Ref. No. 3440

ONKYO SERVICE MANUAL

PORTABLE CD PLAYER
MODEL DX-F5

UD, UDN	120V AC, 60Hz
UP	230V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS INDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.
MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

TABLE OF CONTENTS

ONKYO®
AUDIO COMPONENTS

■ PRECAUTION OF LASER DIODE

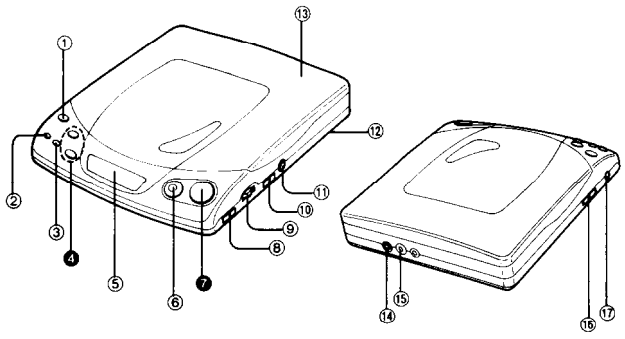
CAUTION: This unit utilizes a class 1 laser. Invisible laser radiation is emitted from the optical pickup lens when the unit is turned on:

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.

■ CONTROLS AND FUNCTIONS

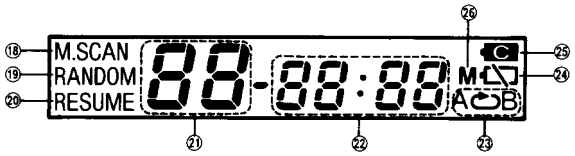
The function indicated by the numbers with black background (❹) can also be activated from the Remote Control Transmitter. (See page 14.)

Control Section



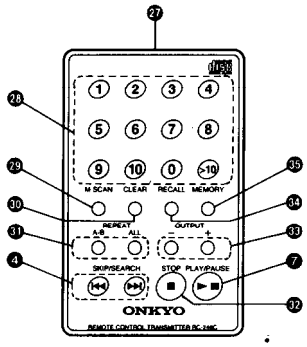
① **Open Button (OPEN)**
② **Memory/Recall Button (MEMORY/RECALL)**
Use this button to play the program or to confirm the program.
③ **Repeat Button (REPEAT)**
Press this button to activate the repeat mode. The repeat indicator illuminates. Press again to cancel the repeat mode. The repeat indicator will no longer illuminate.
❹ **Skip/Search Buttons (⏮◀◀ SKIP/SEARCH ▶▶⏭)**
Use these buttons to move the pickup forward and backward, or to hear the disc sound as the pickup moves at high speed while playing.
⑤ **Display**
If this unit is used by AC adaptor or Car adaptor, the backlight of the display will be turned on.
⑥ **Stop/Power Off Button (■ STOP/POWER OFF)**
❼ **Play/Pause Button (▶❚❚ PLAY/PAUSE)**
When using rechargeable or dry cell batteries, the Play/Pause Button of the Remote Control Transmitter will not function if the main unit is turned off.
⑧ **Hold Switch (HOLD)**
Functional buttons except for Open Button cannot be activated in the hold state.
Before operating the front panel button, be sure to release the hold state.
⑨ **Volume Control (VOLUME)**
⑩ **High Filter/DBE Selector (HI-FILTER/DBE)**
Use the selector to listen to special sound. (Headphones only)
⑪ **Headphones Jack (PHONES)**
⑫ **Battery Compartment Cover [bottom]**
⑬ **Disc Holder**
⑭ **Line Out Jack (LINE OUT)**
⑮ **DC IN Jack (DC IN 3 V)**
⑯ **Play Mode Selector (PLAY MODE)**
⑰ **Remote Sensor Jack (REMOTE SENSOR)**
Connect the included Remote Sensor to use the unit by Remote Control Transmitter.

Display Section



⑱ **Music Scan Indicator (M. SCAN)**
Illuminates when the music scan play is operated. (by Remote Control Transmitter only)
⑲ **Random Play Indicator (RANDOM)**
Illuminates when the random play mode is selected.
⑳ **Resume Play Indicator (RESUME)**
Illuminates when the resume play mode is selected.
㉑ **Track Display**
Shows the number (up to 99) of the current track.
㉒ **Time Display**
Shows the elapsed playing time of the track being played.
㉓ **Repeat/A–B Repeat Play Indicator (A ⮌ B)**
Illuminates when the repeat button is pressed (A–B repeat play is by the Remote Control Transmitter only).
㉔ **Battery Check Indicator ( )**
Flashes on and off when the batteries are weak.
㉕ **Charge Indicator ( )**
While charging, when the indicator illuminates, playing for approximately 1.5 hours can be operated. The indicator will turn off, when the charging is finished.
㉖ **Memory Indicator (M)**
Illuminates when the program play is operated.

Remote Control Transmitter Section

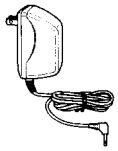


㉗ **Remote Control Transmission window**
Aim the transmission window toward the remote sensor of the main unit when operating the remote control.
㉘ **Numeric Button (1–10, 0, >10)**
These buttons are used to specify the desired track number.
㉙ **Music Scan Button (M. SCAN)**
This button can be used to play the first part of each track in order.
㉚ **Clear Button (CLEAR)**
Each time this button is pressed, the last entry in the program sequence is cancelled.
㉛ **Repeat Buttons (REPEAT)**
The A–B repeat button can be used to play the portion of a disc between two points (A and B) chosen by you.
㉜ **Stop Button (■ STOP)**
㉝ **Output Buttons (– OUTPUT +)**
These button can be used to control output level (from –12 dB to 0 dB).
㉞ **Recall Button (RECALL)**
Press this button to confirm the contents of the program.
㉟ **Memory Button (MEMORY)**
Pressing this button initiates the programmed play mode. You can then enter specific tracks using the numeric buttons.

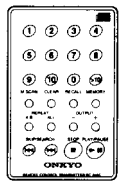
The function description of buttons ❹, ❼ is as described under "Control Section" on page 12.

■ ACCESSORIES

AC adaptor
AD-120AC03-1



Remote Control Transmitter
RC-246C



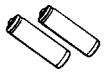
Stereo Headphones
DP-F105

Soft Case
DSC-F105

Stereo Connection Cable
SJPD5-2K

Remote Control Receiver Unit
RCDNTR1008A

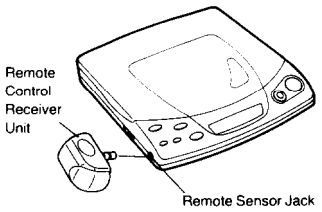
Rechargeable Batteries
SH-CDB8-2



Lithium Battery
CR2025-1P0D

■ CONNECTIONS

Using by the included Remote Control Transmitter

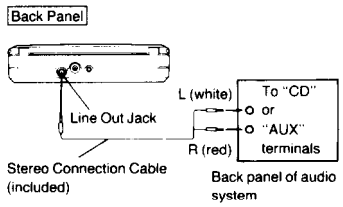


Connect the included Remote Control Receiver Unit to Remote Sensor Jack.

The included Remote Control Transmitter is designed only for this unit.

When operating from the remote control, the AC adaptor or the optional car adaptor are the recommended power sources.

Listening through an audio system

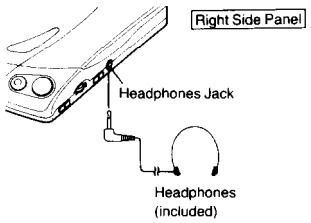


Use the Stereo Connection Cable (included) to connect this unit to a receiver or a stereo amplifier.

Do not connect this unit to the PHONO terminals of the receiver or stereo amplifier.

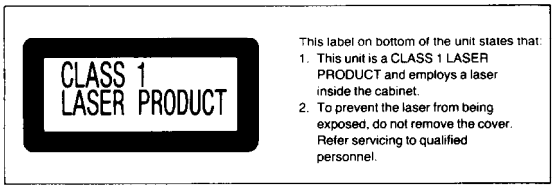
Switch OFF the power to the receiver or stereo amplifier before connecting this unit.

Listening through the stereo headphones



Connect the plug of the Stereo Headphones (included) to the Headphones Jack.

■ LASER WARNING LABEL

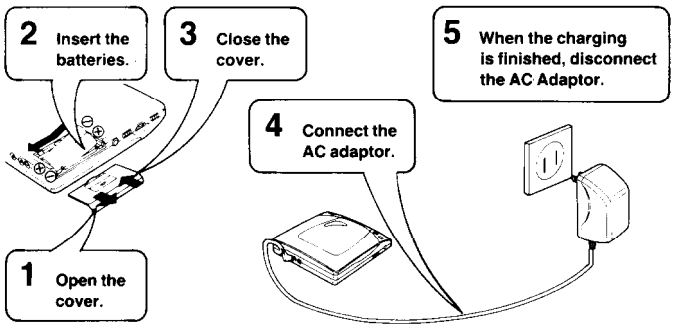


■ POWER SOURCE

From the Main Unit

Rechargeable batteries operation

This unit may be used with the included rechargeable batteries, two "AA" size alkaline batteries, the included AC Adaptor or the optional Car Adaptor (CAD-F105).



For its initial use after purchasing or after a long time interval (more than three months), make sure to recharge the rechargeable batteries.

1 Open the cover.
Press gently and move the cover in the direction of the arrow.

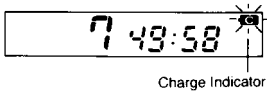
2 Insert the batteries.
Use two included rechargeable batteries, making sure that the proper polarities are maintained.

3 Close the cover.

5 When the charging is finished, disconnect the AC Adaptor.
The unit can be turned on with the AC Adaptor while the batteries are being recharged. In this case, the recharging time will be longer than the specified time.

Normally 1 hour recharging will give approximately 1.5 hours and 3 hours recharging will give approximately 2.5 hours play.

4 Connect the AC Adaptor.
The Charge Indicator will begin flashing. When the indicator stops flashing, approximately 1.5 hours of playing time can be obtained. When the indicated turn off, the batteries are fully charged and approximately 2.5 hours of playing time can be obtained.



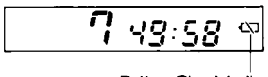
Charge Indicator

While playing, the Charge Indicator will not come up if the rechargeable batteries are inserted.

Rechargeable battery life

This rechargeable battery can be recharged about 300 times. Over 300 times, its operation time will become shortened. That's time for replacing the rechargeable batteries with new ones.

Battery condition can be checked by the Battery Check Indicator on the display. When the batteries are weak, the Battery Check Indicator begins to flash on and off, and then the unit will automatically shut off.



Battery Check Indicator

On its initial use after purchasing or its use after a long time interval, 3 hours recharging may not provide normal operation time. But the repeat of recharging will recover the normal operation time.

Do not attempt to recharge "AA" size alkaline or carbon batteries.

Do not use a rechargeable battery mixed with the other type (carbon or alkaline).

Do not allow metal objects to touch the terminals. (A hazardous short circuit may result.)

The batteries supplied with this unit are designed for ONKYO brand portable audio products only. Use in other products could cause damage or personal injury.

Avoid recharging or placing the rechargeable battery near sources of heat or humidity. Recharging should be performed at 0°C~40°C (32°F~104°F).

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

Operation of "AA" size batteries

Two "AA" size alkaline batteries can be inserted into the battery compartment in the same way as the rechargeable batteries.

Battery condition can be also checked by the Battery Check Indicator. The indicator begins flashing on and off at a half consumption of the battery life.
Use of alkaline batteries will give approximately 4 hours play.

Batteries installed with incorrect polarities may leak and damage this unit.

Do not mix batteries (old and new) or types (Ni-Cd, alkaline and carbon).

If the set is not used for a long period of time or is used only from an AC power source, remove all the batteries for battery life and to prevent potential damage due to possible battery leakage.

Do not incinerate the battery or bring it near a fire or open flame.

If a battery leak should occur and the electrolyte comes into contact with skin or clothes, flush with water immediately.
If the internal parts of the battery become visible because of damage to the battery, discard it immediately.

AC power operation

Use only the included AC Adaptor with this unit.

1 Insert the plug, at the end of the AC Adaptor cord, into the DC In Jack.

2 Plug the AC Adaptor into your household AC power outlet.

To operate on battery power, unplug the AC Adaptor from the household AC Power Outlet and the DC In Jack on the unit.

Use only the included AC Adaptor or optional Car Adaptor when recharging.

CAUTION:
Do not use the included AC Adaptor for other products.

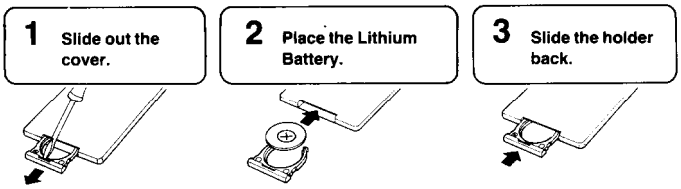
Car battery operation

Follow the operating instructions of the optional Car Adaptor.
The rechargeable battery can be recharged with the Car Adaptor.

CAUTION:
Use only car adaptor, Model: CAD-F105, manufactured by ONKYO CORPORATION.

The Remote Control Transmitter

Battery Installation



1 Slide out the holder with a screwdriver.

2 Place the lithium battery (included) in the holder.
Do not handle the battery with any metal tool.

The ⊕ side of the battery must face up.

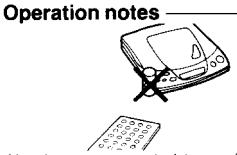
Do not try to recharge or dispose of in fire.

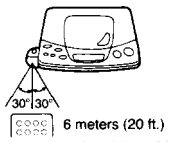
Keep batteries out of children's reach. If batteries are swallowed, contact a physician immediately.

