ORDER NO. AD9307220C8

Service Manual

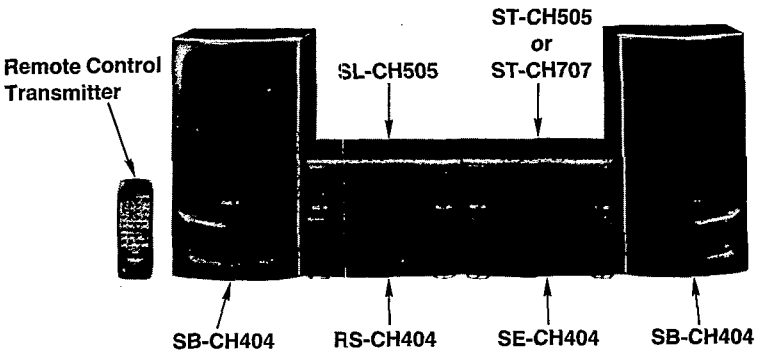
COMPACT disc DIGITAL AUDIO

Compact Disc Player

MASH*1 multi-stage noise shaping

Compact Disc Player

SL-CH505



Colour

(K) . . . . Black Type

Area

Suffix for Model No.	Area	Colour
(E)	Europe, Asia, Latin America, Middle Near East, Africa and Oceania	(K)

System: SC-CH404

Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

TRAVERSE DECK: RAE0111Z MECHANISM SERIES

Specifications

■ Audio

DA converter	1 bit 2 DAC MASH

■ Pickup

Wavelength	780 nm
Laser power	No hazardous radiation is emitted (with safety protection).

■ General

Dimensions (W×H×D)	270×89.0×262 mm
Weight	1.9 kg

Notes:
1. Weights and dimensions shown are approximate.
2. Design and specifications are subject to change without notice.

*1 MASH is a trademark of NTT.

System	Tuner	Compact disc player	Amplifier	Cassette deck	Speakers
SC-CH404	*2ST-CH505 *3ST-CH707	**SL-CH505**	SE-CH404	RS-CH404	*4SB-CH404

Notes: *2For Europe and Oceania
*3For Asia, Latin America, Middle Near East and Africa
*4For Europe...Made in PAES
For Asia, Latin America, Middle Near East, Africa and Oceania...Made in NABEL

Technics

■ Contents

■ Handling Precautions for Traverse Deck

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

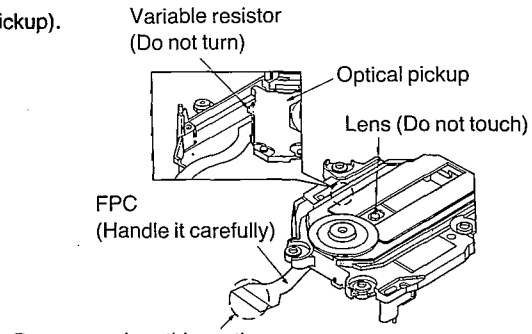
•Handling of traverse deck (optical pickup)

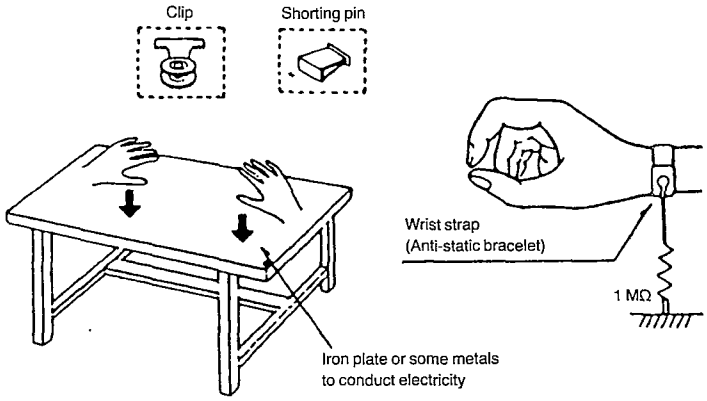
1. *Do not subject the traverse deck (optical pickup) to static* electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board (FPC board). When removing or connecting the short pin, finish 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 discharge the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

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





■ Precaution of Laser Diode

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick up lens.
Wave length: 780 nm
Maximum output radiation power from pick up: 100 µW/VDE

Laser radiation from the pick up unit is safety level, but be sure the followings:

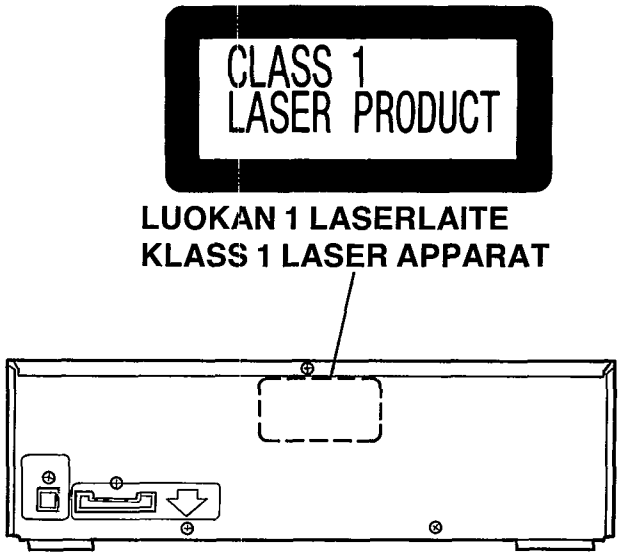
1. Do not disassemble the optical pick up unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pickup unit. It was already adjusted.
3. Do not lock at the focus lens using optical instruments.
4. Recommend not to lock at pick up lens for a long time.

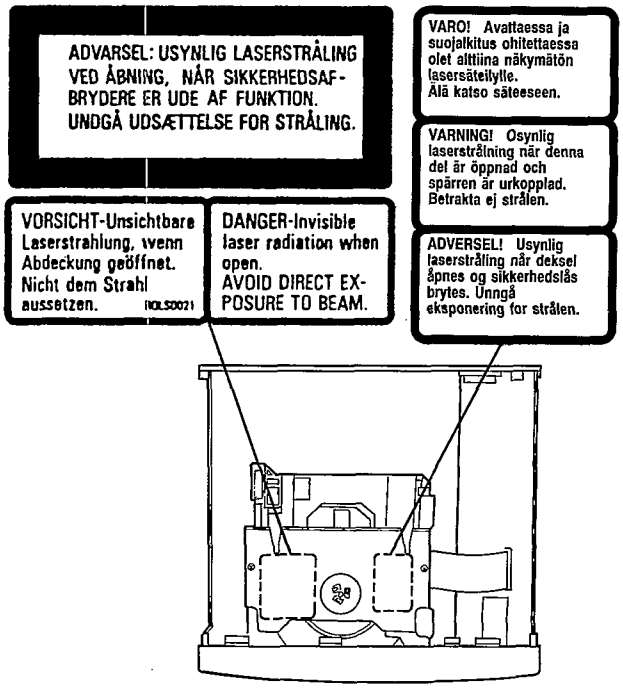
ACHTUNG: Dieses produkt enthält eine laserdiode. Im eingeschalteten zustand wird unsichtbare laserstrahlung von der lasereinheit abgestrahit.

Wellenlänge: 780 nm
Maximale strahlungsleistung der laserinhelt: 100 µW/VDE

Die strahlung an der lasereinheit ist ungefährlich, wenn folgende punkte beachtet werden:

1. Die lasereinheit nicht zerlegen, da die strahlung an der freigelegten laserdiode gefähriich ist.
2. Den werksseitig justierten einstellregler der lasereinreit nicht verstellen.
3. Nicht mit optischen instrumenten in die fokussierlinse blicken.
4. Nicht über längere zeit in die fokussierlinse blicken.

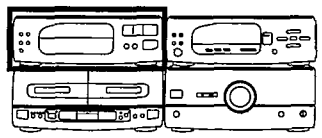


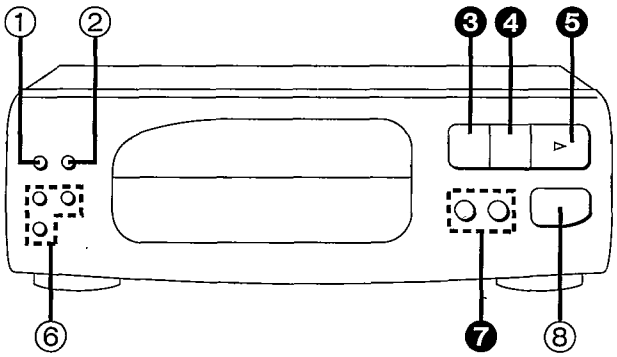


NOTE:
Refer to the service manual for Model No. SE-CH404 (Order No. AD9307218C8) for information on "ACCESSORIES", "STACKING THE COMPONENTS", "CONNECTIONS" and "PACKAGING".

■ Location of Controls

The functions indicated by the numbers with black background (for example ❸) can also be activated from the remote control transmitter.



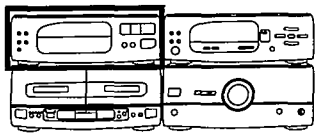


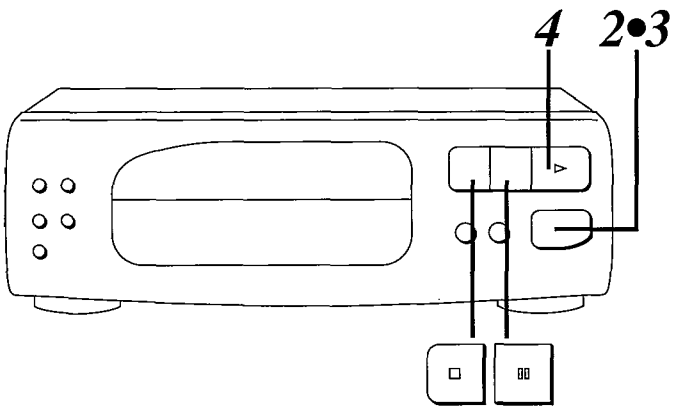
No.	*Name*
①	Random play button (RANDOM)
②	Repeat button (REPEAT)
❸	Stop button (□)
❹	Pause button (▯▯)
❺	Play button and indicator (▷)
⑥	CD edit buttons (J.FIT, ALBUM, LAST FADE)
❼	Skip/search buttons (-SKIP/-SEARCH, ⏮/◀◀ , ▶▶/⏭)
⑧	Disc tray open/close button (⏏ OPEN/CLOSE)

■ Listening to Compact Discs

Sequential play

Sequential play refers to play beginning with the first track and continuing in order to the last track.





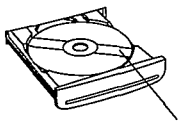
1 POWER STANDBY ON

Switch on the power on the amplifier.

2 OPEN/CLOSE

Press ▲ OPEN/CLOSE to open the disc tray.
Insert the disc with label facing upward.

Do not put your finger through the hole in the middle of the disc holder. It could get caught when the holder closes.

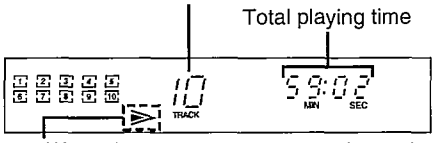


Label must face upward.

3 OPEN/CLOSE

Press ▲ OPEN/CLOSE to close the disc tray.

Total number of tracks
Total playing time



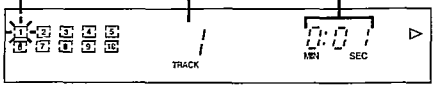
When there are 16 or more tracks on the disc, ⩥ will appear.

4 ▷

Press ▷.

Disc play begins from the first track on the disc.
Play stops automatically when the last track on the disc finishes playing.

The track currently playing
Flashes.
Elapsed play time



5 VOLUME DOWN UP

Adjust the volume level as you like on the amplifier.

To stop the disc play:
Press □.

To temporarily stop the disc play:
Press ▯▯.
▷ flashes.

To play again, press ▷.

For your reference:

- If you press ▷ instead of ▲ OPEN/CLOSE after inserting a disc, *the tray will close and play will start directly from the track 1.*
- The compact disc will automatically stop when a different soudn mode is selected during its operation.

Concerning ▷ indicator:

While stopping: Lights in orange.
While playing: Lights in green.

When "no dISC" appears:

"no dISC" appears on the display if you have not put a disc on the disc tray.

Concerning the total playing time on the display:

The total playing time displayed includes the silent sections between tracks. Hence, there will be a difference between the total playig time and the liner notes included with the disc.

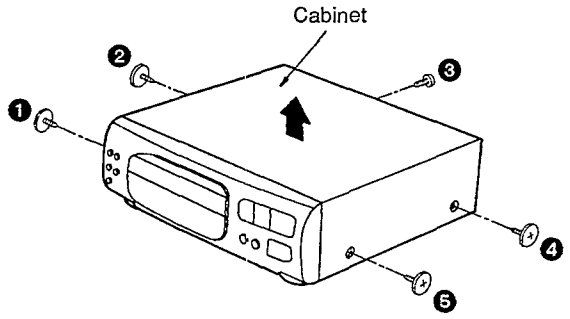
■ Disassembly Instructions

Warning: This product uses a laser diode. Refer to caution statements on page 2.
ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereilnheit dart nur gegen eine vom hersteller speziferte einheit ausgetauscht werden.

