

# CDP-EX77

## SERVICE MANUAL

AEP Model  
UK Model  
E Model



CDP-EX77 is the CD player section  
in MHC-EX66, DHC-EX77MD/MD77

Model Name Using Similar Mechanism	HCD-MD5
CD Mechanism Type	CDM38A-5BD19
Base Unit Name	BU-5BD19
Optical Pick-up Name	KSS-213B/K-N

### SPECIFICATIONS

System	Compact disc and digital audio system
Laser	Semiconductor laser ( $\lambda = 780 \text{ nm}$ ) Emission duration: continuous
Laser output	Max. $44.6 \mu\text{W}^*$ * This output is the value measured at a distance of 200 mm from the objective lens surface on the Op- tical Pick-up Block with 7 mm aperture.
Frequency response	2 Hz to 20 kHz ( $\pm 0.5 \text{ dB}$ )
CD OPTICAL DIGITAL OUT	(Square optical connector jack, rear panel)
Dimensions (w/h/d) incl. projecting parts and controls:	Approx. $280 \times 122.5 \times 347 \text{ mm}$
Mass	Approx. 3.7 kg

Design and specifications are subject to change without notice.

COMPACT DISC PLAYER



**SONY**<sup>®</sup>

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

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

During repair, pay attention to electrostatic break-down 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.

### 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 from more than 30 cm away from the objective lens.

### LASER DIODE AND FOCUS SEARCH OPERATION CHECK

Carry out the “S curve check” in “CD section adjustment” and check that the S curve waveforms is output three times.

### 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.

### 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.

### CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

CLASS 1 LASER PRODUCT  
LUOKAN 1 LASERLAITE  
KLASS 1 LASERAPPARAT

Laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

The following caution label is located inside the unit.

CAUTION	;	INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL	;	USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSÅFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	;	AVAITTAESSA JA SUOJALUKITUS OHITETTAESSA DLET ALTIIVINA LASERSÄTEILYLLE.
VARNING	;	LASERSTRÅLING NÅR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
ADVARSEL	;	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNEES UNGÅ EKSPONERING FOR STRÅLEN.

### SAFETY-RELATED COMPONENT WARNING!!

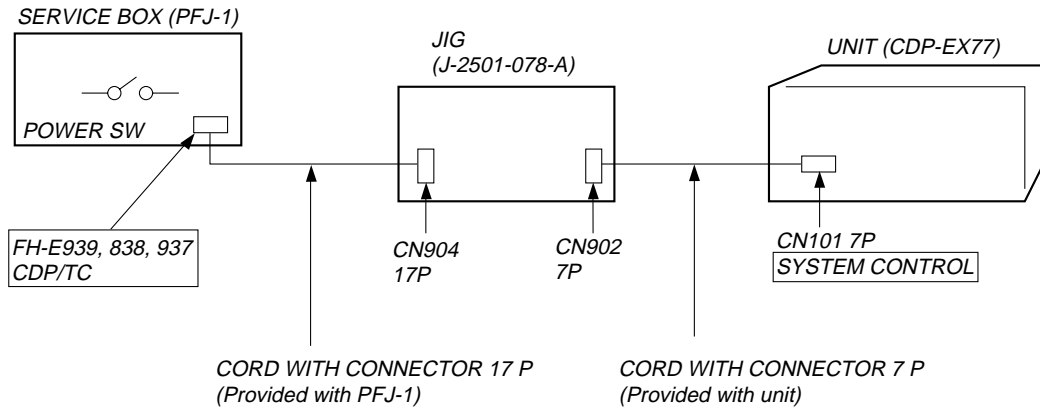
COMPONENTS IDENTIFIED BY MARK  $\triangle$  OR DOTTED LINE WITH MARK  $\triangle$  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

# SECTION 1 SERVICING NOTES

## 1-1. Power Supply During Servicing

This unit is not able to operate on its own because it does not have its own power supply. During servicing, connect to other units. Power is supplied when the **SYSTEM POWER** button of the amplifier (TA-EX66/EX77) is turned ON. If the other units are not available, use a service box (PFJ-1) and jig (J-2501-078-A). In this case, press the **STOP** button and **TIME** button simultaneously to turn on the power.

### [Connection Diagram]



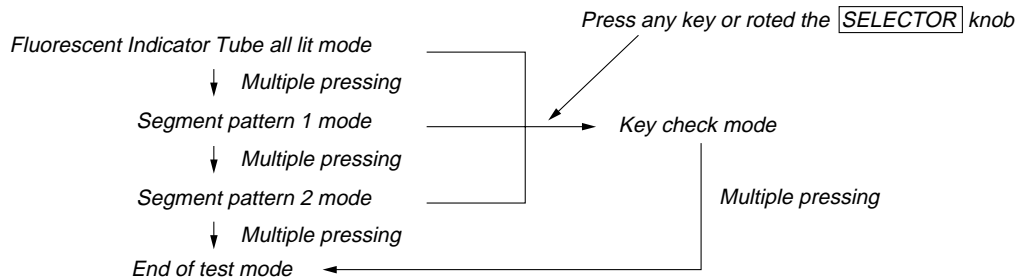
## 1-2. Fluorescent Indicator Tube/Key Check Mode

After turning on the power, press the **STOP** button, **TIME** button, and **DISC 1** button simultaneously to perform the Fluorescent indicator tube check.

The steps of the Fluorescent Indicator Tube check mode will proceed onto the next one by the above multiple pressing.

During the Fluorescent Indicator Tube check mode, press any button or rotate the selector knob to set the key check mode.

To end the mode, press the above three buttons simultaneously.



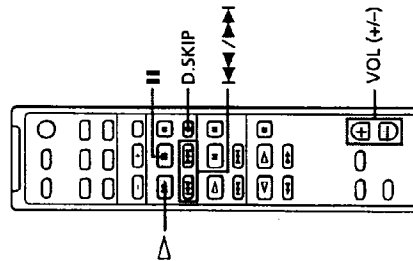
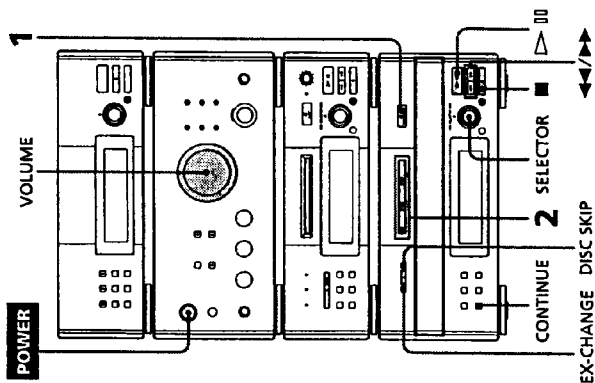
**Note 1)** When the three buttons pressed to enter the Fluorescent Indicator Tube all lit mode are released together, the Fluorescent Indicator Tube all lit mode will remain on. When released separately, the key check mode will be set soon after the Fluorescent Indicator Tube all lit mode.

In “multiple pressing”, if the three buttons are pressed and released together, the next mode will be set. If not, the key check mode will be set.

**Note 2)** In the key check mode, each time the button is pressed, the “KEY=” number on the Fluorescent indicator tube increases. When the **SELECTOR** knob is rotated, the “KEY=” number on the Fluorescent indicator tube increases in the + direction and decreases in the – direction.

## Basic Operations Playing a CD

You can play up to three CDs in a row.

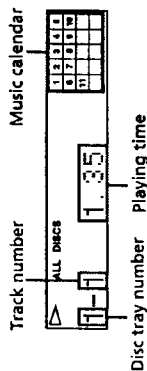


- 1 Press  $\square$  OPEN/CLOSE and place a CD on the disc tray.

With the label side up. When you play a single CD, place it on the inner circle of the tray.

To place the third disc, press DISC SKIP (or D.SKIP on the remote) to rotate the disc tray.

- 2 Press one of the DISC 1 - 3 buttons. The disc tray closes and play starts. If you press  $\triangleright$  00 (or  $\triangleright$  on the remote) when the disc tray is closed, play starts from the CD loaded on the tray whose button is lit green.



To	Do this
Stop play	Press $\blacksquare$ .
Pause	Press $\triangleright$ 00 (or $\blacksquare$ on the remote). Press again to resume play.
Select a track	Turn SELECTOR clockwise (to go forward) or counter-clockwise (to go back) and release it when you locate the desired track (or press $\triangleright$ 1 or $\triangleleft$ on the remote). Turn and hold SELECTOR to locate other discs.
Find a point in a track	Press $\blacktriangleright$ or $\blacktriangleleft$ during play and release it at the desired point.

continued

17 EN

## Basic Operations

### Playing a CD (continued)

To	Do this
Select a CD	Press DISC 1 - 3 button or DISC SKIP (or D.SKIP on the remote).
Play only the CD you have selected	Press CONTINUE repeatedly until "1 DISC" appears.
Play all CDs	Press CONTINUE repeatedly until "ALL DISCS" appears.
Remove or exchange the CD	Press $\square$ OPEN/CLOSE.
Exchange the CD during play	Press EX-CHANGE. Press again to close the disc tray.
Adjust the volume	Turn VOLUME (or press VOL $\oplus$ or $\ominus$ on the remote).

### Tips

- Pressing  $\triangleright$  00 when the power is off automatically turns the power on and starts CD playback if there is a CD on the tray (One Touch Play).
- You can switch from another source to the CD player and start playing a CD just by pressing  $\triangleright$  00 or the DISC 1 - 3 buttons\* (Automatic Source Selection).
- Pressing the DISC 1 - 3 buttons works as the Automatic Source Selection feature while normal play or "1 DISC SHUFFLE" is appearing in the display.
- If there is no CD in the player, "NO DISC" appears.
- When the disc tray is selected or the CD loaded on the tray is playing, the DISC 1 - 3 button for the tray is lit green.

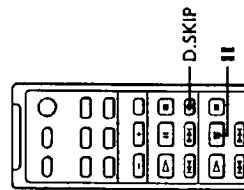
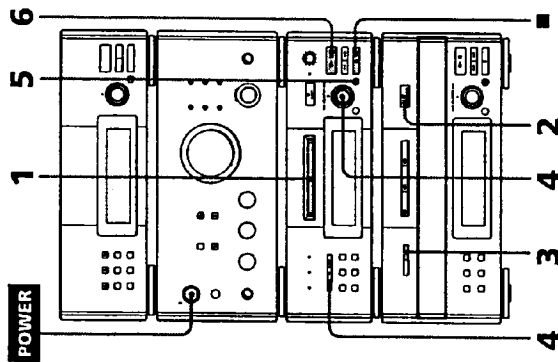
This section is extracted from instruction manual.

## SECTION 2 GENERAL

### Recording a CD on an MD (DHC-MD77/EX77MD only)

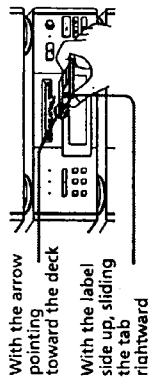
#### — CD Synchro Recording

You can make a digital recording of a CD on an MD, marking track numbers in the same sequence as the original CD. In addition, you can record a program of favorite tracks (see page 38), record only the first track on each CD (Hit Parade, see page 40), and edit an MD after recording (see pages 45 to 51).



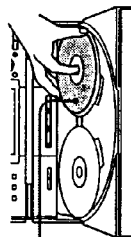
18 EN

- 1 Insert a recordable MD.



With the arrow pointing toward the deck  
With the label side up, sliding the tab rightward

- 2 Press **OPEN/CLOSE** and place a CD on the disc tray.  
The disc tray opens.



With the label side up. When you play a single CD, place it on the inner circle of the tray.

To place the third disc, press **DISC SKIP** (or **D.SKIP** on the remote) to rotate the disc tray.

- 3 Press **DISC SKIP** (or **D.SKIP** on the remote) repeatedly until the **DISC** 1 - 3 button you want lights green.

- 4 Press **CD SYNC**, then turn **SELECTOR** on the MD deck until "NORMAL ?" appears.

- 5 Press **ENTER/YES**.  
The MD deck stands by for recording and the CD is in pause for playback.

- 6 Press **▶||** on the MD deck (or **||** on the remote).  
Recording starts. The CD player stops and the MD deck pauses automatically when the recording is completed. If there is no remaining recording time on the MD, the MD deck stops.

#### To stop recording

Press **■** on the MD deck.

#### While "TOC" lights up or is flashing

Do not move the deck or pull out the power cord to ensure the complete recording. The deck is currently updating the Table Of Contents (TOC).

#### Tip

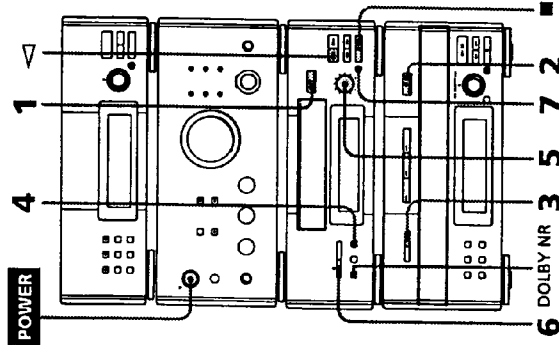
Inserting an MD when the power is off automatically turns the power on.

## Recording a CD on a tape (MHC-EX66 or the optional TC-TX77 users only)

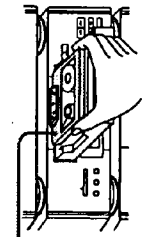
### — CD Synchro Recording

The **CD SYNC** button lets you record from a CD to a tape easily. You can use **TYPE-I** (normal), **TYPE-II** (C-O2) and **TYPE-IV** (metal) tapes. The deck detects the tape type automatically.

**MHC-EX66** is used for illustration purpose.

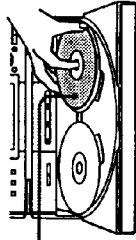


- 1 Press **OPEN/CLOSE** on the tape deck and insert a blank tape.  
Press **OPEN/CLOSE** again to close the tray.



With the side you want to record on facing up

- 2 Press **OPEN/CLOSE** on the CD player and place a CD on the disc tray.  
The disc tray opens.



With the label side up. When you play a single CD, place it on the inner circle of the tray.

To place the third disc, press **DISC SKIP** (or **D.SKIP** on the remote) to rotate the disc tray.

- 3 Press **DISC SKIP** (or **D.SKIP** on the remote) repeatedly until the **DISC** 1 - 3 button you want lights green.

- 4 Press **DIRECTION** repeatedly to select the side you want to record on.

Select **▶** to record on one side. Select **◀** or **◄** to record on both sides.

- 5 Turn **REC LEVEL** to adjust the recording level.

The fourth dot is satisfactory for most purposes. For details, see "Recording on a tape manually" on page 52.

- 6 Press **CD SYNC** on the tape deck.  
The tape deck stands by for recording and the CD is in pause for playback. The **CD SYNC** indicator lights up and "PLAY ▶ **||** (REC)" (for front side) appears.

- 7 Press **||** on the tape deck.  
Recording starts.

### To stop recording

Press **■** on the tape deck or the CD player.

#### Tips

- Pressing SYSTEM POWER on the DHC-MD77/EX77MD automatically turns on the TC-1X77 deck bus cable.
  - If you want to record from the reverse side, press **<** in step 6 so that **◀PLAY** **||** **(REC)** (for reverse side) appears.
  - When you record on both sides, be sure to start from the front side. If you start from the reverse side, recording stops at the end of the reverse side even though you select **◀**.
  - When you want to reduce the hiss noise in low-level high-frequency signals, press DOLBY NR repeatedly to select B or C before step 5. You cannot switch DOLBY NR during recording.
  - If the tape reaches the end of its front side while dual-sided recording, the fadeout feature works so that a track is not abruptly cut off at the end of the tape (Fade Synchro). The track will be recorded again from the beginning on the reverse side. The Fade Synchro feature works during one-side recording, too.
  - You cannot perform CD Synchro Recording by pressing the CD SYNC buttons on both the tape deck and the MD deck at the same time.
- Use the CD Synchro Recording feature for a tape and record on an MD manually. This method is recommended since on the MD deck, you can erase the overlapping track recorded using the Fade Synchro feature just by specifying its track number (Erase Function).

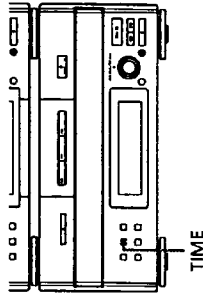
#### Note

You cannot listen to other sources while recording.

## The CD player

### Using the CD display

You can check the remaining time of the current track or that of the CD.



Press TIME repeatedly during play. Each time you press the button, the display changes as follows:

- Playing time on the current track
- Remaining time on the current track
- Remaining time on the current CD\*

\* The remaining time on the CD is not displayed during Program or Shuffle Play.

### To check the total playing time and the number of tracks on the CD

Press TIME in normal or shuffle play stop mode.

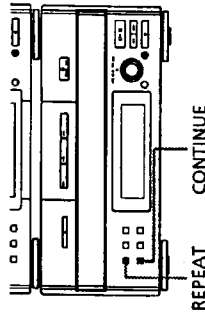
#### Tips

- Tracks numbered 1 to 20 appear in the Music Calendar Display. Tracks numbered 21 or over are not displayed.
- "→--" appears when you check the remaining time of a track whose number is 21 or over.

### Playing the CD tracks repeatedly

#### Repeat Play

This function lets you repeat a single CD or all CDs in normal play, Shuffle Play and Program Play.



Press REPEAT during play until "REPEAT" appears.

Repeat Play starts. Do the following procedure to change the repeat mode.

#### To repeat

All the tracks on the current CD "1 DISC" appears.

All the tracks on all CDs "ALL DISCS" appears.

Only one track\* "REPEAT 1" appears while playing the track you want to repeat.

\* You cannot repeat a single track during Shuffle Play and Program Play.

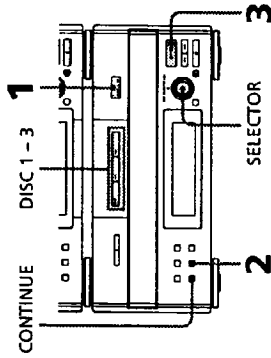
#### To cancel Repeat Play

Press REPEAT repeatedly until "REPEAT" or "REPEAT 1" disappears.

## Playing the CD tracks in random order

### — Shuffle Play

You can play all the tracks on one CD or all CDs in random order.



**1** Place a CD (CDs) on the disc tray.

**2** Press SHUFFLE.

"SHUFFLE" appears. Each time you press the button, the display changes as follows:

"ALL DISCS" ↔ "1 DISC"  
(All the CDs play in random order.)  
(A single CD whose DISC 1 - 3 button lights green plays in random order.)

**3** Press  $\triangleright$   $\square$  (or  $\triangleleft$  on the remote). The sound source automatically switches to the CD player. "3" appears, then all the tracks play in random order.

### To cancel Shuffle Play

Press CONTINUE.

### To select a desired CD

Press DISC 1 - 3 button while "1 DISC" is appearing in the display.

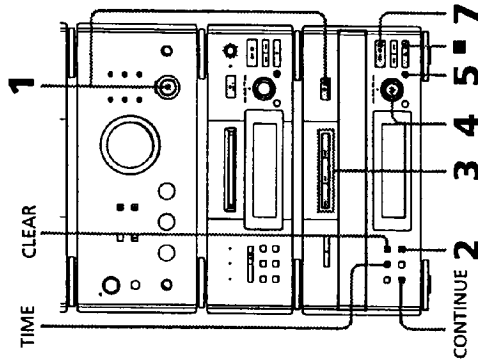
### Tips

- You can start Shuffle Play during normal play by pressing SHUFFLE.
- To skip a track, turn SELECTOR clockwise (or press  $\blacktriangleright$  on the remote).

