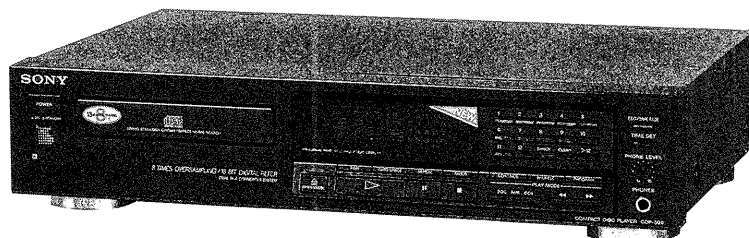


# CDP-590

## SERVICE MANUAL

US Model  
AEP Model  
UK Model  
E Model  
Australian Model



### SPECIFICATIONS

#### Compact disc player

Frequency response	2Hz – 20 kHz $\pm$ 0.5 dB
Signal to noise ratio	More than 100 dB
Dynamic range	More than 92 dB
Harmonic distortion	Less than 0.008%
Channel separation	More than 95 dB

#### Outputs

LINE OUT (phono jacks)	Output level 2 V (at 50 kilohms) Load impedance over 10 kilohms
PHONES (stereo phone jack)	Output level max. 10 mW Load impedance 32 ohms

#### General

Power requirements	120 V AC, 60Hz
Power consumption	11W
Dimensions (approx., including projections)	430×100×280 mm (w/h/d) (17×4×11 <sup>1</sup> / <sub>8</sub> inches)
Weight (approx.)	3.5 kg (7 lbs 12 oz)

#### Supplied accessories



Audio cord	1 (2 phono plugs – 2 phono plugs)
Remote commander	1
R6 (size AA) batteries	2

#### Remote commander


Remote control system	Infrared control
Power requirements	3 V DC with two R6 (size AA) batteries
Dimensions	Approx. 43×20×175 mm (w/h/d) (1 <sup>3</sup> / <sub>4</sub> × <sup>13</sup> / <sub>16</sub> ×7 inches)
Weight	Approx. 105 g (4 oz) Including batteries

Design and specifications subject to change without notice.

#### 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.

COMPACT DISC PLAYER  
**SONY**<sup>®</sup>

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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 microampers). 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 2 V AC range are suitable. (See Fig. A)

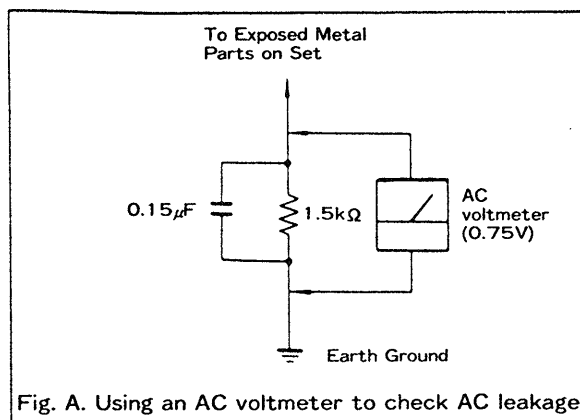


Fig. A. Using an AC voltmeter to check AC leakage.

SERVICING NOTE

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.

CAUTION

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

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.

## 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: max. 44.6  $\mu$ W\*
- \* This output is the value measured at a distance of about 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).

---

## BESKYTTELSE AF ØJNE MOD LASERSTRÅLING UNDER SERVICE

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

Følg igrøvrigt 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.

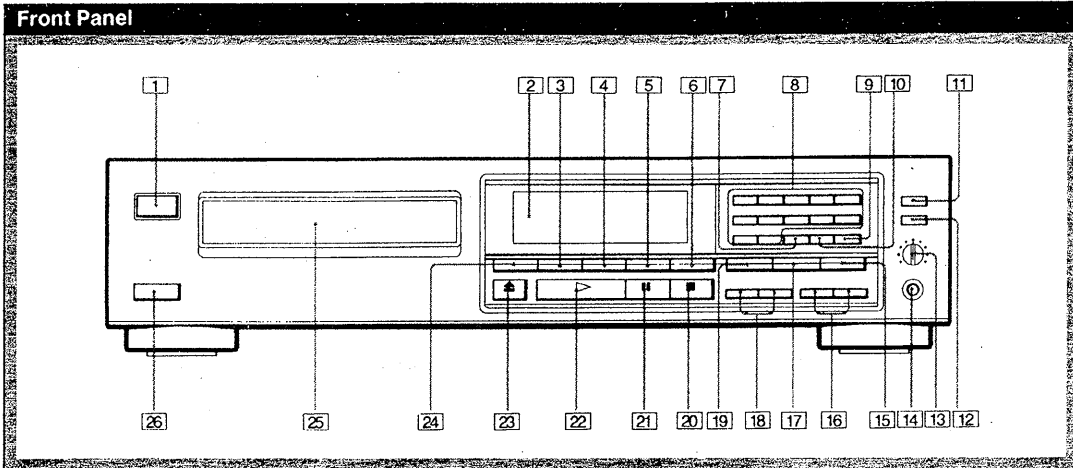
#### 1. Laser-diooe data

- 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.

# SECTION 1 GENERAL

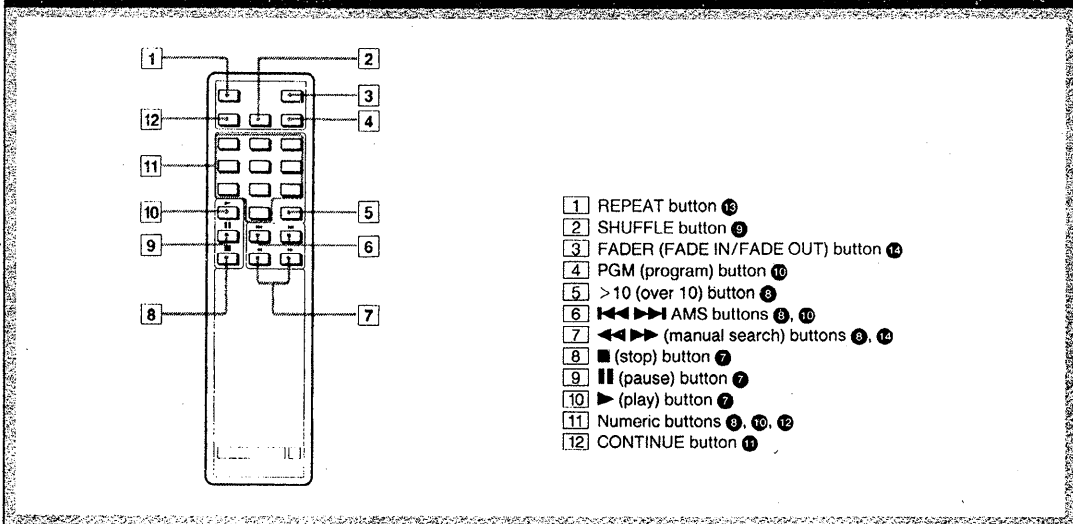
## Location of Controls



Refer to the pages indicated in ● for details.

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1 POWER switch ●</li> <li>2 Display window</li> <li>3 TIME button ●</li> <li>4 AUTO SPACE button ●</li> <li>5 REPEAT button ●</li> <li>6 FADER (FADE IN/FADE OUT) button ●</li> <li>7 CHECK (program check) button ●</li> <li>8 Numeric buttons ●, ●, ●</li> <li>9 &gt;12 (over 12) button ●</li> <li>10 CLEAR (program clear) button ●</li> <li>11 EDIT/TIME FADE button ●, ●</li> <li>12 TIME SET button ●, ●</li> <li>13 PHONE LEVEL control</li> <li>14 PHONES jack</li> </ul> | <ul style="list-style-type: none"> <li>15 PROGRAM button ●</li> <li>16 ◀▶ (manual search) buttons ●, ●</li> <li>17 SHUFFLE button ●</li> <li>18 ◀▶▶▶ (AMS*/RMS**) buttons ●, ●</li> <li>19 CONTINUE button ●</li> <li>20 ■ (stop) button ●</li> <li>21    (pause) button ●</li> <li>22 ▶ (play) button ●</li> <li>23 ▲ (open/close) button ●</li> <li>24 PEAK SEARCH button ● (except for AEP model)</li> <li>25 Disc tray ●</li> <li>26 Remote sensor ●</li> </ul> <p>* AMS is the abbreviation of Automatic Music Sensor.<br/>** RMS is the abbreviation of Random Music Sensor.</p> |
|---|--|

## Remote Commander



## SECTION 2

### IC FUNCTION DESCRIPTION

#### IC101 (CXA1372Q) PIN DESIGNATION

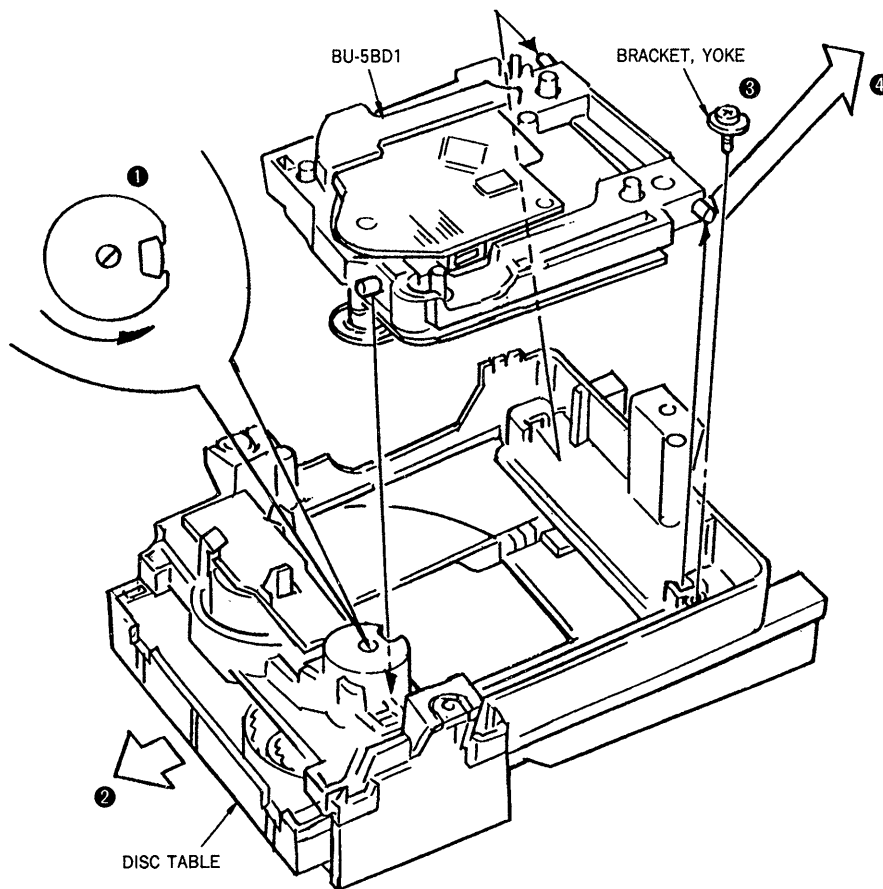
Pin No.	Pin Name	I/O	Pin Description
1	VC		GND when two ( $\pm$ ) dual power supplies are in use, or the center voltage (2.5 V) when a single power supply is in use.
2	FGD	I	Time constants for gain switching in normal mode/down mode and for focus gain are connected between the FGD and FS3 pins.
3	FS3	I	
4	FLB	I	The capacitor for low frequency boost in the focus servo loop is connected.
5	FEO	O	Focus drive output
6	FE-	I	Inverted input to focus amplifier
7	SRCH	I	Time constants to generate the focus search waveform are connected.
8	TGU	I	Time constants for gain switching in normal mode/up mode and for tracking gain are connected between TGU pin and TG2 pin.
9	TG2	I	
10	AVCC		Analog power supply (5 V when $\pm$ dual power supplies are in use, 5 V when a single power supply is in use.)
11	TAO	O	Tracking drive output
12	TA-	I	Inverted input to tracking amplifier
13	SL+	I	Non-inverted input to sled amplifier
14	SLO	O	Sled drive output
15	SL-	I	Non-inverted input to sled amplifier
16	ESET	I	The 610-k $\Omega$ phase compensator resistor is connected to this pin.
17	ISET	I	The current setting resistor is connected to this pin.
18	SSTOP	I	The limit switch is connected to this pin.
19	AVEE		Analog power supply (-5V when $\pm$ dual power supplies are in use, or GND when a single power supply is in use.)
20	DIRC	I	Direct control pin.
21	LOCK	I	Sled run-away prevention circuit operates when this signal is "L".
22	CLK	I	Serial data transfer clock input that is supplied from CPU (or DSP).
23	XLT	I	Latch input from CPU (or DSP).
24	DATA	I	Serial data input from CPU (or DSP).
25	XRST	I	System reset. "L" to reset.
26	C.OUT	O	Output to tracking counter.
27	SENS	O	SENS output
28	DGND		Digital ground (GND). (GND when $\pm$ dual power supplies are in use. GND when a single power supply is in use.)
29	MIRR	O	Mirror output.
30	DFCT	O	Defect output. "H" when defective.
31	ASY	I	Auto-assymetry control input.
32	EFM	O	EFM comparator output.
33	FOK	O	Focus OK.
34	CC2	I	Defect-bottom-hold input (input by capacitive coupling).
35	CC1	O	Defect-bottom-hold output.
36	DVCC		Digital power supply (+5 V when $\pm$ dual power supplies in use. +5 V when a single power supply is in use.)
37	CB	I	The defect-bottom-hold capacitor is connected to this pin.
38	CP	I	The mirror hold capacitor is connected to this pin.
39	RF1	I	RF signal input (input by capacitive coupling).
40	RF0	I	RF signal input (input by DC coupling).
41	DVEE		Digital power supply (-5 V when $\pm$ dual power supplis are in use. GND when a single power supply is in use.)
42	TZC	I	Tracking zero cross comparator input.
43	TE	I	Tracking error input.
44	TDFCT	I	The defect prevention hold capacitor is connected to this pin.
45	ATSC	I	Anti-shock input.
46	FZC	I	Focus zero-cross comparator input.
47	FE	I	Focus error input.
48	DFDCT	I	The defect prevention hold capacitor is connected to this pin.

## SECTION 3 DISSASSEMBLY OF BASE UNIT

**Note:**

Follow the disassembly procedure in the numerical order given.

- ① Turn the cam to the direction of arrow (Counter clock wise) by minus screw driver.
- ② Take off the disc table.
- ③ Remove the bracket yoke.
- ④ Remove the MD (BU-5BD1) to the direction of arrow.



# SECTION 4 ADJUSTMENTS

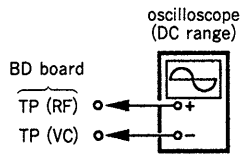
## ELECTRICAL ADJUSTMENTS

1. Perform adjustments in the order given.
2. Use YEDS-18 (Part No. 3-702-101-01) disc unless otherwise indicated.
3. Use the oscilloscope with more than 10MΩ impedance.

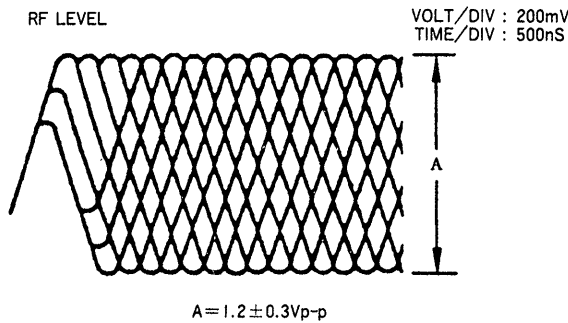
### RF LEVEL check

This adjustment should be made after replacing the Optical Pick-up Block.

Procedure:



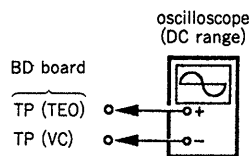
1. Connect oscilloscope to the test points TP (RF) and TP (VC).
2. Turn POWER switch on.
3. Put the disc (YEDS-18) in and press ▷ button.
4. Confirm that an optimum waveform eye pattern. Optimum eye pattern means that shape “◇” can be clearly distinguished at the center of the waveform.



### E-F Balance Check

This adjustment should be made after replacing the Optical Pick-up Block.

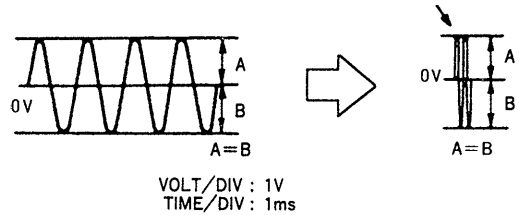
Procedure:



1. Connect the oscilloscope to the test points TP (TEO) and TP (VC).
2. Connect test point TP (ADJ) to ground and TP (TES) to TP (VC) with lead wire.
3. Turn POWER switch on.

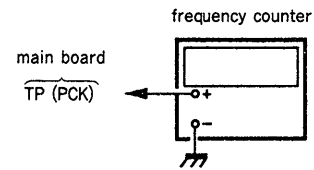
4. Put the disc (YEDS-18) in and press ▷ button.
5. Confirm that the traverse waveform is symmetrical above and below.
6. After adjustment, remove the TP(ADJ), in ground.

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



### RF PLL Free-run Frequency Check

Procedure:



1. Connect the frequency counter to the test points TP (PCK) and TP (GND).
2. Turn POWER switch on.
3. Put the disc (YEDS-18) in and press ▷ button.
4. Confirm that the reading on the frequency counter is locked at 4.3218 MHz.

### Focus/Tracking Gain Adjustment

A frequency response analyzer is necessary in order to perform this adjustment exactly. However, this gain has a margine, so even if it is slightly off, there is no problem. Therefore, this adjustment is not recommended generally to be performed.

Focus/tracking gains determine the pick-up follow-up (vertical and horizontal) relative to mechanical noise and mechanical shock when the 2-axis device operate.

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

- When gain is raised, the noise when the 2-axis device operates increases.
- When gain is lowered, it is more susceptible to mechanical shock and skipping occurs more easily.
- When gain adjustment is off, the symptoms below appear.

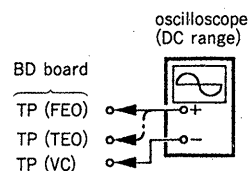
Symptoms	Gain	Focus	Tracking
● The time until music starts becomes longer for STOP →▷PLAY or automatic selection (◀▶▶▶) buttons pressed. (Normally takes about 2 seconds.)		low	low or high
● Music does not start and disc continues to rotate for STOP →▷PLAY or automatic selection (◀▶▶▶) buttons pressed.)		—	low
● Sound is interrupted during PLAY. Or time counter display stops progressing.		—	low
● More noise during 2-axis device operation.		high	high

The following is a simple adjustment method.

### Simple Adjustment

**Note:** Since exact adjustment cannot be performed, remember the positions of the controls before performing the adjustment. If the positions after the simple adjustment are only a little different, return the controls to the original position.

Procedure:



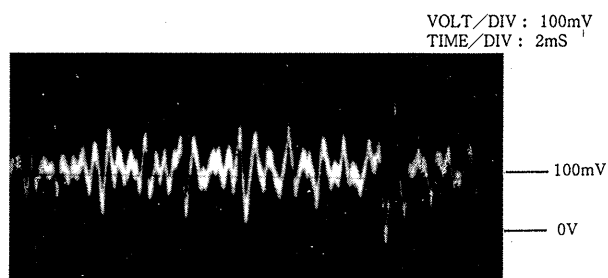
1. Keep the set flat.

If the set is not horizontal, this adjustment cannot be performed due to the gravity against the 2 axis device.

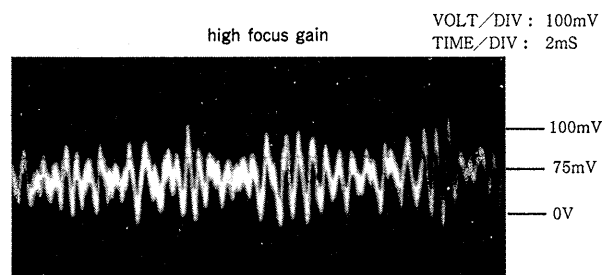
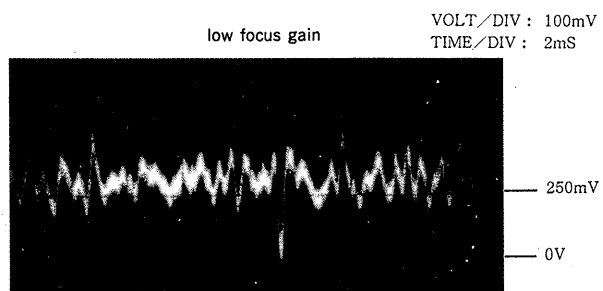
2. Insert the disc (YEDS-18) and press ▷ PLAY button.

