ORDER NO. AD9504106C8

Service Manual

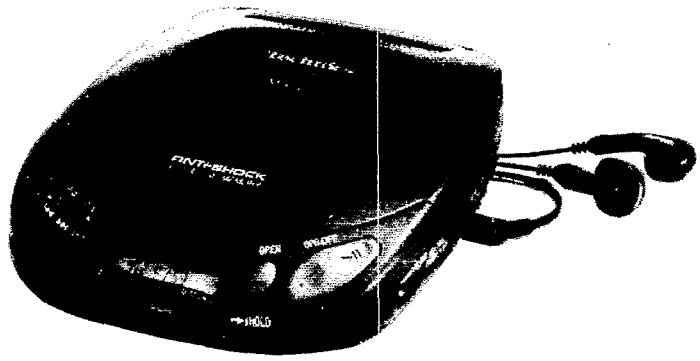
COMPACT disc DIGITAL AUDIO

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

※ • 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.

■ SPECIFICATIONS

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

■ Audio

No. of channels: 2 channels (left and right, stereo)
Output voltage: 0.6V (50kΩ) φ3.5 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/16Ω (variable) stereo mini jack φ3.5

■ 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 batterles (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.

Recharging time; About 3 hours
Power consumption when recharging: Approx. 5.8W

■ General

Operational temperature range: 0°C−40°C (32°F−104°F)
Power requirement: 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 Batterries; DC 2.4V with an optional Panasonic Rechargeable Batteries (SH-CHB8D/RP-BP60)
Car Battery; with an optional panasonic car adaptor (SH-CDC9)

DC IN: 4.5V

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.

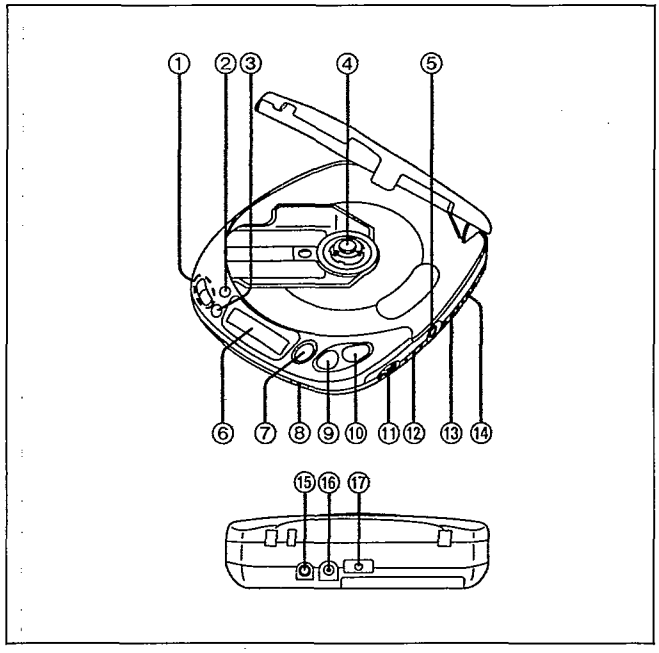
Technics®

⚠ WARNING

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

■ CONTENTS

■ LOCATION OF CONTROLS

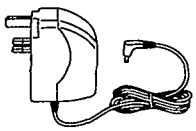


Portable CD Player

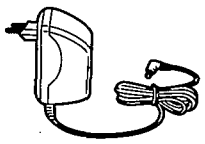
① **Skip/search buttons (|◀◀ -SKIP/–SEARCH ▶▶|)**
② **Memory/recall button (MEMORY/RECALL)**
③ **Repeat button (REPEAT)**
④ **Push button (PUSH)**
⑤ **Headphones jack (∩) 16Ω φ3.5**
⑥ **Display**
⑦ **Open button (OPEN)**
⑧ **Hold switch (HOLD)**
⑨ **Stop/operation off button (■/OPR OFF)**
⑩ **Play/pause 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

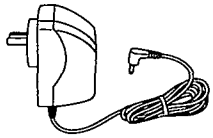
AC adaptor..... 1 pc.
[For (EB) area.]
(RFEA404B-W)



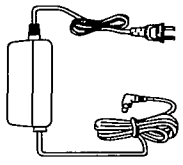
[For (E, EG) areas.]
(RFEA401E-1S)



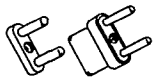
[For (GN) area.]
(RFEA404A-W)



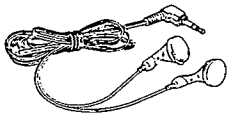
[For (GC) area.]
(RFEA402Z-W)



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.

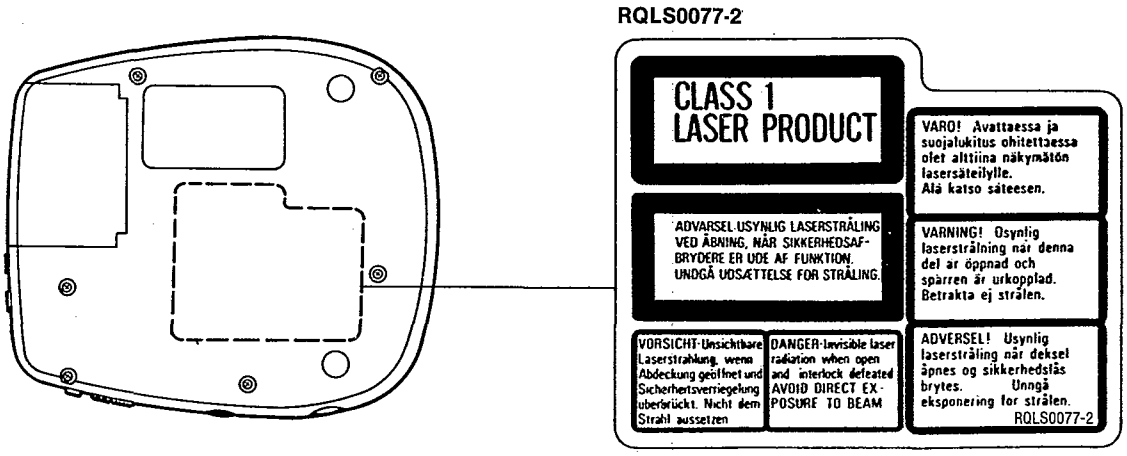
ACHTUNG: Dieses Produkt enthält eine Laserdiode. Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

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 Laserdiode gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinheit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.

ADVARSEL: I dette a apparat anvendes laser.



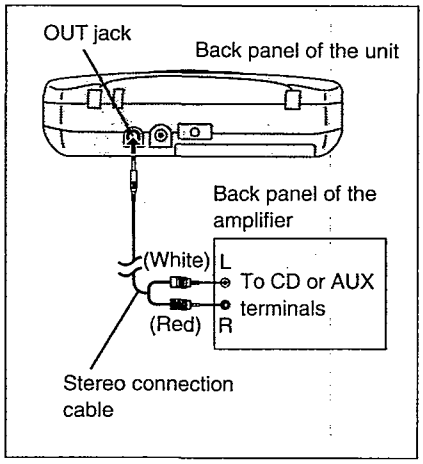
(Bottom side)

■ 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:

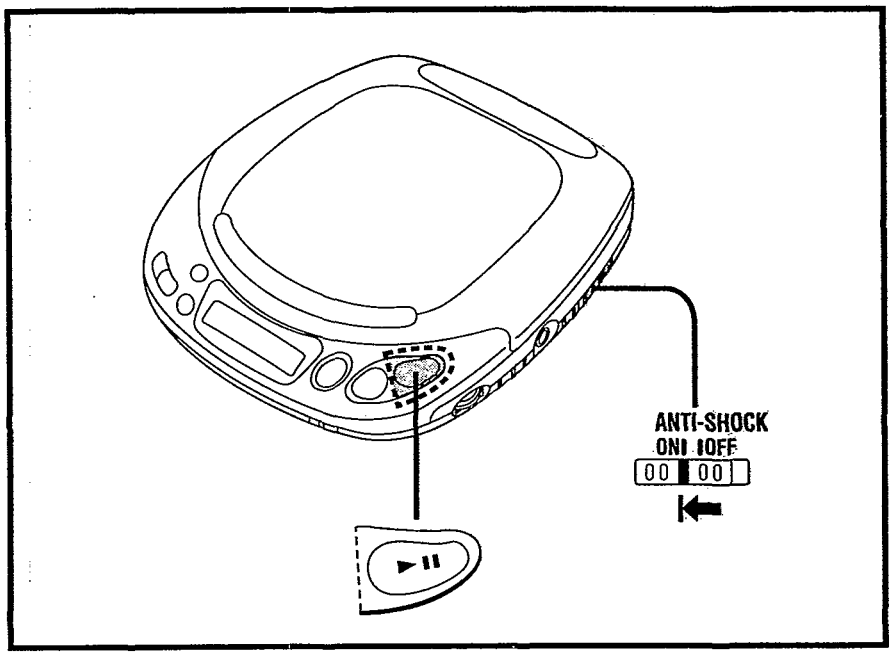
- Car adaptor (SH-CDC9)
- Car mounting kit (SH-CDF20)
  Car mounting arm, Car mounting base

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.

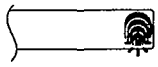
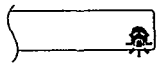
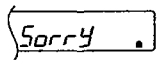
1 **Set ANTI-SHOCK to ON.**

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

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.

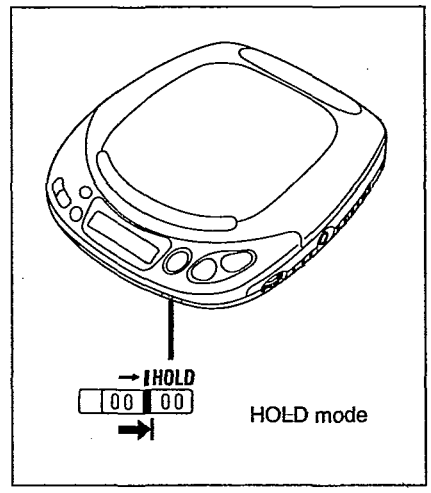
M.RESERVE indicator

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.

■ 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

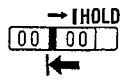
If the unit is in the hold mode, the "hold" indicator appears when any of the unit's function buttons (except OPEN) is pressed.

When the unit is turned off
The "hold" indicator appears only when ► II is pressed.

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

■ SEQUENTIAL PLAY

1 Release the hold mode.

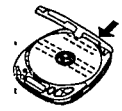


2 Press OPEN to open the lid, and insert the disc.

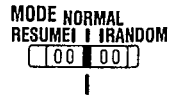
Label must face upward.

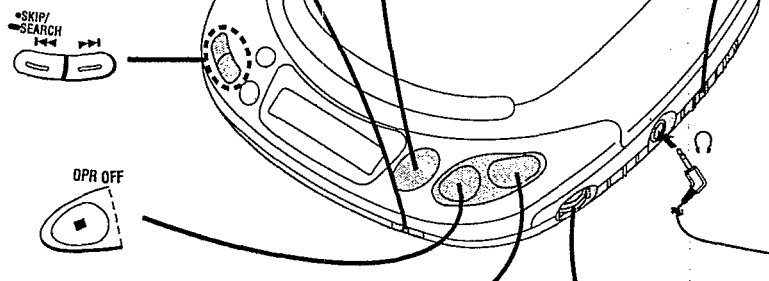
Press the area near the center hole of the disc until it clicks into position.

Close the lid.



3 Set MODE to NORMAL.

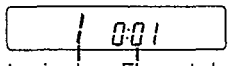




4 Connect the stereo earphones to the ∩ jack.

(Plug in firmly)

5 Press ▶ II. Play now starts.

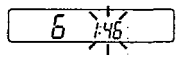
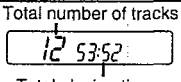


Track number in play Elapsed playing time of each track

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 foward/backward (skip function): press during play **Rapid foward/backward (search function):** keep depressed during play	▶▶I: Forward direction I◀◀: 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.)

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:

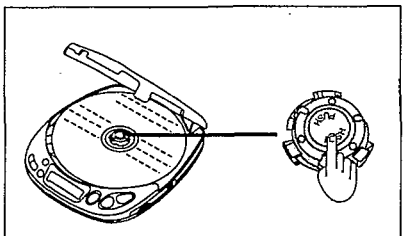
(This is possible only when the unit has been powered by batteries.)

Press ▶ II 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.

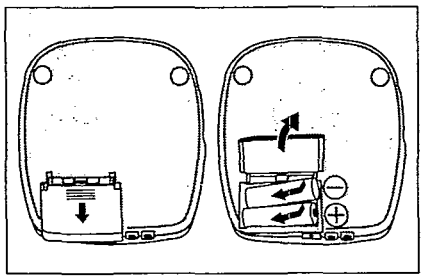
■ POWER SUPPLY PREPARATIONS

Using rechargeable batteries (not included)

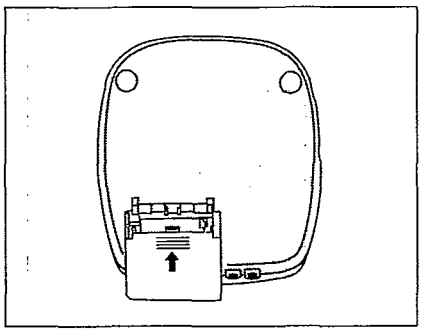
Obtain the optional rechargeable batteries (SH-CDB8D/RP-BP60).
Make sure that the rechargeable batteries have been recharged before use.

