

D-33

SERVICE MANUAL

*US Model
Canadian Model
AEP Model
E Model
Australian Model*



MEGA BASS
Discman

Model Name Using Similar Mechanism	D-11
CD Mechanism Name	KSM-220ABN

SPECIFICATIONS

CD section
System
Laser diode properties

Compact disc digital audio system
Material: GaAlAs
Wavelength: $\lambda = 780 \text{ nm}$
Emission duration: Continuous Laser output: Less than 44.6 μW (This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block.)
Sony Super Strategy Cross Interleave Read Solomon
Code D-A conversion 16-bit linear 8fs digital filter
20-20,000 Hz $\pm 1.5 \text{ dB}$
(measured by EIAJ CP-307)
Line output (stereo minijack)
Output level 1 V rms at 47 kilohms
Load impedance over 10 kilohms
Headphones (stereo minijack)
5mW + 5mW at 16 Ω

Error correction
Frequency response
Output (at 9V input level)

General
Power requirements

Supplied:
• DC IN 9 V jack accepts the Sony AC power adaptor for use one:
120V AC, 60Hz (US, Canadian Model)
220V AC, 50Hz (AEP Model)
100-240V, 50/60Hz (E, Australian Model)
Optional:
• DC IN 9V accepts the Sony CPM-203P mount plate and CPM-200A plate arm for use on 12V car battery.
• DC 6V, four LR6 (size AA) alkaline-batteries
1.2W DC
Approx. 137 x 35 x 155.3 mm ($5\frac{1}{2} \times 1\frac{7}{8} \times 6\frac{1}{8}$) (w/h/d) incl. projecting parts and controls
Approx. 410 g (14.5 oz.) net
Approx. 505 g (18 oz.) incl. batteries
AC power adaptor (1)
Connecting cord
(phono plug x 2 + stereo miniplug x 1) (1)
Stereo headphones (1)

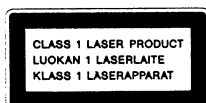
Power consumption
Dimensions
Weight
Supplied accessories

Design and specifications subject to change without notice.

CAUTION

The use of optical instruments with this product will increase eye hazard.

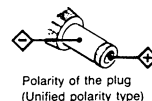
For the AEP MODEL



This Compact Disc player is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT label is located on the bottom exterior.

Note on the AC power adaptor

Use only the AC power adaptor supplied or AC-E6M/AC-E90M AC power adaptor (not supplied). Do not use any other AC power adaptor.
The AC power adaptor supplied with other DISCMAN models with DC IN 9V or DC IN 6V jack and AC-D6M, etc. cannot be used with this unit.



COMPACT DISC COMPACT PLAYER
SONY

CAUTION

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

ADVARSEL !

Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
 Udskiftning må kun ske med batteri
 af samme fabrikat og type.
 Lever det brugte batteri tilbage til leverandøren.

ADVARSEL

Lithiumbatteri – Eksplosjonsfare.
 Ved utskifting benyttes kun batteri som
 anbefalt av apparatfabrikanten.
 Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
 Använd samma batterityp eller en ekvivalent
 typ som rekommenderas av apparattillverkaren.
 Kassera använt batteri enligt fabrikantens
 instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
 Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
 tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
 mukaisesti.

SAFETY-RELATED COMPONENT WARNING!!




COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH 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.

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ATTENTION AU COMPOSANT AYANT RAPPORT
À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SECTION 1

SERVICING NOTES

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

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.

During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.

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

Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

CAUTION

1. To prevent damages to the S801 (OPEN SW)
If the P plate is installed when the CD cover is closed, the S801 lever is positioned behind the open/close arm section of the cover. Thus, when the cover is opened, the S801 will be damaged.
 - To prevent damages to the S801 (OPEN SW), do not install the P plate when the CD cover is closed. Install the P plate when the CD cover is opened. In addition, check the position of the S801 lever when installing the P plate.
2. Special mode for normal operation check
The S801 (OPEN SW) of the D-33 is found near the contact joint of the cover. Since it is difficult to turn the power ON without the cover with the test tool, conduct the following step to enable normal operation without the cover.
 - Press the PLAY and STOP button simultaneously while turning the DC power supply ON.

Before Replacing the Optical Block

Please be sure to check thoroughly the parameters as for the "Optical Block Checking Procedures" (Part No.: 9-960-027-11) issued separately before replacing the optical block. Note and specifications required to check are given below.

- FOK output : IC501⑨pin
When checking FOK, remove the lead wire to disc motor and unsolder and open IC801②pin (FOK).
- S-carve P-to-P value : 3Vp-p
When checking S-carve P-to-P value, remove the lead wire to disc motor.
- Adjusted part for focus gain adjustment : RV501
- RF signal P-to-P value : 0.7 – 1.25Vp-p
- Traverse signal P-to-P value : 1.5Vp-p
- The repairing grating holder is impossible.
- Adjusted part for tracking gain adjustment : RV502

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe more than 25cm away from the objective lens.

Laser Diode Check Procedure

The laser diode on this set will not emit unless the top panel is closed and S801 (leaf SW type) is turned on. The laser diode will always emit even if focus search is not performed in service mode.

The laser diode is checked using the current value which flows to the laser diode inside the optical pick-up block.

Procedure 1 (service mode or normal operation)

Check the laser diode emission with the eye.

1. Open upper panel.
2. S801 on as Fig. 1.
(In service mode, this operation is not necessary.)
3. Press the ▶|| key.
(In service mode, this operation is not necessary.)
4. Observe the objective lens and confirm that the laser diode is emitting light. At this time, the laser diode goes on about 10 seconds due to focus search. If it does not, APC circuit or optical pick-up block is defective.

