ORDER NO. HAD8607631C0
A6

Service Manual

SL-P210

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-P210

Color	Areas
(K)	[M].....U.S.A.
(K)	[MC]...Canada.
(K) (S)	[E].....Switzerland and Scandinavia.
(K) (S)	[EK]....United Kingdom.
(K) (S)	[XL]....Australia.
(K) (S)	[EG]...F.R. Germany.
(K) (S)	[EB]....Belgium.
(K) (S)	[EH]...Holland.
(K) (S)	[EF]....France.
(K) (S)	[Ei].....Italy.
(K) (S)	[XA]....Asia, Latin America, Middle Near East, Africa and Oceania.
(K) (S)	[XB]....Saudi Arabia.
(K) (S)	[PA]....East PX.
(K) (S)	[PE]....European Miliary.
(K) (S)	[PC]....European Audio Club.

Color

(K)...Black Type
(S)...Silver Type

SPECIFICATIONS

(*Measured by EIAJ (CP-307))

■ Audio

No. of channels: 2 (left and right, stereo)
Frequency response: 4—20,000 Hz ±0.3 dB*
Dynamic range: More than 95 dB*
S/N ratio: More than 96 dB*
Harmonic distortion: 0.002% (1 kHz, 0 dB)
Total harmonic distortion: 0.004% (1 kHz, 0 dB)*
Channel separation: More than 96 dB*
Wow and flutter: Below measurable limit
Low-pass filter: High-resolution digital filter

■ Signal Format

Sampling frequency: 44.1 kHz
Correction system: Technics Super Decoding Algorithm
D-A conversion: 16-bit linear

■ Pickup

Type: Fine-focus, one beam
Access time: 1 second (access to the last track)*
Light source: Semiconductor laser
Wavelength: 780 nm
Traverse system: High-speed linear access system
Spindle system: Brushless DD motor

■ Functions

Automatic play: All tracks.
Random access play: Track number.
Repeat play: Entire disc or programmed tracks.
Search: Forward/backward track skip.
Forward/backward manual search.
Program play: For up to 20 selections
Preset edit play: Up to 99 minutes (for program play)
Display: Total tracks.
Current track.
Time display:
- Time display (min., sec./dB).
- The following four time modes display minutes and seconds according to the time mode select button setting:
  ① Disc remaining playing time.
  ② Track number and remaining playing time of current track.
  ③ Playing time from beginning of first track.
  ④ Track number and elapsed playing time from beginning of current track.

Indicator: Play indicator.
Pause indicator.
Repeat indicator.
Disc indicator.
Remote control sensor
Disc loading: Motor-driven horizontal type.
Headphone output level: 15 mW max. 32Ω (fixed)

Technics

Matsushita Services Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Sales Company, Division of Matsushita Electric of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Panasonic Hawaii Inc.
91-238 Kauhi St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office
Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-chome, Minato-ku,
Tokyo 105, Japan

■ Infrared remote control unit

Dimensions (W×D×H): 6.5×15.5×1.8 cm
Batteries: UM-3 "AA" batteries or IEC R6 or equivalent (1.5V×2)
Remote control functions: Numeric buttons (0—9)
Memory button
Clear button
Repeat button
Digital volume attenuation buttons
Time mode select button
Forward and backward skip/search buttons
Stop button
Play/pause button
Weight: 140 g (including batteries)

■ General

Power supply: For U.S.A. and Canada: AC 120V, 60Hz
For United Kingdom and Australia: AC 240V, 50Hz
For Continental Europe: AC 220V, 50Hz
For Others: AC110~127/220~240V, 50/60Hz
Power consumption: 10 W
Output voltage: 2 V (at 0 dB)*
Output impedance: Approx. 550Ω
Load impedance: More than 10 kΩ
Dimensions (W×D×H): 43×24×7.7 cm (16-15/16"×9-7/16"×3-1/32") [When disc holder is opened: 37.2 cm (14-21/32") (D)]
Weight: 3.1 kg (6.8 lbs.)

Specifications are subject to change without notice for further improvement.
Weight and dimensions are approximate.

■ CONTENTS

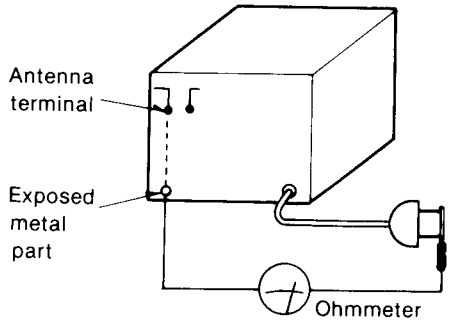
■ SAFETY PRECAUTION (This "safety precaution" is applied only in U.S.A.)

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

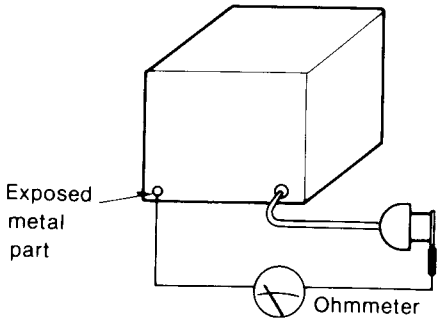
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with 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 ∞

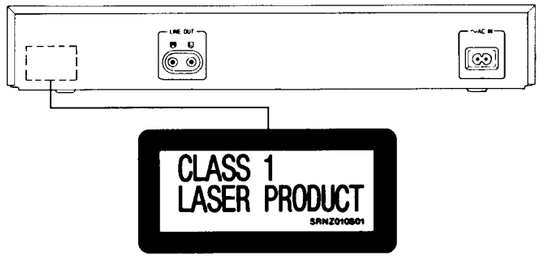
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ PRECAUTION OF LASER DIODE

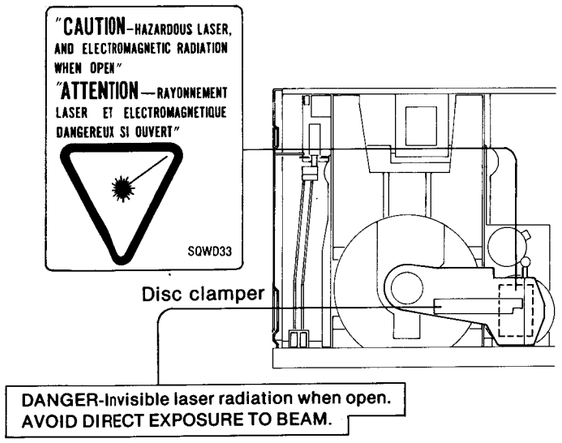
Caution: This product utilizes a laser diode.
ADVARSEL: I dette a apparat anvendes laser.

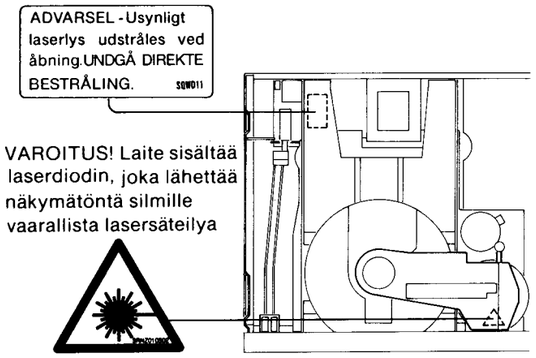
- **Use of caution labels** Note: ○ Mark is used, × Mark is not used.

Areas	Disc clamper	SQWD33	SQWD11	SRNZ010S01	SRNZ010S02
[M], [PA], [PE], [PC]	○	×	×	×	×
[MC]	○	○	×	×	×
[E]	○	×	○	○	○
[EK], [XL], [EG] [EB], [EH], [EF] [EI], [XB], [XA]	○	×	×	○	○



Obs:
Apparaten innehåller laser
Komponent av höger laserklass
än klass 1.

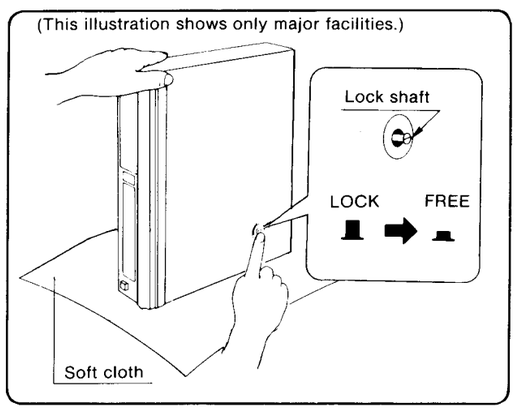




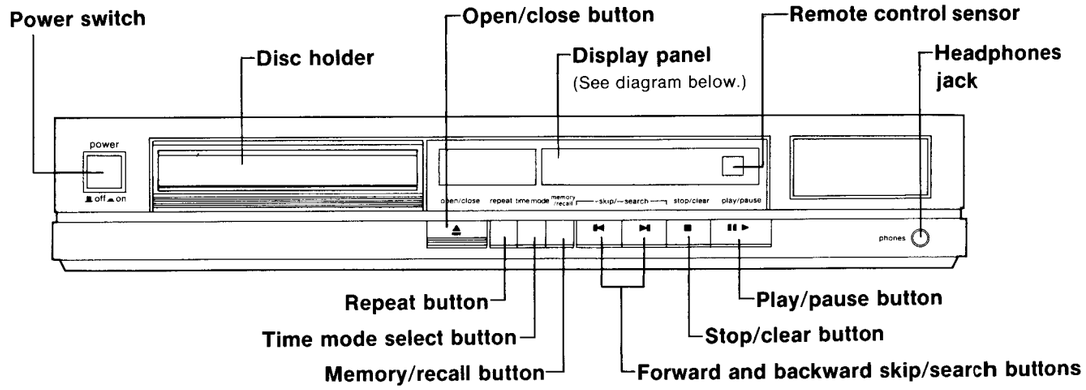
■ BEFORE USING THIS UNIT

1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (🔒→🔓).

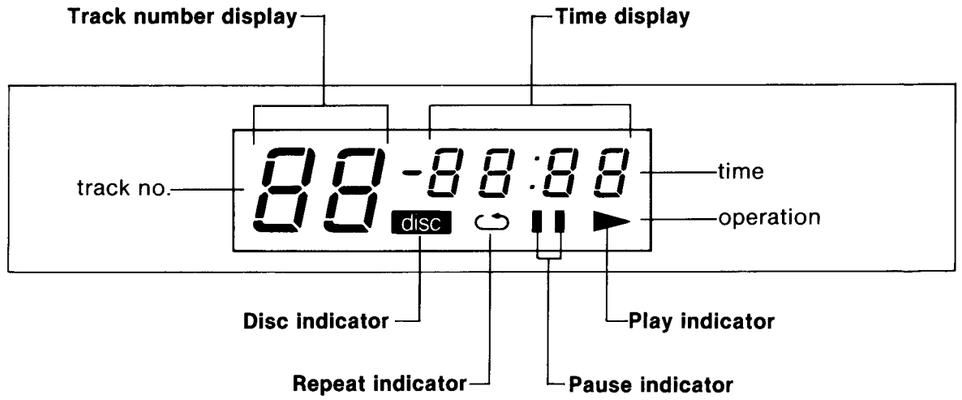
NOTE:
IF THE UNIT IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:
1) Remove the disc from the holder.
2) Pull the lock shaft to the out (LOCK) position (🔓→🔒).
CAUTION:
Do not transport the unit without locking the lock shaft.
SEVERE DAMAGE WILL RESULT.



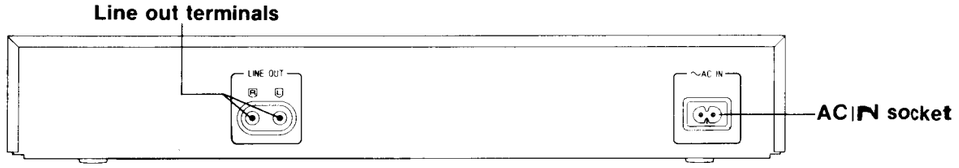
■ LOCATION OF CONTROLS



(Display panel)

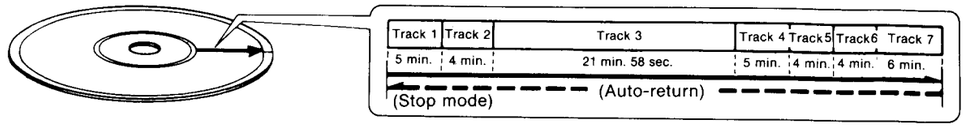


(Rear panel of player)

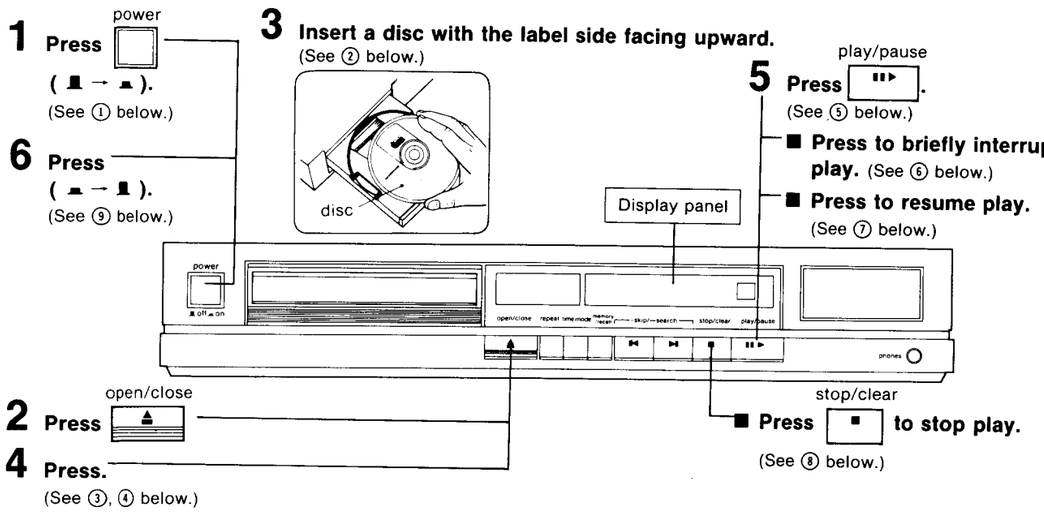


Playing a disc

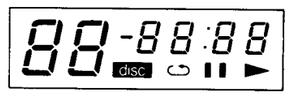
The following explanation is for a disc containing 7 tracks having a total playing time of 49 minutes and 58 seconds.



1 Automatic play (To play a disc from beginning to end.)



① Display illuminates as shown below:



② Insert the disc only after the disc holder has opened all the way. If the disc is inserted too soon, it may be damaged. Do not tilt the unit while the disc holder is opening or closing since the disc could fall out of the holder.

③ Step 4 can be skipped by pressing the play/pause button after inserting a disc. In this case, the holder will close and disc play will begin immediately from track 1, but the tracks and total playing time will not be displayed.

④ If the open/close button is pressed, the display illuminates as shown below.

Disc information is read.
↓
Reading of disc information finished.
↓
Stop mode.

⑤ •The play indicator (▶) illuminates and play begins.

•After the last track has been played the pickup returns to the beginning of the first track and the unit switches to the stop mode.

⑥ The play indicator (▶) goes out, the pause indicator (❚❚) illuminates and the unit switches to the pause mode.

⑦ The pause mode is cancelled and play is resumed.

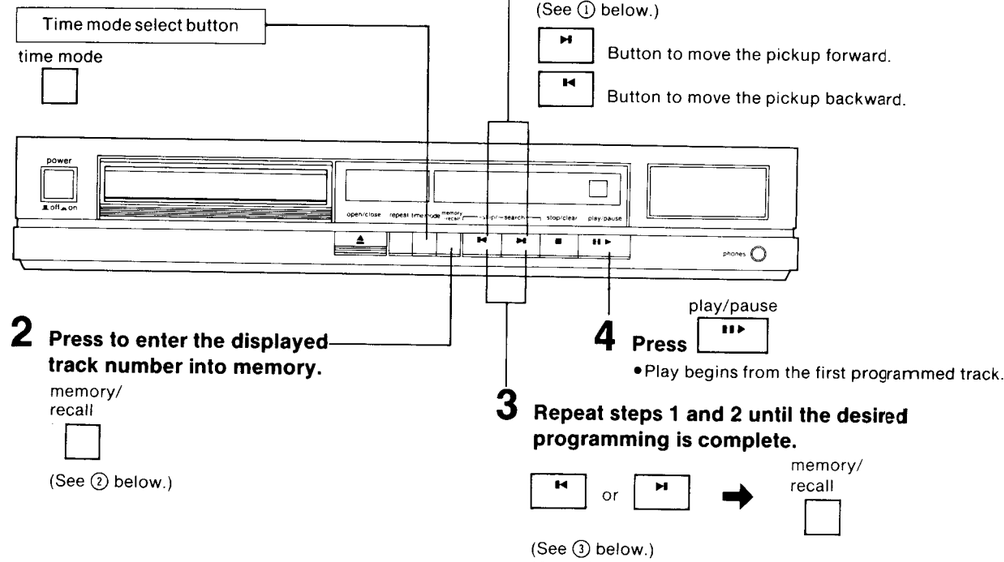
⑧ The pickup will return to the beginning of the first track and the unit will switch to the stop mode.

⑨ When the end of the disc is reached, the pickup returns to the beginning of the first track and the unit switches to the stop mode.
•Remove the disc from the disc holder.
•Turn off the power if the unit is not to be used again for a while.

• Since steps 1, 2, 3, 4 and 6 in this procedure are the same for all play procedures, they are not included in the following explanations.

2 Program play (When the unit is in the stop mode.)

Note:
•Program entries cannot be made during play or pause mode, using these forward and backward skip/search buttons. However, it is possible to program during play or pause mode if you use remote control unit's numeric buttons.



① •If more than 20 selections are entered "F" (full) is shown in the display panel and no further selections can be programmed.

•Keeping the button (or button) pressed will cause the track number display to advance (or go back) continuously.

•When the button is kept pressed continuously, the track number display returns to the first track after passing the last track on the disc. For example, if there are 7 tracks on the disc, keeping the button pressed, would display the track numbers as follows:

→1 → 2 → 3 → 4 → 5 → 6 → 7 →

•Likewise, keeping the button pressed results in the following display:

← 1 ← 2 ← 3 ← 4 ← 5 ← 6 ← 7 ←

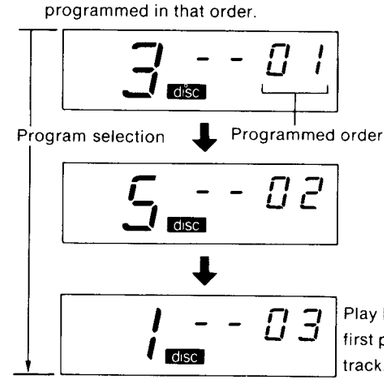
② To enter the same track number several times in succession, simply press the memory/recall button the same number of times that the track is to be played.
Each entry counts as one selection.

Total playing time confirmation

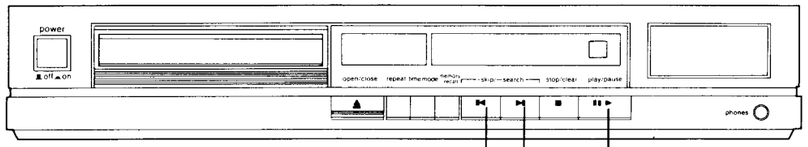
To display the total playing time of all programmed tracks.
Example: If tracks 3, 5 and 1 are specified and the time mode select button is pressed, 30 minutes 58 seconds is displayed.

time mode
Press.

③ The diagram below shows track 3, track 5 and track 1 programmed in that order.



3 Random access play (When the unit is in the stop mode.)



1 While watching the track number display, press for an instant (less than one second) to specify the desired track. (See ① below.)

⏭ Button to move the pickup forward.

⏮ Button to move the pickup backward.

2 Press play/pause ⏯ (See ② below.)

① The display below shows track 3 is specified.

Track number

② The play indicator (▶) illuminates and play begins from track 3.

4 Skip play

(During play or the pause mode.)

■ Forward or backward track skip play

■ While watching the track number display, press for an instant the forward or backward skip/search button until the desired track has been located. (See ① below.)

⏭ Forward skip/search button (Pickup skips forward)

⏮ Backward skip/search button (Pickup skips backward)

5 Manual search play

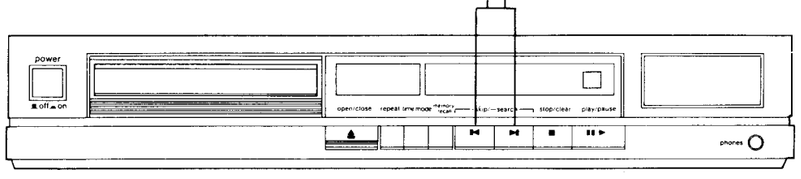
(During play or the pause mode.)

■ To play the disc from a specific point

■ Keep the forward or backward skip/search button pressed to move the pickup forward or backward. Release the button when the desired point has been reached (as shown by the display). (See ② below.)

⏭ Forward skip/search button (Pickup moves forward)

⏮ Backward skip/search button (Pickup moves backward)



① Pressing one of the skip buttons for an instant activates the quick skip mode.

Forward skip

- During automatic play, the pickup skips to the beginning of the next track each time the button is pressed.
- During program play or program repeat play, the pickup skips to the beginning of the next programmed track each time the button is pressed.

Backward skip

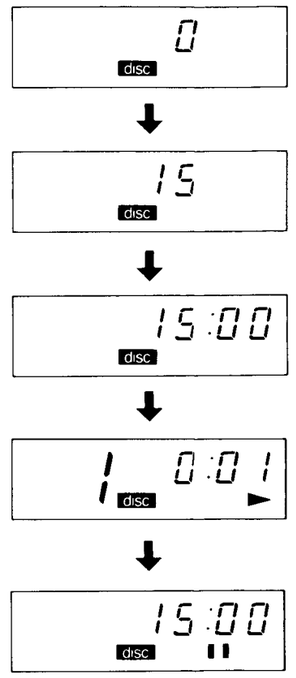
- During automatic play, the pickup skips to the beginning of the current track. If pressed again quickly, the pickup skips to the beginning of the previous track.
- During program play (repeat function not activated), the pickup skips backward only to the beginning of the current track.
- During program repeat play, the pickup skips to the beginning of the current track. If pressed again quickly, the pickup skips to the beginning of the previous programmed track.

② • The pickup moves slowly at first and then rapidly if one of the buttons is held down for more than about 3 seconds.
- If one of the buttons is pressed while a disc is being played, sound from the disc can be heard as the pickup moves. The output level at this time is decreased by 12 dB (1/4) compared with the normal level.
- During program play, the pickup can only be moved between the beginning and end of the track currently being played.

6 Preset edit play

(When the unit is in the stop mode.)

Note:
It is possible to specify preset edit time using remote control unit.

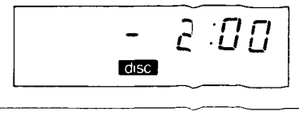
Procedure	Function
Confirm that the unit is in the stop mode. 1. Press the time mode select button. 2. Press the forward or backward skip/search button to specify the playing time in minutes. 3. Press the memory/recall button. (For automatic play or repeat play, this step may be omitted.) 4. Press the play/pause button. 5. After playing the preset edit time the unit switches to the pause mode. **Notes:** • If a preset edit time that is longer than the recorded playing time is specified, the unit switches to the stop mode after the last track has been played. • A maximum time of 99 minutes may be specified for program disc play. • If you operate the search or skip function during preset edit play, preset edit play is cancelled. • For preset edit play during program play, the preset edit time must be specified before the program selections are entered.	**Preset edit play** **For example, to play only 15 minutes:** 1. time mode □ **Press.** 2. ⏭ or ⏮ **Press.** (Specify 15 minutes.) 3. memory/recall □ **Press.** 4. play/pause ⏯ **Press.**  (The above illustration shows a disc containing more than 15 minutes within the first track.) • During automatic play, the unit switches to the pause mode after playing for 15 minutes. • During program play, the unit switches to the pause mode after playing for 15 minutes, and the next programmed track is displayed if there is a further programmed track. • During repeat play, the unit switches every 15 minutes to the pause mode. (Play is restarted by pressing the play/pause button.)

The time mode button can also be used for the following function.

Remaining specified time confirmation

To display the remaining specified time.
Example: If 15 minutes has been specified and then tracks 2→4→6 are programmed, pressing the time mode select button displays the remaining playing time between the end of the last programmed track and the specified preset edit time of 15 minutes.

In the example, track 2 has a playing time of 4 minutes, track 4 of 5 minutes and track 6 of 4 minutes, therefore the displayed remaining playing time is 2 minutes (15 minutes minus 13 minutes).



7. Remote control unit

Remote control unit facilities

① Automatic play
② Program play
③ Random access play
④ Skip play
⑤ Manual search play
⑥ Repeat play
⑦ Time mode display function
⑧ Preset edit play
⑨ Digital volume attenuation function
⑩ Program clear function
⑪ Program recall operation

- The following operations are not possible using the remote control unit.

① Power on/off
② Disc holder open/close

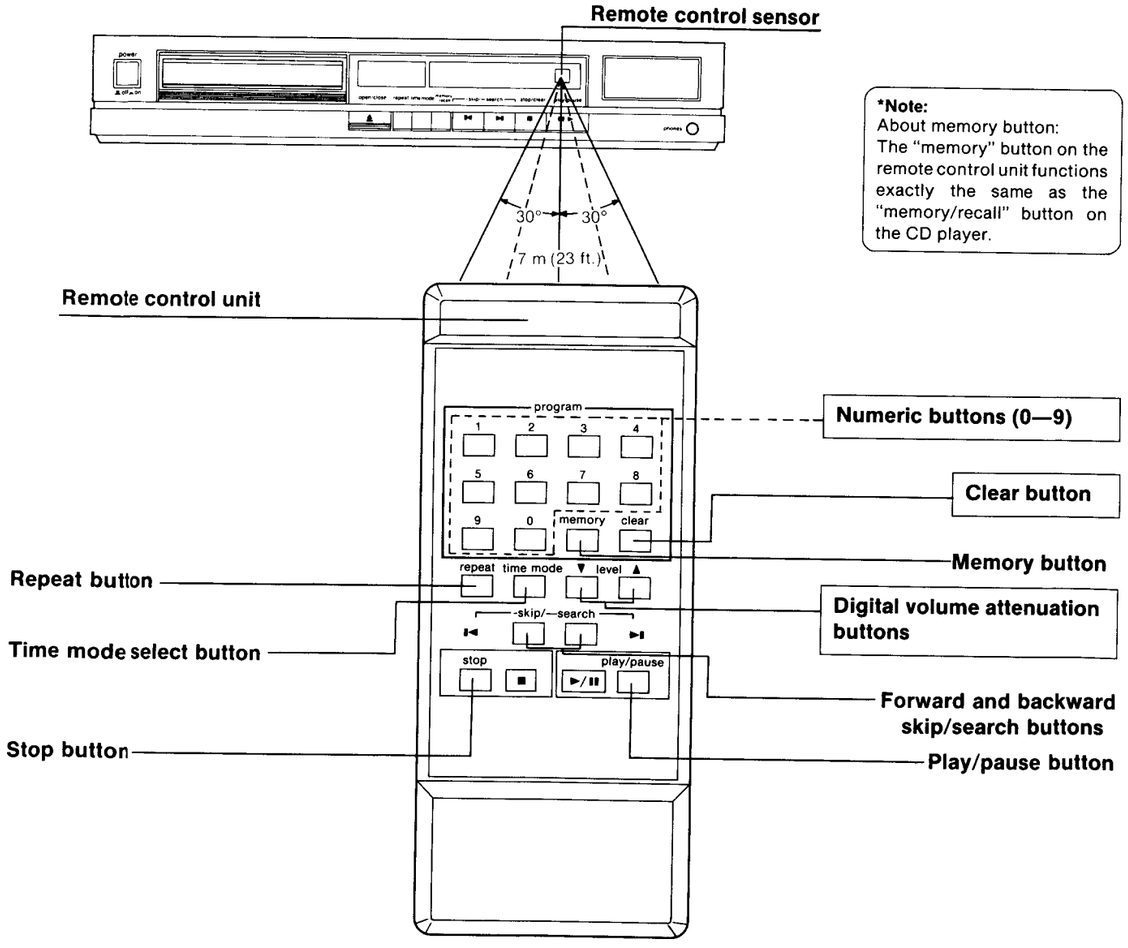
■ Notes

- Always aim the remote control unit at the front panel receiver.
- The remote control unit can be used at an angle range of up to 30° from the direction in which the front panel faces.
- The remote control unit cannot be used from a distance of more than 7 meters (23 ft.)

■ Remote control operation

Point the remote control unit at the front panel receiver and press the appropriate button(s).

Parts identification



***Note:**
About memory button:
The "memory" button on the remote control unit functions exactly the same as the "memory/recall" button on the CD player.

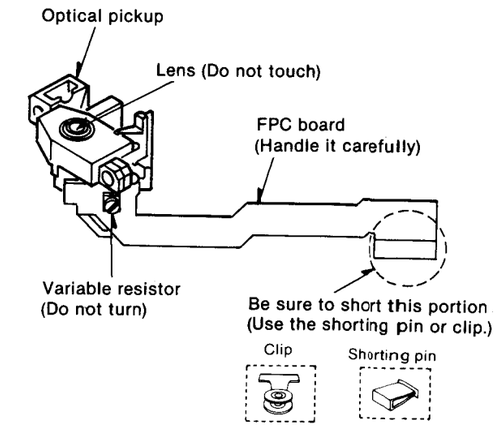
When using the remote control unit, press the buttons slowly and accurately to avoid mistaken operation.

■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the 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 optical pickup.

• Handling of optical pickup

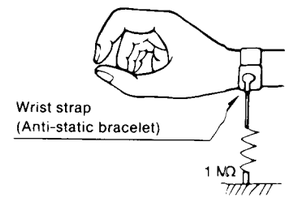
1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. **(FPC board)**
   When removing or connecting the short pin, finish the job in as short 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.

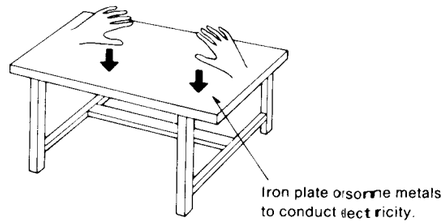


• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
   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 optical pickup.

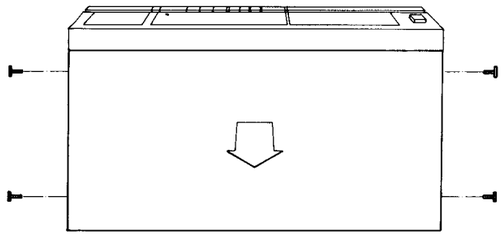




■ DISASSEMBLY INSTRUCTIONS

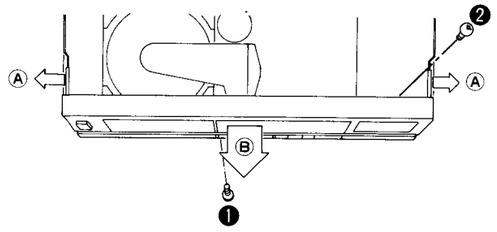
CAUTION:
- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When doing the job, removing the cabinet and disc clamper of this unit, be sure to turn the power supply off.

