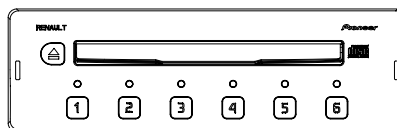


Service Manual

Pioneer

RENAULT



ORDER NO.
CRT2412

6 DISC IN-DASH CD CHANGER

CDX-MG2006ZRN

EW

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

Model No.	Order No.	Mech. Module	Remarks
CX-890	CRT2376	G1	CD Mechanism Module:Circuit Description, Mechanism Description, Disassembly

VEHICLE	DESTINATION	PRODUCED AFTER	RENAULT PART No.	ID No.	PIONEER MODEL No.
ESPACE, AVANTIME	EUROPE	April 2000	6025 40 2760	—	CDX-MG2006ZRN/EW

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

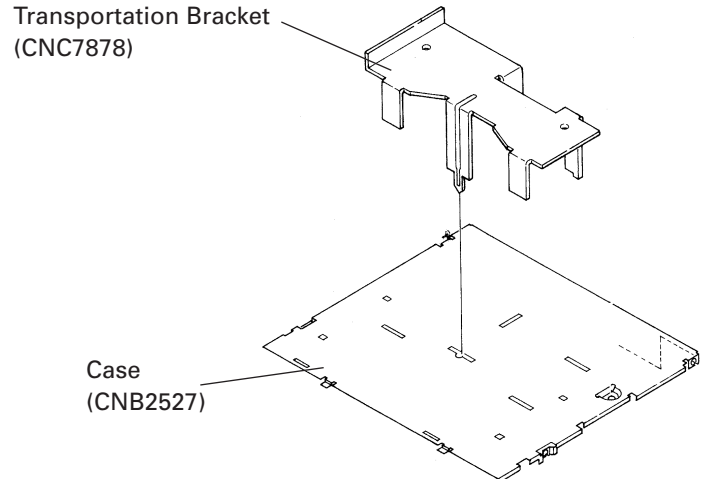
● CD Player Service Precautions

1. For pickup unit(CXX1311) handling, please refer to "Disassembly"(see page 54).
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 service pickup unit(see page 46).

● When the Repair is Complete

When the repair is complete, make the CD mechanism ready for transportation implementing the following procedures:

1. Press the changer side 1 and 4 simultaneously to turn the ACC on.
2. As the ACC is turned on, the disc indicator blinks in red.
3. When the blinking is stopped, the mechanism is ready for the transportation.
4. Attach the Transportation Bracket (CNC7878). Now you can transport it.(See the figure below)



1. SAFETY INFORMATION

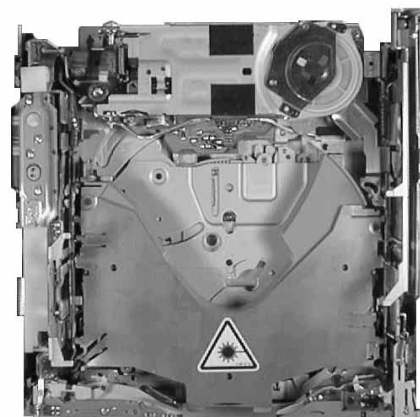
This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly 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.

- 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 bottom of the player.
3. The triangular label is attached to the mechanism unit holder.



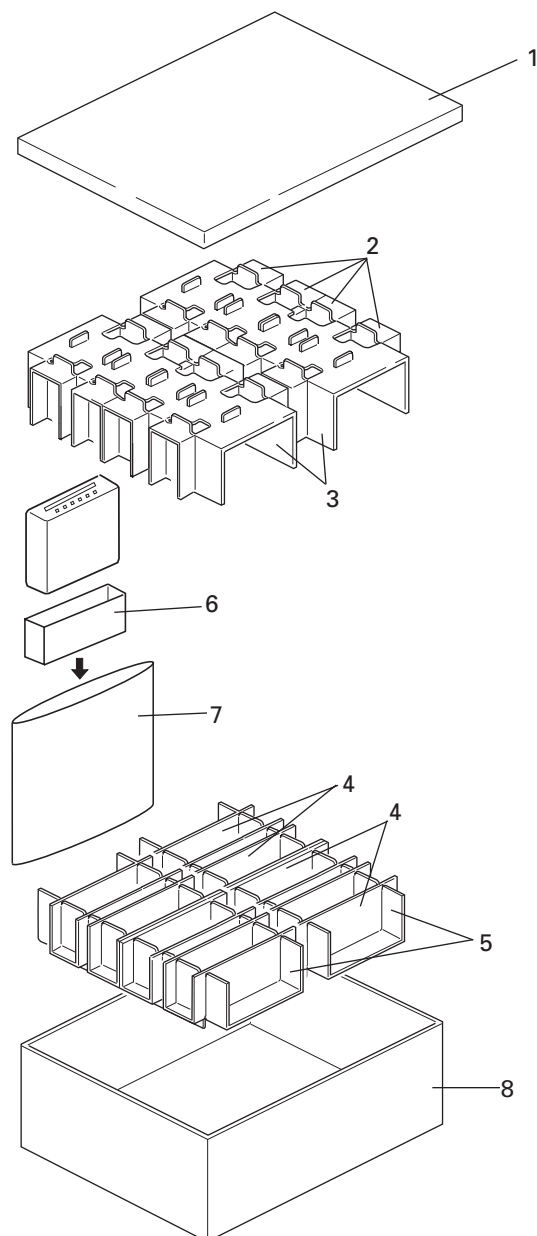
4. Specifications of Laser Diode

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

Wavelength = 800 nanometers

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



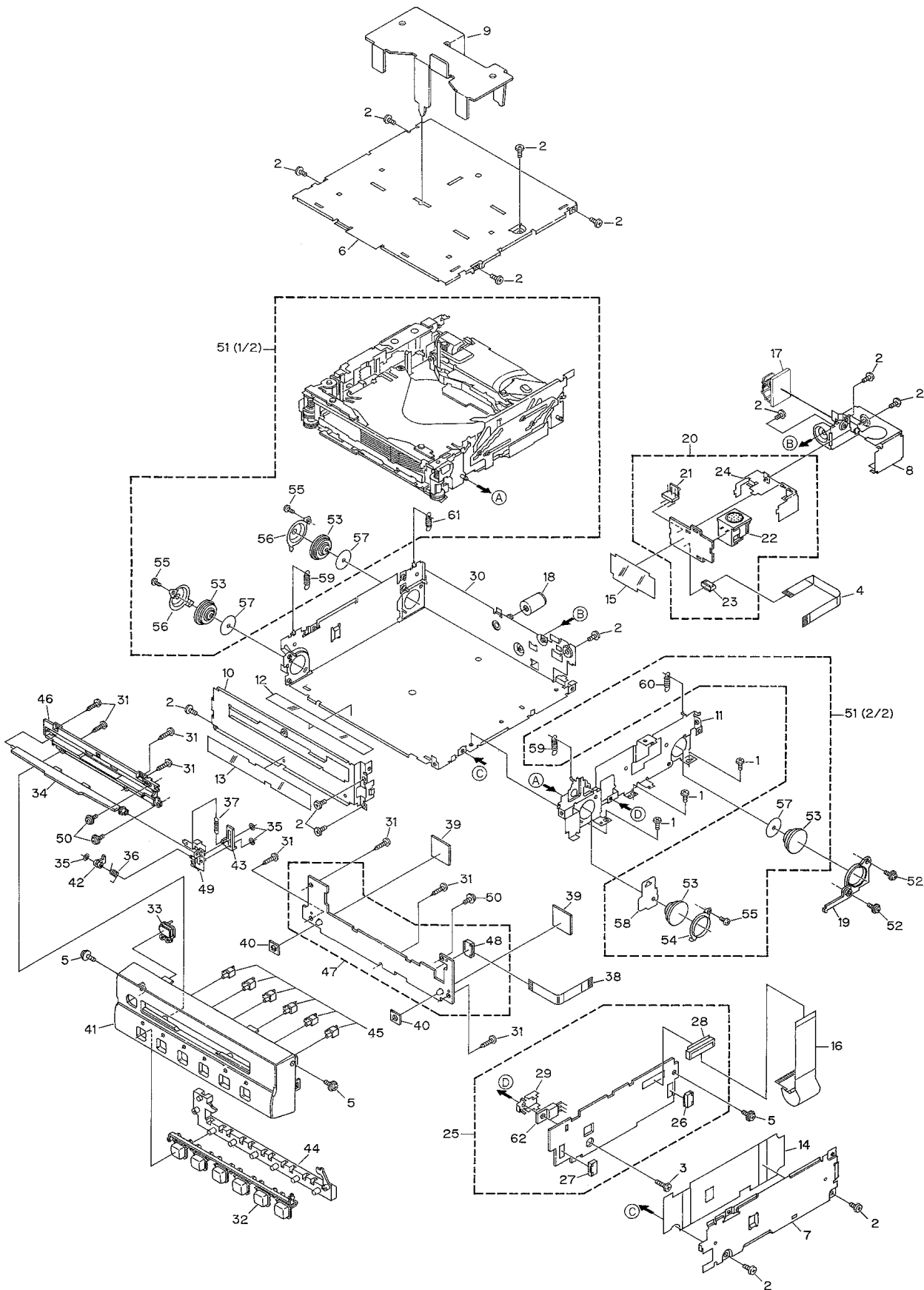
NOTE:

- 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.	Mark No.	Description	Part No.
	1 Lid	CHW1584		6 Protector	CHP2238
*	2 Protector	CHP2235		7 Polyethylene Bag	CEG1042
*	3 Protector	CHP2234	*	8 Contain Box	CHL3990
*	4 Protector	CHP2237			
*	5 Protector	CHP2236			

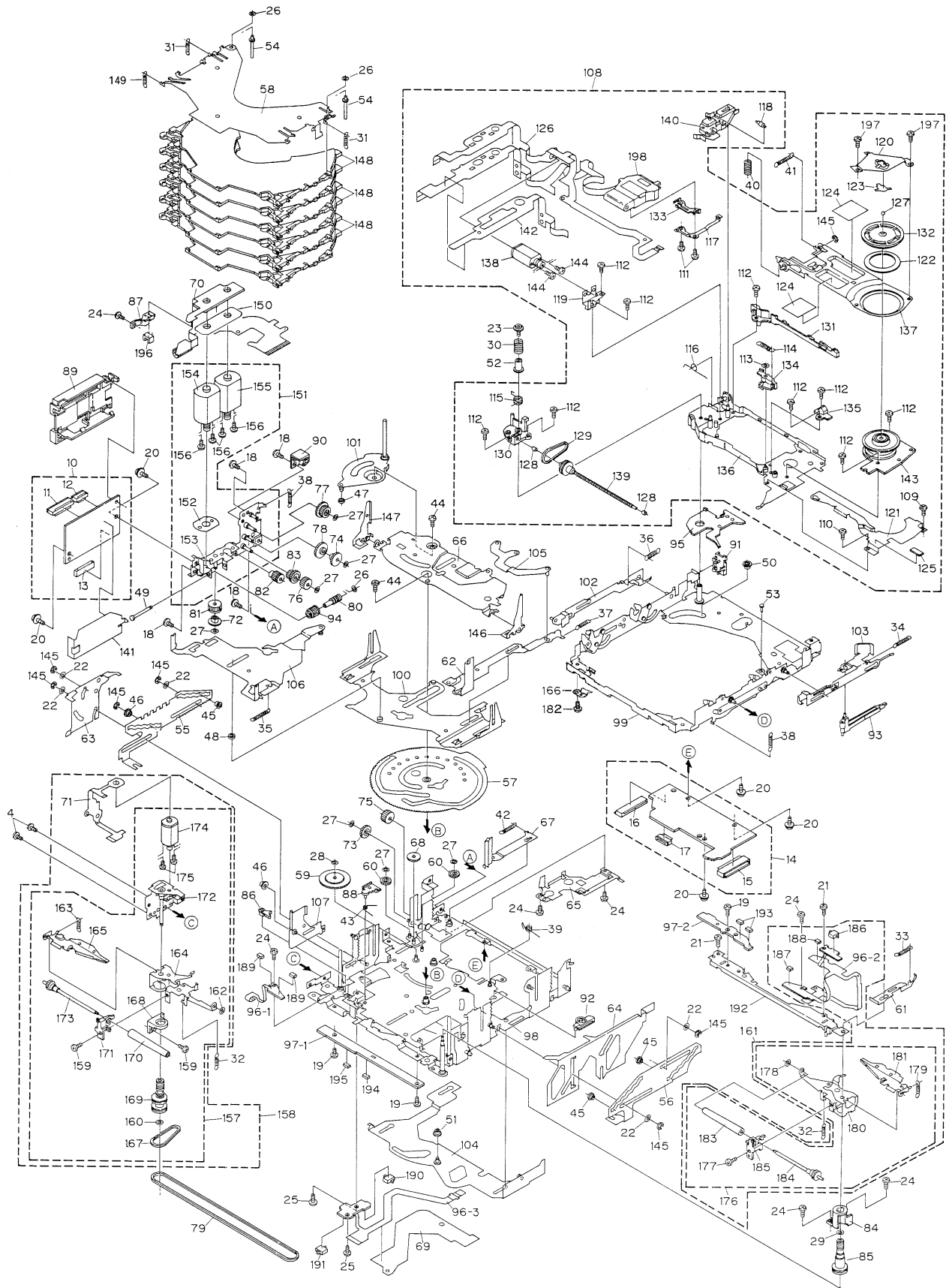
2.2 EXTERIOR



● EXTERIOR SECTION PARTS LIST

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BMZ20P020FMC	46	Holder	CNV6030
2	Screw	BMZ26P030FMC	47	Keyboard Unit	CWM6822
3	Screw	BMZ26P060FMC	48	Connector(CN901)	CKS3748
4	Connector	CDE6144	49	Bracket Unit	CXB3111
5	Screw	IMS26P040FMC	50	Screw	IMS20P040FMC
6	Case	CNB2527	51	CD Mechanism Module(G1)	CXK4700
7	Side Frame	CNB2528	52	Screw	IMS20P040FMC
8	Case	CNB2529	53	Damper	CNV5120
9	Bracket	CNC7878	54	Holder	CNC7826
10	Front frame	CNC8574	55	Screw(M2x2)	CBA1250
11	Bracket	CNC8816	56	Holder	CNC7477
12	Insulator	CNM5969	57	Sheet	CNM5981
13	Insulator	CNM6248	58	Sheet	CNM6318
14	Insulator	CNM6532	59	Spring(Front)	CBH2409
15	Insulator	CNM6533	60	Spring(Right Rear)(Black)	CBH2361
16	PCB	CNP5516	61	Spring(Left Rear)	CBH2365
17	Clamper	CNV5150	62	Transistor(Q708)	2SB1335A
18	Bush	CNV3253			
19	Holder	CNV5543			
20	Connector Unit	CWM6823			
21	Plug(CN705)	CKS2372			
22	Connector(CN704)	CKS3180			
23	Connector(CN703)	CKS4120			
24	Holder	CNC8575			
25	Extension Unit	CWM6824			
26	Connector(CN777)	CKS3747			
27	Connector(CN701)	CKS3747			
28	Connector(CN101)	CKS3989			
29	Holder	CNC8031			
30	Chassis Unit	CXB4792			
31	Screw	BPZ20P080FMC			
32	Button(1-6)	CAC6344			
33	Button(EJECT)	CAC6345			
34	Door	CAT2185			
35	Washer	CBF1038			
36	Spring	CBH2200			
37	Spring	CBH2201			
38	Connector	CDE6143			
39	Insulator	CNM5331			
40	Insulator	CNM6818			
41	Grille	CNS6101			
42	Gear	CNV5547			
43	Arm	CNV5548			
44	Lighting Conductor	CNV6028			
45	Lighting Conductor	CNV6029			

2.3 CD MECHANISM



● CD MECHANISM SECTION PARTS LIST

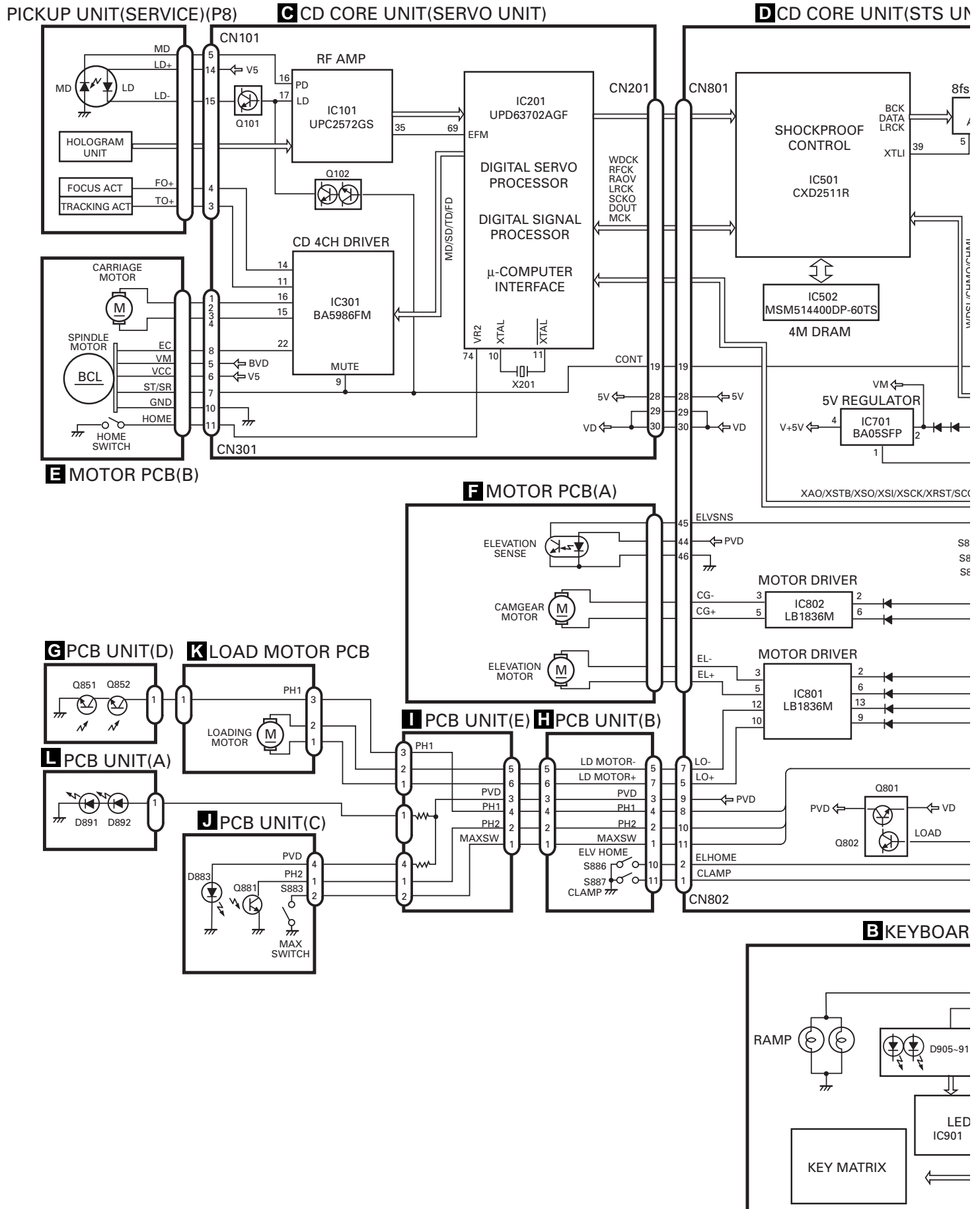
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1-9	●●●●●		54	Shaft	CLA3693
10	CD Core Unit(Servo Unit)	CWX2202	55	Steer	CNC7215
11	Connector(CN101)	CKS2764	56	Steer	CNC7216
12	Connector(CN301)	CKS3966	57	Cam	CNC8774
13	Connector(CN201)	CKS3991	* 58	Holder	CNC7235
14	CD Core Unit(STS Unit)	CWX2203	59	Gear	CNC7236
15	Connector(CN701)	CKS3989	60	Gear	CNC8883
16	Connector(CN801)	CKS3989	61	Lever	CNC7243
17	Connector(CN802)	CKS4054	62	Lever	CNC7244
18	Screw	CBA1037	63	Lever	CNC7245
19	Screw	CBA1041	64	Lever	CNC7246
20	Screw	CBA1076	65	Cover	CNC7441
21	Screw	CBA1250	66	Holder Unit	CXB4946
22	Washer	CBA1512	67	Lever	CNC8024
23	Screw	CBA1452	68	Gear	CNC8140
24	Screw	CBA1453	69	Sheet	CNM5831
25	Screw	CBA1479	70	PCB	CNP5680
26	Washer	CBF1037	71	PCB	CNP5681
27	Washer	CBF1038	72	Gear	CNR1479
28	Washer	CBF1039	73	Gear	CNR1481
29	Washer	CBF1064	74	Gear	CNR1495
30	Spring	CBH2007	75	Gear	CNR1501
31	Spring	CBH2271	76	Gear	CNR1502
32	Spring	CBH2274	77	Gear	CNR1540
33	Spring	CBH2014	78	Gear	CNR1541
34	Spring	CBH2015	79	Belt	CNT1080
35	Spring	CBH2016	80	Worm Gear	CNV5046
36	Spring	CBH2017	81	Gear	CNV5047
37	Spring	CBH2290	82	Gear	CNV5048
38	Spring	CBH2366	83	Gear	CNV5049
39	Spring	CBH2064	84	Holder	CNV5056
40	Spring	CBH2195	85	Pulley	CNV5058
41	Spring	CBH2196	86	Arm	CNV5061
42	Spring	CBH2224	87	Spacer	CNV5066
43	Spring	CBH2250	88	Arm	CNV5189
44	Screw	CBA1082	89	Cover	CNV5207
45	Roller	CLA3154	90	Cover	CNV5424
46	Roller	CLA3157	91	Cover	CNV5425
47	Roller	CLA3159	92	Lever	CNV5427
48	Roller	CLA3160	93	Arm	CNV5491
49	Shaft	CLA3179	94	Gear	CNV5519
50	Spacer	CLA3194	95	Holder	CNV5648
51	Roller	CLA3248	96	Composite PCB	CNX3141
52	Bush	CLA3353	97	Composite PCB	CNX2989
* 53	Shaft	CLA3469	98	Chassis Unit	CXB4314

Mark No.	Description	Part No.	Mark No.	Description	Part No.
99	Frame Unit	CXB5806	144	Screw	JFZ14P020FZK
100	Lever Unit	CXB6026	145	Washer	YE15FUC
101	Arm Unit	CXB2704	146	Arm Unit	CXB5018
102	Lever Unit	CXB2708	147	Arm Unit	CXB5019
103	Lever Unit	CXB2709	148	Tray Assy	CXB4307
104	Lever Unit	CXB2711	149	Spring	CBH2269
105	Arm Unit	CXB2712	150	Sheet	CNM6699
106	Lever Unit	CXB6027	151	Cam Motor Assy	CXB3170
107	Lever Unit	CXB2714	152	Spacer	CNC8289
108	Carriage Mechanism Unit(G1)	CXB2998	* 153	Bracket Unit	CXB4165
109	Screw	CBA1041	* 154	Motor Unit(M1 Cam Gear)	CXB3174
110	Screw	CBA1250	* 155	Motor Unit(M3 ELV)	CXB3175
111	Screw	CBA1362	156	Screw	JFZ20P025FMC
112	Screw	CBA1471	157	Loading Arm L Assy	CXB3171
113	Washer	CBF1038	158	Load Arm L Assy(Service)	CXX1415
114	Spring	CBH2008	159	Screw	CBA1453
115	Spring	CBH2009	160	Washer	CBF1038
116	Spring	CBH2010	161	Load Arm R Assy(Service)	CXX1416
117	Spring	CBL1335	162	Washer	CBF1074
118	Roller	CLA3707	163	Spring	CBH2136
* 119	Bracket	CNC7228	* 164	Arm	CNC7241
120	Guide Unit	CXB4417	* 165	Arm	CXB4449
121	Cover	CNC7628	166	Holder	CBL1465
122	Sheet	CNM6414	167	Belt	CNT1079
123	Sheet	CNM5378	168	Holder	CNV5055
124	Sheet	CNM5695	169	Pulley	CNV5057
125	Sheet	CNM5827	170	Roller	CNV6209
126	PCB	CNP4978	171	Guide	CNV5125
127	Ball	CNR1189	* 172	Bracket Unit	CXB4316
128	Bearing	CNR1423	173	Roller Gear Unit	CXB3176
129	Belt	CNT1079	* 174	Motor Unit(M2 LOAD)	CXB3177
130	Holder	CNV5037	175	Screw	JFZ14P020FMC
131	Guide	CNV5040	176	Loading Arm R Assy	CXB3172
132	Clamper	CNV5042	177	Screw	CBA1453
133	Rack	CNV5111	178	Washer	CBF1074
134	Arm	CNV5579	179	Spring	CBH2136
135	Holder	CNV5759	* 180	Arm	CNC7242
* 136	Chassis	CXB6025	* 181	Arm	CXB4448
137	Arm Unit	CXB2705	182	Screw	JFZ20P014FMC
138	Motor Unit(M4 CARRIAGE)	CXB3178	183	Roller	CNV6209
139	Screw Unit	CXB3179	184	Roller Gear Unit	CXB3176
140	Lever Unit	CXB4450	185	Guide	CNV5126
141	Insulator	CNM6306	186	Switch(S885 MAX)	CSN1052
142	Spacer	CNM6345	187	LED(D883)	CL202IRXTU
143	Motor(M5 SPINDLE)	CXM1120	188	Photo-transistor(Q881)	CPT231SXTD

Mark	No.	Description	Part No.
	189	LED(D891,892)	CL202IRXTU
	190	Switch(S887 CLAMP)	CSN1051
	191	Switch(S886 ELV HOME)	CSN1052
	192	Bracket Unit	CXB4306
	193	Photo-transistor(Q851,852)	CPT231SXTD
	194	Resistor(R856)	RS1/8S911J
	195	Resistor(R857)	RS1/8S821J
	196	Photo-interrupter(Q1)	RPI-221
	197	Screw	CBA1387
	198	Pickup Unit(Service)(P8)	CXX1311

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

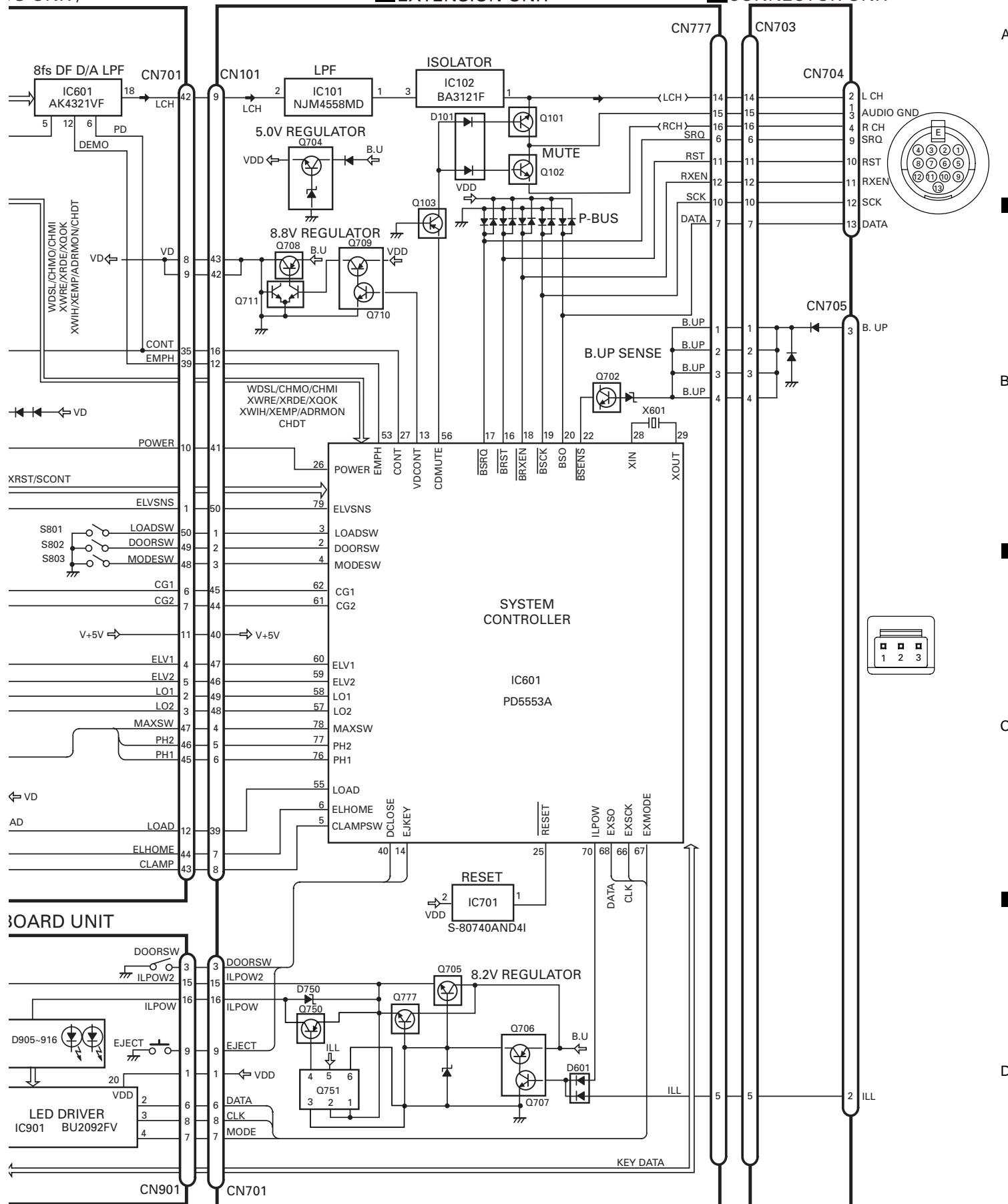
3.1 BLOCK DIAGRAM



[S UNIT)

A EXTENSION UNIT

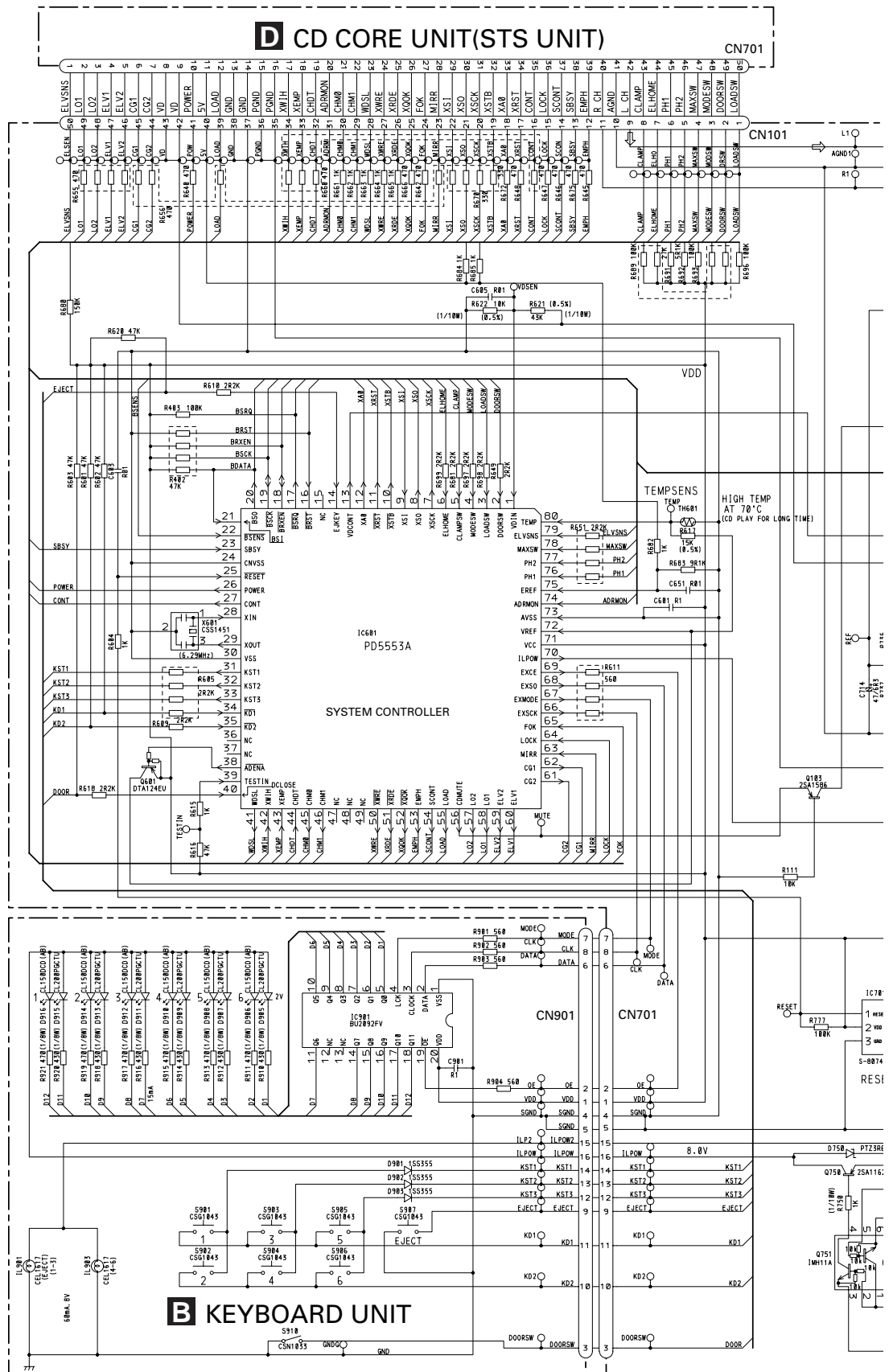
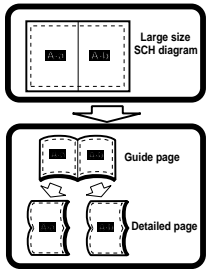
M CONNECTOR UNIT



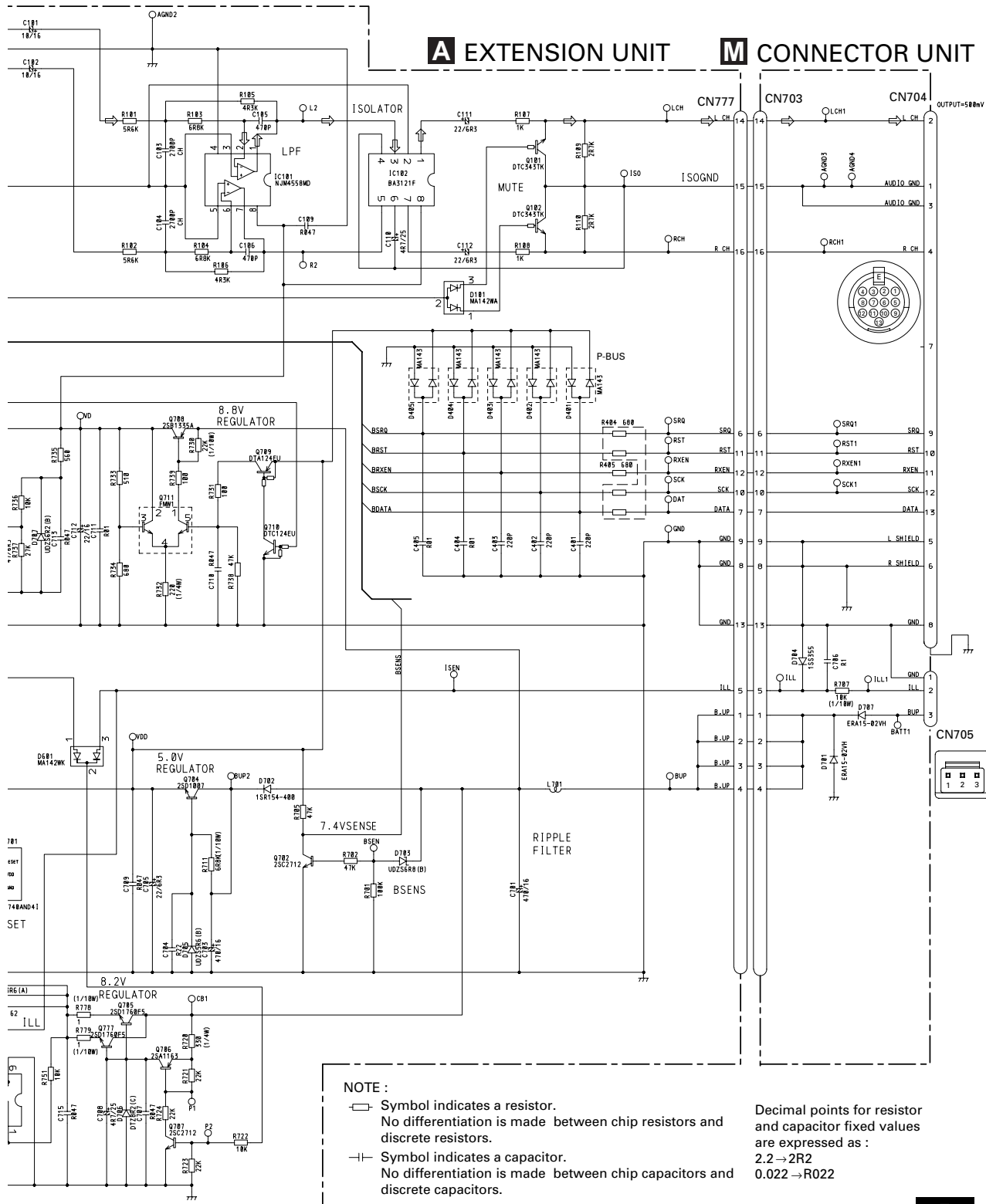
3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

