

# D-5/D-50

## SERVICE MANUAL

D-5:

*US Model*

D-50:


*AEP Model**UK Model**E Model*

**COMPACT**  
**disc**  
**DIGITAL AUDIO**

### SPECIFICATIONS

<b>System</b>	Compact disc digital audio system	<b>General</b>	
<b>Disc</b>	Compact disc	<b>Power requirements</b>	DC 9V, six alkaline batteries, size C (IEC designation LR14) or six KR-C-F-2 nickel-cadmium rechargeable batteries used in optional Sony EBP-9LC battery case
<b>Laser</b>	Semiconductor laser ( $\lambda = 780 \text{ nm}$ )		DC IN 9V jack accepts;
<b>Spindle speed</b>	200 r.p.m. to 500 r.p.m.(CLV)		Sony ac power adaptor (supplied) for use on 120V ac, 60 Hz or Sony DCC-120 car battery cord (optional) for use on 12V car battery
<b>Scan velocity</b>	1.2–1.4 m/sec.		
<b>Error correction</b>	Sony Super Strategy Cross Interleave Read Solomon Code		
<b>Number of channels</b>	2	<b>Power consumption</b>	4W
<b>D-A conversion</b>	16-bit linear	<b>Dimensions</b>	Approx. 127×36.9×132.5 mm (w/h/d) (5×1½×5¼ inches)
<b>Frequency response</b>	20–20,000 Hz $\pm 1/3$ dB		not incl. projecting parts and controls
<b>Harmonic distortion</b>	Less than 0.008 % (1 kHz) (Model D-5) Less than 0.0095 % (1 kHz) (Model D-50)		Approx. 127.5×42×133 mm (w/h/d) (5¼×1¾×5¼ inches)
<b>Dynamic range</b>	More than 90 dB (1 kHz)		incl. projecting parts and controls
<b>Channel separation</b>	More than 85 dB (1 kHz) (Model D-5) More than 82 dB (1 kHz) (Model D-50)	<b>Weight</b>	Approx. 590 g (1 lb 5 oz), net
<b>Wow and flutter</b>	Below measurable limit		
<b>Outputs</b>	Line output (stereo minijack) Output level 1.6V rms (at MSB) Load impedance over 10 kilohms Headphones (stereo minijack) 10mW + 10mW at 32 ohms		
<b>Disc</b>			
<b>Track pitch</b>	1.6 $\mu$ m		
<b>Sampling frequency</b>	44.1 kHz		
<b>Quantization</b>	16 bit linear quantizing/channel		
<b>Modulation system</b>	EFM		
<b>Transfer rate</b>	2.03 Mbit/sec. (before modulation)		

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

COMPACT DISC COMPACT PLAYER  
**SONY**®



## FEATURES

### Extremely compact size for easy transport

By connecting the optional Sony EBP-9LC battery case, this CD jacket-sized player can be operated on batteries, which enables you to enjoy the sound of Compact Discs anywhere you want.

### High performance and fidelity

Flat frequency response (20–20,000 Hz), low wow and flutter (lower than the measurable limit), wide dynamic range (more than 90 dB), minimal distortion (less than 0.008%) and high channel separation (more than 85 dB) are achieved. Listening to the sound reproduction is just like being in the concert hall.

### Full-logic "feather touch" operation

At the lightest touch, the "feather-touch" function keys enable you to switch directly from one mode to another.

### AMS and SEARCH function

The AMS (Automatic Music Sensor) function for locating the beginning of a selection on the disc and the SEARCH function for locating the desired point in a particular selection.

### Digital readout display

The track number and the playing time elapsed of the selection playing is shown on the LCD(Liquid Crystal Display) window. With one touch of the REMAIN button, this time display will change to indicate with a minus sign how many selections and how much playing time are left on the disc.

### Non-contact signal readout system

Because a laser beam is employed for signal pick-up, there is no physical contact with the disc, which means no wear. In addition, because the pit pattern is recorded below the surface of the disc, it is not necessary to be constantly on guard against dust, making the disc easy to handle.

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## PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

### WARNING !!

**DO NOT LOOK AT THE LASER BEAM.**

#### 1. Laser Diode Properties

- Materiale: GaAlAs
- Wavelength: 780 nm
- Emission Duration: continuous
- Laser Output: max. 0.4 mW\*

\* This output is the value measured at a distance of about 1.6 mm from the objective lens surface on the Optical Pick-up Block.

- Classification: Class IIIb

2. During service, do not take the Optical Pick-up Block apart, and do not adjust the APC circuit in the Optical Pick-up Block. If there is a breakdown in the APC circuit (including laser diode) in the Optical Pick-up Block, replace the entire Optical Pick-up Block (including APC board).

## BESKYTTELSE AF ØJNE MOD LASERSTRÅLING UNDER SERVICE

I dette apparat anvendes laserlys. Derfor skal nedenstående instruktioner nøje følges under service.

### ADVARSEL!!

**Se ikke direkte på laserstrålen.**

#### 1. Laser-diode data

- Materiale: GaAlAs
- Bolgelængde: 780 nm
- Udsendelsesvarighed: Kontinuerlig
- Laseroutput: Max. 0,4 mW\*

\* Dette output er værdien målt i en afstand af ca. 1,6 mm fra den optiske pick-up enheds linseoverflade.

- Klassifikation: Klasse IIIb.

2. Adskil aldrig den optiske pick-up enhed under service, og juster ikke APC kredsløbet i den optiske pick-up enhed (Automatic Power Control). Hvis APC kredsløbet i den optiske pick-up enhed (inkl. laser-dioden) bryder ned, skal hele den optiske pick-up enhed udskiftes.

— CAUTION FOR ELECTROSTATIC BREAKDOWN —

**NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK (KSS-110A)**

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.

The printed matter below is included in the repair parts. During repair, use the procedure in the printed matter.

The flexible board is easily damaged and should be handled with care.

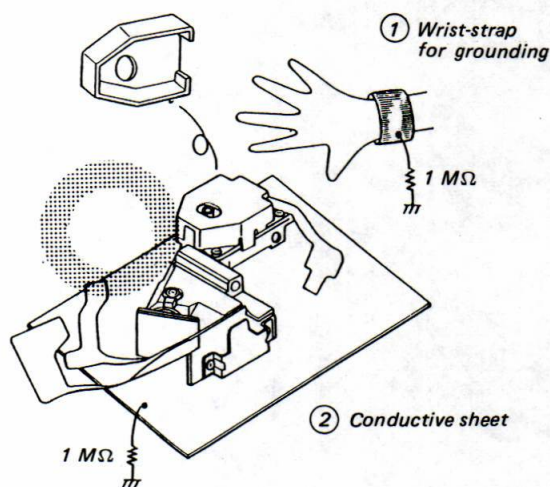
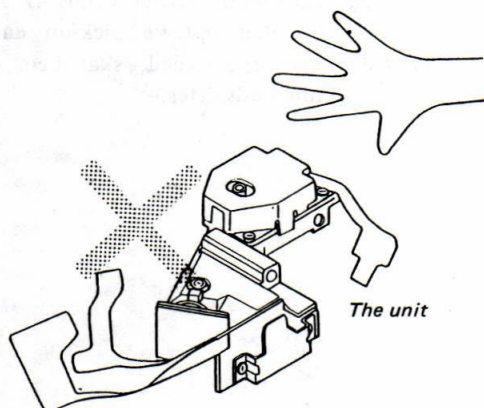
The following method is an example for reference purposes:

1. Place a conductive sheet on the workbench. (The black sheet used as repair parts wrapping).
2. Place the set on the conductive sheet so that the chassis touches the sheet. (This makes it the same potential as the conductive sheet).
3. Place your hands on the conductive sheet. (This makes them the same potential as the sheet).
4. Remove the optical pick-up block.
5. Perform work on top of the conductive sheet. Be careful that clothing does not touch the optical pick-up block.

**Printed Matter Included in the Repair Parts**

**When opening or repairing the unit, the procedure for grounding as follows is required to prevent damage caused by static electricity.**

1. Grounding for the human body  
Be sure to put on a wrist-strap for grounding (with impedance lower than  $10^8 \Omega$ ) whose other end is grounded. The strap works to drain away the static electricity build-up on the human body.
2. Grounding for the work table  
Be sure to lay on the table a conductive sheet (with impedance lower than  $10^9 \Omega$ ) such as sheet of copper, which is grounded.
3. As static electricity build-up on clothes is not drained away, be careful not to let your clothes touch the unit.
4. Handling the flexible board  
The flexible board is easily damaged and should be handled with care.



**Chip Component Indications**

The official specifications which are presently indicated are EIAJ standard.

- (1) MELF (leadless): EIAJ RC-8001
- (2) Square chip components (laminated ceramic): EIAJ RC-3699. Square chip resistors are presently under study by EIAJ.

The following explanation covers square chip components (MELF omitted).

**1. 2-letter Method (EIAJ RC-3699)**

- Letter combination: letter + 1 number
- Letter meaning: letter = effective numeric  
number = multiplier

\* The units used are pF for capacitors and Ω (ohm) for resistor.  
(This is mainly used for Symbol and Numeric and Multiplier capacitors.)

Letter	A	B	C	D	E	F	G	H	J	K	L
Numeric	1	1.1	1.2	1.3	1.5	1.6	1.8	2	2.2	2.4	2.7
Letter	M	N	P	Q	R	S	T	U	V	W	X
Numeric	3	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5
Letter	Y	Z	a	b	d	e	f	m	n	t	y
Numeric	8.2	9.1	2.5	3.5	4	4.5	5	6	7	8	9

Number	0	1	2	3	4	5	6	7	8	9
Multiplier	10 <sup>0</sup>	10 <sup>1</sup>	10 <sup>2</sup>	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>8</sup>	10 <sup>-1</sup>

- Ex.: A1 1 x 10<sup>1</sup> = 10 pF (or, .10Ω)
- E3 1.5 x 10<sup>3</sup> = 1500 pF (or, 1.5 kΩ)

**2. 3-number Method**

(Mainly used for chip resistors)

- Number meaning:  
1st and 2nd number = effective numeric  
3rd number = multiplier of 10  
Unit: pF for capacitor, for resistor
- Ex.: 103 10 x 10<sup>3</sup> = 10000Ω = 10 kΩ  
(or, 0.01 μF)
- 224 22 x 10<sup>4</sup> = 220000Ω = 220 kΩ  
(or, 0.22 μF)

**3. 4-letter Method (used for capacitor)**

- Letter combination: 3 numbers + 1 letter
- Letter meaning: number = effective numeric + multiplier of 10  
(same as 3-number method)  
letter = capacitor response
- Symbol and Response

< For temperature compensation >

Symbol	C	P	R	S	T	U	(NO)
Response	CΔ	PΔ	RΔ	SΔ	TΔ	UΔ	SL

Δ is temperature coefficient tolerance, and is G, H, J, K.

< For high dielectric constant >

Symbol	K	Z
Response	B	F

- Ex.:

47
3Z

 → 47 x 10<sup>3</sup> = 47000pF = 0.047μF F response

15
1R

 → 15 x 10<sup>1</sup> = 150pF RΔ response

22
2

 → 22 x 10<sup>2</sup> = 2200pF SL response

**Replacing chip components**

All chip components should be connected and disconnected, using a tapered soldering iron [temperature of the iron tip: less than 280°C (536°F)], a pair of tweezers and braided wire.

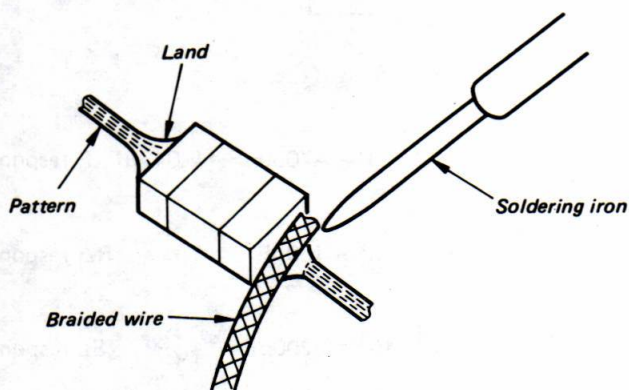
**Precautions for replacement**

1. Do not disconnect the chip component forcefully. Otherwise, the pattern may peel off.
2. Never re-use a disconnected chip component. Dispose of all old chip components.
3. To protect the chip component, heating time for attaching the component should be within 3 seconds.

○ **Removing chip components**

**(1) Removing solder at electrode**

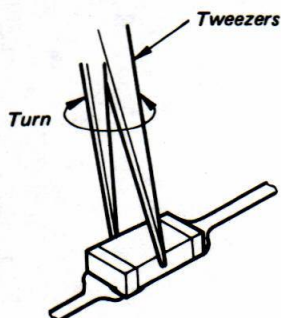
Remove the solder at the electrode, using a thin braided wire. Do not remove the solder of the part (chip component) attached adjacent to the electrode.



**(2) Disconnecting chip components**

Turn the tweezers with the soldering iron alternately applied to both electrodes, and the chip component will be disconnected. Take careful precautions while disconnecting, because if the chip component is forcefully removed the land may peel off.

Never re-use a disconnected chip component.



**(3) Smoothing the soldered surface**

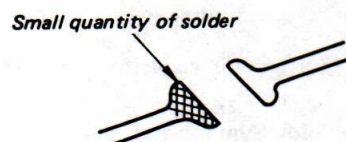
After disconnecting the chip component, remove the solder by using a braided wire to smooth the land surface.

○ **Connecting chip components**

The value of chip components is not displayed on the main body. Take due precautions to avoid mixing new chip components with other ones.

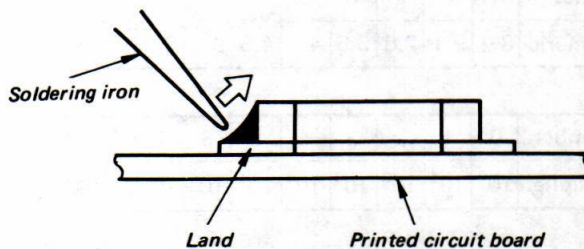
**(1) Applying solder to land on one side**

Apply a thin layer of solder to the land on one side where the chip component is to be connected. Too much solder may cause bridging.



**(2) Speedy soldering**

Hold the chip component at the desired position, using tweezers, and apply the soldering iron in the arrow-marked direction. To protect the chip component, heating time should be within 3 seconds.



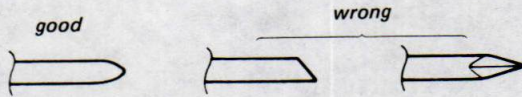
**(3) Speedy soldering of electrode on the other side**

Solder the electrode on the other side in the same way as in (2) above.

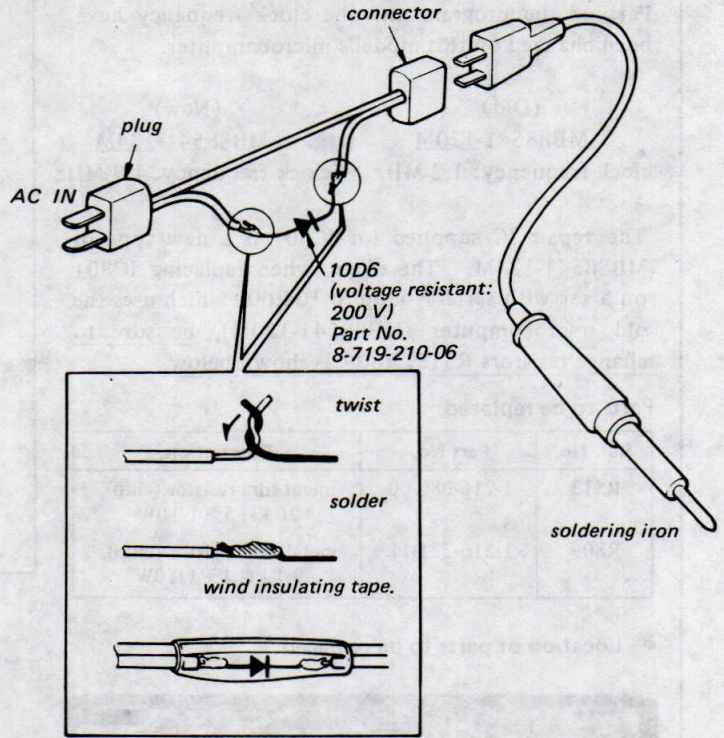
### Flexible Circuit Board Repairing

1. Keep the temperature of the soldering iron at  $270^{\circ} \pm 10^{\circ}C$  during repairing.  
You can maintain the temperature of the soldering iron around  $270^{\circ}C$  by using the thermal controller as illustrated on the right.
2. Do not touch the soldering iron more than 4 seconds or 3 times on the same conductor of the circuit board.
3. Do not apply force on the conductor when soldering or unsoldering.

### Tip of soldering iron

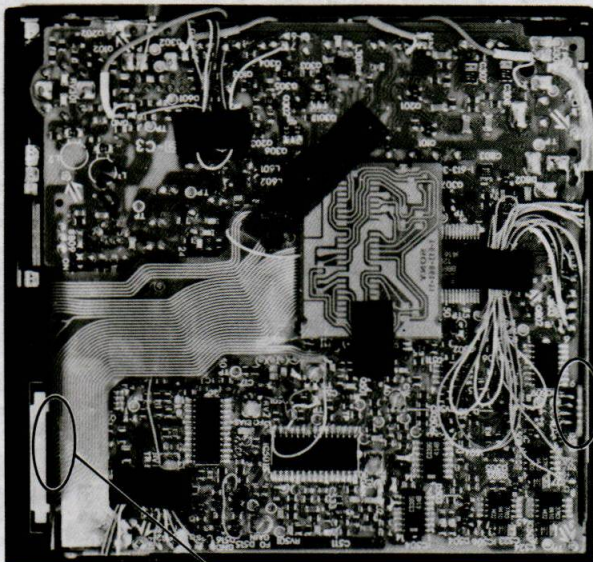


### To make thermal controller of soldering iron



### NOTES ON OPENING MAIN BOARD

*Be careful not to cut the FOP flexible boards when opening the main board during repair. If they break, FOP should be replaced.*



*Be careful not to break the flexible board under this shield board. (connected to FOP signal and laser)*

*Be careful not to break the flexible board which is attached to the end of this board. (connected to FOP 2-axis device)*

**NOTES ON REPLACING IC801 (MB88541-120M) (MODEL D-5 ONLY)**

Part of the program and the clock frequency have been changed on this model's microcomputer.

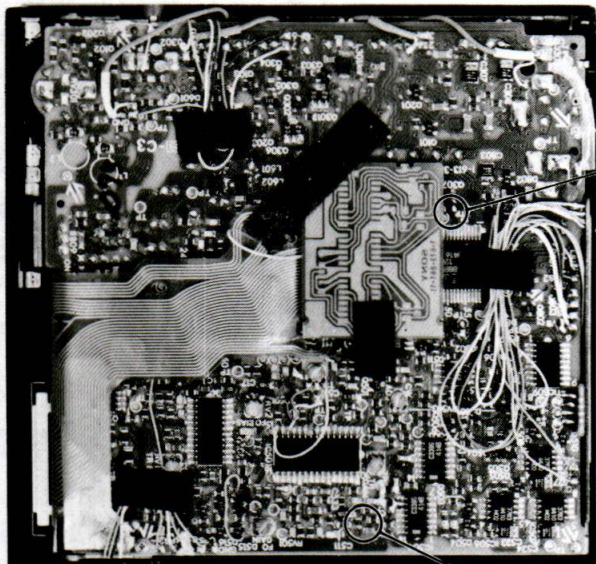
(Old) MB88541-120M  $\rightarrow$  (New) MB88541-124M  
 clock frequency: 1.2 MHz clock frequency: 1.3 MHz

The repair IC supplied for IC801 is a new type of MB88541-124M. Therefore, when replacing IC801 on a set with serial No. up to 104,000 which uses the old microcomputer (MB88541-120M), be sure to change resistors R513, R809 as shown below.

**Parts to be replaced:**

Ref. No.	Part No.	Description
R513	1-216-080-00	metal film resistor (chip), 20 k $\Omega$ 5% 1/10W
R809	1-216-331-11	metal film resistor (chip), 9.1 k $\Omega$ 1% 1/10W

**• Location of parts to be replaced**



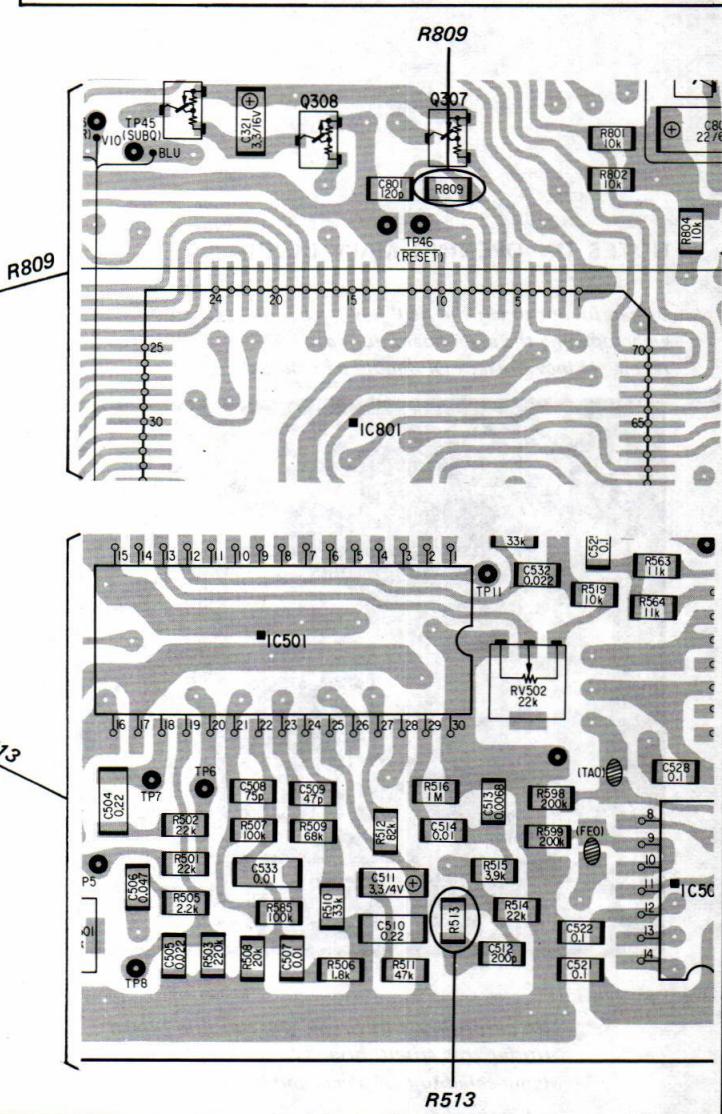
**CAUTION ON DC-DC CONVERTER REPLACEMENT**

Be sure to check PLL free run frequency when replacing the DC-DC converter. (Refer to page 36) DC-DC converter -5V output voltage changes when the DC-DC converter is replaced, causing PLL free run frequency to change.

**Reference:**

**Converter Output Voltage Variation**

Conditions	Specifications
mechanical voltage	+5 V output: DC +5.2 V $\pm$ 50 mV
DC +5 - 12 V	-5 V output: DC -5.2 V $\pm$ 50 mV





SERVICE MODE (service program)

As shown in Figure 1, the program on this set selects either service program routine or normal routine after power supply is connected and a RESET signal enters. When it enters service program routine, the microcomputer brings the necessary job from each subroutine corresponding to the key input, and executes that job. Operation check can be performed efficiently using this mode. The operation method of service mode is explained below.