Recharging procedure

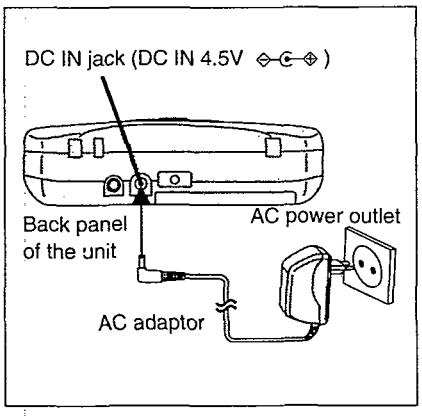
1 Place the rechargeable batteries inside the unit.
(No batteries other than SH-CDB8D/RP-BP60 can be recharged.)



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



2 Connect the AC adaptor.



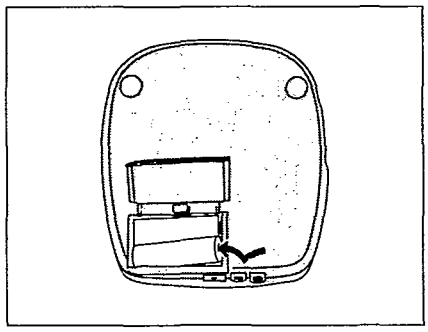
Note

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.

Using the AC adaptor

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

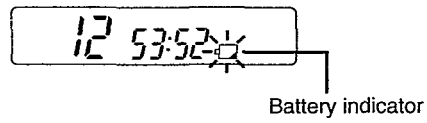
Note

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



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
Rechargeabe 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.)

■ MAINTENANCE

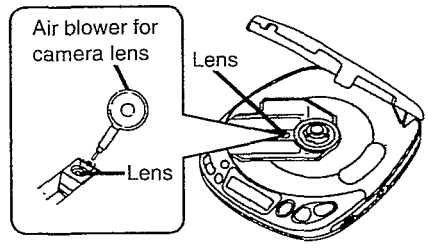
Maintaining the unit

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.

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 ⊕ and ⊖ 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.

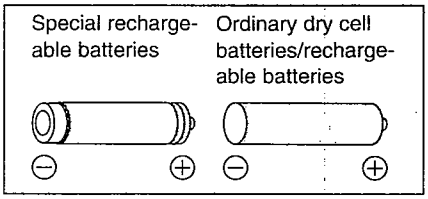
Precautions for Listening with the Headphones

- 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.

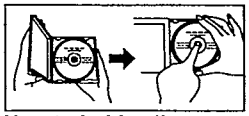


(For (E, EG) areas)

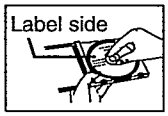
Notice about the rechargeable battery
The battery is designated recyclable.
Please follow your local recycling regulations.

■CONCERNING COMPACT DISCS

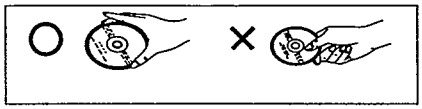
How to remove a disc from its case



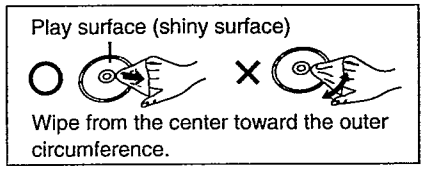
How to store the disc in its case



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

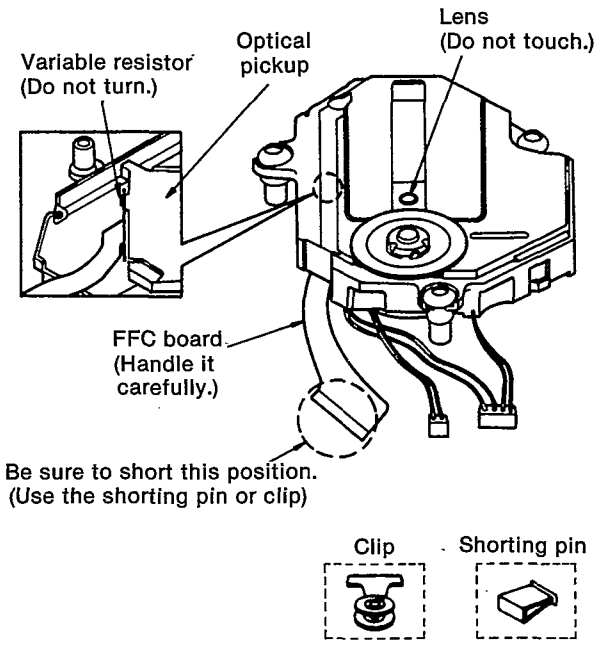
- On the label side (the side with writing)
  Do not write anything using a pencil, ballpoint pen, etc. Do not stick paper or labels.
- On the disc (shiny) side
  Handle this side carefully to keep it free from fingerprints or scratches. Do not use record cleaners, solvents, etc.

■ 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).

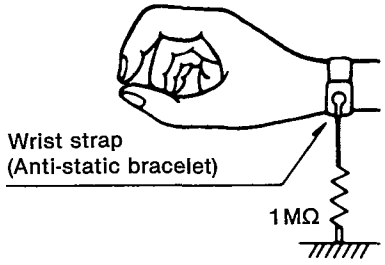
• Handling of traverse deck (optical pickup)

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.

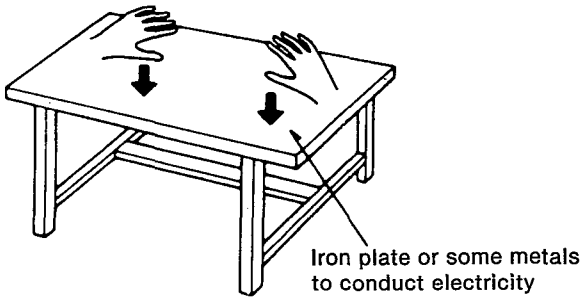


• Grounding for electrostatic breakdown prevention

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.

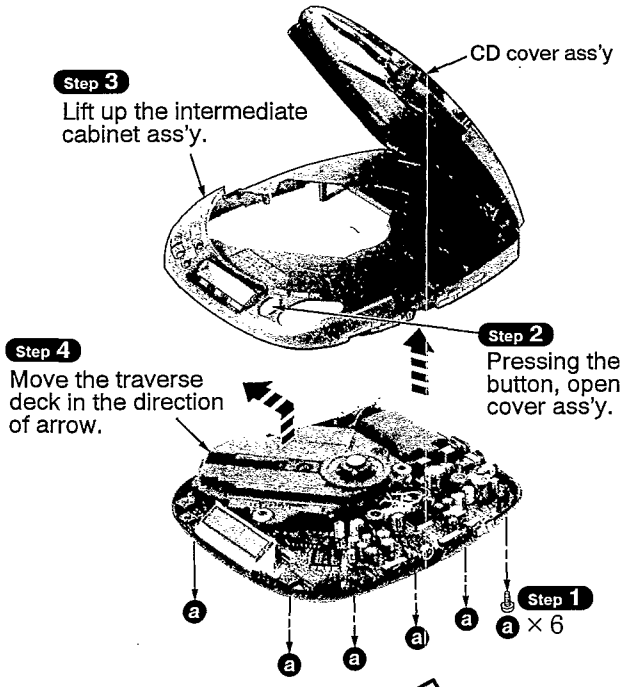
NOTE

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.**

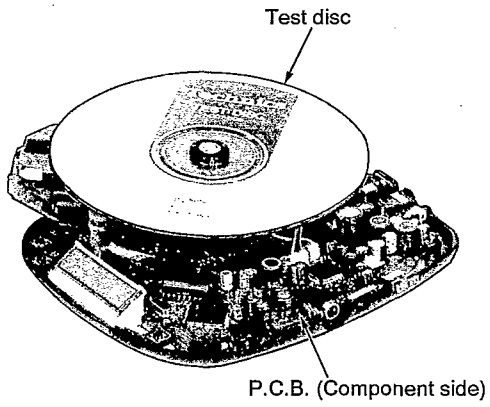
1. Checking for the P.C.B.

ⓐ [XTN17+6GFZ] (Black)

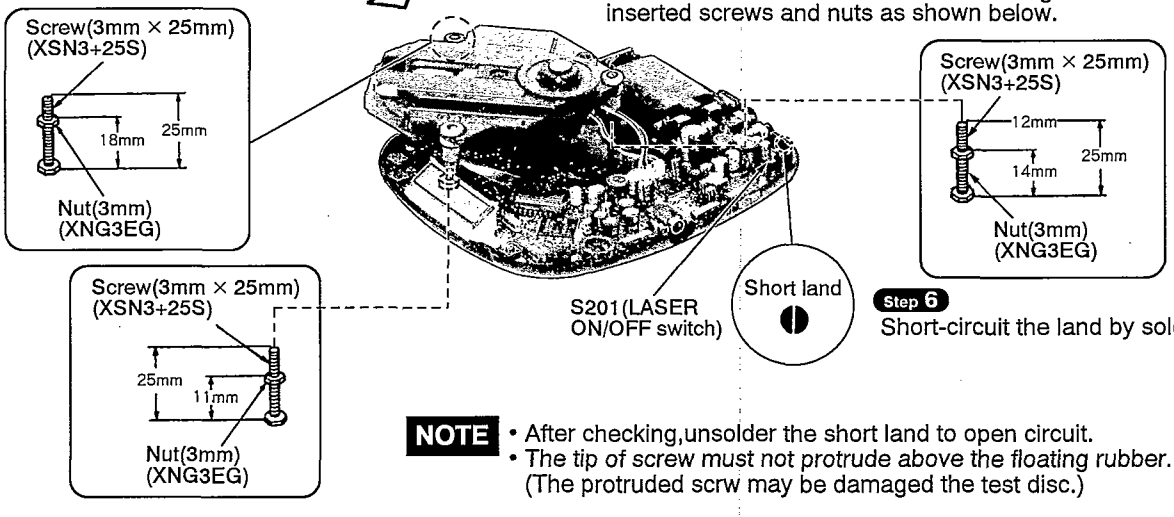
Checking for the P.C.B. (component side)



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



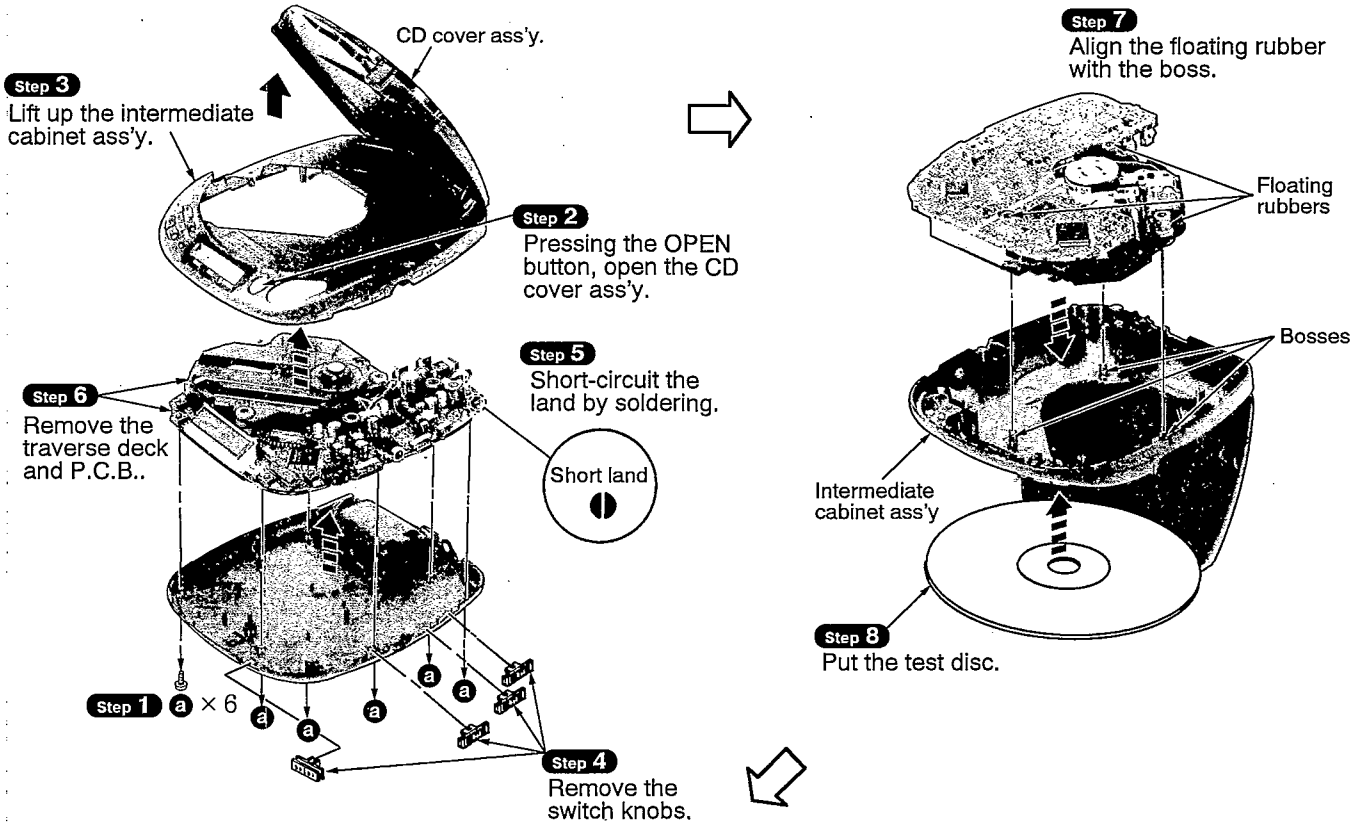
Step 5
Sustain the traverse deck with the floating rubber inserted screws and nuts as shown below.