## Programming the CD tracks

### — Program Play

You can make a program of up to 32 tracks from all the CDs in the order you want them to be played. You can also record the program you made.



**1** Turn FUNCTION until the CD indicator lights up, then place a CD (CDs) on the disc tray.

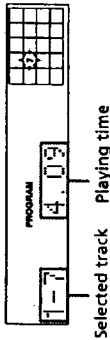
**2** Press PROGRAM.

"PROGRAM" appears.

**3** Press one of the DISC 1 - 3 buttons to select a CD.

## Programming the CD tracks (continued)

**4** Turn SELECTOR until the desired track number appears.



Playing time

**5** Press ENTER.

The track is programmed. The last programmed track appears, followed by the total playing time. If you have made a mistake, press CLEAR.

**6** To program additional tracks, repeat steps 3 to 5.

Skip step 3 if you select a track from the same disc.

**7** Press  $\triangleright$   $\square$  (or  $\triangleleft$  on the remote).

All the tracks play in the order you selected.

## To check the total number of the programmed tracks

Press TIME in stop mode.

"Step" appears, followed by the total number of the programmed tracks.

To Do this

Cancel Program Play Press CONTINUE.

Clear a track from the end (in stop mode) Press CLEAR.

Add a track to the program (in stop mode) Do steps 3 to 5 in "programming the CD tracks."

Clear the entire program Press  $\blacksquare$  once in stop mode.

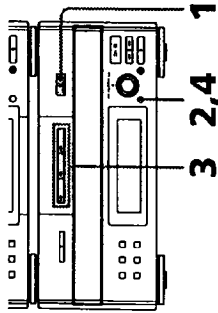
### Tips

- To program the entire CD as one step of the program, skip step 4.
- When you want to record the program, see "Recording the favorite CD tracks on an MD" (see page 38) or "Recording the favorite CD tracks on a tape" (see page 54).
- The program you made remains after the Program Play has finished. To play the same program again, press  $\triangleright$   $\square$ . However, when you make a recording with the Hit Parade feature, the program is erased.
- The total playing time is not displayed when you select a track whose number is 21 or over, or the total program time exceeds 100 minutes.

## Looping part of a CD

### — Loop

With the loop function, you can repeat part of a CD during playback. This lets you create original recordings.



- 1 Place a CD (CDs) on the disc tray.
- 2 Press LOOP repeatedly in pause or stop mode to select "NORMAL 1 - 5" or "RHYTHM 1 - 5." Each time you press the button, the display changes as follows:

NORMAL 1\*.....▶ NORMAL 5  
↑  
RHYTHM 5 ◀..... RHYTHM 1\*

\* See "The difference between NORMAL and RHYTHM" for details.

- 3 Press one of the DISC 1 - 3 buttons, then start playing.
- 4 Press and hold LOOP at the point you want to start the Loop function, and release the button to resume normal play.

## The difference between NORMAL and RHYTHM

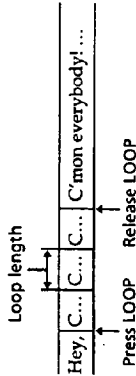
The original track can be looped in two ways, NORMAL and RHYTHM.

### Original

Hey, Come on everybody! ...

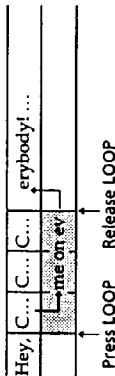
### NORMAL

Normal play resumes from the point the loop started.



### RHYTHM

Normal play resumes from the point the loop ends.



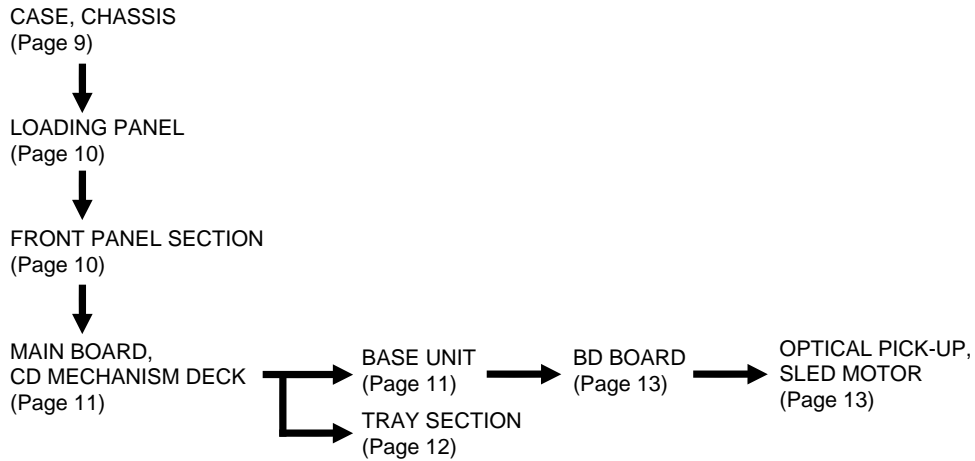
⋮ : Unheard portion overlapped by the loop.

You can choose the loop length from the five levels with the range from 0.25 to one second.



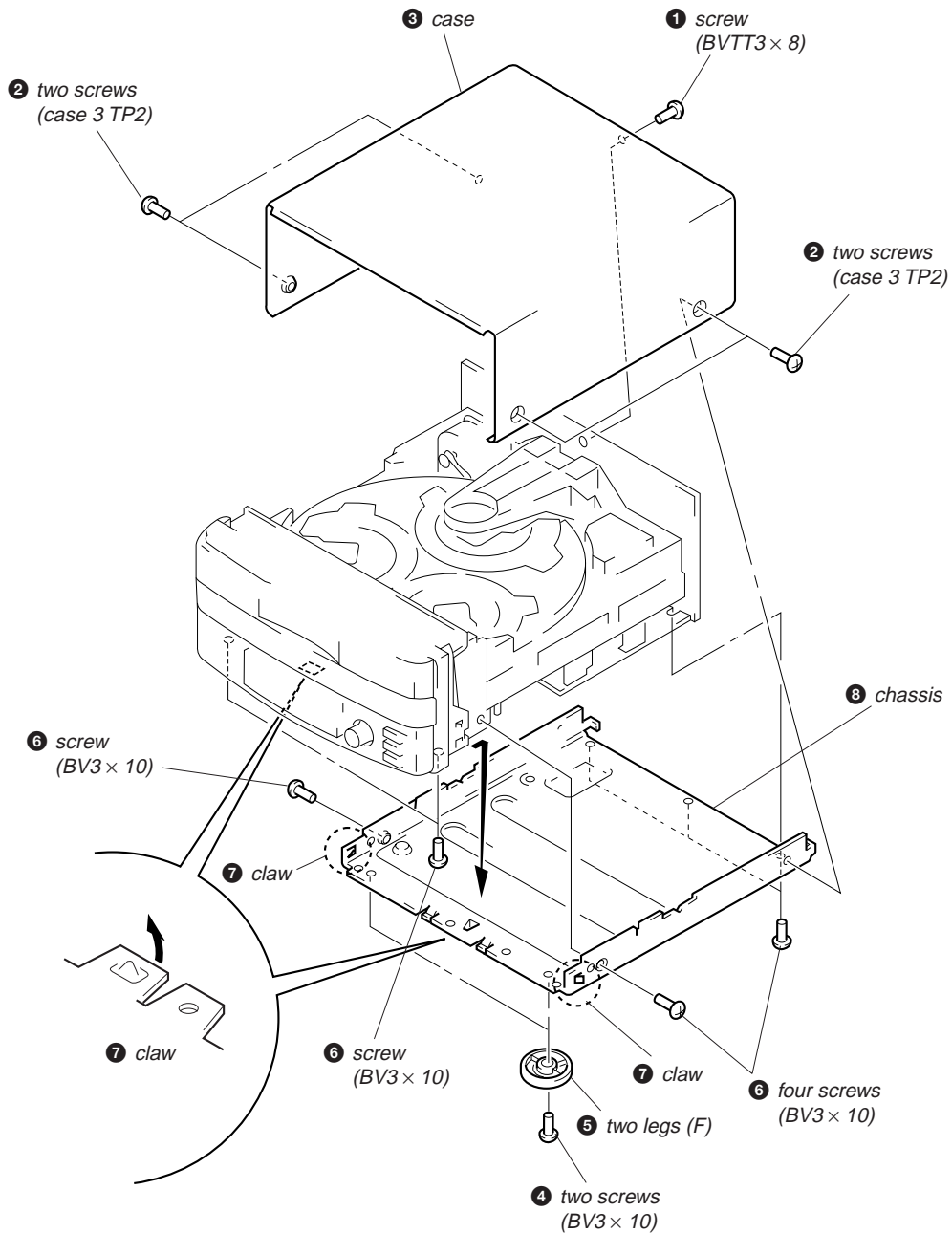
## SECTION 3 DISASSEMBLY

• This set can be disassembled in the order shown below.

