

Service Manual

Pioneer

BMW

ORDER NO.
CRT2274

MULTI-COMPACT DISC PLAYER

CDX-M2086ZBM2

X1HW

CDX-M2086ZBM3

X1HW



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

Model	Order No.	Mech. Module	Remarks
CX-652	CRT1857	C5	CD Mech. Module:Circuit Description, Mech.Description, Disassembly
CDX-M2086ZBM/X1HWL	CRT2223		

VEHICLE	DESTINATION	PRODUCED AFTER	PART No.	ID No.	PIONEER MODEL No.
BMW 7 series	WORLD	September 1999	82 11 1 470 459	—	CDX-M2086ZBM2/X1HW
BMW 7 series	WORLD	September 1999	82 11 1 470 460	—	CDX-M2086ZBM3/X1HW

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K-ZZB. JUNE 1999 Printed in Japan

EXPLODED VIEWS AND PARTS LIST

PACKING (Page 4)

● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.		
			CDX-M2086ZBM/X1HWL	CDX-M2086ZBM2/X1HW	CDX-M2086ZBM3/X1HW
	3	Carton	HHG3431	HHG0189	HHG0189
	4	Contain Box	HHL3431	HHL0189	HHL0189
	9	Magazine assy	CXB2843	CXB2843	Not used
		Installation Manual	Not used	HRB0038	HRB0038
		Screw(x4)	Not used	HBA0002	HBA0002

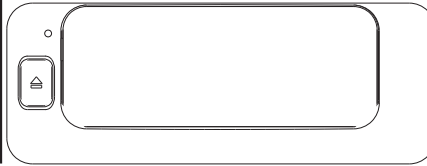
MAGAZINE ASSY (Page 10)

● MAGAZINE ASSY SECTION PARTS LIST

Mark	No.	Description	Part No.		
			CDX-M2086ZBM/X1HWL	CDX-M2086ZBM2/X1HW	CDX-M2086ZBM3/X1HW
	1	Magazine assy	CXB2843	CXB2843	Not used
	2	Tray(x6)	CNV5341	CNV5341	Not used

Service Manual

PIONEER®
The Art of Entertainment
BMW



ORDER NO.
CRT2223

MULTI-COMPACT DISC PLAYER

CDX-M2086ZBM X1HWL

COMPACT
disc
DIGITAL AUDIO

- See the separate manual CX-652(CRT1857) for the CD mechanism description, disassembly and circuit description.
- The CD mechanism employed in this model is one of C5 series.

VEHICLE	DESTINATION	PRODUCED AFTER	ID No.	BMW PART No.	PIONEER MODEL No.
BMW 7 series	WORLD	1998	—	65.12-8 375 537.0	CDX-M2086ZBM/X1HWL

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● CD Player Service Precautions

1. For pickup unit(Service)(CXX1235) handling, please refer to "Disassembly"(CX-652 Service Manual CRT1857).

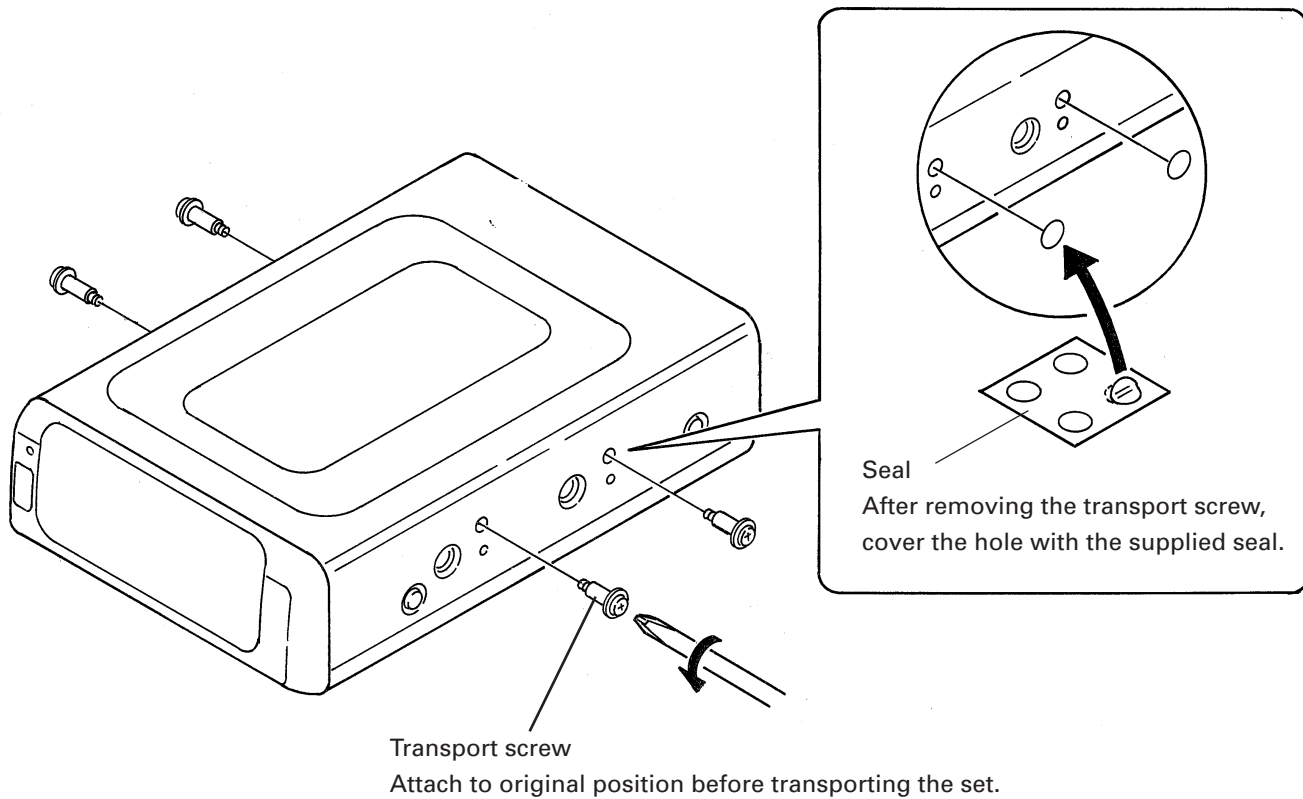
During replacement, handling precautions shall be taken to prevent an electrostatic discharge(Protection by a short pin).

2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

3. Please check the grating after changing the pickup unit.

4. Since these screws protect the mechanism during transport, be sure to affix it when it is transported for repair, etc.

● Transportation of multi-CD Player



A transport screw has been attached to the set in order to protect it during transportation. After removing the transport screw, cover the hole with the supplied seal. Be sure to remove the transport screw before mounting the set. The removed transport screw should be retained in the accessory bag for use the next time the set is transported.

1. SAFETY INFORMATION

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.

1. Safety Precautions for those who Service this Unit.

- Follow the adjustment steps (see pages 31 through 37) in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

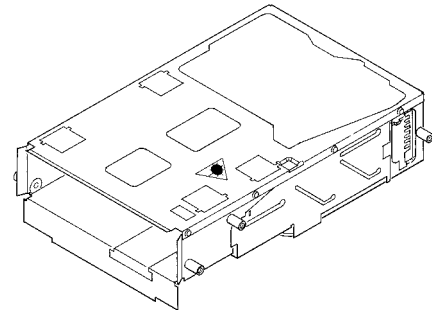
Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the rear of the player.



3. The triangular label is attached to the mechanism unit frame.



4. Specifications of Laser Diode

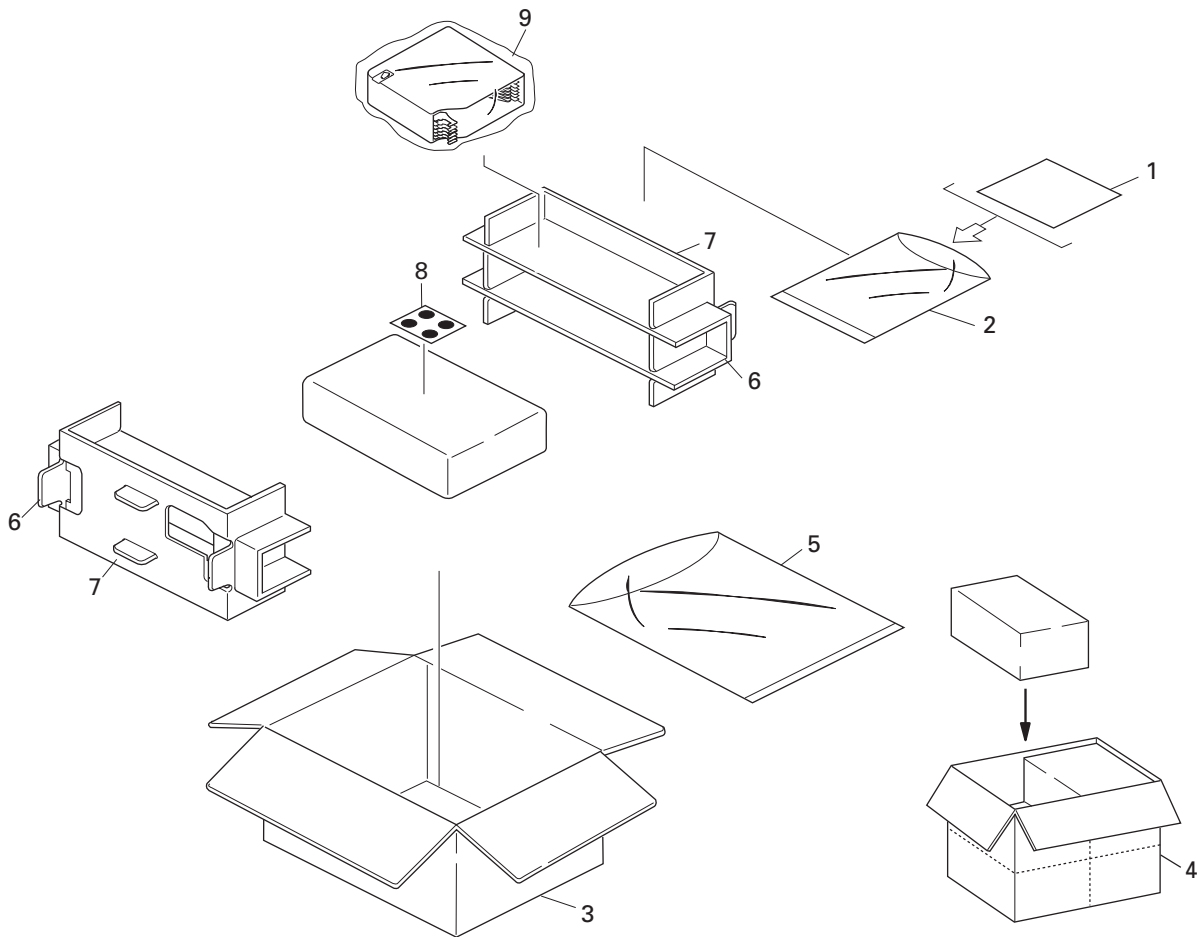
Specifications of laser radiation fields to which human access is possible during service.

Wavelength = 785 nanometers

Radiant power = 69.7 microwatts (Through a circular aperture stop having a diameter of 80 millimeters)
0.55 microwatts (Through a circular aperture stop having a diameter of 7 millimeters)

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



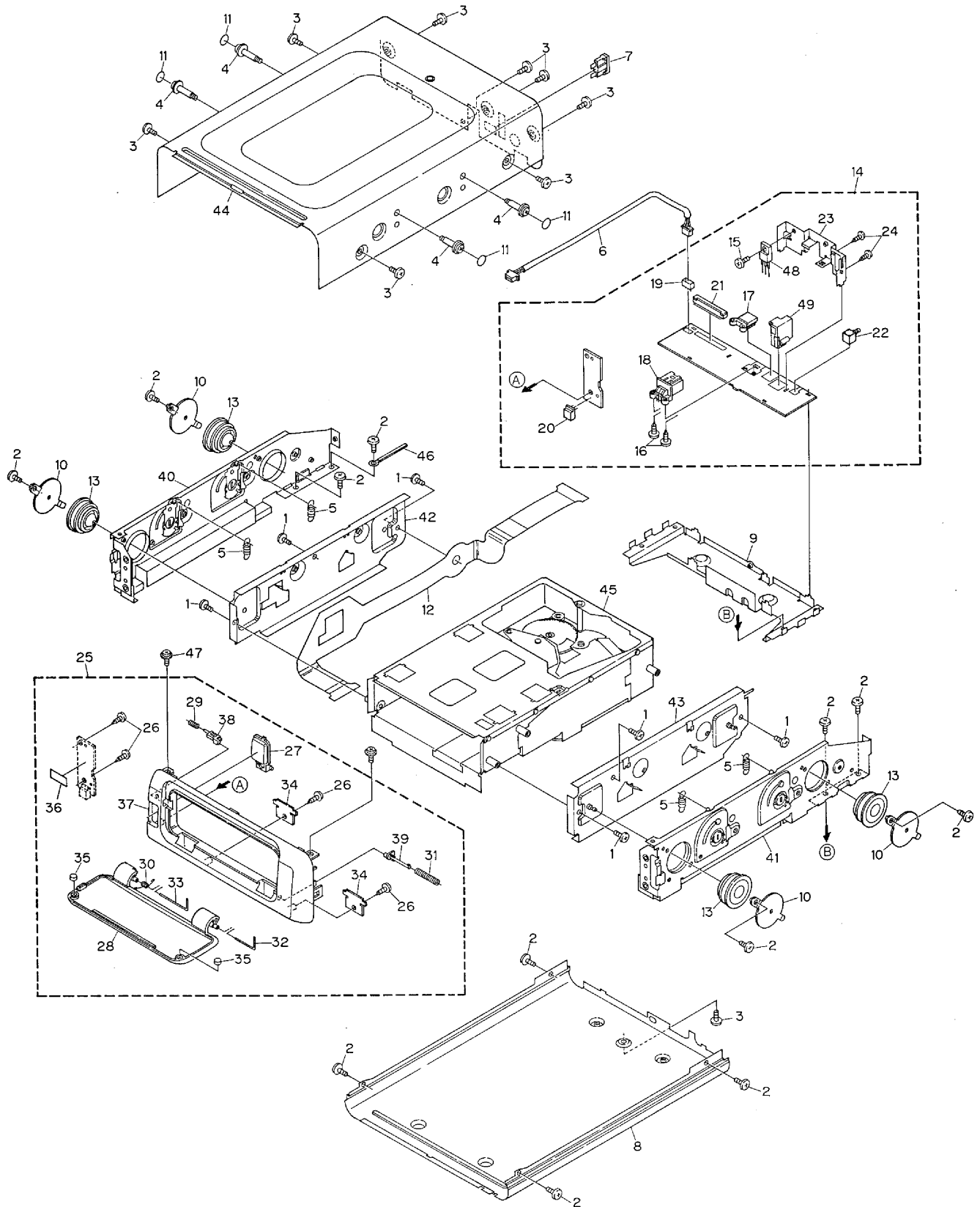
NOTE:

- 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.

