Pioneer sound.vision.soul

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".

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE NV Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZU. NOV. 2002 Printed in Japan

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.

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.

CONTENTS

● 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 serviving, 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 ..... 200/500/1k/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

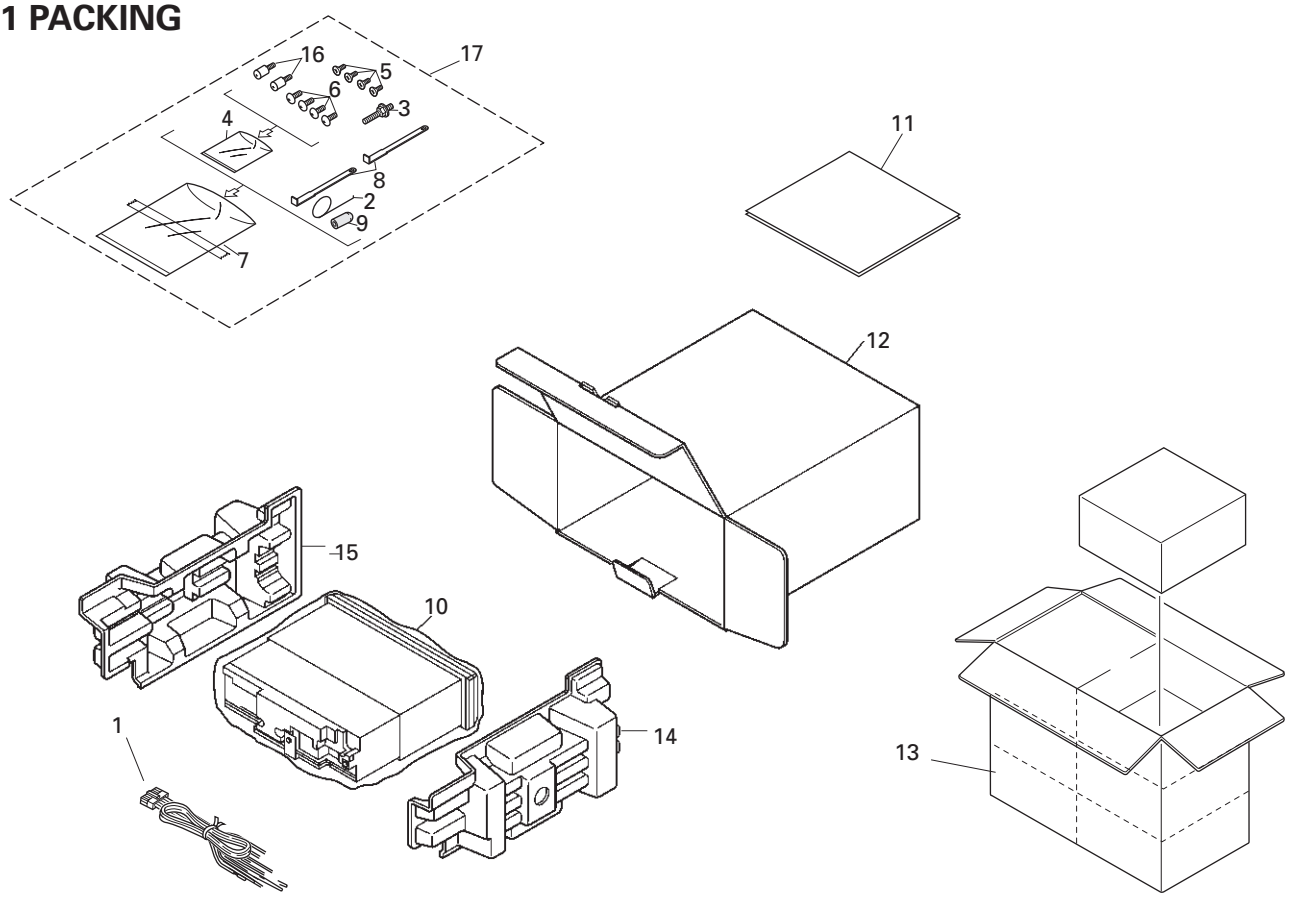
Frequency range ..... 87.9 – 107.9 MHz
Usable sensitivity ..... 8 dBf (0.7 μV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 10 dBf (0.9 μV/75 Ω, mono)
Signal-to-noise ratio ..... 75 dB (IHF-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
0.1 % (at 65 dBf, 1 kHz, mono)
Frequency 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.
	1	Cord Assy	CDE7060
	2	Spring	CBH1650
	3	Screw	CBA1002
*	4	Polyethylene Bag	CEG-127
	5	Screw	CRZ50P090FTC
	6	Screw	TRZ50P080FTC
*	7	Polyethylene Bag	CEG-158
	8	Handle	CNC5395
	9	Bush	CNV3930
	10	Polyethylene Bag	CEG1173

Mark	No.	Description	Part No.
	11-1	Owner's Manual	See Contrast table(2)
	11-2	Installation Manual	See Contrast table(2)
*	11-3	Card	ARY1048
	11-4	Caution Card	See Contrast table(2)
	12	Carton	See Contrast table(2)
	13	Contain Box	See Contrast table(2)
	14	Protector	CHP2663
	15	Protector	CHP2664
	16	Fixing Screw(M2x4)	See Contrast table(2)
	17	Accessory Assy	CEA3438

(2) CONTRAST TABLE

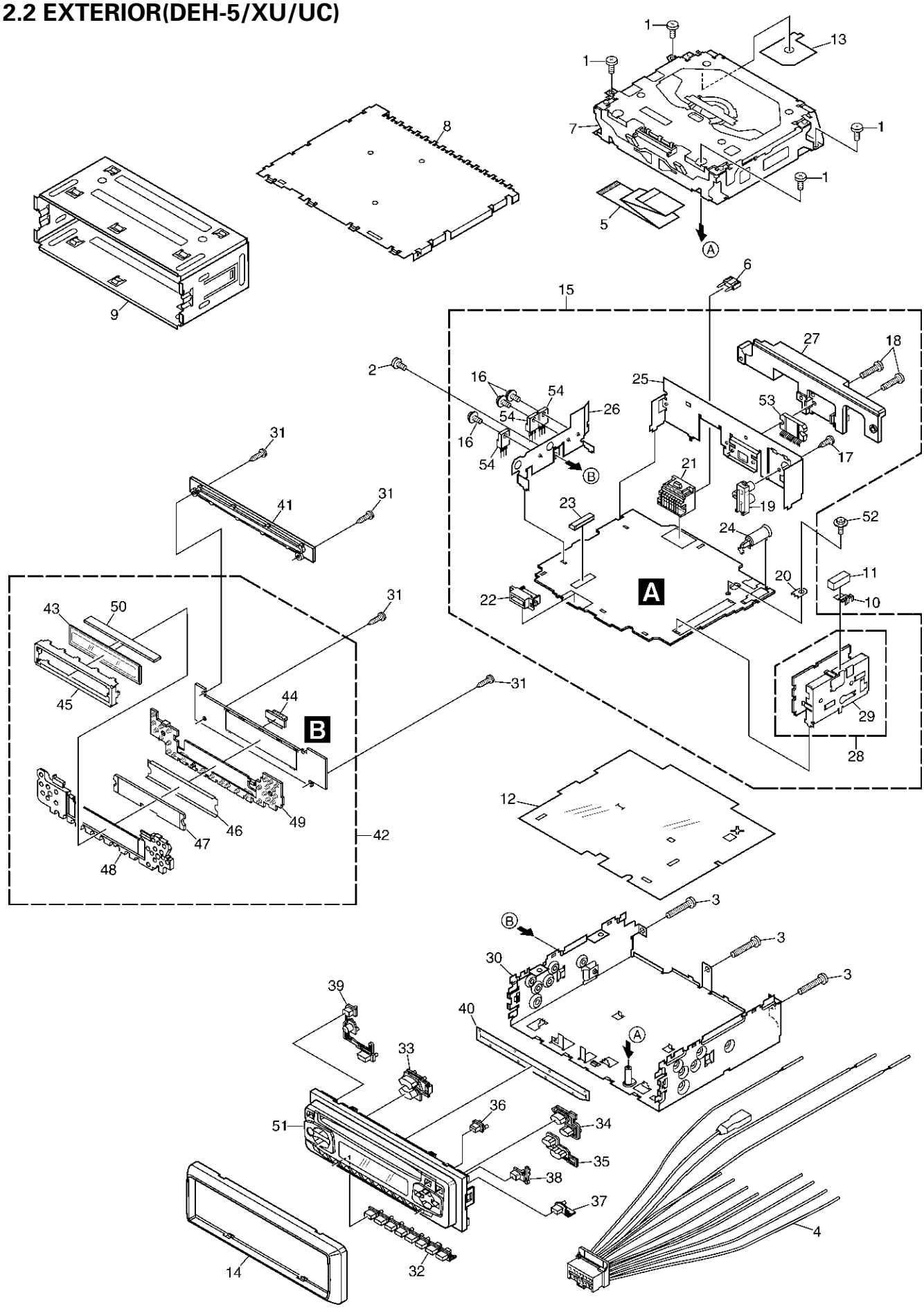
DEH-5/XU/UC , DEH-15/XU/UC and DEH-1500/XU/UC are constructed the same except for the following:

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	

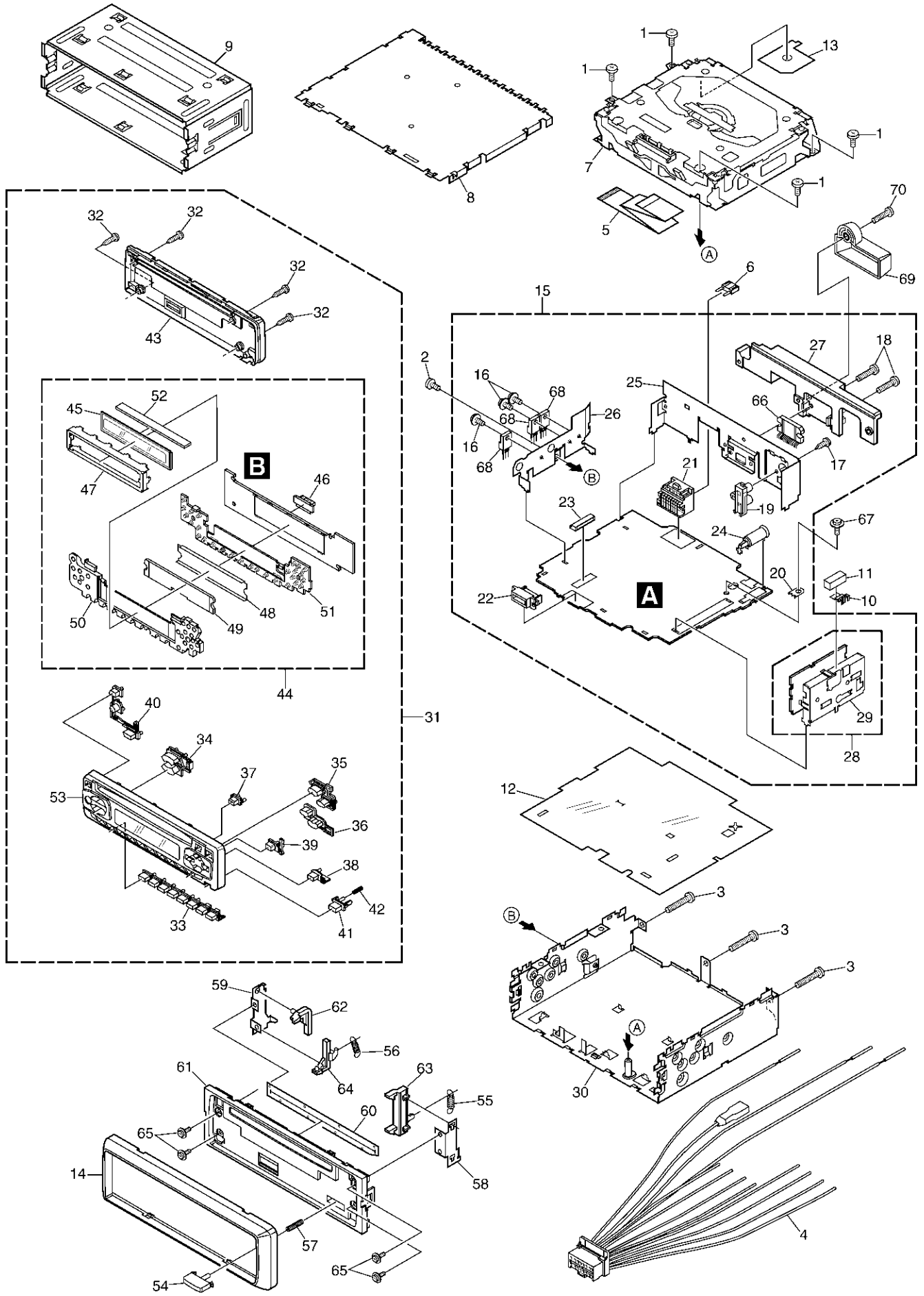
2.2 EXTERIOR(DEH-5/XU/UC)



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

Mark No.	Description	Part No.
1	Screw	BSZ26P060FTC
2	Screw	BSZ30P060FTC
3	Screw	BSZ30P200FTC
4	Cord Assy	CDE7060
5	Cable	CDE7113
6	Fuse(10A)	CEK1208
7	CD Mechanism Module(S10)	CXK5600
8	Case	CNB2793
9	Holder	CNC8659
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
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
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
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
49	Rubber	CNV7368
50	Connector	CNV7369
51	Grille Unit	CXB9805
52	Screw	ISS26P055FTC
53	IC(IC302)	TDA7384
54	Transistor(Q911,921,991)	2SD2375

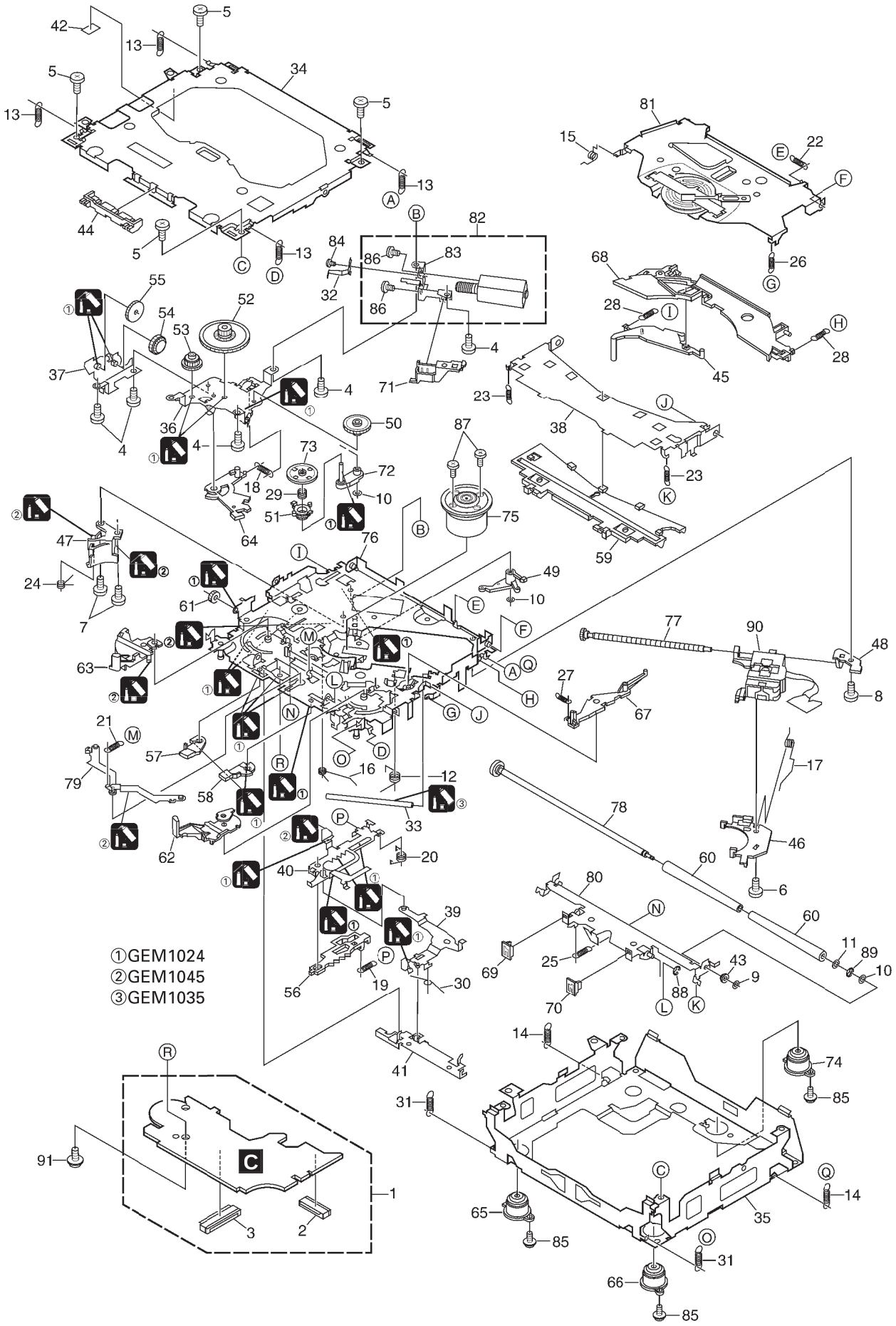
2.3 EXTERIOR(DEH-15/XU/UC,1500/XU/UC)



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

Mark	No.	Description	Part No.
	1	Screw	BSZ26P060FTC
	2	Screw	BSZ30P060FTC
	3	Screw	BSZ30P200FTC
	4	Cord Assy	CDE7060
	5	Cable	CDE7113
	6	Fuse(10A)	CEK1208
	7	CD Mechanism Module(S10)	CXK5600
	8	Case	CNB2793
	9	Holder	CNC8659
	10	Earth Plate	CNC8915
	11	Cushion	CNM8275
	12	Insulator	CNM8059
	13	Insulator	CNM8174
	14	Panel	CNS7239
	15	Tuner Amp Unit(DEH-15)	CWM8568
		Tuner Amp Unit(DEH-1500)	CWM8794
	16	Screw	ASZ26P060FTC
	17	Screw	BPZ26P080FTC
	18	Screw	BSZ26P160FTC
	19	Pin Jack(CN352)	CKB1028
	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
	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
	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
		LCD(LCD1801)(DEH-1500)	CAW1733
	46	Connector(CN1801)	CKS3580
	47	Holder	CNC9617
	48	Sheet	CNM7932
	49	Lens	CNV7060
	50	Lighting Conductor	CNV7367
	51	Rubber	CNV7368
	52	Connector	CNV7369
	53	Grille Unit(DEH-15)	CXB9870
		Grille Unit(DEH-1500)	CXB9869
	54	Button	CAC4836
	55	Spring	CBH1835
	56	Spring	CBH2208
	57	Spring	CBH2367
	58	Bracket	CNC6791
	59	Holder	CNC8042
	60	Cover	CNM6276
	61	Panel	CNS7238
	62	Arm	CNV4692
	63	Arm	CNV4728
	64	Arm	CNV5576
	65	Screw	IMS20P030FZK
	66	IC(IC302)	PAL007A
	67	Screw	ISS26P055FTC
	68	Transistor(Q911,921,991)	2SD1275
	69	Holder(DEH-15)	CNV7619
	70	Screw(DEH-15)	BMZ40P140FTC

2.4 CD MECHANISM MODULE



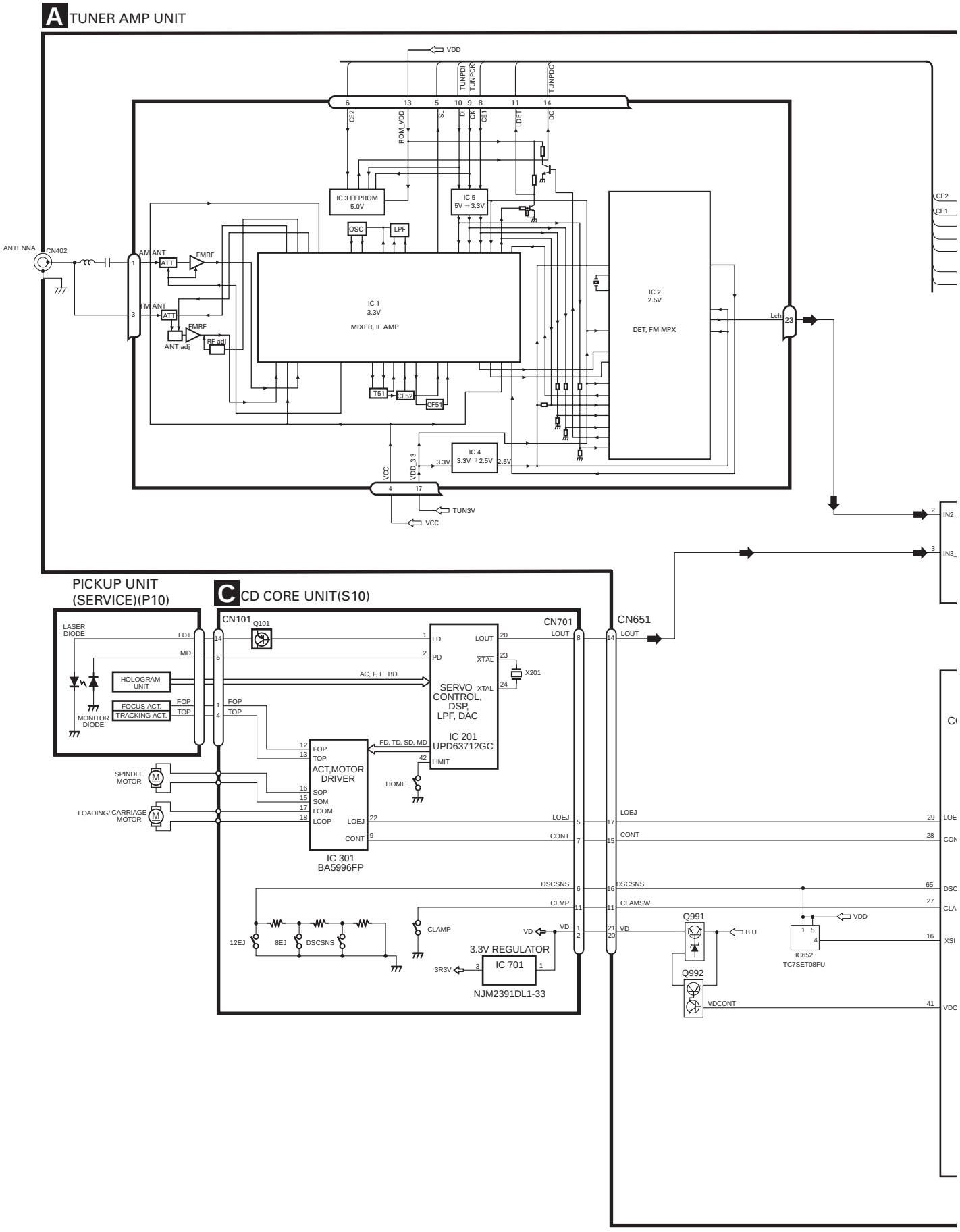
● CD MECHANISM MODULE SECTION PARTS LIST

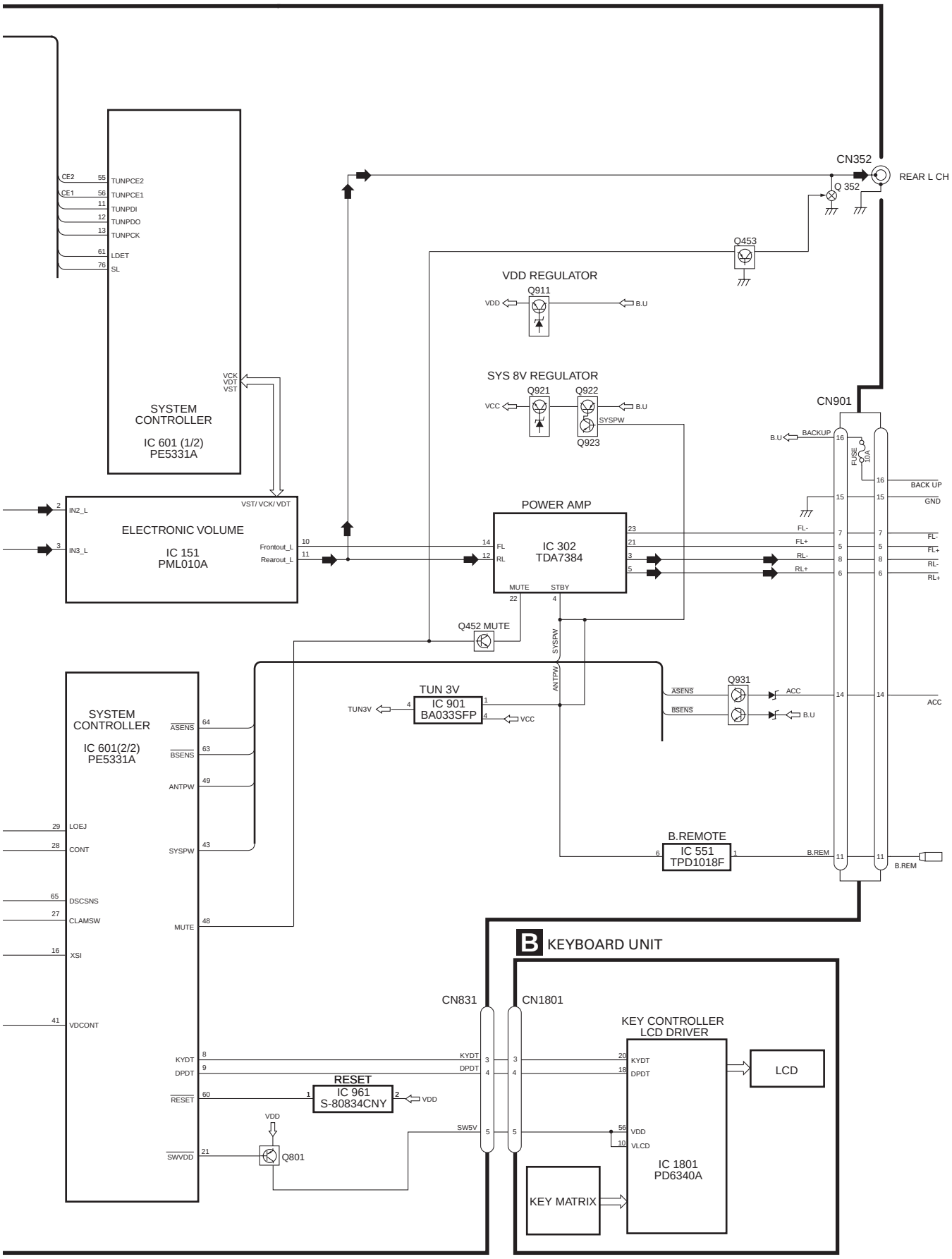
Mark	No.	Description	Part No.
	1	CD Core Unit(S10)	CWX2708
	2	Connector(CN101)	CKS4182
	3	Connector(CN701)	CKS4188
	4	Screw	BMZ20P035FTC
	5	Screw	BSZ20P040FTC
	6	Screw(M2x4)	CBA1362
	7	Screw(M2x3)	CBA1511
	8	Screw(M2x3)	CBA1527
	9	Washer	CBF1037
	10	Washer	CBF1038
	11	Washer	CBF1060
	12	Spring	CBH2390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