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

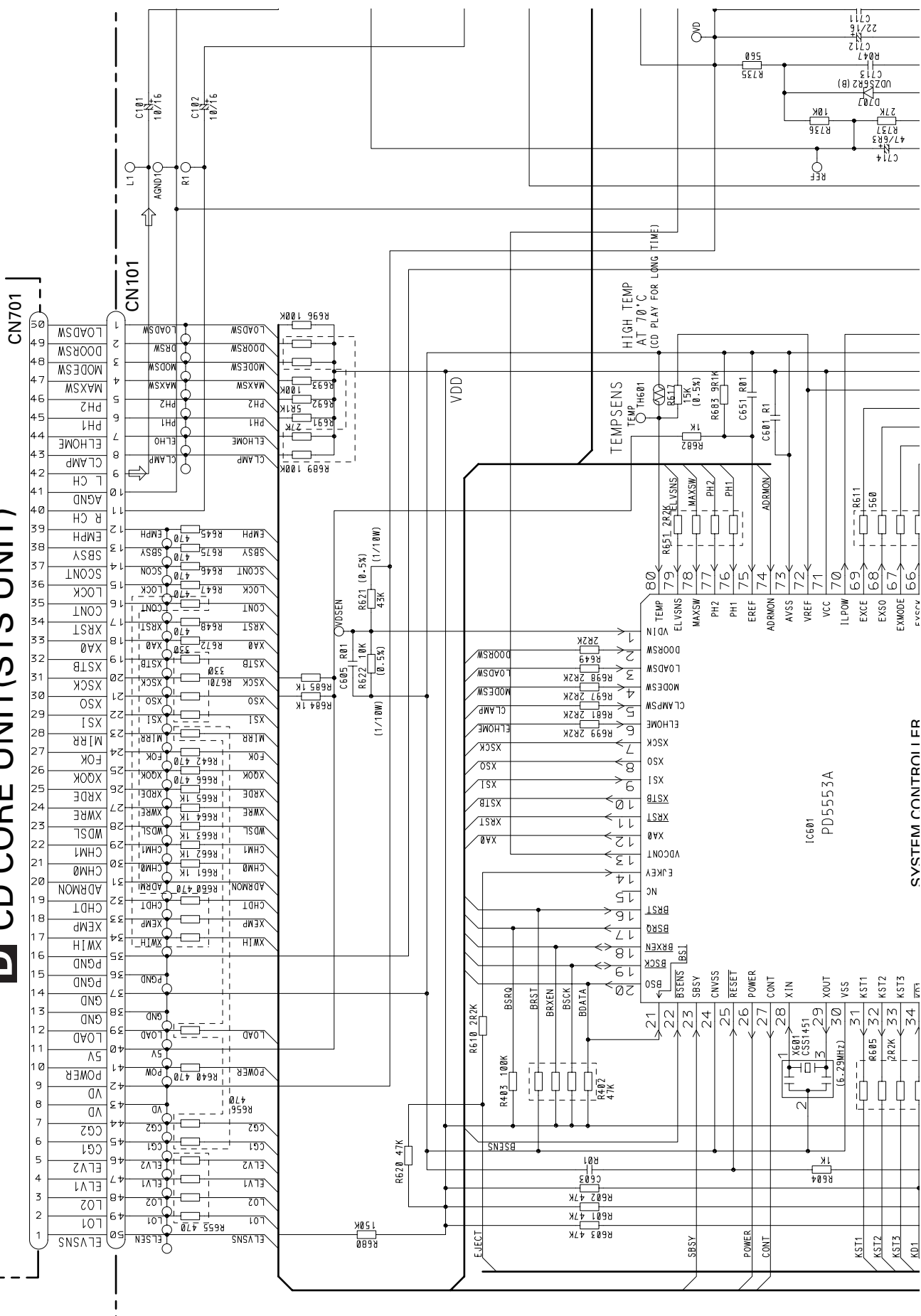
A-a

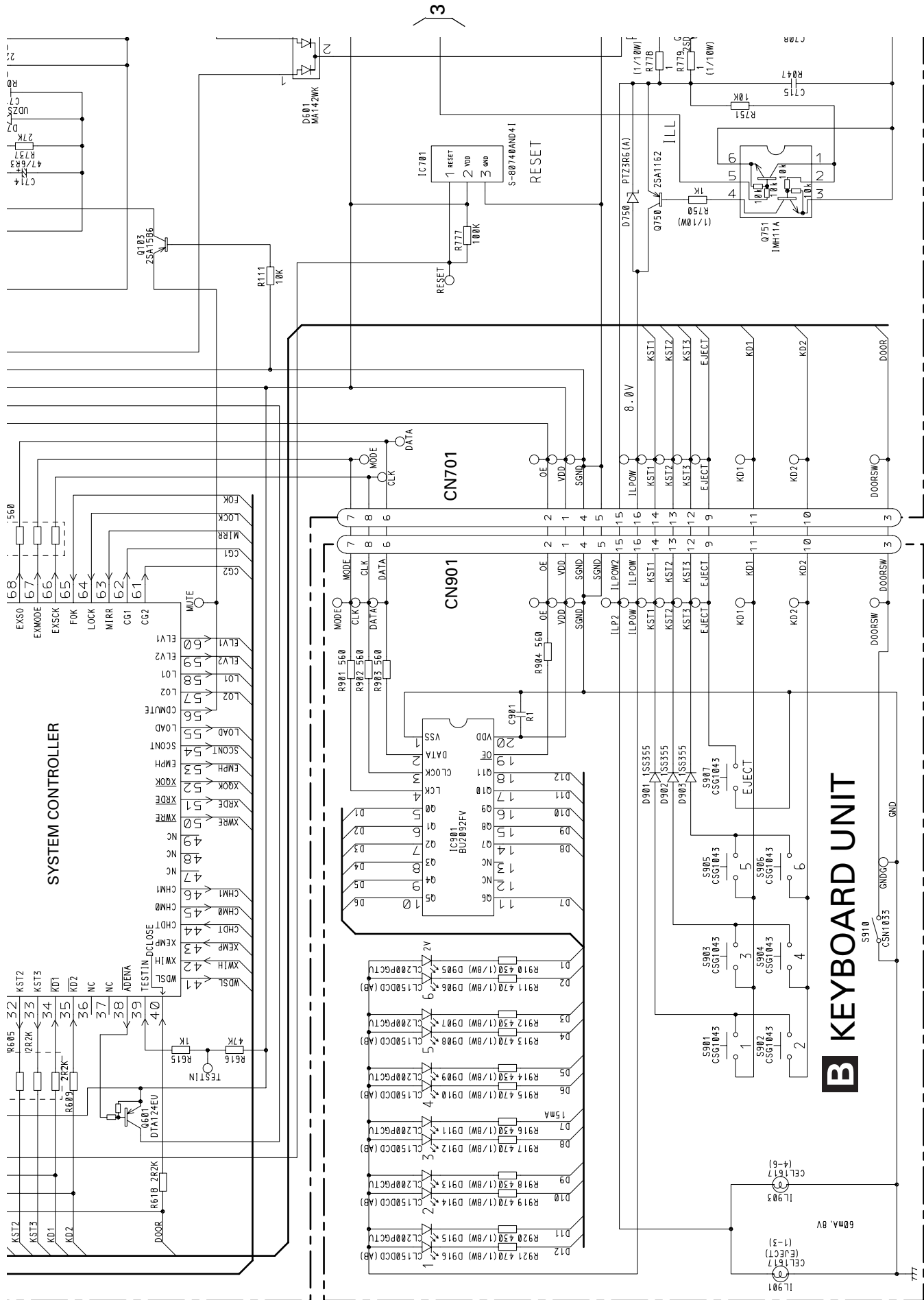


A-b



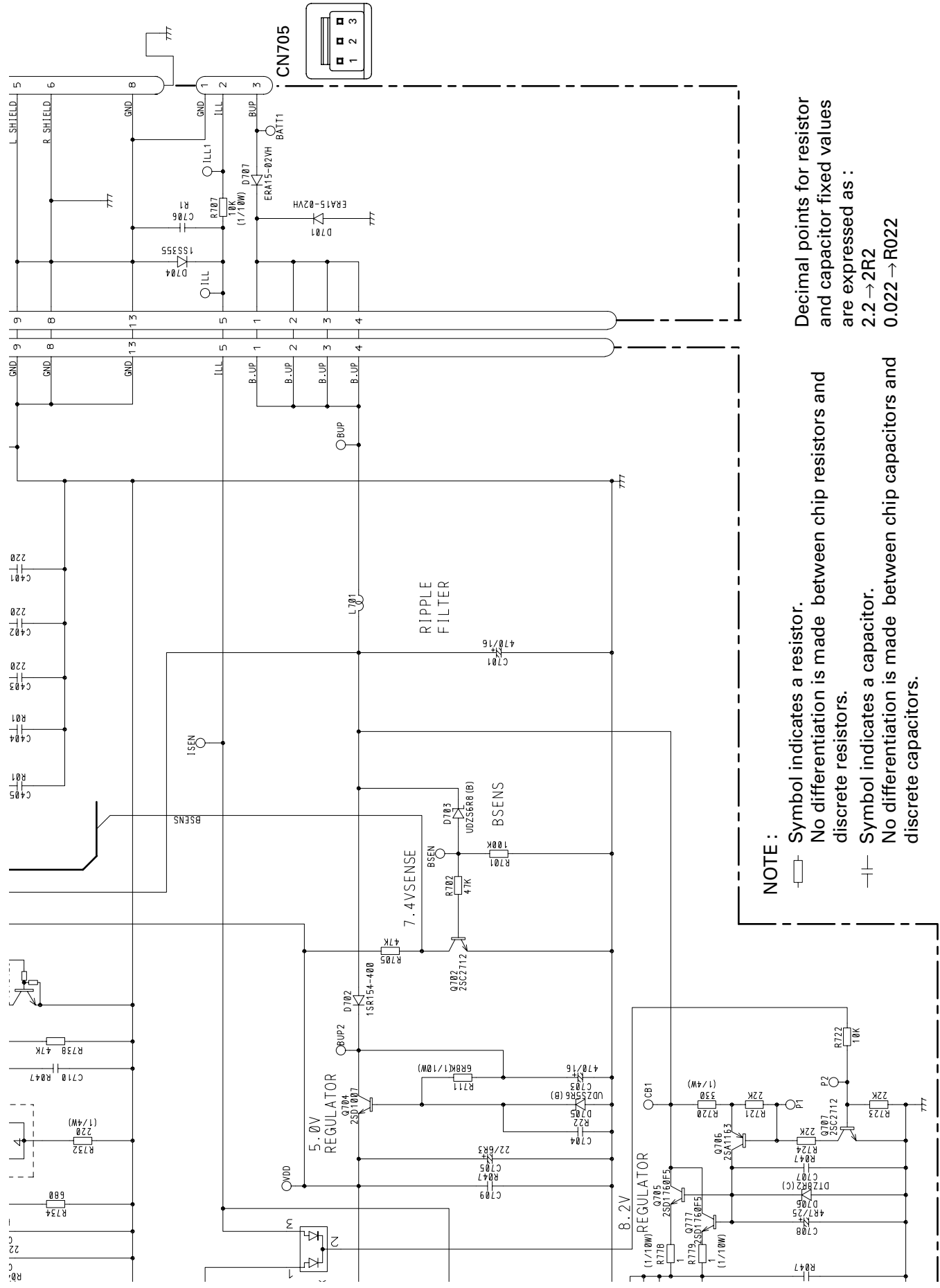
D CD CORE UNIT(STS UNIT)





A-a A-b

A-a B



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

A-a A-b

A

B

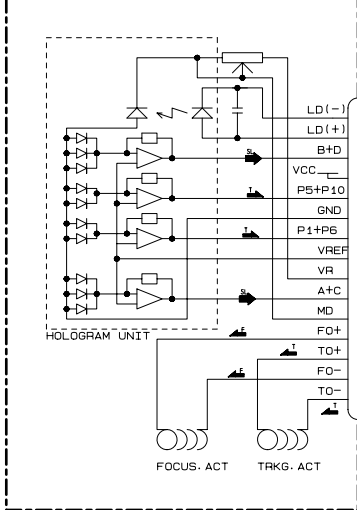
C

D

3.3 CD CORE UNIT(SERVO UNIT)

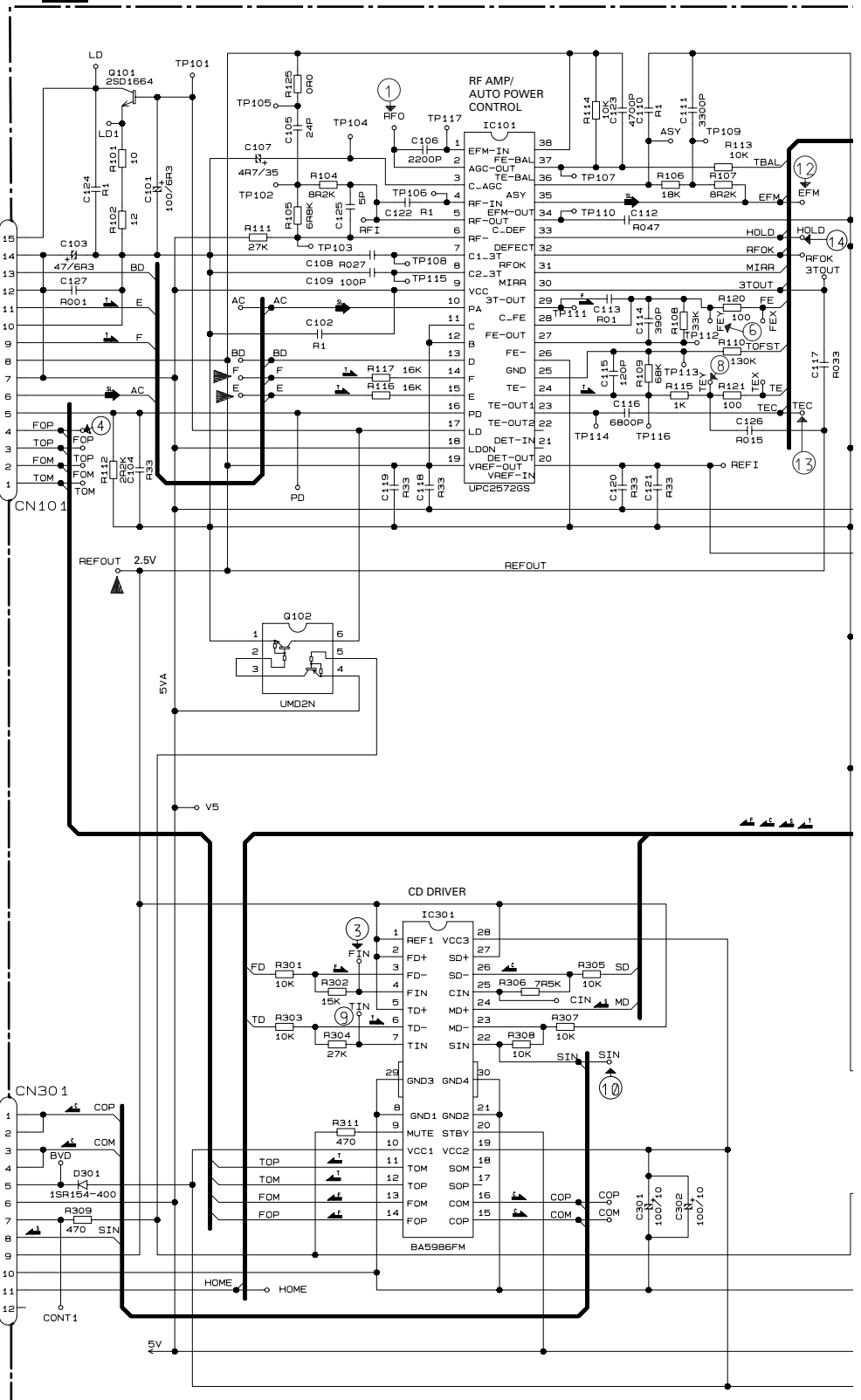
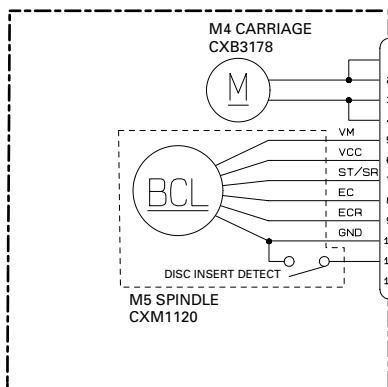
CD CORE UNIT(SERVO UNIT)

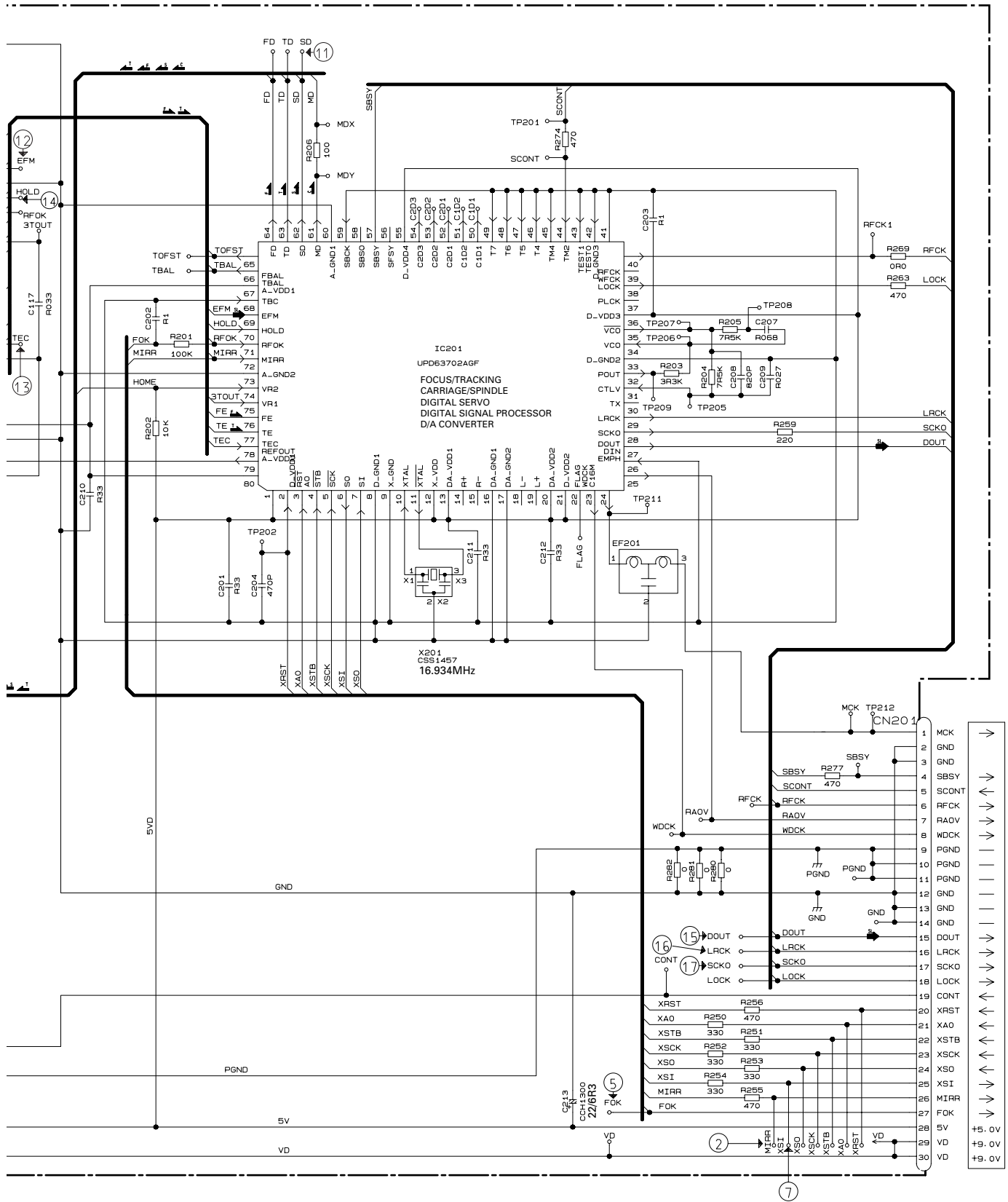
PICKUP UNIT
(SERVICE)(P8)



SL SIGNAL LINE
FL FOCUS SERVO LINE
TL TRACKING SERVO LINE
CL CARRIAGE SERVO LINE
SL SPINDLE SERVO LINE

MOTOR PCB(B)





A

B

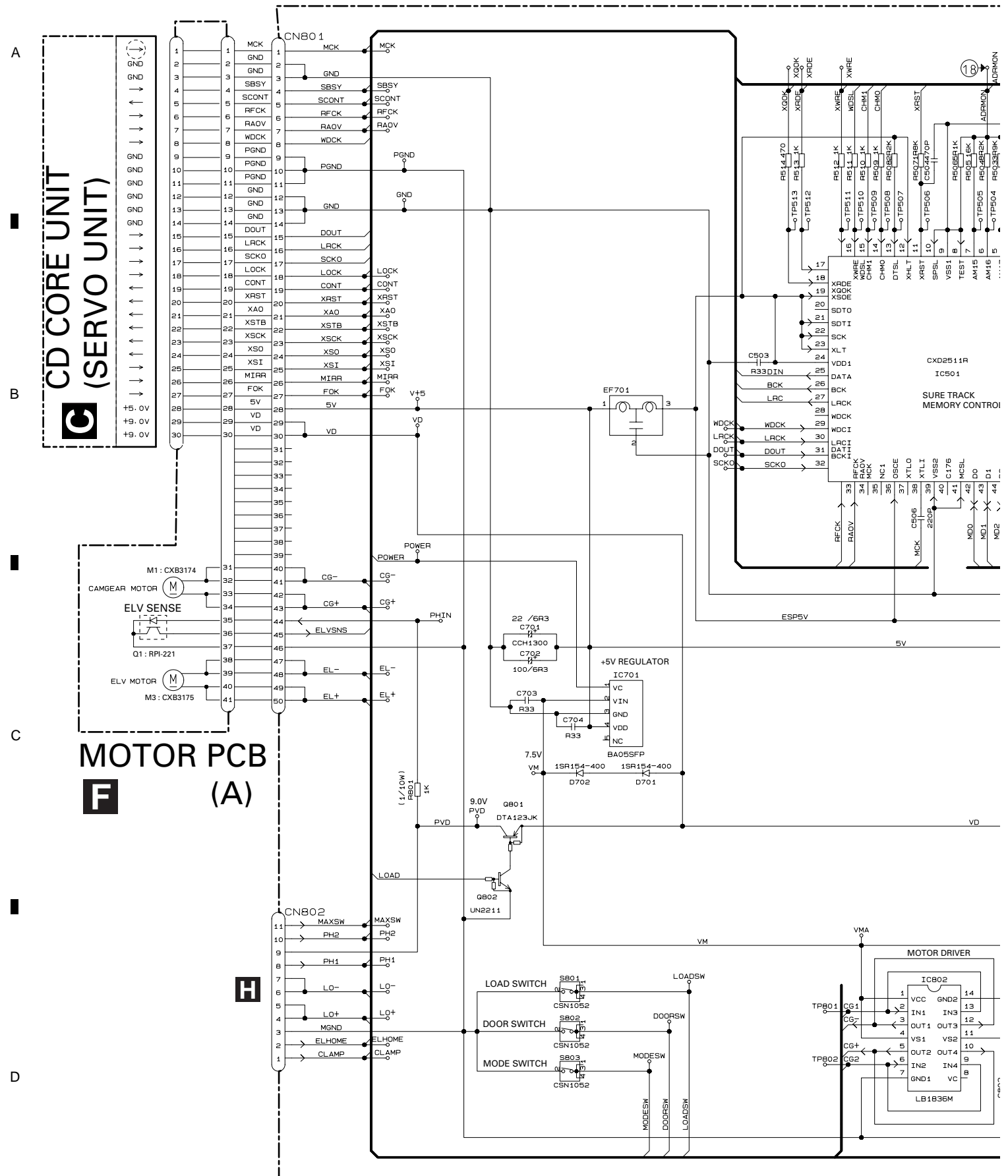
C

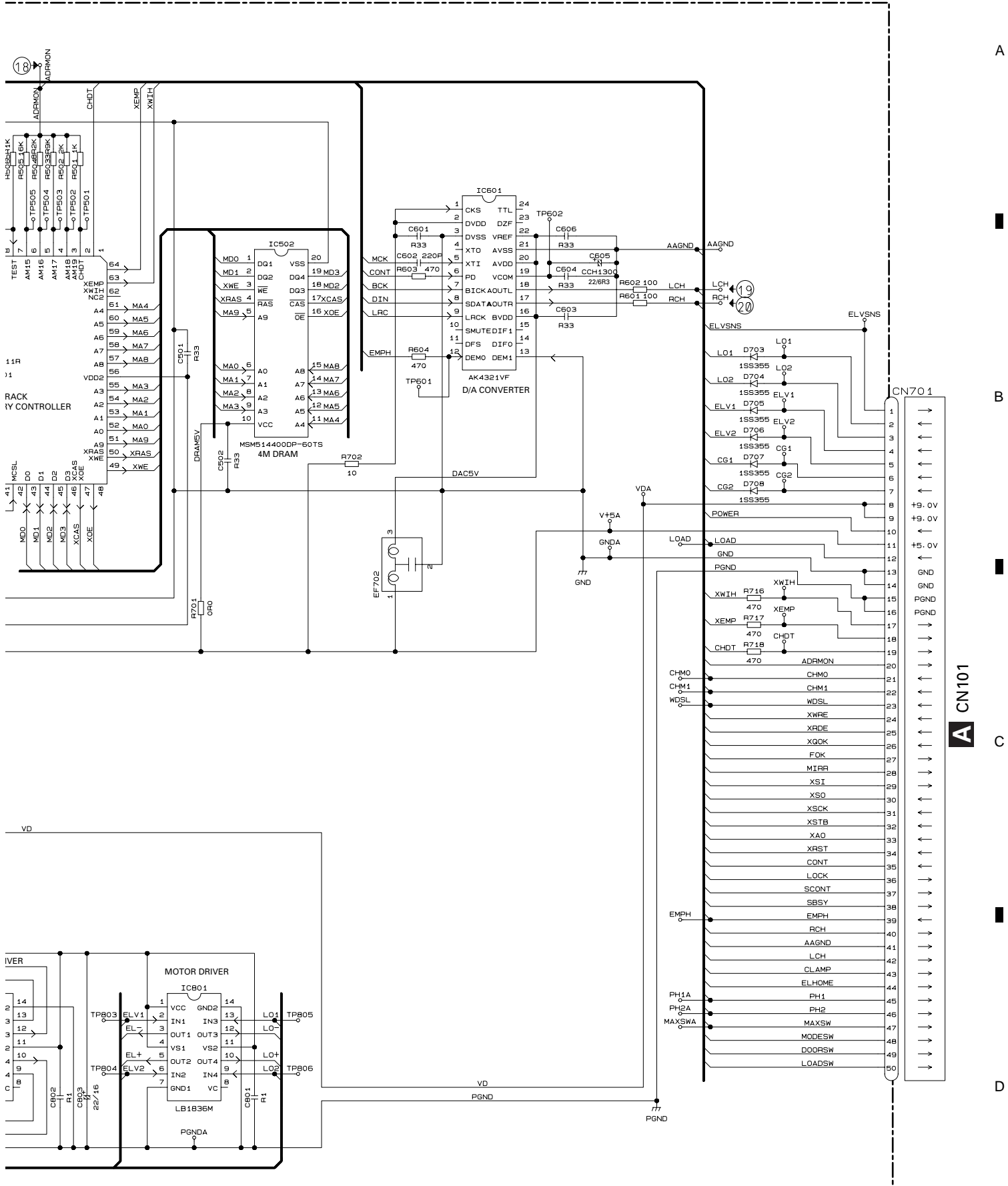
F

D

3.4 CD CORE UNIT(STS UNIT)

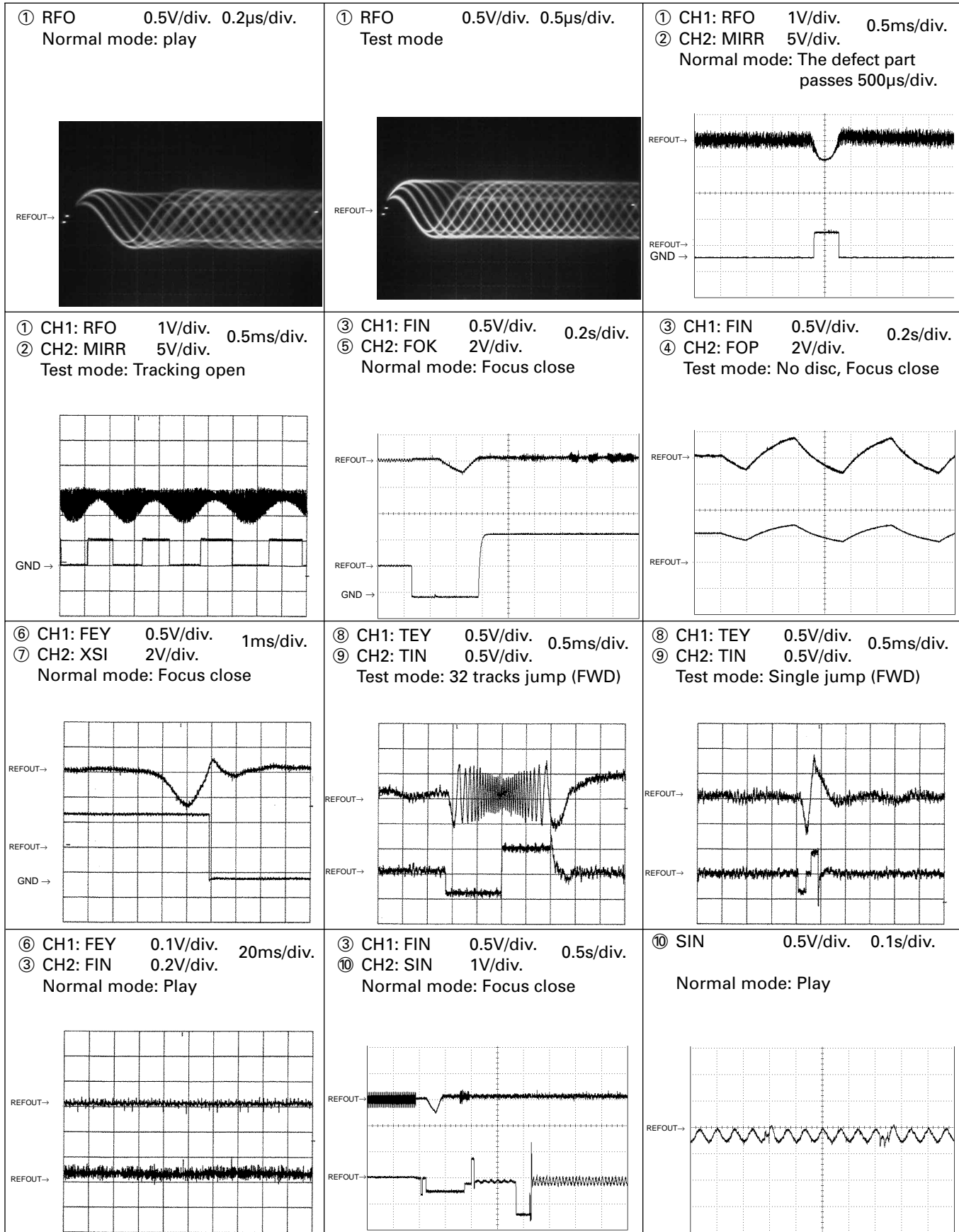
CD CORE UNIT(STS UNIT)