3. Connect the oscilloscope to TP (FEO) and TP (VC).

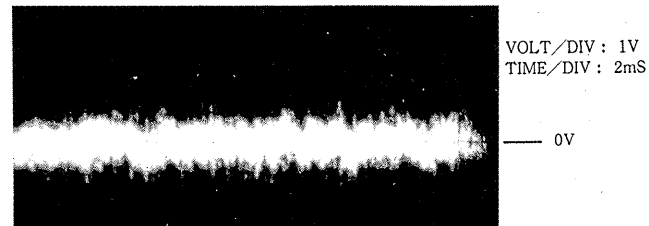
4. Adjustment RV102 so that the waveform is as shown in the picture below. (focus gain adjustment)



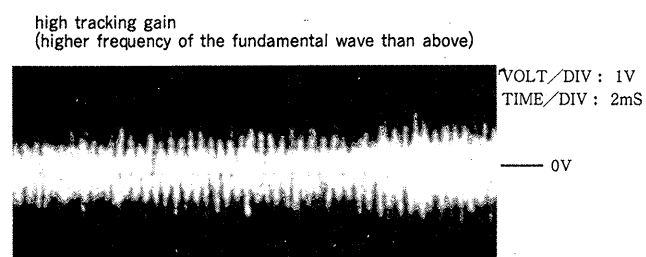
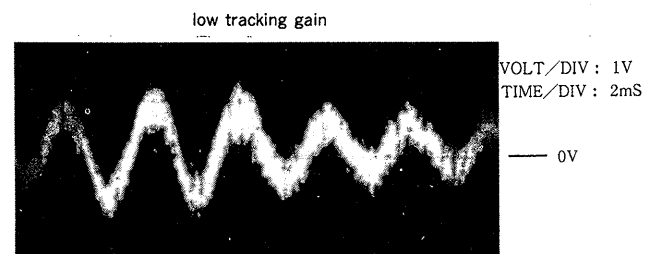
● Incorrect Examples (DC level is quite different from the adjusted waveform) (below)



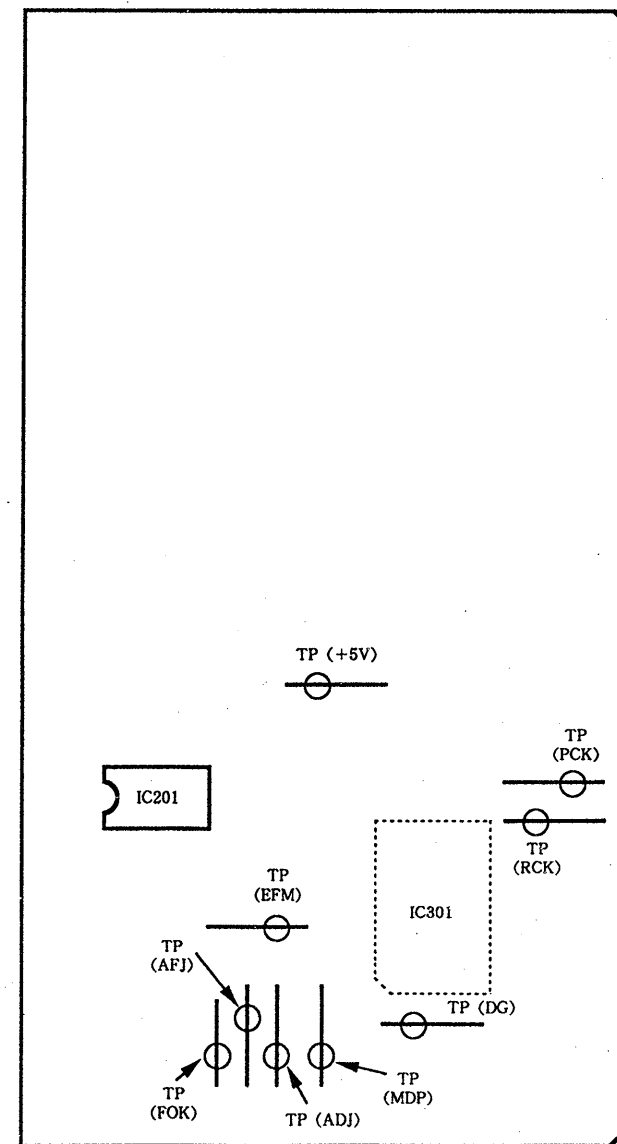
5. Connect the oscilloscope to BD BOARD, TP (TEO).
6. Adjust RV101 so that the waveform is as shown in the picture below. (tracking gain adjustment)



● Incorrect Examples (fundamental wave appears)



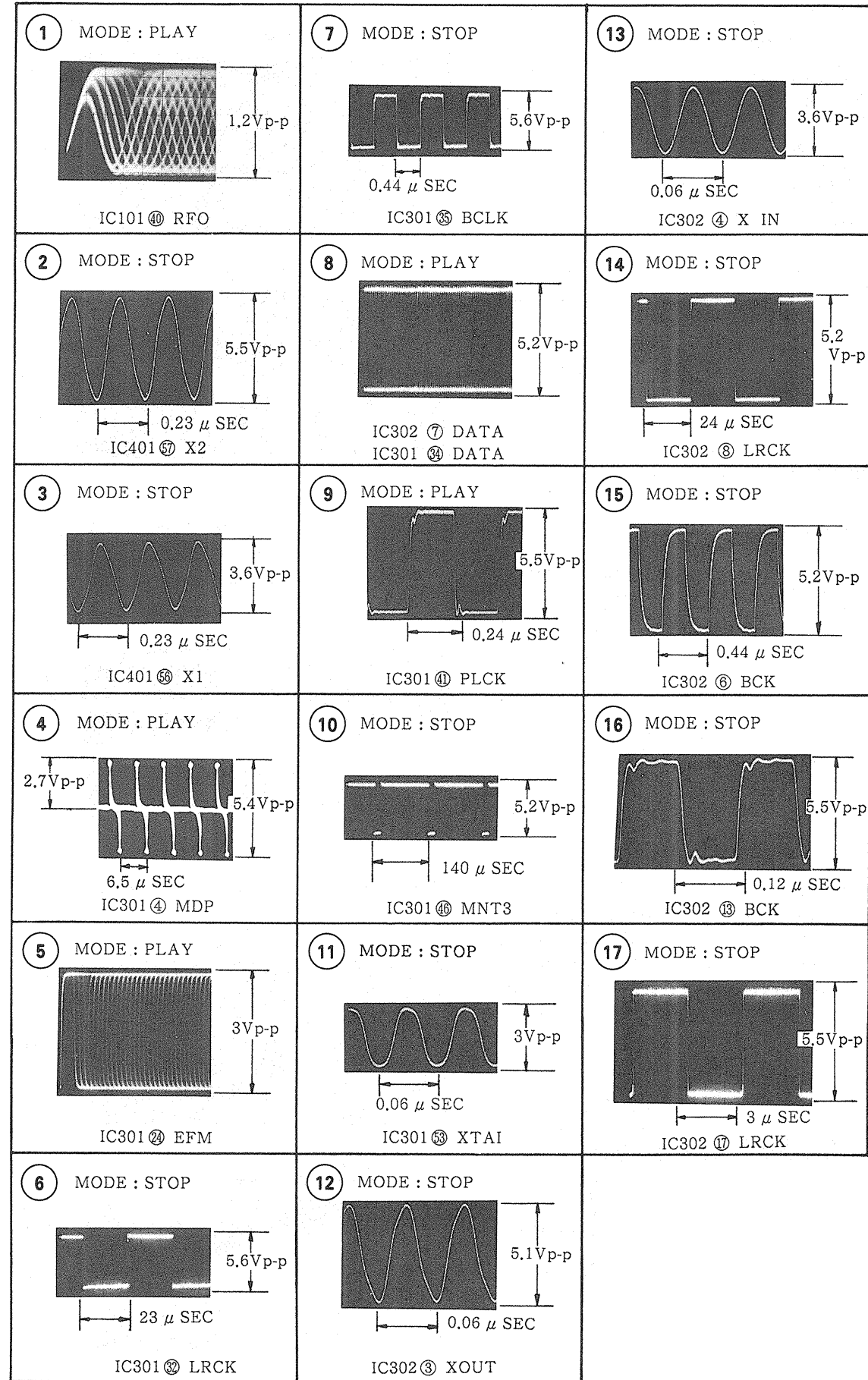
● Adjustment Location :  
MAIN BOARD (Component side)



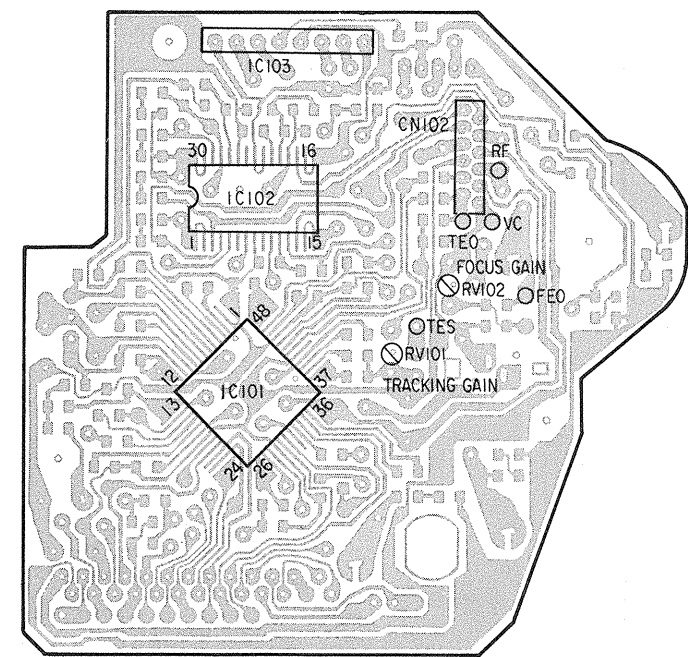


**SECTION 5  
DIAGRAMS**

**5-1. WAVEFORMS**

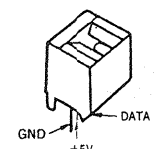


**BD BOARD (Component side)**

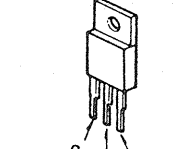


**● Semiconductor Lead Layouts**

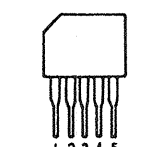
**GP1U52XB**



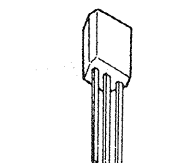
**2SB1094-L**



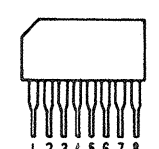
**M5293L**



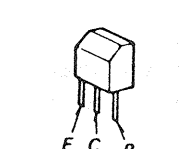
**2SC2458-YGR**



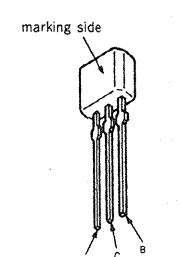
**M54641L**



**2SD774-34**



**2SA1175-HFE**



**11ES2**

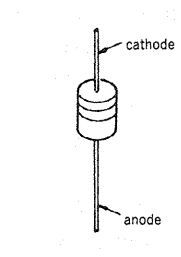
**1SS202-1**

**HZS9B2L**

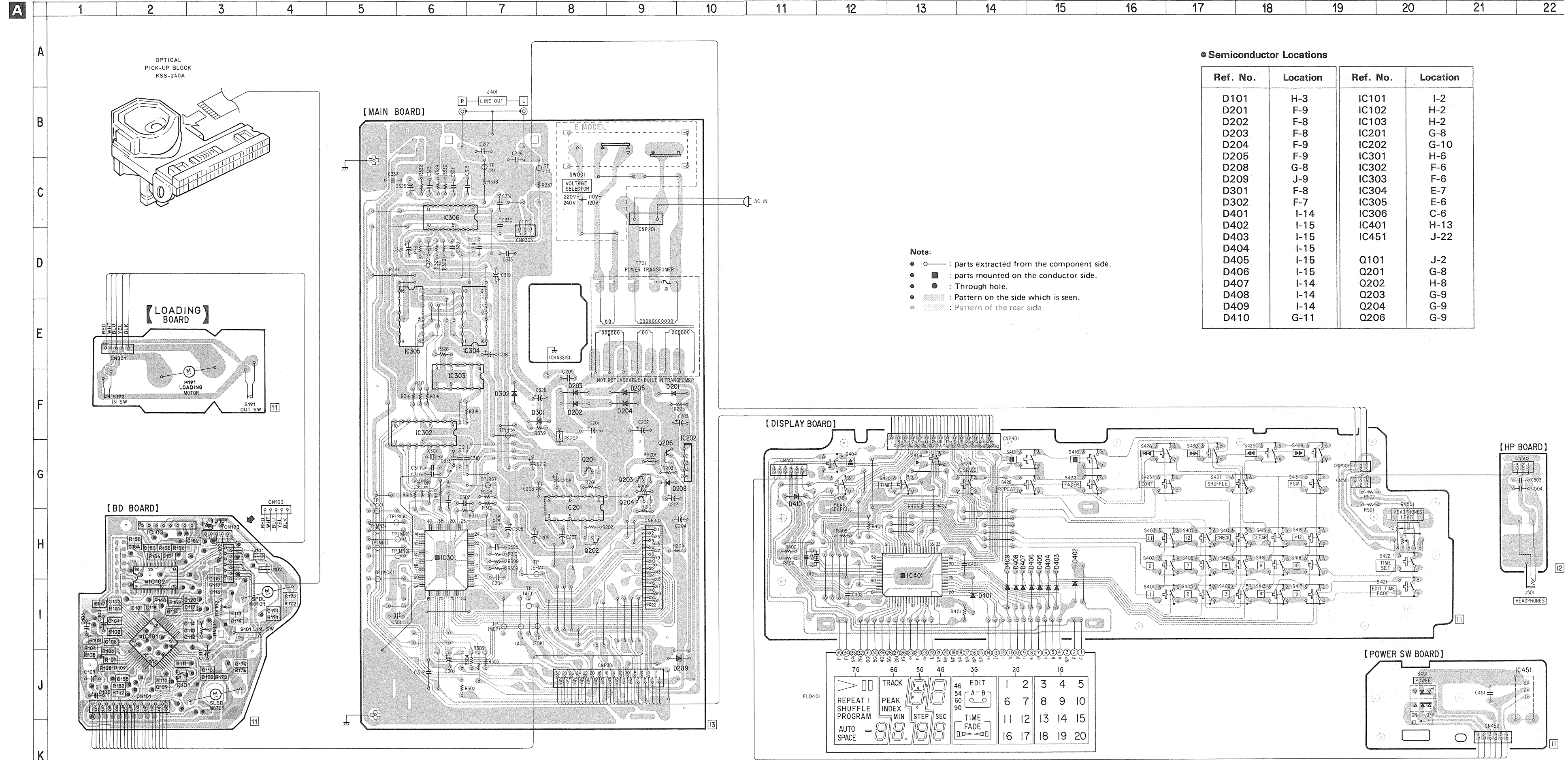
**RD6.2ES-B2**

**RD6.3ES-L3**

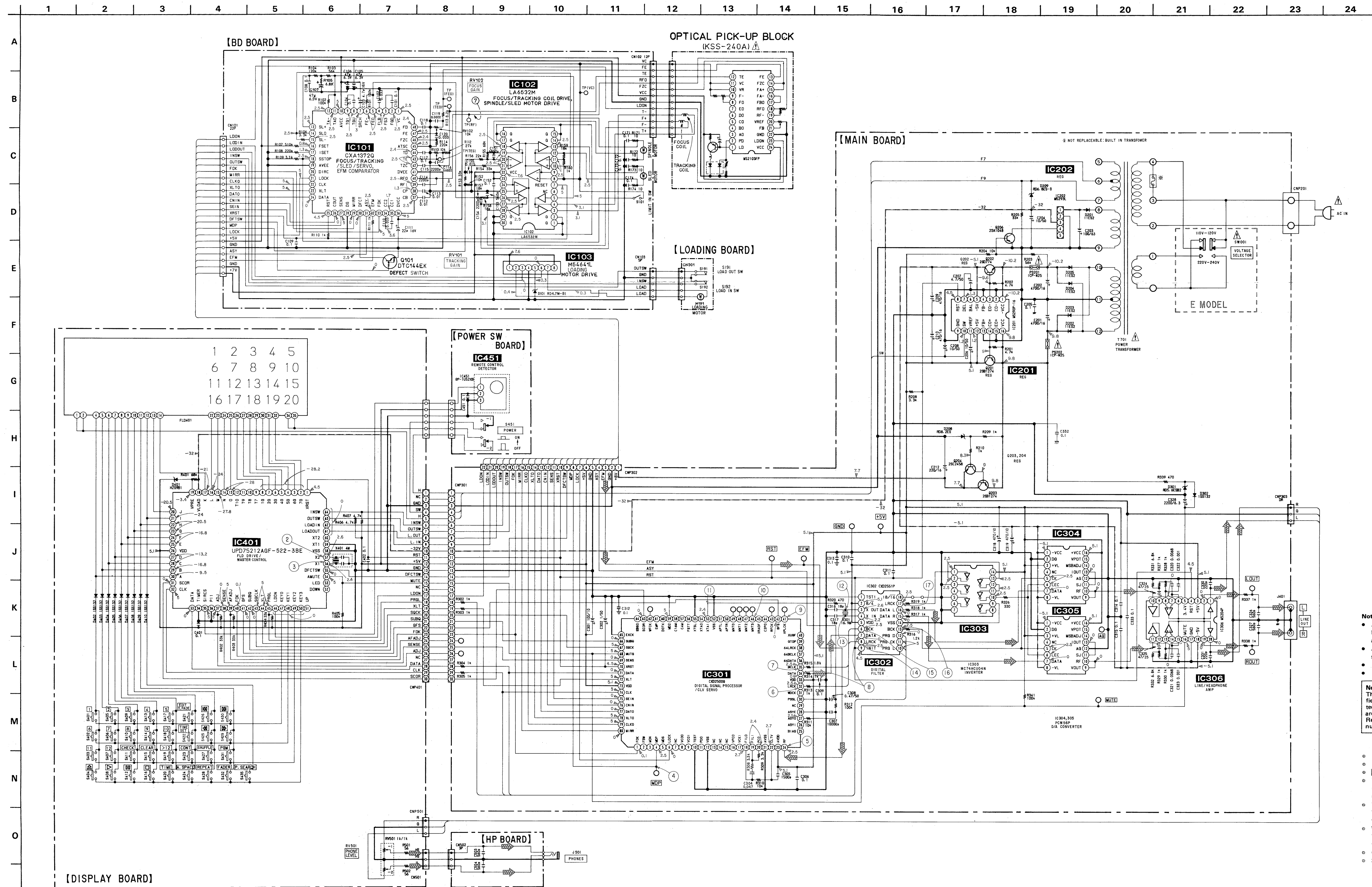
**RD8.2ES-B2**



**5-2. PRINTED WIRING BOARDS**







**Note:**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF} = \mu\text{F} \times 10^{-6}$  or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $\frac{1}{4}\text{W}$  or less unless otherwise specified.
- % : indicates tolerance.
- $\Delta$  : internal component.