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM

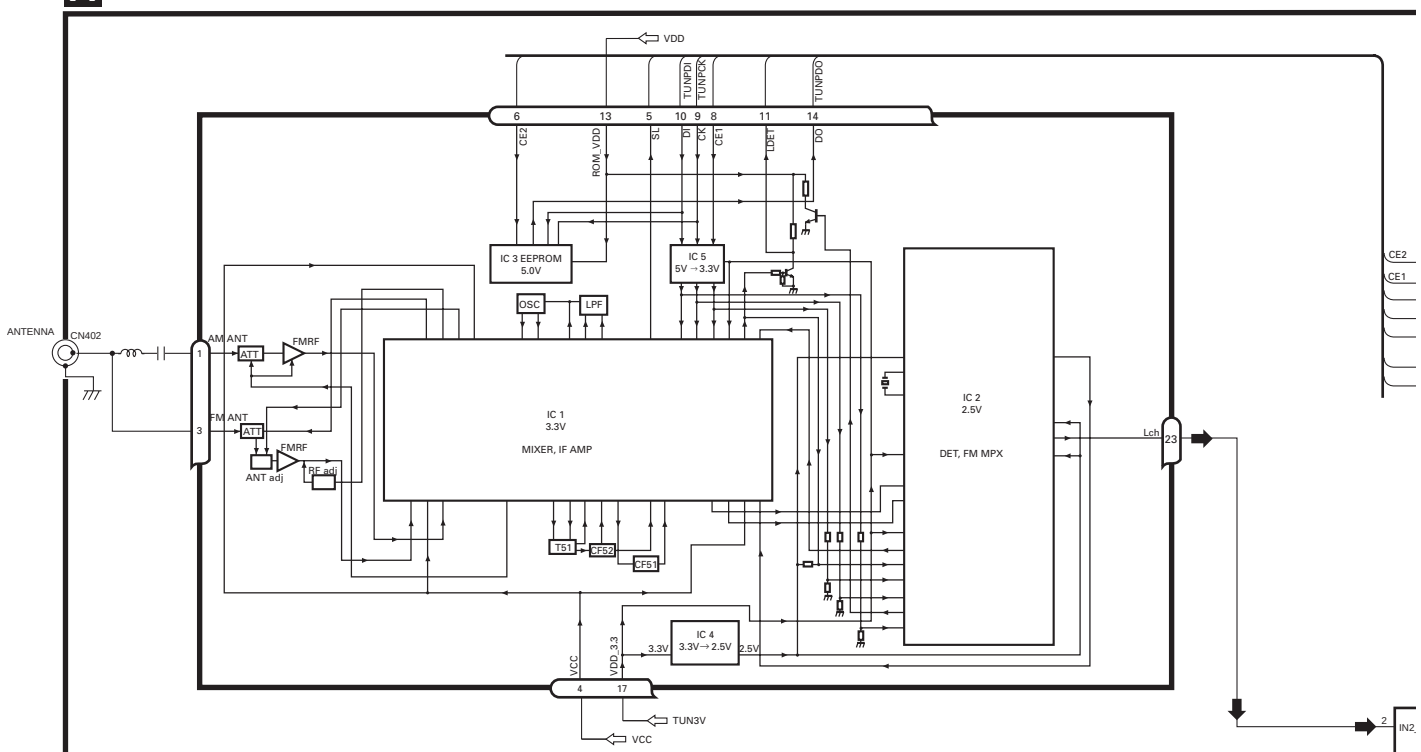
● DEH-5/XU/UC

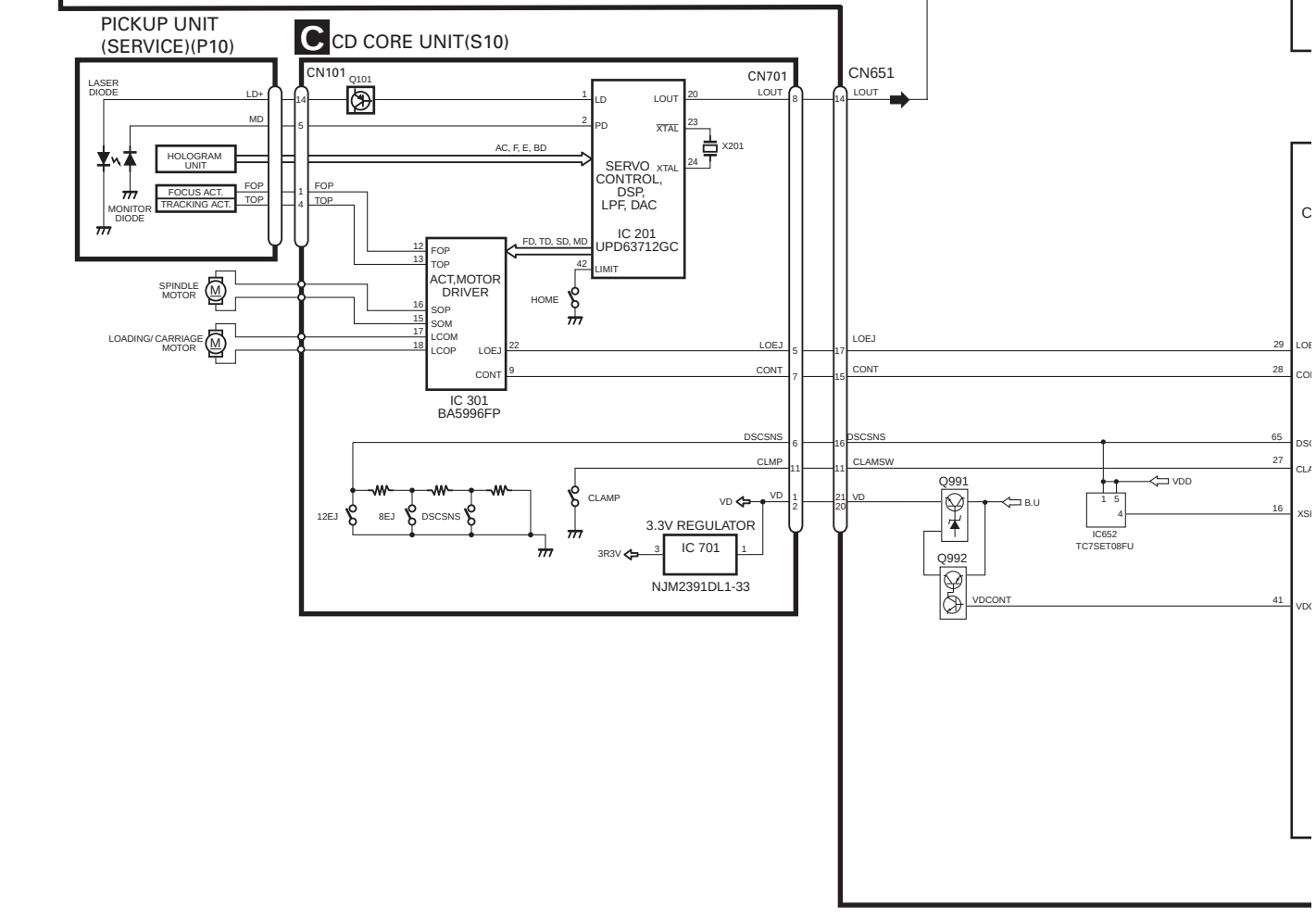


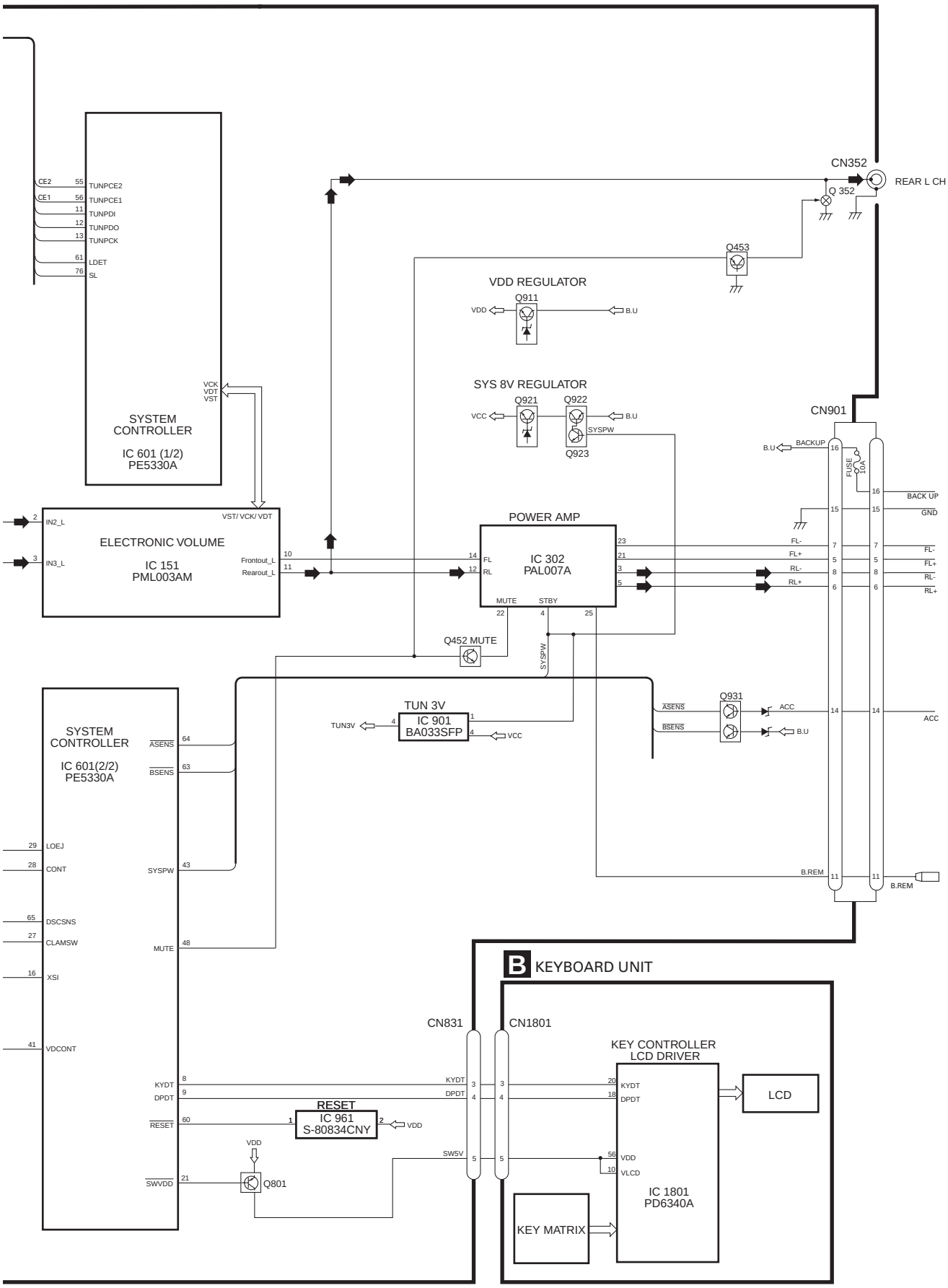

CN352
REAR L CH
Q 352
Q453
VDD REGULATOR
Q911
VDD
B.U
SYS 8V REGULATOR
Q921
Q922
Q923
VCC
SYSPW
CN901
BACKUP
FUSE 10A
BACK UP
GND
SYSTEM CONTROLLER
IC 601 (1/2)
PE5331A
CE2
CE1
TUNPCE2
TUNPCE1
TUNPDI
TUNPDO
TUNPCK
LDET
SL
VCK
VDT
VST
ELECTRONIC VOLUME
IC 151
PML010A
IN2_L
IN3_L
VST/ VCK/ VDT
Frontout_L
Rearout_L
POWER AMP
IC 302
TDA7384
FL
RL
MUTE
STBY
FL-
FL+
RL-
RL+
Q452 MUTE
SYSPW
ANTPW
TUN 3V
IC 901
BA033SFP
TUN3V
VCC
Q931
ASENS
BSENS
ACC
B.U
SYSTEM CONTROLLER
IC 601(2/2)
PE5331A
LOEJ
CONT
DSCSNS
CLAMSW
XSI
VDCONT
MUTE
B.REMOTE
IC 551
TPD1018F
B.REM
B KEYBOARD UNIT
CN831
CN1801
KEY CONTROLLER
LCD DRIVER
KYDT
DPDT
RESET
IC 961
S-80834CNY
VDD
SW5V
VLCD
LCD
IC 1801
PD6340A
KEY MATRIX
Q801
SWVDD

● DEH-15/XU/UC,1500/XU/UC

A TUNER AMP UNIT

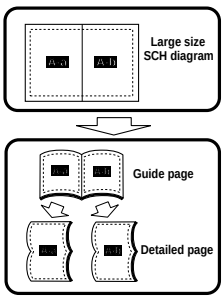




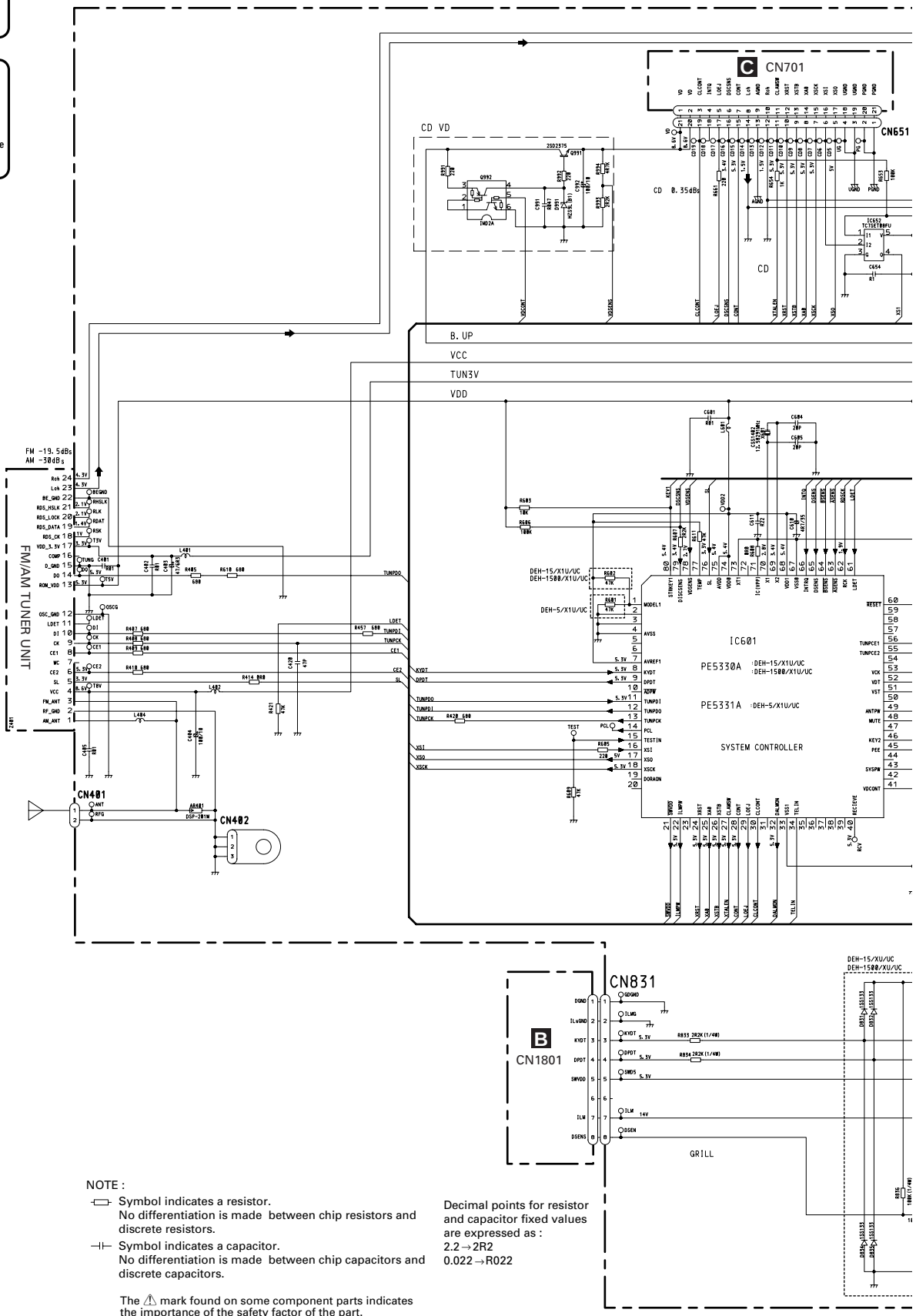

CN352
REAR L CH
Q 352
Q453
VDD REGULATOR
Q911
VDD
B.U
SYS 8V REGULATOR
Q921
Q922
Q923
VCC
SYSPW
CN901
BACKUP
FUSE 10A
BACK UP
GND
FL-
FL+
RL-
RL+
ACC
B.REM
SYSTEM CONTROLLER
IC 601 (1/2)
PE5330A
CE2
CE1
TUNPCE2
TUNPCE1
TUNPDI
TUNPDO
TUNPCK
LDET
SL
VCK
VDT
VST
VST/ VCK/ VDT
ELECTRONIC VOLUME
IC 151
PML003AM
IN2_L
IN3_L
Frontout_L
Rearout_L
POWER AMP
IC 302
PAL007A
FL
RL
MUTE
STBY
Q452 MUTE
TUN 3V
IC 901
BA033SFP
TUN3V
VCC
Q931
ASENS
BSENS
SYSTEM CONTROLLER
IC 601(2/2)
PE5330A
LOEJ
CONT
SYSPW
DSCSNS
CLAMSW
MUTE
XSI
VDCONT
KEYBOARD UNIT
CN831
CN1801
KEY CONTROLLER
LCD DRIVER
KYDT
DPDT
RESET
IC 961
S-80834CNY
SW5V
VDD
VLCD
Q801
SWVDD
LCD
IC 1801
PD6340A
KEY MATRIX

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



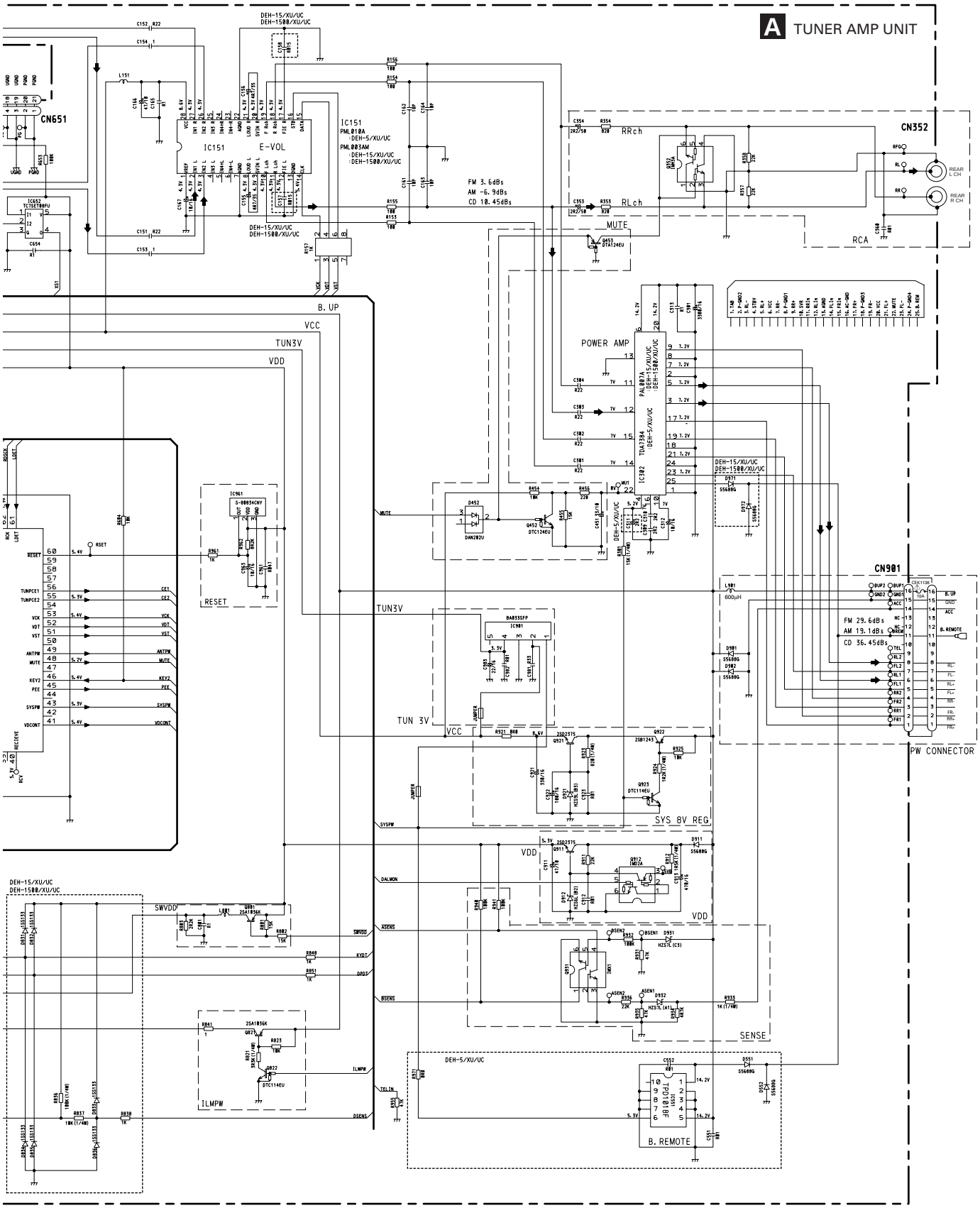
NOTE :

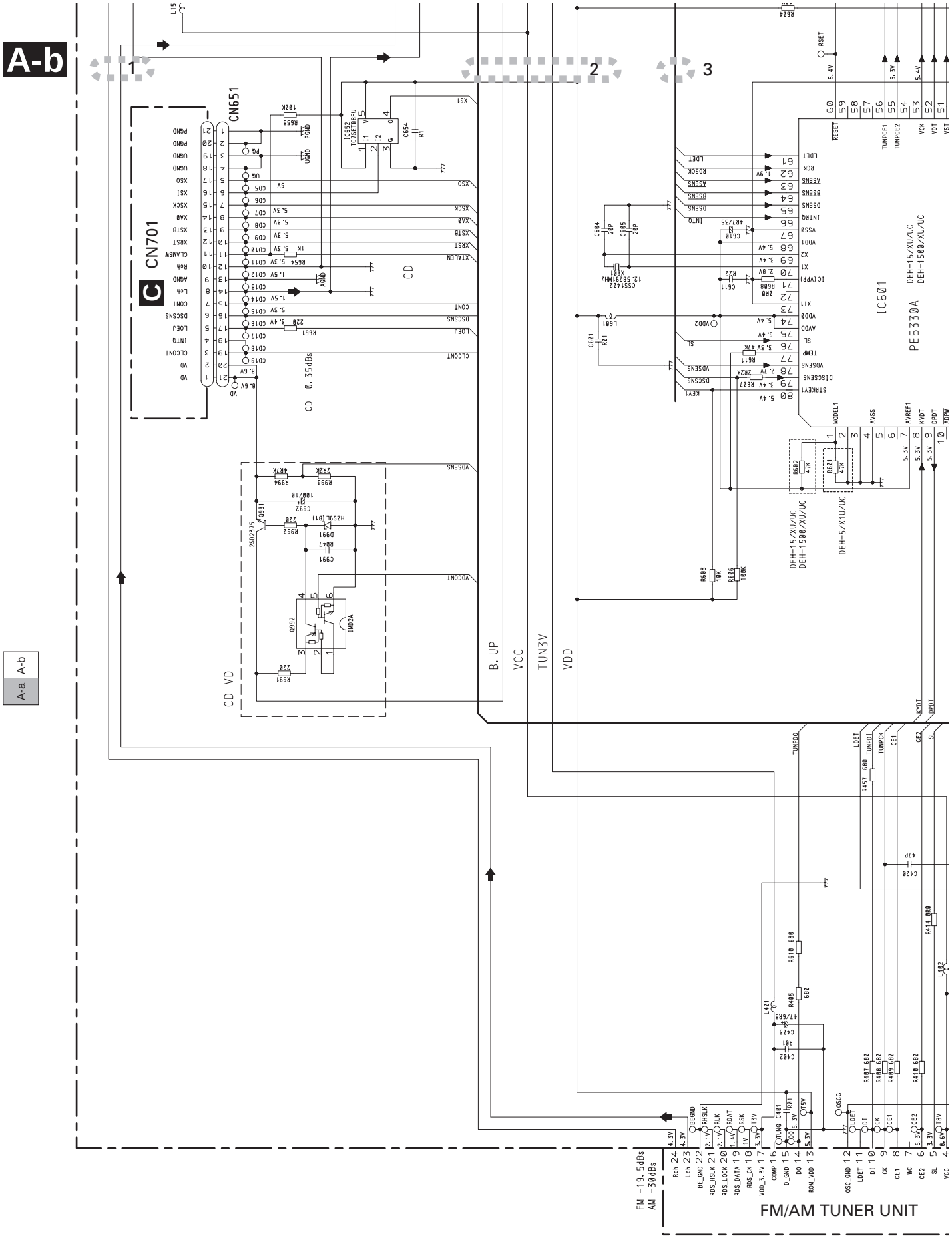
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

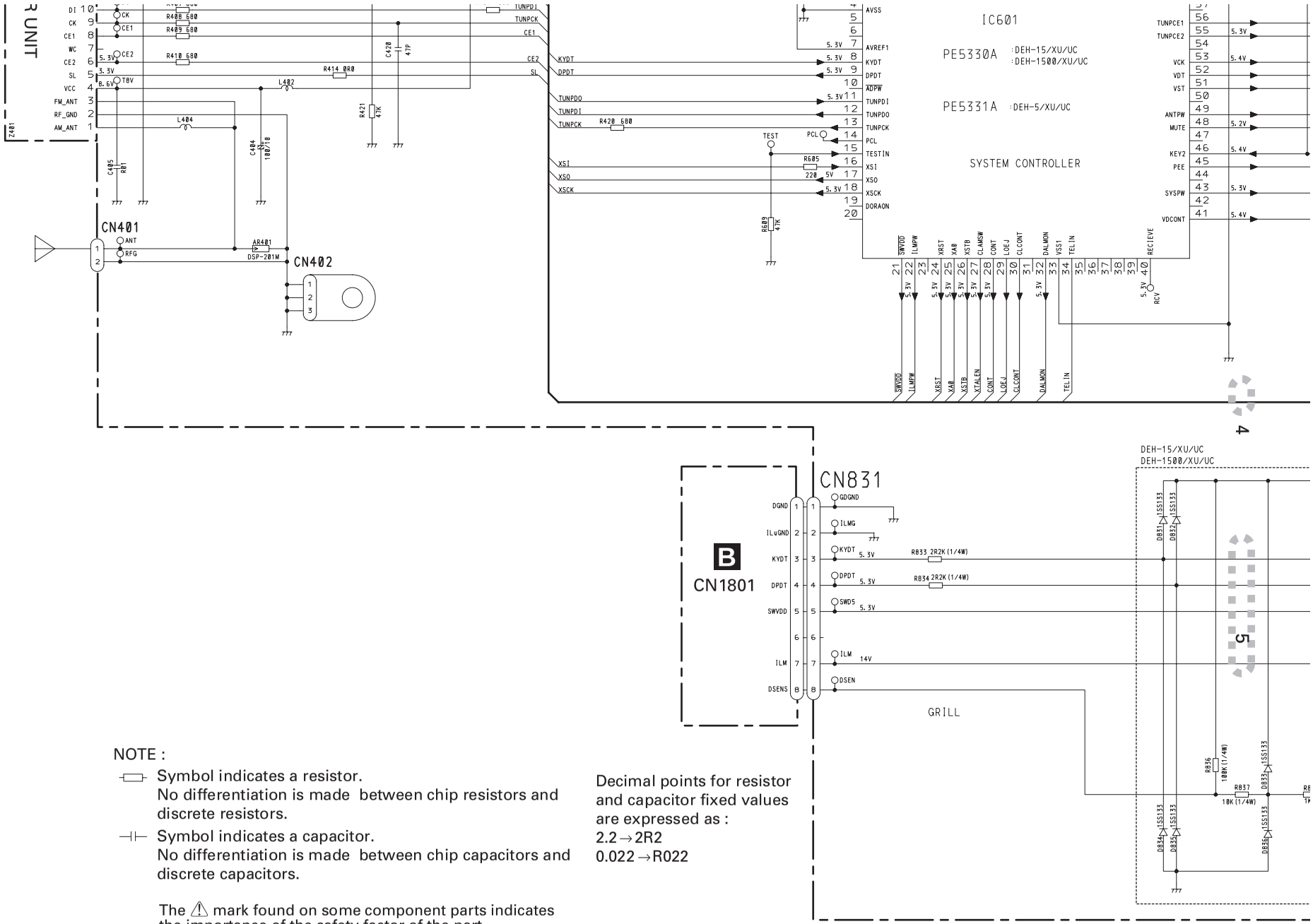
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

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

A-b


A TUNER AMP UNIT
CN651
CN352
CN901
IC151
E-VOL
RRch
RLch
MUTE
RCA
REAR L CH
REAR R CH
FM 3.6dBs
AM -6.9dBs
CD 10.45dBs
POWER AMP
B. UP
VCC
TUN3V
VDD
RESET
TUN 3V
SYS 8V REG
SENSE
ILMPW
B. REMOTE
PW CONNECTOR
FM 29.6dBs
AM 19.1dBs
CD 36.45dBs


A-b
A-a
CN651
CN701
CD
CD VD
B.UP
VCC
TUN3V
VDD
IC601
PE5330A
:DEH-15/XU/UC
:DEH-1500/XU/UC
DEH-15/XU/UC
DEH-1500/XU/UC
DEH-5/X1U/UC
FM/AM TUNER UNIT
FM -19.5dBs
AM -30dBs



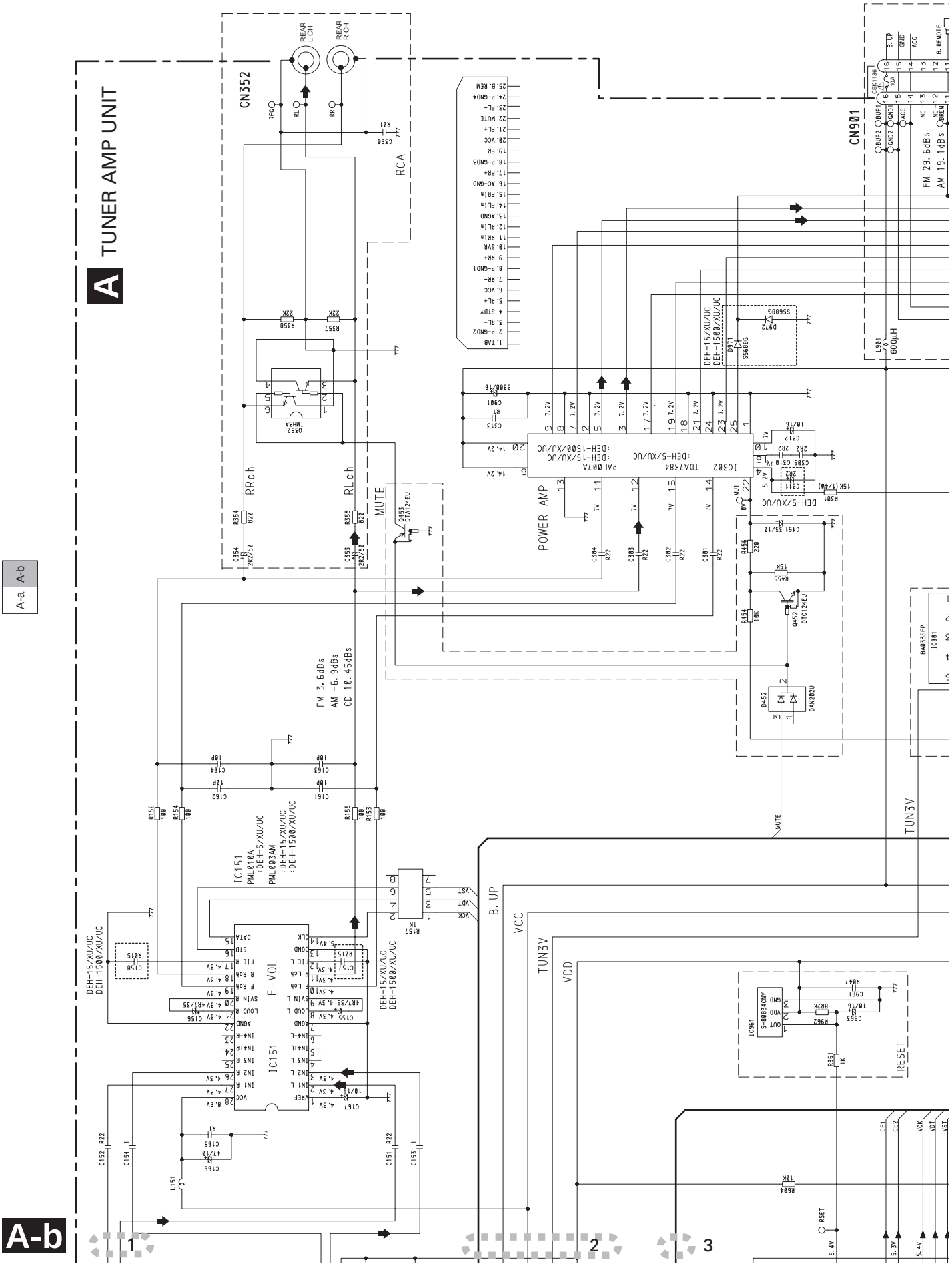
NOTE :

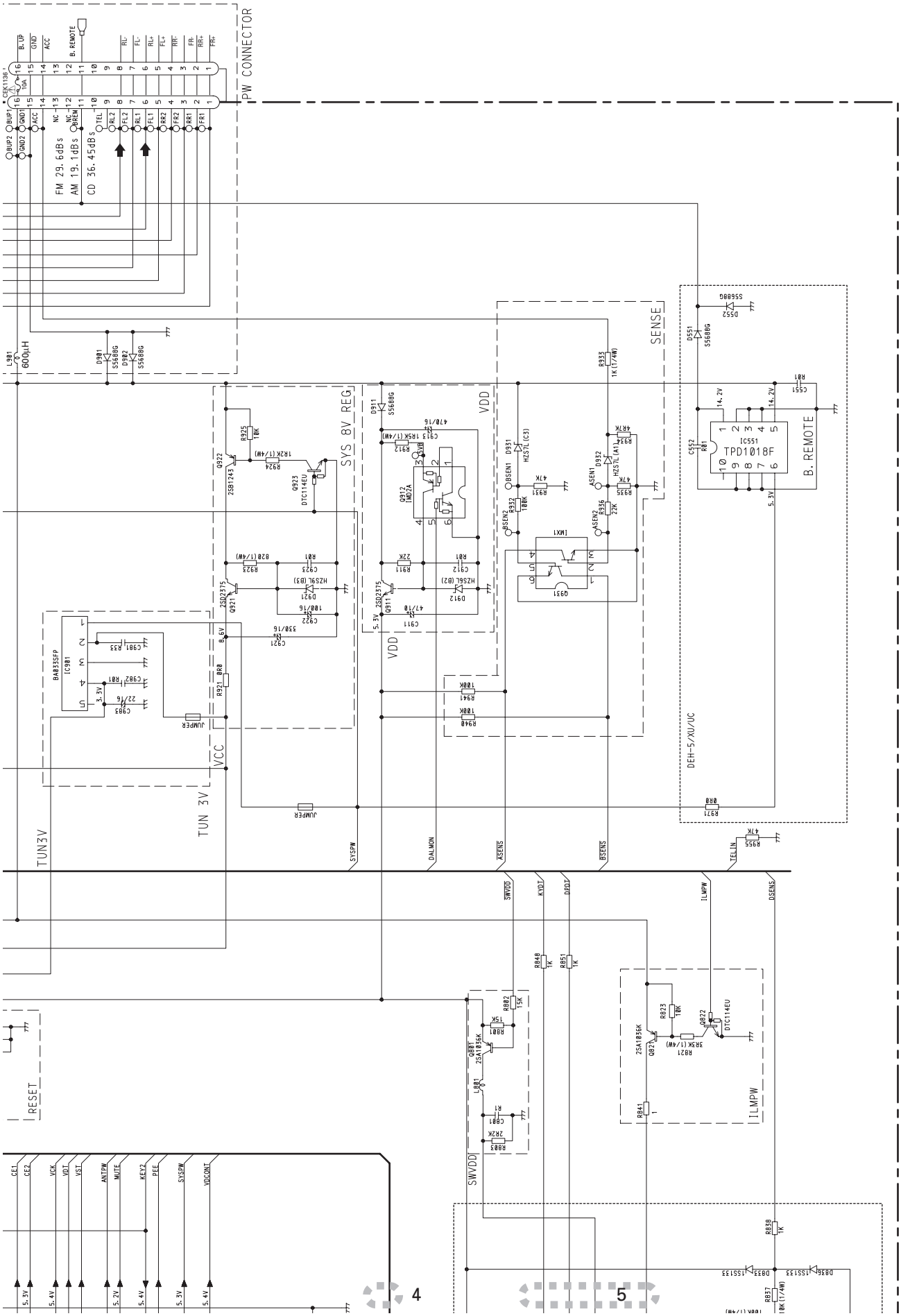
- Symbol indicates a resistor.
  No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor.
  No differentiation is made between chip capacitors and discrete capacitors.

