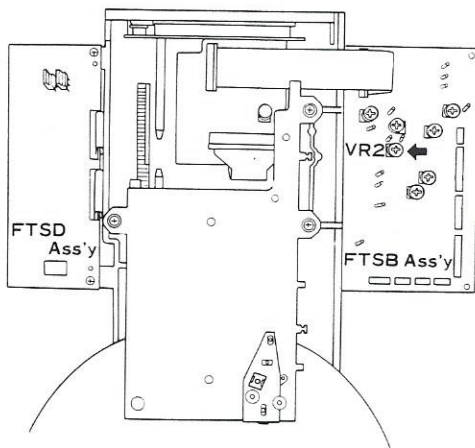
(2) LD FOCS Error Balance Adjustment

9.3 Mechanical Adjustment

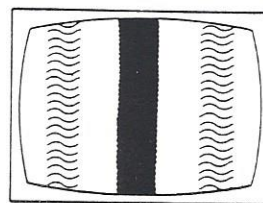
- Purpose: To ensure that the FOCS servo maintains the objective lens at the optimum distance from the disc surface.
- When not properly adjusted: Crosstalk will be generated.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode • Position to be adjusted | <ul style="list-style-type: none"> • TV monitor • Video signal output terminal • 8-inch LD test disc GGV1002 ... #115 (#104) • Still mode • The carriage assembly should be in the forward position. • FTSB assembly VR2 |
|---|---|

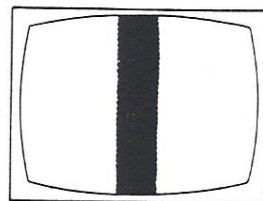
Connection diagram



2. Adjust VR2 on the FTSB assembly for minimum crosstalk.



Crosstalk generated on the screen



2. Adjust so that the crosstalk on the screen is minimum.

Adjustment Procedure

1. Play the LD test disc and search frame #115 (#104).
2. Adjust VR2 on the FTSB assembly so that the crosstalk on the left and right sides on the TV screen is minimized.

If adjustment of VR2 fails to reduce crosstalk to an allowable level, perform "Pick-up Tangential Direction Angle Adjustment" and "Tilt Servo Balance Adjustment".

3. Spindle Motor Centering Check

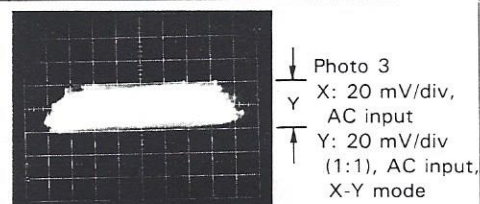
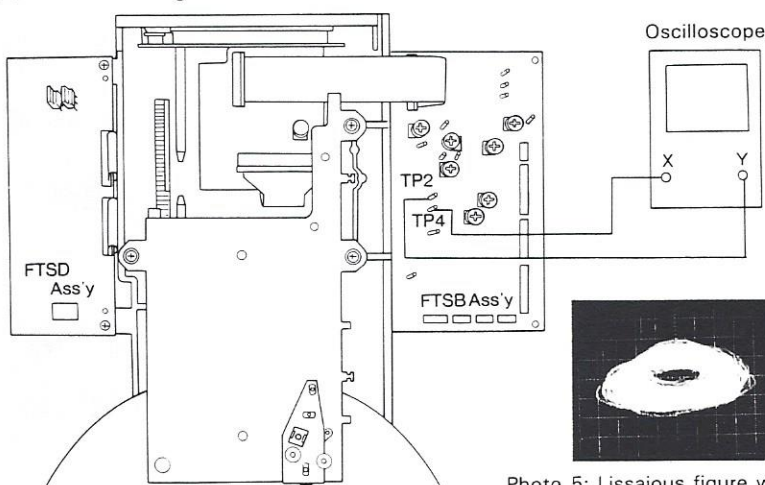
9.3 Mechanical Adjustment

- Purpose: To check that the center of the spindle motor is on the orbit of the laser beam.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Position to be adjusted

- Oscilloscope
- FTSB assembly TP4 (TRKG error), TP2 (TRKG sum)
- 8-inch LD test disc GGV1002 ... # 100 and # 22,000, (# 100 and # 22,000 with a commercially available "karaoke" LD disc) • Play mode • CD test disc (YEDS-7) • Test Mode (TRKG servo: Open) • The carriage assembly should be in the forward position.
- Check the Lissajous figure

Connection diagram



Lissajous figure of the inner track of the disc (CD)

Check that $Y = Y'$

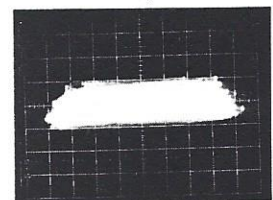


Photo 4

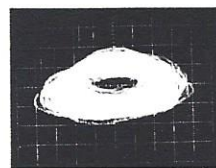


Photo 5: Lissajous figure when not properly adjusted

Lissajous figure of the outer track of the disc (CD)

3. Connect TP4 and TP2 on the FTSB ass'y to the X, Y inputs of oscilloscope.

5. The Y axis of the Lissajous figure should be the same for the inner and the outer tracks.

Note: LD test disc F2 is not suitable for this adjustment because the recorded portion with a track pitch of $1.52 \mu\text{m}$ is present only around inner tracks # 1 to # 500.

Checking Procedure

1. Play the 8-inch LD test disc.
2. Move the pick-up to frame # 22,000 by scanning or searching, then open the TRKG servo.
3. Connect TP4 on the FTSB assembly to the X-input (CH-1) of the oscilloscope and TP2 to the Y-input (CH-2).
Set the oscilloscope to the X-Y mode and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
4. Write down the Y-axis amplitudes of the Lissajous figures. (Photo 3)
5. Close the TRKG servo and search frame # 100, then open the TRKG servo again to observe the Lissajous figure.

At this time, check that the Y-axis amplitude of the Lissajous figure is the same as that noted in step 4. (Photo 4)

6. Remove the 8-inch LD test disc from the player, then load the CD test disc and repeat the checking procedures steps 1 to 5. However, it is not necessary to specify the inner or outer track positions of the disc. If the Y-axis amplitude of the Lissajous figure is different for the inner and outer tracks, perform "4. Spindle Motor Centering Adjustment".

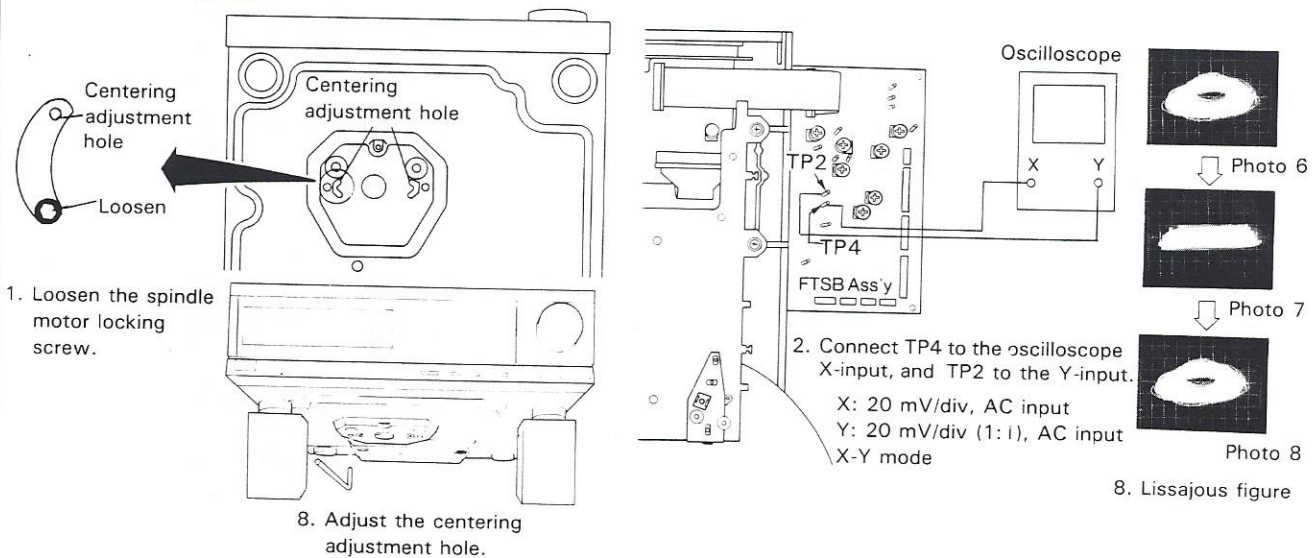
4. Spindle Motor Centering Adjustment

9.3 Mechanical Adjustment

- Purpose: To adjust so that the center of the spindle motor is on the orbit of the laser beam.
- When not properly adjusted: Track skips, or searching takes too long.