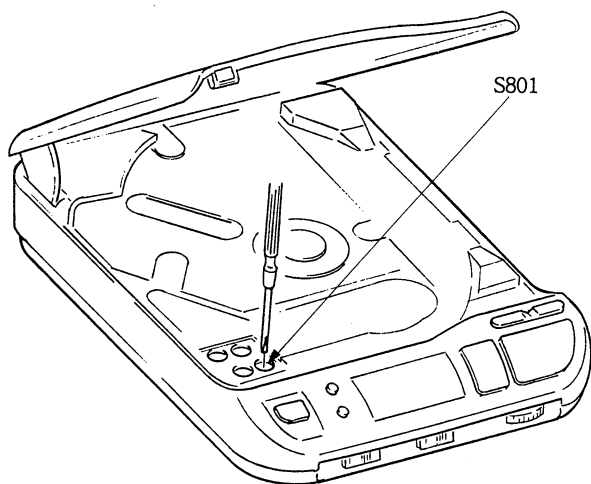
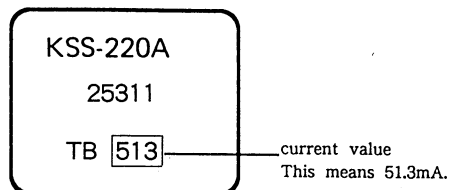


Fig.1 Turning S801 on

Procedure 2 (service mode or normal operation)

Check by the current with flows in the laser diode.

1. Close the top panel.
2. Remove the main board and read the current value on the label affixed to the optical pick-up block.
(Label on optical pick-up block)



The current value varies with the set.

3. Connect a VOM as shown in Fig. 2.
4. Press the ▶|| key.
5. Calculate the current by the VOM reading.
VOM reading (V) ÷ 10 = current (A)
ex. VOM reading = 0.56V
 $0.56 \div 10 = 0.056$ (A) = 56 (mA)
6. Confirm that the ammeter reading is within the range given below.
value on label: 51 mA (25°C)
variation relative to temperature: 0.4mA/°C
(Current increases when temperature rises and decreases when it drops.)

If the value is more than the range give, APC circuit has been defective or the laser diode has deteriorated. If it is less, APC circuit or optical pick-up block is defective.

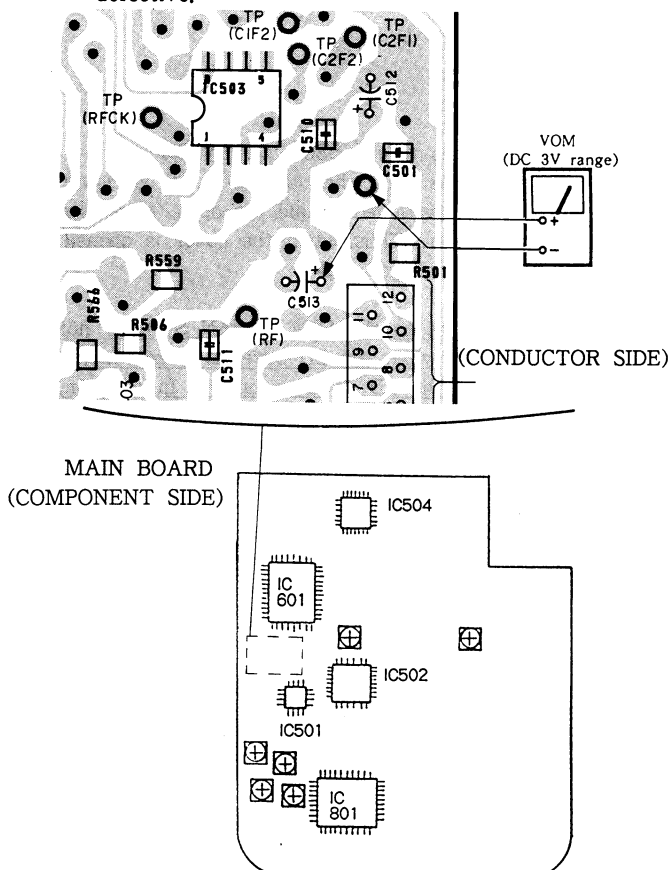


Fig.2 VOM Connection

SERVICE MODE (service program)

This set has built-in service program in the microcomputer as usual sets.

The operation method of service program is explained below.

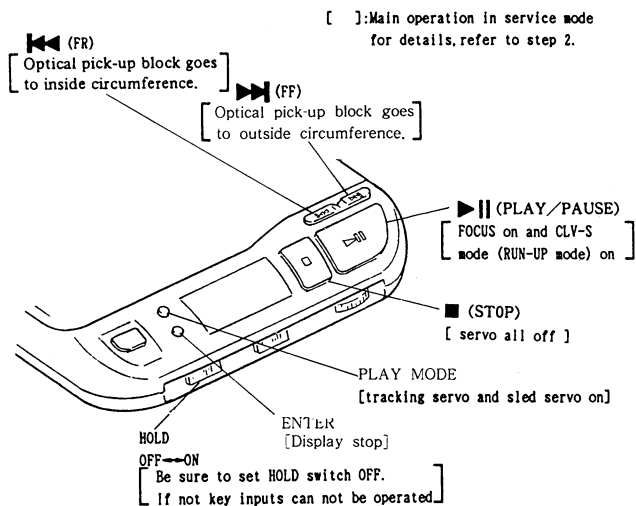


Fig.3 Key Positions

• Step 1 (Service Mode setting method)

1. Turn the HOLD switch OFF with the external power supply not plugged in (no power applied to set) and press the ▶▶ key.
2. Solder jumper TEST terminal.
(IC801 pin④(TEST) is grounded.)
3. Plug in external power supply.
This puts the set into service mode.

TEST terminal
Solder jumper for service mode.
(After checking or adjusting in service mode, be sure to remove this solder jumper.)

