Service Manual

Pioneer

FORD

ORDER NO.
CRT2389

CD PLAYER

YPM-MG2196ZF

WL

COMPACT disc DIGITAL AUDIO

● **The CD mechanism employed in this model is one of G1 series.**

CONTENTS

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● CD Player Service Precautions

1. For pickup unit(CXX1312) handling, please refer to"Disassembly"(see page 43).
   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 checking the grating after changing the service pickup unit(see page 34).

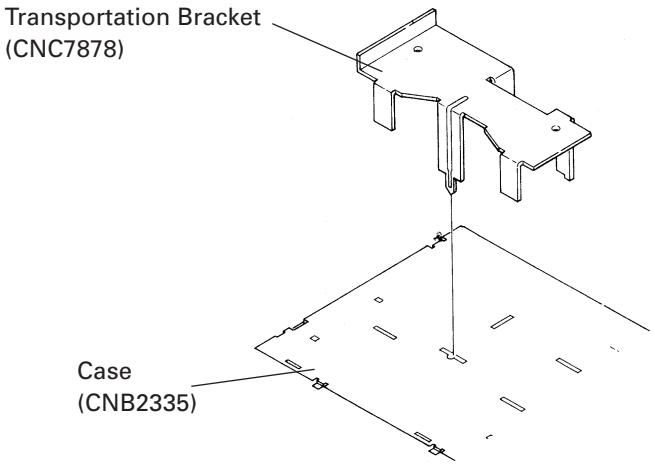
● When the Repair is Complete

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)

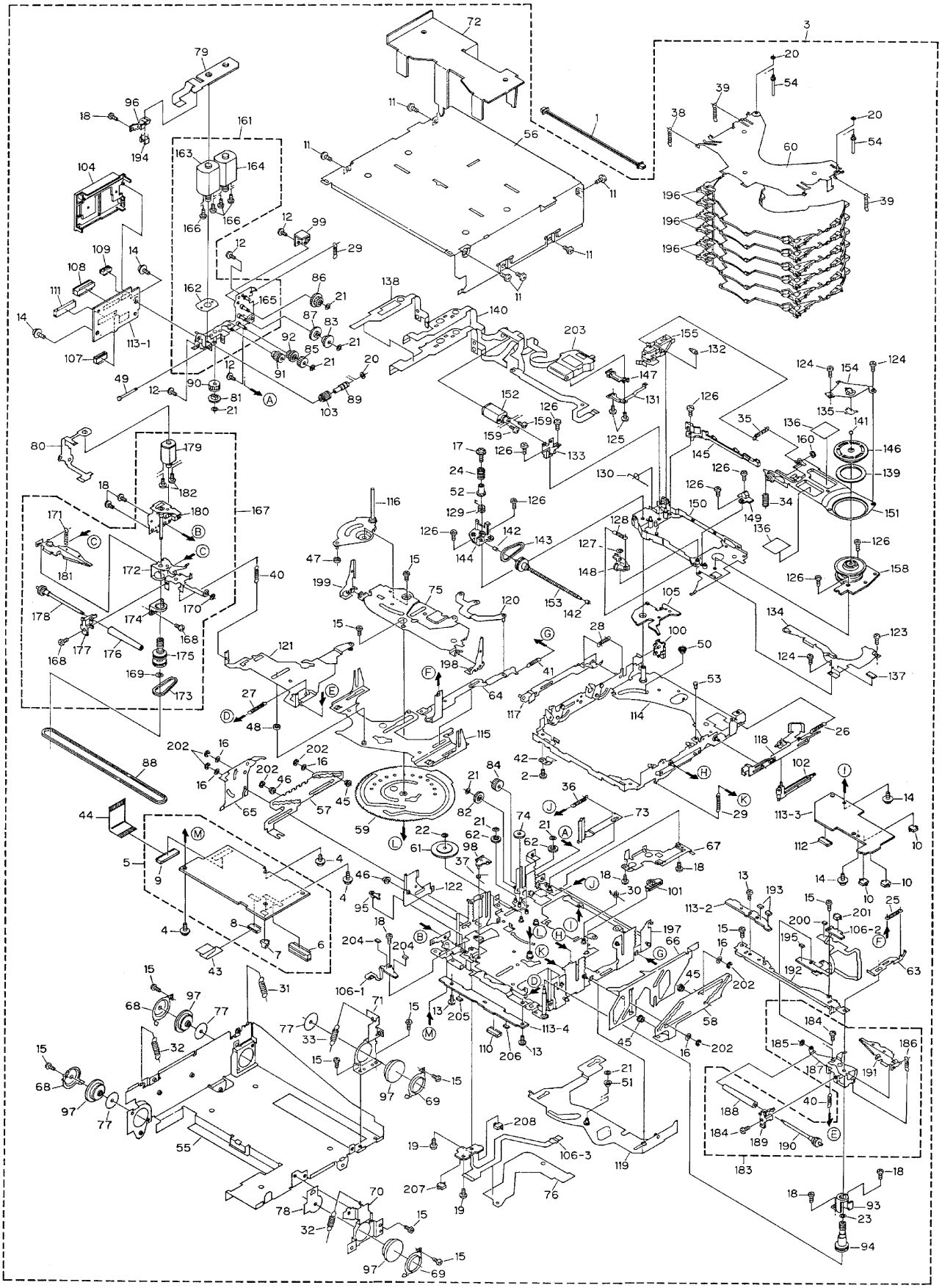


1. SAFETY INFORMATION

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.

2. EXPLODED VIEWS AND PARTS LIST

2.1 CD MECHANISM



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.

● CD MECHANISM SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Connector	CDE5741
	2	Screw	JFZ20P014FMC
	3	CD Mechanism Module(G1)	CXK4710
	4	Screw	CBA1076
	5	CD Core Unit	CWX2250
	6	Connector(CN701)	CKS2767
	7	Connector(CN702)	CKS3124
	8	Connector(CN802)	CKS3970
	9	Connector(CN801)	CKS4052
	10	Switch(S866-868)	CSN1052
	11	Screw	BMZ26P030FMC
	12	Screw	CBA1037
	13	Screw	CBA1041
	14	Screw(M2x2.5)	CBA1076
	15	Screw(M2x2)	CBA1250
	16	Washer	CBA1405
	17	Screw	CBA1452
	18	Screw(M2x1.925)	CBA1453
	19	Screw(M2x2)	CBA1479
	20	Washer	CBF1037
	21	Washer	CBF1038
	22	Washer	CBF1039
	23	Washer	CBF1064
	24	Spring	CBH2007
	25	Spring	CBH2014
	26	Spring	CBH2015
	27	Spring	CBH2016
	28	Spring	CBH2017
	29	Spring	CBH2019
	30	Spring	CBH2064
	31	Spring	CBH2065
	32	Spring	CBH2066
	33	Spring(Black)	CBH2067
	34	Spring	CBH2195
	35	Spring	CBH2196
	36	Spring	CBH2224
	37	Spring	CBH2250
	38	Spring	CBH2269
	39	Spring	CBH2271
	40	Spring	CBH2274
	41	Spring	CBH2290
	42	Holder	CBL1465
	43	Connector	CDE5685
	44	Connector	CDE5686
	45	Roller	CLA3154
	46	Roller	CLA3157
	47	Roller	CLA3159
	48	Roller	CLA3160
	49	Shaft	CLA3179
	50	Spacer	CLA3194
	51	Roller	CLA3248
	52	Bush	CLA3353
*	53	Shaft	CLA3469
	54	Shaft	CLA3693
	55	Chassis	CNA2067
	56	Case	CNB2335
	57	Steer	CNC7215
	58	Steer	CNC7216
	59	Cam	CNC7227
*	60	Holder	CNC7235
	61	Gear	CNC7236
	62	Gear	CNC7238
	63	Lever	CNC7243
	64	Lever	CNC7244
	65	Lever	CNC7245
	66	Lever	CNC7246
	67	Cover	CNC7441
	68	Holder	CNC7477
	69	Holder	CNC7826
	70	Holder	CNC7843
	71	Holder	CNC7844
	72	Bracket	CNC7878
	73	Lever	CNC8024
	74	Gear	CNC8140
	75	Holder	CNC8613
	76	Sheet	CNM5831
	77	Sheet	CNM5981
	78	Sheet	CNM6318
	79	PCB	CNP5203
	80	PCB	CNP5681
	81	Gear	CNR1479
	82	Gear	CNR1481
	83	Gear	CNR1495
	84	Gear	CNR1501
	85	Gear	CNR1502
	86	Gear	CNR1540
	87	Gear	CNR1541
	88	Belt	CNT1080
	89	Worm Gear	CNV5046
	90	Gear	CNV5047

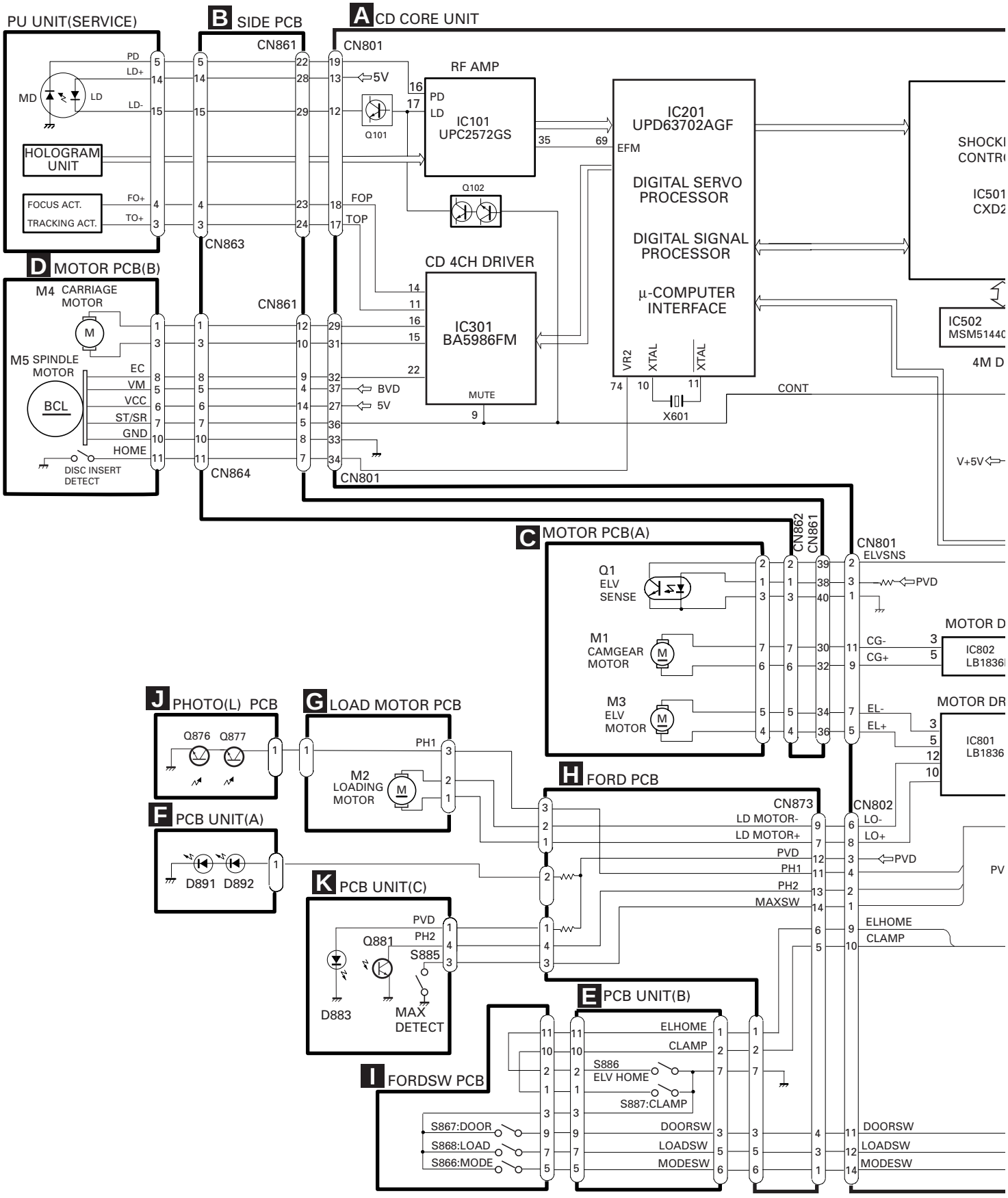
Mark	No.	Description	Part No.
	91	Gear	CNV5048
	92	Gear	CNV5049
	93	Holder	CNV5056
	94	Pulley	CNV5058
	95	Arm	CNV5061
	96	Spacer	CNV5066
	97	Damper	CNV5120
	98	Arm	CNV5189
	99	Cover	CNV5424
	100	Cover	CNV5425
	101	Lever	CNV5427
	102	Arm	CNV5491
	103	Gear	CNV5519
	104	Cover	CNV5541
	105	Holder	CNV5648
	106	Composite PCB	CNX3141
	107	Connector(CN862)	CKS1945
	108	Connector(CN863)	CKS2764
	109	Connector(CN864)	CKS3966
	110	Connector(CN873)	CKS3970
	111	Connector(CN861)	CKS4052
	112	Connector(CN869)	CKS4054
	113	Composite PCB	CNX2990
	114	Frame Unit	CXB2702
	115	Lever Unit	CXB2703
	116	Arm Unit	CXB2704
	117	Lever Unit	CXB2708
	118	Lever Unit	CXB2709
	119	Lever Unit	CXB2711
	120	Arm Unit	CXB2712
	121	Lever Unit	CXB2713
	122	Lever Unit	CXB2714
	123	Screw	CBA1041
	124	Screw	CBA1250
	125	Screw	CBA1362
	126	Screw	CBA1471
	127	Washer	CBF1038
	128	Spring	CBH2008
	129	Spring	CBH2009
	130	Spring	CBH2010
	131	Spring	CBL1335
	132	Roller	CLA3707
*	133	Bracket	CNC7228
	134	Cover	CNC7628
	135	Sheet	CNM5378
	136	Sheet	CNM5695
	137	Sheet	CNM5827
	138	Spacer	CNM6345
	139	Sheet	CNM6414
	140	PCB	CNP4978

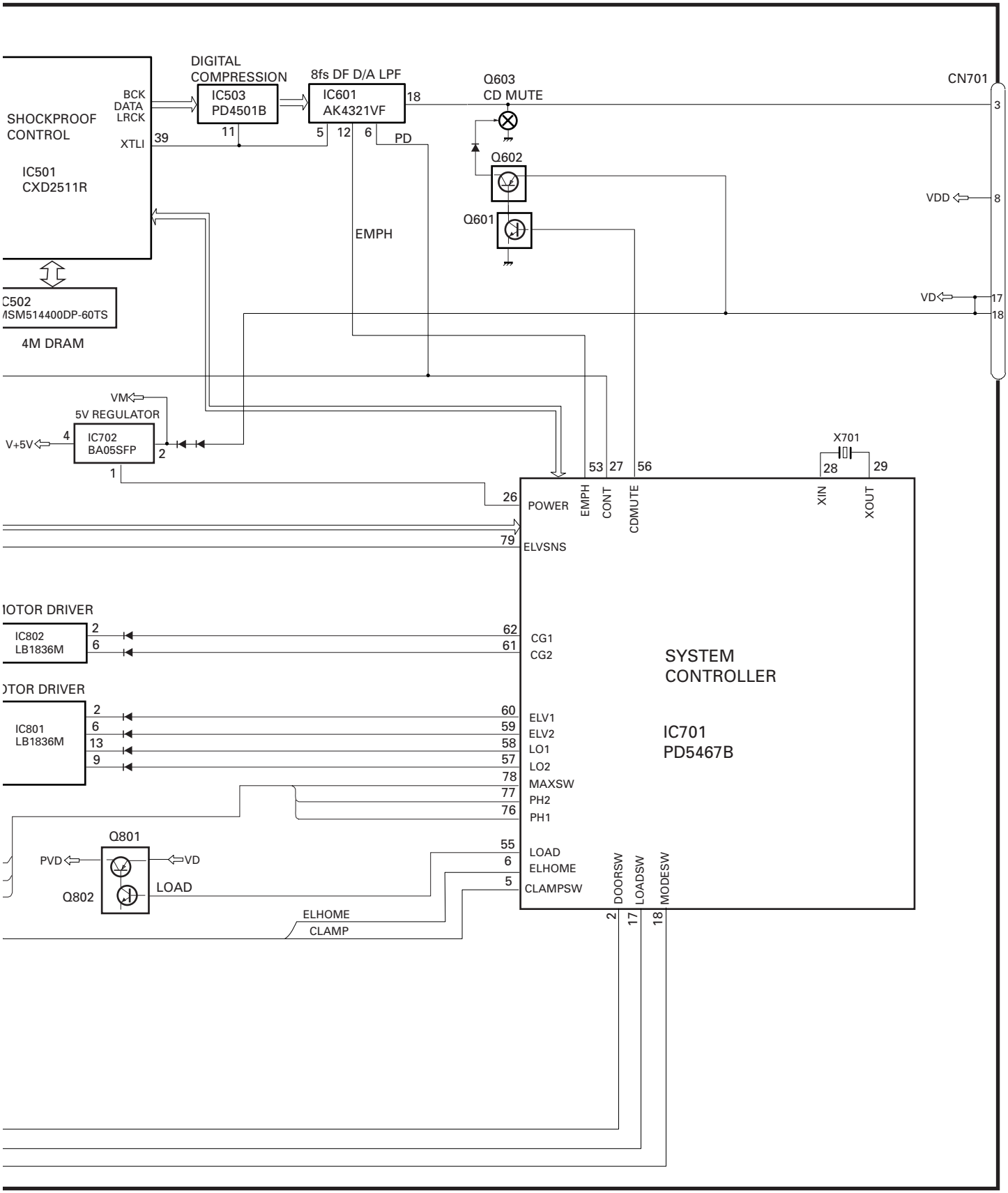
Mark	No.	Description	Part No.
	141	Ball	CNR1189
	142	Bearing	CNR1423
	143	Belt	CNT1079
	144	Holder	CNV5037
	145	Guide	CNV5040
	146	Clamper	CNV5042
	147	Rack	CNV5111
	148	Arm	CNV5579
	149	Holder	CNV5759
*	150	Chassis Unit	CXB2698
	151	Arm Unit	CXB2705
	152	Motor Unit(M4)(Carriage)	CXB3178
	153	Screw Unit	CXB3179
	154	Guide Unit	CXB4417
	155	Lever Unit	CXB4450
	156,157	•••••	CBL1444
	158	Motor(M5)(Spindle)	CXM1120
	159	Screw	JFZ14P020FMC
	160	Washer	YE15FUC
	161	Cam Motor Assy	CXB3170
	162	Spacer	CNC8289
*	163	Motor Unit(M1)(Cam Gear)	CXB3174
*	164	Motor Unit(M3)(ELV)	CXB3175
*	165	Bracket Unit	CXB4165
	166	Screw	JFZ20P025FMC
	167	Loading Arm L Assy	CXB3171
	168	Screw	CBA1453
	169	Washer	CBF1038
	170	Washer	CBF1074
	171	Spring	CBH2136
*	172	Arm	CNC7241
	173	Belt	CNT1079
	174	Holder	CNV5055
	175	Pulley	CNV5057
	176	Roller	CNV5064
	177	Guide	CNV5125
	178	Roller Gear Unit	CXB3176
*	179	Motor Unit(M2)(Loading)	CXB3177
*	180	Bracket Unit	CXB4316
*	181	Arm	CXB4449
	182	Screw	JFZ14P020FMC
	183	Loading Arm R Assy	CXB3172
	184	Screw	CBA1453
	185	Washer	CBF1074
	186	Spring	CBH2136
*	187	Arm	CNC7242
	188	Roller	CNV5064
	189	Guide	CNV5126
	190	Roller Gear Unit	CXB3176
*	191	Arm	CXB4448

Mark	No.	Description	Part No.
	192	Bracket Unit	CXB4306
	193	Photo-Transistor(Q876,877)	CPT231SXTD
	194	Photo-Interrupter(Q1)	RPI-221
	195	LED(D883)	CL202IRXTU
	196	Tray Assy	CXB4307
	197	Chassis Unit	CXB4315
	198	Arm Unit	CXB4953
	199	Arm Unit	CXB4954
	200	Photo-Transistor(Q881)	CPT231SXTD
	201	Switch(Max Detect)	CSN1052
	202	Washer	YE15FUC
	203	PU Unit(P8)(Service)	CXX1312
	204	LED(D891,892)	CL202IRXTU
	205	Resistor(R872)	RS1/8S821J
	206	Resistor(R871)	RS1/8S911J
	207	Switch(ELV)(S886)	CSN1052
	208	Switch(Clamp)(S887)	CSN1051