- Measuring instruments and jigs:
 - L-shaped eccentric screwdriver (GGV-129)
 - 2.5 mm Hexagonal wrench
 - Oscilloscope
- Measuring point:
 - FTSB assembly TP4 (TRKG error), TP2 (TRKG sum)
- Test disc and player mode
 - 8-inch LD test disc GGV1002 ... #100 and #22,000, (or a commercially available "karaoke" LD disc)
 - Play mode
 - CD test disc (YEDS-7)
 - Test Mode (TRKG servo: Open/Close)
 - The carriage assembly should be in the forward position.
- Adjustment position
 - Spindle motor centering adjustment hole

Connection diagram



Adjustment Procedure

Note: For the same reasons given in the "Note" in section 9.3.3, the LD test disc F2 is not suitable for this adjustment.

Note: There are two centering adjustment holes on the player. Either can be used.

1. Loosen the two spindle motor locking screws using the hexagonal wrench.
2. Connect TP4 of the FTSB assembly to the X-input (CH-1) of the oscilloscope and TP2 to the Y-input (CH-2).
3. Play the 8-inch LD test disc and search frame #22,000.
4. Open the TRKG servo and observe the Lissajous figures of the TP4 (TRKG error signal) and the TP2 (TRKG sum signal).
5. Fine-adjust the grating so that the Y-axis amplitude of the Lissajous figure is minimized. (Photo 7)
6. Close the TRKG servo and search frame #100.
7. Open the TRKG servo again and observe the Lissajous figure and write the values down. (Photo 6)

8. Insert the L-shaped eccentric screwdriver into the adjusting hole from the left bottom of the player, and turn slowly so that the Y-axis amplitude of the Lissajous figure is reduced. After the Y-axis amplitude of the Lissajous figure is minimized, turn the adjusting screw further until the amplitude becomes the same shape as that observed in procedure 7. (Photos 6 - 8)
9. Close the TRKG servo, and move the pick-up assembly to the outer track of the disc (#22,000), then perform the adjustments in steps 4 to 6 again.
10. Re-open the TRKG servo and observe the Lissajous figure to check that the Y-axis amplitude is minimum. (Photo 7) If the Y-axis amplitude of the Lissajous figure is larger than specified, repeat the adjustment procedures from steps 5 to 7.
11. After adjustment is complete, perform the adjustment in "3. Spindle Motor Centering Check" item 6.

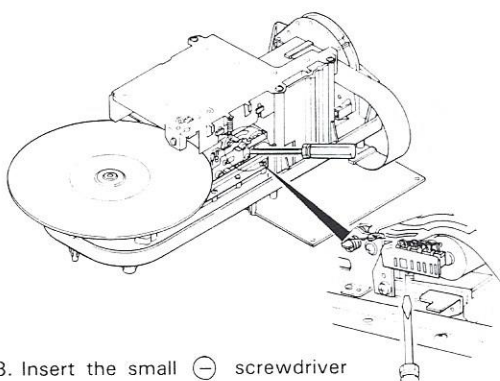
5. Fine Grating Adjustment

9.3 Mechanical Adjustment

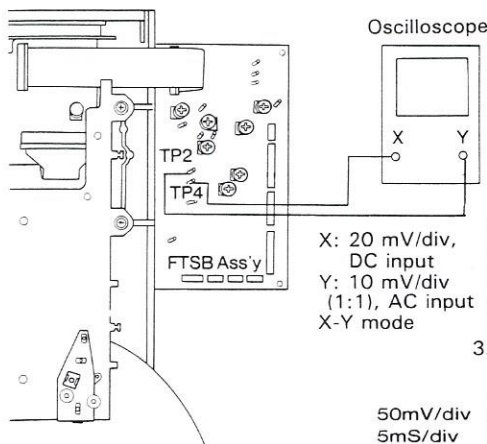
- Purpose: To fine adjust the grating so that the two tracking beams for the TRKG servo are projected in the optimum positions on the tracks being played.
Set the TRKG servo loop offset voltage to 0 V.
- When not properly adjusted: During play, tracks may be skipped.

- Measuring instruments and jigs:
 - Oscilloscope
 - Small \ominus screwdriver
- Measuring point:
 - FTSB assembly TP4 (TRKG error), TP2 (TRKG sum)
- Test disc and player mode:
 - 8-inch LD test disc GGV1002 ... #6,500, (#300)
 - Still mode
 - The carriage assembly should be in the forward position.
 - Test Mode (TRKG servo: Open)
- Position to be adjusted:
 - Grating

Connection diagram

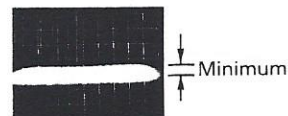


3. Insert the small \ominus screwdriver into the grating adjustment hole to fine adjust it.



2. Connect FTSB ass'y TP4 and TP2 to the oscilloscope's X-input and Y-input.

Photo 9: Fine grating adjustment



3. Y-axis amplitude of Lissajous figure becomes minimum

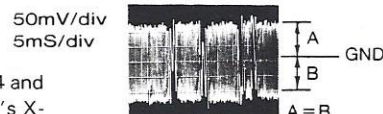


Photo 10: TRKG balance adjustment

Adjustment Procedure

1. Play the LD test disc and search frame #6,500 (#300), then open the TRKG servo.
2. Connect the oscilloscope's X-input (CH-1) to FTSB assembly TP4, and the Y-input (CH-2) to TP2. Set the oscilloscope to the X-Y mode and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
3. Insert the small \ominus screwdriver into the grating adjustment hole, and fine-adjust the grating so that the Y-axis amplitude of the Lissajous figures is minimized. (Photo 9)
If the grating is turned too much and the optimum position can no longer be found, repeat the "Coarse Grating Adjustment".
4. Select the oscilloscope's X-input (CH-1) and check that the positive and negative amplitudes of the TRKG error signal are equal. (Photo 10)

If they are not, repeat the "Tracking Balance Adjustment".

5. Close the TRKG servo and check that the picture (image) on the TV screen is normal.

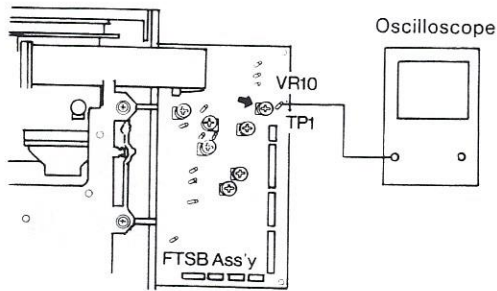
6. RF Gain Adjustment

9.3 Mechanical Adjustment

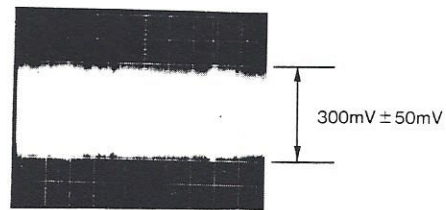
- Purpose: To adjust the RF signal amplitude to the optimum value.
- When not properly adjusted: Dropout occurs frequently.