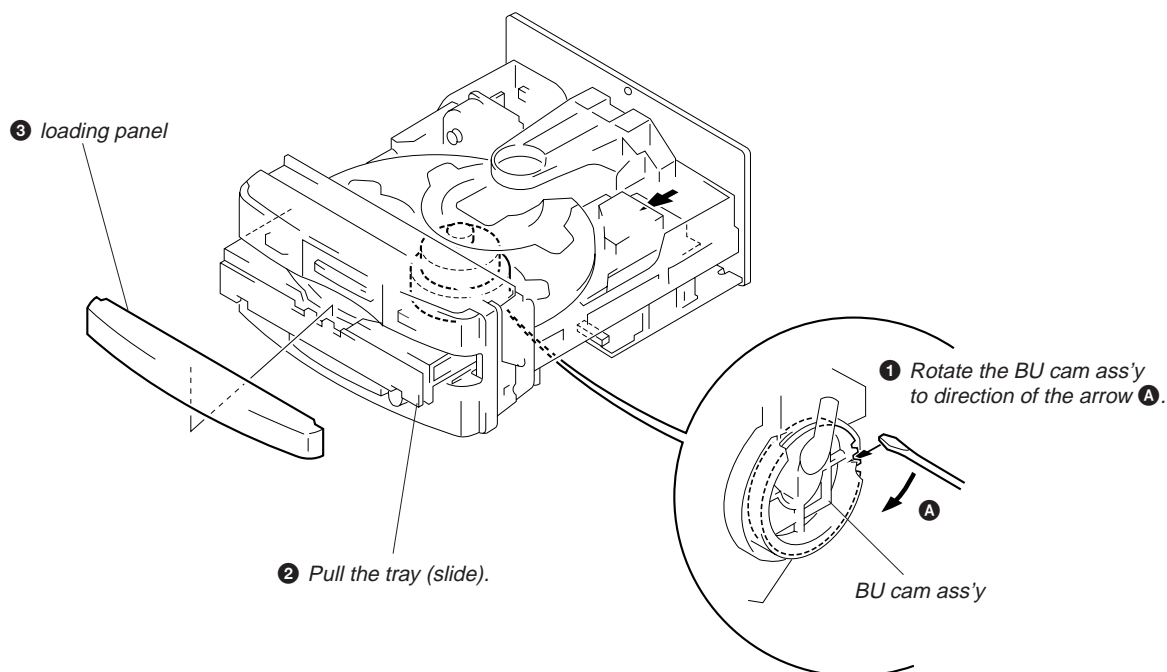


**Note:** Follow the disassembly procedure in the numerical order given.

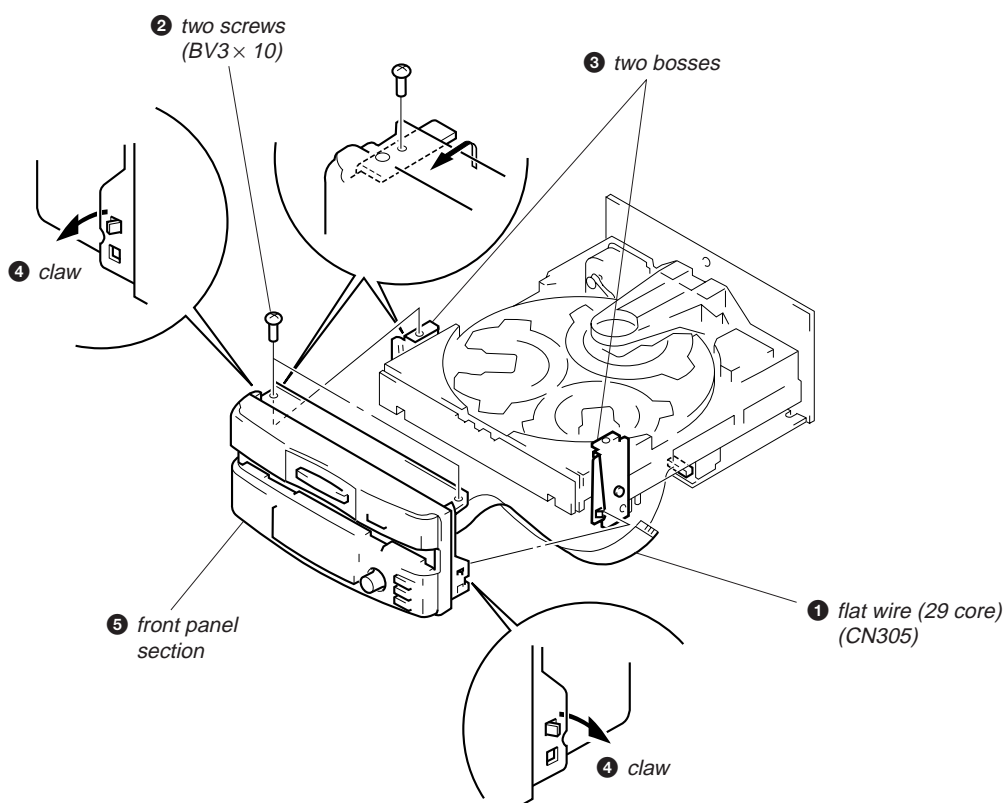
### CASE, CHASSIS



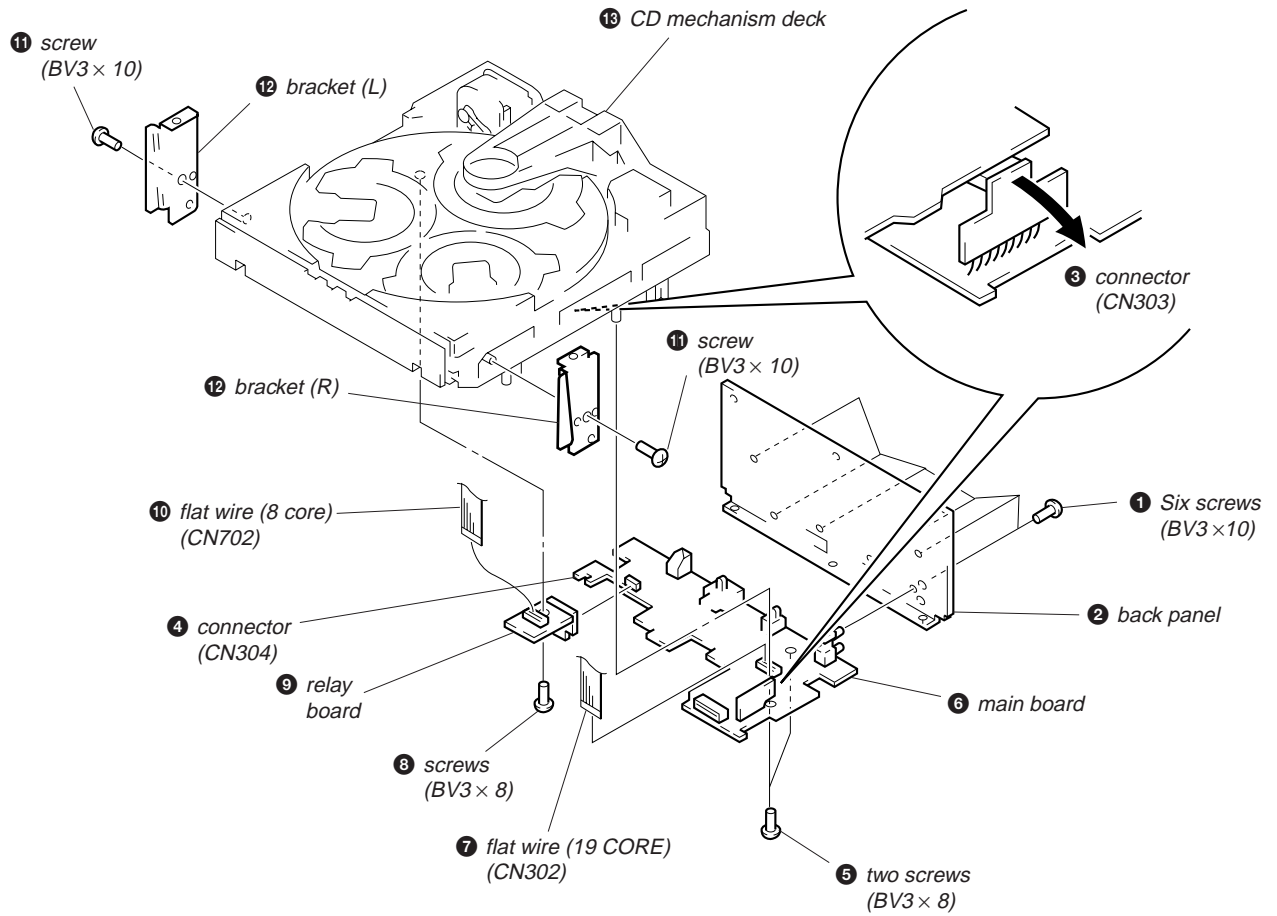
## LOADING PANEL



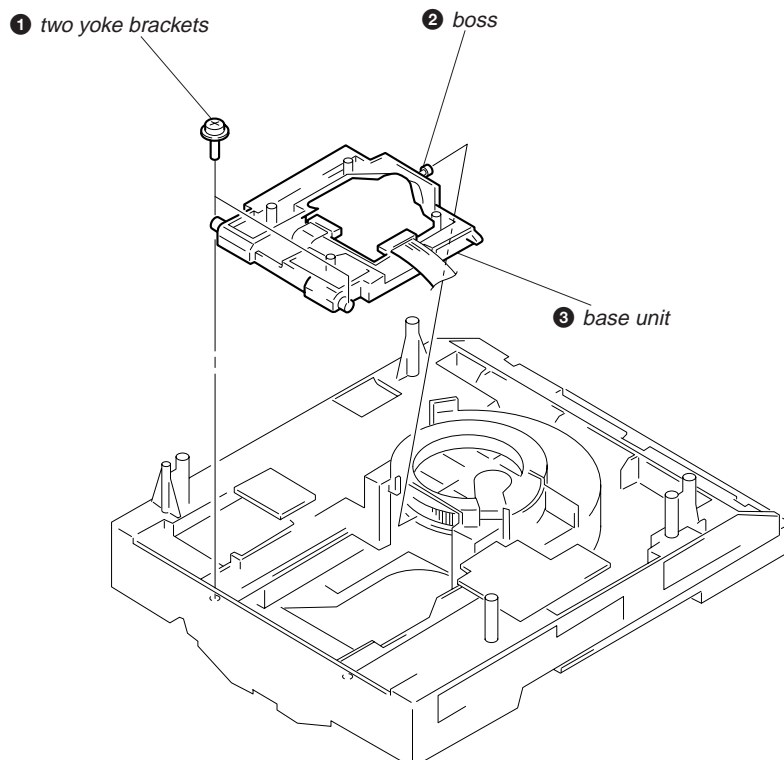
## FRONT PANEL SECTION



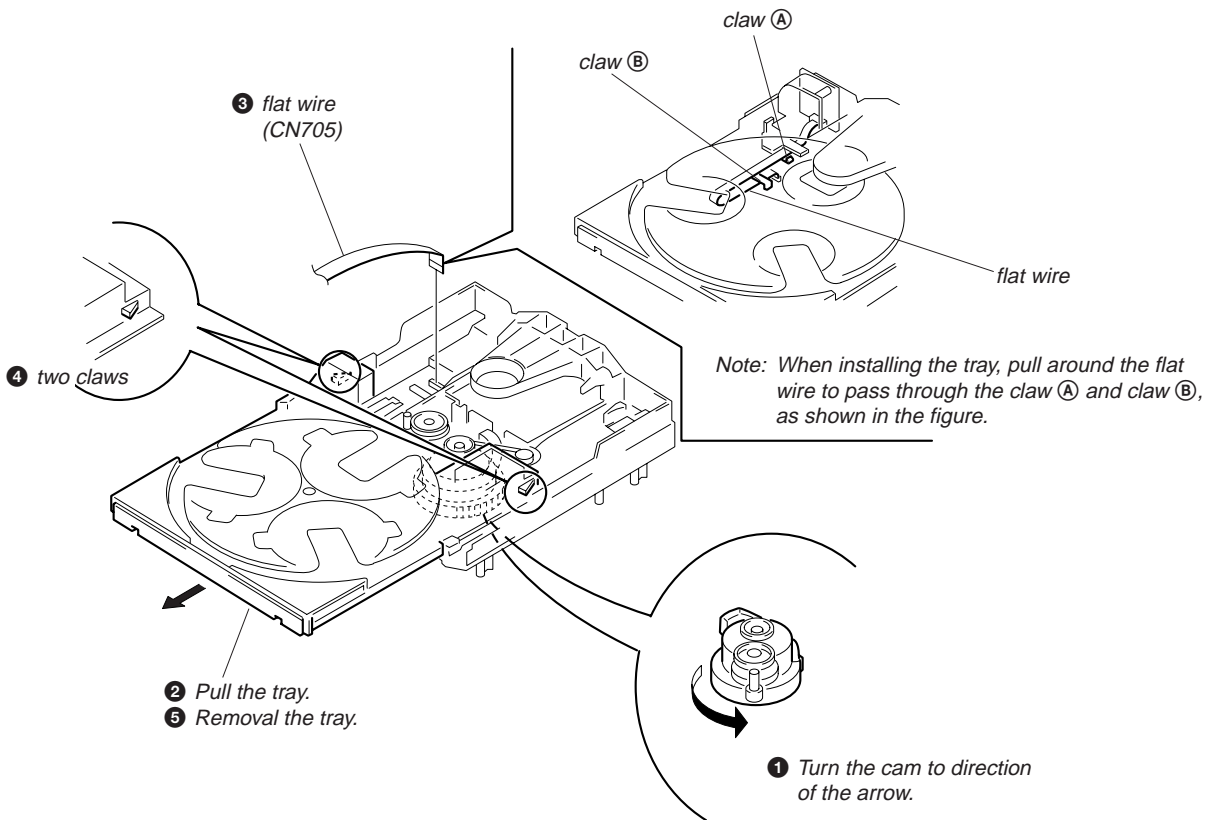
## MAIN BOARD, CD MECHANISM DECK



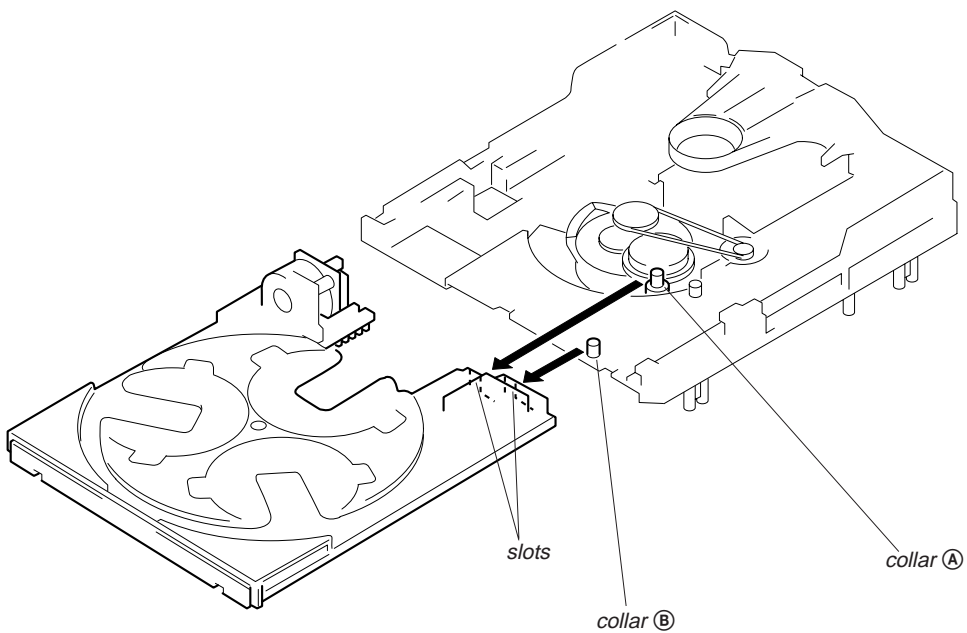
## BASE UNIT



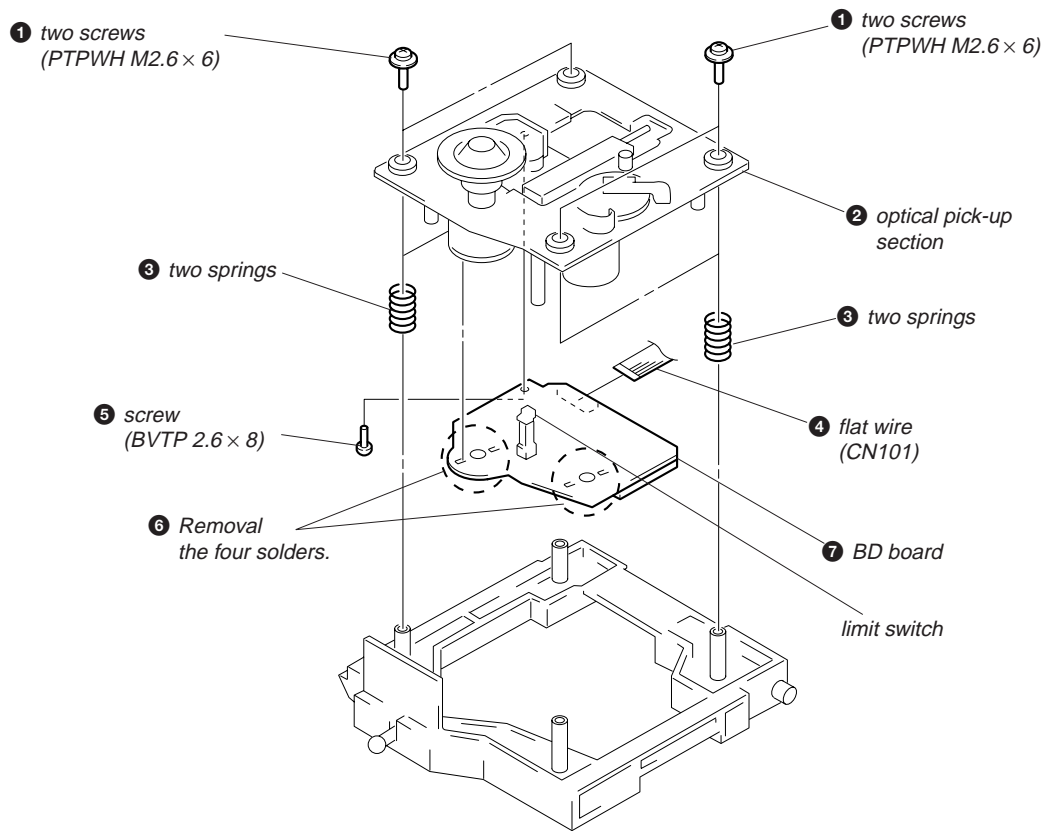
## TRAY SECTION



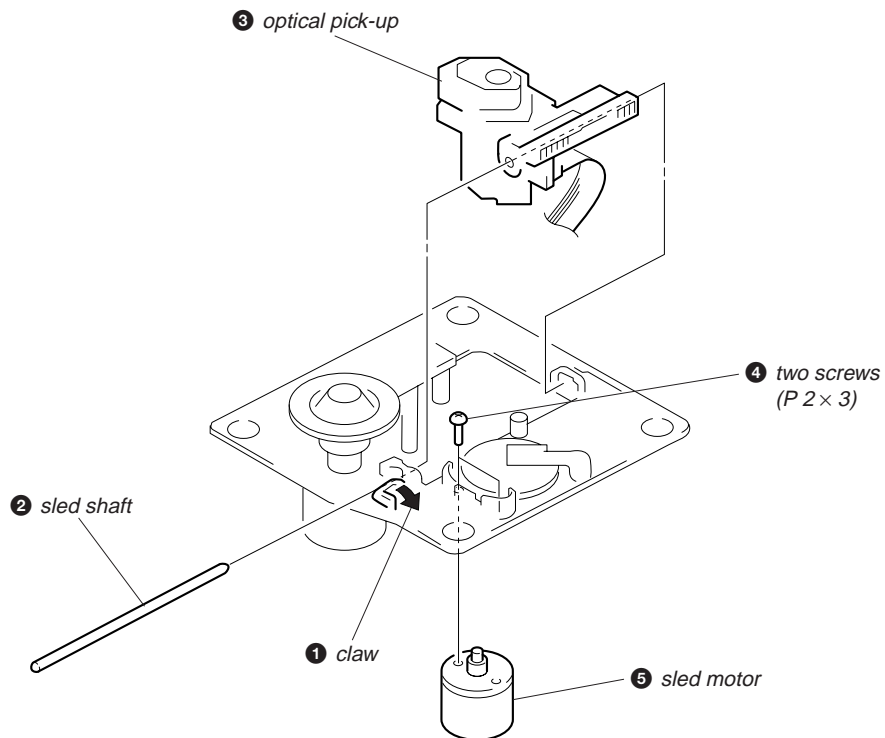
Note: When installing the tray, take care so that the collars **A** and **B** are properly inserted into the slots.



## BD BOARD



## OPTICAL PICK-UP, SLED MOTOR



## SECTION 4 ELECTRICAL ADJUSTMENTS

### Notes:

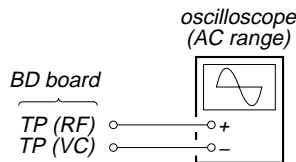
1. CD Block basically constructed to operated without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (Part No.: 3-702-101-01) unless otherwise indicated.
3. Use the oscilloscope with more than 10 MΩ impedance.
4. Clean an object lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.
5. Adjust the focus bias adjustment when optical pick-up is replaced.

### Focus Bias Adjustment

This adjustment is to be done when the optical pick-up is replaced.

**Condition:** This adjustment is performed with the set placed horizontally.

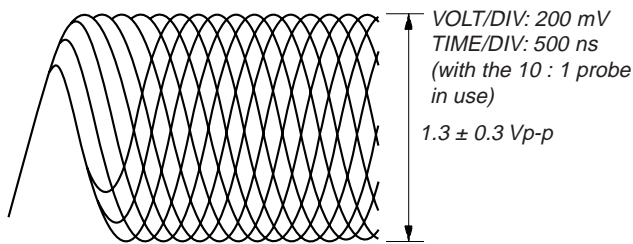
### Connection:



### Adjustment Procedure:

1. Connect the oscilloscope to TP (RF) and TP (VC) on BD board.
2. Turned power switch on. (stop mode)
3. Put disc (YEDS-18) in and press the button.
4. Adjust RV101 so that the oscilloscope waveform is as shown in the figure below (eye pattern).  
A good eye pattern means that the diamond shape (◇) in the center of the waveform can be clearly distinguished.
5. After adjustment, check the RF signal level.

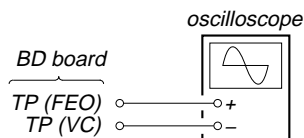
### • RF signal reference waveform (eye pattern)



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

### S-Curve Check

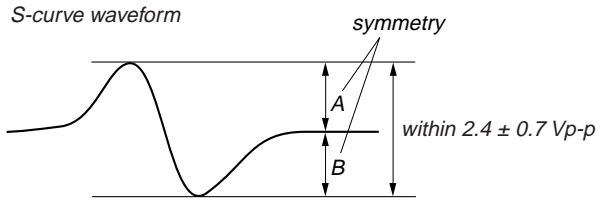
#### Connection:



#### Procedure:

1. Connect the oscilloscope to TP (FEO) and TP (VC) on BD board.
2. Connect the TP (FOK) and TP (GND) with lead wire.
3. Turned power switch on.
4. Put disc (YEDS-18) in and turned power switch on again and actuate the focus search. (actuate the focus search when disc table is moving in and out.)

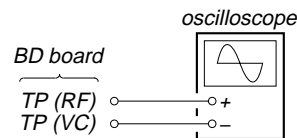
5. Confirm that the oscilloscope waveform (S-curve) is symmetrical between A and B. And confirm peak to peak level within  $2.4 \pm 0.7$  Vp-p.



6. After check, remove the lead wire connected in step 2.
- Note:**
- Try to measure several times to make sure that the ratio of A : B or B : A is more than 10 : 7.
  - Take sweep time as long as possible and light up the brightness to obtain best waveform.

### RF Level Check

#### Connection:

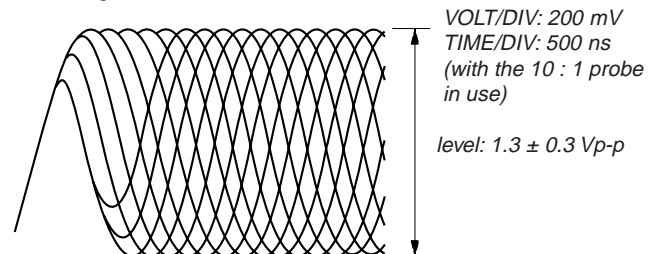


#### Procedure:

1. Connect the oscilloscope to TP (RF) and TP (VC) on BD board.
2. Turned power switch on. (stop mode)
3. Put disc (YEDS-18) in and press the button.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

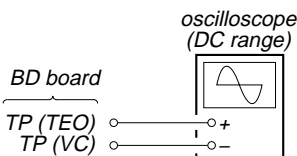
**Note:** Clear RF signal waveform means that the shape “◇” can be clearly distinguished at the center of the waveform.

#### RF signal waveform



### E-F Balance (Traverse) Check

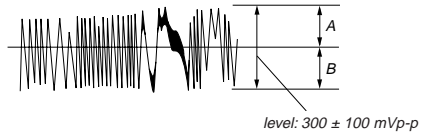
#### Connection:



#### Procedure:

1. Connect the TP501 (ADJ) and Ground with lead wire. (on the display board)
2. Connect the oscilloscope to TP (TEO) and TP (VC) on BD board.
3. Turned power switch on.
4. Put disc (YEDS-18) in and press the button.
5. Press the button. (Tracking servo and sled servo are turned off.)
6. Confirm that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0 Vdc, and check this level.

Traverse waveform



specified value:  $\bullet \frac{A-B}{2(A+B)} \times 100 = \text{less than } \pm 7\%$   
 $\bullet A+B = 300 \pm 100$  mVp-p

7. After check, remove the lead wire connected in step 1.

**Focus/Tracking Gain Adjustment (RV102, RV103)**

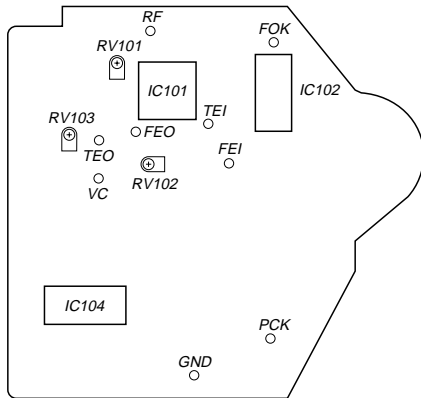
This gain has a margin, so even if it is slightly off. There is no problem.

Therefore, do not perform, this adjustment.

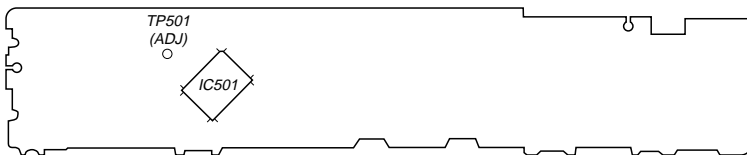
Please note that it should be fixed to mechanical center position when you moved and do not know original position.