Replace with a new lithium battery when needed.

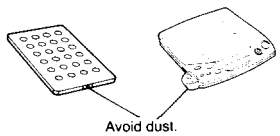
3 Slide the holder back into place.
The ⊕ marked side of the holder must face up.

Operation notes


Aim the remote control transmission window toward the unit's sensor. Avoid any obstacles.



Use the remote control within a 60 degree angle and within 6 meters (20 ft.) from the unit.


Avoid dust.

Be sure the transmission window and the unit's sensor are free from dust. Excessive dust might prevent reception.

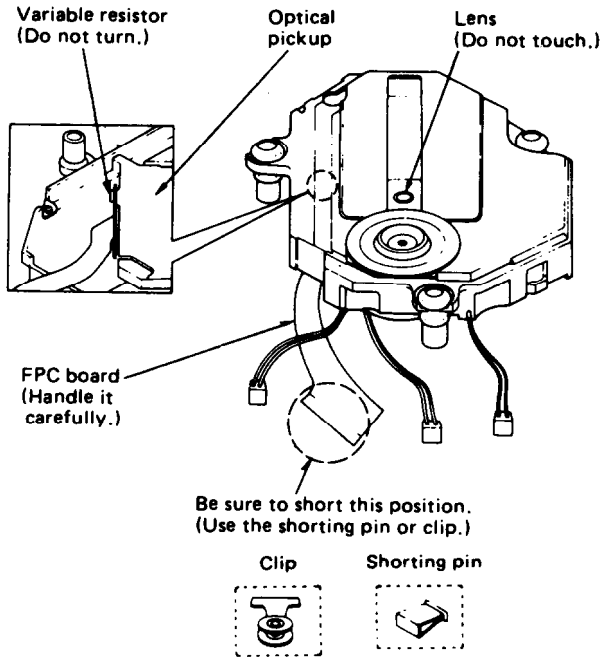
The operation may not be correct if direct sunlight or other strong light sources strike the remote control signal sensor part of this unit. If there is a problem, place the unit away from the light source.

■ HANDLING PRECAUTIONS FOR TRAVERSE DECK

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

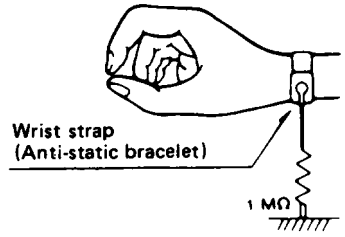
1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board (FPC board).
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board (FPC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

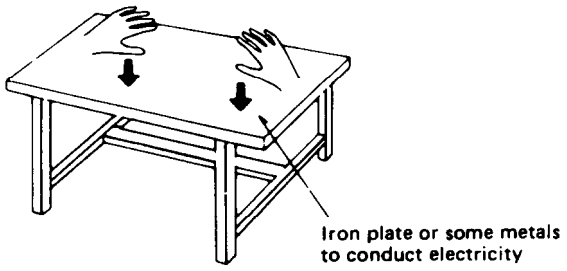


• Grounding for electrostatic breakdown prevention

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

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



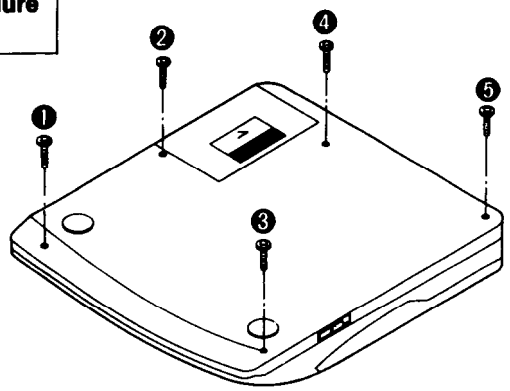


■ DISASSEMBLY INSTRUCTIONS

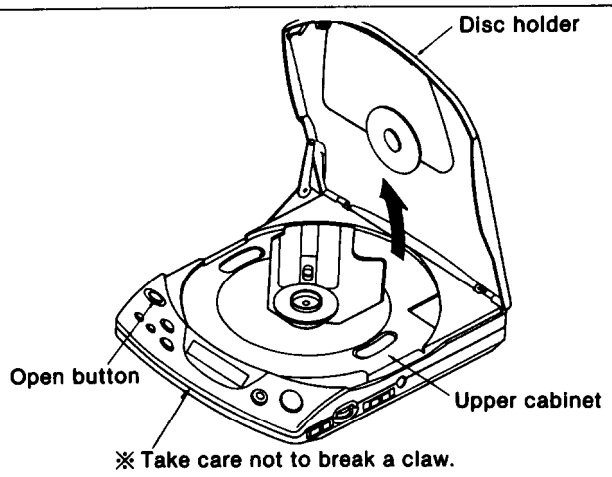
Warning: This product uses a laser diode. Refer to caution statements on page 2.

Ref. No. 1 **Removal of the upper cabinet**

Procedure 1



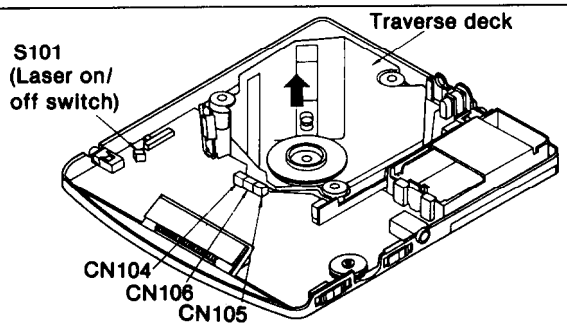
1. Remove the 5 screws (❶~❺).



2. Push the open button and open the disc holder.
3. Remove the upper cabinet in the direction of the arrow.

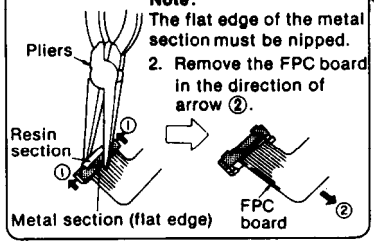
Ref. No. 2 **Removal of the traverse deck**

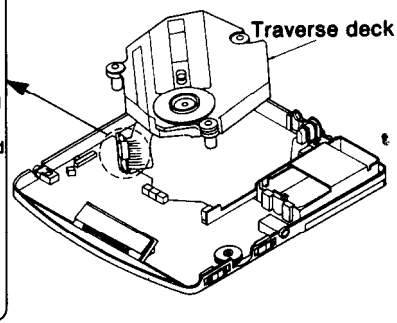
Procedure 1→2



1. Disconnect the connectors (CN104, CN105, CN106).
2. Pull out the traverse deck in the direction of the arrow.

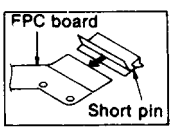
How to Remove the FPC Board.
1. Nip the metal and resin sections of the connector with a pair of pliers and then move the metal section in the direction of arrows ①.
Note:
The flat edge of the metal section must be nipped.
2. Remove the FPC board in the direction of arrow ②.





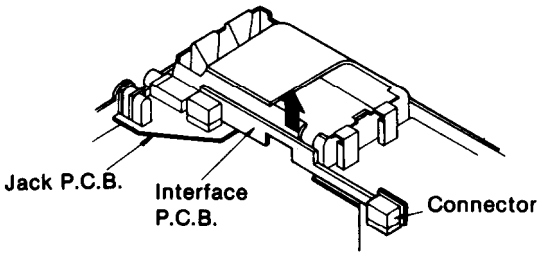
3. Remove the FPC board (CN103).

Caution:
Insert a short pin into the traverse deck's FPC board. (Refer to "handling precautions for traverse deck" on page 5.)

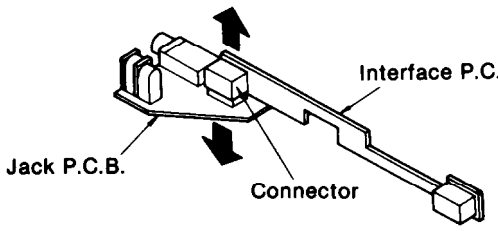


Ref. No. 3 **Removal of the interface P.C.B. and jack P.C.B.**

Procedure 1→2→3



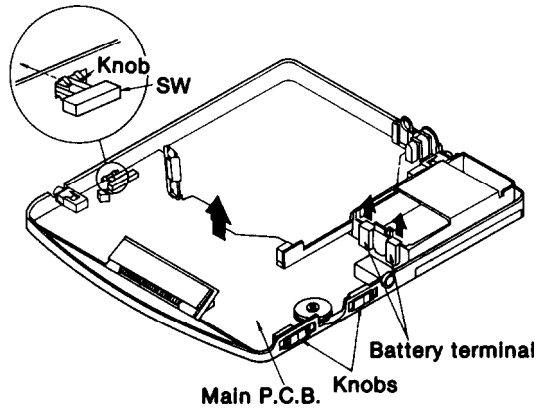
1. Remove the interface P.C.B. in the direction of the arrow.
※Take care of the connector.



2. Remove the interface P.C.B. and jack P.C.B. in the direction of the arrow.

Ref. No. 4	Removal of the main P.C.B.

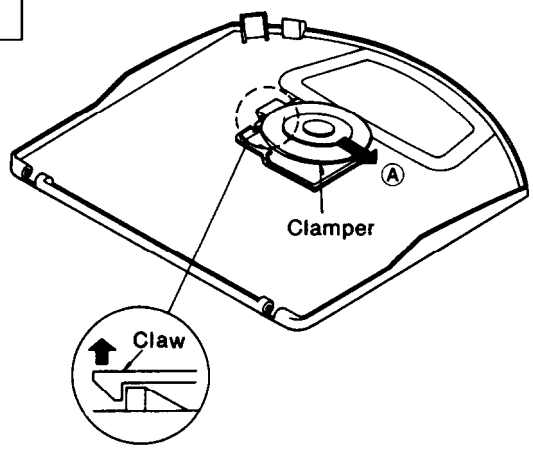
Procedure 1→2→3→4



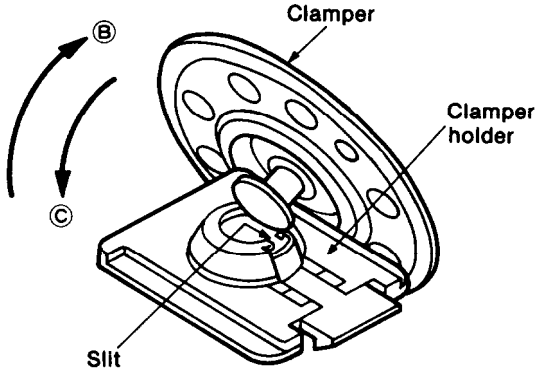
1. Push out the knobs from within.
2. Remove the main P.C.B. and battery terminal in the direction of the arrow.

Ref. No. 6	Removal of the clamper

Procedure 1→5→6



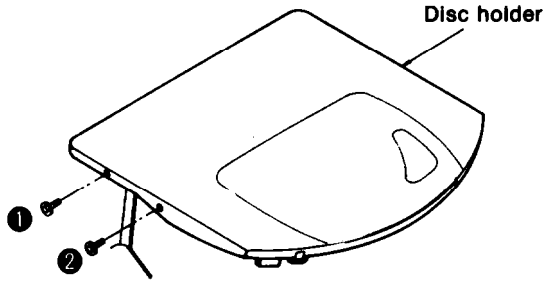
1. Release the 1 claw, and remove the clamper in the direction of the arrow Ⓐ.



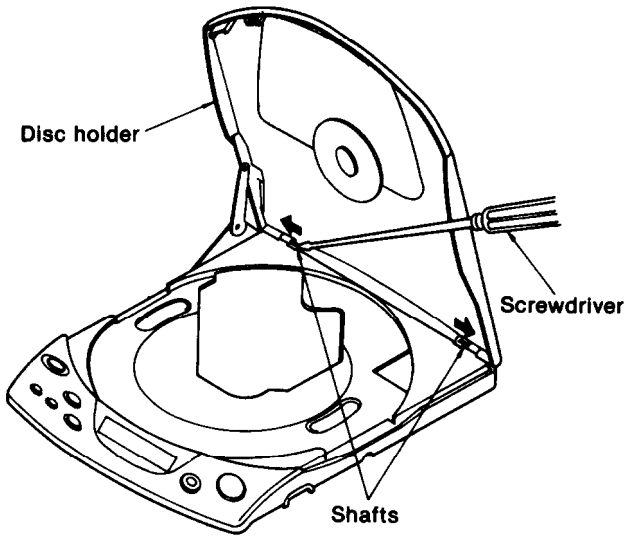
2. Position the clamper and clamper holder relation shown in figure.
3. Remove the clamper from the clamper holder in the direction of the arrow Ⓑ. (Using slit).
4. To reassemble reverse the above way (arrow Ⓒ).

Ref. No. 5	Removal of the disc holder

Procedure 1→5



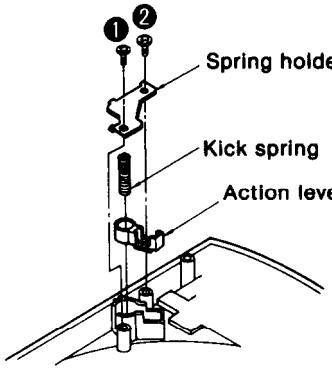
1. Remove the 2 screws (❶, ❷).



