

Service Manual

COMPACT
disc
DIGITAL AUDIO

DIGITAL

MASH^{*}
multi-stage noise shaping

Portable CD Player

SL-XP190

Colour

(K)...Black Type



Area

Suffix for Model No.	Area	Colour
(E)	Europe.	(K)
(EB)	Great Britain.	
(EG)	Germany and Italy.	
(GC)	Asia, Latin America, Middle Near East and Africa.	

※ • MASH is a trademark of NTT.

Please file and use this manual together with the service manual for Model No. SL-S190, Order No. AD9505147C1.

Note: • This service manual is provided to indicate the main differences between the original model No. SL-S190 (P) and the subsequent model No. SL-XP190 (E, EB, EG, GC).

CHANGES

■ SPECIFICATIONS

SL-XP190 (P)

■ General

Power consumption:
Using AC adaptor; 4.5 W



SL-XP190 (E, EB, EG, GC)

■ General

Power consumption:
Using AC adaptor; 6.0 W

⚠ 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.

Technics[®]

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■ 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: 800 nm
Maximum output radiation power from pickup: 100μW/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 Laserdioden. Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

Wellenlänge: 800 nm
Maximale Strahlungsleistung der Lasereinheit: 100μW/VDE

Die Strahlung an der Lasereinheit ist ungefährlich, wenn folgende Punkte beachtet werden:

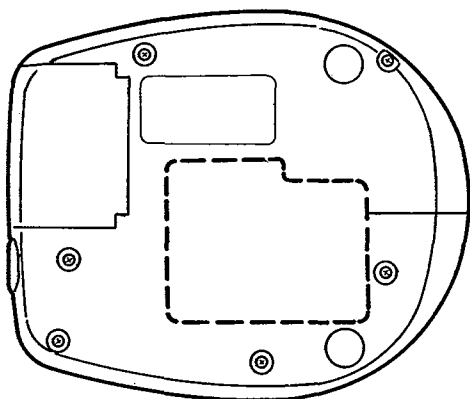
1. Die Lasereinheit nicht zerlegen, da die Strahlung an der freigelegten Laserdioden gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinheit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.

ADVARSEL: I dette a apparat anvendes laser.

CAUTION!

THIS PRODUCT UTILIZES A LASER.

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.



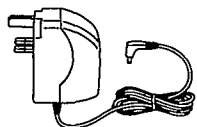
(Bottom Side)

RQLS0077-2

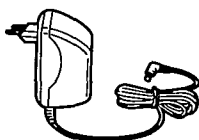
CLASS 1 LASER PRODUCT		VARO! Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymätön lasersäteilylle. Älä katso säteeseen.
ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING. NÅR SIKKERHEDSÅFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.		VARNING! Osynlig laserstråling når denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.
VORSICHT: Unsichtbare Laserstrahlung, wenn Abdeckung geöffnet und Sicherheitsverriegelung überbrückt. Nicht dem Strahl aussetzen.	DANGER: Invisible laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE TO BEAM.	ADVERSEL! Usynlig laserstråling når deksel åpnes og sikkerhedsås brytes. Unngå eksponering for strålen. RQLS0077-2

ACCESSORIES

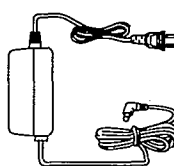
AC adaptor..... 1 pc.
[For (EB) area.]
(RFEA404B-W)



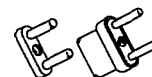
[For (E, EG) areas.]
(RFEA401E-1S)



[For (GC) area.]
(RFEA402Z-W)



Power plug adaptor..... 1 pc.
[For (GC) area.]
(SJP9223-1)

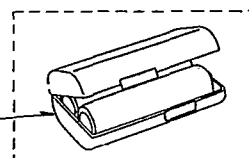


Stereo earphones with remote
controller..... 1 pc.
(RFEV131ACKS)



Rechargeable batteries
[RP-BP60EYS1; For (E, EB, EG) areas.]
[RP-BP60SYSA; For (GC) area.]
Battery carrying case
(RFKNLS370-K)

Battery carrying case



Rechargeable batteries

CHANGES

CHANGE IN REPLACEMENT PARTS LIST (SL-S190 Service Manual Pages 28, 32)

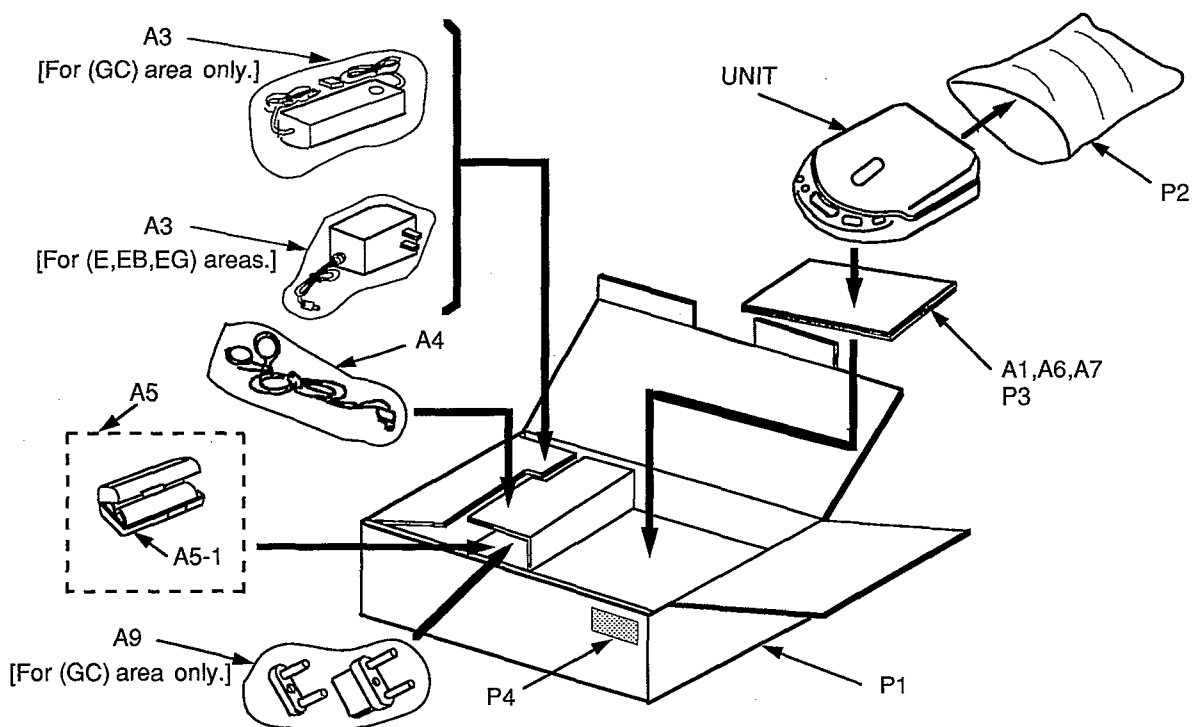
- Notes:**
- Mentioned in this parts list is only those different from Model No. SL-S190 (P). All other parts are the same as for SL-S190 (P).
 - Important safety notice:
Components identified by Δ mark have special characteristics important for safety. Furthermore, special parts which have purposes 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.
 - The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

Ref. No.	Change of Part No.		Part Name & Description	Remarks
	SL-S190 (P)	 SL-XP190 (E, EB, EG, GC)		
CABINET AND CHASSIS				
5	RFKJLS190P-H	RFKJLXP190E	BOTTOM CABINET ASS'Y	(E)
		RFKJLXP190EB	BOTTOM CABINET ASS'Y	(EB, GC)
		RFKJLXP190EG	BOTTOM CABINET ASS'Y	(EG)
8	RYF0348-H	RYF0348A-K	CD COVER ASS'Y	
9	RFKKLS190P-H	RFKKLXP190EK	INTERMEDIATE CABINET ASS'Y	

Ref. No.	Change of Part No.		Part Name & Description	Remarks
	SL-S190 (P)	SL-XP190 (E, EB, EG, GC)		
PACKING MATERIAL				
P1	RPK0589	RPK0591	PACKING CASE	
P3	—	RPF0046	PROTECTION BAG (F.B.)	Addition
P4	—	SQZD3	AREA LABEL	(E) Addition
		SQZD7	AREA LABEL	(EB, GC) Addition
		SQZD6	AREA LABEL	(EG) Addition
ACCESSORIES				
A1	RQT3033-P	RFKSLXP190E	INSTRUCTION MANUAL ASS'Y	(E)
		RQT3034-B	INSTRUCTION MANUAL ASS'Y	(EB)
		RFKSLXP190EG	INSTRUCTION MANUAL ASS'Y	(EG)
		RFKSLXP190GC	INSTRUCTION MANUAL ASS'Y	(GC)
A2	EURHJB30-2	—	WIRED REMOTE CONTROLLER	Deletion
A3	RFEA405C-1W	RFEA401E-1S	AC ADAPTOR	(E, EG) Δ
		RFEA404B-W	AC ADAPTOR	(EB) Δ
		RFEA402Z-W	AC ADAPTOR	(GC) Δ
A4	RP-HT103DPYS	RFEV131ACKS	STEREO EARPHONES WITH R.C.	
A5	RP-BP60PYS	RP-BP60EYS1	RECHARGEABLE BATTERIES	(E, EB, EG)
		RP-BP60SYSA	RECHARGEABLE BATTERIES	(GC)
A6	—	RQA0013	WARRANTY CARD	(E, EB, EG) Δ Addition
A7	—	RQCB0169	SERVICENTER LIST	Addition
A8 ※	—	RKB205ZA-0	EAR PADS	Addition
A9	—	SJP9223-1	POWER PLUG ADAPTOR	(GC) Δ Addition
PRINTED CIRCUIT BOARD ASS'Y				
PCB1	—	REP2134B-M	MAIN P.C.B.	(RTL) Addition

Note: ※ This item is not attached to merchandise, but it is supplied as a replacement parts.

PACKAGING



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disc
 DIGITAL AUDIO

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MASH^{*}
 multi-stage noise shaping

 Portable CD Player
SL-S190

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Colour

(H)... Gray Type

Area

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

TRAVERSE DECK: RAE0140Z MECHANISM SERIES

SPECIFICATIONS

Audio

No. of channels: 2 channels (left and right, stereo)
Output voltage: 0.6V (50kΩ) ϕ 3.5 stereo mini jack
Frequency response: 20~20,000Hz (+0.5dB, -1.5dB)
S/N: more than 94dB
Wow and flutter: Below measurable limit
DA converter: 1 bit, MASH^{*}
Headphone output level: max. 9mW+9mW/16Ω (variable)
 stereo mini jack ϕ 3.5
 8 times over sampling

Digital filter:

Signal Format

Correction system: Technics New
 Super Decoding Algorithm

Pickup

Type: One beam
Light source: Semiconductor laser
Wavelength: 800nm
Lens: Glass pressed lens

Playing time;

(When the unit is used,
 at 25°C temperature
 and on flat and stable
 surface.)

Rechargeable batteries	About 3 hours 30 minutes
Panasonic Dry cell alkaline batteries	About 13 hours

The play time may be shorter depending on the operating conditions.
 About 3 hours

Recharging time;

General

Power requirement:

AC; with an included panasonic AC adaptor
 RFEA405C-1W
 Batteries; DC 3V (two "AA" size batteries, not included)
 (Panasonic R6P/LR6 or equivalent, not included)
 Rechargeable Batteries; DC 2.4V with an included Panasonic Rechargeable Batteries (RP-BP60PYS set of 2)
 Car Battery; with an optional Panasonic car adaptor (SH-CDC9)
 DC 4.5V $\diamond$ $\circ$ $\diamond$

DC IN:

Operation temperature range:

0°C - 40°C (32°F - 104°F)

Power supply:

DC 4.5V

Power consumption:

AC adaptor;

4.5W

Battery;

0.5W

Dimensions (W × H × D):

128 × 30.3 × 152mm
 (5¹/₁₆" × 1³/₁₆" × 6")

Weight:

250g (8.8 oz) without batteries
 290g (10.2 oz) with batteries

Note: Design and specifications are subject to change without notice.
 Weight and dimensions are approximate.

⚠ WARNING

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Panasonic[®]

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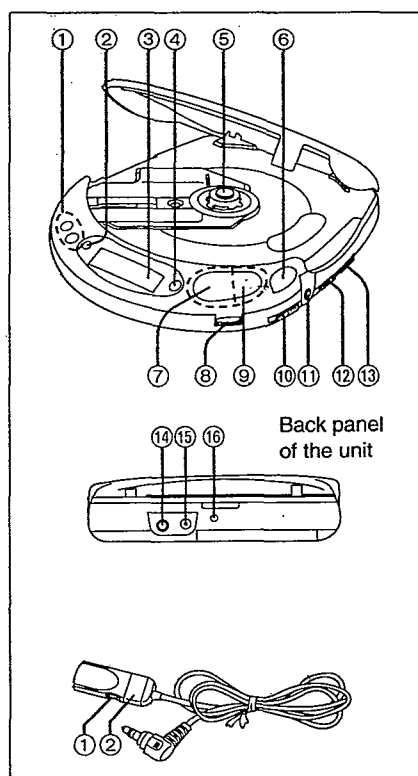
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PRECAUTION OF LASER DIODE

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

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

LOCATION OF CONTROLS



Portable CD player

- ① Skip/search buttons (◀◀ -SKIP-SEARCH ▶▶)
- ② Memory/recall button (MEMORY/RECALL)
- ③ Display
- ④ Repeat button (REPEAT)
- ⑤ Push button (PUSH)
- ⑥ Open button (OPEN)
- ⑦ Play/pause button (▶ ||)
- ⑧ Headphones volume control (VOLUME)
- ⑨ Stop/power off button (■/POWER OFF)
- ⑩ High filter/XBS selector (HIGH FILTER, XBS, OFF)
- ⑪ Headphones jack (⌀) 16Ω ϕ3.5
- ⑫ Play mode selector (MODE)
- ⑬ Hold switch (HOLD)
- ⑭ Out jack (OUT)
- ⑮ DC in jack (DC IN 4.5 V ⚡)
- ⑯ Hole for car insulator mounting screw

Wired remote control

- ① Volume control (VOLUME)
- ② Operation button

BATTERY SERVICE LIFE

Approx 3.5 hours (EIAJ) with rechargeable batteries.

Approx 13 hours (EIAJ) with panasonic LR6 alkaline (AA-size) batteries.

The above battery service life is measured according to the conditions set forth by EIAJ (Electronic industries Association of Japan). As the battery service life varies with the method of operation and environmental conditions, use these values as reference.

POWER SUPPLY PREPARATIONS

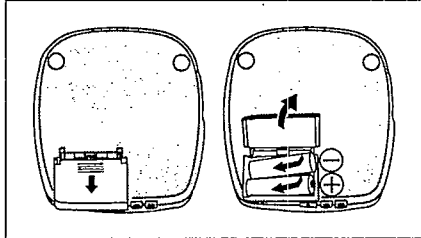
Using the rechargeable batteries

Make sure that the rechargeable batteries have been recharged before use.