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

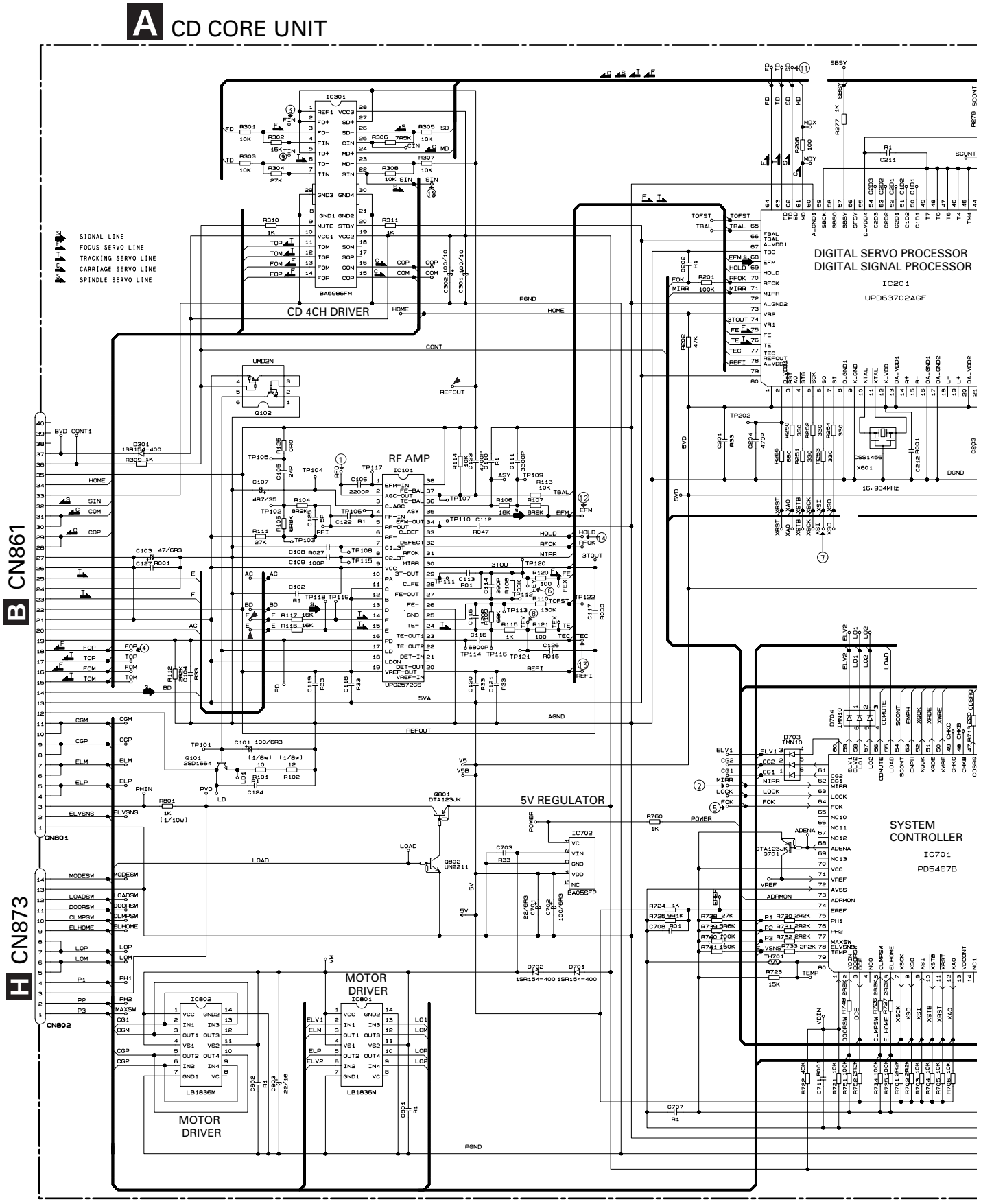
3.1 BLOCK DIAGRAM

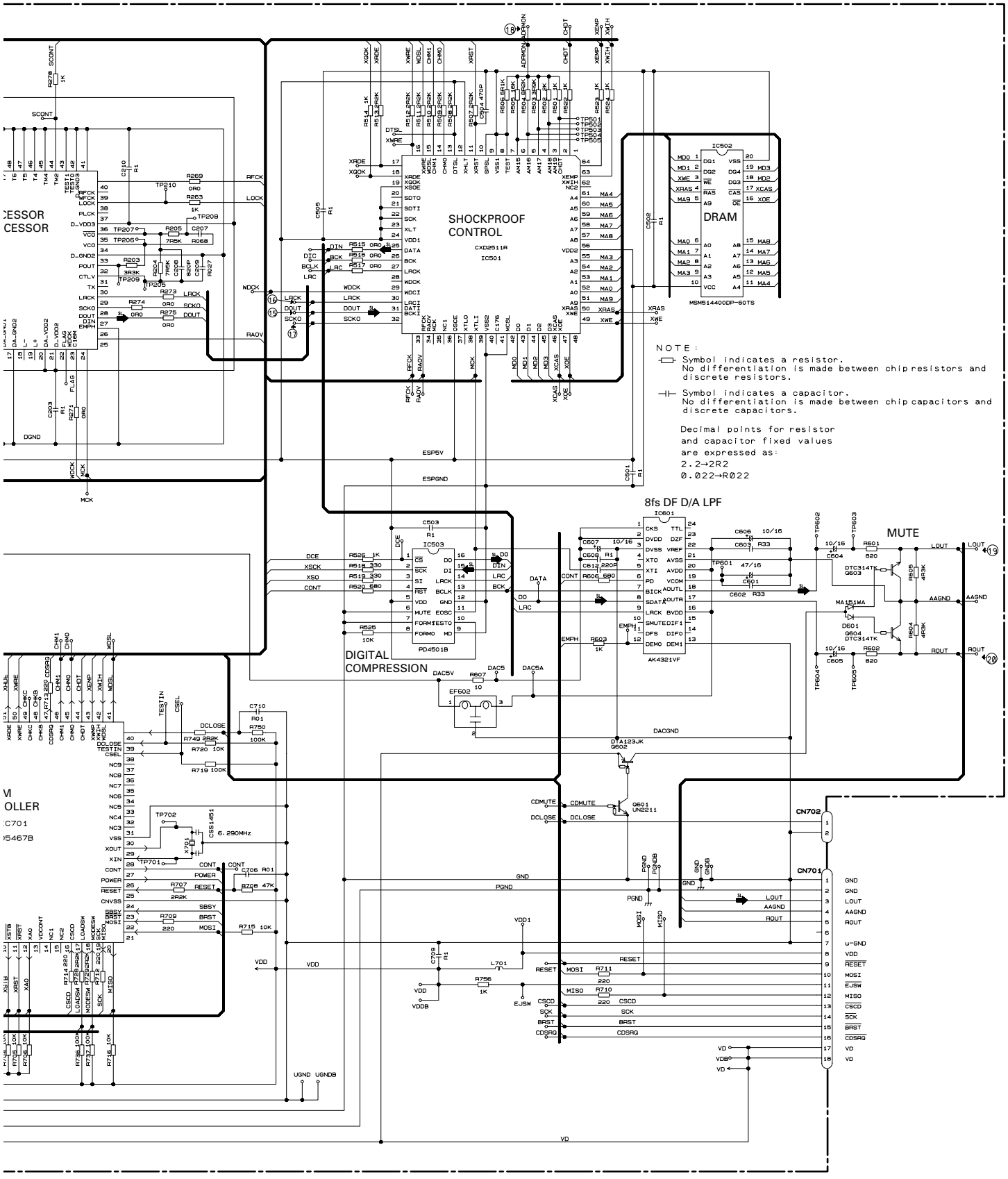



DIGITAL COMPRESSION
IC503 PD4501B
8fs DF D/A LPF
IC601 AK4321VF
Q603 CD MUTE
CN701
SHOCKPROOF CONTROL
IC501 CXD2511R
BCK
DATA
LRCK
XTLI
PD
Q602
Q601
EMPH
VDD
VD
C502
MSM514400DP-60TS
4M DRAM
VM
5V REGULATOR
V+5V
IC702 BA05SFP
X701
POWER
EMPH
CONT
CDMUTE
XIN
XOUT
ELVSNS
IOTOR DRIVER
IC802 LB1836M
CG1
CG2
SYSTEM CONTROLLER
OTOR DRIVER
IC801 LB1836M
ELV1
ELV2
LO1
LO2
MAXSW
PH2
PH1
IC701 PD5467B
Q801
Q802
PVD
VD
LOAD
ELHOME
CLAMPSW
DOORSW
LOADSW
MODESW
ELHOME
CLAMP

3.2 CD CORE UNIT

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

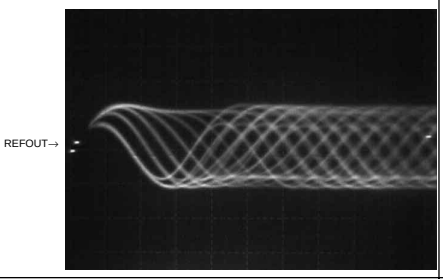



SHOCKPROOF CONTROL
CXD2511R
IC501
DRAM
IC502
MSM514400DP-60TS
8fs DF D/A LPF
IC601
AK4321VF
DIGITAL COMPRESSION
IC503
PD45018
MUTE
CN702
CN701
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor.
No differentiation 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

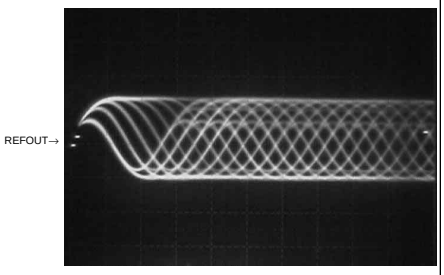
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFOUT:2.5V

● Waveforms

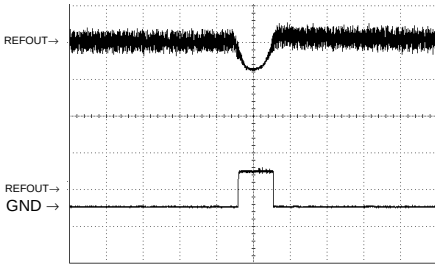
① RFO 0.5V/div. 0.2µs/div.
Normal mode: play



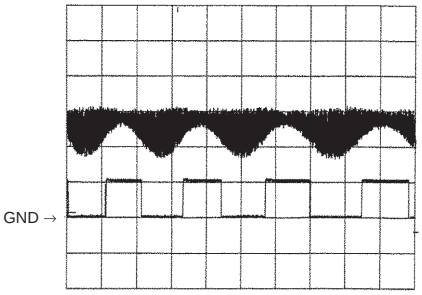
① RFO 0.5V/div. 0.5µs/div.
Test mode



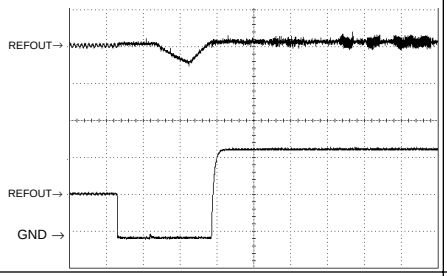
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div.
0.5ms/div.
Normal mode: The defect part passes 500µs/div.



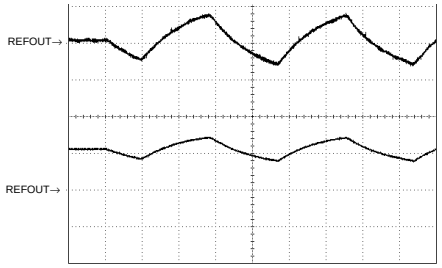
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div.
0.5ms/div.
Test mode: Tracking open



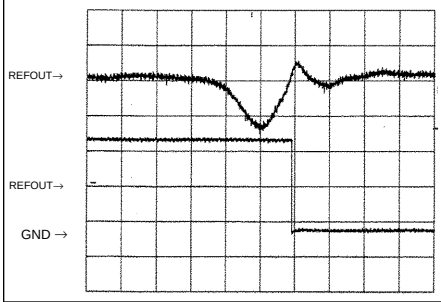
③ CH1: FIN 0.5V/div.
⑤ CH2: FOK 2V/div.
0.2s/div.
Normal mode: Focus close



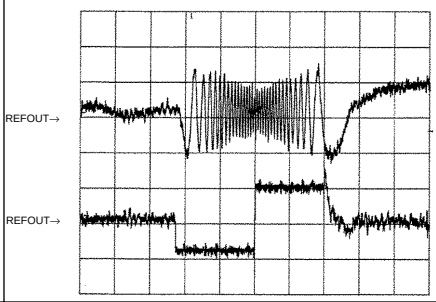
③ CH1: FIN 0.5V/div.
④ CH2: FOP 2V/div.
0.2s/div.
Test mode: No disc, Focus close



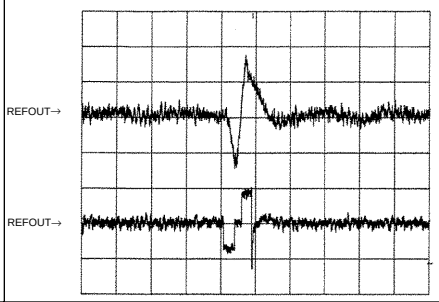
⑥ CH1: FEY 0.5V/div.
⑦ CH2: XSI 2V/div.
1ms/div.
Normal mode: Focus close



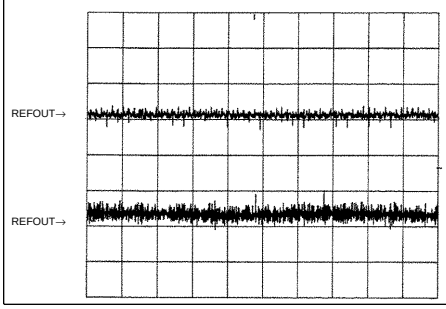
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div.
0.5ms/div.
Test mode: 32 tracks jump (FWD)



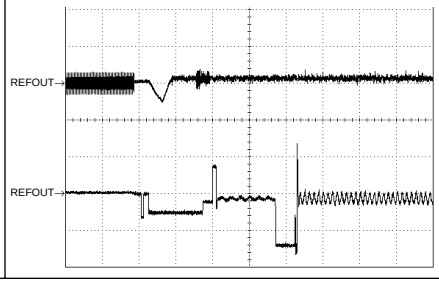
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div.
0.5ms/div.
Test mode: Single jump (FWD)



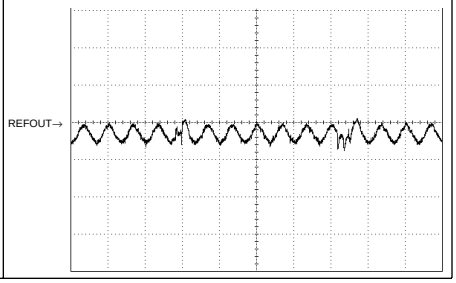
⑥ CH1: FEY 0.1V/div.
③ CH2: FIN 0.2V/div.
20ms/div.
Normal mode: Play



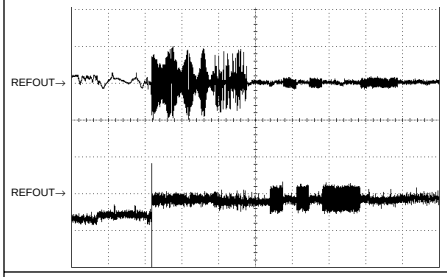
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div.
0.5s/div.
Normal mode: Focus close



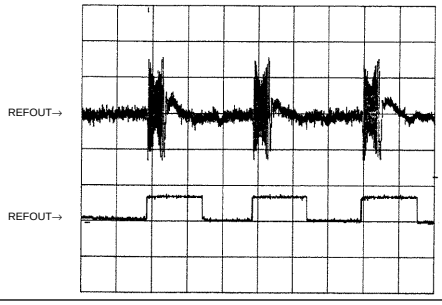
⑩ SIN 0.5V/div. 0.1s/div.
Normal mode: Play



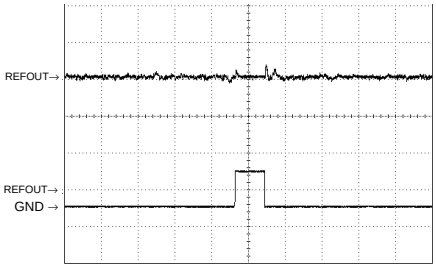
⑧ CH1: TEY 0.5V/div.
⑥ CH2: FEY 0.1V/div. 0.2s/div.
Normal mode: AGC after focus close



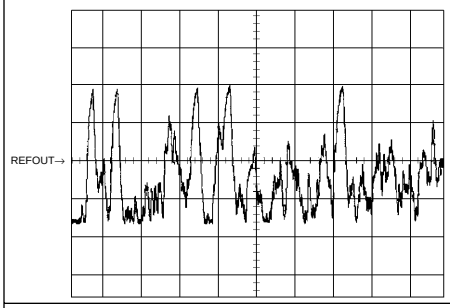
⑧ CH1: TEY 0.5V/div.
⑪ CH2: SD 0.5V/div. 5ms/div.



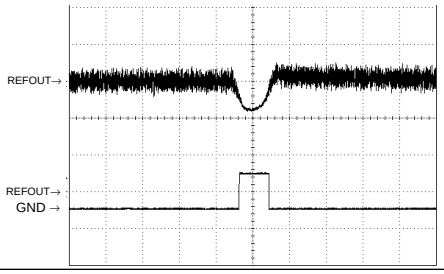
③ CH1: FIN 1V/div.
⑭ CH2: HOLD 5V/div. 500µs/div.
Normal mode: The defect part passes 800µm



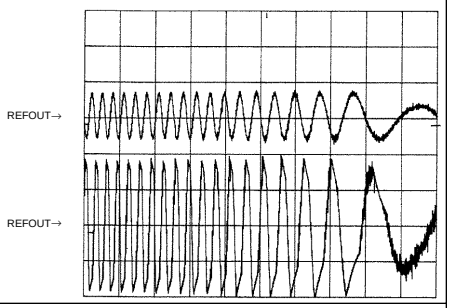
⑩ SIN 1V/div. 10ms/div.
Long Search



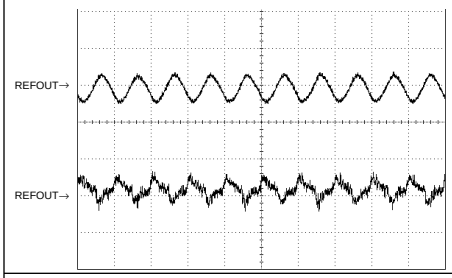
① CH1: RFO 1V/div.
⑭ CH2: HOLD 5V/div. 500µs/div.
Normal mode: The defect part passes 800µm



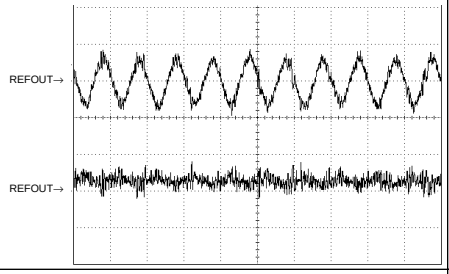
⑧ CH1: TEY 1V/div.
⑬ CH2: TEC 1V/div. 2ms/div.
Test mode: Focus close
Tracking open



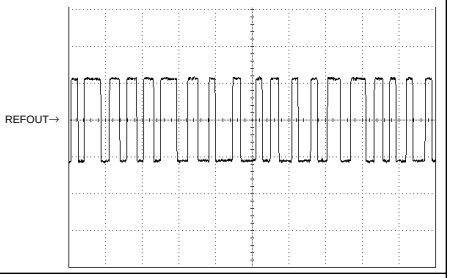
⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 1ms/div.
Normal mode: During AGC



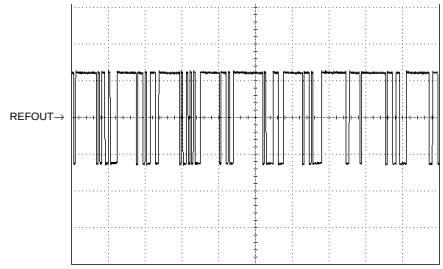
⑧ CH1: TEY 0.2V/div.
⑨ CH2: TIN 0.5V/div. 1ms/div.
Normal mode: During AGC



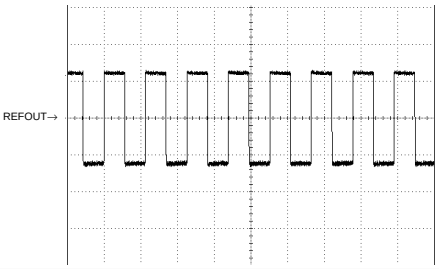
⑫ EFM 1V/div. 2µs/div.
Play



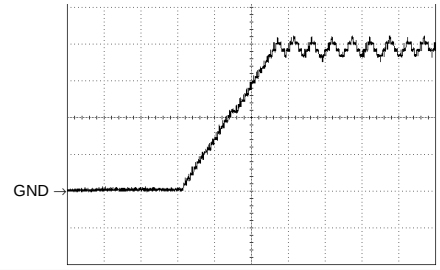
⑮ Dout 2V/div. 5µs/div.
Play

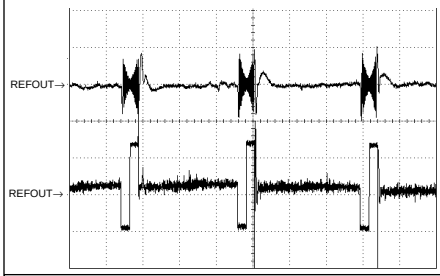
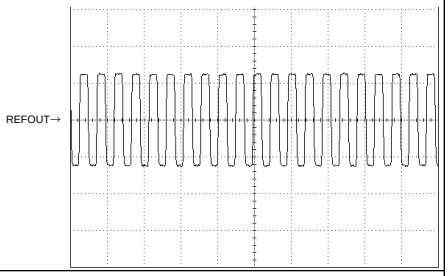
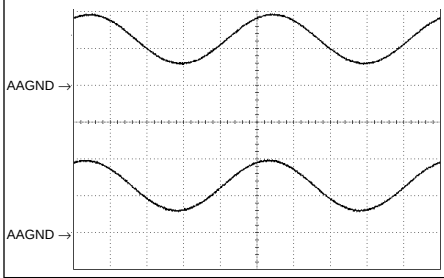


⑯ LRCK 2V/div. 10µs/div.

