

Service Manual

COMPACT
disc
DIGITAL AUDIO

DIGITAL

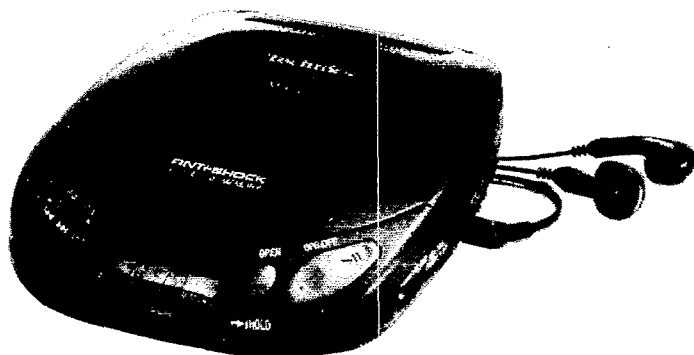
MASH
multi-stage noise shaping

Portable CD Player

SL-XP290

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.	
(GN)	Oceania.	

TRAVERSE DECK: RAE0133Z MECHANISM SERIES

SPECIFICATIONS

Audio

No. of channels: 2 channels (left and right, stereo)
Output voltage: 0.6V (50k Ω) ϕ 3.5 stereo mini jack
Frequency response: 20~20,000Hz (+0.5dB, -1.5dB)
S/N: more than 96dB**
Wow and flutter: Below measurable limit
Digital filter: 8 times over sampling
DA converter: 1 bit, MASH*
Headphone output level: max. 9mW+9mW/16 Ω (variable) stereo mini jack ϕ 3.5

Signal Format

Correction system: Technics New Super Decoding Algorithm

Pickup

Type: One beam
Light source: Semiconductor laser
Wavelength: 780nm
Lens: Glass pressed lens

Playing time;

(When used in hold mode, at 25°C temperature and on a flat and stable surface.)

Batteries used	Anti-shock OFF/ON
Rechargeable batteries (SH-CDB8D/RP-BP60)	About 3 hours/ About 2 hours 30 minutes
Panasonic alkaline dry cell batteries (LR6)	About 9 hours/ About 6 hours

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

Recharging time;
Power consumption when recharging:

Approx. 5.8W

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

※※ These specifications were measured in the anti-shock OFF mode.

General

Operational temperature range:
Power requirement:

0°C—40°C (32°F—104°F)
 AC; with an included panasonic AC adaptor
 RFEA401E-1S: (E, EG)
 RFEA404B-W: (EB)
 RFEA402Z-W: (GC)
 RFEA404A-W: (GN)
 Batteries; 3V (two "AA" size (R6P/LR6) batteries, not included)
 (Panasonic R6P/LR6 or equivalent, not included)
 Rechargeable Batteries; DC 2.4V with an optional Panasonic Rechargeable Batteries (SH-CHB8D/RP-BP60)
 Car Battery; with an optional panasonic car adaptor (SH-CDC9).
 4.5V $\diamond$ $\ominus$ $\diamond$

DC IN:

Power consumption:

Power source	Anti-shock OFF/ON
AC adaptor	4.0W/4.3W
Batteries	0.6W/1.0W

Dimensions (W×H×D): 128×30.3×145mm
Weight: 310g (with batteries)
 270g (without batteries)

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

Technics®

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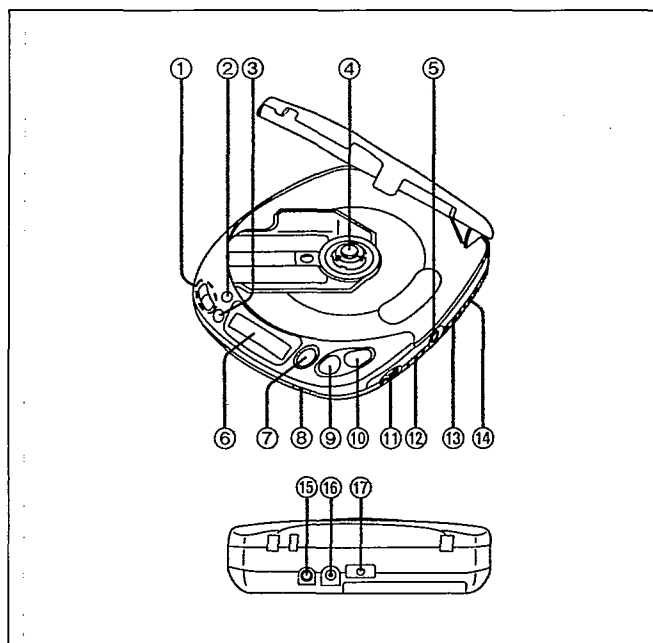
⚠ WARNING

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.

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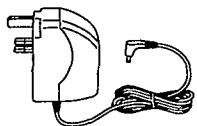
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LOCATION OF CONTROLS**Portable CD Player**

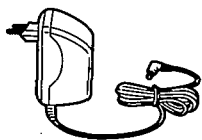
- ① Skip/search buttons (◀◀ -SKIP/-SEARCH ▶▶)
- ② Memory/recall button (MEMORY/RECALL)
- ③ Repeat button (REPEAT)
- ④ Push button (PUSH)
- ⑤ Headphones jack (⌀) 16Ω φ3.5
- ⑥ Display
- ⑦ Open button (OPEN)
- ⑧ Hold switch (HOLD)
- ⑨ Stop/operation off button (■/OPR OFF)
- ⑩ Play/pause button (▶ ||)
- ⑪ Headphones volume control (VOLUME)
- ⑫ High filter/XBS selector (HIGH FILTER, XBS, OFF)
- ⑬ Play mode selector (MODE)
- ⑭ Anti-shock switch (ANTI-SHOCK)
- ⑮ Out jack (OUT)
- ⑯ DC in jack (DC IN 4.5 V ⚡)
- ⑰ Hole for car mounting base

ACCESSORIES

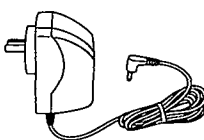
AC adaptor..... 1 pc.
[For (EB) area.]
(RFEA404B-W)



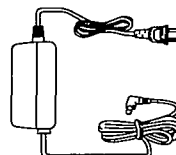
[For (E, EG) areas.]
(RFEA401E-1S)



[For (GN) area.]
(RFEA404A-W)



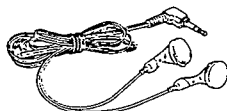
[For (GC) area.]
(RFEA402Z-W)



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



Stereo earphones
(RFEV310A-KS)..... 1 pc.



■ 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: 780nm
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 Lasereinheit. Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

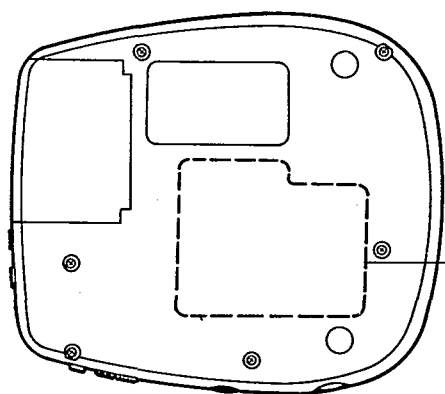
Wellenlänge: 780nm

Maximale Strahlungsleistung der Lasereinheit: 100μW/VDE

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

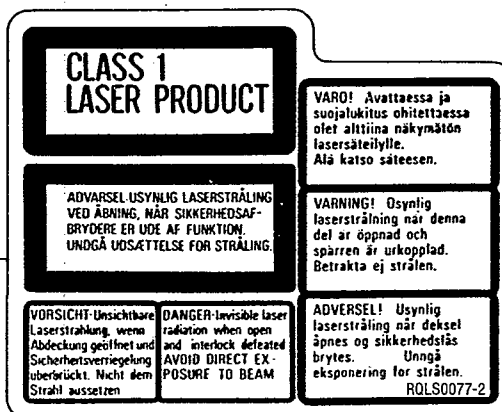
1. Die Lasereinheit nicht zerlegen, da die Strahlung an der freigelegten Lasereinheit gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinheit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlinse blicken.
4. Nicht über längere Zeit in die Fokussierlinse blicken.

ADVASEL: I dette apparat anvendes laser.



(Bottom side)

RQLS0077-2

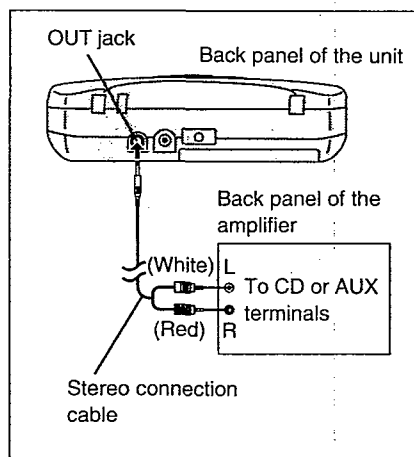


■ USING THE UNIT WITH OPTIONAL ACCESSORIES

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 stereo

Items to be purchased

For connection to the car audio system:
Car stereo cassette adaptor (SH-CDM9D)

For securing the unit and connecting the power supply:

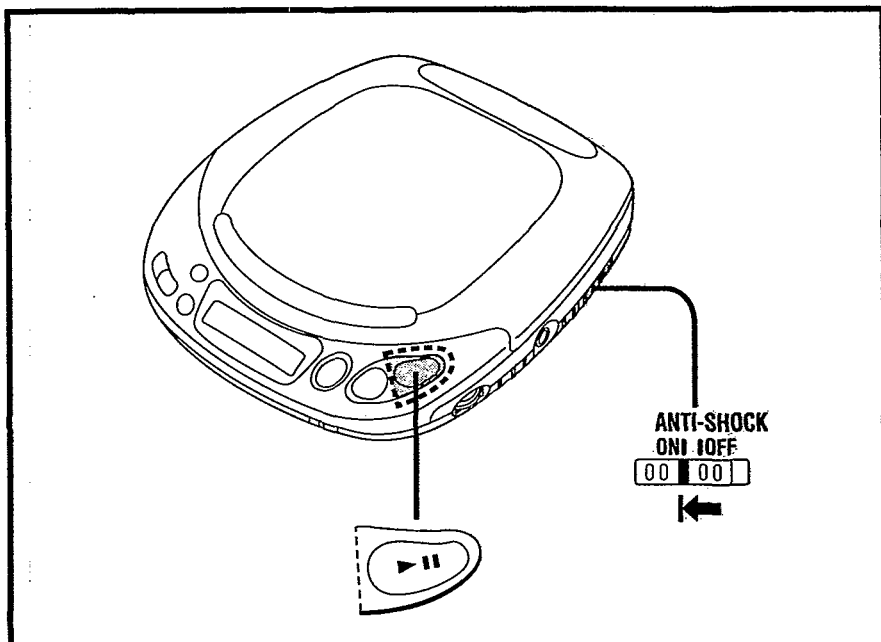
- Car adaptor (SH-CDC9)
- Car mounting kit (SH-CDF20)
Car mounting arm, Car mounting base

Note

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

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

ANTI-SHOCK FUNCTION



This function minimizes sound interruptions due to vibration when listening to a disc while walking about or in a moving vehicle or train.

Once the anti-shock function has been activated, play data of up to 3 seconds can be stored in the memory.

Therefore, even if the unit sustains an external impact, the data stored in the memory is sent to minimize sound interruptions during play.

1 Set ANTI-SHOCK to ON.

2 Press ►||.

The function starts to store the play data, and the M.RESERVE indicator on the display shows how much data is stored.

M.RESERVE indicator

M.RESERVE mode	Unit mode	Play mode (play data mode)
	Stable.	Sound is heard (sufficient data has been stored).
	Unit sustains a shock.	Sound is heard (stored data is used).
	Shock subsides.	Sound is heard (data storage commences).
	Unit sustains continuous shocks.	Sound is interrupted (no more data is stored).

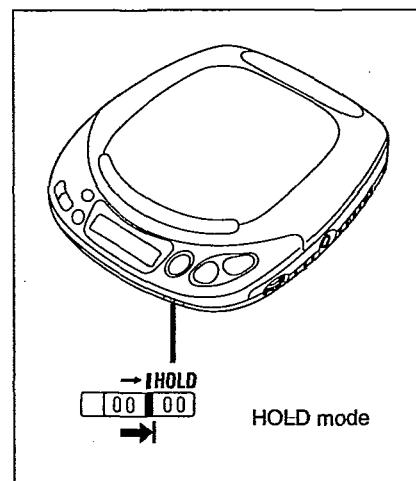
Listening to sound with the unit connected to an audio system

The anti-shock function incorporates digital signal compression technology. When listening to sound with the unit connected to an audio system at home, it is recommended that the anti-shock switch be set to the OFF position.

Notes

- The ANTI-SHOCK can be set during play but doing so will produce a slight gap in the sound due to a change in the disc speed.
- While the anti-shock function is on, the life span of the batteries is shortened and sound made by the rotation of the disc increases somewhat because the disc rotates faster and the play data is stored.

ACCIDENTAL OPERATION PREVENTION FUNCTION



This function prevents the unit from operating even if a control button is pressed in error. (The disc lid, however, 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 function buttons (except OPEN) is pressed.

