

# CDP-C67ES/C615

## SERVICE MANUAL

*US Model*  
CDP-C67ES/C615  
*Canadian Model*  
*AEP Model*  
*E Model*  
*Australian Model*  
CDP-C615



Photo: CDP-C67ES

Model Name Using Similar Mechanism	CDP-C312M
CD Mechanism Type	CDM16E2-5BD3
Optical Pick-Up Block Type	BU-5BD3

### SPECIFICATIONS

System	Compact disc digital audio system	DIGITAL OUT (OPTICAL)	Wave length 660 nm
Laser	Semiconductor laser ( $\lambda=780$ nm)	(optical output connector)	Output level -18 dBm
Laser output	Emission duration: continuous Max. 44.6 $\mu$ W*	HEADPHONES (stereo phone jack)	Output level max. 15 mW Load impedance 32 ohms
	* This output is the value measured at a distance of about 200 mm from the objective lens surface on the Optical Pick-up Block.	<b>General</b>	
Frequency response	2 Hz - 20 kHz ( $\pm 0.5$ dB)	Power requirements	US and Canadian model: 120 V AC, 60 Hz
Signal to noise ratio	More than 110 dB (C67ES) More than 100 dB (C615)		Australian model: 240 V AC, 50/60 Hz
Dynamic range	More than 100 dB (C67ES) More than 98 dB (C615)		AEP model: 220-230 V AC, 50/60 Hz
Harmonic distortion	Less than 0.0025% (1 kHz) (C67ES) Less than 0.004% (1 kHz) (C615)		E model: 110-120 V, 220-240 V, 50/60 Hz
Channel separation	More than 105 dB (1 kHz) (C67ES) More than 100 dB (1 kHz) (C615)	Power consumption	13 W
Wow and flutter	Below measurable limit	Dimensions	Approx. 430×125×385 mm (w/h/d) (17×5×15 <sup>1</sup> / <sub>4</sub> inches) not including projecting parts and controls
<b>Outputs</b>		Weight	Approx. 7 kg (15 lbs 7 oz), net (C67ES) Approx. 6 kg (13 lbs 4 oz), net (C615)
LINE OUT (FIXED) (phone jacks)	Output level 2 V (at 50 kilohms) Load impedance over 10 kilohms		
LINE OUT (VARIABLE) (phono jacks)	Output level max. 2 V (at 50 kilohms) Load impedance over 10 kilohms		

— Continued on next page —



COMPACT DISK PLAYER  
**SONY**®

**Remote commander** RM-D615  
 Remote control system Infrared control  
 Power requirements 3 V DC with two batteries size AA  
 (IEC esignation R6)

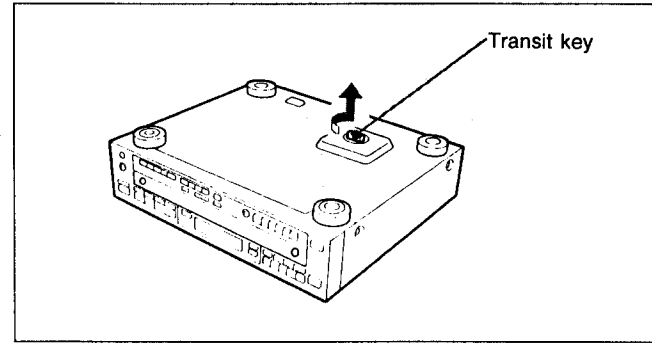
**Supplied accessories**  
 Connecting cord (1)  
 (2 phono plugs ↔ 2 phono plugs)  
 Remote commander (1)  
 Size AA batteries (2)  
 Operating Manual (1)

**Optional accessory**  
 Audio Optical connecting cord POC-15

Design and specifications subject to change without notice.

**Note on the Transit Key**

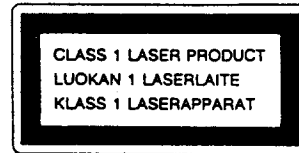
The transit key on the bottom exterior of the unit protects the optical system against shock during transportation. Before operating the CD player, be sure to remove the key by following the instructions on the label, and store it in a safe place. When transporting the unit, replace the key in its original hole and lock it in place.





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For the European countries



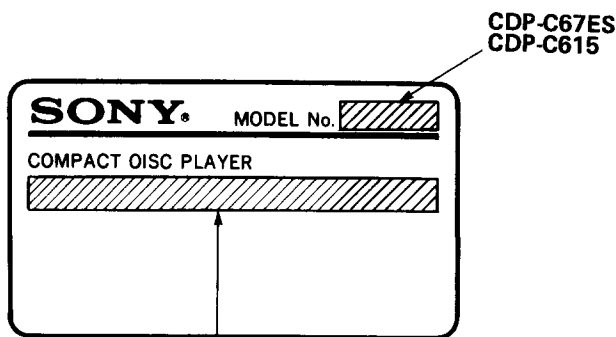
This Compact Disc player is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT label is located on the rear exterior.

**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.

**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.

**MODEL IDENTIFICATION**

—Model Number Label—



US, Canadian model : AC : 120V 60Hz

AEP model : AC : 220-230V-50/60Hz

Australian model : AC : 240V-50/60Hz

E model : AC : 110-120V, 220-240V-50/60Hz

**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.

**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 30cm away from the objective lens.

**SAFETY CHECK-OUT**

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

**LEAKAGE TEST**

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

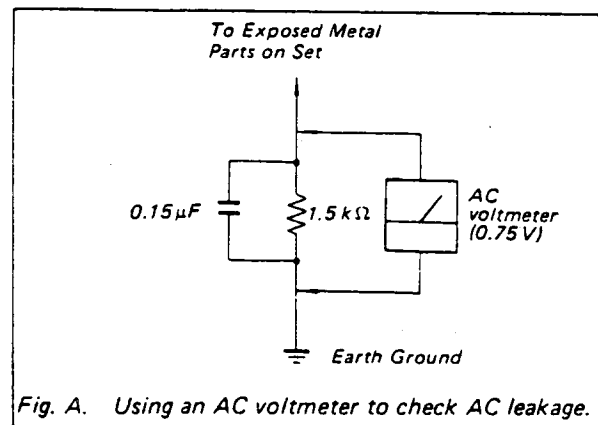


Fig. A. Using an AC voltmeter to check AC leakage.

## PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

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

### CAUTION

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

#### 1. Laser Diode Properties

- Material: GaAlAs
- Wavelength: 780 nm
- Emission Duration: continuous
- Laser Output Power: less than 44.6  $\mu$ W\*

\* This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block.

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

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## BESKYTTELSE AF ØJNE MOD LASERSTRÅLING UNDER SERVICE

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

Følg iverigt instruktionerne i servicemanualen.

### ADVARSEL!!

Under service må øjnene ikke komme nær objektiv-linsen på den optiske pick-up enhed. I tilfælde af at det er nødvendigt at kontrollere udsendelsen af laserlys, skal det ske i en afstand af mere end 25 cm fra den optiske pick-up.

#### 1. Laser-dioe data

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

\* Målt i 1,6 mm afstand fra overfladen af objektiv-linsen på den optiske pick-up enhed.