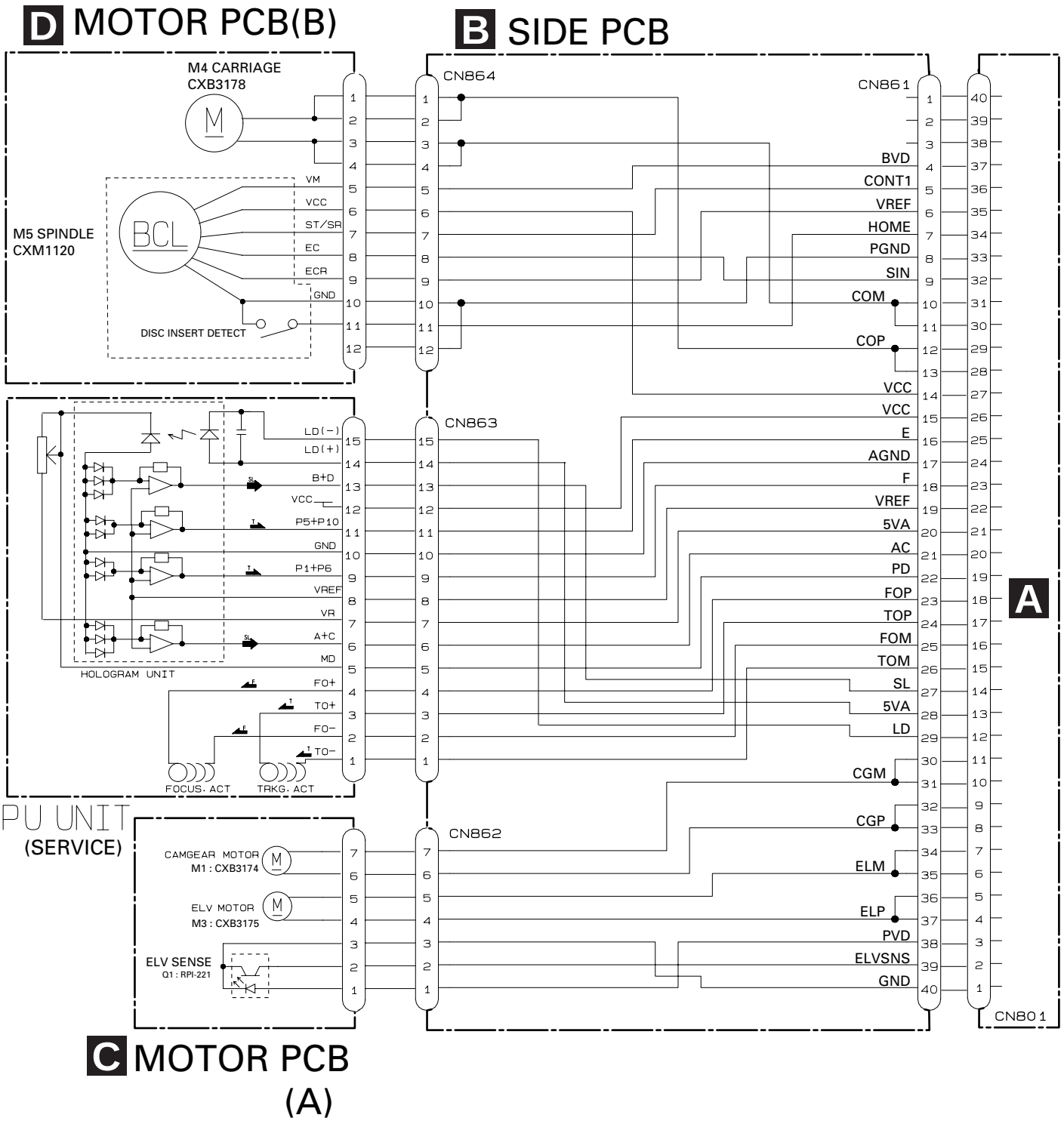


⑱ ADRMON 1V/div. 1s/div.
Normal mode: Starting play

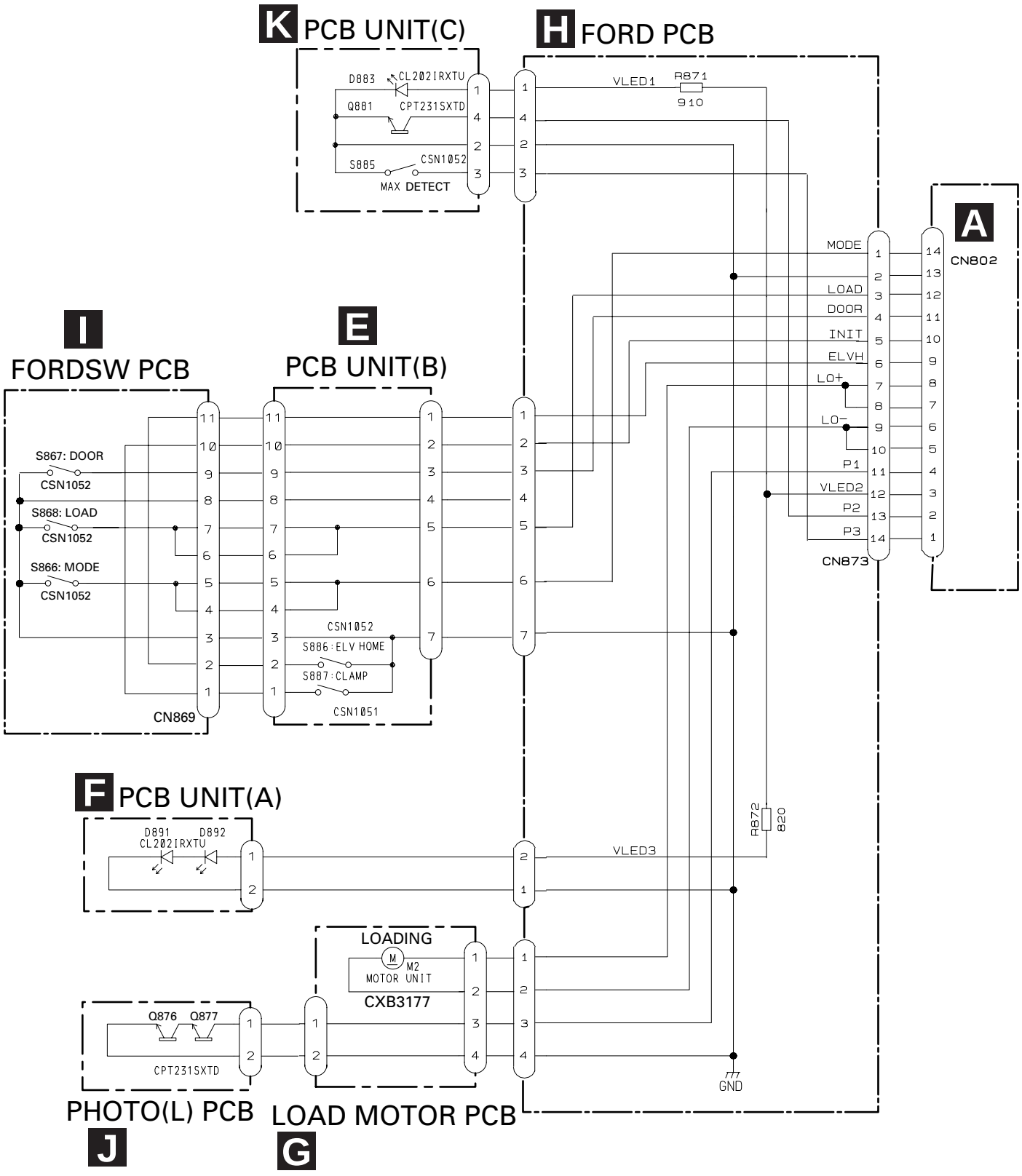


⑧ CH1: TEY 0.5V/div. ⑨ CH2: TIN 0.5V/div. 5ms/div. Test mode: 100 tracks jump(FWD) 	⑧ CH1: TEY 0.5V/div. ⑨ CH2: TIN 0.5V/div. 10ms/div. Normal mode: Play 	⑰ SCKO 2V/div. 500ns/div. Play 
⑳ CH1: RCH 2V/div. ⑲ CH2: LCH 2V/div. 200µs/div. Normal mode: PLAY (0dB,1kHz) 		