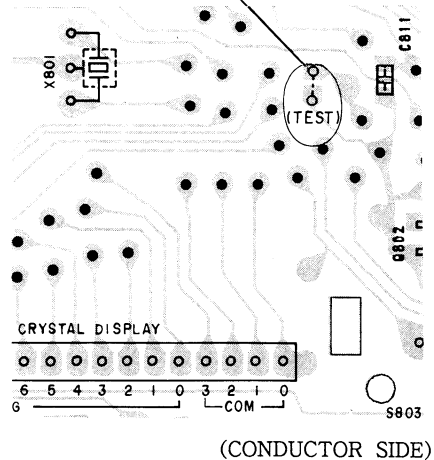


Fig.4 TEST terminal position

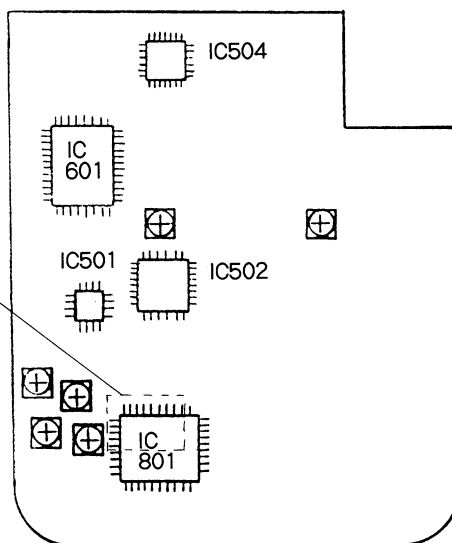
• Step 2 (Service Mode operation)

1. When service mode is set, the display will change 6 times, and those 6 changes will be repeated over and over.
With this the LCD display should be present in service mode. Even if LCD does not display, other operations will be performed.
2. When ▶▶ or ◀◀ key is pressed, the optical pick-up block moves to the inside or outside circumference. Tracking servo and sled servo go off when this is done, so press PLAY-MODE to turn on the tracking servo if necessary.
3. When ▶▶ key is pressed, CLV-S (pull-in mode) starts while performing focus search. When there is no disc installed, focus search is repeated several times while disc motor is rotating.
4. When PLAY-MODE is pressed, tracking servo, sled servo and CLV-A (servo during PLAY) go ON.
5. When 3 and 4 are performed, the disc begins to play. At this time, the top panel should be closed and S801 is to be ON. A sound is not produced as muting is ON.
6. All servo (focus, tracking, sled and spindle) go off when ■ key is pressed.

• Step 3 (Service Mode release)

1. First be sure to unplug the external power supply, then remove the solder jumper TEST terminal.
2. The set will now operated normally.

MAIN BOARD (COMPONENT SIDE)



PACK ASSY INSTALLING PROCEDURE

The positioning adjustment is required when installing the rack assy.

Perform the adjustment using with rack assy positioning jig.

Description	Part No.
Rack Assy Positioning Jig	4-931-565-01

[Adjustment Procedure]

- (1) Position the rack assy so that the distance A and B becomes equal by rotating the sled gear.

(A=B=6 mm)

Loosen the rack assy mounting screws.

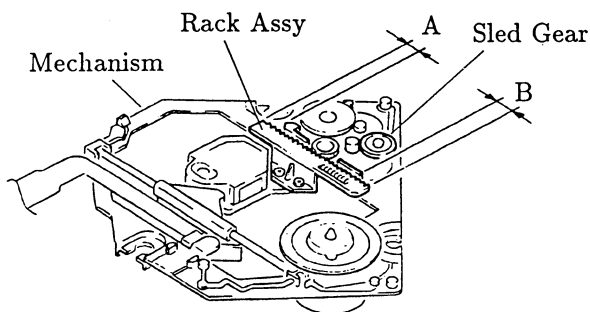


Fig-1

- (2) Place the positioning jig on the mechanism as shown in figure 2. The shaft comes in the "U" gutter of jig.

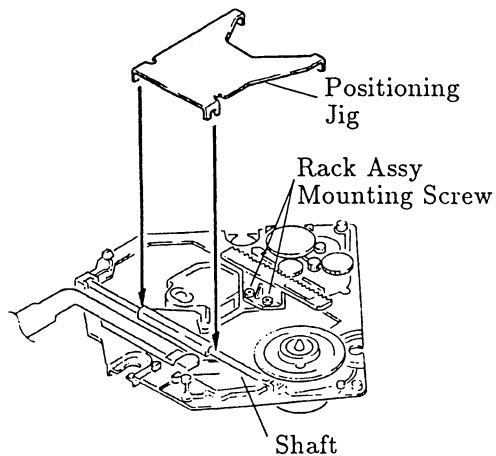


Fig-2

- (3) While pressing the rack assy to the direction of arrow in order to keep the contact the teeth of rack gear with the jig, tighten the screws.

Note : Tighten the each screw alternately and little by little.

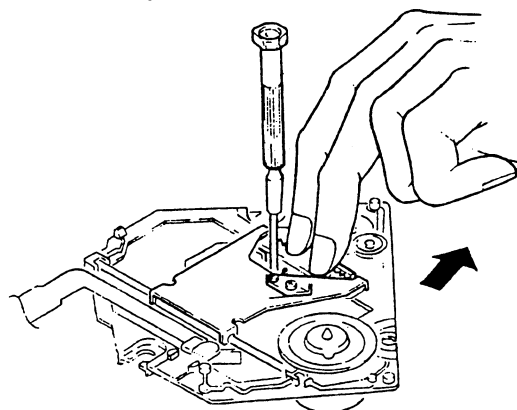


Fig-3

- (4) Confirm the clearance between the teeth of rack gear and the jig as shown in figure 4.

Remove the rack assy side of jig first when removing the jig.

(Be sure not to remove it from the shaft side first.)

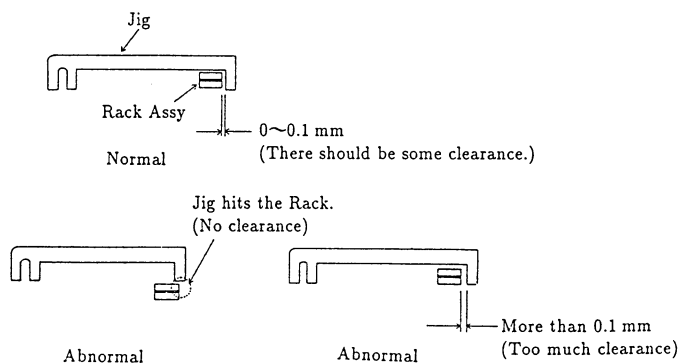


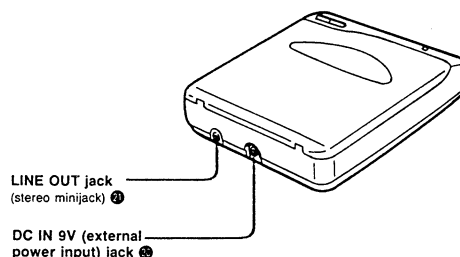
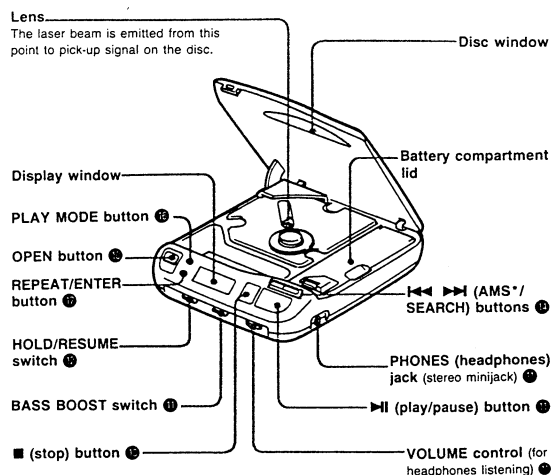
Fig-4

SECTION 2 GENERAL

This section is extracted from instruction manual.