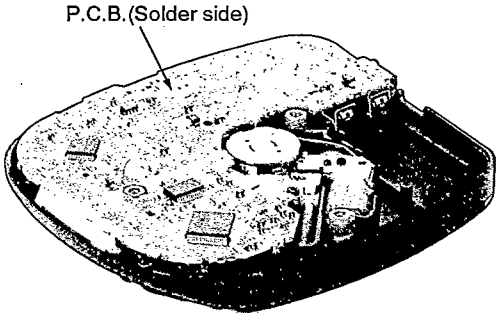
Step 6
Short-circuit the land by soldering.

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

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



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

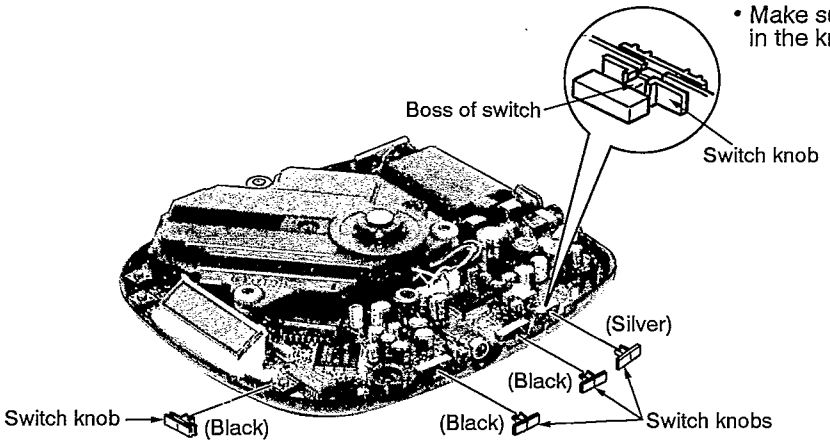


NOTE

After checking,unsolder the short land to open circuit.

a
[XTN17+6GFZ] (Black)

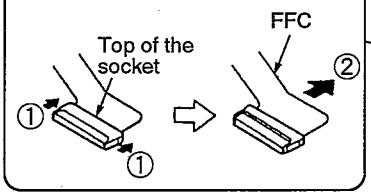
Notice for Installation of switch knobs

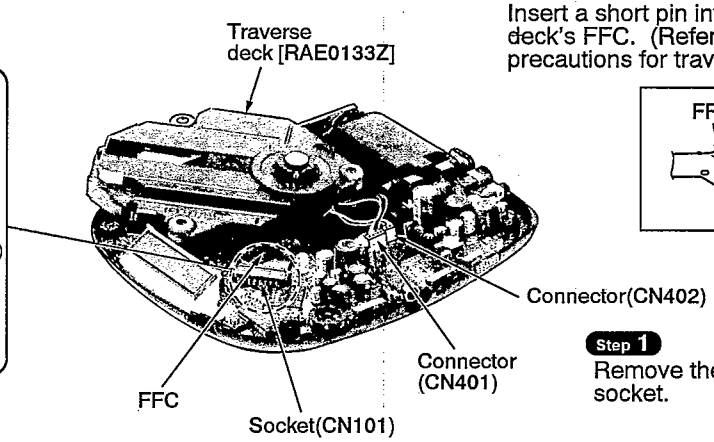


2. Replacement of the traverse deck

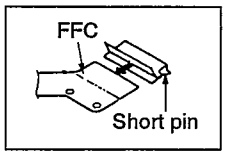
• Follow the Step 1 ~ Step 4 in item 1.

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





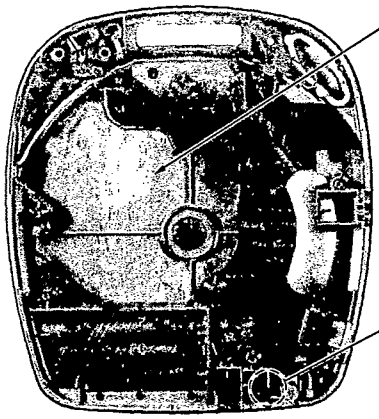
Caution:
Insert a short pin into the traverse deck's FFC. (Refer to "handing precautions for traverse deck" on page 8.)



Step 1
Remove the 2 connectors and socket.

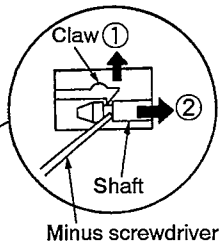
3. Replacement of the CD cover ass'y

• Follow the Step 1 ~ Step 3 in item 1.

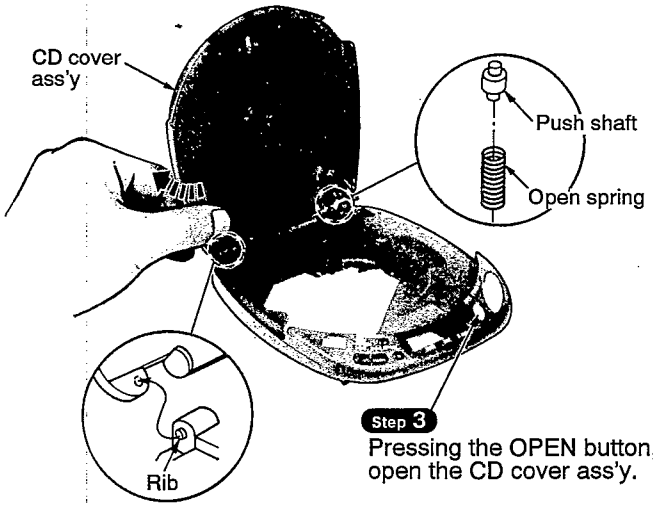


Step 1
Close the CD cover ass'y.

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



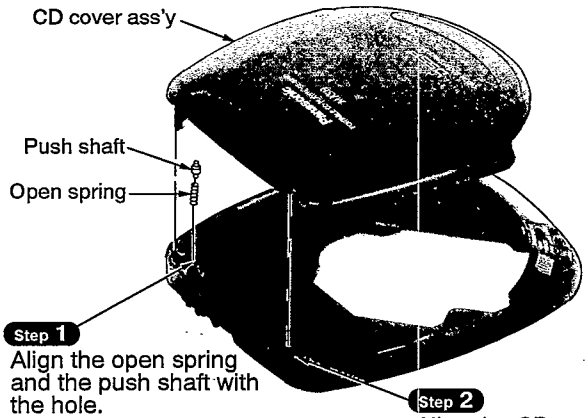
NOTE When the CD cover ass'y is removed, the push shaft and the open spring will also be removed. Be careful not to loose them.



Step 3
Pressing the OPEN button, open the CD cover ass'y.

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

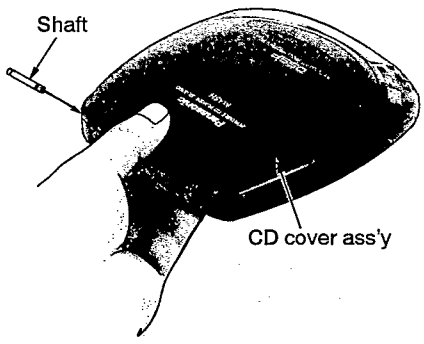
Reassembly procedures of CD cover ass'y



Step 1
Align the open spring and the push shaft with the hole.

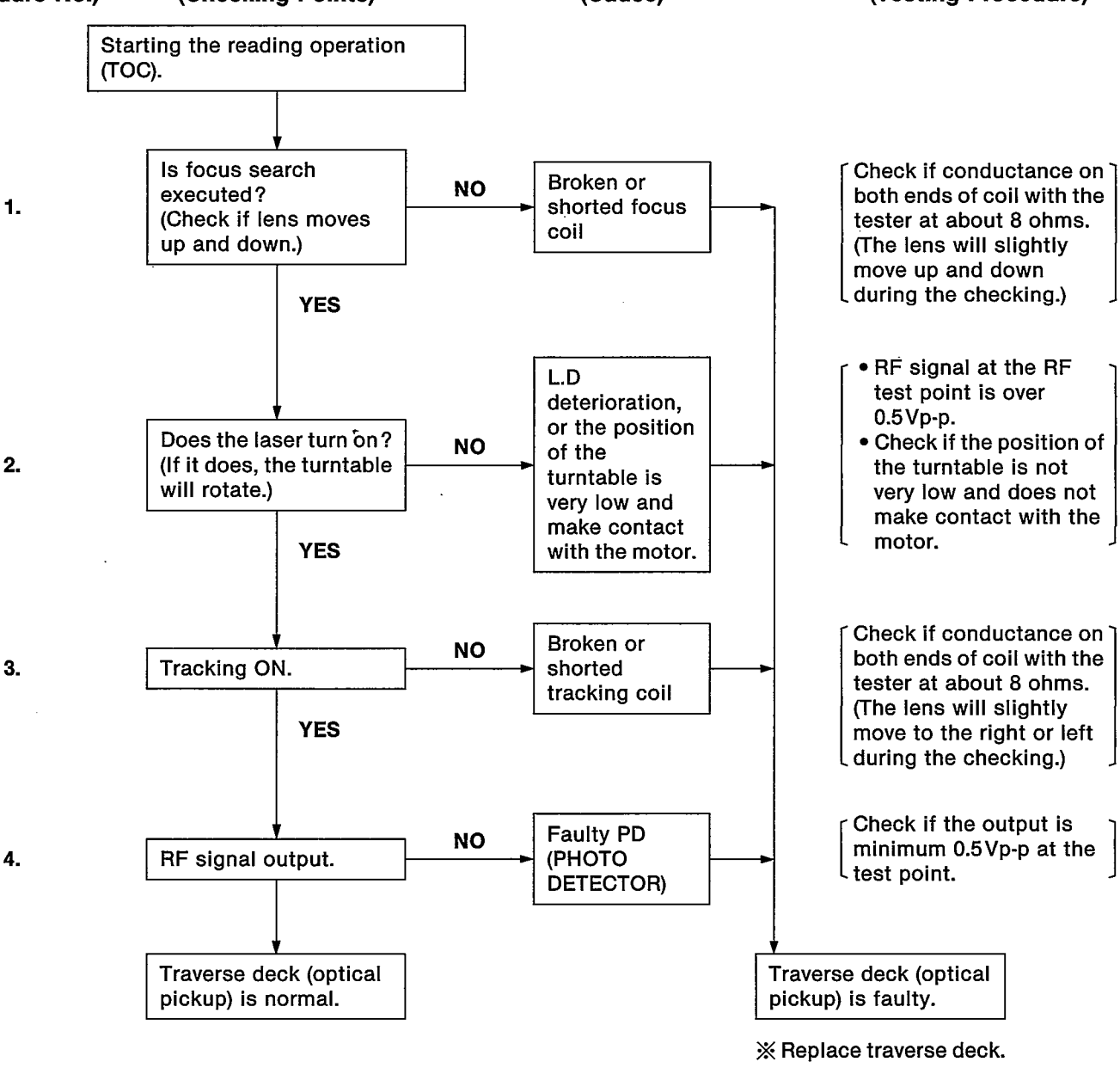
Step 2
Align the CD cover ass'y with the rib.

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.



- 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)

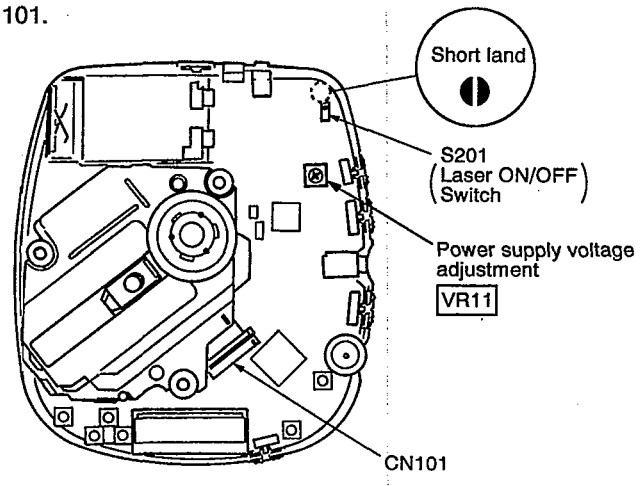
• Test short land

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.