3.3 MOTOR PCB(A), MOTOR PCB(B), SIDE PCB



3.4 MOTOR PCB(A), MOTOR PCB(B), SIDE PCB

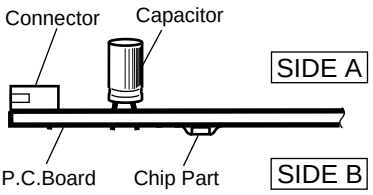


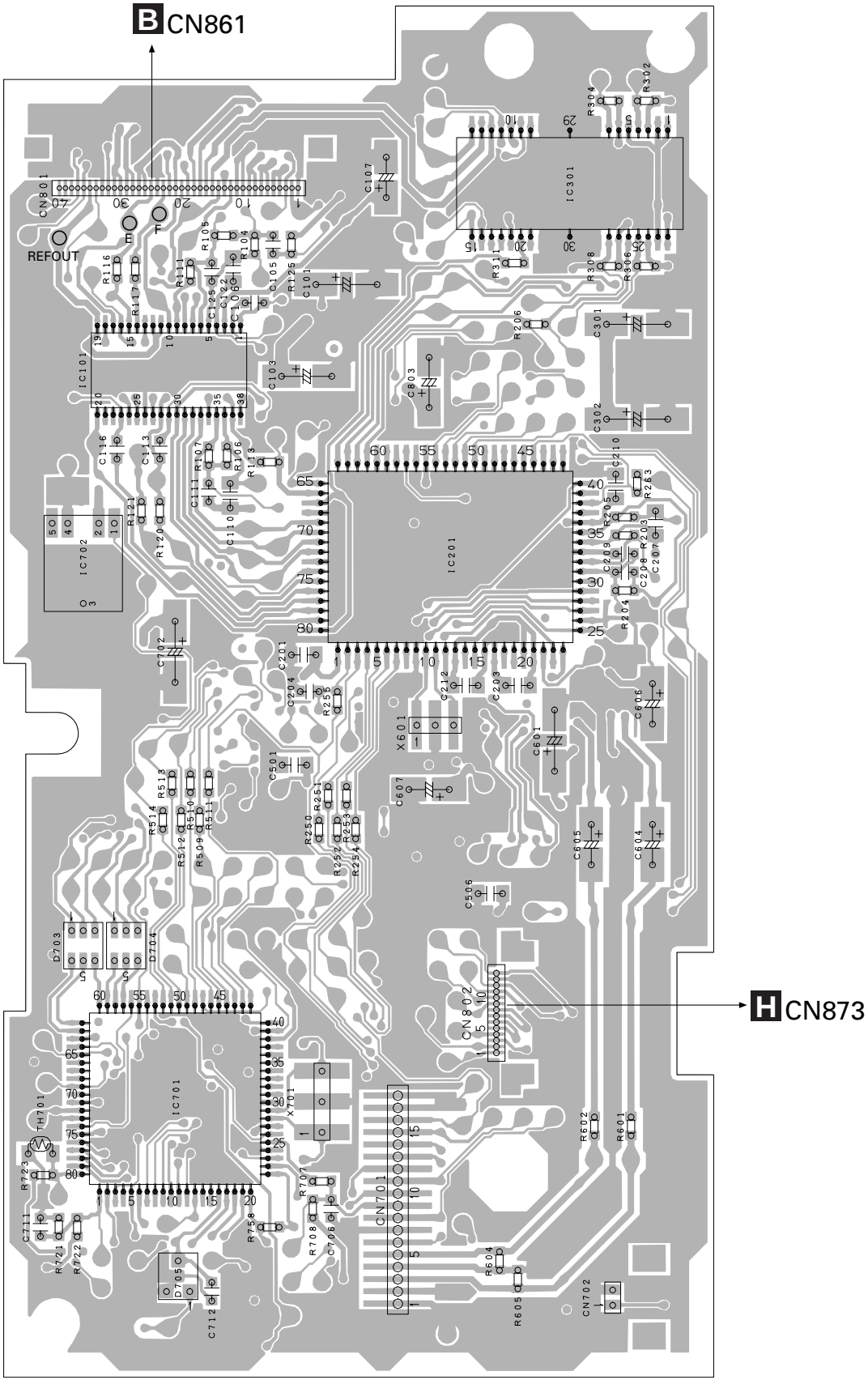
4. PCB CONNECTION DIAGRAM

4.1 CD CORE UNIT

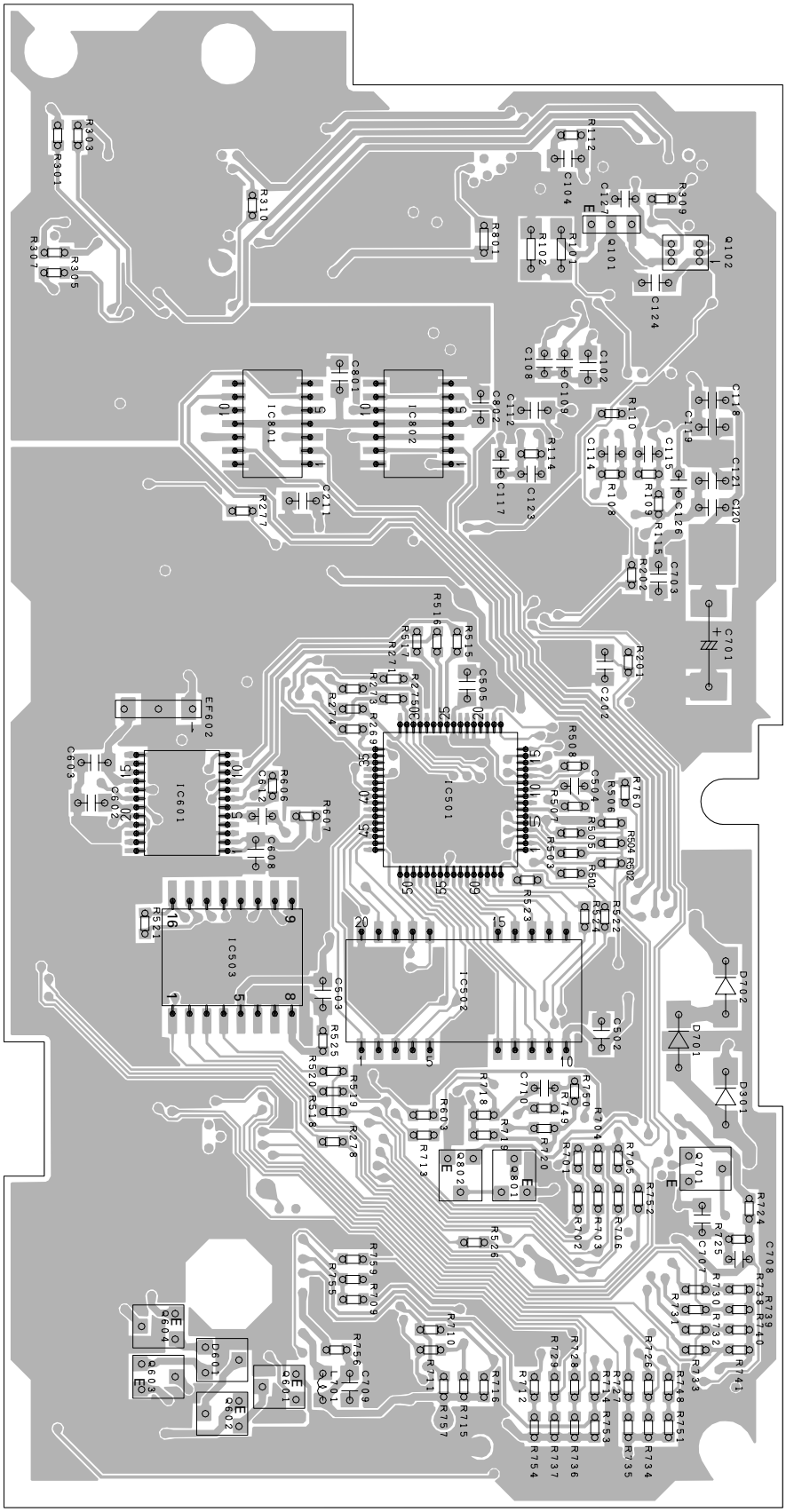
NOTE FOR PCB DIAGRAMS

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



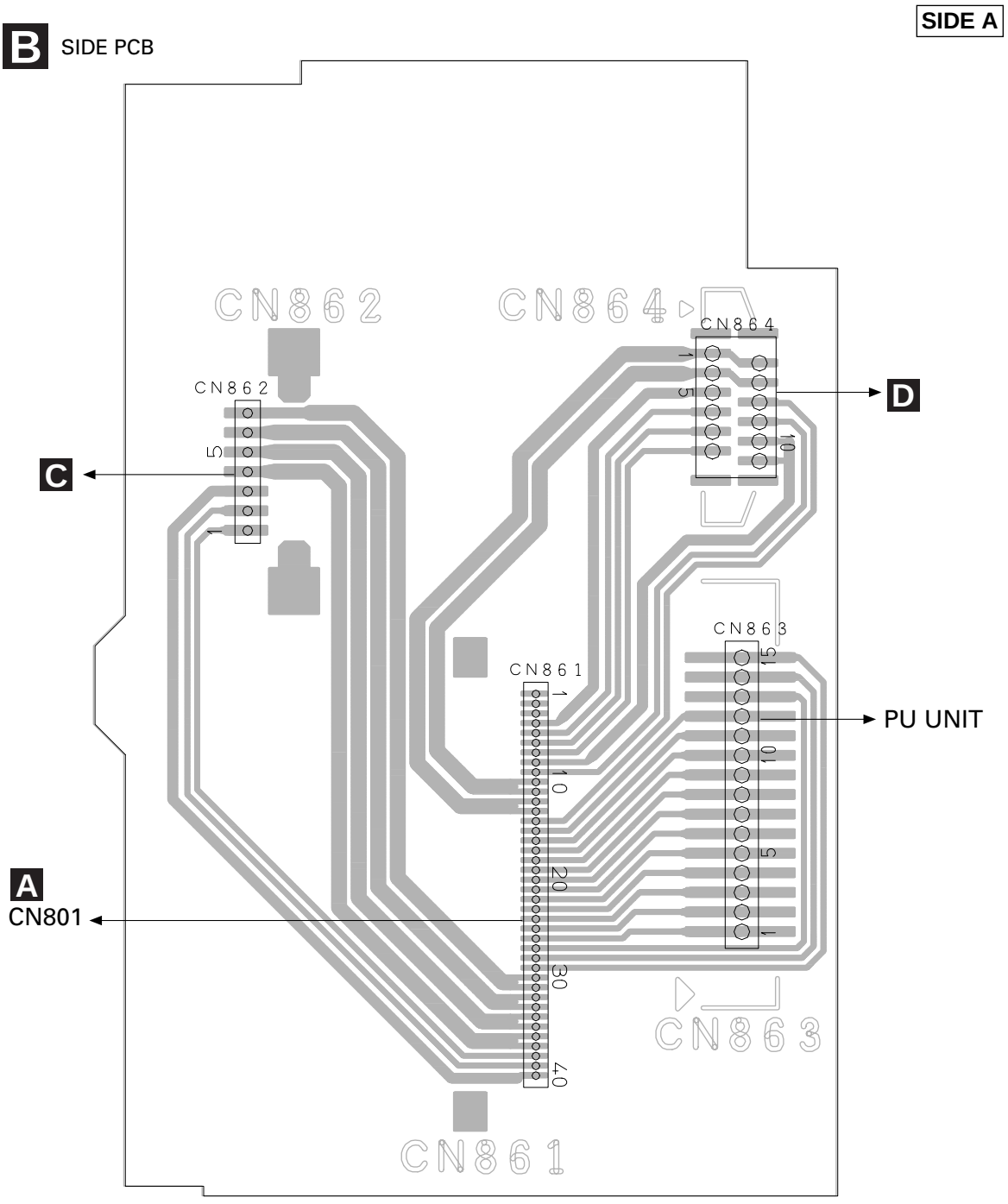


SIDE B



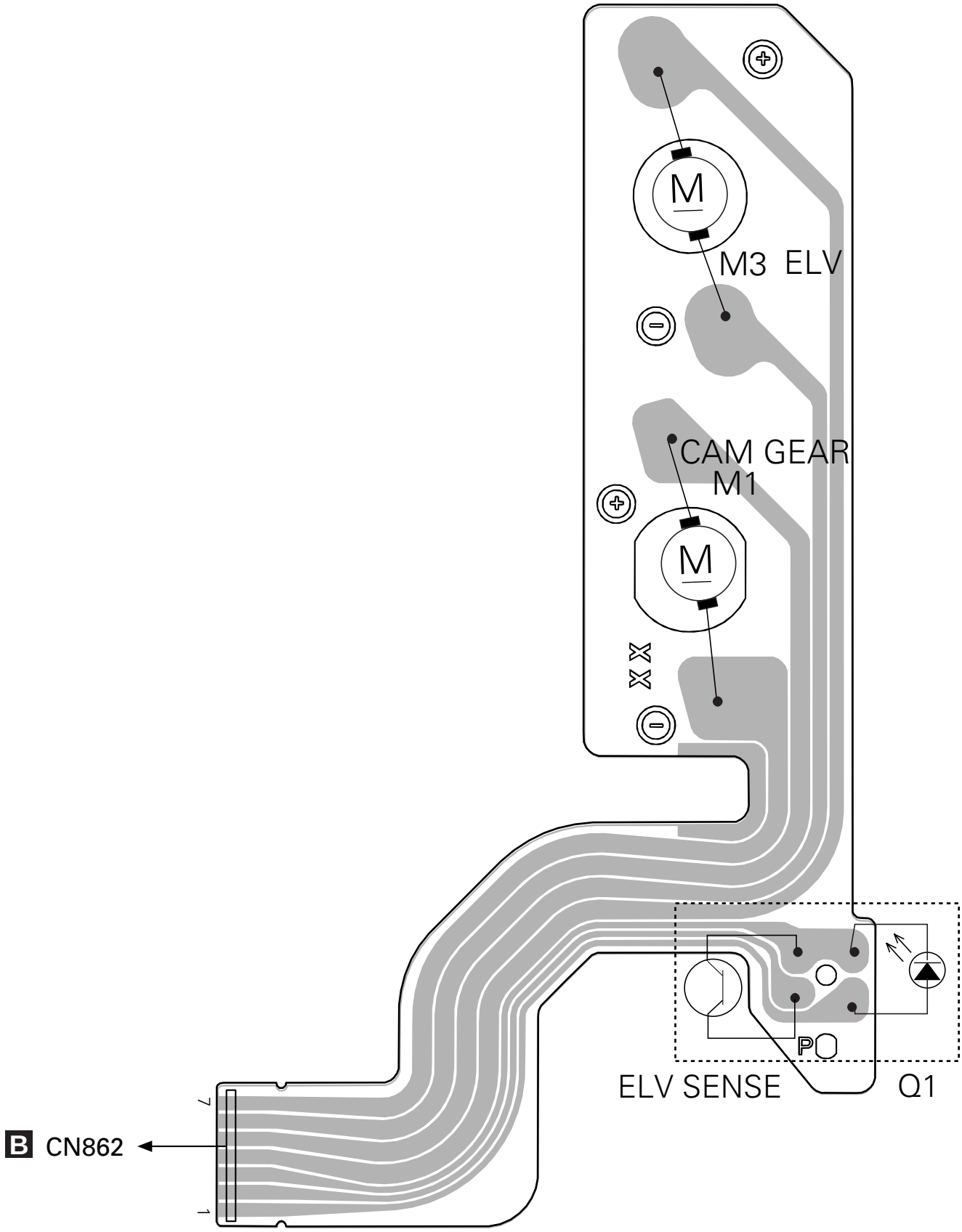
A CD CORE UNIT

4.2 SIDE PCB

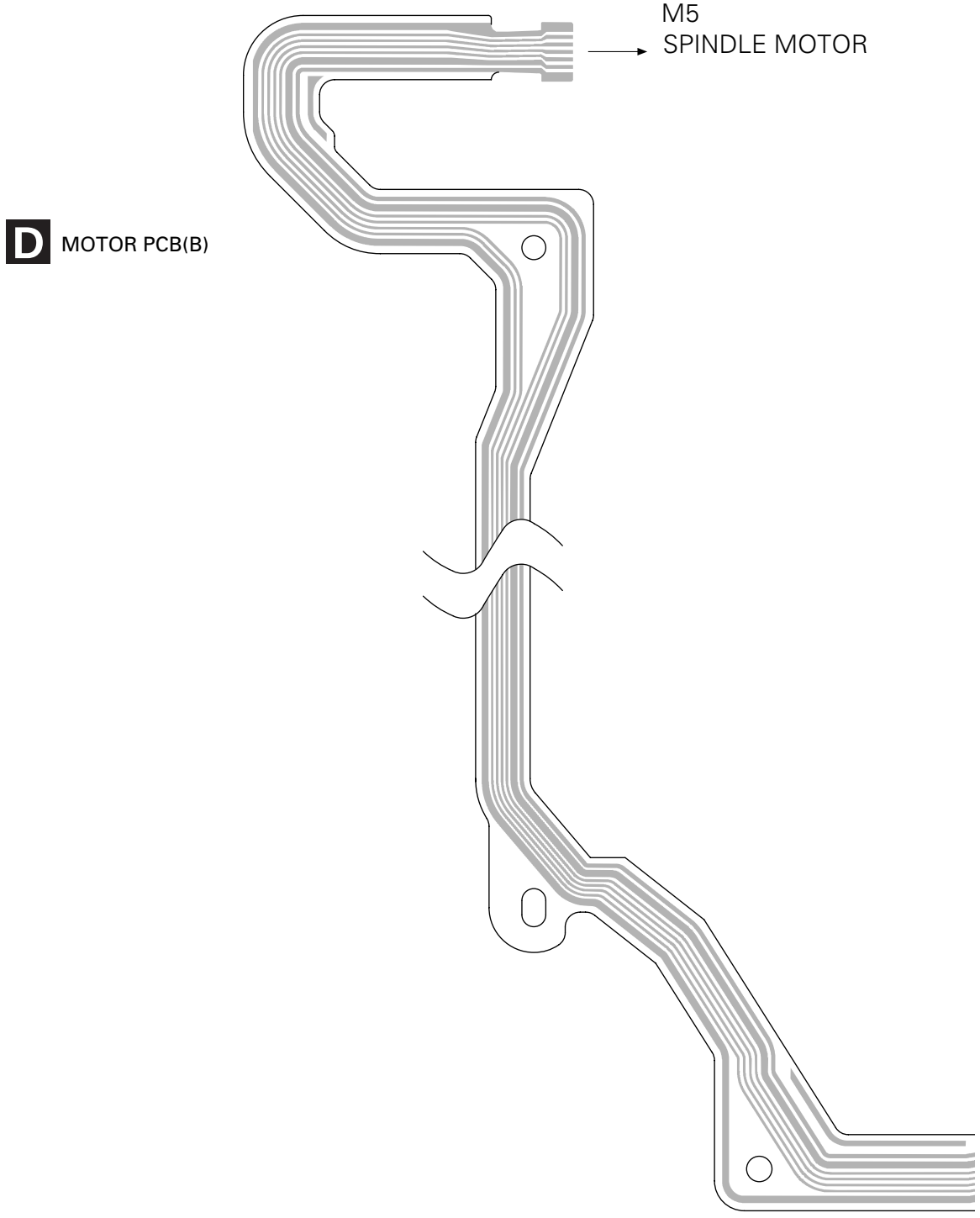

SIDE A
B SIDE PCB
CN862
CN864
CN864
CN862
C
D
CN863
CN861
PU UNIT
A
CN801
CN863
CN861

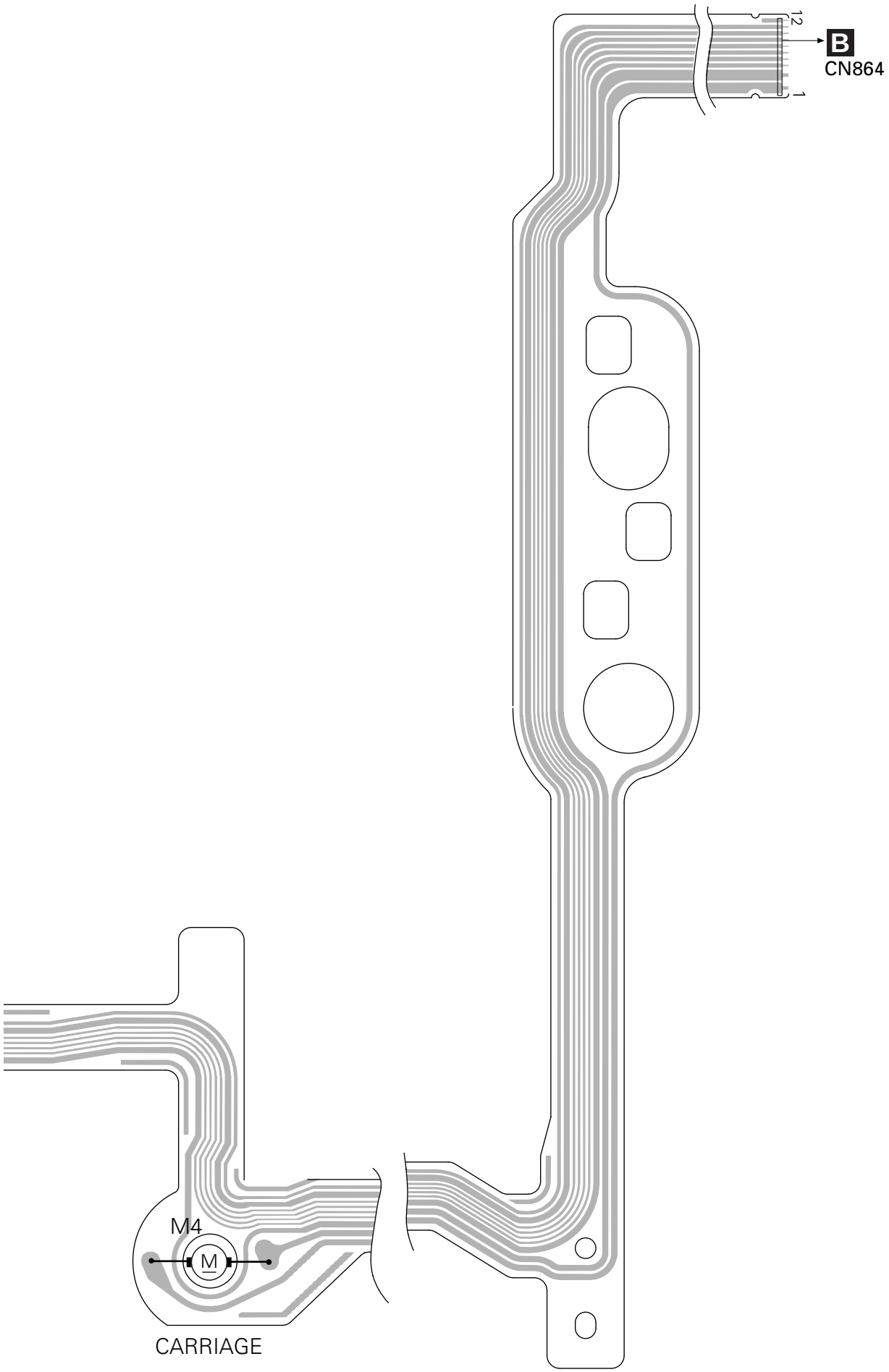
4.3 MOTOR PCB(A)

C MOTOR PCB(A)

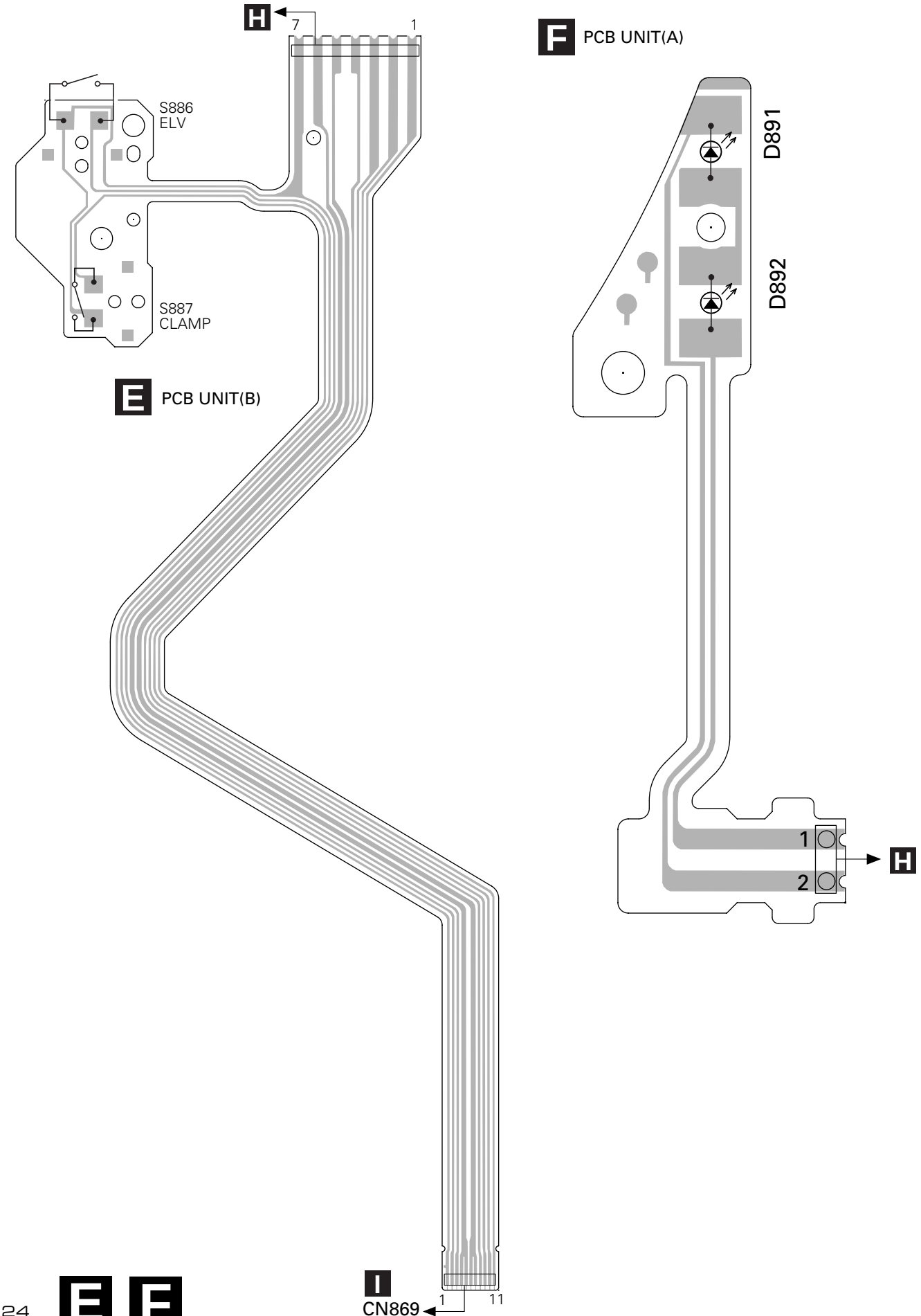


4.4 MOTOR PCB(B)

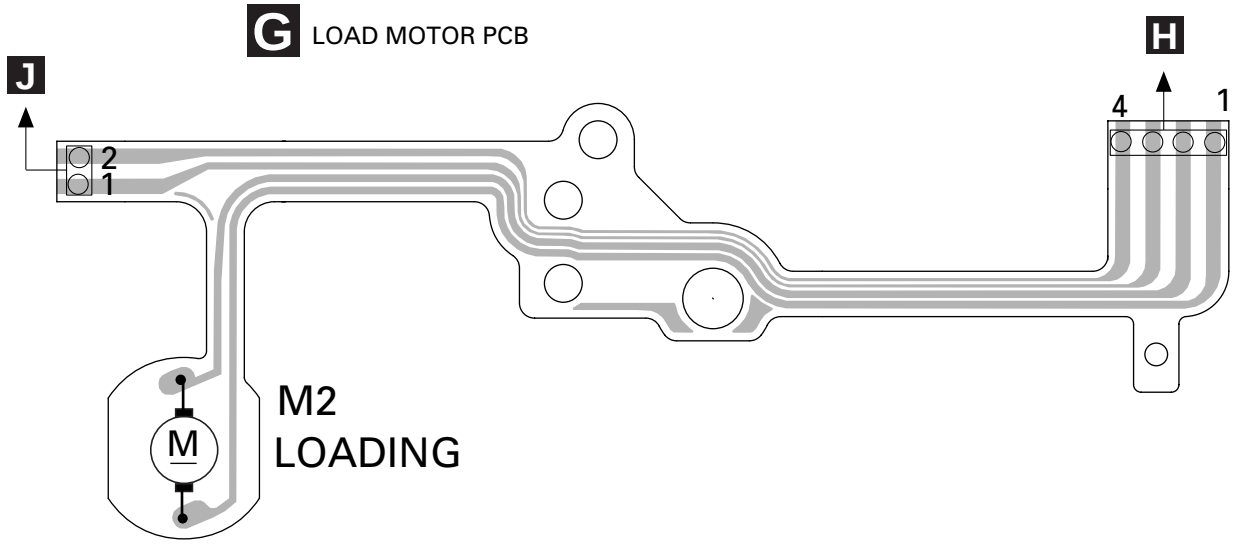



12
1
B
CN864
M4
M
CARRIAGE

4.5 PCB UNIT(B), PCB UNIT(A)



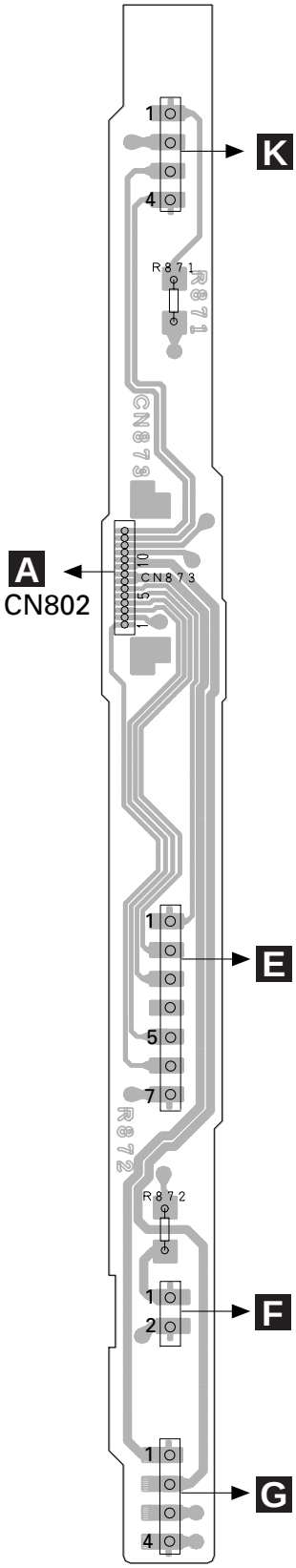
4.6 LOAD MOTOR PCB



4.7 FORD PCB

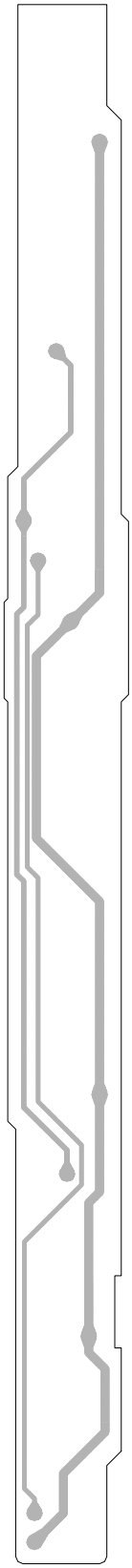
H FORD PCB

SIDE A



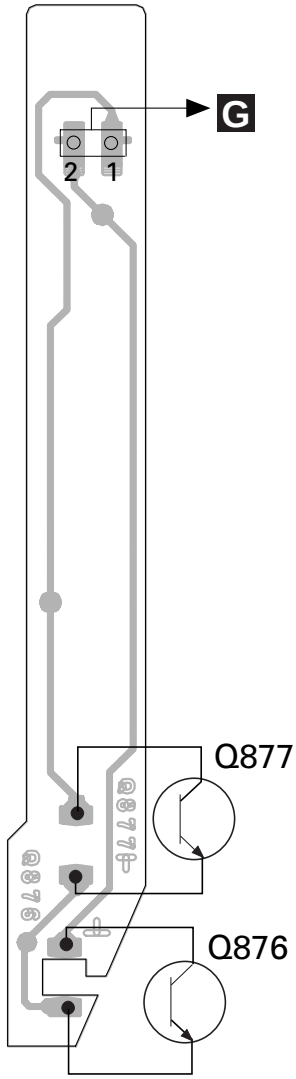
H FORD PCB

SIDE B

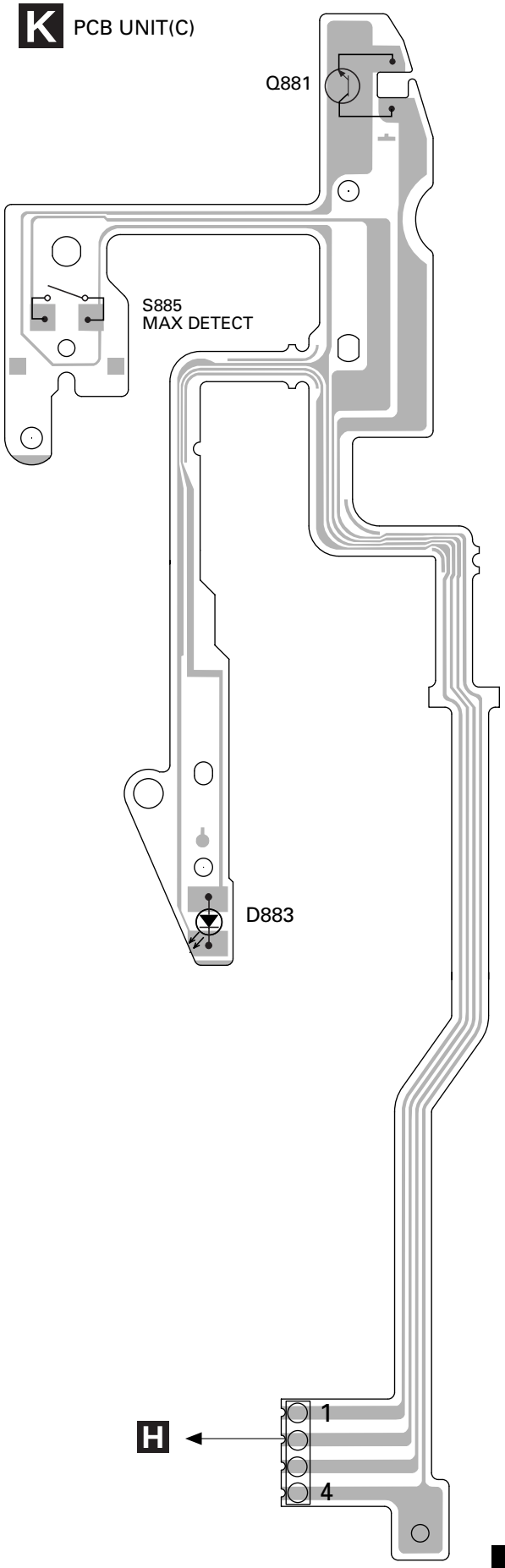


4.8 PHOTO(L) PCB, PCB UNIT(C)

J PHOTO(L) PCB



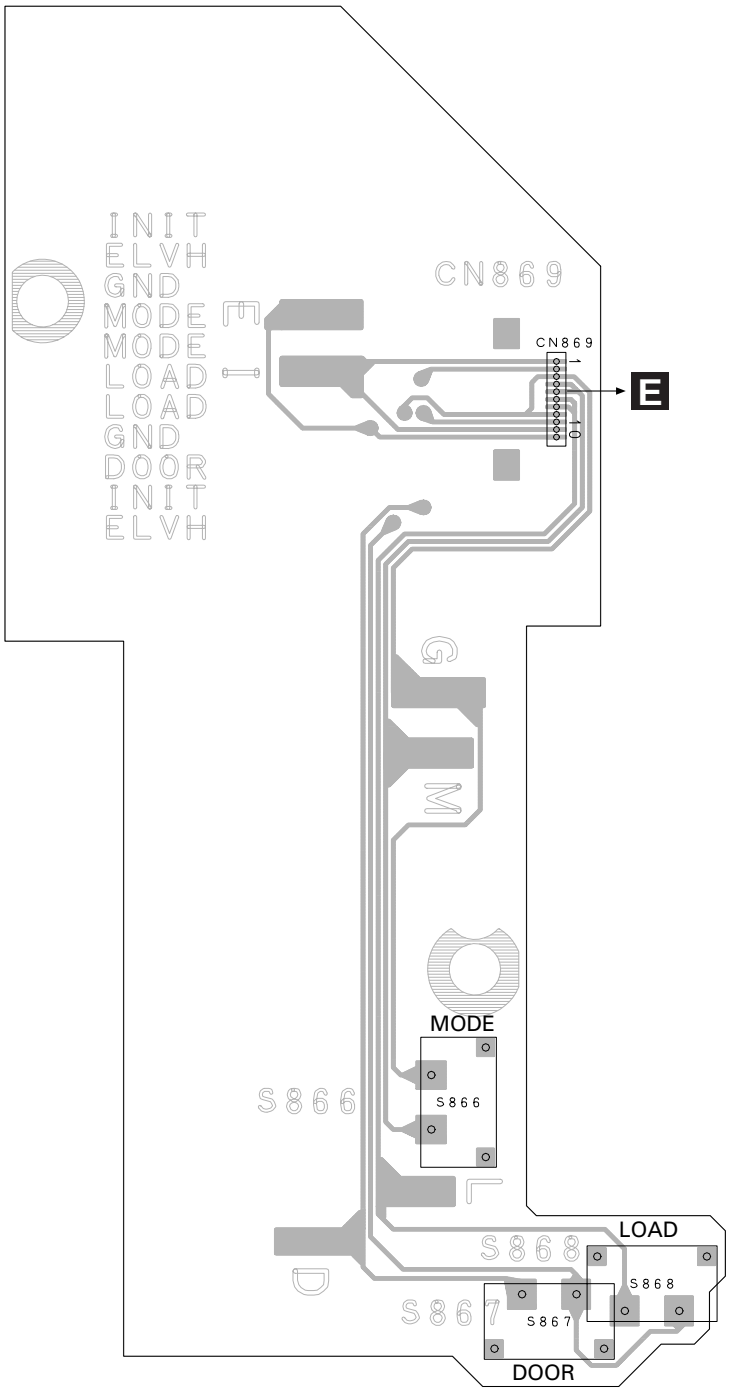
K PCB UNIT(C)



4.9 FORDSW PCB

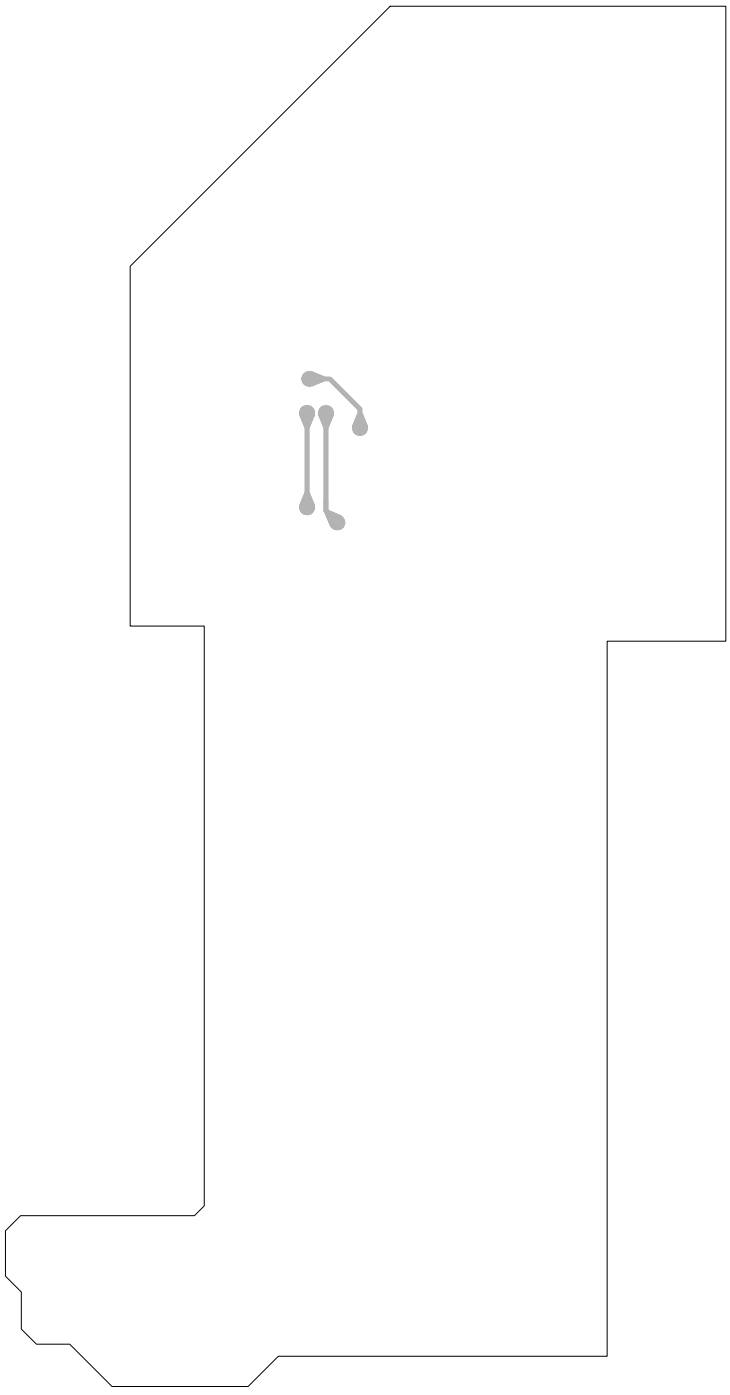
SIDE A

I FORDSW PCB



SIDE B

I FORDSW PCB



5. ELECTRICAL PARTS LIST

NOTES:

● Parts whose parts numbers are omitted are subject to being not supplied.