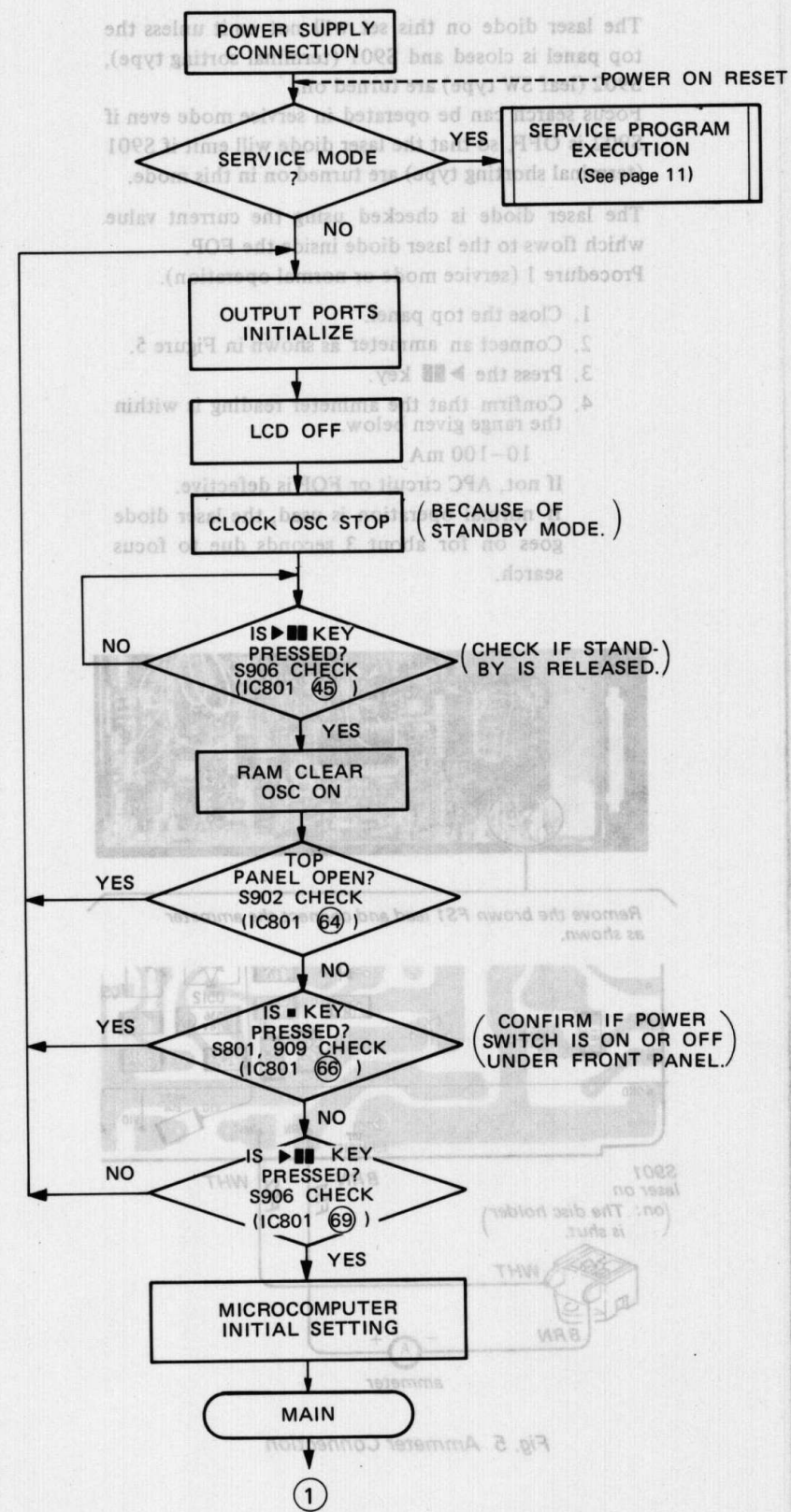


Figure 1. Program Flow Chart

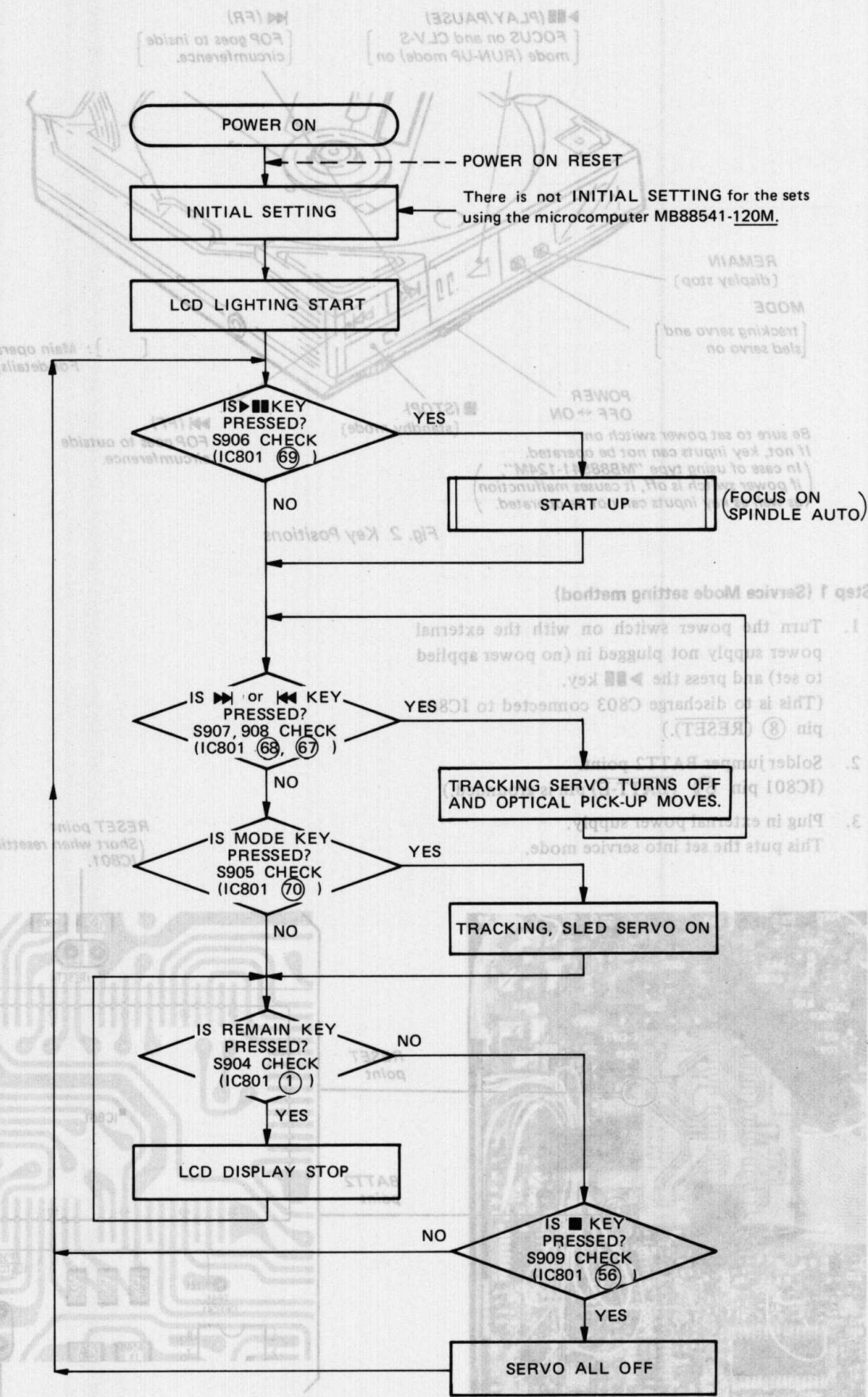
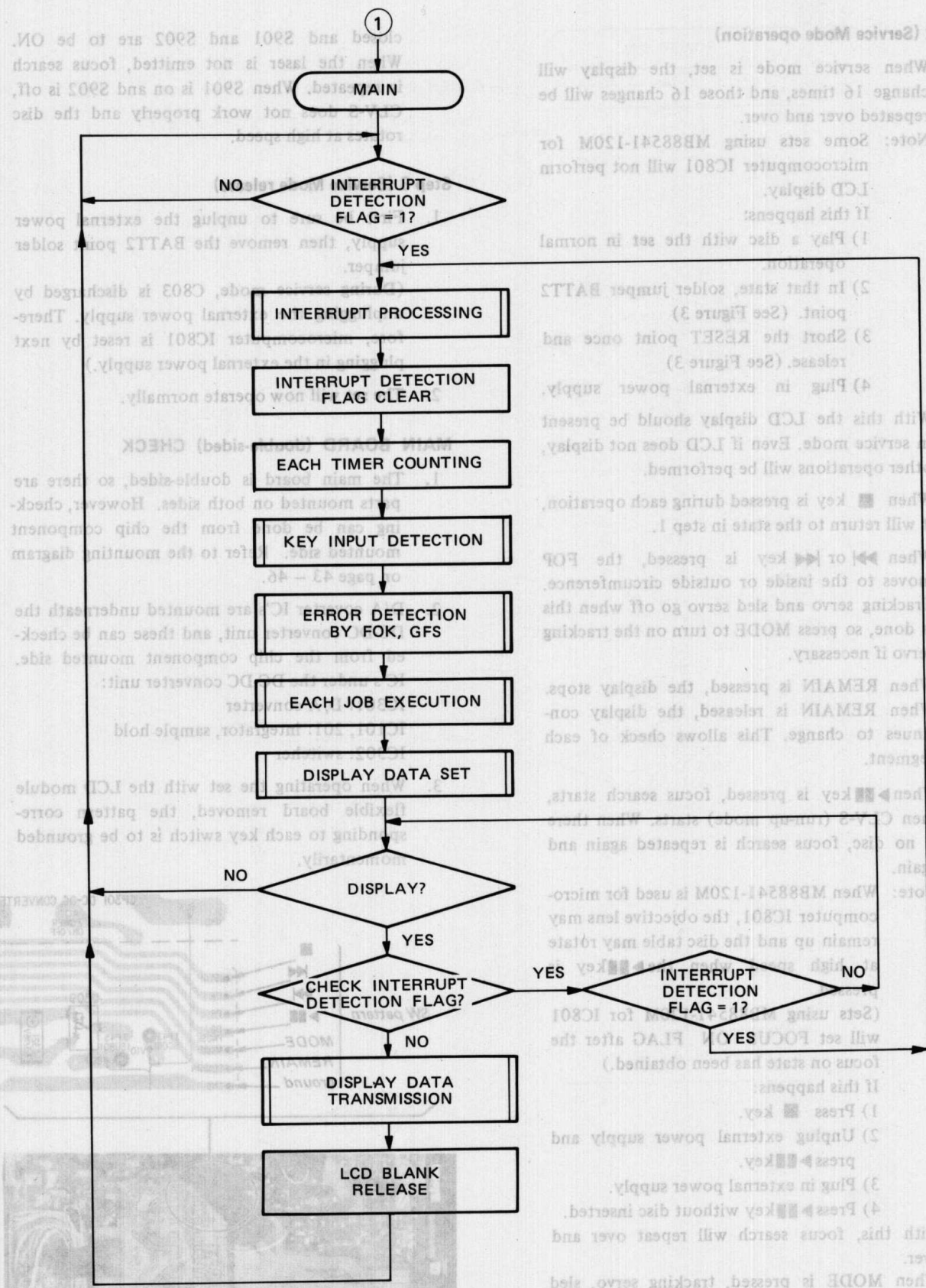
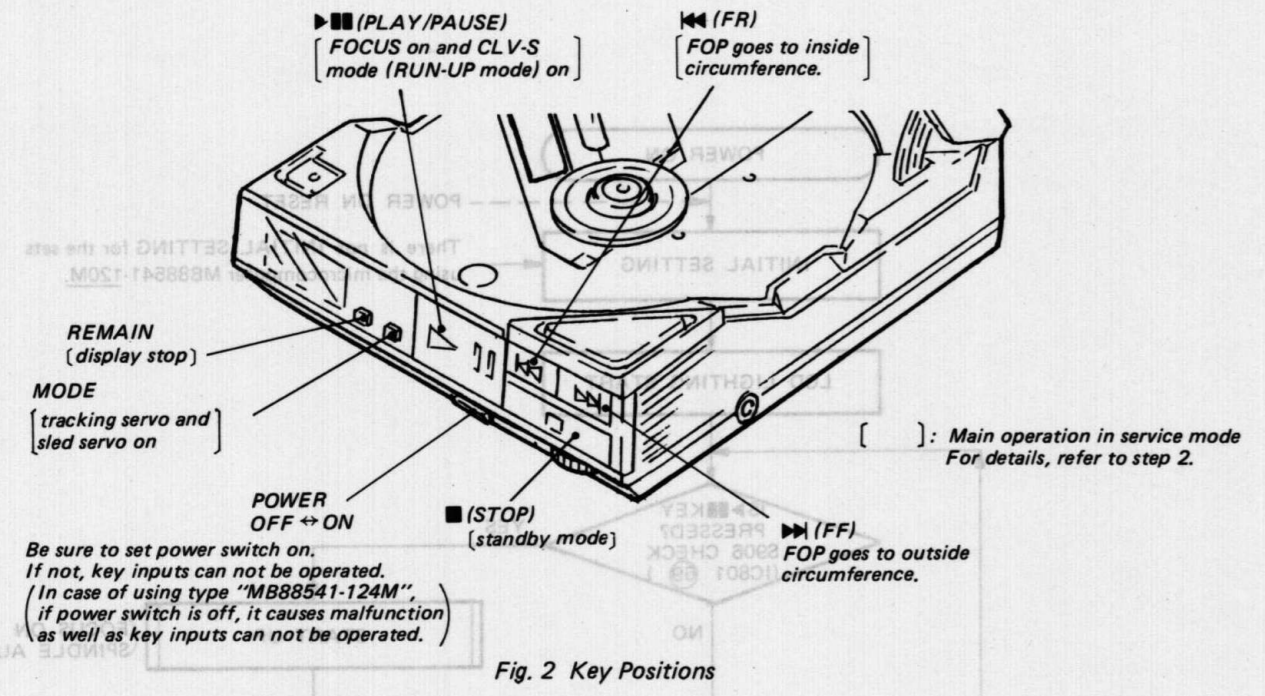


Fig. 1-1 Service Program Flow Chart



Step 1 (Service Mode setting method)

1. Turn the power switch on with the external power supply not plugged in (no power applied to set) and press the ▶▶ key. (This is to discharge C803 connected to IC801 pin ⑧ (RESET).)
2. Solder jumper BATT2 point. (IC801 pin ⑤ (BATT-E) pin is grounded.)
3. Plug in external power supply. This puts the set into service mode.

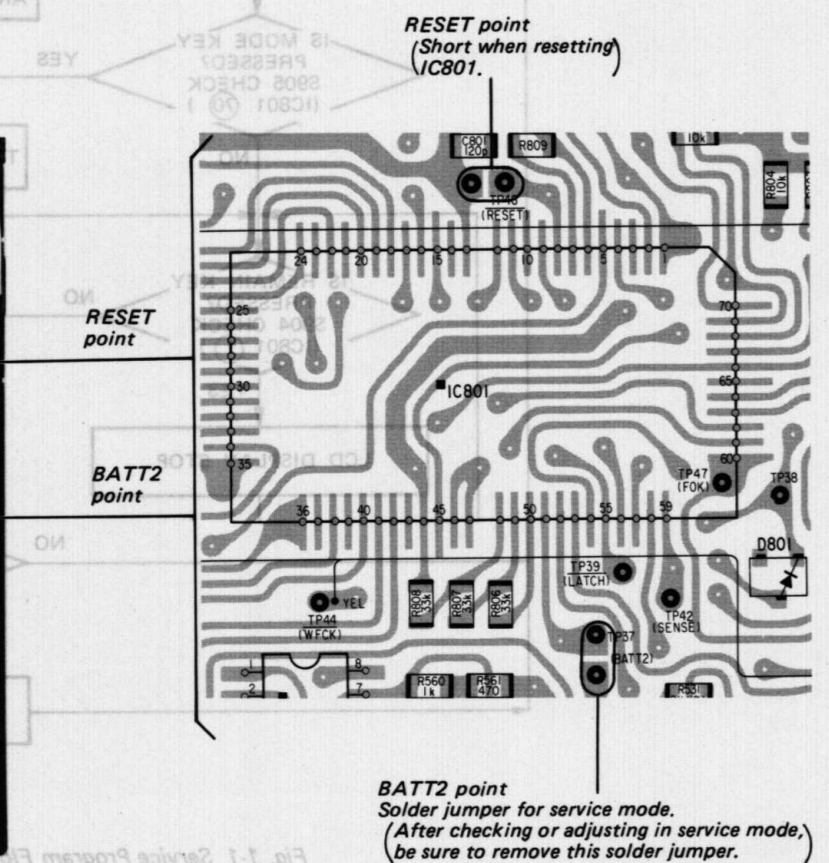
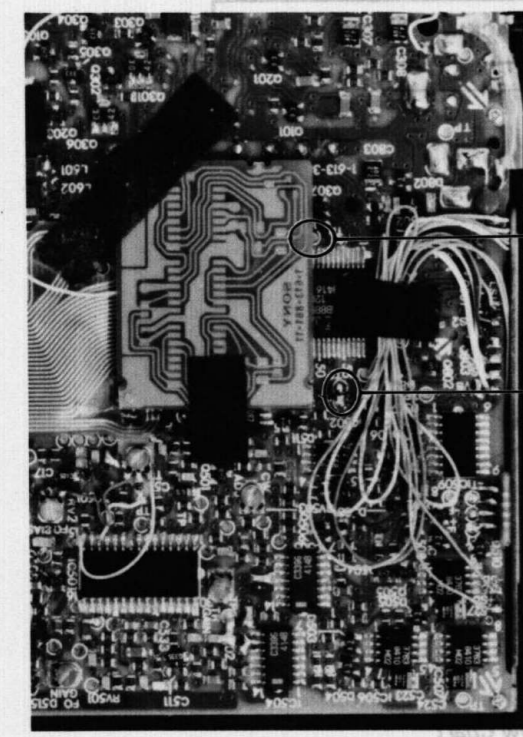


Fig. 3 BATT2 point, RESET point Positions

Step 2 (Service Mode operation)

1. When service mode is set, the display will change 16 times, and those 16 changes will be repeated over and over.  
Note: Some sets using MB88541-120M for microcomputer IC801 will not perform LCD display.  
If this happens:  
1) Play a disc with the set in normal operation.  
2) In that state, solder jumper BATT2 point. (See Figure 3)  
3) Short the RESET point once and release. (See Figure 3)  
4) Plug in external power supply.  
With this the LCD display should be present in service mode. Even if LCD does not display, other operations will be performed.
2. When ■ key is pressed during each operation, it will return to the state in step 1.
3. When ▶▶ or ◀◀ key is pressed, the FOP moves to the inside or outside circumference. Tracking servo and sled servo go off when this is done, so press MODE to turn on the tracking servo if necessary.
4. When REMAIN is pressed, the display stops. When REMAIN is released, the display continues to change. This allows check of each segment.
5. When ▶▶ key is pressed, focus search starts, then CLV-S (run-up mode) starts. When there is no disc, focus search is repeated again and again.  
Note: When MB88541-120M is used for microcomputer IC801, the objective lens may remain up and the disc table may rotate at high speed when the ▶▶ key is pressed.  
(Sets using MB88541-120M for IC801 will set FOCUS ON FLAG after the focus on state has been obtained.)  
If this happens:  
1) Press ■ key.  
2) Unplug external power supply and press ▶▶ key.  
3) Plug in external power supply.  
4) Press ▶▶ key without disc inserted.  
With this, focus search will repeat over and over.
6. When MODE is pressed, tracking servo, sled servo and CLV-A (servo during PLAY) go ON.
7. When 5 and 6 are performed, the disc begins to play. At this time, the top panel should be

closed and S901 and S902 are to be ON. When the laser is not emitted, focus search is repeated. When S901 is on and S902 is off, CLV-S does not work properly and the disc rotates at high speed.

Step 3 (Service Mode release)

1. First be sure to unplug the external power supply, then remove the BATT2 point solder jumper. (During service mode, C803 is discharged by unplugging the external power supply. Therefore, microcomputer IC801 is reset by next plugging in the external power supply.)
2. The set will now operate normally.

MAIN BOARD (double-sided) CHECK

1. The main board is double-sided, so there are parts mounted on both sides. However, checking can be done from the chip component mounted side. Refer to the mounting diagram on page 43 - 46.
2. D/A converter IC's are mounted underneath the DC-DC converter unit, and these can be checked from the chip component mounted side.  
IC's under the DC-DC converter unit:  
IC301: D/A converter  
IC101, 201: integrator, sample hold  
IC302: switcher
3. When operating the set with the LCD module flexible board removed, the pattern corresponding to each key switch is to be grounded momentarily.

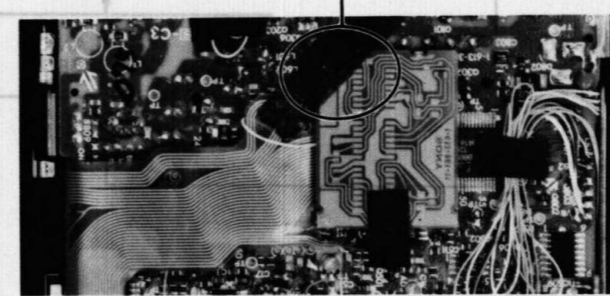
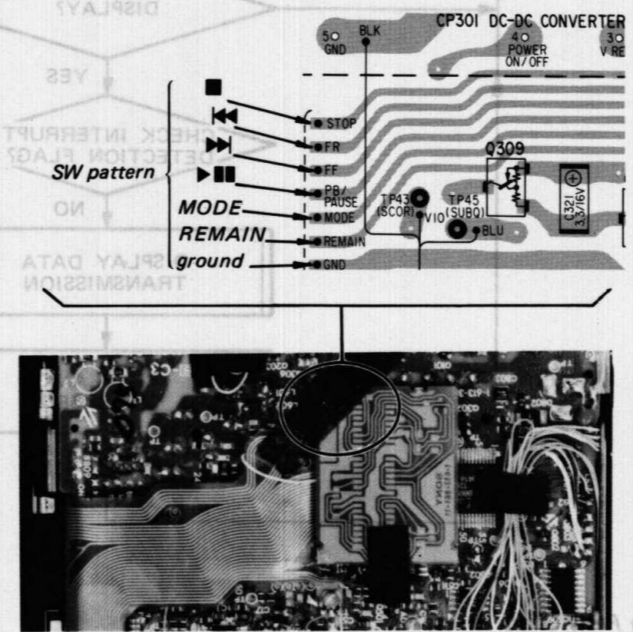


Fig. 4 Switch Pattern Diagram

Laser Diode Check Procedure

The laser diode on this set will not emit unless the top panel is closed and S901 (terminal sorting type), S902 (leaf SW type) are turned on. Focus search can be operated in service mode even if S902 is OFF, so that the laser diode will emit if S901 (terminal shorting type) are turned on in this mode.  
The laser diode is checked using the current value which flows to the laser diode inside the FOP.  
Procedure 1 (service mode or normal operation).

1. Close the top panel.
2. Connect an ammeter as shown in Figure 5.
3. Press the ▶▶ key.
4. Confirm that the ammeter reading is within the range given below.  
10-100 mA  
If not, APC circuit or FOP is defective.  
If normal operation is used, the laser diode goes on for about 3 seconds due to focus search.

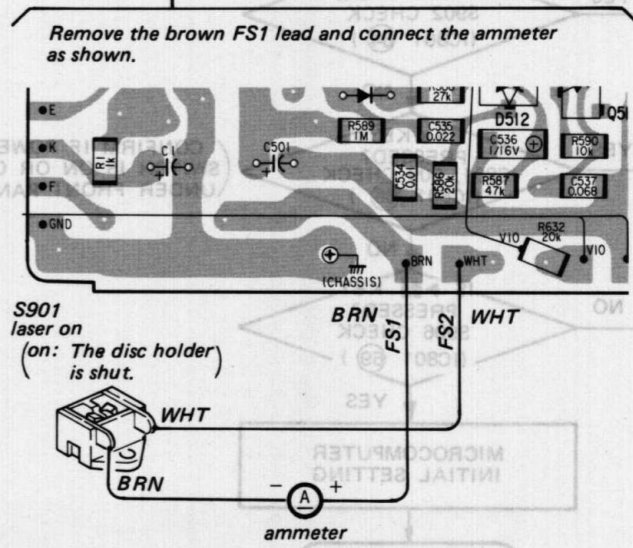
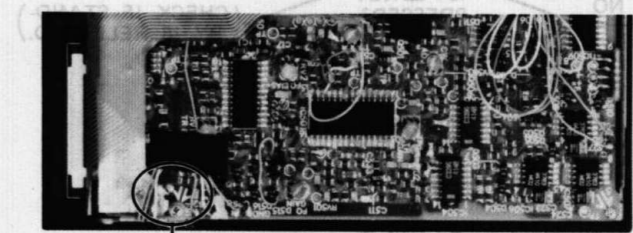
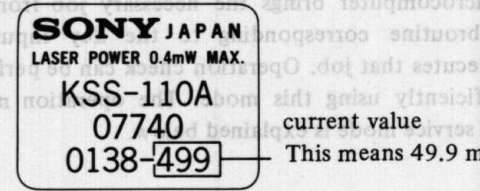
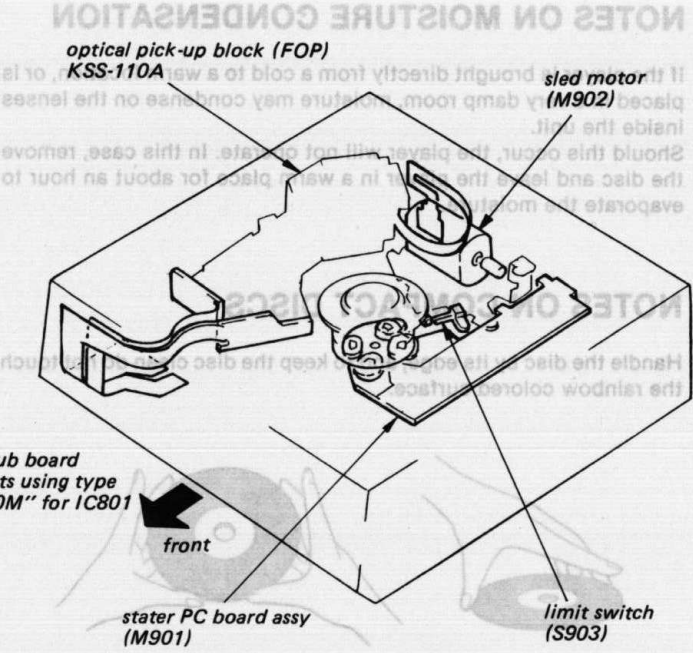
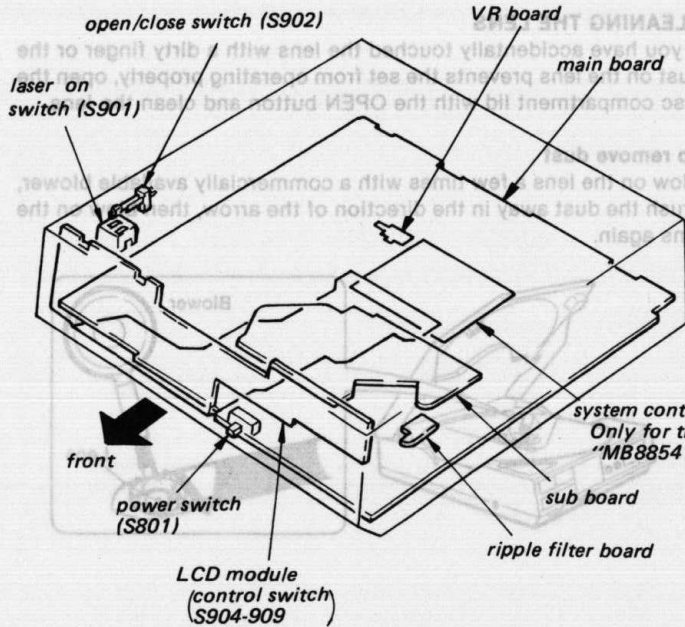


Fig. 5 Ammeter Connection

Procedure 2 (service mode or normal operation)

1. Close the top panel.
  2. Remove the main board and read the current value on the label affixed to the FOP. (Label on FOP)
- 
- The current value varies with the set.
3. Mount the main board and connect an ammeter as shown in Figure 5.
  4. Press the ▶▶ key.
  5. Confirm that the ammeter reading is within the range given below.  
value on label  $\pm 1$  mA (25°C)  
variation relative to temperature:  
0.4 mA/°C  
(Current increases when temperature rises and decreases when it drops.)  
If the value is more than the range given, APC circuit has been defective or the laser diode has deteriorated. If it is less, APC circuit or FOP is defective.

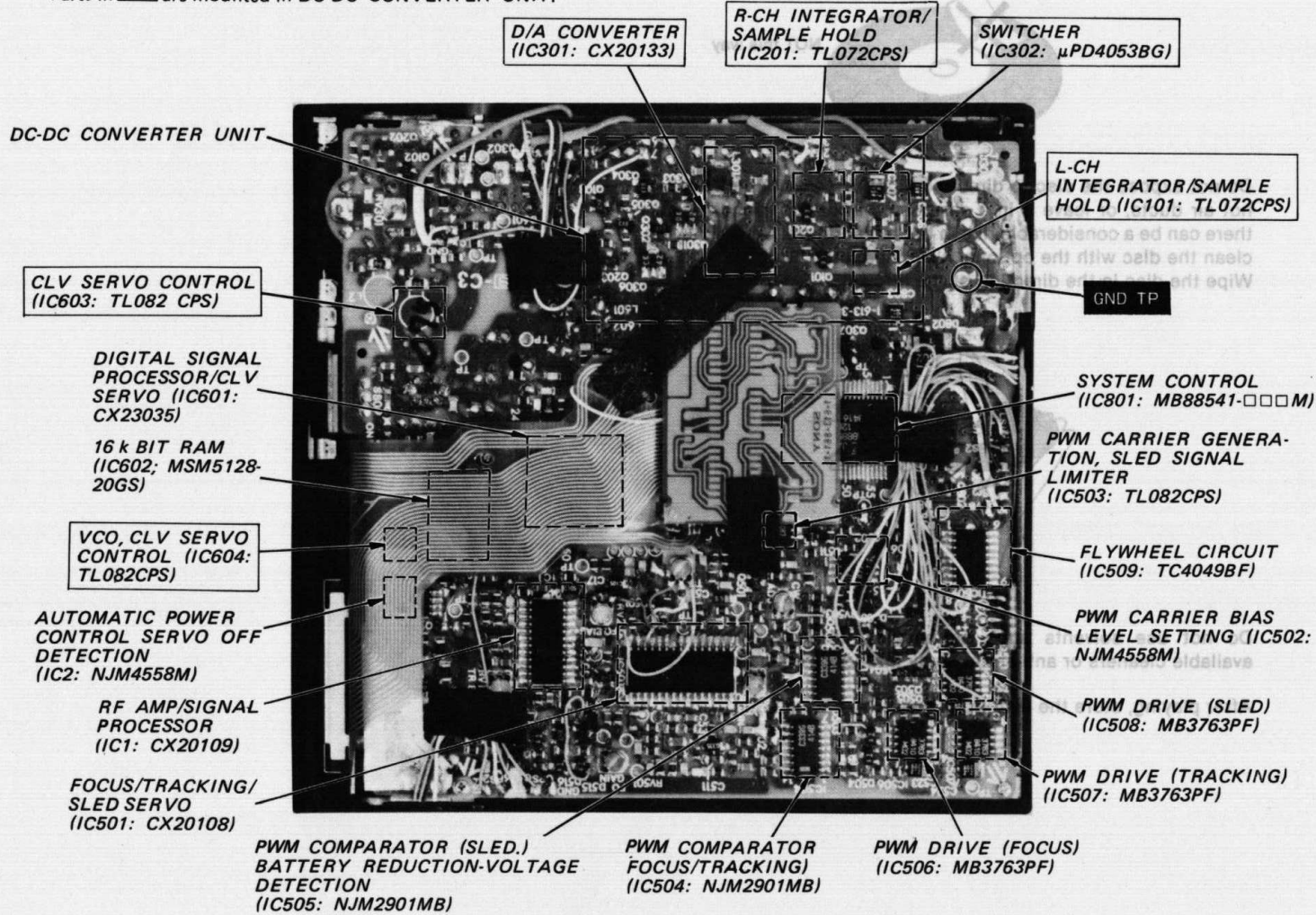
**PC BOARDS/SWITCH/MOTOR LAYOUTS**



**MAIN BOARD IC LAYOUTS**

(Viewed from chip component mounted side)

Parts in   are mounted in DC-DC CONVERTER UNIT.