"ATTENTION SERVICER"

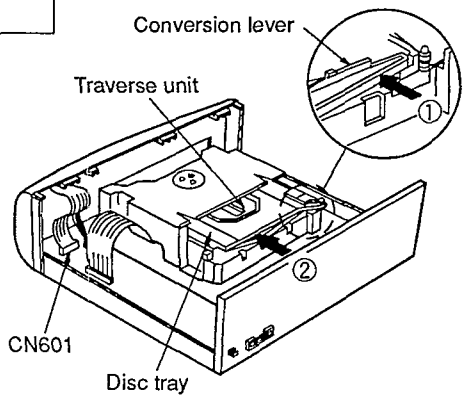
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

Ref. No. 1	Removal of the Cabinet
Procedure 1	

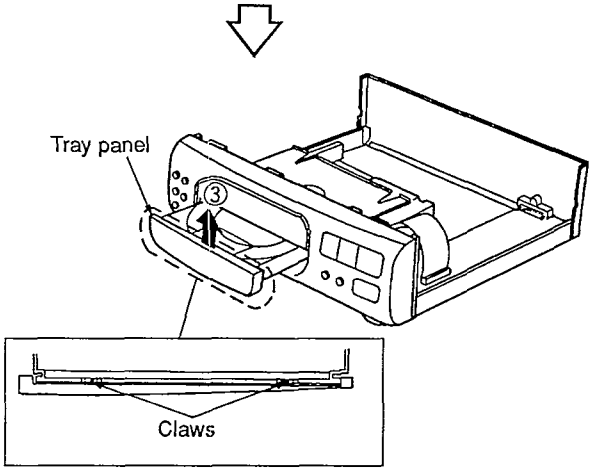


1. Remove the 5 screws (❶~❺).
2. Remove the cabinet in the direction of arrow.

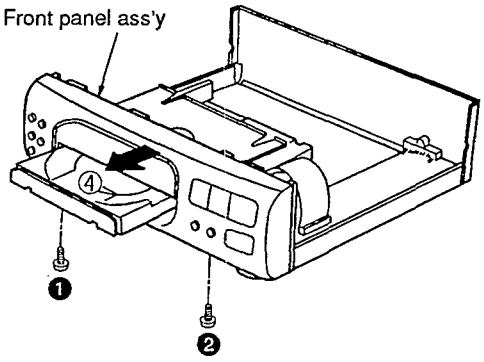
Ref. No. 2	Removal of the Front Panel Ass'y
Procedure 1→2	



1. Remove the 1 connector (CN601).
2. Push the conversion lever in the direction of arrow ① until the traverse unit goes down and then push the disc tray in the direction of arrow ②.

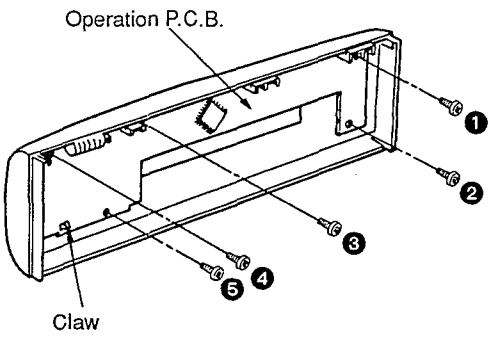


3. Remove the 2 claws and then remove the tray panel in the direction of arrow ③.



4. Remove the 2 screws (❶, ❷).
5. Remove the front panel ass'y in the direction of arrow ④.

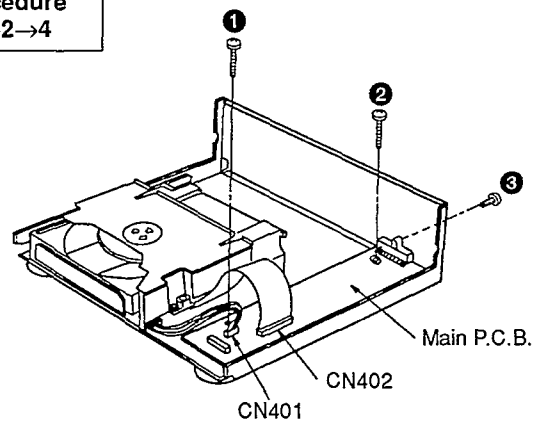
Ref. No. 3	Removal of the operation P.C.B.
Procedure 1→2→3	



1. Remove the 5 screws (❶~❺).
2. Release the 1 claw.

Ref. No. 4	Removal of the Main P.C.B.

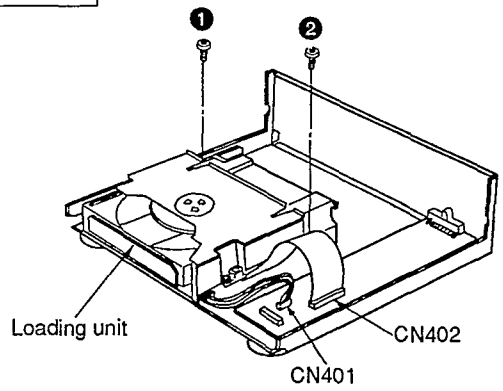
Procedure
1→2→4



1. Remove the 2 connectors (CN401, CN402).
2. Remove the 3 screws (❶~❸).

Ref. No. 5	Removal of the Loading Unit

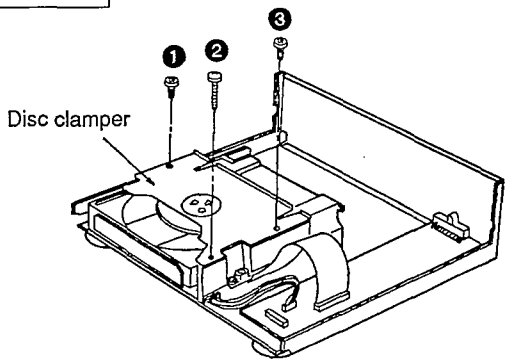
Procedure
1→2→5



1. Remove the 2 connectors (CN401, CN402).
2. Remove the 2 screws (❶, ❷).

Ref. No. 6	Removal of the Disc Clamper

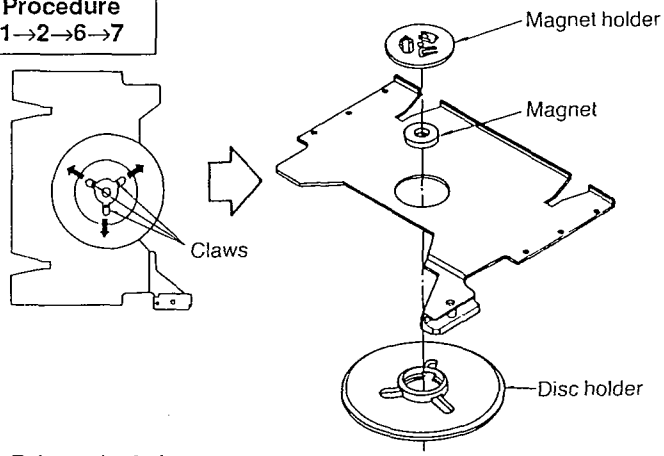
Procedure
1→2→6



• Remove the 3 screws (❶~❸).

Ref. No. 7	Removal of the Magnet Holder, Magnet and Disc Holder

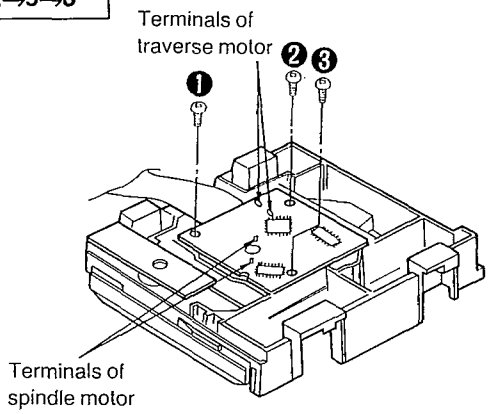
Procedure
1→2→6→7



• Release the 3 claws.

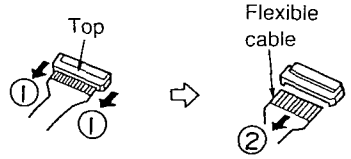
Ref. No. 8	Removal of the Servo P.C.B.

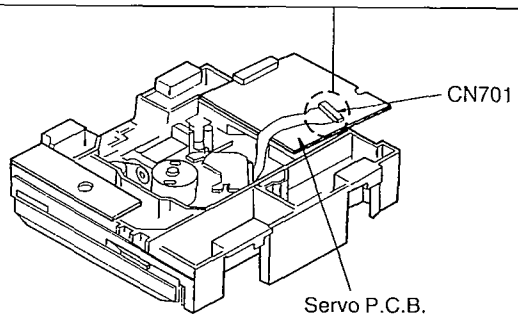
Procedure
1→2→5→8



1. Remove the 3 screws (❶~❸).
2. Unsolder the 2 terminals of spindle motor.
3. Unsolder the 2 terminals of traverse motor.

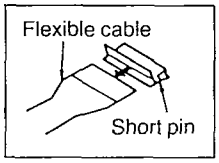
• **Removal of the flexible cable**
Push the top of the connector in the direction of the arrow ①, and then Pull Out the flexible cable in the direction of the arrow ②.





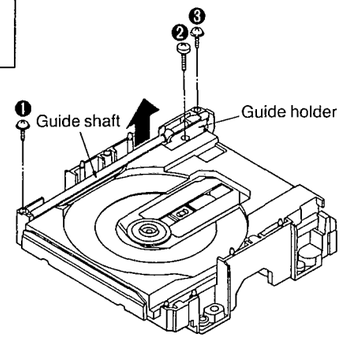
4. Remove the flexible cable (CN701).

Note:
Insert a short pin into the traverse unit flexible cable.



Ref. No. 9 — Removal of the Guide Shaft and Guide Holder

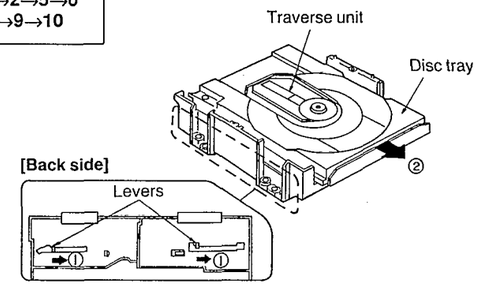
Procedure
1→2→5→6
→9



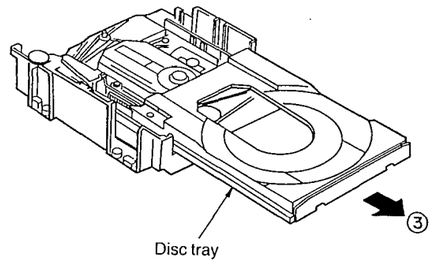
1. Remove the 3 screws (❶~❸).
2. Remove the guide shaft and guide holder in the direction of arrow.

Ref. No. 10 — Removal of the Disc Tray

Procedure
1→2→5→6
→9→10



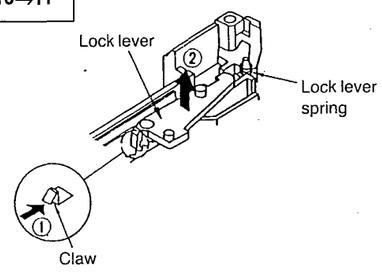
1. Push the 2 levers in the direction of arrow ① until the traverse unit goes down and the disc tray slightly in the direction of arrow ②.



2. Remove the disc tray in the direction of arrow ③.

Ref. No. 11 — Removal of the Lock Lever

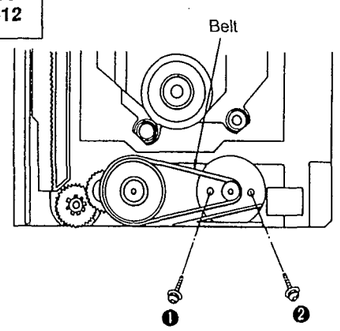
Procedure
1→2→5→6
→9→10→11



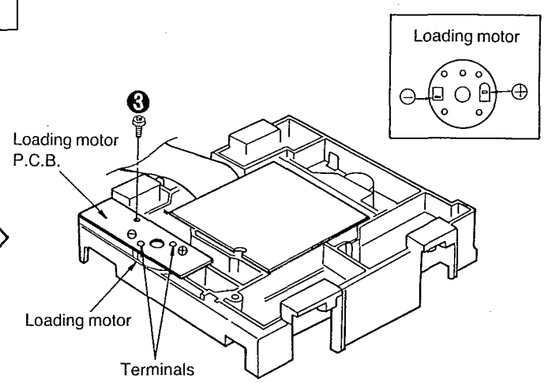
1. Remove the lock lever spring.
2. Release the claw in the direction of the arrow ①, and then remove the lock lever in the direction of arrow ②.

Ref. No. 12 — Removal of the Loading Motor P.C.B. and Loading Motor

Procedure
1→2→5→6
→9→10→12



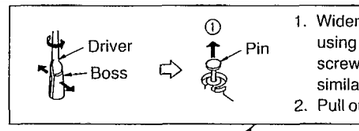
1. Remove the belt
2. Remove the 2 screws (❶, ❷).



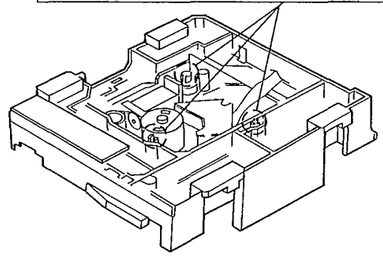
3. Remove the 1 screw (❸).
4. Unsolder the 2 terminals of loading motor.