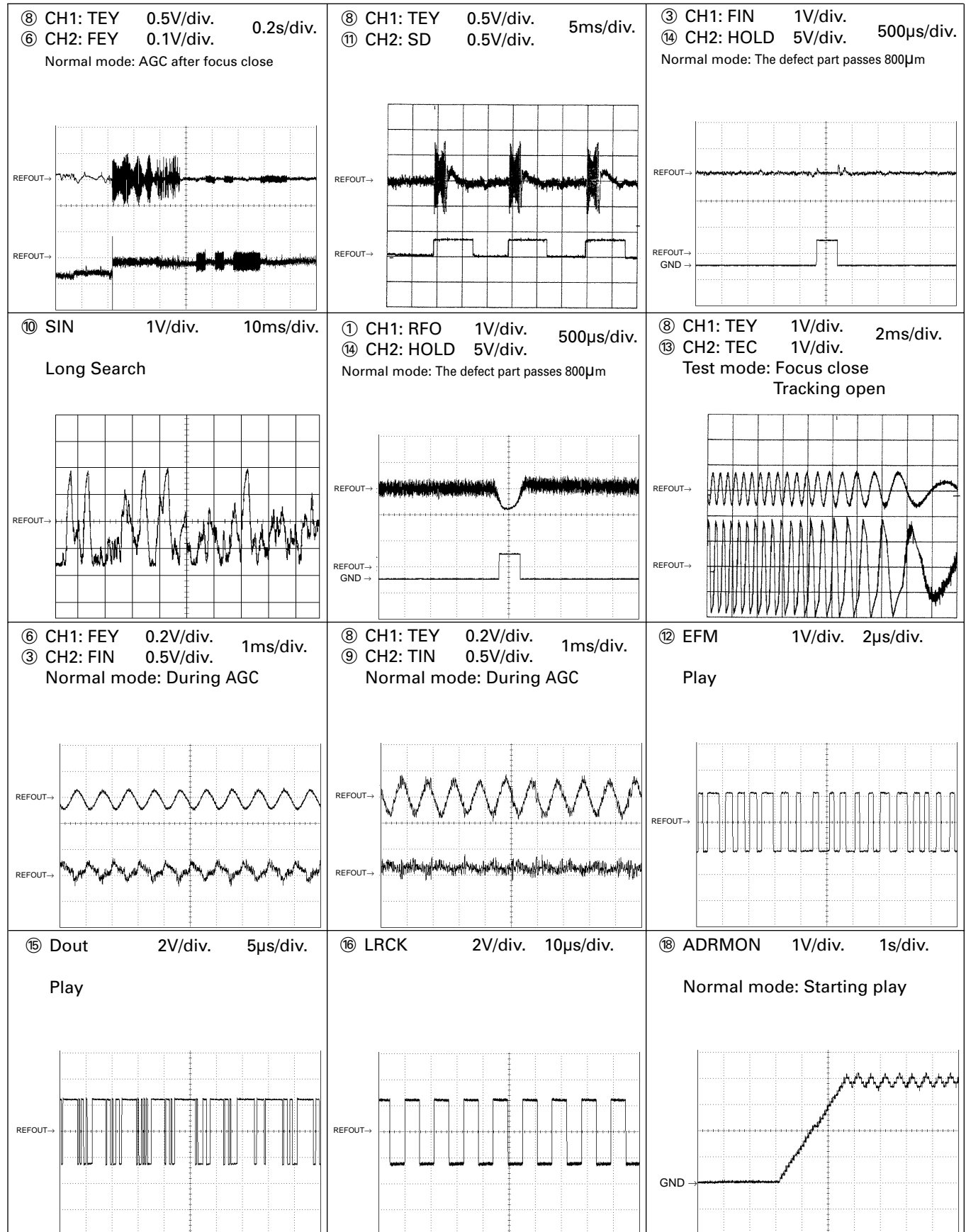


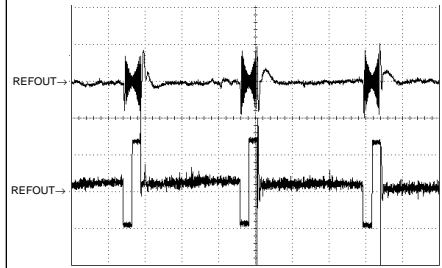

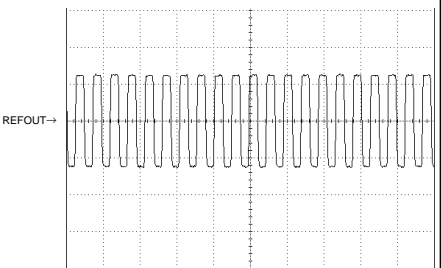
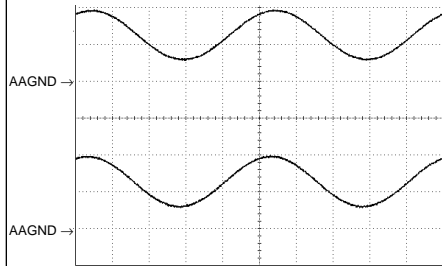


Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFOUT:2.5V

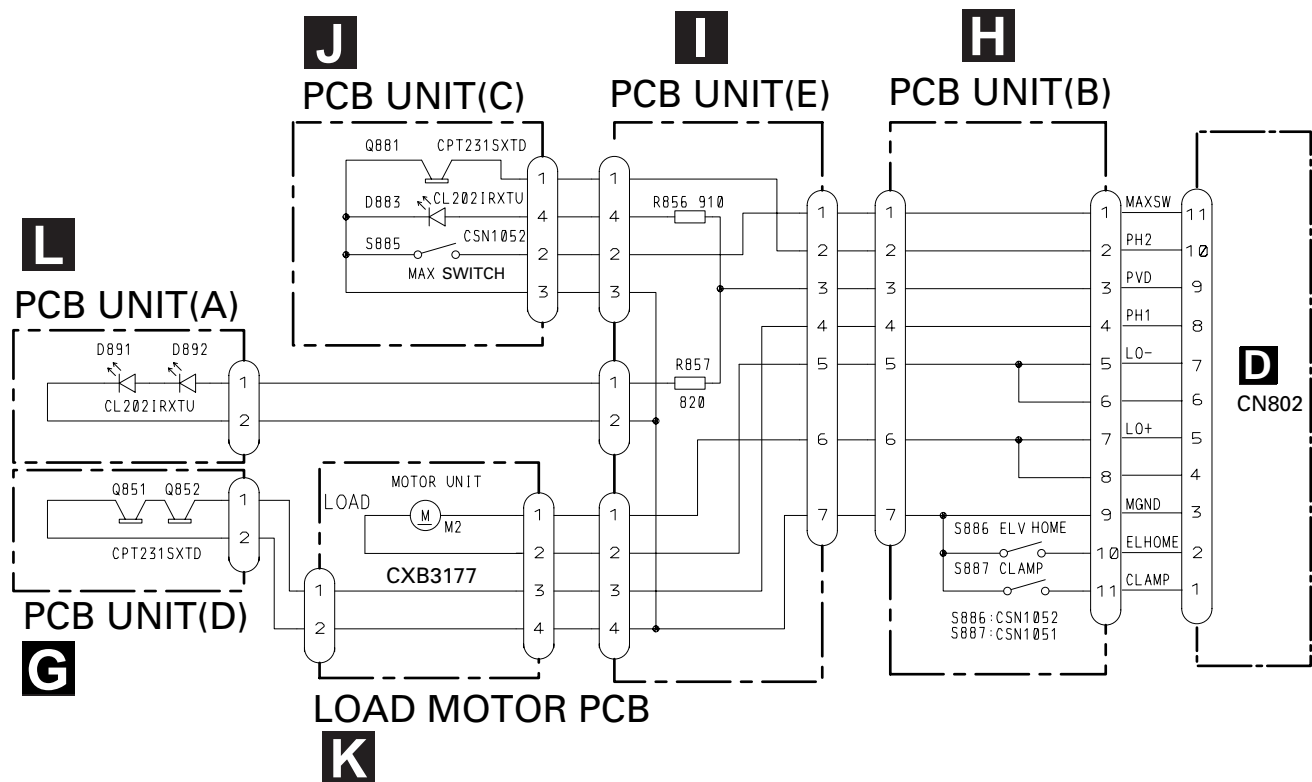
● Waveforms





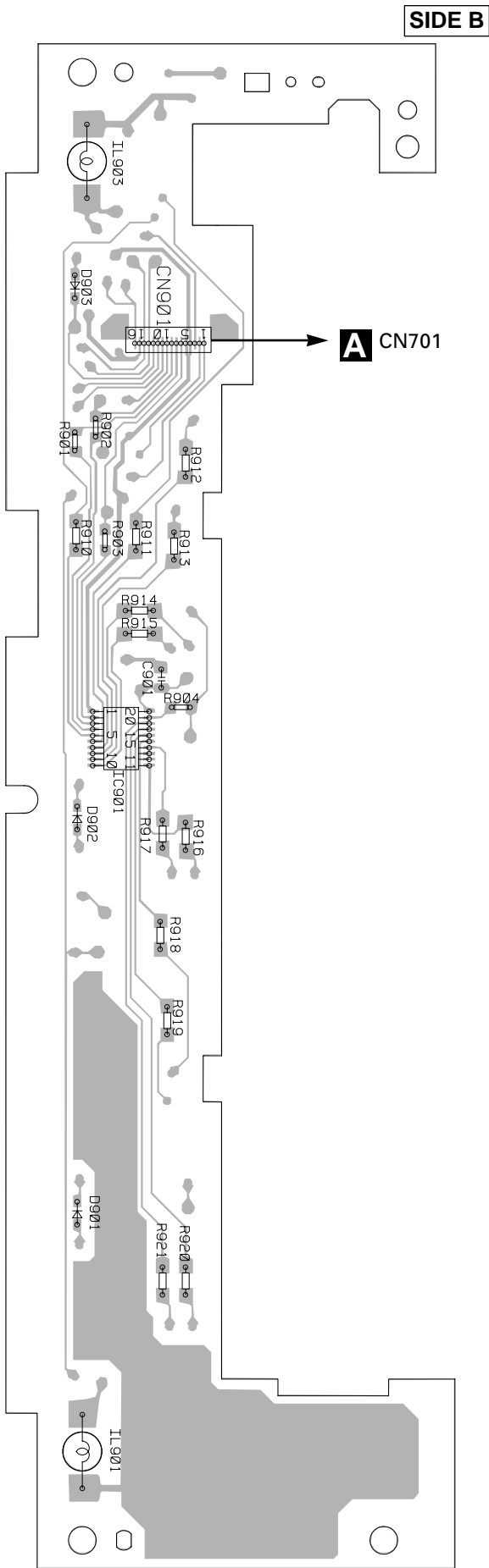
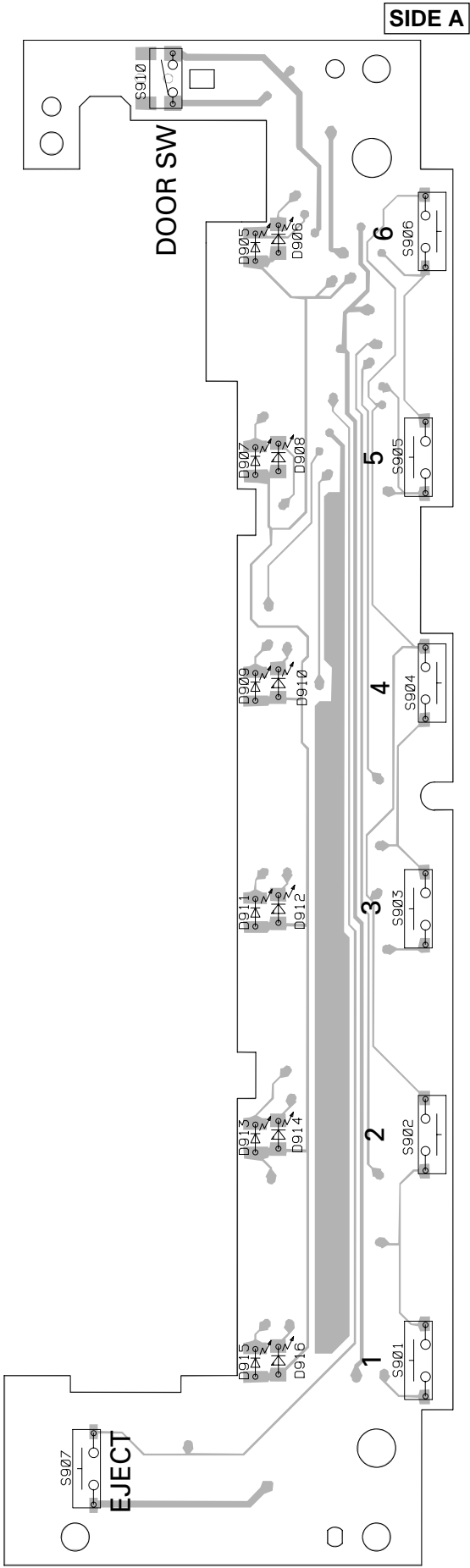
<div><div><div>⑧ CH1: TEY 0.5V/div. 5ms/div.</div><div>⑨ CH2: TIN 0.5V/div.</div><div>Test mode: 100 tracks jump(FWD)</div></div><div></div></div>	<div><div><div>⑧ CH1: TEY 0.5V/div. 10ms/div.</div><div>⑨ CH2: TIN 0.5V/div.</div><div>Normal mode: Play</div></div><div></div></div>	<div><div><div>⑰ SCKO 2V/div. 500ns/div.</div><div>Play</div></div><div></div></div>
<div><div><div>⑳ CH1: RCH 2V/div. 200μs/div.</div><div>㉑ CH2: LCH 2V/div.</div><div>Normal mode: PLAY (0dB,1kHz)</div></div><div></div></div>		

3.5 PCB UNIT(A,B,C,D,E), LOAD MOTOR PCB





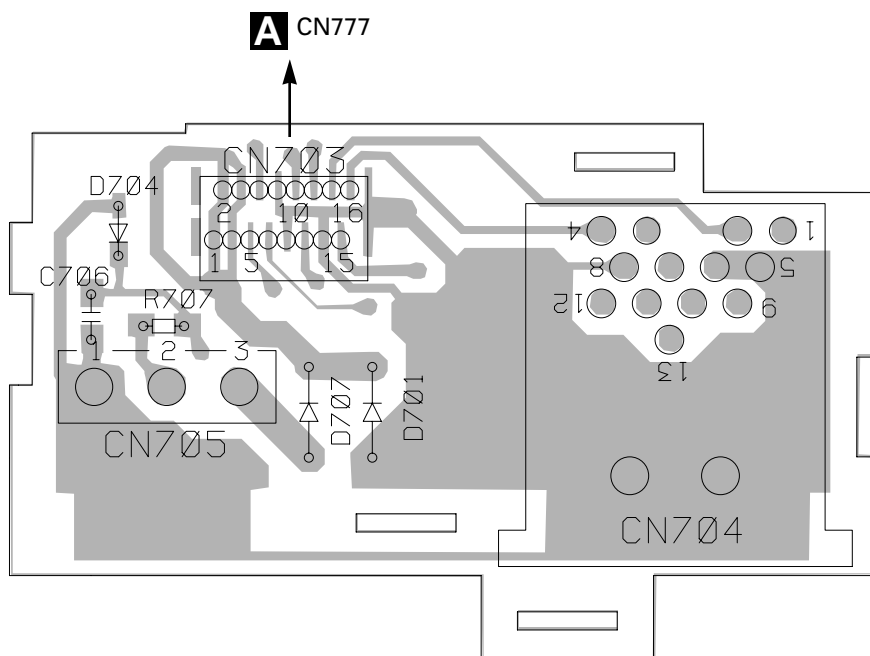
4.2 KEYBOARD UNIT



4.3 CONNECTOR UNIT

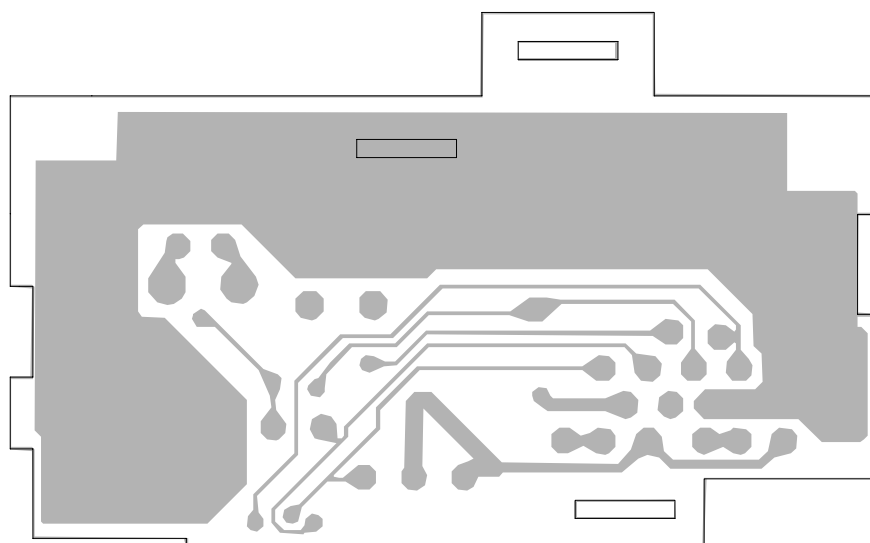
M CONNECTOR UNIT

SIDE A



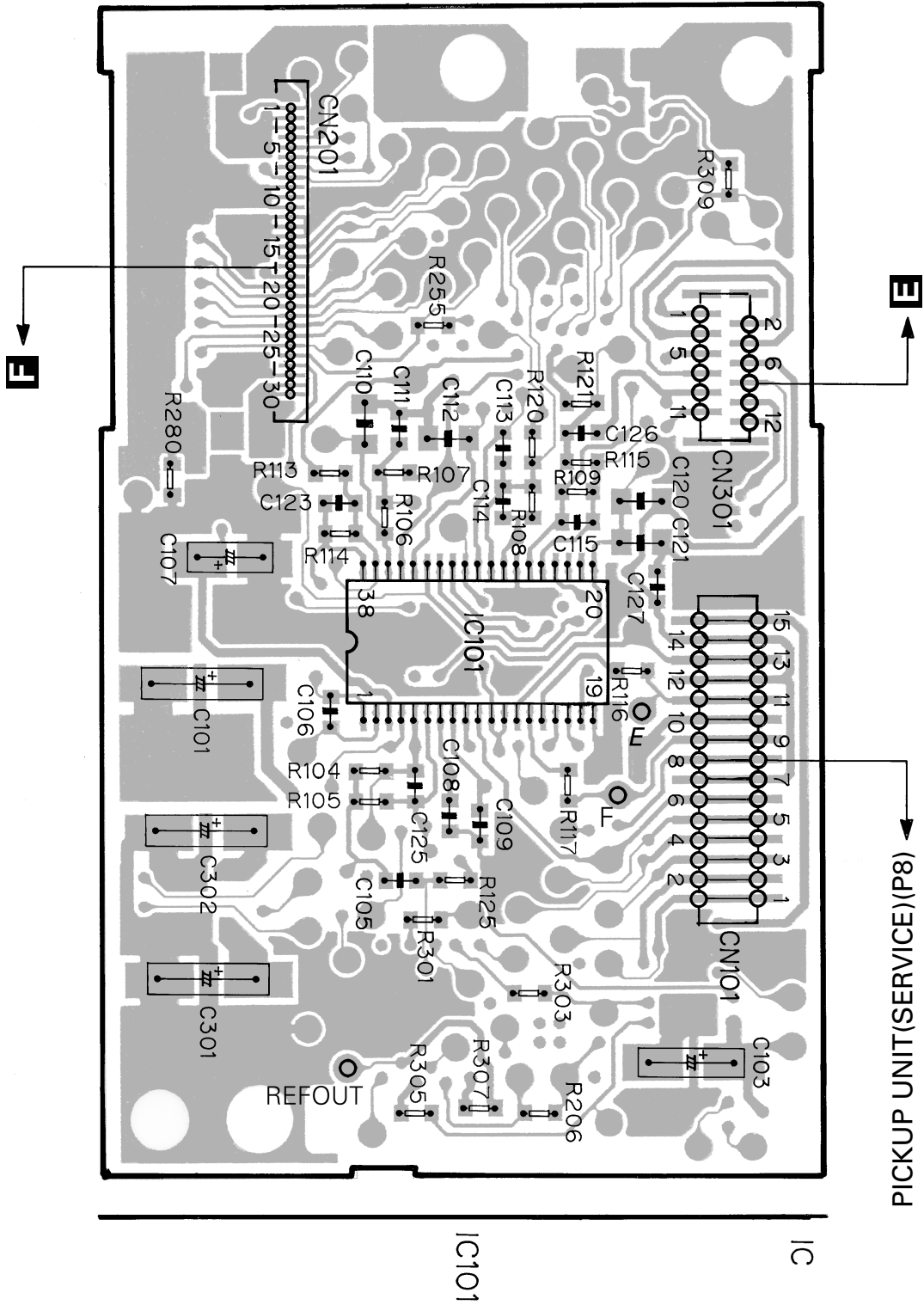
M CONNECTOR UNIT

SIDE B



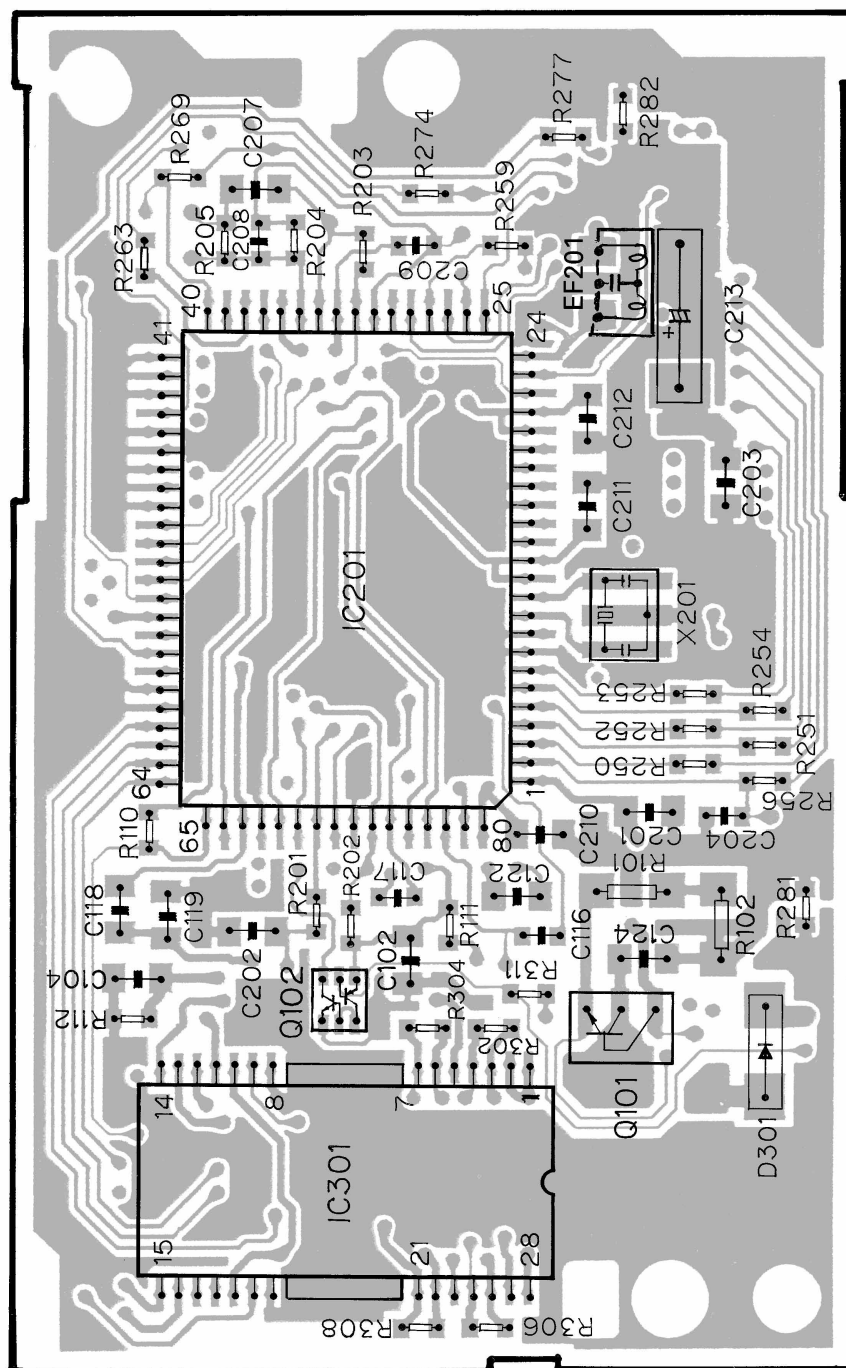
4.4 CD CORE UNIT(SERVO UNIT)

SIDE A



(8P)(IC101)SERVO PICKUP

CD CORE UNIT(SERVO UNIT)


$$\frac{Q}{C}$$

IC301

Q102

1C201

Q101

4.5 CD CORE UNIT(STS UNIT)

D CD CORE UNIT(STS UNIT)

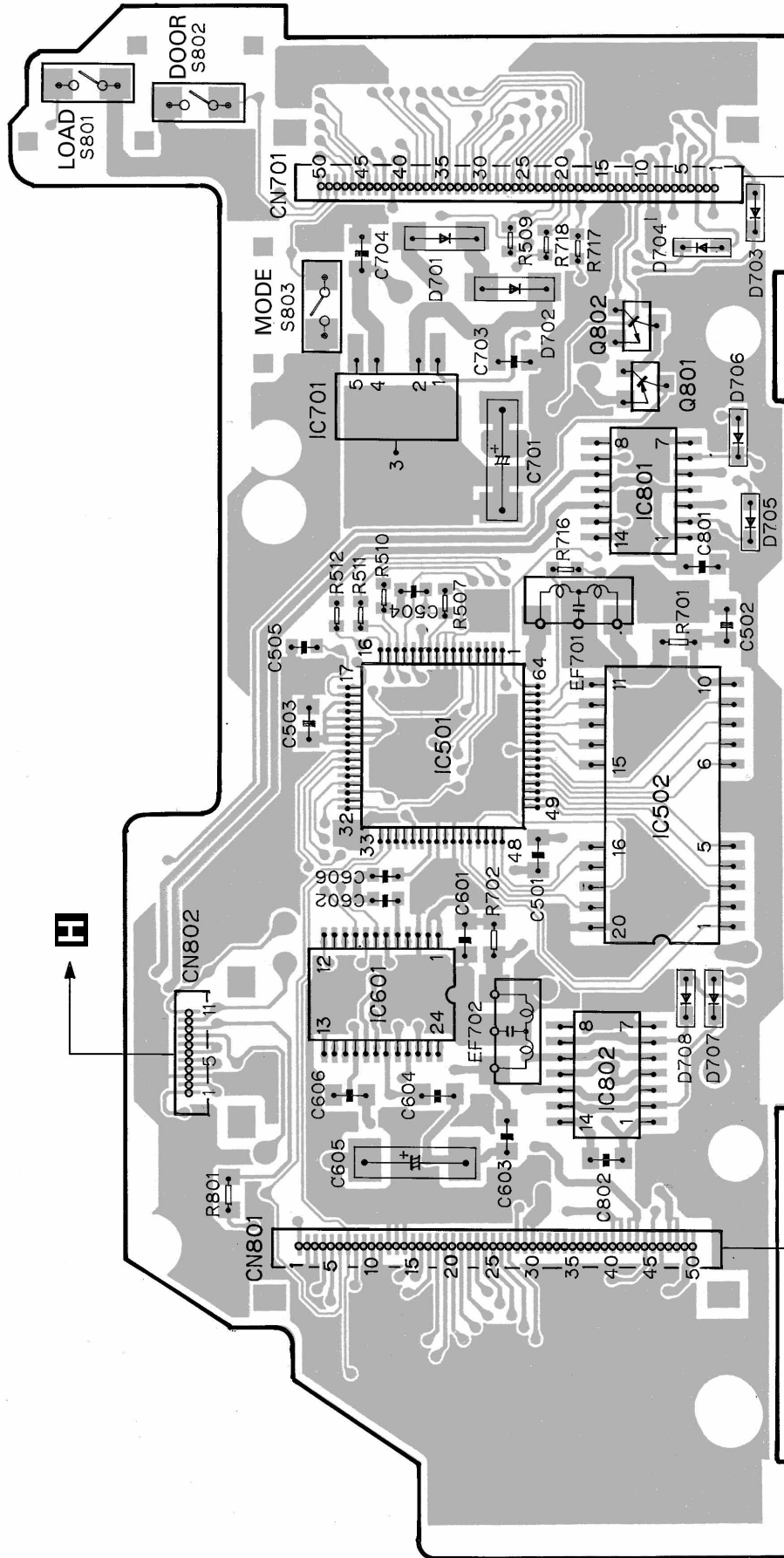
A SIDE A

IC701
IC801 Q801 Q802

IC501
IC502

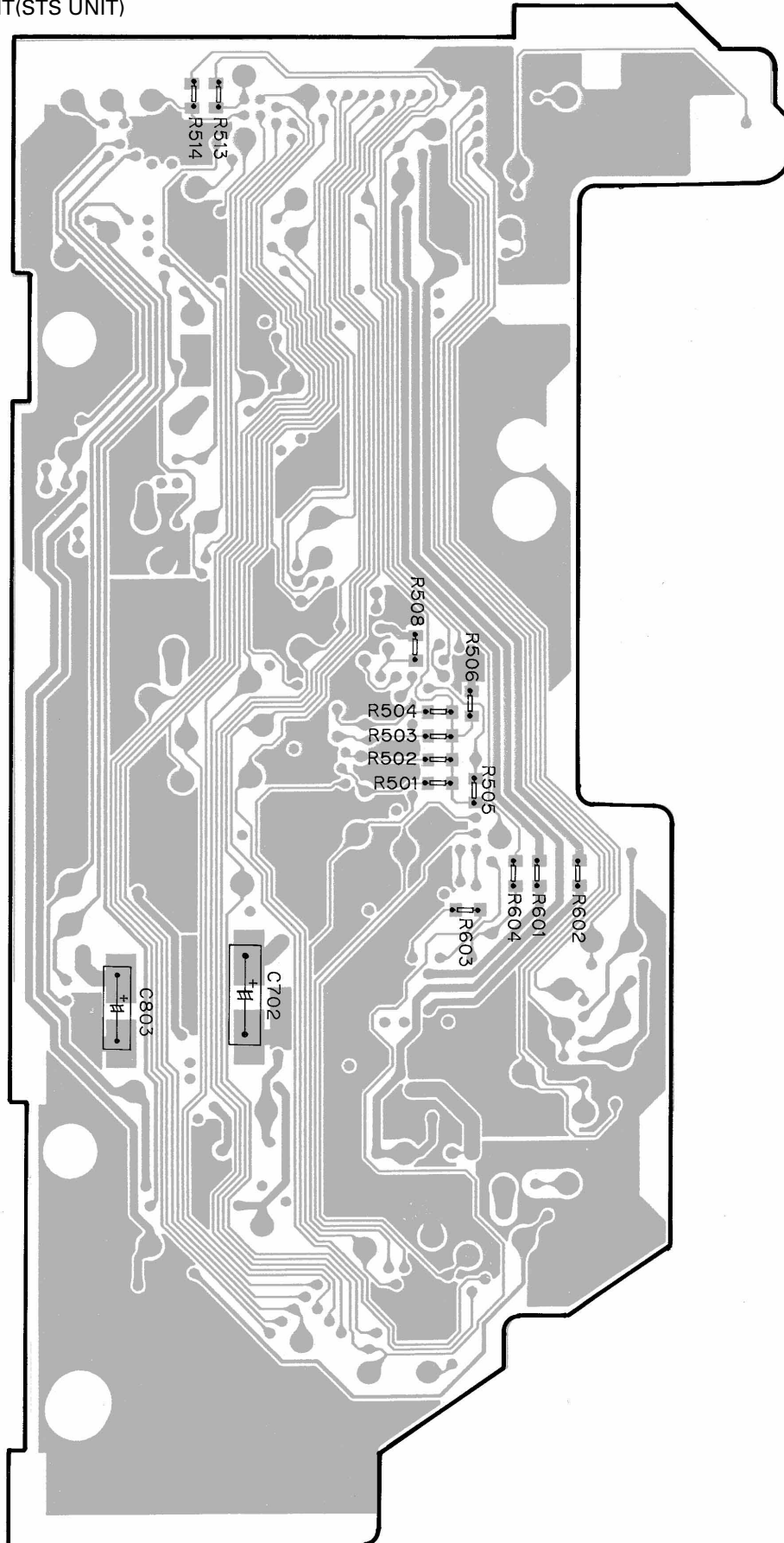
IC802 IC601

IC, Q



D CD CORE UNIT(STS UNIT)

SIDE B

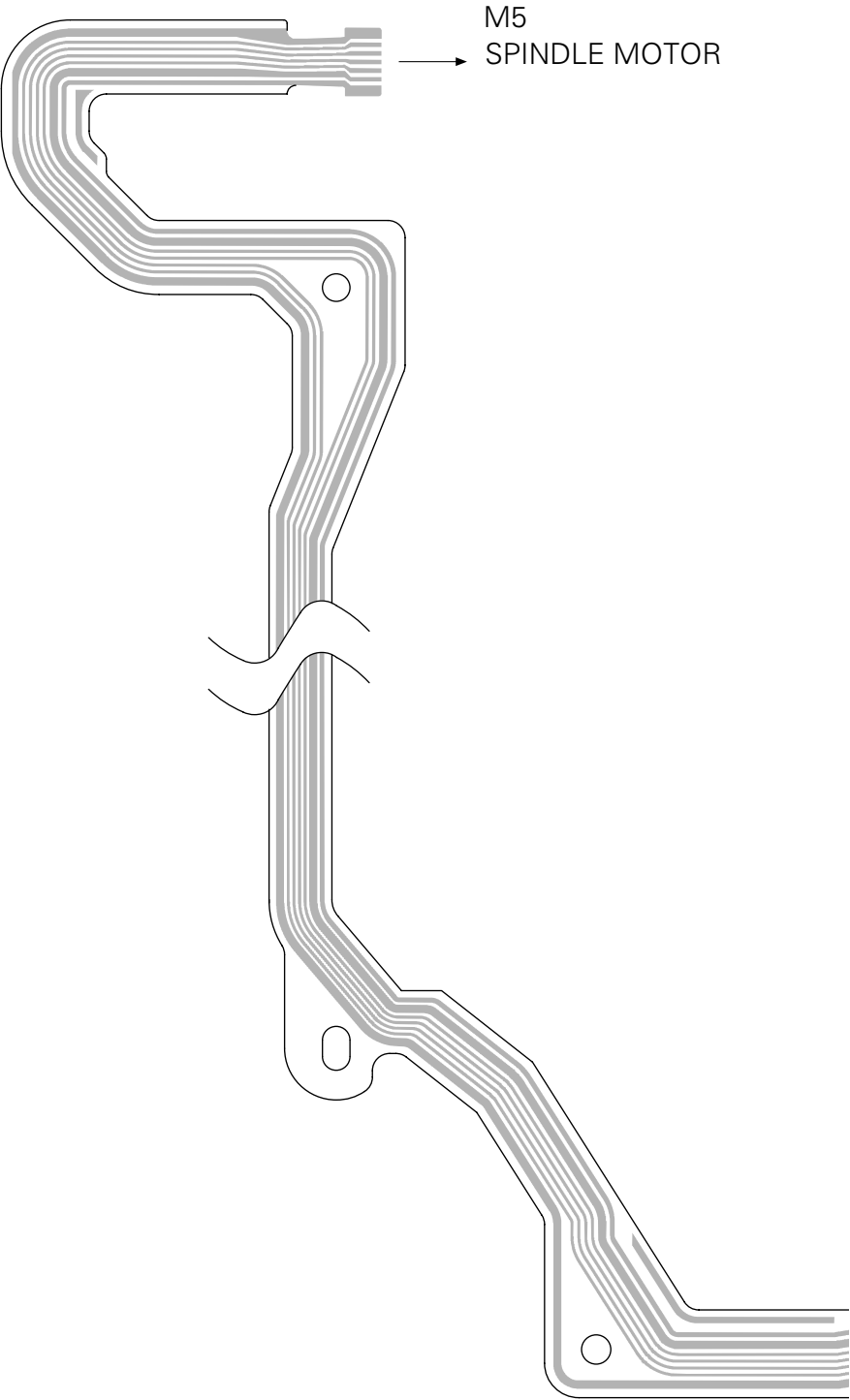


4.6 MOTOR PCB(B)

A



MOTOR PCB(B)