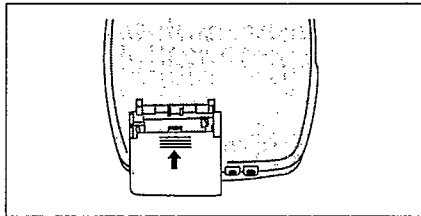
Recharging procedure

1 Place the rechargeable batteries inside the unit.

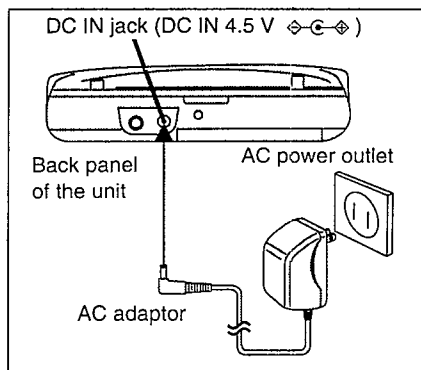
(No batteries other than RP-BP60 /SH-CDB8D can be recharged.)



If the battery compartment lid becomes disengaged, position it horizontally and press it back into position.



2 Connect the AC adaptor.

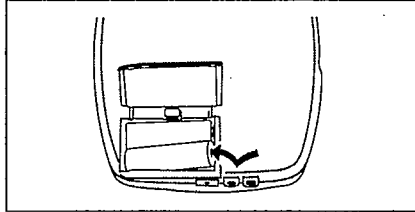


It takes about 3 hours to fully recharge the batteries.

3 Upon completion of the recharging, disconnect the AC adaptor from the DC IN jack and power outlet.

Removing the batteries

Push the batteries upward in the direction of the arrow to remove them.



- The batteries can be used for about 10 months (300 times) if they are used every day. They will need to be replaced if the duration of their operation drops drastically.
- You can operate the unit with the AC adaptor while recharging the batteries, but it will lengthen the recharging time.
- Recharging should be performed at 0°C–40°C (32°F–104°F).
- While recharging, the AC adaptor and rechargeable batteries may get warm. This is normal.

Using the dry cell batteries (not included)

Disconnect the AC adaptor and then install two "AA" size (LR6) alkaline batteries.

The batteries are inserted and removed in the same way as for the rechargeable batteries.

Using the AC adaptor

Connect the AC adaptor supplied.

Refer to the section on "Using the rechargeable batteries" for details on the connections.

Using the car adaptor (not included)

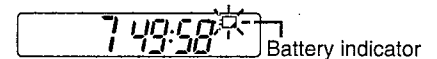
CAUTION:

Use only car adaptor, Model: SH-CDC9 manufactured by Matsushita Electric Industrial Co., Ltd.

Be sure to obtain the car adaptor (SH-CDC9), available as an optional accessory.

The batteries can be recharged inside the car using the car adaptor.

Battery indicator



It starts flashing when the batteries have run down. After a short while the power is automatically cut off.

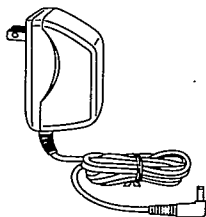
(The amount of time the unit will continue to play after the indicator has started flashing differs slightly, depending on the type of batteries used.)

Type of battery	Action
Rechargeable batteries	Recharge the batteries again.
Dry cell batteries	Replace with new batteries.

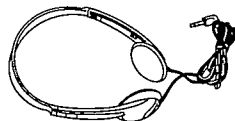
(The battery indicator may not flash if rechargeable batteries, other than those designated by Panasonic, are used.)

ACCESSORIES

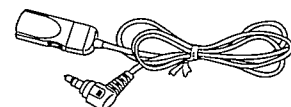
AC adaptor (RFEA405C-1W) 1 pc.



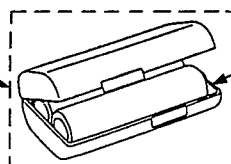
Stereo headphones (RP-HT103DPYS) 1 pc.



Wired remote controller 1 pc. (EURHJB30-2)

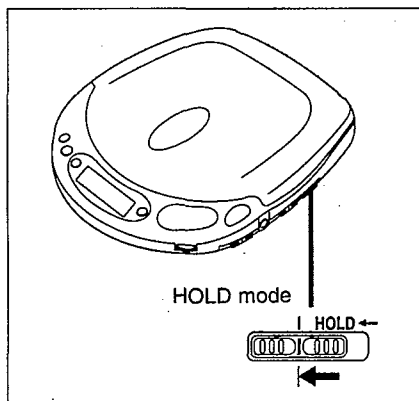


Rechargeable batteries 2 pcs. (RP-BP60PYS)



Battery Carrying Case 1 pc. (RFKNLS370-K)

■ ACCIDENTAL OPERATION PREVENTION FUNCTION



This function prevents the unit from operating even if a control button is pressed in error. (The disc lid can still be opened and closed.)
Use the function to prevent the following situations:

Example 1:

While the unit is not in use, the power is inadvertently turned on and the batteries run down.

Example 2:

Play is interrupted while the unit is in use.

To use the accidental operation prevention function

Set HOLD to the HOLD position.

HOLD indicator

If the unit is in the hold mode, the "hold" indicator appears when any of the unit's control buttons (except OPEN button) is pressed.

When the unit is turned off

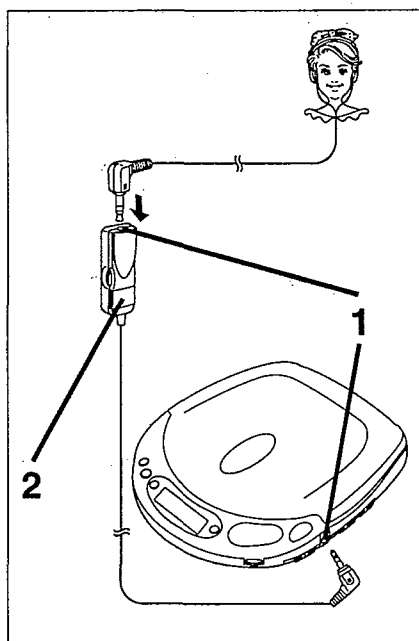
The display appears only when ► || is pressed.

Before operating the buttons

Be absolutely sure to move HOLD to release the unit from the hold mode.

■ USING THE WIRED REMOTE CONTROLLER

Using the provided wired remote controller, a variety of operations can be performed by hand using a single button.

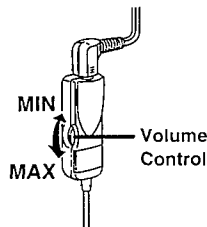


- 1 Connect the wired remote controller to the stereo headphones and the headphones jack.
- 2 Press the operation button on the wired remote controller.

The wired remote controller can be operated regardless of the hold mode of the unit.

To adjust the volume

When adjusting the volume using the wired remote controller, position the volume control on the unit to between 5 and 7.

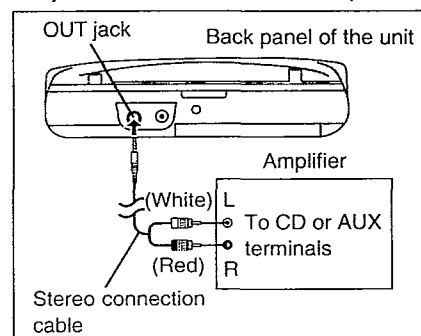


■ USING THE UNIT WITH OPTIONAL ACCESSORIES

Using the unit with an audio system

Using the stereo connection cable (not included), you can hear CDs on your audio system.

- Connect the cable to the amplifier after turning off its power.
- Do not connect the cable to the PHONO jacks on the amplifier.
- Obtain the optional connecting cable if the amplifier comes with mini-phone jacks.
- Adjust the volume level on the amplifier.



Using the unit with a car audio system

Items to be purchased

For connection to the car audio system:
Car stereo cassette adaptor (SH-CDM9A)

For securing the unit and connecting the power supply:

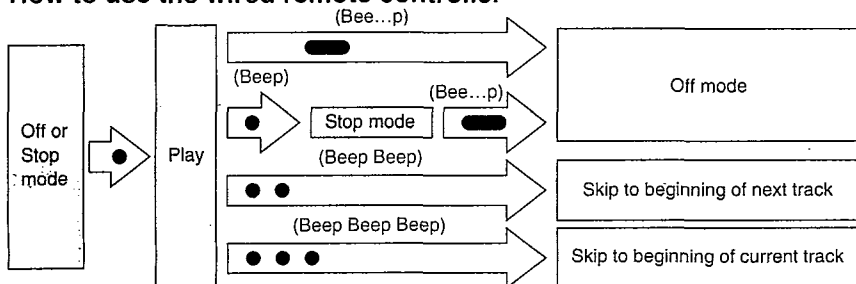
- Car adaptor (SH-CDC9)
- Car Mount Kit (SH-CDF7)
- Car mounting arm, Car insulator

Note

It may not be possible to use the unit with some types of car audio systems owing to restrictions imposed by the construction of the car stereo cassette adaptor.

For further details, refer to the instructions of the part concerned.

How to use the wired remote controller



Parentheses represent confirmation tones.

- Press once.
- ● Press twice.
- ● ● Press three times.
- Press and hold.

An operation tone ("Beep") sounds whenever the remote controller button is pressed. In addition, a confirmation tone sounds following every operation.

- When pressing the remote controller button two or three times, do so as quickly and evenly as possible.
- When the button is pressed three times and then three times again, the unit will skip to the beginning of the previous track.
(When the play mode switch on the unit is in the RANDOM position, however, this operation is not possible.)

SEQUENTIAL PLAY

- 1 Press OPEN to open the lid, and insert the disc.**
 Label must face upward.
 Press the area near the center hole of the disc until it clicks into position.
 Close the lid.
- 2 Release the hold mode.**
- 3 Set MODE to NORMAL.**
- 4 Connect the stereo headphones to the jack.**
 (Plug in firmly)
- 5 Press ► II.**
 Play now starts.
 Track number in play

 Elapsed playing time of each track
 Play stops automatically when all the tracks have been played.
- 6 Adjust the volume level.**
 (If the unit has been connected to the car audio system, adjust the volume level on the system.)

Operation	Button	Display
Pause: press during play/press again to resume play	► II	
To stop play: press during play Stop mode	■	Total number of tracks Total playing time
To turn off the unit: press during stop mode Off mode	■	
Skip forward/backward (skip function): press during play Rapid forward/backward (search function): keep depressed during play.	►►: Forward direction ◄◄: Backward direction	—

Skip and search functions

- During program play the tracks are skipped in the forward or backward direction in the programmed sequence.
- During program play, random play or 1-track repeat play, only the track being played is searched.
- During random play, it is not possible to skip to the track which has already been played.

For your reference:

"no disc" display

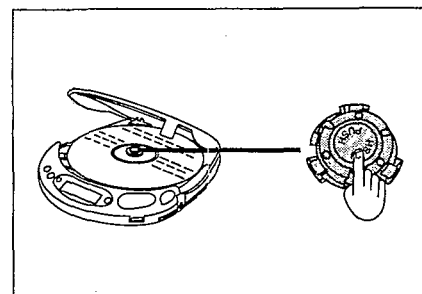
This appears for about 30 seconds when a disc has not been inserted or when a disc has not been inserted properly and then ► II is pressed.

"OPEN" display

This appears for about 10 minutes after the lid is opened. (It does not appear when the unit is turned off.)

Removing the disc

After the disc has stopped rotating, open lid, press PUSH to release the disc. (Do not open the lid during play.)



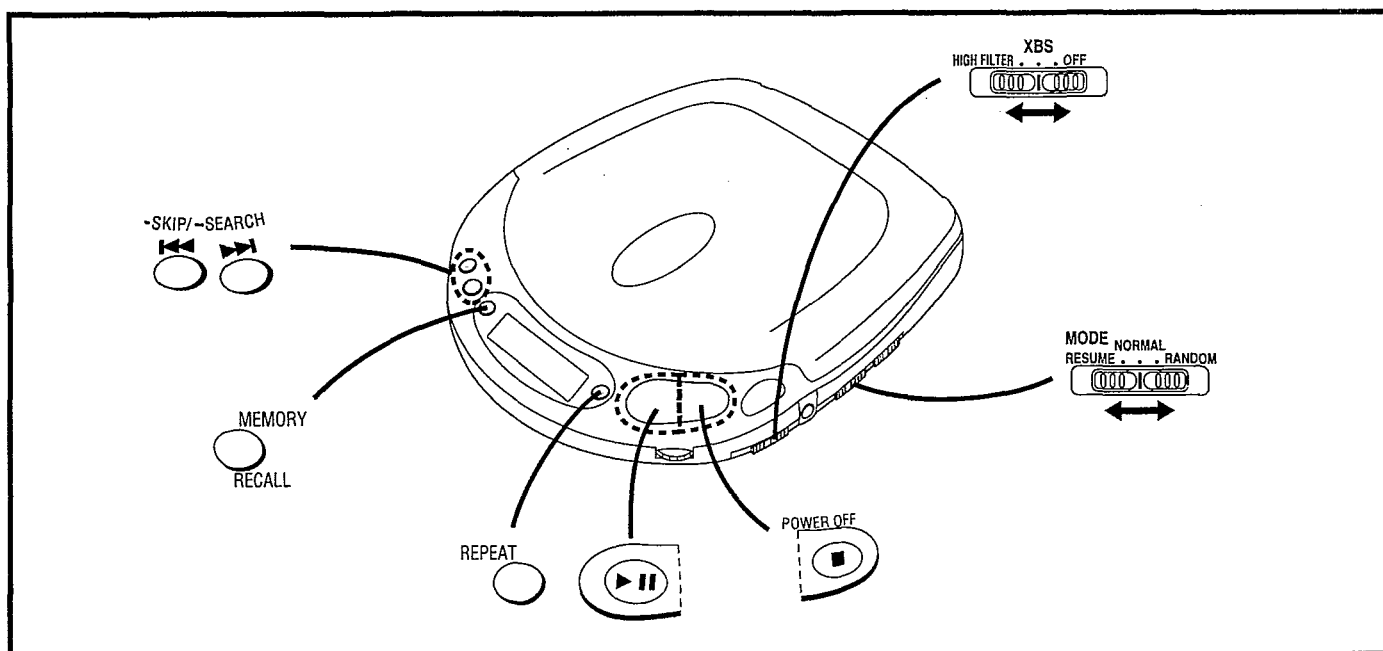
Automatic Shut-OFF function

When the unit is left for about 10 minutes in the stop or pause mode, this function automatically shuts off the power in order to prevent the rechargeable batteries, etc. from discharging needlessly.

Backlight

When using the AC adaptor or the car adaptor (not included), the backlight of the display turns on.

OTHER PLAY METHODS



Skip play

Preparation:

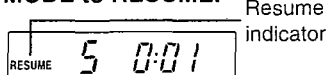
Set the unit to the stop mode.
(See page 5.)

- 1 Set **MODE** to **NORMAL**.
- 2 Press **-SKIP/-SEARCH** to select the desired track number.
- 3 Press **▶ II**.

The tracks are played in sequence starting with the selected track until the last track, after which play is automatically stopped.

Resume play

Set **MODE** to **RESUME**.



Play can be resumed from the start of the track which was playing when the stop mode was last selected or when the power was last turned off.

This is useful when playing discs inside a car.

To cancel the resume mode

Set **MODE** to **NORMAL**.

For your reference:

If **MODE** is set to **RESUME** while the unit is turned off, the all repeat function is automatically activated when play is started.

