ORDER NO. AD9404104C1
A6

Service Manual

COMPACT disc DIGITAL AUDIO

DIGITAL

MASH* multi-stage noise shaping

Compact Disc Changer

SL-PD449

Colour

(K) ... Black Type

Area

Suffix for Model No.	Area	Colour
(P)	U.S.A.	(K)

※
- Technics (or Panasonic) developed the world's first MASH type DAC and ADC. MASH technology was invented by NTT (LSI Labs).
- MASH is a trademark of NTT.

RAE0113Z MECHANISM SERIES

■ SPECIFICATIONS

■ AUDIO

No. of channels	2 (left and right, stereo)
Frequency response	2−20,000 Hz, ±1 dB
Output voltage	2 V (at 0 dB)
Dynamic range	92 dB
S/N	100 dB
Total harmonic distortion	0.007 % (1 kHz, 0 dB)
Wow and flutter	Below measurable limit
DA converter	MASH (1 bit)
Output impedance	Approx. 1 kΩ
Load impedance	More than 10 kΩ

■ PICKUP

Wavelength	780 nm

■ GENERAL

Power consumption	11 W
Power supply	AC 120 V, 60 Hz
Dimensions (W × H × D)	360 × 125 × 370 mm (14-3/16″ × 4-15/16″ × 14-9/16″)
Weight	4.1 kg (9.1 lb.)

Note:

Disign and specifications are subject to change without notice.
Weight and dimensions are approximate.

■ CONTENTS

Panasonic®

⚠ WARNING

This service literature is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service literature by anyone else could result in serious injury or death.

■ PRECAUTION OF LASER DIODE

CAUTION: This unit utilizes a class 1 laser. Invisible laser radiation is emitted from the optical pickup lens when the unit is turned on:

1. Do not look directly into the pickup lens.
2. Do not use optical instruments to look at the pickup lens.
3. Do not adjust the preset variable resistor on the optical pickup.
4. Do not disassemble the optical pickup unit.
5. If the optical pickup is replaced, use the manufactures specified replacement pickup only.
6. Use of control or adjustments or performance of procedures other than those specified herin may result in hazardous radiation exposure.

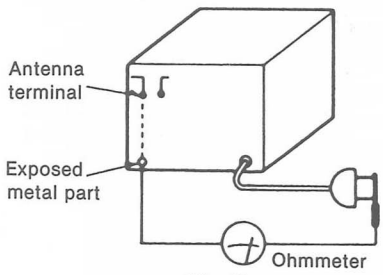
■ SAFETY PRECAUTION (This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

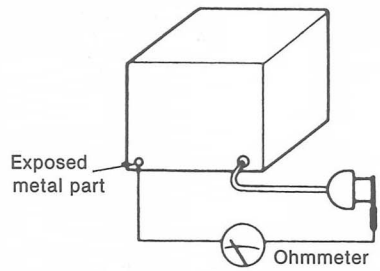
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance=3MΩ–5.2MΩ

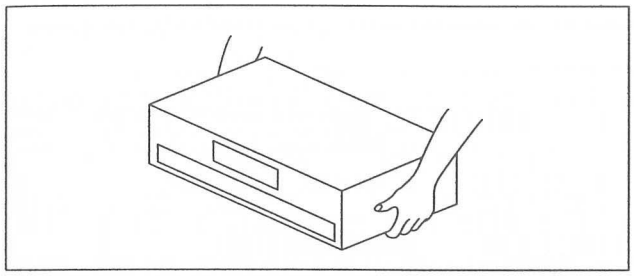


(Fig. B)

Resistance=Approx ∞

4. If the measurement is outside the specified limits, there is a possibilty of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ CAUTIONS CONCERNING THE MOVING OF THIS UNIT



CAUTION

Before moving the changer to another location, be sure to carry out the "Preparations for moving the unit" described below.

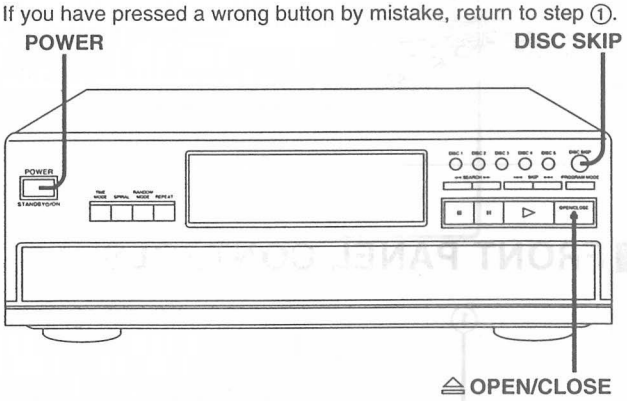
Failure to do so will expose the compact discs and the changer to the risk of severe damage.

Preparations for moving the unit

All of the discs must be removed so that the trays are completely empty.
Use the following procedure.

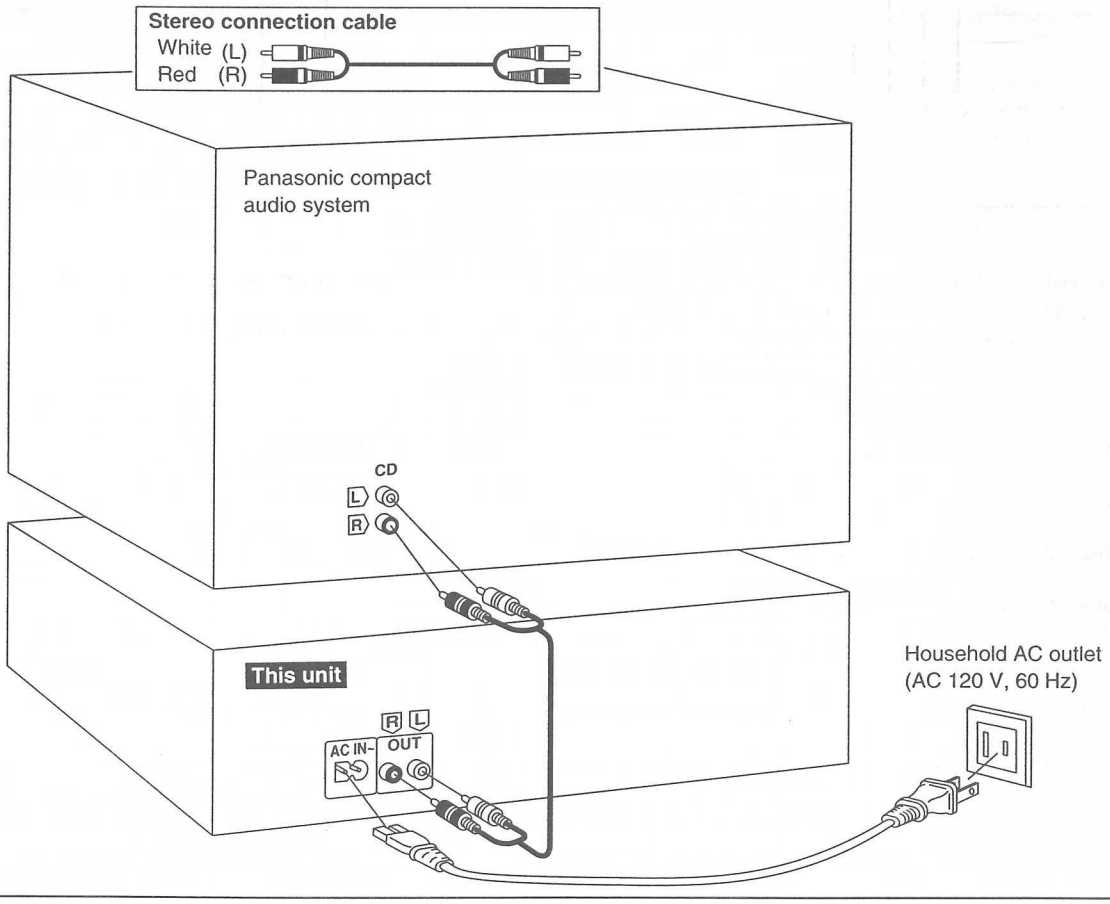
① Press POWER to switch off the unit.
② Press POWER to switch on the unit.
(If there is a disc in the play section, it will be returned to the disc tray at this time.)
③ Press ⏏ OPEN/CLOSE to open the loading drawer.
④ Press DISC SKIP to rotate the disc trays and remove the discs from all disc trays.
⑤ Press ⏏ OPEN/CLOSE to close the loading drawer.
⑥ Press POWER to switch off the unit.

If you have pressed a wrong button by mistake, return to step ①.



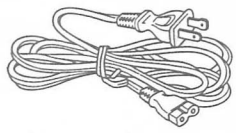
■ CONNECTIONS

Before connecting the changer to your audio system, make sure that the power of the changer and all other system components are turned off.

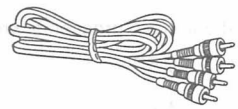


■ ACCESSORIES

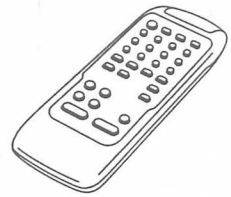
AC power supply cord ..... 1 pc. (SJA172)



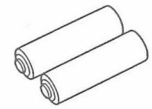
Stereo connection cable ..... 1 pc. (SJP2249-3)



Remote control transmitter ..... 1 pc. (RAK-SL142WH)

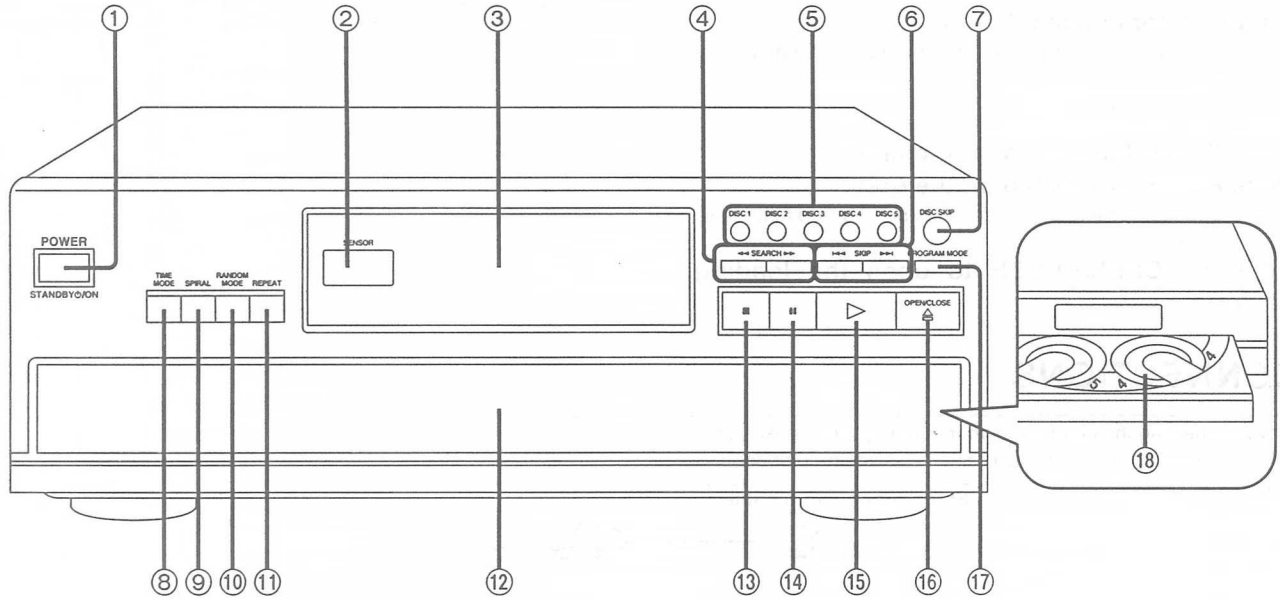


Batteries for remote control transmitter ..... 2 pcs. (UM-4, "AAA", R03)



Note: These are available on sale route.

■ FRONT PANEL CONTROLS



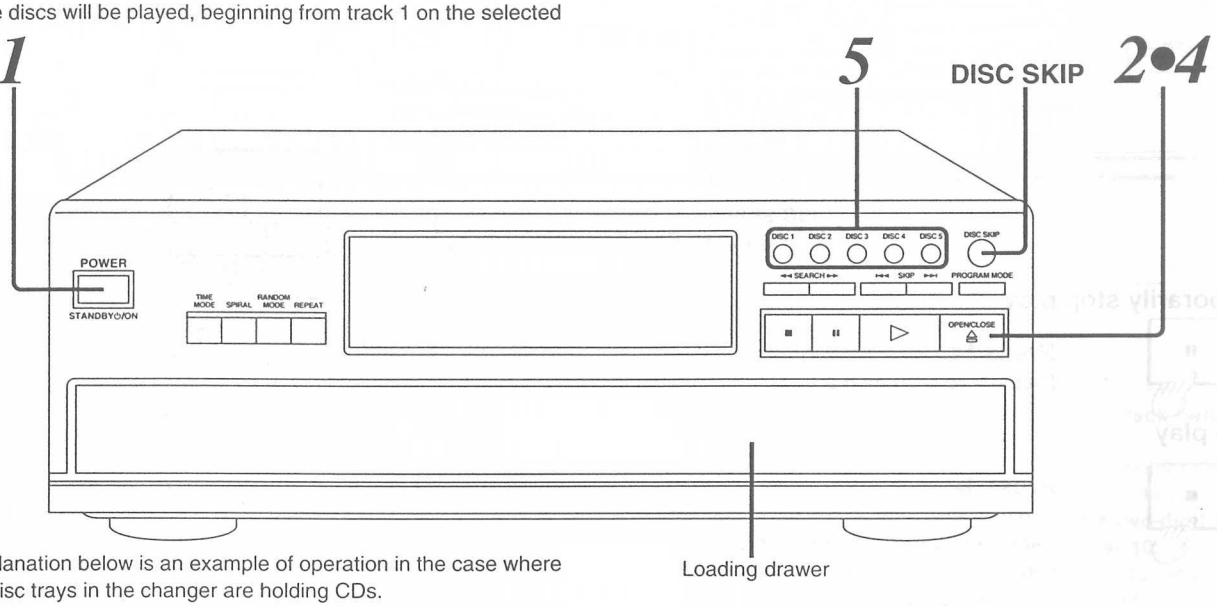
No.	*Name*
①	**Power "STANDBY ⏻/ON" switch (POWER, STANDBY ⏻/ON)** Press to switch the unit from on to standby mode or vice versa. In standby mode, the unit is still consuming a small amount of power.
②	**Remote control signal sensor (SENSOR)**
③	**Display**
④	**Search buttons (◀◀ SEARCH ▶▶)**
⑤	**Disc buttons (DISC 1–5)**
⑥	**Skip buttons (⏮ SKIP ⏭)**
⑦	**Disc skip button (DISC SKIP)**
⑧	**Time mode button (TIME MODE)**
⑨	**Spiral button (SPIRAL)**

No.	*Name*
⑩	**Random mode button (RANDOM MODE)**
⑪	**Repeat button (REPEAT)**
⑫	**Loading drawer**
⑬	**Stop button (■)**
⑭	**Pause button (❚❚)**
⑮	**Play button (▷)**
⑯	**Loading drawer open/close button (⏏OPEN/CLOSE)**
⑰	**Program mode button (PROGRAM MODE)**
⑱	**Disc trays (1–5)**

BASIC OPERATIONS

Sequential play

All of the discs will be played, beginning from track 1 on the selected disc.



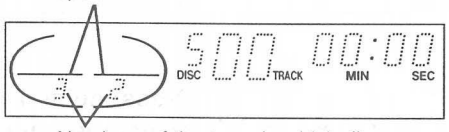
The explanation below is an example of operation in the case where all five disc trays in the changer are holding CDs.

1 POWER

Press POWER.
The unit will switch on.

2 OPEN/CLOSE

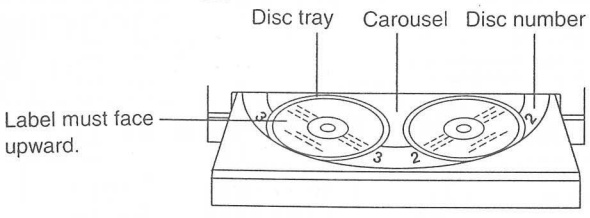
Press ⏏ OPEN/CLOSE to open the loading drawer.
Indicates that the loading drawer is open.



Numbers of the trays in which discs are loaded.

3

Load the disc(s) on the disc tray(s).
The discs can be loaded two at a time by pressing DISC SKIP to rotate the carousel.

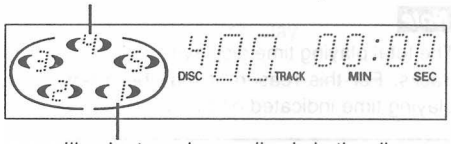


Do not load 3″ (8 cm) and 5″ (12 cm) discs on the same disc tray.

4 OPEN/CLOSE

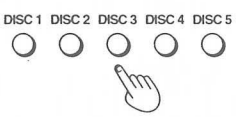
Press ⏏ OPEN/CLOSE again to close the loading drawer.
Do not attempt to close the drawer by hand.

Current play position (The numeral illuminates with a red color.)

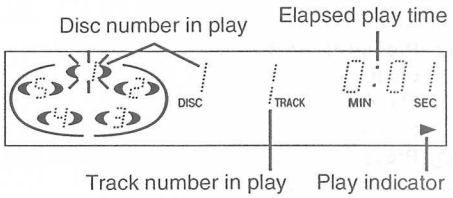


Illuminates when a disc is in the disc tray. If there is no disc in the disc tray, the indication disappears when the disc tray comes to the play position.

5



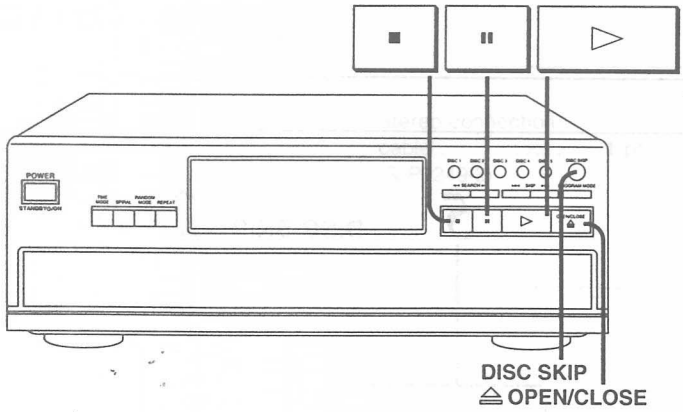
Press the desired disc button (1–5).
Play will begin from the selected disc.
If a disc is not on the selected disc tray, the changer plays the disc at the next number.



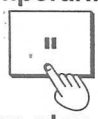
The changer plays all the tracks on all the discs in order and stops automatically when the last track on the last disc finishes playing. The first disc will then be at the playing position.

CAUTION

Do not touch the loading drawer and carousel while they are in motion, and do not attempt to rotate the carousel by hand; doing so could result in incorrect operation of the unit and/or damage to the discs.

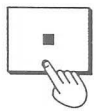


To temporarily stop play

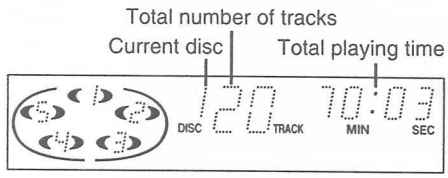


Press ❚❚.
Press ▷ to resume play.

To stop play



Press ■.
The display will show the total number of tracks and the total playing time of the current disc.



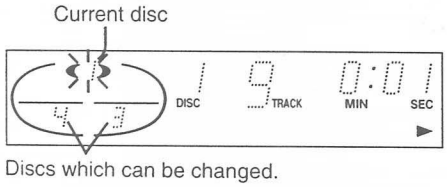
Note

The total playing time displayed includes the silent sections between tracks. For this reason, it may be a few seconds longer than the playing time indicated on the disc.

To exchange discs during play

While playing a disc, it is possible to change the other discs without interrupting play.

① **Press ≙ OPEN/CLOSE to open the loading drawer.**



② **Press DISC SKIP to rotate the disc trays and exchange the discs.**
The carousel will move by one disc tray. Pressing again moves the carousel in the opposite direction by two disc trays.

③ **Press ≙ OPEN/CLOSE to close the loading drawer.**

Note

If you play a disc with the loading drawer open, discs other than the current disc cannot be played.