● PACKING SECTION PARTS LIST

Mark No.	Description	Part No.
*	1 Pass Card	CRY1122
*	2 Polyethylene Bag	E36-615
	3 Carton	HHG3431
	4 Contain Box	HHL3431
	5 Polyethylene Bag	HEG0009
	6 Protector	HHP1668
	7 Protector	HHP1669
	8 Seal	CNM4918
	9 Magazine Assy	CXB2843

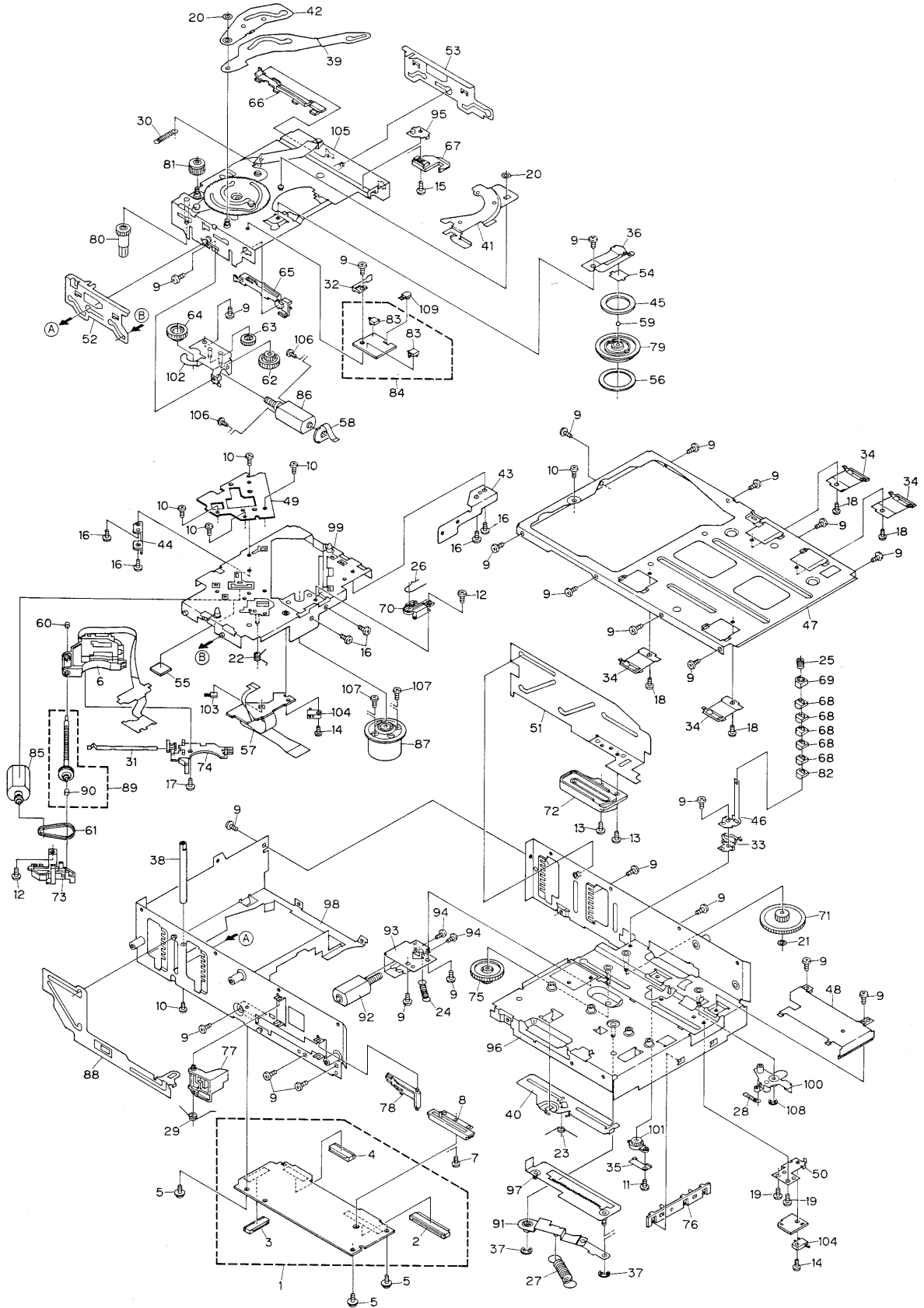
2.2 EXTERIOR



● EXTERIOR SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BMZ26P040FMC	31	Spring	CBH2133
2	Screw	BMZ30P040FMC	32	Shaft	CLA1949
3	Screw	BMZ30P040FZK	33	Shaft	CLA2038
4	Screw	CBA1353	34	Spring Holder	CNC3972
5	Spring	CBH2209	35	Cushion	CNM5862
6	Cord Assy	CDE5367	36	Sheet	CNM6020
7	Fuse(5A)	CEK1005	37	Grille	CNS4895
8	Lower Case	CNB2364	38	Lever	CNV5309
9	Sub Chassis	CNC7110	39	Stopper	CNV5413
10	Holder	CNC7111	40	Chassis L Assy	CXB1618
11	Seal	CNM4918	41	Chassis R Assy	CXB1619
12	PCB	CNP4760	42	Frame L Assy	CXB1621
13	Damper	CNV5465	43	Frame R Assy	CXB1622
14	Extension Unit	HWX2132	44	Upper Case	CXB3153
15	Screw	BMZ26P060FMC	45	CD Mechanism Module(C5)	CXK4480
16	Screw	CBA1407	46	Clamper	HEF-102
17	Connector(CN901)	CKM1253	47	Screw	IMS30P040FMC
18	Connector(CN101)	CKM1254	48	Transistor(Q903)	2SB1185
19	Plug(CN702)	CKS1036	49	Fuse Holder	CKR1011
20	Plug(CN703)	CKS1633			
21	Connector(CN701)	CKS2779			
22	Connector(CN201)	CKX1012			
23	Holder	CNC7112			
24	Screw	PPZ20P060FMC			
25	Grille Assy	HXB1316			
26	Screw	BPZ26P080FMC			
27	Button	CAC5546			
28	Door	CAT1949			
29	Spring	CBH1426			
30	Spring	CBH1983			

2.3 CD MECHANISM MODULE



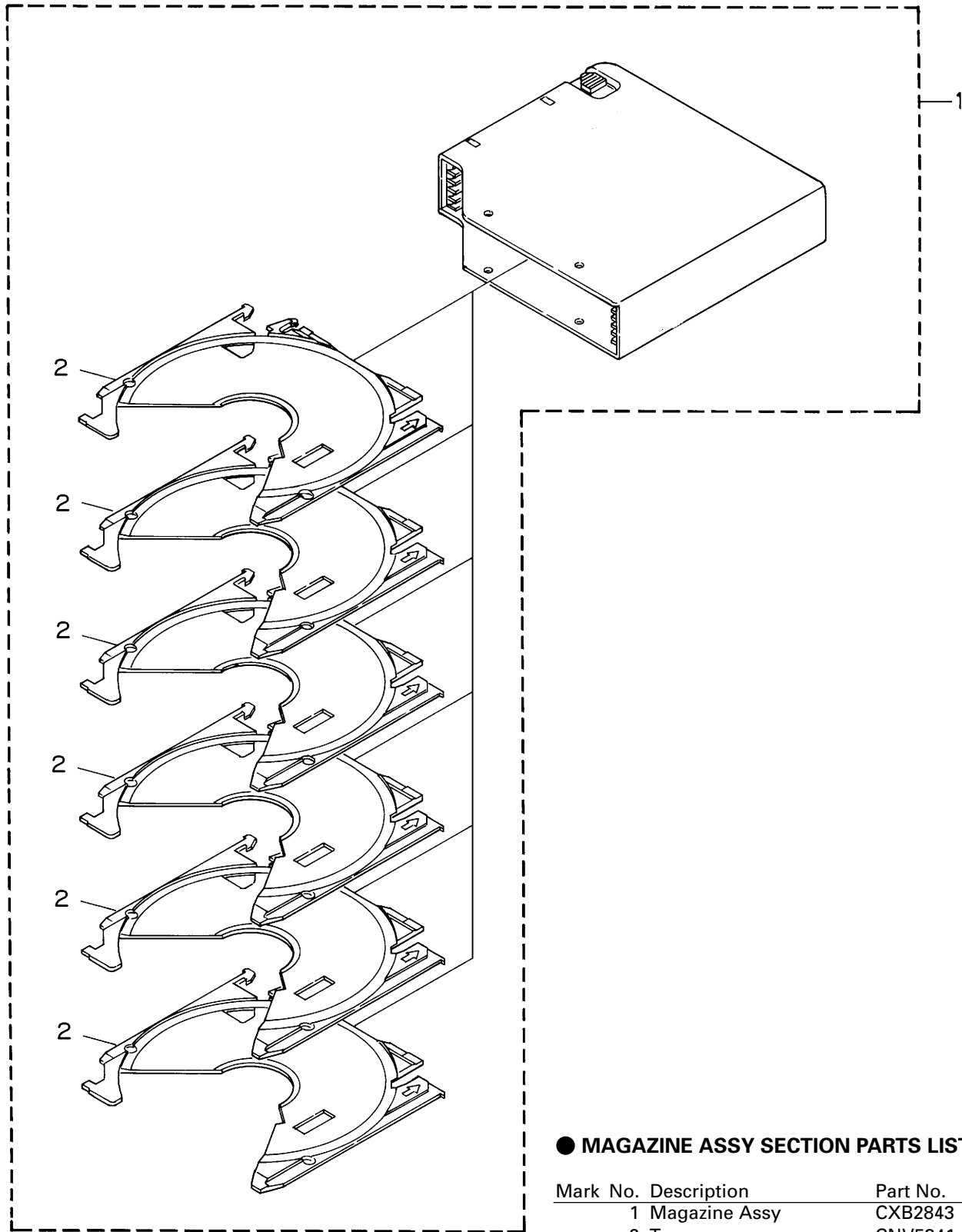
● CD MECHANISM MODULE SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	CD Core Unit	CWX2118	46	Holder	CNC7065
2	Connector(CN701)	CKS1968	47	Frame	CNC7070
3	Connector(CN801)	CKS3484	48	Cover	CNC7074
4	Connector(CN101)	CKS3486	49	Plate	CNC7076
5	Screw	IMS26P040FMC	* 50	Bracket	CNC7115
6	Pickup Unit(Service)	CXX1235	51	Lever	CNC7715
7	Screw	JFZ17P020FNI	52	Lever	CNC7975
8	Volume(VR801)	CCW1021	53	Lever	CNC8097
9	Screw(M2x2.5)	CBA1037	54	Spacer	CNM4879
10	Screw(M2x2.5)	CBA1041	* 55	Sheet	CNM5020
11	Screw(M2x2.5)	CBA1077	56	Sheet	CNM5118
12	Screw(M2x2.5)	CBA1085	57	PCB	CNP4205
13	Screw	CBA1114	58	PCB	CNP4382
14	Screw	CBA1166	59	Ball	CNR1189
15	Screw(M2x2)	CBA1176	60	Bearing	CNR1423
16	Screw	CBA1250	61	Belt	CNT1053
17	Screw(M2x2)	CBA1362	62	Gear	CNV4403
18	Screw	CBA1387	63	Gear	CNV4404
19	Screw	CBA1419	64	Gear	CNV4406
20	Washer	CBF1002	65	Rail(White)	CNV4419
21	Washer	CBF1038	66	Rail(Black)	CNV4420
22	Spring	CBH1822	67	Lever	CNV4422
23	Spring	CBH1827	68	Guide	CNV4597
24	Spring	CBH1830	69	Guide	CNV4722
25	Spring	CBH1930	70	Holder	CNV4761
26	Spring	CBH1948	71	Gear	CNV4827
27	Spring	CBH1972	72	Rack	CNV4828
28	Spring	CBH1974	73	Cover	CNV4924
29	Spring	CBH2024	74	Holder	CNV4950
30	Spring	CBH2091	75	Gear	CNV4954
31	Spring	CBL1241	76	Guide	CNV4982
32	Spring	CBL1242	77	Arm	CNV5072
33	Spring	CBL1295	78	Arm	CNV5073
34	Spring	CBL1314	79	Clamper	CNV5226
35	Spring	CBL1362	80	Gear	CNV5305
36	Spring	CBL1388	81	Gear	CNV5306
37	Washer	YE20FUC	82	Guide	CNV5517
38	Shaft	CLA3087	83	Speing Switch	CSN1033
39	Arm	CNC6181	84	PCB Unit	CWX2032
40	Lever	CNC6194	85	Motor Unit(M854)(Carriage)	CXB1394
41	Lever	CNC6534	86	Motor Unit(M853)(Tray)	CXB1142
42	Arm	CNC6799	87	Motor Unit(M851)(Spindle)	CXB1395
* 43	Holder	CNC6819	88	Lever Unit	CXB1256
* 44	Holder	CNC6827	89	Screw Unit	CXB1270
45	Plate	CNC6847	90	Bearing	CNR1423

Mark No.	Description	Part No.
91	Arm Unit	CXB1476
92	Motor Unit	CXB1847
93	Bracket	CNC7067
94	Screw	JFZ20P025FNI
95	Plate Unit	CXB2262
96	Magazine Holder Unit	CXB2287
97	Lever Unit	CXB2289
98	Frame Unit	CXB2290
*	99 Chassis Unit	CXB2692
100	Arm Unit	CXB2815
101	Damper Unit	CXB2816
102	Bracket Unit	CXB2962
103	Photo Transistor(Q851)	PT4800
104	Switch(S853,S855)	CSN1012
105	Chassis Unit	CXB3313
106	Screw	JFZ20P025FNI
107	Screw	JGZ17P022FZK
108	Washer	YE15FUC
109	LED(D851)	CN504-2

**Note: As for brown and orange lead wires, be sure to use the cord kit (CDK1033).
(Shorter or longer wires may lead to malfunctions.)**

2.4 MAGAZINE ASSY



● MAGAZINE ASSY SECTION PARTS LIST

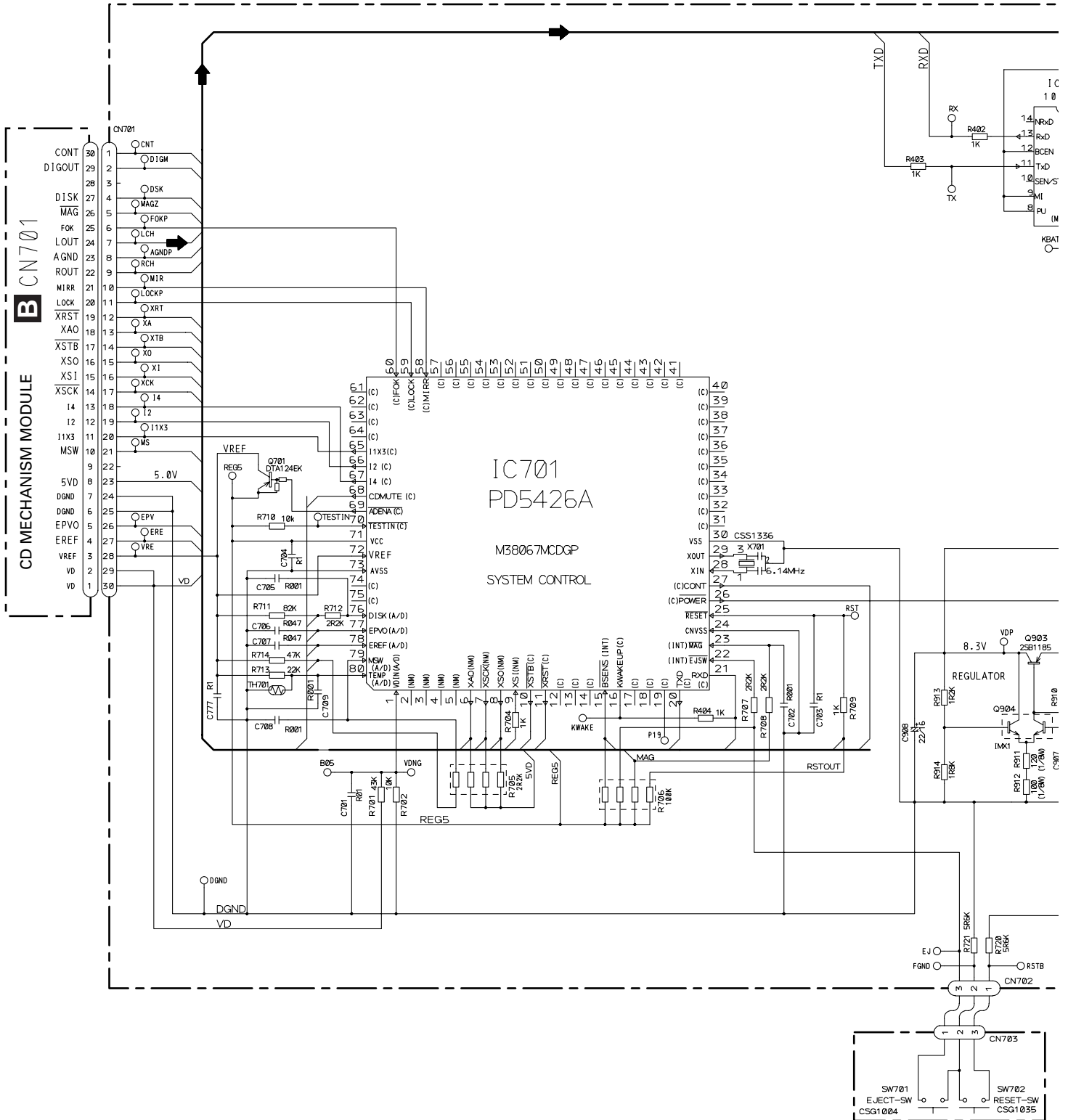
Mark No.	Description	Part No.
1	Magazine Assy	CXB2843
2	Tray	CNV5341

