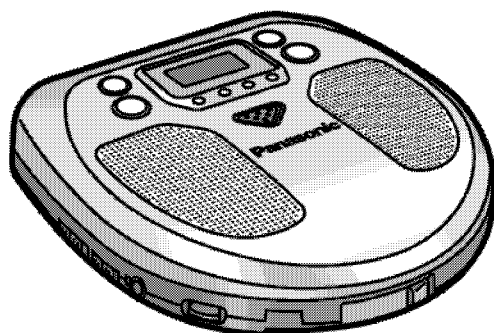


Service Manual

Portable CD Player

COMPACT
disc
DIGITAL AUDIO

MASH
multi-stage noise shaping



SL-PH270AEB
SL-PH270AEG

Traverse Deck: RAE0145Z Mechanism Series

Colour

(S).....Silver Type

Specifications

Audio (Anti-shock OFF)

No. of channels: 2 channels (left and right, stereo)

DA converter: 1 bit, MASH

Headphone output level: RMS max. 9 mW+9 mW/16Ω
(adjustable)

Speaker output level: RMS max. 90 mW+90 mW

Speaker (3.6 cm) 16Ω x 2

Pickup

Light source: Semiconductor laser

Wavelength: 780 nm

General

Operational temperature range: 0-40 degree

Recharge. temperature range: 5-40 degree

Power supply: DC 4.5V

Power consumption:

AC adaptor;

<Speaker off> 3.2 W/3.4 W (Anti-shock OFF/ON)

<Speaker on> 3.6 W (Anti-shock ON)

Battery;

<Speaker off>

0.4 W/0.45 W (Anti-shock OFF/ON)

<Speaker on>

1.0 W (Anti-shock ON)

Playing time:

(When used in hold mode with EQ canceled, at 25 degree, on a flat, stable surface.)

Battery used:

Panasonic alkaline dry cell batteries (LR6, 2 pcs.);

<Speaker off>

18 h/24 h (Anti-shock OFF/ON)

<Speaker on>

20 h (Anti-shock ON)

Optimal rechargeable batteries (P-3GAVE (T));

<Speaker off>

11 h/13 h (Anti-shock OFF/ON)

<Speaker on>

10 h (Anti-shock ON)

The play time may be less depending on the operating conditions.

Dimensions (W x H x D) 128 x 31.6 x 131.5 mm

Mass: 286 g with batteries
240 g without batteries

Notes:

Specifications are subject to change without notice.

Mass and dimensions are approximate.

Panasonic

© 2002 Matsushita Electric Industrial Co., Ltd. All rights reserved. Unauthorized copying and distribution is a violation of law.

⚠ WARNING

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

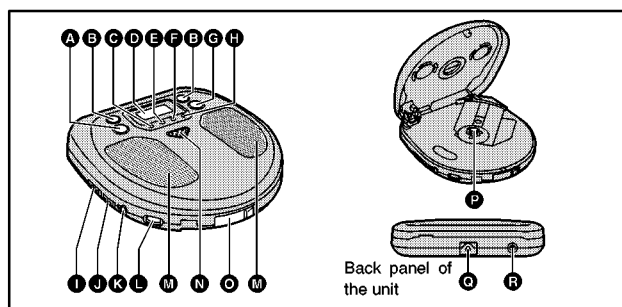
CONTENTS

	Page		Page
1 Accessories	2	9 Type Illustration of ICs, Transistors and Diodes	13
2 Location of Controls	2	10 Schematic Diagram Notes	13
3 Precaution of Laser Diode	3	11 Schematic Diagram	15
4 Handling Precautions for Traverse Deck	3	12 Printed Circuit Board and Wiring Connection Diagram	19
5 Operation Checks and Component Replacement Procedures	4	13 Block Diagram	21
6 Display of Self-Diagnostic Function	10	14 Terminal Function of ICs	23
7 Checking the Operation Problems on the Traverse Deck (Optical Pickup)	11	15 Replacement Parts List	26
8 Automatic Adjustment Results Display Function (Self-Check Function)	12	16 Cabinet Parts Location	28
		17 Traverse Unit Parts Location	29
		18 Packaging	30

1 Accessories

- AC adaptor for (EB) area
(RFEA403B-S).....1 pc.
- AC adaptor for (EG) area
(RFEA419E-M).....1 pc.
- Stereo earphones
(L0BAB0000123).....1 pc.
- Hook
(RXQ0709).....1 pc.

2 Location of Controls



- | | |
|--|--|
| <p>A Stop/operation off button
(■, OPR OFF)</p> <p>B Skip/search buttons
(◀◀, ▶▶, ◀◀, ▶▶)</p> <p>C Anti-shock button (A.SHOCK)</p> <p>D Display</p> <p>E EQ button (EQ)</p> <p>F Memory/recall button
(MEMORY/RECALL)</p> <p>G Play/pause button (▶)</p> <p>H Repeat button (↺)</p> <p>I Play mode selector
(NOR, RANDOM, RESUME)</p> | <p>J Hold switch (HOLD)</p> <p>K Headphone jack (◯)</p> <p>L Headphone volume control
(VOLUME)</p> <p>M Speakers</p> <p>N Speaker/headphone switch
(◯(EQ)/◻)</p> <p>O Open switch (OPEN)</p> <p>P CD release button (PUSH)</p> <p>Q Hole for car mounting base/
hole for ring</p> <p>R DC IN jack
(DC IN 4.5 V ◊—◊)</p> |
|--|--|

3 Precaution of Laser Diode

CAUTION:

This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pickup lens.

Wave length: 780 nm

Maximum output radiation power from pickup: 100 μ W/VDE

W/VDE

Laser radiation from the pickup lens is safety level, but be sure the followings:

1. Do not disassemble the optical pickup 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 look at the focus lens using optical instruments.
4. Recommend not to look at pickup lens for a long time.

ACHTUNG:

Dieses Produkt enthält eine Laserdiode.

Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

Wellenlänge: 780 nm

Maximale Strahlungsleistung der Lasereinheit: 100 μ W/VDE

W/VDE

Die Strahlungen der Lasereinheit ungefährlich, wenn folgende Punkte beachtet werden:

1. Die Lasereinheit nicht zerlegen, da die Strahlung an der freigelegten Laserdiode gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinheit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.

4 Handling Precautions for Traverse Deck

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 traverse deck (optical pickup).

4.1. Handling of traverse deck (optical pickup)

1. Do not subject the optical pickup to static electricity as it is extremely sensitive to electrical shock.
2. To protect the laser diode against electrostatic breakdown, short the flexible board (FFC board) with a clip or similar object. Refer to Fig. 4-1.
3. Take care not to apply excessive stress to the flexible board (FFC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted. Refer to Fig. 4-1.

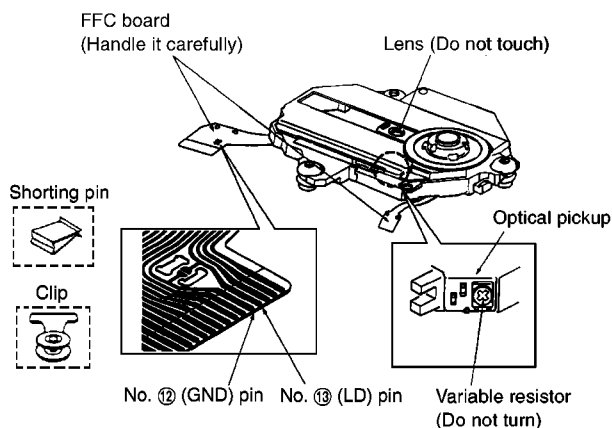


Fig. 4-1.

4.2. Grounding for electrostatic breakdown prevention

4.2.1. Human body grounding

Use the anti-static wrist strap to discharge the static electricity from your body. Refer to Fig. 4-2.

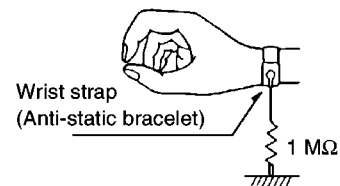


Fig. 4-2.

4.2.2. 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. Refer to Fig. 4-3.

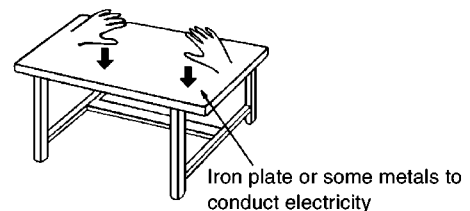


Fig. 4-3.

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).

5 Operation Checks and Component Replacement Procedures

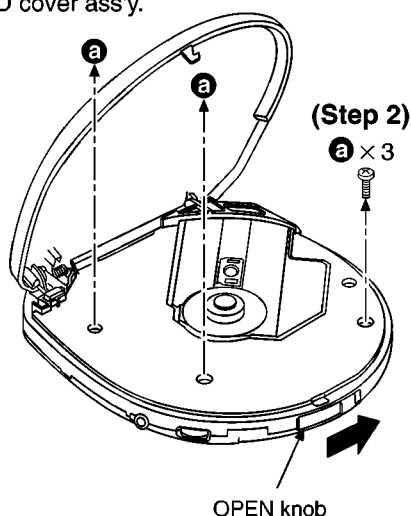
- This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
- For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.

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

5.1.1. Checking for the main P.C.B. (A side)

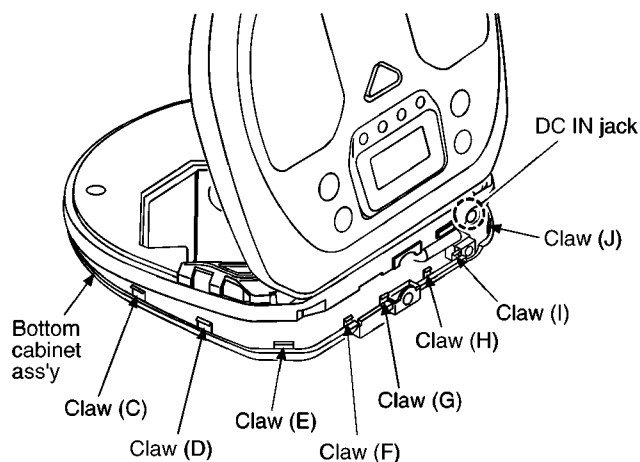
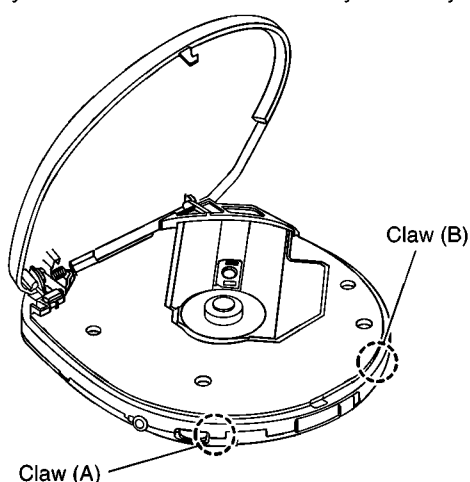
(Step 1)

Sliding the OPEN knob to right, open the CD cover ass'y.



(Step 3)

Spread the clearance between the bottom cabinet ass'y and intermediate cabinet ass'y manually.



(Step 4)

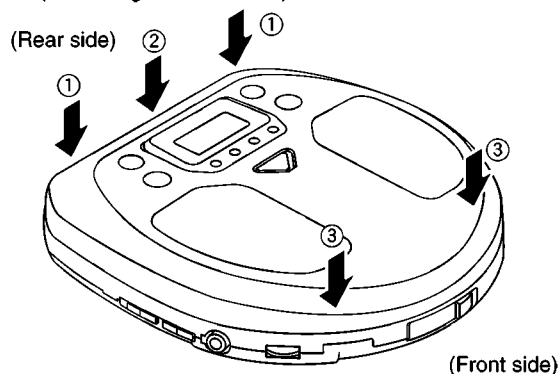
Open the clearance between the bottom cabinet ass'y and intermediate cabinet ass'y, and then release the claw (C) to claw (J) in turn.

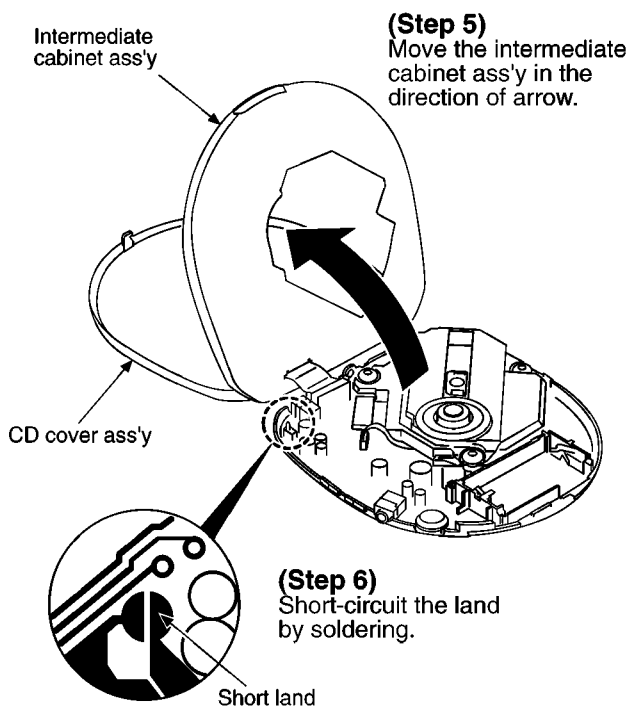
NOTE:

Take care not to break the DC IN Jack provided with intermediate cabinet.