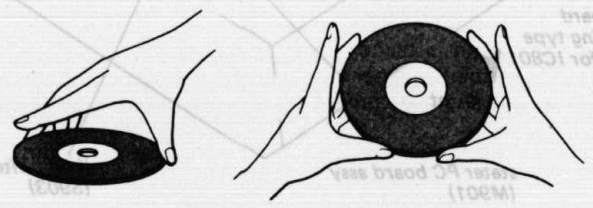


### NOTES ON MOISTURE CONDENSATION

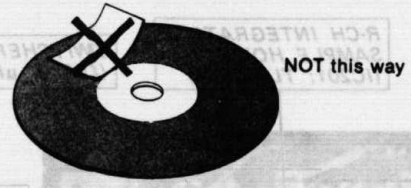
If the player is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lenses inside the unit. Should this occur, the player will not operate. In this case, remove the disc and leave the player in a warm place for about an hour to evaporate the moisture.

### NOTES ON COMPACT DISCS

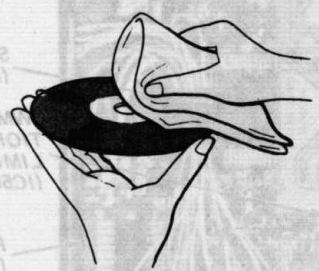
Handle the disc by its edge, and to keep the disc clean do not touch the rainbow colored surface.



Do not stick paper or tape or write anything on the labeled surface.



Do not expose the disc to direct sunlight or heat sources such as hot air ducts, or leave it in a car parked in direct sunlight where there can be a considerable rise in the temperature. Before playing, clean the disc with the optional cleaning cloth.



Do not use solvents such as benzine, thinner, commercially available cleaners or anti-static spray intended for analog discs.

After playing, store the disc in its case.

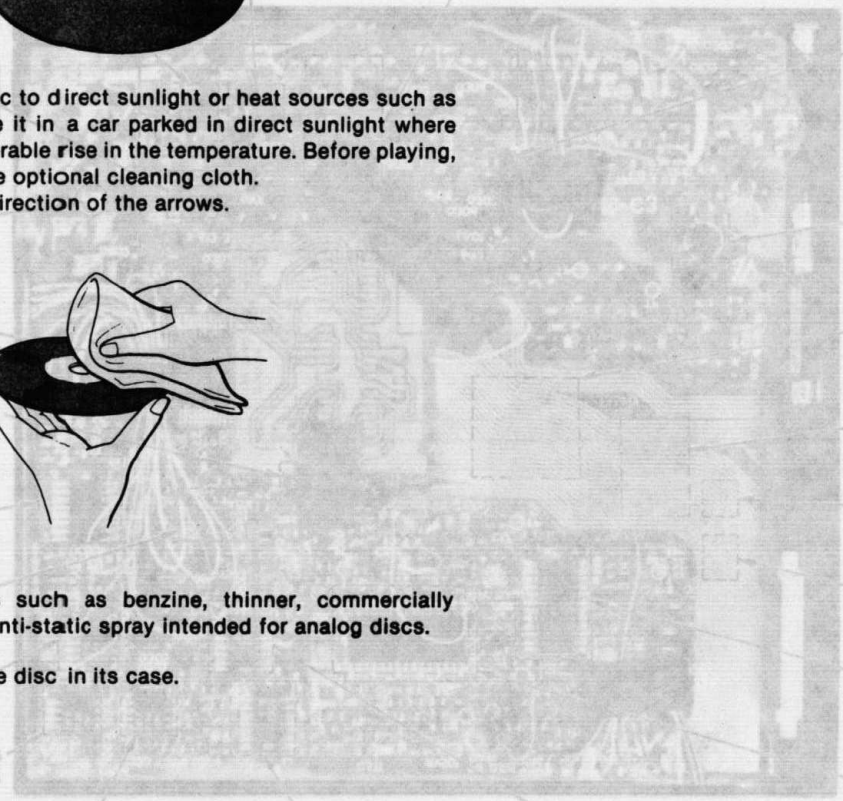
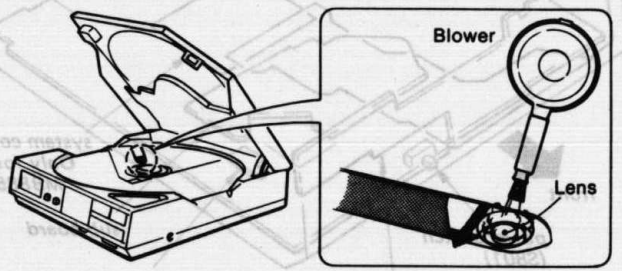
### MAINTENANCE

#### CLEANING THE LENS

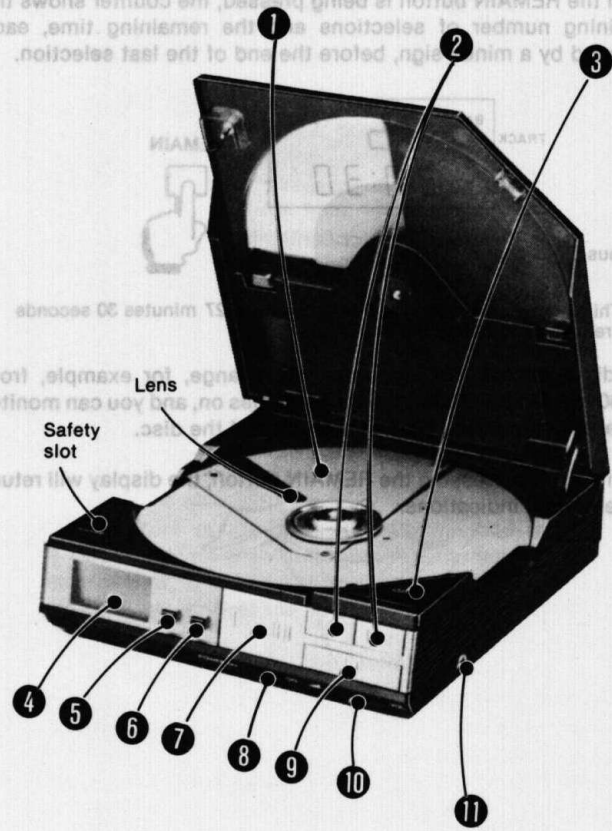
If you have accidentally touched the lens with a dirty finger or the dust on the lens prevents the set from operating properly, open the disc compartment lid with the OPEN button and clean the lens.

#### To remove dust

Blow on the lens a few times with a commercially available blower, brush the dust away in the direction of the arrow, then blow on the lens again.



LOCATION AND FUNCTION OF CONTROLS

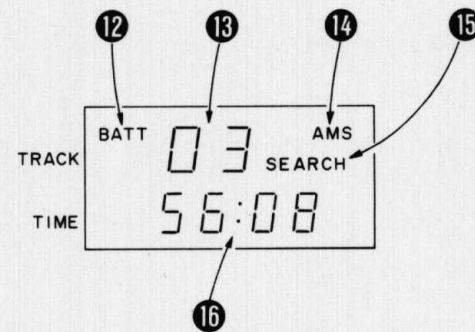


FRONT

- 1 Disc compartment**  
Place a compact disc here. To open the lid, press the OPEN button 3.
- 2 AMS (Automatic Music Sensor) keys**  
While the AMS indicator 11 is being displayed, press the ◀◀ or ▶▶ key to locate the beginning of the desired selection. While the SEARCH indicator 15 is being displayed, keep the ◀◀ or ▶▶ key pressed to go back or advance to the desired point in a particular selection. During pause, you can go back or advance faster than during playback (See page 19).
- 3 OPEN button**  
Press to open the disc compartment lid.
- 4 Display window**  
See 12-16 on pages 17 and 18.
- 5 REMAIN button**  
While this button is being pressed, the TRACK indicator 13 will show the remaining number of selections on the disc and the TIME counter 16 will show the time remaining before the end of the last selection. When you stop pressing the button, the display will return to the normal indications. (See page 20).

- 6 MODE button**  
Press to select either AMS function or SEARCH function. When play starts, the AMS indicator will appear on the display window, indicating that the AMS function can be activated by pressing the ◀◀ or ▶▶ key. To select the SEARCH function, press this button. The SEARCH indicator will appear. Press the button again to return to the AMS function.
- 7 ▶ || (play/pause) key**  
When the POWER switch 8 is set to ON, press this key once. The indications on the display window will appear and play will start. Press again to stop the play for a moment. The TIME counter will flicker. To release the pause mode, press this key again. The TIME counter will return to the normal time indication and disc playing restarts.
- 8 POWER switch**  
Set to ON to turn the power on. The player will stand by and disc playing will start simply by pressing the ▶ || key. Set to OFF after use and when transporting the unit so that the player will not operate even if any of the operation keys or buttons is pressed.
- 9 ■ (stop) key**  
Press to stop the disc playing. The indications on the display window will disappear after a few seconds and disc will stop rotating.
- 10 VOL (headphones volume) control**  
Turn to adjust the volume at the headphones connected to the Ω jack 11. Before playing the disc turn down the volume completely. Turn to the right for more volume as you listen. Turn to the left for less volume.
- 11 Ω (headphones) jack (stereo minijack)**  
Connect an optional pair of headphones for private listening.

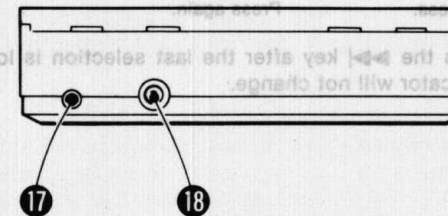
Display window



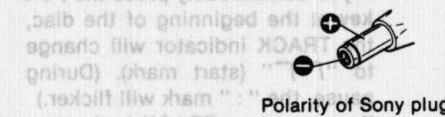
- 12 BATT (battery) indicator**  
This indicator appears when disc playing starts. During battery operation, this indicator shows the battery condition. When the batteries are weak, the indicator flickers.
- 13 TRACK indicator**  
This indicator shows the track number of the selection being played.
- 14 AMS indicator**  
This indicator appears when the MODE button is pressed once during the playback or the pause mode. While this indicator is being displayed, you can locate the beginning of the desired selection by pressing either the ◀◀ or ▶▶ key.
- 15 SEARCH indicator**  
This indicator appears when the MODE button is pressed once during the playback or the pause mode. While this indicator is being displayed, if you press either ◀◀ or ▶▶ key, you can go back or advance to the desired point on the disc.
- 16 TIME counter**  
The counter shows the location in a particular selection by means of actual elapsed time. The first two digits of the counter show playing time of the selection in minutes, and the last two digits show the seconds. While the REMAIN button is being pressed, the counter shows the time remaining before the end of the last selection on the disc. During pause, the time indication flickers.

- 17 LINE OUT jack (stereo minijack)**  
This jack can be connected to the line input jacks of an amplifier when listening through a speaker system or of a tape recorder for recording.
- 18 DC IN 9V (external power input) jack**  
Connect the supplied ac power adaptor, optional car battery cord or battery case.

REAR PANEL

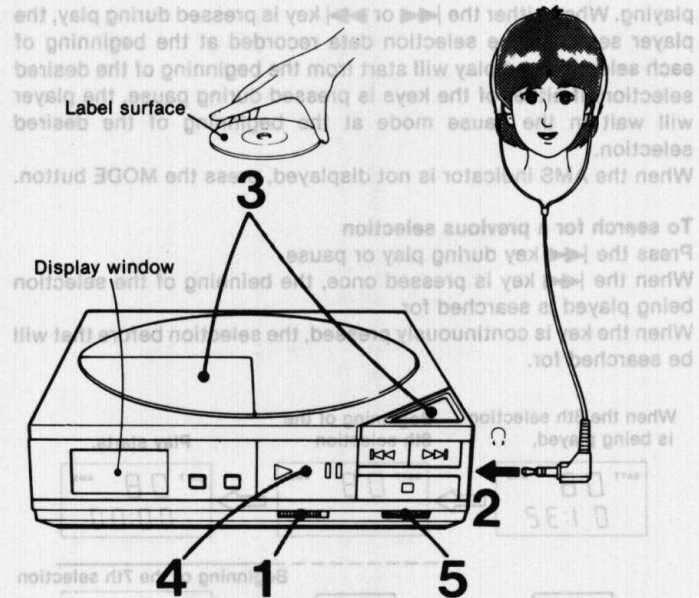


- 17 LINE OUT jack (stereo minijack)**  
This jack can be connected to the line input jacks of an amplifier when listening through a speaker system or of a tape recorder for recording.
- 18 DC IN 9V (external power input) jack**  
Connect the supplied ac power adaptor, optional car battery cord or battery case.



**Note:** Use only an ac power adaptor or car battery cord manufactured by Sony. Polarity of the plugs of other manufacturers may be different.

DISC PLAYING



- 1 Make sure that the POWER switch is set to ON.
  - 2 Connect an optional pair of headphones to the Ω jack.
  - 3 Press the OPEN button to open the disc compartment lid. Holding the disc by the rim, place it with the label side up on the compartment, then close the lid.
  - 4 Press the ▶ || key. The indications on the display window will appear and play will begin from the beginning of the first selection.
  - 5 Turn the VOL control to adjust the headphones volume.
- When the player reaches the end of the last selection of the disc, the indications on the display window will disappear after a few seconds and the disc will stop rotating.

TO STOP DURING PLAY

Press the ■ key. The indications on the display window will disappear after a few seconds and the disc will stop rotating. If you then press the ▶ || key, play will start from the beginning of the first selection. To take out the disc, open the disc compartment lid with the OPEN button.

TO PAUSE DURING PLAY

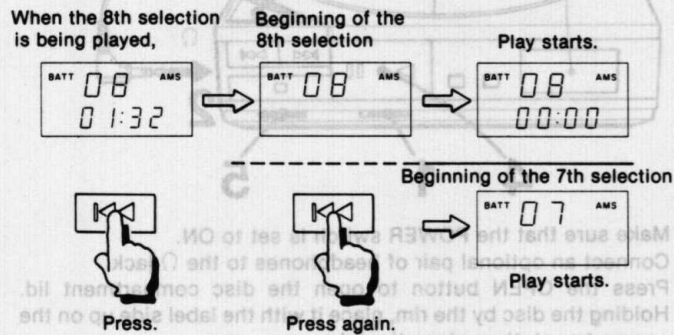
Press the ▶ || key again. The TIME counter will flicker (The disc will not stop rotating). To release pause mode and restart play from the same point, press the ▶ || key again.

### TO SEARCH FOR A PARTICULAR SELECTION—AMS (Automatic Music Sensor) function

While the AMS indicator is being displayed during play or pause, you can quickly locate a selection before or after the selection playing. When either the ◀◀ or ▶▶ key is pressed during play, the player searches the selection data recorded at the beginning of each selection and play will start from the beginning of the desired selection. If either of the keys is pressed during pause, the player will wait in the pause mode at the beginning of the desired selection. When the AMS indicator is not displayed, press the MODE button.

#### To search for a previous selection

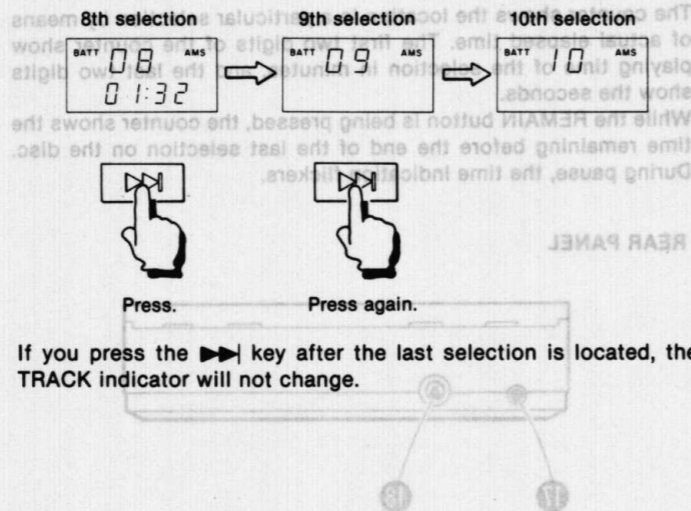
Press the ◀◀ key during play or pause. When the ◀◀ key is pressed once, the beginning of the selection being played is searched for. When the key is continuously pressed, the selection before that will be searched for.



Keep the ◀◀ key pressed until the desired selection number is displayed. If you press the ◀◀ key after the first selection is located, the TRACK indicator will not change.

#### To search for a selection ahead

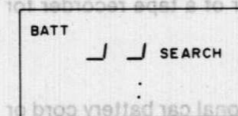
Press the ▶▶ key during play or pause. When the ▶▶ key is pressed once, the selection after the one being played is searched for. When the key is continuously pressed, the selection after that will be searched for.



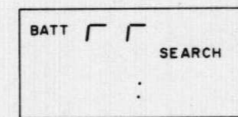
### TO SEARCH FOR A PARTICULAR POINT IN A SELECTION—SEARCH function

During play or pause, press the MODE button so that the AMS indicator on the display window will disappear and the SEARCH indicator will appear instead. While the SEARCH indicator is being displayed, you can locate a particular point in a selection. When either ◀◀ or ▶▶ key is continuously pressed, the disc playing goes forward or in reverse. Release the button at the desired point found by observing the TIME counter or by monitoring the high-speed sound during play.

#### What are these indications?

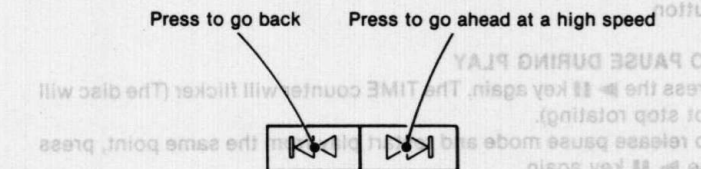


If you continuously press the ▶▶ key at the end of the disc, the TRACK indicator will change to "┌┐" (end mark). (During pause, the ":" mark will flicker.) To return to a TRACK indication, press the ◀◀ key.



If you continuously press the ◀◀ key at the beginning of the disc, the TRACK indicator will change to "┐┐" (start mark). (During pause, the ":" mark will flicker.) To return to a TRACK indication, press the ▶▶ key.

The "┐┐" mark also appears when the set is subject to strong vibration (it is not a problem). When this happens, make sure that the AMS indicator is displayed and press the ▶▶ key so that the display will return to normal indications.

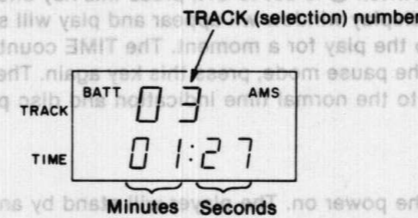


If either ◀◀ or ▶▶ key is pressed when the set is in the pause mode, you can go back or ahead at a higher speed than during play-back.

### USING THE TIME COUNTER

#### TO MONITOR THE ELAPSED PLAYING TIME

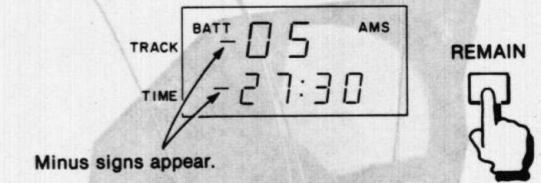
Generally, the TIME counter shows the elapsed playing time from the beginning of the selection in minutes and seconds. When a new selection starts, the counter is reset to "00:00" and then starts counting time again. If the selection has a blank space at its beginning, the counter is reset to the time preceded by the minus sign such as "-00:02", "-00:01", etc.



This indication shows that 1 minute 27 seconds have elapsed from the beginning of the third selection.

#### TO MONITOR THE REMAINING PLAYING TIME

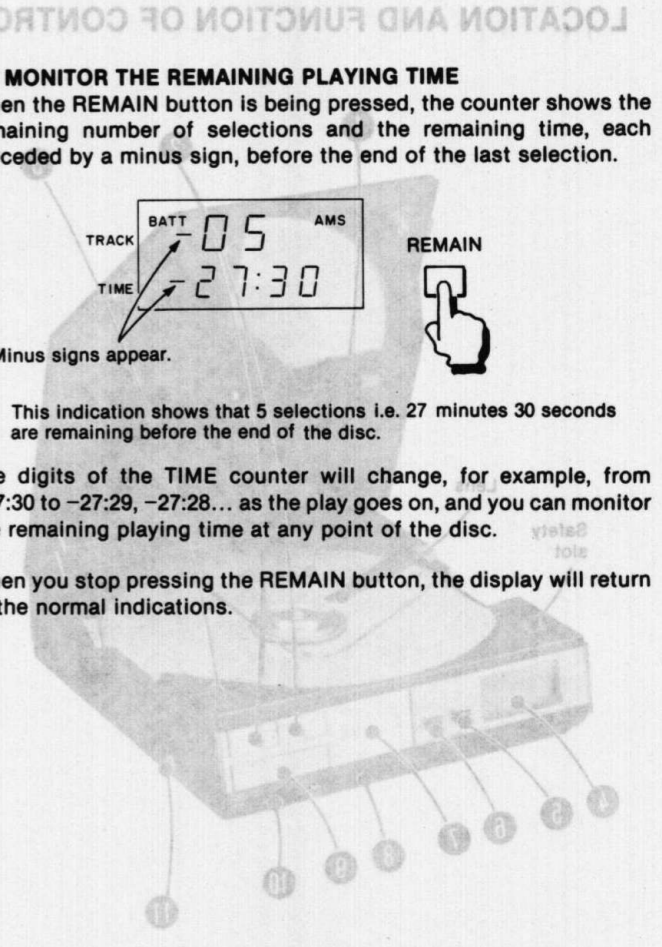
When the REMAIN button is being pressed, the counter shows the remaining number of selections and the remaining time, each preceded by a minus sign, before the end of the last selection.



This indication shows that 5 selections i.e. 27 minutes 30 seconds are remaining before the end of the disc.

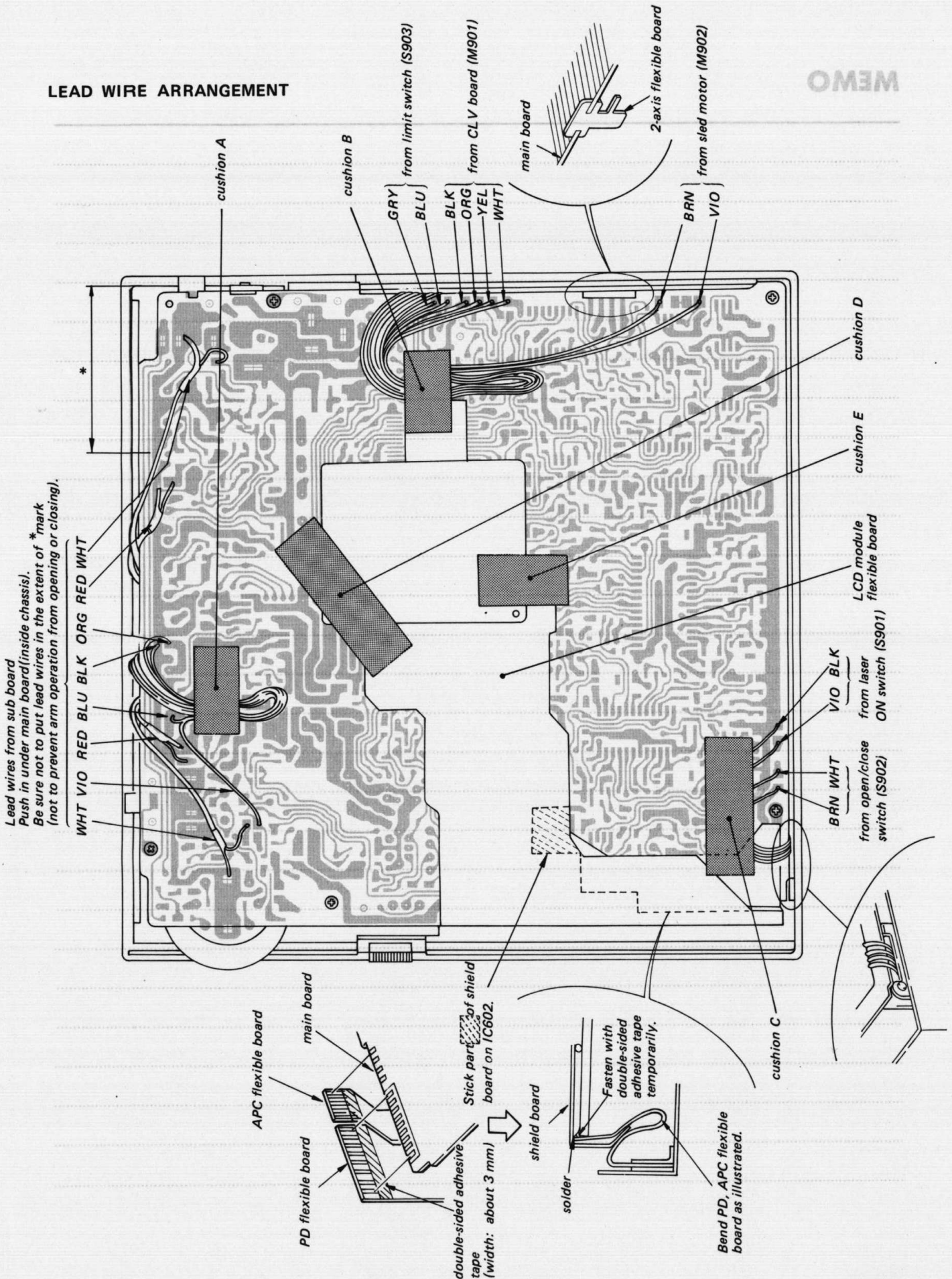
The digits of the TIME counter will change, for example, from -27:30 to -27:29, -27:28... as the play goes on, and you can monitor the remaining playing time at any point of the disc.

When you stop pressing the REMAIN button, the display will return to the normal indications.