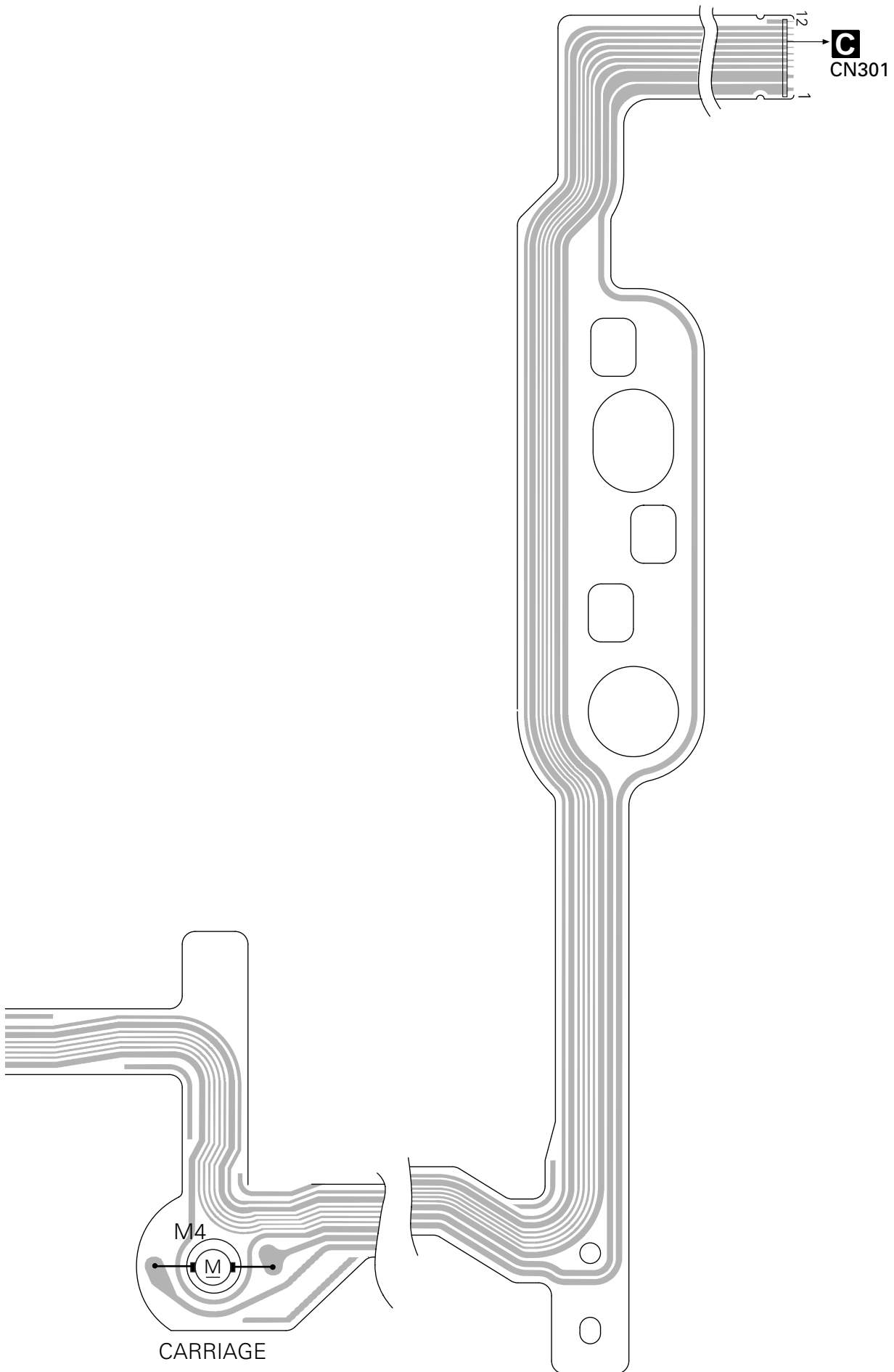


M5
SPINDLE MOTOR

B

C

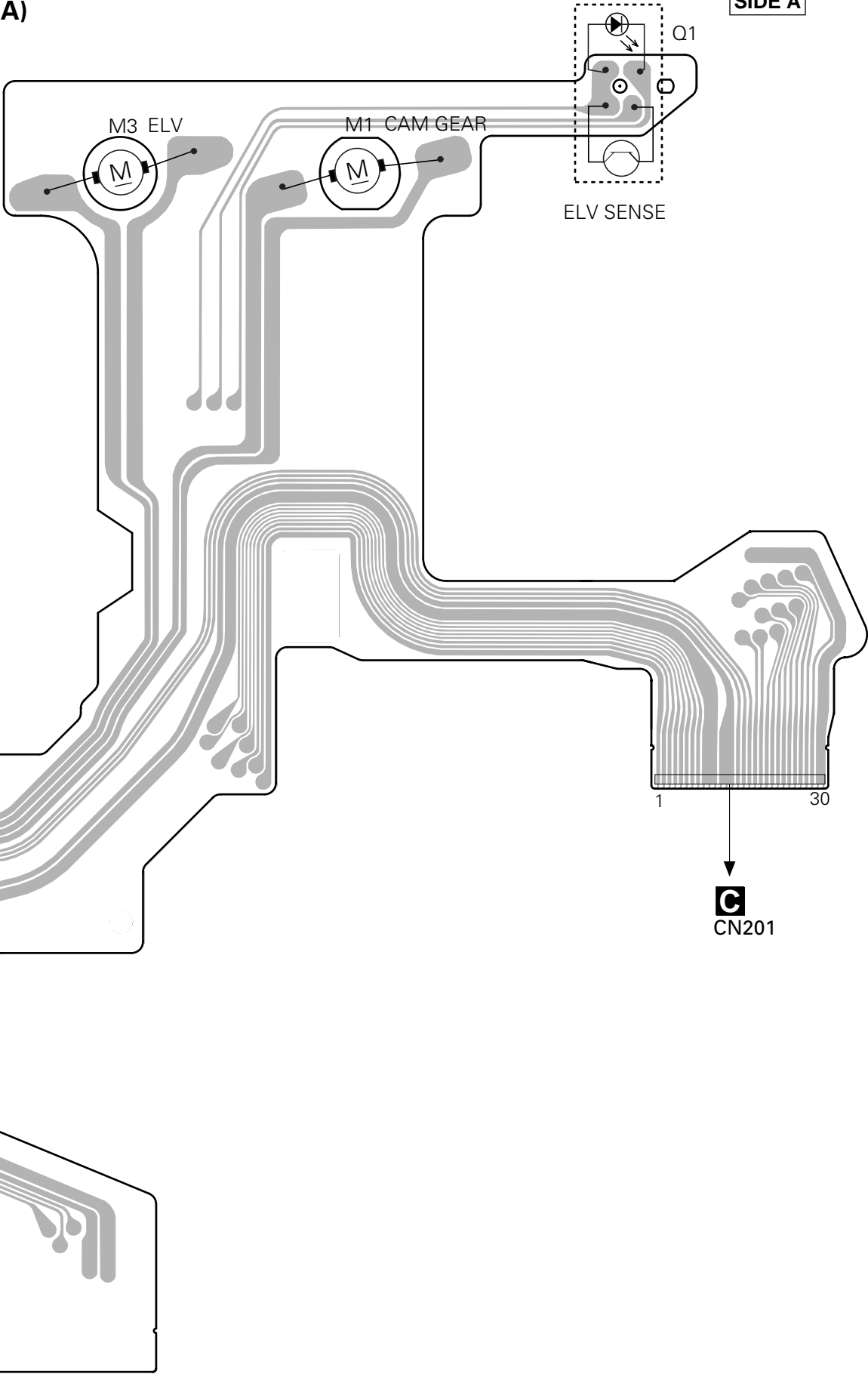
D



4.7 MOTOR PCB(A)

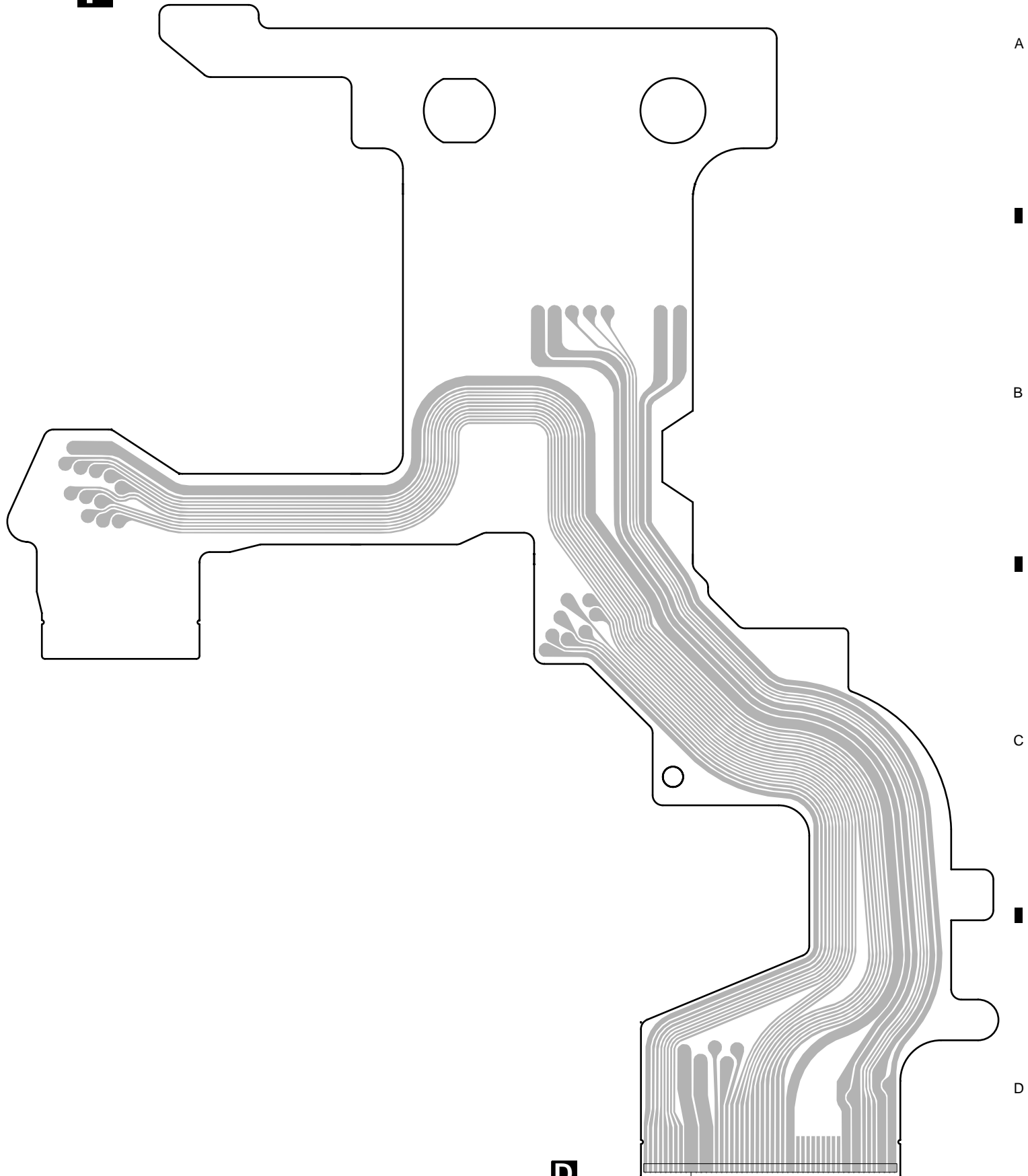
F MOTOR PCB(A)

SIDE A



SIDE B

F MOTOR PCB(A)



D
CN801

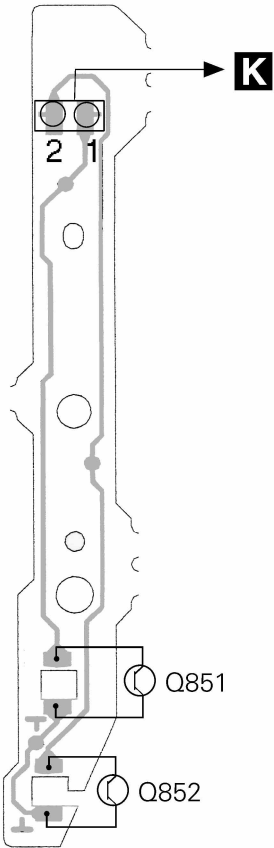
F

4.8 PCB UNIT(D)

4.9 PCB UNIT(B)

A

G PCB UNIT(D)

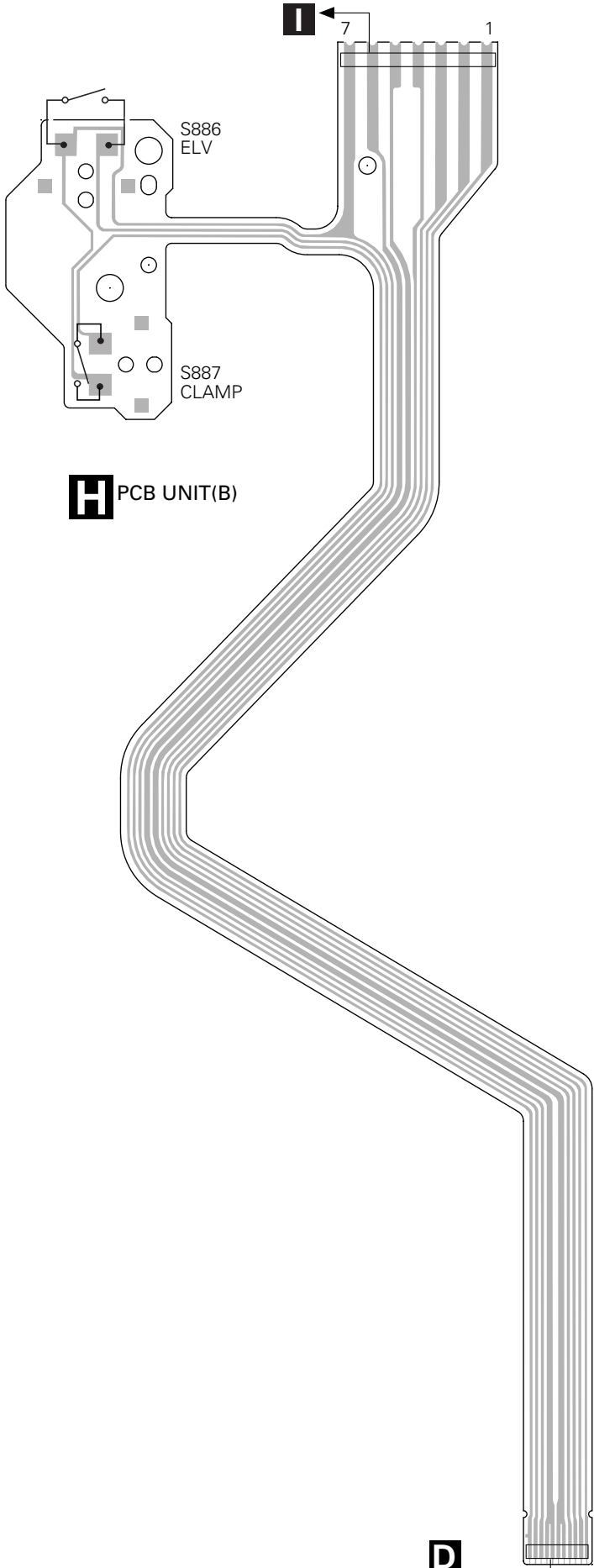


B

C

D

H PCB UNIT(B)



D

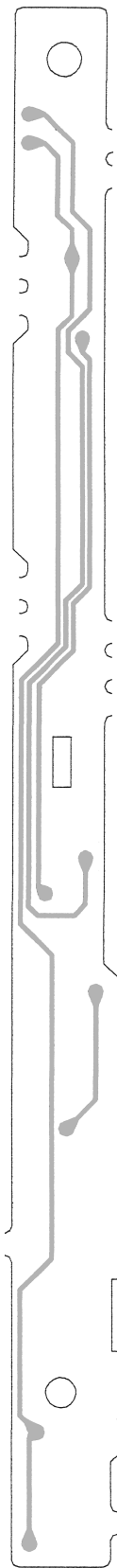
CN802

11

1

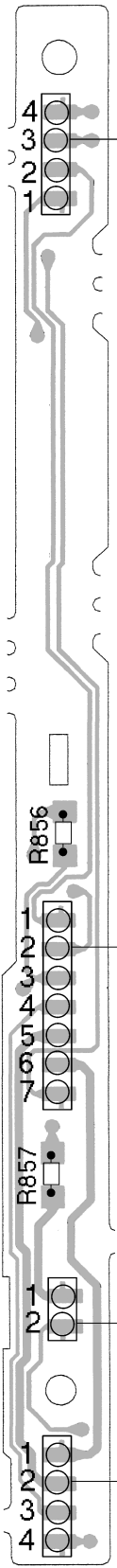
4.10 PCB UNIT(E)

PCB UNIT(E)



SIDE A

PCB UNIT(E)



SIDE B

J

H

L

K

A

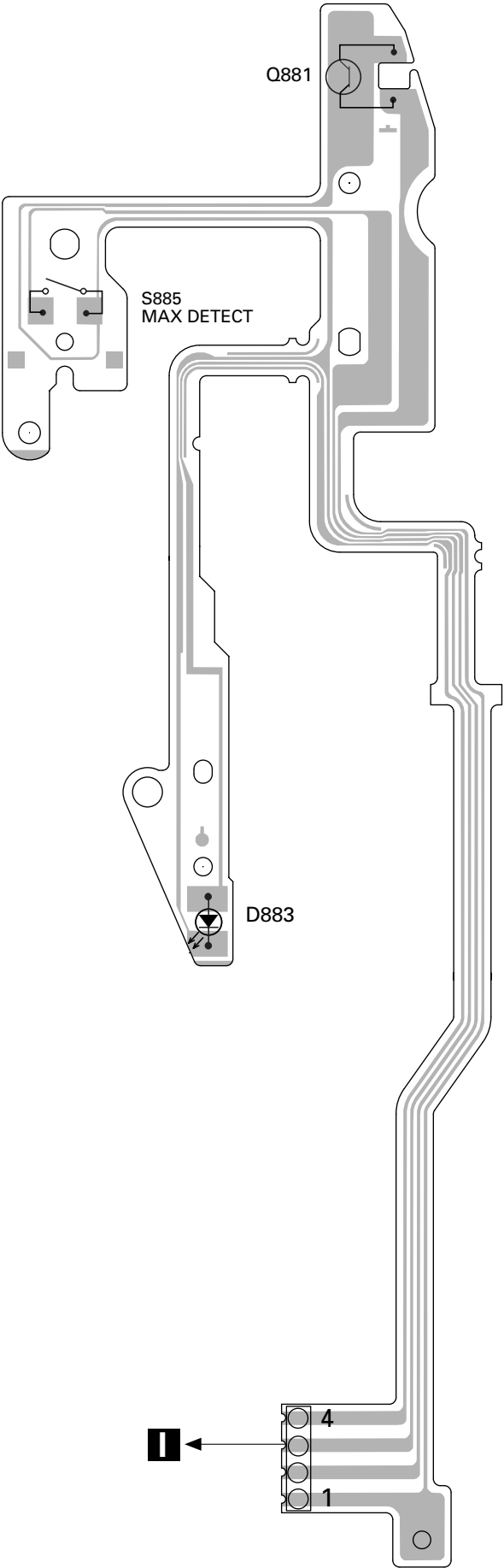
B

C

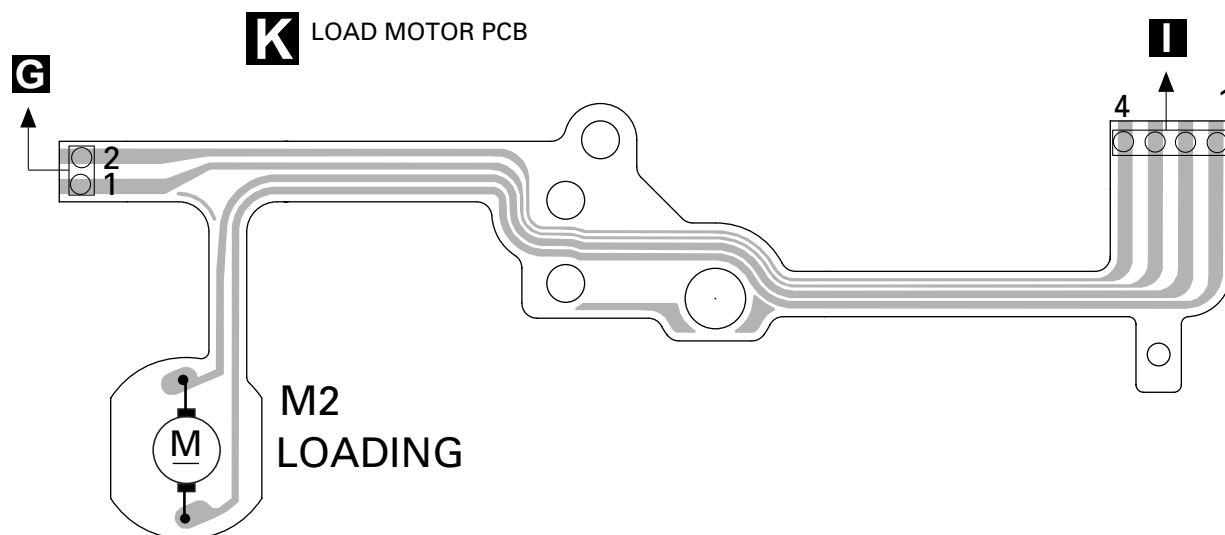
D

4.11 PCB UNIT(C)

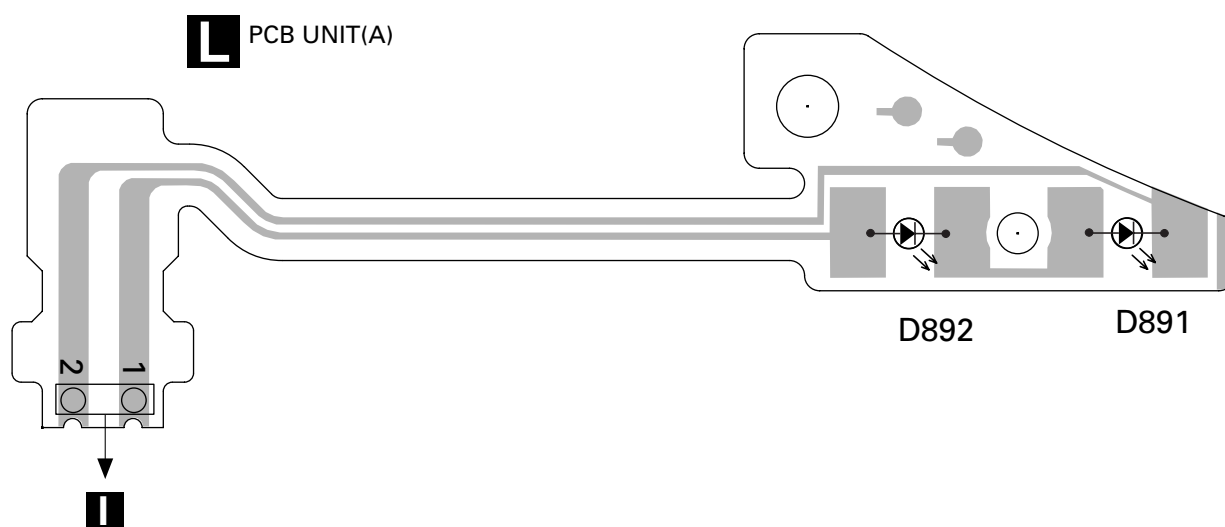
J PCB UNIT(C)



4.12 LOAD MOTOR PCB



4.13 PCB UNIT(A)



5. ELECTRICAL PARTS LIST

NOTE:

- 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.....

====Circuit Symbol and No.====Part Name	Part No.	====Circuit Symbol and No.====Part Name	Part No.
<div><div>A</div><div>Unit Number : CWM6824 Unit Name : Extension Unit</div></div>		R 111	RS1/16S103J
MISCELLANEOUS		R 402	RA4C473J
IC 101 IC	NJM4558MD	R 403	RS1/16S104J
IC 102 IC	BA3121F	R 404	RA4C681J
IC 601 IC	PD5553A	R 405	RS1/16S681J
IC 701 IC	S-80740AND4I		
Q 101 Transistor	DTC343TK	R 601	RS1/16S473J
Q 102 Transistor	DTC343TK	R 602	RS1/16S473J
Q 103 Transistor	2SA1586	R 603	RS1/16S473J
Q 601 Transistor	DTA124EU	R 604	RS1/16S102J
Q 702 Chip Transistor	2SC2712	R 605	RA4C222J
Q 704 Transistor	2SD1007		
Q 705 Transistor	2SD1760F5	R 609	RS1/16S222J
Q 706 Transistor	2SA1163	R 610	RS1/16S222J
Q 707 Chip Transistor	2SC2712	R 611	RA4C561J
Q 708 Transistor	2SB1335A	R 615	RS1/16S102J
Q 709 Transistor	DTA124EU	R 616	RS1/16S473J
Q 710 Transistor	DTC124EU		
Q 711 Transistor	FMW1	R 617	RN1/16SE1502D
Q 750 Transistor	2SA1162	R 618	RS1/16S222J
Q 751 Transistor	IMH11A	R 620	RS1/16S473J
Q 777 Transistor	2SD1760F5	R 621	RN1/10SE4302D
D 101 Diode	MA142WA	R 622	RN1/10SE1002D
D 401 Diode	MA143		
D 402 Diode	MA143	R 640	RS1/16S471J
D 403 Diode	MA143	R 642	RS1/16S471J
D 404 Diode	MA143	R 645	RS1/16S471J
D 405 Diode	MA143	R 646	RS1/16S471J
D 601 Diode	MA142WK	R 647	RS1/16S471J
D 702 Diode	1SR154-400		
D 703 Diode	UDZS6R8(B)	R 648	RS1/16S471J
D 705 Diode	UDZS5R6(B)	R 649	RS1/16S222J
D 706 Diode	DTZ8R2(C)	R 651	RA4C222J
D 707 Diode	UDZS6R2(B)	R 655	RA4C471J
D 750 Diode	PTZ3R6(A)	R 660	RA4C471J
L 701 Coil	CTH1190	R 661	RA4C471J
TH 601 Thermistor	CCX1032	R 662	RA4C471J
X 601 Radiator 6.290MHz	CSS1451	R 663	RA4C471J
RESISTORS		R 664	RA4C471J
R 101	RS1/16S562J	R 665	RA4C471J
R 102	RS1/16S562J	R 666	RA4C471J
R 103	RS1/16S682J	R 667	RA4C471J
R 104	RS1/16S682J	R 668	RA4C471J
R 105	RS1/16S432J	R 669	RA4C471J
R 106	RS1/16S432J	R 670	RA4C471J
R 107	RS1/16S102J	R 671	RA4C471J
R 108	RS1/16S102J	R 672	RA4C471J
R 109	RS1/16S272J	R 675	RA4C471J
R 110	RS1/16S272J		
		R 680	RS1/16S154J
		R 681	RS1/16S222J
		R 682	RS1/16S222J
		R 683	RS1/16S102J
		R 684	RS1/16S912J
			RS1/16S102J
		R 685	RS1/16S102J
		R 689	RA4C104J
		R 691	RS1/16S273J
		R 692	RS1/16S512J
		R 693	RS1/16S104J
		R 696	RS1/16S104J
		R 697	RS1/16S222J
		R 698	RS1/16S222J
		R 699	RS1/16S222J
		R 701	RS1/16S104J

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

Part No.

R	702	RS1/16S473J
R	705	RS1/16S473J
R	711	RS1/10S682J
R	720	RS1/4S331J
R	721	RS1/16S223J

R	722	RS1/16S103J
R	723	RS1/16S223J
R	724	RS1/16S223J
R	730	RS1/10S223J
R	731	RS1/16S101J

R	732	RS1/4S221J
R	733	RS1/16S511J
R	734	RS1/16S681J
R	735	RS1/16S561J
R	736	RS1/16S103J

R	737	RS1/16S273J
R	738	RS1/16S473J
R	739	RS1/16S101J
R	750	RS1/10S102J
R	751	RS1/16S103J

R	777	RS1/16S104J
R	778	RS1/10S1R0J
R	779	RS1/10S1R0J

CAPACITORS

C	101	CEV100M16
C	102	CEV100M16
C	103	CKSRYB272K50
C	104	CKSRYB272K50
C	105	CCSRCH471J50

C	106	CCSRCH471J50
C	109	CKSRYB473K16
C	110	CEV4R7M25
C	111	CEV220M6R3
C	112	CEV220M6R3

C	401	CCSRCH221J50
C	402	CCSRCH221J50
C	403	CCSRCH221J50
C	404	CKSRYB103K50
C	405	CKSRYB103K50

C	601	CKSRYB104K16
C	603	CKSRYB103K50
C	605	CKSRYB103K50
C	651	CKSRYB103K50
C	701	CEAT471M16

C	703	CEAT471M16
C	704	CKSQYB224K16
C	705	CEV220M6R3
C	707	CKSRYB473K16
C	708	CEV4R7M25

C	709	CKSRYB473K16
C	710	CKSRYB473K16
C	711	CKSRYB103K50
C	712	CEV220M16
C	713	CKSRYB473K16

C	714	CEV470M6R3
C	715	CKSRYB473K16

M Unit Number : CWM6823
Unit Name : Connector Unit

MISCELLANEOUS

D	701	Diode	ERA15-02VH
D	704	Diode	1SS355
D	707	Diode	ERA15-02VH

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

Part No.

RESISTORS

R	707	RS1/10S103J
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CAPACITORS

C	706	CKSQYB104K50
---	-----	--------------

B Unit Number : CWM6822
Unit Name : Keyboard Unit

MISCELLANEOUS

IC	901	IC	BU2092FV
D	901	Diode	1SS355
D	902	Diode	1SS355
D	903	Diode	1SS355
D	905	LED	CL200PGCTU

D	906	LED	CL150DCD(AB)
D	907	LED	CL200PGCTU
D	908	LED	CL150DCD(AB)
D	909	LED	CL200PGCTU
D	910	LED	CL150DCD(AB)

D	911	LED	CL200PGCTU
D	912	LED	CL150DCD(AB)
D	913	LED	CL200PGCTU
D	914	LED	CL150DCD(AB)
D	915	LED	CL200PGCTU

D	916	LED	CL150DCD(AB)
S	901	Switch	CSG1043
S	902	Switch	CSG1043
S	903	Switch	CSG1043
S	904	Switch	CSG1043

S	905	Switch	CSG1043
S	906	Switch	CSG1043
S	907	Switch	CSG1043
S	910	Spring Switch	CSN1033
IL	901	Lamp 60mA,8V	CEL1617

IL	903	Lamp 60mA,8V	CEL1617
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RESISTORS

R	901	RS1/10S561J
R	902	RS1/10S561J
R	903	RS1/10S561J
R	904	RS1/10S561J
R	910	RS1/8S431J

R	911	RS1/8S471J
R	912	RS1/8S431J
R	913	RS1/8S471J
R	914	RS1/8S431J
R	915	RS1/8S471J

R	916	RS1/8S431J
R	917	RS1/8S471J
R	918	RS1/8S431J
R	919	RS1/8S471J
R	920	RS1/8S431J

R	921	RS1/8S471J
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CAPACITORS

C	901	CKSQYB104K16
---	-----	--------------

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

C Unit Number : CWX2202
Unit Name : CD Core Unit(Servo Unit)

MISCELLANEOUS

IC	101	IC	UPC2572GS
IC	201	IC	UPD63702AGF
IC	301	IC	BA5986FM
Q	101	Transistor	2SD1664
Q	102	Transistor	UMD2N
D	301	Diode	1SR154-400
X	201	Ceramic Resonator 16.934MHz	CSS1457
EF	201	Filter	CCG1076

RESISTORS

R	101	RS1/8S100J
R	102	RS1/8S120J
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	112	RS1/16S222J
R	113	RS1/16S103J
R	114	RS1/16S103J
R	115	RS1/16S102J
R	116	RS1/16S163J
R	117	RS1/16S163J
R	120	RS1/16S101J
R	121	RS1/16S101J
R	125	RS1/16S0R0J
R	201	RS1/16S104J
R	202	RS1/16S103J
R	203	RS1/16S332J
R	204	RS1/16S752J
R	205	RS1/16S752J
R	206	RS1/16S101J
R	250	RS1/16S331J
R	251	RS1/16S331J
R	252	RS1/16S331J
R	253	RS1/16S331J
R	254	RS1/16S331J
R	255	RS1/16S471J
R	256	RS1/16S471J
R	259	RS1/16S221J
R	263	RS1/16S471J
R	269	RS1/16S0R0J
R	274	RS1/16S471J
R	277	RS1/16S471J
R	301	RS1/16S103J
R	302	RS1/16S153J
R	303	RS1/16S103J
R	304	RS1/16S273J
R	305	RS1/16S103J
R	306	RS1/16S752J
R	307	RS1/16S103J
R	308	RS1/16S103J
R	309	RS1/16S471J
R	311	RS1/16S471J

CAPACITORS

C	101	CEV101M6R3
C	102	CKSQYB104K16
C	103	CEV470M6R3
C	104	CKSQYB334K16
C	105	CCSRCH240J50

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

C	106	CKSRYB222K50
C	107	CEV4R7M35
C	108	CKSRYB273K25
C	109	CCSRCH101J50
C	110	CKSQYB104K16

C	111	CKSRYB332K50
C	112	CKSQYB473K16
C	113	CKSRYB103K25
C	114	CKSRYB391K50
C	115	CCSRCH121J50

C	116	CKSRYB682K50
C	117	CKSRYB333K16
C	118	CKSQYB334K16
C	119	CKSQYB334K16
C	120	CKSQYB334K16

C	121	CKSQYB334K16
C	122	CKSQYB104K16
C	123	CKSRYB472K50
C	124	CKSQYB104K16
C	125	CCSRCH5R0C50

C	126	CKSRYB153K25
C	127	CKSRYB102K50
C	201	CKSQYB334K16
C	202	CKSQYB104K16
C	203	CKSQYB104K16

C	204	CKSRYB471K50
C	207	CKSQYB683K16
C	208	CKSRYB821K50
C	209	CKSRYB273K25
C	210	CKSQYB334K16

C	211	CKSQYB334K16
C	212	CKSQYB334K16
C	213	CCH1300
C	301	CEV101M10
C	302	CEV101M10

D Unit Number : CWX2203
Unit Name : CD Core Unit(STS Unit)

MISCELLANEOUS

IC	501	IC	CXD2511R
IC	502	IC	MSM514400DP-60TS
IC	601	IC	AK4321VF
IC	701	IC	BA05SFP
IC	801	IC	LB1836M

IC	802	IC	LB1836M
Q	801	Transistor	DTA123JK
Q	802	Transistor	UN2211
D	701	Diode	1SR154-400
D	702	Diode	1SR154-400

D	703	Diode	1SS355
D	704	Diode	1SS355
D	705	Diode	1SS355
D	706	Diode	1SS355
D	707	Diode	1SS355

D	708	Diode	1SS355
S	801	Spring Switch(LOAD)	CSN1052
S	802	Spring Switch(DOOR)	CSN1052
S	803	Spring Switch(MODE)	CSN1052
EF	701	Filter	CCG1051

EF	702	Filter	CCG1051
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RESISTORS

R	501	RS1/16S102J
R	502	RS1/16S202J
R	503	RS1/16S392J
R	504	RS1/16S822J
R	505	RS1/16S163J

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

Part No.