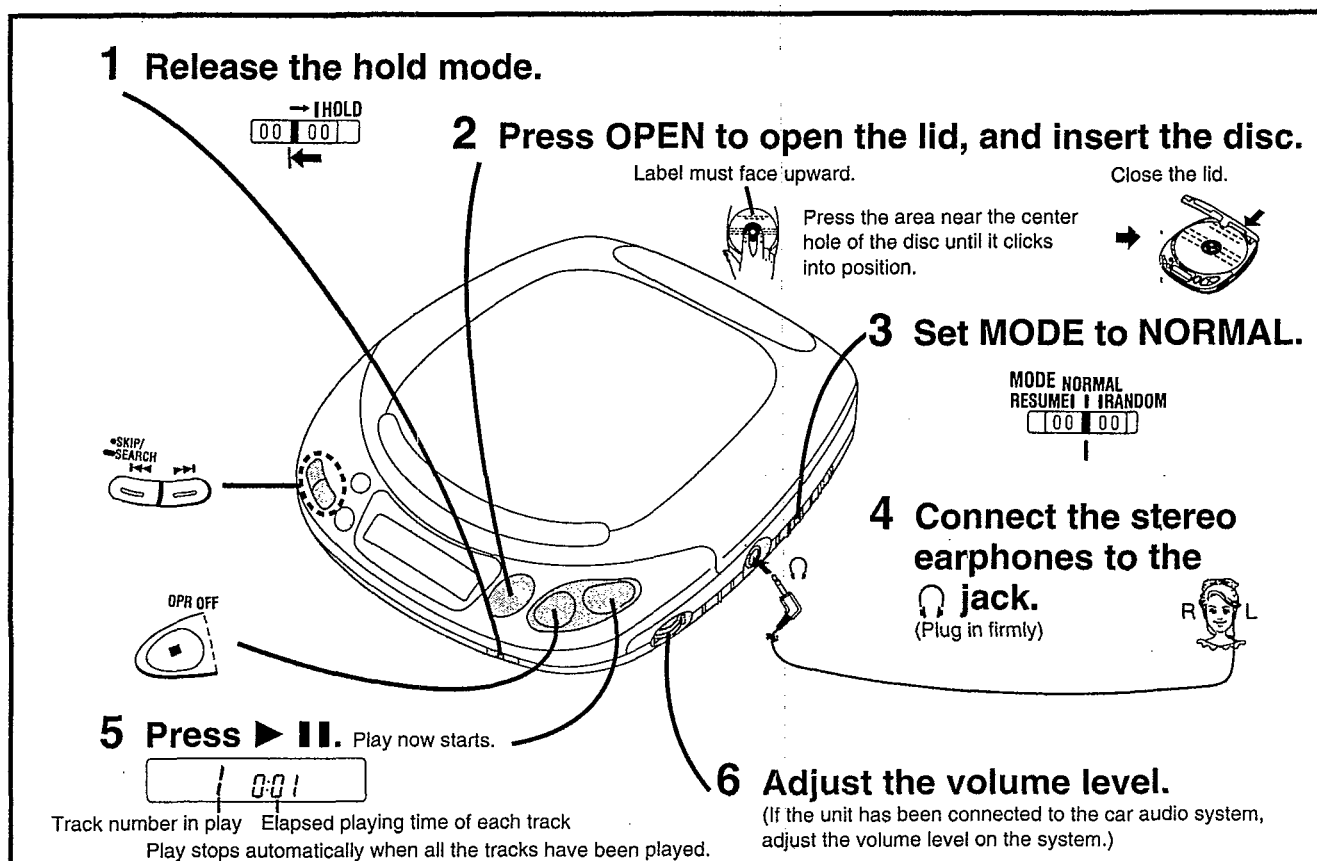
When the unit is turned off

The "hold" indicator appears only when ►|| is pressed.

Before operating the buttons

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

SEQUENTIAL PLAY



Operation	Button	Display
Pause: press during play/press again to resume play	►	6 1:46
To stop play: press during play [Stop mode]	■	Total number of tracks 12 53:52 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 ►|| 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.)

Backlight

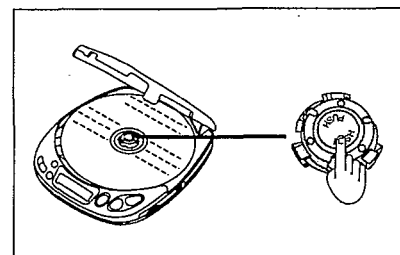
The backlight comes on to illuminate the display panel when the unit is used with a AC adaptor or car adaptor (not included). The backlight will also come to illuminate the display panel for about 5 seconds if any function button (except OPEN) is pressed when the HOLD mode has been released and the unit is being operated with its batteries.

Play without turning on the backlight:

(This is possible only when the unit has been powered by batteries.)
Press ►|| while holding down MEMORY/RECALL in the off mode.
(The backlight will come on again when the unit is turned off and back on again, and a function button is then pressed.)

Removing the disc

After the disc has stopped rotating, press PUSH and 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.

POWER SUPPLY PREPARATIONS

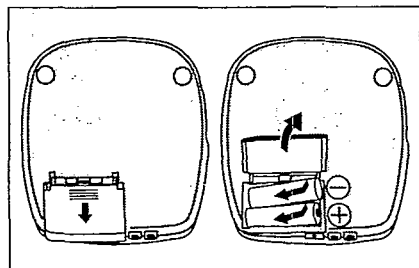
Using rechargeable batteries (not included)

Obtain the optional rechargeable batteries (SH-CDB8D/RP-BP60).
Make sure that the rechargeable batteries have been recharged before use.

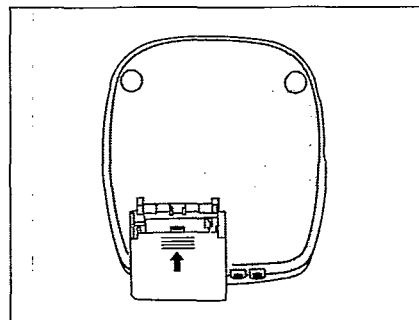
Recharging procedure

1 Place the rechargeable batteries inside the unit.

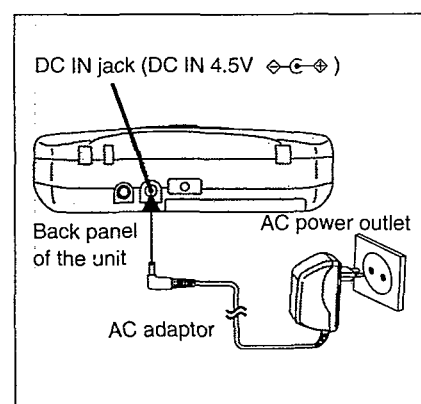
(No batteries other than SH-CDB8D/RP-BP60 can be recharged.)



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



2 Connect the AC adaptor.



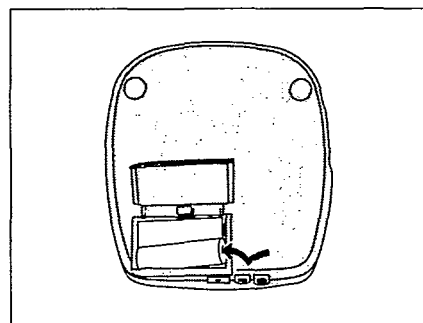
Note

The configuration of the AC adaptor differs according to the area.
It takes about 3 hours to recharge the batteries fully.

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.
- While recharging, the AC adaptor and rechargeable batteries may get warm. This is normal.

Using dry cell batteries (not included)

Disconnect the AC adaptor and then install two LR6 (UM-3) type alkaline batteries.

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

MAINTENANCE

Maintaining the unit

Wipe the unit with a soft cloth. Remove stubborn dirt using a cloth which has been dipped in water or soapy water and wrung out, and then wipe dry.

- If you intend to use a chemical cleaning cloth, read its directions first.
- Do not use alcohol or paint thinners.

Using the AC adaptor

Connect the AC adaptor supplied.
Refer to the section on "Using rechargeable batteries" for details on the connections.

Note

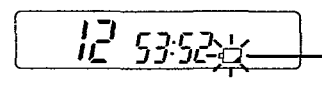
The unit is in the standby condition when the AC adaptor is connected. The primary circuit is always "live" as long as the AC adaptor is connected to an electrical outlet.

Using the car adaptor (not included)

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



Battery indicator

This starts flashing when the batteries have run down, and after a short while the power is automatically cut off.

(The amount of time during which play continues 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.

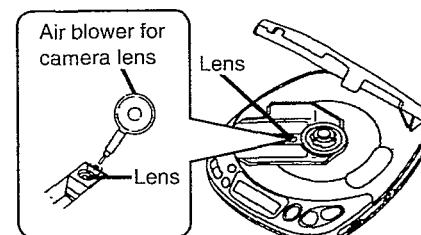
(The battery indicator may not flash if rechargeable batteries, other than those designated by our company, are used.)

Maintaining the lens

Open the lid and clean the lens as shown in the figure.

Use a cotton swab to gently wipe off any fingerprints.

Recommended product: Lens cleaner kit (SZZP1038C)



CAUTIONS

AC adaptor

- Handle the AC adaptor carefully. Improper handling is dangerous.
 - Do not touch it with wet hands.
 - Do not place heavy objects on top of it.
 - Do not forcibly bend it.
- Be sure to connect only the AC adaptor provided with the unit.
- Disconnect the AC adaptor from the power outlet if the unit is not going to be used for a long time.

Unit

No altering or remodeling

This can cause malfunctioning.

No dropping or strong impacts

This may damage the unit.

Locations to be avoided

Avoid using the unit in the following locations since they can cause malfunctioning.

1. Bathrooms and other moisture-prone places
2. Warehouses and other dusty places
3. Very hot places near heating appliances, etc.

Do not leave the unit exposed to direct sunlight for long periods of time

This may deform or discolor the cabinet and may also cause malfunctioning.

Rechargeable batteries

- Only the SH-CDB8D/RP-BP60 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.
- 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 state.
- Do not allow any metal objects to touch the terminals of rechargeable batteries since this may cause short-circuiting which is dangerous.

Dry cell batteries/rechargeable batteries

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

- Align the $\oplus$ and $\ominus$ polarities properly when inserting the batteries.
- 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 a long 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.
- Do not peel off the plastic covering on the rechargeable batteries. Short-circuiting may occur which is dangerous.

Carrying dry cell batteries/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 together 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

In the interest of traffic safety, do not operate the unit while driving.

Precautions for Listening with the Headphones

- Do not play your headset 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 headset 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.

When purchasing rechargeable batteries

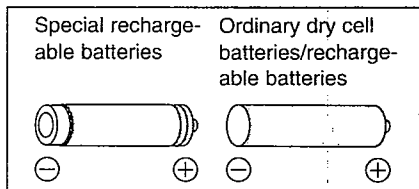
As a safety precaution, the portable CD players made by Technics have a construction designed to make it impossible to recharge ordinary batteries.

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.



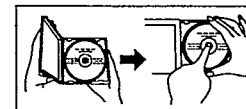
(For (E, EG) areas)

Notice about the rechargeable battery

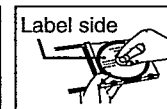
The battery is designated recyclable. Please follow your local recycling regulations.

CONCERNING COMPACT DISCS

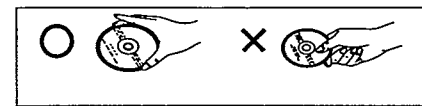
How to remove a disc from its case



How to store the disc in its case

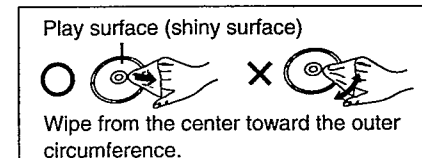


How to hold a disc



If the surface is dirty

Wipe it with a damp cloth and then wipe dry.



If moisture has formed on a disc

When moisture has formed because the disc was brought suddenly into a warm room from a cold environment, wipe it off using a soft dry cloth.

When storing discs

Avoid locations which are

- Exposed to direct sunlight.
- Susceptible to high levels of humidity or dust.
- Directly exposed to heat from a heating appliance.
- On top of a car dashboard or near the rear window.

Handling precautions

- On the label side (the side with writing)
 - Do not write anything using a pencil, ball-point pen, etc. Do not stick paper or labels.
- On the disc (shiny) side
 - Handle this side carefully to keep it free from fingerprints or scratches. Do not use record cleaners, solvents, etc.

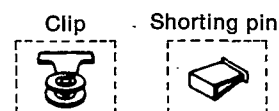
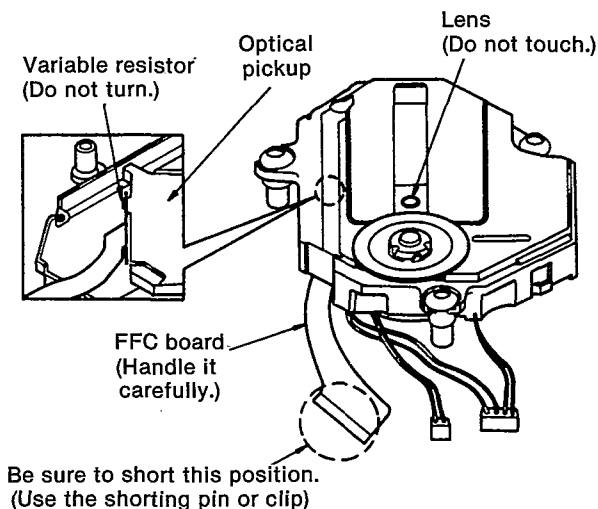
HANDLING PRECAUTIONS FOR TRAVERSE DECK

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 board).
When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board (FFC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

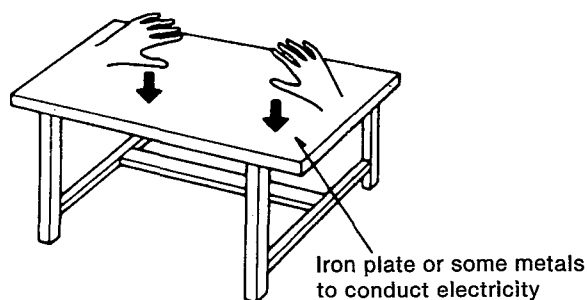
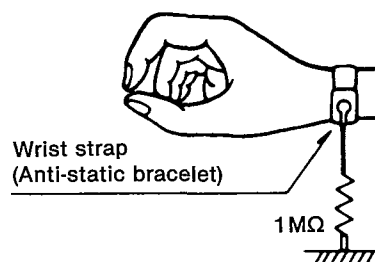


• Grounding for electrostatic breakdown prevention

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

Caution:

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



■ OPERATION CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES

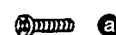
Warning: This product uses a laser diode. Refer to caution statements on page 3.

ACHTUNG: • Die lasereinheit nicht zerlegen.

• Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

- 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. [] indicates parts No.

1. Checking for the P.C.B.



[XTN17+6GFZ] (Black)

Checking for the P.C.B. (component side)

Step 3

Lift up the intermediate cabinet ass'y.

Step 2

Pressing the OPEN button, open the CD cover ass'y.

Step 4

Move the traverse deck in the direction of arrow.

Step 1

a × 6

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

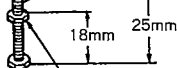
Test disc

P.C.B. (Component side)

Step 5

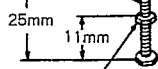
Sustain the traverse deck with the floating rubber inserted screws and nuts as shown below.