The ⚠ 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.

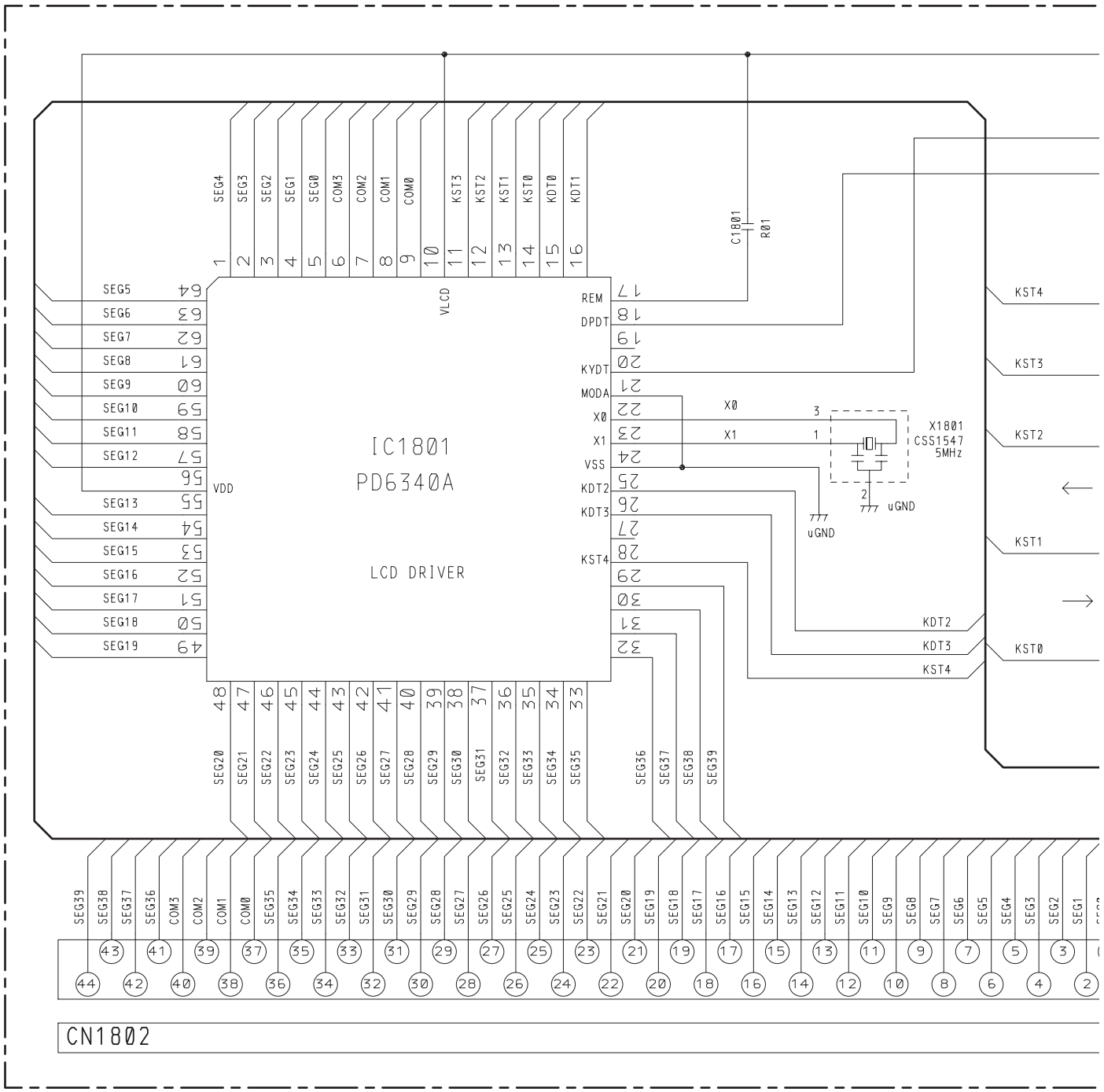
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022

A-a A-b

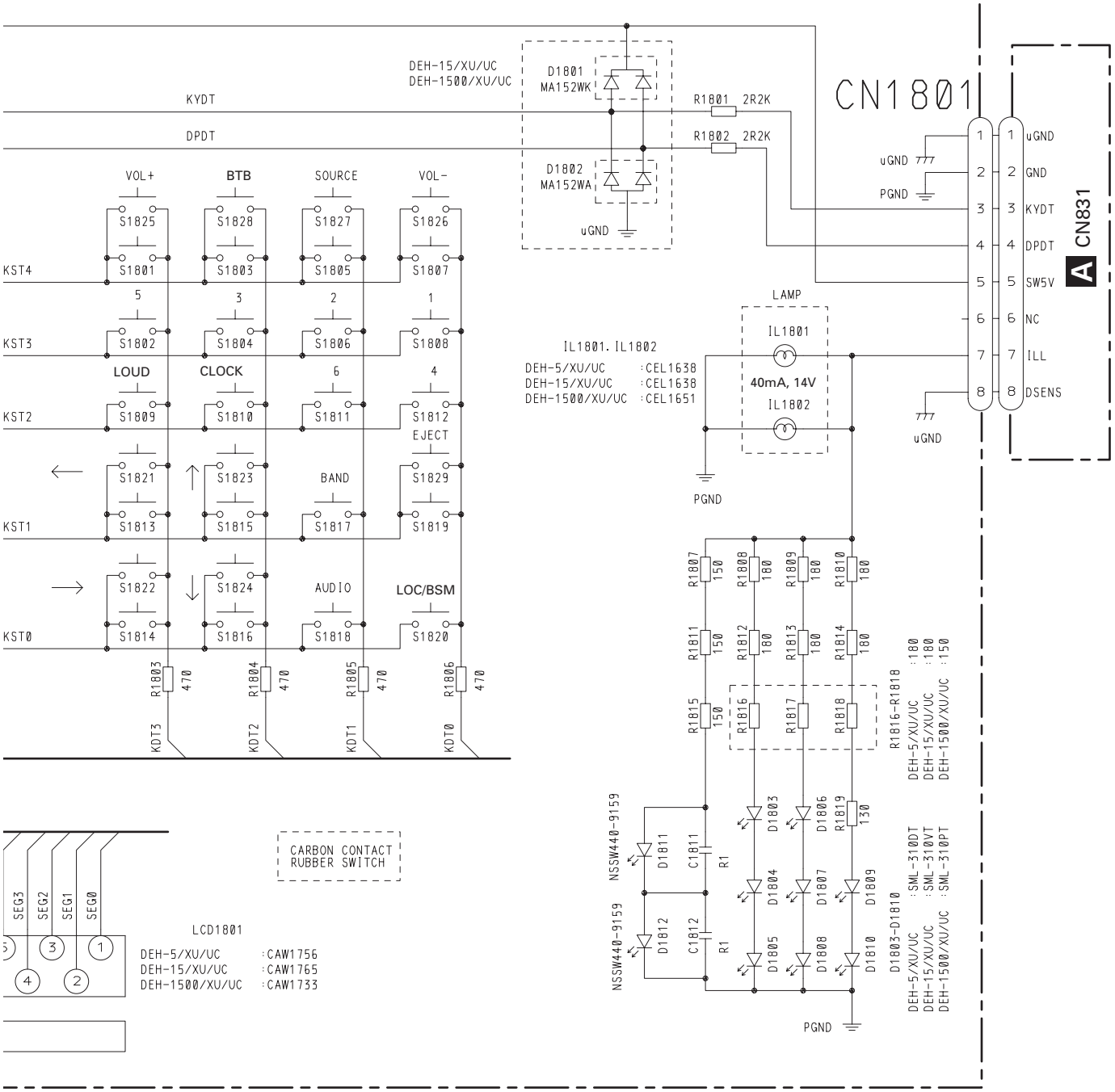

A TUNER AMP UNIT
CN352
REAR L CH
REAR R CH
RCA
RRch
RLch
MUTE
POWER AMP
IC302
TDA7384
PAL0073A
DEH-5/XU/UC
DEH-15/XU/UC
DEH-1500/XU/UC
CN901
B.UP
GND
ACC
B.REMOTE
FM 29.6dBs
AM 19.1dBs
FM 3.6dBs
AM -6.9dBs
CD 10.45dBs
IC151
PML010A
PML003AM
E-VOL
TUN3V
VCC
VDD
B.UP
MUTE
RESET
A-b
A-a
22
DEH-5/XU/UC


PW CONNECTOR
B_UP
GND
ACC
B.REMOTE
RL-
FL-
RL+
FL+
RR-
FR-
RR+
FR+
BUP1
BUP2
GND1
GND2
ACC
NC
NC
AREM
TEL
RL2
FL2
RL1
FL1
RR2
FR2
RR1
FR1
FM 29.6dBs
AM 19.1dBs
CD 36.45dBs
L901 600uH
D901 S5688G
D902 S5688G
SYS 8V REG
VDD
SENSE
D911 S5688G
C913 18SK(T/4W)
R912 82K
C912 0.22/16
Q912 UN2A
R911 22K
D912 HZ5BL(B2)
C911 47/10
Q911 2SD2375
R933 1K(T/4W)
D931 HZ5TL(C3)
R934 47K
R935 47K
D932 HZ5TL(A1)
R931 47K
R932 100K
R936 22K
BSEN1
BSEN2
ASEN1
ASEN2
IMX1
Q931
R941 100K
R940 100K
D552 S5688G
D551 S5688G
C551
R01
C552
IC551
TPD1018F
B. REMOTE
14.2V
5.3V
DEH-5/XU/UC
R971 0R0
R955 47K
TEL_IN
R924 1R2K(T/4W)
Q922 2SB1243
Q923 DTC114EU
R925 10K
R923 820(T/4W)
C923 100/16
D921 HZ5BL(B3)
C922 330/16
Q921 2SD2375
C921 330/16
C981 R33
C982 R01
C983 22/16
IC901 BA033SFP
R921 0R0
R01
JUMPER
TUN3V
TUN 3VL
VCC
8.6V
3.3V
SYSPW
DALMON
ASENS
BSENS
SWVDD
KYDT
DDET
ILMPW
DSENS
R848 1K
R851 1K
R882 15K
R881 15K
Q881 2SA1036K
L881
C881 2K2K
R883 2K2K
Q882 2SA1036K
R823 10K
Q822 DTC114EU
R821 3R3K(T/4W)
R841 1
R838 1K
D836 1SS133
D837 1SS133
R837 10K(T/4W)
RESET
CE1
CE2
VCK
VDT
VST
ANTPW
MUTE
KEY2
PEE
SYSPW
VDCONT
5.3V
5.4V
5.2V
4
5
A-b
A-a
DEH-5/XU/UC
23

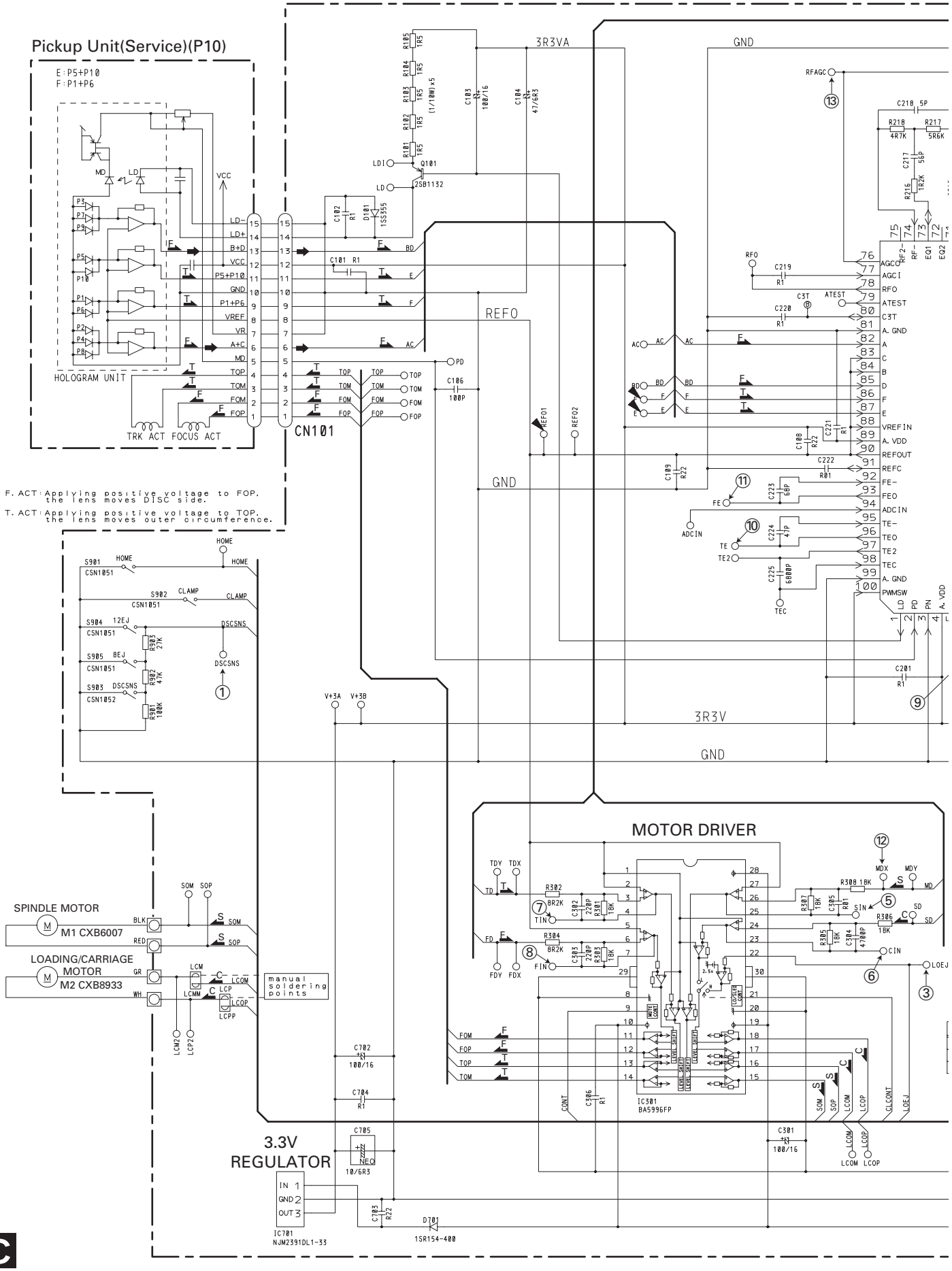
3.3 KEYBOARD UNIT

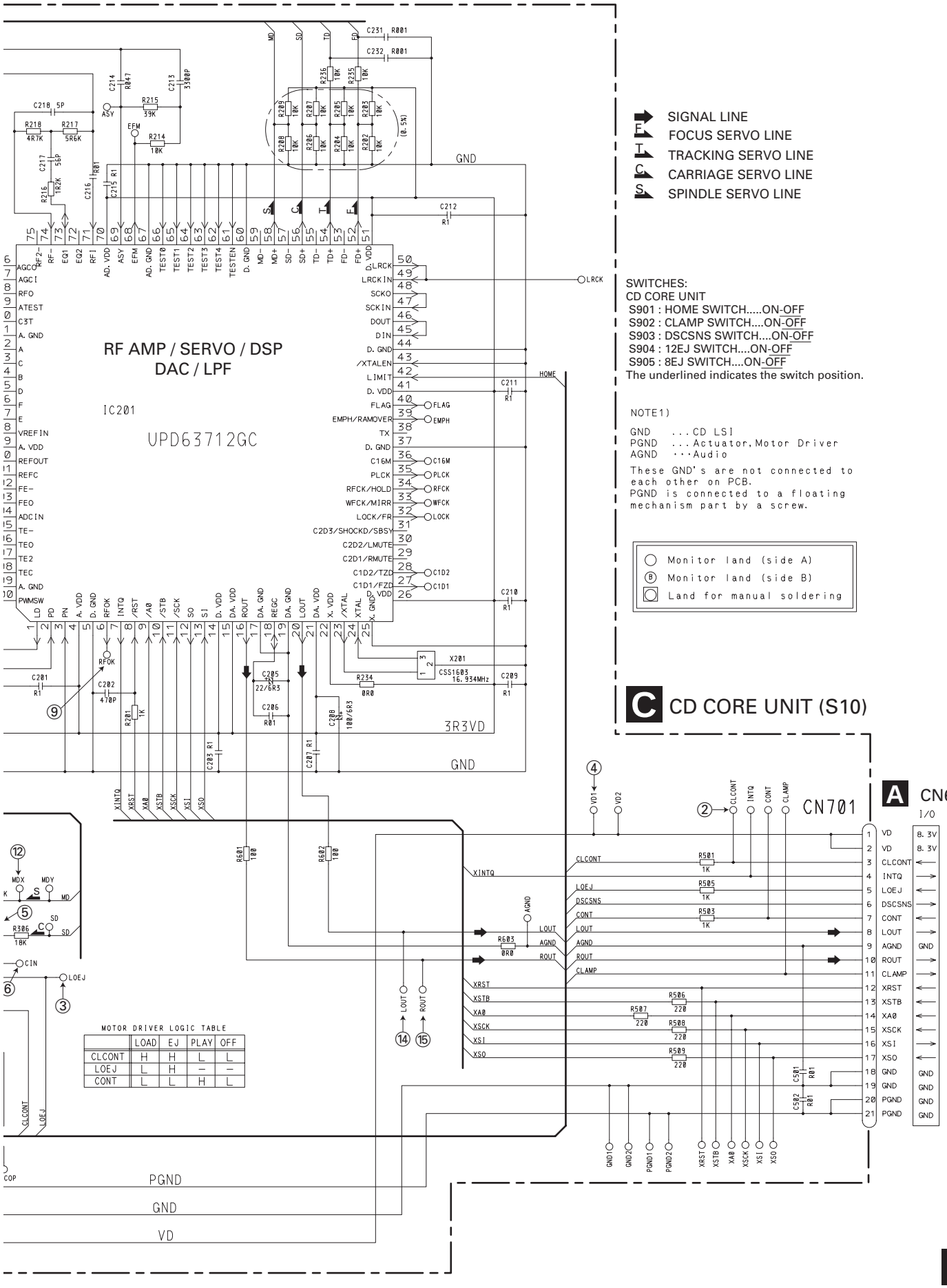


B KEYBOARD UNIT



3.4 CD MECHANISM MODULE



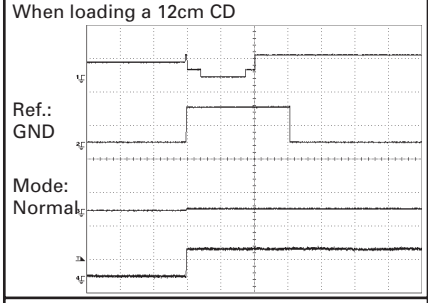

SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
SWITCHES:
CD CORE UNIT
S901 : HOME SWITCH.....ON-OFF
S902 : CLAMP SWITCH....ON-OFF
S903 : DSCSNS SWITCH....ON-OFF
S904 : 12EJ SWITCH....ON-OFF
S905 : 8EJ SWITCH....ON-OFF
The underlined indicates the switch position.
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.
Monitor land (side A)
Monitor land (side B)
Land for manual soldering
RF AMP / SERVO / DSP
DAC / LPF
IC201
UPD63712GC
C CD CORE UNIT (S10)
A CN651
I/O
CN701
MOTOR DRIVER LOGIC TABLE
LOAD EJ PLAY OFF
CLCONT H H L L
LOEJ L H – –
CONT L L H L
PGND
GND
VD

● Waveforms

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

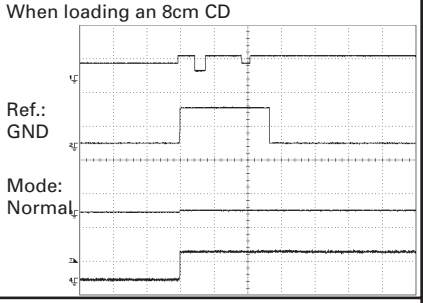
① DSCSNS	5V/div	500ms/div
② CLCONT	5V/div	
③ LOEJ	5V/div	
④ VD	10V/div	

When loading a 12cm CD



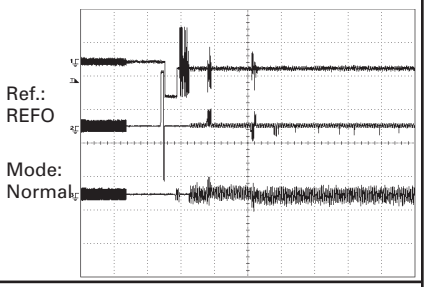
① DSCSNS	5V/div	500ms/div
② CLCONT	5V/div	
③ LOEJ	5V/div	
④ VD	10V/div	

When loading an 8cm CD



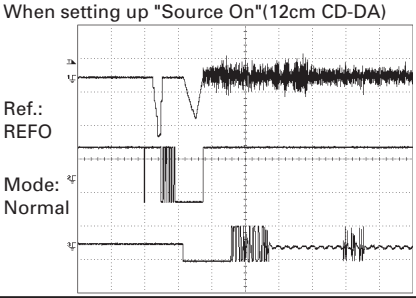
⑤ SIN	1V/div	2s/div
⑥ CIN	500mV/div	
⑦ TIN	500mV/div	

When setting up after loading a 12cm CD-DA disc



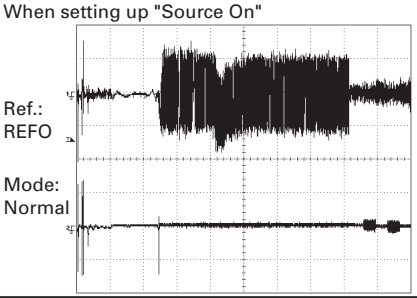
⑧ FIN	200mV/div	500ms/div
⑨ RFOK	2V/div	
⑤ SIN	2V/div	

When setting up "Source On"(12cm CD-DA)



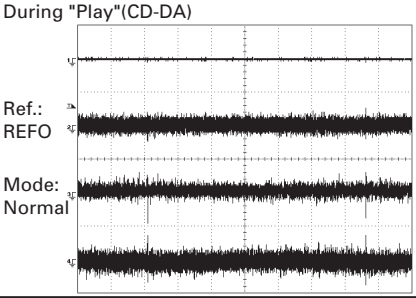
⑩ TE	500mV/div	200ms/div
⑪ FE	500mV/div	

When setting up "Source On"



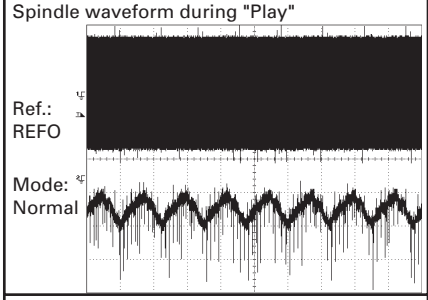
⑪ FE	500mV/div	20ms/div
⑧ FIN	500mV/div	
⑩ TE	500mV/div	
⑦ TIN	500mV/div	

During "Play"(CD-DA)



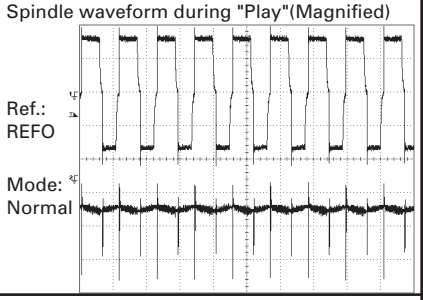
⑫ MDX	500mV/div	5ms/div
⑤ SIN	1V/div	

Spindle waveform during "Play"



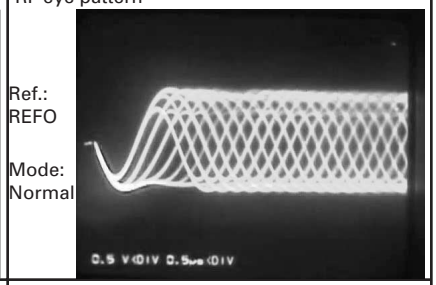
⑫ MDX	500mV/div	5µs/div
⑤ SIN	1V/div	

Spindle waveform during "Play"(Magnified)



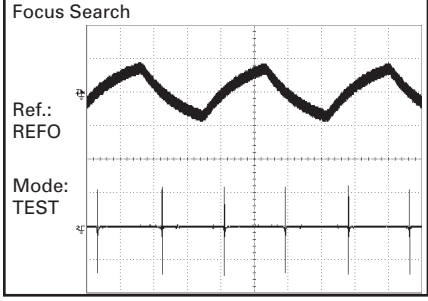
⑬ RFAGC	500mV/div	0.5µs/div

RF eye pattern



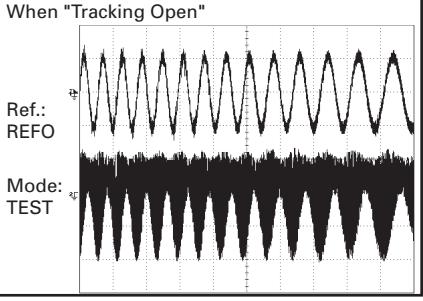
⑧ FIN	500mV/div	200ms/div
⑪ FE	500mV/div	

Focus Search



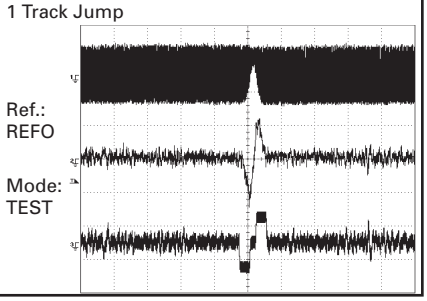
⑩ TE	500mV/div	2ms/div
⑬ RFAGC	500mV/div	

When "Tracking Open"



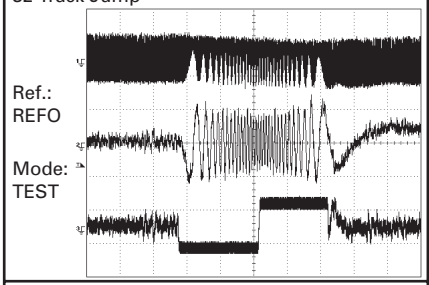
⑬ RFAGC	1V/div	500µs/div
⑩ TE	500mV/div	
⑦ TIN	500mV/div	

1 Track Jump



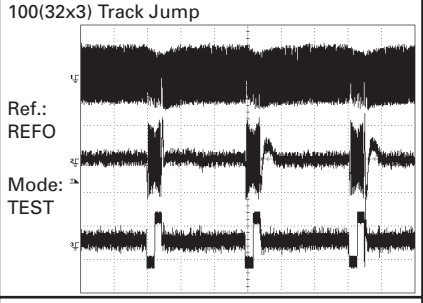
⑬ RFAGC 1V/div 500ms/div
⑩ TE 500mV/div
⑦ TIN 500mV/div

32 Track Jump



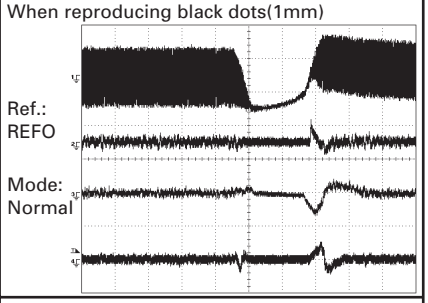
⑬ RFAGC 1V/div 5ms/div
⑩ TE 500mV/div
⑦ TIN 500mV/div