2. Use a screwdriver or similar tool to push the shafts in the direction of the arrow and remove it.

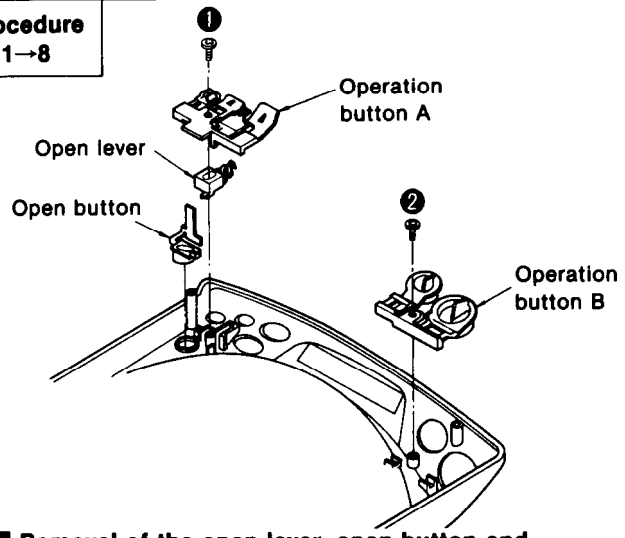
Ref. No. 7	Removal of the kick spring and action lever

Procedure 1→7



1. Remove the 2 screws (❶, ❷).
2. Remove the spring holder.
3. Remove the kick spring and action lever.

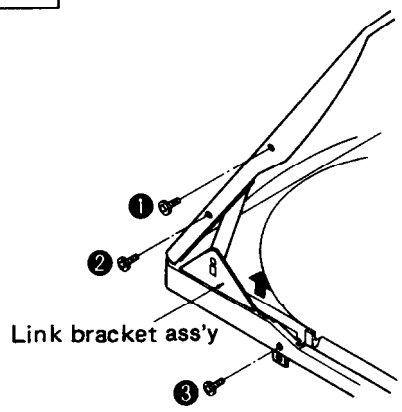
Ref. No. 8	Removal of the open lever, open button and operation button A, B
Procedure 1→8	



■ **Removal of the open lever, open button and operation button A**
- Remove the 1 screw (❶).

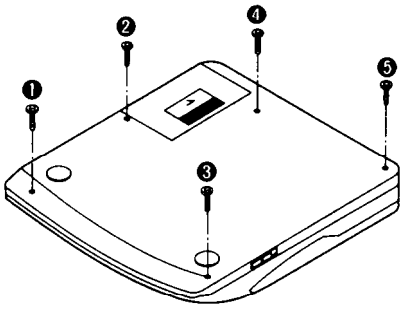
■ **Removal of the operation button B**
- Remove the 1 screw (❷).

Ref. No. 9	Removal of the link bracket ass'y
Procedure 1→9	

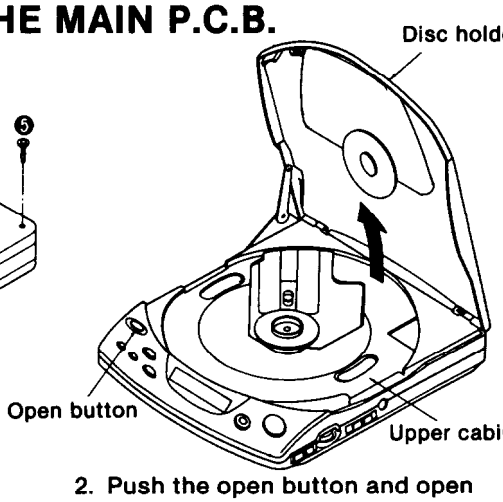


1. Remove the 3 screws (❶~❸).
2. Remove the link bracket ass'y in the direction of the arrow.

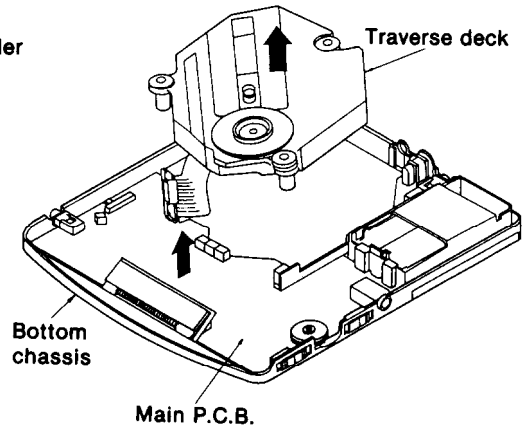
■ HOW TO CHECK THE MAIN P.C.B.



1. Remove the 5 screws (❶~❺).

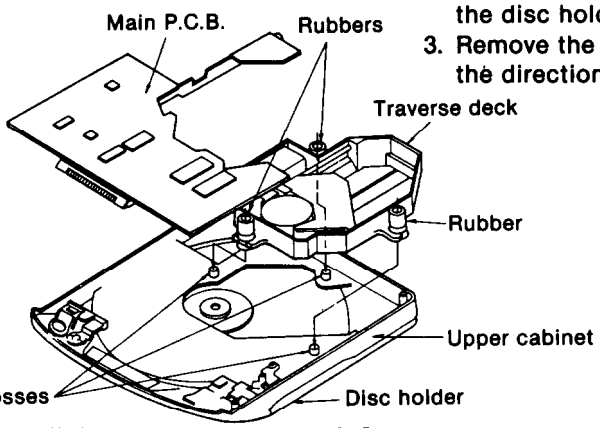


2. Push the open button and open the disc holder.
3. Remove the upper cabinet in the direction of the arrow.



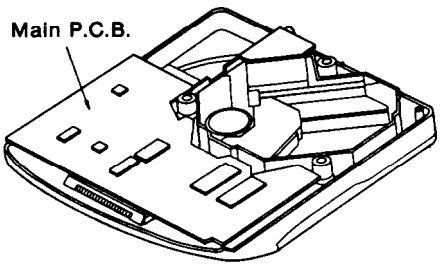
4. Remove the traverse deck and P.C.B. from the bottom chassis.
5. Short-circuit the lands of the laser ON/OFF SW (S101) by soldering them. (See pages 11 and 12)

Note:
After checking the P.C.B., remove the solders from the lands.



6. Install the traverse deck and P.C.B. in the upper cabinet.
7. Install the unit in place by holding the traverse deck and P.C.B. firmly, and then install the disc.

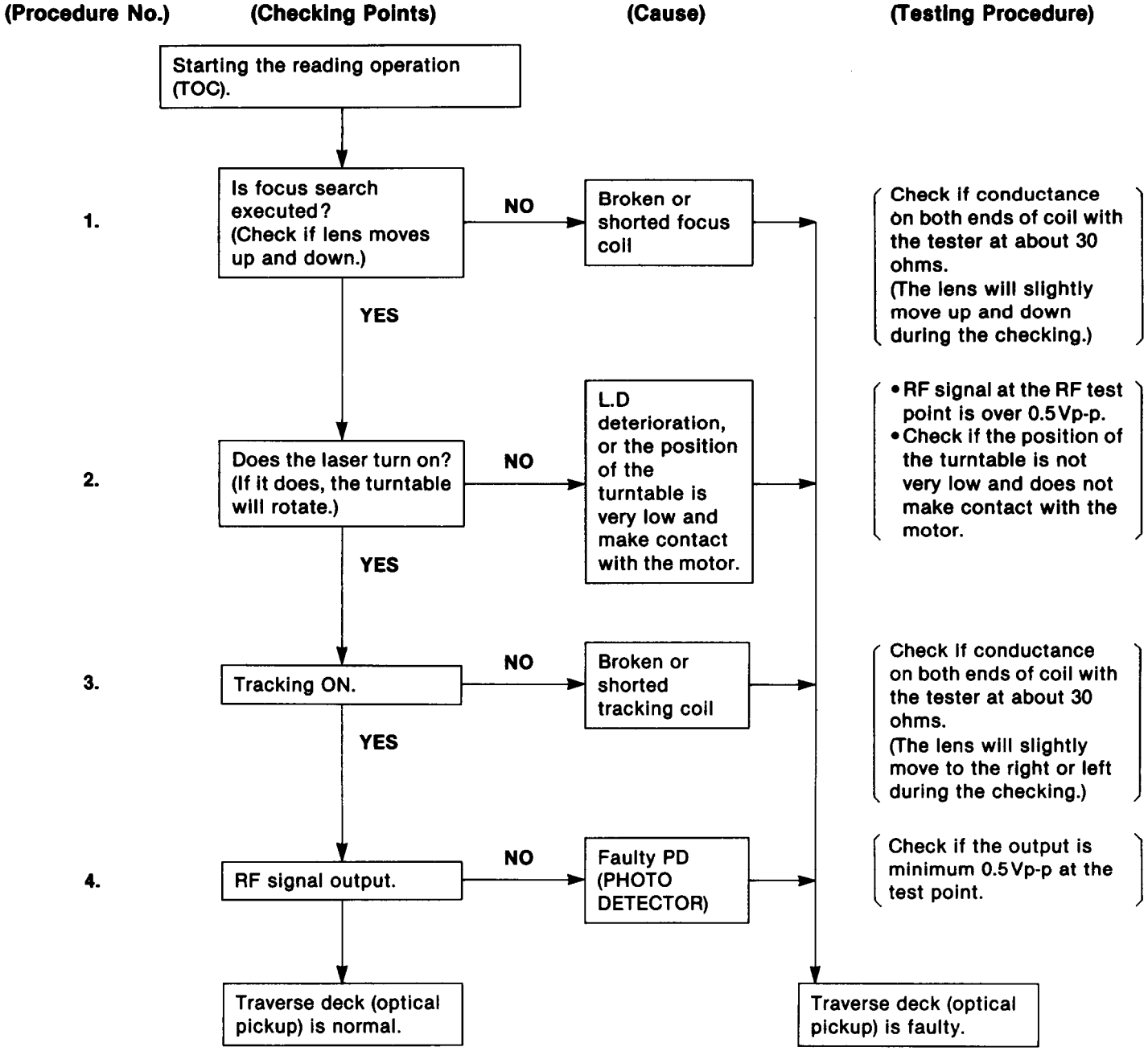
Note:
Engage the rubber sections of the traverse deck in the bosses on the upper cabinet.



8. With the P.C.B. in place as shown in the figure above, connect the AC adapter to the DC IN jack, press the play button and then measure the voltage and waveform.

■ CHECKING THE OPERATION PROBLEMS ON THE TRAVERSE DECK (OPTICAL PICKUP)

Make sure to follow the procedures below to check the operation problems of the traverse deck (optical pickup) before replacing it. Replace the traverse deck only after the problem is identified.



※ Replace traverse deck.

- Check electrical circuit.
- CD is not adjusted properly. Adjust CD again.
  - (1) Mechanical adjustment.
  - (2) Power supply voltage adjustment.
  - (3) Best eye adjustment (PD balance).
  - (4) Focus gain adjustment.
  - (5) Tracking gain adjustment.
  - (6) Focus offset adjustment.
  - (7) Tracking offset adjustment.
  - (8) Tracking balance adjustment.

  Refer to pages 13~15
- Check for flaws on disc or if it is warped or not centered.

※ Checking Operations of Replaced Traverse Deck (New Traverse Deck)

a) 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 Using Defect Disc
1. Play the 0.7mm black dot and the 0.7mm wedge on the defect test disc (NR-5A) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc (YEDS-18) and verify that no sound skip or noise occurs.

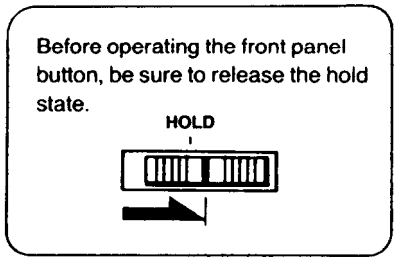
b) If the operations are normal, CD adjustments are not required when the traverse deck is replaced.

Note: CD adjustments are required in the cases below. (Mechanical adjustments are not necessary.)
- If audio is not played back continuously or noises occur after step (a) is executed.
- If the adjustment VRs (VR101~VR106) were rotated before the traverse deck was replaced.
- If the ICs in the servo circuit or adjustment VRs (VR101~VR106) were replaced.

■ NOTE FOR SERVICE

• About hold switch

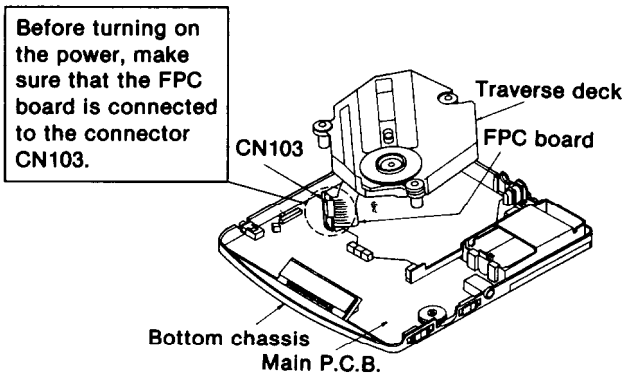
Before checking the operation problems and adjustments, be sure to release the hold state.



• Connection of the FPC board of the optical pickup

Before you put the power supply to work from the AC adaptor or batteries to check the set's operations and voltage, be sure to connect the FPC board of the optical pickup to the connector CN103 on the main P.C.B. If you disconnected the FPC board from the connector CN103, the transistor Q12 may be damaged when the PLAY/PAUSE button is pressed with the FPC board disconnected.

The note described above does not apply in the case that the FPC board is connected to the connector CN103 during service.