● The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

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

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

A Unit Number : CWX2250
Unit Name : CD Core Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	101	IC	UPC2572GS
IC	201	IC	UPD63702AGF
IC	301	IC	BA5986FM
IC	501	IC	CXD2511R
IC	502	IC	MSM514400DP-60TS
IC	503	IC	PD4501B
IC	601	IC	AK4321VF
IC	701	IC	PD5467B
IC	702	IC	BA05SFP
IC	801	IC	LB1836M
IC	802	IC	LB1836M
Q	101	Transistor	2SD1664
Q	102	Transistor	UMD2N
Q	601	Transistor	UN2211
Q	602	Transistor	DTA123JK
Q	603	Transistor	DTC314TK
Q	604	Transistor	DTC314TK
Q	701	Transistor	DTA123JK
Q	801	Transistor	DTA123JK
Q	802	Transistor	UN2211
D	301	Diode	1SR154-400
D	601	Chip Diode	MA151WA
D	701	Diode	1SR154-400
D	702	Diode	1SR154-400
D	703	Diode	IMN10
D	704	Diode	IMN10
L	701	Inductor	LCTB4R7K2125
TH	701	Thermistor	CCX1015
X	601	Ceramic Resonator 16.934MHz	CSS1456
X	701	Radiator 6.290MHz	CSS1451
EF	602		CCG1051

RESISTORS

=====Circuit Symbol and No.		===Part Name	Part No.
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		RS1/16S473J
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		RS1/16S681J
R	263		RS1/16S102J
R	269		RS1/16S0R0J
R	271		RS1/16S0R0J
R	273		RS1/16S0R0J
R	274		RS1/16S0R0J
R	275		RS1/16S0R0J
R	277		RS1/16S102J
R	278		RS1/16S102J
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		RS1/16S102J
R	310		RS1/16S102J
R	311		RS1/16S102J
R	501		RS1/16S102J
R	502		RS1/16S202J
R	503		RS1/16S392J
R	504		RS1/16S822J
R	505		RS1/16S163J
R	506		RS1/16S512J
R	507		RS1/16S222J
R	508		RS1/16S222J
R	509		RS1/16S222J
R	510		RS1/16S222J
R	511		RS1/16S222J
R	512		RS1/16S222J
R	513		RS1/16S222J
R	514		RS1/16S102J
R	515		RS1/16S0R0J
R	516		RS1/16S0R0J
R	517		RS1/16S0R0J
R	518		RS1/16S331J
R	519		RS1/16S331J
R	520		RS1/16S681J

Circuit Symbol and No.		Part Name	Part No.
R	522		RS1/16S102J
R	523		RS1/16S102J
R	524		RS1/16S102J
R	525		RS1/16S103J
R	526		RS1/16S102J
R	601		RN1/16SC8200D
R	602		RN1/16SC8200D
R	603		RS1/16S102J
R	604		RN1/16SC4301D
R	605		RN1/16SC4301D
R	606		RS1/16S681J
R	607		RS1/16S100J
R	701		RS1/16S222J
R	702		RS1/16S222J
R	703		RS1/16S103J
R	704		RS1/16S103J
R	705		RS1/16S103J
R	706		RS1/16S103J
R	707		RS1/16S222J
R	708		RS1/16S473J
R	709		RS1/16S221J
R	710		RS1/16S221J
R	711		RS1/16S221J
R	712		RS1/16S221J
R	713		RS1/16S221J
R	714		RS1/16S221J
R	715		RS1/16S103J
R	716		RS1/16S103J
R	719		RS1/16S104J
R	720		RS1/16S103J
R	721		RS1/16S103J
R	722		RS1/16S433J
R	723		RS1/16S153J
R	724		RS1/16S102J
R	725		RS1/16S912J
R	726		RS1/16S222J
R	727		RS1/16S222J
R	728		RS1/16S222J
R	729		RS1/16S222J
R	730		RS1/16S222J
R	731		RS1/16S222J
R	732		RS1/16S222J
R	733		RS1/16S222J
R	734		RS1/16S104J
R	735		RS1/16S104J
R	736		RS1/16S104J
R	737		RS1/16S104J
R	738		RS1/16S273J
R	739		RS1/16S562J
R	740		RS1/16S104J
R	741		RS1/16S154J
R	748		RS1/16S222J
R	749		RS1/16S222J
R	750		RS1/16S104J
R	751		RS1/16S104J
R	752		RS1/16S222J
R	756		RS1/16S102J
R	760		RS1/16S102J
R	801		RS1/10S102J

Circuit Symbol and No.		Part Name	Part No.
C	106		CKSRYB222K50
C	107		CEV4R7M35
C	108		CKSRYB273K25
C	109		CCSRCH101J50
C	110		CKSQYB104K25
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		CKSQYB104K25
C	123		CKSRYB472K50
C	124		CKSQYB104K25
C	125		CCSRCH5R0C50
C	126		CKSRYB153K25
C	127		CKSRYB102K50
C	201		CKSQYB334K16
C	202		CKSQYB104K25
C	203		CKSQYB104K25
C	204		CKSRYB471K50
C	207		CKSQYB683K16
C	208		CKSRYB821K50
C	209		CKSRYB273K25
C	210		CKSQYB104K25
C	211		CKSQYB104K25
C	212		CCSQCH102J50
C	301		CEV101M10
C	302		CEV101M10
C	501		CKSQYB104K25
C	502		CKSQYB104K25
C	503		CKSQYB104K25
C	504		CKSRYB471K50
C	505		CKSQYB104K25
C	601		CEV470M16
C	602		CKSQYB334K16
C	603		CKSQYB334K16
C	604		CEV100M16
C	605		CEV100M16
C	606		CEV100M16
C	607		CEV100M16
C	608		CKSQYB104K25
C	612		CKSRYB221K50
C	701	22µF/6.3V	CCH1300
C	702		CEV101M6R3
C	703		CKSQYB334K16
C	706		CKSRYB103K25
C	707		CKSQYB104K25
C	708		CKSRYB103K25
C	709		CKSQYB104K25
C	710		CKSRYB103K25
C	711		CKSRYB102K50
C	801		CKSQYB104K25
C	802		CKSQYB104K25
C	803		CEV220M16

CAPACITORS

C	101	CEV101M6R3
C	102	CKSQYB104K25
C	103	CEV470M6R3
C	104	CKSQYB334K16
C	105	CCSRCH240J50

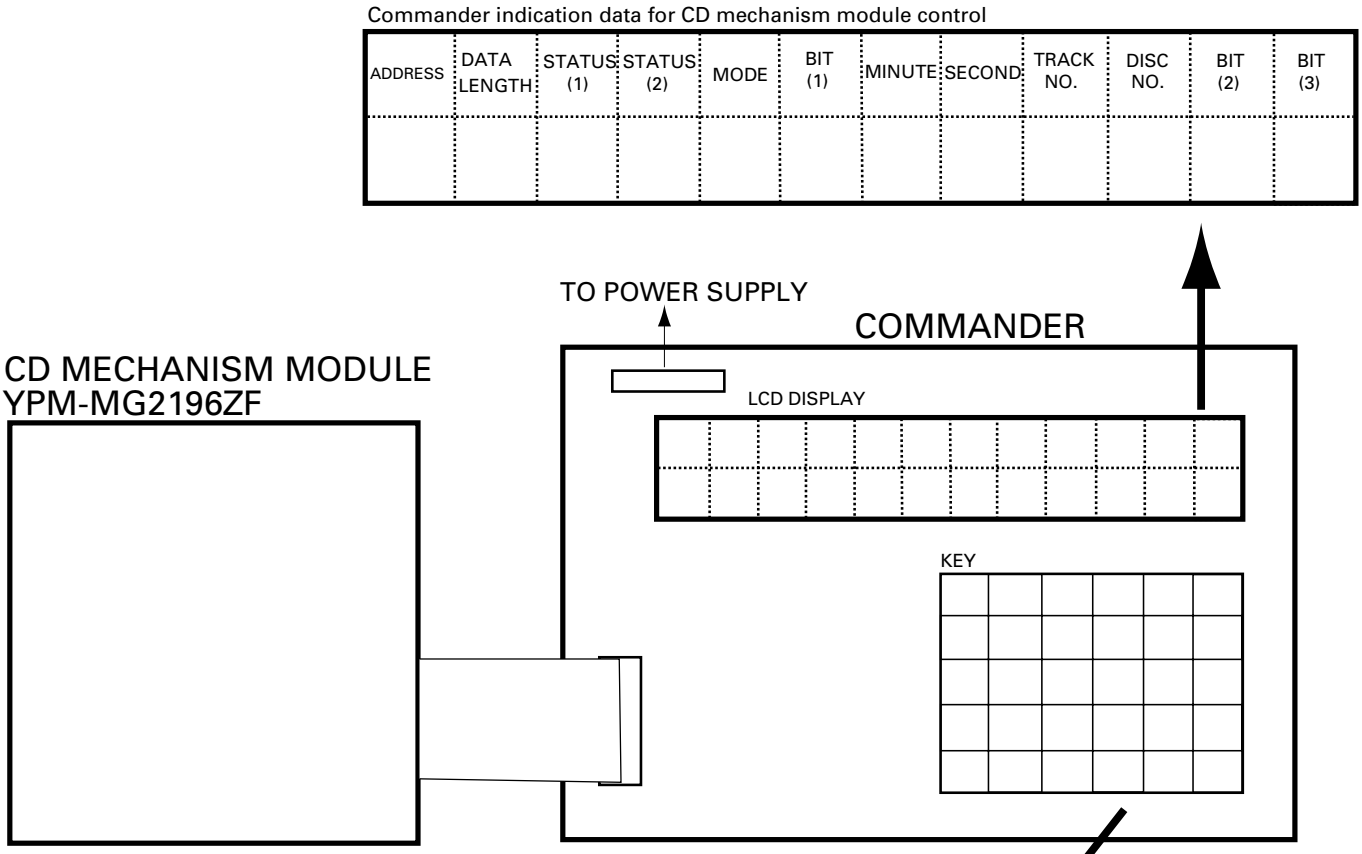
=====Circuit Symbol and No.		===Part Name	Part No.
J		Unit Number : Unit Name : Photo(L) PCB	
Q	876	Photo-transistor	CPT231SXTD
Q	877	Photo-transistor	CPT231SXTD
I		Unit Number : Unit Name : Fordsw PCB	
S	866	Spring Switch(MODE)	CSN1052
S	867	Spring Switch(DOOR)	CSN1052
S	868	Spring Switch(LOAD)	CSN1052
H		Unit Number : Unit Name : Ford PCB	
R	871		RS1/8S911J
R	872		RS1/8S821J
F		Unit Number : Unit Name : PCB Unit(A)	
D	891	Chip LED	CL202IRXTU
D	892	Chip LED	CL202IRXTU
E		Unit Number : Unit Name : PCB Unit(B)	
S	886	Spring Switch(ELV)	CSN1052
S	887	Spring Switch(CLAMP)	CSN1051
K		Unit Number : Unit Name : PCB Unit(C)	
Q	881	Photo-transistor	CPT231SXTD
D	883	Chip LED	CL202IRXTU
S	885	Spring Switch(MAX DETECT)	CSN1052
G		Unit Number : Unit Name : Load Motor PCB	
M	2	Motor Unit(LOADING)	CXB3177
C		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
D		Unit Number : Unit Name : Motor PCB(B)	
M	4	Motor Unit(CARRIAGE)	CXB3178
M	5	Motor(SPINDLE)	CXM1120

Miscellaneous Parts List

		PU Unit(Service)	CXX1312

6. ADJUSTMENT

● **Connection Diagram**



KEY

LOAD1	LOAD2	LOAD3	LOAD4	LOAD5	LOAD6
EJECT1	EJECT2	EJECT3	EJECT4	EJECT5	EJECT6
DISC1 T-CLS	DISC2 T-OPN	DISC3 F-CLS	DISC4 F-OPN	DISC5 JMPOFF	DISC6 C/T
CD ON/OFF	TRK+ F-KICK	TRK- R-KICK	FF	REV	DISC+
COMP ON/OFF	SCAN REG-ON	RANDOM	SHUFFLE	SHIP- POS.	TESTIN

CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

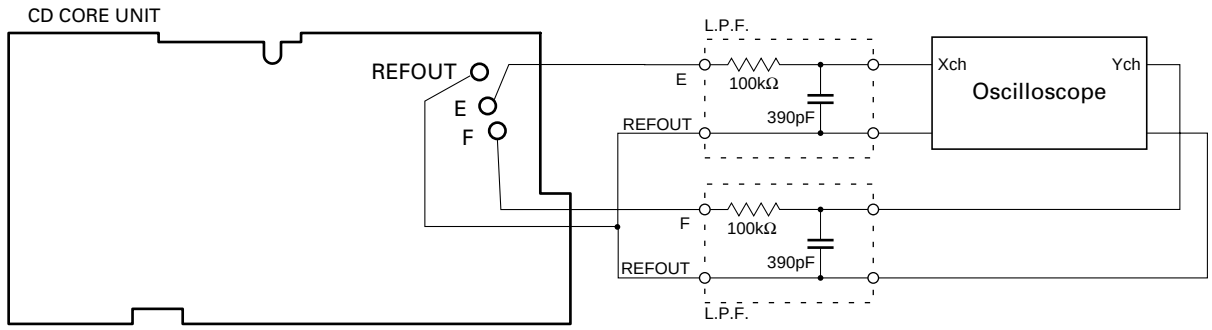
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best 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 TRK+ and TRK- buttons, move the PU unit to the innermost track.
3. Press key **DISC3** to close focus, the display should read "91". Press key **DISC2** to implement the tracking balance adjustment the display should now read "81". Press key **DISC3** 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.

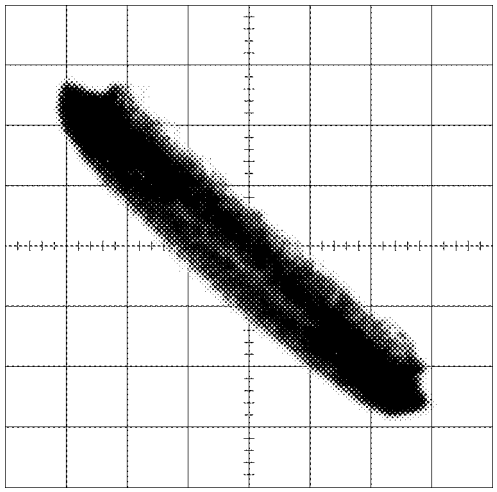
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

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

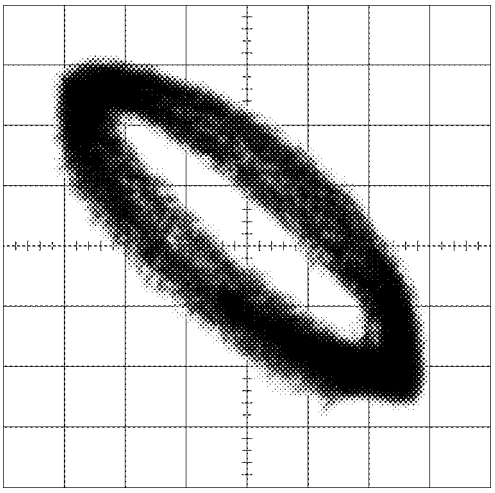
Grating waveform

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

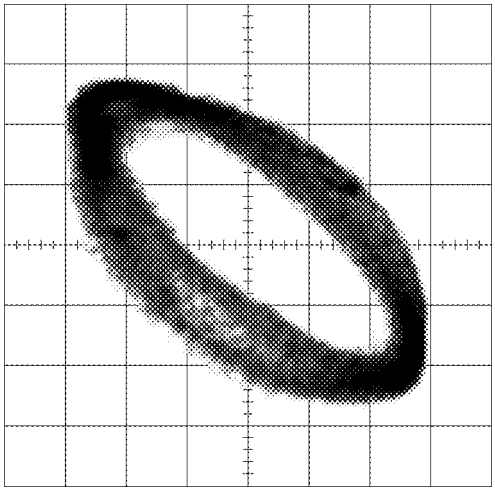
0°



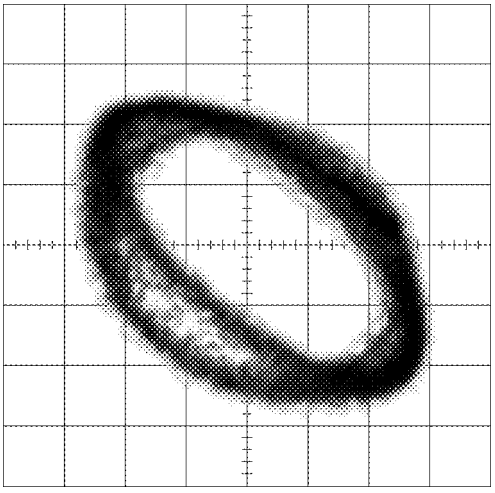
30°



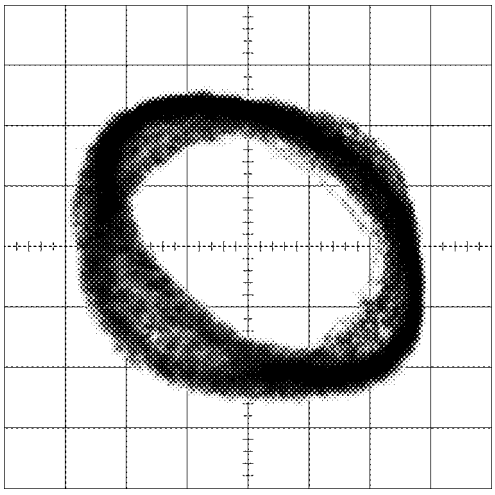
45°



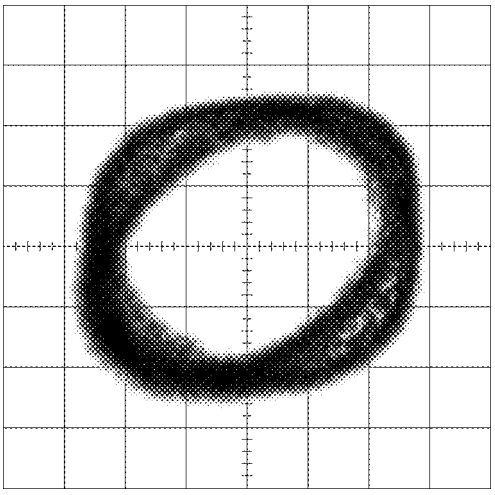
60°



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 REFOUT (approximately 2.5V) rather than GND.
  Inadvertent contact of REFOUT 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 REFOUT and GND at same time. Take special care not to connect ch1 negative probe to REFOUT and ch2 negative plobe to GND at same time. 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 REFOUT 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.