Ref. No. 13 — Removal of the Traverse Unit

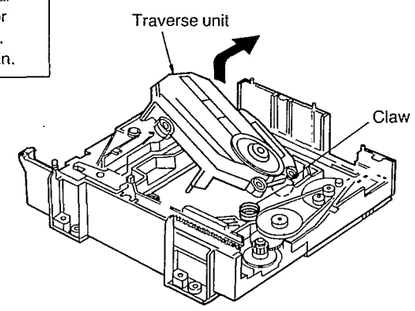
Procedure
1→2→5→6
→8→9→10→13



1. Widen the boss by using a regular screwdriver or similar object.
2. Pull out the pin.



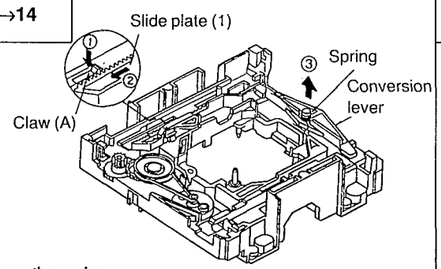
1. Remove the 3 pins in the direction of arrow ①.



2. Release the claw and then remove the traverse unit in the direction of arrow.

Ref. No. 14 — Removal of the Conversion Lever

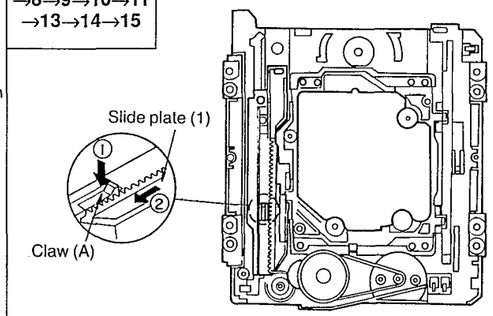
Procedure
1→2→5→6
→8→9→10→11
→13→14



1. Remove the spring.
2. Push the claw (A) in the direction of arrow ①, and then move the slide plate (1) in the direction of arrow ②.
3. Remove the conversion lever in the direction of arrwo ③.

Ref. No. 15 — Removal of the Traverse Chassis

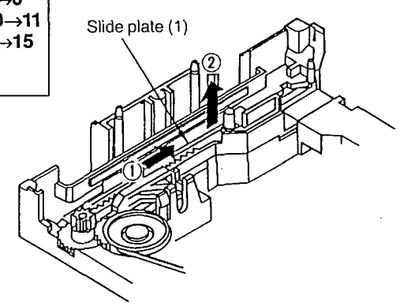
Procedure
1→2→5→6
→8→9→10→11
→13→14→15



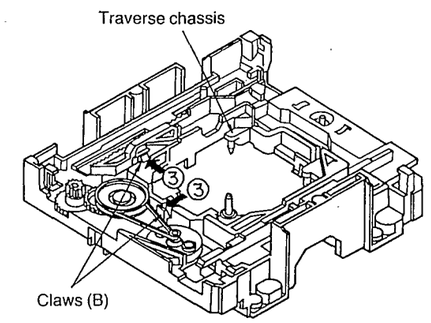
1. Push the claw (A) in the direction of arrow ①, and then move the slide plate (1) in the direction of arrow ②.

Ref. No. 16 — Removal of the Slide Plate (1)

Procedure
1→2→5→6
→8→9→10→11
→13→14→15
→16



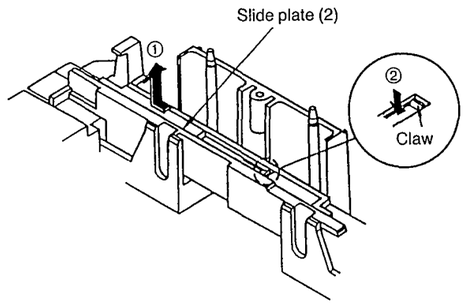
- Move the slide plate (1) in the direction of the arrow ①, and remove the slide plate (1) in the direction of the arrow ②.



2. Push 2 claws (B) in the direction of arrow ③, and then remove the traverse chassis.

Ref. No. 17	Removal of the Slide Plate (2)

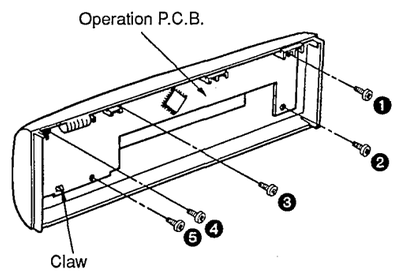
Procedure
1→2→5→6
→8→9→10→11
→13→14→15
→17

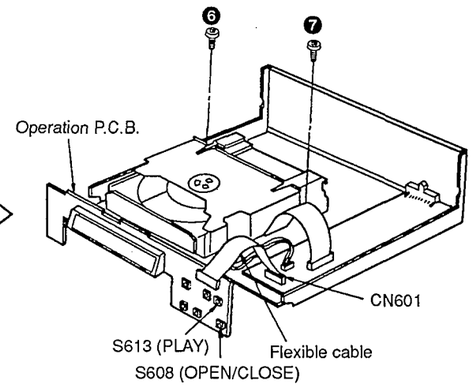


- Push the claw in the direction of the arrow ①, and remove the slide plate (2) in the direction of the arrow ②.

Ref. No. 18	How to check the Operation P.C.B. and Servo P.C.B.

Procedure
1→2→18

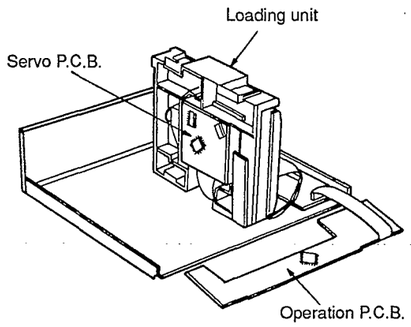




1. Remove the 5 screws (❶~❺).
2. Release the 1 claw.
3. Remove the operation P.C.B.

4. Remove the 2 screws (❻, ❼).
5. Connect the flexible cable to connector (CN601).

Note:
Make sure not to damage the flexible cable.



6. Place the loading unit sideways as shown above.
7. When checking the solder surface of the operation P.C.B. and servo P.C.B., do as shown above.

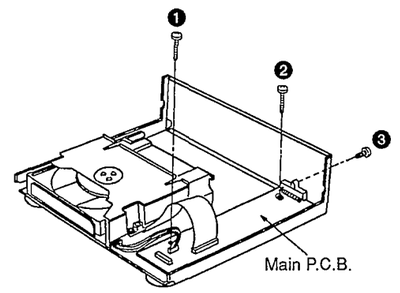
To play a disc

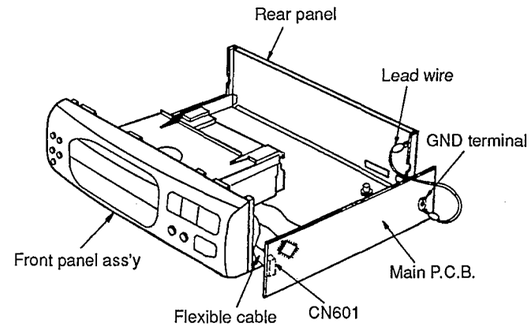
1. Push the S608 (OPEN/CLOSE) switch so that the loading unit comes up.
2. Playing the test disc on the tray. Then, push the S608 (OPEN/CLOSE) switch to set the test disc.
3. Push the S613 (PLAY) switch to start the disc play.

Ref. No. 19	How to check the Main P.C.B.

Procedure
1→2→19

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



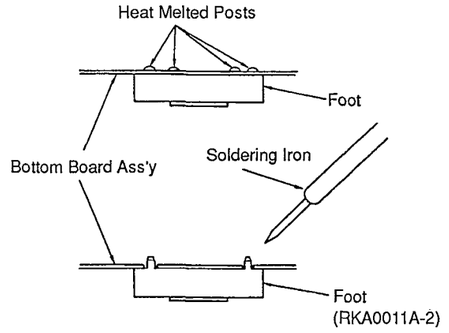


1. Remove the 3 screws (❶~❸).
2. Remove the main P.C.B. and then stand the main P.C.B. at the side of unit.

3. Reinstall the front panel ass'y to the unit and then connect the flexible cable (CN601).
4. Connect the GND terminal to the rear panel by the lead wire.

• Replacement of the Foot.

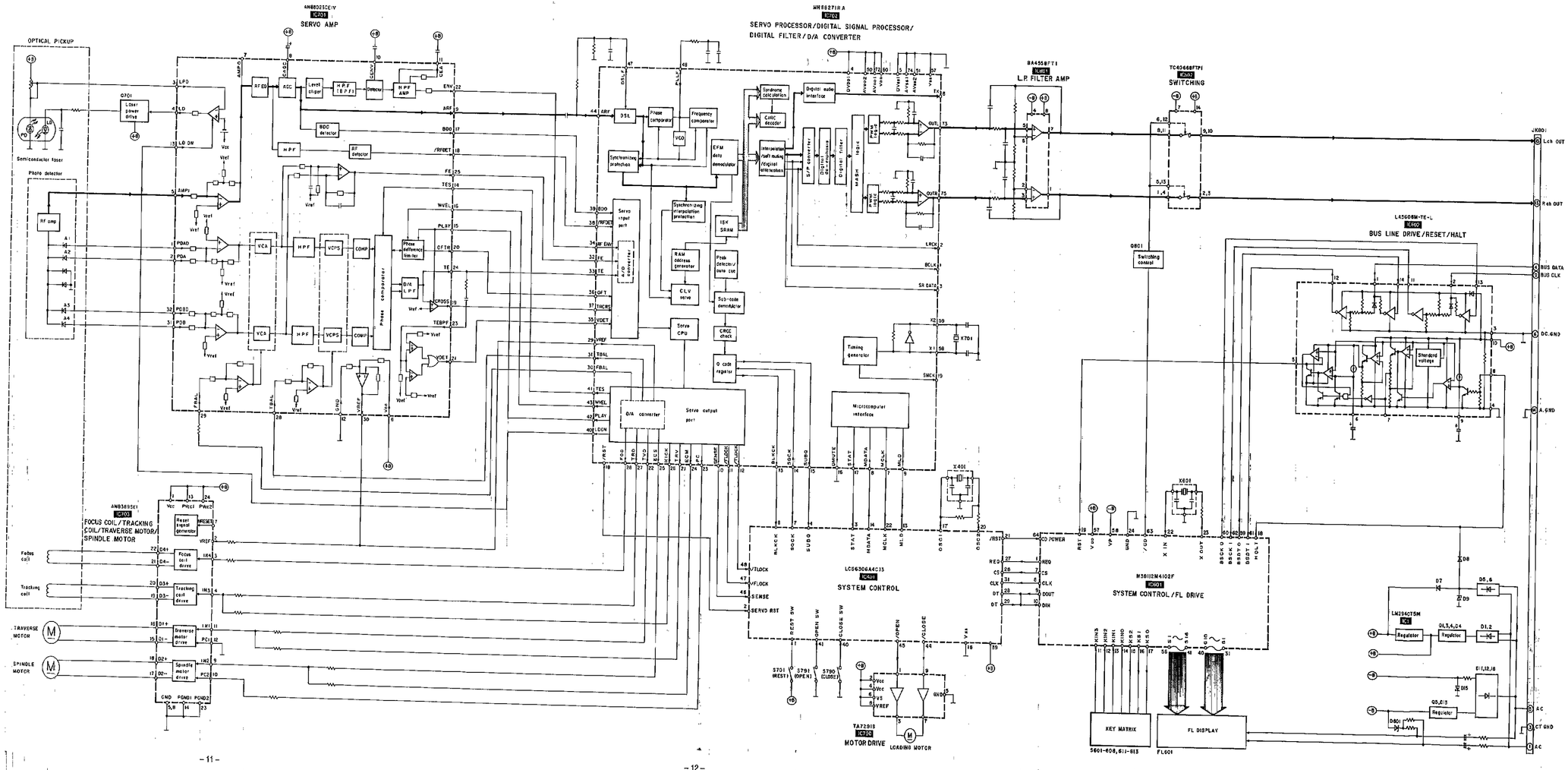
1. Remove the 4 heat melted posts on the Bottom board ass'y with a pair of nippers or similar tool.
2. To replace the foot (RK0011A-2) on the Bottom board ass'y, melt the 4 posts with a soldering iron.



NOTE:
Please refer to pages 10-13 in the service manual for Model No. SL-CH550 (Order No. AD9208264C8) for information on "INSTALLING SERVO P.C.B.", "INSTALLING OF GUIDE SHAFT", "CD UNIT ASSEMBLY", "INSTALLING DISC TRAY UNIT" and "INSTALLING DISC TRAY".

SL-CH505 SL-CH505

■ Block Diagram



■ Measurements and Adjustments

Caution:
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
  With the unit turned "on", laser radiation is emitted from the pickup lens.
  Avoid exposure to the laser beam, especially when performing adjustments.

■ This unit (SL-CH505) is actuated by power supply from the tuner amplifier SE-CH404. If you wish to actuate this unit without using the tuner amplifier SE-CH404 for checking or repairing, follow below procedure.

- Apply AC 11 V between AC (L1) – J1 – AC (L1).