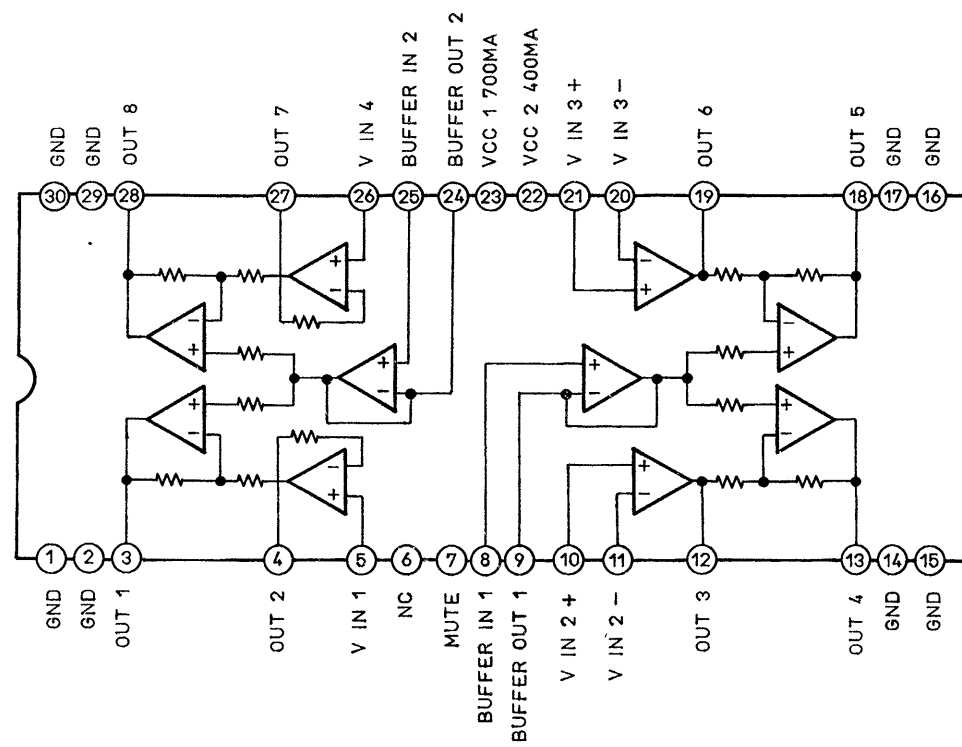
**Note:** The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

**Note:** Les composants identifiés par une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

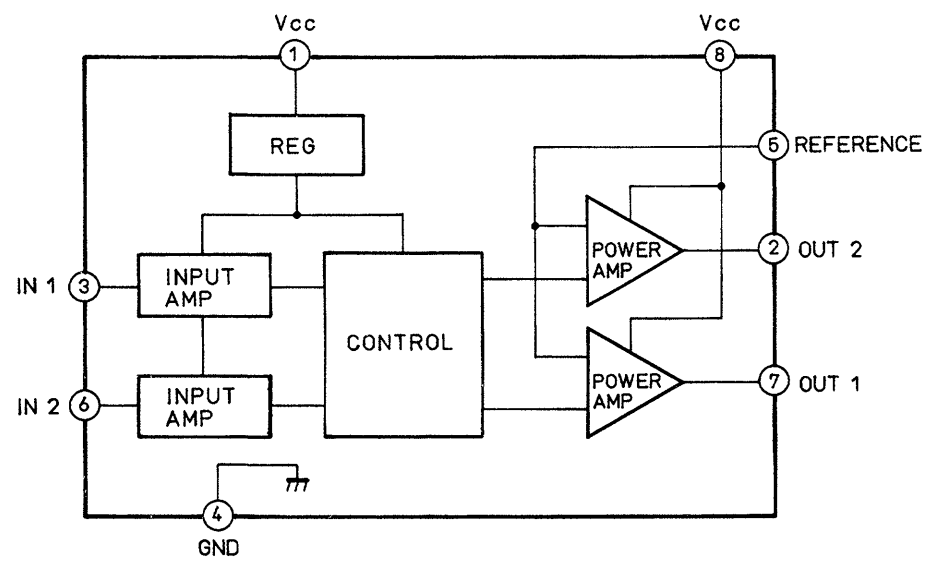
- : B+ Line
- ◻ : B- Line
- ◻ : adjustment for repair.
- : Voltage and waveforms are dc with respect to ground under no-signal (detuned) conditions. no mark: STOP
- : Voltages are taken with a VOM (Input impedance 10M $\Omega$ ). Voltage variations may be noted due to normal production tolerances.
-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

## 5-4. IC BLOCK DIAGRAMS

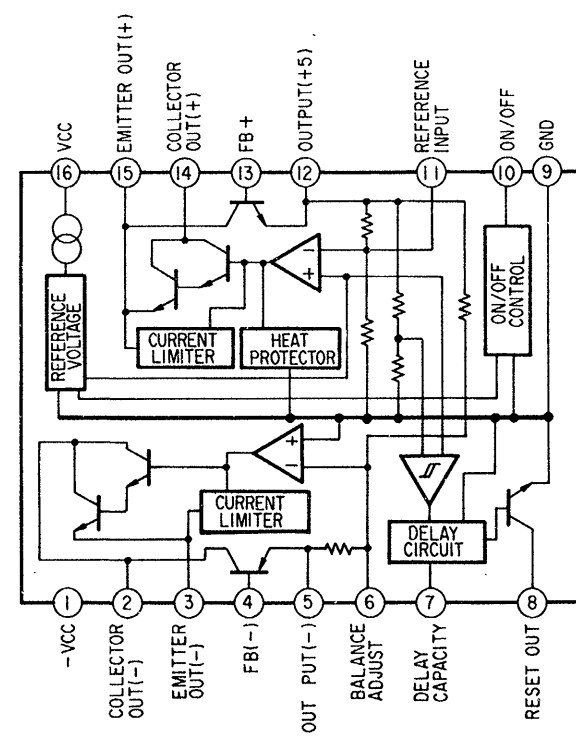
**IC102**  
**LA6532M**



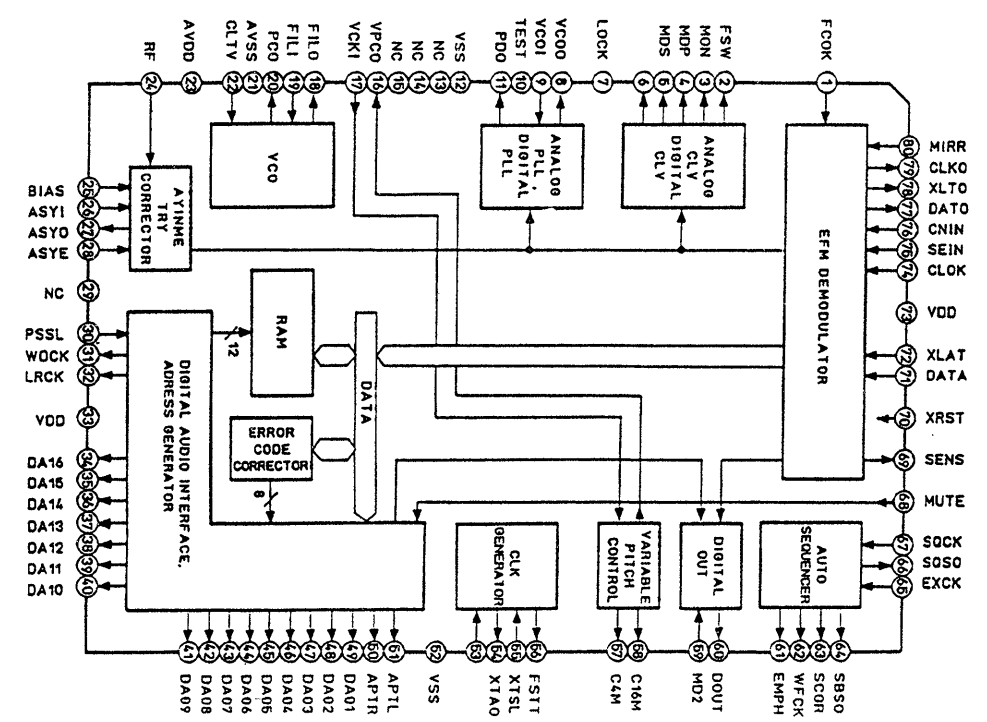
**IC103**  
**M54641L**



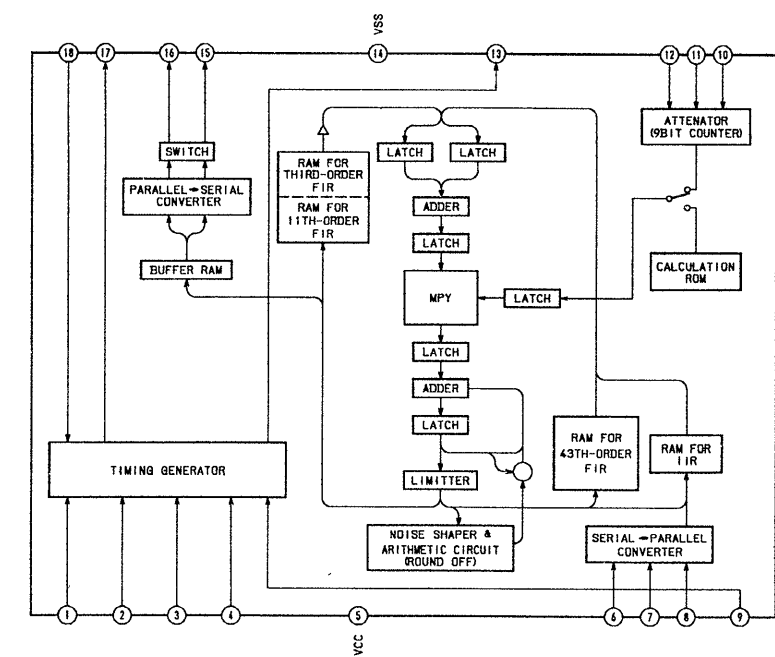
**IC201**  
**M5290P-16**



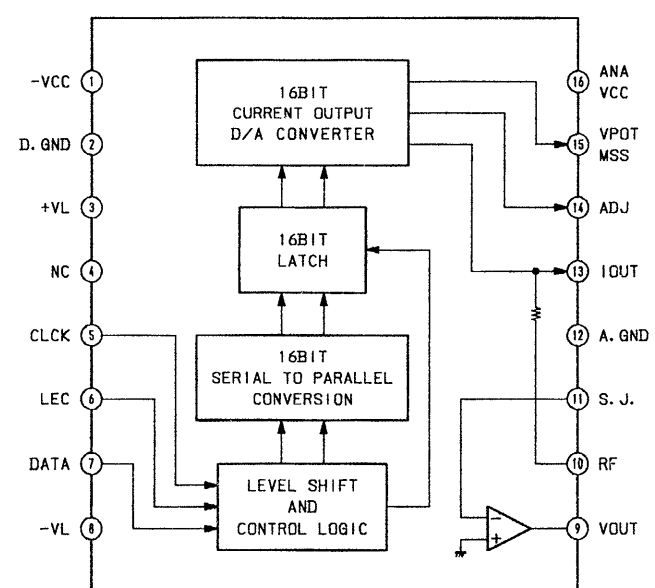
**IC301**  
**CXD2500Q**



**IC302**  
**CXD2551P**



**IC304, 305**  
**PCM56**



## SECTION 6 EXPLODED VIEWS

**NOTE:**

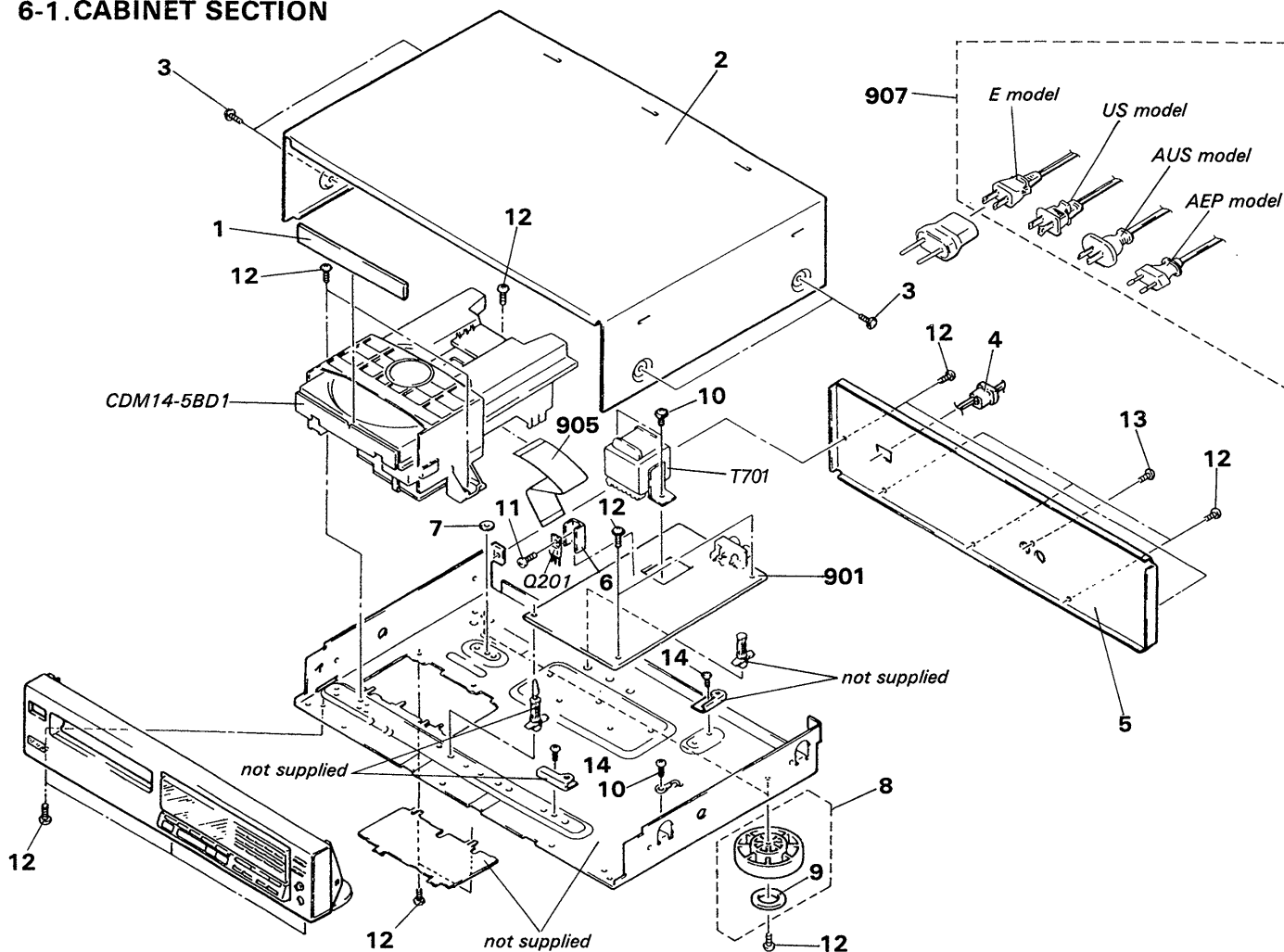
- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts  
Example:  
(RED) ... KNOB, BALANCE (WHITE)  
↑ Cabinet's Color                      ↑ Parts' Color

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

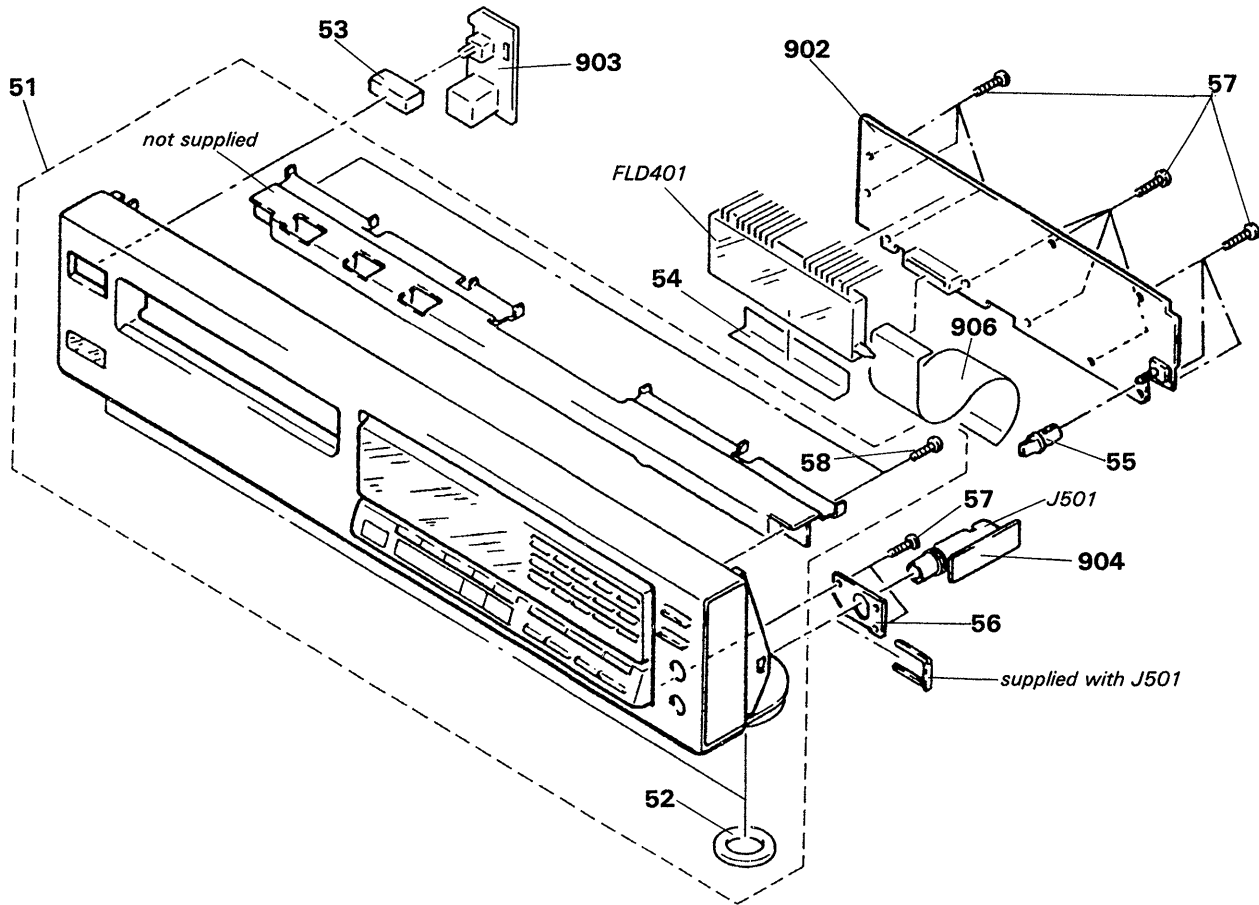
Les composants identifiés par une marque sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

### 6-1. CABINET SECTION



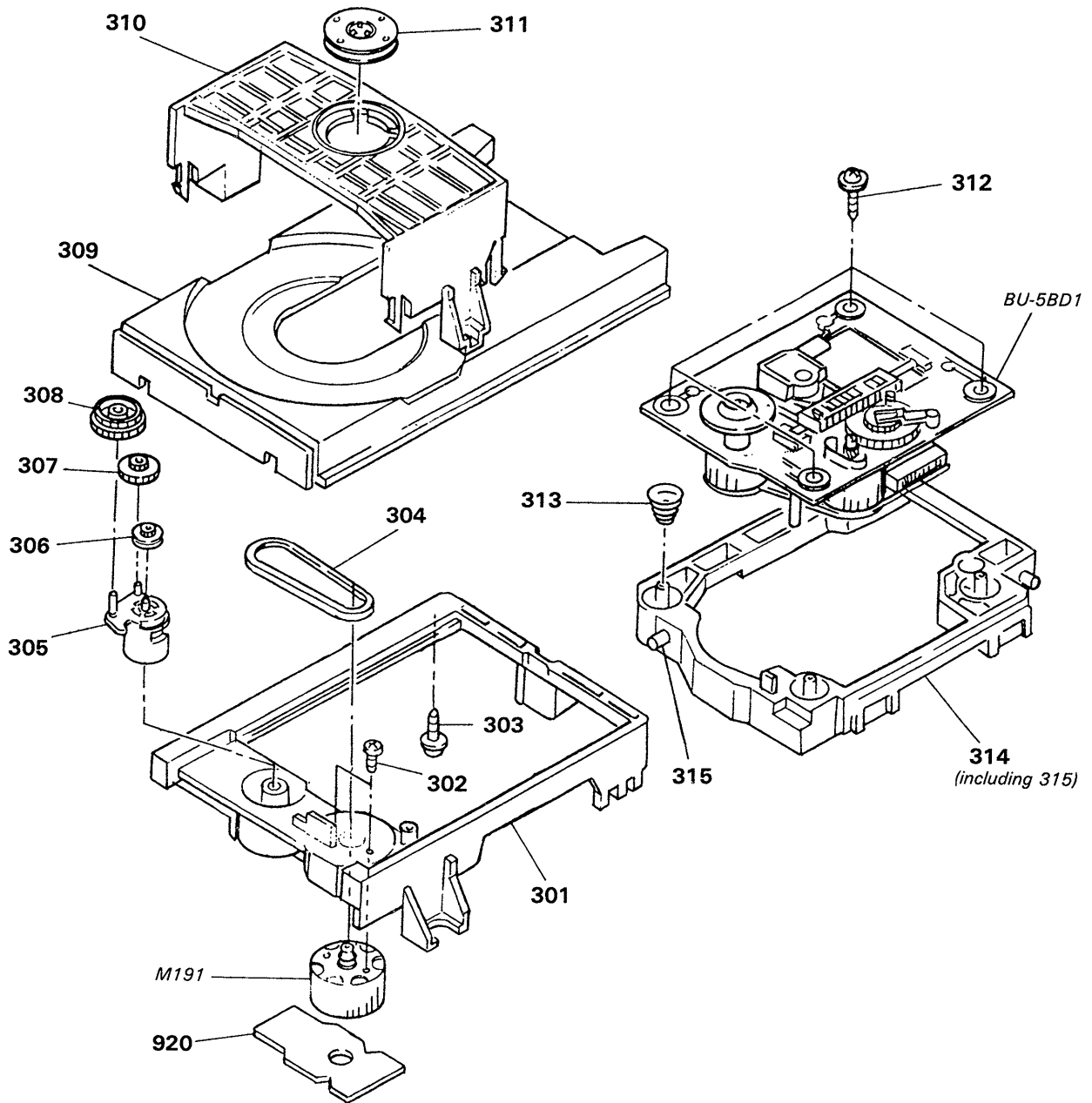
No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
1	4-933-208-03	(E,AEP,AUS)...PANEL, LOADING		9	4-923-836-11	CUSHION	
	4-933-208-51	(US).....PANEL, LOADING		10	2-383-566-00	SCREW	
2	4-929-035-31	CASE		11	7-682-547-09	SCREW +B 3X6	
3	3-704-366-31	SCREW (CASE) (M3X6)		12	7-682-548-09	SCREW +BVTT 3X8 (S)	
4	*3-703-244-00	(US,AEP,AUS)...BUSHING (2104), CORD		13	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
	*3-703-571-11	(E).....BUSHING (S)(4516), CORD		14	7-682-547-04	SCREW +BVTT 3X6 (S)	
5	*4-933-201-11	(US)...PANEL, BACK		901	*A-4617-315-A	(E).....MOUNTED PCB, MAIN	
	*4-933-201-31	(AEP)...PANEL, BACK			*A-4617-494-A	(US,AEP,AUS)...MOUNTED PCB, MAIN	
	*4-933-201-41	(E)....PANEL, BACK		905	1-575-002-11	WIRE, FLAT TYPE (22 CORE)	
	*4-933-201-91	(AUS)...PANEL, BACK		907	△.1-575-104-11	(E)....CORD, POWER	
6	4-902-345-01	HEAT SINK			△.1-575-105-11	(US)...CORD, POWER	
7	*4-933-220-01	SPACER (MD)			△.1-575-453-11	(AEP)...CORD, POWER	
8	X-3304-938-2	(E,AEP,AUS)...FOOT ASSY			△.1-575-677-11	(AUS)...CORD, POWER	
	X-4885-950-1	(US).....FOOT ASSY		908	△.1-526-565-00	(E)...AC PLUG ADAPTOR	
				Q201	8-729-111-67	TRANSISTOR 2SB1094-L	
				T701	△.1-449-921-11	(US).....TRANSFORMER, POWER	
				T701	△.1-449-922-11	(AEP,AUS)...TRANSFORMER, POWER	
				T701	△.1-449-923-11	(E).....TRANSFORMER, POWER	