3. SCHEMATIC DIAGRAM

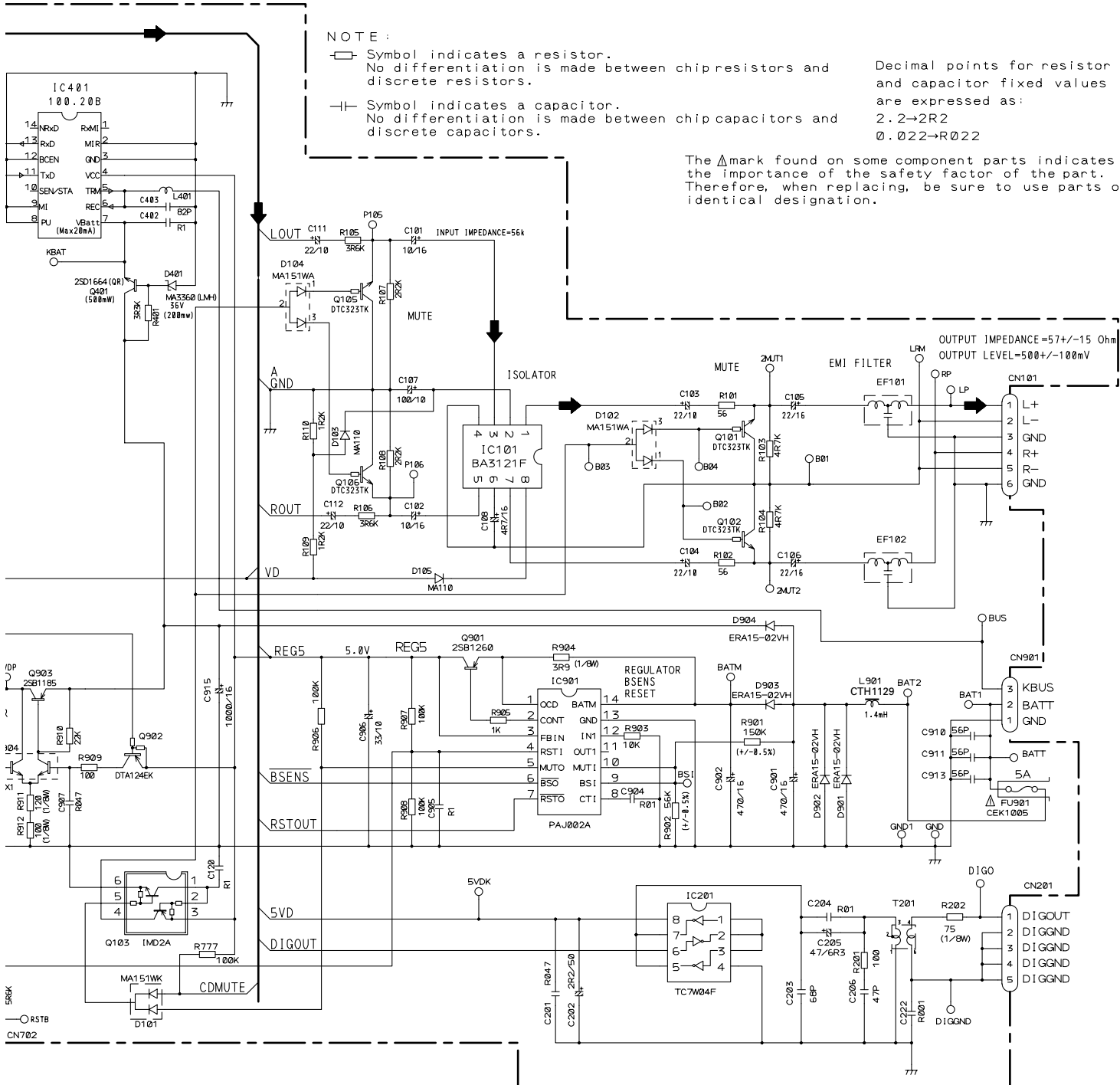
3.1 EXTENSION UNIT

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

A EXTENSION PCB



G BUTTON PCB



NOTE :

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

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

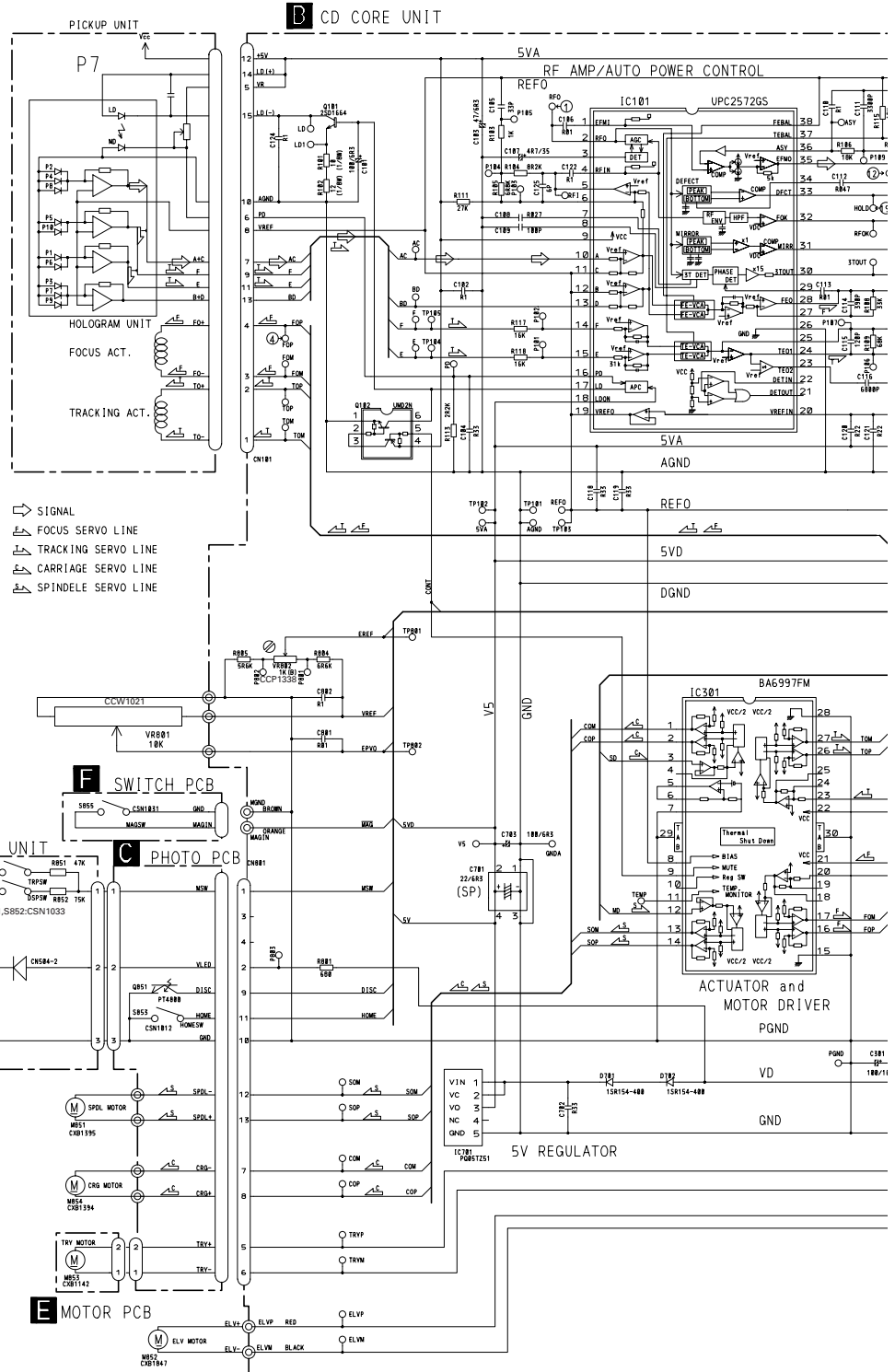
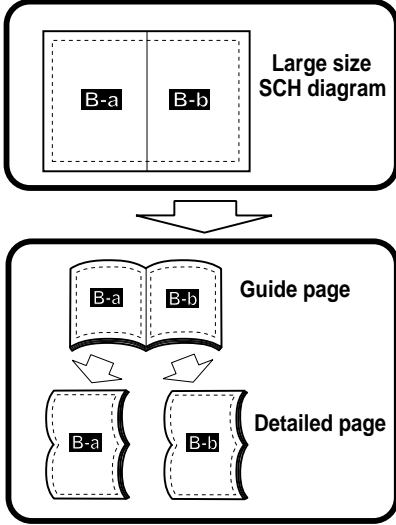
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

