ORDER NO. AD9703058C3

Service Manual

Portable CD Player

SL-S450

COMPACT disc DIGITAL AUDIO

MASH※ multi-stage noise shaping

※ • MASH is a trademark of NTT.

Colour (A)... Blue Type
(H)... Gray Type
(S)... Silver Type

Area
SG ..... Tourist

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 96 dB*
Wow and flutter:	Below measurable limit
DA converter:	1 bit, MASH※
Headphone 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 temperature and on flat and stable surface.)

Batteries used: X-DSSP OFF/ON

Panasonic Alkaline dry cell batteries :(LR6, 2pcs.)	: Approx. 20h / 13h
Rechargeable batteries (When rechargeable 3 hours.)	: Approx. 10.5h / 6.5h
Panasonic Alkaline dry cell batteries :(LR6, 4pcs.)	: Approx. 45h / 30h
Rechargeable batteries (When rechargeable 3 hours.) + Panasonic Alkaline dry cell batteries (LR6, 2pcs.)	: Approx. 30h / 20h

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

General

Operation temperature range:	0~40 degree
Rechargeable temperature range:	5~40 degree
Power supply:	DC 4.5 V
Power consumption(X-DSSP OFF/ON)	
AC adaptor:	2.8W/3.2W
Battery (DC 3V):	0.35W/0.4W
When recharging:	5.9W
Dimensions :	128(Wide)/25.7(High)/142(Depth)mm
Weight:	230 g without batteries 275 g with batteries

*These specifications were measured in the X-DSSP 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 t tial dangers in attempting to service a product. Products powered by electricity should ced professional technicians. Any attempt to service or repair the product or products one else could result in serious injury or death.

Panasonic®

WORLDWIDE WARRANTY

Panasonic/Technics

Contents

Precaution of Laser Diode

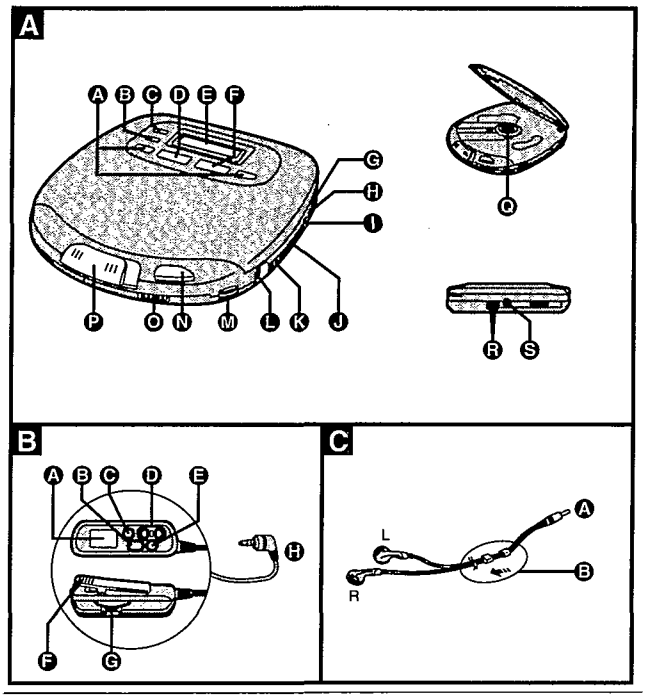
CAUTION: This unit utilizes a class 1 laser. Invisible laser radiation is emitted from the optical pickup lens when the unit is turned on :

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.

Accessories

- AC adaptor ..... 1 pc. (REFA403Z-S)
- Stereo earphones ..... 1 pc. (RFEV316P-K1S)
- Wired remote controller ..... 1 pc. (RFEV006PCKM)
- Plug adaptor ..... 1 pc. (SJP5213-2)
- Soft case ..... 1 pc. (RFC0041-K)
- Battery case ..... 1 pc. (RFA0627-K4)
- Rechargeable battery Ass'y ..... 1 pc. (RFKFP3GAVT2S)
- Battery carrying case ..... 1 pc. (RFKNLS370-K)

Location of Controls



Portable CD player A

- Ⓐ Skip/search buttons (⏮, ⏭/◀◀, ▶▶)
- Ⓑ Memory/recall button (MEMORY/RECALL)
- Ⓒ Repeat button (REPEAT)
- Ⓓ Stop/power off button (■, POWER OFF)
- Ⓔ Display
- Ⓕ Play/pause button (▶ ❚❚)
- Ⓖ DC in jack (DC IN 4.5 V ⊖-Ⓒ-⊕)
- Ⓗ Out jack (OUT)
- Ⓘ Optical digital out jack (OPT OUT)
- Ⓙ Play mode selector (RESUME, NORMAL, RANDOM)
- Ⓚ Train/S-XBS selector (TRAIN, S-XBS, OFF)
- Ⓛ Headphones jack (∩)
- Ⓜ Headphones volume control (VOLUME)
- Ⓝ Open button (OPEN)
- Ⓞ Optical digital out/Extra digital sound shock protector switch (OPT OUT/X-DSSP)
- Ⓟ Hold switch (HOLD-LOCK)
- Ⓠ Push button (PUSH)
- Ⓡ Connection terminal for battery case
- Ⓢ Hole for car mounting base/battery case

Wired remote controller B

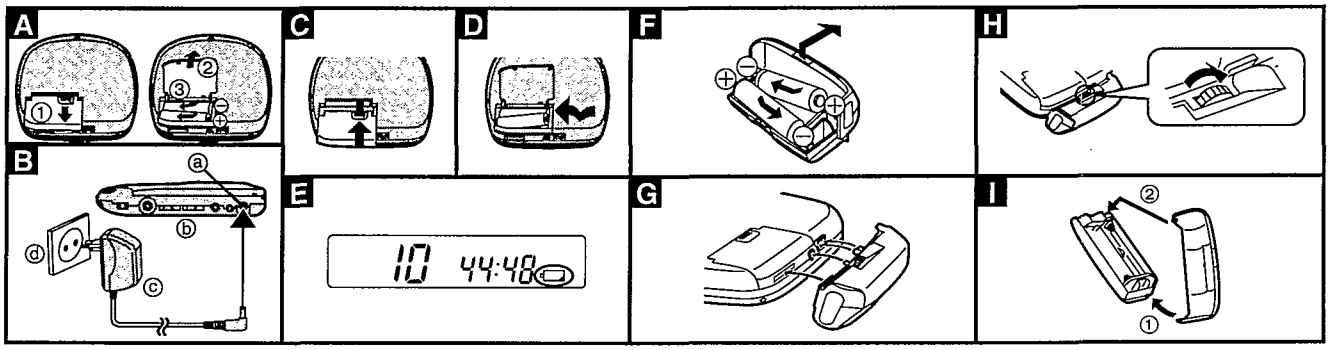
- Ⓐ Display
- Ⓑ Play/stop/off button
- Ⓒ Repeat button (REPEAT)
- Ⓓ Skip/search buttons (⏮, ⏭)
- Ⓔ Light/hold button (•LIGHT/▬ HOLD)
- Ⓕ Clip
- Ⓖ Volume control
- Ⓗ Plug

Stereo earphones C

- Ⓐ Plug
- Ⓑ Slider

Power Supply Preparations

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



Using rechargeable batteries

Make sure to recharge the batteries before using them. The unit cannot be used to charge rechargeable batteris other than those specifically designed for it.

- Supplied batteries (P-3GAVT)
- Optional batteries (P-3GAVT/2B, SH-CDB8D)

Recharging procedure

1 Insert the special rechargeable batteries into the unit. A

2 Connect the AC adaptor. B

ⓐ DC IN jack (DC IN 4.5 V ⊖-Ⓒ-⊕)
ⓑ Side panel of the unit
ⓒ AC adaptor
ⓓ AC power outlet

The configuration of the AC adaptor differs according to the area.

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 supplied 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.
- When recharging starts, the "Ⓒ" charging indicator flashes on and off on the unit's display panel.
- The AC adaptor and rechargeable batteries may become warm while recharging is in progress. This is not a malfunction.
- Recharging may only be performed when the unit is powered off. (It is not possible to recharge the batteries while playing a CD.)

If the battery lid compartment comes loose C

Slide the lid back into place horizontally.

Removing batteries D

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

Using dry-cell batteries (not included)

After disconnecting the AC adaptor, insert two LR6 (UM-3) alkaline batteries.

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

Using the AC adaptor

Connect the AC adaptor supplied.

Refer to "Using rechargeable batteries" for connection instructions.

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.

Battery indicator E

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.

Using the battery case

The battery case allows you to extend the maximum playing time of the unit by loading an additional two LR6 (UM-3) alkaline batteries.

Notes

- When using the battery case, always insert batteries in the unit body as well. (The unit cannot be operated on the batteries in the external battery case alone.)
- Do not use rechargeable batteries in the battery case.
- If rechargeable batteries and dry-cell batteries are used together, make sure to use fully charged rechargeable batteries and new dry-cell batteries.
- When using four dry-cell batteries, do not mix new and old batteries.

1 Open the cover of the battery case and insert the batteries. F

Insert the end marked (–) first.

2 Mount the battery case on the unit body. G

Insert the protrusions on the battery case into the four indentations in the unit body.

3 Secure in place with the screw. H

Reverse the above procedure to remove the external battery case.

For your reference:

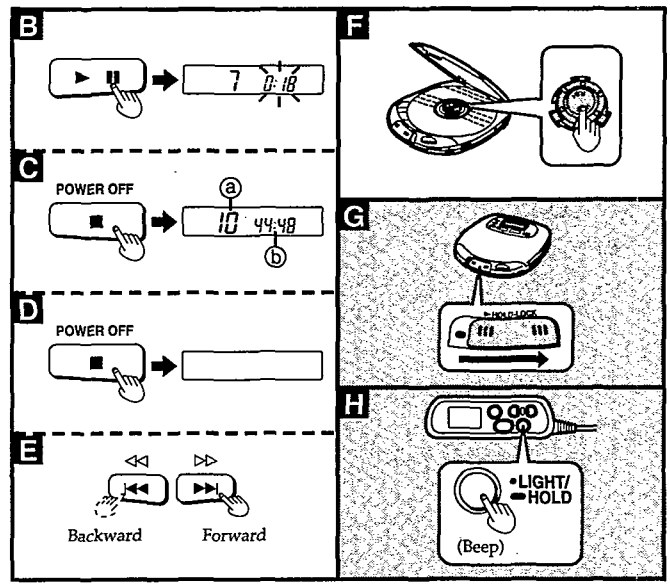
The maximum playing time will differ depending on the type of batteries (rechargeable/dry-cell) loaded in the unit body.

If the cover of the battery case comes loose: I

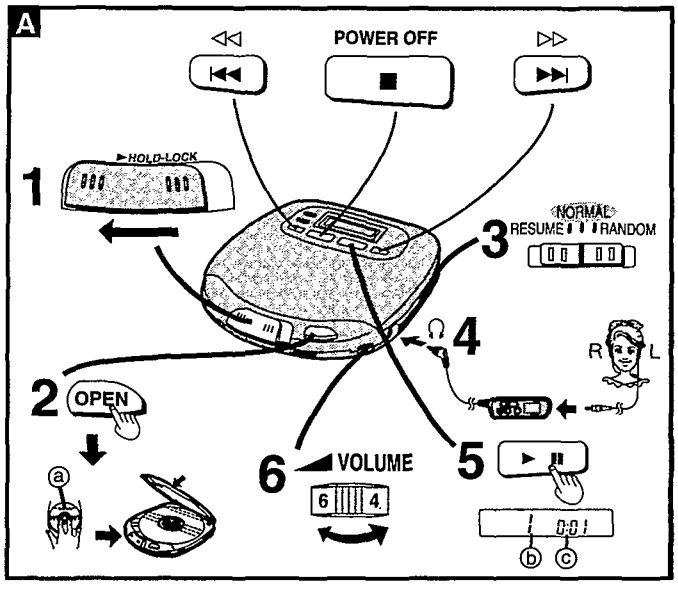
Insert the protrusions into the holes on either end of the lid.

Using the car adaptor (not included)

Be sure to obtain the car adaptor (SH-CDC9), available as an optional accessory. The car adaptor can be used to recharge the unit's batteries while in the car.



■Sequential Play (Basic Play)



Following steps 1–6. A

ⓐ Label side up
ⓑ Track number in play
ⓒ Elapsed playing time of each track

- 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.

To pause play B

Press during play

To stop play C

Press during play [Stop mode]

ⓐ Total number of tracks
ⓑ Total playing time

To turn off the unit D

Press during stop mode [Off mode]

Skip forward/backward (skip function) E

Press during play

Rapid forward/backward (search function) E

Press and hold during play.

- During program play (see page 5), these buttons are used to skip forward or back through the programmed sequence of tracks.
- During random play (see page 5), 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 (see page 5), search operation is limited to the current track only.

Removing discs F

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.)

Note

Never insert foreign objects into the unit body.

"no dISC" indication

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

"oP EN" 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.)

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.

■Accidental Operation Prevention Function

This function causes the unit to ignore short, accidental button presses. (When the unit is in hold status, the cover will not open even when the OPEN button is pressed.)

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.
- The cover opening unexpectedly in the middle of a selection.

The unit body and remote control are equipped with a HOLD-LOCK slider and a HOLD button, respectively, and each operates independently of the other to activate hold status.

To use the accidental operation prevention function

Slide the HOLD-LOCK slider on the unit body to the HOLD position. (The remote control still functions.) G

Hold down the HOLD button on the remote control until the confirmation beep sounds. (The controls on the unit body still function.) H

"hoLd"/"HOLD" Indication

Unit body: 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.

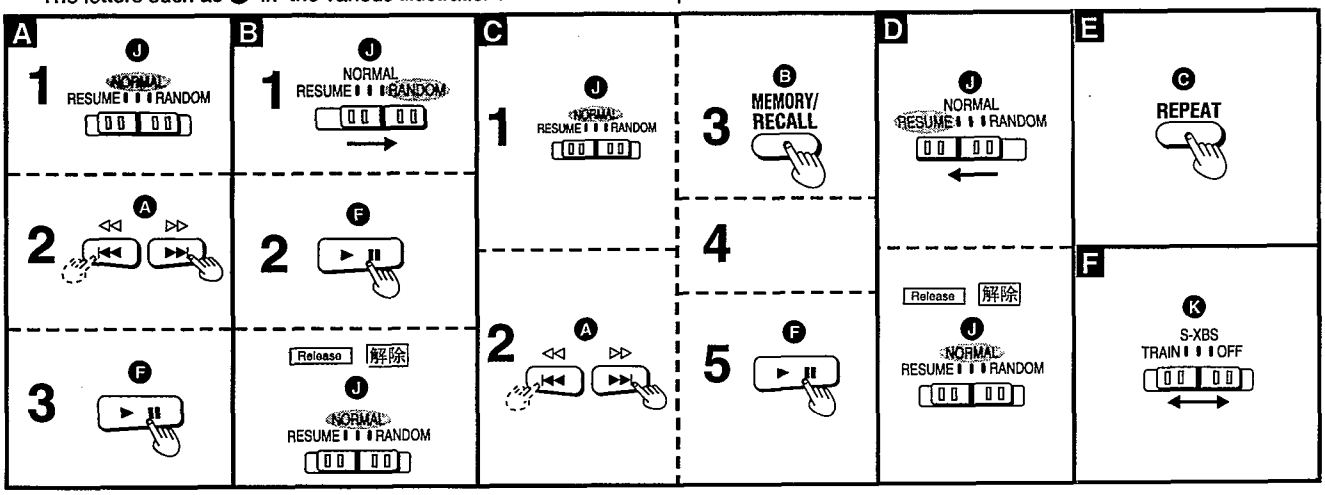
When the unit is powered off

The "hoLd" indication appears only when the ► ❚❚ button is pressed.

Remote control: The indication "HOLD" appears on the display when hold status is activated.

■Other Play Methods

The letters such as Ⓐ in the various illustrations refer to the descriptions in the " Location of Controls " section.



Skip play A

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

Preparation: Put unit in stop mode. (See page 4.)

Following steps 1–3.
In step 2, select the desired track.

Random play B

Following steps 1–2.
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.

Program play C

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

Preparation: Put unit in stop mode. (See page 4.)

Following steps 1–5.
In step 2, select the desired track.
In step 3, register in sequence.
(The indication "M" and the programmed sequence appear on the display panel.)
In step 4, repeat steps 2 and 3 to program all the desired tracks.

■ 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.

Resume play D

This function allows you to listen from the beginning to 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.

For your reference:
- If the RESUME, NORMAL, RANDOM (play mode switch) 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 disk.

Repeat function E

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

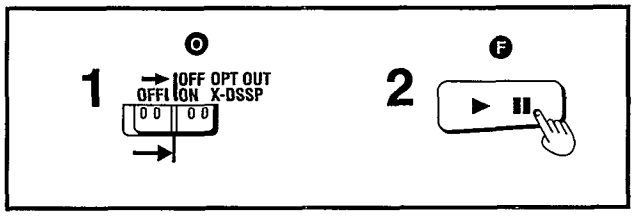
For your reference:
If REPEAT is pressed during program play, only the tracks in the programmed sequence are repeated.
(The indication "ALL" is not displayed.)
The setting is switched in the sequence indicated below each time REPEAT is pressed.

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 F

S-XBS:
Select this setting to boost the low-range response.
TRAIN:
Select this setting to avoid annoying other passengers with noise from your earphones while riding on the train, or to reduce fatigue when listening for a long period of time.
OFF:
Select this setting to turn off the S-XBS and TRAIN functions.

Note
The sound quality setting does not affect the output from the OUT (analog output) and OPT OUT (optical digital output) jacks.



■Extra Digital Sound Shock Protector

This function minimizes sound interruption when vibrations are encountered by utilizing audio data that has been stored ahead of time (up to approximately 10 seconds' worth).

Optical digital out jack cannot be used when the X-DSSP slider is in the ON position.

Notes
- The position of the X-DSSP slider can be changed during play, but this may cause a slight interruption in the sound because the disc's rotational speed changes.
- During X-DSSP 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.

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)
Sorry	Bumps continue repeatedly	Sound is interrupted (data buffer empty)

Using the unit with an audio system

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

■Using the Remote Controller

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

■ Display panel illumination

When hold status is canceled and the remote control is operated, the display panel illuminates for approximately five seconds. This is useful when operating the unit in a dark location.
Also, the display panel illuminates when the •LIGHT/ ➡HOLD button is pressed once while the unit is in hold status.