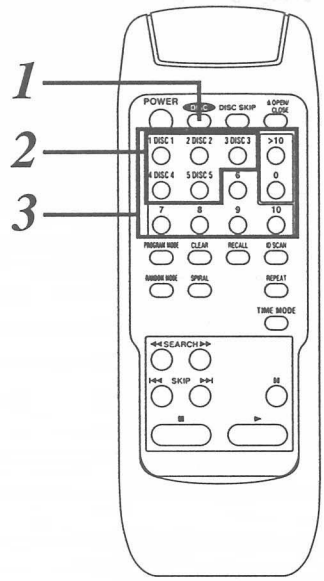
CAUTION

Do not move this changer with a compact disc inside the unit.
If a disc comes off the disc tray, it might be scratched or the changer might become incapable of playing.
(Refer to "Cautions concerning the moving of this unit" on page 3.)

■ DIRECT ACCESS PLAY

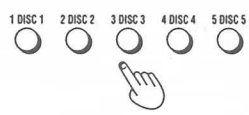
(Available only from the remote control)

This function involves starting play from a specific track on a specific disc and playing all discs on the five-disc tray in sequence.

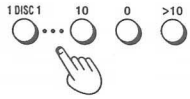


1 

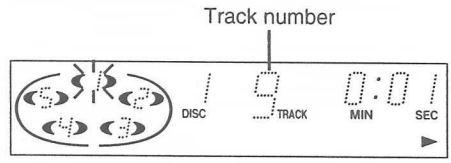
Press DISC.

2 

Press the numeric button (1–5) to select the disc.
If the disc only is selected, play will begin its first track.
If a disc is not on the selected disc tray, the changer plays the disc at the next number.

3 

Press the numeric button(s) to select the track.



To select a track between 1 and 10:
Press the corresponding number on the numeric button.

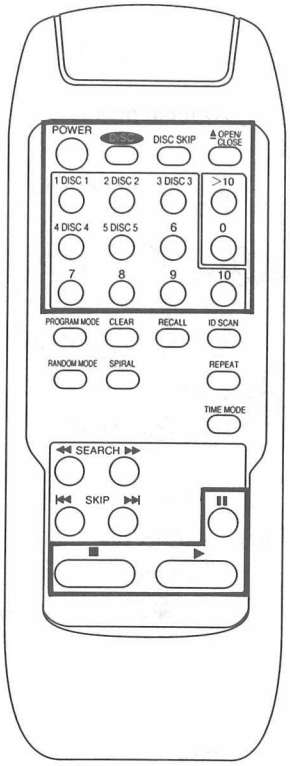
To select a two-digit track number over 10:
First press >10, and then press the numbers for the two digits.

For example; number 20:
Press >10, then 2, and then 0.
Play begins at the track selected and continues through the end of the last disc.

The changer will stop automatically when the last track on the last disc finishes playing.

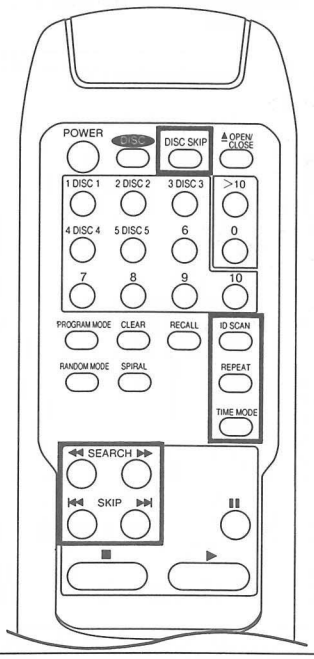
■ REMOTE CONTROL OPERATION

Basic operation



To OFF/ON the main unit	POWER
To open/close the loading drawer	▲OPEN/ CLOSE
To rotate the carousel	DISC SKIP
To select the desired disc number	DISC → 1 DISC 1, 2 DISC 2, 3 DISC 3, 4 DISC 4, 5 DISC 5
To select the desired track number	1 DISC 1, 2 DISC 2, 3 DISC 3, >10, 4 DISC 4, 5 DISC 5, 6, 0, 7, 8, 9, 10 **To select a track between 1 and 10:** Press the corresponding number on the keypad. **To select a two-digit track number over 10:** First press >10, and then press the numbers for the two digits.
To start play	▶
To stop play temporarily	❚❚ Press ▶ button to resume play.
To stop play	■

Other functions



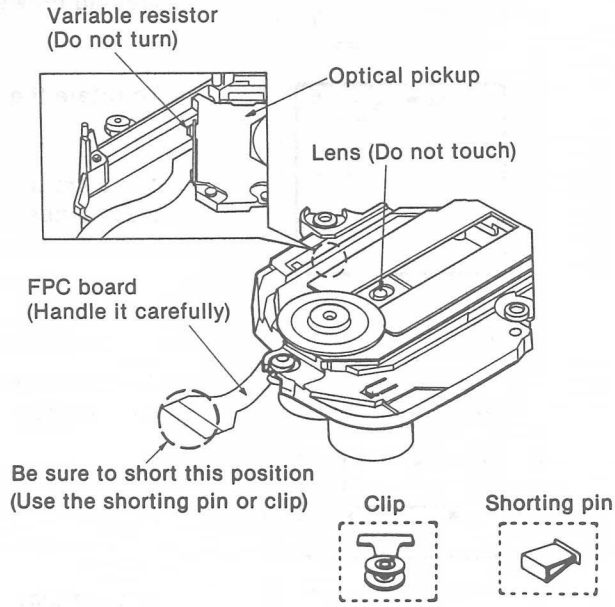
To skip discs	DISC SKIP
To skip tracks	⏮ SKIP ⏭
To search for a desired place	(In the play or pause mode) ◀◀ SEARCH ▶▶
To start ID scan	ID SCAN To cancel ID scan, press this button again.
To repeat play	REPEAT To cancel repeat mode, press this button again.
To select time mode	TIME MODE

■ HANDLING PRECAUTIONS FOR TRAVERSE DECK

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

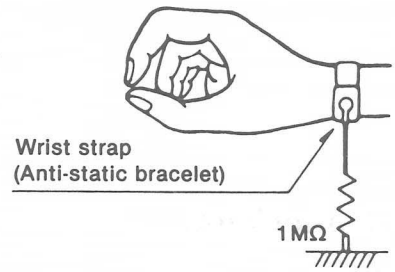
• Handling of traverse deck (optical pickup)

1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an antistatic shorting pin is inserted into the flexible board (FPC board).
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board (FPC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.



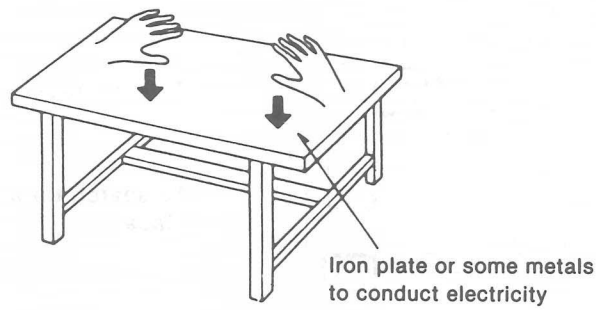
• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table gounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.



Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).



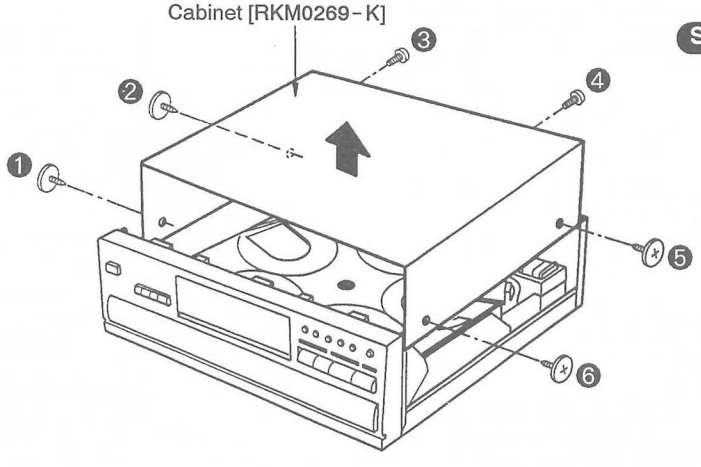
■ OPERATION CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES

NOTE

1. **This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**
2. **For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.**
3. **Select items from the following index when checks or replacement are required.**
4. **Illustrated screws are equivalent to actual size.**
5. **[ ] indicates parts No.**

• Contents

1. Common disassembly procedures (Follow this procedure prior to other disassembly.)



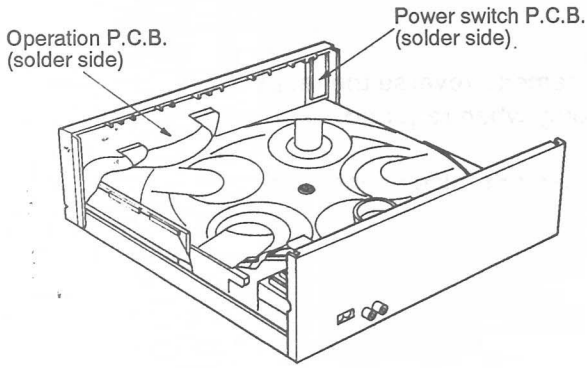
Step 1 Remove the 6 screws.

[SNE2129-3] (Black)

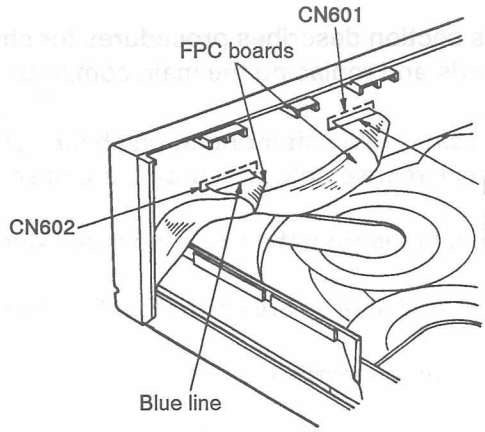
[XTBS3+8JFZ1] (Black)

2. Checking for the operation P.C.B. and power switch P.C.B.

Step 1 Follow the disassembly procedure described in item 1 on page 9.



Step 2 Pull out the FPC boards from connectors.

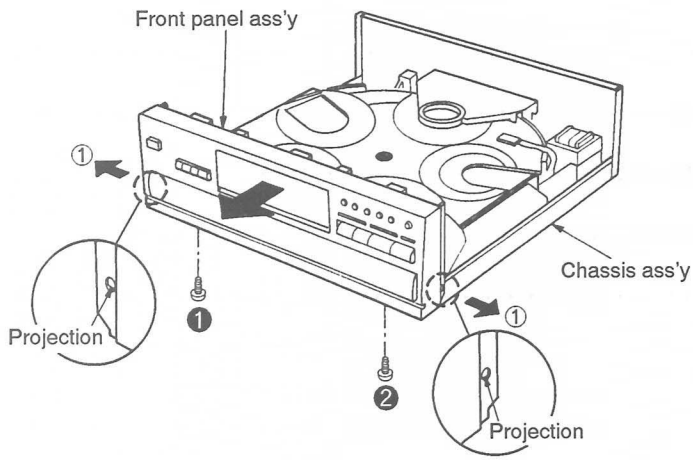


■ Note on installation

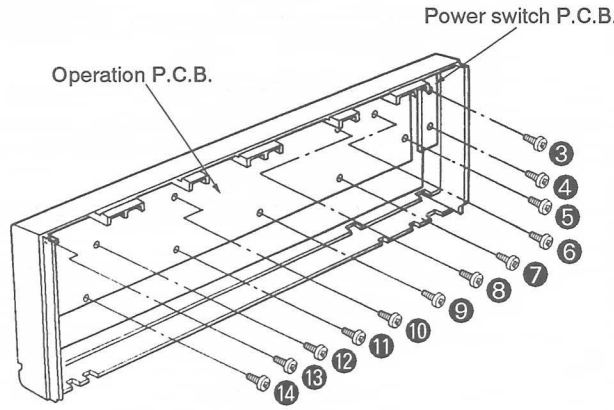
Connect the FPC board with the blue line upward.

Step 3 Remove the 2 screws(❶, ❷).

Step 4 Pull the front panel ass'y in both direction of arrow ① to unlock it from the projections of the chassis ass'y.



Step 5 Remove the 12 screws.



❶, ❷ 〔XTB3+8JFZ〕 (Black)

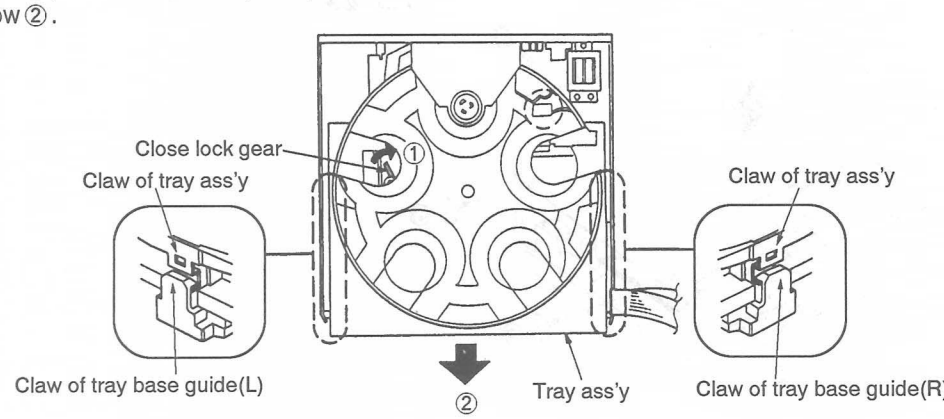
❸ ~ ⓮ 〔XTB26+8J〕

3. Checking for the main P.C.B.

Step 1 Perform the Step 1 ~ Step 4 in item 2 on page 10.

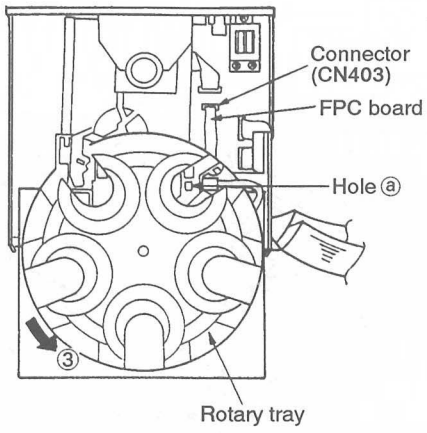
Step 2 Keep the close lock gear pressed in the direction of arrow ①, and move the tray ass'y in the direction of arrow ②.

Step 3 Fit the claw of tray ass'y in the claw of tray base guide(L) and tray base guide(R).

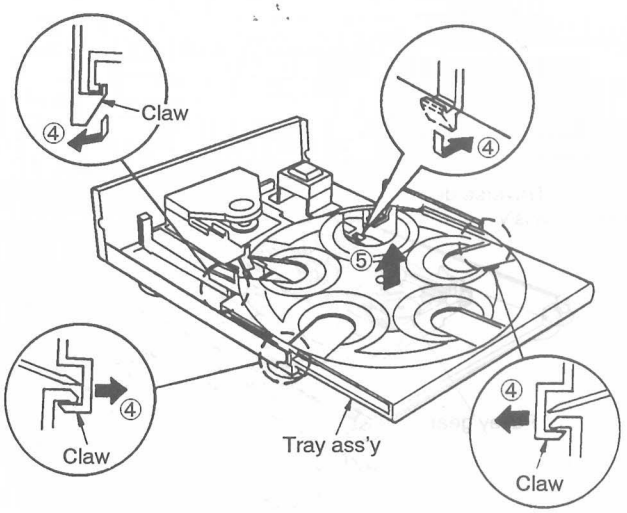


Step 4 Pull out the FPC board from connector.

Step 5 Rotate the rotary tray to the position that can be confirmed the hole ⓐ in the direction of arrow ③.

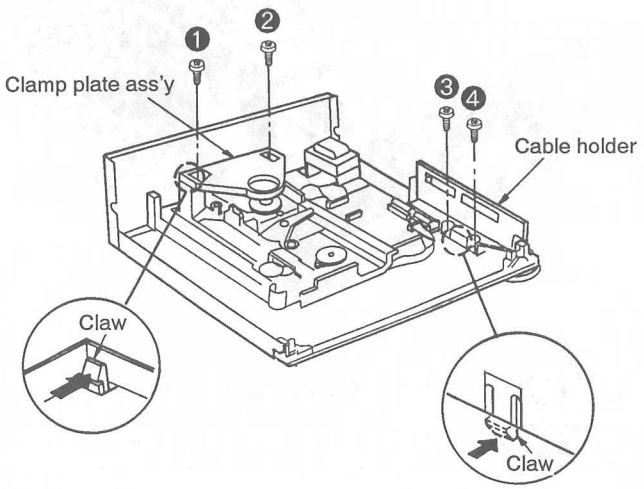


Step 6 Push and release the 4 claws in the direction of arrow ④, and then remove the tray ass'y in the direction of arrow ⑤.

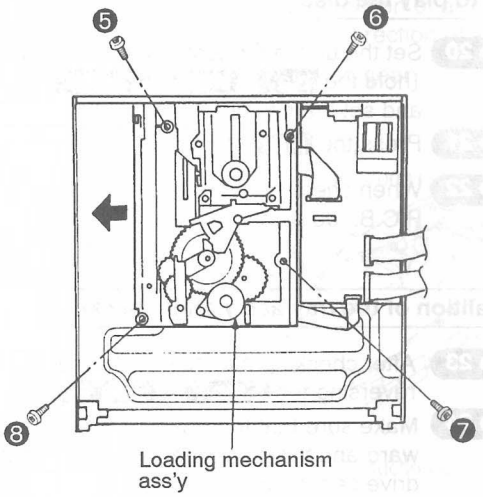


Step 7 Remove the 2 screws and claw, and then remove the clamp plate ass'y.

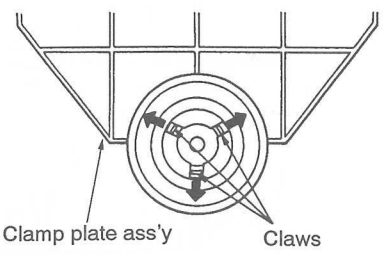
Step 8 Remove the 2 screws and claw, and then remove the cable holder.

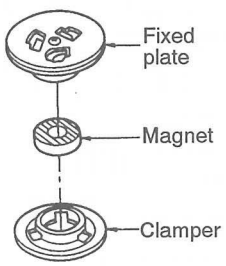


Step 9 Remove the 4 screws, and then move the mechanism ass'y in the direction of arrow.



Step 10 Release the 3 claws, and then remove the fixed plate, magnet and clamper.

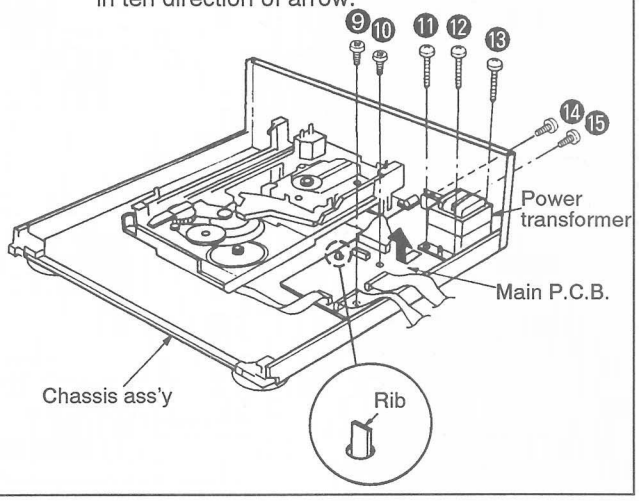




Step 11 Remove the 7 screws.

Step 12 Remove the power transformer.

Step 13 Lift up the main P.C.B. to release the rib of chassis ass'y, and then remove the main P.C.B. in teh direction of arrow.



