ORDER NO. AD9702018C5
A6

Service Manual

Portable CD Player

COMPACT disc DIGITAL AUDIO

MASH※ multi-stage noise shaping

※ • MASH is a trademark of NTT.

SL-S220
SL-S225
SL-S221C

SL-S220

SL-S225

SL-S221C

Colour (H) ... Gray Type

Areas

P ..... U.S.A.
PC ..... Canada.
PX ..... PX.

Areas for Every Model

SL-S220 ..... (P, PC)
SL-S225 ..... (P)
SL-S221C ..... (P, PC, PX)

Traverse Deck: RAE0142Z Mechanism Series

Specifications

Audio

No. of channels:	2 channels (left and right, stereo)
Output voltage:	0.6 V(50 kohm) diameter 3.5 stereo mini jack
Frequency response:	20—20,000 Hz (+0.5 dB, -1.5 dB)
S/N:	More than 94 dB*
Wow and flutter:	Below measurable limit
DA converter:	1 bit, MASH※
Headphones output level:	Max. 9 mW+9 mW/16 ohm (variable) stereo mini jack diameter 3.5
Digital filter:	8 times over sampling

Signal Format

Correction system:	Technics New Super Decoding Algorithm

Pickup

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

Playing time

(When used in hold mode, at 25 degree (77 fahrenheit) temperature and on flat and stable surface.)

Batteries used: Anti-shock OFF/ON
Panasonic Alkaline dry cell batteries(LR6, 2pcs.) : Approx. 10h / 8.5h
Rechargeable batteries (When rechargeable 3 hours.) : Approx. 3.0h / 2.5h
The play time may be less depending on the operating conditions.

General

Operation temperature range:	0 — 40 degree (32-104 fahrenheit)
Rechargeable temperature range:	5 — 40 degree (41-104 fahrenheit)
Power supply:	DC 4.5 V
Power consumption(Anti-shock OFF/ON)	
AC adaptor;	4.3W/4.5W
Battery (DC 3V);	0.6W/0.7W
When recharging;	2.4W
Dimensions :	128(Wide)/28.0(High)/144(Depth)mm 5 1/16" (Wide)/ 1 3/32" (High)/ 5 11/16" (Depth) inch
Weight:	265 g(9.4oz) with batteries 220 g(7.8oz) without batteries

*These specifications were measured in the Anti-shock OFF mode.
Note: Specifications are subject to change without notice.
Weight and dimensions are approximate.

⚠ 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.

Panasonic®

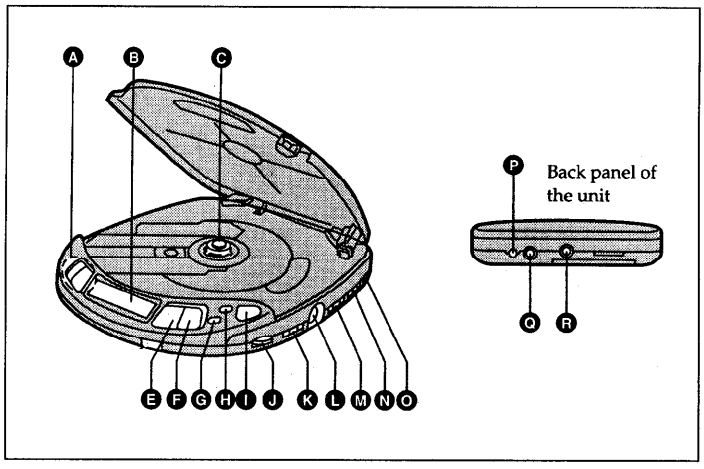
■ Contents

■ Precaution of Laser Diode

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

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

■ Location of Controls



- Ⓐ Skip/search buttons (⏮, ⏭ • SKIP ▬ SEARCH)
- Ⓑ Display
- Ⓒ Push button (PUSH)
- Ⓔ Play/pause button(▶, ⏸)
- Ⓕ Stop/power off button (■ ,POWER OFF)
- Ⓖ Memory/recall button (MEMORY/RECALL)
- Ⓗ Repeat button(REPEAT)
- Ⓘ Open button (OPEN)
- Ⓙ Headphones volume control (VOLUME)
- Ⓚ XBS selector (XBS)
- Ⓛ Headphones jack(🎧16Ω ϕ 3.5)
- Ⓜ Play mode selector (RESUME, NORMAL, RANDOM)
- Ⓝ Hold switch (HOLD)
- Ⓞ Anti-shock switch (ANTI-SHOCK)
- Ⓟ Out jack (OUT)
- Ⓠ DC in jack (DC IN 4.5V ⟐⊖⟐)
- Ⓡ Hole for car insulator mounting screw

■ Accessories

AC adaptor

For (P, PC) only : (RFEA403C-S) .....1pc.

For (PX) only : (RFEA403Z-S) .....1pc.

- **For (P, PX) only**

  Stereo headphones (RFEV705P-KS) .....1pc.

- **For (PC) only**

  Stereo earphones (RFEV317P-KS) .....1pc.

- **For SL-S221C(PX) only**

  Power plug adaptor (SJP5213-2) .....1pc.

For SL-S225(P) only

Rechargeable batteries (RP-BP60PYS) ..... 2pcs.

Battery carrying case (RFKNLS370-K) .....1pc.

- **For SL-S221C(P, PC, PX) only**

  Car adaptor (SH-CDC2PPY) .....1pc.

  Car stereo cassette adaptor (SH-CDM8B) .....1pc.

■ Power Supply Preparations

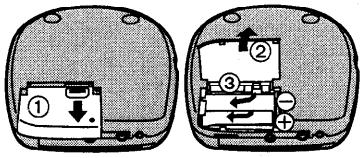
Refer to the specifications (cover page) for information on operating times when using rechargeable batteries or dry-cell batteries.

Using rechargeable batteries

Obtain the optional rechargeable batteries for SL-S220 and SL-S221C.
Make sure to recharge the batteries before using them. The unit cannot be used to charge rechargeable batteries other than those specifically designed for it.
- Supplied batteries for SL-S225 (RP-BP60)
- Optional batteries (SH-CDB8D)

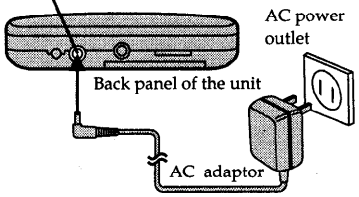
Recharging procedure

1 Insert the special rechargeable batteries into the unit.



2 Connect the AC adaptor.

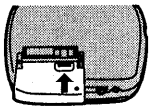
DC IN jack (DC IN 4.5 V ⊖⊂⊕)



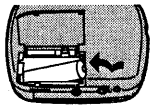
3 When recharging is complete, unplug the AC adaptor from the power outlet and the DC IN jack.

Notes
- It takes approximately three hours to fully recharge the rechargeable batteries.
- Rechargeable batteries have a service life of approximately 300 charge-discharge cycles. If the operating time on one full charge becomes noticeably shorter than it used to be, the battery has reached the end of its service life and should be replaced.
- You can operate the unit with the AC adaptor while recharging the batteries, but it will lengthen the recharging time.
- The AC adaptor and rechargeable batteries may become warm while recharging is in progress. This is not a malfunction.

If the battery lid comes loose
Slide the lid back into place horizontally.



Removing batteries
Push up on the battery in the direction indicated by the arrow. Then lift it out.



Using the AC adaptor

Connect the AC adaptor supplied.
Refer to "Using rechargeable batteries" for connection instructions.

Using the car adaptor

The SL-S221C come with a car adaptor.
Be sure to use the adaptor specially designed for this model. (Refer to the separate installation instructions.)
Be sure to obtain the car adaptor (SH-CDC9) for SL-S220 and SL-S225, available as an optional accessory. The car adaptor can be used to recharge the unit's batteries while in the car.

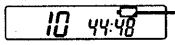
CAUTION:
Use only car adaptor, Model: SH-CDC9 manufactured by Matsushita Electric Industrial Co., Ltd.

Using dry-cell batteries (not included)

After disconnecting the AC adaptor, insert two "AA" (LR6) alkaline batteries.

The procedure for inserting and removing dry-cell batteries is identical to that for rechargeable batteries.

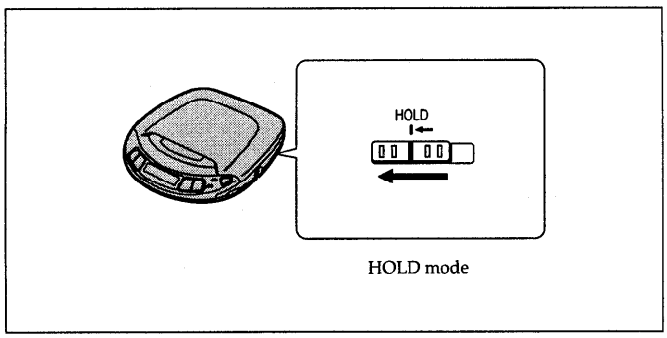
Battery indicator



This indicator flashes on and off when the batteries are almost out of power. Power is cut off completely a short while later.
Rechargeable batteries: Recharge batteries.
Dry-cell batteries: Replace batteries with new ones.

Notes
- The length of time the unit will continue to operate between when the battery indicator starts flashing and when the power is cut off differs depending on the type of batteries used.
- The battery indicator may not flash if rechargeable batteries, other than those designated by Panasonic, are used.

■ Accidental Operation Prevention Function



HOLD mode

This function causes the unit to ignore short, accidental button presses. (The disc lid can still be opened and closed.)

The misoperation prevention function prevents the following:
- Powering on the unit accidentally (which can cause the batteries to go dead).
- Play being cut off unexpectedly in the middle of a selection.

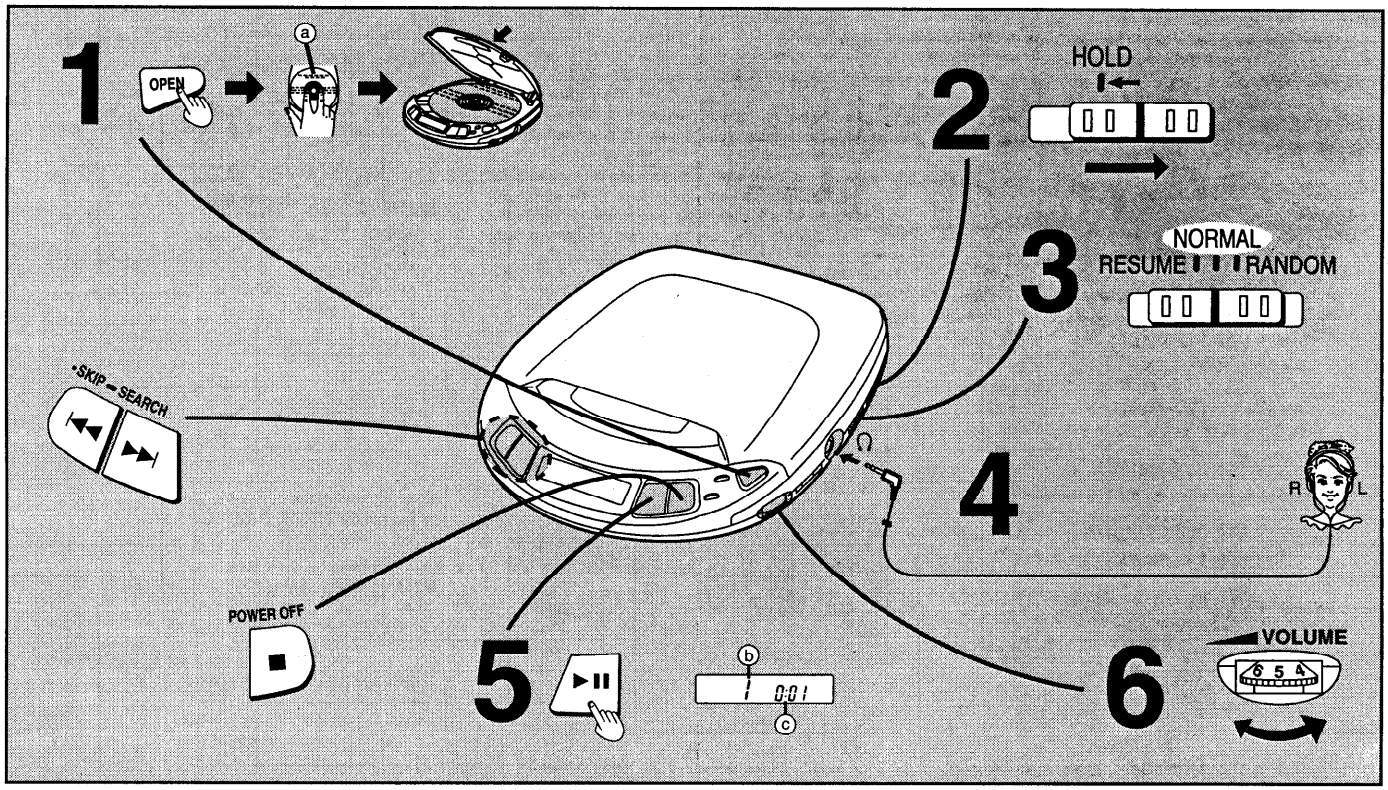
To use the accidental operation prevention function
Set HOLD to the HOLD position.

"hold" Indication
When the unit is in hold status, pressing any operation button (other than the OPEN button) causes the indication "hold" to appear on the display.

When the unit is powered off
The "hold" indication appears only when the ▶ II button is pressed.

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

■ Sequential Play



Following steps 1–6.

ⓐ Label must face upward. ⓑ Track number in play ⓒ Elasped playing time of each track

In step 4, connect the stereo headphones/earphones to the ∩ jack. **(Plug in firmly.)**

- Play stops automatically when all the tracks have been played.
- If the unit has been connected to the car audio system, adjust the volume level between 4 and 6 on the unit, then adjust the volume level on the system.

Operation	Button	Display/reference
To pause play	Press during play ▶II	7 0:18 Press again to resume play
To stop play **Stop mode**	Press during play POWER OFF ■	Total number of tracks 10 44:48 Total playing time
To turn off the unit **Off mode**	Press during stop mode POWER OFF ■	
Skip forward/ backward (skip function)	Press during play •SKIP – SEARCH ▶▶| |◀◀	• During program play, these buttons are used to skip forward or back through the programmed sequence of tracks. • During random play, the skip buttons cannot be used to skip back to tracks that were played previously in the random sequence. • During program play, random play or 1 track repeat play, search operation is limited to the current track only.
Rapid forward/ backward (search function)	(Backward) (Forward) Keep depressed during play	

Backlight

The backlight comes on to illuminate the display panel when the unit is used with a AC adaptor or car adaptor.

For your reference:

"no dISC" indication

This indication appears for about 30 seconds if the ▶ II button is pressed when no disc is loaded in the unit or if the disc is not completely seated.

"OPEn" indication

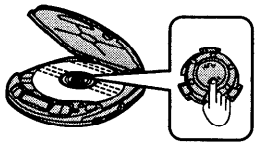
This indication appears for about 10 minutes when the cover is opened. (However, the indication does not appear when the unit is powered off.)

Note

Never insert foreign objects into the unit body.

Removing discs

After the disc has stopped rotating, press the PUSH button to release the disc. (To protect the disc, never open the cover while it is playing.)



Auto power off function

If the unit is left in stop or paused status for approximately 10 minutes, the unit powers itself off automatically in order to prevent the battery from running down.

■ Other Play Methods

The letters such as Ⓐ in the various illustrations refer to the descriptions in the "Location of Controls" (see page 2) section.

Skip play

The disc plays from the specific track through to the end, then play stops automatically.

Preparation: Put unit in stop mode.

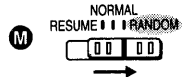
1

2 Select the desired track.

3

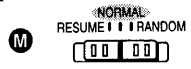
Random play

1



2

Release

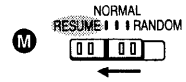


For your reference:

- It is also possible to press the ▶▶| button while the unit is in stop status to change the first track to be played. (All tracks are played eventually, regardless of which is played first.)
- Program play is not possible in the random mode.

Resume play

This function allows you to listen from the beginning of the track where play stopped because the unit was powered off (or switched to stop status). It is useful when listening to CDs in the car, etc.



Release

For your reference:

- If the RESUME, NORMAL, RANDOM (play mode selector) slider is put in the RESUME position, the all-repeat function will be activated automatically as soon as the unit is powered on.
- If power is cut off near the end of a track (power off status), playback may resume from the beginning of the next track in some cases.
- If the unit is powered off while a disc was playing and then a new disc is inserted, play will begin from the middle of the new disc because the unit remembers the position where play stopped on the old disc.

Program play

Up to 24 tracks can be entered in the programmed sequence.

Preparation: Put unit in stop mode.

1

2 Select the desired track.

3 Register in sequence.

(The indication "M" and the programmed sequence appear on the display panel.)

4 Repeat steps 2 and 3 to program all the desired tracks.

5

■ To program the same track in the sequence more than once

After step 3, press MEMORY/RECALL the desired number of times.

■ If "ƒ" is displayed

No more tracks may be added to the sequence.

■ To confirm the contents of the programmed sequence

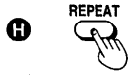
Press MEMORY/RECALL while the disc is playing. (The number of the programmed tracks appear on the display panel in sequence.)

■ To delete the entire programmed sequence

Press ■, POWER OFF.

Repeat function

Press REPEAT while disc is playing or when unit is in stop status.



For your reference:

If REPEAT is pressed during program play, only the tracks in the programmed sequence are repeated.
(The indication "ALL" is not displayed.)

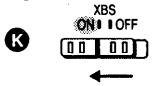
The setting is switched in the sequence indicated below each time REPEAT is pressed.

1-track repeat (1 ↻)
One track is repeated.
↓
All-track repeat (ALL ↻)
All the tracks on the disc are repeated.
↓
Cancel

Changing the sound quality

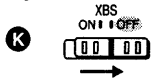
XBS ON:

Select this setting to boost the low-range response.



OFF:

Select this setting to turn off the XBS function.



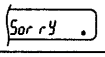
Note

This function is available except when using the OUT jack.

■ Anti-shock Function

This function minimizes sound interruption when vibrations are encountered by utilizing audio data that has been stored ahead of time (up to approximately 3 seconds' worth).

1

M.RESERVE indicator status	Unit body status	Play status (audio data status)
	Stable	Normal (plenty of data is stored)
	Bump encountered	Normal (stored data is used)
	Bumping stops	Normal (data again starts to be stored)
	Bumps continue repeatedly	Sound is interrupted (data buffer empty)

Notes

- The position of the ANTI-SHOCK slider can be changed during play, but this may cause a slight interruption in the sound because the disc's rotational speed changes.
- During ANTI-SHOCK operation, the disc rotates at a higher rate than usual in order to collect extra audio data. This may cause the batteries to run out faster and could result in a slight increase in disc rotation noise.

Using the unit with an audio system

The ANTI-SHOCK uses digital signal compression technology. It is recommended that the ANTISHOCK be kept in the OFF position if the unit is connected to a home audio system.