- | | |
|---|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode • Position to be adjusted | <ul style="list-style-type: none"> • Oscilloscope • FTSB assembly TP1 (RF signal) • 8-inch LD test disc GGV1002 ... #15,000 (#15,000) • Still mode • Test Mode (TRKG servo: Close) • The carriage assembly should be in the forward position. • FTSB assembly VR10 (RF gain) |
|---|--|

Connection diagram



2. Connect FTSB ass'y TP1 to an oscilloscope



3. RF signal

Photo 11

Adjustment Procedure

1. Play the LD test disc and search frame #15,000 (#15,000).
2. Connect an oscilloscope to FTSB assembly TP1 (RF signal) and observe the RF signal.
3. Adjust FTSB assembly VR10 so that the amplitude of the RF signal becomes 300 mV ± 50 mV. (Photo 11)

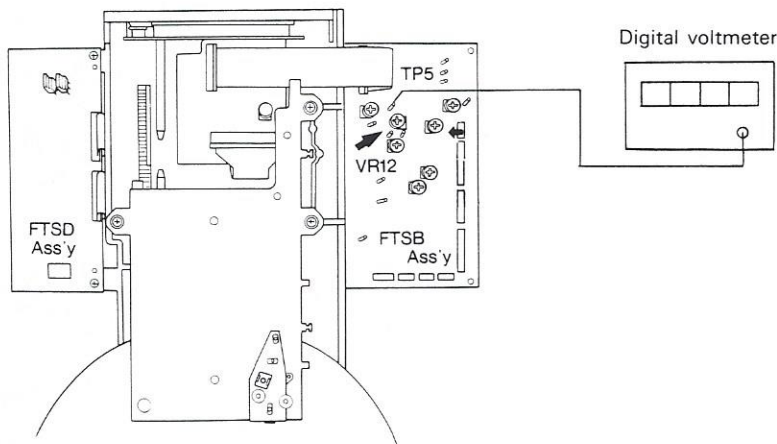
7. FOCS Sum Level Adjustment

9.3 Mechanical Adjustments

- Purpose: To set the voltage of the FOCS (A + B) signal to the optimum value.
- When not properly adjusted: FOCS is not locked, and tracks may be skipped.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode • Position to be adjusted | <ul style="list-style-type: none"> • Digital voltmeter • FTSB assembly TP5 (FOCS A + B) • 8-inch LD test disc GGV1002 ... #15,000 (#15,000) • Play mode • The carriage assembly should be in the forward position. • FTSB assembly VR12 |
|---|---|

Connection diagram



1. Connect FTSB ass'y TP5 to the digital volt meter

Adjustment Procedure

1. Connect FTSB assembly TP5 (FOCS A + B) to the digital voltmeter.
2. Play the 8-inch LD test disc and play frame #15,000.
3. Measure the voltage at TP5, and adjust FTSB assembly VR12 so that the voltage becomes 2.0 V DC.

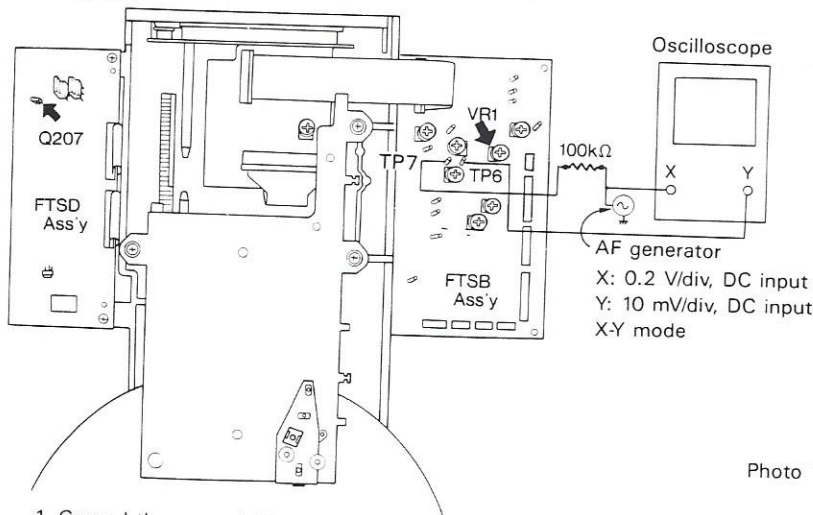
8. FOCS Servo Loop Gain Adjustment

9.3 Mechanical Adjustments

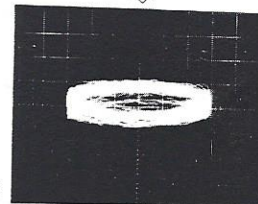
- Purpose: To set the loop gain of the FOCS servo to the optimum value.
- When not properly adjusted: Performance deteriorates.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode • Adjustment position | <ul style="list-style-type: none"> • Oscilloscope • AF generator • Resistor (100k ohms) • FTSB assembly TP7 (FOCS error), TP6 (FOCS gain) • 8-inch LD test disc GGV1002 ... #15,000 (#15,000) • Still mode • TRKG servo: Close • The FOCS motor protection circuit is disabled. • The carriage assembly should be in the forward position. • FTSB assembly VR1 |
|---|---|

Connection diagram



Adjustment not complete



Properly adjusted

Photo 12

1. Ground the gate of FTSD ass'y Q207.

2. Connect FTSB ass'y TP7, AF generator, resistor and the oscilloscope.

6. The X-axis and Y-axis of the Lissajous figure are symmetrical.

Adjustment Procedure

1. Connect the gate of the FTSD assembly Q207 to GND to inhibit the operation of the focus motor protection circuit.
2. Connect the resistor, AF generator and the oscilloscope to FTSB assembly TP7, as shown in the above diagram.
3. Set the AF generator output to 1.6 kHz/6 Vp-p for GGV1002, or 1.6 kHz/6 Vp-p for F2, according to the test disc used.
4. Play the 8-inch LD test disc and search frame #15,000 (#15,000).
5. Set the oscilloscope to the X-Y mode and observe the Lissajous figure.
6. Adjust VR1 on the FTSB assembly so that Lissajous figure is symmetrical on both the X- and Y-axes of the oscilloscope. (Photo 12)
7. Release the grounding from Q207 of the FTSD assembly.

Note: If the AF generator output does not exceed 6 Vp-p, reduce the value of the resistor (100k ohms) in the above diagram, for easier observation of the Lissajous figure. (not below 33k ohms)

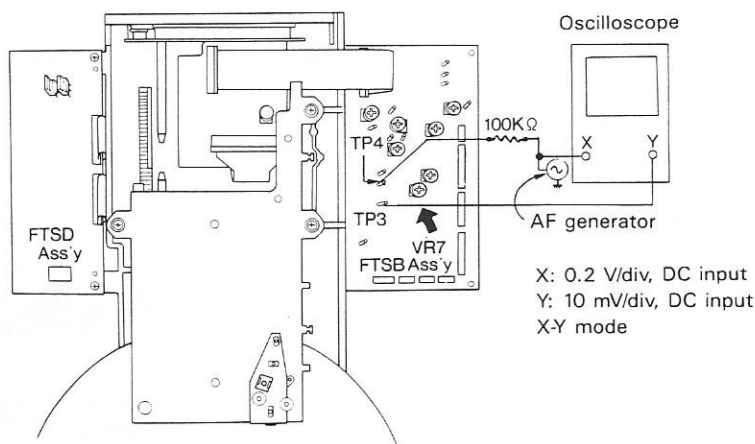
9. TRKG Servo Loop Gain Adjustment

9.3 Mechanical Adjustments

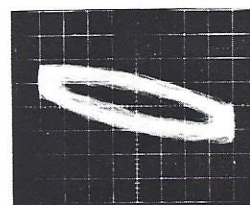
- Purpose: To set the loop gain of the TRKG servo to the optimum value.
- When not properly adjusted: Performance deteriorates.

- | | |
|---|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode • Adjustment position | <ul style="list-style-type: none"> • Oscilloscope • Resistor (100k ohms) • AF generator • FTSB assembly TP4 (TRKG error), TP3 (TRKG gain) • 8-inch LD test disc GGV1002 ... #15,000 (#15,000) • Still mode • TRKG servo: Close • The carriage assembly should be in the forward position. • FTSB assembly VR7 |
|---|--|

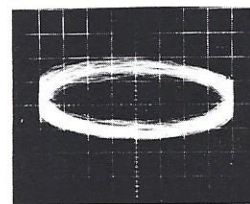
Connection diagram



2. Connect FTSB ass'y TP4, AF generator, resistor and the oscilloscope as shown.



Adjustment not complete



Properly adjusted

Photo 13

5. The X-axis and Y-axis of the Lissajous figure are symmetrical.

Adjustment Procedure

1. Play the LD test disc and search frame # 15,000 (#15,000).
2. Connect FTSB assembly TP4 to the oscilloscope's X-input via the resistor and AF generator, and TP3 to the Y-input, as shown in the above diagram.
3. Set the AF generator output to 3.4 kHz/6 Vp-p for GGV1002, or 3.5 kHz/6 Vp-p for F2, according to the test disc used.
4. Set the oscilloscope to the X-Y mode and observe the Lissajous figure.
5. Adjust VR7 on the FTSB assembly so that the Lissajous figure is symmetrical on both the X- and Y-axes of the oscilloscope. (Photo 13)