Ref. No. 1	How to remove the top case
Procedure 1	• Remove the 4 setscrews.

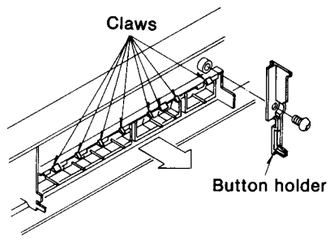


Note: When doing the job, Lock the lock shaft at bottom of the unit. (See page 3)

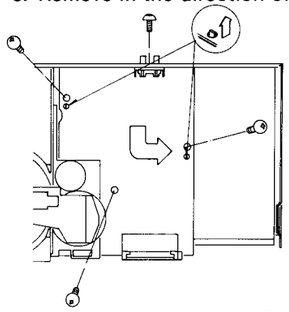
Ref. No. 2	How to remove the front panel
Procedure 1 → 2	1. Remove the 2 setscrew ❶, ❷. 2. Slightly pull the tabs outward (arrows Ⓐ). 3. Remove in the direction of the arrow Ⓑ.



Ref. No. 3	How to remove the operation button
Procedure 1 → 2 → 3	1. Remove the setscrew and button holder. 2. Release the 8 claws.



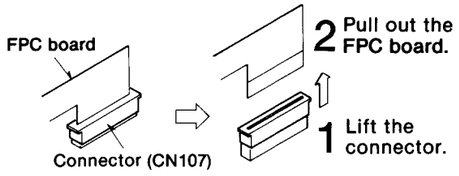
Ref. No. 4	How to remove the main P.C.B.
Procedure 1 → 2 → 4	1. Remove the 4 setscrews. 2. Lift the P.C.B. to remove it from the chassis tabs. 3. Remove in the direction of the arrow.



How to check the main P.C.B.

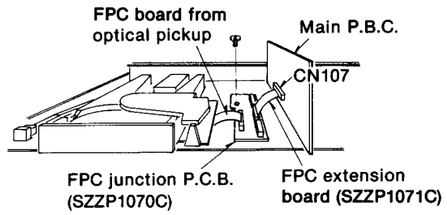
- When checking the soldered surfaces of the main P.C.B. and replacing the parts, do as shown.

1. Remove the main P.C.B. and relay P.C.B.
2. Remove the FPC board (CN107).



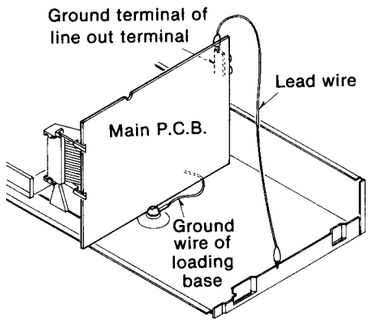
Caution: Insert the short pin into the FPC cord in order to prevent breakdown of laser diode. (See page 10)

3. Mount FPC junction P.C.B. (SZZP1070C) on the chassis. (Do the job as shown by using the main P.C.B. setscrew.)
4. Connect FPC board from optical pickup to FPC junction P.C.B.
5. Connect FPC extension board (SZZP1071C) to FPC junction P.C.B. and CN107 of main P.C.B.

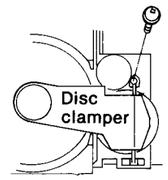


6. Place the main P.C.B. as shown in the figure.

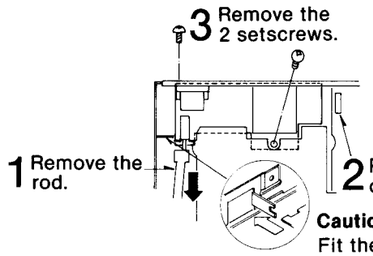
Cautions:
1. Be sure to connect the P.C.B. ground terminal (line out terminal) and chassis lead wire.
2. Connect the ground wire of loading base to the chassis.



Ref. No. 5	How to remove the disc clamper
Procedure 1 → 5	• Remove the setscrew.



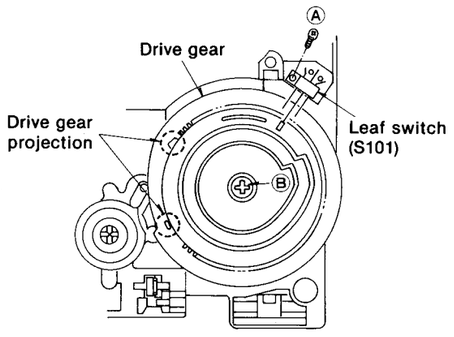
Ref. No. 6	How to remove the power supply P.C.B.
Procedure 1 → 6	• Remove in the numerical order shown. (Shift the disc holder forward.)



Caution for fitting
Fit the P.C.B. in the groove of chassis.

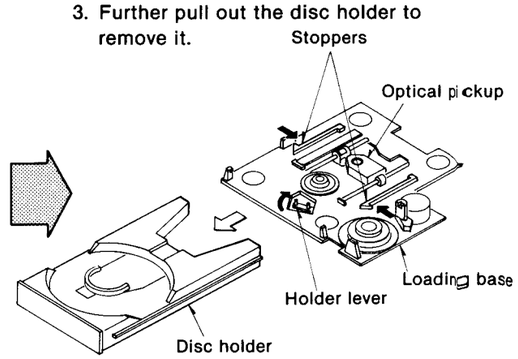
Ref. No. 7	How to remove the disc holder (disc tray)
Procedure 1 → 2 → 5 → 7	

- **Set the drive gear as shown below.** (Turn it completely to the right, then turn it to the left by about 20° so that drive gear teeth or projection will not touch the rack of disc holder.)



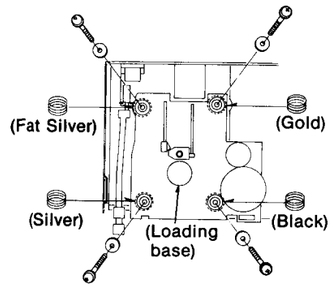
- **To remove the drive gear**
Remove the screw Ⓐ of leaf switch (S101), then remove the drive gear setscrew Ⓑ.

1. Push the holder lever backward, (From underneath the loading base.)
2. Pull the disc holder and bend the 2 claws of disc holder stopper of loading base toward the optical pickup.
3. Further pull out the disc holder to remove it.



- **Caution for fitting**
When fitting the disc holder, make the drive gear as shown on the left, and then insert the disc holder along the guide of loading base.
After inserting the disc holder completely, turn the drive gear to the right completely.

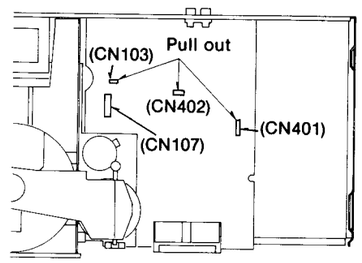
Ref. No. 8	How to remove the loading base
Procedure 7→8	**Note:** Lock the lock shaft at the bottom of the unit. • Remove the 4 setscrews.



Note the color of each spring, they must be reinstalled in their original position.

Refer to the optical pickup handling precautions (See page 10).

1. Pull out the 3 connectors (CN103, 401, 402).
2. Remove the FPC board (CN107).

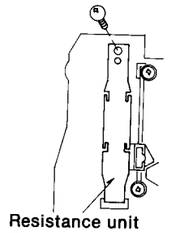


Caution: Insert the short pin into the FPC board in order to prevent breakdown of laser diode. (See page 10)

Ref. No. 9	How to remove the optical pickup
Procedure 7→8→9	• Follow the numerical order shown.

Refer to the optical pickup handling precautions (See page 10).

1 Remove the screw.

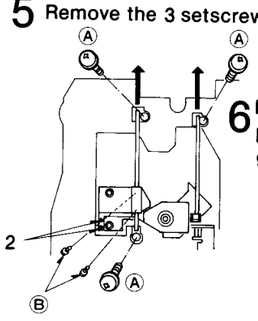


Resistance unit (Speed sensor)

2 Remove the resistance unit.

3 Unsolder the 2 terminals.

5 Remove the 3 setscrews Ⓐ.

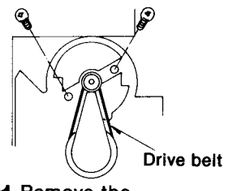


6 Pull out the optical pickup from the 2 guide shafts.

4 Remove the 2 setscrews Ⓑ. (Underneath)

Ref. No. 10	How to remove the drive motor
Procedure 7→8→10	• Follow the numerical order shown.

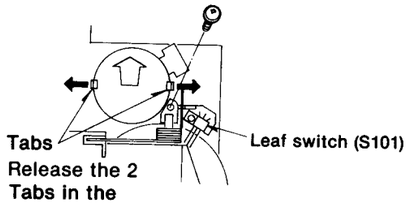
2 Remove the 2 setscrews.



1 Remove the drive belt.

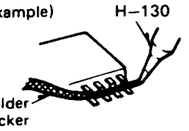
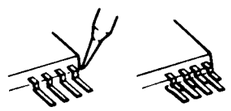
5 Lift up the drive motor.

3 Remove the setscrew.



4 Release the 2 Tabs in the direction of the arrows.

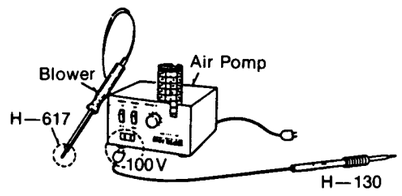
■ HOW TO REPLACE IC'S (Small outline type)

	Replacing procedure		Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	(Example) H—130  Solder sucker	• Recommended tool .....Special soldering iron * H605M and H-130. * H605E and H-130. • Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. • When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. • When using a pencil type soldering iron. 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

*** Special soldering iron**
(Refer to Technical Information, ORDER NO. GAD84125486T1)...For U.S.A. and Canada
(Refer to Technical Information, ORDER NO. GAD84115476T8)...For others

• H—605 Spot Heater (hot-air solder iron)
This device that uses hot air to melt solder was developed to remove Flat-Package ICs, RHCs and chip parts.

- H—605M (For 120V power source)
- H—605E (For 200V/220V/240V power source)

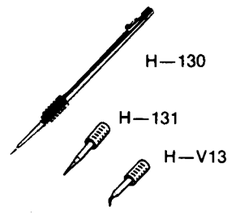


• H—617 Twin Nozzle (for spot heater)
Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter: 1.0mm×2)

• H—130 Slim Pencil Solder Iron
An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs etc, to high-density circuit boards.
Features:

• Rated power:	100V, 15W
• Max. temp.:	400°C
• Heater:	ceramic (long life)
• Insulation resistance:	100MΩ
• Length:	178mm
• Weight:	16g (not including cord)

H—617



• H—131, H—V13 Cap Bits
Solder tip for the slim pencil Solder Iron is composed of a bit holder and a corrosion resistance solder tip. Permits changing of solder tips even while still hot.

• Solder tip:	0.3mm

■ TERMINAL FUNCTION OF LSI

• MN15261PDU (System Control and FL Drive)

Pin No.	Mark	Signal	I/O Devision	Function
1	VSS	GND	I	GND terminal
2	X0	——	O	Not used (Open)
3	X1	SENSE	I	Optical servo condition input
4	P00	PC	O	Spindle motor control signal (ON·OFF command)
5	P01	M DATA	O	Command data output
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	M-RLY	O	Muting relay control
9	P11	D-DAT	O	Data output
10	P12	$\overline{\text{SYNC}}$	O	Synchro recording control (Not used)
11	P13	$\overline{\text{D-OP}}$	O	Direct operation control (Not used)
12	$\overline{\text{SYNC}}$	——	O	Not used (Open)
13	$\overline{\text{RST}}$	RESET	I	Reset signal input (reset at "L")
14	$\overline{\text{IRQ}}$	BLKCK	I	Sub-code block (Q data) clock (75Hz) input
15 ⟨ 18	P50 ⟨ P53	——	I	Key scan input
19	$\overline{\text{SBT}}$	$\overline{\text{CLDCK}}$	I	Sub-code frame clock (7.35kHz)
20	$\overline{\text{SBD}}$	SUBQ	I	Sub-code Q data input
21	P20	TGC	O	———
22	P21	$\overline{\text{TRV-H}}$	O	Traverse servo control signal
23	P22	$\overline{\text{TRV-R}}$	O	Traverse reverse command signal
24	P23	$\overline{\text{RRV-F}}$	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
30	P41	$\overline{\text{D END}}$	O	Data (end signal) signal
31	P42	$\overline{\text{FLOCK}}$	I	Optical servo condition (focus) input
32	P43	$\overline{\text{SENSE}}$	I	Optical servo condition (track cross) input
33	PE0	$\overline{\text{CLOSE}}$	O	Loading motor close command (ON at "L")
34	PE1	$\overline{\text{OPEN}}$	O	Loading motor open command (ON at "L")
35	P60	$\overline{\text{CLK}}$	O	Clock signal output
36	P61	D-STA	O	Data start signal
37	DAC	DAC	O	———
38	VPP	——	I	FL drive power supply (connected to −32V)
39 ⟨ 52	D0 ⟨ DD	——	O	FL grid signal and key scan signal
53 ⟨ 61	S8 ⟨ S0	——	O	FL anode signal
62	OSC2	——	I	Clock terminal
63	OSC1	——	I	Clock input
64	VDD	——	I	Power supply (connected to +5V)

• MN1550PDT (Remote Control Signal Processing)

Pin No.	Mark	Signal	I/O Devision	Function
1	VDD	——	I	Power supply (connected to +5V)
2	OSC	SMCK	I	Clock input
3	P23	——	——	———
4	P22	——	——	———
5	RST	RESET	I	Reset signal input
6	P21	——	——	———
7	P20	——	I	Remote control signal input
8	IRQ	——	I	Program enable/de-enable control
9	SYNC	——	O	Clock output
10 ⟨ 13	P10 ⟨ P13	Data	I	Key strobe
14 ⟨ 17	P00 ⟨ P03	Data	I	Key strobe
18	VSS	GND	I	GND terminal

• MN6617 (Digital Signal Processing : EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O Devision	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
2	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
3	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)
5	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
6	MLD	I	Command load input
7	MCLK	I	Command clock input
8	MDATA	I	Command data input
9	DMUTE	I	Muting control (muting ON at "H")
10	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output
12	SMCK	O	Clock output (4.2336 MHz)
13	PMCK	O	Pitch control clock output (Not used, open)
14	ITC	I	Track counter input signal (Not used, connected to +5V)
15	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +5V)
16	X2	O	Clock output (16.9344 MHz)
17	X1	I	Clock input (16.9344 MHz)
18	SEL	I	DA output parallel/serial selection (serial at "L")
19	LDG/WDCK	O	L channel deglitch signal/serial data word clock.
20	RDG	O	R channel deglitch signal.
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
22	IPFLAG	O	Interpolation flag (interpolation at "H")
23	FLAG0	O	Error flag (error at "H")
24	FLAG6	O	16 K RAM address reset signal (reset at "H")
25	XCK	O	Clock (16.9344 MHz) output (Not used, open)
26	DA15/ SRDATA	O	16-bit data output/serial data output (MSB first)
27	DA14/ SRDATAX	O	16-bit data output/serial data output (LSB first)
28	DA13/SRCK	O	16-bit data output/serial data beat clock.
29	DA12/WDCK	O	16-bit data output/serial data word clock (Not used)
30	DA11/ BYTCK	O	16-bit data output/serial data byte clock (Not used)
31	GND	I	GND terminal
32	DA10/RIL	O	16-bit data output/RIL signal
33	DA9/RESY	O	16-bit data output/ Resynchronizing signal
34	DA8/FCLV	O	16-bit data output/Synchronizing detection signal (Not used)
35	DA7/ IPBYTE	O	16-bit data output/Interpolation flag for each byte (Not used)
36	DA6/IPSEL	I/O	16-bit data output/ interpolation inhibit (Not used)
37	DA5/FLAG5	O	16-bit data output/C2 decoder correction flag 3 (Not used)
38	DA4/FLAG4	O	16-bit data output/C2 decoder correction flag 2 (Not used)
39	DA3/FLAG3	O	16-bit data output/C2 decoder correction flag 1 (Not used)
40	DA2/FLAG2	O	16-bit data output/C1 decoder correction flag 2 (Not used)
41	DA1/FLAG1	O	16-bit data output/C1 decoder correction flag 1 (Not used)
42	DA0/FLCK0	O	16-bit data output/Crystal frame clock
43 ⟨ 50	D7 ⟨ D0	I/O	16 K RAM data output
51	RAMOE	O	16 K RAM $\overline{\text{OE}}$ signal
52	RAMWE	O	16 K RAM $\overline{\text{WE}}$ signal
53 ⟨ 63	RAMA 0 ⟨ RAMA10	O	16 K RAM address signal (RAMA0 : LSB, RAMA10: MSB)
64	PC	O	Spindle motor ON signal (ON at "L")
65	EC	O	Spindle motor drive signal
66	FG	I	Spindle motor FG signal input
67	———	——	———
68	———	——	———
69	———	——	———
70	———	——	———
71	———	——	———
72	PCK	I	PLL extract clock input
73	VDD	I	Power supply (connected to +5V)
74	EFM	I	EFM signal input (PLL)
75	SRF	I	EFM signal input (DSL)
76	DO	I	Drop-out signal (Drop-out at "H")
77	CLVS	O	11T servo OK signal (OK at "H")
78	FPC	O	PLL frequency comparision signal
79	BSSEL	O	PLL frequency in take operation signal.
80	———	——	———
81	———	——	———
82	———	——	———
83	SUBC	O	Sub-code serial output data
84	SBCK	I	Clock for sub-code serial output

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE−	I	Phase difference-voltage conversion (−)
9	TE +	I	Phase difference-voltage conversion (+)
10	APC −	O	Laser power inversion input
11	C·MEM	I	Capacitor connection for phase difference memory
12	APC +	I	Laser power non-inversion input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, grounded)
18	C·MSP	I	Track-cross reference speed setting capacitor connection (not used, grounded)
19	C·AF	I	Auto focus timer capacitor connection
20	KICK R/$\overline{F}$	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	Control input ($\overline{FOON}$: Focus servo ON signal)
23	CNT2	I	Control input ($\overline{TRON}$: Tracking servo ON signal)
24	CNT3	I	Control input (KICKF : Kick direction [forward] command)
25	CNT4	I	Control input (KICKR : Kick direction [reverse] command)
26	$\overline{F\cdot LOCK}$	O	Focus lock signal output
27	C·FBDO	O	Capacitor connection for inversion RF high speed detection
28	C·SBDO	O	Capacitor connection for inversion RF low speed detection
29	C·SBRT	O	Capacitor connection for non-inversion RF low speed detection
30	C·FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RFIN	I	RF signal input
34	S·OUT	O	Focus search signal output
35	C·LW	I	Capacitor connection for triangular wave generation
36	FE·OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE·REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current/voltage conversion output (B)
41	IVA	O	Current/voltage conversion output (A)
42	PDA	I	Photo detector current input (A)

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted from SRF
2	EFM	O	EFM signal output synchronized with PCK
3	D·GND	I	GND terminal (digital system)
4	SRF	O	RF signal output data-sliced into digital value
5	SLC	I	Slice level control signal input
6	DO	O	Drop-out detection pulse output
7	FPC	I	Frequency comparison error signal input.
8	VCC	I	Power supply (connected to +5V)
9	NC	——	Non connection
10	VR	I	Resistor connection for VCO oscillation frequency
11	VEE	I	Power supply (connected to −5V)
12	VC1	I	Capacitor connection for VCO oscillator frequency
13	VC2	I	Capacitor connection for VCO oscillator frequency
14	A·GND	I	GND terminal (analog system)
15	RF	I	RF signal input

• MN6618 (Digital Filter)

Pin No.	Mark	I/O Device	Function
1	———	——	———
2	D012	O	16-bit parallel data output
3	D011/SCK	O	16-bit parallel data output/ serial output bit clock
4	D010/SOUT	O	16-bit parallel data output/ serial output data
5	GND	I	GND terminal
6	D09	O	16-bit parallel data
7	———	——	———
8	D08	O	16-bit parallel data
9	D07	O	16-bit parallel data
10	———	——	———
11	———	——	———
12	D06	O	16-bit parallel data
13	D05	O	16-bit parallel data
14	D04	O	16-bit parallel data
15	D03/2RLCK	O	16-bit parallel data/RL signal
16	———	——	———
17	———	——	———
18	D02/WCK	O	16-bit parallel data/serial output word clock
19	D01	O	16-bit parallel data
20	D00	O	16-bit parallel data (LSB)
21	MDATA	I	Command data input
22	———	——	———
23	MCLK	I	Command clock input
24	MLD	I	Command load input
25	———	——	———
26	$\overline{RST}$	I	Reset signal input (reset at "L")
27	VDD	I	Power supply (connected to +5V)
28	LRCK	I	R/L signal
29	———	——	———
30	SFT	I	Serial data input clock
31	SIN	I	Serial data input
32	———	——	———
33	X OUT	O	Clock output (Not used)
34	X IN	I	Clock input (16.9344 MHz)
35	OSEL	I	DA output parallel/serial selection. (parallel at "H")
36	LDGL	O	L channel deglitch signal
37	RDGL	O	R channel deglitch signal
38	VDD	I	Power supply (connected to +5V)
39	D015	O	16-bit parallel data (MSB)
40	D014	O	16-bit parallel data
41	———	——	———
42	D013	O	16-bit parallel data

• AN8290S (Spindle Motor Drive)

Pin No.	Mark	I/O Devision	Function
1	GND	I	Minimum potential of IC control. (In this unit, it is connected to VEE [−8.5V])
2	DCR	I	Standard voltage of FAI, PC, CLK. (In this unit, it is connected to 2.5V.)
3	FAI	I	Torque command filter amp. input. (Normal rotation command when FAI < DCR.)
4	FAO	O	Filter amp. output.
5	DI	I	Absolute value circuit input.
6	LPF	I	Capacitor terminal for low pass filter of current feedback loop.
7	A1	O	Drive signal output.
8	A2	O	
9	A3	O	
10	PGND	I	Minimum potential of IC power. (In this unit, it is connected to VEE [−8.5V])
11	CS	I	Drive current detection resistor terminal.
12	PVCC	I	Power input for IC power.
13	H3−	I	Not used in this unit.
14	H3+	I	
15	H2−	I	Negative output of Hall element is input.
16	H2+	I	Positive output of Hall element is input.
17	H1−	I	Negative output of Hall element is input.
18	H1+	I	Positive output of Hall element is input.
19	HSW	I	Bias switch of Hall element. (OFF when PC > DCR)
20	HB	I	Bias power of Hall element.
21	VCC	I	Power input for IC control.
22	PC	I	Power control. (Power down mode when PC > DCR)
23	CLK	I	Clock input. (DCR standard, operated at the edge of rise.)
24	TC	I	Triangular wave generation capacitor terminal.

■ RESISTORS AND CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ. All capacitors are in MICORFARADS (μF), P = 10^{-6}μF.

Numbering System of Resistor

Example

ERD	S2	T	J	101
Type	Wattage (1/4W)	Shape	Tolerance (± 5%)	Value (1kΩ)

ERJ	8	GEY	J	102	[ ]
Type	Wattage (1/8W)	Shape	Tolerance (± 5%)	Value (1kΩ)	Specialuse

Resistor Type	Wattage	Tolerance
ERD : Carbon ERJ : Chip Type Carbon	S2 : 1/4W 8 : 1/8W	J : ± 5% K : ± 10%

Numbering System of Capacitor

Example

ECKD	1H	102	K	C
Type	Voltage (50V)	Value (0.001μF)	Tolerance (± 10%)	Peculiarity

ECEA	0G	KS	470	L
Type	Voltage (4V DC)	Peculiarity use	Value (47μF)	Special use

GR426	B	273	K	25
Type	Peculiarity	Value (0.027μF)	Tolerance (± 10%)	Voltage (25V)

Type		Voltage	Tolerance
ECEA	: Electrolytic	**ECEA, AR, REC, ECEV Types**	F : ± 1 pF
ECEA..N	: Non-Polar Electrolytic	0G : 4V 0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V	J : ± 5% K : ± 10% M : ± 20% Z : +80 −20% N : ± 30% P : +100 0%
ECEV	: Electrolytic (Chip Type)		
ECQM	: Polyester		
ECFR, ECKD, ECFF, ECCD	: Ceramic		
GR426	: Ceramic (Chip Type)	**Others**	
RCBS	: Ceramic (Axial Type)	1E : 25V DC 1H : 50V DC 50 : 50V DC 2B : 125V DC KC : 125V AC	

- **Indication of RCBS type capacitor (Axial type)**
- **Rated voltage**

The rated voltages are indicated by insulating paint colors.

Rated voltage (DC)	Paint color
16V	Pink
50V	Light-green

- **Electrostatic capacity and characteristics**

The nominal electrostatic capacites (PF), tolerances and temperature characteristics are indicated by color codes.

Color band	Brown	Red	Orange	Yellow	Green	Blue	Purple	Gray	White	Black	Gold	Silver
1st, 2nd color bands (Effective number of nominal electrostatic capacity)	1	2	3	4	5	6	7	8	9	0	—	—
3rd color band (Multiplier of nominal electrostatic capacity)	10^1	10^2	10^3	10^4	—	—	—	—	—	10^0	10^{-1}	10^{-2}
4th color band (Tolerances)	—	—	—	—	—	—	—	N	Z	M	J	K
5th color band (Temperature characteristic)												

● RESISTORS

Ref. No.	Part No.	Value
R11, 12	ERDS2TJ681	680
R13	ERDS2TJ221	220
R14	ERDS2TJ101	100
R15, 16	ERDS2TJ561	560
R17	ERDS2TJ222	2.2K
R18	ERDS2TJ822	8.2
R19	ERDS2TJ103	10K
R20	ERDS2TJ332	3.3K
R21	ERDS2TJ153	15K
R22, 23	ERDS2TJ682	6.8K
R24, 25	ERDS2TJ471	470
R26	ERDS2TJ471	470
R101	ERDS2TJ154	150K
R102, 103	ERDS2TJ472	4.7K
R104	ERDS2TJ223	22K
R105	ERDS2TJ334	330K
R107	ERDS2TJ683	68K
R108	ERDS2TJ332	3.3K
R109	ERDS2TJ822	8.2K
R110, 111	ERDS2TJ682	6.8K
R112	ERDS2TJ822	8.2K
R113, 114	ERDS2TJ182	1.8K
R115	ERDS2TJ102	1K
R116, 117	ERDS2TJ182	1.8K
R118	ERDS2TJ102	1K
R119	ERDS2TJ471	470
R120	ERDS2TJ120	12

Ref. No.	Part No.	Value
R141	ERDS2TJ102	1K
R142	ERDS2TJ333	33K
R143	ERDS2TJ224	220K
R144	ERDS2TJ333	33K
R145	ERDS2TJ153	15K
R146	ERDS2TJ122	1.2K
R147	ERDS2TJ682	6.8K
R148	ERDS2TJ104	100K
R149	ERDS2TJ152	1.5K
R150	ERDS2TJ103	10K
R151	ERDS2TJ101	100
R152	ERDS2TJ153	15K
R153	ERDS2TJ270	27
R154	ERDS2TJ3R3	3.3
R161	ERDS2TJ333	33K
R162	ERDS2TJ222	2.2K
R163	ERDS2TJ333	33K
R164	ERDS2TJ153	15K
R165	ERDS2TJ122	1.2K
R166	ERDS2TJ102	1K
R167	ERDS2TJ681	680
R168	ERDS2TJ272	2.7K
R169	ERDS2TJ392	3.9K
R170	ERDS2TJ101	100
R171	ERDS2TJ270	27
R172	ERDS2TJ3R3	3.3
R180	ERDS2TJ474	470K

Ref. No.	Part No.	Value
R181	ERDS2TJ222	2.2K
R182, 183	ERDS2TJ564	560K
R184	ERDS2TJ472	4.7K
R185, 186	ERDS2TJ473	47K
R187, 188	ERDS2TJ473	47K
R189	ERDS2TJ123	12K
R190	ERDS2TJ332	3.3K
R191	ERDS2TJ154	150K
R192	ERDS2TJ824	820K
R193	ERDS2TJ101	100
R194	ERDS2TJ683	68K
R195, 196	ERDS2TJ103	10K
R197	ERDS2TJ473	47K
R198	ERDS2TJ333	33K
R301	ERDS2TJ102	1K
R302	ERDS2TJ472	4.7K
R303, 304	ERDS2TJ102	1K
R305	ERDS2TJ104	100K
R307	ERDS2TJ471	470
R401, 402	ERDS2TJ223	22K
R403	ERDS2TJ472	4.7K
R404	ERDS2TJ394	390K
R406	ERDS2TJ394	390K
R407	ERDS2TJ152	1.5K
R408, 409	ERDS2TJ472	4.7K
R410, 411	ERDS2TJ472	4.7K
R412, 413	ERDS2TJ472	4.7K

Ref. No.	Part No.	Value
R414, 415	ERDS2TJ472	4.7K
R416	ERDS2TJ913	91K
R417	ERDS2TJ124	120K
R418	ERDS2TJ913	91K
R419	ERDS2TJ124	120K
R420	ERDS2TJ101	100
R421, 422	ERDS2TJ103	10K
R423	ERDS2TJ103	10K
R424	ERDS2TJ473	470K
R425, 426	ERDS2TJ103	10K
R427, 428	ERDS2TJ103	10K
R429, 430	ERDS2TJ222	2.2K
R431, 432	ERDS2TJ222	2.2K
R433	ERDS2TJ103	10K
R434	ERDS2TJ472	4.7K
R501, 502	ERJ8GEXK1R5	1.5
R503	ERJ8GEYJ223	22K
R801, 802	ERDS2TJ102	1K
R803, 804	ERDS2TJ122	1.2K
R805, 806	ERDS2TJ221	220
R807, 808	ERDS2TJ391	390
R809, 810	ERDS2TJ473	47K
R811, 812	ERDS2TJ563	56K
R813, 814	ERDS2TJ560	56
R815, 816	ERDS2TJ223	22K
R1001	ERDS2TJ103	10K

● CAPACITORS

Ref. No.	Part No.	Value
C1 ⚠	ECKDKC103PF	0.01
C11, 12	ECFR1H104ZF	0.1
C13	ECEA1CU470	47
C14	ECFR1H104ZF	0.1
C15, 16	ECEA1CU221	220
C17	ECFR1H104ZF	0.1
C18	ECFF1H104ZF	0.1
C19, 20	REC1A101M0T	100
C21, 22	ECEA1CU222	2200
C23, 24	ECEA1CU331	330
C25, 26	ECEA1VU101	100
C27, 28	ECEA0JU331	330
C29	ECEA0JU101	100
C101	ECFR1H104ZF	0.1
C102, 103	ECKD1H102KB	0.001
C104	ECKD1H681KB	680P
C105, 106	ECKD1H471KB	470P
C107	ECCD1H220K	22P
C108	ECEA1HU0R1	0.1
C109	ECEA1HU010	1

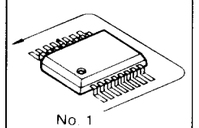
Ref. No.	Part No.	Value
C110	ECFR1H104ZF	0.1
C111, 112	ECEA1HU100	10
C113	ECEA1HKNR33	0.33
C114	RCBS1C182MXY	0.0018
C115	RCBS1C682MXY	0.0068
C116	ECQM1H333KV	0.033
C117	RCBS1H221KBY	220P
C118	ECEA1HU010	1
C119	ECEA0JU220	22
C120	RCBS1H681KB	680P
C121	ECKD1H103KB	0.01
C122, 123	ECCD1H101KB	100P
C124	ECFR1H104ZF	0.1
C125	ECEA0JU220	22
C126	ECEA0JU470	47
C127, 128	ECKD1H102KB	0.001
C141	ECQM1H153KV	0.015
C142	ECQM1H122KV	0.0012
C143	ECQM1H473KV	0.047
C144	ECEA1VSN2R2	2.2

Ref. No.	Part No.	Value
C145	ECEA1HSNR22	0.22
C161	ECQM1H153KV	0.015
C162	RCBS1H681KB	680P
C163	ECQM1H103KV	0.01
C164	ECEA1ESN3R3	3.3
C165	ECEA1HSN0R1	0.1
C181	ECQM1H104KV	0.1
C182	ECCD1H221KB	220P
C183	ECQM1H103KV	0.01
C184	ECEA1HSN010	1
C186	ECFR1H104ZF	0.1
C187	ECEA1VSN2R2	2.2
C301	ECCD1H220K	22P
C302	ECCD1H070C	7P
C303	ECEA1VSN2R2	2.2
C304, 305	ECFR1H104ZF	0.1
C306	ECKD1H103KB	0.01
C307	ECKD1H471KB	470P
C308	ECFR1H104ZF	0.1
C401	ECFR1H104ZF	0.1

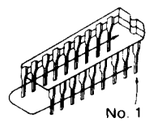
Ref. No.	Part No.	Value
C402	ECEA0JU470	47
C403	ECKD1H103KB	0.01
C404	ECFR1H104ZF	0.1
C405	ECFR1H104ZF	0.1
C406	ECCD1H220K	22P
C501	ECEV1EV330	33
C502	ECEV1HV010	1
C504	GR428B273K25	0.027
C506	GR428B152K50	0.0015
C507	GR428B104Z25	0.1
C511, 512	ECEA1EN470B	47
C513	ECEA1EN470B	47
C801, 802	ECKD1H391KB	390P
C803, 804	RBP1CN220MCT	22
C805, 806	ECKD1H102KB	0.001
C810	ECFR1H104ZF	0.1
C812	ECKD1H103KB	0.01
C813, 814	ECEA1CN220S	22

● Terminal guide of IC's, transistors and diodes

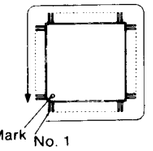
AN8370S.....42 pin
AN6554NS.....14 pin
MN4416S.....24 pin
AN8376S.....28 pin
MN6636S.....10 pin
AN8290S.....24 pin
MN1550PDT.....18 pin



AN6552.....8 pin
MN15261PDU.....64 pin
SVIPCM54HP.....28 pin



MN6617S.....84 pin
MN6618A.....42 pin



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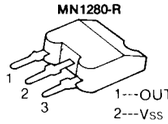

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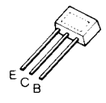

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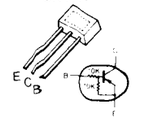

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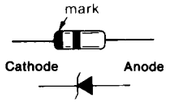
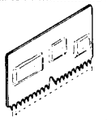
MA4091, MA4330, MA4068



EHDGA1243.....15 pin
SVIGA011.....5 pin



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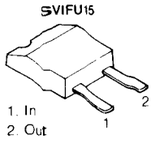

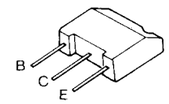

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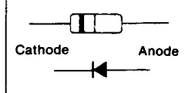
2SB973M
2SC2021M

MA165



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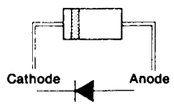

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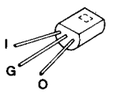
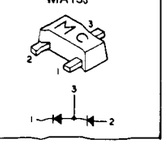


MA153



■ REPLACEMENT PARTS LIST

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "S" mark is service standard parts and may differ from production parts.
5. Ⓚ-marked parts are used for black type only, while ○-marked parts are for silver type only.
6. Part other than Ⓚ-and ○-marked are used for both black and silver types.
7. The parenthesized numbers in the columns of description stand for the quantity per set.

