

# Service Manual



DEH-5/XU/UC

ORDER NO.  
**CRT2968**

HIGH POWER CD PLAYER WITH FM/AM TUNER

# DEH-5

 XU/UC

# DEH-15

 XU/UC

# DEH-1500

 XU/UC

COMPACT  
**disc**  
DIGITAL AUDIO

● This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
CX-3026	CRT2944	S10	CD Mech. Module:Circuit Description, Mech.Description, Disassembly



For details, refer to "Important symbols for good services".

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## A SAFETY INFORMATION

### CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

### B WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.  
Health & Safety Code Section 25249.6 - Proposition 65

### [ Important symbols for good services ]

In this manual, the symbols shown-below indicate that adjustments, settings or cleaning should be made securely. When you find the procedures bearing any of the symbols, be sure to fulfill them:

#### 1. Product safety



You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.

#### 2. Adjustments



To keep the original performances of the product, optimum adjustments or specification confirmation is indispensable. In accordance with the procedures or instructions described in this manual, adjustments should be performed.

#### 3. Cleaning



For optical pickups, tape-deck heads, lenses and mirrors used in projection monitors, and other parts requiring cleaning, proper cleaning should be performed to restore their performances.

#### 4. Shipping mode and shipping screws



To protect the product from damages or failures that may be caused during transit, the shipping mode should be set or the shipping screws should be installed before shipping out in accordance with this manual, if necessary.

#### 5. Lubricants, glues, and replacement parts



Appropriately applying grease or glue can maintain the product performances. But improper lubrication or applying glue may lead to failures or troubles in the product. By following the instructions in this manual, be sure to apply the prescribed grease or glue to proper portions by the appropriate amount. For replacement parts or tools, the prescribed ones should be used.

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## ● CD Player Service Precautions



1. Before disassembling the unit, be sure to turn off the power. Unplugging and plugging the connectors during power-on mode may damage the ICs inside the unit.
2. To protect the pickup unit from electrostatic discharge during servicing, take an appropriate treatment(shorting-solder) by referring to "the DISASSEMBLY" on page 47.
3. After replacing the pickup unit, be sure to check the grating.(See p.44.)
4. In this product, because the memory capacity of the microcomputer is insufficient, the test mode is not installed. However grating of the pickup unit can be confirmed.

# 1. SPECIFICATIONS

## ● DEH-5/XU/UC

### General

Power source ..... 14.4 V DC (10.8 – 15.1 V allowable)  
 Grounding system ..... Negative type  
 Max. current consumption ..... 10.0 A

### Backup current

..... Less than 5mA

### Dimensions (W × H × D):

#### DIN

Chassis ..... 178 × 50 × 157 mm  
 (7 × 2 × 6-1/8 in.)  
 Nose ..... 188 × 58 × 19 mm  
 (7-3/8 × 2-1/4 × 3/4 in.)

#### D

Chassis ..... 178 × 50 × 162 mm  
 (7 × 2 × 6-3/8 in.)  
 Nose ..... 170 × 46 × 14 mm  
 (6-3/4 × 1-3/4 × 1/2 in.)

Weight ..... 1.3 kg (2.9 lbs)

### Audio

Continuous power output is 17 W per channel minimum into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.

Maximum power output ..... 40 W × 4

Load impedance ..... 4 Ω (4 – 8 Ω allowable)

Preout max output level/output impedance

..... 2.2 V/1 kΩ

### Bass/Treble:

#### Bass

Frequency ..... 100 Hz  
 Gain ..... ±12dB

#### Treble

Frequency ..... 10k Hz  
 Gain ..... ±12dB

### Loudness contour

Low ..... +7 dB (100 Hz), +4 dB (10 kHz)

High ..... +10 dB (100 Hz), +6.5 dB (10 kHz)  
 (volume: -30 dB)

### CD player

System ..... Compact disc audio system

Usable discs ..... Compact disc

### Signal format:

Sampling frequency ..... 44.1 kHz

Number of quantization bits

..... 16; linear

Frequency characteristics ... 5 – 20,000 Hz (±1 dB)

Signal-to-noise ratio ..... 94 dB (1 kHz) (IHF-A network)

Dynamic range ..... 92 dB (1 kHz)

Number of channels ..... 2 (stereo)

### FM tuner

Frequency range ..... 87.9 – 107.9 MHz

Usable sensitivity ..... 8 dBf (0.7 μV/75 Ω, mono, S/N: 30 dB)

50 dB quieting sensitivity ..... 10 dBf (0.9 μV/75 Ω, mono)

Signal-to-noise ratio ..... 75 dB (IHF-A network)

Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)  
 0.1 % (at 65 dBf, 1 kHz, mono)

Frequency response ..... 30 – 15,000 Hz (±3 dB)

Stereo separation ..... 45 dB (at 65 dBf, 1 kHz)

Selectivity ..... 80 dB (±200 kHz)

Three-signal intermodulation (desired signal level)

..... 30 dBf (two undesired signal level: 100 dBf)

### AM tuner

Frequency range ..... 530 – 1,710 kHz (10 kHz)

Usable sensitivity ..... 18 μV (S/N: 20 dB)

Signal-to-noise ratio ..... 65 dB (IHF-A network)

## ● DEH-15/XU/UC, DEH-1500/XU/UC

### General

Power source .....	14.4 V DC (10.8 – 15.1 V allowable)
Grounding system .....	Negative type
Max. current consumption .....	10.0 A
Backup current .....	Less than 5mA
Dimensions (W × H × D):	
DIN	
Chassis .....	178 × 50 × 157 mm (7 × 2 × 6-1/8 in.)
Nose .....	188 × 58 × 19 mm (7-3/8 × 2-1/4 × 3/4 in.)
D	
Chassis .....	178 × 50 × 162 mm (7 × 2 × 6-3/8 in.)
Nose .....	170 × 48 × 14 mm (6-3/4 × 1-7/8 × 1/2 in.)
Weight .....	1.3 kg (2.9 lbs)

### Audio

Continuous power output is 22 W per channel minimum into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.

Maximum power output .....	50 W × 4
Load impedance .....	4 Ω (4 – 8 Ω allowable)
Preout max output level/output impedance .....	2.2 V/1 kΩ

#### Equalizer (3-Band Parametric Equalizer):

Low	
Frequency .....	40/80/100/160 Hz
Q Factor .....	0.35/0.59/0.95/1.15 (+6 dB when boosted)
Gain .....	±12dB
Mid	
Frequency .....	200/500/1 k/2k Hz
Q Factor .....	0.35/0.59/0.95/1.15 (+6 dB when boosted)
Gain .....	±12dB
High	
Frequency .....	3.15k/8k/10k/12.5k Hz
Q Factor .....	0.35/0.59/0.95/1.15 (+6 dB when boosted)
Gain .....	±12dB

#### Loudness contour

Low .....	+3.5 dB (100 Hz), +3 dB (10 kHz)
Mid .....	+10 dB (100 Hz), +6.5 dB (10 kHz)

High .....	+11 dB (100 Hz), +11 dB (10 kHz) (volume: -30 dB)
------------	--

### CD player

System .....	Compact disc audio system
Usable discs .....	Compact disc
Signal format:	
Sampling frequency .....	44.1 kHz
Number of quantization bits .....	16; linear
Frequency characteristics .....	5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio .....	94 dB (1 kHz) (IHF-A network)
Dynamic range .....	92 dB (1 kHz)
Number of channels .....	2 (stereo)

### FM tuner

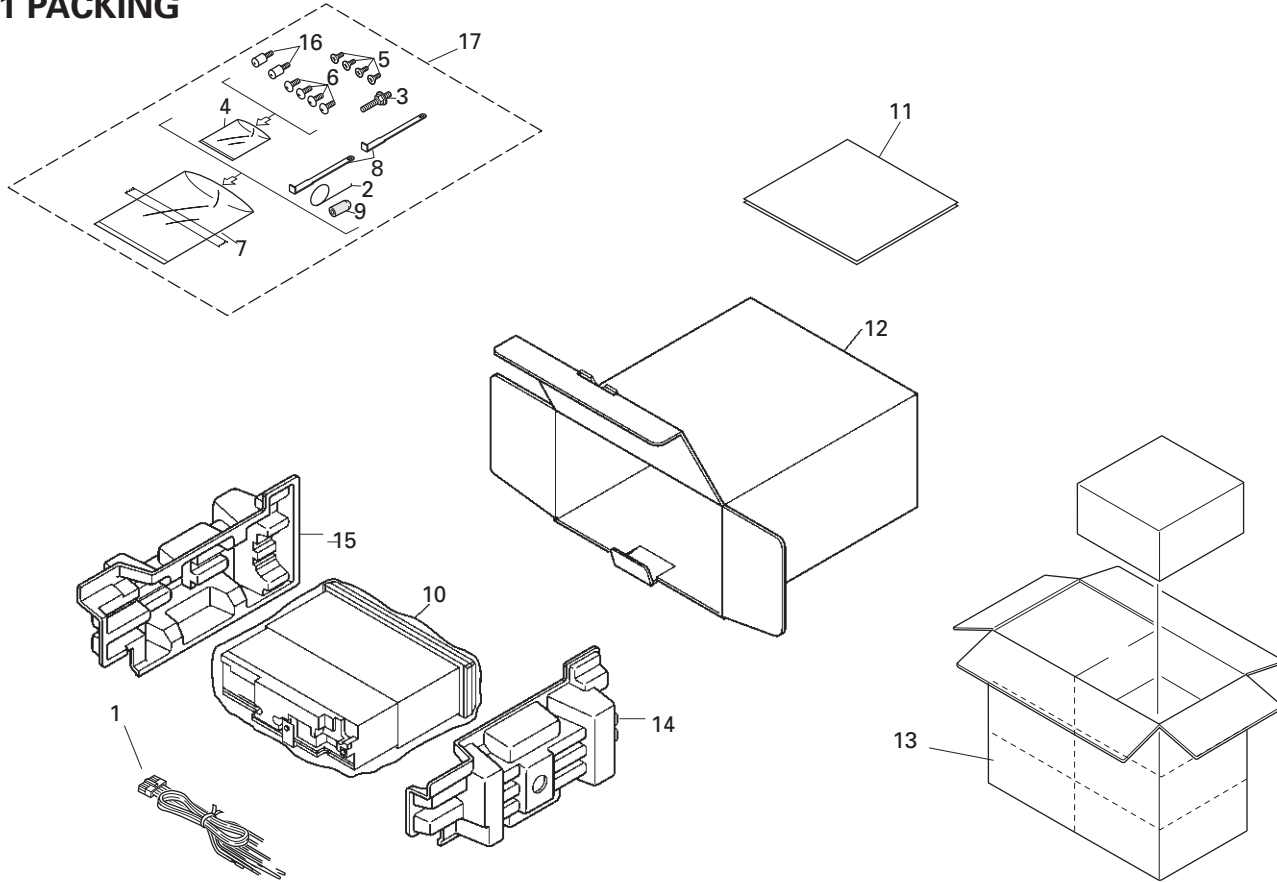
Frequency range .....	87.9 – 107.9 MHz
Usable sensitivity .....	8 dBf (0.7 μV/75 Ω mono, S/N: 30 dB)
50 dB quieting sensitivity .....	10 dBf (0.9 μV/75 Ω mono)
Signal-to-noise ratio .....	75 dB (IHF-A network)
Distortion .....	0.3 % (at 65 dBf, 1 kHz, stereo) 0.1 % (at 65 dBf, 1 kHz, mono)
Frequency response .....	30 – 15,000 Hz (±3 dB)
Stereo separation .....	45 dB (at 65 dBf, 1 kHz)
Selectivity .....	80 dB (±200 kHz)
Three-signal intermodulation (desired signal level) .....	30 dBf (two undesired signal level: 100 dBf)

### AM tuner

Frequency range .....	530 – 1,710 kHz (10 kHz)
Usable sensitivity .....	18 μV (S/N: 20 dB)
Signal-to-noise ratio .....	65 dB (IHF-A network)

## 2. EXPLODED VIEWS AND PARTS LIST

### 2.1 PACKING



#### NOTE:

- Parts marked by "\*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ▽ mark on the product are used for disassembly.
- For the applying amount of lubricants or glue, follow the instructions in this manual.  
(In the case of no amount instructions, apply as you think it appropriate.)

#### (1) PACKING SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Cord Assy	CDE7060	11-1	Owner's Manual	See Contrast table(2)
2	Spring	CBH1650	11-2	Installation Manual	See Contrast table(2)
3	Screw	CBA1002	* 11-3	Card	ARY1048
* 4	Polyethylene Bag	CEG-127	11-4	Caution Card	See Contrast table(2)
5	Screw	CRZ50P090FTC	12	Carton	See Contrast table(2)
6	Screw	TRZ50P080FTC	13	Contain Box	See Contrast table(2)
* 7	Polyethylene Bag	CEG-158	14	Protector	CHP2663
8	Handle	CNC5395	15	Protector	CHP2664
9	Bush	CNV3930	16	Fixing Screw(M2x4)	See Contrast table(2)
10	Polyethylene Bag	CEG1173	17	Accessory Assy	CEA3438

**(2) CONTRAST TABLE**

**DEH-5/XU/UC , DEH-15/XU/UC and DEH-1500/XU/UC are constructed the same except for the following:**

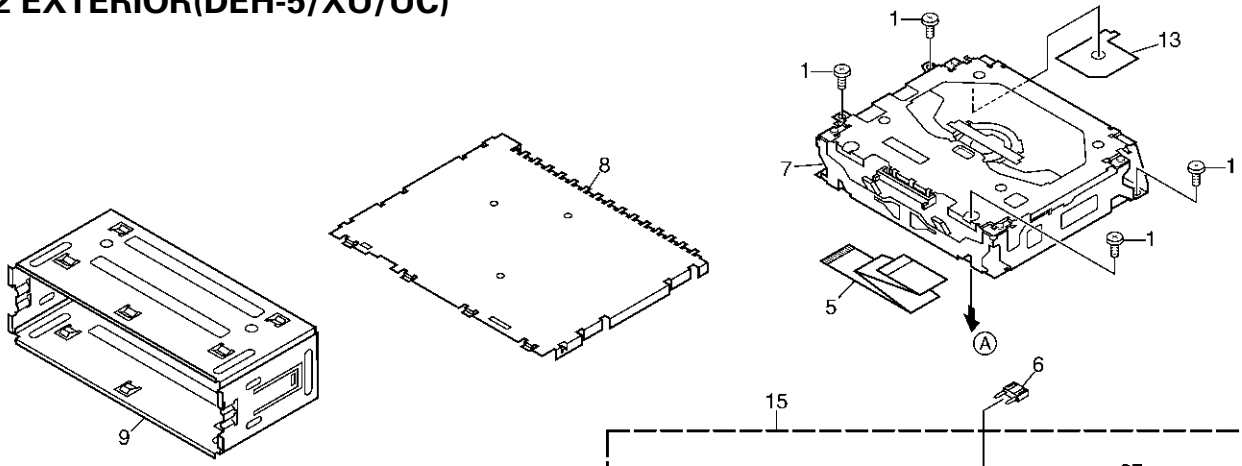
Mark No. Symbol and Description	Part No.		
	DEH-5/XU/UC	DEH-15/XU/UC	DEH-1500/XU/UC
11-1 Owner's Manual	CRD3666	CRD3664	CRD3664
11-2 Installation Manual	CRD3667	CRD3665	CRD3665
11-4 Caution Card	Not used	CRP1294	Not used
12 Catron	CHG4989	CHG4988	CHG4987
13 Contain Box	CHL4989	CHL4988	CHL4987
16 Fixing Screw(M2x4)	Not used	CBA1488	CBA1488

**● Owner's Manual, Installation Manual**

Model	Part No.	Language
DEH-5/XU/UC	CRD3666	English,French,Spanish
	CRD3667	
DEH-15/XU/UC	CRD3664	English,French,Spanish
DEH-1500/XU/UC	CRD3665	

# 2.2 EXTERIOR(DEH-5/XU/UC)

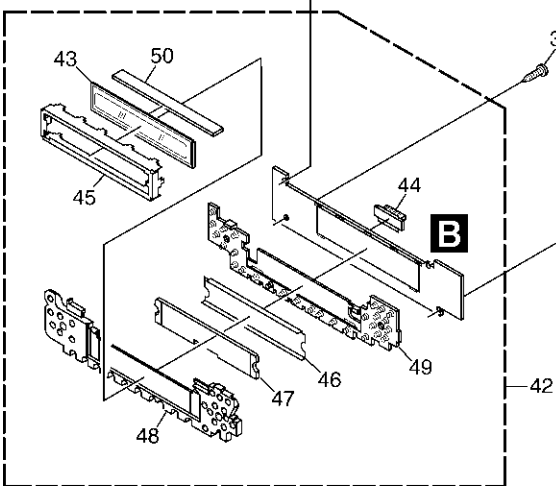
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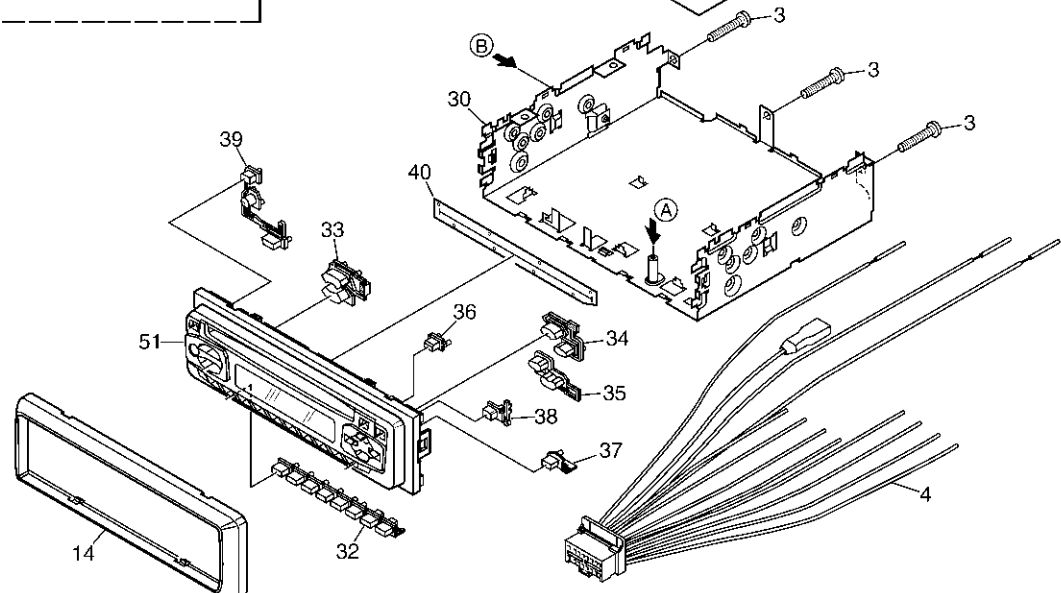
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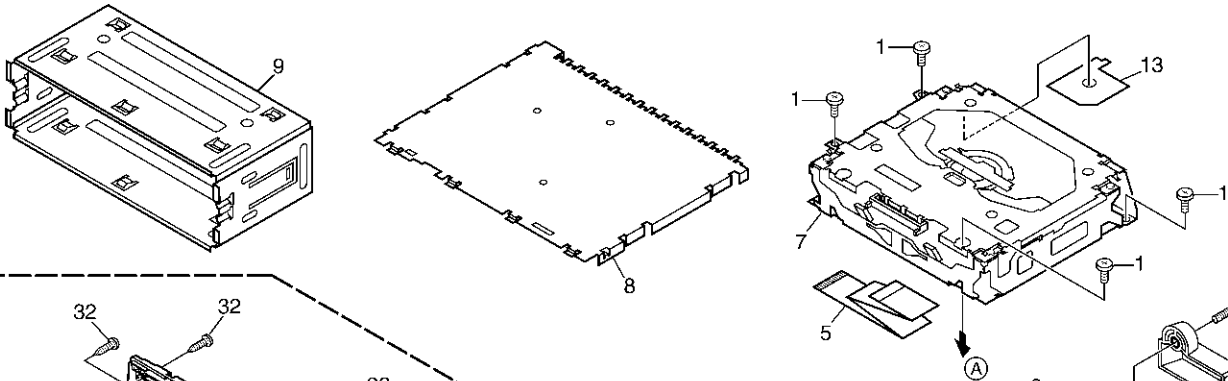


## ● EXTERIOR(DEH-5/XU/UC) SECTION PARTS LIST

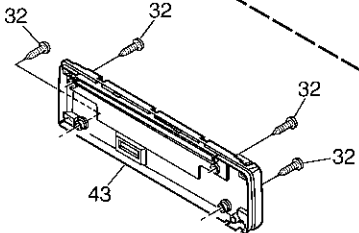
Mark No.	Description	Part No.	Mark No.	Description	Part No.	
1	Screw	BSZ26P060FTC	49	Rubber	CNV7368	A
2	Screw	BSZ30P060FTC	50	Connector	CNV7369	
3	Screw	BSZ30P200FTC				
4	Cord Assy	CDE7060	51	Grille Unit	CXB9805	
5	Cable	CDE7113	52	Screw	ISS26P055FTC	
6	Fuse(10A)	CEK1208	53	IC(IC302)	TDA7384	
7	CD Mechanism Module(S10)	CXK5600	54	Transistor(Q911,921,991)	2SD2375	
8	Case	CNB2793				
9	Holder	CNC8659				B
10	Earth Plate	CNC8915				
11	Cushion	CNM8275				
12	Insulator	CNM8059				
13	Insulator	CNM8174				
14	Panel	CNS7239				
15	Tuner Amp Unit	CWM8569				
16	Screw	ASZ26P060FTC				
17	Screw	BPZ26P080FTC				
18	Screw	BSZ26P160FTC				
19	Pin Jack(CN352)	CKB1028				C
20	Terminal(CN402)	CKF1059				
21	Plug(CN901)	CKM1376				
22	Connector(CN831)	CKS3581				
23	Connector(CN651)	CKS3835				
24	Antenna Jack(CN401)	CKX1056				
25	Holder	CND1241				
26	Holder	CND1328				
27	Heat Sink	CNR1668				
28	FM/AM Tuner Unit	CWE1646				D
29	Holder	CND1054				
30	Chassis Unit	CXB9542				
31	Screw	BPZ20P080FTC				
32	Button(1-6)	CAC7739				
33	Button(Volume)	CAC7740				
34	Button(Up)	CAC7741				
35	Button(Down)	CAC7742				
36	Button(Eject)	CAC7743				
37	Button(Audio)	CAC7745				
38	Button(Band)	CAC7746				E
39	Button(SRC-EQ)	CAC7841				
40	Cover	CNM7500				
41	Holder	CNV6867				
42	Keyboard Unit	CWM8577				
43	LCD(LCD1801)	CAW1756				
44	Connector(CN1801)	CKS3580				
45	Holder	CNC9617				
46	Sheet	CNM7932				
47	Lens	CNV7060				
48	Lighting Conductor	CNV7367				F

### 2.3 EXTERIOR(DEH-15/XU/UC,1500/XU/UC)

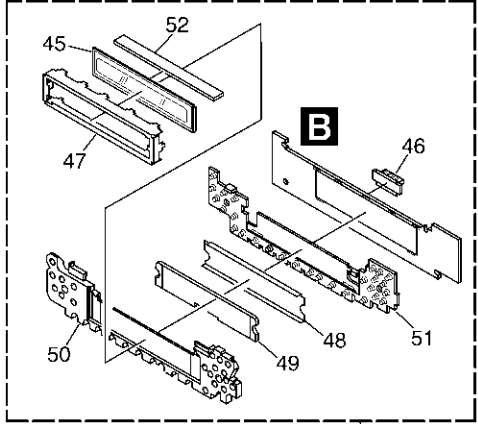
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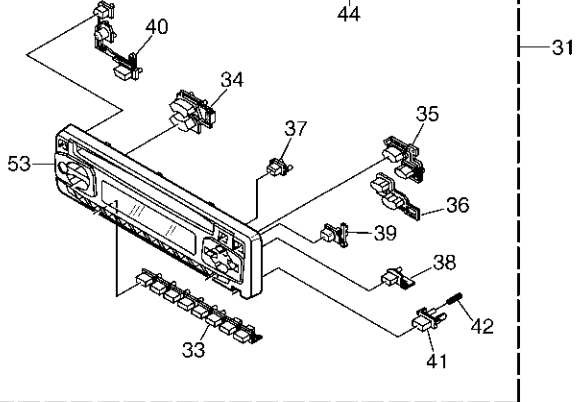
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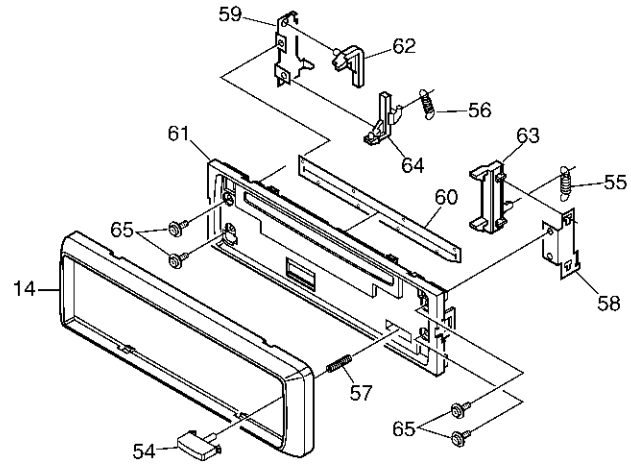
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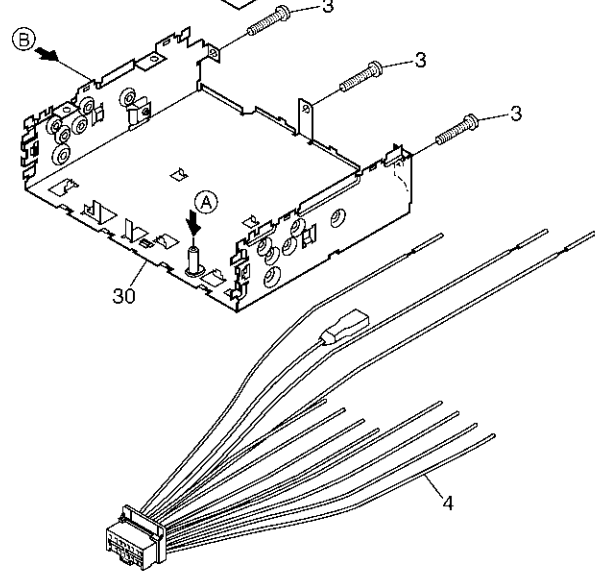
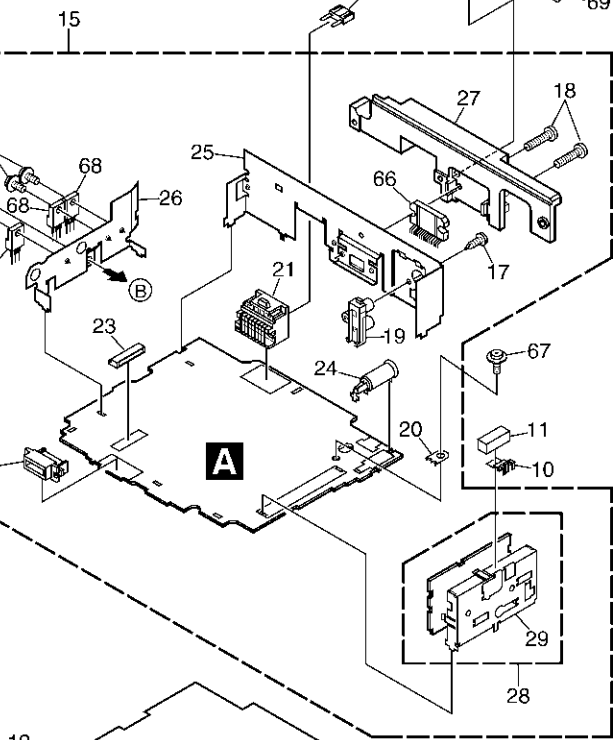
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### ● EXTERIOR(DEH-15/XU/UC, 1500/XU/UC) SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.	
1	Screw	BSZ26P060FTC		LCD(LCD1801)(DEH-1500)	CAW1733	A
2	Screw	BSZ30P060FTC	46	Connector(CN1801)	CKS3580	
3	Screw	BSZ30P200FTC	47	Holder	CNC9617	
4	Cord Assy	CDE7060	48	Sheet	CNM7932	
5	Cable	CDE7113				
6	Fuse(10A)	CEK1208	49	Lens	CNV7060	
7	CD Mechanism Module(S10)	CXK5600	50	Lighting Conductor	CNV7367	
8	Case	CNB2793	51	Rubber	CNV7368	
9	Holder	CNC8659	52	Connector	CNV7369	
10	Earth Plate	CNC8915	53	Grille Unit(DEH-15)	CXB9870	B
				Grille Unit(DEH-1500)	CXB9869	
11	Cushion	CNM8275	54	Button	CAC4836	
12	Insulator	CNM8059	55	Spring	CBH1835	
13	Insulator	CNM8174	56	Spring	CBH2208	
14	Panel	CNS7239	57	Spring	CBH2367	
15	Tuner Amp Unit(DEH-15)	CWM8568	58	Bracket	CNC6791	
	Tuner Amp Unit(DEH-1500)	CWM8794				
16	Screw	ASZ26P060FTC	59	Holder	CNC8042	
17	Screw	BPZ26P080FTC	60	Cover	CNM6276	
18	Screw	BSZ26P160FTC	61	Panel	CNS7238	
19	Pin Jack(CN352)	CKB1028	62	Arm	CNV4692	C
20	Terminal(CN402)	CKF1059	63	Arm	CNV4728	
21	Plug(CN901)	CKM1376	64	Arm	CNV5576	
22	Connector(CN831)	CKS3581	65	Screw	IMS20P030FZK	
23	Connector(CN651)	CKS3835	66	IC(IC302)	PAL007A	
24	Antenna Jack(CN401)	CKX1056	67	Screw	ISS26P055FTC	
25	Holder	CND1241	68	Transistor(Q911,921,991)	2SD1275	
26	Holder	CND1328	69	Holder(DEH-15)	CNV7619	
27	Heat Sink	CNR1668	70	Screw(DEH-15)	BMZ40P140FTC	D
28	FM/AM Tuner Unit	CWE1646				
29	Holder	CND1054				
30	Chassis Unit	CXB9542				
31	Detach Grille Assy(DEH-15)	CXB9571				
	Detach Grille Assy(DEH-1500)	CXC1127				
32	Screw	BPZ20P100FZK				
33	Button(1-6)	CAC7739				
34	Button(Volume)	CAC7740				
35	Button(Up)	CAC7741				
36	Button(Down)	CAC7742				E
37	Button(Eject)	CAC7743				
38	Button(Band)	CAC7745				
39	Button(Audio)	CAC7746				
40	Button(SRC-EQ)	CAC7749				
41	Button(Detach)	CAC7753				
42	Spring	CBH2210				
43	Cover	CNS7232				
44	Keyboard Unit(DEH-15)	CWM8576				
	Keyboard Unit(DEH-1500)	CWM8795				
45	LCD(LCD1801)(DEH-15)	CAW1765				F

# 2.4 CD MECHANISM MODULE

A

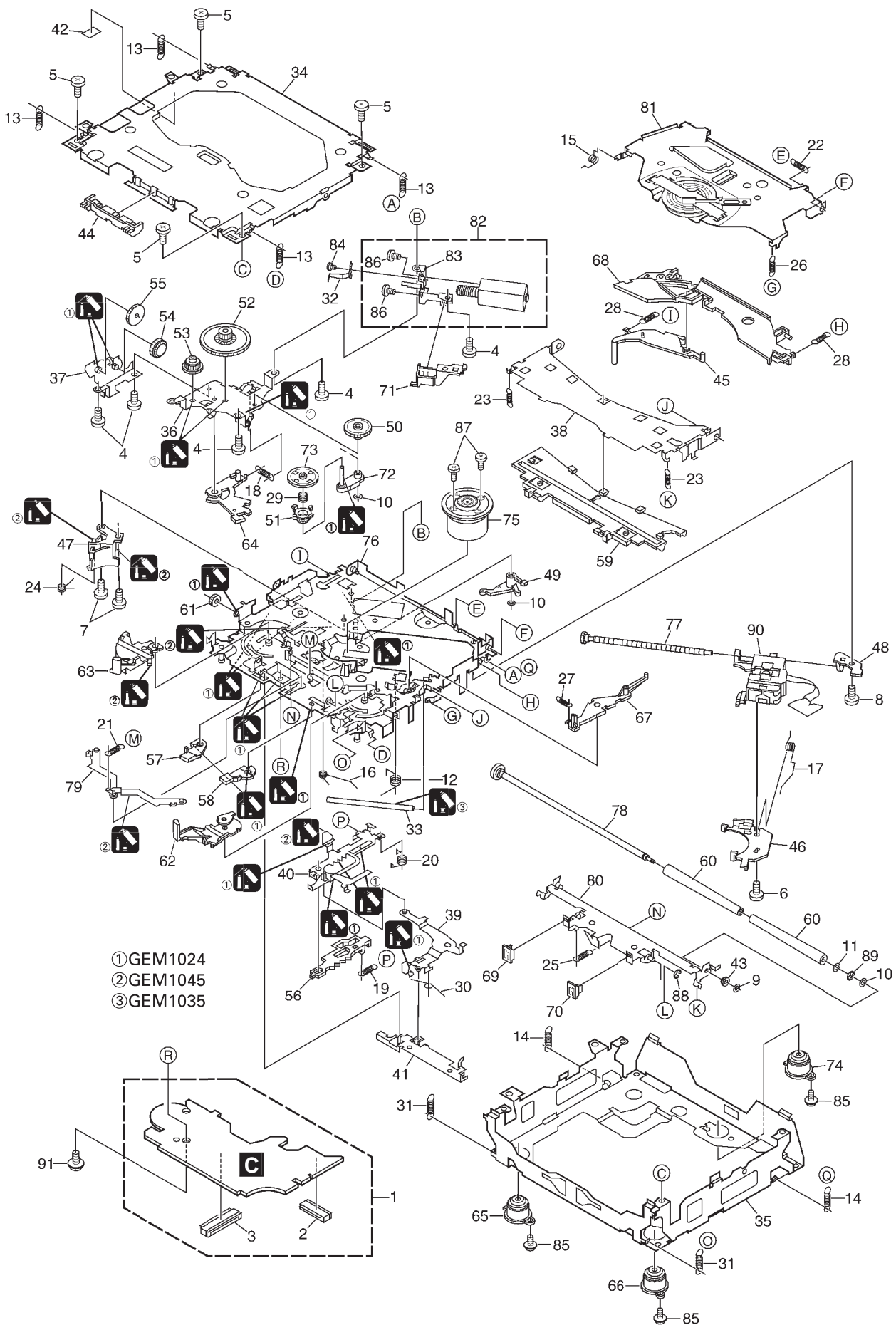
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- ① GEM1024
- ② GEM1045
- ③ GEM1035

## ● CD MECHANISM MODULE SECTION PARTS LIST

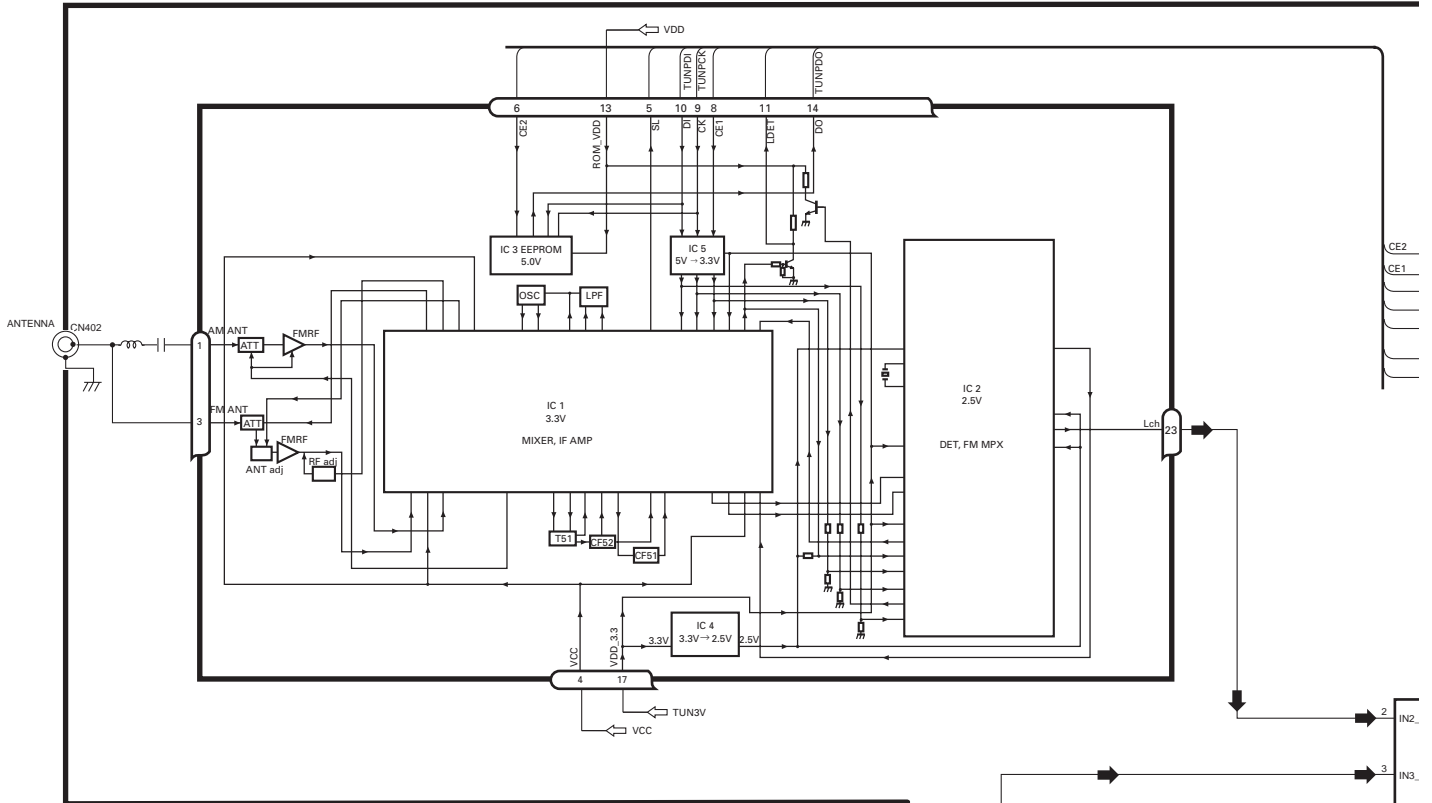
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	CD Core Unit(S10)	CWX2708	48	Holder	CNV7202
2	Connector(CN101)	CKS4182	49	Arm	CNV7203
3	Connector(CN701)	CKS4188	50	Gear	CNV7207
4	Screw	BMZ20P035FTC			
5	Screw	BSZ20P040FTC	51	Gear	CNV7208
			52	Gear	CNV7209
6	Screw(M2x4)	CBA1362	53	Gear	CNV7210
7	Screw(M2x3)	CBA1511	54	Gear	CNV7211
8	Screw(M2x3)	CBA1527	55	Gear	CNV7212
9	Washer	CBF1037			
10	Washer	CBF1038	56	Rack	CNV7214
			57	Arm	CNV7215
11	Washer	CBF1060	58	Arm	CNV7216
12	Spring	CBH2390	59	Guide	CNV7217
13	Spring	CBH2606	60	Roller	CNV7218
14	Spring	CBH2607			
15	Spring	CBH2608	61	Gear	CNV7219
			62	Arm	CNV7221
16	Spring	CBH2609	63	Arm	CNV7220
17	Spring	CBH2610	64	Arm	CNV7222
18	Spring	CBH2611	65	Damper	CNV7313
19	Spring	CBH2612			
20	Spring	CBH2613	66	Damper	CNV7314
			67	Arm	CNV7341
21	Spring	CBH2614	68	Arm	CNV7342
22	Spring	CBH2615	69	Guide	CNV7360
23	Spring	CBH2616	70	Guide	CNV7361
24	Spring	CBH2617			
25	Spring	CBH2620	71	Holder	CNV7437
			72	Arm	CNV7444
26	Spring	CBH2621	73	Gear	CNV7595
27	Spring	CBH2641	74	Damper	CNV7618
28	Spring	CBH2642	75	Motor Unit(M1)	CXB6007
29	Spring	CBH2643			
30	Spring	CBH2659	76	Chassis Unit	CXB8728
			77	Screw Unit	CXB8729
31	Spring	CBH2688	78	Gear Unit	CXB8731
* 32	Spring	CBL1614	79	Arm Unit	CXB8732
33	Shaft	CLA3845	80	Arm Unit	CXB8735
34	Frame	CNC9962			
35	Frame	CNC9963	81	Arm Unit	CXB8852
			82	Motor Unit(M2)	CXB8933
36	Bracket	CNC9966	83	Bracket	CNC9985
37	Bracket	CNC9967	84	Screw	JFZ20P020FTC
38	Arm	CNC9968	85	Screw(M2x5)	EBA1028
39	Arm	CNC9973			
40	Lever	CNC9983	86	Screw	JFZ20P020FTC
			87	Screw	JGZ17P022FTC
41	Lever	CNC9984	88	Washer	YE15FTC
42	Sheet	CNM8134	89	Washer	YE20FTC
43	Collar	CNV6906	90	Pickup Unit(Service)(P10)	CXX1641
44	Guide	CNV6925			
45	Arm	CNV7198	91	Screw	IMS26P030FMC
46	Rack	CNV7199			
47	Holder	CNV7201			