Note: If the AF generator output does not exceed 6 Vp-p, reduce the value of the resistor (100k ohms) in the above diagram, for easier observation of the Lissajous figure. (not below 33k ohms)

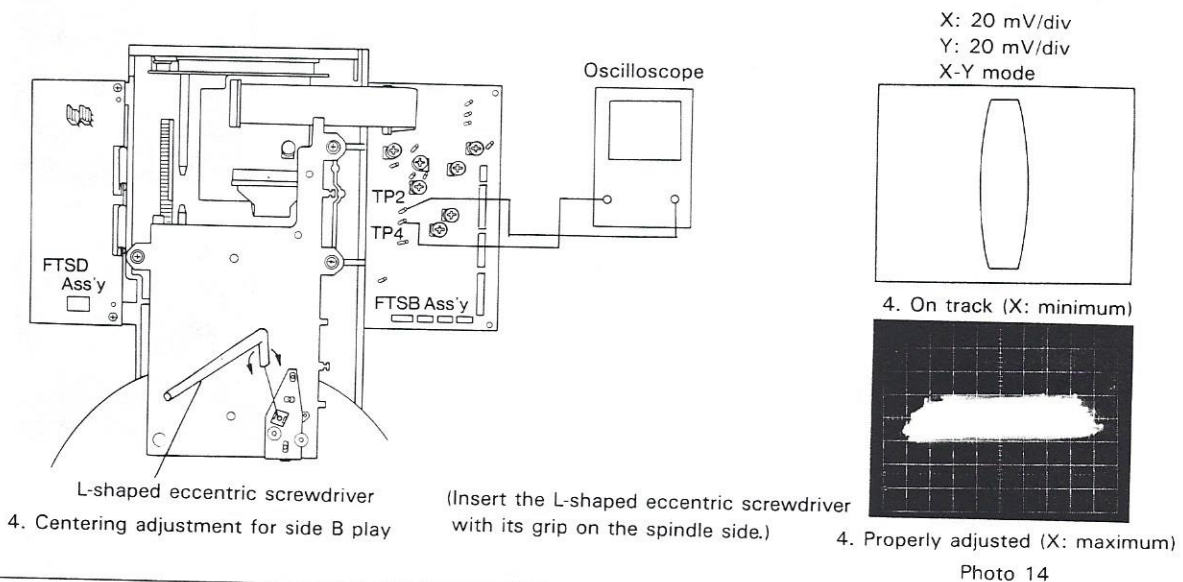
10. Centering Adjustment for Side B Play

9.3 Mechanical Adjustments

- Purpose: To set the center of the spindle motor on the path of the laser beam when playing the side B of the disc.
- When not properly adjusted: Tracks skipped, longer searching time or searching is impossible when playing side B of the disc.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring points: • Test disc and player mode • Position to be adjusted | <ul style="list-style-type: none"> • L-shaped eccentric screwdriver (GGV-129) • Oscilloscope • FTSB assembly TP4 (TRKG error), TP2 (TRKG sum) • 8-inch LD test disc GGV1002 ... #100 (#300) • Play mode • The carriage assembly should be in the reverse position. • Test mode (TRKG servo: Open/Close) • Centering adjustment hole for side B |
|--|--|

Connection diagram



Adjustment Procedure

1. Turn the LD test disc upside-down (change from side A to side B).
 2. Set the oscilloscope to the X-Y mode, and connect FTSB assembly TP4 (TRKG error) to the oscilloscope's X-input (CH-1) and TP2 (TRKG sum) to the Y-input (CH-2).
 3. Play the LD test disc and search frame #100 (#300), then open the tracking servo.
- Note: If the center is too eccentric on side B of the disc, since searching will be impossible on side B, open the TRKG servo when the carriage assembly moves to the side B play position and searches around frame #100.
4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure is minimized (on-track position). Then turn the eccen-

tric screwdriver clockwise further until the X-axis amplitude of the Lissajous figure becomes maximum. (Photo 14)

Note: When "2 (1) Tangential Direction Angle Adjustment" is performed with the pick-up in the forward direction, perform "11. Pick-up Tangential Direction Angle Adjustment for Side B Play" and "12. Fine Centering Adjustment for Side B play".

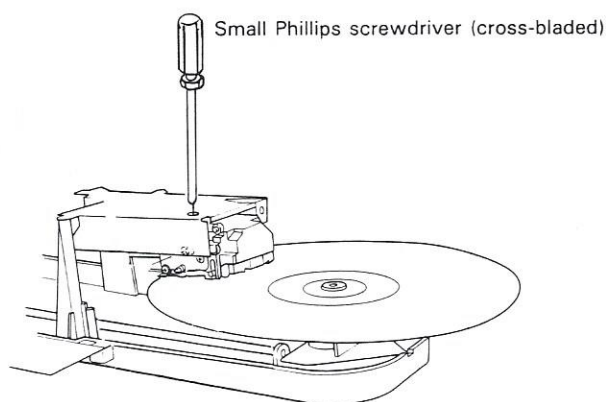
11. Pick-up Tangential Direction Angle Adjustment for Side B Play

9.3 Mechanical Adjustments

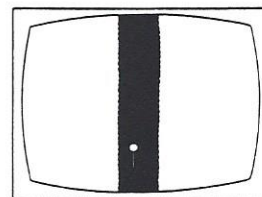
- Purpose: To adjust the crosstalk to become minimum in the tangential direction angle of the pick-up assembly when playing side B of the disc.
- When not properly adjusted: Crosstalk is significant.

- | | |
|---|---|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Position to be adjusted | <ul style="list-style-type: none"> ● TV monitor ● Small Phillips screwdriver (cross-bladed) ● Monitor screen ● 8-inch LD test disc GGV1002 ... #115 (#104) ● Still mode ● The carriage assembly should be in the reverse position. ● Pick-up tangential direction angle adjustment screw |
|---|---|

Connection diagram



2. Pick-up tangential direction angle adjustment



2. Minimum crosstalk

Adjustment Procedure

1. Play the LD test disc and search frame #115 (#104).
2. Check if crosstalk appears on the screen of the TV monitor, and adjust the pick-up tangential direction angle adjustment screw so that the crosstalk is minimized.
3. After steps 1 and 2 have been completed, perform "10. Centering Adjustment for Side B Play" again.

Note: When the pick-up tangential direction angle for side B play is varied by this adjustment, the center of the disc for side B may be shifted slightly. As a countermeasure, perform the centering adjustment again.

(→ 12. Fine Centering Adjustment for Side B Play)

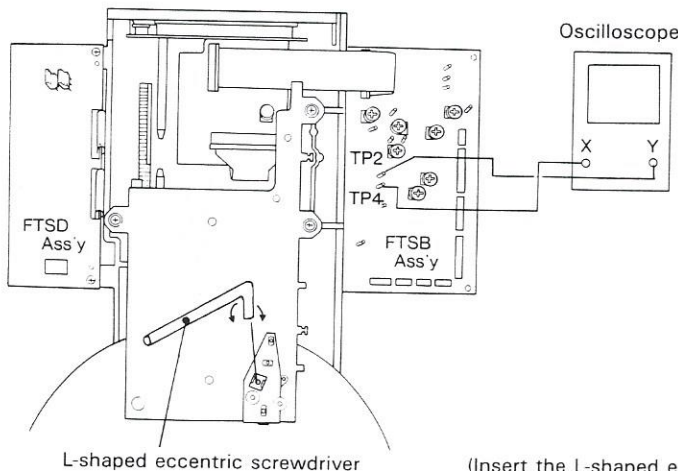
12. Fine Centering Adjustment for Side B Play

9.3 Mechanical Adjustments

- Purpose: To set the center of the spindle motor on the track of the laser beam when playing the side B of the disc.
- When not properly adjusted: Tracks skipped when playing side B of the disc.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring points: • Test disc and player mode • Adjustment position | <ul style="list-style-type: none"> • Oscilloscope • L-shaped eccentric screwdriver (GGV-129) • FTSB assembly TP4 (TRKG error), TP2 (TRKG sum) • 8-inch LD test disc GGV1002 ... #100 (#300) • Play mode • The carriage assembly should be in the reverse position. • Test mode (TRKG servo: Open) • Centering adjustment hole for side B |
|--|--|

Connection diagram



X: 20 mV/div
 Y: 20 mV/div
 X-Y mode

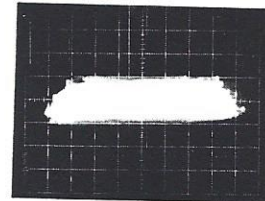


Photo 15

4. X-axis of Lissajous figure maximum

L-shaped eccentric screwdriver
 4. Fine centering adjustment for side B play

(Insert the L-shaped eccentric screwdriver with its grip on the spindle side.)