❶, ❷ [XTB3+10JFZ] (Black)

⓫ ~ ⓭ [XTB3+20J]

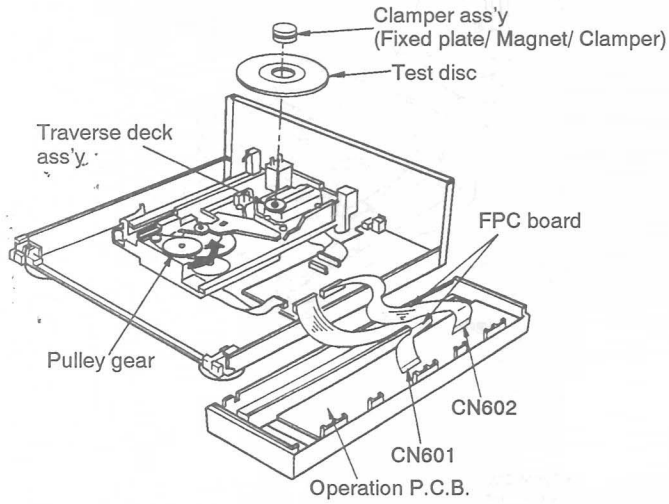
❸ ~ ❿ [XTB3+8JFZ] (Black)

⓮, ⓯ [XTBS3+8JFZ1] (Black)

Step 14 Rotate the pulley gear in the direction of arrow until traverse deck ass'y comes up.

Step 15 Place the test disc and secure it by using the clamper ass'y.

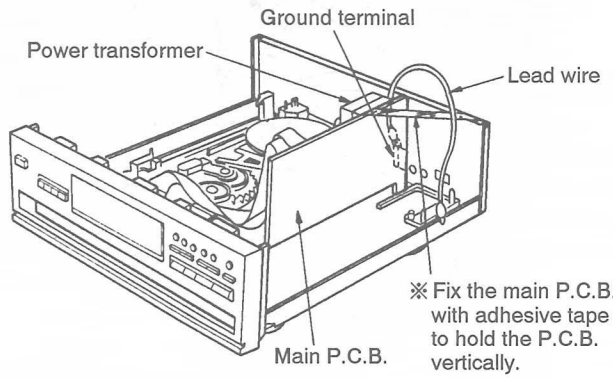
Step 16 Connect the 2 FPC board.



Step 17 Set up the main P.C.B.

Step 18 Connect the main P.C.B. ground terminal (line out terminal) to the chassis ass'y with a lead wire.

Step 19 Install the power transformer on the main P.C.B.

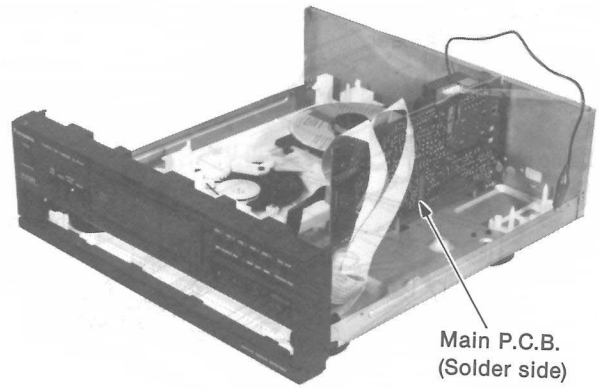


How to play the disc

Step 20 Set the unit in the test mode as follows:
〔hold the play , stop and disc 1 keys(3 keys) on and set the power switch to ON.〕

Step 21 Press the play key and play the test disc.

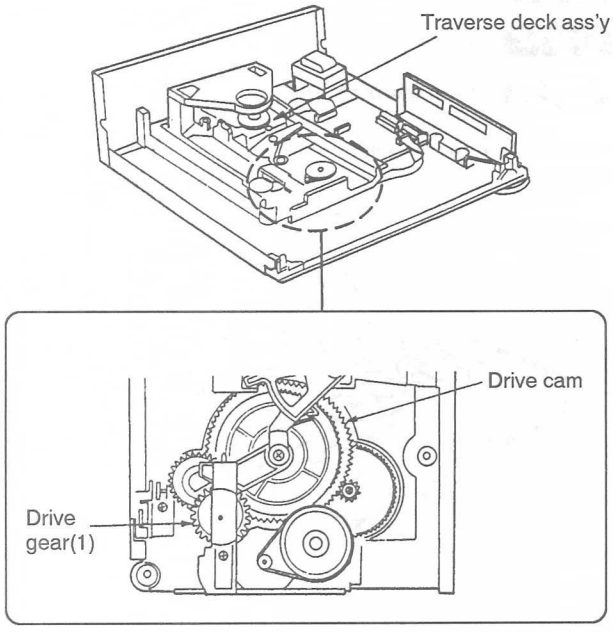
Step 22 When checking the soldered surface of the main P.C.B., do as shown right.



Installtion of the tray ass'y after checking

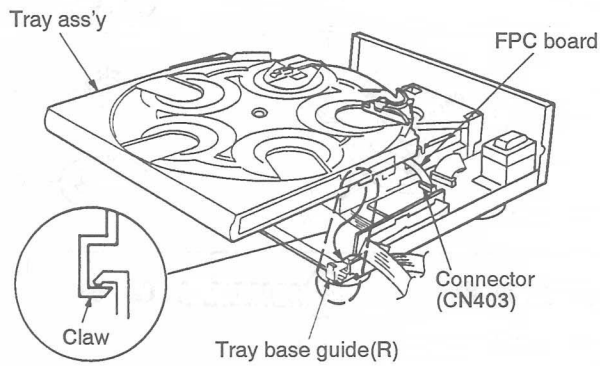
Step 23 After checking the main P.C.B., reassemble by reversing the Step 7 ~ Step 19 .

Step 24 Make sure that the traverse deck ass'y, falls down ward and the drive gear(1) is not engaged to the drive cam gear.



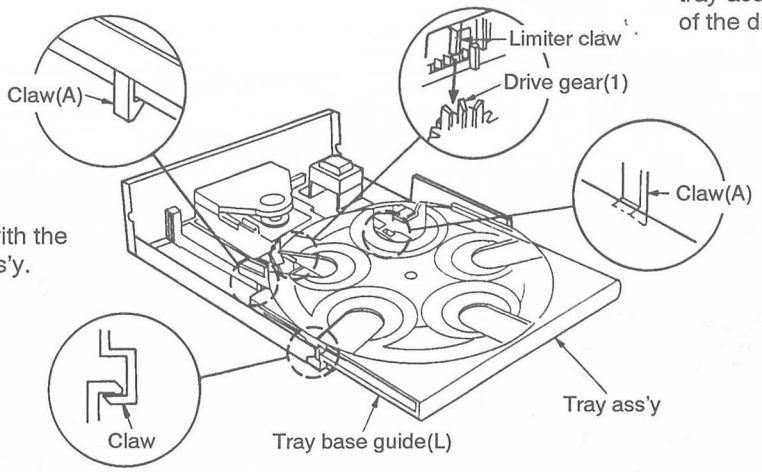
Step 25 Attach the FPC board to the connector.

Step 26 Fit the claws on the right side of the tray ass'y underneath the claws on the tray base guide(R).



Step 27 Fit the claws on the right side of the tray ass'y underneath the claws on the tray base guide(L).

Step 28 Fit the limiter claw on the tray ass'y between the teeth of the drive gear(1).



Step 29 Catch the 2 claws(A) with the loading mechanism ass'y.

Step 30 After installing the tray ass'y, check that it moves smoothly.

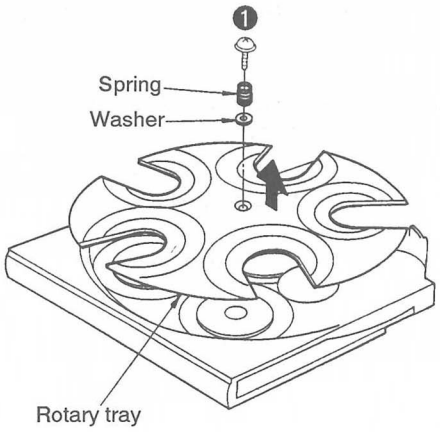
4. Replacement for the belt and tray motor ass'y

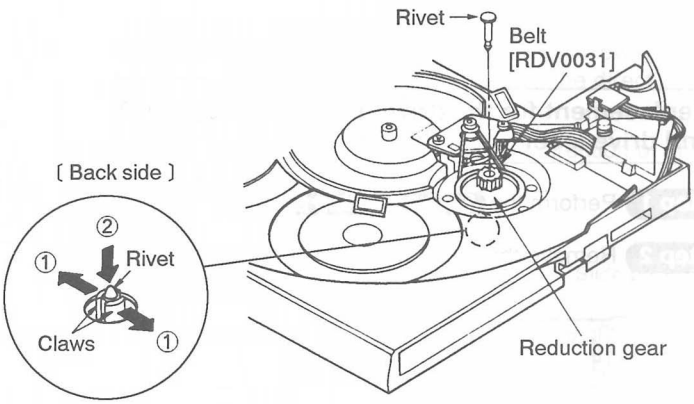
Step 1 Perform the Step 1 ~ Step 6 in item 3 on page 10,11.

Step 2 Remove the 1 screw and then remove the rotary tray.

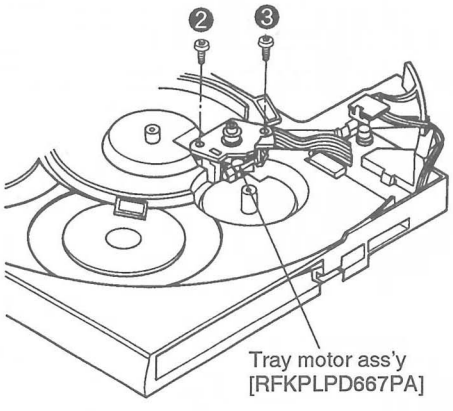
Step 3 Release the 2 claws in the direction of arrow ①, and then push the rivet in the direction of arrow ②.

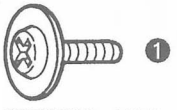
Step 4 Remove the belt and reduction gear.





Step 6 Remove the 2 screws.

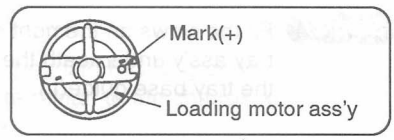




[XTWS3+10T]

[XTB3+10G]

5. Replacement for the belt and loading motor ass'y



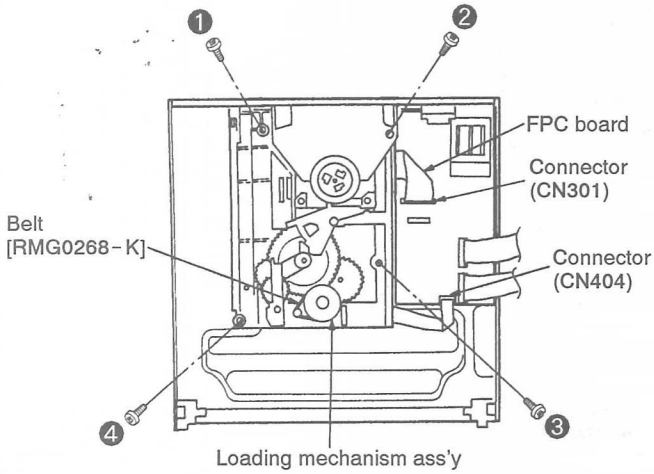
Step 1 Perform the Step 1 ~ Step 6 in item 3 on page 10,11.

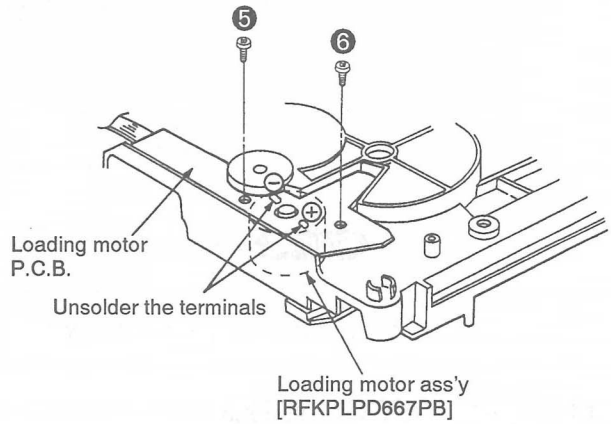
Step 2 Remove the belt.

Step 3 Remove the 4 screws and connector.

Step 4 Unsolder the terminals of the loading motor ass'y.

Step 5 Remove the 2 screws and then remove the loading motor P.C.B. and loading motor ass'y.





6. Replacement for the drive gear(1), drive gear(2) and drive lever

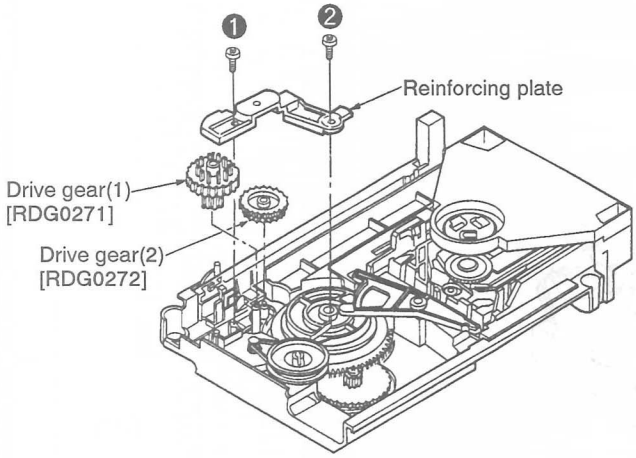
Step 1 Perform the Step 1 ~ Step 6 in item 3 on page 10,11.

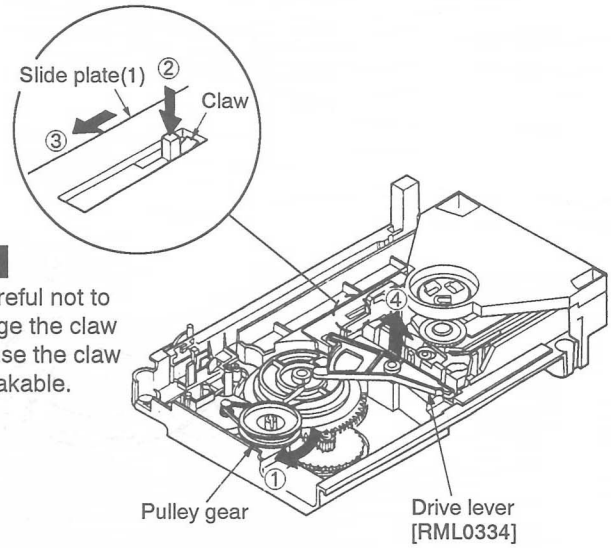
Step 2 Remove the 2 screws.

Step 3 Rotate the pulley gear to full position in the direction of arrow ①.

Step 4 Push the claw in the direction of arrow ②, and then move the slide plate(1) in the direction of arrow ③.

Step 5 Remove the drive lever in the direction of arrow ④.





NOTE

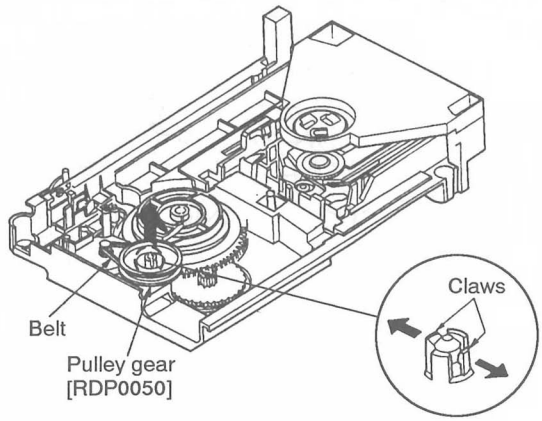
Be careful not to damage the claw because the claw is breakable.

7. Replacement for the pulley gear, drive cam and reduction gear

Step 1 Perform the Step 1 ~ Step 5 in item 6 on page 14.

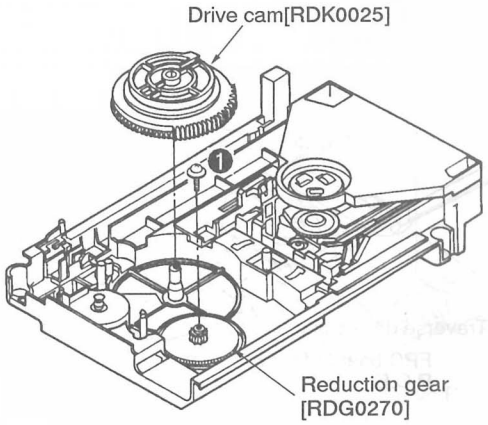
Step 2 Remove the belt.

Step 3 Release the 2 claws, and then the remove the pulley gear.



Step 4 Remove the drive cam .

Step 5 Remove the 1 screw and reduction gear.

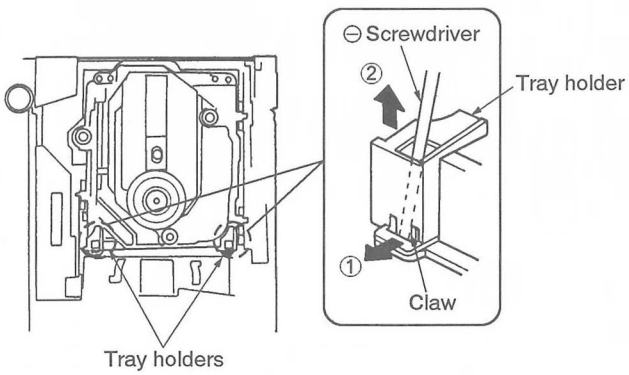


[RHD26019]

8. Checking for the servo P.C.B.

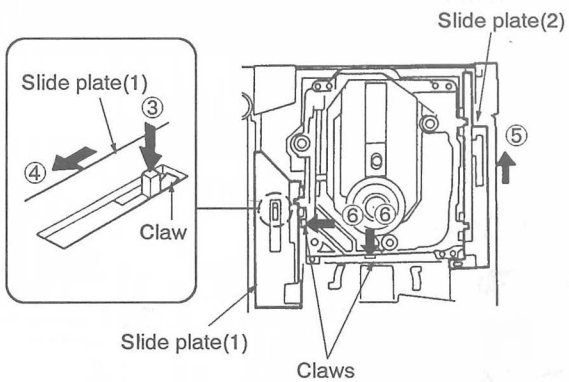
Step 1 Perform the Step 1 ~ Step 10 in item 3 (on page 10,11) and item 6(on page 14) .

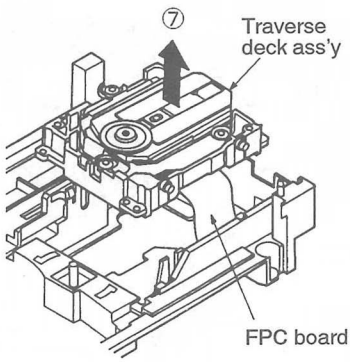
Step 2 While pushing the claw of tray holders in the direction of arrow ① using the ⊖ screwdriver, remove the tray holder in the direction of arrow ② .



Step 3 Push the claw in the direction of arrow ③ , and then move the slide plate(1) in the direction of arrow ④ .

Step 4 Move the slide plate(2) in the direction of arrow ⑤ .



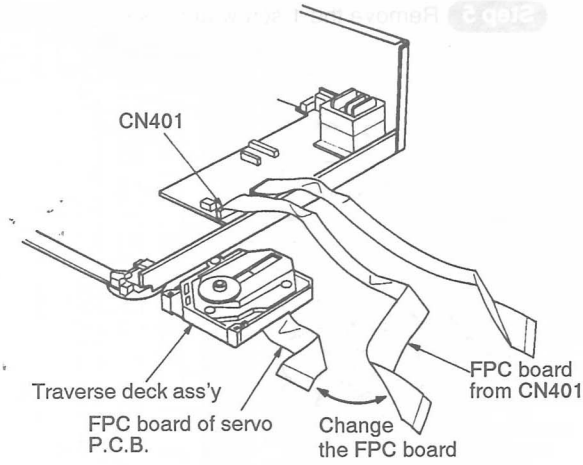


NOTE

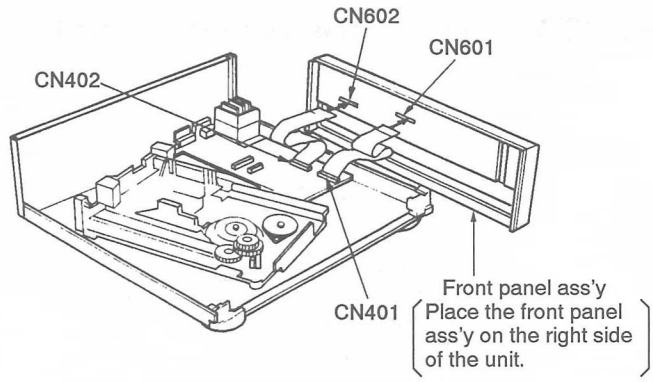
Be careful not to scratch or bend the FPC board.