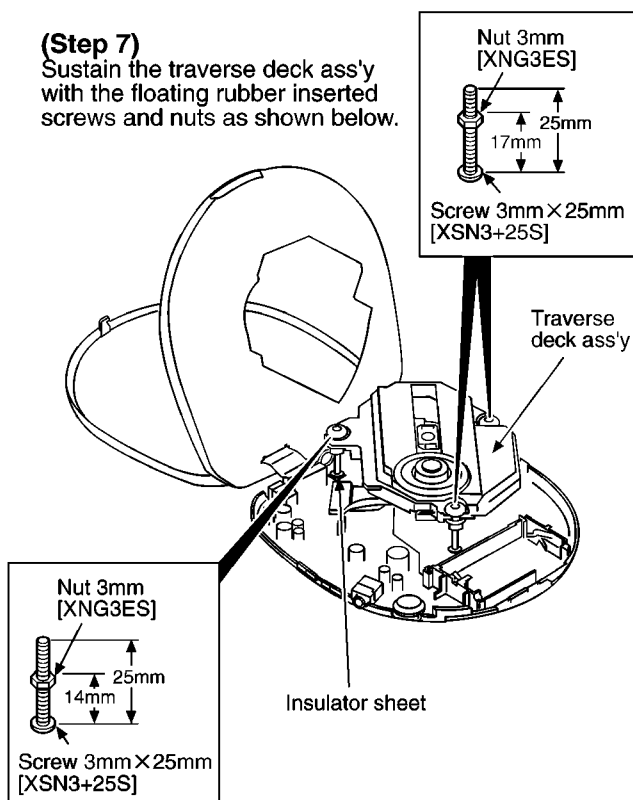
■ CD cover ass'y and intermediate reassembly procedure

- ① Fit together right side and left side of rear part.
(Either right or left side)
- ② Fit together the center of rear part.
- ③ Fit together the right and left of front part.
(Either right or left side)





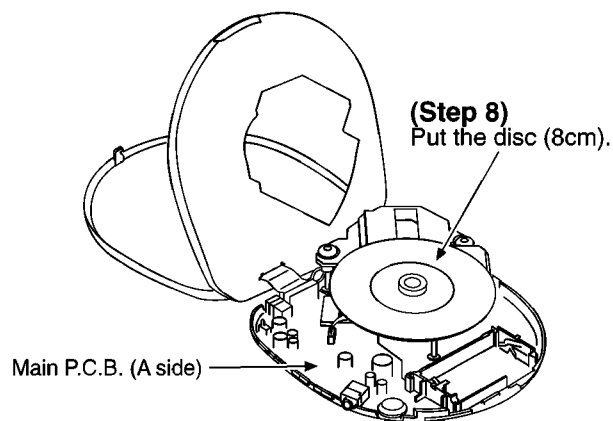
(Step 7)
Sustain the traverse deck ass'y with the floating rubber inserted screws and nuts as shown below.



NOTE:

- The tip of screw must not protrude above the floating rubber.
- To keep insulation, place the insulator sheet (paper etc.) between the P.C.B. and the head of screws.

- Check the main P.C.B. (A side) as shown below.

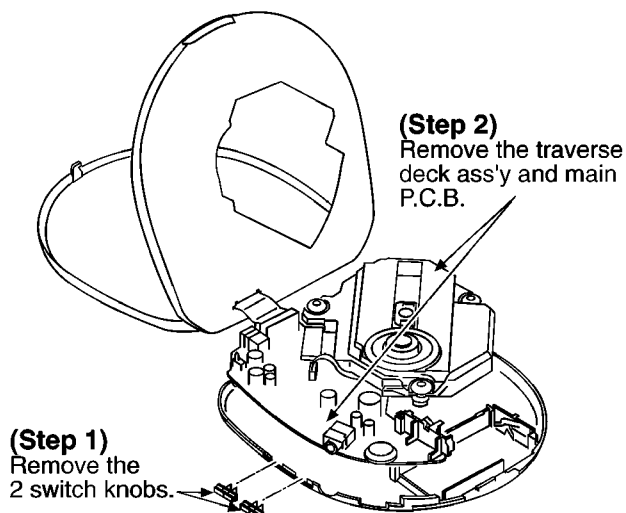


NOTE:

After checking, unsolder the short land to open circuit.

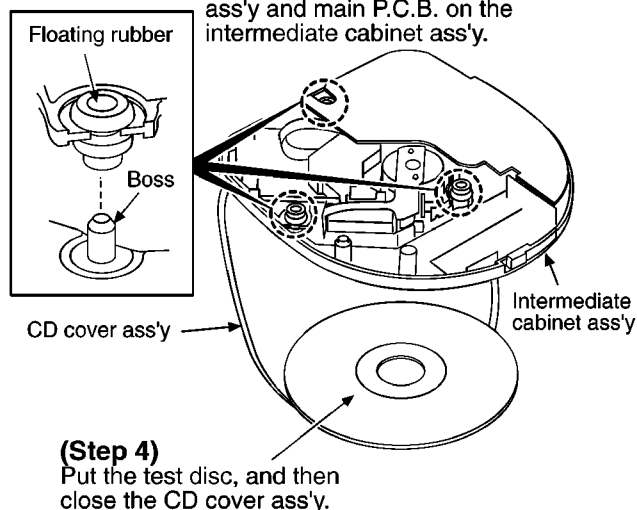
5.1.2. Checking for the main P.C.B. (B side)

- Follow the (Step 1) - (Step 6) of item 5.1.1.



(Step 3)

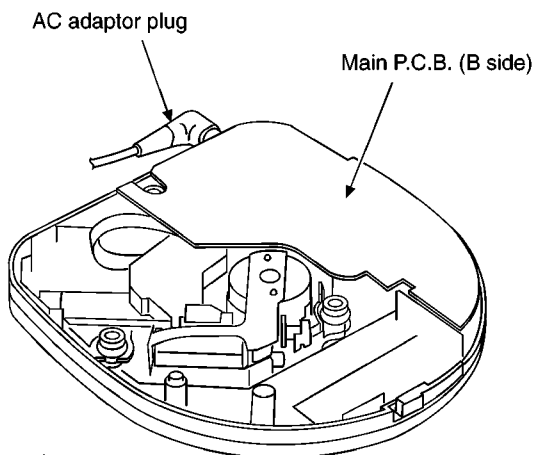
Align the floating rubbers with bosses, and then locate the traverse deck ass'y and main P.C.B. on the intermediate cabinet ass'y.



- Check the main P.C.B. (B side) as shown below.

(Step 5)

Insert the AC adaptor plug into the DC IN jack, and then apply the power.

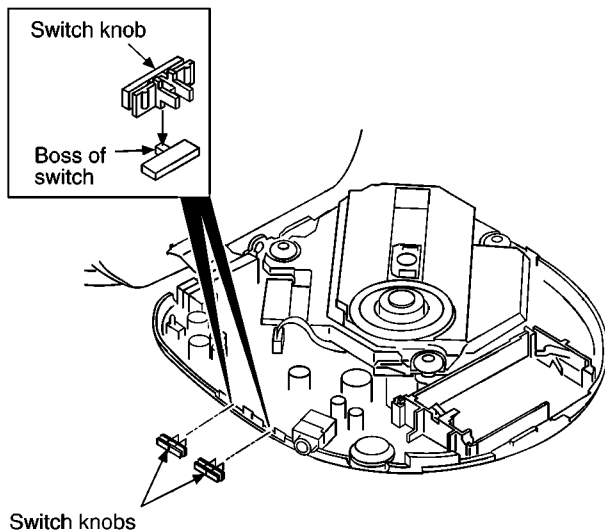


NOTE:

After checking, unsolder the short land to open circuit.

Notice for installation of switch knobs

- Make sure the bosses of switch are fit in the switch knobs.

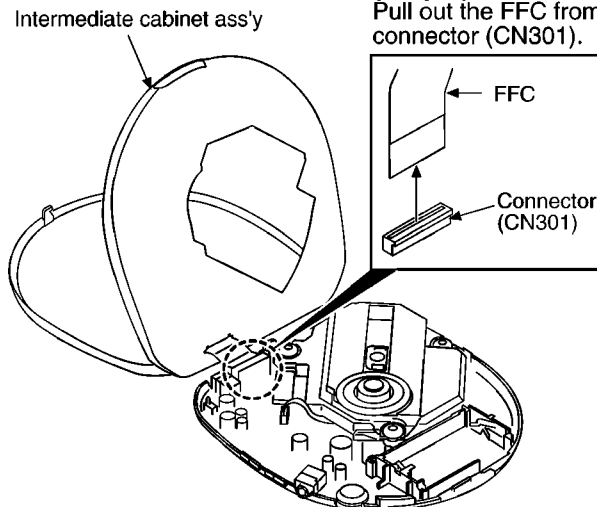


5.2. Replacement for the speaker and CD cover ass'y

- Follow the (Step 1) - (Step 5) of item 5.1.1.

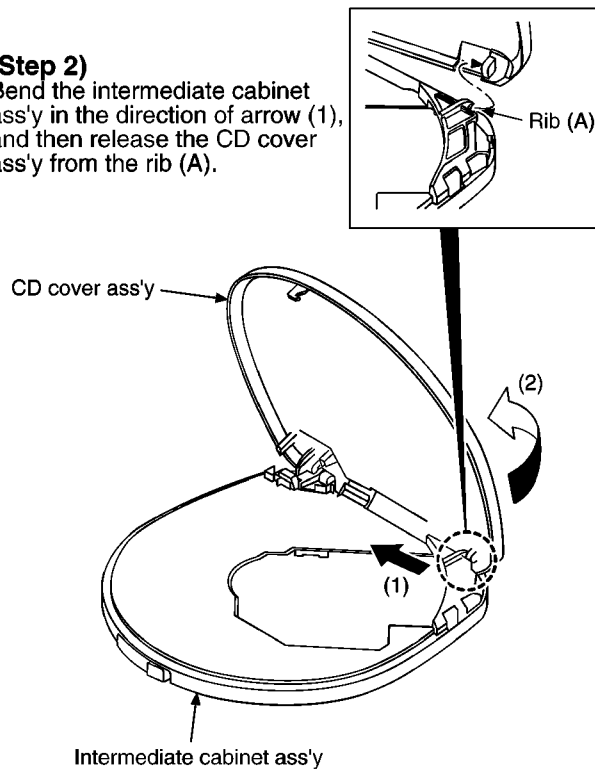
(Step 1)

Pull out the FFC from connector (CN301).



(Step 2)

Bend the intermediate cabinet ass'y in the direction of arrow (1), and then release the CD cover ass'y from the rib (A).

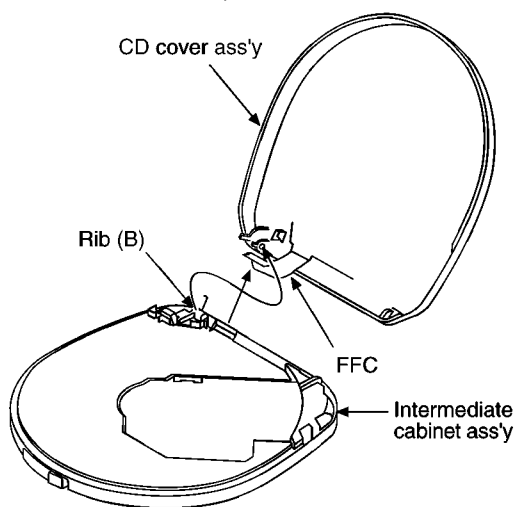
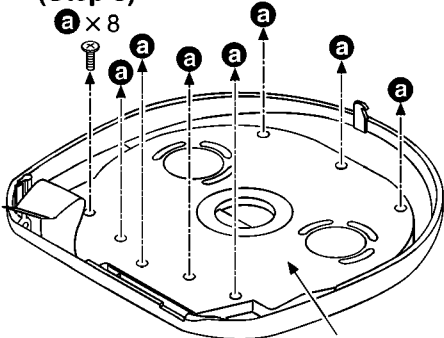


(Step 3)

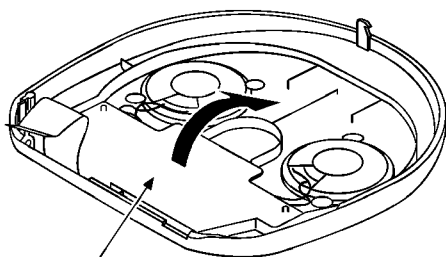
Remove the CD cover ass'y from the rib (B).

(Step 4)

Draw the FFC from the intermediate cabinet ass'y.
(Take care not to damage the FFC.)

**(Step 5)****(Step 6)**

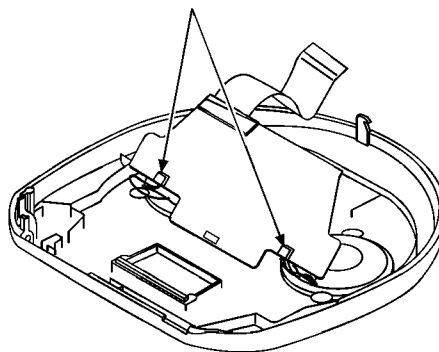
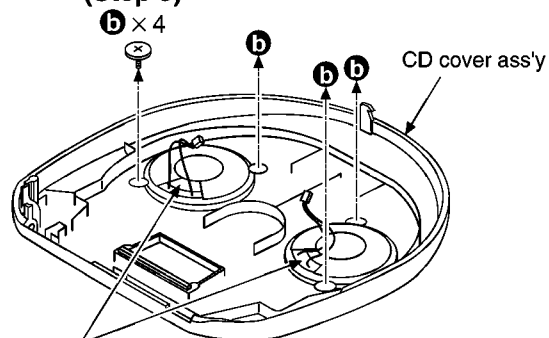
Remove the cover.

**(Step 7)**

Upset the operation P.C.B..

(Step 8)

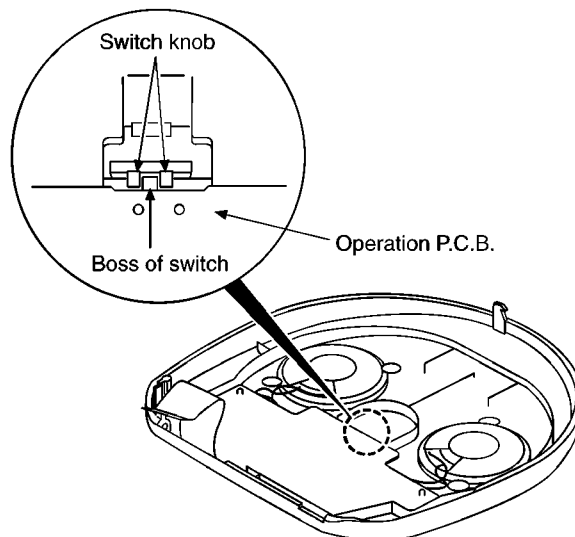
Remove the connector (2 points).