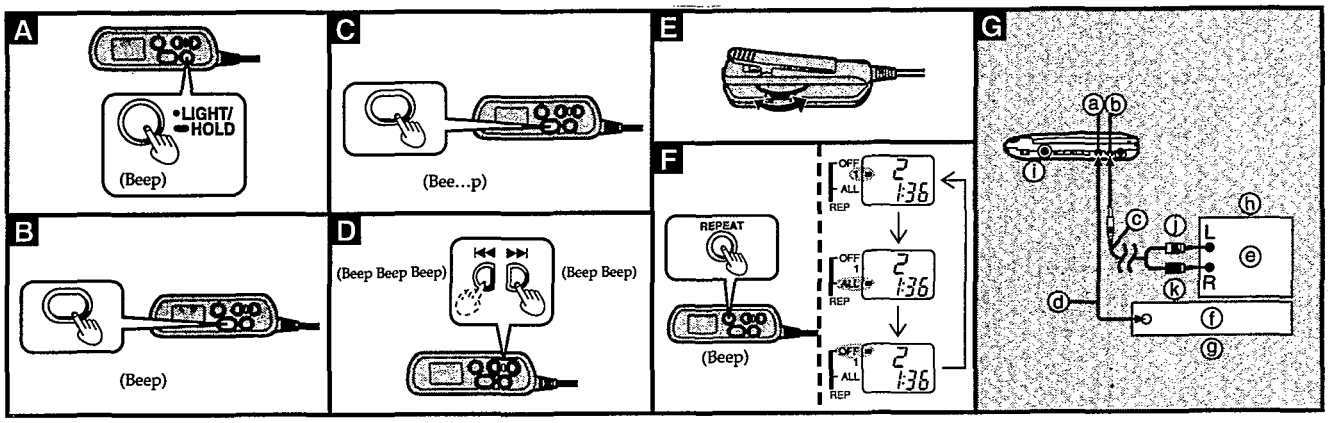
■ Operation confirmation beep

When an operation button is pressed, a confirmation beep sounds. However, no confirmation beep sounds when the •LIGHT/ ➡HOLD button is pressed once (causing the display panel to illuminate). Refer to the explanations in parentheses ( ) in the illustration above, etc., for information on the different types of confirmation beeps that sound.

How to use the wired remote controller

Preparation:
Release the remote controller from the hold mode. Hold down until "HOLD" indication disappears. A

To start play B
Press once during off or stop.mode.



To stop play B
Press once during play.

To turn off the unit C
Press and hold during play or stop mode.

Skip forward/backward D
Press once during play
▶▶|: Forward direction
|◀◀: Backward direction

Rapid forward/backward D
Press and hold during play.

To adjust the volume E
When adjusting the volume using the remote controller, position the volume control on the unit to between 4 and 6.

How to use the repeat button F
Press during play or stop mode.
Each time you press REPEAT, the repeat function changes as follows.

One track repeat
↓
All tracks repeat
↓
Cancel

Note
When the repeat button is operated, the sound will be interrupted for an instant. This is normal and not indicative of a malfunction.

Using the unit with an audio system G

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.

ⓐ Optical digital out jack
ⓑ OUT jack
ⓒ Stereo connection cable (not included)
ⓓ Optical cable (not included)
ⓔ To CD or AUX terminals
ⓕ To optical digital in jack
ⓖ MD recorder etc.
ⓗ Amplifier
ⓘ Side panel of the unit
ⓙ (White)
ⓚ (Red)

- To use the player with an optical cable, use the AC adaptor and check that the X-DSSP selector is OFF.

Operation is not possible when rechargeable batteries or dry cell batteries are used to power the player.

Using the unit with a car audio system stereo

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

For securing the unit and connecting the power supply:
- Car 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 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.

■Troubleshooting Guide

First, consult the table below. If the problem persists, contact the dealer from whom you purchased the unit.

Problem	Check this
Cannot open/close cover.	•Is the disc properly secured in place? •Is the unit body in hold status?
Cannot play discs.	•Is the unit in hold status? •Is the disc properly secured in place? •*Is there moisture condensation on the lens?* (Wait for about an hour and then try again.)
Cannot remove disc.	Did you press the PUSH button to release the disc?
Tracks on disk do not play in order, starting with the first track.	Is the RESUME, NORMAL, RANDOM (play mode switch) slider in the NORMAL position?
Cannot hear music—too noisy.	•Are the earphone plug and the remote control plug inserted all the way? •Are the plugs dirty?
TV picture is distorted. Radio reception is noisy.	Are you using the unit body too near a TV or tuner? (If the TV or tuner is connected to a simple indoor antenna, connect it to an outdoor antenna.)

■Cautions

Rechargeable batteries
- Only the P-3GAVT, P-3GAVT/2B, 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 insert rechargeable batteries into the battery case.

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

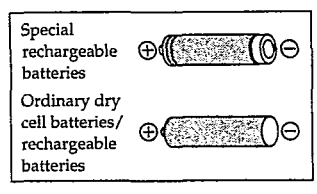
When putting dry cell or rechargeable batteries in a pocket or bag, ensure that no other metal objects such as a necklace are placed together with them. Contact with metal may cause short-circuiting which, in turn, may cause a fire.
Be absolutely sure to carry the rechargeable batteries in the battery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

When driving a car

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

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: P-3GAVT/2B, SH-CDB8D (set of 2)
For details, check with your dealer.



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.

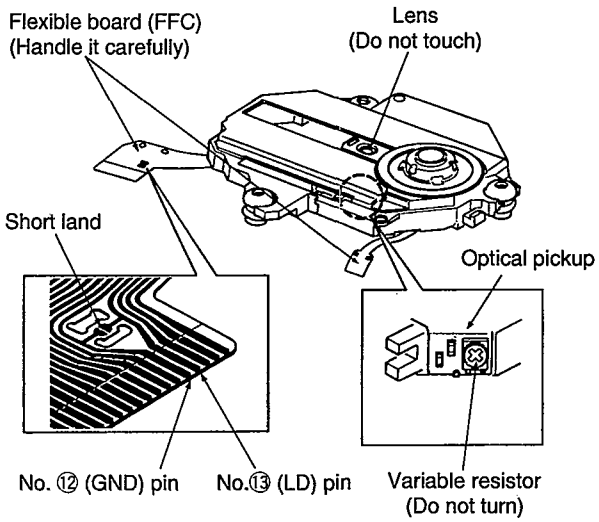
Precautions for Listening with the Headphones
- Do not play your headset at a high volume. Hearing experts advise against continuous extended play.
- If you experience a ringing in your ears, reduce volume or discontinue use.
- Do not use while operating a motorized vehicle. It may create traffic hazard 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.

■ 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).

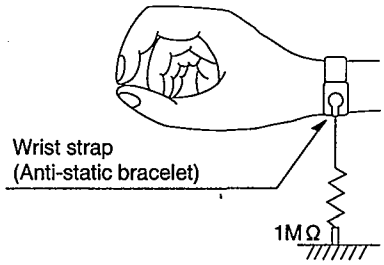
● Handling of traverse deck (optical pickup)

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 (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.



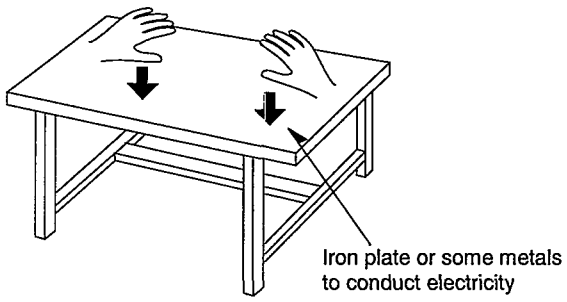
● Grounding for electrostatic breakdown prevention

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).



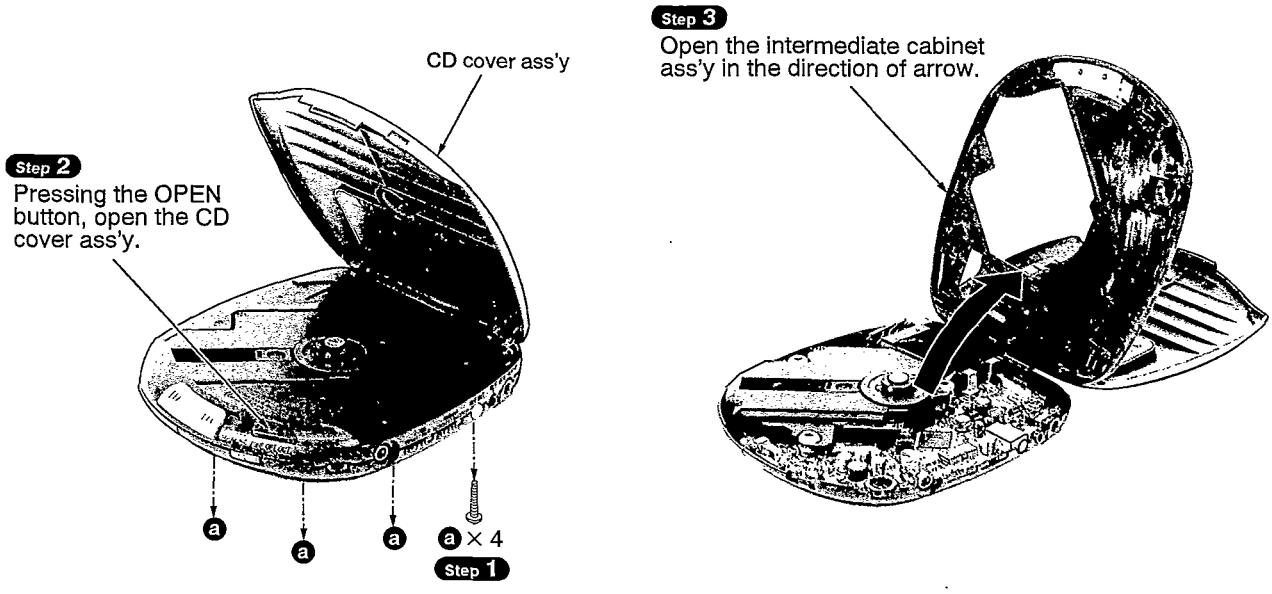
■ Operation Checks and Main Component Replacement Procedures

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.**

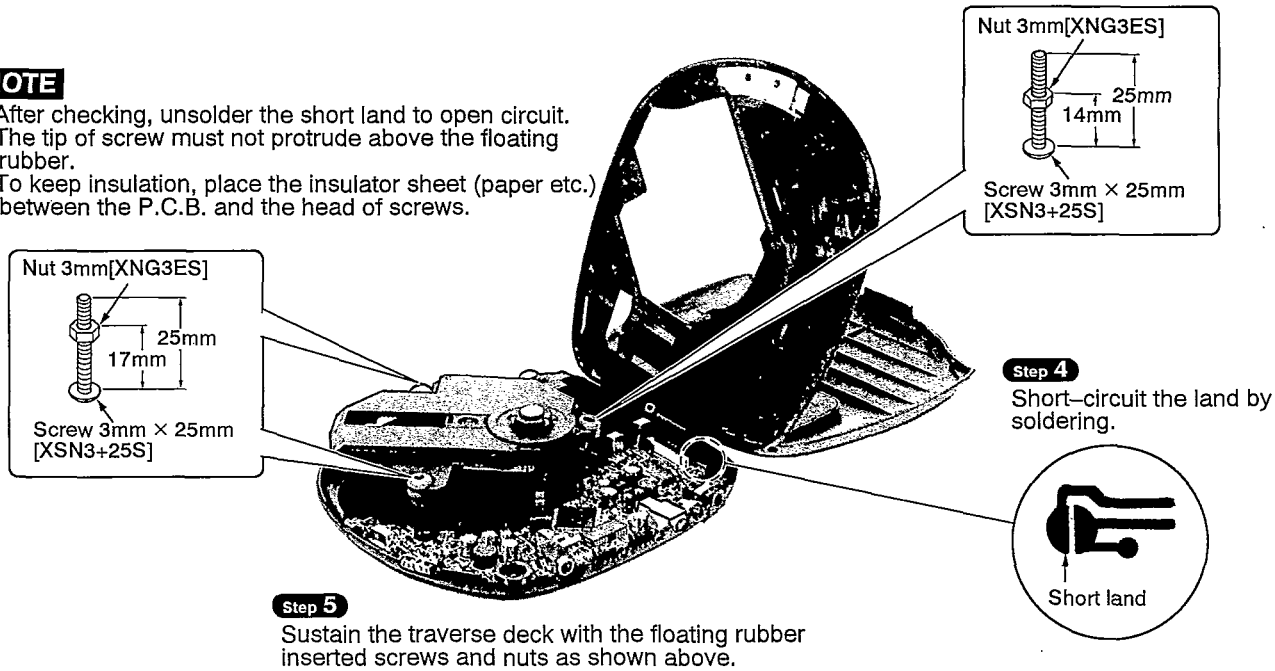
1. Checking for the P.C.B.

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

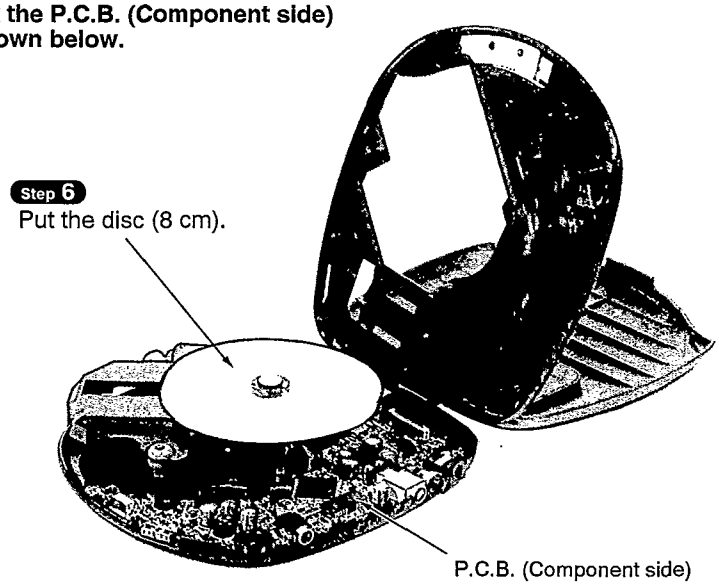


NOTE

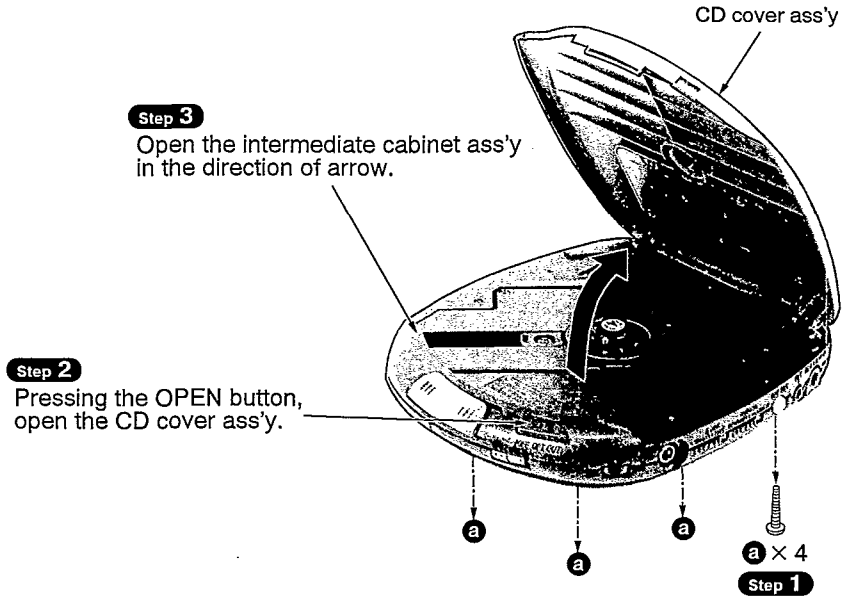
- After checking, unsolder the short land to open circuit.
- The tip of screw must not protrude above the floating rubber.
- To keep insulation, place the insulator sheet (paper etc.) between the P.C.B. and the head of screws.

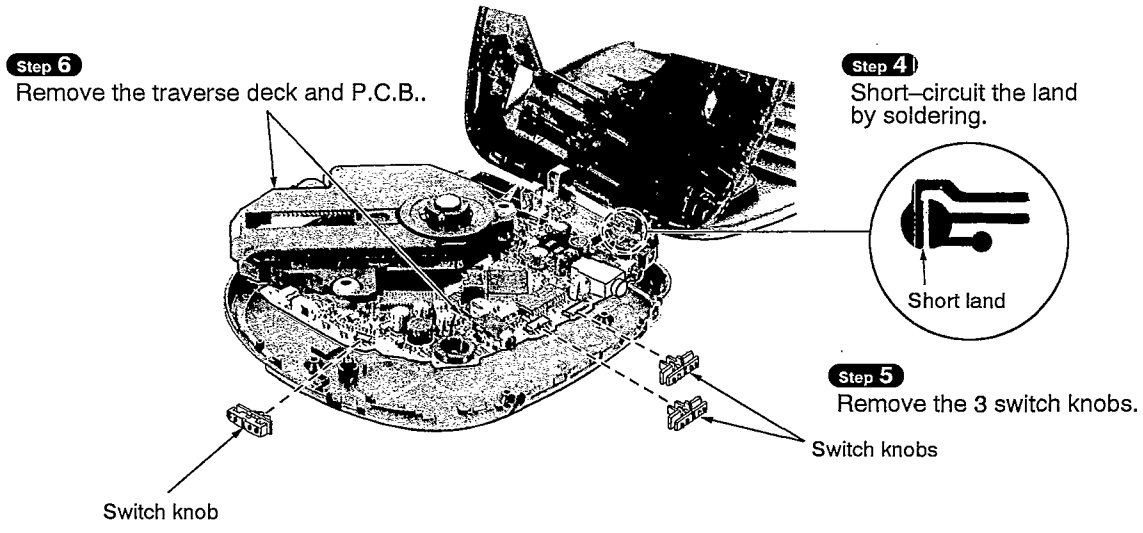


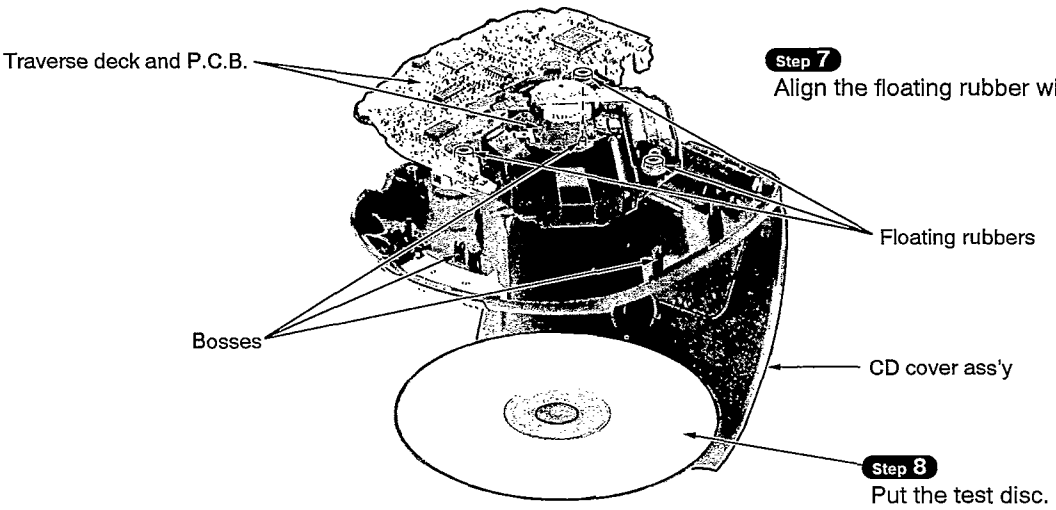
• **Check the P.C.B. (Component side) as shown below.**



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



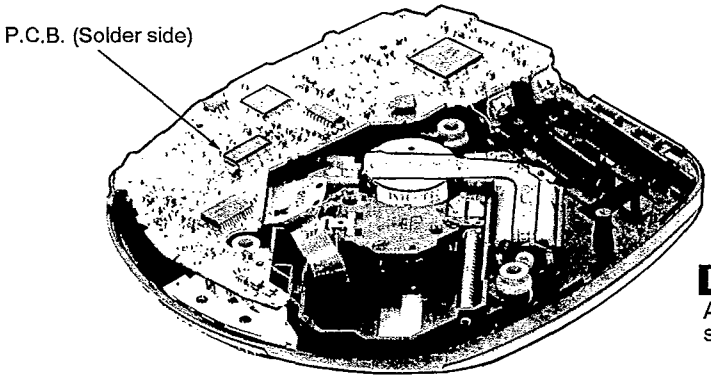




Step 7
Align the floating rubber with the boss.