Screw(3mm × 25mm)
(XSN3+25S)



Nut(3mm)
(XNG3EG)

Screw(3mm × 25mm)
(XSN3+25S)



Nut(3mm)
(XNG3EG)

Screw(3mm × 25mm)
(XSN3+25S)



Nut(3mm)
(XNG3EG)

S201(LASER
ON/OFF switch)

Short land

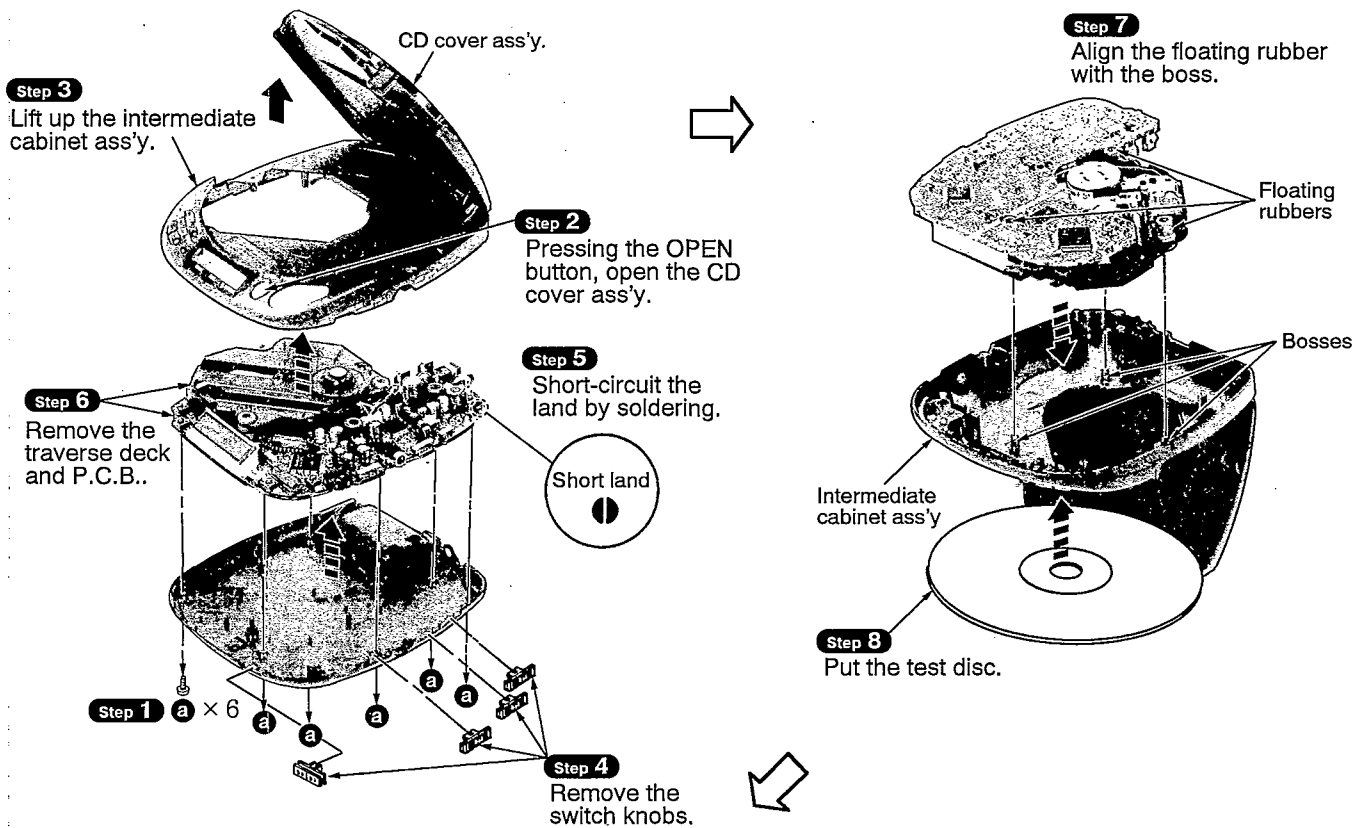
Step 6

Short-circuit the land by soldering.

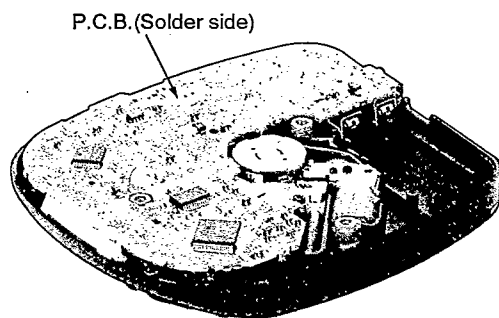
NOTE

- After checking, unsolder the short land to open circuit.
- The tip of screw must not protrude above the floating rubber. (The protruded screw may be damaged the test disc.)

Checking for the P.C.B. (solder side)



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

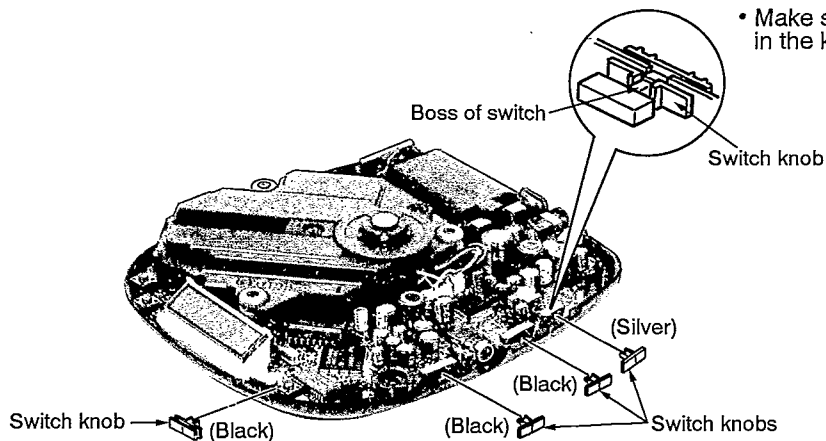


NOTE

After checking,unsolder the short land to open circuit.

[XTN17+6GFZ] (Black)

Notice for Installation of switch knobs

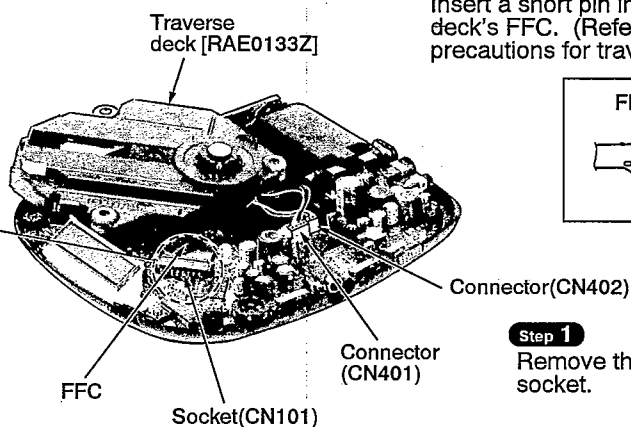
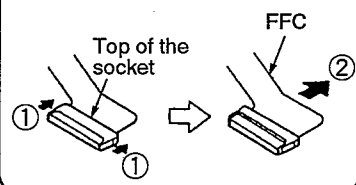


• Make sure the bosses of switch are fit in the knobs of switch.

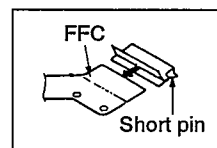
2. Replacement of the traverse deck

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

1. Push the top of the socket in the direction of arrow ①
2. Remove the FFC in the direction of arrow ②.



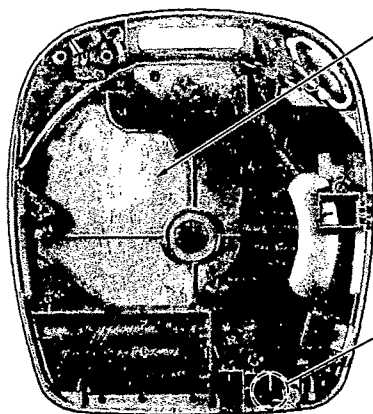
Caution:
Insert a short pin into the traverse deck's FFC. (Refer to "handling precautions for traverse deck" on page 8.)



- Step 1**
Remove the 2 connectors and socket.

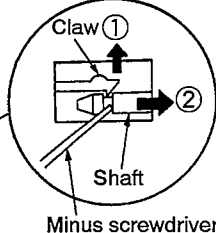
3. Replacement of the CD cover ass'y

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

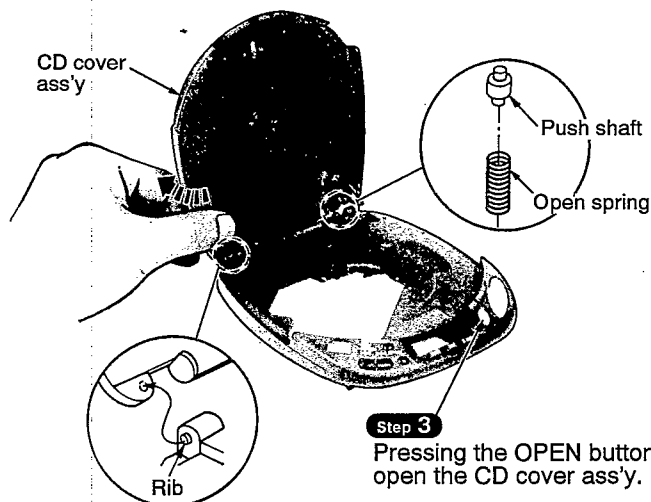


- Step 1**
Close the CD cover ass'y.

- Step 2**
Release the claw, and then remove the shaft.

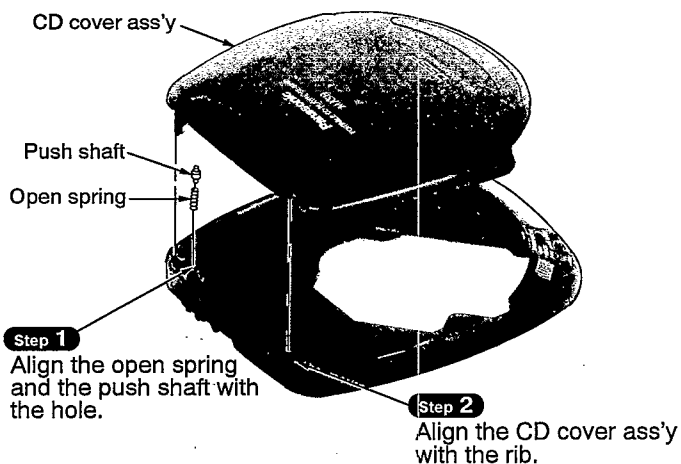


NOTE When the CD cover ass'y is removed, the push shaft and the open spring will also be removed. Be careful not to lose them.

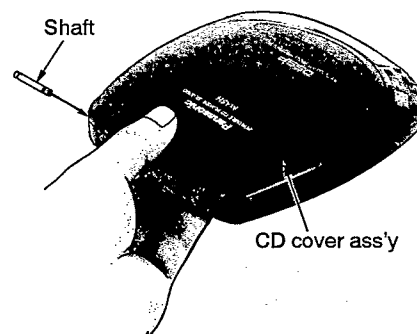


- Step 4**
Remove the CD cover ass'y from rib.

Reassembly procedures of CD cover ass'y

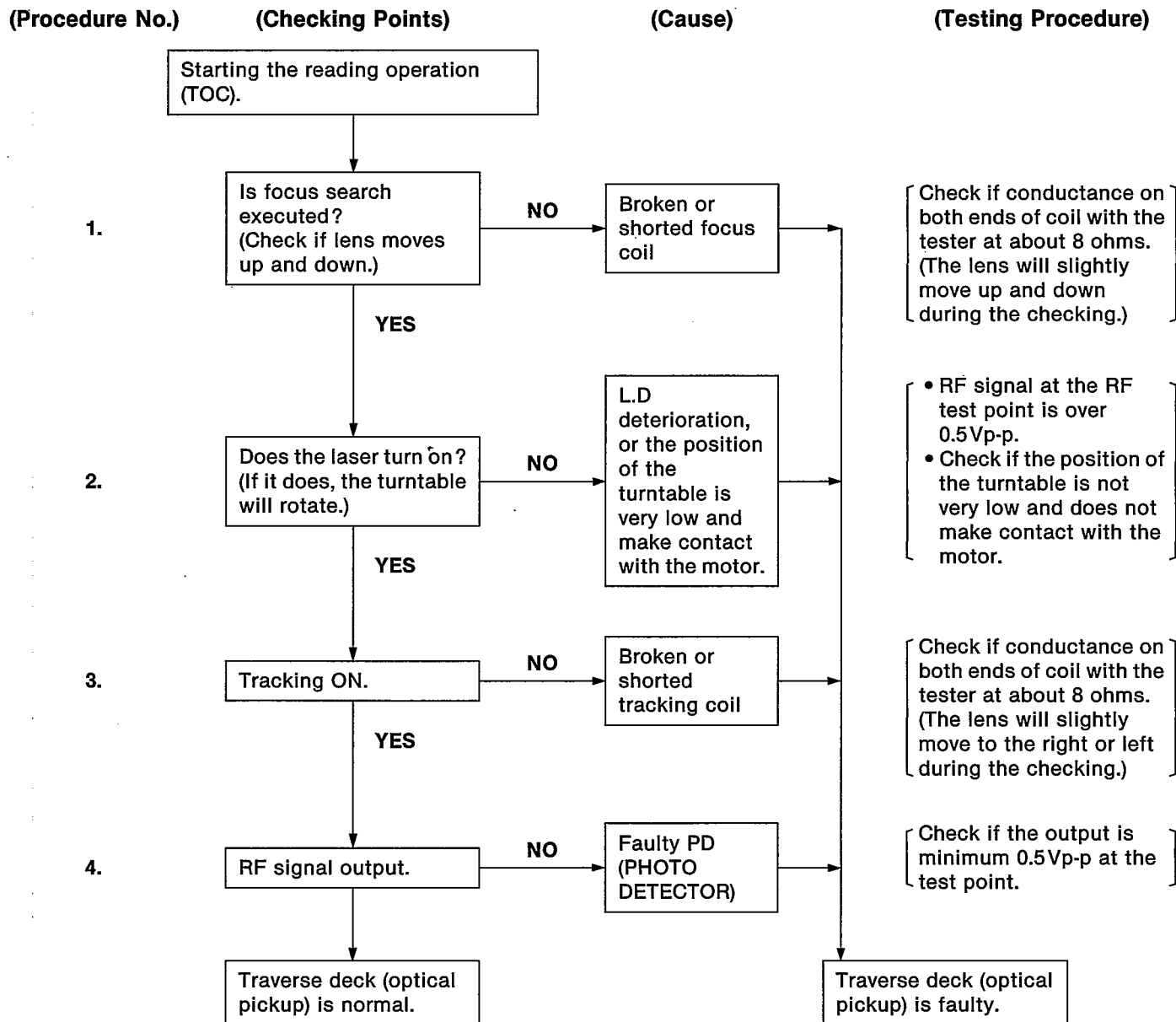


- Step 3**
Holding the CD cover ass'y not to be detached the open spring and the push shaft, install the shaft.



■ 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.