Color

(K)...Black Type
(S)...Silver Type

Color	Areas
(K)	[M].....U.S.A.
(K)	[MC]...Canada.
(K) (S)	[E].....Switzerland and Scandinavia.
(K) (S)	[EK]....United Kingdom.
(K) (S)	[XL]....Australia.
(K) (S)	[EG]...F.R. Germany.
(K) (S)	[EB]....Belgium.
(K) (S)	[EH]...Holland.
(K) (S)	[EF]....France.
(K) (S)	[Ei].....Italy.
(K) (S)	[XA]....Asia, Latin America, Middle Near East, Africa and Oceania.
(K) (S)	[XB]....Saudi Arabia.
(K) (S)	[PA]....East PX.
(K) (S)	[PE]....European Miliary.
(K) (S)	[PC]....European Audio Club.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC11, 12	SVIFU15	Integrated Circuit
IC13	SVIM5236L	Integrated Circuit
IC101	AN8370S	Integrated Circuit
IC102	MN6636S	Integrated Circuit
IC103, 104	AN6554NS	Integrated Circuit
IC301	MN6617S	Integrated Circuit
IC302	MN6618A	Integrated Circuit
IC303	MN4416S	Integrated Circuit
IC304	EHDGA1243	Integrated Circuit
IC401	MN15261PDU	Integrated Circuit
IC402	AN6552	Integrated Circuit
IC403	MN1280−R	Integrated Circuit
IC404	MN1550PDT	Integrated Circuit
IC501	AN8290S	Integrated Circuit
IC602 [M, MC]	SVIHC−MD03M	Integrated Circuit
IC602 [other]	SVIHC−MD01E	Integrated Circuit
IC801	SVIPCM54HP−1	Integrated Circuit
IC802	MN6636S	Integrated Circuit
IC803	AN8376S	Integrated Circuit
IC804, 805	SVIGA011	Integrated Circuit
IC1001	MN1280−S	Integrated Circuit
TRANSISTORS		
Q11	2SD973A	Transistor
Q12~14	2SB793A−QRS	Transistor
Q15	2SD973A	Transistor
Q16	2SB793A−QRS	Transistor
Q17	2SB642	Transistor
Q101	2SD637	Transistor
Q141	2SD973A	Transistor
Q142	2SB793A−QRS	Transistor
Q161	2SD973A	Transistor
Q162	2SB793A−QRS	Transistor
Q181	2SD973A	Transistor
Q182	2SB793A−QRS	Transistor
Q402	2SD973A	Transistor
Q403	2SB793A−QRS	Transistor

Ref. No.	Part No.	Description
TRANSISTORS		
Q1001	UN4212	Transistor
Q1002	UN4112	Transistor
DIODES		
D11, 12	MA4091−M	Zener
D15, 16	MA4068TA	Zener
D17	MA4330	Zener
D18	MA4082M	Zener
D19~26 ⚠	SVDMPG06G	Rectifier
D181, 182, 401~404, 406~413, 415~418	MA165	Diode
D501	MA153	Diode
D1001~1004	MA165	Diode
CRYSTAL		
X301	SVQ16CKSS	16.9344Hz
RELAY		
RL1001	SFDYG5A237P	Muting
VARIABLE RESISTORS		
VR101	EVND3AA00B53	5kΩ(B)
VR102~105	EVND3AA00B14	10kΩ(B)
VR106	EVND3AA00B53	5kΩ(B)
VR301	EVN38CA00B13	1kΩ(B)
HALL ELEMENTS		
H501, 502	OH−011	Hall Element
FLUORESCENT DISPLAY TUBE		
FL401	SADD3	Display
COIL		
L501	NL4532T100K2	10μF
SWITCHES		
S1 ⚠	ESB8249V	Power
S2 [XA, XB, PA, PE, PC only] ⚠	SRDSHXW0251	Voltage
S101	SSPD5	Open/Close Detector
S401~408	SSGD1−1	Operation
POWER TRANSFORMER		
T1 [M, MC] ⚠	SLTD5K022SC	Power Source
T1 [EK, XL] ⚠	SLTD5K024SG	Power Source
T1 [XA, XB, PA, PE, PC] ⚠	SLTD5K025SX	Power Source
T1 [other] ⚠	SLTD5K023SE	Power Source

Ref. No.	Part No.	Description
FUSES		
F1 Except [M, MC] ⚠	XBA2C012TB0S	250V, T125mA
F2 [XA, XB, PA, PE, PC only] ⚠	XBA2C025TB0S	250V, T250mA
COMPONENT COMBINATION		
C2 ⚠	EXRFS203ZS	0.01μF×2

Ref. No.	Part No.	Description
LOADING UNIT PARTS		
1	SIRLP110−KM	Disc Tray Ass'y
1-1	SHSD13	Sheet
1-2	SHGD49	Rubber
4 ○	SGXD170MA0A	Ornament Plate
4 Ⓚ	SGXD270ZK0A	Ornament Plate
5	SUSD29−1	Spring
6	SIRD20	Lever
7	SIRD16E−1	Holder Ass'y with Rubber
7-1	SHGD46	Rubber Holder
9	SUWD46	Bracket
10	SUXD25	Shaft
11 ⚠	SOAD30A	Optical Pickup
12	EWSL04A00000	Holder
13	SHGD47	Rubber
14	SORD10E	Coil
15	EWS7B0A00Q53	Resistance Unit
16	SOYD8E	Yoke
17	SOYD9	Yoke
18	SJGD4E	Motor
19	SHGD64	Rubber
20	SHGD48−1	Rubber
21	SDRD2	Roller
22	SUWD44	Bracket
23	SHGD69	Rubber
24	SOYD2	Yoke
25	SOMD4	Magnet
26	SIRD17E	Clamper
27	SIRD28	Holder
28	SDGD19	Gear
29	SDGD20	Gear
31	SDOD8	Ring
32	SRQA010N04	Spring
33	SDOD7−1	Turntable
34	SISD7E	Base
35	SUSD32−1	Spring (Black)
36	SUSD43	Spring (Gold)
37	SUSD44	Spring (Silver)
38	SUSD42	Spring (Fat Silver)

Ref. No.	Part No.	Description
LOADING UNIT PARTS		
39	SMBD2−1	Belt
40	SHRD23	Lock Shaft
41	SOMD9A	Rotor
42	SXPD940	Spindle P.C.B. Ass'y
43	SHRD19	Lever
44	SUSD31	Spring
45	SUSD51	Spring
CABINET and CHASSIS PARTS		
51 ○	SKCD40SY	Top Case
51 Ⓚ	SKCD40KZ	Top Case
52	SUBD5−M	Rod
53 ○	SBC666	Button
53 Ⓚ	SBC666−5	Button
54 ○	SBCD220MA0A	Button
54 Ⓚ	SBCD220ZK0A	Button
55	SHRD22−M	Bracket
56 ○	SGYLP210−SE	Front Panel Ass'y
56 Ⓚ	SGYLP210−KM	Front Panel Ass'y
57 [XL] ⚠	SJSD16	AC Socket
57 [other] ⚠	SJS9236	AC Socket
58	SWKD110061	Connector
59	SMND7−1	Holder
60	SJFD4	Terminal
61 [XA, XB, PA, PE, PC]	SGPD41ZF2A	Chassis
61 [other]	SGPD41ZF0A	Chassis
62 [M]	SGTD94	Name Plate
62 [MC]	SGTD95	Name Plate
62 [E]	SGTD96	Name Plate
62 [EK]	SGTD97	Name Plate
62 [XL]	SGTD98	Name Plate
62 [EG]	SGTD99	Name Plate
62 [PA, PE, PC]	SGTD101	Name Plate
62 [other]	SGTD100	Name Plate

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
63	SRGA008N01	Rubber
64	QJA0455ZC	Headphones Jack
65	SMND9−1	Bracket
CONNECTORS		
71	EMCS0350Z	3 Pin (CN103)
71	EMCS0550Z	5 Pin (CN402)
71	EMCS0650Z	6 Pin (CN11)
71	EMCS0750Z	7 Pin (CN401)
72	SJSD1709	17 Pin (CN101)
SCREWS and WASHERS		
N1	SNSD10	Screw
N2	XTN2+4G	Screw, ⊕2×4
N3	XQN17+A6	Screw, ⊕1.7×6
N4	SHDD1−2	Screw
N5	XTW3+8T	Screw, ⊕3×8
N6	XXE26D5	Screw
N7	SNSD9	Screw
N8	XSN26+6	Screw, ⊕2.6×6
N9	SFXW120−01	Washer
N10	XSN26+8	Screw, ⊕2.6×8
N11	XTN2+5G	Screw, ⊕2×5
N12 ○	SRXG007N10	Screw
N12 Ⓚ	SRXG007N51	Screw
N13	XTV3+8JFYR	Screw, ⊕3×8
N14	XTV3+8G	Screw, ⊕3×8
N15	SFXGQ06N01	Screw
N16	XTV3+8JFZ	Screw, ⊕3×8
N17	XTV3+8JFZ	Screw, ⊕3×8
N18	XTV3+10G	Screw, ⊕3×10
ACCESSORIES		
A1 [M]	SQUD99	Instruction Book
A1 [MC]	SQULP210−KMC	Instruction Book
A1 [EK]	SQUD102	Instruction Book
A1 [Ei]	SQUD103	Instruction Book
A1 [E, EB, EH]	SQULP210−KE	Instruction Book
A1 [XB]	SQULP210−KXB	Instruction Book
A1	SQULP210−KPA	Instruction Book
A1 [PA, PE, PC]	SQUD101	Instruction Book
A1 [other]	SQUD101	Instruction Book

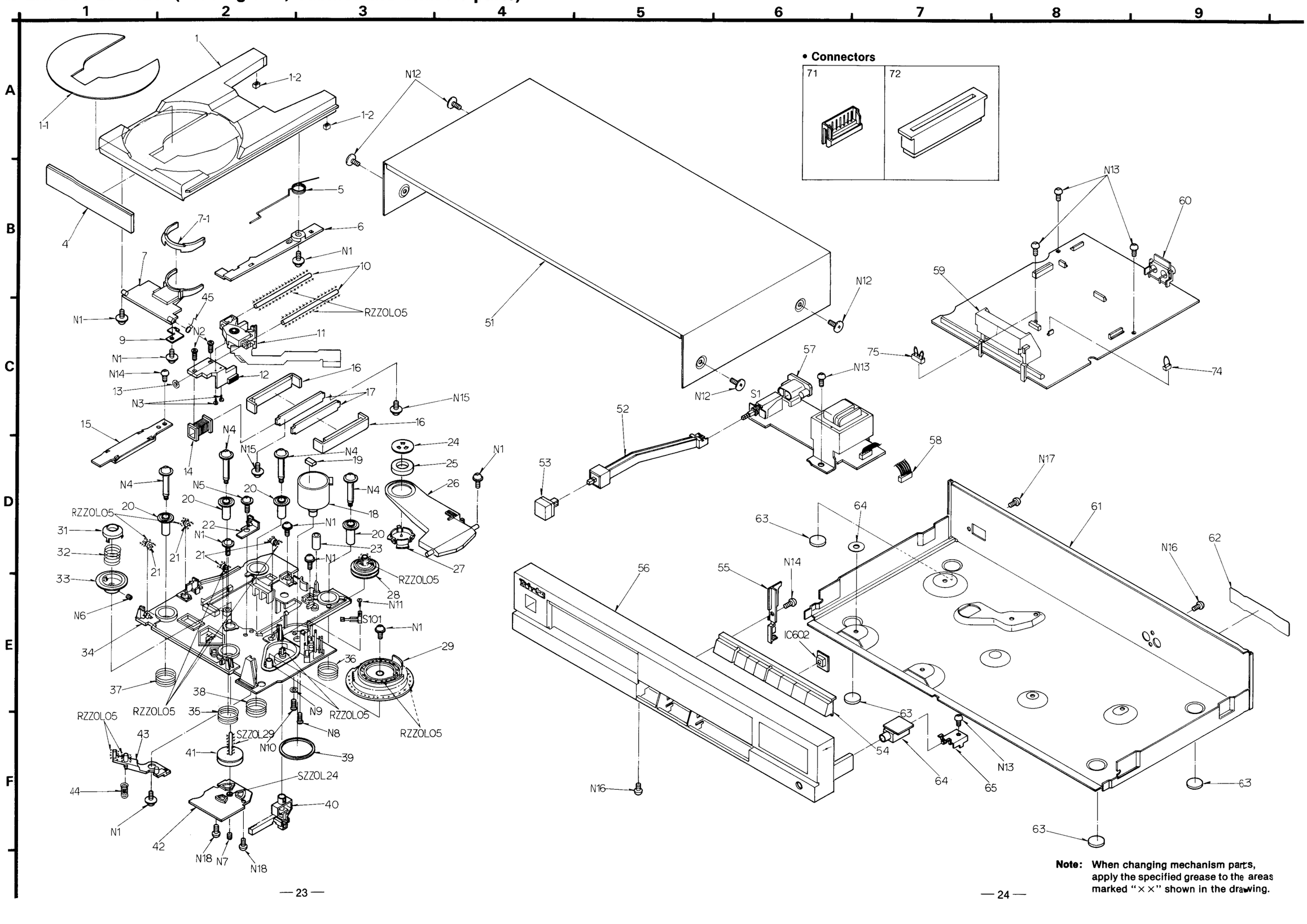
Ref. No.	Part No.	Description
ACCESSORIES		
A2 [M] ⚠	SJA170−1	AC Cord
A2 [MC] ⚠	SJA170	AC Cord
A2 [EK] ⚠	SFDAC05G02	AC Cord
A2 [XL] ⚠	SJA173	AC Cord
A2 [XA] ⚠	SJA171	AC Cord
A2 [XB] ⚠	SJA183	AC Cord
A2 ⚠ [PA, PE, PC]	SJA168−1	AC Cord
A2 ⚠ [other]	SJA171	AC Cord
A3	SJP2249−1	Output Cord
A4 ⚠ [XB, PA, PE, PC only]	SJP9215	Adaptor
A5 ⚠ [XA] only	SFDK−I19118	Plug
PACKING PARTS		
P1 [EF] ○	SPND103	Carton Box
P1 ○ [other]	SPND102	Carton Box
P1 [MC] Ⓚ	SPND86−1	Carton Box
P1 [EF] Ⓚ	SPND113	Carton Box
P1 Ⓚ [other]	SPND85−1	Carton Box
P2	SPSD45	Pad
P3	SPSD46	Pad
P4	XZB55X40A01	Polyethylene Bag, Unit
P5	SPSD68	Sheet
P6	SRHZJ02N01	Polyethylene Bag, Remote Control Unit
P7	XZB23X20C03	Polyethylene Bag, Cords

● REMOTE CONTROL UNIT

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1001 [M, MC]	MN6030CA	Integrated Circuit
IC1001 [other]	MN6030B	Integrated Circuit
TRANSISTOR		
Q1001	UN1231	Transistor
DIODES		
D1001	LN66−S	LED
D1002~1005	MA154WK	Diode
D1006, 1007	MA154WA	Diode
CERAMIC OSCILLATORS		
X1001 [M, MC]	CSB455EB1	455KHz
X1001 [other]	CSB420PB1	420KHz
RESISTOR		
R1001	ERDS2TJ1R0	Carbon, 1/4W, 1Ω, ±5%
CAPACITORS		
C1001 [M, MC]	ECKD1H101KB	Ceramic, 50V, 100PF, ±10%
C1001 [other]	ECKD1H471KB	Ceramic, 50V, 470PF, ±10%
C1002 [M, MC]	ECKD1H101KB	Ceramic, 50V, 100PF, ±10%
C1002 [other]	ECKD1H121KB	Ceramic, 50V, 120PF, ±10%
C1003	ECEA0JK101	Electrolytic, 6.3V, 100μF

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
101	UR64PP246	Panel
102 ○	UR64CS119A	Top Cover
102 Ⓚ	UR64CS119	Top Cover
103	UR64SB125	Cover
104	UR64BT123A	Button
105	UR64CT122	Rubber, Switch
106 ○	UR64CS120A	Bottom Cover
106 Ⓚ	UR64CS120	Bottom Cover
107	UR64LB126BL	Label
108 ○	UR64EC121A	Battery Cover
108 Ⓚ	UR64EC121	Battery Cover
109	UR64TD128	Terminal ⊖
110	UR64TD127	Terminal ⊕
111	UR52TD101	Terminal
SCREWS		
N101 ○	XTS26+12GFC	Screw, ⊕2.6×12
N101 Ⓚ	XTS26+12GFZ	Screw, ⊕2.6×12

■ EXPLODED VIEW (Loading unit, Cabinet and Chassis parts)

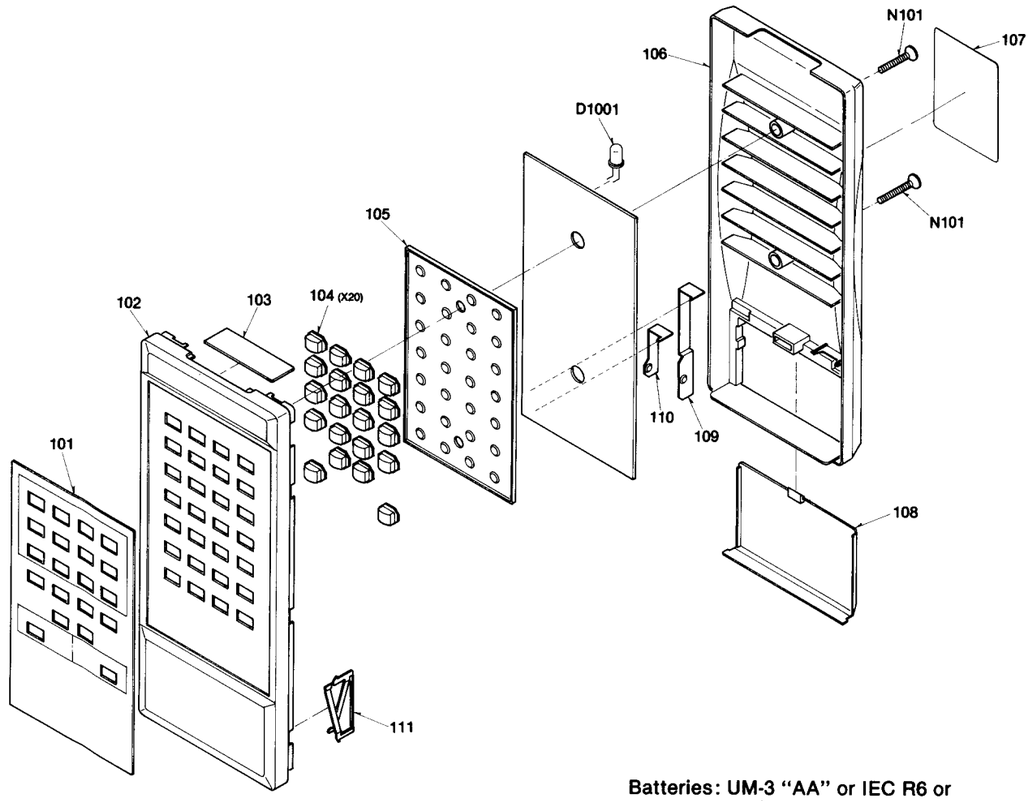


• Connectors

71	72

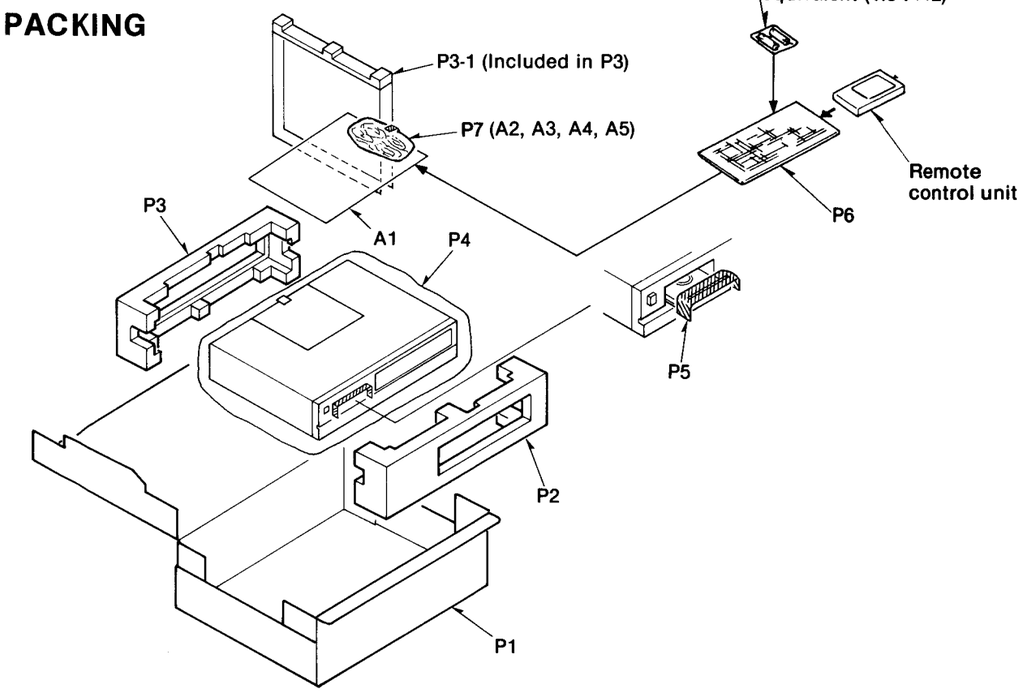
Note: When changing mechanism parts, apply the specified grease to the areas marked "××" shown in the drawing.

■ EXPLODED VIEW (Remote control parts)



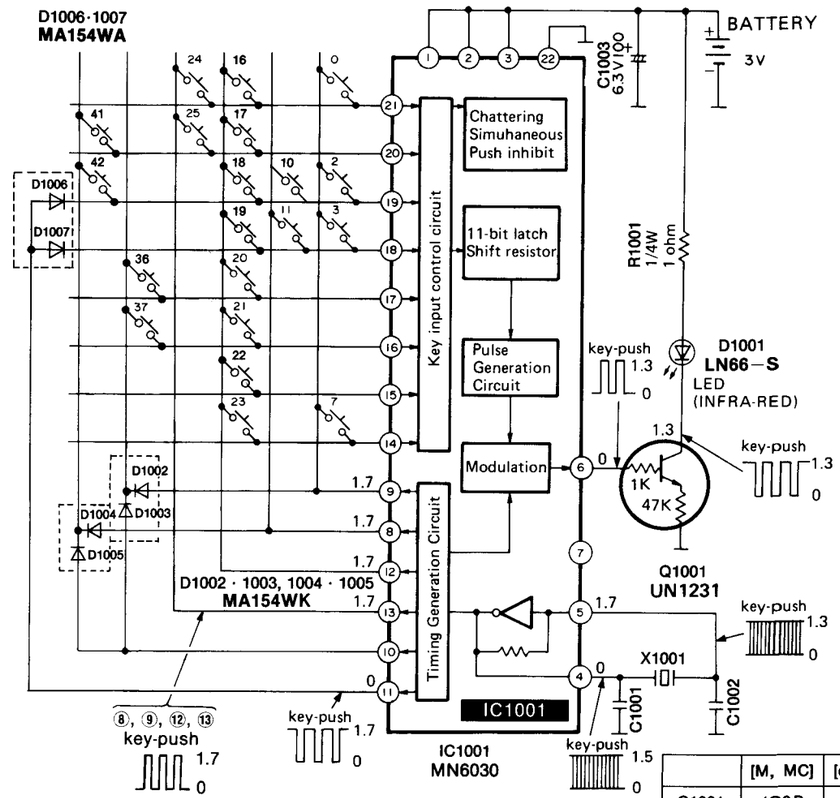
Batteries: UM-3 "AA" or IEC R6 or equivalent (1.5V×2)

■ PACKING



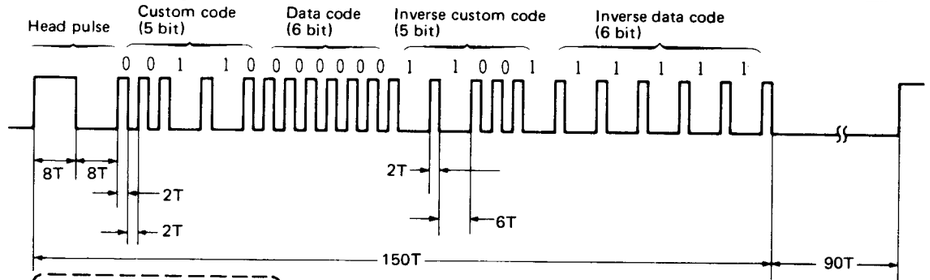
■ SCHEMATIC DIAGRAM OF REMOTE CONTROL UNIT

Key No.	Function
0	Stop
2	Skip/search ⏮
3	Skip/search ⏭
7	Repeat
10	Play/pause
11	Clear
16	Numeric 1
17	Numeric 2
18	Numeric 3
19	Numeric 4
20	Numeric 5
21	Numeric 6
22	Numeric 7
23	Numeric 8
24	Numeric 9
25	Numeric 0
36	Level Up ▲
37	Level Down ▼
41	Time Mode
42	Memory

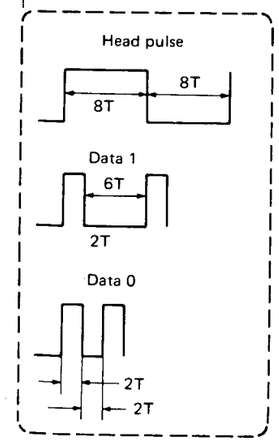


	[M, MC]	[others]
C1001	100P	470P
C1002	100P	120P

• **Key number description and data code**



★1T = 0.420ms~0.424ms (U.S.A. and Canada)
1T = 0.454ms~0.460ms (Europe and Others)



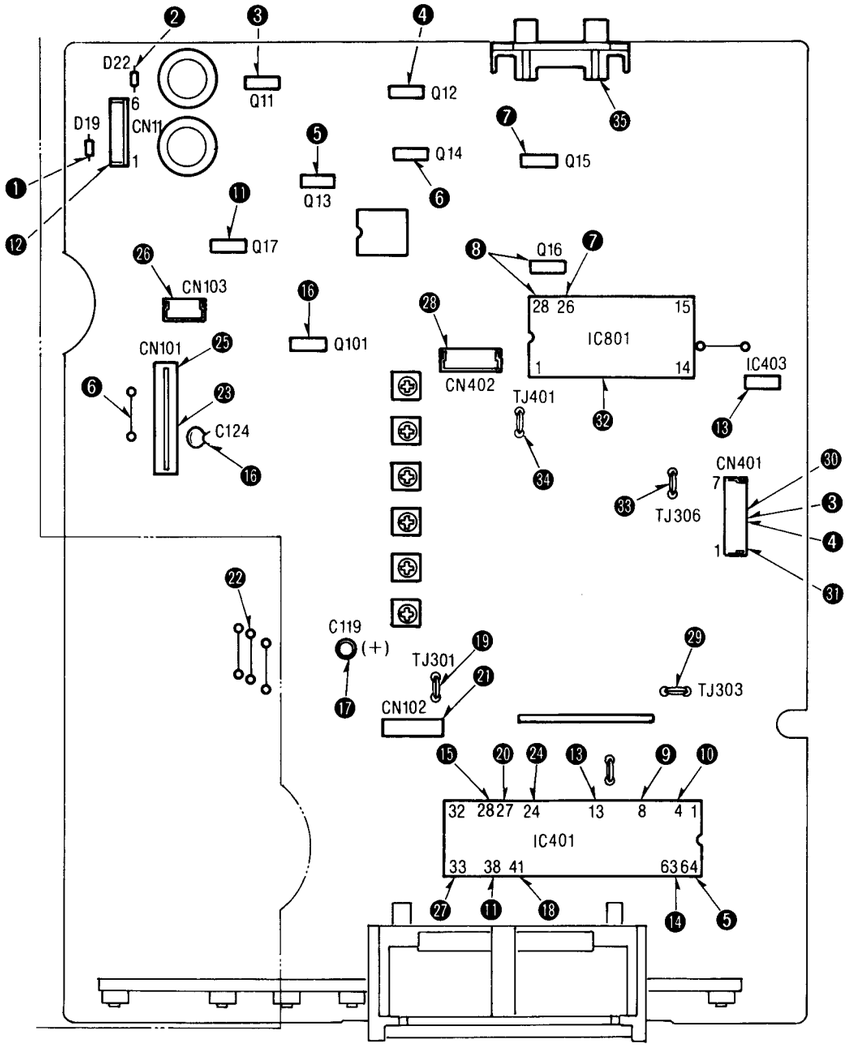
Key No.	Function	Data Code	Key No.	Function	Data Code
0	Stop	000000	20	Numeric 5	001010
2	Skip/search ⏮	010000	21	Numeric 6	101010
3	Skip/search ⏭	110000	22	Numeric 7	011010
7	Repeat	111000	23	Numeric 8	111010
10	Play/pause	010100	24	Numeric 9	000110
11	Clear	110100	25	Numeric 0	100110
16	Numeric 1	000010	36	Level Up ▲	001001
17	Numeric 2	100010	37	Level Down ▼	101001
18	Numeric 3	010010	41	Time Mode	100101
19	Numeric 4	110010	42	Memory	010101

■ TROUBLESHOOTING

Notes:

1. Carefully handle the compact disc because stains, dust or warping may cause generation of noise.
2. For the voltage value and waveform, refer to the schematic diagram. (The voltage value and waveform slightly varies depending on the measuring set and tester.)
3. Possible defects are mainly shown by the name of semi-conductor. The adjacent electronic circuits (such as C and R) are omitted.