**(Step 9)****(Step 10)**

Remove the speakers.

Notice for installation of switch knob

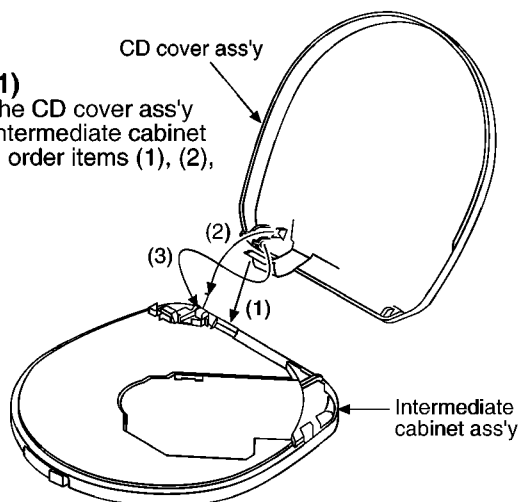
- Make sure the boss of switch are fit in the switch knob.



Installation of CD cover ass'y

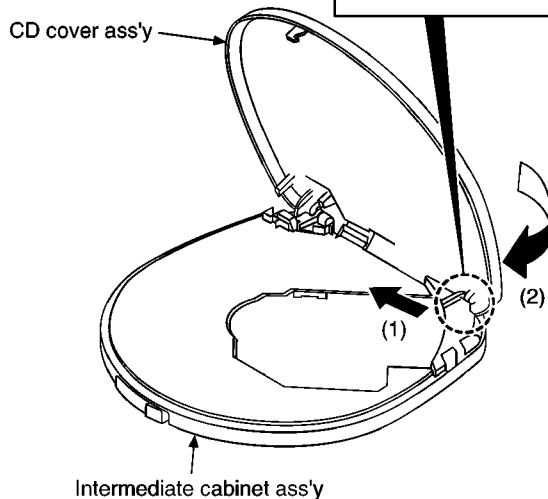
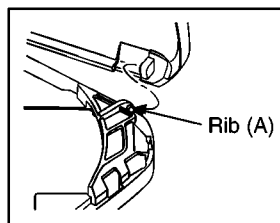
(Step 1)

Install the CD cover ass'y to the intermediate cabinet ass'y in order items (1), (2), (3).



(Step 2)

Bend the intermediate cabinet ass'y in the direction of arrow (1), and then align the CD cover ass'y with the rib (A).

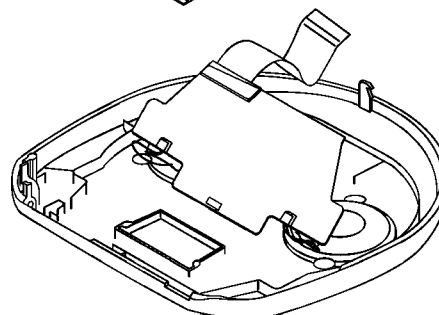
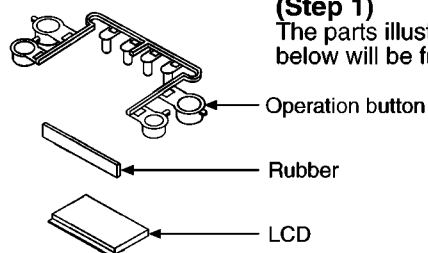


5.3. Replacement for the LCD

- Follow the (Step 1) - (Step 5) of item 5.1.1.
- Follow the (Step 1) - (Step 7) of item 5.2.

(Step 1)

The parts illustrated below will be free.

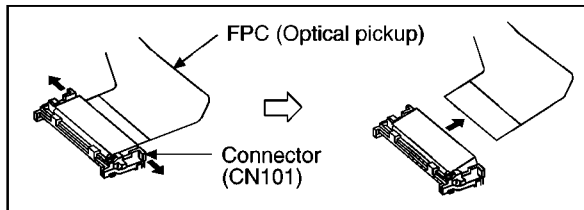


NOTE:

Be careful not to be applied the dust or smudge on the surface rubber.

5.4. Replacement for the traverse motor

- Follow the (Step 1) - (Step 5) of item 5.1.1.



(Step 1)
Pull out the FPC from connector (CN101).

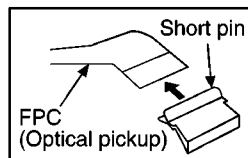
(Step 3)
Remove the traverse deck.

FPC (From the motor)

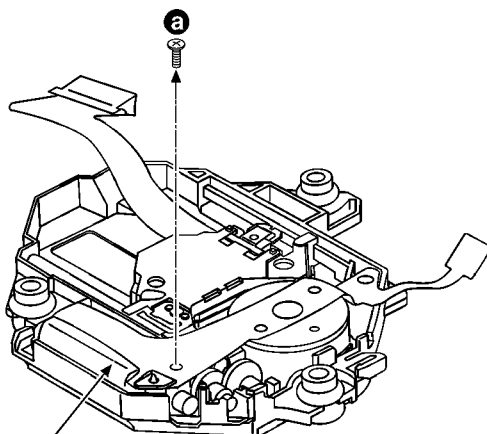
Connector (CN401)

(Step 2)
Pull out the FPC from connector (CN401), and then remove the traverse deck ass'y.

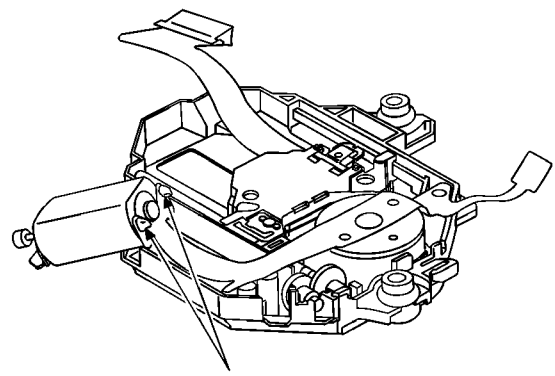
NOTE:
Insert a short pin into the traverse deck's FPC.
(Refer to "Handling Precautions for Traverse Deck".)



(Step 4)



(Step 5)
Remove the traverse motor.



(Step 6)
Unsolder the motor terminals.
(2 points)

5.5. Replacement for the optical pickup

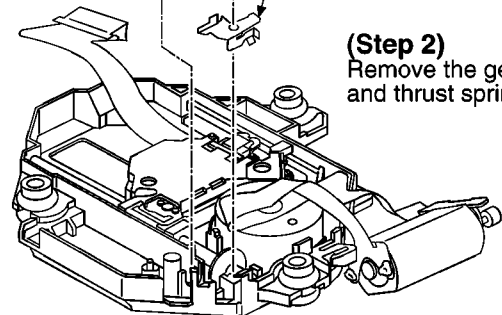
- Follow the (Step 1) - (Step 5) of item 5.1.1.
- Follow the (Step 1) - (Step 5) of item 5.4.

(Step 1)

Gear

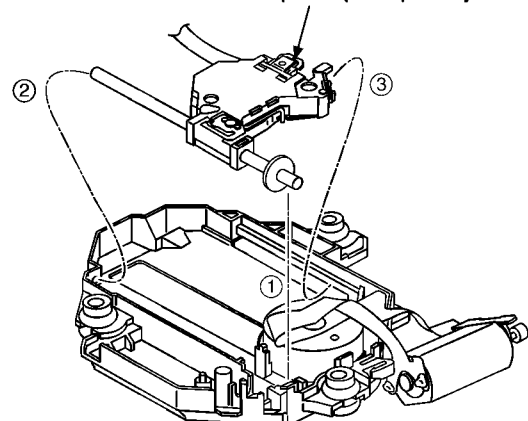
Thrust spring

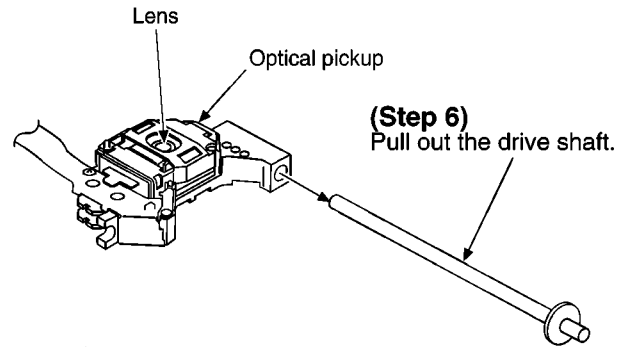
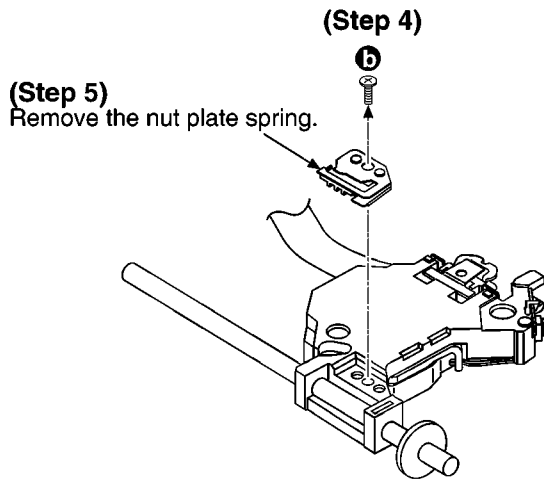
(Step 2)
Remove the gear and thrust spring.



(Step 3)

Remove the optical pickup ass'y.



**NOTE:**

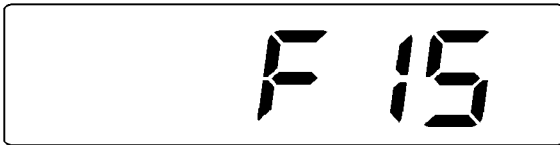
1. Use care to prevent damage the optical pickup, due to the precision construction.
2. Do not apply the grease on the lens of optical pickup.
3. Do not touch the lens of the optical pickup.

6 Display of Self-Diagnostic Function

This unit (SL-PH270A) has self-diagnostic function. It may display below-mentioned on the LCD of this unit.

- The substance of self-diagnostic display.

LCD display



(Press PLAY and STOP button. After 15 seconds, it is displayed for 2 seconds.)

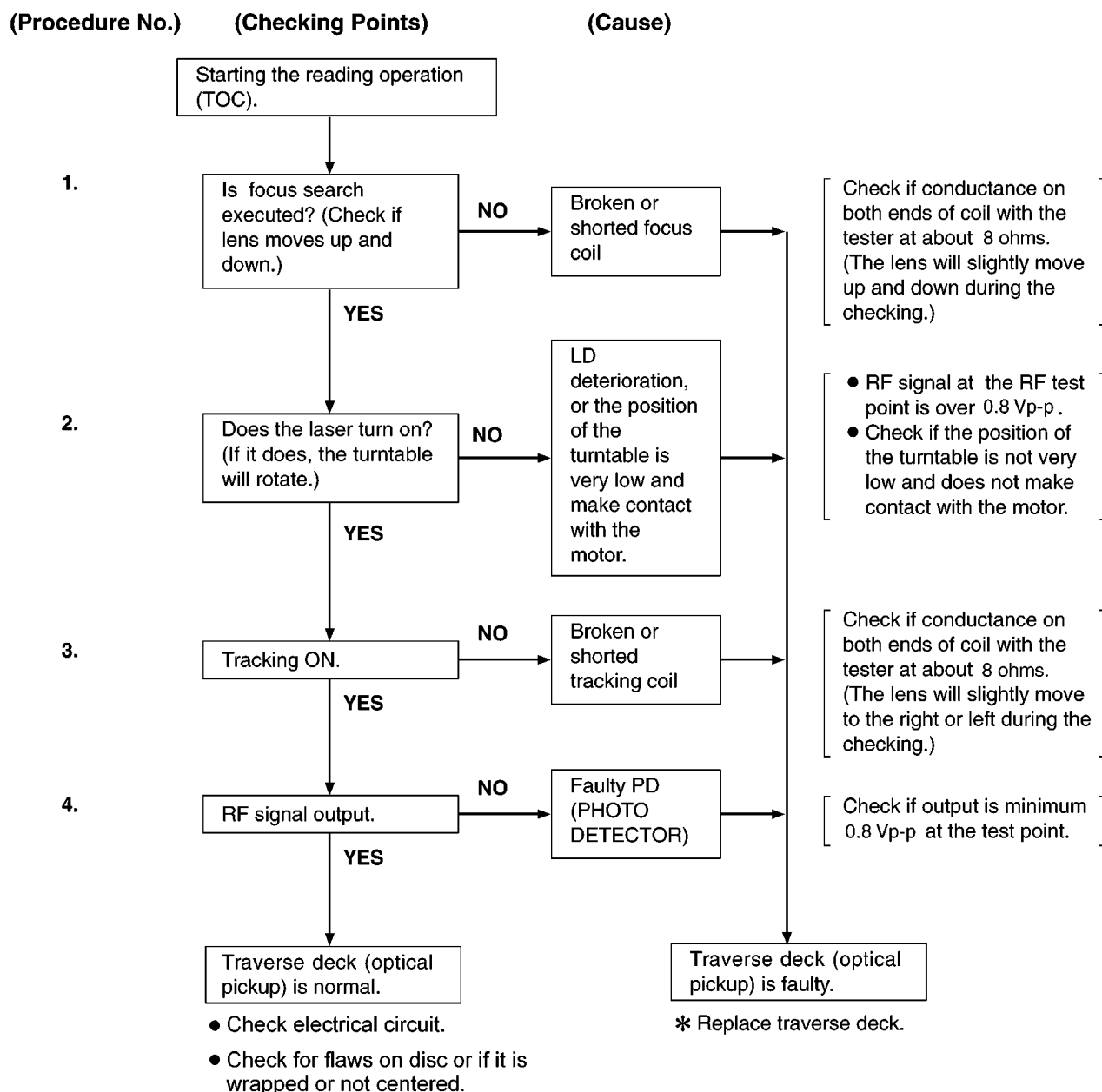
In case of this display, it may be causing for abnormally movements of traverse deck, touching failure of REST detect switch and coming off or cutting off the flexible P.C.B.. It is necessary for confirmation or repair and replacement each parts.