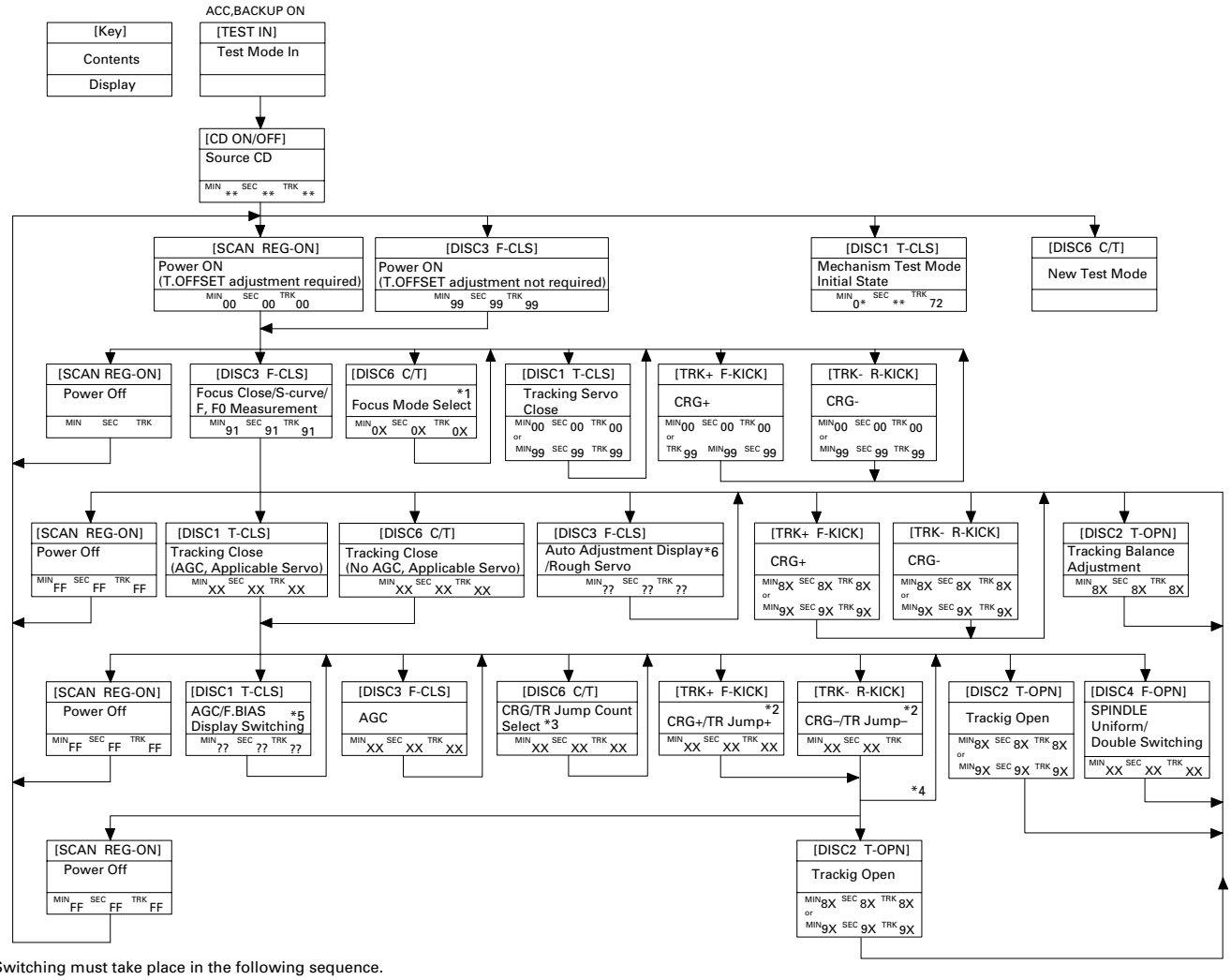
  If a malfunction is recognized, appropriate remedial actions must be taken. Such actions include changing the light source position, changing the unit position and applying a cover to the photo-transistor.
- When you press the EJECT key to eject a disc, you must not touch any other key until the ejection is complete.
- If you press the TRK+ or TRK– 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 commander for module control, thus key operations for adjustments are done from the commander. The keys referred to in the following are those used on the commander.

- Turning on the Test Mode
  Press the TEST IN key
- Ending the Test Mode
  Apply the reset (the reset will be applied two minutes after the power is turned from off).
- 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



Switching must take place in the following sequence.

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

Focus Close → S.Curve Check → 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 → T.AGC Gain → F. BIAS Setting

(AGC Gain = (Current value/Initial value) x 20)

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

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

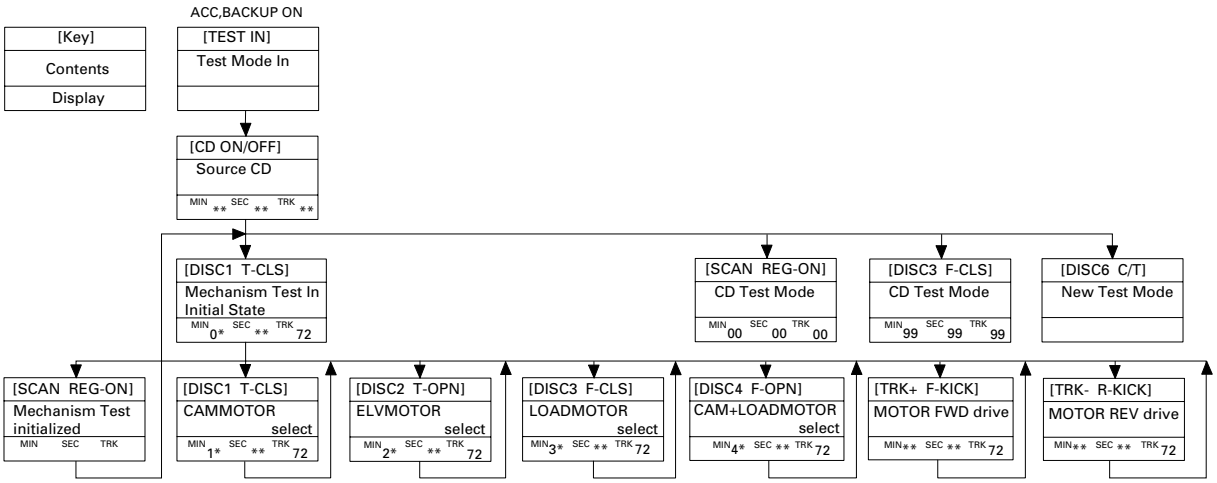
(F.Bias value, F.Cancel value, T.Offset value, T.Bal value
= (Upper 8 bits of the setting (7F[H] to 80[H] + 128)/4
= 63[D] to 32[D] to 00[D]).

[Key]	Operation	
	Test Mode	New Test Mode
[SCAN REG-ON] 15 00H	Power ON/OFF	Error occurrence time/ Cause display switching
[TRK+ F-KICK] 15 01H	CRG+/TR Jump+ (Toward outer perimeter)	Track+/FF
[TRK- R-KICK] 15 02H	CRG-/TR Jump- (Toward inner perimeter)	Track-/REV
[DISC1 T-CLS] 15 03H	Tracking Close/AGC gain, F.Bias adjustment value display switching	—
[DISC2 T-OPN] 15 04H	Auto Tracking Balance adjustment/ Tracking Open	Mode
[DISC3 F-CLS] 15 05H	Focus Close, S.Curve, F.EQ measurement/ Rough Servo/AGC	—
[DISC4 F-OPN] 15 06H	Focus Open	RAMDOM
[DISC5 JMPOFF] 15 07H	Jump Off	—
[DISC6 C/T] 15 08H	Focus Mode select/Tracking Close/ CRG*TR Jump Switching	Auto/Manual switching

- 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 ending the test mode, apply the reset (the reset is applied in two minutes from powering off).

Note: The commander for G1 mech. must be employed for controlling the test mode.
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 [TRK+] or [TRK-] key during the Focus Search, you must turn the power off immediately (otherwise, the lens can stick resulting in actuator damages).

● CD Player Mechanism Flowchart

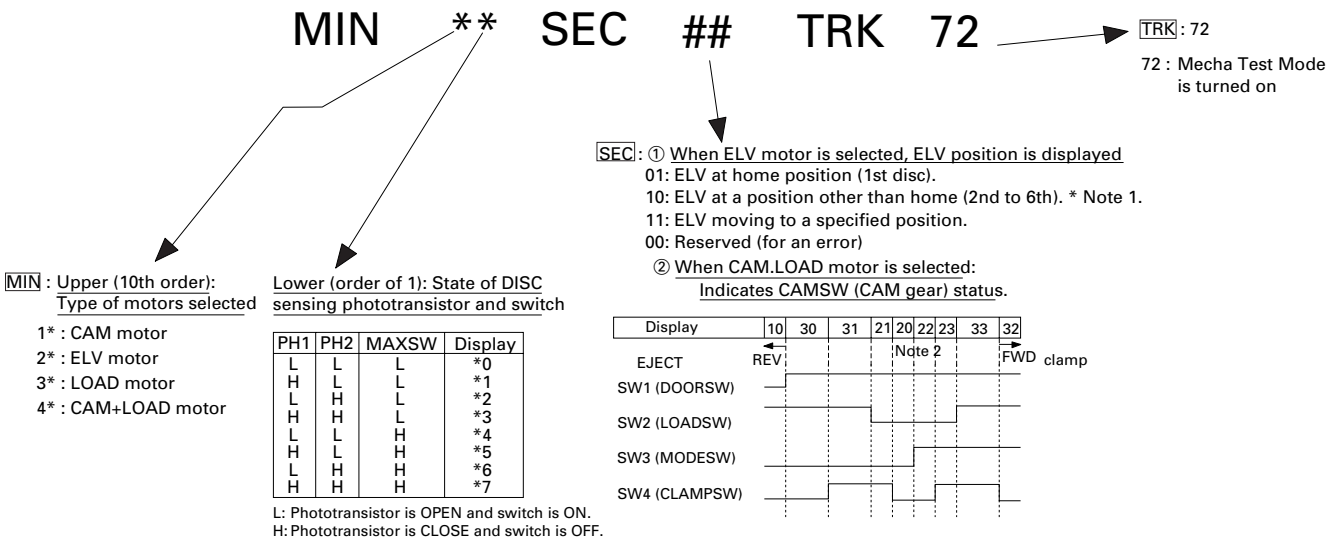


❑ Operating Procedures:

1) Turn on the CD Test Mode.
2) Press [DISC1 T-CLS] to turn on the Mecha Test Mode.
3) Select the motor to be driven using the [DISC1 T-CLS] to [DISC4 F-OPN] keys.
   MIN SEC TRK
   (X* ** 72)
4) Press the [TRK+ F-KICK] or [TRK– R-KICK] in this state to drive the selected motor.

[Key]	Operation
[SCAN REG-ON] 15 00H	Mechanism Test is initialized.
[TRK+ F-KICK] 15 01H	Valid only when the motor selected (using the [DISC1 T-CLS] to [DISC4 F-OPN] keys) is driven in FWD direction.
[TRK– R-KICK] 15 02H	Valid only when the motor selected (using the [DISC1 T-CLS] to [DISC4 F-OPN] keys) is driven in REV direction.
[DISC1 T-CLS] 15 03H	CAMMOTOR is selected.
[DISC2 T-OPN] 15 04H	ELVMOTOR is selected.
[DISC3 F-CLS] 15 05H	LOADMOTOR is selected.
[DISC4 F-OPN] 15 06H	CAM + LOADMOTOR is selected.

<Screen Display during Mecha Test Mode>



PH1	PH2	MAXSW	Display
L	L	L	*0
H	L	L	*1
L	H	L	*2
H	H	L	*3
L	L	H	*4
H	L	H	*5
L	H	H	*6
H	H	H	*7

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

An example when TRK 72, MIN 10 and SEC 31:

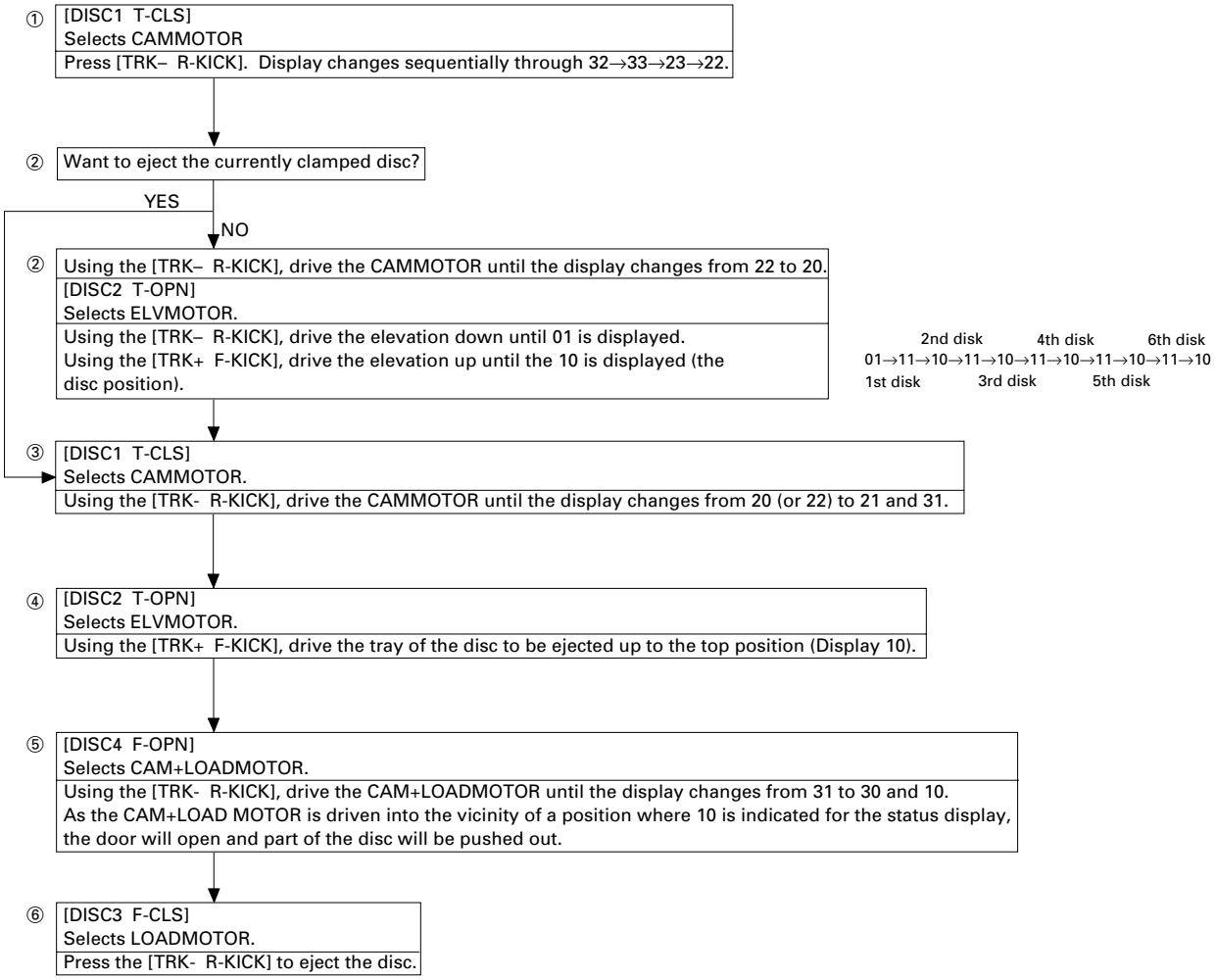
Test Mode is turned on from TRK 72.
CAMMOTOR is selected from 1 of MIN 10 and PH1/PH2 and MAX switch are set to L(low) from 0.
As for SEC 31, since CAMMOTOR is selected from MIN, CAM gear CLAMP switch is set to L (low) and others are H (high) from SEC①.

❑ Precautions

* The keys are inoperable as long as operation of the mechanism is continued.
* When driving the CAMMOTOR in 31 → 30 → 10 (in REV direction), the elevation position must be at the EJECT/LOAD position (the top position).

Note 1: When the elevation is situated at the Note 1 position, move of any motor other than the REV is disabled.
Note 2: 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.

❍ Operating Procedures for Ejecting a Clamped Disc



① Select CAMMOTOR using [DISC1 T-CLS], then press the [TRK– R-KICK] 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 [DISC2 T-OPN] ELVMOTOR 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 ELVMOTOR, lower the elevation until the ELV position display becomes 01 (1st disc) using the [TRK- R-KICK].
Drive the elevation up until the display is changed to 10 using the [TRK+ F-KICK] . 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 [DISC1 T-CLS] CAMMOTOR and then, using the [TRK+ F-KICK], drive it until the display changes from 20 (or 22) to 21 and 31.

④ Select the [DISC2 T-OPN] ELVMOTOR, then drive the tray of the disc to be ejected up to the EJECT/LOAD position (using the [TRK+ F-KICK]).

⑤ Select the [DISC4 F-OPN] CAM+LOADMOTOR, 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 [DISC3 F-CLS] LOADMOTOR, then drive it in REV direction until the disc is completely ejected.

● New Test Mode

Principally, discs are played normally in this test mode.

When the test mode has been turned on, it will indicate when (in absolute time) and why an error occurred. Errors include off-focus, spindle lock disengagement, unavailability of sub-code reading and sound skipping.

While the test mode setup is taking place, operational status (Internal RAM: CPOINT) of the CD control software is displayed.

(1) Turning On the New Test Mode

Refer to the Test Mode Flowchart on page 33.

(2) Display of Operational Status During Setup

Status No.	Contents	Protective Action
01	Carriage returning to home position	None
02	Carriage moving to inner perimeter	10-second time-out, failure on home switch.
03	Carriage moving to outer perimeter	10-second time-out, failure on home switch.
05	Carriage outer perimeter feed (1 second) taking place	None
11	Setup started	None
12	Spindle rotation Focus search started	None
13	Waiting for focus close (XSL = L)	Focus close not available
10	Waiting for focus close (FOK = H) (When AGC has not been conducted)	Improper focus close
14,15	Waiting for focus close (FOK = H) (When AGC has already been conducted)	Improper focus close
16,17	Focus CLOSE Tracking OPEN	Off-focus
18	T.BAL adjustment	Off-focus
19	Tracking CLOSE	Off-focus
1A	CLV Servo	Off-focus
1B	Process before AGC	Off-focus
1C	Focus AGC in progress	Off-focus
1D	Tracking AGC in progress	Off-focus
1E	Waiting for MIRR, LOCK and sub-code.(normal speed) Carriage close, servo applicable to CLV.	Off-focus, failure on MIRROR, spindle lock unavailable, sub-code unreadable.
21	Normal/Double speed switching	Off-focus
22	Waiting for MIRR, LOCK and sub-code Carriage close, servo applicable to CLV.(double speed)	Off-focus,failure on MIRR, spindle lock unavailable, sub-code unreadable.

* "Setup" denotes a series of operations from establishing the focus up to playing a disc.

(5) LCD Display Example

• While the setup is in progress

8-digit indication LCD

Min	Sec	TNo.
11	11	11

• The operation mode (PLAY, SEARCH, etc.) is identical with the normal mode.

• When a protection/error has occurred (8-digit indication LCD)

Display of occurrence No. and occurrence time (in absolute time)

Min	Sec	TNo.
40	05	10

● Error No. Display

The error mode is turned on if a CD player becomes not playable or is forced to halt due to an error. Cause(s) of an error will be indicated with numerical characters. The error-number-display function is intended to facilitate the error analysis and resulting repair work.

(1) Commander Indication

• Refer to the connection diagram on page 33.

(2) Error Message Indication

• High temperature detection

FC on MODE

• CD Operation Error(Electricity)

FD on MODE

Details for the error code are indicated on BIT(3).

• CD Operation Error(Mechanism)

FD on MODE

02 on BIT(3)

Details for the error code are indicated on MINUITE and SECOND.

(3) Error Code List(Electric)

code	Error	Contents	Details and Cause
80	C.HOME NG	Carriage home position NG	CRG doesn't move to inner track.CRG doesn't move from inner track →Home switch NG, CRG unmovable
40	LOCK NG	Spindle lock NG	Spindle doesn't lock →Spindle NG, flaws and dirt on the disc, have vibration.
20	MIRR NG	Mirror NG	MIRR signal is more than 100ms NG("H") →Dirt on the disc, disc upside down, have vibration and empty CD-R.
10	SETUP NG	Setup NG	AGC protection doesn't work out of focus. →Flaw and dirt on disc, have vibration.
08	SRCH TO	Search time out	Doesn't reach to the address. →CRG and tracking NG or flaws on the disc.
04	POWER ERR	Power NG	Power(VD) is shorted GND and shorted +B power supply. →SW transistor NG, power abnormal(connector NG)
01	SURF ERR	Surface error	Out of focus →Flaws and dirt on the back of CD. And have vibration. Disc with no CD-R. Disc is rarely up side down.

Code	Name	Description
20	Door OPENING	While the mechanism is in operation, should have been closed a door was opened.
21	Roller OFF time-out	4 seconds have elapsed before completing the roller OFF (the cam gear has not been rotated to the roller-OFF end position).
22	Roller SET time-out	4 seconds have elapsed before completing the roller SET.
	(Roller OFF time-out)	(During the roller OFF operation, 4 seconds have elapsed while the cam gear is rotating in REV direction.)
23	Door CLOSING	Door can't be closed when the roller OFF has ended.
24	Cam started from invalid position	The cam gear attempted to do roller OFF/roller SET from an invalid position.
26	Foreign substance on phototransistor (before closing the door)	Foreign substance was found on the phototransistor when closing the door after the loading is complete. An error will be indicated if the disc is still caught by the phototransistor after 4 seconds of forced eject.
29	Roller being caught	Although the cam gear has been rotated up to the roller OFF end position, the roller can't be moved to the standby position.
41	Lift DOWN time-out	4 seconds have elapsed before completing the lift DOWN operation.
42	Lift UP time-out	4 seconds have elapsed before completing the lift UP operation.
	(Lift DOWN time-out)	(During the lift DOWN operation, 4 seconds have passed with the cam gear rotating in REV direction.)
45	Lift DOWN cam displacement	The lift DOWN complete cam gear has been displaced from its specified position.
52	EJECT time-out	8 seconds have elapsed before completing the EJECT operation. An error will be indicated if the disc is still caught by the phototransistor after 4 seconds of forced eject.
55	HOME SW ON after forced EJECT	HOME SW was still at ON position after 4 seconds of forced eject.
57	Phototransistor being caught after forced EJECT	When forced eject was employed for the Bup failure during loading or ejection,an error will be indicated if the disk is still caught by the phototransistor after 4 seconds of forced eject.
61	CRGIN time-out	10 seconds have elapsed before completing CRGIN operation.
	(CRGOUT time-out)	(During CRGOUT operation, 10 seconds have elapsed with the cam gear rotating in REV direction.)
62	CRGOUT time-out	10 seconds have elapsed before completing the CRGOUT operation.
65	CRGOUT cam displacement	Position of the CRGOUT complete cam gear has been displaced.
71	ELVUP time-out	2 seconds have elapsed before completing 1-stage UP.
72	ELVDN time-out	2 seconds have elapsed before completing 1-stage DOWN.
74	ELV displacement	At the start of ELV, ELVSNS was not set to low. (In case of starting from the 1st floor, ELHOME was not set to low.)
75	ELV counting error	HLHOME was set to low though not on the 1st floor. (There is a conflict between the floor number stored on the microcomputer and the actual floor number.)
91	LOAD time-out	8 seconds have elapsed before completing the LOAD. An error will be indicated if the disc is still caught by the phototransistor after 4 seconds of forced eject.
96	Settlement of foreign substance	Unauthorized foreign substance such as 8 cm disc has been loaded. An error will be indicated if the disc is still caught by the phototransistor after 4 seconds of forced eject.

7.1.2 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.
   1. 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.