Step 5 Release the 2 claws in the direction of arrow ⑥ , and then remove the traverse deck ass'y in the direction of arrow ⑦ .

Step 6 Replace the FPC board of servo P.C.B. to the FPC board(CN401) of main P.C.B.



Step 7 Connect the FPC boards as shown in above.
(Between CN401 and CN601
Between CN402 and CN602)



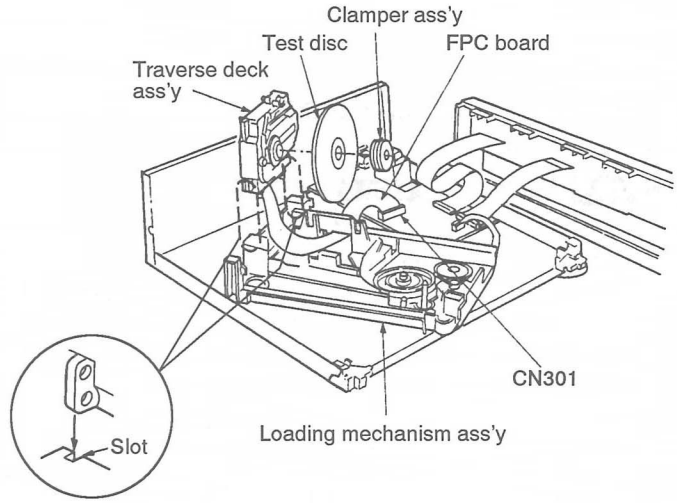
Step 8 Insert the traverse deck in the slot of loading mechanism ass'y.

Step 9 Connect the FPC board of servo P.C.B. to the connector(CN301) of main P.C.B.

Step 10 Set the test disc on the traverse deck ass'y, and then fix the traverse deck ass'y with clamper ass'y.

NOTE

After completing the check, restore the replaced FPC boards to their original positions.

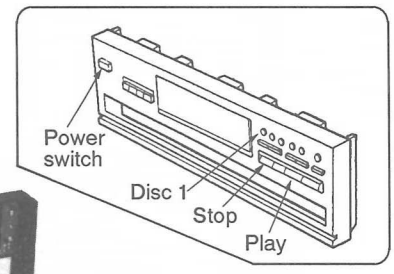


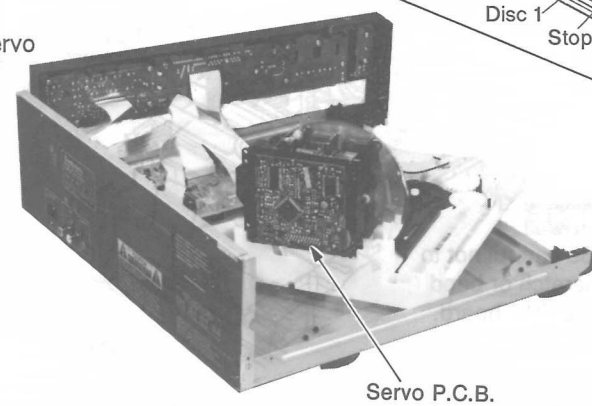
How to play the disc

Step 11 Set the unit in the test mode as follows:
(hold the play , stop and disc 1 keys(3 keys) on and set the power switch to ON.)

Step 12 Press the play key and play the test disc.

Step 13 When checking the soldered surface of the servo P.C.B., do as shown right.



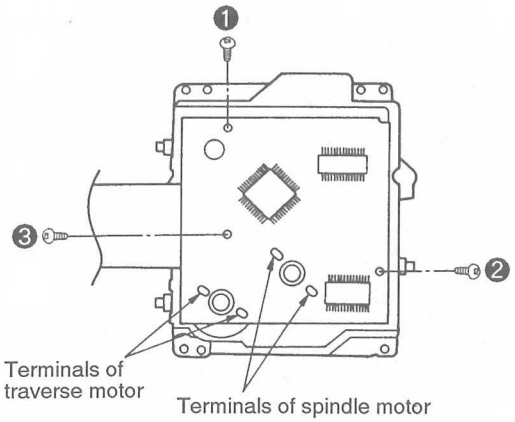


9. Replacement for the traverse deck ass'y

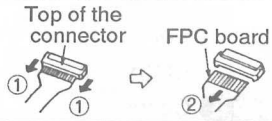
Step 1 Perform the Step 1 ~ Step 5 in item 8 on page 15.

Step 2 Remove the 3 screws.

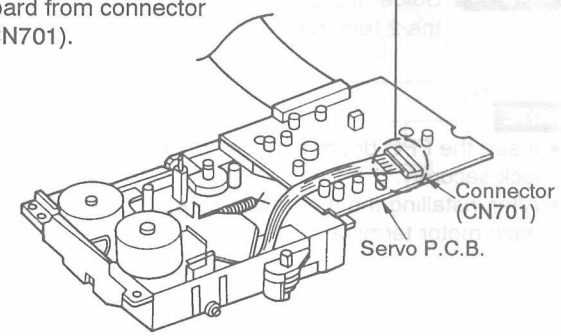
Step 3 Unsolder the traverse motor and spindle motor terminals.



1. Push the top of the connector in the direction of arrow ①.
2. Remove the FPC board in the direction of arrow ②.

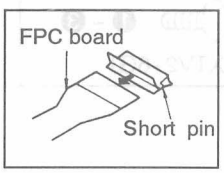


Step 4 Remove the FPC board from connector (CN701).

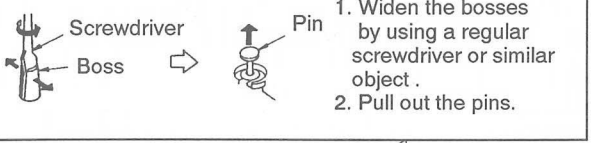


NOTE

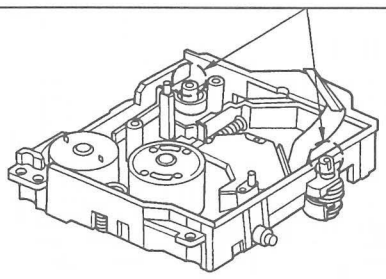
Insert a short pin into the traverse unit FPC board.
(Refer to " handling precautions for traverse deck " on page 8.)



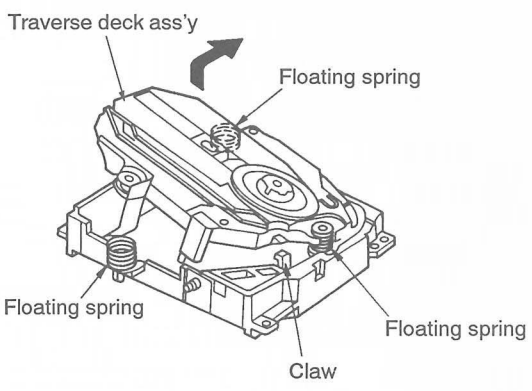
Step 5 Remove the 2 pins.



1. Widen the bosses by using a regular screwdriver or similar object .
2. Pull out the pins.



Step 6 Release the claw, and then remove the traverse deck ass'y in the direction of arrow.



NOTE

Be careful not to lose the 3 floating springs because those will also be removed on removal of the traverse deck ass'y.

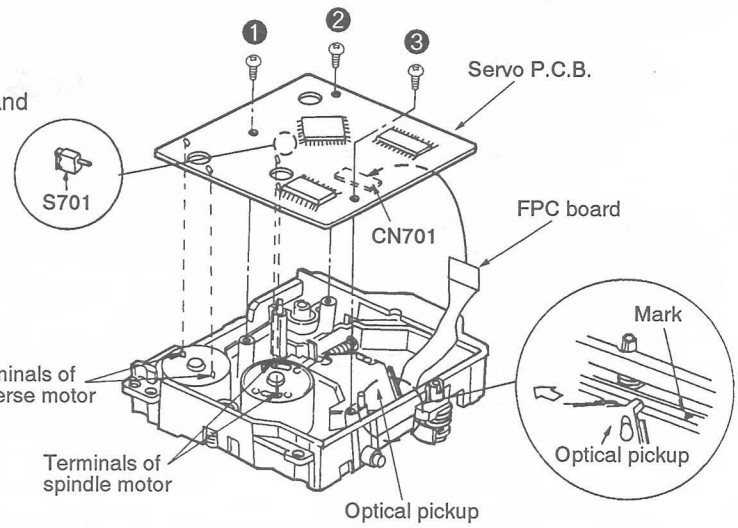
Installation of servo P.C.B. after replacement

Step 7 When installing servo P.C.B., move the optical pickup to the more external side than the mark (▲). (When the optical pickup is not moved, the switch (S701) on the servo P.C.B. may be broken.)

Step 8 Connect the FPC board to the connector(CN701).

Step 9 Install the servo P.C.B. to the traverse unit with 3 screws.

Step 10 Solder the 2 terminals of the traverse motor and the 2 terminals of the spindle motor.



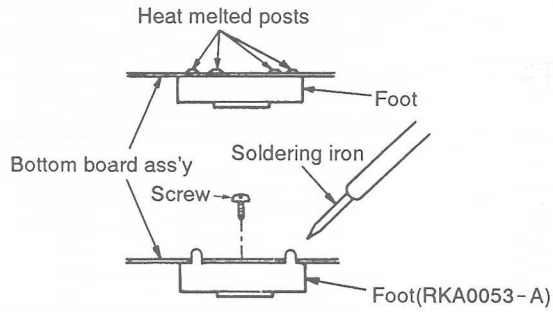
NOTE

- Insert the FPC board into the connector and lock securely.
- After installing the motor with screws, solder each motor terminal.

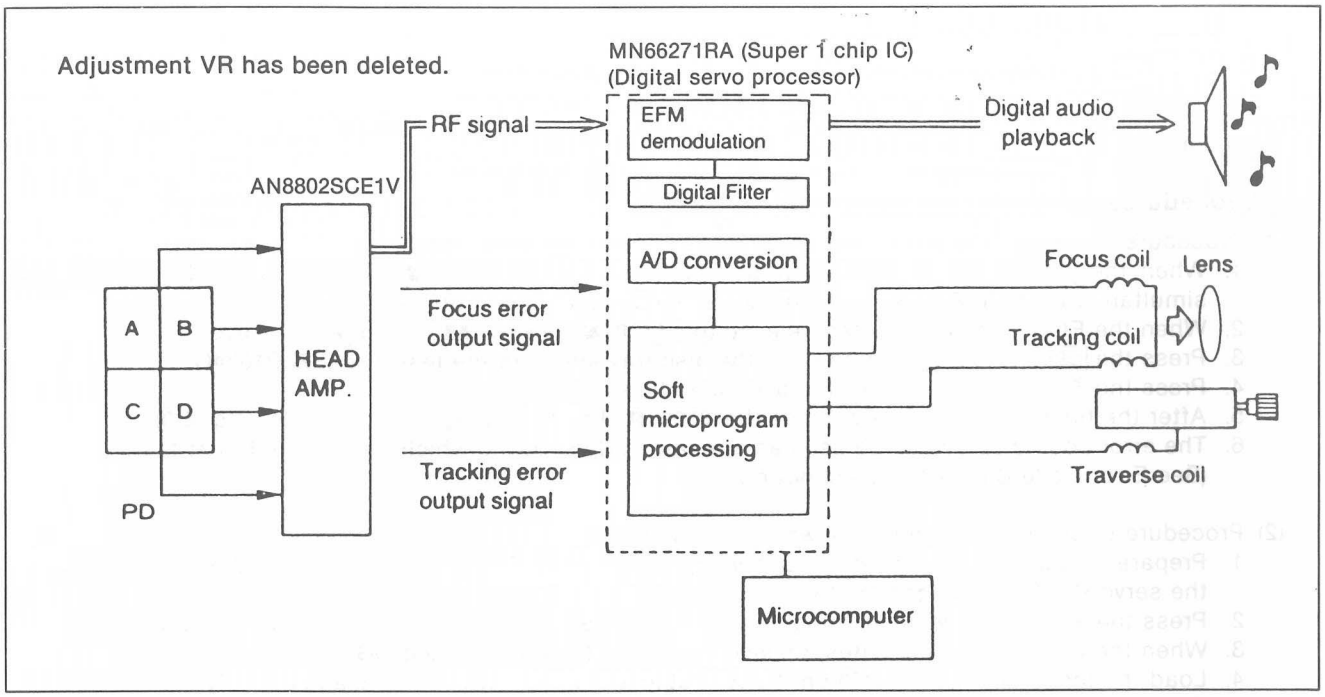
(XTV2+6G)

■ REPLACEMENT OF THE FOOT

1. Remove the 4 heat melted posts on the Bottom board ass'y with a pair of nippers or similar tool.
2. To replace the foot (RKA0053-K) on the Bottom board ass'y melt the 4 posts with a soldering iron or install it with a screw (XTB3+6J).

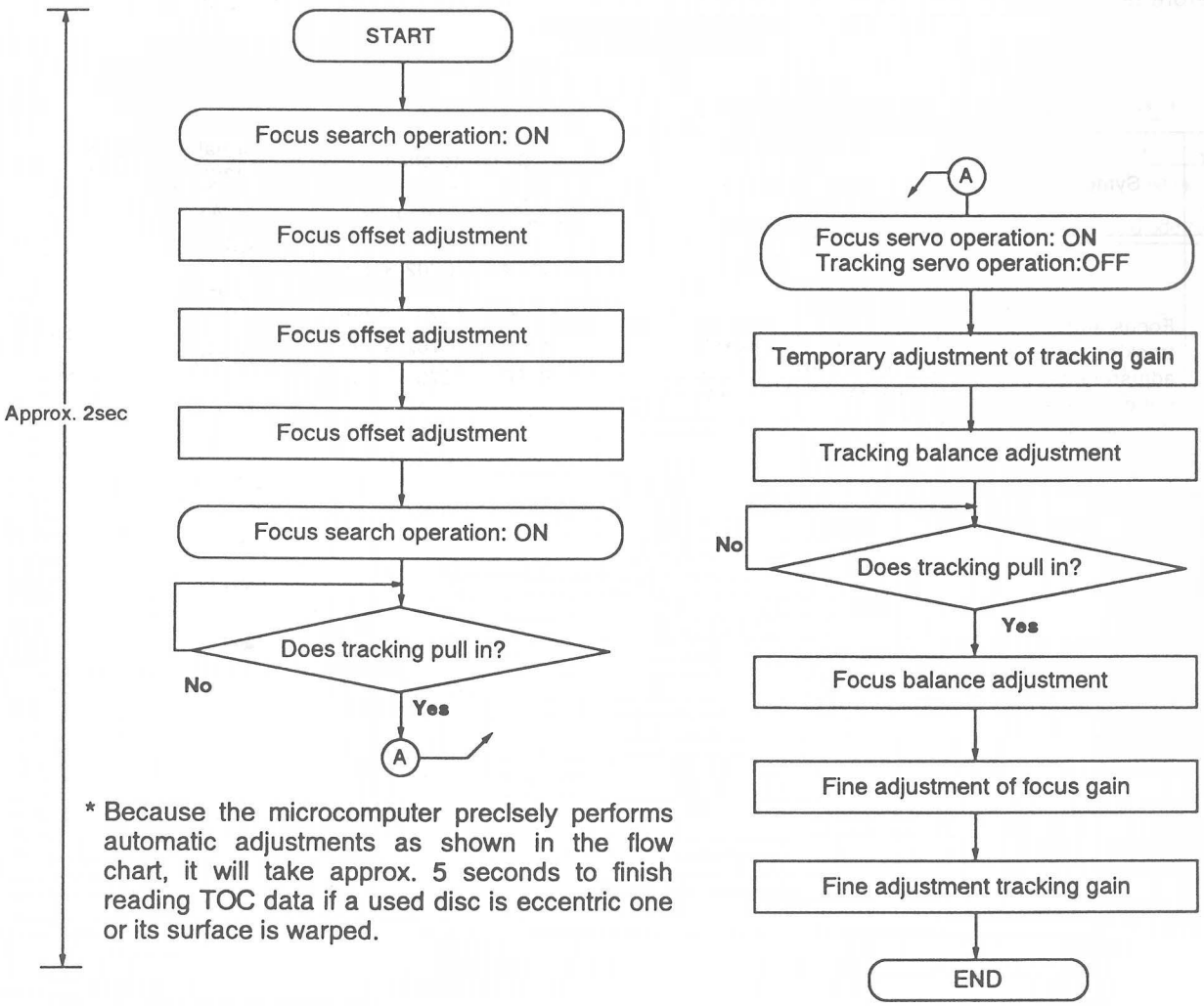


■ DIGITAL SERVO SYSTEM



The following flow chart shows the sequence of automatic adjustments.

● Flow chart automatic adjustment sequence



* Because the microcomputer preclsely performs automatic adjustments as shown in the flow chart, it will take approx. 5 seconds to finish reading TOC data if a used disc is eccentric one or its surface is warped.

■ DISPLAY FUNCTION OF AUTOMATICALLY-ADJUSTED RESULTS

(SELF-CHECK FUNCTION)

The unit contains a function which displays the result of the automatically adjustment of the servo circuits (tracking, focus servo, etc.) as an error code on the FL display.
The error code display serves as a repair guide showing the automatically adjustment circuit is at fault. The procedures for displaying the error codes are given below.

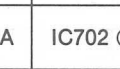
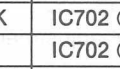
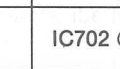
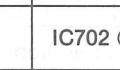
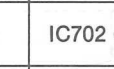
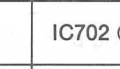
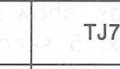
• Procedures to display the error code

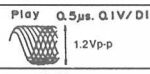
(1) Procedure to display the error code before disassembly (finished unit)
1. When the [POWER] key is pressed while holding down the [STOP (■)], [PAUSE (▮▮)] and [PLAY (▷)] keys simultaneously, the FL display illuminates, release the power turns on.
2. When the FL display illuminates, release the [STOP (■)], [PAUSE (▮▮)] and [PLAY (▷)] keys.
3. Press the [OPEN/CLOSE (≙)] key to open the disc tray and load the test disc (SZZP1054C).
4. Press the [PLAY (▷)] key to start the play operation.
5. After the time display appears, press the [STOP (■)] key to display the error code. (e.g. **E-0**)
6. The error code display can be used as a repair guide showing which servo circuit is at fault. (See Error Code Based Troubleshooting.)

(2) Procedure to display the error code when disassembled
1. Prepare the unit as described in "Checking for the main P.C.B." on pages 10~13 and "Checking for the servo P.C.B." on pages 15, 16.
2. Press the [POWER] key while holding down the [STOP (■)], [PLAY (▷)] and [DISC 1] keys simultaneously.
3. When the FL display illuminates, release the [STOP (■)], [PLAY (▷)] and [DISC 1] keys.
4. Load the test disc (SZZP1054C) on the turntable and secure it with the clamper ass'y.
5. Perform steps 4 and 5 in section (1) above.

• Error code based troubleshooting

※ The unit is satisfactory if the error code is **E-0** of **E-2**.
※ Before testing, check that the test disc is free of scratches and dirt and optical pickup is clean.