■ Cautions

Listening caution

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

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

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

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

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

Sound can be deceiving. Over time your hearing "comfort level" adapts to higher volumes of sound. So what sounds "normal" can actually be loud and harmful to your hearing.
Guard against this by setting your equipment at a safe level BEFORE your hearing adapts.
To establish a safe level:

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

Once you have established a comfortable sound level:

- Set the dial and leave it there.

Rechargeable batteries

- Only the RP-BP60/SH-CDB8D batteries can be recharged.
- If the power delivered by the batteries lasts for a very short time after recharging, it means that the batteries' service life is over. Do not use them any more.
- 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.
- Do not peel off the plastic covering on the rechargeable batteries. Short-circuiting may occur which is dangerous.

Dry cell batteries/rechargeable batteries

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

- 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.

Carrying dry cell batteries/ rechargeable batteries around

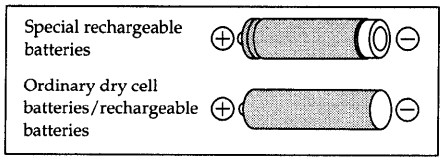
When putting dry cell or rechargeable batteries in a pocket or bag, ensure that no other metal objects such as a necklace are placed together with them. Contact with metal may cause short-circuiting which, in turn, may cause a fire.
Be absolutely sure to carry the rechargeable batteries in the battery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

When purchasing rechargeable batteries

As a safety precaution, the portable CD players made by Panasonic 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.



When driving a car

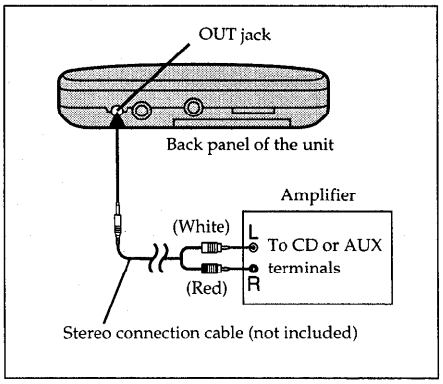
In the interest of traffic safety, do not operate the unit while driving.

■ Using the Unit with Optional Accessories

Using the unit with an audio system

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

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



Using the unit with a car audio system stereo

The SL-S221C come with the car adaptor and car stereo cassette adaptor.

Items to be purchased

For connection to the car audio system:
Car stereo cassette adaptor (SH-CDM9A)
Connect the car stereo cassette adaptor to the unit's headphone jack.
(When doing this, keep the unit's VOLUME control at a setting between 4 and 6.)

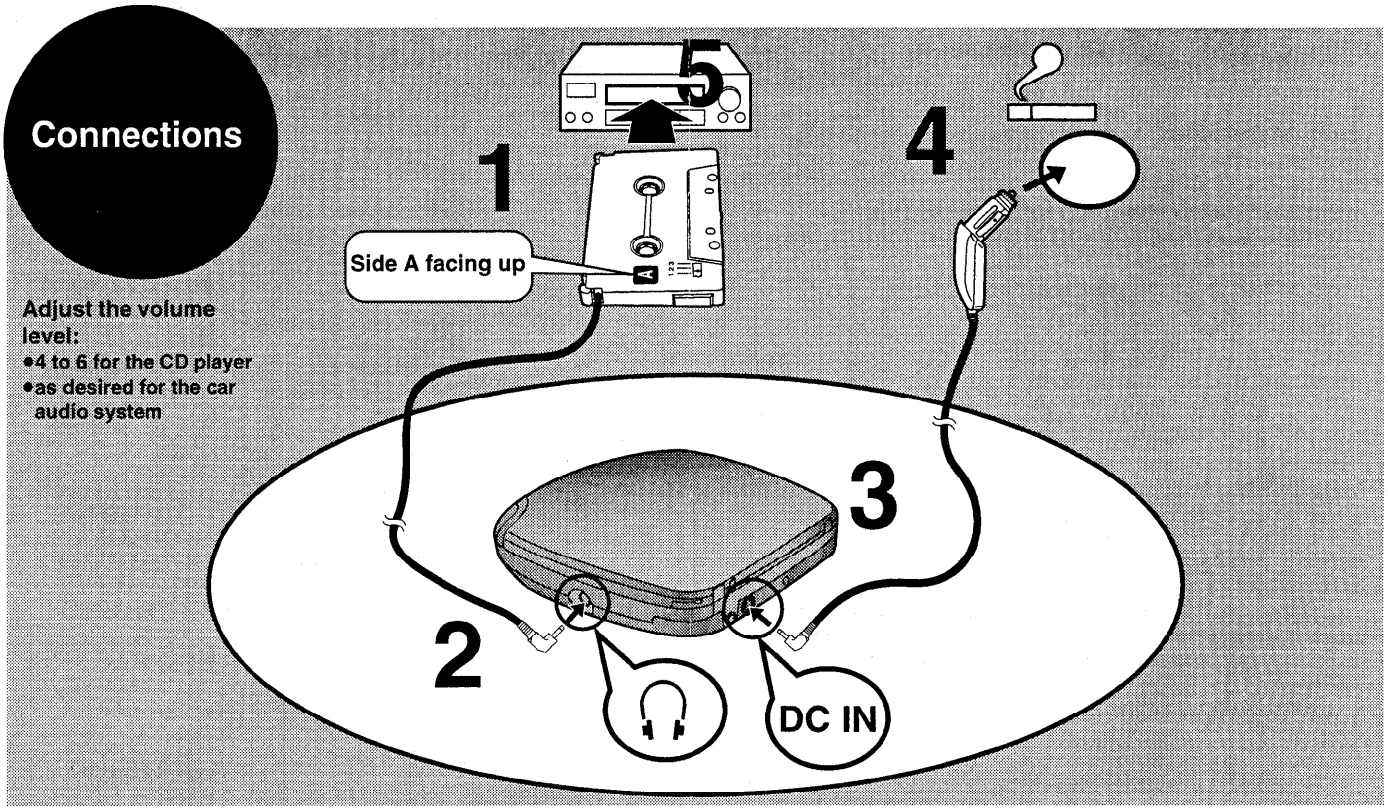
For securing the unit and connecting the power supply:
- Car adaptor (SH-CDC9)
- Car mounting kit (SH-CDF7)
  Car mounting arm, Car insulator

Note

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

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

■ Car Kit Installation (SL-S221C only)



● Car Audio System

■ When the car audio system has a blank skip function

The blank skip function may operate when the CD player stops. Therefore, be sure to set the blank skip function to off.

Note:
Depending on the type of vehicle, static may be heard if the unit is connected via line cord to the car audio system's CD IN jack or AUX IN jack. If this occurs, it is recommended that you use the provided cassette adaptor.

When you leave the car
Push the eject button to remove the cassette adaptor.

• Car Adaptor

The provided car adaptor must be connected.

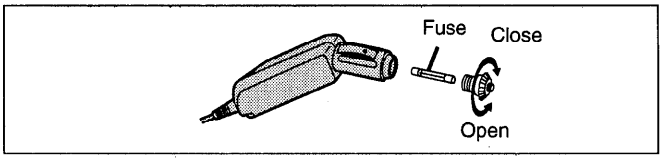
- This car adaptor can be used in an automobile which has a 12 V or 24 V battery. You can use it in a truck or other large vehicle. (This is a special-purpose negative ground car adaptor.)
- Do not connect the adaptor immediately after using the cigarette lighter.
- Leave a little slack in the car adaptor's cord, making sure that it does not run underneath the unit.

■ To replace the fuse

1 Remove the plug cap by rotating it in the direction shown by the arrow, and take out the old fuse.

2 Insert the new fuse (125 V, 500 mA type) into the fuse receptacle and reinstall the plug cap.

Note: For continued protection against risk of fire, replace only with same type 125V, 500mA fuse.



If the fuse blows frequently, there may be something wrong with the adaptor. Consult your dealer.

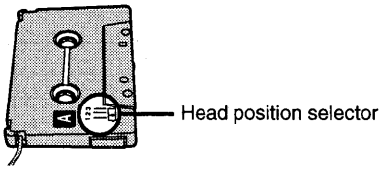
• When the soundvolume is extermely low

① Set the play direction for the car audio system to the forward (FWD) direction.

If the sound volume is still low:

② Adjust the cassette adaptor's head position selector.

Set the cassette adaptor's head position selector to 1, 2 or 3, whichever yields the highest volume level.



• Cautions

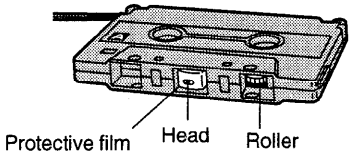
Please understand that we cannot take responsibility for the unit falling or any other damage that may occur as a result of faulty installation.

■ Car adaptor

- The provided car adaptor is made specifically for use with DC 4.5 V Panasonic portable CD players. Do not use it with other devices.
- Do not use the adaptor for a long period with the batteries left in the unit because this may shorten the life of the batteries.
- Pay attention to the car battery capacity when using this adaptor for a long period.
- Do not expose this adaptor to strong sunlight or very high temperatures.
- Be sure to remove this adaptor from the cigarette lighter socket when not using this adaptor or before leaving the automobile.
- The power source polarities of this unit are ⊖-⊂-⊕, check the DC IN jack.

■ Cassette adaptor

- Bunch the excess cord together or place it so that it will not interfere with operation.
- Do not touch the head or roller.
- A protective film has been placed over the heads to prevent them from being damaged. Do not remove this film.



- After use, remove the cassette adaptor and keep it so that no dust will adhere to the head section.
- After installing the cassette adaptor in the car audio system, do not allow its cord to make contact with the control section.
- The sound quality deteriorates when the head section of the car audio system becomes dirty. It is, therefore, a good idea to clean it periodically.
- If the rollers or car audio capstan are dirty, it may not longer be possible to install the cassette adaptor in the car audio system. Clean the rollers and capstan using a cotton swab.
- Do not leave this adaptor in a vehicle which is exposed to direct sunlight.
- Do not bring any magnetized objects near this adaptor's head position.
- Because of the nature of its construction, the sound of something rotating can be heard in this adaptor. This is normal and not indicative of a malfunction.
- During the winter months when the temperature inside the vehicle falls to an extremerly low level, there may be times when the unit cannot be used because the cord is too stiff to allow the adaptor to be installed in its proper position.

• Troubleshooting Guide

Before requesting service for this unit, check the chart below for a possible cause of the problem you are experiencing. Some simple checks or a minor adjustment on your part may eliminate the problem and restore proper operation.

If you are in doubt about some of the check points, or if the remedies indicated in the chart do not solve the problem, refer to the directory of Authorized Service Centers (enclosed with this unit) to locate a convenient service center, or consult your dealer for instructions.

(In U.S.A. consult PASC Authorized Servicenters for detailed instructions or call 1-800-545-2672 for the address of an authorized factory servicenter.)

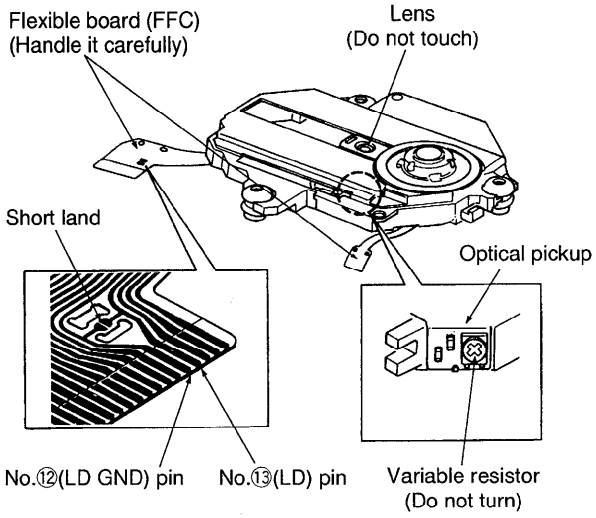
Problem	Checkpoint	Remedy
The sound volume is extremely low.	Did you adjust the volume level of the unit?	Adjust the volume level of the unit to 4–6.
	Did you adjust the volume level of the car audio system?	Adjust the volume level of the car audio system to the desired level.
	Did you adjust the cassette adaptor's head position selector?	Set the sound to the highest volume level.
	Have you removed the cord cover of the cassette adaptor?	Install the cord cover properly.
	Does the car audio system have an auto-reverse function?	Set the play direction for the car audio system to the forward (FWD) direction. [The forward (FWD) direction is the side which produces sound or which has the greatest sound volume.]
The cassette adaptor cannot be inserted into the car audio system.	Did you check the position of the head?	Check the position of the head in relation to the car audio system to ensure the cassette adaptor is installed correctly.
	Have you inserted the side with the cord in first?	Remove the cord cover, and change the position from which the cord extends.
The unit cannot be turned on.	Is the fuse for the car adaptor blon?	Insert a new fuse (0.5 A).

■ 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)

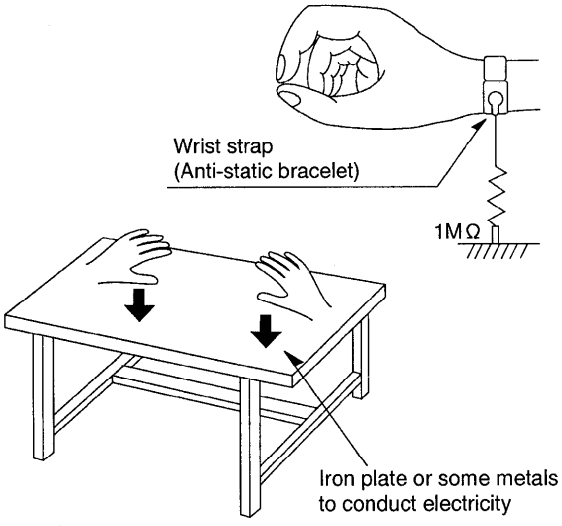
1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. The short land between the No.⑫ (LD GND) and No. ⑬ (LD) pins on the flexible board (FFC) is shorted with a solder build-up to prevent damage to the laser diode. To connect to the PC board, be sure to open by removing the solder build-up, and finish the work quickly.
3. Take care not to apply excessive stress to the flexible board (FFC).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.



• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the 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).



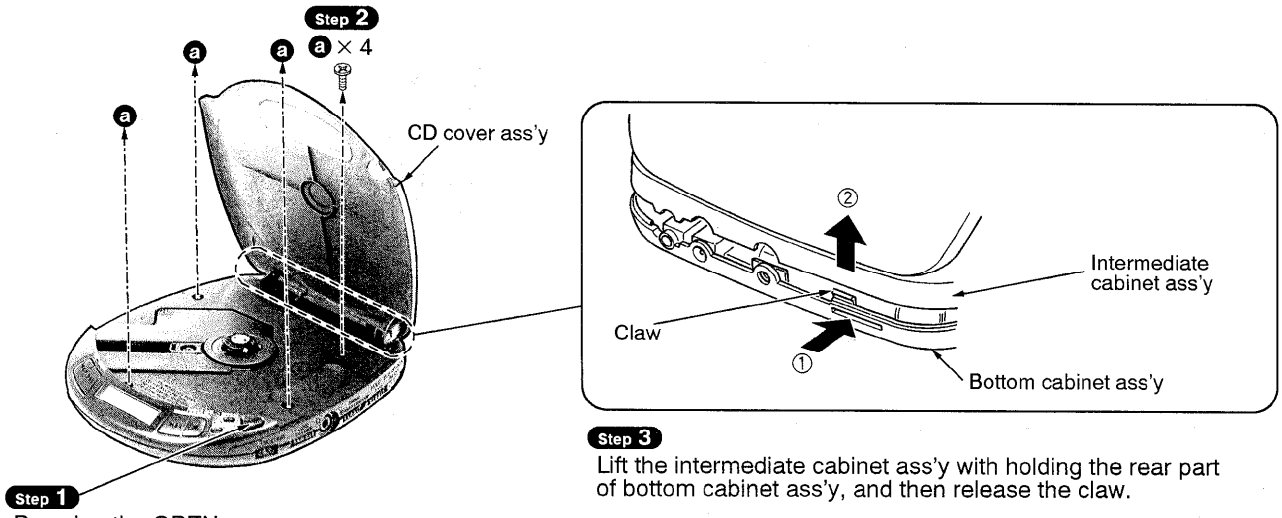
■ Operation Checks and Main Component Replacement Procedures

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. **[ ] indicates parts No.**
4. **The pictures show model SL-S220.**

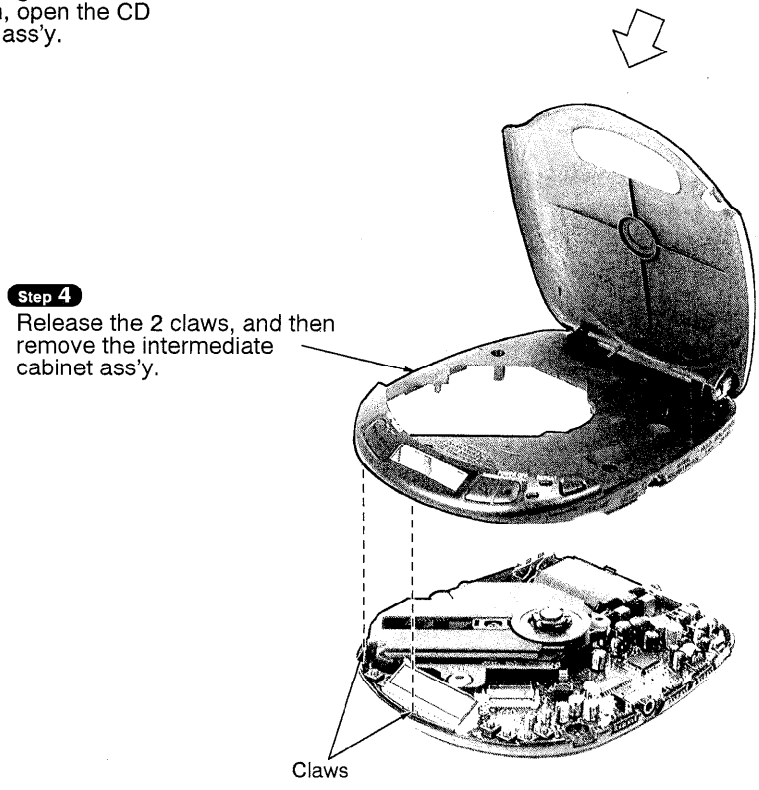
1. Checking for the P.C.B.