R	506	RS1/16S512J
R	507	RS1/16S182J
R	508	RS1/16S222J
R	509	RS1/16S102J
R	510	RS1/16S102J
R	511	RS1/16S102J
R	512	RS1/16S102J
R	513	RS1/16S102J
R	514	RS1/16S471J
R	601	RS1/16S101J
R	602	RS1/16S101J
R	603	RS1/16S471J
R	604	RS1/16S471J
R	701	RS1/10S0R0J
R	702	RS1/10S100J
R	716	RS1/16S471J
R	717	RS1/16S471J
R	718	RS1/16S471J
R	801	RS1/10S102J

CAPACITORS

C	501	CKSQYB334K16
C	502	CKSQYB334K16
C	503	CKSQYB334K16
C	504	CCSRCH471J50
C	506	CCSRCH221J50
C	601	CKSQYB334K16
C	602	CCSRCH221J50
C	603	CKSQYB334K16
C	604	CKSQYB334K16
C	605	22μF/6.3V
C	606	CKSQYB334K16
C	701	22μF/6.3V
C	702	CCH1300
C	703	CEVL101M6R3
C	704	CKSQYB334K16
C	801	CKSQYB104K25
C	802	CKSQYB104K25
C	803	CEVL220M16

G Unit Number :
Unit Name : PCB Unit(D)

Q	851	Photo-transistor	CPT231SXTD
Q	852	Photo-transistor	CPT231SXTD

I Unit Number :
Unit Name : PCB Unit(E)

R	856	RS1/8S911J
R	857	RS1/8S821J

J Unit Number :
Unit Name : PCB Unit(C)

Q	881	Photo-transistor	CPT231SXTD
D	883	Chip LED	CL202IRXTU
S	885	Spring Switch(MAX)	CSN1052

L Unit Number :
Unit Name : PCB Unit(A)

D	891	Chip LED	CL202IRXTU
D	892	Chip LED	CL202IRXTU

H Unit Number :
Unit Name : PCB Unit(B)

S	886	Spring Switch(ELV Home)	CSN1052
S	887	Spring Switch(Clamp)	CSN1051

F Unit Number :
Unit Name : Motor PCB(A)

Q	1	Photo-interrupter	RPI-221
M	1	Motor Unit(Cam Gear)	CXB3174
M	3	Motor Unit(ELV)	CXB3175

E Unit Number :
Unit Name : Motor PCB(B)

M	4	Motor Unit(Carriage)	CXB3178
M	5	Motor(Spindle)	CXM1120

K Unit Number :
Unit Name : Load Motor PCB

M	2	Motor Unit(Load)	CXB3177
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Miscellaneous Parts List

Pickup Unit(Service)(P8)	CXX1311
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6. ADJUSTMENT

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 :**

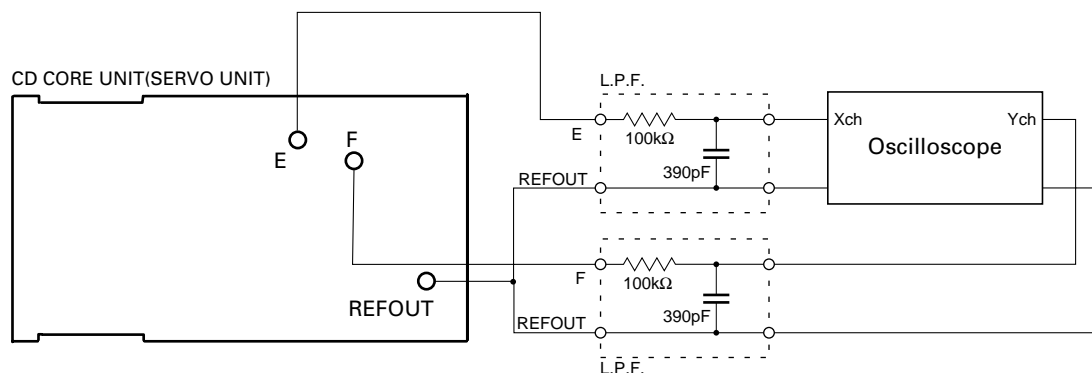
To check that the grating is within an acceptable range when the PU unit is changed.

• **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, 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 **FWD** and **REV** buttons, move the PU unit to the innermost track.
3. Press key **B** to close focus, the display should read "91". Press key **D** to implement the tracking balance adjustment the display should now read "81". Press key **B** 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 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**

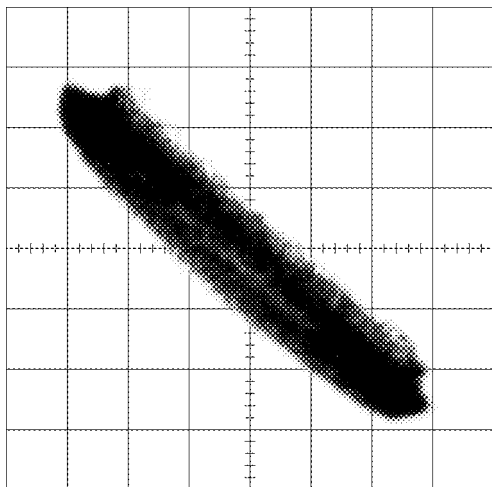
Reloading the disc changes the clamp position and may decrease the "wobble".

Grating waveform

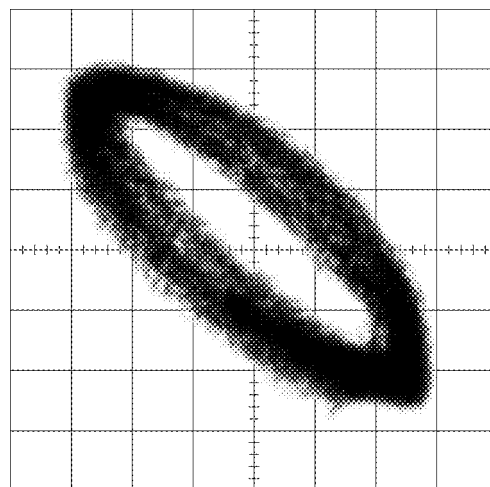
Ech → Xch 20mV/div, AC

Fch → Ych 20mV/div, AC

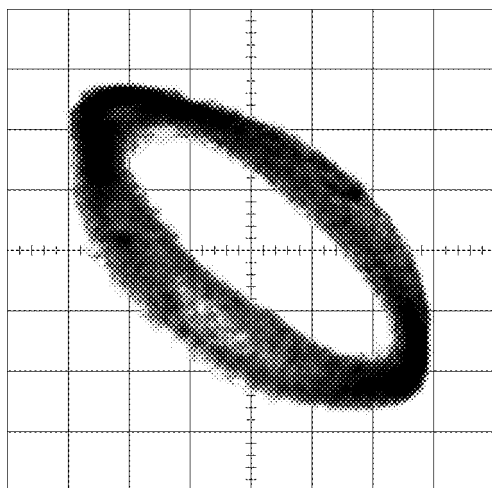
0°



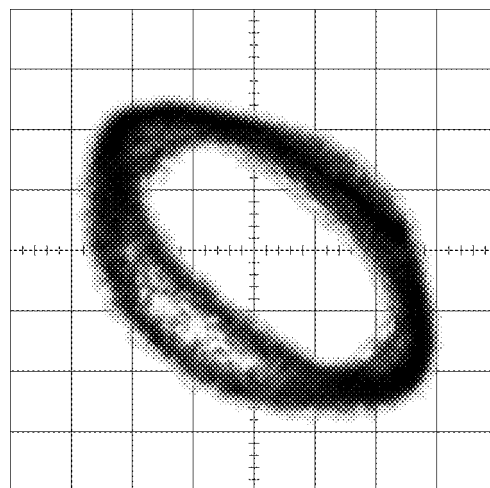
30°



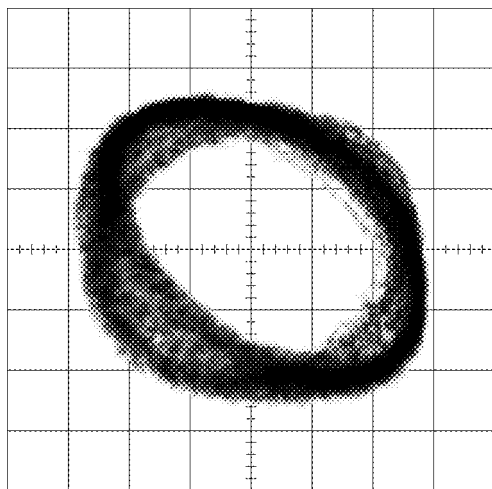
45°



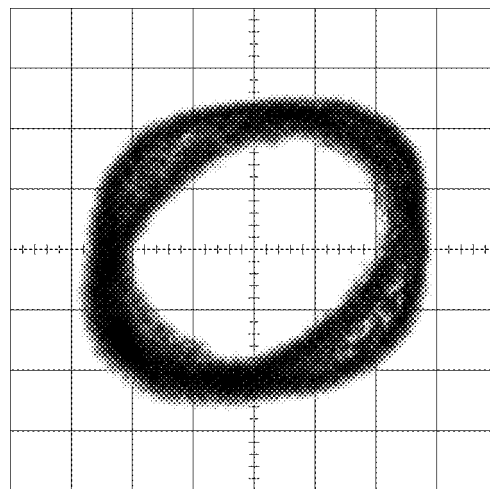
60°



75°



90°



7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 TEST MODE

● CD Test Mode

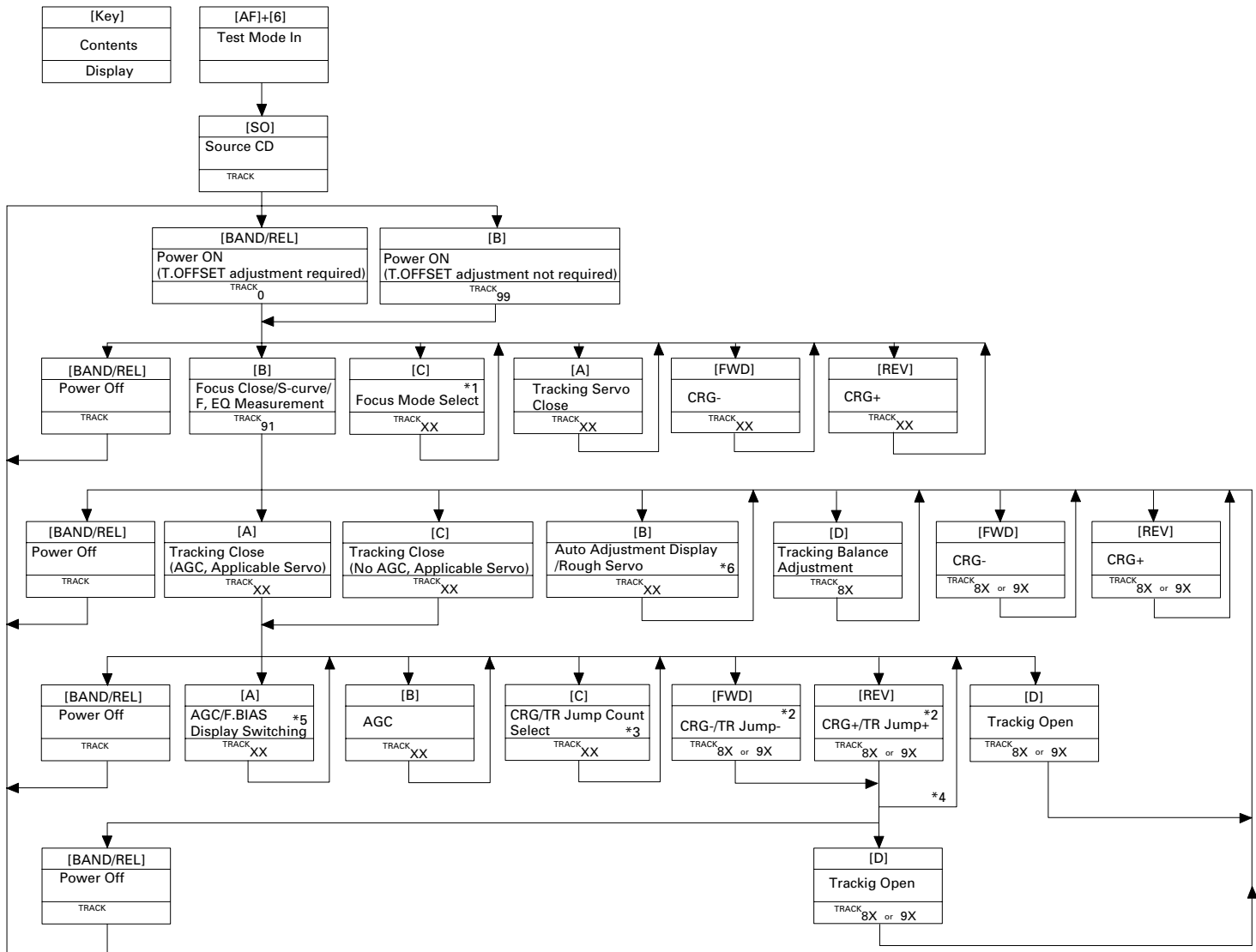
1) Precautions on Adjustment

- The unit employs a single voltage (+5V) for the regulator, thus the reference potential of the signal is RFOUT (approximately 2.5V) rather than GND. Inadvertent contact of RFOUT and GND during adjustment can result not only in disabling normal potential measurement but also in exposing the pick-up to strong impacts due to malfunctioning of the servo. Therefore, you are requested to observe the following precautions.
- Make sure that the negative probe of the measuring instrument is not connected to RFOUT or GND. Special care must be exercised so that the channel 1 negative probe may not be connected to the oscilloscope and the channel 2 negative probe to GND. Since the frame of the measuring instrument is usually at the same potential as the negative probe, the frame of the measuring instrument must be changed to floating status. When RFOUT is inadvertently connected to GND, you must immediately turn off the regulator or power supply.
- The regulator must be turned off before mounting or dismounting filters or wiring materials.
- You should not start adjustment or measurement immediately after the regulator is turned on. It is recommended to run the player for approximately one minute so that it may stabilize.
- When the test mode is turned on, various protective functions from the software become unavailable. Thus, you must make sure that undesirable electric or mechanical shocks are not be given to the system.
- This model employs a photo-transistor for detecting discs at their loading or ejection. Thus, if its outer case is removed during repair work and internal parts are exposed to light of strong intensity, malfunctions including the following can result:
 - * The eject button becomes inoperable during play. Pressing the eject button does not eject a disc and play is continued.
 - * Loading becomes unavailable.
 If a malfunction is recognized, appropriate remedial actions must be taken. Such actions include changing the light source position, changing the unit position and applying a cover to the photo-transistor.
- When you press the [EJECT] key to eject a disc, you must not touch any other key until the ejection is complete.
- If you press the [FWD] or [REV] for the focus search in the test mode, you must turn the power off immediately. (Otherwise, the lens will be forced to stick to the top or bottom, potentially resulting in the burning of the actuator.)

2) Description of the Test Mode

- Adjustment of this unit is done in parallel with the CD control unit (KEH-M9100ZRN/EW), thus key operations for adjustments are done from the unit. Taking the example of the KEH-M9100ZRN/EW, the following describes how to turn on the test mode and operate the keys. The keys referred to in the following are those used on the KEH-M9100ZRN/EW.
- Turning on the Test Mode
Press the [AF] and [6] keys simultaneously to turn on the ACC and the backup.
 - Ending the Test Mode
When ACC or Back up is off, the test mode is canceled.
 - Operation of TR JUMPs (except 100TR) continues after your finger has left the key. CRG MOVE and 100TR JUMP are forced to the tracking close mode as soon as the key is released.
 - Turning the power on or off resets the JUMP MODE to the Single TR.

● CD Player Flowchart



*1) Switching must take place in the following sequence.

99 : Focus Close → 1 : S.Curve Check → 2 : Focus EQ Measurement.

*2) Single TR / 4TR / 10TR / 32TR / 100TR

***3) Switching must take place in the following sequence.**

Single TR → 4 TR → 10 TR → 32 TR → 100 TR → CRG Move
9X(8X):91(81) 92(82) 93(83) 94(84) 95(85) 96(86)



*4) It applies to the CRG Move and 100TR Jump alone.

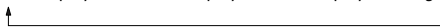
*5) Switching must take place in the following sequence.

Min/Sec (or Track No.) → F.AGC Gain → F.AGC Gain → F. BIAS Setting


$$(\text{AGC Gain} = (\text{Current value}/\text{Initial value}) \times 20)$$

*6) Switching must take place in the following sequence.

F.Cancel Display → T.Offset Display → T.Bal Display → Rough Servo.



(F.Bias value, F.Cancel value, T.Offset value, T.Bal value
= (Upper 8 bits of the setting (7F[H] to 80[H] + 80[H])/4
= 63[D] to 32[D] to 00[D]).

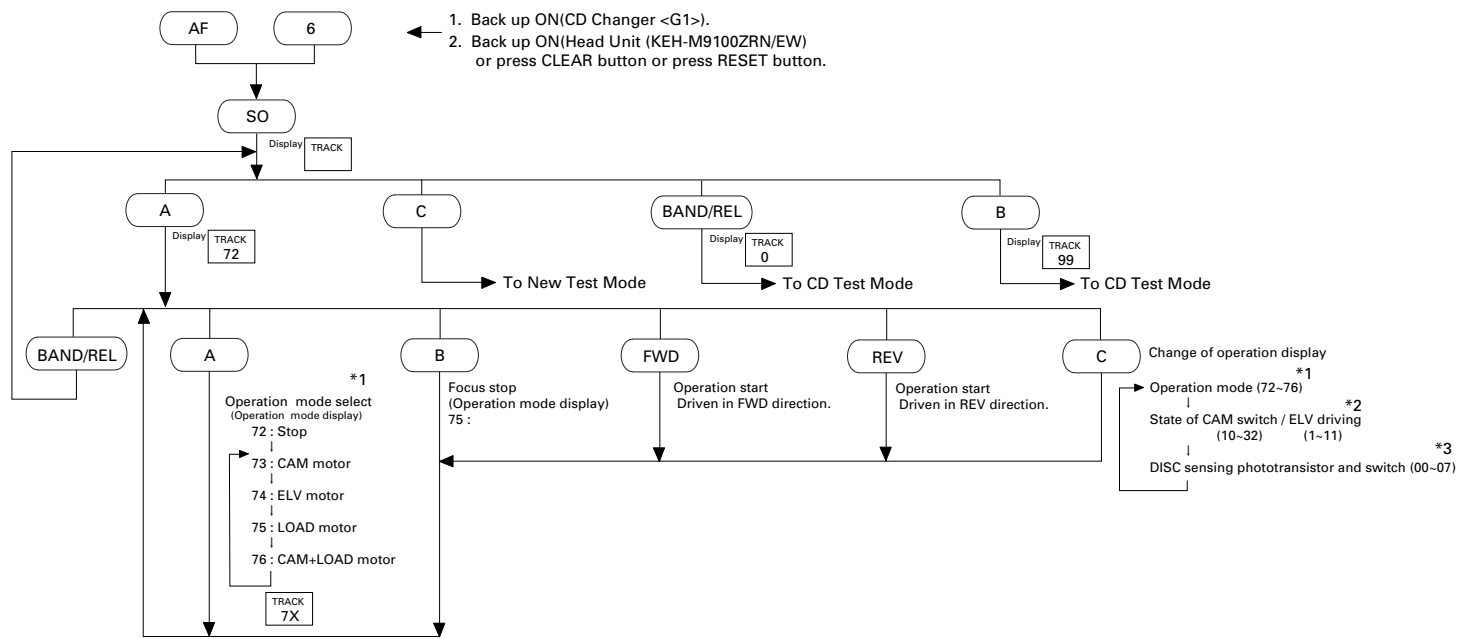
[Key]	Operation
[BAND/REL]	Power ON/OFF
[REV]	CRG+/TR Jump+ (Toward outer perimeter)
[FWD]	CRG-/TR Jump- (Toward inner perimeter)
[A]	Tracking Close/AGC gain, F.Bias adjustment value display switching
[B]	Focus Close, S.Curve, F.EQ measurement/ Rough Servo/AGC
[C]	Focus Mode select/Tracking Close/ CRG,TR Jump Switching
[D]	Auto Tracking Balance adjustment/ Tracking Open

- Operation of TR JUMPs other than 100TR is continued after your finger has left the key. CRG Move and 100TR Jump are forced to the Tracking Close Mode when the key is released.
- Powering on or off resets the Jump Mode to the Single TR (91).
- When ACC or Back up is off, the test mode is canceled.

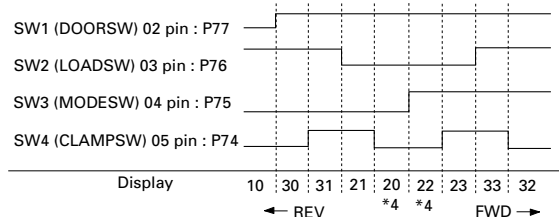
Note: Sound is unavailable even after the tracking has been closed
(this trouble results when the IC for the STS is not controlled in the test mode).

Note: When you pressed the [FWD] or [REV] key during the Focus Search, you must turn the power off immediately (otherwise, the lens can stick resulting in actuator damages).

● CD Changer Mechanism Flowchart



Indicates CAMSW (CAM gear) status. *2



State of DISC sensing phototransistor and switch *3

PH1	PH2	MAXSW	Display
L	L	L	00
L	L	L	01
L	H	L	02
H	H	L	03
L	L	H	04
H	L	H	05
L	H	H	06
H	H	H	07

L: Phototransistor is OPEN and switch is ON.
H: Phototransistor is CLOSE and switch is OFF.

● Precautions

- *4 Before performing the elevation, make sure that the CAM SW (switch) is set to a position between 22 and 20.
As a rule, driving of the ELV MOTOR must be started immediately after the CAMSW indication has changed from 22 to 20.

When driving the CAM MOTOR in 31 → 30 → 10 (in REV direction), the elevation position must be at the EJECT/LOAD position (the top position).

● Operating Procedures for Ejecting a Clamped Disc

- ① Select CAM MOTOR[73], then press the REV direction while the disc is being clamped (CAMSW state is 32).
The CAMSW status indication sequentially changes through 32→33→23→22.
- ② When the disc to be ejected is not identical with the disc being clamped, select the ELV MOTOR[74] in the vicinity of where the display changes from 22 to 20, then match the elevation to the disc to be ejected according to the following procedures:
After selecting ELV MOTOR[74], lower the elevation until the ELV position display becomes 01 (1st disc) using the REV direction.
Drive the elevation up until the display is changed to 10. This is the elevation where the second disk is situated.
The next display of 10 tells you the elevation of the 3rd disc. Repeating this operation allows you to establish an elevation matching each disc. (When the elevation is driven from the 1st through 6th disc, the status display changes as 01→11→10→11→10→11→10→11→10→11→10.)
(When the disc to be ejected coincides with the disc being clamped, the above operations are not necessary.)
- ③ Select the CAM MOTOR [73] and then, using the REV direction, drive it until the display changes from 20 (or 22) to 21 and 31.
- ④ Select the ELV MOTOR [74], then drive the tray of the disc to be ejected up to the EJECT/LOAD position (using the FWD direction).
- ⑤ Select the CAM+LOAD MOTOR [76], then drive it in the REV direction until the display changes from 31 to 30 and 10.
The door will open immediately before the display changes to 10 and part of the disc will be pushed out.
- ⑥ When 10 is displayed, select the LOAD MOTOR [75], then drive it in REV direction until the disc is completely ejected.

● New Test Mode

In the new test mode, the CD player plays as same as in the normal mode.

After setup, it displays error data such as out-of-focus, spindle unlocked, sub-code unreadable, and sound skipping together with causes, error-occurred time and disc No.

During setup, the operation status of the CD control software (the internal RAM: CPOINT) is displayed.

These functions and displayed data will help the efficiency in the service activities of aging test and failure analysis.

(1) Entering the new test mode

See the test mode flow chart on Page.49

(2) Key function table

Key	Test mode		New test mode	
	Regulator Off	Regulator On	In-play	Error/Protection
BAND	To regulator on	To regulator off	–	Time/Err.No. switching
FWD	–	FWD-Kick	FF/TR+	–
REV	–	REV-Kick	REV/TR-	–
A	–	Tracking close	Scan	–
D	–	Tracking open	Mode	–
B	–	Focus close	–	–
–	–	Focus open	–	–
–	–	Jump off	–	–
C	To New test mode	Jump mode select	Auto/Manual	Track No./Time switching

(3) Error Codes and causes

Code	Category	The Contents of errors	Causes
10	Electricity	Off focus detected.	FOK remains low for 100 msec. → Damages/stains on disc, vibrations or failure on servo.
11	Electricity	Spindle unlocked.	FOK = Low continued for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
42	Electricity	Sub-code unreadable.	Sub-code was unreadable for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
43	Electricity	Sound skipping detected.	Last address memory function was activated. → Damages/stains on disc, vibrations or failure on servo.

Note: The error codes should be indicated in the same way as in the normal mode.

(4) Display of Operational Status (CPOINT) during Setup

Status No.	Contents	Status No.	Contents
01	C.HOME INNER START	02	DURING CARRIAGE INNER
03	DURING CARRIAGE OUTER	04	CARRIAGE HOME END
05	DURING CARRIAGE OUTER FOR RETRY	11	START SETUP
12	SP KICK AND FOCUS SEARCH START	13	XSI=L WAIT
14	FOK=H WAIT	15	FOK=H WAIT
16	ROUGH AGC	17	RADIAL KICK
18	TRACKING BALANCE AUTO CONTROL	19	TRACKING CLOSE
1A	TRACKING CLOSE WAIT FAGC/CRG CLOSE JUNC	1B	BEFORE FOCUS AGC CONTROL
1C	FOCUS AGC	1D	TRACKING AGC
1E	MIRR, LOCK, SUBCODE CHECK	1F	TEST MODE WAIT
20	SUPPORT JUNC	21	SPINDLE SPEED 1→2
22	MIRR, LOCK, SUBCODE CHECK Part 2	31	TRACKING OPEN
32	CARRIAGE SHIFT	33	WAIT TRACKING OPEN
34	START CARRIAGE MOVE	35	CARRIAGE BRAKE
36	TRACKING BRAKE ON	37	TRACKING BRAKE OFF
38	SPINDLE ROUGH SERVO	41	TRACKING KICK
42	SINGLE JUMP	43	4TRACK JUMP
44	10TRACK JUMP	45	32TRACK JUMP
4D	32TRACK JUMP	4E	32TRACK JUMP
4F	32TRACK JUMP		

(5) Display Examples

① During Setup (In case of 6-digit display and CPOINT=11H)

TRK No.	MINUTE	SECOND
11	11	11

(In case of 4-digit display, AUTO, and CPOINT=11H)

TRK No.
11

(In case of 4-digit display, MANU, and CPOINT= 1H)

MINUTE	SECOND
11	11

② During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

③ When a protection / Error occurred

Ⓐ Error display (Use the BAND key to switch to (B) or (C).)

8-digit display : ERROR-XX

6-digit display : ERR-XX

: Err-XX

4-digit display : E-XX

Ⓑ Track No. error-occurred (Use the BAND key to switch to (C).)

6 or more-digit display : TRACK MINUTE SECOND

10 40 05

4-digit display : TRACK

10

Ⓒ Absolute time error-occurred (Use the BAND key to switch to (B).)

6 or more- digit display (the same as in the Track No. display mode)

: TRACK MINUTE SECOND

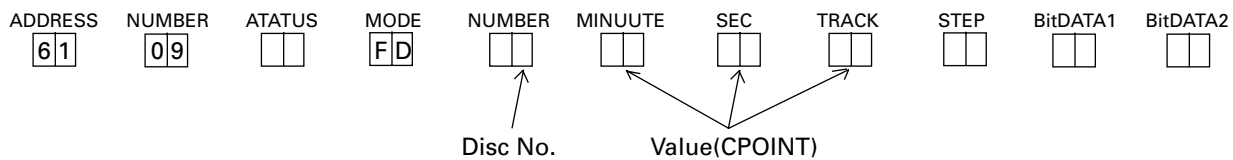
10 40 05

4-digit display, Manual:MINUTESECOND

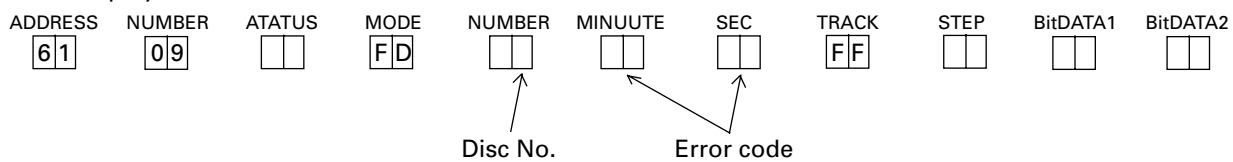
10 05

(6) P-BUS data format

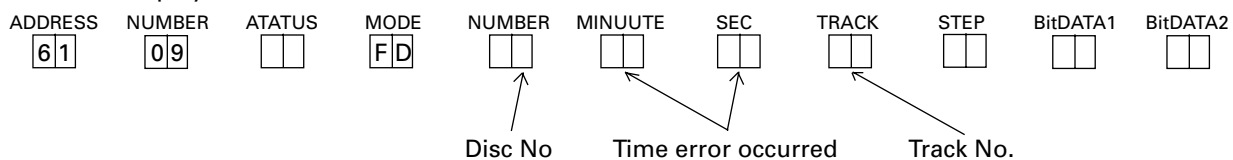
① During Setup



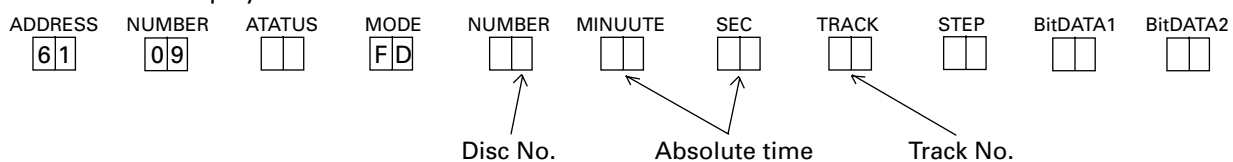
②-Ⓐ Error display



③-Ⓑ Track No. display



③-Ⓒ Absolute time display



● Mechanism Test Mode

In this mode, operation tests such as elevation and tray-drawing /-pushing operation should be performed.

- (1) Entering the mechanism test mode
See the test mode flow chart on page 50.

(2) Key function table

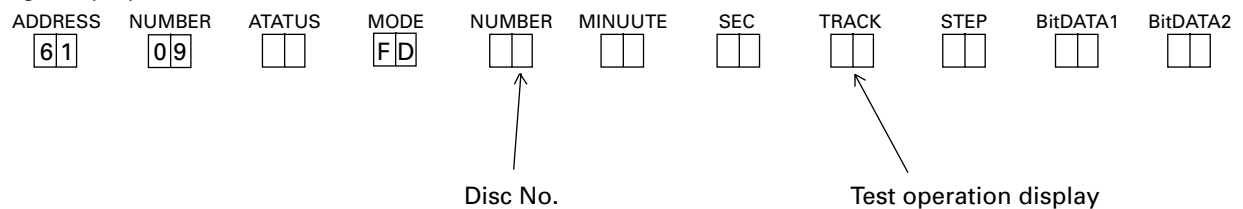
Key	Test mode		Mech. test mode
	Regulator Off	Regulator On	
BAND	To regulator on	To regulator off	To regulator off
FWD	–	FWD-Kick	Driven in FWD direction
REV	–	REV-Kick	Driven in REV direction
A	To Mech.test mode	Tracking close	Operation mode selection 72:Stop 73:CAM 74:ELV 75:LOAD 76:CAM+LOAD
D		Tracking open	–
B	–	Focus close	Focus stop (75:LOAD)
–	–	Focus open	–
–	–	Jump off	–
C	To New.test mode	Jump mode select	Operation display change Operation mode Display (72~76) ↓ CAM Switch Display (10~32) ↓ Disc-sense photoswitch display (00~07)

(3) Display Examples

- | | |
|----------------------------|-------------|
| 1) 6-digit display, 73:CAM | TRACK
73 |
| 2) 4-digit display, 73:CAM | TRACK
73 |

(4) P-BUS data format

- 1) 6-digit display, 73:CAM



7.1.2 DISASSEMBLY

● Removing the upper case (not shown)

1. Remove the five screws, then remove the upper case.

● Removing the Extension Unit (Fig. 1)

1. Remove the two screws B, then remove the side frame .
2. Remove screw C, screw D and PCB from the connector.
3. Straighten the three currently bent claws, then remove the extension unit.

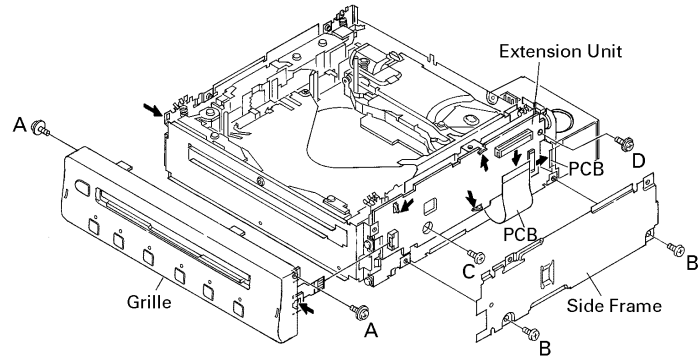


Fig. 1

● Removing the Grille (Fig. 1)

1. Remove the two screws A and the connector, then remove the grille.

● Removing the CD Mechanism Module (Fig. 2)

1. Remove the three screws A, then remove the front frame.
2. Remove the three screws B and two screws C, then remove the damper and holder.
3. Remove the two spring ①s, spring ② and spring ③ from the hook, then remove the CD mechanism module.

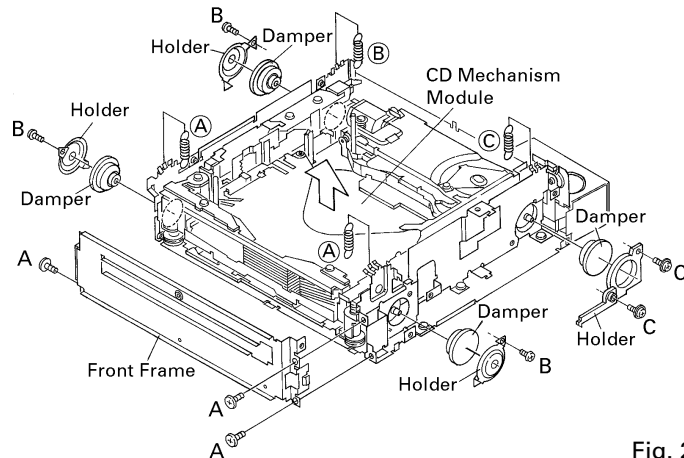


Fig. 2

– Precautions on Assembly –
 Apply spring ③ (black) to the front side hook.
 Remaining springs ① and ② are to be hung on the center hook.

● Removing the Keyboard Unit (Fig. 3)

1. Remove the four screws B and, screw A then remove the keyboard Unit.
2. Remove the four screws C, then remove the holder.

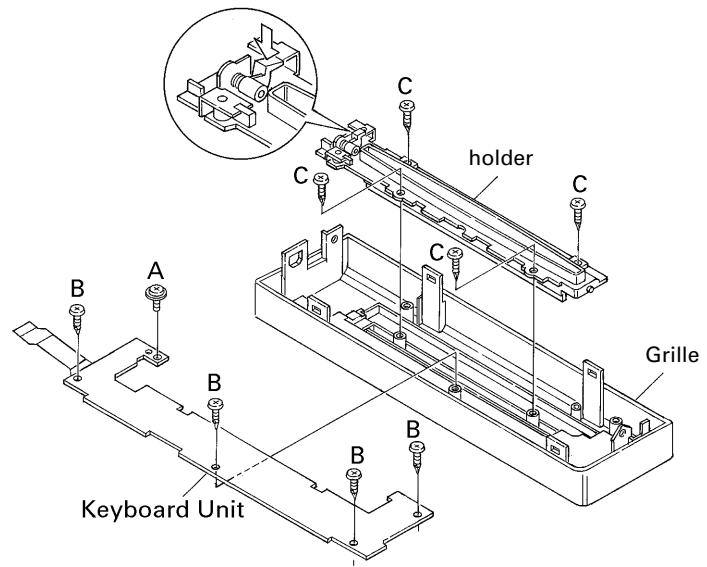


Fig. 3

● How to remove the Tray Assy

1. Apply about 6V current to the Cam gear motor until all holes match at the position (A) (elevation OK position).
2. Hook the three springs B temporarily as shown in Fig. 5. While pushing the Tray holder lock arms (right and left) in the direction (C), remove the Tray holder.

3. Lift up the Tray assy to remove it.

* Be careful not to remove the Tray hooks from the Tray assy.