Adjustment Procedure

1. Set the oscilloscope to the X-Y mode, and connect FTSD assembly TP4 (TRKG error) to the oscilloscope's X-input (CH-1) and TP2 (TRKG sum) to the Y-input (CH-2).
2. Play the LD test disc and search frame #100 (#300).
3. Open the TRKG servo.
4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure becomes maximum. (Photo 15)

9.4 VSOP ASSEMBLY ADJUSTMENT

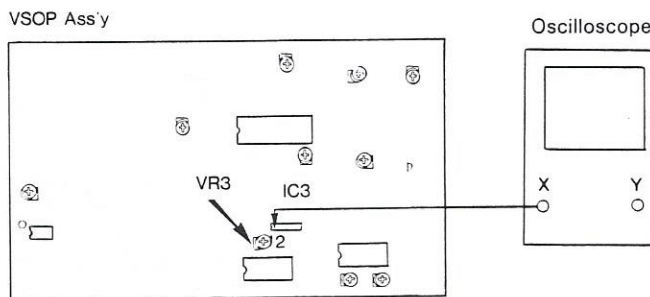
9.4 VSOP (TBC) ASSEMBLY ADJUSTMENT

1. PLL Offset

- Purpose: To adjust the offset of the 3.58 MHz VCXO for the detection of VPS errors.
- When not properly adjusted: The image (picture) is abnormal (irregular color)

- | | |
|--|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • VSOP (TBC) assembly IC3 (NJM4558S) pin 2 • LD test disc • Play mode • VSOP assembly VR3 |
|--|---|

Connection diagram



Adjustment Procedure

1. Play the LD test disc.
 2. Connect an oscilloscope to the VSOP assembly IC3 (NJM4558S) pin 2.
 3. Adjust VR3 in the VSOP assembly to set the offset voltage to 0 V.
- VPS : Video Phase Shifter
 VCXO : Voltage Controlled Crystal Oscillator

2. Trapezoid Inclination Adjustment

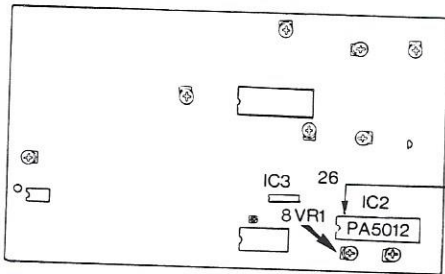
9.4 VSOP (TBC) ASSEMBLY ADJUSTMENT

- Purpose: To adjust the inclination of the trapezoidal (pulse) waveform used for SPDL/TBC error detection.
- When not properly adjusted: When a CAV disc is used with through-mode, the picture on the screen flickers in the still mode, or the position of the image stored in memory may appear in a different position.

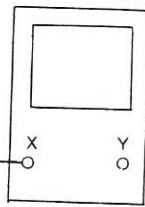
- | | |
|--|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • VSOP (TBC) assembly IC2 (PA5012) Pin 26 • LD test disc • Still mode at an arbitrary frame. • VSOP (TBC) assembly VR1 |
|--|--|

Connection diagram

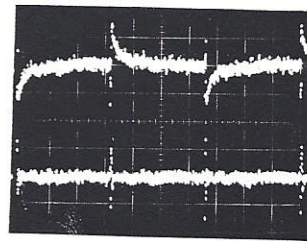
VSOP Ass'y



Oscilloscope



X: 0.2 V/div
Y: 10 ms/div
DC input



Adjustment not complete

Properly adjusted

Photo 16

Adjustment Procedure

1. Play the LD test disc and set to the still mode at an arbitrary frame of the disc.
 2. Set the Digital Memory switch OFF.
 3. Connect the oscilloscope to IC2 (PA5012) pin 26 (VPS error) in the VSOP assembly.
 4. Adjust VR1 in the VSOP assembly so that the VPS error waveform is stabilized (flat). (Photo 16)
- Trapezoid : Trapezoidal waveform for generation of SPDL error signal.
VPS : Video phase shift
Note: If IC2 pin 26 cannot be located easily, measure the voltage at IC3 pin 8.

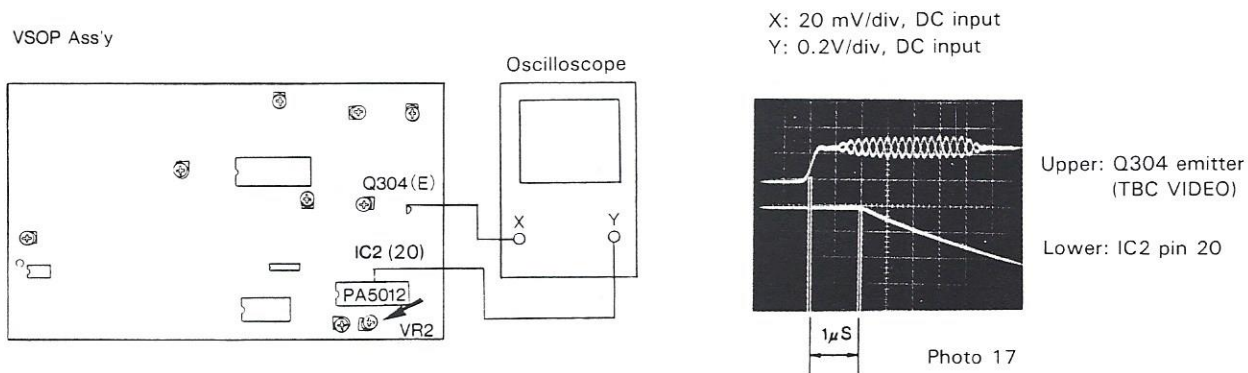
3. Burst Gate Timing Adjustment

9.4 VSOP (TBC) ASSEMBLY ADJUSTMENT

- Purpose: To set the burst gate to the optimum value.
- When not properly adjusted: Play starts from the middle of the disc.
No color or irregular color, or thin stripes are noticeable.

- | | |
|---|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring positions: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • VSOP assembly Q304 (emitter), IC2 (PA5012) pin 20 • LD test disc • Play mode • VSOP assembly VR2 |
|---|--|

Connection diagram



Adjustment Procedure

1. Play the LD test disc.
2. Connect the oscilloscope's X-input (CH-1) to the emitter of Q304 in the VSOP assembly and Y-input (CH-2) to pin 20 of the IC2 (PA5012).
3. Adjust VR2 in the VSOP assembly so that rising edge of the MMV's output comes 1 μ sec later than the rising edge of the video signal. (Photo 17)
MMV: Monostable Multivibrator

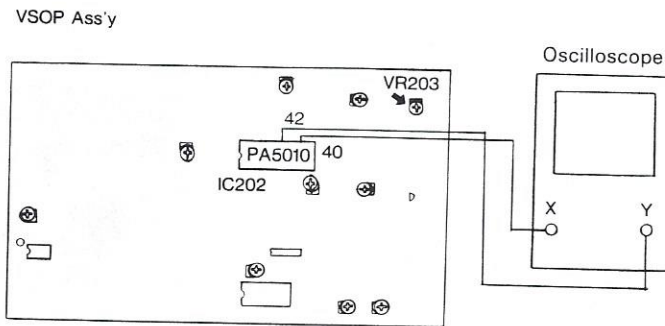
4. 1H Delay Video Level Adjustment

9.4 VSOP (VDEM) Assembly Adjustment

- Purpose: To adjust so that the amplitude of the video signal subject to 1H delay becomes the same as the amplitude of the main track video signal.
- When not properly adjusted: When 1H delay level is too high
 - White dropout becomes noticeable and horizontal sync is disordered (horizontal stripes appear on the screen)
 When 1H delay level is too low
 - Black dropout becomes noticeable

- | | |
|---|---|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring positions: ● Test disc and player mode: ● Position to be adjusted: | <ul style="list-style-type: none"> ● Dual-trace oscilloscope ● VSOP assembly IC202 (PA5010) pin 42, pin 40 ● N-series LD test disc ... #19,801 (F-series ... #19,801) ● VSOP assembly VR203 |
|---|---|

