

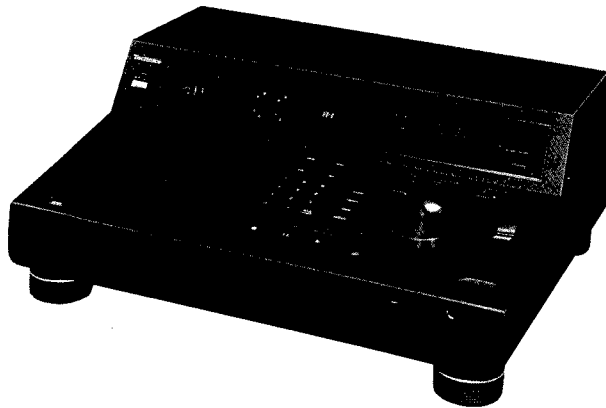
# Service Manual



**DIGITAL**

## Compact Disc Player SL-P1200

Compact Disc Player



**Color**

(K) ..... Black Type

Color	Areas
(K)	[M] ..... U.S.A.
(K)	[MC] ... Canada.
(K)	[E] ..... Switzerland and Scandinavia.
(K)	[EK] .... United Kingdom.
(K)	[XL] .... Australia.
(K)	[EG] ... F.R. Germany.
(K)	[EB] .... Belgium.
(K)	[EH] .... Holland.
(K)	[EF] .... France.
(K)	[Ei] ..... Italy.
(K)	[XA] .... Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	[XB] .... Saudi Arabia.
(K)	[PA] .... East PX.
(K)	[PE] .... European Military.
(K)	[PC] .... European Audio Club.

SL-P1200

### SPECIFICATIONS

[\*Measured by EIAJ (CP-307)]

**Audio**

- No. of channels:** 2 (left and right, stereo)
- Frequency response:** 4—20,000 Hz  $\pm 0.1$  dB\*
- Dynamic range:** More than 96 dB\*
- S/N ratio:** More than 106 dB\*
- Harmonic distortion:** 0.0012% (1 kHz, 0 dB)
- Total harmonic distortion:** 0.0025% (1 kHz, 0 dB)\*
- Channel separation:** More than 106 dB (1 kHz)\*
- Channel phase balance:** Less than 5°\*
- Wow and flutter:** Below measurable limit\*
- Low-pass filter:** High-resolution digital filter  
Digital: Double over sampling  
96th order FIR (Finite Impulse Response) type  
Analog: GIC (Generalized Impedance Converter) active type

**Signal Format**

- Sampling frequency:** 44.1 kHz
- Correction system:** Technics Super Decoding Algorithm
- D-A conversion:** 16-bit linear

**Pickup**

- Type:** Fine-focus, one beam



- Light source:** Semiconductor laser
- Wavelength:** 780 nm

**Traverse system:**

- Type:** High-speed linear access system

**Spindle system:**

- Type:** Brushless DD motor

**Functions**

- Automatic play:** • All tracks
- Direct access play:** • Direct access to any track, index, or time on disc
- Program play:** • Max. of 20 program selections
- Skip play:** • Forward and backward track skip
- Forward and backward program track skip
- Search play:** • Forward and backward manual search
- Button search (2-speed)
- Dial search (2-speed)
- Display functions:** • Music Matrix (20 tracks)
- Track number display
- Index number display
- Time display (min./sec./1/10th sec.)
- Programmed order (No.) (when recall button is pressed)
- Overflow mark (▶)
- Overflow indicator (>)
- Repeat indicator

Matsushita Services Company  
50 Meadowland Parkway,  
Secaucus, New Jersey 07094

Panasonic Sales Company,  
Division of Matsushita Electric  
of Puerto Rico, Inc.  
Ave. 65 De Infanteria, KM 9.7  
Victoria Industrial Park  
Carolina, Puerto Rico 00630

Panasonic Hawaii, Inc.  
91-238, Kauhū St. Ewa Beach  
P.O. Box 774  
Honolulu, Hawaii 96808-0774

Matsushita Electric  
of Canada Limited  
5770 Ambler Drive, Mississauga,  
Ontario, L4W 2T3

Matsushita Electric Trading Co.,  
Ltd.  
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office  
Matsushita Electric Trading Co.,  
Ltd.  
6th Floor, World Trade Center  
Bldg.,  
No. 4-1, Hamamatsu-cho 2-Chome,  
Minato-ku, Tokyo 105, Japan

# Technics

- Standby indicator
  - Auto cue indicator
  - Time mode indicator
  - Emphasis indicator
- When using remote control unit:
- dB display
  - Level indicator
  - Music scan indicator
  - Remote control indicator

### ■ Headphones:

**Output level:** 100 mW max. (variable)  
**Impedance:** 32 Ω  
**Plug:** 1/4 inch stereo

### ■ General

**Power supply:** For U.S.A. and Canada:  
 AC 60Hz, 120V  
 For United Kingdom and  
 Australia: AC 240V, 50Hz  
 For Continental Europe:  
 AC 220V, 50Hz  
 For others:  
 AC 110~127/220~240V, 50/60Hz

**Power consumption:** 29 W  
**Output voltage:** 2 V (at 0 dB)\*  
**Output impedance:** About 200 Ω  
**Load impedance:** More than 10 kΩ

**Dimensions (W×D×H):** 43×38×16.8 cm  
 (16-15/16"×14-3/32"×6-5/8")  
 When disc compartment is open.  
 23 cm (9-1/16") height  
**Weight:** 14.5 kg (32 lbs)

### ■ Infrared remote control unit

**Remote control buttons:** Basic buttons: 7  
 Program buttons: 12  
 Time mode select buttons: 2  
 Index button: 1  
 Music scan button: 1  
 Repeat button: 1  
 Asterisk button: 1  
 Digital volume attenuation  
 buttons: 2

**Dimensions (W×H×D):** 6.4×15.5×1.8 cm  
**Batteries:** UM-3 "AA" batteries or IEC R6  
 or equivalent (1.5 V×2)  
**Weight:** 140 g (0.3 lb.)  
 (including batteries)

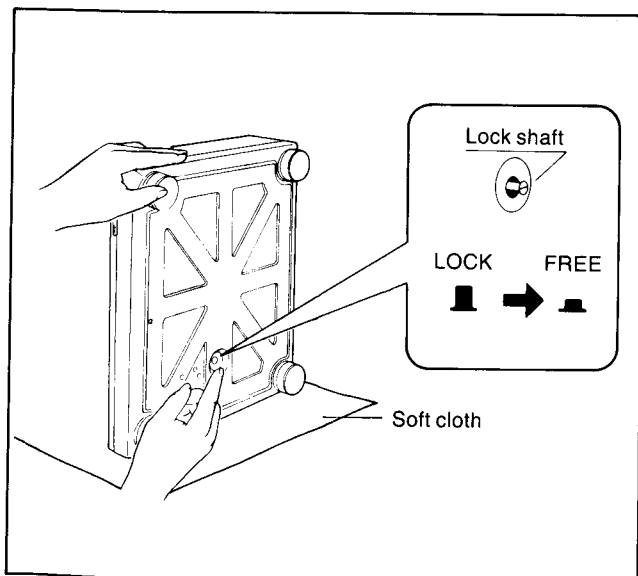
Specifications are subject to change without notice for further improvement.  
 Weight and dimensions are approximate.

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## ■ BEFORE USING THIS UNIT

1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (■ → ■).



### NOTE: IF THE UNIT IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:

- 1) Remove the disc from the holder.
- 2) Pull the lock shaft to the out (LOCK) position (■ ← ■).

### CAUTION:

Do not transport the unit without locking the lock shaft.  
**SEVERE DAMAGE WILL RESULT.**

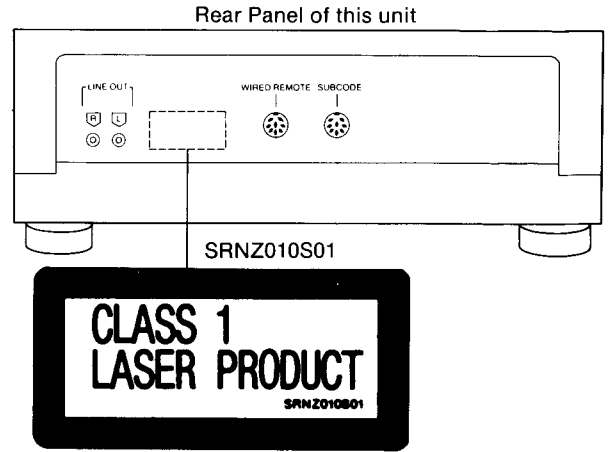
# ■ PRECAUTION OF LASER DIODE

**Caution: This product utilizes a laser diode.**  
**ADVARSEL: I dette a apparat anvendes laser.**

## ● Use of caution labels

Note: ○ Mark is used, × Mark is not used.

Areas	SRNZ010C01	SRNZ010S01	SRNZ010S02	SRNZ050S01
[MC]	○	×	×	×
[E], [EK], [XL], [EG], [EB], [EH], [EF], [Ei], [XA], [XB]	×	○	○	○



Obs:  
 Apparaten innehåller laser  
 Komponent av höger laserklass  
 än klass 1.

**CAUTION-MAZARDOUS LASER, AND ELECTROMAGNETIC RADIATION WHEN OPEN AND INTERLOCK DEFEATED**  
**ATTENTION-RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE**

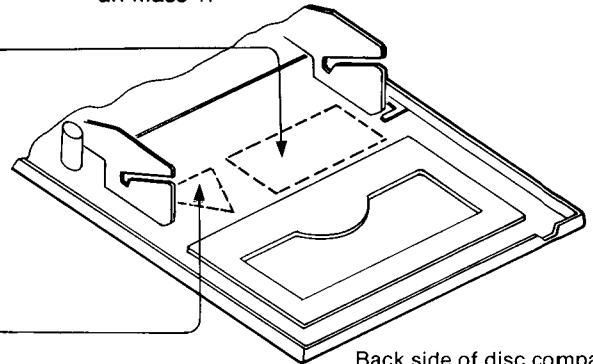
SRNZ010C01

ADVARSEL-Der Vii udstråles osynlig laser når apparatet åbnes og aflåsningmekanismen frigøres. UNDGÅAT BLIVE UDSET FOR LASERBESTRÅLING.

DANGER-Invisible laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE

SRNZ050S01

VAROITUS! Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä



Back side of disc compartment

# ■ SAFETY PRECAUTION

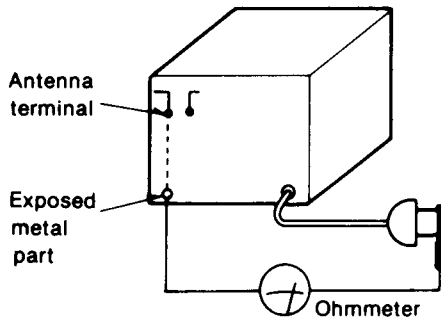
(This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

## ● INSULATION RESISTANCE TEST

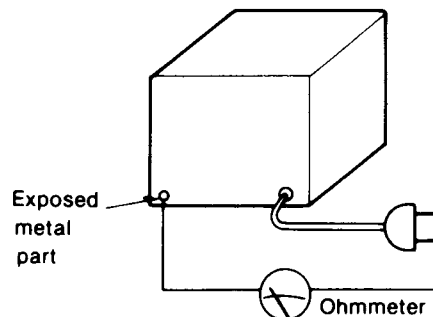
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

**Note:** Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



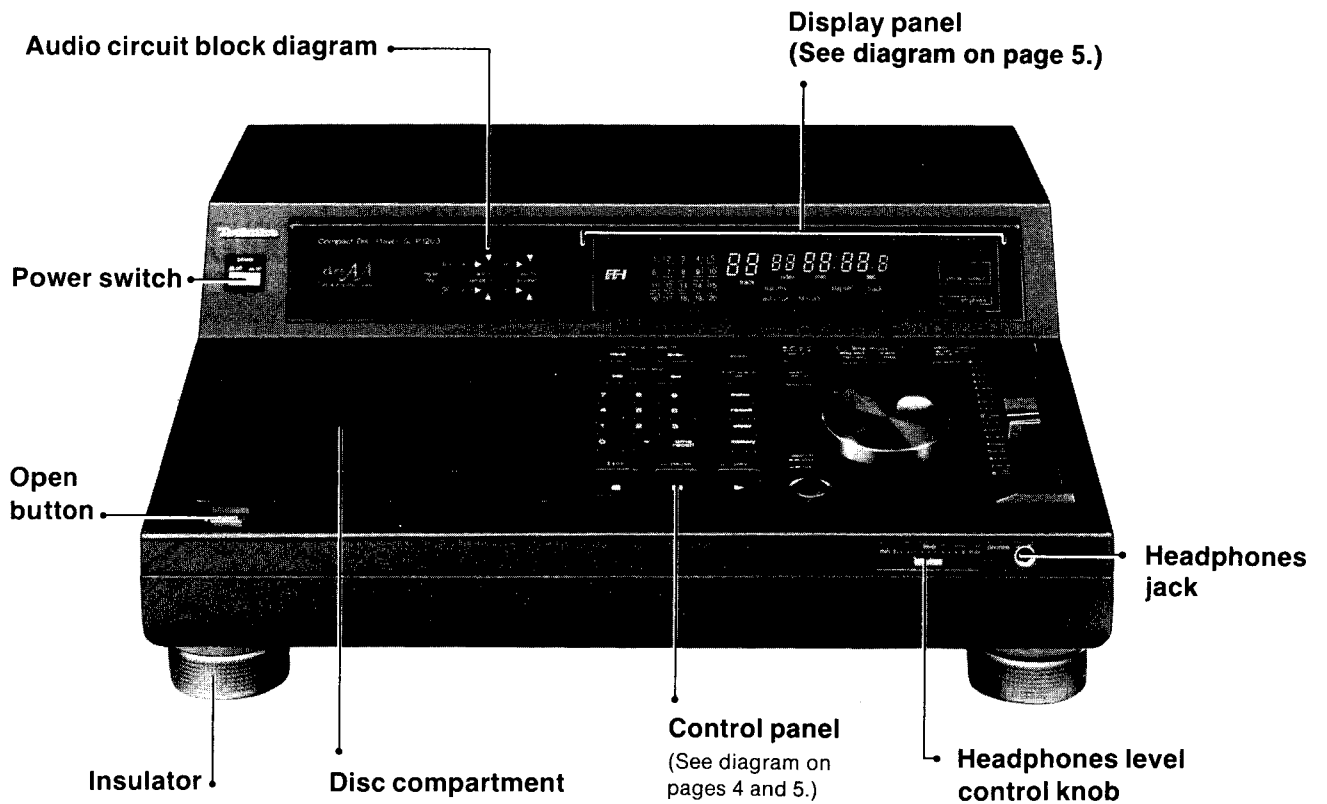
(Fig. B)

Resistance = Approx ∞

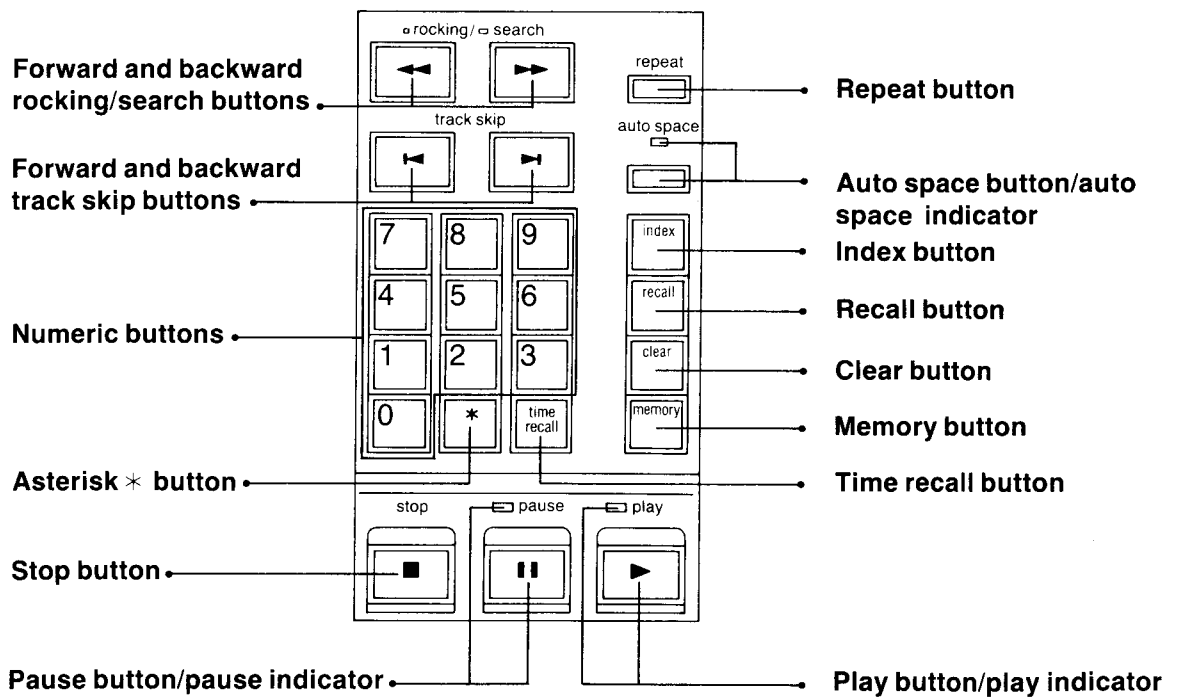
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

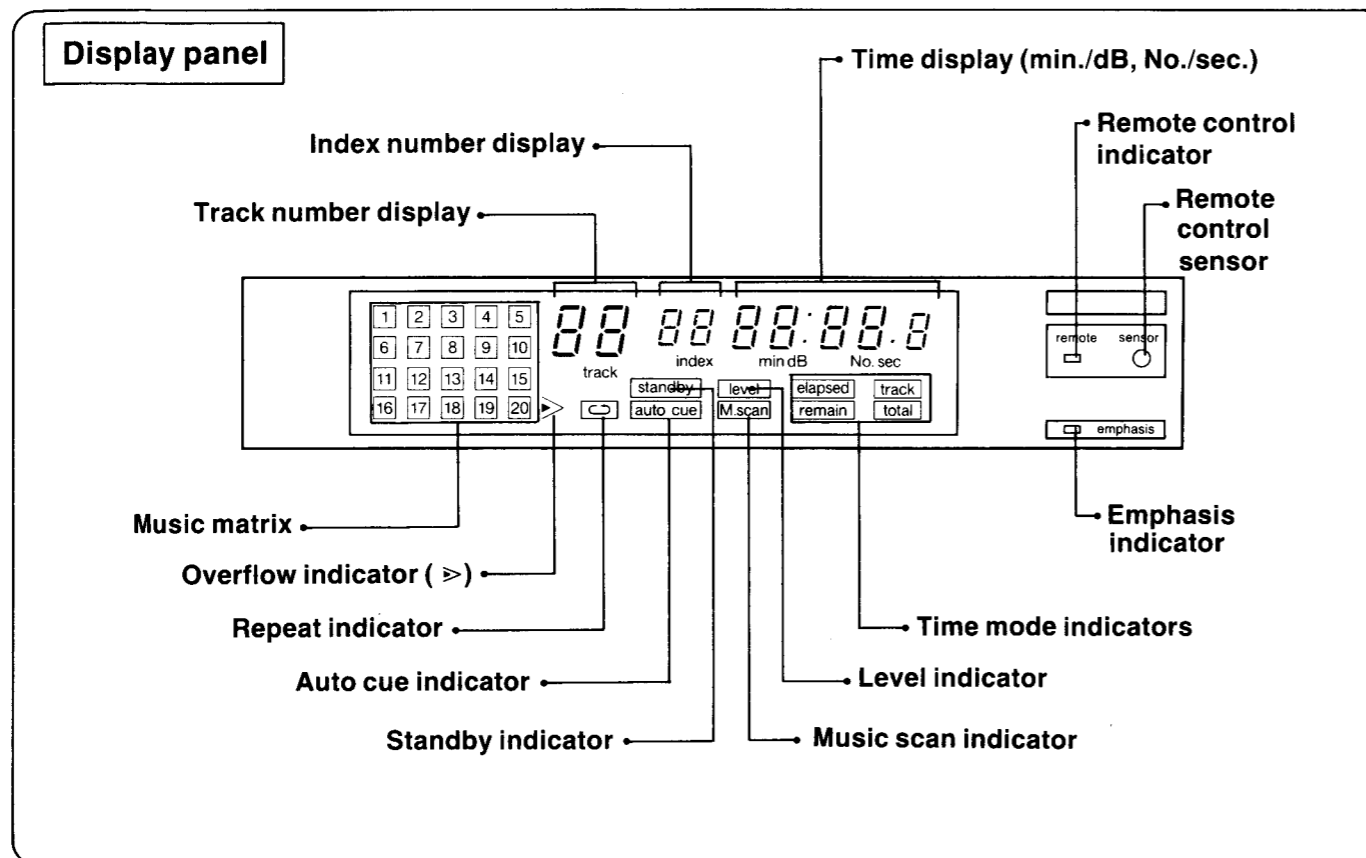
# ■ LOCATION OF CONTROLS

## Front panel

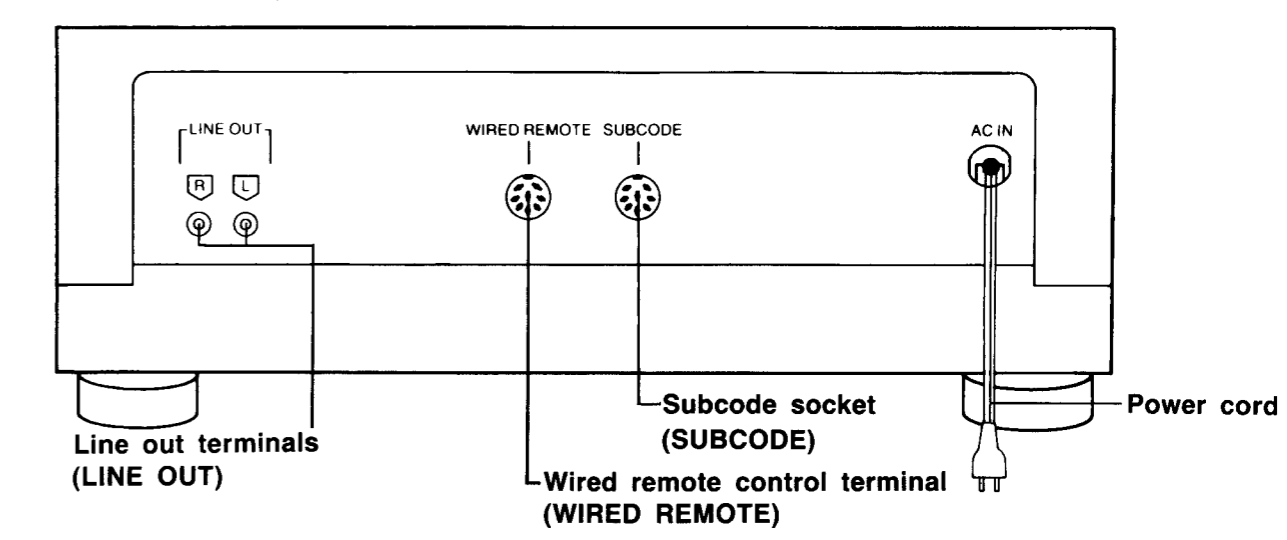


## Control panel

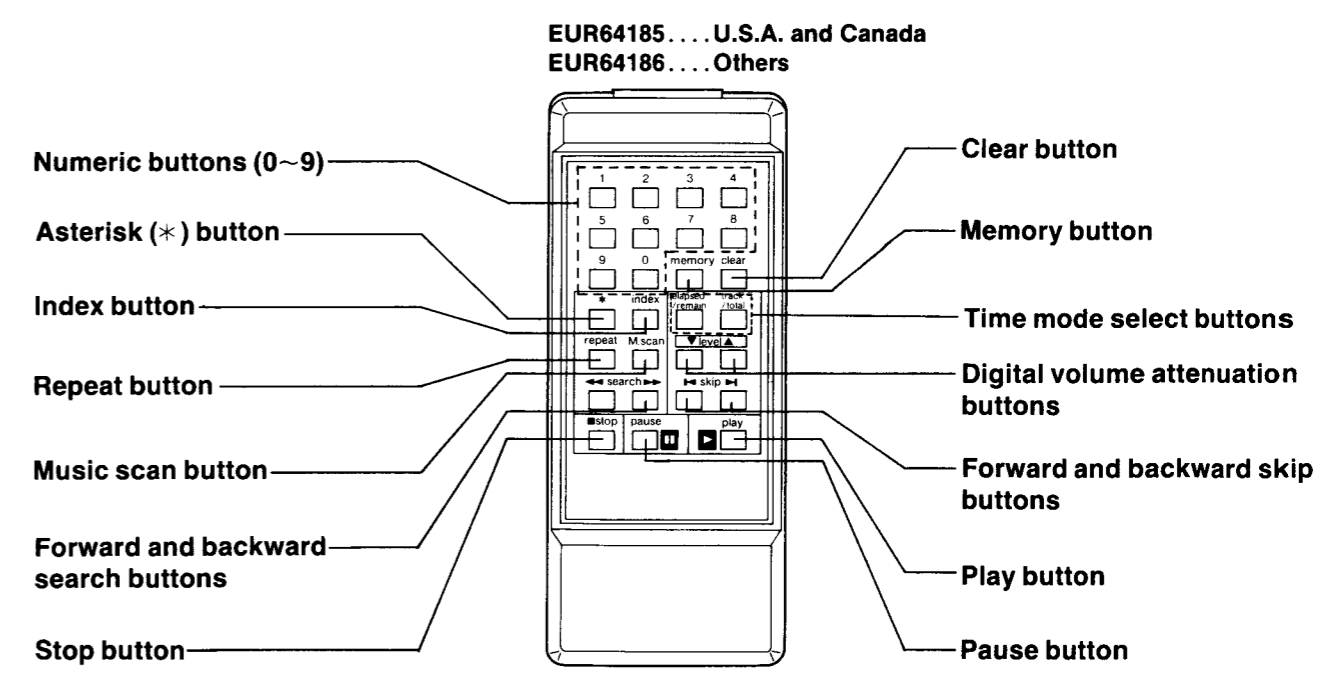




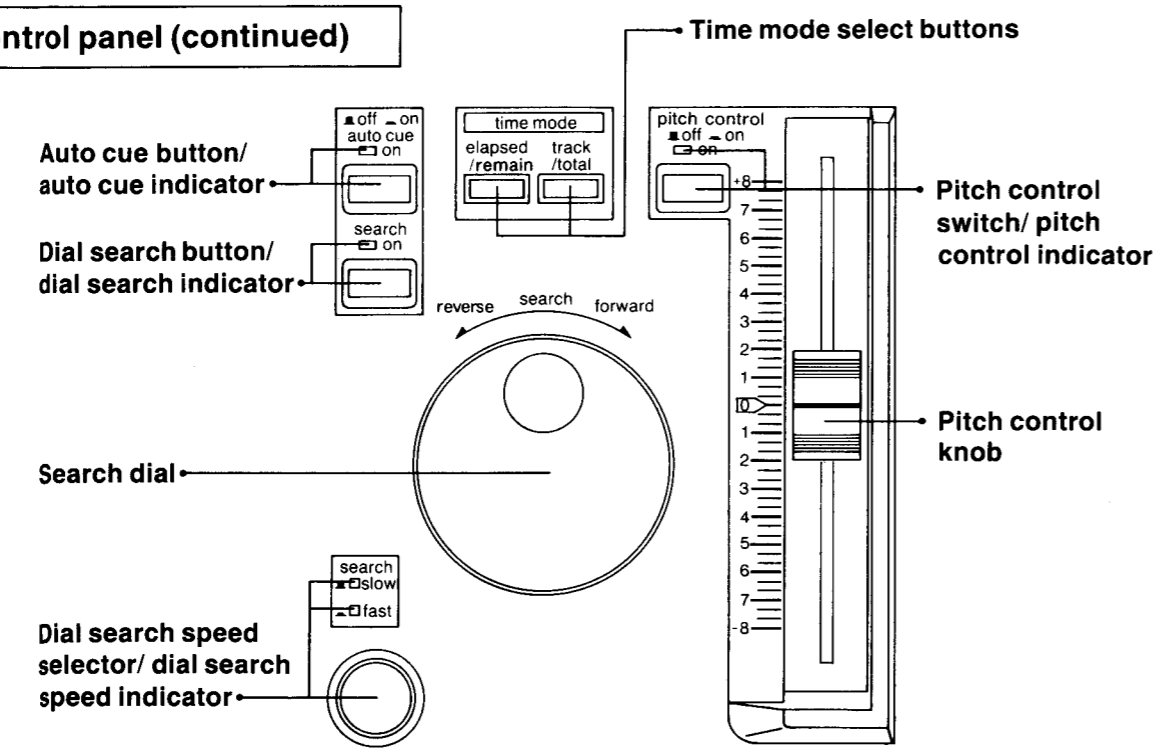
### Rear panel



### Remote control



### Control panel (continued)



# Playing a disc

## 1 Automatic play

■ To play a disc from the first track to the end of the disc.

**1** Press ( ) to turn power on. (See 1 below.)

**2** Press to open the disc compartment.

**3** Insert a disc with the label side facing upward.

**4** Push the cover down by hand to close it. (See 2 below.)

**5** Press the play button. (See 3 below.) Play begins from the first track.

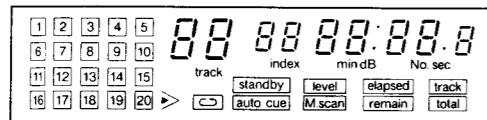
**6** Press ( ) to turn power off.

Emphasis indicator illuminates when a disc recorded with pre-emphasis is played.

■ Press the stop button to stop disc play.

■ Press the pause button to briefly interrupt play. (See 4 below.)

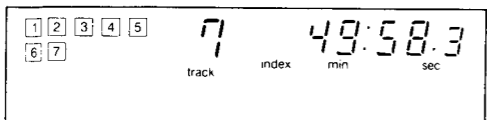
1 When power is turned on, the display panel illuminates as shown below:



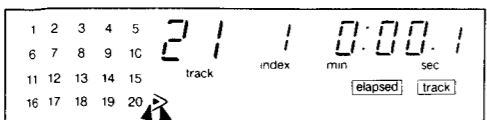
After about 5 seconds or after the disc compartment has been opened the display panel shows the following:



2 After inserting the disc and closing the cover the disc will begin to rotate. After the total number of tracks, and total playing time are displayed, the player switches to the stop mode.



If a disc has more than 20 tracks the overflow indicator illuminates, and when the 21st track is played the overflow indicator flashes on and off.



Illuminates / Flashes on and off during play

Remove the disc from the disc holder and turn off the power if the player is not to be used again for a while.

## 2 Random access play

■ Starting disc play from a specific place on the disc.

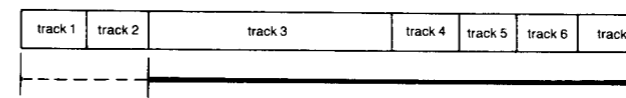
■ From this page onward the following basic operations are omitted:

- Power on/off
- Disc compartment open/close
- Interrupting play
- Stopping play

■ Press the buttons in the order shown by the arrows.

### 2-1. To start disc play from a specific track

■ For example, to play from the beginning of track 3 to the end of the disc.



• The display below shows track 3 is specified.

Specify track no.

Track display

• When the play button is pressed, play begins from track 3.

• The border of the track being played flashes on and off.

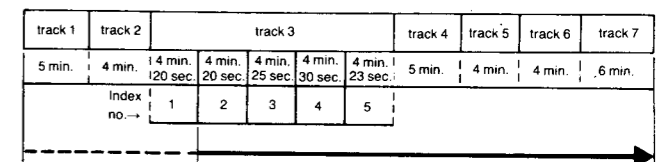
Flashes on and off

• The player switches to the stop mode when play has finished.

### 2-2. To play a disc from a specific index

(This is possible only on discs having indexes.)

■ For example, to play from the beginning of index 2 of track 3 to the end of the disc.



Specify track no.

• When playing discs having only one track, remember to enter track number 1, then specify the index number.

Specify index

Specify index no.

• Index numbers up to 99 can be specified.

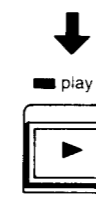
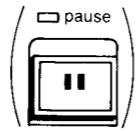
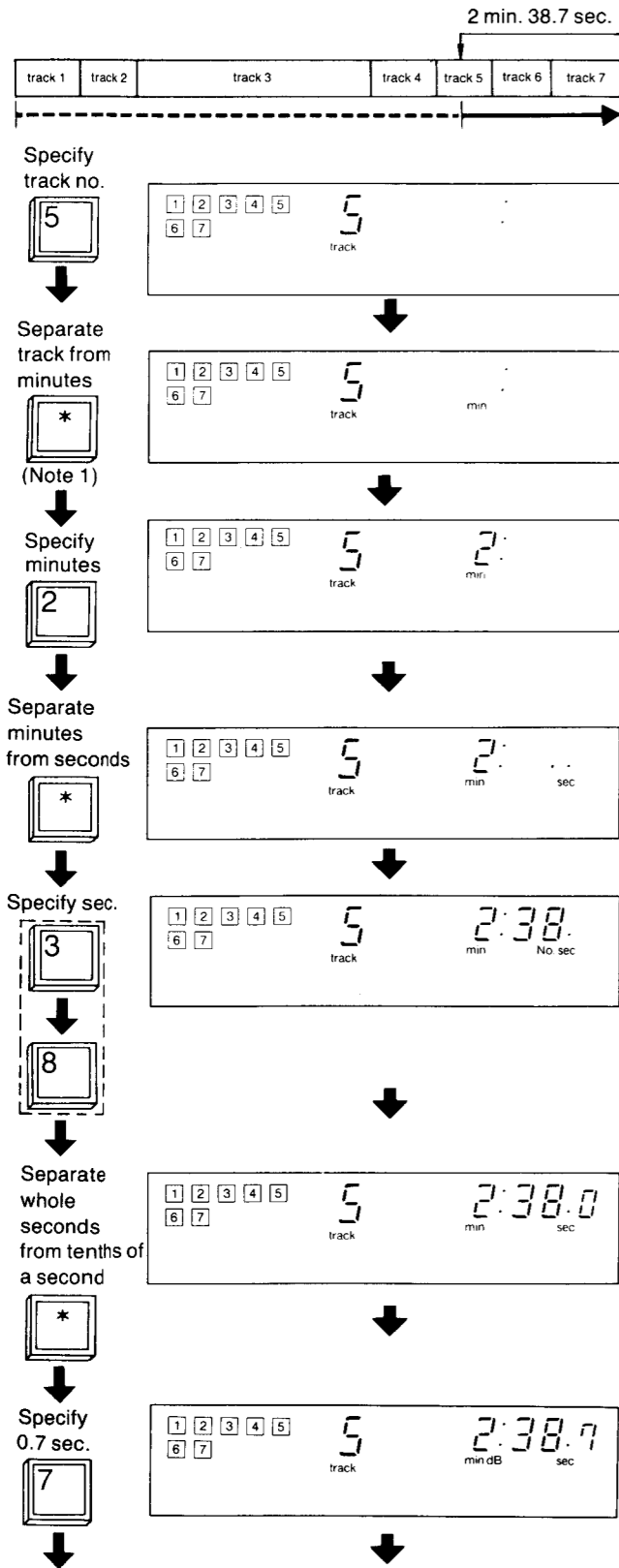
Flashes on and off

• When the play button is pressed, disc play begins from index 2 of track 3.