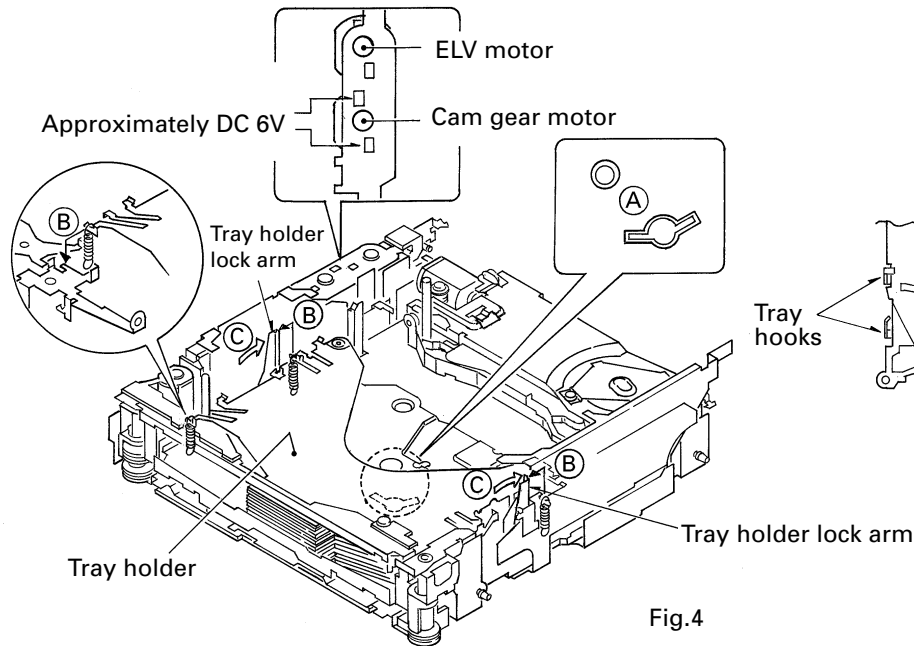


Fig. 4

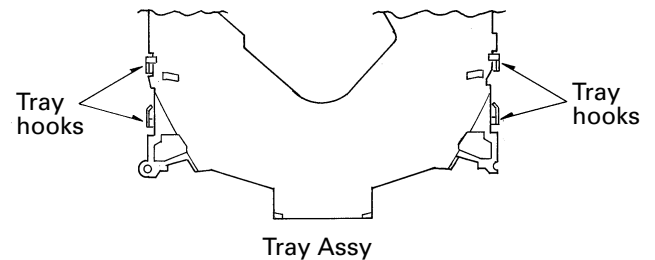


Fig. 5

● How to remove the Carriage Mech. Assy

1. Insert a short pin into the flexible PCB of the Pickup unit.
2. While opening the resin hooks, remove the cover from the Servo unit.
3. Disconnect the flexible PCBs from the connectors CN101 and CN301.
4. Remove the Tray holder and the Tray assy. (See above)
5. Rotate the Cam gear motor until the positions of all holes (E) match, then stop the motor. (The Carriage Mech assy will stop as shown in the Fig.7.)

* When the positions of all holes match, they will be completely covered by the Carriage mech assy.

* To rotate the Cam Gear motor, see "How to remove the Tray assy".

6. Unhook the spring A.
7. Remove the flexible holder B (while opening the hooks).
8. Remove the flexible PCB (C) from the motor. (The flexible PCB (C) has been stuck on the motor with double-sided adhesive tape.)
9. Loosen the fixing screw and remove the flexible holder.

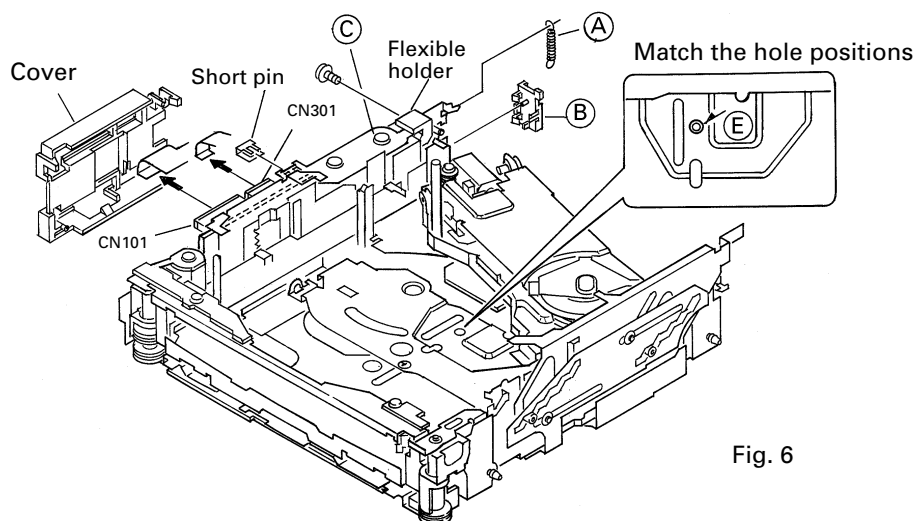


Fig. 6

10. Remove the screw, pressure spring and collar. Lift up the Carriage mechanism assy to remove it.

* Screw tightening torque: 2.6kgfcm

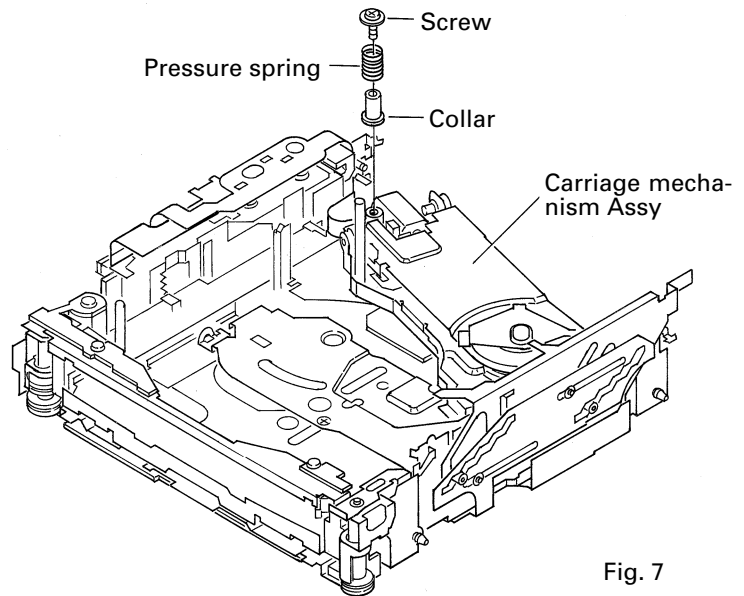


Fig. 7

● How to remove the Pickup unit

1. Remove the pulling spring, torsion spring and E-shaped ring. Then remove the Clamper arm.

* The spring (A) will be removed with the Clamper arm.

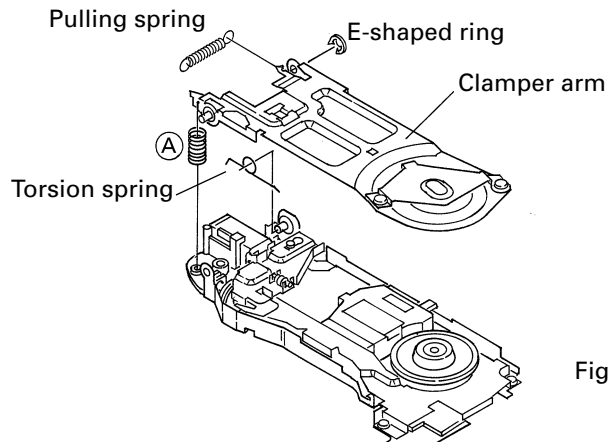


Fig. 8

2. Slide the Clamp UP lever (B) to remove it.
3. Loosen the 2 screws. Remove the feed-screw cover by sliding it.
4. Remove the feed-screw pressure spring (D).
5. Loosen the 2 screws. Remove the feed-screw holder (E).
6. Remove the belt.

7. Remove the Pickup unit together with the feed screw.

* Be careful not to lose the shaft holders at the both ends of the feed screw.

* Be careful not to damage the 2 flexible PCBs(for the Pickup and motor) when separating them. The flexible PCBs have been stuck each other with double-sided adhesive tape.

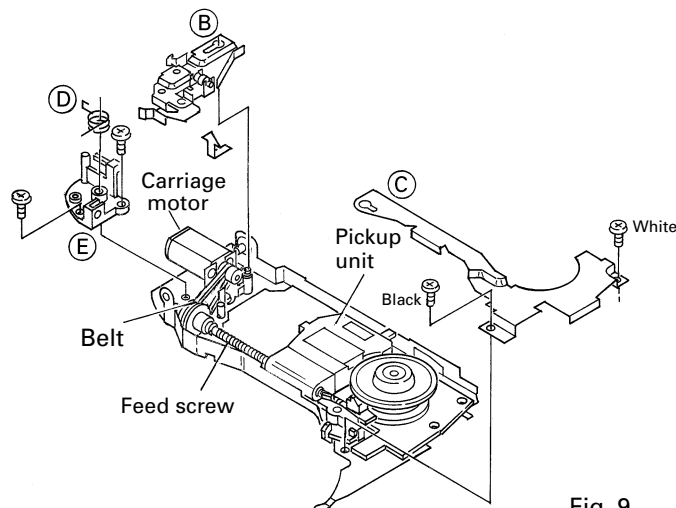


Fig. 9

8. Loosen the 2 screws. Remove the plate spring and the rack.
9. Pull out the feed screw from the Pickup unit.

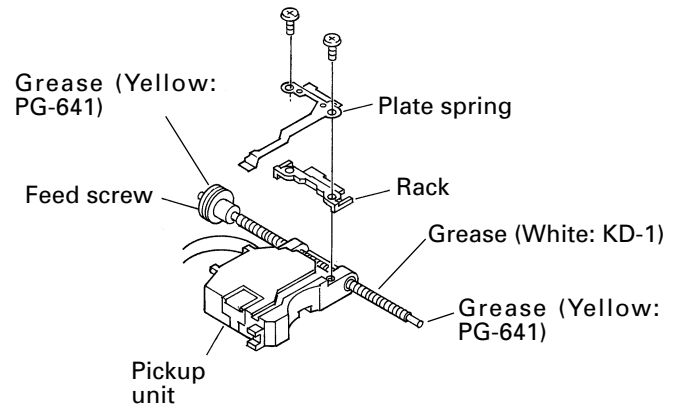
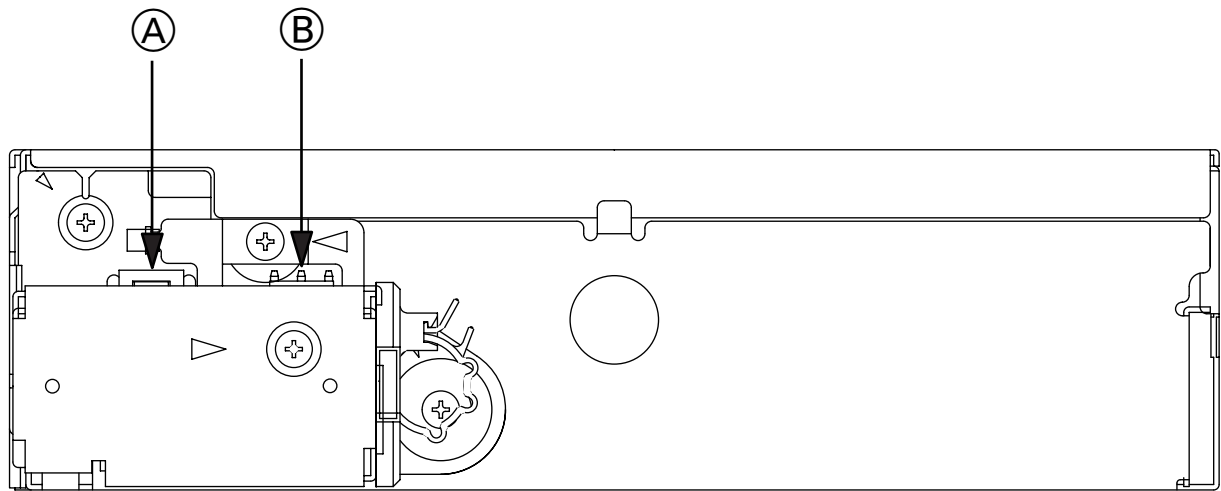
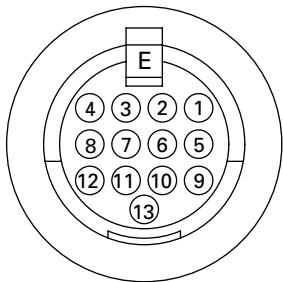


Fig. 10

7.1.3 CONNECTOR FUNCTION DESCRIPTION

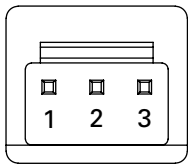


(A)
P-BUS CONNECTOR (DIN 13pins)



- 1 AUDIO GND
- 2 Lch
- 3 AUDIO GND
- 4 Rch
- 5 Lch SHIELD
- 6 Rch SHIELD
- 7 NC
- 8 GND
- 9 SRQ
- 10 RST
- 11 RXEN
- 12 SCK
- 13 DATA
- E SHIELD GND

(B)
POWER CONNECTOR (3pins)



- 1 GND
- 2 ILL
- 3 B.UP

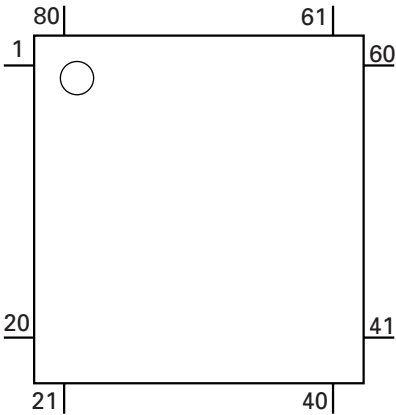
7.2 IC

● Pin Functions (PD5553A)

Pin No.	Pin Name	I/O	Function and Operation
1	VDIN	I	VD power supply sensor input
2	DOORSW	I	Door open position sense input
3	LOADSW	I	Loading sense input
4	MODESW	I	Elevation OK input
5	CLAMPSW	I	Disk clamp sense input
6	ELHOME	I	Elevation reset input
7	XSCK	O	LSI clock output
8	XSO	O	LSI data output
9	XSI	I	LSI data input
10	XSTB	O	LSI strobe output
11	XRST	O	LSI reset output
12	XAO	O	LSI data discernment control signal output
13	VDCONT	O	VD power supply control output
14	EJKEY	I	Eject key input
15	NC		Not used
16	BRST	I	P-BUS reset input
17	BSRQ	O	P-BUS service request input
18	ERXEN	I/O	P-BUS busy input/output
19	BSCK	I/O	P-BUS clock input/output
20	BSO	O	P-BUS data output
21	BSI	I	P-BUS data input
22	BSENS	I	Back up power sense input
23	BSCY	I	Signal indicating head of subcode block input
24	CNV55		GND
25	RESET	I	Reset input
26	POWER	O	Servo / Mechanism power supply control output
27	CONT	O	Servo driver power supply control output
28	XIN	I	Crystal oscillating element connection pin
29	XOUT	O	Crystal oscillating element connection pin
30	VSS		GND
31-33	KST1-3	O	Key strobe output
34,35	KDT1,2	I	Key data input
36,37	NC		Not used
38	ADENA	O	A/D converter reference voltage output
39	TESTIN	I	Test program mode input
40	DCLOSE	I	Door close sense input
41	WDSL	O	Data comparison designation output
42	XWIH	I	DRAM data white inhibit input
43	XEMP	I	DRAM data read inhibit input
44	CHDT	I	Data comparison mode monitor input
45,46	CHM0,1	O	Data comparison mode output
47-49	NC		Not used
50	XWRE	O	DRAM data white enable output L:enable
51	XRDE	O	DRAM data read enable output L:enable
52	XQOK	O	SUB-Q OK output L:SUBQ OK
53	EMPH	O	DAC EMPH output
54	SCONT	O	Double speed select output
55	LOAD	O	PHOT power supply control output
56	CDMUTE	O	CD mute output
57,58	LO2,1	O	Load motor control output
59,60	ELV2,1	O	ELV motor control output
61,62	CG2,1	O	CAM motor control output
63	MIRR	I	Mirror detector input
64	LOCK	I	Spindle lock detector input
65	FOK	I	Focus OK signal input
66	EXSCK	O	Shift clock output

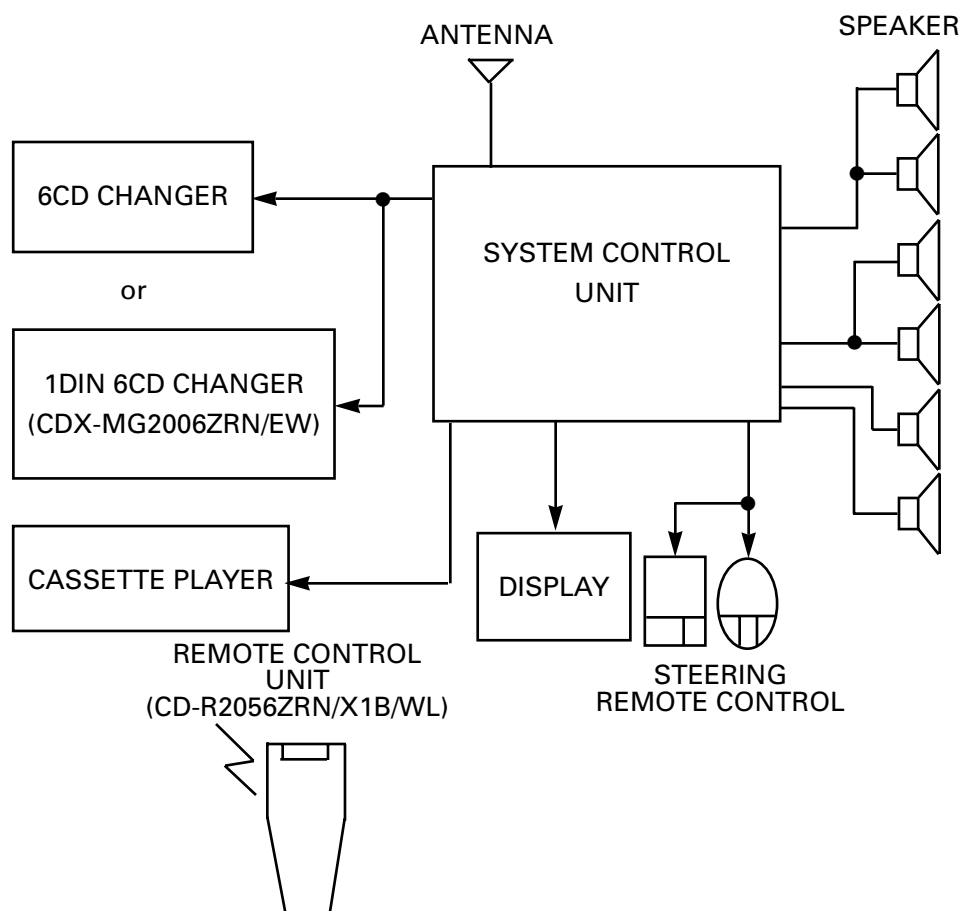
Pin No.	Pin Name	I/O	Function and Operation
67	EXMODE	O	Latch clock output
68	EXSO	O	Serial data output
69	EXCE	O	Chip enable output
70	ILPOW	O	Illumination indicator control output
71	VCC		VDD
72	VREF	I	A/D converter reference voltage input
73	AVSS	I	A/D converter GND
74	ADRMON	I	DRAM memory remaining monitor input
75	EREF	I	DRAM A/D converter reference voltage input
76,77	PH1-3	I	Disc photo sense input
78	MAXSW	I	Maxi CD discernment sense input
79	ELVSNS	I	ELV position sense input
80	TEMP	I	Temperature detector input

*PD5553A



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

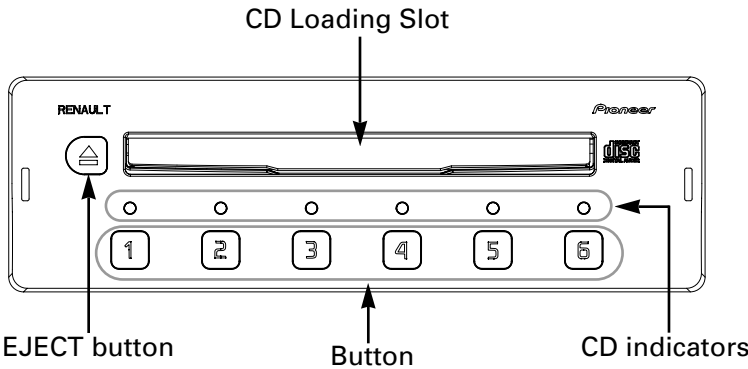
7.3 SYSTEM BLOCK DIAGRAM



8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

Key Finder



8.2 SPECIFICATIONS

General	
Power source	14.4 V DC (10.5 – 16.0 V allowable)
Grounding system	Negative type
Standby current	2 mA
Dimensions (chassis size)	177.8 (W) × 50 (H) × 160 (D) mm
Weight	1.55 kg

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	20 – 20,000 Hz
Signal-to-noise ratio	92 dB (1kHz) (IHF-A network)
Dynamic range	92 dB (1kHz)
Number of channels	2 (stereo)

Pioneer

Service Manual

ORDER NO.
CRT2376

CD MECHANISM MODULE

CX-890

NOTE:

- This Service Manual outlines operations of the CD mechanism module used in the models listed blow.
- For repair, use this Service Manual and the Service Manual of the model used in the system.

Model	Service manual	CD mechanism module	CD mechanism unit
CDX-PD6/UC	CRT2372	CXK4701	CXB2700

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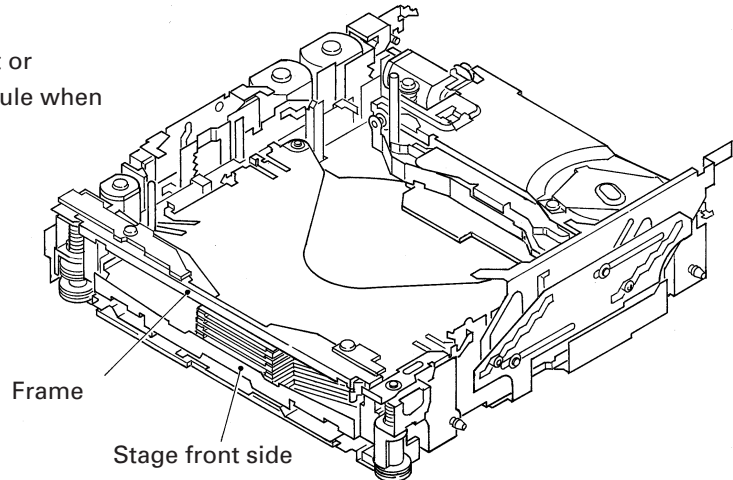
● CD Player Service Precautions

1. For pickup unit(CXX1311) handling, please refer to "Disassembly"(Page 21).

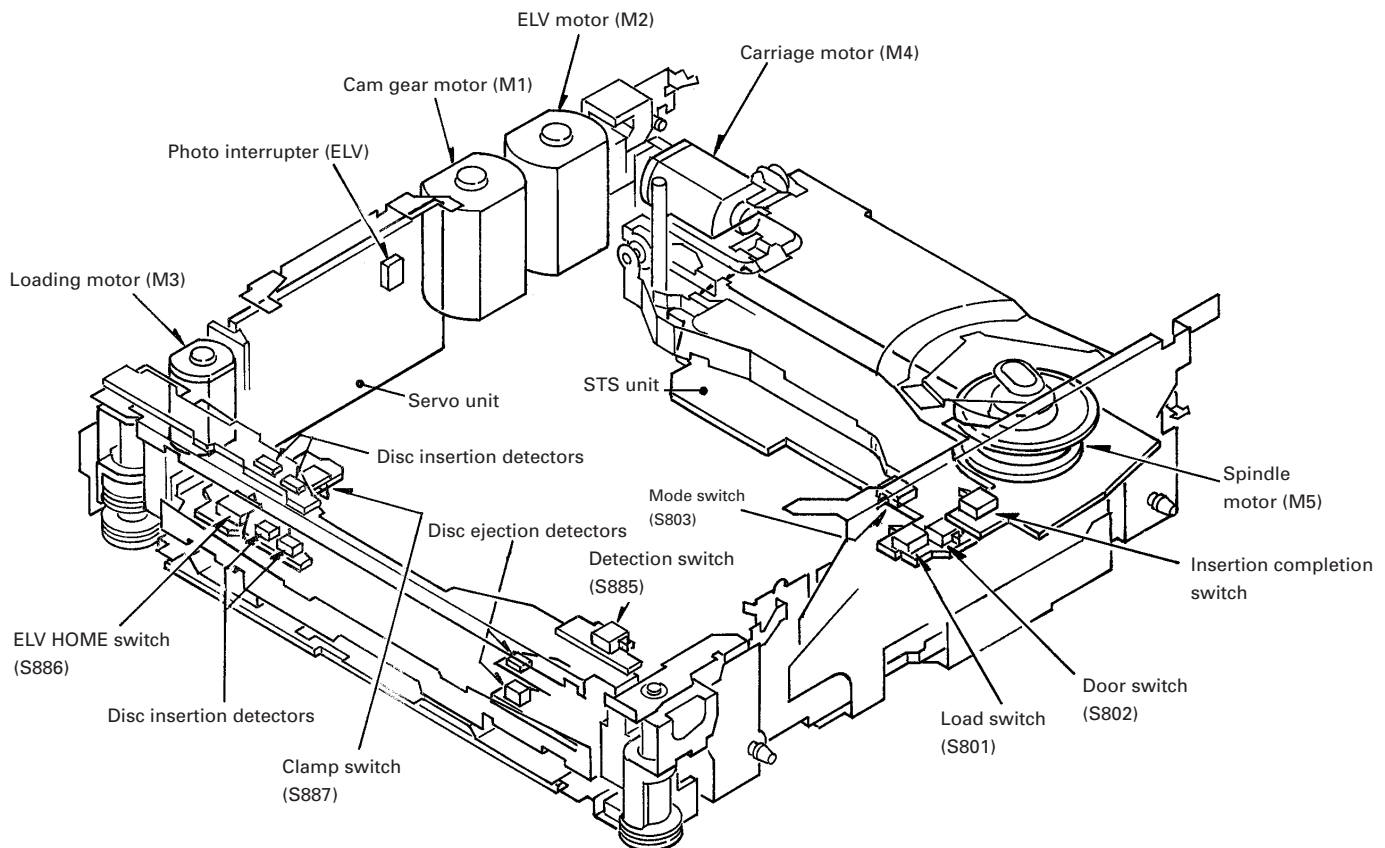
During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).

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

Do not hold the upper frame of the disc insertion slot or the front side of the stage in the CD mechanism module when servicing to prevent them from being deformed.



1. MAIN PARTS LOCATIONS



2) RF amplifier and RF AGC amplifier

Photodetector outputs (A+C) and (B+D) are added, amplified and equalized in IC101, and output to the RFI terminal as RF signal. (Eye pattern can be checked at this terminal.)

Low-frequency components of voltage RFI is:

$$RFI = ((A + C) + (B + D)) \times 3.22$$

where R111 is offset resistor to keep RFI signal within the output range of the preamplifier. RFI signal is goes under AC coupling, and is input to Pin 4 (RFIN terminal).

IC101 contains an RF AGC circuit. RFO output from Pin 2 is maintained to a constant level (1.2 ± 0.2 Vp-p). The RFO signal is used in the EFM, DFCT, and MIRR circuits.

3) EFM circuit

The EFM circuit converts RF signal into digital signals of "0" and "1". RFO signal after AC coupling is input to Pin 1, and supplied to the EFM circuit.

Asymmetry caused during manufacturing of discs cannot be eliminated solely by AC coupling. Therefore, the system controls the reference voltage ASY of the EFM comparator by using the fact that probability to generate "0" and "1" is 50% in EFM signal. This reference voltage ASY is generated by output from the EFM comparator through L.P.F. EFM signal is output from Pin 35. As signal level, amplification is 2.5 Vp-p around REFOUT.

4) DFCT (defect) circuit

DFCT signal detects mirror defect in discs, and is output from Pin 33. The system outputs "H" when a mirror defect is detected.

If disc is soiled, the system determines it as lack of mirror. Therefore, the system inputs the DFCT signal output to the HOLD terminal of servo LSI. Focus and tracking servo drives change to Hold status only when DFCT output is in "H" so that performance of the system upon detection of defect can be improved.

5) RFOK circuit

The RFOK circuit outputs signal to show the timing of focus closing servo, as well as the status of focus closing during playback. The signal is output from Pin 32. The system inputs the RFOK signal output to the RFOK terminal of servo LSI. The servo LSI issues Focus Close command. The system outputs signal in "H" during focus closing and playback.

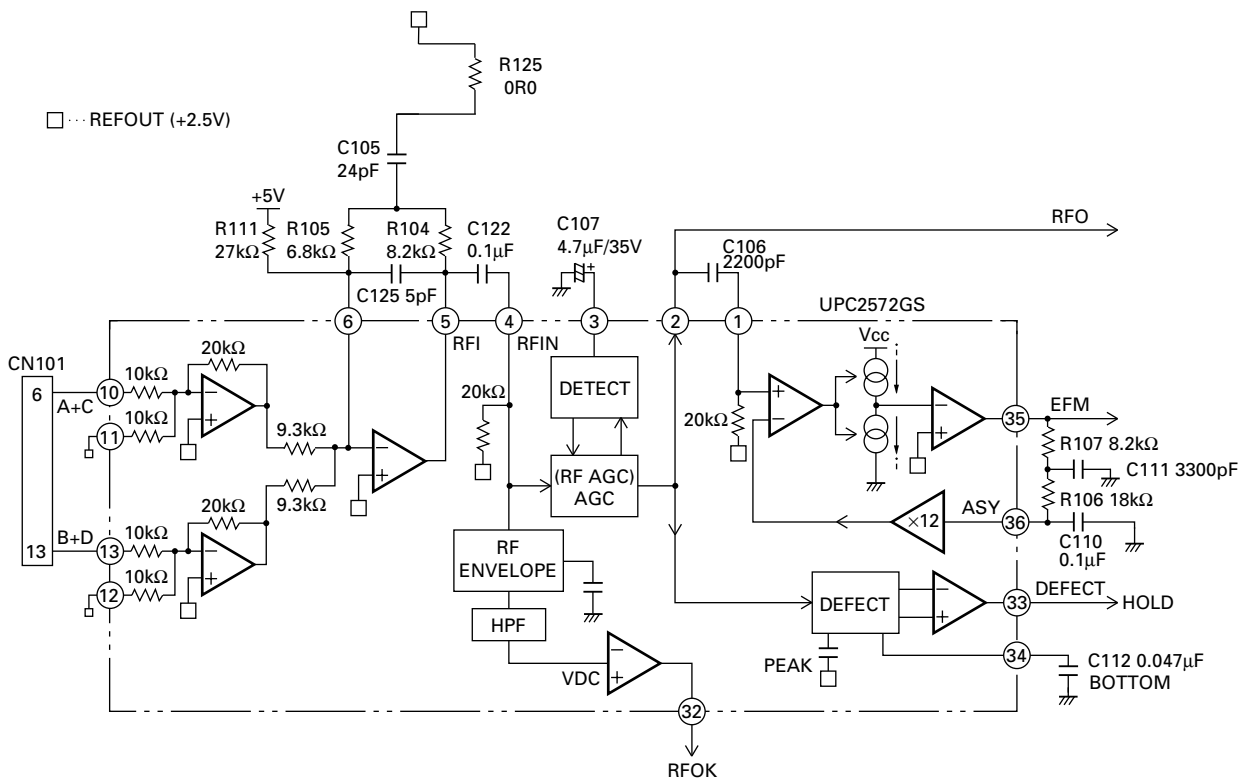


Fig. 3 RF AMP, RF AGC, EFM, DFCT, RFOK Circuit

6) Focus-error amplifier

The system outputs photodetector output (A+C) and (B+D) as FE signal (A+C)-(B+D) from Pin 28 via the difference amplifier, then via the error amplifier.

Low-frequency components of voltage FEY is:

$$\text{FEY} = (A+C) - (B+D) \times \frac{20\text{k}\Omega}{10\text{k}\Omega} \times \frac{90\text{k}\Omega}{68.8\text{k}\Omega} \times \frac{R_{108}}{17.2\text{k}\Omega}$$

: (FE level of pickup unit x 5.02)

An S curve equivalent to approximately 1.6 Vp-p is obtained at FE output (Pin 28) by using REFO as reference. The cut-off frequency of the amplifier of the last layer is 12.4 kHz.

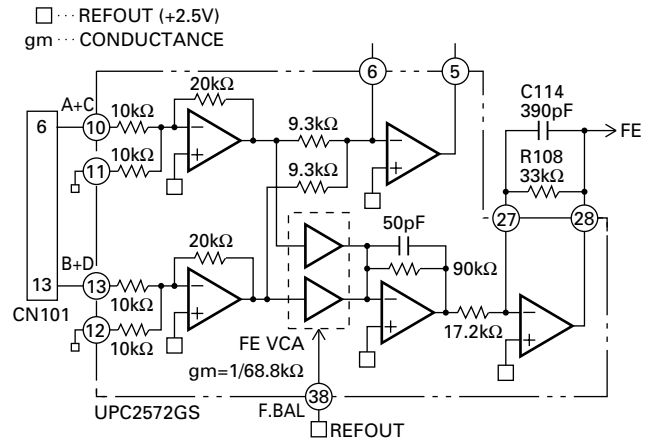


Fig. 4 Focus-error amplifier

7) Tracking-error amplifier

Outputs E and F from the photodetector are output as TE signal (E-F) from Pin 24 via the difference amplifier, then via the error amplifier.

Low-frequency components of voltage TEY is:

$$\text{TEY} = (E-F) \times \frac{63\text{k}\Omega}{(31\text{k}\Omega + 16\text{k}\Omega)} \times \frac{68\text{k}\Omega}{17\text{k}\Omega}$$

: (TE level of pickup unit x 5.36)

TE waveforms equivalent to approximately 1.5 Vp-p are obtained at TE output (Pin 24) by using REFO as reference. The cut-off frequency of the amplifier of the last layer is 19.5 kHz.

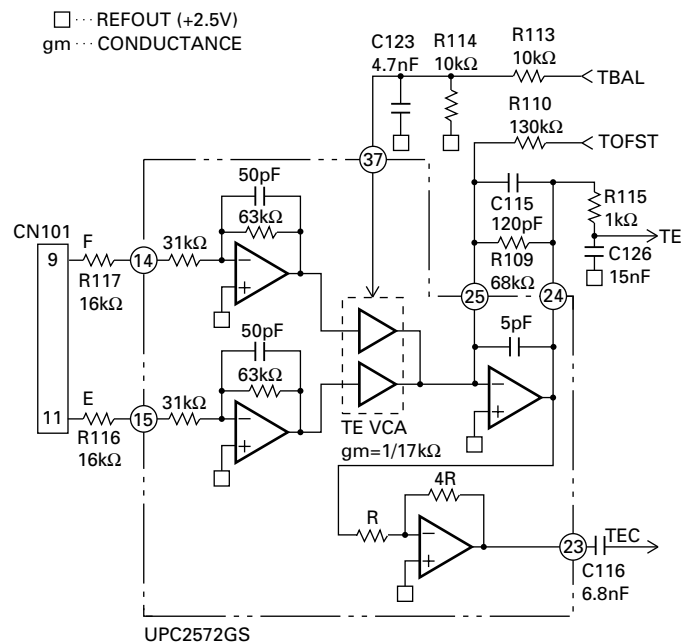


Fig. 5 Tracking-error amplifier,
Tracking zero-cross amplifier

8) Tracking zero-cross amplifier

Tracking zero-cross signal (TEC signal) is generated by amplifying TE waveforms (voltage at Pin 24) by a factor of four. The signal is used for detecting the zero-cross point of tracking error in the servo LSI UPD63702AGF. The purposes of detecting the zero-cross point are as follows:

- (1) To be used for counting tracks for carriage move and track jump.
- (2) To be used for detecting the direction of lens movement when tracking is closed. (To be used in the tracking brake circuit mentioned later.)

The frequency range of TEC signal is from 500 Hz to 19.5 kHz.

Voltage TEC = TE level x 4

In other words, the TEC signal level is calculated as 6 Vp-p. This level exceeds the D range of the operation amplifier, resulting in the signal to clip. However, there shall be no problem, since the servo LSI uses only zero-cross point.

9) MIRR (mirror) circuit

MIRR signal shows ON and OFF track information. The signal is output from Pin 31.

The status of MIRR signal is as follows:

Laser beam ON track: MIRR = "L"

Laser beam OFF track: MIRR = "H"

The signal is used in the brake circuit mentioned later.