〈Checking for the P.C.B. (Component side)〉



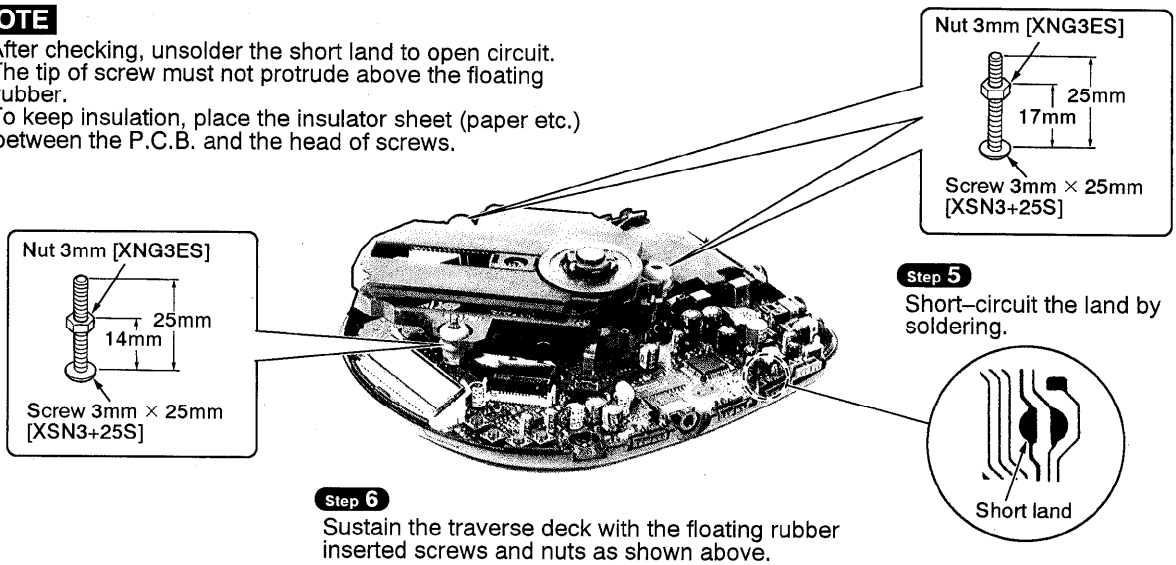
Step 1
Pressing the OPEN button, open the CD cover ass'y.

Step 3
Lift the intermediate cabinet ass'y with holding the rear part of bottom cabinet ass'y, and then release the claw.



NOTE

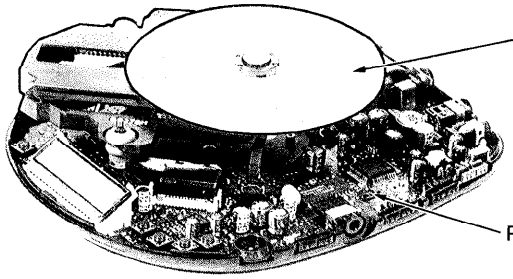
- After checking, unsolder the short land to open circuit.
- The tip of screw must not protrude above the floating rubber.
- To keep insulation, place the insulator sheet (paper etc.) between the P.C.B. and the head of screws.



Step 5
Short–circuit the land by soldering.

Step 6
Sustain the traverse deck with the floating rubber inserted screws and nuts as shown above.

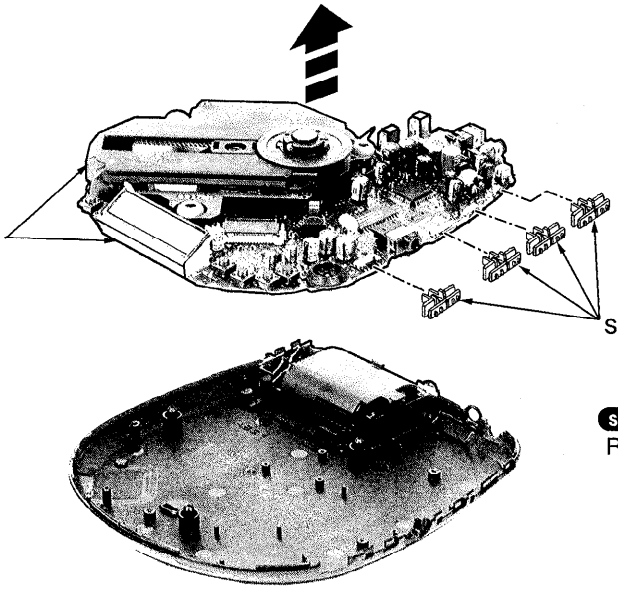
• Check the P.C.B. (Component side) as shown below.



Step 7
Put the disc (8cm).

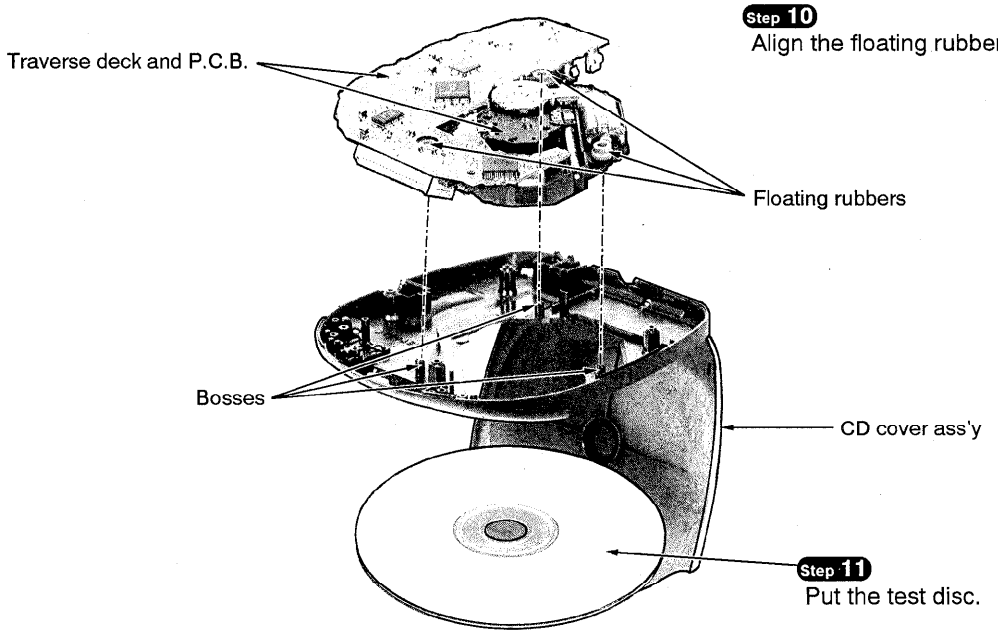
NOTE
After checking, unsolder the short land to open circuit.

〈Checking for the P.C.B. (Solder side)〉



Step 9
Remove the traverse deck and P.C.B..

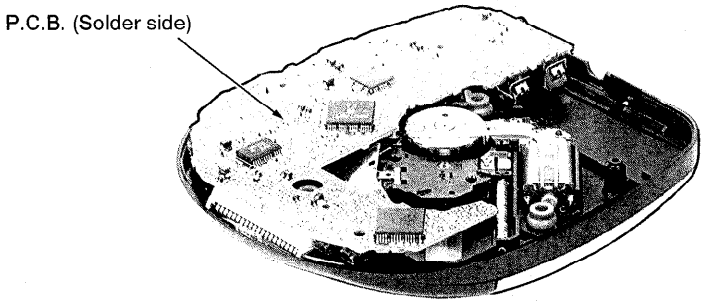
Step 8
Remove the 4 switch knobs.



Step 10
Align the floating rubber with the boss.

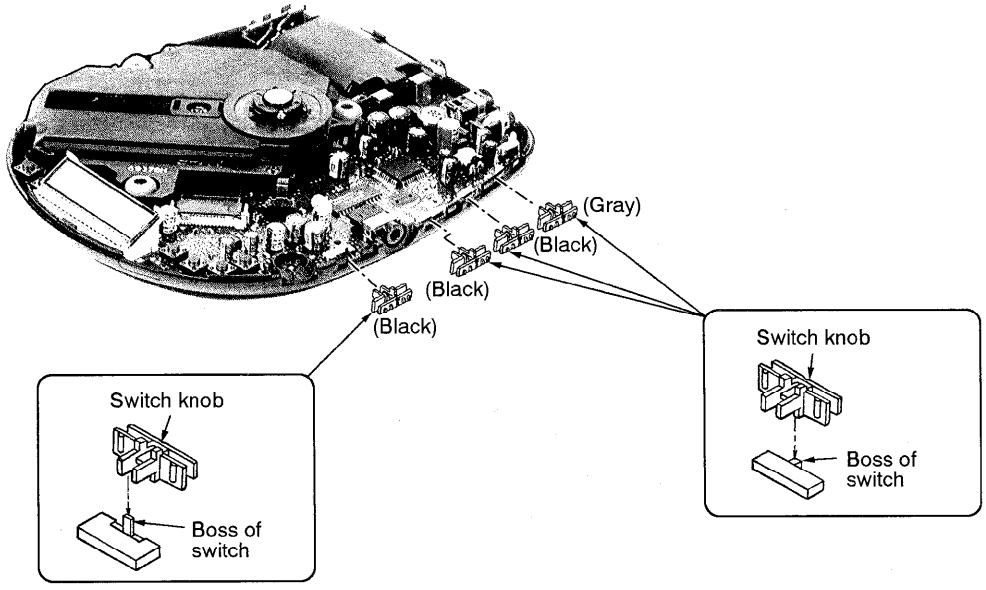
Step 11
Put the test disc.

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



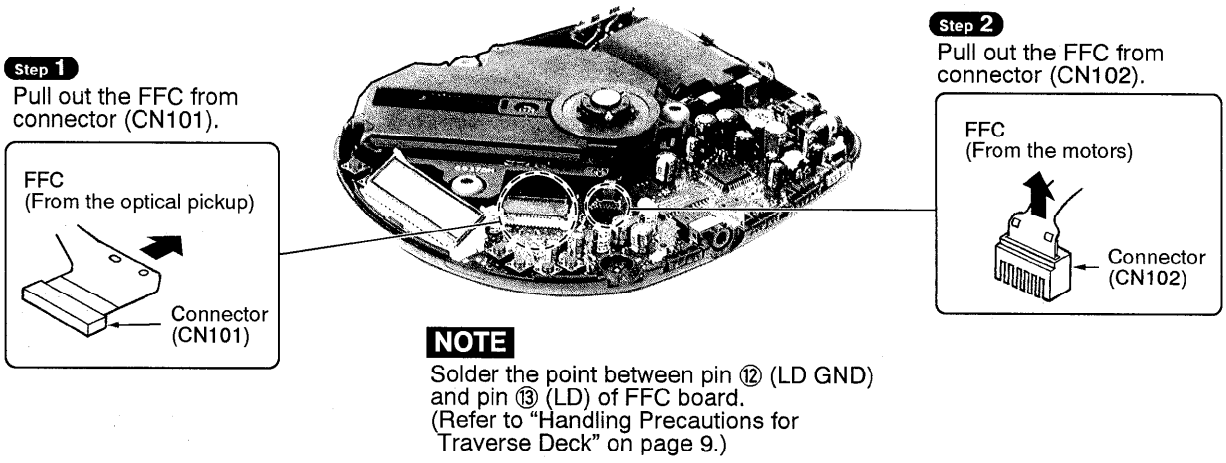
NOTE
After checking, unsolder the short land to open circuit.

Notice for installation of switch knobs



2. Replacement for the traverse deck

• Follow the Step 1 ~ Step 4 in item 1 on page 8.

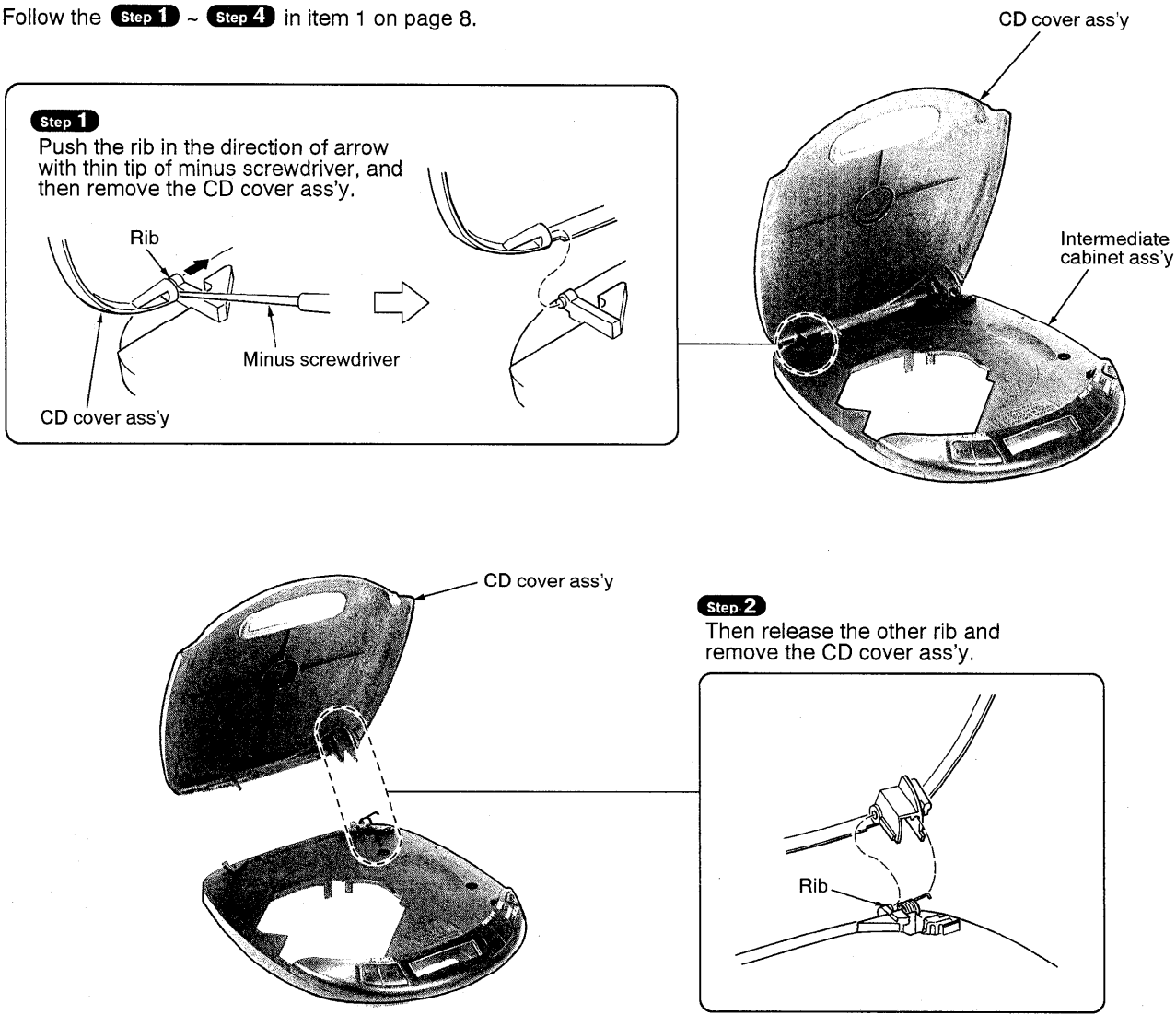


NOTE

Solder the point between pin ⑫ (LD GND) and pin ⑬ (LD) of FFC board.
(Refer to "Handling Precautions for Traverse Deck" on page 9.)

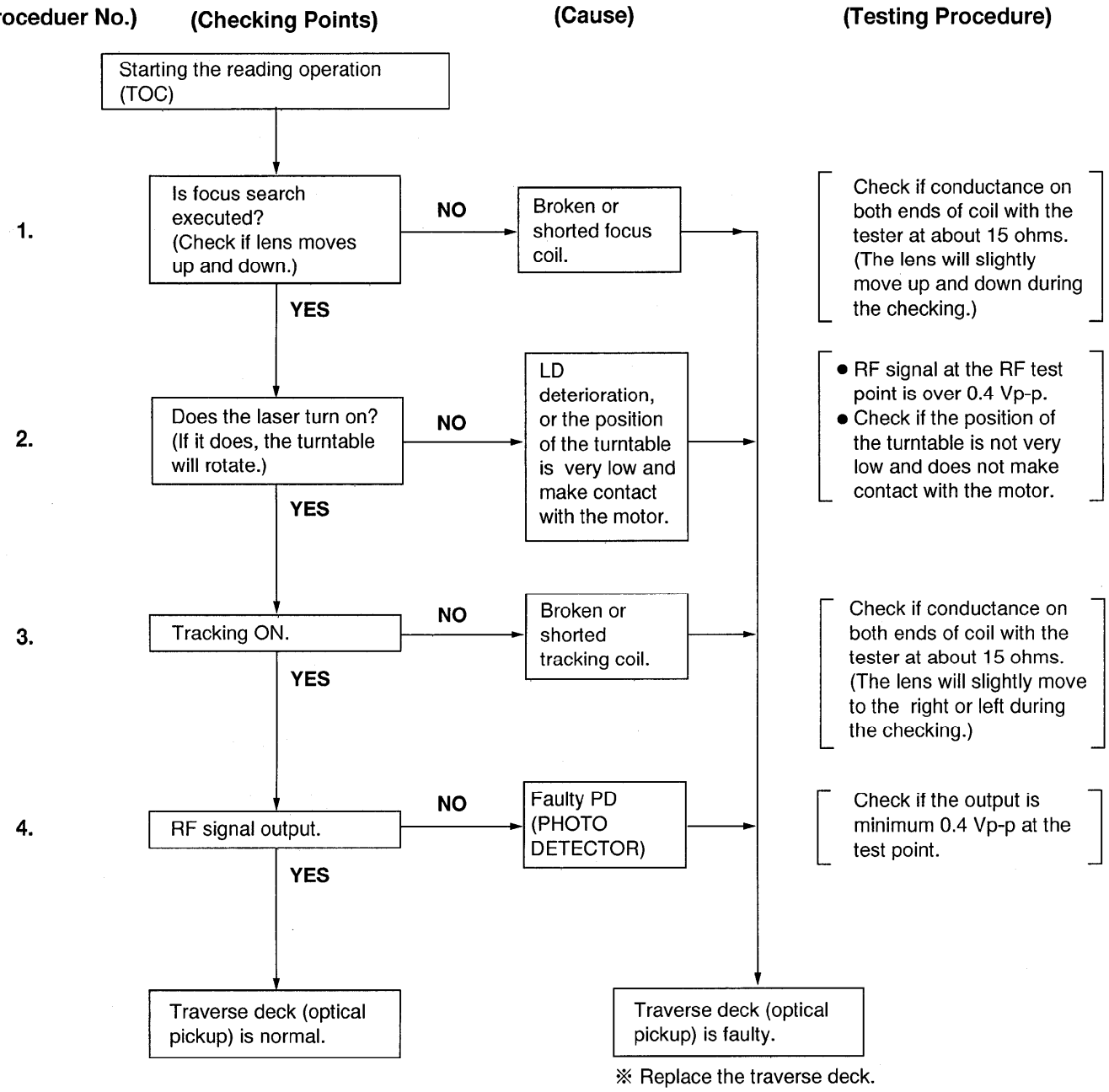
3. Replacement for the CD cover ass'y

• Follow the Step 1 ~ Step 4 in item 1 on page 8.



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

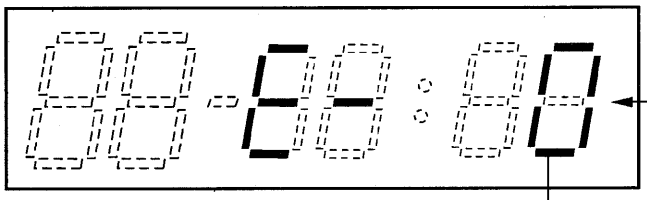
■ Automatic Adjustment Results Display Function (Self-check Function)

On this unit (SL-S220/S225/S221C), 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).