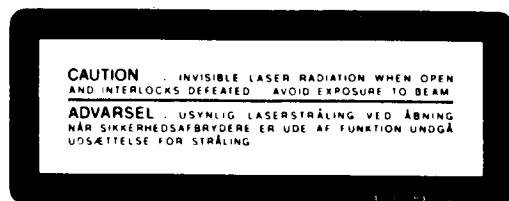
- Klassifikation: Klasse IIIb.

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

## LASER ADVARSEL MÆRKNING

Følgende mærkning findes indvendig i apparatet:

#### 1. Advarsel Mærkning



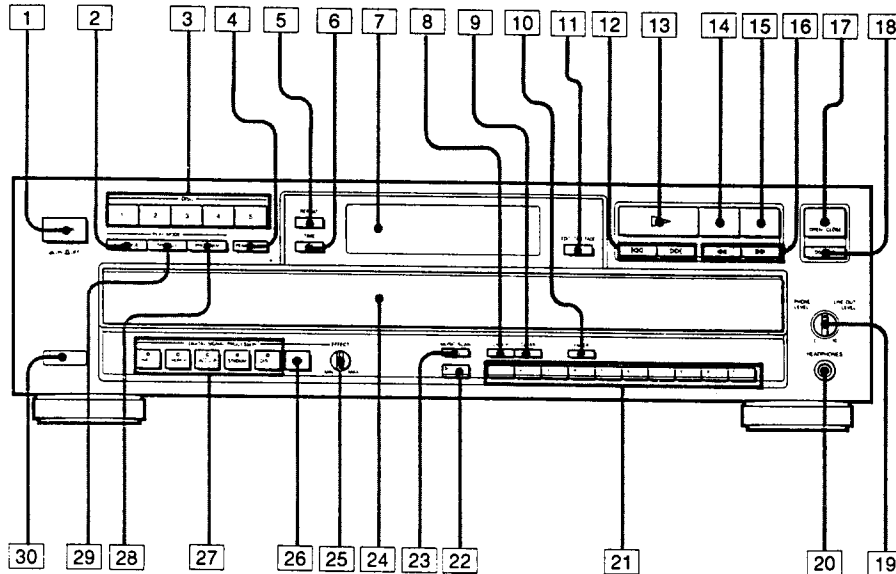

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**VAROITUS:** Laite sisältää, laserdiodin, joka lähettää (näkyvätöntä) silmille vaarallista lasersäteilyä.

## SECTION 1 GENERAL

### 1-1. LOCATION OF CONTROLS

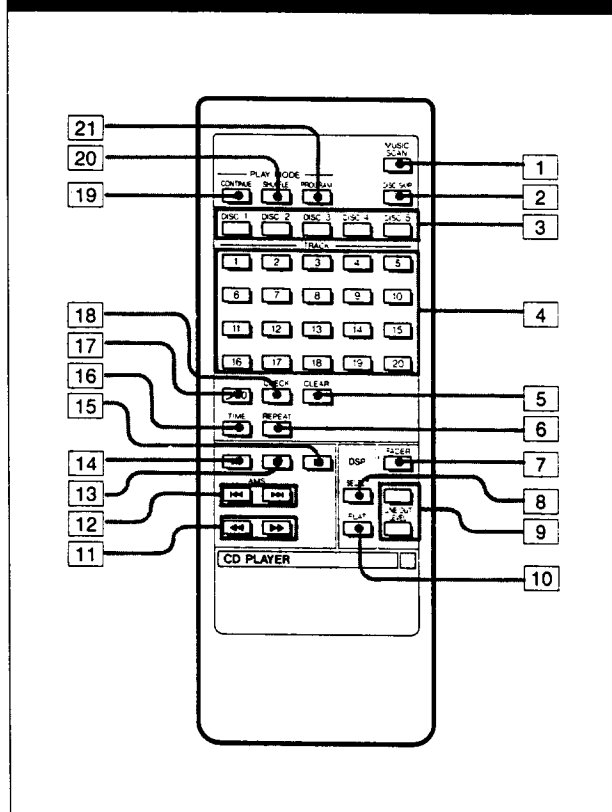
#### Front Panel



- |                                |                                                  |
|--------------------------------|--------------------------------------------------|
| 1 POWER switch                 | 17 ▲ OPEN/CLOSE button                           |
| 2 CONTINUE button              | 18 DISC SKIP button                              |
| 3 DISC 1-5 buttons             | 19 LINE OUT/PHONE LEVEL control                  |
| 4 PEAK SEARCH button           | 20 HEADPHONES jack                               |
| 5 REPEAT button                | 21 Numeric buttons (1-10)                        |
| 6 TIME button                  | 22 > 10 (over 10) button                         |
| 7 Display window               | 23 MUSIC SCAN button                             |
| 8 CHECK (program check) button | 24 Disc tray                                     |
| 9 CLEAR (program clear) button | 25 DIGITAL SIGNAL PROCESSOR EFFECT level control |
| 10 FADER button                | 26 DIGITAL SIGNAL PROCESSOR FLAT button          |
| 11 EDIT/TIME FADE button       | 27 DIGITAL SIGNAL PROCESSOR mode select buttons  |
| 12 ◀▶ (AMS*) buttons           | 28 PROGRAM button                                |
| 13 ▶ (play) button             | 29 SHUFFLE button                                |
| 14    (pause) button           | 30 Remote sensor                                 |
| 15 ■ (stop) button             |                                                  |
| 16 ◀▶ (manual search) buttons  |                                                  |

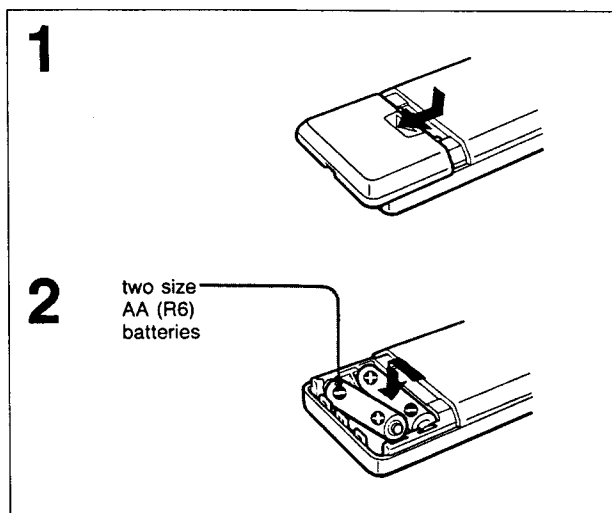
\* AMS is the abbreviation of Automatic Music Sensor.