# 3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

## 3.1 BLOCK DIAGRAM

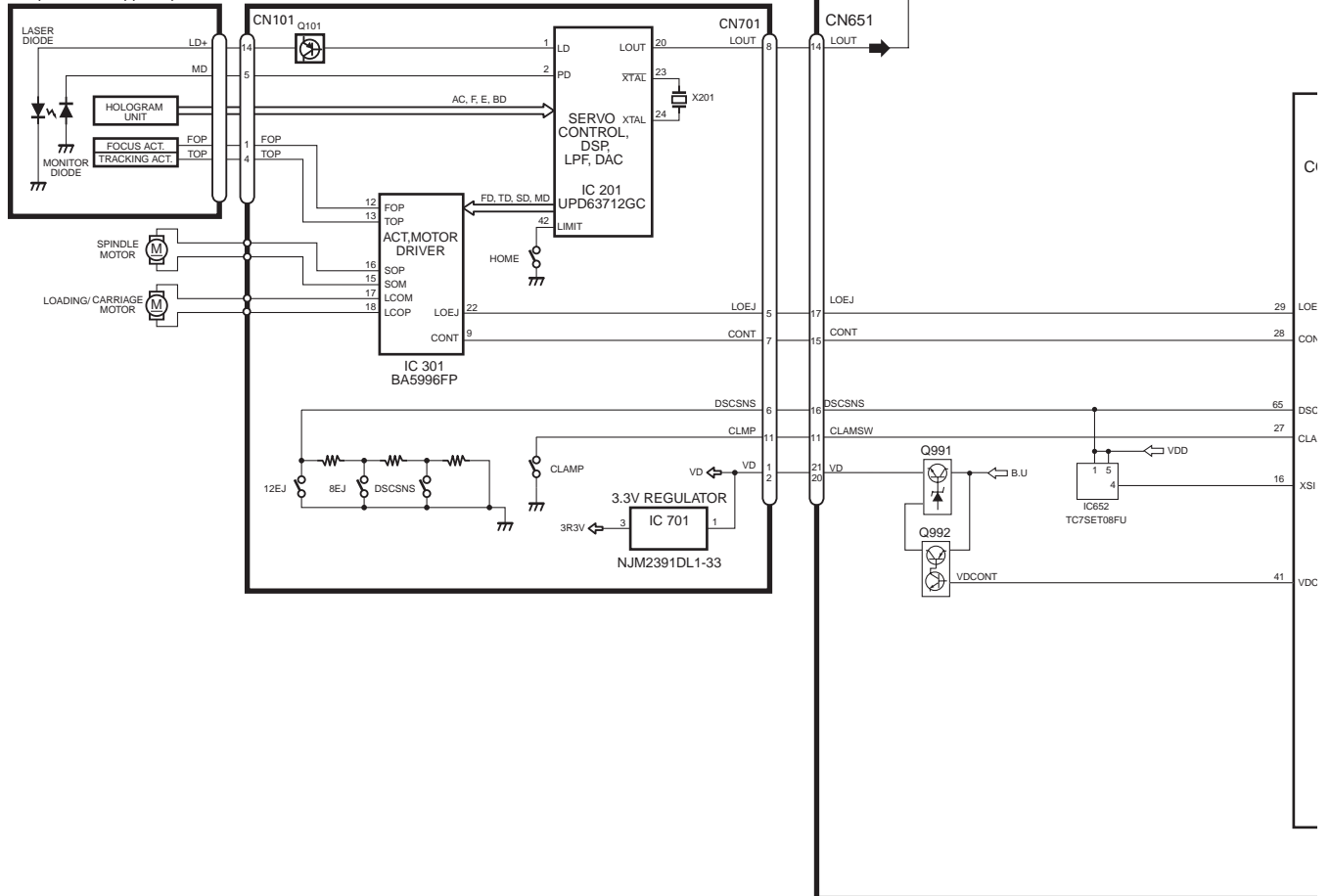
● DEH-5/XU/UC

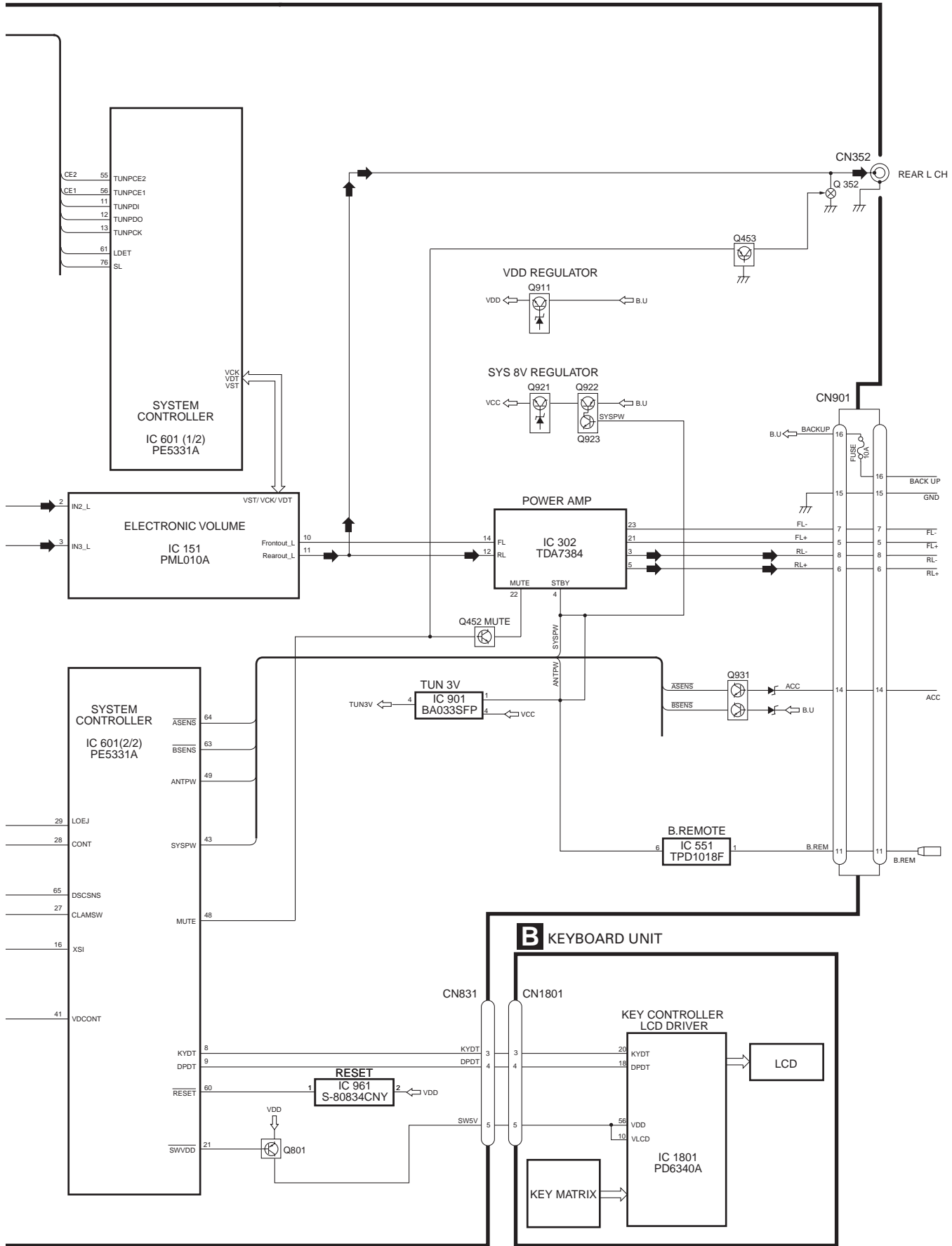
### A TUNER AMP UNIT



### PICKUP UNIT (SERVICE)(P10)

### C CD CORE UNIT(S10)





A

B

C

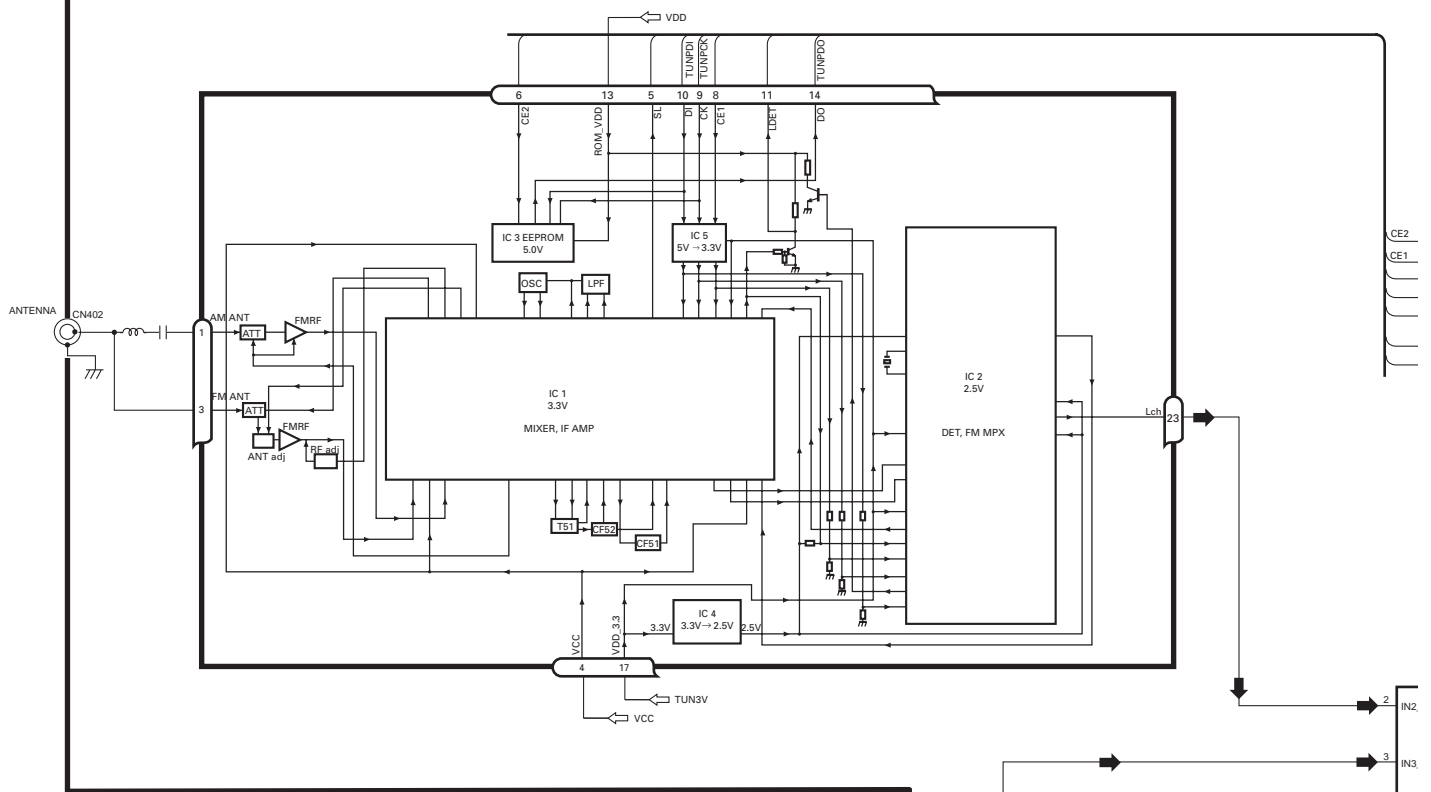
D

E

F

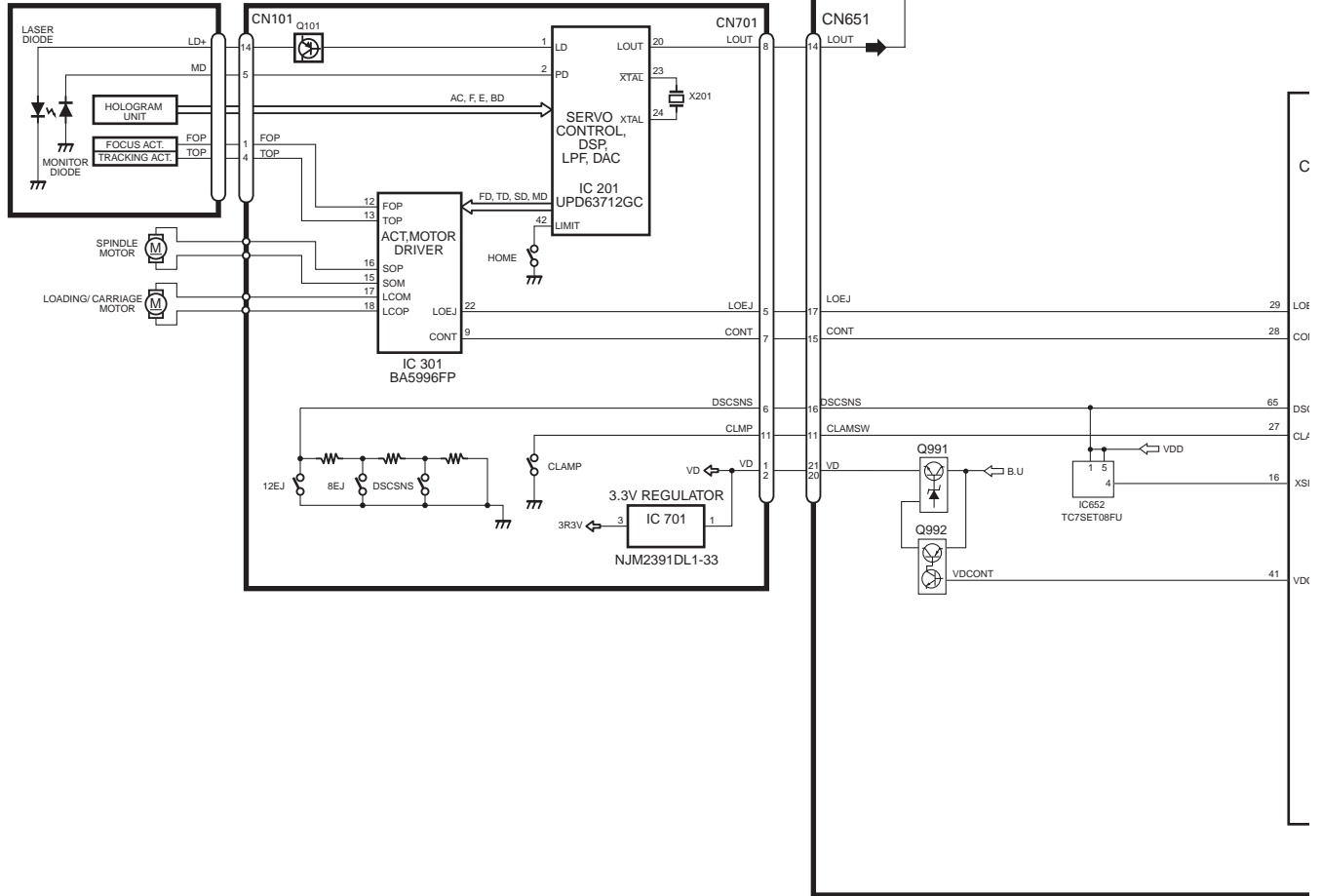
● DEH-15/XU/UC,1500/XU/UC

**A** TUNER AMP UNIT

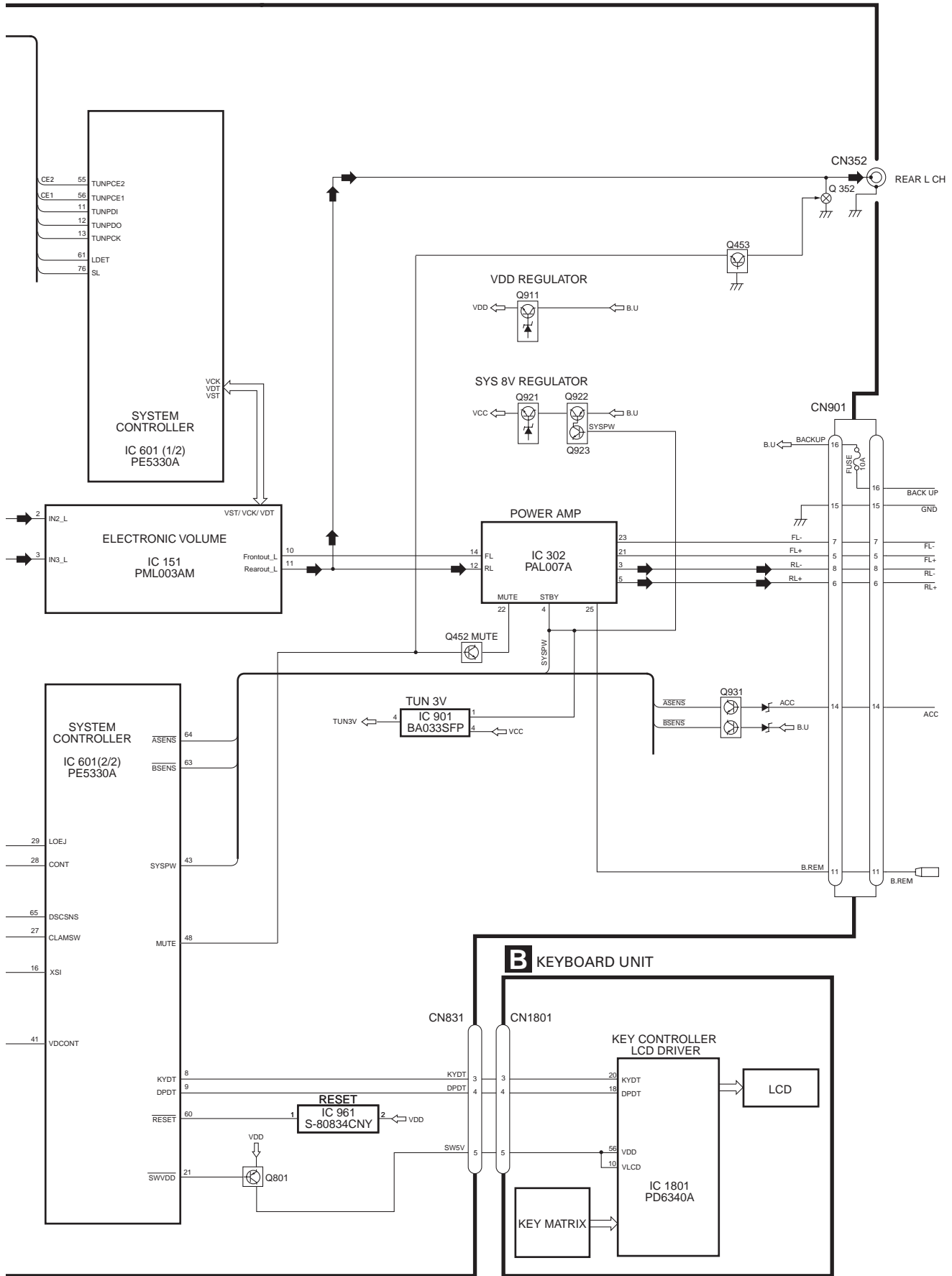


PICKUP UNIT (SERVICE)(P10)

**C** CD CORE UNIT (S10)







A

B

C

D

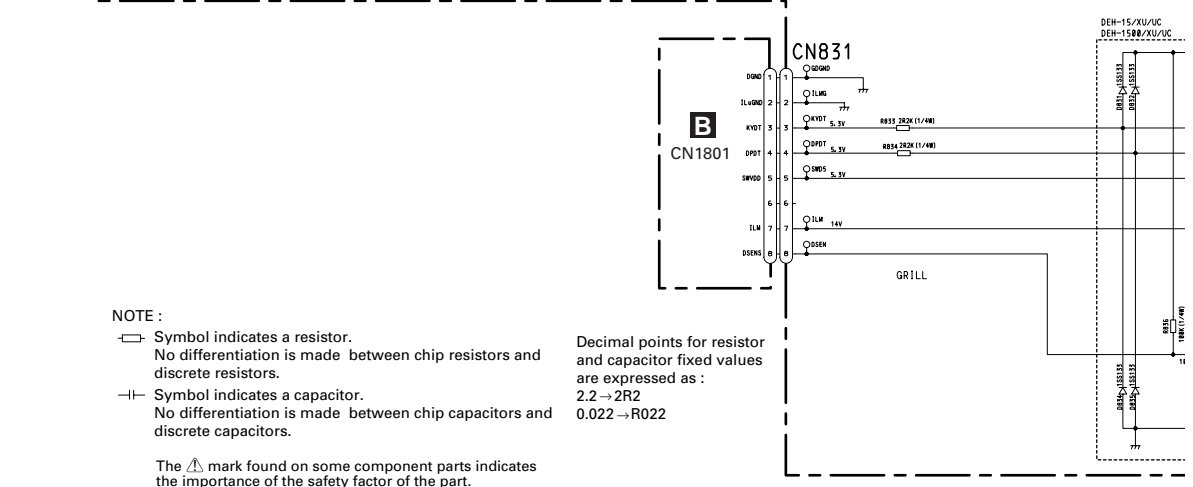
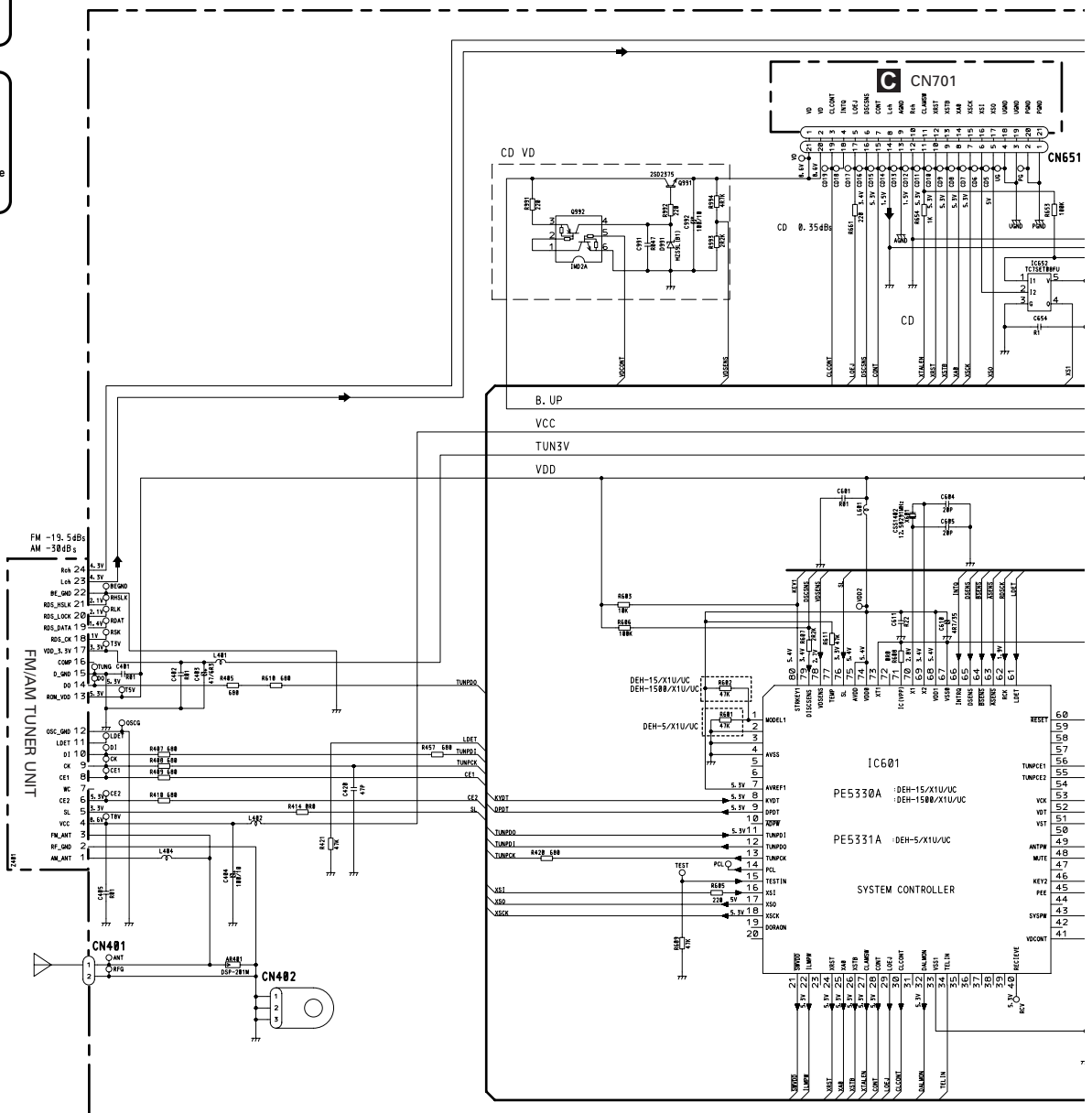
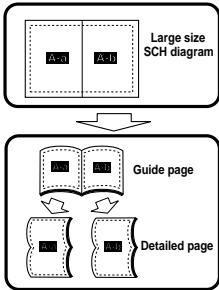
E

F

### 3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to " EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

# A-a



- NOTE :
- Symbol indicates a resistor.  
No differentiation is made between chip resistors and discrete resistors.
  - |— Symbol indicates a capacitor.  
No differentiation is made between chip capacitors and discrete capacitors.

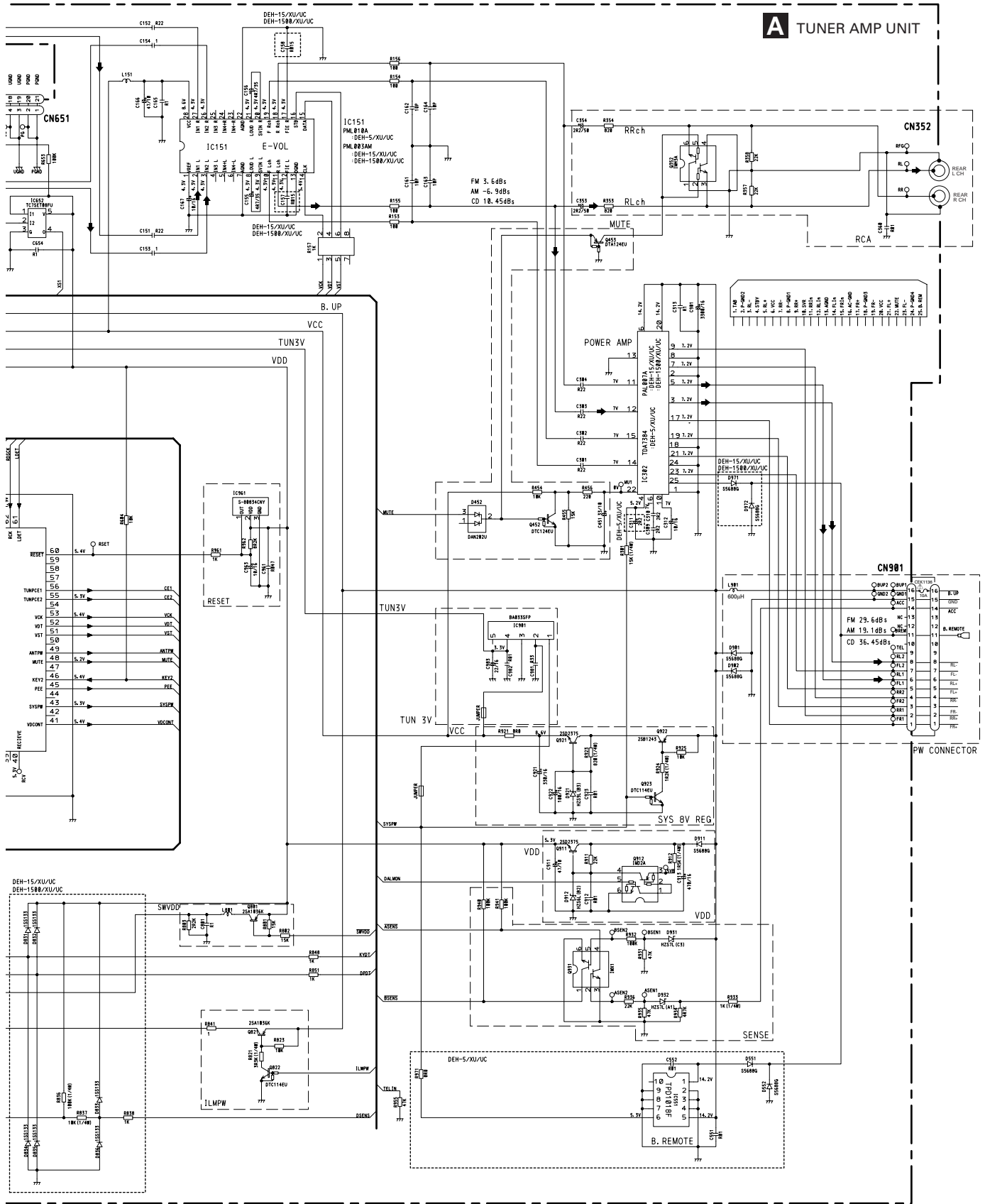
Decimal points for resistor and capacitor fixed values are expressed as :  
2.2 → 2R2  
0.022 → R022

The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

# A

# A-b

## A TUNER AMP UNIT



A-b

A

B

C

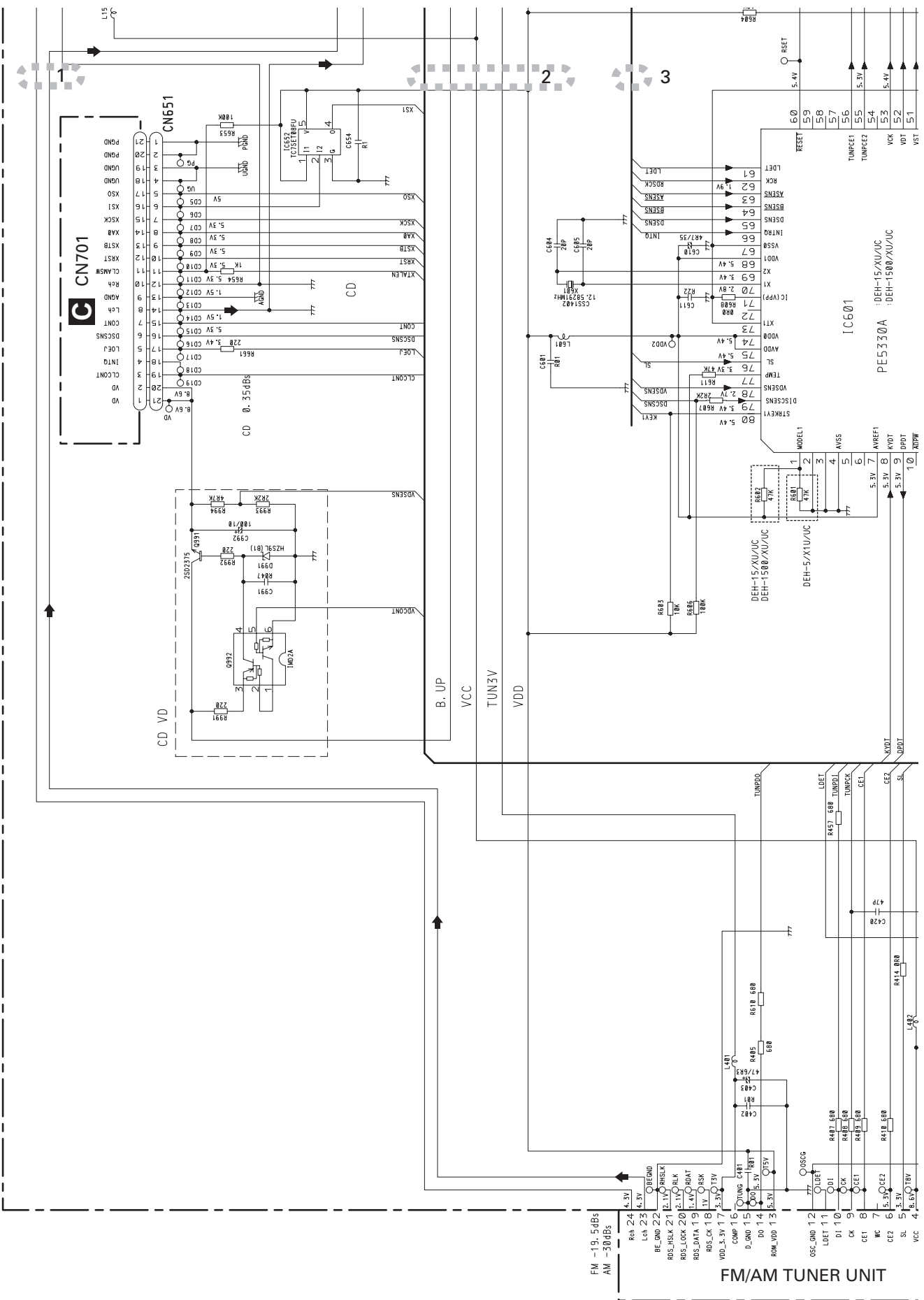
D

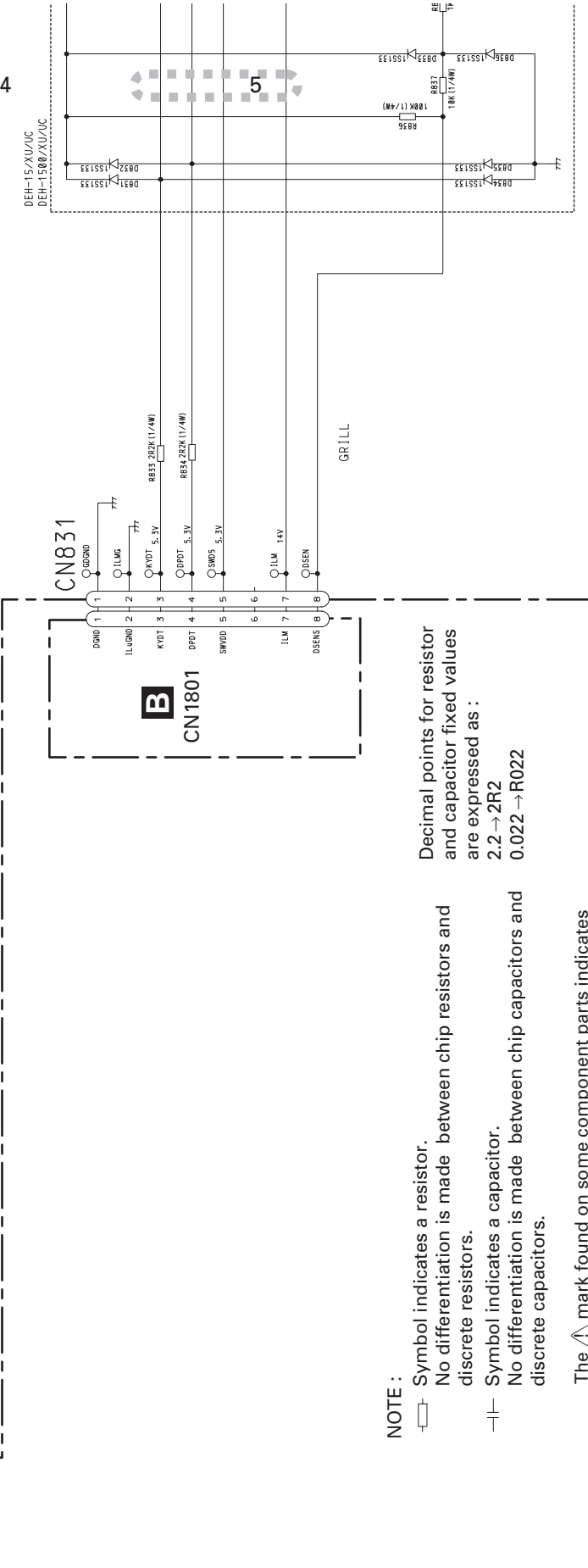
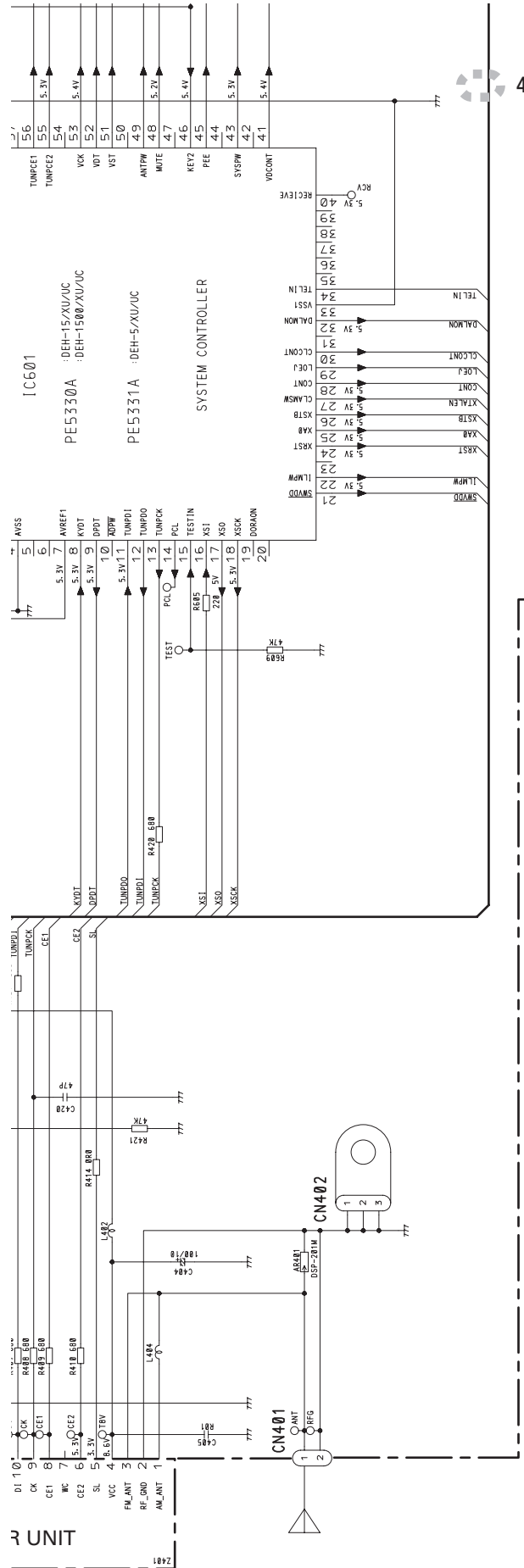
E