100(32x3) Track Jump



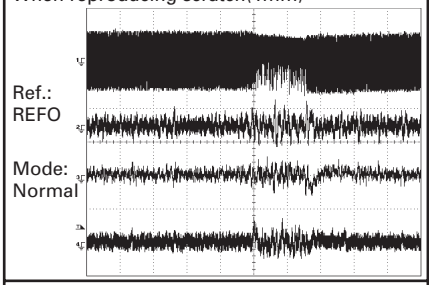
⑬ RFAGC 1V/div 500µs/div
⑦ TIN 1V/div
⑩ TE 1V/div
⑧ FIN 1V/div

When reproducing black dots(1mm)



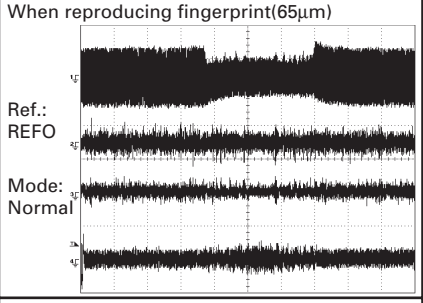
⑬ RFAGC 1V/div 500µs/div
⑩ TE 1V/div
⑥ CIN 500mV/div
⑤ SIN 2V/div

When reproducing scratch(1mm)



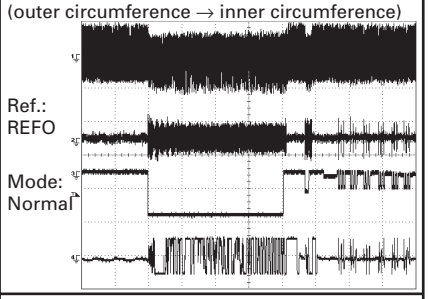
⑬ RFAGC 1V/div 5ms/div
⑩ TE 1V/div
⑥ CIN 500mV/div
⑤ SIN 2V/div

When reproducing fingerprint(65µm)



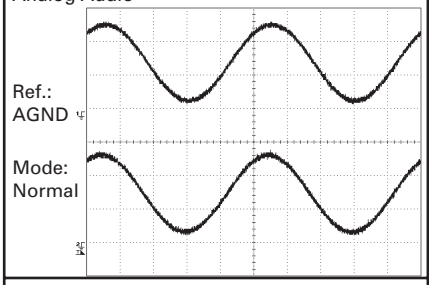
⑬ RFAGC 1V/div 500µs/div
⑩ TE 1V/div
⑥ CIN 500mV/div
⑤ SIN 2V/div

During inside/outside search
(outer circumference → inner circumference)



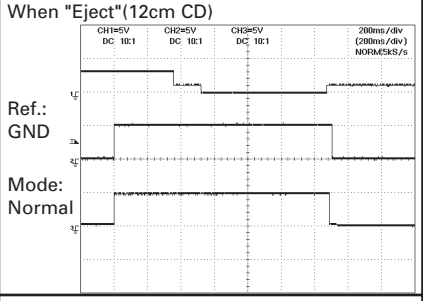
⑭ LOUT 1V/div 200µs/div
⑮ ROUT 1V/div

Analog Audio



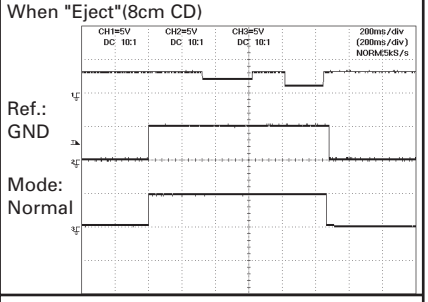
① DSCSNS 5V/div 200ms/div
② CLCONT 5V/div
③ LOEJ 5V/div

When "Eject"(12cm CD)



① DSCSNS 5V/div 200ms/div
② CLCONT 5V/div
③ LOEJ 5V/div

When "Eject"(8cm CD)

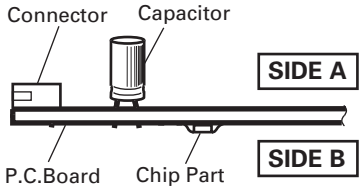


4. PCB CONNECTION DIAGRAM

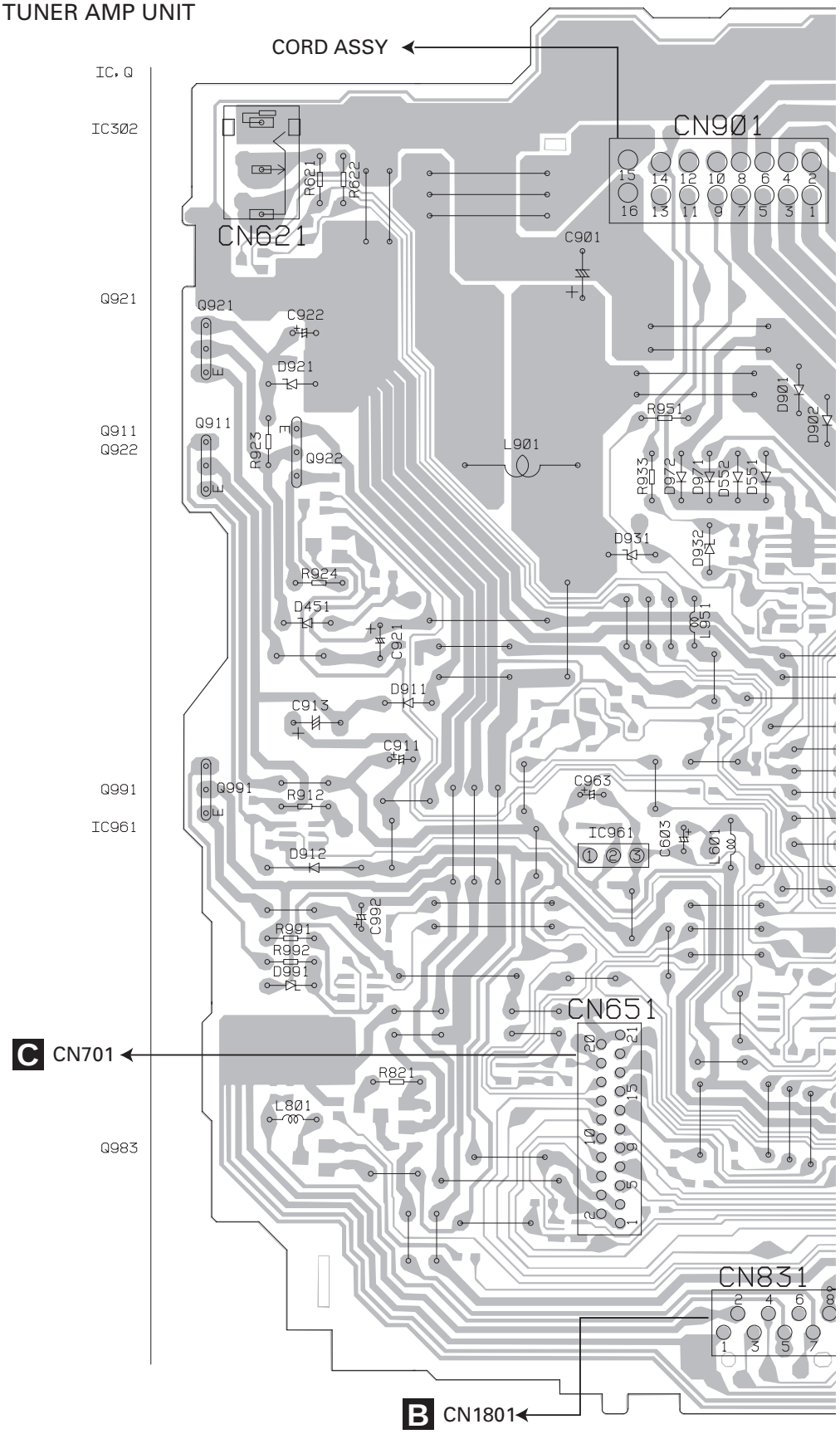
4.1 TUNER AMP UNIT

NOTE FOR PCB DIAGRAMS

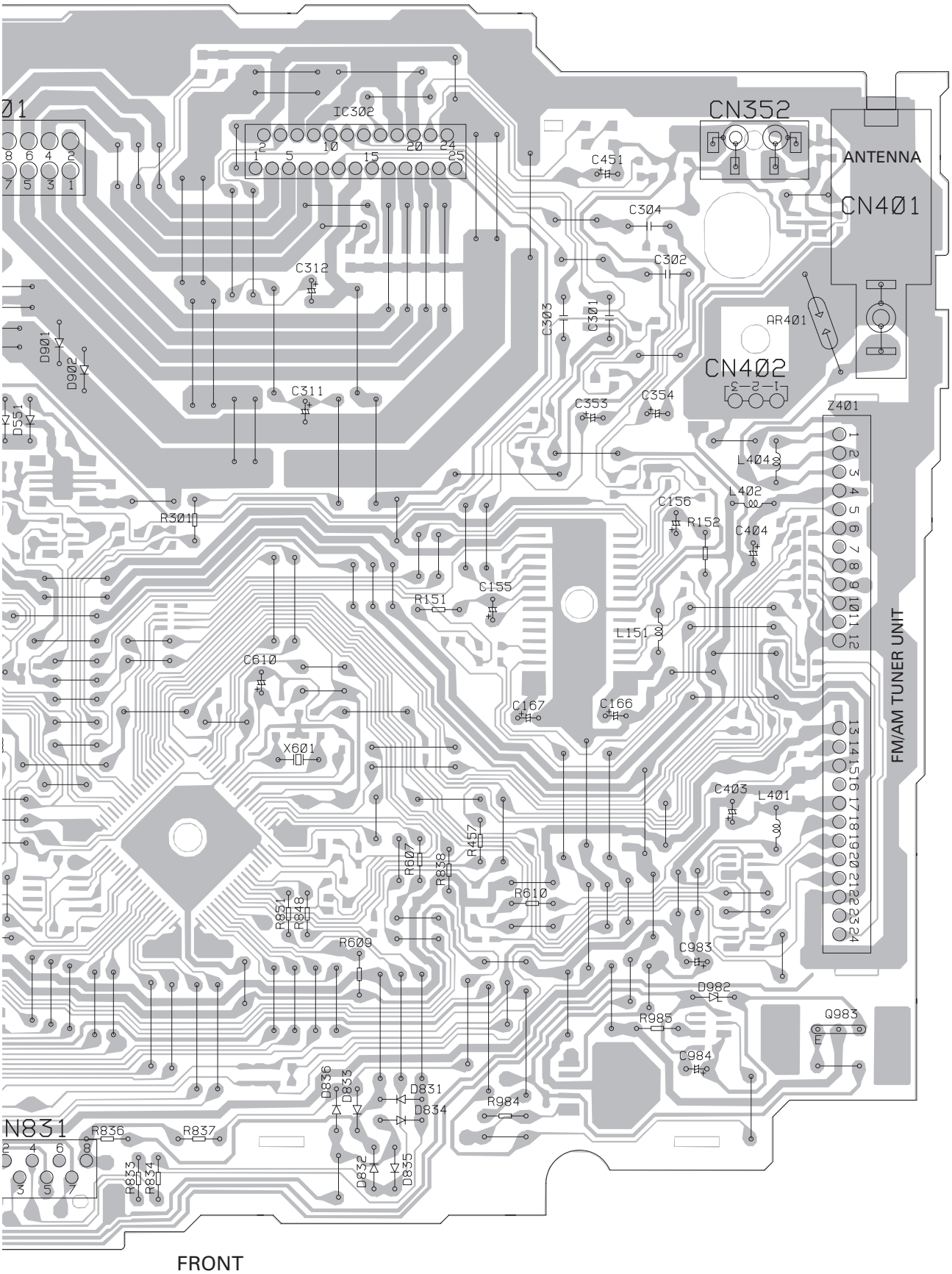
1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



A TUNER AMP UNIT



SIDE A


IC302
CN352
ANTENNA
CN401
CN402
AR401
Z401
FM/AM TUNER UNIT
C451
C304
C302
C303
C301
C312
C311
C353
C354
C156
R152
C404
L404
L402
R301
C155
R151
L151
C610
C167
C166
X601
C403
L401
R607
R838
R457
R610
R851
R848
R609
C983
D982
R985
Q983
C984
R984
D836
D833
D831
D834
D832
D835
N831
R836
R837
R833
R834
D901
D902
D551
FRONT

A

B

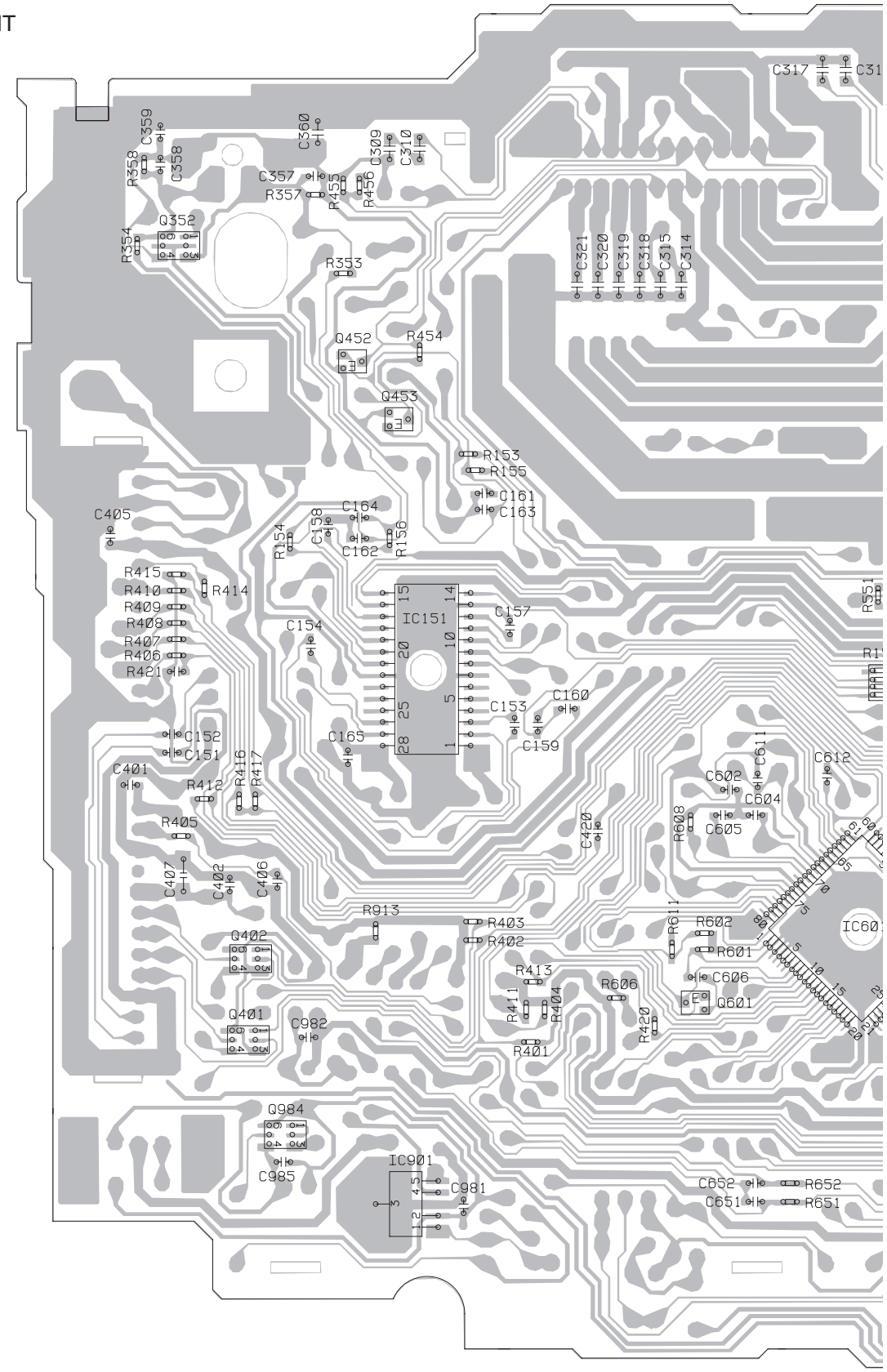
C

D

E

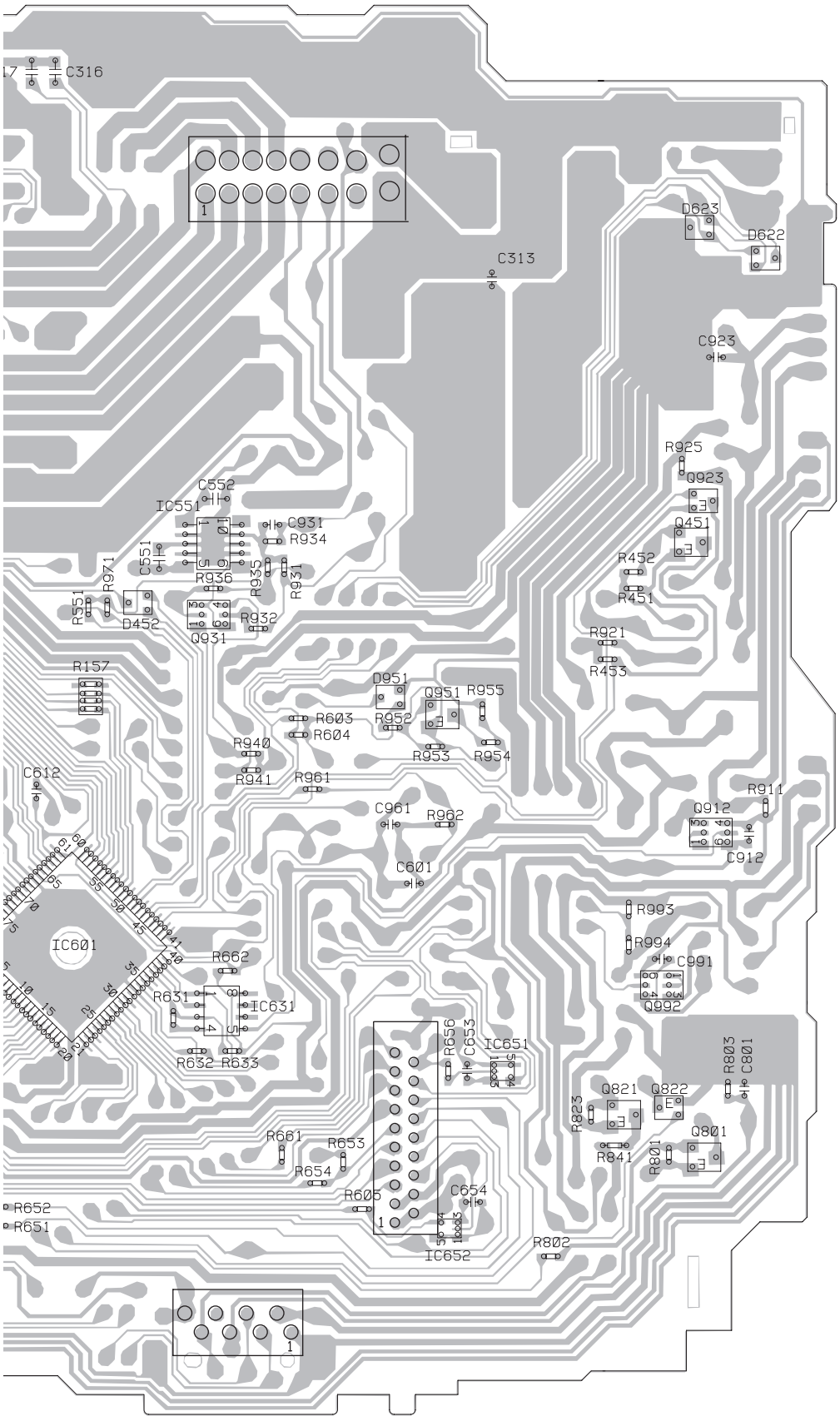
F

A TUNER AMP UNIT



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

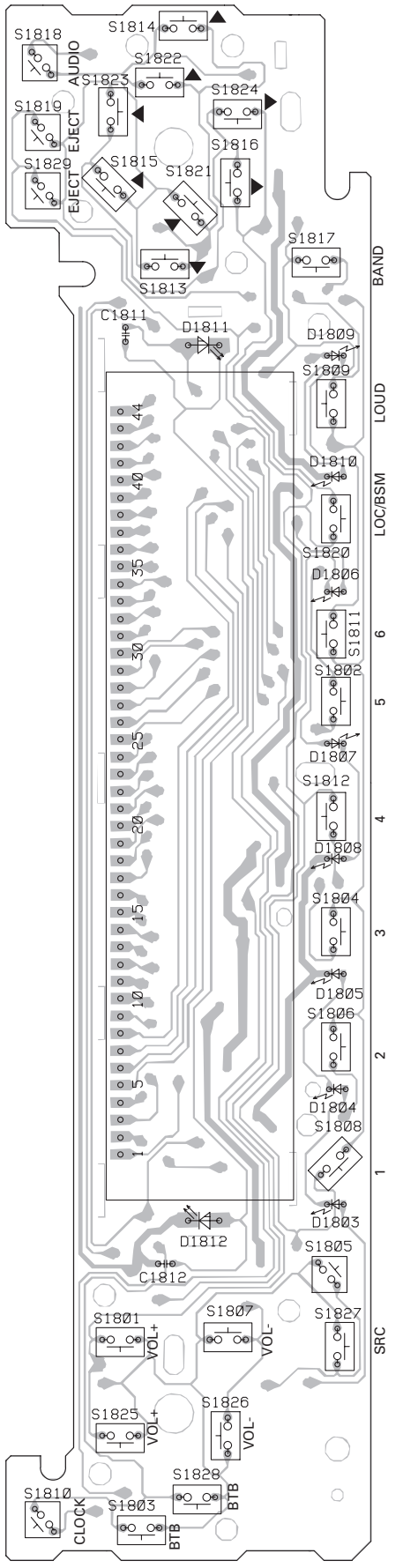
IC901

IC652

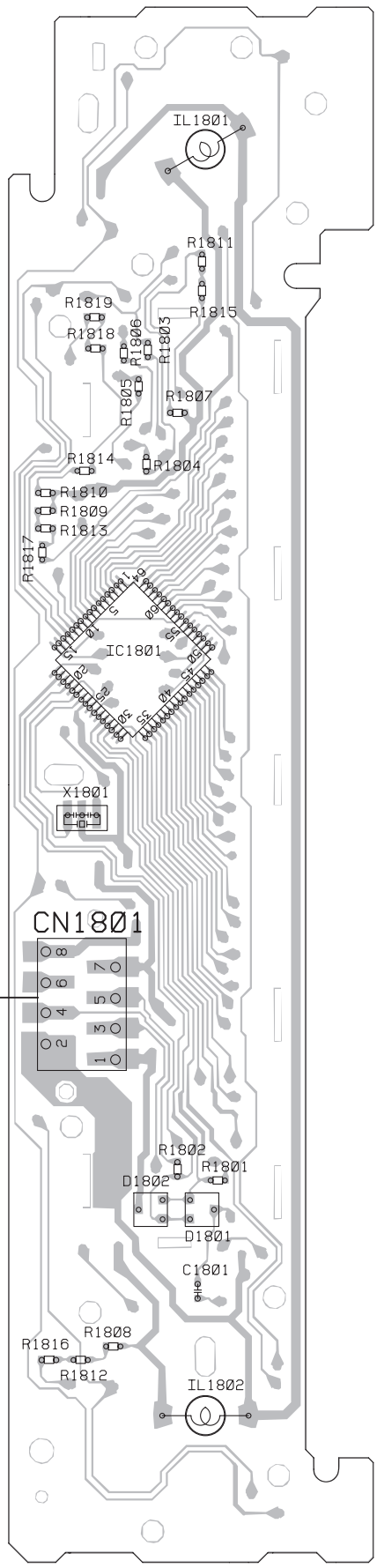
A

4.2 KEYBOARD UNIT

B KEYBOARD UNIT **SIDE A**



B KEYBOARD UNIT **SIDE B**



A
CN831

IC, Q

IC1801

B

A

B

C

D

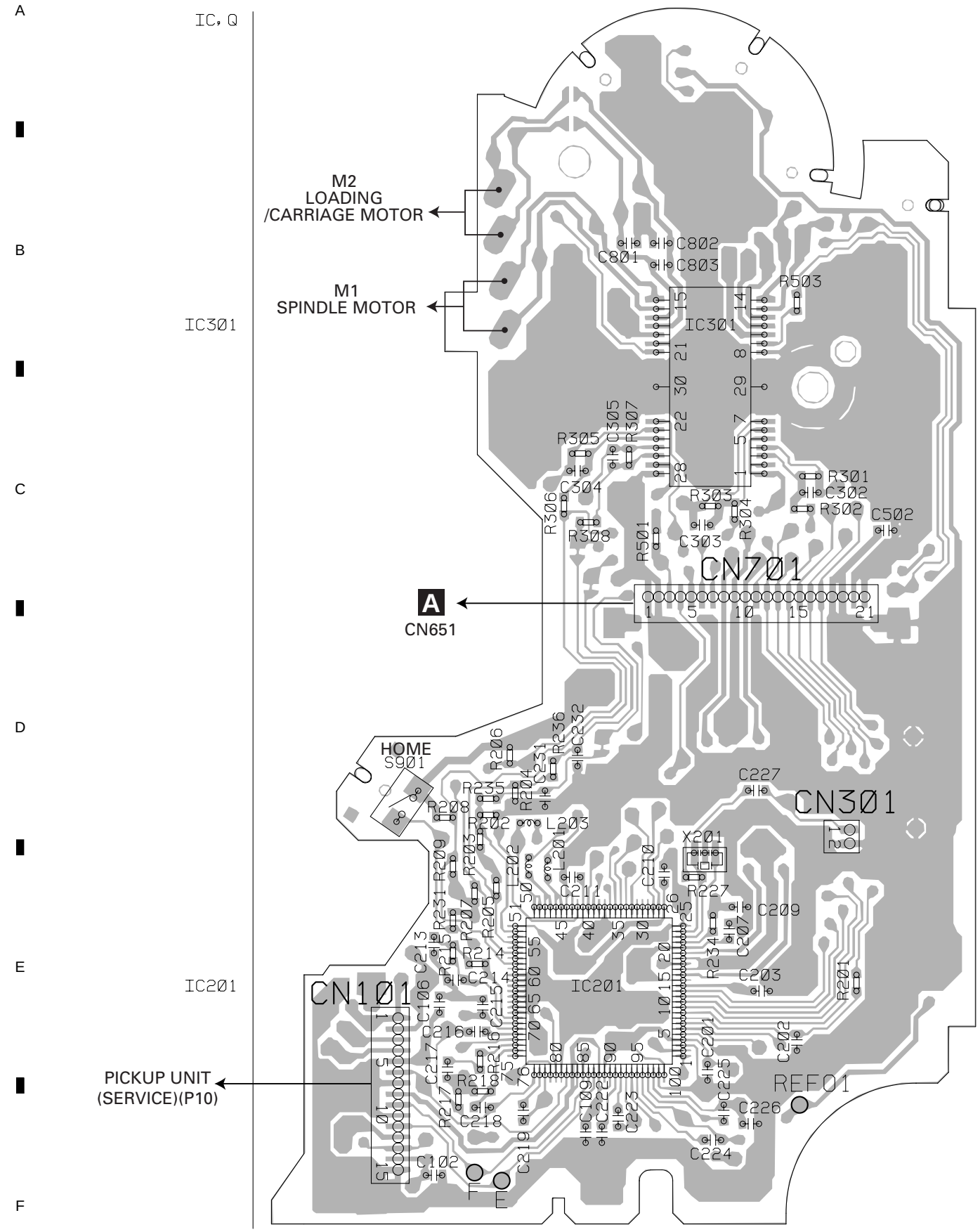
E

F

4.3 CD MECHANISM MODULE

C CD CORE UNIT(S10)

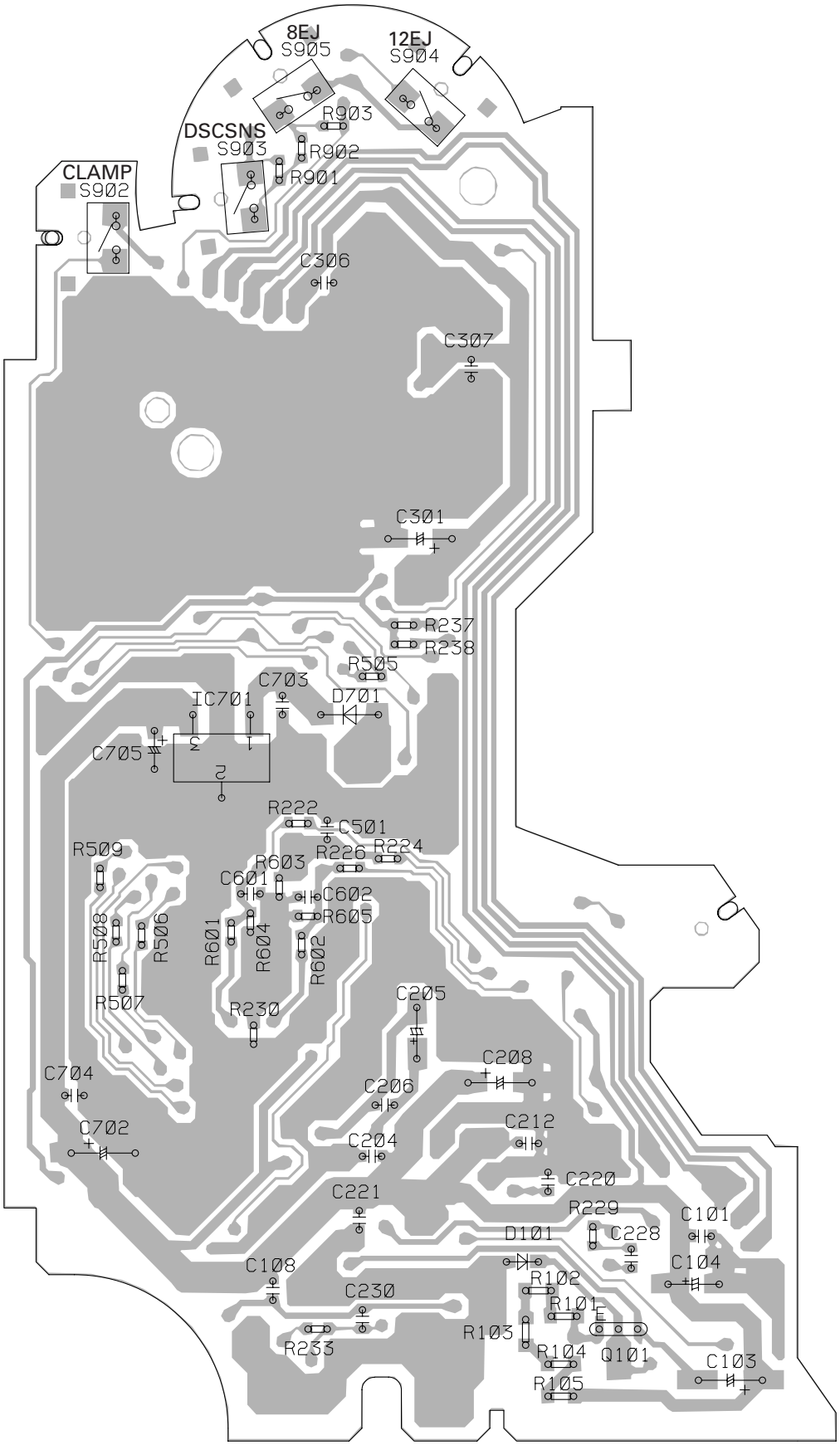
SIDE A



C

C CD CORE UNIT(S10)