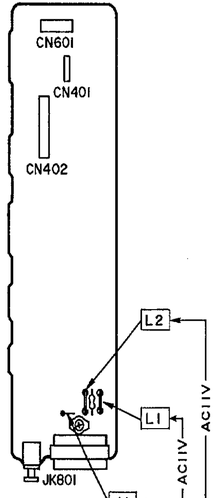


Fig. 1

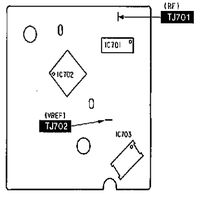


Fig. 2

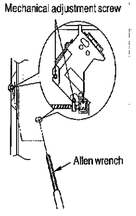


Fig. 3

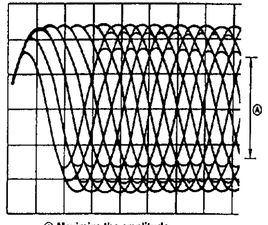
Measuring Instruments and Special Tools

- Test disc
  1. Playability test disc (SZZP1054C)
  2. Uneven test disc (SZZP1056C)
- Allen wrench (M2.0) (SZZP1101C)
- Oscilloscope

(1) MECHANICAL ADJUSTMENT

- When the traverse deck is replaced, making adjustments is not necessary. (The traverse deck ass'y is already adjusted.)
- Make adjustments to improve playability when the traverse deck has not been replaced. Make the electrical adjustments first.

1. Connect the oscilloscope's CH. 1 probe across TJ701 (+) and TJ702 (VREF) on the Servo P.C.B.
   Oscilloscope setting:
   VOLT ..... 200 mV
   SWEEP ..... 0.5 µsec
   Input coupling ..... AC
2. Switch the player power **ON**, and play track **19** on the test disc (SZZP1056C).
3. Leave the player in Play mode and place it as shown in the figure on the right.
4. Alternately adjust the two mechanical adjusting screws with the 2.0 mm allen wrench (SZZP1101C) until the RF signal amplitude on the oscilloscope is maximize. (Shown in Fig. 3)
5. After completing the adjustment, lock the **mechanical adjustments** with lock paint (RZZ0L01).

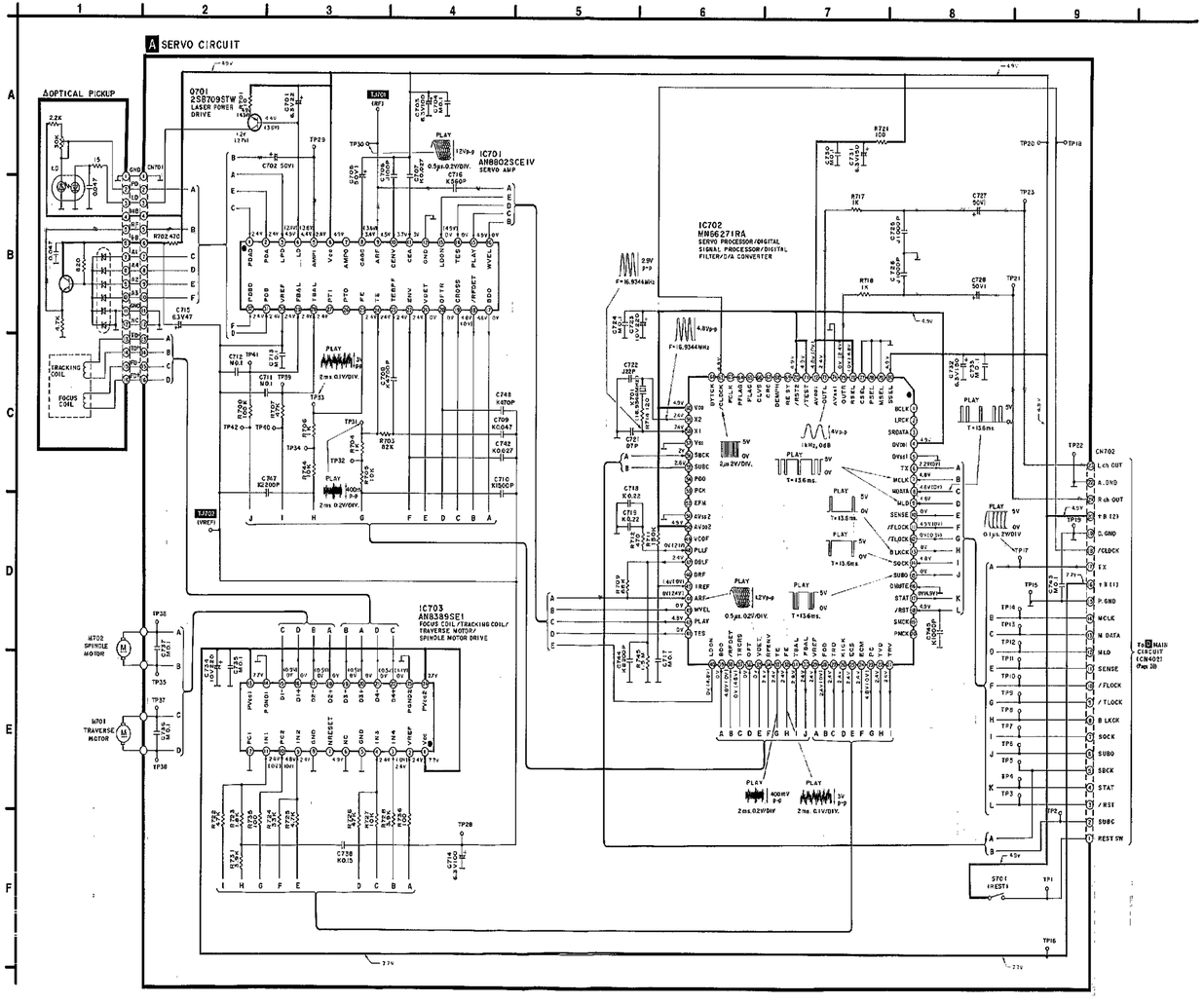


Ⓐ **Maximize the amplitude.**

(2) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

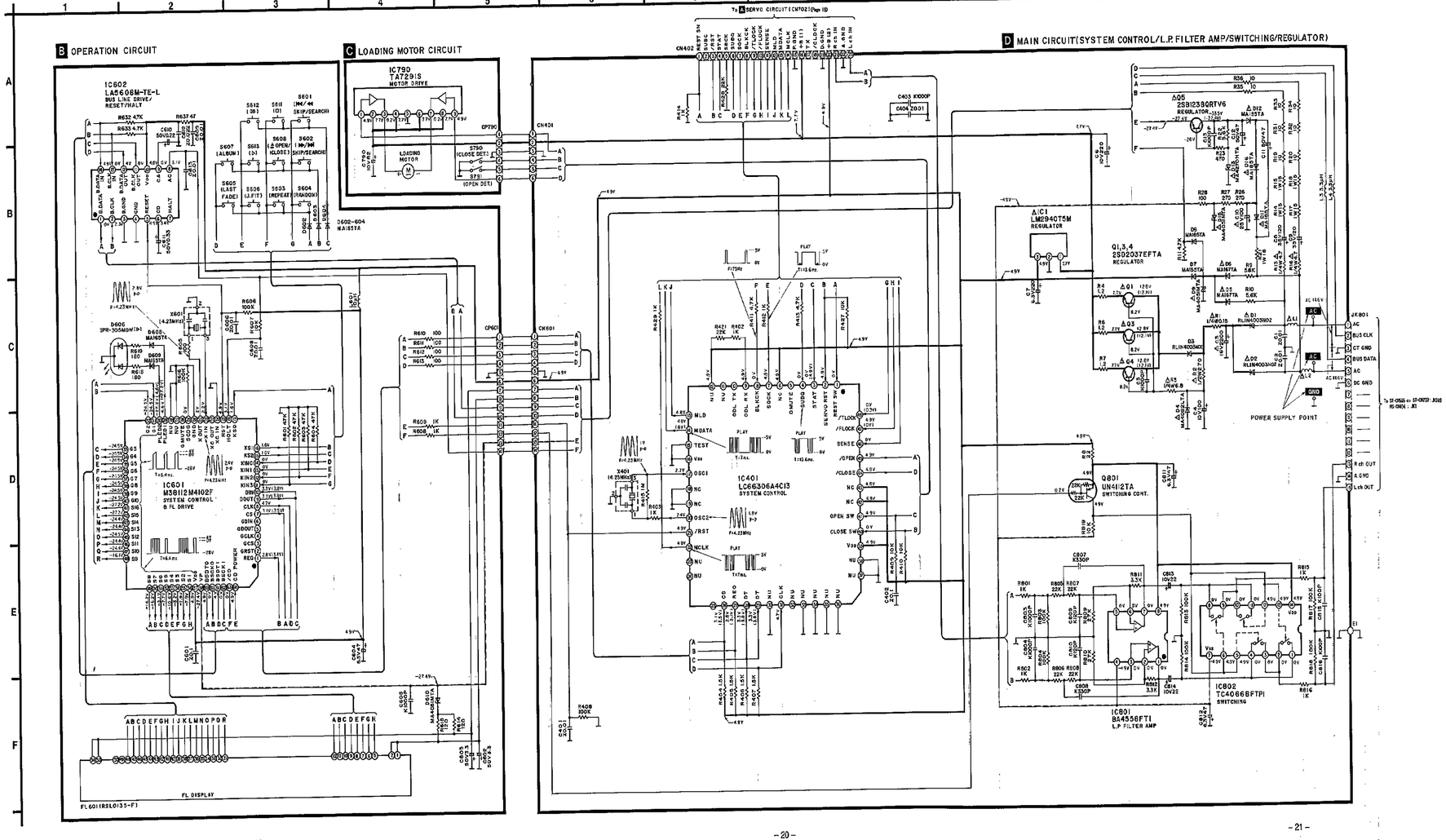
- **Checking Skip Search**
  1. Play an ordinary musical program disc.
  2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).
- **Checking Manual Search**
  1. Play an ordinary musical program disc.
  2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).
- **Checking playability**
  1. Play the 0.7 mm black dot and the 0.7 mm wedge on the test disc (SZZP1054C) and verify that no sound skip or noise occurs.
  2. Play the middle tracks of the uneven test disc and verify that no sound skip or noise occurs.

■ Schematic Diagram • OPTICAL PICKUP AND SERVO CIRCUIT (Parts list on pages 35~37)



SL-CH505 SL-CH505

■ Schematic Diagram •LOADING MOTOR, OPERATION AND MAIN CIRCUIT (Parts list on pages 35~37)



Notes:

- •S601 : R. Skip/Search switch (|◀◀/◀◀)
- •S602 : F. Skip/Search switch (▶▶/▶▶|)
- •S603 : Repeat switch (REPEAT)
- •S604 : Random play switch (RANDOM)
- •S605 : CD edit switch (LAST FADE)
- •S606 : Fit edit switch (J. FIT)
- •S607 : Sequential CD recording switch (ALBUM)
- •S608 : Disc tray open/close switch (▲ OPEN/CLOSE)
- •S611 : Stop switch (□)
- •S612 : Pause switch (II)
- •S613 : Play switch (▷)
- •S701 : Rest switch
- •S790 : Disc tray close detection switch
- •S791 : Disc tray open detection switch

•Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

No mark: CD STOP ( ): CD PLAY (1 kHz, L+R, 0 dB)

•Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardent (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

Caution!
IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
•Cover the parts boxes made of plastics with aluminum coil.
•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.

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

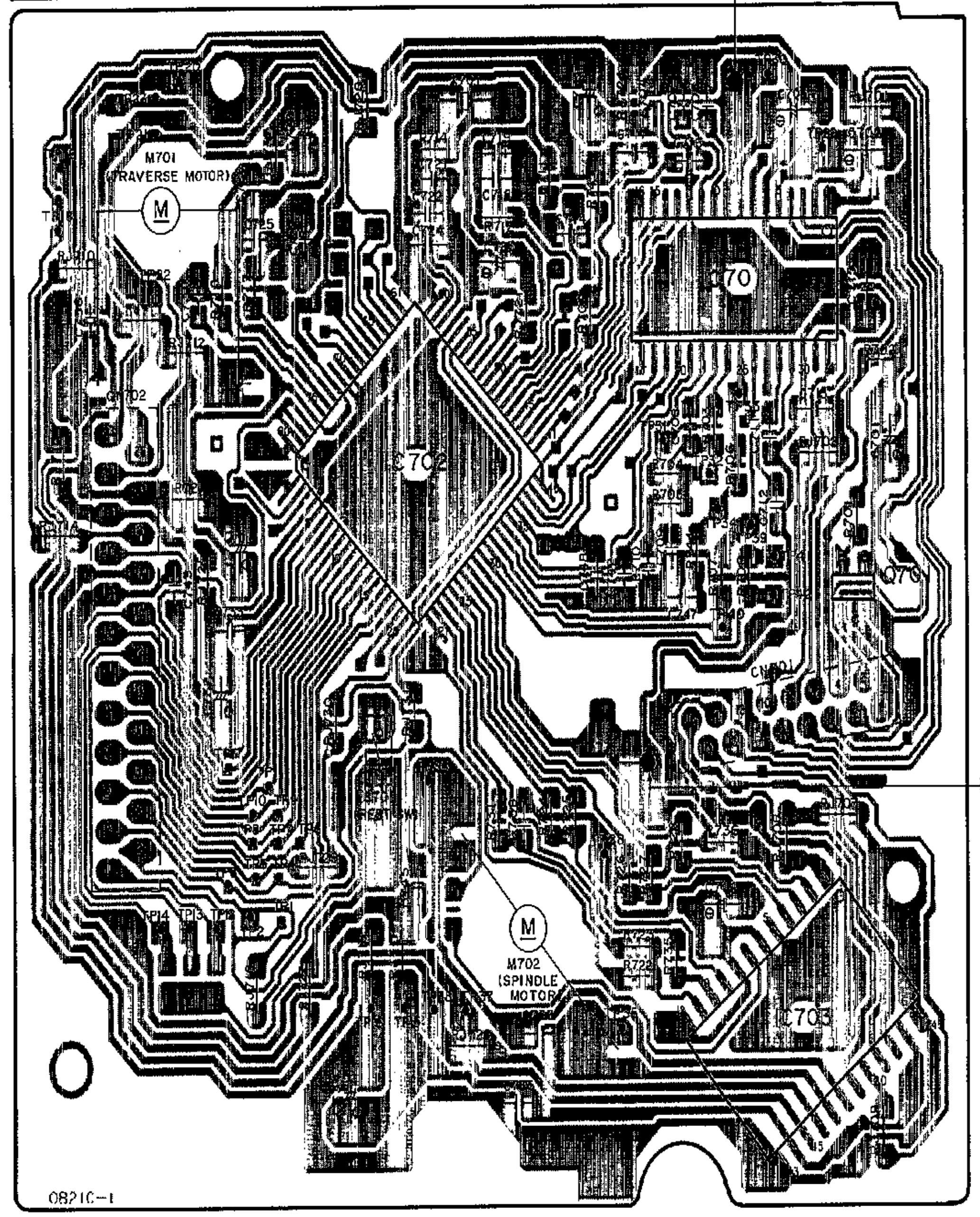
•The supply part number is described alone in the replacement parts list.