## 6-2.FRONT PANEL SECTION



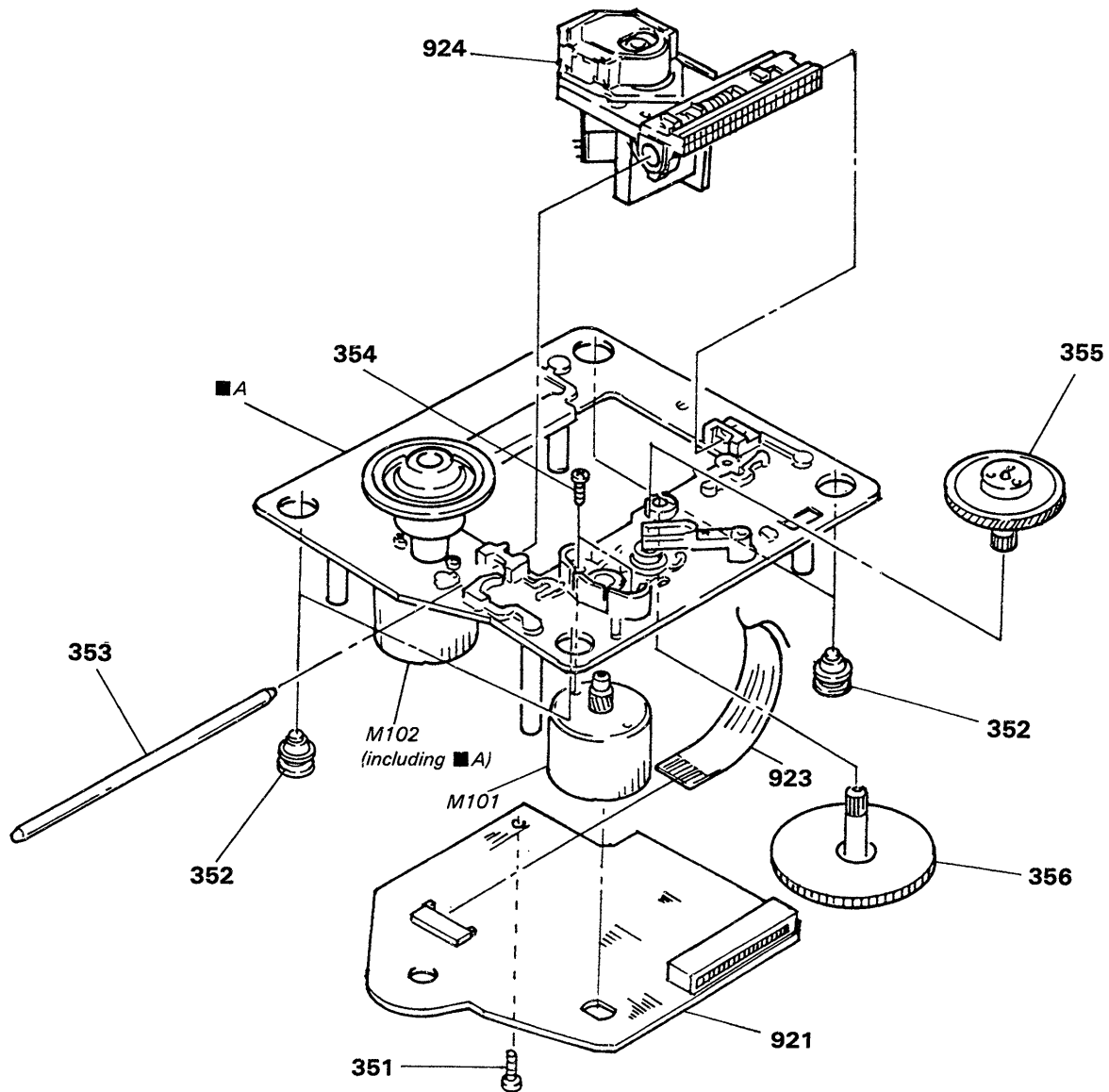
No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
51	X-4604-397-1	(AEP).....PANEL ASSY, FRONT	52,58	57	4-928-635-01	SCREW, +BV (2.6X8) TAPPING	
	X-4604-404-1	(E,AUS)....PANEL ASSY, FRONT	52,58	58	7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S	
	X-4933-214-1	(US).....PANEL ASSY, FRONT	52,58	902	*1-632-243-11	PC BOARD, DISPLAY	
52	4-923-836-11	CUSHION		903	*1-632-245-11	PC BOARD, POWER SW	
53	4-922-921-01	BUTTON (POWER)		904	*1-632-244-11	PC BOARD, HP	
54	*4-927-353-01	SHEET (FL)		906	1-575-120-11	WIRE, FLAT TYPE (30 CORE)	
55	4-933-116-11	KNOB (C, TYPE), LOV		FLD401	1-519-556-11	INDICATOR TUBE, FLUORESCENT	
56	*4-933-204-01	BRACKET (H.P)		J501	1-568-519-21	JACK, LARGE TYPE	

6-3.MD SECTION-1 (CDM14-5BD1)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
301	4-933-111-01	CHASSIS (MD)		310	4-933-110-01	HOLDER (MG)	
302	7-621-775-10	SCREW +B 2.6X4		311	A-4675-347-A	MG ASSY	
303	*4-917-583-21	BRACKET, YOKE		312	4-933-134-01	SCREW (+PTPWH M2.6X6)	
304	4-927-649-01	BELT		313	4-917-541-01	SPRING (B)	
305	4-933-109-01	CAM		314	4-933-129-01	HOLDER (BU)	
306	4-927-651-01	PULLEY (S)		315	4-933-108-01	SHAFT (CAM)	
307	4-927-628-01	GEAR (C)		M191	A-4604-363-A	MOTOR (L) ASSY	
308	4-933-107-01	GEAR (PL)		920	*1-632-202-11	PC BOARD, LOADING	
309	4-933-112-01	TABLE, DISK					

6-4.MD SECTION-2 (BU-5BD1)



<p><b>Note:</b> The components identified by mark <math>\triangle</math> or dotted line with mark <math>\triangle</math> are critical for safety. Replace only with part number specified.</p>	<p><b>Note:</b> Les composants identifiés par une marque <math>\triangle</math> sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.</p>
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No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
351	7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S		921	*A-4617-161-A	MOUNTED PCB, BD	
352	4-933-126-01	INSULATOR (A)		923	1-575-001-11	WIRE, FLAT TYPE (12 CORE)	
353	4-917-565-01	SHAFT, SLED		924	$\triangle$ 8-848-144-11	DEVICE, OPTICAL KSS-240A	
354	7-621-255-15	SCREW +P 2X3		M101	X-4917-504-1	MOTOR ASSY (SLED)	
355	4-917-567-01	GEAR (M)		M102	X-4917-523-3	MOTOR ASSY (SPINDLE)	
356	4-917-564-01	GEAR (P), FLATNESS					

## SECTION 7 ELECTRICAL PARTS LIST

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

**CAPACITORS:**MF:  $\mu$ F, PF:  $\mu$ PF.**RESISTORS**

- All resistors are in ohms.
- F: nonflammable

**COILS**

- MMH: mH, UH:  $\mu$ H

**SEMICONDUCTORS**In each case, U:  $\mu$ , for example:UA...:  $\mu$ A..., UPA...:  $\mu$ PA...,UPC...:  $\mu$ PC, UPD...:  $\mu$ PD...

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

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

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description			
901	*A-4617-315-A	(E).....MOUNTED PCB, MAIN	C173	1-163-038-00	CERAMIC CHIP	0.1MF		25V
	*A-4617-494-A	(US,AEP,AUS)...MOUNTED PCB, MAIN	C174	1-163-038-00	CERAMIC CHIP	0.1MF		25V
902	*1-632-243-11	PC BOARD, DISPLAY	C201	1-126-842-11	ELECT	4700MF	20%	16V
903	*1-632-245-11	PC BOARD, POWER SW	C202	1-126-842-11	ELECT	4700MF	20%	16V
904	*1-632-244-11	PC BOARD, HP	C203	1-126-880-11	ELECT	100MF	20%	63V
			C204	1-126-059-11	ELECT	10MF	20%	50V
905	1-575-002-11	WIRE, FLAT TYPE (22 CORE)	C205	1-162-851-11	CERAMIC	0.1MF	20%	16V
906	1-575-120-11	WIRE, FLAT TYPE (30 CORE)	C206	1-126-059-11	ELECT	10MF	20%	50V
907	$\Delta$ .1-575-104-11	(E)....CORD, POWER	C207	1-124-045-00	ELECT	4.7MF	20%	50V
	$\Delta$ .1-575-105-11	(US)....CORD, POWER	C208	1-126-059-11	ELECT	10MF	20%	50V
	$\Delta$ .1-575-453-11	(AEP)...CORD, POWER	C209	1-126-012-11	ELECT	470MF	20%	16V
	$\Delta$ .1-575-677-11	(AUS)...CORD, POWER	C210	1-126-012-11	ELECT	470MF	20%	16V
908	.1-526-565-00	(E)...AC PLUG ADAPTOR	C212	1-126-024-11	ELECT	220MF	20%	16V
920	*1-632-202-11	PC BOARD, LOADING	C301	1-124-994-11	ELECT	100MF	20%	10V
921	*A-4617-161-A	MOUNTED PCB, BD	C302	1-126-301-11	ELECT	1MF	20%	50V
923	1-575-001-11	WIRE, FLAT TYPE (12 CORE)	C304	1-136-161-00	FILM	0.047MF	5%	50V
924	$\Delta$ .8-848-144-11	DEVICE, OPTICAL KSS-240A	C305	1-161-374-11	CERAMIC	0.0015MF	30%	16V
C101	1-163-038-00	CERAMIC CHIP	C306	1-164-159-11	CERAMIC	0.1MF		50V
C102	1-163-989-11	CERAMIC CHIP	C307	1-162-306-11	CERAMIC	0.01MF	20%	16V
C103	1-126-094-11	ELECT	C308	1-126-300-11	ELECT	0.47MF	20%	50V
			C309	1-164-159-11	CERAMIC	0.1MF		50V
C104	1-163-038-00	CERAMIC CHIP	C310	1-164-159-11	CERAMIC	0.1MF		50V
C105	1-126-154-11	ELECT	C311	1-164-159-11	CERAMIC	0.1MF		50V
C106	1-126-154-11	ELECT	C312	1-164-159-11	CERAMIC	0.1MF		50V
			C313	1-164-159-11	CERAMIC	0.1MF		50V
C107	1-126-154-11	ELECT	C314	1-164-159-11	CERAMIC	0.1MF		50V
C108	1-163-038-00	CERAMIC CHIP	C315	1-164-159-11	CERAMIC	0.1MF		50V
C109	1-163-038-00	CERAMIC CHIP	C316	1-162-205-31	CERAMIC	18PF	5%	50V
			C317	1-162-205-31	CERAMIC	18PF	5%	50V
C110	1-163-989-11	CERAMIC CHIP	C318	1-124-997-11	ELECT	470MF	20%	10V
C111	1-131-367-00	TANTALUM	C319	1-124-997-11	ELECT	470MF	20%	10V
C112	1-164-232-11	CERAMIC CHIP	C320	1-130-481-00	MYLAR	0.0068MF	5%	50V
			C321	1-130-481-00	MYLAR	0.0068MF	5%	50V
C113	1-164-232-11	CERAMIC CHIP	C322	1-130-471-00	MYLAR	0.001MF	5%	50V
C114	1-164-161-11	CERAMIC CHIP	C323	1-130-471-00	MYLAR	0.001MF	5%	50V
C115	1-164-161-11	CERAMIC CHIP	C324	1-123-332-00	ELECT	47MF	20%	25V
			C325	1-123-332-00	ELECT	47MF	20%	25V
C116	1-164-161-11	CERAMIC CHIP	C326	1-162-291-31	CERAMIC	560PF	10%	50V
C117	1-163-038-00	CERAMIC CHIP	C327	1-162-291-31	CERAMIC	560PF	10%	50V
C118	1-163-038-00	CERAMIC CHIP	C328	1-124-893-11	ELECT	2200MF	20%	6.3V
			C330	1-162-286-31	CERAMIC	220PF	10%	50V
C119	1-164-161-11	CERAMIC CHIP	C331	1-162-286-31	CERAMIC	220PF	10%	50V
C120	1-163-989-11	CERAMIC CHIP	C332	1-164-159-11	CERAMIC	0.1MF		50V
C151	1-163-019-00	CERAMIC CHIP	C333	1-164-159-11	CERAMIC	0.1MF		50V
			C401	1-164-159-11	CERAMIC	0.1MF		50V
C152	1-163-038-00	CERAMIC CHIP	C402	1-164-159-11	CERAMIC	0.1MF		50V
C153	1-163-006-11	CERAMIC CHIP						
C154	1-164-161-11	CERAMIC CHIP						
C155	1-163-023-00	CERAMIC CHIP						
C171	1-163-038-00	CERAMIC CHIP						
C172	1-163-038-00	CERAMIC CHIP						



Ref.No.	Part No.	Description			
C451	1-164-159-11	CERAMIC	0.1MF		50V
C503	1-162-291-31	CERAMIC	560PF	10%	50V
C504	1-162-291-31	CERAMIC	560PF	10%	50V
CN101	1-568-796-11	SOCKET, CONNECTOR 22P			
CN102	1-568-795-11	SOCKET, CONNECTOR 12P			
CN103	*1-564-721-11	PIN, CONNECTOR (SMALL TYPE) 5P			
CN301	*1-564-707-11	PIN, CONNECTOR (SMALL TYPE) 5P			
CN502	*1-564-337-00	PIN, CONNECTOR 3P			
CNP201	*1-564-321-00	PIN, CONNECTOR 2P			
CNP301	*1-568-933-11	SOCKET, CONNECTOR 30P			
CNP302	*1-568-822-11	SOCKET, CONNECTOR 22P			
CNP303	*1-564-337-61	PIN, CONNECTOR 3P			
CNP401	*1-568-933-11	SOCKET, CONNECTOR 30P			
D101	8-719-105-72	DIODE RD4.7M-B1			
D201	8-719-200-82	DIODE 11ES2			
D202	8-719-200-82	DIODE 11ES2			
D203	8-719-200-82	DIODE 11ES2			
D204	8-719-200-82	DIODE 11ES2			
D205	8-719-200-82	DIODE 11ES2			
D208	8-719-110-08	DIODE RD8.2ES-B2			
D209	8-719-120-90	DIODE RD6.8ES-L3			
D301	8-719-123-54	DIODE RD6.2ES-B2			
D302	8-719-107-94	DIODE 1SS202-1			
D401	8-719-933-57	DIODE HZS9B2L			
D402	8-719-107-94	DIODE 1SS202-1			
D403	8-719-107-94	DIODE 1SS202-1			
D404	8-719-107-94	DIODE 1SS202-1			
D405	8-719-107-94	DIODE 1SS202-1			
D406	8-719-107-94	DIODE 1SS202-1			
D407	8-719-107-94	DIODE 1SS202-1			
D408	8-719-107-94	DIODE 1SS202-1			
D409	8-719-107-94	DIODE 1SS202-1			
D410	8-719-107-94	DIODE 1SS202-1			
FLD401	1-519-556-11	INDICATOR TUBE, FLUORESCENT			
IC101	8-752-037-33	IC CXA1372Q			
IC102	8-759-821-94	IC LA6532M			
IC103	8-759-633-65	IC M54641L			
IC201	8-759-630-21	IC M5290P-16			
IC202	8-759-633-42	IC M5293L			
IC301	8-752-333-31	IC CXD2500Q			
IC302	8-752-334-06	IC CXD2551P			
IC303	8-759-917-18	IC SN74HCU04N			
IC304	8-759-998-22	IC PCM56P			
IC305	8-759-998-22	IC PCM56P			
IC306	8-759-631-39	IC M5204P			
IC401	8-759-150-29	IC UPD75212AGF-522-3BE			
IC451	8-749-920-83	IC GPIU52XB			
J101	1-216-295-00	METAL GLAZE	0	5%	1/10W
J102	1-216-295-00	METAL GLAZE	0	5%	1/10W
J401	1-566-921-11	JACK, PIN 2P (LINE OUT L/R)			
J501	1-568-519-21	JACK, LARGE TYPE (PHONES)			
M101	X-4917-504-1	MOTOR ASSY (SLED)			
M102	X-4917-523-3	MOTOR ASSY (SPINDLE)			
M191	A-4604-363-A	MOTOR (L) ASSY			
PS201	1-532-685-00	LINK, IC			
PS202	1-532-637-00	LINK, IC			
Q101	8-729-901-01	TRANSISTOR DTC144EK			
Q201	8-729-111-67	TRANSISTOR 2SB1094-L			
Q202	8-729-140-96	TRANSISTOR 2SD774-34			

Ref.No.	Part No.	Description			
Q203	8-729-111-67	TRANSISTOR 2SB1094-L			
Q204	8-729-230-45	TRANSISTOR 2SC2458-YGR			
Q206	8-729-119-76	TRANSISTOR 2SA1175-HFE			
R101	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R102	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R103	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R104	1-216-099-00	METAL GLAZE	120K	5%	1/10W
R105	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R106	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R107	1-216-114-00	METAL GLAZE	510K	5%	1/10W
R108	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R109	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R110	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R111	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R112	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R113	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R114	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R152	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R153	1-216-085-00	METAL GLAZE	33K	5%	1/10W
R154	1-216-085-00	METAL GLAZE	33K	5%	1/10W
R155	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R156	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R157	1-216-079-00	METAL GLAZE	18K	5%	1/10W
R158	1-216-079-00	METAL GLAZE	18K	5%	1/10W
R159	1-216-079-00	METAL GLAZE	18K	5%	1/10W
R160	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R171	1-216-001-00	METAL GLAZE	10	5%	1/10W
R172	1-216-001-00	METAL GLAZE	10	5%	1/10W
R173	1-216-001-00	METAL GLAZE	10	5%	1/10W
R174	1-216-001-00	METAL GLAZE	10	5%	1/10W
R201	1-249-425-11	CARBON	4.7K	5%	1/4W
R202	1-249-425-11	CARBON	4.7K	5%	1/4W
R203	1-249-438-11	CARBON	56K	5%	1/4W
R204	1-249-429-11	CARBON	10K	5%	1/4W
R205	1-249-435-11	CARBON	33K	5%	1/4W
R208	1-249-423-11	CARBON	3.3K	5%	1/4W
R209	1-249-417-11	CARBON	1K	5%	1/4W
R210	1-249-417-11	CARBON	1K	5%	1/4W
R302	1-249-417-11	CARBON	1K	5%	1/4W
R303	1-249-417-11	CARBON	1K	5%	1/4W
R304	1-249-417-11	CARBON	1K	5%	1/4W
R305	1-249-417-11	CARBON	1K	5%	1/4W
R308	1-249-423-11	CARBON	3.3K	5%	1/4W
R309	1-249-423-11	CARBON	3.3K	5%	1/4W
R310	1-249-429-11	CARBON	10K	5%	1/4W
R311	1-249-429-11	CARBON	10K	5%	1/4W
R312	1-249-441-11	CARBON	100K	5%	1/4W
R313	1-249-417-11	CARBON	1K	5%	1/4W
R314	1-249-417-11	CARBON	1K	5%	1/4W
R315	1-249-420-11	CARBON	1.8K	5%	1/4W
R316	1-249-418-11	CARBON	1.2K	5%	1/4W
R317	1-249-417-11	CARBON	1K	5%	1/4W
R318	1-249-417-11	CARBON	1K	5%	1/4W
R319	1-249-417-11	CARBON	1K	5%	1/4W