Location and Function of Controls

See the pages indicated in ● for more details.



*AMS is an abbreviation for Automatic Music Sensor.

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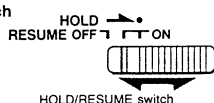
Disc Playing

To resume the disc play from the point where you last stopped the play (Resume play mode)

You can resume the disc play from the point where you last pressed ■. To enter this mode, set the HOLD/RESUME switch to the center or the right position. The resume function can be performed in any operation mode. (Refer to the table shown below.)

The positions of the HOLD/RESUME switch

	1st. (left)	2nd. (center)	3rd. (right)
Hold	OFF — OFF — ON		
Resume play mode	OFF — ON — ON		

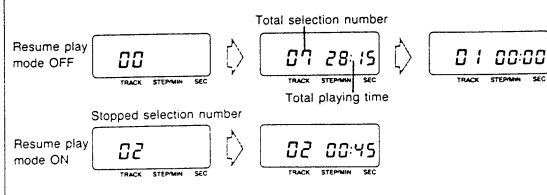


You can hold the disc play locking the buttons to prevent them from being accidentally depressed. To enter this mode, set the HOLD/RESUME switch to the right position.

Note on the display window while the disc is playing

When the disc play start

The display window changes as follows.



Notes

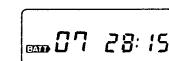
- We recommend you to install the batteries for the resume play. The memory of the stopped point will be maintained by the batteries even if you remove the car battery cord or AC power adaptor, or set the ignition key to the off position.
- The memory of the stopped point is canceled if you open the lid after pressing ■. After the memory is canceled, play starts from the first selection of the disc.

On Display Window

On time counter

When you press ►||

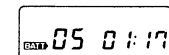
Total selection number of the disc and then the total playing time appear.



Total selection number Total playing time

During the play

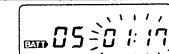
The truck number and the elapsed playing time of the current selection appear.



1 min. 17 sec. has elapsed from the beginning of the fifth selection.

During the pause

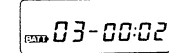
The elapsed playing time of the current point flashes.



Pause mode at the point 1 min. 17 sec. from the beginning of the fifth selection

Between the selections

The time to the beginning of the next selection appears.







2 sec. to the beginning of the 3rd selection

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Locating a Particular Portion

Locating a particular selection (AMS*)	To locate the beginning of the current selection  Press once.	To locate the beginning of the next selection  Press once.
	To go back at high speed.  Keep pressing.	To go ahead at high speed.  Keep pressing.

* AMS is the abbreviation of Automatic Music Sensor.

Notes on the AMS function

- The player pauses at the beginning of the located selection when you press **◀◀** or **▶▶** in the pause mode.
- Each time you press **◀◀**, the player locates the previous selection. Each time you press **▶▶**, the player locates the next selections and stops at the last selection.
- During the programmed play, AMS operates in the programmed order.

Note on the SEARCH function

While searching, the elapsed playing time appears in the display window.

What is this indication?

⏮ appears if you continuously press **▶▶** at the end of the disc. To return to the selection number indication, press **◀◀**.

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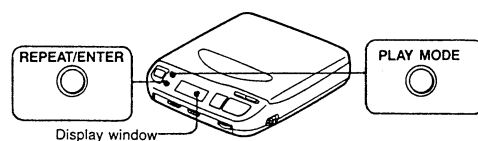
Various Playing Modes

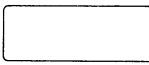
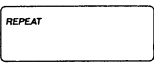




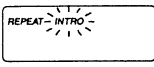
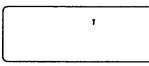
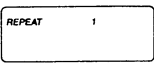
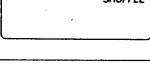
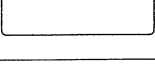
This unit has 10 playing modes.

To change the mode, press the PLAY MODE button during play. The current mode appears in the display window.

To play repeatedly, press REPEAT/ENTER button.
"REPEAT" appears in the display window.
Press again to cancel the repeat play.

To stop the disc, press **■** button.



	REPEAT/ENTER button is not pressed.		REPEAT/ENTER button is pressed.	
	Display window	Playing mode	Display window	Playing mode
		Normal play Plays the whole disc once and stops.		Repeats the whole disc.
PLAY MODE  ↓ PLAY MODE  ↓ PLAY MODE 		INTRO play Plays the first about ten seconds of all the selections. To start playing Press ▶▶ . "INTRO" stops flashing and playing starts.	 Press ▶▶ again to listen to the selection to the end.	Plays the first about ten seconds of all the selections again and again.
		Playing a single selection Plays one selection and stops at the end of the selection.		Plays a single selection repeatedly.
		Shuffle play Plays the whole selection in a random order.		Plays the selections in random order repeatedly.