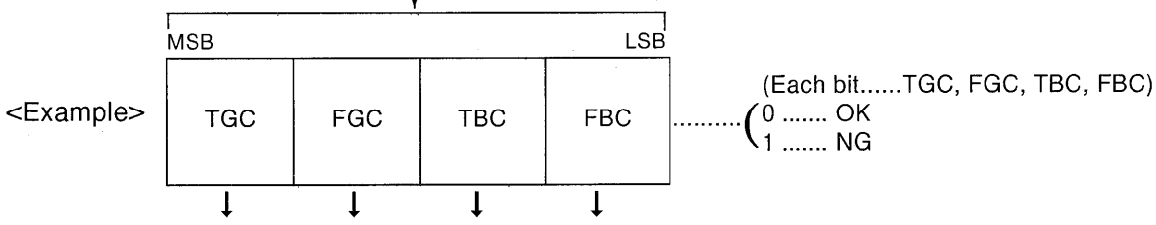
● How to display automatic adjustment results

1. Load the test disc (SZZP1054C).
2. Press the ⏮ (SKIP/SEARCH) and ⏭ (SKIP/SEARCH) Buttons simultaneously and hold them, and additionally press the ▶/⏸ (PLAY/PAUSE) Button.
3. Press the ■ (STOP/POWER OFF) Button once.
4. An automatic adjustment result is displayed on the LCD.

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



4 bits (TGC, FGC, TBC, FBC) are displayed in hexadecimal system from 0~F.



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 FG.)

4) 1 1 1 1 ⇨ **"E—F"** is displayed.
(All adjustments are NG.)

5) 1 0 0 0 ⇨ **"E—8"** is displayed.
(NG) (OK) (OK) (OK)
(Tracking gain adjustment is NG.)

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

〈Example〉 **Follow the below steps when "E−1" is displayed.**

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

(1) the waveform or voltage of the focus servo circuit is correct.
(2) the optical pickup returns to the normal state by exchanging the traverse deck.

Follow the below steps when "E − 4" is displayed.

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

(1) the waveform or voltage of the focus servo circuit is correct,
(2) the focus coil of the optical pickup is correct (around 15 ohms).
(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.
(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.

■ Mesurements and Adjustments

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

• Measuring instruments and special tools

- **Test discs**
1. Playability test disc (SZZP1054C)
2. Uneven test disc (SZZP1056C)

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

• Test short land

Short-circuit the lands of the laser ON/OFF switch (S201) by soldering them. It turns "ON" position. (Refer to below **Fig. 1** or printed circuit board and wiring connection diagram for short land location on page 22.)
Note: Remove the solders from the lands after adjustment.

- Adjustment point

Notes: 1. Please refer to the printed circuit board and wiring connection diagram for test point locations on page 22.
2. Take care to connect CN101 and CN102,as shown in **Fig.1**.

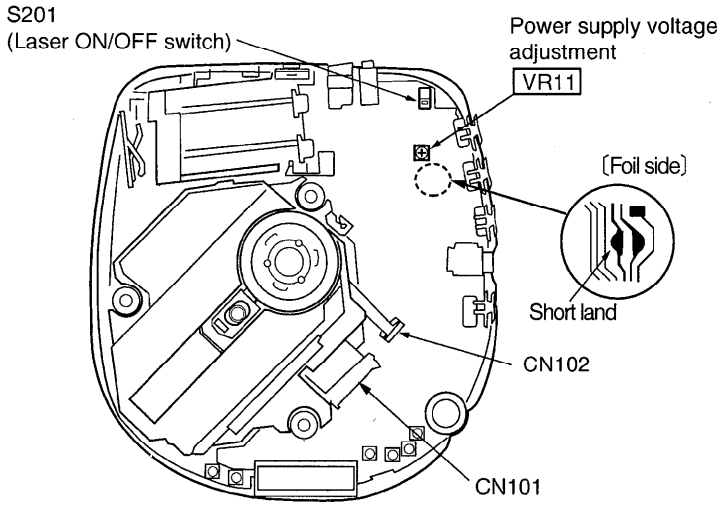


Fig. 1

(1) 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 **3.10 ~ 3.14 V**, as shown in **Fig. 1.**

(2) CHECK OF PLAY OPERATION

*** Checking Skip Search**

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

*** Checking Manual Search**

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

*** Checking Playability**

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

• Automatic adjustment

On our conventional type portable CD player, there were mounted 6 semi-fixed controls for each adjustment. Since the SL-S220/S225/S221C servo circuit is equipped with an automatic adjusting circuit, these controls are removed from SL-S220/S225/221C.

On conventional portable CD player Use for Old Servo IC (AN8373SE2, AN8374SE2)		**On SL-S220/S225/221C** Use for New Servo IC (AN8837SBE1, MN662746RPK1)
1. Tracking Offset Adjustment VR (TOC)	➡	Non Adjustment
2. Focus Offset Adjustment VR (FOC)		
3. Tracking Gain Adjustment VR (TGC)	➡	Automatic Adjusting Circuit
4. Focus Gain Adjustment VR (FGC)		
5. Tracking Balance Adjustment VR (TBC)		
6. Focus Balance Adjustment VR (FBC)		
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-S220/S225/S221C automatically controls the servo circuit to obtain optimum performance according to any disc's characteristics. Therefore, no malfunction occurs because of mis-adjustment.

■ Outline of 3 - Second Sound Keeper Technique Used for Prevention of Sound from Skipping

1. Conventional Shockproofing Technique

Input information read out of the CD at double speed is demodulated, stored in the memory, and while sound-marking signal is supplied at normal speed from the memory to the D/A converter, the residual data is accumulated in the memory.

If reaccess to the break point is accomplished before the memory becomes empty, apparent playback sound is entirely kept free from breaking even when information pauses due to vibration, etc. It was necessary to use the 4M bit memory for securing the accumulation time of about 3 seconds.

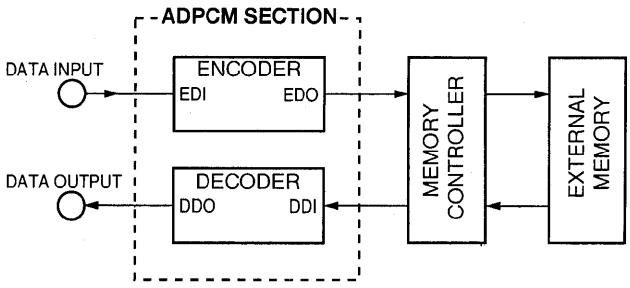
2. Compression-shockproofing

[Outline]

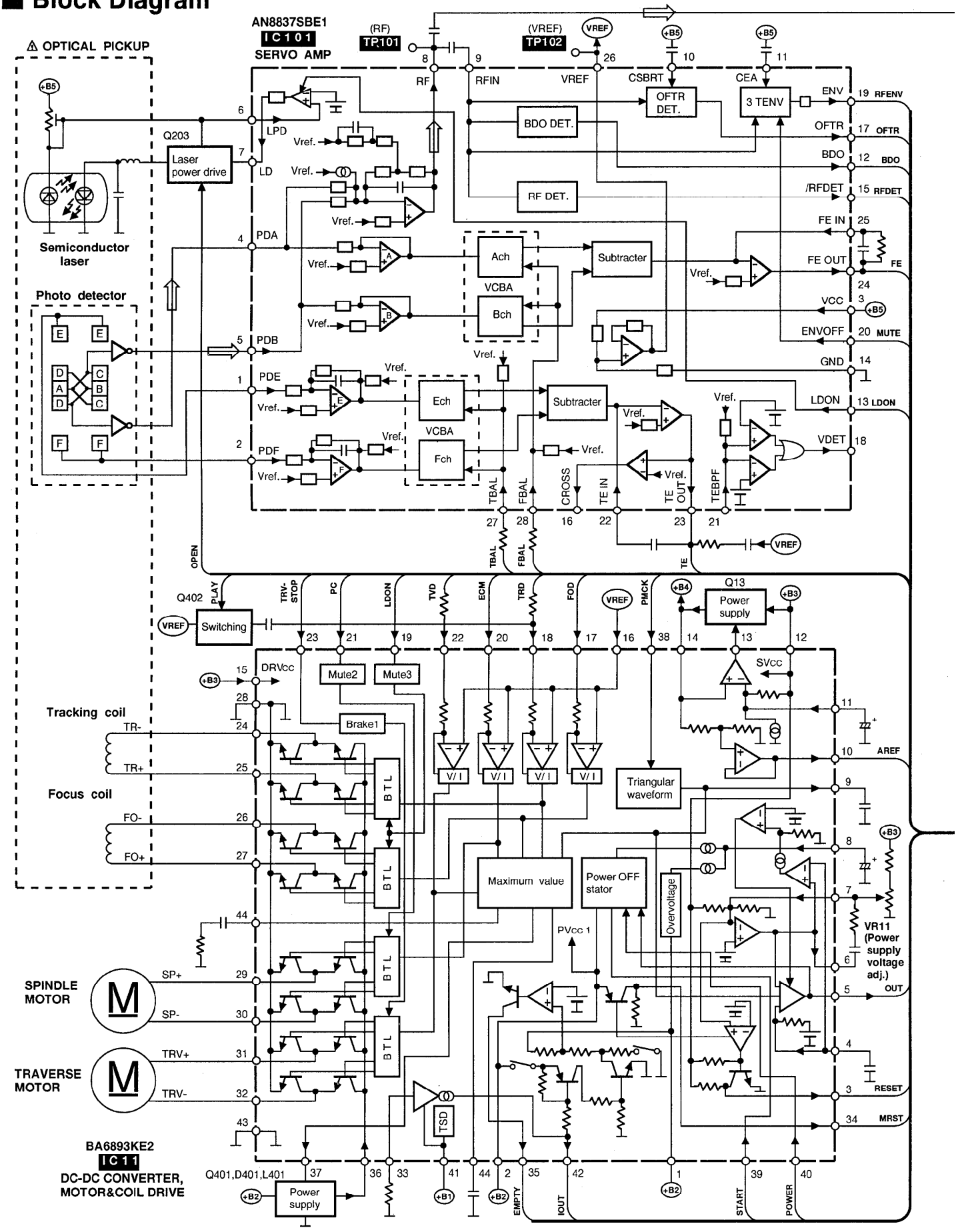
Fig. 1 is a block diagram showing the compression-shockproofing mechanism, the difference of which from the conventional mechanism is as follows: Input information read out at double speed undergoes data compression (16 bits → 4 bits) by the encoder in the ADPCM (Adaptive Difference PCM) and stored in the external memory; the stored memory information undergoes data elongation (4 bits → 16 bits) by the decoder in the ADPCM and supplied at normal speed to the D/A converter.

The data compression technique has conduced to reduction of required memory capacity from 4M bits to 1M bit for securing the accumulation time equivalent to the conventional.