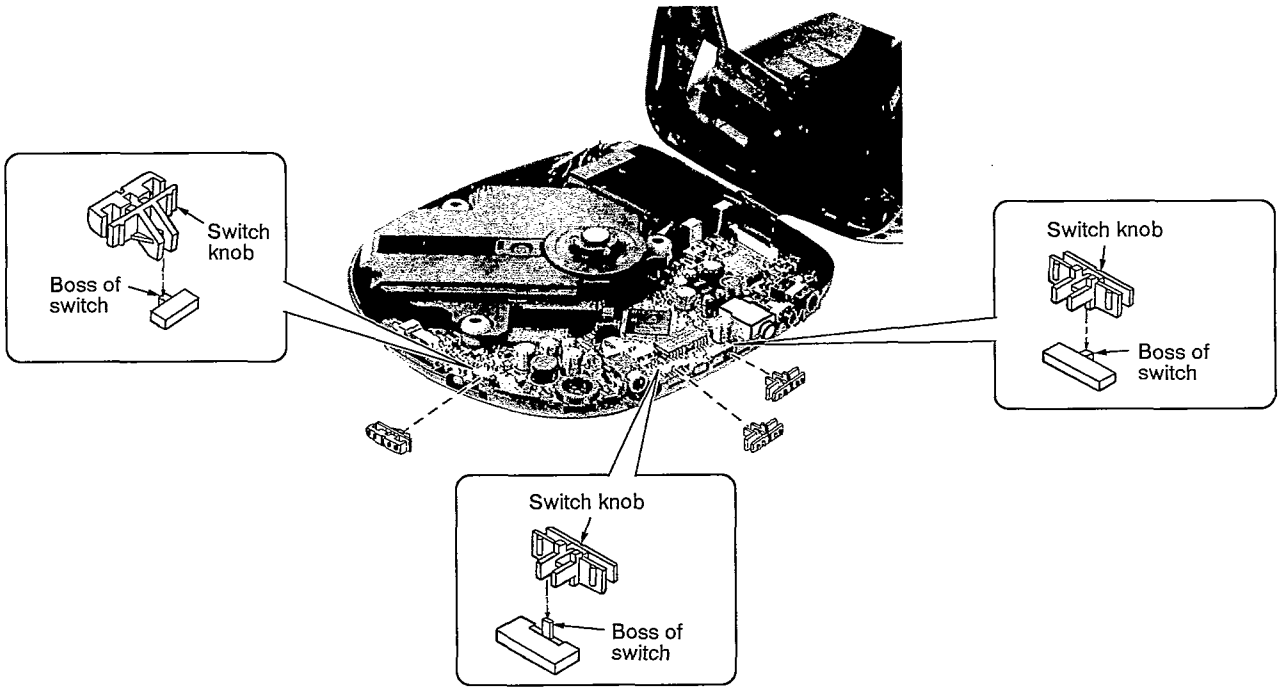
Step 8
Put the test disc.

• 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

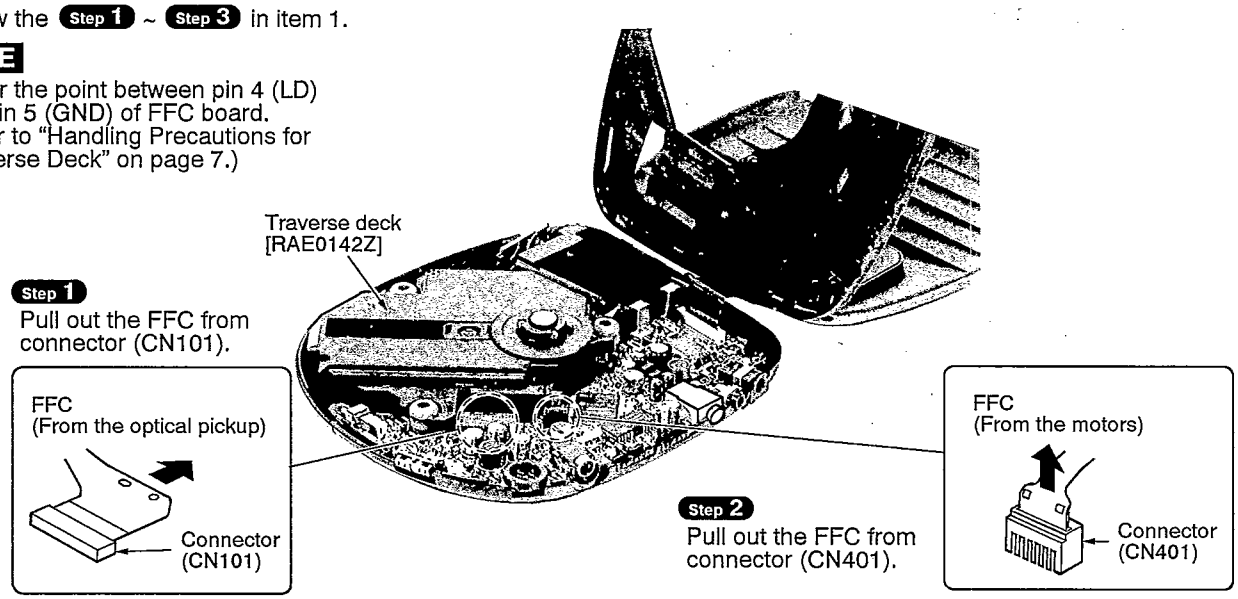


2. Replacement for the traverse deck

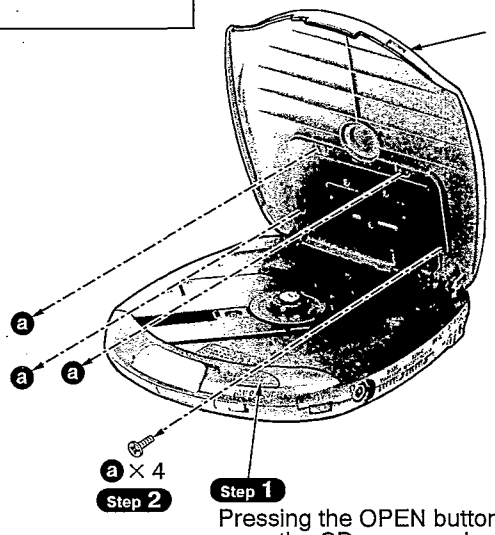
• Follow the Step 1 ~ Step 3 in item 1.

NOTE

Solder the point between pin 4 (LD) and pin 5 (GND) of FFC board. (Refer to "Handling Precautions for Traverse Deck" on page 7.)

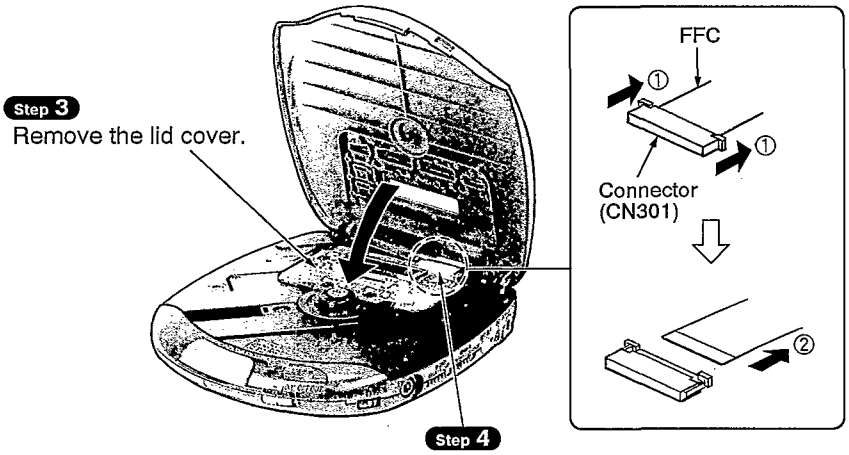


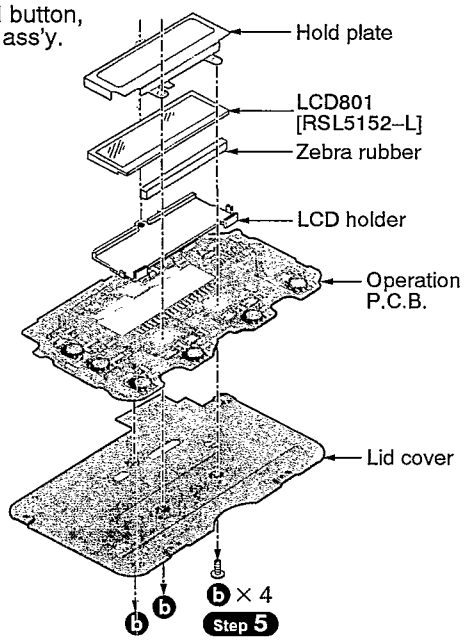
3. Replacement for the LCD



NOTE

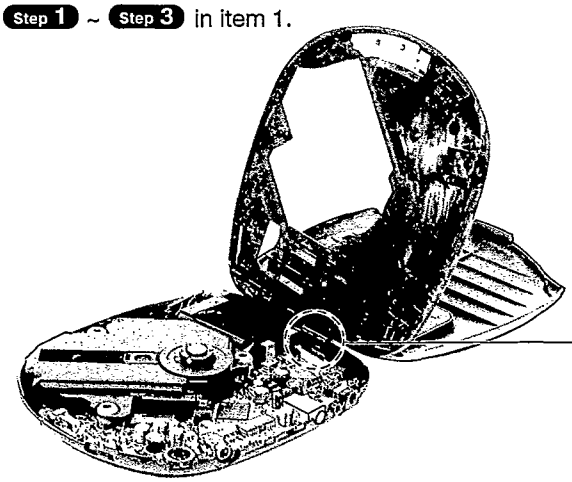
Keep clean the surface of the zebra rubber.



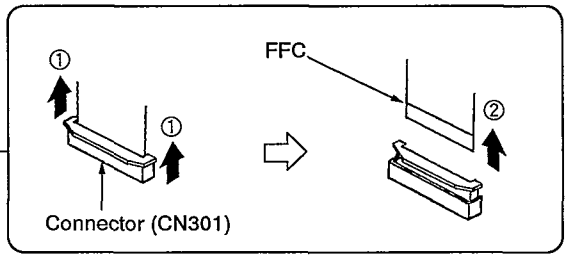


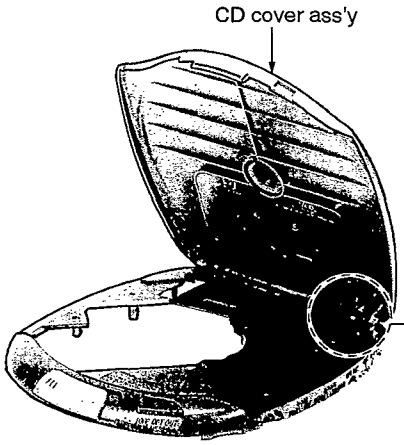
4. Replacement for the CD cover ass'y

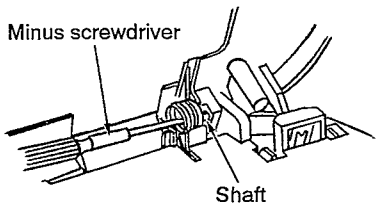
• Follow the Step 1 ~ Step 3 in item 1.



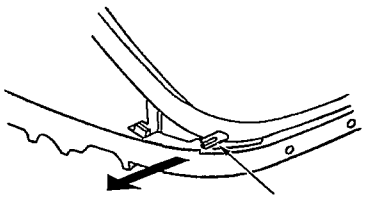
Step 1
Remove the FFC from the connector (CN301).



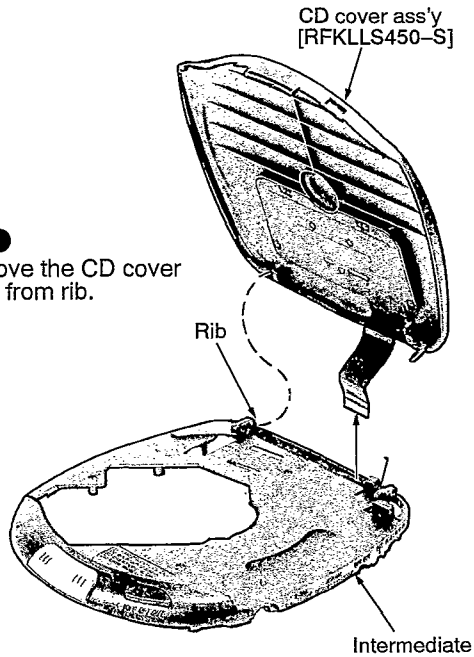




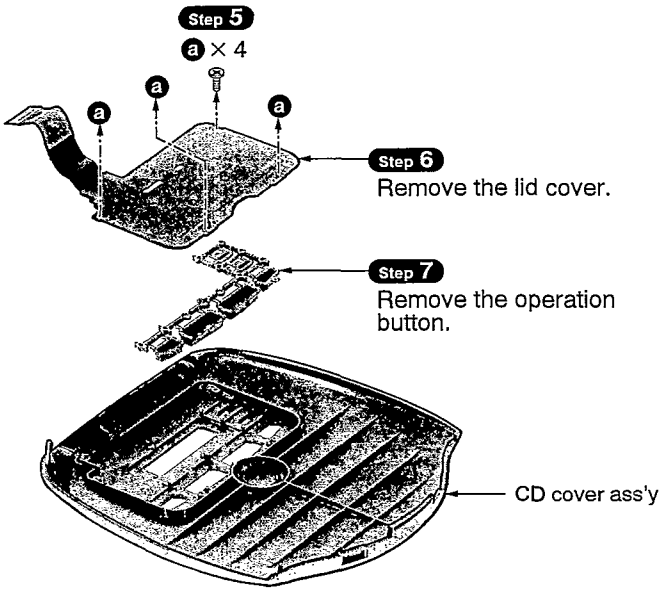
Step 2
Push the shaft with the thin minus screwdriver.



Step 3
Pull out the shaft.



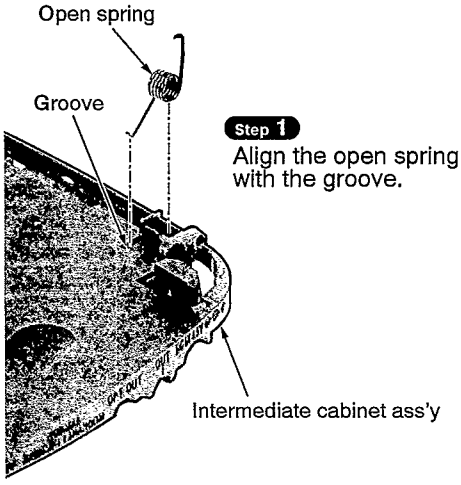
Step 4
Remove the CD cover ass'y from rib.



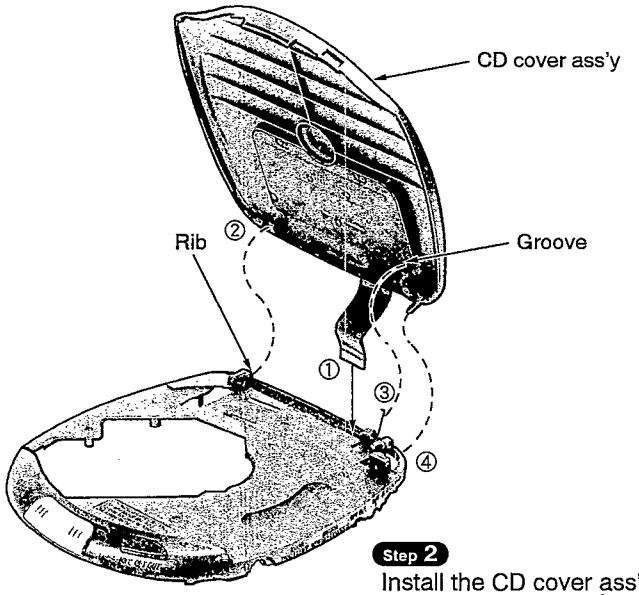
Step 6
Remove the lid cover.

Step 7
Remove the operation button.