EXTENSION UNIT
 Consists of
 EXTENSION PCB
 BUTTON PCB

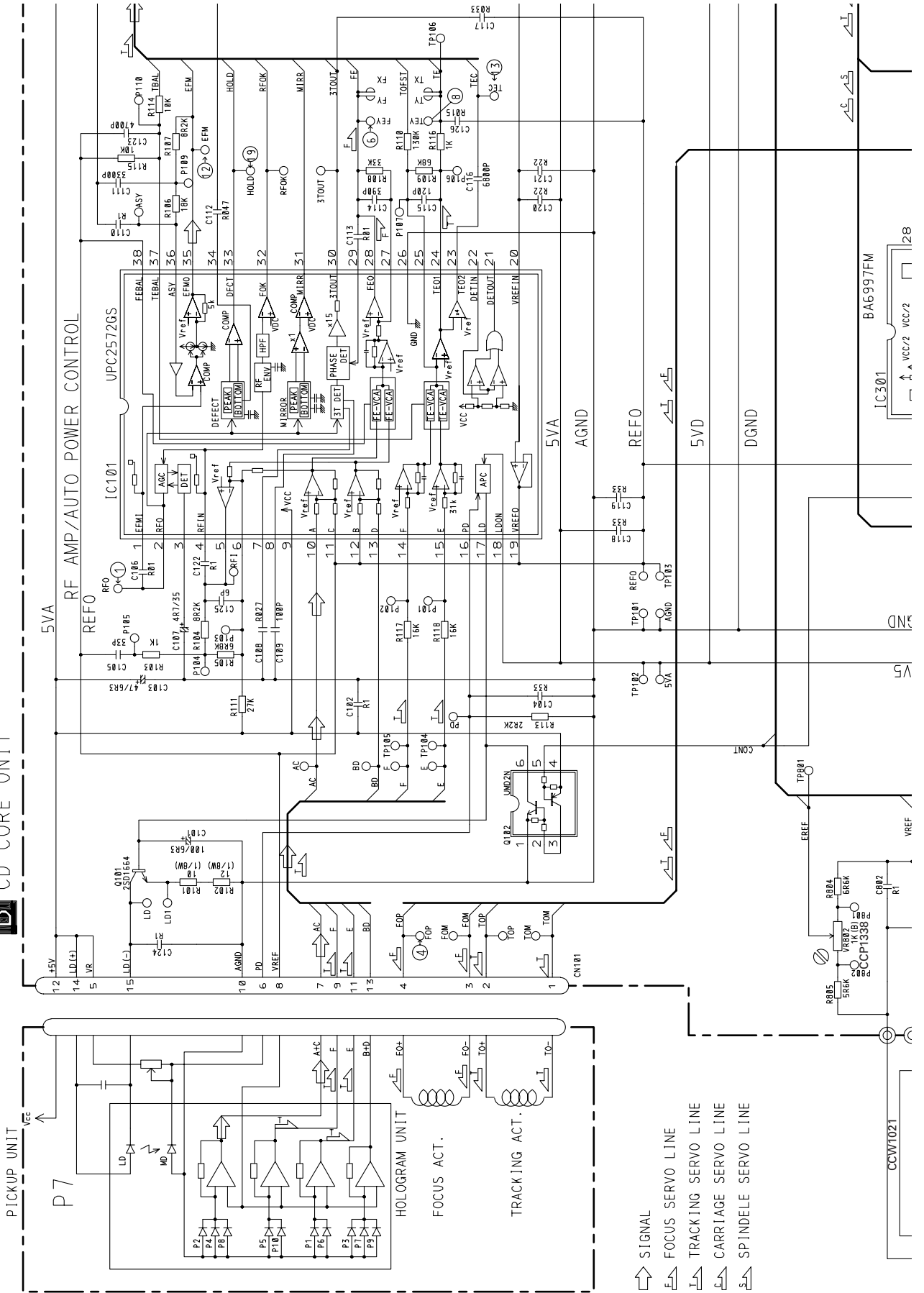
PCB

3.2 CD MECHANISM MODULE(GUIDE PAGE)

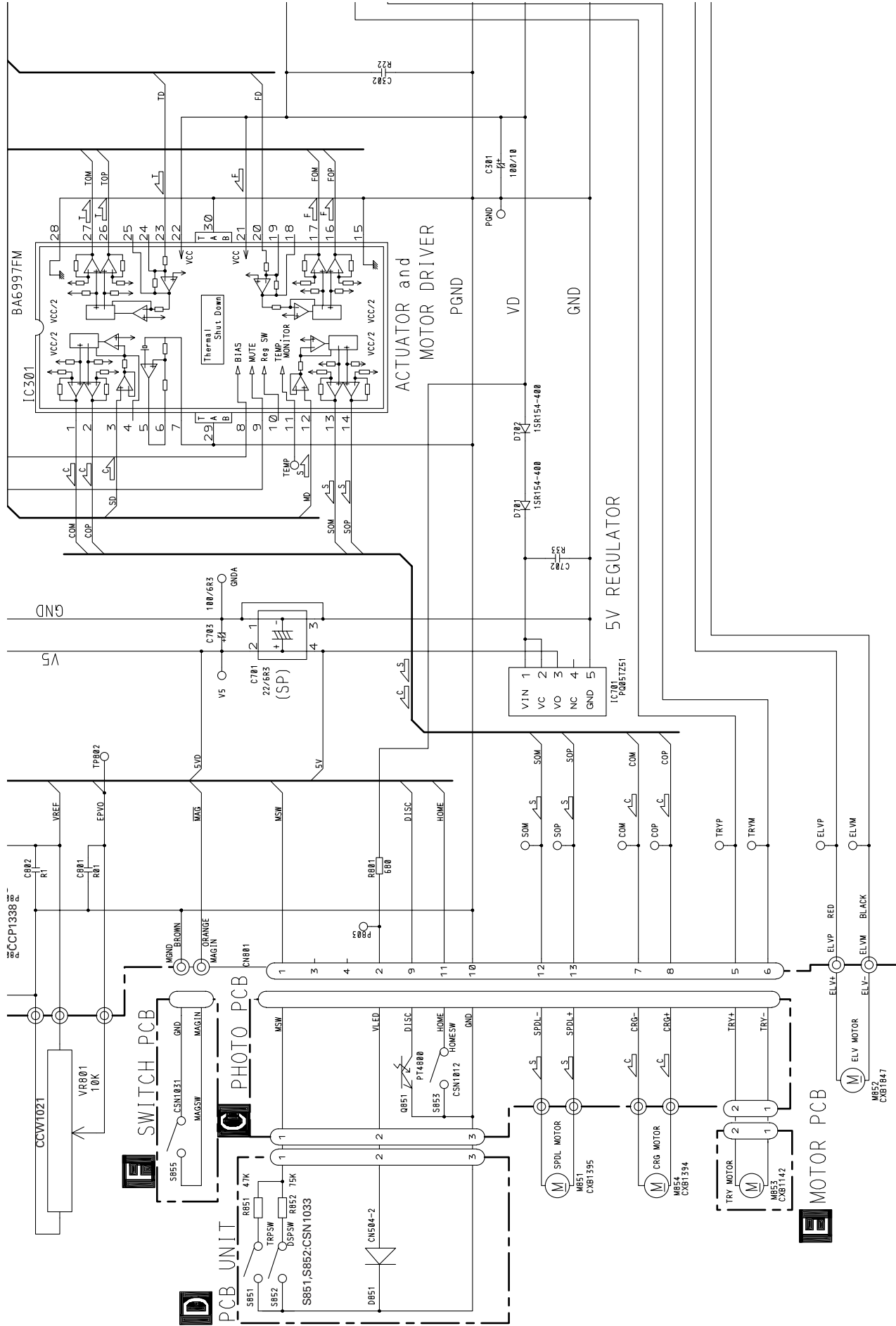
B-a



CD CORE UNIT



- SIGNAL
- ↔ FOCUS SERVO LINE
- ↔ TRACKING SERVO LINE
- ↔ CARRIAGE SERVO LINE
- ↔ SPINDELE SERVO LINE



B-a B-b

A

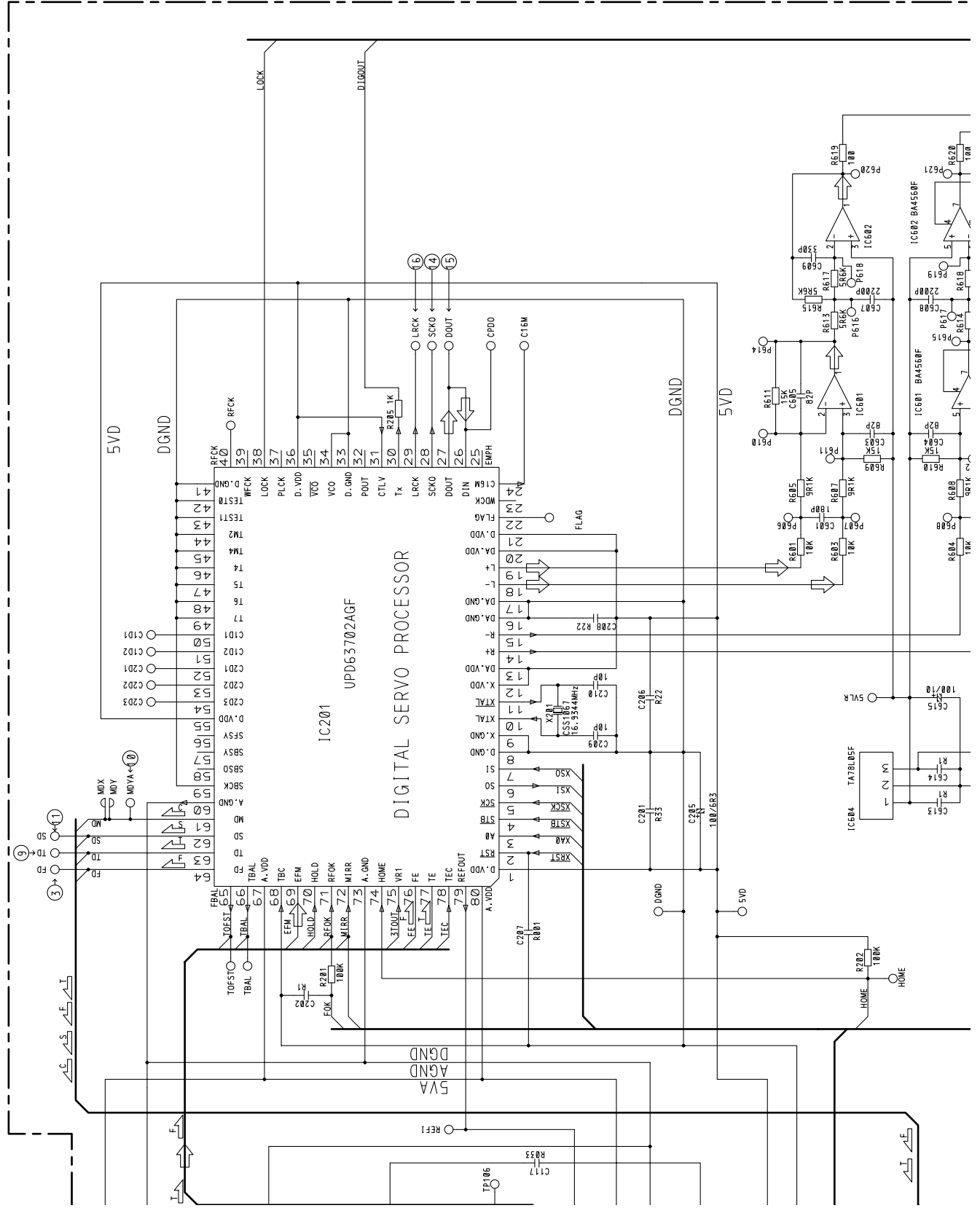
B

C

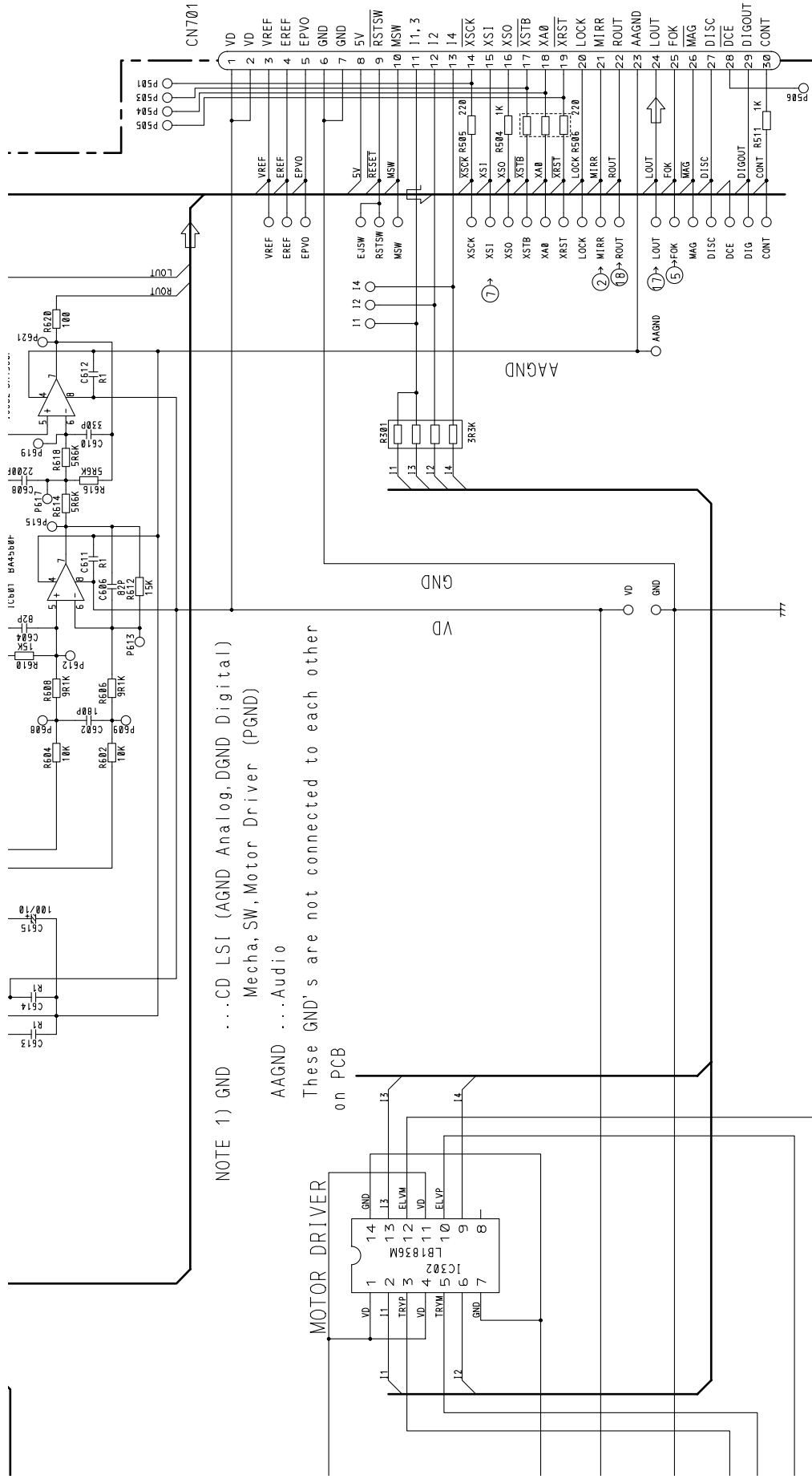
D

B-a C D E F

B-a B-b



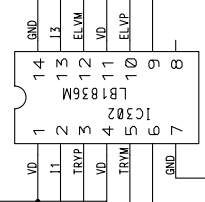
EXTENSION PCB



NOTE 1) GND ...CD LSI (AGND Analog, DGND Digital)
 Mecha, SW, Motor Driver (PGND)
 AAGND ...Audio

These GND's are not connected to each other
 on PCB

MOTOR DRIVER



B-a B-b

A

B

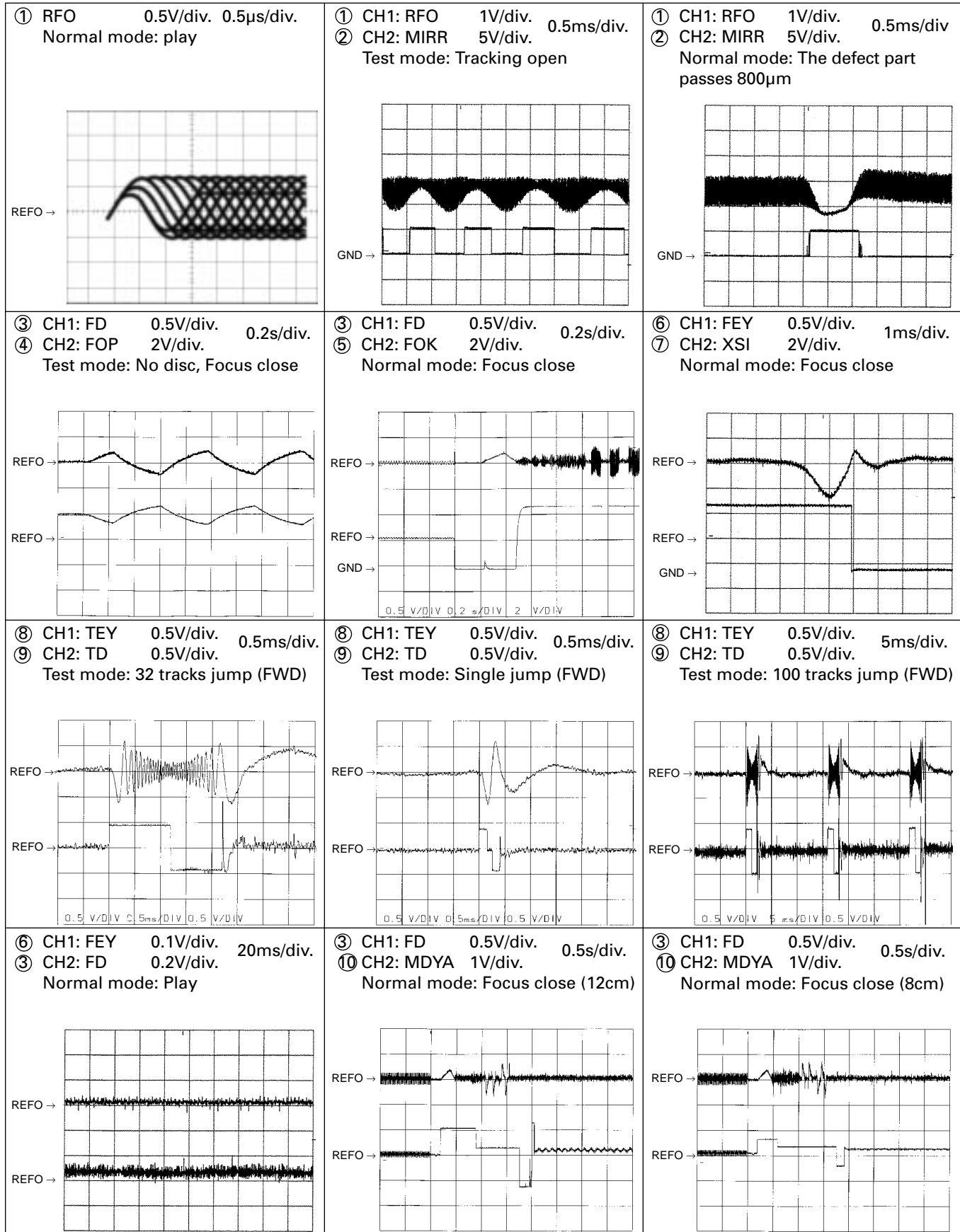
C

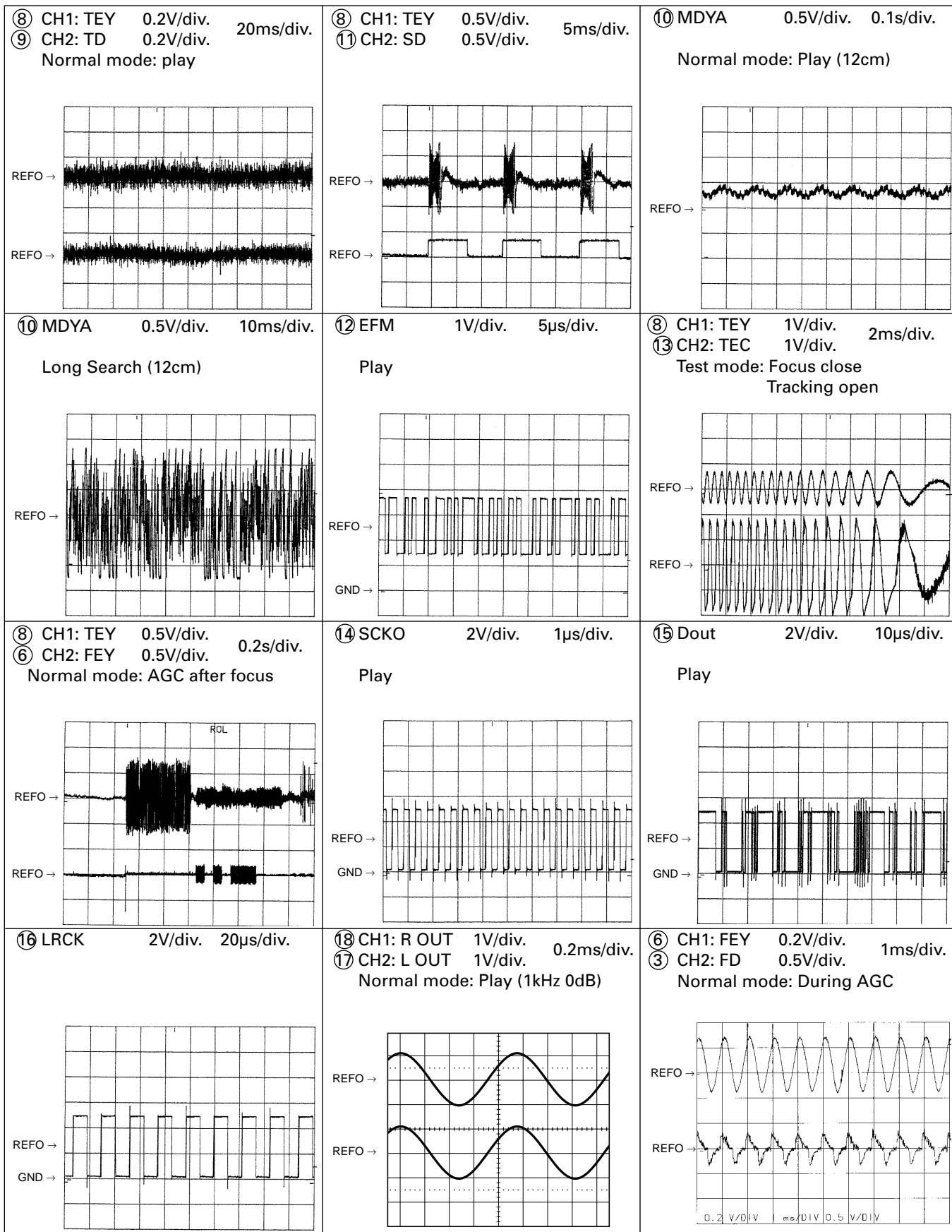
D

B-b

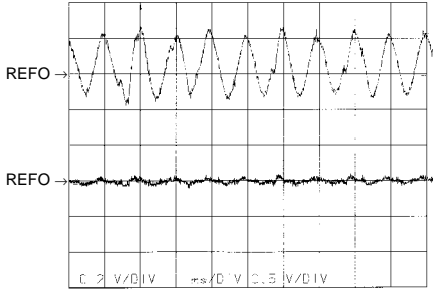
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
 2. Reference voltage
 REFO:2.5V

● **Waveforms**

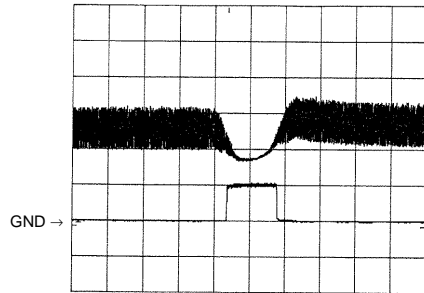




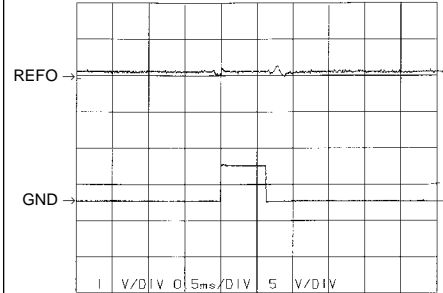
⑧ CH1: TEY 0.2V/div. 1ms/div.
 ⑨ CH2: TD 0.5V/div.
 Normal mode: During AGC