MEASUREMENTS AND ADJUSTMENTS

Warning: This product uses a laser diode. Refer to caution statements on page 3.

ACHTUNG: • Die lasereinheit nicht zerlegen.

• Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

Measuring instruments and special tools

Test discs

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

- Lock paint (RZZ0L01)
- Allen wrench (M2.0) (SZZP1101C)
- Musical program disc (ordinary)
- DC voltmeter
- Lead wire (for test points)

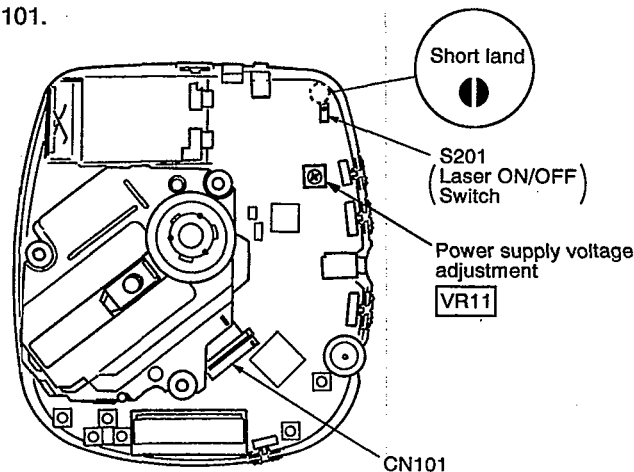
Test short land

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 pages 21~24.)

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

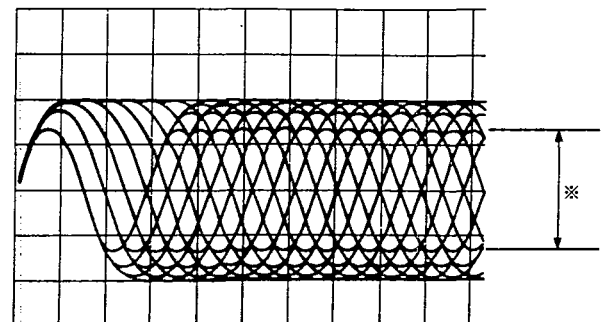
(1) MECHANICAL ADJUSTMENT

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

1. Connect the oscilloscope's CH. 1 probe across **TP101** (RF) (+) and **TP102** (VREF) (–) on the P.C.B.

Oscilloscope setting: VOLT 100mV
SWEEP 0.5μs.
Input coupling AC

2. Switch the player power **ON**, and play track 9 on the test disc (SZZP1056C).
(Playing any other track will prevent, the HEX screws from being accessed.)
3. Alternately adjust the HEX screws with the 2.0mm allen wrench (SZZP1101C) until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched. (Refer to Fig. 1 and Fig. 2)
4. After completing the adjustment, lock the HEX screws with lock paint (RZZ0L01).



* Most stretched eye pattern.

Fig. 1

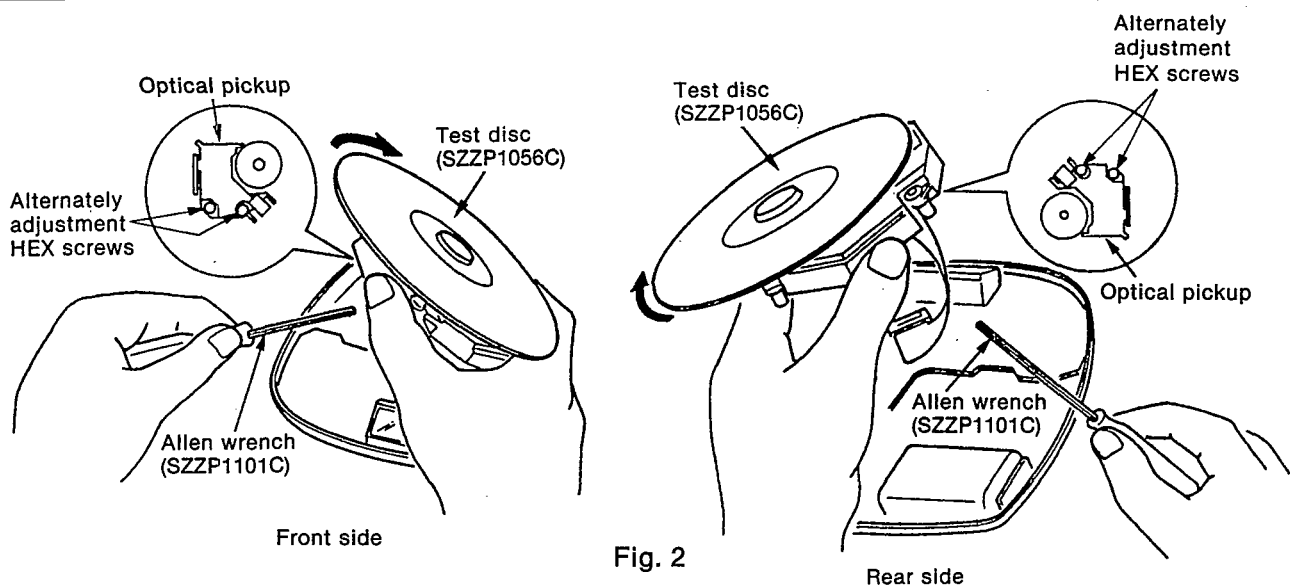


Fig. 2

(2) POWER SUPPLY VOLTAGE ADJUSTMENT

1. Connect the DC voltmeter to **TP103** (VCC) (+) and **TP104** (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 3.35~3.38V.

(3) 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-XP290 servo circuit is equipped with an automatic adjusting circuit, these controls are removed from SL-XP290.

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) ☐

On SL-XP290
Use for New Servo IC (AN8832SBE1, MN662740RE)

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-XP290 automatically controls the servo circuit to obtain optimum performance according to any disc's characteristics. Therefore, no malfunction occurs because of mis-adjustment.

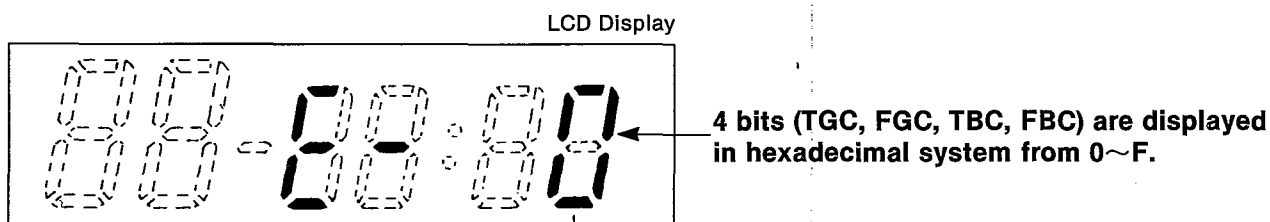
AUTOMATIC ADJUSTMENT RESULTS DISPLAY FUNCTION (SELF-CHECK FUNCTION)

On this unit (SL-XP290), 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/OPERATION OFF) Button once.
4. An automatic adjustment result is displayed on the LCD.

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



<Example>	MSB LSB					
	TGC	FGC	TBC	FBC		
	↓	↓	↓	↓		(Each bit ... TGC, FGC, TBC, FBC)
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.)					

<Example> Follow the below steps when "E-1" is displayed.

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

• Check if

- (1) R101 (4 resistors) is not defective by measuring the value,
- (2) the waveform or voltage of the focus servo circuit is correct, and
- (3) 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 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.

■ TERMINAL GUIDE

• IC11 (AN8819NFB): DC-DC converter control/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	—	PWM control terminal (Not used, open)
43	COMPO	—	Not used, open
44	COMPI	—	Laser power drive terminal Not used, connected to GND

• IC101 (AN8832SBE1): Servo amp

Pin No.	Mark	I/O Division	Function
1	PDAD	I	Photo detector current input
2	PDA	I	Photo detector current input
3	LPD	I	Non-inverting laser power input
4	LD	O	Laser power auto control output
5	AMPI	I	RF signal input Not used, connected to V _{CC}
6	V _{CC}	I	Power supply terminal
7	RFIN	I	RF signal input
8	CAGC	I	AGC detecting capacitor terminal
9	ARF	O	RF signal output
10	CEA	I	HPF-amp. terminal
11	GND	—	Ground terminal
12	LDON	I	Laser ON/OFF control input
13	PLAY	I	Play control terminal
14	WVEL	I	WVEL control terminal

Pin No.	Mark	I/O Division	Function
15	BDO	O	Dropout detection output
16	RFDET	O	NRFDET signal output
17	TRCRS	O	CROSS signal output
18	OFTR	O	OFTR signal output
19	VDET	O	VDET signal output
20	RFENV	O	Envelope signal output
21	TEBPF	I	Shock detection signal input
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	PDB	I	Photo detector current input
28	PDBD	I	Photo detector current input

• IC501 (MN662740RE): 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 _{DD1}	I	Power supply (digital circuit) terminal
5	DV _{SS1}	—	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)

Pin No.	Mark	I/O Division	Function
13	BLKCK	O	Sub-code block clock (f=75 Hz)
14	SQCK	I	Sub-code Q register clock
15	SUBQ	O	Sub-code Q data
16	DMUTE	—	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=4.2336 MHz)
20	PMCK	O	Frequency division clock signal ($f = \frac{1}{1.92} \times ck = 88.2 \text{ kHz}$)
21	TRV	O	Traverse servo control
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)

Pin No.	Mark	I/O Division	Function
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
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	O	Tracking error shunt output ("H": dropout)
42	PLAY	O	Play signal ("H": play)
43	WVEL	O	Double velocity status signal ("H": double)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias terminal (Not used, open)
47	DSLIF	I/O	DSL loop filter terminal
48	PLLIF	I/O	PLL loop filter terminal
49	VCOF	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	O	384fs (16.9344 MHz) output
53	PCK	—	PLL extract clock (f=4.3218 MHz) (Not used, open)
54	TROF	—	Tracking servo OFF signal (Not used, open)

Pin No.	Mark	I/O Division	Function
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)
63	FCLK	O	Crystal frame clock
64	IPFLAG	—	Interpolation flag terminal (Not used, open)
65	FLAG0	—	Flag terminal (Not used, open)
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	O	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
78	ISRDATA	I	Serial data signal input
79	IKRCK	I	L/R discriminating signal input
80	IBCLK	I	Serial bit clock input

• IC301 (SC424670FU): SYSTEM CTL & LCD DRIVE

Pin No.	Mark	I/O Division	Function
1	V _{DD}	I	Power supply terminal
2	STROBE2	O	Key scan signal output
3	STROBE1		
4	POWER	O	Power ON/OFF signal output
5	LIGHT	O	LCD backlight control signal output
6	MUTE	O	Muting signal output ("H": MUTE)
7	LED	—	LED drive command signal (Not used, open)
8	MDATA	O	Command data signal output
9	MCLK	O	Command clock output
10	MLD	O	Command load signal output
11	CCHG	—	Voltage control terminal (Not used, open)
12	CHARGE	—	Not used, open
13	VLCD3	—	Not used, connected to GND
14	VLCD2	I	Power supply terminal
15	VLCD1		
16	V _{SS}	—	GND terminal
17	V _{PP}	I	Power supply terminal
18	XOSC1	I	Reset signal input terminal
19	XOSC2	—	Not used, open
20	RESET	O	Reset detect terminal
21	OSC1	I	Main-system clock input
22	OSC2	—	Not used, open
23	WRDRCN /LCDREM	O	Remote control signal output
24	—KEY /RDATA	O	Remote control data output
25	+KEY /RCLK	O	Remote control clock output
26	STAT	I	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
27	MEM/ SKIPR	I	Key input terminal (MEMORY/RECALL/SKIP. R)
28	STOP/REP /SKIPF	I	Key input terminal (STOP/POWER OFF/REPEAT/ SKIP. F)
29	RANDOM	I	Key input terminal (RANDOM)

Pin No.	Mark	I/O Division	Function
30	RESUME	I	Key input terminal (RESUME)
31	HOLD	I	Key Input terminal (HOLD)
32	SEL	I	Key input selector terminal
33	PLAY	I	Processing condition (CRC, CUE, CLVS, FCLV, TTSTOP) input
34	ZSENSE	I	Sense signal input
35	EMPTY	I	Empty detection input terminal
36	REST	I	Rest detection terminal
37	CHGCMP	—	Voltage control input terminal (Not used, open)
38	ACDET	I	Power supply detection signal input
39	SUBQ	I	Sub-code (Q data) input
40	S490	—	Not used, open
41	SQCK	O	Sub-code Q resistor clock output
42	OPEN	I	Disc holder open detection terminal
43	LSIRST	O	Reset signal output
44	BUZ	—	Beep control output (Not used, open)
45	BLKCK	I	Sub-code block (Q data) clock (75Hz) input
46	WLSRCN	—	Remote control signal input (Not used, open)
47	V _{DD}	I	Power supply terminal
48 51	BP3 BP0	O	LCD segment signal output
52 59	FP0 FP7	O	LCD segment signal output
60	V _{SS}	—	GND terminal
61 69	FP8 FP16	O	LCD segment signal output
70 79	FP17 FP26	—	LCD segment signal output (Not used, open)
80	STROBE3	O	Key scan signal output

• IC502 (SM5856AF): Shock proof controller

Pin No.	Mark	I/O Division	Function
1	V _{DD1}	I	Power supply terminal
2	UC1	I	Key input terminal (ANTI-SHOCK MEMORY)
3	XBS	—	Key input terminal (Not used, open)
4	BASS	—	Not used, open
5	ASC	—	Sound quality/sound field control terminal (Not used, open)
6	UC5	O	Sound quality/sound field control terminal
7	NTEST1	—	Test terminal (Not used, open)
8	NTEST2		
9	CLK	I	Clock signal input (f = 16.9344MHz)
10	V _{SS}	—	GND terminal
11	YSRDATA	I	Serial data input terminal
12	YLCK	I	L/R clock input terminal
13	YSCK	I	Serial bit clock input terminal
14	ZSCK	O	Serial bit clock output terminal
15	ZLCK	O	L/R clock output terminal
16	ZSRDATA	O	Serial data output terminal
17	YFLAG	I	RAM over-flow flag terminal
18	YFCLK	I	Crystal frame clock input