Connection diagram



Adjustment Procedure

1. Play the LD test disc and search frame #19,801 (#19,801).
2. Connect the oscilloscope's X-input (CH-1) to pin 40 of IC202 (PA5010) in the VSOP assembly and Y-input (CH-2) to pin 42 of IC202 (PA5010), to observe the main track video signal waveform and the 1H delay line video signal waveform at the same time.
3. Adjust VR203 in the VSOP assembly so that the amplitude from the sync tip to the white peak level of the 1H delay video signal (CH-2) becomes the same as that of main track video signal (CH-1). (Photo 18)

X: 50 mV/div, DC input
 Y: 50 mV/div, DC input
 10 μs/div

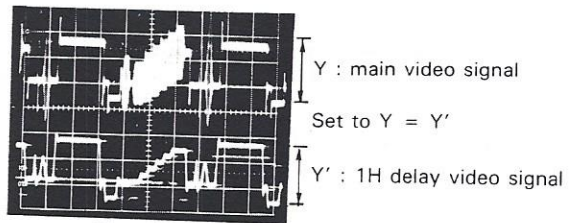


Photo 18

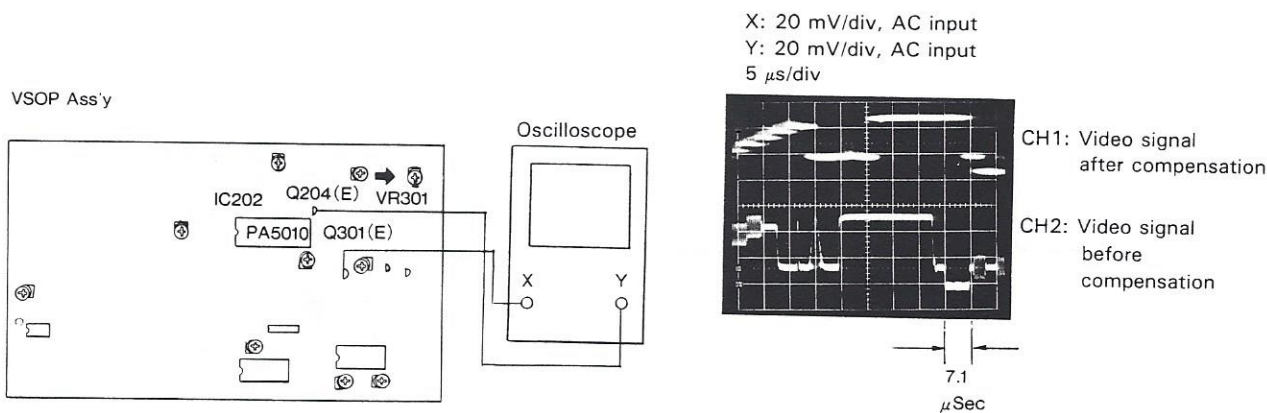
5. VCO Center Frequency Adjustment

9.4 VSOP (VDEM) Assembly Adjustment

- Purpose: To set the delay time of the CCD variable delay line for time axis error compensation to the optimum value.
- When not properly adjusted: Color not stabilized.
Color lock will be delayed after searching.

- | | |
|---|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring positions: ● Test disc and player mode: ● Position to be adjusted: | <ul style="list-style-type: none"> ● Dual trace oscilloscope ● VSOP assembly Q204 emitter, Q301 emitter ● N-series LD test disc ... #19,801 (F-series ... #19,801) ● VSOP assembly VR301 |
|---|--|

Connection diagram



Adjustment Procedure

1. Play the LD test disc and search frame #19,801 (#19,801).
2. Connect the oscilloscope's X-input (CH-1) to the emitter of Q302 in the VSOP assembly and the Y-input (CH-2) to the emitter of Q204, and triggers CH-2 to observe the waveforms of the video signals before and after time axis error compensation at the same time.
3. The CH-1 video signal after time axis error compensation includes jitter. Observing the falling edge of the horizontal sync signal (H-Sync), adjust VR301 in the VSOP assembly so that the center of the jitter is delayed by 70.6 μsec (1H + 7.1 μsec) after the falling edge of the horizontal sync signal (H-Sync) of the CH-2 video signal before compensating the time-axis error. (Photo 19)

VCO: Voltage Controlled Oscillator
CCD: Charge Coupled Devices

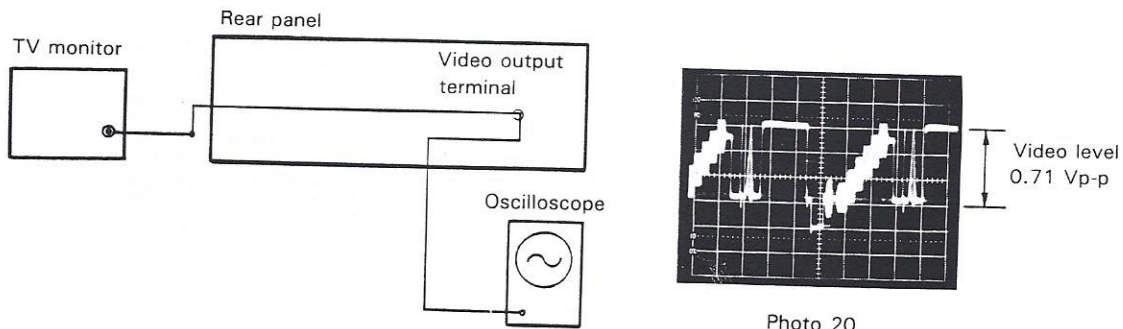
6. Output Video Level Adjustment

9.4 VSOP (VDEM) Assembly Adjustment

- Purpose: To set the output video signal amplitude (between the pedestal level and 100% white level) to 0.71 V_{p-p}.
- When not properly adjusted: Video data cannot be read out and play starts in the middle of the disc.
Screen is too bright or too dark.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • Video signal output terminal in the ADEM Assembly • N-series LD test disc ... #19,801 (F-series ... #19,801) • VSOP assembly VR302 |
|--|--|

Connection diagram



Adjustment Procedure

Note: The video output terminal should be terminated with 75 ohms by connecting to the video monitor. When a TV without a video input terminal is used, terminate the video output terminal using a 75-ohm resistor.

1. Play the LD test disc and search frame #19,801 (#19,801).
2. Connect the oscilloscope to the video output terminal and observe the playback video signal waveform.
3. Adjust VR302 in the VSOP assembly so that the amplitude between the pedestal level and the white level of the playback video signal waveform becomes 0.71 V_{p-p} ± 5%. (Photo 20)

7. Hue Error Signal Level Adjustment

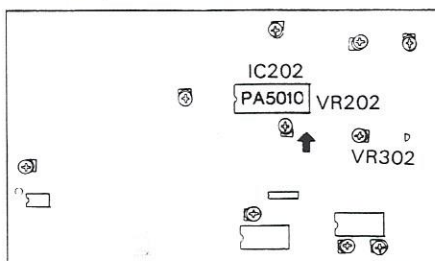
9.4 VSOP (VDEM) Assembly Adjustment

- Purpose: To set the amount of the hue error signal applied to the color hue compensator to the optimum value.
- When not properly adjusted: Irregular color significant

- | | |
|--|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Adjustment position: | <ul style="list-style-type: none"> • TV monitor • Adjust by watching the screen of the monitor • N-series LD test disc ... #7,201 (F-series . #26,101) • VSOP assembly VR202 |
|--|--|

Connection diagram

VSOP Ass'y



Adjustment Procedure

1. Play the LD test disc and search frame #7,201 (#26,101).
3. Adjust VR202 in the VSOP assembly so that irregularities of the magenta screen are minimized.