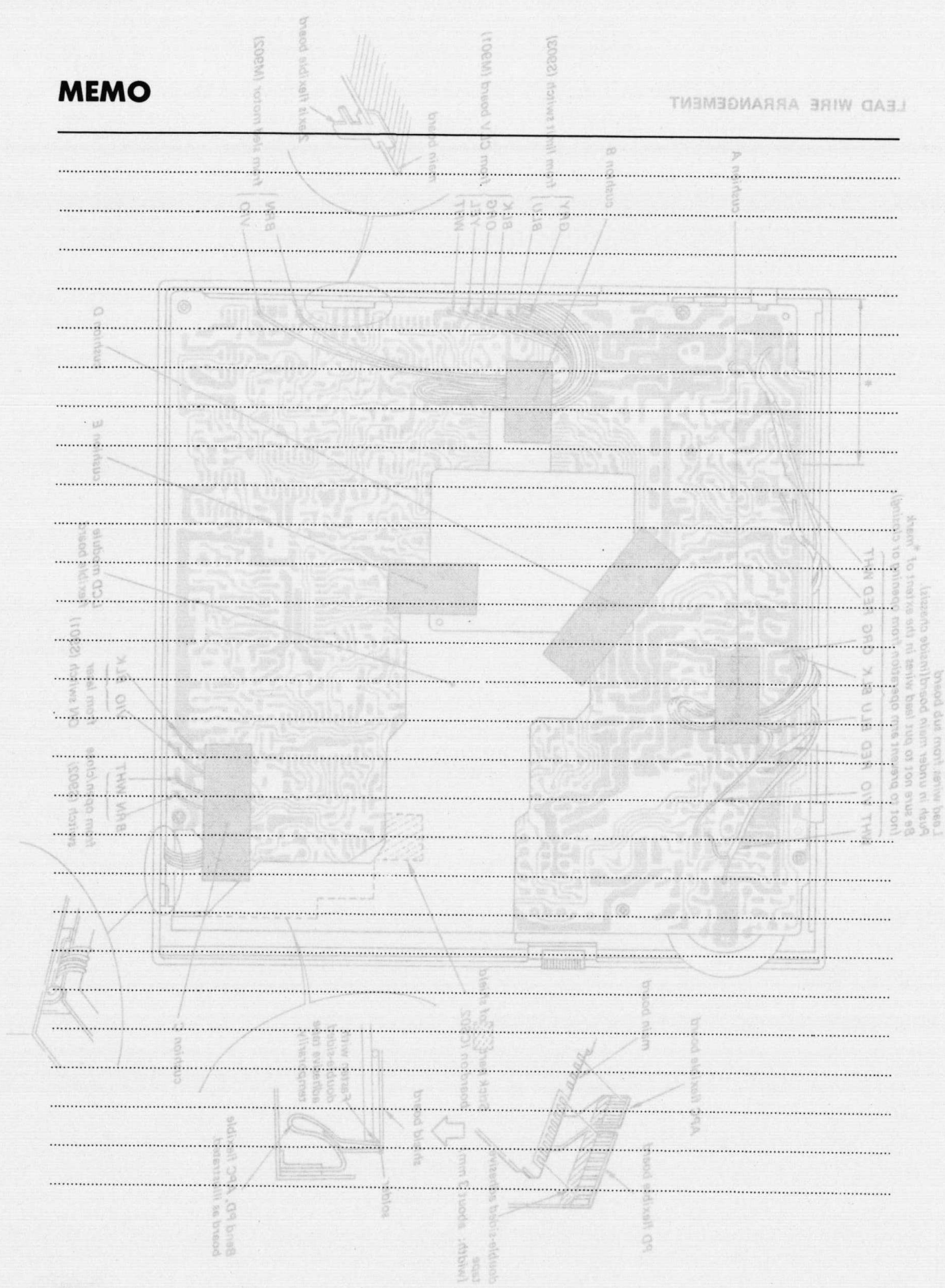
MEMO

### LEAD WIRE ARRANGEMENT



# MEMO

## LEAD WIRE ARRANGEMENT





SECTION 1

OUTLINE

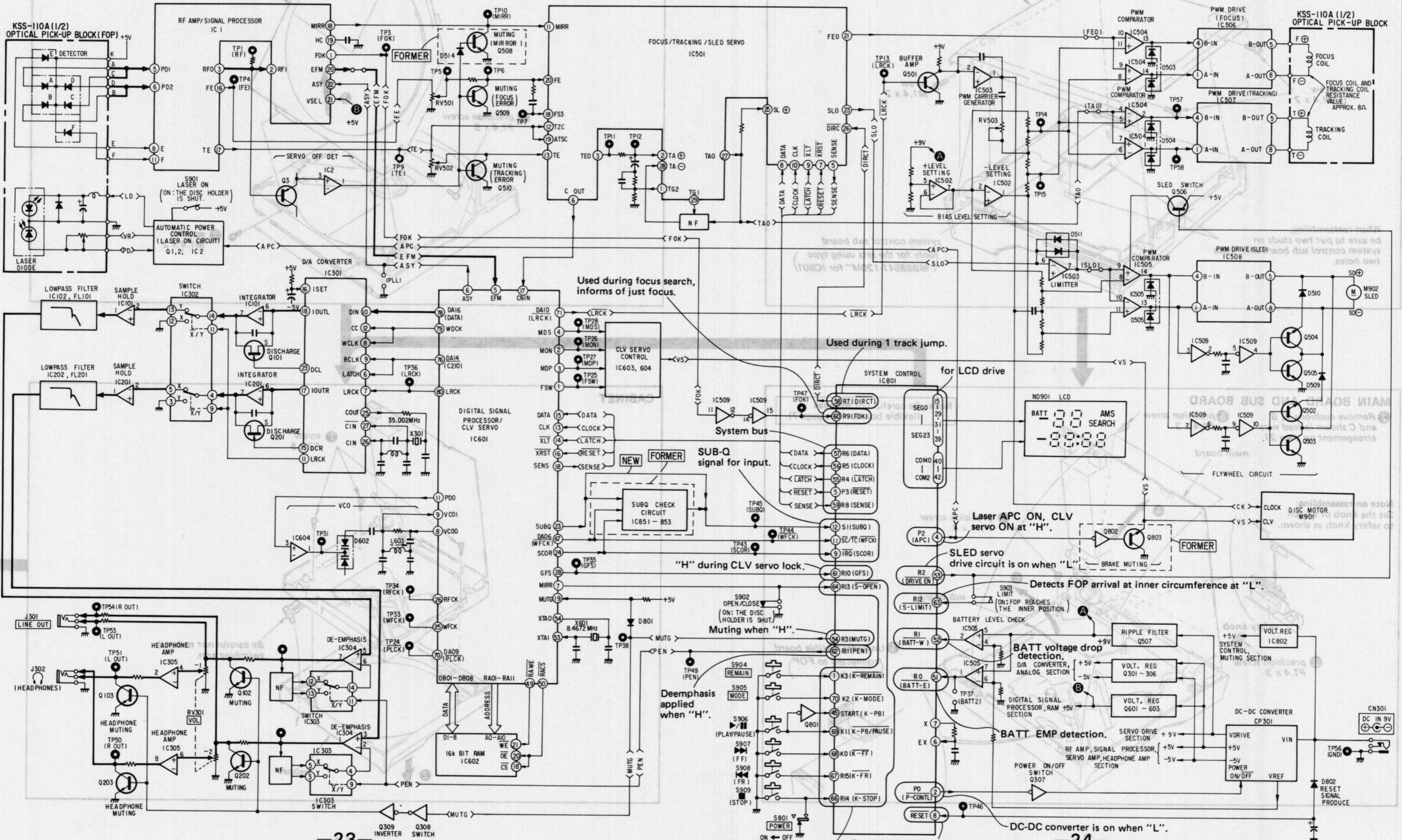
1-1. BLOCK DIAGRAM

Note:

A part of the circuit in this model differs depending on the microcomputer (Old: MB88541-120M, New: MB88541-124M) being used for IC801. These differences are indicated by "Old" and "New".

Old . . . . . shows the circuit of the set using type "MB88541-120M" for IC801 (D-5; up to serial No. 104,000).

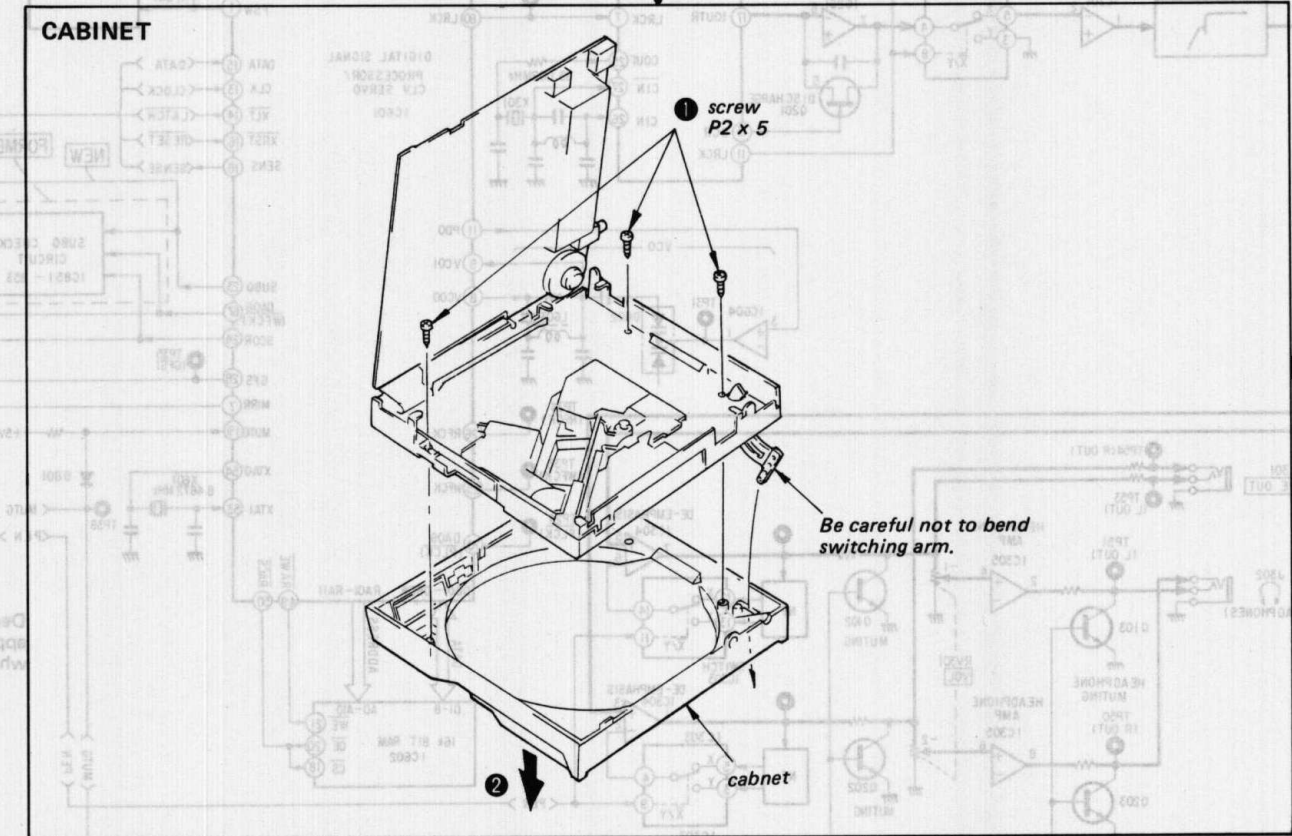
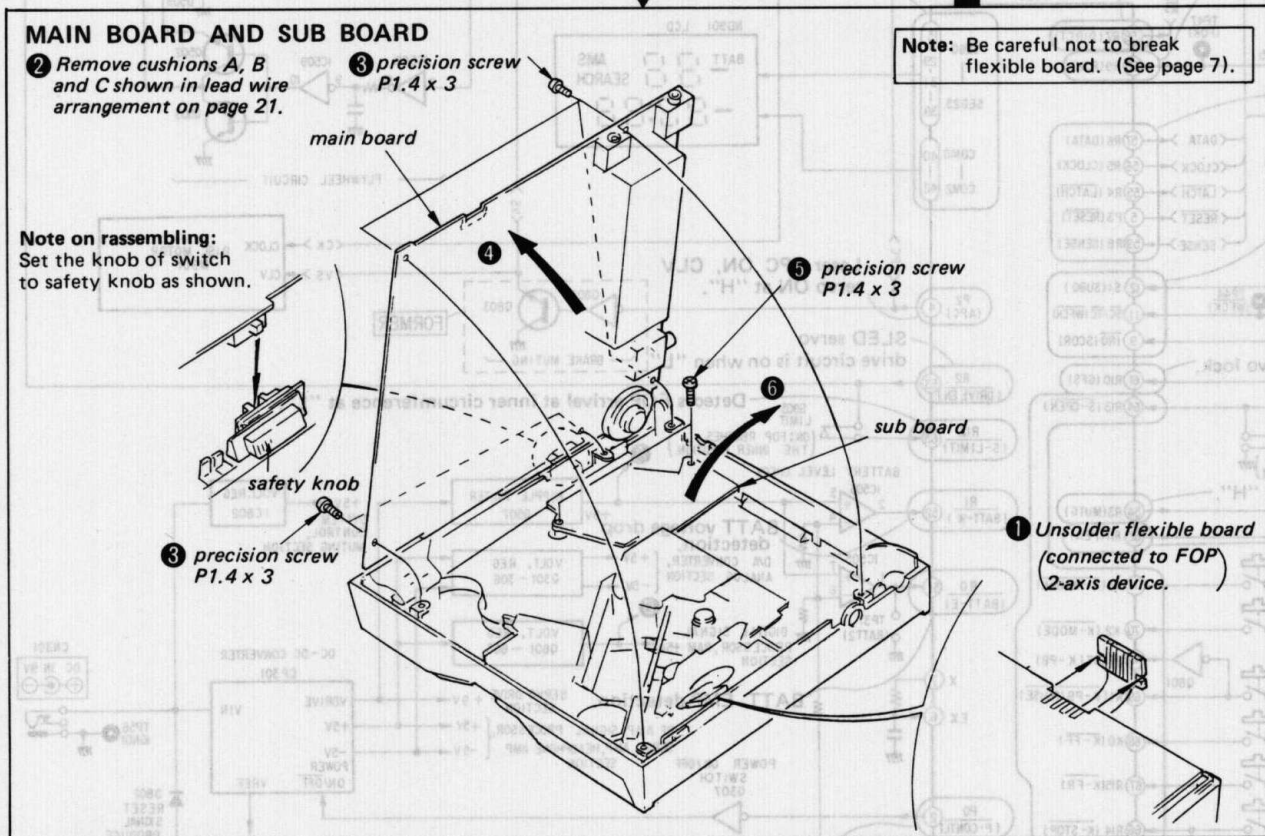
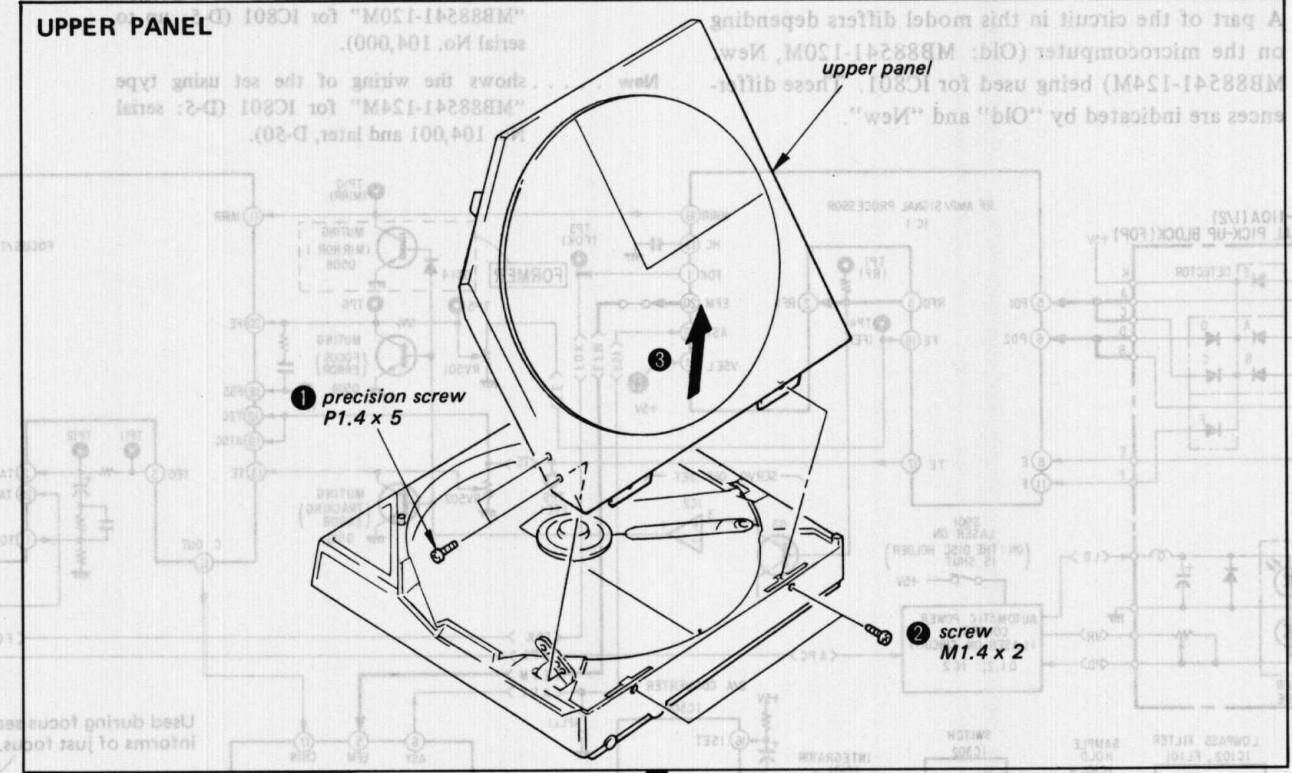
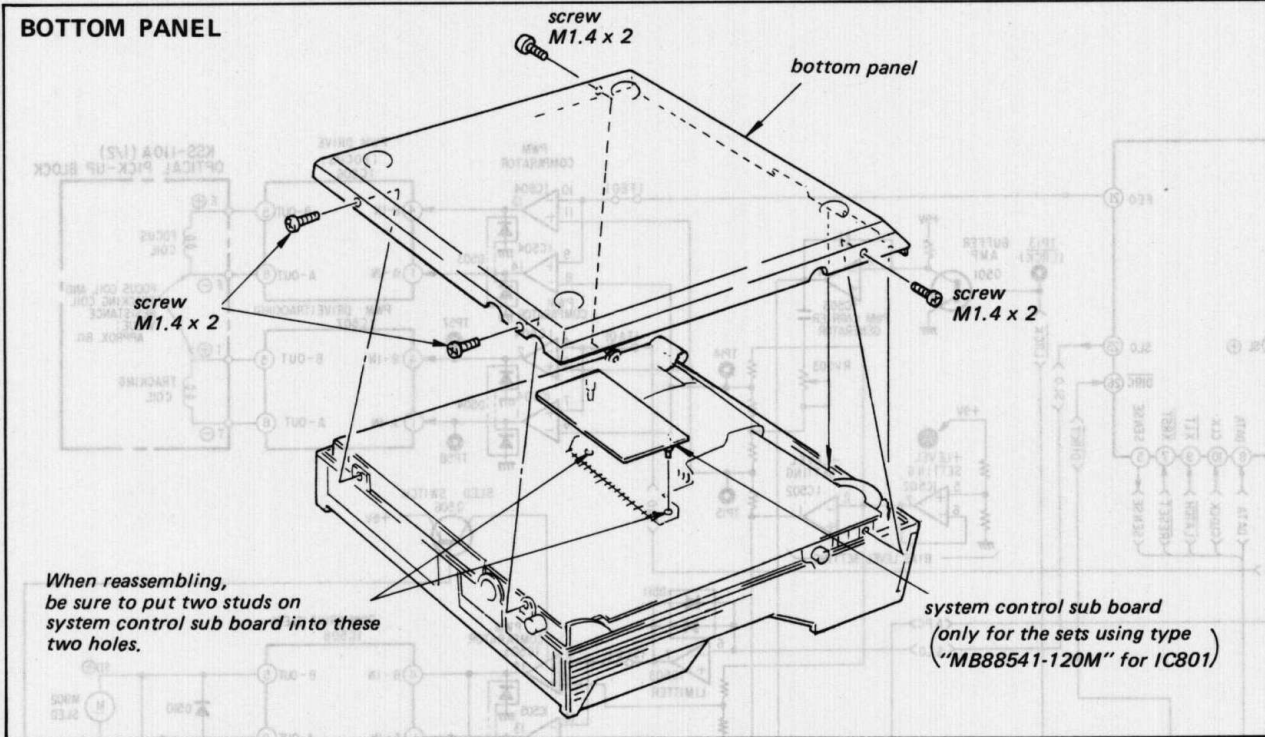
New . . . . . shows the wiring of the set using type "MB88541-124M" for IC801 (D-5; serial No. 104,001 and later, D-50).

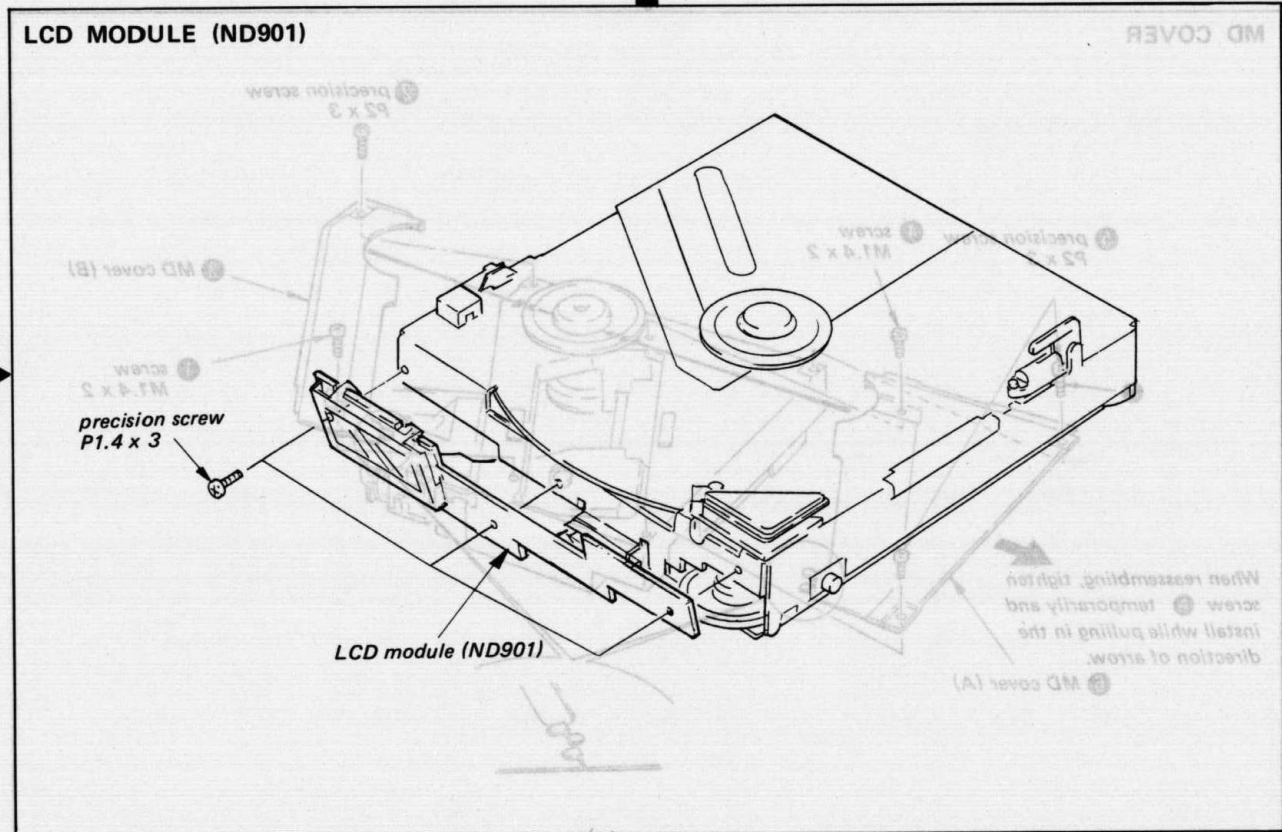
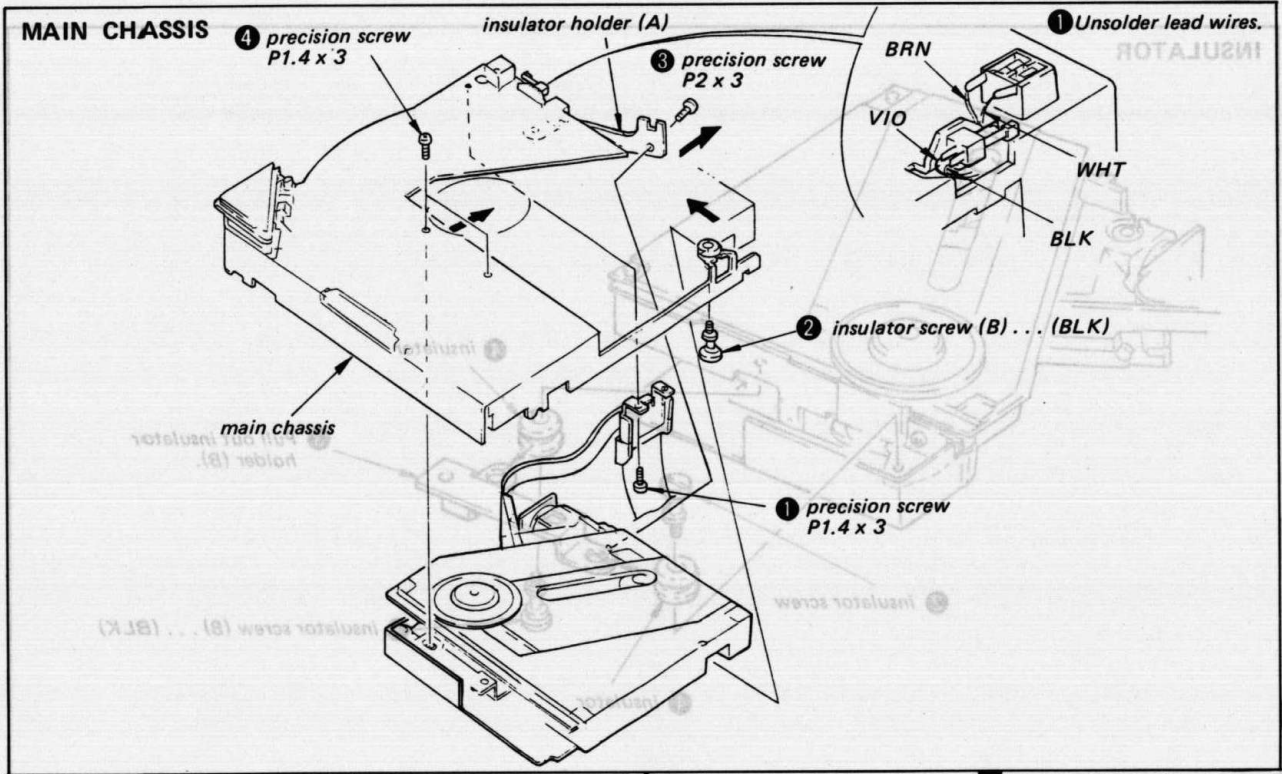