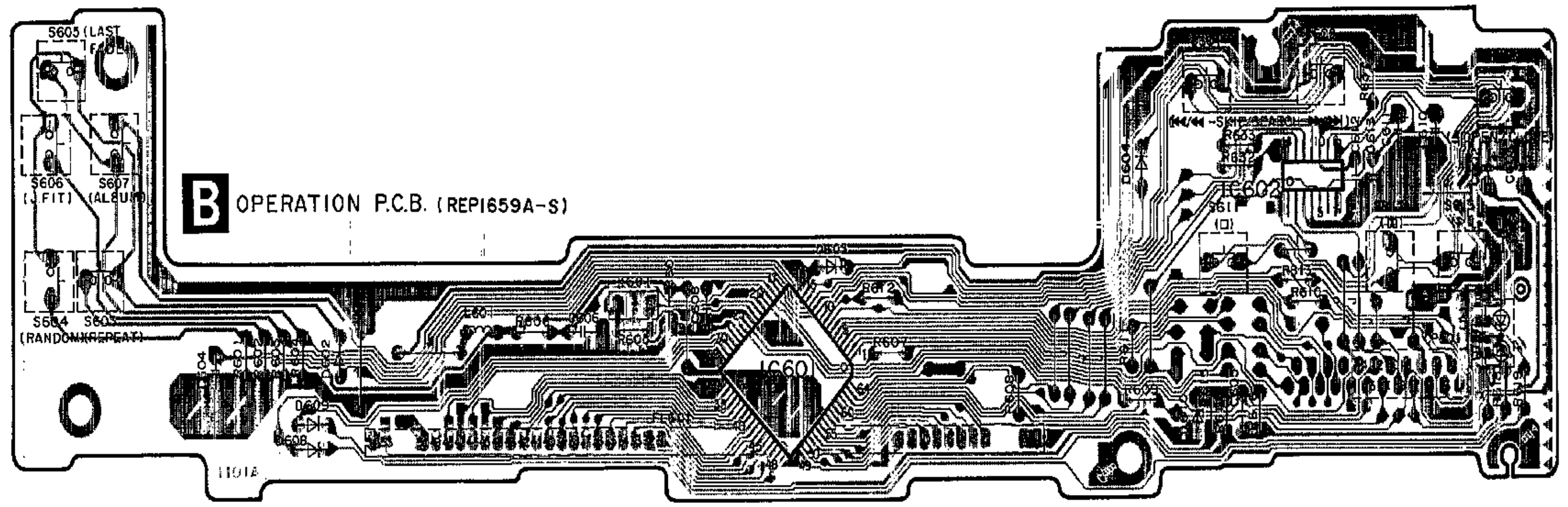
Ref. No	Production Parts No.	Supply Parts No.
IC1	LM2940T5M	LM2940T5
IC801	BA4558FT1	SVIBA4558F

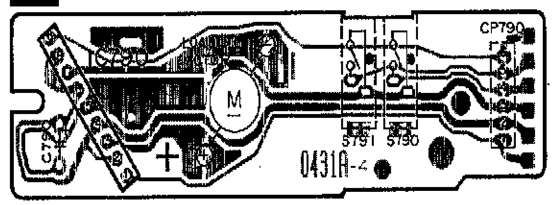
——— : Positive voltage line
– – – – : Negative voltage line
▒▒▒▒ : CD signal line

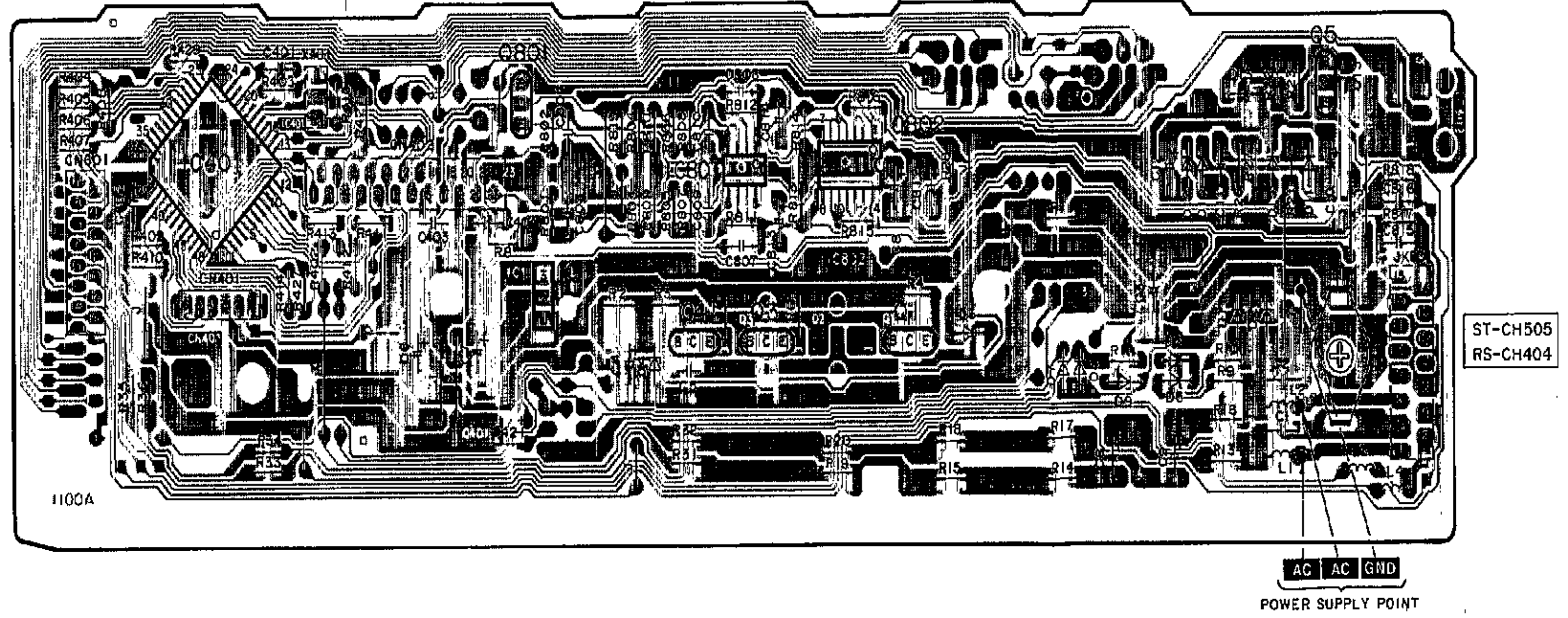
■ Printed Circuit Board Diagram (Parts list on pages 35~37)

•This circuit board diagram may be modified at any time with the development of new technology.