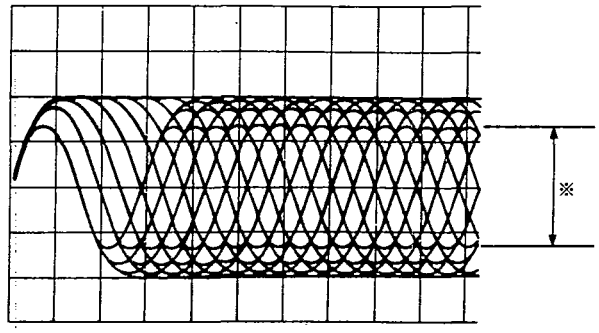


• Adjustment procedure

(1) MECHANICAL ADJUSTMENT

- When the traberse 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

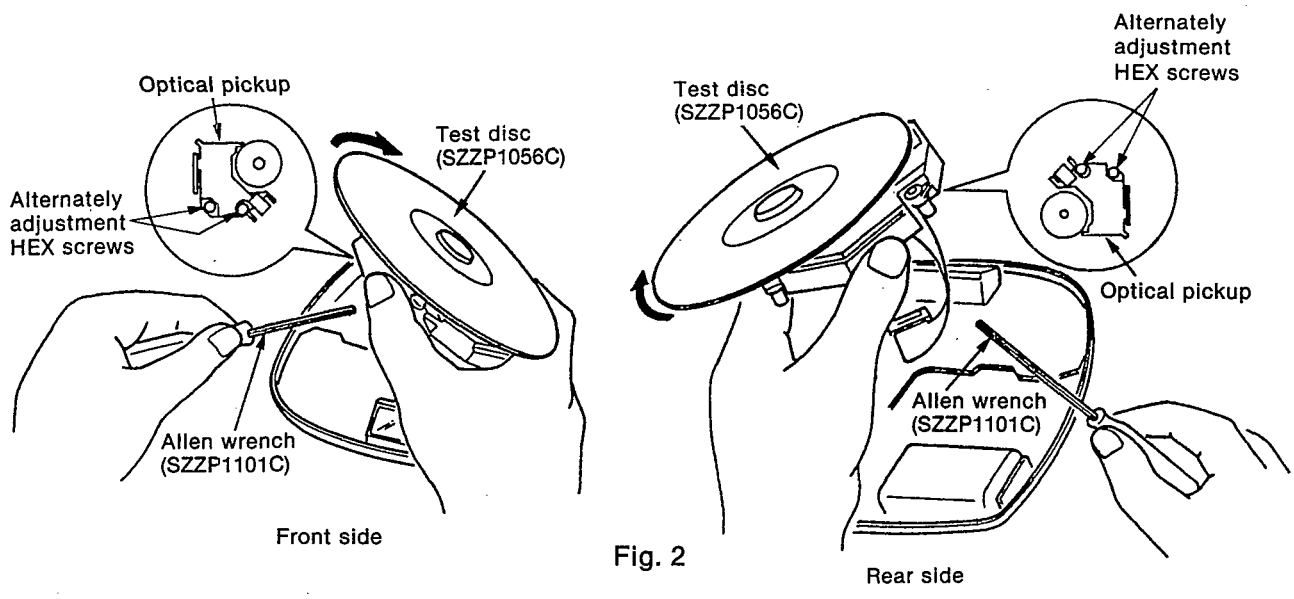


Fig. 2

(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)		**On SL-XP290** Use for New Servo IC (AN8832SBE1, MN662740RE)
1. Tracking Offset Adjustment VR (TOC) 2. Focus Offset Adjustment VR (FOC)	➡	Non Adjustment
3. Tracking Gain Adjustment VR (TGC) 4. Focus Gain Adjustment VR (FGC) 5. Tracking Balance Adjustment VR (TBC) 6. Focus Balance Adjustment VR (FBC)	➡	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.

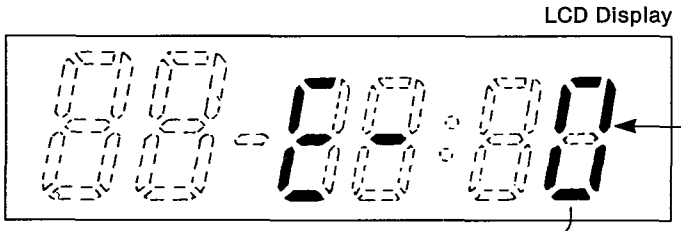
■ AUTOMATIC ADJUSTMENT RESULTS DISPLAY FUNCTION (SELF-CHECK FUNCTION)

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).

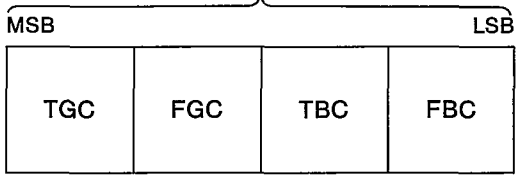
• How to display automatic adjustment results

1. Load the test disc (SZZP1054C).
2. Press the I◀◀ (SKIP/SEARCH) and ▶▶I (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〉



(Each bit ... TGC, FGC, TBC, FBC)
{ 0 ... OK
1 ... NG

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	$DV_{DD}1$	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)

Pin No.	Mark	I/O Division	Function
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	—	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 ($f=\frac{1}{1.92}\times ck=88.2kHz$)
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	DSLF	I/O	DSL loop filter terminal
48	PLLF	I/O	PLL loop filter terminal
49	VCOF	I	VCO loop filter terminal (Not used, connected to $AV_{DD}2$)
50	$AV_{DD}2$	I	Power supply (analog circuit) terminal (2)
51	$AV_{SS}2$	—	GND (analog circuit) terminal
52	FS384	O	384fs (16.9344MHz) output
53	PCK	—	PLL extract clock (f=4.3218MHz) (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=16.9344MHz)
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	$AV_{DD}1$	I	Power supply (analog circuit) terminal (1)
73	OUTL	O	Lch audio signal
74	$AV_{SS}1$	—	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 loard 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	$V_{DD}1$	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	YLRCK	I	L/R clock input terminal
13	YSCK	I	Serial bit clock input terminal
14	ZSCK	O	Serial bit clock output terminal
15	ZLRCK	O	L/R clock output terminal
16	ZSRDATA	O	Sirial data output terminal
17	YFLAG	I	RAM over-flow flag terminal
18	YFCLK	I	Crystal frame clock input

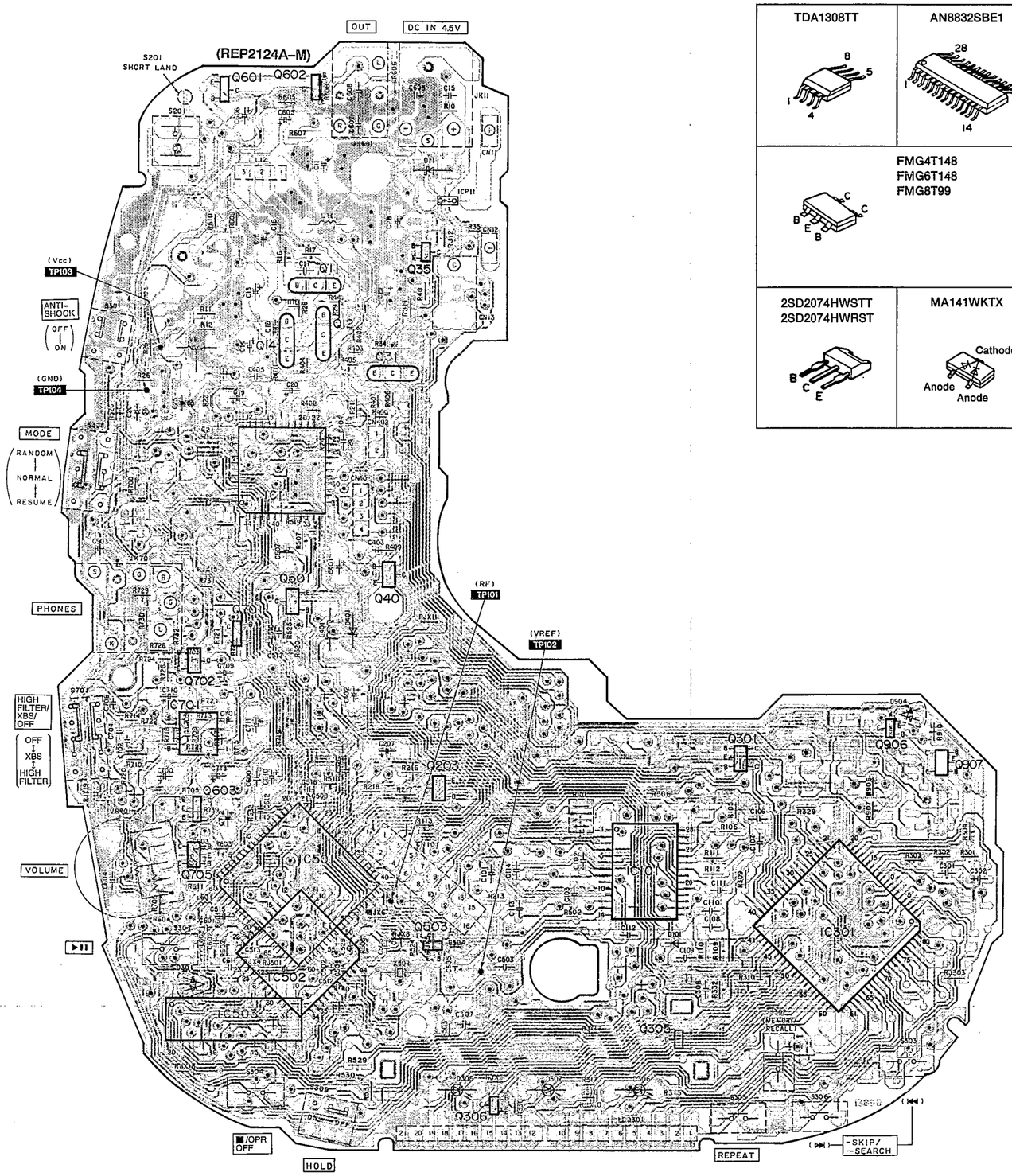
Pin No.	Mark	I/O Division	Function
19	YBLKCK	I	Sub-cord block clock input terminal
20	RESET	I	Reset input terminal
21	ZSENSE	O	Microcomputer states output terminal
22	RAMSEL	—	Not used, open
23	YDMUTE	I	Mute input terminal
24	YMLD	I	Microcomputer latch clock input terminal
25	YMDATA	I	Microcomputer sirial 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): 1M DRAM

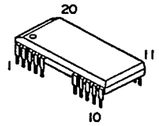
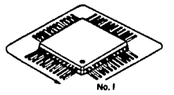
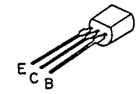
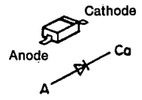
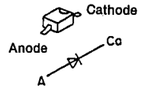
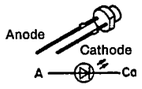
Pin No.	Mark	I/O Division	Function
1	D0	I/O	Data input/output terminal
2	D1	I/O	Data input/output terminal
3	NWE	I	Write enable terminal
4	NRAS	I	Low address strobe terminal
5	A9	I	Address input terminal
6	A0	I	Address input terminal
7 ∫ 9	A1 ∫ A3	I	Address input terminal

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

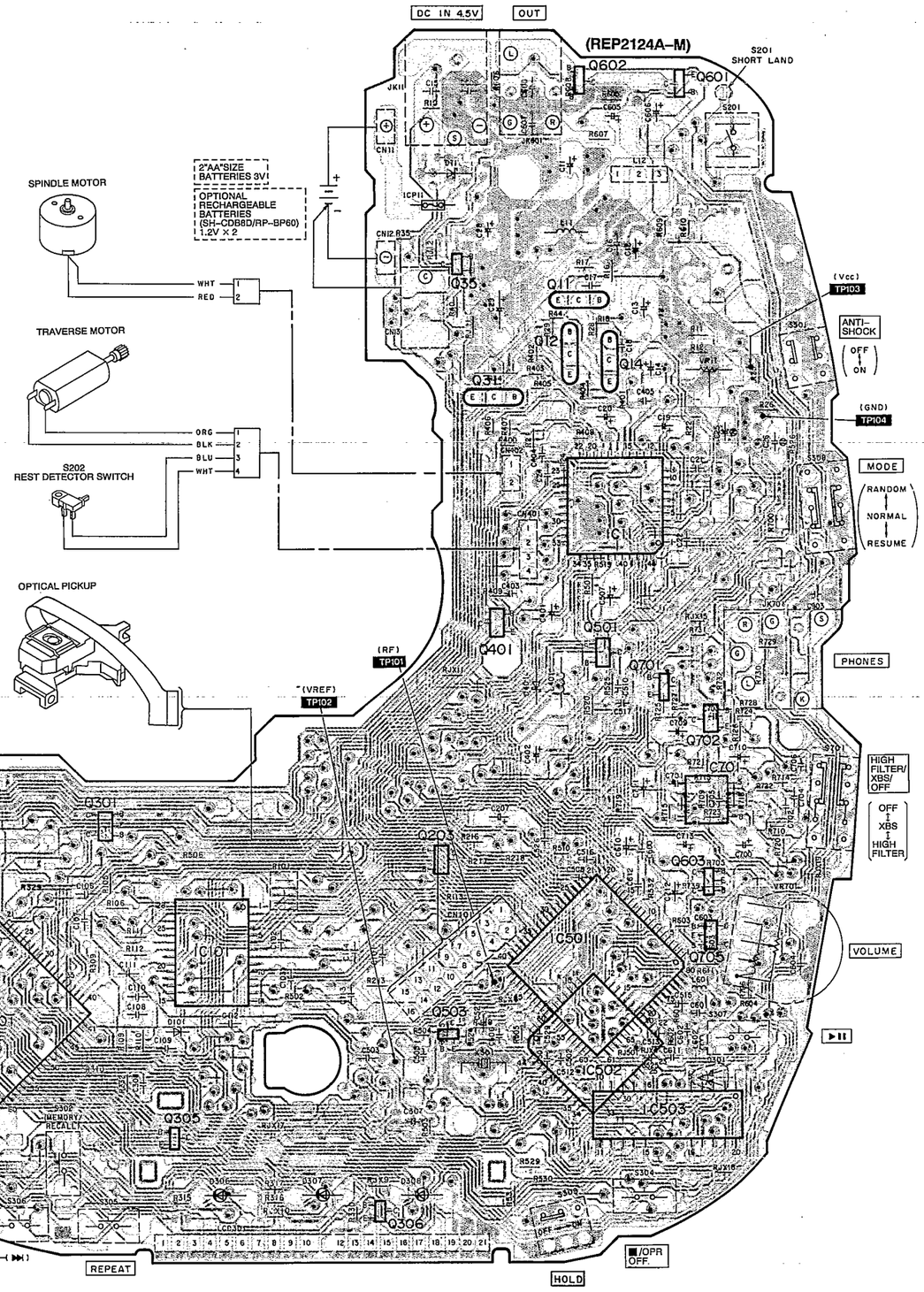


• Terminal guide of IC's, transistors and diodes.