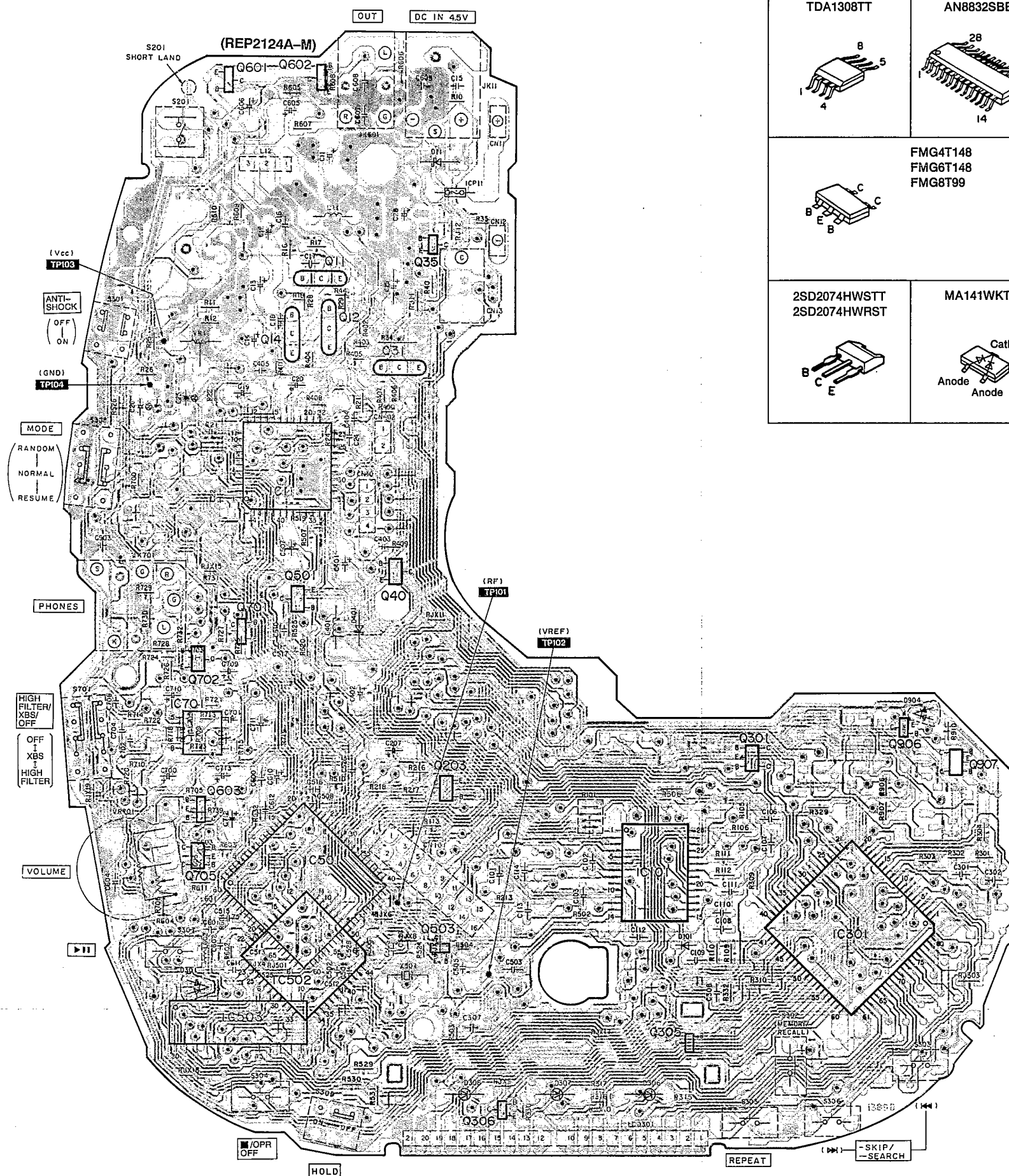
Pin No.	Mark	I/O Division	Function
19	YBLKCK	I	Sub-cord block clock input terminal
20	RESET	I	Reset input terminal
21	ZSENSE	O	Microcomputer states output terminal
22	RAMSEL	—	Not used, open
23	YDMUTE	I	Mute input terminal
24	YMLD	I	Microcomputer latch clock input terminal
25	YMDATA	I	Microcomputer serial data input terminal
26	YMCLK	I	Microcomputer shift clock input terminal
27	NOE	O	D-RAM output enable terminal
28	NCAS	O	D-RAM column address strobe terminal
29 32	D0 D3	I/O	D-RAM data input/output terminal
33	NWE	O	D-RAM write enable terminal
34	NRAS	O	D-RAM low address strobe terminal
35 44	A0 A9	O	D-RAM address output terminal

• IC503 (LH6V56K4): 1 M DRAM

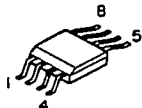
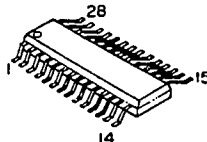
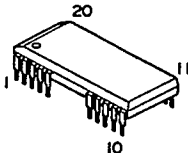
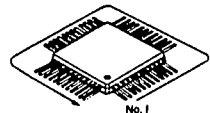
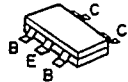
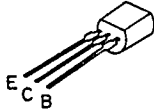
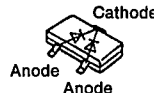
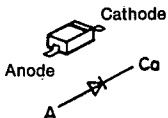
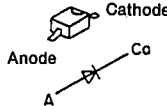
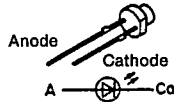
Pin No.	Mark	I/O Division	Function
1	D0	I/O	Data input/output terminal
2	D1	I/O	Data input/output terminal
3	NWE	I	Write enable terminal
4	NRAS	I	Low address strobe terminal
5	A9	I	Address input terminal
6	A0	I	Address input terminal
7 9	A1 A3	I	Address input terminal

Pin No.	Mark	I/O Division	Function
10	VCC	I	Power supply terminal
11 15	A4 A8	I	Address input terminal
16	NOE	I	Output enable terminal
17	NCAS	I	Column address strobe terminal
18	D3	I	Data input terminal
19	D2	I	Data input terminal
20	GND	—	GND terminal

PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



Terminal guide of IC's, transistors and diodes.

TDA1308TT 	AN8832SBE1 	LH6V56K4 	 <table><tr><td>AN8819NFB</td><td>44 Pin</td></tr><tr><td>SM5856AF</td><td>44 Pin</td></tr><tr><td>MN662740RE</td><td>80 Pin</td></tr><tr><td>SC424670FU</td><td>80 Pin</td></tr></table>	AN8819NFB	44 Pin	SM5856AF	44 Pin	MN662740RE	80 Pin	SC424670FU	80 Pin
AN8819NFB	44 Pin										
SM5856AF	44 Pin										
MN662740RE	80 Pin										
SC424670FU	80 Pin										
 FMG4T148 FMG6T148 FMG8T99	 2SB709QRSTX 2SB970RSTX 2SD1328RSTTX 2SD1819QRSTX DTC144TUT107	UN5114TX UN521VTX	2SD1302STTA 								
2SD2074HWSTT 2SD2074HWRST 	MA141WKTIX 	MA110TX 	MBRS130LT3 								
SLC-505MCA47 											

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 "●" and "⊙" marks denote 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.

■ SCHEMATIC DIAGRAM

(Parts list on pages 33~35, 37)

(This schematic diagram may be modified at any time with 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.)
- **S302** : Memory/recall (MEMORY/RECALL) switch.
- **S303, S306** : Skip/search (◀◀ -SKIP/-SEARCH ▶▶) switches.
(S303: ◀◀, S306: ▶▶)
- **S304** : Stop/operation off (■/OPR OFF) switch.
- **S305** : Repeat (REPEAT) switch.
- **S307** : Play/pause (▶ ■) switch.
- **S308** : Play mode selector (MODE) in "NORMAL" position.
(RESUME ↔ NORMAL ↔ RANDOM)
- **S309** : Hold (HOLD) switch in "OFF" position.
- **S501** : Anti-shock (ANTI-SHOCK) 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 (1 kHz, L+R, 0dB) in play mode, and the other, for no disc in stop mode.

* AC adaptor is used for power supply.

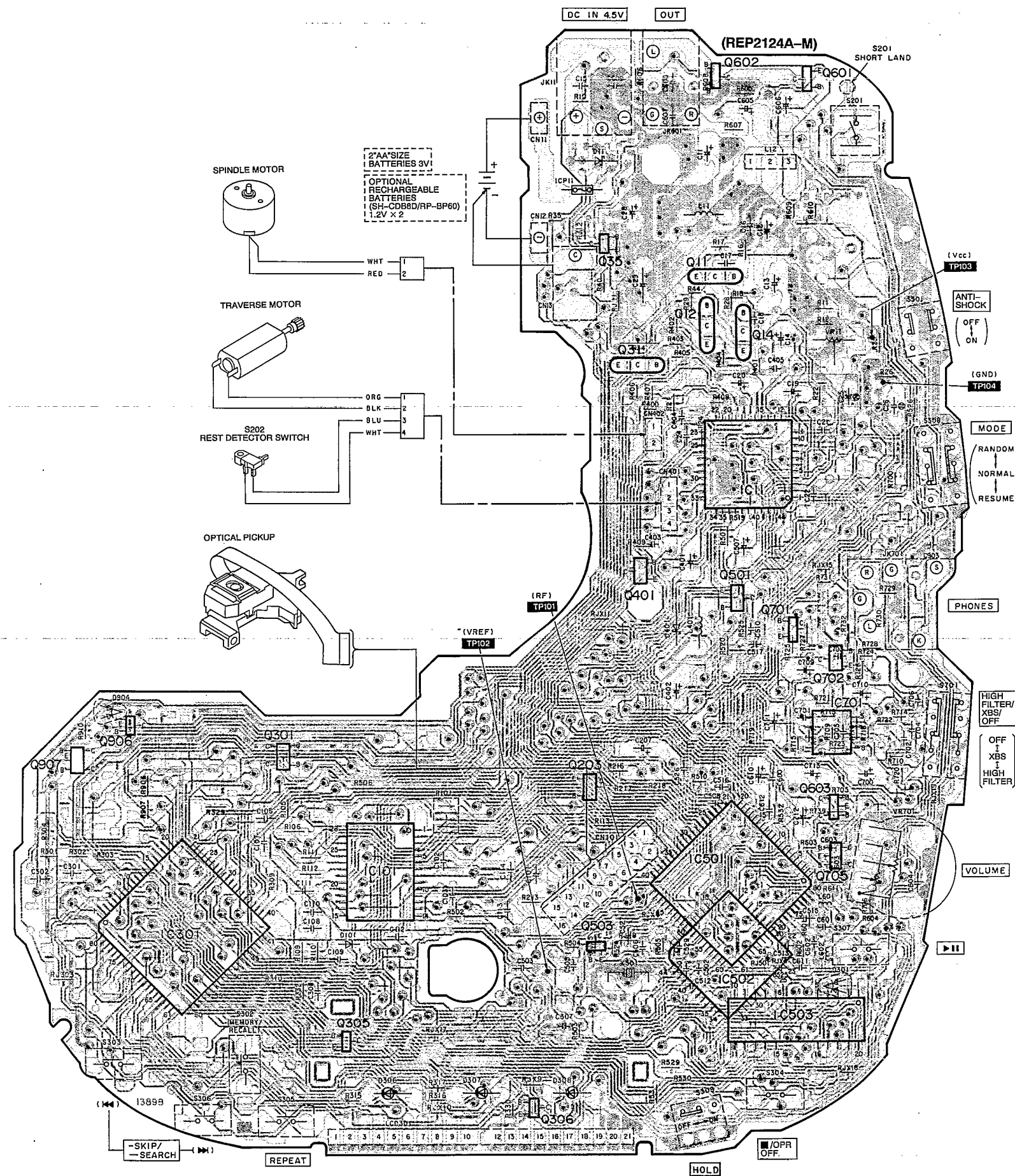
-  : Positive voltage lines.
-  : Audio signal lines.

• Important safety notice:
Components identified by  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.

Caution!