**Adjustment Location :**

**[BD BOARD] – Side B –**

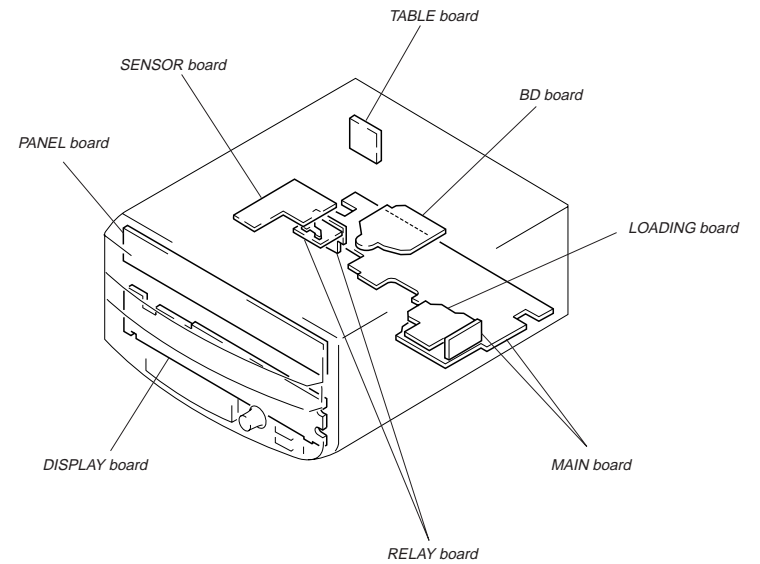


**[DISPLAY BOARD] – Conductor Side –**



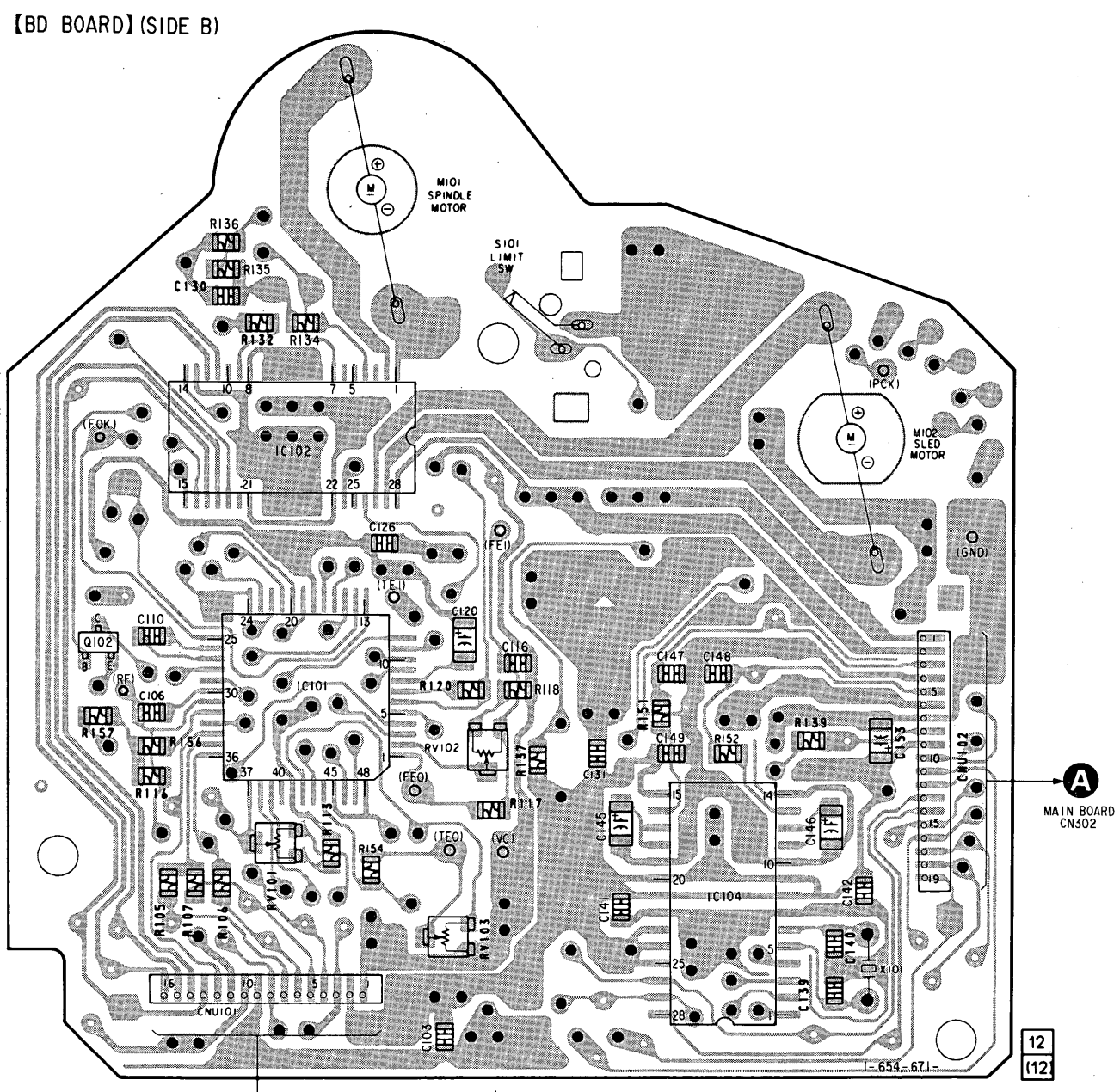
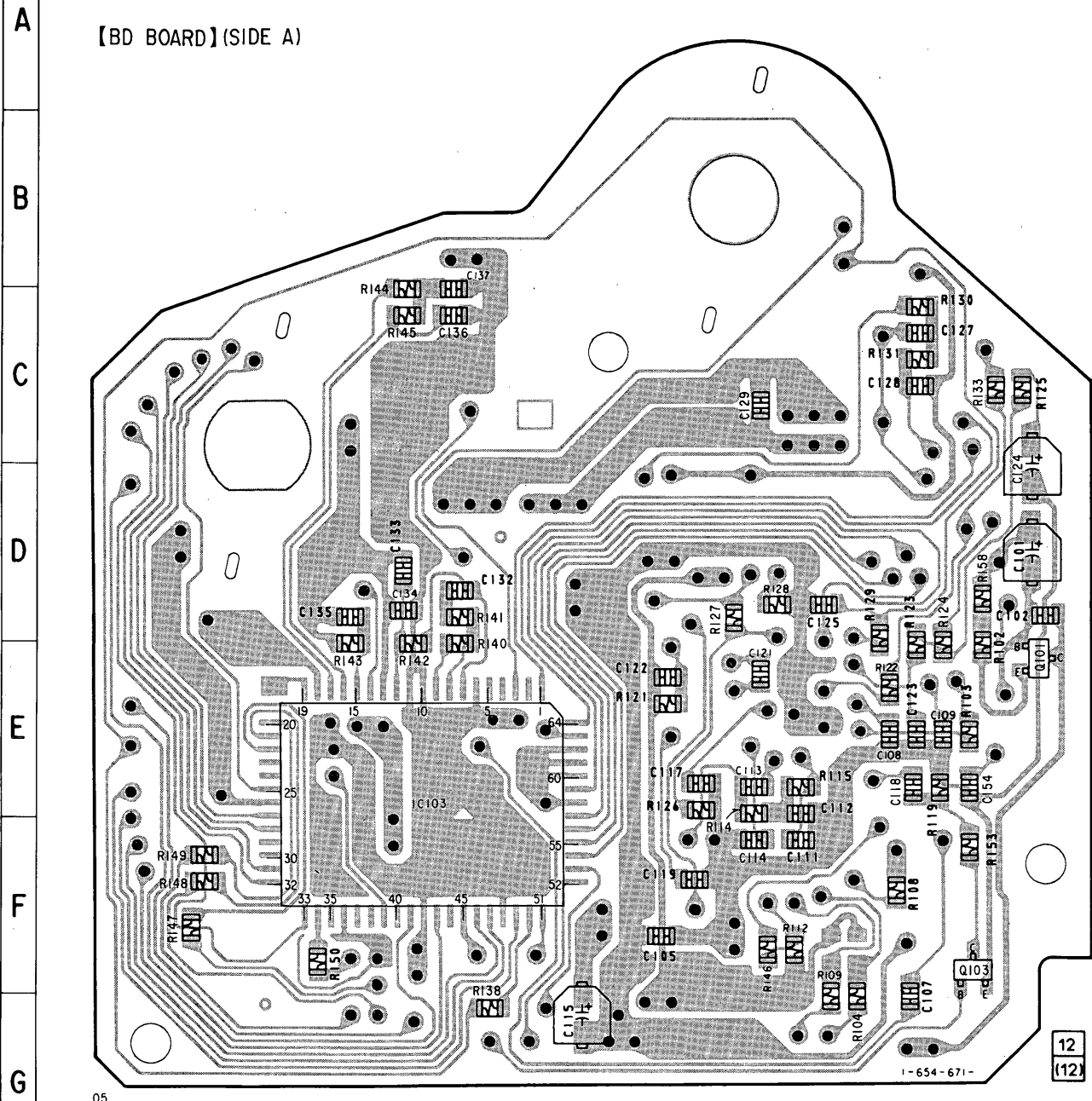
**SECTION 5  
DIAGRAMS**

**• Circuit Boards Location**



5-1. PRINTED WIRING BOARD - BD Section - • See page 16 for Circuit Boards Location.

1 2 3 4 5 6 7 8 9 10 11 12 13



**Note on Printed Wiring Board:**

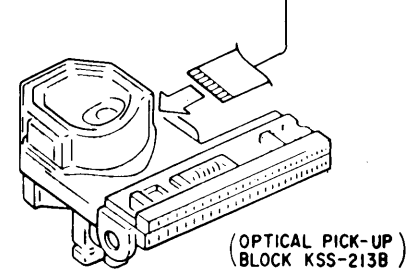
- : parts extracted from the component side.
- : Through hole.
- ▨ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

**Caution:**

Pattern face side: Parts on the pattern face side seen from the (Side B) are indicated.

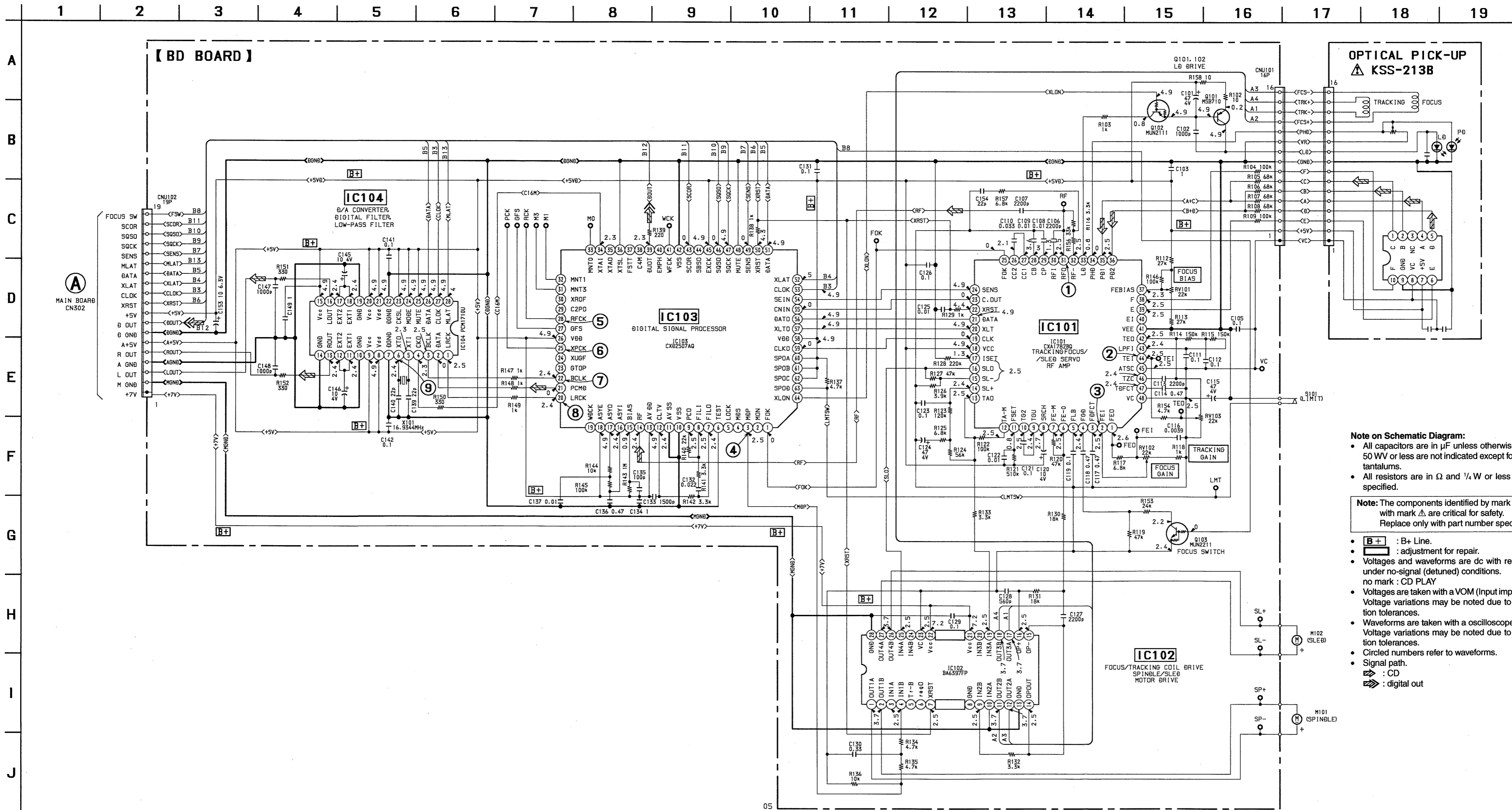
Parts face side: Parts on the parts face side seen from the (Side A) are indicated.



• Semiconductor Location

Ref. No.	Location
IC101	E-9
IC102	C-8
IC103	E-3
IC104	F-11
Q101	E-6
Q102	E-7
Q103	F-6





**Note on Schematic Diagram:**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{pF}$  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $\frac{1}{4}W$  or less unless otherwise specified.

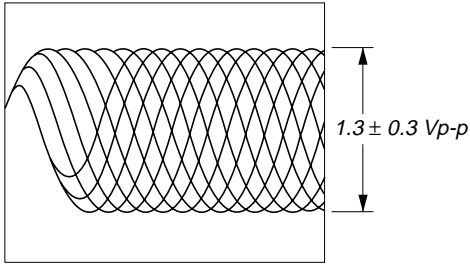
**Note:** The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

- $\text{B+}$  : B+ Line.
- $\square$  : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions. no mark : CD PLAY
- Voltages are taken with a VOM (Input impedance 10 M $\Omega$ ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with an oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
- $\square$  : CD
- $\Rightarrow$  : digital out

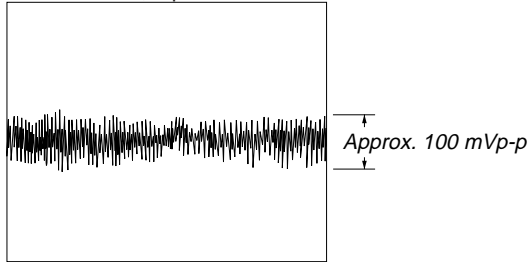
• Waveforms

– BD Section –

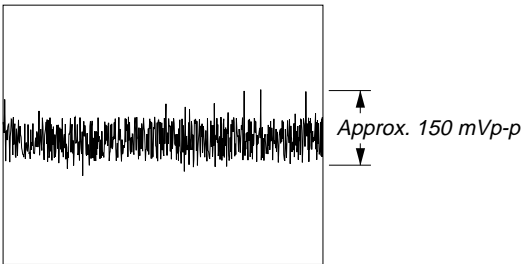
① IC101 ⑤ (RFO) (PLAY Mode)  
500 mV/DIV, 500 ns/DIV



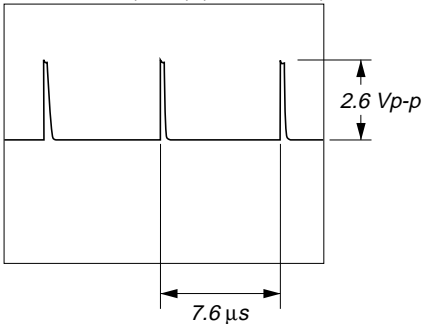
② IC101 ④ (TEI) (PLAY Mode)  
50 mV/DIV, 1 μs/DIV



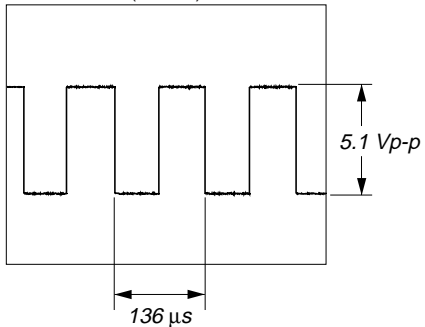
③ IC101 ② (FEI) (PLAY Mode)  
50 mV/DIV, 1 μs/DIV



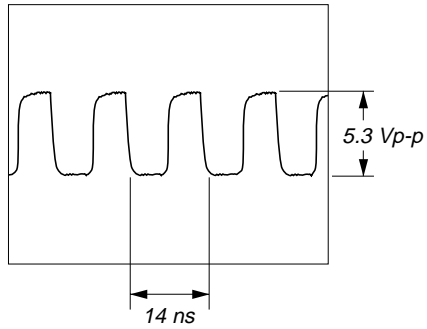
④ IC103 ③ (MDP) (PLAY Mode)



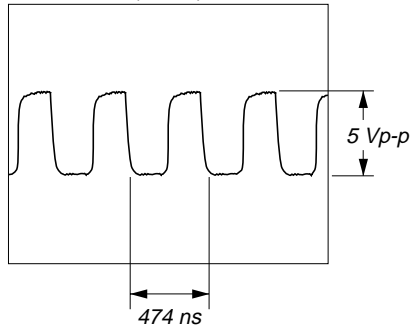
⑤ IC103 ② (RFCK)



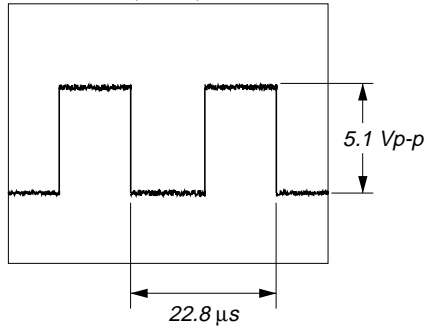
⑥ IC103 ⑤ (XPCK)



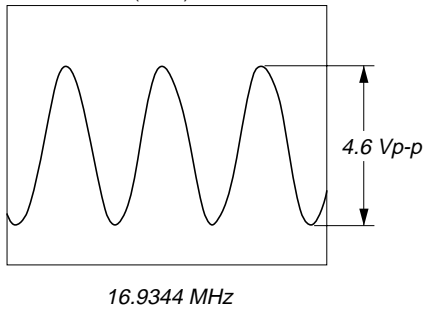
⑦ IC103 ② (BCLK)



⑧ IC103 ⑩ (LRCK)

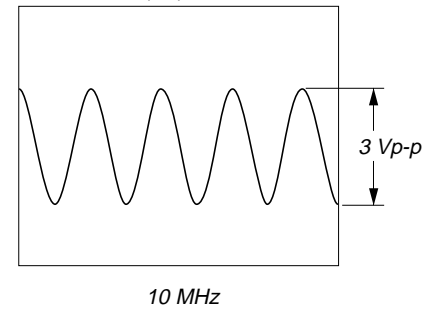


⑨ IC104 ⑥ (XTO)

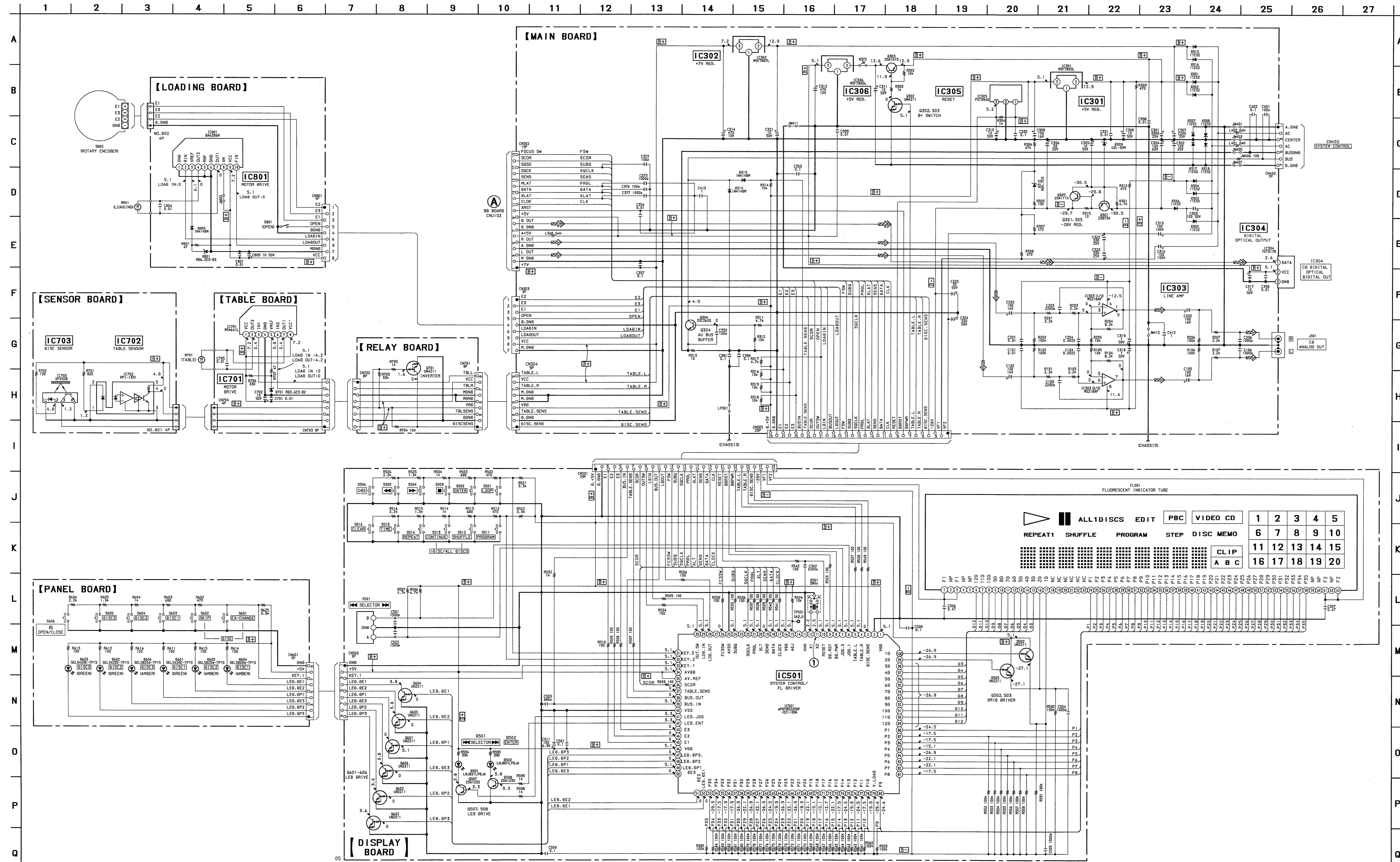


– MAIN/PANEL/MOTOR Section –

① IC501 ① (X2)