■ MEASUREMENTS AND ADJUSTMENTS

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

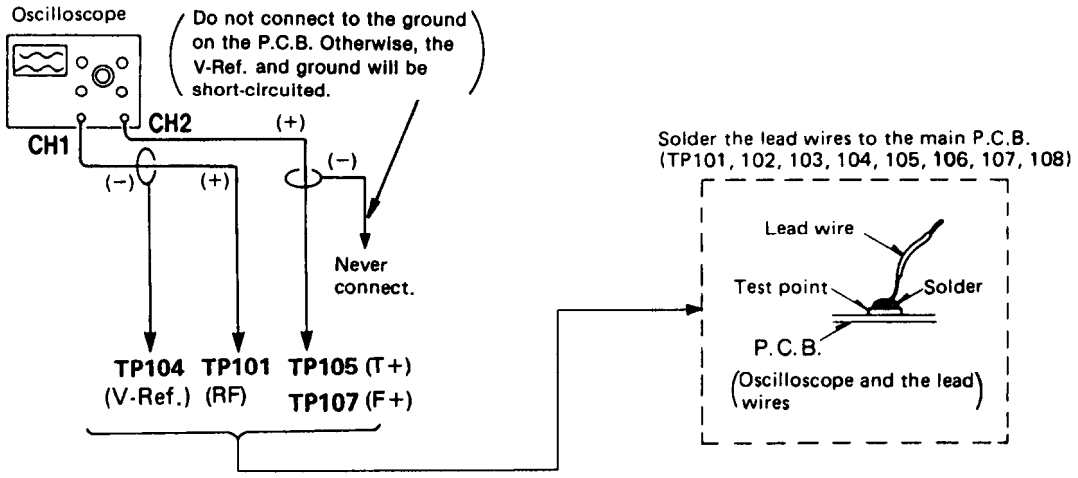
Caution: During adjustment, never connect CH-2 probe's GND to any place for it may short Vref line. (Connect CH-1 probe's GND to specified TP. described in each section.)

Measuring Instruments and Special Tools

* Test discs
1. Test disc (YEDS-18)
2. Black dot test disc (NR-5A)
* Normal disc
* Dual-beam oscilloscope with bandwidth of 30MHz or better (with EXT. trigger and 1:1 probe).
* Audio frequency (AF) oscillator
* AC adaptor(AD-120AC03-1 or AD-230AC03-1)
* Lead wire (for test points)
* Allen wrench (M2.0)
* DC voltmeter
* Disc clamper(27301649)

• Connection of oscilloscope

(For best eye, focus offset, tracking offset, tracking balance and mechanical adjustments.)

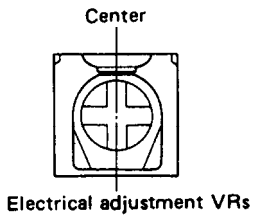


• Precaution for adjustments

1. Remove the upper cabinet. (Refer to page 6.)
2. Solder the lead wires and connector with lead wire to the test points on the main P.C.B.
3. Confirm the mechanical center.
   In the focus gain adjustment, if **VR104** is turned too far, the rotation of the turntable will stop. Turn a little at a time to the right or left from the mechanical center, and then switch on the power. After finding the position at which rotation starts, repeat the adjustment.
   • If any of the adjustments is substantially out of adjustment, reset the electrical adjustment VRs back to the mechanical center and readjust.

• Temporary setting of each VR

Temporary VR setting if any of the electrical adjustment VRs are replaced or require re-adjustment, temporarily set them to the following positions:



• Test short land

Short-circuit the lands of the laser ON/OFF switch (S101) by soldering them. It turns "ON" position. (Refer to below and left figure.)

Note: Remove the solders from the lands after adjustment.

• Adjustment procedure

(1) MECHANICAL ADJUSTMENT

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

1.Connect the oscilloscope CH.1 probe across **TP-101** (RF) (+) and **TP104** (V-Ref.) (-) on the main pc board.

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

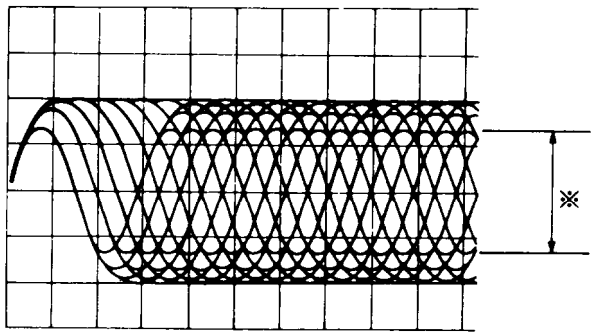
2.Switch the player power ON, and play track 2 on the test disc (YEDS-18).

3.Leave the player in play mode,and place it as shown below.

4.Alternately adjust the two mechanical adjusting screws with the 2.0mm allen wrench until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.

5.After completing the adjustment,lock the mechanical adjustment with lock paint.

Note:When adjusting the traverse deck, hold is shown in the figures. Adjust it in either of the ways shown in figure (A) or (B).



※ Most stretched eye pattern.

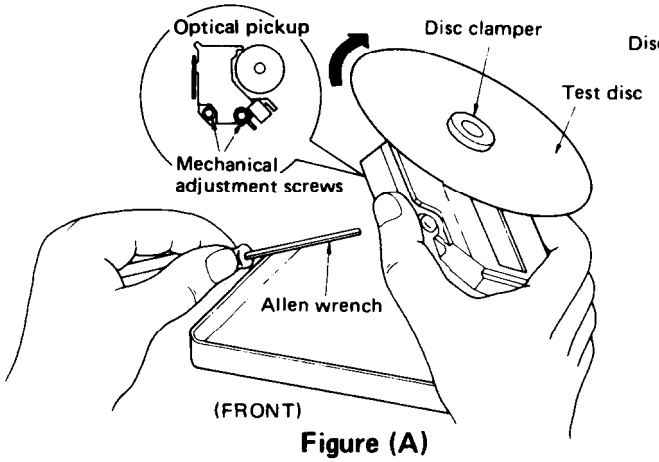
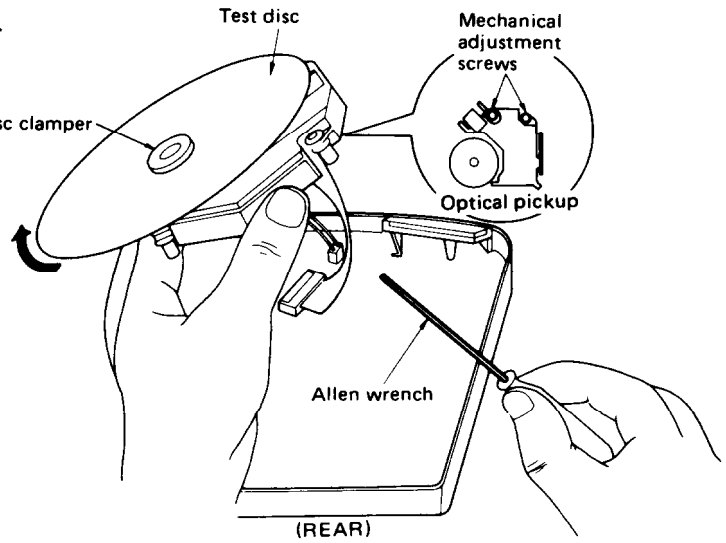


Figure (A)

Figure (B)



(2) POWER SUPPLY VOLTAGE ADJUSTMENT

1.Connect the DC voltmeter to C14 (+) and **TP110** (D.GND).

2.Insert the test disc,and switch the player power ON.

3.Adjust VR11 on the main pc board at 4.6±0.04V.

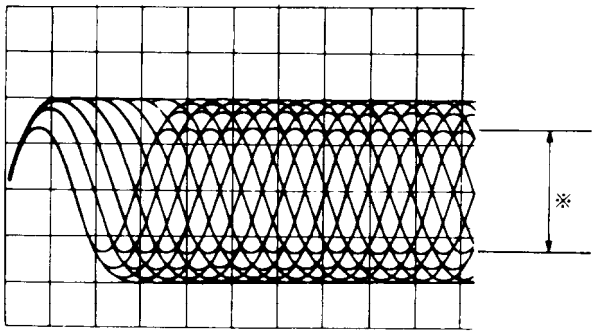
(3) BEST EYE (PD BALANCE) ADJUSTMENT

1.Connect the oscilloscope's CH.1 probe across **TP101** (RF) (+) and **TP104** (V-REF.) (-) on the main pc board.

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

2.Play the track 2 on the test disc (YEDS-18).

3.Adjust VR101 until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.



※ Most stretched eye pattern.

(4) FOCUS GAIN ADJUSTMENT

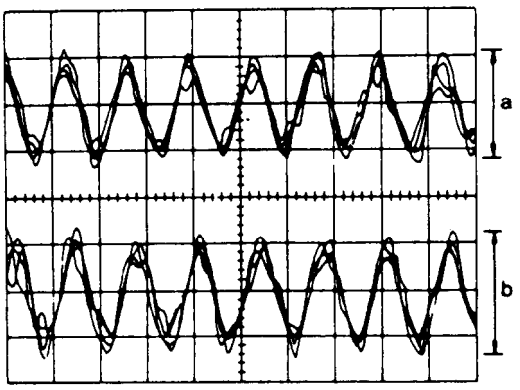
1.Set up the AF oscillator output for 825Hz,200mVp-p, and connect it to the test points **TP107** and **TP108** on the main pc board.

2.Connect the oscilloscope's CH.1 and CH.2 probes to the test points **TP107** and **TP108**,respectively (**TP102** is GND).

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

3.Play the track 2 on the test disc (YEDS-18).

4.Adjust VR104 until the signal amplitudes on both channels become identical to each other.



※ Adjust **VR104** until a equals b.

(5) TRACKING GAIN ADJUSTMENT

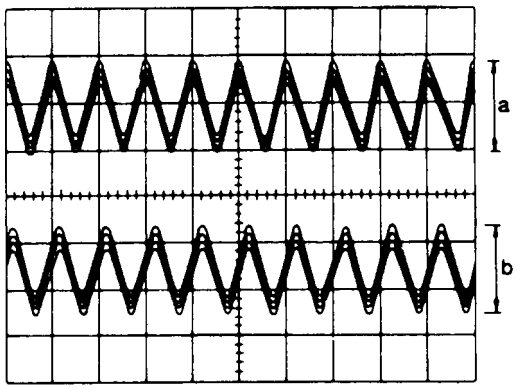
1.Set up the AF oscillator output for 1.1kHz,200mVp-p, and connect it to the test points **TP105** and **TP106** on the main pc board.

2.Connect the oscilloscope's CH.1 and CH.2 probes to the test points **TP105** and **TP106**,respectively (**TP102** is GND).

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

3.Play the track 2 on the test disc (YEDS-18).

4.Adjust VR105 until the signal amplitudes on both channels become identical to each other.



※ Adjust **VR102** until a equals b.

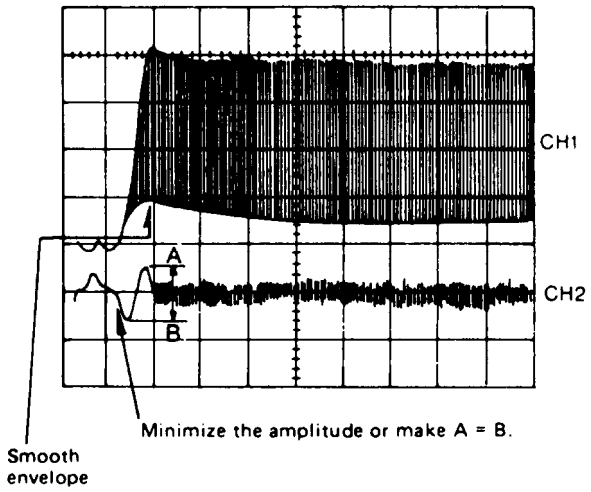
(6) FOCUS OFFSET ADJUSTMENT

1.Connect the oscilloscope's CH.1 probe across **TP101**、(+) and **TP102** (-) on the main pc board and its CH.2 probe (+) to **TP107**.

Oscilloscope setting: VOLT 200mV (CH.1)
100mV (CH.2)
SWEEP .....0.2ms.
Input coupling ..... AC
Trigger mode.....NORM (Trigger CH.1)

2.Play the track 13 on the test disc (NR-5A).

3.Trigger the oscilloscope's CH.1 so that the following waveformes are observed. Adjust VR103 until the dip in the RF signal envelope on CH.1 is smooth and the signal amplitude on CH.2 is minimized, i.e. when amplitude A equals amplitude B.



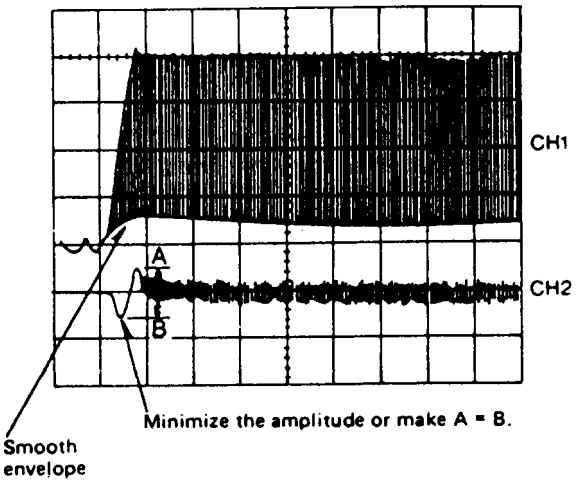
(7) TRACKING OFFSET ADJUSTMENT

1.Connect the oscilloscope's CH.1 probe across **TP101** (+) and **TP102** (-) on the main pc board and its CH.2 probe (+) to **TP105**.

Oscilloscope setting: VOLT 100mV (CH.1)
200mV (CH.2)
SWEEP .....0.2ms.
Input coupling ..... AC
Trigger mode.....NORM (Trigger CH.1)

2.Play the track 13 on the test disc (NR-5A).