## Remote Commander



- 1 MUSIC SCAN button
- 2 DISC SKIP button
- 3 DISC 1-5 buttons
- 4 Numeric buttons
- 5 CLEAR (program clear) button
- 6 REPEAT button
- 7 FADER button
- 8 DSP SELECT button
- 9 LINE OUT LEVEL buttons
- 10 DSP FLAT button
- 11 ◀▶▶▶ (manual search) buttons
- 12 ◀◀▶▶▶ (AMS) buttons
- 13 || (pause) button
- 14 ▶ (play) button
- 15 ■ (stop) button
- 16 TIME button
- 17 >20 (over 20) button
- 18 CHECK (program check) button
- 19 CONTINUE button
- 20 SHUFFLE button
- 21 PROGRAM button

## Installing Batteries in the Remote Commander



### On battery life

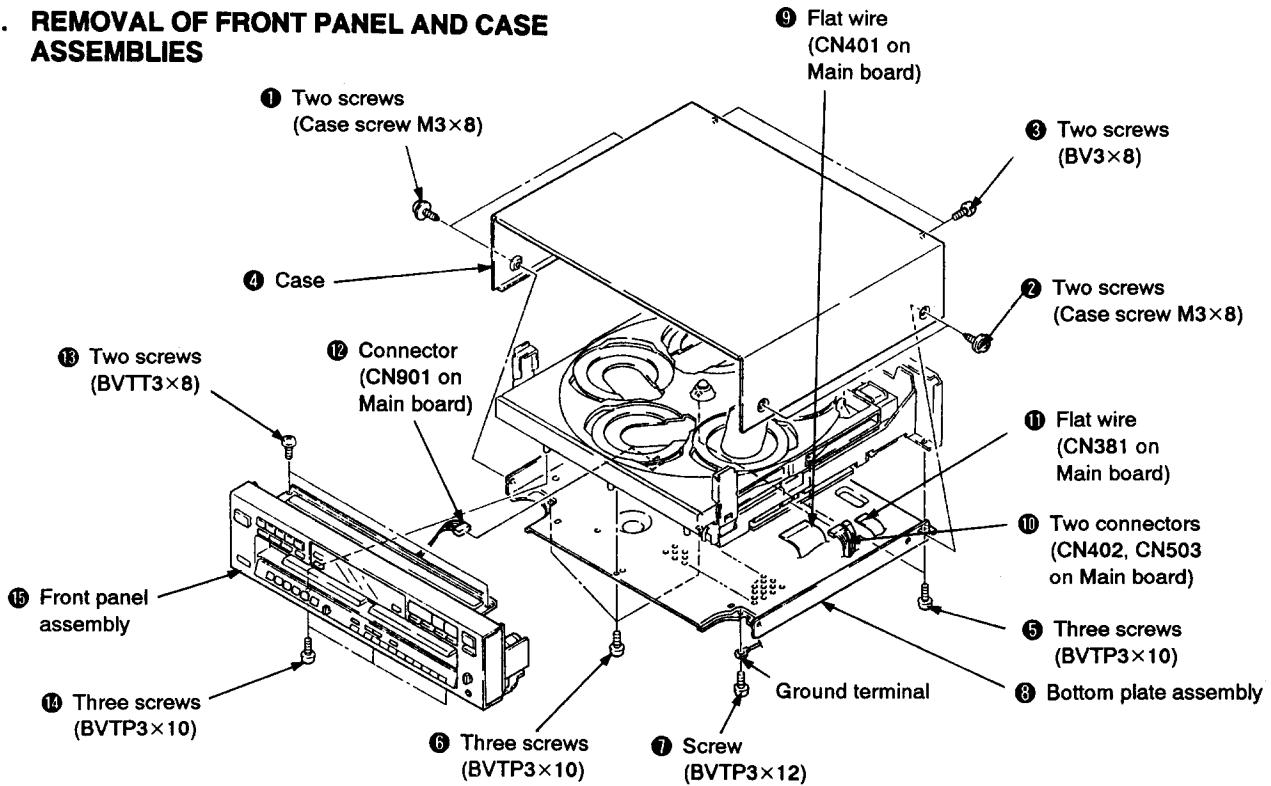
- About half a year of normal operation can be expected when using the Sony SUM-3(NS) batteries.
- When the batteries are run down, the remote commander will not operate the unit. In this case, replace both batteries with new ones.

### Notes on the remote commander and remote control operation

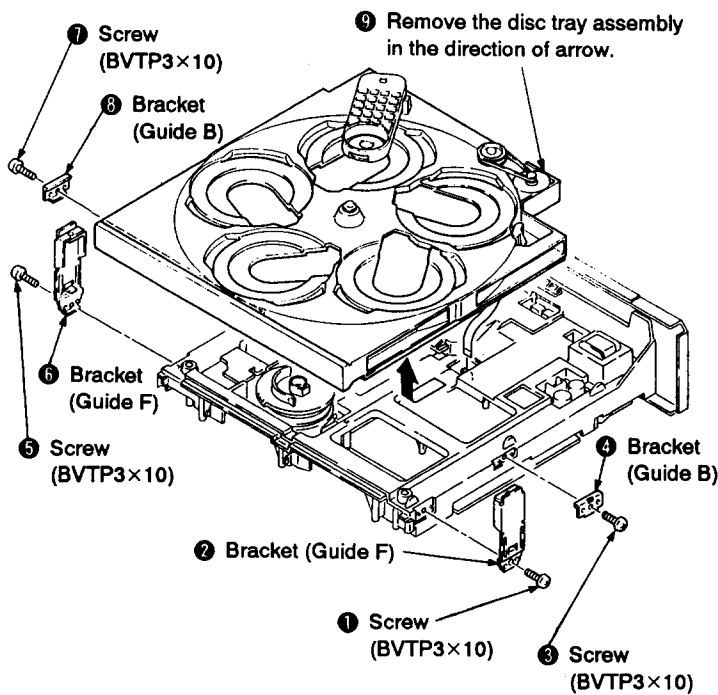
- Keep the commander away from extremely hot or humid places.
- Avoid dropping any foreign objects into the commander casing, particularly when replacing the batteries.
- Avoid exposing the remote sensor to direct sunlight or lighting apparatus. Such exposure can cause a malfunction.
- To avoid damage caused by battery leakage and corrosion, remove the batteries when the commander will not be used for a long time.

## SECTION 2 DISASSEMBLY

### 2-1. REMOVAL OF FRONT PANEL AND CASE ASSEMBLIES

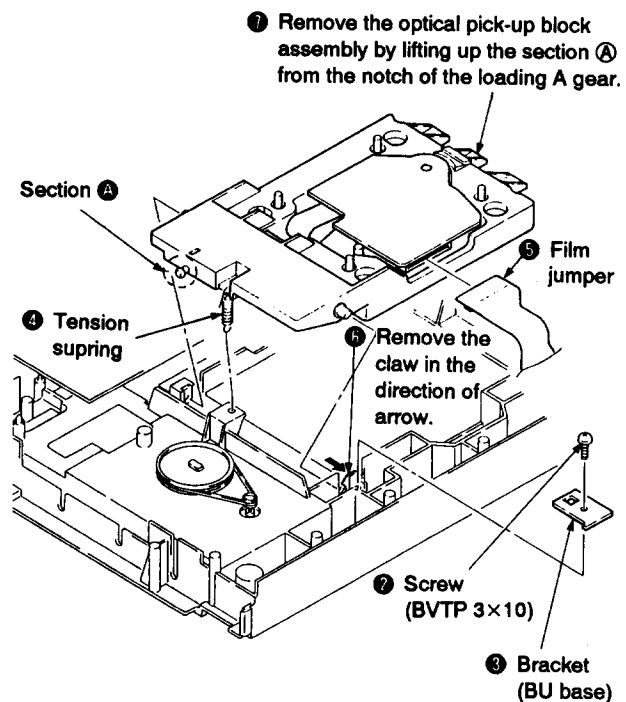


### 2-2. REMOVAL OF DISC TRAY ASSEMBLY



### 2-3. REMOVAL OF OPTICAL PICK-UP BLOCK ASSEMBLY

1) Replace the set up side down.