SIDE B



IC, Q

IC701

Q101

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/○S○○○J,RS1/○○S○○○J

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

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

A Unit Number : CWM8569(DEH-5)
Unit Name : Tuner Amp Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	151	IC	PML010A
IC	302	IC	TDA7384
IC	551	IC	TPD1018F
IC	601	IC	PE5331A
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	551	Diode	S5688G
D	552	Diode	S5688G
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	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
		FM/AM Tuner Unit	CWE1646
AR	401	Arrester	DSP-201M

RESISTORS

=====Circuit Symbol and No.		===Part Name	Part No.
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
R	408		RS1/16S681J
R	409		RS1/16S681J
R	410		RS1/16S681J
R	414		RS1/16S0R0J
R	420		RS1/16S681J
R	421		RS1/16S473J
R	454		RS1/16S103J
R	455		RS1/16S153J
R	456		RS1/16S221J
R	457		RD1/4PU681J
R	601		RS1/16S473J
R	603		RS1/16S103J
R	604		RS1/16S103J
R	605		RS1/16S221J
R	606		RS1/16S104J
R	607		RD1/4PU222J
R	608		RS1/16S0R0J
R	609		RD1/4PU473J
R	610		RD1/4PU681J
R	611		RS1/16S473J
R	653		RS1/16S104J
R	654		RS1/16S102J
R	661		RS1/16S221J
R	801		RS1/16S153J
R	802		RS1/16S153J
R	803		RS1/16S222J
R	821		RD1/4PU332J
R	823		RS1/16S103J
R	833		RD1/4PU222J
R	834		RD1/4PU222J
R	841		RS1/16S1R0J
R	848		RD1/4PU102J
R	851		RD1/4PU102J
R	911		RS1/16S223J
R	912		RD1/4PU152J
R	921		RS1/16S0R0J
R	923		RD1/4PU821J
R	924		RD1/4PU122J
R	925		RS1/16S103J
R	931		RS1/16S473J
R	932		RS1/16S104J
R	933		RD1/4PU102J
R	934		RS1/16S472J
R	935		RS1/16S473J
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	CCH1494
C	911		CEJQ470M10
C	912		CKSRYB103K50
C	913	470µF/16V	CCH1331
C	921	330µF/16V	CCH1326
C	922		CEJQ101M16
C	923		CKSRYB103K50
C	961		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	DSP-201M
		FM/AM Tuner Unit	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

			Part No.
R	408		RS1/16S681J
R	409		RS1/16S681J
R	410		RS1/16S681J
R	414		RS1/16S0R0J
R	420		RS1/16S681J
R	421		RS1/16S473J
R	454		RS1/16S103J
R	455		RS1/16S153J
R	456		RS1/16S221J
R	457		RD1/4PU681J
R	602		RS1/16S473J
R	603		RS1/16S103J
R	604		RS1/16S103J
R	605		RS1/16S221J
R	606		RS1/16S104J
R	607		RD1/4PU222J
R	608		RS1/16S0R0J
R	609		RD1/4PU473J
R	610		RD1/4PU681J
R	611		RS1/16S473J
R	653		RS1/16S104J
R	654		RS1/16S102J
R	661		RS1/16S221J
R	801		RS1/16S153J
R	802		RS1/16S153J
R	803		RS1/16S222J
R	821		RD1/4PU332J
R	823		RS1/16S103J
R	833		RD1/4PU222J
R	834		RD1/4PU222J
R	836		RD1/4PU104J
R	837		RD1/4PU103J
R	838		RD1/4PU102J
R	841		RS1/16S1R0J
R	848		RD1/4PU102J
R	851		RD1/4PU102J
R	911		RS1/16S223J
R	912		RD1/4PU152J
R	921		RS1/16S0R0J
R	923		RD1/4PU821J
R	924		RD1/4PU122J
R	925		RS1/16S103J
R	931		RS1/16S473J
R	932		RS1/16S104J
R	933		RD1/4PU102J
R	934		RS1/16S472J
R	935		RS1/16S473J
R	936		RS1/16S223J
R	940		RS1/16S104J
R	941		RS1/16S104J
R	955		RS1/16S473J
R	961		RD1/4PU102J
R	962		RS1/16S822J
R	991		RD1/4PU221J
R	992		RD1/4PU221J
R	993		RS1/16S222J
R	994		RS1/16S472J

CAPACITORS

			Part No.
C	151		CKSRYB224K16
C	152		CKSRYB224K16
C	153		CKSRYB105K10
C	154		CKSRYB105K10
C	155		CEJQ4R7M35
C	156		CEJQ4R7M35
C	157		CKSRYB153K50
C	158		CKSRYB153K50
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	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	601		CKSRYB103K50
C	604		CCSRCH200J50
C	605		CCSRCH200J50
C	610		CEJQ4R7M35
C	611		CKSRYB224K16
C	654		CKSRYB104K16
C	801		CKSRYB104K16
C	901	3300µF/16V	CCH1494
C	911		CEJQ470M10
C	912		CKSRYB103K50
C	913	470µF/16V	CCH1331
C	921	330µF/16V	CCH1326
C	922		CEJQ101M16
C	923		CKSRYB103K50
C	961		CKSRYB473K50
C	963		CEJQ100M16
C	981		CKSRYB334K10
C	982		CKSRYB103K50
C	983		CEJQ220M16
C	991		CKSRYB473K50
C	992		CEJQ101M10

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

MISCELLANEOUS

			Part No.
IC	1801	IC	PD6340A
D	1801	Diode(DEH-15,1500)	MA152WK
D	1802	Diode(DEH-15,1500)	MA152WK
D1803-1810		LED (DEH-5)	SML-310DT
D1803-1810		LED (DEH-15)	SML-310VT
D1803-1810		LED (DEH-1500)	SML-310PT
D	1811	LED	NSSW440-9159
D	1812	LED	NSSW440-9159
X	1801	Ceramic Resonator 5.00MHz	CSS1547
IL	1801	Lamp 14V 40mA(DEH-5,15)	CEL1638
IL	1801	Lamp 14V 40mA(DEH-1500)	CEL1651
IL	1802	Lamp 14V 40mA(DEH-5,15)	CEL1638
IL	1802	Lamp 14V 40mA(DEH-1500)	CEL1651
LCD	1801	LCD(DEH-5)	CAW1756

Circuit Symbol and No.	Part Name	Part No.
LCD1801	LCD(DEH-15)	CAW1765
LCD1801	LCD(DEH-1500)	CAW1733

RESISTORS

R	1801		RS1/16S222J
R	1802		RS1/16S222J
R	1803		RS1/16S471J
R	1804		RS1/16S471J
R	1805		RS1/16S471J
R	1806		RS1/16S471J
R	1807		RS1/16S151J
R	1808		RS1/16S181J
R	1809		RS1/16S181J
R	1810		RS1/16S181J
R	1811		RS1/16S151J
R	1812		RS1/16S181J
R	1813		RS1/16S181J
R	1814		RS1/16S181J
R	1815		RS1/16S151J
R	1816	(DEH-5,15)	RS1/16S181J
R	1816	(DEH-1500)	RS1/16S151J
R	1817	(DEH-5,15)	RS1/16S181J
R	1817	(DEH-1500)	RS1/16S151J
R	1818	(DEH-5,15)	RS1/16S181J
R	1818	(DEH-1500)	RS1/16S151J
R	1819		RS1/16S131J

CAPACITORS

C	1801		CKSRYB103K50
C	1811		CKSRYF104Z25
C	1812		CKSRYF104Z25

C 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
R	215		RS1/16S393J
R	216		RS1/16S122J
R	217		RS1/16S562J
R	218		RS1/16S472J
R	234		RS1/16S0R0J
R	235		RS1/16S103J
R	236		RS1/16S103J
R	301		RS1/16S183J
R	302		RS1/16S822J
R	303		RS1/16S183J
R	304		RS1/16S822J
R	305		RS1/16S183J
R	306		RS1/16S183J
R	307		RS1/16S183J
R	308		RS1/16S183J
R	501		RS1/16S102J
R	503		RS1/16S102J
R	505		RS1/16S102J
R	506		RS1/16S221J
R	507		RS1/16S221J
R	508		RS1/16S221J
R	509		RS1/16S221J
R	601		RS1/16S101J
R	602		RS1/16S101J
R	603		RS1/16S0R0J
R	901		RS1/16S104J
R	902		RS1/16S473J
R	903		RS1/16S273J

CAPACITORS

C	101		CKSRYB104K16
C	102		CKSRYB104K16
C	103	100µF/16V	CCH1504
C	104	47µF/6.3V	CCH1506
C	106		CCSRCH101J50
C	108		CKSRYB224K16
C	109		CKSRYB224K16
C	201		CKSRYB104K16
C	202		CKSRYB471K50
C	203		CKSRYB104K16
C	205	22µF/6.3V	CCH1507
C	206		CKSRYB103K25
C	207		CKSRYB104K16
C	208	100µF/6.3V	CCH1505
C	209		CKSRYB104K16
C	210		CKSRYB104K16
C	211		CKSRYB104K16
C	212		CKSRYB104K16
C	213		CKSRYB332K50
C	214		CKSRYB473K25
C	215		CKSRYB104K16
C	216		CKSRYB103K25
C	217		CCSRCH560J50
C	218		CCSRCH5R0C50
C	219		CKSRYB104K16
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	CCH1504
C	302		CCSRCH221J50
C	303		CCSRCH221J50
C	304		CKSRYB472K50

=====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

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 guarantied 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.

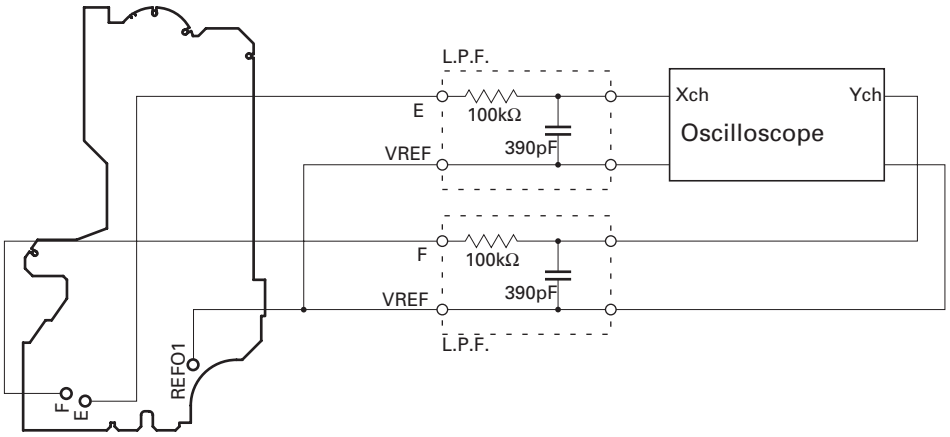
• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **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

CD CORE UNIT(S10)



• **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° . Refer to the photographs supplied to determine the phase angle.
4. If the phase difference is determined to be greater than 75° 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° then the mechanism should be judged to be at fault.

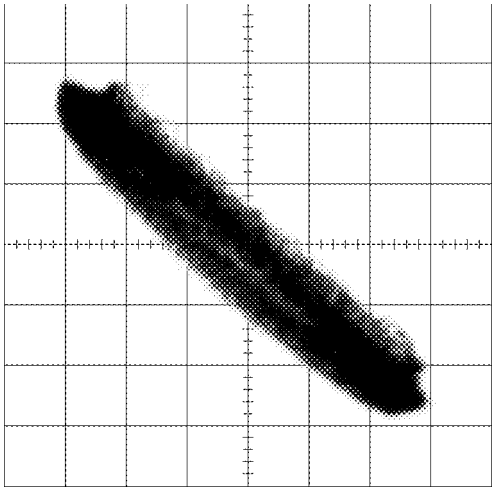
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

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

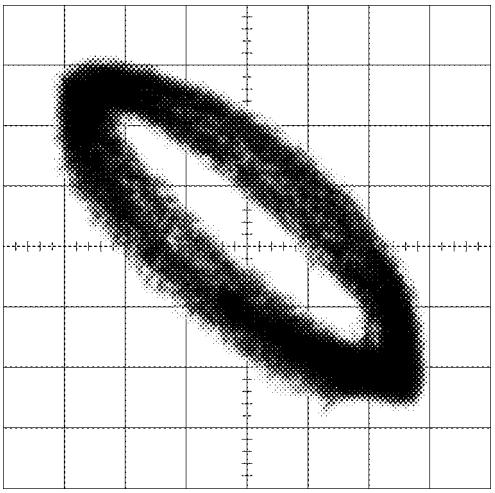
Grating waveform

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

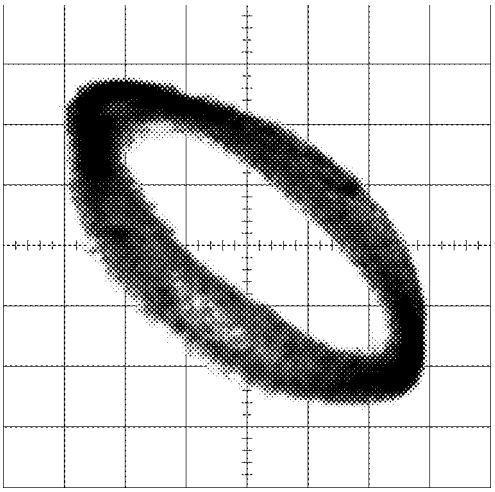
0°



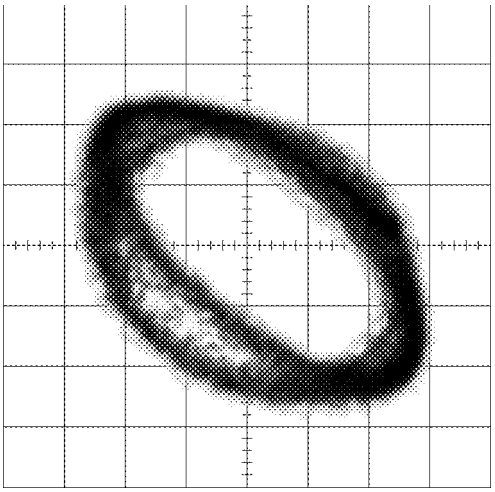
30°



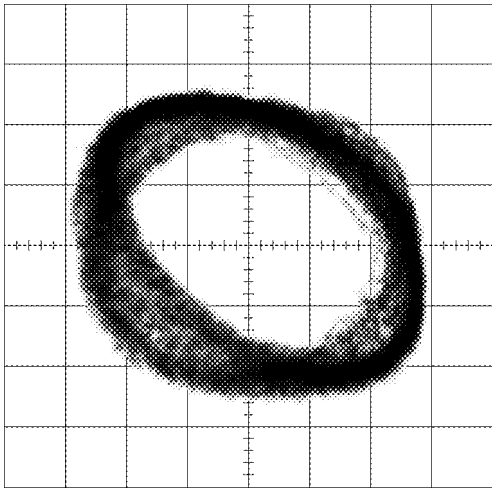
45°



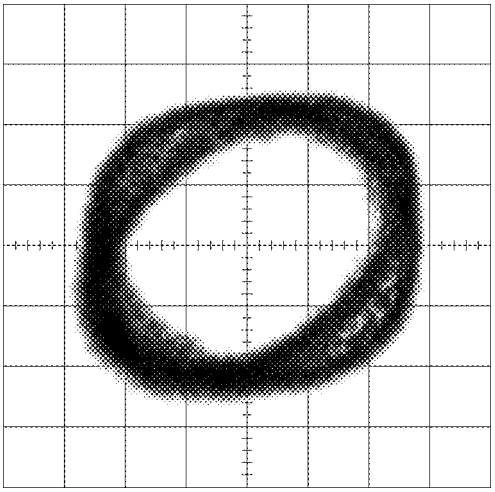
60°



75°



90°



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	6-digit display	4-digit display
ERROR–xx	ERR–xx	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 Communication 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.

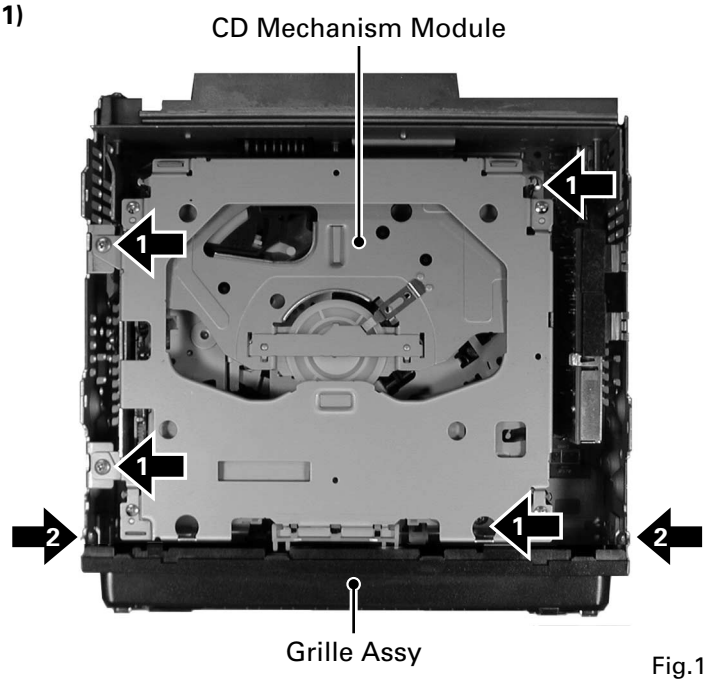


Fig.1

● **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.

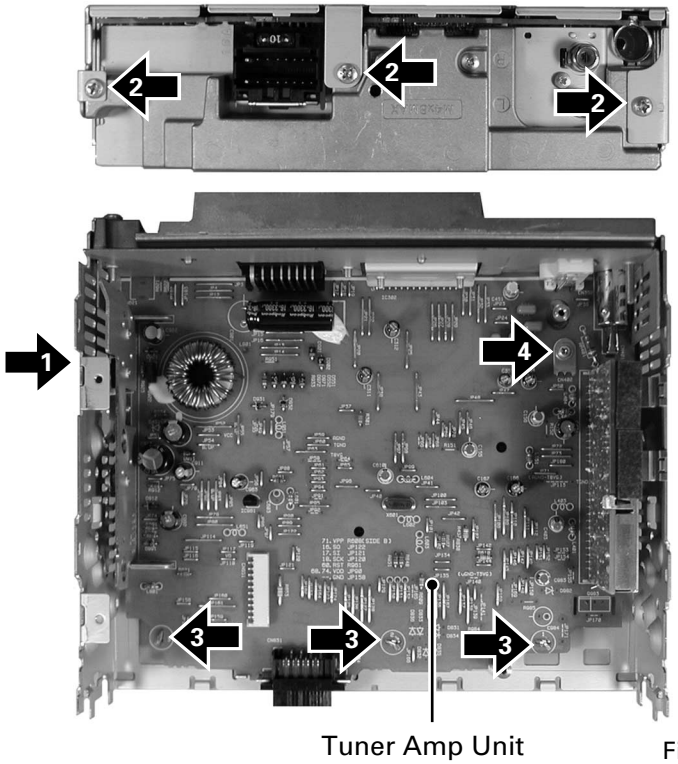
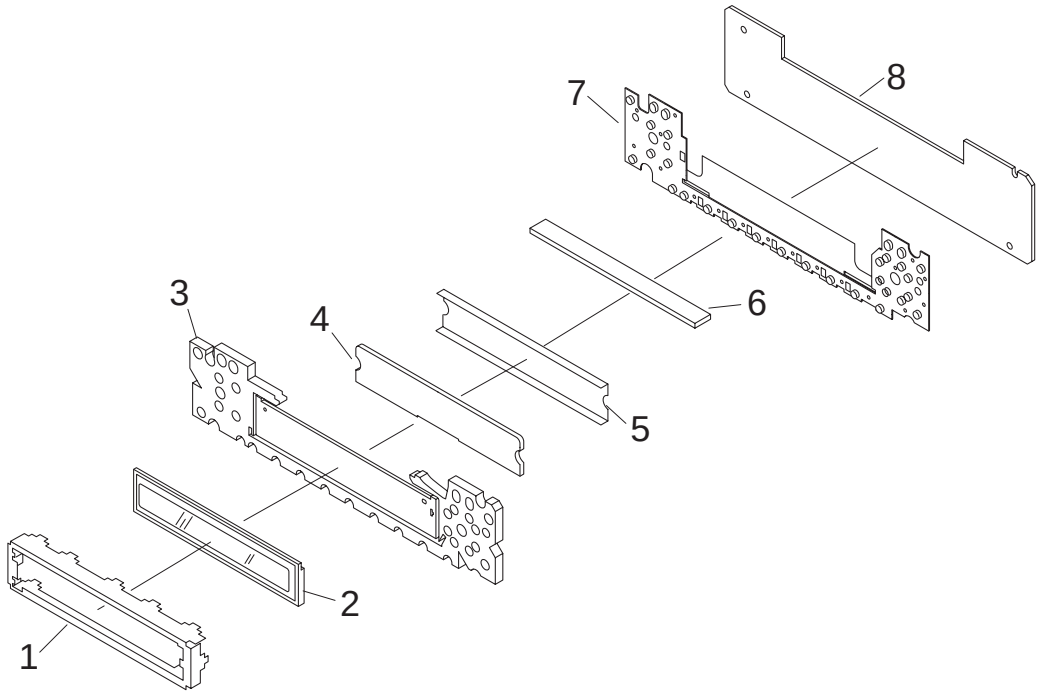


Fig.2

● How to assemble Keyboard Unit

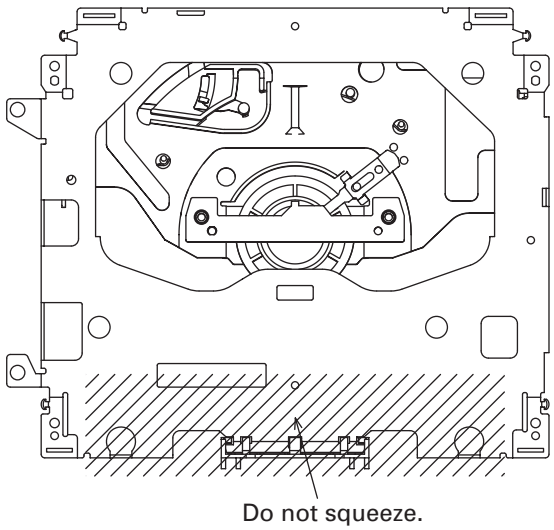
1. Assemble them in order from "1" to "8". (See the figure below.)
2. After that, bend the crows (7 in total) until they get the right angles with the marks printed on "8".

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".



● How to hold the Mechanical Unit

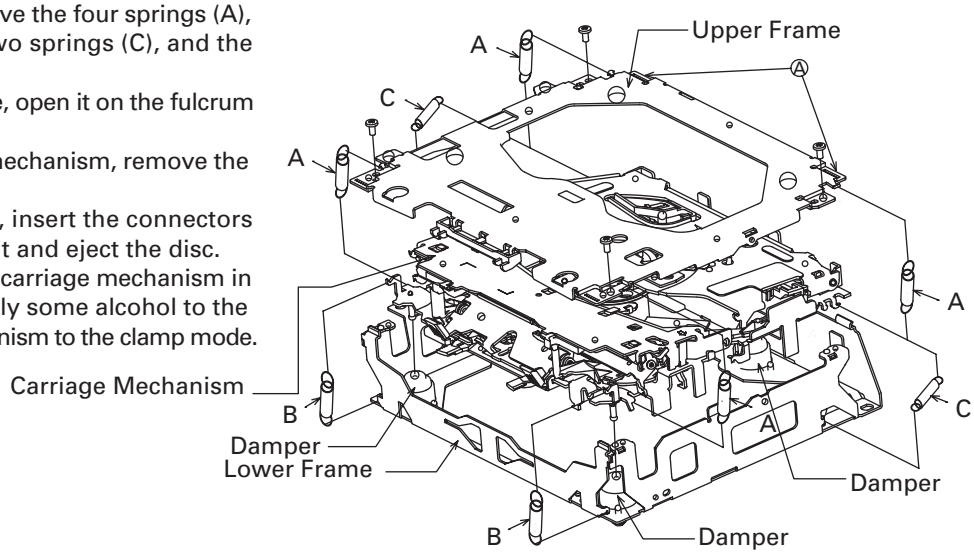
1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



● Removing the Upper and Lower Frames

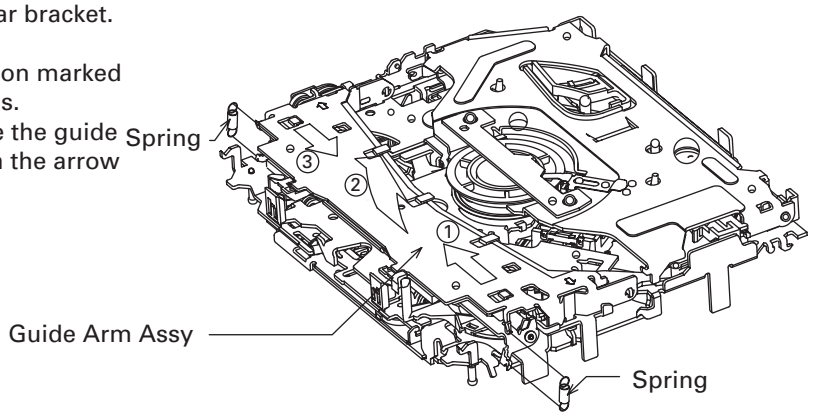
1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
2. To remove the upper frame, open it on the fulcrum A.
3. While lifting the carriage mechanism, remove the three dampers.
4. With the frames removed, insert the connectors coming from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

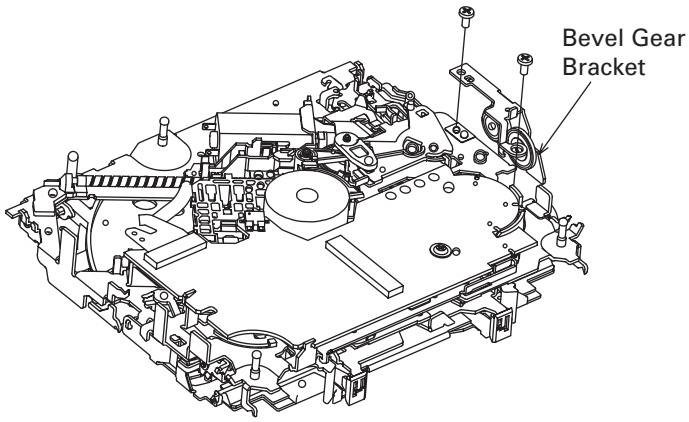
Caution: Before installing the carriage mechanism in the frames, be sure to apply some alcohol to the dampers and set the mechanism to the clamp mode.



● 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.

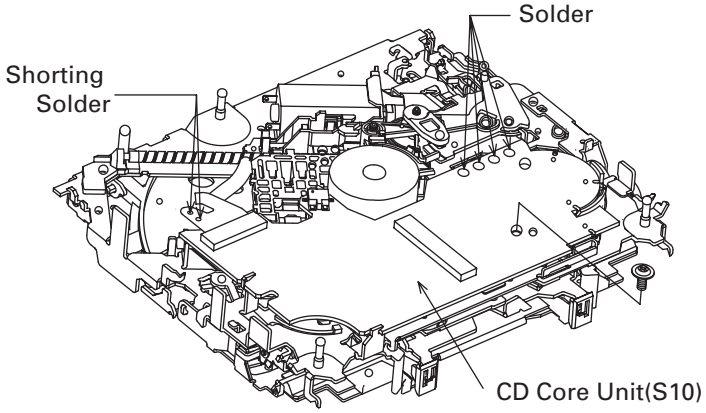




● Removing the CD Core Unit(S10)

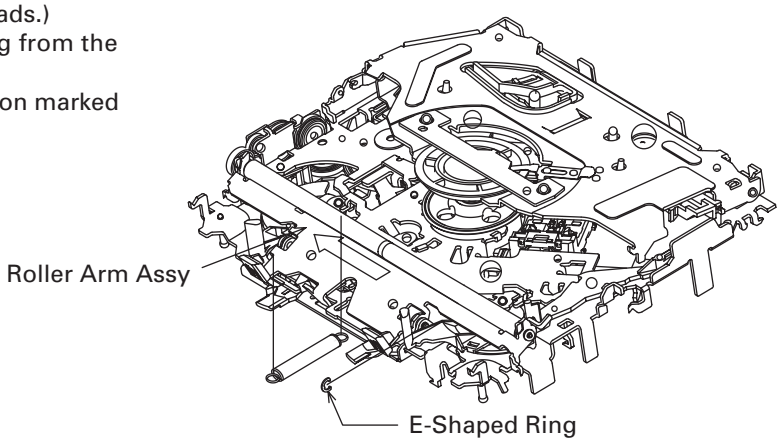
1. Apply shorting solder to the Pickup flexible cable. Disconnect the cable.
2. Remove the solder from the four leads, and loosen the screw.
3. Remove the CD core unit(S10).

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

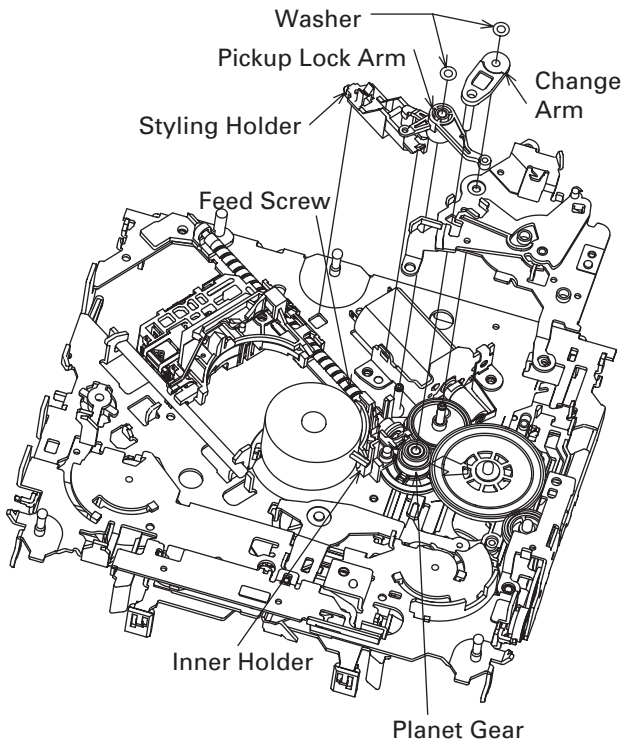
1. Remove the guide arm Assy and set the mechanism to the eject mode.
2. Remove the CD core unit(S10). (You do not have to remove the solder from the four leads.)
3. Remove the spring and E-shaped ring from the fulcrum shaft.
4. Slide the roller arm Assy in the direction marked with an arrow.