FL error code display	Symptom	Probable cause	Signal to check		Normal the values of voltage and waveform	
			Signal name	Location	PLAY	STOP
E-1	Focus and tracking offset adjustments did not complete in the specified time period.	① Clocks X1 and X2, power supply VDD, and reset/RST, all on IC702 ② MDATA, MCLK, MLD, and SENSE signals to/from the mechanism controller	MDATA	IC702 ⑧ pin		4.8V
			MCLK	IC702 ⑦ pin		4.8V
			MLD	IC702 ⑨ pin		
			SENSE	IC702 ⑩ pin	0V	0V
			/RST	IC702 ⑱ pin	4.9V	4.9V
			X1	IC702 ⑤⑧ pin		
			X2	IC702 ⑤⑨ pin		
E-3 E-5 E-7 E-9 E-B E-D E-F	Disc play unstable	① Scratches or contaminants on disc surface ② Focus and tracking servo circuits (check waveforms, voltages, and part constants.) ③ Spindle driver circuit ④ Optical pickup	FE	IC702 ㉜ pin		2.4V
			TE	IC702 ㉝ pin		2.4V
			FOD	IC702 ㉘ pin	2.4V	2.4V
			TRD	IC702 ㉗ pin	2.4V	2.4V
			KICK	IC702 ㉖ pin	2.4V	2.4V
			/FLOCK	IC702 ⑪ pin	0V	4.9V
			/RF DET	IC702 ㊳ pin	0V	4.8V
			RF	TJ701		3.4V
			STAT	IC702 ⑰ pin	3.5V	0V

FL error code display	Symptom	Probable cause	Signal to check		Normal the values of voltage and waveform	
			Signal name	Location	PLAY	STOP
E-4 E-6 E-C E-E	Best Eye (PD Balance) adjustment diode not comkplete in the specified time period.	① Scratches or contaminants on disc surface ② Focus and Tracking servo circuit (check waveforms, voltages, and part constants.) ③ Optical pickup	FBAL	IC702 ㉜ pin	2.5 ± 1.25V	2.5 ± 1.25V
			RF	TJ701		3.4V
			FE	IC702 ㉜ pin		0V
			/TLOCK	IC702 ⑫ pin	0V	0V
			OFT	IC702 ㊱ pin	0V	0V
E-8 E-A	Focus or Tracking gain adjustment did not complete in the specified time period.	① Scratches or contaminants on disc surface ② Focus and Tracking servo circuit (check waveforms, voltages, and part constants.) ③ Optical pickup	FE	IC702 ㉜ pin		2.4V
			TE	IC702 ㉝ pin		2.4V
			/TLOCK	IC702 ⑫ pin	0V	0V
			OFT	IC702 ㊱ pin	0V	0V

■ MEASUREMENTS AND ADJUSTMENTS

Warning: This product uses a laser diode. Refer to caution statements on page 2.

Measuring Instruments and Special Tools

* Test discs
1. Playability test disc (SZZP1054C)
2. Uneven test disc (SZZP1056C)
* Musical program disc (ordinary)
* Dual-beam oscilloscope with bandwidth of 30MHz or better (with EXT. trigger and 1:1 probe).
* Allen wrench (M2.0) (SZZP1101C)
* Lock paint (RZZ0L01)

PREPARATION

1. Remove the cabinet and front panel ass'y (refer to "operation checks and main component replacement procedures" Item No. 1, 2 [step 1~4]).
2. Set the power switch to ON and press the open/close key to close the loading drawer.
3. Press the play key and when the traverse deck reaches it's height position, set the power switch to OFF.
4. Remove the tray ass'y (refer to "operation checks and main component replacement procedures" Item No. 3 [step 1~6]).
5. Remove the clamp plate, fixed plate, magnet and clamper (refer to "operation checks and main component replacement procedures" Item No. 3 [step 1~8, 10]).
6. Place the test disc and secure it by using clamper ass'y. (Refer to Fig. 1)
   (refer to "operation checks and main component replacement procedures" Item No. 3 [step 10]).
7. Set the unit in the test mode as follows:
   (hold the play, stop and disc 1 keys (3 keys) on and set the power switch to ON.)
8. Press the play key and play the test disc.
9. Follow the adjustment procedure.

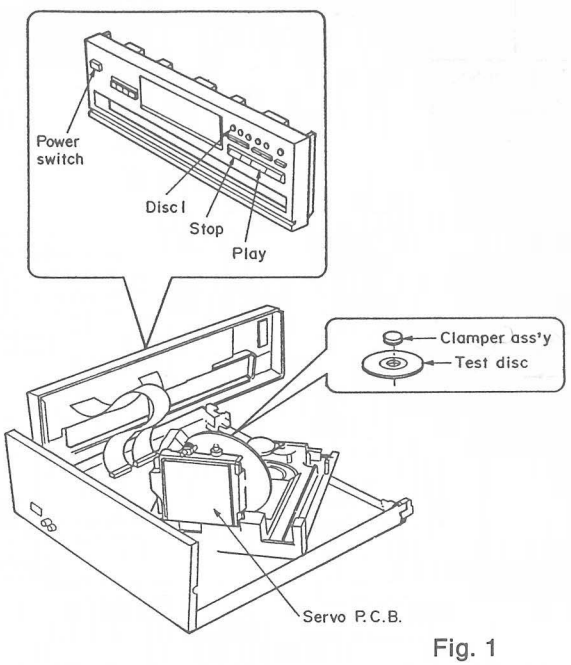
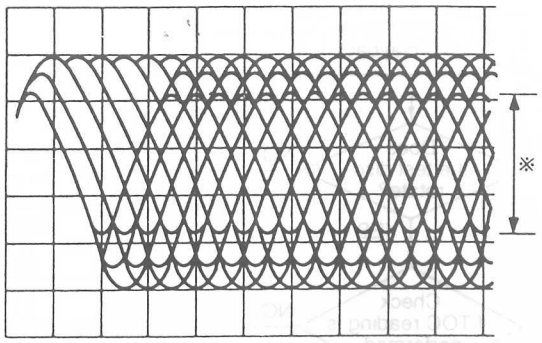


Fig. 1

(1) MECHANICAL ADJUSTMENT

1. Connect the oscilloscope's CH. 1 probe across TJ701 (RF) and TJ702 (VREF) on the servo P.C.B. (Refer to Fig. 3)
   Oscilloscope setting: VOLT 200mV
   SWEEP..... 0.5µs.
   Input coupling..... AC
2. Switch the player power **ON**, and play track **19** on the test disc (SZZP1056C).
   (Playing any other track will prevent the HEX screws from being accessed.)
3. Leave the player in play mode and place it as shown Fig. 3.
4. Alternately adjust the two HEX screws with the 2.0mm allen wrench (SZZP1101C) until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched. (Refer to Fig. 2)
5. After completing the adjustment, lock the HEX screws with lock paint (RZZ0L01).



※ Most stretched eye pattern.

Fig. 2

(2) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

＊ Checking Skip Search

1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

＊ Checking Manual Search

1. Play an ordinary musical program disc.
2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).

＊ Checking Playability

1. Play the 0.7mm black dot and the 0.7mm wedge on the playability test disc (SZZP1054C) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc (SZZP1056C) and verify that no sound skip or noise occurs.

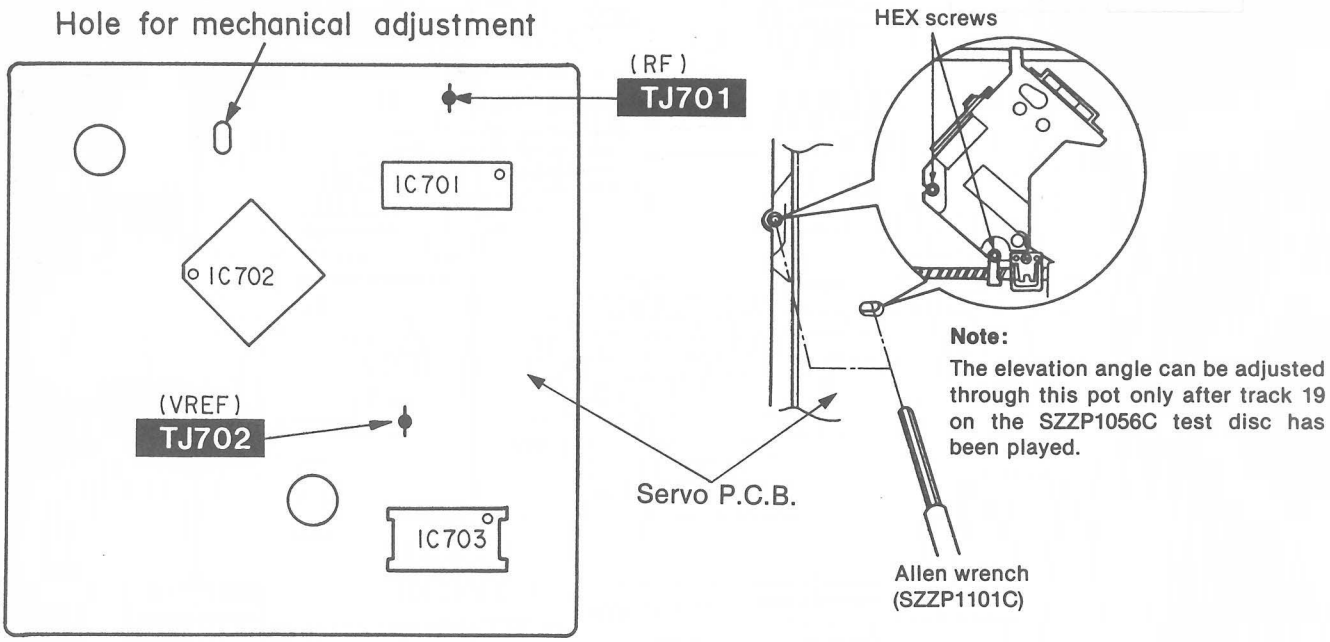
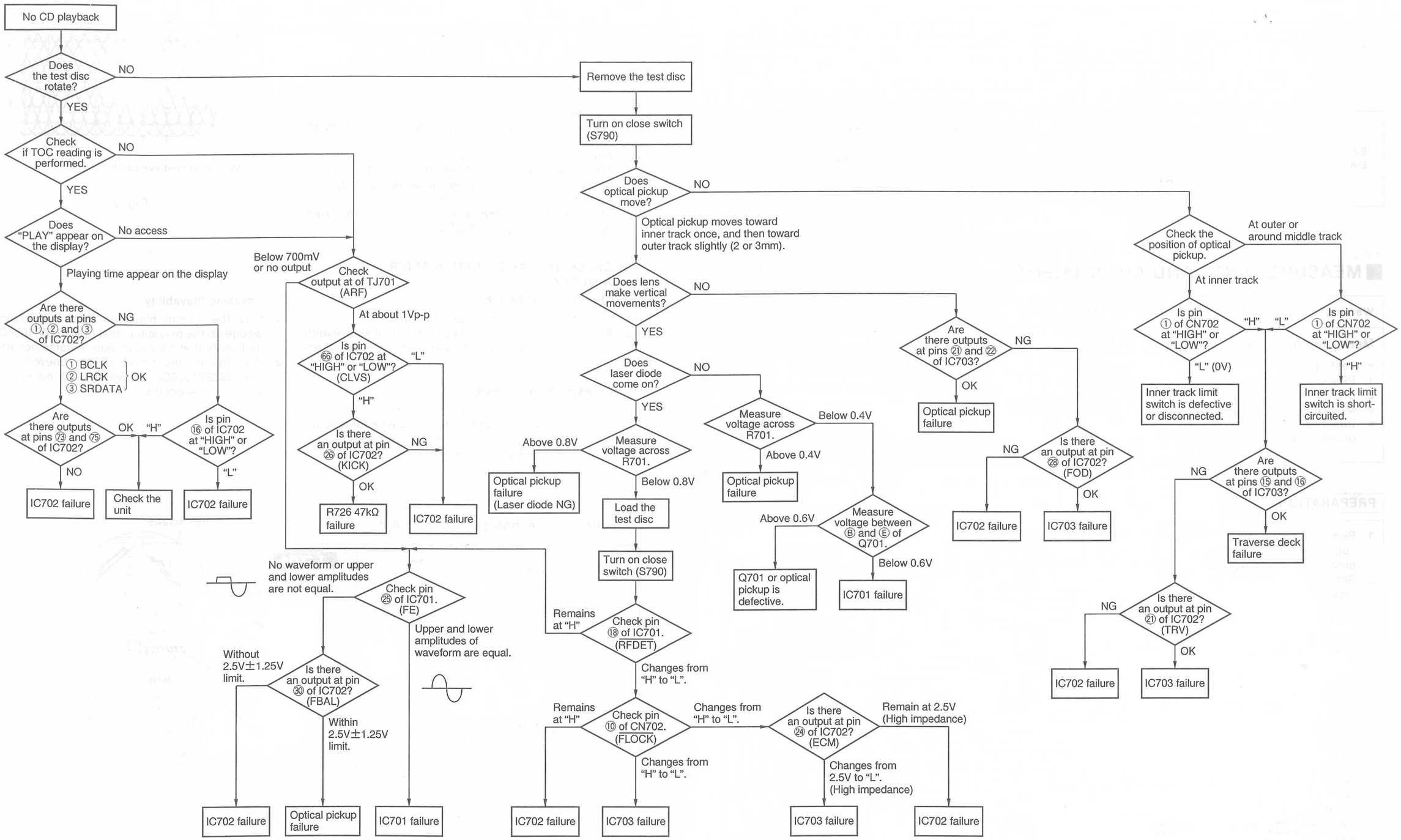


Fig. 3

■ TROUBLESHOOTING GUIDE



■ TERMINAL FUNCTION OF IC'S

• IC701 (AN8802SCE1V): Servo amp

Pin No.	Mark	I/O Division	Function
1	PDAD	I	Photo detector Bch input without delay
2	PDA	I	Photo detector Ach input without delay
3	LPD	I	Laser PD signal
4	LD	O	Laser power auto control output
5	AMPI	I	RF amp terminal
6	V_{CC}	I	Power supply terminal
7	AMPO	O	RF amp signal
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal
10	CENV	I	RF detect capacitor connection terminal
11	CEA	I	HPF-AMP capacitor connection terminal
12	GND	—	GND terminal
13	LDON	I	LD APC ON/OFF ("H": ON, "L": OFF)
14	TES	I	Tracking error shunt input ("H": shunt)
15	PLAY	I	Play signal ("H": ON, "L": OFF)
16	WVEL	I	Double velocity ("H": double, "L": single)

Pin No.	Mark	I/O Division	Function
17	BDO	O	Dropout detection control
18	/RFDET	O	RF det. signal ("L": det.)
19	CROSS	O	Tracking error zero cross output
20	OFTR	O	Off track detection ("H": det.)
21	VDET	O	Oscillation det. signal ("H": det.)
22	ENV	O	Envelope output terminal
23	TEBPF	I	Oscillation detect input terminal (Not used, open)
24	TE	O	Tracking error signal
25	FE	O	Focusing error signal
26	PTO	O	Potention amp output
27	PTI	I	Potention amp input
28	TBAL	I	Tracking balance adj. input
29	FBAL	I	Focus balance adj. input
30	VREF	O	Reference voltage output
31	PDB	I	Photo detector Ach input with delay
32	PDBD	I	Photo detector Bch input with delay

• IC703 (AN8389SE1): Focus coil/tracking coil/traverse motor/spindle motor

Pin No.	Mark	I/O Division	Function
1	V_{CC}	I	Power supply terminal
2	VREF	I	Reference voltage input
3	IN4	I	Motor driver (4) input
4	IN3	I	Motor driver (3) input
5	GND	—	GND terminal
6	NC	—	No used, connected to GND
7	NRESET	O	Reset terminal
8	GND	—	GND terminal
9	IN2	I	Motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Motor driver (1) input
12	PC1	I	PC1 (power cut) input (Not used, open)

Pin No.	Mark	I/O Division	Function
13	$PV_{CC}1$	I	Driver power supply (1)
14	PGND1	—	Driver GND terminal (1)
15	D1−	O	Motor driver (1) output terminal (−)
16	D1+	O	Motor driver (1) output terminal (+)
17	D2−	O	Motor driver (2) output terminal (−)
18	D2+	O	Motor driver (2) output terminal (+)
19	D3−	O	Motor driver (3) output terminal (−)
20	D3+	O	Motor driver (3) output terminal (+)
21	D4−	O	Motor driver (4) output terminal (−)
22	D4+	O	Motor driver (4) output terminal (+)
23	PGND2	—	Driver GND terminal (2)
24	$PV_{CC}2$	I	Driver power supply (2)

• IC702 (MN66271RA): Servo processor/digital signal processor/digital filter/D/A converter

Pin No.	Mark	I/O Division	Function
1	BCLK	O	Serial bit clock terminal
2	LRCK	O	L/R discriminating signal
3	SRDATA	O	Serial data (Not used, open)
4	$DV_{DD}1$	I	Power supply (digital circuit) terminal
5	$DV_{SS}1$	—	GND (digital circuit) terminal
6	TX	O	Digital audio interface signal
7	MCLK	I	Command clock signal
8	MDATA	I	Command data signal
9	MLD	I	Command load signal ("L": LOAD)
10	SENSE	O	Sense signal (OFT, FESL, NACEND, NAJEND, POSAD, SFG)
11	/FLOCK	O	Optical servo condition (focus) ("L": lead-in)
12	/TLOCK	O	Optical servo condition (tracking) ("L": lead-in)
13	BLKCK	O	Sub-code block clock (f=75Hz) (Not used, open)
14	SQCK	I	Sub-code Q register clock
15	SUBQ	O	Sub-code Q data
16	DMUTE	I	Muting input ("H": MUTE) (Not used, connected to GND)
17	STAT	O	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
18	/RST	I	Reset signal ("L": reset)
19	SMCK	O	System clock (f=4.2336MHz) (Not used, open)
20	PMCK	O	Frequency division clock signal (Not used, open) ($f=\frac{1}{1.92}\times ck=88.2kHz$)
21	TRV	O	Traverse servo control

Pin No.	Mark	I/O Division	Function
22	TVD	O	Traverse drive signal
23	PC	O	Turntable motor drive signal ("L": ON)
24	ECM	O	Turntable motor drive signal (Forced mode)
25	ECS	O	Turntable motor drive signal (Servo error signal)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive signal output
28	FOD	O	Focus drive signal output
29	VREF	I	D/A drive output (TVD, ECS, TRD, FOD, FBAL, TBAL) normal voltage input terminal
30	FBAL	O	Focus balance adj. output (Not used, open)
31	TBAL	O	Tracking balance adj. output
32	FE	I	Focus error signal (analog input)
33	TE	I	Tracking error signal (analog input)
34	RFENV	I	RF envelope signal
35	VDET	I	Oscillation det. signal ("H": det.)
36	OFT	I	Off frack signal ("H": Off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal ("L": detection)
39	BDO	I	Dropout detection signal ("H": dropout)
40	LDON	O	Laser power control ("H": ON)
41	TES	O	Tracking error shunt output ("H": dropout)
42	PLAY	O	Play signal ("H": play)

Pin No.	Mark	I/O Division	Function
43	WVEL	O	Double velocity status signal ("H": double)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	I	DSL bias terminal (Not used, open)
47	DSLF	I/O	DSL loop filter terminal
48	PLLF	I/O	PLL loop filter terminal
49	VCOF	I/O	VCO loop filter terminal (Not used, open)
50	$AV_{DD}2$	I	Power supply (analog circuit) terminal (2)
51	$AV_{SS}2$	—	GND (analog circuit) terminal
52	EFM	O	EFM signal (Not used, open)
53	PCK	O	PLL extract clock (f=4.3218MHz)
54	PDO	O	Phase comparated signal of EFM and PCK (Not used, open)
55	SUBC	O	Sub-code serial output data (Not used, open)
56	SBCK	I	Sub-code serial output clock (Not used, connected to GND)
57	V_{SS}	—	GND terminal
58	X1	I	Crystal oscillator terminal (f=16.9344MHz)
59	X2	O	
60	V_{DD}	I	Power supply terminal
61	BYTCK	O	Byte clock signal (Not used, open)
62	/CLDCK	O	Sub-code frame clock signal (f CLDCK=7.35kHz: Normal) (Not used, open)