F

A-a A-b

A-a





**NOTE :**

- Symbol indicates a resistor.  
No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor.  
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as :  
2.2 → 2R2  
0.022 → R022

The  $\triangle$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

R UNIT

A-b

A-a

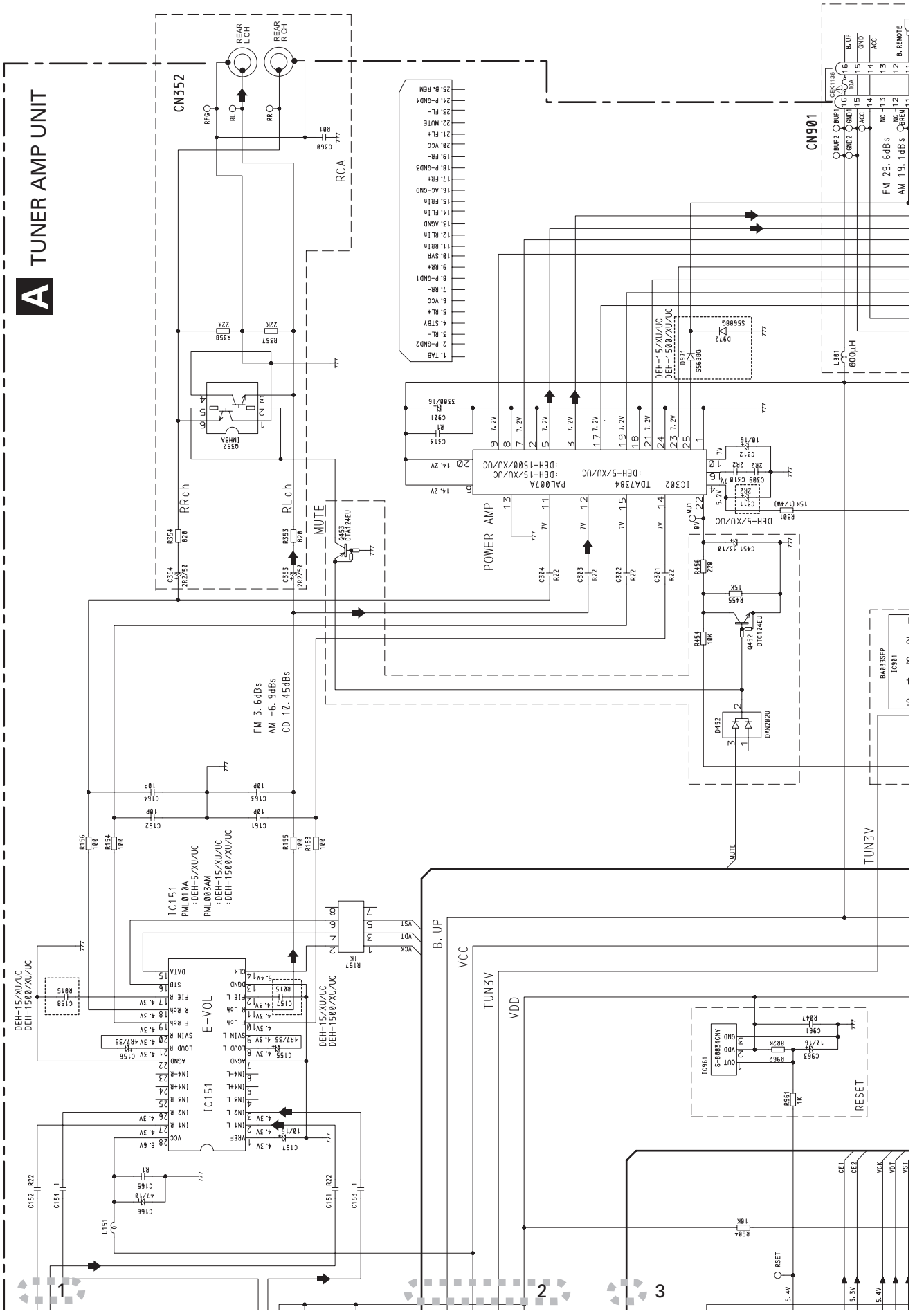
A B C D E F

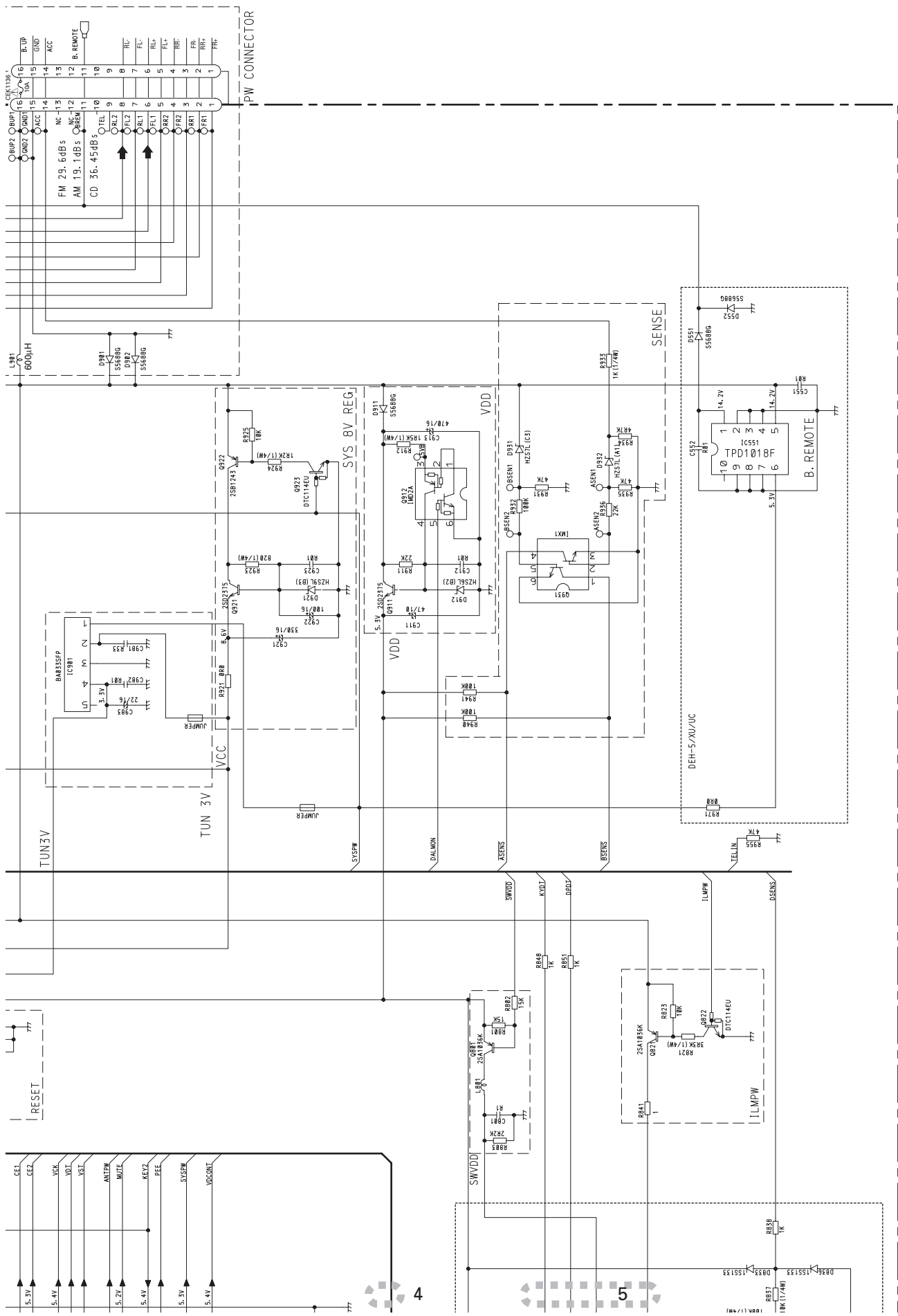
A-a A-b

# A TUNER AMP UNIT

A-a

A-b





A-a A-b

A-b

### 3.3 KEYBOARD UNIT

A

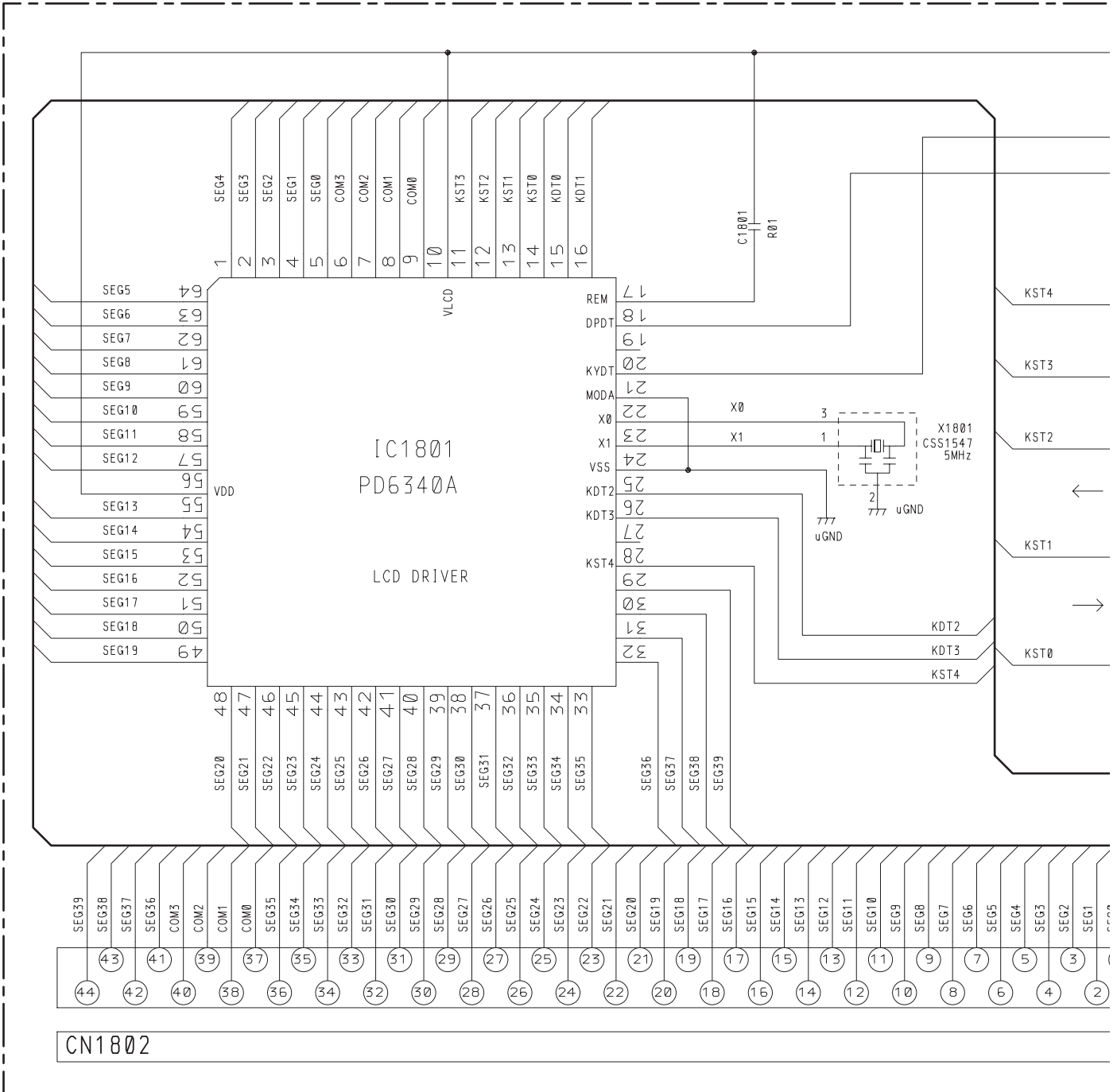
B

C

D

E

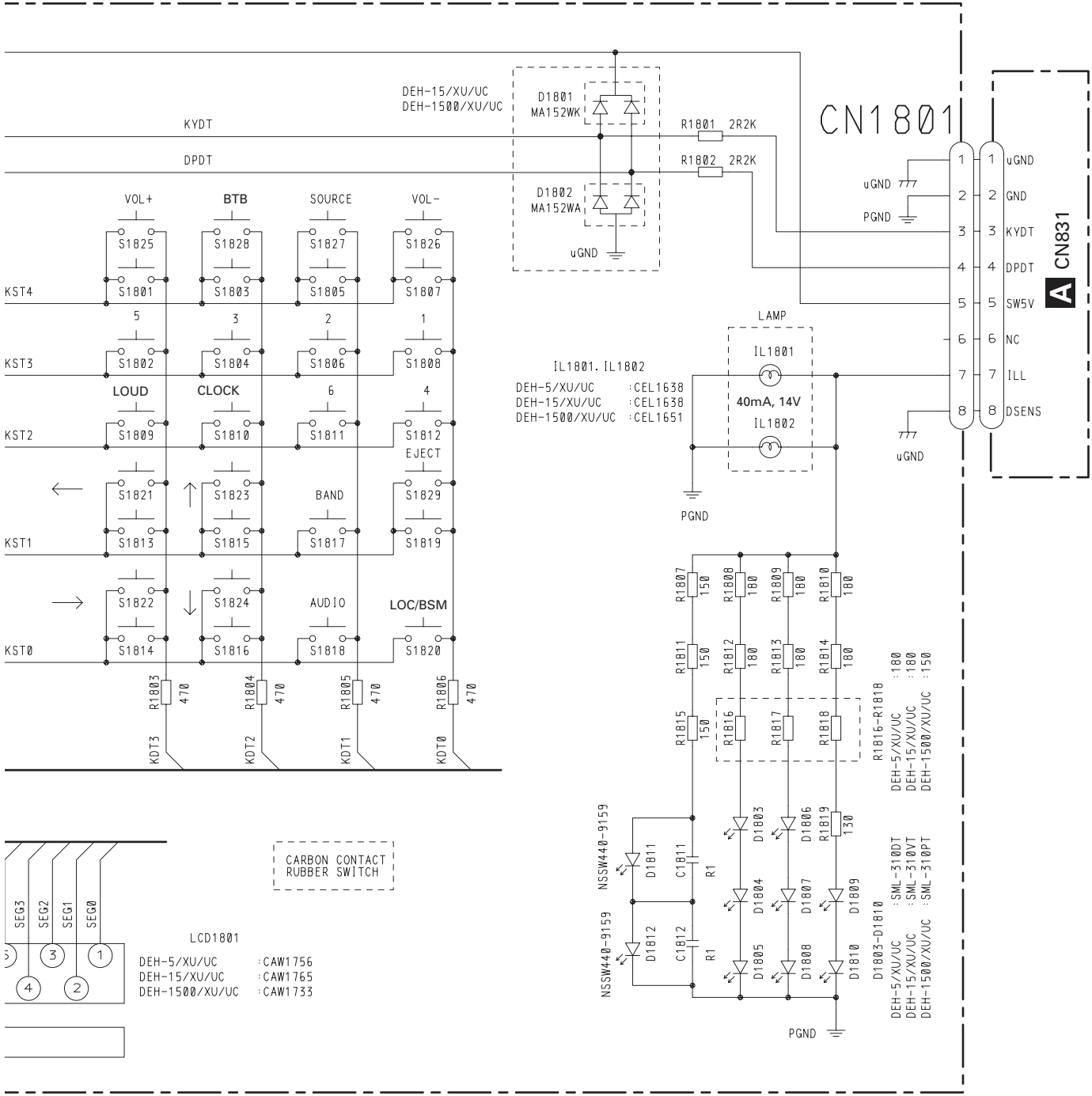
F



**B**



# B KEYBOARD UNIT



# 3.4 CD MECHANISM MODULE

A

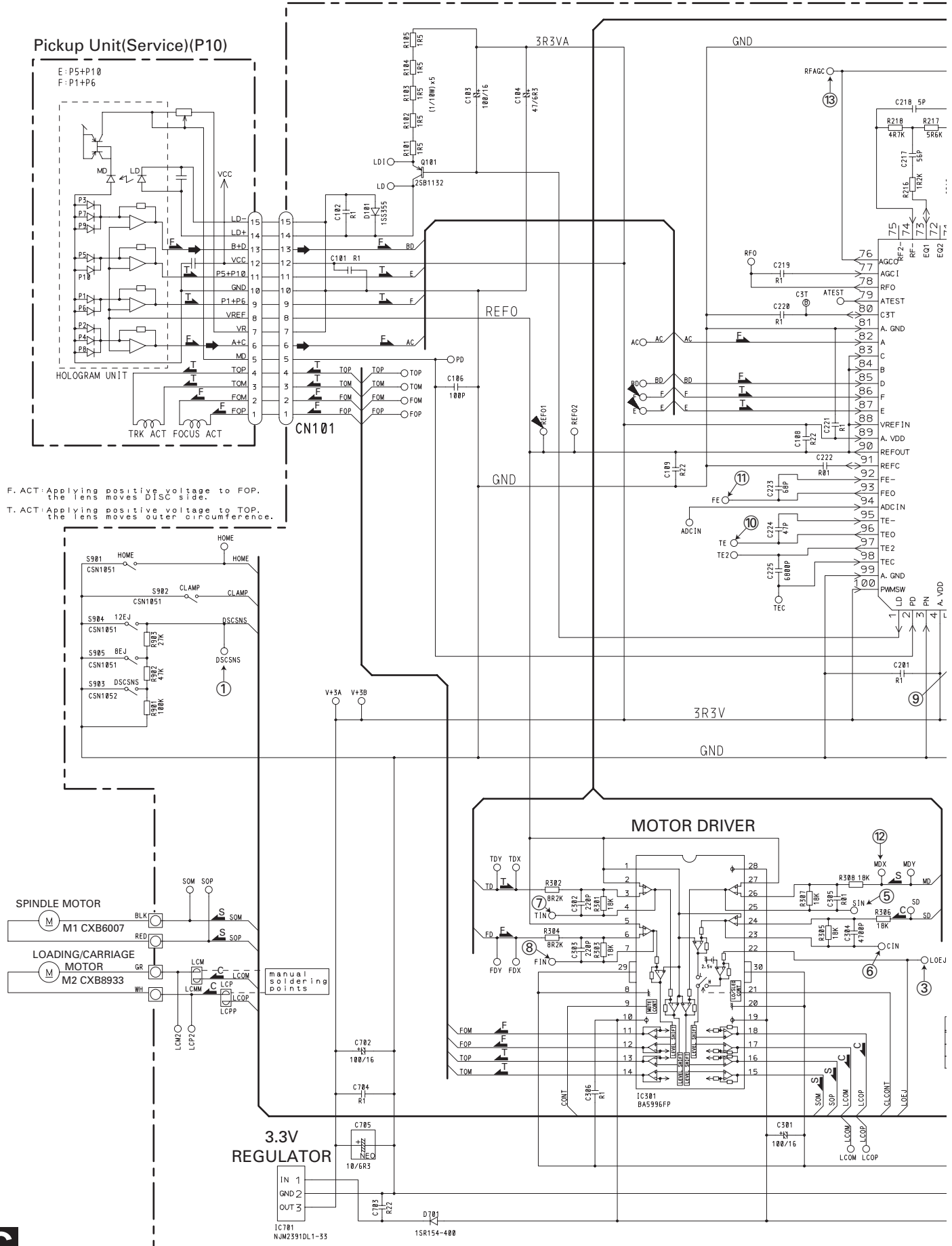
B

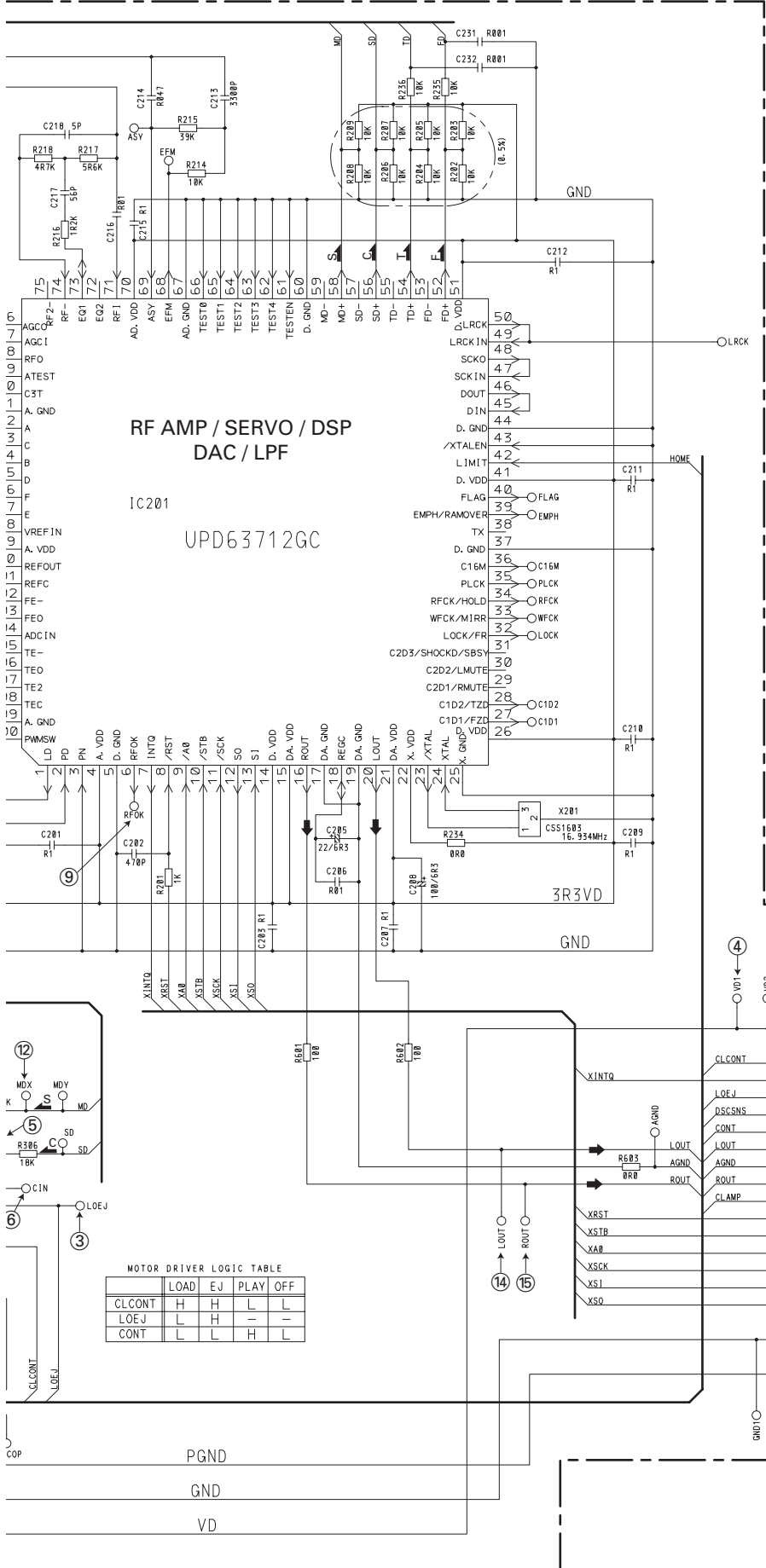
C

D

E

F





**RF AMP / SERVO / DSP  
DAC / LPF**

IC201  
UPD63712GC

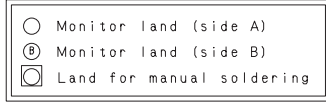
MOTOR DRIVER LOGIC TABLE

	LOAD	EJ	PLAY	OFF
CLCONT	H	H	L	L
LOEJ	L	H	-	-
CONT	L	L	H	L

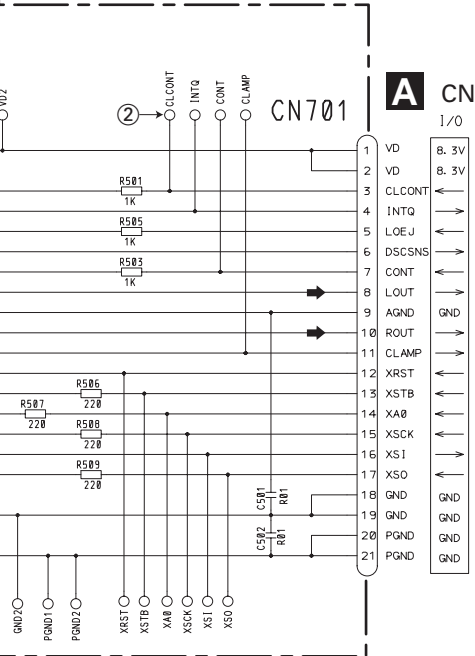
- ➔ SIGNAL LINE
- Ⓣ FOCUS SERVO LINE
- Ⓜ TRACKING SERVO LINE
- Ⓒ CARRIAGE SERVO LINE
- Ⓢ SPINDLE SERVO LINE

**SWITCHES:**  
 CD CORE UNIT  
 S901 : HOME SWITCH.....ON-OFF  
 S902 : CLAMP SWITCH.....ON-OFF  
 S903 : DSCSNS SWITCH....ON-OFF  
 S904 : 12EJ SWITCH....ON-OFF  
 S905 : 8EJ SWITCH.....ON-OFF  
 The underlined indicates the switch position.

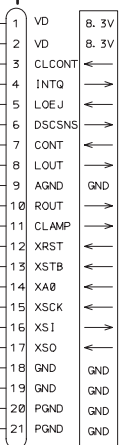
NOTE1)  
 GND ... CD LSI  
 PGND ... Actuator, Motor Driver  
 AGND ... Audio  
 These GND's are not connected to each other on PCB.  
 PGND is connected to a floating mechanism part by a screw.



**C CD CORE UNIT (S10)**



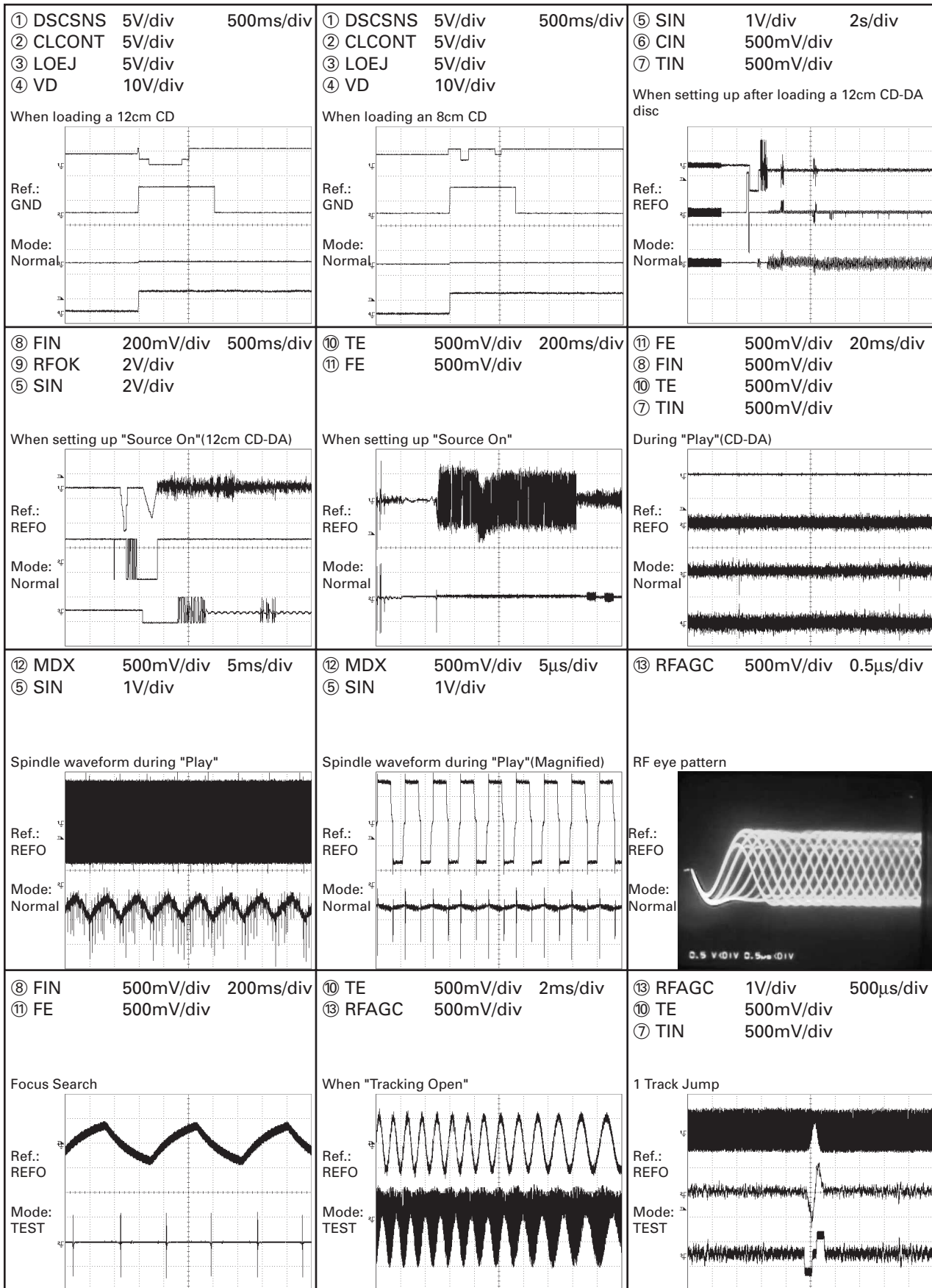
**A CN651**  
1/0

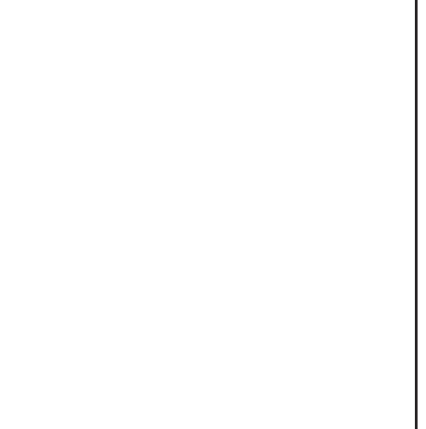
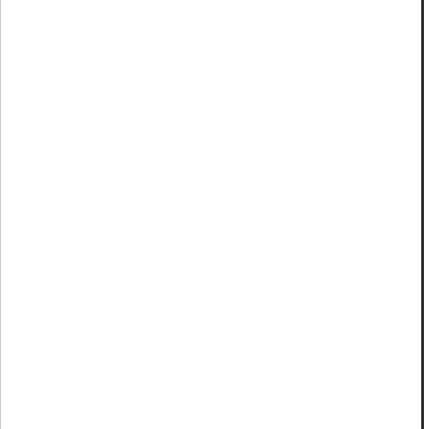
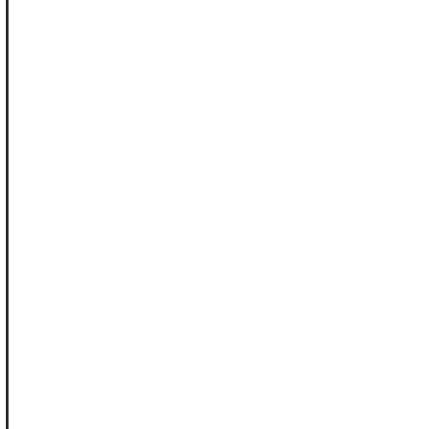
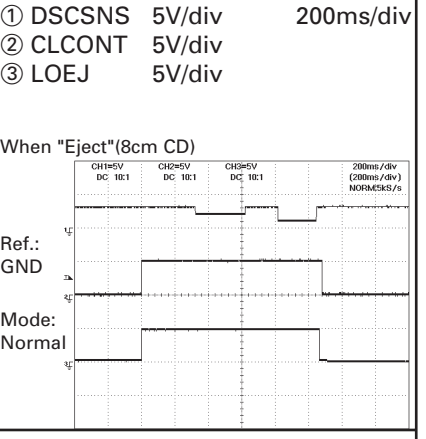
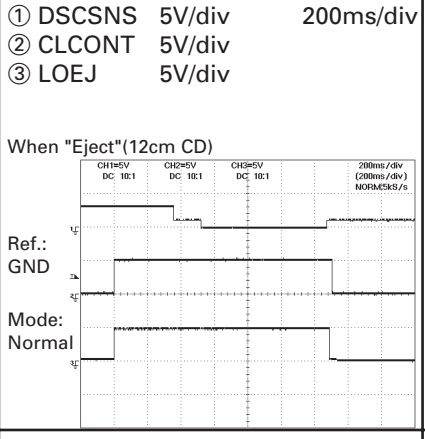
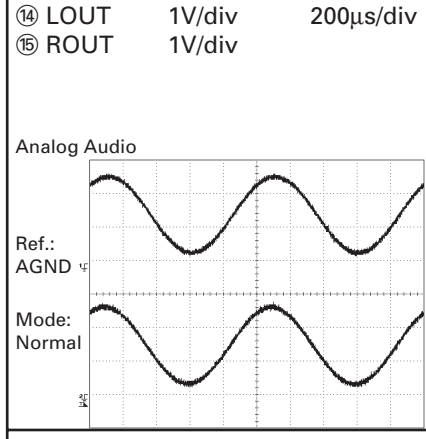
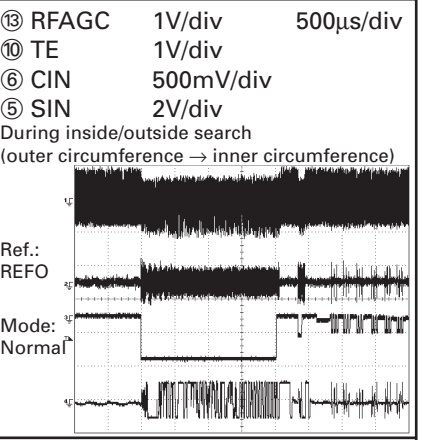
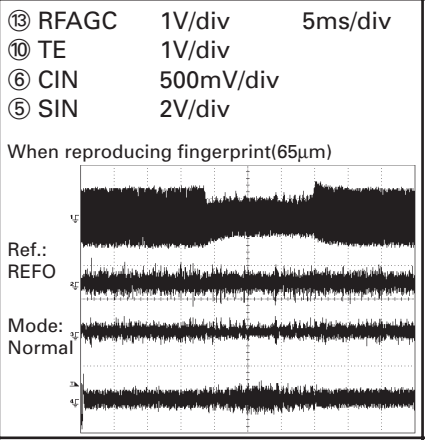
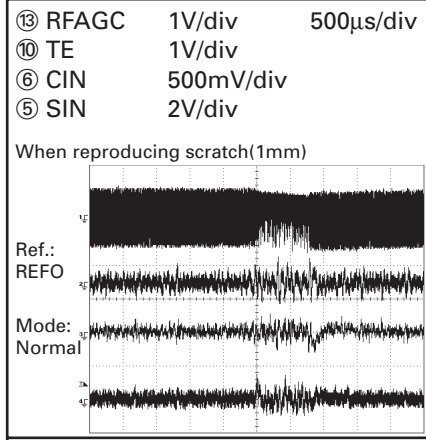
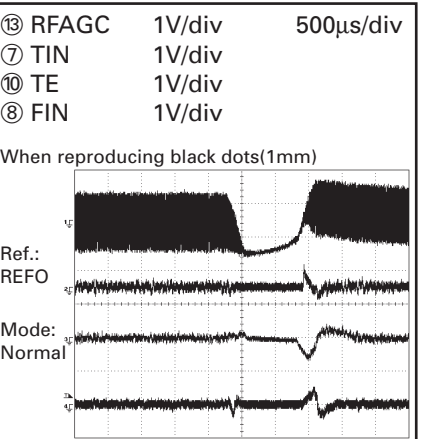
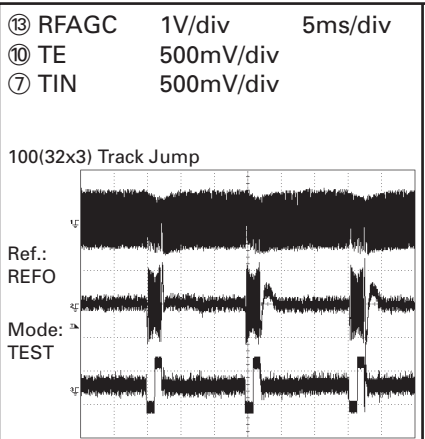
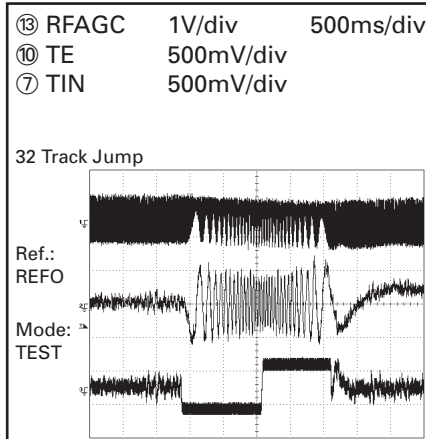


A  
B  
C  
D  
E  
F

## Waveforms

Note : 1. The encircled numbers denote measuring points in the circuit diagram.  
2. Reference voltage REFO1(1.65V)





# 4. PCB CONNECTION DIAGRAM

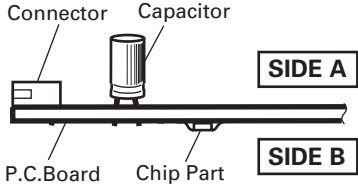
## 4.1 TUNER AMP UNIT

A

### NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.  
 For further information for respective destinations, be sure to check with the schematic diagram.