Notes

- If play is stopped near the end of a track, it may be resumed from the next track.
- When the unit is turned off during play and the disc is replaced, play will start at the same position midway through the corresponding track on the new disc since the position of the track which was previously played is still in the memory.

Program play

Up to 24 tracks can be programmed.

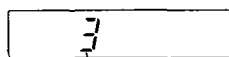
Preparation:

Set the unit to the stop mode.
(See page 5.)

- 1 Set **MODE** to **NORMAL**.
- 2 Press **-SKIP/-SEARCH** to select the desired track number.

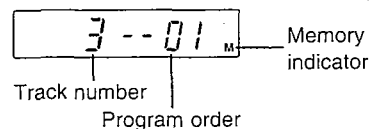
For example:

To select track 3, press **▶▶** 3 times.



Track number

- 3 Press **MEMORY/RECALL** to store the number in the memory.



- 4 Repeat steps 2 and 3 to program all the desired tracks.
- 5 Press **▶ II**.

To program the same track repeatedly

Press **MEMORY/RECALL** repeatedly after step 3.

When "F" appears

No more tracks can be programmed.

To check what has been programmed

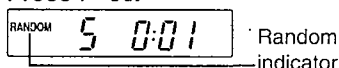
Press **MEMORY/RECALL** during play.
(The display shows the programmed track numbers in the sequence you have entered.)

To cancel all the programming

Press **■/POWER OFF**.

Random play

- 1 Set MODE to RANDOM.
- 2 Press ► II.



To cancel the random mode

Set MODE to NORMAL.

For your reference:

The first track to be played can be changed by pressing ►► in the stop mode. (All the tracks are played regardless of the track first played.)

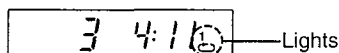
Note

Program play is not possible in the RANDOM mode.

Repeat function

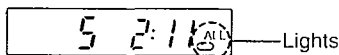
To repeat one track

Press REPEAT once in the stop mode or during play.



To repeat all the tracks

Press REPEAT twice in the stop mode or during play. (In the program play mode, only all the programmed tracks will be repeated.)



To cancel the repeat function

Press REPEAT once in the all repeat mode.

To change the tone quality

(Available only when listening through the stereo headphones.)

- HIGH FILTER:** For a more dynamic and mellow sound
- XBS:** For extra bass sound
- OFF:** To cancel the HIGH FILTER, XBS mode

CAUTIONS

Rechargeable batteries

- Only the RP-BP60/SH-CDB8D batteries can be recharged.
- If the power delivered by the batteries lasts for a very short time after recharging, it means that the batteries' service life is over. Do not use them any more, please replace the batteries.
- Recharging already charged batteries will shorten their service life.
- When recharging batteries for the first time or when they have not been used for a long period of time, the play time may be shorter than usual. In a case like this, repeatedly recharge and discharge the batteries. This will restore them to their regular charged state.
- Do not allow any metal objects to touch the terminals of rechargeable batteries since this may cause short-circuiting which is dangerous.
- Do not peel off the plastic covering on the rechargeable batteries. Short-circuiting may occur, which is dangerous.

Dry cell batteries/rechargeable batteries

To prevent damage to the batteries and electrolyte leakage, heed the following points into the unit.

- Align the ⊕ and ⊖ polarities properly when inserting the batteries into the unit.
- Do not mix different types or makes of batteries or old and new batteries.
- Remove the batteries if you do not plan to use the unit for an extended period of time.
- Do not throw batteries into a fire, and do not short-circuit, disassemble or subject them to excessive heat.
- Do not attempt to recharge dry cell batteries.

Carrying dry cell batteries or rechargeable batteries around

When putting dry cell or rechargeable batteries in a pocket or bag, ensure that no other metal objects, such as a necklace, are placed in the pocket or bag with them. Contact with metal may cause short-circuiting which, in turn, may cause a fire. Be absolutely sure to carry the rechargeable batteries in the battery carrying case.

When driving a car

For safety reasons, do not operate the unit while driving.

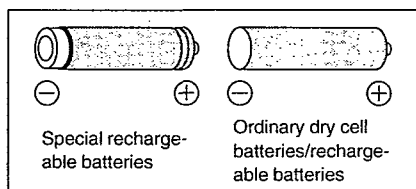
When purchasing rechargeable batteries

As a safety precaution, the portable CD players made by our company have a construction designed to make it impossible to recharge ordinary batteries.

To use rechargeable batteries, be absolutely sure to purchase the rechargeable Ni-Cd batteries designed especially for this unit.

Special rechargeable Ni-Cd batteries:
SH-CDB8D (set of 2)

For details, check with your dealer.



Listening caution



Do not play your headphones or earphones at a high volume. Hearing experts advise against continuous extended play.

If you experience a ringing in your ears, reduce volume or discontinue use.

Do not use while operating a motorized vehicle. It may create a traffic hazard and is illegal in many areas.

You should use extreme caution or temporarily discontinue use in potentially hazardous situations.

Even if your headphones or earphones is an open-air type designed to let you hear outside sounds, don't turn up the volume so high that you can't hear what's around you.

Sound can be deceiving. Over time your hearing "comfort level" adapts to higher volumes of sound. So what sounds "normal" can actually be loud and harmful to your hearing.

Guard against this by setting your equipment at a safe level BEFORE your hearing adapts.

To establish a safe level:

- Start your volume control at a low setting.
- Slowly increase the sound until you can hear it comfortably and clearly, and without distortion.

Once you have established a comfortable sound level:

- Set the dial and leave it there.

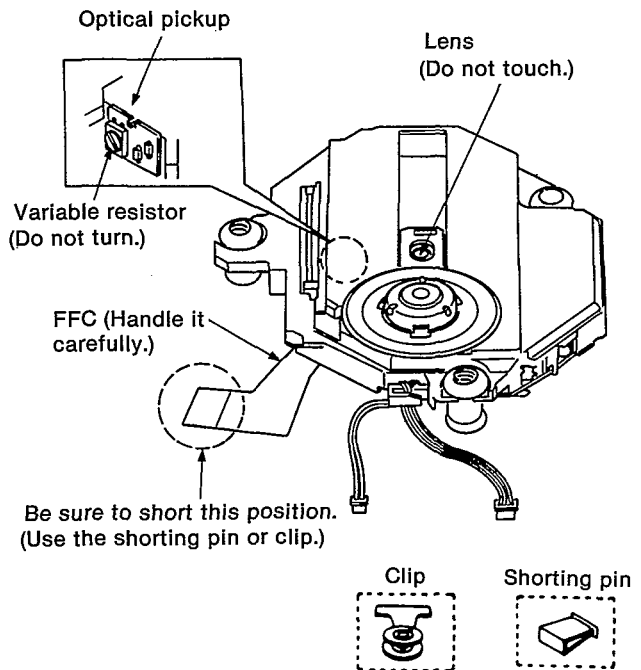
HANDLING PRECAUTIONS FOR TRAVERSE DECK

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.

So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an antistatic shorting pin is inserted into the flexible board (FFC).
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 (FFC).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

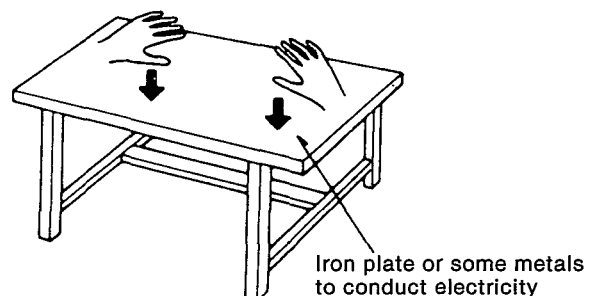
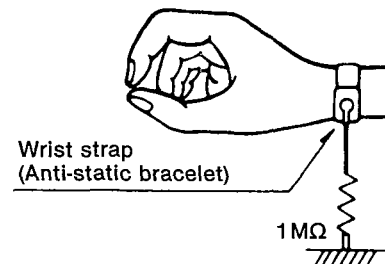


• Grounding for electrostatic breakdown prevention

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).



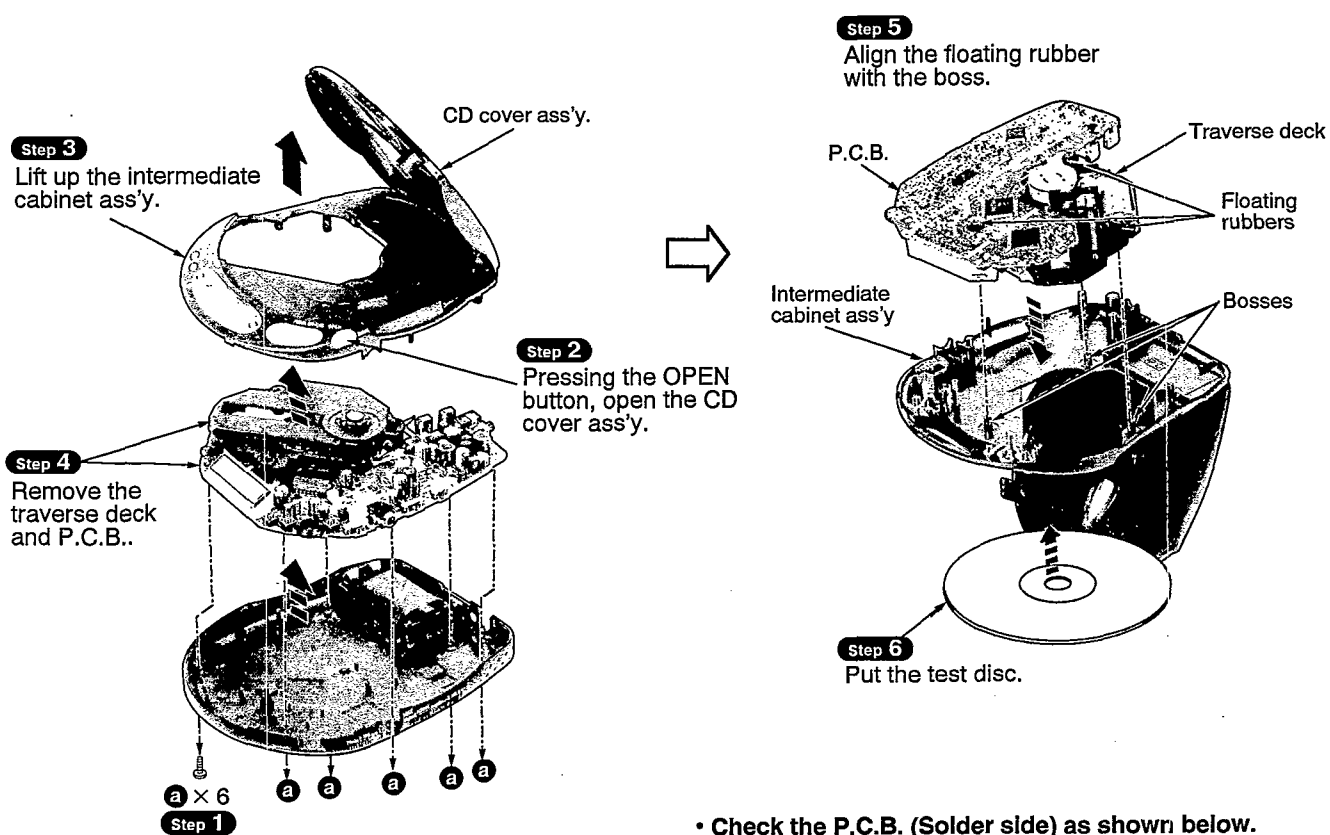
■ OPERATION CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES

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

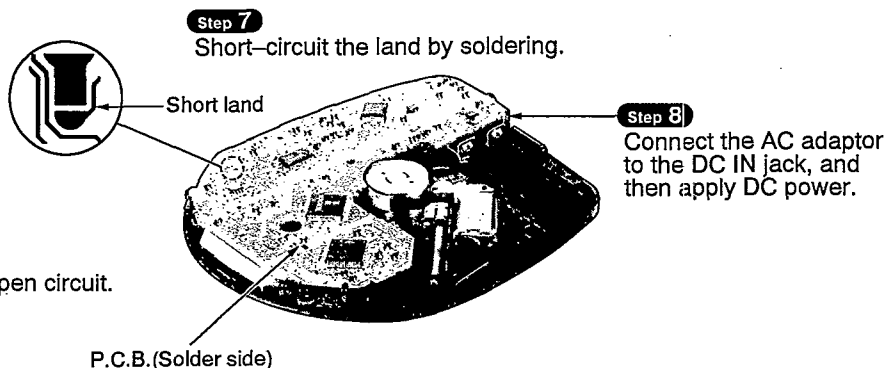
- NOTE**
1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
 2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.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

1. Checking for the P.C.B.

[XTN17+6GFZ] (Black)



• Check the P.C.B. (Solder side) as shown below.

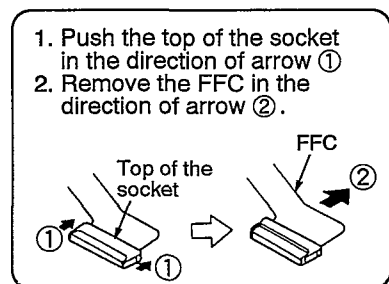


NOTE
After checking, unsolder the short land to open circuit.

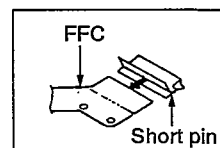
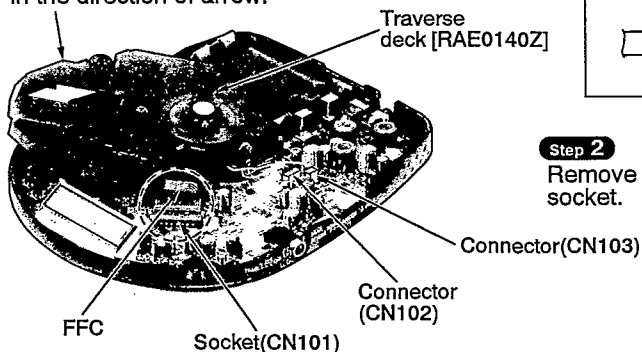
2. Replacement of the traverse deck

- Follow the **Step 1** ~ **Step 3** in item 1.

Caution:
Insert a short pin into the traverse deck's FFC. (Refer to "handling precautions for traverse deck" on page 8.)



Step 1
Pull out the traverse deck in the direction of arrow.