Reassembly procedures of CD cover ass'y

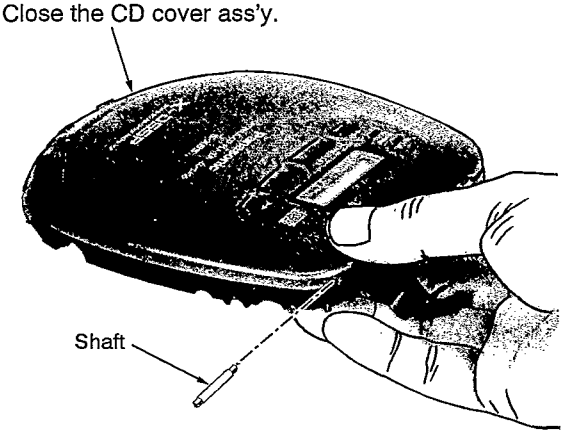


Step 1
Align the open spring with the groove.



Step 2
Install the CD cover ass'y in order of numeric ①–④.

Step 3
Close the CD cover ass'y.



Step 4
Holding the CD cover ass'y not to be detached the open spring and push the shaft, install the shaft.

■Outline of 10 - 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

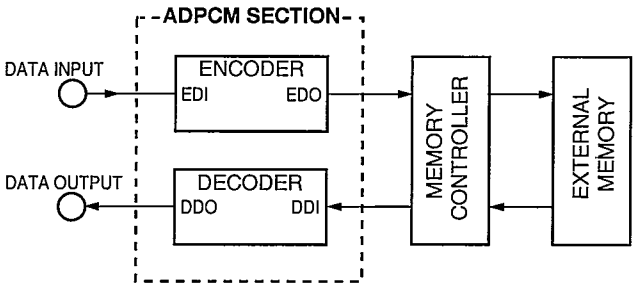
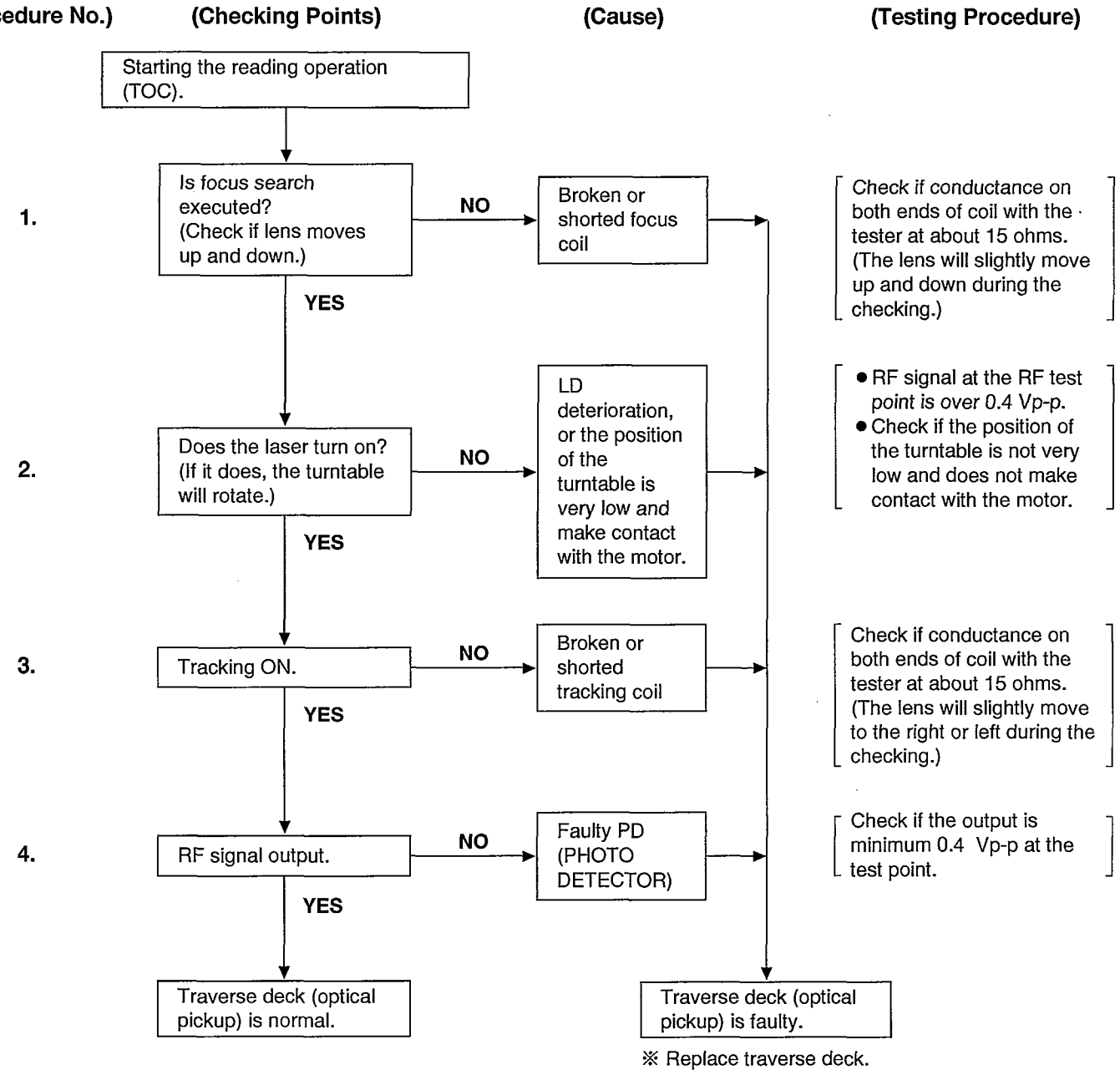


Fig. 1

■ 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)

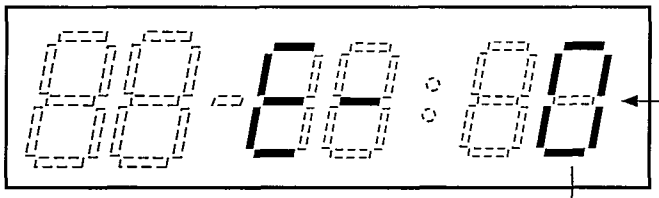
On this unit (SL-S450), each automatic adjustment result are displayed on the LCD. This function is convenient to check or identify which automatic adjustment circuit is incorrect. The followings are the contents of the automatic adjustment result displays (self-check function).

• 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)

LCD Display



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

MSB LSB

〈Example〉

TGC	FGC	TBC	FBC

(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.)

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

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

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

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

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

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

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

(1) the waveform or voltage of the focus servo circuit is correct,
(2) the focus coil of the optical pickup is correct (around 15 ohms), and
(3) the optical pickup returns to the normal state by exchanging the traverse deck.

Follow the below steps when "E—F" is displayed.

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

(1) the optical pickup returns to the normal state by exchanging the traverse deck, and
(2) the waveform or voltage of the servo IC's (IC101, 501) are correct.

Note:
It is not always necessary to exchange the traverse deck when an error message is displayed.
Be sure to check if the circuit is defective or not before exchanging the traverse deck.

Note:
If any other disc than the test disc (SZZP1054C) is used, an error message may be displayed. This is not a malfunction.

■ Mesurements and Adjustments

Warning: This product uses a laser diode. Refer to caution statements on page 2.
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)
- 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 28.)

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,as shown in Fig.1.

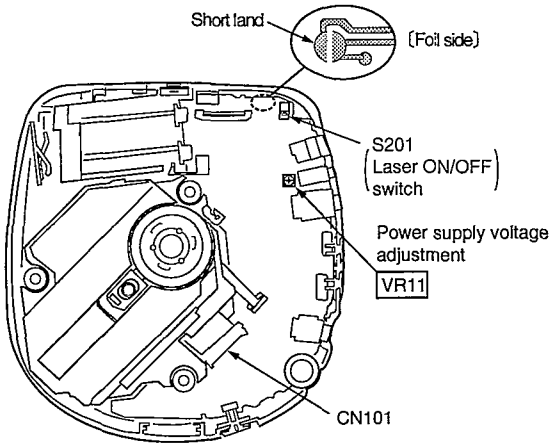


Fig. 1

• Adjustment procedure

(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 **2.70** $^{+\ 0.02}_{-\ 0.00}$ **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.

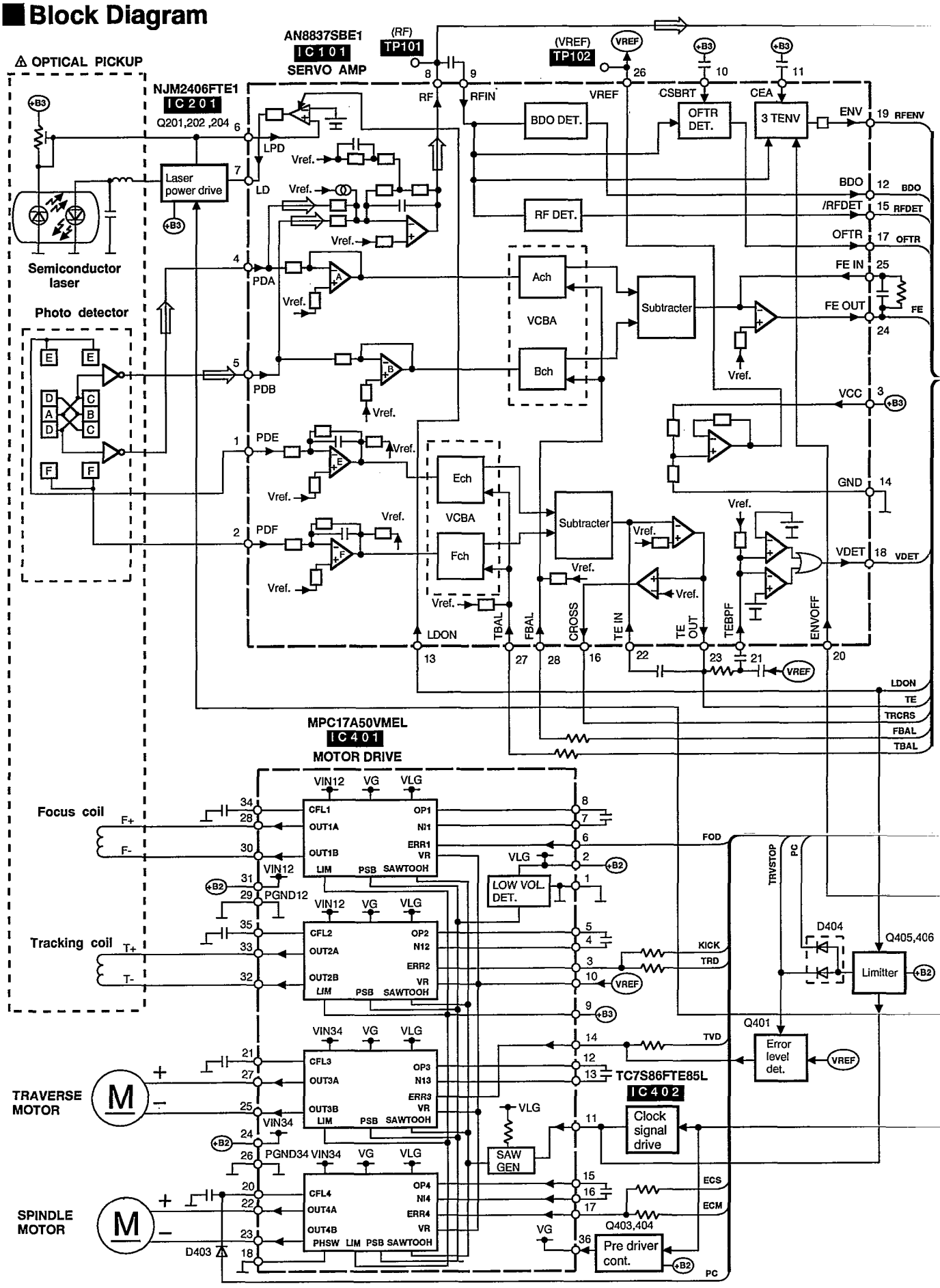
• Automatic adjustment

On our conventional type portable CD player, there were mounted 6 semi-fixed controls for each adjustment. Since the SL-S450 servo circuit is equipped with an automatic adjusting circuit, these controls are removed from SL-S450.

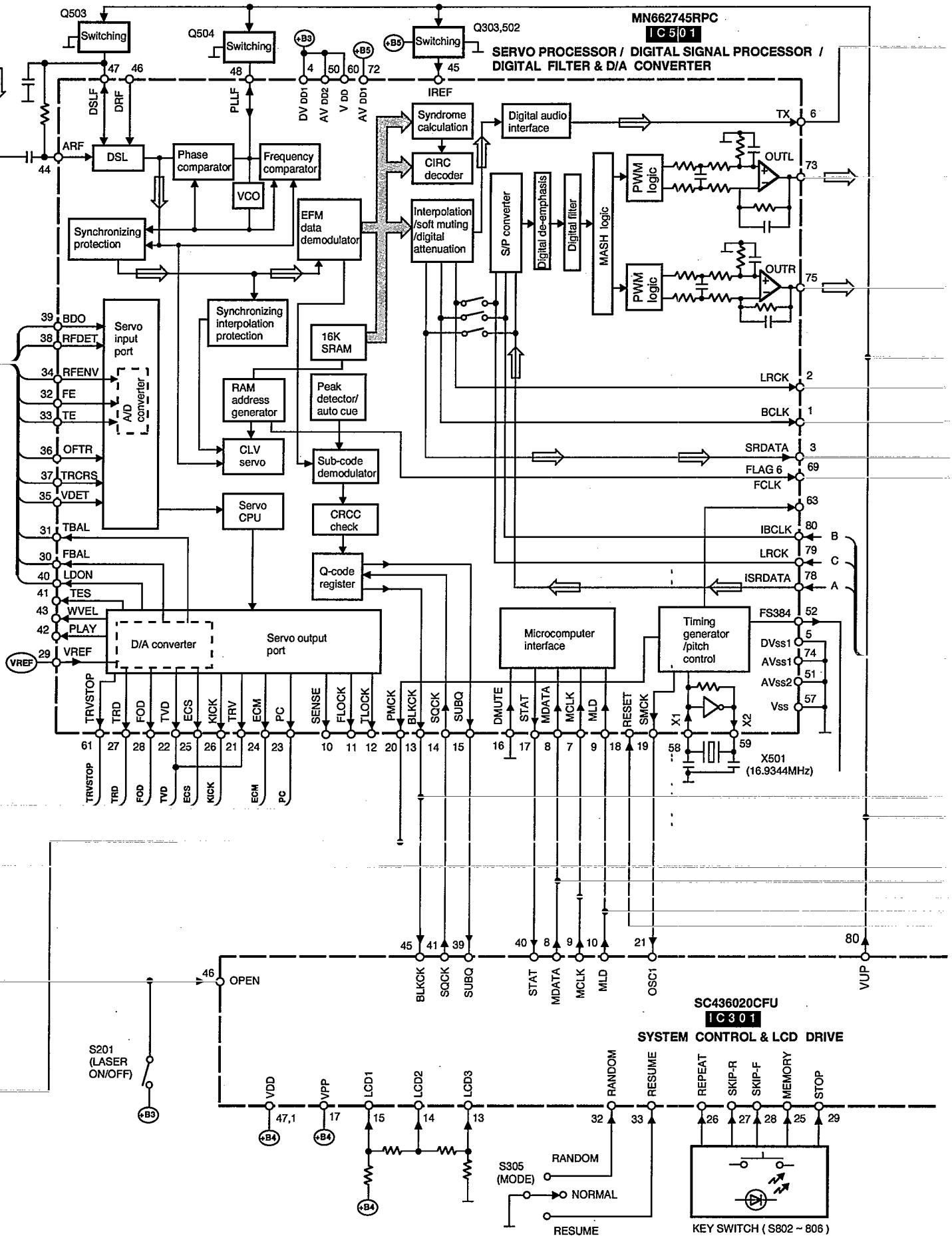
On conventional portable CD player Use for Old Servo IC (AN8373SE2, AN8374SE2)		**On SL-S450** Use for New Servo IC (AN8837SBE1, MN662745RPC)
1. Tracking Offset Adjustment VR (TOC)	➡	Non Adjustment
2. Focus Offset Adjustment VR (FOC)		
3. Tracking Gain Adjustment VR (TGC)	➡	Automatic Adjusting Circuit
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-S450 automatically controls the servo circuit to obtain optimum performance according to any disc's characteristics. Therefore, no malfunction occurs because of mis-adjustment.