2. Viewpoint of PCB diagrams



### A TUNER AMP UNIT

B

C

D

E

F

IC, Q

IC302

Q921

Q911

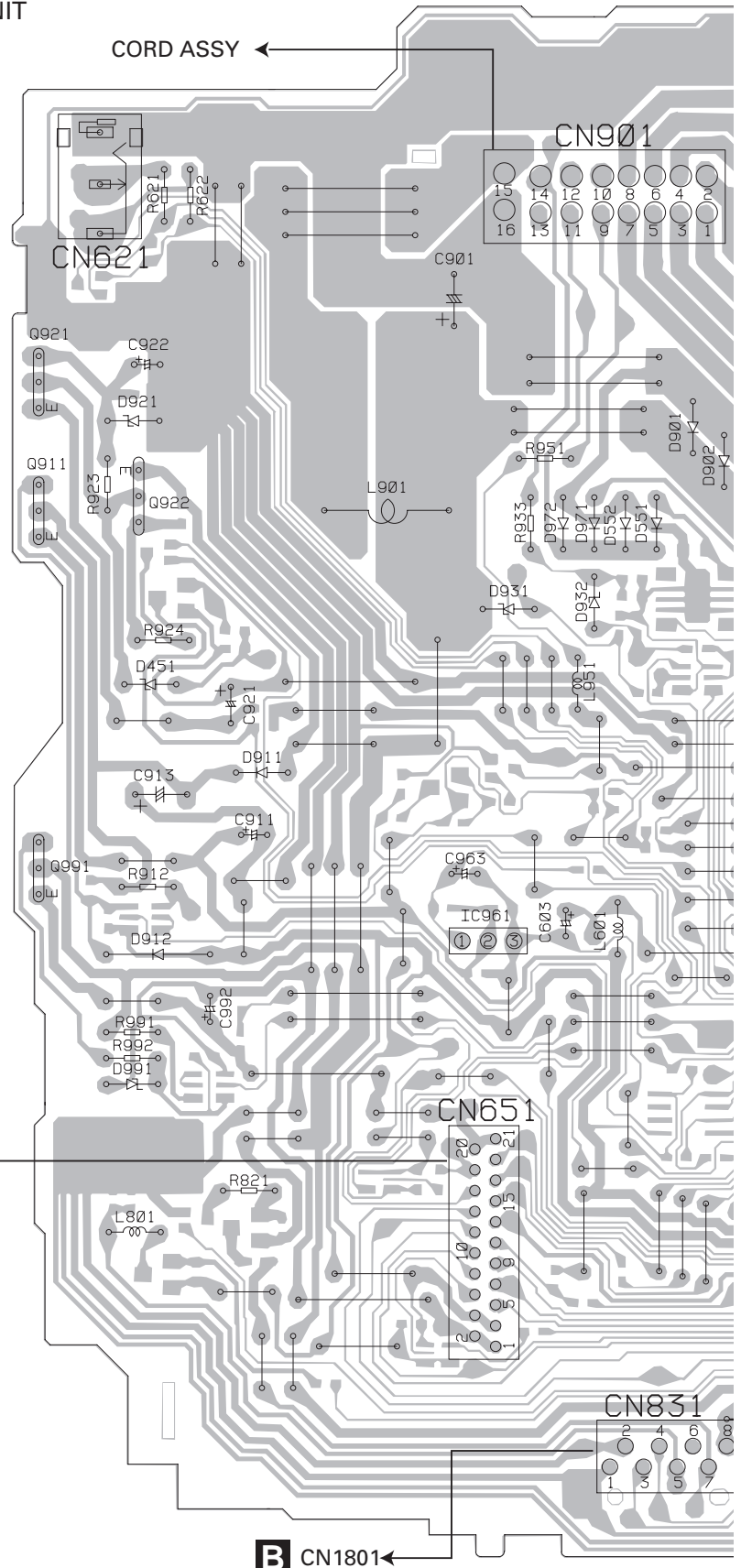
Q922

Q991

IC961

Q983

CORD ASSY ←

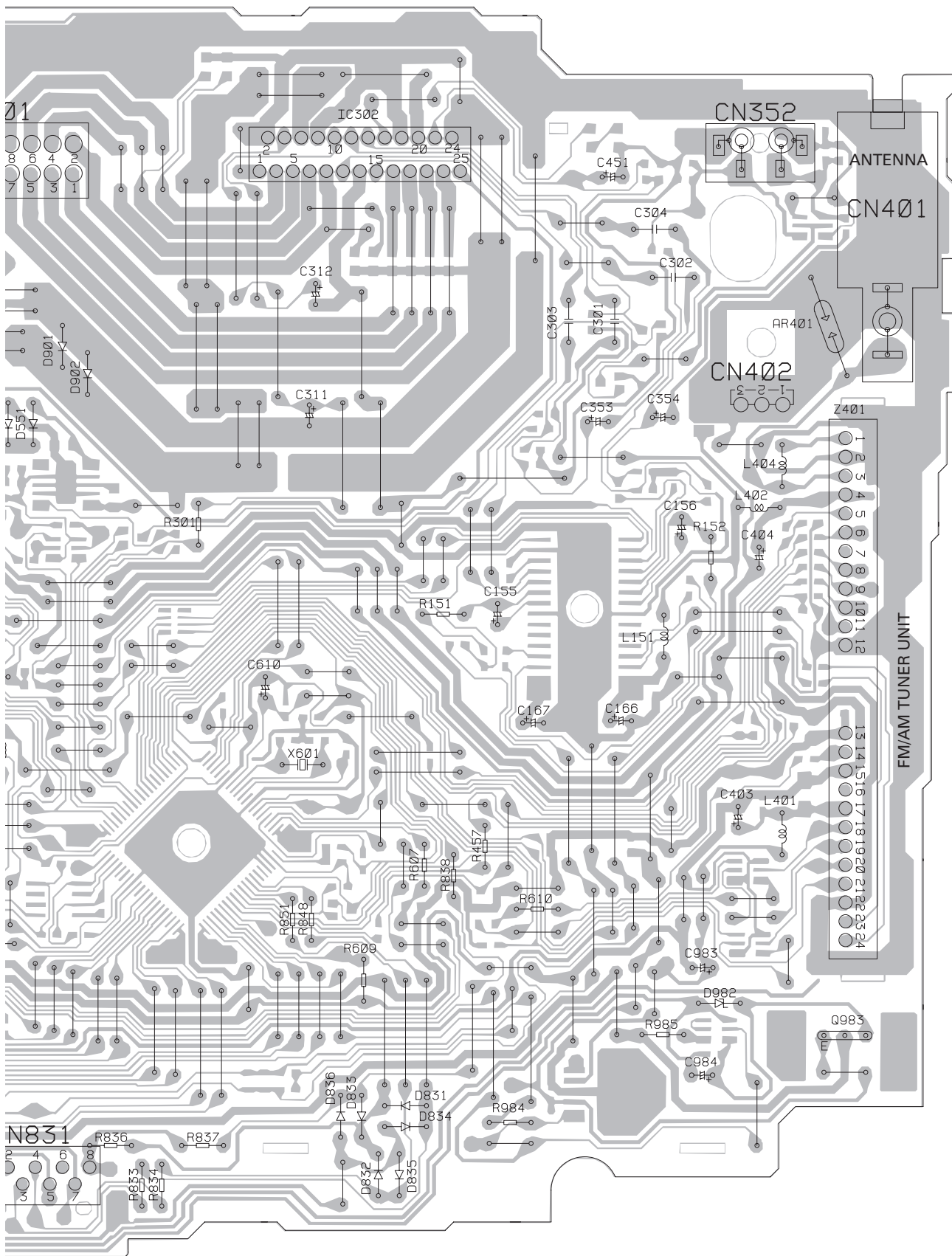


C CN701 ←

B CN1801 ←

A

**SIDE A**



FRONT

**A**

A

# A TUNER AMP UNIT

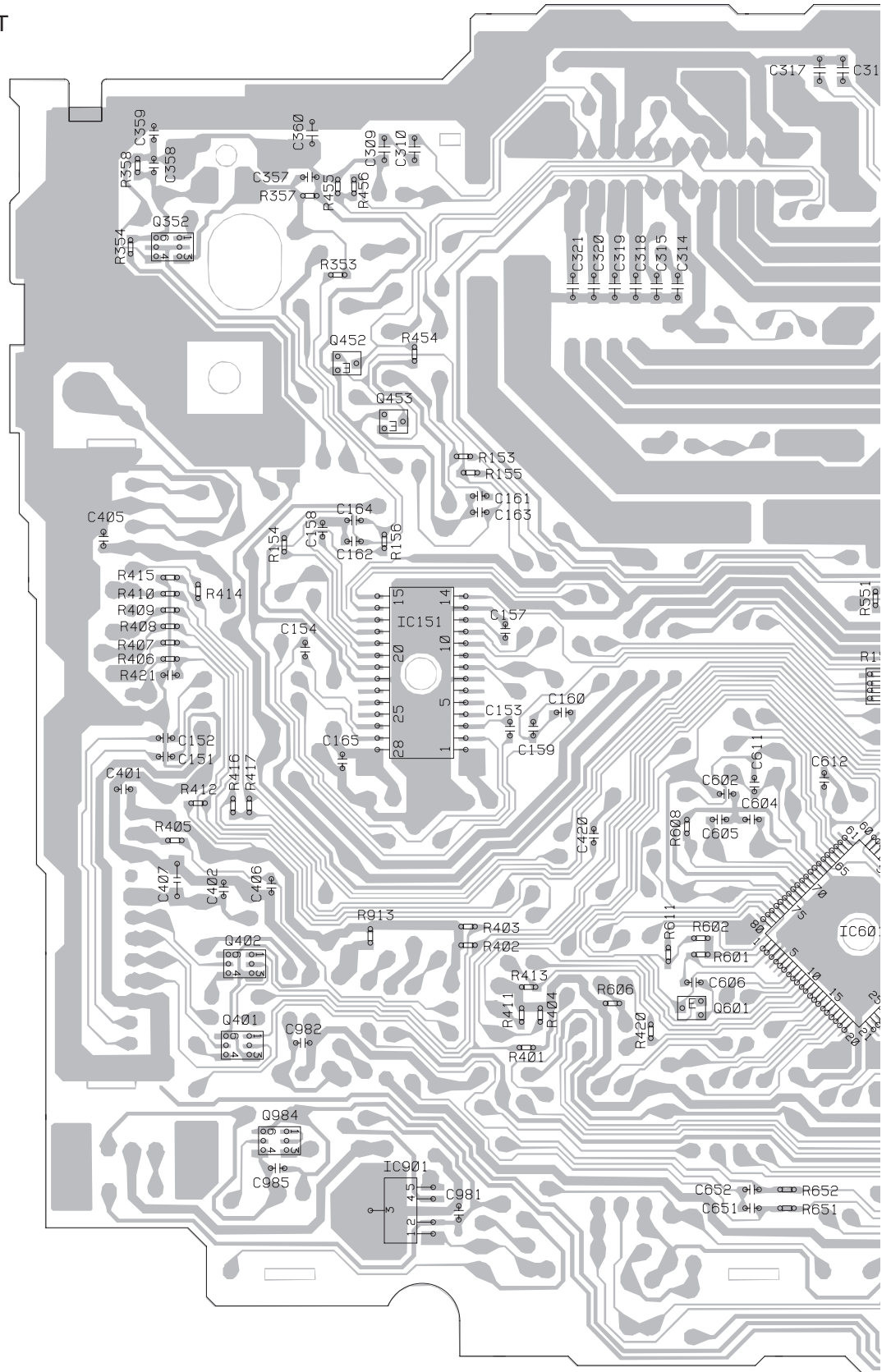
B

C

D

E

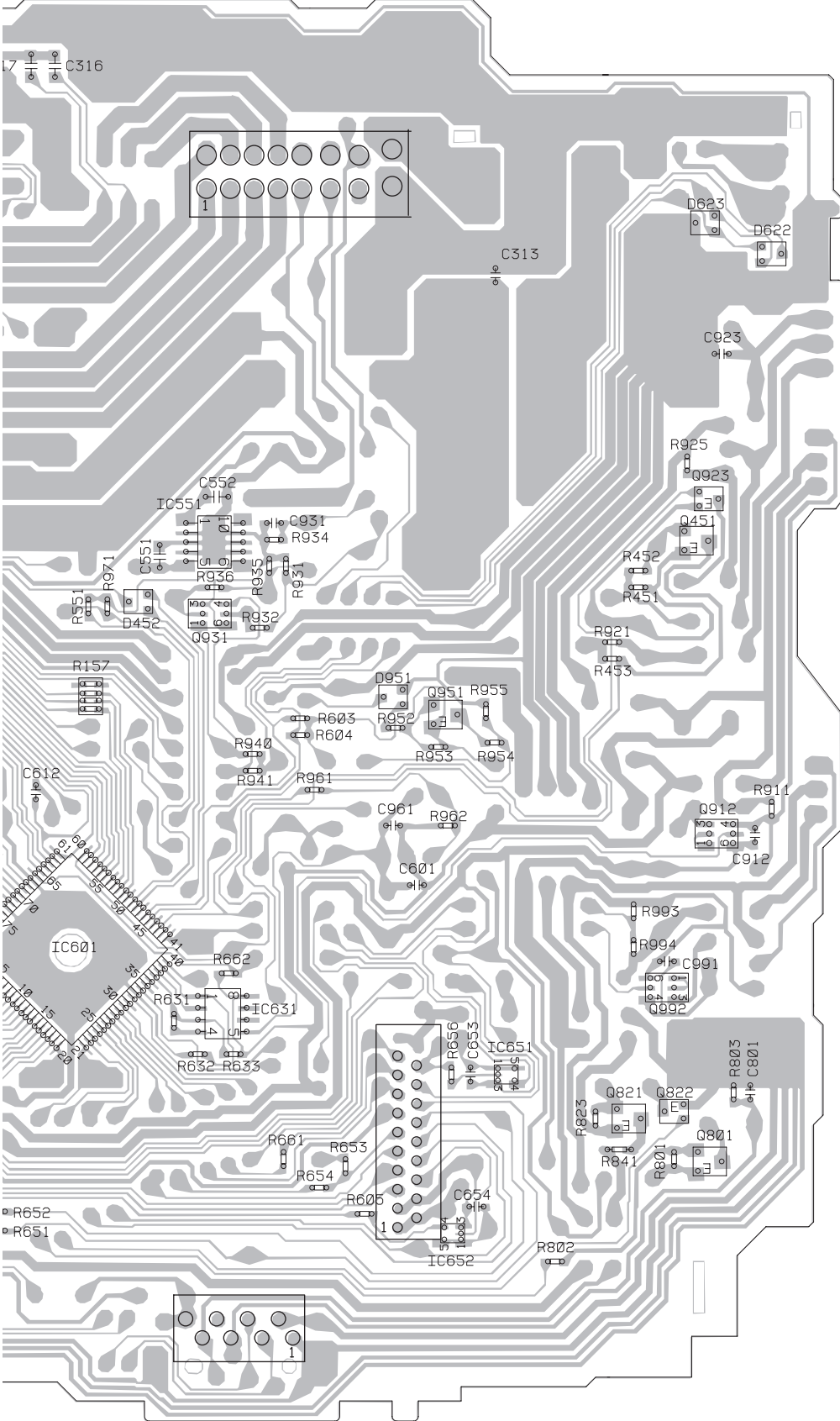
F



# A



**SIDE B**



- IC, Q
- Q352
- Q452
- Q453
- Q923
- IC551
- Q451
- IC151
- Q931
- Q951
- Q912
- IC601
- Q402
- IC631
- Q992
- Q601
- Q401
- IC651
- Q821
- Q822
- Q984
- Q801
- IC901
- IC652

A  
B  
C  
D  
E  
F

**A**

# 4.2 KEYBOARD UNIT

## B KEYBOARD UNIT SIDE A

## B KEYBOARD UNIT SIDE B

A

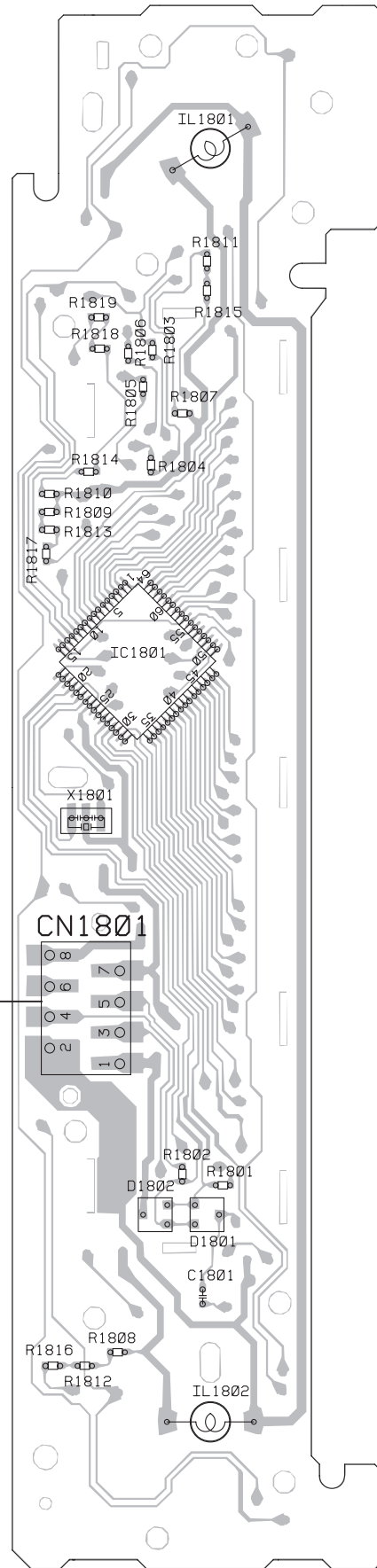
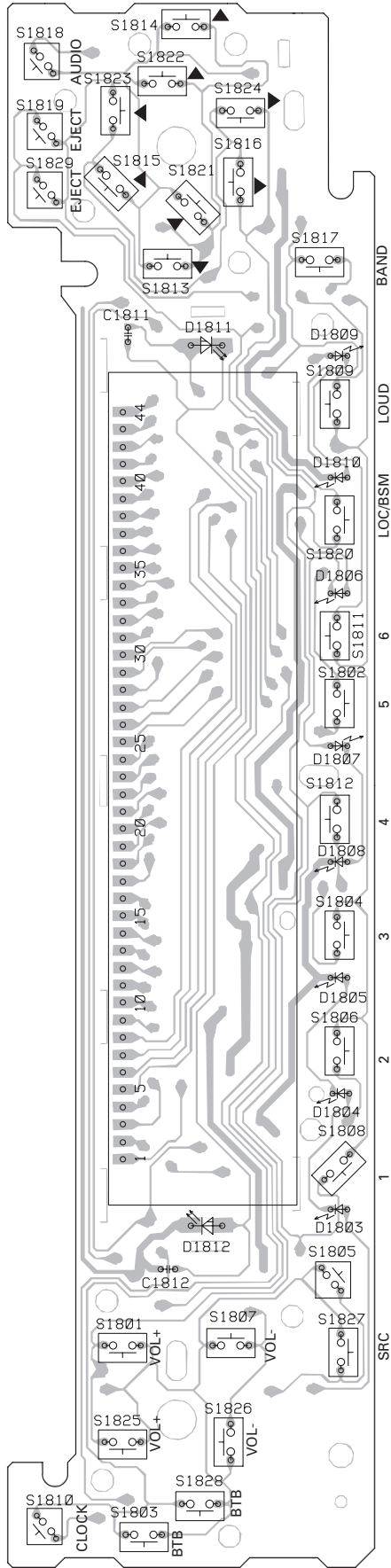
B

C

D

E

F



IC, Q

IC1801

**A**  
CN831

A

B

C

D

E

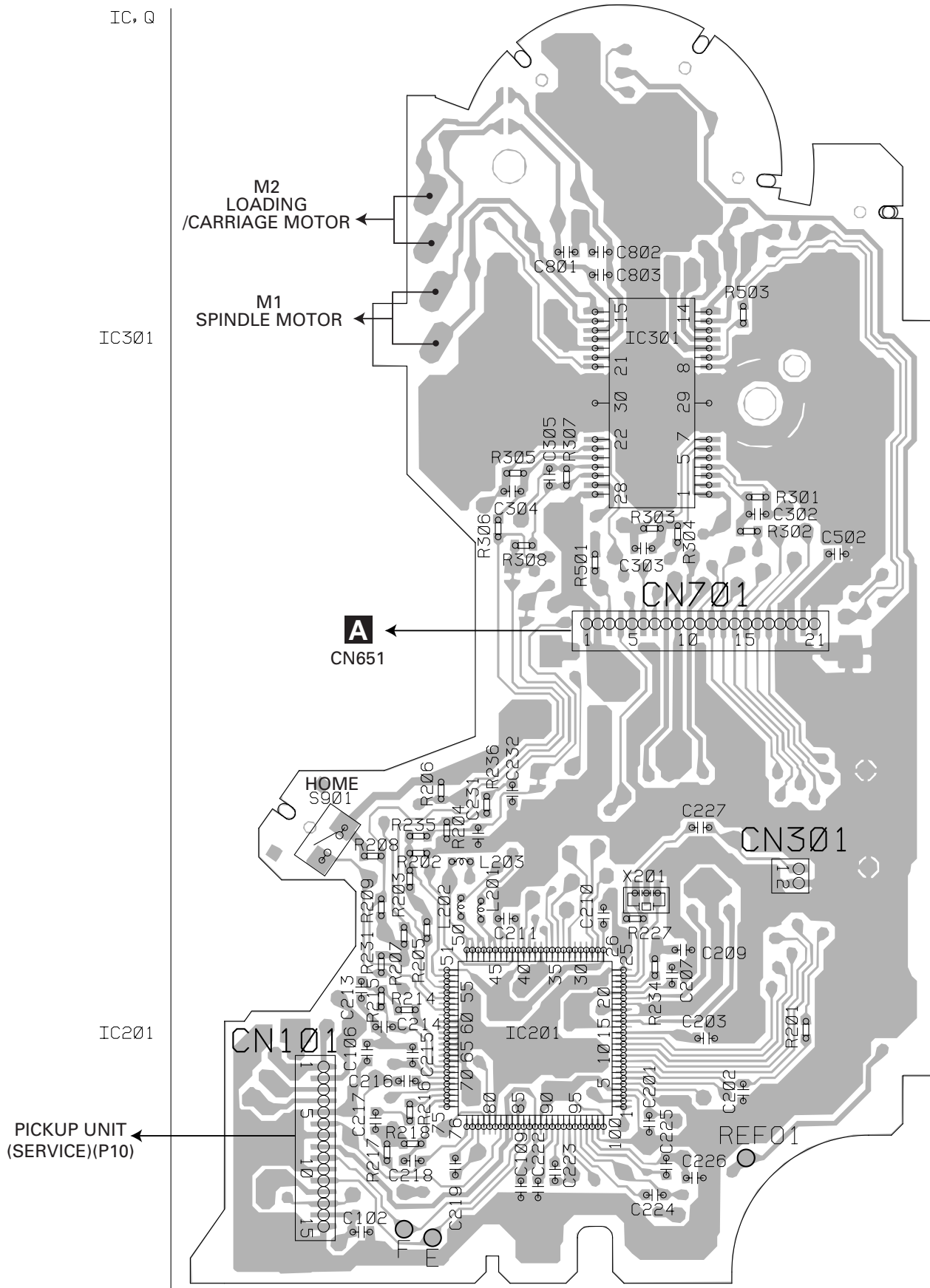
F

# 4.3 CD MECHANISM MODULE

**C** CD CORE UNIT(S10)

**SIDE A**

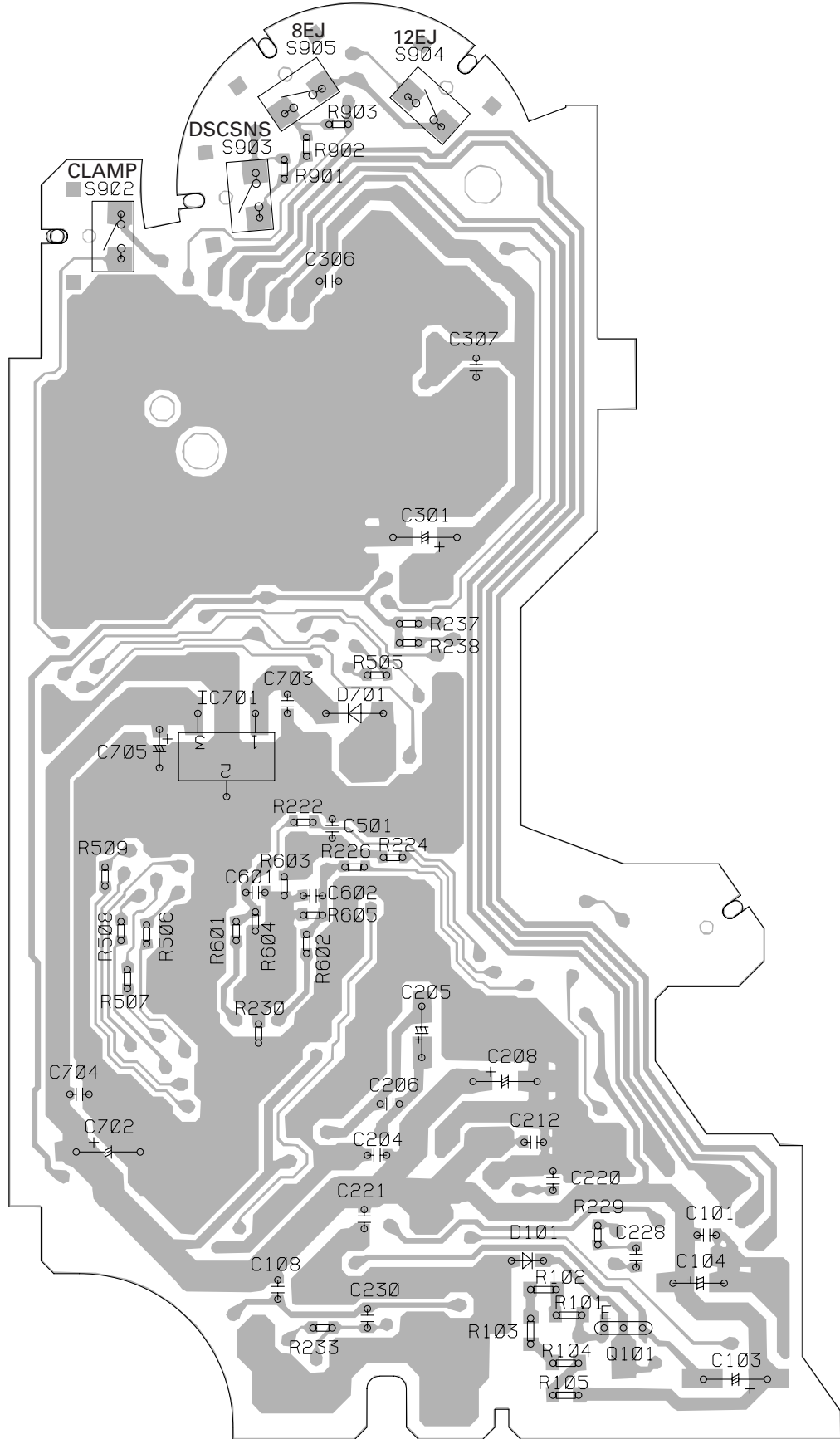
A  
B  
C  
D  
E  
F



**C**

**C** CD CORE UNIT(S10)

**SIDE B**



IC, Q

IC701

Q101

A

B

C

D

E

F

**C**

## 5. ELECTRICAL PARTS LIST

### NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/OSOOOJ,RS1/OOSOOOJ

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

====Circuit Symbol and No.====Part Name	Part No.	====Circuit Symbol and No.====Part Name	Part No.
<b>A</b> Unit Number : CWM8569(DEH-5)		R 301	RD1/4PU153J
Unit Name : Tuner Amp Unit		R 353	RS1/16S821J
<b>MISCELLANEOUS</b>		R 354	RS1/16S821J
IC 151 IC	PML010A	R 357	RS1/16S223J
IC 302 IC	TDA7384	R 358	RS1/16S223J
IC 551 IC	TPD1018F	R 405	RS1/16S681J
IC 601 IC	PE5331A	R 407	RS1/16S681J
IC 652 IC	TC7SET08FU	R 408	RS1/16S681J
		R 409	RS1/16S681J
		R 410	RS1/16S681J
IC 901 IC	BA033SFP		
IC 961 IC	S-80834CNY	R 414	RS1/16S0R0J
Q 352 Transistor	IMH3A	R 420	RS1/16S681J
Q 452 Transistor	DTC124EU	R 421	RS1/16S473J
Q 453 Transistor	DTA124EU	R 454	RS1/16S103J
		R 455	RS1/16S153J
Q 801 Transistor	2SA1036K		
Q 821 Transistor	2SA1036K	R 456	RS1/16S221J
Q 822 Transistor	DTC114EU	R 457	RD1/4PU681J
Q 911 Transistor	2SD2375	R 601	RS1/16S473J
Q 912 Transistor	IMD2A	R 603	RS1/16S103J
		R 604	RS1/16S103J
Q 921 Transistor	2SD2375		
Q 922 Transistor	2SB1243	R 605	RS1/16S221J
Q 923 Transistor	DTC114EU	R 606	RS1/16S104J
Q 931 Transistor	IMX1	R 607	RD1/4PU222J
Q 991 Transistor	2SD2375	R 608	RS1/16S0R0J
		R 609	RD1/4PU473J
Q 992 Transistor	IMD2A		
D 452 Diode	DAN202U	R 610	RD1/4PU681J
D 551 Diode	S5688G	R 611	RS1/16S473J
D 552 Diode	S5688G	R 653	RS1/16S104J
D 901 Diode	S5688G	R 654	RS1/16S102J
		R 661	RS1/16S221J
D 902 Diode	S5688G		
D 911 Diode	S5688G	R 801	RS1/16S153J
D 912 Diode	HZS6L(B2)	R 802	RS1/16S153J
D 921 Diode	HZS9L(B3)	R 803	RS1/16S222J
D 931 Diode	HZS7L(C3)	R 821	RD1/4PU332J
		R 823	RS1/16S103J
D 932 Diode	HZS7L(A1)		
D 991 Diode	HZS9L(B1)	R 833	RD1/4PU222J
L 151 Inductor	LAU2R2K	R 834	RD1/4PU222J
L 401 Inductor	LAU1R0K	R 841	RS1/16S1R0J
L 402 Inductor	LAU1R0K	R 848	RD1/4PU102J
		R 851	RD1/4PU102J
L 404 Ferri-Inductor	LAU4R7K		
L 601 Inductor	LAU1R0K	R 911	RS1/16S223J
L 801 Inductor	LAU2R2K	R 912	RD1/4PU152J
L 901 Choke Coil 600μH	CTH1280	R 921	RS1/16S0R0J
X 601 Radiator 12.58291MHz	CSS1402	R 923	RD1/4PU821J
		R 924	RD1/4PU122J
AR 401 FM/AM Tuner Unit Arrester	CWE1646 DSP-201M	R 925	RS1/16S103J
		R 931	RS1/16S473J
<b>RESISTORS</b>		R 932	RS1/16S104J
R 153	RS1/16S101J	R 933	RD1/4PU102J
R 154	RS1/16S101J	R 934	RS1/16S472J
R 155	RS1/16S101J		
R 156	RS1/16S101J	R 935	RS1/16S473J
R 157	RAB4C102J	R 936	RS1/16S223J
		R 940	RS1/16S104J

====Circuit Symbol and No.====Part Name

Part No.

R	941	RS1/16S104J
R	955	RS1/16S473J
R	961	RD1/4PU102J
R	962	RS1/16S822J
R	971	RS1/16S0R0J
R	991	RD1/4PU221J
R	992	RD1/4PU221J
R	993	RS1/16S222J
R	994	RS1/16S472J

## CAPACITORS

C	151	CKSRYB224K16
C	152	CKSRYB224K16
C	153	CKSRYB105K10
C	154	CKSRYB105K10
C	155	CEJQ4R7M35
C	156	CEJQ4R7M35
C	161	CCSRCH100D50
C	162	CCSRCH100D50
C	163	CCSRCH100D50
C	164	CCSRCH100D50
C	165	CKSRYB104K16
C	166	CEJQ470M10
C	167	CEJQ100M16
C	301	CFTNA224J50
C	302	CFTNA224J50
C	303	CFTNA224J50
C	304	CFTNA224J50
C	309	CKSQYB225K10
C	310	CKSQYB225K10
C	311	CEJQ2R2M50
C	312	CEJQ100M16
C	313	CKSRYB104K16
C	353	CEJQ2R2M50
C	354	CEJQ2R2M50
C	360	CKSQYB103K50
C	401	CKSRYB103K50
C	402	CKSRYB103K50
C	403	CEJQ470M6R3
C	404	CEJQ101M10
C	405	CKSRYB103K50
C	420	CCSRCH470J50
C	451	CEJQ330M10
C	551	CKSQYB103K50
C	552	CKSQYB103K50
C	601	CKSRYB103K50
C	604	CCSRCH200J50
C	605	CCSRCH200J50
C	610	CEJQ4R7M35
C	611	CKSRYB224K16
C	654	CKSRYB104K16
C	801	CKSRYB104K16
C	901	3300µF/16V
C	911	CCH1494
C	912	CEJQ470M10
C	913	CKSRYB103K50
C	913	470µF/16V
C	921	CCH1326
C	922	330µF/16V
C	923	CEJQ101M16
C	961	CKSRYB103K50
C	963	CKSRYB473K50
C	963	CEJQ100M16
C	981	CKSRYB334K10
C	982	CKSRYB103K50
C	983	CEJQ220M16
C	991	CKSRYB473K50
C	992	CEJQ101M10

====Circuit Symbol and No.====Part Name

Part No.

**A** Unit Number : CWM8568(DEH-15)  
Unit Number : CWM8794(DEH-1500)  
Unit Name : Tuner Amp Unit

## MISCELLANEOUS

IC	151	IC	PML003AM
IC	302	IC	PAL007A
IC	601	IC	PE5330A
IC	652	IC	TC7SET08FU
IC	901	IC	BA033SFP
IC	961	IC	S-80834CNY
Q	352	Transistor	IMH3A
Q	452	Transistor	DTC124EU
Q	453	Transistor	DTA124EU
Q	801	Transistor	2SA1036K
Q	821	Transistor	2SA1036K
Q	822	Transistor	DTC114EU
Q	911	Transistor	2SD2375
Q	912	Transistor	IMD2A
Q	921	Transistor	2SD2375
Q	922	Transistor	2SB1243
Q	923	Transistor	DTC114EU
Q	931	Transistor	IMX1
Q	991	Transistor	2SD2375
Q	992	Transistor	IMD2A
D	452	Diode	DAN202U
D	831	Diode	1SS133
D	832	Diode	1SS133
D	833	Diode	1SS133
D	834	Diode	1SS133
D	835	Diode	1SS133
D	836	Diode	1SS133
D	901	Diode	S5688G
D	902	Diode	S5688G
D	911	Diode	S5688G
D	912	Diode	HZS6L(B2)
D	921	Diode	HZS9L(B3)
D	931	Diode	HZS7L(C3)
D	932	Diode	HZS7L(A1)
D	971	Diode	S5688G
D	972	Diode	S5688G
D	991	Diode	HZS9L(B1)
L	151	Inductor	LAU2R2K
L	401	Inductor	LAU1R0K
L	402	Inductor	LAU1R0K
L	404	Ferri-Inductor	LAU4R7K
L	601	Inductor	LAU1R0K
L	801	Inductor	LAU2R2K
L	901	Choke Coil 600µH	CTH1280
X	601	Radiator 12.58291MHz	CSS1402
AR	401	Arrester FM/AM Tuner Unit	DSP-201M CWE1646

## RESISTORS

R	153	RS1/16S101J
R	154	RS1/16S101J
R	155	RS1/16S101J
R	156	RS1/16S101J
R	157	RAB4C102J
R	301	RD1/4PU153J
R	353	RS1/16S821J
R	354	RS1/16S821J
R	357	RS1/16S223J
R	358	RS1/16S223J
R	405	RS1/16S681J
R	407	RS1/16S681J

A	====Circuit Symbol and No.====Part Name	Part No.	====Circuit Symbol and No.====Part Name	Part No.
	R 408	RS1/16S681J	C 161	CCSRCH100D50
	R 409	RS1/16S681J	C 162	CCSRCH100D50
	R 410	RS1/16S681J		
	R 414	RS1/16S0R0J	C 163	CCSRCH100D50
	R 420	RS1/16S681J	C 164	CCSRCH100D50
	R 421	RS1/16S473J	C 165	CKSRYB104K16
	R 454	RS1/16S103J	C 166	CEJQ470M10
	R 455	RS1/16S153J	C 167	CEJQ100M16
	R 456	RS1/16S221J	C 301	CFTNA224J50
	R 457	RD1/4PU681J	C 302	CFTNA224J50
	R 602	RS1/16S473J	C 303	CFTNA224J50
	R 603	RS1/16S103J	C 304	CFTNA224J50
	R 604	RS1/16S103J	C 309	CKSQYB225K10
B	R 605	RS1/16S221J	C 310	CKSQYB225K10
	R 606	RS1/16S104J	C 312	CEJQ100M16
	R 607	RD1/4PU222J	C 313	CKSRYB104K16
	R 608	RS1/16S0R0J	C 353	CEJQ2R2M50
	R 609	RD1/4PU473J	C 354	CEJQ2R2M50
	R 610	RD1/4PU681J	C 360	CKSQYB103K50
	R 611	RS1/16S473J	C 401	CKSRYB103K50
	R 653	RS1/16S104J	C 402	CKSRYB103K50
	R 654	RS1/16S102J	C 403	CEJQ470M6R3
	R 661	RS1/16S221J	C 404	CEJQ101M10
	R 801	RS1/16S153J	C 405	CKSRYB103K50
	R 802	RS1/16S153J	C 420	CCSRCH470J50
	R 803	RS1/16S222J	C 451	CEJQ330M10
	R 821	RD1/4PU332J	C 601	CKSRYB103K50
	R 823	RS1/16S103J	C 604	CCSRCH200J50
	R 833	RD1/4PU222J	C 605	CCSRCH200J50
	R 834	RD1/4PU222J	C 610	CEJQ4R7M35
	R 836	RD1/4PU104J	C 611	CKSRYB224K16
	R 837	RD1/4PU103J	C 654	CKSRYB104K16
	R 838	RD1/4PU102J	C 801	CKSRYB104K16
	R 841	RS1/16S1R0J	C 901	3300µF/16V
	R 848	RD1/4PU102J	C 911	CCH1494
	R 851	RD1/4PU102J	C 912	CEJQ470M10
	R 911	RS1/16S223J	C 913	CKSRYB103K50
	R 912	RD1/4PU152J	C 921	470µF/16V
			C 922	330µF/16V
D	R 921	RS1/16S0R0J	C 922	CEJQ101M16
	R 923	RD1/4PU821J	C 923	CKSRYB103K50
	R 924	RD1/4PU122J	C 961	CKSRYB473K50
	R 925	RS1/16S103J	C 963	CEJQ100M16
	R 931	RS1/16S473J	C 981	CKSRYB334K10
	R 932	RS1/16S104J	C 982	CKSRYB103K50
	R 933	RD1/4PU102J	C 983	CEJQ220M16
	R 934	RS1/16S472J	C 991	CKSRYB473K50
	R 935	RS1/16S473J	C 992	CEJQ101M10
	R 936	RS1/16S223J		
	R 940	RS1/16S104J		
	R 941	RS1/16S104J		
	R 955	RS1/16S473J		
	R 961	RD1/4PU102J		
	R 962	RS1/16S822J		
E	R 991	RD1/4PU221J	IC 1801	IC
	R 992	RD1/4PU221J	D 1801	Diode(DEH-15,1500)
	R 993	RS1/16S222J	D 1802	Diode(DEH-15,1500)
	R 994	RS1/16S472J	D1803-1810	LED (DEH-5)
			D1803-1810	LED (DEH-15)
			D1803-1810	LED (DEH-1500)
			D 1811	LED
			D 1812	LED
			X 1801	Ceramic Resonator 5.00MHz
			IL 1801	Lamp 14V 40mA(DEH-5,15)
			IL 1801	Lamp 14V 40mA(DEH-1500)
			IL 1802	Lamp 14V 40mA(DEH-5,15)
			IL 1802	Lamp 14V 40mA(DEH-1500)
			LCD1801	LCD(DEH-5)
				PD6340A
				MA152WK
				MA152WK
				SML-310DT
				SML-310VT
				SML-310PT
				NSSW440-9159
				NSSW440-9159
				CSS1547
				CEL1638
				CEL1651
				CEL1638
				CEL1651
				CAW1756
F	C 151	CKSRYB224K16		
	C 152	CKSRYB224K16		
	C 153	CKSRYB105K10		
	C 154	CKSRYB105K10		
	C 155	CEJQ4R7M35		
	C 156	CEJQ4R7M35		
	C 157	CKSRYB153K50		
	C 158	CKSRYB153K50		