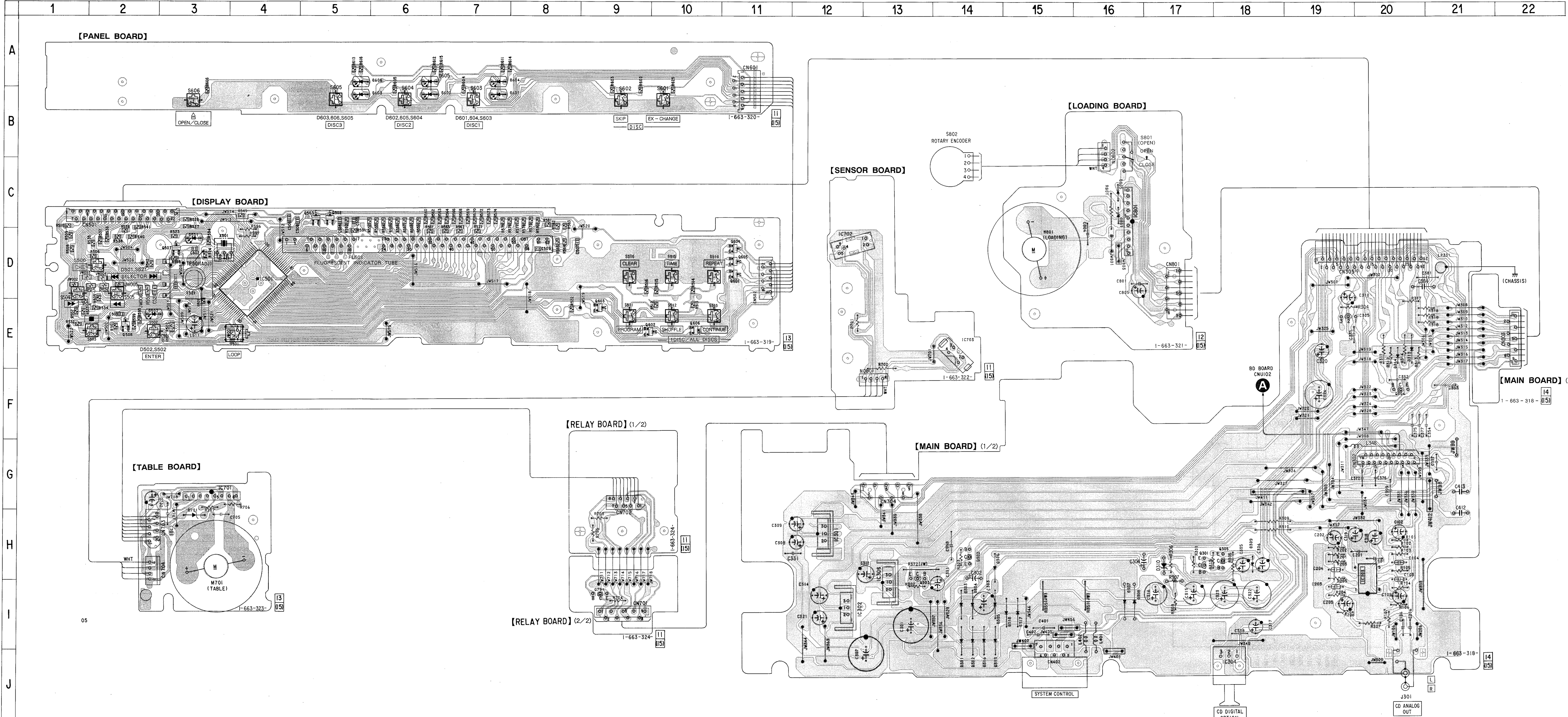


5-3. SCHEMATIC DIAGRAM - MAIN/PANEL/MOTOR Section -  
• See page 22 for Waveforms, see page 33 for IC Block Diagrams, and see page 34 for IC Pin Function Description.



**Note on Schematic Diagram:**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{pF}$
- 50  $\text{W}$  or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4$   $\text{W}$  or less unless otherwise specified.
- $\Delta$  : internal component.
- $\square$  : panel designation.
- $\text{B}+$  : B+ Line.
- $\text{B}-$  : B- Line.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
- no mark : STOP
- Voltages are taken with a VOM (Input impedance 10  $\text{M}\Omega$ ).
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with an oscilloscope.
- Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
- $\square$  : CD
- $\square$  : digital out



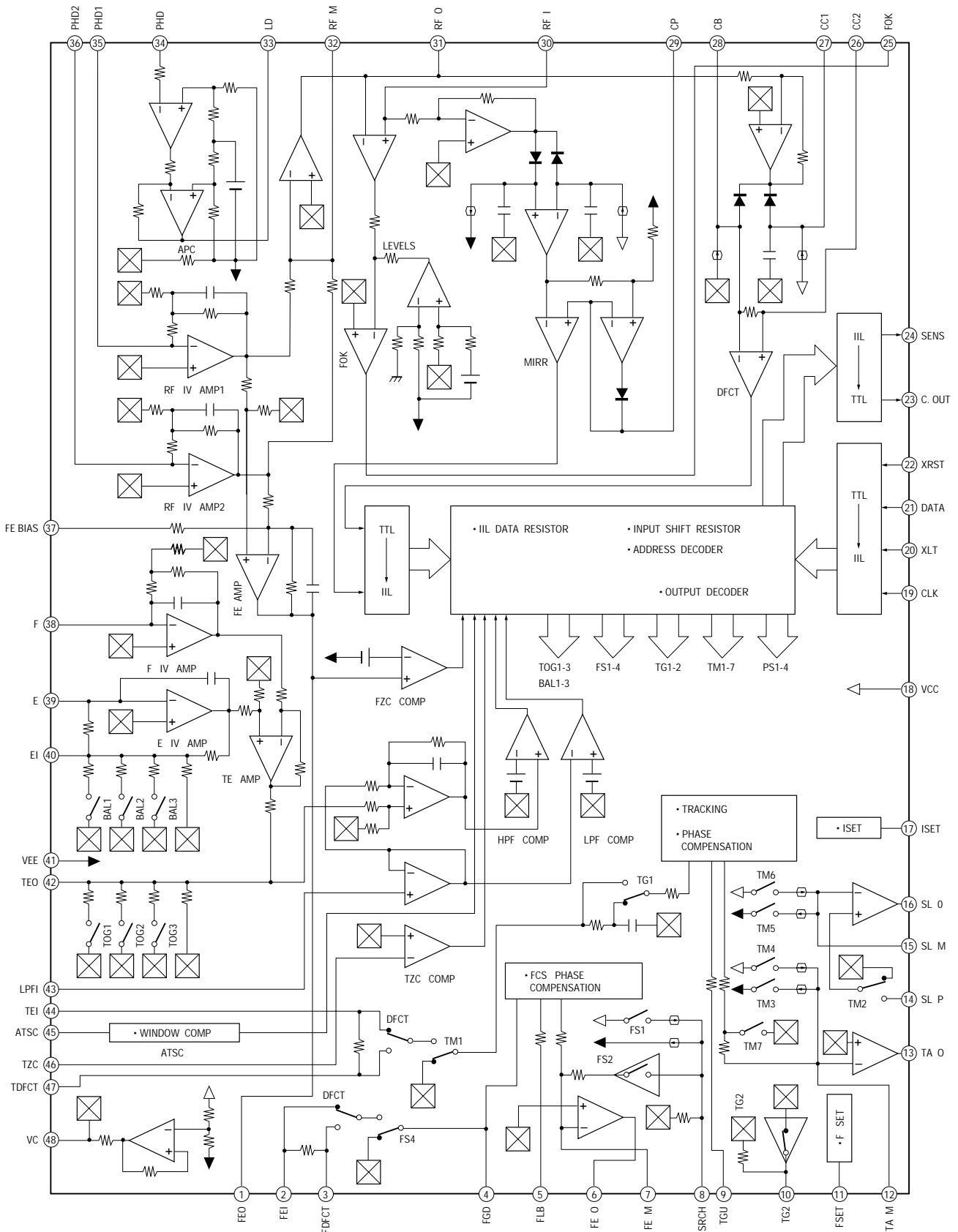
• Semiconductor Location

Ref. No.	Location	Ref. No.	Location
D301	J-14	IC301	H-12
D302	J-14	IC302	I-12
D303	I-14	IC303	H-20
D304	I-14	IC304	J-18
D305	I-14	IC305	E-20
D306	H-14	IC306	H-13
D307	I-16	IC501	D-4
D308	I-16	IC701	G-3
D309	H-18	IC702	D-12
D310	H-17	IC703	E-14
D313	E-20	IC801	C-16
D314	E-20		
D315	J-14	Q301	H-17
D316	J-14	Q302	H-14
D317	I-15	Q303	I-13
D318	I-15	Q304	F-20
D501	D-3	Q305	H-18
D502	E-2	Q502	C-5
D601	B-7	Q503	C-5
D602	B-6	Q507	D-3
D603	B-5	Q508	E-2
D604	A-7	Q601	D-11
D605	A-6	Q602	E-9
D606	A-5	Q603	E-9
D701	H-3	Q604	D-11
D801	C-16	Q605	D-11
D805	C-16	Q606	E-10
		Q701	I-9

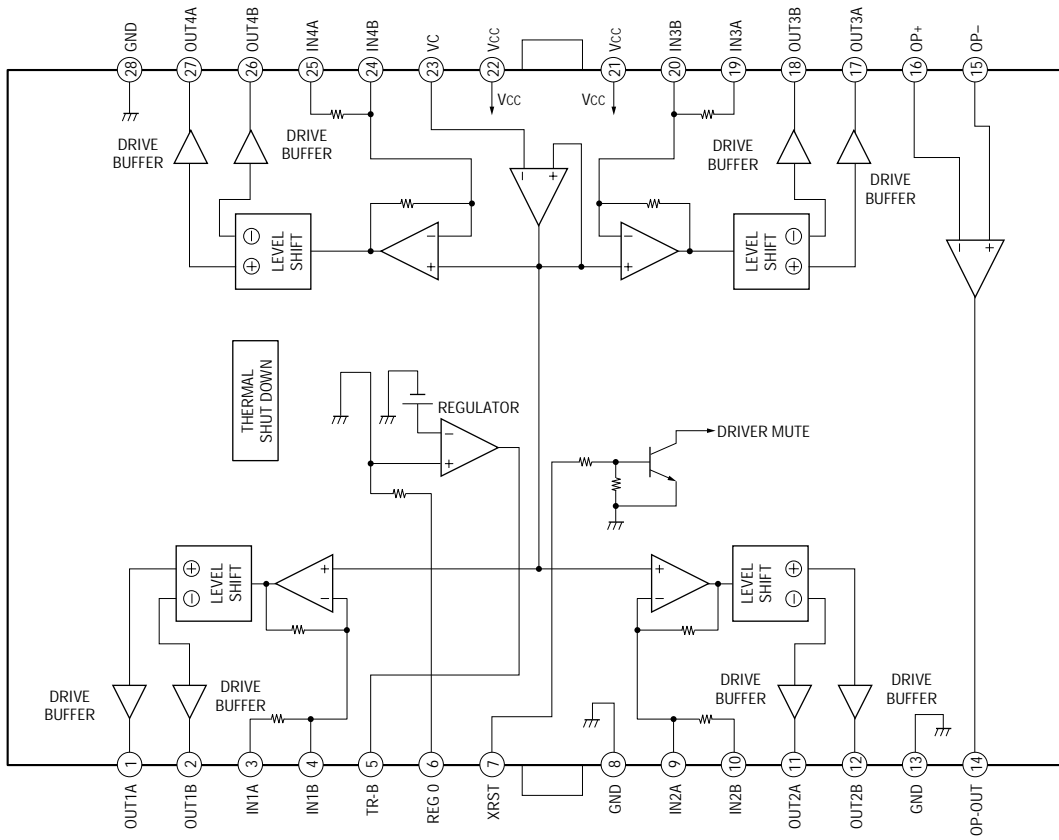
**Note on Printed Wiring Board:**

- : parts extracted from the component side.
- : parts mounted on the conductor side.
- △ : internal component.
- ▨ : Pattern from the side which enables seeing.

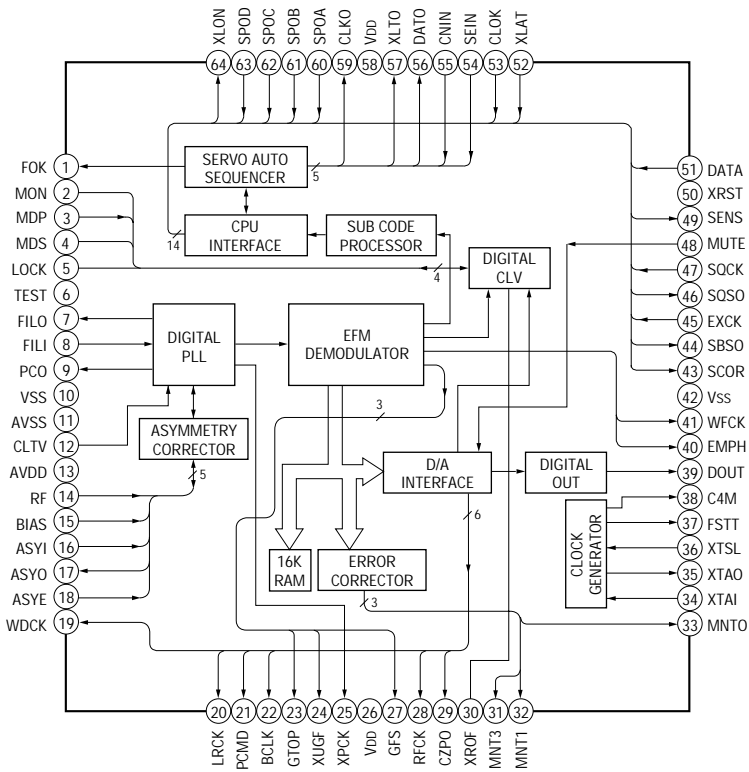
• IC Block Diagrams  
 – BD Section –  
 IC101 CXA1782BQ



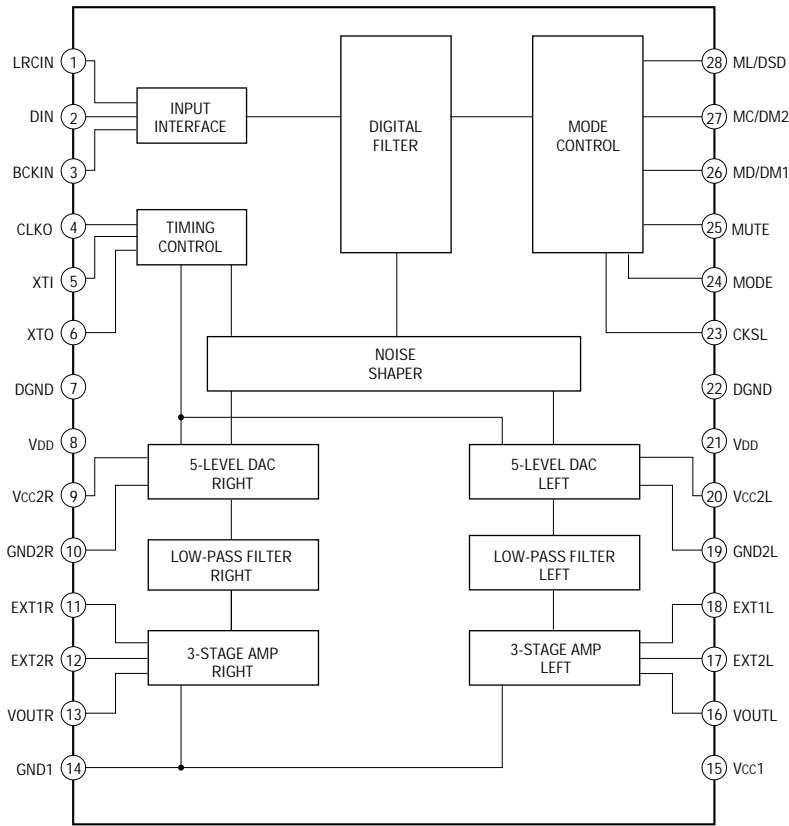
**IC102 BA6397FP**



**IC103 CXD2507AQ**

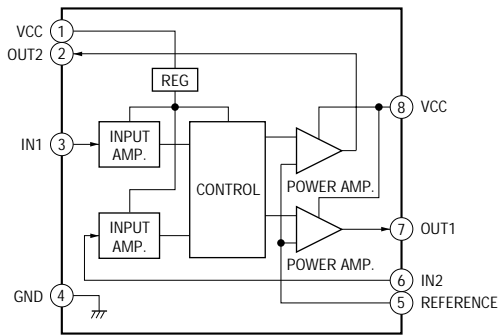


**IC104 PCM1710U-B**

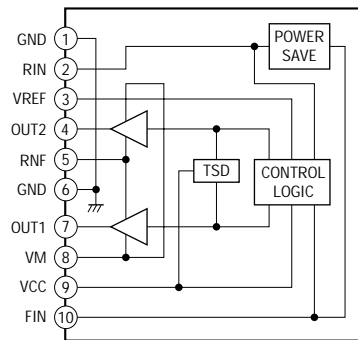


**– MAIN/PANEL/MOTOR Section –**

**IC701 M54641L**



**IC801 BA6286N**



## 5-5. IC PIN FUNCTION DESCRIPTION

### • DISPLAY BOARD IC501 $\mu$ PD780205GF-021-3BA (SYSTEM CONTROL, FL TUBE DISPLAY DRIVE)

Pin No.	Pin Name	I/O	Function
1	VDD	–	+5 V power supply
2	–	–	Connected to ground
3	DISC. SENS	I	Input of disc sensor signal “L” : No disc, “H” : Disc present
4	TABLE. R	O	Output of disc table clockwise rotation
5	TABLE. L	O	Output of disc table counterclockwise rotation
6	JOG. 1	I	Encoder switch input B
7	JOG. 0	I	Encoder switch input A
8	BD. PWR	O	Output of power ON/OFF to BD block “L” : OFF, “H” : ON
9	BD. RST	O	Output of Reset signal to BD block “L” : Reset
10	RESET	I	Input of system Reset signal “L” : Reset
11	X2	O	Main system clock (5MHz)
12	X1	I	
13	GND	–	Ground
14	–	–	Not used (open)
15	ADJ	I	Pin for test mode “L” : Test mode
16	VDD	–	+5V power supply
17	CLOCK	O	Output of serial clock to IC103 (DSP) and IC104 (D/A converter)
18	DATA	O	Output of serial data to IC103 (DSP) and IC104 (D/A converter)
19	SENS	I	Input of various status signals from IC103 (DSP) and IC104 (D/A converter)
20	XLT	O	Output of serial data latch pulse to IC103 (DSP) and IC104 (D/A converter)
21	PRGL	O	Output of serial data latch pulse to digital filter
22	SOCLK	O	Output of subcode Q data reading clock to IC103 (DSP)
23	–	O	Not used (open)
24	SUBQ	I	Subcode Q data serial input from IC103 (DSP)
25	AVSS	–	Ground (for A/D converter)
26	FCSSW	O	Output of focus gain selection switch “L” : Normal, “H” : Down
27	–	–	Not used (open)
28	LOD. OUT	O	Output of disc tray loading out
29	LOD. IN	O	Output of disc tray loading in
30	OUT. SW	I	Input of disc tray open complete signal “L” : Completed
31	KEY. 3	I	Key data A/D input 2
32	KEY. 2	I	Key data A/D input 1
33	KEY. 1	I	Key data A/D input 0
34	AVDD	–	+5 V analog power supply (for A/D converter)
35	AV. REF	I	Input of reference voltage (+5 V) (for A/D converter)
36	SCOR	I	Input of subcode sync S0, S1 detection
37	TABLE. SENS	I	Input of table address detection sensor
38	BUS. OUT	O	Output of audio bus signal
39	BUS. IN	I	Input of audio bus signal
40	VSS	–	Ground