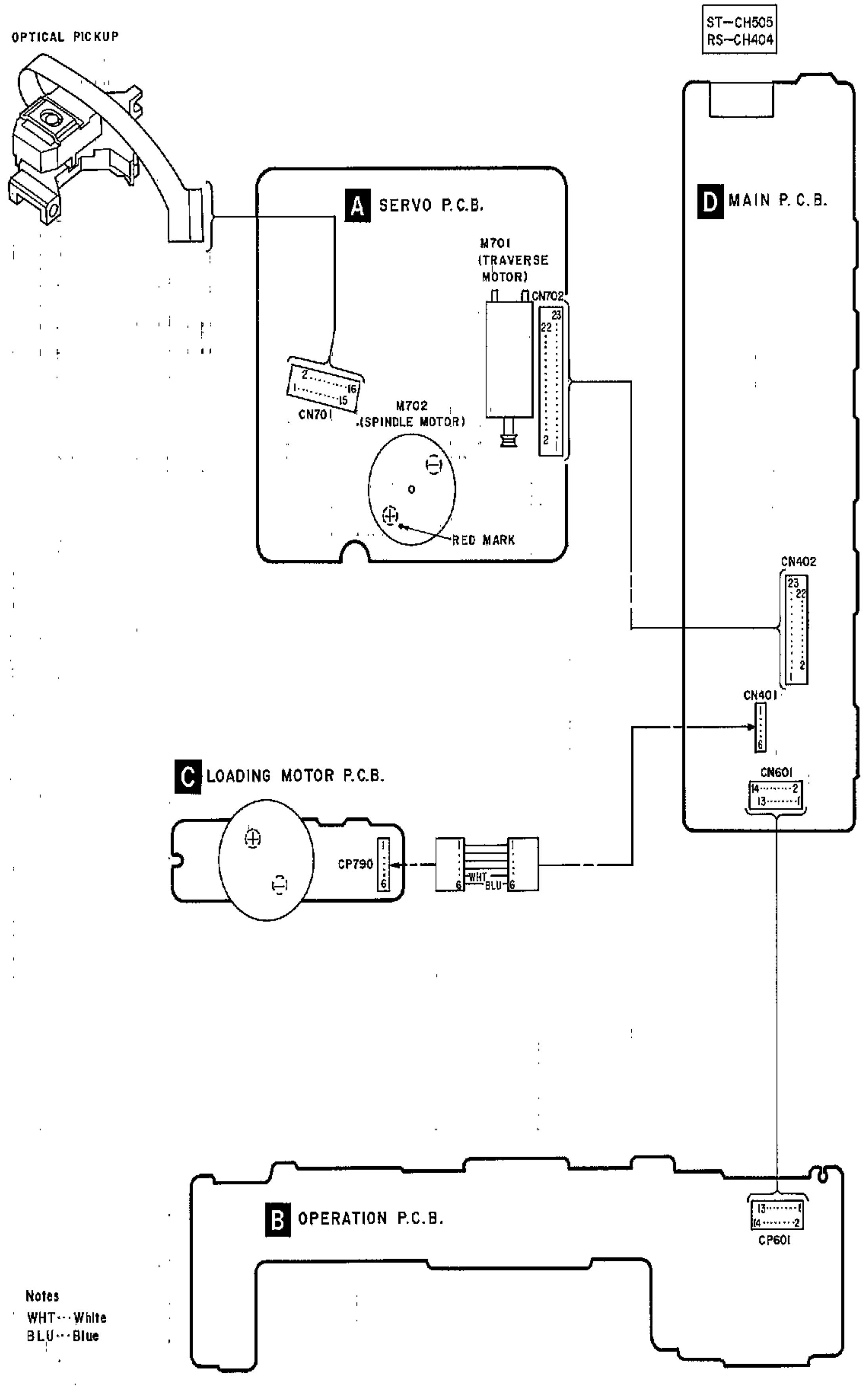




•Terminal guide of IC's, transistors and diodes

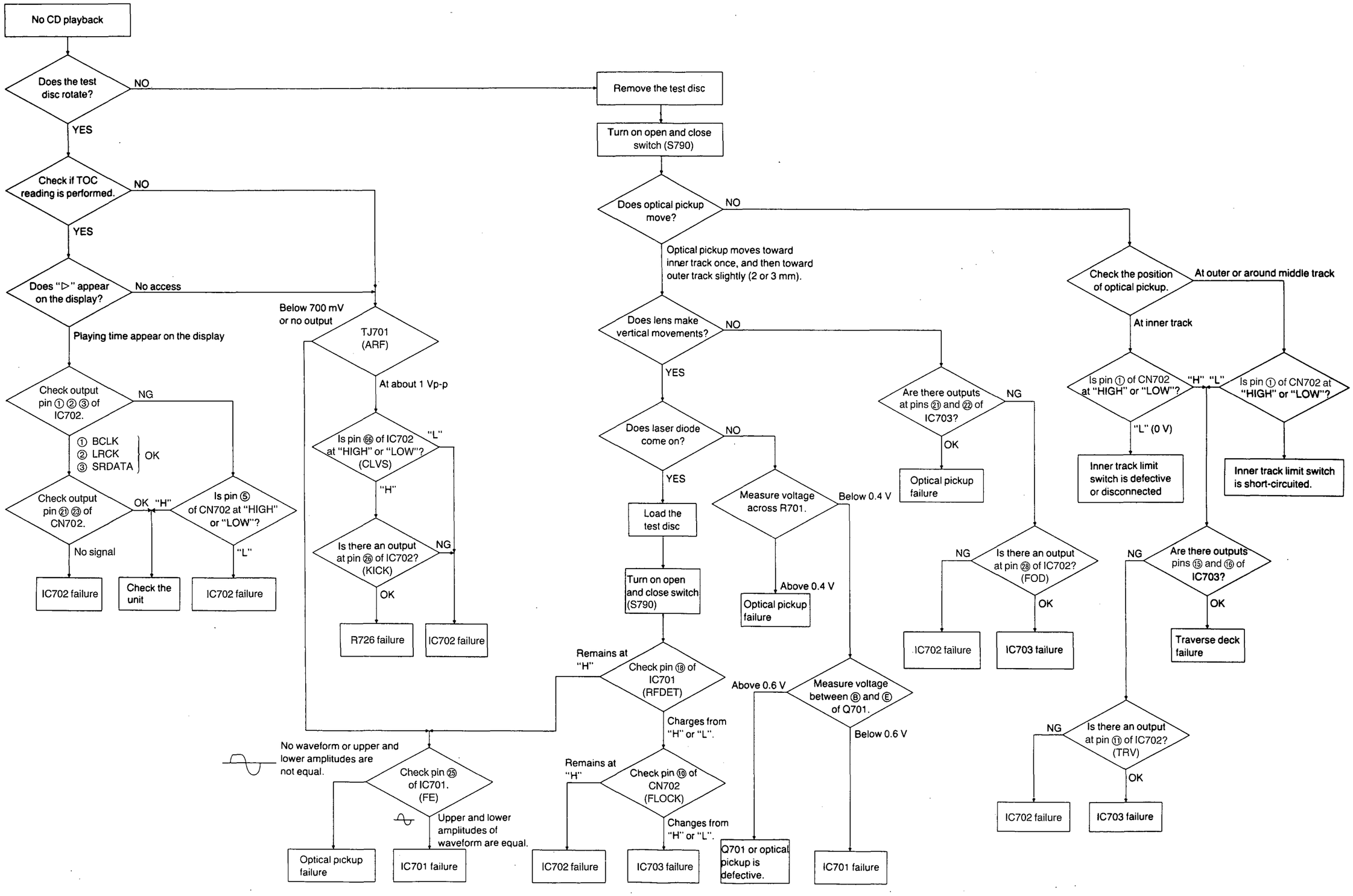
BA4558FT1	TC4066BFTP1	LC66306A4C13
LA5608M-TE-L 14 Pin; AN8802SCE1V 32 Pin		TA7291S
M38112M4102F 64 Pin; MN66271RA 80 Pin		LM2940T5M
AN8389SE1	UN4112TA	2SB1238QRTV6
2SD2037EFTA	2SB709STW	MA165TA MA167TA
MA4051MTA MA4082LTA	MA4270HTA	MA185TA
RL1N4003N02	SPR-305MDTF	

■ Wiring Connection Diagram



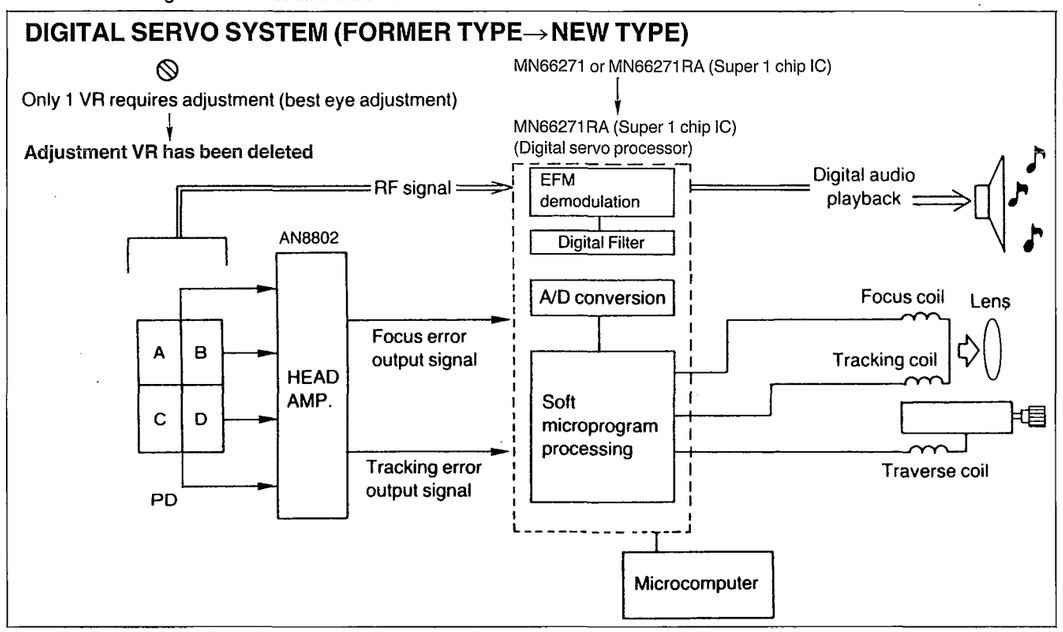
Notes
WHT···White
BLU···Blue

■ Troubleshooting Guide



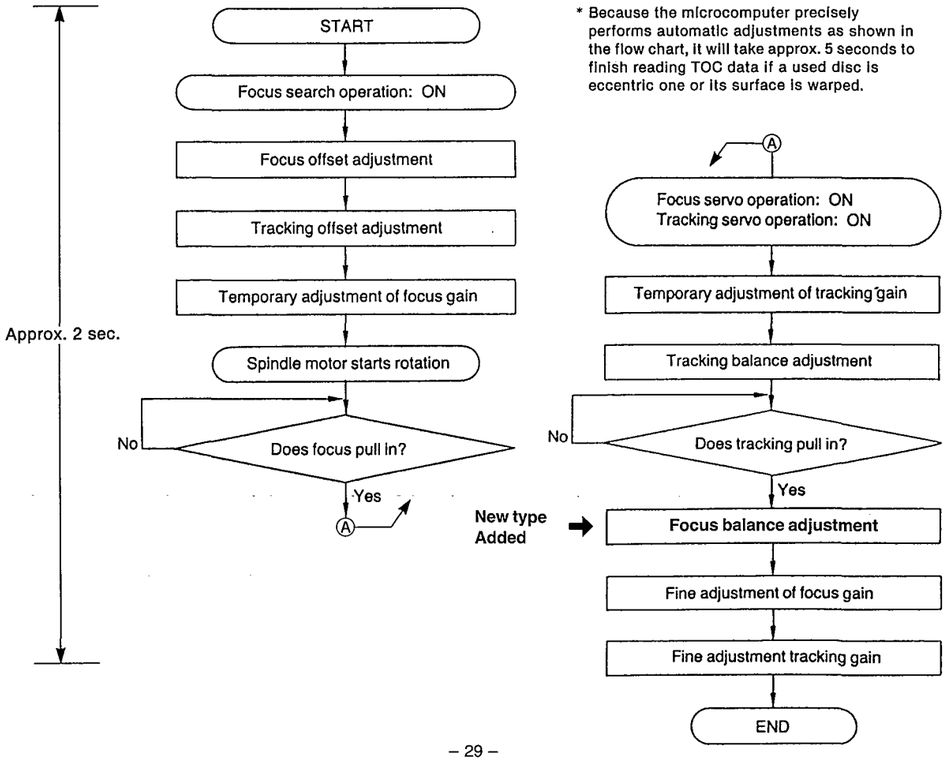
■ New Digital Servo System

This model employs a new type of digital servo circuit which all adjustment VRs have removed in electric section, compared to the former digital servo circuit.
Therefore, a mechanism has only to be adjusted.
The below block diagrams show the difference between the two.



The following flow chart shows the sequence of automatic adjustments.

• Flow chart on automatic adjustment sequence



■ Function of IC Terminals

•IC401 (LC66306A4C13)

Pin No.	Terminal Name	I/O	Function
1	REST SW	I	Innermost track sense switch status
2	SERVO RST	I	Reset signal input
3	STAT	I	Status signal input
4	SUBQ	I	Subcode Q input
5	D MUTE	O	Muting signal output (No use)
6	NC	—	——
7	SQCK	O	External clock for subcode Q register
8	BLKCK	I	Subcode block clock input
9	ODL RX	I	——
10	ODL TX	—	——
11	NU	—	——
12	NU	—	Tied high
13	MLD	O	Microprocessor command load signal
14	M DATA	O	Microprocessor command data
15	TEST	—	GND
16	Vss		
17	OSC1	I	Clock input from X401 (4.23 MHz)
18	NC	—	GND
19	NC	—	GND
20	OSC2	—	——
21	/RST	O	Reset signal output
22	M CLK	O	Microprocessor command clock
23	NU	—	——
24	NU	—	——
25	——	—	——

Pin No.	Terminal Name	I/O	Function
26	CS	I	Input of Serial communication starting to IC601 for system control
27	REQ	I	Input of Request signal from IC601 for system control
28	DT	I/O	Data Signal in/output from IC601 for system control
29			
30	NU	—	GND
31	CLK	I	Clock for communication with IC601
32	NU	—	——
33	NU	—	GND
34			
35			
36			
37			
38			
39	V_{DD}	I	Power supply
40	CLOSE SW	I	Disc tray "close" sense switch status
41	OPEN SW	I	Disc tray "open" sense switch status
42	NC	—	Connected to Vss
43			
44	/CLOSE	O	Close Disc Tray command output
45	/OPEN	O	Open Disc Tray command output
46	SENSE	I	Sense signal input
47	/FLOCK	I	Focus servo pull-in signal
48	/TLOCK	I	Tracking servo pull-in signal

•IC601 (M38112M4102F)

Pin No.	Terminal Name	I/O	Function
1	REQ	O	Request signal output to IC401 for system control
2	GRST	O	Reset signal output
3, 4, 5, 6	GCS, GCLK GDOUT, GDIN	—	——
7	CS	O	Output of Serial communication starting to IC401 for system control
8	CLK	O	Clock signal output to IC401 for system control
9	DOUT	O	Data signal output to IC401 for system control
10	DIN	I	Data signal input from IC401 for system control
11 ≀ 14	KIN3 ≀ KIN0	I	Signal input from operation key
15 ≀ 17	KS2 ≀ KS0	O	Strobe signal output for operation key scanning
18	HOLT	I	Detection signal input for an electricity failure
19	RST	I	Reset signal input
20	XCIN	—	——
21	XCOUT	—	——
22	XIN	I	Clock signal input
23	XOUT	O	Clock signal output

Pin No.	Terminal Name	I/O	Function
24	GND	—	Connected to GND
25	SCDG	I	——
26	GMUTE	—	——
27 28	NU	—	——
29	PLED1	O	Output signal for PLAY LED lighting
30	PLED2		
31 ≀ 40	G1 ≀ G10	O	Grid signal output for FL display tube
41 ≀ 56	S16 ≀ S1	O	Segment signal output for FL display tube
57	V_{DD}	—	Supplied +5 V
58	VP	—	Supplied power to FL display tube for pulling down
59	BSDTO	O	Data signal output to bus
60	BSCKO	O	Clock signal output to bus
61	BSDTI	I	Data signal input from bus
62	BSCKI	I	Clock signal input from bus
63	/CD	O	Muting signal output to CD
64	CD POWER	I	AF switching input to CD for power control

•IC703 (AN8389SE1)

Pin No.	Terminal Name	I/O	Function
1	Vcc	I	Power supply
2	VREF	I	VREF input
3	IN4	I	Motor driver (4) input
4	IN3	I	Motor driver (3) input
5	GND	—	Ground connection
6	NC	—	Ground connection
7	NRESET	I	Reset input
8	GND	—	Ground connection
9	IN2	I	Motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Motor driver (1) input
12	PC1	I	PC1 (power cut) input (no use, open)

Pin No.	Terminal Name	I/O	Function
13	PVcc1	I	Power supply (1) for driver
14	PGND1	—	Ground connection (1) for driver
15	D1−	O	Motor driver (1) reverse-action output
16	D1+	O	Motor driver (1) forward-action output
17	D2−	O	Motor driver (2) reverse-action output
18	D2+	O	Motor driver (2) forward-action output
19	D3−	O	Motor driver (3) reverse-action output
20	D3+	O	Motor driver (3) forward-action output
21	D4−	O	Motor driver (4) reverse-action output
22	D4+	O	Motor driver (4) forward-action output
23	PGND2	—	Ground connection (2) for driver
24	PVcc2	I	Power supply (2) for driver

•IC701 (AN8802SCE1V)

Pin No.	Terminal Name	I/O	Function
1	PDAD	I	PD A channel signal input with delay
2	PDA	I	PD A channel signal input without delay
3	LPD	I	Laser PD connection
4	LD	O	Power supply for LD driving
5	AMPI	I	RF amplifier input
6	Vcc	I	Power supply connection
7	AMPO	O	RF amplifier output (no use, open)
8	CAGC	I	AGC loop filter connection
9	ARF	O	RF AGC output
10	CENV	I	Capacitor connection for RF detection
11	CEA	I	Capacitor connection for HPF amplifier
12	GND	—	Ground connection
13	LDON	I	ON/OFF input of LD APC ("H": ON, "L": OFF)
14	TES	I	Tracking error shunt signal input ("H": shunt)
15	PLAY	I	Play signal input ("H": PLAY)
16	WVEL	I	WVEL control
17	BDO	O	BDO output
18	/RFDET	O	NRFDET output
19	CROSS	O	CROSS output
20	OFTR	O	OFTR output
21	VDET	O	VDET output
22	ENV	O	ENV output
23	TEBPF	I	Vibration detection input
24	TE	O	Tracking error output
25	FE	O	Focus error output
26	PTO	O	Potentioamplifier output (no use, open)
27	PTI	I	Potentioamplifier inversion input (no use, open)
28	TBAL	I	Tracking balance input
29	FBAL	I	Focus balance input
30	VREF	O	VREF output
31	PDB	I	PD B channel signal input without delay
32	PDBD	I	PD B channel signal input with delay