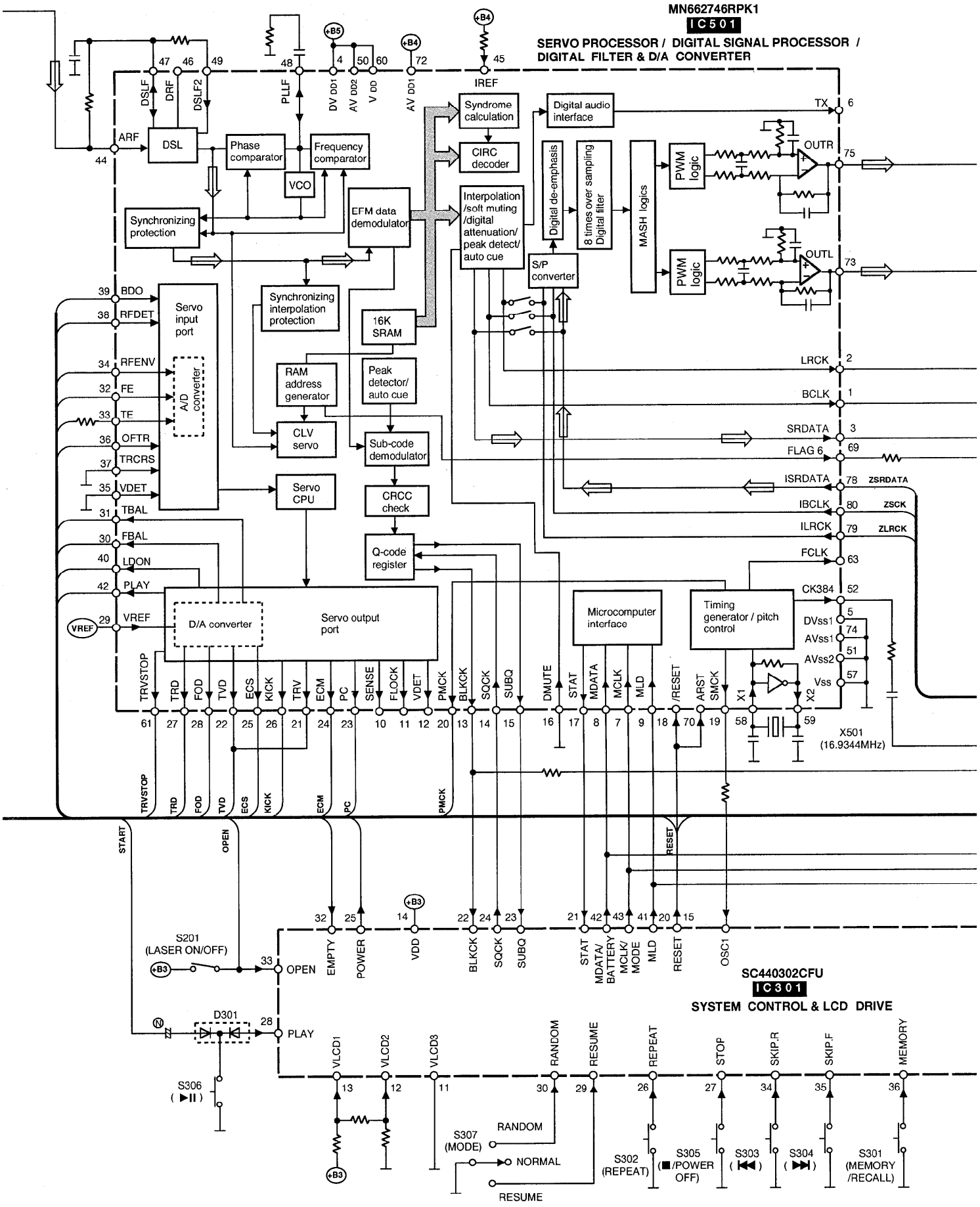
All-inclusive Block Diagram



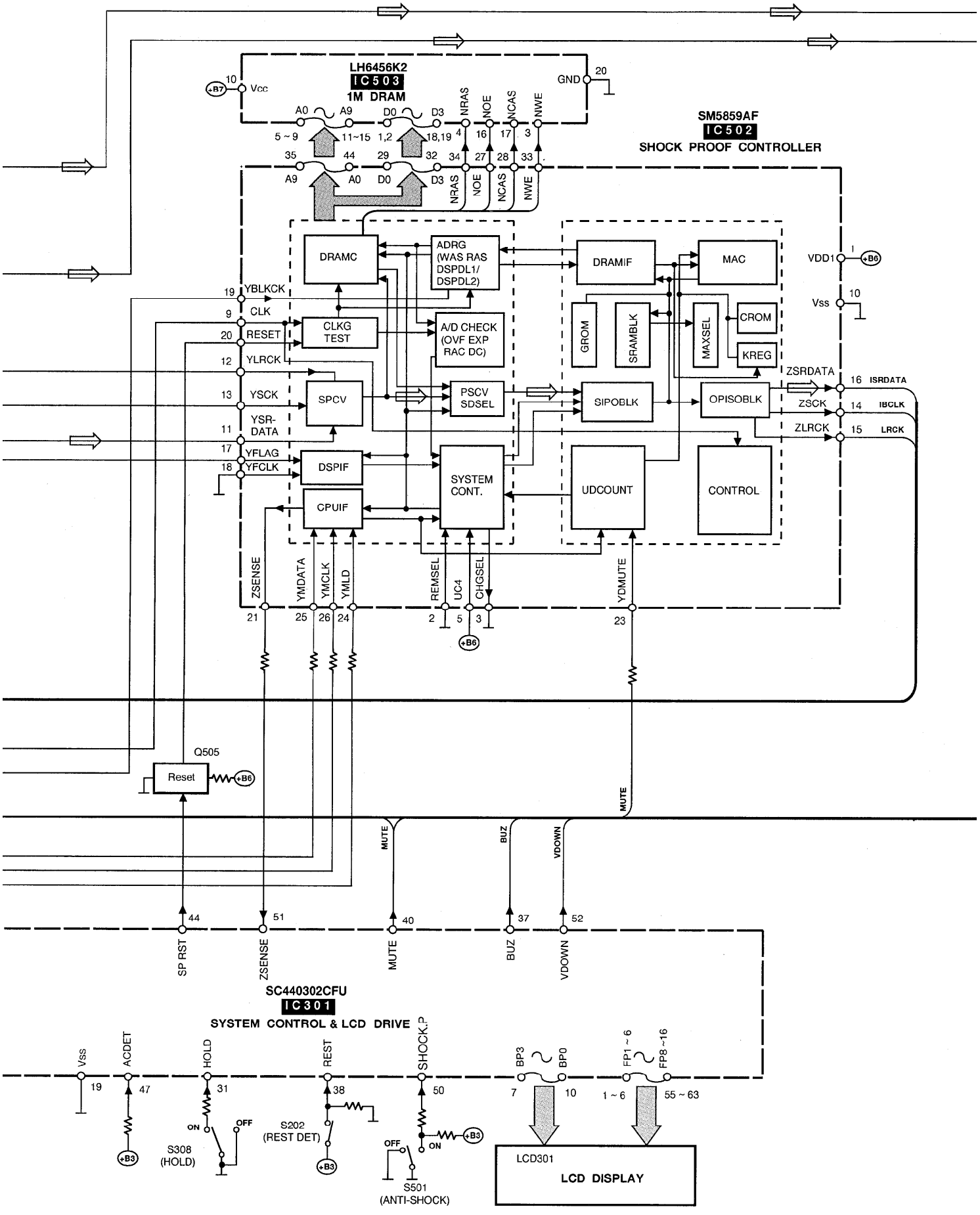
■ Block Diagram

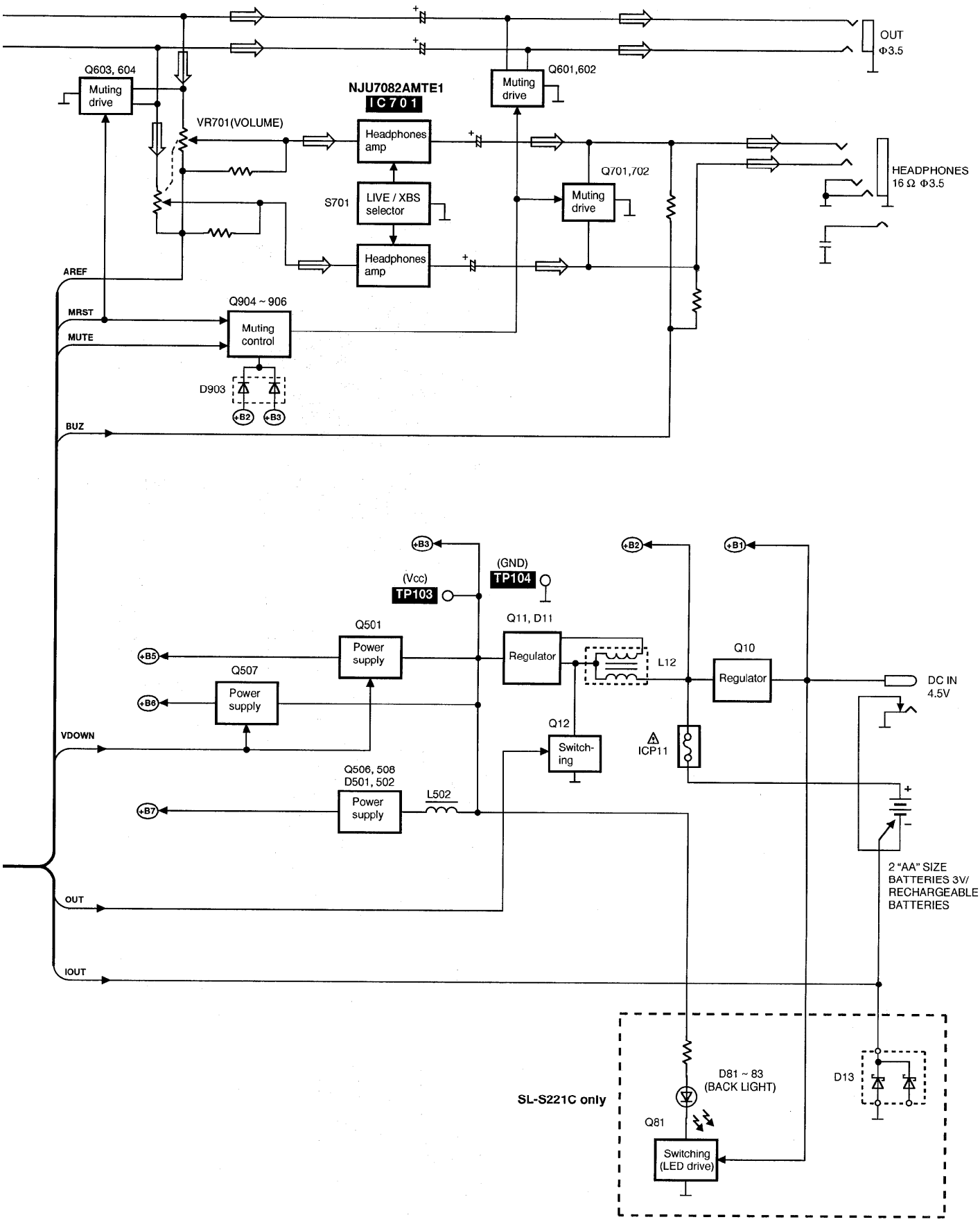


● Signal line ⇨ : Audio signal



● Signal line ⇨ : Audio signal

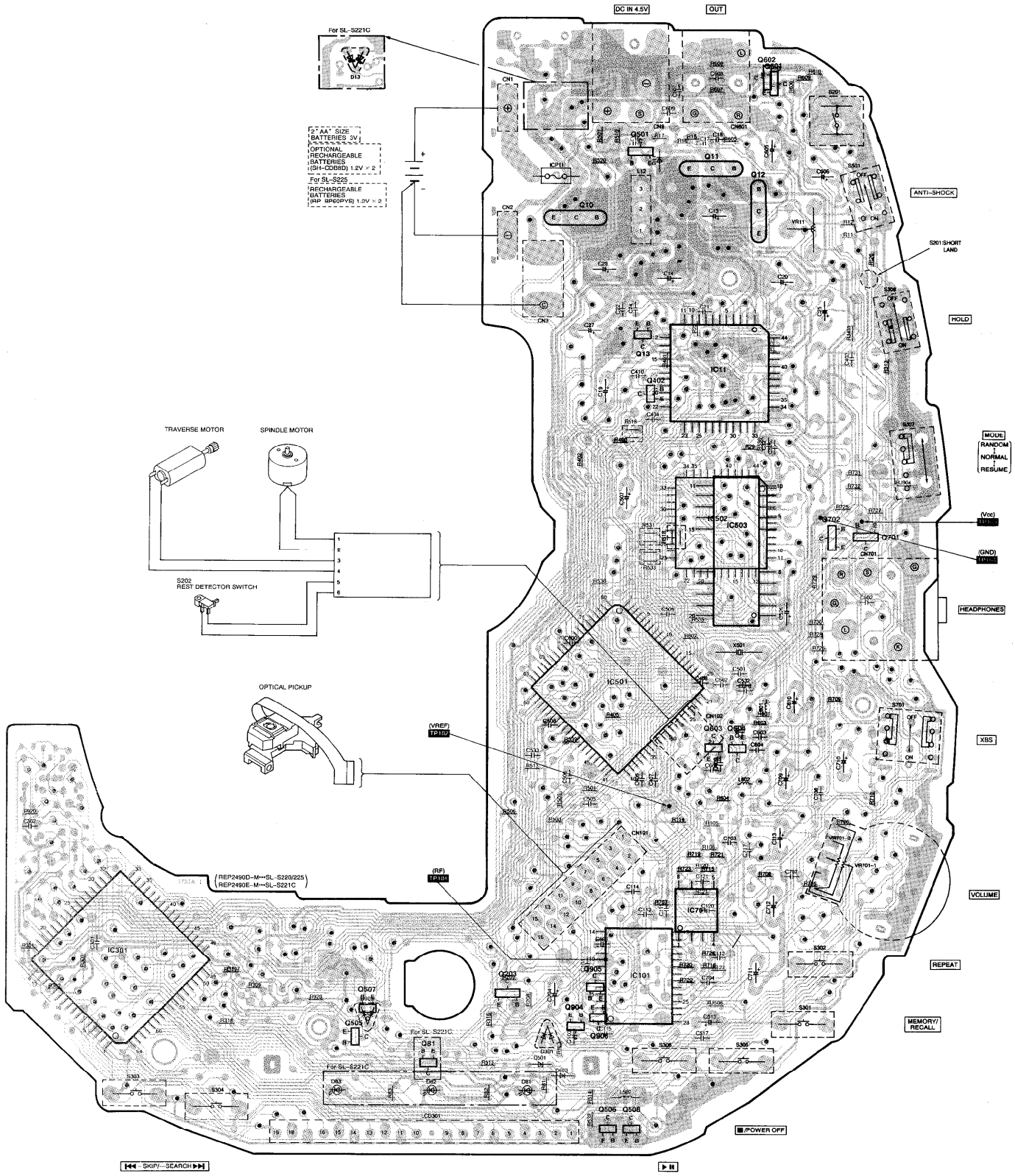



OUT
Φ3.5
Q603, 604
Muting drive
NJU7082AMTE1
IC701
Q601,602
Muting drive
VR701(VOLUME)
Headphones amp
Q701,702
Muting drive
HEADPHONES
16 Ω Φ3.5
S701
LIVE / XBS selector
Headphones amp
AREF
MRST
MUTE
Q904 ~ 906
Muting control
D903
+B2
+B3
BUZ
+B3
(Vcc)
TP103
(GND)
TP104
+B2
+B1
Q11, D11
Q501
Power supply
Regulator
L12
Q10
Regulator
DC IN
4.5V
+B5
Q507
Power supply
+B6
VDOWN
Q12
Switch-ing
ICP11
Q506, 508
D501, 502
Power supply
L502
+B7
2 "AA" SIZE
BATTERIES 3V/
RECHARGEABLE
BATTERIES
OUT
IOUT
SL-S221C only
D81 ~ 83
(BACK LIGHT)
D13
Q81
Switching
(LED drive)

■ Printed Circuit Board and Wiring Connection Diagram

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.




OUT
DC IN 4.5V
For SL-S221C
ANTI-SHOCK
S201:SHORT LAND
HOLD
MODE
RANDOM
NORMAL
RESUME
(Vcc) TP103
(GND) TP104
HEADPHONES
XBS
VOLUME
REPEAT
MEMORY/RECALL
■/POWER OFF
▶II
(VREF) TP102
(RF) TP101
REP2490D-M···SL-S220/225
REP2490E-M···SL-S221C
For SL-S221C
LCD301
◀◀-SKIP/—SEARCH▶▶
IC11
IC503
IC502
IC501
IC701
IC101
IC301

■ Schematic Diagram (See parts list on pages 34,35.)

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

Notes:

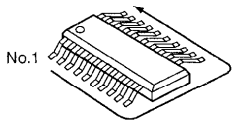
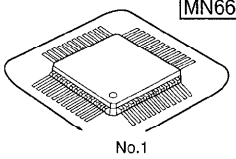
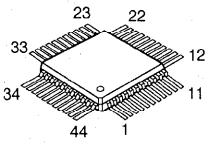
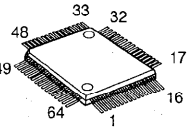
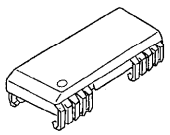
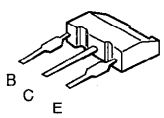
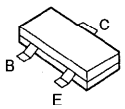
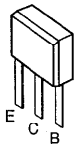
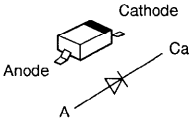
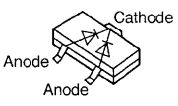
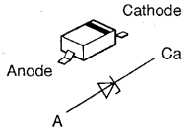
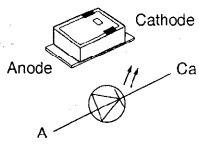
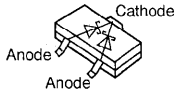
- **S201 :** Laser ON/OFF switch in "OFF" position. (It turns "ON" with disc holder closed.)
- **S202 :** Rest detector in "OFF" position. (It turns "ON" when optical pickup comes to innermost periphery.)
- **S301 :** Memory/recall (MEMORY/RECALL) switch.
- **S302 :** Repeat (REPEAT) switch.
- **S303 :** Skip/search (▶▶▌ / ▶▶ ,▐◀◀ / ◀◀) switches.
- **S304 :** [S303: GO BACK, S304: ADVANCE]
- **S305 :** Stop/power off (■/POWER OFF) switch.
- **S306 :** Play/pause (▶ / ▮▮) switch.
- **S307 :** Play mode selector (MODE) in "RANDOM" position. (RANDOM ←→ NORMAL ←→ RESUME)
- **S308 :** Hold (HOLD) switch in "ON" position.
- **S501 :** Anti-shock (ANTI-SHOCK) switch in "OFF" position.
- **S701 :** XBS selector (XBS) in "OFF" position.
- **VR11 :** Power supply voltage adjustment.
- **VR701-1, 2 :** Headphones volume (VOLUME) control.
- 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.
- Mesurement conditions:
  - * Set the hold lock and ANTI-SHOCK switches to ON.
  - * The parenthesized is the voltage for test disc (1 kHz, L + R, 0 dB) in play mode, and the other, for no disc in stop mode.
  - * 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 manufacture's specified parts shown in the parts list.

Caution!

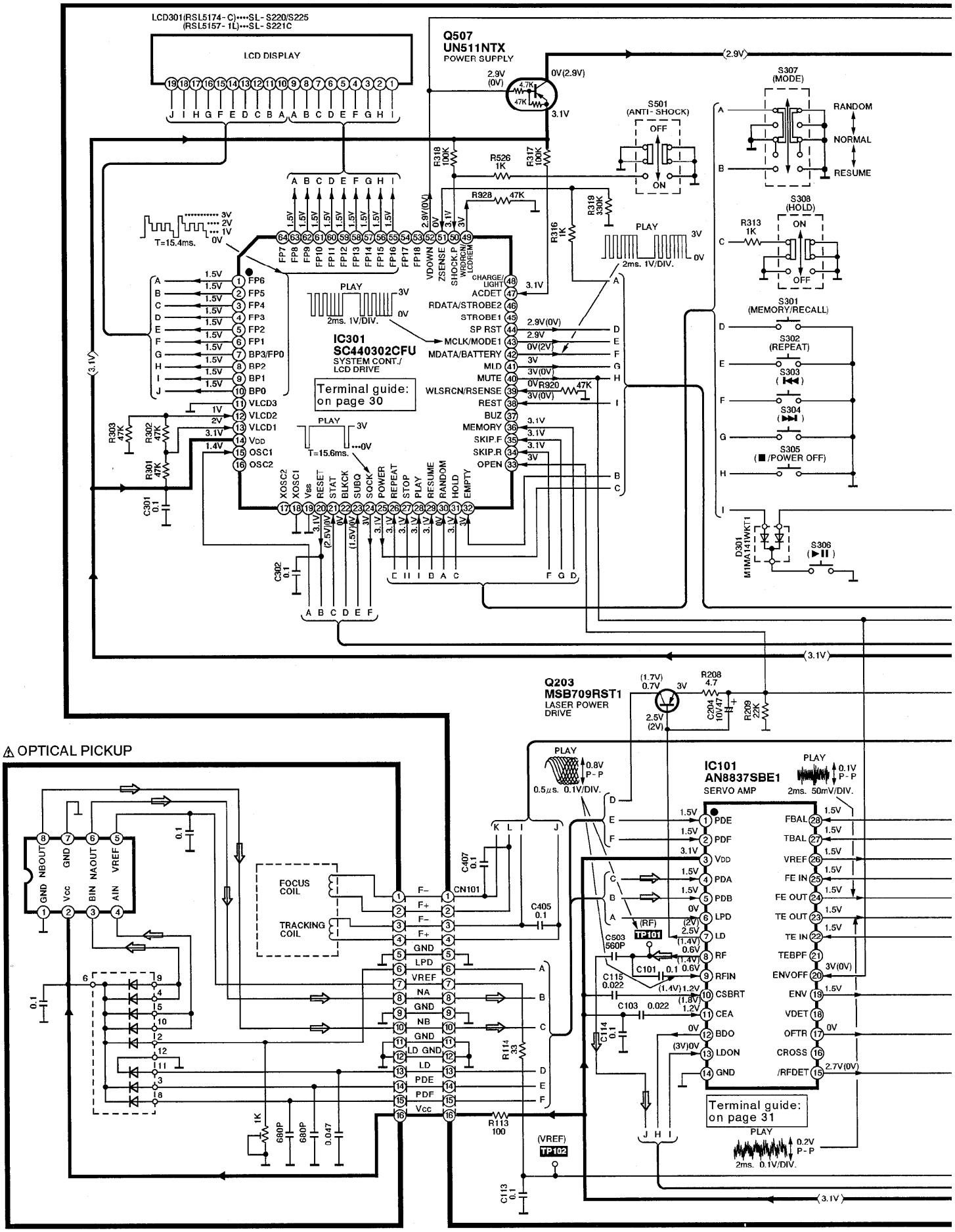
IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum 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.

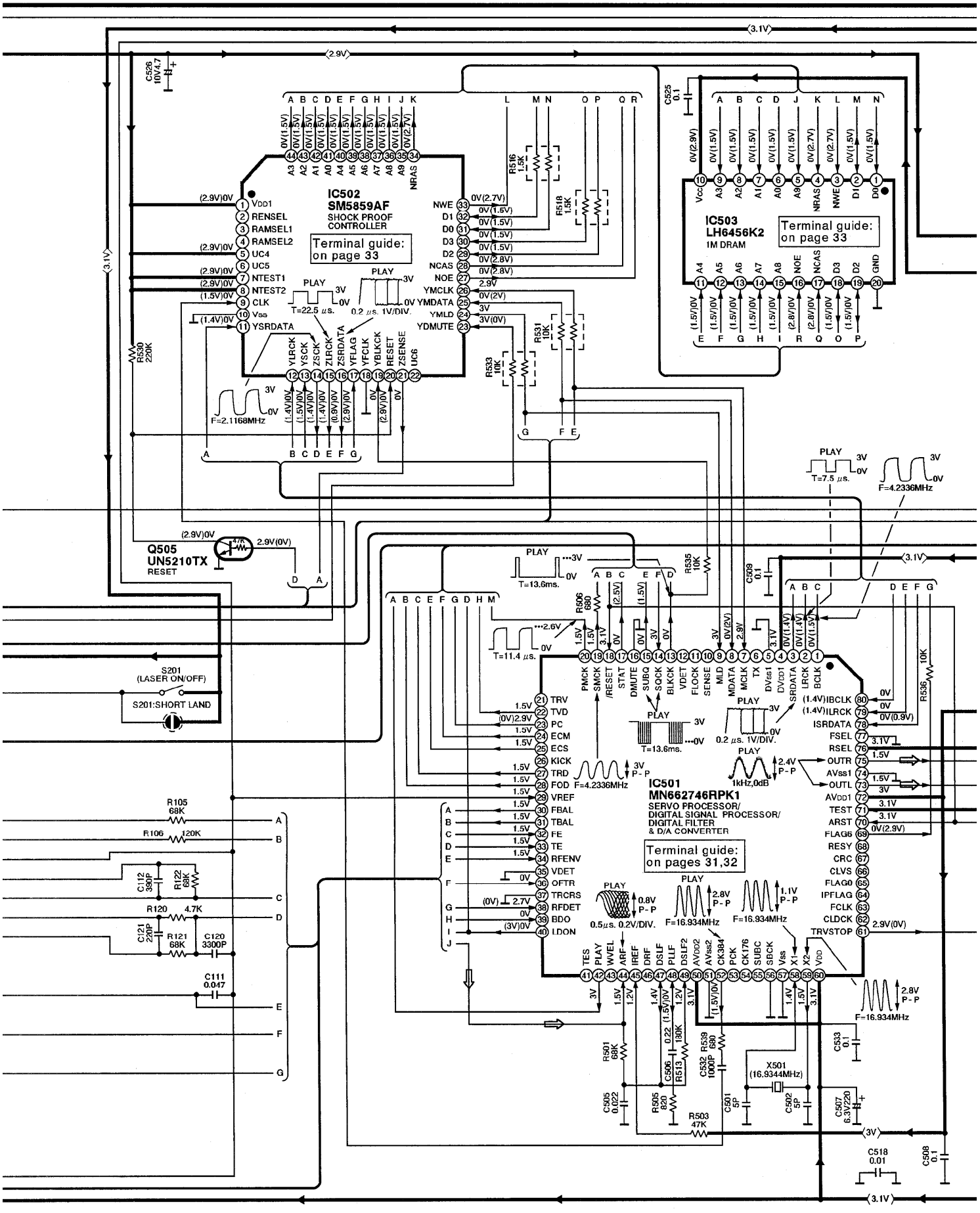
■ Type Illustration of IC's, Transistors and Diodes