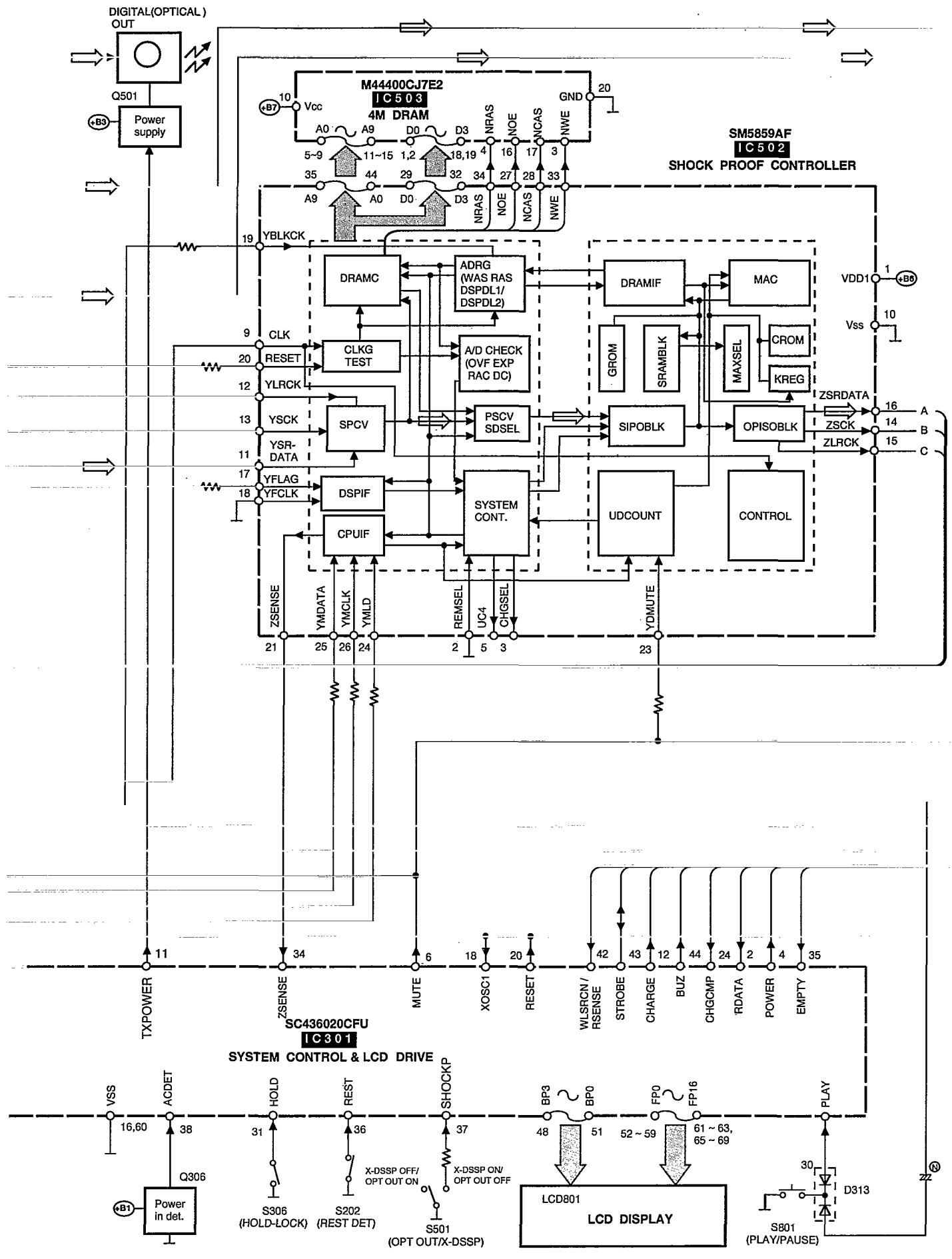
Block Diagram



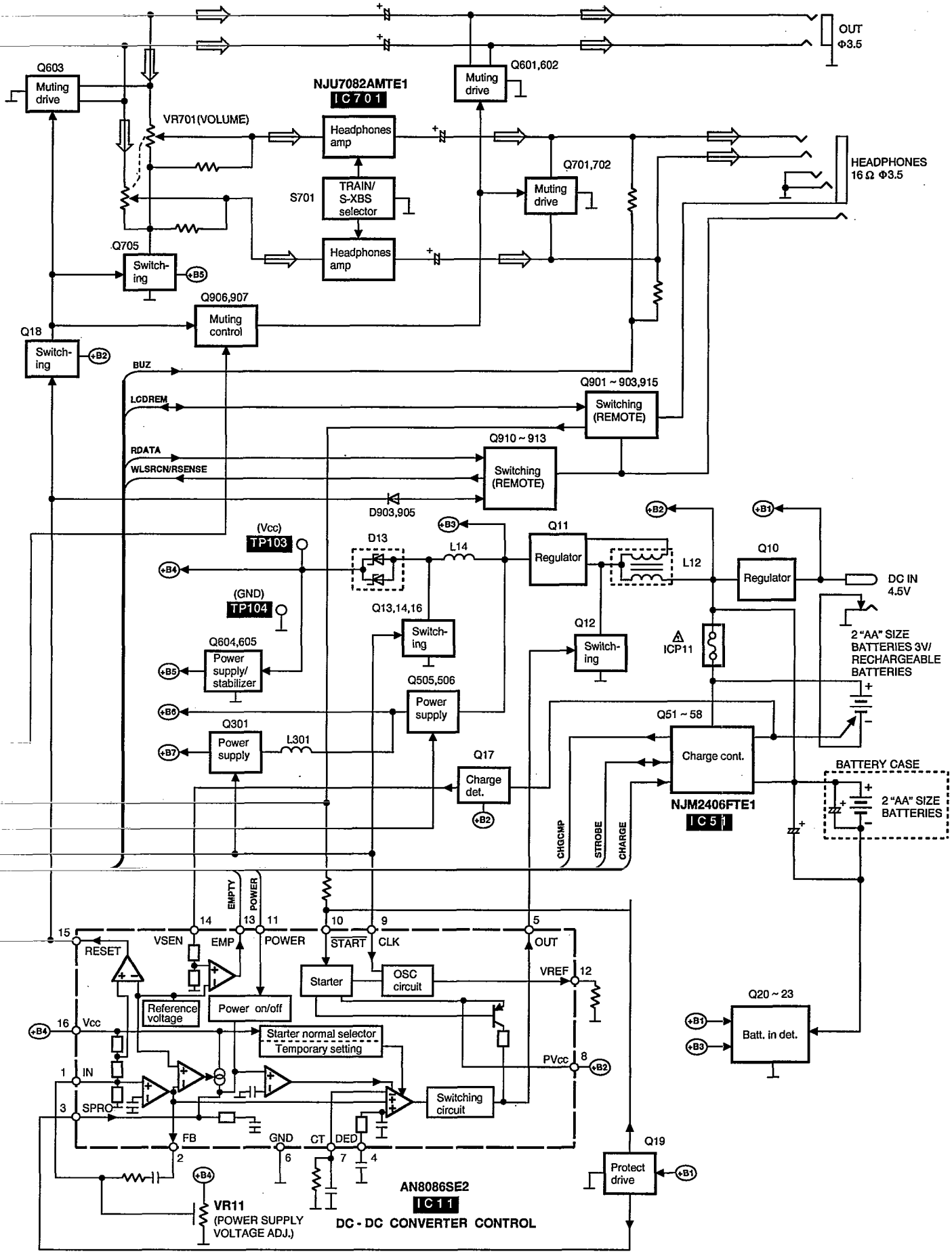
Note: ● ⟹ : Audio signal lines.



● Signal line ⇨ : Audio signal



Note: ● ⟹ : Audio signal lines.



■Schematic Diagram (See parts list on pages 35 ~ 38.)

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

Notes:

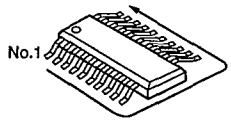
- **S201:** Laser ON/OFF switch in "OFF" position. (It turns "ON" with disc holder closed.)
- **S202:** Rest detector in "OFF" position. (It turns "ON" when optical pickup comes to innermost periphery.)
- **S305:** Play mode selector (MODE) in "RANDOM" position. (RANDOM←→NORMAL←→RESUME)
- **S306:** Hold lock (HOLD-LOCK) switch in "OFF" position.
- **S501:** Optical Pickup/sound keeper (OPT OUT/X-DSSP) switch in "OFF" position. [X-DSSP OFF←→ON(OPT OUT OFF)]
- **S701:** S-XBS switch in "OFF" position. (TRAIN/S-XBS/OFF)
- **S801:** Play/pause (▶ / ❚❚) switch.
- **S802:** Stop/power off (■ /POWER OFF) switch.
- **S803:** Skip/search (▶▶❙ / ▶▶ , ❙◀◀ / ◀◀) switches.
  S804: [S804: GO BACK, S803: ADVANCE]
- **S805:** Memory/recall (MEMORY/RECALL) switch.
- **S806:** Repeat (REPEAT) switch.
- **VR11:** Power supply voltage adjustment.
- **VR701:** 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 X-DSSP 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.

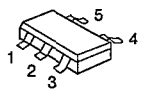
- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.

● Terminal guide of IC's, transistors and diodes

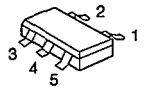


NJU7082AMTE1	8 Pin
AN8086SE2	16 Pin
AN8837SBE1	28 Pin
MPC17A50VMEL	36 Pin

TC7S86FTE85L



NJM2406FTE1



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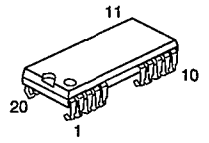
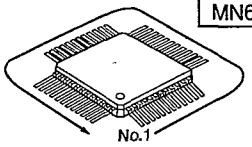
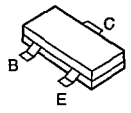


SM5859AF	44 Pin
SC436020CFU	80 Pin
MN662745RPC	80 Pin





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2SB709QRSTX
2SB970RSTX
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2SD1328RSTTX
2SD1758TLPQR
2SD1819QRSTX
DTA114YUA106

DTA143TUT106
UN5113TX
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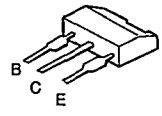
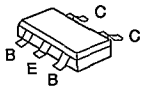
UN5211TX
UN5213TX
UN5215TX

2SD2074HWSTT





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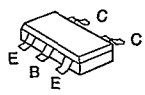
XN1215TX
XN1501TX
XP0121N00L

XN2401TX



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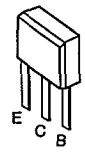

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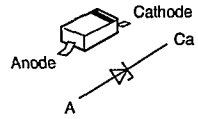

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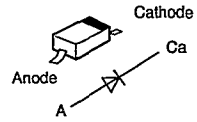

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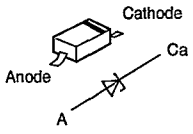

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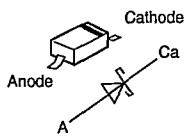

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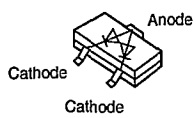

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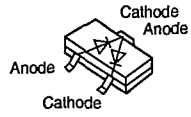

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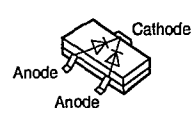

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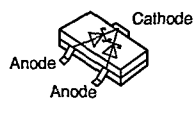
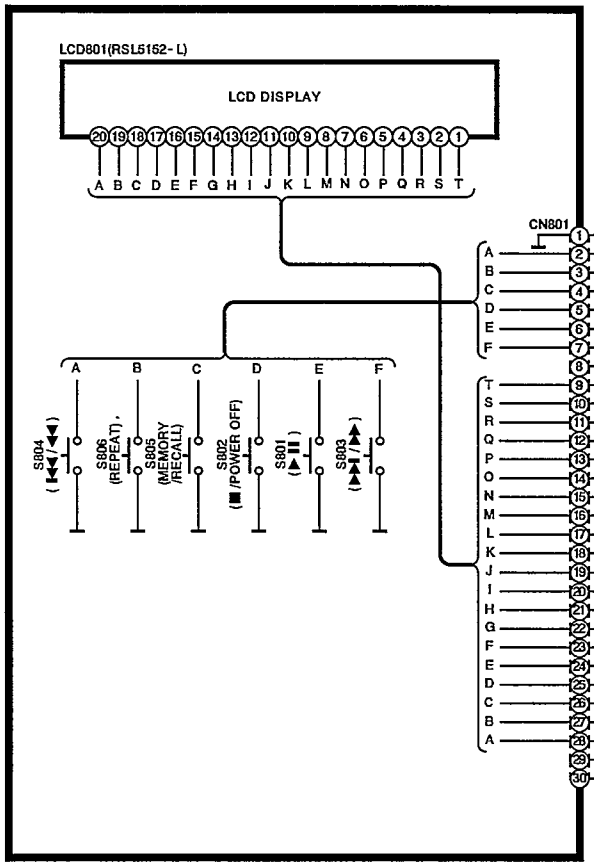


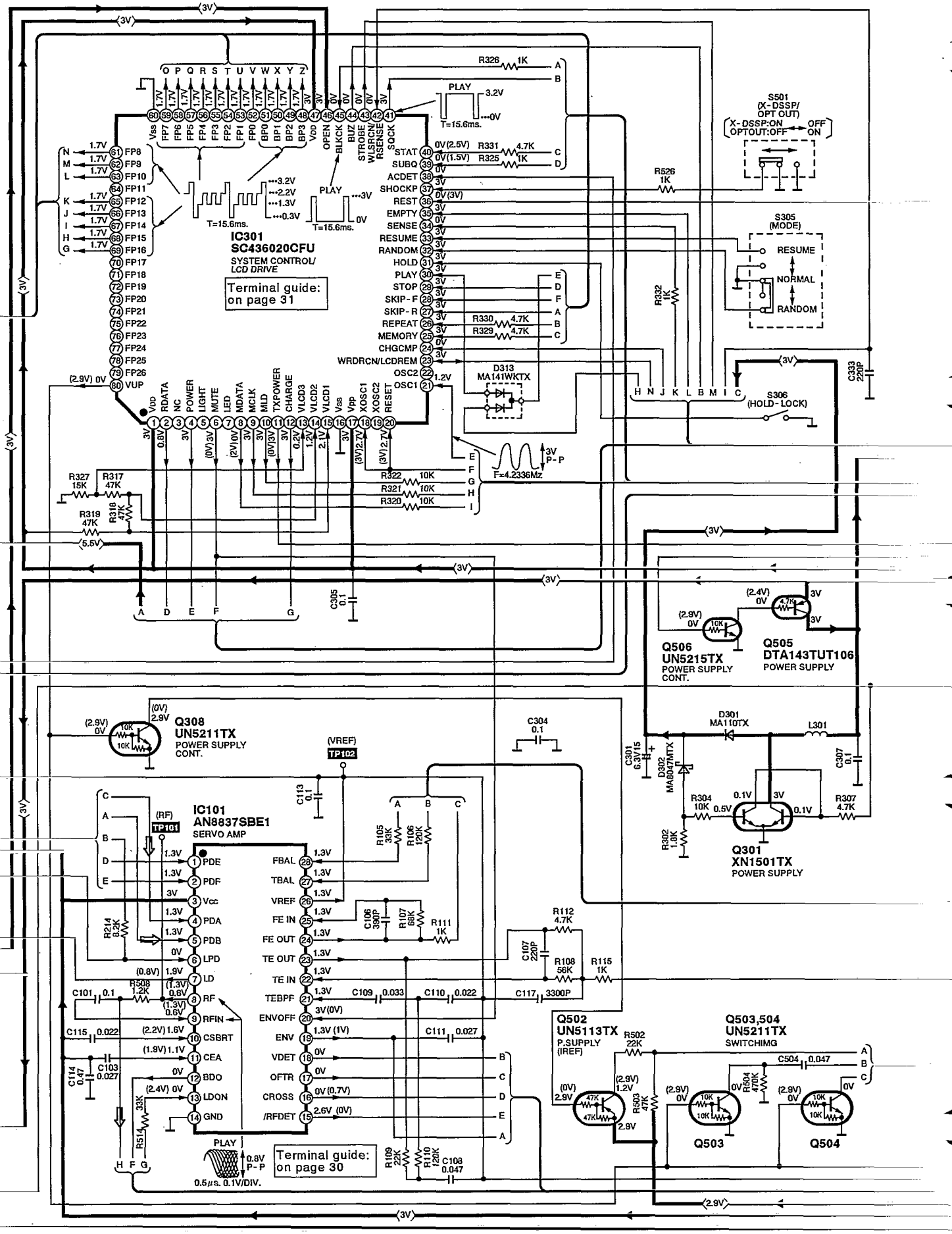
Note: ● ⟹ : Audio signal lines.

A OPERATION CIRCUIT (P.C.Board:on page 28)

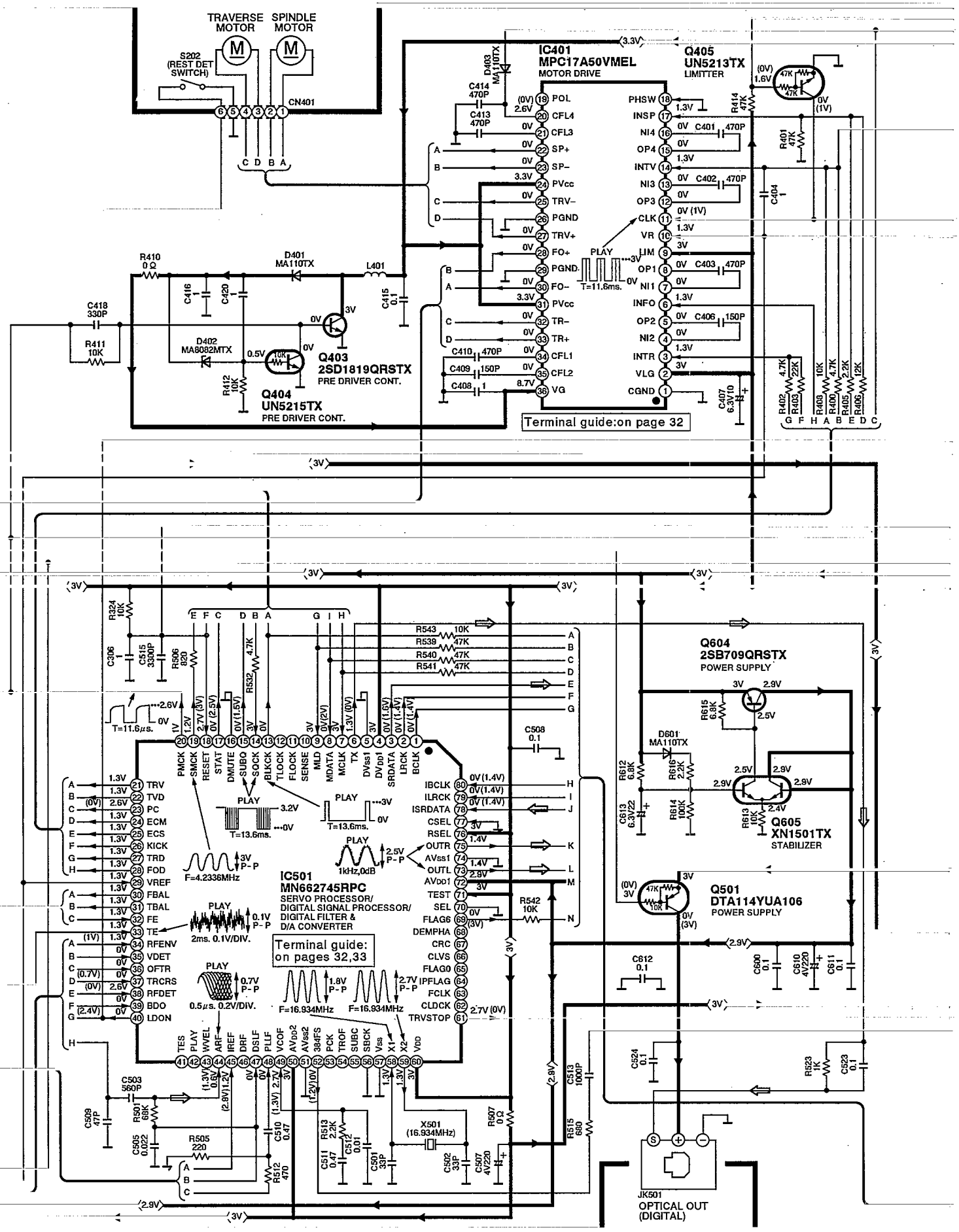


B MAIN CIRCUIT (P.C.Board:on pages 28,29)