3.Trigger the oscilloscope s CH.1 so that the following waveformes are observed. Adjust VR106 until the dip in the RF signal envelope on CH.1 is smooth and the signal amplitude on CH.2 is minimized, i.e. when amplitude A equals amplitude B.



(8) TRACKING BALANCE ADJUSTMENT

1.Set up the AF oscillator output for 1.1kHz,600mVp-p, and connect it to the test points **TP105** and **TP106** on the main pc board.

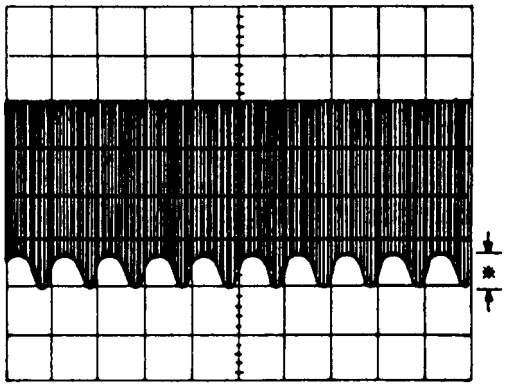
2.Connect the hot lead of the oscilloscope's CH. 1 probe to the test points **TP101** and the cold lead to **TP104**.

* Connect the hot lead of the oscilloscope's CH.2 probe to **TP105**.

Oscilloscope setting: VOLT 100mV (CH.1)
200mV (CH.2)
SWEEP .....0.1ms.
Input coupling ..... AC
Trigger mode.....NORM (Trigger CH.2)

3.Play the track 2 on the test disc (YEDS-18).

4. Adjust VR106 until the section of the waveform marked with * is balanced on CH.1.



※ Minimize the envelope amplitude uniformly.

(9) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

* Checking Skip Search

1.Play an ordidinary musical program disc.

2.Press the skip button to check for normal search operation (in both the forward and reverse directions).

*Checking Manual Search

1.Play an odinary musical program disc.

2.Press the manual search button to check for smooth manual search operations at either low or high speed (in both forward and reverse directions).

* Checking Using Defect Disc

1.Play the 0.7 mm black dot and the 0.7mm wedge on the defect test disc (NR-5A) and verify that no sound skip or noise occurs.

2.Play the middle tracks of hte uneven test disc and verify that no sound skip or noise occurs.

■ TERMINAL FUNCTION OF IC'S

• IC11 : (AN8083SE2) : DC-DC converter control

Pin No.	Mark	I/O Division	Function
1	IN	I	Error amp input
2	FB	O	Error amp output
3	SPRO	I	Short protect input
4	DED	I	Dead time input
5	OUT	O	Switching output
6	GND	I	Ground 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 input
10	$\overline{\text{START}}$	I	Start input
11	POWER	I	Power ON/OFF
12	VREF	O	Reference voltage output
13	EMP	O	Empty detection output
14	VSEN	I	Empty detection input
15	RST	O	Reset output
16	VCC	I	Power supply terminal

• IC101 (AN8373SE2) : Servo amp.

Pin No.	Mark	I/O Division	Function
1	AMP1	I	RF signal input (X30 amp.) (Not used, connected to GND)
2	PDAD	I	Photo detector current input (A2)
3	PDA	I	Photo detector current input (A1)
4	PDBD	I	Photo detector current input (A4)
5	PDB	I	Photo detector current input (A3)
6	LPD	I	Non-inverting laser power input
7	LD	O	Laser power auto control output
8	FBL1	I	PD balance adjustment
9	FBL2	I	
10	TBL1	I	Tracking balance adjustment
11	TBL2	I	
12	FOOFS	I	Focus offset adjustment
13	IVA	O	Current/voltage conversion output (A)
14	IVB	O	Current/voltage conversion output (B)
15	FE	O	Focus gain adjustment output
16	FPI	I	Focus error signal input
17	TPI	I	Tracking error signal input
18	C. TPL	I	Tracking error filter capacitor input
19	C. TPH		
20	C. FPL	I	Focus error filter capacitor input
21	C. FPH		

Pin No.	Mark	I/O Division	Function
22	TPO	O	Tracking error signal output
23	FPO	O	Focus error signal output
24	FGC	I	Focus gain up signal input
25	TGC	I	Tracking gain up signal input
26	GD	I	Focus/tracking gain down signal input
27	PTO	O	Position detection amp. output (Not used, open)
28	PTI	I	Position detecting amp. output (Not used, open)
29	PBO	O	Position detection buffer output (Not used, open)
30	POT	I	Position detecting buffer input
31	BDO	O	Dropout detection output
32	$\overline{\text{RFDET}}$	O	RF detection signal output
33	SDO	O	Dropout detection pulse output
34	C. SBDO	I	Dropout detecting capacitor input
35	ARF	O	RF signal output
36	C. AGC	I	AGC detecting capacitor input
37	VCC	I	Power supply terminal
38	LDON	I	Laser power control input
39	RF IN	I	RF signal input
40	AMPO	O	RF signal output (Not used, open)
41	VREF	O	Reference voltage output
42	GND	I	Ground terminal

• IC102 (AN8374SE2) : Servo processor

Pin No.	Mark	I/O Division	Function
1	LSA	I	Phase difference input (A)
2	LSB	I	Phase difference input (B)
3	TEOFS	I	Tracking offset adjustment
4	TE	O	Tracking gain adjustment
5	TEG	I	
6	TE OUT	O	Tracking error signal output
7	TE BPF	I	Tracking error gain detecting filter
8	FEG	I	Focus gain adjustment
9	FE OUT	O	Focus error signal output
10	CLW	O	Triangular wave oscillator capacitor input
11	VREF	I	Reference voltage input
12	ARF	I	RF signal input
13	CDSL	I	Data slice filter capacitor input
14	FPC	I	Frequency difference signal input
15	GND	I	Ground terminal
16	C. PLL	I	PLL loop filter constant
17	VSS	I	Ground terminal
18	CLK	I	Frequency pull-in clock signal (88.2 kHz) input
19	SRF	O	Sliced and digitized RF signal output
20	PCK	O	Clock output extracted from SRF
21	EFM	O	EFM signal output synchronous with PCK

Pin No.	Mark	I/O Division	Function
22	VDD	I	Power supply terminal
23	SPCNT	O	Track crossing speed control output output (Not used, open)
24	SENSE	O	Selector output (track crossing state)
25	TRV	O	Traverse servo control output
26	$\overline{\text{FLOCK}}$	O	Focus lock signal output
27	KICK	O	Track kick signal output
28	LDON	O	Laser power control output
29	VDET	O	Focus/tracking gain up output
30	CNT1	I	Control input ($\overline{\text{FOON}}$: Focus servo ON signal)
31	CNT2	I	Control input ($\overline{\text{TRON}}$: Tracking servo ON signal)
32	CNT3	I	Control input (KICKF: Kick direction (forward) command)
33	CNT4	I	Control input (KICKR: Kick direction (reverse) command)
34	TRVF	I	Traverse forward command signal
35	TRVR	I	Traverse backward command signal
36	$\overline{\text{RFDET}}$	I	RF detection signal input
37	BDO	I	Dropout detection input
38	VCC	I	Power supply terminal
39	TVPO	O	Traverse position detecting resistor/capacitor inputs
40	TVPI	I	
41	BROUT	O	Tracking drive control output
42	BRIN	I	Tracking error signal input

• IC103, 104 : (AN8387SE2): Motor & actuator coil drive

Pin No.	Mark	I/O Division	Function
1	VCC	I	Power supply terminal
2	INI	I	Spindle motor drive signal input and tracking coil drive signal input
3	PCI	I	Spindle motor ON signal input
4	VREF	I	Reference voltage input
5	P. GND	I	Ground terminal
6			
7	S. GND	I	Ground terminal
8	PC2	I	Traverse motor brake control input
9	IN2	I	Traverse motor drive signal input and focus coil drive signal input
10	VCC	I	Power supply terminal

Pin No.	Mark	I/O Division	Function
11	VLIM2	I	Voltage limit terminal
12	P. VCC	I	Power supply terminal
13	D2+	O	Traverse motor drive signal output and focus coil drive signal output
14	D2–		
15	P. GND	I	Ground terminal
16			
17	D1+	O	Spindle motor drive signal output and tracking coil drive signal output
18	D1–		
19	P. VCC	I	Power supply terminal
20	VLIMI	I	Voltage limit terminal

• IC201 (μPD75308G487): System control & LCD drive

Pin No.	Mark	I/O Division	Function
1 ∫ 12	S12 ∫ S23	O	Segment signal output (7 pin~12 pin) (Not used, open)
13	MLE	O	Mode set latch enable signal
14	LDON	O	Laser power control input
15	TRV • F	O	Traverse forward command signal
16	TRV • R	O	Traverse backward command signal
17	MLD	O	Command load signal output
18	MDATA	O	Command data output
19	MCLK	O	Command clock signal output
20	LED	O	Remote control detection
21 ∫ 24	COM0 ∫ COM3	O	LCD common line output
25	BIAS	O	(Not used, connected to GND)
26	VLC0	—	
27	VLC1	—	(Not used, open)
28	VLC2		
29	PROG	I	Key signal input
30	REPEAT		
31	SKIP • R		
32	SKIP • F		
33	VSS	I	GND terminal
34	STOP	I	Key signal input
35	PLAY		
36	RESUME		
37	RANDOM		
38	BLKCK	I	Sub-code block (Q data) clock (75 Hz)
39	CLDCK	I	Sub-code frame (Q data) clock (7.35 kHz)
40	SUBQ	I	Sub-code (Q data) output
41	STAT	I	Processing condition (CRC, CUE, CLVS, FCLV. TT STOP) input

Pin No.	Mark	I/O Division	Function
42	WLSRCN	I	Offering signal of edge det
43	FLOCK	I	Focus lock signal input
44	OPEN	I	Laser ON/OFF switch detection
45	SENSE	I	Selector input (track crossing state)
46	CHARGE	O	(Not used, open)
47	ACDET	O	Power supply detection
48	POWER	O	Power ON/OFF output
49	BUZ	O	Muting control
50	CHGCMP	I	(Not used, open)
51	EMP	I	Empty detection input
52	REST • SW	I	REST switch signal input
53	WORCN	O	Rechargeable battery detection
54	VDD	I	Power supply terminal
55	XT1	I	Sub-system clock crystal terminal (Not used, open)
56	XT2	—	
57	NC	—	Not connected
58	X1	I	Clock input (4.2336 MHz)
59	X2	I	Clock input (Not used, open)
60	TRVSTOP	O	Traverse motor brake control output
61	MUTE	O	Muting control
62	PWRDWN	—	(Not used, open)
63	LIGHT	O	LED drive command signal
64	CNT1	O	Control input ($\overline{\text{FOON}}$: Focus servo ON signal)
65	CNT2	O	Control input ($\overline{\text{TRON}}$: Tracking servo ON signal)
66	CNT3	O	Control input (KICKF: Kick direction (forward) command)
67	CNT4	O	Control input (KICKR: Kick direction (reverse) command)
68	RESET	I	Reset signal
69 ∫ 80	S0 ∫ S11	O	Segment signal output (69 pin~71 pin) (Not used open)

• IC202 (MN6625A): Digital signal processor

Pin No.	Mark	I/O Division	Function
1	BYTCK	O	Serial data byte clock (Not used, open)
2	FCLK	O	Crystal frame clock (7.35 kHz) (Not used, open)
3	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
4	SRDATA	O	Serial data output (MSB first)
5	SLCK	O	Serial bit clock output
6	LRCK	O	LR discrimination signal output
7	WDCK	O	Serial data output word clock
8	LDG	O	L channel deglitch signal (Not used, open)
9	RDG	O	R channel deglitch signal (Not used, open)
10	IPFLAG	O	Interpolation flag (interpolation at "H")
11	FLAG	O	Error flag terminal
12	XCK	O	Clock (16.9344MHz) output (Not used, open)
13	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +4.0V)
14	TX	O	Digital signal output (Not used, open)
15	SLEEP	I	Mode selector (Not used, connected to GND) ("L": normal, "H": SLEEP mode)
16	CSEL	I	Test terminal ("L": normal) (Not used, connected to GND)
17	X1	I	Clock input (16.9344MHz)
18	X2	O	Clock output (16.9344MHz)
19	VSS	I	GND terminal
20	BLKCK	O	Sub-code block (Q data) clock (75Hz)
21	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35kHz)
22	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
23	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
24	MLD	I	Command load signal input
25	MCLK	I	Command clock signal input
26	MDATA	I	Command data input
27	DMUTE	I	Muting control
28	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
29	STAT	O	Processing condition (CRC, CUE, CLVS, TT STOP, FCLV)
30	SUBC	O	Sub-code serial output data (Not used, open)
31	SBCK	I	Clock for sub-code serial output (Not used, open)
32	SMCK	O	Clock output (4.2336MHz)
33	VDD	I	Power supply terminal
34	MEMP	I	Emphasis signal input (Not used, connected to power supply)
35	FG	I	Spindle motor FG signal input (Not used, connected to power supply)
36	PC	O	Spindle motor ON signal (ON at "L")
37	EC	O	Spindle motor drive signal
38	RESY	O	Resynchronizing signal (Not used, open)
39	DO	I	Drop-out signal (Drop-out at "H")
40	SRF	I	EFM signal input (DSL)
41	EFM	I	EFM signal input (PLL)
42	PCK	I	PLL extract clock input (4.3218MHz)
43	FPC	O	PLL frequency comparision signal
44 ⟆ 51	D7 ⟆ D0	I/O	16K RAM data input/output
52	RAM/OE	O	16K RAM $\overline{\text{OE}}$ signal
53	RAM/WE	O	16K RAM $\overline{\text{WE}}$ signal
54 ⟆ 64	RAM/A0 ⟆ RAM/A10	O	16K RAM address signal (RAMA0: LSB, RAMA10: MSB)