**B** Unit Number : CWM8577(DEH-5)  
Unit Number : CWM8576(DEH-15)  
Unit Number : CWM8795(DEH-1500)  
Unit Name : Keyboard Unit

#### MISCELLANEOUS

#### CAPACITORS



====Circuit Symbol and No.====Part Name	Part No.	====Circuit Symbol and No.====Part Name	Part No.	
LCD1801 LCD(DEH-15)	CAW1765	R 215	RS1/16S393J	A
LCD1801 LCD(DEH-1500)	CAW1733	R 216	RS1/16S122J	
		R 217	RS1/16S562J	
		R 218	RS1/16S472J	
		R 234	RS1/16S0R0J	
<b>RESISTORS</b>				
R 1801	RS1/16S222J	R 235	RS1/16S103J	
R 1802	RS1/16S222J	R 236	RS1/16S103J	
R 1803	RS1/16S471J	R 301	RS1/16S183J	
R 1804	RS1/16S471J	R 302	RS1/16S822J	
R 1805	RS1/16S471J	R 303	RS1/16S183J	
R 1806	RS1/16S471J	R 304	RS1/16S822J	
R 1807	RS1/16S151J	R 305	RS1/16S183J	
R 1808	RS1/16S181J	R 306	RS1/16S183J	B
R 1809	RS1/16S181J	R 307	RS1/16S183J	
R 1810	RS1/16S181J	R 308	RS1/16S183J	
R 1811	RS1/16S151J	R 501	RS1/16S102J	
R 1812	RS1/16S181J	R 503	RS1/16S102J	
R 1813	RS1/16S181J	R 505	RS1/16S102J	
R 1814	RS1/16S181J	R 506	RS1/16S221J	
R 1815	RS1/16S151J	R 507	RS1/16S221J	
R 1816 (DEH-5,15)	RS1/16S181J	R 508	RS1/16S221J	
R 1816 (DEH-1500)	RS1/16S151J	R 509	RS1/16S221J	
R 1817 (DEH-5,15)	RS1/16S181J	R 601	RS1/16S101J	
R 1817 (DEH-1500)	RS1/16S151J	R 602	RS1/16S101J	
R 1818 (DEH-5,15)	RS1/16S181J	R 603	RS1/16S0R0J	
R 1818 (DEH-1500)	RS1/16S151J	R 901	RS1/16S104J	C
R 1819	RS1/16S131J	R 902	RS1/16S473J	
		R 903	RS1/16S273J	
<b>CAPACITORS</b>		<b>CAPACITORS</b>		
C 1801	CKSRYB103K50	C 101	CKSRYB104K16	
C 1811	CKSRYF104Z25	C 102	CKSRYB104K16	
C 1812	CKSRYF104Z25	C 103	100μF/16V	
		C 104	47μF/6.3V	
		C 106	CCSRCH101J50	
		C 108	CKSRYB224K16	
		C 109	CKSRYB224K16	
		C 201	CKSRYB104K16	
		C 202	CKSRYB471K50	
		C 203	CKSRYB104K16	D
		C 205	22μF/6.3V	
		C 206	CCH1507	
		C 207	CKSRYB103K25	
		C 208	CKSRYB104K16	
		C 209	100μF/6.3V	
		C 210	CCH1505	
		C 211	CKSRYB104K16	
		C 212	CKSRYB104K16	
		C 213	CKSRYB104K16	
		C 214	CKSRYB332K50	
		C 215	CKSRYB473K25	
		C 216	CKSRYB104K16	
		C 217	CKSRYB103K25	
		C 218	CCSRCH560J50	E
		C 219	CCSRCH5R0C50	
		C 220	CKSRYB104K16	
		C 221	CKSRYB104K16	
		C 222	CKSRYB103K25	
		C 223	CCSRCH680J50	
		C 224	CCSRCH470J50	
		C 225	CKSRYB682K50	
		C 231	CKSRYB102K50	
		C 232	CKSRYB102K50	
		C 301	100μF/16V	
		C 302	CCH1504	
		C 303	CCSRCH221J50	F
		C 304	CKSRYB472K50	



Unit Number : CWX2708  
Unit Name : CD Core Unit(S10)

#### MISCELLANEOUS

IC 201	IC	UPD63712GC
IC 301	IC	BA5996FP
IC 701	IC	NJM2391DL1-33
Q 101	Transistor	2SB1132
D 101	Diode	1SS355
D 701	Diode	1SR154-400
X 201	Ceramic Resonator 16.934MHz	CSS1603
S 901	Spring Switch(HOME)	CSN1051
S 902	Spring Switch(CLAMP)	CSN1051
S 903	Spring Switch(DSCSNS)	CSN1052
S 904	Spring Switch(12EJ)	CSN1051
S 905	Spring Switch(8EJ)	CSN1051

#### RESISTORS

R 101	RS1/10S1R5J
R 102	RS1/10S1R5J
R 103	RS1/10S1R5J
R 104	RS1/10S1R5J
R 105	RS1/10S1R5J
R 201	RS1/16S102J
R 202	RS1/16S1002D
R 203	RS1/16S1002D
R 204	RS1/16S1002D
R 205	RS1/16S1002D
R 206	RS1/16S1002D
R 207	RS1/16S1002D
R 208	RS1/16S1002D
R 209	RS1/16S1002D
R 214	RS1/16S103J

====Circuit Symbol and No.====		Part Name	Part No.
C	305		CKSRYB103K25
C	306		CKSRYB104K16
C	501		CKSRYB103K25
C	502		CKSRYB103K25
C	702	100μF/16V	CCH1504
C	703		CKSRYB224K16
C	704		CKSRYB104K16
C	705	10μF/6.3V	CCH1470

Miscellaneous Parts List

		Pickup Unit(Service)(P10)	CXX1641
M	1	Motor Unit(SPINDLE)	CXB6007
M	2	Motor Unit(LOADING/CARRIAGE)	CXB8933

C

D

E

F

## 6. ADJUSTMENT

### 6.1 CD ADJUSTMENT

#### 1) Cautions on adjustments

- In this product the single voltage (3.3V) is used for the regulator. The reference voltage is the REFO1 (1.65V) instead of the GND.

If you should mistakenly short the REFO1 with the GND during adjustment, accurate voltage will not be obtained, and the servo's misoperation will apply excessive shock to the pickup. To avoid such problems:

a. Do not mix up the REFO1 with the GND when connecting the (-) probe of measuring instruments. Especially on an oscilloscope, avoid connecting the (-) probe for CH1 to the GND.

b. In many cases, measuring instruments have the same potential as that for the (-) probe. Be sure to set the measuring instruments to the floating state.

c. If you have mistakenly connected the REFO1 to the GND, turn off the regulator or the power immediately.

- Before mounting and removing filters or leads for adjustment, be sure to turn off the regulator.

- For stable circuit operation, keep the mechanism operating for about one minute or more after the regulator is turned on.

- In the test mode, any software protections will not work. Avoid applying any mechanical or electrical shock to the mechanism during adjustment.

- The RFI and RFO signals with a wide frequency range are easy to oscillate. When observing the signals, insert a resistor of 1k ohms in series.

- The load and eject operation is not guaranteed with the mechanism upside down. If the mechanism is blocked due to mistaken eject operation, reset the product or turn off and on the ACC to restore it.

#### 2) Test mode

This mode is used to adjust the CD mechanism module.

- To enter the test mode.

While pressing the 4 and 6 keys at the same time, reset.

- To exit from the test mode.

Turn off the ACC and back up.

#### Notes:

a. During ejection, do not press any other keys than the EJECT key until the loaded disc is ejected.

b. If you have pressed the (→) key or (←) key during focus search, turn off the power immediately to protect the actuator from damage caused by the lens stuck.

## 6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT



### • Note :

The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

### • Purpose :

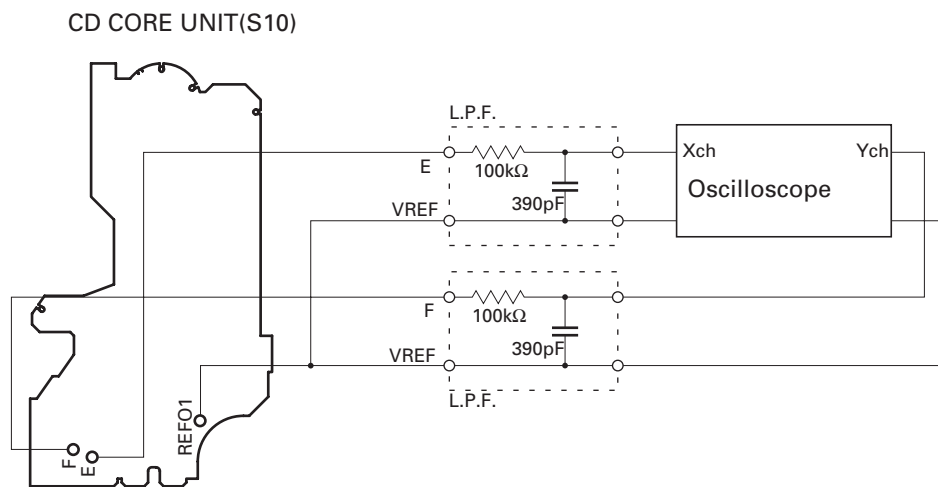
To check that the grating is within an acceptable range when the PU unit is changed.

### • Symptoms of Mal-adjustment :

If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

### • Method :

- |                       |                            |
|-----------------------|----------------------------|
| • Measuring Equipment | • Oscilloscope, Two L.P.F. |
| • Measuring Points    | • E, F, REFO1              |
| • Disc                | • ABEX TCD-782             |
| • Mode                | • TEST MODE                |



### • Checking Procedure

1. While pressing the 4 and 6 keys at the same time, reset.
2. The display will change, returning to "81" on the fourth press.
3. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within  $75^\circ$ . Refer to the photographs supplied to determine the phase angle.
4. If the phase difference is determined to be greater than  $75^\circ$  try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than  $75^\circ$  then the mechanism should be judged to be at fault.

### • Note

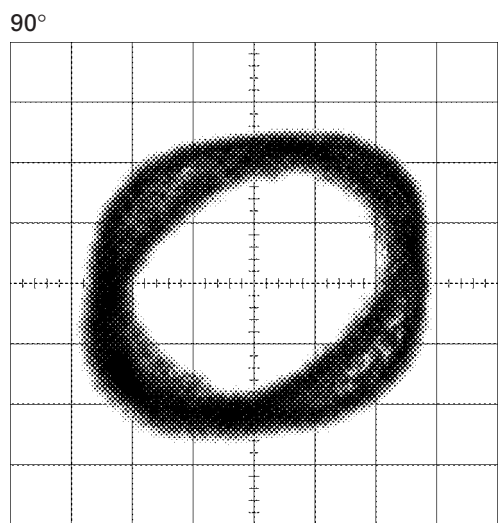
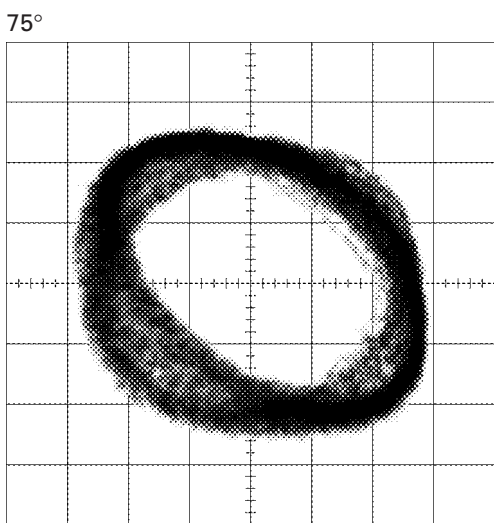
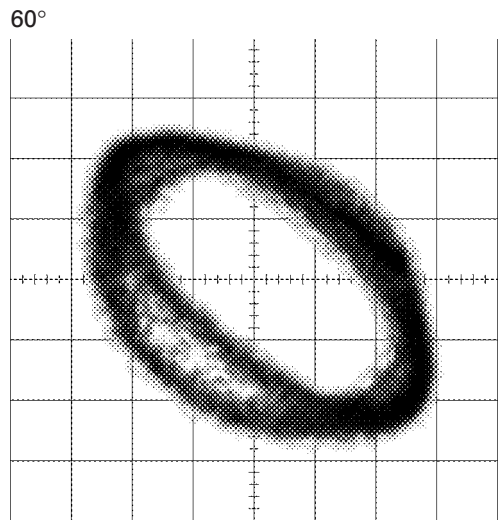
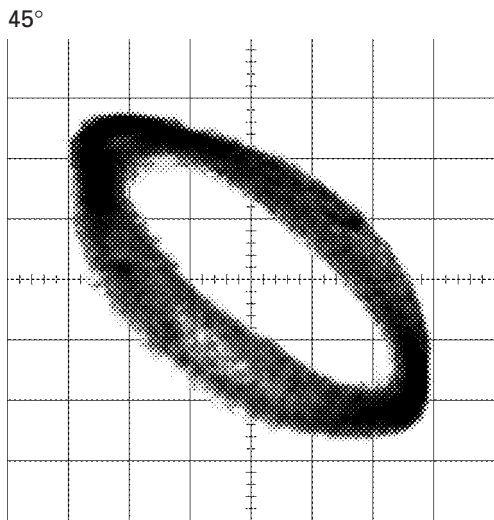
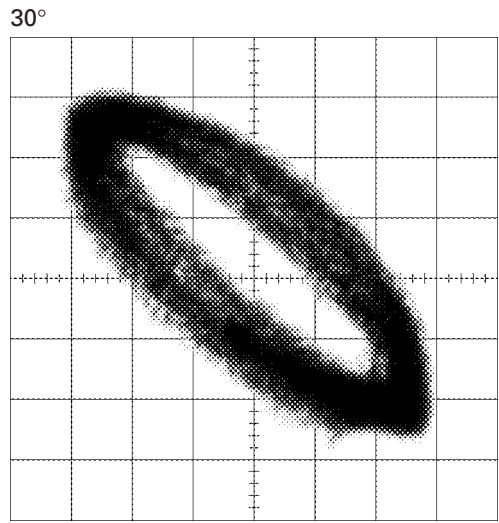
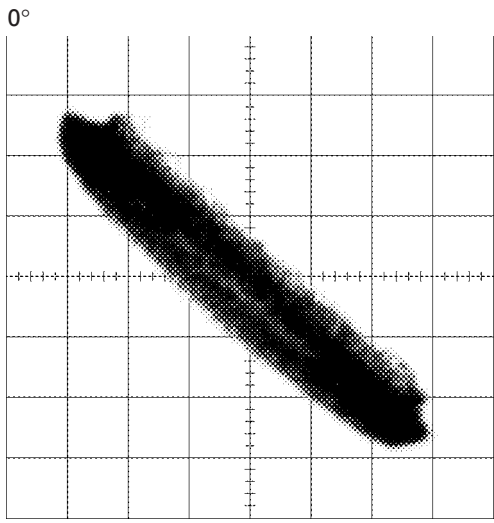
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" ( the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

### • Hint

Reloading the disc changes the clamp position and may decrease the "wobble".

### Grating waveform

Ech → Xch 20mV/div, AC  
Fch → Ych 20mV/div, AC



A

B

C

D

E

F

## 6.3 ERROR MODE

### ● Error Messages

If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

#### (1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

#### 2) Head unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.

8-digit display

ERROR-xx

6-digit display

ERR-xx

4-digit display

E-xx

#### (2) Error Code List

Code	Class	Displayed error code	Description of the code and potential cause(s)
10	Electricity	Carriage Home NG SERVO LSI Com- munication Error	CRG can't be moved to inner diameter. CRG can't be moved from inner diameter. → Failure on home switch or CRG move mechanism. Communication error between microcomputer and SERVO LSI.
11	Electricity	Focus Servo NG	Focusing not available. → Stains on rear side of disc or excessive vibrations on REWRITABLE.
12	Electricity	Spindle Lock NG Subcode NG	Spindle not locked. Sub-code is strange (not readable). → Failure on spindle, stains or damages on disc, or excessive vibrations. A disc not containing CD-R data is found. Turned over disc are found, though rarely. CD signal error.
17	Electricity	Setup NG	AGC protection doesn't work. Focus can be easily lost. → Damages or stains on disc, or excessive vibrations on REWRITABLE.
30	Electricity	Search Time Out	Failed to reach target address. → CRG tracking error or damages on disc.
44	Electricity	ALL Skip	Skip setting for all track. (CD-R/RW)
50	Mechanism	CD On Mech Error	Mechanical error during CD ON. → Defective loading motor, mechanical lock and mechanical sensor.
A0	System	Power Supply NG	Power (VD) is ground faulted. → Failure on SW transistor or power supply (failure on connector).

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).

Unreadable TOC does not constitute an error. An intended operation continues in this case.

Upper digits of an error code are subdivided as shown below:

1x: Setup relevant errors, 3x: Search relevant errors, Ax: Other errors.

## 7. GENERAL INFORMATION

### 7.1 DIAGNOSIS

#### 7.1.1 DISASSEMBLY

##### ● Removing the Case (not shown)

1. Remove the Case.

##### ● Removing the CD Mechanism Module (Fig.1)

**1** Remove the four screws.

Disconnect the connector and then remove the CD Mechanism Module.

##### ● Removing the Grille Assy (Fig.1)

**2** Release the two latches and then remove the Grille Assy.

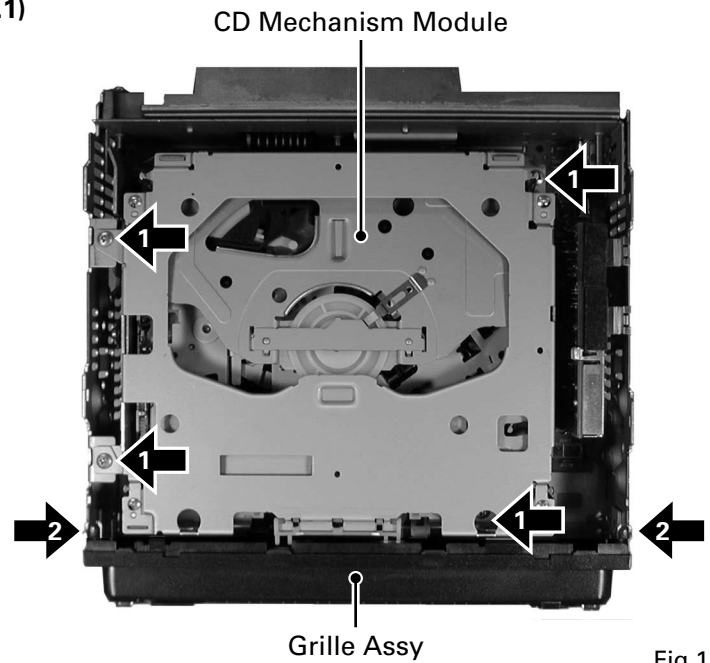


Fig.1

##### ● Removing the Tuner Amp Unit (Fig.2)

**1** Remove the screw.

**2** Remove the three screws.

**3** Straight the tabs at three locations indicated.

**4** Remove the screw and then remove the Tuner Amp Unit.

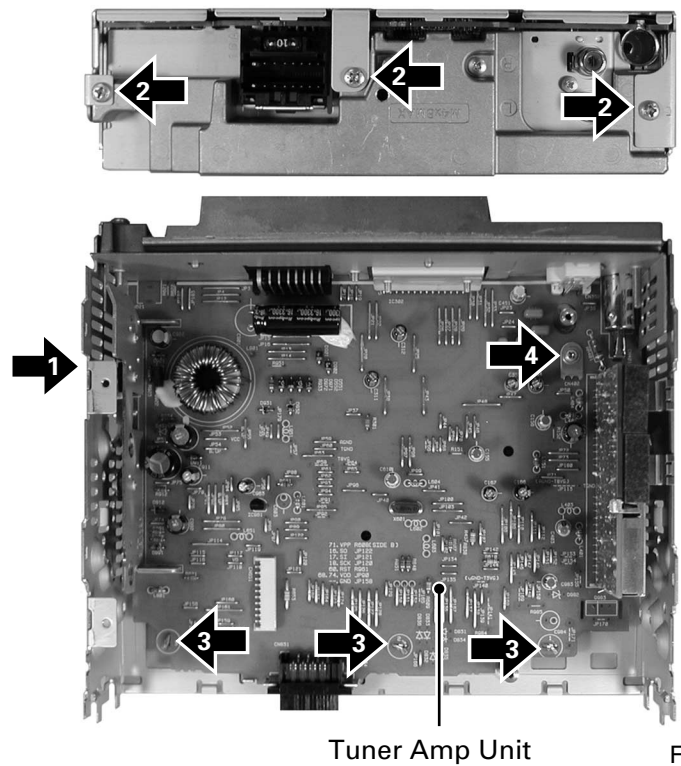


Fig.2

A

● How to assemble Keyboard Unit

- 1. Assemble them in order from "1" to "8". (See the figure below.)
- 2. After that, bend the crows (7 in total) until they get the right angles with the marks printed on "8".

Note) If "5" is not set collectly, defective contact may occur on "6".  
 To avoid this problem, hold "5" using "7" just before putting "8".

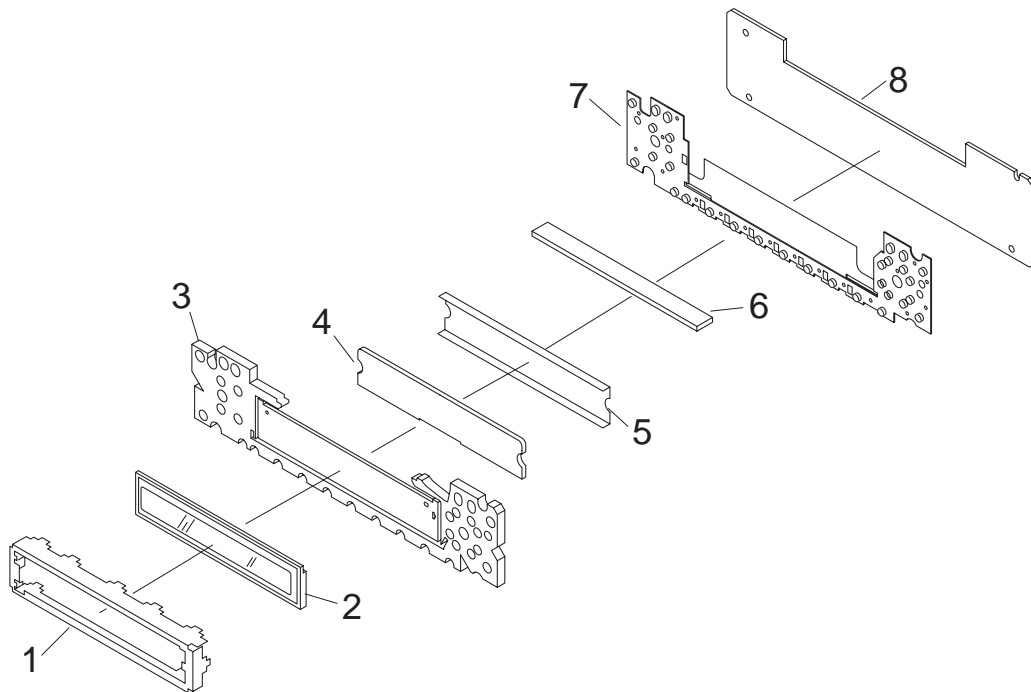
B

C

D

E

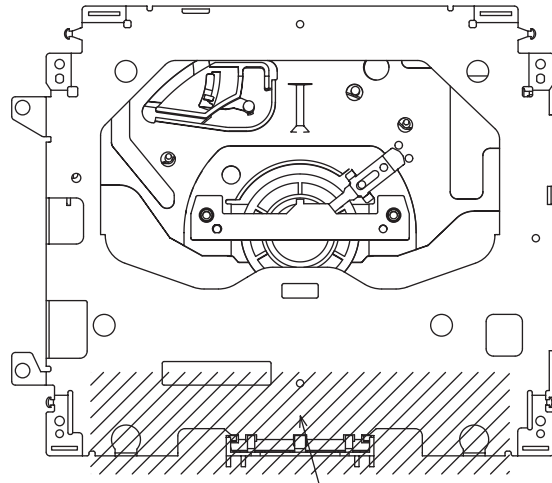
F





### ● How to hold the Mechanical Unit

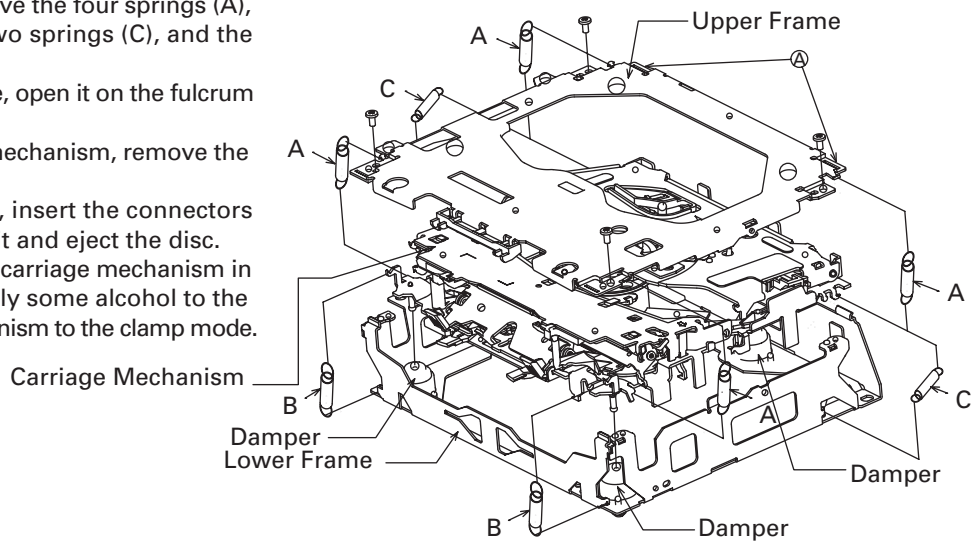
1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



Do not squeeze.

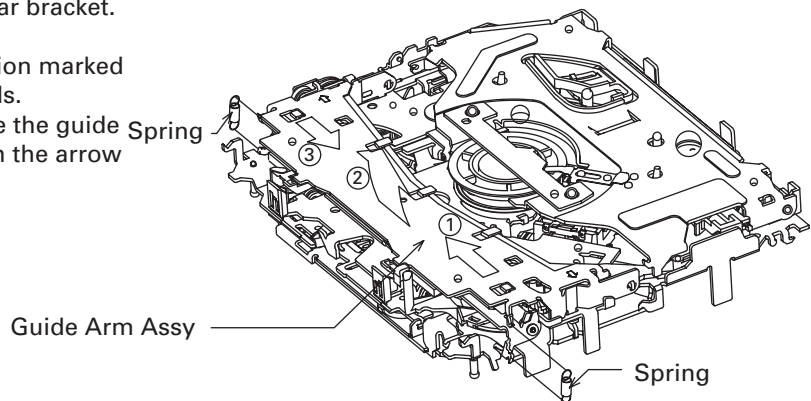
### ● Removing the Upper and Lower Frames

1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
  2. To remove the upper frame, open it on the fulcrum A.
  3. While lifting the carriage mechanism, remove the three dampers.
  4. With the frames removed, insert the connectors coming from the main unit and eject the disc.
- Caution: Before installing the carriage mechanism in the frames, be sure to apply some alcohol to the dampers and set the mechanism to the clamp mode.

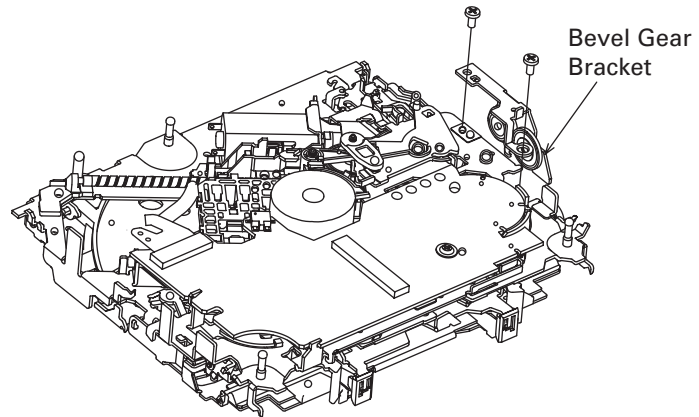


### ● Removing the Guide Arm Assy

1. Remove the upper and lower frames and set the mechanism to the clamp mode.
2. Remove the two springs.
3. Remove the two screws and bevel gear bracket. Note that the gears come off.
4. Slide the guide arm Assy in the direction marked with the arrow (1) and open it upwards.
5. At the angle of about 45 degrees, slide the guide arm Assy in the direction marked with the arrow (3) to remove it.



A



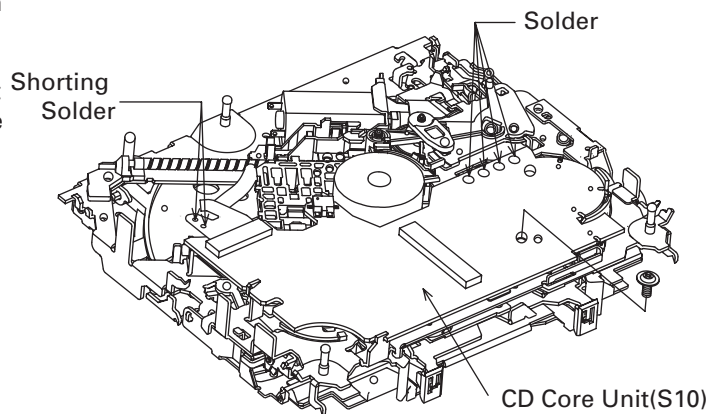
B

### ● Removing the CD Core Unit(S10)

1. Apply shorting solder to the Pickup flexible cable. Disconnect the cable.
2. Remove the solder from the four leads, and loosen the screw.
3. Remove the CD core unit(S10).

Caution: When assembling the CD core unit(S10), set the mechanism to the clamp mode to protect the switches from any damage.

C

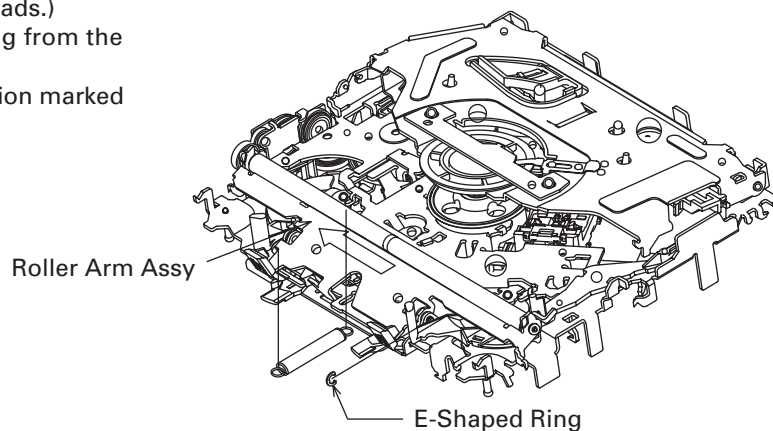


D

### ● Removing the Roller Arm Assy

1. Remove the guide arm Assy and set the mechanism to the eject mode.
2. Remove the CD core unit(S10). (You do not have to remove the solder from the four leads.)
3. Remove the spring and E-shaped ring from the fulcrum shaft.
4. Slide the roller arm Assy in the direction marked with an arrow.

E

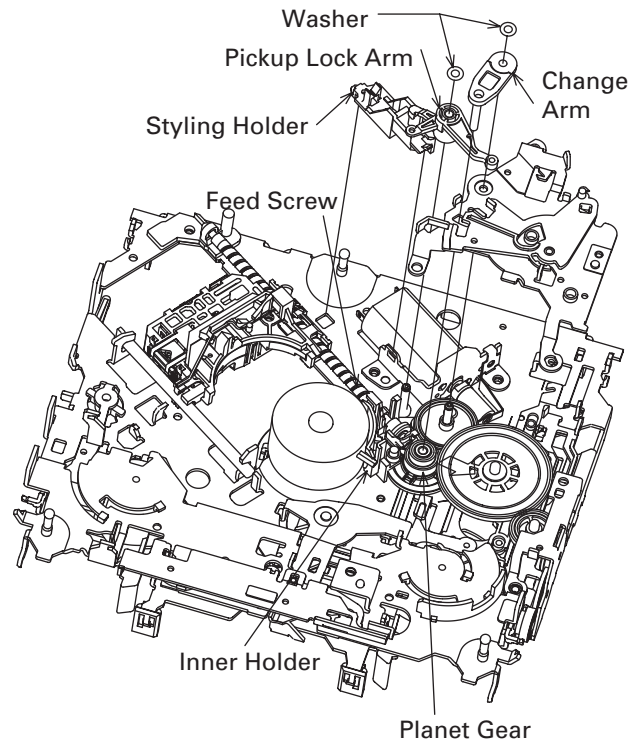


F

### ● Removing the Pickup Unit

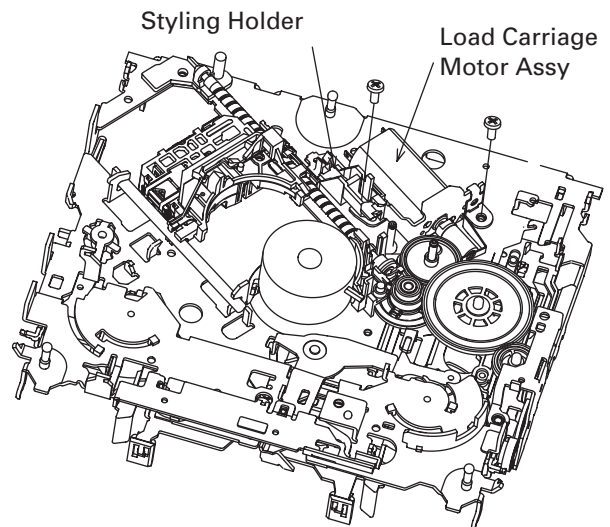
1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the two washers, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

Caution: In assembling, move the planet gear to the load/eject position before setting the feed screw in the inner holder.

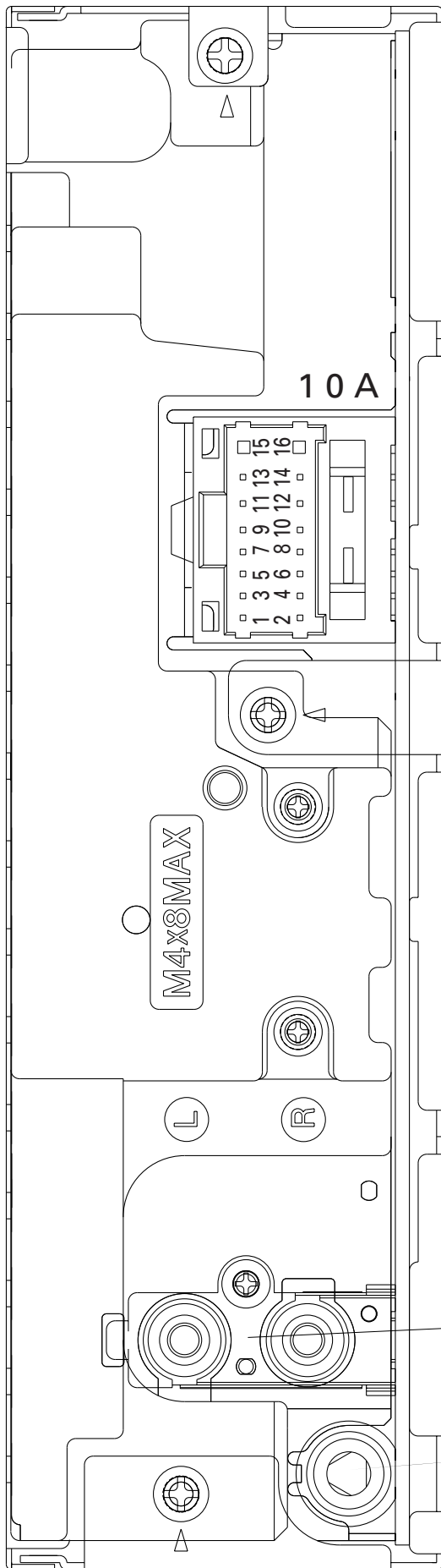


### ● Removing the Load Carriage Motor Assy

1. Release the leads from the styling holder and remove the holder.
2. Remove the two screws.
3. Remove the load carriage motor Assy.



## 7.1.2 CONNECTOR FUNCTION DESCRIPTION



Pin No.	Pin No.
1	9
2	10
3	11
4	12
5	13
6	14
7	15
8	16

ANTENNA PRE OUT

## 7.2 PARTS

### 7.2.1 IC

#### ● Pin Functions (PE5330A,PE5331A)

Pin No.	Pin Name	I/O	Function and Operation
1	MODEL1		Model port 1
2,3	NC		Not used
4	AVSS		A/D GND
5,6	NC		Not used
7	AVREF1		A/D converter reference voltage
8	KYDT	I	Key data input
9	DPDT	O	Display data output
10	ADPW	O	A/D converter power supply output
11	TUNPDI	I	PLL IC data input
12	TUNPDO	O	PLL IC data output
13	TUNPCK	O	PLL IC clock output
14	PCL	O	Clock adjustment output
15	TESTIN	I	Test program mode input
16	XSI	I	Serial data input
17	XSO	O	Serial data output
18	XSCK	O	Serial data clock output
19,20	NC		Not used
21	SWVDD	O	Keyboard unit power supply control output
22	ILMPW	O	Illumination power supply control output
23	NC		Not used
24	XRST	O	CD LSI reset output
25	XA0	O	CD LSI identification control signal output
26	XSTB	O	CD LSI strobe output
27	CLAMSW	O	Disc clamp switch output (CD)
28	CONT	O	Servo driver power supply control output
29	LOEJ	O	CD load motor LOAD/EJECT direction exchange output
30	CLCONT	O	Driver input select output
31	NC		Not used
32	DALMON	O	Stand-by output
33	VSS1		GND
34	TELIN	O	Telephone mute output
35-39	NC		Not used
40	RECIEVE		Not used
41	VDCONT	O	VD control output
42	NC		Not used
43	SYSPW	O	System power supply control output
44	NC		Not used
45	PEE	O	Beep tone output
46	KEY2	I	Key data input (Remote control)
47	NC		Not used
48	MUTE	O	System mute output
49	ANTPW	O	Antenna output
50	NC		Not used
51	VST	O	Strobe pulse output for electronic volume
52	VDT	O	Data output for electronic volume
53	VCK	O	Clock output for electronic volume
54	NC		Not used
55	TUNPCE2	O	EEPROM chip enable output 2
56	TUNPCE1	O	EEPROM chip enable output 1
57-59	NC		Not used
60	RESET	I	Reset input
61	LDET	I	PLL lock sense input

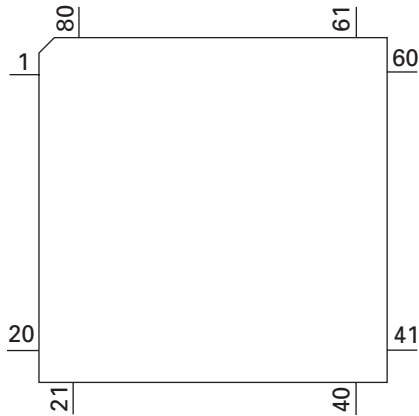
A

Pin No.	Pin Name	I/O	Function and Operation
62	RCK	I	RDS demodulation clock input
63	ASENS	I	ACC sense input
64	BSENS	I	Back up sense input
65	DSENS	I	Grille detach sense input
66	INTRQ	I	ATAPI HOST interrupt request input
67	VSS0		GND
68	VDD1		Power supply
69	X2		Crystal oscillator connection pin
70	X1		Crystal oscillator connection pin
71	IC(VPP)		Connect to GND
72	NC		Not used
73	XT1		Connect to GND
74	VDD0		Power supply
75	AVDD		Positive power supply terminal for analog circuit
76	SL	I	SD level input from tuner
77	TEMP		Not used
78	VDSSENS	I	VD power supply voltage sense input
79	DISCSSENS	I	CD DISC sense input
80	STRKEY1		Key data (Remote control)

B

C

\*PE5330A,PE5331A

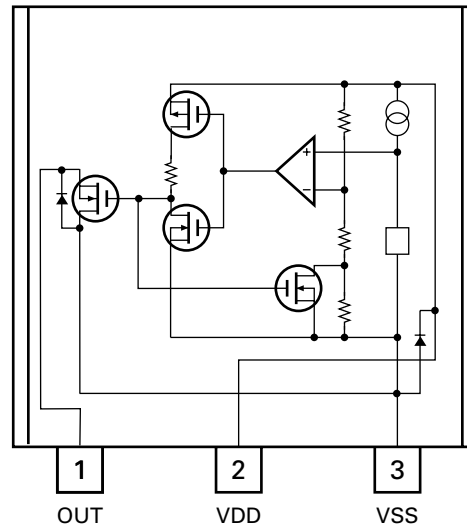


D

IC's marked by \* are MOS type.