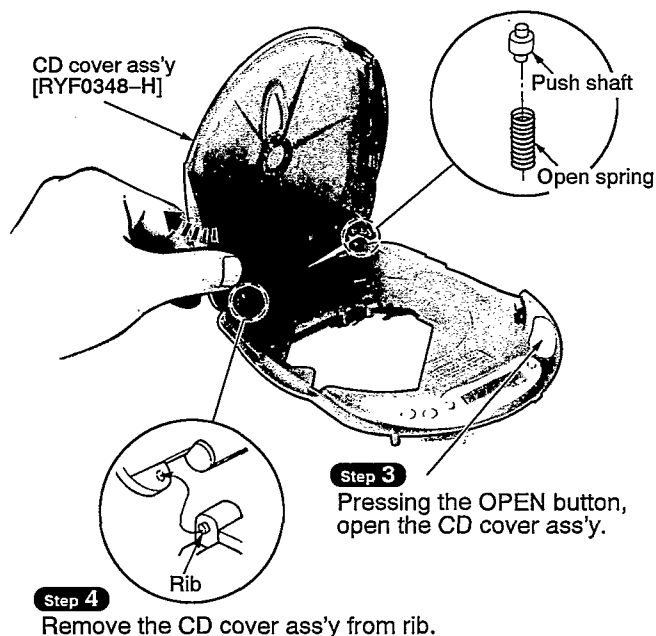
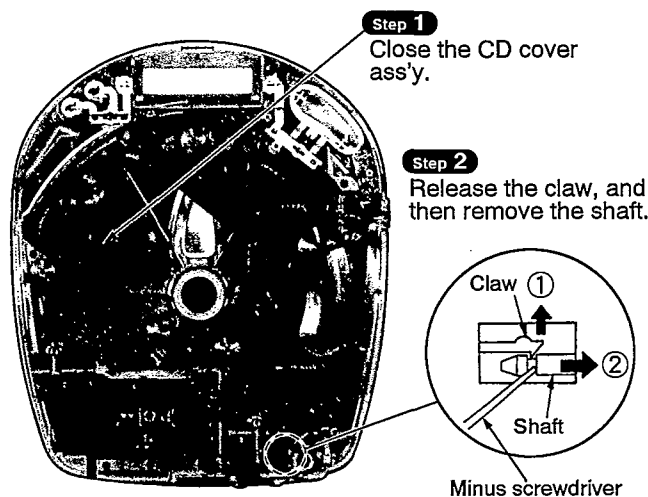


Step 2
Remove the 2 connectors and socket.

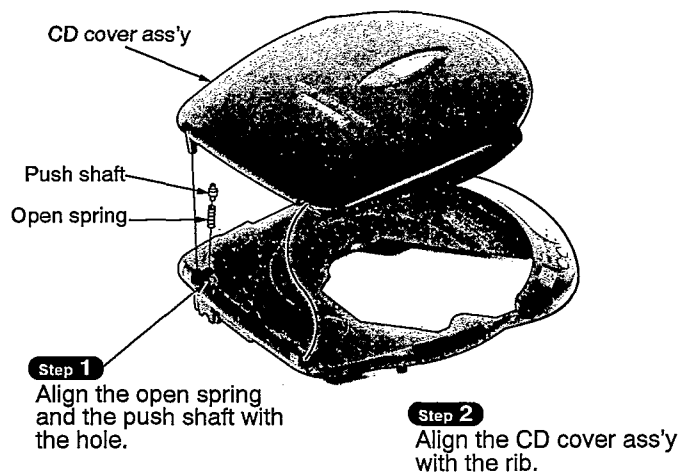
3. Replacement of the CD cover ass'y

- Follow the **Step 1** ~ **Step 3** in item 1.

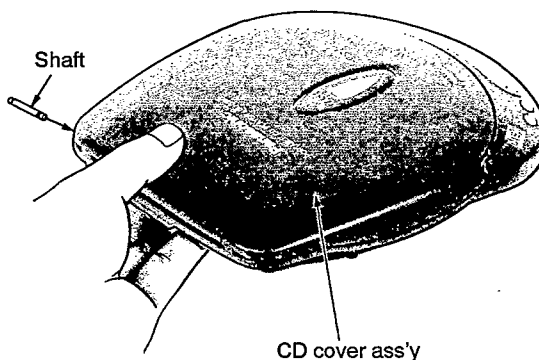
NOTE When the CD cover ass'y is removed, the push shaft and the open spring will also be removed. Be careful not to loose them.



Reassembly procedures of CD cover ass'y



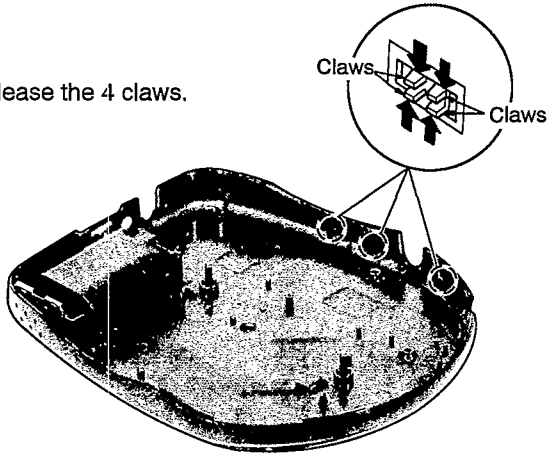
Step 3
Holding the CD cover ass'y not to be detached the open spring and the push shaft, install the shaft.



4. Replacement of the switch knob (HIGH FILTER,XBS,HOLD,MODE)

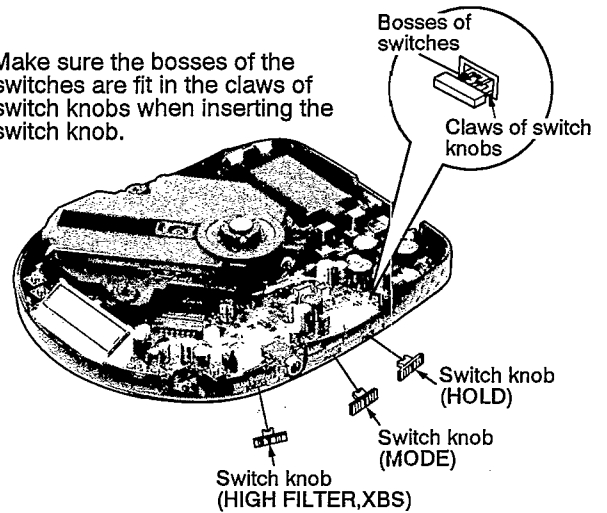
- Follow the **Step 1** ~ **Step 4** in item 1.

- Release the 4 claws.



Notice for Installation of switch knobs

- Make sure the bosses of the switches are fit in the claws of switch knobs when inserting the switch knob.



※ Before installing the switch knob, be sure to check the claws for defects that would render the claws unserviceable. (If a white line like white wax on a claw is found, the claw may be broken when installing the switch knob.)

MEASUREMENTS AND ADJUSTMENTS

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

• Measuring instruments and special tools

• Test discs

1. Playability test disc (SZZP1054C)
2. Uneven test disc (SZZP1056C)

- Musical program disc (ordinary)
- DC voltmeter
- Lead wire (for test points)

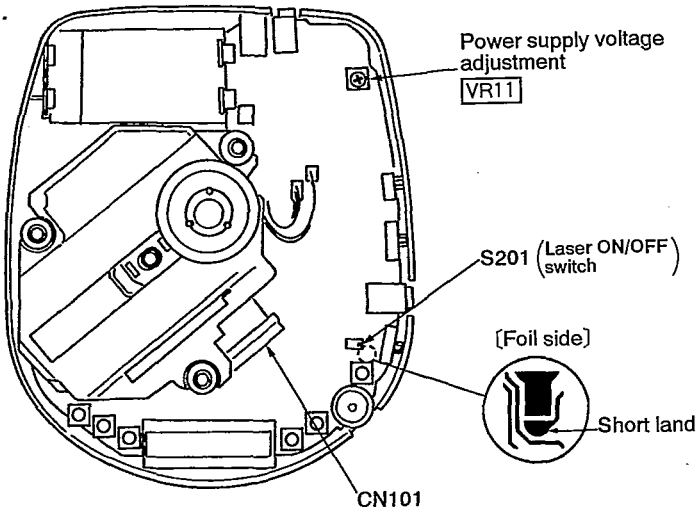
• Test short land

Short-circuit the lands of the laser ON/OFF switch (S201) by soldering them. It turns "ON" position. (Refer to below figure or printed circuit board and wiring connection diagram for short land location on page 22.)

Note: Remove the solders from the lands after adjustment.

• Adjustment point

Notes: 1. Please refer to the printed circuit board and wiring connection diagram for test point locations.
2. Take care to connect CN101.



• Adjustment procedure

(1) POWER SUPPLY VOLTAGE ADJUSTMENT

1. Connect the DC voltmeter to **TP3** (VCC) (+) and **TP4** (GND) on the P.C.B.

2. Connect the AC adaptor cord to the DC (IN) port and move the PLAY switch to the ON position. (Use a new dry cell battery or a rechargeable battery that is full charged.)
3. Insert the test disc, and switch the player power ON.

4. Adjust **VR11** on the P.C.B. at **3.30~3.32V**.

(2) CHECK OF PLAY OPERATION

*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 backward 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 backward directions).

*Checking Playability

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

• Automatic adjustment

On our conventional type portable CD player, there were mounted 6 semi-fixed controls for each adjustment. Since the SL-S190 servo circuit is equipped with an automatic adjusting circuit, these controls are removed from SL-S190.

On conventional portable CD player
Use for Old Servo IC (AN8373SE2, AN8374SE2)

1. Tracking Offset Adjustment VR (TOC)

2. Focus Offset Adjustment VR (FOC)

3. Tracking Gain Adjustment VR (TGC)

4. Focus Gain Adjustment VR (FGC)

5. Tracking Balance Adjustment VR (TBC)

6. Focus Balance Adjustment VR (FBC)
-



Non Adjustment



Automatic Adjusting Circuit

Total 6 Adjustment VRs

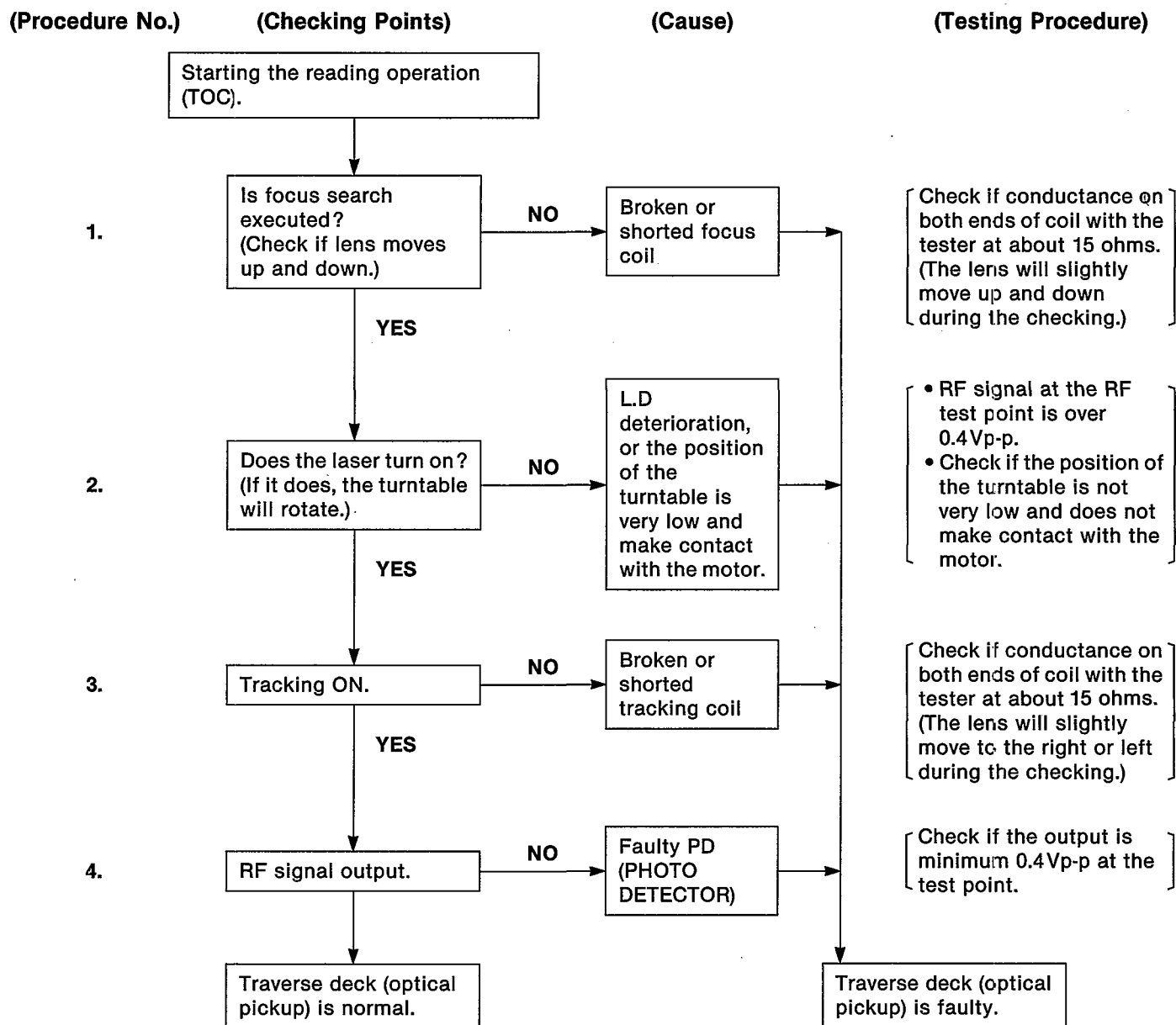


No Adjustment VR

Although all discs are manufactured according to the same specifications, their characteristics are not always precisely the same because they are produced by different manufacturers in various lots, or have different warp etc. SL-S190 automatically controls the servo circuit to obtain optimum performance according to any disc's characteristics. Therefore, no malfunction occurs because of mis-adjustment.

■ 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.



※ Replace traverse deck.

- Check electrical circuit.
- Check for flaws on disc or if it is warped or not centered.

• Check the operations described below on the traverse deck after replacing it.

* Checking Skip Search

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

* Checking Manual Search

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

* Checking Playability

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

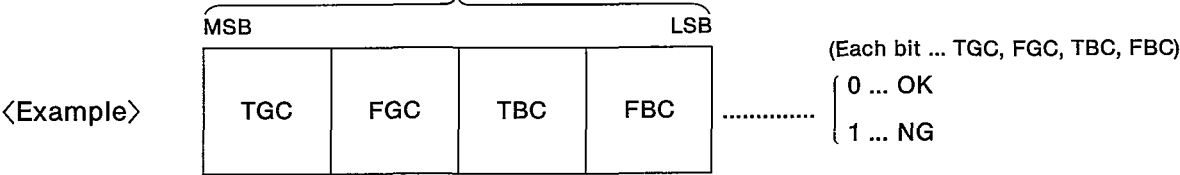
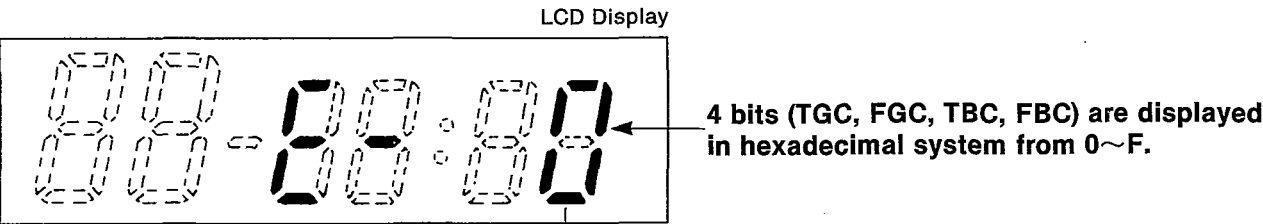
AUTOMATIC ADJUSTMENT RESULTS DISPLAY FUNCTION (SELF-CHECK FUNCTION)

On this unit (SL-S190), 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).