7 Checking the Operation Problems on the Traverse Deck (Optical Pickup)

Make sure to follow the procedures below to check the operation problems of the traverse deck (optical pickup) before

replacing it.

Replace the traverse deck only after the problem is identified.



7.1. Check the operations described below on the traverse deck after replacing

7.1.1. 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).

7.1.2. Checking Manual Search

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

7.1.3. Checking Playability

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

8 Automatic Adjustment Results Display Function (Self-Check Function)

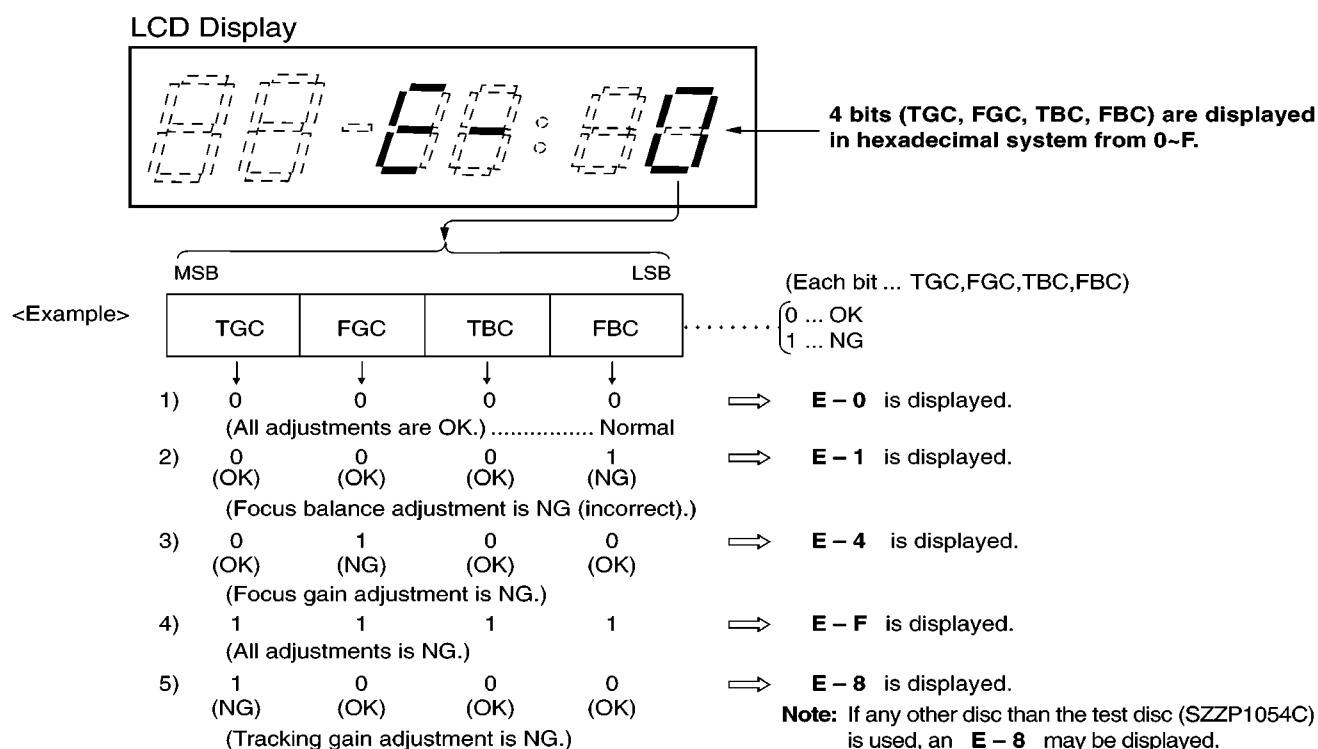
On the unit (SL-PH270A), each automatic adjustment result are displayed on the LCD. This function is convenient to check or identify which automatic adjustment circuit is incorrect.

The followings are the contents of the automatic adjustment result displays (Self-Check Function).

8.1. How to display automatic adjustment results

1. Load the test disc (SZZP1054C).
2. Press the ◀◀ (SKIP/SEARCH) and ▶▶ (SKIP/SEARCH) buttons simultaneously and hold them, and additionally press the ▶|| (PLAY/PAUSE) button.
3. Press the ■ (STOP/OPR OFF) button once.
4. An automatic adjustment result is displayed on the LCD.

8.2. Display of automatic adjustment results (Self-Check Function)



<Example>

Follow the below steps when E-1 is displayed.

(Cause: Focus balance (FBC) is set beyond the limit.)

- Check if
 1. the waveform or voltage of the focus servo circuit is correct, and
 2. the optical pickup returns to the normal state by exchanging the traverse deck.

Follow the below steps when E-4 is displayed.

(Cause: Focus gain (FGC) is set beyond the limit.)

- Check if
 1. the waveform or voltage of the focus servo circuit is correct,
 2. the focus coil of the optical pickup is correct (around 8 ohms), and
 3. the optical pickup returns to the normal state by exchanging the traverse deck.

Follow the below steps when E-F is displayed.

(Cause: All adjustments (TGC, FGC, TBC, FBC) are set beyond the limit.)

- Check if
 1. the optical pickup returns to the normal state by exchanging the traverse deck, and
 2. the waveform or voltage of the servo ICs are correct.

Note:

It is not always necessary to exchange the traverse deck when an error message is displayed.

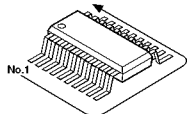
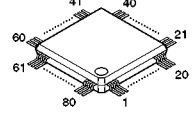
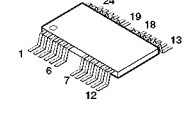
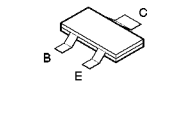
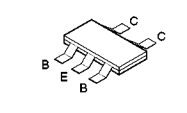
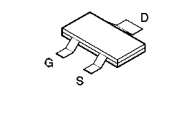
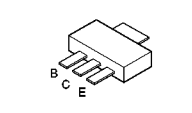
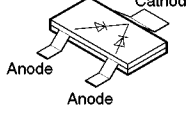
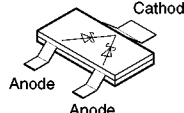
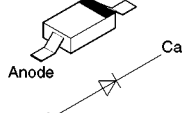
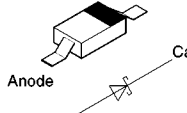
Be sure to check if the circuit is defective or not before exchanging the traverse deck.

Note:

If any other disc than the test disc (SZZP1054C) is used, an error message may be displayed.

This is not a malfunction.

9 Type Illustration of ICs, Transistors and Diodes

	<table><tr><td>NJU7082BVAE1</td><td>8PIN</td></tr><tr><td>AN8839NSBE1</td><td>28PIN</td></tr><tr><td>RS10003E2</td><td>40PIN</td></tr><tr><td>AN8746SAE1</td><td>32PIN</td></tr><tr><td>TK10416MTL</td><td>6PIN</td></tr></table>	NJU7082BVAE1	8PIN	AN8839NSBE1	28PIN	RS10003E2	40PIN	AN8746SAE1	32PIN	TK10416MTL	6PIN	C2BAFD000045 MN662784SA 	C3ABMB000027 		2SB709ATX 2SB1295-6-TB 2SD1328TX 2SD1819ATX DTA114YUA106 UN5110TX
NJU7082BVAE1	8PIN														
AN8839NSBE1	28PIN														
RS10003E2	40PIN														
AN8746SAE1	32PIN														
TK10416MTL	6PIN														
FMG6AT148 	2SK1958T1 	2SB1132T100 	DAN202UT106 	RB715FT106 	MA111TX 										
MA1070400L 															

10 Schematic Diagram Notes

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

Notes:

- S201:** Laser ON/OFF switch in OFF position
(It turns ON with disc holder closed.)
- S202:** Rest detector switch in OFF position
(It turns ON when optical pickup comes to innermost periphery.)
- S309:** Play mode selector (MODE) in NORMAL position (NOR ↔ RANDOM ↔ RESUME)
- S310:** Hold (HOLD) switch in OFF position
- S801:** Anti-shock (A.SHOCK) switch
- S802:** F.skip/search (▶▶▶, ▶▶▶) switch
- S803:** Play/pause (▶||) switch
- S804:** R.skip/search (◀◀◀, ◀◀◀) switch
- S805:** Stop/operation off (■, OPR OFF) switch
- S806:** EQ (EQ) switch
- S807:** Memory/recall (MEMORY/RECALL) switch
- S808:** Repeat (↺) switch
- S809:** Speaker/headphone switch in Headphone position (🔊 (EQ)/🔊)
- VR701:** Headphone volume control VR (VOLUME)

- Important safety notice:

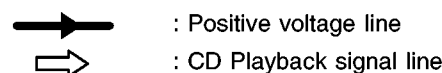
Components identified by  mark have special characteristics important for safety.

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 supply part number is described alone in the replacement parts.
- Voltage and signal line



- The voltage values and waveforms are the reference voltage of this measured by the DC electronic voltmeter (high impedance) and oscilloscope on the basis of GND terminal (DC IN jack). Accordingly, there may arise some errors in the voltage values and waveforms depending upon the internal impedance of the tester or measuring unit.

Measurement conditions:

- AC adaptor is used for power supply.
- Set the headphone VR (VR701) to center position (No.5).
- Set the hold lock and anti-shock switches to ON.
- The parenthesized is the voltage for test disc (1 kHz, L+R, 0 dB) in play mode, and the other, for no disc in stop mode.

• Caution!

IC and LSI are sensitive to static electricity.

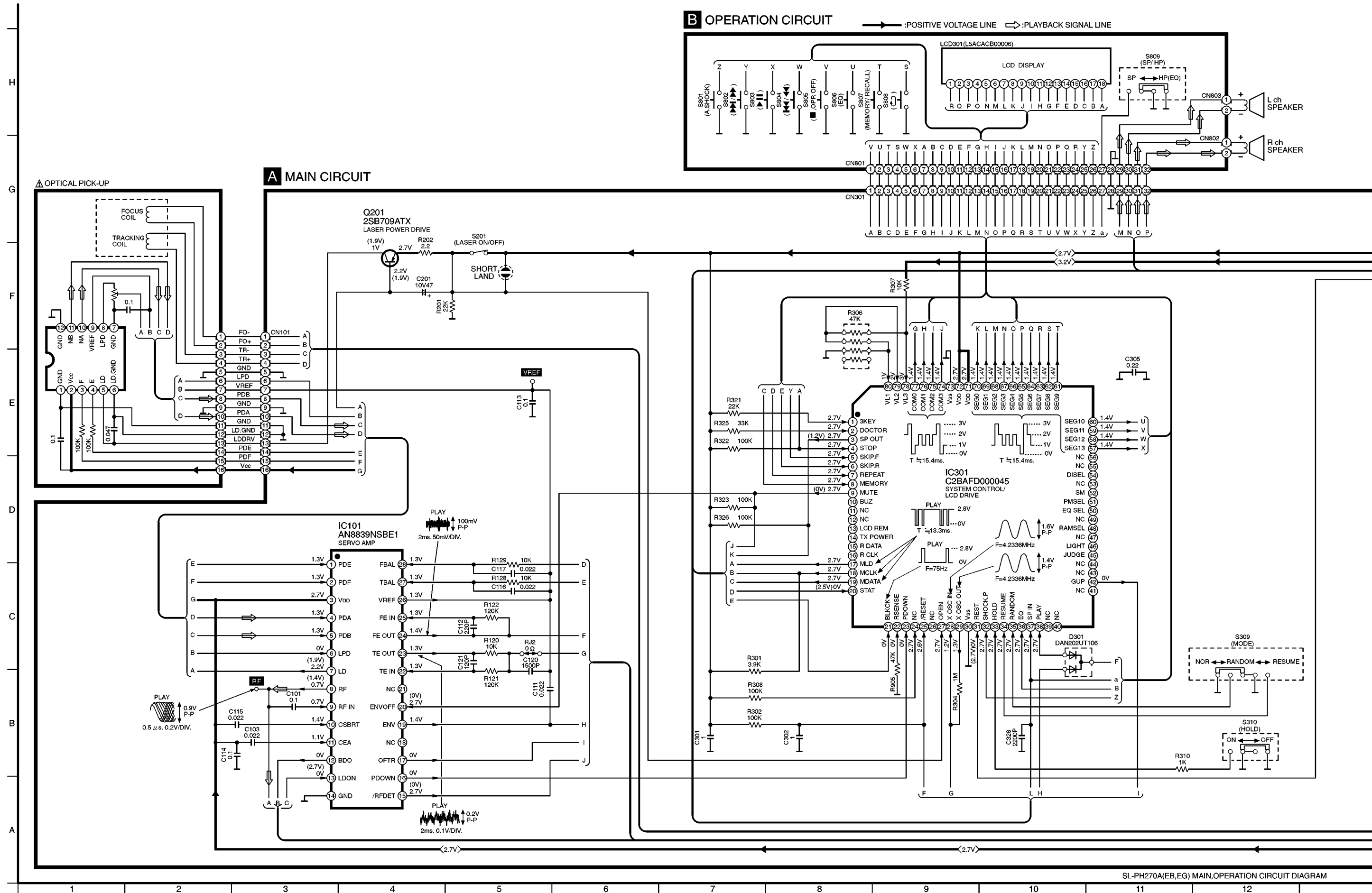
Secondary trouble can be prevented by taking care during repair.