Be careful in handling them because they are very liable to be damaged by electrostatic induction.

\*S-80834CNY



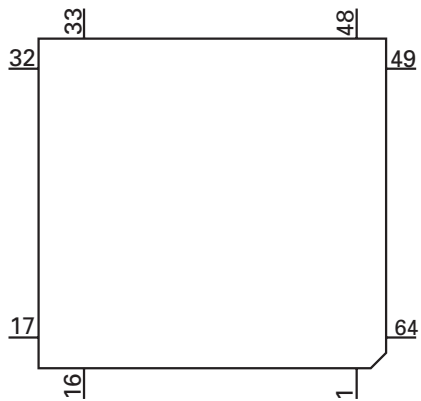
E

F

### ● Pin Functions (PD6340A)

Pin No.	Pin Name	I/O	Function and Operation
1-5	SEG4-0	O	LCD segment output
6-9	COM3-0	O	LCD common output
10	VLCD		LCD drive power supply
11-14	KST3-0	O	Key strobe output
15,16	KDT0,1	I	Key data input (analogue input)
17	REM	I	Remote control reception input
18	DPDT	I	Display data input
19	NC		Not used
20	KYDT	O	Key data output
21	MODA		GND
22	X0		Crystal oscillator connection pin
23	X1		Crystal oscillator connection pin
24	VSS		GND
25,26	KDT2,3	I	Key data input
27	NC		Not used
28	KST4	O	Key strobe output
29-32	NC		Not used
33-55	SEG35-13	O	LCD segment output
56	VDD		Power supply
57-64	SEG12-5	O	LCD segment output

\*PD6340A



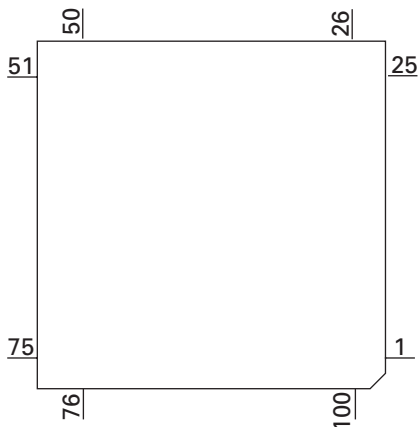
## ● Pin Functions(UPD63712GC)

Pin No.	Pin Name	I/O	Function and Operation
1	LD	O	Output of LD
2	PD	I	Input of PD
3	PN	I	Assignment of pickup polarity
4	AVDD		Power supply for the analog system
5	DGND		Ground for digital circuits
6	RFOK	O	Output of RFOK
7	INTQ	O	Interruption signals to the external microcomputer
8	RST	I	Input of reset
9	A0	I	Command/Parameter discrimination signal input
10	STB	I	Data strobe signal input
11	SCK	I	Serial data clock input
12	SO	O	Serial data output
13	SI	I	Serial data input
14	DVDD		Power supply for digital circuits
15	DAVDD		Power supply for DAC
16	ROUT	O	Output of audio for the right channel
17	DAGND		GND for DAC
18	REGC		Connected to the capacitor for band gap
19	DAGND		GND for DAC
20	LOUT	O	Output of audio for the left channel
21	DAVDD		Power supply for DAC
22	XVDD		Power supply for the crystal oscillator
23	XTAL	O	Connected to the crystal oscillator
24	XTAL	I	Connected to the crystal oscillator
25	XGND		Ground for the crystal oscillator
26	DVDD		Power supply for digital circuits
27	C1D1	O	Information on error correction
28	C1D2	O	Information on error correction
29	C2D1	O	Information on error correction
30	C2D2	O	Information on error correction
31	C2D3	O	Information on error correction
32	LOCK	O	Output of LOCK
33	MIRR	O	MIRR signal
34	HOLD	O	HOLD signal
35	PLCK	O	Output of PLCK
36	C16M	O	Output of 16.9344MHz
37	DGND		Ground for digital circuits
38	TX	O	DAI output
39	EMPH	O	Pre-emphasis information output
40	FLAG	O	The flag for which output sound data cannot be corrected is outputted
41	DVDD		Power supply for digital circuits
42	LIMIT	I	Signal is inputted when the register can be read
43	XTALEN	I	Permission to oscillate
44	DGND		Ground for digital circuits
45	DIN	I	Input of audio data
46	DOUT	O	Output of audio data
47	SCKIN	I	Clock input for audio data
48	SCKO	O	Clock output for audio data
49	LRCKIN	I	Input of LRCK for audio data
50	LRCK	O	Output LRCK for audio data
51	DVDD		Power supply for digital circuits
52	FD+	O	Output of focus drive PWM
53	FD-	O	Output of focus drive PWM
54	TD+	O	Output of tracking drive PWM
55	TD-	O	Output of tracking drive PWM
56	SD+	O	Output of thread drive PWM
57	SD-	O	Output of thread drive PWM
58	MD+	O	Output of spindle drive PWM
59	MD-	O	Output of spindle drive PWM
60	DGND		Ground for digital circuits



Pin No.	Pin Name	I/O	Function and Operation
61	TESTEN	I	Connected to GND
62-66	TEST4-0	I	Connected to GND
67	ADGND		GND for DAC
68	EFM	O	Output of EFM signals
69	ASY	I	Input of asymmetry
70	ADVDD		Power supply for DAC
71	RFI	I	Input of RF
72, 73	EQ2, 1		Equalizer 2, 1
74	RF-	I	Reversal input of RF
75	RF2-	I	Reversal input of RF2
76	AGCO	O	Output of RF
77	AGCI	I	Input of AGC
78	RFO	O	Output of RF
79	ATEST	O	Analog tests
80	C3T		Connection to the capacitor for detecting 3T
81	AGND		Ground for the analog system
82	A	I	Input of A
83	C	I	Input of C
84	B	I	Input of B
85	D	I	Input of D
86	F	I	Input of F
87	E	I	Input of E
88	VREFIN	I	Photo-detector input bias voltage
89	AVDD		Power supply for the analog system
90	REFOUT	O	Output of reference voltage
91	REFC		Connected to the capacitor for output of REFOUT
92	FE-	I	Reversal input of FE
93	FEO	O	Output of FE
94	ADCIN	I	TEST
95	TE-	I	Reversal input of TE
96	TEO	O	Output of TE
97	TE2	O	TE2
98	TEC	I	TEC
99	AGND		Ground for the analog system
100	PWMSW	I	Servo PWM mode switching

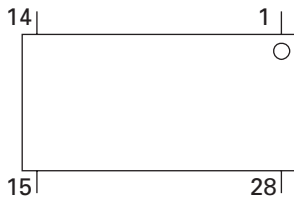
\* UPD63712GC



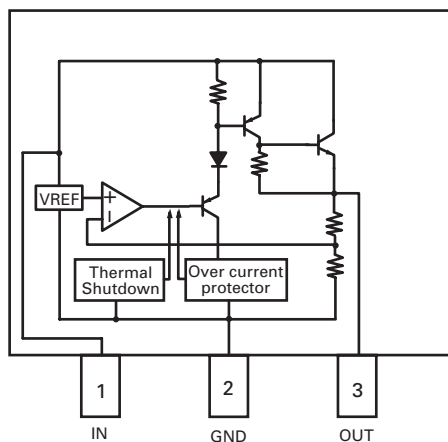
## Pin Functions(BA5996FP)

Pin No.	Pin Name	Function and Operation
1	VR	Input pin for reference voltage
2	OPIN2(+)	Input pin for non-inverting input for CH2 preamplifier
3	OPIN2(-)	Input pin for inverting input for CH2 preamplifier
4	OPOUT2	Output pin for CH2 preamplifier
5	OPIN1(+)	Input pin for non-inverting input for CH1 preamplifier
6	OPIN1(-)	Input pin for inverting input from CH1 preamplifier
7	OPOUT1	Output pin for CH1 preamplifier
8	GND	Ground pin
9	MUTE	Mute control pin
10	POWVCC1	Power supply pin for CH1, CH2, and CH3 at "Power" stage
11	VO1(-)	Driver CH1 - Negative output
12	VO1(+)	Driver CH2 - Positive output
13	VO2(-)	Driver CH2 - Negative output
14	VO2(+)	Driver CH2 - Positive output
15	VO3(+)	Driver CH2 - Positive output
16	VO3(-)	Driver CH2 - Negative output
17	VO4(+)	Driver CH4 - Positive output
18	VO4(-)	Driver CH4 - Negative output
19	POWVCC2	Power supply pin for CH4 at "Power" stage
20	GND	Ground pin
21	CNT	Control pin
22	LDIN	Loading input
23	OPOUTSL	Output pin for preamplifier for thread
24	OPINLSL	Input pin for preamplifier for thread
25	OPOUT3	CH3 preamplifier output pin
26	OPIN3(-)	Input pin for inverting input for CH3 preamplifier
27	OPIN3(+)	Input pin for non-inverting input for CH3 preamplifier
28	PREVCC	PreVcc

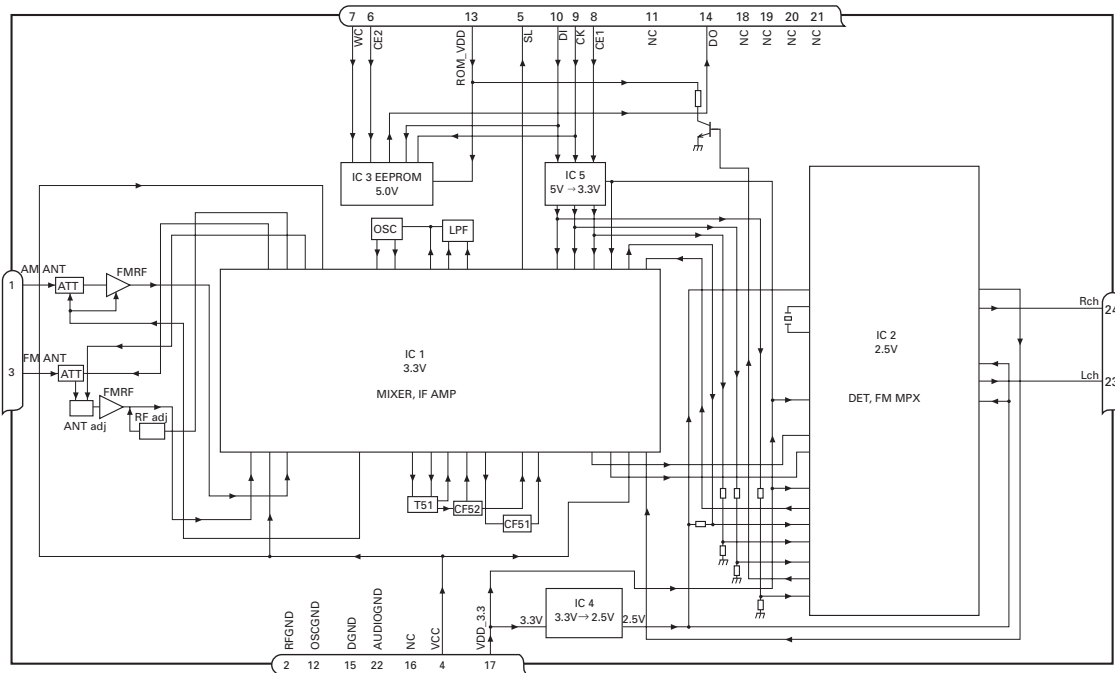
BA5996FP



NJM2391DL1-33



## ● FM/AM Tuner Unit



No.	Symbol	I/O	Explain
1	AMANT	I	AM antenna input AM antenna input high impedance AMANT pin is connected with an all antenna by way of 4.7μH. (LAU type inductor) A series circuit including an inductor and a resistor is connected with RF ground for the countermeasure against the ham of power transmission line.
2	RFGND		RF ground Ground of antenna block
3	FMANT	I	FM antenna input Input of FM antenna 75Ω Surge absorber(DSP-201M-S00B) is necessary.
4	VCC		power supply The power supply for analog block. D.C 8.4V ± 0.3V
5	SL	O	signal level Output of FM/AM signals level
6	CE2	I	chip enable-2 Chip enable for EEPROM "Low" active
7	WC	I	write control You can write EEPROM, when EEPROM write control is "Low". Ordinary non connection
8	CE1	I	chip enable-1 Chip enable for AF•RF "High" active
9	CK	I	clock Clock
10	DI	I	data in Data input
11	NC		non connection Not used
12	OSCGND		osc ground Ground of oscillator block
13	ROM_VDD		power supply Power supply for EEPROM pin 13 is connected with a power supply of micro computer.
14	DO	O	data out Data output
15	DGND		digital ground Ground of digital block
16	NC		non connection Not used
17	VDD_3.3		power supply The power supply for digital block. 3.3V ± 0.2V
18	NC		non connection Not used
19	NC		non connection Not used
20	NC		non connection Not used
21	NC		non connection Not used
22	AUDIOGND		audio ground Ground of audio block
23	L ch	O	L channel output FM stereo "L-ch" signal output or AM audio output
24	R ch	O	R channel output FM stereo "R-ch" signal output or AM audio output

# 7.2.2 DISPLAY

## ● LCD(CAW1756)(DEH-5/XU/UC)

A

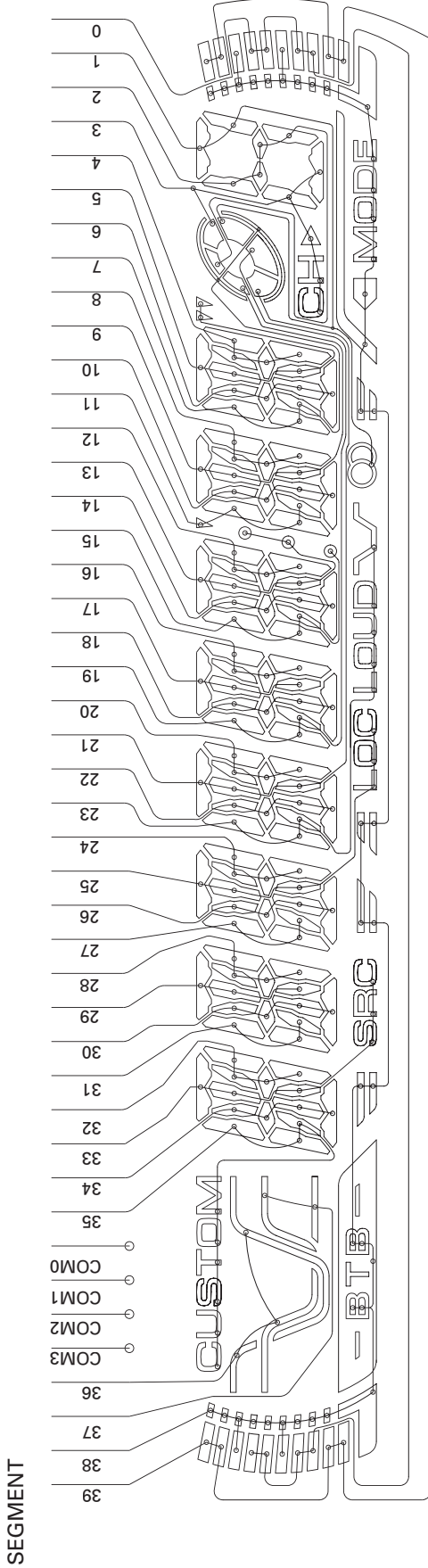
B

C

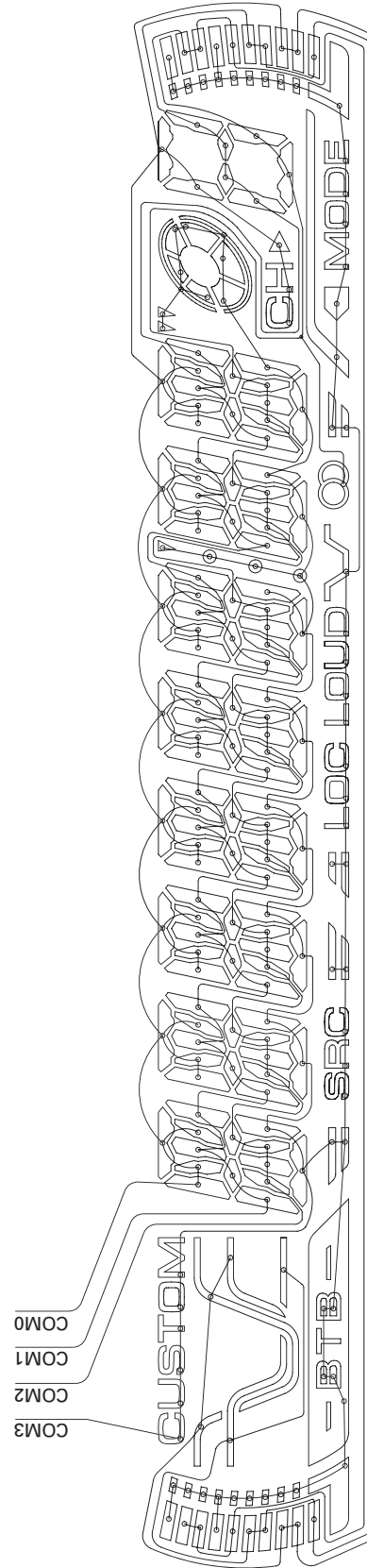
D

E

F

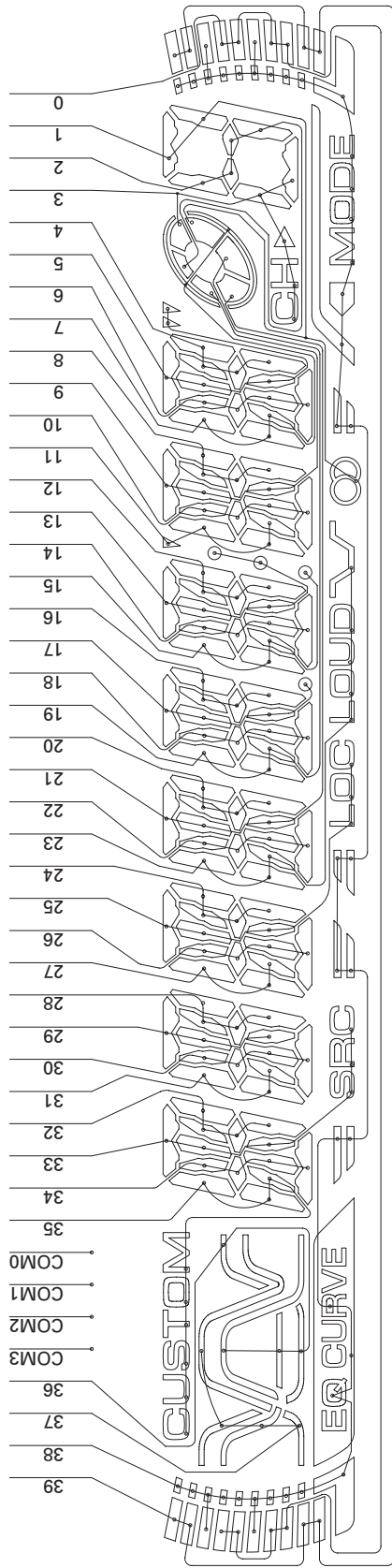


COMMON

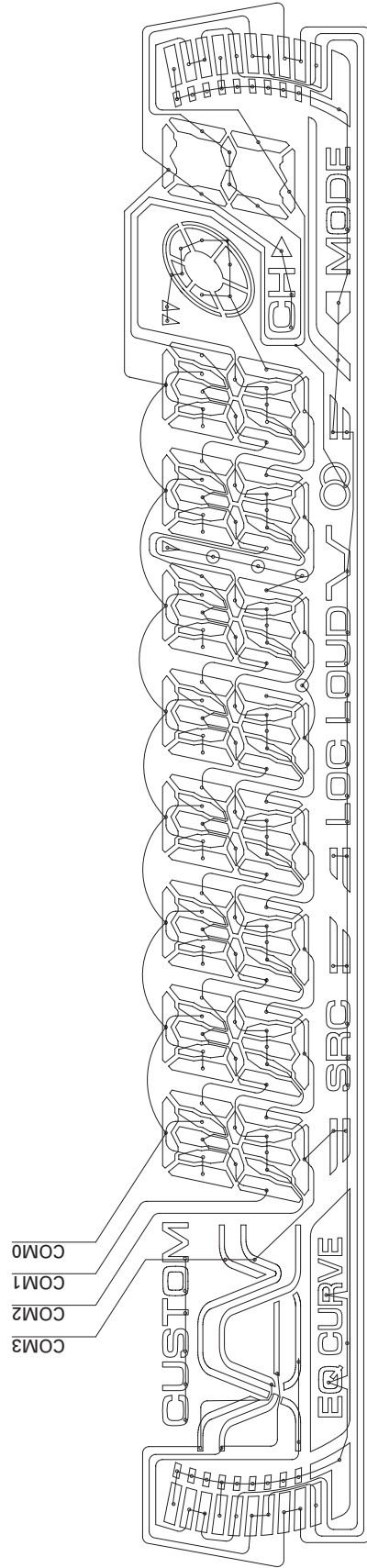


● LCD(CAW1765)(DEH-15/XU/UC)

SEGMENT



COMMON



A

B

C

D

E

F

● LCD(CAW1733)(DEH-1500/XU/UC)

A

B

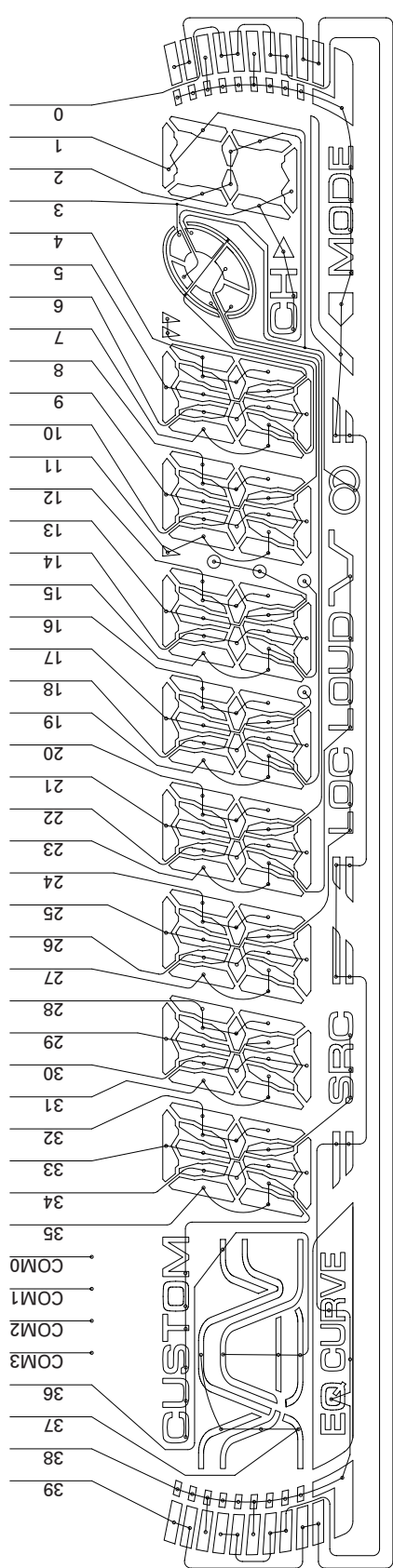
C

D

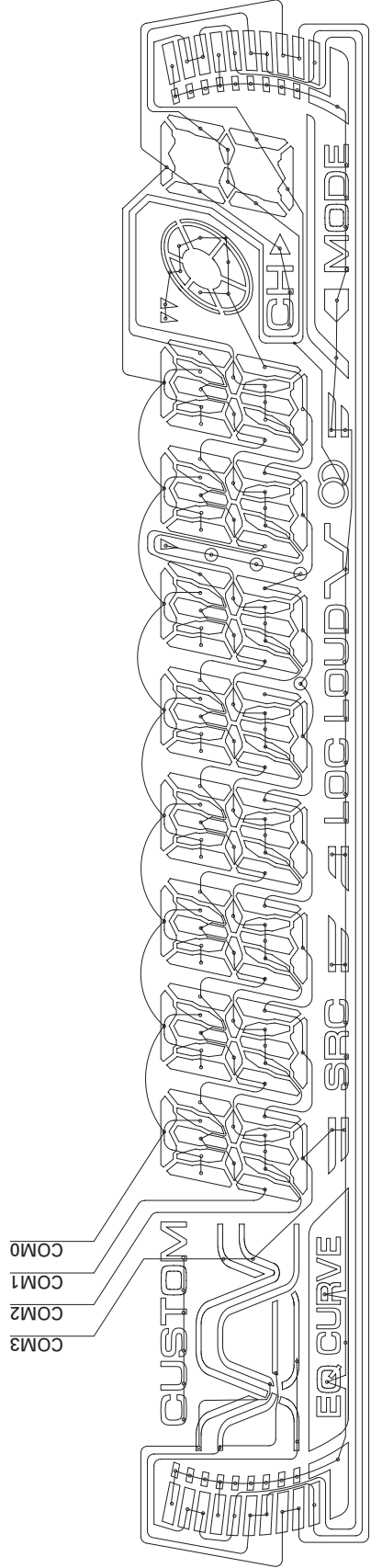
E

F

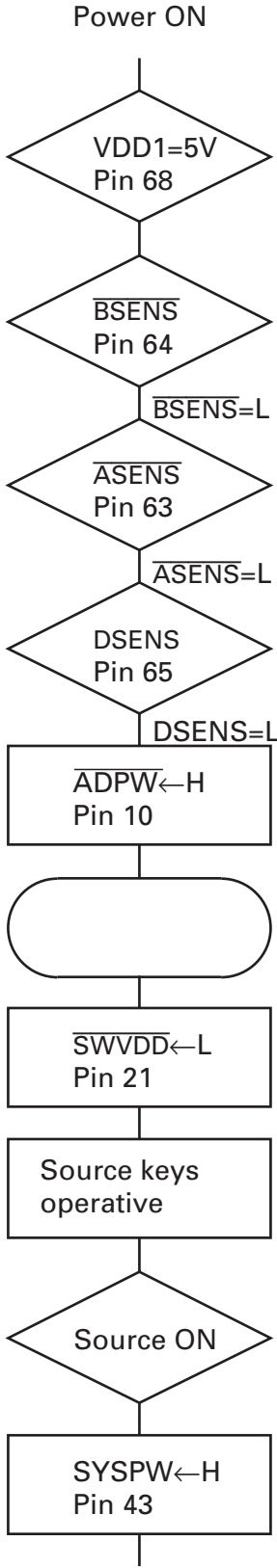
SEGMENT



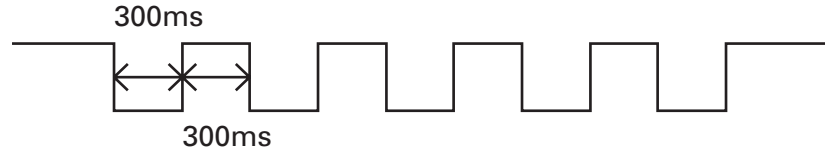
COMMON



### 7.3 OPERATIONAL FLOW CHART



Starts communication with Grille microcomputer.



In case of the above signal, the communication with Grille microcomputer may fail. If the time interval is not 300msec, the oscillator may be defective.

Completes power-on operation.(After that, proceed to each source operation.)

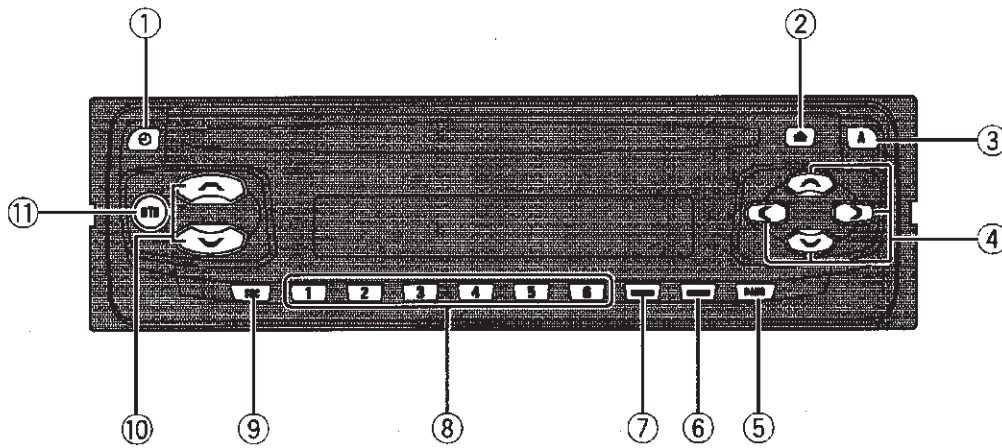
## 7.4 CLEANING

Before shipping out the product, be sure to clean the following portions by using the prescribed cleaning tools:

Portions to be cleaned	Cleaning tools
CD pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008



## 8. OPERATIONS



### Head unit

#### ① **CLOCK button**

Press to change to the clock display.

#### ② **CD EJECT button**

You can eject a CD by pressing **CD EJECT**.

#### ③ **AUDIO button**

Press to select various sound quality controls.

#### ④ **▲/▼/◀/▶ buttons**

Press to do manual seek tuning, fast forward, reverse and track search controls. Also used for controlling functions.

#### ⑤ **BAND button**

Press to select among three FM and one AM bands and cancel the control mode of functions.

#### ⑥ **LOUDNESS button**

Press to turn loudness on or off.

#### ⑦ **LOCAL/BSM button**

Press to turn local function on or off.  
Press and hold to turn BSM function on or off.

#### ⑧ **1-6 buttons**

Press for preset tuning.

#### ⑨ **SOURCE button**

This unit is turned on by selecting a source. Press to cycle through all of the available sources.

#### ⑩ **VOLUME**

Press to increase or decrease the volume.

#### ⑪ **BTB button**

Press to select various BTB (bass treble booster) setting.

## Power ON/OFF

### Turning the unit on

- **Press SOURCE to turn the unit on.**  
When you select a source the unit is turned on. ▢

### Selecting a source

You can select a source you want to listen to. To switch to the built-in CD player, load a disc in this unit.

- **When using the head unit, press SOURCE to select a source.**  
Press **SOURCE** repeatedly to switch between the following sources:  
**Built-in CD player—Tuner**

#### Notes

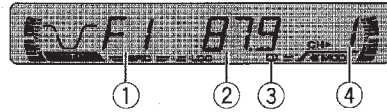
- When no disc has been set in the unit, the source will not switch to the built-in CD player.
- When this unit's blue/white lead is connected to the car's auto-antenna relay control terminal, the car's antenna extends when this unit's source is turned on. To retract the antenna, turn the source off. ▢

### Turning the unit off

- **Press SOURCE and hold until the unit turns off.** ▢

## Tuner

### Listening to the radio



- ① **Band indicator**  
Shows which band the radio is tuned to, AM or FM.
- ② **Frequency indicator**  
Shows to which frequency the tuner is tuned.
- ③ **Stereo (SD) indicator**  
Shows that the frequency selected is being broadcast in stereo.
- ④ **Preset number indicator**  
Shows what preset has been selected.

**1 Press SOURCE to select the tuner.**

**2 Use VOLUME to adjust the sound level.**  
Rotate to increase or decrease the volume.

**3 Press BAND to select a band.**  
Press **BAND** until the desired band is displayed, **F1, F2, F3** for FM or **AM**.

**4 To perform manual tuning, press ◀ or ▶ with quick presses.**  
The frequencies move up or down step by step.

**5 To perform seek tuning, press and hold ◀ or ▶ for about one second and release.**  
The tuner will scan the frequencies until a broadcast strong enough for good reception is found.

- ▢ You can cancel seek tuning by pressing either ◀ or ▶ with a quick press.

- ▢ If you press and hold ◀ or ▶ you can skip broadcasting stations. Seek tuning starts as soon as you release the buttons.

#### Note

When the frequency selected is being broadcast in stereo the stereo (SD) indicator will light. ▢

### Storing and recalling broadcast frequencies

If you press any of the preset tuning buttons **1–6** you can easily store up to six broadcast frequencies for later recall with the touch of a button.

- **When you find a frequency that you want to store in memory press a preset tuning button 1–6 and hold until the preset number stops flashing.**

The number you have pressed will flash in the preset number indicator and then remain lit. The selected radio station frequency has been stored in memory.

The next time you press the same preset tuning button **1–6** the radio station frequency is recalled from memory.

#### Notes

- Up to 18 FM stations, 6 for each of the three FM bands, and 6 AM stations can be stored in memory.
- You can also use ▲ and ▼ to recall radio station frequencies assigned to preset tuning buttons **1–6**. ▢

## Tuner

### Tuning in strong signals

Local seek tuning lets you tune in only those radio stations with sufficiently strong signals for good reception.

**1 Press LOCAL/BSM to turn local seek tuning on.**

LOC appears in the display.

**2 When you want to return to normal seek tuning, press LOCAL/BSM to turn local seek tuning off.** 

### Storing the strongest broadcast frequencies


BSM (best stations memory) lets you automatically store the six strongest broadcast frequencies under preset tuning buttons 1-6 and once stored there you can tune in to those frequencies with the touch of a button.

● **Press LOCAL/BSM and hold until the BSM turns on.**

BSM begins to flash. While BSM is flashing the six strongest broadcast frequencies will be stored under preset tuning buttons 1-6 in order of their signal strength. When finished, BSM stops flashing.

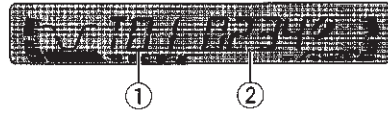
- To cancel the storage process, press LOCAL/BSM.

 **Note**

Storing broadcast frequencies with BSM may replace broadcast frequencies you have saved using 1-6. 

## Built-in CD Player

### Playing a CD



**1 Track number indicator**  
Shows the track currently playing.

**2 Play time indicator**  
Shows the elapsed playing time of the current track.

**1 Insert a CD into the CD loading slot.**  
Playback will automatically start.



CD loading slot

- You can eject a CD by pressing CD EJECT.


**2 After a CD has been inserted, press SOURCE to select the built-in CD player.**

**3 Use VOLUME to adjust the sound level.**  
When you press VOLUME up/+, the volume is raised and when pressed down/–, the volume is lowered.

**4 To perform fast forward or reverse, press and hold ◀ or ▶.**

**5 To skip back or forward to another track, press ◀ or ▶.**  
Pressing ▶ skips to the start of the next track. Pressing ◀ once skips to the start of the current track. Pressing again will skip to the previous track.


 **Notes**

- The built-in CD player plays one, standard, 12-cm or 8-cm (single) CD at a time. Do not use an adapter when playing 8-cm CDs.
- Do not insert anything other than a CD into the CD loading slot.
- If you cannot insert a disc completely or if after you insert a disc the disc does not play, check that the label side of the disc is up. Press CD EJECT to eject the disc, and check the disc for damage before inserting the disc again.
- If the built-in CD player does not operate properly, an error message such as **ERROR-11** may be displayed. Refer to *Understanding built-in CD player error messages*. 

### Playing tracks in a random order

Random play lets you play back tracks on the CD in a random order.

**1 Press 4 to turn random play on.**  
RDM appears in the display. Tracks will play in a random order.

**2 Press 4 to turn random play off.**  
Tracks will continue to play in order. 

### Repeating play

Repeat play lets you hear the same track over again.


**1 Press 5 to turn repeat play on.**  
RPT appears in the display. The track currently playing will play and then repeat.

## Built-in CD Player

**2 Press 5 to turn repeat play off.**

The track currently playing will continue to play and then play the next track.

 **Note**

If you perform track search or fast forward/reverse, repeat play is automatically cancelled. 


### Pausing CD playback

Pause lets you temporarily stop playback of the CD.

**1 Press 6 to turn pause on.**

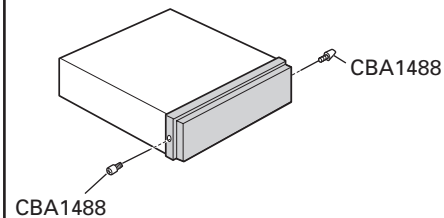
PAUSE appears in the display. Play of the current track pauses.