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

**Note:**  
Les composants identifiés par une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description			
R320	1-249-413-11	CARBON	470	5%	1/4W
R326	1-249-411-11	CARBON	330	5%	1/4W
R327	1-249-417-11	CARBON	1K	5%	1/4W
R328	1-249-417-11	CARBON	1K	5%	1/4W
R329	1-249-417-11	CARBON	1K	5%	1/4W
R330	1-249-417-11	CARBON	1K	5%	1/4W
R331	1-249-427-11	CARBON	6.8K	5%	1/4W
R332	1-249-427-11	CARBON	6.8K	5%	1/4W
R337	1-249-417-11	CARBON	1K	5%	1/4W
R338	1-249-417-11	CARBON	1K	5%	1/4W
R339	1-249-413-11	CARBON	470	5%	1/4W
R341	1-249-441-11	CARBON	100K	5%	1/4W
R401	1-249-439-11	CARBON	68K	5%	1/4W
R402	1-249-435-11	CARBON	33K	5%	1/4W
R403	1-249-435-11	CARBON	33K	5%	1/4W
R404	1-249-435-11	CARBON	33K	5%	1/4W
R405	1-249-441-11	CARBON	100K	5%	1/4W
R406	1-249-425-11	CARBON	4.7K	5%	1/4W
R407	1-249-425-11	CARBON	4.7K	5%	1/4W
R501	1-249-402-11	CARBON	56	5%	1/4W
R502	1-249-402-11	CARBON	56	5%	1/4W
RV101	1-238-016-11	RES, ADJ, CARBON 10K			
RV102	1-238-016-11	RES, ADJ, CARBON 10K			
RV501	1-238-748-11	RES, VAR, CARBON 1K/1K (PHONE LEVEL)			
S101	1-572-085-11	SWITCH, LEAF (LIMIT)			
S191	1-572-086-11	SWITCH, LEAF (LOAD OUT)			
S192	1-572-086-11	SWITCH, LEAF (LOAD IN)			
S401	1-554-303-21	SWITCH, KEY BOARD (1)			
S402	1-554-303-21	SWITCH, KEY BOARD (6)			
S403	1-554-303-21	SWITCH, KEY BOARD (11)			
S404	1-554-303-21	SWITCH, KEY BOARD (▲)			
S405	1-554-303-21	SWITCH, KEY BOARD (2)			
S406	1-554-303-21	SWITCH, KEY BOARD (7)			
S407	1-554-303-21	SWITCH, KEY BOARD (12)			
S408	1-554-303-21	SWITCH, KEY BOARD (▶)			
S409	1-554-303-21	SWITCH, KEY BOARD (3)			
S410	1-554-303-21	SWITCH, KEY BOARD (8)			
S411	1-554-303-21	SWITCH, KEY BOARD (CHECK)			
S412	1-554-303-21	SWITCH, KEY BOARD (■)			
S413	1-554-303-21	SWITCH, KEY BOARD (4)			
S414	1-554-303-21	SWITCH, KEY BOARD (9)			
S415	1-554-303-21	SWITCH, KEY BOARD (CLEAR)			
S416	1-554-303-21	SWITCH, KEY BOARD (■)			
S417	1-554-303-21	SWITCH, KEY BOARD (5)			
S418	1-554-303-21	SWITCH, KEY BOARD (10)			

Ref.No.	Part No.	Description
S419	1-554-303-21	SWITCH, KEY BOARD (>12)
S420	1-554-303-21	SWITCH, KEY BOARD (TIME)
S421	1-554-303-21	SWITCH, KEY BOARD (EDIT/TIME FADE)
S422	1-554-303-21	SWITCH, KEY BOARD (TIME SET)
S423	1-554-303-21	SWITCH, KEY BOARD (CONTINUE)
S424	1-554-303-21	SWITCH, KEY BOARD (AUTO SPECE)
S425	1-554-303-21	SWITCH, KEY BOARD (◀◀)
S426	1-554-303-21	SWITCH, KEY BOARD (◀◀)
S427	1-554-303-21	SWITCH, KEY BOARD (SHUFFLE)
S428	1-554-303-21	SWITCH, KEY BOARD (REPEAT)
S429	1-554-303-21	SWITCH, KEY BOARD (▶▶)
S430	1-554-303-21	SWITCH, KEY BOARD (▶▶)
S431	1-554-303-21	SWITCH, KEY BOARD (PROGRAM)
S432	1-554-303-21	SWITCH, KEY BOARD (FADER)
S435	1-554-303-21	SWITCH, KEY BOARD (PEAK SEARCH)
S451	1-571-305-11	SWITCH, PUSH (1 KEY)(POWER)
SW001	△.1-571-722-11	(E)...SWITCH, VOLTAGE SELECTION
T701	△.1-449-921-11	(US).....TRANSFORMER, POWER
T701	△.1-449-922-11	(AEP,AUS)...TRANSFORMER, POWER
T701	△.1-449-923-11	(E).....TRANSFORMER, POWER
X301	1-567-926-11	VIBRATOR, CRYSTAL (16.9MHz)
X401	1-567-819-11	VIBRATOR, CERAMIC (4MHz)

## ACCESSORY &amp; PACKING MATERIAL

1-465-281-11	REMOTE COMMANDER
1-559-533-11	CORD, CONNECTION
3-750-792-11	(E,AUS)...MANUAL, INSTRUCTION
3-750-792-21	(US).....MANUAL, INSTRUCTION
3-750-792-41	(AEP).....MANUAL, INSTRUCTION
3-750-792-51	(AEP).....MANUAL, INSTRUCTION
*3-795-629-11	(AEP)...INSTRUCTION
4-384-285-01	COVER, BATTERY
*4-925-389-01	CUSHION
*4-933-231-11	INDIVIDUAL CARTON

**Note:**

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

**Note:**

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



# CDP-590

## SONY® SERVICE MANUAL

*AEP Model*  
*UK Model*

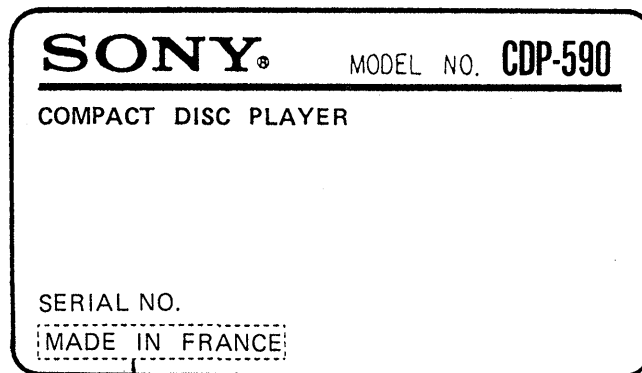
### SUPPLEMENT-1

File this supplement with the service manual.

- Addition of UK Model.
- This SUPPLEMENT-1 is for CDP-590(AEP and UK model) made in France.

Refer to the CDP-590 service manual for related information not contained in this SUPPLEMENT-1.

#### [MODEL IDENTIFICATION]



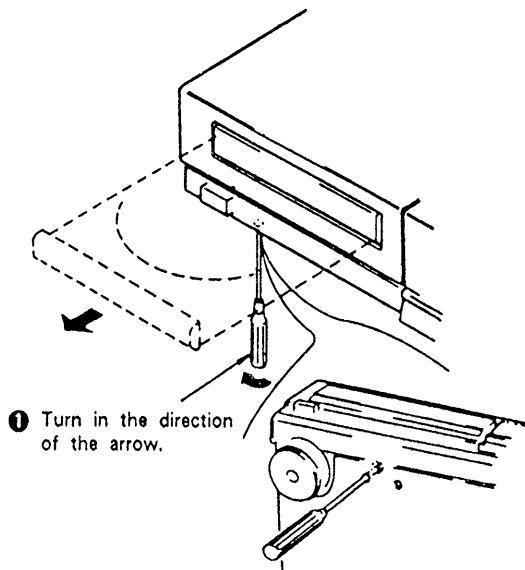
LABEL MODEL NUMBER

Identify the set with the indication of "MADE IN FRANCE" here.

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**HOW TO OPEN THE DISC TRAY WHEN POWER SWITCH TURNS OFF**

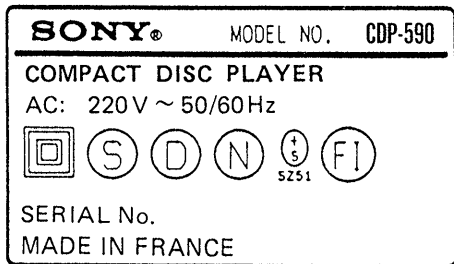


Caution : When you work, keep the set horizontal.

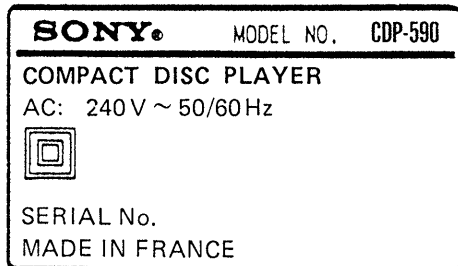
**MODEL IDENTIFICATIONS**

—Speciation Label—

AEP model:



UK model:



**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 more than 25cm away from the objective lens.

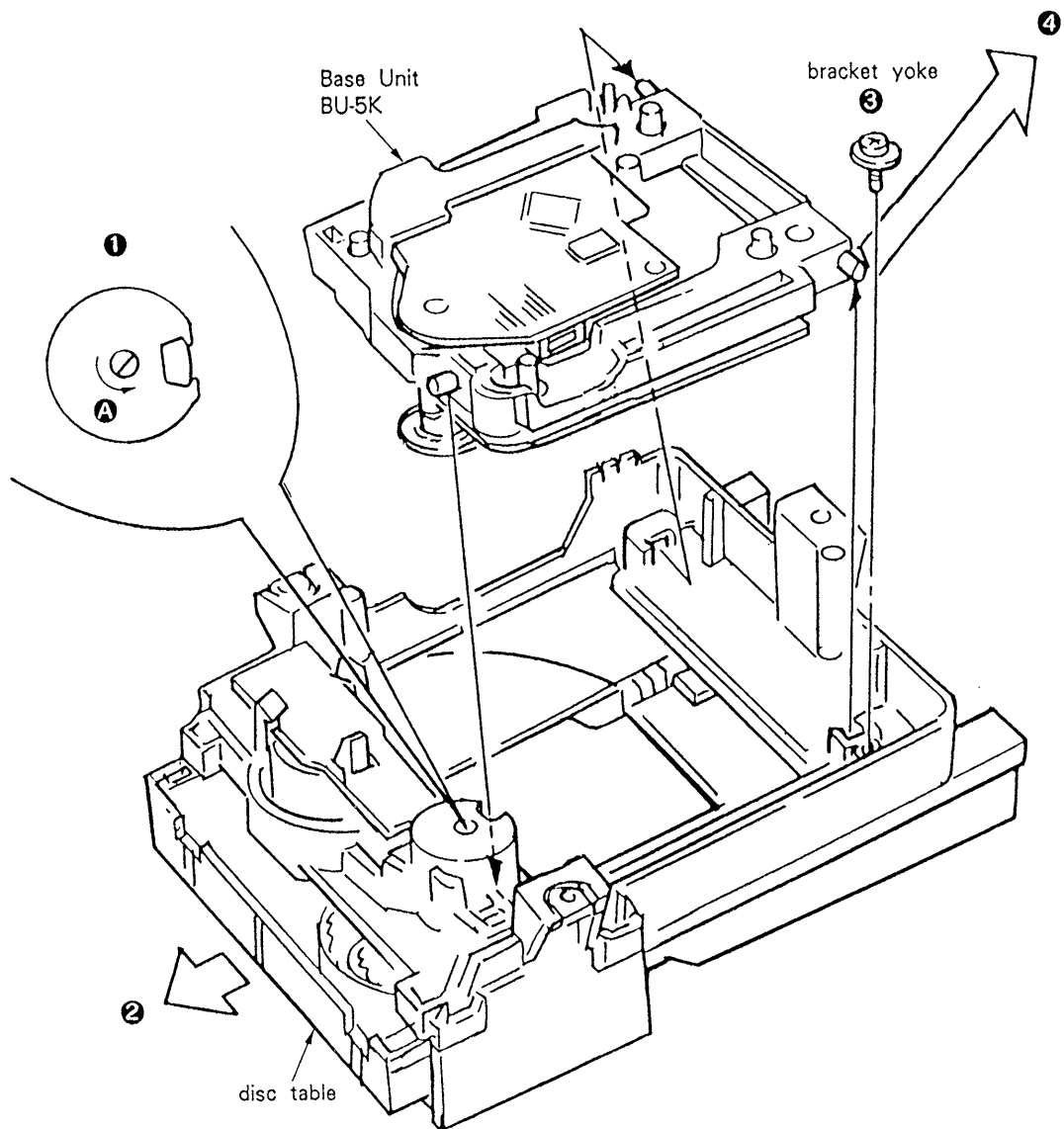
**SAFETY-RELATED COMPONENT WARNING!!**

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.

## SECTION 1 DISSASSEMBLY OF BASE UNIT

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

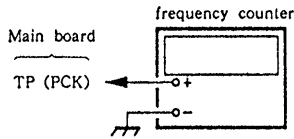
1. Remove CD mechanism from the set and turn over.
2. Turn the cam in the Arrow **A** direction by the  driver.
3. Take out disc table.
4. Remove bracket yoke.
5. Remove BU-5K in the Arrow **4** direction.



## SECTION 2 ELECTRICAL ADJUSTMENTS

1. Perform adjustments in the order given.
2. Use YEDS-18 (Part No : 3-702-101-1) disc unless otherwise indicated.
3. Use the oscilloscope with more than 10 MΩ impedance.

### RF PLL Frequency Adjustment/Lock Frequency Check Procedure :

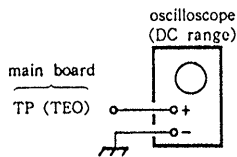


1. Connect test point TP (ASY) to ground with lead wire.
2. Turn POWER switch on.
3. Connect the frequency counter to test point TP (PCK).
4. Adjust RV201 so that the reading on frequency counter is 4.3218 MHz ± 30 KHz.  
.....(RF PLL frequency adjustment)
5. Remove lead wire connecting TP (ASY) to ground.
6. Set disc (YEDS-18) and press ▷ PLAY button.
7. Confirm that the reading on frequency counter is 4.3218 MHz.  
.....(Lock frequency check)
8. Turn POWER switch off.

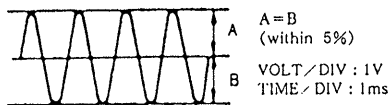
### E-F Balance Adjustment

This adjustment should be made when replacing TOP (T-type Optical Pick-up).

#### Procedure :



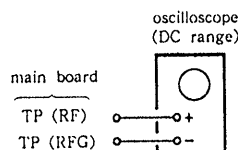
1. Connect test point TP (ADJ) to ground and TP (TES) to TP (VC) with lead wire.
2. Connect oscilloscope to test point TP (TEO).
3. Set disc (YEDS-18) and turn POWER switch on.
4. Adjust RV101 so that the traverse waveform is symmetrical above and below.
5. Turn POWER switch off.
6. After adjustment, remove the lead wire connected in step 1.



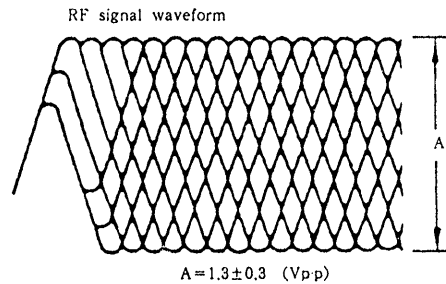
### Focus Bias Adjustment

This adjustment should be made when replacing TOP (T-type Optical Pick-up).

#### Procedure :



1. Connect oscilloscope to test point TP (RF) and test point TP (RFG).
2. Set disc (YEDS-18) and turn POWER switch on.
3. Adjust RV102 for an optimum waveform eye pattern or so that the peak is maximum. Optimum eye pattern means that shape "◇" can be clearly distinguished at the center of the waveform.
4. Turn POWER switch off.



### REFERENCE

#### Focus/Tracking Gain Adjustments

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

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

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

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

- When gain is raised, the noise when the 2-axis device operates increases.
- When gain is lowered, mechanical shock and skipping occurs more easily.
- When gain adjustment is off, the symptoms below appear.

Symptoms	Gain	Focus	Tracking
• The time until music starts becomes longer for ■STOP → ▷PLAY or automatic selection. (◀▶ buttons pressed.) (Normally takes about 1 seconds.)		low	low or high
• Music does not start and disc continues to rotate for ■STOP → ▷PLAY or automatic selection. (◀▶ buttons pressed.)		-	low
• Sound is interrupted during PLAY or time counter display stops progressing.		-	low
• More noise during 2-axis device operation.		high	high

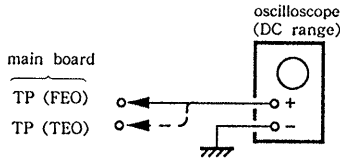
The following is a simple adjustment method.

**-Primary Adjustment-**

**Note :** Since exact adjustment cannot be performed, remember the positions of the controls before performing the adjustment.

If the position after the primary adjustment are only a little different, return the controls to the original position.

**Procedure :**



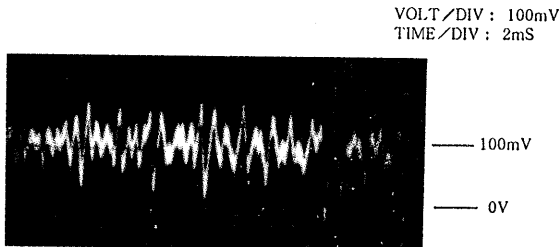
1. Keep the set horizontal.

(If the set is not horizontal, this adjustment cannot be performed due to the gravity against the 2-axis device.)

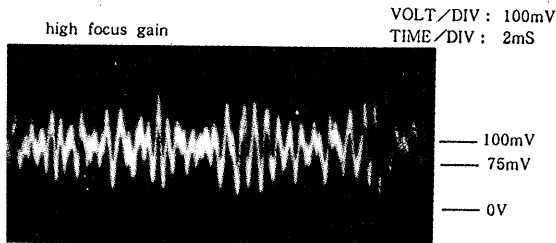
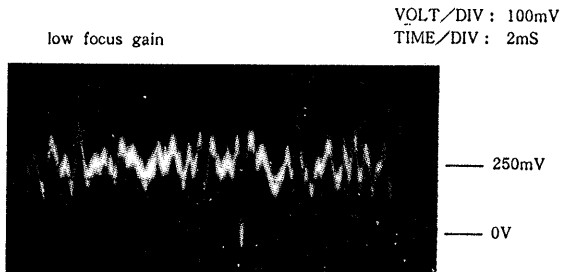
2. Set disc (YEDS-18) and turn POWER switch on.

3. Connect oscilloscope to main amp board TP (FEO).

4. Adjust RV103 so that the waveform is as shown in the figure below. (focus gain adjustment)



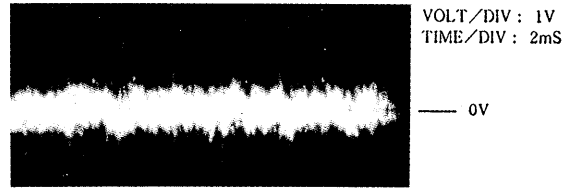
• Inconrent Examples (DC level changes more than on adjusted waveform)



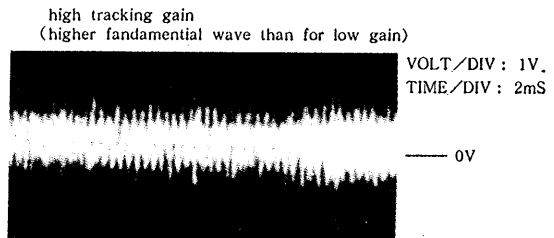
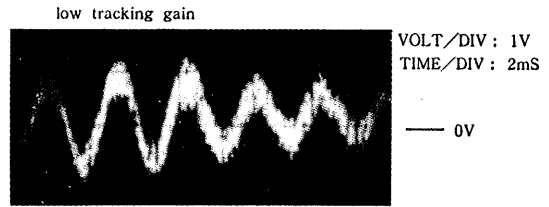
5. Connect oscilloscope to main board TP (TEO).

6. Adjust RV104 so that the waveform is as shown in the figure below. (tracking gain adjustment)

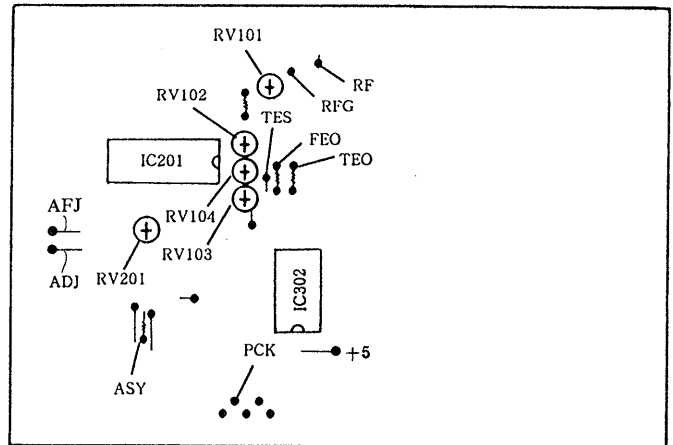
7. Turn POWER switch off.