• **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 ▶/II (PLAY/PAUSE) Button.
- 3. Press the ■ (STOP/POWER OFF) Button once.
- 4. An automatic adjustment result is displayed on the LCD.

• **Display of automatic adjustment results (self-check function)**



<Example>

- | | | | | | | |
|---|------|------|------|------|---|---------------------|
| 1) | 0 | 0 | 0 | 0 | ⇒ | "E-0" is displayed. |
| (All adjustments are OK.)..... Normal | | | | | | |
| 2) | 0 | 0 | 0 | 1 | ⇒ | "E-1" is displayed. |
| | (OK) | (OK) | (OK) | (NG) | | |
| (Focus balance adjustment is NG (incorrect.)) | | | | | | |
| 3) | 0 | 1 | 0 | 0 | ⇒ | "E-4" is displayed. |
| | (OK) | (NG) | (OK) | (OK) | | |
| (Focus gain adjustment is NG.) | | | | | | |
| 4) | 1 | 1 | 1 | 1 | ⇒ | "E-F" is displayed. |
| (All adjustments are NG.) | | | | | | |
| 5) | 1 | 0 | 0 | 0 | ⇒ | "E-8" is displayed. |
| | (NG) | (OK) | (OK) | (OK) | | |
| (Tracking gain adjustment is NG.) | | | | | | |

Note: If any other disc than the test disc (SZZP1054C) is used, an "E-8" may be displayed.

〈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 15 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 IC's (IC101, 501) 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.

■ SCHEMATIC DIAGRAM

(Parts list on pages 30, 31)

(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 in “OFF” position.
(It turns “ON” when optical pickup comes to innermost periphery.)
- **S301** : Memory/recall (MEMORY/RECALL) switch.
- **S302** : Repeat (REPEAT) switch.
- **S303**, **S304** : Skip/search (◀◀ -SKIP/-SEARCH ▶▶) switches.
S303 (▶▶), **S304** (◀◀)
- **S305** : Stop/power off (■ POWER OFF) switch.
- **S306** : Play/pause (▶ ■) switch.
- **S307** : Play mode selector (MODE) in “NORMAL” position.
- **S308** : Hold (HOLD) switch in “OFF” position.
- **S701** : High filter/XBS selector (HIGH FILTER, XBS, OFF) in “OFF” position.
- The voltage value and waveforms are the reference voltage of this measured by 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.

* The parenthesized is the voltage for test disc (1kHz, L+R, 0dB) in play mode, and the other, for no disc in stop mode.

* AC adaptor is used for power supply.

-  : Positive voltage lines.
-  : Audio signal lines.

Important safety notice:

Components identified by Δ 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 manufacture's specified parts shown in the parts list.

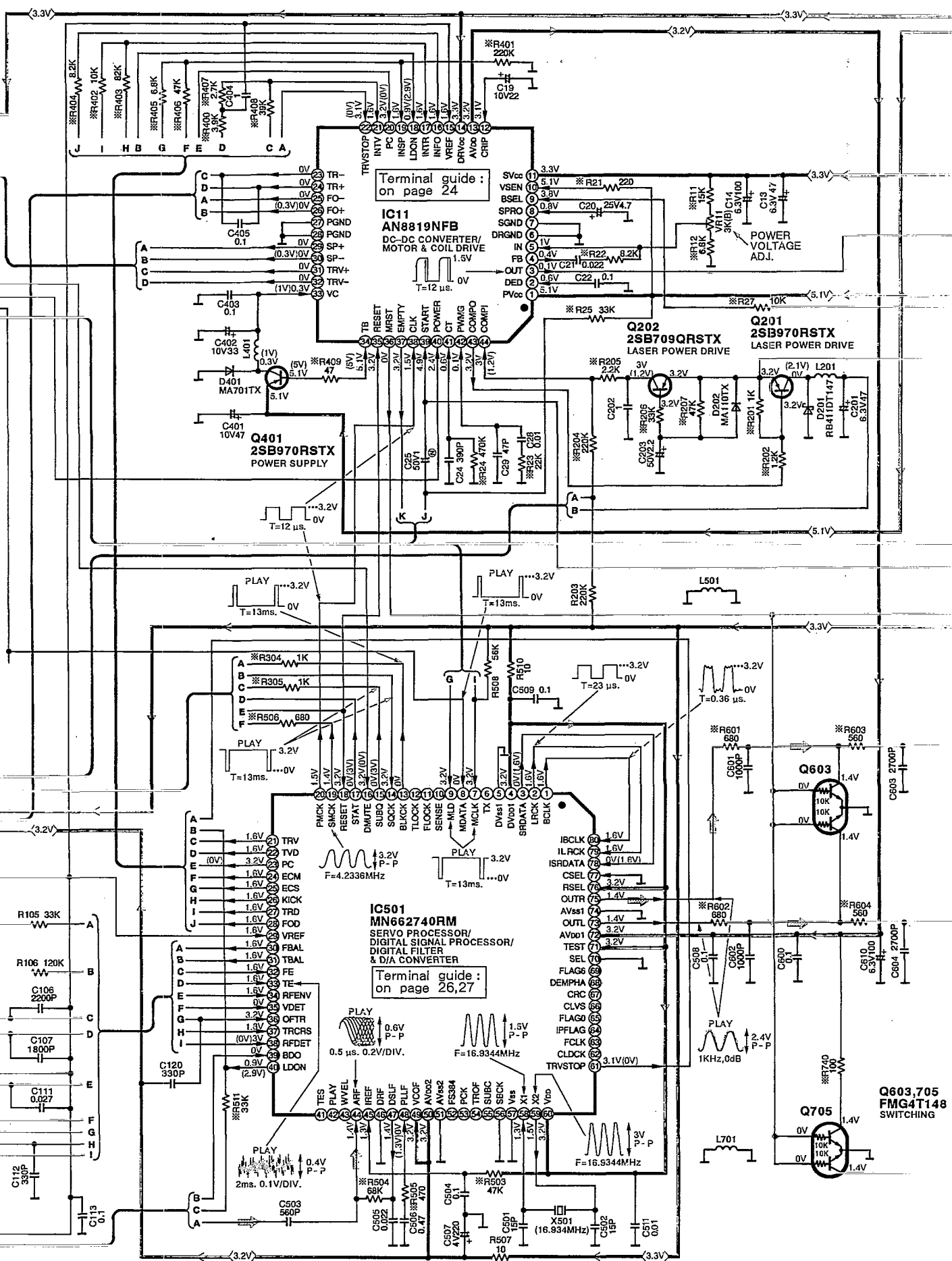
※ marks indicate printed resistor.

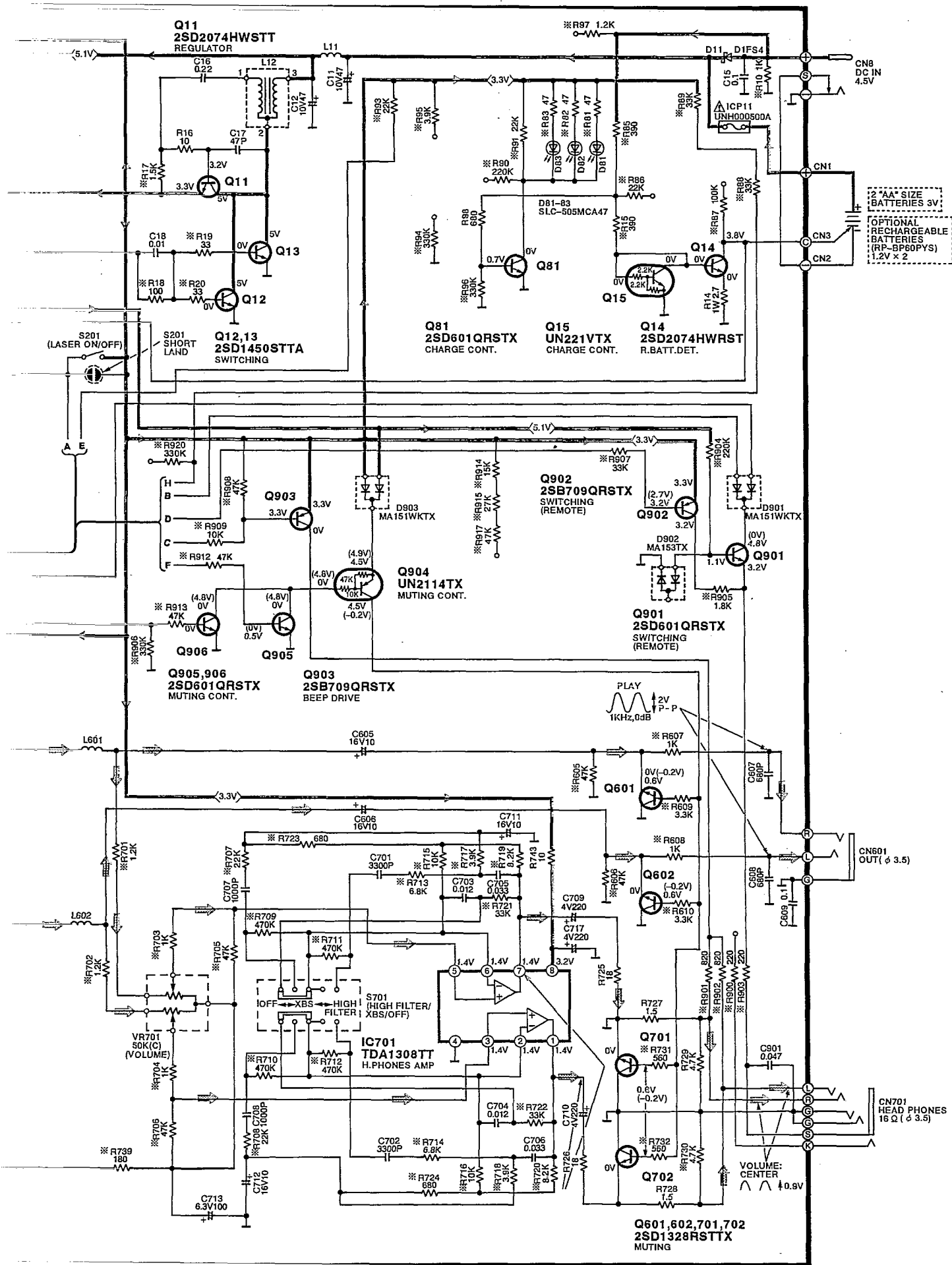
Caution !

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

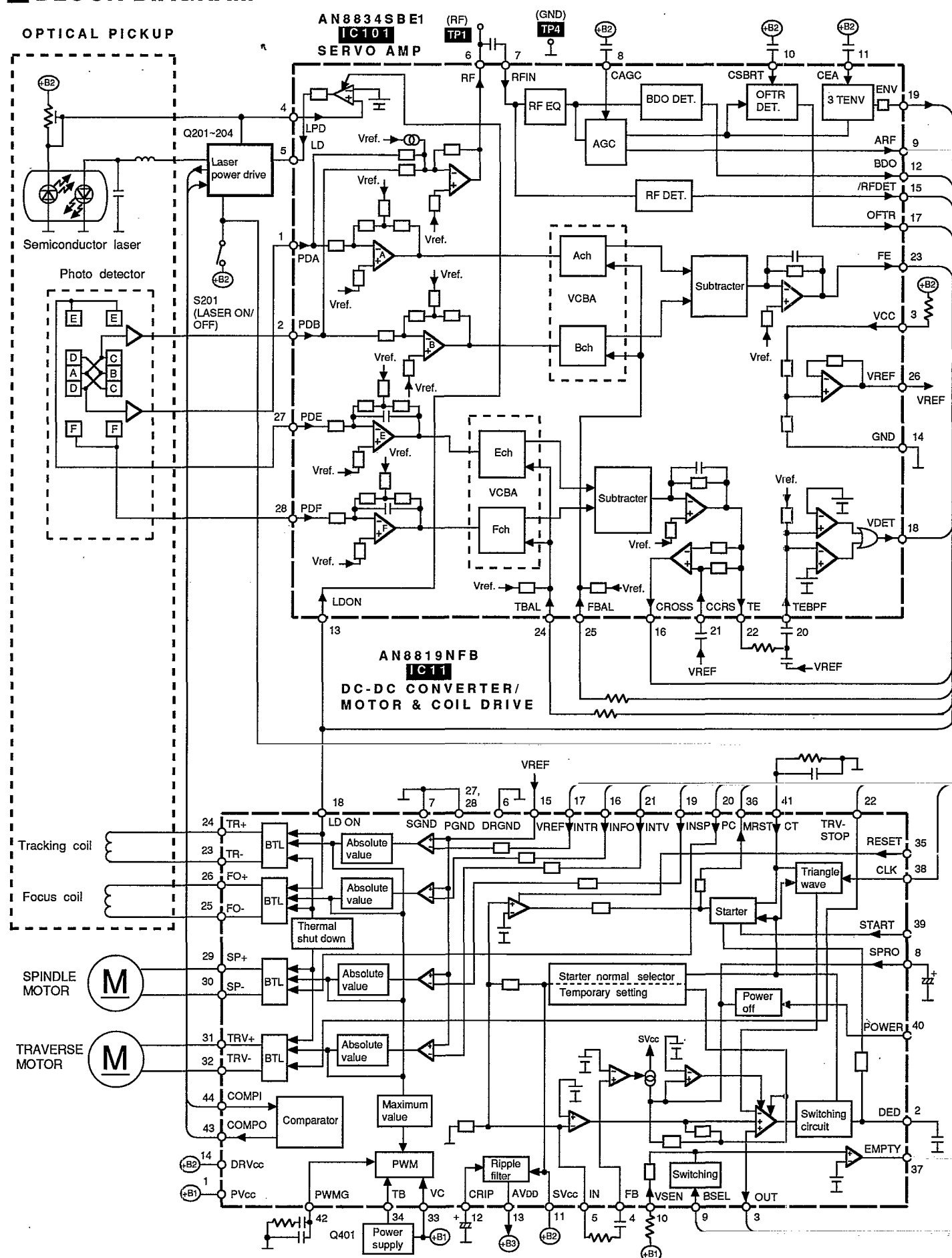
- Cover the parts boxes made of plastics with aluminium foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.