(To be continued)

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SECTION 3

ELECTRICAL ADJUSTMENTS

Notes on Adjustment

1. Perform adjustments in service mode.
Be sure to release service mode after completing adjustments.
(Refer to "Service Mode (service program)" on page 5.)
2. Perform adjustments in the order given.
3. Use YEDS-18 disc (part No.: 3-702-101-01) unless otherwise indicated.
4. Power supply voltage : DC 9V
HOLD switch : OFF

PREPARATION

Put the set into service mode (See page 5.) 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 optical pick-up block moves smoothly, without catching, from the inmost → outmost → inmost circumference.
►► : optical pick-up block moves outward
◄◄ : optical pick-up block moves inward

• Focus Search Check

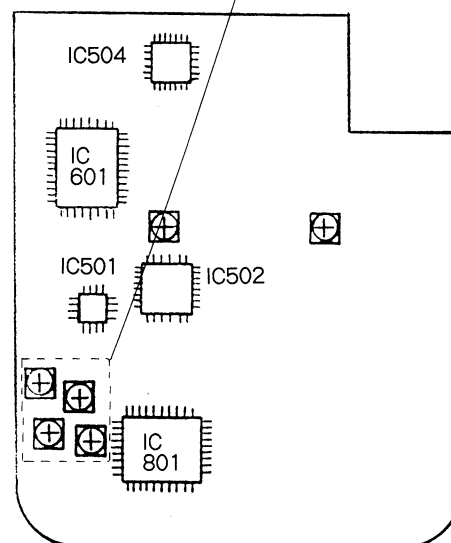
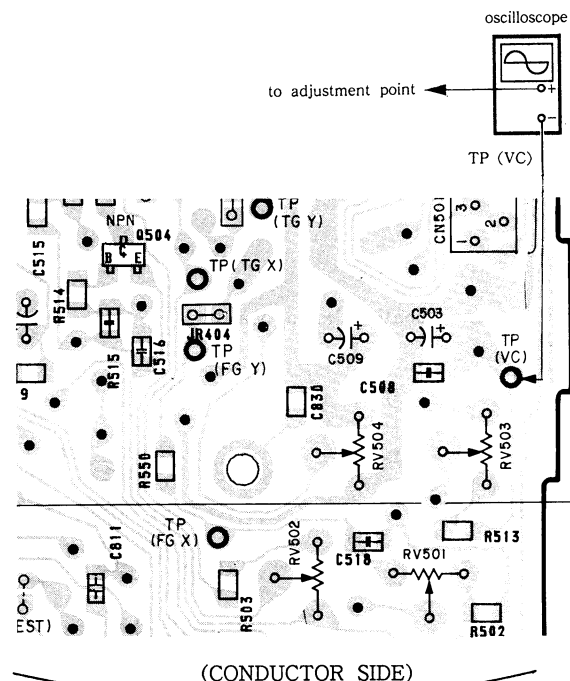
1. Press the OPEN button and open the top panel.
2. Press the ►|| key. (Focus search is performed continuously.)
3. Observe the optical pick-up block objective lens and check that it moves smoothly up and down with no catching or noises.
4. Press the ■ key.
Check that focus search operation stops. If it does not, press the ■ key again.

VC (1/2 Vcc) Connecting Point

FOCUS BIAS ADJUSTMENT

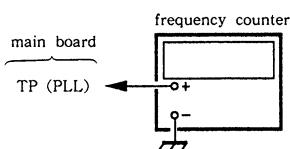
TRACKING BALANCE ADJUSTMENT

When the adjustments above are performed, connect the ⊖ side of oscilloscope to the point below.



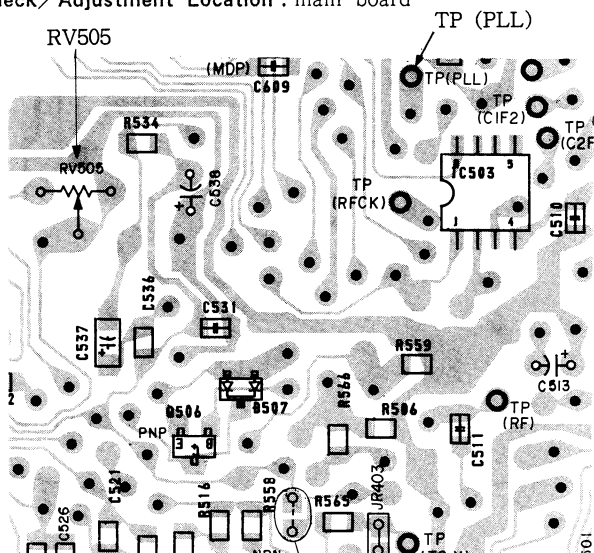
PLL Free Run Frequency Check and Adjustment

Check/Adjustment Procedure :



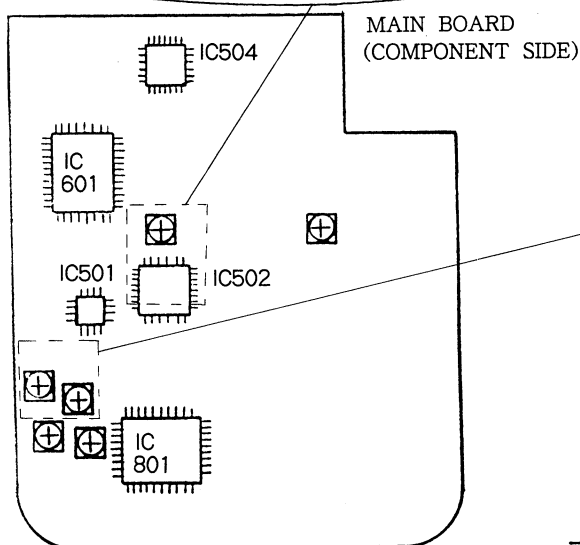
1. Disconnect ASY solder jumper terminal in the diagram below.
2. Connect a frequency counter to main board test point TP (PLL).
3. Put the set into service mode (See page 5).
4. Check that the frequency counter reading is 4.32 ± 0.01 MHz. If not, adjust RV505 so that it is 4.32 ± 0.01 MHz.
5. After adjustment, release service mode (see page 5).
6. Short the jumper terminal disconnected in step 1.

Check/Adjustment Location : main board



(CONDUCTOR SIDE)

ASY solder jumper terminal

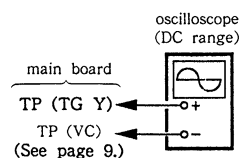
MAIN BOARD
(COMPONENT SIDE)

Tracking Balance Adjustment

Conditions :

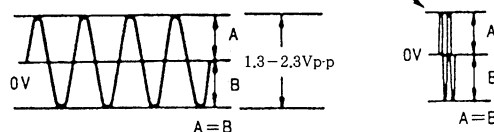
The set should be placed either horizontally.