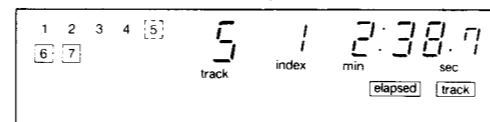
• When the end of the disc is reached, the player switches to the stop mode.

### 2-3. To play a disc from a specific starting time

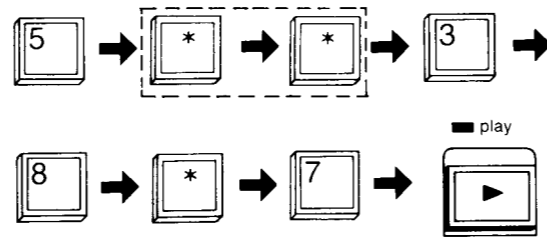
■ For example, to play from the 2 min. 38.7 sec. point of track 5.



•When the play button is pressed, disc play begins from the 2 min. 38.7 sec. point of track 5.



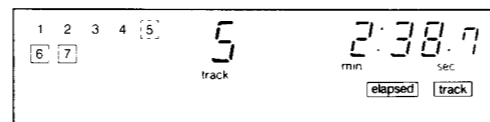
**Note 1)** When no minutes are to be specified, for example, if play is to begin at the 38.7 sec. point of track 5, press the numeric button "0" or press the asterisk button twice in a row, as shown below.



- An already specified time will be cancelled when a new time is entered or the clear button is pressed.
- If the starting time is specified while the unit is in the pause mode, press the pause button once and then press the play button to resume play. Not pressing the pause button will cause a short delay before sound is heard.

### Restarting play from the same point of time (By means of starting time confirmation.)

- Press the time recall button during play.
- The starting time is shown for about 20 seconds on the display panel. During that time play continues.



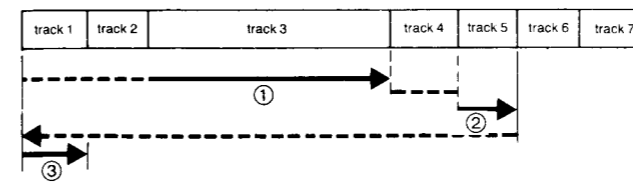
- If the play button is pressed during that time, play begins again from the location indicated on the display.

## 3 Program play

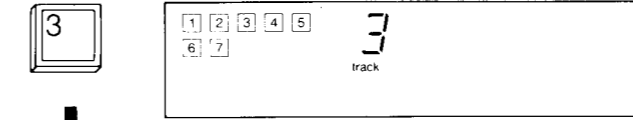
Using the program play function a maximum of 20 selections can be programmed in any sequence. Index numbers can not be programmed.

### 3-1. Track program play (in any order)

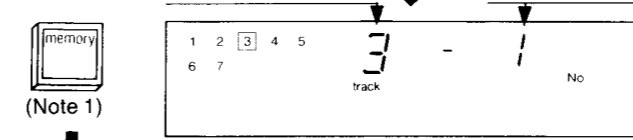
■ For example, to play track 3, track 5 and track 1 in that order.



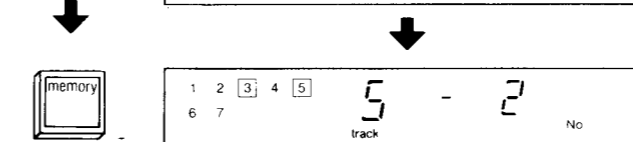
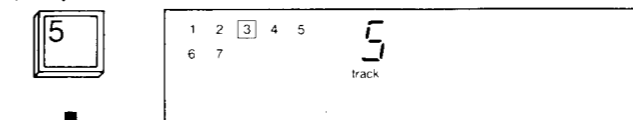
Specify track no.



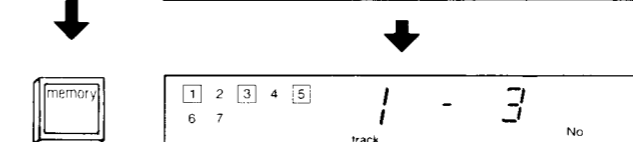
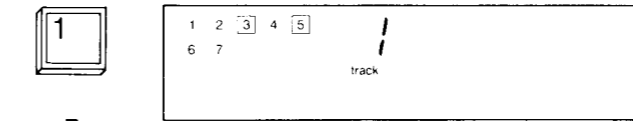
Programmed track



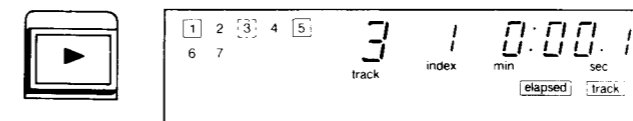
Specify track no.



Specify track no.



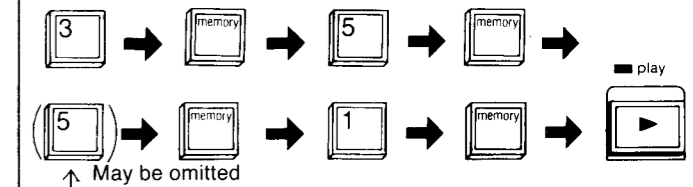
•When the play button is pressed, disc play begins from track 3.



**Note 1)** E (error) will be displayed momentarily if a track number not on the disc is specified. If more than 20 selections are entered "F" (full) is shown in the display panel and no further selections can be programmed.

•If an incorrect entry is made while the unit is in the stop mode, pressing the clear button will cancel the last program entry. However, if the clear button is pressed during disc play or in the pause mode, all memory contents are cleared and disc play continues from the current point to the end of the disc (memory clear function).

•Programming two tracks in a row. For example, if tracks 3-5-5-1 are programmed in that order, press the memory button twice, as shown below. The double numeric button operation may be abbreviated.



- After a track has been played its border goes out.
- The player switches to the stop mode when the last programmed track has been played.

## 4 Pitch control

This function allows fine adjustment of pitch (up to  $\pm 8\%$ ).

1. Press the pitch control switch to "on".  
The pitch control indicator illuminates.
2. Slide the pitch control knob upward or downward to the desired setting.

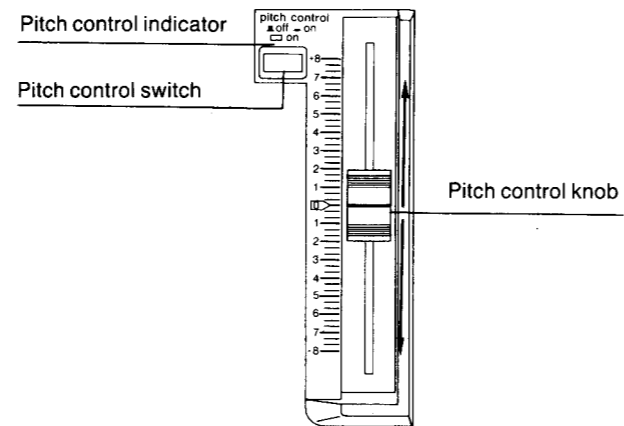
- When not using this function, press the pitch control switch again to release it (off).

### Note:

In the center position (0) a "click" can be perceived. This position is the 0% standard pitch.

The +5.9% position is a half tone sharp ( $\sharp$ ).  
The -5.6% position is a half tone flat ( $\flat$ ).

- When the pitch has been changed, the elapsed or remaining playing time readings will differ from the actual times by the amount of pitch adjustment.



## 5 Skip play

(Skip play can be performed when the player is in the play or pause mode.)

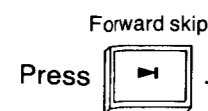
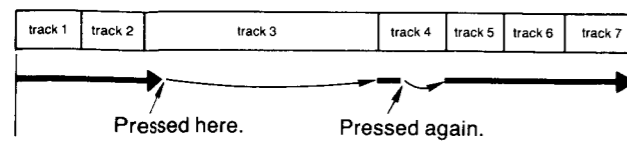
This function allows quick access to the beginning of a track.

**Note:** Index skip play is not possible.

### Forward skip

- The pickup skips the same number of tracks as the number of times the button is pressed.
- During automatic play, the pickup skips to the beginning of the next track each time the button is pressed.
- During program play or program repeat play, the pickup skips to the beginning of the next programmed track each time the button is pressed.
- While watching the track number display, press the forward skip button until the desired track has been located.

- **Example:** To advance to the beginning of the fourth track and then to the beginning of the fifth track while listening to the third track.

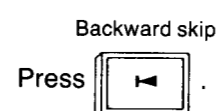
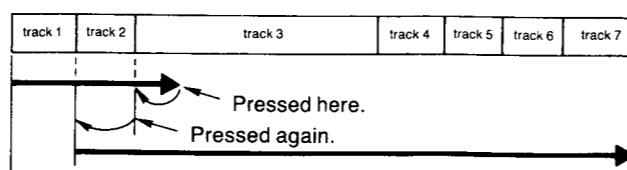


### Backward skip

- During automatic play, the pickup skips to the beginning of the current track. If pressed again quickly, the pickup skips to the beginning of the previous track.
- During program play (repeat function not activated), the pickup skips backward only to the beginning of the current track.
- During program repeat play, the pickup skips to the beginning of the current track. If pressed again quickly, the pickup skips to the beginning of the previous programmed track.
- The pickup skips the same number of tracks as the number of times the button is pressed.
- While watching the track number display, press the backward skip button until the desired track has been located.

Remember that for backward skip, the present track is included in the count.

- **Example:** To return to the beginning of the third track and then to the beginning of the second track, while listening to the third track.



## 6 Search play (forward/backward)

(Search play can be performed when the player is in the play or in the pause mode.)

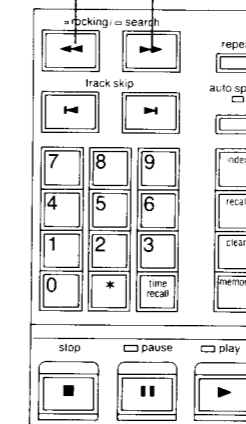
This function allows search to any desired point on the disc.

Search play can be performed by using either the forward and backward rocking/search buttons **A** or the search dial **B**.

- The position of the pickup is confirmed by watching the display panel or listening to the sound from the compact disc.

### A Search play using the forward and backward rocking/search buttons (Button search)

Forward and backward rocking/search buttons **A**



Depending on how these buttons are pressed, search with three different speeds is possible.



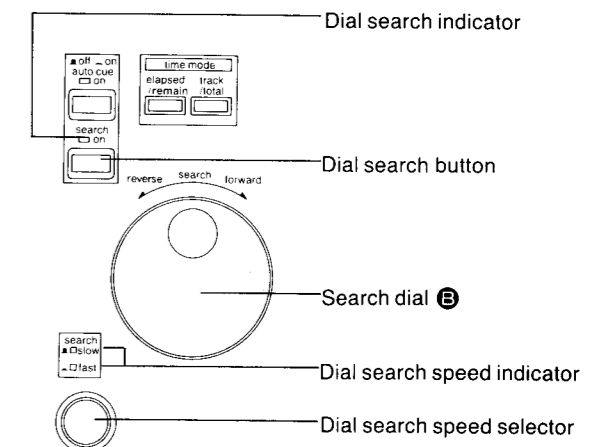
- 1 Press one of these buttons momentarily to move the pickup by one pit-track (one disc rotation). This allows very fine rocking search.
- 2 When one of these buttons is held down, the pickup will move slowly at first.
- 3 When one of these buttons is held down for more than about 3 seconds, the pickup will move rapidly.

- Release the button when the desired point has been reached (as shown by the display).
- If these buttons are pressed during play, sound can be heard during the search operation. During steps 2 and 3, the output level is decreased by -12 dB (1/4) compared with the normal level.

### About rocking search

When two or more CD players are used at a time, as often happens in a studio for example, fade-in and fade-out of the units have to be timed exactly. The rocking search function is useful for this because it permits movement of the pickup across one pit-track (at inner diameter in about 0.13 second) each time either button is pressed momentarily.

### B Search play using the search dial (Dial search)



- Usually no sound can be heard while the unit is in the pause mode. However, if the dial search button is in the "on" position, sound can also be heard during the pause mode.

- Dial search can be performed at two different speeds depending upon the position (slow and fast).

- If the search dial is turned clockwise the pickup performs forward search, and if it is turned counterclockwise, the pickup performs backward search. However, when the dial search button is not in the "on" position and the dial search indicator (■) is not illuminated, dial search is not possible.

- 1 Press the dial search button "on".  
The dial search indicator (■) illuminates.  
The dial search speed indicator (■) for "slow" or "fast" illuminates also.
- 2 Press the dial search speed selector to change the selected search speed.

- Perform search while watching the display panel or listening to the sound from the disc.  
The sound level is not reduced during dial search.

### Notes:

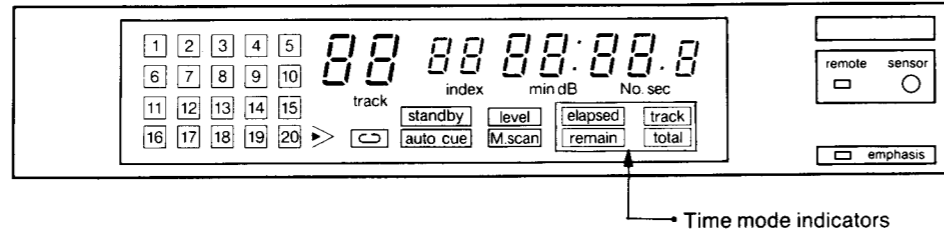
- The search speed changes according to the speed at which the search dial is turned. However, you can not force the pickup to search faster or slower than its predetermined limits.
- When dial search is performed with the unit in the play mode, the normal play speed of the pickup is added to (forward search) or subtracted from (backward search) the dial search speed.



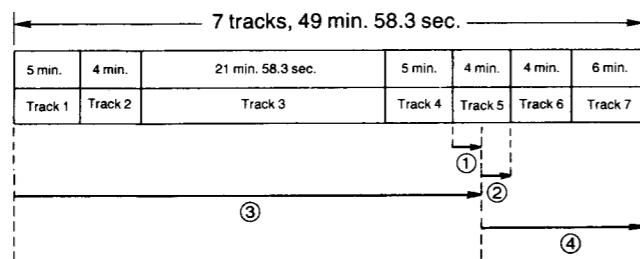
## 7 Time mode display function (During play or in the pause mode.)

- The appropriate time mode indicators illuminate to show which time mode display has been selected.
- Pressing the elapsed/remain button will change the mode from elapsed time to remaining time or vice versa.

- Pressing the track/total button will change the mode from track time to total (disc or programmed) time or vice versa.
- When changing the time display mode, use the time mode indicators to confirm selection of the desired time display mode.



- For example, if the time mode select button is pressed when playing a disc of 49 min. 58.3 sec. at a point 2 min. 10 sec. after the beginning of track 5:



	Illuminated time mode indicators	Time display	Display panel
1	elapsed track	Elapsed playing time from the beginning of the current track.	
2	remain track	Remaining playing time of the current track.	
3	elapsed total	Playing time from the beginning of the first track. •During program play, the total remaining programmed playing time is displayed.	
4	remain total	Disc remaining playing time. •During program play, the total elapsed programmed playing time is displayed.	

### Note:

- During random access play, skip play and search play, the total time from the beginning of the first track is displayed in mode 3.  
(This is not an actual elapsed playing time.)

- Tracks skipped during program play are not included in the elapsed playing time.

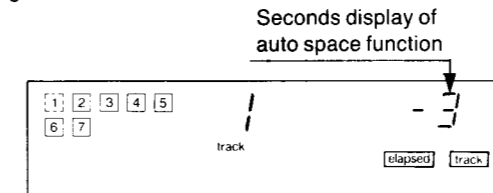
## 8 Auto space function

### Auto space function

When this function is activated, a silent interval of 3 seconds is created between all tracks.

This 3 seconds interval occurs instead of, not in addition to, any pause interval recorded on the disc.

- Press the auto space button.  
Auto space indicator (■) on the display panel illuminates.
- The following diagram shows the silent interval between all songs is about 3 seconds.



- At the beginning of each track -3, -2 and then -1 is displayed.
- Press this button again to cancel the auto space function.  
The auto space indicator (■) goes out.

### Note:

When the auto cue function is used together with auto space the auto space indicator illuminates, but only the auto cue function operates.

## 9 Auto cue function (automatic standby)

### Auto cue function

At the beginning of each track on most discs, a silent interval of about one second is recorded. Therefore, when play is started from 0 min. 00 sec, music is not heard immediately.

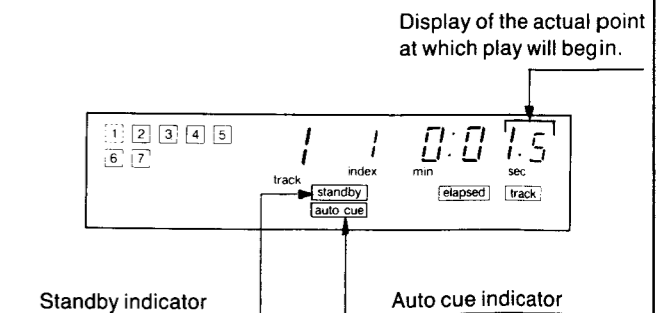
When the auto cue function is activated, the unit automatically detects the beginning of the music on each track and then switches to standby mode.

When play is started from this point (by pressing the play button) music is heard immediately.

- 1 Press the auto cue button (■).  
The auto cue indicator (■) above the button and the auto cue indicator on the display panel illuminate.
- 2 Press the play button.  
The standby indicator on the display panel illuminates and the unit switches to the standby mode.
- 3 To start disc play, press the play button.  
The next track will begin immediately.  
The standby indicator will go out, but both auto cue indicators will remain illuminated.

### Notes:

- In this mode, the unit will switch to standby at the beginning of each track. It is therefore necessary to press the play button to resume play at the beginning of every track.
- This function can also be used during program play.  
The unit will then switch to standby at the beginning of each programmed track.
- The illustration below shows that the unit is in the standby mode at the beginning of the music portion of track 1.



- If the auto cue button is pressed during play, this function is activated at the beginning of the next track.

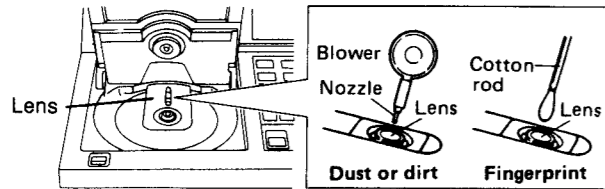
- When not using this function, press the auto cue button again to release it (■). The standby and both auto cue indicators will go out.

## ■ CLEANING OF LENS

If the lens is stained causing sound skip or operation failure, open the top cover by pressing the open button, and clean the lens.

### ● To remove dust or dirt

Blow the lens with the blower provided in the cleaning kit to remove dust or dirt.



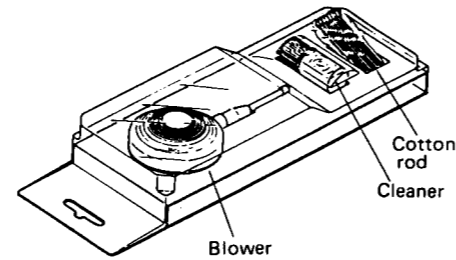
### ● To remove fingerprint

If the blower is not enough, moisten the cotton rod with the lens cleaner solution and wipe the lens with it from center of the lens to outside.

### Cautions:

- Do not directly apply the cleaner solution to the lens. Do not apply too much solution to the cotton rod or otherwise the solution will flow into the player.
- Wipe the lens carefully. Do not give too much stress to the lens or otherwise it may scratch the lens or cause optical pickup trouble.
- If the solution should be too much applied, wipe the lens with a dry cotton rod.

### Lens cleaning kit (Part No. : SZZP1038C)

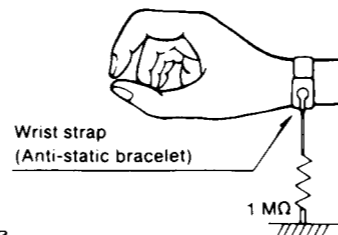
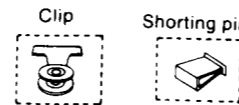
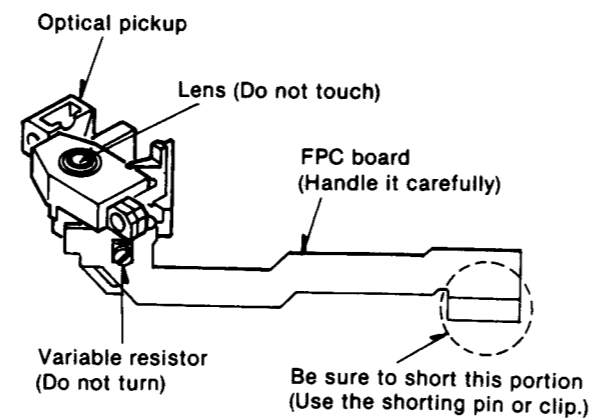


## ■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the 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 optical pickup.

### ● Handling of optical pickup

1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
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.

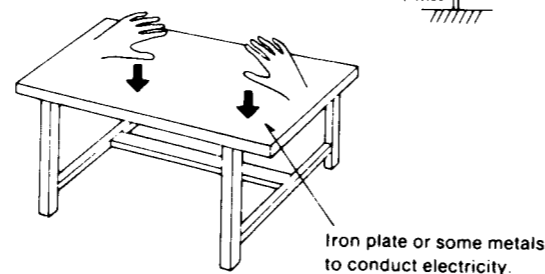


### ● Grounding for electrostatic breakdown prevention

1. Human body grounding  
Use the anti-static wrist strap to relieve 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 optical pickup.

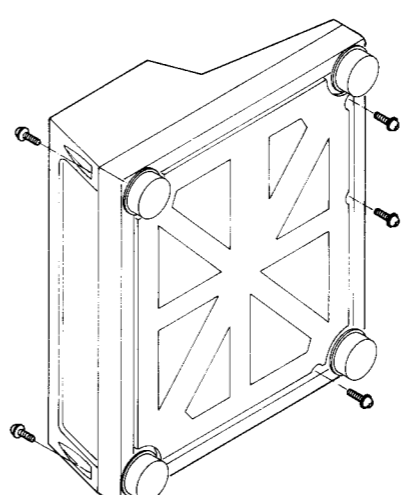
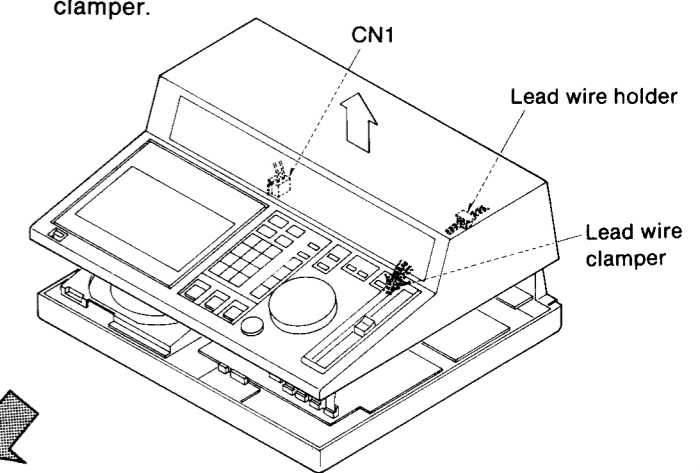
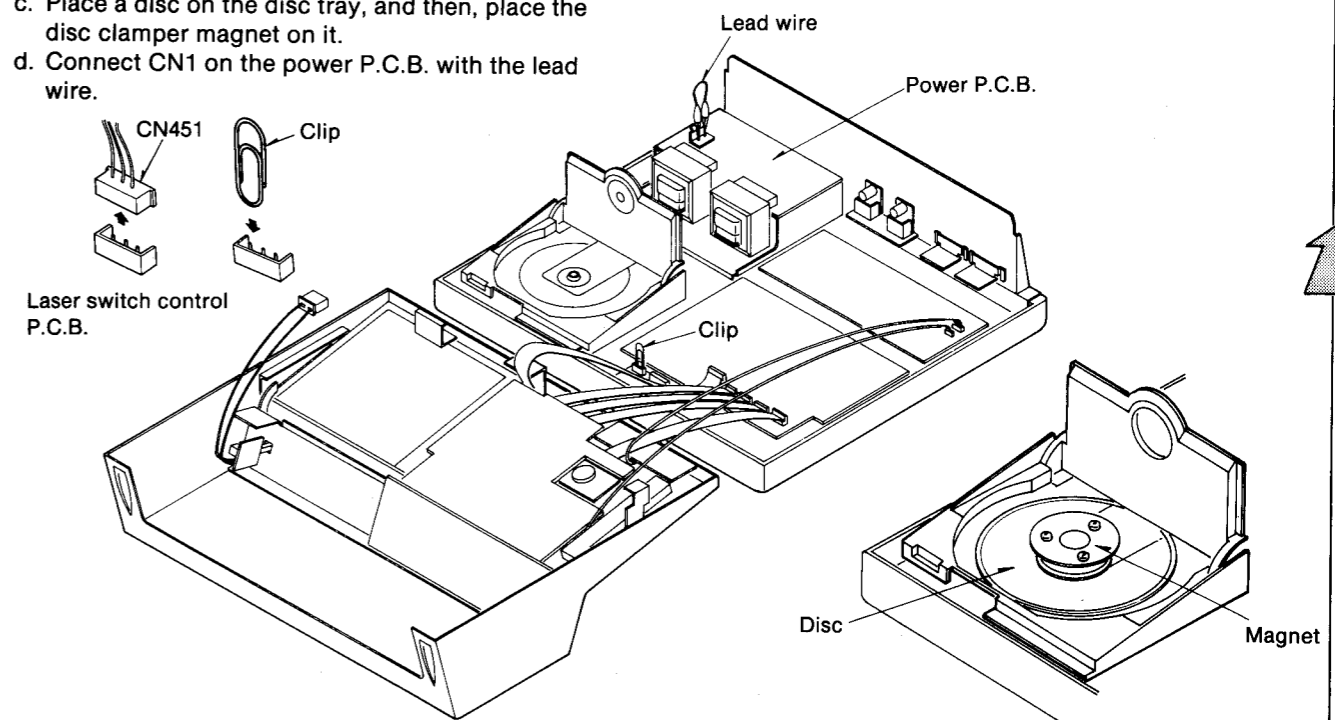


## ■ DISASSEMBLY INSTRUCTIONS

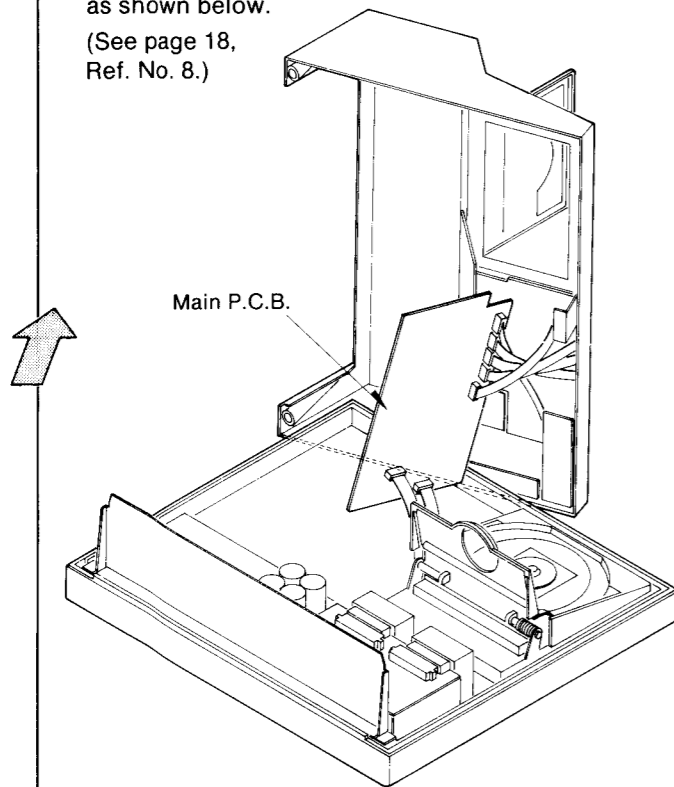
### ● Cautions for laser diode light emission

In this unit, the compact disc information is read by the laser beam diffused from the laser diode in the optical pickup. It is dangerous to directly look at the laser beam or to let it touch your body. During the normal operation of this unit, the laser diode will not emit light unless the disc holder is closed and S101 (laser ON/OFF switch) is turned ON. When servicing the unit, note that the laser diode emits lights if power switch is turned on with S101 ON.

### ● This unit uses FPC and care should be taken during assembly and disassembly.

Ref. No.	How to remove the front panel and check the main unit	
1		
Procedure 1	1. Remove the 5 setscrews.	2. Lift the front panel and pull out the power switch connector (CN1). 3. Remove the lead wire (headphone, pitch control VR) from its holder on the front panel. Cut off the lead wire clamber.
		
	4. Check the main unit as shown in the figure below.	
	<b>Note:</b> When checking the main unit power on. a. Pull out the connector CN451 on the laser switch control P.C.B. and short it with a clip. b. Remove the disc clamber magnet. (See page 18, Ref. No. 6.) c. Place a disc on the disc tray, and then, place the disc clamber magnet on it. d. Connect CN1 on the power P.C.B. with the lead wire.	<b>Caution regarding laser radiation</b> It is extremely dangerous to look at or touch laser radiation. Care must be taken when handling to prevent radiation exposure.
		

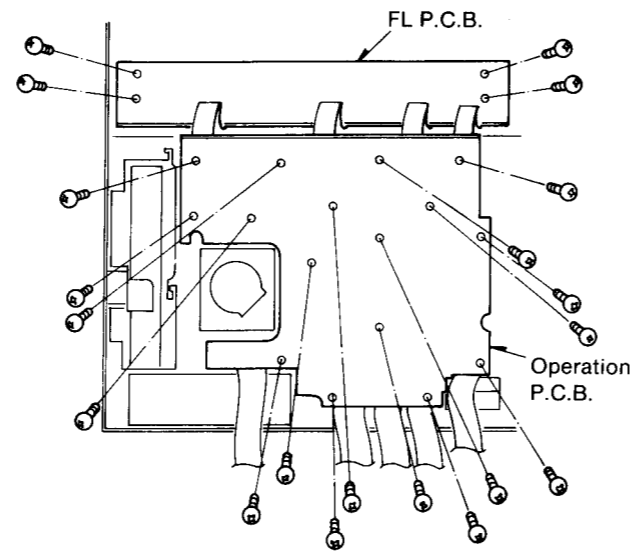
5. Otherwise, remove the main circuit P.C.B., and check as shown below.  
(See page 18, Ref. No. 8.)



Main P.C.B.

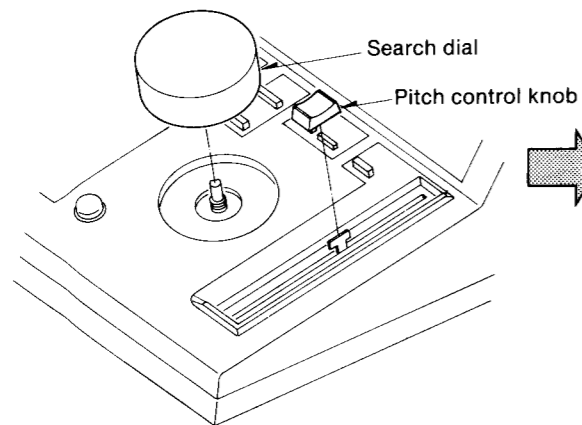
**Ref. No. 2**  
**Procedure 1 → 2**  
**How to remove the operation P.C.B. and FL P.C.B.**

- Remove the 20 setscrews.



**Ref. No. 3**  
**Procedure 1 → 2 → 3**  
**How to remove the operation buttons**

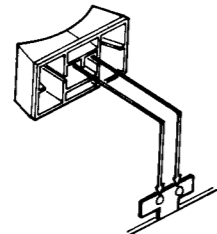
- Pull out the search dial and pitch control knob.



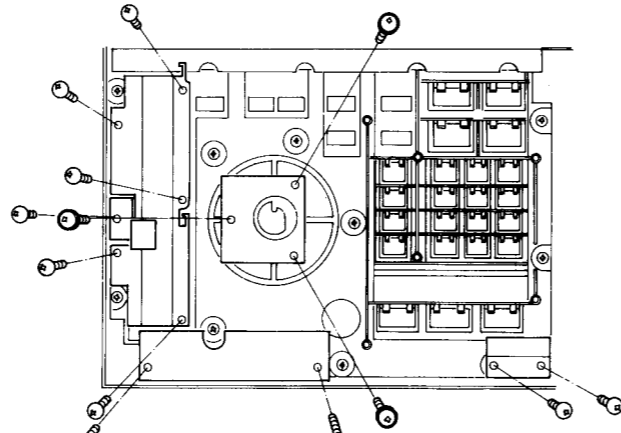
Search dial

Pitch control knob

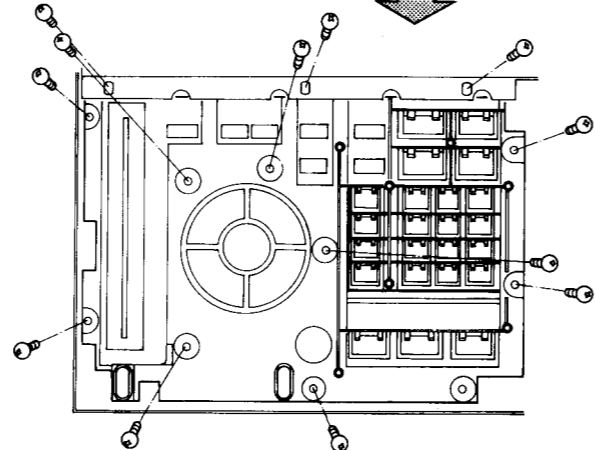
**Note:** When replacing the pitch control knob, it must be properly aligned.  
(See figure below.)



- Remove the 13 setscrews. Remove the search volume, pitch control volume, headphone P.C.B. and the 2 metal pieces which hold the panel.

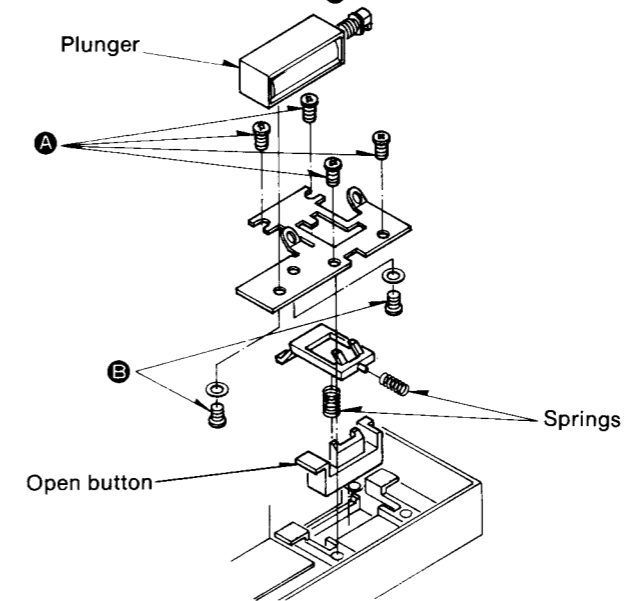


- Remove the 12 setscrews.