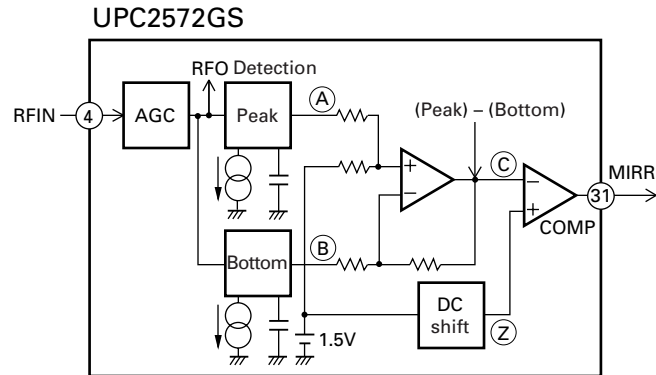


Fig.6 MIRR Circuit

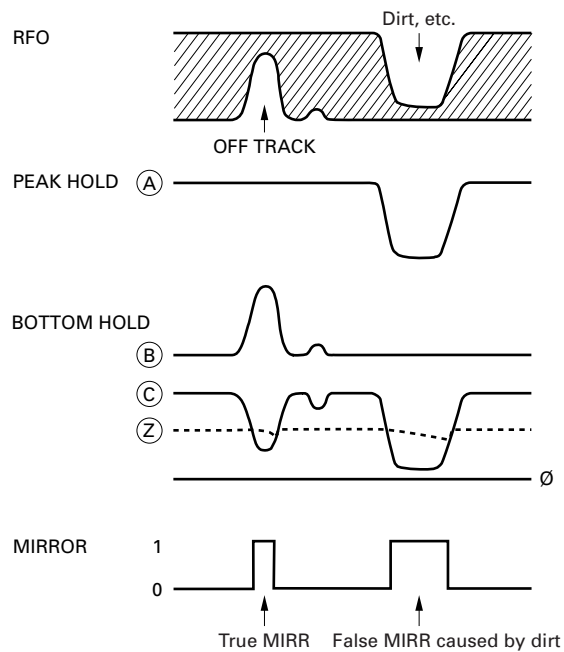


Fig. 7 MIRR Circuit

10) 3T OUT circuit

The system detects flickering of RF signal when disturbance is input to the focus servo loop, and outputs the difference of phase between FE signal and RF-level fluctuation signal from Pin 30. The resulting signal is obtained through L.P.F. with a f_c of 40 Hz. This signal is used for automatic adjustment of FE bias.

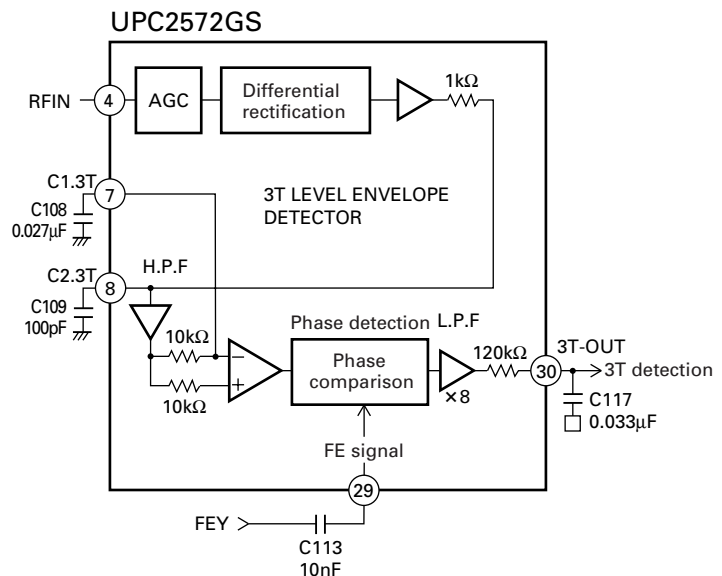


Fig. 8 3T OUT Circuit

2.2 Servo (UPD63702AGF: IC201)

The servo consists of mainly two parts. The first part is the servo processing unit to equalize error signals and control track jump, carriage move, in focus, etc. The second part is the signal processing unit to perform data decoding, error correction, and interpolation. The system converts FE and TE signals from analog to digital in IC201, then outputs drive signals of the focus, tracking, and carriage systems via the servo block. The EFM signal input from the preamplifier is decoded by the signal processing unit, and eventually output as audio signal after conversion into analog from digital signals via the DA converter (IC201 contains audio DAC). Then, the system generates error signal for the spindle servo in the decoding process, sends the signal to the spindle servo to generate drive signal for spindle.

After that, drive signals for focus, tracking, carriage, and spindle are amplified in IC301 and BA5986FM, and supplied to respective actuators and motors.

1) Focus servo system

The main equalizer of focus servo is located in the UPD63702AGF. Fig. 9 shows block diagram of the focus servo.

For the focus servo system, the lens must be positioned within the focusing range in order to perform focus closing. To achieve this, the system moves the lens upward/downward by focus-search voltage of triangular waveform to detect the focusing point. During searching, the system kicks the SPDL motor to maintain rotation speed to set speed.

The servo LSI monitors FE and RFOK signals so that focus closing is performed automatically at an appropriate point.

Focus closing is performed when the following four conditions are satisfied:

- (1) When the lens moves nearer to the disc.
- (2) RFOK = "H"
- (3) FZD signal (in IC) is latched to "H"
- (4) FE = 0 (REFOUT as reference)

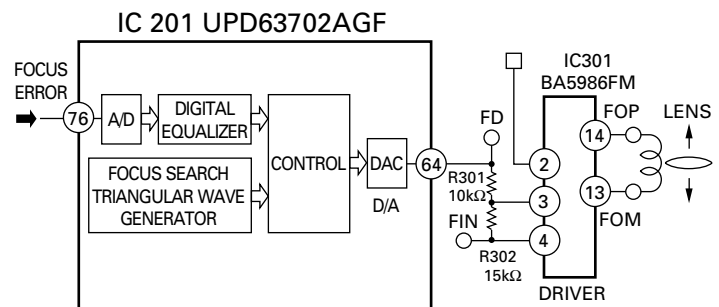


Fig. 9 Focus servo block diagram

When the conditions mentioned above are satisfied and focus is closed, the XSO terminal changes from "H" to "L". Then, the microcomputer starts monitoring RFOK signal through L.P.F after 40 ms. If the system judges RFOK signal as "L", the microcomputer takes actions, including protection.

Fig. 10 shows operations related to focus closing. (The illustration shows when the system cannot perform focus closing.) S curve, search voltage, and actual lens behavior can be checked by pressing the Focus Close button when "01" is shown in Focus Mode Select in Test mode.

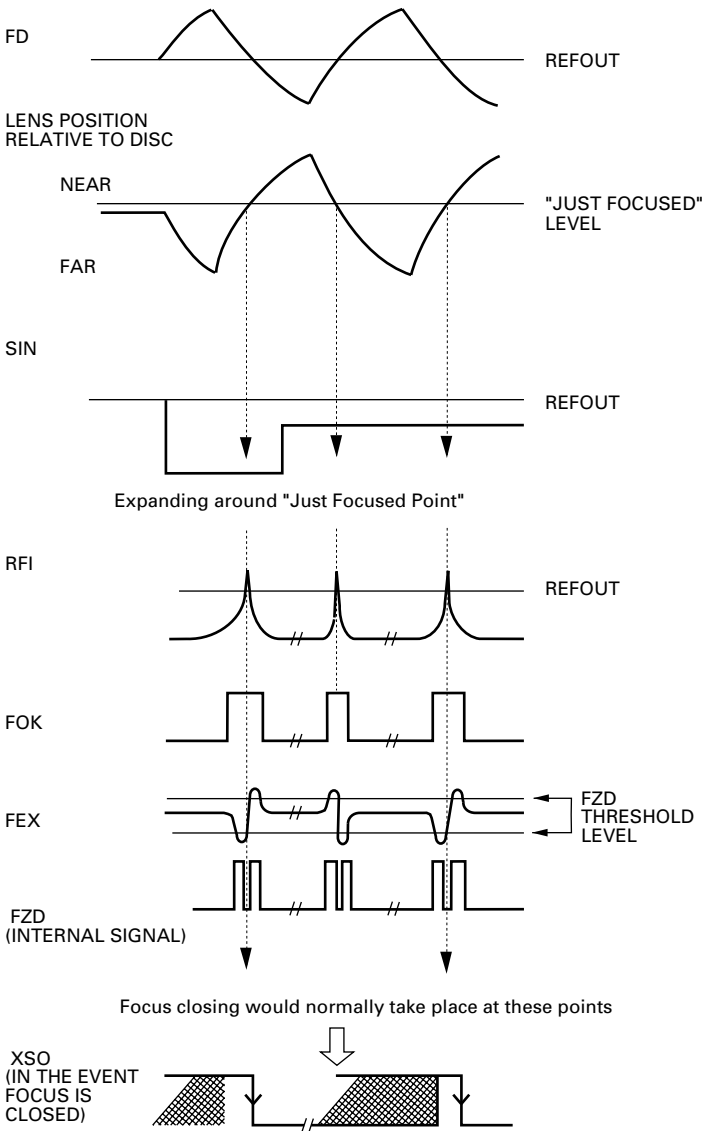


Fig. 10 Sequence of Focus Closing

2) Tracking servo system

The main equalizer of tracking servo is located in the UPD63702AGF. Fig. 11 shows block diagram of the tracking servo.

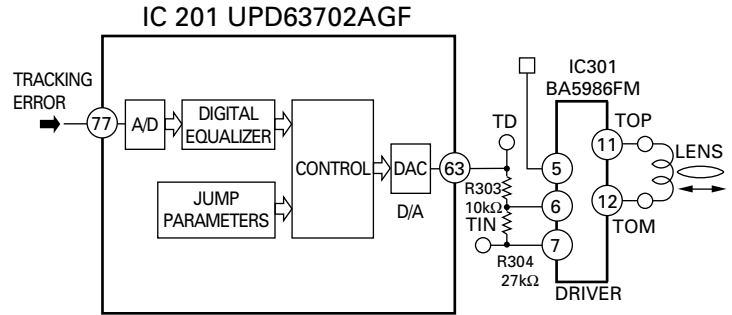


Fig. 11 Tracking servo block diagram

a) Track jump

Track jump is automatically performed by the auto sequence function in LSI when the LSI accepts command. The system has six types of jump (1, 4, 10, 32, 32x2, and 32x3) for track jump during searching. In Test mode, the system can select and check these jump types and CRG move by selecting a mode. The micro-computer sets half of the total number of track jumps (two tracks if the total number of tracks are four), and counts the set number of tracks by using TEC signal. The system outputs brake pulse for a specified time (set by the microcomputer) from the point of time when the set number is counted, and stops the lens. Thus, tracking is closed, and the system can continue normal playback.

To improve servo withdrawal during track jump, the system sets the brake circuit to ON for 60 ms after brake pulse so that gain of the tracking servo can be increased.

FF/REV in normal mode is made by continuously performing single jump approximately ten times faster than in normal playback.

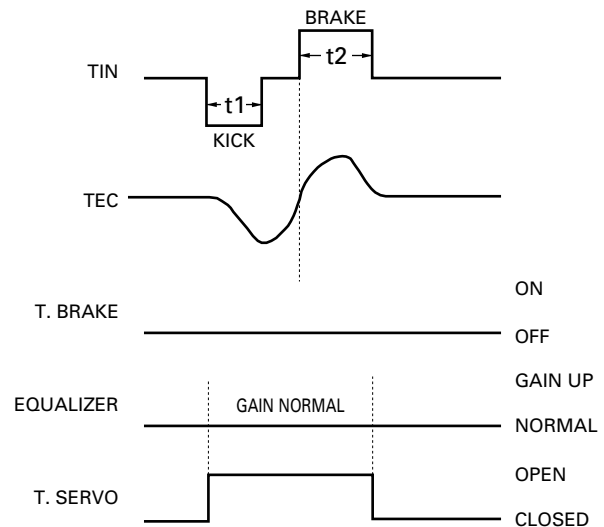


Fig. 12 Single track jump

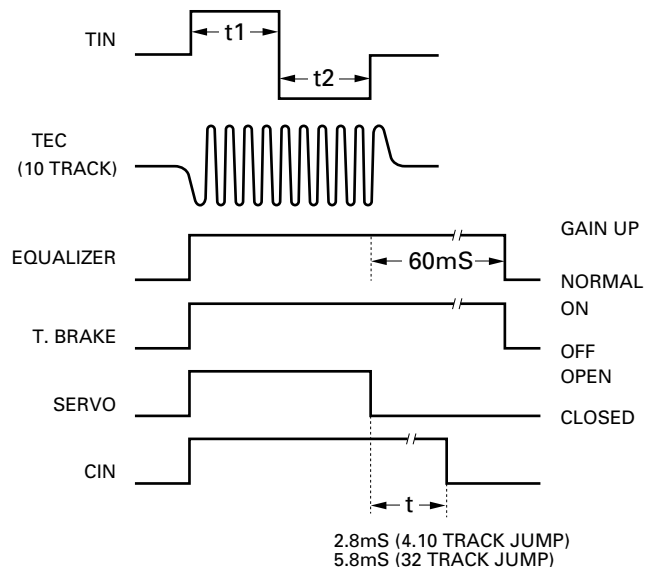


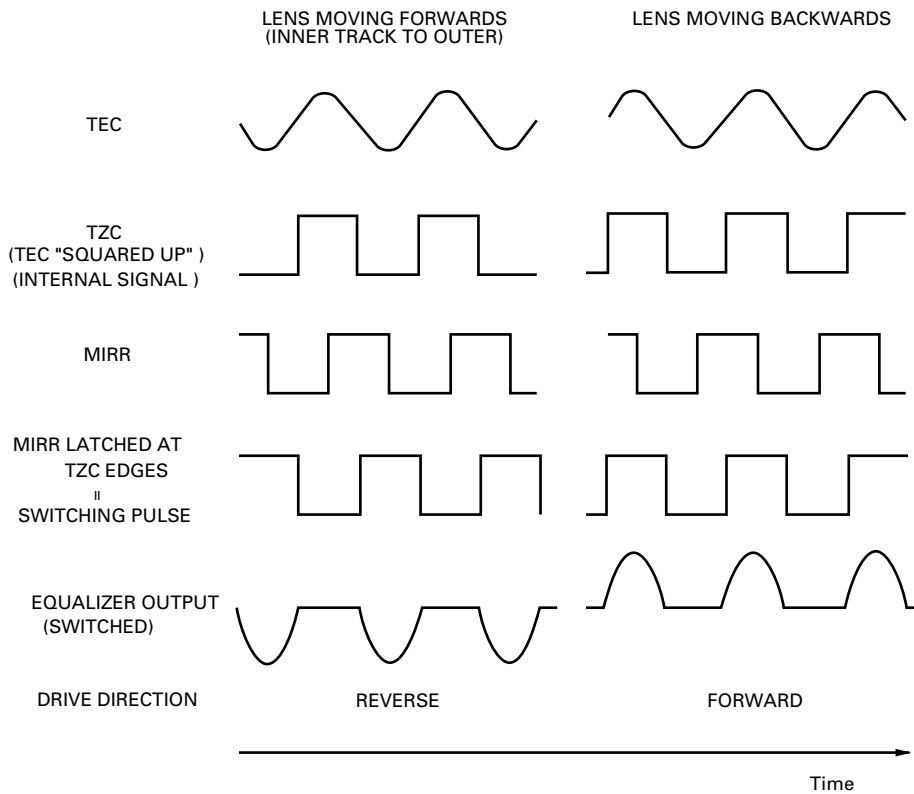
Fig. 13 Multi track jump

b) Brake circuit

Servo withdrawal will deteriorate during setting and track jump. Thus, the system uses the brake circuit to provide stable withdrawal to servo loop.

The brake circuit detects the direction of lens movement, and outputs only drive signal in the opposite direction from the lens movement. Thus, the system delays the speed of the lens movement to stabilize withdrawal of the tracking servo.

The system judges sliding direction of track from TEC and MIRR signals, as well as the relationship of their phase.



Note: In the illustration, the phase of equalizer output is shown as the same as with that of TEC.

Fig. 14 Tracking Brake Circuit

3) Carriage servo system

Output from low-frequency components (lens position information) of the tracking equalizer is input to the carriage equalizer by the carriage servo. After obtaining a certain gain, the system outputs drive signal from the servo LSI. The signal is then applied to the carriage motor via the driver IC. More specifically, the pickup unit as a whole must be moved forward when lens off-set during playback reaches a specified level. Therefore, gain of equalizer is set so that voltage higher than the activation voltage of the carriage motor is output. As actual operation, a certain threshold level is set for equalizer output in the servo LSI, and drive voltage is output from the servo LSI only when the equalizer output level exceeds that level. Thus, power consumption is reduced. Depending on eccentricity, etc. of disc, the equalizer output voltage may cross the threshold level several times before the pickup unit as a whole starts operation. At this time, waveforms of drive voltage from LSI are output as pulse.

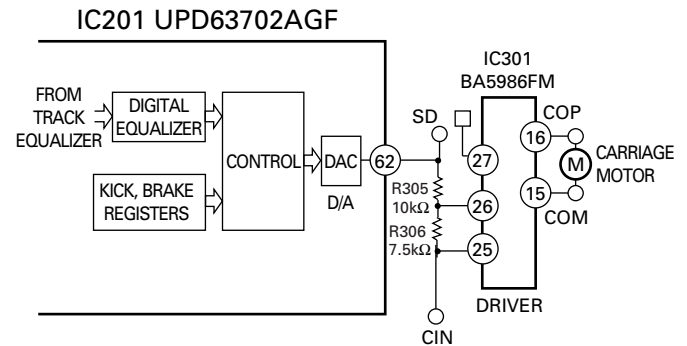


Fig. 15 Carriage Servo Circuit

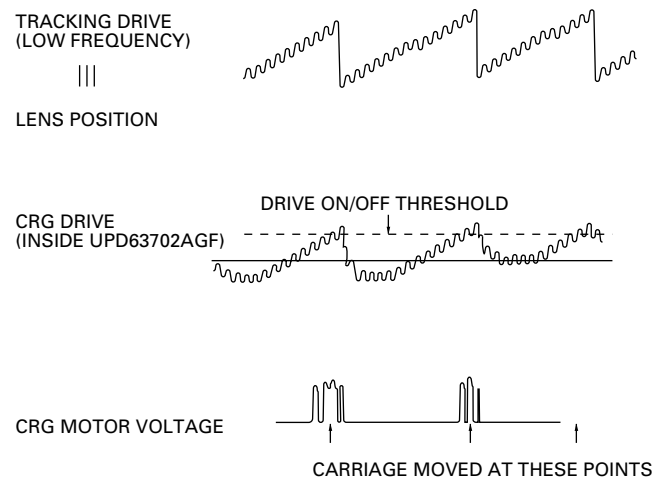


Fig. 16 Carriage Signal Waveforms

4) Spindle servo system

The spindle servo has the following modes:

- (1) Kick mode: To be used for accelerating disc rotation during setting.
- (2) Offset mode:
 - a) To be used after completion of kick until completion of spindle lock during setting.
 - b) If focus is out of range during playback, this mode is used until focus is recovered. In both cases, Offset mode is used for maintaining disc rotation to the speed close to specified rotation.
- (3) Adaptive Servo mode: CLV servo mode during normal operation. The system samples every WFCK in 16 cycles whether frame synchronous signal matches output from the internal frame counter in EFM demodulation block, and generates signal that shows matching/unmatching status. If signal showing unmatching status continues for 8 times, the system deems it as asynchronous status. Except this case, the system judges as synchronous. In Adaptive Servo mode, the system automatically selects withdrawal servo for asynchronous status, and steady-state servo for synchronous status.
- (4) Brake mode: Mode to stop the spindle motor.
 The microcomputer outputs brake voltage from the servo LSI. Waveforms of EFM are monitored inside the LSI. If the longest pattern of EFM exceeds specified intervals (if the rotation speed adequately slowed down), flag is activated in the LSI, and the microcomputer turns brake voltage to OFF. If no flag is activated after a specified time, the microcomputer changes from Brake to Stop mode. This status continues for a specified time. If the system changes to Stop mode during ejection, disc is ejected after the specified time mentioned above.
- (5) Stop mode: To be used when the power is turned to ON, and during ejection. In Stop mode, the end-to-end voltage of the spindle motor is 0 V.
- (6) Rough Servo mode: To be used when returning carriage (carriage move during long search, etc.). The system calculates linear speed from waveforms of EFM, and inputs either "H" or "L" level to the spindle equalizer. This mode is also used for confirmation of grating in Test mode.

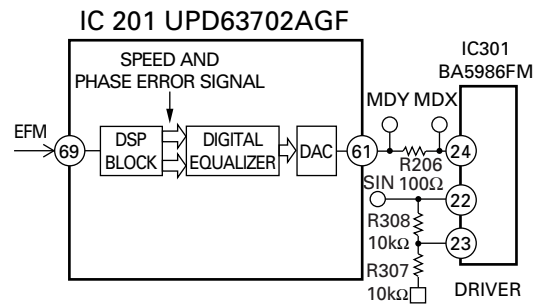


Fig. 17 Spindle servo block diagram

2.3 Automatic Adjustment Function

With this system, all circuit adjustments are automatically performed by using the preamplifier (UPC2572GS) and servo LSI (UPD63702AGF). All adjustments are automatically performed whenever disc is inserted or CD mode is selected by the Source key. Details of automatic adjustments are as follows:

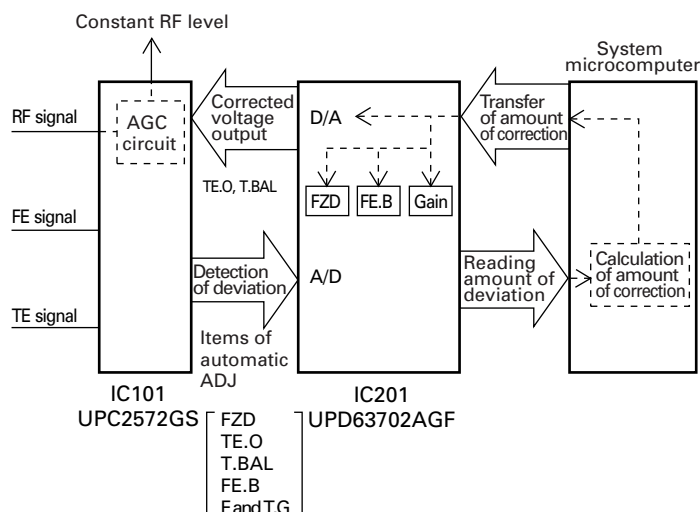


Fig. 18 Outline of Automatic Adjustment

1) Setting of FZD cancellation

This setting ensures focus closing. The system reads the FE offset level when the power is turned to ON, then writes the inverse voltage of offset value of that level to CRAM inside IC to cancel offset. Thus, the threshold level of FZD can be set to a constant value (+150 mV). As a result, "Latching FZD signal to H", which is one of the conditions required for focus closing in IC, is ensured.

2) TE offset automatic adjustment

Adjusts TE amplifier offset of the preamplifier to 0 V when the power is turned to ON.

Adjustment is made as follows:

- (1) The microcomputer reads TE offset in LD OFF status via the servo LSI (TE1).
- (2) The microcomputer calculates the voltage to be corrected using the TE1 value, and outputs from Pin 65 (pin name: TOFST) of the servo LSI. More specifically, calculation is made as follows:

$$\text{TOFST2} = \text{TOFST1} + \text{TE1} \times \text{R110} / \text{R109}$$

3) Tracking balance (T.BAL) automatic adjustment

To make the sensitivity of Ech of TE output equal to that of Fch. In fact, adjustment is made so that the upper and lower portions of TE waveforms are symmetric to REFOUT.

Adjustment is made in the following steps:

- (1) After focus close, the system kicks the lens in the radial direction to ensure TE waveforms to be generated.
- (2) The microcomputer reads the peak bottom of TE waveforms via the servo LSI.
- (3) The microcomputer calculates the amount of offset, then calculates the voltage to be corrected based on that offset. The system outputs the result from Pin 66 (pin name: TBAL) of the servo LSI.

- (4) The voltage output from the servo LSI is input to Pin 37 of the preamplifier (IC101: UPC2572GS). Pin 37 is a control-voltage terminal of the TEVCA amplifier. According to voltage input, the system changes gain of Ech and Fch in the preamplifier, and adjusts the tracking balance to make the upper and lower portions of TE waveforms symmetric to REFOUT.

4) FE bias automatic adjustment

Maximizes the RFI level by optimizing focus point during playback. Adjustment is made by using 3T level waveforms of RF waveforms and the phase difference generated by input of disturbance of focus error. Since adjustment is made by inputting disturbance to focus loop, the system uses the same timing as with auto gain control (mentioned later~) for adjustment.

Adjustment is made in the following steps:

- (1) Disturbance is input to focus loop by the command from the microcomputer (inside the servo LSI).
- (2) The system detects flickering of 3T components of RF signal in the preamplifier.
- (3) The system checks the phase difference between 3T components mentioned above and FE signal caused by input of disturbance to detect the direction of focus deviation. The result is output as DC voltage from Pin 30 (3TOUT) of the preamplifier.
- (4) The 3TOUT voltage is input to Pin 75 (A/D port) of the servo LSI. The microcomputer reads this 3TOUT voltage via the servo LSI.
- (5) The microcomputer calculates the amount of correction required. The results are transferred to offset of focus loop in the servo LSI.

As with auto gain control, the system repeats the same adjustment process several times to improve adjustment precision.

5) Auto gain control (AGC)

AGC adjustment is already used in the CD modules of the previous generation. This function automatically adjusts servo loop gain of focus and tracking.

Adjustment is made in the following steps:

- (1) Disturbance is input to servo loop.
- (2) The system extracts error signals (FE and TE) upon input of disturbance via the B.P.F. and obtains signals of G1 and G2.
- (3) The microcomputer reads G1 and G2 signals via the servo LSI.
- (4) The microcomputer calculates required amount of correction to adjust loop gain in the servo LSI.
The system repeats the same adjustment process several times to improve adjustment precision.

6) Initial adjustment value

For all automatic adjustments, the system uses the previous adjustment value as initial values, except when the power of the microcomputer has been turned to OFF (backup is turned to OFF). If backup has been turned to OFF, the system uses initial set value to perform automatic adjustment.

7) Display of coefficients of adjustment results

Results of automatic adjustments can be displayed in Test mode for confirmation. Display of coefficients in each automatic adjustment is as follows:

- (1) FZD cancel, TE.OFST cancel, T.BAL, and FE bias
Reference = 32 (32: No adjustment was required)
Display is made in units of approximately 40 mV.
Example: Coefficient of FZD cancel = 35
 $35 - 32 = 3 \quad 3 \times 40 \text{ mV} = 120 \text{ mV}$
Corrected amount is approximately +120 mV.
Thus, FE offset before adjustment is -120 mV.

- (2) Adjustment of F and T gain

Reference: Focus = 13, tracking = 20

The amount of reduced gain in comparison with the reference is known by looking at the coefficient displayed.

Example: AGC coefficient = 40

Amount of reduced gain = $20 \log (20/40) = -6\text{dB}$

2.4 Power Supply and Mechanism Control

The power supply VM (7.5V) is produced from the power supply VD (9.0V) supplied from the extension P.C. board, and used as the power supply for the loading motor driver, elevation motor driver, cam gear motor driver, and 5V Reg IC. As for the drive voltage for the disc detection LEDs and the power supply for the CD driver ICs, the power supply VD (9.0V) is used. The system IC controls the ON/OFF operations of the CD driver and laser diodes, the 5V power supply, and the drive voltage PVD for detection LEDs with "CONT", "POWER", and "LOAD" signals respectively.

2.5 STS(Sure Track System) Circuit

By pooling the musical data read in from a compact disc into the memory, even if the pickup should go off track for some reason, the Sure Track System enables prevention of sound interruption during recovery (approximately 3 seconds) by continuing to output data from the memory.

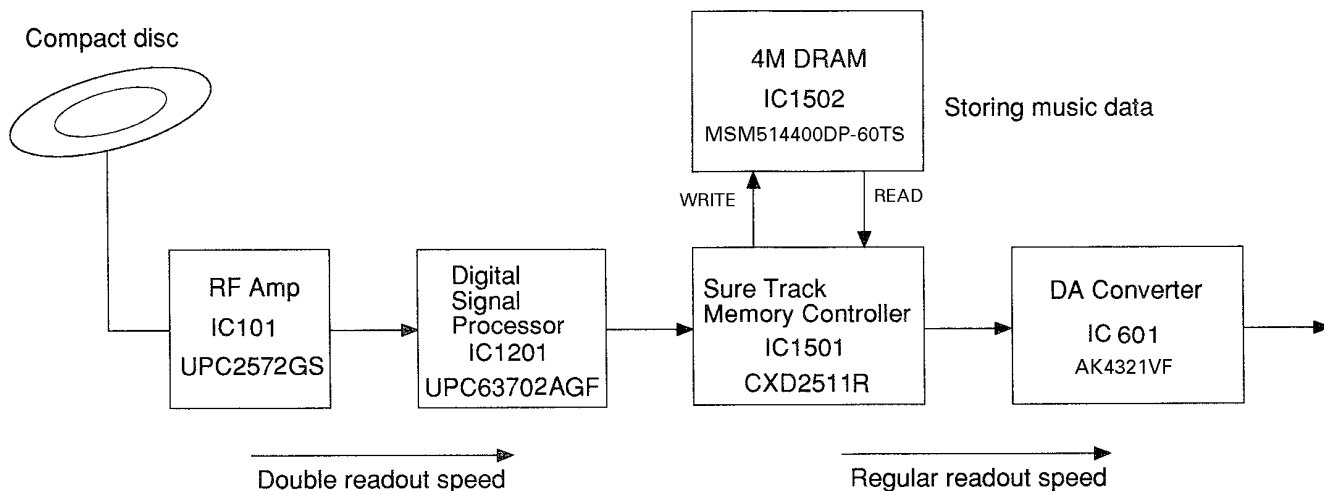


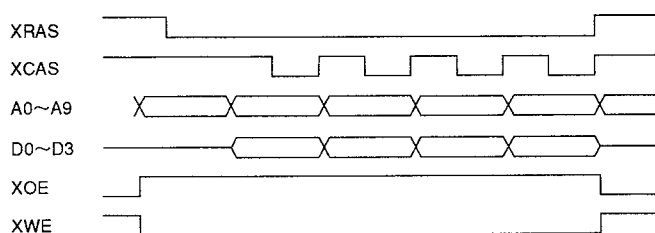
Fig. 19

Operation Principle

The STS circuit is controlled by the vibration free memory controller (CXD2511R). Data read in at double speed from a compact disc is input via the digital signal processing circuit into CXD2511R.

CXD2511R stores this DA data in DRAM (MSM5114400 DP-60TS), and reads and outputs the data at normal speed in synchronization with the internally generated FS system clock. In order to write the DA data at double speed and to read out at normal speed, the DRAM becomes full, but when it reaches capacity it will tentatively stop reading data. (The CD is in the pause mode during this time.) When an available area is created by data read-out from the DRAM, data writing will start again. (The available area of the DRAM can be monitored by ADRMON. By repeating this process, the DRAM is always used effectively, and approximately 2.67 seconds worth data can be stored. Even if the pickup should go off track due to vibrations for example, if recovered within 2.67 seconds while using the memorized data, sound interruption can be prevented.

DRAM Interface(Data Write in)



DRAM Interface(Data Readout)

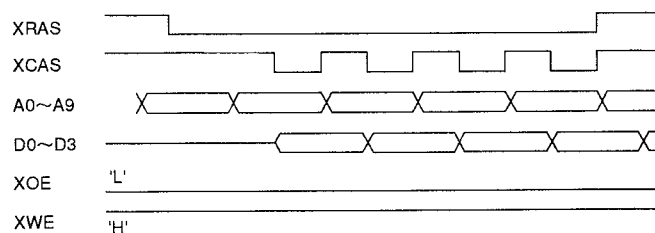


Fig. 20 TIMING CHART

3. MECHANISM OPERATIONS

3.1 Disc Insertion

- a) The Cam gear rotates to the elevation OK position (See "How to remove the Tray Assy" on page 21). The Stage Mech Assy moves upwards or downwards to reach the height of the selected tray by using the elevation mechanism.
- b) The Cam gear rotates counterclockwise until the LOAD switch is turned off. The Beak arms of the Stage Mech Assy driven by the Cam gear's movement lift the selected tray.
- c) The Stage Mech Assy with the tray lifted moves to the top position using the elevation mechanism.
- * Disc insertion/ejection is performed at the top position (the 6th stage) irrespectively of tray position.
- d) The Cam gear rotates counterclockwise to move the

LOAD arms as shown in Fig.21.

- e) The LOAD arms push the disc loaded on the tray and open the tray hooks.
- f) When a disc is inserted, the disc interrupts the infrared LED light from the photo transistors, and the Rubber roller starts rotating.
- * The photo transistors are connected in serial. When the light is interrupted from either photo-transistor, the start of disc insertion will be detected.
- g) The disc is drawn in. Then the disc pushes the insertion completion switch via the arm.
- h) The LOAD arms move forward to be released from the disc. At the same time, the tray hooks close to hold the disc on the tray.

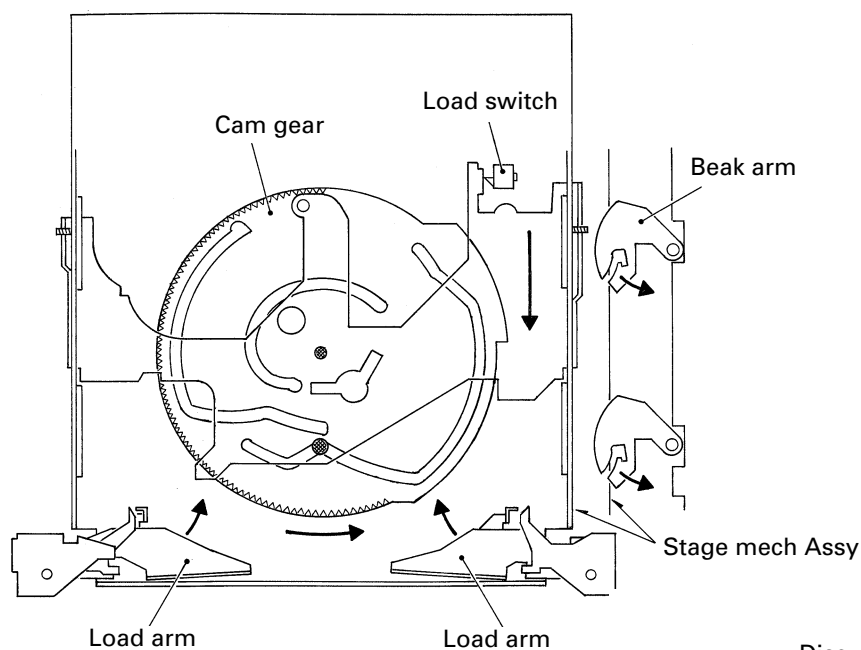


Fig. 21: Elevation OK position

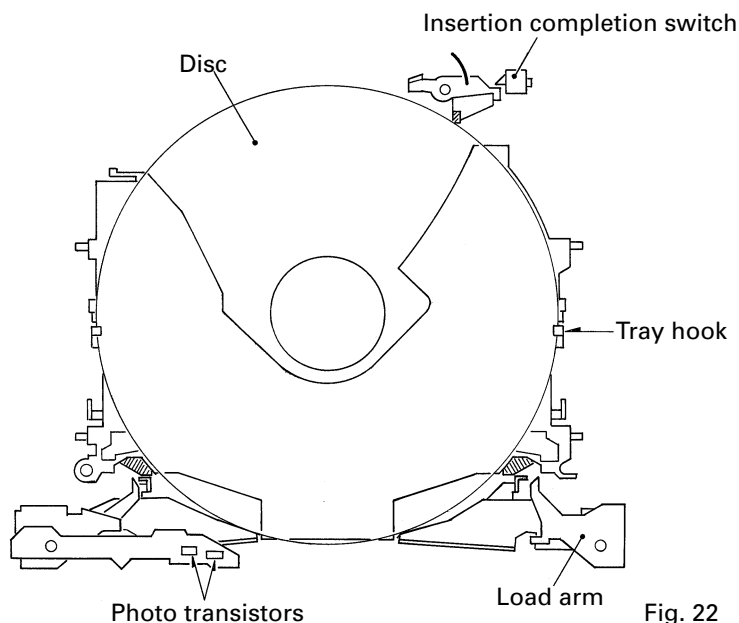


Fig. 22

3.2 Elevation

- a) The Cam gear rotates to the elevation OK position.
- b) The ELV motor rotates to slide the elevation lever via the gears.
- c) The 2 elevation levers (left and right) can synchronize their sliding via the joint arm.
- d) The shafts of the Stage Mech Assy engage with the stair-like grooves in the elevation levers and the verti-

cal holes in the Main chassis via the rollers.