• Check points



• Check the power supply circuit

Check point ❶

Check the voltage of terminal D19 (cathode).....8.9V — NO → AC cord, S1, T1, D19, 20 } defective

Check point ❷ YES

Check the voltage of terminal D22 (anode).....⊖9.3V — NO → D21, D22 } defective

Check point ❸ YES

Check the voltage of terminal Q11 (emitter) or CN401, pin 4.....8.5V — NO → IC11, Q11, D11 } defective

Check point ❹ YES

Check the voltage of terminal Q12 (emitter) or CN401, pin 3.....⊖8.5V — NO → IC12, Q12, D12 } defective

Check point ❺ YES

Check the voltage of terminal Q13 (collector) or IC401, pin 64.....5V — NO → IC13, Q13 } defective

Check point ❻ YES

Check the voltage of terminal Q14 (emitter) or jumer wire.....⊖5V — NO → IC402, Q14 } defective

Check point ❼ YES

Check the voltage of terminal Q15 (emitter) or IC801, pin 26.....6.5V — NO → Q15, D15 } defective

Check point ❽ YES

Check the voltage of terminal Q16 (emitter) or IC801, pin 28.....⊖6.5V — NO → Q16, D16 } defective

Check point ❾ YES

Check the voltage of IC401, pin 8.....12.5V — NO → D23, D24 } defective

Check point ❿ YES

Check the voltage of IC401, pin 4.....⊖12V — NO → D24, D25 } defective

Check point ⓫ YES

Check the voltage of terminal Q17 (emitter) or IC401, pin 38.....⊖32V — NO → D18, D25, D26, Q17 } defective

Check point ⓬ YES

Check the voltage of CN11 ①, ②..... AC 2.3V — NO → T1, D18 } defective

• Check the focus servo

Check the power supply circuit

Check point ⓭ YES

Reset signal is "H (4.2V)"? (IC403, pin 1 or IC401, pin 13) — NO → IC402

Check point ⓮ YES

Clock is oscillating (4.2336MHz)? (IC401, pin 63) — NO → IC301, X, R407, C

Check point ⓯ YES

Focus ON signal level is "L (0V)"? (IC401, pin 28) — NO → IC401, IC101

Check point ⓰ YES

Laser A.P.C. signal is ON? (Q101 collector or C124) — NO → IC101, Q101

Check point ⓱ YES

Focus search signal is emitted? (IC101, pin 35 or C119) — NO → IC101

Check point ⓲ YES

Focus OK signal is "L (0V)"? (IC401, pin 31) — NO → IC101, IC401

YES

Focus lens moves up and down for a few seconds? (Not needed to set the disc) — NO → IC104, Q141, 1, Pickup

Check point ⓳ YES

RF signal is emitted? (Test pin TJ301) — NO → IC101, Pickup

• Check the tracking servo

Check point ⓴

Check the TR ON signal (IC401 27 pin). "L" in play and "H" in search/skip. — NO → IC101, IC401

Check point ㉑ YES

Tracking error signal is emitted? (CN102, pin 1 or pin 2) — NO → IC101

Check point ㉒ YES

Track jump pulse is emitted during search/skip? (IC101, pin 20 or jumper wire) — NO → IC101

Check point ㉓ YES

Tracking coil drive signal is emitted? (CN101, pin 8) — NO → IC104, Q161, Q162

rm slightly

(such as C

• Check the power supply circuit

Check point ❶

Check the voltage of terminal D19 (cathode).....8.9V — NO → AC cord, S1, T1, D19, 20 } defective

Check point ❷ — YES

Check the voltage of terminal D22 (anode).....⊖9.3V — NO → D21, D22 } defective

Check point ❸ — YES

Check the voltage of terminal Q11 (emitter) or CN401, pin 4.....8.5V — NO → IC11, Q11, D11 } defective

Check point ❹ — YES

Check the voltage of terminal Q12 (emitter) or CN401, pin 3.....⊖8.5V — NO → IC12, Q12, D12 } defective

Check point ❺ — YES

Check the voltage of terminal Q13 (collector) or IC401, pin 64.....5V — NO → IC13, Q13 } defective

Check point ❻ — YES

Check the voltage of terminal Q14 (emitter) or jumer wire.....⊖5V — NO → IC402, Q14 } defective

Check point ❼ — YES

Check the voltage of terminal Q15 (emitter) or IC801, pin 26.....6.5V — NO → Q15, D15 } defective

Check point ❽ — YES

Check the voltage of terminal Q16 (emitter) or IC801, pin 28.....⊖6.5V — NO → Q16, D16 } defective

Check point ❾ — YES

Check the voltage of IC401, pin 8.....12.5V — NO → D23, D24 } defective

Check point ❿ — YES

Check the voltage of IC401, pin 4.....⊖12V — NO → D24, D25 } defective

Check point ⓫ — YES

Check the voltage of terminal Q17 (emitter) or IC401, pin 38.....⊖32V — NO → D18, D25, D26, Q17 } defective

Check point ⓬ — YES

Check the voltage of CN11 ①, ②..... AC 2.3V — NO → T1, D18 } defective

• Check the focus servo

Check the power supply circuit

Check point ⓭ — YES

Reset signal is "H (4.2V)"? (IC403, pin 1 or IC401, pin 13) — NO → IC402 defective

Check point ⓮ — YES

Clock is oscillating (4.2336MHz)? (IC401, pin 63) — NO → IC301, X301, R407, C403 } defective

Check point ⓯ — YES

Focus ON signal level is "L (0V)"? (IC401, pin 28) — NO → IC401, IC101 } defective

Check point ⓰ — YES

Laser A.P.C. signal is ON? (Q101 collector or C124) — NO → IC101, Q101 } defective

Check point ⓱ — YES

Focus search signal is emitted? (IC101, pin 35 or C119) — NO → IC101 defective

Check point ⓲ — YES

Focus OK signal is "L (0V)"? (IC401, pin 31) — NO → IC101, IC401 } defective

YES

Focus lens moves up and down for a few seconds? (Not needed to set the disc) — NO → IC104, Q141, 142, Pickup } defective

Check point ⓳ — YES

RF signal is emitted? (Test pin TJ301) — NO → IC101, Pickup } defective

• Check the tracking servo

Check point ⓴

Check the TR ON signal (IC401 27 pin). "L" in play and "H" in search/skip. — NO → IC101, IC401 } defective

Check point ㉑ — YES

Tracking error signal is emitted? (CN102, pin 1 or pin 2) — NO → IC101 defective

Check point ㉒ — YES

Track jump pulse is emitted during search/skip? (IC101, pin 20 or jumper wire) — NO → IC101 defective

Check point ㉓ — YES

Tracking coil drive signal is emitted? (CN101, pin 8) — NO → IC104, Q161, Q162 } defective

• Check the traverse servo

Check point ㉔

Kick pulse is emitted in skip mode? (IC401, pins 23, 24) — NO → IC401 defective

Check point ㉕ — YES

Traverse coil drive signal is emitted? (CN101, pin 17) — NO → IC103, Q181, Q182 } defective

Check point ㉖ — YES

Speed sensor singnal is emitted? (CN103, pin 3) — NO → Speed sensor } defective

• Check the loading motor drive

Check point ㉗

Loading motor close/open command signal is emitted? (IC401, pins 33, 34) — NO → IC401 defective

Check point ㉘ — YES

Loading motor drive signal is emitted? (CN402, pin 5) — NO → IC402, Q402, 403, motor } defective

• Check the digital and audio

Check point ㉙

PCK signal is emitted? (Test pin TJ303) — NO → IC304, IC301 } defective

Check point ㉚ — YES

CLK signal is emitted? (CN401, pin 5) — NO → IC301 defective

Check point ㉛ — YES

Spindle motor ON command signal is "H (2.5V)"? (CN401, pin 1) — NO → IC301 defective

Check point ㉜ — YES

Data signal is emitted? (IC801, pins 2, 3, 5~18) — NO → IC301, 302, IC801 } defective

Check point ㉝ — YES

Deglitch signal is emitted? (Test pin TJ306) — NO → IC301, IC302 } defective

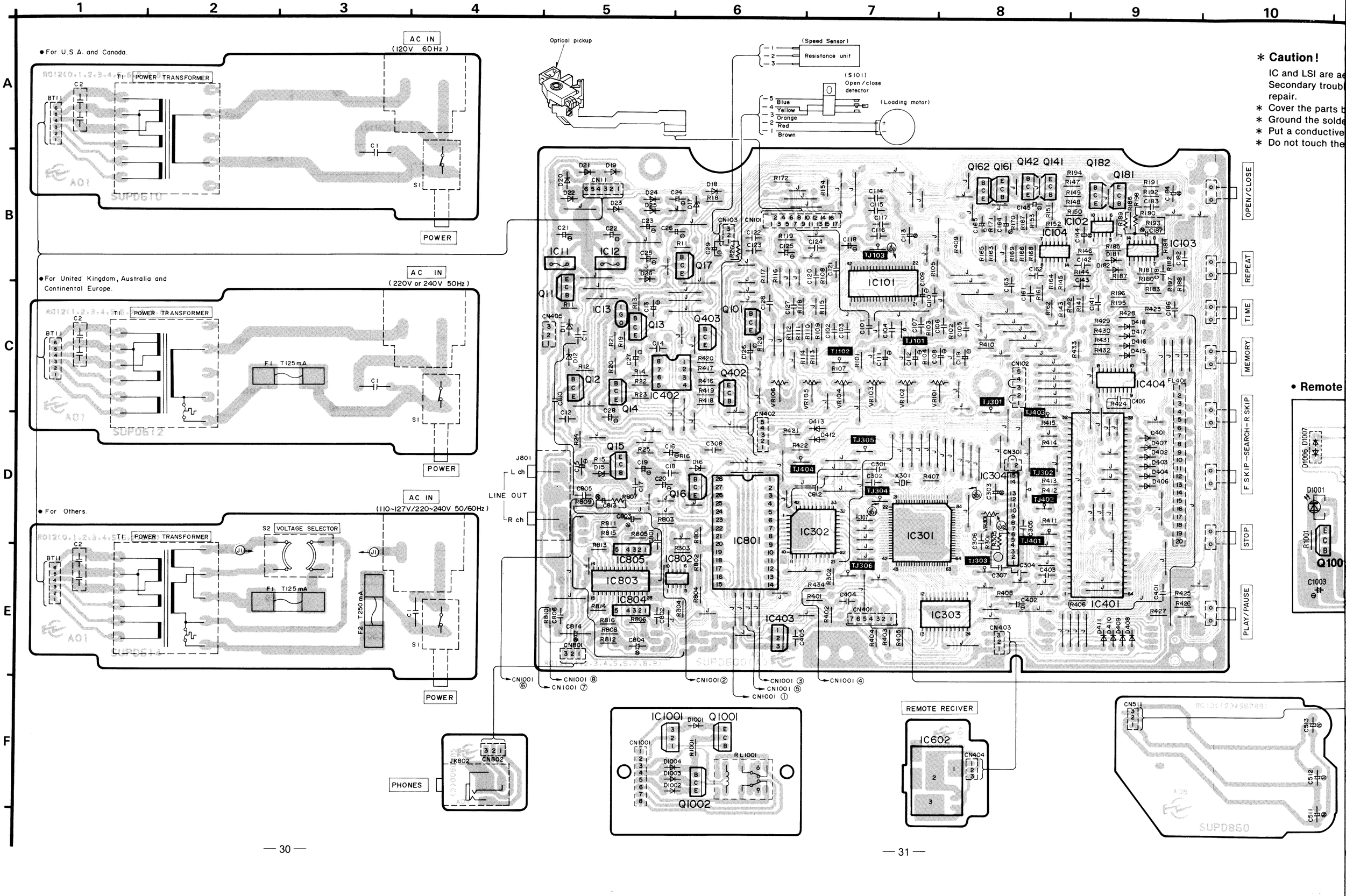
Check point ㉞ — YES

Muting signal level is "L (0V)"? (Test pin TJ401) — NO → IC401, IC803 } defective

Check point ㉟ — YES

AF signal is emitted? (Output terminal) — NO → IC802~804 defective

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

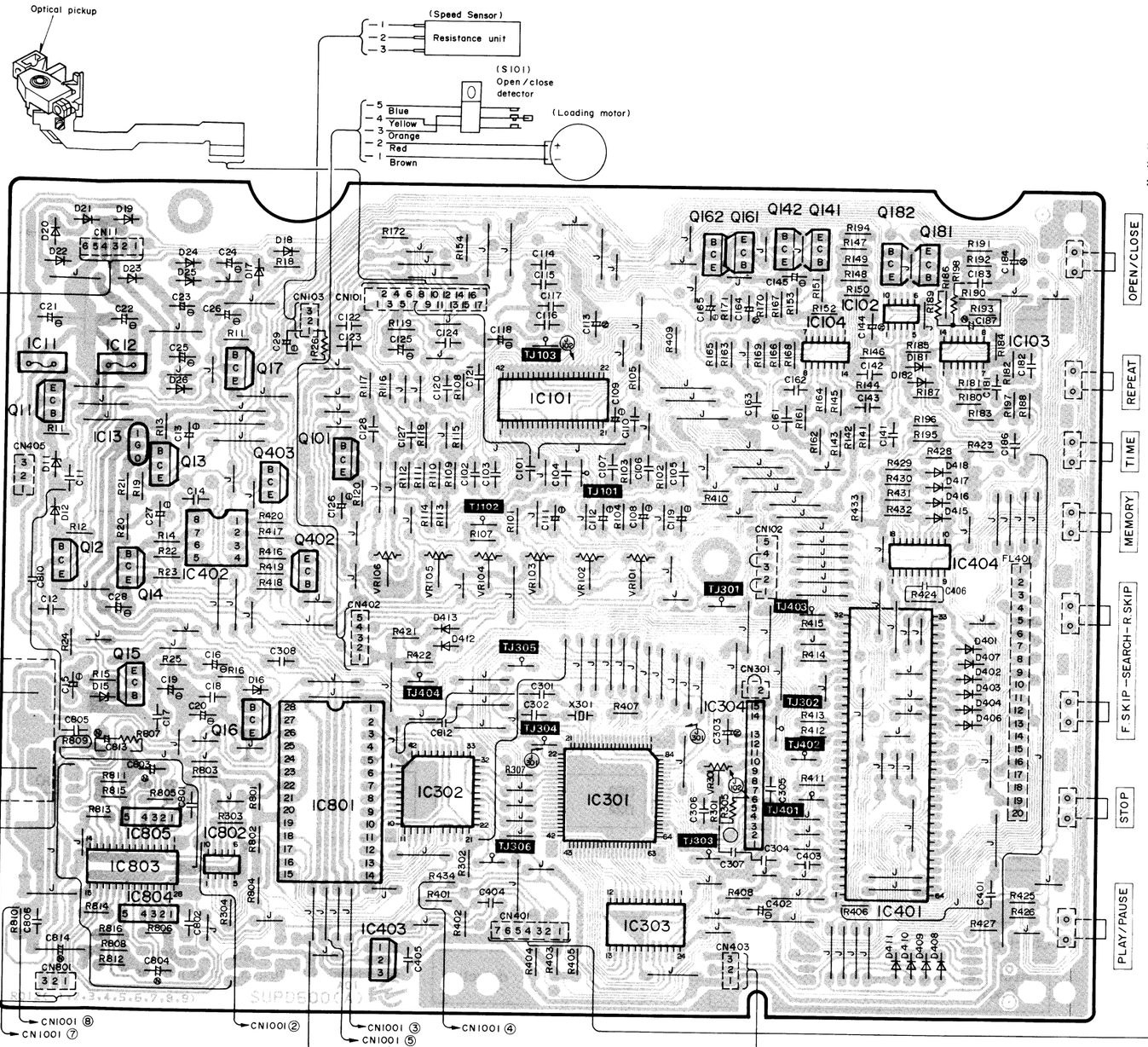


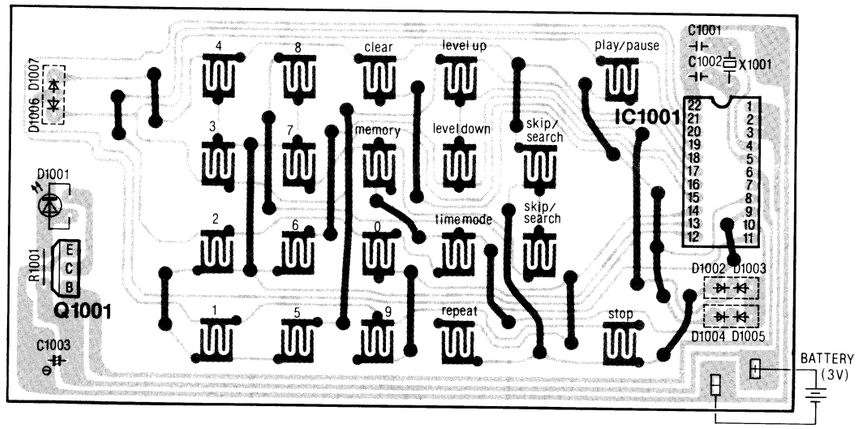
* Caution!

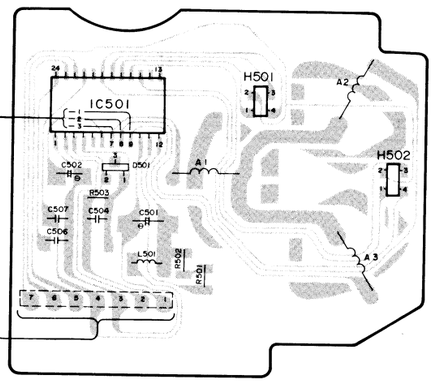
IC and LSI are ae
Secondary troubl
repair.

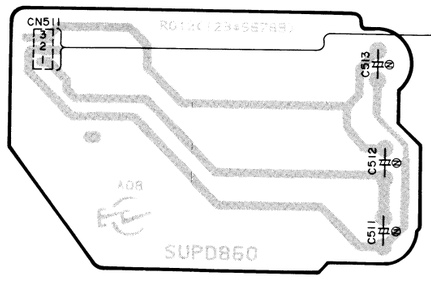
* Cover the parts b
* Ground the solde
* Put a conductive
* Do not touch the

• Remote









* Caution!

IC and LSI are aensitive 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 legs of IC or LSI with the fingers directly.

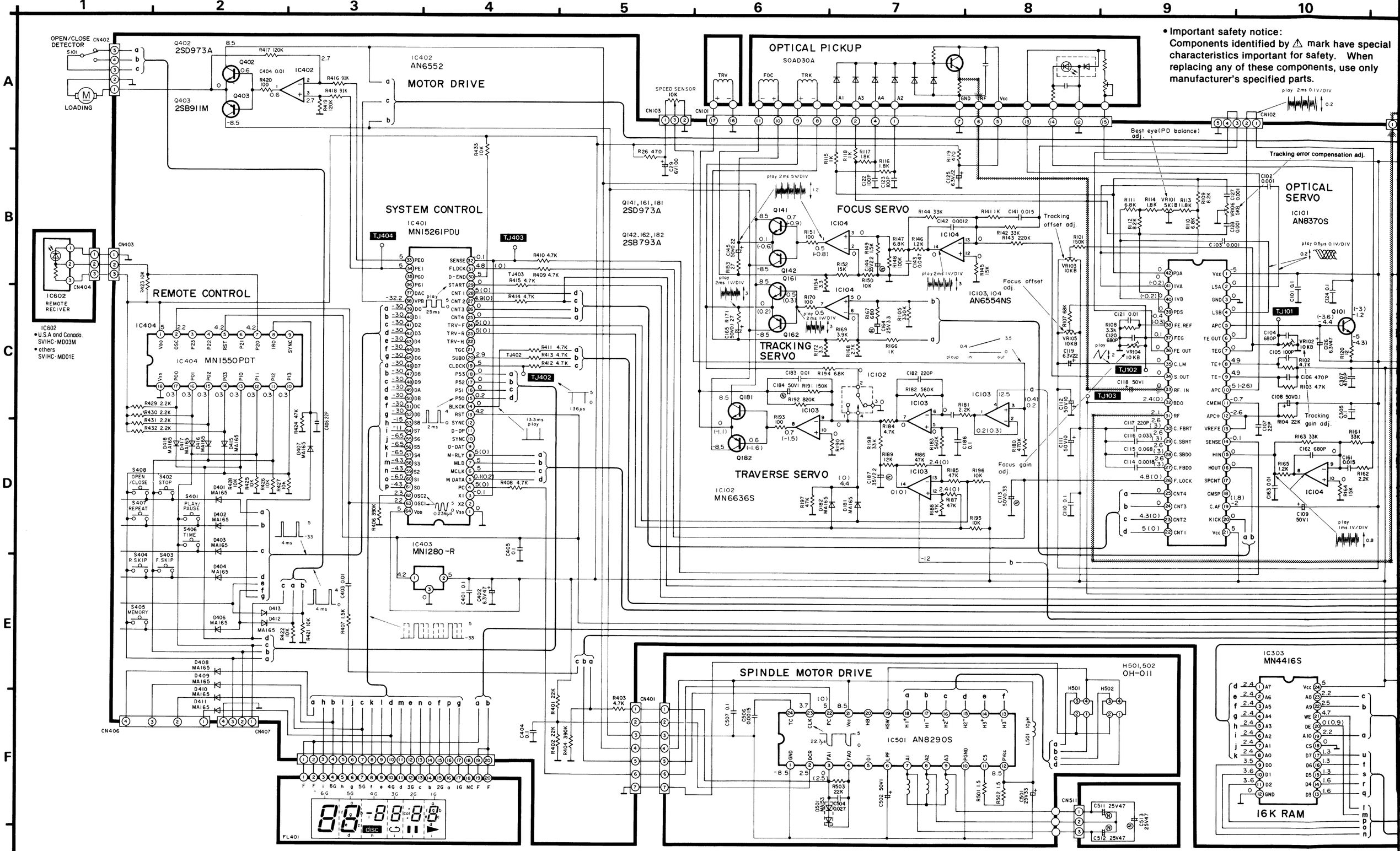
• Remote Control

■ SCHEMATIC DIAGRAM

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

Notes:

1. **S1** : Power switch in "**on**" position.
2. **S2** : Voltage selector switch.
   (For [XA], [XB], [PA], [PE] and [PC] areas)
3. **S101** : Disc holder open/close detection switch.
4. **S401** : Play/pause switch.
5. **S402** : Stop/clear switch.
6. **S403** : Forward skip/search switch.
7. **S404** : Backward skip/search switch.
8. **S405** : Memory/recall switch.
9. **S406** : Time mode select switch.
10. **S407** : Repeat switch.
11. **S408** : Open/close switch.
12. The voltage value and waveform 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.
13. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
14. ——— : Positive voltage lines and negative voltage lines.
    ▒▒▒▒ : Audio signal lines.


• Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
OPTICAL PICKUP
SOAD30A
OPEN/CLOSE DETECTOR
LOADING
MOTOR DRIVE
IC402
AN6552
SPEED SENSOR
SYSTEM CONTROL
IC401
MN1526IPDU
REMOTE CONTROL
IC602
REMOTE RECIVER
• U.S.A and Canada. SVIHC-MD03M
• others SVIHC-MD01E
IC404 MN1550PDT
IC403
MN1280-R
FOCUS SERVO
TRACKING SERVO
TRAVERSE SERVO
IC102
MN6636S
IC103, 104
AN6554NS
OPTICAL SERVO
IC101
AN8370S
SPINDLE MOTOR DRIVE
IC501 AN8290S
H501, 502
0H-011
IC303
MN4416S
16K RAM
FL401
Tracking error compensation adj.
Best eye(PD balance) adj.
Tracking offset adj.
Focus offset adj.
Focus gain adj.
Tracking gain adj.

Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

• ——— : Positive voltage lines and negative voltage lines.
⟿ : Audio signal lines.

9 10 11 12 13 14 15 16 17 18 19

OPTICAL SERVO
IC101 AN8370S

POWER SOURCE
IC402 AN6552
IC13 SVIM5236L
Q11 2SD973A
Q12~14 2SB793A
Q17 2SB642
IC11,12 SVIFU15
Q16 2SB793A
Q15 2SD973A
Q101 2SD637

IC304 EHDGA1243
DATA SLICE AND PLL

DIGITAL SIGNAL PROCESSING
IC301 MN6617S

IC303 MN4416S
16K RAM

IC302 MN6618A
DIGITAL FILTER

IC801 SVIPCM54HP
D/A CONVERTER

IC802 MN6636S
DIGLITCH

IC805 SVIGA011 FILTER
IC804 SVIGA011 FILTER

IC803 AN8376S
AUDIO

MUTING
IC1001 MN1280
Q1001 UN4212
Q1002 UN4112

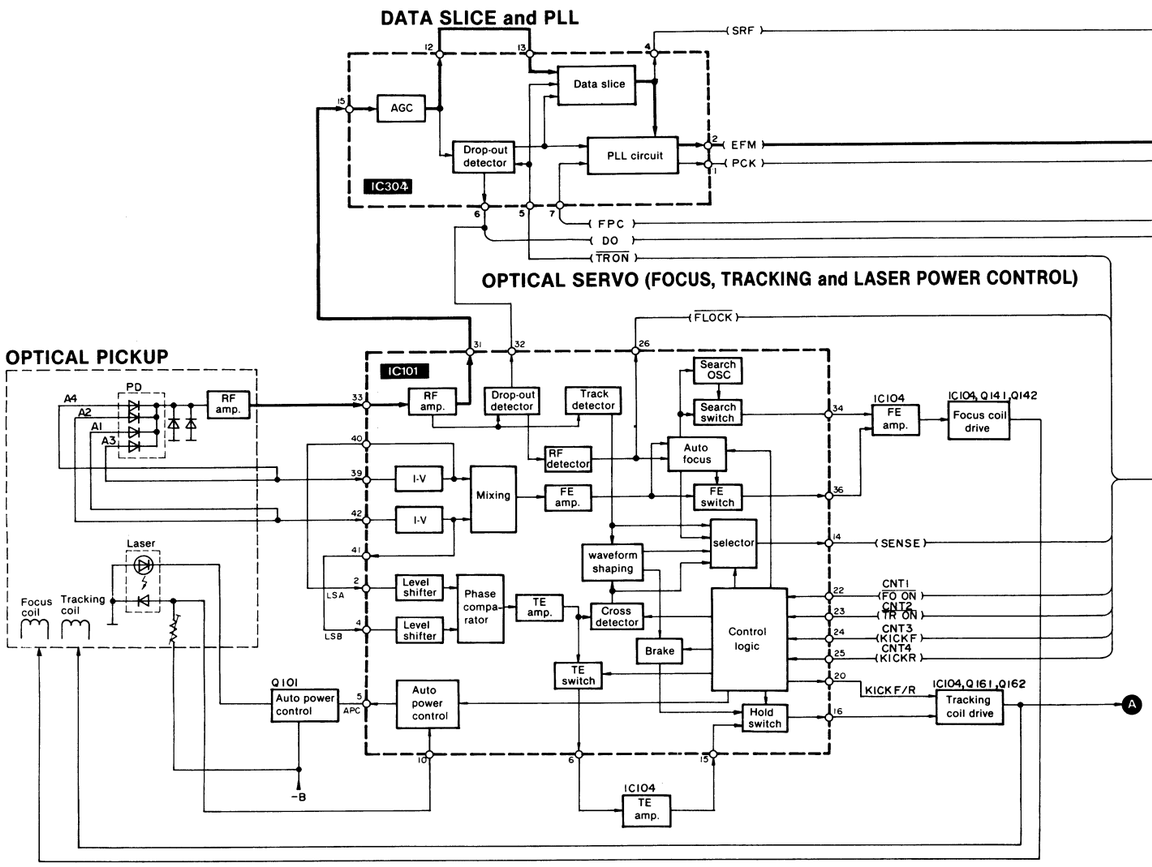
For U.S.A. and Canada.
POWER SUPPLY
AC 120V (60Hz)

For Continental Europe, United Kingdom and Australia.
AC 220,240V (50/60Hz)

For others
AC110-127/220-240V (50/60Hz)

LINE OUT
PHONES

■ BLOCK DIAGRAM



SL-P210

SYSTEM CONTROL and FL DRIVE

IC401

CLOCK GEN.
ROM 6144 x 8
IR
PC
HALT/ STOP
DISPLAY CONTROL
SP
X
SX SY SE
Y
320 x 4
BANK
SBT
SB
INT. FLAG
INT. EN. FLAG
CF ZF
ALU
LB
TC
TB
BC
SYSTEM CONTROL
E
A
DAC

SMCK
RST
BLKCK
SUBQ
CLDCK
PC
MDATA
MCLK
MLD
DMUTE
STAT
FLOCK
SENSE
CLOSE
OPEN
CNT4
CNT3
CNT2
CNT1

SIO1 Open/close detector
KEY MATRIX
F L

REMOTE CONTROL DATA PROCESSING

IC404

CLOCK GEN.
ROM 1024 x 8
IR
PC (10)
HALT/ STOP
SP
Y (4)
X (4)
SX SY SE
96 x 4
SBT
SB
INT.FLAG
INT. EN. FLAG
CF ZF
ALU
TC
TB
BC
SYSTEM CONTROL
E(4)
A(4)
LB

SMCK
RST

MOTOR DRIVE

IC402 Logic
Q402,403 Motor drive
Loading motor

TRAVERSE SERVO

IC102
IC103 Traverse servo
Traverse coil drive
IC103,Q181,182
Traverse coil
IC103 Speed detector
+B

POWER SUPPLY

IC402 — 12.5V
IC801~803, D801 — 6.5V
IC501,Q141,Q601, Q181, Q402 — 8.5V
IC101~104, IC301 304, IC401, IC403 IC404, Q803, Pickup — 5V
Q15 Regulator
IC13 Regulator
Q13 Regulator
Q11 Regulator
IC11 IC Protector
D23 Rectifier
D9,20 Rectifier
D21,22 Rectifier
D24 Rectifier
D26 Rectifier
Power transformer (T1)
(S1) AC IN

IC402 Regulator
Q14 Regulator
Q12 Regulator
IC12 IC Protector
IC101,103,104,304 Q101, Pickup — -5V
IC501,Q142,Q162, Q182, Q403 — -8.5V
Q16 Regulator
IC801,803 — -6.5V
IC402 — -12V
IC401 — -32V
Q17 Regulator
D18
FL401 — AC2.3V

REMOTE CONTROL RECEIVER

IC602 Remote control reciver

DIGITAL FILTER

IC302

Input resistor
RAM1 Address counter
RAM2 Addres counter
RAM1
RAM2
Logic
Logic
Acqum-lator
ROM
CPU interface
Overflow limitter
Output resistor
Timing generator

D/A CONVERTER

IC801
Ladder resistor network
I-V

IC802
IC802
IC803
IC804
IC805

Q1001,1002 Relay drive
Relay
L ch
R ch
LINE OUT
Headhone

REMOTE CONTROL TRANSMITTER

3V
Q1001 LED drive
Modulation
Pulse generator
11 Bit latch
Chattering simuldepression inhibit
Timing generation circuit
Key input control circuit
IC1001
Key switch
1,2,3
3V

Printed in Japan
860709500 Ⓗ AM

ORDER NO. HAD8610727P0

Parts Change Notice

Service Manual
Order No. HAD8606593C0
Order No. HAD8607634A1
Order No. HAD8607635A1
Order No. HAD8607631C0
Order No. HAD8607667C0

Model No. SL-P110/P115/P116/P210/P310

Please revise the original parts list in the Service Manual to conform to the change (s) shown herein. If new part numbers are shown, be sure to use them when orderring parts.