• IC301 (SM5840AS-ET): Digital filter

Pin No.	Mark	I/O Division	Function
1	CKSL	I	Oscillator and input frequency selector (Not used, connected power supply)
2	XT1	I	Oscillator input
3	XT0	O	Oscillator output (Not used, open)
4	CKO	O	Clock output (Not used, open)
5	VSS	—	GND terminal
6 7	NC	—	(Connected to GND)
8	MDT	I	Mode set data
9	MCK	I	Mode set clock
10	MLE	I	Mode set latch enable
11	RESET	I	Reset input

Pin No.	Mark	I/O Division	Function
12	DG	O	Deglitch signal (Not used, open)
13	DOR	O	Rch data output
14	DOL	O	Lch data output
15	WCKO	O	Word clock output
16	VDD	I	Power supply terminal
17 18	NC	—	Not connected
19	BCKO	O	Serial bit clock output
20	CRCI	I	Input data sample rate (fs) clock
21	BCKI	I	Serial bit clock input
22	DIN	I	Serial data input

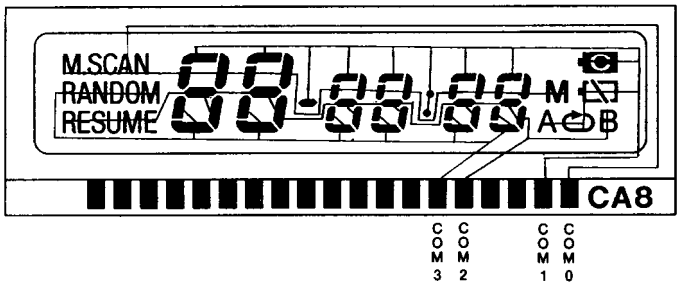
• IC302 (UPD6376GSE1): D/A Converter

Pin No.	Mark	I/O Division	Function
1	FS. SEL	—	(Not used, connected power supply)
2	D. GND	I	GND terminal
3	NC	—	Not connected
4	D. VDD	I	Power supply terminal
5	A. GND	I	GND terminal
6	R. OUT	O	Rch signal output
7	A. VDD	I	Power supply terminal
8			

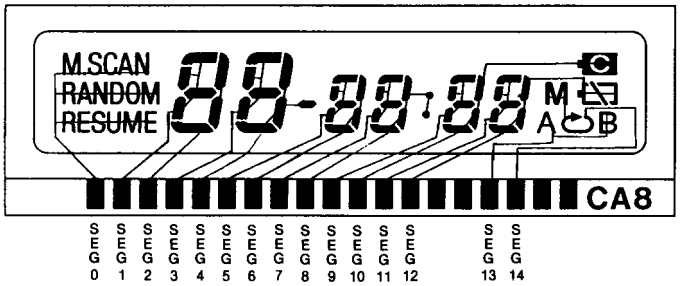
Pin No.	Mark	I/O Division	Function
9	R. REF	O	Rch reference voltage capacitor output
10	L. REF	O	Lch reference voltage capacitor output
11	L. OUT	O	Lch signal output
12	A. GND	I	GND terminal
13	WDCK	I	Word clock input
14	R. SI	I	Rch data input
15	L. SI	I	Lch data input
16	SLK	I	Serial bit clock input

■ INTERNAL CONNECTIONS OF LCD

• Common connection diagram



• Segment connection diagram



■ SCHEMATIC DIAGRAM

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

Notes:

- **S101** : Laser ON/OFF switch in "**off**" position. (It turns "**on**" with disc holder closed.)
- **S102** : Rest switch in **"off"** position. (It turns "**on**" when optical pickup comes to innermost periphery.)
- **S201** : Play/pause switch. (▶▮▮)
- **S202** : Stop/power off switch. (■)
- **S203** : Skip/search (▶▶▮) switch.
- **S204** : Skip/search (▮◀◀) switch.
- **S205** : Repeat switch.
- **S206** : Memory/recall switch.
- **S207** : Play mode selector switch. (random ⟷ resume ⟷ normal)
- **S208** : Hold switch in "**off**" position.
- **S301** : High Filter/XBS **selector switch in "off" position.**
- The voltage value and waveforms are the reference voltage of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of GND terminal (DC IN Jack). Accordingly, there may arise some error in the voltage values and waveforms depending upon the internal impedance of the tester or measuring unit.
  * The parenthesized is the voltage for test disc (1 kHz, L + R, 0 dB) in play mode, and the other, for no disc in stop mode.
  * AC adaptor (RFEA301C-1X) is used for power supply.

※ Headphones volume (VR301) in center (Scale. 5) position.

- ——— : Positive voltage lines.
  ▒▒▒ : Aduio signal lines.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

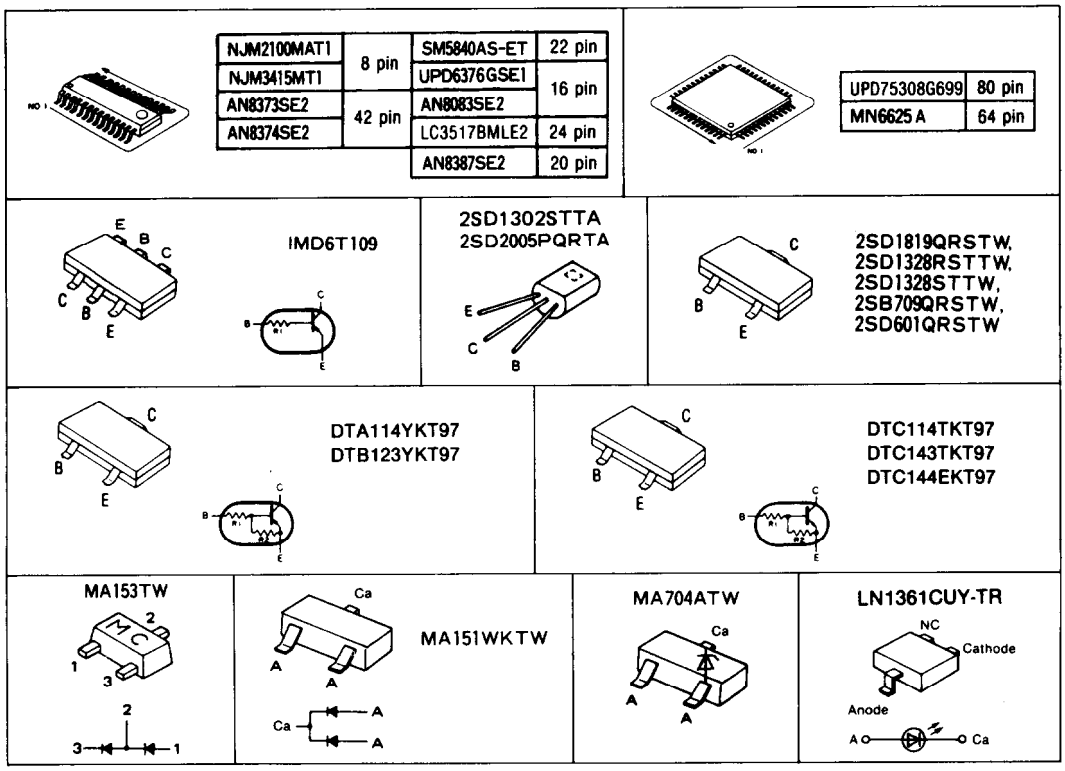
* Caution !

IC and LSI are sensitive to static electricity.

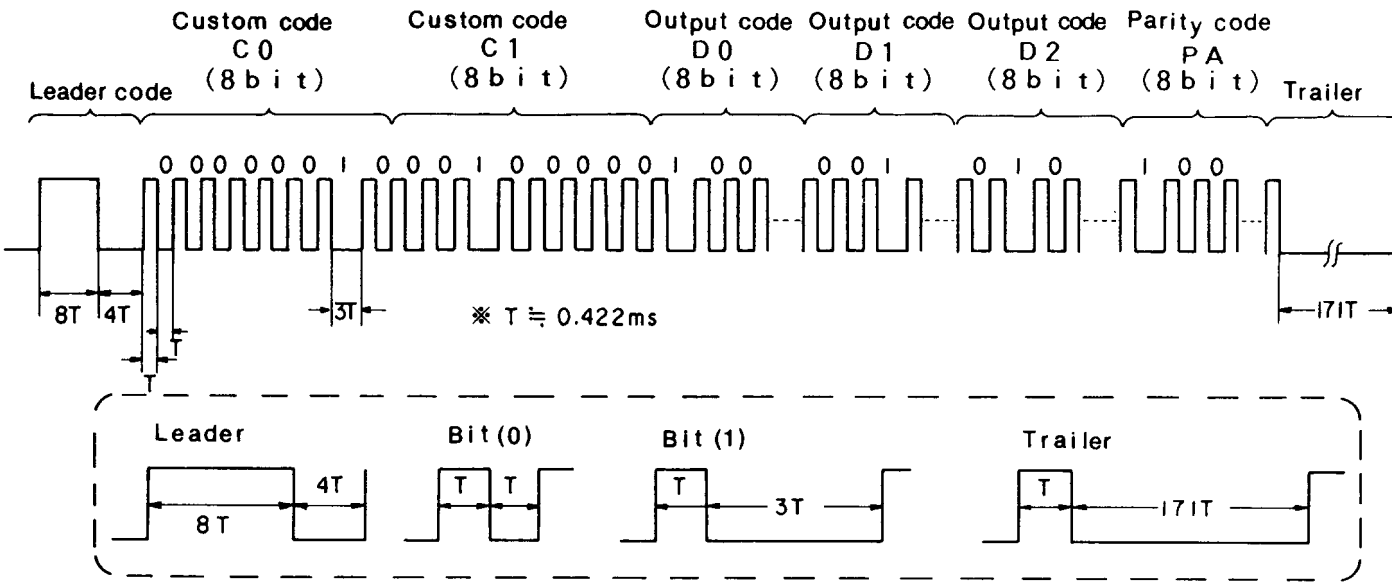
Secondary trouble can be prevented by taking care during repair.

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

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



• Remote control data code



	D0	D1	D2
1	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 0 0 0
2	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 0 0 1
3	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 0 1 0
4	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 0 1 1
5	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 1 0 0
6	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 1 0 1
7	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 1 1 0
8	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 0 1 1 1
9	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 1 0 0 0
10	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	1 0 0 0 0 1 0 1
0	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 1 1 0 0 1
>10	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	1 0 0 0 0 1 0 0
M.SCAN	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 1 0 0 0 1 1 0
CLEAR	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	1 0 0 0 0 0 0 0
RECALL	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	1 0 0 0 0 0 0 1
PROGRAM	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	1 0 0 0 1 0 1 0
REPEAT A-B	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 1 0 0 1 0 0 0
REPEAT ↻	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 1 0 0 0 1 1 1
LEVEL ▼	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 1 0 0 0 0 1
LEVEL ▲	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 1 0 0 0 0 0
-SKIP/SEARCH ⏮	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 1 0 0 1 0 0 1
-SKIP/SEARCH ⏭	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 1 0 0 1 0 1 0
STOP ■	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 0 0 0 0 0
PLAY / PAUSE ⏯	1 0 1 0 0 0 0 0	0 0 0 0 1 0 1 0	0 0 0 0 1 0 1 0

■ PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
1	28184531	Battery cover
2	27190912	LCD holder
3	28324755	Knob,headphone volume
4	28324756	Knob, holder
5	27141605	Battery terminal
6	28110675	Bottom cabinet ass y
7	27141602	Bracket
8	27260329	Shaft
9	27301648	Clamper holder
10	27141604	Link bracket ass'y
11	27301649	Clamper
12	28184530	Dust cover
13	28324757	Button,operation A
14	28324758	Button,operation B
15	28324759	Button,open
16	27141603	Spring holder
17	27180523	Spring(kick)
18	27301646	Open lever
19	27301647	Action lever
20	28110676	Intermediate cabinet ass'y
21	27175284	Foot
22	24800008	Traverse deck unit
22－1	24818010	Rubber spacer
22－2	24818009	Rubber spacer
N1	82141703	1.7P+3F(BC),Special screw
N2	801523	Special screw
N3	801524	Special screw
N4	833117048	1.7TTP+4B,Self-tapping screw
N5	833417060	1.7TTP+6P(BC),Self-tapping screw
U1	24505351	Main pc board ass'y
U2	24505352	Jack pc board ass'y
U3	24505353	Interface pc board ass'y

PRINTED CIRCUIT BOARD-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
IC11	22240645R0	AN8083S
IC101	22240476R0	AN8373S
IC102	22240477R0	AN8374S
IC103,104	22240646R0	AN8387S
IC201	22240647R0	MPD75308GJ26
IC202	22240648R0	MN6625A
IC203	22240649R0	LC3517BML
IC301	22240650R0	SM5840AS
IC302	22240555R0	MPD6376GS
IC303	22240608R0	NJM2100M
IC304	22240651R0	NJM3415M
	Transistors	
Q11	2212354 or	2SD1302-S or
	2212355	2SD1302-T
Q12	2214455R0 or	2SD1328-S or
	2214456R0	2SD1328-T
Q20	2212354 or	2SD1302-S or
	2212355	2SD1302-T
Q21,22	2214413R0 or	2SB709A-Q or
	2214414R0	2SB709A-R
Q26	2214743R0 or	2SD1819A-Q or
	2214744R0	2SD1819A-R
Q27,Q29	2214760R0	DTC114TK
Q30	2214413R0 or	2SB709A-Q or
	2214414R0	2SB709A-R
Q31	2214770R0	DTC144EK
Q32	2214433R0 or	2SD601A-Q or
	2214434R0	2SD601A-R
Q33	2214752 or	2SD2005-P or
	2214753	2SD2005-Q
Q34	2214780R0	DTB123YK
Q35,36	2214433R0 or	2SD601A-Q or
	2214434R0	2SD601A-R
Q109	2214413R0 or	2SB709A-Q or
	2214414R0	2SB709A-R
Q201	2214433R0 or	2SD601A-Q or
	2214434R0	2SD601A-R
Q202	2214790R0	DTC143TK
Q301-304	2214455R0 or	2SD1328-S or
	2214456R0	2SD1328-T
Q305,Q306	2214760R0	DTC114TK
Q308	2214433R0 or	2SD601A-Q or
	2214434R0	2SD601A-R
Q312	2214743R0 or	2SD1819A-Q or
	2214744R0	2SD1819A-R
Q315,316	2214455R0 or	2SD1328-S or
	2214456R0	2SD1328-T