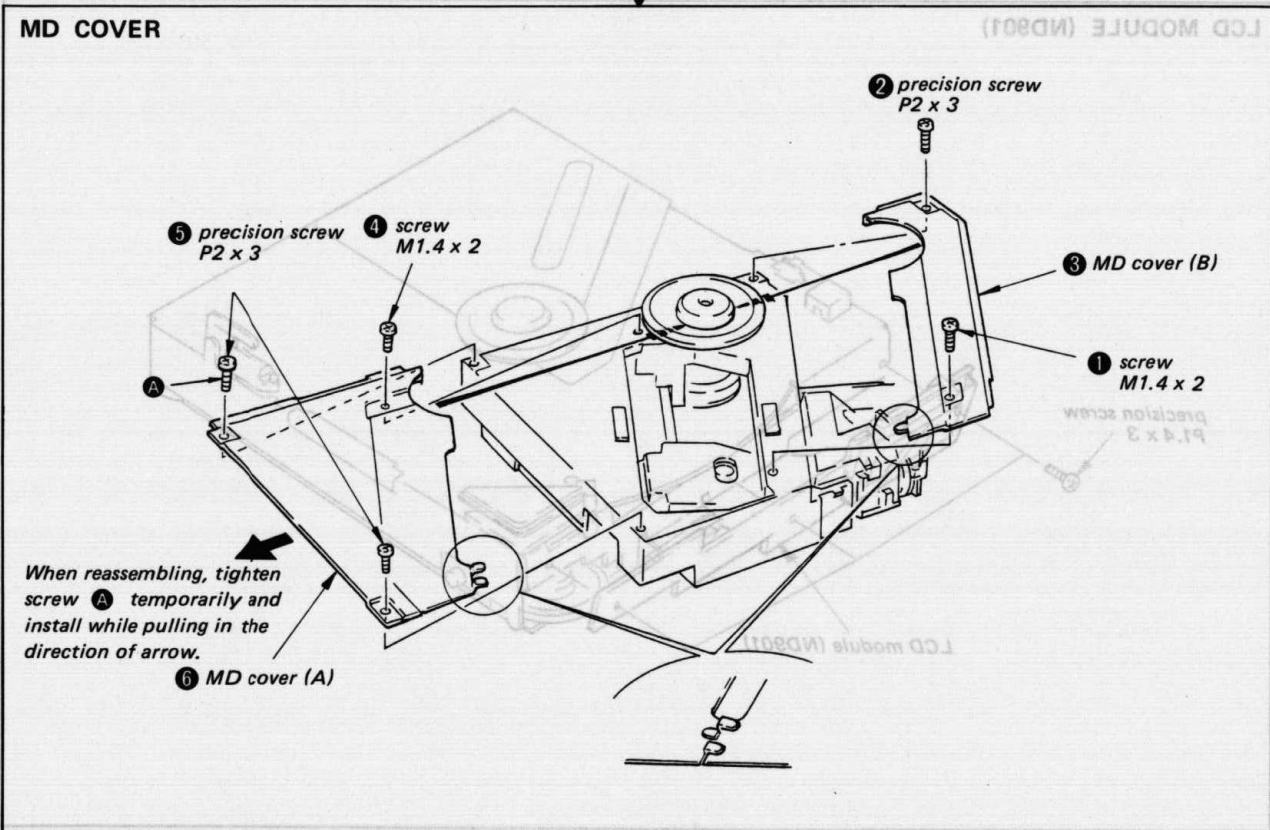
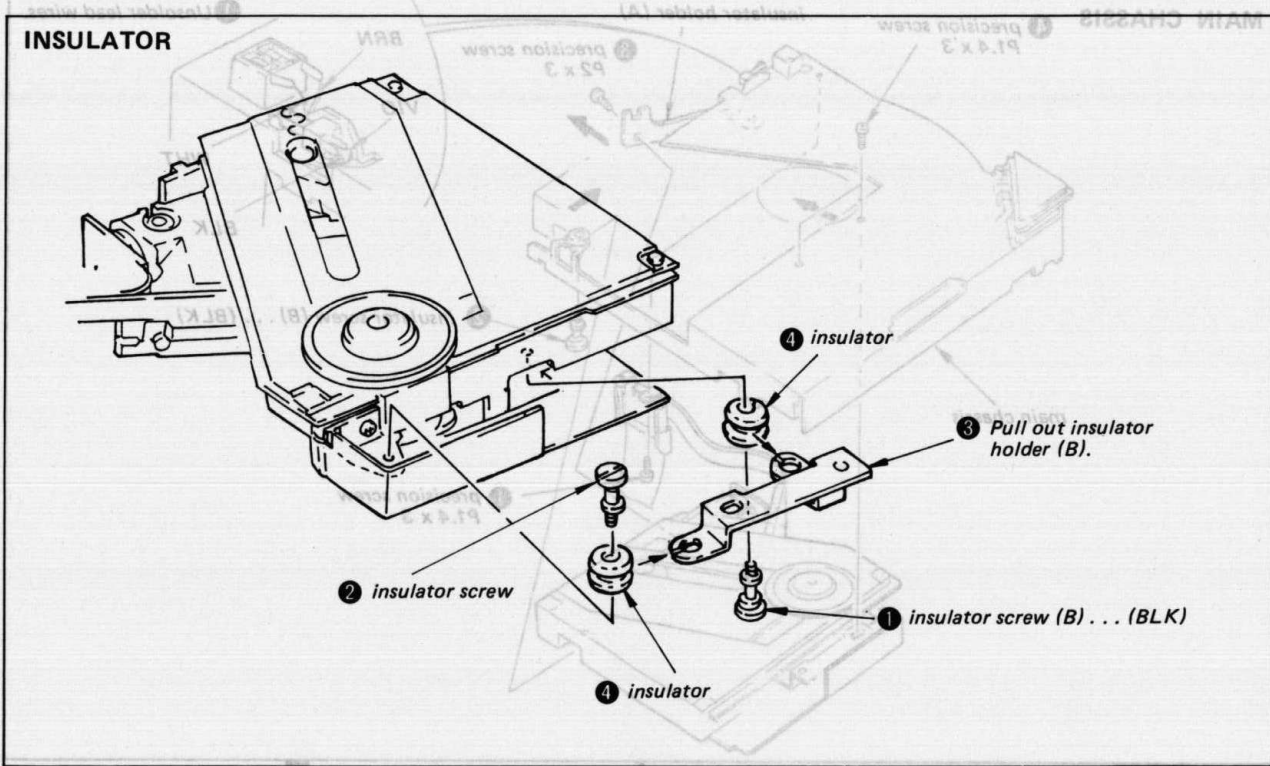
### SECTION 2 DISASSEMBLY AND REASSEMBLY

#### 2-1. DISASSEMBLY

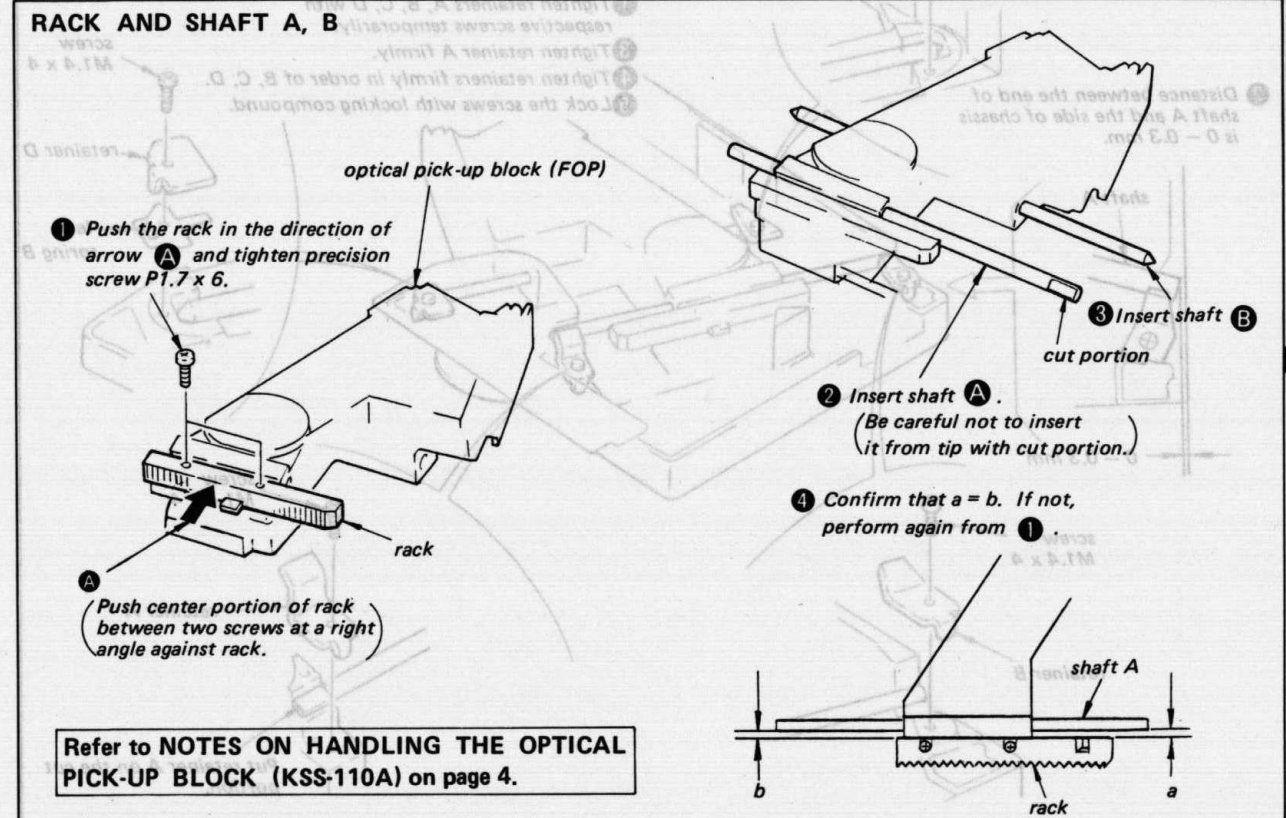
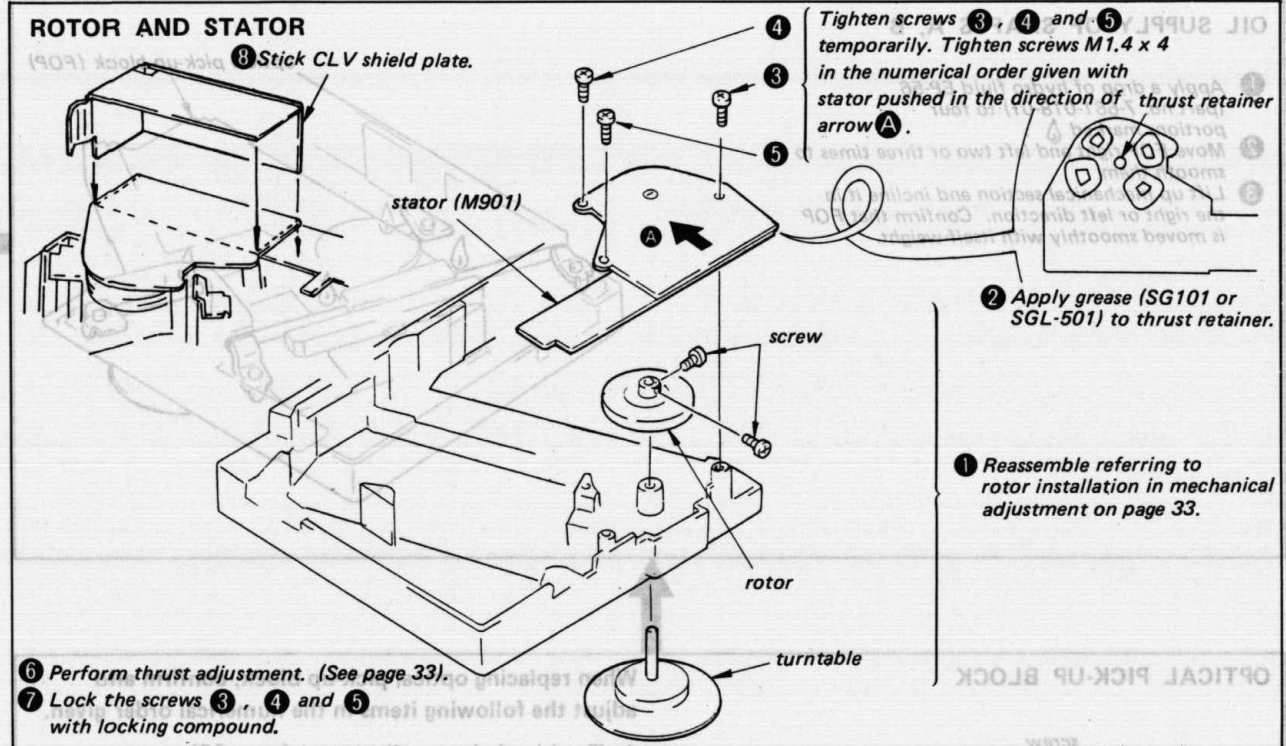
**Note:** Follow the disassembly procedure in the numerical order given.








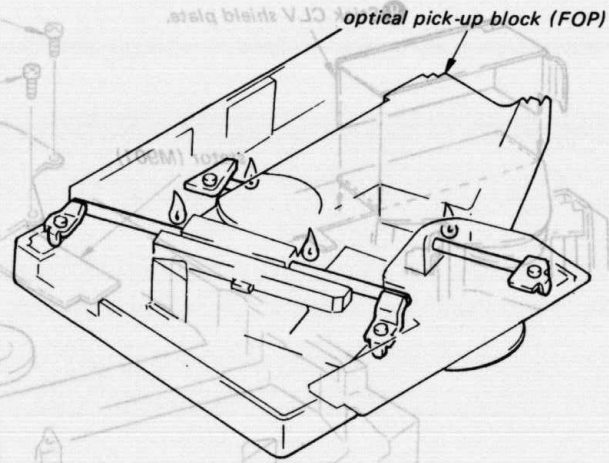
### 2.2. MECHANICAL SECTION REASSEMBLY



Refer to NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK (KSS-110A) on page 4.

OIL SUPPLY OF SHAFTS A, B

- 1 Apply a drop of hydro fluid EP-56 (part no. 7-661-018-01) to four portions marked .
- 2 Move FOP right and left two or three times to smooth them.
- 3 Lift up mechanical section and incline it in the right or left direction. Confirm that FOP is moved smoothly with itself-weight.

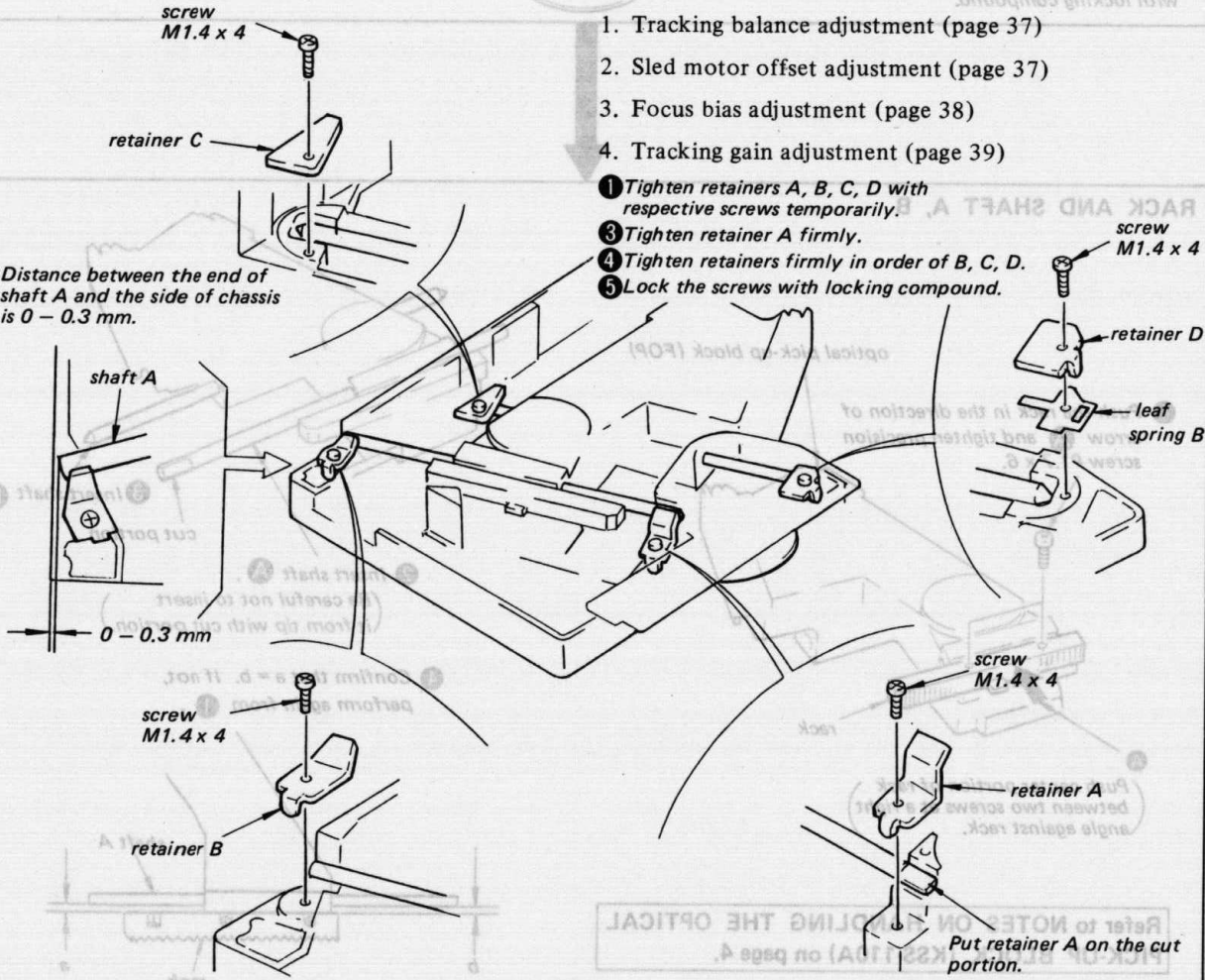


OPTICAL PICK-UP BLOCK

When replacing optical pick-up block, confirm and adjust the following items in the numerical order given.

- 1. Tracking balance adjustment (page 37)
- 2. Sled motor offset adjustment (page 37)
- 3. Focus bias adjustment (page 38)
- 4. Tracking gain adjustment (page 39)

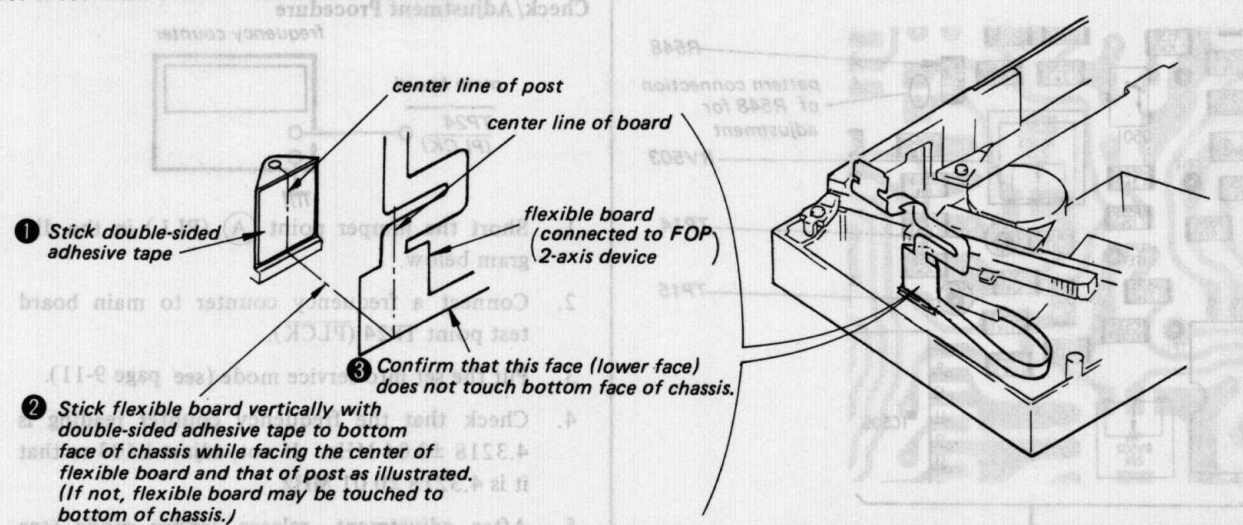
2 Distance between the end of shaft A and the side of chassis is 0 - 0.3 mm.



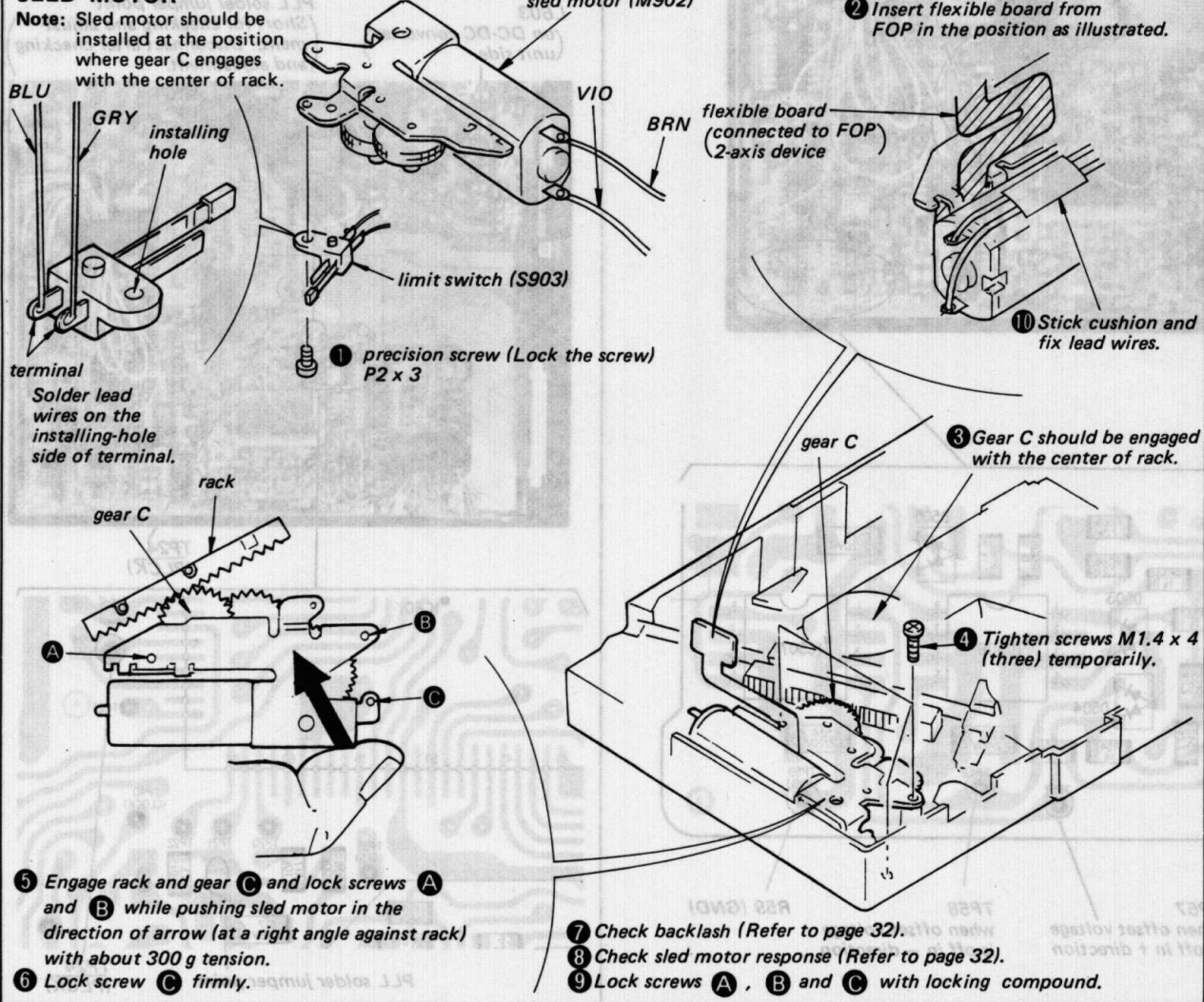
- 1 Tighten retainers A, B, C, D with respective screws temporarily.
- 2 Tighten retainer A firmly.
- 3 Tighten retainers firmly in order of B, C, D.
- 4 Lock the screws with locking compound.

Refer to NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK (KSS-110A) on page 4.

**ATTACHMENT OF FLEXIBLE BOARD**



**SLED MOTOR**



**2-3. MECHANICAL ADJUSTMENTS**

**Backlash Check**

**Measuring Locations:**

- Outer circumference: Where dimension A in the figure at right (space between FOP and press plate B) is 3-5 mm.
- Middle: Location where gear C engagement point is at the center of the rack.
- Inner circumference: Where dimension B at right (space between FOP and retainer A) is 3-5 mm.

**Measuring Procedure:**

- Apply 3 V to sled motor lead and move the FOP to the measuring location. (Refer to figure).
- At each measuring location, check that there is no movement in the directions of the arrows marked X and Z when 50 g is applied to a fan-shaped tension gauge.
- If there is movement, sled motor mounting should be redone. (Refer to page 31, Sled Motor Assembly.)

Switch position	Direction of movement	Switch position	Direction of movement
side A	inner to outer circumference	side B	outer to inner circumference

**Sled Motor Response Check**

If the following check is not satisfied, replace the sled motor (M902).

**Minimum Activation Voltage Check.**

- Apply 1.5 V and check that the FOP moves smoothly from the inner to the outer circumference.
- Next apply 2 V and check that the FOP moves smoothly from the outer to the inner circumference.

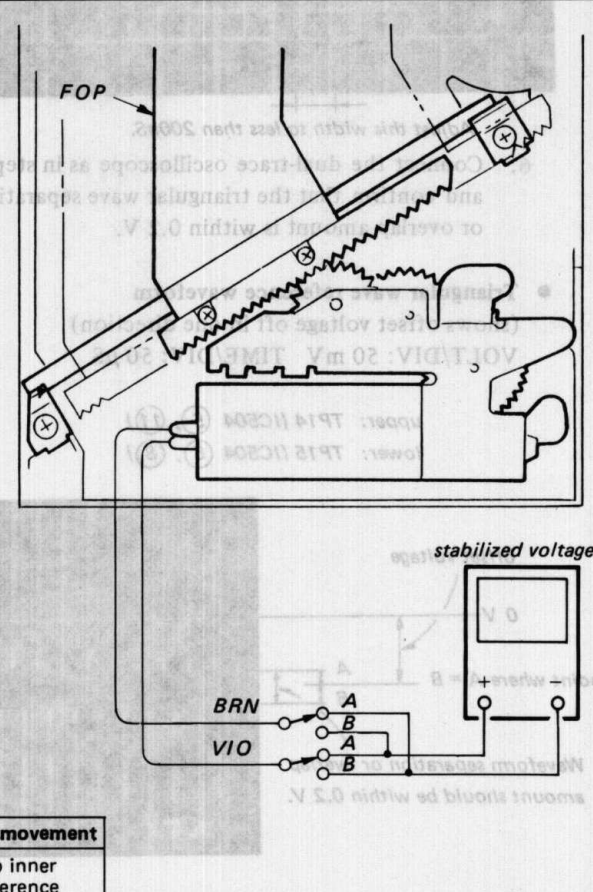
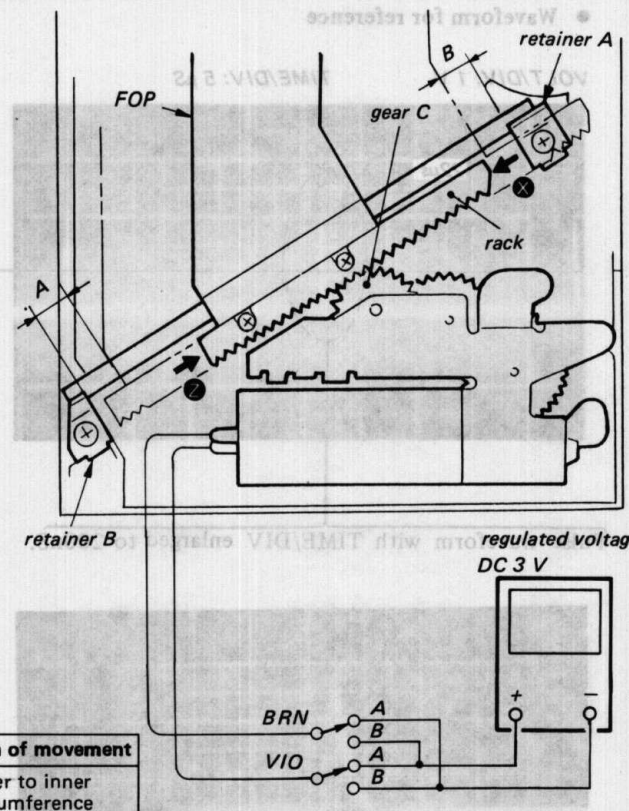
**Sled Sending Current Check**

- Apply 3 V and move the FOP from the innermost to the outermost circumference. Check that current value is less than 120 mA at this time.
- Next move the FOP from the outermost to the innermost circumference. Check that current value is less than 150 mA at this time.

**Sled Sending Time Check**

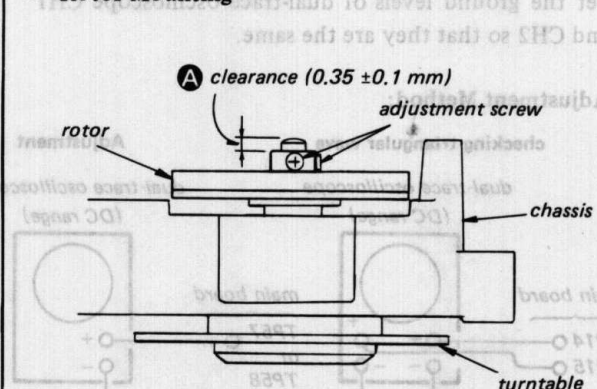
Apply 3 V, and check that the time for the FOP to move from the innermost to the outermost circumference and from the outermost to the innermost circumference is less than 5 seconds each.

Switch position	Direction of movement	Switch position	Direction of movement
side A	inner to outer circumference	side B	outer to inner circumference



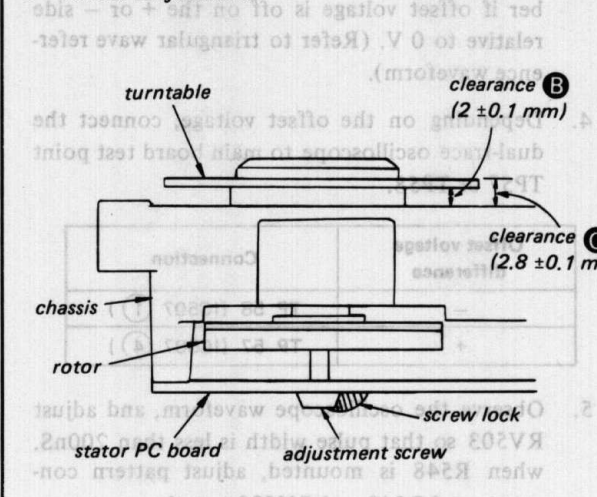
**Rotor Mounting, Thrust Adjustment**

**Rotor Mounting**



Mount the rotor on the turntable shaft so that the clearance A above is  $0.35 \pm 0.1$  mm.