TDA1308TT	AN8832SBE1	LH6V56K4 		AN8819NFB 44Pin SM5856AF 44Pin MN662740RE 80Pin SC424670FU 80Pin
	FMG4T148 FMG6T148 FMG8T99		2SB709QRSTX 2SB970RSTX 2SD1328RSTTX 2SD1819QRSTX DTC144TUT107	UN5114TX UN521VTX
2SD1302STTA 				
2SD2074HWSTT 2SD2074HWRST	MA141WKTX	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 (I◀◀ -SKIP/-SEARCH ▶▶I) switches. (S303: I◀◀, S306: ▶▶I)
- **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, 0 dB) 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.

: Positive voltage lines
: Audio lines

(P.C.Board:on pages 21 – 24)

LCD301(EDD052CG8AHP)
LCD DISPLAY

Terminal guide: on page 19

IC301
SC424670FU
SYSTEM CONTROL/ LCD DRIVE

Q305
UN5114TX
LED DRIVE

D306- 308
SLC- 505MCA47
(LCD BACK LIGHT)

Q306
2SD1819QRSTX
LED DRIVE

Q203
2SB709QRSTX
LASER POWER DRIVE

S201 (LASER ON/OFF)
S201:SHORT LAND

⚠OPTICAL PICKUP
FOCUS COIL
TRACKING COIL

Terminal guide:on page 17

IC101
AN8832SBE1
SERVO AMP

D101 MA110TX

S308 (MODE)
RANDOM
NORMAL
RESUME

D301 MA141WKTX

S307
S309(HOLD)
ON — OFF

S304 /OPR OFF)
S305 (REPEAT)
S306 (▶▶|)
S302 (MEMORY/ RECALL)
S303 (|◀◀)

Q301
FMG8T99
POWER IN DET.

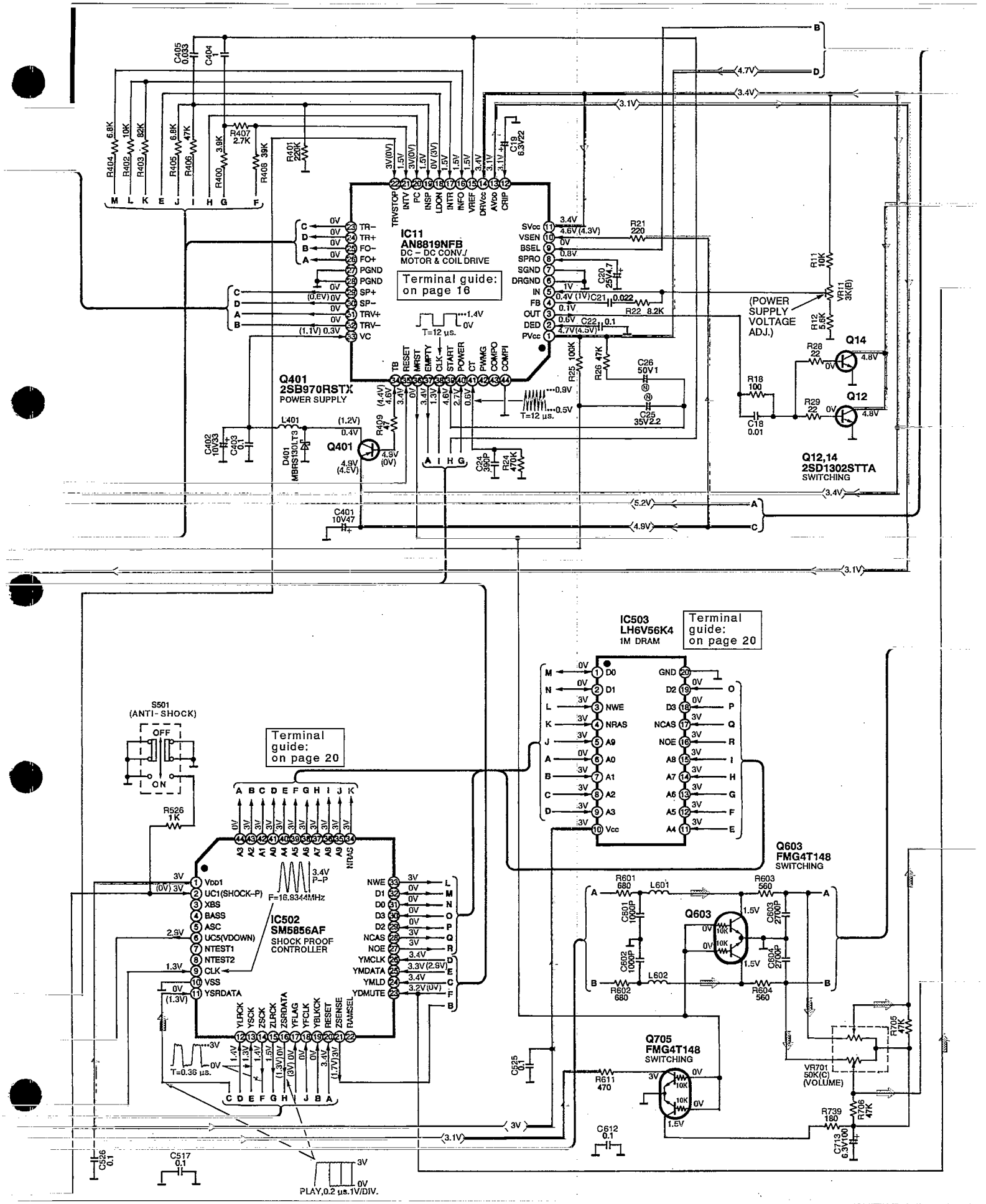
TRAVERSE MOTOR
SPINDLE MOTOR
S202 (REST DET SWITCH)
CN401
CN402