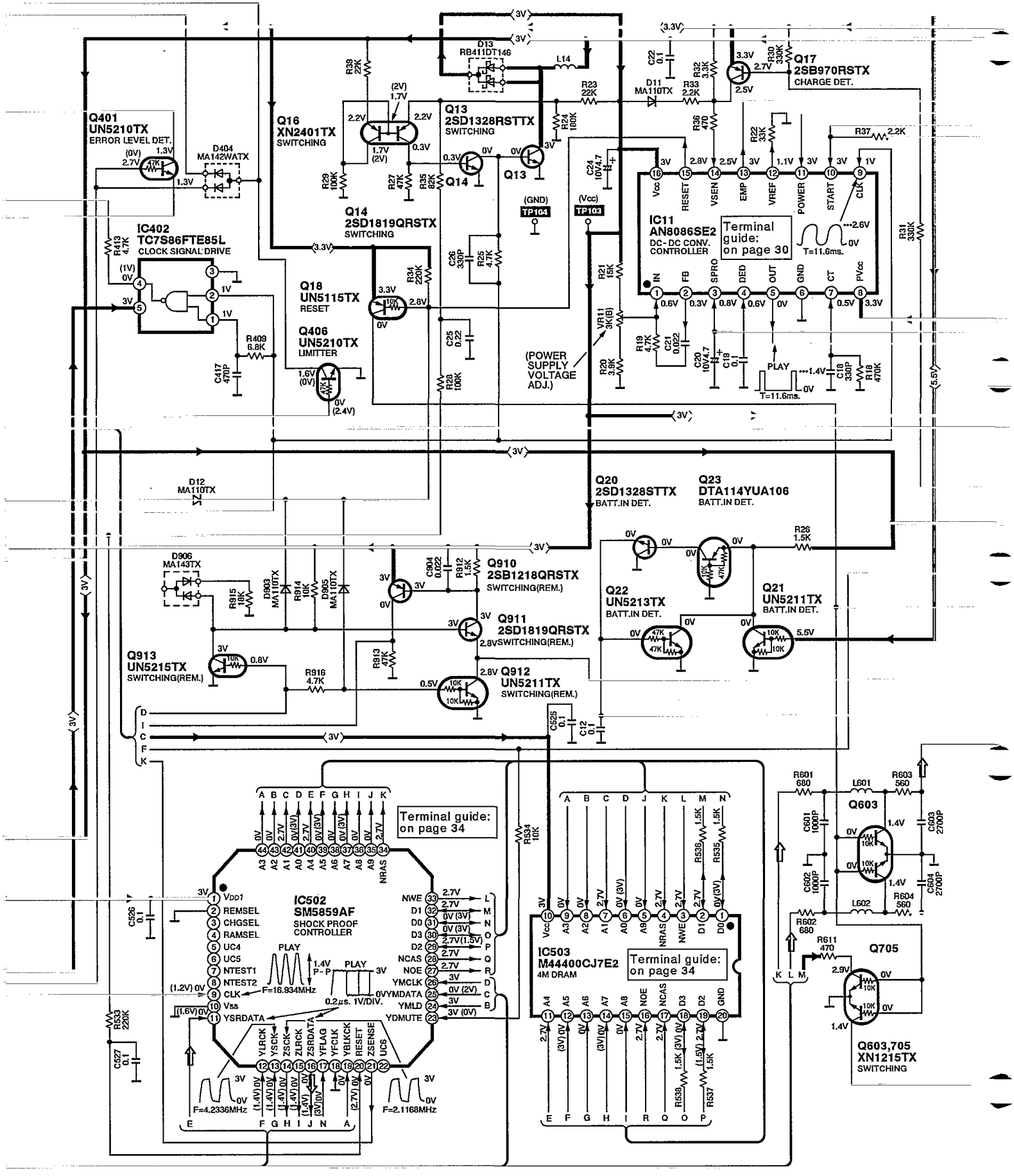
Note: ● ⟹ : Audio signal lines.



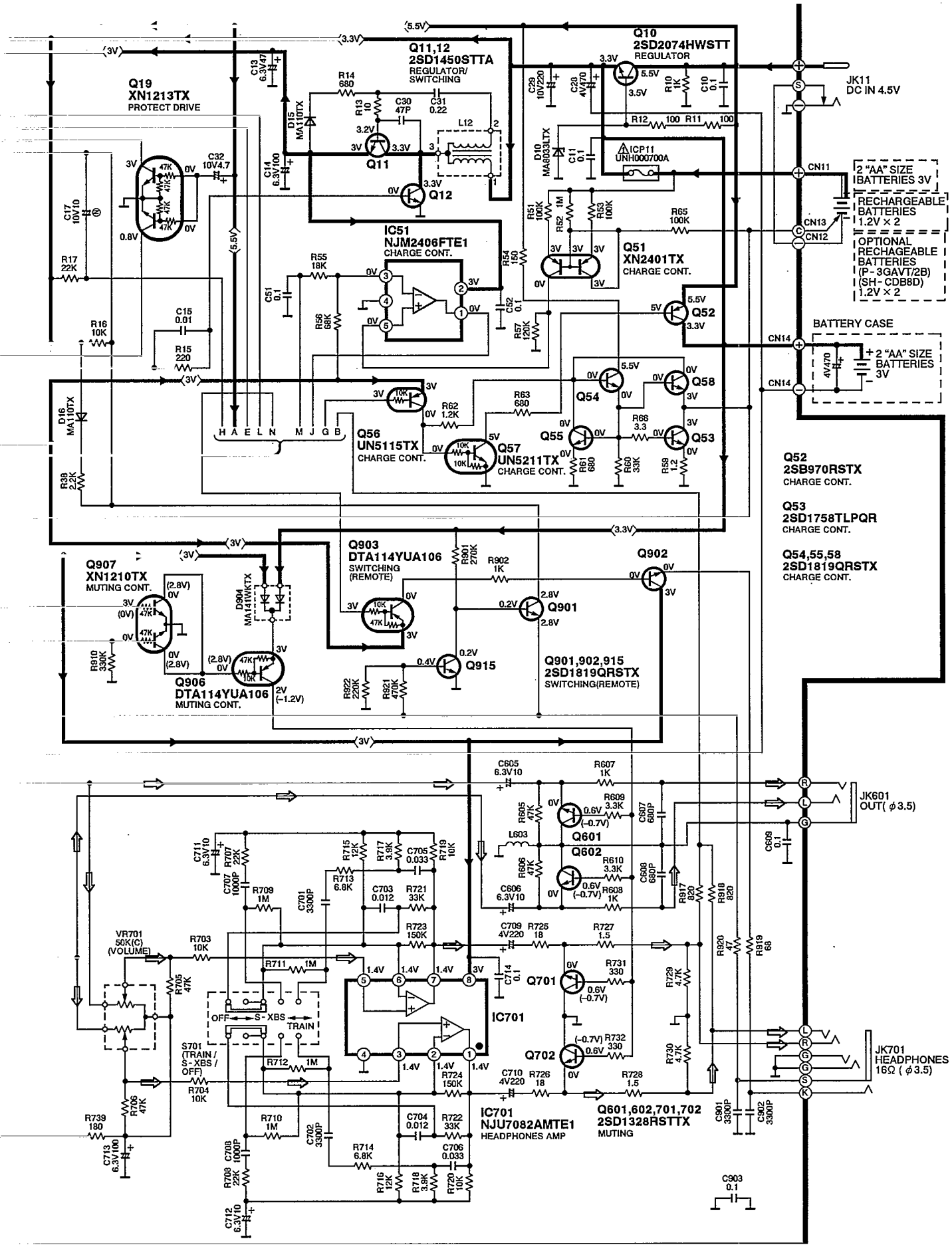
B MAIN CIRCUIT (P.C.Board:on pages 28,29)



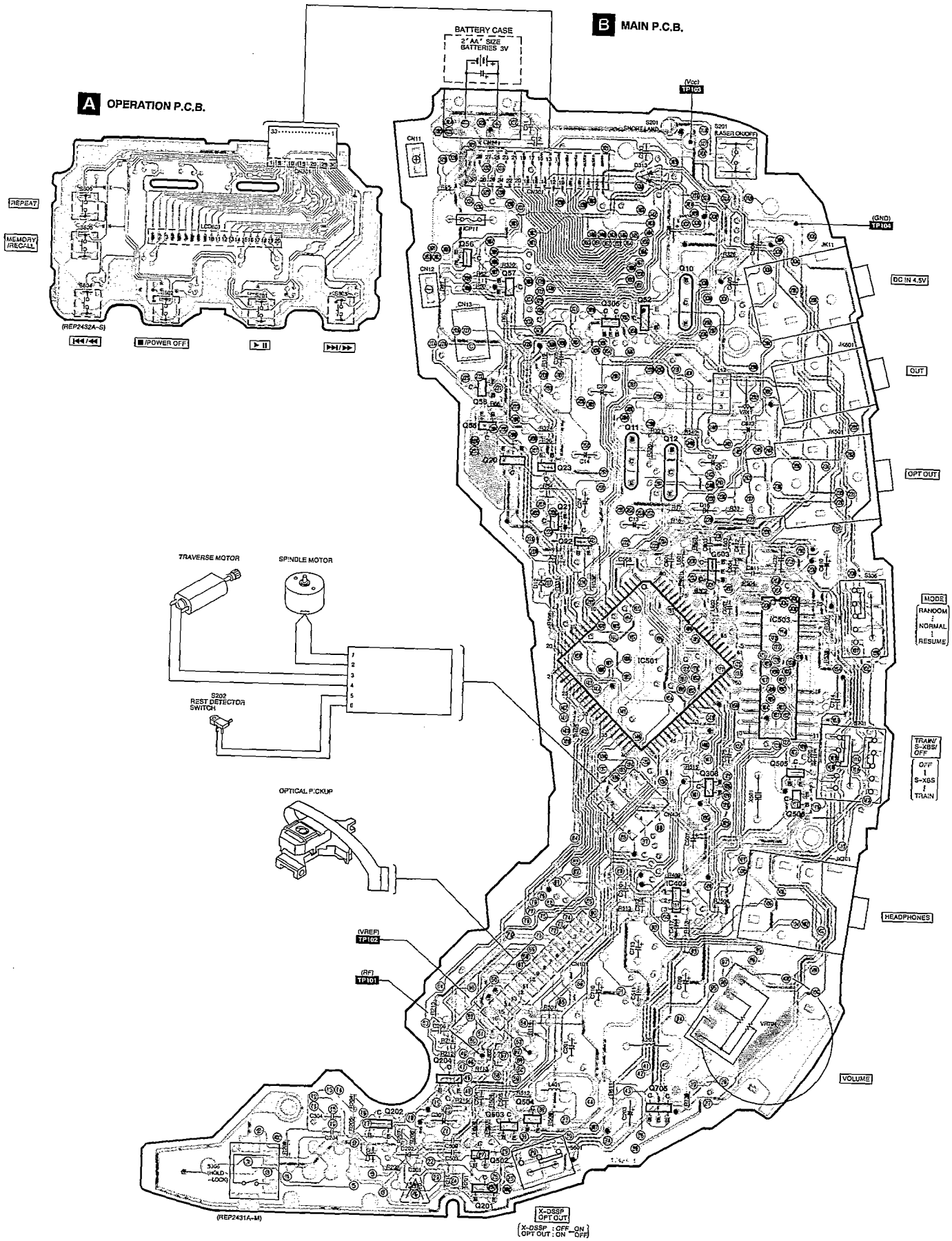
Note: ● ⟹ : Audio signal lines.

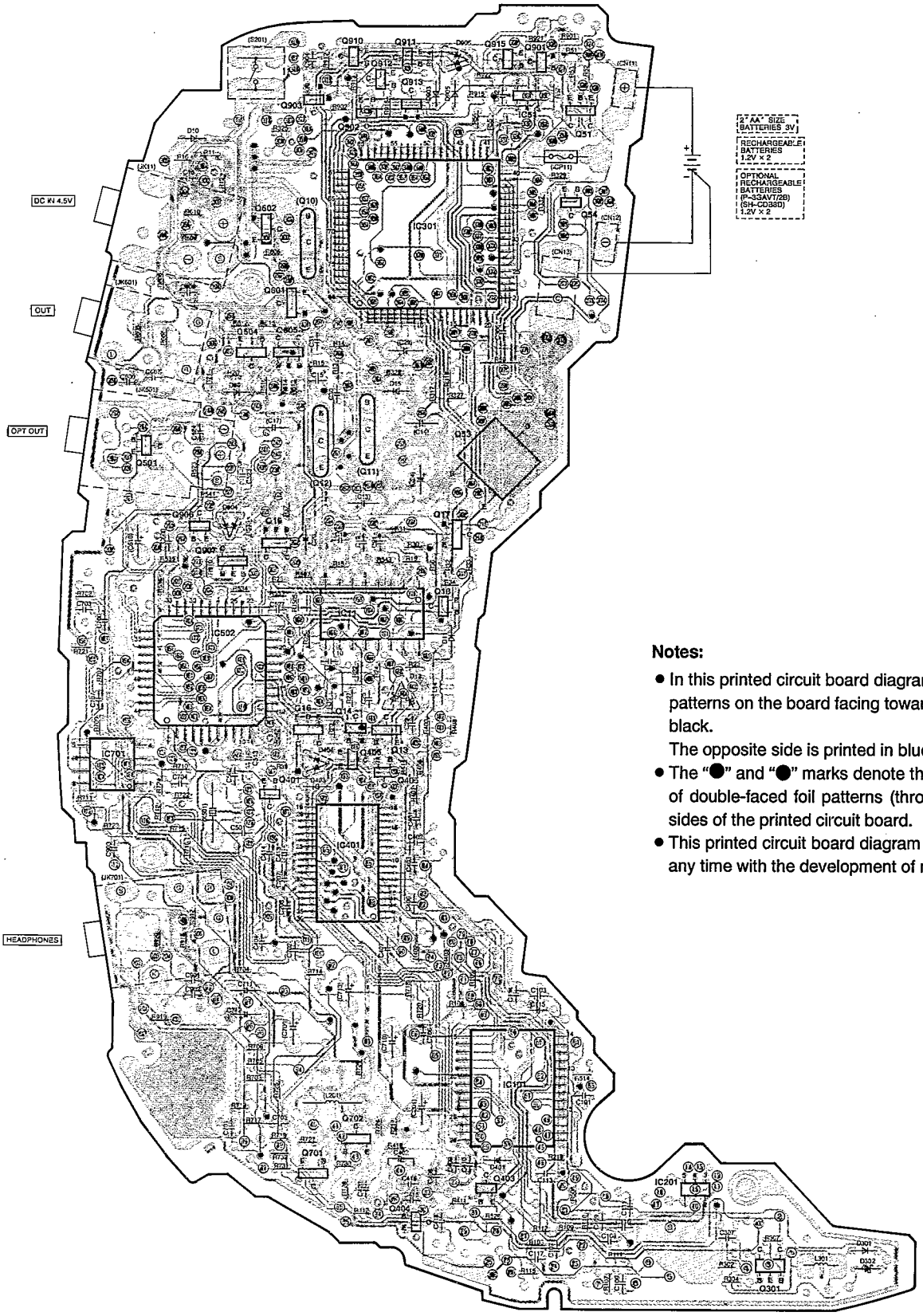


B MAIN CIRCUIT (P.C.Board:on pages 28,29)



■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.

■Terminal Function of IC's

• IC11 (AN8086SE2) : DC-DC converter controller

Pin No.	Mark	I/O Division	Function
1	IN	I	Error amp input
2	FB	O	Error amp output
3	SPRO	I	Short protect circuit
4	DED	I	Dead time input
5	OUT	O	Switching output
6	GND	—	GND terminal
7	CT	I	Triangular wave oscillator capacitor input
8	PVcc	I	Power supply terminal

Pin No.	Mark	I/O Division	Function
9	CLK	I	Clock signal input (f=88.2kHz)
10	START	I	Start detection input
11	POWER	I	Power ON/OFF detection terminal
12	VREF	O	Reference voltage input
13	EMP	O	Empty signal output
14	VSEN	I	Empty detect terminal
15	RESET	O	Reset signal output
16	Vcc	I	Power supply terminal

• 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	Vcc	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	O	Track cross signal output terminal
17	OFTR	O	Off track signal output terminal ("H" : Off track)
18	VDET	O	Vibration det. signal output terminal ("H" : Det.)
19	ENV	O	RF envelope signal output terminal
20	ENV OFF	I	ENV control input terminal
21	TEBPF	I	VDET input terminal
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

• IC301 (SC436020CFU) : System control & LCD drive

Pin No.	Mark	I/O Division	Function
1	VDD	I	Power supply terminal
2	RDATA	O	Key scan signal output
3	NC		
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	O	LED drive command signal (Not used, open)
8	MDATA	O	Command data signal output
9	MCLK	O	Command clock output
10	MLD	O	Command load signal output
11	TX POWER	O	Voltage control terminal
12	CHARGE	O	Not used, open
13	VLCD3	I	Power supply terminal (LCD drive)
14	VLCD2		
15	VLCD1		
16	Vss	—	GND terminal
17	VPP	I	Power supply terminal
18	XOSC1	I	Reset signal input terminal
19	XOSC2	—	Not used, open
20	RESET	I	Reset detect terminal
21	OSC1	I	Main-system clock input
22	OSC2	—	Not used, open
23	LCDREM	I/O	Remote control signal output
24	CHGCMP	O	Remote control signal output
25	MEMORY	I	Key input terminal (MEMORY/RECALL)
26	REPEAT	I	Key input terminal (REPEAT)
27	SKIP-R	I	Key input terminal (SKIP. R)
28	SKIP-F	I	Key input terminal (SKIP. F)
29	STOP	I	Key input terminal (■ / POWER OFF)