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

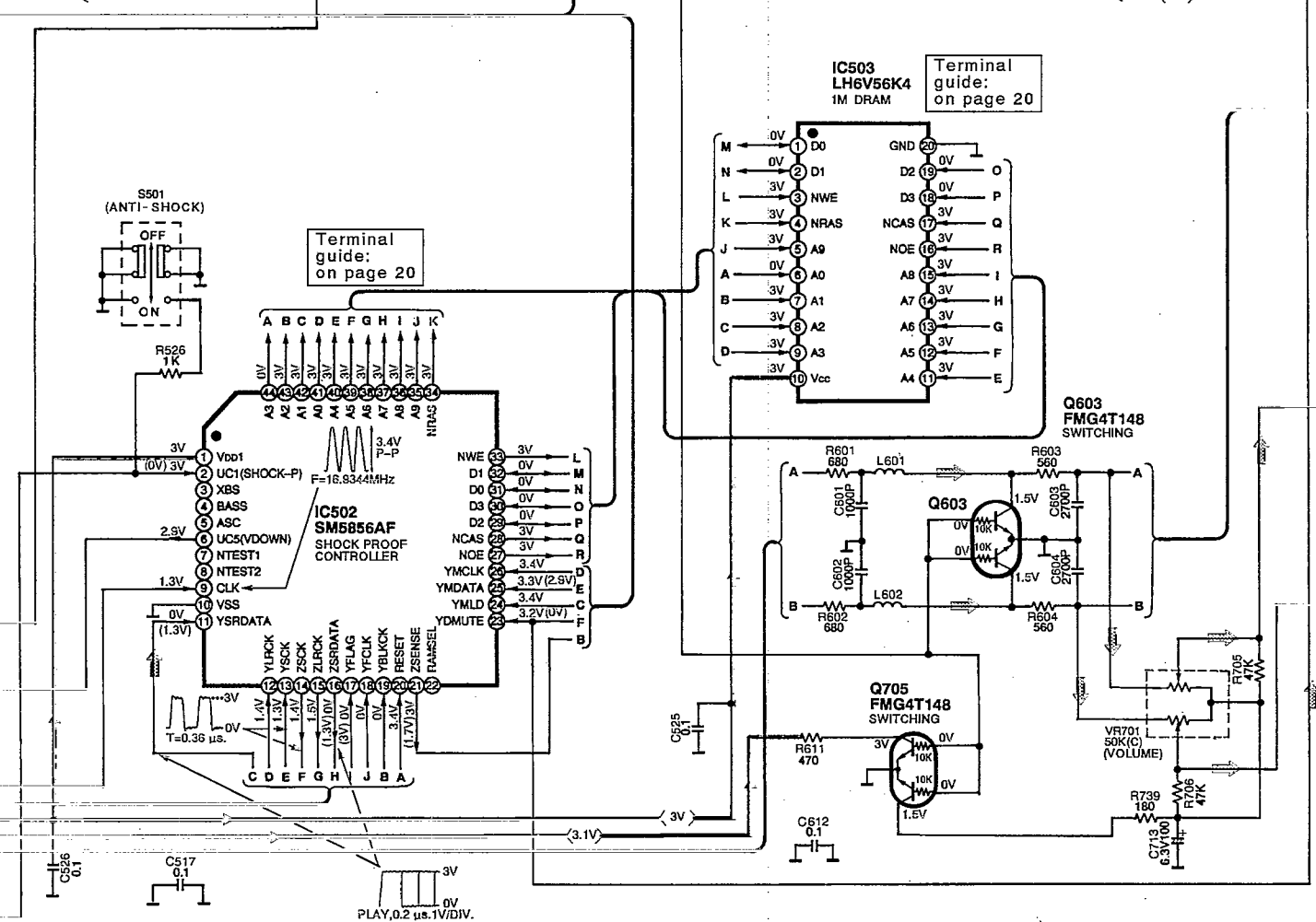
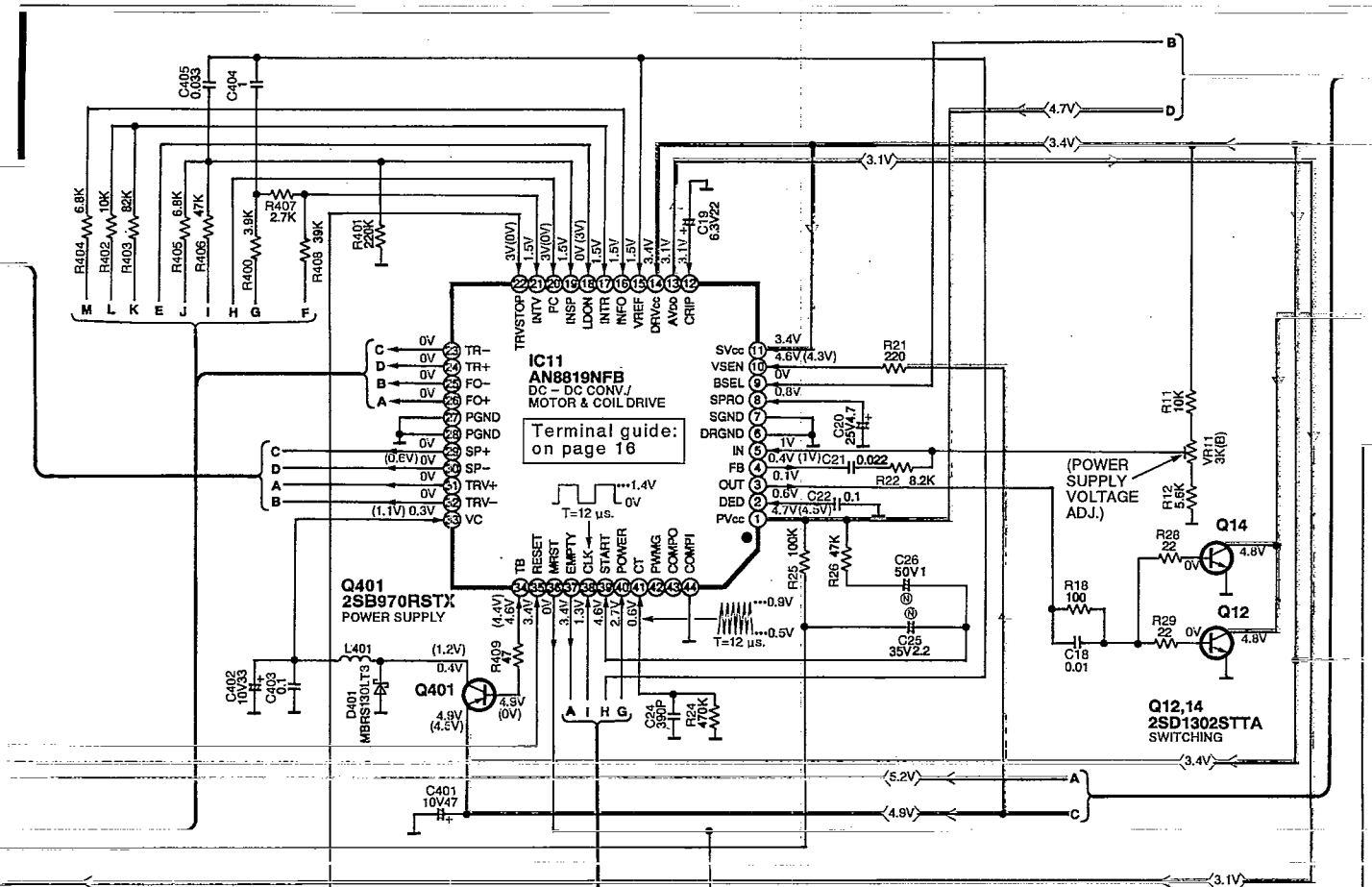
- Cover the parts boxes made of plastics with aluminium foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.



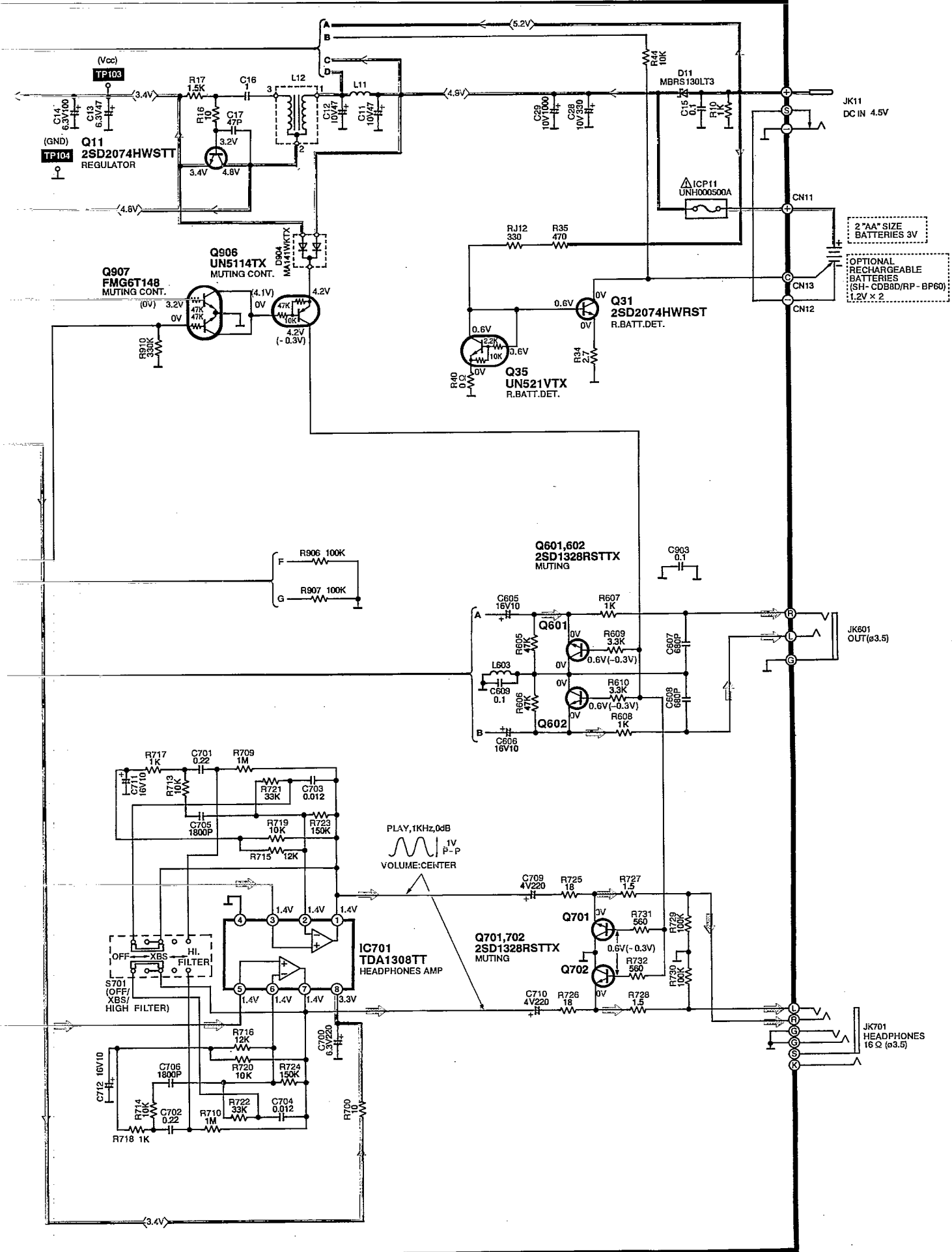
This schematic diagram illustrates the internal electronics of a VCR, organized into several functional sections:

- Optical Pickup Section:** Located at the bottom left, it shows the optical pickup assembly with components like the focus coil, tracking coil, and photodiodes (A1, A2, A3, A4). It includes a terminal guide on page 17.
- System Control Section:** The central part of the diagram features the **IC301 SC424670FU** system control/LCD drive. It manages various functions such as play, stop, fast forward, and reverse. It includes a terminal guide on page 19 and is connected to the LCD display (top left) and the laser power drive (Q203).
- Servo Processor Section:** The bottom right section contains the **IC501 MN662740RE** servo processor/digital signal processor/digital filter & D/A converter. It controls the motor's position and speed. It includes a terminal guide on pages 17 and 18.
- Power Supply Section:** The top right section shows the power supply circuit, including the **Q501 2SB970RSTX** power supply and the **Q503 DTC144TUT107** switching transistor. It provides the necessary voltages for the other components.
- Motor and LED Drivers:** The diagram includes drivers for the laser power (Q203), LED drive (Q305), and the traverse and spindle motors (S202, S203).

The schematic includes numerous signal waveforms (e.g., PLAY, STOP, FAST FORWARD) and component values (resistors, capacitors, transistors) to provide a comprehensive view of the VCR's internal circuitry.