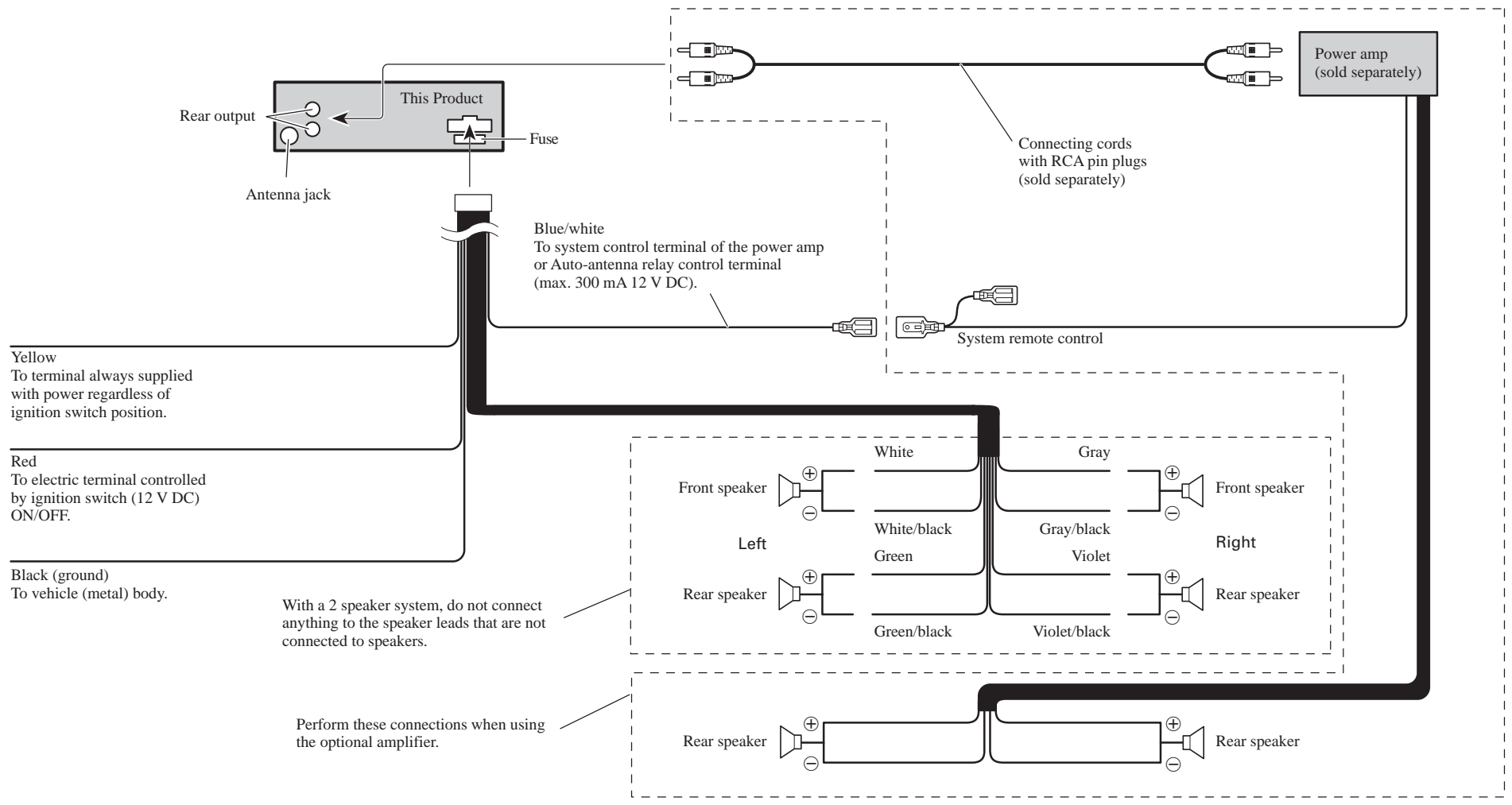
**2 Press 6 to turn pause off.**

Play will resume at the same point that you turned pause on. 

DEH-15/XU/UC, 1500/XU/UC

About the fixing screws for the front panel.





1

2

3

4

1

2

3

4

# Service Manual

ORDER NO.  
**CRT2944**

CD MECHANISM MODULE

# CX-3026

- This service manual describes the operation of the CD mechanism module incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for model under repair.

Model	Service Manual	CD Mechanism Module
DEH-P250/XM/UC DEH-P250/XN/UC DEH-P2500/XM/UC DEH-P2500/XN/UC DEH-P25/XM/UC DEH-P25/XN/UC	CRT2981	CXK5600
DEH-P2530R/XM/EW DEH-P2530R/XN/EW DEH-P2500R/XM/EW DEH-P2500R/XN/EW DEH-P2500RB/XM/EW DEH-P2500RB/XN/EW	CRT2982	
DEH-P2550/XM/ES DEH-P2550/XN/ES	CRT2983	
DEH-P350/XM/UC DEH-P350/XN/UC DEH-P3500/XM/UC DEH-P3500/XN/UC DEH-P4550/XM/ES DEH-P4550/XN/ES	CRT2984	
DEH-P4500R/XM/EW DEH-P4500R/XN/EW	CRT2985	

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2. MECHANISM DESCRIPTIONS.....	20
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# 1. CIRCUIT DESCRIPTIONS

Recently, Many CD LSIs have been one-chip LSIs where RF amplifier, DSP, audio DAC, post filter, and other circuits are integrated.

This product uses this type CD LSI, UPD63712GC, which includes all functions necessary for CD player control.

Basically, this system outputs the analog signal, and the digital output can be supported.

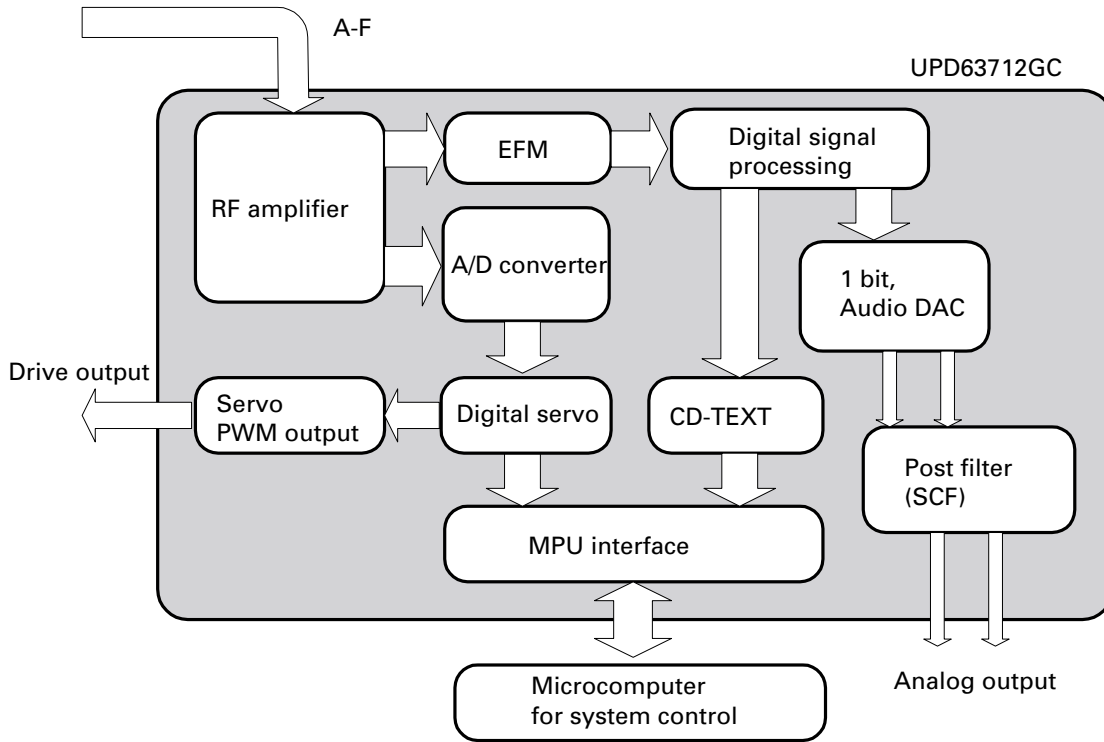


Fig.1.0.1 Block diagram of CD LSI UPD63712GC



### 1.1.2 RF and RFAGC amplifiers

The photo-detector outputs (A + C) and (B + D) are added, amplified, and equalized inside this LSI, and then provided as the RF signal from the RFI terminal. The RF signal can be used for eye-pattern check.

The low frequency component of the RFI voltage is:

$$RFO = (A + B + C + D) \times 2$$

The RFO is used for the FOK generation circuit and RF offset adjustment circuit.

The RFI output from the pin 71 is A/C-coupled outside this LSI, and returned to the pin 76 of this LSI. The signal is amplified in the RFAGC amplifier to obtain the RFAGC signal. This LSI is equipped with the RFAGC auto-adjustment function as explained below. This function automatically controls the RFO level to keep at 1.5V by switching the feedback gain for the RFAGC amplifier.

The RFO signal is also used for the EFM, DFCT, MIRR, and RFAGC auto-adjustment circuits.

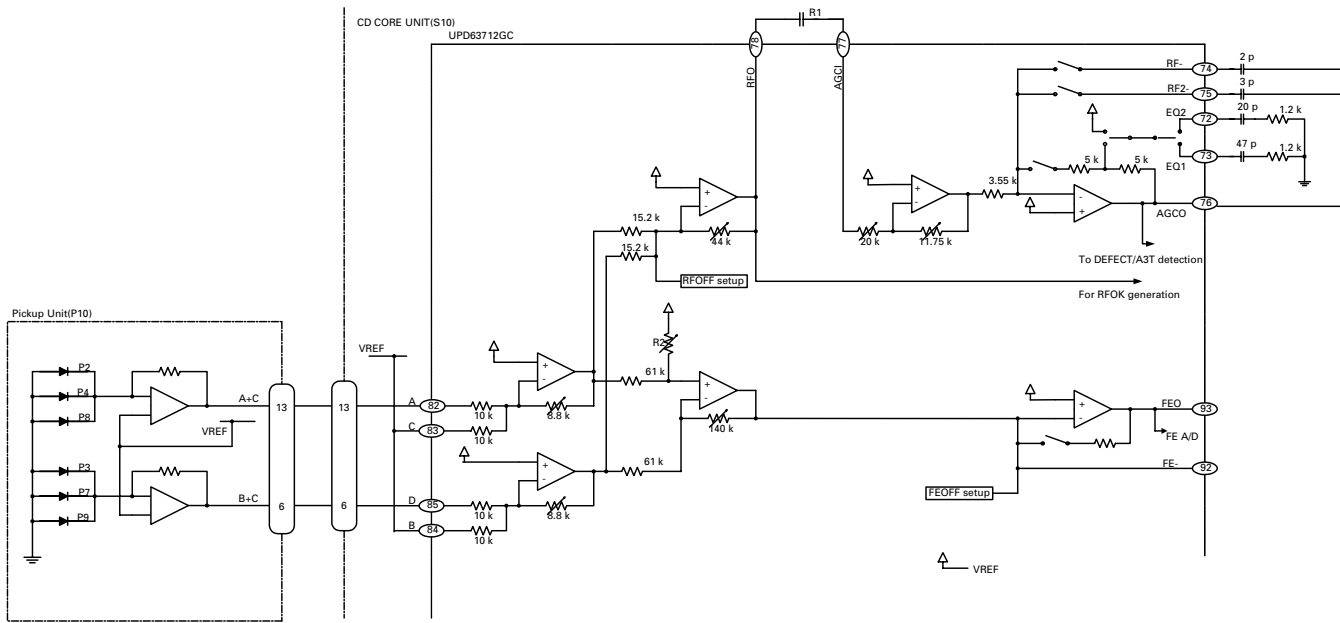


Fig. 1.1.2 RF/AGC/FE



### 1.1.3 Focus error amplifier

The photo-detector outputs (A + C) and (B + D) are applied to the differential amplifier and the error amplifier to obtain the (A + C - B - D) signal, which is then provided from the pin 93 as the FE signal.

The low frequency component of the FE voltage is:

$$\begin{aligned} FE &= (A + C - B - D) \times 8.8k/10k \times 111k/61k \times 160k/72k \\ &= (A + C - B - D) \times 3.55 \end{aligned}$$

The FE output shows 1.5Vp-p S-shaped curve based on the REFO. For the next-stage amplifiers, the cutoff frequency is 14.6kHz.

### 1.1.4 RFOK

The RFOK circuit generates the RFOK signal, which indicates focus-close timing and focus-close status during the play mode, and outputs from the pin 6. This signal is shifted to "H" when the focus is closed and during the play mode.

The DC level of the RFI signal is peak-held in the digital block and compared with a certain threshold level to generate the RFOK signal. Therefore, even on a non-pit area or a mirror-surface area of a disc, the RFOK becomes "H" and the focus is closed.

This RFOK signal is also applied to the microcomputer via the low-pass filter as the FOK signal, which is used for protection and RF amplifier gain switching.

### 1.1.5 Tracking error amplifier

The photo-detector outputs E and F are applied to the differential amplifier and the error amplifier to obtain the (E - F) signal, and then provided from the pin 96 as the TE signal.

The low frequency component of the TE voltage is:

$$\begin{aligned} TEO &= (E - F) \times 63k/112k \times 160k/160k \times 181k/45.4k \times 160k/80k \\ &= (E - F) \times 4.48 \end{aligned}$$

The TE output provides the TE waveform of about 1.16Vp-p based on the REFO. For the next-stage amplifiers, the cutoff frequency is 21.1kHz.

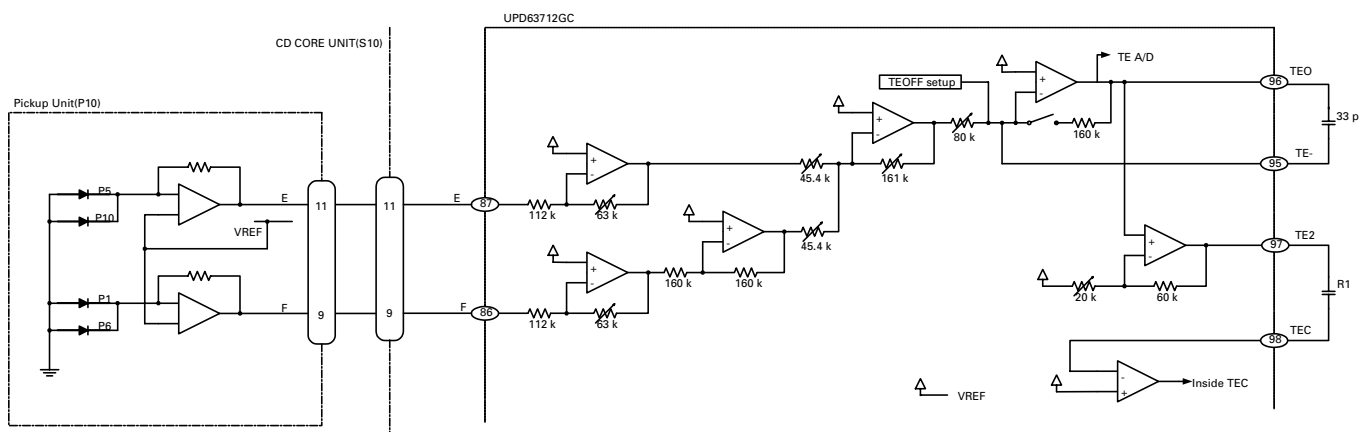


Fig. 1.1.3 TE

### 1.1.6 Tracking zero-cross amplifier

The tracking zero-cross signal (hereinafter TEC signal) is obtained by amplifying the TE signal 4 times, and used to detect the tracking-error zero-cross point.

By using the information on this point, the following two operations can be performed:

1. Track counting in the carriage move and track jump modes
2. Sensing the lens-moving direction at the moment of the tracking close (The sensing result is used for the tracking brake circuit as explained below.)

The frequency range of the TEC signal is between 300Hz and 20kHz.

TEC voltage = TE level x 4

The TEC level can be calculated at 4.64V. This level exceeds the D range of the operation amplifier, and the signal gets clipped. However, it can be ignored because the CD LSI only uses the signal at the zero-cross point.

### 1.1.7 EFM

The EFM circuit converts the RF signal into a digital signal expressed in binary digits 0 and 1. The AGCO output from the pin 76 is A/C-coupled in the peripheral circuit, fed back to the LSI from the pin 71, and sent to the EFM circuit inside the LSI.

On scratched or dirty discs, part of the RF signal recorded may be missing. On other discs, part of the RF signal recorded may be asymmetric, which was caused by dispersion in production quality. Such lack of information cannot be completely eliminated by this AC coupling process. Therefore, by utilizing the fifty-fifty occurrence ratio of binary digits (0 and 1) in the EFM signal, the EFM comparator reference voltage ASY is controlled, so that the comparator level always stays around the center of the RFO signal. The reference voltage ASY is made from the EFM comparator output via the low-pass filter. The EFM signal is put out from the pin 68.

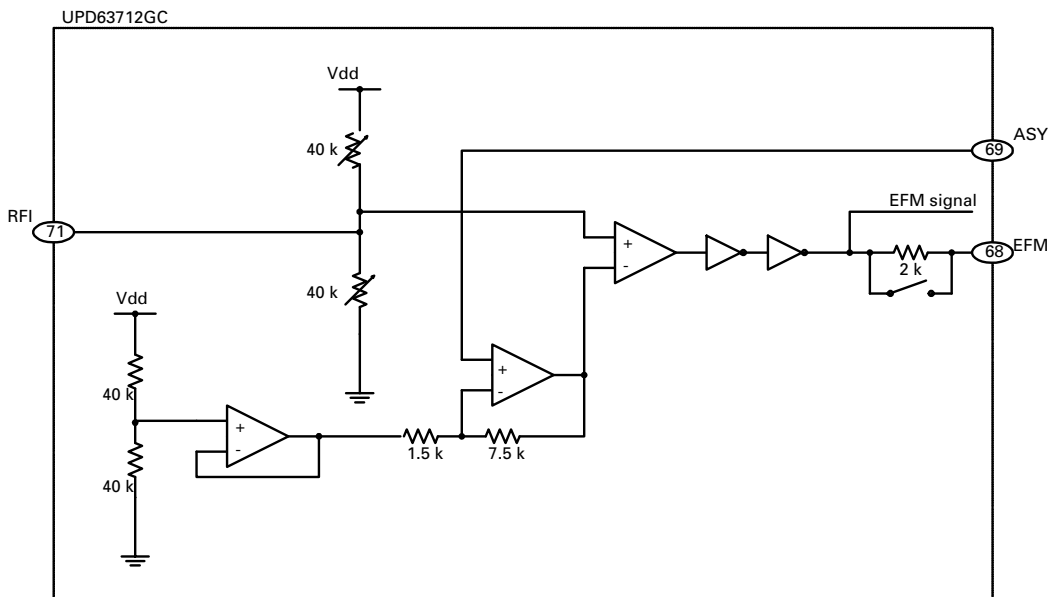


Fig. 1.1.4 EFM

## 1.2 SERVO BLOCK (UPD63712GC: IC201)

The servo block controls the servo systems for error signal equalizing, in-focus, track jump and carriage move and so on. The DSP block is a signal-processing block, where data decoding, error correction, and compensation are performed.

After A/D-converted, the FE and TE signals (generated in the preamplifier block) are applied to the servo block and used to generate the drive signals for the focus, tracking, and carriage servos.

The EFM signal is decoded in the DSP block, and finally sent out as the audio signal after D/A-converted. In this decoding process, the spindle servo error signal is generated, supplied to the spindle servo block, and used to generate the spindle drive signal.

The drive signals for focus, tracking, carriage, and spindle servos (FD, TD, SD, and MD) are provided as PWM3 data, and then converted to the analog data by the low-pass filter in the driver IC BA5996FP (IC301). These analog drive signals can be monitored by the FIN, TIN, CIN, and SIN signals respectively. Afterwards, the signals are amplified and applied to each servo's actuator and motor.

### 1.2.1 Focus servo system

In the focus servo system, the digital equalizer block works as its main equalizer. The figure 1.2.1 shows the block diagram of the focus servo system.

To close the focus loop circuit, the lens should be moved to within the in-focus range. While moving the lens up and down by using the focus search triangular signal, the system tries to find the in-focus point. In the meantime, the spindle motor rotation is kept at the prescribed one by using the kick mode.

The servo LSI monitors the FE and RFOK signals and automatically performs the focus close operations at an appropriate timing. The focus loop will close when the following three conditions are satisfied at the same time:

- 1) The lens moves toward the disc surface.
- 2) The RFOK signal is shifted to "H".
- 3) The FE signal is zero-crossed. At last, the FE signal comes to the zero level (or REFO).

When the focus loop is closed, the FSS bit is shifted from "H" to "L". The microcomputer starts monitoring the RFOK signal obtained through the low-pass filter 10msec after that.

If the RFOK signal is detected as "L", the microcomputer will take several actions including protection.

The timing chart for focus close operations is shown in fig. 1.2.2. (This shows the case where the system fails focus close.)

In the test mode, the S-shaped curve, search voltage, and actual lens movement can be confirmed by pressing the focus close button when the focus mode selector displays 01.

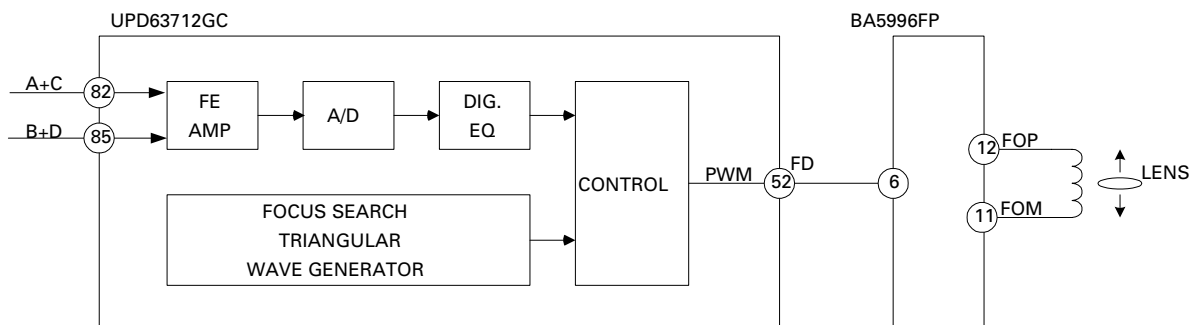
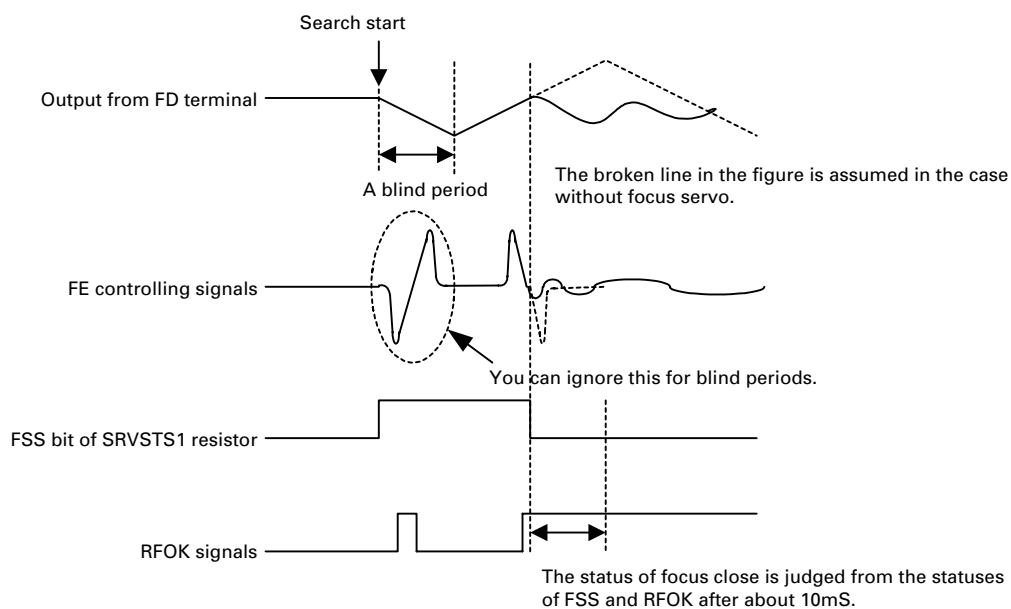


Fig. 1.2.1 Block diagram of the focus servo system

A



B

C

Fig. 1.2.2 Timing chart for focus close operations

## 1.2.2 Tracking servo system

In the tracking servo system, the digital equalizer block is used as its main equalizer. The figure 1.2.3 shows the block diagram of the tracking servo system.

### (a) Track jump

Track jump operation is automatically performed by the auto-sequence function inside the LSI with a command from the microcomputer. In the search mode, the following five track jump modes are available: 1, 4, 10, 32, and 32\*3. In the test mode, 1, 32, and 32\*3 track jump modes, and carriage move mode are available and can be switched by selecting the mode.

For track jumps, first, the microcomputer sets about half the number of tracks to be jumped as the target. (Ex. For 10 track jumps, it should be 5 or so.) Using the TEC signal, the microcomputer counts up tracks. When the counter reaches the target set by the microcomputer, a brake pulse is sent out to stop the lens. The pulse width is determined by the microcomputer. Then, the system closes the tracking loop and proceeds to the normal play. At this moment, to make it easier to close the tracking loop, the brake circuit is kept ON for 50msec after the brake pulse, and the tracking servo gain is increased.

In the normal operation mode, the FF/REW operation is realized by continuously repeating single jumps about 10 times faster than the normal single jump operation.

### (b) Brake circuit

The brake circuit stabilizes the servo-loop close operation even under poor conditions, especially in the setting-up mode or track jump mode. This circuit detects the lens-moving direction and emits only the drive signal for the opposite direction to slow down the lens. Thus, this makes it easier to close the tracking servo loop. The off-track direction is detected from the phases of the TEC and MIRR signals.

F

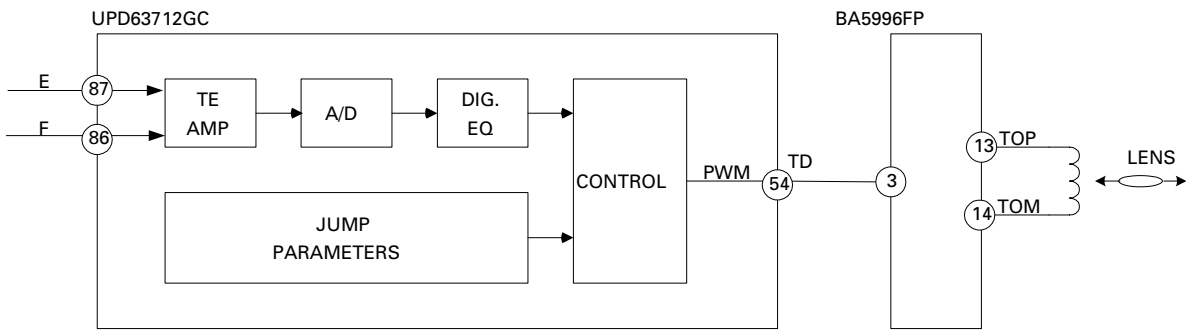


Fig. 1.2.3 Block diagram of the tracking servo system

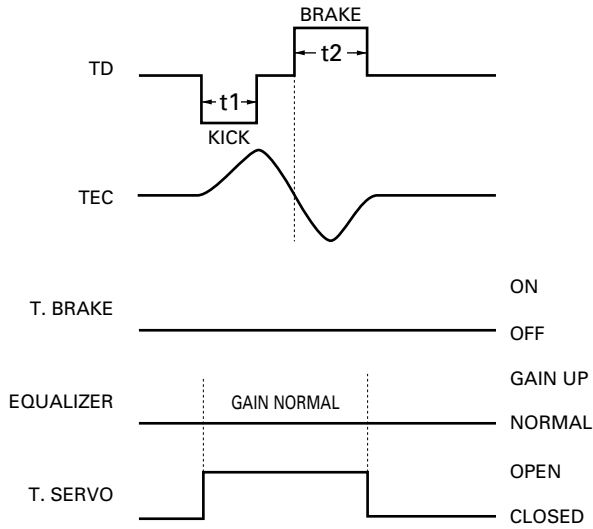


Fig. 1.2.4 Single-track jump

A

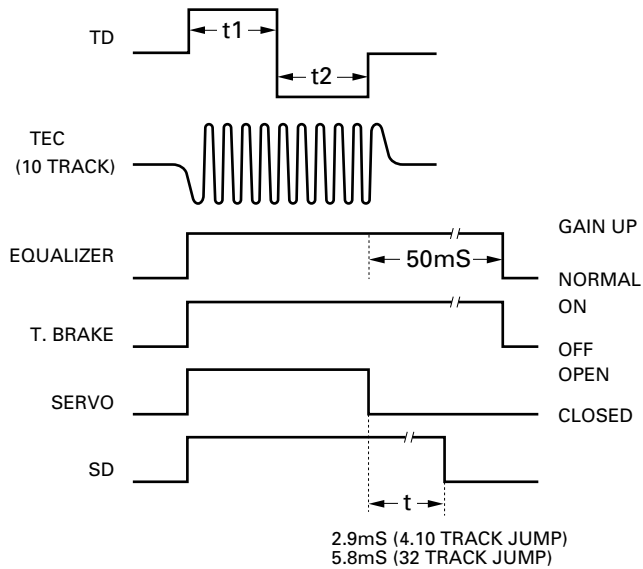
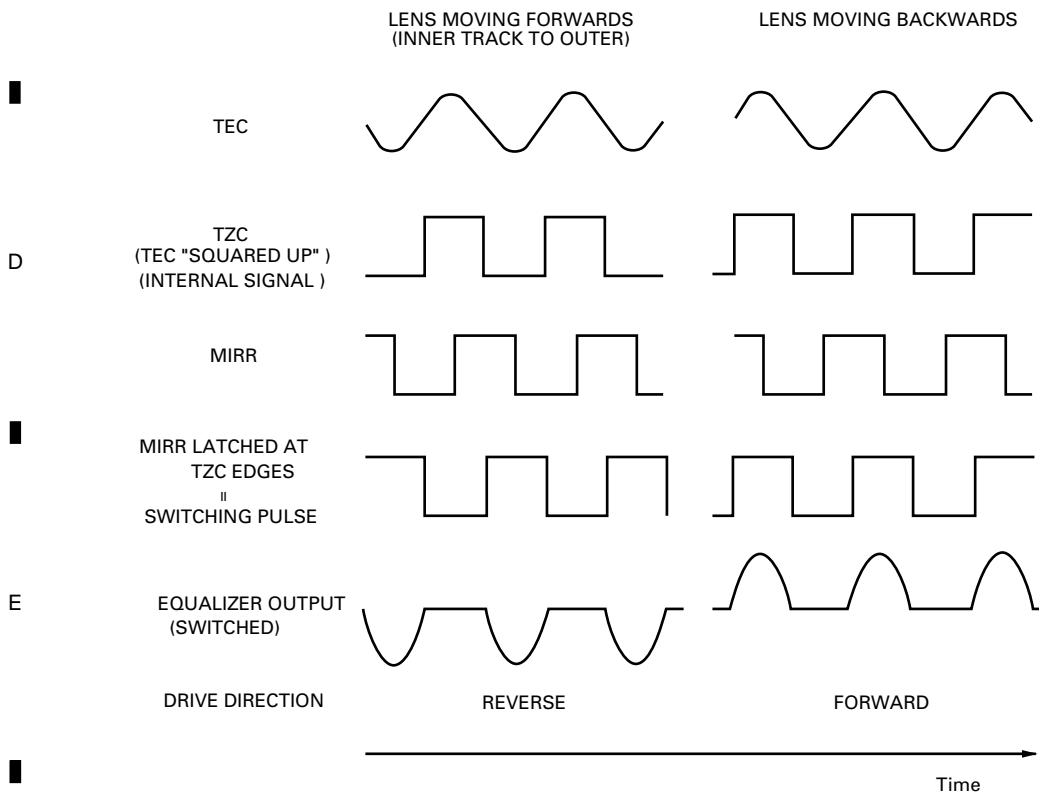


Fig. 1.2.5 Multi-track jump

C



Note : Equalizer output assumed to have same phase as TEC.

F

Fig. 1.2.6 Track brake

### 1.2.3 Carriage servo system

In the carriage servo system, the low frequency component from the tracking equalizer (the information on the lens position) is transferred to the carriage equalizer, where the gain is increased to a certain level, and then sent out from the LSI as the carriage drive signal. This signal is applied to the carriage motor via the driver IC.

During the play mode, when the lens offset reaches a certain level, it is necessary to move the pickup toward the FORWARD direction. The equalizer gain is adjusted so that the output over the carriage motor starting voltage is sent out in such a case. In actual operations, only when the equalizer output exceeds the threshold level preset in the servo LSI, the drive signal is sent out. This can reduce the consumption power.

With an eccentric disc loaded, before the whole pickup starts moving, the equalizer output may exceed the threshold level a few times. In this case, the drive signal applied from the LSI shows pulse-like waveforms.

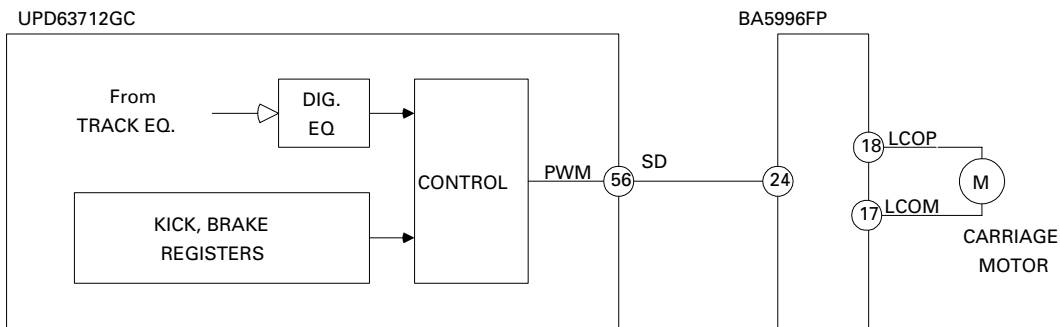


Fig. 1.2.7 Block diagram for the carriage servo block

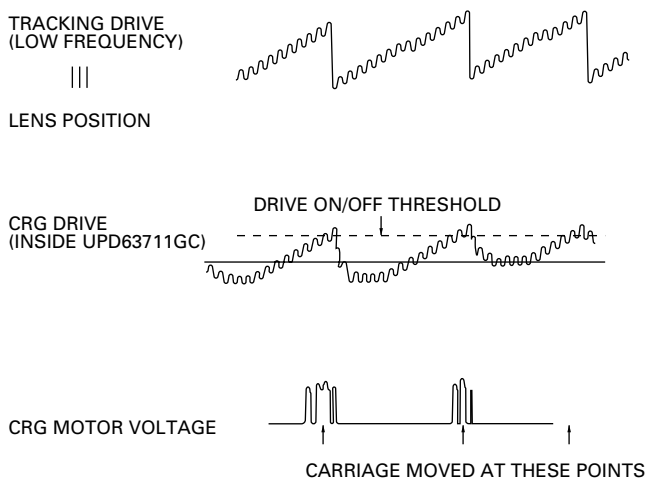


Fig. 1.2.8 Waveforms of the carriage signal

## 1.2.4 Spindle servo system

In the spindle servo system, the following six modes are available:

### 1) Kick

Used to accelerate the disc rotation in the setting-up mode.

### 2) Offset

a. Used in the setting-up mode until the AGC completes after the kick mode.

b. Used when the focus loop is unlocked during the play mode and until it is locked again.

In both cases, the mode is to keep the disc rotation near to the appropriate one.

### 3) Applicable servo

In the normal operation, the CLV servo mode is used.

The EFM demodulation block detects through WFCK/16 sampling whether or not the frame sync signal and the internal frame counter output are synchronized, and generates the status signal based on the sampling result, synchronized or non-synchronized. If eight consecutive "non-sync" signals are obtained, the system senses the status as "non-sync". If not, the system senses as "sync". In the applicable servo mode, the leading-in servo mode is automatically selected at the non-sync status, and the normal servo mode is at the sync status.

### 4) Brake

Used to stop the spindle motor.

In accordance with the microcomputer's command, the brake voltage is sent out from the servo LSI. At this moment, the EFM waveform is being monitored in this LSI. When the longest EFM pattern exceeds a certain cycle (or the rotation slows down enough), a flag is set inside the LSI, and the microcomputer switches off the brake voltage. If a flag is not set within a certain period, the microcomputer shifts the mode from the brake mode to the stop mode, and keeps this for a certain period. In the eject mode, after the mode is shifted to the stop mode and a certain period passes, the loaded disc is ejected.

### 5) Stop

Used when the power is turned on and during the eject mode. At this moment, the voltage through the spindle motor is 0V.

### 6) Rough servo

Used when the carriage is moved (or in the carriage move mode such as long search).

By obtaining the linear velocity from the EFM waveform, "H" or "L" is applied to the spindle equalizer. In the test mode, this mode is used for grating confirmation.

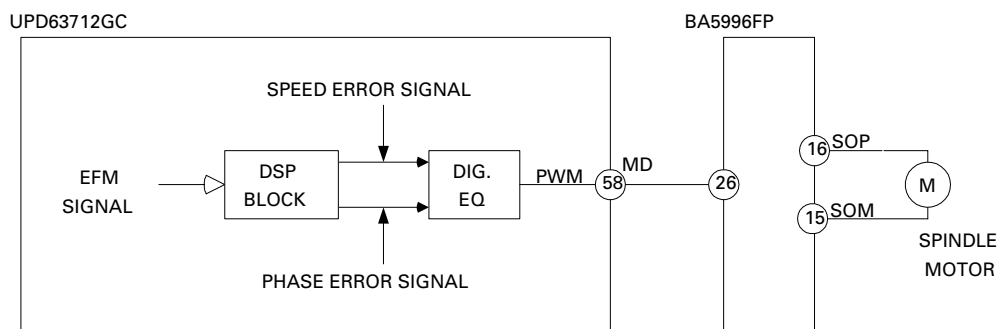


Fig.1.2.9 Block diagram of the spindle servo system



## 1.3 AUTOMATIC ADJUSTMENT FUNCTION

This system automatically handles the circuit adjustment inside the CD LSI. All adjustments are performed whenever a disc is inserted or the CD mode is selected by pressing the source key. Each adjustment will be explained below.

### 1.3.1 TE, FE, and RF offset auto-adjustment

This adjustment is made to adjust the offsets of the TE, FE, and RF amplifiers in the preamplifier block to their target values on the basis of the REFO when the power is turned on. (The target values for TE, FE, and RE offsets are 0V, 0V, and -0.8V respectively.)

<Adjusting procedures>

- 1) With the LD OFF status, the external microcomputer reads each offset through the servo LSI.
- 2) The microcomputer calculates the voltages for correction from the measured values, and inputs the calculated results as the offset adjustment values.

### 1.3.2 Tracking balance (T.BAL) auto-adjustment

This adjustment is to equalize the pickup output offsets for E-ch and F-ch by changing the amplifier gain inside the LSI. Actually, the gain is adjusted so that the TE waveform becomes symmetrical on each side of the REFO.

<Adjusting procedures>

- 1) The focus loop is closed.
- 2) The lens is kicked in the radial direction to make certain that the TE waveform is generated.
- 3) The microcomputer reads the TE offset calculated in the LSI through the servo LSI.
- 4) The microcomputer takes either of the following steps depending on the calculated offset:
  - When the offset is 0, the adjustment completes.
  - When the offset is positive or negative, the amp gains for E-ch and F-ch should be changed.

The steps 2) to 4) are repeatedly taken until the offset becomes 0 or the repeating time reaches the limit frequency.

### 1.3.3 EF bias auto-adjustment

This adjustment obtains the best focus point during the play mode and maximizes the RFI level by utilizing the phase difference between the 3T level of the RF signal and that of the signal obtained when focus error disturbance is applied to the focus loop. At this moment, the auto-gain control (AGC), where focus error disturbance is applied to the focus and tracking loops, is also performed as explained below.

<Adjusting procedures>

- 1) The external microcomputer transmits the command to apply disturbance component to the focus loop (inside the servo LSI).
- 2) In the LSI, the 3T-offset component of the RF signal is detected.
- 3) From the relation between the 3T detected component and the disturbance, the LSI obtains the volume and direction of the focus offset.
- 4) The microcomputer transmits the command and reads out the detecting result from the servo LSI.
- 5) The external microcomputer calculates the necessary correction and inputs the result as the bias adjustment value to the servo LSI.