• Inccorrect Examples (fundamental wave appears)



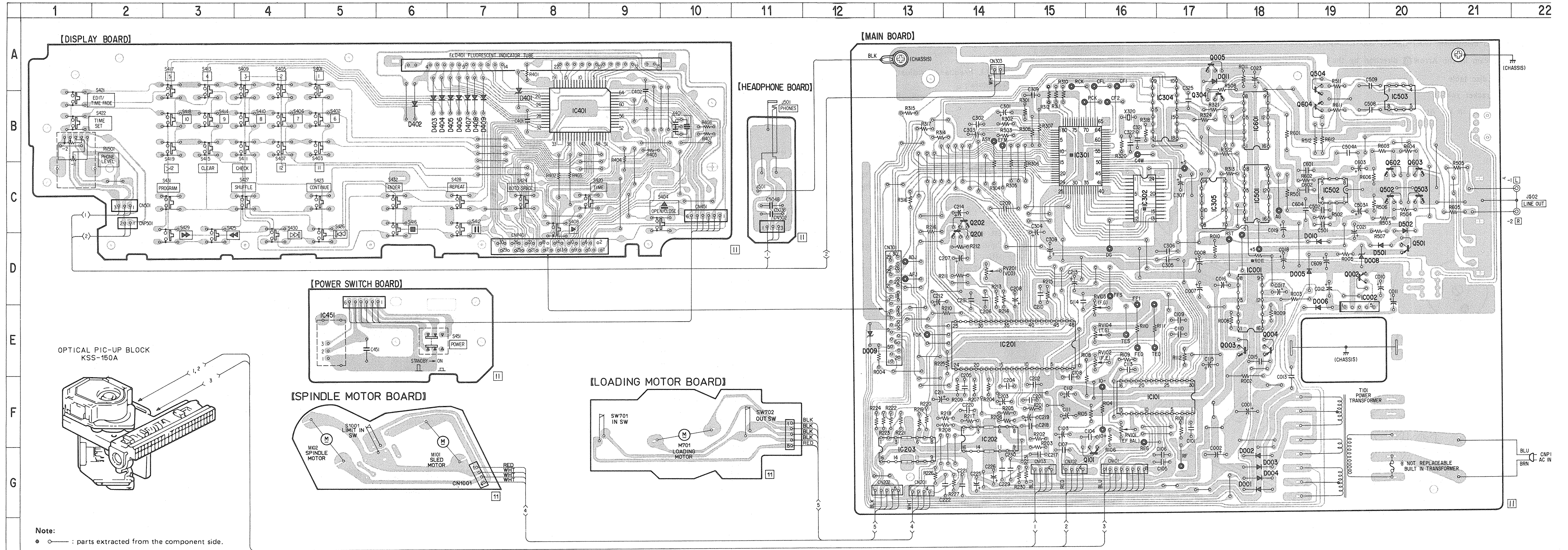
Adjustment Location : main board -component side-



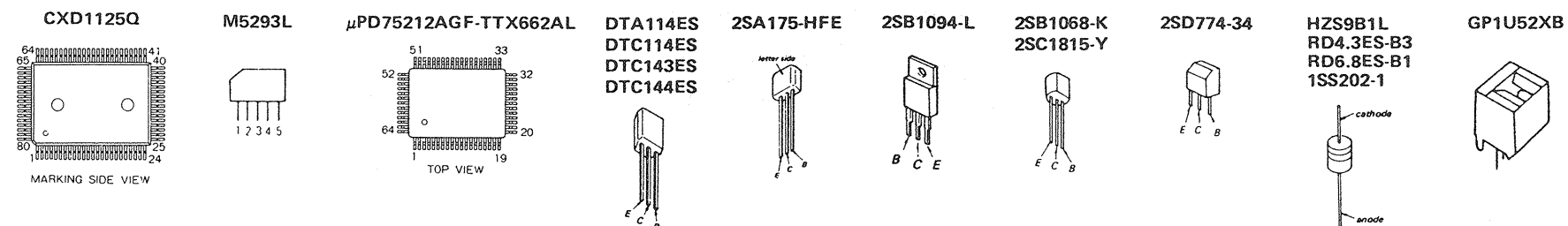


# SECTION 3 DIAGRAMS

## 3-1. PRINTED WIRING BOARDS



### SEMICONDUCTOR LEAD LAYOUTS



### Semiconductor Location

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D001	G-18	D402	D-7	IC001	D-18	IC451	E-5	Q202	C-14
D002	G-18	D403	B-6	IC002	E-19	IC501	C-18	Q304	B-17
D003	G-18	D404	B-6	IC101	F-16	IC502	C-19	Q502	C-20
D004	G-18	D405	B-7	IC201	E-14	IC503	B-20	Q503	C-20
D005	D-19	D406	B-7	IC202	F-14			Q504	A-19
D006	E-19	D407	B-7	IC203	G-13	Q002	D-19	Q602	C-20
D008	D-19	D408	B-7	IC301	B-16	Q003	E-18	Q603	C-20
D009	E-12	D409	B-7	IC302	C-16	Q004	E-18	Q604	B-19
D010	D-19	D501	D-20	IC304	B-17	Q005	A-17		
D011	A-17	D502	C-20	IC305	C-17	Q101	G-16		
D401	B-8			IC401	B-8	Q201	D-14		

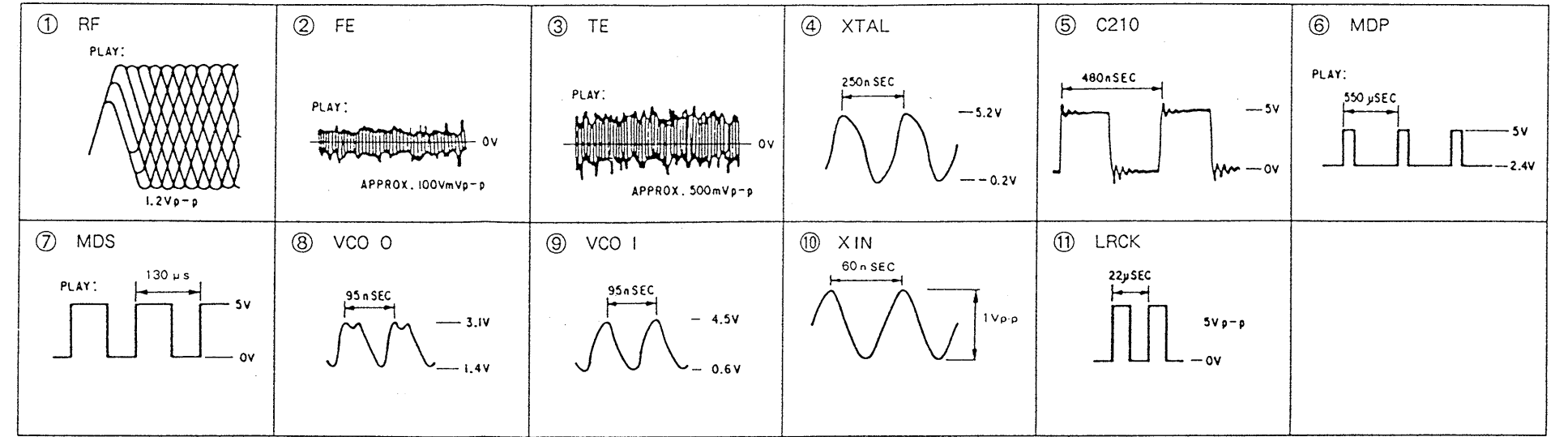
Note :

- All capacitors are in  $\mu F$  unless otherwise noted, pF :  $\mu F$  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $\frac{1}{2}W$  or less unless otherwise specified.
- $\Delta$  : internal component.
- **B+** : B+ Line
- **B-** : B- Line
- $\square$  : adjustment for repair.

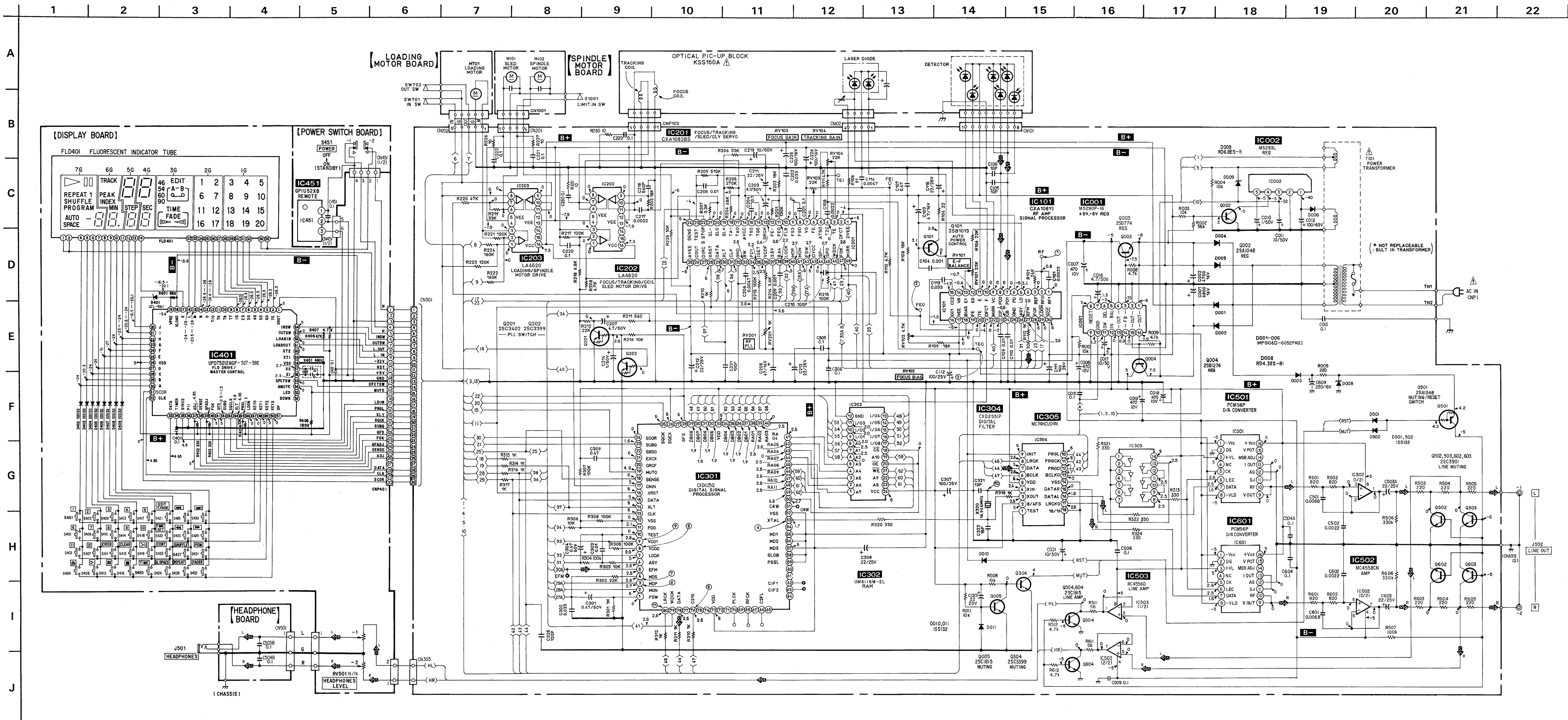
Note: The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

- Voltage and waveforms are dc with respect to ground under no-signal conditions.
- no mark : PLAY
- Voltages are taken with a VOM (input impedance 10M  $\Omega$ ). 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.
- $\Rightarrow$  : CD