Cover the parts boxes made of plastics with aluminum foil. Ground the soldering iron.

Put a conductive mat on the work table.

Do not touch the legs of IC or LSI with the fingers directly.

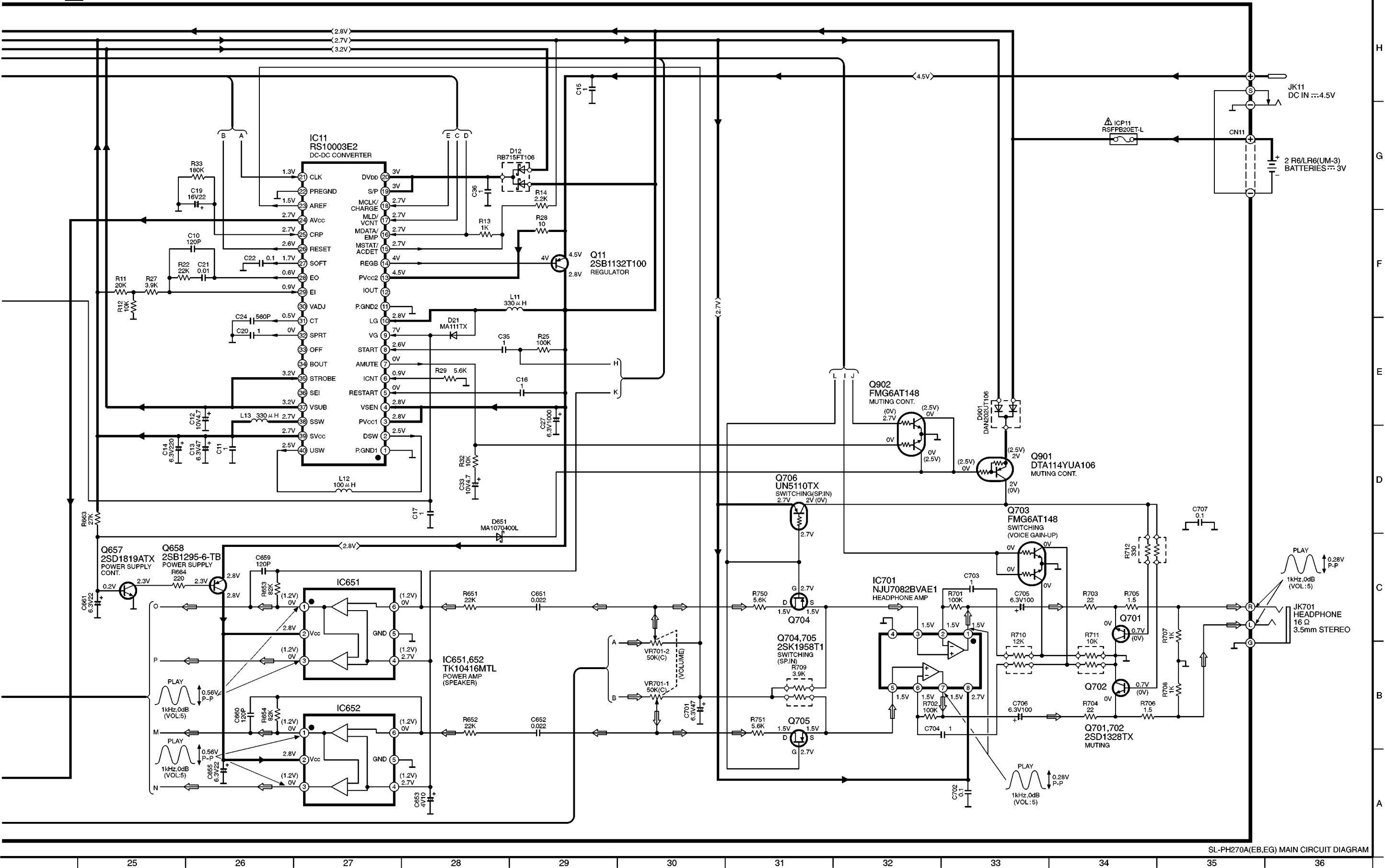
11 Schematic Diagram





A MAIN CIRCUIT

→ : POSITIVE VOLTAGE LINE ⇨ : PLAYBACK SIGNAL LINE

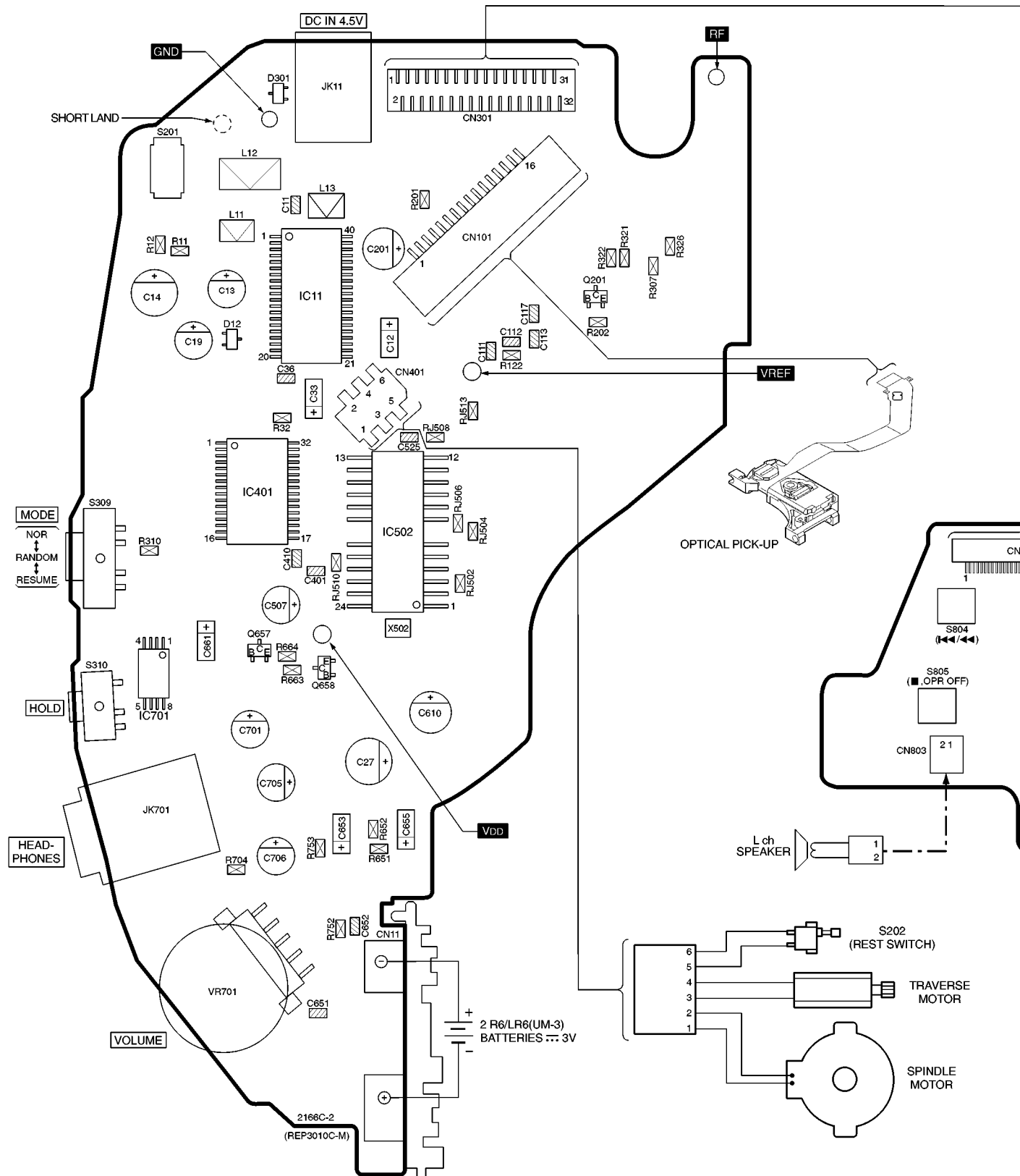


SL-PH270A(EB,EG) MAIN CIRCUIT DIAGRAM

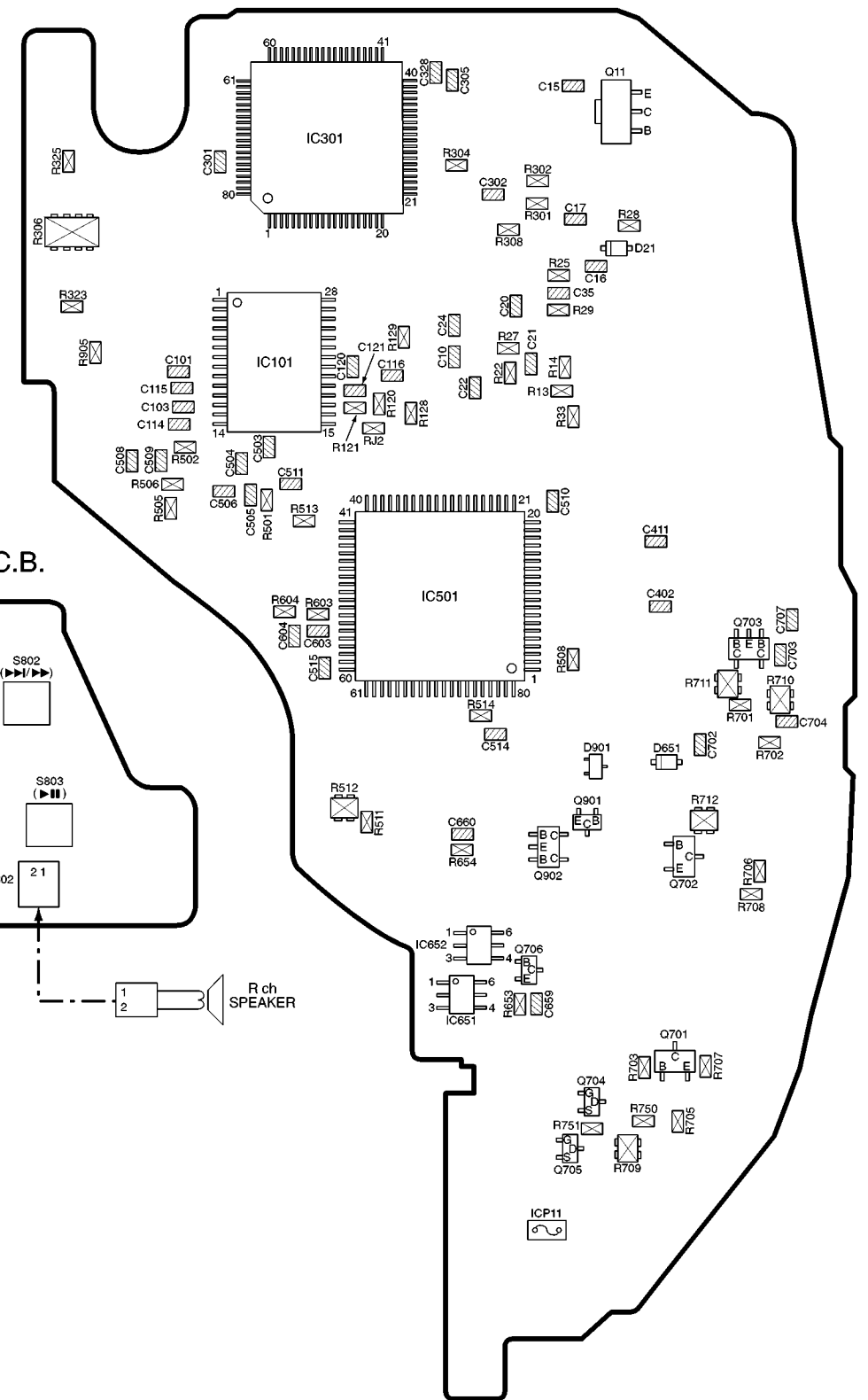
12 Printed Circuit Board and Wiring Connection Diagram

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

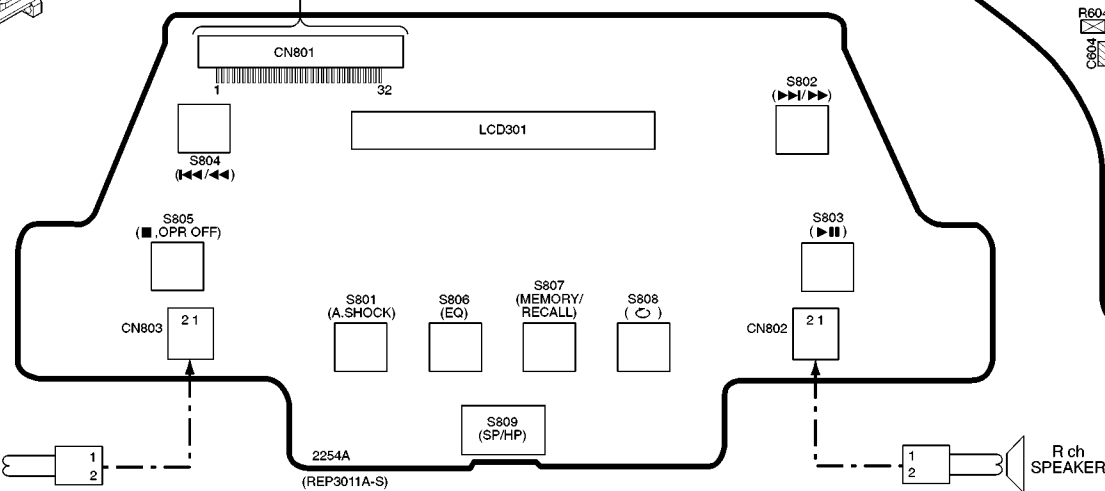
A MAIN P.C.B. (SIDE : A)