Pin No.	Pin Name	I/O	Function
41	LED. JOG	O	Output of JOG LED drive
42	LED. ENT	O	Output of ENTER LED drive
43	E3	I	Disc tray address detection encoder input 2
44	E2	I	Disc tray address detection encoder input 1
45	E1	I	Disc tray address detection encoder input 0
46	VDD	–	+5 V power supply
47	LED. DP3	O	Output of DISC 3 pointer LED (green) drive
48	LED. DP2	O	Output of DISC 2 pointer LED (green) drive
49	LED. DP1	O	Output of DISC 1 pointer LED (green) drive
50	DE3	O	Output of DISC 3 yes/no LED (amber) drive
51	DE2	O	Output of DISC 2 yes/no LED (amber) drive
52	DE1	O	Output of DISC 1 yes/no LED (amber) drive
53–78	P35–P10	O	Output of FL display tube segments
79	V. LOAD	–	–30 V power supply for FL display tube
80–88	P9–P1	O	Output of FL display tube segments
89–100	12G–1G	O	Output of FL display tube grids

## SECTION 6 EXPLODED VIEWS

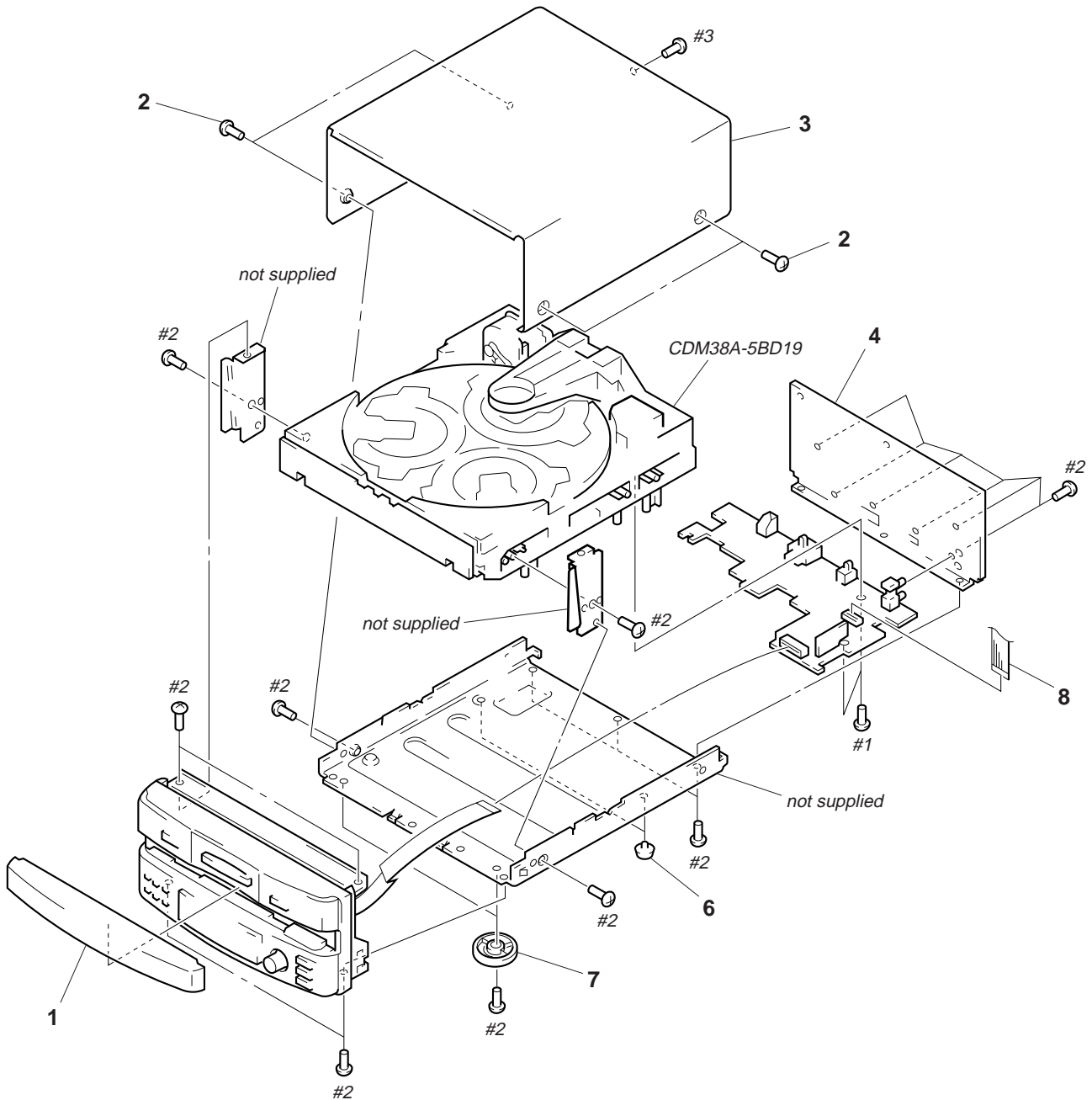
**NOTE:**

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts  
Example:  
KNOB, BALANCE (WHITE) . . . (RED)  
                  ↑                  ↑  
          Parts Color  Cabinet's Color

- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list are given in the last of the electrical parts list.

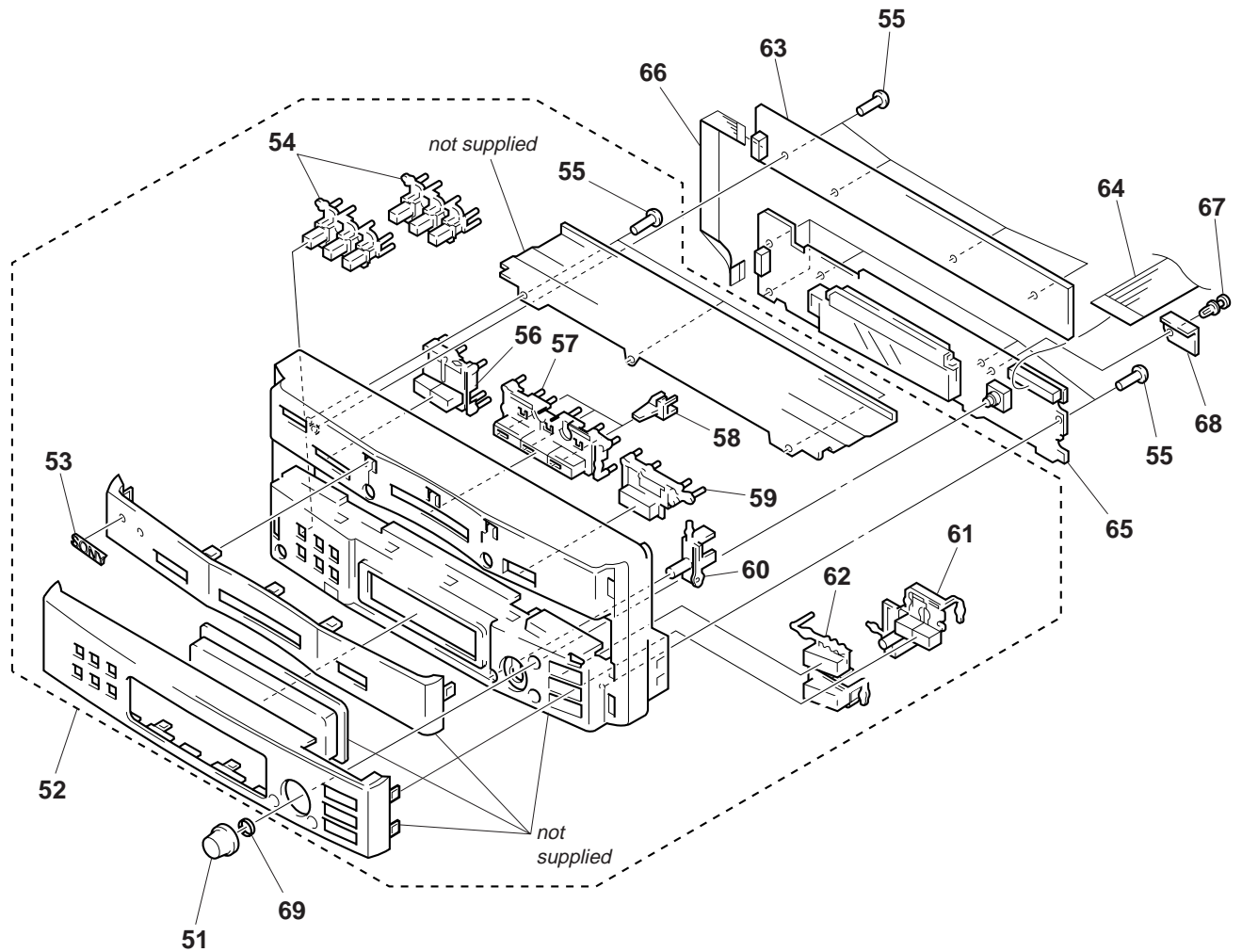
The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

### (1) CHASSIS SECTION



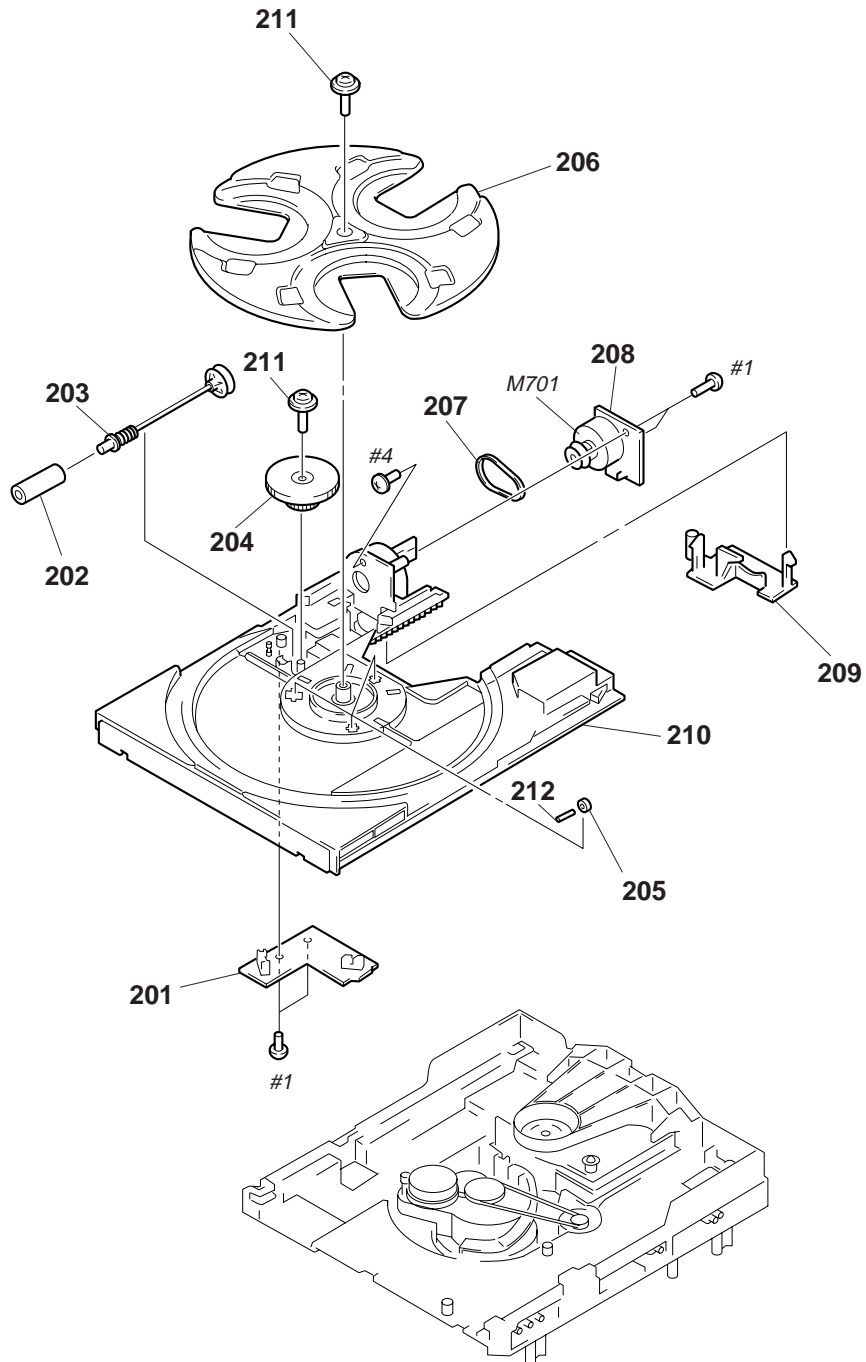
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	4-985-912-01	PANEL, LOADING		* 5	A-4699-658-A	MAIN BOARD, COMPLETE	
2	3-363-099-01	SCREW (CASE 3 TP2)		6	4-965-822-01	FOOT	
3	4-977-698-11	CASE		7	4-977-699-11	LEG (F)	
* 4	4-977-697-41	PANEL, BACK		8	1-777-862-11	WIRE (FLAT TYPE) (19 CORE)	

## (2) FRONT PANEL SECTION



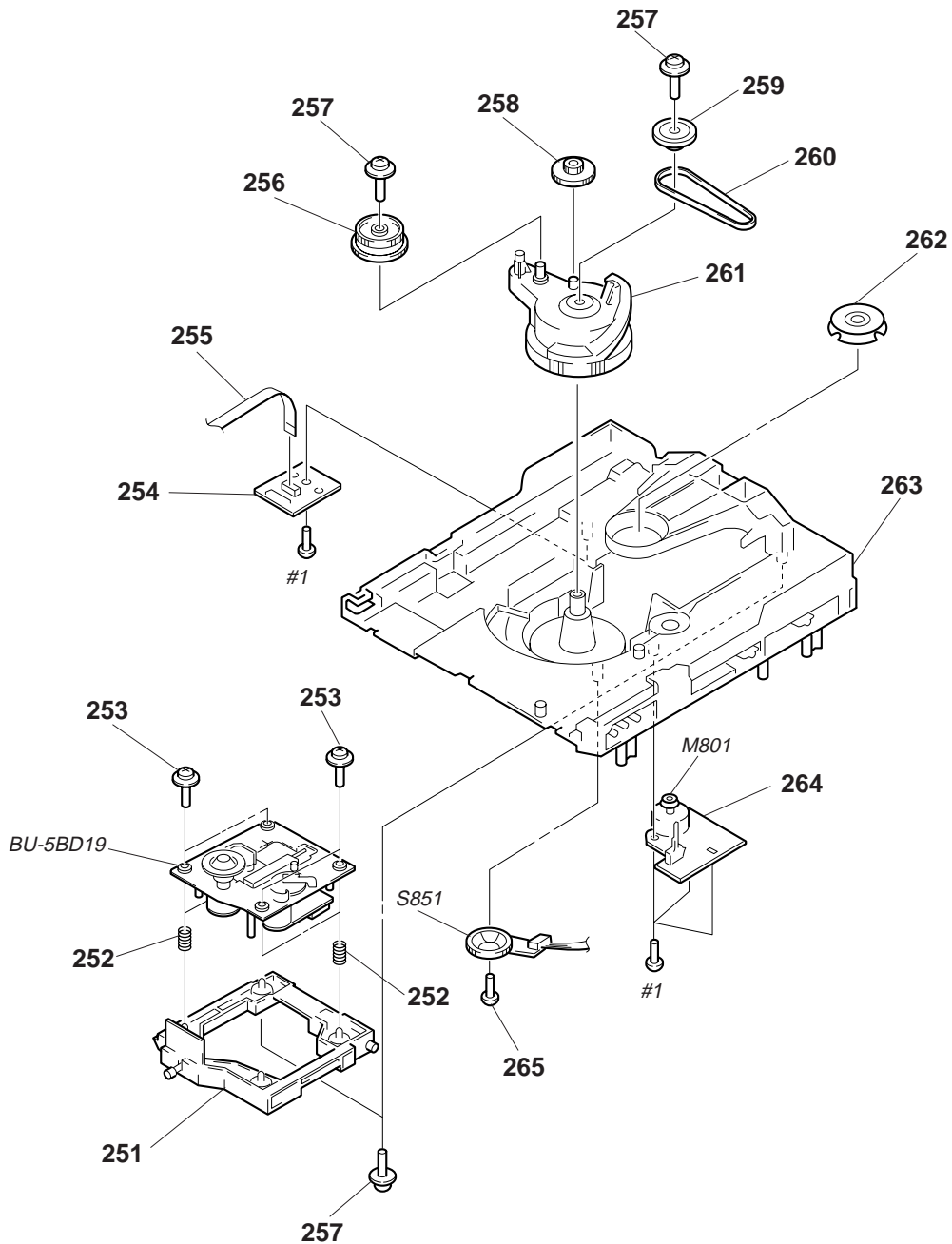
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	4-985-925-01	KNOB (JOG)		61	X-4947-763-1	BUTTON (F/R) ASSY (◀▶▶▶)	
52	X-4947-654-1	PANEL ASSY, FRONT		62	4-985-892-01	BUTTON (PLAY) (▶▶▶▶, ■)	
53	4-962-708-01	EMBLEM (4-A), SONY		* 63	A-4699-278-A	PANEL BOARD, COMPLETE	
54	4-985-890-01	BUTTON (MODE)		64	1-777-861-11	WIRE (FLAT TYPE) (29 CORE)	
55	4-951-620-01	SCREW (2.6X8), +BVTP		* 65	A-4699-659-A	DISPLAY BOARD, COMPLETE	
56	4-985-894-01	BUTTON (EDIT) (EX-CHANGE, SKIP)		66	1-777-860-11	WIRE (FLAT TYPE) (9 CORE)	
57	4-985-909-01	BUTTON (CD3) (DISC1, DISC2, DISC3)		67	4-812-134-11	RIVET (DIA. 3.5), NYLON	
58	4-985-913-01	INDICATOR (CD)		68	4-987-952-01	INSULATOR	
59	4-985-910-01	BUTTON (O/C) (⊕, OPEN/CLOSE)		69	4-988-161-01	SPRING, RING	
60	4-985-911-01	BUTTON (EX)					