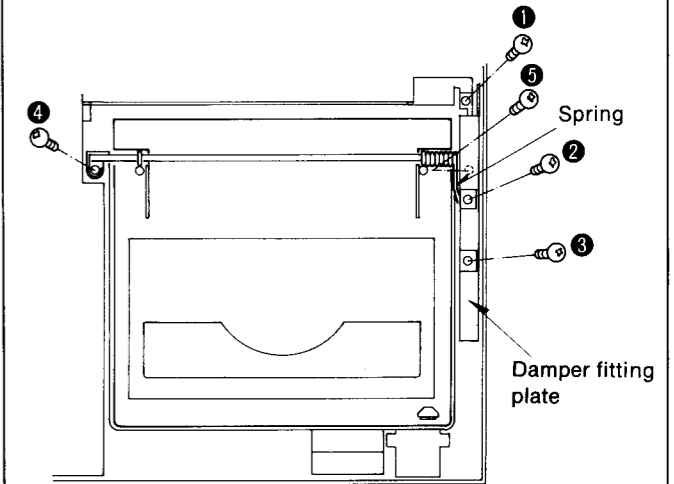
**Ref. No. 4**  
**Procedure 1 → 4**  
**How to remove the open button and plunger**

- Remove the 4 setscrews **A**.
- Remove the 2 setscrews **B**.



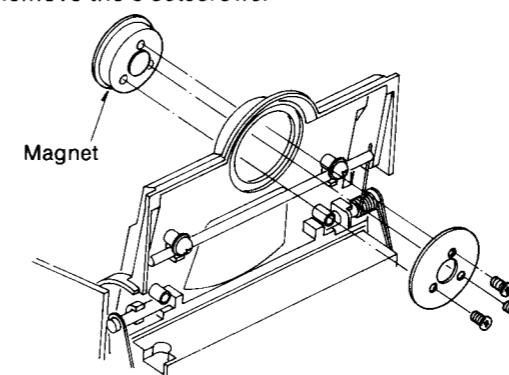
**Ref. No. 5**  
**Procedure 1 → 5**  
**How to remove the disc compartment panel**

- Remove the spring from the damper fitting plate.
- Remove the 3 setscrews (1~3). Remove the damper fitting plate.
- Remove the 2 setscrews (4 and 5).



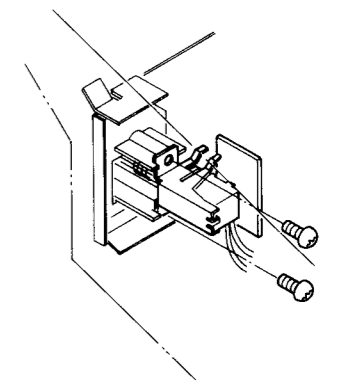
**Ref. No. 6**  
**Procedure 1 → 6**  
**How to remove the disc clamber magnet**

- Remove the 3 setscrews.



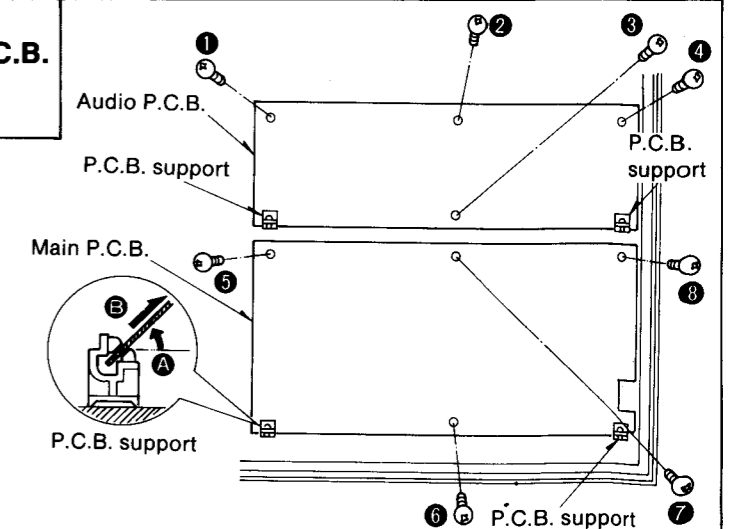
**Ref. No. 7**  
**Procedure 1 → 7**  
**How to remove the power switch**

- Remove the 2 setscrews.



**Ref. No. 8**  
**Procedure 1 → 8**  
**How to remove the audio P.C.B. and main P.C.B.**

- Audio P.C.B.**
  - Remove the 4 setscrews (1~4).
  - Remove the P.C.B. from its supports (arrows **A**→**B**).
- Main P.C.B.**
  - Remove the 4 setscrews (5~8).
  - Remove the P.C.B. from its supports (arrows **A**→**B**).



<b>Ref. No.</b> 9	<b>How to remove the disc tray</b>	
<b>Procedure</b> 1 → 9	<ol style="list-style-type: none"> <li>1. Remove the 4 setscrews.</li> <li>2. Lower the disc holder as shown by arrow A.</li> <li>3. Remove the disc tray in the direction indicated by arrow B.</li> </ol>	

<b>Ref. No.</b> 10	<b>How to remove the power transformer</b>	
<b>Procedure</b> 1 → 10	<ol style="list-style-type: none"> <li>1. Remove the 9 setscrews.</li> <li>2. Remove the stopper on the power P.C.B. with pliers.</li> <li>3. Pull off the power transformer in the direction indicated by the arrows.</li> </ol>	

<b>Ref. No.</b> 11	<b>How to remove the disc clamber</b>	
<b>Procedure</b> 1 → 11	<ol style="list-style-type: none"> <li>1. Remove the 2 E-rings (1 and 2).</li> <li>2. Pull out the shaft (B).</li> <li>3. Remove the disc clamber in the direction shown by the arrow.</li> </ol> <p><b>To install</b></p> <ol style="list-style-type: none"> <li>1. Hook part A of the clamp spring on part B of the loading base.</li> <li>2. Insert the shaft (A) into the hole of the loading base, and place E-ring 2.</li> <li>3. Insert the shaft (B) into the hole of the loading base, and place E-ring 1.</li> </ol>	

<b>Ref. No.</b> 12	<b>How to remove the traverse unit assembly</b>	
<b>Procedure</b> 1 → 12	<p>Refer to "HANDLING PRECAUTIONS FOR OPTICAL PICKUP" on page 15.</p> <ol style="list-style-type: none"> <li>1. Remove the 4 setscrews.</li> <li>2. Remove the 3 connectors (CN104, CN303, CN451).</li> <li>3. Remove the flexible board (CN105).</li> </ol> <p><b>Note:</b> To prevent damage to the laser diode, insert the shorting pin into the flexible board.</p>	

<b>Ref. No.</b> 13	<b>How to remove the traverse deck</b>	
<b>Procedure</b> 12 → 13	<ul style="list-style-type: none"> <li>Remove the 4 nuts.</li> </ul> <p><b>Note:</b> The 4 springs are different colors and must be reinstalled in their original positions.</p> <p>Refer to "HANDLING PRECAUTIONS FOR OPTICAL PICKUP" on page 15.</p>	

<b>Ref. No.</b> 14	<b>How to remove the optical pickup</b>	
<b>Procedure</b> 13 → 14	<ul style="list-style-type: none"> <li>Remove in the numbered order shown in the figure.</li> </ul> <ol style="list-style-type: none"> <li>1. Remove the 2 setscrews.</li> <li>2. Remove the 4 setscrews and lift off the traverse cover.</li> <li>3. Remove the setscrew and take out the resistance unit.</li> <li>4. Unsolder the 2 terminals.</li> <li>5. Remove the 3 setscrews.</li> <li>6. Remove the guide shaft in the direction shown by the arrows.</li> </ol> <p>Refer to "HANDLING PRECAUTIONS FOR OPTICAL PICKUP" on page 15.</p>	

# RESISTORS AND CAPACITORS

## Notes: \* Important safety notice:

Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

\* Bracketed indications in Ref. No. columns specify the area.

Parts without these indications can be used for all areas.

## Numbering System of Resistor

### Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value
ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value
				47x10 <sup>1</sup> (ohm)

## Numbering System of Capacitor

### Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M		330
Type	Voltage	Peculiarity		Value
				(33x10 <sup>0</sup> microfarad)

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	J : ±5%
ERG : Metal Oxide	12 : 1/2W	F : ±1%
ERX : Metal Film	25 : 1/4W	G : ±2%
ERQ : Fuse Type Metal	1A : 1W	K : ±10%
ERD [ ] L : Carbon (chip)	18 : 1/8W	
ERO [ ] K : Metal Film (chip)	S2 : 1/4W	
ERC : Solid	S1 : 1/2W	
	2F : 1/4W	
	50 : 1/2W	
	2A : 2W	

Capacitor Type	Voltage	Tolerance
ECE : Electrolytic	0J : 6.3V	C : ±0.25pF
ECCD : Ceramic	1A : 10V	J : ±5%
ECKD : Ceramic	1C : 16V	K : ±10%
ECQM : Polyester	1E : 25V	Z : +80%
	1H : 50V	-20%
ECQP : Polypropylene	1V : 35V	P : +100%
	50 : 50V	-0%
ECG : Ceramic	05 : 50V	M : ±20%
ECEADDN : Non Polar Electrolytic	2H : 500V	
QCU [ ] : Ceramic (Chip Type)	2A : 100V	D : ±0.5pF
ECUX : Ceramic (Chip Type)	1 : 100V	G : ±2%
ECF : Semiconductor	KC : 400V AC	
	KC : 125VAC (UL)	
	1J : 63V	
EECW : Liquid electrolyte double layer capacitor		

Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
<b>RESISTORS</b>								
R11	ERDS2TJ822	001 152 2455 0	R143	ERDS2TJ474	001 152 2443 4	R334	ERDS2TJ684	001 152 2451 4
R12	ERDS2TJ472	001 152 2362 4	R144	ERDS2TJ223	001 152 2432 7	R335	ERDS2TJ472	001 152 2362 4
R13, R14	$\Delta$ ERDS2TJ151	001 152 2426 5	R145	ERDS2TJ224	001 152 2433 6	R336	ERDS2TJ272	001 152 2354 4
R15, R16	$\Delta$ ERDS2TJ151	001 152 2426 5	R146	ERDS2TJ473	001 152 2363 3	R351	ERDS2TJ102	001 152 2346 4
R101	ERDS2TJ392	001 152 2439 0	R147	ERDS2TJ223	001 152 2432 7	R352	ERDS2TJ474	001 152 2443 4
R102	ERDS2TJ222	001 152 2353 5	R148	ERDS2TJ473	001 152 2363 3	R353, R354	ERDS2TJ472	001 152 2362 4
R103	ERDS2TJ273	001 152 2436 3	R149, R150	ERDS2TJ222	001 152 2353 5	R355	ERDS2TJ332	001 152 2357 1
R104	ERDS2TJ223	001 152 2432 7	R151	ERDS2TJ392	001 152 2439 0	R356	ERDS2TJ272	001 152 2354 4
R105	ERDS2TJ182	001 152 2352 6	R152	ERDS2TJ101	001 152 2421 0	R357	ERDS2TJ183	001 152 2429 2
R106	ERDS2TJ473	001 152 2363 3	R153	ERDS2TJ103	001 152 2347 3	R358, R359	ERDS2TJ104	001 152 2348 2
R107	ERDS2TJ274	001 152 2437 2	R154	ERDS2TJ392	001 152 2439 0	R360, R361	ERDS2TJ222	001 152 2353 5
R109, R110	ERDS2TJ473	001 152 2363 3	R155	ERDS2TJ101	001 152 2421 0	R362, R363	ERDS2TJ103	001 152 2347 3
R111, R112	ERDS2TJ274	001 152 2437 2	R156	ERDS2TJ223	001 152 2432 7	R364, R365	ERDS2TJ103	001 152 2347 3
R113, R114	ERDS2TJ473	001 152 2363 3	R157	ERDS2TJ473	001 152 2363 3	R366	ERDS2TJ274	001 152 2437 2
R115	ERDS2TJ102	001 152 2346 4	R158	ERDS2TJ683	001 152 2450 5	R367	ERDS2TJ823	001 152 2456 9
R116	ERDS2TJ472	001 152 2362 4	R159	ERDS2TJ272	001 152 2354 4	R368	ERDS2TJ473	001 152 2363 3
R117	ERDS2TJ270	001 152 2434 5	R160, R161	ERDS2TJ102	001 152 2346 4	R369	ERDS2TJ121	001 152 2349 1
R118	ERDS2TJ3R3	001 152 3152 8	R162, R163	ERDS2TJ102	001 152 2346 4	R370	ERDS2TJ331	001 152 2356 2
R119	ERDS2TJ101	001 152 2421 0	R164	ERDS2TJ822	001 152 2455 0	R372	ERDS2TJ221	001 152 2431 8
R120	ERDS2TJ270	001 152 2434 5	R165	ERDS2TJ682	001 152 2365 1	R373	ERDS2TJ391	001 152 2360 6
R121	ERDS2TJ3R3	001 152 3152 8	R166, R167	ERDS2TJ222	001 152 2353 5	R374	ERDS2TJ681	001 152 2449 8
R122	ERDS2TJ153	001 152 2351 7	R168	ERDS2TJ682	001 152 2365 1	R375	ERDS2TJ220	001 152 2430 9
R123	ERDS2TJ101	001 152 2421 0	R169	ERDS2TJ822	001 152 2455 0	R376	ERDS2TJ101	001 152 2421 0
R124	ERDS2TJ103	001 152 2347 3	R170	ERDS2TJ334	001 152 2438 1	R401	ERDS2TJ104	001 152 2348 2
R125	ERDS2TJ104	001 152 2348 2	R171	ERDS2TJ223	001 152 2432 7	R402, R403	ERDS2TJ222	001 152 2353 5
R126	ERDS2TJ152	001 152 2350 8	R172, R173	ERDS2TJ472	001 152 2362 4	R404, R405	ERDS2TJ222	001 152 2353 5
R127	ERDS2TJ682	001 152 2365 1	R174	ERDS2TJ154	001 152 2427 4	R406	ERDS2TJ105	001 152 2422 9
R128	ERDS2TJ153	001 152 2351 7	R175	ERDS2TJ120	001 152 3146 6	R407, R408	ERDS2TJ474	001 152 2443 4
R129	ERDS2TJ224	001 152 2433 6	R176	ERDS2TJ471	001 152 2361 5	R409, R410	ERDS2TJ472	001 152 2362 4
R130	ERDS2TJ122	001 152 2423 8	R177	ERDS2TJ681	001 152 2449 8	R411, R412	ERDS2TJ103	001 152 2347 3
R131, R132	ERDS2TJ333	001 152 2358 0	R178	ERDS2TJ270	001 152 2434 5	R413, R414	ERDS2TJ103	001 152 2347 3
R133	ERDS2TJ102	001 152 2346 4	R179	ERDS2TJ472	001 152 2362 4	R415	ERDS2TJ472	001 152 2362 4
R134	ERDS2TJ392	001 152 2439 0	R301	ERDS2TJ822	001 152 2455 0	R419, R420	ERDS2TJ223	001 152 2432 7
R135	ERDS2TJ102	001 152 2346 4	R303	ERDS2TJ474	001 152 2443 4	R421, R422	ERDS2TJ223	001 152 2432 7
R136	ERDS2TJ182	001 152 2352 6	R304, R305	ERDS2TJ223	001 152 2432 7	R423, R424	ERDS2TJ223	001 152 2432 7
R137	ERDS2TJ681	001 152 2449 8	R306	ERDS2TJ152	001 152 2350 8	R425, R426	ERDS2TJ223	001 152 2432 7
R138	ERDS2TJ153	001 152 2351 7	R307	ERDS2TJ102	001 152 2346 4	R427	ERDS2TJ223	001 152 2432 7
R139	ERDS2TJ223	001 152 2432 7	R308	ERDS2TJ103	001 152 2347 3	R428	ERDS2TJ392	001 152 2439 0
R140	ERDS2TJ821	001 152 2454 1	R309	ERDS2TJ104	001 152 2348 2	R429, R430	ERDS2TJ472	001 152 2362 4
R141	ERDS2TJ333	001 152 2358 0	R311	ERDS2TJ103	001 152 2347 3	R431, R432	ERDS2TJ472	001 152 2362 4
R142	ERDS2TJ222	001 152 2353 5	R312	ERDS2TJ122	001 152 2423 8	R433	ERDS2TJ472	001 152 2362 4
			R331	ERDS2TJ102	001 152 2346 4	R434	ERDS2TJ332	001 152 2357 1
			R332, R333	ERDS2TJ101	001 152 2421 0	R435	ERDS2TJ103	001 152 2347 3

Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
R436, R437	ERDS2TJ101	001 152 2421 0	C105	ECQM1H224KVW	001 106 5164 6	C356	RCBS1C472MXY	001 103 5563 0
R438	ERDS2TJ683	001 152 2450 5	C107, C108	ECEA1HN2R2S		C357, C358	RCBS1H100JCY	001 103 5563 0
R439	ERDS2TJ333	001 152 2358 0	C109	ECEA1HN2R2SE		C359, C360	RCBS1C103MYY	001 103 8060 6
R440	ERDS2TJ103	001 152 2347 3	C110	ECQM1H122KVW		C361, C362	RCBS1C103MYY	001 103 8060 6
R444, R445	ERDS2TJ153	001 152 2351 7	C111	ECQM1H473JZ	001 106 0810 9	C363, C364	RCBS1C103MYY	001 103 8060 6
R446	ERDS2TJ153	001 152 2351 7	C112	ECFR1H104ZFM	001 108 0794 2	C365	RCBS1C103MYY	001 103 8060 6
R447, R451	ERDS2TJ103	001 152 2347 3	C113	ECQM1H153KV3	001 106	C366	ECEA1HN010S	001 120 0354 0
R452	ERDS2TJ102	001 152 2346 4	C114	ECEA1HN3R3S	001 120 0358 6	C367	RCBS1H220JLY	001 103 5601 1
R454	ERDS2TJ472	001 152 2362 4	C115	ECFR1H104ZFM	001 108 0794 2	C368	RCBS1H101KBY	001 103 5569 4
R455	ERDS2TJ224	001 152 2433 6	C116	ECQM1H153KV3	001 106	C369	RCBS1H102KBY	001 103 5571 0
R456	ERDS2TJ101	001 152 2421 0	C117	ECQM1H104KV3		C370	RCBS1H271KBY	001 103 5611 9
R457	ERDS2TJ223	001 152 2432 7	C118	ECQM1H104JZ	001 106 0675 8			
R458	ERDS2TJ472	001 152 2362 4	C119	ECEA0JU471	001 120 2924 0	C401	ECFR1H104ZFM	001 108 0794 2
R460	ERDS2TJ101	001 152 2421 0	C120	ECEA1HKR33	001 120 0337 1	C402	ECKD1H103PF	001 103 1449 7
R501	ERJ8GEXK1R5	001 151 6260 8	C121	ECKW1H182KB5		C403	ECFR1H104ZFM	001 108 0794 2
R502	ERJ8GEXK1R0		C122	ECKD1H682KB	001 103 1592 1	C404	ECEA0JU470	001 120 3125 9
R503	ERJ8GEXJ223	001 151 5630 6	C123	ECQM1H333KVW		C405, C406	ECKR1H103ZF5	
R601, R602	ERDS2TJ471	001 152 2361 5	C124	ECCD1H221K	001 103 0508 7	C407, C408	ECKR1H103ZF5	
R603, R604	ERDS2TJ471	001 152 2361 5	C125	ECEA1HU010	001 120 2842 1	C409	ECEA1CU100	001 120 2905 3
R605	ERDS2TJ471	001 152 2361 5	C126	ECEA0JU220	001 120 4670 5	C410	ECCD1H220KC	001 103 0494 6
R607	ERDS2TJ331	001 152 2356 2	C127	ECKD1H681K	001 103 1580 5	C412	ECEA1CU100	001 120 2905 3
R608	ERDS2TJ151	001 152 2426 5	C128	ECKD1H103PF	001 103 1449 7	C414	ECEA0JU101	001 120 2829 8
R609	ERDS2TJ181	001 152 2428 3	C129, C130	ECCD1H221K	001 103 0508 7	C415, C416	ECBS1H102KBY	001 103 3504 9
R610, R611	ERDS2TJ471	001 152 2361 5	C131, C132	ECKD1H102KB	001 103 1414 8	C417	ECBS1H102KBY	001 103 3504 9
R612	ERDS2TJ473	001 152 2363 3	C133	ECFR1H104ZFM	001 108 0794 2	C420	ECEA0JU220	001 120 4670 5
R801, R802	ERDS2TJ272	001 152 2354 4	C134	ECEA1HU010	001 120 2842 1	C451	ECKR1H103ZF5	
R803, R804	ERDS2TJ272	001 152 2354 4	C135	ECEA1H0R1	001 120 0340 6	C452	ECEA1HN2R2S	001 120 0356 8
R821, R822	ERDS2TKG10R0	001 151 4827 9	C136	ECCD1H220KC	001 103 0494 6	C455	ECEA1CU100	001 120 2905 3
R823, R824	ERDS2TKG33R0	001 151 4828 8	C139	ECKD1H681K	001 103 1580 5	C501	ECEV1EV330	001 120 5624 7
R825, R826	ERDS2TKG1001	001 151 3320 5	C140, C141	ECKD1H102KB	001 103 1414 8	C502	ECEV1H010	001 120 5625 6
R827, R828	ERDS2TKG3301	001 151 3338 5	C142, C14					

# REPLACEMENT PARTS LIST

**Notes:** \* Important safety notice:

Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

\* Bracketed indications in Ref. No. columns specify the area.

Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
<b>INTEGRATED CIRCUITS</b>							
IC11	$\Delta$ AN78M05	001 060 4137 4	I.C.	Q412	2SD638	001 030 1798 3	TRANSISTOR
IC12	$\Delta$ AN79N05	001 060 8714 7	I.C.	Q413	2SD682	001 030 2415 7	TRANSISTOR
IC13	AN78N12	001 060 4721 4	I.C.	Q414, Q452	UN4212	001 030 3019 1	TRANSISTOR
IC14	AN79L12	001 060 9072 4	I.C.	Q453	UN4112	001 030 3018 2	TRANSISTOR
IC101	AN8370S	001 060 8399 8	I.C.	Q454	UN4214	001 030 4835 3	TRANSISTOR
IC102, IC103	AN6554NS	001 060 4860 4	I.C.	Q455	UN4212	001 030 3019 1	TRANSISTOR
IC104	AN6552S	001 060 7386 7	I.C.	Q456	2SK301	001 030 2428 2	TRANSISTOR
IC105	AN6914S	001 060 3298 2	I.C.	Q457, Q458	UN4212	001 030 3019 1	TRANSISTOR
IC106	SVLUPD4053BC	001 060 4885 5	I.C.	Q459, Q460	UN4112	001 030 3018 2	TRANSISTOR
IC301	EHDGA1243	001 061 3036 7	I.C.	Q461, Q601	UN4112	001 030 3018 2	TRANSISTOR
IC302	MN6617S	001 061 3042 9	I.C.	Q602, Q603	UN4112	001 030 3018 2	TRANSISTOR
IC303	MN6618A	001 061 3043 8	I.C.	Q604, Q605	UN4212	001 030 3019 1	TRANSISTOR
IC304	MN4416S-12	001 060 9746 5	I.C.	Q606, Q607	UN4212	001 030 3019 1	TRANSISTOR
IC331	AN6914	001 060 0297 5	I.C.	Q608, Q609	UN4212	001 030 3019 1	TRANSISTOR
IC351, IC352	MN74HC04S	001 061 3232 5	I.C.	Q610, Q611	UN4212	001 030 3019 1	TRANSISTOR
IC353	MN74HC74S	001 060 7634 0	I.C.	Q612, Q613	UN4212	001 030 3019 1	TRANSISTOR
IC354	MN74HC00S	001 060 7089 3	I.C.	Q614, Q615	UN4212	001 030 3019 1	TRANSISTOR
IC355	AN6564NS	001 060 7085 7	I.C.	Q616, Q617	UN4212	001 030 3019 1	TRANSISTOR
IC401	MN15261PDK	001 061 3159 7	I.C.	Q618, Q619	UN4112	001 030 3018 2	TRANSISTOR
IC402	MN1550PDM	001 061 3230 7	I.C.	Q821, Q822, Q891	UN4114	001 030 4832 6	TRANSISTOR
IC403	MN1280-R	001 060 8669 5	I.C.	<b>DIODES</b>			
IC501	AN8290S	001 061 3034 9	I.C.	D11	$\Delta$ SVDS1WB40	001 032 7473 7	RECTIFIER
IC601	SV1BX1439M	001 061 3235 2	I.C.	D12	$\Delta$ SVD1SR35200A	001 032 3951 4	RECTIFIER
(M, MC)				D13	MA4082M	001 032 4955 6	DIODE
IC601	SV1BX1439E	001 061 3671 6	I.C.	D14	MA4330L	001 032 7228 8	DIODE
EXCEPT (M, MC)				D15, D16	MA4082M	001 032 4955 6	DIODE
IC801	$\Delta$ AN78M15	001 060 4532 7	I.C.	D17, D18	$\Delta$ SVD1SR35200A	001 032 3951 4	RECTIFIER
IC802	$\Delta$ AN79N15	001 060 8715 6	I.C.	D101, D102	MA165	001 032 0494 0	DIODE
IC803	AN78M15	001 060 4532 7	I.C.	D103, D104	MA165	001 032 0494 0	DIODE
IC804	AN79N15	001 060 8715 6	I.C.	D105, D106	MA4082M	001 032 4955 6	DIODE
IC805	AN78M12	001 060 4332 2	I.C.	D351	MA4051-H	001 032 5891 1	DIODE
IC806	AN79N12	001 060 8663 1	I.C.	D352	MA165	001 032 0494 0	DIODE
IC821	MN51005PDM	001 061 3231 6	I.C.	D353	SVDKV1230Z23	001 032 9299 5	DIODE
IC822, IC823	SV1PCMS4KP-M	001 061 3644 9	I.C.	D354, D401	MA165	001 032 0494 0	DIODE
IC824, IC825	SV1UPD4053BC	001 060 4885 5	I.C.	D402, D403	MA165	001 032 0494 0	DIODE
IC826, IC827	SV1MS238P	001 060 9725 0	I.C.	D404, D405	MA165	001 032 0494 0	DIODE
IC828, IC829	NJM5532DD	001 061 3161 3	I.C.	D406, D407	MA165	001 032 0494 0	DIODE
IC830, IC831	SV1AL079	001 061 3234 3	I.C.	D408, D409	MA165	001 032 0494 0	DIODE
IC851	SV1NJM4556SA	001 061 0445 6	I.C.	D451	MA165	001 032 0494 0	DIODE
<b>TRANSISTORS</b>							
Q11	$\Delta$ 2SA1309Q	001 030 4058 0	TRANSISTOR	D501	MA153	001 032 0489 7	DIODE
Q12	$\Delta$ 2SD973	001 030 1944 1	TRANSISTOR	D601, D602	MA165	001 032 0494 0	DIODE
Q13	$\Delta$ 2SB793-QRS	001 030 2766 7	TRANSISTOR	D603, D604	MA165	001 032 0494 0	DIODE
Q101	$\Delta$ 2SD1055	001 030 4872 8	TRANSISTOR	D605, D606	MA165	001 032 0494 0	DIODE
Q102	$\Delta$ 2SB822	001 030 0781 6	TRANSISTOR	D607, D608	MA165	001 032 0494 0	DIODE
Q103	$\Delta$ 2SD1055	001 030 4872 8	TRANSISTOR	D609, D610	MA165	001 032 0494 0	DIODE
Q104	$\Delta$ 2SB822	001 030 0781 6	TRANSISTOR	D611, D612	MA165	001 032 0494 0	DIODE
Q105	$\Delta$ 2SD1055	001 030 4872 8	TRANSISTOR	D613, D614	MA165	001 032 0494 0	DIODE
Q106	$\Delta$ 2SB822	001 030 0781 6	TRANSISTOR	D615	MA165	001 032 0494 0	DIODE
Q107	2SK301	001 030 2428 2	TRANSISTOR	D616, D617	SVGLB74VR3HL	001 032 9300 9	LED
Q108	UN4212	001 030 3019 1	TRANSISTOR	D618, D619	SVGLB74VR3HL	001 032 9300 9	LED
Q109	2SA1309Q	001 030 4058 0	TRANSISTOR	D620, D621	SVGLB74VR3HL	001 032 9300 9	LED
Q110	2SC2021	001 030 4276 2	TRANSISTOR	D622	SVGLB74MG3HL	001 032 7888 8	LED
Q111	UN4212	001 030 3019 1	TRANSISTOR	D623	SVGLB74DU3HL	001 032 7185 2	LED
Q301, Q331	UN4112	001 030 3018 2	TRANSISTOR	D624, D625	SVGLB74VR3HL	001 032 9300 9	LED
Q351	2SK301	001 030 2428 2	TRANSISTOR	D626	MA165	001 032 0494 0	DIODE
Q401	UN4214	001 030 4835 3	TRANSISTOR	D801, D802	$\Delta$ SVDS1WB40	001 032 7473 7	RECTIFIER
Q402	2SA1309Q	001 030 4058 0	TRANSISTOR	D803, D804	$\Delta$ SVD1SR35200A	001 032 3951 4	RECTIFIER
Q403, Q404	UN4214	001 030 4835 3	TRANSISTOR	D805, D806	MA4054-MTA	001 032 9513 8	DIODE
Q405, Q406	2SC3311-Q	001 030 2936 7	TRANSISTOR	D807, D808	MA4054-MTA	001 032 9513 8	DIODE
Q407	2SC3311-Q	001 030 2936 7	TRANSISTOR	D821, D822	MA165	001 032 0494 0	DIODE
Q408, Q409	2SA1309Q	001 030 4058 0	TRANSISTOR	D891	MA165	001 032 0494 0	DIODE
Q410	2SA1309Q	001 030 4058 0	TRANSISTOR	<b>HALL ELEMENTS</b>			
Q411	UN4114	001 030 4832 6	TRANSISTOR	H501, H502	OH-001	001 036 0010 2	HALL ELEMENT
<b>VARIABLE RESISTORS</b>							
VR101	EVND3AA00B53	001 180 2644 9	5K $\Omega$ (B)				

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
VR102, VR103	EVND3AA00B14	001 180 2642 1	10K $\Omega$ (B)	T2	$\Delta$ SLT54JU3A	001 202 8479 1	POWER TRANSFORMER
VR104	EVND3AA00B53	001 180 2644 9	5K $\Omega$ (B)	(M, MC)			
VR105	EVND3AA00B14	001 180 2642 1	10K $\Omega$ (B)	<b>COMPONENT COMBINATIONS</b>			
VR106	EVND3AA00B53	001 180 2644 9	5K $\Omega$ (B)	C20, C21	$\Delta$ RXAF103Z22EY	001 230 0547 0	0.01 $\mu$ F X 2
VR301	EVND3AA00B13	001 180 3053 2	1K $\Omega$ (B)	C803, C804	$\Delta$ RXAF103Z22EY	001 230 0547 0	0.01 $\mu$ F X 2
VR601	SVSD2	003 439 2047 2	20K $\Omega$ (B)	C809, C810	$\Delta$ RXAF103Z22EY	001 230 0547 0	0.01 $\mu$ F X 2
VR851	EWANA1X05A15	001 174 8134 8	100K $\Omega$ (A)	<b>OSCILLATORS</b>			
VR901	EWTXAR27025B	001 174 8659 8	SEARCH DIAL	X351	SVQ16CKSS	001 250 1471 7	16.9344MHZ
<b>COILS AND TRANSFORMERS</b>							
L1, L2	$\Delta$ SLQX400-D	001 210 7020 0	COIL	<b>DISPLAYS</b>			
EXCEPT (M, MC)				FL601	SADD4	001 080 0329 2	DISPLAY
L101	ELEPH2R2MA	001 211 2463 2	COIL	<b>FUSES</b>			
L201, L202 (EG) ONLY	SLQDSP33R3K		COIL	F1	$\Delta$ XBA1F08NU14	002 380 0307 9	125V, 800mA
L203, L204 (EG) ONLY	SLQDSP33R3K		COIL	F1	$\Delta$ XBA2C04TB0S		250V, T400mA
L205, L206 (EG) ONLY	SLQDSP33R3K		COIL	EXCEPT (M, MC)			
L301	ELEPH3R3KA		COIL	F2	$\Delta$ XBA2C016TB0S	002 380 1470 5	250V, T160mA
L351	SLOD9B1-T	001 211 3312 2	COIL	EXCEPT (M, MC)			
L352	ELEPK1R2MA	001 211 0621 4	COIL	<b>SWITCHES</b>			
L353	ELEPHR33MA		COIL	S1	$\Delta$ ESB8249V	003 435 5877 0	POWER
L501	NL4532T100K2	001 211 3218 9	COIL	S2	$\Delta$ SRDSHXW0251	003 438 1067 7	VOLTAGE SELECTOR
L851	ELEPH1R2MA	001 210 8983 4	COIL	EXCEPT (M, MC)			
L851	SLQDSP33R3K		COIL	S101	$\Delta$ SSPD4-1	003 434 1042 6	OPEN/CLOSE DET.
EXCEPT (M, MC)				S601, S602	EVQQS405K	003 435 2832 5	OPERATION
L852	ELEPH1R2MA	001 210 8983 4	COIL	S603, S604	EVQQS405K	003 435 2832 5	OPERATION
L852	SLQDSP33R3K		COIL	S605, S606	EVQQS405K	003 435 2832 5	OPERATION
EXCEPT (M, MC)				S607, S608	EVQQS405K	003 435 2832 5	OPERATION
L853	ELEPH1R2MA	001 210 8983 4	COIL	S609, S610	EVQQS405K	003 435 2832 5	OPERATION
L853	SLQDSP33R3K		COIL	S611, S612	EVQQS405K	003 435 2832 5	OPERATION
EXCEPT (M, MC)				S613, S614	EVQQS405K	003 435 2832 5	OPERATION
T1	$\Delta$ SLT54JE47E	001 202 8478 2	POWER TRANSFORMER	S615, S616	EVQQS405K	003 435 2832 5	OPERATION
EXCEPT (M, MC)				S617, S618	EVQQS405K	003 435 2832 5	OPERATION
T1	$\Delta$ SLT54JU4A	001 202 8480 8	POWER TRANSFORMER	S619, S620	EVQQS405K	003 435 2832 5	OPERATION
(M, MC)				S621, S622	EVQQS405K	003 435 2832 5	OPERATION
T2	$\Delta$ SLT54JE53E		POWER TRANSFORMER	S623, S624	EVQQS405K	003 435 2832 5	OPERATION
EXCEPT (M, MC)				S625, S626	EVQQS405K	003 435 2832 5	OPERATION
				S627	EVQQS405K	003 435 2832 5	OPERATION
				S628, S629	ESB6471	003 435 4986 0	OPERATION
				S630, S631	ESB6471	003 435 4986 0	OPERATION
<b>RELAYS</b>							
RLY801, RLY802	SFDYG5A237P	003 450 2713 4	RELAY				
RLY891	SFDYG5A237P	003 450 2713 4	RELAY				