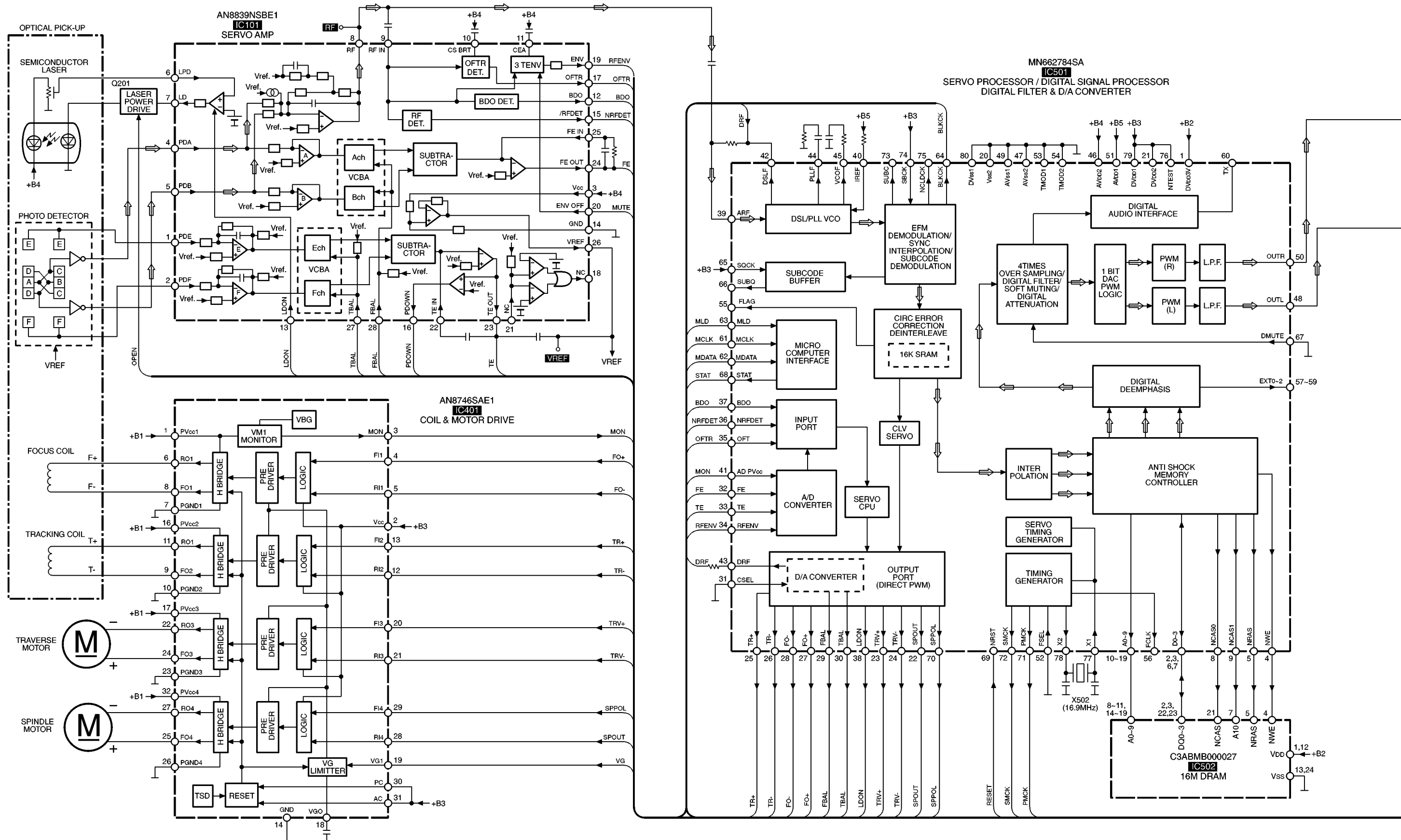
A MAIN P.C.B. (SIDE : B)

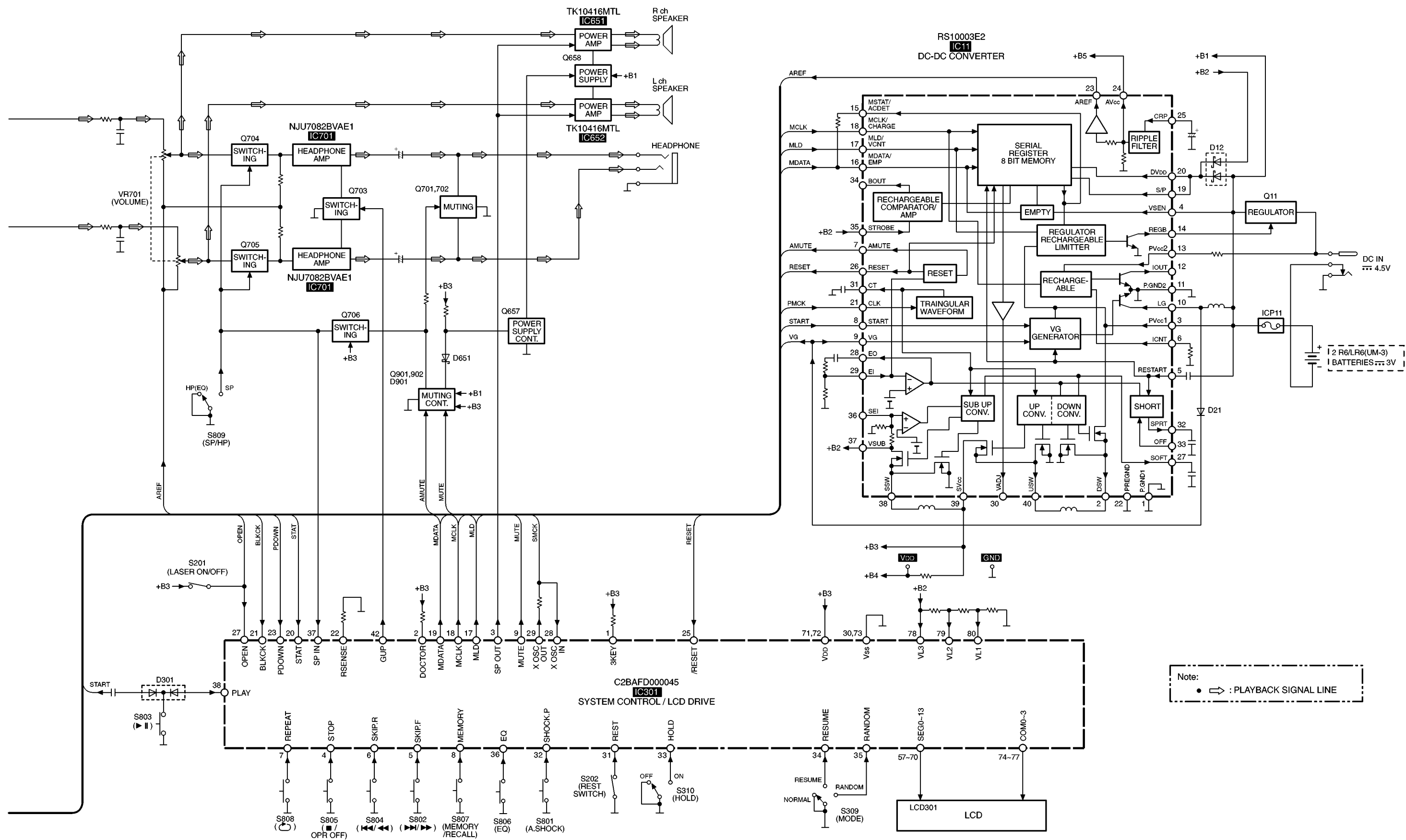


B OPERATION P.C.B.



13 Block Diagram





SL-PH270A(EB,EG) BLOCK DIAGRAM

14 Terminal Function of ICs

14.1. IC11 (RS10003E2): DC-DC Converter

Pin No.	Terminal Name	I/O	Function
1	P.GND1	-	GND
2	DSW	O	DC-DC converter coil drive terminal
3	PV _{CC} 1	I	Power supply terminal
4	VSEN	I	Empty supply terminal (Power supply terminal)
5	RESTART	I	DC-DC converter drive terminal
6	ICNT	I	Charge current setting terminal
7	AMUTE	O	Muting signal output
8	START	I	DC-DC converter start terminal
9	VG	I	Power supply terminal
10	LG	I	Connected to power supply
11	P.GND2	-	GND
12	IOUT	O	Charge signal output
13	PV _{CC} 2	I	Power supply terminal
14	REGB	O	Regulator drive signal output
15	MSTAT/ACDET	O	DC jack detect signal output
16	MDATA/EMP	I	Decline voltage detect signal input
17	MLD/VCNT	I	Regulator voltage select input
18	MCLK/CHARGE	I	Charge ON/OFF terminal
19	S/P	I	Serial/Parallel select terminal (Connected to power supply)
20	DV _{DD}	I	Power supply terminal
21	CLK	I	Clock signal input
22	PREGND	-	GND
23	AREF	O	Audio reference output
24	AV _{CC}	O	Ripple filter output
25	CRP	I	Connected to capacitor
26	RESET	O	Reset detect signal output
27	SOFT	O	Soft start setting terminal (Connected to capacitor)
28	EO	O	DC-DC converter error amp output
29	EI	I	DC-DC converter error amp input
30	VADJ	-	DC-DC converter variable output (Not used, open)
31	CT	O	Triangular wave output (Connected to capacitor)
32	SPRT	O	Power off time-constant setting terminal (Connected to capacitor)
33	OFF	-	DC-DC converter off terminal (Not used, open)
34	BOUT	-	Amp output terminal (Not used, open)
35	STROBE	I	Strobe signal input
36	SEI	-	Sub DC-DC converter, error amp input (Not used, open)
37	VSUB	I	Power supply terminal
38	SSW		
39	SV _{CC}		
40	USW	I	DC-DC converter coil drive terminal

14.2. IC101 (AN8839NSBE2): Servo Amp

Pin No.	Terminal Name	I/O	Function
1	PDE	I	Tracking signal input (1)
2	PDF	I	Tracking signal input (2)
3	V _{DD}	I	Power supply terminal
4	PDA	I	Focus signal input (1)

Pin No.	Terminal Name	I/O	Function
5	PDB	I	Focus signal input (2)
6	LPD	I	APC amp input terminal
7	LD	O	APC amp output terminal
8	RF	O	RF summing output terminal
9	RF IN	I	RF signal input
10	CSBRT	I	Capacitor connection terminal for OFTR
11	CEA	I	Capacitor connection terminal for H.P.F. amp
12	BDO	O	Dropout signal output (H: Dropout)
13	LDON	I	APC control signal input
14	GND	-	GND
15	/RFDET	O	RF det.signal output (L: Detection.)
16	PDOWN	O	Power down signal output
17	OFTR	O	Off track signal output (H: Off track)
18	NC	-	Not used, open
19	ENV	O	RF envelope signal output
20	ENVOFF	I	ENV control signal input
21	NC	-	Not used, open
22	TEIN	I	Tracking error amp input
23	TEOUT	O	Tracking error amp output
24	FEOUT	O	Focus error amp output
25	FEIN	I	Focus error amp input
26	VREF	O	Reference voltage output
27	TBAL	I	Tracking balance signal input
28	FBAL	I	Focus balance signal input

14.3. IC301 (C2BAFD000045): System Control/LCD Drive

Pin No.	Terminal Name	I/O	Function
1	3KEY	I	A/D key signal input (Connected to power supply via resistor)
2	DOCTOR	I	Doctor mode signal input (Connected to power supply via resistor)
3	SP OUT	O	Speaker signal output
4	STOP	I	STOP key signal input
5	SKIP.F	I	SKIP.F key signal input
6	SKIP.R	I	SKIP.R key signal input
7	REPEAT	I	REPEAT key signal input
8	MEMORY	I	MEMORY key signal input
9	MUTE	O	Hard muting output
10	BUZ	O	Beep control output
11	NC	-	Not used, open
12	NC	-	Not used, open
13	LCD REM	-	Not used, open
14	TX POWER	-	Optical output ON signal output (Not used, open)
15	R DATA	-	Not used, open
16	R CLK	-	Not used, open
17	MLD	O	Serial command latch signal output
18	MCLK	O	Serial command clock output
19	MDATA	O	Serial command data output
20	STAT	I	Status signal input
21	BLKCK	I	Block clock signal input
22	RSENSE	I	Remote control sense signal input
23	PDOWN	I	Head amp power OFF signal input
24	NC	I	Not used, connected to power supply via resistor
25	/RESET	I	Reset detect signal input
26	NC	-	Not used, open
27	OPEN	I	Cover open detect signal input
28	XOSCIN	I	Clock signal input (F= 4.2336 MHz)
29	XOSCOUT	O	Clock signal output (F= 4.2336 MHz)

Pin No.	Terminal Name	I/O	Function
30	V _{SS}	-	GND
31	REST	I	REST (innermost position) detect input
32	SHOCK.P	I	SHOCK.P key input
33	HOLD	I	HOLD switch input
34	RESUME	I	RESUME switch input
35	RANDOM	I	RANDOM switch input
36	EQ	I	EQ key input
37	SP IN	I	Speaker key input
38	PLAY	I	PLAY key input
39 41	NC	-	Not used, open
42	GUP	O	Gain control signal output
43 44	NC	-	Not used, open
45	JUDGE	-	Not used, open
46	LIGHT	-	Not used, open
47	NC	-	Not used, open
48	RAMSEL	-	Not used, open
49	NC	-	Not used, open
50	EQ SEL	-	Not used, open
51	PMSSEL	-	Not used, open
52	SM	-	Not used, open
53	NC	-	Not used, open
54	DISEL	-	Not used, open
55 56	NC	-	Not used, open
57 70	SEG13 SEG0	O	LCD segment signal output
71	V _{DD}	I	Power supply input
72	V _{DD}	I	Power supply input
73	V _{SS}	-	GND
74 77	COM3 COM0	O	LCD common signal output
78	VL3	I	Power supply input
79	VL2	I	Power supply input (LCD drive bias)
80	VL1	I	Power supply input (LCD drive bias)