IC501
MN662740RE
SERVO PROCESSOR/ DIGITAL SIGNAL PROCESSOR/ DIGITAL FILTER & D/A CONVERTER

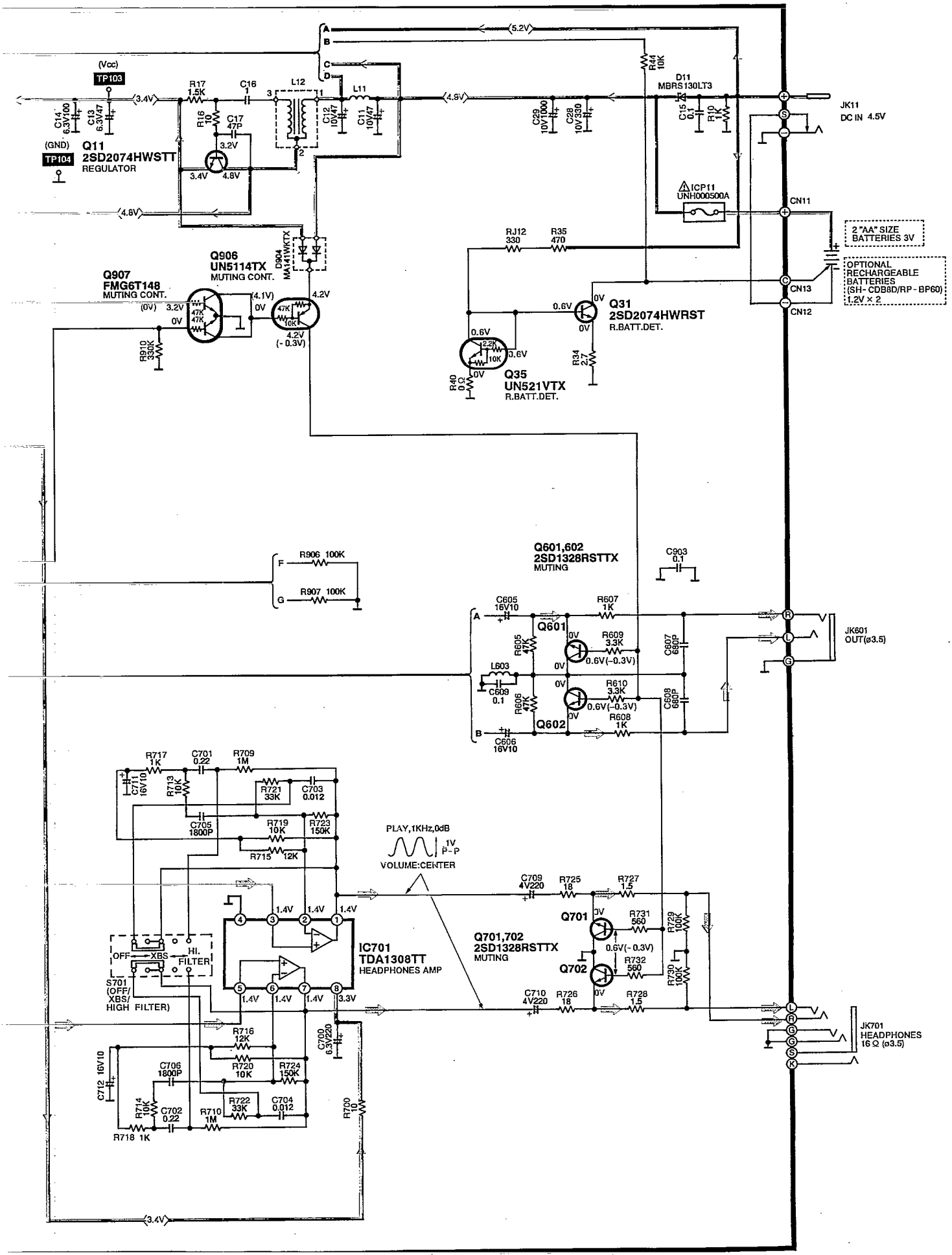
Terminal guide: on pages 17,18

Q501
2SB970RSTX
POWER SUPPLY

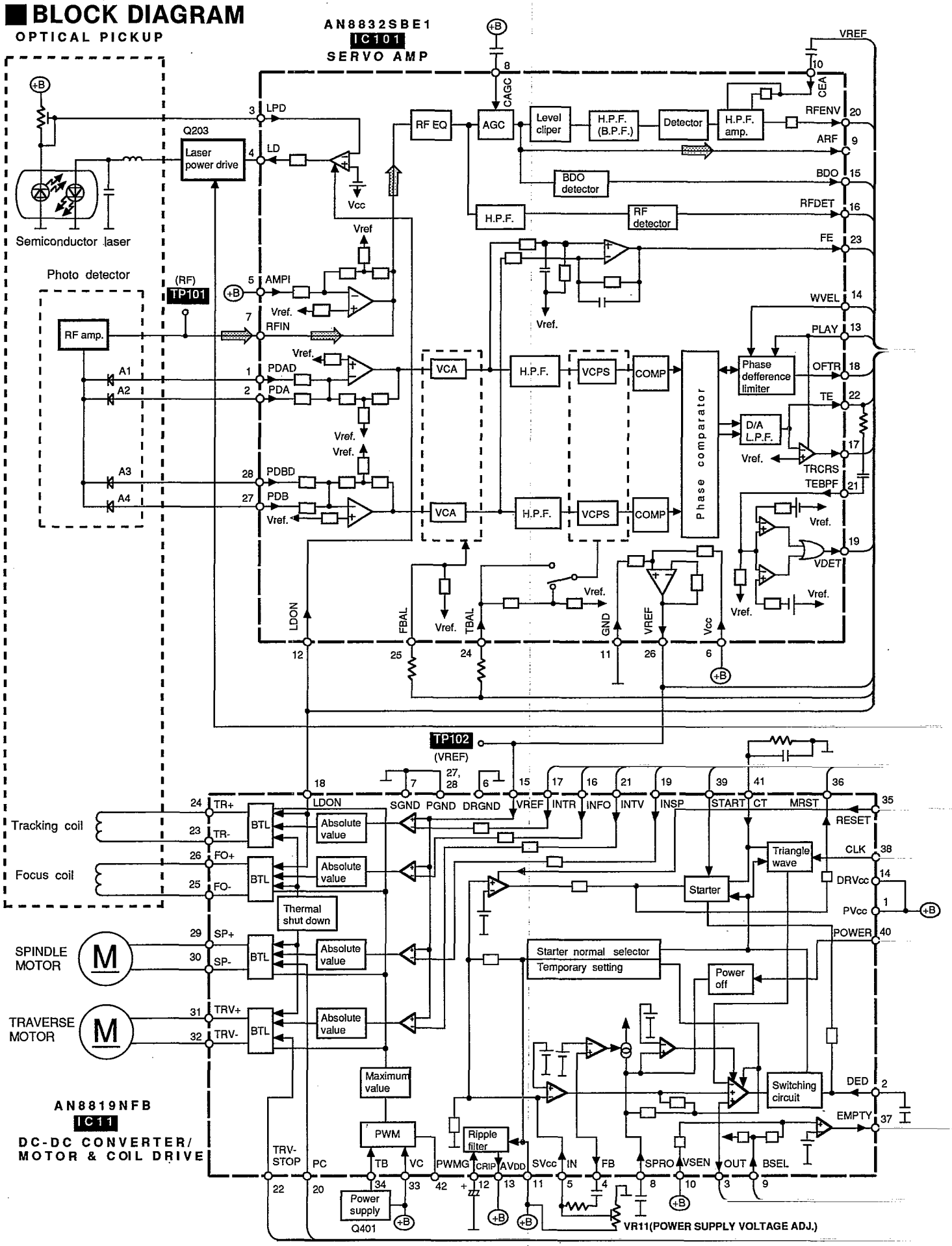
Q503
DTC144TUT107
SWITCHING


IC11
AN8819NFB
DC – DC CONV./
MOTOR & COIL DRIVE
Terminal guide:
on page 16
Q401
2SB970RSTX
POWER SUPPLY
Q12,14
2SD1302STTA
SWITCHING
(POWER
SUPPLY
VOLTAGE
ADJ.)
IC503
LH6V56K4
1M DRAM
Terminal
guide:
on page 20
S501
(ANTI-SHOCK)
OFF
ON
IC502
SM5856AF
SHOCK PROOF
CONTROLLER
Q603
FMG4T148
SWITCHING
Q705
FMG4T148
SWITCHING
VR701
50K(C)
(VOLUME)
PLAY,0.2 µs.1V/DIV.