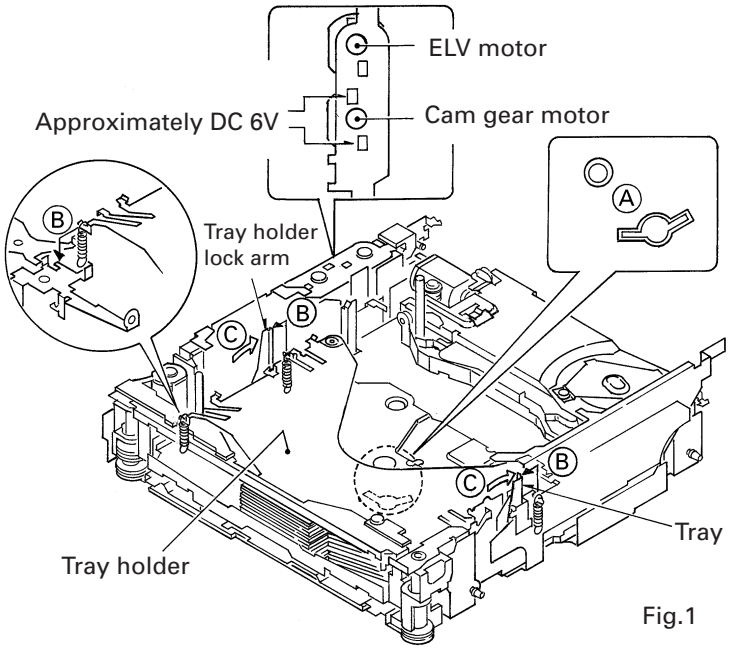


Fig.1

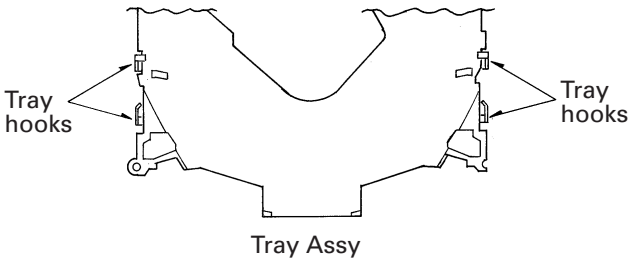


Fig. 2

● 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 Side PCB.
3. Disconnect the flexible PCBs from the connectors CN863 and CN864.
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.3.)

* 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.

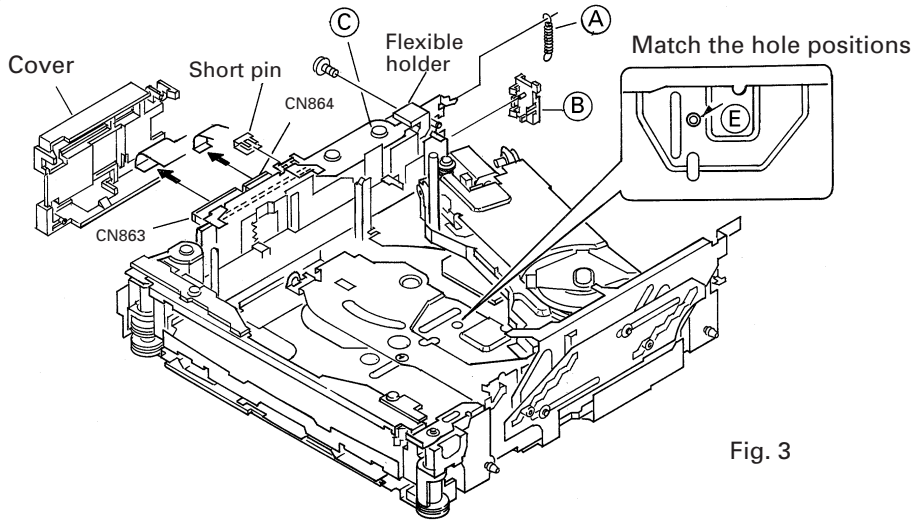


Fig. 3

10. Remove the screw, pressure spring and collar. Lift up the Carriage mech assy to remove it.
    * Screw tightening torque: 2.6kgfcm

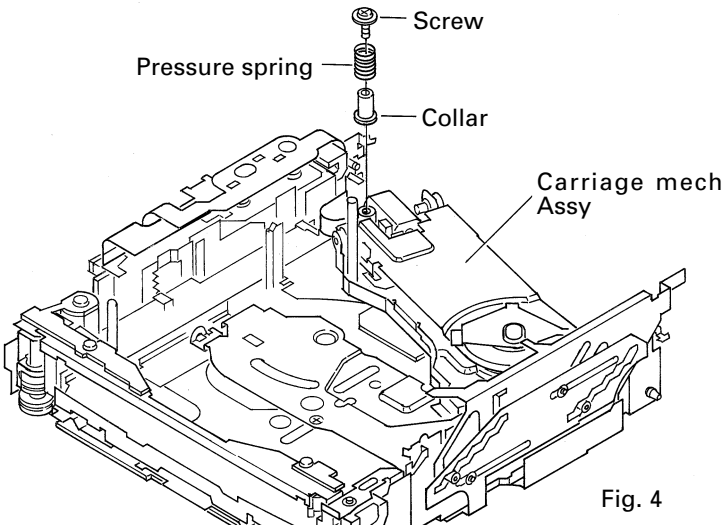


Fig. 4

● How to remove the Pickup unit

1. Remove the pulling spring, torsion spring and E type washer. Then remove the Clamper arm.

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

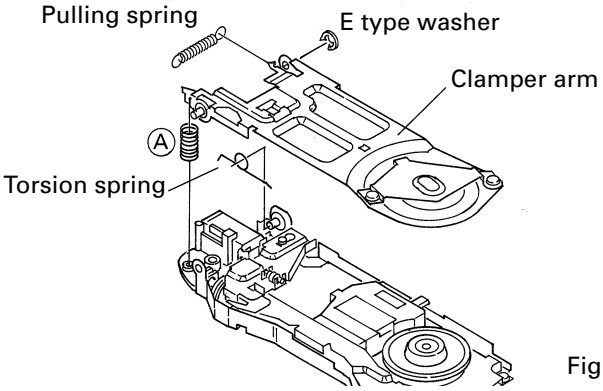


Fig. 5

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.

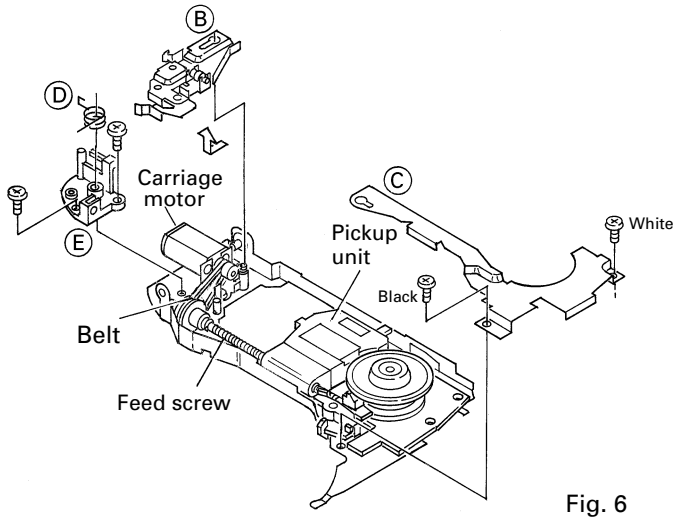


Fig. 6

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

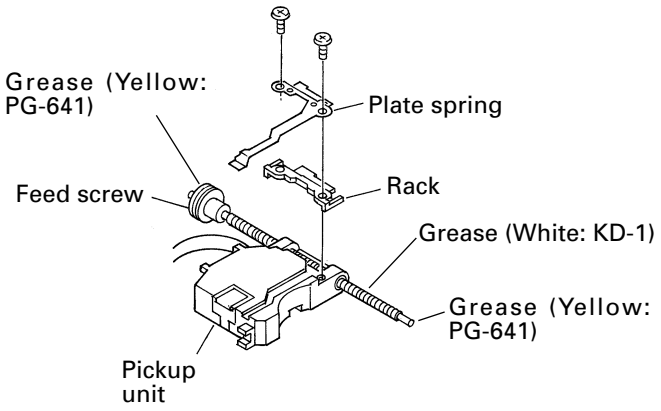


Fig. 7

● 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.

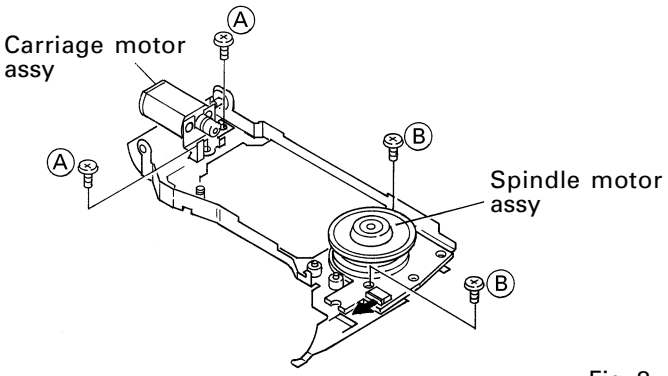


Fig. 8

● How to remove the Cam gear motor and ELV motor

1. Insert a short pin into the Pickup flexible PCB. (See Fig. 3)
   Remove the Cover from the Side PCB. (See Fig. 3)
   Disconnect the flexible PCBs from the connectors CN863 and CN864. (See Fig. 3)
2. Disconnect the the flexible PCB (Motor PCB(A)) from the connector CN862 on the Side PCB.
3. Disconnect the flexible PCB from the connector CN861 to the CD core unit.
4. Loosen the 2 screws (A). Remove the Side PCB.
5. Loosen the screw (B). Remove the flexible PCB holder.
6. De-solder at the 4 portions (C). Remove the Motor PCB(A)

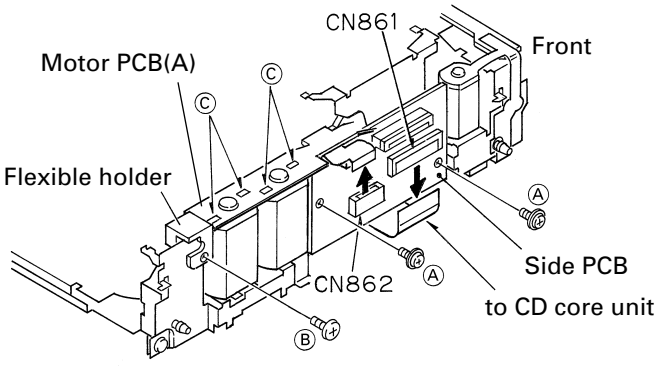


Fig. 9

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

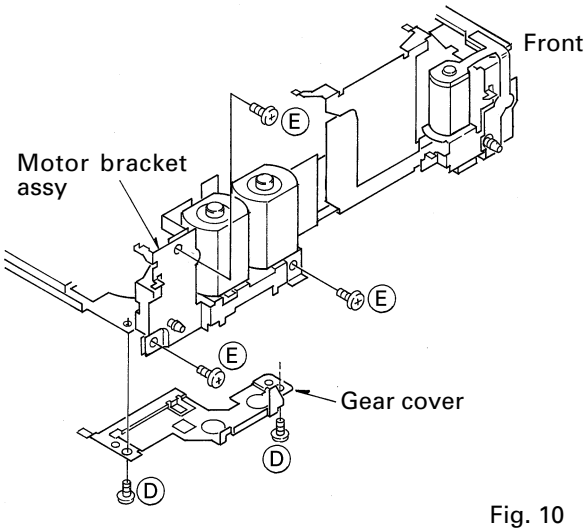


Fig. 10

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

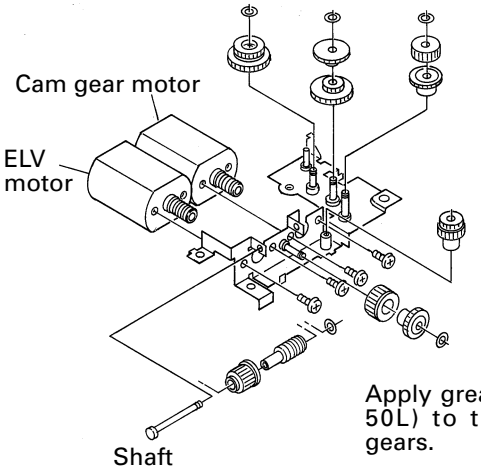


Fig. 11

● How to remove the Loading motor

1. Insert a short pin into the flexible PCB of the Pickup unit.(See Fig. 3)
   Remove the Cover from the Side PCB. (See Fig. 3)
   Disconnect the flexible PCBs from the connectors CN863 and CN864. (See Fig. 3)
   Disconnect the the flexible PCB (Motor PCB (A)) from the connector CN862 on the Side PCB. (See Fig. 9)
   Loosen the 2 screws (A). Remove the Side PCB.
2. Unhook the spring. Remove the Door open lever.
3. Loosen the 3 screws. Remove the Photo(L) PCB, PCB unit(C) and the frame.
4. Remove the spring (A).

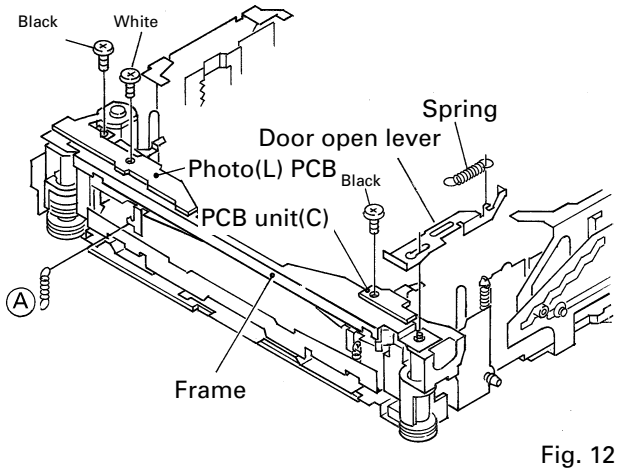


Fig. 12

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.

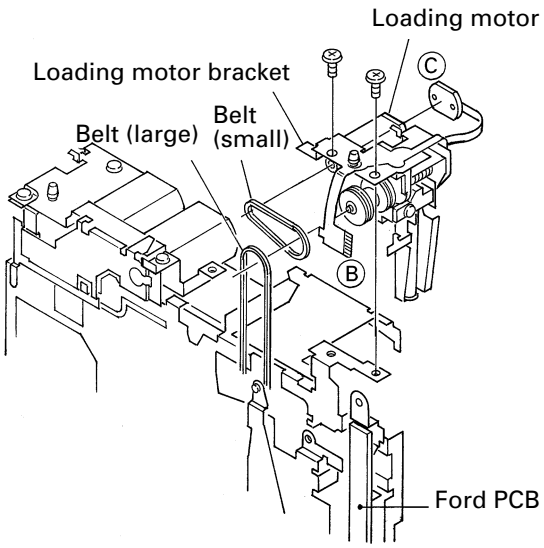


Fig. 13

● How to remove the Stage Mech Assy

1. Remove the Tray holder and the Tray assy. (See Fig. 1)
   Remove the Carriage mech assy. (See Fig. 3 and 4)
   Remove the Side PCB. (See Fig. 9)
   Remove the Motor PCB (A). (See Fig. 9)
   Remove the Gear cover. (Fig. 10)
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

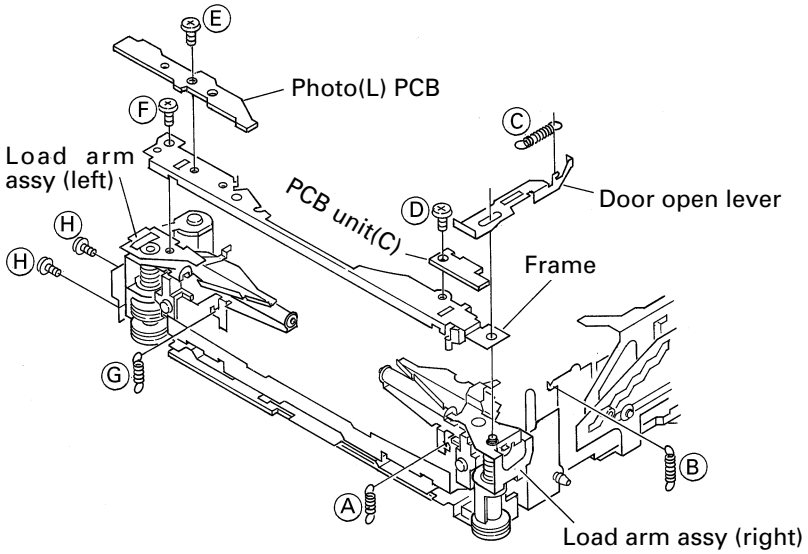


Fig. 14

(left) including the Loading motor.

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

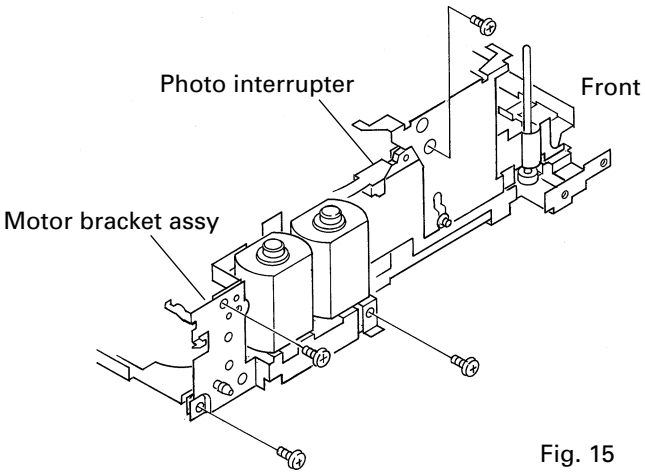


Fig. 15

9. Remove the 4 E type washers (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).

(Pay attention to the mounting direction.)

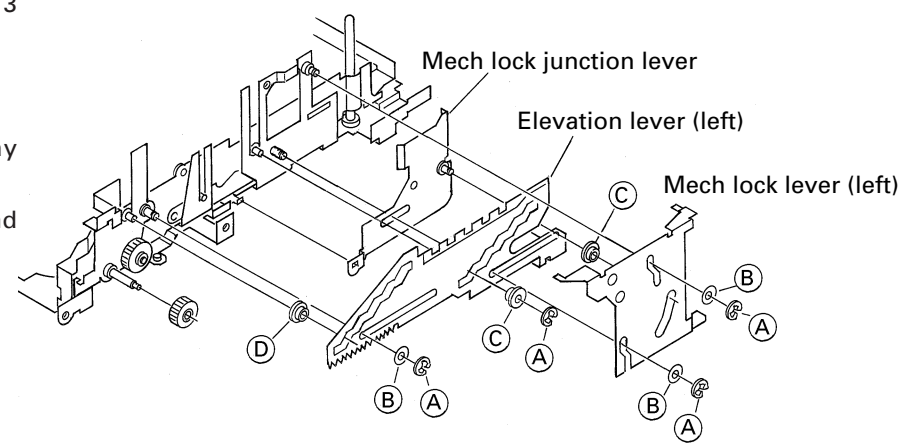


Fig. 16

14. Remove the 2 E type washers (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.

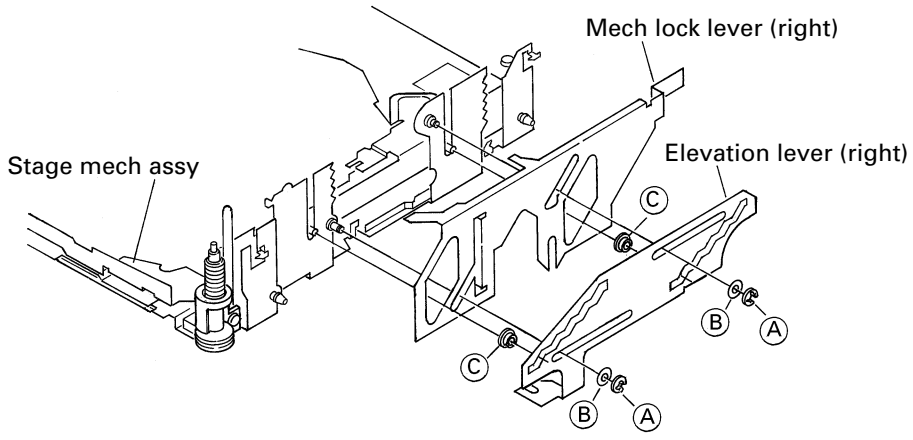


Fig. 17

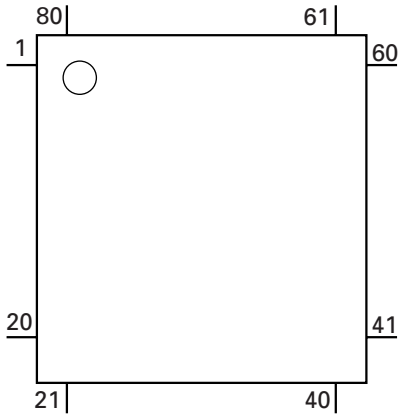
7.2 IC

● **Pin Functions (PD5467B)**

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	$\overline{DCE}$	O	COMP IC chip enable
4	NC		Not used
5	CLMPSW	I	Disk clamp sense input
6	ELHOME	I	Elevation reset sense input
7	XSCK	O	LSI clock output
8	XSO	O	LSI data output
9	XSI	I	LSI data input
10	$\overline{XSTB}$	O	LSI strobe output
11	$\overline{XRST}$	O	LSI reset output
12	XA0	O	LSI data discernment control signal output
13-15	NC		Not used
16	CSCD	I	F-BUS chip select input
17	LOADSW	I	Loading sense input
18	MODESW	I	Elevation OK input
19	SCK	I/O	F-BUS serial clock input/output
20	MISO	O	F-BUS data output
21	MISI	I	F-BUS data input
22	$\overline{BRST}$	I	F-BUS reset input
23	SBSY	I	Signal indicating head of subcode block input
24	CNVSS		CPU mode select
25	$\overline{RESET}$	I	Reset input
26	POWER	O	+5V 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
31–37	NC3-9	O	Key strobe output
38	CSEL	I	COMP select input
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	CDSRQ	O	F-BUS SRQ/ACK output
48,49	NC		Not used
50	XWRE	O	DRAM data white enable output
51	XRDE	O	DRAM data read enable output
52	XQOK	O	SUB-Q OK output
53	EMPH	O	DAC EMPH output
54	SCONT	O	Double speed select output
55	LOAD	O	PHOT power supply control output
56	CDMUTE	O	Mute output
57,58	LO2,LO1	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	FOK signal input
66-68	NC		Not used
69	ADENA	O	A/D reference voltage control output
70	NC		Not used
71	VCC		Power supply terminal