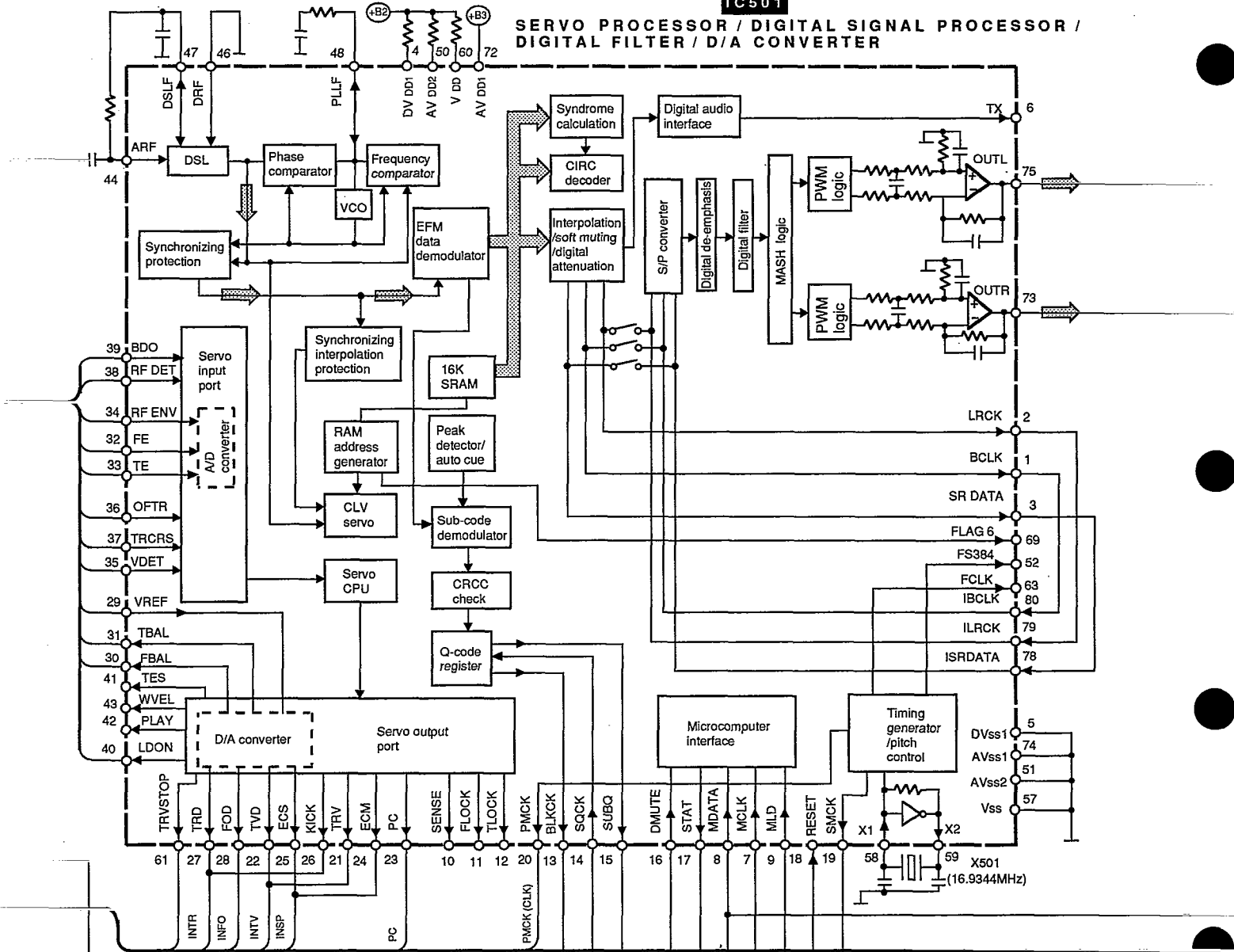
■ BLOCK DIAGRAM



MN662740RM

IC501

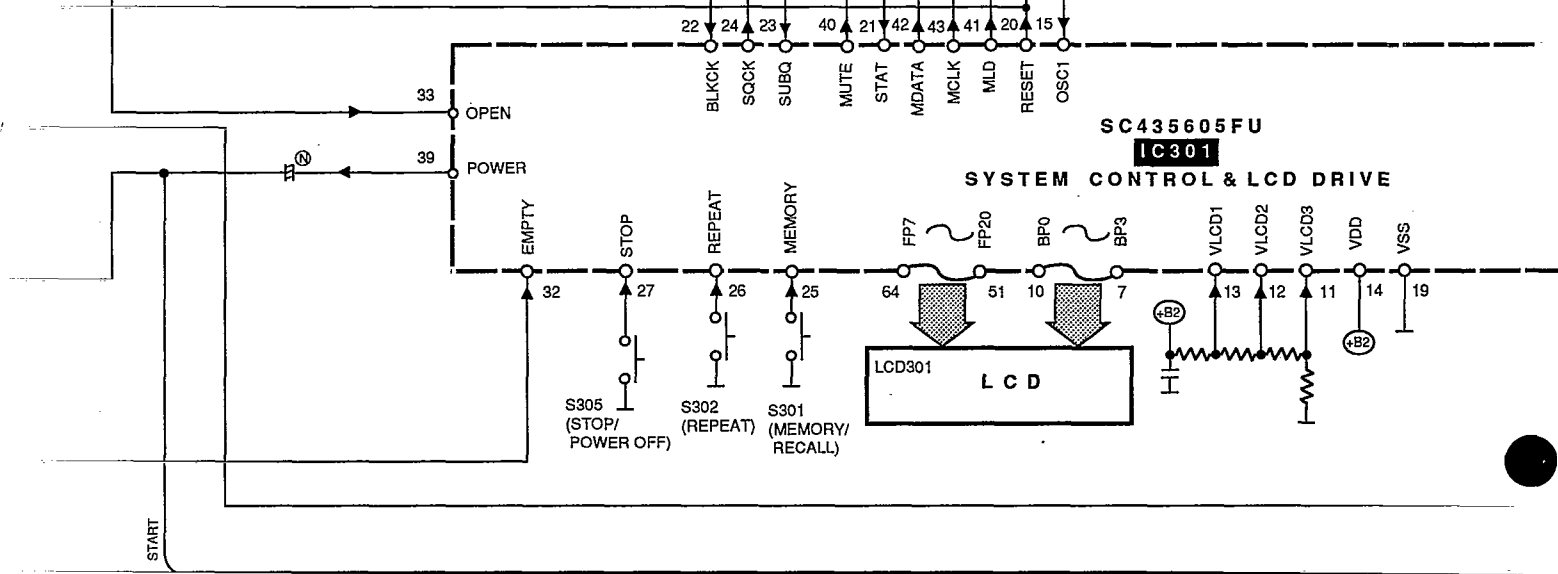
SERVO PROCESSOR / DIGITAL SIGNAL PROCESSOR /
DIGITAL FILTER / D/A CONVERTER

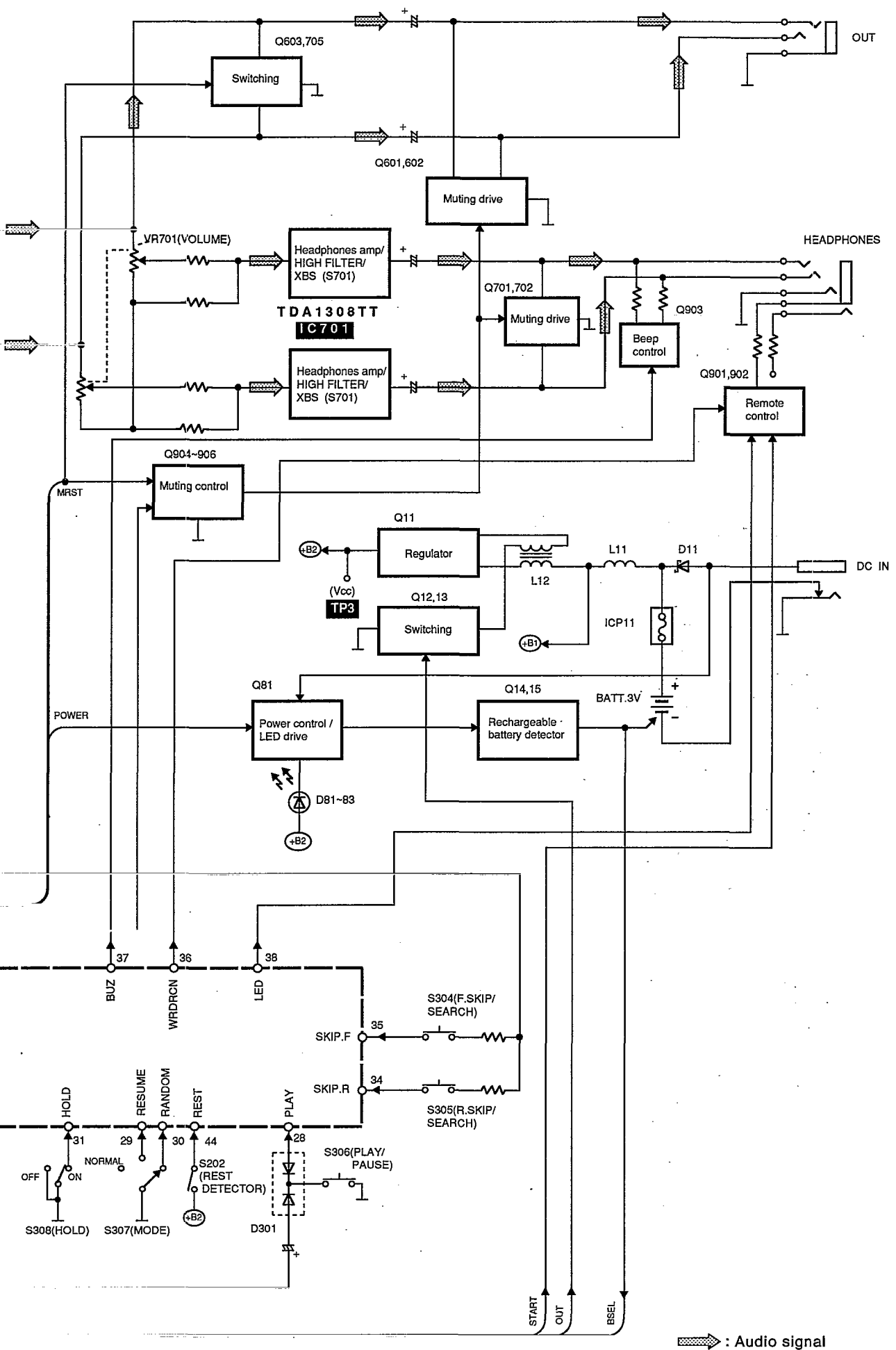


SC435605FU

IC301

SYSTEM CONTROL & LCD DRIVE



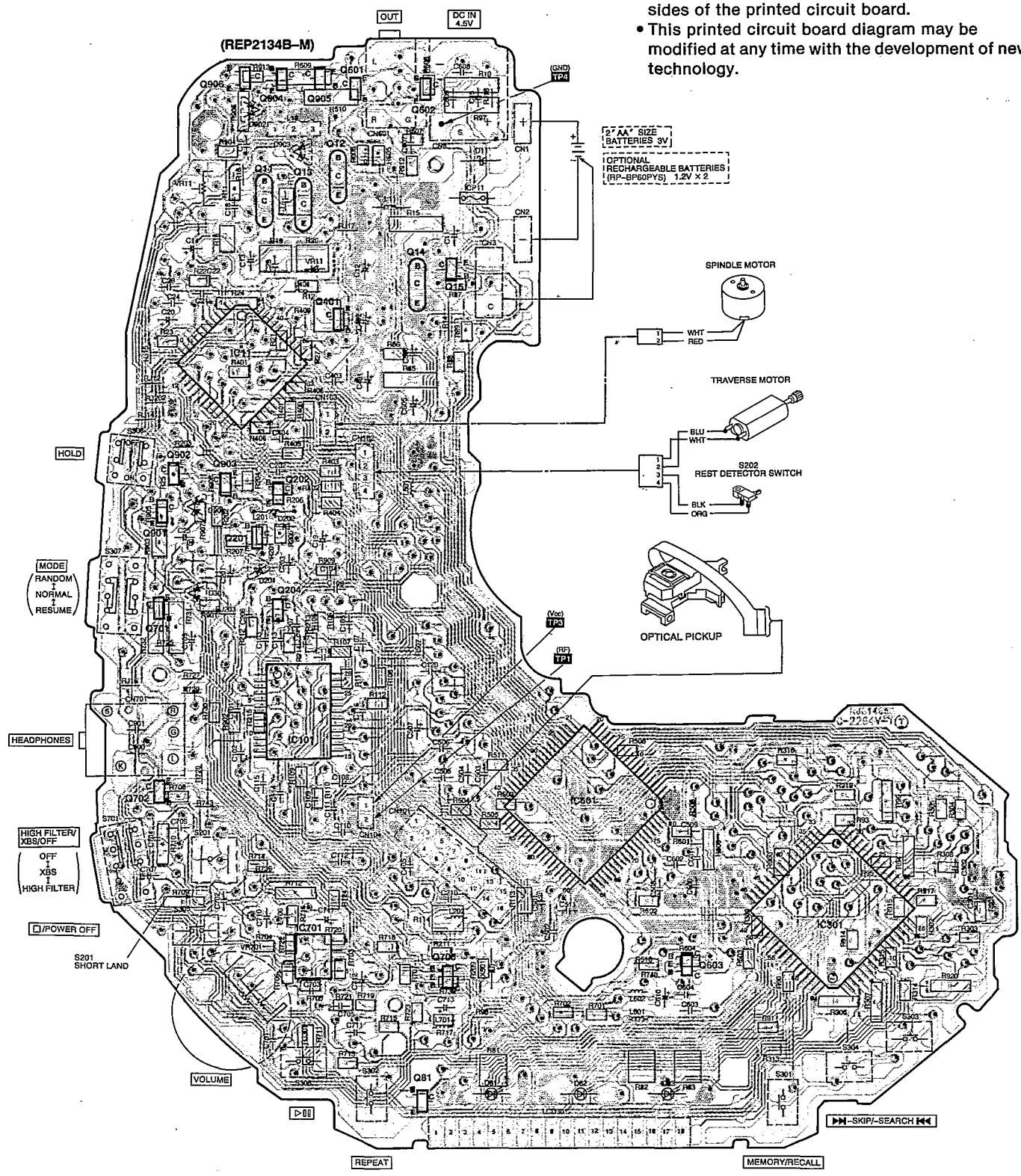


➡ : Audio signal

PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

A
B
C
D
E
F
G

- Notes:
- In this printed circuit board diagram, the parts and foil patterns on the board facing toward you are printed in black. The opposite side is printed in blue.
 - The "●" mark denotes the connection points of double-faced foil patterns (through holes) on both sides of the printed circuit board.
 - This printed circuit board diagram may be modified at any time with the development of new technology.