• WAVEFORM



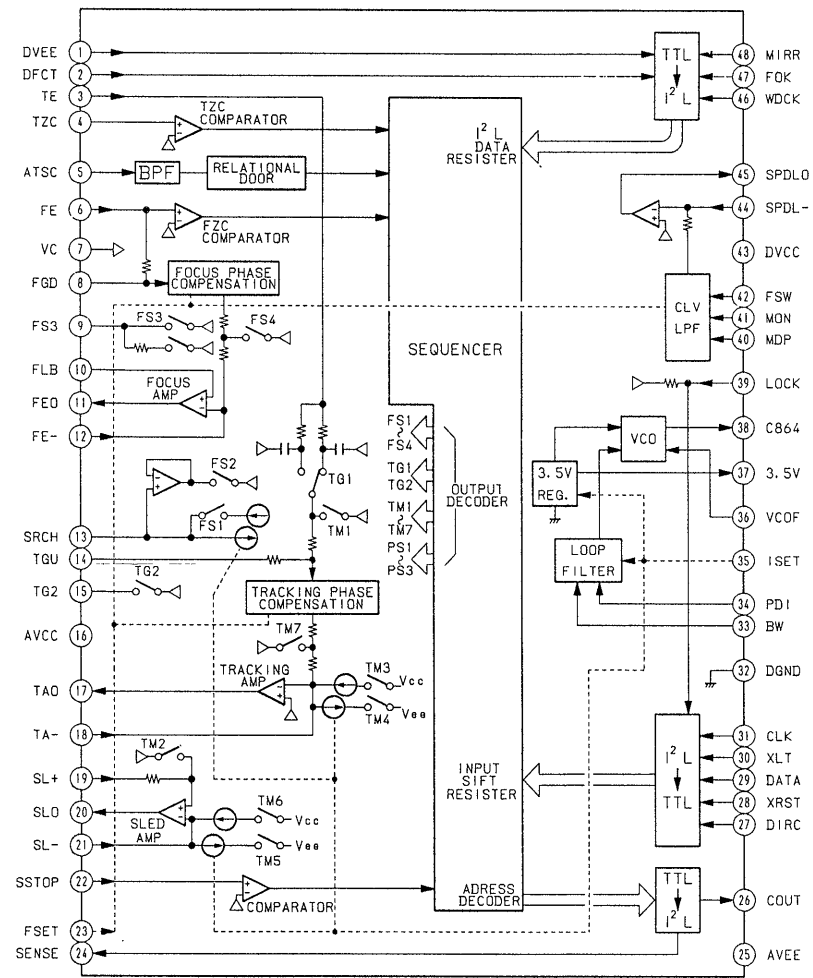
3-2. SCHEMATIC DIAGRAM



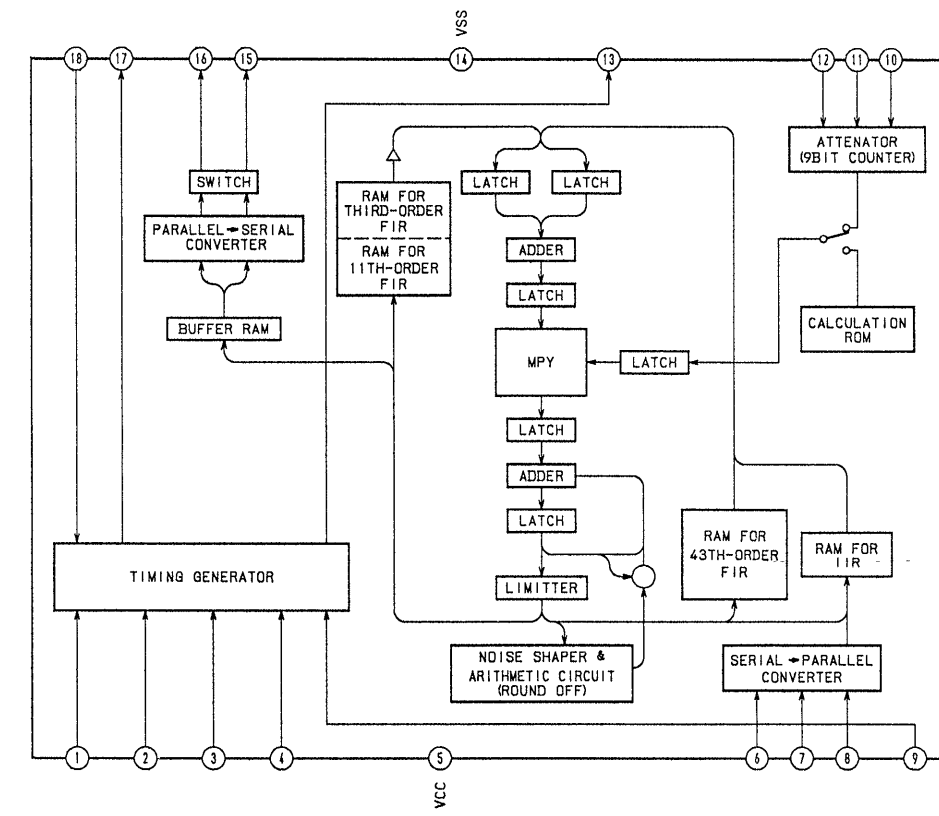


3-3. IC BLOCK DIAGRAM

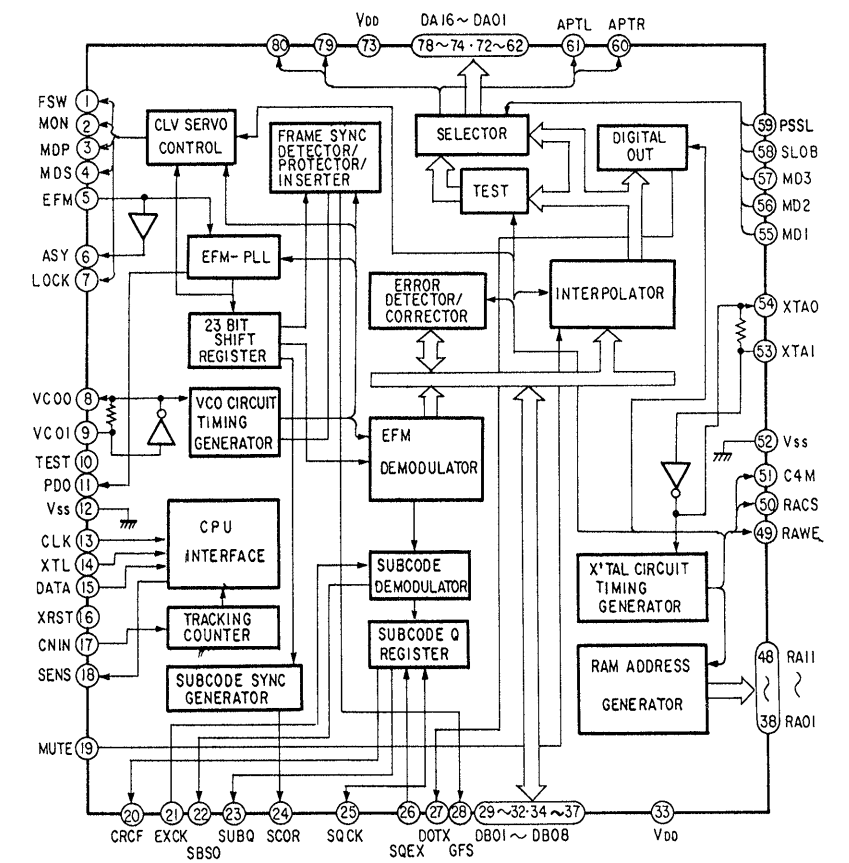
IC201 CXA1082BS



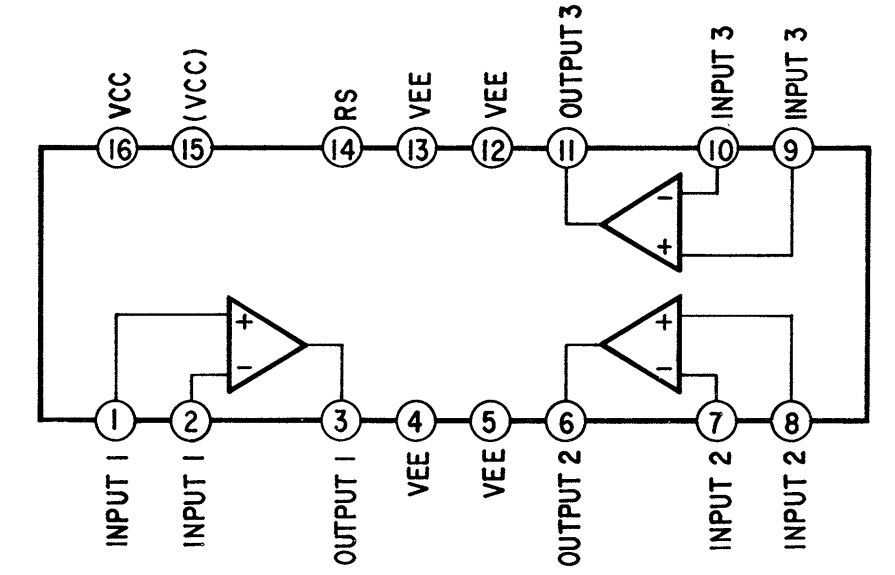
IC304 CXD2551P



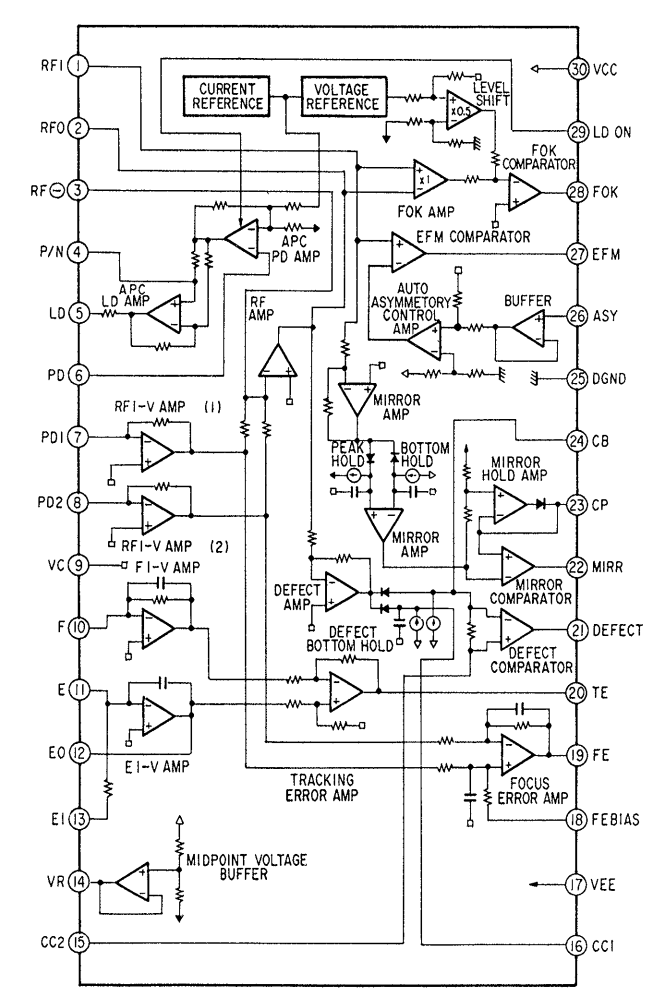
IC301 CXD1125Q



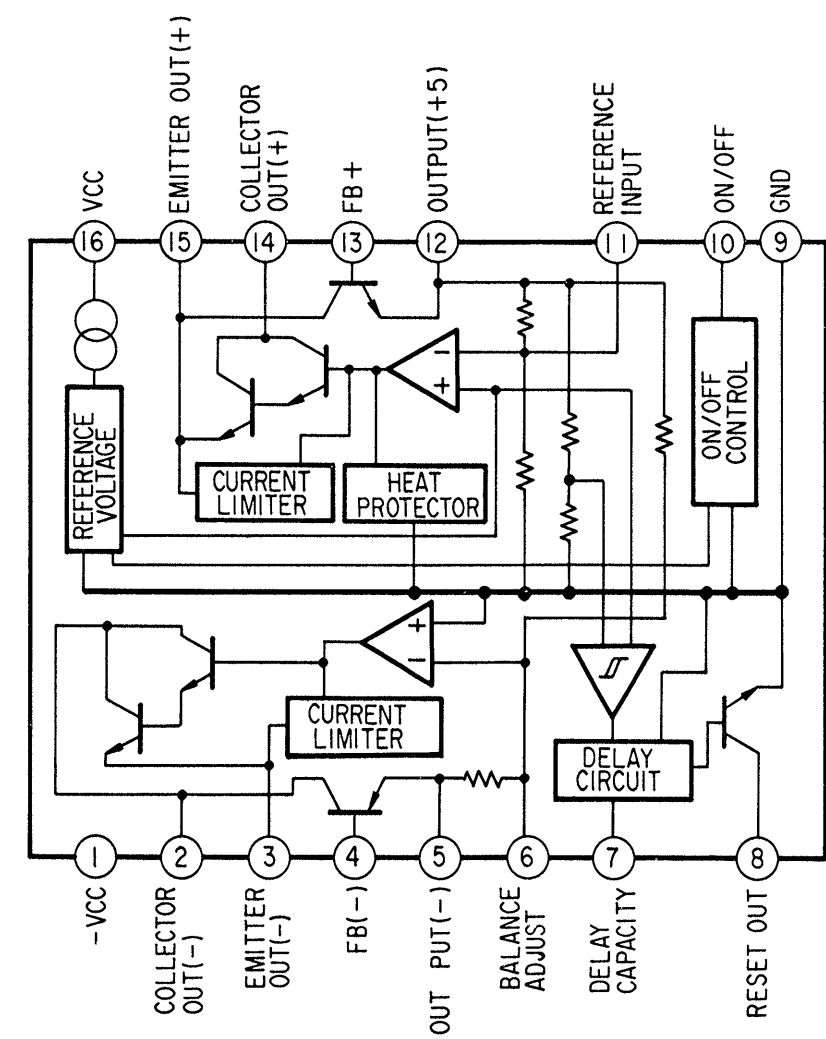
IC202, 203 LA6520



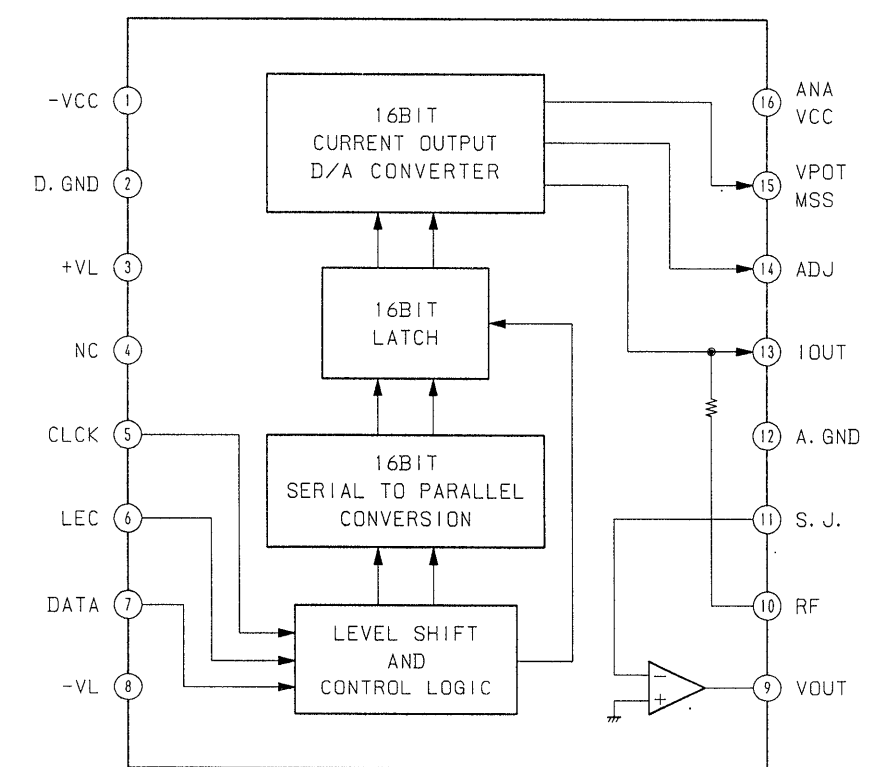
IC101 CXA1081S



IC001 M5290P

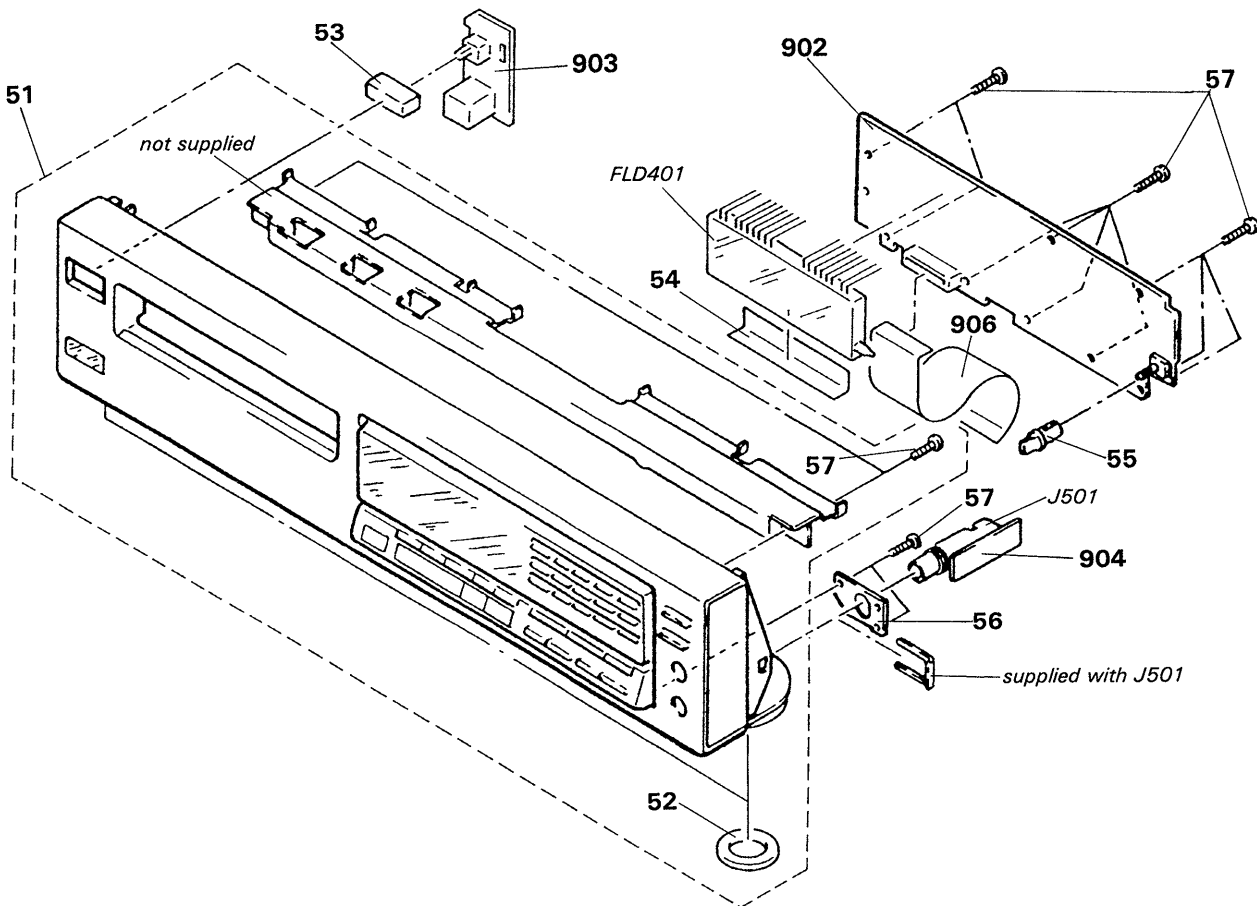


IC501, 601 PCM56P



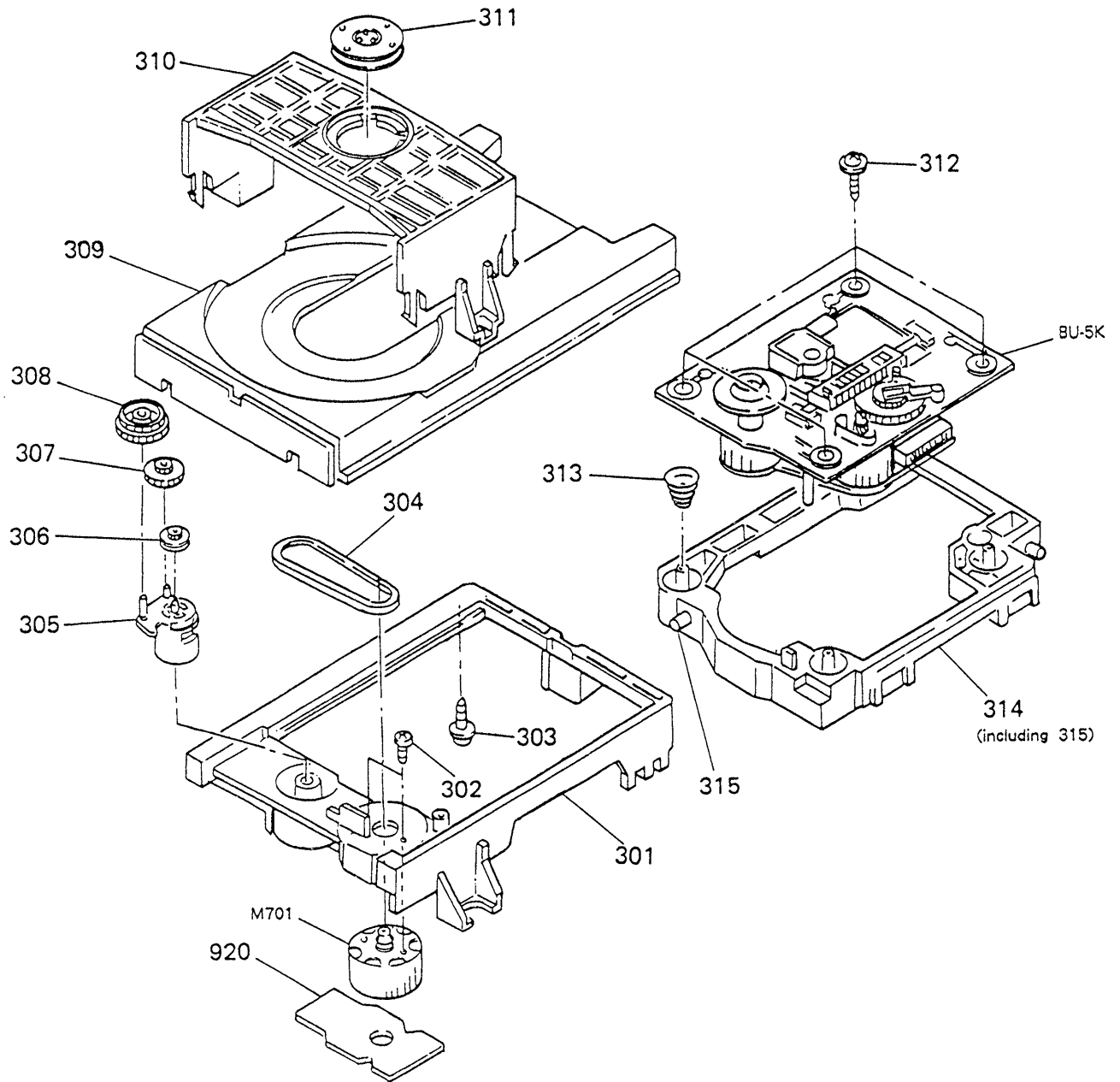


## 4-2. FRONT PANEL SECTION



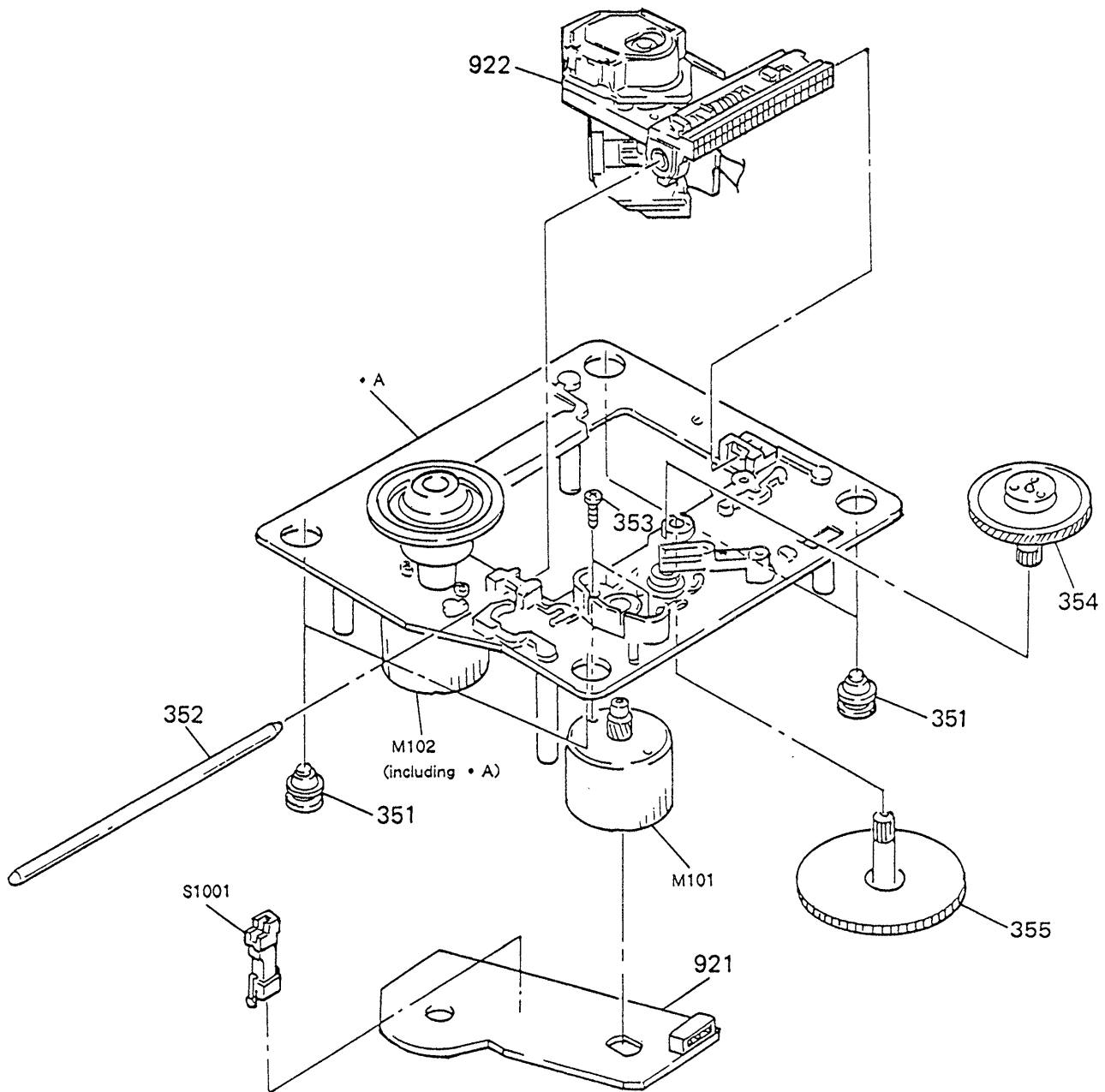
No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
51	A-4604-397-A	PANEL ASSY, FRONT	52,57	902	*A-4617-325-A	MOUNTED PCB, DISPLAY	
52	4-923-836-11	CUSHION		903	*1-634-322-11	PC BOARD, P.S.W	
53	4-922-921-01	BUTTON (POWER)		904	*1-634-321-11	PC BOARD, HP	
54	*4-927-353-01	SHEET (FL)		906	1-575-120-11	WIRE, FLAT TYPE (30 CORE)	
55	4-933-116-11	KNOB (C, TYPE), LOV		FLD401	1-519-556-11	INDICATOR TUBE, FLUORESCENT	
56	*4-933-204-01	BRACKET (H.P)		J501	1-568-519-51	JACK, LARGE TYPE (PHONES)	
57	7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S					

### 4-3. CD MECHANISM SECTION (CDM14A-5K)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
301	4-933-111-01	CHASSIS (MD)		310	4-933-110-01	HOLDER (MG)	
302	7-621-775-10	SCREW +B 2.6X4		311	A-4675-347-A	MG ASSY	
303	*4-917-583-21	BRACKET, YOKE		312	4-933-134-01	SCREW (+PTPWH M2.6X6)	
304	4-927-649-01	BELT		313	4-917-541-01	SPRING (B)	
305	4-933-109-01	CAM		314	4-933-129-01	HOLDER (BU)	315
306	4-927-651-01	PULLEY (S)		315	4-933-108-01	SHAFT (CAM)	
307	4-927-628-01	GEAR (C)		316	3-831-441-XX	CUSHION (B), CABINET	
308	4-933-107-01	GEAR (PL)		905	*1-632-169-11	PC BOARD, LOADING MOTOR	
309	4-933-112-01	TABLE, DISK		M701	A-4608-362-A	MOTOR (L) ASSY	

#### 4-4. OPTICAL PICK-UP BLOCK (BU-5K)



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

No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
351	4-933-126-01	INSULATOR (A)		908	*1-632-460-12	PC BOARD, SL/SP MOTOR	
352	4-917-565-01	SHAFT, SLED		909	$\Delta$ .8-848-062-01	DEVICE, OPTICAL KSS-150A(H)	
353	7-621-255-15	SCREW +P 2X3		M101	X-4917-504-1	MOTOR ASSY (SLED)	
354	4-917-567-01	GEAR (M)		M102	X-4917-523-3	MOTOR ASSY (SPINDLE)	
355	4-917-564-01	GEAR (P), FLATNESS		S1001	1-570-822-11	SWITCH, LEAF (LIMIT IN)	
356	7-621-773-86	SCREW +BVT 2.6X4 (S)					

## SECTION 5 ELECTRICAL PARTS LIST

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

**CAPACITORS:**MF:  $\mu$ F, PF:  $\mu$ PF.**RESISTORS**

- All resistors are in ohms.
- F: nonflammable

**COILS**

- MMH: mH, UH:  $\mu$ H

**SEMICONDUCTORS**In each case, U:  $\mu$ , for example:UA...:  $\mu$ A..., UPA...:  $\mu$ PA...,UPC...:  $\mu$ PC, UPD...:  $\mu$ PD...