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q317	2214760R0	DTC114TK
Q318	2214800R0	DTA114YK
Q319	2214810R0	IMD6
	Diodes	
D11-13	223215R0	MA151WK
D14,D16	223216R0	MA153
D17	223217R0	MA704A
D110	223216R0	MA153
D205	223215R50	MA151WK
	L.E.Ds	
E201-E206	225283R0	LN1361CUY
	IC protector	
ICP11	252116	ICP-N50-2.0A
	LCD	
LCD201	24190039	EDD052CA8AHP
	Coils	
L11	231213	RLZ0007
L13	233444	RLQB330K
L101	233445R0	SLQDNL330K
	Ceramic resonator	
X201	3010206	CSA16.93MX
	Semi-fixed resistors	
VR11	5210278	EVNDXAA00B33
VR101	5210276	EVNDXAA00B14
VR102	5210277	EVNDXAA00B24
VR103-106	5210276	EVNDXAA00B14
	Variable resistor	
VR301	5104317	EVUBPAT50C54
	Switches	
S101	25065463	RSH1A91ZA,Micro
S201-206	25035647	EVQQTJ105R,Push
S207,S301	25065465	ESD11H230,Slide
S208	25065464	ESD11H220,Slide
	Terminals	
CN12,13	25060184	RJC30002
CN14	25060185	RJH5102
	Sockets	
CN103	25050901	RJS1A6116
CN303,306	25050902	RJU059W006
	Plugs	
CN104-106	25055640	EMCS0255B
CN304,305	25055641	RJT059W006
	Jacks	
CN201,301	25045378	RJJD3S5ZA
CN302	25045379	RJJD5S3MZA
CN11	25045380	RJJ4301
	Holder	
	27190912	RJF0004,LCD

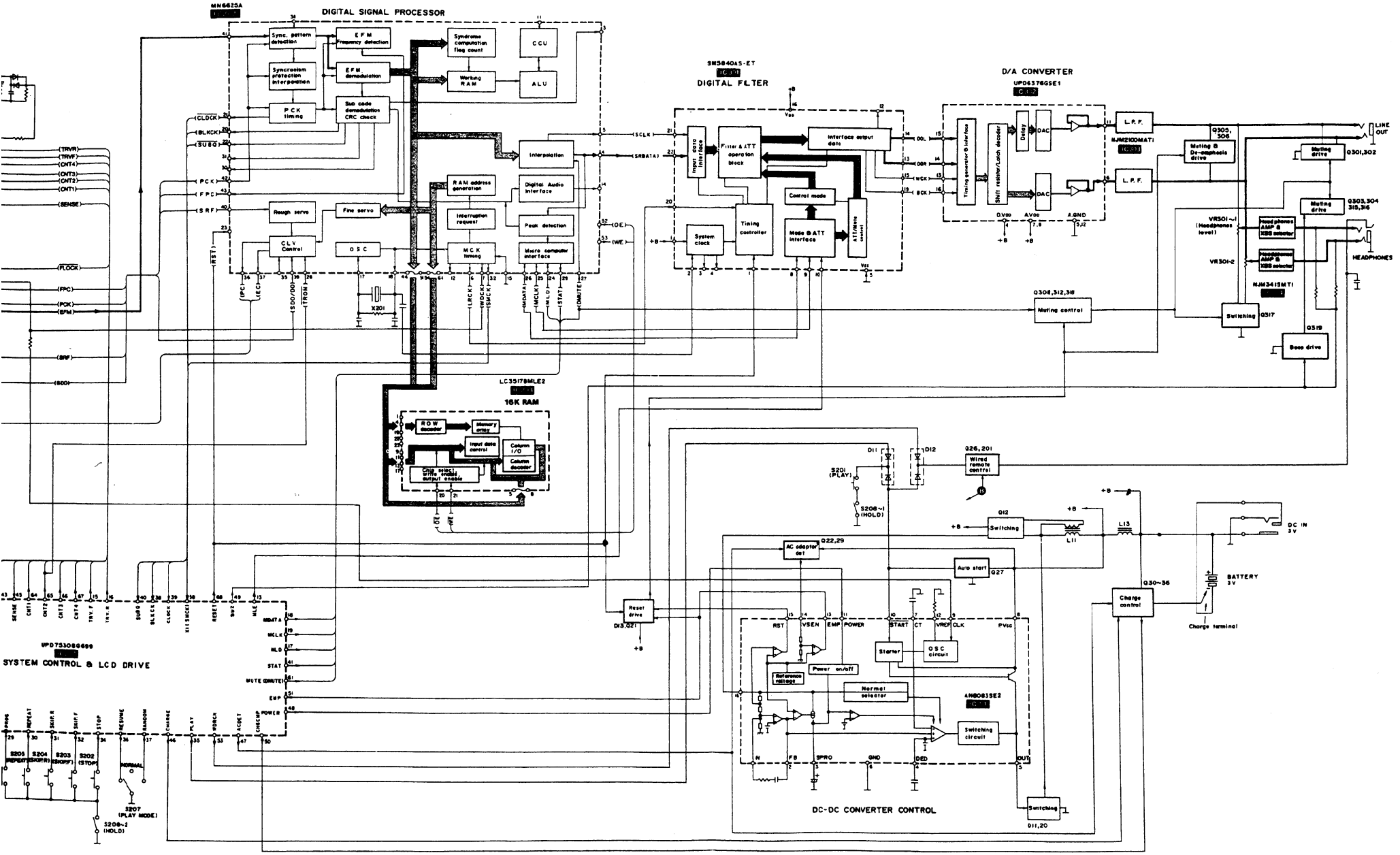
CIRCUIT NO.	PART NO.	DESCRIPTION
	Knob	
	28324755	SBND90ZKDA,Headphone
	Screw	
	82141703	XQN17+C3FZ,Headphone knob

Packing view-parts list

REF.NO.	PART NO.	DESCRIPTION
P1	29052525	Packing case
P2	29091607	Cushion, top
P3	29091608	Cushion,bottom
P4	29100132	Protection bag
P5	29052527	Carton box
P6	29095677	Sheet
P7	29095671	Sheet <D>
	29095688	Sheet <P>
P8	29095670	Sheet
P9	29095669	Protection sheet
P10	29100003	150×200,Styrene bag
P11	29100023	60×200,Styrene bag
P12	29100026	80×150,Styrene bag
P13	29100071	50×40,Styrene bag
P14	29100004	210×390,Styrene bag
P15	29100131	160×240,Styrene bag
	29361503	Label,packing case
A1	24505348	⚠ AD-120AC03-1,AC adaptor <D>
	24505349	⚠ AD-230AC03-1,AC adaptor <P>
A2	24140246	RC-246C,Remote control transmitter
A2a	27301644	Battery case
A3	24130008	RCDNTR1008A,Remote control receiving
A4	24714016	DP-F105,Stereo headphone
A5	2010284	SPJD5-2K,Stereo connection cable
A6	29105171	DSC-F105,Soft case
A7	3010207	SH-CDB8-2,Rechangeable battery <D>
	3010208	SH-CDB8-3,Rechangeable battery <P>
A8	3010209	CR2025-1P0D,Lithium battery
A9	29341776	Instruction manual <D>
	29341777	Instruction manual <P>
A10	29358002J	Service station list <D>
A11	29365019A	Warranty card <D>
	29365020H	Warranty card <V>
	29365024A	Warranty card <F>

Car Adaptor-parts list

PART NO.	DESCRIPTION
24505350	⚠ CAD-F105,Car adaptor
252176	⚠ 0.4A-ST-6CSA,Fuse
29052528	Packing case
29100023	Styrene bag
29341784	Instruction manual