### SECTION 3

#### IC101 (CXA1372Q) PIN FUNCTION

Pin No.	Pin Name	I/O	Function
1	VC		When $\pm$ power : GND. When signal power : middle point (2.5V)
2	FGD	I	FGD terminal of gain select (time constant) in focus gain normal, down
3	FS3	I	Connecting terminal between FS3 terminals
4	FLB	I	Capacitor connecting terminal for equalizing low-frequency response of focus servo
5	FEO	O	Focus drive output
6	FE-	I	Focus amplifier inverting input
7	SRCH	I	Time constant connecting terminal to create focus search waveform
8	TGU	I	TGU terminal of gain select time constant in tracking gain normal, up
9	TG2	I	Connecting terminal between TG2 terminals
10	AVcc		Analog power (when $\pm$ power : +5V, when single power : +5V)
11	TAO	O	Tracking drive output
12	TA-	I	Tracking amplifier inverting input
13	SL+	I	Sled amplifier non-inverting input
14	SLO	O	Sled drive output
15	SL-	I	Sled amplifier non-inverting input
16	FSET	I	Resistor of 510 k $\Omega$ connecting terminal for phase compensation setting
17	ISET	I	Resistor connecting terminal for current source setting
18	SSTOP	I	Limit switch connecting terminal
19	AVEE		Analog power (when $\pm$ power : -5V, when single power : GND)
20	DIRC	I	Direct control terminal
21	LOCK	I	"L" : sled free-run protector operates
22	CLK	I	Serial data transmission clock input from CPU (or DSP)
23	XLT	I	Latch input from CPU (or DSP)
24	DATA	I	Serial data input from CPU (or DSP)
25	SENS	O	SENS signal output
26	XRST	I	System reset. "L" : reset
27	C. OUT	O	Output for tracking counter
28	DGND		Digital ground (when $\pm$ power : GND, when single power : GND)
29	MIRR	O	Mirror output
30	DFCT	O	Defect output. "H" : when defected
31	ASY	I	Auto asymmetry control input
32	EFM	O	EFM comparator output
33	FOK	O	Focus OK
34	CC2	I	Defect bottom hold input (fed by capacitor coupling)
35	CC1	O	Defect bottom hold output
36	DVcc		Digital power (when $\pm$ power : +5V, when single power : +5V)
37	CB	I	Defect bottom hold capacitor connecting terminal
38	CP	I	Mirror hold capacitor connecting terminal
39	RFI	I	RF signal input (fed by capacitor coupling)
40	RFO	I	RF signal input (fed by DC coupling)
41	DVEE		Digital power (when $\pm$ power : -5V, when single power : GND)
42	TZC	I	Tracking zero-cross comparator input
43	TE	I	Tracking error input
44	TDFCT	I	Hold capacitor connecting terminal against defects
45	ATSC	I	Anti-shock input
46	FZC	I	Focus zero-cross comparator input
47	FE	I	Focus error input
48	FDCT	I	Hold capacitor connecting terminal against defects



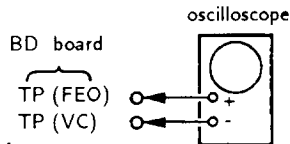
## SECTION 4

### ELECTRICAL BLOCK CHECKING

**Note :**

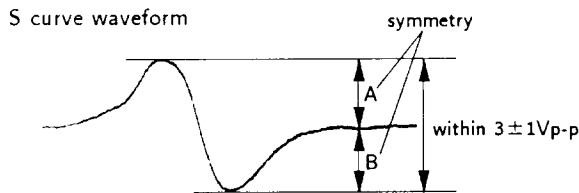
1. CD Block basically constructed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (3-702-101-01) unless otherwise indicated.
3. Use the oscilloscope with more than  $10M\Omega$  impedance.
4. Clean an object lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.

#### S Curve Check



**Procedure :**

1. Connect oscilloscope to test point TP (FEO) on BD board.
2. Connect between test point TP (FES) and TP (VC) by lead wire.
3. Turned Power switch on and actuate the focus serch. (actuate the focus serch when disc table is moving in and out.)
4. Check the oscilloscope waveform (S curve) is symmetrical between A and B. And confirm peak to peak level within  $3 \pm 1V_{p-p}$ .

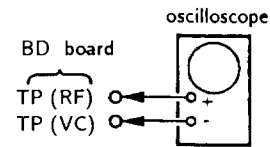


5. After check, remove the lead wire connected in step 2.

**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

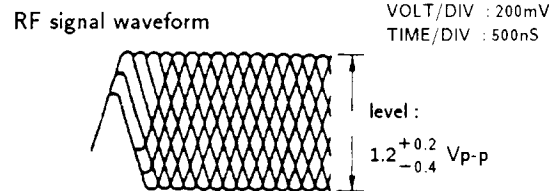


**Procedure :**

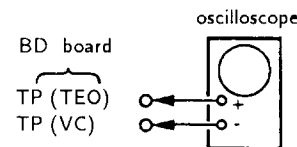
1. Connect oscilloscope to test point TP (RF) on BD board.
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

**Note :**

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

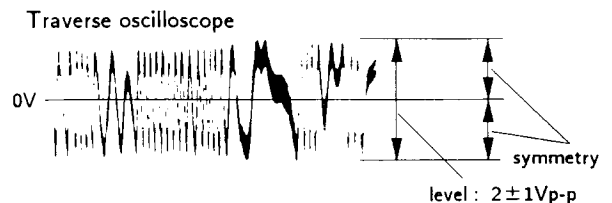


#### E-F Balance Check



**Procedure :**

1. Connect test point TP (ADJ) to ground and TP (TES) to TP (VC) with lead wire.
2. Connect oscilloscope to test point TP (TEO) on BD board.
3. Turn Power switch on.
4. Put disc (YEDS-18) in and playback.
5. Confirm that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0V, and check this level.

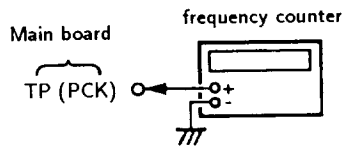


6. Remove the lead wire connected in step 1.

## RF PLL Free-run Frequency Check

### Procedure :

1. Connect frequency counter to test point (PCK) with lead wire.



2. Turn Power switch on.
3. Confirm that reading on frequency counter is
4. 3218MHz.

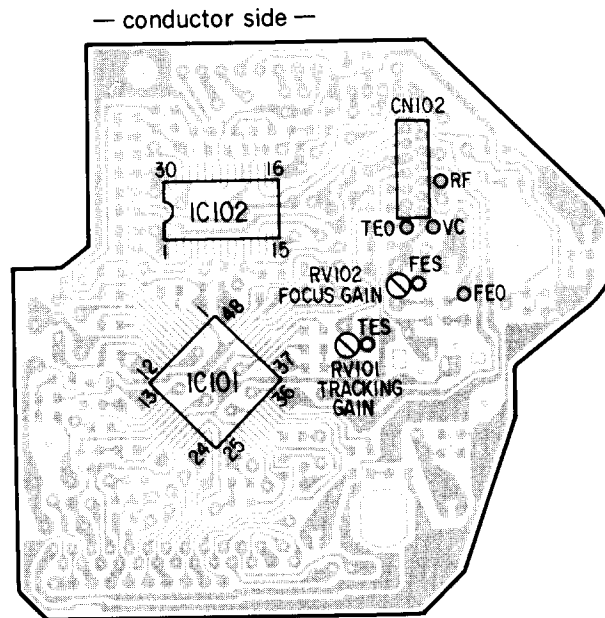
## Focus/Tracking Gain

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

Therefore, do not perform, this adjustment.