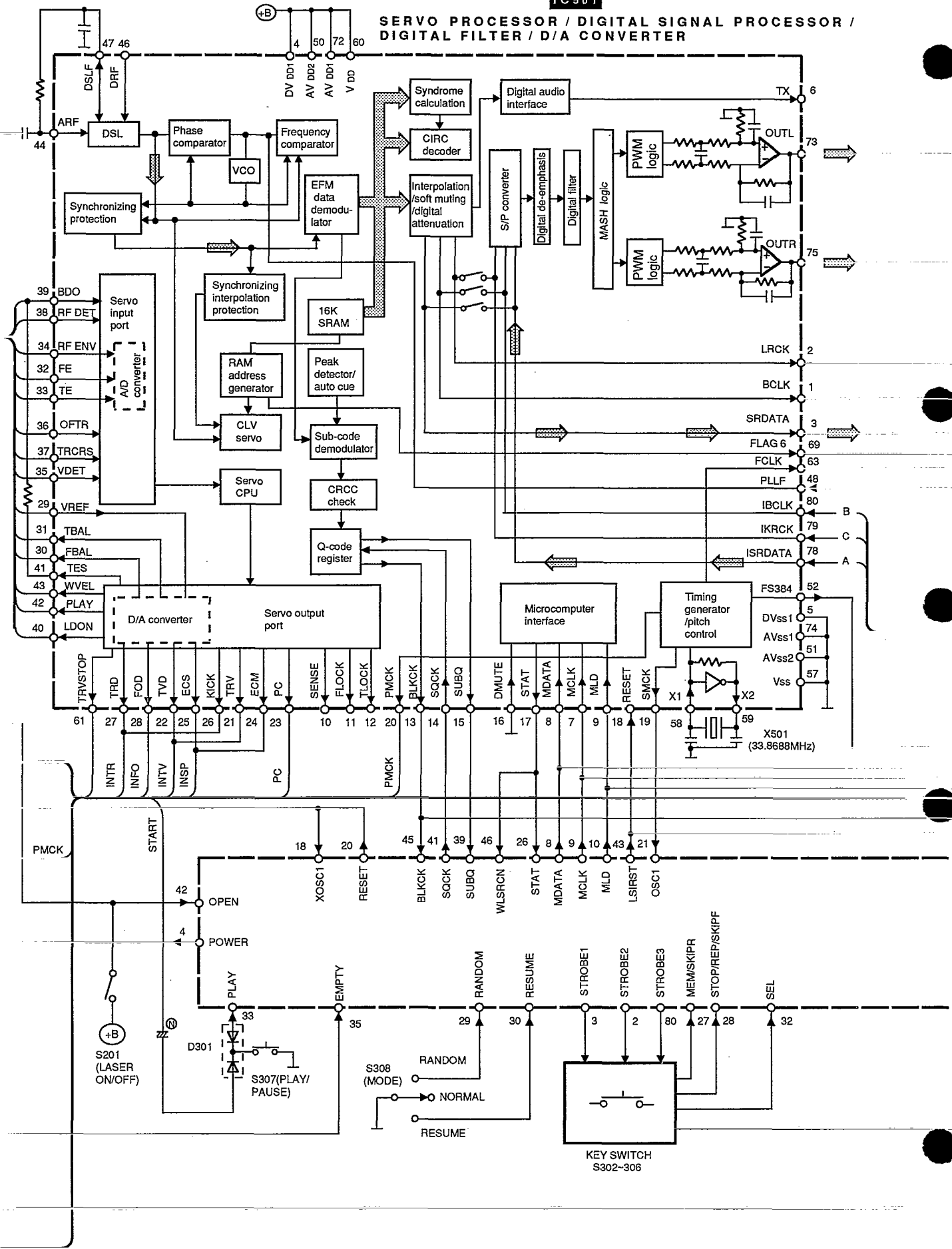


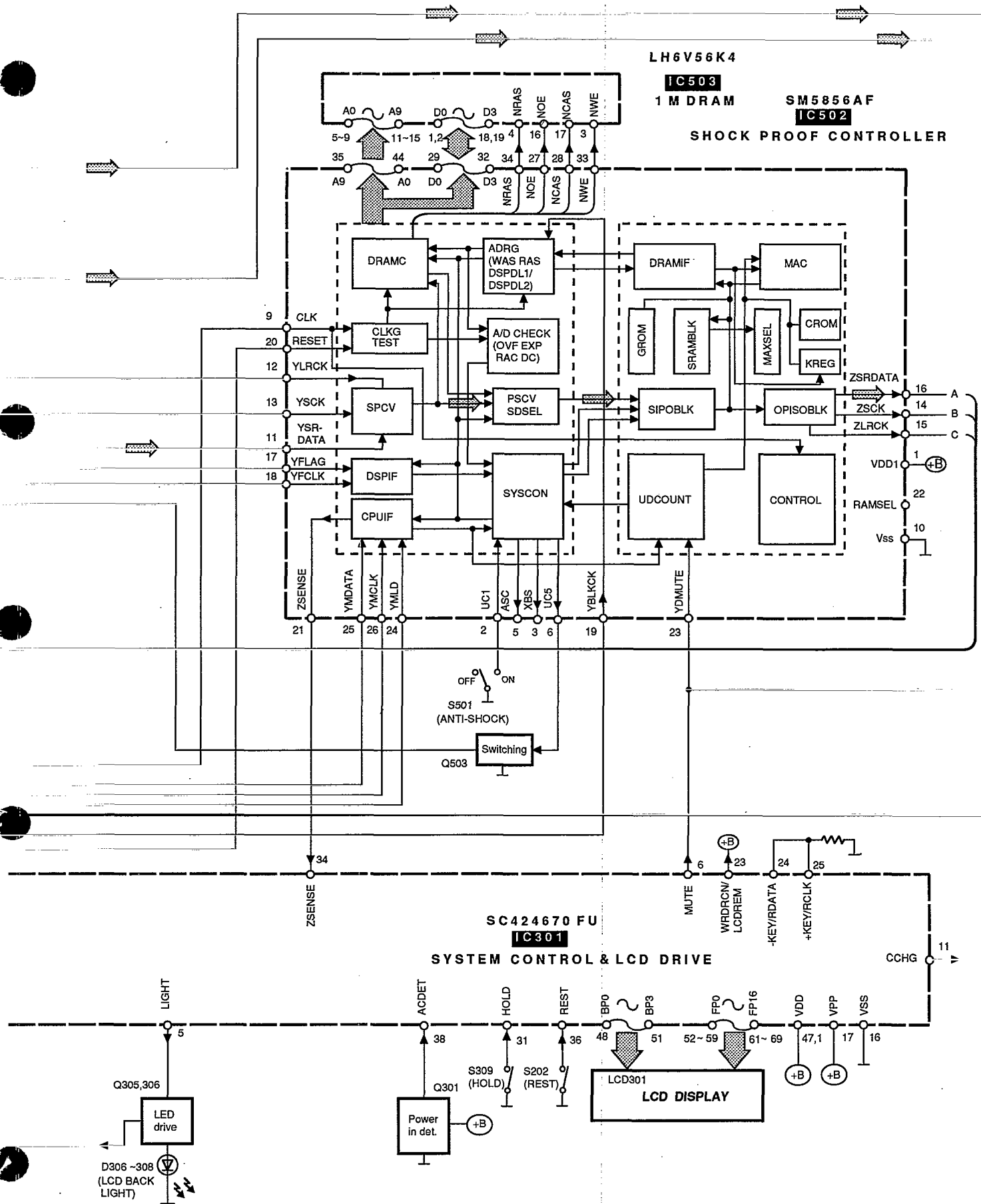
→ : Positive voltage lines
⇒ : Audio signal

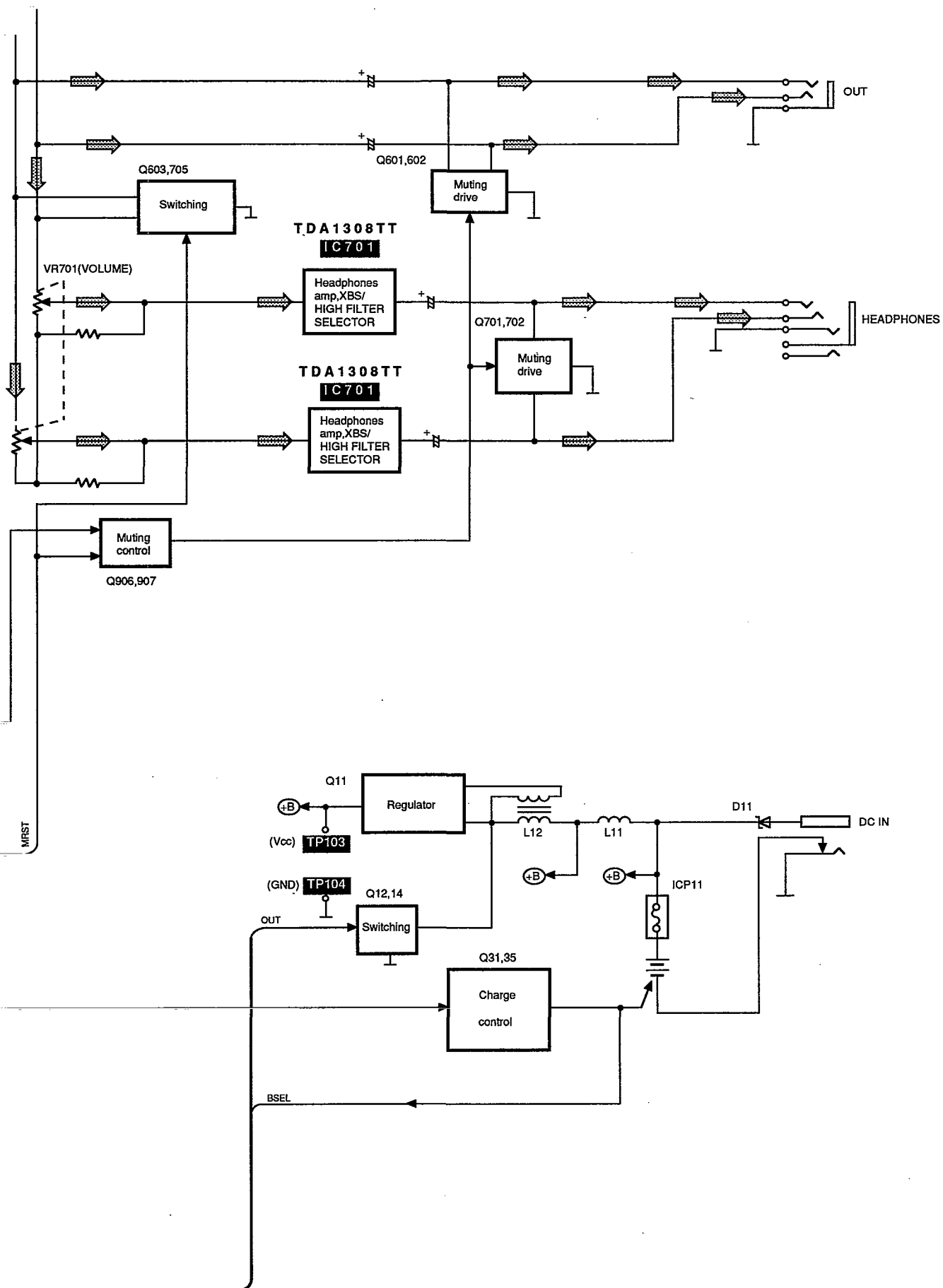




SERVO PROCESSOR / DIGITAL SIGNAL PROCESSOR /
DIGITAL FILTER / D/A CONVERTER







Note:  Audio signal

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 3.

*ACHTUNG: Die Lasereinheit nicht zerlegen.

Die Lasereinheit darf nur gegen eine vom Hersteller spezifizierte Einheit ausgetauscht werden.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
						VARIABLE RESISTOR(S)	
		INTEGRATED CIRCUIT(S)					
IC11	AN8819NFB	DC-DC CONVERTER		VR11	EVNDXAA00B33	POWER SUPPLY VOLTAGE AD.	
IC101	AN8832SBE1	SERVO AMP		VR701	EVUT2EA25C54	VOLUME	
IC301	SC424670FU	SYSTEM CONTROL&LCD DRIVE				COIL(S)	
IC501	MN662740RE	SERVO PROCESSOR					
IC502	SM5856AF	SHOCK PROOF CONTROLLER		L11	RLQB330KT-M	COIL	
IC503	LH6V56K4	1M DRAM		L12	RLZ0028T-M	COIL	
IC701	TDA1308TT	HEADPHONES AMP		L401	RLQB330KT-M	COIL	
				L601-603	RLBV102V-Y	COIL	
		TRANSISTOR(S)					
						OSCILLATOR(S)	
Q11	2SD2074HWSTT	TRANSISTOR					
Q12	2SD1302STTA	TRANSISTOR		X501	RSXZ33M&MO1T	OSCILLATOR (33.8688MHz)	
Q14	2SD1302STTA	TRANSISTOR				LCD(S)	
Q31	2SD2074HWST	TRANSISTOR					
Q35	UN521VTX	TRANSISTOR					
Q203	2SB709QRSTX	TRANSISTOR		LCD301	EDD052CG8AHP	LCD	
Q301	FMG8T99	TRANSISTOR					
Q305	UN5114TX	TRANSISTOR				SWITCH(ES)	
Q306	2SD1819QRSTX	TRANSISTOR					
Q401	2SB970RSTX	TRANSISTOR		S201	RSH1A912A-A	LASER ON/OFF	
Q501	2SB970RSTX	TRANSISTOR		S202	SSH05	REST DETECTOR	
Q503	DTC144TUT107	TRANSISTOR		S302	EVQ21405R	MEMORY/RECALL	
Q601, 602	2SD1328QRSTX	TRANSISTOR		S303	EVQ21405R	SKIP/SEARCH(R)	
Q603	FMG4T148	TRANSISTOR		S304	EVQ21405R	STOP/OPR OFF	
Q701, 702	2SD1328QRSTX	TRANSISTOR		S305	EVQ21405R	REPEAT	
Q705	FMG4T148	TRANSISTOR		S306	EVQ21405R	SKIP/SEARCH(F)	
Q906	UN5114TX	TRANSISTOR		S307	EVQ21405R	PLAY/PAUSE	
Q907	FMG6T148	TRANSISTOR		S308	ESD11H230	MODE	
				S309	ESD11H220	HOLD	
		DIODE(S)		S501	ESD11H220	ANTI-SHOCK ON/OFF	
				S701	ESD11H230	HIGH FILTER/XBS SELECTOR	
D11	MBRS130LT3	DIODE					
D101	MA110TX	DIODE				CONNECTOR(S) AND SOCKET(S)	
D301	MA141WKTIX	DIODE					
D306-308	SLC-505MCA47	L. E. D.		CN11	RJC93015-1	BATTERY TERMINAL(+)	
D401	MBRS130LT3	DIODE		CN12	RJC93015-1	BATTERY TERMINAL(-)	
D904	MA141WKTIX	DIODE		CN13	RJH5102-1	RECHARGEABLE BATT. TERMINAL	
				CN101	RJU035T016-1	SOCKET(16P)	
		IC PROTECTOR(S)		CN401	RJT068W04V	CONNECTOR(4P)	
				CN402	RJT068W02V	CONNECTOR(2P)	
ICP11	UNH000500A	IC PROTECTOR	Δ				
						JACK(S)	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
JK11	RJJ4303-1	DC IN JACK					
JK601	RJJD3S5ZB-C	OUT JACK					
JK701	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)