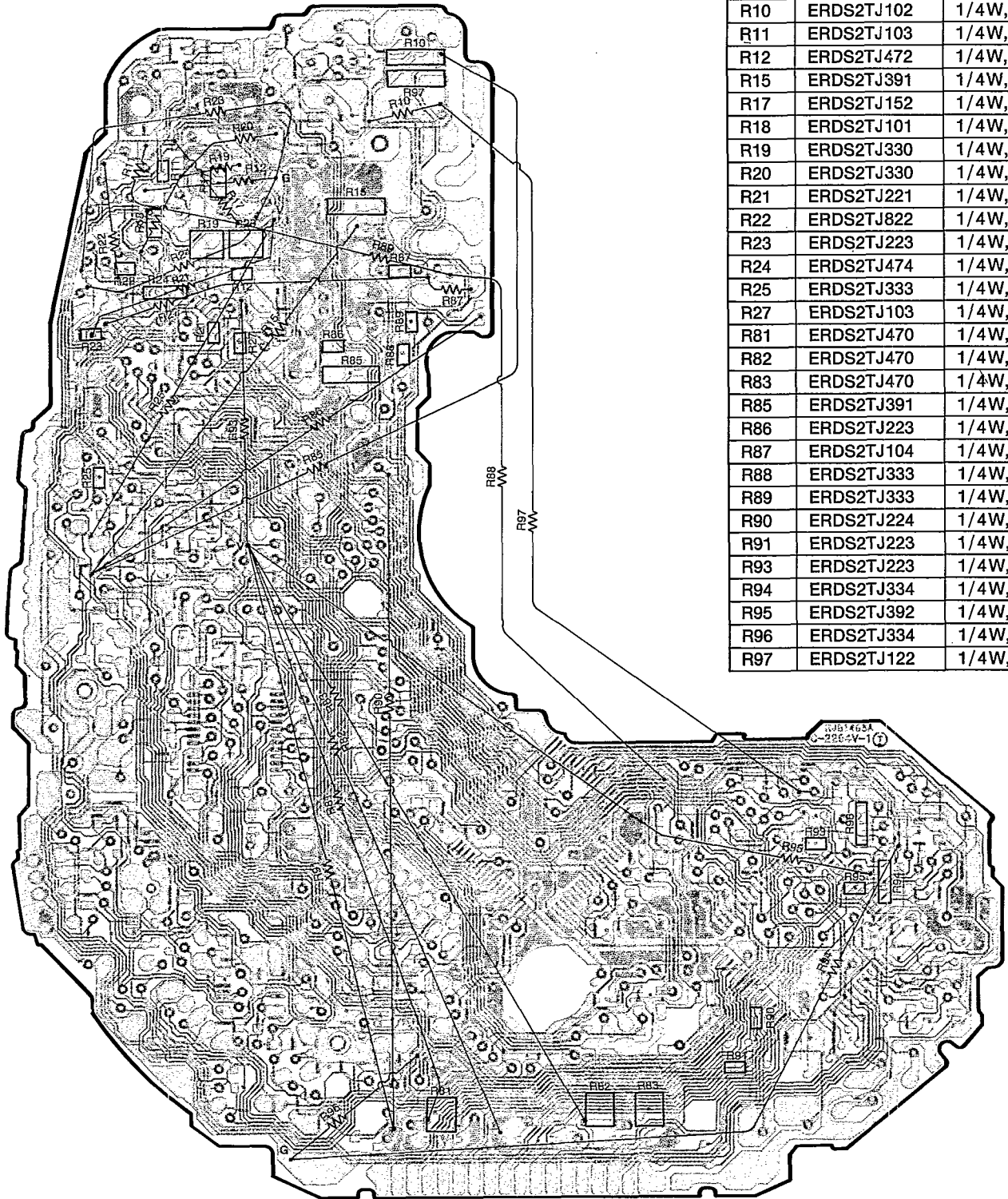


REPAIRING THE PRINTED RESISTOR

This unit uses a printed resistor for the printed circuit board. If the printed resistor is insulated, all maintenance should be done with reference to the following repair parts connection diagram and repair parts list.

Note: Reading the repair parts connection diagram.

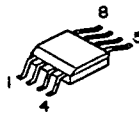
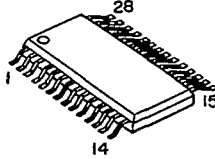
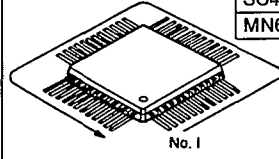
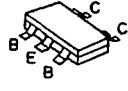
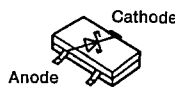
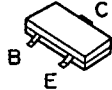
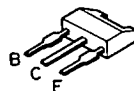
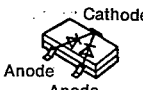
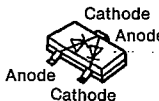
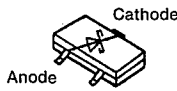
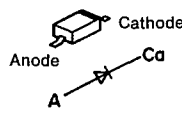
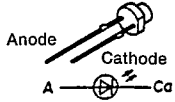
- The pattern foil and repair parts are printed in blue.
- The connection points (•—•) for the pattern foil and repair parts are printed in black.



REPLACEMENT PARTS LIST

R10	ERDS2TJ102	1/4W, 1kΩ
R11	ERDS2TJ103	1/4W, 10kΩ
R12	ERDS2TJ472	1/4W, 4.7kΩ
R15	ERDS2TJ391	1/4W, 390Ω
R17	ERDS2TJ152	1/4W, 1.5kΩ
R18	ERDS2TJ101	1/4W, 100Ω
R19	ERDS2TJ330	1/4W, 33Ω
R20	ERDS2TJ330	1/4W, 33Ω
R21	ERDS2TJ221	1/4W, 220Ω
R22	ERDS2TJ822	1/4W, 8.2kΩ
R23	ERDS2TJ223	1/4W, 22kΩ
R24	ERDS2TJ474	1/4W, 470kΩ
R25	ERDS2TJ333	1/4W, 33kΩ
R27	ERDS2TJ103	1/4W, 10kΩ
R81	ERDS2TJ470	1/4W, 47Ω
R82	ERDS2TJ470	1/4W, 47Ω
R83	ERDS2TJ470	1/4W, 47Ω
R85	ERDS2TJ391	1/4W, 390Ω
R86	ERDS2TJ223	1/4W, 22kΩ
R87	ERDS2TJ104	1/4W, 100kΩ
R88	ERDS2TJ333	1/4W, 33kΩ
R89	ERDS2TJ333	1/4W, 33kΩ
R90	ERDS2TJ224	1/4W, 220kΩ
R91	ERDS2TJ223	1/4W, 22kΩ
R93	ERDS2TJ223	1/4W, 22kΩ
R94	ERDS2TJ334	1/4W, 330kΩ
R95	ERDS2TJ392	1/4W, 3.9kΩ
R96	ERDS2TJ334	1/4W, 330kΩ
R97	ERDS2TJ122	1/4W, 1.2kΩ

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

TDA1308TT 	AN8834SBE1 	<table border="1"><tr><td>AN8819NFB</td><td>44 Pin</td></tr><tr><td>SC435605FU</td><td>64 Pin</td></tr><tr><td>MN662740RE</td><td>80 Pin</td></tr></table> 	AN8819NFB	44 Pin	SC435605FU	64 Pin	MN662740RE	80 Pin	FMG4T148 	D1FS4 
AN8819NFB	44 Pin									
SC435605FU	64 Pin									
MN662740RE	80 Pin									
	2SB709QRSTX 2SB970RSTX 2SD601QRSTX 2SD1328RSTTX UN221VTX UN2114TX	2SD2074HWRST 2SD2074HWSTT 	MA151WKTX 	MA153TX 	MA701TX 					
RB411DT147 	MA110TX 	2SD1450STTA 	SLC-505MCA47 							

■ TERMINAL GUIDE

• IC11 (AN8819NFB): DC-DC converter/motor & coil drive

Pin No.	Mark	I/O Division	Function
1	PV _{CC}	I	Power supply terminal
2	DED	I	Dead time input
3	OUT	O	Switching output
4	FB	O	Error amp output
5	IN	I	Error amp input
6	DRGND	—	Ground terminal
7	SGND	—	Ground terminal
8	SPRO	I	Short protect circuit
9	BSEL	I	Battery select terminal
10	VSEN	I	Empty detect terminal
11	SV _{CC}	I	Power supply terminal
12	CRIP	I	Ripple filter terminal
13	AV _{DD}	O	Power supply terminal
14	DRV _{CC}	I	Power supply terminal
15	VREF	I	Reference voltage input
16	INFO	I	Focus coil control signal input
17	INTR	I	Tracking coil control signal input
18	LDON	I	Laser ON/OFF control signal input
19	INSP	I	Spindle motor control signal input
20	PC	I	Phase control terminal
21	INTV	I	Traverse motor control signal input
22	TRVSTOP	I	Traverse motor stopping signal input

Pin No.	Mark	I/O Division	Function
23	TR—	O	Tracking coil drive signal output
24	TR+		
25	FO—	O	Focus coil drive signal output
26	FO+		
27	P. GND	—	Ground terminal
28	P. GND	—	Ground terminal
29	SP+	O	Spindle motor drive signal output
30	SP—		
31	TRV+	O	Traverse motor drive signal output
32	TRV—		
33	VC	I	PWM control terminal
34	TB	I	PWM control terminal
35	RESET	I	Reset signal input
36	MRST	O	Muting signal output
37	EMPTY	O	Empty signal output
38	CLK	I	Clock signal input (f=88.2kHz)
39	START	I	Start detection input
40	POWER	I	Power ON/OFF detection terminal
41	CT	I	Triangular wave oscillator capacitor input
42	PWMG	—	Not used, open
43	COMPO	O	Laser power control terminal
44	COMPI	I	

• IC301 (SC435605FU): System control/LCD drive

Pin No.	Mark	I/O Division	Function
1 └ 6	FP6 └ FP1	—	LCD segment signal output Not used, open
7	BP3/FP0	O	LCD segment signal output
8 └ 10	BP2 └ BP0	O	LCD segment signal output
11	VLCD3	I	Voltage control terminal
12	VLCD2		
13	VLCD1		
14	V _{DD}	I	Power supply terminal
15	OSC1	I	Main-system clock input terminal
16	OSC2	—	Not used, open
17	XOSC2	—	Not used, open
18	XOSC1	—	Not used, connected to GND
19	V _{SS}	—	Ground terminal
20	RESET	O	Reset signal output terminal
21	STAT	I	Processing condition (CRU, CUE, CLVS, FCLV, TTSTOP) input
22	BLKCK	I	Sub-code block (Q data) clock (75Hz) output
23	SUBQ	I	Sub-code (Q data) output
24	SQCK	O	Sub-code Q resistor clock output
25	MEMORY	I	Key input terminal (MEMORY)
26	REPEAT	I	Key input terminal (REPEAT)
27	STOP	I	Key input terminal (STOP)

Pin No.	Mark	I/O Division	Function
28	PLAY	I	Key input terminal (PLAY/PAUSE)
29	RESUME	I	Key input terminal (RESUME)
30	RANDOM	I	Key input terminal (RANDOM)
31	HOLD	I	Key input terminal (HOLD)
32	EMPTY	I	Empty detect signal input
33	OPEN	I	Disc holder open detect terminal
34	SKIP. R	I	Key input terminal (SKIP/SEARCH. R.)
35	SKIP. F	I	Key input terminal (SKIP/SEARCH. F.)
36	WRDRCN	O	Remote control signal output
37	BUZ	O	Beep control output
38	LED	O	LED drive command signal
39	POWER	O	Power ON/OFF signal output
40	MUTE	O	Muting signal output ("H": MUTE)
41	MLD	O	Command load signal output
42	MDATA	O	Command data output
43	MCLK	O	Command clock output
44	REST	I	Rest detect terminal
45 └ 50	FP26 └ FP21	—	LCD segment signal output Not used, open
51 └ 64	FP20 └ FP7	O	LCD segment signal output

• IC501 (MN662740RM): Servo processor/Digital signal processor/Digital filter/D/A converter

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

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

Pin No.	Mark	I/O Division	Function
43	WVEL	—	Double velocity status signal ("H": double) (Not used, open)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias terminal (Not used, connected to GND)
47	DSL F	O	DSL loop filter terminal
48	PLL F	I	PLL loop filter terminal
49	VCO F	I	VCO loop filter terminal (Not used, connected to AV _{DD2})
50	AV _{DD2}	I	Power supply (analog circuit) terminal (2)
51	AV _{SS2}	—	GND (analog circuit) terminal
52	FS384	—	384fs (16.9344MHz) output (Not used, open)
53	PCK	—	PLL extract clock (f=4.3218MHz) (Not used, open)
54	TROF	—	Tracking servo OFF signal (Not used, open)
55	SUBC	—	Sub-code serial output data (Not used, open)
56	SBCK	—	Sub-code serial input clock (Not used, connected to GND)
57	V _{SS}	—	GND terminal
58	X1	I	Crystal oscillator terminal (f=16.9344 MHz)
59	X2	O	
60	V _{DD}	I	Power supply terminal
61	TRVSTOP	O	Traverse motor stop control terminal
62	CLDCK	—	Sub-code frame clock signal (f CLDCK=7.35kHz: Normal) (Not used, open)

Pin No.	Mark	I/O Division	Function
63	FCLK	—	Crystal frame clock (Not used, open)
64	IPFLAG	—	Interpolation flag terminal
65	FLAGO	—	Flag terminal
66	CLVS	—	Turntable servo phase synchro signal ("H": CLV, "L": Rough servo) (Not used, open)
67	CRC	—	Sub-code CRC check terminal ("H": OK, "L": NG) (Not used, open)
68	DEMPHA	—	De-emphasis ON signal ("H": ON) (Not used, open)
69	FLAG6	—	Flag terminal
70	SEL	—	Not used, connected to GND
71	TEST	I	Test terminal (Normal: "H")
72	AV _{DD1}	I	Power supply (analog circuit) terminal (1)
73	OUTL	O	Lch audio signal
74	AV _{SS1}	—	GND (analog circuit) terminal (1)
75	OUTR	O	Rch audio signal
76	RSEL	I	Polarity direction control terminal of RF signal (Not used, connected to power supply)
77	CSEL	I	Frequency control terminal of crystal oscillator (Not used, connected to GND)
78	ISRDATA	I	Serial data signal input
79	ILRCK	I	L/R discriminating signal input
80	IBCLK	I	Serial bit clock input

• IC101 (AN8834SBE1): Servo amp.