Adjustment Procedure :



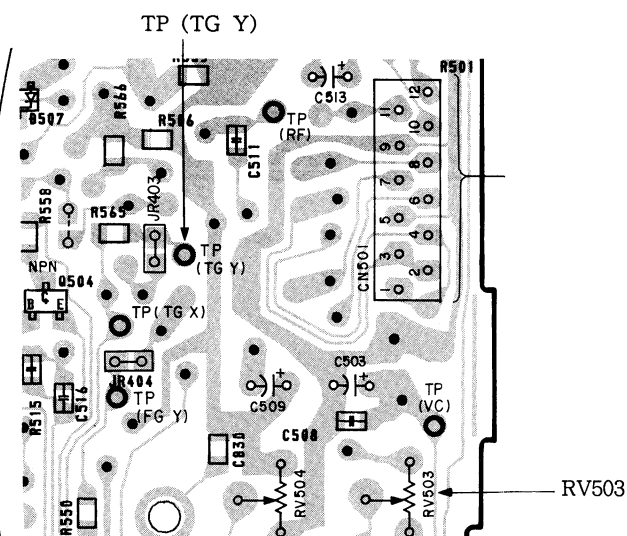
1. Connect the oscilloscope to main board TP (TG Y).
2. Put the set into service mode (See page 5).
3. Press the ► and ◀ keys to move the optical pick-up block to the center.
4. Insert the disc (YEDS-18) and close the top panel.
5. Press the ► key.
(It will go from focus search to focus on, and CLV)
(pull-in mode state, Tracking and sled are OFF.)
6. Adjust RV503 so that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0V.

Note : Take sweep time as long as possible to obtain best waveform.



7. Press the ■ key.
8. After adjustment, release service mode (see page 5).

Adjustment Location : main board



Reference

Focus/Tracking Gain Adjustment

A frequency response analyzer or CD jig is necessary in order to perform this adjustment exactly.

However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perform this adjustment.

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

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.

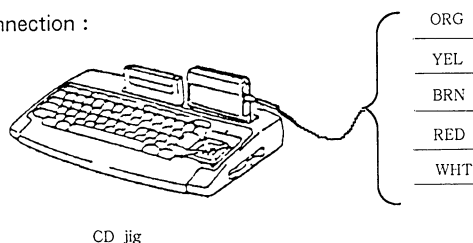
This adjustment is to be performed when replacing the following parts :

- UPF (optical pick-up block)
- RV501 (focus gain volume)
- RV502 (tracking gain volume)

On this set, it is very difficult to simplify this adjustment. For those sets on which symptoms such as "occasional skipping" are hard to discover, or it is hard to tell if the set has been repaired, use the CD jig and perform this adjustment. Refer to the diagram below for connection of the CD jig. The adjustment procedure is described in the separate CD jig Instruction Manual.

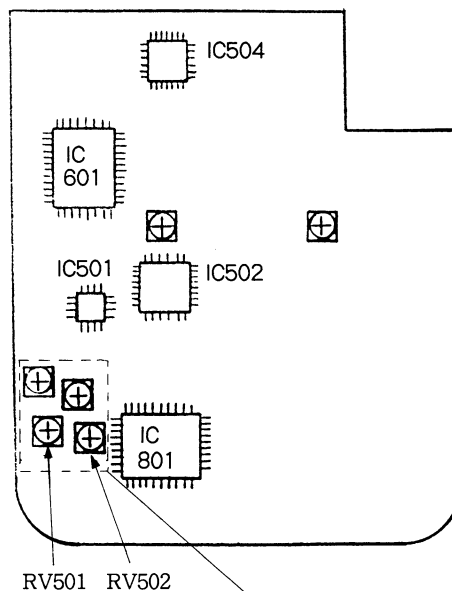
Please be careful not to move RV501 (focus gain volume), RV502 (tracking gain volume) ordinarily.

CD jig connection :

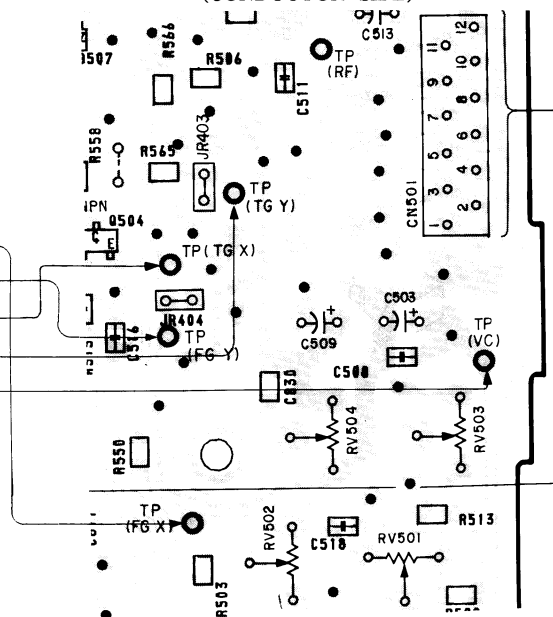


Remove the solder jumpers at the TG and FG locations and connect the CD jig.

MAIN BOARD (COMPONENT SIDE)



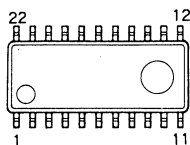
(CONDUCTOR SIDE)