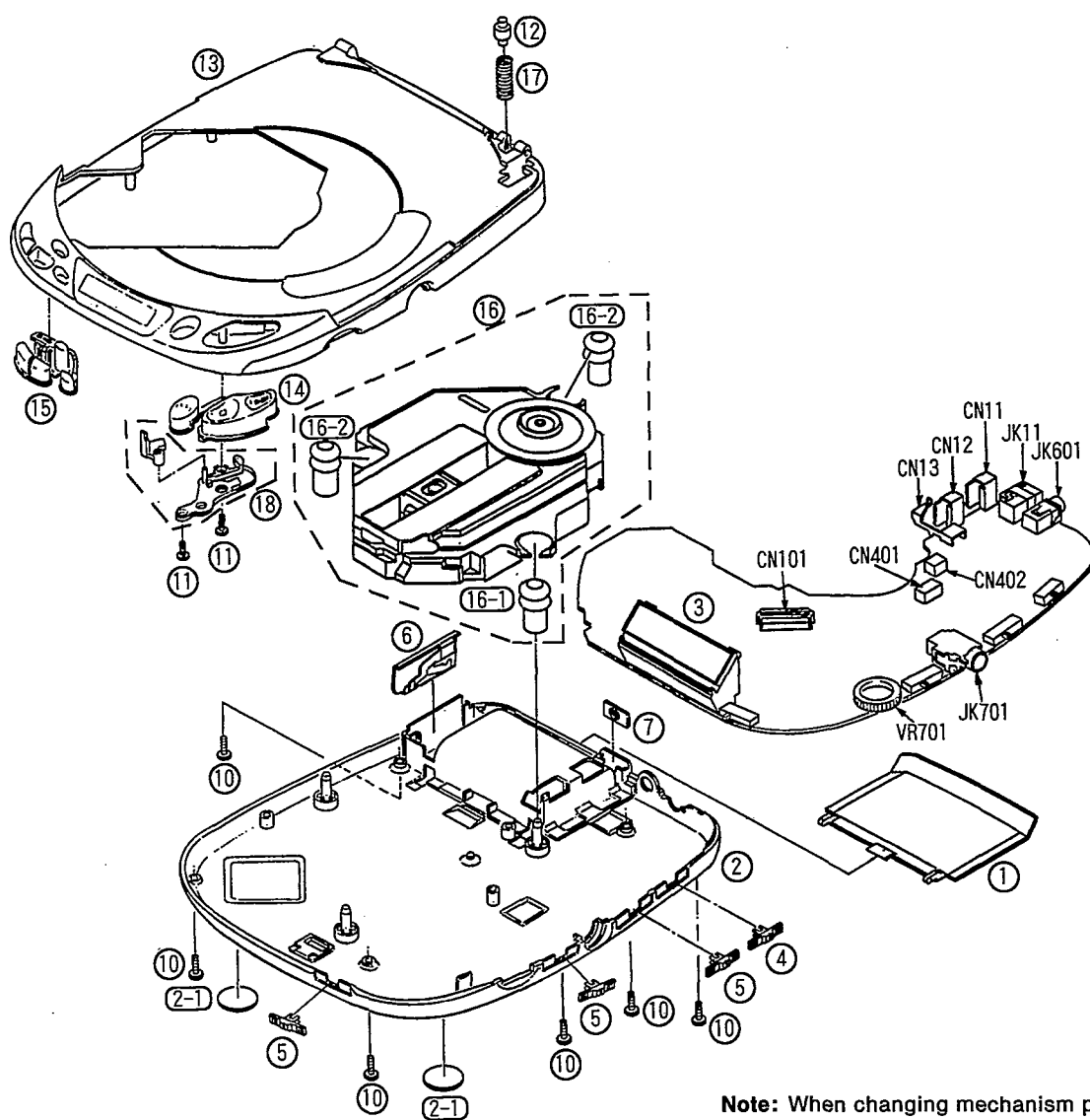
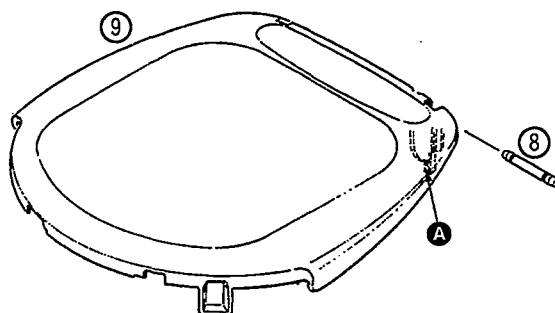
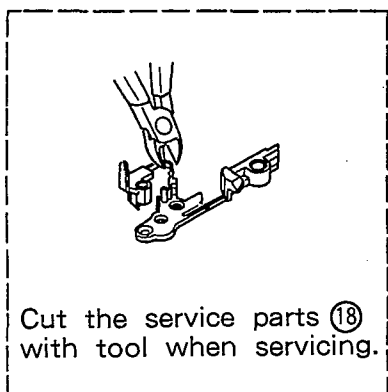
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		RESISTORS	R218	ERJ6GEYJ223V	1/10W 22K	R526	ERJ6GEYJ102V	1/10W 1K
			R301-303	ERJ6GEYJ473V	1/10W 47K	R529-531	ERJ6GEYJ102V	1/10W 1K
			R304	ERJ6GEYJ103V	1/10W 10K	R532	ERJ3GEYJ102V	1/16W 1K
R10	ERJ6GEYJ102V	1/10W 1K	R309, 310	ERJ6GEYJ102V	1/10W 1K	R601, 602	ERJ3GEYJ681V	1/16W 680
R11	ERJ6GEYJ103V	1/10W 10K	R315-317	ERJ3GEYJ680V	1/16W 68	R603, 604	MCR03PZHJ561	1/16W 560
R12	ERJ6GEYJ562V	1/10W 5.6K	R329	ERJ6GEYJ473V	1/10W 47K	R605	ERJ6GEYJ473V	1/10W 47K
R16	ERJ6GEYJ100	1/10W 10	R330	ERJ3GEYJ102V	1/16W 1K	R606	ERJ3GEYJ473V	1/16W 47K
R17	ERJ6GEYJ152V	1/10W 1.5K	R332	ERJ6GEYJ224V	1/10W 220K	R607, 608	ERJ6GEYJ102V	1/10W 1K
R18	ERJ3GEYJ101V	1/16W 100	R400	ERJ3GEYJ392V	1/16W 3.9K	R609, 610	ERJ3GEYJ332V	1/16W 3.3K
R21	ERJ6GEYJ221V	1/10W 220	R401	ERJ3GEYJ224V	1/16W 220K	R611	ERJ6GEYJ471V	1/10W 470
R22	ERJ3GEYJ822V	1/16W 8.2K	R402	ERJ3GEYJ103V	1/16W 10K	R700	ERJ3GEYJ100V	1/16W 10
R24	ERJ6GEYJ474V	1/10W 470K	R403	ERJ3GEYJ823V	1/16W 82K	R705, 706	ERJ6GEYJ473V	1/10W 47K
R25	ERJ6GEYJ104V	1/10W 100K	R404, 405	ERJ3GEYJ682V	1/16W 6.8K	R709, 710	ERJ3GEYJ105V	1/16W 1M
R26	ERJ6GEYJ473V	1/10W 47K	R406	ERJ3GEYJ473V	1/16W 47K	R713, 714	ERJ3GEYJ103V	1/16W 10K
R28, 29	ERJ6GEYJ220	1/10W 22	R407	ERJ3GEYJ272V	1/16W 2.7K	R715, 716	ERJ3GEYJ123V	1/16W 12K
R34	ERJ12YJ2R7H	1/2W 2.7	R408	ERJ3GEYJ393V	1/16W 39K	R717, 718	ERJ3GEYJ102V	1/16W 1K
R35	ERJ3GEYJ471V	1/16W 470	R409	ERJ6GEYJ470V	1/10W 47	R719, 720	ERJ3GEYJ103V	1/16W 10K
R44	ERJ3GEYJ103V	1/16W 10K	R502	ERJ3GEYJ103V	1/16W 10K	R721	ERJ3GEYJ333V	1/16W 33K
R101	EXB8V223J	1/8W 22K	R503	ERJ3GEYJ473V	1/16W 47K	R722	ERJ6GEYJ333V	1/10W 33K
R105	ERJ6GEYJ333V	1/10W 33K	R504	ERJ3GEYJ683V	1/16W 68K	R723, 724	ERJ3GEYJ154V	1/16W 150K
R106	ERJ6GEYJ153V	1/10W 15K	R505	ERJ3GEYJ471V	1/16W 470	R725, 726	ERJ6GEYJ180V	1/10W 18
R109	ERJ6GEYJ223V	1/10W 22K	R506	ERJ6GEYJ821V	1/10W 820	R727, 728	ERJ6GEYJ1R5V	1/10W 1.5
R110	ERJ6GEYJ124V	1/10W 120K	R507	ERJ6GEYJ100	1/10W 10	R729, 730	ERJ6GEYJ104V	1/10W 100K
R111, 112	ERJ6GEYJ103V	1/10W 10K	R510	ERJ3GEYJ220V	1/16W 22	R731	MCR03PZHJ561	1/16W 560
R113	ERJ6GEYJ101V	1/10W 100	R519	ERJ6GEYJ8R2V	1/10W 8.2	R732	ERJ6GEYJ561V	1/10W 560
R213	ERJ6GEYJ474V	1/10W 470K	R520	ERJ6GEYJ152V	1/10W 1.5K	R739	ERJ6GEYJ181V	1/10W 180
R216	ERJ6GEYJ4R7V	1/10W 4.7	R524	ERJ3GEYJ474V	1/16W 470K	R906, 907	ERJ6GEYJ104V	1/10W 100K
R217	ERJ6GEYJ100	1/10W 10	R525	ERJ6GEYJ153V	1/10W 15K	R910	ERJ6GEYJ334V	1/10W 330K

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks			
RJ12	ERJ6GEYJ331V	1/10W 330	C402	RCE1ASA330IX	10V 33U			
			C403	ECUV1C104ZFN	16V 0.1U			
		CHIP JUMPERS	C404	ECUVNC105ZFN	16V 1U			
			C405	ECUV1C333KBN	16V 0.033U			
R40	ERJ6GEYOR00V	CHIP JUMPER	C501, 502	ECUV1H070DCV	50V 7P			
RJ11	ERJ6GEYOR00V	CHIP JUMPER	C503	ECUV1H561KBN	50V 560P			
RJ303	ERJ6GEYOR00V	CHIP JUMPER	C505	ECUV1E223KBN	25V 0.022U			
RJ501	ERJ3GEYOR00V	CHIP JUMPER	C506	ECUV1C224KBN	16V 0.22U			
RJX4	ERJ3GEYOR00V	CHIP JUMPER	C507	RCE1ASA330IX	10V 33U			
RJX5, 6	ERJ6GEYOR00V	CHIP JUMPER	C508	ECUV1C104ZFN	16V 0.1U			
RJX8, 9	ERJ6GEYOR00V	CHIP JUMPER	C510	ECUV1C104ZFN	16V 0.1U			
RJX10	ERJ3GEYOR00V	CHIP JUMPER	C512, 513	ECUV1C104ZFN	16V 0.1U			
RJX11	ERJ6GEYOR00V	CHIP JUMPER	C515	ECUV1H332KBN	50V 3300P			
RJX15	ERJ3GEYOR00V	CHIP JUMPER	C516, 517	ECUV1C104ZFN	16V 0.1U			
RJX17	ERJ6GEYOR00V	CHIP JUMPER	C525, 526	ECUV1C104ZFN	16V 0.1U			
RJX18	ERJ3GEYOR00V	CHIP JUMPER	C527	ECUV1C224KBN	16V 0.22U			
RJX19	ERJ6GEYOR00V	CHIP JUMPER	C529	ECUV1H102KBN	50V 1000P			
			C600	ECUV1C104ZFN	16V 0.1U			
		CAPACITORS	C601, 602	ECUV1H102KBN	50V 1000P			
			C603	ECUV1H272KBN	50V 2700P			
C11, 12	RCE1AKA4701G	10V 47U	C604	ECUV1H272KBN	50V 2700P			
C13	RCE0JSA4701X	6.3V 47U	C605, 606	ECEA1CPK100I	16V 10U			
C14	RCE0JKA1011V	6.3V 100U	C607, 608	ECUV1H681KBN	50V 680P			
C15	ECUV1C104ZFN	16V 0.1U	C609	ECUV1C104ZFN	16V 0.1U			
C16	ECUVNC105ZFN	16V 1U	C610	ECEA0JPK101I	6.3V 100U			
C17	ECUV1H470KCN	50V 47P	C611	ECUV1C104ZFN	16V 0.1U			
C18	ECUV1E103KBN	25V 0.01U	C612	ECUV1C104ZFN	16V 0.1U			
C19	RCE0JKA2201G	6.3V 22U	C700	ECEA0JKA221I	6.3V 220U			
C20	ECEA1EKA47I	25V 4.7U	C701, 702	ECUV1C224KBN	16V 0.22U			
C21	ECUV1E223KBN	25V 0.022U	C703	ECUV1E123KBN	25V 0.012U			
C22	ECUV1C104KBN	16V 0.1U	C704	ECUV1E123KBN	25V 0.012U			
C24	ECUV1H391KBN	50V 390P	C705, 706	ECUV1H182KBN	50V 1800P			
C25	ECEA1VKN2R2I	35V 2.2U	C709, 710	ECEA0GPK221I	4V 220U			
C26	ECEA1HKN010I	50V 1U	C711	ECEA1CPK100I	16V 10U			
C28	ECA1AM331I	10V 330U	C712	ECEA1CPD100I	16V 10U			
C29	RCE1AM102BV	10V 1000U	C713	ECEA0JPK101I	6.3V 100U			
C101, 102	ECUV1C104KBN	16V 0.1U	C903	ECUV1C104ZFN	16V 0.1U			
C103	ECUV1E183KBN	25V 0.018U						
C106	ECUV1H222KBN	50V 2200P						
C107	ECUV1H152KBN	50V 1500P						
C108	ECUV1C473KBN	16V 0.047U						
C109	ECUV1C333KBN	16V 0.033U						
C110	ECUV1E103KBN	25V 0.01U						
C111	ECUV1C333KBN	16V 0.033U						
C112	ECUV1H331KBN	50V 330P						
C113, 114	ECUV1C104ZFN	16V 0.1U						
C207	RCE0JKA4701G	6.3V 47U						
C301	ECUV1C104ZFN	16V 0.1U						
C302	ECUVNC105ZFN	16V 1U						
C307	ECUV1C104ZFN	16V 0.1U						
C308	ECUV1C104ZFN	16V 0.1U						
C401	RCE1AKA4701G	10V 47U						

1 2 3 4 5

CABINET PARTS LOCATION

The parts enclosed in the dotted boxes are supplied as a block assembly. Therefore, they are not supplied separately except parts indicated with Ref. No.



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

*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.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS					
1	RKK0065-K	BATTERY COVER		A1	RFKSLXP290EK	INSTRUCTION MANUAL ASS'Y	(E)
2	RFKJLXP290EK	BOTTOM CABINET ASS'Y	(E)	A1	RFKSLXP290EG	INSTRUCTION MANUAL ASS'Y	(EG)
2	RFKJLXP290EB	BOTTOM CABINET ASS'Y	(EB, GC, GN)	A1	RFKSLXP290GC	INSTRUCTION MANUAL ASS'Y	(GC)
2	RFKJLXP290EG	BOTTOM CABINET ASS'Y	(EG)	A1	RQT2947-B	INSTRUCTION MANUAL	(EB, GN)
2-1	RKA0063-K	FOOT		A2	RQA0013	WARRANTY CARD	(E, EB, EG)
3	RJF0023	LCD HOLDER		A2	RQX7433ZA	WARRANTY CARD	(GN)
4	RGV0145-H	ANTI-SHOCK KNOB		A3	RQCB0169	SERVICENTER LIST	
5	RGV0145-K	MODE, H. FILTER/XBS, HOLD KNOB		A4	RFEA401E-1S	AC ADAPTOR	(E, EG) Δ
6	RJC93020	COMMON BATTERY TERMINAL		A4	RFEA402Z-W	AC ADAPTOR	(GC) Δ
7	RMA0677	REAR ORNAMENT		A4	RFEA404A-W	AC ADAPTOR	(GN) Δ
8	RMS0105-1	SHAFT		A4	RFEA404B-W	AC ADAPTOR	(EB) Δ
9	RYF0331J-K	CD COVER ASS'Y		A5	RFEV310A-KS	STEREO EARPHONES	
10	XTN17+6GFZ	SCREW		A6	SJP9223-1	POWER PLUG ADAPTOR	(GC) Δ
11	RHE5079YA	SCREW		A7 ※	RKB205ZA-0	EAR PADS	
12	RMS0462	PUSH SHAFT				<PRINTED CIRCUIT BOARDS ASS'Y>	
13	RFKKLXP290EK	INTERMEDIATE CABINET ASS'Y		PCB1	REP2124A-M	MAIN P. C. B.	(RTL)
14	RGU1193-H	OPERATION BUTTON (A)					
15	RGU1194-K	OPERATION BUTTON (B)				<GREASE OR JIG/TOOL>	
16	RAE0133Z	TRAVERSE DECK				TEST DISCS	
16-1	SHGD157	FLOATING RUBBER(1)					
16-2	SHGD165	FLOATING RUBBER(2)					
17	RMB0351	OPEN SPRING		SA1	SZZP1054C	PLAYABILITY TEST DISC	
18	RML0361	OPEN LEVER		SA2	SZZP1056C	UNEVEN TEST DISC	
		PACKING MATERIAL				ALLEN WRENCH	
P1	RPK0577	PACKING CASE		SA3	SZZP1101C	ALLEN WRENCH (M2.0)	
P2	RPF0111	PROTECTION BAG (UNIT)				LOCK PAINT	
P3	RPF0046	PROTECTION BAG (F. B.)					
P4	SQZD3	AREA LABEL	(E)			GREASE	
P4	SQZD6	AREA LABEL	(EG)	SA4	RZZ0L01	LOCK PAINT	
P4	SQZD7	AREA LABEL	(EB)				
P4	RQLA0066	AREA LABEL	(GC)				
P4	RQLA0067	AREA LABEL	(GN)	SA5	RFKXP671	MOLYCOAT GREASE PG671	
		ACCESSORIES					

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

- 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.

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■ PACKAGING