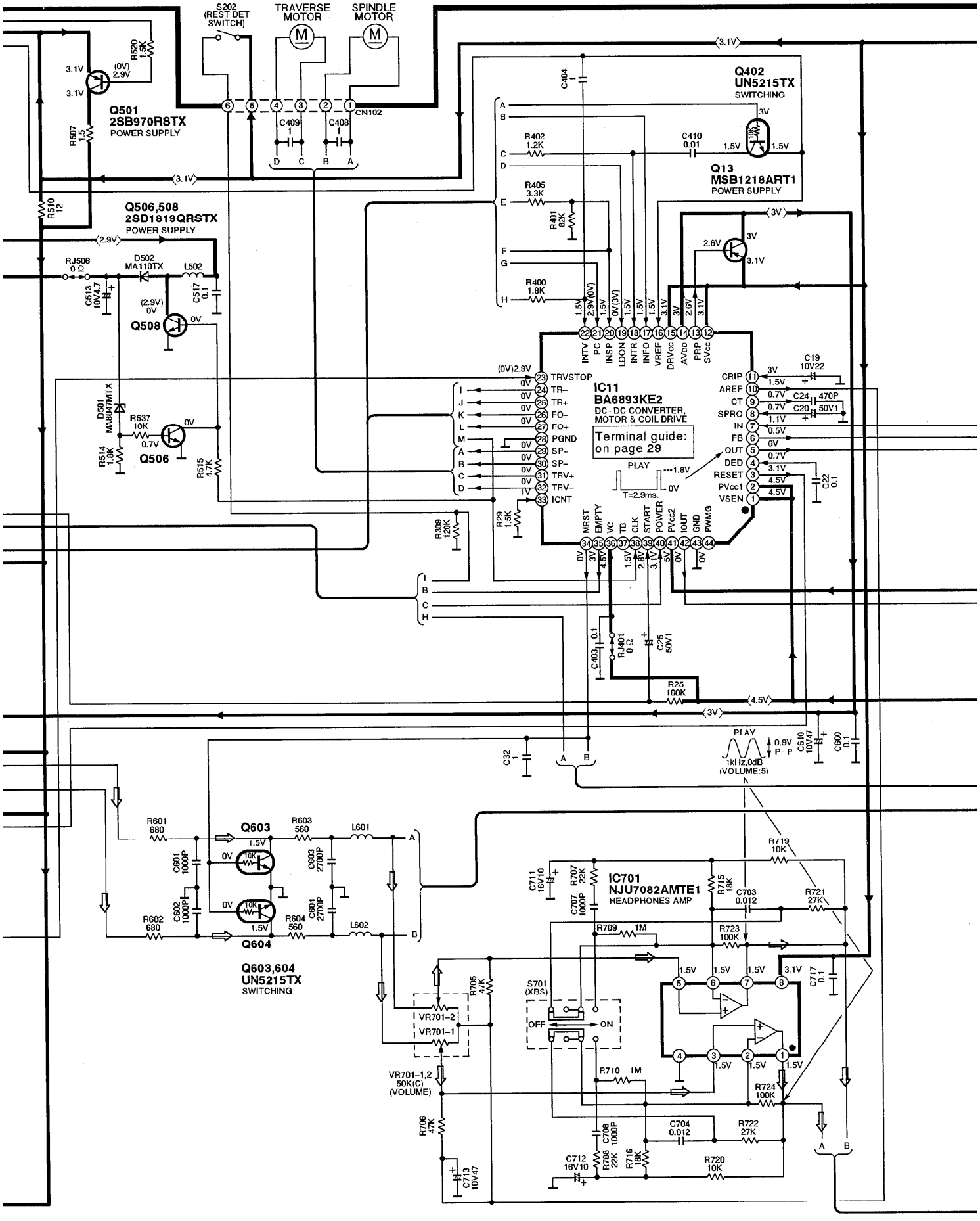
NJU7082AMTE1 8PIN AN8837SBE1 28PIN 	SM5859AF 44PIN MN662746RPK1 80PIN 	BA6893KE2 	SC440302CFU 	
LH6456K2 	2SD2074HWRST 	2SB970RSTX 2SD1328RSTTX 2SD1819QRSTX  DTA114YUA106 MSB1218ART1 MSB709RST1 UN5215TX UN5210TX UN511NTX UN521MTX [For SL-S221C only]	2SD1302STTA 2SD1450STTA 	MA110TX 
M1MA141WKT1 	MA8047MTX 	[For SL-S221C only] CL170YGCDT 	[For SL-S221C only] RB411DT146 	

(P.C.Board:on pages 22,23)

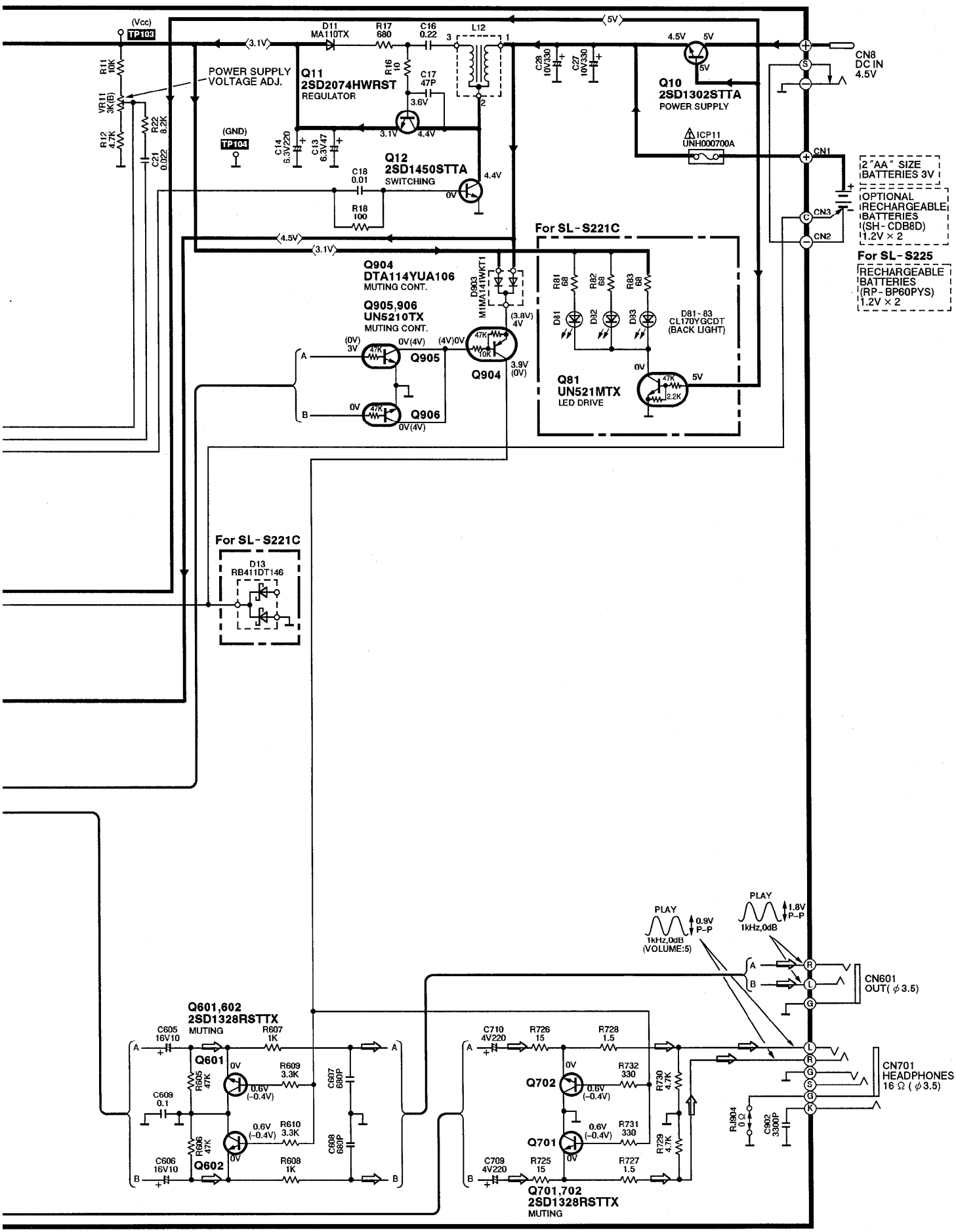


Note: ● ⇨: Audio signal lines.




S202
(REST DET SWITCH)
TRAVERSE MOTOR
SPINDLE MOTOR
CN102
Q501
2SB970RSTX
POWER SUPPLY
Q506,508
2SD1819QRSTX
POWER SUPPLY
Q508
Q506
Q402
UN5215TX
SWITCHING
Q13
MSB1218ART1
POWER SUPPLY
IC11
BA6893KE2
DC-DC CONVERTER, MOTOR & COIL DRIVE
Terminal guide: on page 29
TRVSTOP
TR−
TR+
FO−
FO+
PGND
SP+
SP−
TRV+
TRV−
ICNT
INTV
PC
INSP
LDON
INTR
INFO
VREF
DRVcc
AVDD
PRP
SVcc
CRIP
AREF
CT
SPRO
IN
FB
OUT
DED
RESET
PVcc1
VSEN
MRST
EMPTY
VC
TB
CLK
START
POWER
PVcc2
IOUT
GND
FWMG
PLAY
T=2.9ms.
Q603
Q604
Q603,604
UN5215TX
SWITCHING
IC701
NJU7082AMTE1
HEADPHONES AMP
PLAY
1kHz,0dB
(VOLUME:5)
0.9V P-P
S701
(XBS)
OFF
ON
VR701-1
VR701-2
VR701-1,2
50K(C)
(VOLUME)

Note: ● ⇨: Audio signal lines.



■ Terminal Function of IC's

• IC11 (BA6893KE2): DC-DC converter / motor drive

Pin No.	Mark	I/O Division	Function
1	VSEN	I	Battery voltage monitor terminal
2	PVcc	I	Battery power supply input terminal
3	RESET	O	Reset signal output terminal
4	DED	I	Dead time setting terminal
5	OUT	O	Boost transistor drive output terminal
6	FB	O	Error amp output terminal
7	IN	I	Error amp input terminal
8	SPRO	I	Short protect setting input terminal
9	CT	O	Triangle wave oscillator output terminal
10	AREF	O	Audio reference output terminal
11	CRIP	I	Ripple filter smoothing terminal
12	SVcc	I	Power supply input terminal for control circuit
13	PRP	O	Transistor drive output terminal for ripple filter
14	AVDD	O	Power supply output terminal for ripple filter
15	DRVcc	I	Pre-driver power supply input terminal
16	VRFF	I	Reference voltage input terminal
17	INFO	I	Focus coil drive input terminal
18	INTR	I	Tracking coil drive input terminal
19	LDON	I	Laser ON/OFF drive input terminal
20	INSP	I	Spindle motor drive input terminal
21	PC	I	Spindle motor drive ON/OFF input terminal
22	INTV	I	Traverse motor drive input terminal

Pin No.	Mark	I/O Division	Function
23	TRVSTOP	I	Traverse motor drive ON/OFF input terminal
24	TR-	O	Tracking coil drive output terminal
25	TR+		
26	FO-	O	Focus coil drive output terminal
27	FO+		
28	PGND	—	Power section GND terminal
29	SP+	O	Spindle motor drive output terminal
30	SP-		
31	TRV+	O	Traverse motor drive output terminal
32	TRV-		
33	ICNT	I	Rechargeable current setting terminal
34	MRST	O	Muting reset output terminal
35	EMPTY	O	Empty detect output terminal
36	VC	I	Power supply input terminal
37	TB	—	PWM transistor drive output terminal (Not used, open)
38	CLK	I	External clock synch. input terminal
39	START	I	Boost DC/DC converter starting input terminal
40	POWER	I	Boost DC/DC converter OFF input terminal
41	PVcc2	I	Rechargeable circuit power supply input terminal
42	IOUT	O	Empty detect level select output terminal
43	GND	—	Pre-section GND terminal
44	PWMG	—	PWM phase compensating input terminal (Not used, open)

• IC301 (SC440302CFU): System control / LCD drive

Pin No.	Mark	I/O Division	Function
1 ⟆ 6	FP6 ⟆ FP1	O	LCD segment signal output terminal
7	BP3/FP0	O	LCD segment signal output terminal
8 ⟆ 10	BP2 ⟆ BP0	O	LCD segment signal output terminal
11 ⟆ 13	VLCD3 ⟆ VLCD1	I	Voltage control input terminal
14	V_{DD}	I	Power supply terminal
15	OSC1	I	Main system clock input terminal
16	OSC2	—	Not used, open
17	XOSC2	—	Not used, open
18	XOSC1	—	Not used, connected to GND
19	V_{SS}	—	GND terminal
20	RESET	O	Reset signal output terminal
21	STAT	I	Status signal input (CRC, CUE, CLVS, TT STOP, FCLV, SQOK)
22	BLKCK	I	Sub-code block clock (F=75Hz with normal play)
23	SUBQ	I	Sub-code Q data input terminal
24	SQCK	O	Sub-code Q register clock signal output terminal
25	POWER	O	Power On/Off signal output terminal
26	REPEAT	I	Key switch(REPEAT) input terminal
27	STOP	I	Key switch(STOP) input terminal
28	PLAY	I	Key switch(PLAY/PAUSE) input terminal
29	RESUME	I	Key switch(RESUME) input terminal
30	RANDOM	I	Key switch(RANDOM) input terminal
31	HOLD	I	Key switch(HOLD) input terminal
32	EMPTY	I	Empty detect input terminal
33	OPEN	I	Disc holder open det. terminal ("L" with open)
34	SKIP. R	I	Key switch input terminal (SKIP/SEARCH. R)
35	SKIP. F	I	Key switch input terminal (SKIP/SEARCH. F)
36	MEMORY	I	Key switch input terminal (MEMORY)
37	BUZ	—	Beep control signal output terminal (Not used, open)
38	REST	I	Rest det. input terminal
39	WLSRCN/ RSENSE	I	Remote control signal input terminal. (Not used, connected to resistor)
40	MUTE	O	Muting signal output terminal ("H" : mute)
41	MLD	O	Command load signal output terminal ("L" : load)
42	MDATA/ BATTERY	O	Command data signal output terminal
43	MCLK/ MODE1	O	Command clock signal output terminal
44	SPRST	O	Reset signal output terminal for shock proof controller IC
45	STROBE1	—	Not used, open
46	RDATA/ STROBE2	—	Not used, open
47	ACDET	I	Power det. input terminal
48	CHARGE/ LIGHT	—	Not used, open
49	WRDRCN/ LCDREM	O	Remote control signal output terminal (Not used, connected to resistor)
50	SHOCK. P	I	Key switch(ANTI-SHOCK) input terminal
51	ZSENSE	I	Sense signal input terminal
52	VDOWN	O	Power supply control output terminal
53 · 54	FP18 · FP17	—	Not used, open
55 ⟆ 63	FP16 ⟆ FP8	O	LCD segment signal output terminal
64	FP7	—	Not used, open

• IC101 (AN8837SBE1): Servo amp.

Pin No.	Mark	I/O Division	Function
1	PDE	I	Tracking signal input terminal (1)
2	PDF	I	Tracking signal input terminal (2)
3	V_{DD}	I	Power supply terminal
4	PDA	I	Focus signal input terminal (1)
5	PDB	I	Focus signal input terminal (2)
6	LPD	I	APC amp input terminal
7	LD	O	APC amp output terminal
8	RF	O	RF summing output terminal
9	RF IN	I	RF signal input terminal
10	CSBRT	I	Capacitor connection terminal for OFTR
11	CEA	I	Capacitor connection terminal for H.P.F. amp
12	BDO	O	Dropout signal output terminal ("H" : Dropout)
13	LDON	I	APC control input terminal
14	GND	—	GND terminal

Pin No.	Mark	I/O Division	Function
15	/RFDET	O	RF det. signal output terminal ("L" : Det.)
16	CROSS	—	Not used, open
17	OFTR	O	Off track signal output terminal ("H" : Off track)
18	VDET	—	Not used, open
19	ENV	O	RF envelope signal output terminal
20	ENV OFF	I	ENV control input terminal
21	TEBPF	—	Not used, open
22	TE IN	I	Tracking error amp input terminal
23	TE OUT	O	Tracking error amp output terminal
24	FE OUT	O	Focus error amp output terminal
25	FE IN	I	Focus error amp input terminal
26	VREF	O	Reference voltage output terminal
27	TBAL	I	Tracking balance signal input terminal
28	FBAL	I	Focus balance signal input terminal

• IC501 (MN662746RPK1) : 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	O	Sense signal (OFT, FESL, NACEND, NAJEND, POSAD, SFG) (Not used, open)
11	FLOCK	O	Optical servo condition (focus) ("L" : lead-in) (Not used, open)
12	VDET	—	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 code
16	DMUTE	I	Muting input ("H" : MUTE) (Not used, connected to GND)
17	STAT	O	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
18	RESET	I	Reset signal ("L" : reset)
19	SMCK	O	System clock (f=4.2336MHz)
20	PMCK	O	Frequency division clock signal (f=1/1.92×ck=88.2kHz)
21	TRV	—	Traverse servo control (Not used, open)
22	TVD	O	Traverse drive signal
23	PC	O	Spindle motor drive signal ("L" : ON)
24	ECM	O	Spindle motor drive signal (Forced mode)
25	ECS	O	Spindle motor drive signal (Servo error signal)

Pin No.	Mark	I/O Division	Function
26	KICK	–	Kick pulse output (Not used, open)
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	–	Oscillation det. signal ("H" : det) (Not used, connected to GND)
36	OFTR	I	Off track signal ("H" : Off track)
37	TRCRS	–	Track cross signal input (Not used, connected to GND)
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) (Not used, open)
42	PLAY	O	Play signal ("H" : play)
43	WVEL	O	Double velocity status signal ("H" : double) (Not used, open)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias terminal (Not used, open)
47	DSLF	I/O	DSL loop filter terminal
48	PLLF	I/O	PLL loop filter terminal
49	DSLF2	I	VCO loop filter terminal
50	AVDD2	I	Power supply (analog circuit) terminal (2)
51	AVSS2	—	GND (analog circuit) terminal
52	CK384	O	384fs (16.9344MHz) output
53	PCK	—	PLL extract clock (f=4.3218MHz) (Not used, open)
54	CK176	—	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	Vss	—	GND terminal
58	X1	I	Crystal oscillator input terminal (f=16.9344MHz)
59	X2	O	Crystal oscillator output terminal (f=16.9344MHz)
60	VDD	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	—	Crystal frame clock signal [f FCLK=7.35kHz: 2 speed(14.7kHz)] (Not used, open)
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	RESY	—	Not used, open
69	FLAG6	O	Flag terminal
70	ARST	I	Reset signal input terminal
71	TEST	I	Test terminal (Normal : "H")
72	AVDD1	I	Power supply (analog circuit) terminal (1)
73	OUTL	O	Lch audio signal
74	AVSS1	—	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	FSEL	–	Frequency control terminal of crystal oscillator (Not used, connected to GND)
78	ISRDATA	I	Serial data signal input
79	ILRCK	I	L/R discriminating signal input
80	IBCLK	I	Serial bit clock input