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
<b>FRONT PANEL</b>							
1	SGWLP1200-KM	016 840 7149 5	FRONT PANEL ASS'Y	24	SBCD2320MBOA	016 702 6774 1	BUTTON
1-1	SHRD58	016 652 0664 7	CORD CLAMPER	25	SBCD2300MBOA	016 702 6783 0	BUTTON
2	SKKLP1200-KM	016 840 7215 2	PANEL ASS'Y	26	SBCD400	016 702 6812 2	BUTTON
2-1	SGUD120	016 842 1506 8	PANEL	27	SUMD50-1	016 650 5276 5	PLATE
2-2	SHGLP1200-KM	016 653 1130 3	RUBBER ASS'Y	28	SUWLP1200-KM	016 650 5283 6	DISPLAY PANEL ASS'Y
3	SUXD33	016 634 0134 0	SHAFT	30	SGXD1330ZK0A	016 846 3627 5	FRAME, POWER SWITCH
4	SUSD37-1	016 726 0857 1	SPRING	31	SRKT015N26	017 702 0066 8	BUTTON, POWER SWITCH
5	SMND8	016 632 1831 8	FRAME, OPEN BUTTON	32	SHWD		

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
CABINET AND CHASSIS							
41	SKUD7	016 802 2056 3	BOTTOM BOARD	57	SHR127	016 645 0037 9	SPACER, AC CORD
42	SGXD1320ZY0A	016 846 3569 5	RUBBER				
43	SGXD1310ZY0A	016 846 3570 2	RUBBER				
44	SGXD1300ZY0A	016 846 3571 1	RUBBER				
47	SKLD2-Z	016 828 0317 7	INSULATOR ASS'Y	58	△	QFC1205M	003 490 0928 5 AC CORD
48	SKUD8	016 802 2055 4	BOTTOM COVER				
49	SMLD3-1	016 601 0579 8	CUSHION RUBBER	58	△	RJA52Y	003 490 3914 9 AC CORD
50	SHRD39	016 652 0660 1	SPACER				
51	SHRD33	016 652 0652 1	SUPPORTER, P.C.BOARD				
52	SHE185	016 918 0330 9	SPACER				
53	SGPD500KY1A	016 840 7181 5	REAR PANEL	58	△	SJA138-3	003 490 2575 2 AC CORD
(M)							
53	SGPD500KY2A	016 840 7193 1	REAR PANEL				
(E)							
53	SGPD500KY3A	016 840 7192 2	REAR PANEL	58	△	SJA174	003 490 4312 5 AC CORD
(XA)							
53	SGPLP1200KEG	016 840 7234 9	REAR PANEL	58	△	SJA182	003 490 5035 3 AC CORD
(EG)							
53	SGPLP1200KEK	016 840 7290 1	REAR PANEL ASS'Y	60		SHGD61	016 653 1107 2 SPACER
(EK)				61		SHRD62	016 652 0704 6 CORD CLAMPER
53	SGPLP1200KMC	016 840 7289 4	REAR PANEL ASS'Y	SCREWS, WASHERS AND NUTS			
(MC)				N1		XTW4+14QFZ	005 501 4636 4 SCREW
53	SGPLP1200KPA	016 840 7291 0	REAR PANEL ASS'Y	N2		XTV3+14GFZ	005 501 1144 1 SCREW
(PA, PE, PC)				N3		XTBS3+8FFZ	005 501 3429 3 SCREW
53	SGPLP1200KXL	016 840 7292 9	REAR PANEL ASS'Y	N4		SRXG016ND1	005 500 5657 0 SCREW
(XL, EB, EH)				N5		XTV3+16JFR	005 501 4634 6 SCREW
(EF, E1, XB)				N6		SNSD17	016 643 0984 5 SCREW
54	SJS6805	003 400 1689 1	SOCKET (8 PIN)	N7		XSB4+25FZ	005 500 7168 4 SCREW
55	SJS6401	003 403 6359 1	SOCKET (5 PIN)	N8		SND6-1	016 643 0982 7 WASHER
56	SJFD5	003 410 7771 8	LINE OUT TERMINAL	N9		XTW3+8TFZ	005 501 2926 5 SCREW
57	RHR111	015 645 0221 9	SPACER, AC CORD	N10		XTW3+8TFR	005 501 2602 2 SCREW
(XA, PA, PE)							
(PC)							

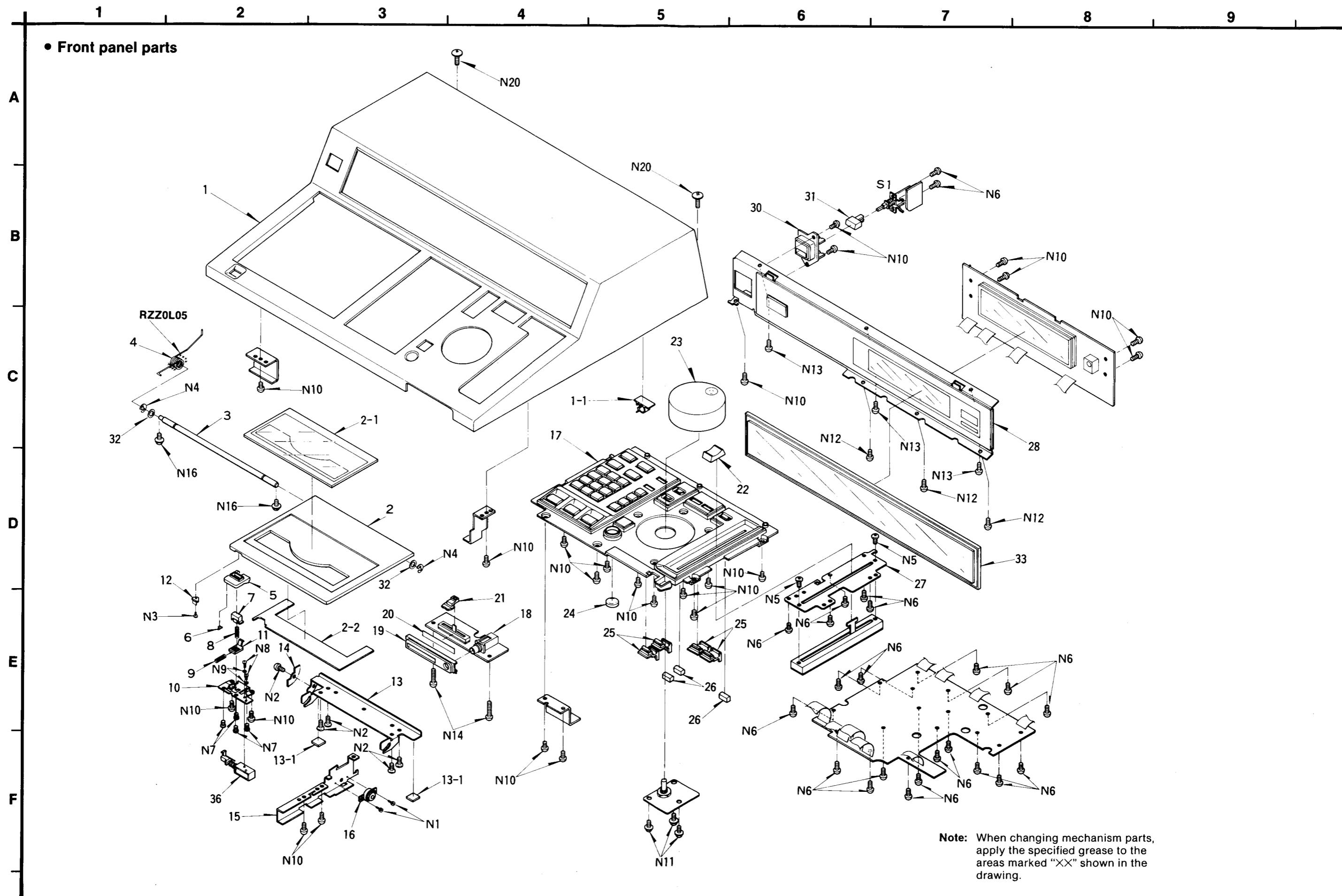
Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
TRAVERS DECK							
1	SIRLP1200-KM	016 632 1819 4	DISC TRAY ASS'Y	29	SHGD53	016 653 1090 4	CUSHION RUBBER
1-1	SHSD15	016 643 0985 4	SHEET	30	SHRD3	016 652 0559 7	SPRING HOLDER
2	SUWLP1200KM2	016 650 5291 6	BASE ASS'Y	31	SXPDB30	003 483 1207 8	SPINDLE P.C.B
3	SIRLP1200KM1	016 652 0675 4	CLAMPER ASS'Y	32	SDWD2	016 846 3479 6	SPACER
3-1	SRGC007ND4	017 653 0358 1	RUBBER	33	SUSD39-1	016 726 0858 0	SPRING (GOLD)
4	SOMLP1200-KM	003 453 0338 0	MAGNET ASS'Y	34	SUSD54-1	016 726 0861 5	SPRING (SILVER)
5	SRUP050N46	017 745 0087 4	PLATE	35	SUSD55-1	016 726 0862 4	SPRING (BLACK)
6	SUXD30	016 641 0256 0	SHAFT	36	SUSD56-1	016 726 0865 1	SPRING (RED)
7	SUXD31	016 641 0255 1	SHAFT	SCREWS, WASHERS AND NUTS			
8	SUSD40	016 726 0874 0	SPRING	N1		XYN2+C4	005 503 0548 9 SCREW
9	SUWD45-1	016 650 5315 5	SPACER	N2		XTW3+8TFZ	005 501 2926 5 SCREW
10	SHWD13	016 643 0995 2	SPACER	N3		XTV3+12JFZ	005 501 0847 1 SCREW
11	△ SOALP1200-KM	001 271 0692 3	OPTICAL PICKUP ASS'Y	N4		XTN23+4GFZ	005 501 4631 9 SCREW
12	EWS78KA00Q53	001 230 2544 5	RESISTANCE UNIT	N5		XTV3+8JFZ	005 501 0919 2 SCREW
13	SUXD25	016 634 0124 2	SHAFT	N6		XUC2FT	005 512 0126 6 E-RING
14	SUXD39	016 634 0137 7	SHAFT	N7		XUC3FY	005 512 0137 3 E-RING
15	SHRD40	016 652 0670 9	SPACER	N8		SFXGQ06ND1	005 500 4963 3 SCREW
16	SHGD47	016 653 1070 8	SPACER	N9		SNSD10	005 500 5675 8 SCREW
17	EWSL04A00000	016 631 0044 6	HOLDER	N10		XQN17+A6	005 500 4900 2 SCREW
18	SORD10E	001 211 3219 8	COIL	N11		XYN2+C4	005 503 0548 9 SCREW
19	SOYD9	016 634 0125 1	YOKE	N12		XTV3+10G	005 501 0826 6 SCREW
20	SOYD8E	016 634 0128 8	YOKE	N13		XTV3+6BFN	005 501 0888 2 SCREW
21	SISD9	016 630 1778 6	TRAVERSE BASE	N14		XXE26D5	005 500 5095 2 SCREW
22	SDMLP1200-KM	016 740 0118 7	ROTOR ASS'Y	N15		XTN2+4G	005 501 2780 5 SCREW
23	SDOD14-E	016 766 0210 0	TURNTABLE	N16		SNSD9	016 726 0765 4 SCREW
24	SRQA010ND4	017 726 0412 8	SPRING	N17		XTV3+14G	005 501 0851 5 SCREW
25	SDOD15	016 745 0208 1	RING	N18		XNG26H	005 507 1598 5 NUT
26	SGXLP1200-KM	016 846 3556 0	TRAVERSE BASE COVER ASS'Y	N19		XWE3AB	005 513 4815 7 WASHER
27	SHRD41	016 652 0677 2	LOCK SHAFT	N20		XTN23+6G	005 501 4632 8 SCREW
28	SHRD42	016 652 0668 3	KNOB, LOCK SHAFT	N21		SHWD13	016 643 0995 2 SPACER

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
PACKINGS							
P1	SPND174	016 971 4879 0	CARTON BOX	A1	SQUD151-1	016 983 4975 5	INSTRUCTION BOOK
(EF)				{XL, EF, EG}			
P1	SPND89	016 971 4718 6	CARTON BOX	(XA)			
EXCEPT				A1	SQULP1200-KE	016 983 4877 6	INSTRUCTION BOOK
(MC, EF)				{E, EB, EH}			
P1	SPND90	016 971 4786 4	CARTON BOX	A1	SQULP1200KMC	016 983 4860 5	INSTRUCTION BOOK
(MC)				(MC)			
P2	SPSD57	016 977 3093 0	PAD	A1	SQULP1200KPA	016 983 4917 5	INSTRUCTION BOOK
P3	SPSD58	016 977 3094 9	PAD	{PA, PE, PC}			
P4	XZB60X65A01	016 978 0510 1	POLYETHYLENE BAG	A1	SQULP1200KXB	016 983 4916 6	INSTRUCTION BOOK
P5	SRHZJ02ND1	017 978 0097 5	PROTECTION COVER	(XB)			
P6	SFYFZ3A35	017 978 0084 0	POLYETHYLENE BAG	A2	SFDHMO3ND2	003 492 5453 9	LINE OUT CORD
P8	SPSD14	016 977 2843 0	PROTECTION SHEET	A3	RJP120ZBS-H	003 402 1437 9	PLUG
ACCESSORIES							
A1	SQUD114	016 983 4879 4	INSTRUCTION BOOK	A4	UM-3NE		BATTERY
(EK)				EXCEPT			
A1	SQUD115	016 983 4918 4	INSTRUCTION BOOK	(M, MC)			
(E1)				A4	UM-3NEP		BATTERY
A1	SQUD149	016 983 4862 3	INSTRUCTION BOOK	(M, MC)			
(M)							

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS							
IC1001	MN6030B	001 060 6133 0	I.C.	EXCEPT			
EXCEPT				(M, MC)	ECKD1H101KB	001 103 1412 0	CERAMIC, 50V, 100PF
(M, MC)				C1002	ECKD1H121KB	001 103 1455 9	CERAMIC, 50V, 120PF
IC1001	MN6030CA	001 060 8758 5	I.C.	(M, MC)			
EXCEPT				C1002			
(M, MC)				EXCEPT			
TRANSISTORS							
Q1001	UNI231	001 030 5092 4	TRANSISTOR	(M, MC)	ECEA0JK101	001 120 0136 8	ELECTROLYTIC, 6.3V, 100µF
DIODES							
D1001	LN66-S	001 032 3730 5	LED	101	UR64PP259	016 840 7312 2	PANEL
D1002, D1003	MA154WK	001 032 3491 1	DIODE	102	UR64CS119C	016 802 2114 0	TOP COVER
D1004, D1005	MA154WK	001 032 3491 1	DIODE	103	UR64SB125	016 861 2468 6	PLATE
D1006, D1007	MA154WA	001 032 3490 2	DIODE	104	UR64BT123A	016 702 6323 4	BUTTON
OSCILLATOR							
X1001	CSB420PB1	001 030 0013 9	420 KHZ	105	UR64CT122	016 653 1011 9	RUBBER, SWITCH
EXCEPT				106	UR64CS120C	016 802 2113 1	BOTTOM COVER
(M, MC)				107	URLJLB126BN	016 862 1069 6	LABEL
X1001	CSB455EB1	001 241 0002 7	455KHZ	(M, MC)			
(M, MC)				107	UR64LB126BP	016 862 1068 7	LABEL
RESISTORS							
R1001	ERDS2TJ1R0	001 152 2419 4	CARBON, 1/4W, 1Ω	EXCEPT			
(M, MC)				(M, MC)	UR64EC121C	016 820 0589 5	BATTERY COVER
CAPACITORS							
C1001	ECKD1H101KB	001 103 1412 0	CERAMIC, 50V, 100PF	108	UR64TD127	003 413 1407 4	TERMINAL ⊕
(M, MC)				109	UR64TD128	003 413 1408 3	TERMINAL ⊖
C1001	ECKD1H471KB	001 103 1551 0	CERAMIC, 50V, 470PF	110	UR64TD101	003 413 1406 5	TERMINAL
SCREWS, WASHERS AND NUTS							
N100	XTS26+12GFZ	005 501 3122 9	SCREW				

# EXPLODED VIEWS

## • Front panel parts



**Note:** When changing mechanism parts, apply the specified grease to the areas marked "XX" shown in the drawing.



1

2

3

4

5

6

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8

9

• Chassis parts

A

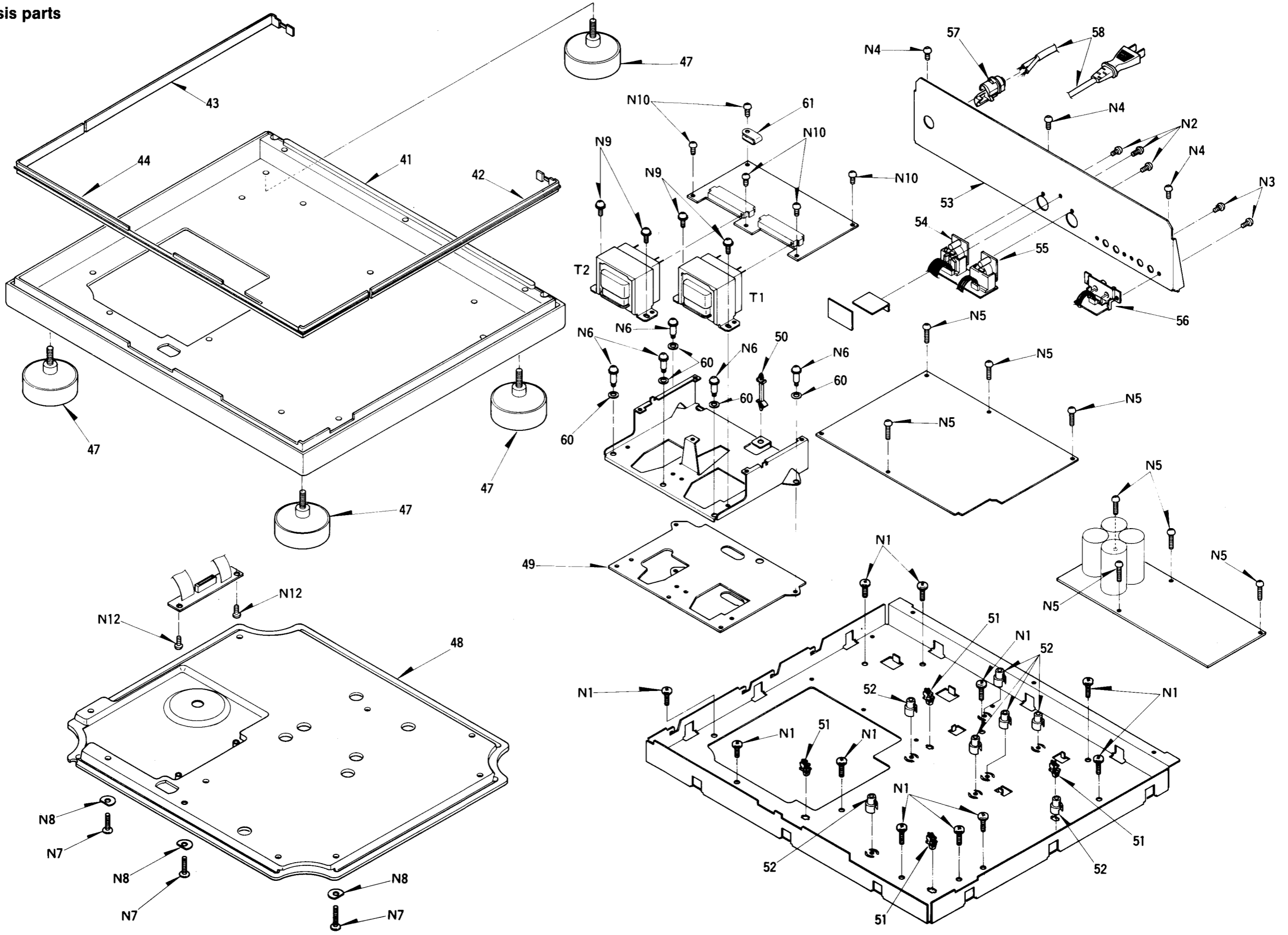
B

C

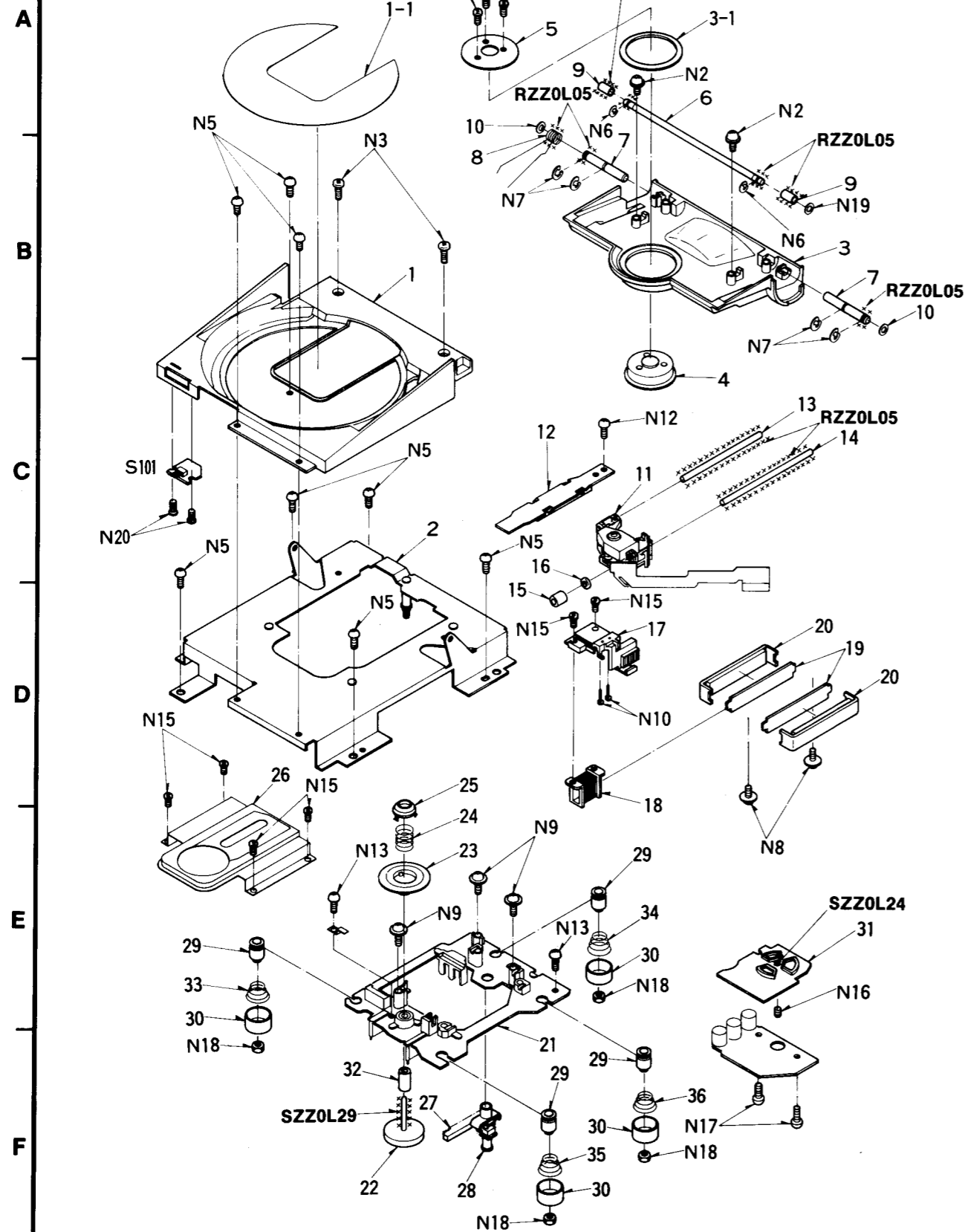
D

E

F

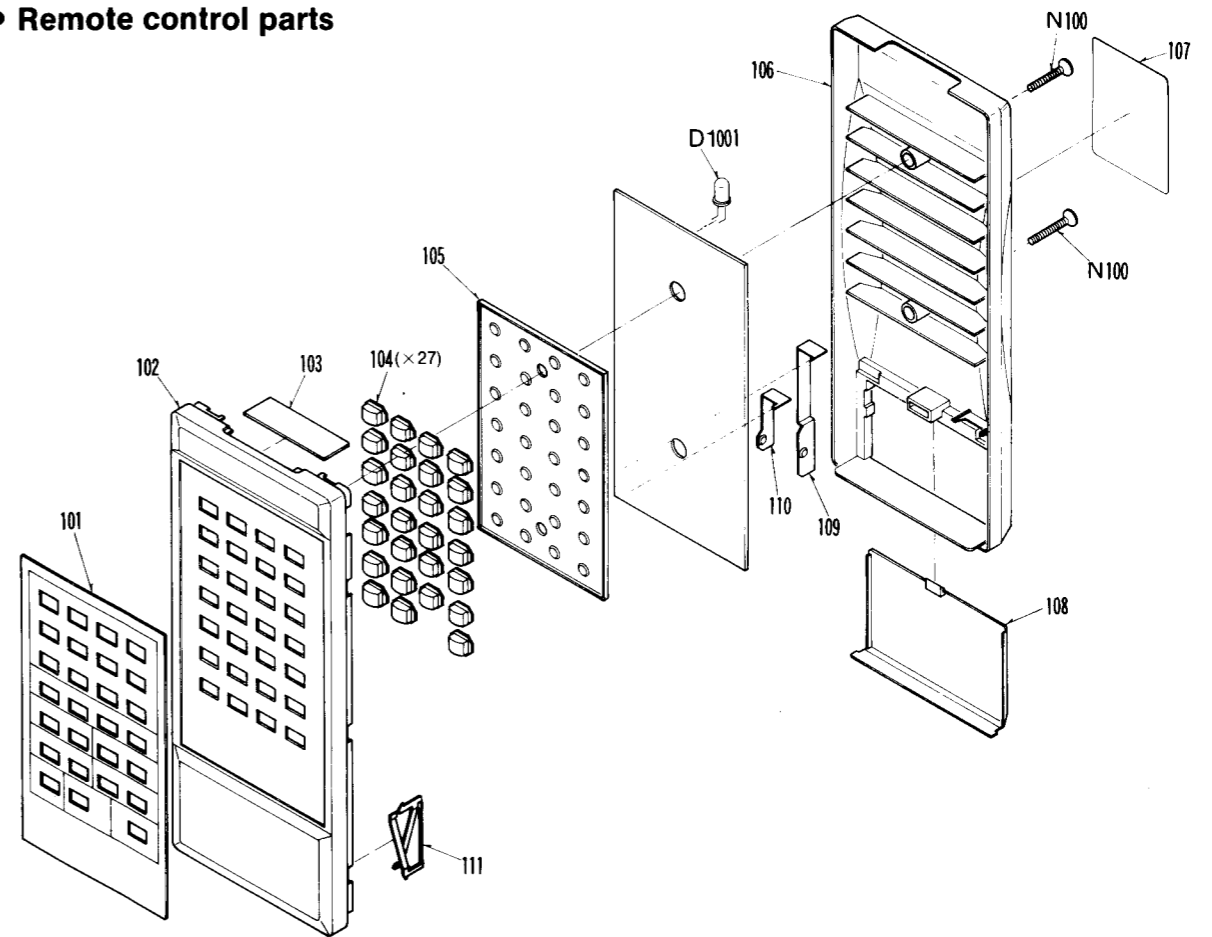


• Traverse deck parts

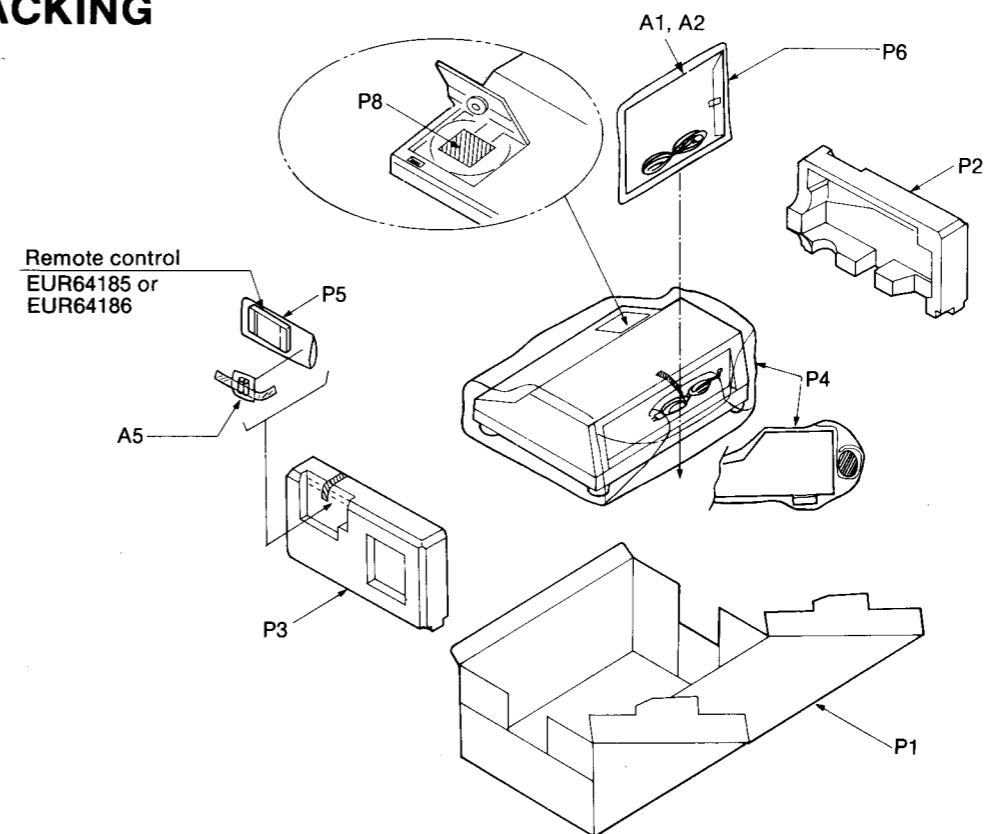


**Note:** When changing mechanism parts, apply the specified grease to the areas marked "XX" shown in the drawing.

• Remote control parts



■ PACKING



## ■ HOW TO REPLACE IC'S (Small outline type)

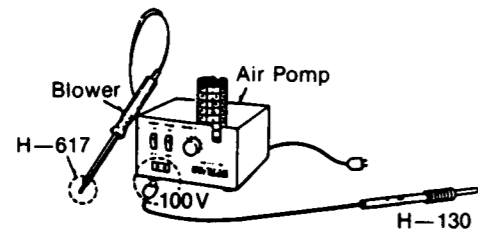
Replacing procedure		Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	<ul style="list-style-type: none"> <li>Recommended tool                             <ul style="list-style-type: none"> <li>.....Special soldering iron                                     <ul style="list-style-type: none"> <li>* H605M and H-130.</li> <li>* H605E and H-130.</li> </ul> </li> </ul> </li> <li>Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil.</li> <li>When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil.</li> <li>When using a pencil type soldering iron.                             <ol style="list-style-type: none"> <li>1. Completely remove the solder from each IC pin by use of solder sucker.</li> <li>2. Raise each pin by means of an eyelet, hold the pliers then remove IC package from P.C.B.</li> </ol> </li> </ul>
2	Melt the solder on the pin (one electrode) with the soldering iron.	
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.	
4	Remove each pin from the foil according to the above-mentioned procedure.	

\* Special soldering iron  
 (Refer to Technical Information, ORDER NO. GAD84125486T1)...For U.S.A. and Canada  
 (Refer to Technical Information, ORDER NO. GAD84115476T8)...For others

### • H-605 Spot Heater (hot-air solder iron)

This device that uses hot air to melt solder was developed to remove Flat-Package ICs, RHCs and chip parts.

- H-605M (For 120V power source)
- H-605E (For 200V/220V/240V power source)



### • H-617 Twin Nozzle (for spot heater)

Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter: 1.0mm x 2)

### • H-130 Slim Pencil Solder Iron

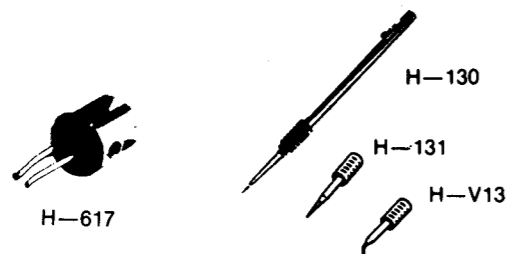
An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs etc., to high-density circuit boards.

- Features:
- Rated power: 100V, 15W
  - Max. temp.: 400°C
  - Heater: ceramic (long life)
  - Insulation resistance: 100MΩ
  - Length: 178mm
  - Weight: 16g (not including cord)

### • H-131, H-V13 Cap Bits

Solder tip for the slim pencil Solder Iron is composed of a bit holder and a corrosion resistance solder tip. Permits changing of solder tips even while still hot.