① CH1: RFO 1V/div. 0.5ms/div.
 ② CH2: HOLD 5V/div. 0.5ms/div.
 Normal mode: The defect part passes 800μm



③ CH1: FD 1V/div. 0.5ms/div.
 ④ CH2: HOLD 5V/div. 0.5ms/div.
 Normal mode: The defect part passes 800μm



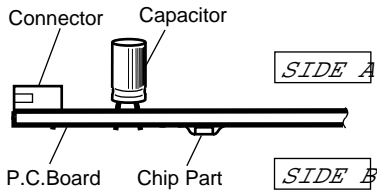
4. PCB CONNECTION DIAGRAM

4.1 EXTENSION PCB

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



IC, Q

IC701

Q701

IC101

Q103

Q903

Q904

Q102

Q901

IC901

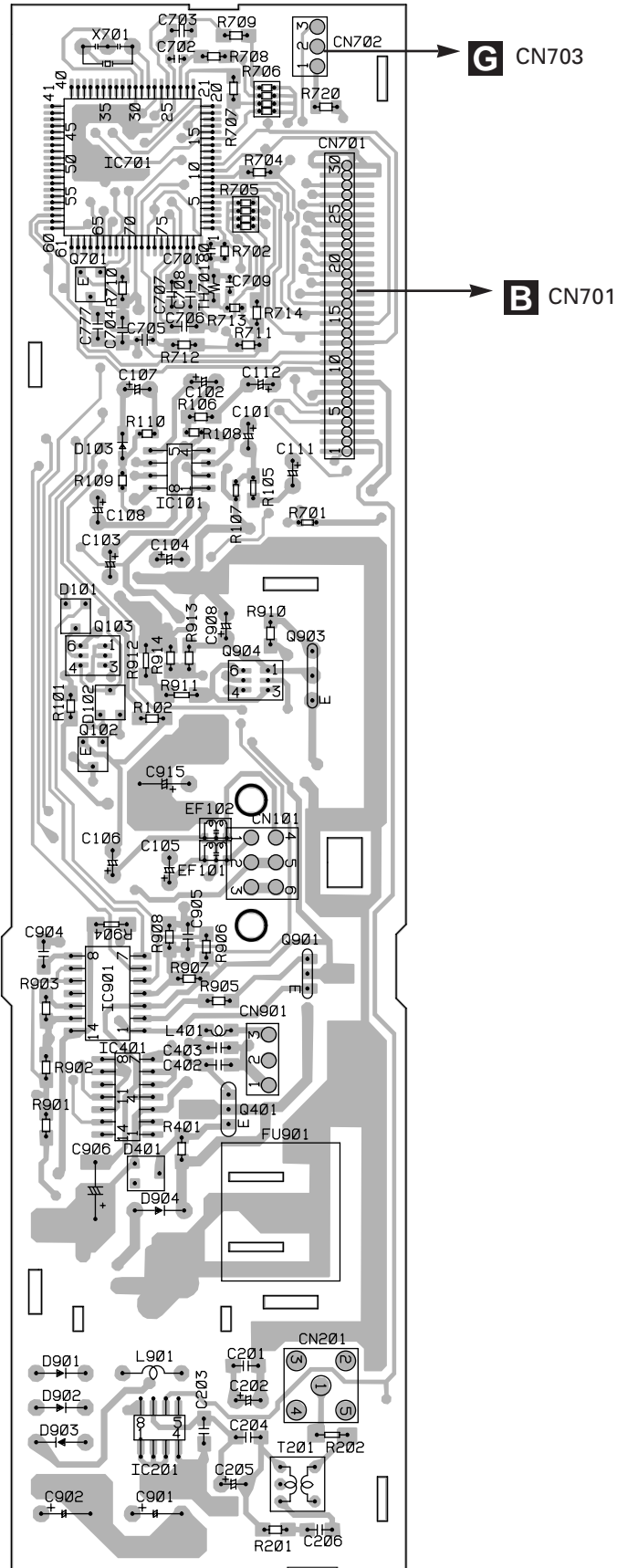
IC401

Q401

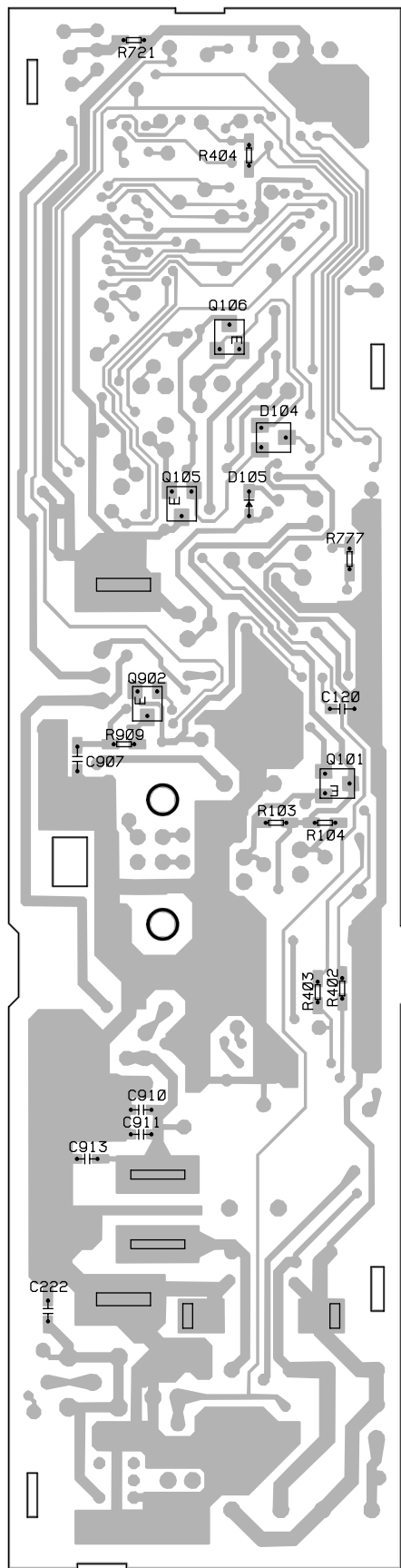
IC201

A EXTENSION PCB

SIDE A



A EXTENSION PCB



IC, Q

SIDE B

Q106

Q105

Q902

Q101

A

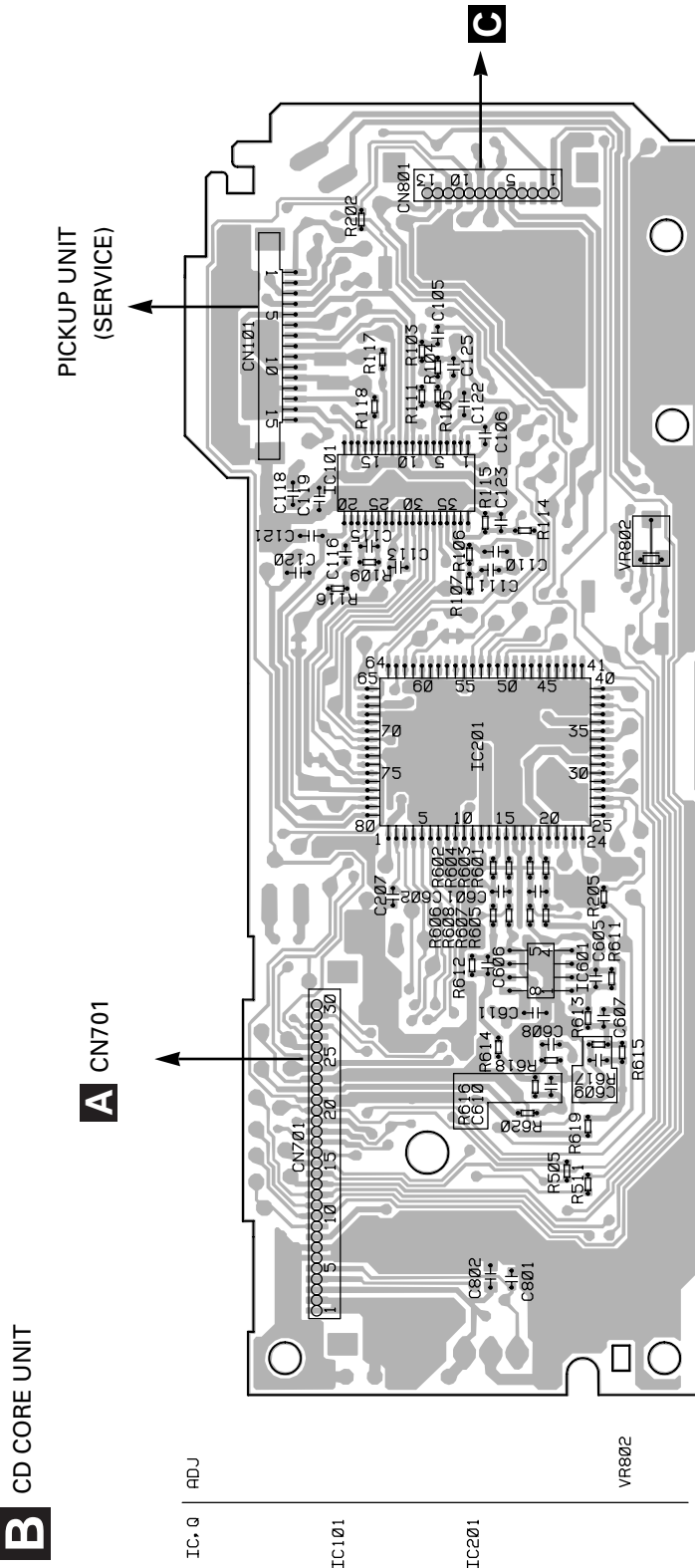
B

C

D

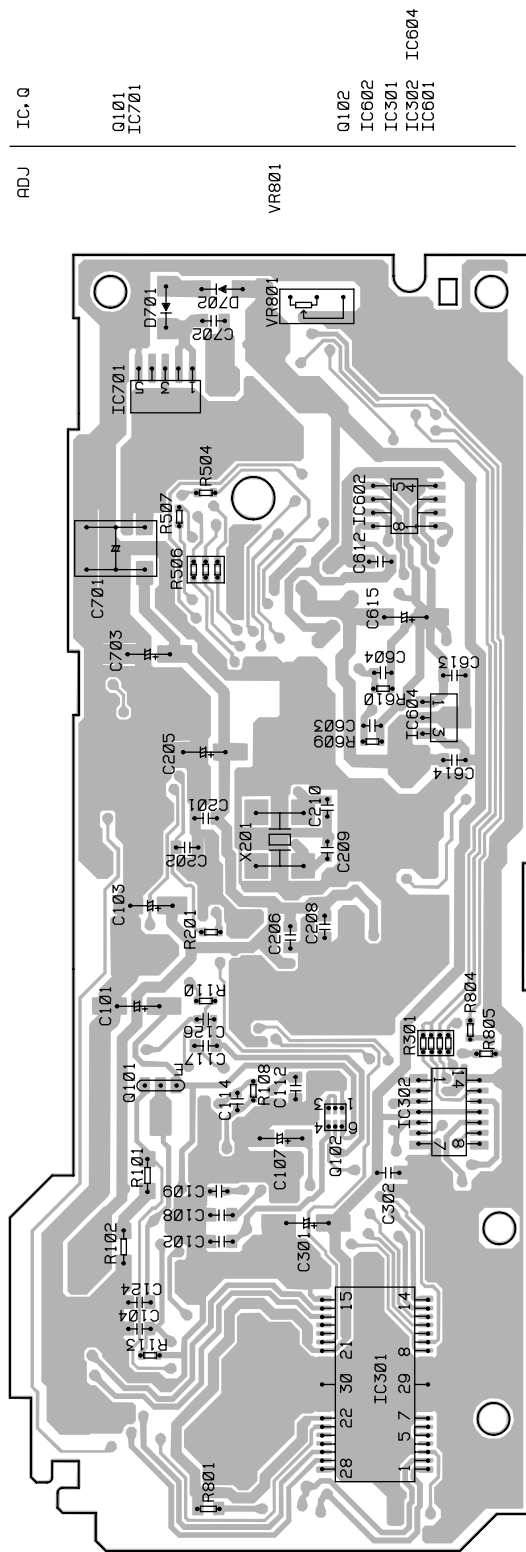
4.2 CD CORE UNIT

SIDE A



SIDE B

B CD CORE UNIT



ADJ

IC, Q

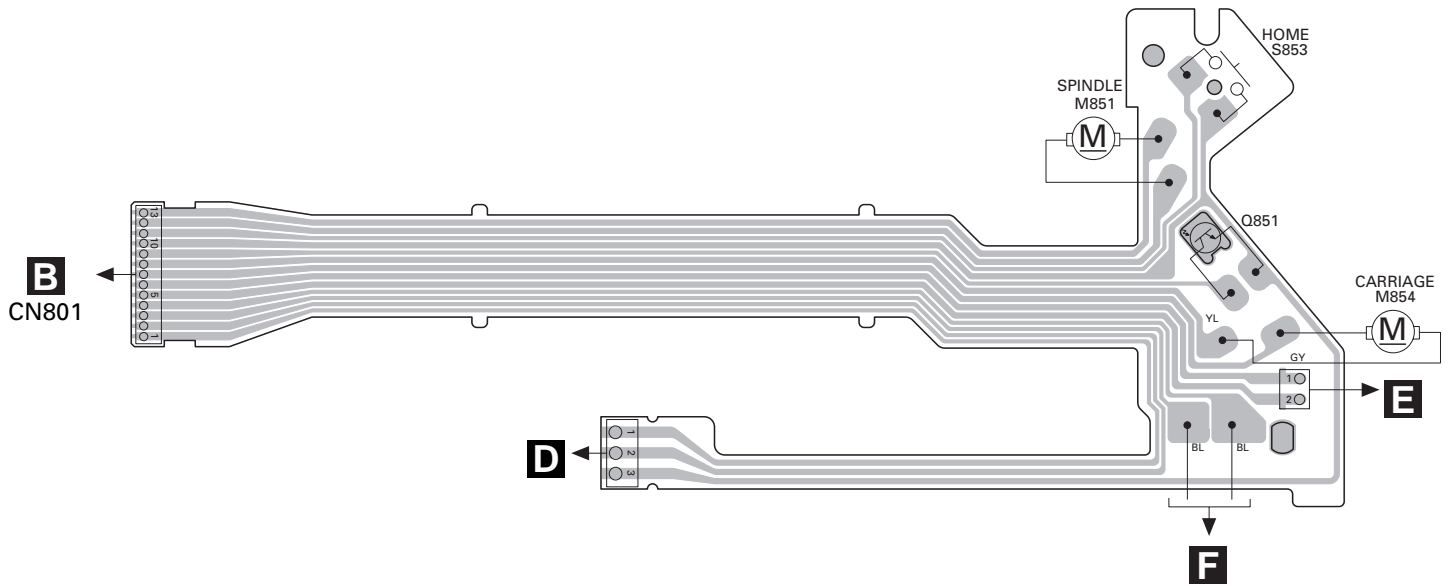
Q101
IC701

VR801

Q102
IC602
IC301
IC302
IC601
IC604

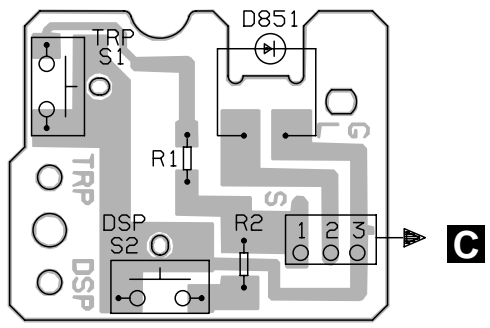
4.3 PHOTO PCB

A **C** PHOTO PCB



4.4 PCB UNIT

C **D** PCB UNIT



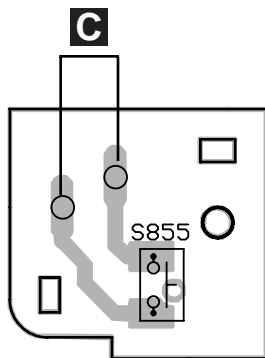
4.5 MOTOR PCB

E MOTOR PCB



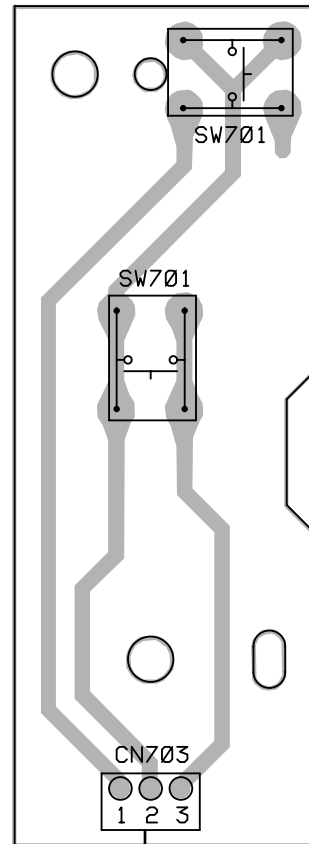
4.6 SWITCH PCB

F SWITCH PCB



4.7 BUTTON PCB

G BUTTON PCB



A
CN702

====Circuit Symbol and No.====Part Name	Part No.	====Circuit Symbol and No.====Part Name	Part No.
C 205	CEJA470M6R3	R 301	RA4C332J
C 206	CCSQCH470J50	R 504	RS1/16S102J
C 222	CCSQCH102J50	R 505	RS1/16S221J
C 402	CKSQYB104K50	R 506	RA3C221J
C 403	CCSQCH820J50	R 511	RS1/16S102J
C 701	CKSRYB103K50	R 601	RS1/16S103J
C 702	CKSRYB102K50	R 602	RS1/16S103J
C 703	CKSQYB104K50	R 603	RS1/16S103J
C 704	CKSQYB104K50	R 604	RS1/16S103J
C 705	CKSRYB102K50	R 605	RS1/16S912J
C 706	CKSQYB473K50	R 606	RS1/16S912J
C 707	CKSQYB473K50	R 607	RS1/16S912J
C 708	CCSQCH102J50	R 608	RS1/16S912J
C 709	CKSRYB102K50	R 609	RS1/16S153J
C 777	CKSQYB104K50	R 610	RS1/16S153J
C 901 470µF/16V	CCH1183	R 611	RN1/16SE1502D
C 902 470µF/16V	CCH1183	R 612	RN1/16SE1502D
C 904	CKSQYB103K50	R 613	RN1/16SK5601D
C 905	CKSQYB104K50	R 614	RN1/16SK5601D
C 906	CSZST330M10	R 615	RN1/16SK5601D
C 907	CKSQYB473K50	R 616	RN1/16SK5601D
C 908	CEJA220M16	R 617	RS1/16S562J
C 910	CCSQCH560J50	R 618	RS1/16S562J
C 911	CCSQCH560J50	R 619	RS1/16S101J
C 913	CCSQCH560J50	R 620	RS1/16S101J
C 915 1000µF/16V	CCH1149	R 801	RS1/10S681J
		R 804	RS1/16S622J
		R 805	RS1/16S562J

B Unit Number : CWX2118
Unit Name : CD Core Unit

MISCELLANEOUS

IC 101 IC	UPC2572GS
IC 201 IC	UPD63702AGF
IC 301 IC	BA6997FM
IC 302 IC	LB1836M
IC 601 IC	BA4560F
IC 602 IC	BA4560F
IC 604 IC	TA78L05F
IC 701 IC	PQ05TZ51
Q 101 Transistor	2SD1664
Q 102 Transistor	UMD2N
D 701 Diode	1SR154-400
D 702 Diode	1SR154-400
X 201 Crystal Resonator 16.9344MHz	CSS1067
VR 802 Semi-fixed 1kΩ(B)	CCP1338

RESISTORS

R 101	RS1/8S100J
R 102	RS1/8S120J
R 103	RS1/16S102J
R 104	RS1/16S822J
R 105	RS1/16S682J
R 106	RS1/16S183J
R 107	RS1/16S822J
R 108	RS1/16S333J
R 109	RS1/16S683J
R 110	RS1/16S134J
R 111	RS1/16S273J
R 113	RS1/16S222J
R 114	RS1/16S103J
R 115	RS1/16S103J
R 116	RS1/16S102J
R 117	RS1/16S163J
R 118	RS1/16S163J
R 201	RS1/16S104J
R 202	RS1/16S104J
R 205	RS1/16S102J

CAPACITORS

C 101	CEV101M6R3
C 102	CKSQYB104K16
C 103	CEV470M6R3
C 104	CKSQYB334K16
C 105	CCSRCH330J50
C 106	CKSRYB103K25
C 107	CEV4R7M35
C 108	CKSQYB273K25
C 109	CCSRCH101J50
C 110	CKSQYB104K16
C 111	CKSRYB332K50
C 112	CKSQYB473K25
C 113	CKSRYB103K25
C 114	CKSRYB391K50
C 115	CCSRCH121J50
C 116	CKSRYB682K25
C 117	CKSQYB333K25
C 118	CKSQYB334K16
C 119	CKSQYB334K16
C 120	CKSQYB224K16
C 121	CKSQYB224K16
C 122	CKSQYB104K16
C 123	CKSRYB472K50
C 124	CKSQYB104K16
C 125	CCSRCH6R0D50
C 126	CKSRYB153K25
C 201	CKSQYB334K16
C 202	CKSQYB104K16
C 205	CEV101M6R3
C 206	CKSQYB224K16
C 207	CKSRYB102K50
C 208	CKSQYB224K16
C 209	CCSRCH100D50
C 210	CCSRCH100D50
C 301	CEV101M10

====Circuit Symbol and No.====	====Part Name	Part No.
C 302		CKSQYB224K16
C 601		CCSRCH181J50
C 602		CCSRCH181J50
C 603		CCSRCH820J50
C 604		CCSRCH820J50
C 605		CCSRCH820J50
C 606		CCSRCH820J50
C 607		CKSRYB222K50
C 608		CKSRYB222K50
C 609		CCSRCH331J50
C 610		CCSRCH331J50
C 611		CKSQYB104K16
C 612		CKSQYB104K16
C 613		CKSQYB104K16
C 614		CKSQYB104K16
C 615		CEV101M10
C 701	22μF/6.3V	CCH1233
C 702		CKSQYB334K16
C 703		CEV101M6R3
C 801		CKSRYB103K25
C 802		CKSQYB104K16

C Unit Number :
Unit Name : Photo PCB

Q 851	Photo-transistor	PT4800
S 853	Switch	CSN1012

D Unit Number : CWX2032
Unit Name : PCB Unit

S 851	Switch(TRP)	CSN1033
S 852	Switch(DSP)	CSN1033
R 851		RS1/8S473J
R 852		RS1/8S753J

E Unit Number :
Unit Name : Motor PCB

M 853	Motor Unit(TRAY)	CXB1142
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F Unit Number :
Unit Name : Switch PCB

S 855	Switch()MAG)	CSN1012