**Thrust Adjustment**



Adjust the adjustment screw so that clearance B and C above are as follows:  
 B:  $2 \pm 0.1$  mm  
 C:  $2.8 \pm 0.1$  mm  
 Lock the screw after adjustment.

### SECTION 3 ADJUSTMENTS

#### 3-1. ELECTRICAL ADJUSTMENTS

##### Notes on Adjustment

1. Perform adjustments in service mode. Be sure to release service mode after completing adjustment. (Refer to "Service Mode (service program)" on page 9-11.)
2. Perform adjustments in the order given.
3. Use YEDS-1, but only when disc use is indicated.
4. Power supply voltage: DC 9 V  
Power switch: ON

##### PREPARATION

Put the set into service mode (see page 9-11) and perform the following checks. Repair if there are any abnormalities.

##### • Sled Motor Check

1. Press the OPEN button and open the top panel.
2. Press the **▶▶**, **◀◀** keys and make sure that the FOP moves smoothly, without catching, from the inmost → outmost → inmost circumference.
  - ▶▶: FOP moves outward
  - ◀◀: FOP moves inward

##### • Focus Search Check

1. Press the OPEN button and open the top panel.
2. Press the **▶■** key. (Focus search is performed continuously. Laser does not emit.)
3. Observe the FOP objective lens and check that it moves smoothly up and down with no catching or noises.
4. Press the **■** key. Check that focus search operation stops. If it does not, press the **■** key again, longer.

##### Note:

For sets using MB88541-120M for microcomputer IC801, the objective lens may stay up and the disc table rotate at high speed when the **▶■** key is pressed.

(Sets using MB88541-120M for IC801 will only perform focus search once the second time after the focus on state has been obtained.)

If this happens,

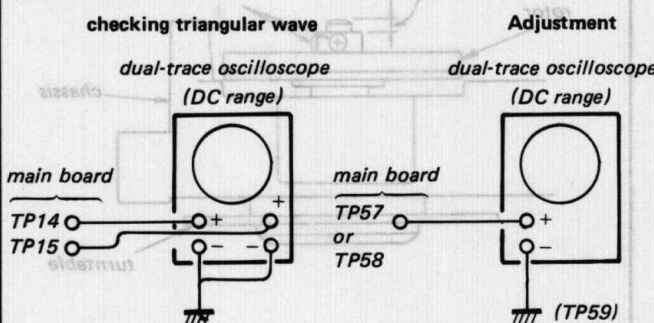
- 1) Press **■** key.
- 2) Unplug external power supply and press **▶■** key.
- 3) Plug in external power supply.
- 4) Press **▶■** key, without disc inserted. With this, focus search will be repeated over and over.

#### TRIANGULAR WAVE ADJUSTMENT

##### Conditions:

Set the ground levels of dual-trace oscilloscope CH1 and CH2 so that they are the same.

##### Adjustment Method:



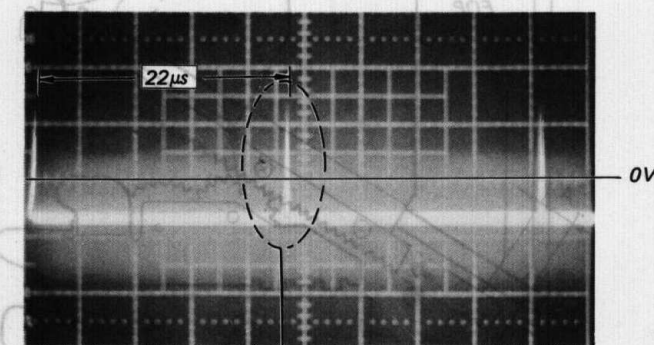
1. Connect the dual-trace oscilloscope to main board test points TP14 and TP15.
2. Put the set into service mode (refer to pages 9-11).
3. Observe the oscilloscope waveform and remember if offset voltage is off on the + or - side relative to 0 V. (Refer to triangular wave reference waveform).
4. Depending on the offset voltage, connect the dual-trace oscilloscope to main board test point TP57 or TP58.

Offset voltage difference	Connection
-	TP 58 (IC507 ①)
+	TP 57 (IC507 ④)

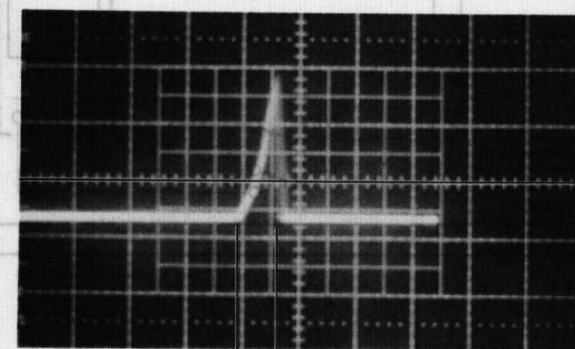
5. Observe the oscilloscope waveform, and adjust RV503 so that pulse width is less than 200nS. when R548 is mounted, adjust pattern connection of R548 and RV503 together. After adjustment, check the waveform for the other test point (TP57 or TP58). If the pulse width is over 200nS, the test point connection was wrong in step 4. Repeat step 4.

##### • Waveform for reference

VOLT/DIV: 1 V TIME/DIV: 5 μS



Pulse waveform with TIME/DIV enlarged to 200nS.



Adjust this width to less than 200nS.

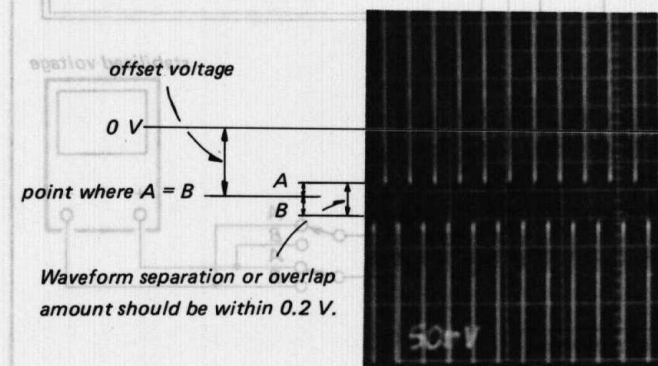
6. Connect the dual-trace oscilloscope as in step 1 and confirm that the triangular wave separation or overlap amount is within 0.2 V.

##### • Triangular wave reference waveform

(shows offset voltage off in one direction)

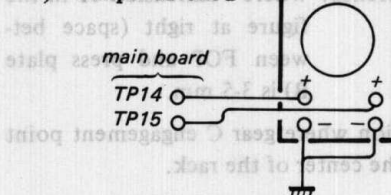
VOLT/DIV: 50 mV TIME/DIV: 50 μS

upper: TP14 (IC504 ⑤, ⑪)  
lower: TP15 (IC504 ⑥, ⑧)



7. After adjustment, release service mode. (Refer to pages 9-11).

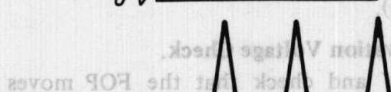
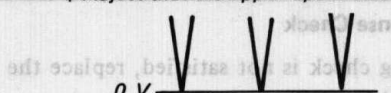
##### B) Simple Method



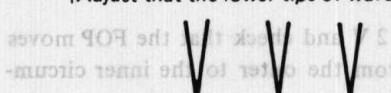
1. Connect the dual-trace oscilloscope to main board test points TP14 and TP15.
2. Put the set into service mode (refer to pages 9-11).
3. Observe the oscilloscope waveform and confirm if offset voltage is off on the + or - side relative to 0 V. (Refer to triangular wave reference waveform).
4. Depending on the offset voltage, adjust RV503 so that the tips of triangular wave are 0 V as fig. A and B below. When R548 is mounted, adjust pattern connection of R548 and RV503 together.

##### • Waveform for adjustment

A) When offset voltage is off in - direction. (Adjust that the upper tips of waveform are 0 V.)



B) When offset voltage is off in + direction. (Adjust that the lower tips of waveform are 0 V.)



5. After adjustment, release service mode. (See page 9-11.)

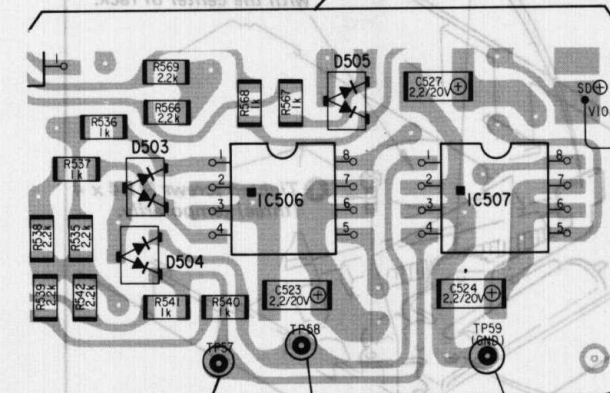
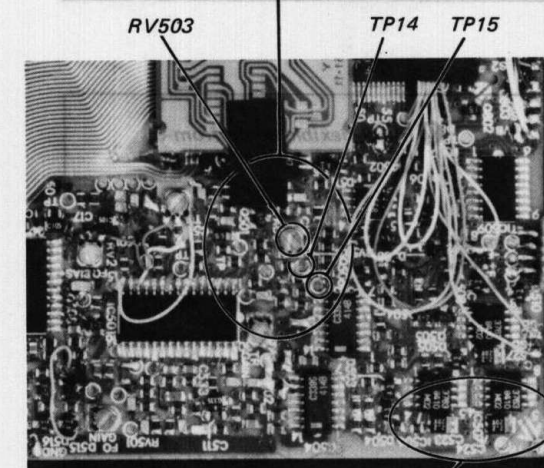
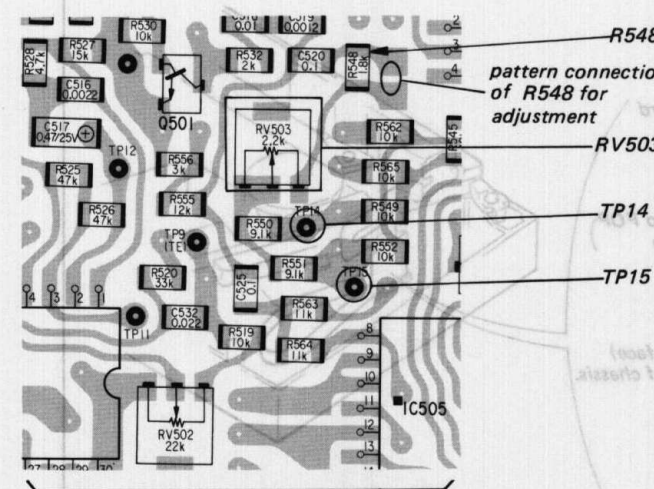
• Waveform for reference (Offset voltage is off in - direction)  
upper: TP14 (IC504 ⑤, ⑪) VOLT/DIV: 100 mV  
lower: TP15 (IC504 ⑥, ⑧) TIME/DIV: 10 μS

• Waveform for reference (Offset voltage is off in + direction)  
upper: TP14 (IC504 ⑤, ⑪) VOLT/DIV: 100 mV  
lower: TP15 (IC504 ⑥, ⑧) TIME/DIV: 10 μS

• Waveform for reference (Offset voltage is off in - direction)  
upper: TP14 (IC504 ⑤, ⑪) VOLT/DIV: 100 mV  
lower: TP15 (IC504 ⑥, ⑧) TIME/DIV: 10 μS

• Waveform for reference (Offset voltage is off in + direction)  
upper: TP14 (IC504 ⑤, ⑪) VOLT/DIV: 100 mV  
lower: TP15 (IC504 ⑥, ⑧) TIME/DIV: 10 μS

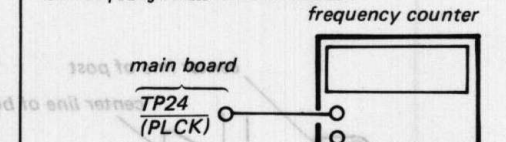
##### Check/Adjustment Location: Main board



TP57 when offset voltage is off in + direction  
TP58 when offset voltage is off in - direction  
R59 (GND)

#### PLL FREE RUN FREQUENCY CHECK AND ADJUSTMENT

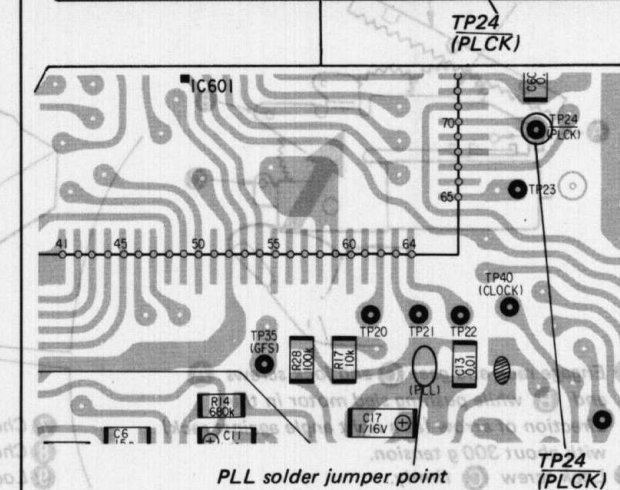
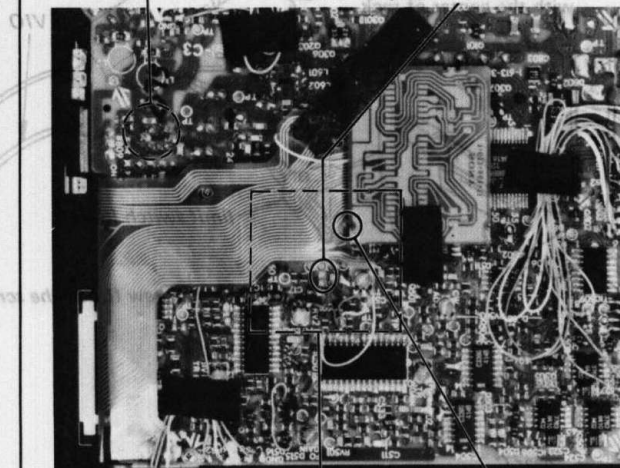
##### Check/Adjustment Procedure



1. Short the jumper point A (PLL) in the diagram below.
2. Connect a frequency counter to main board test point TP24 (PLCK).
3. Put the set into service mode (see page 9-11).
4. Check that the frequency counter reading is 4.3218 ± 0.04 MHz. If not, adjust L603 so that it is 4.3218 ± 0.01 MHz.
5. After adjustment, release service mode (see page 9-11).
6. Disconnect the jumper point shorted in step 1.

##### Check/Adjustment Location: Main board

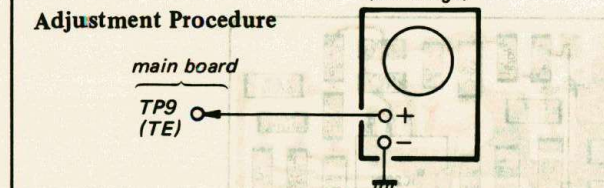
L603 (on DC-DC converter)  
PLL solder jumper point (Short for checking and adjustment. Disconnect after checking and adjustment.)



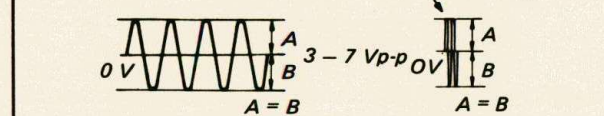
**TRACKING BALANCE ADJUSTMENT**

**Conditions**  
The set should be placed either vertically or horizontally.

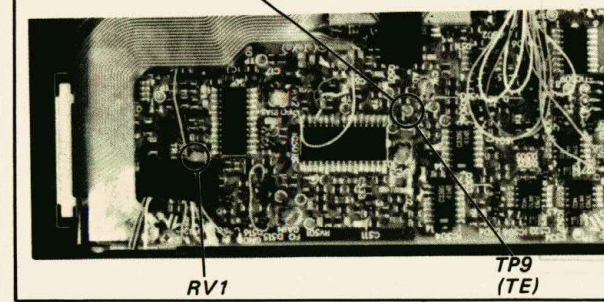
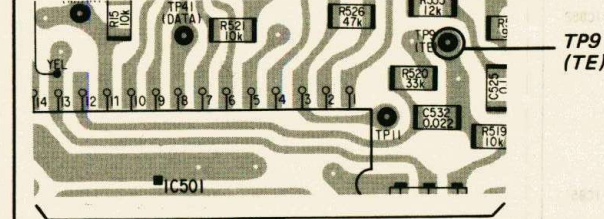
**Adjustment Procedure**



1. Connect the oscilloscope to main board TP9 (TE).
2. Put the set into service mode (see page 9-11).
3. Press the ►► and ◄◄ keys to move the FOP to the center.
4. Insert the disc (YEDS-1) and close the top panel.
5. Press the ►►► key. (It will go from focus search to focus ON, and CLV pull-in mode state. Tracking and sled are OFF.)
6. Adjust RV1 so that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0 V.  
**Note:** Take sweep time as long as possible to obtain best waveform.



**Adjustment Location:** main board

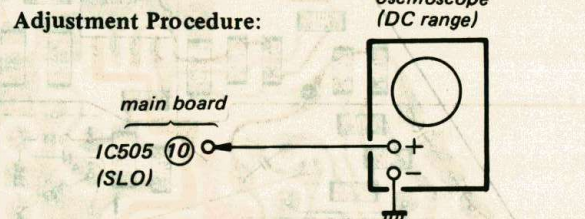


**SLED MOTOR OFFSET CHECK AND ADJUSTMENT**

**Conditions**  
Tracking balance adjustment should have been finished.

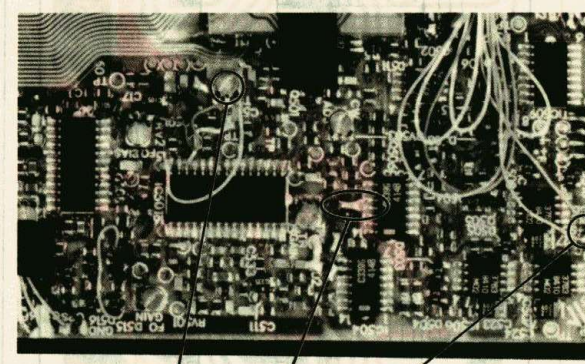
Close the top panel.  
(If the top panel is left open, natural light will enter through the FOP objective lens, and adjustment will not be correct.)

**Adjustment Procedure:**



1. Remove the sled motor +SD lead. (In this adjustment, DC voltage is applied to the tracking amp inside IC501, so this prevents the sled motor from running at abnormal-high speed if RV504 is adjusted too far to the + or - side.)
2. Connect the oscilloscope to main board IC505 pin ⑩ (SLO).
3. Put the set into service mode (see page 9-11).
4. Press the MODE button (tracking and sled go ON).
5. Press the ►►► key. (focus goes on). (This should be made after step 4.)
6. Adjust RV504 so that the oscilloscope reading is  $0 \pm 0.05$  V.
7. Press the ■ key. Confirm that focus search operation stops. If not, press the ■ key again, longer.
8. After adjustment, release service mode (see page 9-11).
9. Reconnect the sled motor lead removed in step 1.

**Adjustment Location:** main board, VR board

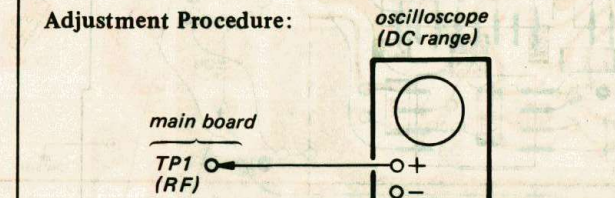


RV504 (VR board) IC505 (SLO) +SD (VIO) for adjustment; remove lead for adjustment; reconnect afterward.

**FOCUS BIAS ADJUSTMENT**

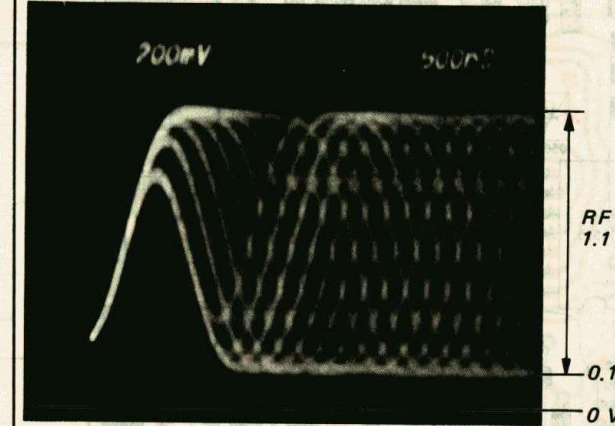
**Conditions**  
The set should be placed either vertically or horizontally.

**Adjustment Procedure:**



1. Put the set into service mode (see page 9-11).
2. Connect the oscilloscope to main board test point TP1 (RF).
3. Press the ►► and ◄◄ keys to move the FOP to the center. (Move the FOP to the music area on the disc to enable easy visibility of the eye pattern).
4. Insert the disc (YEDS-1) and close the top panel.
5. Press the ►►► key. (It will go from focus search to focus ON, and CLV pull-in mode state. Tracking and sled are OFF).
6. Press the MODE button. (Tracking and sled go ON).
7. Adjust RV2 so that the oscilloscope waveform eye pattern is good. A good eye pattern means that the diamond shape (◊) in the center of the waveform can be clearly distinguished.

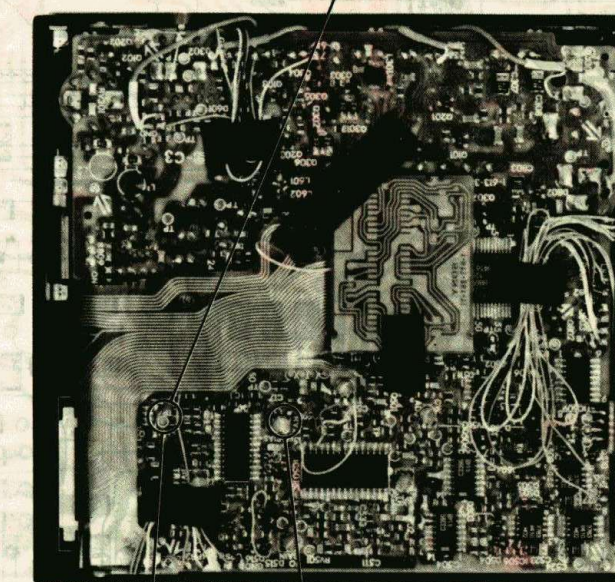
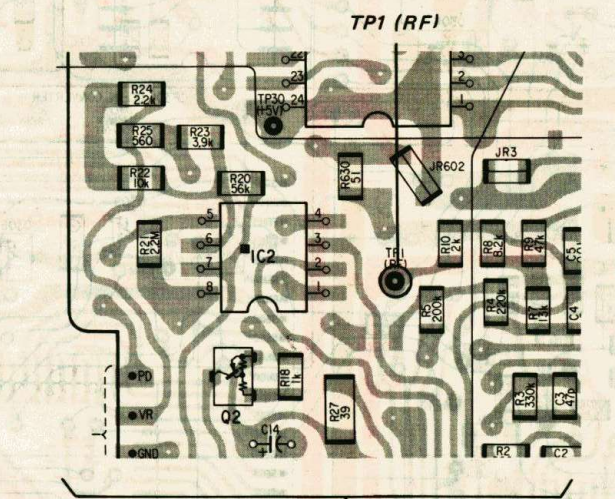
• **RF Signal Reference Waveform (eye pattern)**  
VOLT/DIV: 200 mV  
TIME/DIV: 500 nS



When observing the eye pattern, set the oscilloscope for AC range and raise vertical sensitivity.

8. Press the ■ key. Confirm that disc rotation stops. If not, press the ■ key again, longer.
9. After adjustment, release service mode (see page 9-11).

**Adjustment Location:** main board



TP1 (RF) RV2

**FOCUS/TRACKING GAIN ADJUSTMENT**

Focus/tracking gain determines the pick-up follow-up (vertical and horizontal) relative to mechanical noise and mechanical shock when the 2-axis device operates.

However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is high, the noise when the 2-axis device operates increases.
- When gain is low, it is more susceptible to mechanical shock and skipping occurs more easily.

This adjustment is to be performed when replacing the following parts:  
FOP, RV501 (focus gain VR), RV502 (tracking gain VR)

**Adjustment Method:**  
- Focus Gain Adjustment -  
This adjustment is not performed.  
If the focus gain VR RV501 is turned, set to mechanical center (see Fig. 6).

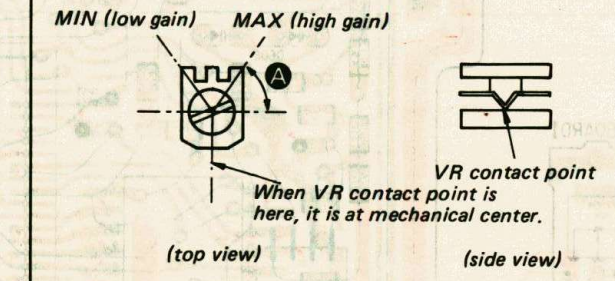
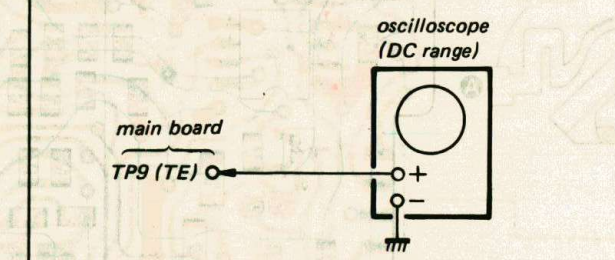


Fig. 6 Mechanical Center (seen from chip mounted side)

- Tracking Gain Adjustment -  
(perform at normal operation)



1. Place the set level, horizontally (upper panel can be facing down). (If the set is not level, the 2-axis device will be weighted and adjustment cannot be done.)
2. Connect the oscilloscope to main board test point TP9 (TE).

3. Turn the power switch on, insert the disc (YEDS-1) and press the ►►► key.
4. Turn RV502 slightly clockwise (tracking gain drops) and obtain a waveform with a fundamental wave (waveform has large waves) as in Figure 7.
5. Turn RV502 slowly counterclockwise (tracking gain rises) until the fundamental wave disappears (no large waves) as in Figure 8.
6. Set RV502 to the position about 30° counterclockwise from the position obtained in step 5. If RV502 contact point location is within the range shown in Figure 6 (A), tracking gain is too high. In this case, readjust from step 4.
7. Select AMS mode with the MODE button, continuously press ►► or ◄◄ key and observe the 100 track jump waveform. Check that no traverse waveform appears for both ►► and ◄◄ directions. (See Figures 9 and 10.) It is acceptable if the traverse waveform appears only now and then, but if it appears constantly, raise tracking gain slightly and check step 7 again.
8. Check that there is not an abnormal amount of operation noise (white noise) from the 2-axis device. If there is, tracking gain is too high, so readjust starting with step 4.

The waveforms are those measured with the oscilloscope set as shown below.  
VOLT/DIV: 1 V  
TIME/DIV: 5 mV

- Waveform when tracking gain is lowered. Fundamental wave appears (large waves).

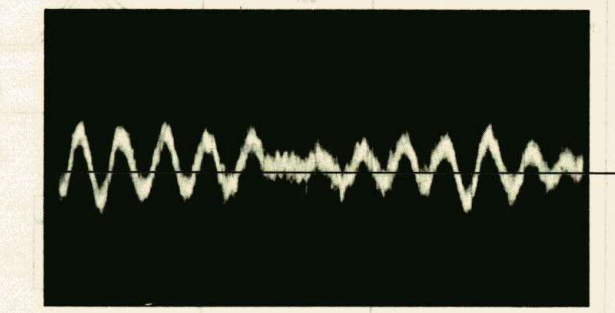


Fig. 7

- Waveform when fundamental wave disappears (no large waves).