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

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
901	*A-4617-324-A	MOUNTED PCB, MAIN	C209	1-162-294-31	CERAMIC 0.001MF 10% 50V
902	*A-4617-325-A	MOUNTED PCB, DISPLAY	C210	1-162-282-31	CERAMIC 100PF 10% 50V
903	*1-634-322-11	PC BOARD, P.SW	C211	1-126-233-11	ELECT 22MF 20% 25V
904	*1-634-321-11	PC BOARD, HP	C212	1-126-233-11	ELECT 22MF 20% 25V
905	*1-632-169-11	PC BOARD, LOADING MOTOR	C213	1-126-233-11	ELECT 22MF 20% 25V
906	1-575-120-11	WIRE, FLAT TYPE (30 CORE)	C214	1-124-791-11	ELECT 1MF 20% 50V
907	*1-535-771-11	TERMINAL	C217	1-161-375-00	CERAMIC 0.0022MF 20% 16V
908	*1-632-460-12	PC BOARD, SL/SP MOTOR	C218	1-162-291-31	CERAMIC 560PF 10% 50V
909	$\Delta$ 8-848-062-01	DEVICE, OPTICAL KSS-150A(H)	C219	1-123-875-11	ELECT 10MF 20% 50V
C001	1-126-017-11	ELECT 6800MF 20% 16V	C220	1-136-165-00	FILM 0.1MF 5% 50V
C002	1-124-898-11	ELECT 4700MF 20% 16V	C221	1-164-159-11	CERAMIC 0.1MF 50V
C007	1-124-472-11	ELECT 470MF 20% 10V	C222	1-164-159-11	CERAMIC 0.1MF 50V
C008	1-124-472-11	ELECT 470MF 20% 10V	C225	1-126-101-11	ELECT 100MF 20% 16V
C010	1-124-791-11	ELECT 1MF 20% 50V	C226	1-126-101-11	ELECT 100MF 20% 16V
C011	1-123-875-11	ELECT 10MF 20% 50V	C229	1-164-159-11	CERAMIC 0.1MF 50V
C012	1-124-572-11	ELECT 100MF 20% 63V	C230	1-164-159-11	CERAMIC 0.1MF 50V
C013	1-164-159-11	CERAMIC 0.1MF 50V	C231	1-162-282-31	CERAMIC 100PF 10% 50V
C015	1-164-159-11	CERAMIC 0.1MF 50V	C301	1-124-902-00	ELECT 0.47MF 20% 50V
C016	1-124-927-11	ELECT 4.7MF 20% 50V	C302	1-106-379-12	MYLAR 0.033MF 5% 100V
C017	1-123-875-11	ELECT 10MF 20% 50V	C303	1-162-306-11	CERAMIC 0.01MF 20% 16V
C018	1-124-472-11	ELECT 470MF 20% 10V	C304	1-124-902-00	ELECT 0.47MF 20% 50V
C019	1-124-472-11	ELECT 470MF 20% 10V	C305	1-164-159-11	CERAMIC 0.1MF 50V
C021	1-123-875-11	ELECT 10MF 20% 50V	C306	1-164-159-11	CERAMIC 0.1MF 50V
C023	1-126-233-11	ELECT 22MF 20% 25V	C307	1-124-478-11	ELECT 100MF 20% 25V
C101	1-106-351-00	MYLAR 0.0022MF 5% 50V	C308	1-126-233-11	ELECT 22MF 20% 25V
C103	1-124-477-11	ELECT 47MF 20% 16V	C309	1-136-173-00	FILM 0.47MF 5% 50V
C104	1-162-294-31	CERAMIC 0.001MF 10% 50V	C321	1-162-204-31	CERAMIC 16PF 5% 50V
C105	1-162-199-31	CERAMIC 10PF 5% 50V	C322	1-162-203-31	CERAMIC 15PF 5% 50V
C106	1-162-199-31	CERAMIC 10PF 5% 50V	C325	1-162-283-31	CERAMIC 120PF 10% 50V
C107	1-136-173-00	FILM 0.47MF 5% 50V	C401	1-164-159-11	CERAMIC 0.1MF 50V
C108	1-161-375-00	CERAMIC 0.0022MF 20% 16V	C402	1-164-159-11	CERAMIC 0.1MF 50V
C109	1-106-367-00	MYLAR 0.01MF 5% 100V	C409	1-164-159-11	CERAMIC 0.1MF 50V
C110	1-106-367-00	MYLAR 0.01MF 5% 100V	C451	1-164-159-11	CERAMIC 0.1MF 50V
C111	1-124-478-11	ELECT 100MF 20% 25V	C501	1-161-329-00	CERAMIC 0.0068MF 20% 16V
C112	1-124-478-11	ELECT 100MF 20% 25V	C502	1-161-375-00	CERAMIC 0.0022MF 20% 16V
C113	1-106-379-12	MYLAR 0.033MF 5% 100V	C503A	1-126-233-11	ELECT 22MF 20% 25V
C114	1-161-377-00	CERAMIC 0.0047MF 20% 16V	C503B	1-164-159-11	CERAMIC 0.1MF 50V
C115	1-126-233-11	ELECT 22MF 20% 25V	C504A	1-164-159-11	CERAMIC 0.1MF 50V
C201	1-136-165-00	FILM 0.1MF 5% 50V	C504B	1-164-159-11	CERAMIC 0.1MF 50V
C202	1-106-379-12	MYLAR 0.033MF 5% 100V	C508	1-164-159-11	CERAMIC 0.1MF 50V
C203	1-124-927-11	ELECT 4.7MF 20% 50V	C509	1-164-159-11	CERAMIC 0.1MF 50V
C204	1-136-165-00	FILM 0.1MF 5% 50V	C601	1-161-329-00	CERAMIC 0.0068MF 20% 16V
C205	1-162-306-11	CERAMIC 0.01MF 20% 16V	C602	1-161-375-00	CERAMIC 0.0022MF 20% 16V
C206	1-161-377-00	CERAMIC 0.0047MF 20% 16V	C603	1-126-233-11	ELECT 22MF 20% 25V
C207	1-124-927-11	ELECT 4.7MF 20% 50V	C604	1-164-159-11	CERAMIC 0.1MF 50V
C208	1-124-477-11	ELECT 47MF 20% 16V	C609	1-124-120-11	ELECT 220MF 20% 16V



Ref.No.	Part No.	Description
CN1 01	*1-564-710-11	PIN, CONNECTOR (SMALL TYPE) 8P
CN2 02	*1-564-706-31	PIN, CONNECTOR (SMALL TYPE) 4P
CN1 03	*1-564-706-31	PIN, CONNECTOR (SMALL TYPE) 4P
CN2 01	*1-568-953-11	PIN, CONNECTOR 4P
CN2 02	*1-568-954-11	PIN, CONNECTOR 5P
CN3 01	*1-568-933-11	SOCKET, CONNECTOR 30P
CN3 03	*1-568-951-11	PIN, CONNECTOR 2P
CN5 02	*1-568-952-11	PIN, CONNECTOR 3P
CN1 001	*1-568-942-11	PIN, CONNECTOR 4P
CNP1 $\Delta$ .1-574-127-11		(AEP)...CORD, POWER
CNP1 $\Delta$ .1-574-390-11		(UK)...CORD, POWER
CNP4 01	*1-568-933-11	SOCKET, CONNECTOR 30P
D001	8-719-950-59	DIODE MPG06D-6052
D002	8-719-950-59	DIODE MPG06D-6052
D003	8-719-950-59	DIODE MPG06D-6052
D004	8-719-950-59	DIODE MPG06D-6052
D005	8-719-950-59	DIODE MPG06D-6052
D006	8-719-950-59	DIODE MPG06D-6052
D008	8-719-109-84	DIODE RD5.1ES-B1
D009	8-719-109-96	DIODE RD6.8ES-B1
D010	8-719-107-94	DIODE 1SS202-1
D011	8-719-107-94	DIODE 1SS202-1
D401	8-719-933-56	DIODE HZS9B1L
D402	8-719-107-94	DIODE 1SS202-1
D403	8-719-107-94	DIODE 1SS202-1
D404	8-719-107-94	DIODE 1SS202-1
D405	8-719-107-94	DIODE 1SS202-1
D406	8-719-107-94	DIODE 1SS202-1
D407	8-719-107-94	DIODE 1SS202-1
D408	8-719-107-94	DIODE 1SS202-1
D409	8-719-107-94	DIODE 1SS202-1
D501	8-719-107-94	DIODE 1SS202-1
D502	8-719-107-94	DIODE 1SS202-1
FLD4 01	1-519-556-11	INDICATOR TUBE, FLUORESCENT
IC001	8-759-630-21	IC M5290P-16
IC002	8-759-633-42	IC M5293L
IC1 01	8-752-034-00	IC CXA1081S
IC2 01	8-752-032-30	IC CXA1082BS
IC2 02	8-759-805-18	IC LA6520
IC2 03	8-759-805-18	IC LA6520
IC3 01	8-752-334-00	IC CXD1125Q
IC3 02	8-759-994-18	IC UM6116M-2L
IC3 04	8-752-334-06	IC CXD2551P
IC3 05	8-759-917-18	IC MC74HCU04N
IC4 01	8-759-148-72	IC UPD75212AGF-527-3BE
IC4 51	8-749-920-83	IC GP1U52XB
IC5 01	8-759-998-22	IC PCM56P
IC5 02	8-759-995-08	IC MC4558
IC5 03	8-759-981-85	IC RC4556D
IC6 01	8-759-998-22	IC PCM56P
J5 01	1-568-519-51	JACK, LARGE TYPE (PHONES)
J5 02	1-569-442-11	JACK, PIN 2P (LINE OUT)
M1 01	X-4917-504-1	MOTOR ASSY (SLED)
M1 02	X-4917-523-3	MOTOR ASSY (SPINDLE)
M7 01	A-4608-362-A	MOTOR (L) ASSY

Ref.No.	Part No.	Description
Q002	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q003	8-729-140-96	TRANSISTOR 2SD774-34
Q004	8-729-111-67	TRANSISTOR 2SB1094-L
Q005	8-729-281-52	TRANSISTOR 2SC1815Y
Q1 01	8-729-116-57	TRANSISTOR 2SB1068-K
Q2 01	8-729-900-80	TRANSISTOR DTC114ES
Q2 02	8-729-900-89	TRANSISTOR DTC144ES
Q3 04	8-729-900-89	TRANSISTOR DTC144ES
Q5 01	8-729-900-61	TRANSISTOR DTA114ES
Q5 02	8-729-900-74	TRANSISTOR DTC143TS
Q5 03	8-729-900-74	TRANSISTOR DTC143TS
Q5 04	8-729-281-52	TRANSISTOR 2SC1815Y
Q6 02	8-729-900-74	TRANSISTOR DTC143TS
Q6 03	8-729-900-74	TRANSISTOR DTC143TS
Q6 04	8-729-281-52	TRANSISTOR 2SC1815Y
R002	1-249-438-11	CARBON 56K 5% 1/4W
R003	1-249-429-11	CARBON 10K 5% 1/4W
R004	1-249-429-11	CARBON 10K 5% 1/4W
R005	1-249-409-11	CARBON 220 5% 1/4W
R008	1-249-425-11	CARBON 4.7K 5% 1/4W
R009	1-249-425-11	CARBON 4.7K 5% 1/4W
R010	1-249-429-11	CARBON 10K 5% 1/4W
R011	1-249-429-11	CARBON 10K 5% 1/4W
R1 01	1-247-864-11	CARBON 24K 5% 1/4W
R1 04	1-249-397-11	CARBON 22 5% 1/4W
R1 05	1-247-806-11	CARBON 91 5% 1/4W
R1 06	1-249-433-11	CARBON 22K 5% 1/4W
R1 08	1-249-432-11	CARBON 18K 5% 1/4W
R1 09	1-249-432-11	CARBON 18K 5% 1/4W
R1 10	1-249-425-11	CARBON 4.7K 5% 1/4W
R1 11	1-249-425-11	CARBON 4.7K 5% 1/4W
R1 12	1-249-417-11	CARBON 1K 5% 1/4W
R2 01	1-247-882-11	CARBON 130K 5% 1/4W
R2 02	1-249-432-11	CARBON 18K 5% 1/4W
R2 03	1-249-432-11	CARBON 18K 5% 1/4W
R2 04	1-249-439-11	CARBON 68K 5% 1/4W
R2 05	1-247-889-00	CARBON 270K 5% 1/4W
R2 06	1-249-435-11	CARBON 33K 5% 1/4W
R2 07	1-249-423-11	CARBON 3.3K 5% 1/4W
R2 08	1-249-425-11	CARBON 4.7K 5% 1/4W
R2 09	1-247-896-11	CARBON 510K 5% 1/4W
R2 10	1-249-417-11	CARBON 1K 5% 1/4W
R2 11	1-249-414-11	CARBON 560 5% 1/4W
R2 12	1-249-433-11	CARBON 22K 5% 1/4W
R2 13	1-249-441-11	CARBON 100K 5% 1/4W
R2 14	1-247-844-11	METAL 3.6K 5% 1/4W
R2 15	1-249-441-11	CARBON 100K 5% 1/4W
R2 16	1-249-429-11	CARBON 10K 5% 1/4W
R2 17	1-247-881-00	CARBON 120K 5% 1/4W
R2 18	1-249-427-11	CARBON 6.8K 5% 1/4W
R2 19	1-249-435-11	CARBON 33K 5% 1/4W
R2 20	1-249-437-11	CARBON 47K 5% 1/4W
R2 21	1-247-881-00	CARBON 120K 5% 1/4W
R2 22	1-247-884-11	CARBON 160K 5% 1/4W
R2 23	1-247-881-00	CARBON 120K 5% 1/4W
R2 24	1-247-884-11	CARBON 160K 5% 1/4W
R2 25	1-249-429-11	CARBON 10K 5% 1/4W

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

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
R226	1-249-393-11	CARBON 10 5% 1/4W	S401	1-554-303-21	SWITCH, KEY BOARD (1)
R227	1-249-393-11	CARBON 10 5% 1/4W	S402	1-554-303-21	SWITCH, KEY BOARD (6)
R230	1-249-393-11	CARBON 10 5% 1/4W	S403	1-554-303-21	SWITCH, KEY BOARD (11)
R231	1-249-393-11	CARBON 10 5% 1/4W	S404	1-554-303-21	SWITCH, KEY BOARD (OPEN/CLOSE)
R301	1-247-903-00	CARBON 1M 5% 1/4W	S405	1-554-303-21	SWITCH, KEY BOARD (2)
R302	1-249-433-11	CARBON 22K 5% 1/4W	S406	1-554-303-21	SWITCH, KEY BOARD (7)
R303	1-249-429-11	CARBON 10K 5% 1/4W	S407	1-554-303-21	SWITCH, KEY BOARD (12)
R304	1-249-441-11	CARBON 100K 5% 1/4W	S408	1-554-303-21	SWITCH, KEY BOARD (▶)
R305	1-249-441-11	CARBON 100K 5% 1/4W	S409	1-554-303-21	SWITCH, KEY BOARD (3)
R306	1-249-429-11	CARBON 10K 5% 1/4W	S410	1-554-303-21	SWITCH, KEY BOARD (8)
R307	1-249-441-11	METAL 100K 5% 1/4W	S411	1-554-303-21	SWITCH, KEY BOARD (CHECK)
R308	1-249-441-11	METAL 100K 5% 1/4W	S412	1-554-303-21	SWITCH, KEY BOARD (■)
R310	1-249-417-11	CARBON 1K 5% 1/4W	S413	1-554-303-21	SWITCH, KEY BOARD (4)
R311	1-249-417-11	CARBON 1K 5% 1/4W	S414	1-554-303-21	SWITCH, KEY BOARD (9)
R312	1-249-417-11	CARBON 1K 5% 1/4W	S415	1-554-303-21	SWITCH, KEY BOARD (CLEAR)
R313	1-249-411-11	CARBON 330 5% 1/4W	S416	1-554-303-21	SWITCH, KEY BOARD (■)
R314	1-249-417-11	CARBON 1K 5% 1/4W	S417	1-554-303-21	SWITCH, KEY BOARD (5)
R315	1-249-417-11	CARBON 1K 5% 1/4W	S418	1-554-303-21	SWITCH, KEY BOARD (10)
R316	1-249-417-11	CARBON 1K 5% 1/4W	S419	1-554-303-21	SWITCH, KEY BOARD (>12)
R317	1-249-417-11	CARBON 1K 5% 1/4W	S420	1-554-303-21	SWITCH, KEY BOARD (TIME)
R318	1-249-417-11	CARBON 1K 5% 1/4W	S421	1-554-303-21	SWITCH, KEY BOARD (EDIT/TIME FADE)
R320	1-249-411-11	CARBON 330 5% 1/4W	S422	1-554-303-21	SWITCH, KEY BOARD (TIME SET)
R321	1-249-411-11	CARBON 330 5% 1/4W	S423	1-554-303-21	SWITCH, KEY BOARD (CONTINUE)
R322	1-249-411-11	CARBON 330 5% 1/4W	S424	1-554-303-21	SWITCH, KEY BOARD (AUTO SPACE)
R324	1-249-411-11	CARBON 330 5% 1/4W	S425	1-554-303-21	SWITCH, KEY BOARD (◀◀)
R401	1-249-439-11	CARBON 68K 5% 1/4W	S426	1-554-303-21	SWITCH, KEY BOARD (◀◀)
R402	1-249-435-11	CARBON 33K 5% 1/4W	S427	1-554-303-21	SWITCH, KEY BOARD (SHUFFLE)
R403	1-249-435-11	CARBON 33K 5% 1/4W	S428	1-554-303-21	SWITCH, KEY BOARD (REPEAT)
R404	1-249-435-11	CARBON 33K 5% 1/4W	S429	1-554-303-21	SWITCH, KEY BOARD (▶▶)
R405	1-249-441-11	CARBON 100K 5% 1/4W	S430	1-554-303-21	SWITCH, KEY BOARD (▶▶)
R406	1-249-425-11	CARBON 4.7K 5% 1/4W	S431	1-554-303-21	SWITCH, KEY BOARD (PROGRAM)
R407	1-249-425-11	CARBON 4.7K 5% 1/4W	S432	1-554-303-21	SWITCH, KEY BOARD (FADER)
R501	1-249-416-11	CARBON 820 5% 1/4W	S451	1-571-305-11	SWITCH, PUSH (1 KEY) (POWER)
R502	1-249-416-11	CARBON 820 5% 1/4W	S1001	1-570-822-11	SWITCH, LEAF (LIMIT IN)
R503	1-249-409-11	CARBON 220 5% 1/4W	SW701	1-572-086-11	SWITCH, LEAF (IN)
R504	1-249-409-11	CARBON 220 5% 1/4W	SW702	1-572-086-11	SWITCH, LEAF (OUT)
R505	1-249-409-11	CARBON 220 5% 1/4W	T701	▲.1-449-967-11	TRANSFORMER, POWER
R506	1-247-891-00	CARBON 330K 5% 1/4W	X320	1-577-328-21	VIBRATOR, CRYSTAL (16.944MHz)
R507	1-249-441-11	CARBON 100K 5% 1/4W	X401	1-567-819-11	VIBRATOR, CERAMIC (4MHz)
R508	1-249-429-11	CARBON 10K 5% 1/4W			
R511	1-249-402-11	CARBON 56 5% 1/4W			
R512	1-249-425-11	CARBON 4.7K 5% 1/4W			
R601	1-249-416-11	CARBON 820 5% 1/4W			
R602	1-249-416-11	CARBON 820 5% 1/4W			
R603	1-249-409-11	CARBON 220 5% 1/4W			
R604	1-249-409-11	CARBON 220 5% 1/4W			
R605	1-249-409-11	CARBON 220 5% 1/4W			
R606	1-247-891-00	CARBON 330K 5% 1/4W			
R611	1-249-402-11	CARBON 56 5% 1/4W			
R612	1-249-425-11	CARBON 4.7K 5% 1/4W			
RV101	1-228-995-00	RES, ADJ, CARBON 22K			
RV102	1-228-993-00	RES, ADJ, CARBON 4.7K			
RV103	1-228-995-00	RES, ADJ, CARBON 22K			
RV104	1-228-995-00	RES, ADJ, CARBON 22K			
RV201	1-228-990-00	RES, ADJ, METAL GLAZE 1K (PHONE LEVEL)			
RV501	1-238-748-11	RES, VAR, CARBON 1K/1K			
					ACCESSORY & PACKING MATERIAL
					1-465-291-11 REMOTE COMMANDER (RM-D190)
					2-181-754-01 COVER, BATTERY
					1-559-533-11 CORD, CONNECTION
					3-750-792-61 (AEP)...MANUAL, INSTRUCTION
					(GERMAN, ITALIAN, DUTCH, SWEDISH)
					3-750-792-71 MANUAL, INSTRUCTION
					(ENGLISH, FRENCH, SPANISH, PORTUGUESE)
					*4-929-506-02 CUSHION
					*4-933-232-11 INDIVIDUAL CARTON

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



9-955-786-12  
( With 9-955-786-81 )  
9-955-786-91

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