● Removing the Pickup Unit

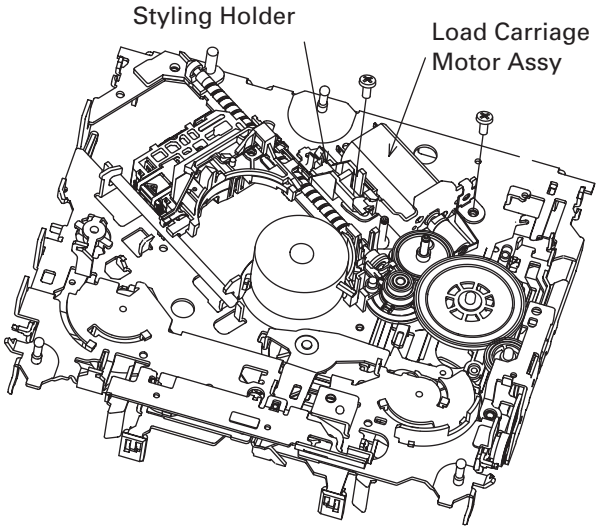
1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the two washers, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

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

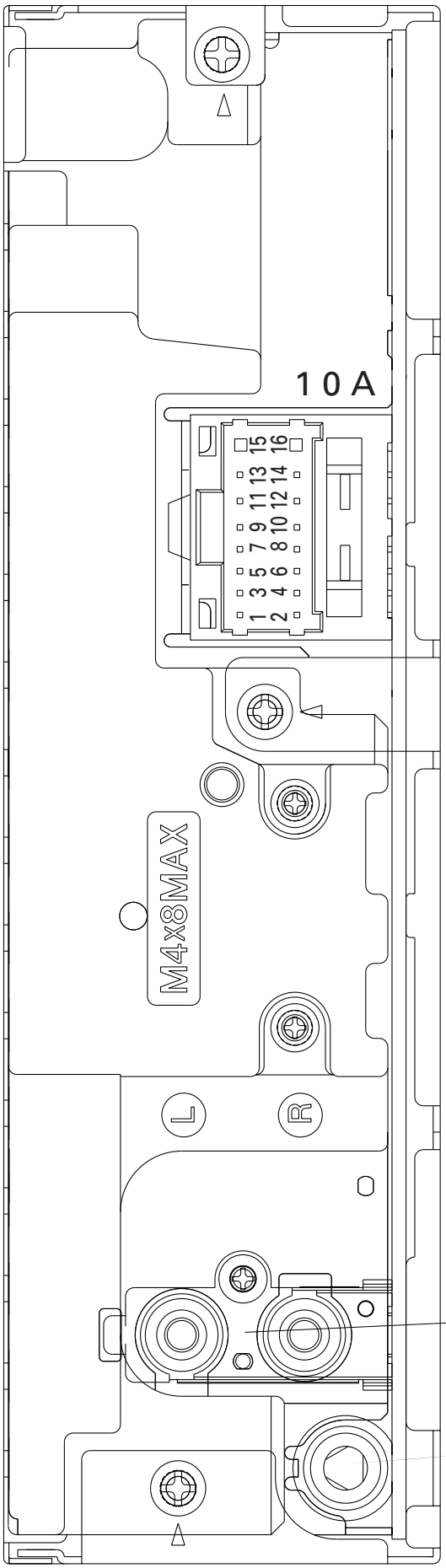


● Removing the Load Carriage Motor Assy

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



7.1.2 CONNECTOR FUNCTION DESCRIPTION



Pin No.		Pin No.	
1	FR+	9	-
2	RR+	10	-
3	FR-	11	B.REMOTE
4	RR-	12	-
5	FL+	13	-
6	RL+	14	ACC
7	FL-	15	GND
8	RL-	16	B.UP

7.2 PARTS

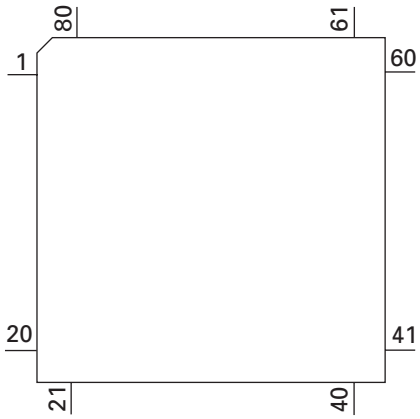
7.2.1 IC

● **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	$\overline{\text{ADPW}}$	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	$\overline{\text{SWVDD}}$	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	$\overline{\text{RESET}}$	I	Reset input
61	LDET	I	PLL lock sense input

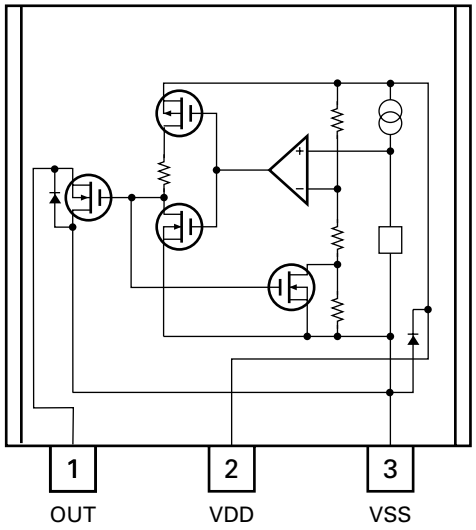
Pin No.	Pin Name	I/O	Function and Operation
62	RCK	I	RDS demodulation clock input
63	$\overline{\text{ASENS}}$	I	ACC sense input
64	$\overline{\text{BSENS}}$	I	Back up sense input
65	DSENS	I	Grille detach sense input
66	INTRQ	I	ATAPI HOST interrupt request input
67	VSS0		GND
68	VDD1		Power supply
69	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	VDSENS	I	VD power supply voltage sense input
79	DISCSENS	I	CD DISC sense input
80	STRKEY1		Key data (Remote control)

*PE5330A,PE5331A



IC's marked by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

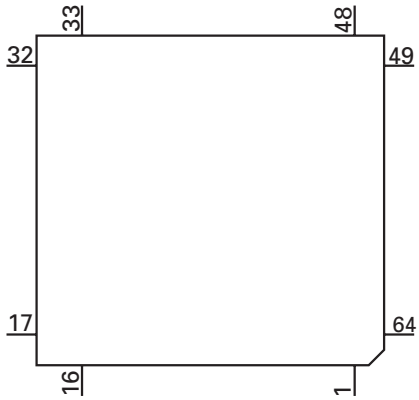
*S-80834CNY



● 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

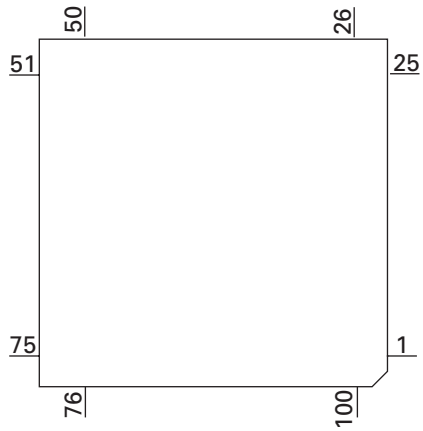


● Pin Functions(UPD63712GC)

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	$\overline{RST}$	I	Input of reset
9	A0	I	Command/Parameter discrimination signal input
10	$\overline{STB}$	I	Data strobe signal input
11	$\overline{SCK}$	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	$\overline{XTAL}$	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	$\overline{XTALEN}$	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

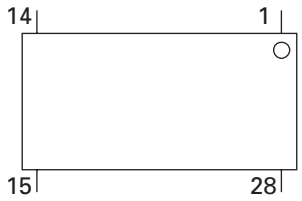
* UPD63712GC



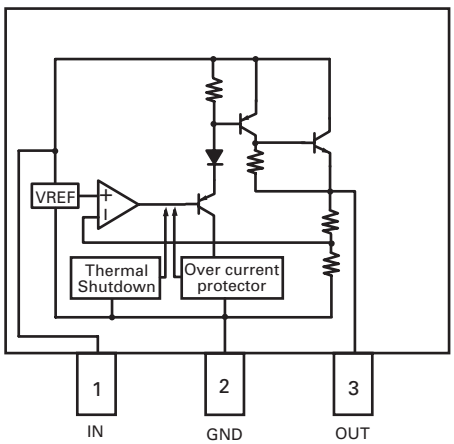
● Pin Functions(BA5996FP)

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

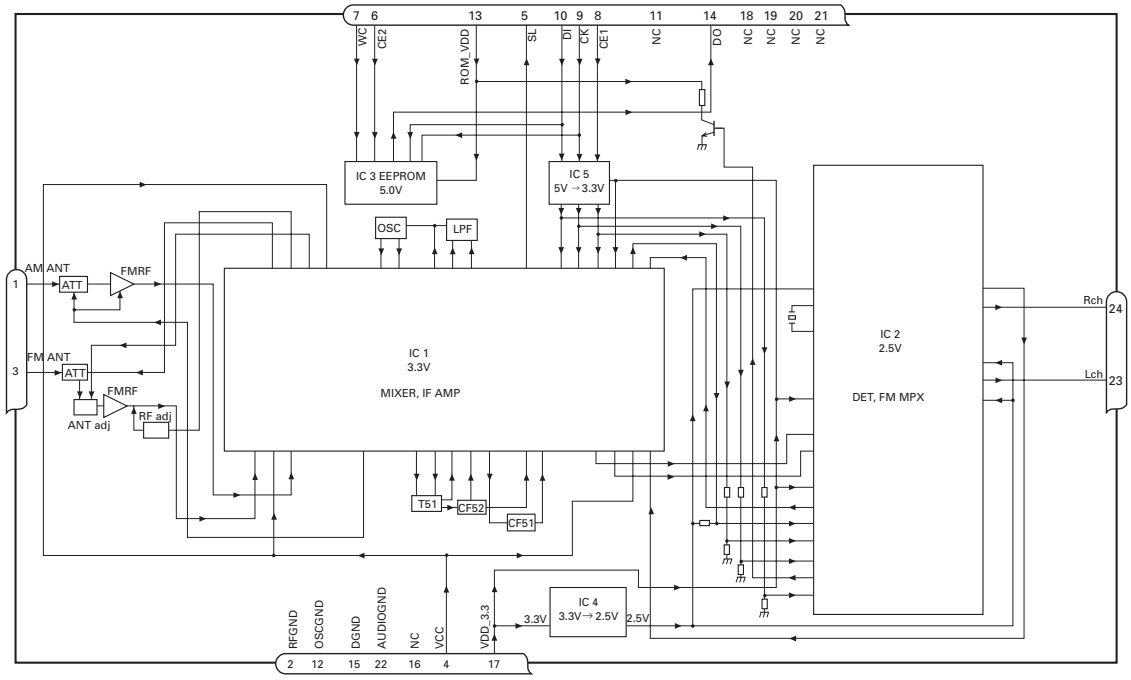
BA5996FP



NJM2391DL1-33



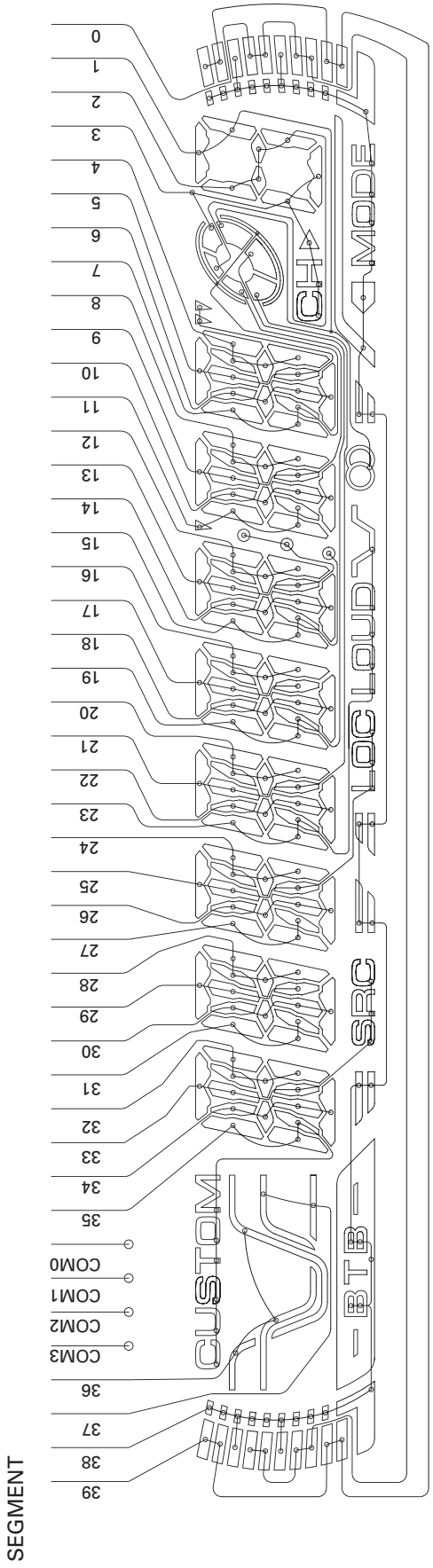
● FM/AM Tuner Unit

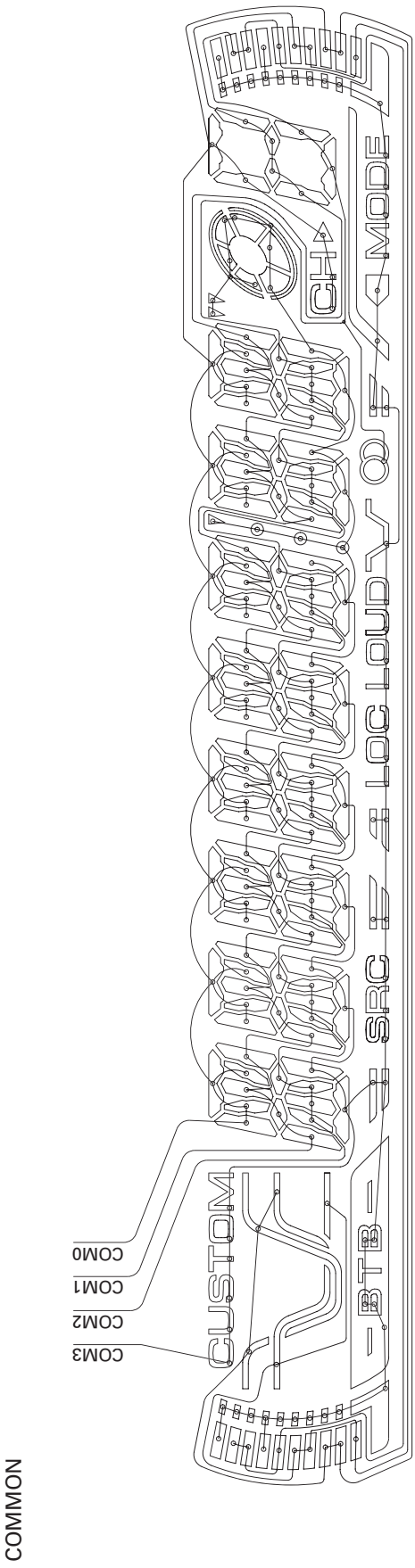


No.	Symbol	I/O	Explain	
1	AMANT	I	AM antenna input	AM antenna input high impedance AMANT pin is connected with an all antenna by way of 4.7μH. (LAU type inductor) A series circuit including an inductor and a resistor is connected with RF ground for the countermeasure against the ham of power transmission 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

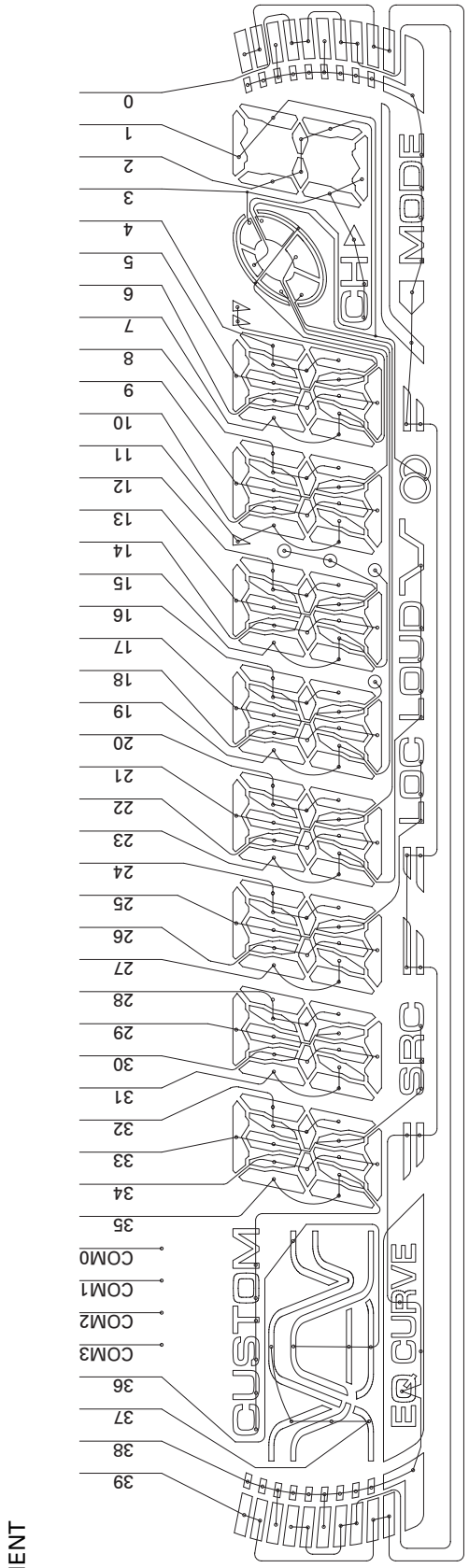
7.2.2 DISPLAY

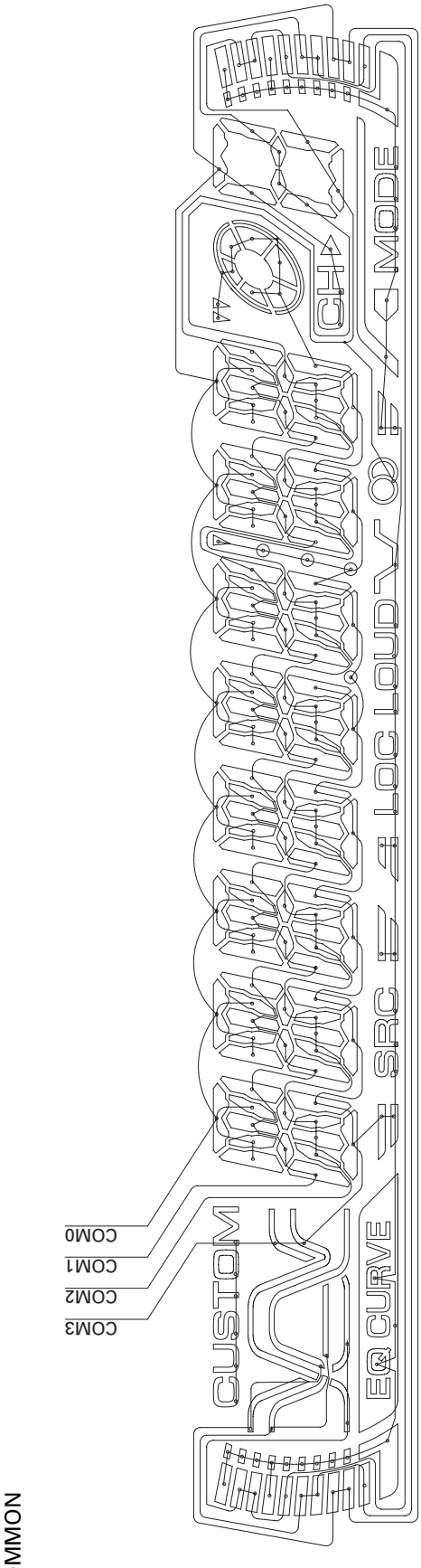
● **LCD(CAW1756)(DEH-5/XU/UC)**



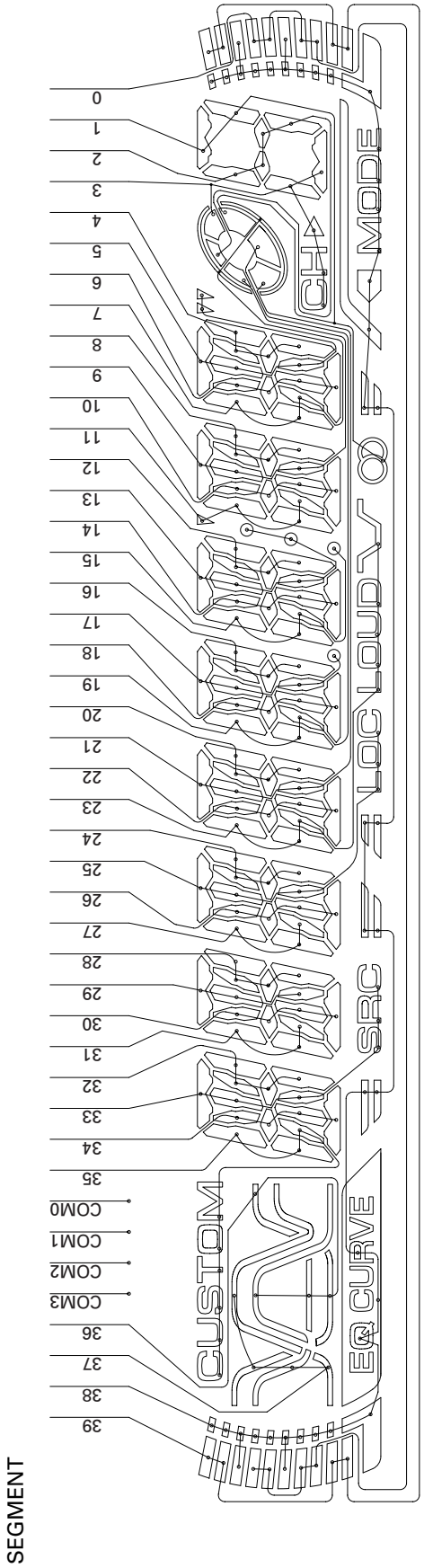


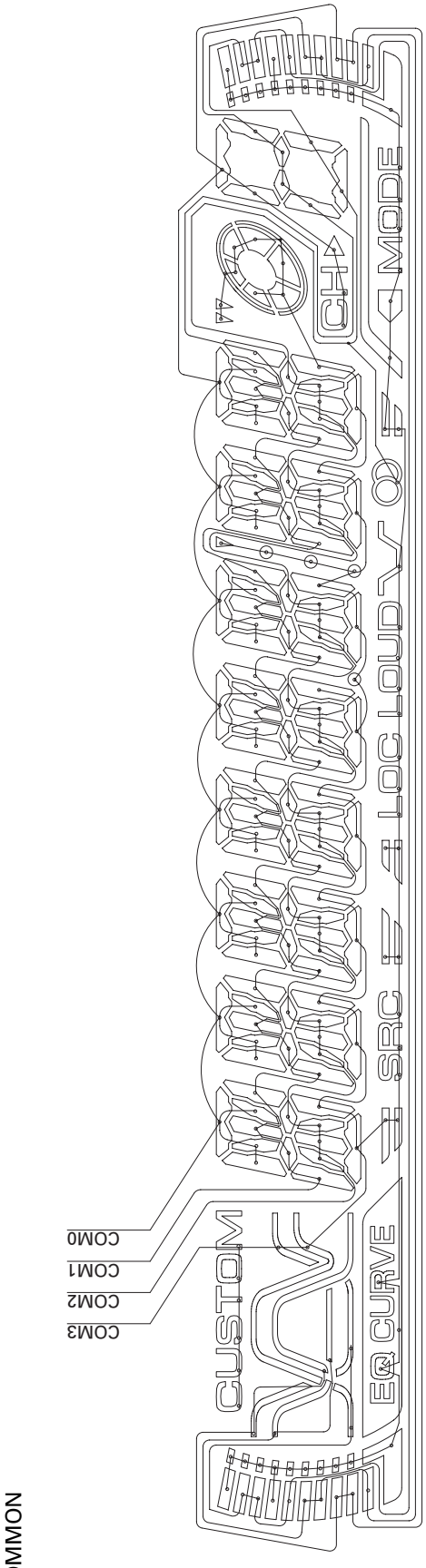
● LCD(CAW1765)(DEH-15/XU/UC)



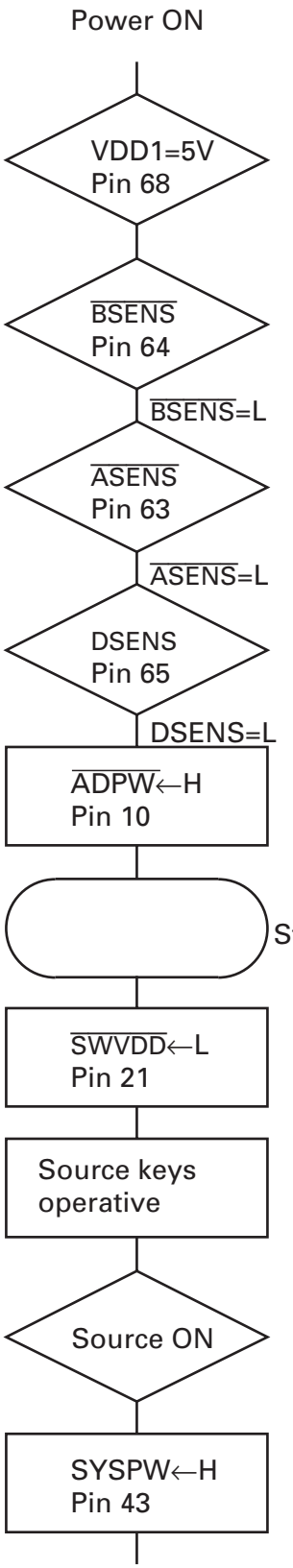


● LCD(CAW1733)(DEH-1500/XU/UC)

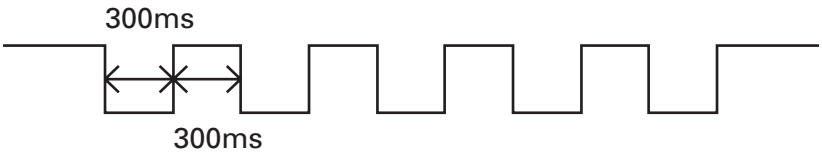




7.3 OPERATIONAL FLOW CHART



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.

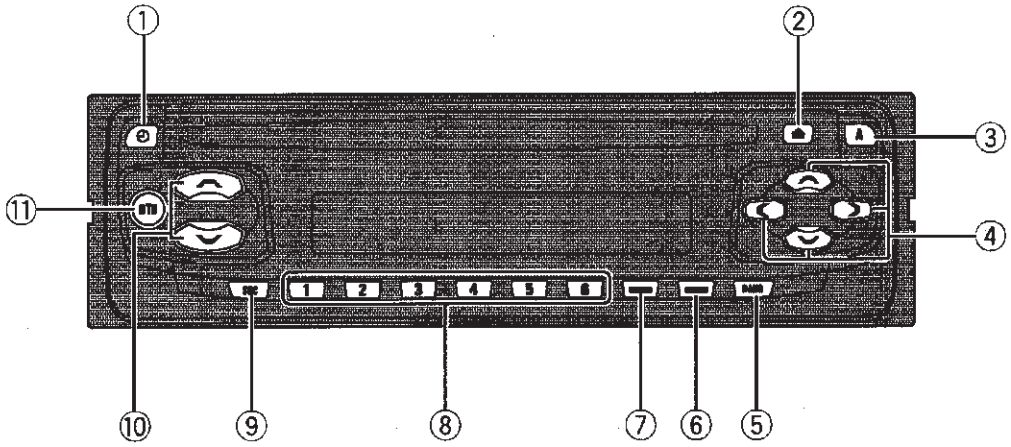
Completes power-on operation.(After that, proceed to each source operation.)

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

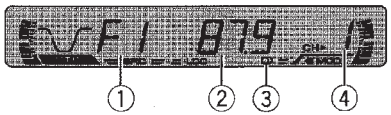
- When no disc has been set in the unit, the source will not switch to the built-in CD player.
- When this unit's blue/white lead is connected to the car's auto-antenna relay control terminal, the car's antenna extends when this unit's source is turned on. To retract the antenna, turn the source off.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

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 (◌) 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 (◌) 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**. ▣

66

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

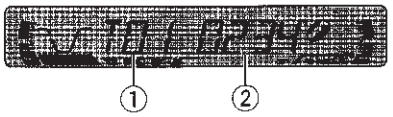
BSM (best stations memory) lets you automatically store the six strongest broadcast frequencies under preset tuning buttons **1–6** and once stored there you can tune in to those frequencies with the touch of a button.

● **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**. ▣

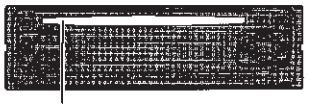
Playing a CD



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

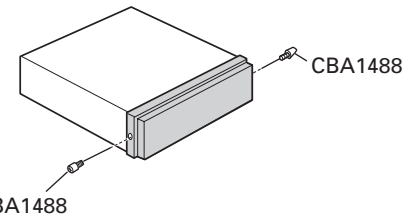
Pause lets you temporarily stop playback of the CD.