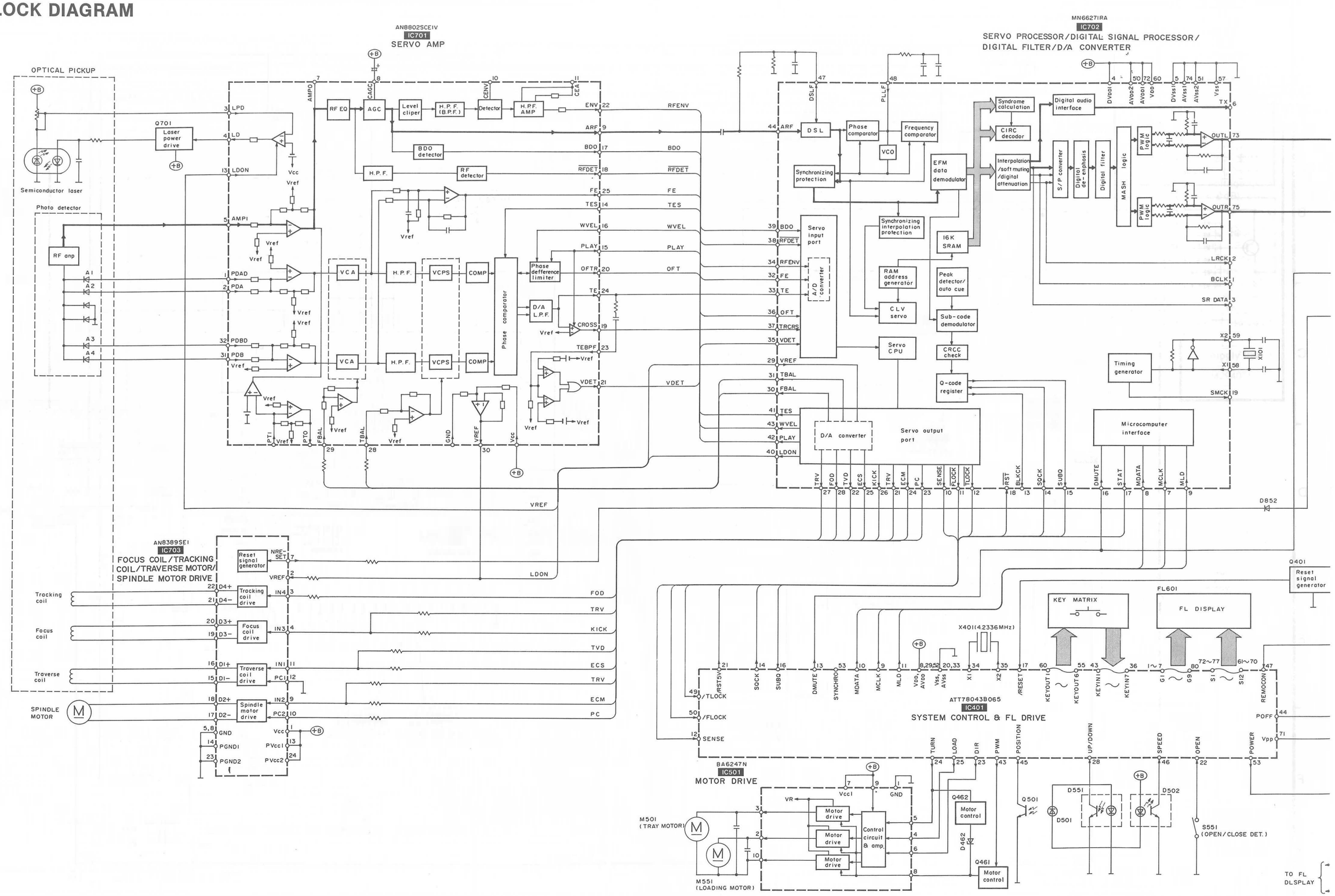
Pin No.	Mark	I/O Division	Function
63	FCLK	O	Crystal frame clock (Not used, open)
64	IPFLAG	O	Interpolation flag terminal
65	FLAG	O	Flag terminal
66	CLVS	O	Turntable servo phase synchro signal ("H": CLV, "L": Rough servo) (Not used, open)
67	CRC	O	Sub-code CRC check terminal ("H": OK, "L": NG)
68	DEMPH	O	De-emphasis ON signal ("H": ON) (Not used, open)
69	RESY	O	Re-synchronizing signal of frame sync. (Not used, open)
70	/RST2	I	Reset terminal after "MASH" circuit
71	/TEST	I	Test terminal (Normal: "H")
72	$AV_{DD}1$	I	Power supply (analog circuit) terminal (1)
73	OUTL	O	Lch audio signal
74	$AV_{SS}1$	—	GND (analog circuit) terminal (1)
75	OUTR	O	Rch audio signal
76	RSEL	I	Polarity direction control terminal of RF signal
77	CSEL	I	Frequency control terminal of crystal oscillator (Not used, connected to GND)
78	PSEL	I	Test terminal (Normal: "L")
79	MSEL	I	"SMCK" terminal frequency select ("L": SMCK=4.2336MHz)
80	SSEL	I	"SUBQ" terminal mode select ("H": Q code buffer)

• IC401 (ATT78043B065): System control & FL drive

Pin No.	Mark	I/O Division	Function
1 ∫ 7	G7 ∫ G1	O	Grid signal of FL display
8	VDD	I	Power supply terminal
9	MCLK	O	Command clock signal
10	MDATA	O	Command data signal
11	MLD	O	Command load signal ("L" LOAD)
12	SENSE	I	Sense signal
13	DMUTE	O	Muting control signal
14	SQCK	O	Sub-code Q register clock
15	NC	—	Not connected
16	SUBQ	I	Sub-code Q data
17	/RESET	I	Reset signal input
18	ZSENSE	—	Not used, connected to GND
19	REC. EN	I	Synchro. rec. control terminal
20	AVSS	—	GND terminal
21	/RSTSV	O	Reset signal output
22	OPEN	I	Open detect terminal
23	DIR	O	Motor control signal
24	TRUN	O	
25	LOAD	O	Motor control signal
26	DAC	—	Not used, open
27	RESTSW	I	Rest position de
28	UP/DOWN	I	Traverse deck up/down det. terminal
29	AVDD	I	Power supply terminal
30	AVREF	I	Power supply terminal
31	XT1	—	Not used, connected to GND

Pin No.	Mark	I/O Division	Function
32	XT2	—	Not used, open
33	VSS	—	GND terminal
34	X1	I	Crystal Osc terminal (F: 4.2336 MHz)
35	X2	O	
36 ∫ 42	KEYIN 7 ∫ KEYIN 1	I	Key return signal
43	PWM	O	Motor control signal
44	POFF	I	Power det. terminal
45	POSITION	I	Rotary tray position det. terminal
46	SPEED	I	Loading motor speed sensor signal
47	REMOCON	I	Remote control signal input
48	IC	—	Not used, connected to GND
49	/TLOCK	I	Optical servo condition (tracking) input
50	/FLOCK	I	Optical servo condition (focus) input
51	STAT	I	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
52	VDD	I	Power supply terminal
53	POWER	O	Power ON/OFF output terminal
54	SYNCHRO	—	Not used, open
55 ∫ 60	KEYOUT 6 ∫ KEYOUT 1	O	Key scan signal
61 ∫ 70	S16 ∫ S7	O	Segment signal of FL display
71	VPP	I	Power supply terminal
72 ∫ 77	S6 ∫ S1	O	Segment signal of FL display
78	EXDATA	—	Not used, open
79	EXCLK	—	Not used, open
80	G8	O	Grid signal of FL display

BLOCK DIAGRAM



MN6627IRA
IC702
SERVO PROCESSOR/DIGITAL SIGNAL PROCESSOR/
DIGITAL FILTER/D/A CONVERTER

DSL
Phase comparator
Frequency comparator
VCO
Synchronizing protection
EFM data demodulator
Syndrome calculation
CIRC decoder
Interpolation /soft muting /digital attenuation
Digital audio interface
S/P converter
Digital de-emphasis
Digital filter
MASH logic
PWM logic
Servo input port
A/D converter
Synchronizing interpolation protection
16K SRAM
RAM address generator
Peak detector/ auto cue
CLV servo
Sub-code demodulator
CRCC check
Q-code register
Servo CPU
Timing generator
Microcomputer interface
D/A converter
Servo output port

Q401
Reset signal generator

KEY MATRIX
FL601
FL DISPLAY
X401(42336MHz)

ATT78043B065
IC401
SYSTEM CONTROL & FL DRIVE

BA6247N
IC501
MOTOR DRIVE
Motor drive
Control circuit & amp.
Motor control
M551
(LOADING MOTOR)
Q501
D501
D551
D502
S551
(OPEN/CLOSE DET.)

XRA4558FTI
IC801
L.P.F.
Muting drive
Q801,802
Muting control
Q851~853
L ch
R ch
LINE OUT

RCDHC-278N
IC601
REMOTE CONTROL SENSOR

LM2940T5M
IC11
Regulator
Q15
Q41
Q21
Q22
Q31
D16
D43
D42
D11~14
D21,22,31,32
D51
D52
D54
PT11
POWER TRANSFORMER
AC IN
Switching
Q11~13
D34
Q32,33
FL drive
TO FL DISPLAY

Note:
Audio signal

■ SCHEMATIC DIAGRAM (Parts list on pages 46~48.)

(This schematic diagram may be modified at any time with the development of new technology.)

Note:

- S551 : Open/close det. switch.
- S601 : Time mode (TIME MODE) switch.
- S602 : Spiral (SPIRAL) switch.
- S603 : Random mode (RANDOM MODE) switch.
- S604 : Repeat (REPEAT) switch.
- S607 : Stop (■) switch.
- S608 : Pause (▮▮) switch.
- S609 : Play (▷) switch.
- S610~S614: Disc (DISC 1~5) switches. (S610: 1, S611: 2, S612: 3, S613: 4, S614: 5)
- S615 : Disc skip (DISC SKIP) switch.
- S616 : Program mode (PROGRAM MODE) switch.
- S617, 618 : Search (SEARCH) switches. (S617: ◀◀, S618: ▶▶)
- S619, 620 : Skip (SKIP) switches. (S619: I◀◀, S620: ▶▶I)
- S621 : Loading drawer open/close (⏏ OPEN/CLOSE) switch.
- S631 : Power "STANDBY ⏻ /ON" (POWER, STANDBY ⏻ ON) switch.
- S701 : Rest detector switch.

Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.
- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis.
  Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.

*The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.

- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used as occation calls. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
- The supply part number is described alone in the replacement parts.

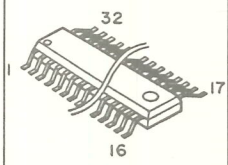
Part No.	Production Part No.	Supply Part No.
IC11	LM2940T5M	LM2940T5

- ▬▶ : Positive voltage lines and
  ▬▬▶ : Negative voltage lines.
  ⋯▶ : audio signal lines.

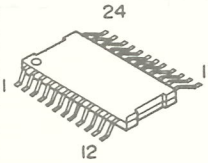
• Terminal guide of IC's, transistors and diodes.

XRA4558FT1

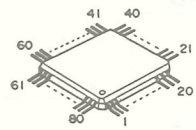
AN8802SCE1V



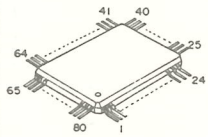
AN8389SE1



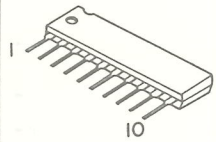
MN66271RA



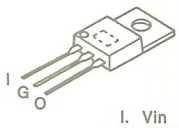
ATT78043B065



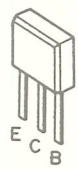
BA6247N



LM2940T5M

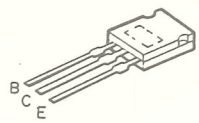


I. Vin
G. GND
O. Vout

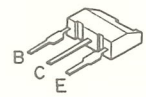


2SA1309AIQST
2SC3311AIQST
2SD1450RSTTA
UN4112TA
UN4114TA
UN4212TA
UN4214TA
UN4215TA

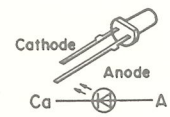
2SD2037EFTA



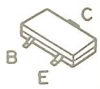
2SB1238QSTV6
2SD1862QRTV6

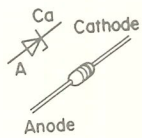


PT381



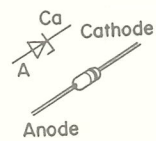
2SB709S



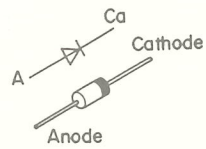


MA4051MTA
MA4056MTA
MA4062MTA
MA4068HTA
MA4091MTA

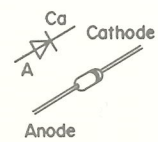
MA4100MTA
MA4270MTA



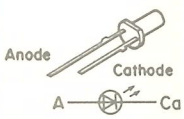
RL1N4003N02



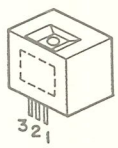
MA165TA
1SS291TA



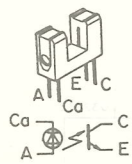
GL380



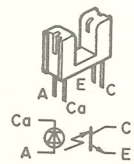
RCDHC-278N



RSQGP1S53V



SG-206S



A SERVO CIRCUIT

△ OPTICAL PICKUP

Q701 2SB709STW LASER POWER DRIVE

IC701 AN8802SCE IV SERVO AMP

IC702 MN6627IRA SERVO PROCESSOR/DIGITAL SIGNAL PROCESSOR/DIGITAL FILTER/D/A CONVERTER

IC703 AN8389SE1 FOCUS COIL/TRACKING COIL/ TRAVERSE MOTOR/ SPINDLE MOTOR DRIVE

TRACKING COIL

FOCUS COIL

M702 SPINDLE MOTOR

M701 TRAVERSE MOTOR

S701 (REST)

REST=ON

To H MAIN CIRCUIT (CN301)

F LOADING MOTOR CIRCUIT

M551 (LOADING MOTOR)

D551 SG-206S DISC SENSOR

S551 (OPEN/CLOSE)

B TRAY MOTOR CIRCUIT

M501 (TRAY MOTOR)

D502 RSOGP1S53V SPEED SENSOR

G SENSOR CIRCUIT

Direction Select — Amp — Drive

IC501 BA6247N MOTOR DRIVE

C POWER SWITCH CIRCUIT

S631 (POWER)

D PHOTO TRANSISTOR CIRCUIT

Q501 PT381 ROTARY POSITION SENSOR

D501 GL380 ROTARY POSITION SENSOR

E OPERATION CIRCUIT

IC601 RCDHC-278N REMOTE CONTROL SENSOR

FL601 (RSL0170-F)

FL DISPLAY

D601-606 MA165TA

S607 (■) S610 (DISC1) S611 (DISC2) S612 (DISC3) S613 (DISC4) S614 (DISC5)

S608 (▮▮) S620 (SKIP ▶▮) S618 (SEARCH ▶▶) S616 (PROGRAM MODE) S621 (▲ OPEN/CLOSE)

S609 (◀▮) S619 (SKIP ▮◀) S617 (SEARCH ◀◀) S601 (TIME MODE)

S603 (RANDOM MODE) S602 (SPIRAL)

S604 (REPEAT)

S615 (DISC SKIP)

R601–R606 4.7K

H MAIN CIRCUIT

To A SERVO CIRCUIT (CN702)

CN301 REST SW, /RST, STAT, DMUTE, SUBQ, SQCK, /TLOCK, /FLOCK, SENSE, MLD, MDATA, MCLK, +B(1), +B(2), DGND, +B(2), R ch IN, A.GND, L ch IN

CN404 C462 0.01

CN403 CN501 CN402 CN602 CN401 CN601

R462 220

R411 4.7K R412 2.2K

TP1 8.6V

R451 270 D461 M4068HTA Q461 UN4215TA MOTOR CONTROL C461 10/447

R410 10K R409 1K D462 MA4056MTA

Q462 UN4215TA MOTOR CONTROL

R413 10K Q401 C403 50V1 C404 25V4.7 R414 470 R415 10K

Q401 2SC3311AIQST RESET

TP7 4.6V TP10 STOP PLAY

PLAY 4.8V 0V T=13.6ms.

IC401 ATT78043B065 SYSTEM CONTROL & FL DRIVE

T=4.4ms T=4.8ms T=13ms T=13.6ms F=4.2336MHz 5V p-p 5.2V p-p

X401 (4.2336MHz)