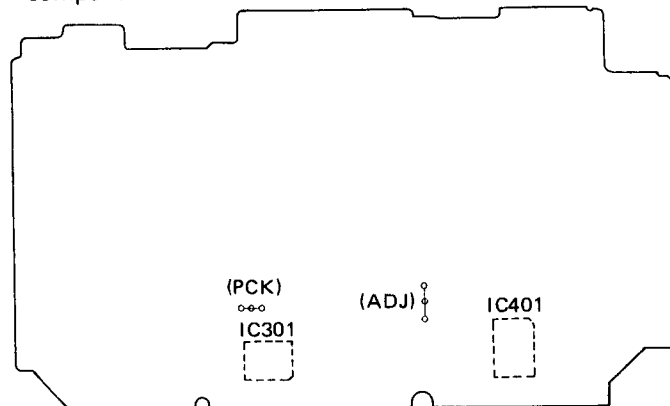
Please note that it should be fixed to mechanical center position when you moved and do not know original position.

### Adjustment Locations : [BD board]



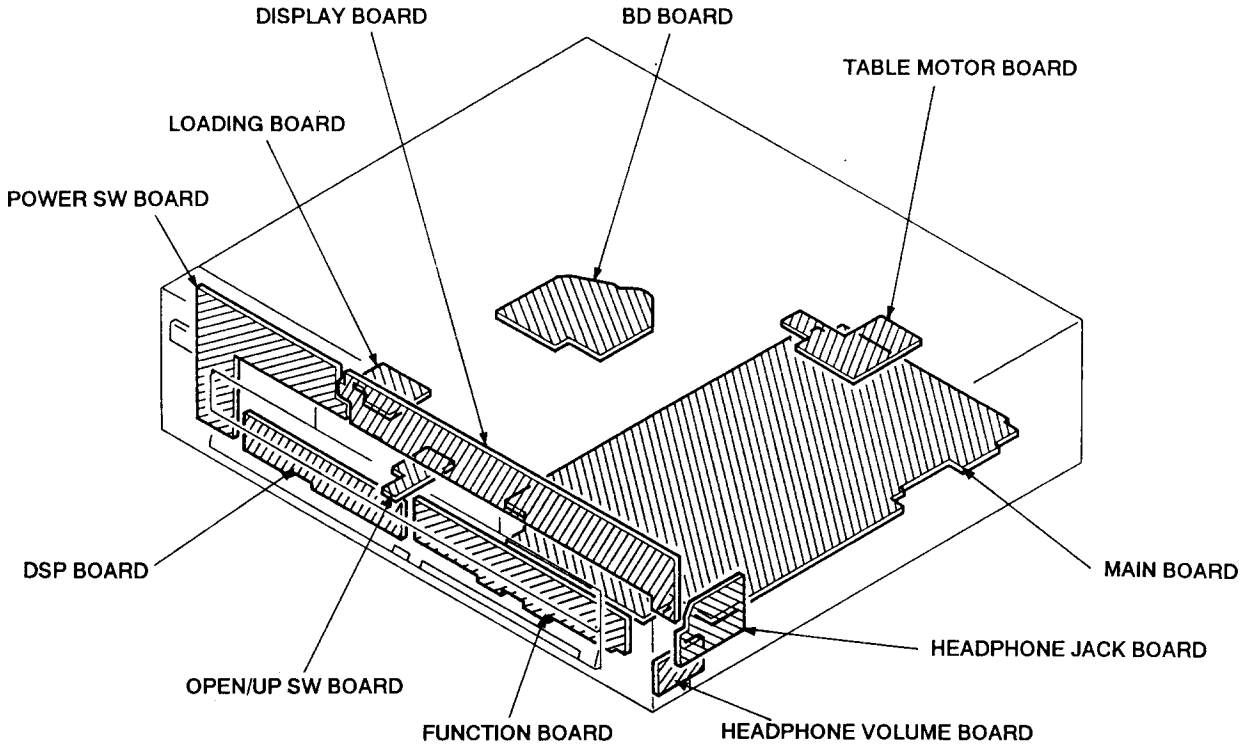
### [Main board]