•IC702 (MN66271RA)

Pin No.	Terminal Name	I/O	Function
1	BCLK	O	Bit clock output for serial data (no used, open)
2	LRCK	O	L/R identification signal output (no use, open)
3	SRDATA	O	Serial data output (no used, open)
4	$DV_{DD}1$	I	Power supply input (for digital circuit)
5	$DV_{SS}1$	—	GND (for digital circuit)
6	TX	O	Digital audio interface signal output
7	MCLK	I	Microprocessor command clock signal input (Latches data at first transition)
8	MDATA	I	Microprocessor command data signal input
9	MLD	I	Microprocessor command load signal input
10	SENSE	O	Sence signal output (OFT, FESL, MAGEND, NAJEND, POSAD, SFG)
11	/FLOCK	O	Focus servo feeding signal output ("L": Feed)
12	/TLOCK	O	Tracking servo feeding signal output ("L": Feed)
13	BLKCK	O	Sub-code block clock signal output (fBLKCK=75 Hz during normal playback)
14	SQCK	I	External clock signal input for sub-code Q register
15	SUBQ	O	Sub-code Q code output
16	DMUTE	I	Muting input ("H": Mute)
17	STAT	O	Status signal output (CRC, CUE, CLVS, TTSTVP, FCLV, SQCK)
18	/RST	I	Reset input
19	SMCK	O	1/2-divided clock signal of crystal oscillating at MSEL="H" (fSMCK=8.4672 MHz) 1/4-divided clock signal of crystal oscillating at MSEL="L" (fSMCK=4.2336 MHz)
20	PMCK	O	1/192-divided clock signal of crystal oscillating (fPMCK=88.2 KHz) (no use, open)
21	TRV	O	Traverse forced feed output
22	TVD	O	Traverse drive output
23	PC	O	Spindle motor ON signal output ("L": ON)
24	ECM	O	Spindle motor drive signal output (forced mode output)
25	ECS	O	Spindle motor drive signal output (servo error signal output)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output

Pin No.	Terminal Name	I/O	Function
29	VREF	I	D/A (drive) output (TVD, ECS, TRD, FOD, FBAL, TBAL) Reference voltage input
30	FBAL	O	Focus balance adjustment output
31	TBAL	O	Tracking balance adjustment output
32	FE	I	Focus error signal input (analog input)
33	TE	I	Tracking error signal input (analog input)
34	RFENV	I	RF envelope signal input
35	VDET	I	Vibration detection signal input ("H": detection)
36	OFT	I	Off-track signal input ("H": off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal input ("L": detection)
39	BDO	I	Dropout signal input ("H": Dropout)
40	LDON	O	Laser on signal output ("H": ON)
41	TES	O	Tracking error shunt signal output ("H": shunt)
42	PLAY	O	Play signal out ("H": PLAY)
43	WVEL	O	Double speed status signal output ("H": Double speed)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	I	DSL bias (no use, open)
47	DSLF	I/O	DSL loop filter
48	PLLF	I/O	PLL loop filter
49	VCOF	I/O	VCO loop filter (no use, open)
50	AVcc2	I	Power supply input (for analog circuit)
51	AVss2	—	GND (for analog circuit)
52	EFM	O	EFM signal output (not use, open)
53	PCK	O	PLL extraction clock output (fPCK=4.321 MHz during normal playback) (no use, open)
54	PDO	O	Phase comparison signal of EFM and PCK signals (no use, open)
55	SUBC	O	Sub-code senal data output (no use, open)
56	SBCK	I	Clock input for sub-code serial data (no use, open)
57	Vss	—	GND
58	X1	I	Crystal oscillating circuit input (f=16.9344 MHz)
59	X2	O	Crystal oscillation circuit output (f=16.9344 MHz)
60	Vcc	I	Power supply input (for oscillating circuit)
61	BYTCK	O	Byte clock output (no use, open)

Pin No.	Terminal Name	I/O	Function
62	/CLDCK	O	Sub-code frame clock signal output (fCLDCK=7.35 kHz during normal playback)
63	FCLK	O	Crystal frame clock signal output (fFCLK=7.35 kHz, double=14.7 kHz)
64	PFLAG	O	Interpolation flag output ("H": Interpolation) (no use, open)
65	FLAG	O	Flage output (no use, open)
66	CLVS	O	Spindle servo phase synchronizing signal output ("H": CLV, "L": rough servo) (no use, open)
67	CRC	O	Sub-code CRC checked output ("H": OK, "L": NG) (no use, open)
68	DEMPH	O	De-emphasis ON signal output ("H": ON) (no use, open)
69	RESY	O	Frame resynchronizing signal output (no use, open)
70	/RST2	I	Reset input through MASH circuit ("L": Reset)
71	/TEST	I	Test input
72	AVcc1	I	Power supply input (for analog circuit)
73	OUTL	O	Left channel audio signal output
74	AVss1	—	GND
75	OUTR	O	Right channel audio signal output
76	RSEL	I	RF signal polarity assignment input (at "H" level, RSEL="H": at "L" level, RSEL=L)
77	CSEL	I	Crystal oscillating frequency designation input ("L": 16.9344 MHz, "H": 33/8688 MHz)
78	PSEL	I	Test input (normally, "L") (no use, open)
79	MSEL	I	Output frequency switching for SMCK terminal "H": SMCK=8.4672 MHz "L": SMCK=4.2336 MHz (no use, open)
80	SSEL	I	Output mode switching of SUBQ terminal ("H": Q code buffer mode)

■ Replacement Parts List

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*Remote Control Ass'y: Supply period for three years from termination of production.
*Warning: This product uses a laser diode. Refer to caution statements on page 2.
*ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.
*The "(SF)" mark denotes the standard part.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC1	LM2940T5	I. C, REGULATOR	⚠
IC401	LC663D6A4C13	I. C, SYSTEM CONTROL	
IC601	M38112M4102F	I. C, FL DRIVE/SYSTEM CONT.	
IC602	LA5608M-TE-L	I. C, BUS LINE/HALT/RESET	
IC701	AN8802SCE1V	I. C, SERVO AMP.	
IC702	MN66271RA	I. C, SERVO PROCESSOR	
IC703	AN8389SE1	I. C, MOTOR DRIVE	
IC790	TA7291S	I. C, MOTOR DRIVE	
IC801	SVIBA4558F	I. C, L. P. F.	
IC802	TC4066BFTP1	I. C, SWITCHING	
		TRANSISTOR(S)	
Q1	2SD2037EFTA	TRANSISTOR	⚠
Q3, 4	2SD2037EFTA	TRANSISTOR	⚠
Q5	2SB1238QRTV6	TRANSISTOR	⚠
Q701	2SB709S	TRANSISTOR	
Q801	UN4112	TRANSISTOR	
		DIODE(S)	
D1, 2	RL1N4003N02	DIODE	⚠
D3	RL1N4003N02	DIODE	
D4	MA4082LTA	DIODE	⚠
D5, 6	MA167	DIODE	⚠
D7, 8	MA165	DIODE	
D9	MA4051MTA	DIODE	⚠
D11, 12	MA185TA	DIODE	⚠
D13	MA4270HTA	DIODE	⚠
D15	MA4051MTA	DIODE	⚠
D16	MA185TA	DIODE	⚠
D602-604	MA165	DIODE	
D606	SPR-305MDW	DIODE	
D608, 609	MA165	DIODE	
D610	MA4051MTA	DIODE	
		COIL(S)	
L1, 2	BL02RN2R62T4	COIL	⚠
L3, 4	ELEXT3R3KA9	COIL	
L601	ELEXT100KA9	COIL	
		OSCILLATOR(S)	
X401	EFOEC4234T3	OSCILLATOR(4.23MHZ)	
X601	EFOEC4234T3	OSCILLATOR(4.23MHZ)	
X701	RSXB16M9J01T	OSCILLATOR(16.9344MHZ)	

Ref. No.	Part No.	Part Name & Description	Remarks
		DISPLAY	
FL601	RSL0135-F	FL DISPLAY	
		SWITCH(ES)	
S601	EVQ21405R	SW, R. SKIP/R. SEARCH	
S602	EVQ21405R	SW, F. SKIP/F. SEARCH	
S603	EVQ21405R	SW, REPEAT	
S604	EVQ21405R	SW, RANDOM	
S605	EVQ21405R	SW, LAST FADE	
S606	EVQ21405R	SW, JUST FIT	
S607	EVQ21405R	SW, ALBUM	
S608	EVQ21405R	SW, OPEN/CLOSE	
S611	EVQ21405R	SW, STOP	
S612	EVQ21405R	SW, PAUSE	
S613	EVQ21405R	SW, PLAY	
S701	RSM0006-P	SW, REST	
S790	RSH1A005	SW, LOADING CLOSE DETECT	
S791	RSH1A005	SW, LOADING OPEN DETECT	
		CONNECTOR(S)	
CN401	RJP6G182A	CONNECTOR(6P)	
CN402	RJS1A6823	SOCKET(23P)	
CN601	RJS1A6814	SOCKET(14P)	
CN701	RJU035T016-1	SOCKET(16P)	
CN702	RJS1A6723-1Q	SOCKET(23P)	
CP601	RJS1A6714-Q	SOCKET(14P)	
CP790	RJP6G172A	CONNECTOR(6P)	
		EARTH TERMINAL	
E1	SNE1004-1	GND PLATE	
		JACK	
JK801	RJT065K15	CONNECTOR(15P)	
		TEST JUMPER(S)	
TJ701	EYF8CU	TEST JUMPER	
TJ702	EYF8CU	TEST JUMPER	

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

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R1	ERQ16NKWR15E	1W 0.15 ⚠
R2	ERDS1FVJ271T	1/2W 270 ⚠
R3	ERD2FCVJ6R8T	1/4W 6.8 ⚠
R4	ERDS2TJ1R2	1/4W 1.2
R6, 7	ERDS2TJ1R2	1/4W 1.2
R8	ERDS2TJ220T	1/4W 22
R9	ERDS2TJ562	1/4W 5.6K
R10	ERDS2TJ562	1/4W 5.6K
R11	ERDS2TJ472	1/4W 4.7K
R13	ERD2FCVJ4R7T	1/4W 4.7 ⚠
R14, 15	ERG1SJ150E	1W 15
R16	ERD2FCVJ4R7T	1/4W 4.7 ⚠
R17, 18	ERG1SJ150E	1W 15
R19, 20	ERDS2TJ100	1/4W 10
R21	ERG1SJ180E	1W 18
R22	ERDS2TJ562	1/4W 5.6K
R23	ERDS2TJ471	1/4W 470
R26, 27	ERDS2TJ271	1/4W 270
R28	ERDS2TJ101	1/4W 100
R31-36	ERDS2TJ100	1/4W 10
R402, 403	ERDS2TJ102	1/4W 1K
R404-407	ERDS2TJ152	1/4W 1.5K
R408	ERDS2TJ104	1/4W 100K
R409, 410	ERDS2TJ103	1/4W 10K
R411	ERDS2TJ472	1/4W 4.7K
R412	ERDS2TJ102	1/4W 1K
R413	ERDS2TJ472	1/4W 4.7K
R414	ERDS2TJ102	1/4W 1K
R415	ERDS2TJ105T	1/4W 1M
R421	ERDS2TJ223	1/4W 22K
R427	ERDS2TJ103	1/4W 10K
R428	ERDS2TJ223	1/4W 22K
R429	ERDS2TJ102	1/4W 1K
R601-604	ERDS2TJ473	1/4W 47K
R605	ERDS2TJ101	1/4W 100
R606	ERDS2TJ104	1/4W 100K
R607	ERDS2TJ103	1/4W 10K
R608, 609	ERDS2TJ102	1/4W 1K
R610-613	ERDS2TJ101	1/4W 100
R614, 615	ERDS2EJ121	1/4W 120
R616	ERDS2TJ104	1/4W 100K
R618, 619	ERDS2TJ181T	1/4W 180
R632, 633	ERDS2TJ472	1/4W 4.7K
R637	ERDS2TJ470	1/4W 47
R701	ERJ6GEYJ100	1/10W 10
R702	ERJ6GEYJ471V	1/10W 470