● IC502 (SM5859AF) : Shock proof controller

Pin No.	Mark	I/O Division	Function
1	VDD1	I	Power supply terminal
2	RENSEL	—	Key input terminal (ANTI-SHOCK MEMORY) (Not used, open)
3	RAMSEL1	—	Key input terminal (Not used, open)
4	RAMSEL2	—	Not used, open
5	UC4	I	Sound quality/sound field control terminal
6	UC5	O	Sound quality/sound field control terminal (Not used, open)
7	NTEST1	I	Test terminal
8	NTEST2		
9	CLK	I	Clock signal input (f=16.9344MHz)
10	Vss	—	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	Serial data output terminal
17	YFLAG	I	RAM over-flow flag terminal
18	YFCLK	I	Crystal frame clock input (Not used, connected to GND)
19	YBLKCK	I	Sub-cord block clock input terminal
20	RESET	I	Reset input terminal
21	ZSENSE	O	Microcomputer states output terminal
22	UC6	I	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 • 30	D2 • D3	I/O	D-RAM data input/output terminal
31 • 32	D0 • D1		
33	NWE	O	D-RAM write enable terminal
34	NRAS	O	D-RAM low address strobe terminal
35 ∫ 40	A9 ∫ A4	O	D-RAM address output terminal
41 ∫ 44	A0 ∫ A3		

● IC503 (LH6456K2) : 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
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/O	Data input/ output terminal
19	D2	I/O	Data input/ output terminal
20	GND	—	GND terminal

■ Replacement Parts List (Electrical)

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.
* Warning: This product uses a laser diode. Refer to caution statements on page 2.
* [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC11	BA6893KE2	IC	[M]
IC101	AN8837SBE1	IC	[M]
IC301	SC440302CFU	IC	[M]
IC501	MN662746RPK1	IC	[M]
IC502	SM5859AF	IC	[M]
IC503	LH6456K2	IC	[M]
IC701	NJU7082AMTE1	IC	[M]
		TRANSISTOR(S)	
Q10	2SD1302STTA	TRANSISTOR	[M]
Q11	2SD2074HWRST	TRANSISTOR	[M]
Q12	2SD1450STTA	TRANSISTOR	[M]
Q13	MSB1218ART1	TRANSISTOR	[M]
Q81	UN521MTX	TRANSISTOR	[M] SL-S221C ONLY
Q203	MSB709RST1	TRANSISTOR	[M]
Q402	UN5215TX	TRANSISTOR	[M]
Q501	2SB970RSTX	TRANSISTOR	[M]
Q505	UN5210TX	TRANSISTOR	[M]
Q506	2SD1819QRSTX	TRANSISTOR	[M]
Q507	UN511NTX	TRANSISTOR	[M]
Q508	2SD1819QRSTX	TRANSISTOR	[M]
Q601, 602	2SD1328QRSTX	TRANSISTOR	[M]
Q603, 604	UN5215TX	TRANSISTOR	[M]
Q701, 702	2SD1328QRSTX	TRANSISTOR	[M]
Q904	DTA114YUA106	TRANSISTOR	[M]
Q905, 906	UN5210TX	TRANSISTOR	[M]
		DIODE(S)	
D11	MA110TX	DIODE	[M]
D13	RB411DT146	DIODE	[M]
D81-83	CL170YGCDT	L. E. D.	[M] SL-S221C ONLY
D301	M1MA141WKT1	DIODE	[M]
D501	MA8047MTX	DIODE	[M]
D502	MA110TX	DIODE	[M]
D903	M1MA141WKT1	DIODE	[M]
		IC PROTECTOR(S)	
ICP11	UNH000700A	IC PROTECTOR	[M]⚠

Ref. No.	Part No.	Part Name & Description	Remarks
		VARIABLE RESISTOR(S)	
VR11	EVNDXAA00B33	V. R	[M]
VR701	EVUTUFB11C54	V. R	[M]
		COIL(S)	
L12	RLZ0028T-0	COIL	[M]
L502	RLQU331KT-W	COIL	[M]
L601, 602	RLBV102V-Y	COIL	[M]
		OSCILLATOR(S)	
X501	RSXZ16M9M01T	OSCILLATOR	[M]
		LCD(S)	
LCD301	RSL5174-C	LCD	[M] SL-S220/S225 ONLY
LCD301	RSL5157-1L	LCD	[M] SL-S221C ONLY
		SWITCH(ES)	
S201	ESE11SV6	SW	[M]
S202	ESE11HS4	SW	[M]
S301-306	EVQ21405R	SW	[M]
S307	RSS3A007-1A	SW	[M]
S308	RSS2A010-1A	SW	[M]
S501	RSS2A010-1A	SW	[M]
S701	RSS2B028-A	SW	[M]
		CONNECTOR(S) AND JACK(S)	
CN1	RJC93015-1	BATTERY TERMINAL(+)	[M]
CN2	RJC93015-1	BATTERY TERMINAL(-)	[M]
CN3	RJH5104	RECHARGEABLE BATT. TERMINAL	[M]
CN8	RJJ43K09-C	DC IN JACK	[M]
CN101	RJS2A4716M1	CONNECTOR(16P)	[M]
CN102	RJS2A5106T1	CONNECTOR(6P)	[M]
CN601	RJJD3S5ZB-C	OUT JACK	[M]
CN701	RJJ33TK07-C	HEADPHONES JACK	[M]

■ Resistors and Capacitors

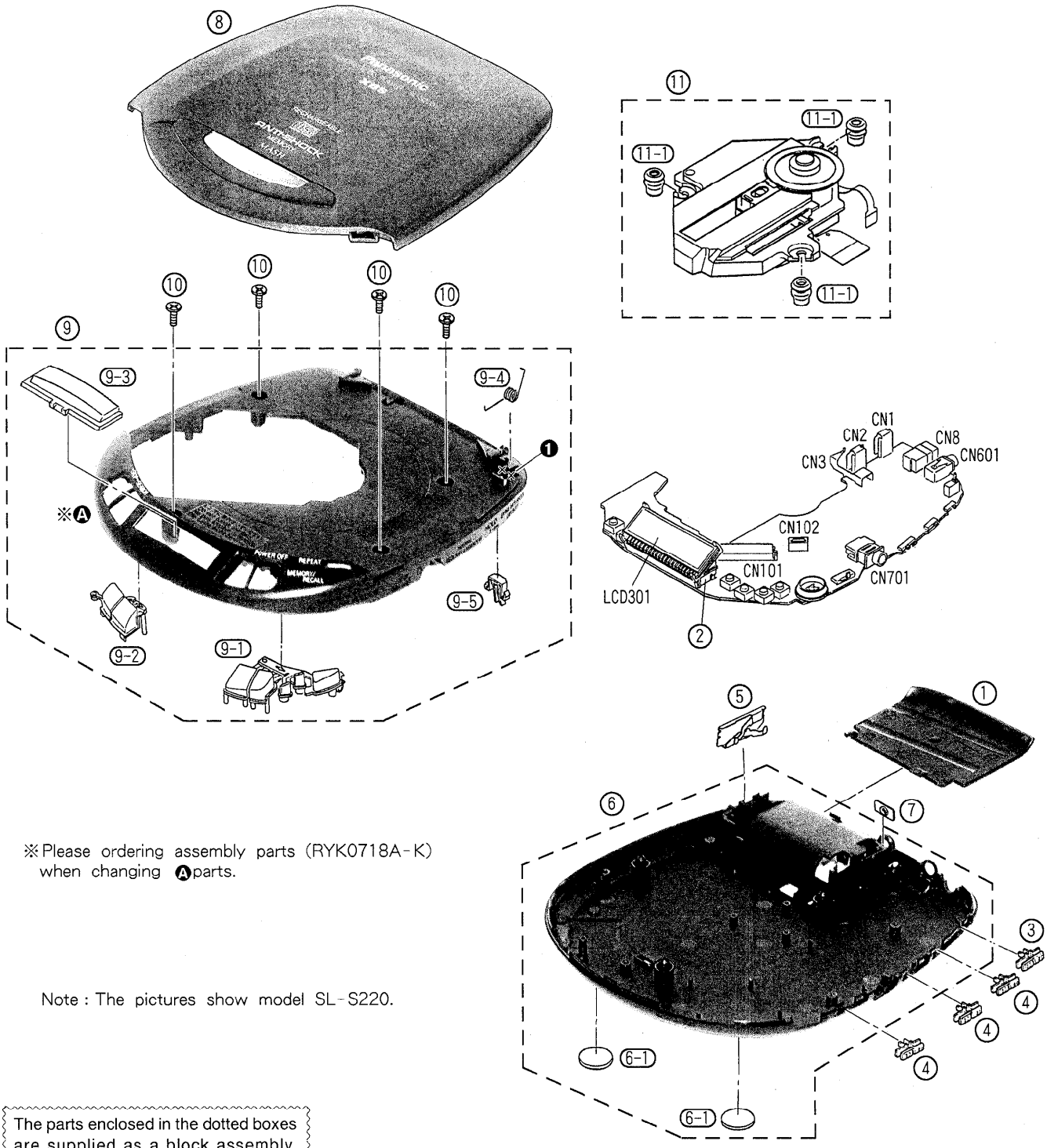
Notes: * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM), 1M=1,000k (OHM)
* [M] indicates in Remarks columns parts that are supplied by MESA.
* (*1) indicates in Values & Remarks columns parts list that can be used only model No. SL-S221C.

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R11	ERJ3GEYJ103Z	1/16W 10K [M]
R12	ERJ3GEYJ472V	1/16W 4.7K [M]
R16	ERJ3GEYJ100V	1/16W 10 [M]
R17	ERJ3GEYJ681V	1/16W 680 [M]
R18	ERJ3GEYJ101V	1/16W 100 [M]
R22	ERJ3GEYJ822V	1/16W 8.2K [M]
R25	ERJ3GEYJ104Z	1/16W 100K [M]
R29	ERJ3GEYJ152V	1/16W 1.5K [M]
R81-83	ERJ3GEYJ680V	1/16W 68 [M] (*1)
R105	ERJ3GEYJ683V	1/16W 68K [M]
R106	ERJ3GEYJ124V	1/16W 120K [M]
R113	ERJ3GEYJ101V	1/16W 100 [M]
R114	ERJ3GEYJ330V	1/16W 33 [M]
R120	ERJ3GEYJ472V	1/16W 4.7K [M]
R121, 122	ERJ3GEYJ683V	1/16W 68K [M]
R208	ERJ3GEYJ4R7V	1/16W 4.7 [M]
R209	ERJ3GEYJ223V	1/16W 22K [M]
R301-303	ERJ3GEYJ473V	1/16W 47K [M]
R309	ERJ3GEYJ124V	1/16W 120K [M]
R313	ERJ3GEYJ102Z	1/16W 1K [M]
R316	ERJ3GEYJ102Z	1/16W 1K [M]
R317, 318	ERJ3GEYJ104Z	1/16W 100K [M]
R319	ERJ3GEYJ334V	1/16W 330K [M]
R400	ERJ3GEYJ182V	1/16W 1.8K [M]
R401	ERJ3GEYJ823V	1/16W 82K [M]
R402	ERJ3GEYJ122V	1/16W 1.2K [M]
R405	ERJ3GEYJ332V	1/16W 3.3K [M]
R501	ERJ3GEYJ683V	1/16W 68K [M]
R503	ERJ3GEYJ473V	1/16W 47K [M]
R505	ERJ3GEYJ821V	1/16W 820 [M]
R506	ERJ3GEYJ681V	1/16W 680 [M]
R507	ERJ3GEYJ1R5V	1/16W 1.5 [M]
R510	ERJ3GEYJ120V	1/16W 12 [M]
R513	ERJ3GEYJ184V	1/16W 180K [M]
R514	ERJ3GEYJ182V	1/16W 1.8K [M]
R515	ERJ3GEYJ472V	1/16W 4.7K [M]
R516	EXBV4V152JV	1/32W 1.5K [M]
R518	EXBV4V152JV	1/32W 1.5K [M]
R520	ERJ3GEYJ152V	1/16W 1.5K [M]
R526	ERJ3GEYJ102Z	1/16W 1K [M]
R530	ERJ3GEYJ224V	1/16W 220K [M]
R531	EXBV4V103JV	1/32W 10K [M]
R533	EXBV4V103JV	1/32W 10K [M]
R535	ERJ6GEYJ103V	1/16W 10K [M]
R536, 537	ERJ3GEYJ103Z	1/16W 10K [M]
R539	ERJ3GEYJ681V	1/16W 680 [M]

Ref. No.	Part No.	Values & Remarks
R601, 602	ERJ3GEYJ681V	1/16W 680 [M]
R603, 604	MCR03PZHJ561	1/16W 560 [M]
R605, 606	ERJ3GEYJ473V	1/16W 47K [M]
R607, 608	ERJ3GEYJ102Z	1/16W 1K [M]
R609, 610	ERJ3GEYJ332V	1/16W 3.3K [M]
R705, 706	ERJ3GEYJ473V	1/16W 47K [M]
R707, 708	ERJ3GEYJ223V	1/16W 22K [M]
R709, 710	ERJ3GEYJ105V	1/16W 1M [M]
R715, 716	ERJ3GEYJ183V	1/16W 18K [M]
R719, 720	ERJ3GEYJ103Z	1/16W 10K [M]
R721, 722	ERJ3GEYJ273V	1/16W 27K [M]
R723, 724	ERJ3GEYJ104Z	1/16W 100K [M]
R725, 726	ERJ3GEYJ150V	1/16W 15 [M]
R727, 728	ERJ3GEYJ1R5V	1/16W 1.5 [M]
R729, 730	ERJ3GEYJ472V	1/16W 4.7K [M]
R731, 732	ERJ3GEYJ331V	1/16W 330 [M]
R920	ERJ3GEYJ473V	1/16W 47K [M]
R928	ERJ3GEYJ473V	1/16W 47K [M]
		CHIP JUMPERS
RJ401	ERJ3GEY0R00V	CHIP JUMPER [M]
RJ506	ERJ3GEY0R00V	CHIP JUMPER [M]
RJ904	ERJ3GEY0R00V	CHIP JUMPER [M]
		CAPACITORS
C13	RCE0JSC470IX	6.3V 47U [M]
C14	RCE0JKA221IG	6.3V 220U [M]
C16	ECUVNC224KBN	16V 0.22U [M]
C17	ECUV1H470KCV	50V 47P [M]
C18	ECUV1E103KBV	25V 0.01U [M]
C19	ECEA1AKA220I	10V 22U [M]
C20	ECEA1HKA010I	50V 1U [M]
C21	ECUV1C223KBV	16V 0.022U [M]
C22	ECUVNC104ZFV	16V 0.1U [M]
C24	ECUV1H471KBV	50V 470P [M]
C25	ECEA1HKA010I	50V 1U [M]
C27, 28	RCE1AMT331IV	10V 330U [M]
C32	ECUVNC105ZFN	16V 1U [M]
C101	ECUV1C104KBV	16V 0.1U [M]
C103	ECUV1C223KBV	16V 0.022U [M]
C111	ECUVNC473KBV	16V 0.047U [M]
C112	ECUV1H391KBV	50V 390P [M]
C113	ECUVNE104ZFN	25V 0.1U [M]
C114	ECUVNC104ZFV	16V 0.1U [M]
C115	ECUV1C223KBV	16V 0.022U [M]
C120	ECUV1H332KBV	50V 3300P [M]
C121	ECUV1H221KBV	50V 220P [M]

Ref. No.	Part No.	Values & Remarks
C204	RCE1AKA470IG	10V 47U [M]
C301, 302	ECUVNC104ZFV	16V 0.1U [M]
C403	ECUVNC104ZFV	16V 0.1U [M]
C404	ECUVNC105ZFN	16V 1U [M]
C405	ECUV1C104KBV	16V 0.1U [M]
C407	ECUVNC104ZFV	16V 0.1U [M]
C408, 409	ECUVNC105ZFN	16V 1U [M]
C410	ECUV1E103KBV	25V 0.01U [M]
C501, 502	ECUV1H050CCV	50V 5P [M]
C503	ECUV1H561KBV	50V 560P [M]
C505	ECUV1C223KBV	16V 0.022U [M]
C506	ECUVNC224KBN	16V 0.22U [M]
C507	RCE0JKA221IG	6.3V 220U [M]
C508, 509	ECUVNC104ZFV	16V 0.1U [M]
C513	RCST1AY475RE	10V 4.7U [M]
C517	ECUVNC104ZFV	16V 0.1U [M]
C518	ECUV1E103KBV	25V 0.01U [M]
C525	ECUVNC104ZFV	16V 0.1U [M]
C526	RCST1AY475RE	10V 4.7U [M]
C532	ECUV1H102KBN	50V 1000P [M]
C533	ECUVNC104ZFV	16V 0.1U [M]
C600	ECUVNC104ZFV	16V 0.1U [M]
C601, 602	ECUV1H102KBV	50V 1000P [M]
C603, 604	ECUV1H272KBV	50V 2700P [M]
C605, 606	ECEA1CKA100I	16V 10U [M]
C607, 608	ECUV1H681KBV	50V 680P [M]
C609	ECUVNC104ZFV	16V 0.1U [M]
C610	RCE1AKA470IG	10V 47U [M]
C703, 704	ECUV1E123KBV	25V 0.012U [M]
C707	ECUV1H102KBN	50V 1000P [M]
C708	ECUV1H102KBV	50V 1000P [M]
C709, 710	ECEA0GPK221I	4V 220U [M]
C711, 712	ECEA1CPK100I	16V 10U [M]
C713	RCE1AKA470IG	10V 47U [M]
C717	ECUVNC104ZFV	16V 0.1U [M]
C902	ECUV1H332KBV	50V 3300P [M]

■ Cabinet Parts Location



※Please ordering assembly parts (RYK0718A-K) when changing Ⓐparts.

Note : The pictures show model SL-S220.

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 loading mechanism parts, apply the specified grease to the areas marked "XX" as shown in the drawing.