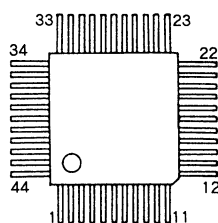
SECTION 4 DIAGRAMS

4-1. SEMICONDUCTOR LEAD LAYOUTS

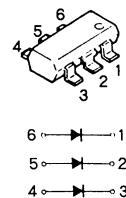
**BA3570F
SM5840CS**



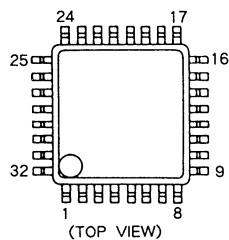
μPC1715



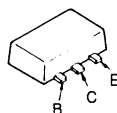
1MN10



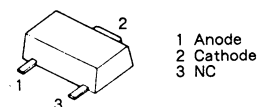
CXA1271Q



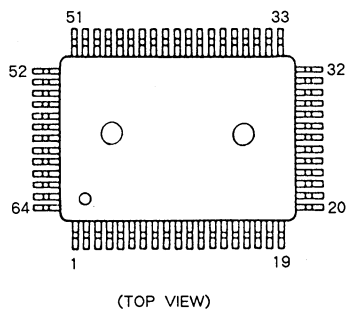
**2SB1120
2SD999-CLCK**



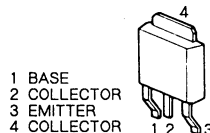
E10QS04



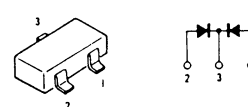
CXP5084-640Q



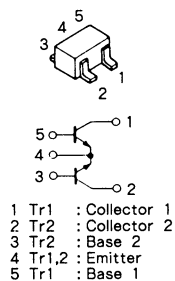
2SD1758F5-QR



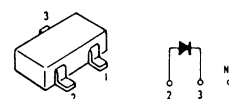
MA152WK



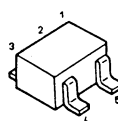
FMW1



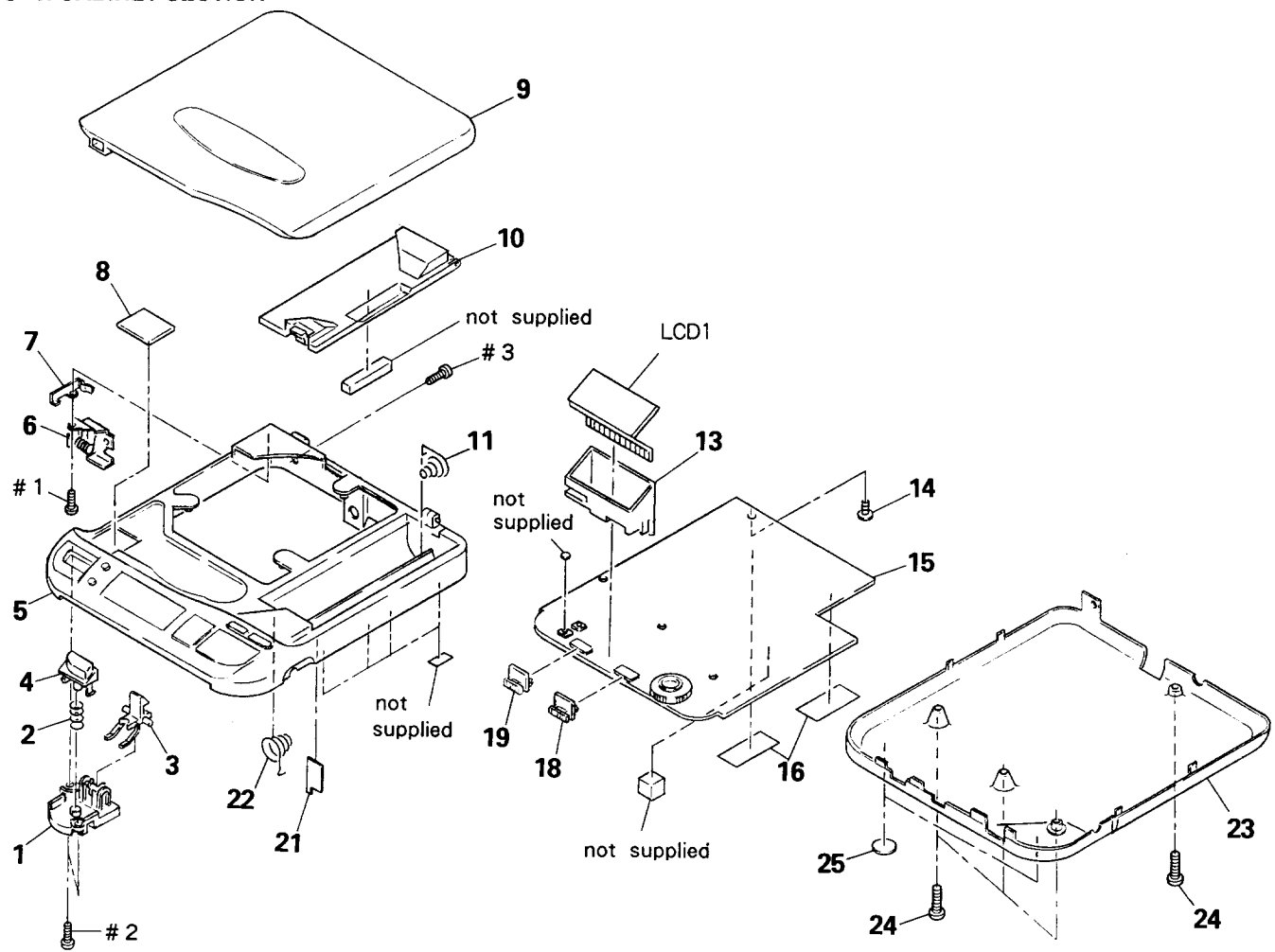
**RB411D
RD10M-B1
RD5.1M-B2
RD7.5M-B1
SB01-05CP**