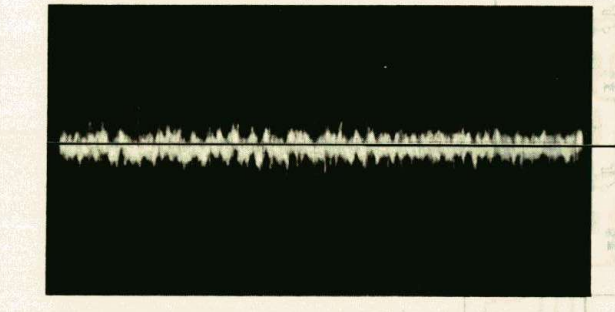
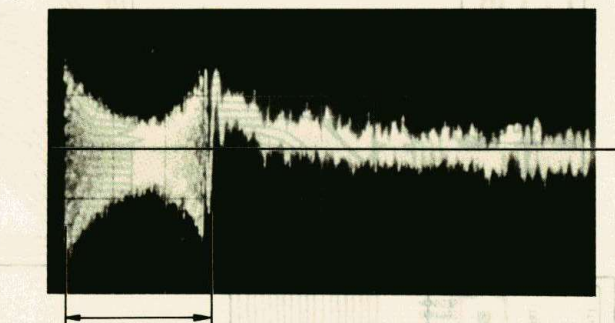


Fig. 8

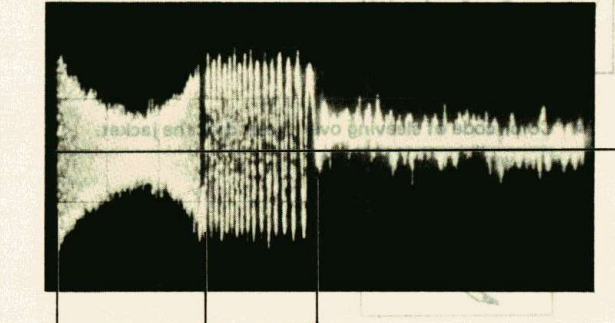
- Waveform with no traverse waveform during 100 track jump. (Brake application is smooth because of adjustment).



100 track jump waveform

Fig. 9

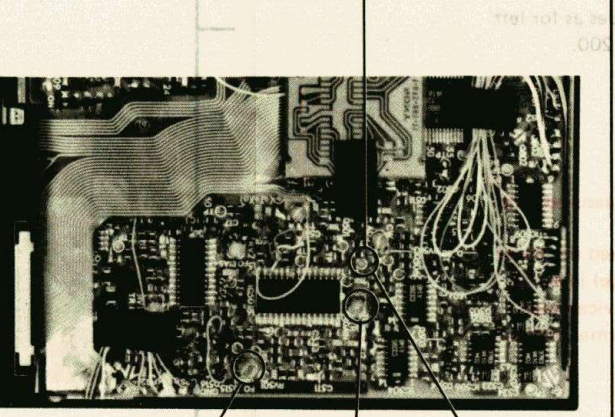
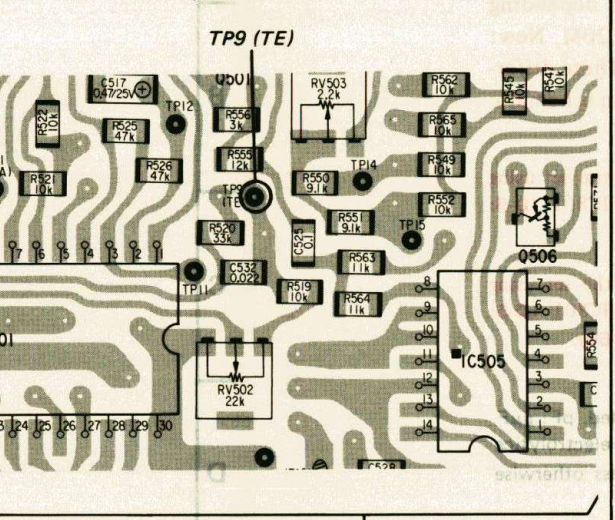
- Waveform with traverse waveform during 100 track jump. (Brake application is poor because of low tracking gain.)



100 track jump traverse waveform waveform

Fig. 10

**Adjustment Location:** main board



RV501 (focus gain) RV502 (tracking gain) TP9 (TE)



SECTION 4  
DIAGRAMS

**Note:**  
A part of the circuit in this model differs depending on the microcomputer (Old: MB88541-120M, New: MB88541-124M) being used for IC801. These differences are indicated by "Old" and "New" in schematic and mounting diagrams.

**Old** . . . . . shows the circuit or value of the set using type "MB88541-120M" for IC801 (D-5: up to serial No. 104,000).

**New** . . . . . shows the wiring or value of the set using type "MB88541-124M" for IC801 (D-5: serial No. 104,001 and later, D-50).

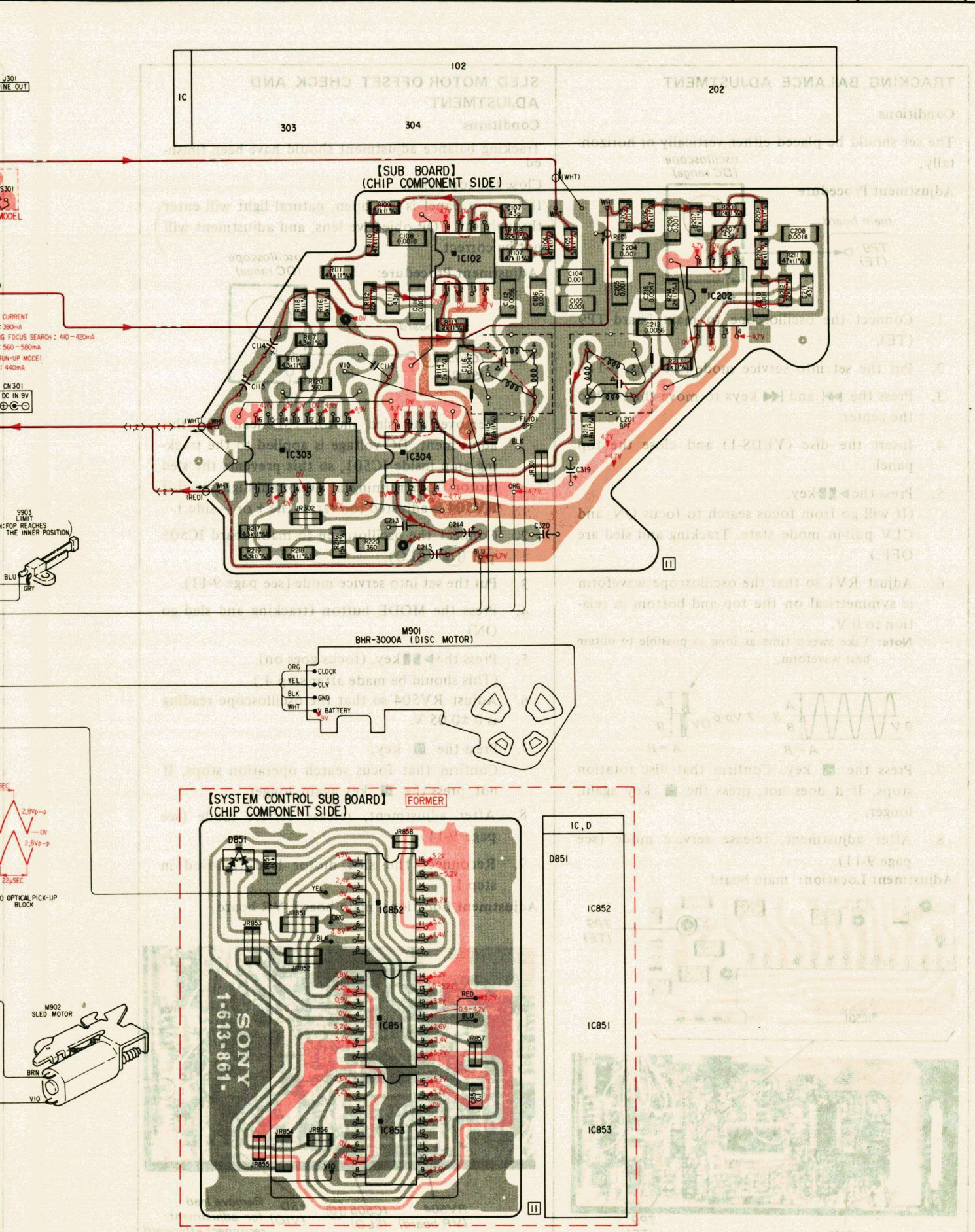
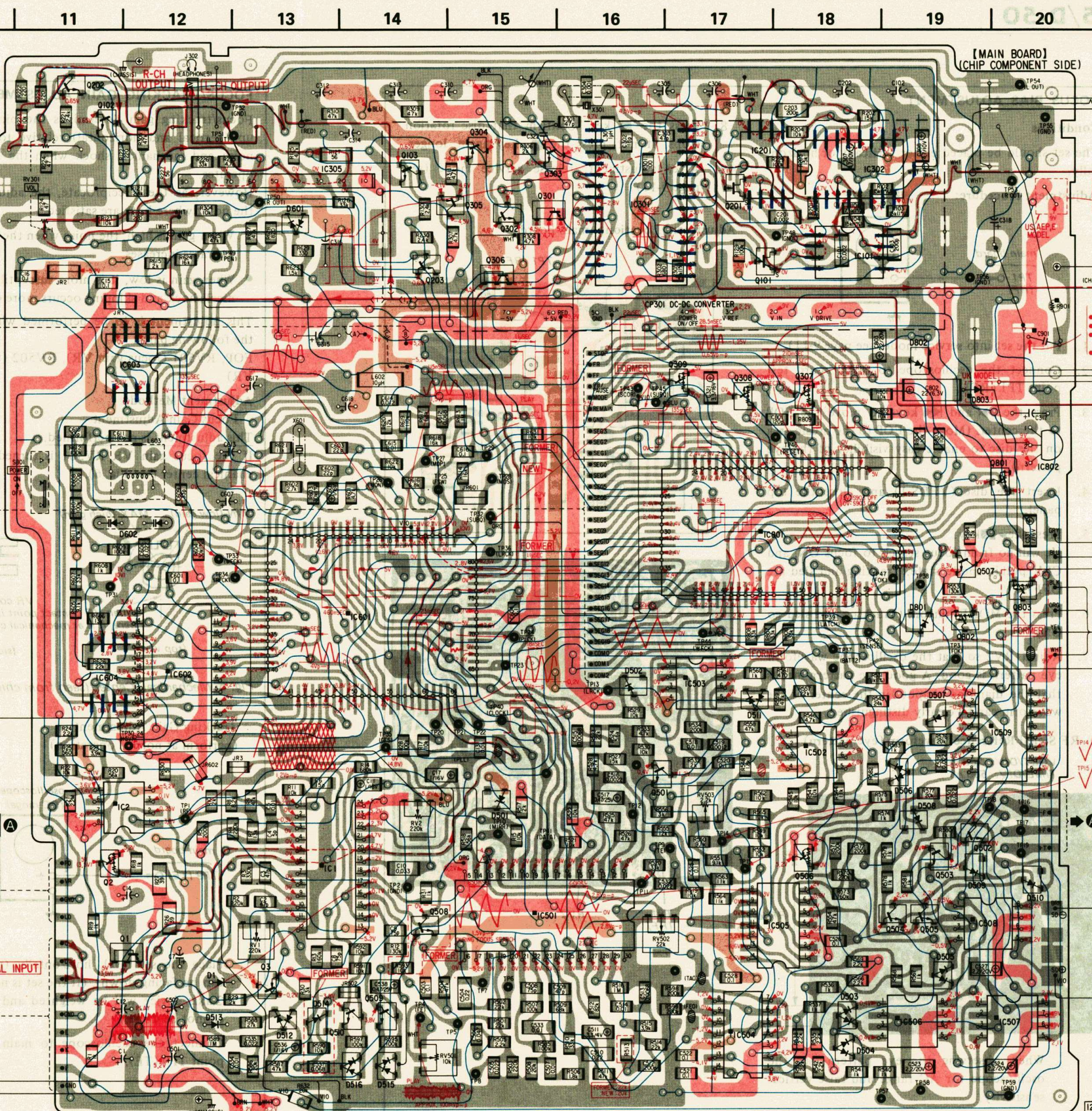
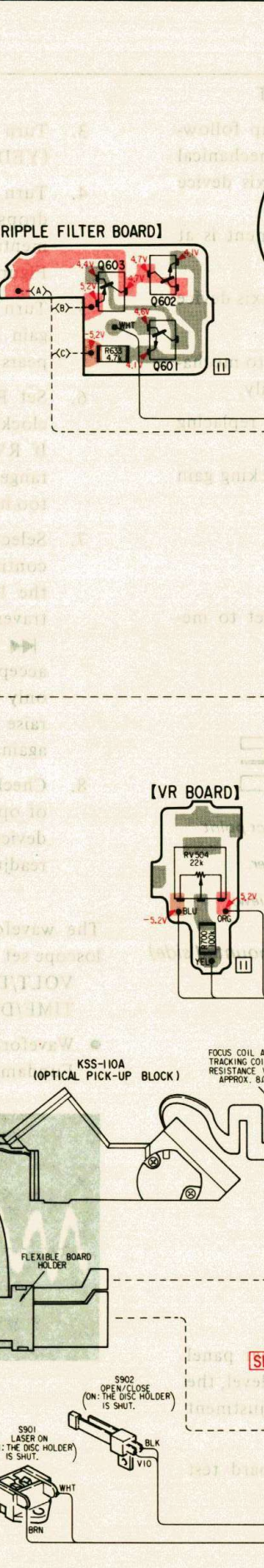
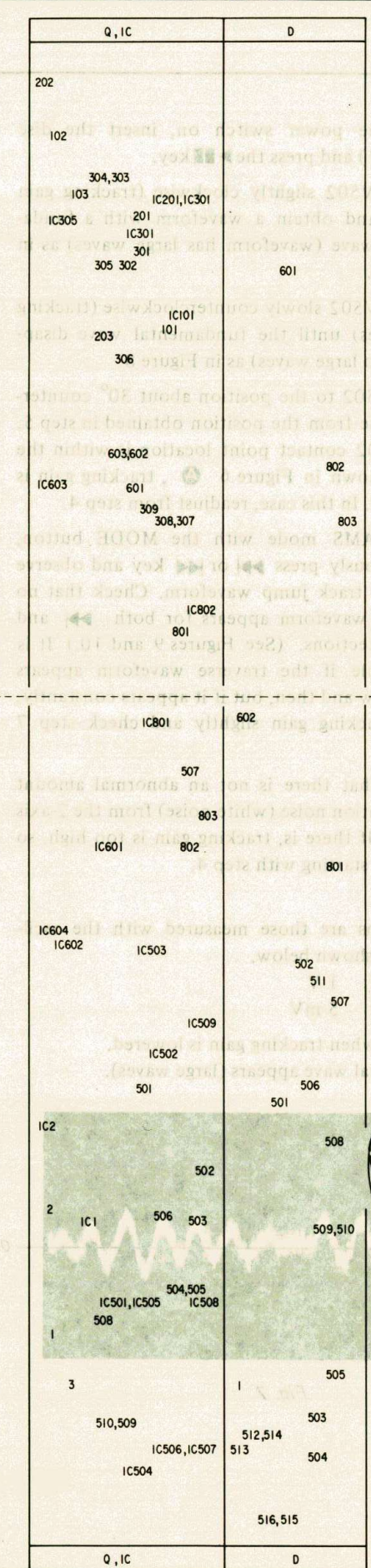
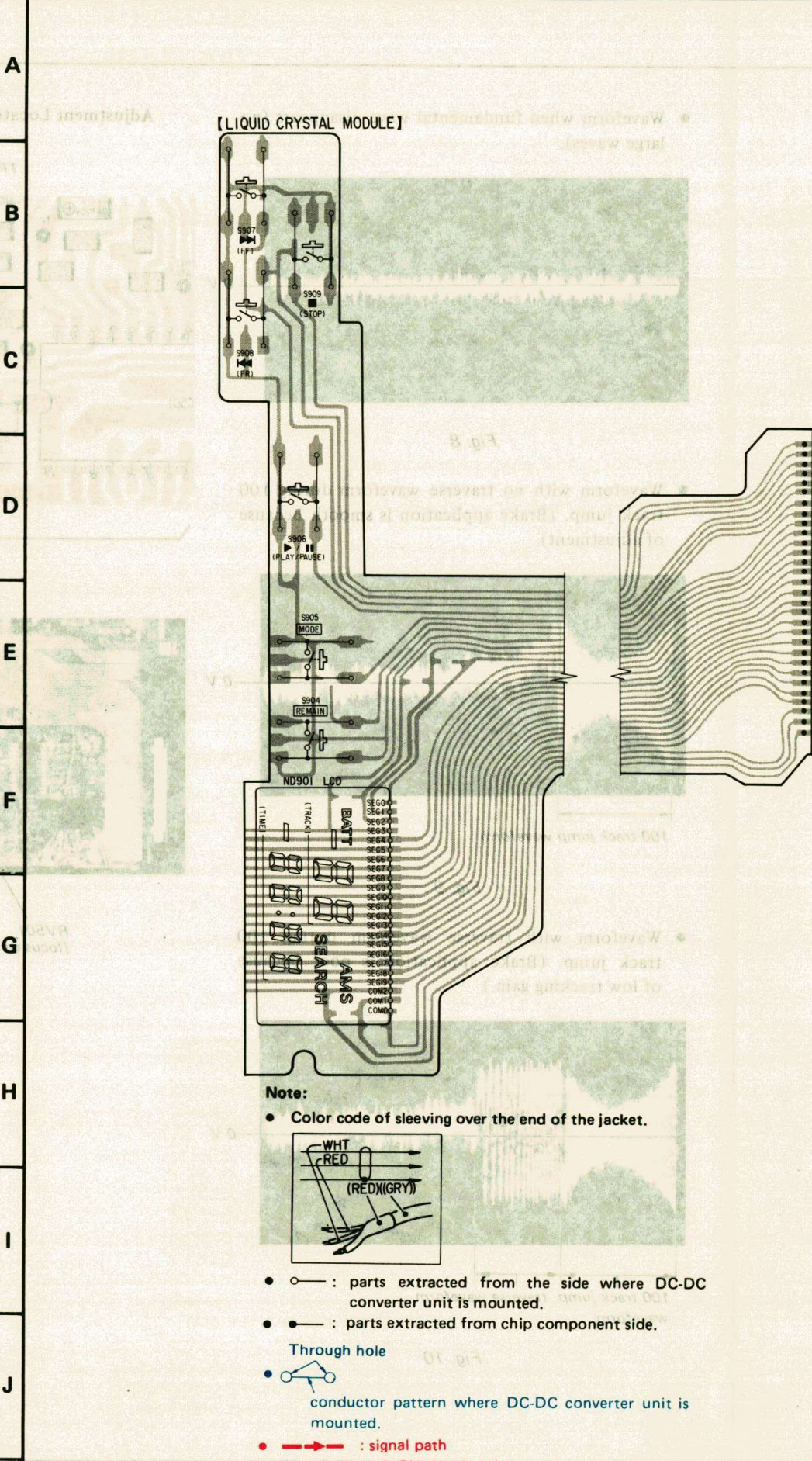
- Note:**
- All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\text{F}$  50V or less are not indicated except for electrolytics.
  - All resistors are in ohms,  $\frac{1}{4}\text{W}$  or less unless otherwise specified.
  - Signal path.
  - Components for right channel have same values as for left channel. Reference numbers are coded from 200.
  - $\Delta$ : internal component.
  - 1% shows tolerance.
  - B+ bus.
  - B- bus.
  - adjustment for repair.
  - Voltages, waveform and total current are measured with top panel closed.
  - Power voltage is DC 9 V and fed with regulated dc power supply from DC in 9 V (external power voltage) jack. Voltages are DC with respect to ground in service mode. Voltage variations may be noted due to normal production tolerances.
  - no mark: stop mode
  - ( ): play mode
  - Waveforms are taken to ground in service mode by using oscilloscope. Voltage variations may be noted due to normal production tolerances.
  - Total current is measured in service mode.

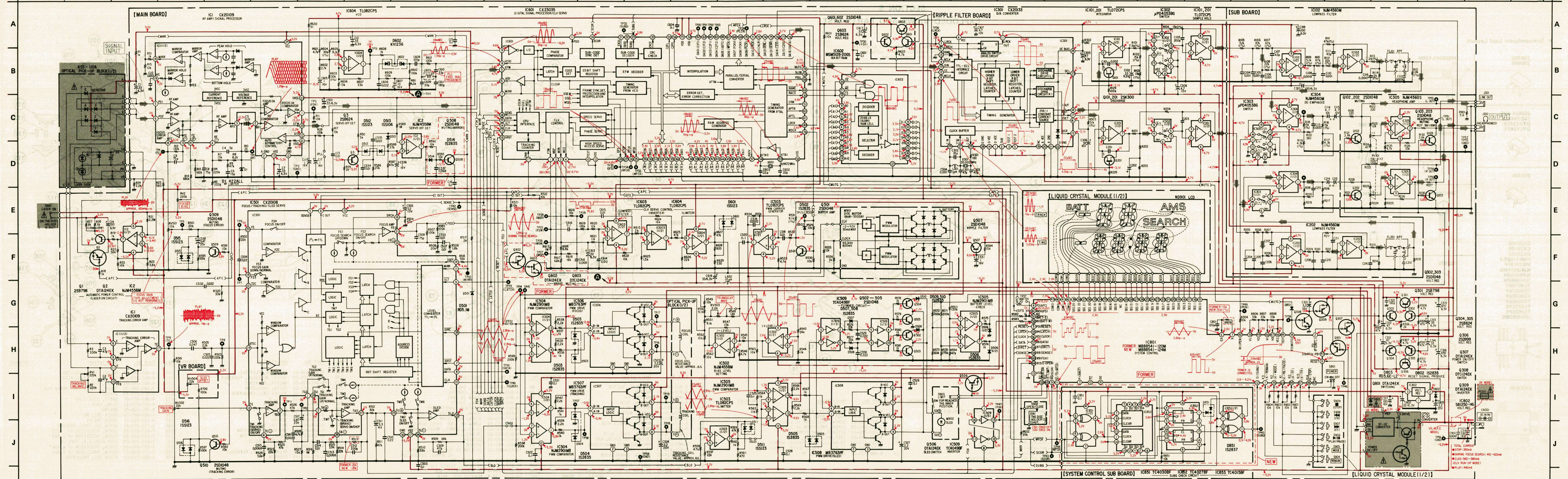
**Switch**

Ref. No.	Switch	Position
S801	POWER	OFF
S901	LASER ON	ON
S902	OPEN/CLOSE	ON
S903	LIMIT	OFF
S904	REMAIN	OFF
S905	MODE	OFF
S906	▶▶(PLAY/PAUSE)	OFF
S907	▶▶(FF)	OFF
S908	▶▶(FR)	OFF
S909	■(STOP)	OFF

See page 9 - 12 for setup of service mode.

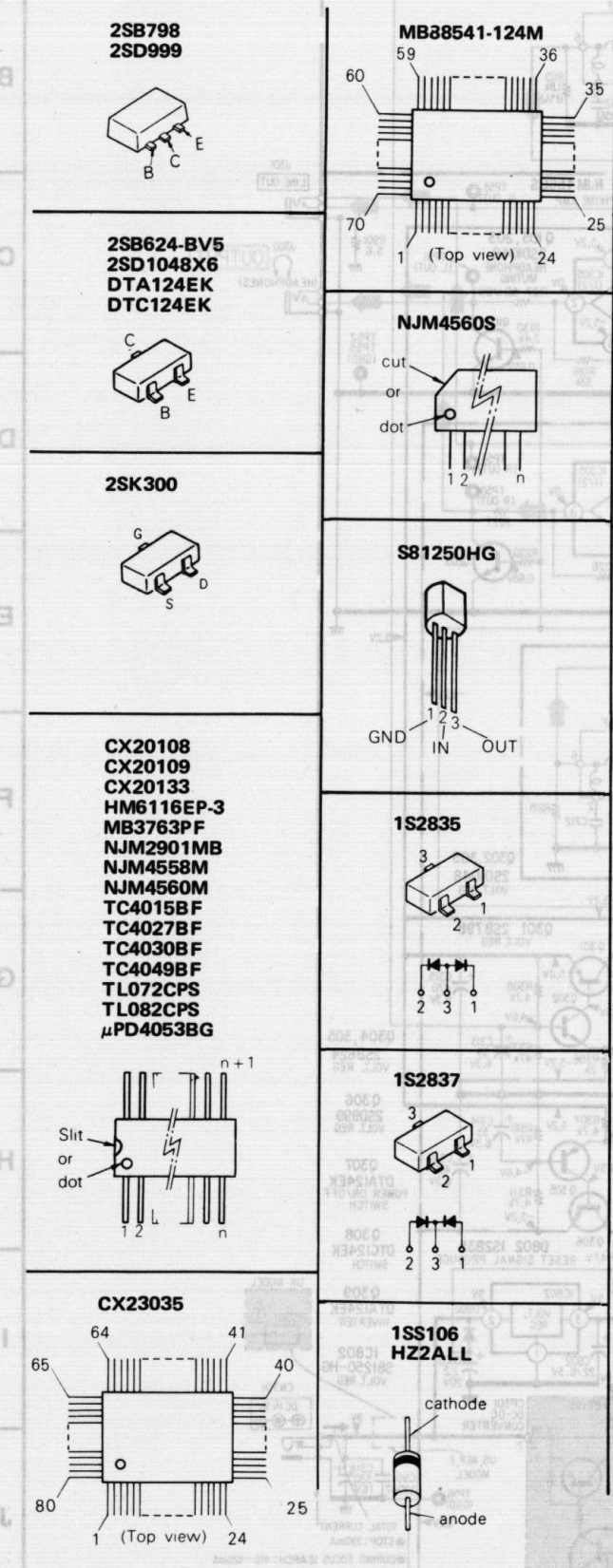
**Note:** The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.