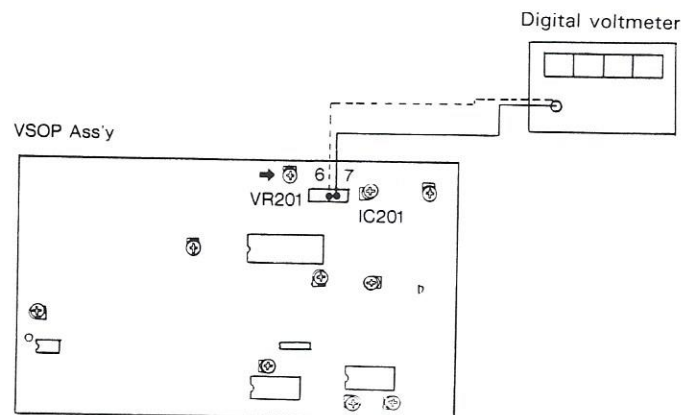
8. Detection Level Adjustment

9.4 VSOP (VDEM) Assembly Adjustment

- Purpose: To set the input voltage applied to the comparator for the detection of spindle motor overrunning
- When not properly adjusted: Spindle servo is not locked, and screen distorted.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring positions: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Digital voltmeter • VSOP assembly IC201 (NJM2903S) pin7, pin 6 • N-series LD test disc ... #4,801 (F-series ... #5,401) • VSOP assembly (VDEM) VR201 |
|---|---|

Connection diagram



Adjustment Procedure

1. Play the LD test disc and search frame #4,801 (#5,401).
2. Connect the digital voltmeter to pin 7 of IC201 (NJM2903S) in the VSOP assembly, and measure and write down the reference voltage of the detection comparator for the overrunning of the spindle motor.
3. Connect the digital voltmeter to IC201 pin 6 and measure the output voltage for speed detection. Adjust VR201 in the VSOP assembly so that the voltage at pin 6 is higher than the voltage at pin 7 by 330 mV.

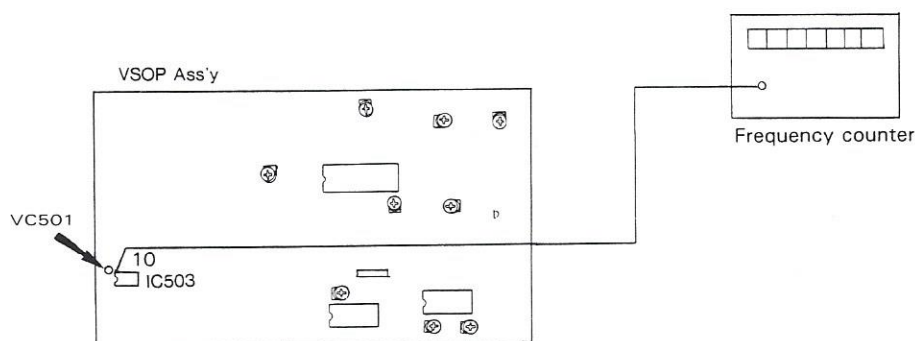
9. Memory Clock Frequency Adjustment

9.4 VSOP (MEMORY) Assembly Adjustment

- Purpose: To set the input voltage applied to the VCXO to the optimum value.
- When not properly adjusted: Horizontal rate of image (picture) incorrect.

- | | |
|--|---|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring position: ● Test disc and player mode: ● Position to be adjusted: | <ul style="list-style-type: none"> ● Oscilloscope ● VSOP assembly IC503 pin 10 ● Turn ON the power. (It is not necessary to play a disc.) ● VSOP assembly VC501 |
|--|---|

Connection diagram



Adjustment Procedure

1. With the player's power ON, connect the frequency counter to pin 10 of IC503 (BU74HCU04) in the VSOP assembly.
2. Adjust VC501 in the VSOP assembly so that the frequency at pin 10 becomes $18.1258\text{M Hz} \pm 150\text{ Hz}$.

10. MMV Adjustment

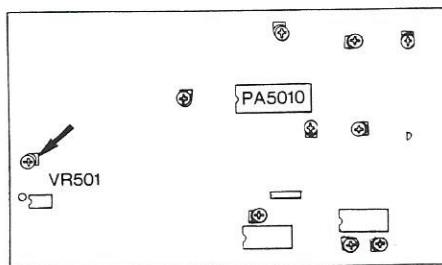
9.4 VSOP (MEMORY) Assembly Adjustment

- Purpose: To match the time axes of the through-video signal and the memory video signal.
- When not properly adjusted: The memory video signal picture is shifted horizontally when compared to the through-video signal picture.

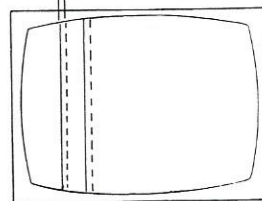
- | | |
|--|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • TV monitor • Monitor screen • N-series LD test disc ... #3,900 (F-series ... #1,000) • VSOP assembly VR501 |
|--|---|

Connection diagram

VSOP Ass'y



Deviation TV monitor



Set the horizontal jitter to minimum

Adjustment Procedure

1. Play the LD test disc and search frame #3,900 (#1,000).
2. While watching the TV screen, turn the DIGITAL MEMORY button ON and OFF repeatedly, and adjust VR501 of the VSOP assembly so that the deviation between the image that has passed through the digital memory and the image that has not passed through the memory becomes minimum.

MMV : Monostable Multivibrator

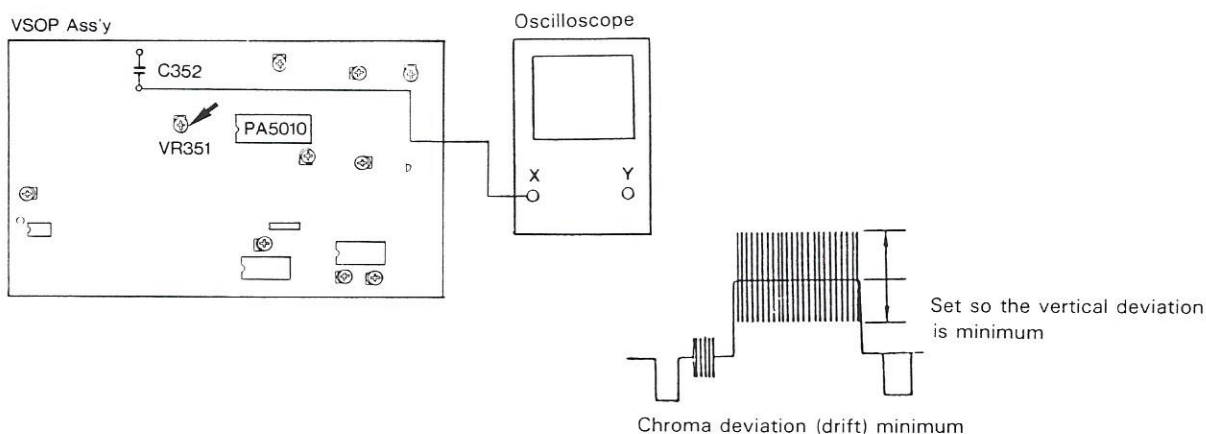
11. 140 ns Shift Level Adjustment

9.4 VSOP (MEMORY) Assembly Adjustment

- Purpose: To set the amplitude of the chroma signal waveform of the video signal which is shifted by 140 ns to the same amplitude as that of the chroma signal waveform of the video signal which is not shifted.
- When not properly adjusted: TV screen flickers

- | | |
|--|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • VSOP assembly (VDEM), C352's lead wire • N-series LD test disc ... #7,201 (F-series ... #6,301) • VSOP assembly VR351 |
|--|---|

Connection diagram



Adjustment Procedure

1. Play the LD test disc and search frame #7,201 (#6,301)
2. Connect an oscilloscope to C352's lead wire (MEMV) in the VSOP (MEM) assembly, and observe the video signal waveform output from the digital memory.
3. Adjust VR351 in the VSOP assembly so that the vertical deviation of the chroma signal becomes minimum.
4. Observe the magenta image on the TV screen and check there is no flickering.

9.5 ADEM ASSEMBLY ADJUSTMENT

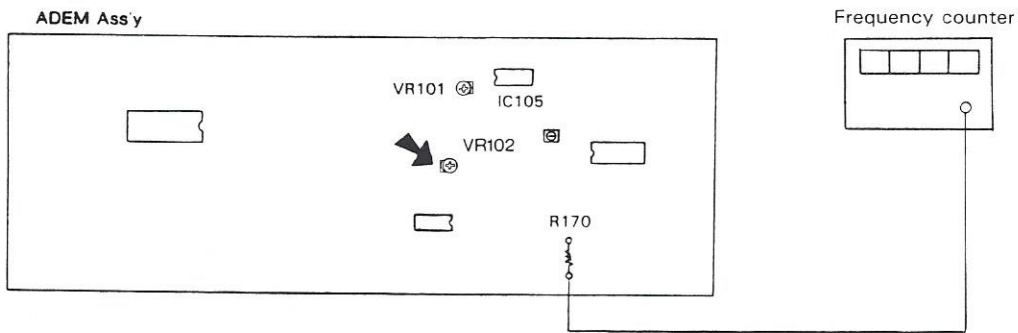
1. VCXO Freerunning Frequency Adjustment

9.5 ADEM Assembly Adjustment

- Purpose: To adjust the frequency of the crystal oscillator used by the EFM decoder to the optimum value.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring point: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Frequency counter • Lead wire of R170 in the ADEM assembly • CD test disc • Play any track of the disc • ADEM assembly VR102 |
|---|---|

Connection diagram



Adjustment Procedure

1. Play any track of the CD test disc.
2. Connect the frequency counter to the lead wire of R170 in the ADEM assembly and observe the freerunning frequency of VCXO.
3. Adjust VR102 in the ADEM assembly so that the frequency becomes $4.2336\text{MHz} \pm 200\text{Hz}$.