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Miscellaneous Parts List

D 851	LED	CN504-2
M 851	Motor Unit(SPINDLE)	CXB1395
M 852	Motor Unit(ELV)	CXB1847
M 854	Motor Unit(CARRIAGE)	CXB1394
VR 801	10kΩ	CCW1021
	PU Unit(Service)	CXX1235

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1)Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND. If REFO and GND are connected to each other by mistake during adjustments,not only will it be impossible to measure the potential correctly,but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this,take special note of the following.
Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
Since the frame of the measuring instrument is usually at the same potential as the negative probe,change the frame of the measuring instrument to floating status.
If by accident REFO comes in contact with GND,immediately switch the regulator or power OFF.
- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON,let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode,be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.
- This unit is adjusted in a combination with the CD control unit (KEH-P7000, etc.). Each regulator key should be operated at the unit.
With the KEH-P7000 taken up for reference, a description will be given below concerning how to enter into the test mode, including key operations. The key in the adjustment text is also one of the KEH-P7000 keys.
- How to enter into the test mode
Switch ACC,back-up ON while pressing the 4 and 6 keys together.
- Resetting the test mode
Switch ACC,back-up Off.
- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently,if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment,the following malfunctions may occur.
*During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way,either re-position the light source,move the unit or cover the photo transistor.
- When loading and unloading discs during adjustment procedures,always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.
- Turn power off when pressing the button **FF** or the button **REV** key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)
- SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released.Tracking is closed the moment C-MOVE is released.
- JUMP MODE resets to SINGLE as soon as power is switched off.

6.2 CHECKING THE GRATING

● Checking the Grating After Changing the Pickup Unit

•Note :

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

•Purpose :

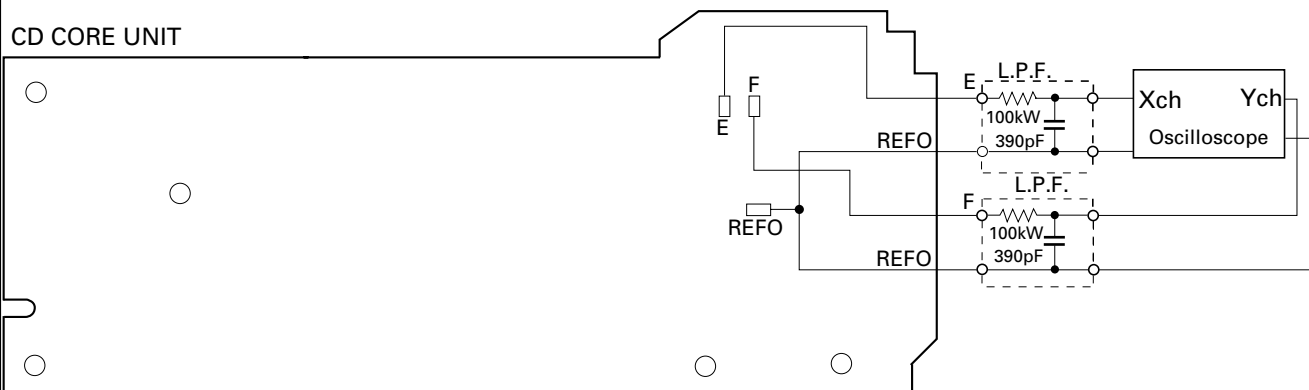
To check that the grating is within an acceptable range.

•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 track searching taking a long time, may appear.

•Method :

- | | |
|----------------------|---------------------------|
| •Measuring Equipment | •Oscilloscope, Two L.P.F. |
| •Measuring Points | •E, F, REFOUT |
| •Disc | •ABEX TCD-784 |
| •Mode | •TEST MODE |



•Checking Procedure

1. In test mode, load the disc and switch the 5V regulator on.
2. Using the **FF** and **REV** buttons, move the pickup unit to the innermost track.
3. Press key **9** to close focus, the display should read "91". Press key **8** to implement the tracking balance adjustment the display should now read "81". Press key **9** 4 times. The display will change, returning to "81" on the fourth press.
4. 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.
5. If the phase difference is determined to be greater than 75° try changing the pickup 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

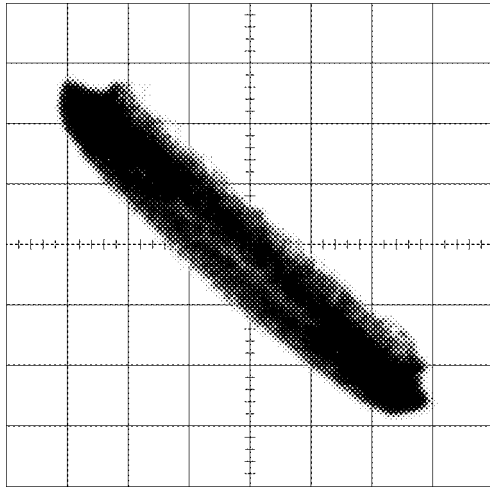
Reloading the disc changes the clamp position and may decrease the "wobble".

Grating waveform

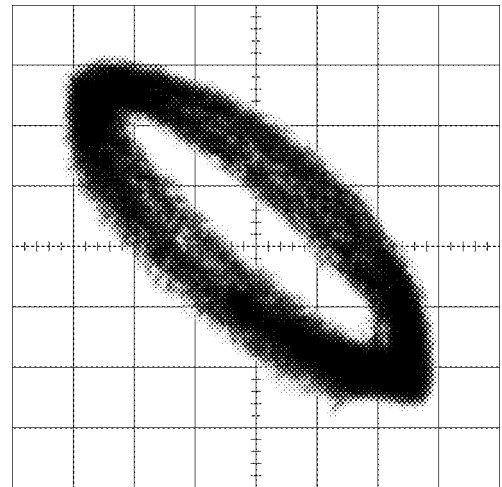
Ech → Xch 20mV/div, AC

Fch → Ych 20mV/div, AC

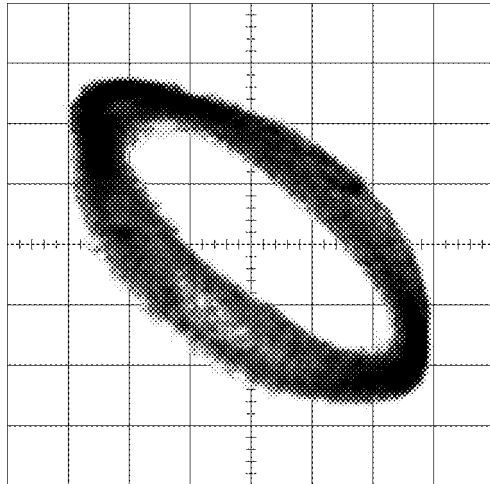
0°



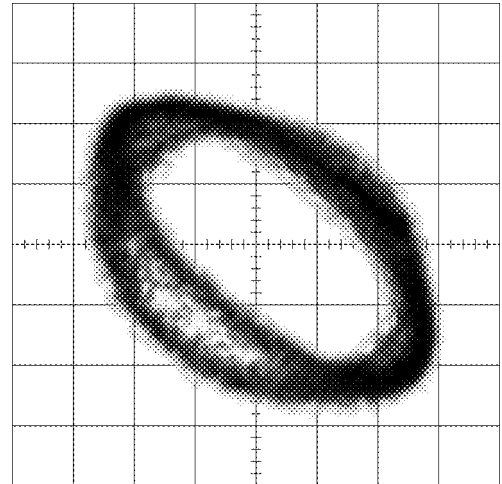
30°



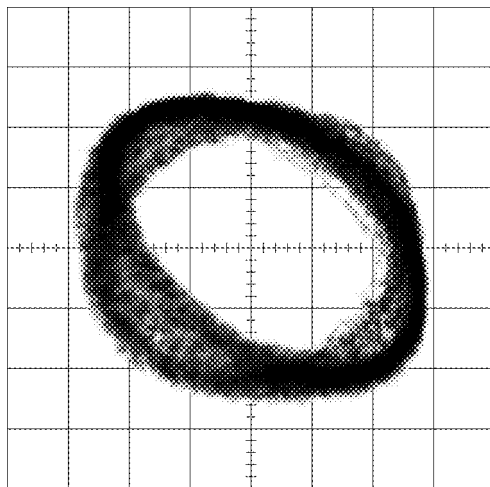
45°



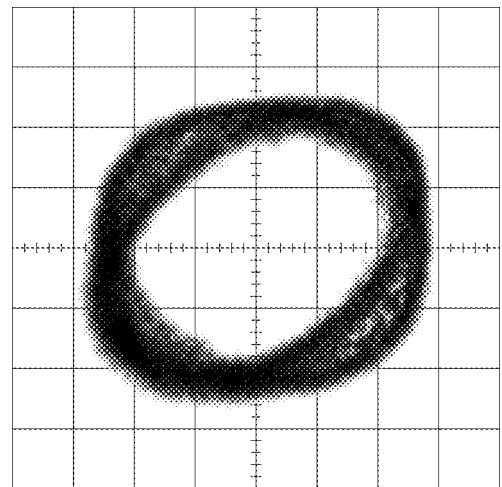
60°



75°



90°



6.3 ADJUSTMENT OF ELEVATION WHEN THE CD CORE UNIT HAS BEEN REMOVED FOR MAINTENANCE

● Adjustment When Error Code 60 is Displayed Because of Malfunctioning Elevation

•Note :

Unlike the conventional mechanisms, the new mechanism detects the height of the stage using slide-variable resistance.

To absorb dislocation of the stage height caused by differences in the mechanism and the CD core unit, adjustment must be made for each CD-mechanism module using a variable resistor.

Normally, readjustment is not needed, as this has been adjusted at the factory. However, adjustment of elevation is required according to the procedure explained below if an elevation error has occurred or if the CD core unit has been removed.