The adjusting steps are repeated a few times for higher adjustment accuracy as same as those for the AGC.

### 1.3.4 Focus and tracking AGC

This function automatically adjusts the focus and tracking servo loop gains.

<Adjusting procedures>

- 1) Disturbance component is applied to the servo loop.
  - 2) The error signals (FE and TE) are extracted through the band pass filter as the G1 and G2 signals.
  - 3) The microcomputer reads the G1 and G2 signals through the servo LSI.
  - 4) The microcomputer calculates the necessary correction and performs the loop gain adjustment inside the servo LSI.
- For higher adjustment accuracy, the above steps are repeated a few times.

### 1.3.5 RF level auto-adjustment (RFAGC)

This adjustment minimizes the dispersion of the RF level (RFO), which may be caused by disc-related errors, for more stable signal transmission by changing the amp gain between RFI and RFO.

<Adjusting procedures>

- 1) The external microcomputer sends the command to the servo LSI to read out the output from the RF level detecting circuit inside the servo LSI.
- 2) The external microcomputer calculates the appropriate amp gain by using the output read out to adjust the RFO level at the prescribed one.
- 3) The external microcomputer sends the command to the servo LSI to adjust the amp gain into the calculated one.

This adjustment is automatically performed when:

- 1) During the setting-up mode, only the focus close operation ends.
- 2) Immediately before the setting-up ends (or right before the play mode starts)
- 3) During the play mode, the focus loop is locked again after unlocked.

### 1.3.6 Pre-amp gain adjustment

In this adjustment, when the reflected beams from disc surface are extremely weak (ex. when the lens is dirty, and a CD-RW is loaded), the whole gain in the RFAMP block (FE, TE, and RF amplifiers) is increased by +6dB or +12dB.

<Adjusting procedures>

When the system senses that the reflected beams from disc surface are extremely weak during the setting-up mode, the whole RFAMP gain is increased by +6dB or +12dB.

After the gain is changed, the setting-up mode is restarted.

If the whole RFAMP gain is always increased to the +6dB level in the play mode, the +6dB level will be employed at the starting of the setting-up mode from the next playback.

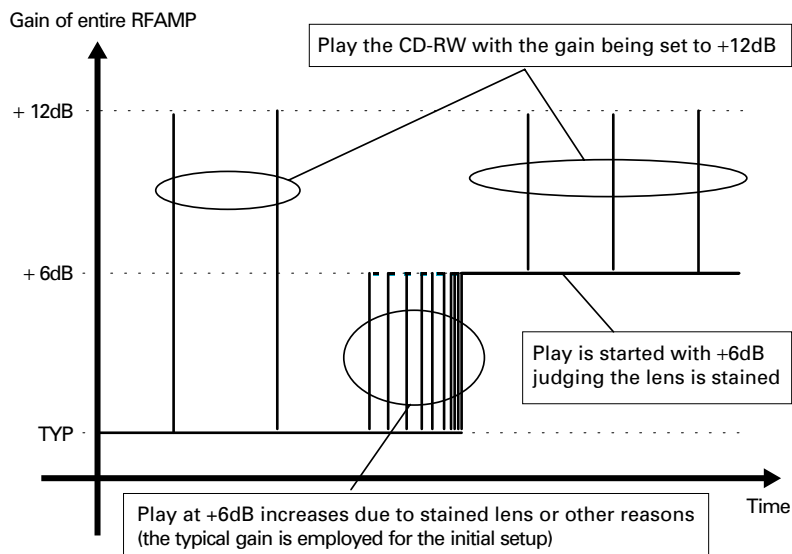


Fig.1.3.1 Pre-amp gain adjustment

### 1.3.7 Initial values in adjustment

For each auto-adjustment, the last adjustment results are basically used as the initial settings of the next adjustment unless the external microcomputer is turned off (or the backup is off). When the microcomputer (or the backup) is turned off, the last adjustment results are not used, but the factory settings.

### 1.3.8 Adjustment result display

For some of the adjustments (FE and RF offset, FZD cancel, F and T gain, and RFAGC), the adjustment results can be displayed and confirmed in the test mode.

#### 1) FE and RF offset

Reference coefficient = 32 ("32" indicates no adjustment required)

The display is expressed in the unit of about 32mV.

Ex. When the FE offset coefficient is 35:

$$35 - 32 = 3 \times 32\text{mV} = 96\text{mV}$$

This means that the correction is about +96mV, and the FE offset before adjustment is -96mV.

#### 2) F and T gain adjustment

Reference coefficient for focus and tracking = 20

The displayed coefficient / the reference coefficient indicates the adjusted gain.

Ex. When the AGC coefficient is 40:

$$40/20 = 2 \text{ times (+6dB)}$$

That is, the gain was adjusted by +6dB.

(The original loop gain was half the target one. So, the whole gain was doubled.)

#### 3) RF level adjustment (RFAGC)

Reference coefficient = 8

The coefficient 9 to 15 indicates increasing the RF level.

The coefficient 0 to 7 indicates decreasing the RF level.

When the coefficient display changes by 1, the gain changes by 0.7 to 1dB.

When the coefficient is 15, the gain is maximum or TYP + 6.5dB.

When the coefficient is 0, the gain is minimum or TYP - 6.0dB.

# 1.4 POWER SUPPLY AND LOADING BLOCK

For the power supply for the internal system, the VD (8.3 + 0.5V) supplied from the mother P.C. Board is used. There are two power supply lines in the system: the VD for the drives and the V+3A for the controls obtained via the 3.3V regulator (3.3V).

For all ON/OFF operations except for the CD driver's loading and ejection switching, the main unit's microcomputer controls with the CONT signal. For the loading drive ON/OFF operations, any control terminal is not prepared, but the LOEJ input functions like a control signal, instead. The LCO output section switches the mechanism between the loading and carriage modes with the CLCONT.

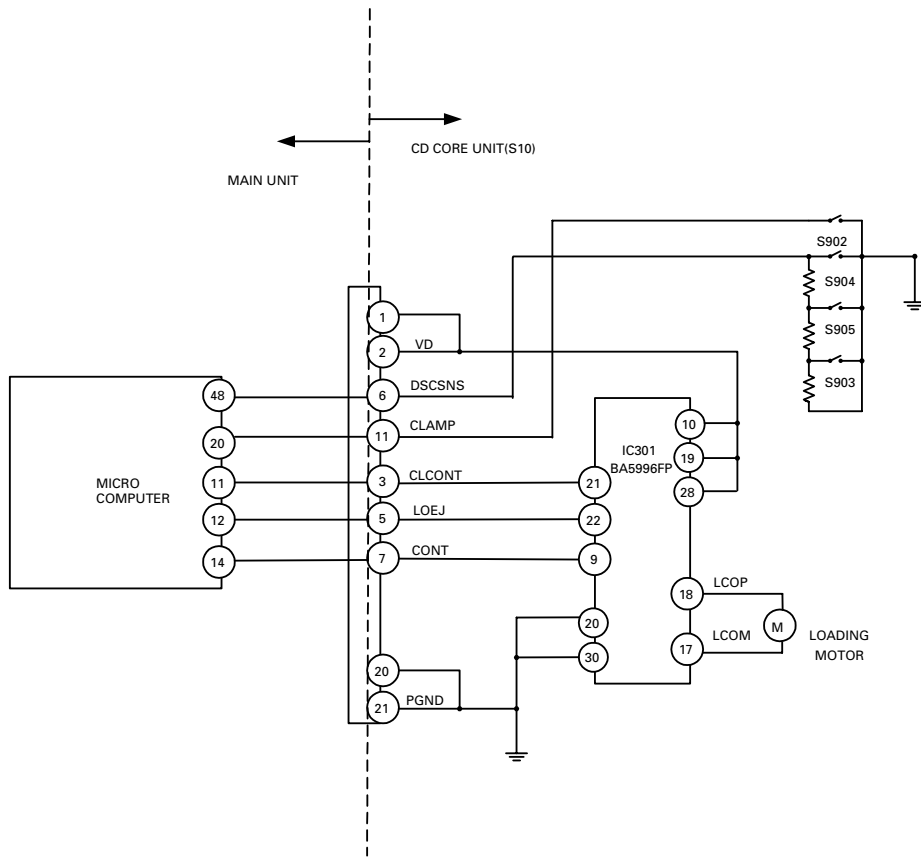


Fig. 1.4.1 Power supply/loading block (\*: CXK5600)

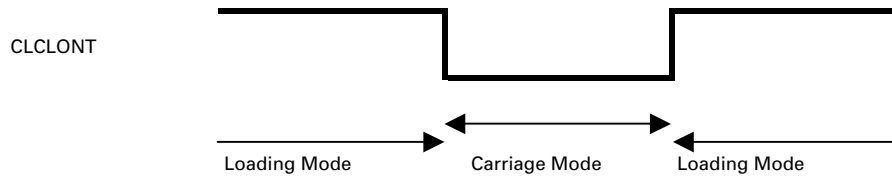


Fig. 1.4.2 Loading/carriage mode shift

The load and eject operations are controlled by observing the status of the clamp switch on the mechanism unit and the three switches on the control unit. The DSCSNS voltage varies depending on the ON/OFF status of the switches. The main unit's microcomputer senses the status (A to E) by observing the voltage at the A/D port. Disc sense (8 or 12cm) is possible by utilizing this status change. The figures 1.4.3 and 1.4.4 show each status and change of the status respectively.

Status	A	B	C	D	E
SW1(S903)	ON	OFF	OFF	OFF	ON
SW2(S905)	OFF	OFF	ON	ON	OFF
SW3(S904)	OFF	OFF	OFF	ON	OFF
SW4(S902)	OFF	OFF	OFF	OFF	ON
Mechanism state	With no disk				Clamp state

Fig.1.4.3 DSCSNS status

A

B

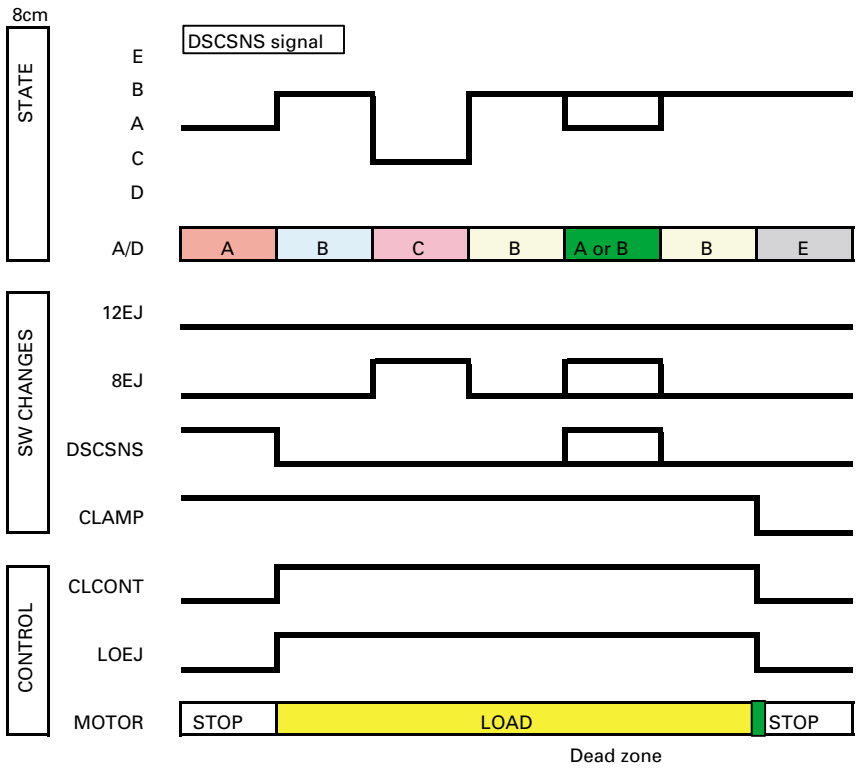
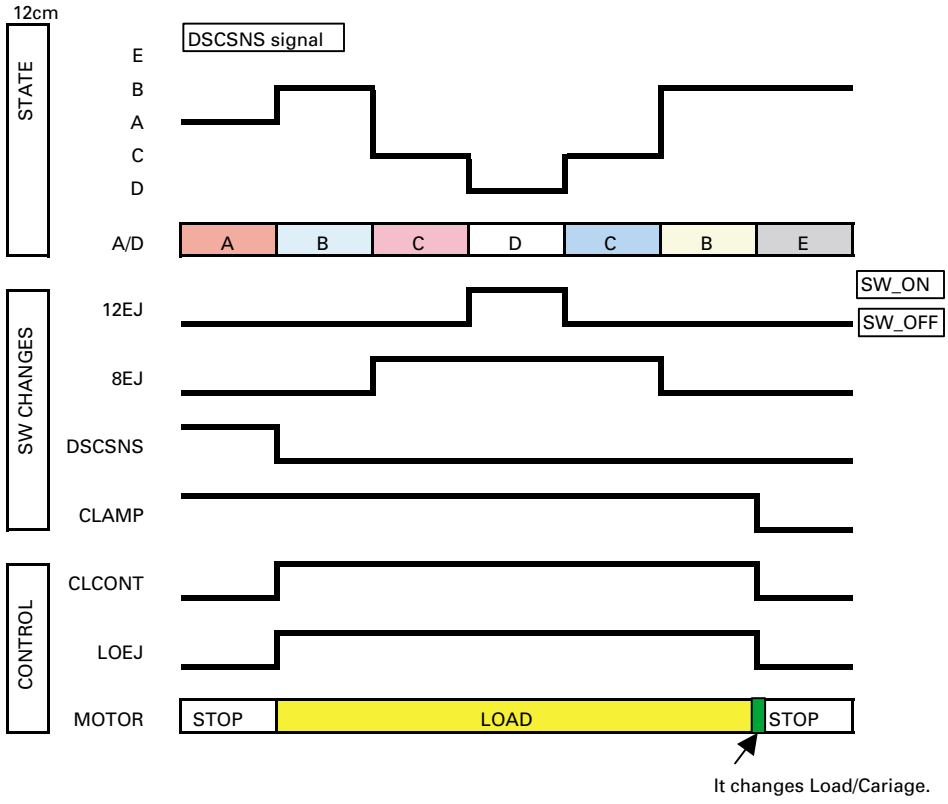
C

D

E

F

• LOADING



• EJECT

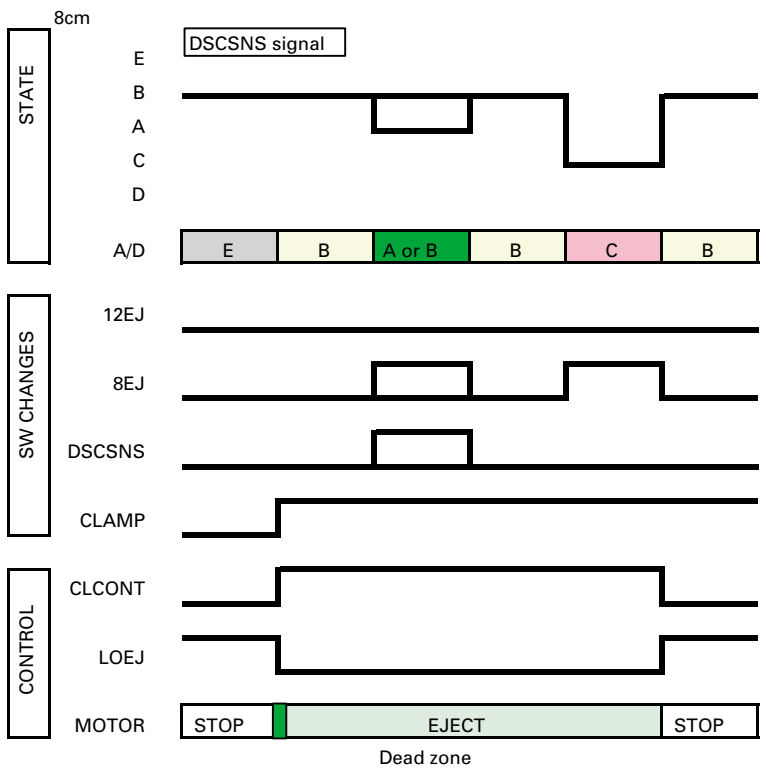
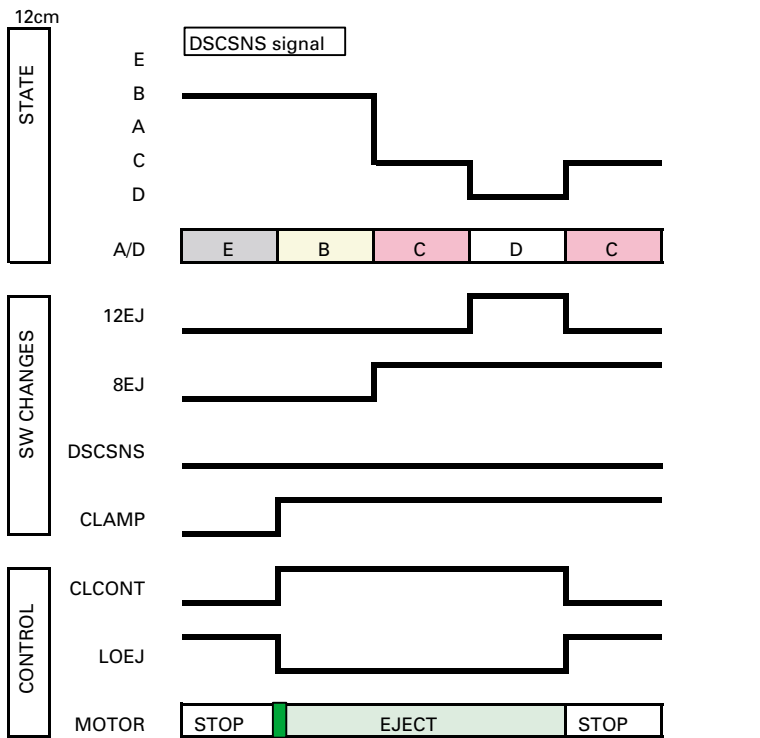
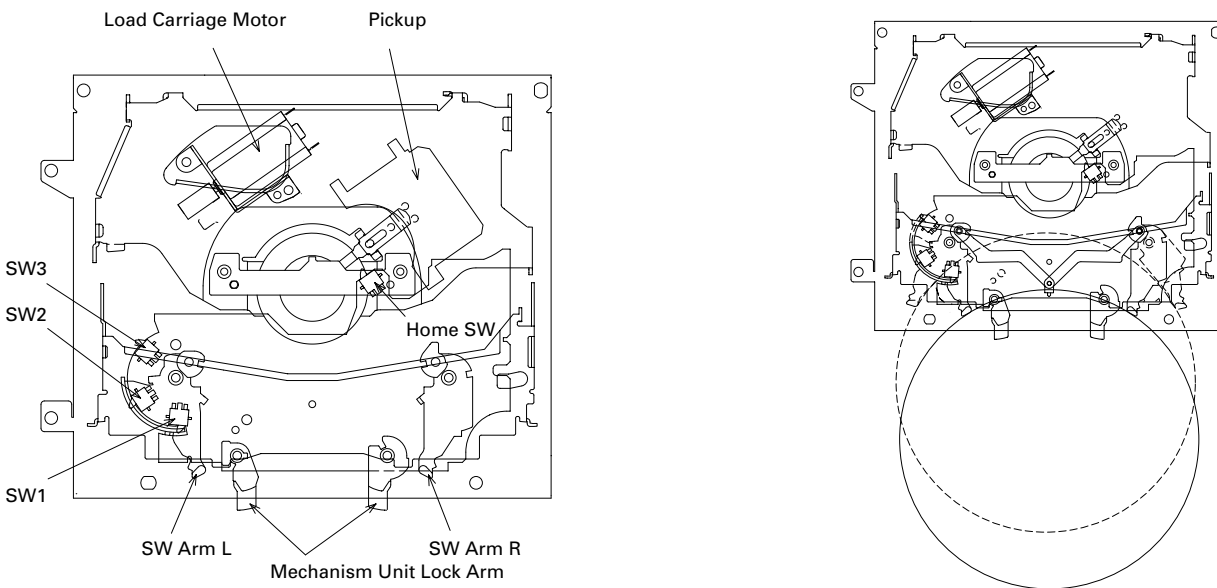


Fig.1.4.4 Status change in LOAD and EJECT modes

## 2. MECHANISM DESCRIPTIONS

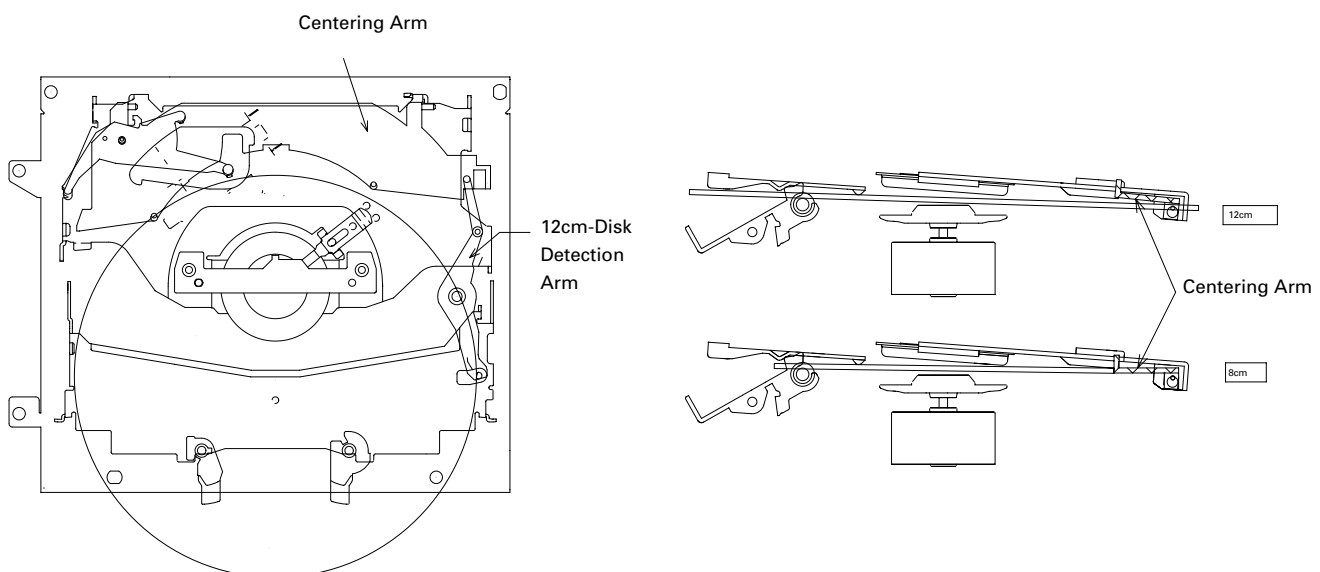
### ● Loading actions

1. When a disk is inserted, SW Arm L and R rotate. Due to the rotation of Arm L, SW1 is switched from ON to OFF and the Load Carriage Motor starts.
  2. If the disk is 12cm-disk, when it is carried to the position shown with the dotted line in the drawing, SW 3 switches to ON due to such rotation of Arm. Then, the microcomputer judges that the disk is 12cm-disk.
  3. In case of 8cm-disk, the disk cannot reach such dotted line position, and from such limitation of approach, the microcomputer judges that the disk is 8cm-disk and simply triggers clamp actions.
- (Movement of SW Arm L and R are connected together. So, if pushing force is fed to only one arm, the distance between tow arms cannot be widened beyond the specific degree, because the coupling part is locked in such case.)



### ● Disk centering mechanism

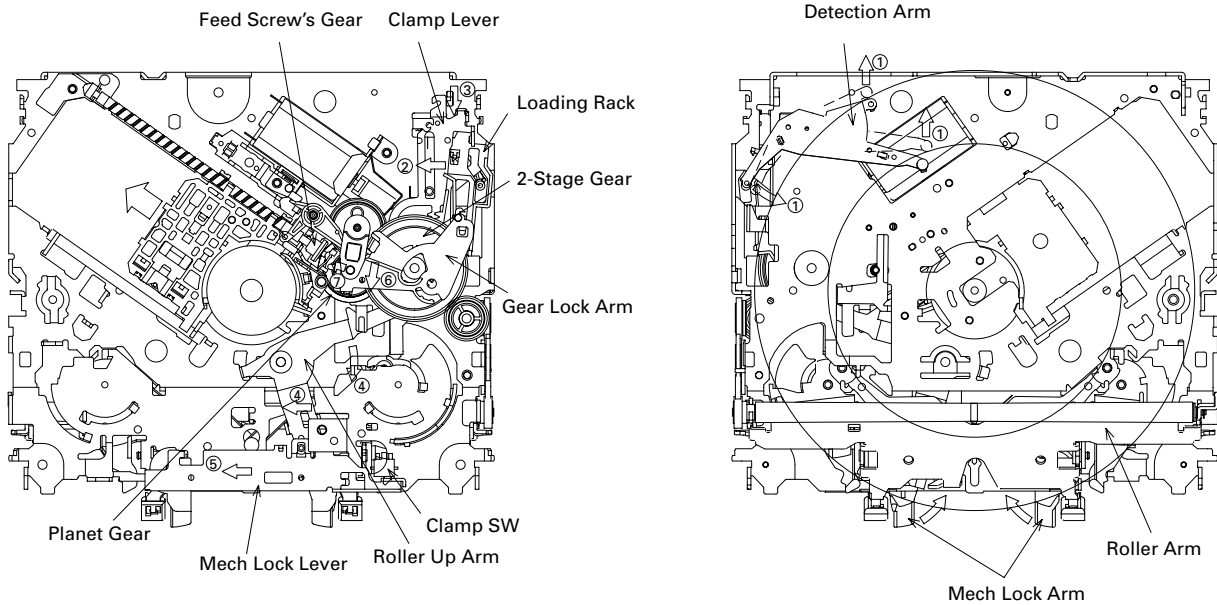
1. In case of 12cm-disk, the 12cm-Disk Detection Arm rotates, and with such rotation, it raises the Centering Arms to retreat the arms from disk's trace. The disk passes through under the arms, and at the inner part, it is centered.
2. In case of 8cm-disk, it is just centered at the position where its edge touches the front portion of the Centering Arm.





## ● Clamp actions

1. When an 8 or 12cm disc is placed on the center of the spindle, the detection arm starts moving.
2. The movement of the detection arm engages the loading rack with the 2-stage gear.
3. The clamp lever slides to lower the clamp arm. At this time, the roller up arm rotates to separate the roller arm from the disc. The roller arm moves the mech lock lever and turns the mech lock arm to release the mech lock. At the position where the clamp switch is turned off, the clamp operation ends.
4. After the clamp operation, the clamp lever moves to rotate the gear lock arm. The planet gear separates from the 2-stage gear to get engaged with the pickup feed screw's gear. Then the carriage operation will start.



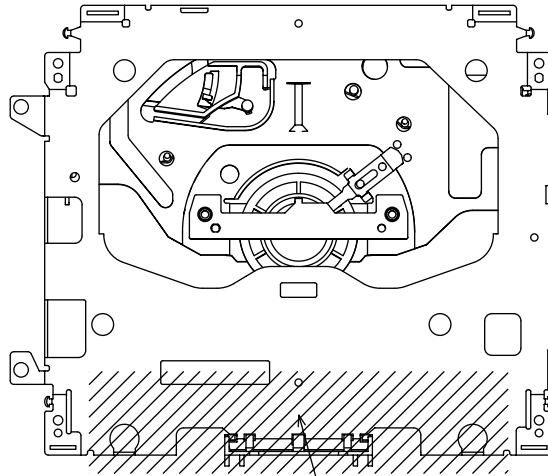
## ● Eject actions

1. Eject actions start when the Pickup is fed to the position inner than "Home SW ON" point in the internal circumference of the circle, caused by backward rotation of the Load Carriage Motor. Eject actions follow the foregoing procedures (steps taken in loading, centering and clamping actions), but each action in those steps is performed in reversed manner.
2. In case of 12cm-disk, Eject is completed when SW3 completes its condition- transition of OFF → ON → OFF.
3. For 8cm-disk, Eject is completed when SW2 completes its condition-transition of OFF → ON → OFF.

### 3. DISASSEMBLY

#### ● How to hold the Mechanism Unit

1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.

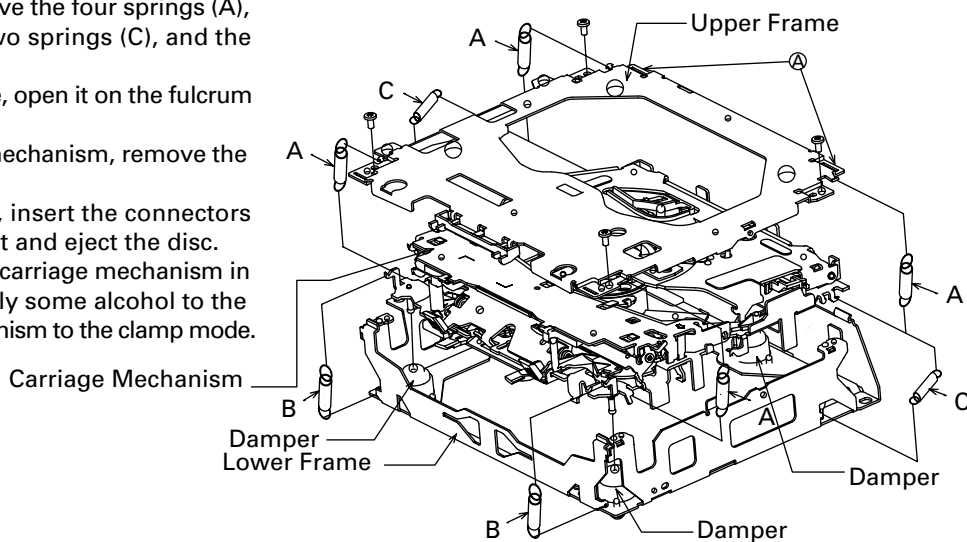


Do not squeeze.

#### ● Removing the Upper and Lower Frames

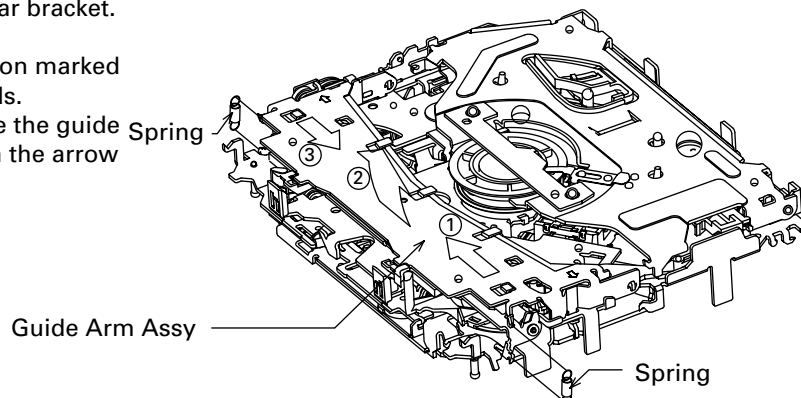
1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
2. To remove the upper frame, open it on the fulcrum A.
3. While lifting the carriage mechanism, remove the three dampers.
4. With the frames removed, insert the connectors coming from the main unit and eject the disc.

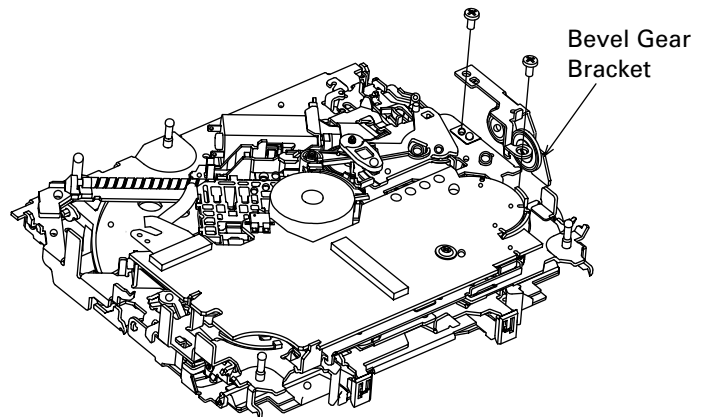
Caution: Before installing the carriage mechanism in the frames, be sure to apply some alcohol to the dampers and set the mechanism to the clamp mode.



#### ● Removing the Guide Arm Assy

1. Remove the upper and lower frames and set the mechanism to the clamp mode.
2. Remove the two springs.
3. Remove the two screws and bevel gear bracket. Note that the gears come off.
4. Slide the guide arm assy in the direction marked with the arrow (1) and open it upwards.
5. At the angle of about 45 degrees, slide the guide arm assy in the direction marked with the arrow (3) to remove it.

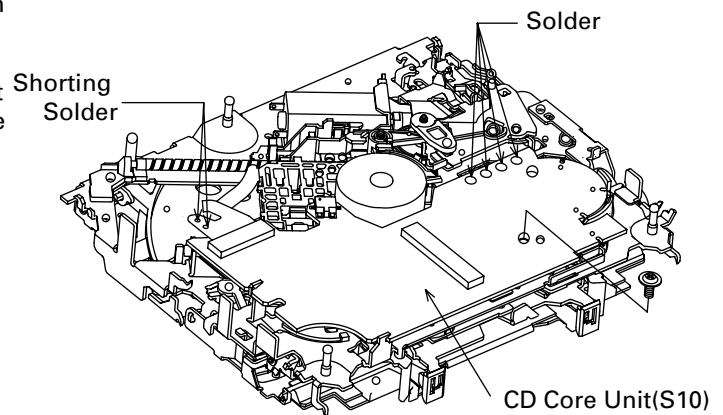




### ● Removing the CD Core Unit(S10)

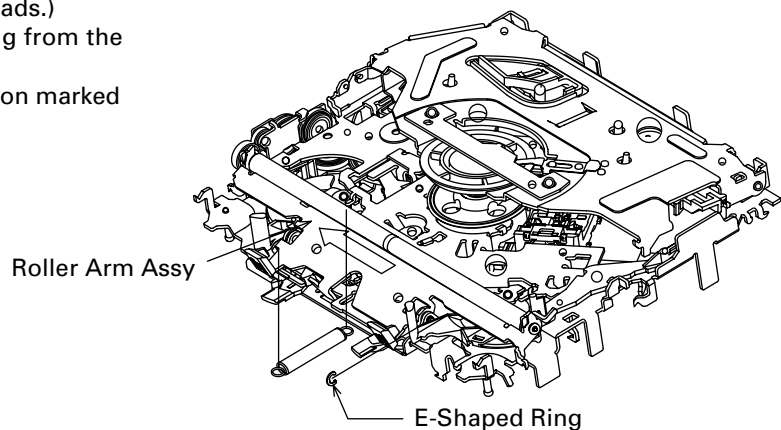
1. Apply shorting solder to the Pickup flexible cable. Disconnect the cable.
2. Remove the solder from the four leads, and loosen the screw.
3. Remove the CD core unit(S10).

Caution: When assembling the CD core unit(S10), set the mechanism to the clamp mode to protect the switches from any damage.



### ● Removing the Roller Arm Assy

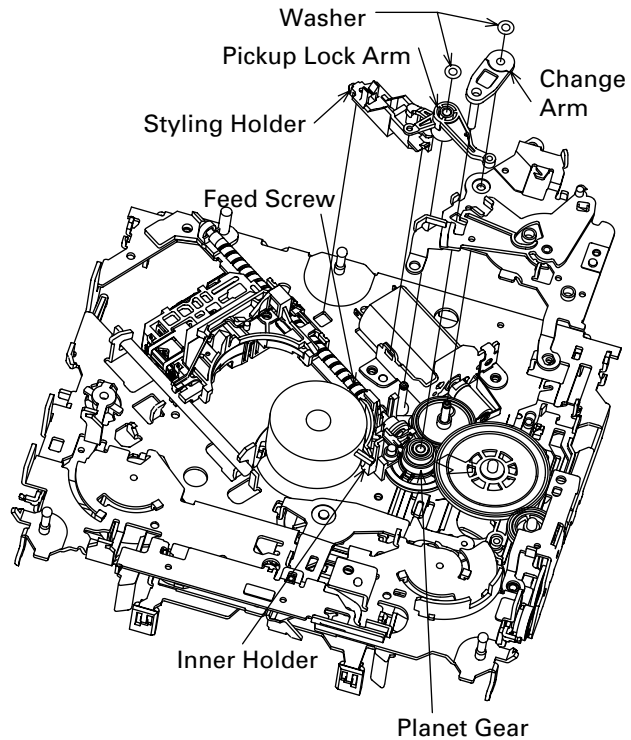
1. Remove the guide arm assy and set the mechanism to the eject mode.
2. Remove the CD core unit(S10). (You do not have to remove the solder from the four leads.)
3. Remove the spring and E-shaped ring from the fulcrum shaft.
4. Slide the roller arm assy in the direction marked with an arrow.



### ● Removing the Pickup Unit

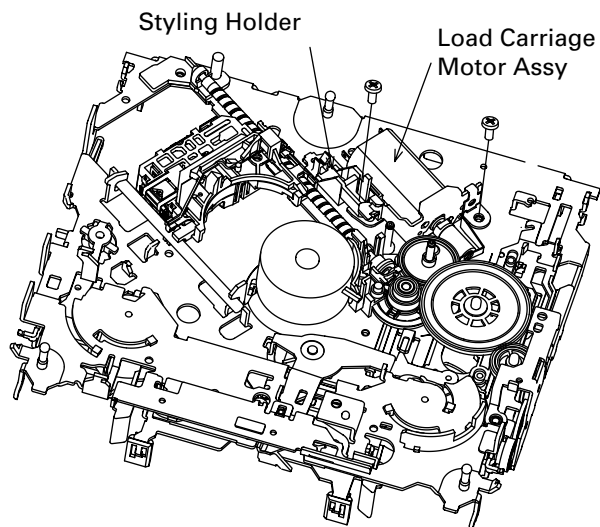
1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the two washers, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

Caution: In assembling, move the planet gear to the load/eject position before setting the feed screw in the inner holder.



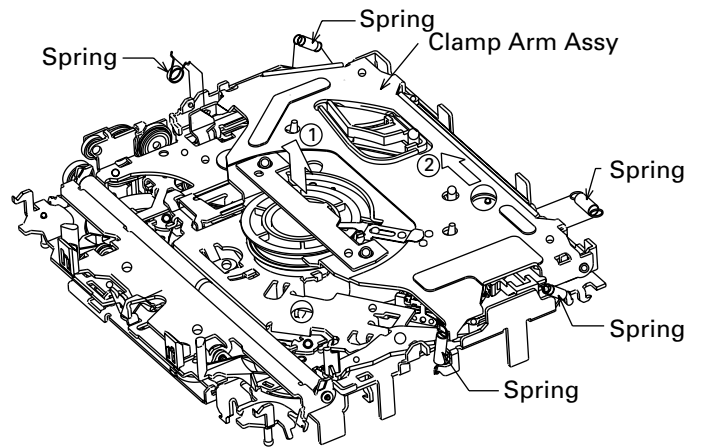
### ● Removing the Load Carriage Motor Assy

1. Release the leads from the styling holder and remove the holder.
2. Remove the two screws.
3. Remove the load carriage motor assy.



### ● Removing the Clamp Arm Assy

1. Remove the five springs.
2. While lifting the clamp arm assy, slide it in the direction marked with the arrow (2) to remove it.



### ● Removing the Spindle Motor

1. Remove the two screws. Take off the spindle motor.