**(3) CD MECHANISM DECK SECTION-1  
(DM38A-5BD19)**



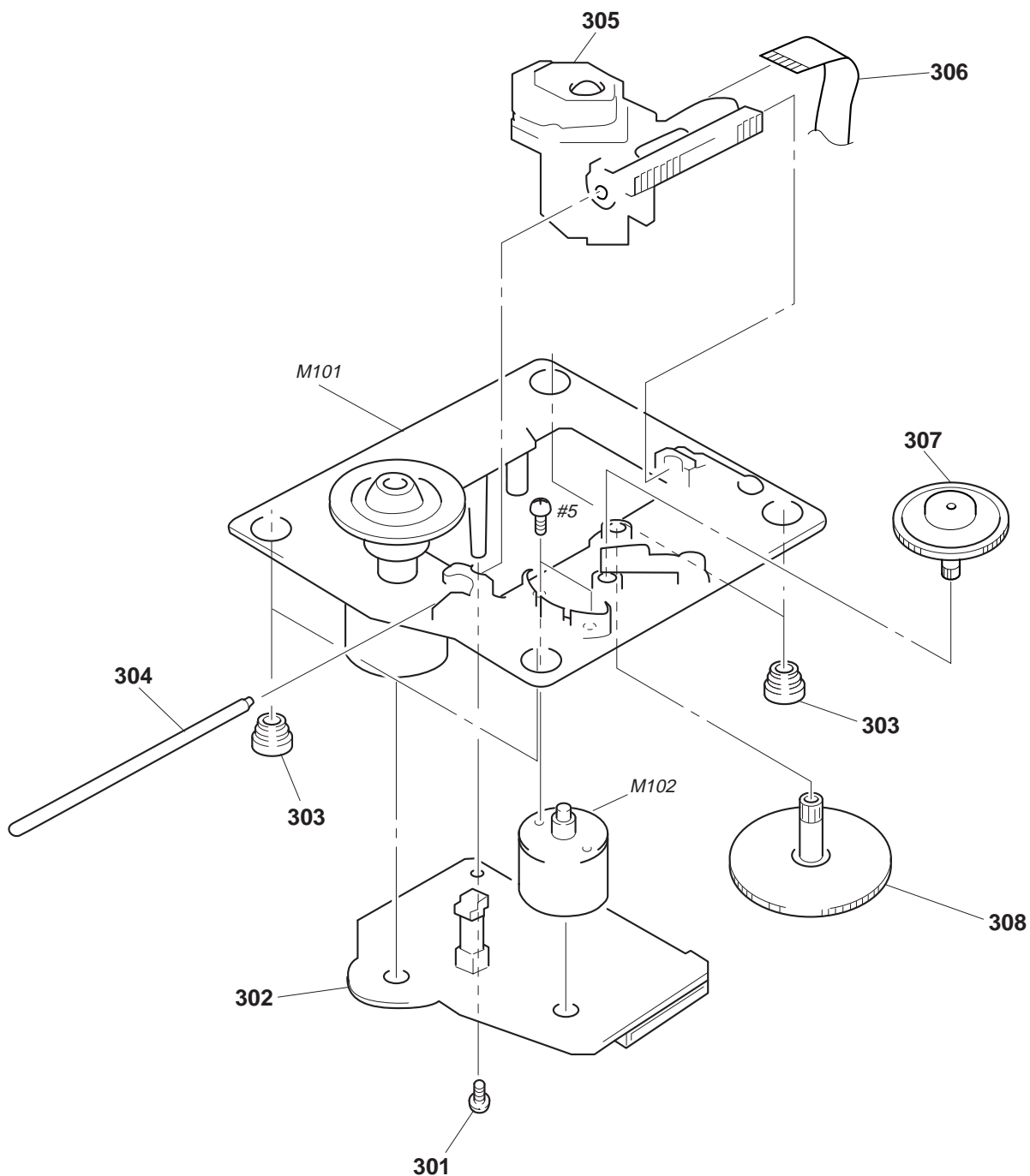
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
* 201	1-663-322-11	SENSOR BOARD		* 208	1-663-323-11	TABLE BOARD	
202	4-981-187-01	COLLAR (WORM)		209	4-977-941-01	BEARING (WORM)	
203	X-4946-295-2	SHAFT ASSY, WORM		210	4-977-944-01	TRAY (SLIDE)	
204	4-977-956-01	WHEEL, WORM		211	4-917-583-21	BRACKET, YOKE	
205	4-988-162-11	ROLLER		212	4-934-376-01	SHAFT (ROLLER)	
206	4-977-945-43	TRAY (TURN)		M701	A-4660-586-A	MOTOR ASSY (TURN)	
207	4-977-943-01	BELT (TURN) (1.2)					

**(4) CD MECHANISM DECK SECTION-2  
(CDM38A-5BD19)**



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
251	X-4946-296-1	HOLDER (BU) ASSY		260	4-977-942-01	BELT (SL) (1.4)	
252	4-982-447-01	SPRING (BU), COMPRESSION		261	X-4946-491-1	CAM ASSY, BU	
253	4-985-672-01	SCREW (+PTPWHM2.6), FLOATING		* 262	1-452-879-11	MAGNET	
* 254	1-663-324-11	RELAY BOARD		263	X-4947-846-4	CHASSIS (CDM) ASSY (NEW)	
255	1-776-042-11	WIRE (FLAT TYPE) (8 CORE)		* 264	1-663-321-11	LOADING BOARD	
256	4-977-955-01	GEAR (SL-B)		265	4-951-620-41	SCREW (2.6), +BVTP	
257	4-917-583-21	BRACKET, YOKE		M801	A-4660-926-A	MOTOR (CDM) ASSY (SPINDLE)	
258	4-977-953-01	GEAR (SL-A)		S851	1-473-335-11	ENCODER, ROTARY	
259	4-977-954-01	PULLEY (SL)					

**(5) BASE UNIT SECTION  
(BU-5BD19)**



The components identified by mark  $\triangle$  or dotted line with mark  $\triangle$  are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
301	4-951-620-01	SCREW (2.6X8), +BVTP		306	1-769-069-11	WIRE (FLAT TYPE) (16 CORE)	
* 302	A-4673-402-A	BD BOARD, COMPLETE		307	4-917-567-01	GEAR (M)	
303	4-951-940-01	INSULATOR (BU)		308	4-917-564-01	GEAR (P), FLATNESS	
304	4-917-565-01	SHAFT, SLED		M101	X-4917-523-4	BASE (OUTSERT) ASSY (SPINDLE)	
$\triangle$ 305	8-848-367-11	OPTICAL PICK-UP KSS-213B/K-N		M102	X-4917-504-1	MOTOR ASSY (SLED)	

# SECTION 7 ELECTRICAL PARTS LIST

BD

**NOTE:**

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS  
All resistors are in ohms.  
METAL: Metal-film resistor.  
METAL OXIDE: Metal oxide-film resistor.  
F: nonflammable

- Items marked “\*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS  
In each case, u:  $\mu$ , for example:  
uA. . . :  $\mu$ A. . .      uPA. . . :  $\mu$ PA. . .  
uPB. . . :  $\mu$ PB. . .    uPC. . . :  $\mu$ PC. . .  
uPD. . . :  $\mu$ PD. . .
- CAPACITORS  
uF:  $\mu$ F
- COILS  
uH:  $\mu$ H

The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
*	A-4673-402-A	BD BOARD, COMPLETE *****		C145	1-135-201-11	TANTALUM CHIP 10uF	20% 4V
		< CAPACITOR >		C146	1-135-201-11	TANTALUM CHIP 10uF	20% 4V
C101	1-126-607-11	ELECT CHIP	47uF 20% 4V	C147	1-163-275-11	CERAMIC CHIP 0.001uF	5% 50V
C102	1-163-275-11	CERAMIC CHIP	0.001uF 5% 50V	C148	1-163-275-11	CERAMIC CHIP 0.001uF	5% 50V
C103	1-164-346-11	CERAMIC CHIP	1uF 16V	C149	1-164-346-11	CERAMIC CHIP 1uF	16V
C105	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C153	1-135-259-11	TANTAL. CHIP 10uF	20% 6.3V
C106	1-164-695-11	CERAMIC CHIP	0.0022uF 5% 50V	C154	1-163-235-11	CERAMIC CHIP 22PF	5% 50V
C107	1-164-695-11	CERAMIC CHIP	0.0022uF 5% 50V			< CONNECTOR >	
C108	1-164-232-11	CERAMIC CHIP	0.01uF 50V	CNU101	1-770-014-11	CONNECTOR, FFC/FPC 16P	
C109	1-164-232-11	CERAMIC CHIP	0.01uF 50V	CNU102	1-770-013-11	CONNECTOR, FFC/FPC 19P	
C110	1-163-989-11	CERAMIC CHIP	0.033uF 10% 25V			< IC >	
C111	1-163-038-00	CERAMIC CHIP	0.1uF 25V	IC101	8-752-069-56	IC CXA1782BQ	
C112	1-163-038-00	CERAMIC CHIP	0.1uF 25V	IC102	8-759-291-06	IC BA6397FP	
C113	1-164-695-11	CERAMIC CHIP	0.0022uF 5% 50V	IC103	8-752-372-94	IC CXD2507AQ	
C114	1-164-005-11	CERAMIC CHIP	0.47uF 25V	IC104	8-759-185-29	IC PCM1710U-B	
C115	1-126-607-11	ELECT CHIP	47uF 20% 4V			< TRANSISTOR >	
C116	1-163-016-00	CERAMIC CHIP	0.0039uF 10% 50V	Q101	8-729-010-08	TRANSISTOR MSB710-R	
C117	1-164-005-11	CERAMIC CHIP	0.47uF 25V	Q102	8-729-424-08	TRANSISTOR UN2111	
C118	1-107-823-11	CERAMIC CHIP	0.47uF 10% 16V	Q103	8-729-421-22	TRANSISTOR UN2211	
C119	1-163-038-00	CERAMIC CHIP	0.1uF 25V			< RESISTOR >	
C120	1-135-201-11	TANTALUM CHIP	10uF 20% 4V	R102	1-216-001-00	METAL CHIP 10	5% 1/10W
C121	1-163-038-00	CERAMIC CHIP	0.1uF 25V	R103	1-216-049-11	METAL GLAZE 1K	5% 1/10W
C122	1-164-232-11	CERAMIC CHIP	0.01uF 50V	R104	1-216-097-00	METAL GLAZE 100K	5% 1/10W
C123	1-163-038-00	CERAMIC CHIP	0.1uF 25V	R105	1-216-093-00	METAL CHIP 68K	5% 1/10W
C124	1-126-607-11	ELECT CHIP	47uF 20% 4V	R106	1-216-093-00	METAL CHIP 68K	5% 1/10W
C125	1-164-232-11	CERAMIC CHIP	0.01uF 50V	R107	1-216-093-00	METAL CHIP 68K	5% 1/10W
C126	1-163-038-00	CERAMIC CHIP	0.1uF 25V	R108	1-216-093-00	METAL CHIP 68K	5% 1/10W
C127	1-164-695-11	CERAMIC CHIP	0.0022uF 5% 50V	R109	1-216-097-00	METAL GLAZE 100K	5% 1/10W
C128	1-163-135-00	CERAMIC CHIP	560PF 5% 50V	R112	1-216-083-00	METAL CHIP 27K	5% 1/10W
C129	1-163-038-00	CERAMIC CHIP	0.1uF 25V	R113	1-216-083-00	METAL CHIP 27K	5% 1/10W
C130	1-164-336-11	CERAMIC CHIP	0.33uF 25V	R114	1-216-101-00	METAL CHIP 150K	5% 1/10W
C131	1-163-038-00	CERAMIC CHIP	0.1uF 25V	R115	1-216-101-00	METAL CHIP 150K	5% 1/10W
C132	1-163-037-11	CERAMIC CHIP	0.022uF 10% 25V	R116	1-216-061-00	METAL CHIP 3.3K	5% 1/10W
C133	1-163-145-00	CERAMIC CHIP	0.0015uF 5% 50V	R117	1-216-069-00	METAL CHIP 6.8K	5% 1/10W
C134	1-164-346-11	CERAMIC CHIP	1uF 16V	R118	1-216-049-11	METAL GLAZE 1K	5% 1/10W
C135	1-163-251-11	CERAMIC CHIP	100PF 5% 50V	R119	1-216-089-00	METAL GLAZE 47K	5% 1/10W
C136	1-164-005-11	CERAMIC CHIP	0.47uF 25V	R120	1-216-089-00	METAL GLAZE 47K	5% 1/10W
C137	1-164-232-11	CERAMIC CHIP	0.01uF 50V	R121	1-216-114-00	METAL GLAZE 510K	5% 1/10W
C139	1-163-235-11	CERAMIC CHIP	22PF 5% 50V	R122	1-216-097-00	METAL GLAZE 100K	5% 1/10W
C140	1-163-235-11	CERAMIC CHIP	22PF 5% 50V	R123	1-216-099-00	METAL CHIP 120K	5% 1/10W
C141	1-163-038-00	CERAMIC CHIP	0.1uF 25V				
C142	1-163-038-00	CERAMIC CHIP	0.1uF 25V				

**BD**

**DISPLAY**

Ref. No.	Part No.	Description	Remark
R124	1-216-091-00	METAL CHIP 56K	5% 1/10W
R125	1-216-069-00	METAL CHIP 6.8K	5% 1/10W
R126	1-216-063-00	METAL GLAZE 3.9K	5% 1/10W
R127	1-216-089-00	METAL GLAZE 47K	5% 1/10W
R128	1-216-105-00	METAL GLAZE 220K	5% 1/10W
R129	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R130	1-216-079-00	METAL CHIP 18K	5% 1/10W
R131	1-216-079-00	METAL CHIP 18K	5% 1/10W
R132	1-216-061-00	METAL CHIP 3.3K	5% 1/10W
R133	1-216-061-00	METAL CHIP 3.3K	5% 1/10W
R134	1-216-065-00	METAL CHIP 4.7K	5% 1/10W
R135	1-216-065-00	METAL CHIP 4.7K	5% 1/10W
R136	1-216-073-00	METAL CHIP 10K	5% 1/10W
R137	1-216-065-00	METAL CHIP 4.7K	5% 1/10W
R138	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R139	1-216-033-00	METAL CHIP 220	5% 1/10W
R140	1-216-081-00	METAL CHIP 22K	5% 1/10W
R141	1-216-061-00	METAL CHIP 3.3K	5% 1/10W
R142	1-216-061-00	METAL CHIP 3.3K	5% 1/10W
R143	1-216-121-00	METAL GLAZE 1M	5% 1/10W
R144	1-216-073-00	METAL CHIP 10K	5% 1/10W
R145	1-216-097-00	METAL GLAZE 100K	5% 1/10W
R146	1-216-097-00	METAL GLAZE 100K	5% 1/10W
R147	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R148	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R149	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R150	1-216-037-00	METAL CHIP 330	5% 1/10W
R151	1-216-037-00	METAL CHIP 330	5% 1/10W
R152	1-216-037-00	METAL CHIP 330	5% 1/10W
R153	1-216-082-00	METAL GLAZE 24K	5% 1/10W
R154	1-216-065-00	METAL CHIP 4.7K	5% 1/10W
R156	1-216-085-00	METAL CHIP 33K	5% 1/10W
R157	1-216-069-00	METAL CHIP 6.8K	5% 1/10W
R158	1-216-001-00	METAL CHIP 10	5% 1/10W
		< VARIABLE RESISTOR >	
RV101	1-223-587-11	RES, ADJ, CARBON 22K	
RV102	1-223-587-11	RES, ADJ, CARBON 22K	
RV103	1-223-587-11	RES, ADJ, CARBON 22K	
		< SWITCH >	
S101	1-572-085-11	SWITCH, LEAF (LIMIT)	
		< VIBRATOR >	
X101	1-579-280-11	VIBRATOR, CRYSTAL (16.9344MHz)	
*****			
*	A-4699-659-A	DISPLAY BOARD, COMPLETE	*****
*	4-955-901-01	CUSHION (FL)	
*	4-977-695-01	HOLDER (FL)	
		< CAPACITOR >	
C501	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C502	1-164-161-11	CERAMIC CHIP 0.0022uF	10% 100V
C503	1-163-137-00	CERAMIC CHIP 680PF	5% 50V
C504	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V
C505	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V

Ref. No.	Part No.	Description	Remark
C506	1-164-005-11	CERAMIC CHIP 0.47uF	25V
C507	1-164-005-11	CERAMIC CHIP 0.47uF	25V
C508	1-165-319-11	CERAMIC CHIP 0.1uF	50V
C509	1-165-319-11	CERAMIC CHIP 0.1uF	50V
C511	1-126-177-11	ELECT 100uF	20% 10V
C521	1-163-011-11	CERAMIC CHIP 0.0015uF	10% 50V
C522	1-163-011-11	CERAMIC CHIP 0.0015uF	10% 50V
		< CONNECTOR >	
* CN501	1-568-844-11	SOCKET, CONNECTOR 29P	
* CN502	1-568-828-11	SOCKET, CONNECTOR 9P	
		< LED >	
D501	8-719-057-09	LED LNJ801LPDJA (◀◀ SELECTOR ▶▶)	
D502	8-719-057-09	LED LNJ801LPDJA (ENTER)	
		< FLUORESCENT INDICATOR TUBE >	
FL501	1-517-462-11	INDICATOR TUBE, FLUORESCENT	
		< IC >	
IC501	8-759-444-42	IC uPD780205GF-021-3BA	
		< JUMPER RESISTOR >	
JW001	1-216-296-00	CONDUCTOR, CHIP (3216)	
JW002	1-216-296-00	CONDUCTOR, CHIP (3216)	
JW003	1-216-296-00	CONDUCTOR, CHIP (3216)	
JW004	1-216-296-00	CONDUCTOR, CHIP (3216)	
JW005	1-216-296-00	CONDUCTOR, CHIP (3216)	
JW006	1-216-295-00	CONDUCTOR, CHIP (2012)	
		< TRANSISTOR >	
Q502	8-729-421-22	TRANSISTOR UN2211	
Q503	8-729-421-22	TRANSISTOR UN2211	
Q507	8-729-600-22	TRANSISTOR 2SA1235-F	
Q508	8-729-600-22	TRANSISTOR 2SA1235-F	
Q601	8-729-421-22	TRANSISTOR UN2211	
Q602	8-729-421-22	TRANSISTOR UN2211	
Q603	8-729-421-22	TRANSISTOR UN2211	
Q604	8-729-421-22	TRANSISTOR UN2211	
Q605	8-729-421-22	TRANSISTOR UN2211	
Q606	8-729-421-22	TRANSISTOR UN2211	
		< RESISTOR >	
R502	1-216-190-00	METAL GLAZE 470	5% 1/8W
R503	1-216-045-00	METAL CHIP 680	5% 1/10W
R504	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R505	1-216-025-00	METAL GLAZE 100	5% 1/10W
R506	1-216-025-00	METAL GLAZE 100	5% 1/10W
R507	1-216-025-00	METAL GLAZE 100	5% 1/10W
R508	1-216-025-00	METAL GLAZE 100	5% 1/10W
R509	1-216-025-00	METAL GLAZE 100	5% 1/10W
R510	1-216-025-00	METAL GLAZE 100	5% 1/10W
R512	1-216-041-00	METAL CHIP 470	5% 1/10W
R513	1-216-045-00	METAL CHIP 680	5% 1/10W
R514	1-216-049-11	METAL GLAZE 1K	5% 1/10W
R515	1-216-052-00	METAL CHIP 1.3K	5% 1/10W
R516	1-216-057-00	METAL CHIP 2.2K	5% 1/10W
R521	1-216-061-00	METAL CHIP 3.3K	5% 1/10W