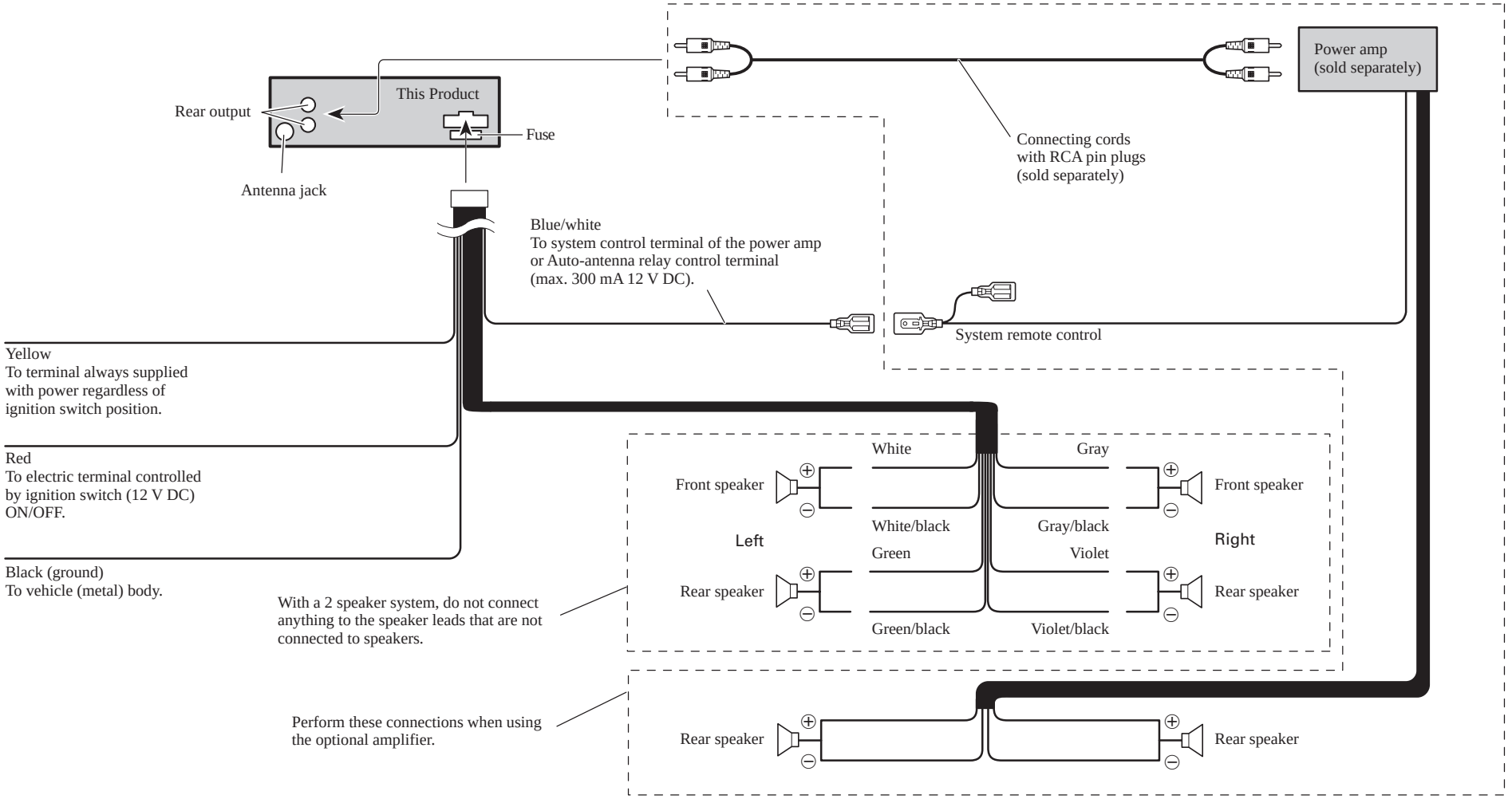
1 Press 6 to turn pause on.
PAUSE appears in the display. Play of the current track pauses.

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.




Power amp
(sold separately)
This Product
Rear output
Fuse
Antenna jack
Connecting cords
with RCA pin plugs
(sold separately)
Blue/white
To system control terminal of the power amp
or Auto-antenna relay control terminal
(max. 300 mA 12 V DC).
System remote control
Yellow
To terminal always supplied
with power regardless of
ignition switch position.
Red
To electric terminal controlled
by ignition switch (12 V DC)
ON/OFF.
Black (ground)
To vehicle (metal) body.
White
Gray
Front speaker
Front speaker
White/black
Gray/black
Left
Right
Green
Violet
Rear speaker
Rear speaker
Green/black
Violet/black
With a 2 speaker system, do not connect
anything to the speaker leads that are not
connected to speakers.
Perform these connections when using
the optional amplifier.
Rear speaker
Rear speaker

Pioneer sound.vision.soul

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	

CONTENTS

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE NV Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZA. NOV. 2002 Printed in Japan

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.

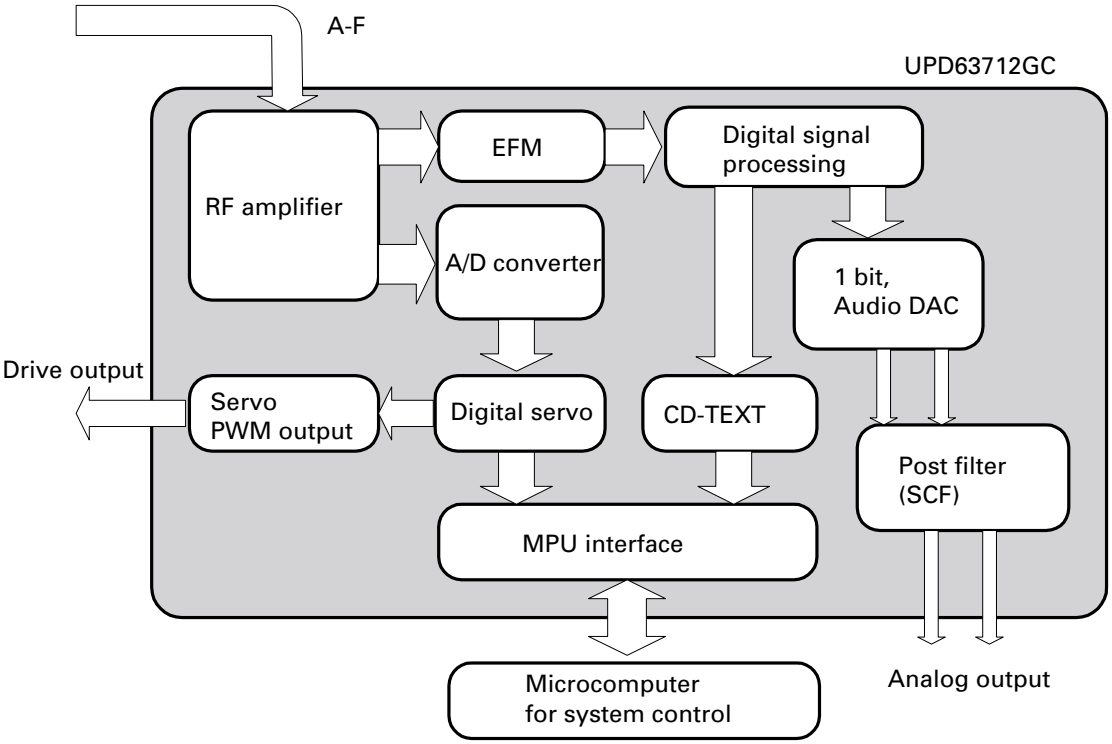


Fig.1.0.1 Block diagram of CD LSI UPD63712GC

1.1 PREAMPLIFIER BLOCK (UPD63712GC: IC201)

In the preamplifier block, the pickup output signals are processed to generate signals that are used for the next-stage blocks: the servo block, demodulator, and control.

After I/V-converted by the preamplifier with built-in photo detectors (inside the pickup), the signals are applied to the preamplifier block in the CD LSI UPD63712GC (IC201). After added by the RF amplifier in this block, these signals are used to produce necessary signals such as RF, FE, TE, and TE zero-cross signals.

The CD LSI employs a single power supply system of + 3.3V. Therefore, the REFO (1.65V) is used as the reference voltage both for this CD LSI and the pickup. The LSI produces the REFO signal by using the REFOUT via the buffer amplifier and outputs from the pin 90. All the measurements should be made based on this REFO.

Caution: Be careful not to short the REFO and GRD when measuring.

1.1.1 APC (Automatic Power Control)

A laser diode has extremely negative temperature characteristics in optical output at constant-current drive. To keep the output constant, the LD current is controlled by monitor diodes. This is called the APC circuit. The LD current is calculated at about 30mA, which is the voltage between LD1 and V+3A divided by 7.5 (ohms).

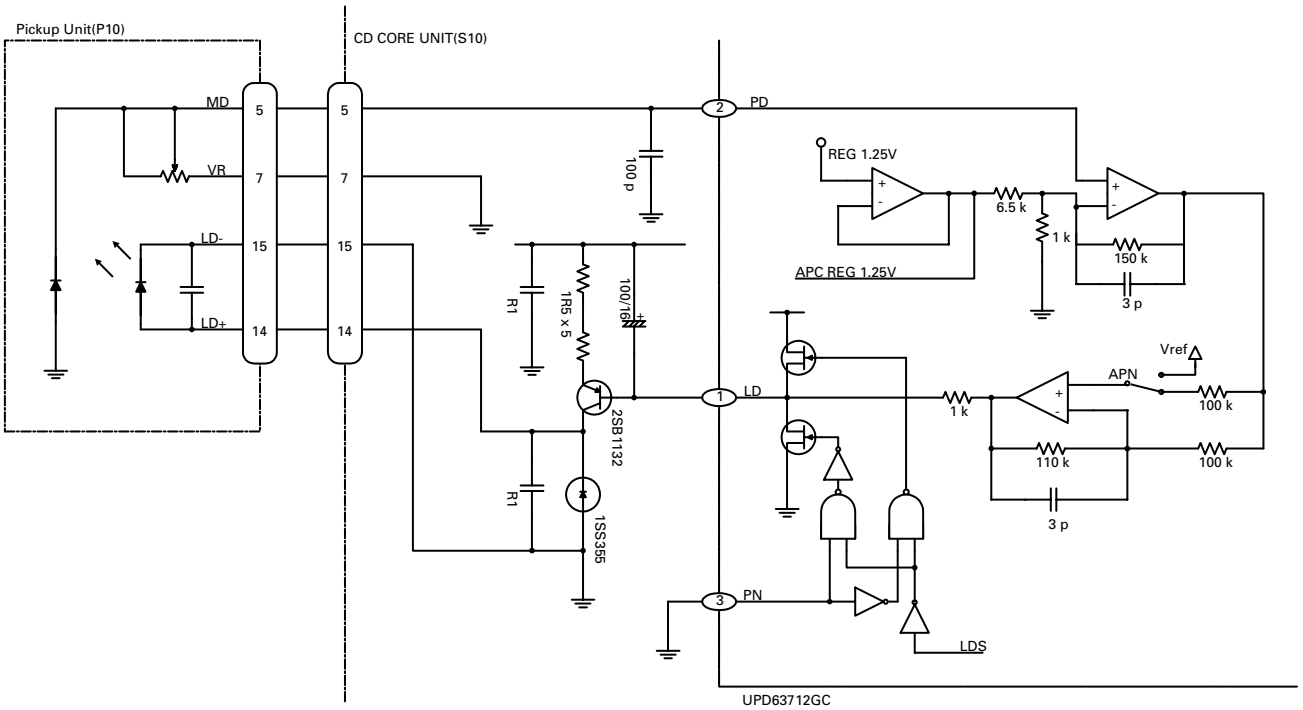


Fig. 1.1.1 APC

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) x 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 feed-back gain for the RFAGC amplifier.

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

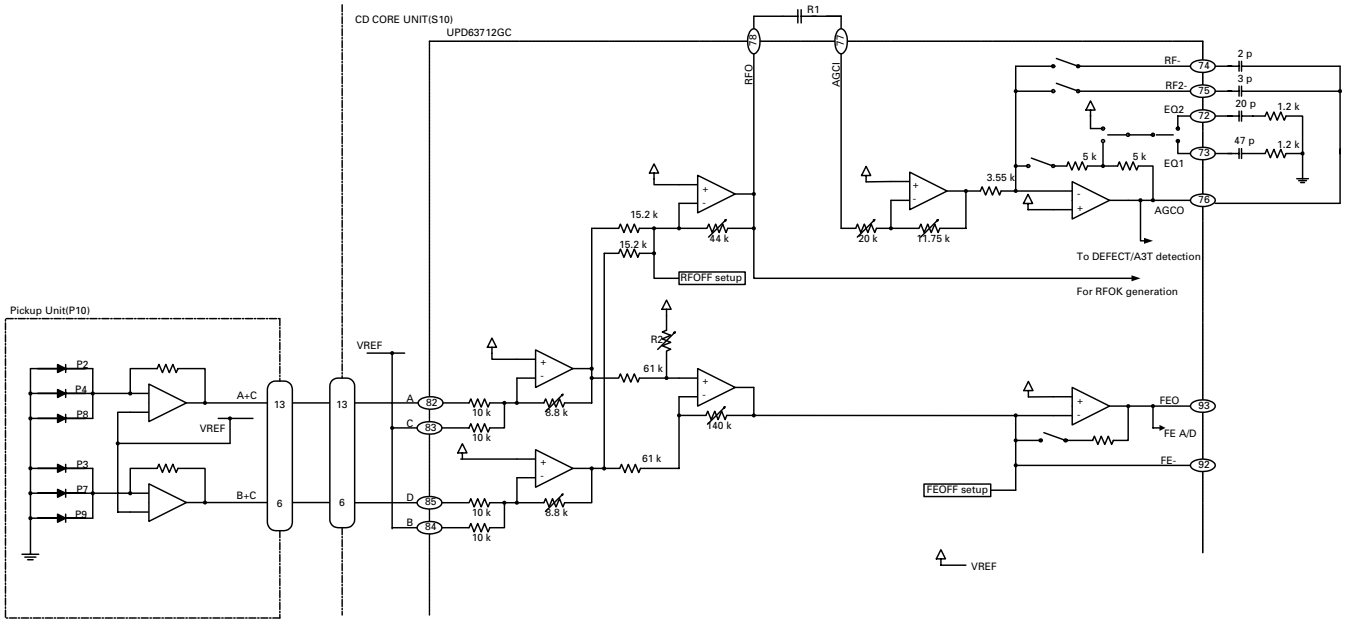


Fig. 1.1.2 RF/AGC/FE

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:
FE = (A + C - B - D) x 8.8k/10k x 111k/61k x 160k/72k
= (A + C - B - D) x 3.55
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 filer 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:
TEO = (E - F) x 63k/112k x 160k/160k x 181k/45.4k x 160k/80k
= (E - F) x 4.48
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.

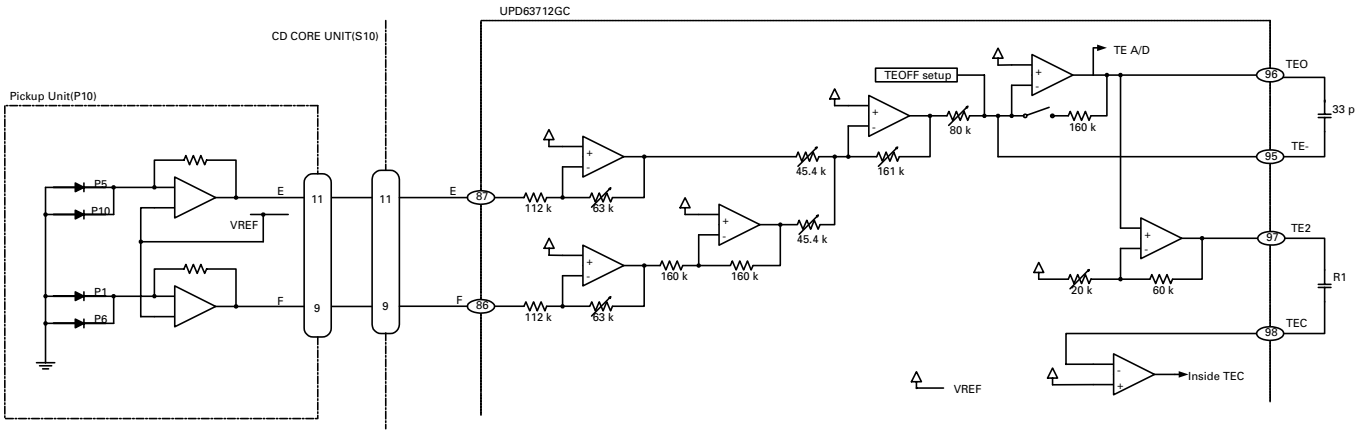


Fig. 1.1.3 TE

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.

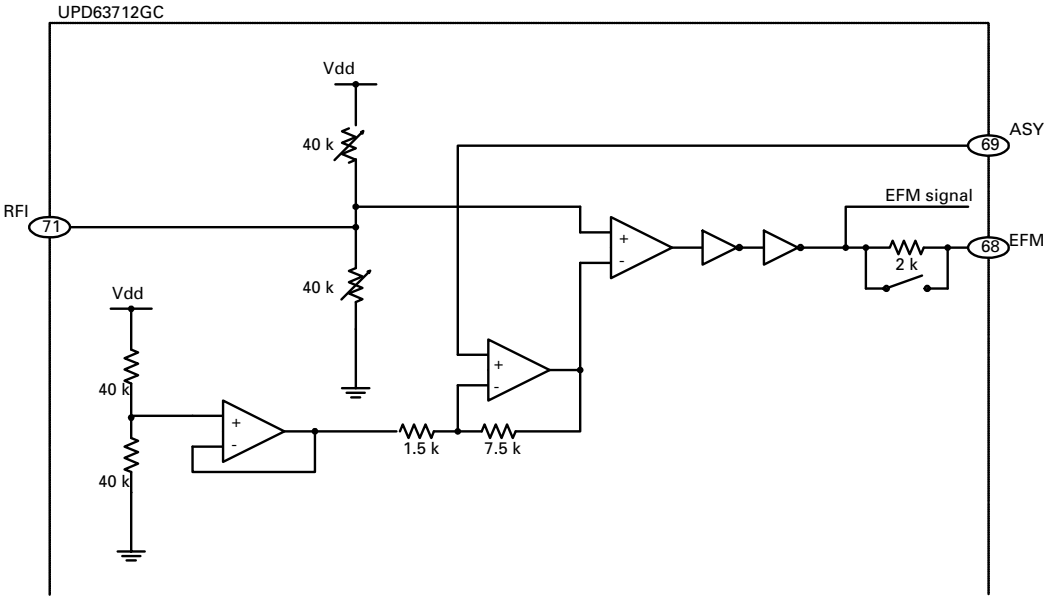


Fig. 1.1.4 EFM

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.

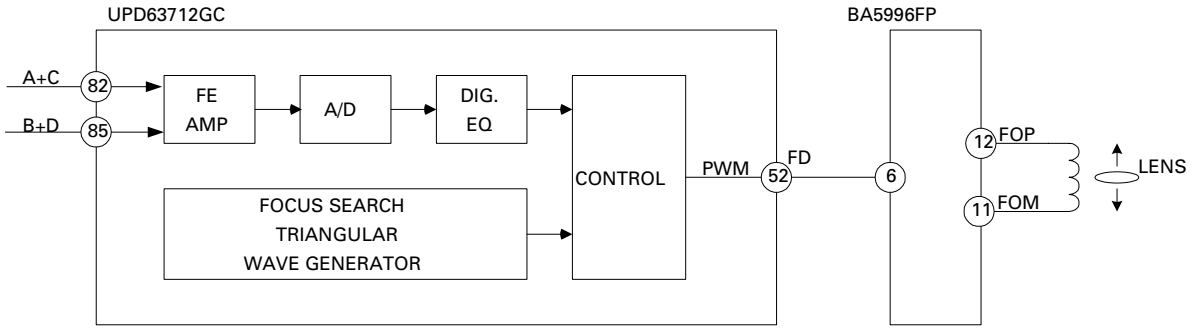


Fig. 1.2.1 Block diagram of the focus servo system

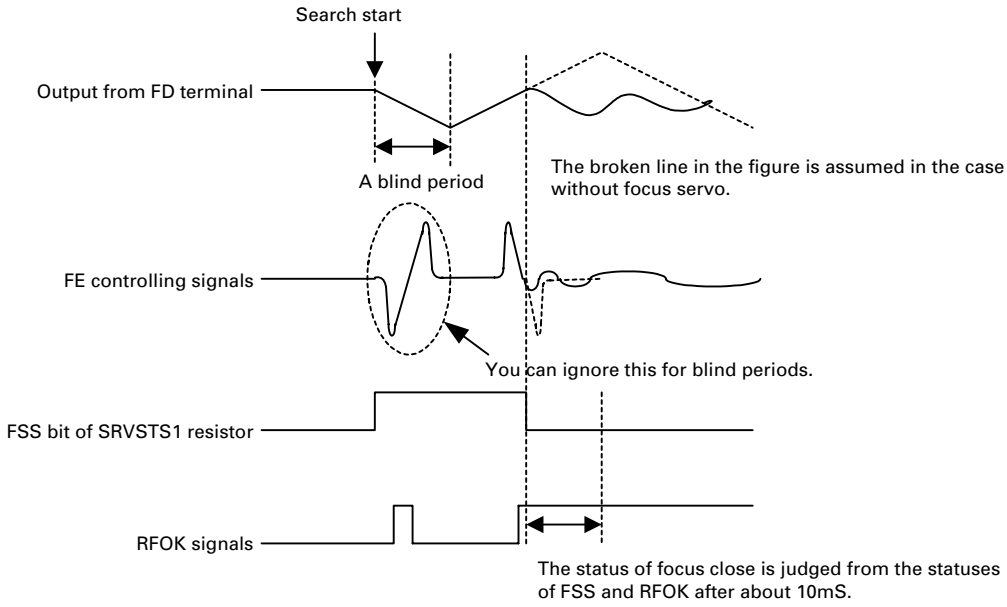


Fig. 1.2.2 Timing chart for focus close operations

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.

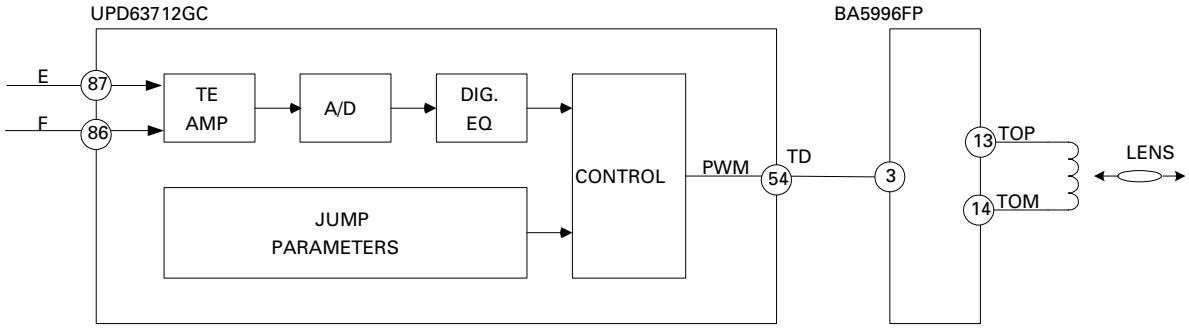


Fig. 1.2.3 Block diagram of the tracking servo system

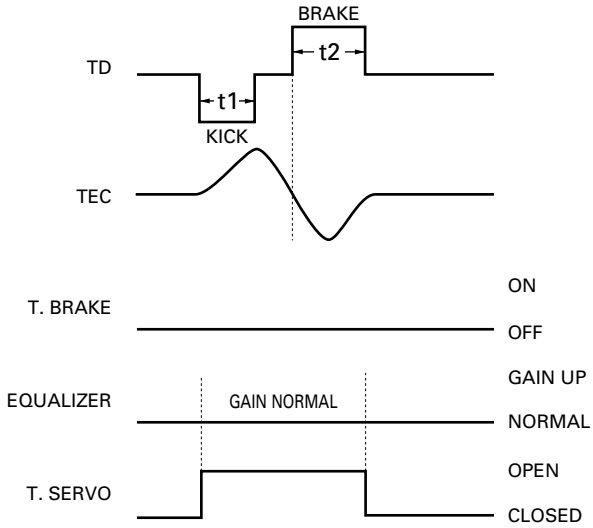


Fig. 1.2.4 Single-track jump

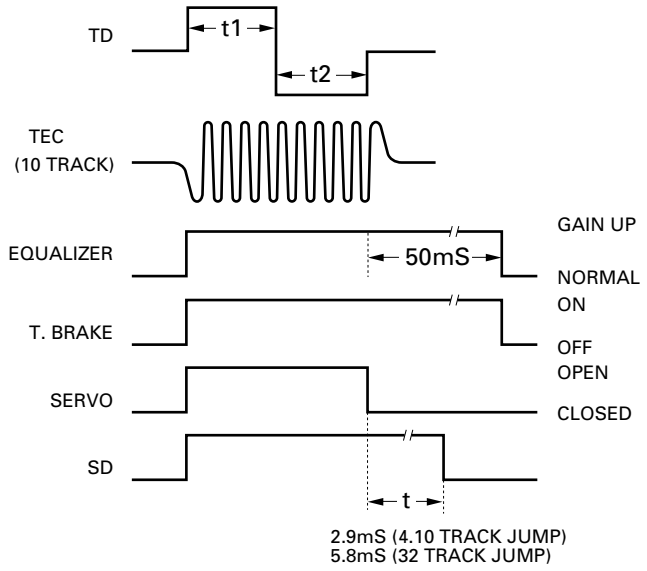
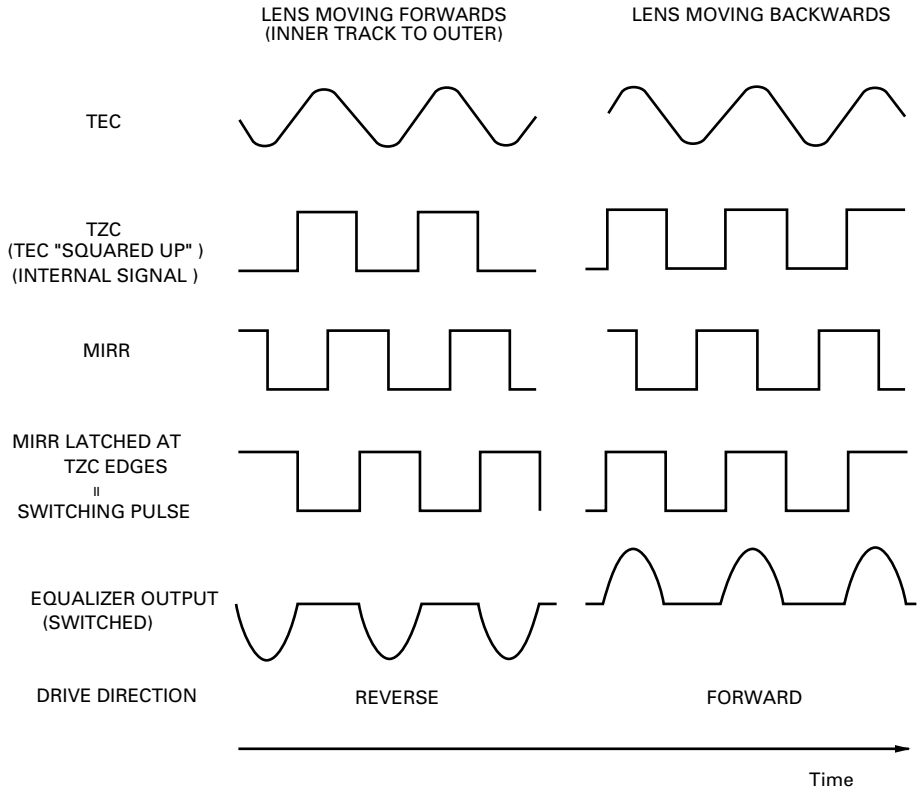


Fig. 1.2.5 Multi-track jump



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

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.

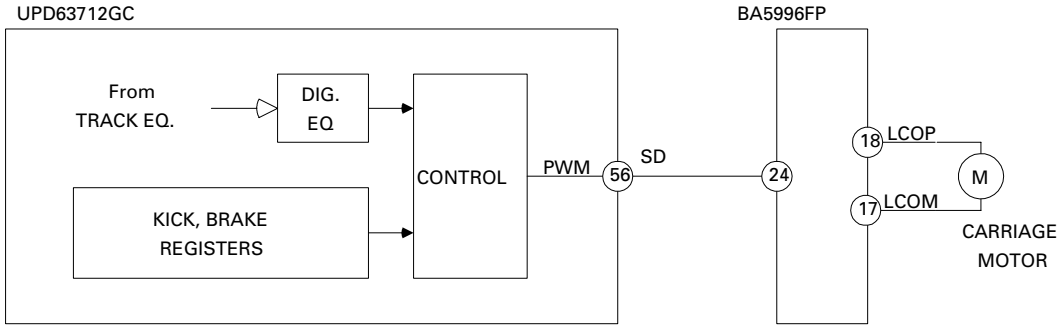


Fig. 1.2.7 Block diagram for the carriage servo block

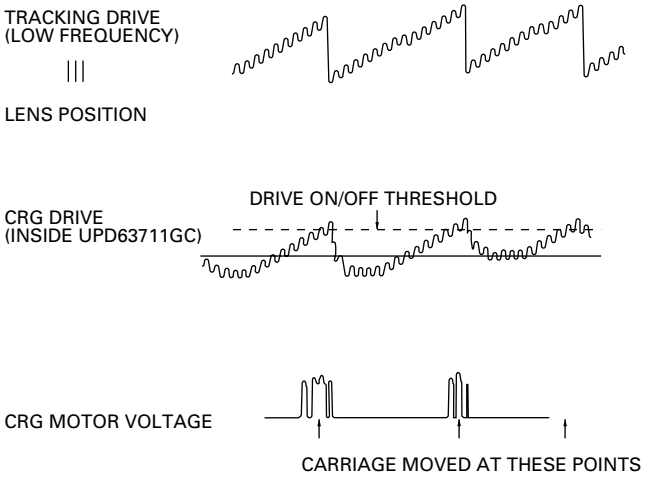


Fig. 1.2.8 Waveforms of the carriage signal

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.

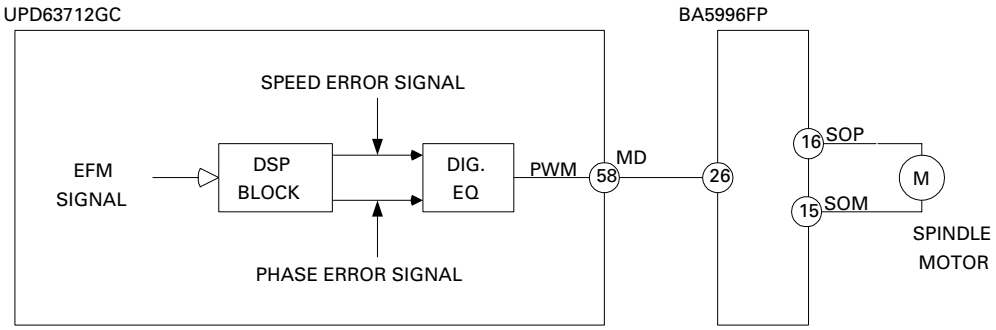


Fig.1.2.9 Block diagram of the spindle servo system

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.