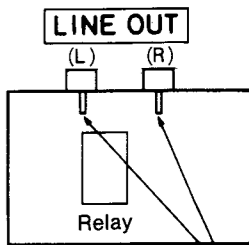
- Solder tip: 0.3mm



## ■ MEASUREMENTS AND ADJUSTMENTS

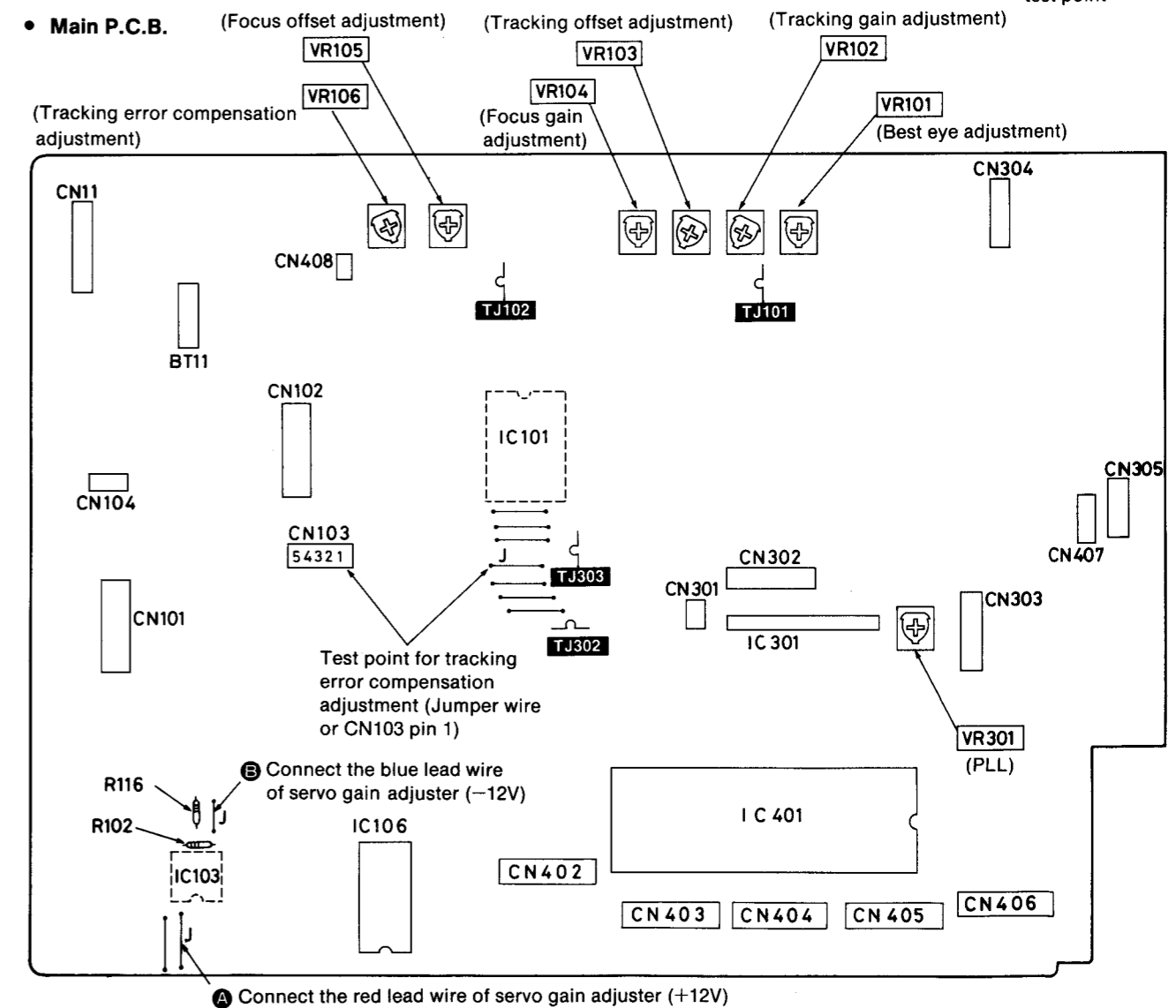
**Caution:**  
 It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.) With the unit turned "on", laser radiation is emitted from the pick-up lens. Be careful during adjustments in particular.

### • Line out P.C.B.

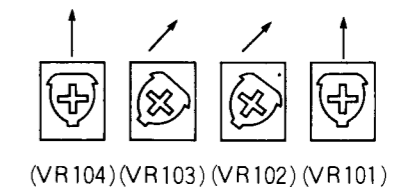
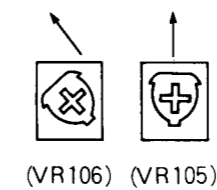


PLL adjustment test point

### ADJUSTMENT POINTS



### TEMPORARY SETTING OF EACH VR



## ELECTRICAL ADJUSTMENT

### Equipment used

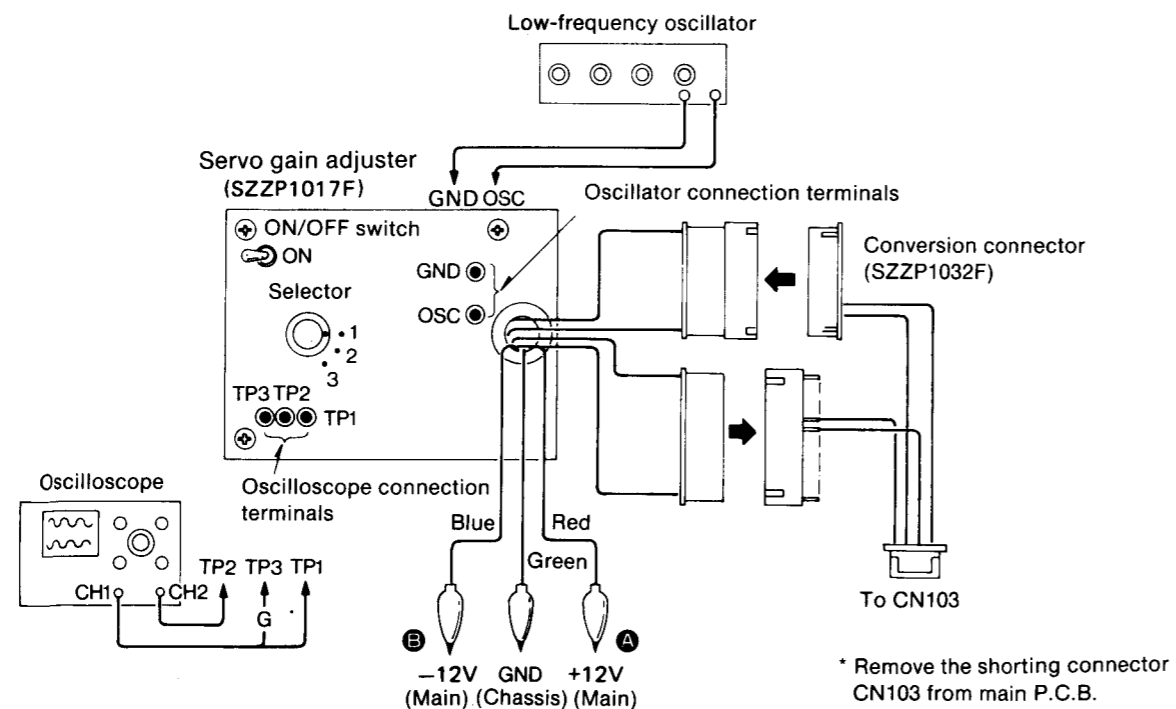
- Servo gain adjuster (SZZP1017F)
- Test discs:
  - Test disc (SZZP1014F)
  - Inspection test disc (SZZP1054C)
  - Uneven disc (SZZP1056C)
  - Black band disc (SZZP1057C)

- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30 MHz or over
- Low-frequency oscillator
- Conversion connector (SZZP1032F)

### Adjustment Procedure

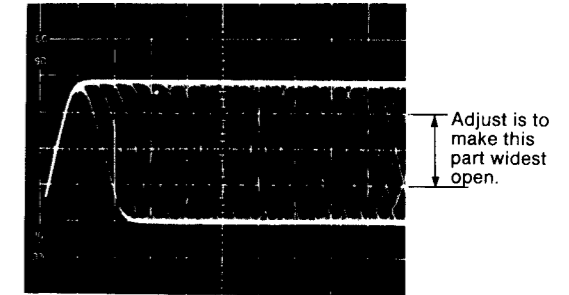
<b>Step 1:</b> Remove the front panel. .... Page 16	<b>Step 7:</b> Temporary adjustment of focus and tracking offset .... Page 37
<b>Step 2:</b> Connect the servo gain adjuster. .... Page 35	<b>Step 8:</b> Focus offset adjustment .... Page 37
<b>Step 3:</b> Temporary setting of each VR. .... Page 34	<b>Step 9:</b> Tracking offset adjustment .... Page 38
<b>Step 4:</b> Best eye (PD balance) adjustment .... Page 36	<b>Step 10:</b> Tracking error compensation adjustment .... Page 38
<b>Step 5:</b> Focus gain adjustment .... Page 36	<b>Step 11:</b> PLL adjustment .... Page 38
<b>Step 6:</b> Tracking gain adjustment .... Page 36	<b>Step 12:</b> Check of play operation after adjustment .... Page 39

### Servo Gain Adjuster and Its Connection



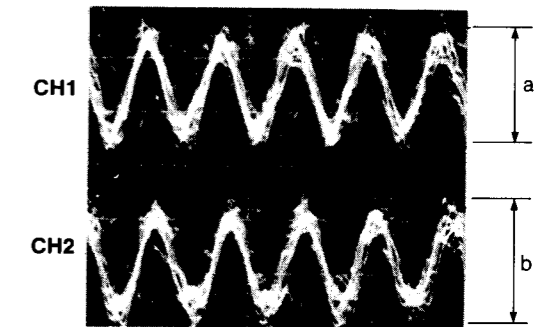
### BEST EYE (PD BALANCE) ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ302**(+) and **TJ303**(-) of the main P.C.B.  
**Oscilloscope setting:** VOLT ..... 500 mV  
 SWEEP ..... 0.5  $\mu$ sec.  
 INPUT ..... AC
2. Turn "on" the power switch and play the **0.5 mm black spot** of the test disc (SZZP1014F or SZZP1054C).
3. Adjust **VR101** so that the eye pattern of the RF signal is widest open.



### FOCUS GAIN ADJUSTMENT

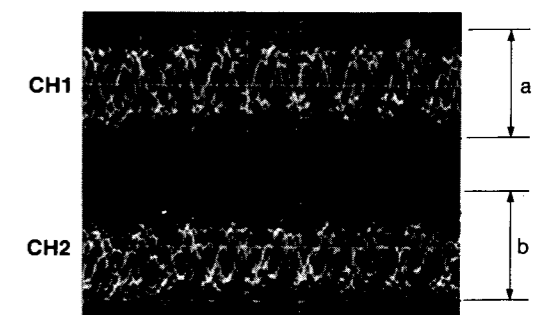
1. Adjust the low-frequency oscillator to **750 Hz** frequency and **150 mVp-p** output voltage, and connect it to **OSC** and **GND** of servo gain adjuster.
2. Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster (**TP3 to ground**).  
**Oscilloscope setting:** VOLT ..... 100 mV  
 (both channels)  
 SWEEP ..... 1 msec.  
 INPUT ..... DC
3. Set the servo gain selector switch to "2". (Set the ON-OFF switch to "on".)
4. Turn "on" the power switch and play the test disc (SZZP1014F or SZZP1054F).
5. With the selector set to "1" a 750 Hz signal appears on the oscilloscope. Then adjust **VR104** so that the waveform amplitudes on both channels are equal to each other.



\* Make a=b

### TRACKING GAIN ADJUSTMENT

1. Adjust the low-frequency oscillator to **1.2 kHz** frequency and **150 mVp-p** output voltage. Connect to **OSC** and **GND** of servo gain adjuster.
2. Connect CH1 and CH2 of the oscilloscope to TP1 and TP2 of the servo gain adjuster (TP3 to ground).  
**Oscilloscope setting:** VOLT ..... 100 mV  
 (both channels)  
 SWEEP ..... 1 msec.  
 INPUT ..... DC
3. Set the servo gain selector switch to "2". (Set the ON-OFF switch to "on".)
4. Turn "on" the power switch and play the test disc (SZZP1014F or SZZP1054C).
5. With the selector set to "3", a 1.2 kHz signal appears on the oscilloscope. Then adjust **VR102** so that the waveform amplitudes on both channels are equal to each other.
6. The servo gain adjuster is not necessary for other adjustments, so discount the adjuster, and **insert the short connector of CN103 to the original position.**



\* Make a=b

### TEMPORARY ADJUSTMENT OF FOCUS AND TRACKING OFFSET

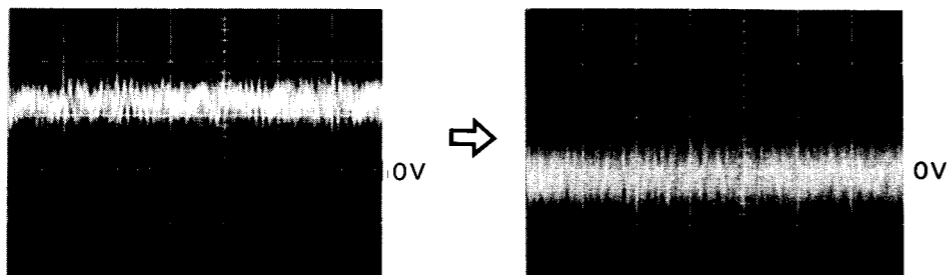
#### (Temporary adjustment of focus offset)

1. Connect CH1 of the oscilloscope to **TJ102** (+) and chassis (-) of the main P.C.B.

#### Oscilloscope setting:

VOLT ..... 100 mV  
SWEEP ..... 5 msec.  
INPUT ..... DC

2. Turn "on" the power switch and play the test disc (SZZP1057C).
3. After reading TOC, set the mode to "stop".
4. Adjust **VR105** so that the DC level shown on the oscilloscope is at the **ground level (0 V)**.



#### (Temporary adjustment of tracking offset)

1. Connect CH1 of the oscilloscope to **TJ101** (+) and chassis (-) of the main P.C.B.

#### Oscilloscope setting:

VOLT ..... 100 mV  
SWEEP ..... 5 msec.  
INPUT ..... DC

2. Turn "on" the power switch and play the test disc (SZZP1057C).
3. After reading TOC, set the mode to "stop".
4. Adjust **VR103** so that the DC level shown on the oscilloscope is at the **ground level (0V)**.

### FOCUS OFFSET ADJUSTMENT

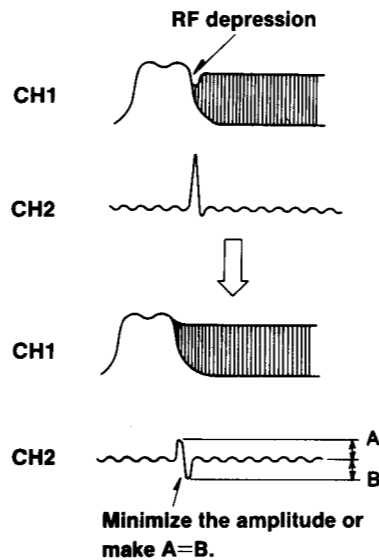
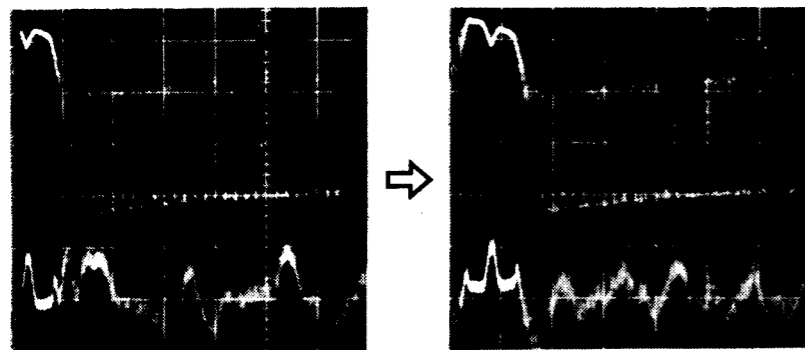
1. Connect CH1 of the oscilloscope to **TJ302** (+) and **TJ303** (-) of the main P.C.B. Connect CH2 to **TJ102** (+) and **TJ303** (-).

Oscilloscope setting: VOLT ..... 500 mV (CH1)  
100 mV (CH2)

SWEEP ..... 0.5 msec.  
INPUT ..... AC (CH1)  
DC (CH2)

MODE ..... NORM (Trigger on CH1)

2. Turn "on" the power and play **Track No. 9** (0.5 mm black spot) of the test disc (SZZP1057C).
3. Trigger so that the waveform as shown appears on the oscilloscope, and adjust **VR105** to minimize the RF depression on CH1 and the wave amplitude on CH2.



### TRACKING OFFSET ADJUSTMENT

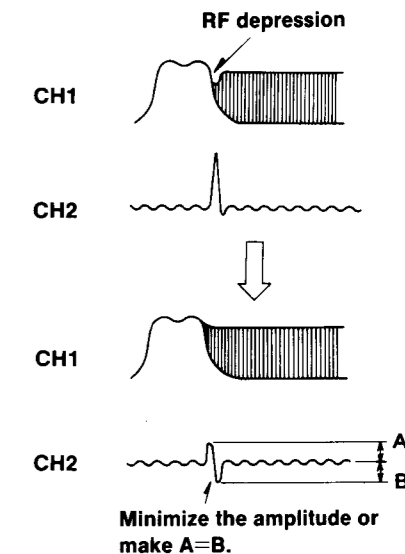
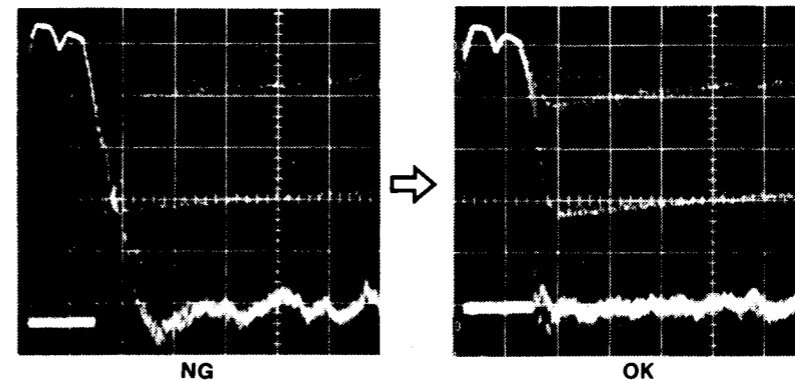
1. Connect CH1 of the oscilloscope to **TJ302** (+) and **TJ303** of the main P.C.B. Connect CH2 to **TJ101** and **TJ303**.

Oscilloscope setting: VOLT ..... 500 mV (CH1)  
100 mV (CH2)

SWEEP ..... 0.5 msec.  
INPUT ..... AC (CH1)  
DC (CH2)

MODE ..... NORM (Trigger on CH1)

2. Turn "on" the power and play **Track No. 9** (0.5 mm black spot) of the test disc (SZZP1057C).
3. Trigger so that the waveform as shown appears on the oscilloscope, and adjust **VR103** to minimize the RF depression on CH1 and the wave amplitude on CH2.



### TRACKING ERROR COMPENSATION ADJUSTMENT

1. Connect CH1 of the oscilloscope to the tracking error compensation test point (+) and chassis (-)

Oscilloscope setting: VOLT ..... 500 mV  
SWEEP ..... 1 msec.  
INPUT ..... DC

2. Turn "on" the power switch and play **Track No. 1** of the test disc (SZZP1014F or SZZP1054C).

3. Check the waveform on the oscilloscope and adjust **VR106** so that the waveform at DC level is  $0 \pm 5$  mV.

### PLL ADJUSTMENT

1. Connect CH1 of the oscilloscope to the **line out terminal** (+) and chassis (-).

Oscilloscope setting: VOLT ..... 1 V  
SWEEP ..... 1 msec.  
INPUT ..... DC

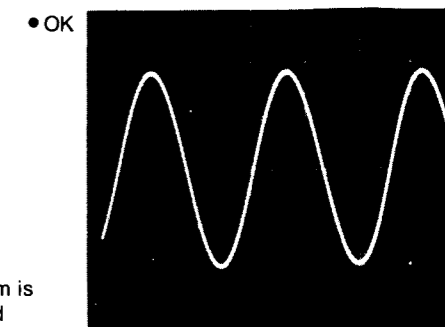
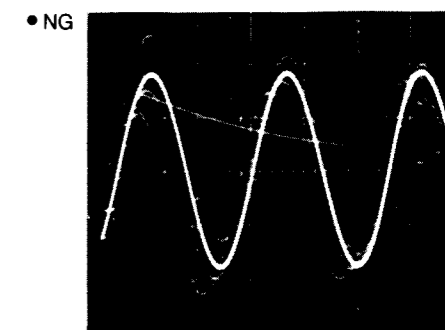
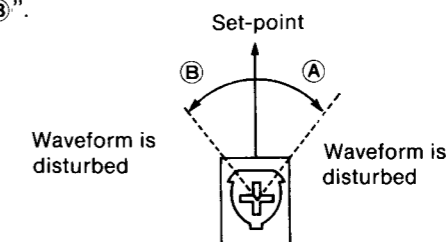
2. Turn "on" the power and play **Track No. 7** (0.5 mm black spot) of the test disc (SZZP1054C).

3. Adjust **VR301** while observing the oscilloscope and set it in the middle of the range where the waveform is stable.

- Ⓐ Slowly turn VR301 clockwise and observe the point at which the waveform on the oscilloscope begins to be disturbed as shown in NG.

- Ⓑ Slowly turn VR301 counterclockwise and observe the point at which the waveform on the oscilloscope begins to be disturbed.

- Ⓒ Set VR301 in the middle between the points observed in above 2 steps "Ⓐ" and "Ⓑ".



### CHECK OF PLAY OPERATION AFTER ADJUSTMENT

#### • Skip search check

1. Play an ordinary disc.
2. Push the skip button to check the skip search (both in forward and reverse modes).

#### • Manual search check

1. Play an ordinary disc.
2. Push the manual search button to check that manual search can be smoothly made at low and high speeds (both in forward and reverse modes).

#### • Check for defects

1. Play black spot portion of the test disc to check that there is no sound skip or noise.
2. Play the fingerprint portion of the test disc to check that there is no sound skip or noise.

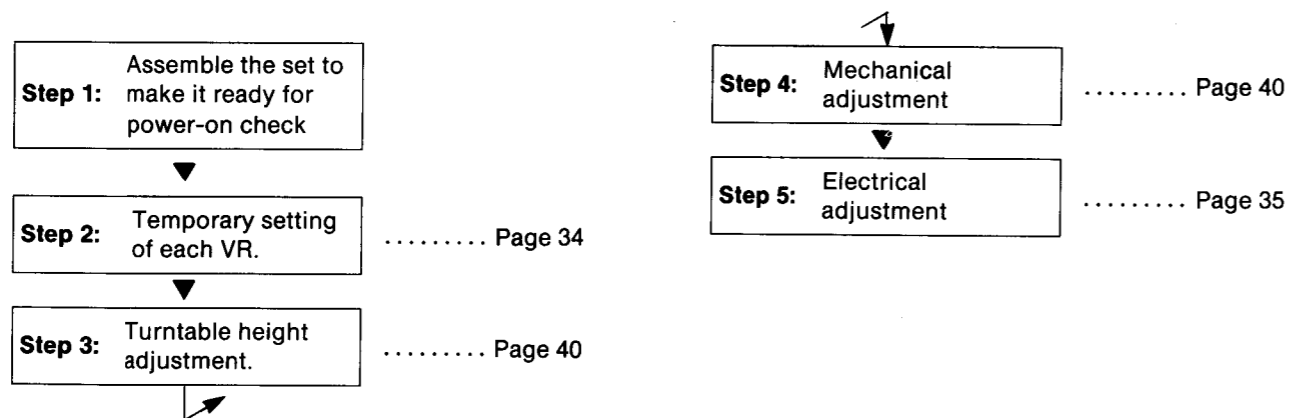
### OPTICAL PICKUP ADJUSTMENT

#### Equipment used

- Two-channel oscilloscope (with trigger) of 30 MHz or over.
- Test disc (SZZP1014F, SZZP1054C, SZZP1056C).
- Hexagonal wrench (SZZP1044C)

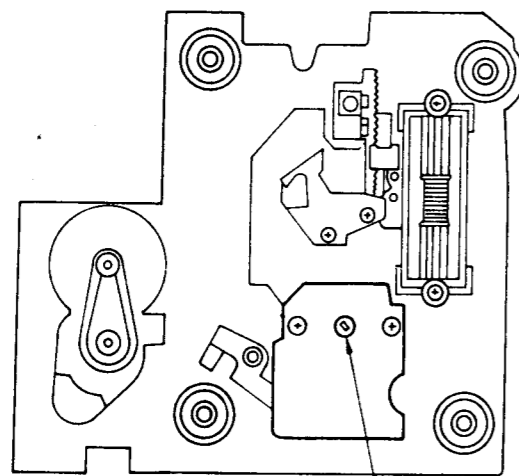
#### Adjustment Procedure

\*If the optical pickup is replaced, adjust it following the procedure below.



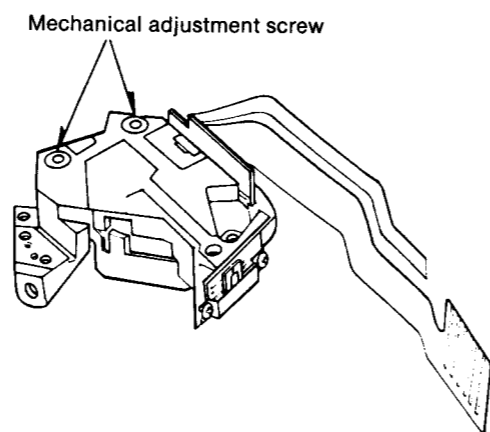
#### Adjustment Points

#### • Traverse unit (rear side)



Turntable height adjustment screw

#### • Optical pickup



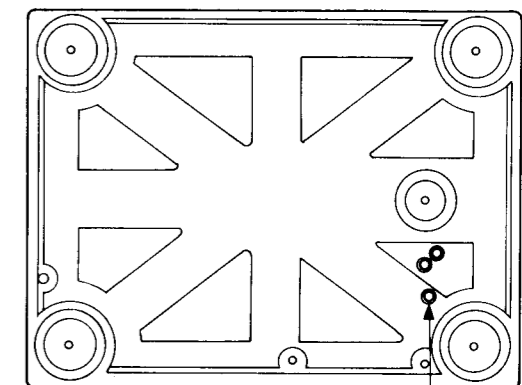
Mechanical adjustment screw

### TURNTABLE HEIGHT ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ102** (+) and chassis (-) of main P.C.B.

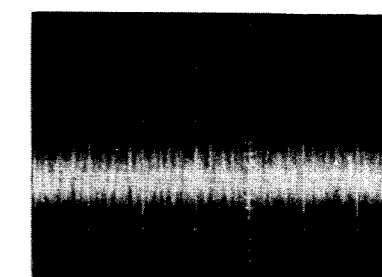
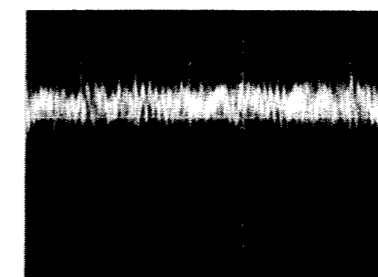
**Oscilloscope setting:** VOLT ..... 100 mV  
SWEEP ..... 5 msec.  
INPUT ..... DC

2. Set the DC ground level of the oscilloscope.
3. Turn "on" the power switch and play the test disc (SZZP1014F or SZZP1054C).
4. Turn the adjusting screw so that the voltage at the waveform center of the oscilloscope is  $0 \pm 50$  mV. (As shown in the figure at right, adjust the screw on the bottom panel using a screwdriver (-).)
5. After the adjustment, apply screw-lock paint (RZZOL01) to the adjusting screw.



Front

Adjusting screw hole

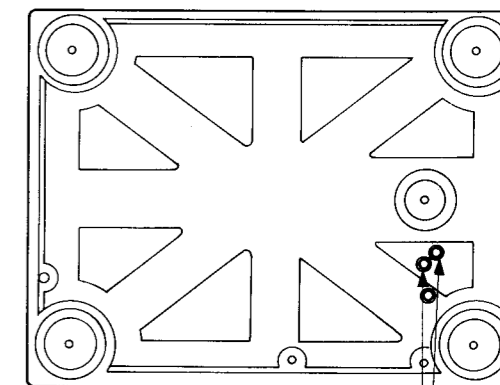


### MECHANICAL ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ302** (+) and **TJ303** (-) of the main P.C.B.

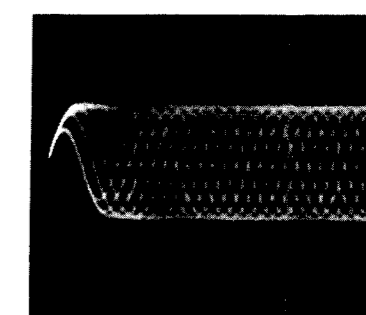
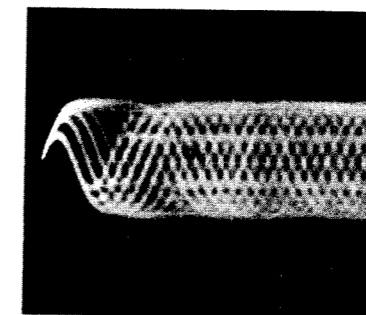
**Oscilloscope setting:** VOLT ..... 500 mV  
SWEEP ..... 0.5  $\mu$ sec.  
INPUT ..... AC

2. Turn "on" the power switch and play **Track No. 9** of the test disc (SZZP1056C). If any track other than No. 9 is played back, this adjustment cannot be made.
3. Alternately turn the 2 optical pickup adjusting screws with the hexagonal wrench (SZZP1044C) so that the vertical fluctuation of RF signal is minimized and the eye pattern most open.
4. After the adjustment, apply screw-lock paint (RZZOL01) to the adjusting screw.



Front

Adjusting screws



## ■ TERMINAL FUNCTION OF LSI

### ● MN6617S (Digital Signal Processing: EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)	34	FCLV	O	Synchronizing detection signal (Not used)
2	CLDCK	O	Sub-code frame (Q data) clock (7.35 kHz)	35	IPSEL	O	Interpolation flag for each byte (Not used)
3	SUBQ	O	Sub-code (Q data) output	36	IPBYTE	I/O	Interpolation prohibited (Not used, connected to GND)
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)	37	FLAG5	O	C2 decoder correction flag 3 (Not used)
5	RST	I	Reset signal input (reset at "L")	38	FLAG4	O	C2 decoder correction flag 2 (Not used)
6	MLD	I	Command load input	39	FLAG3	O	C2 decoder correction flag 1 (Not used)
7	MCLK	I	Command clock input	40	FLAG2	O	C1 decoder correction flag 2 (Not used)
8	MDATA	I	Command data input	41	FLAG1	O	C1 decoder correction flag 1 (Not used)
9	DMUTE	I	Muting control (Not used, connected to GND)	42	FLCK0	O	Crystal frame clock
10	TRON	I	Tracking servo ON signal (tracking servo ON at "L")	43 } 49 } 50 }	D7 } D0 }	I/O	16 K RAM data output
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output	51	RAMOE	O	
12	SMCK	O	Clock output (4.2336 MHz)	52	RAMWE	O	16 K RAM WE signal
13	PMCK	O	Pitch control clock output	53 } 63 }	RAMA 0 } RAMA10 }	O	16 K RAM address signal (RAMA0: LSB, RAMA10: MSB)
14	ITC	I	Track counter input signal	64	PC	O	
15	TEST	I	Test mode selection (Not used, connected to +5V)	65	EC	O	Spindle motor drive signal
16	X2	O	Clock output	66	FG	I	Spindle motor FG signal input (Not used, open)
17	X1	I	Clock input	67	VCNT	—	(Not used, connected to GND)
18	SEL	I	DA output parallel/serial selection (serial at "L")	68	REXT	—	(Not used, connected to GND)
19	LDG/WDC	O	L channel deglitch signal/serial data word clock.	69	VDD	I	Power supply (+5V)
20	RDG	O	Clock signal output for spindle motor control	70	PD	—	(Not used, open)
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")	71	PCKO	—	(Not used, open)
22	IPFLAG	O	Interpolation flag (interpolation at "H")	72	PCK	I	PLL extract clock input
23	FLAG0	O	Error flag (error at "H")	73	VDD	I	Power supply (connected to +5V)
24	FLAG6	O	16 K RAM address reset signal (reset at "H")	74	EFM	I	EFM signal input (PLL)
25	XCK	O	Clock (16.9344 MHz) output	75	SRF	I	EFM signal input (DSL)
26	SRDATA	O	Serial data output (MSB first)	76	DO	I	Drop-out signal (Drop-out at "H")
27	SRDATA	O	Serial data output (LSB first)	77	CLVS	O	11T servo OK signal (OK at "H")
28	SRCK	O	Serial data beat clock.	78	FPC	O	PLL frequency comparison signal
29	WDCK	O	Serial data word clock (Not used)	79	BSSEL	O	PLL frequency in take operation signal.
30	BYTCK	O	Serial data byte clock (Not used)	80	SRFO	—	(Not used, open)
31	GND	I	GND terminal	81	NSRF	—	(Not used, open)
32	R/L	O	R/L signal	82	RF	—	(Not used, open)
33	RESY	O	Resynchronizing signal	83	SUBC	O	Sub-code serial output data
				84	SBCK	I	Clock for sub-code serial output

### ● MN6618A (Digital Filter)

Pin No.	Mark	I/O Device	Function	Pin No.	Mark	I/O Device	Function
1	NC	—	Not connected	22	NC	—	Not connected
2	D012	O	16-bit data output (Not used, open)	23	MCLK	I	Command clock input
3	D011	O	16-bit data output (Not used, open)	24	MLD	I	Command load input
4	D010	O	16-bit data output (Not used, open)	25	NC	—	Not connected
5	GND	I	GND terminal	26	RST	I	Reset signal input (reset at "L")
6	D09	O	16-bit data output (Not used, open)	27	NC	—	Not connected
7	NC	—	Not connected	28	LRCK	I	L/R channel changeover signal
8	D08	O	16-bit data output (Not used, open)	29	NC	—	Not connected
9	D07	O	16-bit data output (Not used, open)	30	SFT	I	Serial data input clock
10	NC	—	Not connected	31	SIN	I	Serial data input
11	NC	—	Not connected	32	NC	—	Not connected
12	D06	O	16-bit data output (Not used, open)	33	X OUT	O	Clock output (Not used)
13	D05	O	16-bit data output (Not used, open)	34	X IN	I	Clock input (16.9344 MHz)
14	D04	O	16-bit data output (Not used, open)	35	OSEL	I	DA output parallel/serial changeover (Serial at "H")
15	LRCK	O	Clock output	36	LDGL	O	L channel deglitch signal
16	NC	—	Not connected	37	RDGL	O	R channel deglitch signal
17	NC	—	Not connected	38	VDD	I	Power supply (connected to +5V)
18	D02/ WDCK	O	16-bit data output/clock output (Not used, open)	39	D015	O	16-bit data output (MSB) (Not used, open)
19	D01/ SRCK	O	16-bit data output/serial data output beat clock	40	D014	O	16-bit data output (Not used, open)
20	D00/SRDATA	O	16-bit data output/serial data output	41	NC	—	Not connected
21	MDATA	I	Command data input	42	D013	O	16-bit data output (Not used, open)

### ● AN8290S (Spindle Motor Drive)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	GND	I	Minimum potential of IC control. (In this unit, it is connected to VEE [-8.0V])	13	NC	I	Not used in this unit.
2	DCR	I	Standard voltage of FAI, PC, CLK. (In this unit, it is connected to 2.5V.)	14	NC	I	
3	FAI	I	Torque command filter amp. input. (Normal rotation command when FAI < DCR.)	15	H2-	I	Negative output of Hall element is input.
4	FAO	O	Filter amp. output.	16	H2+	I	Positive output of Hall element is input.
5	DI	I	Absolute value circuit input.	17	H1-	I	Negative output of Hall element is input.
6	LPF	I	Capacitor terminal for low pass filter of current feedback loop.	18	H1+	I	Positive output of Hall element is input.
7	A1	O	Drive signal output.	19	HSW	I	Bias switch of Hall element. (OFF when PC > DCR)
8	A2	O					
9	A3	O					
10	PGND	I	Minimum potential of IC power. (In this unit, it is connected to VEE [-8.0V])	20	HB	I	Bias power of Hall element.
11	CS	I	Drive current detection resistor terminal.	21	VCC	I	Power Input for IC control.
12	PVCC	I	Power Input for IC power.	22	PC	I	Power control. (Power down mode when PC > DCR)
				23	CLK	I	Clock input. (DCR standard, operated at the edge of rise.)
				24	TC	I	Triangular wave generation capacitor terminal.