- e) When the elevation levers slide, the Stage Mech Assy moves up and down.

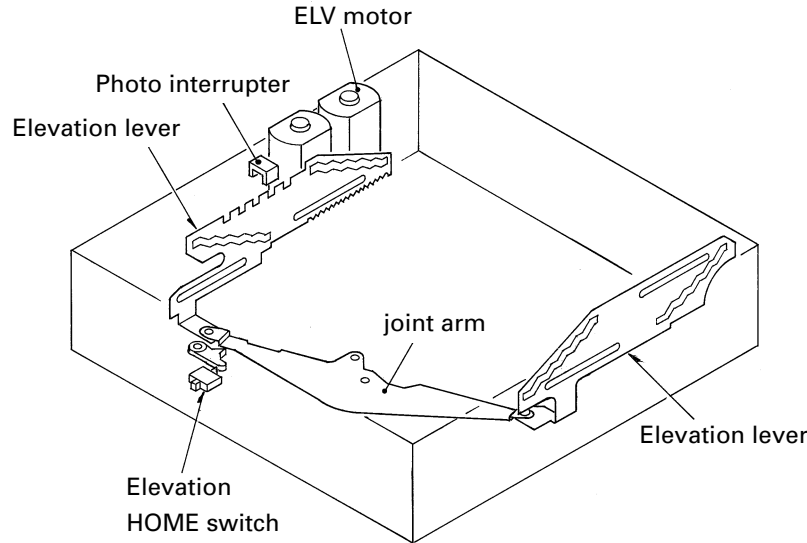


Fig. 23

3.3 Elevation Detection

- a) The elevation detection (slit count) is performed by the photo interrupter.
- b) After the elevation HOME switch is turned ON, the photo interrupter counts the slits of the elevation levers.
- * The bottom position (the 1st stage) is detected when the elevation HOME switch is turned on (not detected by the photo interrupter).

3.4 Disc Clamp

- a) The Stage Mech Assy moves up and down to reach the height of the selected tray, using the elevation mechanism.
- b) The Cam gear rotates clockwise, the Carriage drive arm rotates, and then the Carriage Mech Assy moves toward the disc via the Carriage drive shaft.
- c) The Cam gear continues rotating clockwise and the Carriage drive shaft moves the Clamp UP lever. Then the Clamp arm touching the Clamp UP roller moves down to clamp the disc.
- d) The Cam gear stops when the Clamp switch is turned ON.

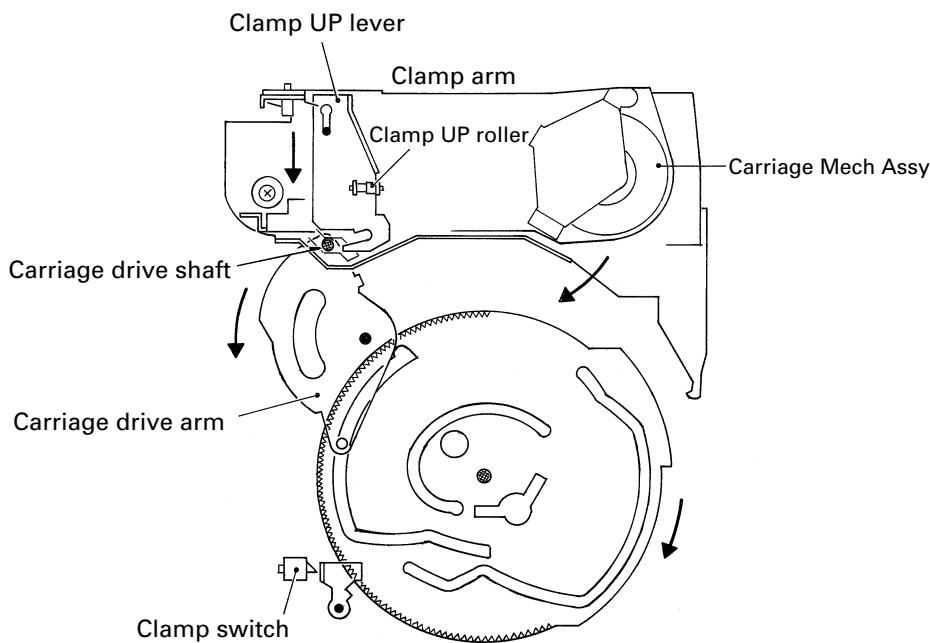


Fig. 24

3.5 Disc Sense (Initializing)

- a) The disc sense operation is to detect if or not a disc is loaded on the trays 1 to 6.
- b) While a disc is inserted using the rubber rollers, the disc pushes the insertion completion switch via the arm to sense that a disc is loaded.

3.6 Disc Ejection

- a) The same operations as the steps a) to e) on "3.1 Disc insertion" are performed.
- b) The rubber roller(s) rotate(s) in the direction for disc ejection.
- c) When the infrared LED light, which has been interrupted by the disc, passes toward the photo transistors, the rubber rollers stop.

3.7 Mechanism Lock

- a) Mechanism lock operation is to push the mechanism downward and toward the disc slot in order to keep the mechanism at the correct position during disc insertion/ejection, and to leave the appropriate gap above the mechanism.
- b) The Cam gear rotates to move the Mech lock lever toward the rear of the Mechanism. The lever pushes the inside surface of the product. It causes the mechanism to move forward.

- c) With the movement of the Mech lock lever, the Mech lock lever (right) moves in a slanting direction as indicated by the arrow in Fig. 25 to push the mechanism forward and downward.
- d) The Mech lock lever (left) is driven by the movement of the Mech lock lever via the Mech lock junction lever to push the Mechanism downward.
- e) The mechanism lock is released only in the disc clamp mode.

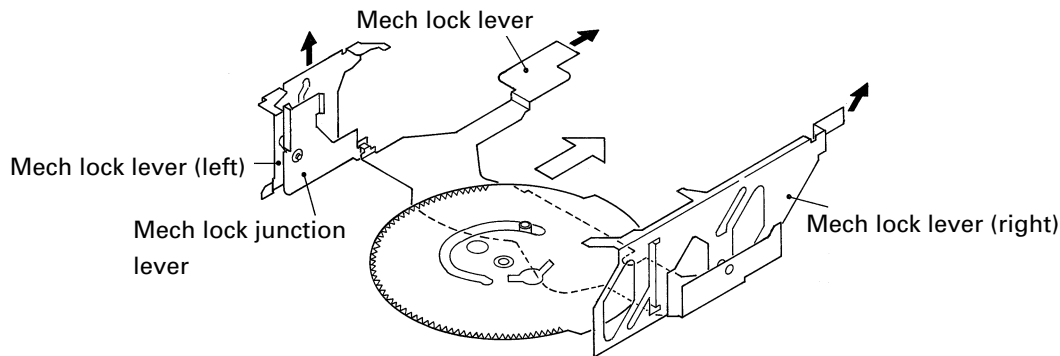


Fig. 25

3.8 Door Open

- a) The Door open lever pushes the door on the product grille to open it.
- b) The Cam gear rotates to move the door arm. Then, the door arm moves the door lever.
- c) The door lever moves the door open lever via the buffer spring.
- d) When the door switch is turned ON, the Cam gear motor stops rotating.

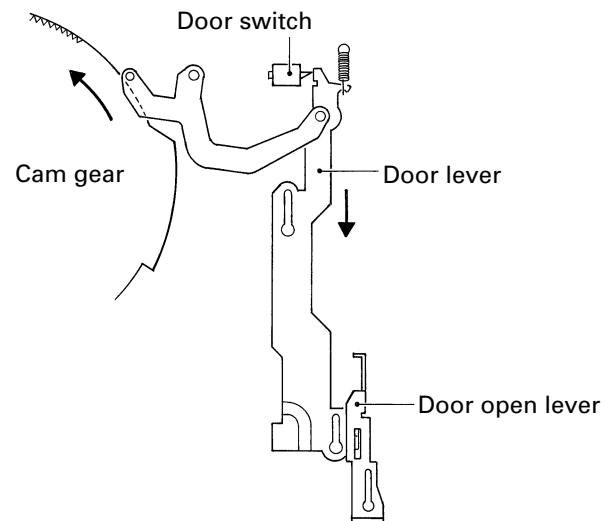


Fig. 26

3.9 Stage Mechanism Lock

- a) To prevent the Stage mech Assy from rattling during disc play, which may adversely affect the vibration-resistant performance, the Stage lock function works only in the disc clamp mode.
- b) In the mode described at the step c) on "3.7 Mechanism lock", the Stage lock lever (right) is driven by the movement of the Mech lock lever (right).
- c) The 2 bent portions of the Stage lock lever (right) are pressed against the gear-like portions of the chassis to lock the right side of the Stage mech Assy.

- d) For the left side of the Stage mech Assy, in the mode described at the step d) on "3.7 Mechanism lock", the Mech lock junction lever is driven to move the Stage lock lever (left).
- e) The 2 bent portions of the Stage lock lever (left) are pressed against the gear-like portions of the chassis to lock the left side of the Stage mech Assy.

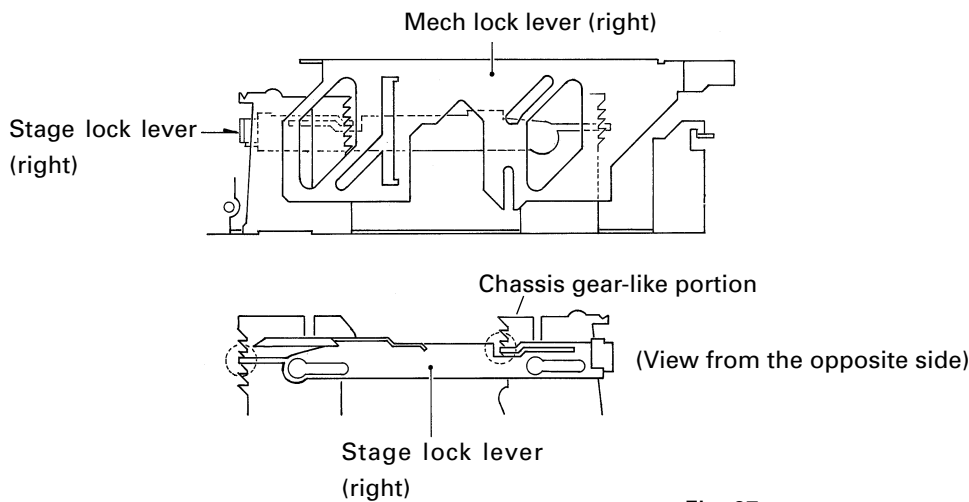


Fig. 27

4. DISASSEMBLY

● How to remove the Tray Assy

1. Apply about 6V current to the Cam gear motor until all holes match at the position (A) (elevation OK position).
2. Hook the three springs B temporarily as shown in Fig. 28. While pushing the Tray holder lock arms (right

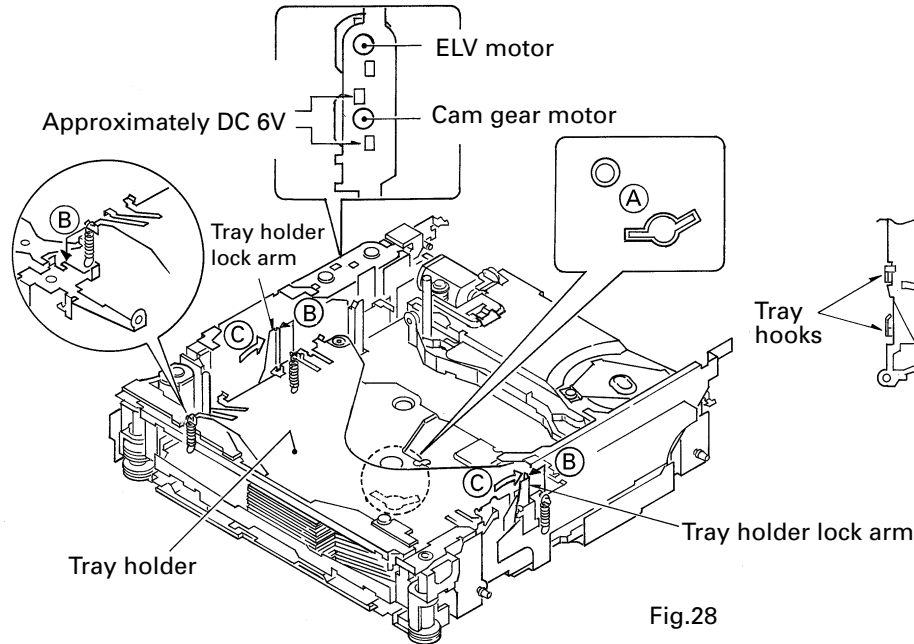


Fig.28

and left) in the direction (C), remove the Tray holder.

3. Lift up the Tray assy to remove it.

* Be careful not to remove the Tray hooks from the Tray assy.

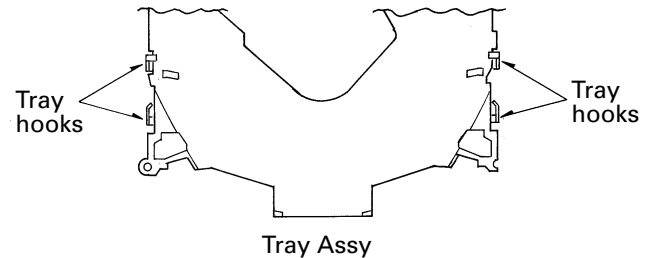


Fig. 29

● How to remove the Carriage Mech Assy

1. Insert a short pin into the flexible PCB of the Pickup unit.
2. While opening the resin hooks, remove the cover from the Servo unit.
3. Disconnect the flexible PCBs from the connectors CN101 and CN301.
4. Remove the Tray holder and the Tray assy. (See above)
5. Rotate the Cam gear motor until the positions of all holes (E) match, then stop the motor.
(The Carriage Mech assy will stop as shown in the Fig. 20)

- * When the positions of all holes match, they will be completely covered by the Carriage mech Assy.
 - * To rotate the Cam Gear motor, see "How to remove the Tray Assy".
6. Unhook the spring A.
 7. Remove the flexible holder B (while opening the hooks).
 8. Remove the flexible PCB (C) from the motor. (The flexible PCB (C) has been stuck on the motor with double-sided adhesive tape.)
 9. Loosen the fixing screw and remove the flexible holder

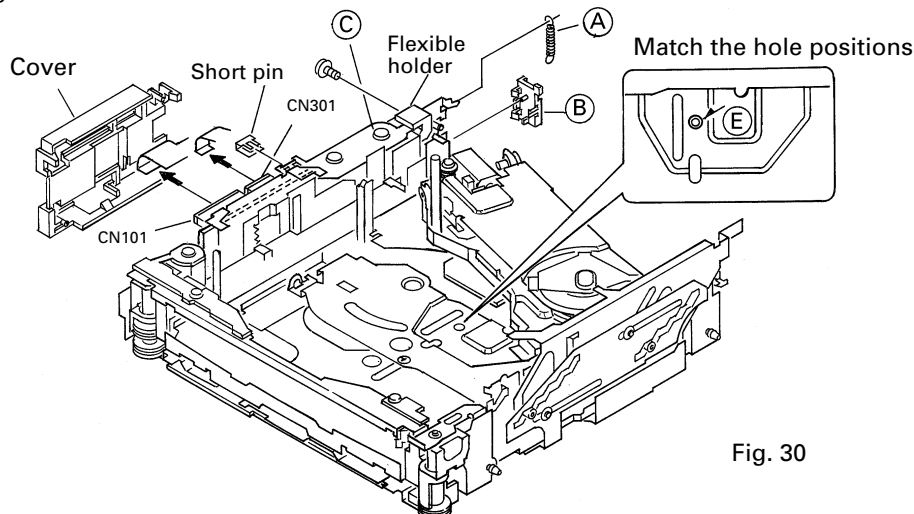


Fig. 30

10. Remove the screw, pressure spring and collar. Lift up the Carriage mech Assy to remove it.

* Screw tightening torque: 2.6kgfcm

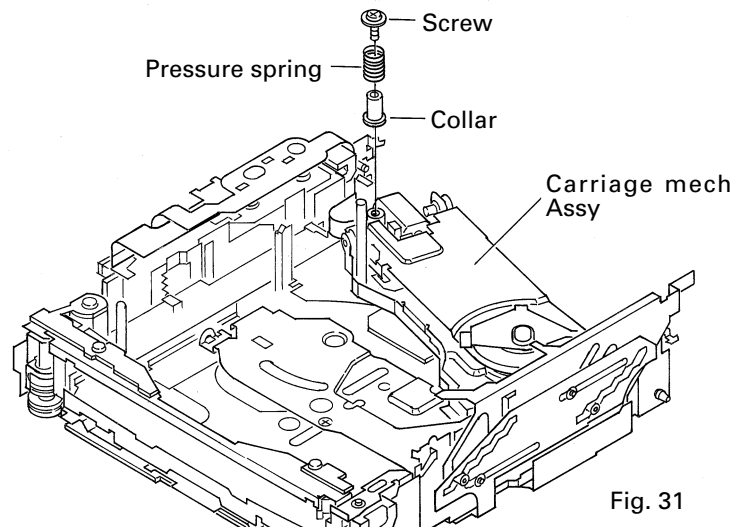


Fig. 31

● How to remove the Pickup unit

1. Remove the pulling spring, torsion spring and E-shaped ring. Then remove the Clamper arm.

* The spring (A) will be removed with the Clamper arm.

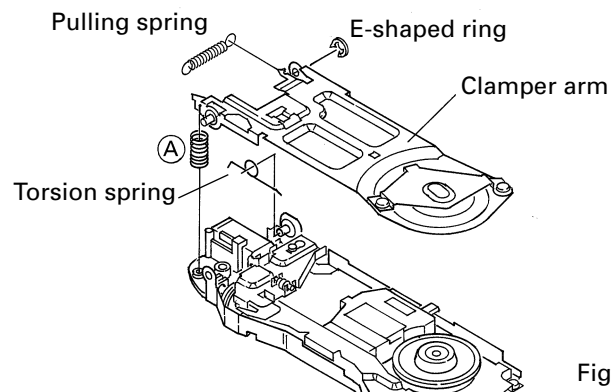


Fig. 32

2. Slide the Clamp UP lever (B) to remove it.
3. Loosen the 2 screws. Remove the feed-screw cover by sliding it.
4. Remove the feed-screw pressure spring (D).
5. Loosen the 2 screws. Remove the feed-screw holder (E).
6. Remove the belt.

7. Remove the Pickup unit together with the feed screw.

* Be careful not to lose the shaft holders at the both ends of the feed screw.

* Be careful not to damage the 2 flexible PCBs(for the Pickup and motor) when separating them. The flexible PCBs have been stuck each other with double-sided adhesive tape.

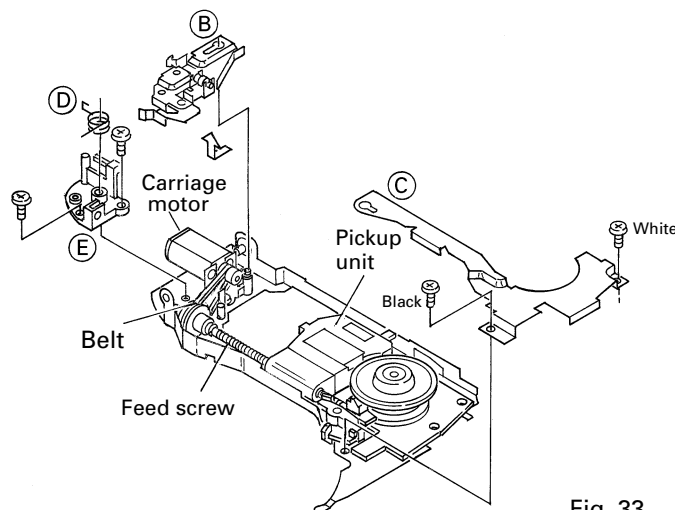


Fig. 33

8. Loosen the 2 screws. Remove the plate spring and the rack.
9. Pull out the feed screw from the Pickup unit.

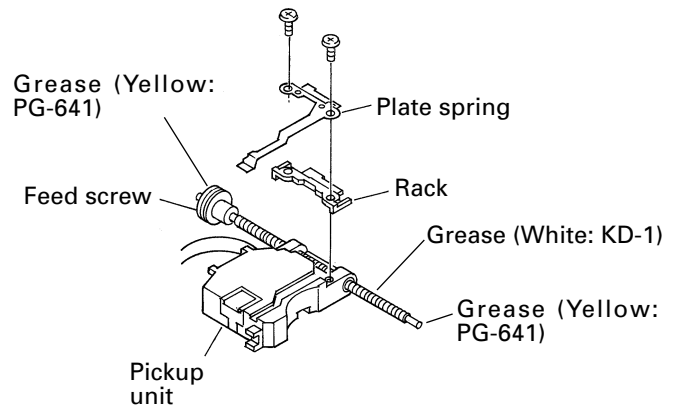


Fig. 34

● How to remove the Carriage Motor Assy

1. Loosen the 2 screws (A). Remove the Carriage motor assy.

● How to remove the Spindle Motor Assy

1. Remove the connector.
2. Loosen the 2 screws (B). Remove the Spindle motor assy.

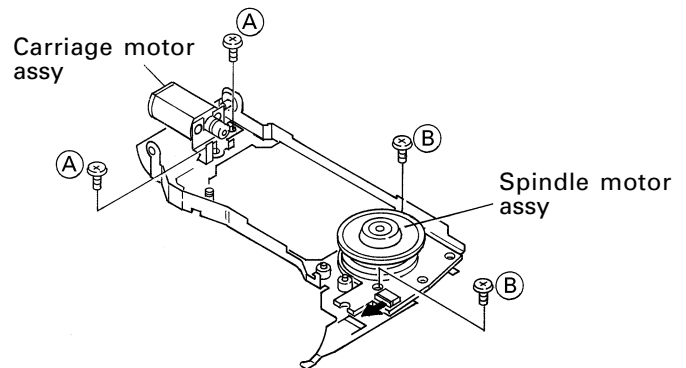


Fig. 35

● How to remove the Cam gear motor and ELV motor

1. Insert a short pin into the Pickup flexible PCB. (See Fig. 30)
Remove the Cover from the Servo unit. (See Fig. 30)
Disconnect the flexible PCBs from the connectors CN101 and CN301. (See Fig. 30)
2. Disconnect the the flexible PCB (Motor PCB(A)) from the connector CN201 on the Servo unit.
3. Disconnect the flexible PCB from the connector CN801 on the STS unit.
4. Loosen the 2 screws (A). Remove the Servo unit.
5. Loosen the screw (B). Remove the flexible PCB holder.
6. De-solder at the 4 portions (C). Remove the flexible PCB.

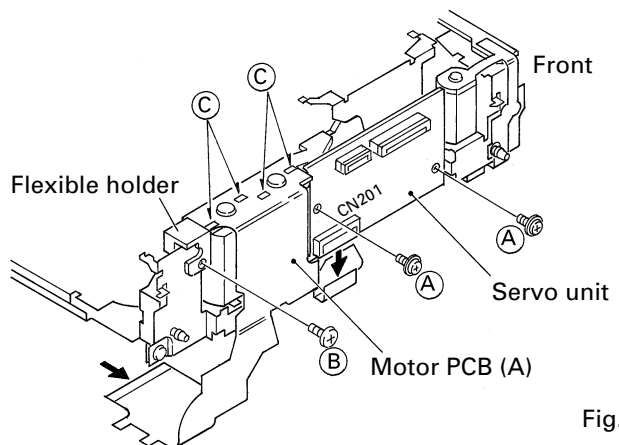


Fig. 36

7. Loosen the 2 screws (D). Remove the Gear cover.
8. Loosen the 3 screws (E). Remove the Motor bracket assy.

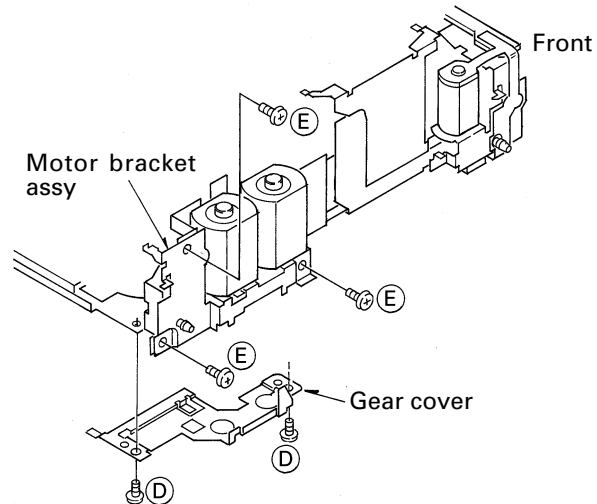


Fig. 37

9. Remove the 5 polyslider washers, then gears and shaft.
10. Loosen the 4 screws. Remove the Cam gear motor and ELV motor.

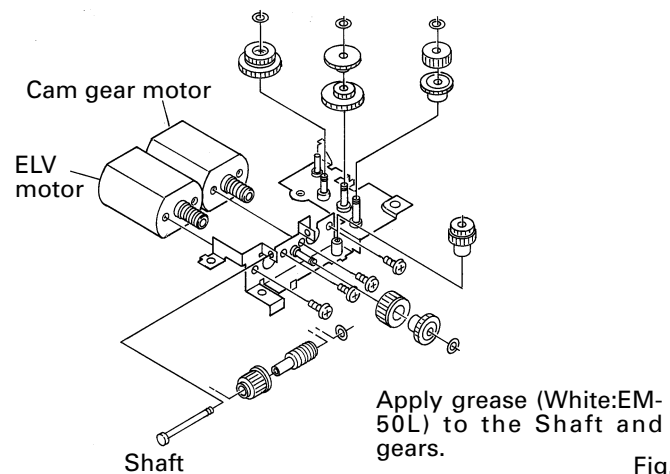


Fig. 38

● How to remove the Loading motor

1. Insert a short pin into the flexible PCB of the Pickup unit.(See Fig. 30)
Remove the Cover from the Servo unit. (See Fig. 30)
Disconnect the flexible PCBs from the connectors CN101 and CN301. (See Fig. 30)
Disconnect the the flexible PCB (Motor PCB (A)) from the connector CN201 on the Servo unit. (See Fig. 36)
2. Unhook the spring. Remove the Door open lever.
3. Loosen the 3 screws. Remove the PCB units (C) & (D) and the frame.
4. Remove the spring (A).

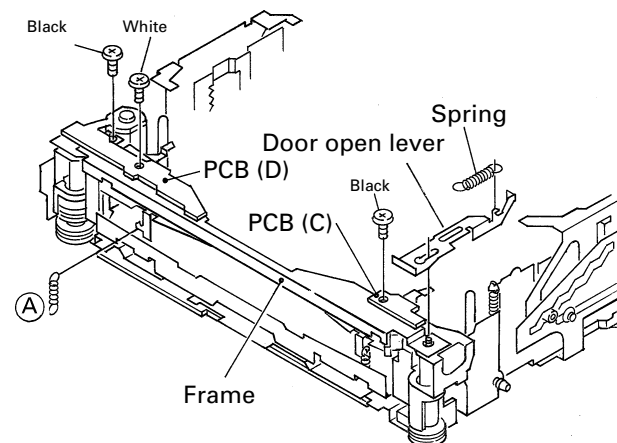


Fig. 39

5. Remove the belt (large).
6. De-solder at the points (B) and (C).
7. Loosen the 2 screws. Remove the Loading motor bracket.
8. Remove the belt (small).
9. Loosen the 2 screws. Remove the Loading motor.

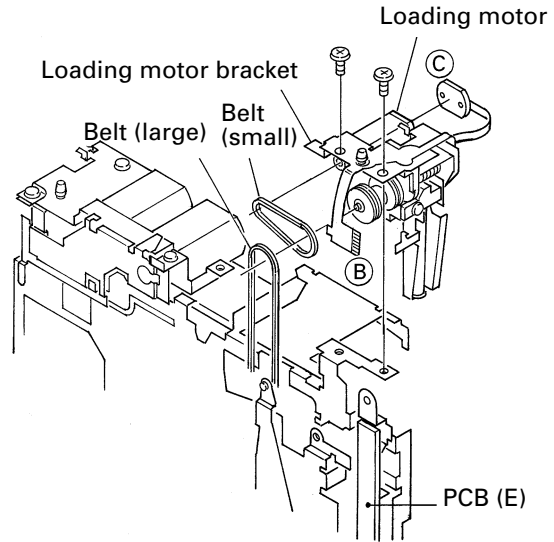


Fig. 40

● How to remove the Stage Mech Assy

1. Remove the Tray holder and the Tray assy. (See Fig. 28)
- Remove the Carriage mech assy. (See Fig. 30 and 31)
- Remove the Servo unit. (See Fig. 36)
- Remove the Motor PCB (A). (See Fig. 36)

Remove the Gear cover. (Fig. 37)

2. Unhook the Spring (C). Remove the Door-open lever.
3. Loosen the screws (D), (E), and (F). Remove the PCB (C) and (D), and the frame.
4. Unhook the springs (A) and (B).
5. Pull out the Load arm assy (right) upward.
6. Unhook the spring (G). Remove the belt (large).
7. Loosen the screw (H). Remove the Load arm assy

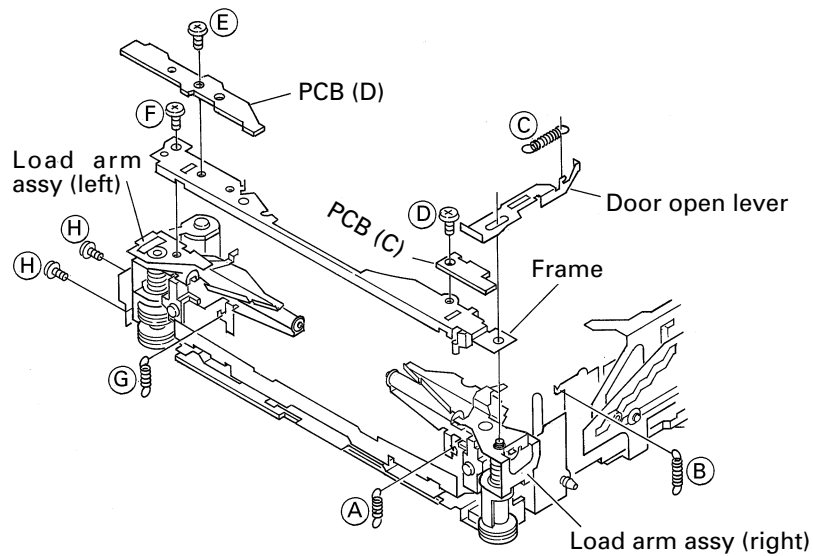


Fig. 41

(left) including the Loading motor.

8. Loosen the 4 screws. Remove the Motor bracket assy and Photo interrupter.

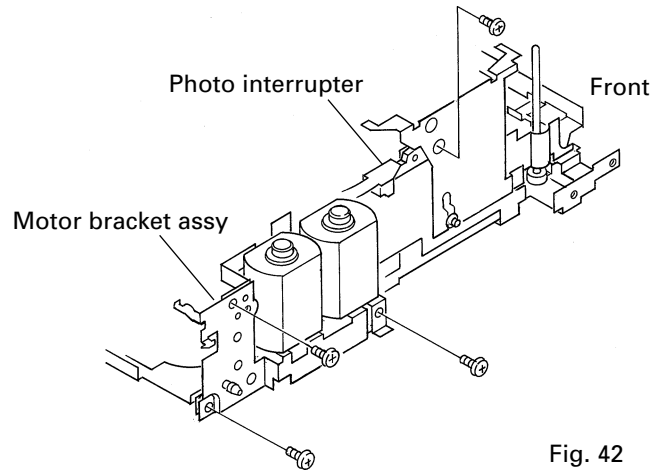


Fig. 42

9. Remove the 4 E-shaped rings (A) and 3 washers (B).
10. Remove the Mech lock lever (left).
11. Remove the 2 rollers (C).
12. Remove the Elevation lever (left). (Pay attention to the mounting direction.)
13. Remove the Mech lock junction lever and roller (D).

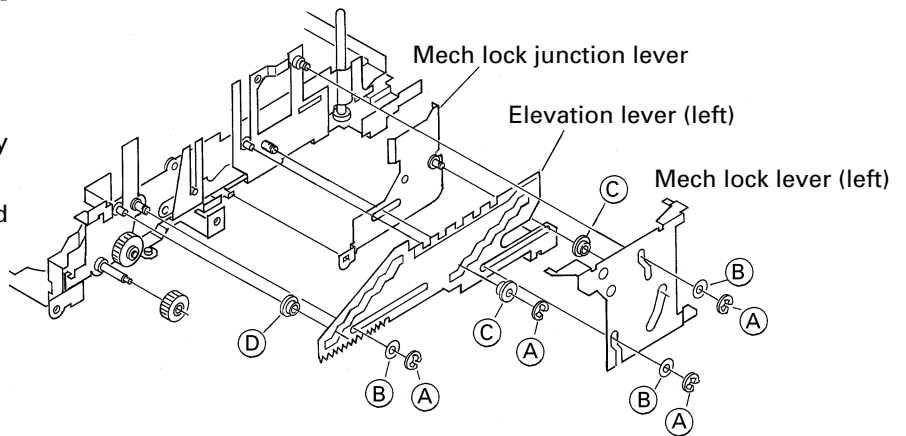


Fig. 43

(Pay attention to the mounting direction.)

14. Remove the 2 E-shaped rings (A) and 2 washers (B).
15. Remove the Elevation lever (right).
16. Remove the 2 rollers (C). (Pay attention to the mounting direction.)

17. Remove the Mech lock lever (right).

18. Lift up the Stage mech assy to remove it.

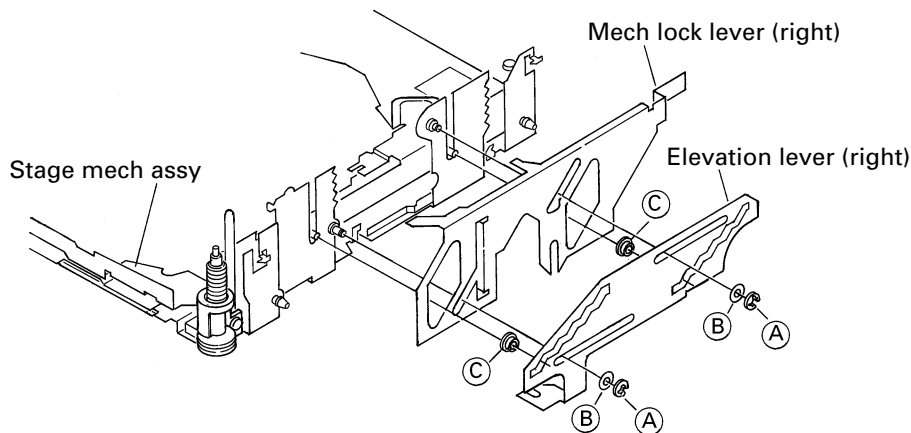


Fig. 44