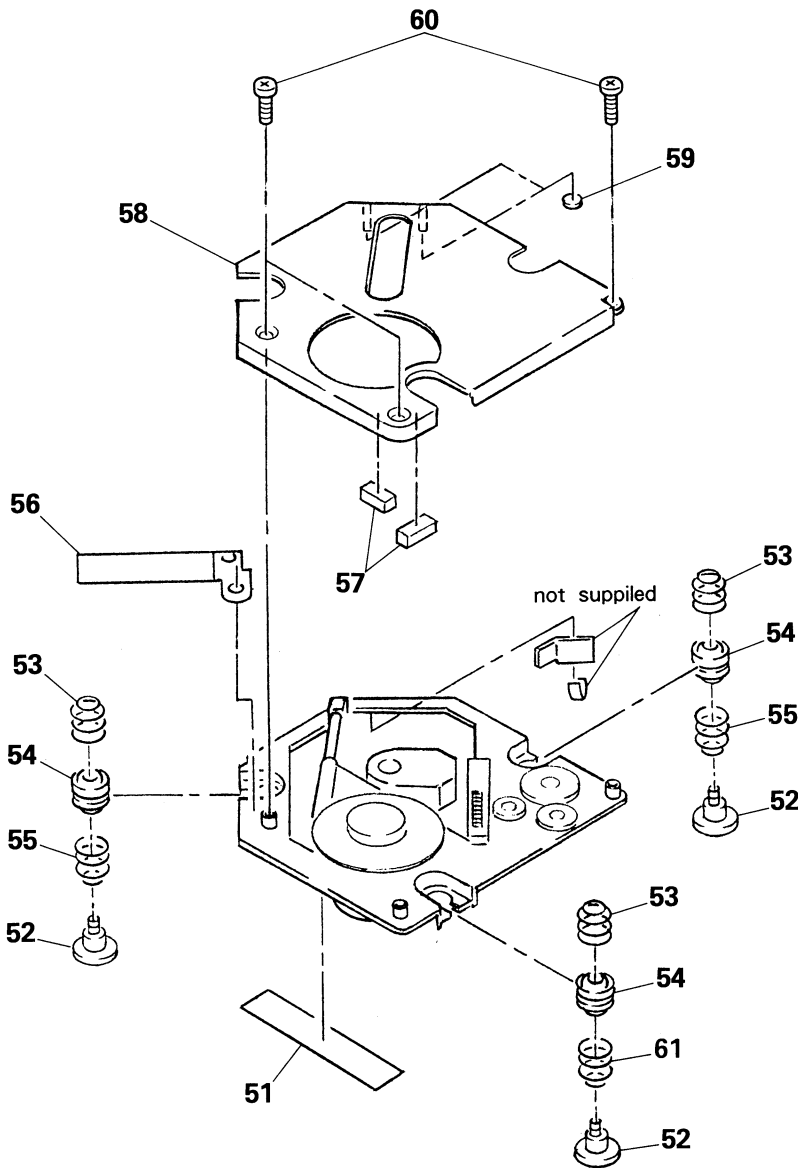
SC7S04F



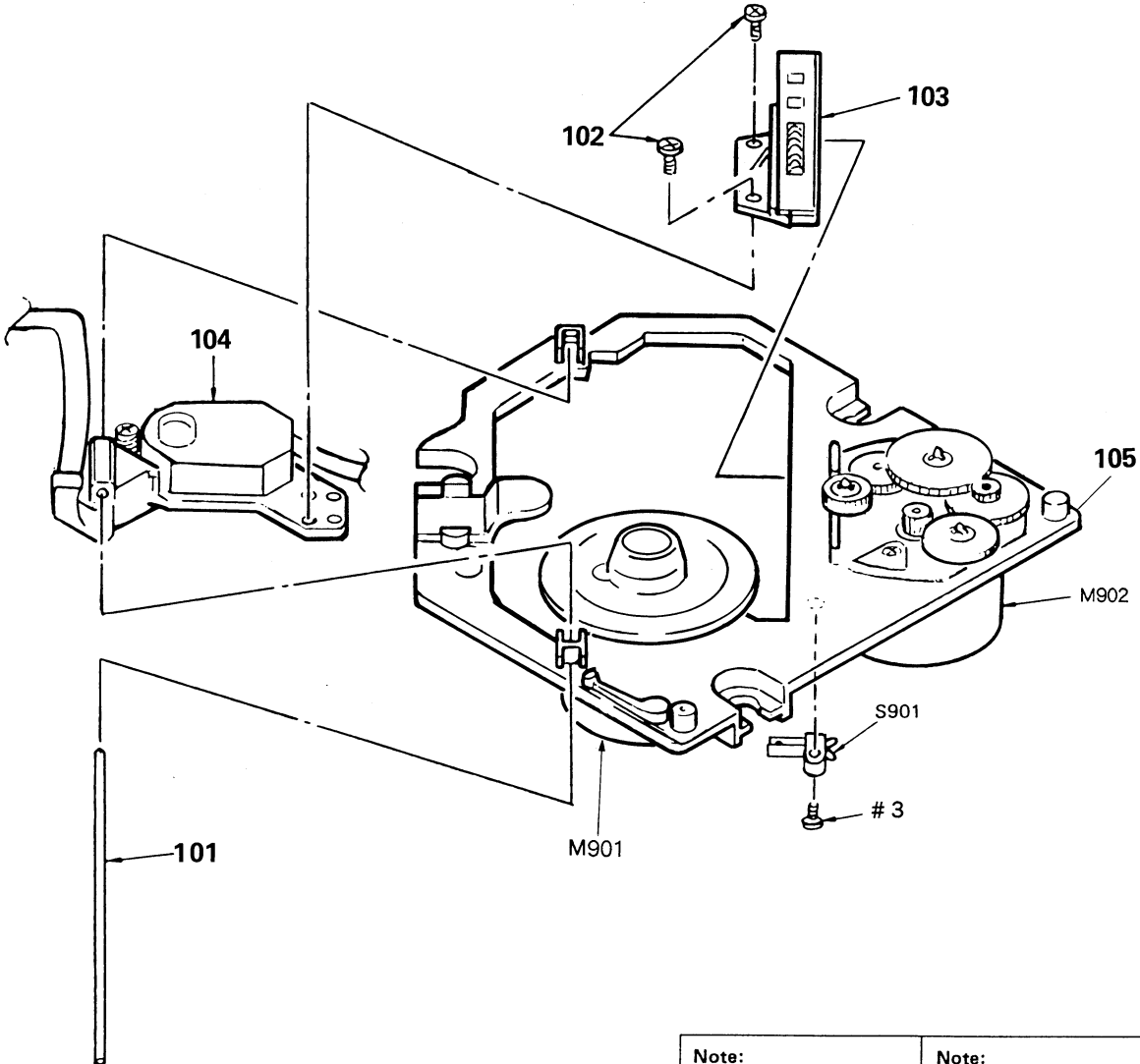
5-1. CABINET SECTION






5-2. CHASSIS SECTION



5-3. MECHANISM SECTION
(KSM-220ABN)



<p>Note: The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.</p>	<p>Note: Les composants identifiés par une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.</p>
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