Reason for Change *The circled item indicates the reason. If no marking, see the Notes in the bottom column.

1. Improve performance	
2. Change of material or dimension	
3. To meel approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code **The circled item Indicates the interchangeability. If no marking, see the Notes in the bottom column.

	Parts		Set Production	
A	Original	⇄	Early	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.
	New		Late	
B	Original	→	Early	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
	New	↗	Late	
C	Original	↗	Early	New parts only may be used in early or late production sets. Stock new parts.
	New	→	Late	
D	Original	→	Early	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
	New	→	Late	
E	Other			

Part Number

Model No.	Ref. No.	Original Part No.	New Part No.	Notes (***)	Part Name & Descriptions
SL-P110	IC801	SVIPCM54HP	SVIPCM54JP–V	7, C	Integrated Circuit
SL-P115	IC801	SVIPCM54HP	SVIPCM54JP–V	7, C	Integrated Circuit
SL-P116	IC801	SVIPCM54HP	SVIPCM54JP–V	7, C	Integrated Circuit
SL-P210	IC801	SVIPCM54HP–1	SVIPCM54JP–V	7, C	Integrated Circuit
SL-P310	IC801	SVIPCM54JP–1	SVIPCM54JP–V	7, C	Integrated Circuit

File this Parts Change Notice with your copy of the Service Manual.

Technics

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Printed in Japan
8109C0250 ® HS

ORDER NO. HAD8610750S0
A6

Service Manual

Supplement

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-P210

SL-P210

Please use this manual together with the service manual for Model No. SL-P210, Order No. HAD8607631C0.

Notes:

★ The main P.C.B. of this unit was changed at the production. Be careful about this point during servicing.

(Main changes)

1. Mounting the muting relay circuit into main P.C.B
2. Discontinuing of parts mounted on the foil side of P.C.B.

★ This supplement should be filed with the service manual for Model No. SL-P210, Order No. HAD8607631C0.

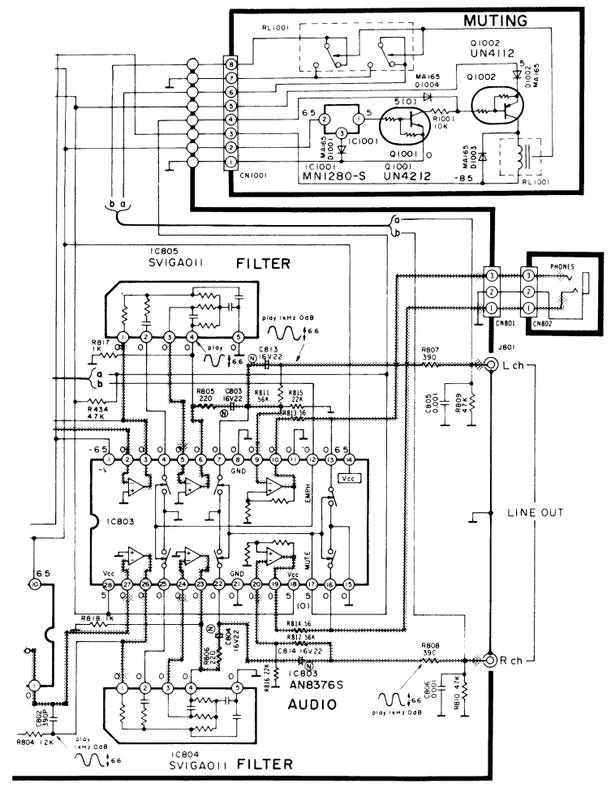
CHANGES

■ REPLACEMENT PARTS LIST

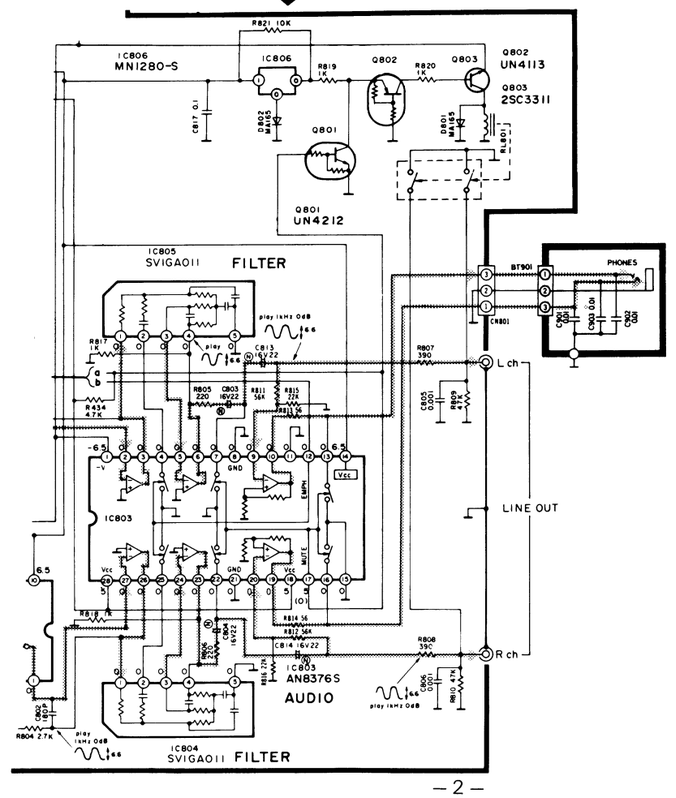
Ref. No.	Change of Part No. OLD → NEW		Part Name & Descrption	Per Set (Pcs.)	Remarks
INTEGRATED CIRCUITS					
IC806	– – – – –	MN1280–S	IC, Reset Signal Generator	1	Addition
IC1001	MN1280–S	– – – – –	IC, Reset Signal Generator	0	Deletion
TRANSISTORS					
Q801	– – – – –	UN4212	Transistor, Switching	1	Addition
Q802	– – – – –	UN4113	Transistor, Switching	1	Addtion
Q803	– – – – –	2SC3311–Q	Transistor, Relay Drive	1	Addition
Q1001	UN4212	– – – – –	Transistor, Switching	0	Deletion
Q1002	UN4112	– – – – –	Transistor, Relay Drive	0	Deletion
DIODES					
D801	– – – – –	MA165	Diode	1	Addtion
D1001 ~1004	MA165	– – – – –	Diode	0	Deletion
RELAYS					
RL801	SSYD2	– – – – –	Relay, Muting	1	Addtion
RL1001	– – – – –	SFDYG5A237P	Relay, Muting	0	Deletion
RESISTORS					
R819	ERDS2TJ102	– – – – –	Carbon, 1/4W, 1kΩ, ±5%	1	Addtion
R820	ERDS2TJ102	– – – – –	Carbon, 1/4W, 1kΩ, ±5%	1	Addtion
R821	ERDS2TJ103	– – – – –	Carbon, 1/4W, 10kΩ, ±5%	1	Addtion
R1001	– – – – –	ERDS2TJ103	Carbon, 1/4W, 10kΩ, ±5%	0	Deletion
CAPACITOR					
C817	ECFD1H104ZF	– – – – –	Semiconductor, 50V, 0.1μF, $\pm^{80}_{20}$%	1	Addition

■ SCHEMATIC DIAGRAM

OLD



NEW



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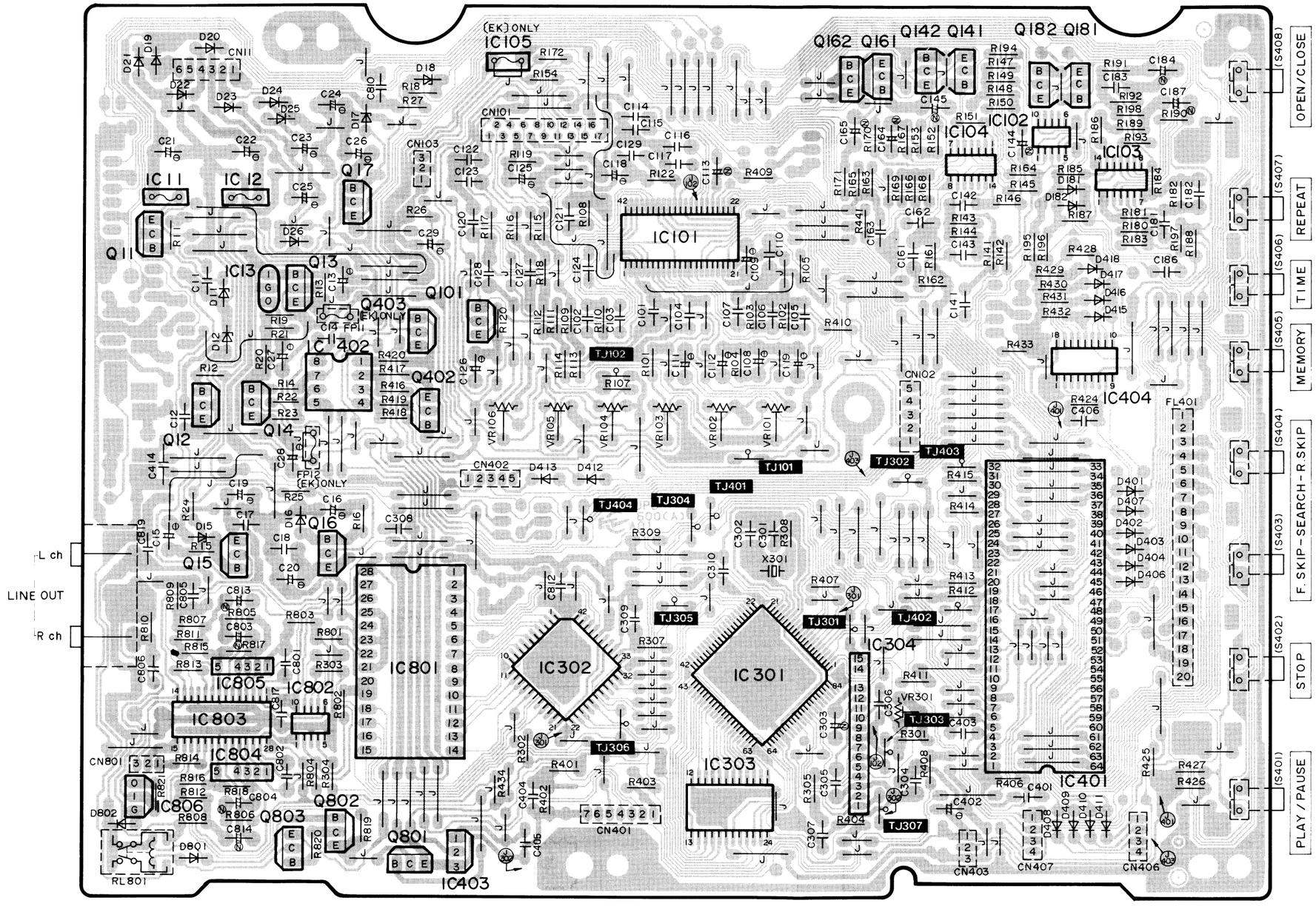
Tokyo 105, Japan

■ PRINTED CIRCUIT BOARD

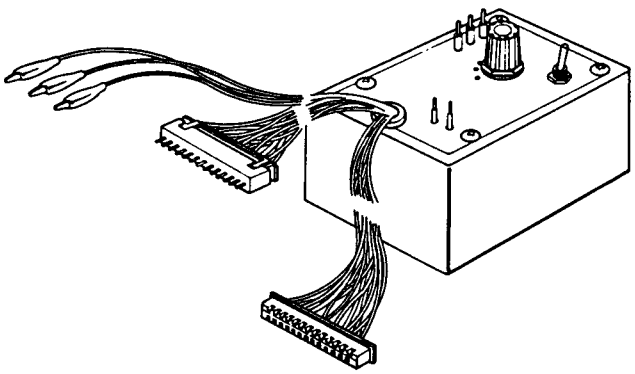


Printed in Japan
8611 0000 Ⓚ AM

1-2. Measuring Instruments and Special Tools

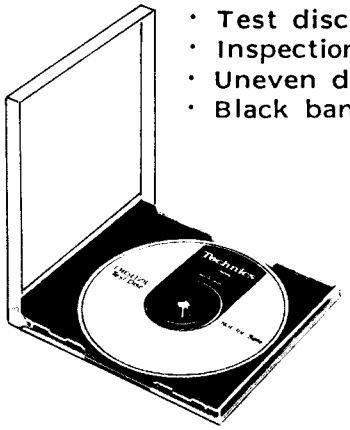
Must provide special tools prior to starting electric adjustment and optical pick-up adjustment. The special tools are available through the ordinary part supply route. Specify the part numbers (SZZP ----) when placing your order.

1. Servo gain adjuster
   (SZZP1017F)



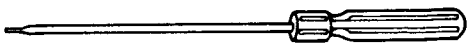
2. Test disc

- Test disc (SZZP1014F) old type
- Test disc (SZZP1014F) new type
- Inspection test disc (SZZ1054C)
- Uneven disc (SZZP1056C)
- Black band disc (SZZP1057C)

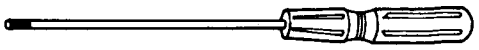


3. Ordinary disc
4. 2-channel oscilloscope
   (with external trigger more than 30MHz)
5. Low frequency oscillator
6. Adjusting screwdriver ----- SZZP1043C
7. Allen wrench ---------- SZZP1044C
9. General servicing tools

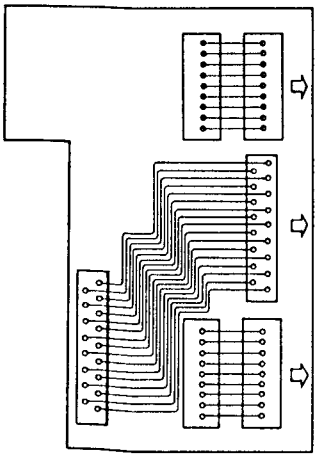
6. Adjusting screwdirver
   (SZZP1043C)



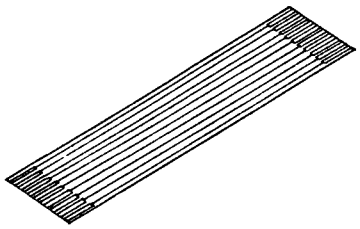
7. Allen wrench (1.5 mm)
   (SZZP1044C)



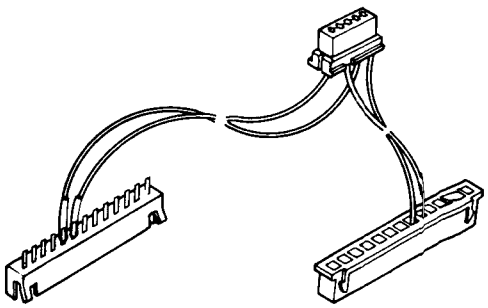
10. Junction PCB
    (SZZP1070C)



11. Junction FPC cord
    (SZZP1071C)



8. Conversion connector
   (SZZP1032F)



SL-P110·SL-P210
SL-P310·SL-P115
SL-P116·

Adjustment Manual

1. ADJUSTMENT PROCEDURE

Refer to the service manual for the disassembling methods of each parts.

(Note) Avoid the direct entrance of laser rays into the eyes and exposure of the body to laser rays which are dangerous. Especially be carefull in the electric and optical pick-up adjustments because a laser beam is radiated from the lens of the optical pick-up when the power supply of unit is turned on. Also follow the adjusting procedures given in the manual.

1-1. Preparation for Electric Adjustments

① Remove the cabinet, and front panel.

② Remove the power switch rod.

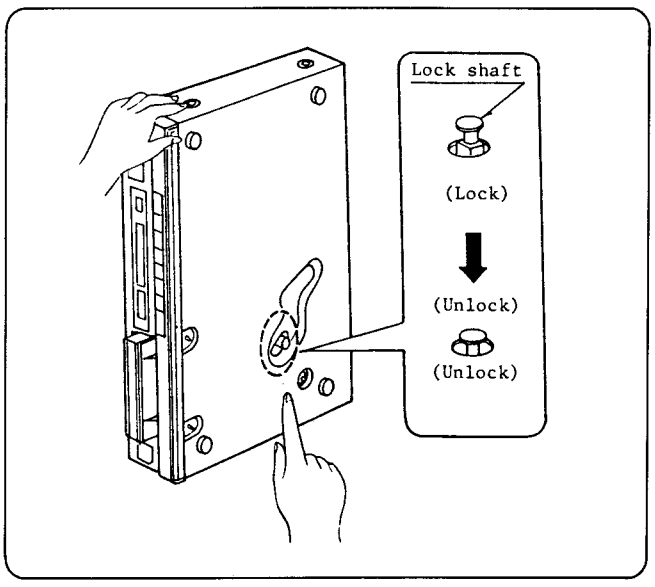
③ Release the optical pick-up lock by pressing in the lock shaft located on the bottom side of unit (▮ (Lock) → ▬ (Free)).

(Note 1)

The pick-up detects signals recorded on the disc with a laser beam. The pick-up moves as the programs are played back but the movement is not visible from outside.

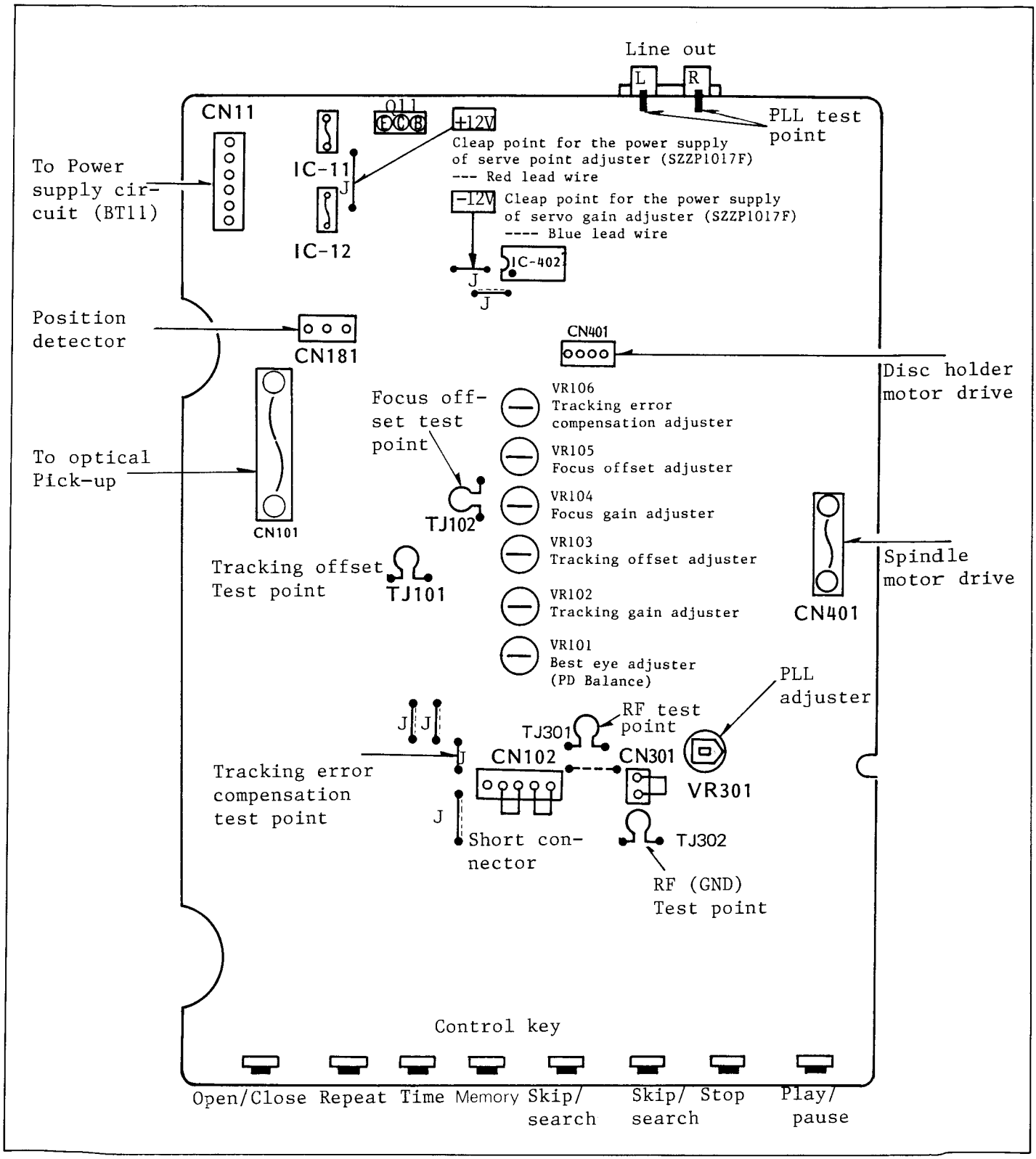
Caution:

- Must remove a disc from the player and lock the pick-up by pressing in the lock shaft when the player is transported as in moving. Otherwise, the disc loading mechanism is moved and damaged.
- Also lock the pick-up by pressing in the lock shaft in (▬→▮) prior to disassembling the player.



Lock Shaft

2. ADJUSTING POINT AND TEST POINT ILLUSTRATION



Main circuit

• TEST DISC (SZZP1014F) old type

Contents

TON	PURPOSE	SIGNAL	Time
		(TOC)	
1	Servo adjustment	Wowble Tone -10dB L+R	2'00"
2	Pickup assenmetry adjustment	Wowble Tone -10dB L+R	5'00"
3	Reference	1 kHz 0 dB L+R	1'00"
4	Freq. Response	20kHz 0 dB L+R	0'30"
5	Emphasis	16 kHz -0.96 L+R	0'30"
6	Channel Separation	L 1kHz 0 dB R-∞	0'30"
7	Channel Separation	R 1kHz 0 dB L-∞	0'30"
8	Dynamic range	1 kHz -60 dB L+R	1'00"
9	Linearity	1 kHz -80 dB L+R	1'00"
10	S/N	- ∞	2'00"
11	THD	1 kHz 0 dB L+R	1'00"
12	Black Spot	Wowble Tone -10 dBL+R	5'00"
13	Black Spot	Wowble Tone -10 dBL+R	5'00"
14	Finger Print	Wowble Tone -10 dBL+R	5'00"
15	Finger Print	Wowble Tone -10 dBL+R	9'00"
16	Wedge	Wowble Tone -10 dBL+R	4'00"
17	Wedge	Wowble Tone -10 dBL+R	4'00"
18	Reference	1 kHz 0 dB L+R	0'30"
19	Freq. Response	15 Hz	0'30"
20	Freq. Response	20	0'30"
21	Freq. Response	50	0'30"
22	Freq. Response	100	0'30"
23	Freq. Response	200	0'30"
24	Freq. Response	500	0'30"
25	Freq. Response	2K	0'30"
26	Freq. Response	5K	0'30"
27	Freq. Response	10K	0'30"
28	Freq. Response	12K	0'30"
29	Freq. Response	15K	0'30"
30	Freq. Response	18K	0'30"
31	Freq. Response	20K	0'30"
32	Channel Separation	L 100Hz 0 dB R - ∞	0'30"
33	Channel Separation	R 100Hz 0 dB L - ∞	0'30"
34	Channel Separation	L 10kHz 0 dB R - ∞	0'30"
35	Channel Separation	R 10kHz 0 dB L - ∞	0'30"
36	Channel Separation	L 20kHz 0 dB L - ∞	0'30"
37	Channel Separation	R 20kHz 0 dB L - ∞	

* This old type test disc has been changed to new type (CDT-002)
* This old type test disc has 37 tracks and display shown 37 tracks when this disc is played
* Characteristics of old type and new type (CDT-002) are completely same. And both disc can use for same purpose

• TEST DISC (SZZP1014F) new type

Contents

TON	PURPOSE	SIGNAL	Time
1	Reference	1 kHz L+R 0dB	1'40"
2	S/N	1 kHz L+R -	1'40"
3	Separation	1 kHz L 0dB	1'40"
4	Separation	1 kHz R 0dB	1'40"
5	Dynamic Range	1 kHz L+R -24dB	1'40"
6	Emphsis	16kHz L+R 0dB	1'40"
7	Black Band 0.4 mm	400Hz L+R -10dB	3'00"
8	Black Band 0.5 mm	400Hz L R -10dB	2'30"
9	Wedge 0.7 mm	400Hz L+R -10dB	5'00"
10	Fingerprint No.3	400Hz L+R -10dB	2'00"
11	Index	1.440Hz L+R -10dB 2.880Hz L+R -10dB 3.1760Hz L+R -10dB	8'00" 8'00" 1'00"
12	Repeat check	1 kHz L+R 0dB	0'05"

• INSPECTION TEST DISC (SZZP1054C) CDT-016

Contents

TON	PURPOSE	SIGNAL	Time
1	Reference	1 kHz L+R 0dB	1'00"
2	Reference	400Hz L+R 0dB	1'40"
3	Wedge 0.4 mm	400Hz L+R -10dB	2'10"
4	Wedge 0.5 mm	400Hz L+R -10dB	2'20"
5	Wedge 0.6 mm	400Hz L+R -10dB	2'20"
6	Wedge 0.7 mm	400Hz L+R -10dB	2'40"
7	Wedge 0.8 mm	400Hz L+R -10dB	2'40"
8	Wedge 0.9 mm	400Hz L+R -10dB	3'10"
9	Black dot 0.3 mm	400Hz L+R -10dB	3'55"
10	Black dot 0.4 mm	400Hz L+R -10dB	4'10"
11	Black dot 0.5 mm	400Hz L+R -10dB	4'20"
12	Black dot 0.6 mm	400Hz L+R -10dB	5'05"
13	Black dot 0.7 mm	400Hz L+R -10dB	5'10"
14	Black dot 0.8 mm	400Hz L+R -10dB	6'05"
15	Black dot 0.9 mm	400Hz L+R -10dB	9'45"

• UNEVEN DISC (SZZP1056C)