R416 1K

ΔIC11 LM2940T5M REGULATOR

D16 RLN4003N02 Z301 C301 0.1 C17 6.3V100 C16 10V470

TP2 TP3 TP5

C405 0.01 TP8 C421 0.01 R421 4.7K TP9

C406 50V1 TP6 -27.2V

STOP PLAY 4.5V 0V

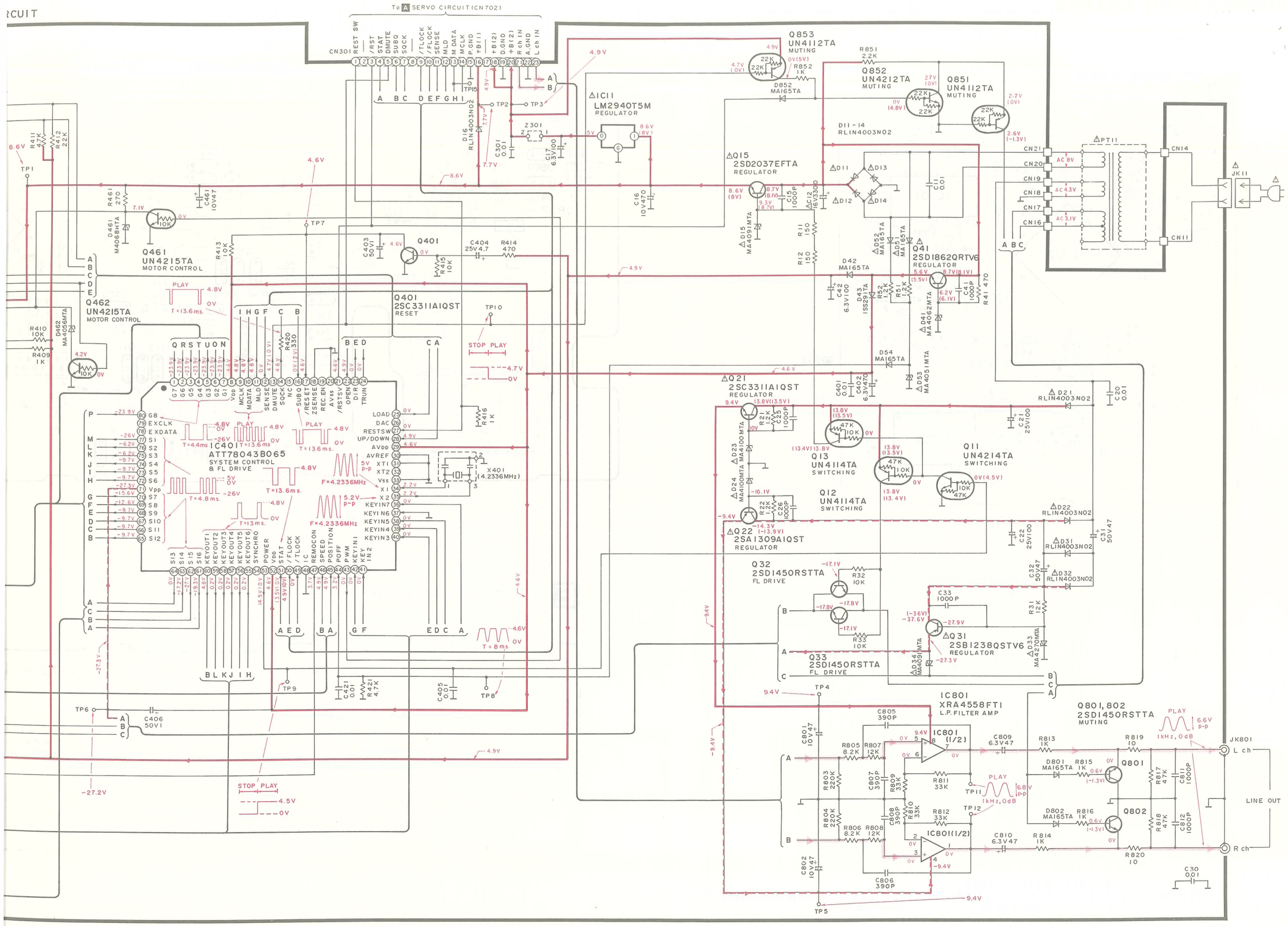
-27.3V

4.9V

— 35 —

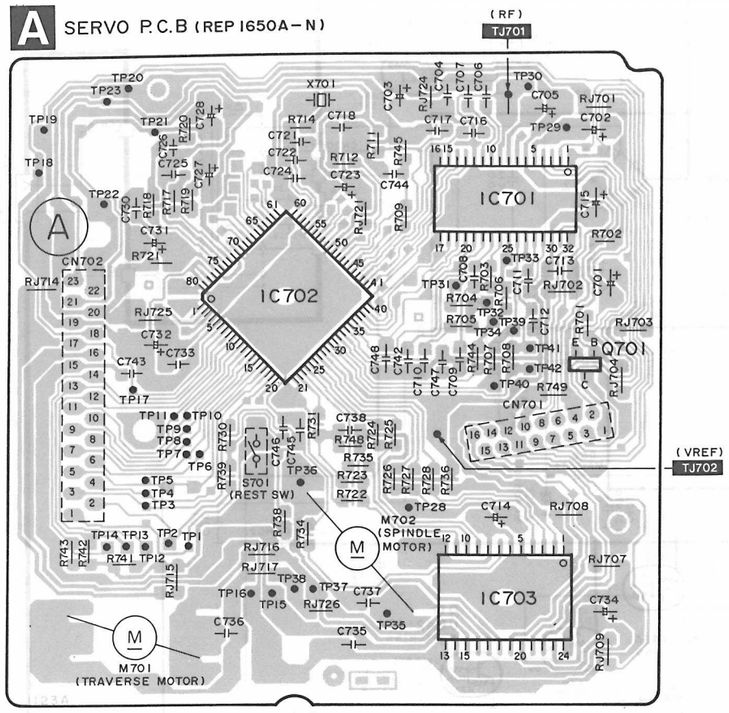
— 36 —

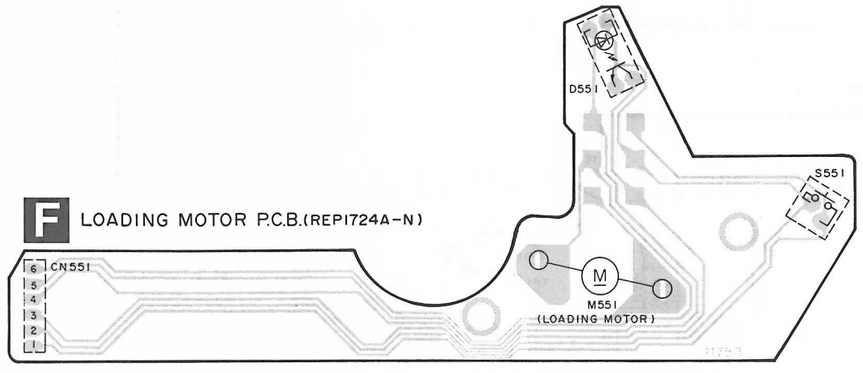
16 17 18 19 20 21 22 23 24



■ PRINTED CIRCUIT BOARDS

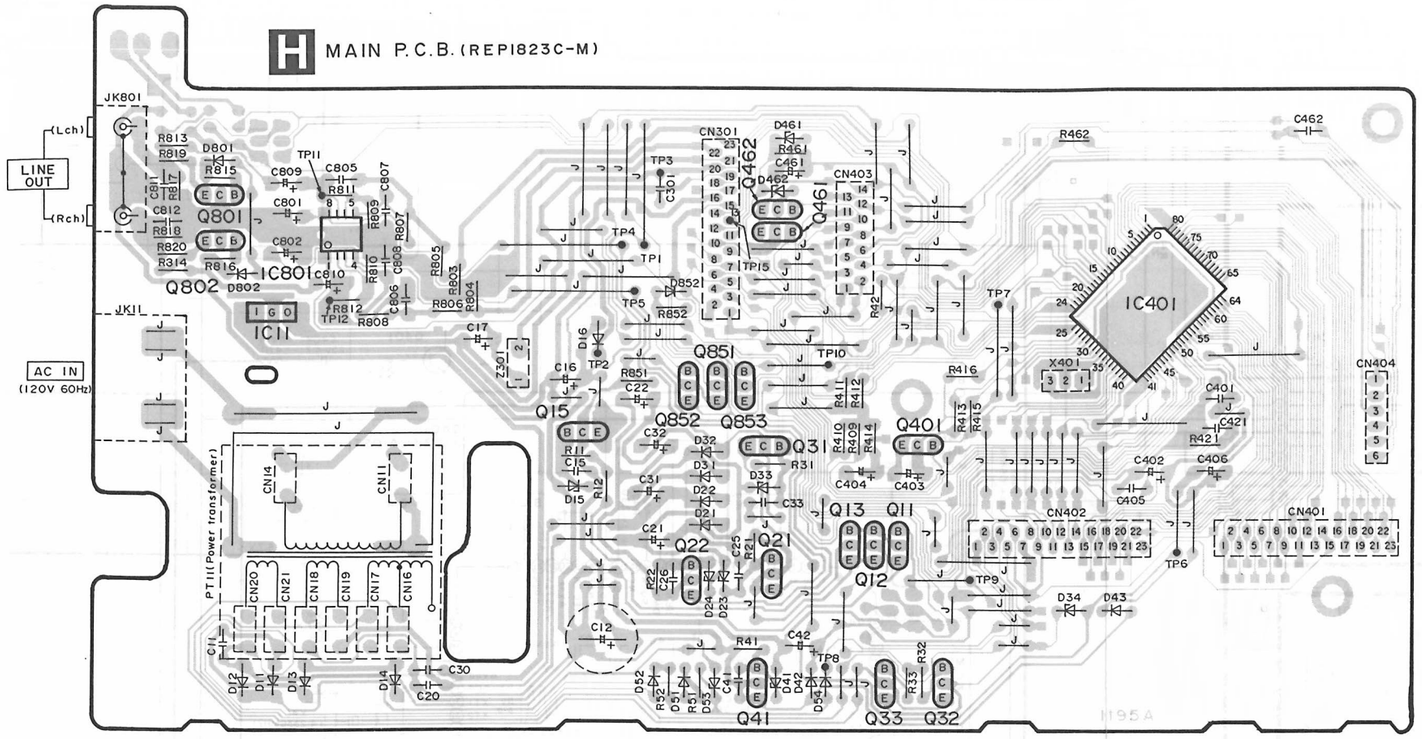
(This printed circuit board diagram may be modified at any time with the development of new technology)



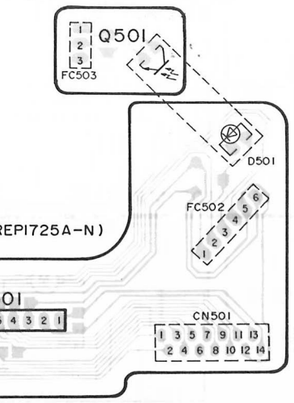


6 7 8 9 10 11 12 13 14

H MAIN P.C.B. (REPI823C-M)

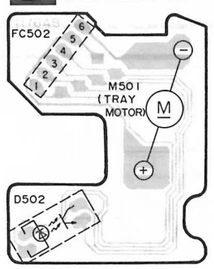


D PHOTO TRANSISTOR P.C.B. (REPI725A-N)

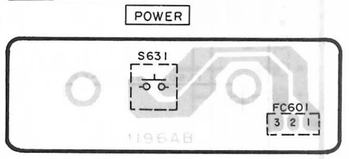


G SENSOR P.C.B. (REPI725A-N)

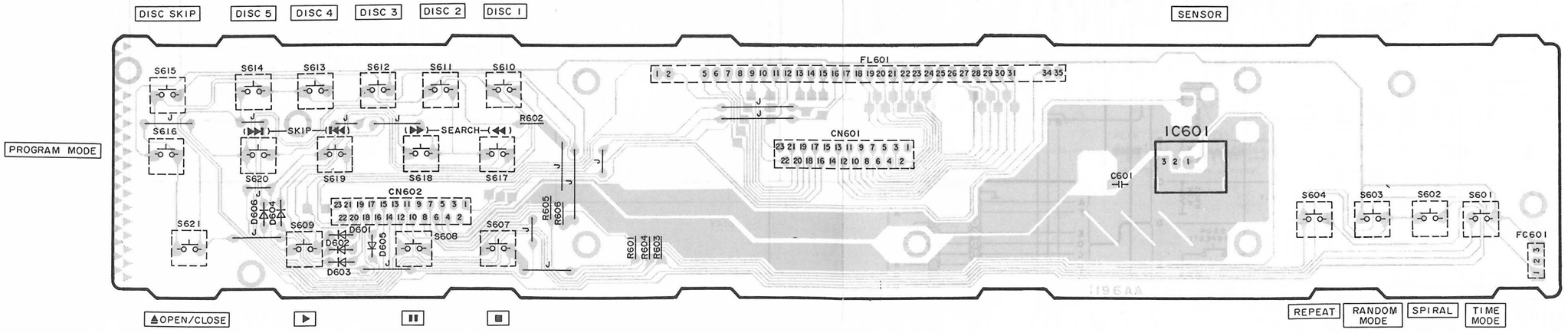
B TRAY MOTOR P.C.B. (REPI725A-N)



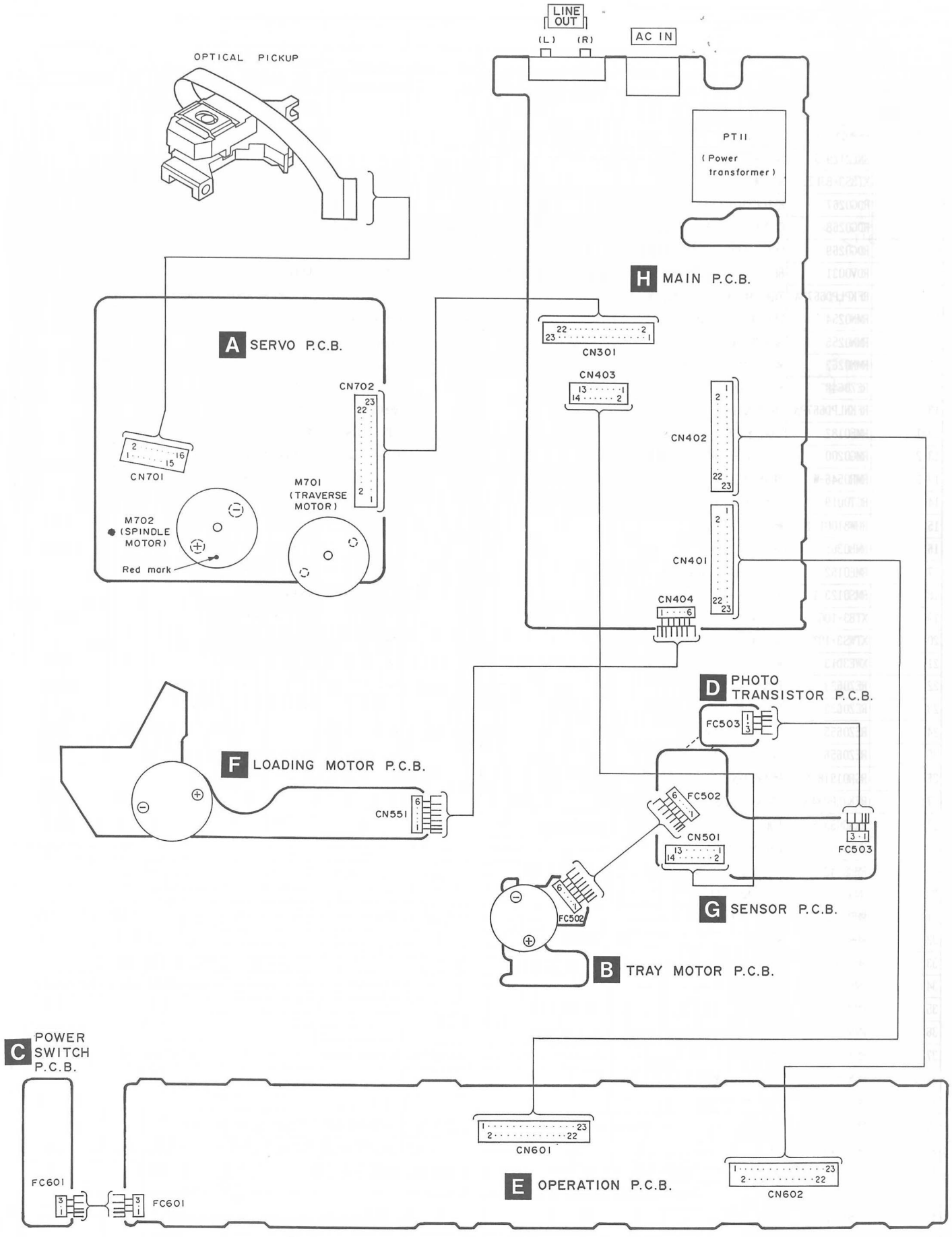
C POWER SWITCH P.C.B. (REPI824C-S)



E OPERATION P.C.B. (REPI824C-S)



WIRING CONNECTION DIAGRAM

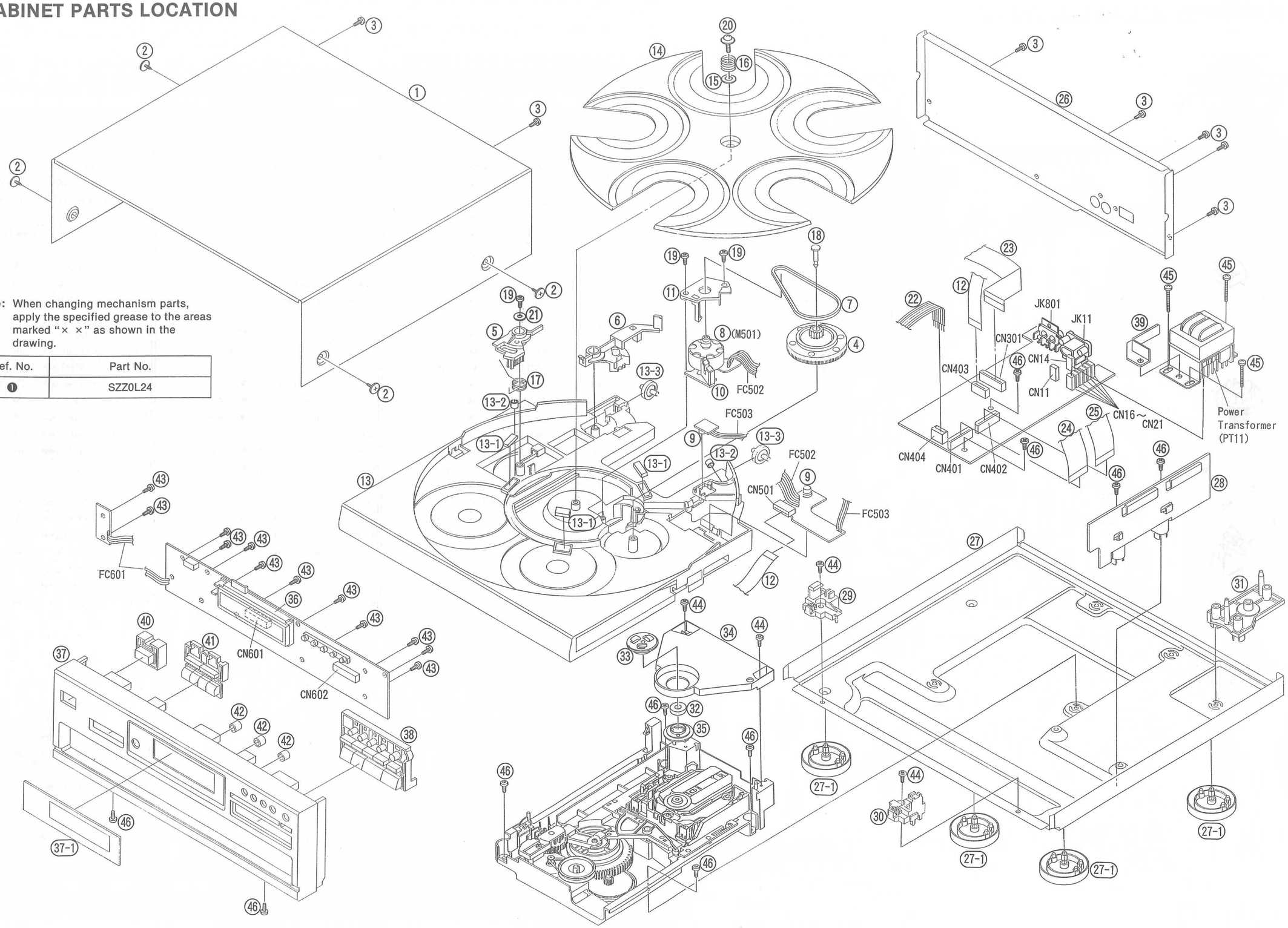


■ REPLACEMENT PARTS LIST

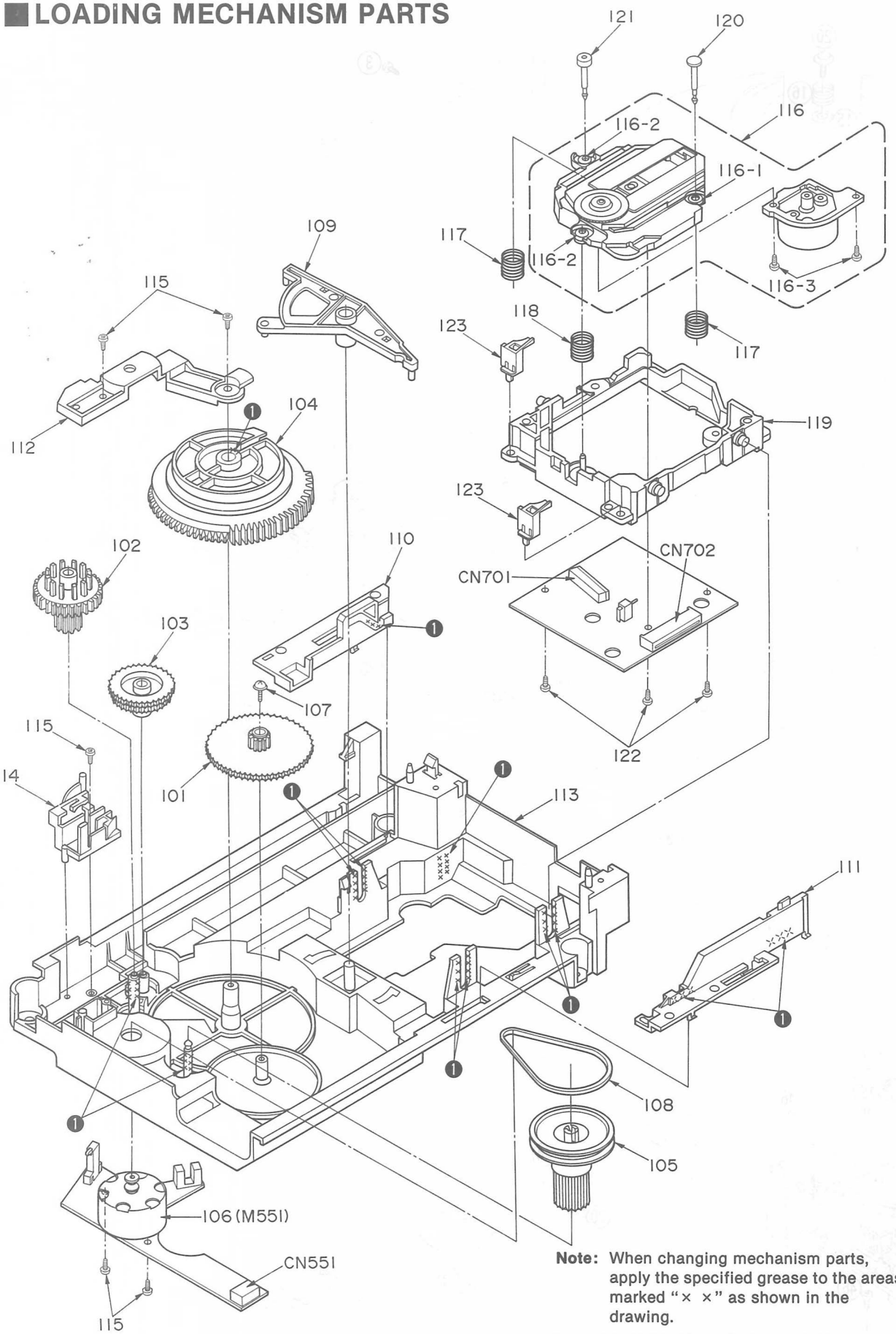
Notes : * Warning: This product uses a laser diode. Refer to caution statements on page 2.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKM0269-K	CABINET	
2	SNE2129-3	SCREW	
3	XTBS3+8JFZ1	SCREW	
4	RDG0267	REDUCTION GEAR	
5	RDG0268	CLOSE LOCK GEAR	
6	RDG0269	OPEN LOCK GEAR	
7	RDV0031	BELT	
8	RFKPLPD667PA	TRAY MOTOR(M501) ASS'Y	
9	RMN0254	LED HOLDER(D501, Q501)	
10	RMN0255	SENSOR HOLDER(D502)	
11	RMN0263	MOTOR HOLDER	
12	REZ0648	FLAT CABLE(14P)	
13	RFKNLPD667PA	TRAY ASS'Y	
13-1	RMF0182	TRAY FELT	
13-2	RMG0200	SILENT RUBBER	
13-3	RMR0546-W	TRAY ROLLER	
14	RGT0019	ROATARY TRAY	
15	RHW81001-1	WASHER	
16	RMB0365	SPRING	
17	RME0152	LOCK GEAR SPRING	
18	RMS0123-1	RIVET	
19	XTB3+10G	SCREW	
20	XTWS3+10T	SCREW	
21	XWE3D13	WASHER	
22	REZ0623	FLAT CABLE(6P)	
23	REZ0635	FPC BOARD(23P)	
24	REZ0655	FPC BOARD(23P)	
25	REZ0656	FPC BOARD(23P)	
26	RGR0191B-A	REAR PANEL	
27	RFKJLPD349PK	CHASSIS ASS'Y	
27-1	RKA0053-K	FOOT	
28	RMR0767-W	CABLE HOLDER	
29	RMR0742-K	TRAY BASE GUIDE(L)	
30	RMR0743-K	TRAY BASE GUIDE(R)	
31	RMR0766-W	TRANSFORMER BASE	
32	RHM245ZA	MAGNET	
33	RMR0334	FIXED PLATE	
34	RMR0744-W	CLAMP PLATE	
35	RMR0761-W	CLAMPER	
36	RMN0185-1	FL HOLDER	
37	RFKGLPD449PK	FRONT PANEL ASS'Y	
37-1	RGK0611G-K	FRONT ORNAMENT PLATE	
38	RGU1046-K	MAIN BUTTON	
39	RMR0778-K	TRANSFORMER COVER	
40	RGU1015-K	POWER BUTTON	
41	RGU1017-K	SUB BUTTON	
42	RMG0200	STOPPER TUBE	
43	XTB26+8J	SCREW	
44	XTB3+10JFZ	SCREW	
45	XTB3+20J	SCREW	
46	XTB3+8JFZ	SCREW	
		LOADING MECHANISM	
101	RDG0270	REDUCTION GEAR	
102	RDG0271	DRIVE GEAR(1)	
103	RDG0272	DRIVE GEAR(2)	
104	RDK0025	DRIVE CAM	
105	RDP0050	PULLEY GEAR	
106	RFKPLPD667PB	LOADING MOTOR(M551) ASS'Y	
107	RHD26019	SCREW	
108	RMG0268-K	BELT	
109	RML0334	DRIVE LEVER	
110	RMM0117	SLIDE PLATE(1)	
111	RMM0118	SLIDE PLATE(2)	
112	RMR0746-W	REINFORCING PLATE	
113	RFKNLPD667PB	MECHANISM BASE ASS'Y	
114	RXQ0346	SLIDER ASS'Y	
115	XTB3+10JFZ	SCREW	
116	RAE0113Z	TRAVERSE DECK ASS'Y	
116-1	SHGD112	FLOATING RUBBER(1)	
116-2	SHGD113-1	FLOATING RUBBER(2)	
116-3	XQS17+A35FZ	SCREW	
117	RME0109	FLOATING SPRING(1)	
118	RME0142	FLOATING SPRING(2)	
119	RMR0698-K	TRAVERSE CHASSIS	
120	RMS0123-1	TRAVERSE FIXED PIN(1)	
121	RMS0350	TRAVERSE FIXED PIN(2)	
122	XTV2+6G	SCREW	
123	RMX0094	TRAY HOLDER	