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to -5V)	23	CNT2	I	Control input (TRON : Tracking servo ON signal)
2	LSA	I	Phase difference input (A)	24	CNT3	I	Control input (KICKF : Kick direction [forward] command)
3	GND	I	GND terminal	25	CNT4	I	Control input (KICKR : Kick direction [reverse] command)
4	LSB	I	Phase difference input (B)	26	F-LOCK	O	Focus lock signal output
5	APC	O	Auto laser power control output	27	C-FBDO	O	Capacitor connection for inversion RF high speed detection
6	TEOUT	O	Tracking error signal output	28	C-SBDO	O	Capacitor connection for inversion RF low speed detection
7	TEG	I	Tracking error gain adjusting input	29	C-SBRT	O	Capacitor connection for non-inversion RF low speed detection
8	TE	I	Phase difference-voltage conversion	30	C-FBRT	O	Capacitor connection for non-inversion RF high speed detection
9	TE	I	Phase difference-voltage conversion	31	RF OUT	O	RF signal output
10	APC -	O	Laser power inversion input	32	BDO	O	Drop-out detection output
11	C-MEM	I	Capacitor connection for phase difference memory	33	RFIN	I	RF signal input
12	APC +	I	Laser power non-inversion input	34	S-OUT	O	Focus search signal output
13	VREF	O	Reference current generation	35	C-LW	I	Capacitor connection for triangular wave generation
14	SENSE	O	Selector output (track-crossed)	36	FE-OUT	O	Focus error signal output
15	HIN	I	Tracking hold circuit input	37	FEG	I	Focus error gain adjusting input
16	HOUT	O	Tracking hold circuit output	38	FE-REF	I	Focus error comparison voltage generation
17	SPCNT	O	Track-cross speed control output	39	PDB	I	Photo detector current input (B)
18	C-MSP	I	Track-cross reference speed setting capacitor connection	40	IVB	O	Current/voltage conversion output (B)
19	C-AF	I	Auto focus timer capacitor connection	41	IVA	O	Current/voltage conversion output (A)
20	KICK R/F	O	Track kick signal output	42	PDA	I	Photo detector current input (A)
21	VCC	I	Power supply (connected to +5V)				
22	CNT1	I	Control input (FOON : Focus servo ON signal)				

• MN15261PDK (System Control and FL Drive)

Pin No.	Mark	Signal	I/O Devision	Function	Pin No.	Mark	Signal	I/O Devision	Function
1	VSS	GND	I	GND terminal	26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
2	XO	—	O	Not used (Open)	27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
3	X1	SENSE	I	Optical servo condition input	28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
4	P00	AS.LED	O	Auto space LED drive	29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
5	P01	M DATA	O	Command data output	30	P41	COMP	O	TOC read control (ON at "L")
6	P02	MCLK	O	Command clock output	31	P42	FLOCK	I	Optical servo condition (focus) input
7	P03	MLD	O	Command load output	32	P43	SENSE	I	Optical servo condition (track cross) input
8	P10	φ0	I	Search dial control	33	PE0	M.RLY	O	Muting control
9	P11	φ1	I	Search dial control	34	PE1	FRST	O	Auto cue control
10	P12	FADER.S	I	Fader start signal input	35	P60	PLAY	O	Play LED drive
11	P13	CUEDET	I	Auto cue ON signal input	36	P61	PAUSE	O	Pause LED drive
12	SYNC	—	O	Not used (Open)	37	DAC	DAC	O	Traverse servo control
13	RST	RESET	I	Reset signal input (reset at "L")	38	VPP	—	I	FL drive power supply (connected to -33V)
14	IRQ	BLKCK	I	Sub-code block (Q data) clock (75Hz) input	39 } 52 } DD	—	O	FL grid signal and key scan signal	
15 } 18 } P50 } P53 } KEY	KEY	I	Key scan input	53 } 61 } S8 } S0	—	O	FL anode signal		
19 } 20 } SBT } CLDCK	CLDCK	I	Sub-code frame clock (7.35kHz)	62	OSC2	—	I	Clock terminal	
20 } 21 } SBD } SUBQ	SUBQ	I	Sub-code Q data input	63	OSC1	—	I	Clock input	
21 } 22 } P20 } SEEK	SEEK	O	Traverse servo control	64	VDD	—	I	Power supply (connected to +5V)	
22 } 23 } P21 } PLC	PLC	O	Plunger drive						
23 } 24 } P22 } REV	REV	O	Traverse reverse command signal						
24 } 25 } P23 } FWD	FWD	O	Traverse forward command signal						
25 } P30 } CNT4	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)						

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted from SRF	9	VA	I	VCO free ran frequency adjusting current input.
2	EFM	O	EFM signal output synchronized with PCK	10	VR	I	Resistor connection for VCO oscillation frequency
3	D-GND	I	GND terminal (digital system)	11	VEE	I	Power supply (connected to -5V)
4	SRF	O	RF signal output data-sliced into digital value	12	VC1	I	Capacitor connection for VCO oscillator frequency
5	SLC	I	Slice level control signal input	13	VC2	I	Capacitor connection for VCO oscillator frequency
6	DO	O	Drop-out detection pulse output	14	A-GND	I	GND terminal (analog system)
7	FPC	I	Frequency comparison error signal input.	15	RF	I	RF signal input
8	VCC	I	Power supply (connected to +5V)				

• MN1550PDM (Remote Control Signal Processing)

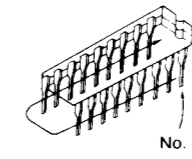
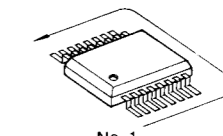
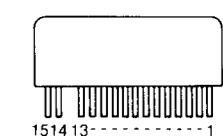
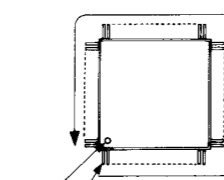
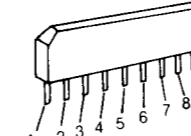
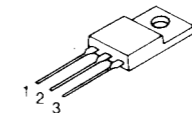
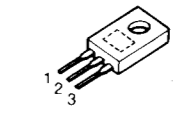
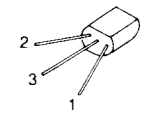
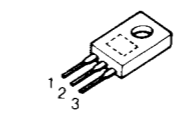
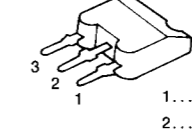
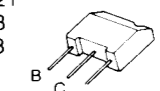
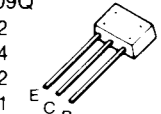
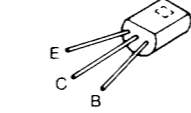
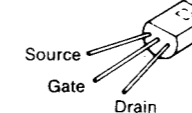
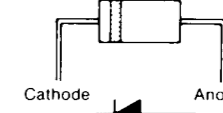
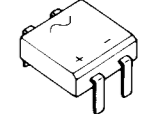
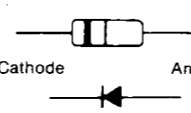
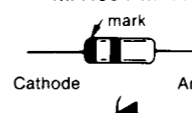
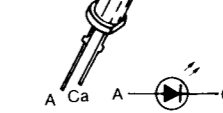
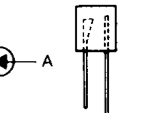
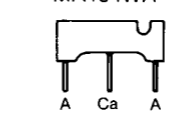
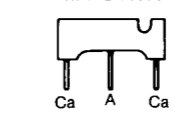
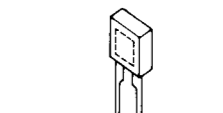
Pin No.	Mark	Signal	I/O Devision	Function	Pin No.	Mark	Signal	I/O Devision	Function
1	VDD	—	I	Power supply (connected to +5V)	9	P31	—	O	Remote control LED drive
2	OSC1	SMCK	I	Clock input	10 } 13 } P0	Data	I	Key strobe	
3	OSC2	—	—	Not used, open	14 } 17 } P03 } P00	Data	I		
4	P22	—	—	Not used, open	18	VSS	GND		I
5	RST	RESET	I	Reset signal input					
6	P21	—	—	Not used, open					
7	P20	—	I	Remote control signal input					
8	IRQ	—	I	Program enable/de-enable control					



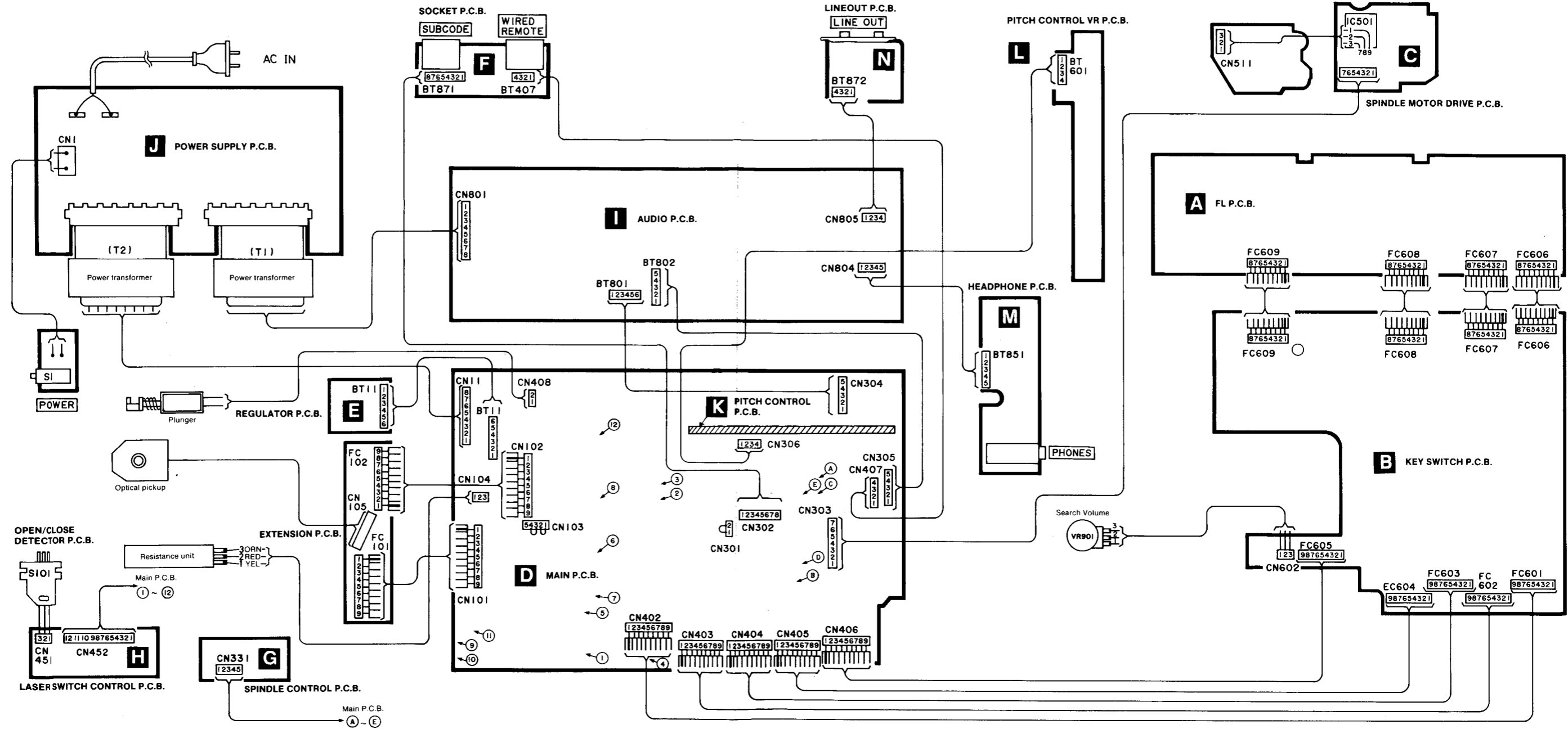
● MN51005PDN (Digital Signal Processing, Serial/Parallel Converter)

Pin No.	Mark	Signal	I/O Devision	Function	Pin No.	Mark	Signal	I/O Devision	Function
1 } 6	B1L } B6L	DATA	O	L-channel parallel data output	41	NC	—	—	Not connected
7	NC	—	—	Not connected	42	NC	—	—	Not connected
8	VDD	—	I	Power supply (+5V)	43	B12R	DATA	O	R-channel parallel data output
9	VSS	GND	I	GND terminal	44 }	NC	—	—	Not connected
10	NC	—	—	Not connected	46	NC	—	—	Not connected
11					47	B13R	DATA	O	R-channel parallel data output
12 } 16	B7L } B11L	DATA	O	L-channel parallel data output	48	B14R			
17	NC	—	—	Not connected	49	NC	—	—	Not connected
18	NC	—	—	Not connected	50	B15R	DATA	O	R-channel parallel data output
19 } 22	B12L } B15L	DATA	O	L-channel parallel data output	51	B16R			
23	NC	—	—	Not connected	52	DEG	—	O	Degitch signal output
24	VSS	GND	I	GND terminal	53	AQOUT	—	O	Auto cue control
25	VDD	—	I	Power supply (+5V)	54	AQRST	—	I	
26	B16L	DATA	O	L-channel parallel data output	55	NC	—	—	Not connected
27 } 37	B1R } B11R	DATA	O	R-channel parallel data output	56	VDD	—	I	Power supply (+5V)
38	NC	—	—	Not connected	57	VSS	GND	I	GND terminal
39	VDD	—	I	Power supply (+5V)	58	PHASE	—	I	Phase change control
40	VSS	GND	I	GND terminal	59	NC	—	—	Not connected
					60				
					61	SRDATA	DATA	I	Serial data input
					62	SRCLK	CLOCK	I	Serial data input clock
					63	LRCK	CLOCK	I	16-bit latch clock
					64	RDG	CLOCK	I	8-bit shift register clock

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

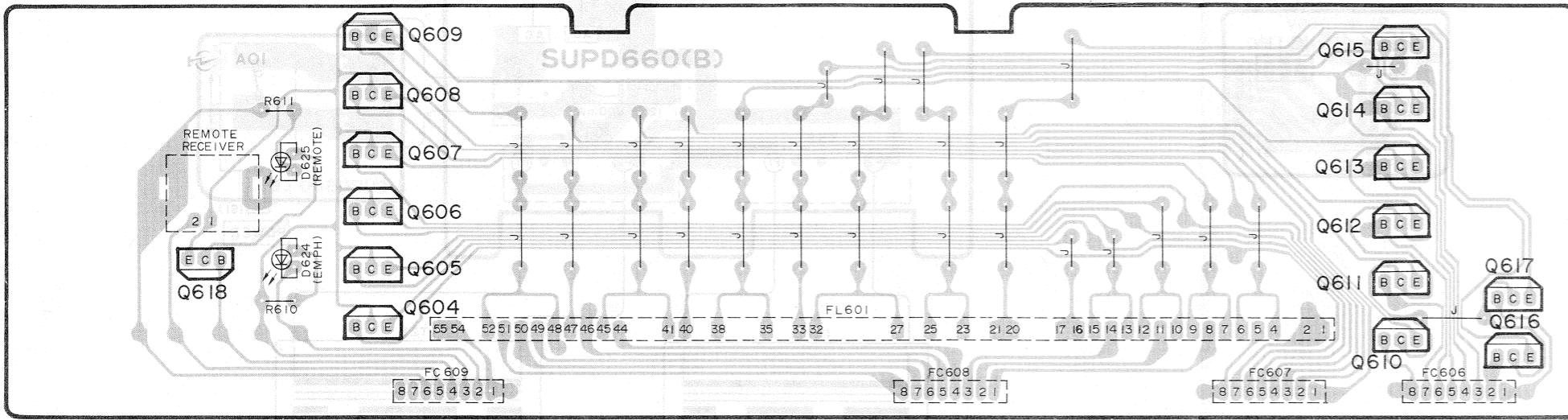
<table border="1"> <tr><td>AN6914</td><td rowspan="5">8 pin</td></tr> <tr><td>SVIM5238P</td></tr> <tr><td>NJM5532DD</td></tr> <tr><td>SVIUPD4053BC</td><td>16 pin</td></tr> <tr><td>SVIPCM54KP-M</td><td>28 pin</td></tr> <tr><td>MN15261PDK</td><td>64 pin</td></tr> </table>  <p>No. 1</p>	AN6914	8 pin	SVIM5238P	NJM5532DD	SVIUPD4053BC	16 pin	SVIPCM54KP-M	28 pin	MN15261PDK	64 pin	<table border="1"> <tr><td>AN6552S</td><td rowspan="2">8 pin</td></tr> <tr><td>AN6914S</td></tr> <tr><td>AN6554NS</td><td rowspan="3">14 pin</td></tr> <tr><td>MN74HCU04S</td></tr> <tr><td>MN74HC74S</td></tr> <tr><td>MN74HC00S</td><td rowspan="2">18 pin</td></tr> <tr><td>MN1550PDM</td></tr> <tr><td>MN4416S-12</td><td>24 pin</td></tr> <tr><td>AN8290S</td><td rowspan="2">42 pin</td></tr> <tr><td>AN8370S</td></tr> </table>  <p>No. 1</p>	AN6552S	8 pin	AN6914S	AN6554NS	14 pin	MN74HCU04S	MN74HC74S	MN74HC00S	18 pin	MN1550PDM	MN4416S-12	24 pin	AN8290S	42 pin	AN8370S	<p>EHDGA1243</p>  <p>15 14 13-----1</p>
AN6914	8 pin																										
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AN8370S																											
<table border="1"> <tr><td>MN6618A</td><td>42 pin</td></tr> <tr><td>MN51005PDN</td><td>64 pin</td></tr> <tr><td>MN6617S</td><td>84 pin</td></tr> </table>  <p>Mark No. 1</p>	MN6618A	42 pin	MN51005PDN	64 pin	MN6617S	84 pin	<table border="1"> <tr><td>SVINJM4556SA</td></tr> </table> 	SVINJM4556SA	<table border="1"> <tr><td>AN78M05</td></tr> <tr><td>AN78M15</td></tr> <tr><td>AN78M12</td></tr> </table> 	AN78M05	AN78M15	AN78M12	<table border="1"> <tr><td>AN79N05</td></tr> <tr><td>AN79N12</td></tr> <tr><td>AN79N15</td></tr> </table> 	AN79N05	AN79N12	AN79N15	<p>AN79L12</p> 										
MN6618A	42 pin																										
MN51005PDN	64 pin																										
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AN79N15																											
<table border="1"> <tr><td>AN78N12</td></tr> <tr><td>AN78N15</td></tr> </table> 	AN78N12	AN78N15	<p>MN1280-R</p>  <p>1...VSS 2...VDD 3...OUT</p>	<table border="1"> <tr><td>2SD1055</td></tr> <tr><td>2SB822</td></tr> <tr><td>2SD638</td></tr> <tr><td>2SC2021</td></tr> <tr><td>2SD973</td></tr> <tr><td>2SB793</td></tr> </table>  <p>B C E</p>	2SD1055	2SB822	2SD638	2SC2021	2SD973	2SB793	<table border="1"> <tr><td>UN4114</td></tr> <tr><td>2SC3311Q</td></tr> <tr><td>2SA1309Q</td></tr> <tr><td>UN4212</td></tr> <tr><td>UN4214</td></tr> <tr><td>UN4112</td></tr> <tr><td>UN1231</td></tr> </table>  <p>E C B</p>	UN4114	2SC3311Q	2SA1309Q	UN4212	UN4214	UN4112	UN1231									
AN78N12																											
AN78N15																											
2SD1055																											
2SB822																											
2SD638																											
2SC2021																											
2SD973																											
2SB793																											
UN4114																											
2SC3311Q																											
2SA1309Q																											
UN4212																											
UN4214																											
UN4112																											
UN1231																											
<p>2SD892</p>  <p>E C B</p>	<p>2SK301</p>  <p>Source Gate Drain</p>	<p>SVD1SR35200A</p>  <p>Cathode Anode</p>	<p>SVDS1WB40</p> <p>SVDS1WBAK20</p> 																								
<p>MA165</p>  <p>Cathode Anode</p>	<table border="1"> <tr><td>MA4082M</td></tr> <tr><td>MA4330L</td></tr> <tr><td>MA4054-MTA</td></tr> </table>  <p>mark Cathode Anode</p>	MA4082M	MA4330L	MA4054-MTA	<p>LN66-S</p>  <p>A Ca A Ca</p>	<table border="1"> <tr><td>SVGLB74VR3HL</td></tr> <tr><td>SVGLB74MG3HL</td></tr> <tr><td>SVGLB74DU3HL</td></tr> </table>  <p>Ca A Ca A</p>	SVGLB74VR3HL	SVGLB74MG3HL	SVGLB74DU3HL																		
MA4082M																											
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<p>MA154WA</p>  <p>A Ca A Ca</p>	<p>MA154WK</p>  <p>Ca A Ca A</p>	<p>SVDKV1230Z23</p>  <p>A Ca A Ca</p>																									

# PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

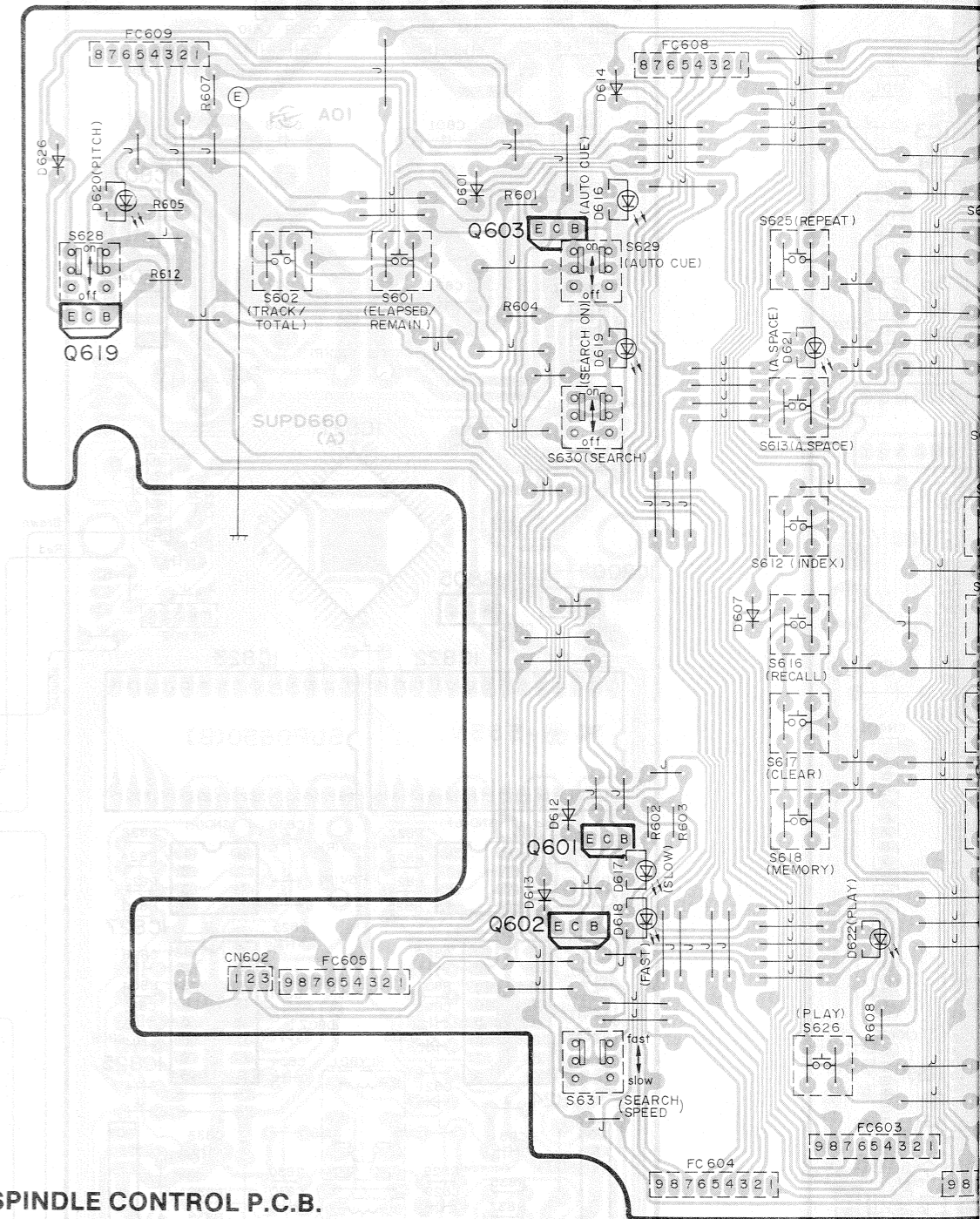


# PRINTED CIRCUIT BOARDS

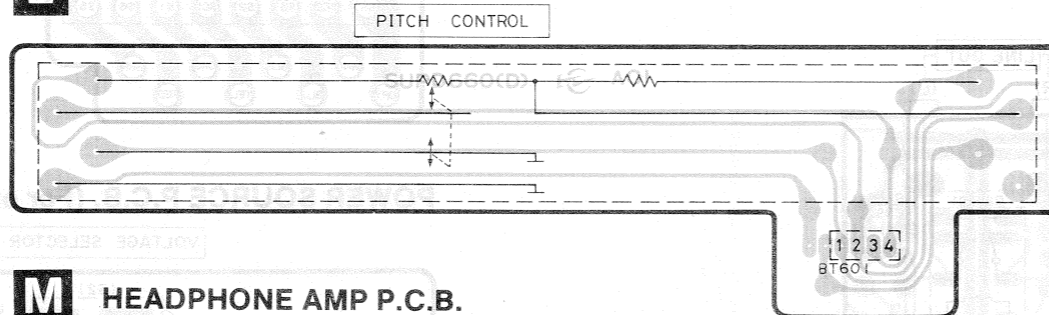
**A** FL P.C.B.



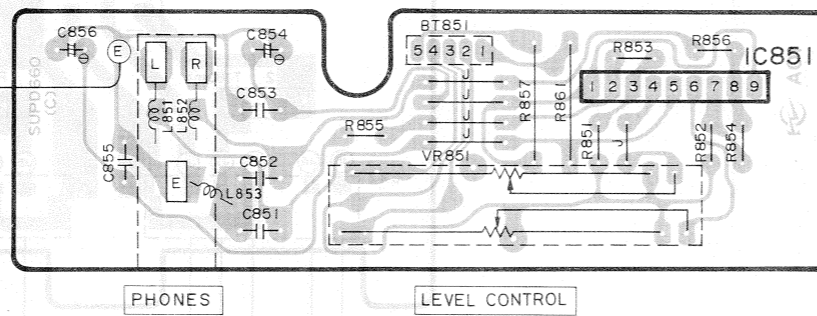
**B** OPERATION P.C.B.



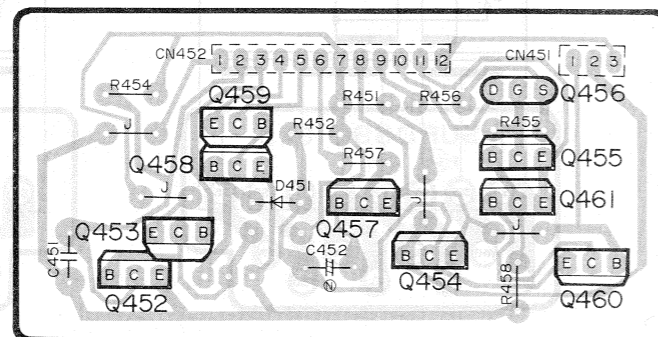
**L** PITCH VR P.C.B.



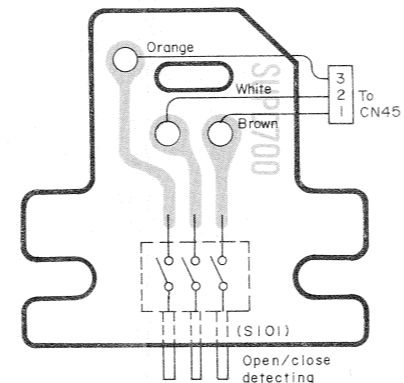
**M** HEADPHONE AMP P.C.B.



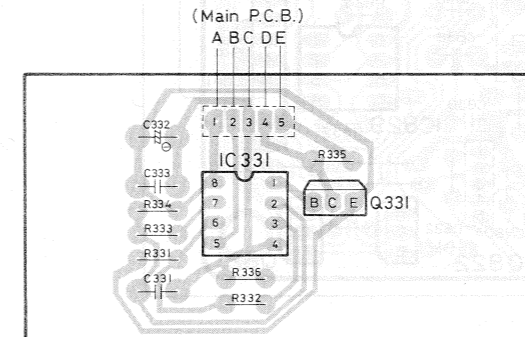
**H** LASER SWITCH CONTROL P.C.B.



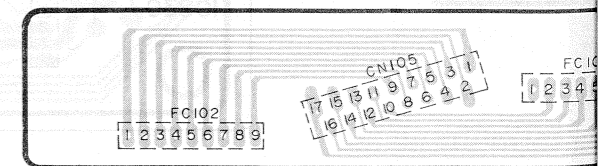
**G** Laser switch P.C.B.



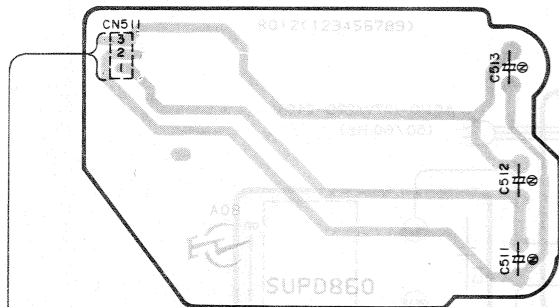
**G** SPINDLE CONTROL P.C.B.



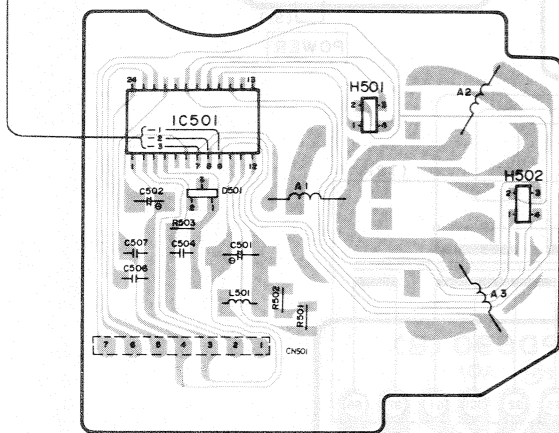
**Extension P.C.B.**

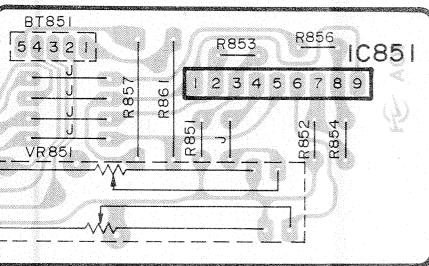
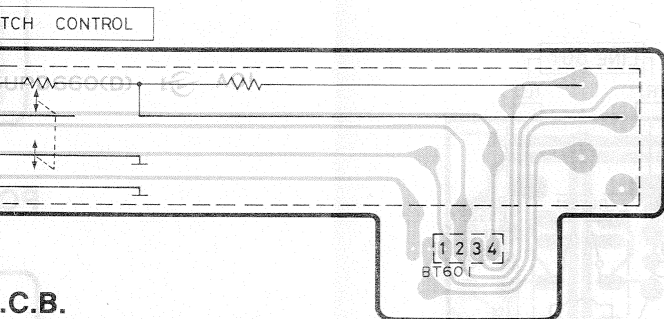
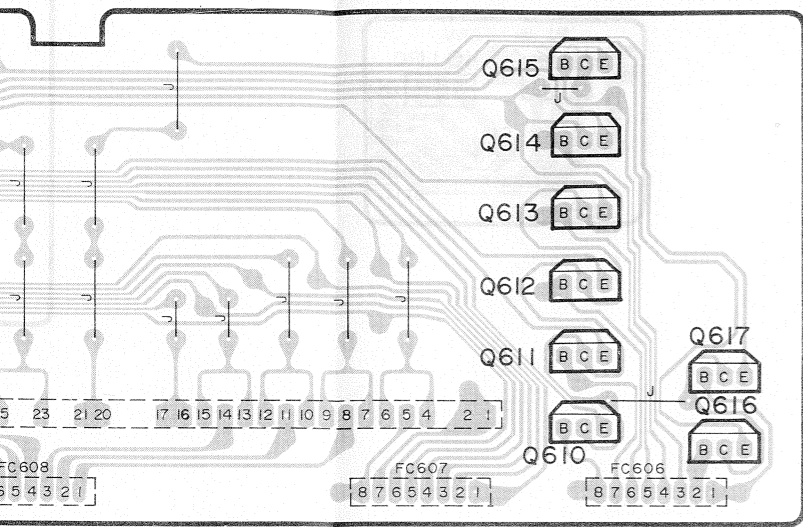


• Spindle sub P.C.B.



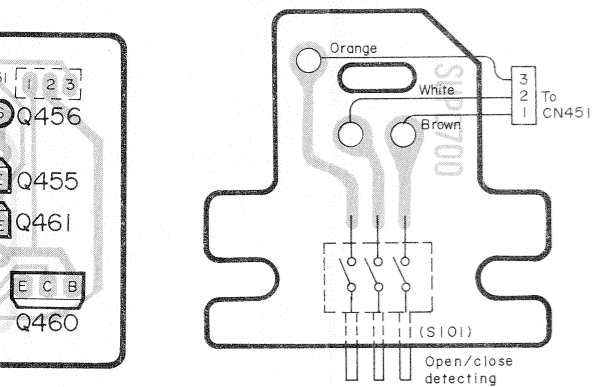
**C** SPINDLE MOTOR DRIVE P.C.B.