Pin No.	Mark	I/O Division	Function
30	PLAY	I	Key input terminal (PLAY/PAUSE)
31	HOLD	I	Key input terminal (HOLD)
32	RANDOM	I	Play mode (RANDOM) selector terminal
33	RESUME	I	Play mode (RESUME) selector terminal
34	SENSE	I	Sense signal input
35	EMPTY	I	Empty detection input terminal
36	REST	I	Reset detection terminal
37	SHOCKP	I	X-DSSP/OPT OUT ON/OFF selector terminal
38	ACDET	I	Power supply detection signal input
39	SUBQ	I	Sub-code (Q data) input
40	STAT	I	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK) input
41	SQCK	O	Sub-code Q resistor clock output
42	WLSRCN/ RSENSE	I	Remote control signal input
43	STROBE	I/O	Rechargeable control input/output terminal
44	BUZ	O	Beep control output
45	BLKCK	I	Sub-code block (Q data) clock (75Hz) input
46	OPEN	I	Disc holder OPEN det. terminal (Not used, connected to power supply)
47	VDD	I	Power supply terminal
48 ∫ 51	BP3 ∫ BP0	O	LCD segment signal output
52 ∫ 59	FP0 ∫ FP7	O	LCD segment signal output
60	Vss	—	GND terminal
61 ∫ 69	FP8 ∫ FP16	O	LCD segment signal output
70 ∫ 79	FP17 ∫ FP26	—	LCD segment signal output (Not used, open)
80	VUP	O	Loop filter control output terminal

• IC401 (MPC17A50VMEL) : Motor drive

Pin No.	Mark	I/O Division	Function
1	CGND	—	GND terminal (control circuit)
2	VLG	I	Power supply terminal (control circuit)
3	INTR	I	Tracking coil control signal input
4	NI2	—	Connected to capacitor filter
5	OP2		
6	INFO	I	Focus coil control signal input
7	NI1	—	Connected to capacitor filter
8	OP1		
9	LIM	I	Limit control level signal input
10	VR	I	Voltage control terminal
11	CLK	I	Clock signal input
12	OP3	—	Connected to capacitor filter
13	NI3		
14	INTV	I	Traverse motor control signal input
15	OP4	—	Connected to capacitor filter
16	NI4		
17	INSP	I	Spindle motor control signal input
18	PHSW	I	CH4 mode input terminal
19	POL	O	CH4 monitor output terminal (Not used, open)

Pin No.	Mark	I/O Division	Function
20	CFL4	—	Connected to capacitor filter
21	CFL3		
22	SP+	O	Spindle motor drive signal output
23	SP−		
24	PVcc	I	(CH3, CH4 output) Power supply terminal
25	TRV−	O	Traverse motor drive signal output
26	PGND	—	GND terminal (CH3, CH4 output)
27	TRV+	O	Traverse motor drive signal output
28	FO+	O	Focus coil drive signal output
29	PGND	—	GND terminal (CH1, CH2 output)
30	FO−	O	Focus coil drive signal output
31	PVcc	I	(CH1, CH2 output) Power supply terminal
32	TR−	O	Tracking coil drive signal output
33	TR+		
34	CFL1	—	Connected to capacitor filter
35	CFL2		
36	VG	I	Power supply terminal (Print driver circuit)

• IC501 (MN662745RPC) : 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	O	Digital audio interface signal
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	TLOCK	O	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 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	O	Traverse servo control
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	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) (Not used, open)
42	PLAY	O	Play signal ("H" : play) (Not used, open)
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	PLL loop filter terminal
49	VCOF	I	VCO loop filter terminal
50	AVDD2	I	Power supply (analog circuit) terminal (2)
51	AVss2	—	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	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	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	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	CSEL	I	Frequency control terminal of crystal oscillator
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	REMSEL	—	Not used, connected to GND
3	CHGSEL	—	Not used, open
4	RAMSEL	—	Not used, open
5	UC4	—	Not used, open
6	UC5	—	Not used, open
7	NTEST1	—	Test terminal (Not used, open)
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	Serial 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

Pin No.	Mark	I/O Division	Function
19	YBLKCK	I	Sub-code block clock input terminal
20	RESET	I	Reset input terminal
21	ZSENSE	O	Microcomputer states output terminal
22	UC6	—	Not used, open
23	YDMUTE	I	Mute input terminal
24	YMLD	I	Microcomputer latch clock input terminal
25	YMDATA	I	Microcomputer serial data input terminal
26	YMCLK	I	Microcomputer shift clock input terminal
27	NOE	O	D-RAM output enable terminal
28	NCAS	O	D-RAM column address strobe terminal
29 ∫ 32	D0 ∫ D3	I/O	D-RAM data input/output terminal
33	NWE	O	D-RAM write enable terminal
34	NRAS	O	D-RAM low address strobe terminal
35 ∫ 44	A0 ∫ A9	O	D-RAM address output terminal

• IC503 (M44400CJ7E2) : 4M 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/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.
* Warning: This product uses a laser diode. Refer to caution statements on page 2.
* ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden.
* [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC11	AN8086SE2	IC	[M]
IC51	NJM2406FTE1	IC	[M]
IC101	AN8837SBE1	IC	[M]
IC201	NJM2406FTE1	IC	[M]
IC301	SC436020CFU	IC	[M]
IC401	MPC17A50VMEL	IC	[M]
IC402	TC7S86FTE85L	IC	[M]
IC501	MN662745RPC	IC	[M]
IC502	SM5859AF	IC	[M]
IC503	M44400CJ7E2	IC	[M]
IC701	NJU7082AMTE1	IC	[M]
		TRANSISTOR(S)	
Q10	2SD2074HWSTT	TRANSISTOR	[M]
Q11, 12	2SD1450STTA	TRANSISTOR	[M]
Q13	2SD1328QRSTX	TRANSISTOR	[M]
Q14	2SD1819QRSTX	TRANSISTOR	[M]
Q16	XN2401TX	TRANSISTOR	[M]
Q17	2SB970RSTX	TRANSISTOR	[M]
Q18	UN5115TX	TRANSISTOR	[M]
Q19	XN1213TX	TRANSISTOR	[M]
Q20	2SD1328-S	TRANSISTOR	[M]
Q21	UN5211TX	TRANSISTOR	[M]
Q22	UN5213TX	TRANSISTOR	[M]
Q23	DTA114YUA106	TRANSISTOR	[M]
Q51	XN2401TX	TRANSISTOR	[M]
Q52	2SB970RSTX	TRANSISTOR	[M]
Q53	2SD1758TLPQR	TRANSISTOR	[M]
Q54, 55	2SD1819QRSTX	TRANSISTOR	[M]
Q56	UN5115TX	TRANSISTOR	[M]
Q57	UN5211TX	TRANSISTOR	[M]
Q58	2SD1819QRSTX	TRANSISTOR	[M]
Q201	2SB970RSTX	TRANSISTOR	[M]
Q202	2SB709QRSTX	TRANSISTOR	[M]
Q204	2SB709QRSTX	TRANSISTOR	[M]
Q301	XN1501TX	TRANSISTOR	[M]
Q306	XP0121N00L	TRANSISTOR	[M]
Q308	UN5211TX	TRANSISTOR	[M]
Q401	UN5210TX	TRANSISTOR	[M]
Q403	2SD1819QRSTX	TRANSISTOR	[M]
Q404	UN5215TX	TRANSISTOR	[M]
Q405	UN5213TX	TRANSISTOR	[M]
Q406	UN5210TX	TRANSISTOR	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
Q501	DTA114YUA106	TRANSISTOR	[M]
Q502	UN5113TX	TRANSISTOR	[M]
Q503, 504	UN5211TX	TRANSISTOR	[M]
Q505	DTA143TUT106	TRANSISTOR	[M]
Q506	UN5215TX	TRANSISTOR	[M]
Q601, 602	2SD1328QRSTX	TRANSISTOR	[M]
Q603	XN1215TX	TRANSISTOR	[M]
Q604	2SB709QRSTX	TRANSISTOR	[M]
Q605	XN1501TX	TRANSISTOR	[M]
Q701, 702	2SD1328QRSTX	TRANSISTOR	[M]
Q705	XN1215TX	TRANSISTOR	[M]
Q901, 902	2SD1819QRSTX	TRANSISTOR	[M]
Q903	DTA114YUA106	TRANSISTOR	[M]
Q906	DTA114YUA106	TRANSISTOR	[M]
Q907	XN1210TX	TRANSISTOR	[M]
Q910	2SB1218QRSTX	TRANSISTOR	[M]
Q911	2SD1819QRSTX	TRANSISTOR	[M]
Q912	UN5211TX	TRANSISTOR	[M]
Q913	UN5215TX	TRANSISTOR	[M]
Q915	2SD1819QRSTX	TRANSISTOR	[M]
		DIODE(S)	
D10	MA8033LTX	DIODE	[M]
D11, 12	MA110TX	DIODE	[M]
D13	RB411DT146	DIODE	[M]
D15, 16	MA110TX	DIODE	[M]
D201	RB411DT146	DIODE	[M]
D202	MA110TX	DIODE	[M]
D301	MA110TX	DIODE	[M]
D302	MA8047MTX	DIODE	[M]
D313	MA141WKTX	DIODE	[M]
D401	MA110TX	DIODE	[M]
D402	MA8082MTX	DIODE	[M]
D403	MA110TX	DIODE	[M]
D404	MA142WATX	DIODE	[M]
D601	MA110TX	DIODE	[M]
D903	MA110TX	DIODE	[M]
D904	MA141WKTX	DIODE	[M]
D905	MA110TX	DIODE	[M]
D906	MA143TX	DIODE	[M]
		IC PROTECTOR(S)	
ICP11	UNH000700A	IC PROTECTOR	[M]⚠
		VARIABLE RESISTOR(S)	

Ref. No.	Part No.	Part Name & Description	Remarks
VR11	EVM1YSX50B33	V. R	[M]
VR701	EVUTUEB09C54	V. R	[M]
		COIL(S)	
L12	ELL7URD001	COIL	[M]
L14	RLQU331KT-W	COIL	[M]
L201	RLQB471KT1-K	COIL	[M]
L202	ELJPC330KF	COIL	[M]
L301	RLQU331KT-W	COIL	[M]
L401	RLQU331KT-W	COIL	[M]
L601-603	RLBV102V-Y	COIL	[M]
		OSCILLATOR(S)	
X501	RSXC16M9S01T	OSCILLATOR	[M]
		LCD(S)	
LCD801	RSL5152-L	LCD	[M]
		SWITCH(ES)	

Ref. No.	Part No.	Part Name & Description	Remarks
S201	ESE11SV6	SW	[M]
S202	ESE11HS4	SW	[M]
S305	RSS3A007-1A	SW	[M]
S306	ESE11MH1T	SW	[M]
S501	RSS2A010-1A	SW	[M]
S701	RSS3B018-A	SW	[M]
S801-806	RSG0030-P	SW	[M]
		CONNECTOR(S) AND JACK(S)	
CN11, 12	RJC93015-1	BATTERY TERMINAL(+) (-)	[M]
CN13	RJH5102-1	R. BATTERY TERMINAL	[M]
CN14	RJH9208	BATT. CASE CONNECT. TERMINAL	[M]
CN101	RJS2A5016T	CONNECTOR(16P)	[M]
CN301	RJS1A8830T	CONNECTOR(30P)	[M]
CN401	RJS2A5106T	CONNECTOR(6P)	[M]
CN801	RJS2A4530T	CONNECTOR(30P)	[M]
JK11	RJJ43K09-C	DC IN JACK	[M]
JK501	GP1F366X	OPTICAL DIGITAL OUT	[M]
JK601	RJJD3S5ZB-C	OUT JACK	[M]
JK701	RJJ36T02-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.

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R10	ERJ3GEYJ102Z	1/16W 1K [M]
R11, 12	ERJ3GEYJ101V	1/16W 100 [M]
R13	ERJ3GEYJ100V	1/16W 10 [M]
R14	ERJ3GEYJ681V	1/16W 680 [M]
R15	ERJ3GEYJ221V	1/16W 220 [M]
R16	ERJ3GEYJ103Z	1/16W 10K [M]
R17	ERJ3GEYJ223V	1/16W 22K [M]
R18	ERJ3GEYJ474V	1/16W 470K [M]
R19	ERJ3GEYJ472V	1/16W 4.7K [M]
R20	ERJ3GEYJ392V	1/16W 3.9K [M]
R21	ERJ3GEYJ153V	1/16W 15K [M]
R22	ERJ3GEYJ333V	1/16W 33K [M]
R23	ERJ3GEYJ223V	1/16W 22K [M]
R24	ERJ3GEYJ184V	1/16W 180K [M]
R25	ERJ3GEYJ472V	1/16W 4.7K [M]
R26	ERJ3GEYJ152V	1/16W 1.5K [M]
R27	ERJ3GEYJ473V	1/16W 47K [M]
R28, 29	ERJ3GEYJ104Z	1/16W 100K [M]
R30, 31	ERJ3GEYJ334V	1/16W 330K [M]

Ref. No.	Part No.	Values & Remarks
R32	ERJ3GEYJ332V	1/16W 3.3K [M]
R33	ERJ3GEYJ222V	1/16W 2.2K [M]
R34	ERJ3GEYJ224V	1/16W 220K [M]
R35	ERJ3GEYJ823V	1/16W 82K [M]
R36	ERJ3GEYJ471V	1/16W 470 [M]
R37, 38	ERJ3GEYJ222V	1/16W 2.2K [M]
R39	ERJ3GEYJ223V	1/16W 22K [M]
R51	ERJ3GEYJ104Z	1/16W 100K [M]
R52	ERJ3GEYJ105V	1/16W 1M [M]
R53	ERJ3GEYJ104Z	1/16W 100K [M]
R54	ERJ3GEYJ151V	1/16W 150 [M]
R55	ERJ3GEYJ183V	1/16W 18K [M]
R56	ERJ3GEYJ683V	1/16W 68K [M]
R57	ERJ3GEYJ124V	1/16W 120K [M]
R59	ERJ12YJ1R2H	1/2W 1.2 [M]
R60	ERJ3GEYJ333V	1/16W 33K [M]
R61	ERJ3GEYJ681V	1/16W 680 [M]
R62	ERJ3GEYJ122V	1/16W 1.2K [M]
R63	ERJ3GEYJ681V	1/16W 680 [M]
R65	ERJ3GEYJ104Z	1/16W 100K [M]
R66	ERJ3GEYJ3R3V	1/16W 3.3 [M]
R105	ERJ3GEYJ333V	1/16W 33K [M]

Ref. No.	Part No.	Values & Remarks
R106	ERJ3GEYJ124V	1/16W 120K [M]
R107	ERJ3GEYJ683V	1/16W 68K [M]
R108	ERJ3GEYJ563V	1/16W 56K [M]
R109	ERJ3GEYJ223V	1/16W 22K [M]
R110	ERJ3GEYJ124V	1/16W 120K [M]
R111	ERJ3GEYJ102Z	1/16W 1K [M]
R112	ERJ3GEYJ472V	1/16W 4.7K [M]
R113, 114	ERJ3GEYJ330V	1/16W 33 [M]
R115	ERJ3GEYJ102Z	1/16W 1K [M]
R201	ERJ3GEYJ102Z	1/16W 1K [M]
R202	ERJ3GEYJ122V	1/16W 1.2K [M]
R204	ERJ3GEYJ104Z	1/16W 100K [M]
R205	ERJ3GEYJ332V	1/16W 3.3K [M]
R206	ERJ3GEYJ333V	1/16W 33K [M]
R207	ERJ3GEYJ473V	1/16W 47K [M]
R208	ERJ3GEYJ563V	1/16W 56K [M]
R212	ERJ3GEYJ333V	1/16W 33K [M]
R213	ERJ3GEYJ103Z	1/16W 10K [M]
R214	ERJ3GEYJ822V	1/16W 8.2K [M]
R215	ERJ3GEYJ393V	1/16W 39K [M]
R216, 217	ERJ3GEYJ223V	1/16W 22K [M]
R218	ERJ3GEYJ224V	1/16W 220K [M]

Ref. No.	Part No.	Values & Remarks
R302	ERJ3GEYJ182V	1/16W 1.8K [M]
R304	ERJ3GEYJ103Z	1/16W 10K [M]
R307	ERJ3GEYJ472V	1/16W 4.7K [M]
R317-319	ERJ3GEYJ473V	1/16W 47K [M]
R320-322	ERJ3GEYJ103Z	1/16W 10K [M]
R324	ERJ3GEYJ103Z	1/16W 10K [M]
R325, 326	ERJ3GEYJ102Z	1/16W 1K [M]
R327	ERJ3GEYJ153V	1/16W 15K [M]
R329-331	ERJ3GEYJ472V	1/16W 4.7K [M]
R332	ERJ3GEYJ102Z	1/16W 1K [M]
R400	ERJ3GEYJ472V	1/16W 4.7K [M]
R401	ERJ3GEYJ473V	1/16W 47K [M]
R402	ERJ3GEYJ472V	1/16W 4.7K [M]
R403	ERJ3GEYJ223V	1/16W 22K [M]
R405	ERJ3GEYJ222V	1/16W 2.2K [M]
R406	ERJ3GEYJ123V	1/16W 12K [M]
R408	ERJ3GEYJ103Z	1/16W 10K [M]
R409	ERJ3GEYJ682V	1/16W 6.8K [M]
R411, 412	ERJ3GEYJ103Z	1/16W 10K [M]
R413	ERJ3GEYJ472V	1/16W 4.7K [M]
R414	ERJ3GEYJ473V	1/16W 47K [M]
R501	ERJ3GEYJ683V	1/16W 68K [M]
R502	ERJ3GEYJ223V	1/16W 22K [M]
R503	ERJ3GEYJ473V	1/16W 47K [M]
R504	ERJ3GEYJ474V	1/16W 470K [M]
R505	ERJ3GEYJ221V	1/16W 220 [M]
R506	ERJ3GEYJ821V	1/16W 820 [M]
R508	ERJ3GEYJ122V	1/16W 1.2K [M]
R512	ERJ3GEYJ471V	1/16W 470 [M]
R513	ERJ3GEYJ222V	1/16W 2.2K [M]
R514	ERJ3GEYJ333V	1/16W 33K [M]
R515	ERJ3GEYJ681V	1/16W 680 [M]
R523	ERJ3GEYJ102Z	1/16W 1K [M]
R526	ERJ3GEYJ102Z	1/16W 1K [M]
R532	ERJ3GEYJ472V	1/16W 4.7K [M]
R533	ERJ3GEYJ224V	1/16W 220K [M]
R534	ERJ3GEYJ103Z	1/16W 10K [M]
R535-538	ERJ3GEYJ152V	1/16W 1.5K [M]
R539-541	ERJ3GEYJ473V	1/16W 47K [M]
R542, 543	ERJ3GEYJ103Z	1/16W 10K [M]
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]
R611	ERJ3GEYJ471V	1/16W 470 [M]
R612	ERJ3GEYJ682V	1/16W 6.8K [M]
R613	ERJ3GEYJ103Z	1/16W 10K [M]
R614	ERJ3GEYJ104Z	1/16W 100K [M]
R615	ERJ3GEYJ682V	1/16W 6.8K [M]
R616	ERJ3GEYJ222V	1/16W 2.2K [M]
R703, 704	ERJ3GEYJ103Z	1/16W 10K [M]