•Purpose :

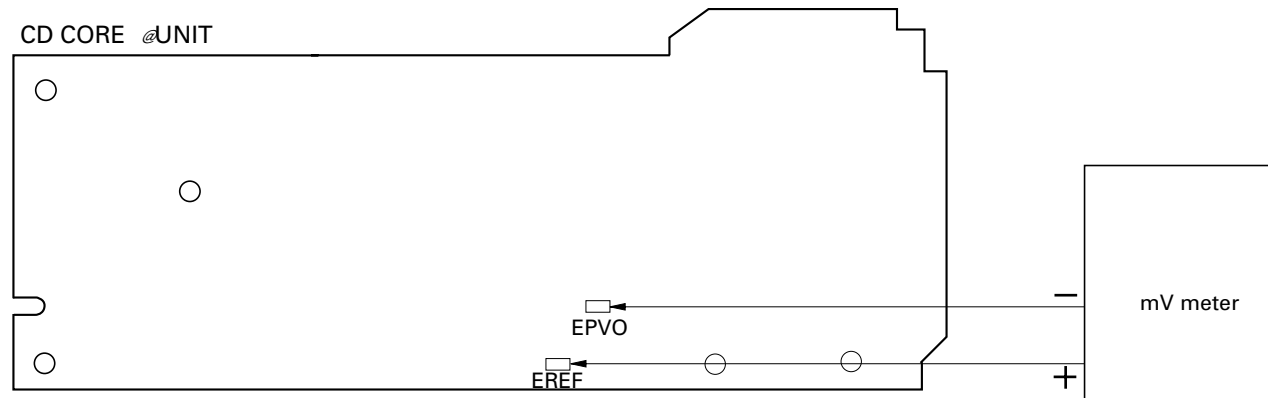
To adjust and confirm whether or not elevation operates correctly.

•Adjustment Method :

•Measuring Equipment: Millivoltmeter

•Measuring Points : EREF, EPVO

•Setting : Without a magazine in Test mode
 With the mechanism placed upside-down (Place the CD mechanism module so that the CD core unit is above.)



•Confirmation Procedure

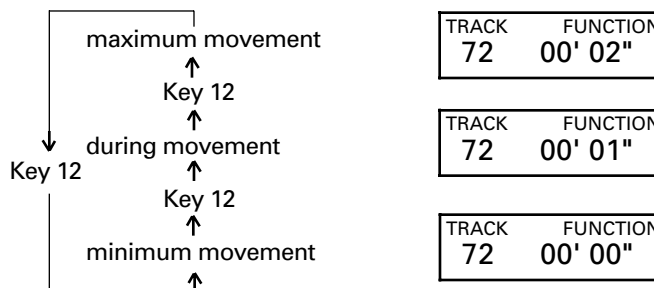
1. Enter Test mode, then select Multi-CD player.
2. Press key 7 to enter Mechanism Test mode.
3. Press key 12 twice to specify the amount of movement.

Examples of display

TRACK	FUNCTION
	1

TRACK	FUNCTION
72	00' 00"

The amount of movement changes each time key 12 is pressed.



4. Press key **9** to set ELV/TRAY mode to TRAY.

Examples of display

TRACK	FUNCTION
72	01' 02"

5. Press key **FF** to release the clamp and return the tray to the magazine.

Release the clamp

6. Press key **9** to enter Elevation Move mode.

TRACK	FUNCTION
72	00' 02"

7. Use key **FF/REV** to operate elevation and set it to the graduation of the fourth step (Fig. 1).

8. Make the adjustment.

Use VR802 to adjust the difference in potential between EREF and EPVO to 0 ± 20 mV.

9. When adjustment is completed, press key **BAND** to exit Mechanism Test mode.

TRACK	FUNCTION
72	00' 02"

10. Confirm operation of the mechanism.

Place the mechanism horizontally (CD core unit below). Take care not to short-circuit the PCB.

TRACK	FUNCTION
	' "

11. Confirm the height of the stage. Use the 4 key to select Disc No.4.

TRACK	FUNCTION
04	00' 00"

Check if the stopper bend of the clamp lever is engaged in the groove of the frame stopper (Fig. 2-4).

•**Note :**

The stopper bend will be pressed downward into the groove for final clamping. Confirm the engagement position of the stopper bend.

•If the stopper bend is engaged in the center and pressed downward, adjustment is completed. Go to step 15.

•If the stopper bend is dislocated, check the amount of dislocation by following steps 12 to 14.

12. To see the amount of dislocation, place the mechanism upside-down.
If the stopper bend has been dislocated in the direction of the first CD, turn VR802 to the left(Fig. 2).

To lower the stage toward the sixth step by 0.1 mm, reduce the voltage of EREF (adjusted in step 8) by 20 mV.

If the stopper bend has been dislocated in the direction of the sixth CD, turn VR802 to the right(Fig. 4).

To raise the stage toward the first step by 0.1 mm, increase the voltage of EREF (adjusted in step 8) by 20 mV.

13. Place the mechanism horizontal. Go back to step 11 to reconfirm the stage height.

14. When adjustment of the stage height is completed, proceed as follows:

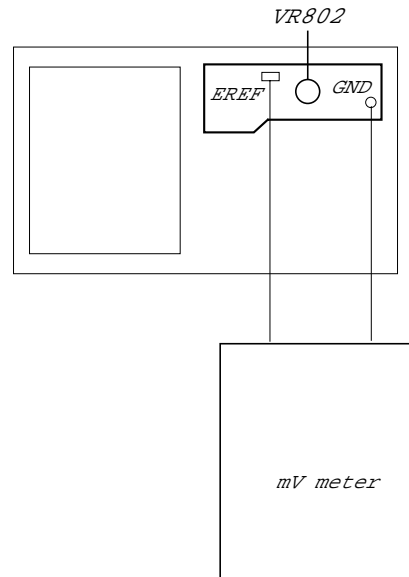
15. Press the **EJECT** switch.

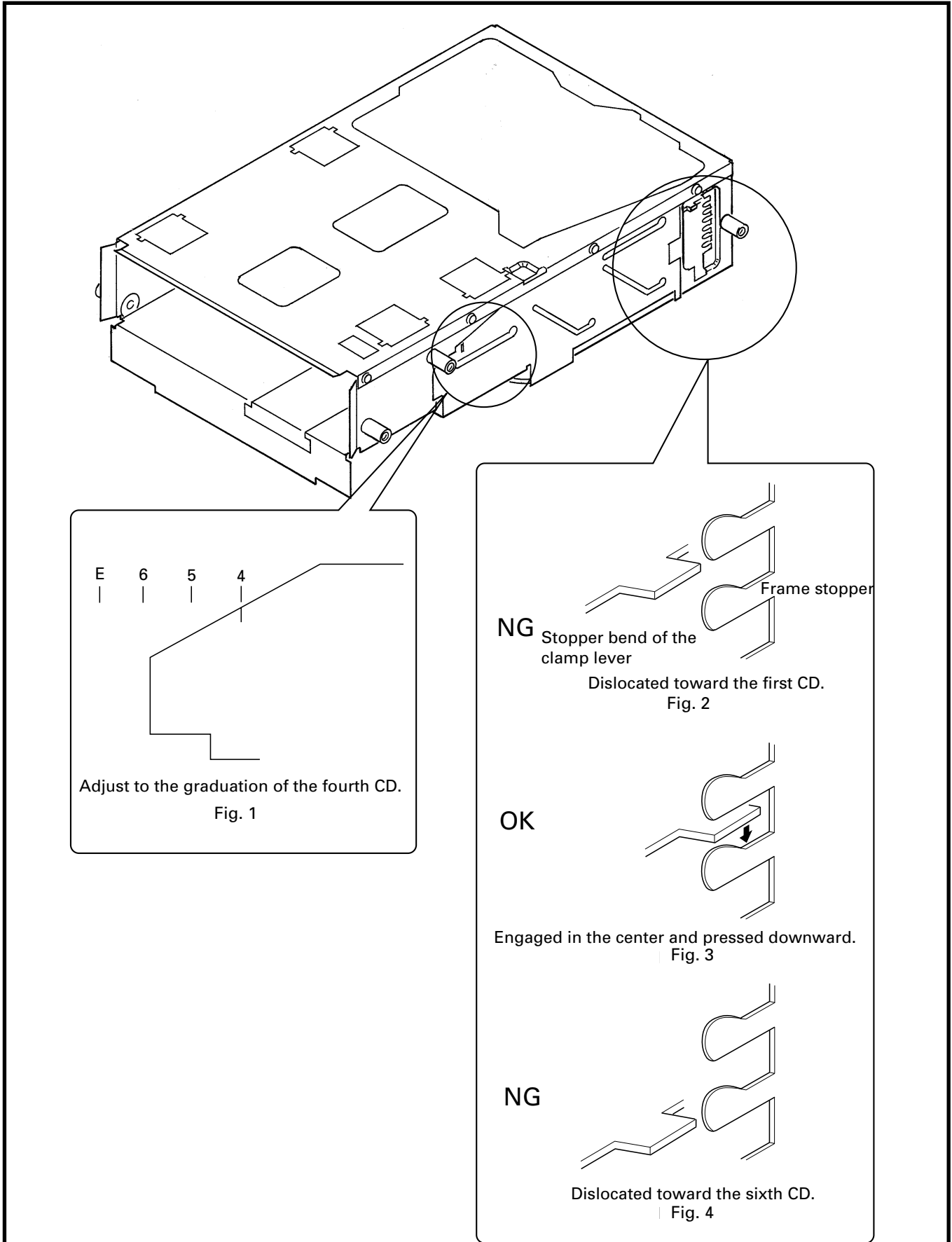
16. Once operation of the mechanism has stopped, turn the power OFF.

17. Wait more than one minute after the power is turned off, then turn the power ON and insert a magazine.

18. Check if the mechanism operates correctly with the first and fourth CDs.

19. If the mechanism operates properly, adjustment is completed. If the mechanism operates improperly, make the adjustment again.

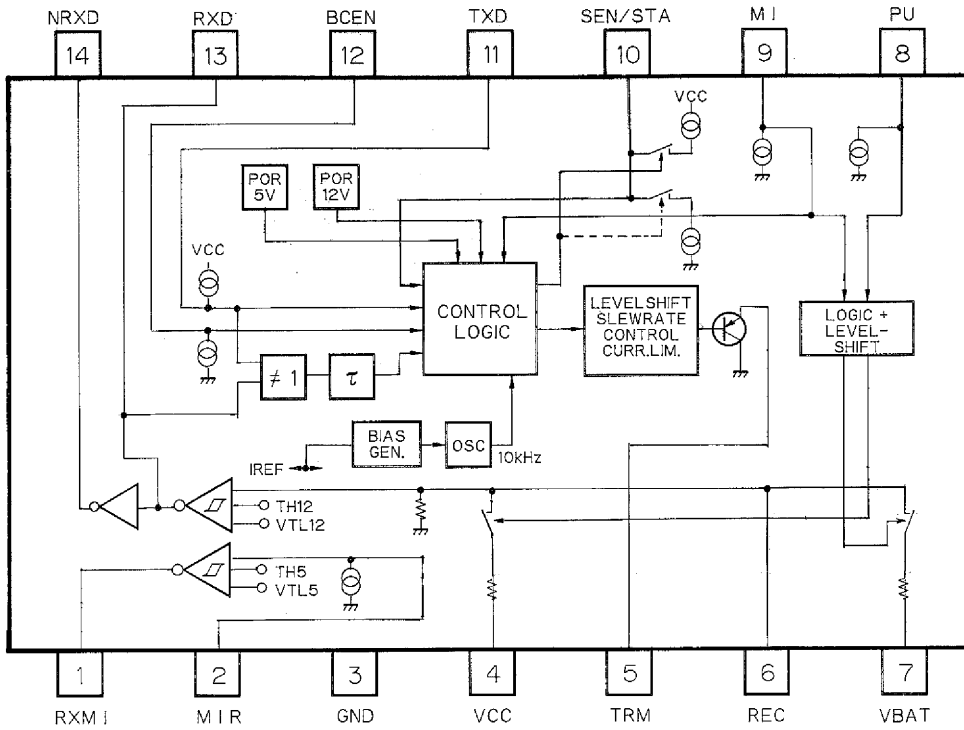




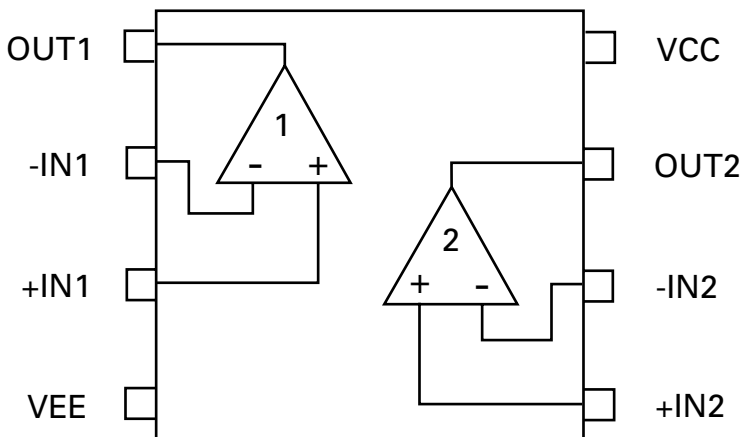
7. GENERAL INFORMATION

7.1 IC

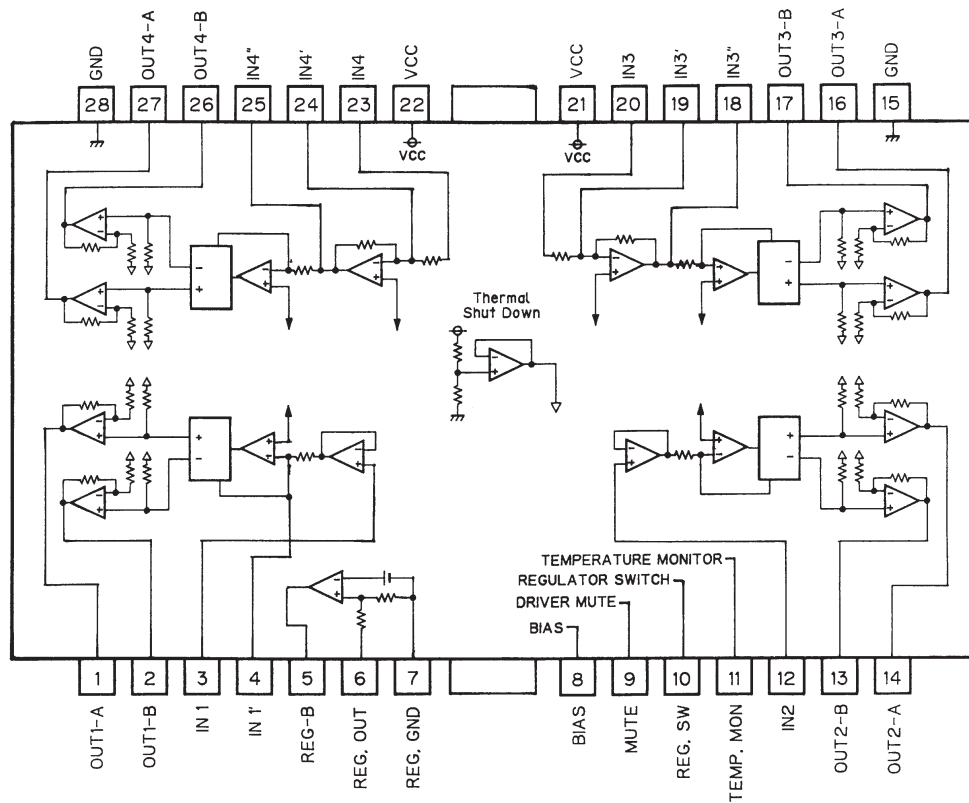
100.20B



BA4560F



BA6997FM

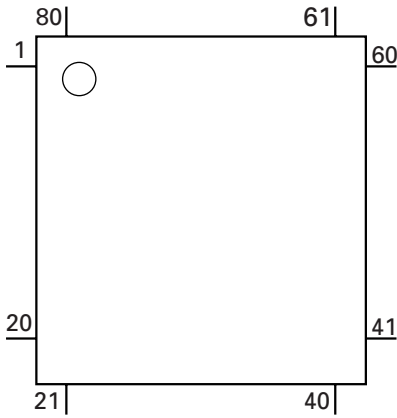


● Pin Functions (PD5426A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	VDIN			Power supply short sensor input
2-5	NC			Not used
6	XA0	O		Control signal distinguishing data from microcomputer
7	XSCK	O	NM	LSI clock output
8	XSO	O	NM	LSI data output
9	XSI	I		LSI data input
10	XSTB	O	C	CD LSI strobe output
11	XRST	O	C	CD LSI reset output
12-14	NC			Not used
15	BSENS	I		Back up power sense input
16	KWAKEUP	I		BUS data input sense
17-19	NC			Not used
20	TXD	O	C	K-BUS data output
21	RXD	I		K-BUS data input
22	EJSW	I		Eject signal input
23	MAG	I		Magazine lock switch
24	CNVSS			GND
25	RESET	I		Reset input
26	POWER	O	C	CD +5V control
27	CONT	O	C	Servo driver power supply control
28	XIN	I		Crystal oscillating element connection pin
29	XOUT	O	C	Crystal oscillating element connection pin
30	VSS			GND
31-57	NC			Not used
58	MIRR	I		Mirror detector input
59	LOCK	I		Spindle lock input (CD)
60	FOK	I		FOK signal input
61-64	NC			Not used