— component side —

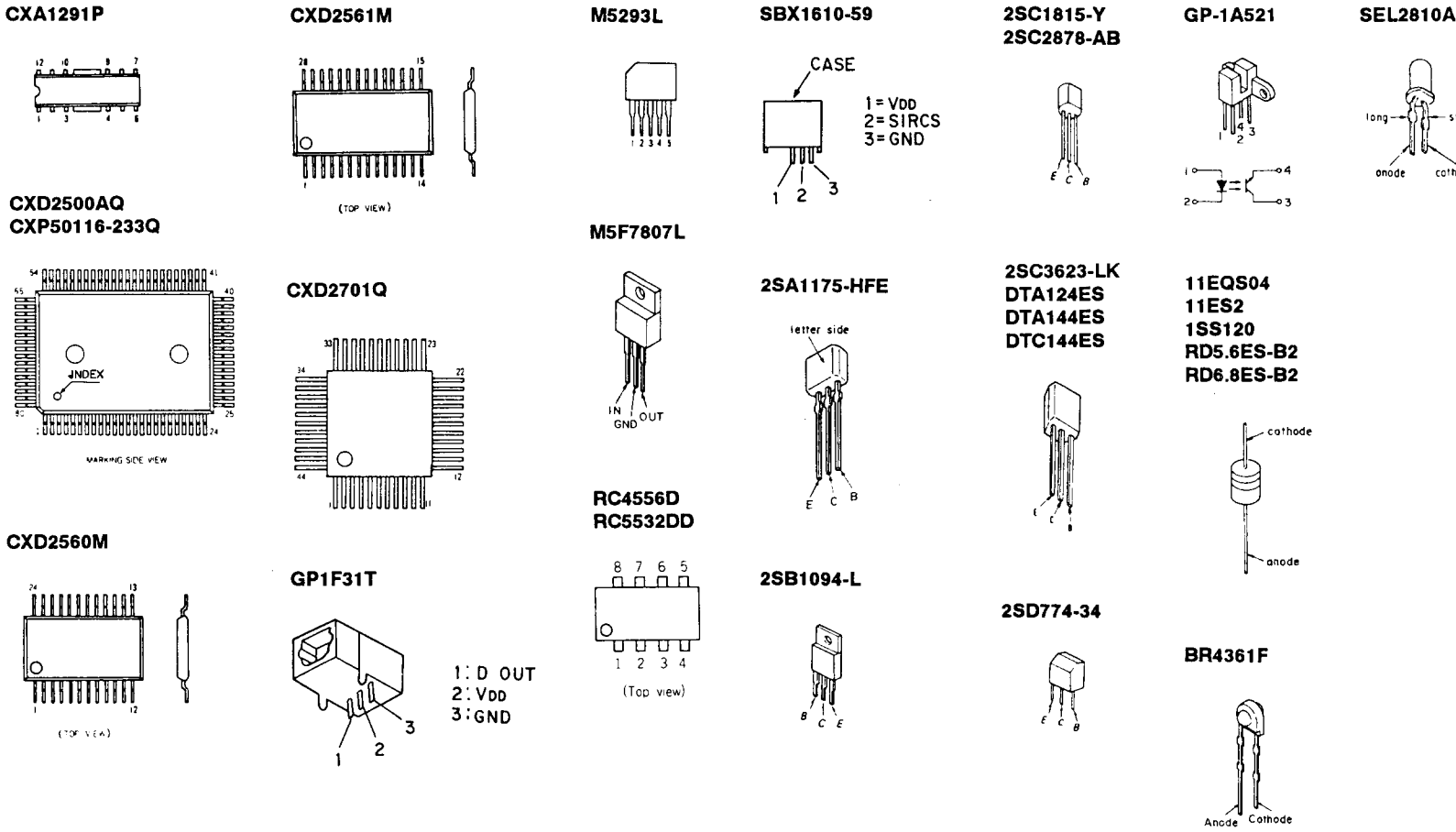


# SECTION 5 DIAGRAMS

## 5-1. CIRCUIT BOARDS LOCATION

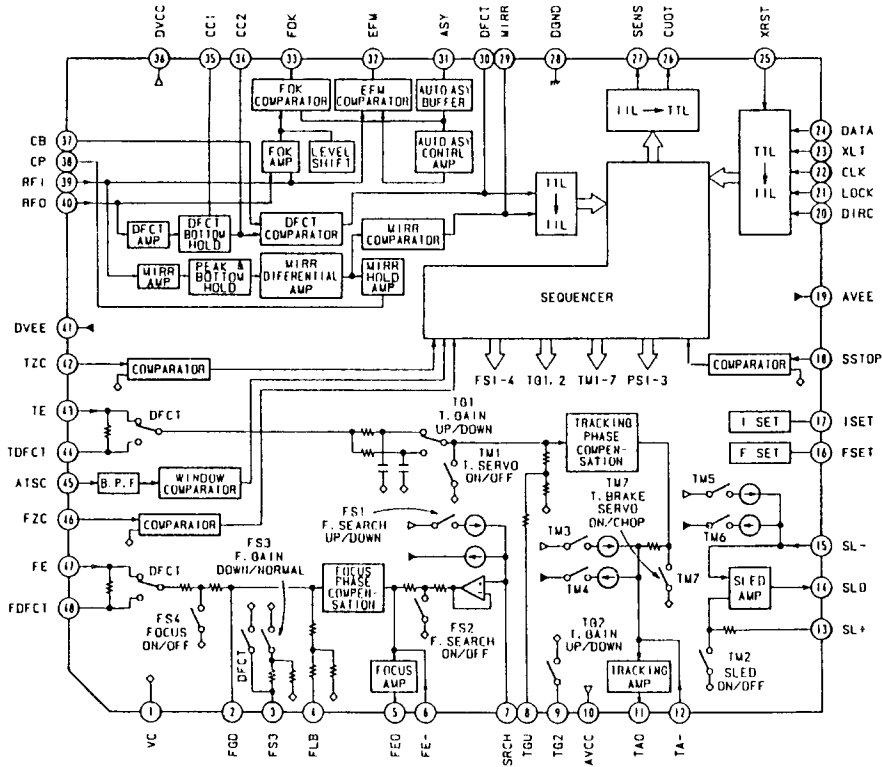


## 5-2. SEMICONDUCTOR LEAD LAYOUTS



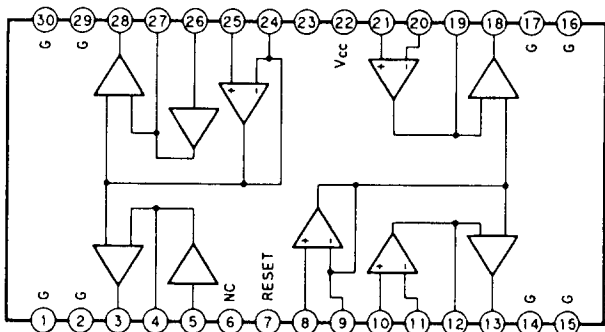
### 5-3. IC BLOCK DIAGRAMS

IC101 CXA1372Q

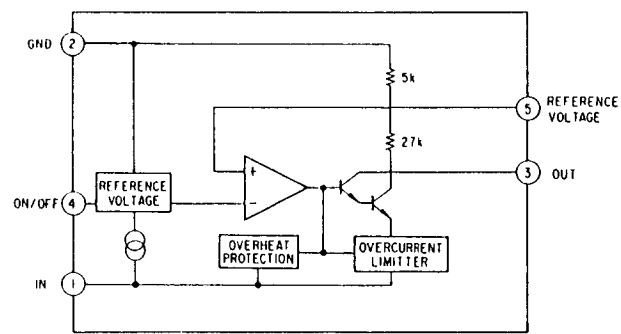