14.4. IC401(AN8746SAE1): Coil & Motor Drive

Pin No.	Terminal Name	I/O	Function
1	PV _{CC} 1	I	Power supply input terminal
2	V _{CC}	I	Power supply input terminal
3	MON	I	A/D reference voltage monitor input terminal
4	FI1	I	Focus coil drive signal input terminal
5	RI1	I	Focus coil drive signal input terminal
6	RO1	O	Tracking coil drive signal output terminal
7	P.GND1	-	GND terminal
8	FO1	O	Tracking coil drive signal output terminal
9	FO2	O	Focus coil drive signal output terminal
10	P.GND2	-	GND terminal
11	RO2	O	Focus coil drive signal output terminal
12	RI2	I	Tracking coil drive signal input terminal
13	FI2	I	Tracking coil drive signal input terminal
14	GND	-	GND terminal
15	NC	-	Not used, open
16	PV _{CC} 2	I	Power supply input terminal
17	PV _{CC} 3	I	Power supply input terminal
18	VGO	O	Connected to GND via capacitor
19	VGI	I	Power supply input terminal
20	FI3	I	Traverse motor drive signal input terminal
21	RI3	I	Traverse motor drive signal input terminal
22	RO3	O	Traverse motor drive signal output terminal

Pin No.	Terminal Name	I/O	Function
23	P.GND3	-	GND terminal
24	FO3	O	Traverse motor drive signal output terminal
25	FO4	O	Spindle motor drive signal output terminal
26	P.GND4	-	GND terminal
27	RO4	O	Spindle motor drive signal output terminal
28	RI4	I	Spindle motor drive signal input terminal
29	FI4	I	Spindle motor drive signal input terminal
30	PC	I	Power supply input terminal
31	AC	I	Power supply input terminal
32	PV _{CC} 4	I	Power supply input terminal

14.5. IC501 (MN662784SA): Servo Processor/Digital Signal Processor/Digital Filter & D/A Converter

Pin No.	Terminal Name	I/O	Function
1	DV _{DD} 3V	I	Power supply terminal
2	D0	I/O	Data 0 input/output terminal
3	D1	I/O	Data 1 input/output terminal
4	NWE	O	Write enable signal output
5	NRAS	O	RAS control signal output
6	D2	I/O	Data 2 input/output terminal
7	D3	I/O	Data 3 input/output terminal
8	NCAS0	O	CAS control 0 signal output
9	NCAS1	O	CAS control 1 signal output
10 14	A8 A4	O	Address 8 - 4 signal output
15	A9	O	Address 9 signal output
16 19	A0 A3	O	Address 0 - 3 signal output
20	V _{SS}	-	GND
21	DV _{DD} 2	I	Power supply terminal
22	SPOUT	O	Spindle motor drive signal output
23	TRV+	O	Traverse motor drive signal output
24	TRV-	O	Traverse motor drive signal output
25	TR+	O	Tracking coil drive signal output
26	TR-	O	Tracking coil drive signal output
27	FO+	O	Focus coil drive signal output
28	FO-	O	Focus coil drive signal output
29	FBAL	O	Focus balance adj.signal output
30	TBAL	O	Tracking balance adj.signal output
31	CSEL	I	Connected to GND
32	FE	I	Focus error signal input
33	TE	I	Tracking error signal input
34	RFENV	I	RF envelope signal input
35	OFT	I	Off track signal input (H: Off track)
36	NRFDET	I	RF detect signal input (L: Detect)
37	BDO	I	Drop out signal input (H: Drop out)
38	LDON	O	Laser on signal output (H: ON)
39	ARF	I	RF signal input
40	IREF	I	Reference current input terminal
41	AD PV _{CC}	O	A/D converter reference voltage output
42	DSL F	O	DSL loop filter output
43	DRF	O	Bias output for DSL
44	PLL F	O	PLL loop filter output
45	VCOF	O	Loop filter output
46	AV _{DD} 2	I	Power supply terminal
47	AV _{SS} 2	-	GND
48	OUTL	O	Audio L ch output
49	AV _{SS} 1	-	GND

Pin No.	Terminal Name	I/O	Function
50	OUTR	O	Audio R ch output
51	AV _{DD} 1	I	Power supply terminal
52	FSEL	-	Noise filter select terminal (H: ON, L: OFF)
53	TMOD1	-	Terminal mode select 1 terminal (L: Normal)
54	TMOD2	-	Terminal mode select 2 terminal (L: Normal)
55	FLAG	-	Flag signal output (Not used, open)
56	FCLK	-	Frame clock signal output (Not used, open)
57	EXT0	-	Expansion port 0 output (Not used, open)
58	EXT1	-	Expansion port 1 output (Not used, open)
59	EXT2	-	Expansion port 2 output (Not used, open)
60	TX	-	Digital audio interface signal output (Not used, open)
61	MCLK	I	Micom command clock signal input
62	MDATA	I	Micom command data signal input
63	MLD	I	Micom command load signal input (L: Load)
64	BLKCK	O	Sub code block clock signal output (f=75 kHz)
65	SQCK	I	Sub code Q resistor clock output (Connected to V _{DD})
66	SUBQ	-	Sub code Q data output (Not used, open)
67	DMUTE	-	Muting signal input (Not used, connected to GND)
68	STAT	O	Status signal output
69	NRST	I	Reset signal input (L: Reset)
70	SPPOL	O	Spindle motor drive signal output
71	PMCK	O	Clock signal output (88.2 kHz)
72	SMCK	O	Clock signal output (4.2336 MHz)
73	SUBC	-	Sub code signal output (Not used, open)
74	SBCK	I	Sub code output clock input (Connected to V _{DD})
75	NCLDCK	-	Sub code frame clock output (Not used, open)
76	NTEST	I	Test terminal (Connected to V _{DD})
77	X1	I	Crystal oscillator input (f=16.9 MHz)
78	X2	O	Crystal oscillator output (f=16.9 MHz)
79	DV _{DD} 1	I	Power supply terminal
80	DV _{SS} 1	-	GND

15 Replacement Parts List

Notes:

- Important safety notice:

Components identified by $\triangle$ 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 manufactures specified parts shown in the parts list.

- The parenthesized indications in Remarks columns specify the areas. (Refer to the cover page for area.)
- The <IA> <IB> <IC> marks in Remarks indicate language of instruction manual.

[<IA>: English/ Spanish/ Swedish/ German/ Italian/ French, <IB>: Netherlands/ Danish/ Russian/ Czech/ Polish/ Portugues, <IC>:English]

- The marking [RTL] indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, it will no longer be available.
- All parts are supplied by MESA.

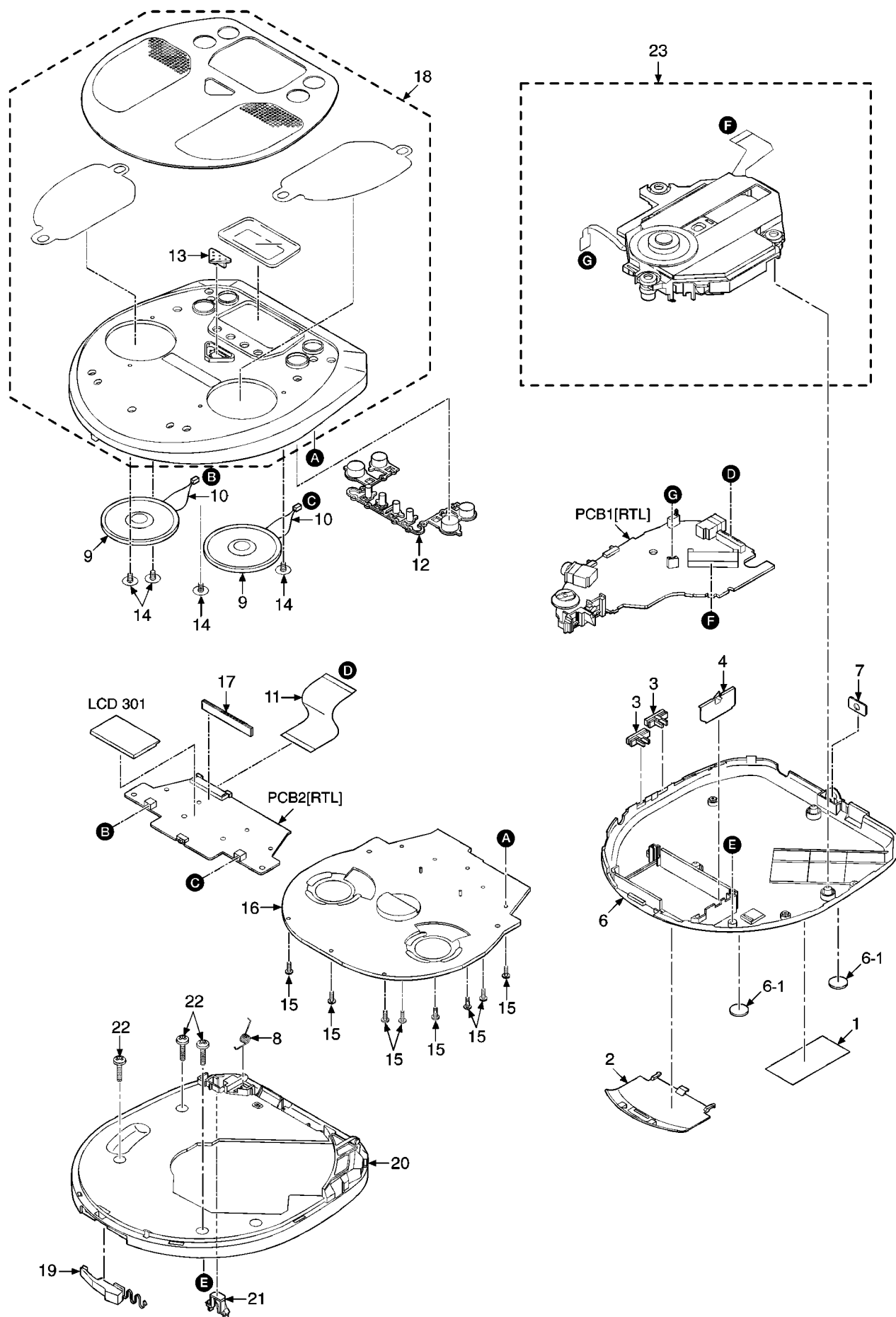
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
1	RGN2329-K	NAME PLATE	1	(EG)
1	RGN2330-K	NAME PLATE	1	(EB)
2	RKK0135-H	BATTERY LID	1	
3	RGV0200-K1	KNOB, HOLD/PLAY MODE	2	
4	RJC93020-1	BATTERY TERMINAL	1	
6	RFKJLSX270EG	BOTTOM CABINET ASS'Y	1	
6-1	RKA0112-K	FOOT	2	
7	RMA0677	BATT.FITTING PLATE	1	
8	RMB0648	OPEN SPRING	1	
9	RAS3P20-M	SPEAKER	2	L0AA03A00010
10	REX1029	WIRE ASS'Y	2	
11	REZ1319-1	FFC (32P)	1	
12	RGU1879-S	BUTTON, OPERATION	1	
13	RGV0259-A	KNOB, SP/HP	1	
14	RHD20025	SCREW	4	
15	RHE5079YA	SCREW	8	
16	RMR1308-H	LID COVER	1	
17	RSQ0073	ZEBRA RUBBER	1	
18	RYF0554-S	CD LID UNIT	1	
19	RGU1838-H	BUTTON, OPEN	1	
20	RKM0411-H2	INTERMEDIATE CABINET	1	
21	RML0580	STOPPER	1	
22	XTN17+6GFZ	SCREW	3	
23	RAE0145Z	TRAVERSE DECK	1	$\triangle$
23-1	RAF0142A	OPTICAL PICKUP	1	$\triangle$
23-2	RDG0305	GEAR	1	
23-3	RDG0306	GEAR	1	
23-4	RJB2550A	TRAVERSE FPC	1	
23-5	RMG0449-H	FLOATING RUBBER	3	
23-6	RMC0264	THRUST SPRING	1	
23-7	RXQ0482	NUT PLATE SPRING	1	
23-8	RXQ0525-1	TRAVERSE MOTOR	1	
23-9	SNSD38	SCREW	1	
23-10	XQN17+BG45	SCREW	1	
23-11	XQN17+CG45	SCREW	1	
23-12	XQN2+BG55	SCREW	1	
A1	RFEA403B-S	AC ADAPTOR	1	(EB) $\triangle$
A1	RFEA419E-M	AC ADAPTOR	1	(EG) $\triangle$