■ CABINET PARTS LOCATION



■ LOADING MECHANISM PARTS



Note: When changing mechanism parts, apply the specified grease to the areas marked "× ×" as shown in the drawing.

Ref. No.	Part No.
❶	SZZ0L24

■ RESISTORS AND CAPACITORS

Notes : * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM), 1M=1,000k (OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R11, 12	ERDS2TJ151	1/4W 150
R21, 22	ERDS2TJ122	1/4W 1.2K
R31	ERDS2TJ123	1/4W 12K
R32, 33	ERDS2TJ103	1/4W 10K
R41	ERDS2TJ471	1/4W 470
R51, 52	ERDS2TJ122	1/4W 1.2K
R409	ERDS2TJ102	1/4W 1K
R410	ERDS2TJ103	1/4W 10K
R411	ERDS2TJ472	1/4W 4.7K
R412	ERDS2TJ223	1/4W 22K
R413	ERDS2TJ103	1/4W 10K
R414	ERDS2TJ471	1/4W 470
R415	ERDS2TJ103	1/4W 10K
R416	ERDS2TJ102	1/4W 1K
R420	ERDS2TJ331	1/4W 330
R421	ERDS2TJ472	1/4W 4.7K
R461	ERDS2TJ271	1/4W 270
R462	ERDS2TJ221	1/4W 220
R601-606	ERDS2TJ472	1/4W 4.7K
R803, 804	ERDS2TJ224T	1/4W 220K
R805, 806	ERDS2TJ822	1/4W 8.2K
R807, 808	ERDS2TJ123	1/4W 12K
R809-812	ERDS2TJ333	1/4W 33K
R813-816	ERDS2TJ102	1/4W 1K
R817, 818	ERDS2TJ473	1/4W 47K
R819, 820	ERDS2TJ100	1/4W 10
R851	ERDS2TJ222	1/4W 2.2K
R852	ERDS2TJ102	1/4W 1K
		CAPACITORS
C11	ECBT1E103ZF	25V 0.01U
C12	ECEA1CU332B	16V 3300U ⚠
C15	ECBT1H102KB5	50V 1000P
C16	RCE1AM471BV	10V 470U
C17	ECEA0JKA101B	6.3V 100U
C20	ECBT1E103ZF	25V 0.01U
C21, 22	ECA1EM101B	25V 100U
C25, 26	ECBT1H102KB5	50V 1000P
C30	ECBT1E103ZF	25V 0.01U
C31, 32	ECA1HM470B	50V 47U
C33	ECBT1H102KB5	50V 1000P
C41	ECBT1H102KB5	50V 1000P
C42	ECEA0JKA101B	6.3V 100U
C301	ECBT1C103NS5	16V 0.01U
C401	ECBT1C103NS5	16V 0.01U

Ref. No.	Part No.	Values & Remarks
C402	ECA0JM471B	6.3V 470U
C403	ECEA1HKA010B	50V 1U
C404	ECEA1EKA4R7B	25V 4.7U
C405	ECBT1C103NS5	16V 0.01U
C406	ECEA1HKA010B	50V 1U
C421	ECBT1C103NS5	16V 0.01U
C461	ECEA1AKA470B	10V 47U
C462	ECBT1C103NS5	16V 0.01U
C601	ECFR1E104ZF5	25V 0.1U
C801, 802	ECEA1AKA470B	10V 47U
C805-808	ECCR1H391J5	50V 390P
C809, 810	ECEA0JKA470B	6.3V 47U
C811, 812	ECBT1H102KB5	50V 1000P
		<SERVO P.C.B>
		RESISTORS
R701	ERJ6GEYJ100	1/10W 10
R702	ERJ6GEYJ471V	1/10W 470
R703	ERJ6GEYJ823	1/10W 82K
R704	ERJ6GEYJ102A	1/10W 1K
R705	ERJ6GEYJ103V	1/10W 10K
R706	ERJ6GEYJ102A	1/10W 1K
R707	ERJ6GEYJ473V	1/10W 47K
R708	ERJ6GEYJ104V	1/10W 100K
R709	ERJ6GEYJ683V	1/10W 68K
R711	ERJ6GEYJ154V	1/10W 150K
R712	ERJ6GEYJ221V	1/10W 220
R717-720	ERJ6GEYJ102A	1/10W 1K
R721	ERJ6GEYJ101V	1/10W 100
R722	ERJ6GEYJ563V	1/10W 56K
R723	ERJ6GEYJ182V	1/10W 1.8K
R724	ERJ6GEYJ333V	1/10W 33K
R725	ERJ6GEYJ472V	1/10W 4.7K
R726	ERJ6GEYJ473V	1/10W 47K
R727	ERJ6GEYJ103V	1/10W 10K
R728	ERJ6GEYJ392V	1/10W 3.9K
R730	ERJ6GEYJ331V	1/10W 330
R731	ERJ6GEYJ392V	1/10W 3.9K
R734-736	ERJ6GEYJ101V	1/10W 100
R738	ERJ6GEYJ223V	1/10W 22K
R739	ERJ6GEYJ681V	1/10W 680
R741-743	ERJ6GEYJ562V	1/10W 5.6K
R744	ERJ6GEYJ103V	1/10W 10K
R745	ERJ6GEYJ155V	1/10W 1.5M
R748	ERJ6GEYJ182V	1/10W 1.8K
R749	ERJ8GEYJ103V	1/8W 10K
		CHIP JUMPERS

Ref. No.	Part No.	Values & Remarks
R714	ERJ6GEY0R00A	CHIP JUMPER
RJ701-704	ERJ8GEY0R00A	CHIP JUMPER
RJ707-709	ERJ8GEY0R00A	CHIP JUMPER
RJ714-717	ERJ8GEY0R00A	CHIP JUMPER
RJ721	ERJ6GEY0R00A	CHIP JUMPER
RJ724-726	ERJ6GEY0R00A	CHIP JUMPER
		CAPACITORS
C701	ECEA0JKA220	6.3V 22U
C702	ECEA1HKA010I	50V 1U
C703	ECEA0JKA101I	6.3V 100U
C704	ECUZ1E104MBN	25V 0.1U
C705	ECEA1HKA010I	50V 1U
C706	ECUE1H101JCN	50V 100P
C707	ECUV1E273KBN	25V 0.027U
C708	ECUE1H472KBN	50V 4700P
C709	ECUE1C473KBN	16V 0.047U
C710	ECUE1H152KBN	50V 1500P
C711, 712	ECUW1E104ZFN	25V 0.1U
C713	ECUV1C104MBM	16V 0.1U
C714	ECEA0JKA101I	6.3V 100U
C715	ECEA0JKA470I	6.3V 47U
C716	ECUE1H561KBN	50V 560P
C717	ECUW1E104ZFN	25V 0.1U
C718	ECUV1C224KBM	16V 0.22U
C721, 722	ECUE1H270JCN	50V 27P
C723	ECEA1AKA221I	10V 220U
C724	ECUV1C104MBM	16V 0.1U
C725, 726	ECUE1H102KBN	50V 1000P
C727, 728	ECEA1HPK010I	50V 1U
C730	ECUW1E104ZFN	25V 0.1U
C731, 732	ECEA0JK221I	6.3V 220U
C733	ECUZ1E104MBN	25V 0.1U
C734	ECEA1AKA221I	10V 220U
C735-737	ECUW1E104ZFN	25V 0.1U
C738	ECUV1C154KBN	16V 0.15U
C742	ECUV1E273KBN	25V 0.027U
C743	ECUW1E104ZFN	25V 0.1U
C744	ECUE1E822KBN	25V 8200P
C745	ECUE1C473MBN	16V 0.047U
C746	ECUE1H050DCN	50V 5P
C747	ECUE1H222KBN	50V 2200P
C748	ECUV1H471KBM	50V 470P

REPLACEMENT PARTS LIST

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*Remote Control Ass'y: Supply period for three years from termination of production.
*The "(SF)" mark denotes the standard part.

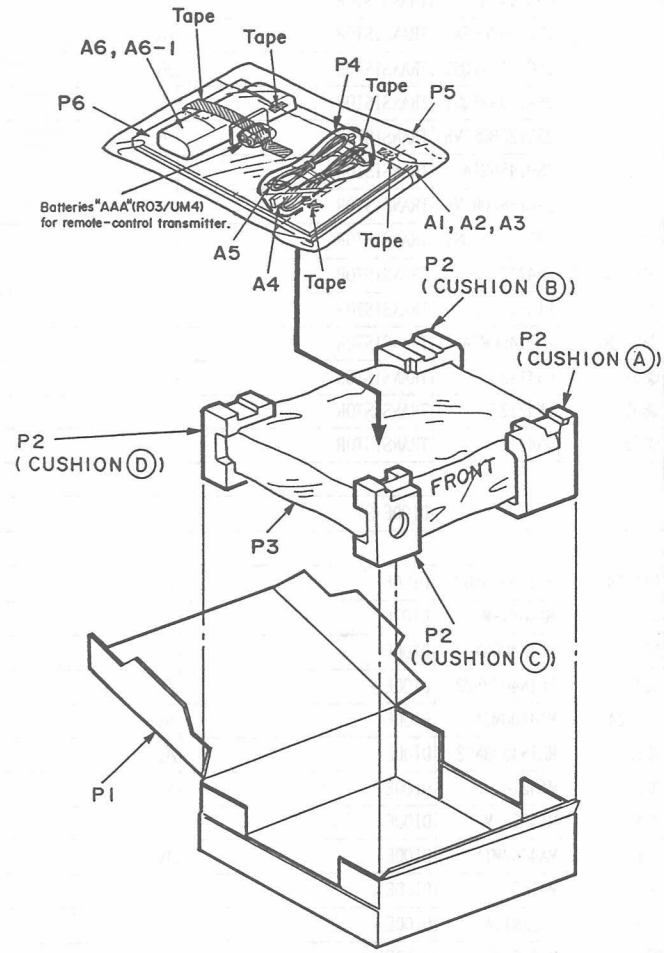
Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC11	LM2940T5	REGULATOR	⚠
IC401	ATT78043B065	SYSTEM CONTROL&FL DRIVE	
IC501	BA6247N	MOTOR DRIVE	
IC601	RCDHC-278N	REMOTE CONTROL SENSOR	
IC801	XRA4558FT1	L. P. F.	
		TRANSISTOR(S)	
Q11	UN4214TA	TRANSISTOR	
Q12, 13	UN4114TA	TRANSISTOR	
Q15	2SD2037EFTA	TRANSISTOR	⚠
Q21	2SC3311AIQST	TRANSISTOR	⚠
Q22	2SA1309AIQST	TRANSISTOR	⚠
Q31	2SB1238QSTV6	TRANSISTOR	⚠
Q32, 33	2SD1450RTA	TRANSISTOR	
Q41	2SD1862QRTV6	TRANSISTOR	⚠
Q401	2SC3311AIQST	TRANSISTOR	
Q461, 462	UN4215	TRANSISTOR	
Q501	PT381TB	TRANSISTOR	
Q801, 802	2SD1450RTA	TRANSISTOR	
Q851	UN4112	TRANSISTOR	
Q852	UN4212TA	TRANSISTOR	
Q853	UN4112	TRANSISTOR	
		DIODE(S)	
D11-14	RL1N4003N02	DIODE	⚠
D15	MA4091-M	DIODE	⚠
D16	RL1N4003N02	DIODE	
D21, 22	RL1N4003N02	DIODE	⚠
D23, 24	MA4100MTA	DIODE	⚠
D31, 32	RL1N4003N02	DIODE	⚠
D33	MA4270	DIODE	⚠
D34	MA4091-M	DIODE	
D41	MA4062MTA	DIODE	⚠
D42	MA165	DIODE	
D43	1SS291TA	DIODE	
D51, 52	MA165	DIODE	⚠
D53	MA4051MTA	DIODE	⚠
D54	MA165	DIODE	
D461	MA4068HTA	DIODE	
D462	MA4056MTA	DIODE	
D501	GL380TB	L. E. D.	

Ref. No.	Part No.	Part Name & Description	Remarks
D502	RSQGP1S53V	DIODE	
D551	SG-206S	DIODE	
D601-606	MA165	DIODE	
D801, 802	MA165	DIODE	
D852	MA165	DIODE	
		TRANSFORMER(S)	
PT11	RTP1K4C014-X	POWER TRANSFORMER	⚠
		COMPONENT COMBINATION(S)	
Z301	BL02RN2R65T2	COMBINATION PART	
		OSCILLATOR(S)	
X401	RSXY4M23M01T	OSCILLATOR(4. 2336MHz)	
		DISPLAY TUBE(S)	
FL601	RSL0170-F	DISPLAY TUBE	
		SWITCH(ES)	
S551	RSH1A005	OPEN/CLOSE DETECTOR	
S601	EVQ21405R	TIME MODE	
S602	EVQ21405R	SPIRAL	
S603	EVQ21405R	RANDOM MODE	
S604	EVQ21405R	REPEAT	
S607	EVQ21405R	STOP	
S608	EVQ21405R	PAUSE	
S609	EVQ21405R	PLAY	
S610	EVQ21405R	DISC 1	
S611	EVQ21405R	DISC 2	
S612	EVQ21405R	DISC 3	
S613	EVQ21405R	DISC 4	
S614	EVQ21405R	DISC 5	
S615	EVQ21405R	DISC SKIP	
S616	EVQ21405R	PROGRAM MODE	
S617	EVQ21405R	REV. SEARCH	
S618	EVQ21405R	FWD. SEARCH	
S619	EVQ21405R	REV. SKIP	
S620	EVQ21405R	FWD. SKIP	
S621	EVQ21405R	OPEN/CLOSE	
S631	EVQ21405R	POWER	

Ref. No.	Part No.	Part Name & Description	Remarks
		CONNECTOR(S)	
CN11	RJS1A1101T1	CONNECTOR(1P)	
CN14	RJS1A1101T1	CONNECTOR(1P)	
CN16-21	RJS1A1101T1	CONNECTOR(1P)	
CN301	RJS1A6823	CONNECTOR(23P)	
CN401, 402	RJS1A6823	CONNECTOR(23P)	
CN403	RJS1A6814	CONNECTOR(14P)	
CN404	RJS1A6606	CONNECTOR(6P)	
CN501	RJS1A6714	CONNECTOR(14P)	
CN551	RJS2A1506	CONNECTOR(6P)	
CN601, 602	RJS1A6223-1	CONNECTOR(23P)	
		JACK(S)	
JK11	SJSD16	AC INLET	⚠
JK801	RJH3201N	LINE OUT	
		FLAT CABLE(S)	
FC502	REZ0612	FLAT CABLE(6P)	
FC503	REZ0613	FLAT CABLE(3P)	
FC601	REZ0610	FLAT CABLE(3P)	
		<SERVO P. C. B.>	
		INTEGRATED CIRCUIT(S)	
IC701	AN8802SCE1V	SERVO AMP	
IC702	MN66271RA	SERVO PROCESSOR	
IC703	AN8389SE1	MOTOR DRIVE	
		TRANSISTOR(S)	
Q701	2SB709S	TRANSISTOR	
		OSCILLATOR(S)	
X701	RSXZ16M9M02T	OSCILLATOR(16. 9344MHz)	
		SWITCH(ES)	
S701	RSM0006-P	REST DETECTOR	
		CONNECTOR(S) AND SOCKET(S)	
CN701	RJU035T016-1	SOCKET(16P)	
CN702	RJS1A6723-1Q	CONNECTOR(23P)	
		PACKING MATERIAL	
P1	RPG2191	PACKING CASE	
P2	RPN0781	CUSHION	

Ref. No.	Part No.	Part Name & Description	Remarks
P3	XZB60X65A01Z	PROTECTION BAG(UNIT)	
P4	XZB22X20C03	PROTECTION BAG(CORD)	
P5	XZB24X33C04	PROTECTION BAG(F. B.)	
P6	RPQ0164	PAD	
		ACCESSORIES	
A1	RFKSLPD449PK	INSTRUCTION MANUAL ASS'Y	
A2	RQA0093	WARRANTY CARD	
A3	RQCB0391	SERVICENTER LIST	
A4	SJA172	AC POWER SUPPLY CORD	⚠(SF)
A5	SJP2249-3	STEREO CONNECTION CABLE	
A6	RAK-SL142WH	REMOTE CONTROL TRANSMITTER	
A6-1	RKK0057-K	BATTERY COVER	FOR R/C TRANSMITTER

■ PACKAGING



(CUSHION Ⓐ, Ⓑ, Ⓒ, Ⓓ Part NO.: RPN0781)

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