: Positive voltage lines
: Audio signal



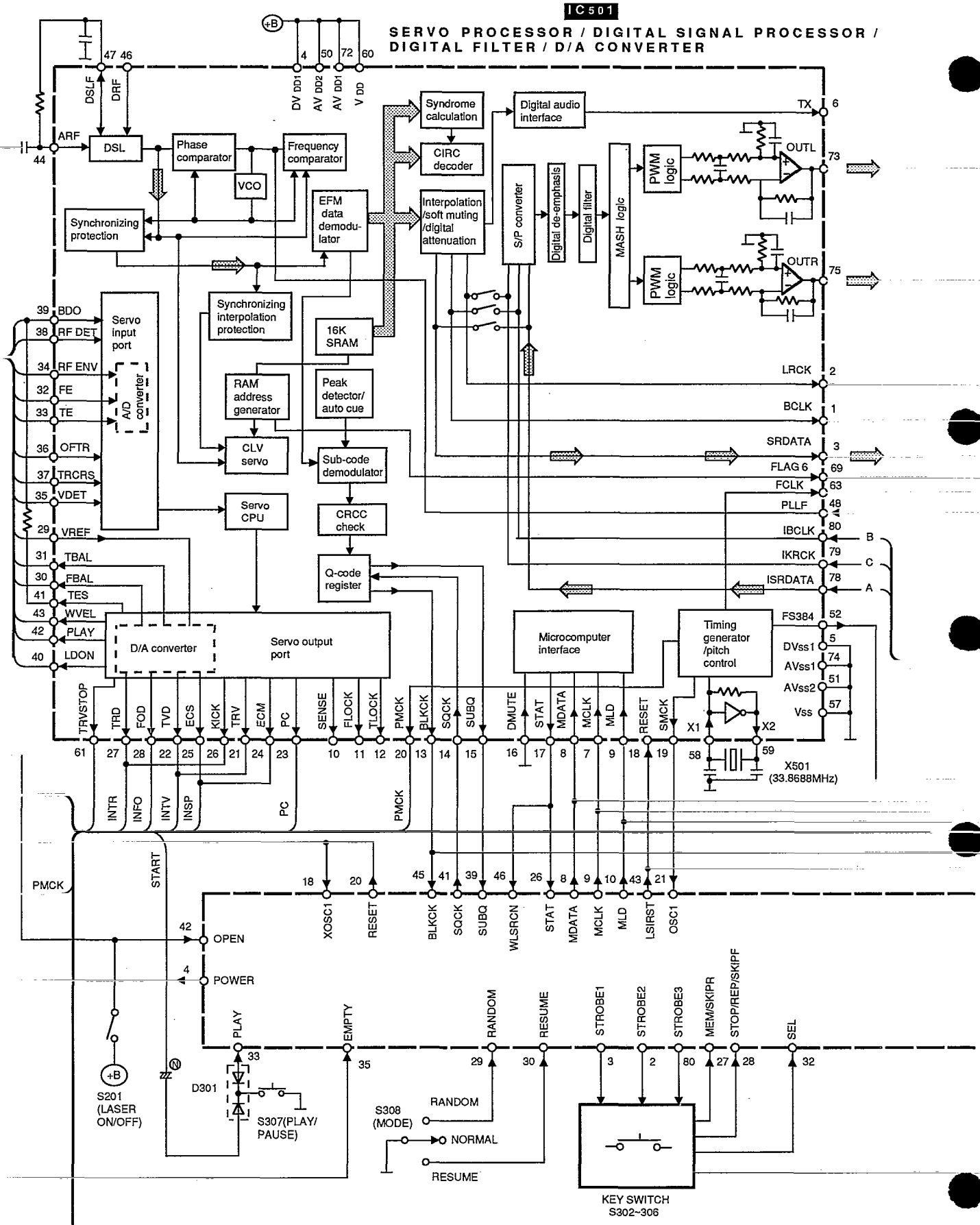
■ BLOCK DIAGRAM

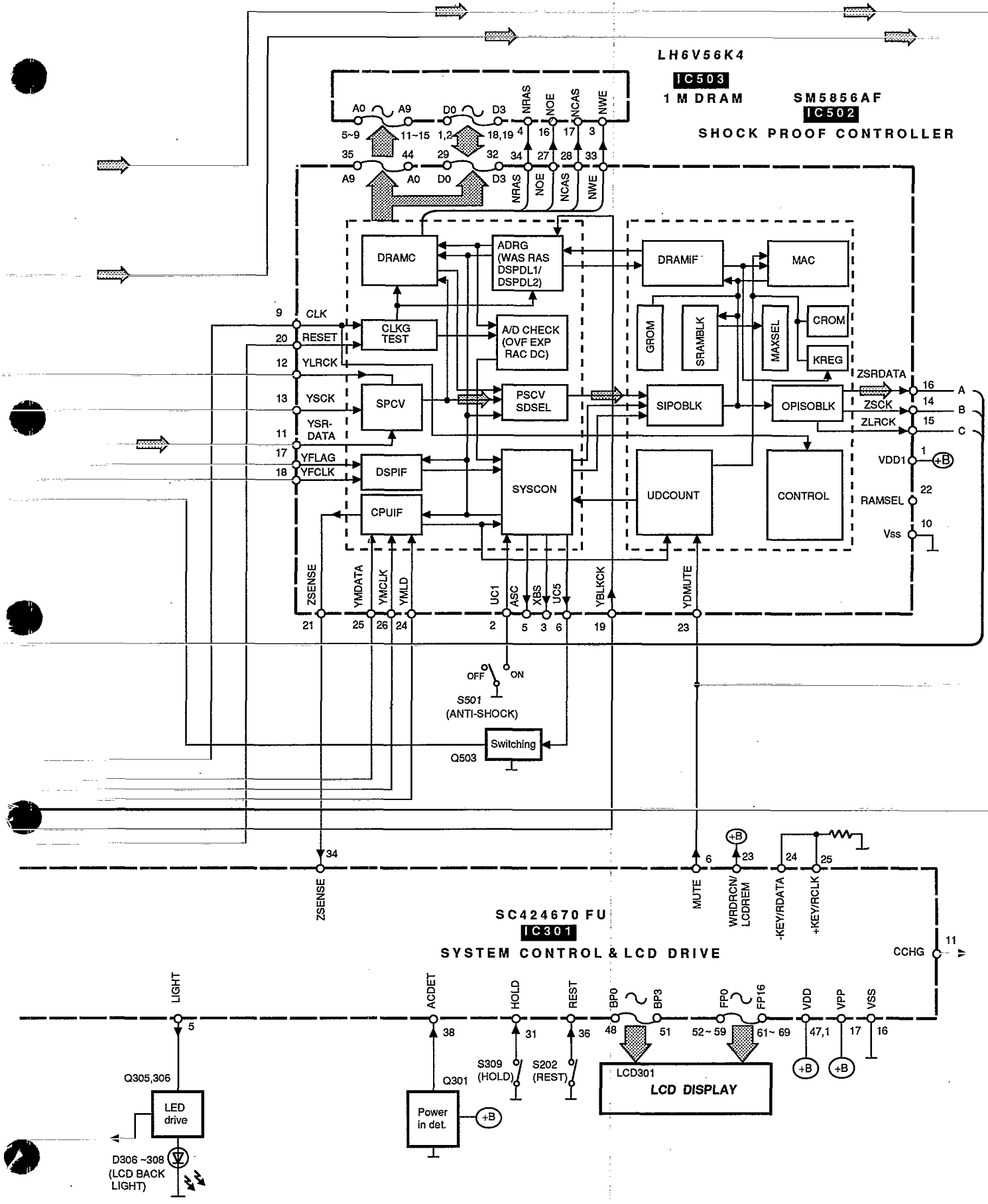


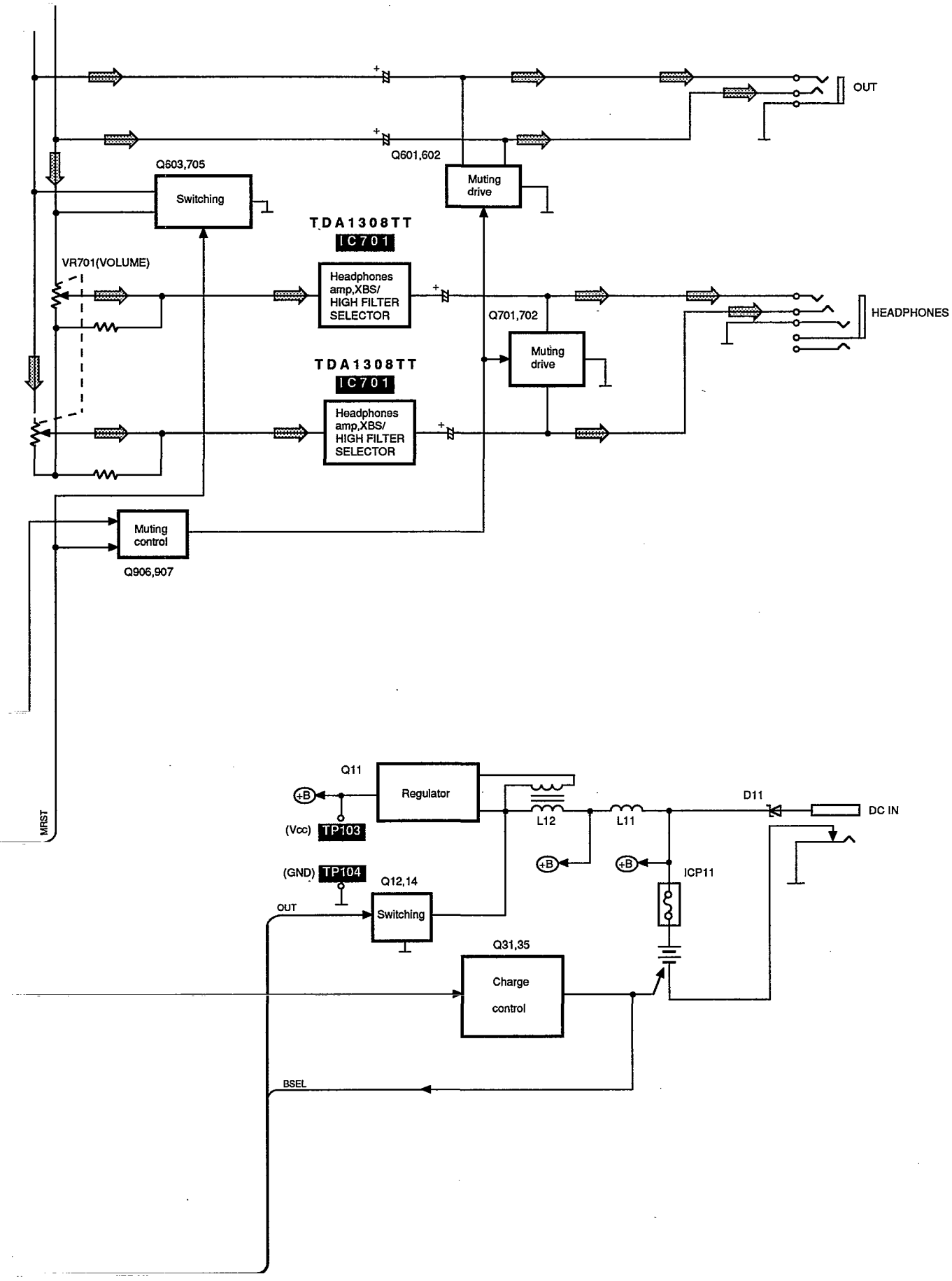
MN662740RE

IC501

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




LH6V56K4
IC503
1 M DRAM
SM5856AF
IC502
SHOCK PROOF CONTROLLER
A0 A9 D0 D3 NRAS NOE NCAS NWE
5~9 11~15 1,2 18,19 4 16 17 3
35 44 29 32 34 27 28 33
A9 A0 D0 D3 NRAS NOE NCAS NWE
DRAMC
ADRG (WAS RAS DSPDL1/ DSPDL2)
DRAMIF
MAC
CLKG TEST
A/D CHECK (OVF EXP RAC DC)
GROM
SRAMBLK
MAXSEL
CROM
KREG
SPCV
PSCV SDSEL
SIPOBLK
OPISOBLK
DSPIF
SYSCON
UDCOUNT
CONTROL
CPUIF
9 CLK
20 RESET
12 YLRCK
13 YSCK
11 YSR-DATA
17 YFLAG
18 YFCLK
ZSRDATA
16 A
ZSCK
14 B
ZLRCK
15 C
VDD1
1
+B
RAMSEL
22
Vss
10
ZSENSE YMDATA YMCLK YMLD UC1 ASC XBS UC5 YBLKOK YDMUTE
21 25 26 24 2 5 3 6 19 23
OFF ON
S501
(ANTI-SHOCK)
Switching
Q503
34
ZSENSE
6
MUTE
+B
23
WRDRCN/ LCDREM
24
-KEY/RDATA
25
+KEY/RCLK
SC424670 FU
IC301
SYSTEM CONTROL & LCD DRIVE
CCHG
11
LIGHT
5
ACDET
38
HOLD
31
REST
36
BP0 BP3
48 51
FP0 FP16
52~59 61~69
VDD VPP VSS
47,1 17 16
Q305,306
LED drive
D306 ~308
(LCD BACK LIGHT)
Q301
Power in det.
+B
S309 (HOLD)
S202 (REST)
LCD301
LCD DISPLAY
+B
+B



Note: ⇨ Audio signal

■ REPLACEMENT PARTS LIST

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*Warning: This product uses a laser diode. Refer to caution statements on page 3.
*ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC11	AN8819NFB	DC-DC CONVERTER	
IC101	AN8832SBE1	SERVO AMP	
IC301	SC424670FU	SYSTEM CONTROL&LCD DRIVE	
IC501	MN662740RE	SERVO PROCESSOR	
IC502	SM5856AF	SHOCK PROOF CONTROLLER	
IC503	LH6V56K4	1M DRAM	
IC701	TDA1308TT	HEADPHONES AMP	
		TRANSISTOR(S)	
Q11	2SD2074HWSTT	TRANSISTOR	
Q12	2SD1302STTA	TRANSISTOR	
Q14	2SD1302STTA	TRANSISTOR	
Q31	2SD2074HWRST	TRANSISTOR	
Q35	UN521VTX	TRANSISTOR	
Q203	2SB709QRSTX	TRANSISTOR	
Q301	FMG8T99	TRANSISTOR	
Q305	UN5114TX	TRANSISTOR	
Q306	2SD1819QRSTX	TRANSISTOR	
Q401	2SB970RSTX	TRANSISTOR	
Q501	2SB970RSTX	TRANSISTOR	
Q503	DTC144TUT107	TRANSISTOR	
Q601, 602	2SD1328QRSTX	TRANSISTOR	
Q603	FMG4T148	TRANSISTOR	
Q701, 702	2SD1328QRSTX	TRANSISTOR	
Q705	FMG4T148	TRANSISTOR	
Q906	UN5114TX	TRANSISTOR	
Q907	FMG6T148	TRANSISTOR	
		DIODE(S)	
D11	MBRS130LT3	DIODE	
D101	MA110TX	DIODE	
D301	MA141WKTX	DIODE	
D306-308	SLC-505MCA47	L. E. D.	
D401	MBRS130LT3	DIODE	
D904	MA141WKTX	DIODE	
		IC PROTECTOR(S)	
ICP11	UNH000500A	IC PROTECTOR	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
		VARIABLE RESISTOR(S)	
VR11	EVNDXAA00B33	POWER SUPPLY VOLTAGE AD.	
VR701	EVUT2EA25C54	VOLUME	
		COIL(S)	
L11	RLQB330KT-M	COIL	
L12	RLZ0028T-M	COIL	
L401	RLQB330KT-M	COIL	
L601-603	RLBV102V-Y	COIL	
		OSCILLATOR(S)	
X501	RSXZ33M8M01T	OSCILLATOR(33.8688MHz)	
		LCD(S)	
LCD301	EDD052CG8AHP	LCD	
		SWITCH(ES)	
S201	RSH1A91ZA-A	LASER ON/OFF	
S202	SSHD5	REST DETECTOR	
S302	EVQ21405R	MEMORY/RECALL	
S303	EVQ21405R	SKIP/SEARCH(R)	
S304	EVQ21405R	STOP/OPR OFF	
S305	EVQ21405R	REPEAT	
S306	EVQ21405R	SKIP/SEARCH(F)	
S307	EVQ21405R	PLAY/PAUSE	
S308	ESD11H230	MODE	
S309	ESD11H220	HOLD	
S501	ESD11H220	ANTI-SHOCK ON/OFF	
S701	ESD11H230	HIGH FILTER/XBS SELECTOR	
		CONNECTOR(S) AND SOCKET(S)	
CN11	RJC93015-1	BATTERY TERMINAL(+)	
CN12	RJC93015-1	BATTERY TERMINAL(-)	
CN13	RJH5102-1	RECHARGEABLE BATT. TERMINAL	
CN101	RJU035T016-1	SOCKET(16P)	
CN401	RJT068W04V	CONNECTOR(4P)	
CN402	RJT068W02V	CONNECTOR(2P)	
		JACK(S)	

Ref. No.	Part No.	Part Name & Description	Remarks
JK11	RJJ4303-1	DC IN JACK	
JK601	RJJD3S5ZB-C	OUT JACK	
JK701	RJJ36T02-C	HEADPHONES JACK	

Ref. No.	Part No.	Part Name & Description	Remarks

■ 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
		RESISTORS
R10	ERJ6GEYJ102V	1/10W 1K
R11	ERJ6GEYJ103V	1/10W 10K
R12	ERJ6GEYJ562V	1/10W 5.6K
R16	ERJ6GEYJ100	1/10W 10
R17	ERJ6GEYJ152V	1/10W 1.5K
R18	ERJ3GEYJ101V	1/16W 100
R21	ERJ6GEYJ221V	1/10W 220
R22	ERJ3GEYJ822V	1/16W 8.2K
R24	ERJ6GEYJ474V	1/10W 470K
R25	ERJ6GEYJ104V	1/10W 100K
R26	ERJ6GEYJ473V	1/10W 47K
R28, 29	ERJ6GEYJ220	1/10W 22
R34	ERJ12YJ2R7H	1/2W 2.7
R35	ERJ3GEYJ471V	1/16W 470
R44	ERJ3GEYJ103V	1/16W 10K
R101	EXBV8V223J	1/8W 22K
R105	ERJ6GEYJ333V	1/10W 33K
R106	ERJ6GEYJ153V	1/10W 15K
R109	ERJ6GEYJ223V	1/10W 22K
R110	ERJ6GEYJ124V	1/10W 120K
R111, 112	ERJ6GEYJ103V	1/10W 10K
R113	ERJ6GEYJ101V	1/10W 100
R213	ERJ6GEYJ474V	1/10W 470K
R216	ERJ6GEYJ4R7V	1/10W 4.7
R217	ERJ6GEYJ100	1/10W 10

Ref. No.	Part No.	Values & Remarks
R218	ERJ6GEYJ223V	1/10W 22K
R301-303	ERJ6GEYJ473V	1/10W 47K
R304	ERJ6GEYJ103V	1/10W 10K
R309, 310	ERJ6GEYJ102V	1/10W 1K
R315-317	ERJ3GEYJ680V	1/16W 68
R329	ERJ6GEYJ473V	1/10W 47K
R330	ERJ3GEYJ102V	1/16W 1K
R332	ERJ6GEYJ224V	1/10W 220K
R400	ERJ3GEYJ392V	1/16W 3.9K
R401	ERJ3GEYJ224V	1/16W 220K
R402	ERJ3GEYJ103V	1/16W 10K
R403	ERJ3GEYJ823V	1/16W 82K
R404, 405	ERJ3GEYJ682V	1/16W 6.8K
R406	ERJ3GEYJ473V	1/16W 47K
R407	ERJ3GEYJ272V	1/16W 2.7K
R408	ERJ3GEYJ393V	1/16W 39K
R409	ERJ6GEYJ470V	1/10W 47
R502	ERJ3GEYJ103V	1/16W 10K
R503	ERJ3GEYJ473V	1/16W 47K
R504	ERJ3GEYJ683V	1/16W 68K
R505	ERJ3GEYJ471V	1/16W 470
R506	ERJ6GEYJ821V	1/10W 820
R507	ERJ6GEYJ100	1/10W 10
R510	ERJ3GEYJ220V	1/16W 22
R519	ERJ6GEYJ8R2V	1/10W 8.2
R520	ERJ6GEYJ152V	1/10W 1.5K
R524	ERJ3GEYJ474V	1/16W 470K
R525	ERJ6GEYJ153V	1/10W 15K

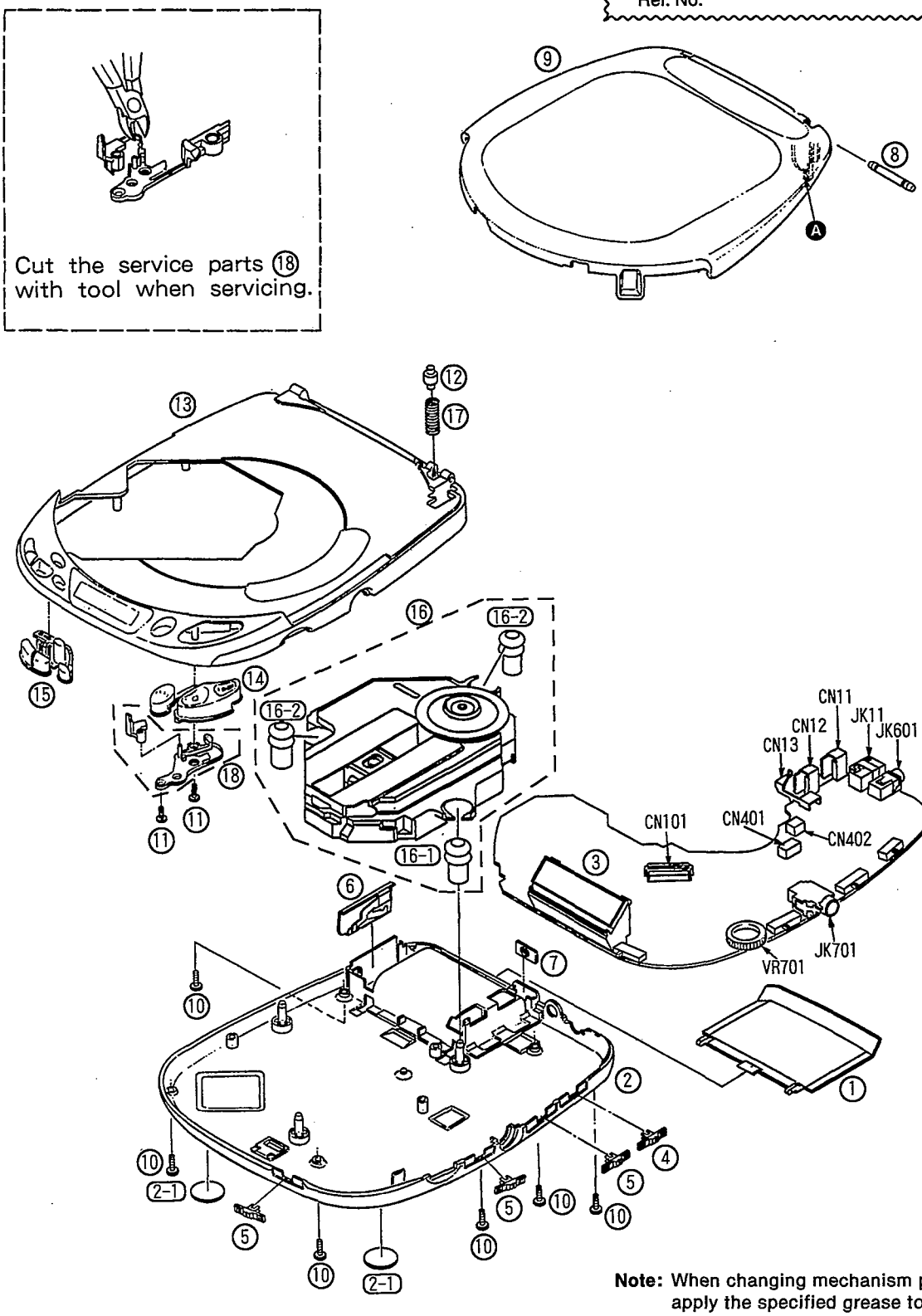
Ref. No.	Part No.	Values & Remarks
R526	ERJ6GEYJ102V	1/10W 1K
R529-531	ERJ6GEYJ102V	1/10W 1K
R532	ERJ3GEYJ102V	1/16W 1K
R601, 602	ERJ3GEYJ681V	1/16W 680
R603, 604	MCR03PZHJ561	1/16W 560
R605	ERJ6GEYJ473V	1/10W 47K
R606	ERJ3GEYJ473V	1/16W 47K
R607, 608	ERJ6GEYJ102V	1/10W 1K
R609, 610	ERJ3GEYJ332V	1/16W 3.3K
R611	ERJ6GEYJ471V	1/10W 470
R700	ERJ3GEYJ100V	1/16W 10
R705, 706	ERJ6GEYJ473V	1/10W 47K
R709, 710	ERJ3GEYJ105V	1/16W 1M
R713, 714	ERJ3GEYJ103V	1/16W 10K
R715, 716	ERJ3GEYJ123V	1/16W 12K
R717, 718	ERJ3GEYJ102V	1/16W 1K
R719, 720	ERJ3GEYJ103V	1/16W 10K
R721	ERJ3GEYJ333V	1/16W 33K
R722	ERJ6GEYJ333V	1/10W 33K
R723, 724	ERJ3GEYJ154V	1/16W 150K
R725, 726	ERJ6GEYJ180V	1/10W 18
R727, 728	ERJ6GEYJ1R5V	1/10W 1.5
R729, 730	ERJ6GEYJ104V	1/10W 100K
R731	MCR03PZHJ561	1/16W 560
R732	ERJ6GEYJ561V	1/10W 560
R739	ERJ6GEYJ181V	1/10W 180
R906, 907	ERJ6GEYJ104V	1/10W 100K
R910	ERJ6GEYJ334V	1/10W 330K