Ref. No.	Part No.	Values & Remarks
R703	ERJ6GEYJ823	1/10W 82K
R704	ERJ6GEYJ102A	1/10W 1K
R705	ERJ6GEYJ103V	1/10W 10K
R706	ERJ6GEYJ102A	1/10W 1K
R707	ERJ6GEYJ473V	1/10W 47K
R708	ERJ6GEYJ104V	1/10W 100K
R709	ERJ6GEYJ683V	1/10W 68K
R711	ERJ6GEYJ154V	1/10W 150K
R712	ERJ6GEYJ471V	1/10W 470
R714	ERJ6GEYJ121V	1/10W 120
R717, 718	ERJ6GEYJ102A	1/10W 1K
R721	ERJ6GEYJ101V	1/10W 100
R722	ERJ6GEYJ473V	1/10W 47K
R723	ERJ6GEYJ182V	1/10W 1.8K
R724	ERJ6GEYJ333V	1/10W 33K
R725	ERJ6GEYJ472V	1/10W 4.7K
R726	ERJ6GEYJ473V	1/10W 47K
R727	ERJ6GEYJ103V	1/10W 10K
R728	ERJ6GEYJ392V	1/10W 3.9K
R731	ERJ6GEYJ392V	1/10W 3.9K
R735, 736	ERJ6GEYJ101V	1/10W 100
R744	ERJ6GEYJ103V	1/10W 10K
R745	ERJ6GEYJ155V	1/10W 1.5M
R801, 802	ERDS2TJ102	1/4W 1K
R803, 804	ERDS2TJ104	1/4W 100K
R805-808	ERDS2TJ223	1/4W 22K
R809, 810	ERDS2TJ273	1/4W 27K
R811, 812	ERDS2TJ332	1/4W 3.3K
R813, 814	ERDS2TJ104	1/4W 100K
R815, 816	ERDS2TJ102	1/4W 1K
R817, 818	ERDS2TJ104	1/4W 100K
R819	ERDS2TJ103	1/4W 10K
		CHIP JUMPER(S)
J701, 702	ERJ8GEY0R00A	CHIP JUMPER
J707-714	ERJ8GEY0R00A	CHIP JUMPER
J716-718	ERJ8GEY0R00A	CHIP JUMPER
J721	ERJ8GEY0R00A	CHIP JUMPER
J724-726	ERJ8GEY0R00A	CHIP JUMPER
J727-729	ERJ8GEY0R00A	CHIP JUMPER
J730-732	ERJ6GEY0R00A	CHIP JUMPER
		CAPACITORS
C1, 2	ECBT1E103Z	25V 0.01U
C3	ECA1CM222B	16V 2200U ⚠
C4	ECEA1AKA101B	10V 100U
C5	ECBT1H102KB5	50V 1000P

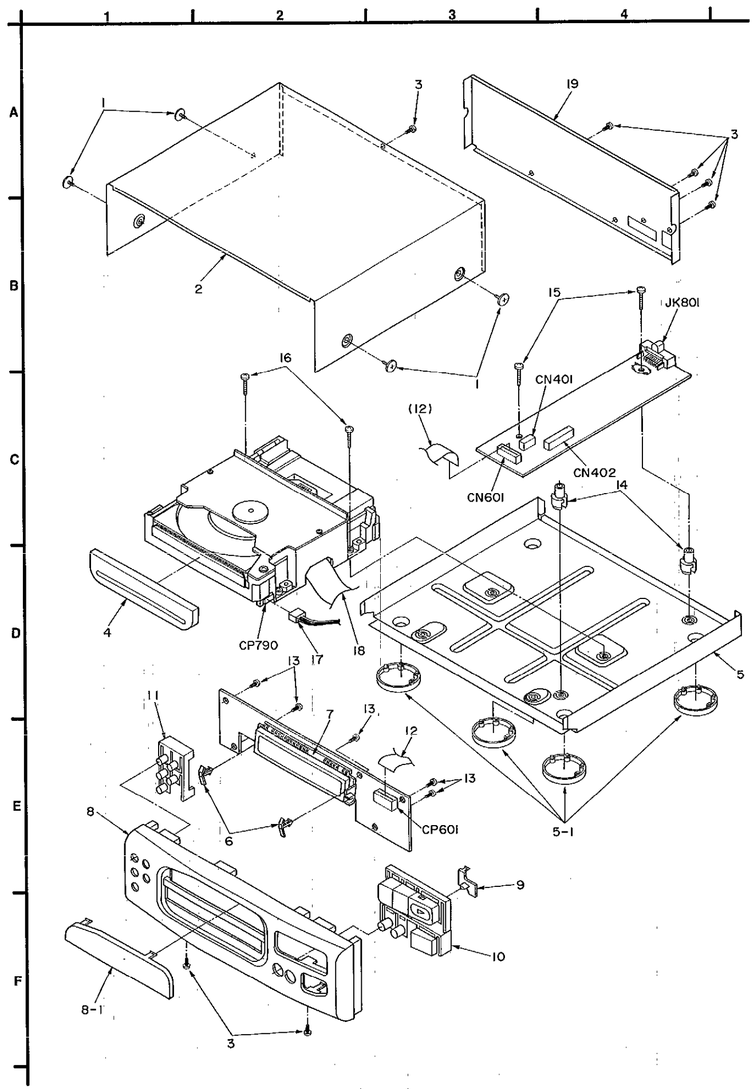
Ref. No.	Part No.	Values & Remarks
C6	ECEA1AKA221Q	10V 220U
C7	ECEA0JKA221B	6.3V 220U
C8, 9	ECA1VFQ121B	35V 120U
C10	ECA1EM101B	25V 100U ⚠
C11, 12	ECA1HM470B	50V 47U
C13	ECBT1H102KB5	50V 1000P
C401	ECBT1E1032F	25V 0.01U
C402	ECBT1H1042F5	50V 0.1U
C403	ECBT1H102KB5	50V 1000P
C404	ECBT1E1032F	25V 0.01U
C406	ECBT1E1032F	25V 0.01U
C601	ECBT1H1042F5	50V 0.1U
C602, 603	ECEA1HKA3R3B	50V 3.3U
C604	ECEA0JKA470B	6.3V 47U
C605	ECBT1H102KB5	50V 1000P
C606	ECBT1E1032F	25V 0.01U
C608, 609	ECBT1E1032F	25V 0.01U
C610	ECEA1HKA220B	50V 0.22U
C611	ECEA1HKA330B	50V 0.33U
C612	ECBT1E2232F	25V 0.022U
C613	ECBT1E1032F	25V 0.01U
C701	ECEA0JKA220	6.3V 22U
C702	ECEA1HKA010I	50V 1U
C703	ECEA0JKA1011	6.3V 1000
C704	ECUZ1E104MBN	25V 0.1U
C705	ECEA1HKA010I	50V 1U
C706	ECUE1H101JCN	50V 100P
C707	ECUV1E273KBN	25V 0.027U
C708	ECUE1H472KBN	50V 4700P
C709	ECUE1C473KBN	16V 0.047U
C710	ECUE1H152KBN	50V 1500P
C711, 712	ECUZ1E104MBN	25V 0.1U
C713	ECUV1C104MBM	16V 0.1U
C714	ECEA0JKA1011	6.3V 1000
C715	ECEA0JKA470I	6.3V 47U
C716	ECUE1H561KBN	50V 560P
C717	ECUZ1E104MBN	25V 0.1U
C718, 719	ECUV1C224KBM	16V 0.22U
C721	ECUV1H070DCN	50V 7P
C722	ECUV1H220JCN	50V 22P
C723	ECEA1AKA221I	10V 220U
C724	ECUV1C104MBM	16V 0.1U
C725, 726	ECUV1H102JCN	50V 1000P
C727, 728	ECEA1HPK010I	50V 1U
C730	ECUZ1E104MBN	25V 0.1U
C731, 732	ECA0SSD151I	6.3V 150U
C733	ECUZ1E104MBN	25V 0.1U
C734	ECEA1AKA221I	10V 220U
C735-737	ECUZ1E104MBN	25V 0.1U

Ref. No.	Part No.	Values & Remarks
C738	ECUV1C154KBN	16V 0.15U
C742	ECUV1E273KBN	25V 0.027U
C743	ECUZ1E104MBN	25V 0.1U
C744	ECUE1E822KBN	25V 8200P
C745	ECUE1H102KBN	50V 1000P
C747	ECUE1H222KBN	50V 2200P
C748	ECUV1H471KBM	50V 470P
C790	ECA1AKF820E	10V 82U
C803, 804	ECBT1H102KB5	50V 1000P
C807, 808	ECBT1H331KB5	50V 330P
C809, 810	ECBT1H121KB5	50V 120P
C811, 812	ECEA0JKA470B	6.3V 47U
C813, 814	ECEA1AKA220B	10V 22U
C815, 816	ECBT1H101KB5	50V 100P

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RHD30007	SCREW	
2	RKMD203A-1K	CABINET	
3	XTBS3+8JFZ1	SCREW	
4	RGK0580-K	TRAY PANEL	
5	RFKJLCH505EK	BOTTOM BOARD ASS'Y	
5-1	RKA0011A-2	FOOT	
6	RMN0195-3	FL SPACER	
7	RMN0227	FL HOLDER	
8	RFKGLCH505EK	FRONT PANEL ASS'Y	
8-1	RKW0291-V	FL PANEL	
9	RGL0212-Q	PANEL LIGHT	
10	RGU0945-K	BUTTON, PLAY etc.	
11	RGU0946-K	BUTTON, EDIT etc.	
12	RKJ5414120EE	FLEXIBLE CABLE	
13	XTBS26+8J	SCREW	
14	SHE185-2	P.C.B. SPACER	
15	XTB3+16JFZ	SCREW	
16	XTB3+8FFZ	SCREW	
17	REX0510	LEAD CABLE(6P)	
18	REZ0537	FLEXIBLE CABLE(23P)	
19	RGR0175A-A	REAR PANEL	

Ref. No.	Part No.	Part Name & Description	Remarks
		LOADING PARTS	
101	RFKJLCH505BK	CHASSIS ASS'Y	
101A	RDG0142	LOADING GEAR	
101B	RDG0193	LOADING GEAR(1)	
101C	RDP0065	PULLEY	
102	REM0019	MOTOR ASS'Y	
103	RMA0339	HOLDER	
104	RME0063	LOCK LEVER SPRING	
105	RME0087	SPRING	
106	RNG0158	BELT	
107	RML0177	CONVERSION LEVER	
108	RML0178-1	LOCK LEVER	
109	RMM0059-1	SLIDE PLATE(2)	
110	RMM0079	SLIDE PLATE(1)	
111	XTN26+6G	SCREW	
112	XYN2+F6FZ	SCREW	
113	RDB0036	GUIDE HOLDER	
114	RHD20010	SCREW	
115	RMG0046	GUIDE SHAFT	
116	RH02452A	MAGNET	
117	RMA0327-1	DISC CLAMPER	
118	RMR0334	MAGNET HOLDER	
119	RXQ0123	DISC HOLDER	
120	RFKNLPG440-K	DRIVE RACK ASS'Y	
121	RGQ0088-K	DISC TRAY	
122	RHD20009-1	SCREW	
123	XTB3+25GFZ	SCREW	
124	XTN26+6G	SCREW	
125	XTN3+8JFZ	SCREW	
126	RAE0111Z	TRAVERSE UNIT ASS'Y	
126A	SHG0112	RUBBER(A)	
126B	SHG0113-1	RUBBER(B)	
126C	RDV0023	BELT	
126D	SNS038	SCREW	
127	RME0109	SPRING	
128	RMS0123-1	PIN(A)	
129	RMS0350	PIN(B)	
130	RMR0533-K	TRAVERSE CHASSIS	
131	XTV2+6G	SCREW	

■ Cabinet Parts Location



■ Loading Unit Parts Location

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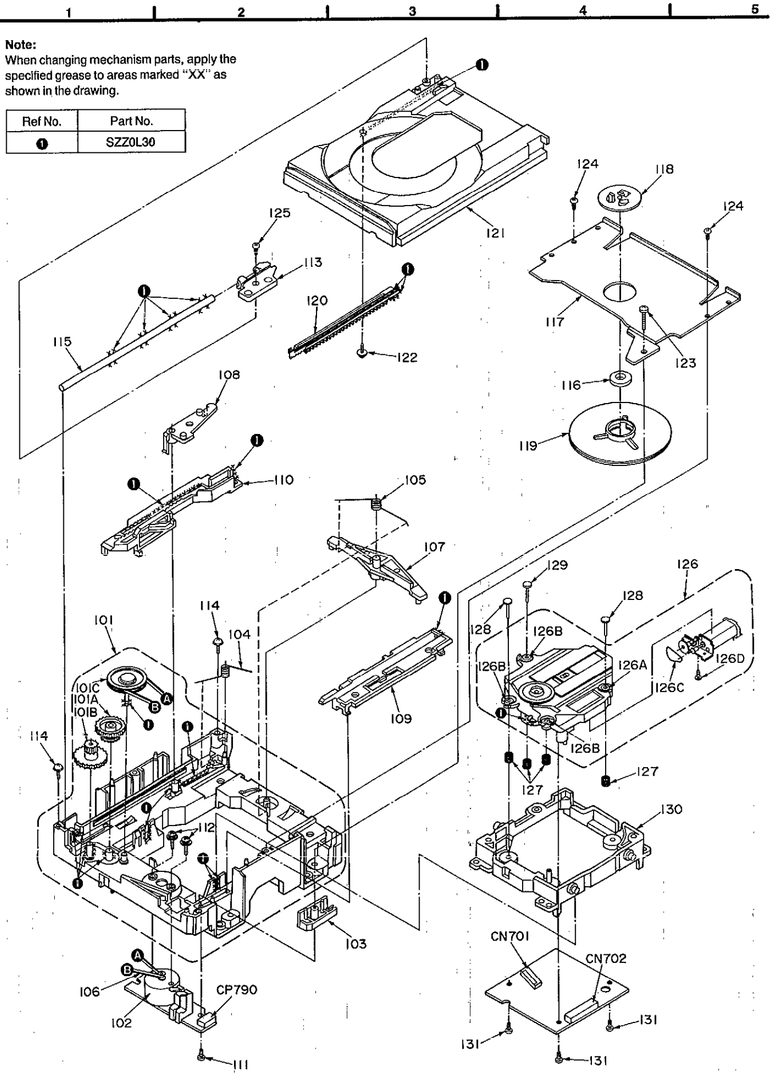
Note:
When changing mechanism parts, apply the specified grease to areas marked "XX" as shown in the drawing.

Ref No.	Part No.
❶	SZZ0L30



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