VCXO: Voltage Controlled Crystal Oscillator

Note: With this adjustment, the VCXO will free run when playing CD and be locked when playing an LD.

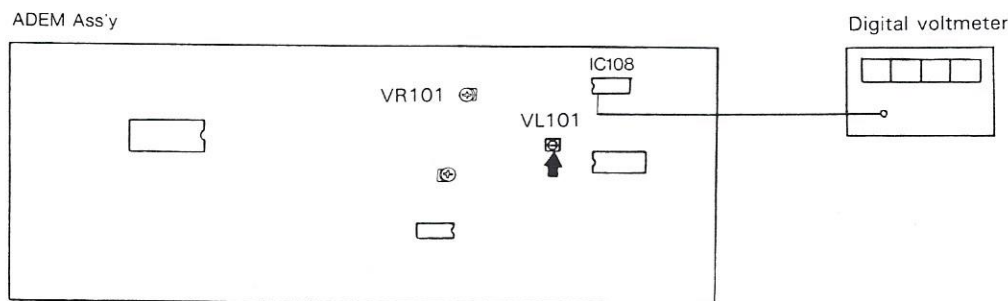
2. PLL Freerunning Frequency Adjustment

9.5 ADEM Assembly Adjustment

- Purpose: To adjust the freerunning frequency of the PLL VCO used by the EFM decoder to the optimum value.
- When not properly adjusted: No sound, or sound is interrupted

- | | |
|--|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Digital voltmeter • ADEM assembly IC108 (NJM082S) pin 2 • LD disc with digital audio (hereinafter, LDD) • Play an arbitrary frame • ADEM assembly VL101 |
|--|---|

Connection diagram



Adjustment Procedure

1. Play any frame of the LDD disc.
2. Connect the digital voltmeter to pin 2 of IC108 in the ADEM assembly and observe the DC voltage of the VCO control signal.
3. Adjust VL101 of the ADEM assembly so that the DC voltage of the VCO control signal becomes +400 mV ± 100 mV.

PLL : Phase Locked Loop
 VCO : Voltage Controlled Oscillator

Note: This adjustment should be performed with the PLL in the locked condition.

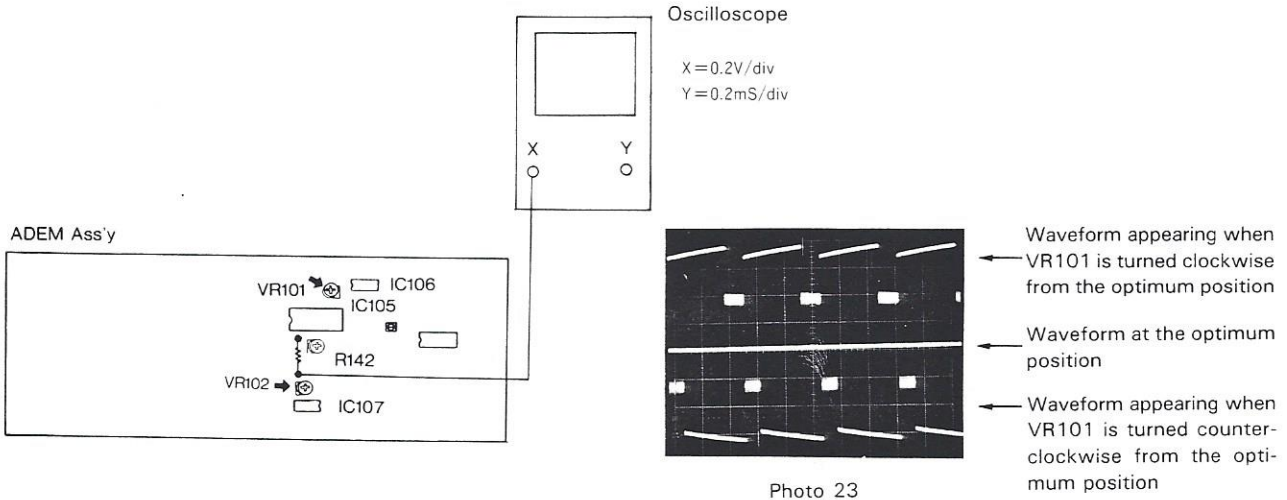
3. VCXO Offset Adjustment

9.5 ADEM Assembly Adjustment

- Purpose: To set the offset voltage of the VCXO PLL phase error signal to minimum.
- When not properly adjusted: Digital audio output is interrupted when playing an LDD disc. (Noise appears synchronously)

- | | |
|--|--|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Position to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • Lead wire of R142 (MDP) in the ADEM assembly • LDD disc • Play any frame • ADEM assembly VR101 |
|--|--|

Connection diagram



Adjustment Procedure

1. Play any frame of the LDD disc.
2. Connect the oscilloscope to the lead wire of R142 (MDP) in the ADEM assembly and observe the PLL phase error output signal of the VCXO.
3. Adjust VR101 in the ADEM assembly so that the width of the pulse appearing on the positive or negative side becomes minimum with continuous waveforms. (Photo 23, center)

VCXO : Voltage Controlled Crystal Oscillator
PLL : Phase Locked Loop

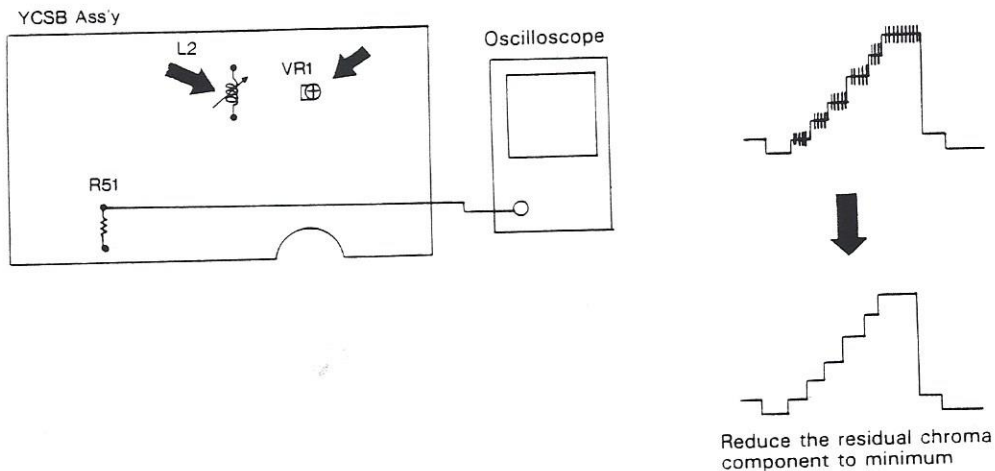
9.6 YCSB ASSEMBLY ADJUSTMENT

9.6 YCSB Assembly Adjustment

- Purpose: To set the chroma component included in the luminance signal to minimum.
- When not properly adjusted: Dot interference increases on the screen and the image becomes too glossy.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Measuring instruments and jigs: • Measuring position: • Test disc and player mode: • Positions to be adjusted: | <ul style="list-style-type: none"> • Oscilloscope • LD test disc • Lead wire of R51 in YCSB assembly • N-series LD test disc ... #19,801 (F-series ... #19,801) • YCSB assembly VR1, L2 |
|---|---|

Connection diagram



Adjustment Procedure

1. Connect an oscilloscope to the lead wire of R51 in the YCSB assembly.
2. Play frame #19,801 (#19,801) of the LD test disc.
3. Observe the luminance signal and turn VR1 to minimize the chroma component.
4. Turn L2 further so that the chroma component is minimized.
5. Repeat the procedures in steps 3 and 4.
6. Check that there is no abnormal color in the image on the TV screen.