SEL2810A-C

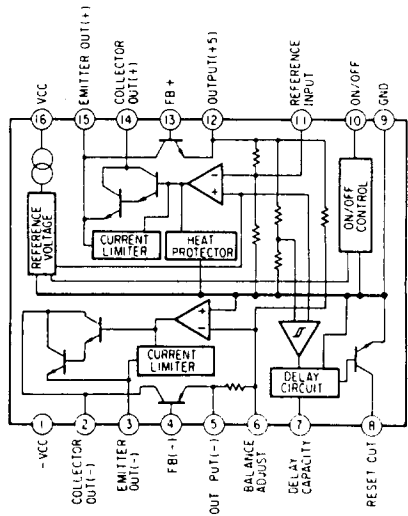
IC102 LA6532M



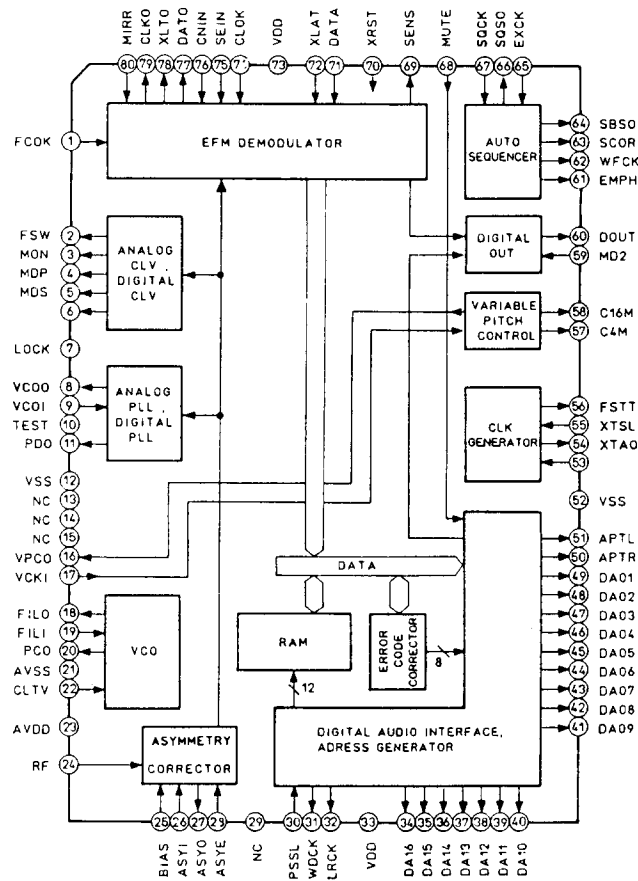
IC201 M5293L



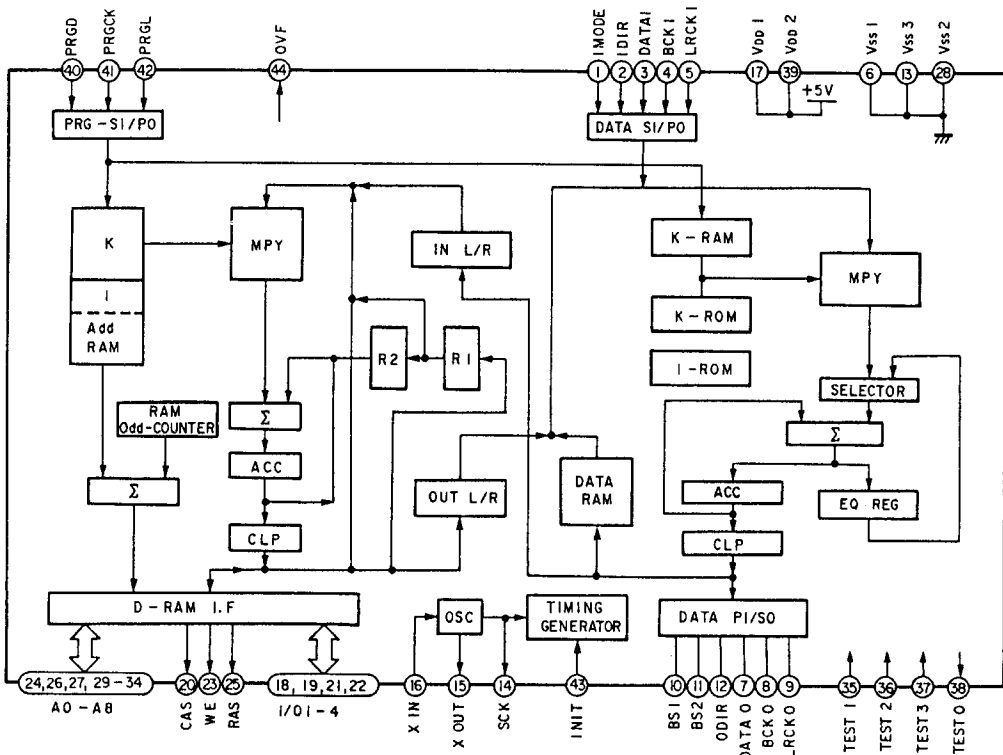
IC202 M5290P-16



IC301 CXD2500Q

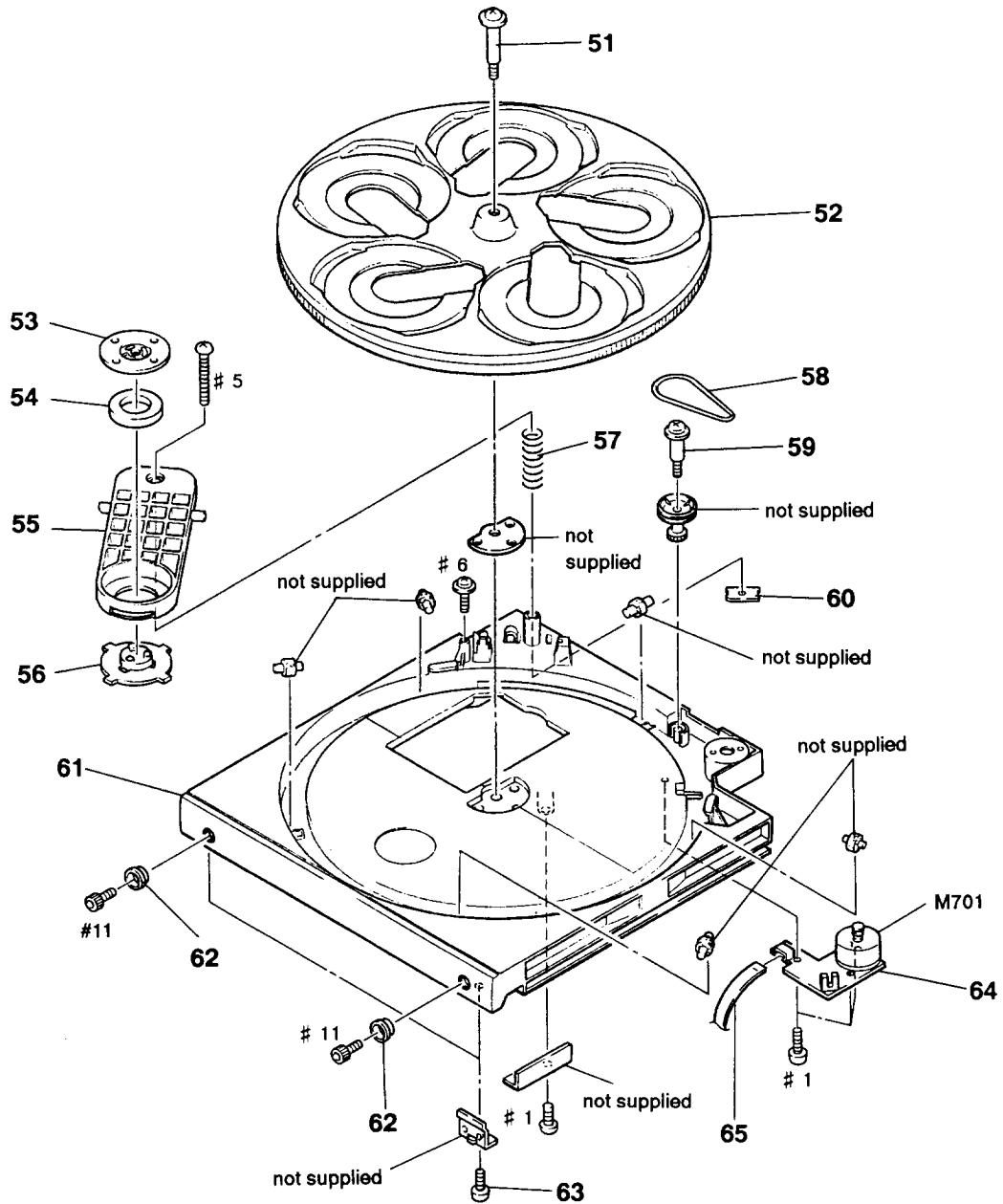


IC901 CXD2701Q



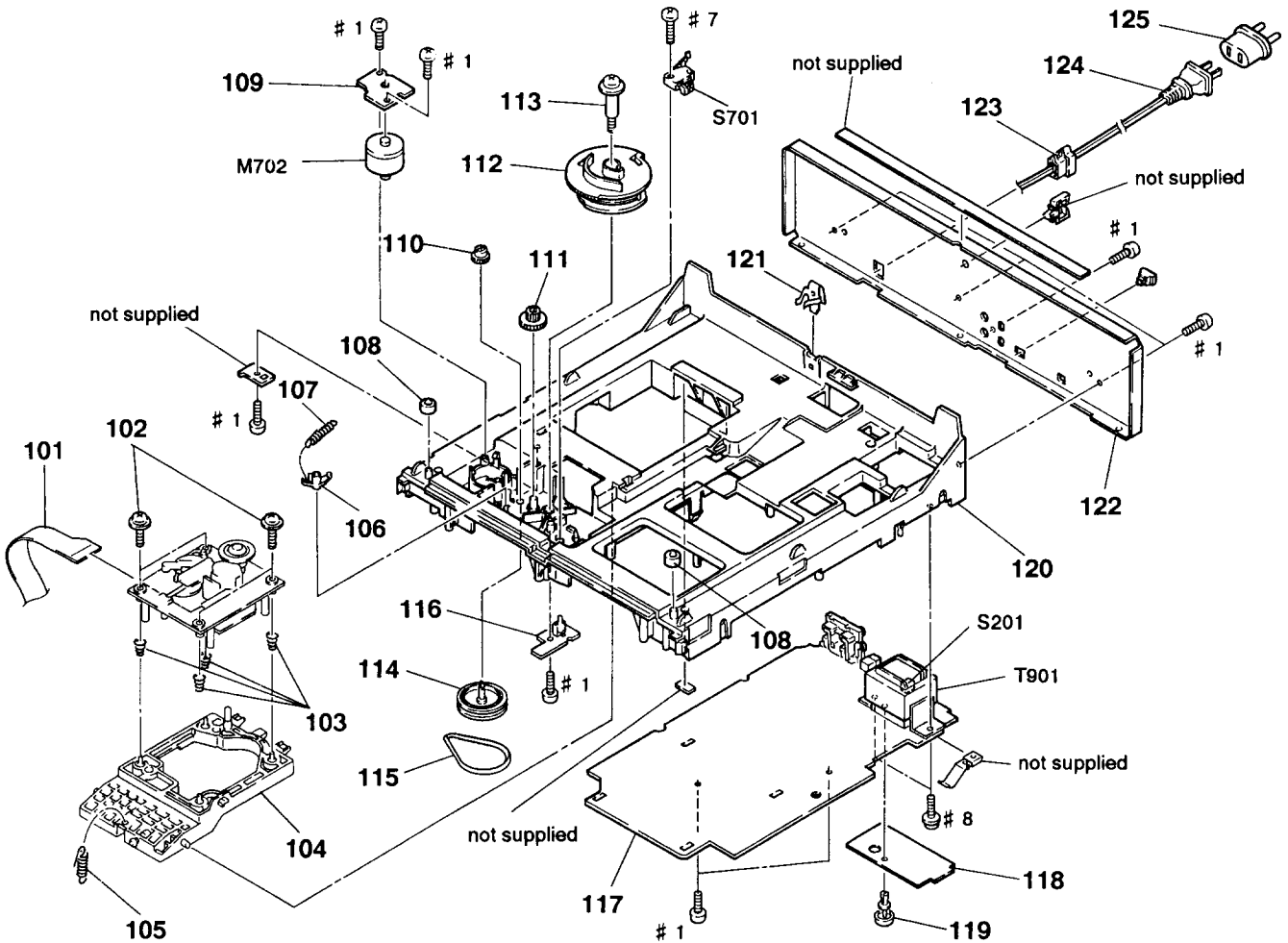