Pin No.	Mark	I/O Division	Function
1	PDA	I	Focus signal input terminal
2	PDB	I	Focus signal input terminal
3	V _{CC}	I	Power supply terminal
4	LPD	I	Non-inverting laser power input
5	LD	O	Laser power auto control output
6	RF	O	RF summing output terminal
7	RFIN	I	RF (AGC) signal input
8	CAGC	I	AGC detecting capacitor terminal
9	ARF	O	RF (AGC) signal output
10	CSBRT	I	Capacitor connection terminal for OFTR
11	CEA	I	HPF-amp. terminal
12	BDO	O	Dropout detection output
13	LDON	I	Laser ON/OFF control input
14	GND	—	Ground terminal

Pin No.	Mark	I/O Division	Function
15	/RFDET	O	RFDET output terminal
16	CROSS	O	CROSS signal output
17	OFTR	O	OFTR signal output
18	VDET	O	VDET signal output
19	ENV	O	Envelope signal output
20	TEBPF	I	VDET input terminal
21	CCRS	I	Capacitor connection terminal for CROSS
22	TE	O	Tracking error signal output
23	FE	O	Focus error signal output
24	TBAL	I	Tracking balance signal input
25	FBAL	I	Focus balance signal input
26	VREF	O	Reference voltage output
27	PDE	I	Tracking signal input terminal
28	PDF	I	Tracking signal input terminal

REPLACEMENT PARTS LIST

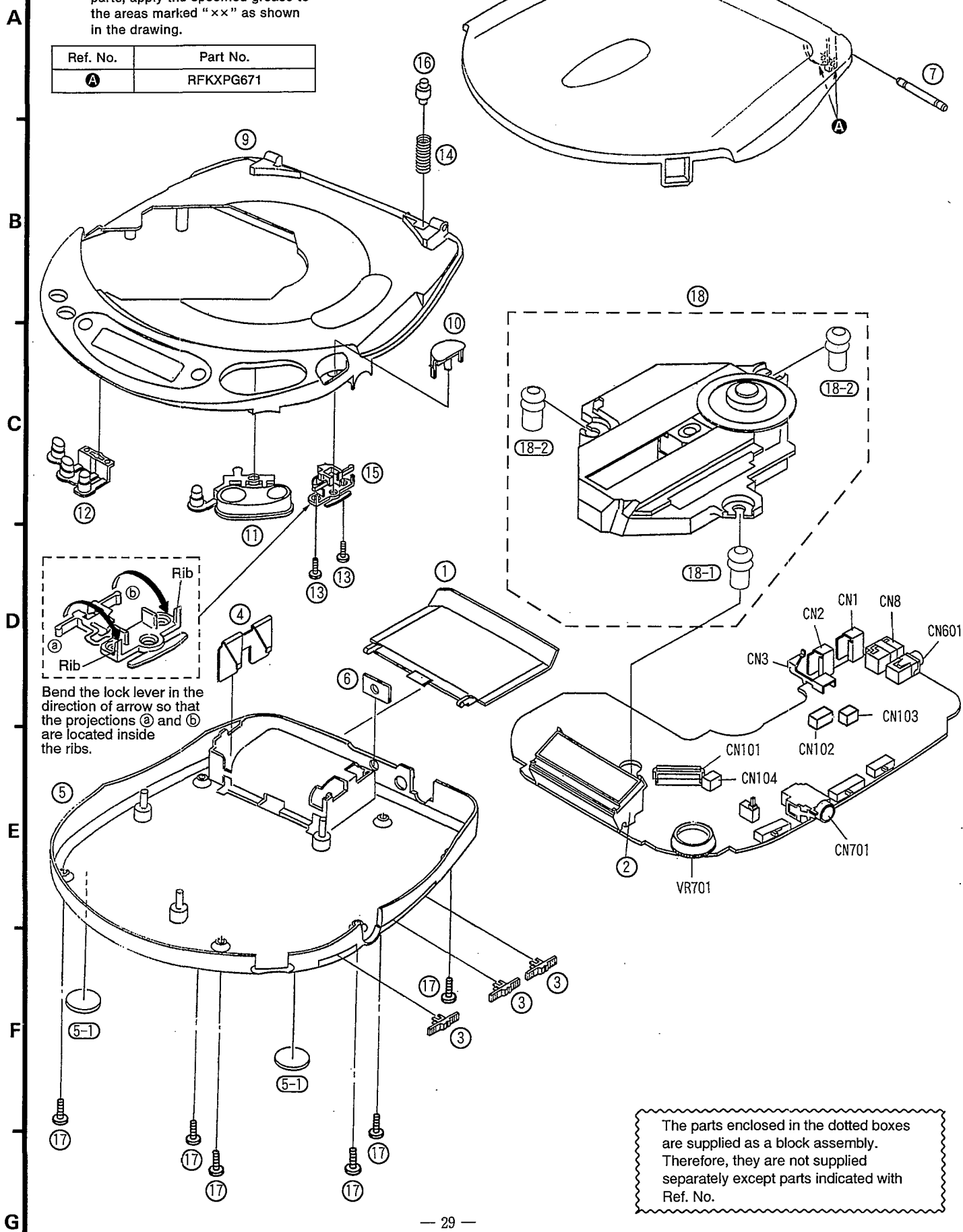
Notes: *Warning: This product uses a laser diode. Refer to caution statements on page 2.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS		9	RFKJLS190P-H	INTERMEDIATE CABINET ASS'Y	
1	RKK0065-K	BATTERY COVER		10	RGU1030-H	OPEN BUTTON	
2	RJF0023	LCD HOLDER		11	RGU1031-H2	OPERATION BUTTON(A)	
3	RGV0120-1K	HL FILTER/MODE/HOLD KNOB		12	RGU1032-H2	OPERATION BUTTON(B)	
4	RJC93007	COMMON BATTERY TERMINAL		13	RHE5079YA	SCREW	
5	RFKJLS190P-H	BOTTOM CABINET ASS'Y		14	RMB0351	OPEN SPRING	
5-1	RKA0063-K	FOOT		15	RML0342	LOCK LEVER	
6	RMA0677	REAR ORNAMENT		16	RMS0462	PUSH SHAFT	
7	RMS0105-1	SHAFT		17	XTN17-6GFZ	SCREW	
8	RYF0348-H	CD COVER ASS'Y		18	RAE0140Z	TRAVERSE DECK	
				18-1	SHGD157	FLOATING RUBBER(1)	
				18-2	SHGD165	FLOATING RUBBER(2)	

CABINET PARTS LOCATION

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

Ref. No.	Part No.
A	RFKXPG671



REPLACEMENT PARTS LIST

Notes: *Important safety notice:

 Components identified by Δ 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.

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

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		VR11	EVNDXAA00B33	POWER SUPPLY VOLTAGE ADJ.	
				VR701	EVUT2FA26C54	VOLUME	
IC11	AN8819NFB	DC-DC CONV. /MOTOR DRIVE				COIL(S)	
IC101	AN8834SBE1	SERVO AMP					
IC301	SC435605FU	SYSTEM CONT. &LCD DRIVE		L11	RLQB330KT-M	COIL	
IC501	MN662740RM	SERVO PROCESSOR		L12	RLZ0028T-0	COIL	
IC701	TDA1308IT	HEADPHONES AMP		L201	RLQB471KT-K	COIL	
		TRANSISTOR(S)		L202	ELJPC330KF	COIL	
				L401	RLQB330KT-M	COIL	
Q11	2SD2074HWSTT	TRANSISTOR		L501	RLB0003	COIL	
Q12, 13	2SD1450STTA	TRANSISTOR		L601, 602	RLB0003	COIL	
Q14	2SD2074HWRST	TRANSISTOR		L701	RLB0003	COIL	
Q15	UN221VTX	TRANSISTOR				OSCILLATOR(S)	
Q81	2SD601QRSTX	TRANSISTOR					
Q201	2SB970RSTX	TRANSISTOR		X501	RSXZ16M9M01T	OSCILLATOR (16.9344MHz)	
Q202	2SB709QRSTX	TRANSISTOR				LCD(S)	
Q204	2SB709QRSTX	TRANSISTOR					
Q401	2SB970RSTX	TRANSISTOR		LCD301	RSL5136-L	LCD	
Q601, 602	2SD1328QRSTX	TRANSISTOR				SWITCH(ES)	
Q603	FMG4T148	TRANSISTOR					
Q701, 702	2SD1328QRSTX	TRANSISTOR		S201	RSHIA91ZA-A	LASER ON/OFF	
Q705	FMG4T148	TRANSISTOR		S202	SSH1-2	REST DETECTOR	
Q901	2SD601QRSTX	TRANSISTOR		S301	EVQ21405R	MEMORY/RECALL	
Q902, 903	2SB709QRSTX	TRANSISTOR		S302	EVQ21405R	REPEAT	
Q904	UN2114TX	TRANSISTOR		S303	EVQ21405R	SKIP/SEARCH(B)	
Q905, 906	2SD601QRSTX	TRANSISTOR		S304	EVQ21405R	SKIP/SEARCH(F)	
		DIODE(S)		S305	EVQ21405R	STOP/POWER OFF	
				S306	EVQ21405R	PLAY/PAUSE	
D11	D1FS4	DIODE		S307	ESD11H230	PLAY MODE	
D81-83	SLC-505MCA47	L. E. D.		S308	ESD11H220	HOLD	
D201	RB411DT147	DIODE		S701	ESD11H230	HIGH FILTER/XBS/OFF	
D202	MA110TX	DIODE				CONNECTOR(S) AND JACK(S)	
D301	MA151WKTIX	DIODE					
D401	MA701TX	DIODE		CN1	RJC93015-1	BATTERY TERMINAL(+)	
D901	MA151WKTIX	DIODE		CN2	RJC93015-1	BATTERY TERMINAL(-)	
D902	MA153TX	DIODE		CN3	RJH5102-1	RECHARGEABLE BATT. TERMINAL	
D903	MA151WKTIX	DIODE		CN8	RJJ4303-1	DC IN JACK	
		IC PROTECTOR(S)		CN101	RJU035T016-1	SOCKET(16P)	
ICP11	UNH00500A	IC PROTECTOR	Δ	CN102	RJT068W04V	CONNECTOR(4P)	
		VARIABLE RESISTOR(S)		CN103, 104	RJT068W02V	CONNECTOR(2P)	
				CN601	RJJD3552B-C	OUT JACK	
				CN701	RJJ36T02-C	HEADPHONES JACK	

RESISTORS AND CAPACITORS

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

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS						
R14	ERJ1WYK2R7H	1W 2.7	C16	ECUV1C224KBN	16V 0.22U	C401	RCE1AKA470IG	10V 47U
R16	ERJ6GEYJ100	1/10W 10	C17	ECUV1H470KCN	50V 47P	C402	RCE1ASC330IX	10V 33U
R98	ERJ6GEYJ681V	1/10W 680	C18	ECUV1E103KBN	25V 0.01U	C403	ECUVNE104ZFN	25V 0.1U
R105	ERJ6GEYJ333V	1/10W 33K	C19	ECEA1AKA220I	10V 22U	C404	ECUVNC105ZFN	16V 1U
R106	ERJ6GEYJ124V	1/10W 120K	C20	ECEA1EKA4R7I	25V 4.7U	C405	ECUVNE104KBN	25V 0.1U
R203	ERJ6GEYJ224V	1/10W 220K	C21	ECUV1E223KBN	25V 0.022U	C501, 502	ECUV1H150KCN	50V 15P
R507	ERJ6GEYJ100	1/10W 10	C22	ECUVNE104KBN	25V 0.1U	C503	ECUV1H561KBN	50V 560P
R508	ERJ6GEYJ563V	1/10W 56K	C24	ECUV1H391KBN	50V 390P	C504	ECUVNE104KBN	25V 0.1U
R510	ERJ6GEYJ100	1/10W 10	C25	ECEA1HKN010I	50V 1U	C505	ECUV1E223KBN	25V 0.022U
R725, 726	ERJ6GEYJ180V	1/10W 18	C28	ECUV1E103KBN	25V 0.01U	C506	ECUV1C474KEM	16V 0.47U
R727, 728	ERJ6GEYK1R5V	1/10W 1.5	C29	ECUV1H470KCN	50V 47P	C507	ECEA0GKA221	4V 220U
R729	ERJ6GEYJ472V	1/10W 4.7K	C101, 102	ECUVNE104KBN	25V 0.1U	C508, 509	ECUVNE104ZFN	25V 0.1U
R743	ERJ6GEYJ100	1/10W 10	C103	ECUV1E273KBN	25V 0.027U	C511	ECUV1E103KBN	25V 0.01U
		CHIP JUMPERS	C106	ECUV1H222KBN	50V 2200P	C600	ECUVNE104ZFN	25V 0.1U
			C107	ECUV1H182KBN	50V 1800P	C601, 602	ECUV1H102KBN	50V 1000P
			C108	ECUV1C473KBN	16V 0.047U	C603, 604	ECUV1H272KBN	50V 2700P
			C109	ECUV1C333KBN	16V 0.033U	C605, 606	RCE1CKA100IG	16V 10U
			C110	ECUV1E223KBN	25V 0.022U	C607, 608	ECUV1H681KBN	50V 680P
			C111	ECUV1E273KBN	25V 0.027U	C609	ECUVNE104ZFN	25V 0.1U
RJ11	ERJ8GEYOR00V	CHIP JUMPER	C112	ECUV1H331KBN	50V 330P	C610	ECEA0JPK101I	6.3V 100U
RJ12	ERJ6GEYOR00V	CHIP JUMPER	C113, 114	ECUVNE104ZFN	25V 0.1U	C701, 702	ECUV1H332KBN	50V 3300P
RJ14-18	ERJ6GEYOR00V	CHIP JUMPER	C115	ECUV1E223KBN	25V 0.022U	C703, 704	ECUV1E123KBN	25V 0.012U
RJ202, 203	ERJ6GEYOR00V	CHIP JUMPER	C116	ECUVNE104KBN	25V 0.1U	C705, 706	ECUV1C333KBN	16V 0.033U
RJ301	ERJ6GEYOR00V	CHIP JUMPER	C120	ECUV1H331KBN	50V 330P	C707, 708	ECUV1H102KBN	50V 1000P
		CAPACITORS	C201	RCE0JSC470IX	6.3V 47U	C709, 710	ECEA0GPK221I	4V 220U
			C202	ECUVNC105ZFN	16V 1U	C711, 712	ECEA1CPK100I	16V 10U
			C203	ECEA1HKA2R2I	50V 2.2U	C713	ECEA0JPK101I	6.3V 100U
C11, 12	RCE1AKA470IG	10V 47U	C206	ECUV1E103KBN	25V 0.01U	C717	ECEA0GPK221I	4V 220U
C13	RCE0JSC470IX	6.3V 47U	C210	ECUVNE104KBN	25V 0.1U	C901	ECUV1C473KBN	16V 0.047U
C14	RCE0JKA101IV	6.3V 100U	C301	ECUVNE104ZFN	25V 0.1U			
C15	ECUVNE104ZFN	25V 0.1U	C302	ECUVNC105ZFN	16V 1U			

SUPPLY OF RECHARGEABLE BATTERY AS REPLACEMENT PARTS

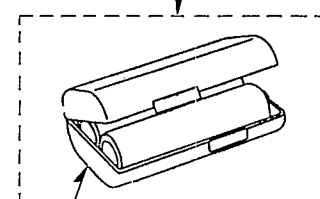
Please take note of the following points relating to Carrying Case to be used for protection of Rechargeable Battery from shorting.

Replacement Parts:

- Rechargeable Battery (RP-BP60PYS) to be supplied will be provided with Carrying Case (RFKNLS370-K).
- No replacement parts will be supplied for Rechargeable Battery without Carrying Case.
- Replacement parts will be supplied for Carrying Case (RFKNLS370-K) without Rechargeable Battery.
- To your customers, delivery Rechargeable Battery together with Carrying Case to prevent shorting accidents that may occur when Rechargeable Battery is carried about without Carrying Case.

RP-BP60PYS

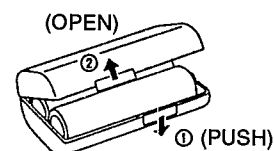
(Rechargeable Battery with Carrying Case)



RFKNLS370-K
(Carrying Case)

CAUTION IN USE OF RECHARGEABLE BATTERY

- Take Rechargeable Battery out of Carrying Case and use it.
- Be sure to carry Rechargeable Battery in this Carrying Case.
If not, it may either heat or ignite by shorting with a metal.



REPLACEMENT PARTS LIST

Notes: *Important safety notice:

 Components identified by Δ 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.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		PACKING MATERIAL		A5	RP-BP60PYS	RECHARGEABLE BATTERIES	
				A5-1	RFKLS370-K	BATTERY CARRYING CASE	
P1	RPK0589	PACKING CASE				<GREASE OR JIG/TOOL>	
P2	RPF0111	PROTECTION BAG (UNIT)				TEST DISCS	
		ACCESSORIES		SA1	SZZP1054C	PLAYABILITY TEST DISC	
				SA2	SZZP1056C	UNEVEN TEST DISC	
A1 ※1	RQT3033-P	INSTRUCTION MANUAL				GREASE	
A2	EURHJB30-2	WIRED REMOTE CONTROLLER					
A3	RFEA405C-1W	AC ADAPTOR	Δ	SA3	RFKXPG671	MOLYCOAT GREASE PG671	
A4	RP-HT103DPYS	STEREO HEADPHONES					

※1: The servicenter list and the warranty card are included in the instruction manual.

PACKAGING