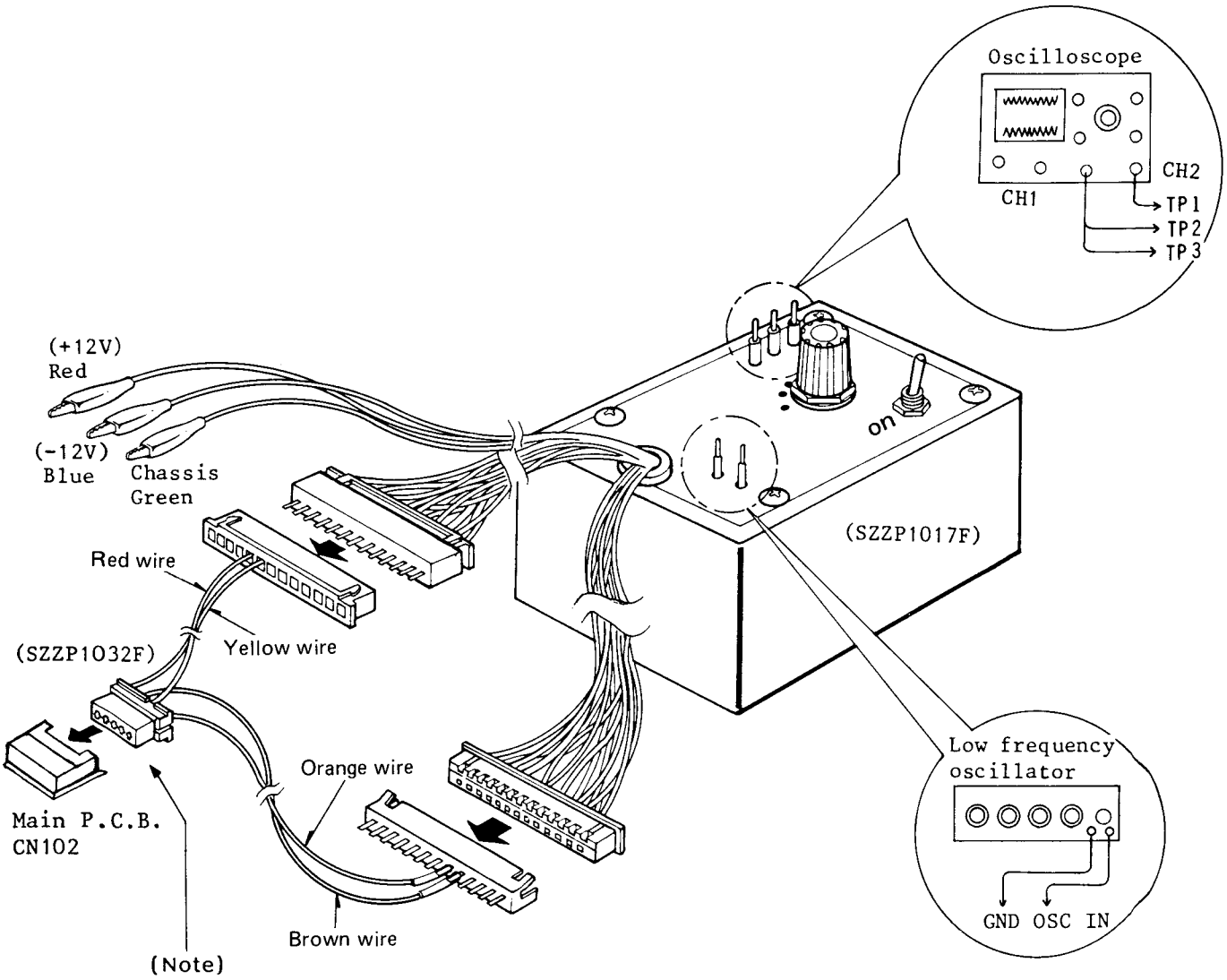
Structure : Ordinary disc with small piece for uneveness
Usage : Optical pick up mechanical adjustment

• BLACK BAND DISC (SZZP1057C)

Structure : Ordinary disc with 0.5 mm width tape at both side
Usage : Adjustment for regular size FF1 CD player

(1) Tracking offset adjustment
(2) Focus offset adjustment

2-1. Servo gain adjuster and its connection



(Note)

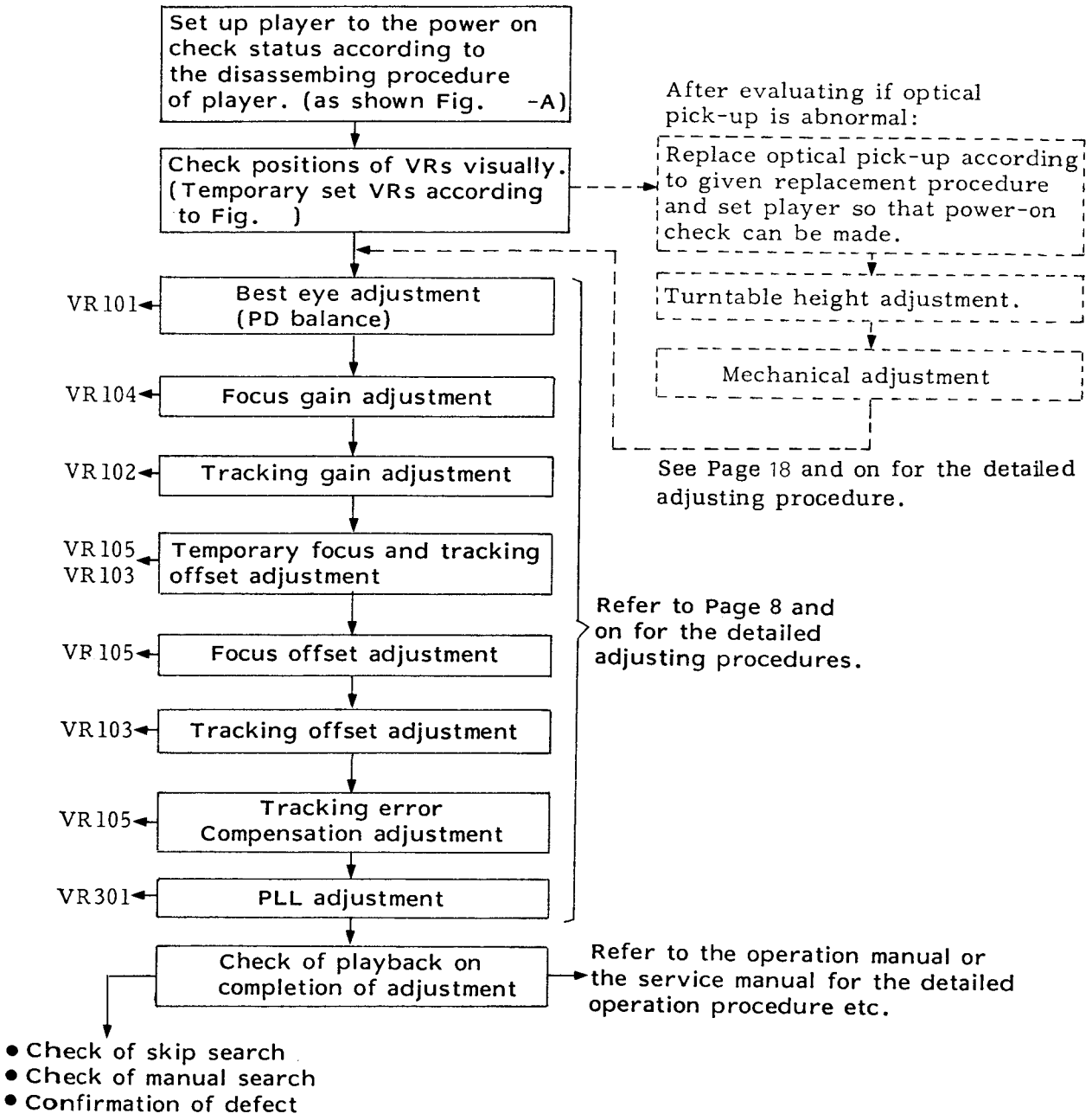
CN102 of the main PCB is provided with a short circuiting connector.
Remove the CN102 connector and install the conversion connector (SZZP1032F) for adjustment.
On completion of adjustment, must return the short-circuiting connector to its place.

Servo Gain Adjuster

Caution:

(1) Do not look into the lens when power is applied to the unit, since there is laser radiation (H.H.S./D.H.W./etc., regulation).
(2) These steps must be followed in order.

3. ELECTRIC ADJUSTMENT STEPS AND POINTS



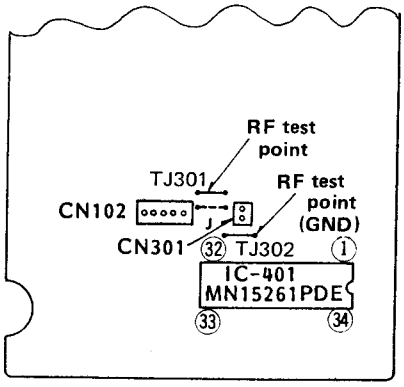
By setting the VRs temporarily as shown in Fig. the player run somehow that the optical pick-up is satisfactory but VRs must be adjusted optimumly finally.

5. ELECTRICAL ADJUSTMENT PROCEDURE

A. Best Eye (PD Balance) Adjustment

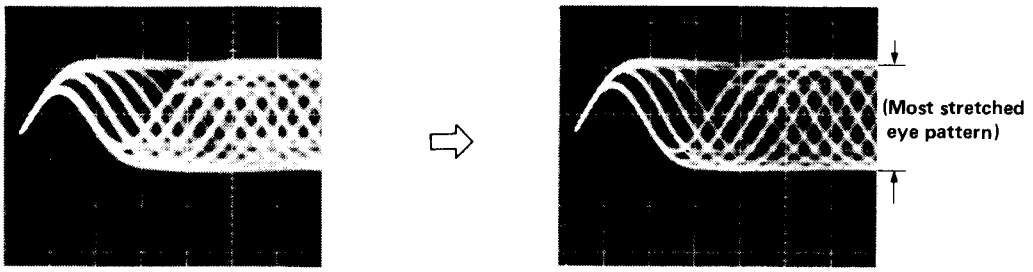
(1) Connect CH-1 of the oscilloscope to the **RF test point** (TJ301) and the grounding test Point (TJ302) on the main PCB as shown in illustration.

Oscilloscope setting ---
- Volt : 500 mV
- Sweep : 0.5 µsec
- Input : AC



Main PCB

(2) Turn on the power supply switch of the player.
(3) Place the test disc **(SZZP1014F)** or **(SZZP1054C)** in to the disc holder by open/close key.
(4) The player to the play mode.
(5) Play of the test disc. (BS 0.5mm)
SZZP1014F (Old) ----- Track 13
(New) ----- Track 8
SZZP1054C ---------- Track 11
(6) Adjust **VR101** so that the eye pattern of RF signal is stretched most as shown in illustration.



NG **OK**

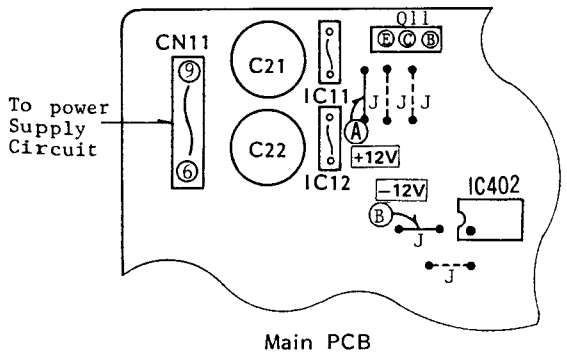
Best eye

(7) Turn off the power supply switch of the player.

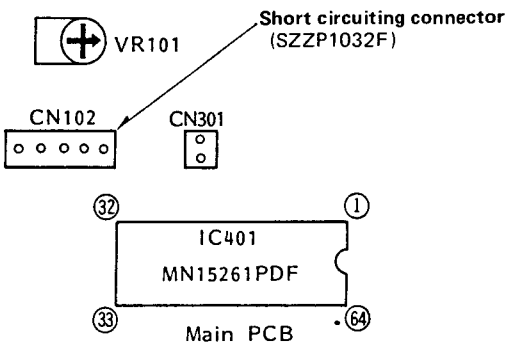
B. Focus Gain Adjustment

(1) Connect the servo gain adjuster **(SZZP1017F)** with conversion connector **(SZZP1032F)** to the player as shown in illustration.

Connecting points
- **Red lead wire**-----Ⓐ Jumper +12V beside the Q11 terminals on the main PCB.
- **Blue lead wire**-----Ⓑ Jumper -12V beside the IC402 terminal on the main PCB.
- **Green read wire** --- Chasis
- **Connector**-------- Remove the short-circuiting pin of **CN102** on the Main PCB and connect the conversion connector (SZZP1032F). Connect the conversion connector side (5 pins) to CN102.



Main PCB

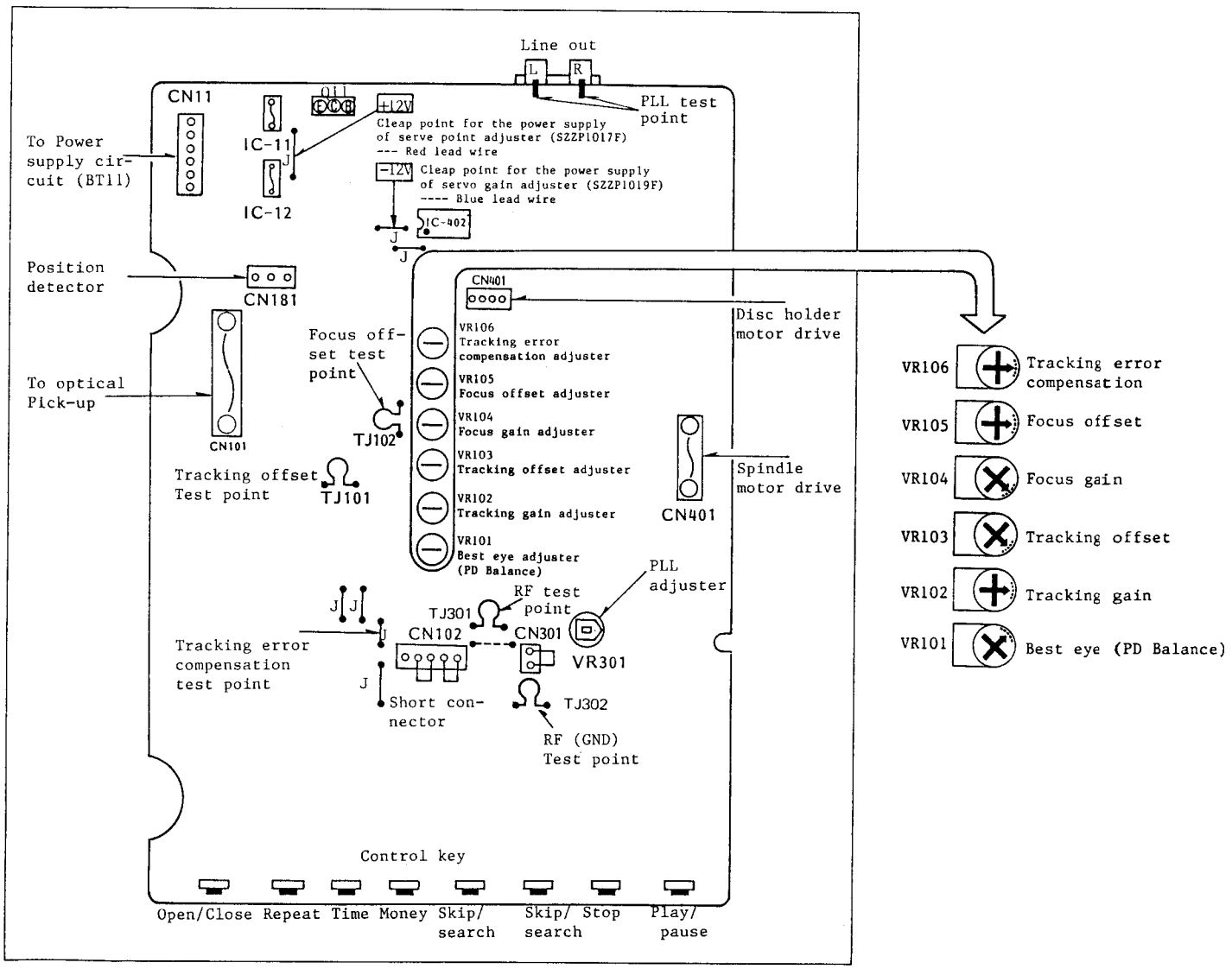


Main PCB

4. INITIAL SETTING POINTS OF ADJUSTING VARIABLE RESISTORS (VR)

• Adjusting Variable Resistors and Test Points

The player operates but not optimum at the above settings of the adjusting variable resistors. Adjust them according to the adjusting procedure.

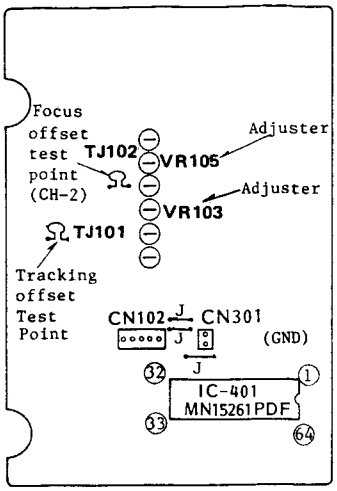


Main circuit

Most conduct the electric adjustment when any electric part is replaced. Perform ① optical pick-up adjustment and ② electric adjustment in the stated order when the optical pick-up (SOAD30A) is replaced.

Arrangement of the adjusting variable resistors viewing the side face. All the electric adjustments are possible by setting as shown in Fig. .
(Removed the power supply switch rod for the convenience of adjustment.)

D. Temporary focus and tracking offset adjustment



Main PCB

(Focus offset)

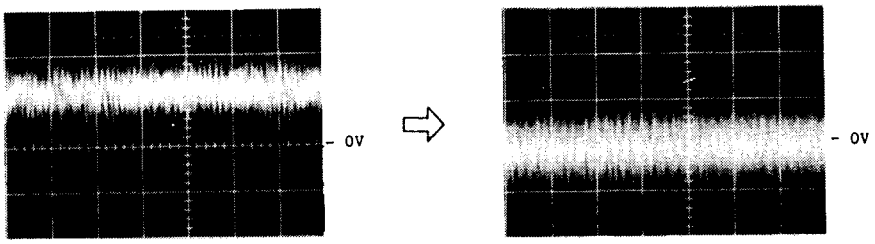
(1) Connect CH-1 of the oscilloscope of the **TJ102** (Focus offset test point) and GND to the chassis.

Oscilloscope setting ---
- Volt : 100mV
- Sweep : 5ms
- Input selector : DC

(2) Turn on the power supply switch of the player.

(3) Place the test disc **(SZZP1057C . . . Black band disc)** in to the disc holder by open/close key.

(4) After TOC reading, the set will become stop mode, then check the waveform on the oscilloscope and adjust **VR105**, so that the waveform at TJ102 shall be **Ground level** as shown in illustration.



NG OK

(Tracking offset)

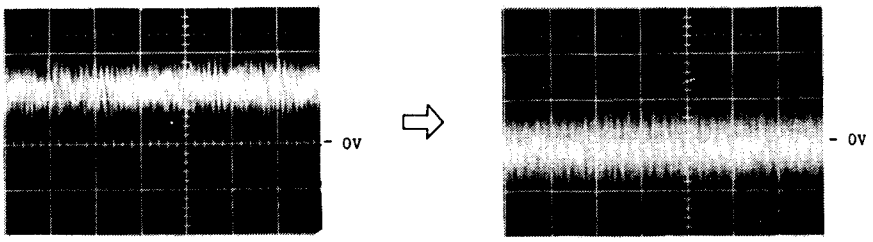
(1) Connect CH-1 of the oscilloscope to the **TJ101** (tracking offset test point) and **GND** to the chassis.

Oscilloscope setting ---
- Volt : 100mV
- Sweep : 5ms
- Input selector : DC

(2) Turn on the power supply switch of the Player.

(3) Place the test disc **(SZZP1057C . . . Black band disc)** in to the disc holder by open/close key.

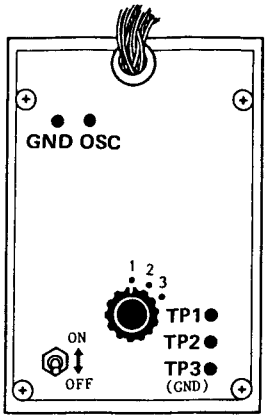
(4) After TOC reading the set will become stop mode, then check the waveform on the oscilloscope and adjust VR103, so that the waveform at **TJ101** shall be **Ground level** as shown in illustration.



NG OK

(5) Turn off the power supply switch of the Player.

Initial setting mode of servo gain adjuster



Servo Gain Adjuster (SZZP1017F)

(1) mode select switch to "2" position.

(2) ON/OFF switch to "ON" position.

(2) Set the low frequency oscillator to a frequency **750 Hz** and an output voltage of **150m Vp-p** then connect the oscillator to the terminals OSC IN and GND of the servo gain adjuster **(SZZP1017F)**.

(3) Connect CH-1 and CH-2 of the oscilloscope to **TP1** and **TP2** of the Servo gain adjuster **(SZZP1017F)**. (TP3 is the grounding terminal.)

Oscilloscope setting --
- Volt ..... 100 mV
- Sweep ..... 1 ms
- Input selector..... DC

(4) Turn on the power supply switch of the player.

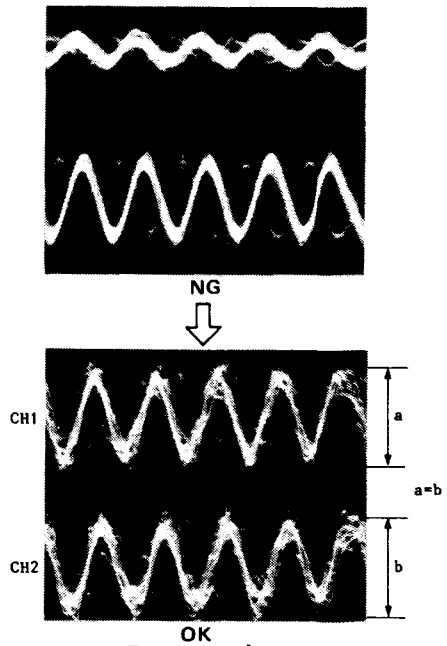
(5) Place the test disc **(SZZP1014F)** or **(SZZP1054C)** in to the disc holder by open/close key and in the Playback mode.

(6) Set the rotary switch of the servo gain adjuster **(SZZP1017F)** to "2" → "1".

(7) The player to the Play mode and the 750 Hz signal will be displayed on the oscilloscope, then adjust **VR104** so that the waveforms and amplitudes of the **both channels shall be equal** as shown in illustration.

(8) Turn off the power supply switch of the player.

(Note) Please do not remove the servo gain adjuster also shorting connector.



Focus gain

C. Tracking Gain Adjustment

(1) Set the low frequency oscillator to a frequency of **1.0 kHz** and an output of **150 mVp–p**, and connect the oscillator to the OSC IN and GND of the gain adjuster **(SZZP1017F)**.

(2) Connect the CH-1 and CH-2 of the oscilloscope to the **TP1** and **TP2** of the gain adjuster **(SZZP1017F)**. (TP3 is a grounding terminal.)

Oscilloscope setting ---
- Volt : 100mV
- Sweep : 1.0ms
- Input selector: DC

(3) Turn on the power supply switch of the Player.

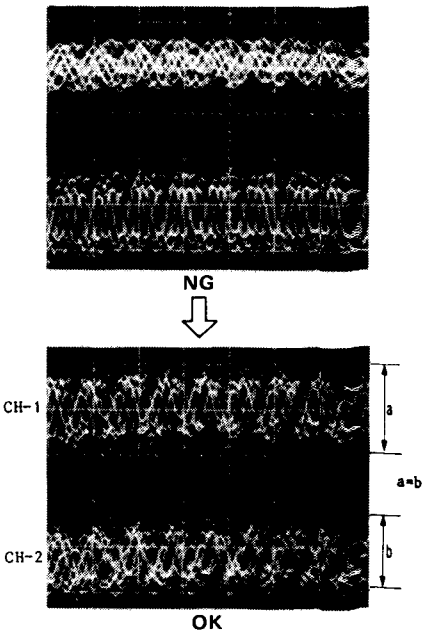
(4) Place the test disc **(SZZP1014F)** or **(SZZP1054C)** in the disc holder by open/close key and in the Playback mode.

(5) Set the rotary switch of the servo gain adjuster (SZZP1017F) to "2" → "3".

(6) The player to the play mode and the 1.0 kHz signal will be displayed on the oscilloscope, then adjust **VR102** so that the waveforms and amplitudes of the **both channels shall be equal** as shown in illustration.

(7) Turn off the power supply switch of the player.

(8) After completing the above mentioned adjustment, **remove the servo gain adjuster and insert the shorting connector into CN102 as it was.**



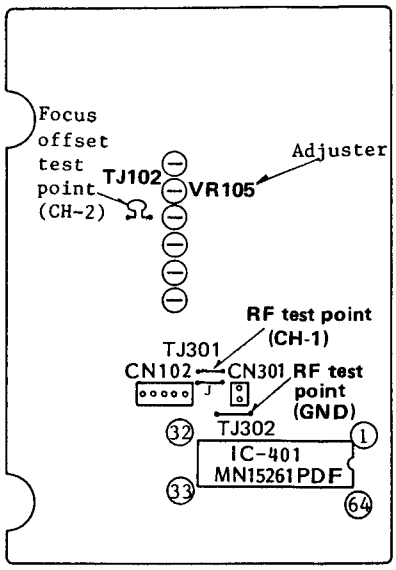
Tracking gain

E. Focus offset Adjustment

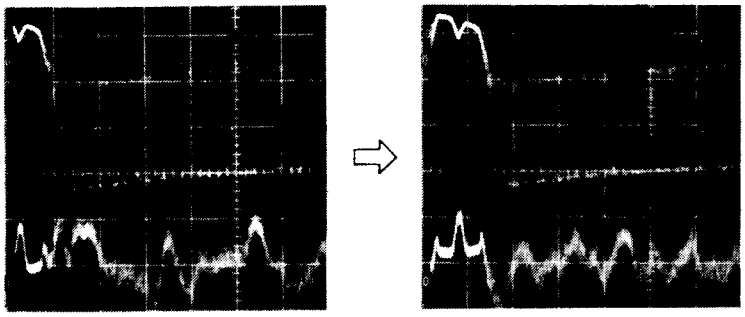
(1) Connect CH-1 of the oscilloscope to the **TJ301** (RF test point) and CH-2 to the terminal **TJ102.** (Focus offset test point) on the main PCB. **TJ302** of RF test point (GND) on the main PCB as shown in illustration.

		TJ301 (CH-1)	TJ102 (CH-2)
Oscilloscope setting	Volt	: 500mV	100mV
	Sweep	: 0.5msec	
	Input Selector	: AC	DC
	Mode	: NORM (Triggering Via CH-1).	

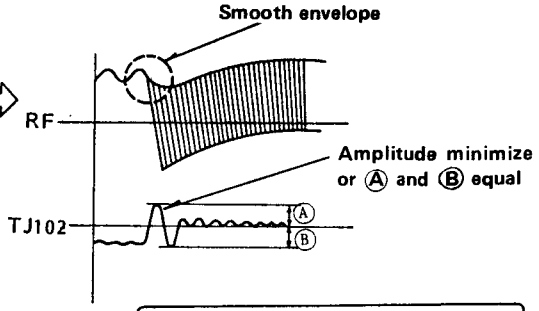
(2) Turn on the power supply switch of the player.
(3) Place the test disc (**SZZP1057C . . . Black band disc**) in to the disc holder by open/close key.
(4) The player to the play mode.
(5) Play **TR9** of the test disc.
(6) Check the waveforms of **CH-1** and **CH-2** on the oscilloscope and adjust **VR105** so that the waveform around the triggering point as shown in illustration.



Main PCB



NG Focus offset OK



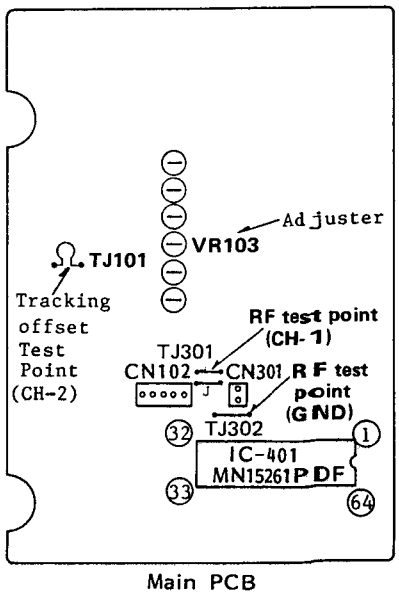
(7) Turn off the power supply switch of the player.

F. Tracking offset Adjustment

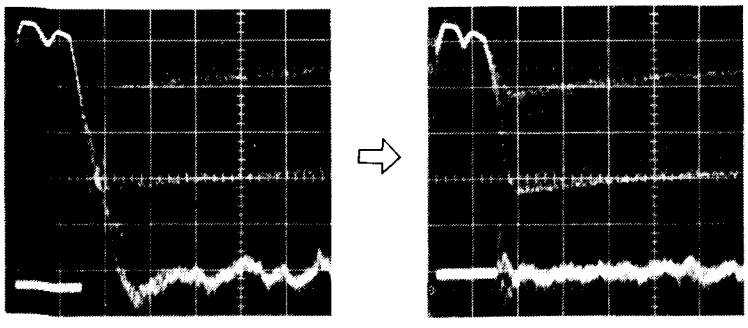
(1) Connect CH-1 of the oscilloscope to the **TJ301** (RF test point) and CH-2 to the terminal **TJ101.** (Tracking offset test point) on the main PCB. Connect GND of the oscilloscope to the RF test point (TJ302) on the main PCB as shown in illustration.

		TJ301 (CH-1)	TJ101 (CH-2)
Oscilloscope setting	Volt	: 500mV	100mV
	Sweep	: 0.5msec	
	Input Selector	: AC	DC
	Mode	: NORM (Triggering Via CH-1).	

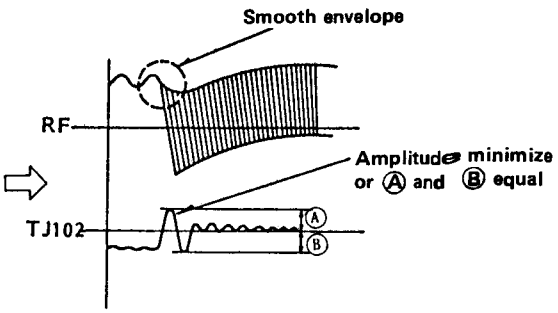
(2) Turn on the power supply switch of the player.
(3) Place the test disc (**SZZP1057C . . . Black band disc**)
(4) The player to the play mode.
(5) Play **TR9** of the test disc.
(6) Check CH-1 and CH-2 waveforms displayed on the oscilloscope and adjust **VR103** so that the waveforms as shown in illustration.



Main PCB



NG Tracking offset OK



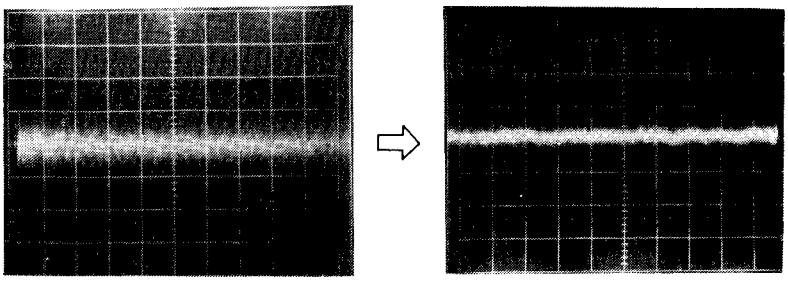
(7) Turn off the power supply switch of the player.

G. Tracking error Compensation Adjustment

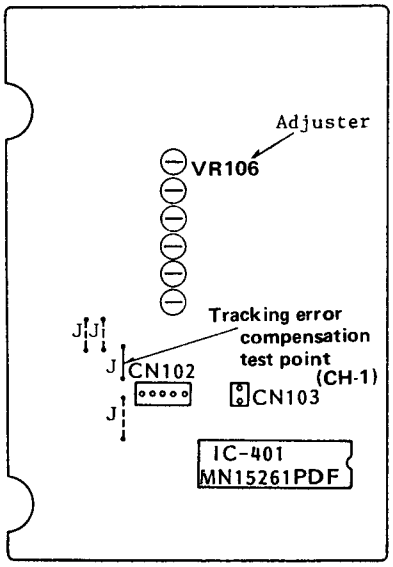
(1) Connect CH-1 of the oscilloscope to the **tracking error compensation test point** (Jumper) and GND to chassis as shown in illustration.