Ref. No.	Part No.
❶	RFKXPG671

■ Replacement Parts List (Cabinet, Packing, Accessories)

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.
* Warning: This product uses a laser diode. Refer to caution statements on page 2.
* [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKK0102-K	BATTERY COVER	[M]
2	RJF0029	LCD HOLDER	[M]
3	RGV0200-H	ANTI-SHOCK KNOB	[M]
4	RGV0200-K	XBS/PLAY MODE/HOLD KNOB	[M]
5	RJC93020	COMMON BATTERY TERMINAL	[M]
6	RFKJLS220P-H	BOTTOM CABINET ASS'Y	[M] SL-S220 (P, PC) ONLY
6	RFKJLS225P-H	BOTTOM CABINET ASS'Y	[M] SL-S225 (P) ONLY
6	RFKJLS221CPH	BOTTOM CABINET ASS'Y	[M] SL-S221C (P, PC) ONLY
6	RFKJLS221CPX	BOTTOM CABINET ASS'Y	[M] SL-S221C (PX) ONLY
6-1	RKA0063-K	FOOT	[M]
7	RMA0677	REAR ORNAMENT	[M]
8	RYF0443-H	CD COVER ASS'Y	[M] SL-S220 ONLY
8	RYF0443H-H	CD COVER ASS'Y	[M] SL-S225 ONLY
8	RYF0443J-H	CD COVER ASS'Y	[M] SL-S221C ONLY
9	RYK0718A-K	INTERMEDIATE CABINET ASS'Y	[M]
9-1	RGU1494-K	OPERATION BUTTON (A)	[M]
9-2	RGU1495-K	OPERATION BUTTON (B)	[M]
9-3	RKW0495-Q	LCD PANEL	[M]
9-4	RME0241	OPEN SPRING	[M]
9-5	RML0472	STOPPER ANGLE	[M]
10	XTN17+6GFZ	SCREW	[M]
11	RAE0142Z	TRAVERSE DECK	[M] ⚠
11-1	RMG0449-H	FLOATING RUBBER	[M]
		<SL-S220 (P, PC) ONLY>	
		PACKING MATERIAL	
P1	RPN1043	COVER	[M] (P)
P2	RPN1044	TRAY	[M] (P)
P3	RPQ0680	GROUND PAPER	[M] (P)
P4	RPQ0752	SPACER	[M] (PC)
P5	RPK0843	PACKING CASE	[M] (PC)
P6	RPF0111	PROTECTION BAG (UNIT)	[M] (PC)
P7	RPF0046	PROTECTION BAG (F. B.)	[M] (PC)
		ACCESSORIES	
A1*1	RQT3745-P	INSTRUCTION MANUAL	[M] <IA>
A1	RQT3746-C	INSTRUCTION MANUAL	[M] (PC) <IB>
A2	RFEA403C-S	AC ADAPTOR	[M] ⚠
A3	RFEV705P-KS	STEREO HEADPHONES	[M] (P)
A3	RFEV317P-KS	STEREO EARPHONES	[M] (PC)

Ref. No.	Part No.	Part Name & Description	Remarks
A4	SQX9131	SERVICENTER LIST	[M] (PC)
A5	SQX7185	WARRANTY CARD	[M] (PC)
A6*2	RKB205ZA-0	EAR PADS	[M] (PC)
		<SL-S225 (P) ONLY>	
		PACKING MATERIAL	
P1	RPK0841	PACKING CASE	[M]
P2	RPQ0677	SPACER	[M]
P3	RPF0111	PROTECTION BAG (UNIT)	[M]
		ACCESSORIES	
A1*1	RQT3745-P	INSTRUCTION MANUAL	[M] <IA>
A2	RFEA403C-S	AC ADAPTOR	[M] ⚠
A3	RFEV705P-KS	STEREO HEADPHONES	[M]
A4	RP-BP60PYS	RECHARGEABLE BATTERIES	[M]
A4-1	RFKNLS370-K	BATTERY CARRYING CASE	[M]
		<SL-S221C (P, PC, PX) ONLY>	
		PACKING MATERIAL	
P1	RPN1067	COVER	[M] (P)
P2	RPN1068	TRAY	[M] (P)
P3	RPQ0684	GROUND PAPER	[M] (P)
P4	RPQ0677	SPACER	[M] (PC)
P4	RPQ0681	SPACER	[M] (PX)
P5	RPK0848	PACKING CASE	[M] (PC)
P5	RPK0850	PACKING CASE	[M] (PX)
P6	RPF0111	PROTECTION BAG (UNIT)	[M] (PC, PX)
P7	RPF0046	PROTECTION BAG (F. B.)	[M] (PC, PX)
		ACCESSORIES	
A1*1	RQT3745-P	INSTRUCTION MANUAL	[M] <IA>
A1	RQT4055-P	INST. MANUAL (CAR MOUNT KIT)	[M] <IA>
A1	RQT3746-C	INSTRUCTION MANUAL	[M] (PC) <IB>
A1	RQT4056-C	INST. MANUAL (CAR MOUNT KIT)	[M] (PC) <IB>
A2	RFEA403C-S	AC ADAPTOR	[M] (P, PC) ⚠
A2	RFEA403Z-S	AC ADAPTOR	[M] (PX) ⚠
A3	RFEV705P-KS	STEREO HEADPHONES	[M] (P, PX)
A3	RFEV317P-KS	STEREO EARPHONES	[M] (PC)
A4	SH-CDC2PPY	CAR ADAPTOR	[M] ⚠
A4-1	XBA1C05NBAU	FUSE, 500mA (IN CAR ADAPTOR)	[M] ⚠
A5	SH-CDM8B	CAR STEREO CASSETTE ADAPTOR	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
A6	SQX9131	SERVICENTER LIST	[M] (PC)
A7	SQX7185	WARRANTY CARD	[M] (PC)
A8*2	RKB2057A-0	EAR PADS	[M] (PC)
A9	RQCA0476	SUPPLEMENTARY INST. MANUAL	[M] (PX)
A10	SJP5213-2	POWER PLUG ADAPTOR	[M] (PX) ⚠
		<GREASE OR JIG/TOOL>	
		TEST DISC	

Ref. No.	Part No.	Part Name & Description	Remarks
SA1	SZZP1054C	PLAYABILITY TEST DISC	[M]
SA2	SZZP1056C	UNEVEN TEST DISC	[M]
		GREASE	
SA3	PFKXPG671	MOLYCOAT GREASE PG671	[M]

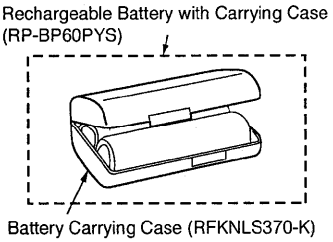
Notes:
- "<IA> and <IB>" marks in Remarks indicate language of instruction manual. [<IA>: English/ <IB>: English, French]
- * 1: The servicenter list and the warranty card are included in the instruction manual.
- * 2: This item is not attached merchandise, but it is supplied as a replacement part.

■ Supply of Rechargeable Battery as Replacement Parts (SL-S225 only)

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

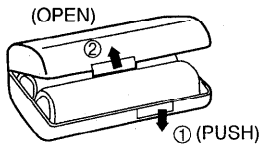
Replacement Parts:

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



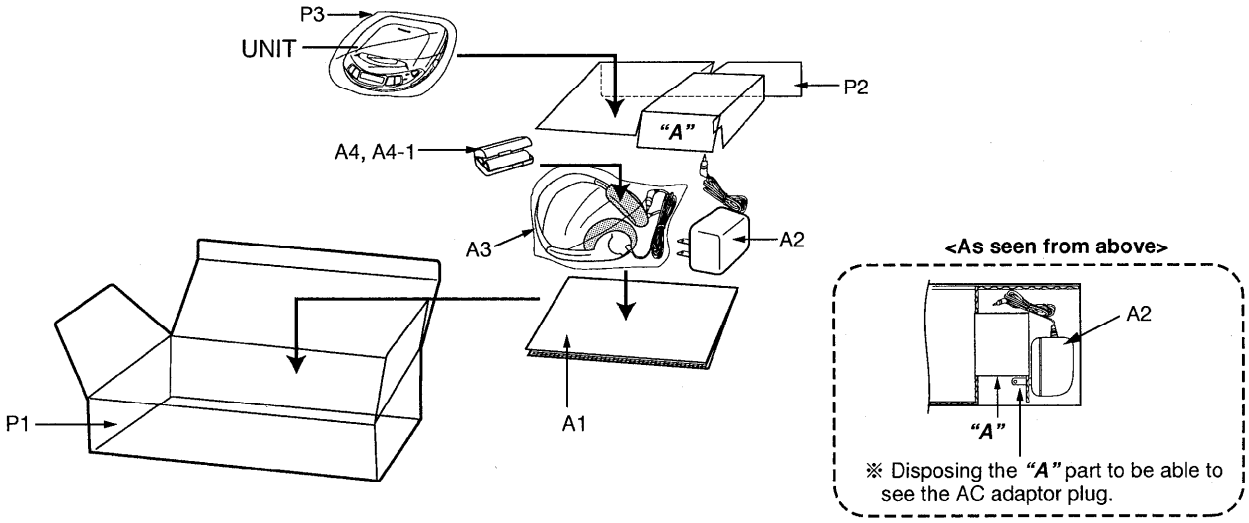
■ Caution in Use of Rechargeable Battery (SL-S225 only)

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

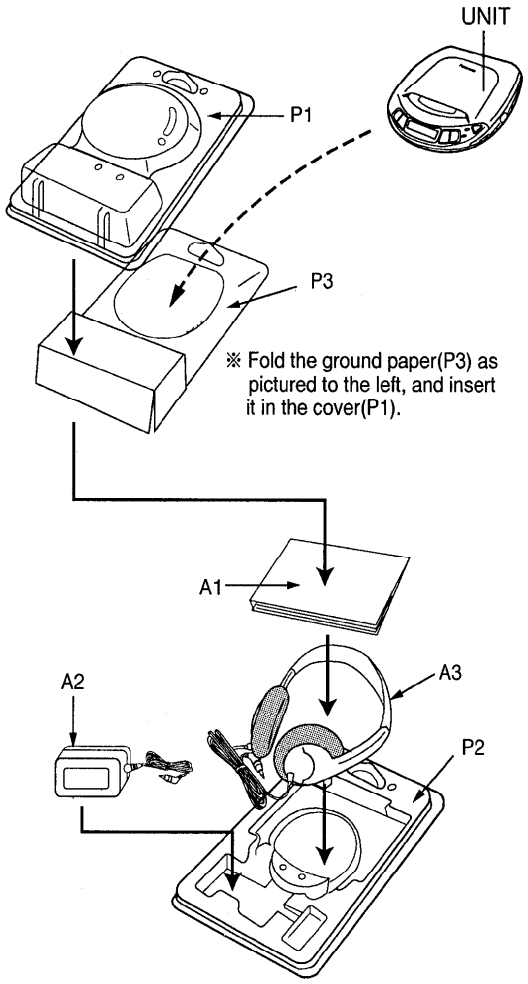


■ Packaging

- **For SL-S225(P) only**



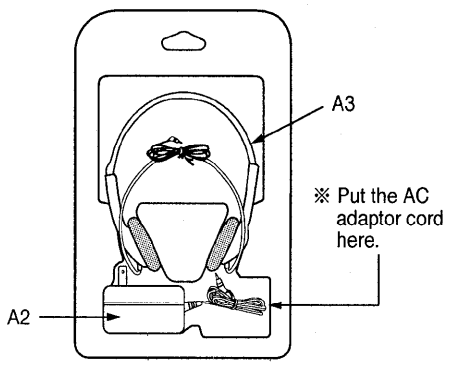
● For SL-S220(P) only



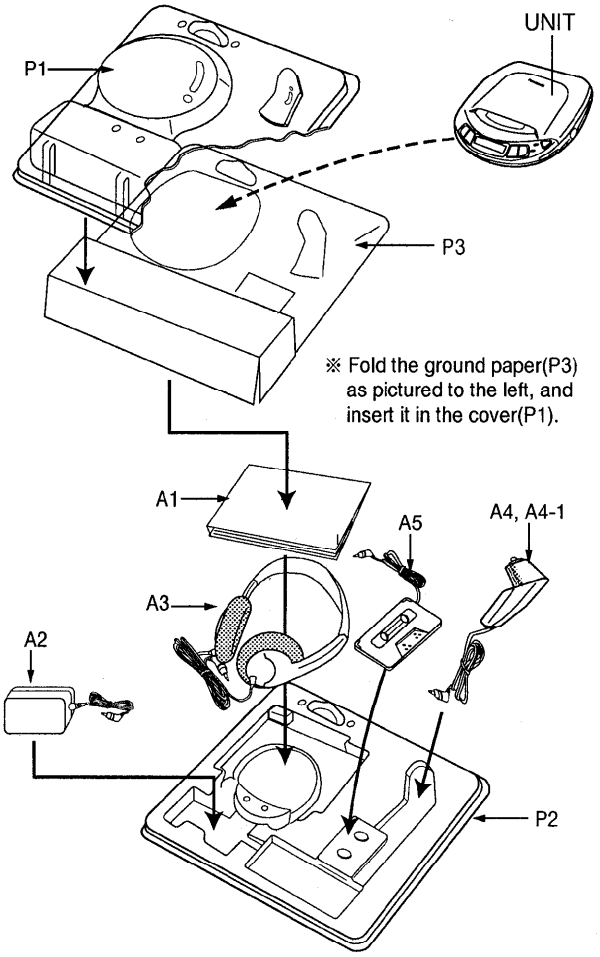
※ Remove the AC adaptor, stereo headphones bag, and insert it in the tray(P2).
※ After inserting the stereo headphones(A3) , insert the instruction manual(A1) .

Tray Ass'y

※ Trim up the stereo headphones cord as pictured to the below.



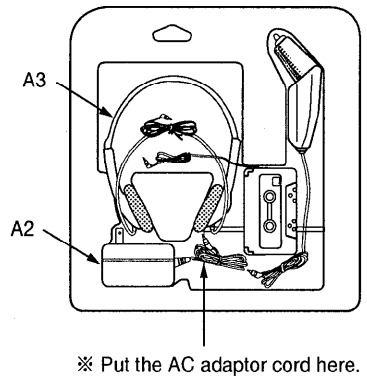
● For SL-S221C(P) only



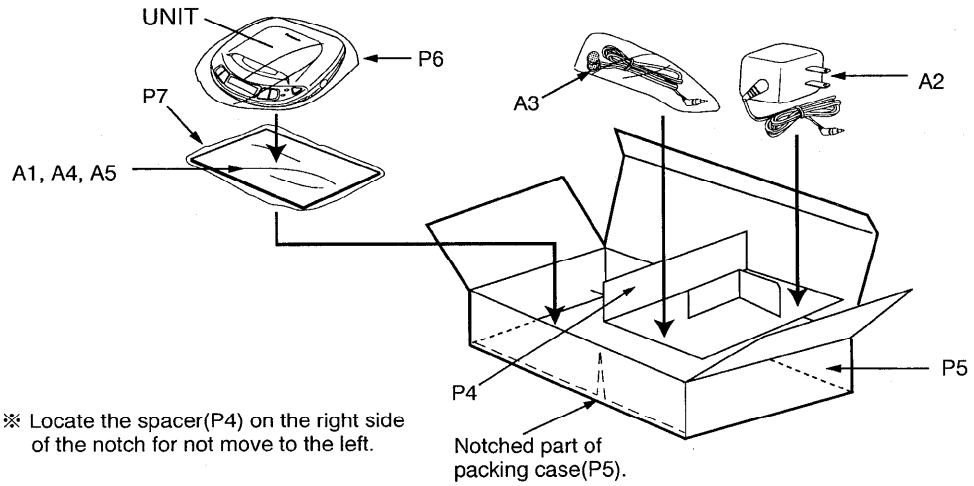
※ Remove the AC adaptor, stereo hedphones bag, and insert it in the tray(P2).
※ Remove the Car stereo cassette adaptor bag and insert it in the tray(P2).
※ Put the instruction manual(A1) on the arm of stereo headphones(A3).

Tray ass'y

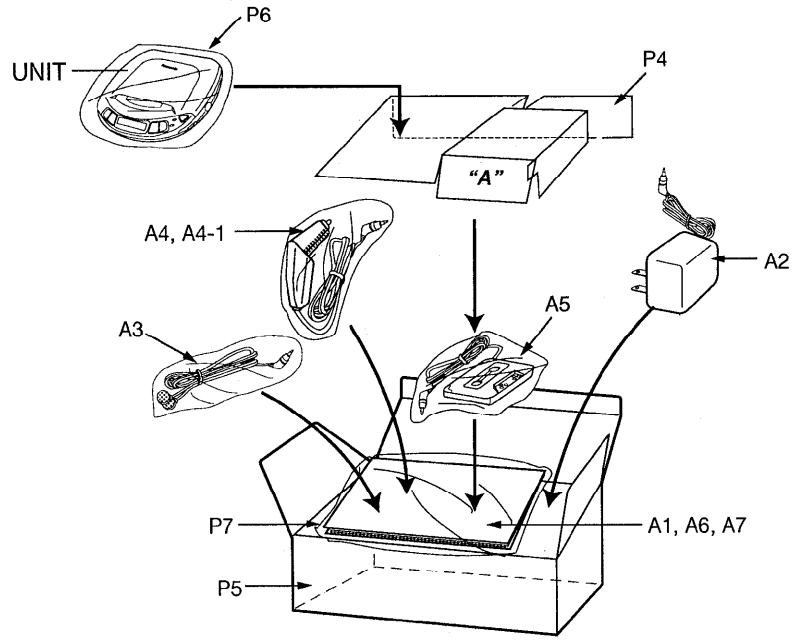
※ Trim up the stereo headphones cord as pictured to the below.



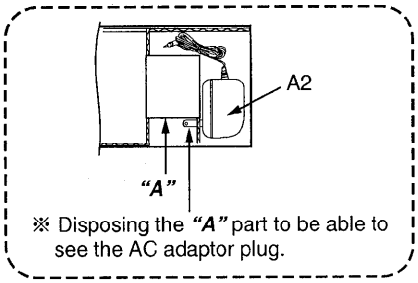
● For SL-S220(PC) only



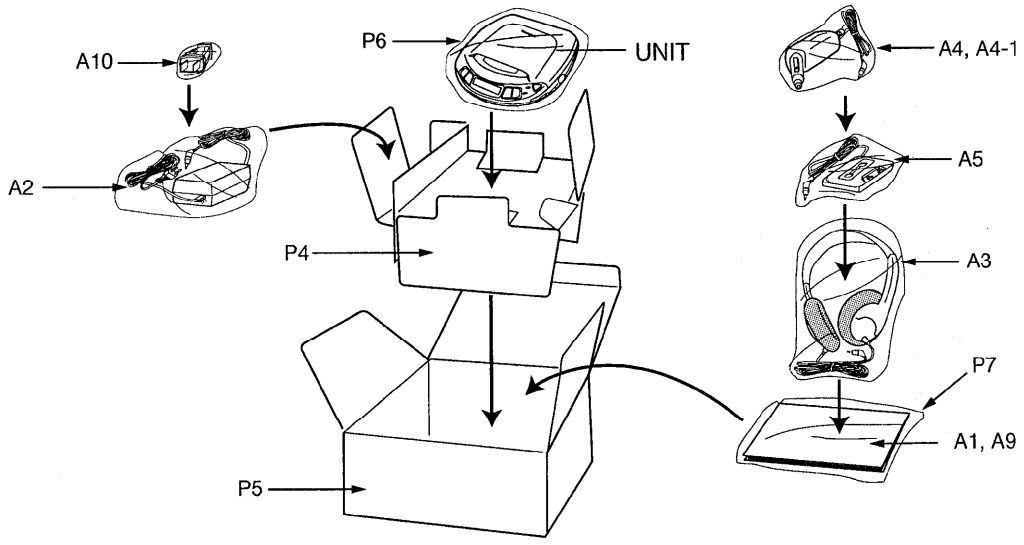
● For SL-S221C(PC) only



<As seen from above>



● For SL-S221C(PX) only



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