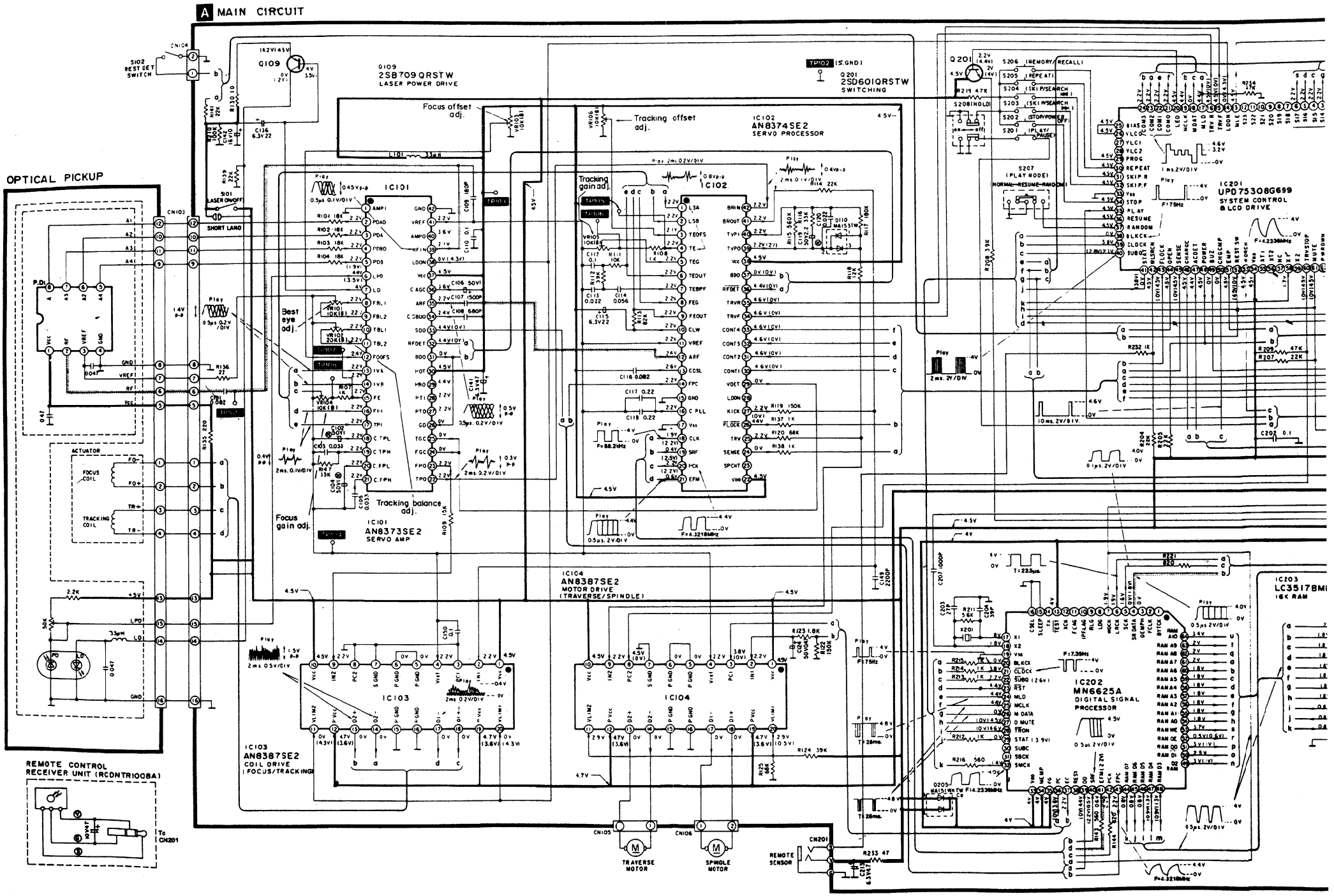


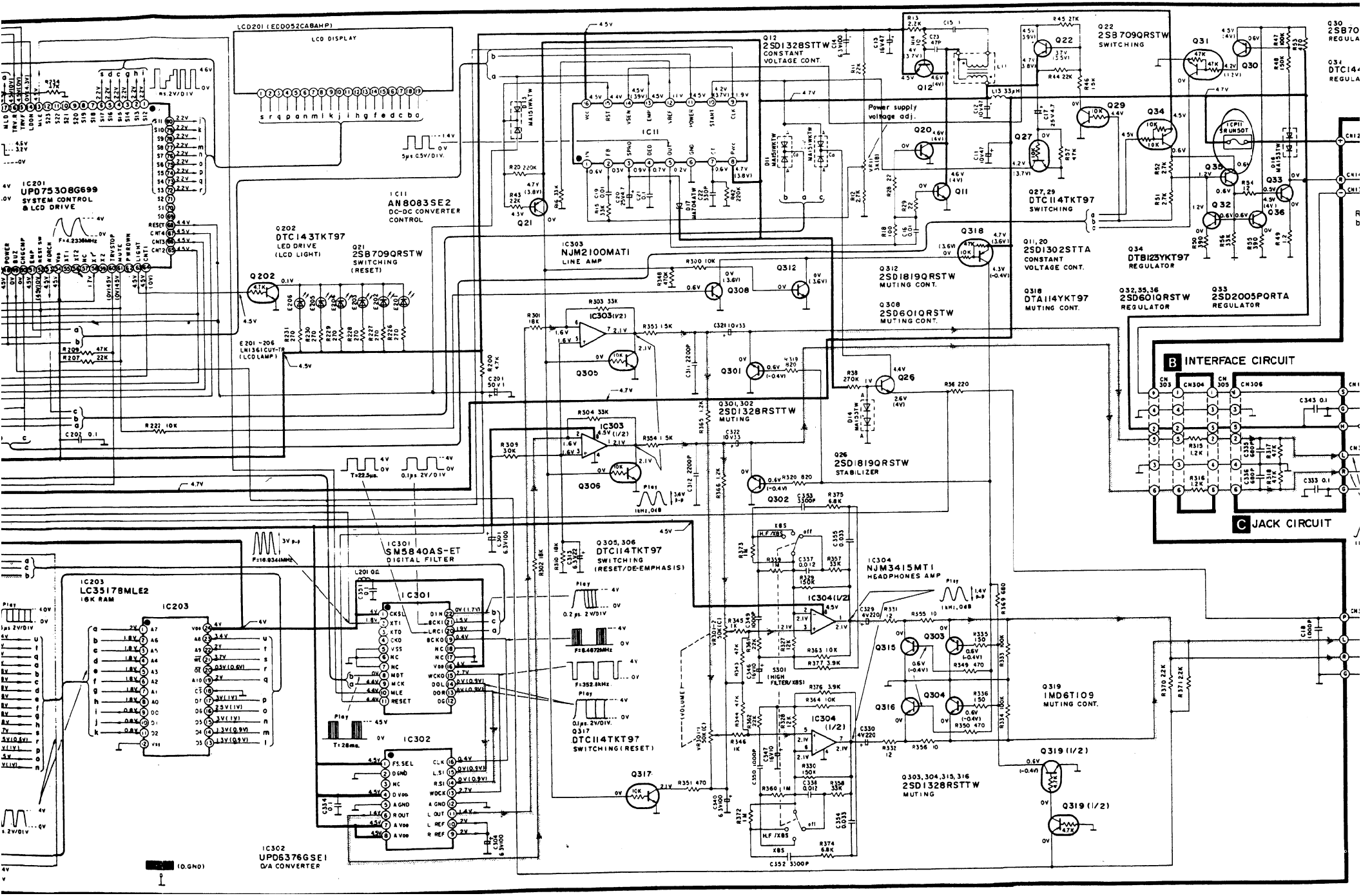
Note:

→ Audio signal

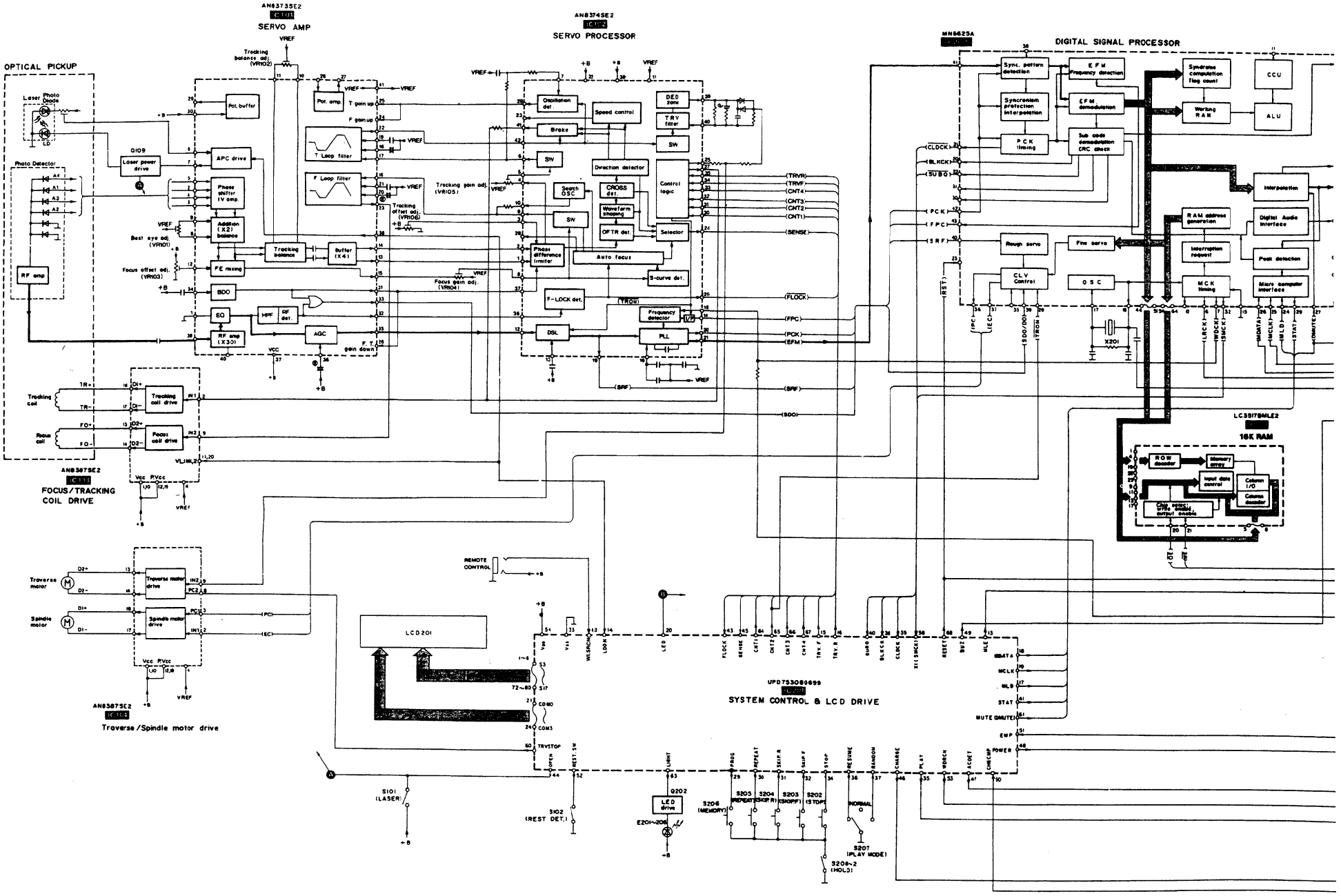
6 7 8 9 10 11 12 13 14 15

A MAIN CIRCUIT




LCD201 (EDD052CA8AHP)
LCD DISPLAY
IC201
UPD75308G699
SYSTEM CONTROL & LCD DRIVE
IC11
AN8083SE2
DC-DC CONVERTER CONTROL
Q12
2SD1328STTW
CONSTANT VOLTAGE CONT.
Power supply voltage adj.
Q22
2SB709QRSTW
SWITCHING
Q27, 29
DTC114TKT97
SWITCHING
Q11, 20
2SD1302STTA
CONSTANT VOLTAGE CONT.
Q34
DTB123YKT97
REGULATOR
Q32, 35, 36
2SD601QRSTW
REGULATOR
Q33
2SD2005PQRTA
REGULATOR
Q202
DTC143TKT97
LED DRIVE (LCD LIGHT)
Q21
2SB709QRSTW
SWITCHING (RESET)
E201 ~ 206
LN136ICUY-TR
(LCD LAMP)
IC303
NJM2100MATI
LINE AMP
Q312
2SD1819QRSTW
MUTING CONT.
Q308
2SD601QRSTW
MUTING CONT.
Q318
DTA114YKT97
MUTING CONT.
Q305
Q306
Q301, 302
2SD1328RSTTW
MUTING
Q26
2SD1819QRSTW
STABILIZER
Q302
B INTERFACE CIRCUIT
C JACK CIRCUIT
IC203
LC35178MLE2
16K RAM
IC301
SM5840AS-ET
DIGITAL FILTER
IC302
UPD6376GSE1
D/A CONVERTER
Q305, 306
DTC114TKT97
SWITCHING (RESET/DE-EMPHASIS)
Q317
DTC114TKT97
SWITCHING (RESET)
IC304
NJM3415MT1
HEADPHONES AMP
Q303, 304, 315, 316
2SD1328RSTTW
MUTING
Q319
1MD6T109
MUTING CONT.
Q319 (1/2)
(0.GND)

■ BLOCK DIAGRAM



■ SPECIFICATIONS

■ Audio

No. of channels:	2 channels (stereo)
Output voltage:	1.0V (50kΩ) φ3.5
Frequency response:	20~20000Hz (+0.5dB, −1.5dB)
Dynamic range:	more than 94dB
S/N ratio:	more than 96dB
Digital filter:	8 times 18 bit oversampling
D/A converter:	2DAC 16 bit
Phones output:	max. 15mW/16Ω φ3.5 (adjustable)

■ Pickup

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

■ General

Power requirement:	AC; with an included AC adaptor (RFEA301C-1X) Battery; with optional two "AA" size (LR6/R6) batteries (DC 1.5V × 2) Rechargeable Battery; with the included rechargeable batteries (DC 1.2V × 2)
DC IN:	3V ⊕—◉—⊖ (mini jack)
Power consumption:	
AC adaptor;	3W
Battery;	0.7W (DC 3V)
Dimensions (W × H × D):	128 × 29 × 145mm ($5'' \times 1^{1}/_{8}'' \times 5^{11}/_{16}''$)
Weight:	335g (11.8oz) with batteries

■ Remote control transmitter

Dimensions (W × H × D):	54 × 5 × 86mm
Weight:	21g (including battery) 18g (without battery)
Battery:	Lithium battery Type CR2025-1P0D × 1

■ Remote sensor

Dimensions (W × H × D):	31.3 × 15 × 29.3mm (including plug) 16.3 × 15 × 29.3mm (without plug)
Weight:	6.2g

Specifications are subject to change without notice.
Weight and dimensions are approximate.

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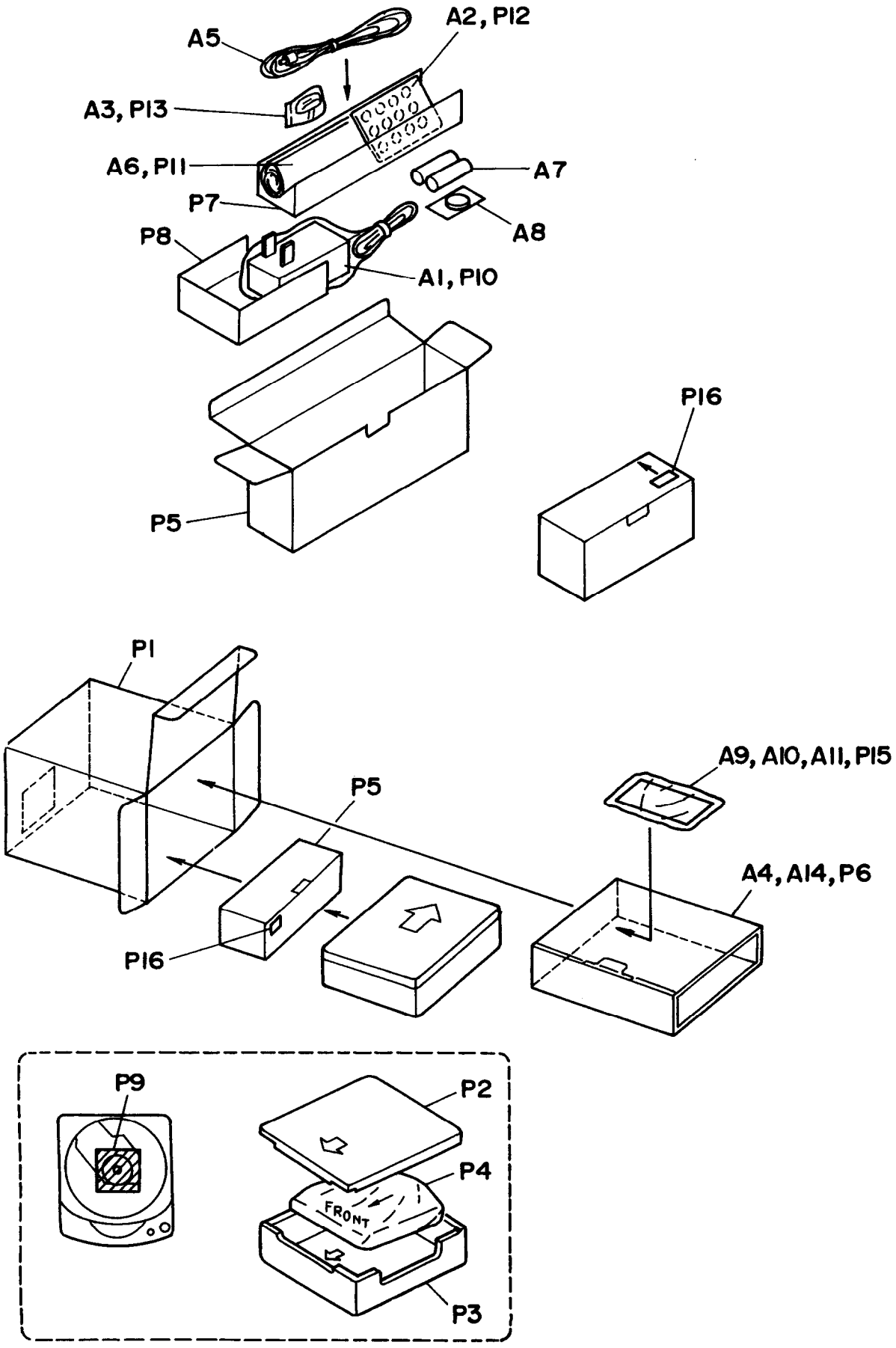
■ PACKING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