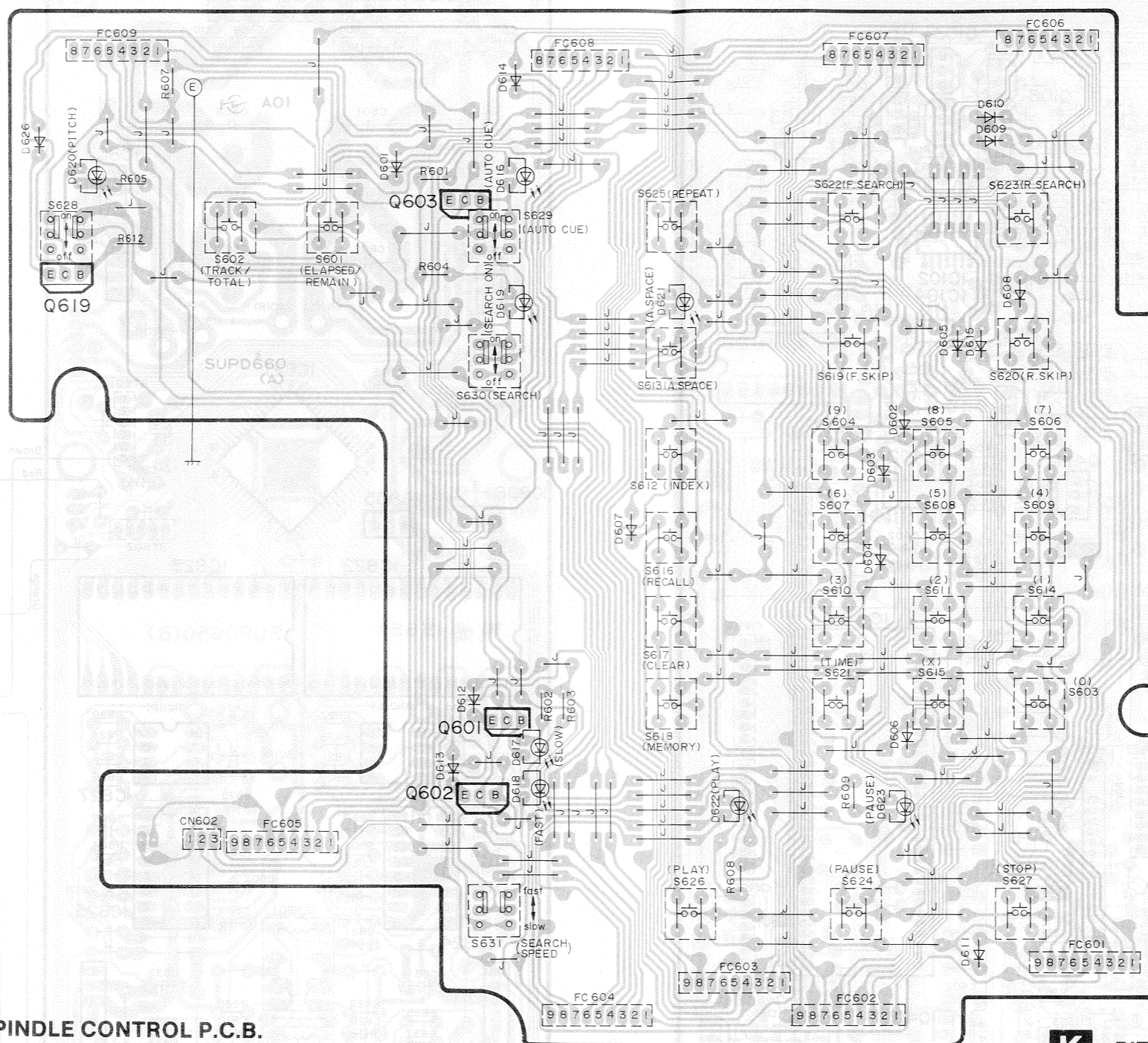


LEVEL CONTROL

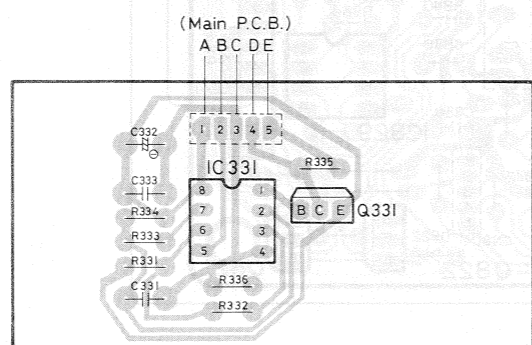
• Laser switch P.C.B.



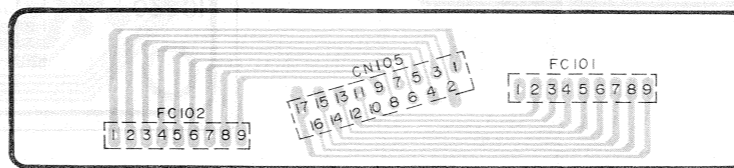
**B** OPERATION P.C.B.



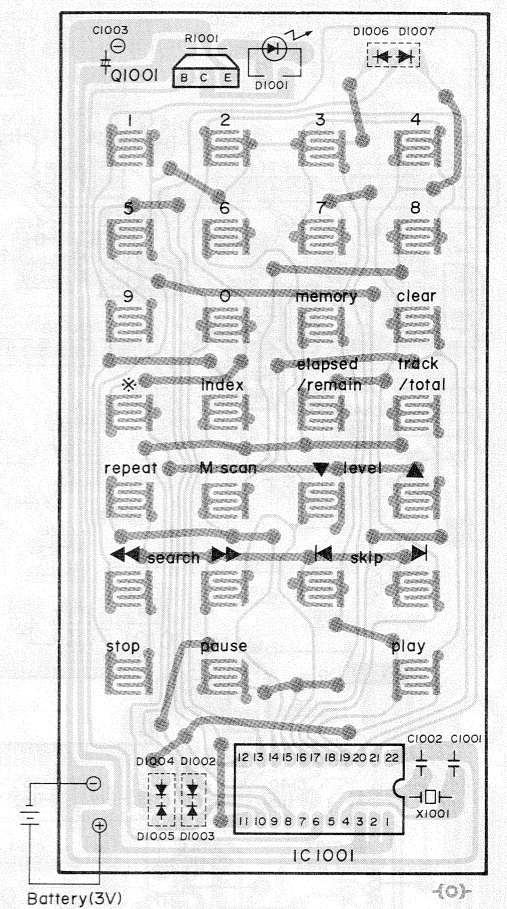
**G** SPINDLE CONTROL P.C.B.



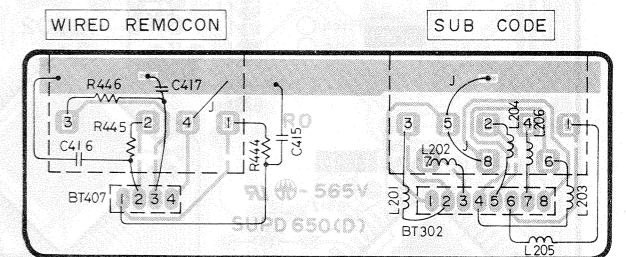
• Extension P.C.B.



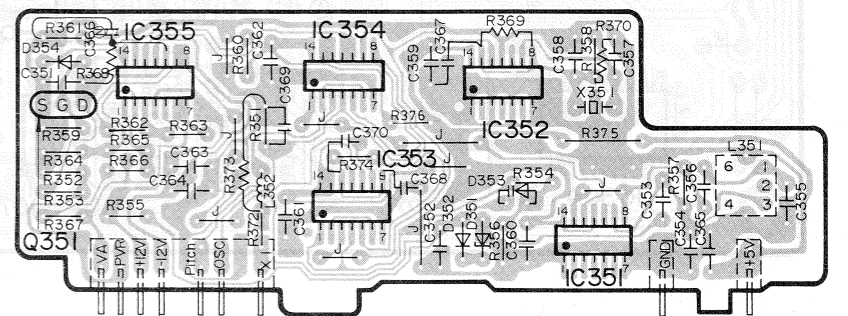
• Remote Control Unit



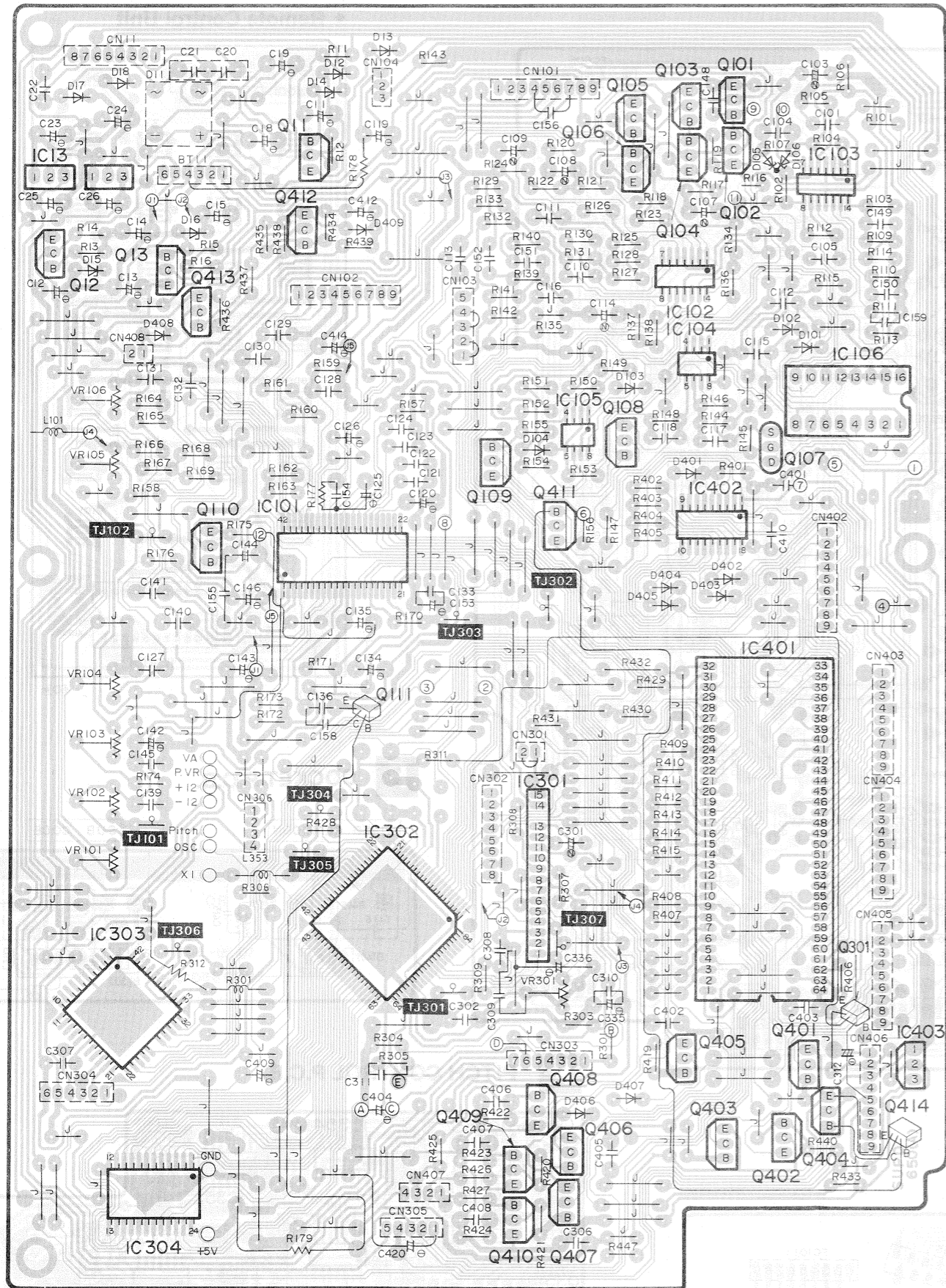
**F** SOCKET P.C.B.



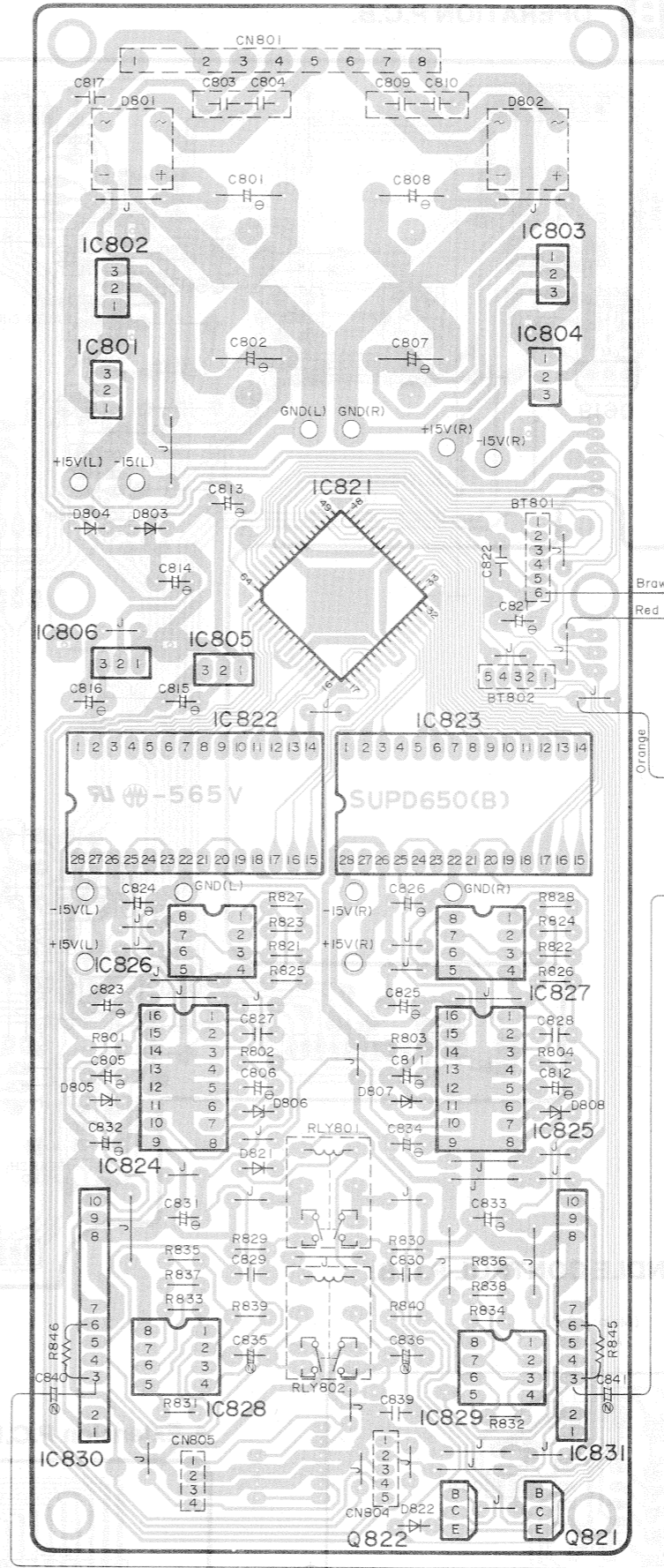
**K** PITCH CONTROL P.C.B.



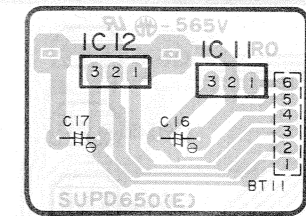
**D** MAIN P.C.B.



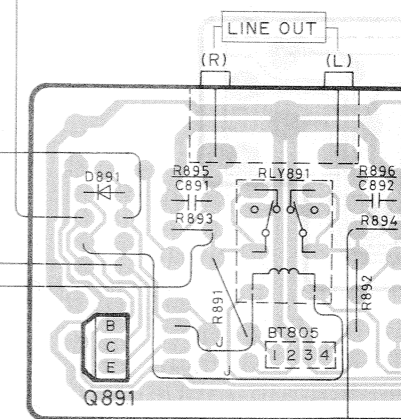
**I** AUDIO P.C.B.



**E** REGULATOR P.C.B.



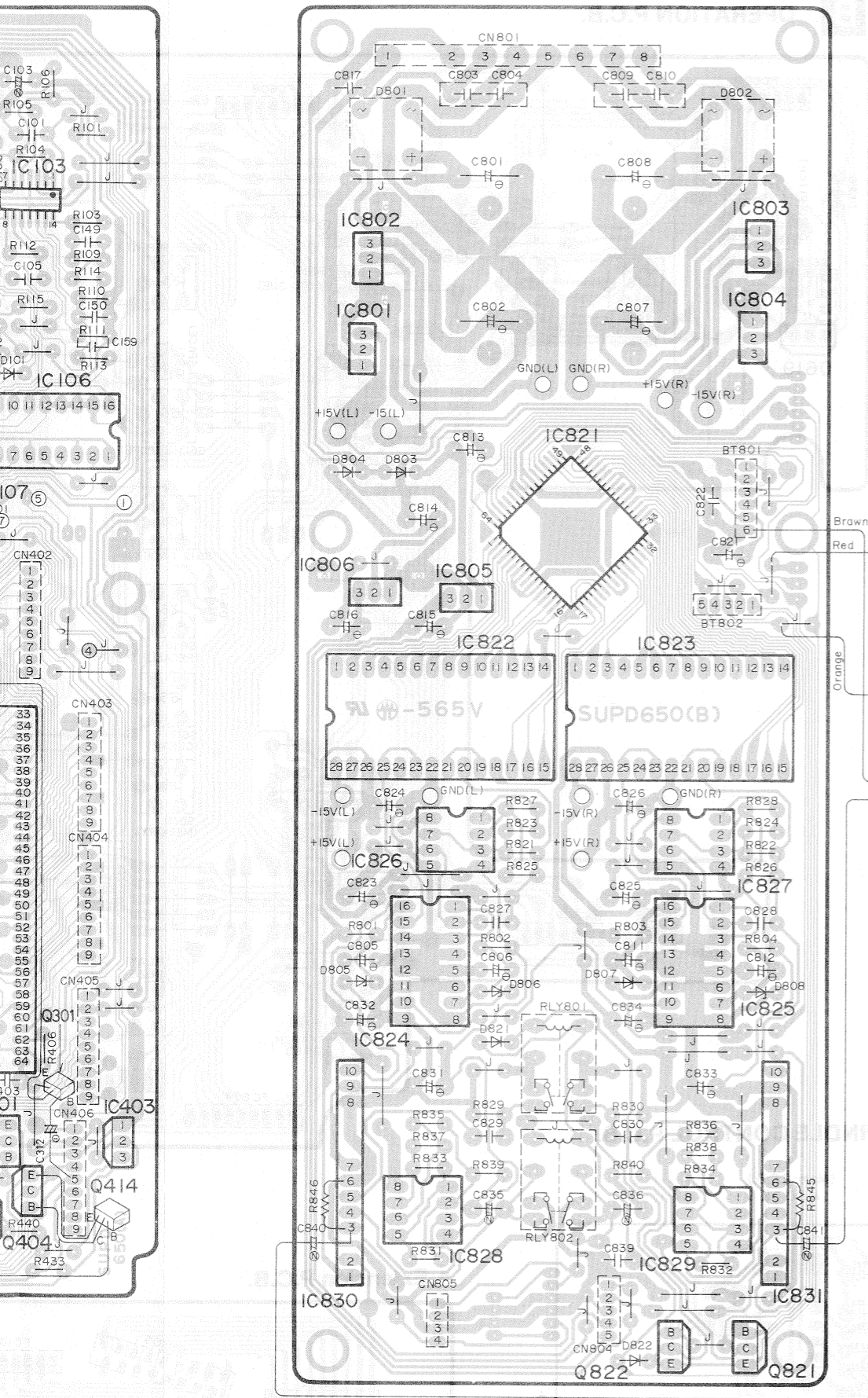
**N** LINE OUT P.C.B.



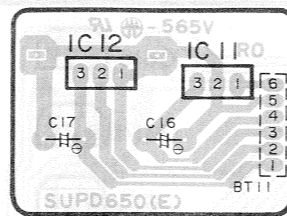
**J** PO

PO

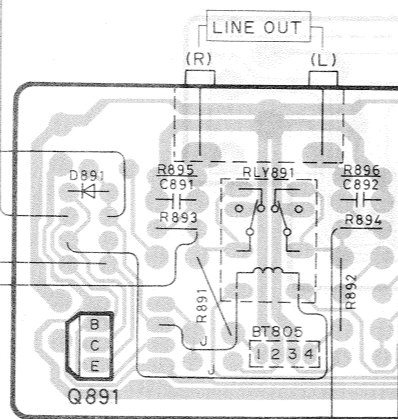
**I** AUDIO P.C.B.



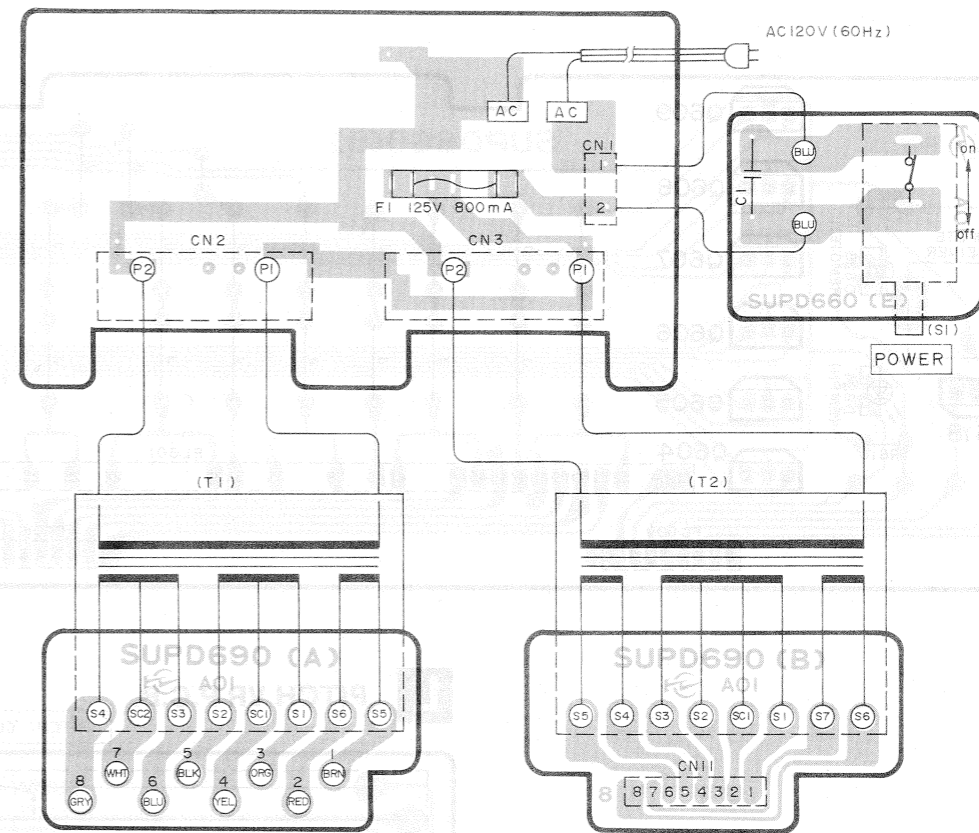
**E** REGULATOR P.C.B.



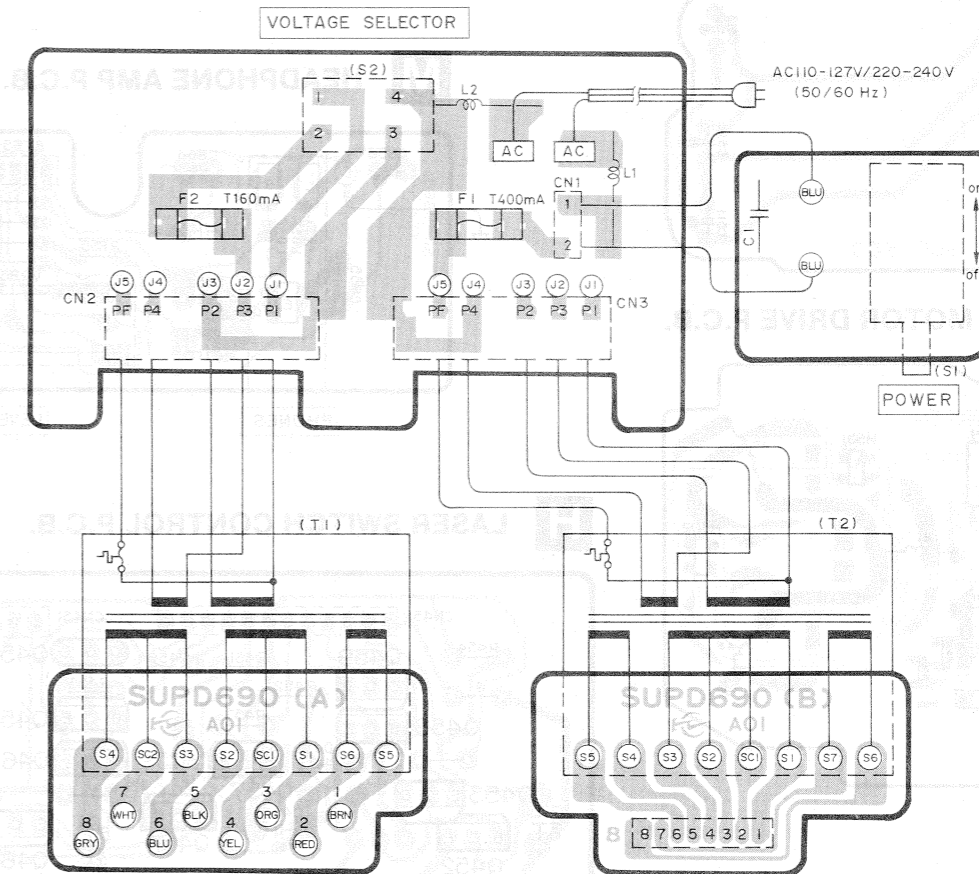
**N** LINE OUT P.C.B.



**J** POWER SOURCE P.C.B. (For U.S.A. and Canada)



POWER SOURCE P.C.B. (For others)



# SCHEMATIC DIAGRAM

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

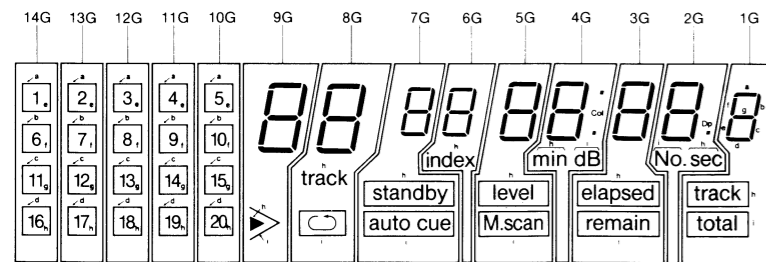
- S1 : Power switch in "on" position.
- S2 : Voltage selector switch. (Except U.S.A. and Canada)
- S101 : Laser switch (Disc compartment open/close detection)
- S601 : Time mode (elapsed/remain) select switch
- S602 : Time mode (track/total) select switch
- S603-611, 614 : Numeric switch (0-9)
- S612 : Index switch
- S613 : Auto space switch
- S615 : Asterisk switch
- S616 : Recall switch
- S617 : Clear switch
- S618 : Memory switch
- S619, 620 : Backward and forward track skip switch
- S621 : Time recall switch
- S622, 623 : Backward and forward rocking/search switch
- S624 : Pause switch
- S625 : Repeat switch
- S626 : Play switch
- S627 : Stop switch
- S628 : Pitch control switch.
- S629 : Auto cue switch
- S630 : Dial search switch
- S631 : Dial search speed selector switch
- The voltage value and waveform are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.  
\* The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
- Important safety notice:  
Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Positive voltage lines and negative voltage lines.  
Audio signal lines.

## 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 legs of IC or LSI with the fingers directly.

# Internal connection of FL601

## Grid connection diagram

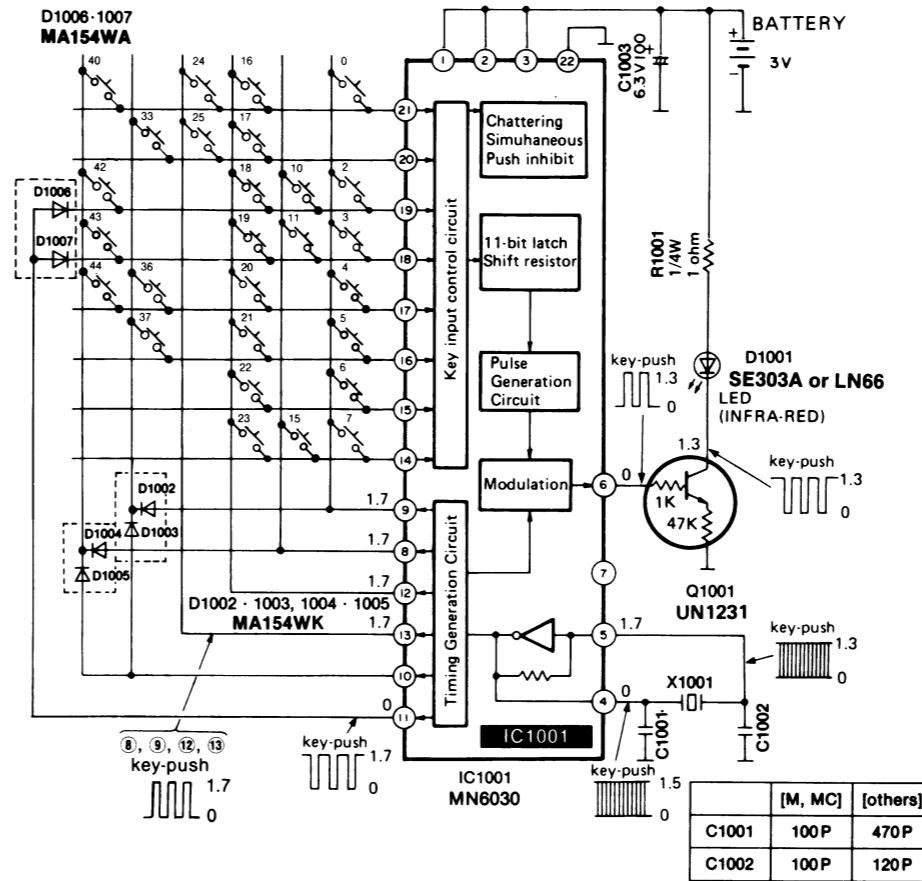


## Anode connection table

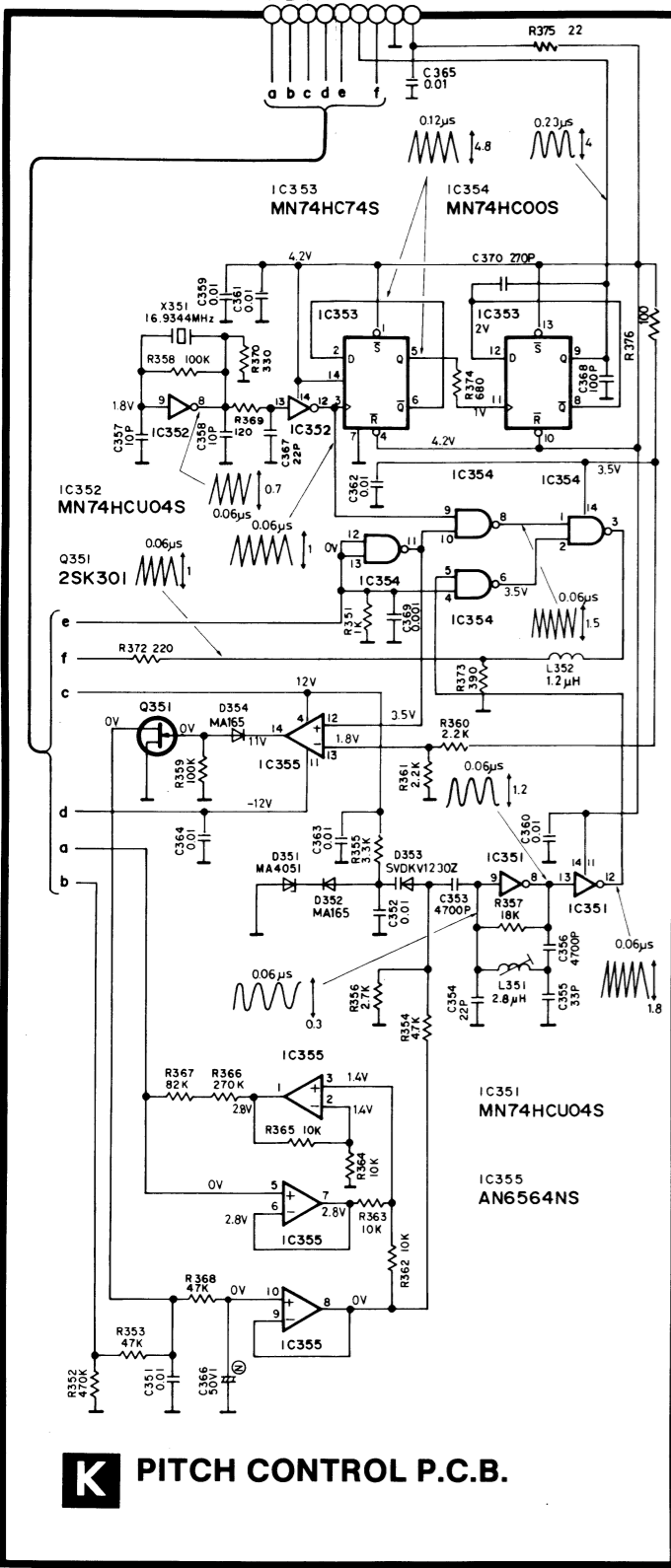
	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	1	2	3	4	5	a	a	a	a	a	a	a	a	a
b	6	7	8	9	10	b	b	b	b	b	b	b	b	b
c	11	12	13	14	15	c	c	c	c	c	c	c	c	c
d	16	17	18	19	20	d	d	d	d	d	d	d	d	d
e	1	2	3	4	5	e	e	e	e	e	e	e	e	e
f	6	7	8	9	10	f	f	f	f	f	f	f	f	f
g	11	12	13	14	15	g	g	g	g	g	g	g	g	g
h	16	17	18	19	20	▶ track	standby	index	level	min. col	elapsed	sec. DP	track	
i	-	-	-	-	-	>	auto cue	-	M. scan	dB	remain	No.	total	

## Remote control unit

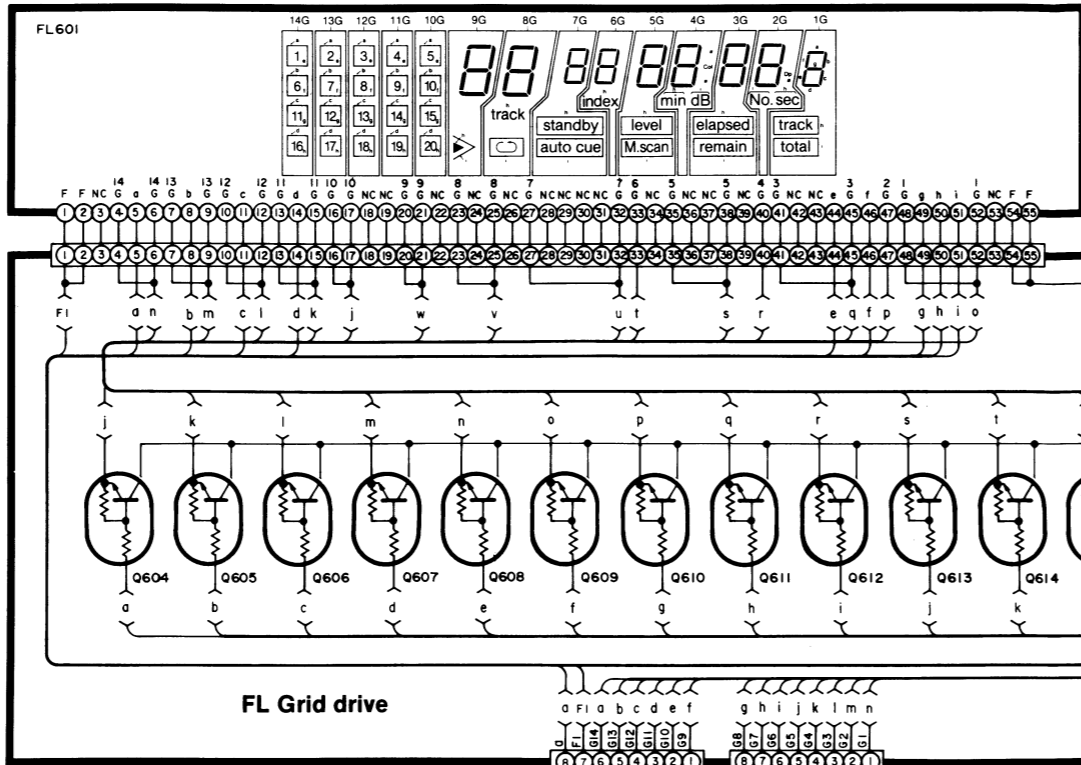
Key No.	Function
0	Stop
2	Skip ◀
3	Skip ▶
4	Search ◀◀
5	Search ▶▶
6	Pause
7	Repeat
10	Play
11	Clear
15	Music Scan
16	Numeric 1
17	Numeric 2
18	Numeric 3
19	Numeric 4
20	Numeric 5
21	Numeric 6
22	Numeric 7
23	Numeric 8
24	Numeric 9
25	Numeric 0
33	Asterisk *
36	Level Up ▲
37	Level Down ▼
40	Index
42	Memory
43	Elapsed/remain
44	Track/total



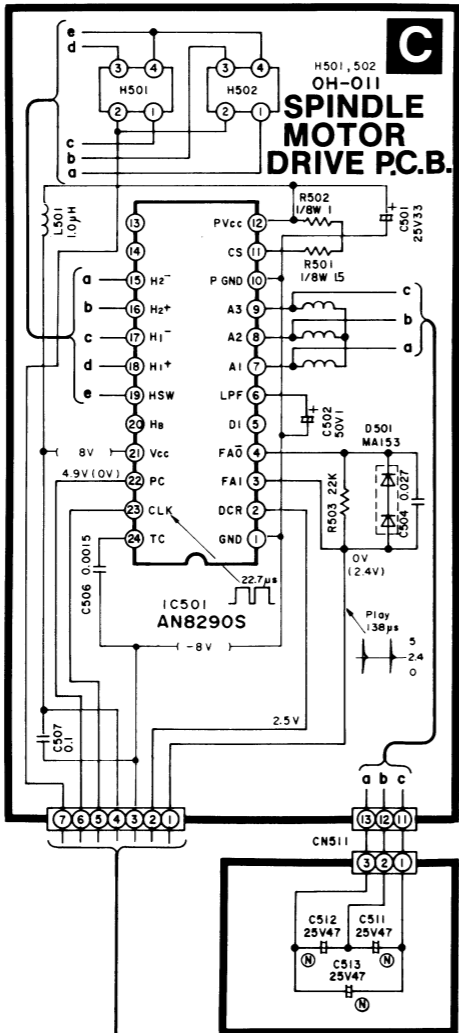
**D** (Main P.C.B.)