Oscilloscope setting
- Volt : 50mv
- Sweep : 1ms
- Input selector : DC

(2) Turn on the power supply switch of the player.
(3) Place the test disc **(SZZP1014F of SZZP1054C)** in to the disc holder by open/close key.
(4) The player to the play mode.
(5) Play **TR1** of the test disc
(6) Check the waveform on the oscilloscope and adjust **VR106,** so that the waveform of DC level less than **0±5mV** as shown in illustration.



NG OK



Main PCB

(7) Turn off the power supply switch of the player.

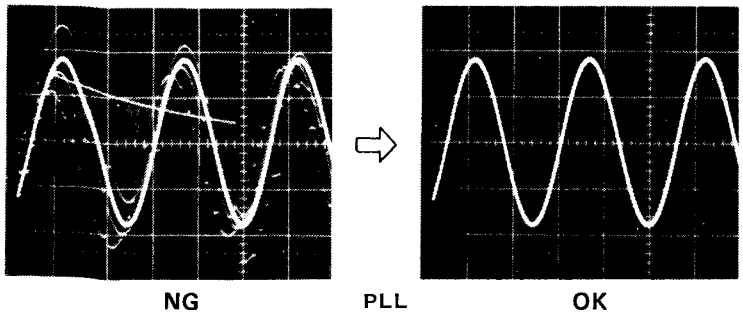
H. PLL Adjustment

(1) Connect CH-1 of the oscilloscope to the **line out terminal** (either of L-CH or R-CH) of the main PCB and the terminal GND of the chassis.

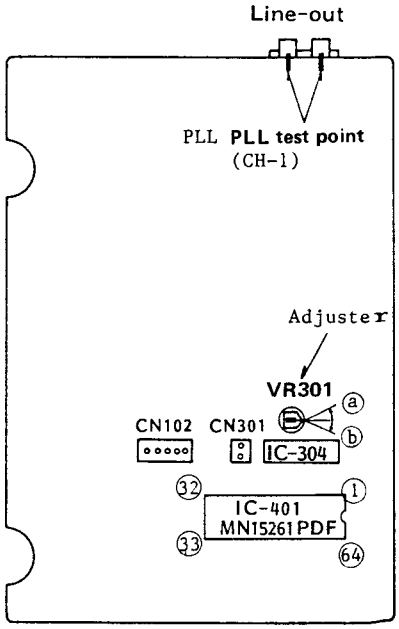
Oscilloscope setting ---
- Volt : 1.0V
- Sweep : 1msec.
- Input selector : DC

(2) Turn on the power supply switch of the player.
(3) Place the test disc **(SZZP1054C)** in to the disc holder by open/close key.
(4) The player to the play mode.
(5) Play of the test disc **Track 7 (WG 0.8mm).**
(6) Check the waveform displayed on the oscilloscope and adjust **VR301** in the following steps.

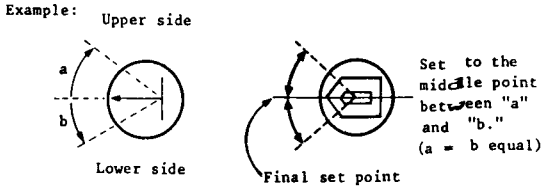
ⓐ Turn VR301 upwards slowly and learn the point at which the waveform on the oscilloscope begins to be **disturbed** as shown in waveform NG .
ⓑ Turn VR301 downwards slowly (opposite direction to that in the above para. "a") and learn the point at which the waveform on the oscilloscope begins to be **disturbed.**
ⓒ **Set VR301 in the middle between the points learned in the above steps "a" and "b".**



NG PLL OK



Main PCB



(7) Turn off the power switch of the player.

I. Check of Play Operation after Adjustment

(1) Check of skip search
   1) Play an ordinary disc.
   2) Press the skip button and check to see that skip search is given (Forward and reverse)

(2) Check of manual search
   1) Play an ordinary disc.
   2) Press the manual search button and check to see that smooth manual search can be done at low and high speeds (Forward and reverse)

(3) Check to make sure the best adjusted condition for defects.
   1) Play the Technics test disc "SZZP1054C".
   2) Play the track 12 (Wedge 0.6 mm), track 13 (Wedge 0.7mm), and see that there is no sound skip or noise.
   3) Play the tracks (Black spot 0.6mm), track 6 (Black spot 0.7mm) and see that there is no sound skip or noise.

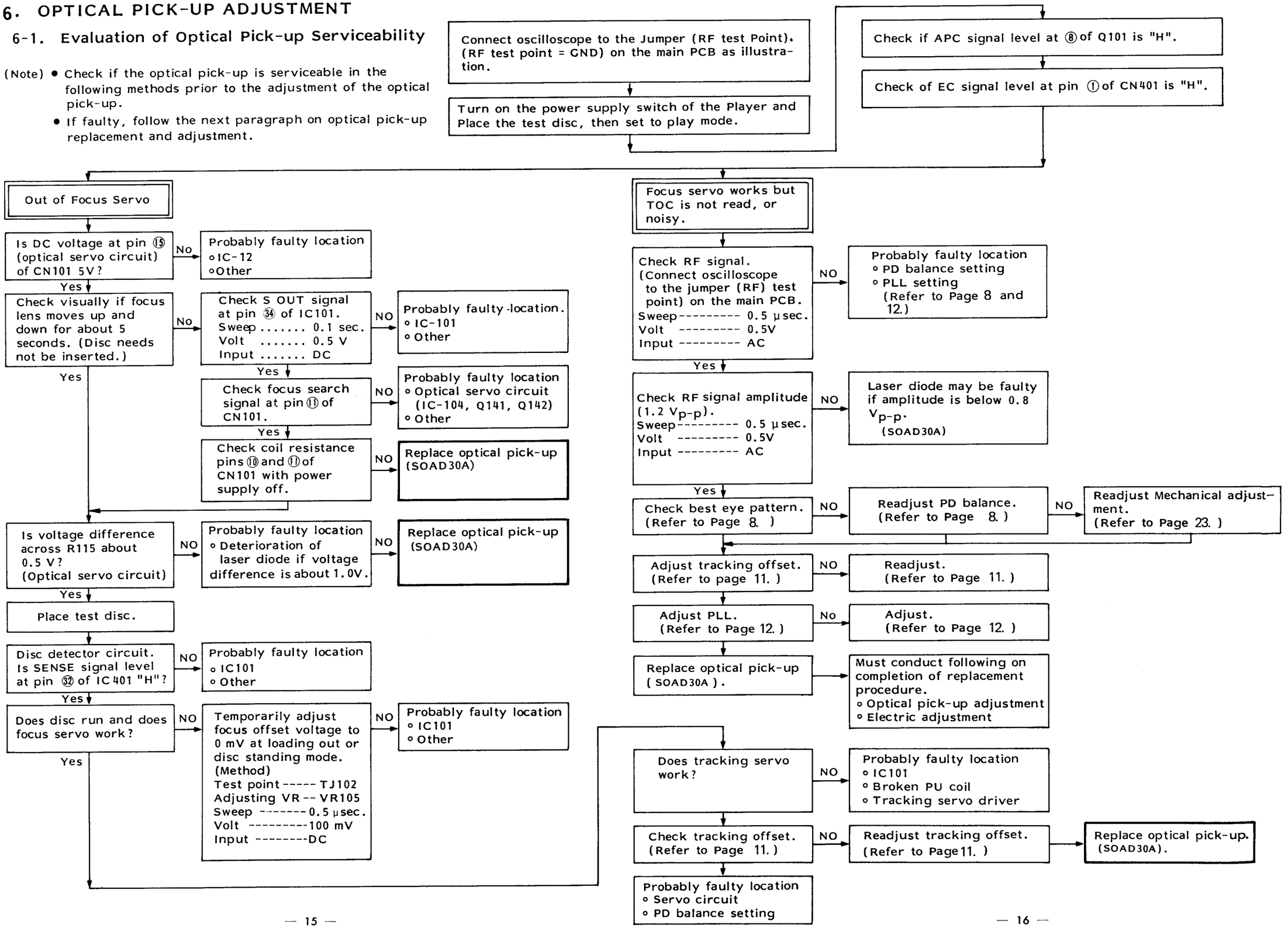
Technics Test Disc "SZZP1054C"	
Track number 12	0.6mm Wedge
Track number 13	0.7mm Wedge
Track number 5	0.6mm Black spot
Track number 6	0.7mm Black spot

– MEMO –

6. OPTICAL PICK-UP ADJUSTMENT

6-1. Evaluation of Optical Pick-up Serviceability

(Note) • Check if the optical pick-up is serviceable in the following methods prior to the adjustment of the optical pick-up.
• If faulty, follow the next paragraph on optical pick-up replacement and adjustment.

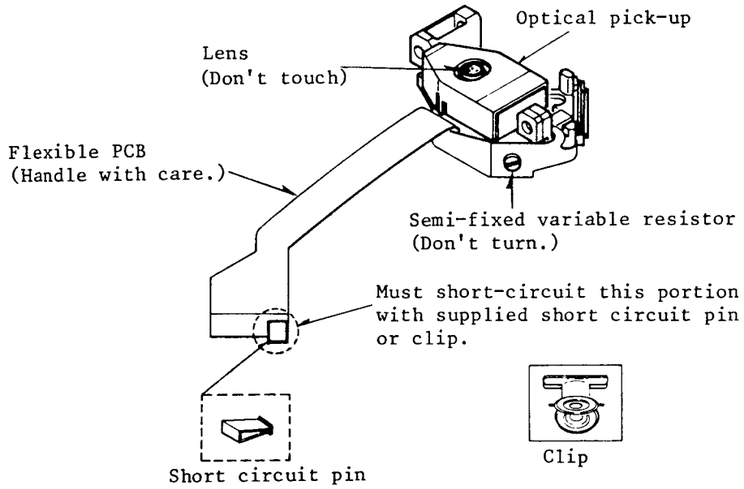


6-2. HOW TO HANDLING OPTICAL PICK-UP

The laser diode in the optical pick-up may be damaged by potential difference caused by static charge on clothing or body. Pay careful attention to damage by static charge when repaired.

• Handling of Optical Pick-up

1. Don't give a heavy shock to the optical pick-up which is very precisely constructed.
2. A charge prevention pin is inserted in the flexible PCB for preventing damage to the laser diode. The pin should be removed or installed in a short time.
3. Handle the flexible PCB with care because PCB may be cut if an excessive stress is applied.
4. Don't meddle with the laser power adjusting VR which is adjusted prior to shipping.



• Grounding for Preventing Static Charge Damge

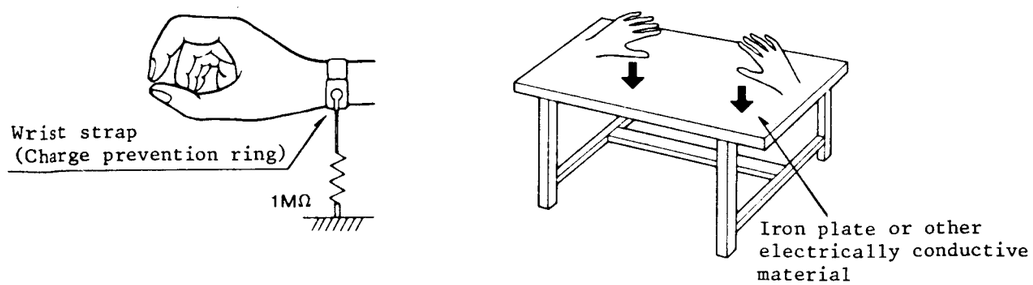
1. Body Grounding

   Put on the charge preventing wrist strap for discharging electricity from the body.

2. Working Table Grounding

   Lay electrically conductive material (conductive sheet) or an iron plate on the table where the optical pick-up is placed, and ground the material or sheet to the floor.

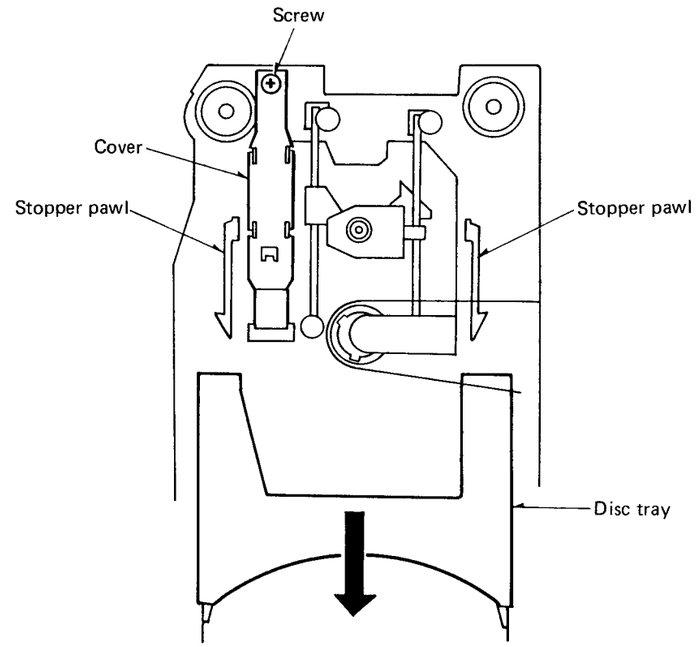
Note: Static charge of clothing is not discharged from the wrist strap. Exercise care so that clothing shall not touch the wrist strap.



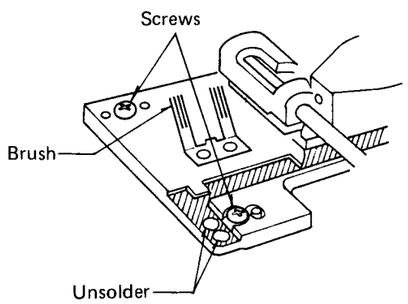
7. OPTICAL PICK-UP REPLACEMENT PROCEDURE

Note: Exercise care so that disassembled parts shall not be lost.
Set up the player so that it can be power on checked as shown in illustration according to the disassembly procedure outlined in the service manual.

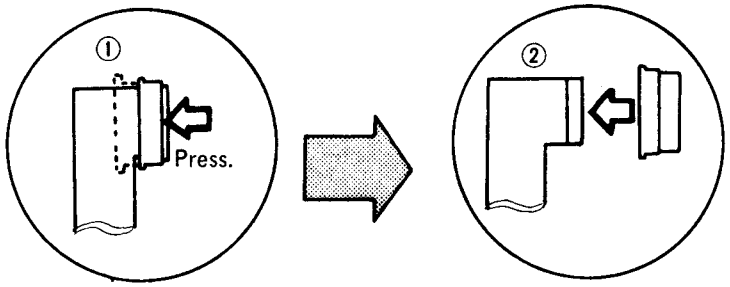
(1) Remove the front panel.
(2) Pushing the two stopper pawls of the disc holder inward simultanouely, pull the holder to remove it.
Note: The stopper pawls are nothing to reassembling.
(4) Remove the resisting plate for the position detector.



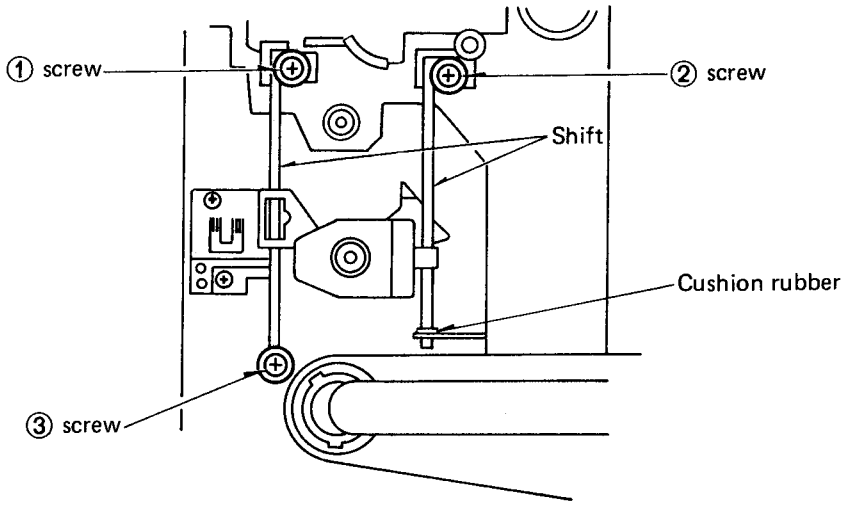
(5) Unsolder the linear motor drive coil and optical pick-up to separate them.
(6) Remove the two linear motor drive coil fastening screws.
Note: Pay due attention to the contact brush.



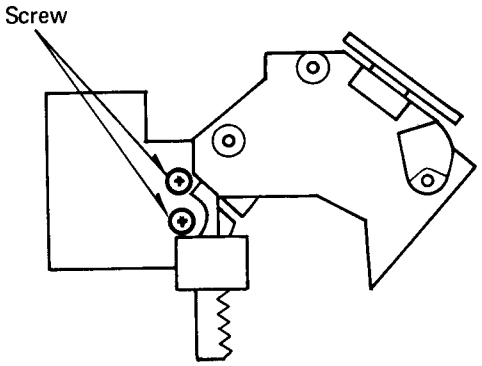
(7) Disconnect the optical pick-up 17-pin flexible cord from connector CN101 on the main PCB.
Note: 1. Pull out the connector at the point indicated by the arrow side.
2. Pull out the flexible cord.



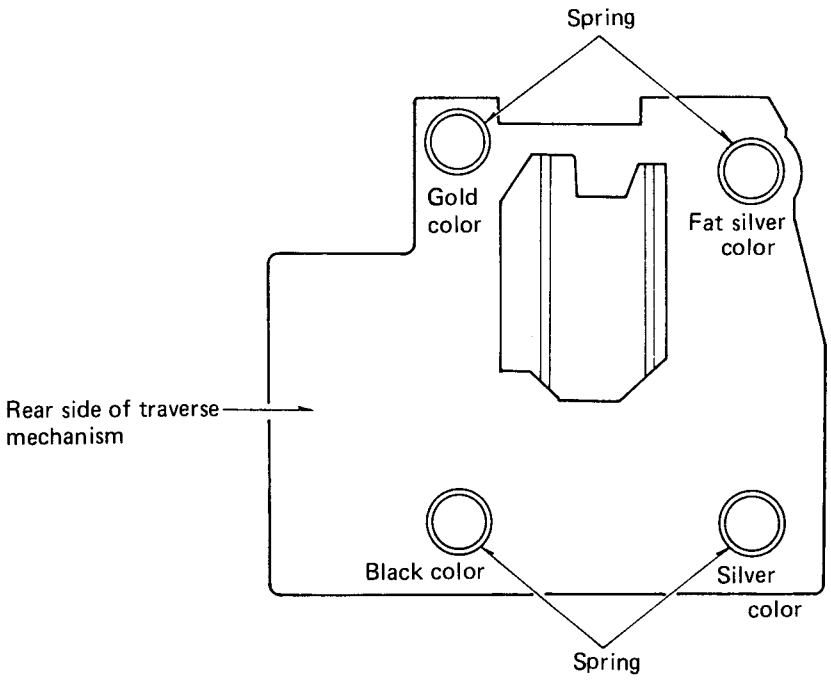
(8) Remove the three optical pick-up fastening screws.
(9) Remove the optical pick-up fastening shaft.
Note: Be careful not to lose or misplace the cushion rubber.
(10) The optical pick-up has been completely separated with this.
It is not necessary to remove the traverse unit as before. If the unit needs to be removed, pay attention to the four springs during removing.



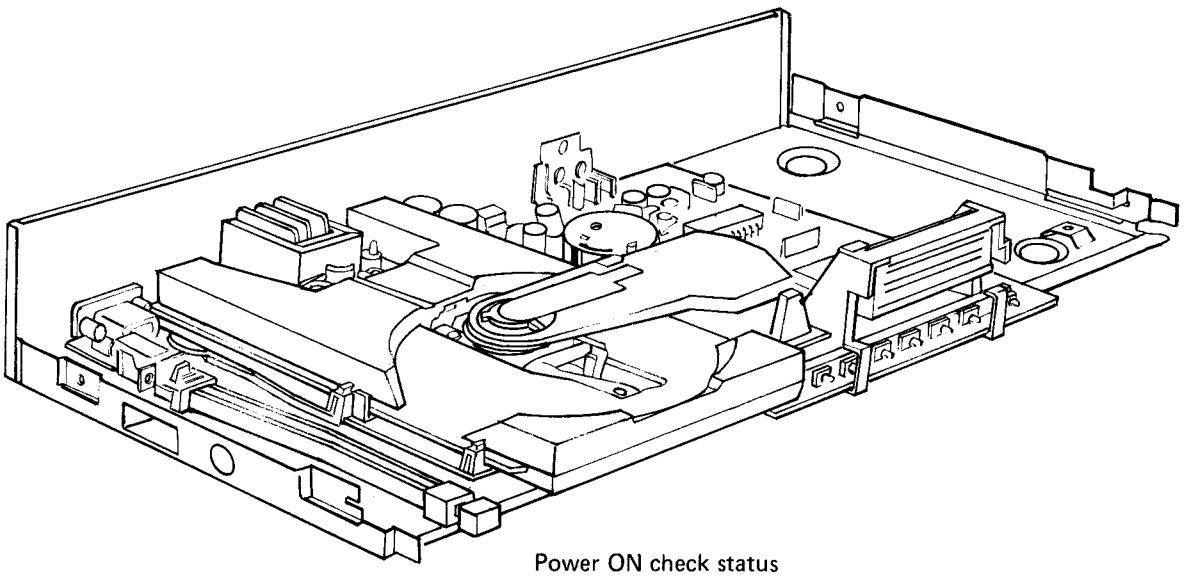
(11) Remove the linear motor coil fastening bracket.



(12) Install the optical pick-up in the reverse order of disassembling so that Power On check can be conducted as shown in illustration.



Front side



Power ON check status

8. ADJUSTING PROCEDURE OF OPTICAL PICK-UP

8-1. Adjusting steps and Points of optical pick-up

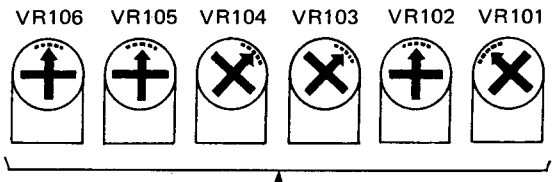
Set up player according to disassembling procedure so that power-on check can be conducted.

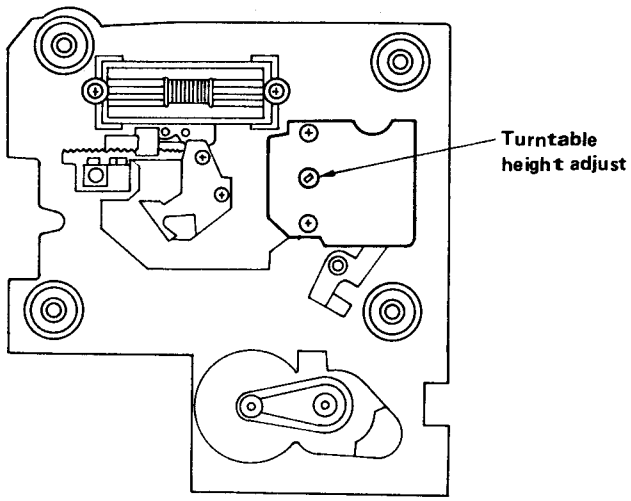
Temporarily set adjusting variable resistors on servo PCBs.

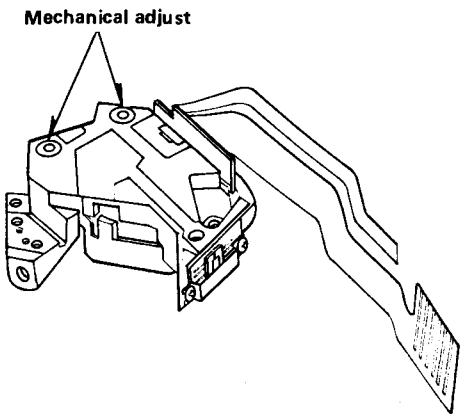
Adjust turntable height.

Mechanical adjustment

Electric adjustment







8-2. Required Measuring Instruments and Tools

1. Two-channel oscilloscope (with external trigger), over 30 MHz.
2. Test desc (SZZP1014F) or (SZZP1054C)
3. Allen wrench --------- 1.5 mm (SZZP1044C)
4. General tools

9. MECHANICAL ADJUSTMENT PROCEDURE

A. Turntable Hight Adjustment

(1) Turn on the power supply switch of the player.

(2) Place the test disc **(SZZP1014F) or (SZZP1054C)** to the disc holder

(3) Turn off the power supply switch of the player.

(4) Set the oscilloscope to **DC zero balance.**

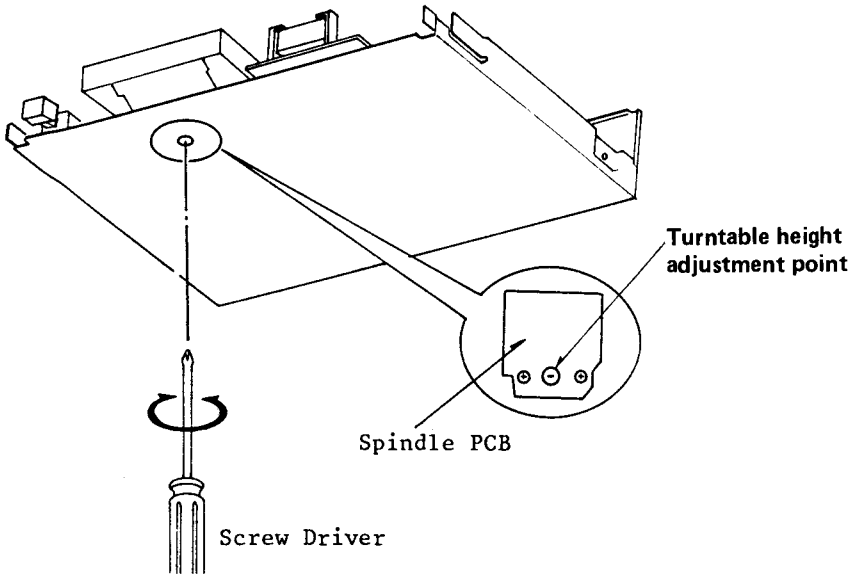
(5) Connect the CH-1 of the oscilloscope to **TJ102** of the servo circuit and GND to the chassis.

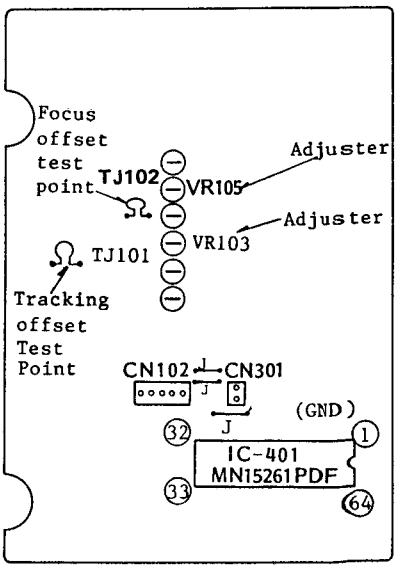
Oscilloscope settings --
- Sweep : 5m sec.
- Volt : 100mV
- Input selector : DC

(6) Turn on the power supply switch of the player.

(7) Play back a desired track.

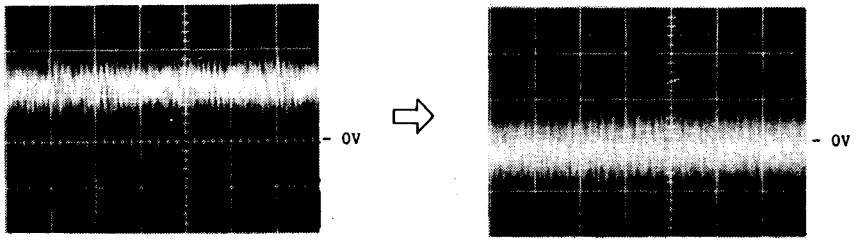
(8) Place the unit in the corner of the workbench -- in the place that allows the adjustment -- and set it as illustrated with care not go give vibration to the unit.





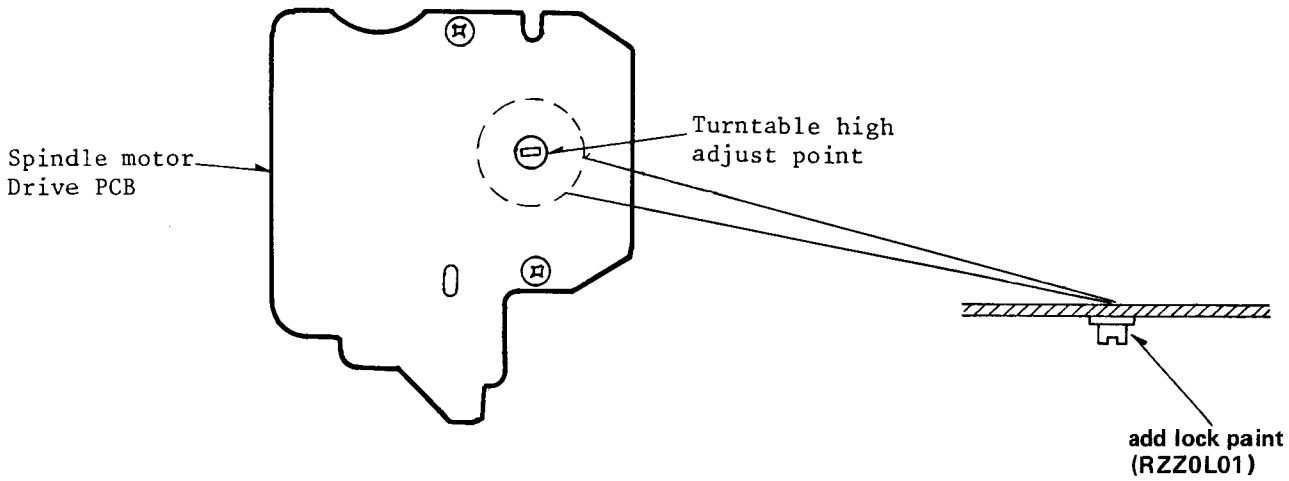
Main PCB

(9) Turn the adjusting screw on the underside of the spindle motor PCB by a flat screwdriver so that the waveform at **TJ102** shall be **0 ± 50mV** as shown in illustration.



NG **OK**

(10) Turn off the power supply switch of the player.
(11) Lock the adjusting screw with "Screw lock paint **(RZZ0L01)**" on completion of adjustment.



B. Mechanical Adjustment

(1) Turn on the power supply switch of the player.
(2) Insert the test disc **(SZZP1056C)** in the disc holder.
(3) Turn off the power supply switch of the player.
(4) Set the oscilloscope as stated below.