Ref. No.	Part No.	Values & Remarks
R705, 706	ERJ3GEYJ473V	1/16W 47K [M]
R707, 708	ERJ3GEYJ223V	1/16W 22K [M]
R709-712	ERJ3GEYJ105V	1/16W 1M [M]
R713, 714	ERJ3GEYJ682V	1/16W 6.8K [M]
R715, 716	ERJ3GEYJ123V	1/16W 12K [M]
R717, 718	ERJ3GEYJ392V	1/16W 3.9K [M]
R719, 720	ERJ3GEYJ103Z	1/16W 10K [M]
R721, 722	ERJ3GEYJ333V	1/16W 33K [M]
R723, 724	ERJ3GEYJ154V	1/16W 150K [M]
R725, 726	ERJ3GEYJ180V	1/16W 18 [M]
R727, 728	ERJ3GEYJ1R5V	1/16W 1.5 [M]
R729, 730	ERJ3GEYJ472V	1/16W 4.7K [M]
R731, 732	ERJ3GEYJ331V	1/16W 330 [M]
R739	ERJ3GEYJ181V	1/16W 180 [M]
R901	ERJ3GEYJ274V	1/16W 270K [M]
R902	ERJ3GEYJ102Z	1/16W 1K [M]
R910	ERJ3GEYJ334V	1/16W 330K [M]
R912	ERJ3GEYJ152V	1/16W 1.5K [M]
R913	ERJ3GEYJ473V	1/16W 47K [M]
R914	ERJ3GEYJ103Z	1/16W 10K [M]
R915	ERJ3GEYJ183V	1/16W 18K [M]
R916	ERJ3GEYJ472V	1/16W 4.7K [M]
R917, 918	ERJ3GEYJ821V	1/16W 820 [M]
R919	ERJ3GEYJ680V	1/16W 68 [M]
R920	ERJ3GEYJ470V	1/16W 47 [M]
R921	ERJ3GEYJ474V	1/16W 470K [M]
R922	ERJ3GEYJ224V	1/16W 220K [M]
		CHIP JUMPERS
R410	ERJ3GEY0R00V	CHIP JUMPER [M]
R507	ERJ3GEY0R00V	CHIP JUMPER [M]
RJ501	ERJ3GEY0R00V	CHIP JUMPER [M]
RJ505	ERJ3GEY0R00V	CHIP JUMPER [M]
		CAPACITORS
C10-12	ECUVNC104ZFV	16V 0.1U [M]
C13	RCE0JSA470IX	6.3V 47U [M]
C14	ECEA0JKA101I	6.3V 100U [M]
C15	ECUV1E103KBV	25V 0.01U [M]
C17	ECEA1AKN100	10V 10U [M]
C18	ECUV1H331KBV	50V 330P [M]
C19	ECUV1C104KBV	16V 0.1U [M]
C20	ECST1AY475RR	10V 4.7U [M]
C21	ECUV1E223KBV	25V 0.022U [M]
C22	ECUVNC104ZFV	16V 0.1U [M]
C24	RCE1ASC4R7IX	10V 4.7U [M]
C25	ECUVNC224KBN	16V 0.22U [M]
C26	ECUV1H331KBV	50V 330P [M]
C28	ECEV0GA471P	4V 470U [M]
C29	ECEA1AKA221I	10V 220U [M]

Ref. No.	Part No.	Values & Remarks
C30	ECUV1H470KCV	50V 47P [M]
C31	ECUVNC224KBN	16V 0.22U [M]
C32	ECST1AY475RR	10V 4.7U [M]
C51	ECUV1C104KBV	16V 0.1U [M]
C52	ECUVNC104ZFV	16V 0.1U [M]
C101	ECUV1C104KBV	16V 0.1U [M]
C103	ECUV1C273KBV	16V 0.027U [M]
C106	ECUV1H391KBV	50V 390P [M]
C107	ECUV1H221KBV	50V 220P [M]
C108	ECUV1C473KBV	16V 0.047U [M]
C109	ECUV1C333KBV	16V 0.033U [M]
C110	ECUV1E223KBV	25V 0.022U [M]
C111	ECUV1C273KBV	16V 0.027U [M]
C113	ECUVNC104ZFV	16V 0.1U [M]
C114	ECUVNC474KBN	16V 0.47U [M]
C115	ECUV1E223KBV	25V 0.022U [M]
C117	ECUV1H332KBV	50V 3300P [M]
C201	RCE0JSL470IX	6.3V 47U [M]
C202	ECUVNC224KBN	16V 0.22U [M]
C203	ECST1AY225RR	10V 2.2U [M]
C204	ECUV1H101KCV	50V 100P [M]
C206	ECUV1E103KBV	25V 0.01U [M]
C207, 208	ECUV1H102KBV	50V 1000P [M]
C301	ECST0JY156RR	6.3V 15U [M]
C304, 305	ECUVNC104ZFV	16V 0.1U [M]
C306	ECUVNC105ZFN	16V 1U [M]
C307	ECUVNC104ZFV	16V 0.1U [M]
C333	ECUV1H221KBV	50V 220P [M]
C401-403	ECUV1H471KBV	50V 470P [M]
C404	ECUVNC105ZFN	16V 1U [M]
C406	ECUV1H151KBV	50V 150P [M]
C407	ECST0JY106RR	6.3V 10U [M]
C408	ECUVNC105ZFN	16V 1U [M]
C409	ECUV1H151KBV	50V 150P [M]
C410	ECUV1H471KBV	50V 470P [M]
C413, 414	ECUV1H471KBV	50V 470P [M]
C415	ECUVNC104ZFV	16V 0.1U [M]
C416	ECUVNC105ZFN	16V 1U [M]
C417	ECUV1H471KBV	50V 470P [M]
C418	ECUV1H331KBV	50V 330P [M]
C420	ECUVNC105ZFN	16V 1U [M]
C501, 502	ECUV1H330KCV	50V 33P [M]
C503	ECUV1H561KBV	50V 560P [M]
C504	ECUV1C473KBV	16V 0.047U [M]
C505	ECUV1E223KBV	25V 0.022U [M]
C507	ECEV0GA221SP	4V 220U [M]
C508	ECUVNC104ZFV	16V 0.1U [M]
C509	ECUV1H470KCV	50V 47P [M]
C510, 511	ECUVNC474KBN	16V 0.47U [M]
C512	ECUV1E103KBV	25V 0.01U [M]
C513	ECUV1H102KBV	50V 1000P [M]
C515	ECUV1H332KBV	50V 3300P [M]

Ref. No.	Part No.	Values & Remarks
C523-527	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	ECST0JY106RR	6.3V 10U [M]
C607, 608	ECUV1H681KBV	50V 680P [M]
C609	ECUVNC104ZFV	16V 0.1U [M]

Ref. No.	Part No.	Values & Remarks
C610	ECEA0GPK221I	4V 220U [M]
C611, 612	ECUVNC104ZFV	16V 0.1U [M]
C613	ECST0JX226RR	6.3V 22U [M]
C701, 702	ECUV1H332KBV	50V 3300P [M]
C703, 704	ECUV1E123KBV	25V 0.012U [M]
C705, 706	ECUV1C333KBV	16V 0.033U [M]
C707, 708	ECUV1H102KBV	50V 1000P [M]

Ref. No.	Part No.	Values & Remarks
C709, 710	ECEA0GPK221I	4V 220U [M]
C711, 712	ECST0JY106RR	6.3V 10U [M]
C713	ECEA0JPK101I	6.3V 100U [M]
C714	ECUVNC104ZFV	16V 0.1U [M]
C901, 902	ECUV1H332KBV	50V 3300P [M]
C903	ECUVNC104ZFV	16V 0.1U [M]
C904	ECUV1E223KBV	25V 0.022U [M]

■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.
* Warning: This product uses a laser diode. Refer to caution statements on page 2.
* The "(A)" mark parts are used for blue type only.
The "(H)" mark parts are used for gray type only.
The "(S)" mark parts are used for silver type only.
Parts other than "(A)", "(H)" and "(s)" marked are used for both blue, gray and silver types.
* [M] indicates in Remarks columns parts that are supplied by MESA.

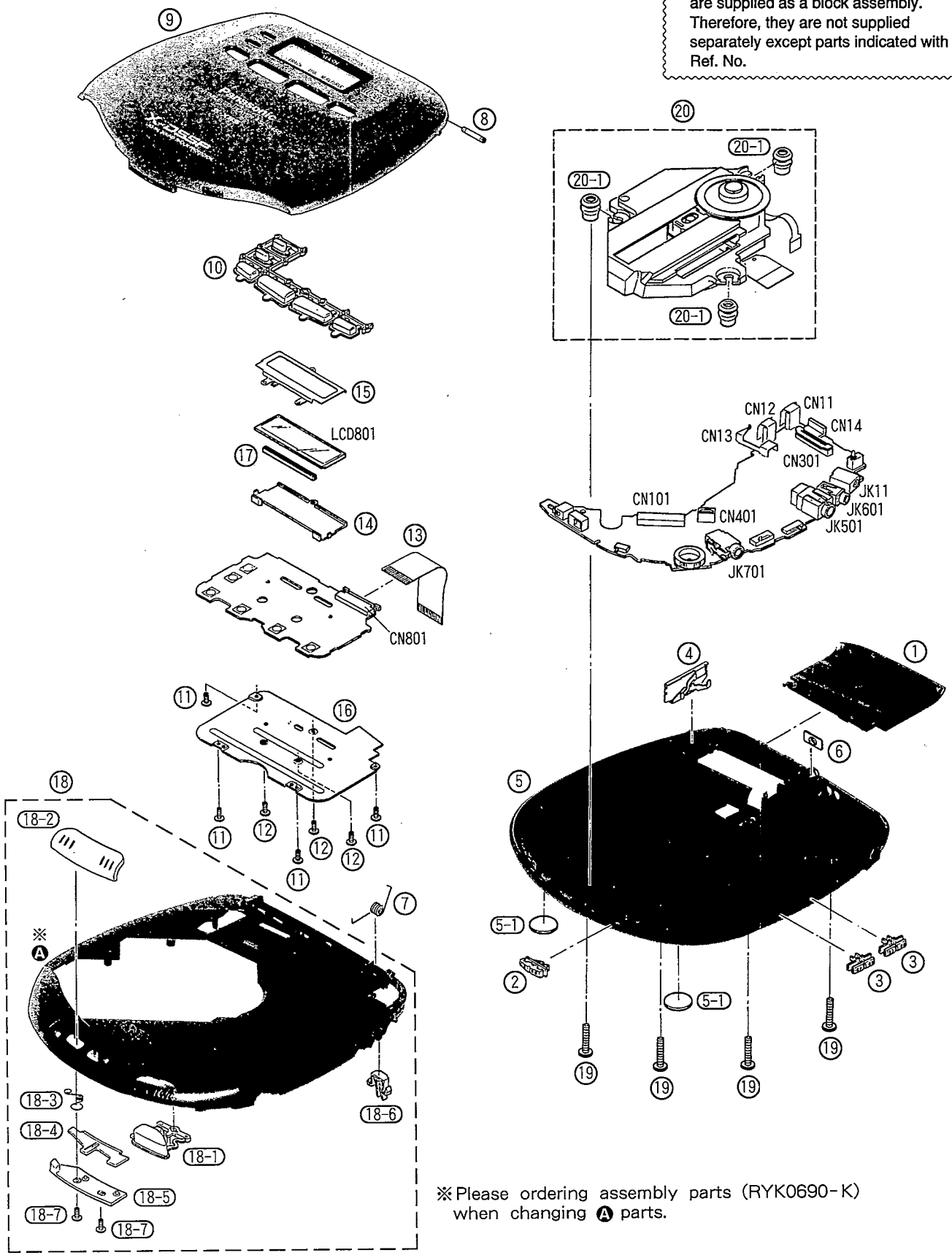
Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKK0102-K	BATTERY COVER	[M]
2	RGV0199-H	OPT OUT/X-DSSP KNOB	[M]
3	RGV0200-K	TRAIN/S-XBS, PLAY MODE KNOB	[M]
4	RJC93020	COMMON BATTERY TERMINAL	[M]
5	RFKJLS450SGS	BOTTOM CABINET ASS'Y	[M]
5-1	RKA0063-K	FOOT	[M]
6	RMA0677	REAR ORNAMENT	[M]
7	RME0239	OPEN SPRING	[M]
8	RMS0570	SHAFT	[M]
9	RFKLLS450-A	CD COVER ASS'Y	[M] (A)
9	RFKLLS450-H	CD COVER ASS'Y	[M] (H)
9	RFKLLS450-S	CD COVER ASS'Y	[M] (S)
10	RGU1488-H	OPERATION BUTTON	[M]
11	RHE5119YA	SCREW	[M]
12	RHE5155YA	SCREW	[M]
13	RJB1770A	FFC(30P)	[M]
14	RJF0027	LCD HOLDER	[M]
15	RMA0937	HOLD PLATE	[M]
16	RMA1029	LID COVER	[M]
17	RSQ0048	ZEBRA RUBBER	[M]
18	RYK0690-K	INTERMEDIATE CABINET ASS'Y	[M]
18-1	RGU1489-K	OPEN BUTTON	[M]
18-2	RGV0198-H	HOLD-LOCK KNOB	[M]
18-3	RME0238	HOLD SPRING	[M]
18-4	RMR1048-G	LOCK PLATE(A)	[M]
18-5	RMR1049-G	LOCK PLATE(B)	[M]
18-6	RMR1050-K	STOPPER	[M]
18-7	RHE5119YA	SCREW	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
19	XTN17+6GFZ	SCREW	[M]
20	RAE0142Z	TRAVERSE DECK	[M]⚠
20-1	RMG0449-H	FLOATING RUBBER	[M]
		PACKING MATERIAL	
P1	RPK0901	PACKING CASE	[M] (A)
P1	RPK0900	PACKING CASE	[M] (H)
P1	RPK0864	PACKING CASE	[M] (S)
P2	RPQ0683	SPACER	[M]
P3	RPF0111	PROTECTION BAG (UNIT)	[M]
		ACCESSORIES	
A1	RFJSLS450SGS	INSTRUCTION MANUAL	[M]
A2	RFKFP3GAVT2S	RECHARGEABLE BATTERY ASS'Y	[M]
A2-1	RFKNLS370-K	BATTERY CARRYING CASE	[M]
A3	RFA0627-K4	BATTERY CASE	[M]
A4	RFC0041-K	SOFT CASE	[M]
A5	RFEA403Z-S	AC ADAPTOR	[M]⚠
A6	RFEV006PCKM	WIRED REMOTE CONTROLLER	[M]
A7	RFEV316P-K1S	STEREO EARPHONES	[M]
A8	SJP5213-2	PLUG ADAPTOR	[M]
A9*	RKB205ZA-0	EAR PADS	[M]
		<GREASE OR JIG/TOOL>	
		TEST DISC	
SA1	SZZP1054C	PLAYABILITY TEST DISC	[M]
SA2	SZZP1056C	UNEVEN TEST DISC	[M]

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

■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.



※Please ordering assembly parts (RYK0690-K) when changing Ⓐ parts.

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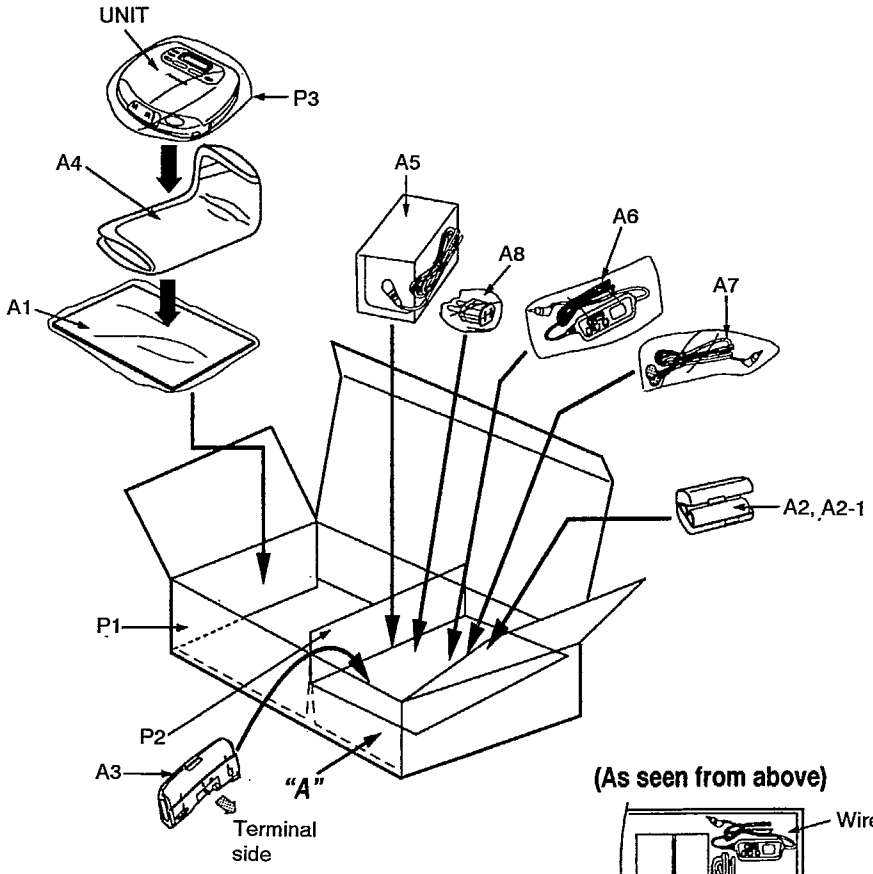
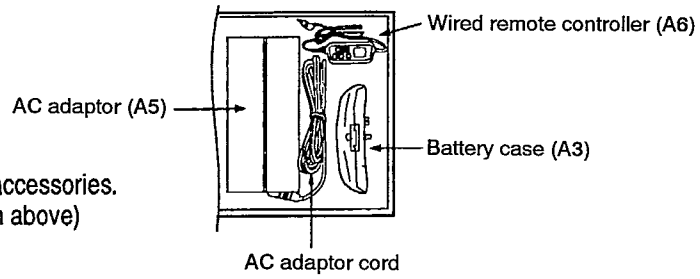
■Packaging



(As seen from above)



Note: Be careful about the direction of all accessories.
(see the picture of *"A"* as seen from above)

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