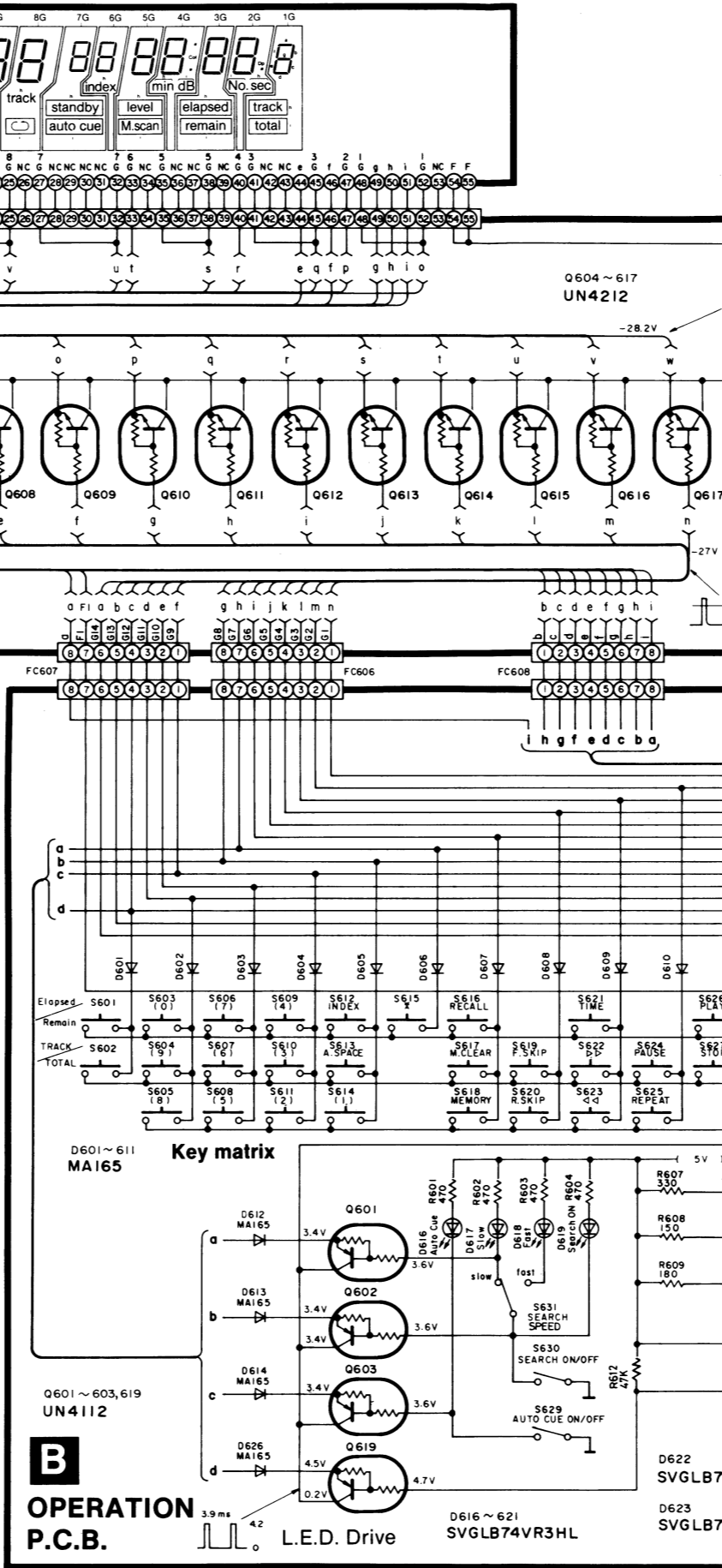
**K** PITCH CONTROL P.C.B.



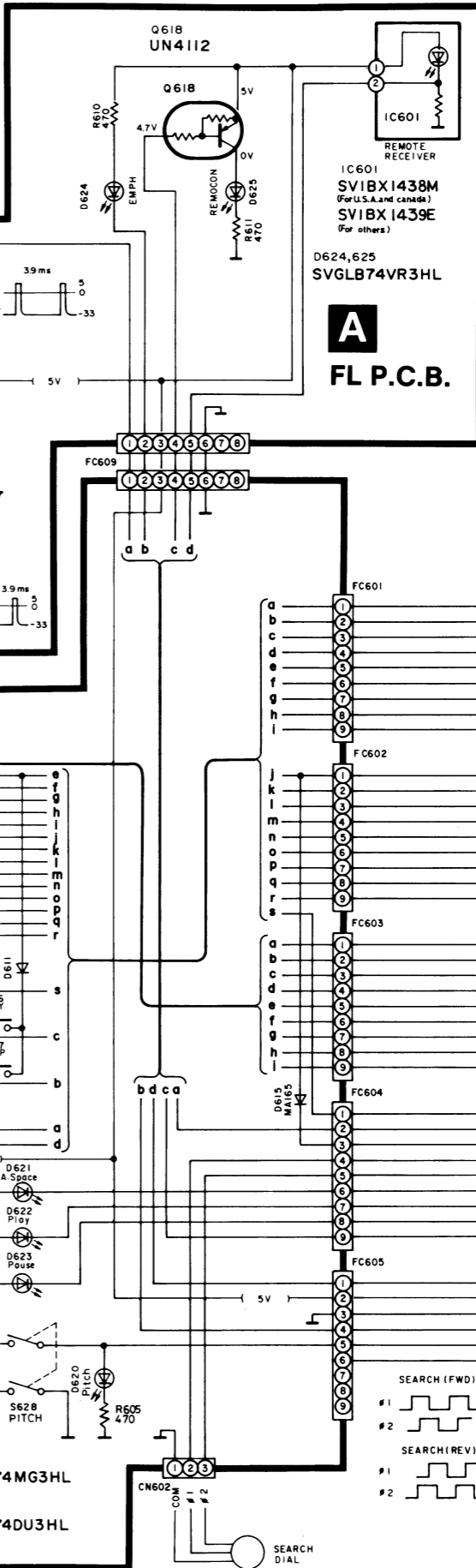
FL Grid drive



**C** SPINDLE MOTOR DRIVE P.C.B.



**B** OPERATION P.C.B.



**A** FL P.C.B.

**D** CN402 (Main P.C.B.)

**D** CN403 (Main P.C.B.)

**D** CN404 (Main P.C.B.)

**D** CN405 (Main P.C.B.)

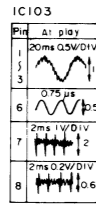
**D** CN406 (Main P.C.B.)

**D** CN303 (Main P.C.B.)



H CN452 (Laser switch control P.C.B.)

(Pitch control P.C.B.) K



D Main P.C.B.

Remote control data processing

Traverse coil drive

Tracking and focus coil drive

Traverse servo

Reset signal generator

System control

16KRAM

B FC601

(Operation P.C.B.)

B FC602

(Operation P.C.B.)

B FC603

(Operation P.C.B.)

B FC604

(Operation P.C.B.)

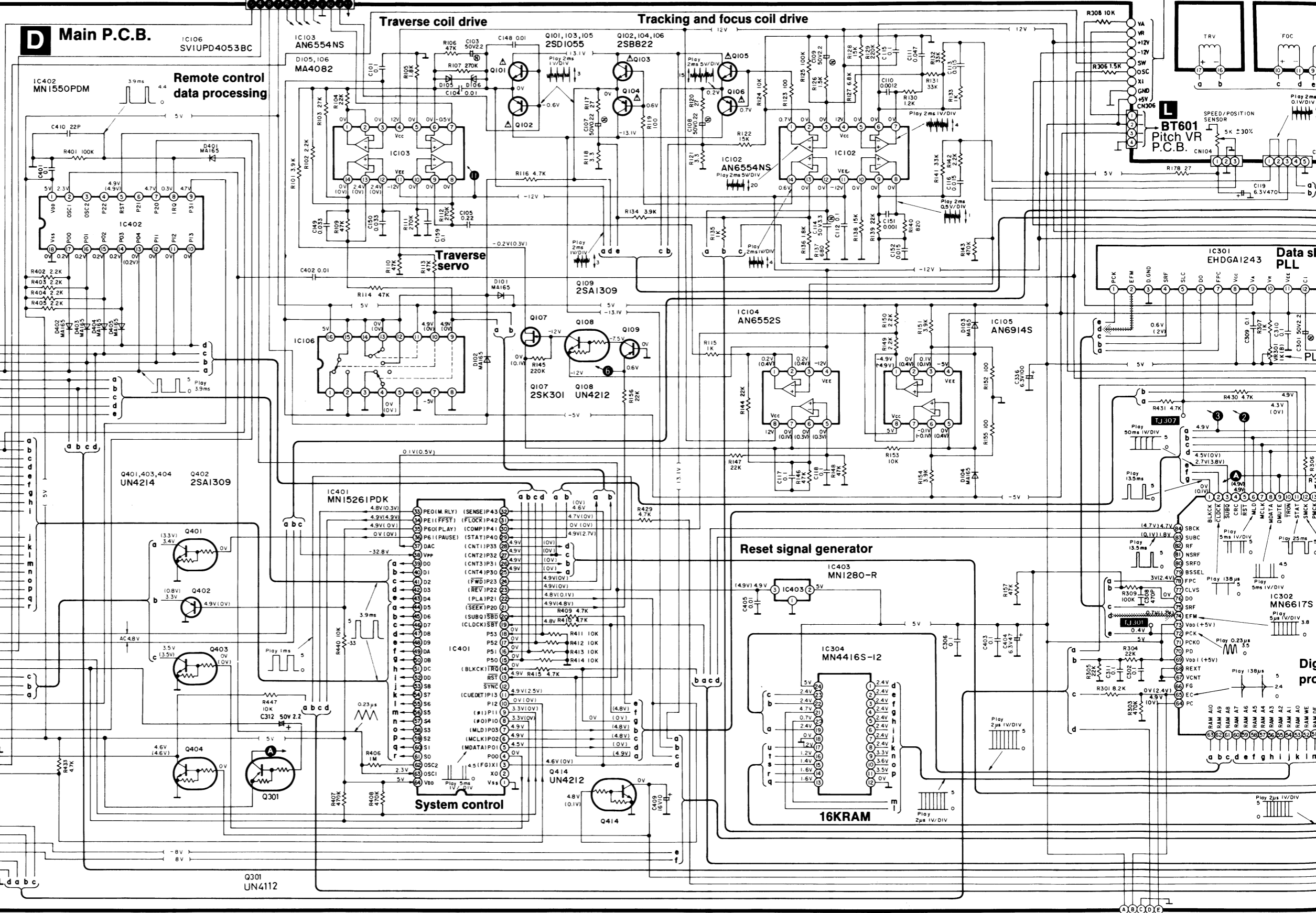
B FC605

(Operation P.C.B.)

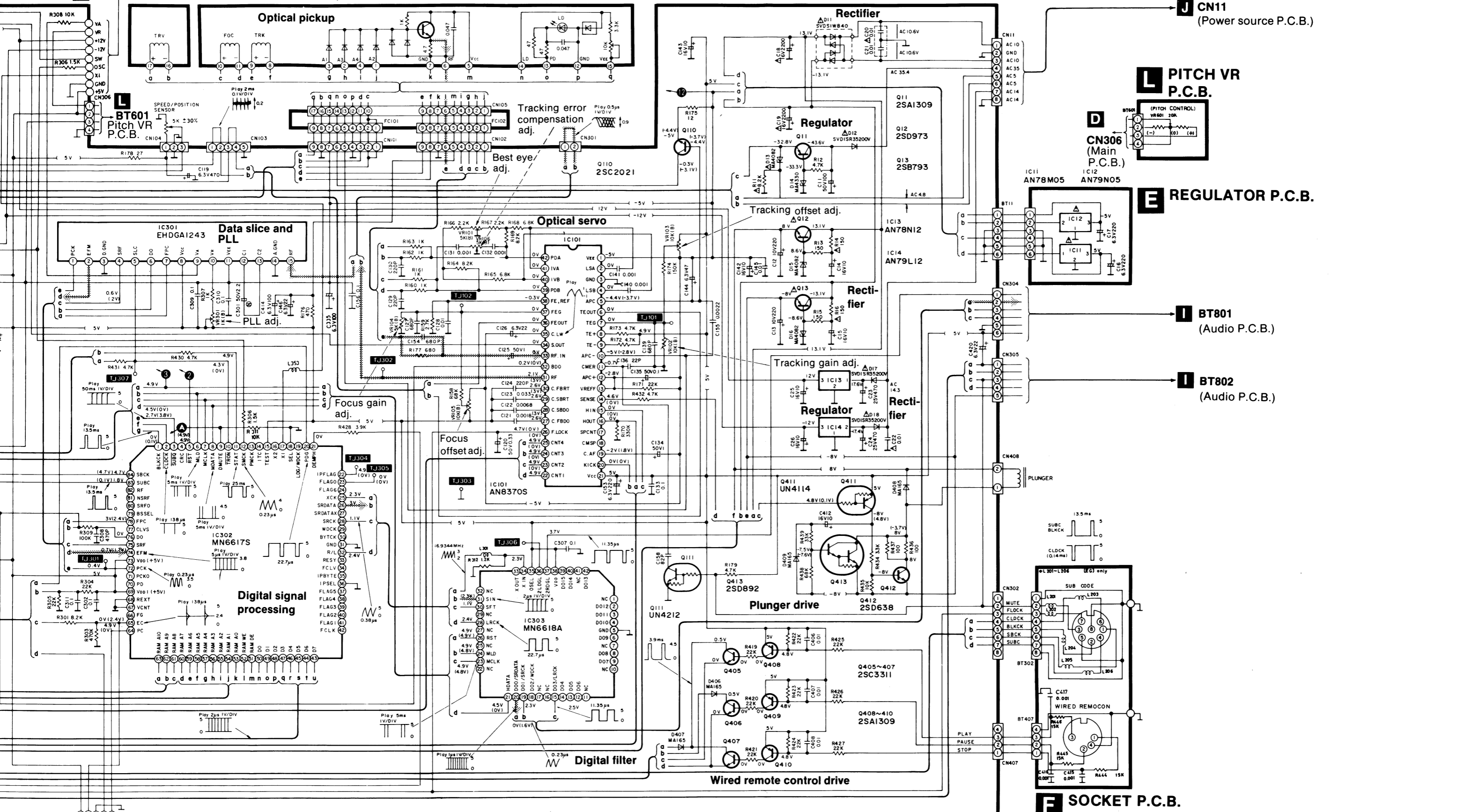
C CN501

(Spindle motor drive P.C.B.)

G CN331 (Spindle control P.C.B.)



control P.C.B.)



G CN331 (Spindle control P.C.B.)

J CN11 (Power source P.C.B.)

L PITCH VR P.C.B.

D CN306 (Main P.C.B.)

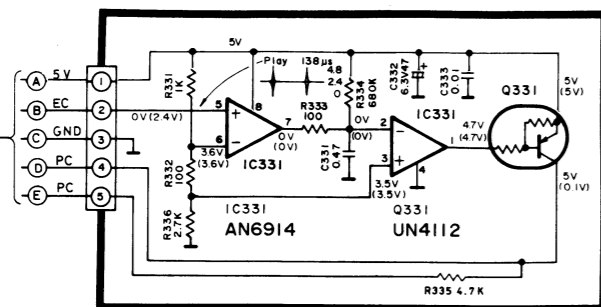
E REGULATOR P.C.B.

I BT801 (Audio P.C.B.)

I BT802 (Audio P.C.B.)

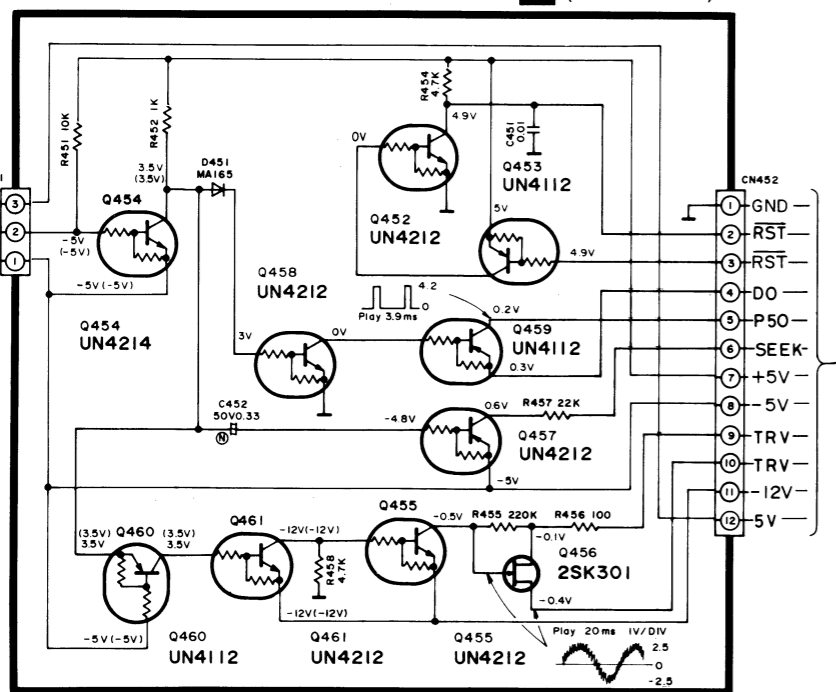
F SOCKET P.C.B.

### G SPINDLE CONTROL P.C.B.



D (Main P.C.B.)

D (Main P.C.B.)



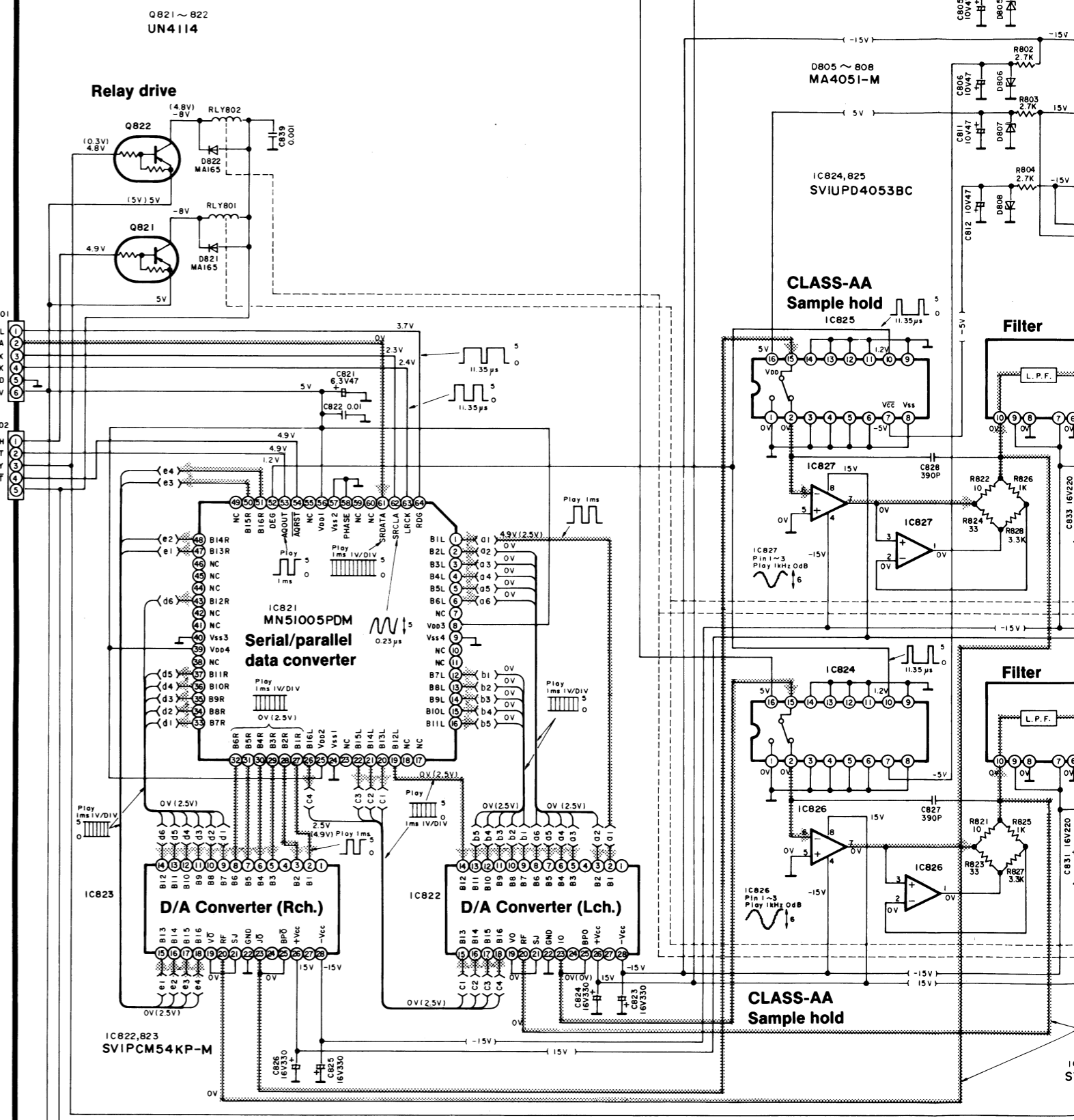
### H LASER SWITCH CONTROL P.C.B.

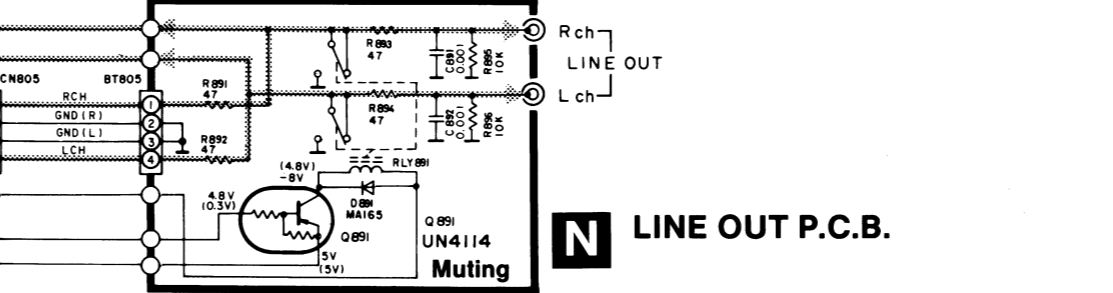
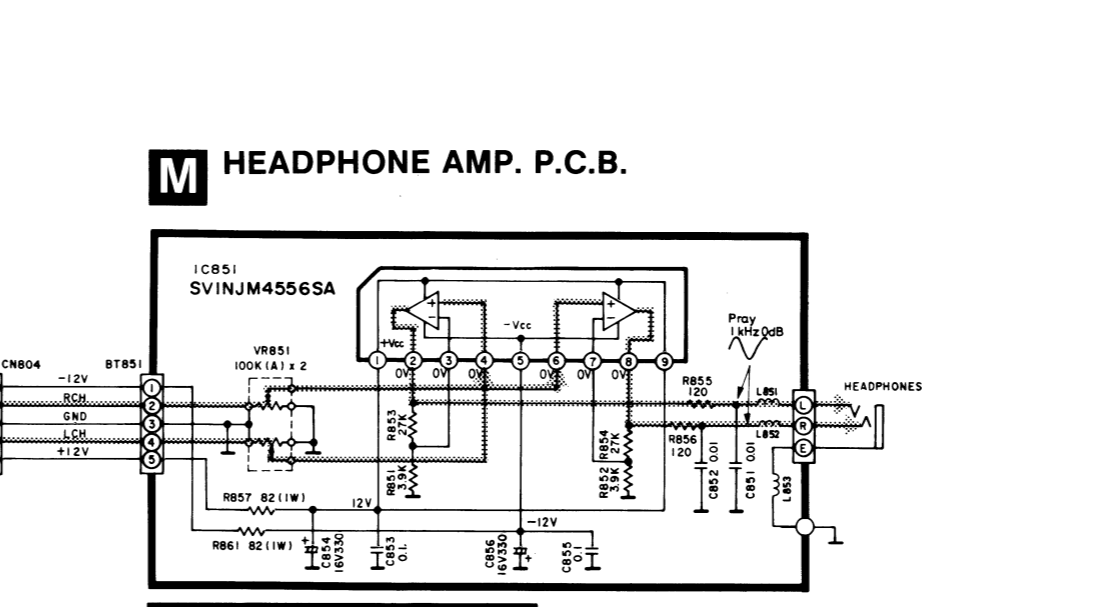
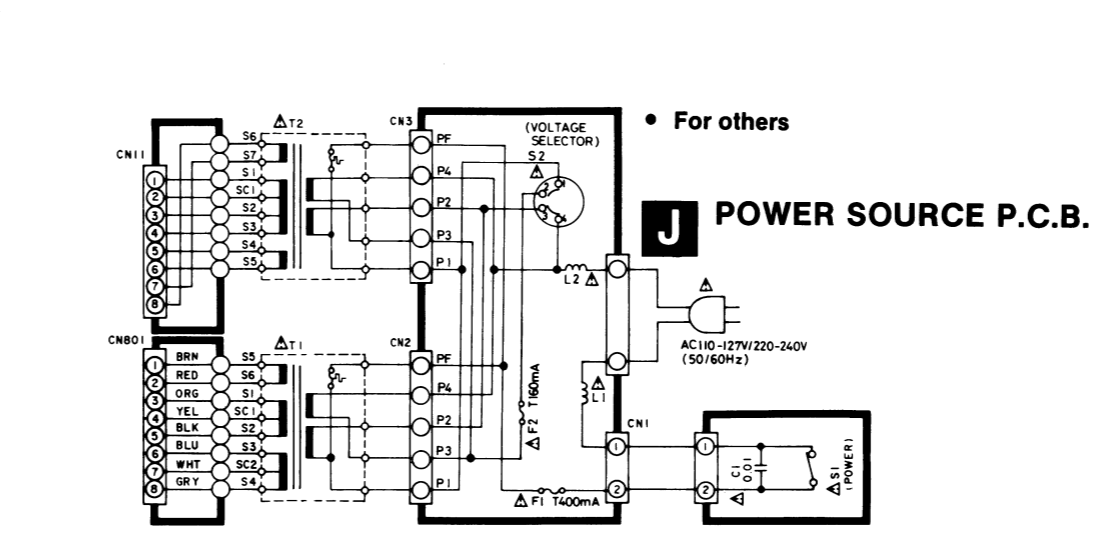
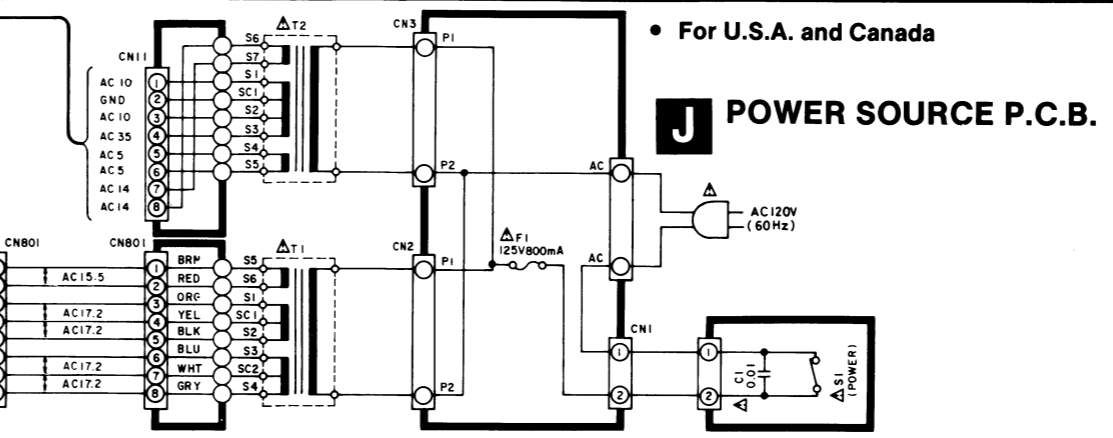
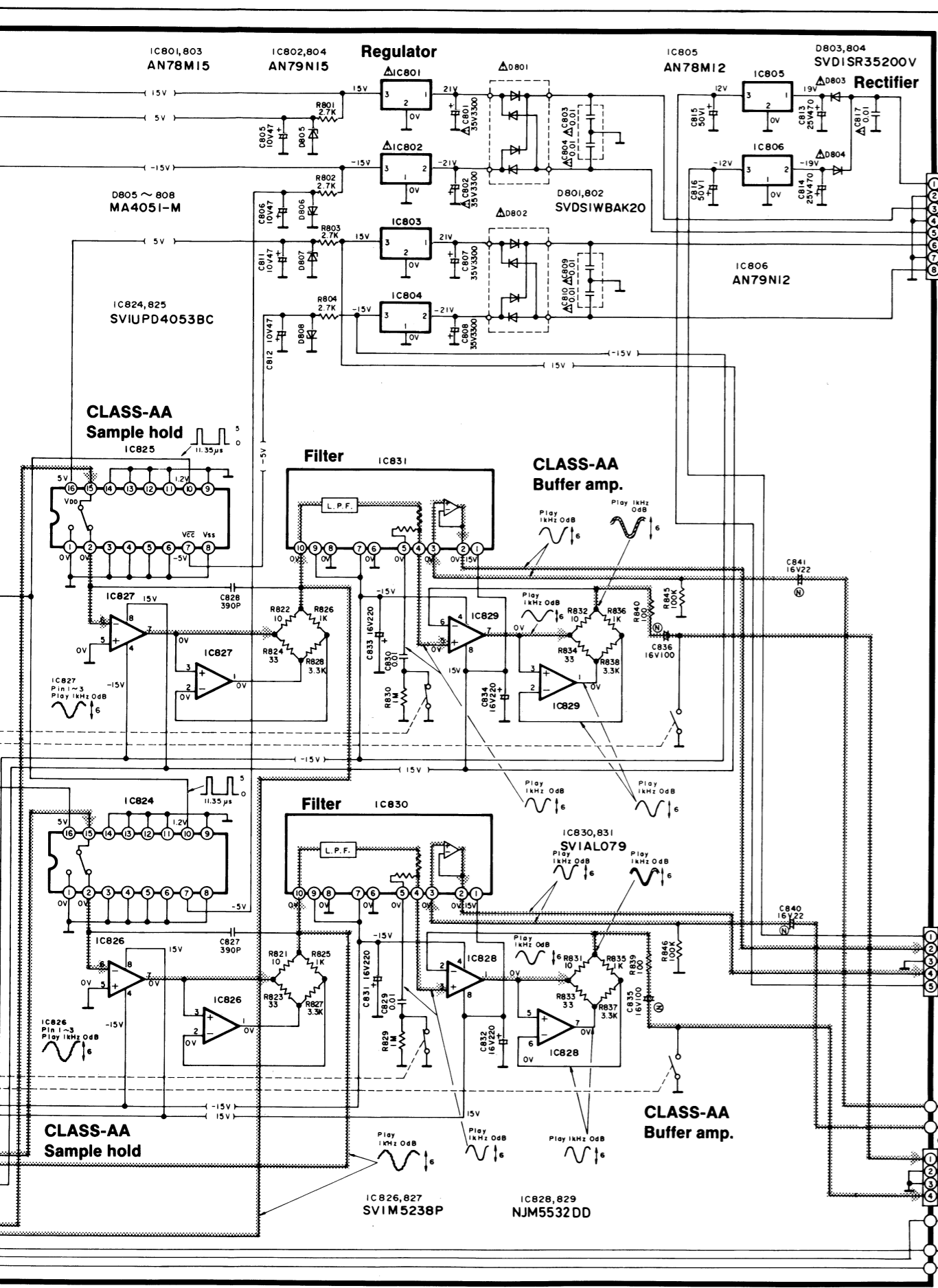
D CN11 (Main P.C.B.)

B CN304 (Main P.C.B.)

B CN305 (Main P.C.B.)

### I AUDIO P.C.B.





• Product for MC only

**FUSE REPLACEMENT**  
 Symbol located near the fuse indicates fast operating type. For continued protection against fire hazard, replace with same type fuse. Refer to the symbol for fuse rating.

**FUSIBLE REMPLACEMENT**  
 Le symbole qui se trouve près du fusible signifie un fusible à action rapide. Pour une protection continue contre les risques d'incendie, n'utiliser que des fusibles du même type. Se rapporter au symbole pour la valeur des fusibles.

# ■ BLOCK DIAGRAM