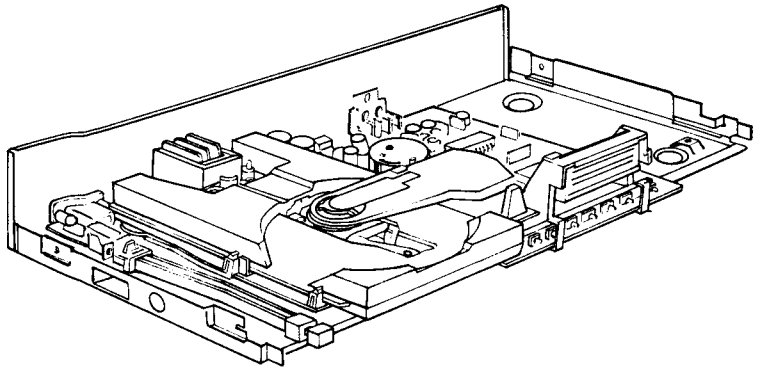
Oscilloscope settings

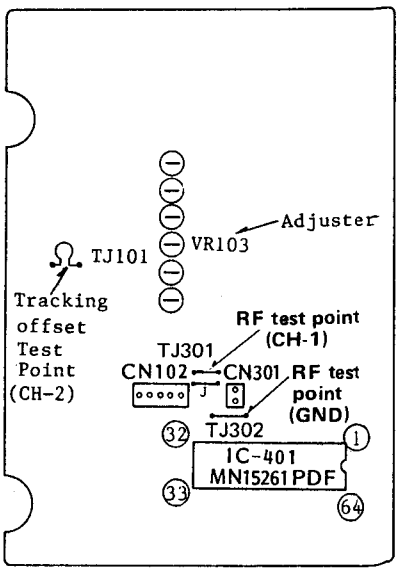
Sweep	:	0.5 µsec.
Volt	:	0.5V
Input selector	:	AC

(5) Connect CH-1 of the oscilloscope to **TJ301 of RF test point** and GPD to **TJ302 of RF test point (GND).**
(6) Turn on the power supply switch of the player.
(7) Play back **TR9.**

Note: If any track other than TR9 is played back, this adjustment cannot be achieved. If the temporary adjustment takes much time, it is advisable to set the player in the **repeat mode.**

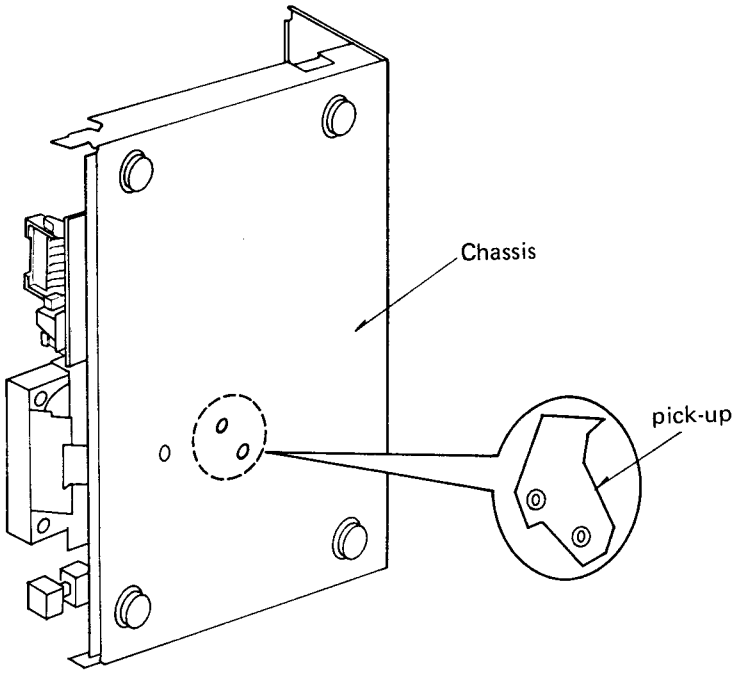
(8) Set the player in the playback mode as shown in illustration with care not to give vibration to the unit.





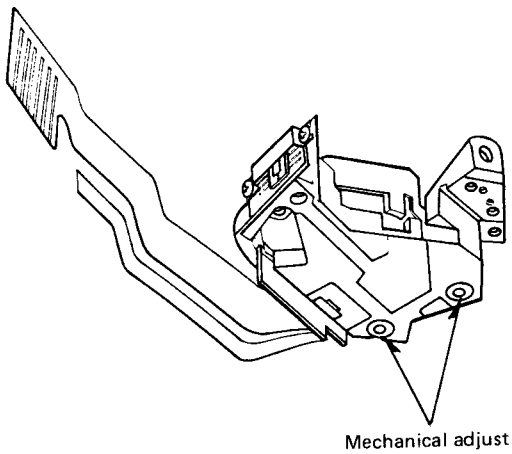
Main PCB

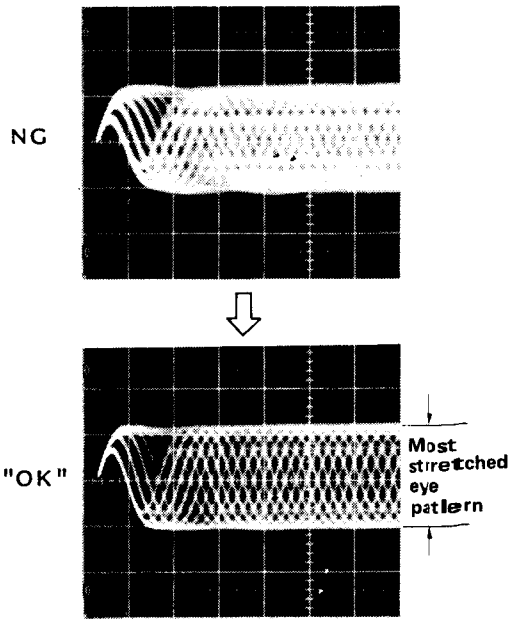
(9) Keeping the player in the playback mode, place it as illustrated **(stand it on its left side).**
Note : If the player is stood on its right side, the adjustment cannot be accomplished perfectly.



(10) Check if the RF signal waveform is as shown in illustration (NG). If the waveform can not be checked or is unlike the given waveform, proceed to the following steps.

(11) Set the allen wrench **(SZZP1044C. . .1.5mm)** into the socket in the heads of the mechanical adjusting screws shown in illustration and turn the both screws right or left to optimum positions.



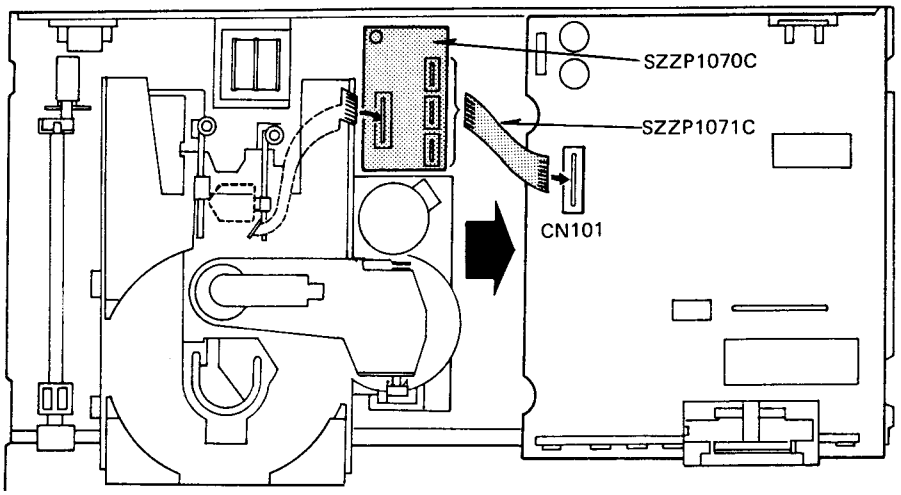


(12) Turn off the power supply switch of the player.

(13) Lock the adjusting both screw with **screw lock paint (RZZ0L01)** on completion of adjustment.

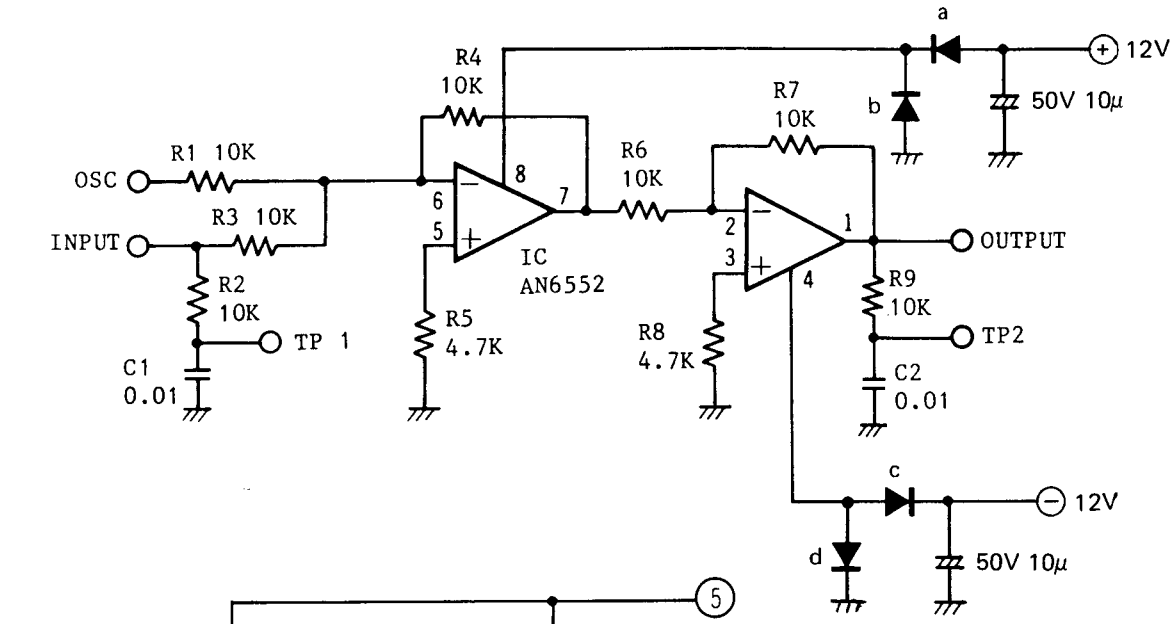
10. CHECKING PROCEDURE FOR THE WHOLE ELECTRICAL CIRCUIT (IN TROUBLESHOOTING)

The FPC cord from the optical pick-up is too short to check the back of the main PCB with case. So use the servicing fixture **(SZZP1070C) and (SZZP1071C)** and follow the procedure shown below. This fixture is not a must in the electrical and mechanical adjustments.

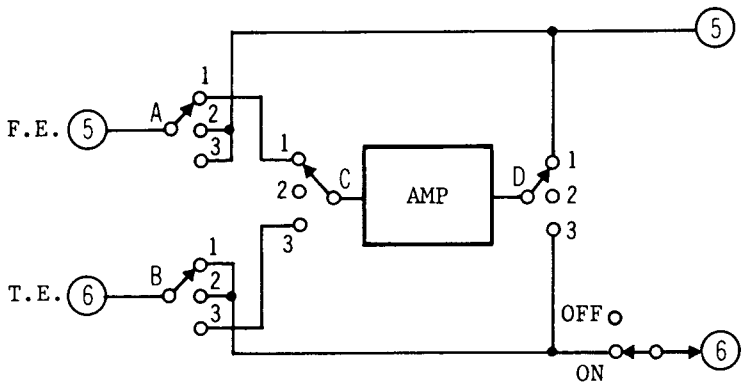


(1) Disconnect the FPC cord from **CN101.**
(2) Attach a clip to the top end of the FPC cord. (This is for protecting the optical pick-up against the breakdown due to static electricity. The clip is not a must, however, when a destaticizing mat or the like is already in use in servicing.)
(3) Remove the four main PCB fastening screws.
(4) Shift the main PCB to the right side.
(5) Attach the servicing fixture **(SZZP1070C)** as illustrated.
(6) Connect the FPC cord from the optical pick-up to the connector of the fixture. (The other connectors are for the SL-P1200. Use care not to mistake any of these for the above connector.)
(7) Connect further the junction FPC cord **(SZZP1071C)** to the output connector from the fixture, then connect the cord to CN101 on the main PCB.
Each part on the back of the main PCB can easily be checked now.

11. SCHEMATIC DIAGRAMS OF SERVO GAIN ADJUSTER (SZZP1017F)



(Circuit Protection)



Ref. No.	Part No.	Q'ty
IC	AN6552	1
R 1,2,3,4,6,7,9	ERDS2TJ103	7
R 5,8	ERDS2TJ472	2
C 1,2	ECKD1H103ZF	2
C	ECEA1HU100	2
Connector	SSDJB13BXHA	1
Lead Wire	(180,600mm)	2
3 Wire with		1
a b c d (Diode)	MA162	4

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ORDER NO. HAD8611769S0
A6

Service Manual

Supplement

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

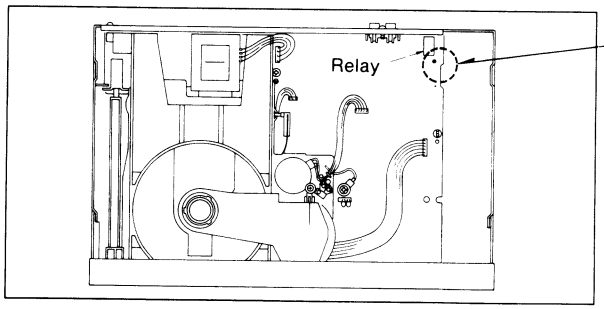
SL-P210

SL-P210

Please use this manual together with the service manual for Model No. SL-P210, Order No. HAD8607631C0.

Notes: ★ The muting circuit relay was changed partway through production from a 6V drive relay to a 12V drive relay.
★ This unit is manufactured to use either relay.
★ When exchanging the relay during servicing, take particular care to follow the instructions below describing how to distinguish between the two relays.
★ This supplement should be filed with the service manual for Model No. SL-P210. (Order No. HAD8607631C0.)

■ HOW TO DISTINGUISH BETWEEN THE 6V DRIVE RELAY AND 12V DRIVE RELAY



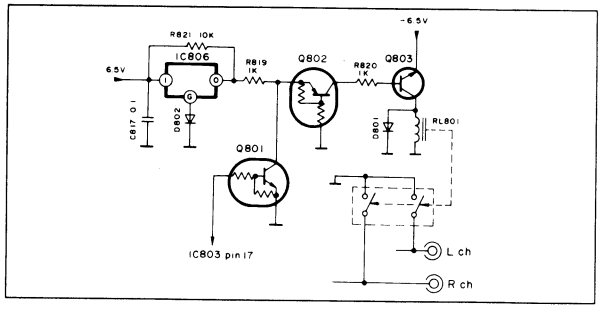
(Upper view of unit after removal of top case)

Units with a red mark near the lower side of the relay were manufactured using a 12V drive relay (Part No. SSYD3)

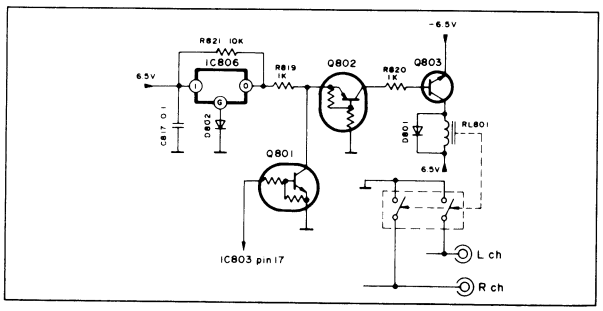
Note: The 6V drive relay and 12V drive relay look exactly the same. They cannot be distinguished by appearance or shape.

■ SCHEMATIC DIAGRAM

For 6V drive relay Part No. SSYD2



For 12V drive relay Part No. SSYD3



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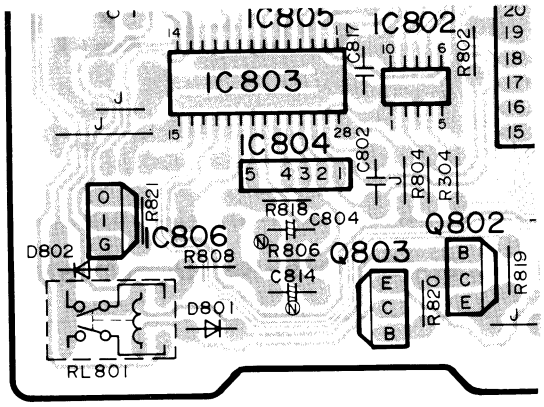
Minato-ku, Tokyo 105, Japan

■ PRINTED CIRCUIT BOARD AND SERVICE

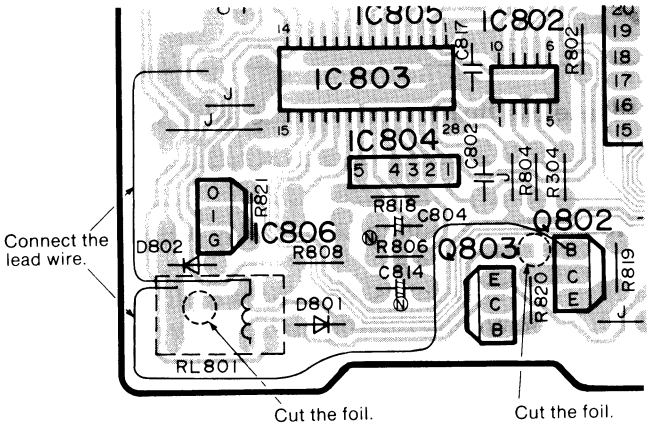
When a 6V drive relay (Part No. SSYD2) is used

• Printed circuit board



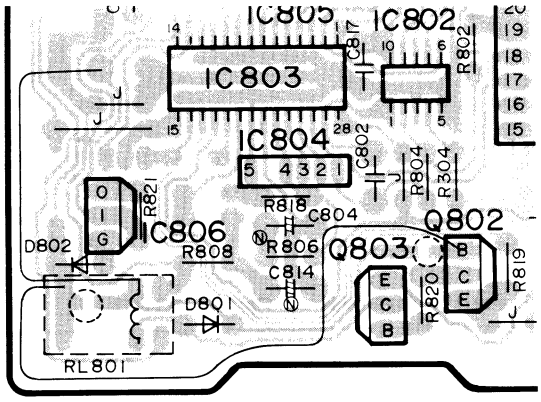
• Service

1. To replace with a 6V drive relay (Part No. SSYD2).
   - Detach the relay. Replace with another of the same type.
2. To replace with a 12V drive relay (Part No. SSYD3).
   - Cut the foil on the P.C.B. as shown in the figure below.
   - Connect the 2 lead wires as shown below.



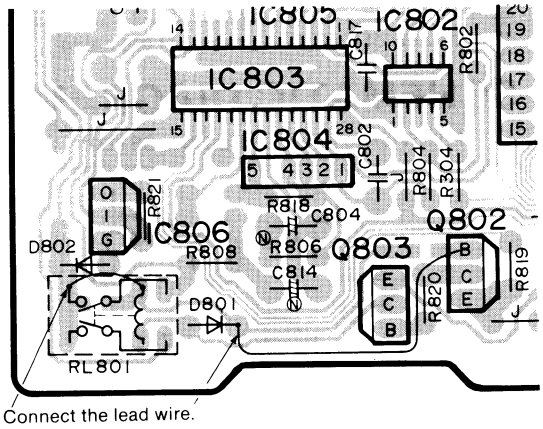
When a 12V drive relay (Part No. SSYD3) is used

• Printed circuit board



• Service

1. To replace with a 12V drive relay (Part No. SSYD3).
   - Detach the relay, and replace with another of the same type.
2. To replace with a 6V drive relay (Part No. SSYD2).
   - Detach the 2 lead wires.
   - Attach the 2 lead wires at the place shown in the figure below.



■ REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Remarks
RL801	SSYD2	Muting Relay	6V Drive Relay
RL801	SSYD3	Relay	12V Drive Relay

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ORDER NO. HAD8610750S0
A6

Service Manual

Supplement

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-P210

SL-P210

Please use this manual together with the service manual for Model No. SL-P210, Order No. HAD8607631C0.

Notes:

★ The main P.C.B. of this unit was changed at the production. Be careful about this point during servicing.
(Main changes)
1. Mounting the muting relay circuit into main P.C.B
2. Discontinuing of parts mounted on the foil side of P.C.B.

★ This supplement should be filed with the service manual for Model No. SL-P210, Order No. HAD8607631C0.

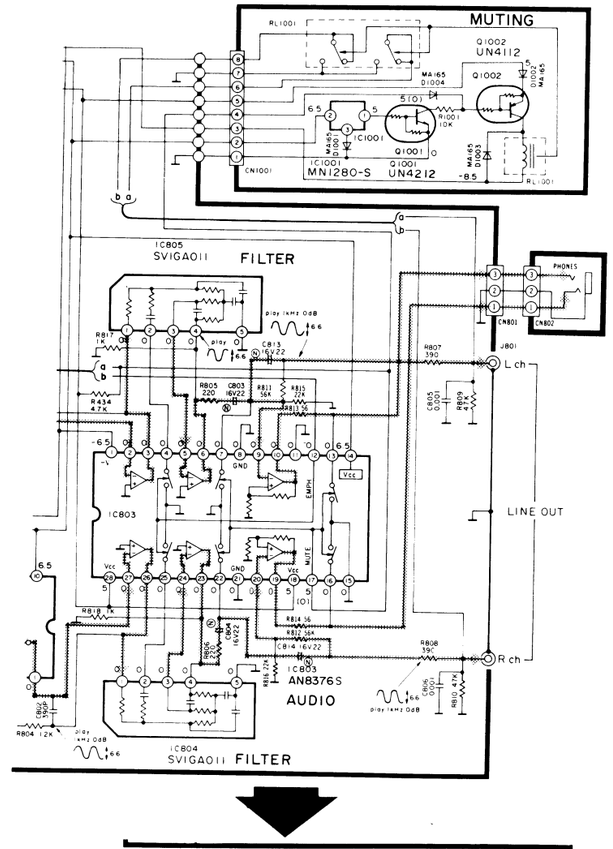
CHANGES

■ REPLACEMENT PARTS LIST

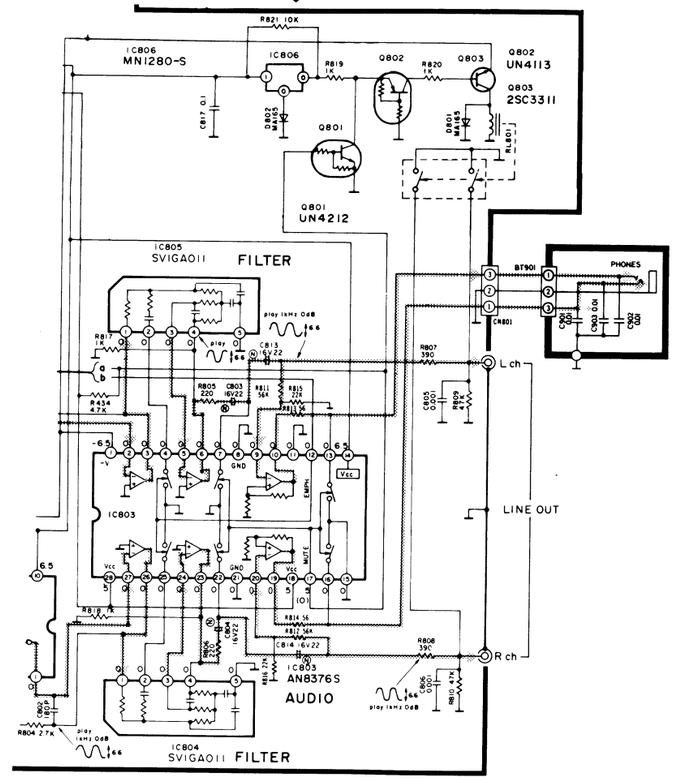
Ref. No.	Change of Part No. OLD	→ NEW	Part Name & Descrption	Per Set (Pcs.)	Remarks
INTEGRATED CIRCUITS					
IC806	– – – – –	MN1280–S	IC, Reset Signal Generator	1	Addition
IC1001	MN1280–S	– – – – –	IC, Reset Signal Generator	0	Deletion
TRANSISTORS					
Q801	– – – – –	UN4212	Transistor, Switching	1	Addition
Q802	– – – – –	UN4113	Transistor, Switching	1	Addtion
Q803	– – – – –	2SC3311–Q	Transistor, Relay Drive	1	Addition
Q1001	UN4212	– – – – –	Transistor, Switching	0	Deletion
Q1002	UN4112	– – – – –	Transistor, Relay Drive	0	Deletion
DIODES					
D801	– – – – –	MA165	Diode	1	Addtion
D1001 ~1004	MA165	– – – – –	Diode	0	Deletion
RELAYS					
RL801	SSYD2	– – – – –	Relay, Muting	1	Addtion
RL1001	– – – – –	SFDYG5A237P	Relay, Muting	0	Deletion
RESISTORS					
R819	ERDS2TJ102	– – – – –	Carbon, 1/4W, 1kΩ, ±5%	1	Addtion
R820	ERDS2TJ102	– – – – –	Carbon, 1/4W, 1kΩ, ±5%	1	Addtion
R821	ERDS2TJ103	– – – – –	Carbon, 1/4W, 10kΩ, ±5%	1	Addtion
R1001	– – – – –	ERDS2TJ103	Carbon, 1/4W, 10kΩ, ±5%	0	Deletion
CAPACITOR					
C817	ECFD1H104ZF	– – – – –	Semiconductor, 50V, 0.1μF, $\pm^{80}_{20}$%	1	Addition

■ SCHEMATIC DIAGRAM

OLD



NEW



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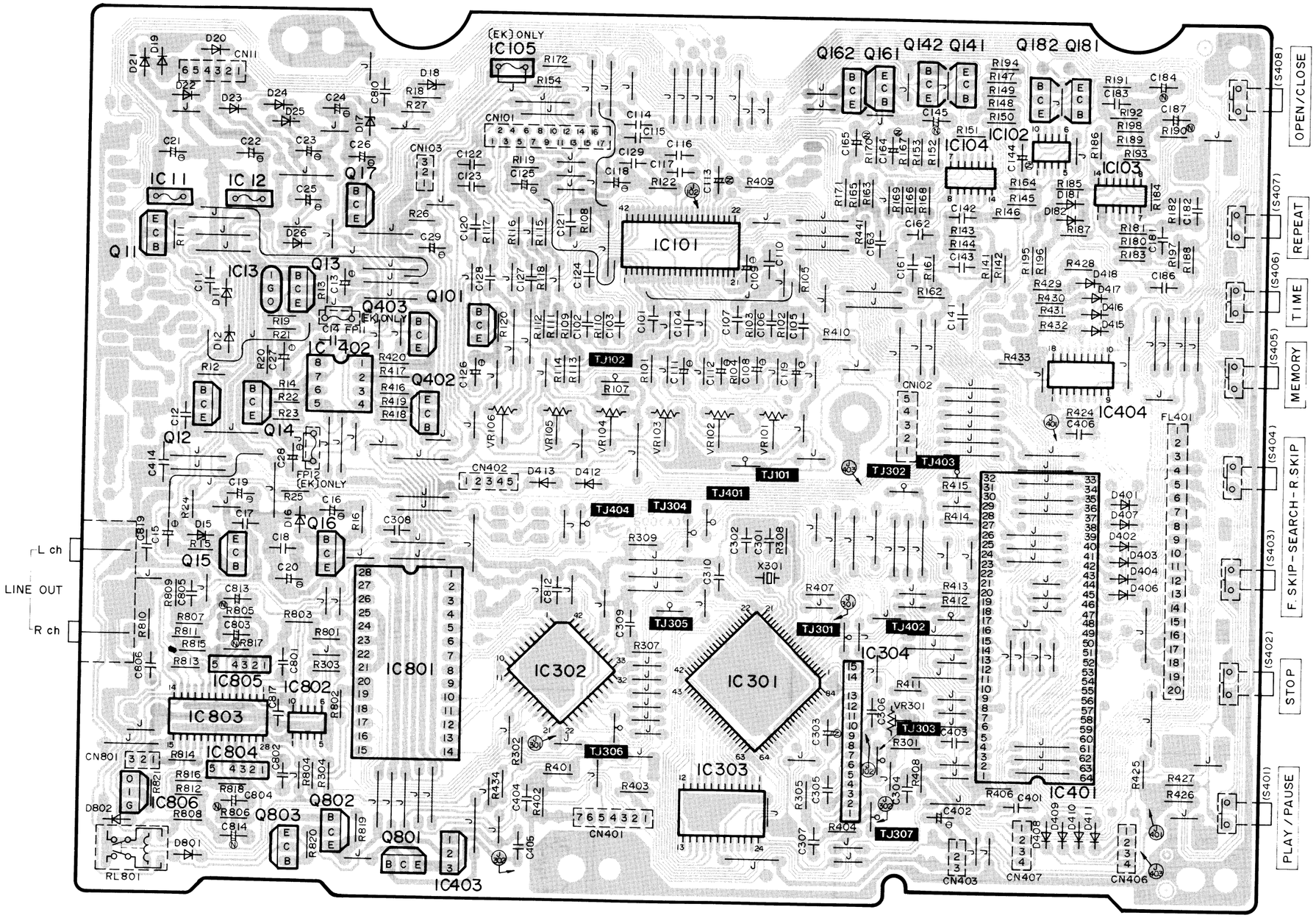
■ PRINTED CIRCUIT BOARD



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ORDER NO. HAD8607665P0

Parts Change Notice

Model No. SL-P110/P210

Service Manual
Order No. HAD8606593C0
Order No. HAD8607631C0

Please revise the original parts list in the Service Manual to conform to the change (s) shown herein. If new part numbers are shown, be sure to use them when orderring parts.

Reason for Change *The circled item indicates the reason. If no marking, see the Notes in the bottom column.

1. Improve performance	
2. Change of material or dimension	
3. To meel approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code **The circled item Indicates the interchangeability. If no marking, see the Notes in the bottom column.

	Parts		Set Production	
A	Original	→	Early	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.
	New	→	Late	
B	Original	→	Early	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
	New	→	Late	
C	Original		Early	New parts only may be used in early or late production sets. Stock new parts.
	New	→	Late	
D	Original	→	Early	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
	New	→	Late	
E	Other			

Part Number

Model No.	Ref. No.	Original Part No.	New Part No.	Notes (***)	Part Name & Descriptions	
SL-P110/210	C110	ECFR1H104ZF	ECQV1H104JZ	1, C	Polyester, 50V, 0.1μF, ±5%	
SL-P110	C812	ECKF1H103KB	ECQV1H104JZ	1, C	Polyester, 50V, 0.1μF, ±5%	
SL-P110/210	Q11	2SD973A	2SD1227M–Q	1, C	Transistor	
SL-P210	C120	RCBS1H681KB	RCBS1H681KBY	8, C	Ceramic, 50V, 680pF, ±10%	
SL-P210	C812	ECKD1H103KB	ECQV1H104JZ	1, C	Polyester, 50V, 0.1μF, ±5%	

File this Parts Change Notice with your copy of the Service Manual.

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