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R522	1-216-061-00	METAL CHIP	3.3K 5%	R597	1-249-425-11	CARBON 4.7K 5%	1/10W
R523	1-216-025-00	METAL GLAZE	100 5%	R598	1-216-049-11	METAL GLAZE 1K 5%	1/10W
R524	1-216-073-00	METAL CHIP	10K 5%	R599	1-216-049-11	METAL GLAZE 1K 5%	1/10W
R525	1-216-052-00	METAL CHIP	1.3K 5%			< SWITCH >	
R526	1-216-057-00	METAL CHIP	2.2K 5%				
R527	1-216-025-00	METAL GLAZE	100 5%	S501	1-554-303-21	SWITCH, TACTILE (LOOP)	
R528	1-216-025-00	METAL GLAZE	100 5%	S502	1-762-196-21	SWITCH, TACT (ENTER)	
R532	1-216-049-11	METAL GLAZE	1K 5%	S503	1-762-196-21	SWITCH, TACT (■)	
R533	1-216-025-00	METAL GLAZE	100 5%	S504	1-762-196-21	SWITCH, TACT (▶▶)	
R534	1-216-025-00	METAL GLAZE	100 5%	S505	1-762-196-21	SWITCH, TACT (◀◀)	
R535	1-216-025-00	METAL GLAZE	100 5%	S506	1-762-196-21	SWITCH, TACT (▷◻)	
R536	1-216-025-00	METAL GLAZE	100 5%	S511	1-762-196-21	SWITCH, TACT (PROGRAM)	
R537	1-216-025-00	METAL GLAZE	100 5%	S512	1-762-196-21	SWITCH, TACT (SHUFFLE)	
R538	1-216-025-00	METAL GLAZE	100 5%	S513	1-762-196-21	SWITCH, TACT (CONTINUE)	
R539	1-216-025-00	METAL GLAZE	100 5%	S514	1-762-196-21	SWITCH, TACT (REPEAT)	
R540	1-216-025-00	METAL GLAZE	100 5%	S515	1-762-196-21	SWITCH, TACT (TIME)	
R541	1-216-025-00	METAL GLAZE	100 5%	S516	1-762-196-21	SWITCH, TACT (CLEAR)	
R542	1-216-025-00	METAL GLAZE	100 5%	S521	1-467-938-11	ENCODER, ROTARY (I◀◀ SELECTOR ▶▶I)	
R549	1-216-025-00	METAL GLAZE	100 5%			< VIBRATOR >	
R550	1-216-025-00	METAL GLAZE	100 5%	X501	1-579-233-11	VIBRATOR, CERAMIC (5MHZ)	
R552	1-216-097-00	METAL GLAZE	100K 5%			*****	
R553	1-216-097-00	METAL GLAZE	100K 5%				
R554	1-216-097-00	METAL GLAZE	100K 5%				
R555	1-216-097-00	METAL GLAZE	100K 5%				
R556	1-216-097-00	METAL GLAZE	100K 5%	*	1-663-321-11	LOADING BOARD	*****
R557	1-216-097-00	METAL GLAZE	100K 5%			< CAPACITOR >	
R558	1-216-097-00	METAL GLAZE	100K 5%	C801	1-162-306-11	CERAMIC 0.01uF 20% 16V	
R559	1-216-097-00	METAL GLAZE	100K 5%	C804	1-162-306-11	CERAMIC 0.01uF 20% 16V	
R560	1-216-097-00	METAL GLAZE	100K 5%	C805	1-126-964-11	ELECT 10uF 20% 50V	
R561	1-216-097-00	METAL GLAZE	100K 5%			< CONNECTOR >	
R562	1-216-097-00	METAL GLAZE	100K 5%	CN801	1-695-093-11	SOCKET, CONNECTOR 9P	
R563	1-216-097-00	METAL GLAZE	100K 5%			< DIODE >	
R564	1-216-097-00	METAL GLAZE	100K 5%	D801	8-719-109-93	DIODE RD6.2ESB2	
R565	1-216-097-00	METAL GLAZE	100K 5%	D805	8-719-987-63	DIODE 1N4148M	
R566	1-216-097-00	METAL GLAZE	100K 5%			< IC >	
R567	1-216-097-00	METAL GLAZE	100K 5%	IC801	8-759-274-09	IC BA6286N	
R568	1-216-097-00	METAL GLAZE	100K 5%			< RESISTOR >	
R569	1-216-097-00	METAL GLAZE	100K 5%	R801	1-249-401-11	CARBON 47 5%	1/4W
R570	1-216-097-00	METAL GLAZE	100K 5%			< SWITCH >	
R571	1-216-097-00	METAL GLAZE	100K 5%	S801	1-762-527-11	SWITCH, ROTARY (OPEN)	
R572	1-216-097-00	METAL GLAZE	100K 5%			*****	
R573	1-216-097-00	METAL GLAZE	100K 5%	*	A-4699-658-A	MAIN BOARD, COMPLETE	*****
R574	1-216-097-00	METAL GLAZE	100K 5%				
R575	1-216-097-00	METAL GLAZE	100K 5%				
R576	1-216-097-00	METAL GLAZE	100K 5%				
R577	1-216-097-00	METAL GLAZE	100K 5%				
R578	1-216-097-00	METAL GLAZE	100K 5%				
R579	1-216-097-00	METAL GLAZE	100K 5%				
R580	1-216-097-00	METAL GLAZE	100K 5%				
R581	1-216-097-00	METAL GLAZE	100K 5%				
R582	1-216-097-00	METAL GLAZE	100K 5%				
R583	1-216-097-00	METAL GLAZE	100K 5%				
R584	1-216-097-00	METAL GLAZE	100K 5%				
R585	1-216-097-00	METAL GLAZE	100K 5%				
R591	1-216-097-00	METAL GLAZE	100K 5%				
R592	1-216-097-00	METAL GLAZE	100K 5%				
R594	1-216-039-00	METAL CHIP	390 5%				
R595	1-216-039-00	METAL CHIP	390 5%				
R596	1-249-425-11	CARBON	4.7K 5%				

**MAIN**

Ref. No.	Part No.	Description	Remark
C105	1-126-933-11	ELECT	100uF 20% 16V
C106	1-162-294-31	CERAMIC	0.001uF 10% 50V
C201	1-162-306-11	CERAMIC	0.01uF 20% 16V
C202	1-126-933-11	ELECT	100uF 20% 16V
C203	1-106-351-00	MYLAR	2200PF 5% 200V
C204	1-106-351-00	MYLAR	2200PF 5% 200V
C205	1-126-933-11	ELECT	100uF 20% 16V
C206	1-162-294-31	CERAMIC	0.001uF 10% 50V
C301	1-126-944-11	ELECT	3300uF 20% 25V
C302	1-104-665-11	ELECT	100uF 20% 25V
C303	1-126-968-11	ELECT	100uF 20% 50V
C304	1-128-576-11	ELECT	100uF 20% 63V
C305	1-126-964-11	ELECT	10uF 20% 50V
C306	1-126-966-11	ELECT	33uF 20% 50V
C307	1-126-943-11	ELECT	2200uF 20% 25V
C308	1-126-964-11	ELECT	10uF 20% 50V
C309	1-126-933-11	ELECT	100uF 20% 16V
C310	1-126-964-11	ELECT	10uF 20% 50V
C311	1-126-964-11	ELECT	10uF 20% 50V
C312	1-126-925-11	ELECT	470uF 20% 10V
C314	1-126-925-11	ELECT	470uF 20% 10V
C315	1-128-563-11	ELECT	100uF 20% 100V
C316	1-128-563-11	ELECT	100uF 20% 100V
C317	1-126-964-11	ELECT	10uF 20% 50V
C318	1-126-960-11	ELECT	1uF 20% 50V
C319	1-126-960-11	ELECT	1uF 20% 50V
C320	1-126-966-11	ELECT	33uF 20% 50V
C321	1-126-964-11	ELECT	10uF 20% 50V
C322	1-126-025-11	ELECT	330uF 20% 25V
C323	1-126-025-11	ELECT	330uF 20% 25V
C324	1-126-970-11	ELECT	330uF 20% 50V
C331	1-162-306-11	CERAMIC	0.01uF 20% 16V
C335	1-164-159-11	CERAMIC	0.1uF 50V
C352	1-162-282-31	CERAMIC	100PF 10% 50V
C353	1-164-159-11	CERAMIC	0.1uF 50V
C354	1-162-306-11	CERAMIC	0.01uF 20% 16V
C357	1-164-159-11	CERAMIC	0.1uF 50V
C358	1-162-306-11	CERAMIC	0.01uF 20% 16V
C372	1-162-282-31	CERAMIC	100PF 10% 50V
C375	1-162-294-31	CERAMIC	0.001uF 10% 50V
C376	1-162-282-31	CERAMIC	100PF 10% 50V
C377	1-162-294-31	CERAMIC	0.001uF 10% 50V
C381	1-164-159-11	CERAMIC	0.1uF 50V
C384	1-164-159-11	CERAMIC	0.1uF 50V
C401	1-162-282-31	CERAMIC	100PF 10% 50V
C402	1-164-159-11	CERAMIC	0.1uF 50V
C412	1-136-177-00	FILM	1uF 5% 50V
C413	1-136-177-00	FILM	1uF 5% 50V
C998	1-162-306-11	CERAMIC	0.01uF 20% 16V
C999	1-162-306-11	CERAMIC	0.01uF 20% 16V
< CONNECTOR >			
CN302	1-770-167-11	CONNECTOR, FFC/FPC 19P	
CN303	1-695-088-11	PIN, CONNECTOR (PC BOARD) 9P	
CN304	1-695-093-11	SOCKET, CONNECTOR 9P	
* CN305	1-658-871-11	SOCKET, CONNECTOR 29P	
CN402	1-770-158-21	HOUSING, CONNECTOR 7P	(SYSTEM CONTROL)

Ref. No.	Part No.	Description	Remark
< DIODE >			
D301	8-719-024-99	DIODE 11ES2-NTA2B	
D302	8-719-024-99	DIODE 11ES2-NTA2B	
D303	8-719-024-99	DIODE 11ES2-NTA2B	
D304	8-719-024-99	DIODE 11ES2-NTA2B	
D305	8-719-024-99	DIODE 11ES2-NTA2B	
D306	8-719-024-99	DIODE 11ES2-NTA2B	
D307	8-719-024-99	DIODE 11ES2-NTA2B	
D308	8-719-024-99	DIODE 11ES2-NTA2B	
D309	8-719-934-22	DIODE HZS30-2L	
D310	8-719-109-81	DIODE RD4.7ESB2	
D313	8-719-987-63	DIODE 1N4148M	
D314	8-719-987-63	DIODE 1N4148M	
D315	8-719-024-99	DIODE 11ES2-NTA2B	
D316	8-719-024-99	DIODE 11ES2-NTA2B	
D317	8-719-024-99	DIODE 11ES2-NTA2B	
D318	8-719-024-99	DIODE 11ES2-NTA2B	
< IC >			
IC301	8-759-231-53	IC TA7805S	
IC302	8-759-604-86	IC M5F7807L	
IC303	8-759-634-51	IC M5218AP	
IC304	8-749-923-04	IC TOTX178	(CD DIGITAL OPTICAL DIGITAL OUT)
IC305	8-759-256-72	IC PST994D	
IC306	8-759-231-53	IC TA7805S	
< JACK >			
J301	1-770-272-11	JACK, PIN 2P (CD ANALOG OUT)	
< JUMPER RESISTOR >			
JW406	1-247-807-31	CARBON 100 5% 1/4W	
< COIL >			
L348	1-412-473-21	INDUCTOR 0uH	
L401	1-412-473-21	INDUCTOR 0uH	
L402	1-412-473-21	INDUCTOR 0uH	
< LEAD (WITH CONNECTOR) >			
* LP301	1-690-880-21	LEAD (WITH CONNECTOR)	
< TRANSISTOR >			
Q301	8-729-140-97	TRANSISTOR 2SB734-34	
Q302	8-729-900-80	TRANSISTOR DTC114ES	
Q303	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q304	8-729-620-05	TRANSISTOR 2SC2603-EF	
Q305	8-729-119-76	TRANSISTOR 2SA1175-HFE	
< RESISTOR >			
R101	1-249-421-11	CARBON 2.2K 5% 1/4W	
R102	1-249-441-11	CARBON 100K 5% 1/4W	
R103	1-249-421-11	CARBON 2.2K 5% 1/4W	
R104	1-249-428-11	CARBON 8.2K 5% 1/4W	
R105	1-249-429-11	CARBON 10K 5% 1/4W	
R106	1-249-441-11	CARBON 100K 5% 1/4W	
R107	1-249-421-11	CARBON 2.2K 5% 1/4W	

**MAIN**

**PANEL**

**RELAY**

**SENSOR**

**TABLE**

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R201	1-249-421-11	CARBON	2.2K 5% 1/4W	S602	1-762-196-21	SWITCH, TACT (SKIP)	
R202	1-249-441-11	CARBON	100K 5% 1/4W	S603	1-762-196-21	SWITCH, TACT (DISC 1)	
R203	1-249-421-11	CARBON	2.2K 5% 1/4W	S604	1-762-196-21	SWITCH, TACT (DISC 2)	
				S605	1-762-196-21	SWITCH, TACT (DISC 3)	
R204	1-249-428-11	CARBON	8.2K 5% 1/4W	S606	1-762-196-21	SWITCH, TACT (≧ OPEN/CLOSE)	
R205	1-249-429-11	CARBON	10K 5% 1/4W	*****			
R206	1-249-441-11	CARBON	100K 5% 1/4W	*	1-663-324-11	RELAY BOARD	
R207	1-249-421-11	CARBON	2.2K 5% 1/4W			*****	
R301	1-249-425-11	CARBON	4.7K 5% 1/4W			< CONNECTOR >	
R302	1-249-429-11	CARBON	10K 5% 1/4W	CN701	1-695-088-11	PIN, CONNECTOR (PC BOARD) 9P	
R303	1-249-417-11	CARBON	1K 5% 1/4W	CN702	1-750-413-11	CONNECTOR, FFC/FPC 8P	
R304	1-249-417-11	CARBON	1K 5% 1/4W			< TRANSISTOR >	
R305	1-247-807-31	CARBON	100 5% 1/4W				
R306	1-249-437-11	CARBON	47K 5% 1/4W	Q701	8-729-900-80	TRANSISTOR DTC114ES	
R307	1-249-413-11	CARBON	470 5% 1/4W			< RESISTOR >	
R308	1-249-413-11	CARBON	470 5% 1/4W	R703	1-249-435-11	CARBON 33K 5% 1/4W	
R309	1-249-413-11	CARBON	470 5% 1/4W	R704	1-249-429-11	CARBON 10K 5% 1/4W	
R310	1-249-413-11	CARBON	470 5% 1/4W	R705	1-249-417-11	CARBON 1K 5% 1/4W	
R311	1-249-425-11	CARBON	4.7K 5% 1/4W	*****			
R312	1-249-429-11	CARBON	10K 5% 1/4W	*	1-663-322-11	SENSOR BOARD	
R313	1-249-393-11	CARBON	10 5% 1/4W			*****	
R314	1-249-429-11	CARBON	10K 5% 1/4W			< IC >	
R315	1-249-393-11	CARBON	10 5% 1/4W	IC702	8-749-924-18	IC PHOTO INTERRUPTER RPI-1391	
R316	1-249-429-11	CARBON	10K 5% 1/4W	IC703	8-749-924-30	IC PHOTO REFLECTOR GP2S28	
R317	1-249-425-11	CARBON	4.7K 5% 1/4W			< RESISTOR >	
R318	1-249-429-11	CARBON	10K 5% 1/4W	R701	1-249-416-11	CARBON 820 5% 1/4W	
R319	1-249-429-11	CARBON	10K 5% 1/4W	R702	1-249-407-11	CARBON 150 5% 1/4W	
*****				*****			
*	A-4699-278-A	PANEL BOARD, COMPLETE	*****				
		< CONNECTOR >					
* CN601	1-568-852-11	SOCKET, CONNECTOR 9P					
		< LED >					
D601	8-719-032-86	LED SEL5420E (DISC 1)(GREEN)					
D602	8-719-032-86	LED SEL5420E (DISC 2)(GREEN)					
D603	8-719-032-86	LED SEL5420E (DISC 3)(GREEN)					
D604	8-719-032-98	LED SEL5820A (DISC 1)(AMBER)					
D605	8-719-032-98	LED SEL5820A (DISC 2)(AMBER)					
D606	8-719-032-98	LED SEL5820A (DISC 3)(AMBER)					
		< RESISTOR >					
R602	1-216-041-00	METAL CHIP	470 5% 1/10W	CN703	1-750-413-11	CONNECTOR, FFC/FPC 8P	
R603	1-216-045-00	METAL CHIP	680 5% 1/10W	CN704	1-506-469-11	PIN, CONNECTOR 4P	
R604	1-216-049-11	METAL GLAZE	1K 5% 1/10W			< DIODE >	
R605	1-216-052-00	METAL CHIP	1.3K 5% 1/10W				
R606	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	D701	8-719-109-69	DIODE RD3.6ES-B2	
R611	1-216-025-00	METAL GLAZE	100 5% 1/10W			< IC >	
R612	1-216-025-00	METAL GLAZE	100 5% 1/10W				
R613	1-216-025-00	METAL GLAZE	100 5% 1/10W	IC701	8-759-633-65	IC M54641L	
R614	1-216-025-00	METAL GLAZE	100 5% 1/10W			< RESISTOR >	
R615	1-216-025-00	METAL GLAZE	100 5% 1/10W				
R616	1-216-025-00	METAL GLAZE	100 5% 1/10W	R706	1-249-411-11	CARBON 330 5% 1/4W	
R625	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	R707	1-249-401-11	CARBON 47 5% 1/4W	
		< SWITCH >		*****			
S601	1-762-196-21	SWITCH, TACT (EX-CHANGE)					

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>
MISCELLANEOUS *****			
8	1-777-862-11	WIRE (FLAT TYPE) (19 CORE)	
64	1-777-861-11	WIRE (FLAT TYPE) (29 CORE)	
66	1-777-860-11	WIRE (FLAT TYPE) (9 CORE)	
255	1-776-042-11	WIRE (FLAT TYPE) (8 CORE)	
* 262	1-452-879-11	MAGNET	
△ 305	8-848-367-11	OPTICAL PICK-UP KSS-213B/K-N	
306	1-769-069-11	WIRE (FLAT TYPE) (16 CORE)	
M101	X-4917-523-4	BASE (OUTSERT) ASSY (SPINDLE)	
M102	X-4917-504-1	MOTOR ASSY (SLED)	
M701	A-4660-586-A	MOTOR ASSY (TURN)	
M801	A-4660-926-A	MOTOR (CDM) ASSY (SPINDLE)	
S851	1-473-335-11	ENCODER, ROTARY	

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HARDWARE LIST  
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- #1 7-685-646-79 SCREW +BVTP 3X8 TYPE2 N-S
- #2 7-685-647-79 SCREW +BVTP 3X10 TYPE2 N-S
- #3 7-685-872-09 SCREW +BVTT 3X8 (S)
- #4 7-621-775-10 SCREW +B 2.6X4
- #5 7-621-255-15 SCREW +P 2X3

The components identified by mark △ or dotted line with mark △ are critical for safety.  
Replace only with part number specified.