Pin No.	Pin Name	I/O	Format	Function and Operation
65	I1X3	O	C	Motor driver control output
66	I2	O	C	Motor driver control output
67	I4	O	C	Motor driver control output
68	CDMUTE	O	C	CD mute output
69	ADENA	O	C	AVREF enable output
70	TESTIN	I		Test program mode input
71	VCC			5V
72	VREF	I		A/D converter reference voltage input
73	AVSS	I		A/D GND
74,75	NC			Not used
76	DISK			Disc detector input
77	ELVPVO	I		Voltage input from ELV position sense
78	ELVREF	I		Voltage input from ELV
79	MSW	I		Disc sense timing input and tray position input
80	TEMP			Temperature detector

*PD5426A



Format	Meaning
C	C MOS
NM	Middle N channel open drain

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

7.2 DIAGNOSIS

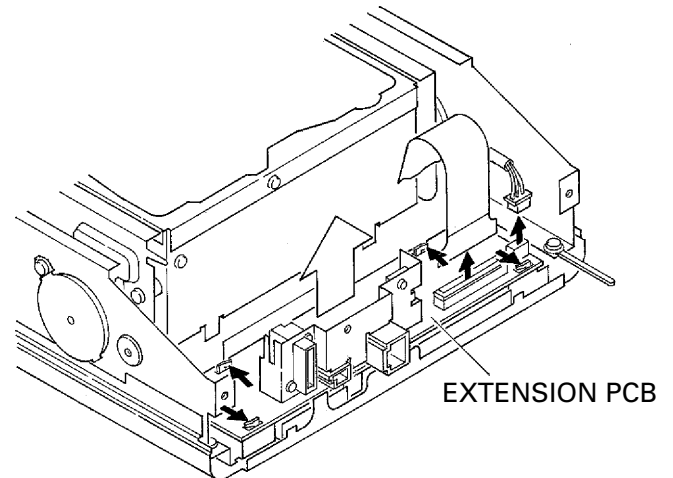
7.2.1 DISASSEMBLY

● Removing the Upper Case

1.Remove the eight screws and then remove the upper case.

● Removing the Extension PCB

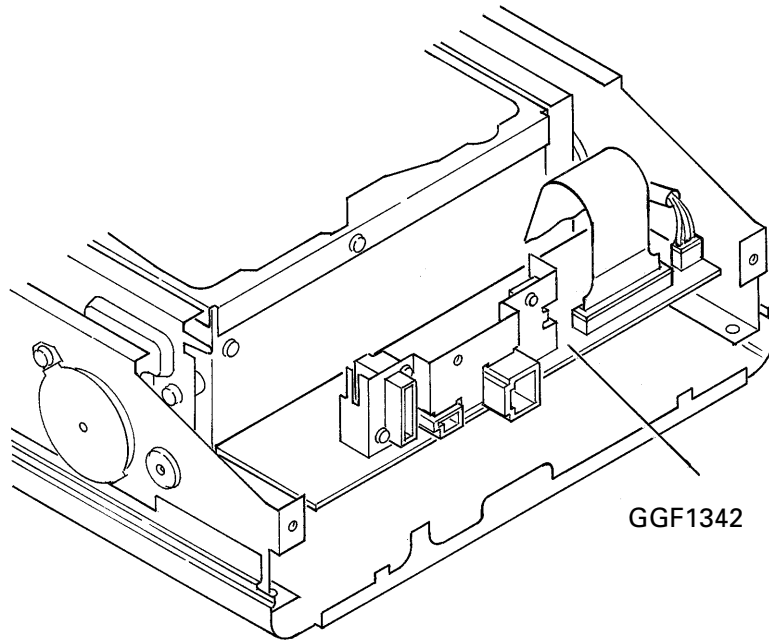
1.Remove the two screws.
2.Stretch the claw indicated by arrow and then remove the extension PCB.



Note : Before disassembling the CD mech module, turn the spring holder so that the spring is positioned horizontally. After reassembling, return the spring to the vertical position.

7.2.2 TEST MODE

Before entering the test modes, remove the EXTENSION PCB and connect the jig (GGF1342) as shown below.



● **New Test Mode(aging operation and setup analysis)**

The single CD player plays in normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disc number)

During the setup, the CD software operation status (internal RAM and C-point)is displayed.

(1) How to enter NEW TEST Mode

See the test mode flow chart Page 43.

(2) Relations of keys between TEST and NEW TEST Modes

Keys	Test Mode		New Test Mode	
	Regulator OFF	Regulator ON	PLAY in progress	Error Occurred, Protection Activated
BAND	Regulator ON	Regulator OFF	—	Time of occurrence/ cause of error select
FF	—	FWD-Kick	FF/TRACK+	—
REV	—	REV-Kick	REV/TRACK-	—
7	—	Tracking close	SCAN	—
8	—	Tracking open	MODE	—
9	—	Focus close	—	—
12	To New Test Mode	Jump Mode Select	AUTO/MANU	TRACK No./ time of occurrence select

Operations,such as EJECT, CD ON/OFF, etc. are performed normally

(3) Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause/Detail	Scratch, Stain, Vibration, Servo defect, etc...
40	ELECTRIC	PLAY	FOK=L 100ms	Put out of focus	
41	ELECTRIC	PLAY	LOCK=L 100ms	Spindle unlock	
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Failed to read subcode	
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated	

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving inwards	10-second time out, Home switch failed
03	Carriage moving outwards	10-second time out, Home switch failed
05	Carriage moving outwards	None
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closure (XSI=L)	Failure to close focus
10,14	Waiting for focus closure (FOK=H)	Failure to close focus
15, 16, 17	Focus closed, Tracking open	Focus disrupted
18	During focus AGC	Focus disrupted
19	During tracking AGC	Disrupted focus
20	Waiting for MIRR, LOCK or subcode read Carriage closed, SPINDLE=ADAPTIVE	Focus disrupted, MIRR NG, Failure to lock, failed to read subcode

(5) Example of Display.

- SET UP in progress
8 digits display LCD

TNo.	Min	Sec
11	11	11

- Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the normal mode.

- Protection/Error upon occurrence(8 digits display LCD)

(a) Error number indicated

ERROR-xx

Select the display with the BAND key.

(b) Track number and absolute time indicated

TNo.	Min	Sec
10	40	05

● Error Number Indication

If the CD should fail to operate or if an error has taken place during operation the player will enter into the error mode, and the cause of the error will be numerically indicated.

This is aimed at assisting in analysis or repair.

(1) Basic Means of Display

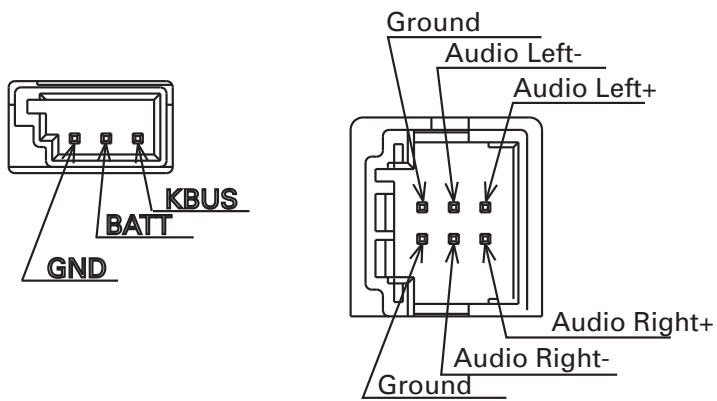
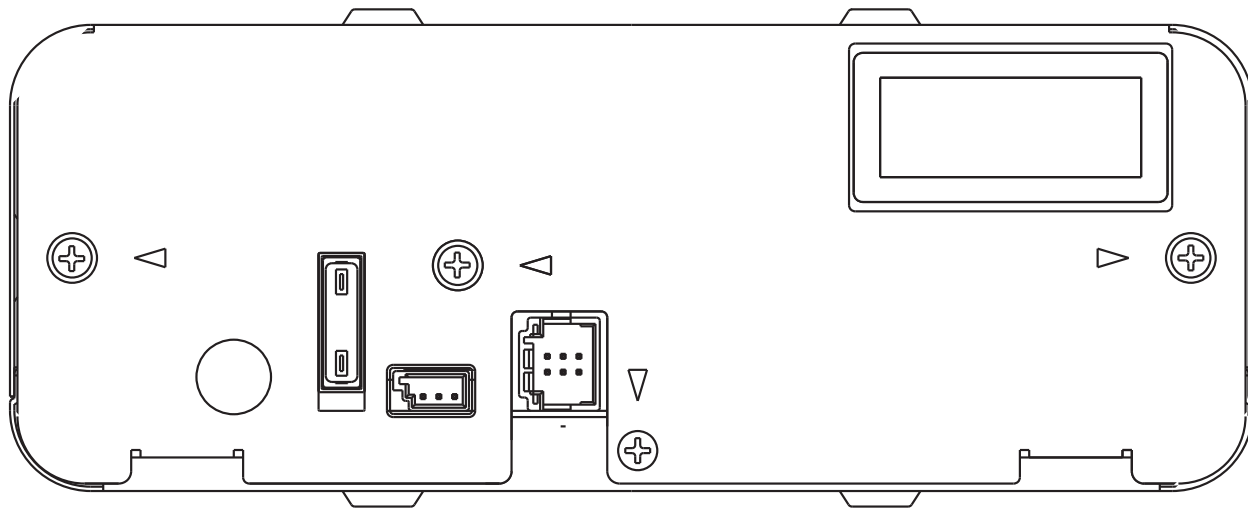
- Examples of Display ERROR-xx

(2) Error Codes

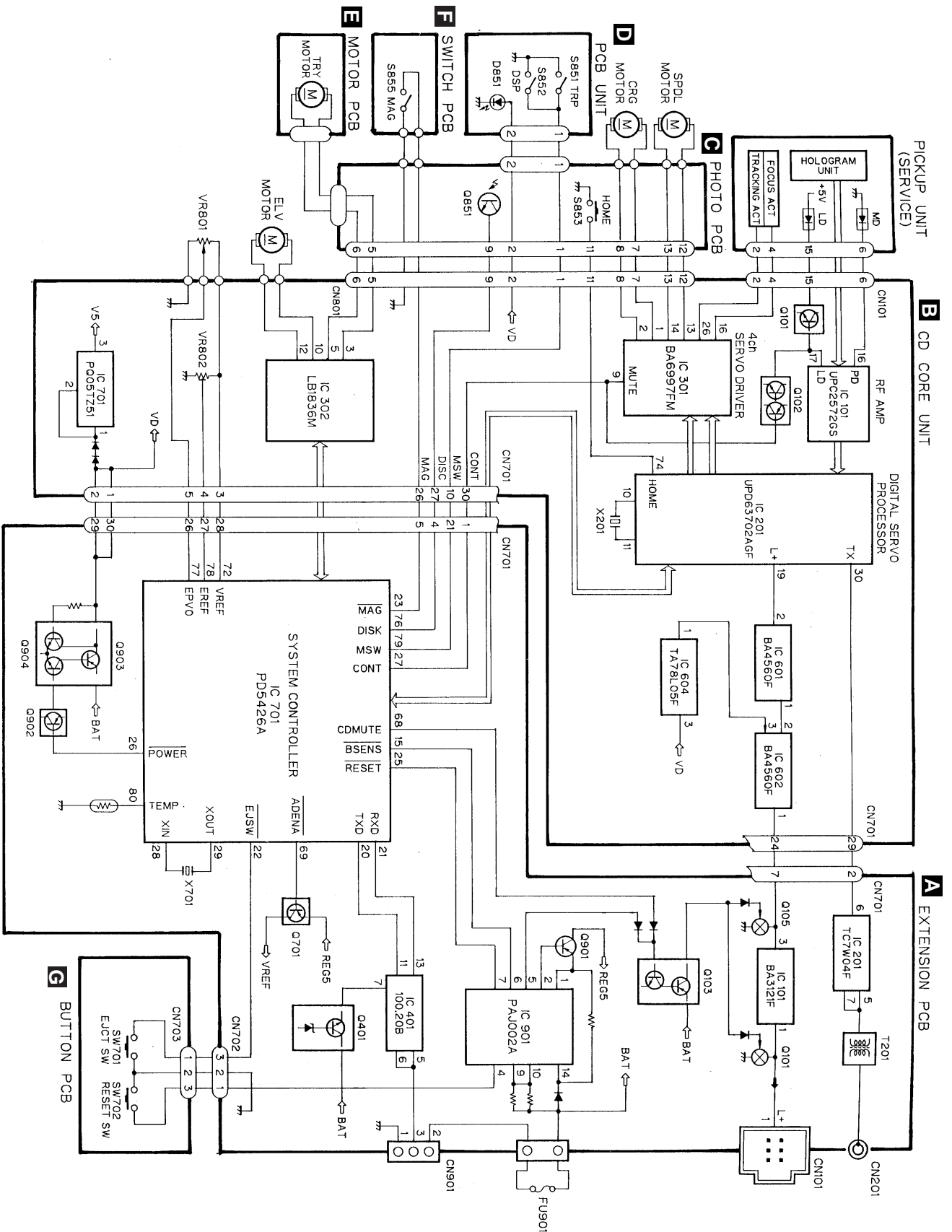
Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and/or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
19	ELECTRIC	Set up failure	Tracking error waveform is too unbalanced (>50%) or level is too small →The pickup unit or tracking error circuitry is N.G.
30	ELECTRIC	Search time out	Failed to reach target address →Carriage/tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and/or power abnormal
A1	SYSTEM	Mechanism power failure	Mechanism elevation reference voltage is out of prescription →EREF adjustment VR and/or power abnormal
50	MECHANISM	An error upon ejection	MAG switch release time has time out Elevation time out when eject
60	MECHANISM	An error while putting in and out the tray	Tray in / out time has time out Tray is caught when put in
70	MECHANISM	An error upon elevation	Elevation time has time out
80	MECHANISM	An error with an empty magazine inserted	No disc is available

* Setup means a series of operations after focusing up to sound output.

7.2.3 CONNECTOR FUNCTION DESCRIPTION

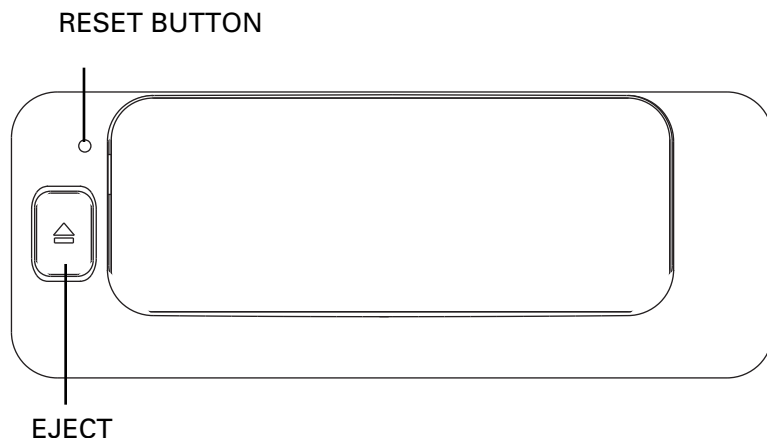


7.3 BLOCK DIAGRAM



8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATION



8.2 SPECIFICATIONS

General

System	.....Compact disc audio system
Usable discs	.....Compact Disc
Signal format	.....Sampling frequency:44.1 kHz Number of quantization bits: 16; linear
Power source	.....14.0 V DC 10.8–16.0 V
Max. current consumption	.....3.0 A
Weight	.....2.8 kg
Dimensions	.....200(W)x77.5(H)x299.6(D)

Audio

Frequency characteristics	.....20–20.000(±1dB)
Signal-to-noise ratio	.....85dB or more(1kHz)(20kLPF,A-Filter)
Distortion	.....0.08% or less(1kHz)(20kLPF)
Dynamic range	.....85dB or more
Output level	.....500mV±100mV(1kHz,0dB)
Number of channels	.....2(stereo)

Note:

Specifications and design are subject to possible modification without prior notice due to improvements.