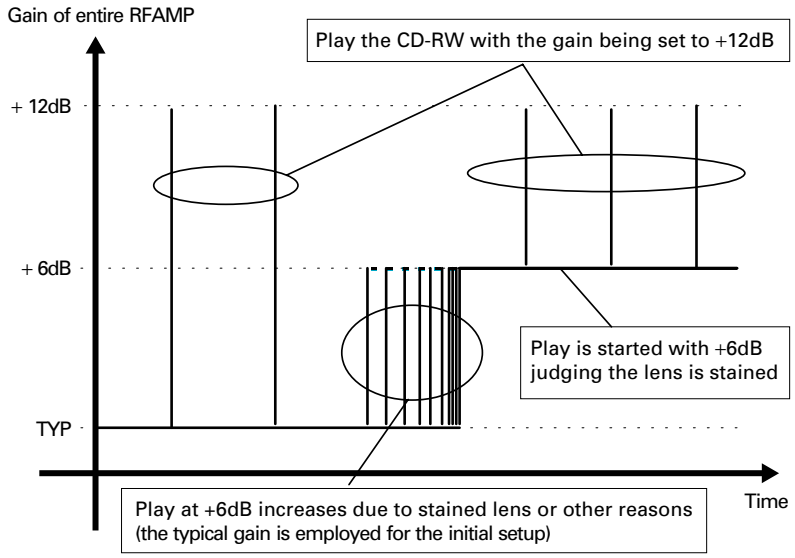


Fig.1.3.1 Pre-amp gain adjustment

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 x 32mV = 96mV

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 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.

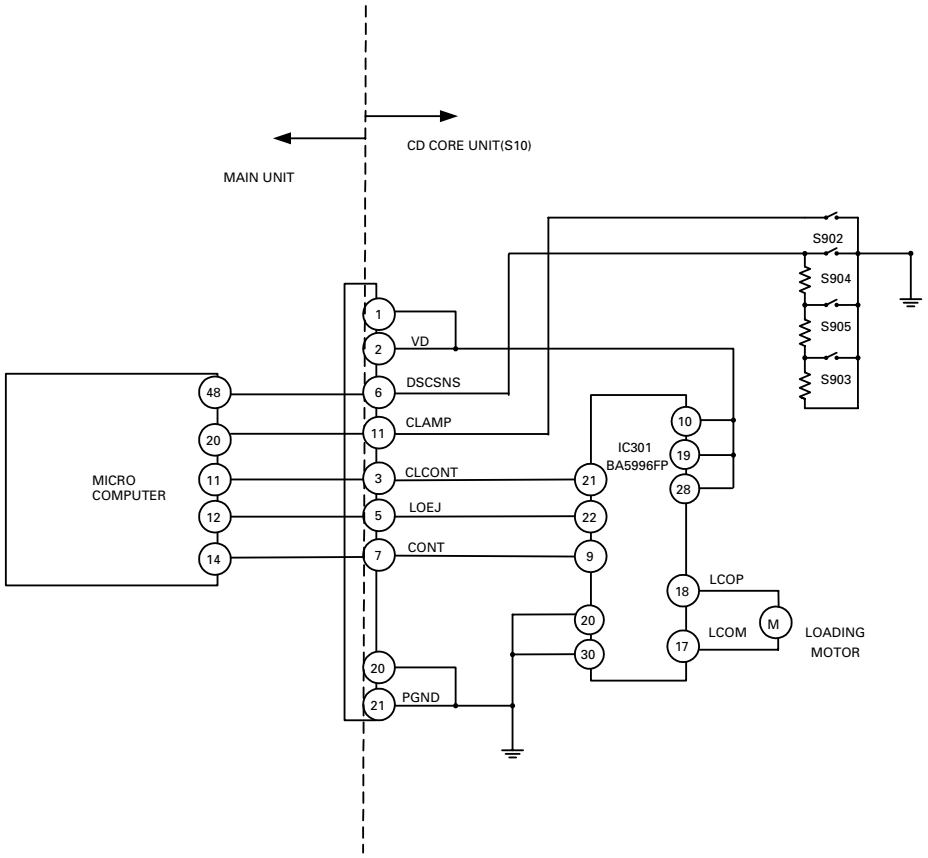


Fig. 1.4.1 Power supply/loading block (*: CXK5600)

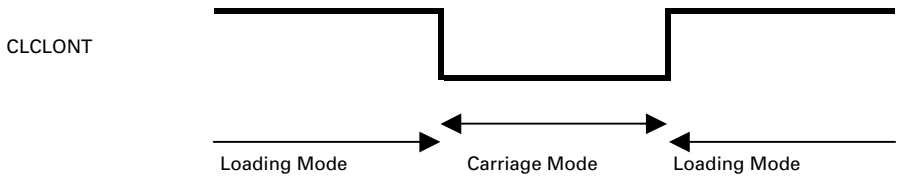


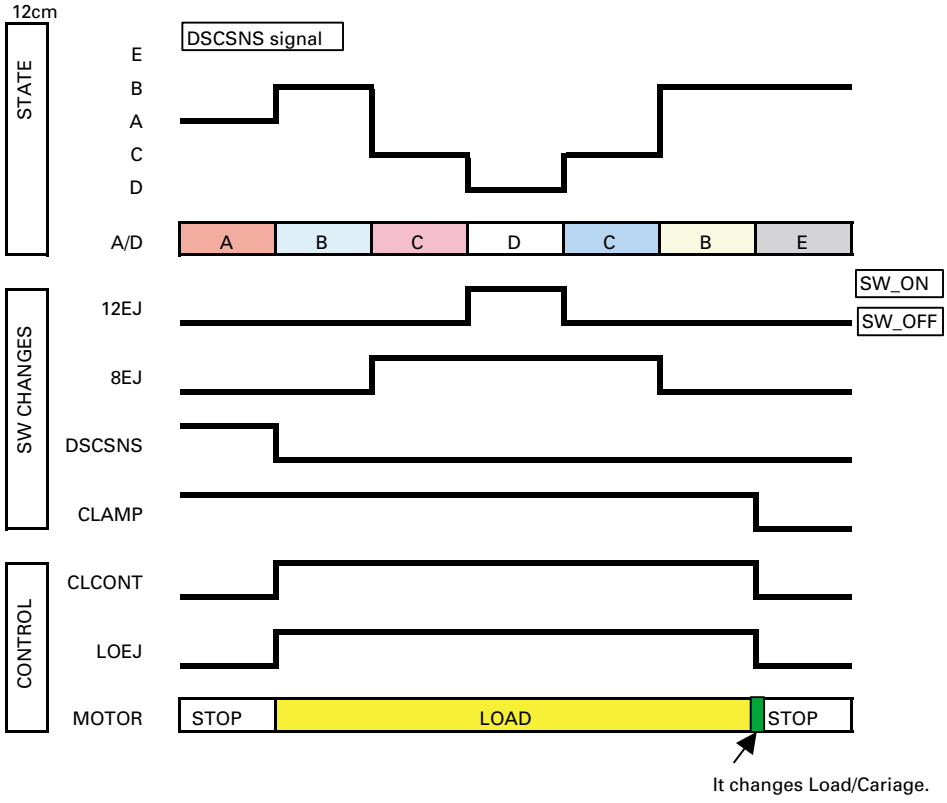
Fig. 1.4.2 Loading/carriage mode shift

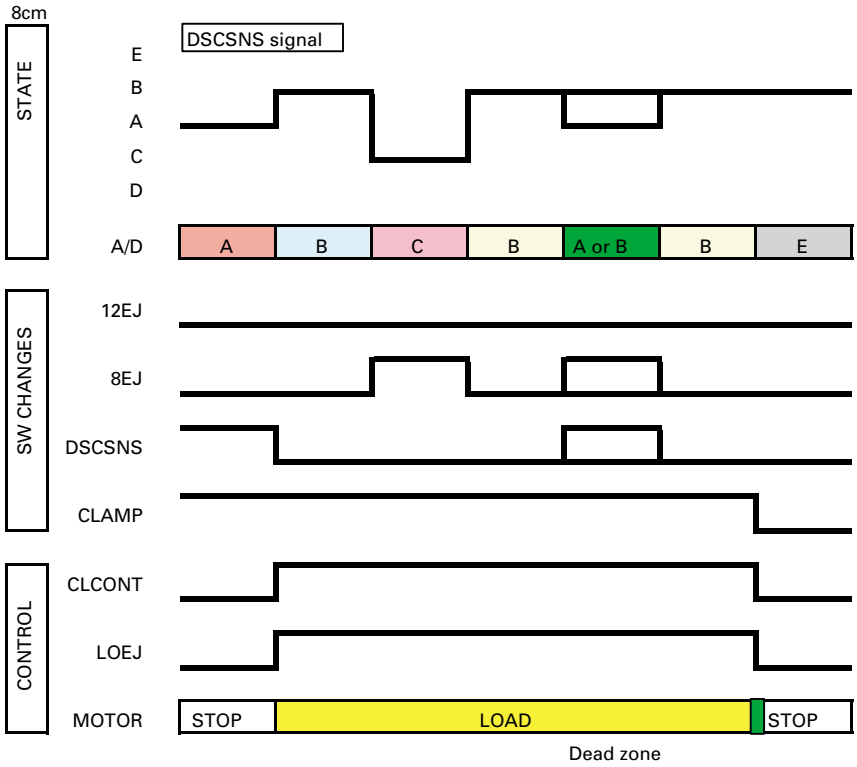
The load and eject operations are controlled by observing the status of the clamp switch on the mechanism unit and the three switches on the control unit. The DSCSNS voltage varies depending on the ON/OFF status of the switches. The main unit's microcomputer senses the status (A to E) by observing the 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

• LOADING


12cm
STATE
DSCSNS signal
E
B
A
C
D
A/D
A
B
C
D
C
B
E
SW_ON
SW_OFF
SW CHANGES
12EJ
8EJ
DSCSNS
CLAMP
CONTROL
CLCONT
LOEJ
MOTOR
STOP
LOAD
STOP
It changes Load/Cariage.


8cm
STATE
DSCSNS signal
E
B
A
C
D
A/D
A
B
C
B
A or B
B
E
SW CHANGES
12EJ
8EJ
DSCSNS
CLAMP
CONTROL
CLCONT
LOEJ
MOTOR
STOP
LOAD
STOP
Dead zone

• EJECT

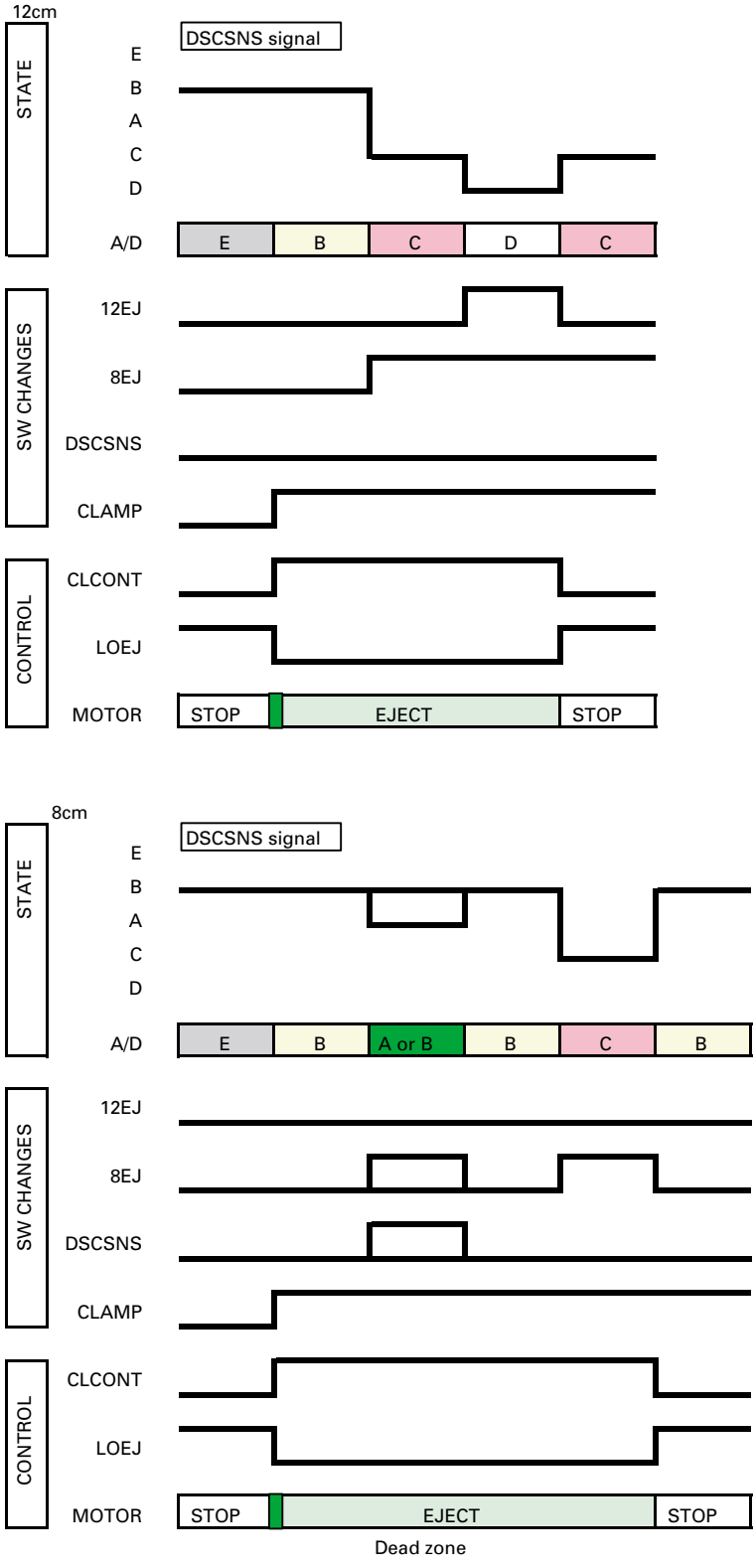
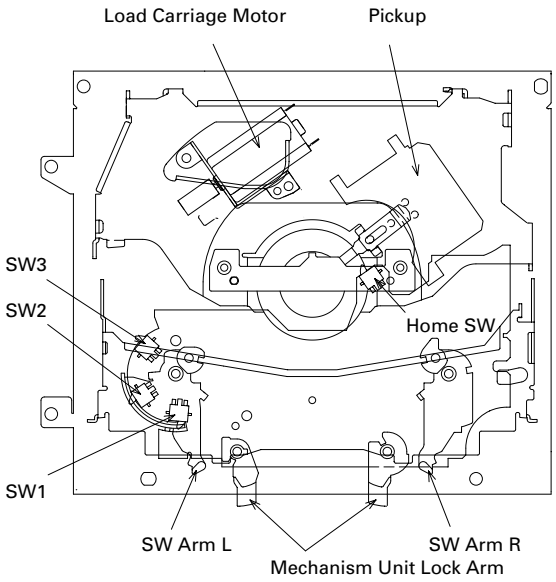


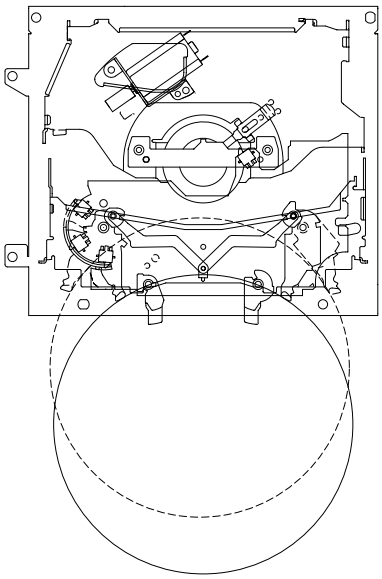
Fig.1.4.4 Status change in LOAD and EJECT modes

2. MECHANISM DESCRIPTIONS

● Loading actions

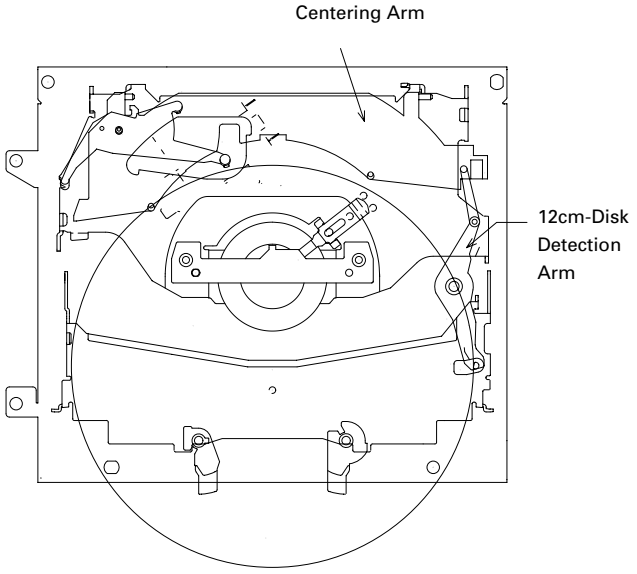
1. When a disk is inserted, SW Arm L and R rotate. Due to the rotation of Arm L, SW1 is switched from ON to OFF and the Load Carriage Motor starts.
2. If the disk is 12cm-disk, when it is carried to the position shown with the dotted line in the drawing, SW 3 switches to ON due to such rotation of Arm. 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.)

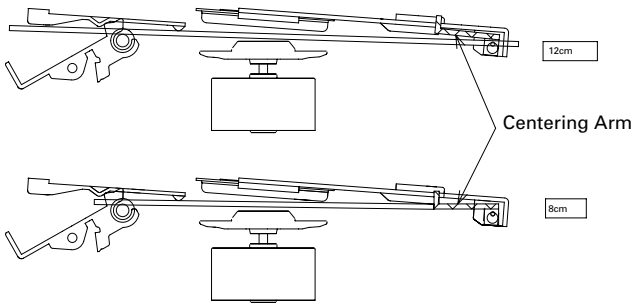




● Disk centering mechanism

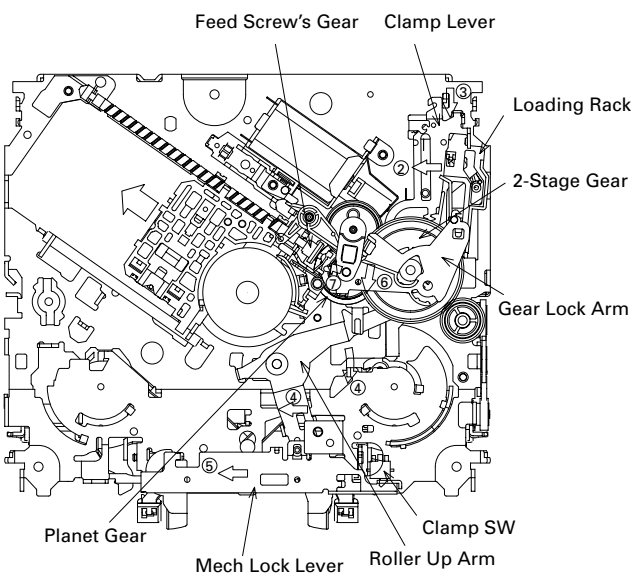
1. In case of 12cm-disk, the 12cm-Disk Detection Arm rotates, and with such rotation, it raises the Centering Arms to retreat the arms from disk's trace. The disk passes through under the arms, and at the inner part, it is centered.
2. In case of 8cm-disk, it is just centered at the position where its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

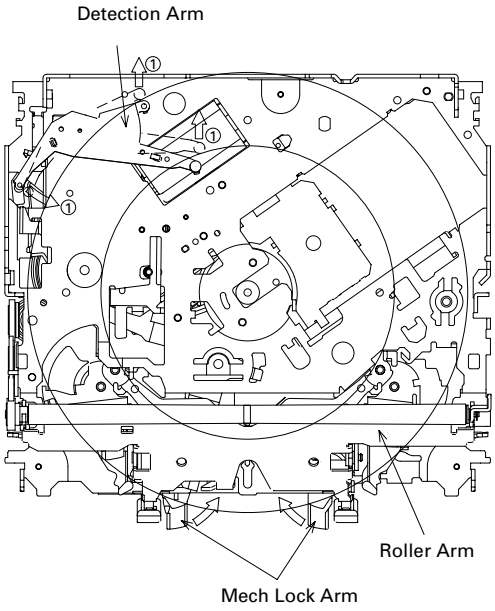




● Clamp actions

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.





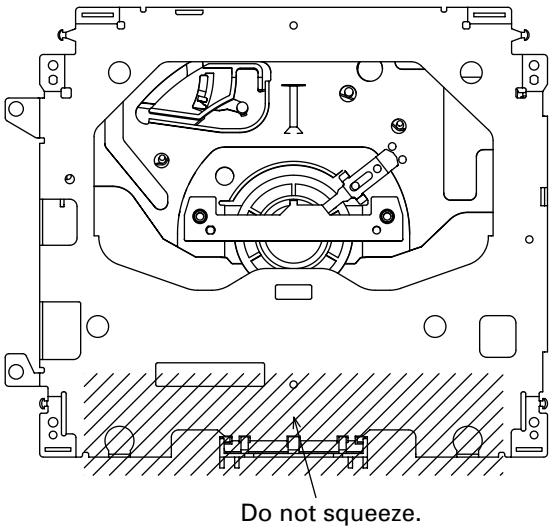
● Eject actions

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

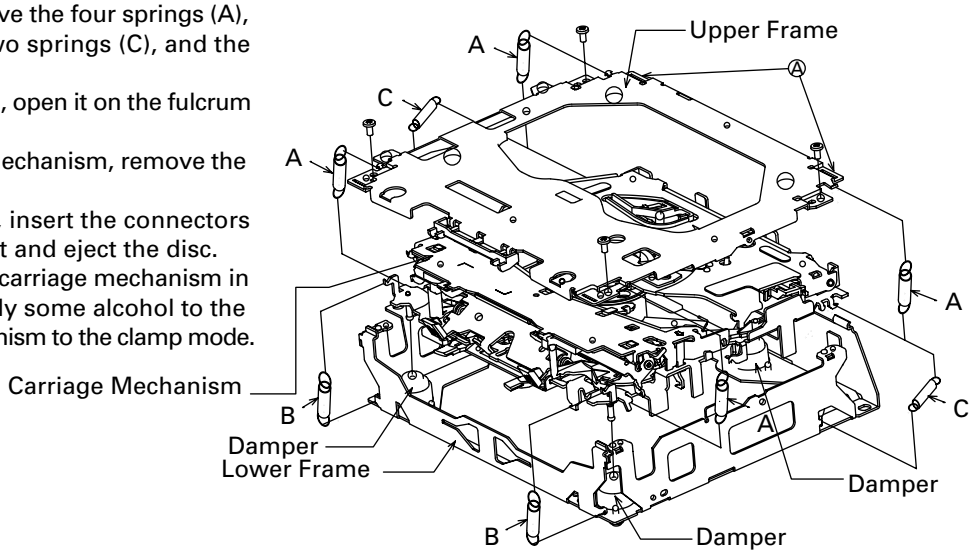
1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



● Removing the Upper and Lower Frames

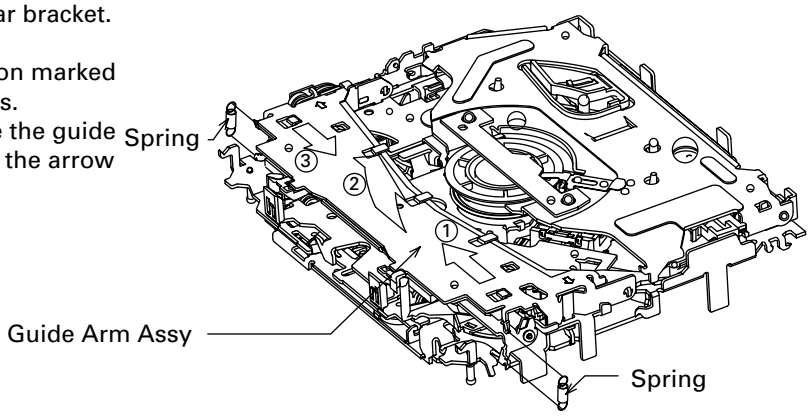
1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
2. To remove the upper frame, open it on the fulcrum A.
3. While lifting the carriage mechanism, remove the three dampers.
4. With the frames removed, insert the connectors coming from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

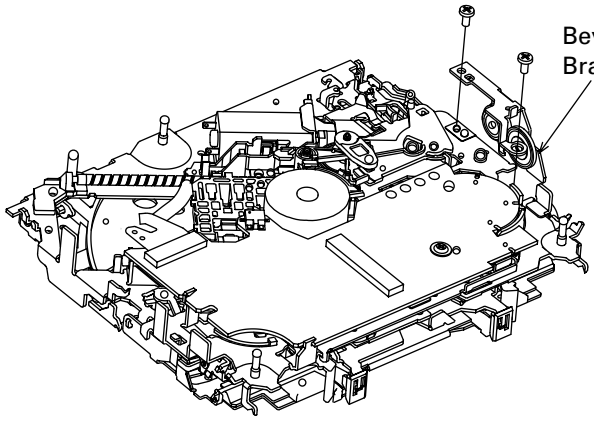
Caution: Before installing the carriage mechanism in the frames, be sure to apply some alcohol to the dampers and set the mechanism to the clamp mode.



● 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.

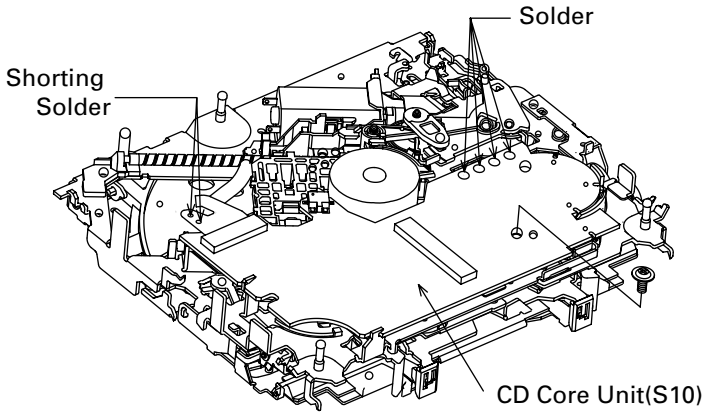




● Removing the CD Core Unit(S10)

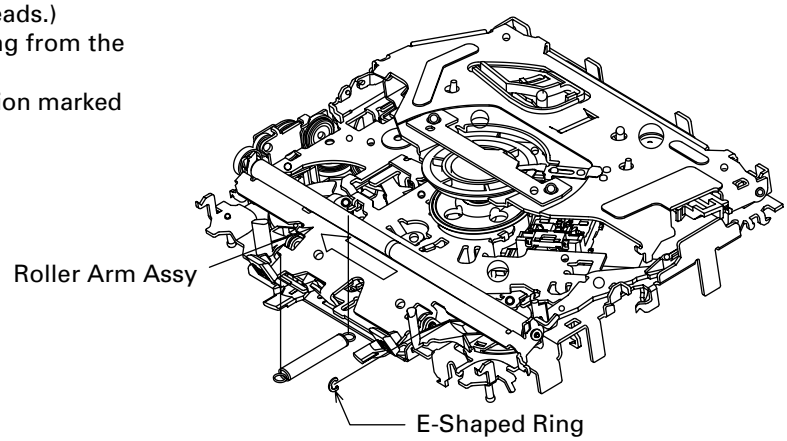
1. Apply shorting solder to the Pickup flexible cable. Disconnect the cable.
2. Remove the solder from the four leads, and loosen the screw.
3. Remove the CD core unit(S10).

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

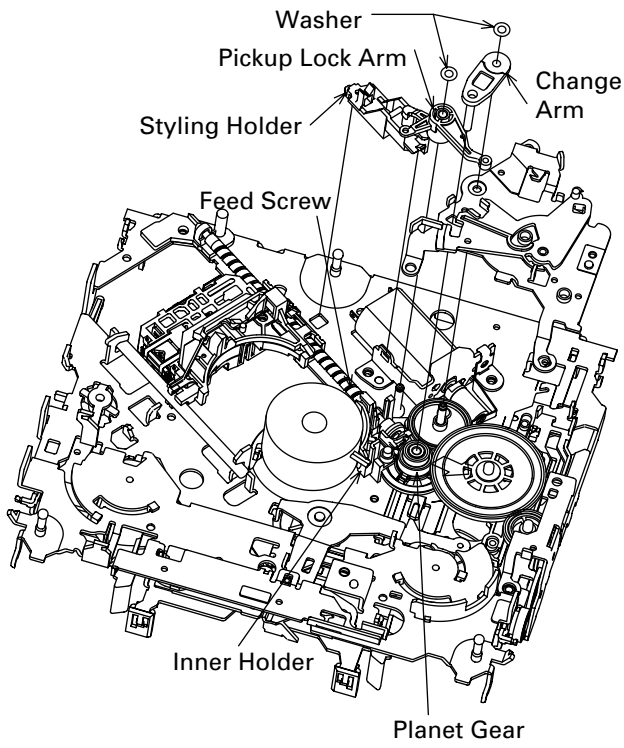
1. Remove the guide arm assy and set the mechanism to the eject mode.
2. Remove the CD core unit(S10). (You do not have to remove the solder from the four leads.)
3. Remove the spring and E-shaped ring from the fulcrum shaft.
4. Slide the roller arm assy in the direction marked with an arrow.



● Removing the Pickup Unit

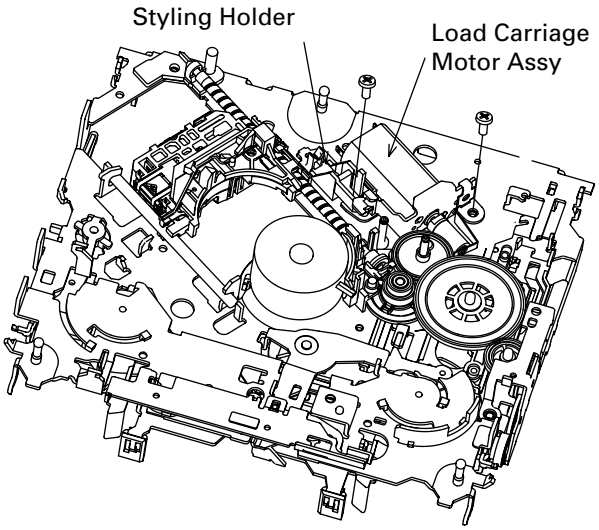
1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the two washers, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

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



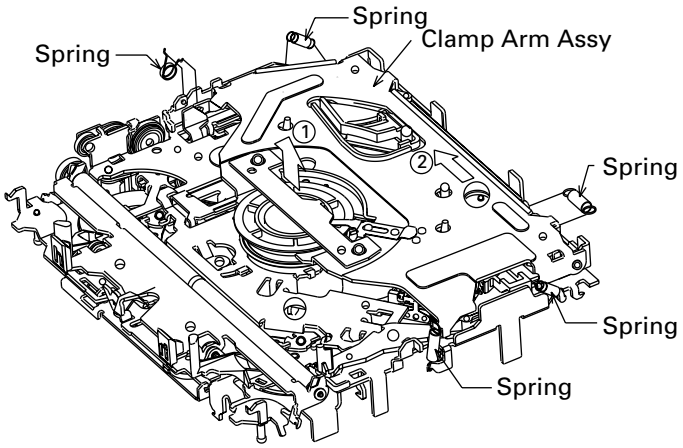
● Removing the Load Carriage Motor Assy

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.