## 6-2. DISC TRAY ASSEMBLY



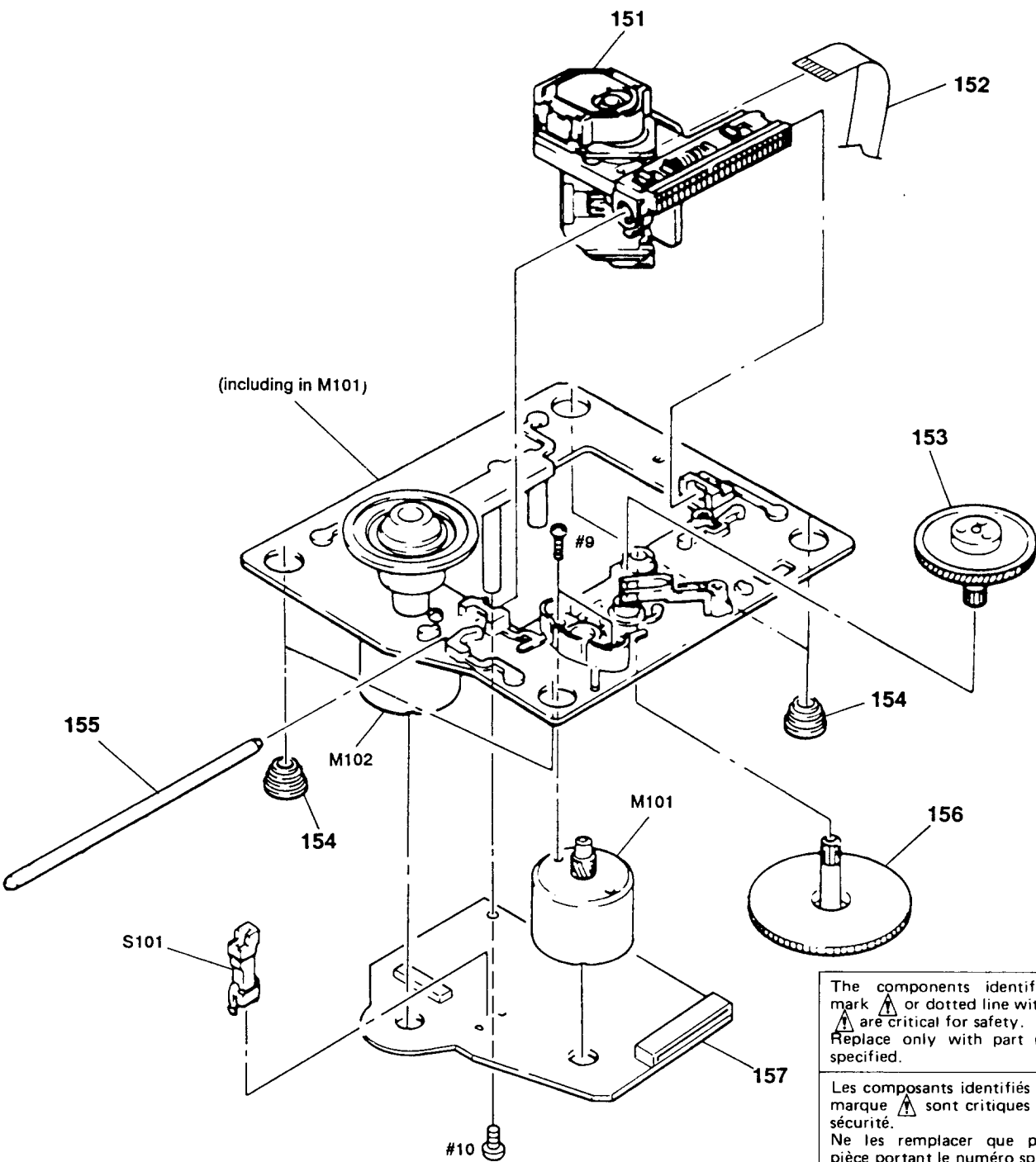
# 6-3. CHASSIS ASSEMBLY



Ne les remplacer que par une pièce portant le numéro spécifié.






**6-4. OPTICAL PICK-UP BLOCK ASSEMBLY  
(BU-5BD3)**



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

Les composants identifiés par une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.