Ref. No.	Part No.	Values & Remarks
RJ12	ERJ6GEYJ331V	1/10W 330
		CHIP JUMPERS
R40	ERJ6GEY0R00V	CHIP JUMPER
RJ11	ERJ6GEY0R00V	CHIP JUMPER
RJ303	ERJ6GEY0R00V	CHIP JUMPER
RJ501	ERJ3GEY0R00V	CHIP JUMPER
RJX4	ERJ3GEY0R00V	CHIP JUMPER
RJX5, 6	ERJ6GEY0R00V	CHIP JUMPER
RJX8, 9	ERJ6GEY0R00V	CHIP JUMPER
RJX10	ERJ3GEY0R00V	CHIP JUMPER
RJX11	ERJ6GEY0R00V	CHIP JUMPER
RJX15	ERJ3GEY0R00V	CHIP JUMPER
RJX17	ERJ6GEY0R00V	CHIP JUMPER
RJX18	ERJ3GEY0R00V	CHIP JUMPER
RJX19	ERJ6GEY0R00V	CHIP JUMPER
		CAPACITORS
C11, 12	RCE1AKA470IG	10V 47U
C13	RCE0JSA470IX	6.3V 47U
C14	RCE0JKA101IV	6.3V 100U
C15	ECUV1C104ZFN	16V 0.1U
C16	ECUVNC105ZFN	16V 1U
C17	ECUV1H470KCN	50V 47P
C18	ECUV1E103KBV	25V 0.01U
C19	RCE0JKA220IG	6.3V 22U
C20	ECEA1EKA4R7I	25V 4.7U
C21	ECUV1E223KBV	25V 0.022U
C22	ECUV1C104KBN	16V 0.1U
C24	ECUV1H391KBN	50V 390P
C25	ECEA1VKN2R2I	35V 2.2U
C26	ECEA1HKN010I	50V 1U
C28	ECA1AM331I	10V 330U
C29	RCE1AM102BV	10V 1000U
C101, 102	ECUV1C104KBN	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	RCE0JKA470IG	6.3V 47U
C301	ECUV1C104ZFN	16V 0.1U
C302	ECUVNC105ZFN	16V 1U
C307	ECUV1C104ZFV	16V 0.1U
C308	ECUV1C104ZFN	16V 0.1U
C401	RCE1AKA470IG	10V 47U

Ref. No.	Part No.	Values & Remarks
C402	RCE1ASA330IX	10V 33U
C403	ECUV1C104ZFV	16V 0.1U
C404	ECUVNC105ZFN	16V 1U
C405	ECUV1C333KBV	16V 0.033U
C501, 502	ECUV1H070DCV	50V 7P
C503	ECUV1H561KBN	50V 560P
C505	ECUV1E223KBV	25V 0.022U
C506	ECUV1C224KBN	16V 0.22U
C507	RCE1ASA330IX	10V 33U
C508	ECUV1C104ZFN	16V 0.1U
C510	ECUV1C104ZFV	16V 0.1U
C512, 513	ECUV1C104ZFV	16V 0.1U
C515	ECUV1H332KBN	50V 3300P
C516, 517	ECUV1C104ZFV	16V 0.1U
C525, 526	ECUV1C104ZFV	16V 0.1U
C527	ECUV1C224KBN	16V 0.22U
C529	ECUV1H102KBV	50V 1000P
C600	ECUV1C104ZFN	16V 0.1U
C601, 602	ECUV1H102KBV	50V 1000P
C603	ECUV1H272KBV	50V 2700P
C604	ECUV1H272KBN	50V 2700P
C605, 606	ECEA1CPK100I	16V 10U
C607, 608	ECUV1H681KBN	50V 680P
C609	ECUV1C104ZFN	16V 0.1U
C610	ECEA0JPK101I	6.3V 100U
C611	ECUV1C104ZFV	16V 0.1U
C612	ECUV1C104ZFN	16V 0.1U
C700	ECEA0JKA221I	6.3V 220U
C701, 702	ECUV1C224KBN	16V 0.22U
C703	ECUV1E123KBV	25V 0.012U
C704	ECUV1E123KBN	25V 0.012U
C705, 706	ECUV1H182KBV	50V 1800P
C709, 710	ECEA0GPK221I	4V 220U
C711	ECEA1CPK100I	16V 10U
C712	ECEA1CPD100I	16V 10U
C713	ECEA0JPK101I	6.3V 100U
C903	ECUV1C104ZFV	16V 0.1U

■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.
Ⓐ	RFKXPG671

■ REPLACEMENT PARTS LIST

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKK0065-K	BATTERY COVER	
2	RFKJLXP290EK	BOTTOM CABINET ASS'Y	(E)
2	RFKJLXP290EB	BOTTOM CABINET ASS'Y	(EB, GC, GN)
2	RFKJLXP290EG	BOTTOM CABINET ASS'Y	(EG)
2-1	RKA0063-K	FOOT	
3	RJF0023	LCD HOLDER	
4	RGV0145-H	ANTI-SHOCK KNOB	
5	RGV0145-K	MODE, H.FILTER/XBS, HOLD KNOB	
6	RJC93020	COMMON BATTERY TERMINAL	
7	RMA0677	REAR ORNAMENT	
8	RMS0105-1	SHAFT	
9	RYF0331J-K	CD COVER ASS'Y	
10	XTN17+6GFZ	SCREW	
11	RHE5079YA	SCREW	
12	RMS0462	PUSH SHAFT	
13	RFKKLXP290EK	INTERMEDIATE CABINET ASS'Y	
14	RGU1193-H	OPERATION BUTTON(A)	
15	RGU1194-K	OPERATION BUTTON(B)	
16	RAE0133Z	TRAVERSE DECK	
16-1	SHGD157	FLOATING RUBBER(1)	
16-2	SHGD165	FLOATING RUBBER(2)	
17	RMB0351	OPEN SPRING	
18	RML0361	OPEN LEVER	
		PACKING MATERIAL	
P1	RPK0577	PACKING CASE	
P2	RPF0111	PROTECTION BAG(UNIT)	
P3	RPF0046	PROTECTION BAG(F.B.)	
P4	SQZD3	AREA LABEL	(E)
P4	SQZD6	AREA LABEL	(EG)
P4	SQZD7	AREA LABEL	(EB)
P4	RQLA0066	AREA LABEL	(GC)
P4	RQLA0067	AREA LABEL	(GN)
		ACCESSORIES	

Ref. No.	Part No.	Part Name & Description	Remarks
A1	RFKSLXP290EK	INSTRUCTION MANUAL ASS'Y	(E)
A1	RFKSLXP290EG	INSTRUCTION MANUAL ASS'Y	(EG)
A1	RFKSLXP290GC	INSTRUCTION MANUAL ASS'Y	(GC)
A1	RQT2947-B	INSTRUCTION MANUAL	(EB, GN)
A2	RQA0013	WARRANTY CARD	(E, EB, EG)
A2	RQX7433ZA	WARRANTY CARD	(GN)
A3	RQCB0169	SERVICENTER LIST	
A4	RFEA401E-1S	AC ADAPTOR	(E, EG) ⚠
A4	RFEA402Z-W	AC ADAPTOR	(GC) ⚠
A4	RFEA404A-W	AC ADAPTOR	(GN) ⚠
A4	RFEA404B-W	AC ADAPTOR	(EB) ⚠
A5	RFEV310A-KS	STEREO EARPHONES	
A6	SJP9223-1	POWER PLUG ADAPTOR	(GC) ⚠
A7 ※	RKB205ZA-0	EAR PADS	
		<PRINTED CIRCUIT BOARDS	
		ASS'Y>	
PCB1	REP2124A-M	MAIN P.C.B.	(RTL)
		<GREASE OR JIG/TOOL>	
		TEST DISCS	
SA1	SZZP1054C	PLAYABILITY TEST DISC	
SA2	SZZP1056C	UNEVEN TEST DISC	
		ALLEN WRENCH	
SA3	SZZP1101C	ALLEN WRENCH(M2.0)	
		LOCK PAINT	
SA4	RZZ0L01	LOCK PAINT	
		GREASE	
SA5	RFKXPG671	MOLYCOAT GREASE PG671	

※ 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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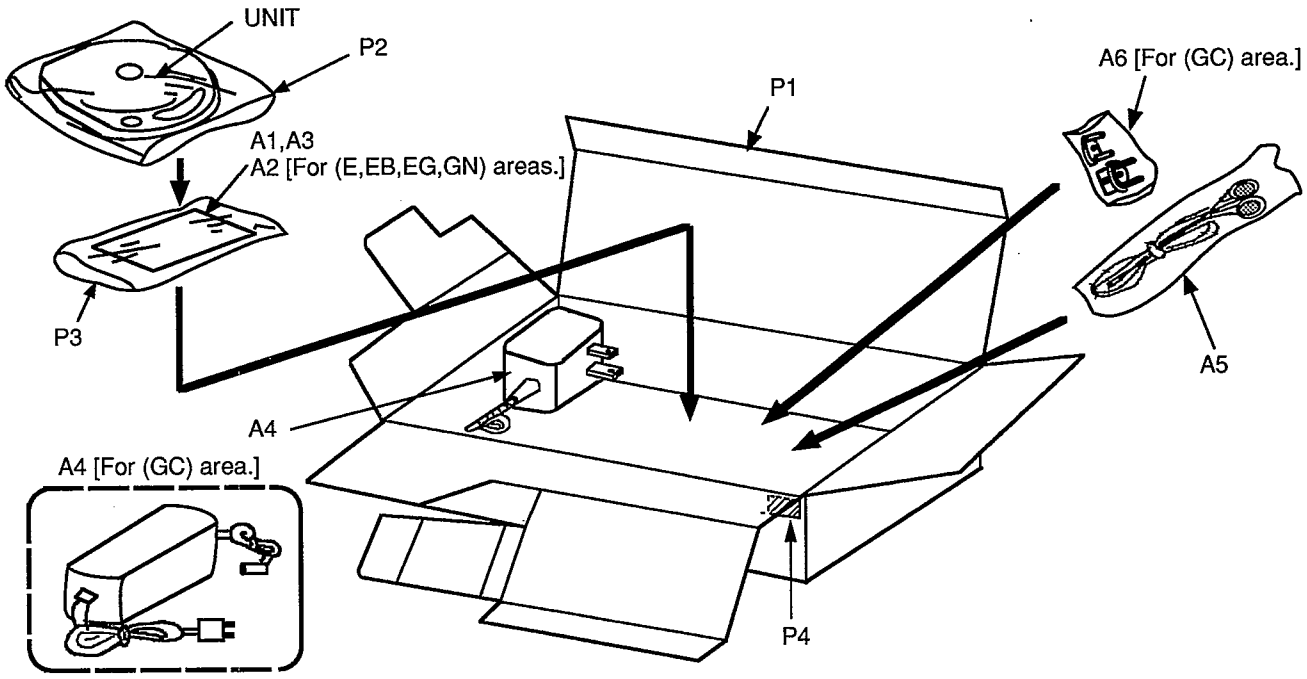
■ PACKAGING



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