SECTION 5 EXPLODED VIEWS AND PARTS LIST

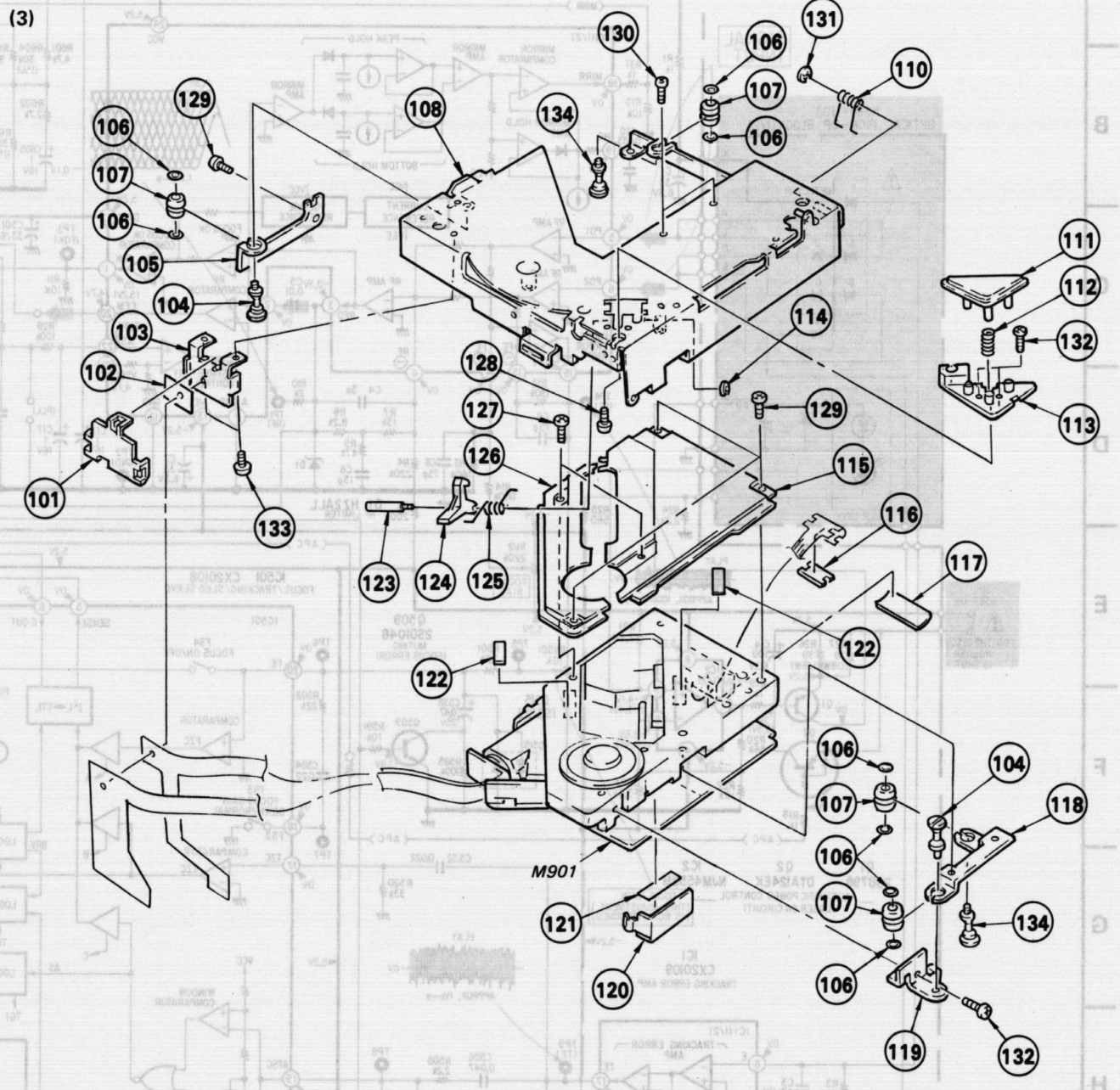
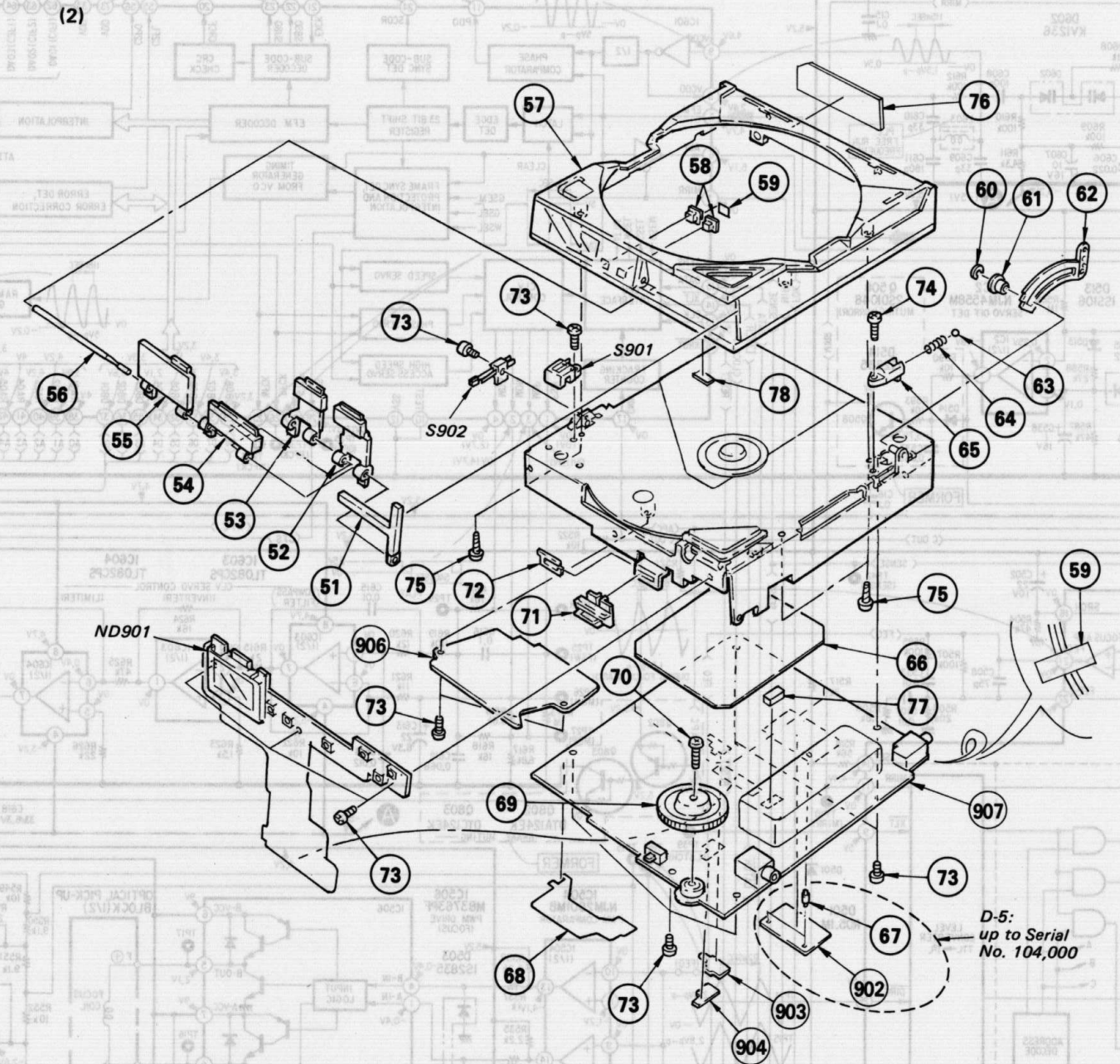
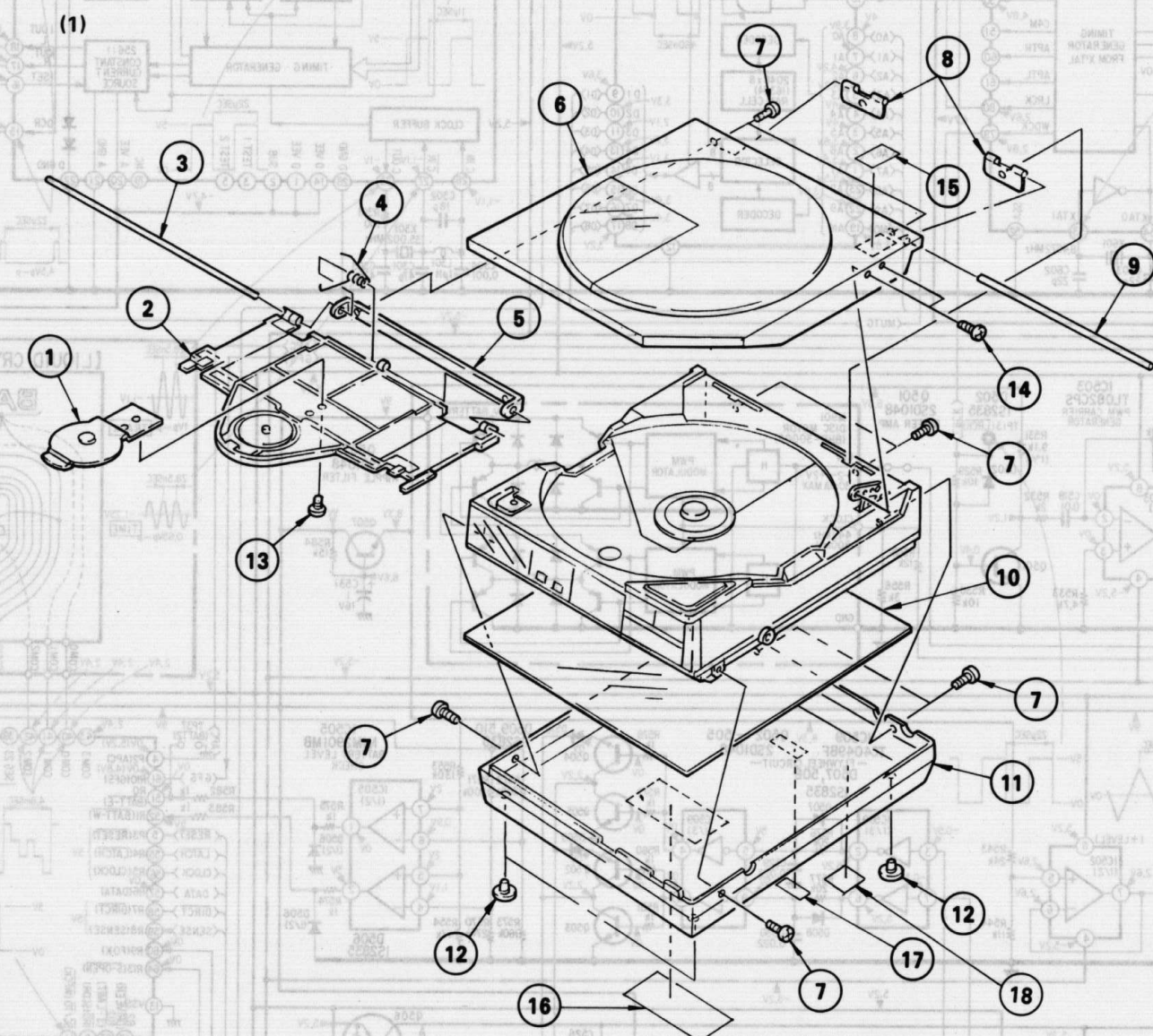
Semiconductor Lead Layouts



NOTE:  
The mechanical parts with no reference number in the exploded views are not supplied.  
Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The construction parts of an assembled part are indicated with a collation number in the remark column.

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.



No.	Part No.	Description	REMARKS
1	X-4907-008-1	PLATE ASSY, THRUST RETAINER	
2	X-4907-007-1	CHUCK ARM ASSY	
3	4-907-016-01	SHAFT, CHUCK ARM	
4	4-907-029-01	SPRING	
5	4-907-015-01	BRACKET, CHUCK ARM	
6	X-4907-009-2	PANEL ASSY, UPPER	
7	3-703-816-02	SCREW (M1.4X2)	
8	4-907-030-11	PLATE, FULCRUM	
9	4-907-031-01	BAR, FULCRUM	
10	4-907-071-01	SHEET, INSULATING	

No.	Part No.	Description	REMARKS
11	X-4907-002-2	PANEL ASSY, BOTTOM	
12	4-907-091-01	FOOT, RUBBER	
13	7-627-850-08	SCREW, PRECISION +P 1.4X2	
14	7-627-551-38	SCREW, PRECISION +P 1.4X5	
15	3-703-709-00	STICKER, SONY SYMBOL	
16	4-885-838-00	(AEP,UK)...LABEL, CLASS 1	
17	3-527-213-00	(D-50)...LABEL, SERIAL NUMBER	
18	3-701-999-00	(D-5)...LABEL, SERIAL NUMBER	
	4-908-735-01	(AEP)...LABEL, SP	

No.	Part No.	Description	REMARKS
51	4-907-062-01	ORNAMENT, BUTTON	
52	4-907-058-01	BUTTON, FF	
53	4-907-059-01	BUTTON, FR	
54	4-907-060-01	BUTTON, STOP	
55	4-907-057-01	BUTTON, PLAY PAUSE	
56	4-907-034-01	SHAFT, BUTTON	
57	X-4907-001-2	CABINET ASSY	
58	4-907-033-01	ARM (OUTSERT), SWITCHING	
59	3-831-441-XX	CUSHION	
60	3-318-236-01	WASHER, POLY, SLIT	
61	4-907-047-01	COLLAR, SWITCHING ARM	
62	4-907-073-01	ARM (OUTSERT), SWITCHING	
63	7-671-112-11	BALL, STEEL	
64	4-907-024-01	SPRING, COMPRESSION	
65	4-907-018-01	HOLDER, SPRING	
66	4-907-049-01	SHEET, BLIND	
67	4-907-082-01	(D-5:UP TO SERIAL No.104000)... SPACER, PC BOARD	

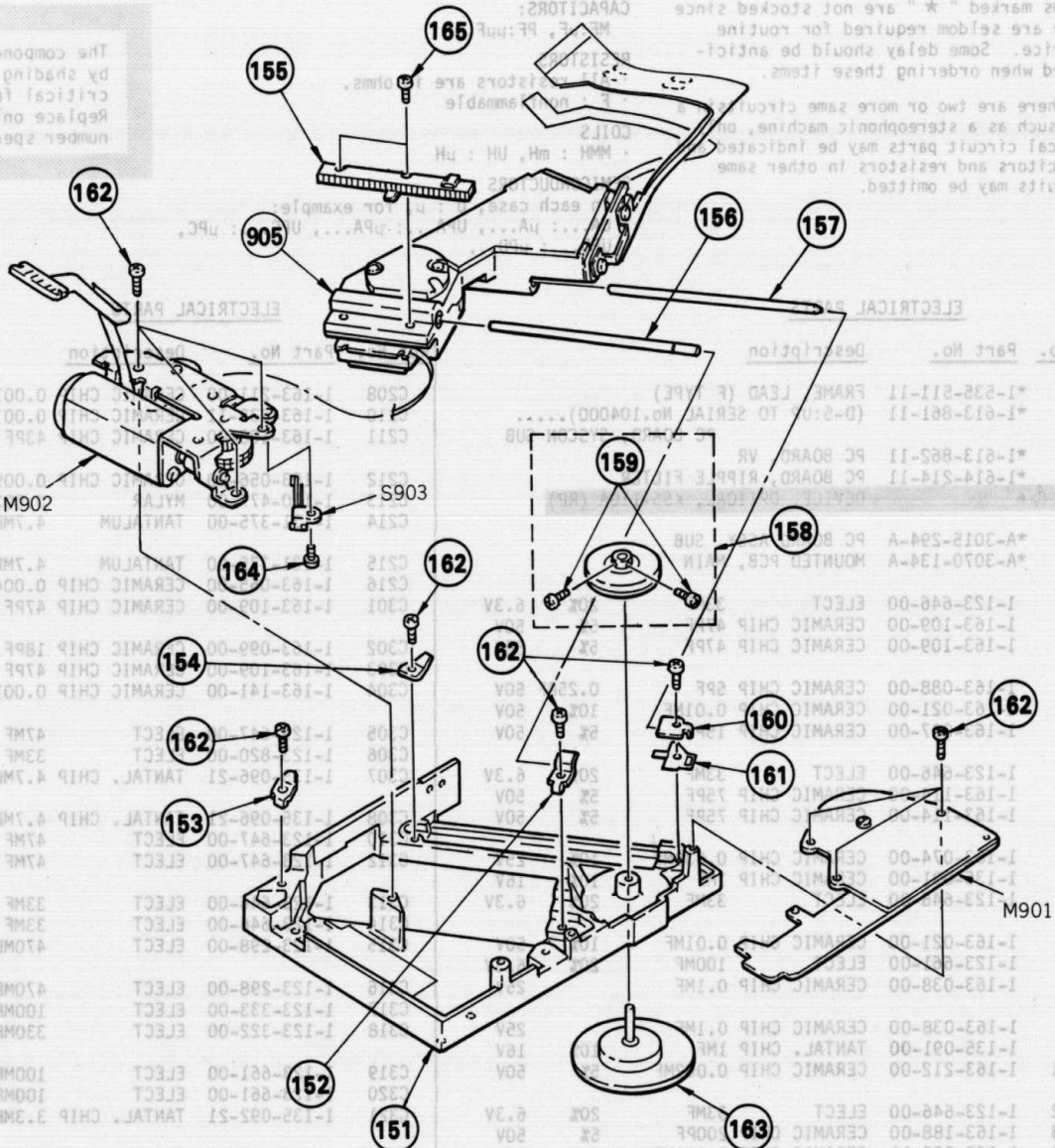
No.	Part No.	Description	REMARKS
68	4-907-077-01	HOIL, SHIELD	
69	4-907-056-11	KNOB, CONTROL	
70	3-888-156-00	SCREW (1.7X4)	
71	4-907-032-11	KNOB, SAFETY	
72	4-907-048-01	RETAINER, SAFETY KNOB	
73	7-627-850-27	SCREW, PRECISION +P 1.4X3	
74	7-627-850-68	SCREW, PRECISION +P 1.4X4	
75	7-685-103-14	SCREW +P 2X5 TYPE2 NON-SLIT	
76	4-907-092-02	(D-5)...LABEL, MODEL NUMBER	
77	4-907-093-02	(D-50)...LABEL, MODEL NUMBER	
78	9-911-840-XX	CUSHION	
902	*1-613-861-11	(D-5:UP TO SERIAL No.104000)... PC BOARD, SYSCON SUB	
903	*1-613-862-11	PC BOARD, VR	
904	*1-614-214-11	PC BOARD, RIPPLE FILTER	
906	*A-3015-294-A	PC BOARD ASSY, SUB	
907	*A-3070-134-A	MOUNTED PCB, MAIN	

No.	Part No.	Description	REMARKS
101	4-907-036-01	RETAINER, FLEXIBLE	
102	7-632-205-00	SHEET, ADHESIVE, FLEXIBLE	
103	*4-907-035-01	HOLDER, FLEXIBLE	
104	4-907-041-01	SCREW, INSULATOR	
105	4-907-039-01	HOLDER (A), INSULATOR	
106	4-907-053-01	RING, O	
107	4-907-054-01	INSULATOR	
108	X-4907-003-2	CHASSIS ASSY, MAIN	
109	3-701-439-21	WASHER	
110	4-907-080-01	SPRING	
111	4-907-055-11	BUTTON, OPEN	
112	4-907-020-01	SPRING, COMPRESSION	
113	4-907-023-11	GUIDE, OPEN BUTTON	
114	3-318-236-01	WASHER, PLASTIC	
115	4-907-064-01	COVER (A), MD	
116	4-907-084-01	REINFORCEMENT, FLEXIBLE	
117	3-831-441-XX	CUSHION	

No.	Part No.	Description	REMARKS
118	4-907-040-01	HOLDER (B), INSULATOR	
119	4-907-050-01	HOLDER (C), INSULATOR	
120	4-907-076-01	PLATE, SHIELD, CLV	
121	3-563-105-00	SHEET, INSULATING, MOTOR PCB	
122	9-911-837-XX	SPACER	
123	4-907-027-01	SHAFT, LOCK CLAM	
124	4-907-025-11	CLAM, LOCK	
125	4-907-026-01	SPRING	
126	4-907-065-01	COVER (B), MD	
127	3-703-816-01	SCREW (M1.4)	
128	3-318-203-61	SCREW (B1.7X4), TAPPING	
129	7-627-553-38	SCREW, PRECISION +P 2X3	
130	7-627-551-58	SCREW, PRECISION +P 1.4X3	
131	7-624-106-04	STOP RING 2.3, TYPE -E	
132	7-627-850-68	SCREW, PRECISION +P 1.4X4	
133	7-627-850-27	SCREW, PRECISION +P 1.4X3	
134	4-908-710-01	SCREW (B), INSULATOR	

(4)

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.



No.	Part No.	Description	REMARKS
151	*X-3320-103-1	CHASSIS ASSY	
152	3-320-102-01	RETAINER (A)	
153	3-320-103-01	RETAINER (B)	
154	3-320-104-01	RETAINER (C)	
155	3-320-121-01	RACK	
156	3-320-106-01	SHAFT (A)	
157	3-320-107-01	SHAFT (B)	
158	X-2622-803-1	ROTOR ASSY	

No.	Part No.	Description	REMARKS
159	2-622-805-01	SCREW	
160	3-320-105-01	RETAINER (D)	
161	3-320-131-01	SPRING (B), LEAF	
162	3-703-816-11	SCREW (M1.4X4)	
163	X-3320-101-1	TURNTABLE ASSY	
164	7-627-553-37	SCREW, PRECISION +P 2X3	
165	7-627-552-77	SCREW, PRECISION +P 1.7X6.0	
905 $\Delta$		DEVICE, OPTICAL, KSS-110A (RP)	

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

NOTE:

- Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

- CAPACITORS:  
MF:μF, PF:μF.
- RESISTORS  
All resistors are in ohms.  
F : nonflammable
- COILS  
MMH : mH, UH : μH
- SEMICONDUCTORS  
In each case, U : μ, for example:  
UA...: μA..., UPA...: μPA..., UPC...: μPC,  
UPD...: μPD...

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description
901	*1-535-511-11	FRAME, LEAD (F TYPE)
902	*1-613-861-11	(D-5:UP TO SERIAL No.104000)..... PC BOARD, SYSCON SUB
903	*1-613-862-11	PC BOARD, VR
904	*1-614-214-11	PC BOARD, RIPPLE FILTER
905	<b>A</b> *	DEVICE, OPTICAL, KSS-110A (RP)
906	*A-3015-294-A	PC BOARD ASSY, SUB
907	*A-3070-134-A	MOUNTED PCB, MAIN
C1	1-123-646-00	ELECT 33MF 20% 6.3V
C2	1-163-109-00	CERAMIC CHIP 47PF 5% 50V
C3	1-163-109-00	CERAMIC CHIP 47PF 5% 50V
C4	1-163-088-00	CERAMIC CHIP 5PF 0.25PF 50V
C5	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V
C6	1-163-097-00	CERAMIC CHIP 15PF 5% 50V
C7	1-123-646-00	ELECT 33MF 20% 6.3V
C8	1-163-114-00	CERAMIC CHIP 75PF 5% 50V
C9	1-163-114-00	CERAMIC CHIP 75PF 5% 50V
C10	1-163-074-00	CERAMIC CHIP 0.033MF 10% 25V
C11	1-135-091-00	CERAMIC CHIP 1MF 10% 16V
C12	1-123-646-00	ELECT 33MF 20% 6.3V
C13	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V
C14	1-123-661-00	ELECT 100MF 20% 6.3V
C15	1-163-038-00	CERAMIC CHIP 0.1MF 25V
C16	1-163-038-00	CERAMIC CHIP 0.1MF 25V
C17	1-135-091-00	TANTAL. CHIP 1MF 10% 16V
C101	1-163-212-00	CERAMIC CHIP 0.002MF 5% 50V
C102	1-123-646-00	ELECT 33MF 20% 6.3V
C103	1-163-188-00	CERAMIC CHIP 200PF 5% 50V
C104	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C105	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C106	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C107	1-163-108-00	CERAMIC CHIP 43PF 5% 50V
C108	1-163-211-00	CERAMIC CHIP 0.0018MF 5% 50V
C110	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C111	1-163-108-00	CERAMIC CHIP 43PF 5% 50V
C112	1-163-056-00	CERAMIC CHIP 0.0056MF 10% 50V
C113	1-130-477-00	MYLAR 0.0033MF 5% 50V
C114	1-131-375-00	TANTALUM 4.7MF 20% 10V
C115	1-131-375-00	TANTALUM 4.7MF 20% 10V
C116	1-163-055-00	CERAMIC CHIP 0.0047MF 10% 50V
C201	1-163-212-00	CERAMIC CHIP 0.002MF 5% 50V
C202	1-123-646-00	ELECT 33MF 20% 6.3V
C203	1-163-188-00	CERAMIC CHIP 200PF 5% 50V
C204	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C205	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C206	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C207	1-163-108-00	CERAMIC CHIP 43PF 5% 50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description
C208	1-163-211-00	CERAMIC CHIP 0.0018MF 5% 50V
C210	1-163-335-11	CERAMIC CHIP 0.001MF 5% 50V
C211	1-163-108-00	CERAMIC CHIP 43PF 5% 50V
C212	1-163-056-00	CERAMIC CHIP 0.0056MF 10% 50V
C213	1-130-477-00	MYLAR 0.0033MF 5% 50V
C214	1-131-375-00	TANTALUM 4.7MF 20% 10V
C215	1-131-375-00	TANTALUM 4.7MF 20% 10V
C216	1-163-055-00	CERAMIC CHIP 0.0047MF 10% 50V
C301	1-163-109-00	CERAMIC CHIP 47PF 5% 50V
C302	1-163-099-00	CERAMIC CHIP 18PF 5% 50V
C303	1-163-109-00	CERAMIC CHIP 47PF 5% 50V
C304	1-163-141-00	CERAMIC CHIP 0.001MF 10% 50V
C305	1-123-647-00	ELECT 47MF 20% 6.3V
C306	1-123-820-00	ELECT 33MF 20% 16V
C307	1-135-096-21	TANTAL. CHIP 4.7MF 20% 10V
C308	1-135-096-21	TANTAL. CHIP 4.7MF 20% 10V
C310	1-123-647-00	ELECT 47MF 20% 6.3V
C312	1-123-647-00	ELECT 47MF 20% 6.3V
C313	1-123-646-00	ELECT 33MF 20% 6.3V
C314	1-123-646-00	ELECT 33MF 20% 6.3V
C315	1-123-298-00	ELECT 470MF 20% 6.3V
C316	1-123-298-00	ELECT 470MF 20% 6.3V
C317	1-123-333-00	ELECT 100MF 20% 16V
C318	1-123-322-00	ELECT 330MF 20% 16V
C319	1-123-661-00	ELECT 100MF 20% 6.3V
C320	1-123-661-00	ELECT 100MF 20% 6.3V
C321	1-135-092-21	TANTAL. CHIP 3.3MF 20% 16V
C322	1-102-973-00	CERAMIC 100PF 5% 50V
C501	1-123-646-00	ELECT 33MF 20% 6.3V
C502	1-131-379-00	TANTALUM 22MF 20% 10V
C503	1-163-038-00	CERAMIC CHIP 0.1MF 25V
C504	1-163-081-00	CERAMIC CHIP 0.22MF 25V
C505	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V
C506	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V
C507	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V
C508	1-163-114-00	CERAMIC CHIP 75PF 5% 50V
C509	1-163-109-00	CERAMIC CHIP 47PF 5% 50V
C510	1-163-081-00	CERAMIC CHIP 0.22MF 25V
C511	1-135-103-00	TANTAL. CHIP 3.3MF 10% 4V
C512	1-163-124-00	CERAMIC CHIP 200PF 5% 50V
C513	1-163-019-00	CERAMIC CHIP 0.0068MF 10% 50V
C514	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V
C515	1-163-019-00	CERAMIC CHIP 0.0068MF 10% 50V
C516	1-163-013-00	CERAMIC CHIP 0.0022MF 10% 50V
C517	1-135-083-00	TANTAL. CHIP 0.47MF 10% 25V
C518	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V

ELECTRICAL PARTS

Table with columns: Ref.No., Part No., Description, and values. Includes parts like C519, C520, C521, C522, C523, C524, C525, C526, C527, C528, C529, C530, C531, C532, C533, C534, C535, C536, C537, C538, C601, C602, C603, C604, C605, C606, C607, C608, C609, C610, C611, C612, C613, C614, C615, C616, C617, C618, C801, C802, C803, C851, C901.

ELECTRICAL PARTS

Table with columns: Ref.No., Part No., Description, and values. Includes parts like CN301A, CP301A, D1, D501, D502, D503, D504, D505, D506, D507, D508, D509, D510, D511, D512, D513, D514, D515, D516, D601, D602, D801, D802, D803A, D851, FL101, FL201, IC1, IC2, IC101, IC102, IC201, IC202, IC301, IC302, IC303, IC304, IC305, IC501, IC502, IC503, IC504, IC505, IC506.

ELECTRICAL PARTS

Table with columns: Ref.No., Part No., Description, and values. Includes parts like IC507, IC508, IC509, IC601, IC602, IC603, IC604, IC801, IC802, IC851, IC852, IC853, J301, J302, JR1, JR2, JR3, JR301, JR302, JR303, JR304, JR502, JR601, JR602, JR851, JR852, JR853, JR854, JR855, JR856, JR857, JR858.

ELECTRICAL PARTS

Table with columns: Ref.No., Part No., Description, and values. Includes parts like L301, L602, L603, M901, M902, ND901, PS301A, Q1, Q2, Q3, Q101, Q102, Q103, Q201, Q202, Q203, Q301, Q302, Q303, Q304, Q305, Q306, Q307, Q308, Q309, Q501, Q502, Q503, Q504, Q505, Q506, Q507, Q508, Q509, Q510, Q601, Q602, Q603, Q801, Q802, Q803.

ELECTRICAL PARTS

Table with columns: Ref.No., Part No., Description, and values. Includes parts like R1, R2, R3, R4, R5, R7, R8, R9, R10, R11, R12, R13, R14, R15, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116.

ELECTRICAL PARTS

Table with columns: Ref.No., Part No., Description, and values. Includes parts like R117, R118, R119, R120, R121, R122, R123, R124, R125, R126, R127, R128, R129, R130, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R212, R213, R214, R215, R216, R217, R218, R219, R220, R221, R222, R223, R224, R225, R226, R227, R228, R229, R230, R301, R302.

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