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
A2	L0BAB0000123	STEREO INSIDE PHONES	1	
A3	RXQ0709	HOOK	1	
A4	RQCB0169	SERVICE CENTER LIST	1	
A5	RQT6516-E	INSTURCTION MANUAL	1	(EG) <IA>
A5	RQT6517-H	INSTURCTION MANUAL	1	(EG) <IB>
A5	RQT6518-B	INSTURCTION MANUAL	1	(EB) <IC>
C10	ECJ1XC1H121J	50V 120P	1	
C11	ECUVNA105ZFV	10V 1U	1	F1H1A105A030
C12	F3K1A4750002	10V 4.7U	1	
C13	RCE0JSL470IX	6.3V 47U	1	F2D0J4700006
C14	RCE0JKA221IG	6.3V 220U	1	F2A0J2210012
C15-17	ECUVNA105ZFV	10V 1U	3	F1H1A105A030
C19	ECA1CAK220XH	16V 22U	1	
C20	ECUVNA105ZFV	10V 1U	1	F1H1A105A030
C21	ECUVNH103KBV	50V 0.01U	1	F1H1H103A748
C22	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C24	ECUV1H561KBV	50V 560P	1	F1H1H561A013
C27	F2A0J102A130	6.3V 1000U	1	
C33	F3K1A4750002	10V 4.7U	1	
C35,36	ECUVNA105ZFV	10V 1U	2	F1H1A105A030
C101	ECJ1VB1C104K	16V 0.1U	1	
C103	ECUVNE223KBV	25V 0.022U	1	F1H1E223A050
C111	ECUVNE223KBV	25V 0.022U	1	F1H1E223A050
C112	ECUV1H221KBV	50V 220P	1	F1H1H2210001
C113,14	ECUZNC104ZV	16V 0.1U	2	F1H1C1040008
C115-17	ECUVNE223KBV	25V 0.022U	3	F1H1E223A050
C120	ECUV1H152KBV	50V 1500P	1	F1H1H152A013
C121	ECJ1XC1H121J	50V 120P	1	
C201	ECEALAKS470	10V 47U	1	
C301,02	ECUVNA105ZFV	10V 1U	2	F1H1A105A030
C305	ECUV1C224ZFV	16V 0.22U	1	F1H1C2240004
C328	ECJ1VB1H222K	35V 2200P	1	
C401	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C402	ECUVNA105ZFV	10V 1U	1	F1H1A105A030
C410	ECUVNA105ZFV	10V 1U	1	F1H1A105A030
C411	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C503	ECUV1H561KBV	50V 560P	1	F1H1H561A013
C504	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C505	ECUVNE223KBV	25V 0.022U	1	F1H1E223A050
C506	ECUVNA224KBV	10V 0.22U	1	F1H1A224A028
C507	RCE0JKA221IG	6.3V 220U	1	F2A0J2210012
C508	ECUVNJ474KBV	6.3V 0.47U	1	F1H0J474A002
C509	ECUVNH103KBV	50V 0.01U	1	F1H1H103A748
C510,11	ECUZNC104ZV	16V 0.1U	2	F1H1C1040008
C514	ECJ1VB1H102K	50V 1000P	1	
C515	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C525	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C603,04	ECUV1H272KBV	50V 2700P	2	F1H1H272A009
C610	ECA0JAK470XH	6.3V 47U	1	
C651,52	ECUVNE223KBV	25V 0.022U	2	F1H1E223A050
C653	RCST0GY106RG	4V 10U	1	F3F0G1060003
C655	RCST0JY226RG	6.3V 22U	1	F3F0J2260002
C659,60	ECJ1XC1H121J	50V 120P	2	
C661	RCST0JY226RG	6.3V 22U	1	F3F0J2260002
C701	ECA0JAK470XH	6.3V 47U	1	
C702	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
C703,04	ECUVNJ105KBV	6.3V 1U	2	F1H0J105A002
C705,06	ECA0JAK101XH	6.3V 100U	2	
C707	ECUZNC104ZV	16V 0.1U	1	F1H1C1040008
CN11	K4ZZ02000071	BATTERY TERMINAL	1	
CN101	RJS2A6216T	CONNECTOR (16P)	1	K1MN16B00027
CN301	RJS2A6132T	CONNECTOR (32P)	1	K1MN32A00014
CN401	RJS2A5106T1	CONNECTOR (6P)	1	K1MN06A00021
CN801	RJS2A4532T	CONNECTOR (32P)	1	

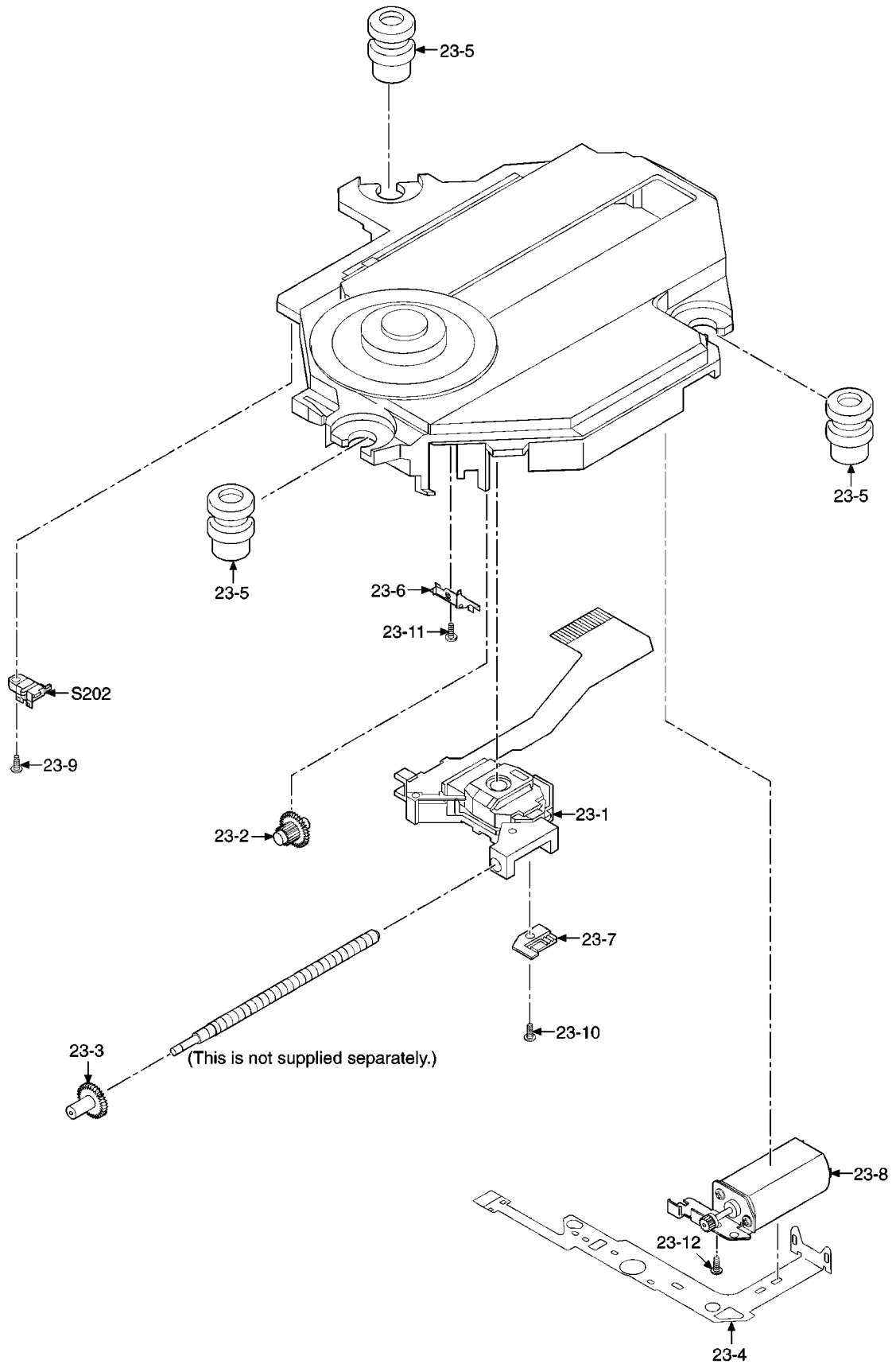
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
CN802,03	RJT120C02T	CONNECTOR(2P)	2	K1KA02B00053
D12	RB715FT106	DIODE	1	B0JDBE000002
D21	MA2J11100L	DIODE	1	
D301	DAN202UT106	DIODE	1	B0ADCF000012
D651	MA1070400L	DIODE	1	MA2J70400L
D901	DAN202UT106	DIODE	1	B0ADCF000012
IC11	C0DBZZH00007	IC	1	
IC101	AN8839NSBE2	IC	1	AN8839NSB-E2
IC301	C2BAFD000045	IC	1	
IC401	AN8746SAE1	IC	1	AN8746SA-E1
IC501	MN662784SA	IC	1	
IC502	C3ABMB000027	IC	1	
IC651,52	TK10416MTL	IC	2	C1BA00000319
IC701	NJU7082BVAE1	IC	1	
ICP11	K5H102Z00002	IC PROTECTOR	1	△
JK11	RJJ43K09-C	JACK,DC IN	1	K2EB2B000006
JK701	RJJ33TK07-C	JACK,H.P.	1	K2HC103B0054
L11	RLQU331KT-W	COIL	1	G1C331K00004
L12	G1A101D00007	COIL	1	
L13	RLQU331KT-W	COIL	1	G1C331K00004
LCD301	L5ACACB00006	LCD	1	
P1	RPK1783	GIFT BOX	1	
P2	RPQ0836-3	PAD 1	1	
P3	RPQ0924	PAD 2	1	
P4	RPQ0966	PAD 3	1	
P5	RPF0111-2	PROTECTION BAG(UNIT)		
PCB1	REP3010C-M	MAIN P.C.B.ASS'Y	1	[RTL]
PCB2	REP3011A-S	OPR P.C.B.ASS'Y	1	[RTL]
Q11	B1ADMD000001	TRANSISTOR	1	
Q201	2SB709A	TRANSISTOR	1	2SB0709A
Q657	2SD1819A0L	TRANSISTOR	1	
Q658	2SB1295-6-TB	TRANSISTOR	1	B1ADKB000001
Q701,02	2SD132800L	TRANSISTOR	2	
Q703	FMG6AT148	TRANSISTOR	1	B1GBCEJA0001
Q704,05	B1CFHA000001	TRANSISTOR	2	
Q706	UN5110TX	TRANSISTOR	1	UNR511000L
Q901	B1GDCFJN0011	TRANSISTOR	1	
Q902	FMG6AT148	TRANSISTOR	1	B1GBCEJA0001
R11	ERA3YED203V	1/16W 20K	1	
R12	ERA3YED103V	1/16W 10K	1	
R13	ERJ3GEYJ102V	1/16W 1K	1	
R14	ERJ3GEYJ222V	1/16W 2.2K	1	
R22	ERJ3GEYJ223V	1/16W 22K	1	D0GB223JA002
R25	ERJ3GEYJ104Z	1/16W 100K	1	
R27	ERJ3GEYJ392V	1/16W 3.9K	1	
R28	ERJ3GEYJ100V	1/16W 10	1	
R29	ERJ3GEYJ562V	1/16W 5.6K	1	D0GB562JA002
R32	ERJ3GEYJ103Z	1/16W 10K	1	
R33	ERA3YKD184V	1/16W 180K	1	
R120	ERJ3GEYJ103Z	1/16W 10K	1	
R121,22	ERJ3GEYJ124V	1/16W 120K	2	D0GB124JA002
R128,29	ERJ3GEYJ103Z	1/16W 10K	2	
R201	ERJ3GEYJ223V	1/16W 22K	1	D0GB223JA002
R202	ERJ3GEYJ2R2V	1/16W 2.2	1	D0GB2R2JA002
R301	ERJ3GEYJ392V	1/16W 3.9K	1	
R302	ERJ3GEYJ104Z	1/16W 100K	1	
R304	ERJ3GEYJ105V	1/16W 1M	1	
R306	EXBV8V473JV	1/16W 47K	1	
R307	ERJ3GEYJ103Z	1/16W 10K	1	
R308	ERJ3GEYJ104Z	1/16W 100K	1	
R310	ERJ3GEYJ102V	1/16W 1K	1	
R321	ERJ3GEYJ223V	1/16W 22K	1	D0GB223JA002

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R322,23	ERJ3GEYJ104Z	1/16W 100K	2	
R325	ERJ3GEYJ333V	1/16W 33K	1	D0GB333JA002
R326	ERJ3GEYJ104Z	1/16W 100K	1	
R501	ERJ3GEYJ683V	1/16W 68K	1	D0GB683JA002
R502	ERJ3GEYJ563V	1/16W 56K	1	
R505	ERJ3GEYJ391V	1/16W 390	1	
R506	ERJ3GEYJ222V	1/16W 2.2K	1	
R508	ERJ3GEYJ1R0V	1/16W 1	1	
R511	ERJ3GEYJ222V	1/16W 2.2K	1	
R512	EXBV4V222JV	1/16W 2.2K	1	
R513	ERJ3GEYJ104Z	1/16W 100K	1	
R514	ERJ3GEYJ681V	1/16W 680	1	D0GB681JA002
R603,04	MCR03PZHJ561	1/16W 560	2	
R651,52	ERJ3GEYJ223V	1/16W 22K	2	D0GB223JA002
R653,54	ERJ3GEYJ823V	1/16W 82K	2	D0GB823JA002
R663	ERJ3GEYJ273V	1/16W 27K	1	D0GB273JA002
R664	ERJ3GEYJ221V	1/16W 220	1	
R701,02	ERJ3GEYJ104Z	1/16W 100K	2	
R703,04	ERJ3GEYJ220V	1/16W 22	2	
R705,06	ERJ3GEYJ1R5V	1/16W 1.5	2	
R707,08	ERJ3GEYJ102V	1/16W 1K	2	
R709	EXBV4V392J	1/32W 3.9K	1	D1H43922A001
R710	EXBV4V123J	1/32W 12K	1	D1H412320001
R711	EXBV4V103JV	1/16W 10K	1	
R712	EXBV4V331JV	1/32W 330	1	
R750-53	ERJ3GEYJ562V	1/16W 5.6K	4	D0GB562JA002
R905	ERJ3GEYJ473V	1/16W 47K	1	D0GB473JA002
RJ2	ERJ3GEY0R00V	CHIP JUMPER	1	
RJ502	ERJ3GEY0R00V	CHIP JUMPER	1	
RJ504	ERJ3GEY0R00V	CHIP JUMPER	1	
RJ506	ERJ3GEY0R00V	CHIP JUMPER	1	
RJ508	ERJ3GEY0R00V	CHIP JUMPER	1	
RJ510	ERJ3GEY0R00V	CHIP JUMPER	1	
RJ513	ERJ3GEY0R00V	CHIP JUMPER	1	
S201	ESE11SV6	SW,LASER ON/OFF	1	
S202	ESE11HS4	SW,REST DET.	1	
S309	RSS3A007-1A	SW,MODE	1	K0D113B00037
S310	RSS2A010-1A	SW,HOLD	1	K0D112B00071
S801-08	RS00051-P	SW,PUSH	8	
S809	RSS2A010-1A	SW,HP/SP	1	K0D112B00071
VR701	EVUTUFB11C54	V.R.,VOLUME	1	
X502	H2D169500016	OSCILLATOR	1	

16 Cabinet Parts Location



17 Traverse Unit Parts Location



18 Packaging