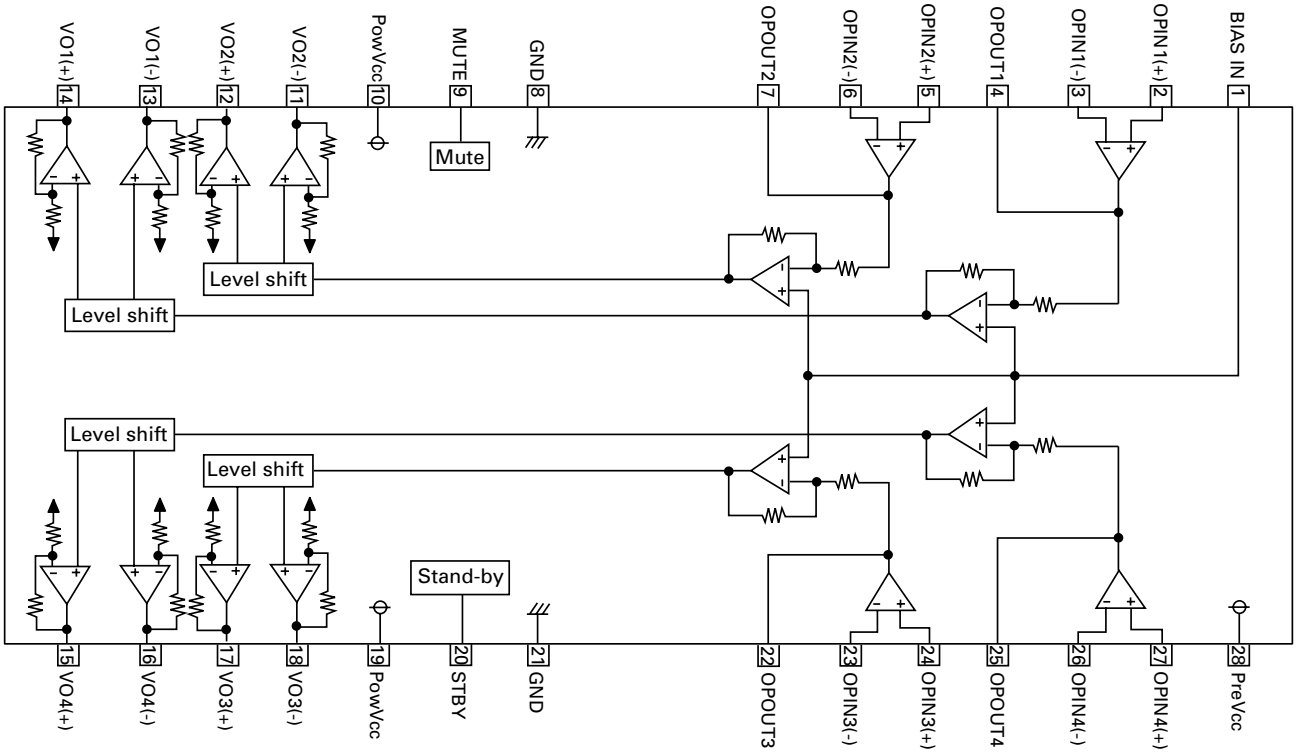
Pin No.	Pin Name	I/O	Function and Operation
72	VREF	I	A/D converter reference voltage input
73	AVSS	I	A/D converter GND
74	ADRMON	I	DRAM memory remaining monitor input
75	EREF	I	DRAM A/D converter reference voltage input
76,77	PH1,2	I	Disc photo sense input
78	MAXSW	I	MAX switch input
79	ELVSNS	I	ELV position sense input
80	TEMP	I	Temperature detector input

*PD5467B

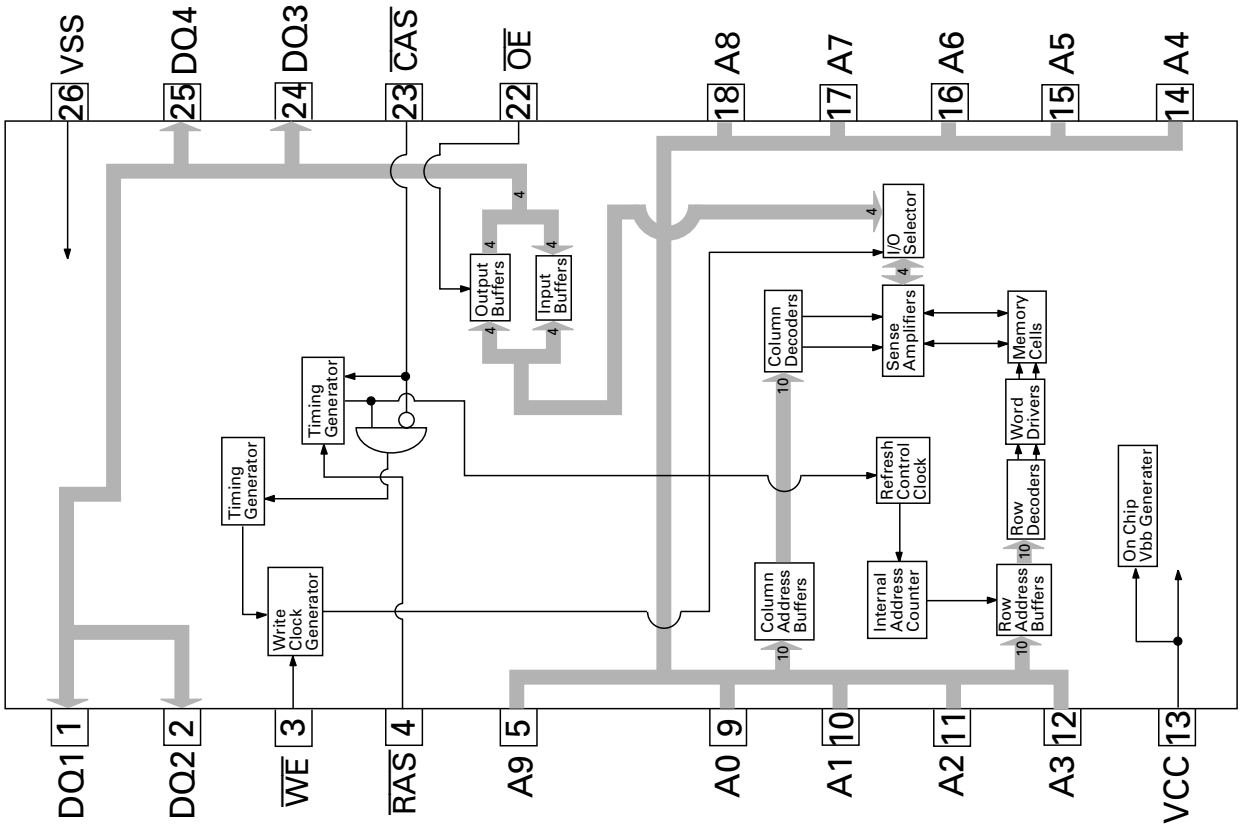


IC's marked by* are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

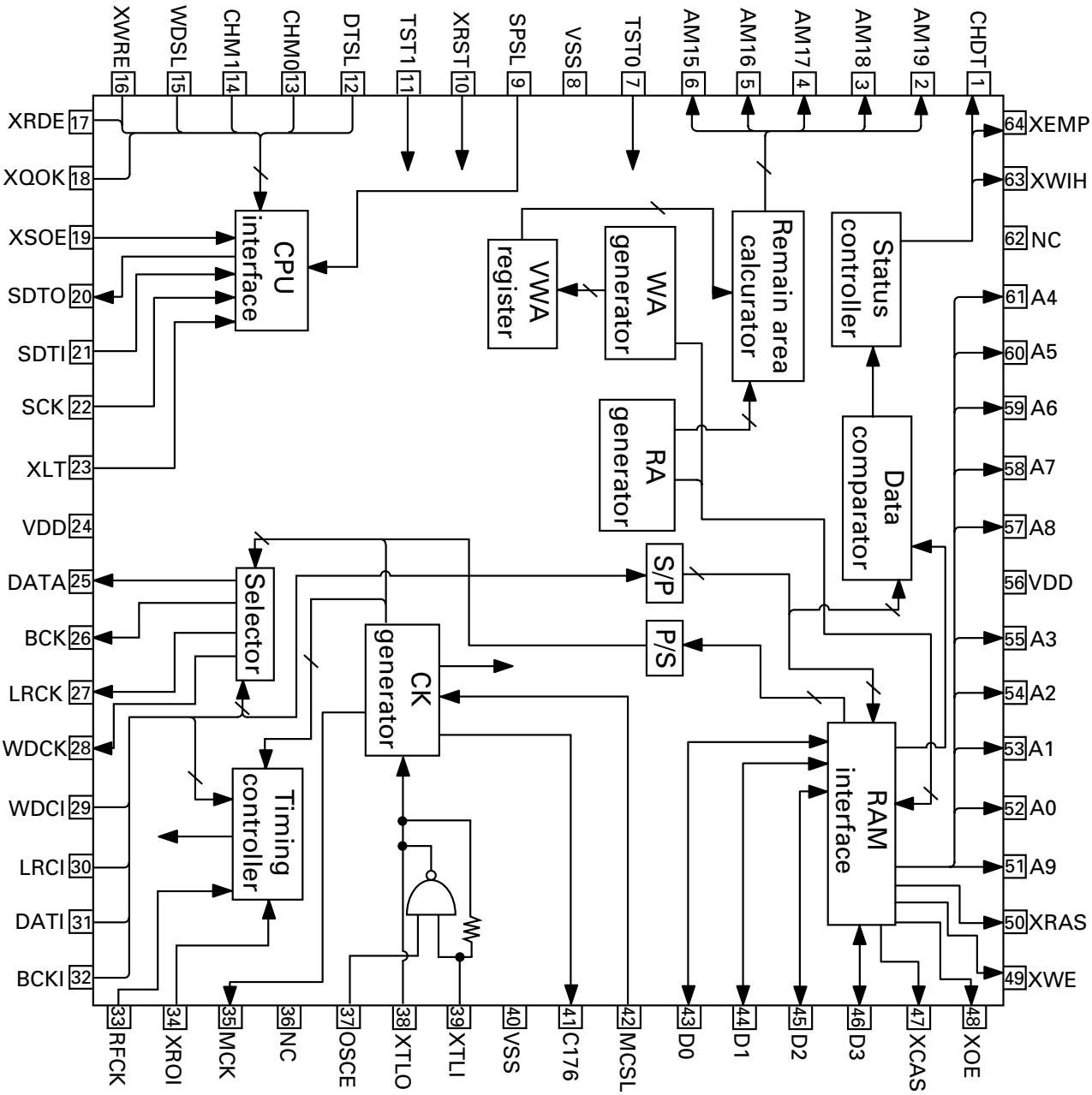
BA5986FM



MSM514400DP-60TS



CXD2511R


XWRE 16
WDSL 15
CHM1 14
CHM0 13
DTSL 12
TST1 11
XRST 10
SPSL 9
VSS 8
TST0 7
AM15 6
AM16 5
AM17 4
AM18 3
AM19 2
CHDT 1
XRDE 17
XQOK 18
XSOE 19
SDTO 20
SDTI 21
SCK 22
XLT 23
VDD 24
DATA 25
BCK 26
LRCK 27
WDCK 28
WDCI 29
LRCI 30
DATI 31
BCKI 32
64 XEMP
63 XWIH
62 NC
61 A4
60 A5
59 A6
58 A7
57 A8
56 VDD
55 A3
54 A2
53 A1
52 A0
51 A9
50 XRAS
49 XWE
CPU interface
VWA register
WA generator
Remain area calcurator
Status controller
RA generator
Data comparator
S/P
P/S
Selector
CK generator
Timing controller
RAM interface
33 RFCK
34 XROI
35 MCK
36 NC
37 OSCE
38 XTLO
39 XTLI
40 VSS
41 C176
42 MCSL
43 D0
44 D1
45 D2
46 D3
47 XCAS
48 XOE

7.3 EXPLANATION

7.3.1 CIRCUIT DESCRIPTIONS

1 Preamplifier (UPC2572GS: IC101)

The preamplifier processes pickup output signals to generate signals to be sent to the servo, demodulator, and controller. The preamplifier with built-in photodetector converts signals from the pickup into intermediate voltage in the pickup. Then, addition is made in the RF amplifier (IC101) to obtain RF, FE, TE, and TE zero cross signals. The system consists of the UPC2572GS and other components explained below. The system uses a single power source (+5 V). Therefore, the reference voltage of IC101 and the reference voltage of the power unit and servo circuit are REFOUT (+2.5 V). REFO UT is obtained from REFOUT of servo LSI (IC201: UPD63702GF) via a buffer, and is output from Pin 19 of IC101. This REFOUT is used as reference for all measurements.

Note:Do NOT short-circuit REFOUT and GND during measurement.

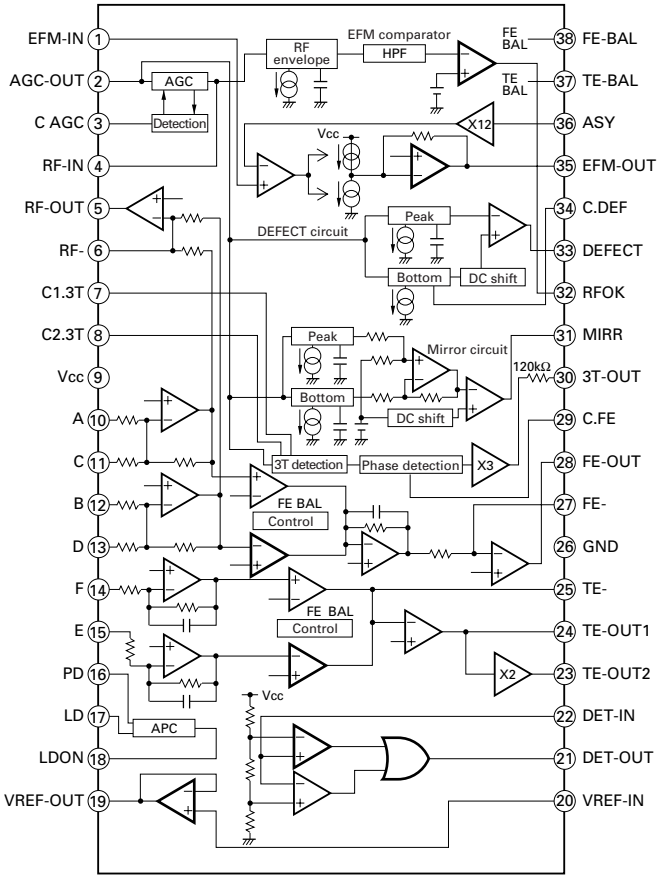


Fig. 1 Block Diagram of UPC2572GS

1) Automatic Power Control (APC) circuit

Laser diode has negative temperature characteristics with great optical output when the diode is driven with constant current. Therefore, current must be controlled by a monitor diode to ensure constant output. Thus functions the APC circuit. LD current can be obtained by measuring the voltage between LD1 and GND. The current value is approximately 35 mA.

$$\text{LD current(mA)} = \frac{\text{Voltage between LD1 and GND(mv)}}{10\ \Omega + 12\ \Omega}$$

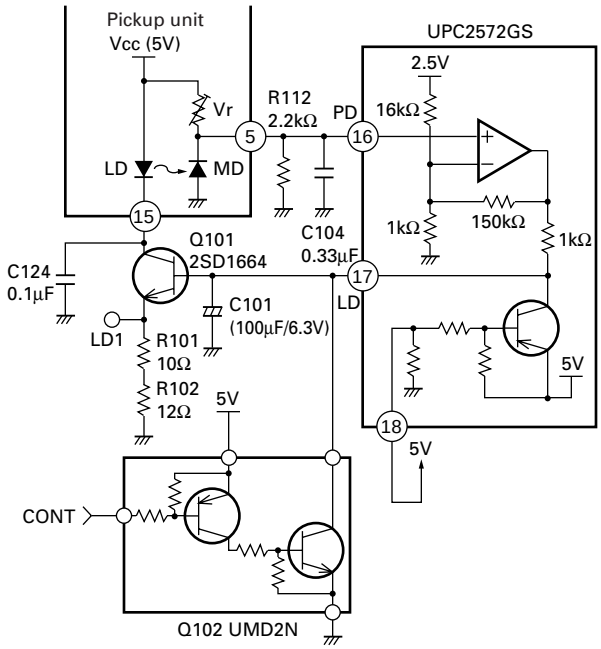


Fig. 2 APC Circuit

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.

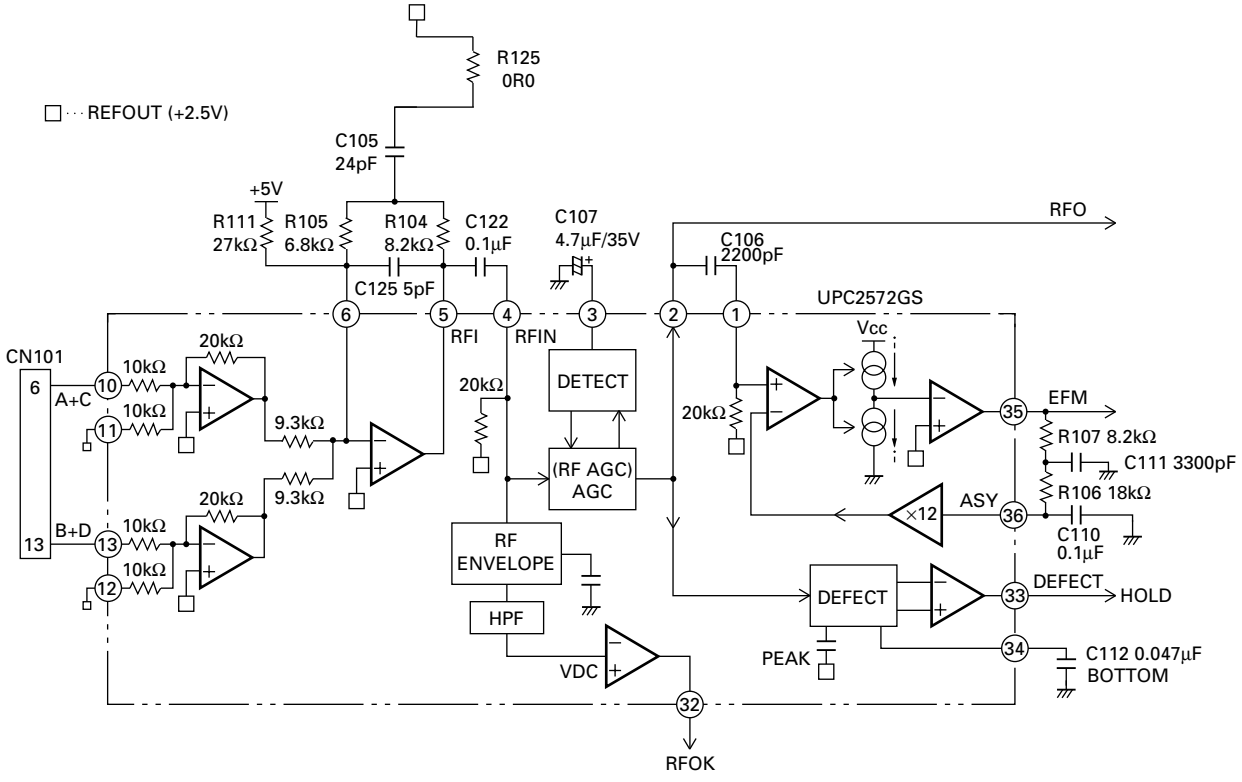


Fig. 3 RF AMP, RF AGC, EFM, DFCT, RFOK Circuit

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:

$$FEY=(A+C)-(B+D)\times\frac{20k\Omega}{10k\Omega}\times\frac{90k\Omega}{68.8k\Omega}\times\frac{R108}{17.2k\Omega}$$

: (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.

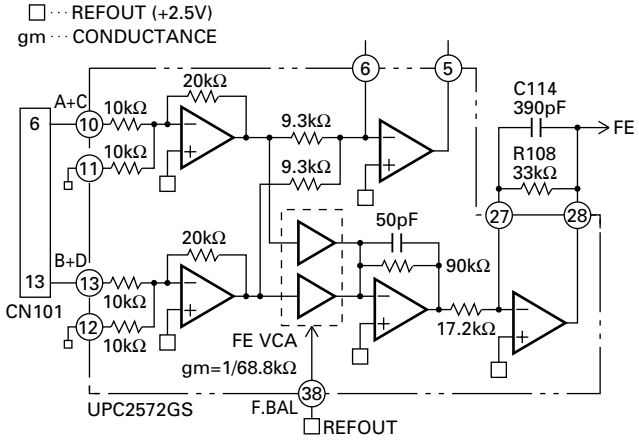


Fig. 4 Focus-error amplifier

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:

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

: (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.

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.

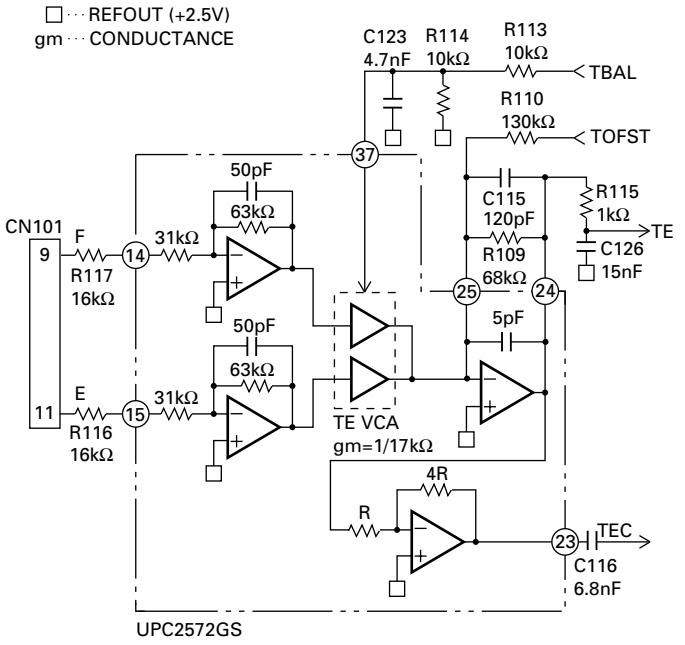


Fig. 5 Tracking-error amplifier, Tracking zero-cross amplifier

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.

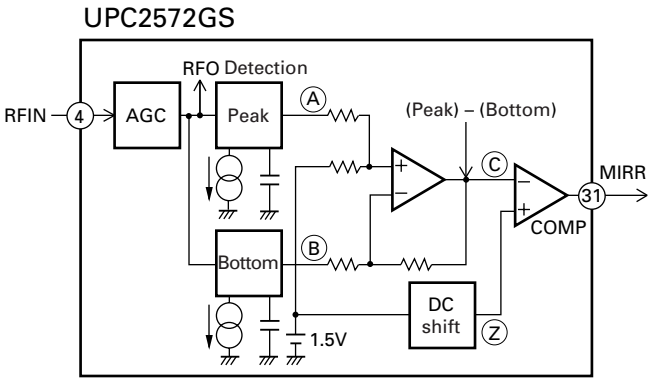


Fig.6 MIRR Circuit

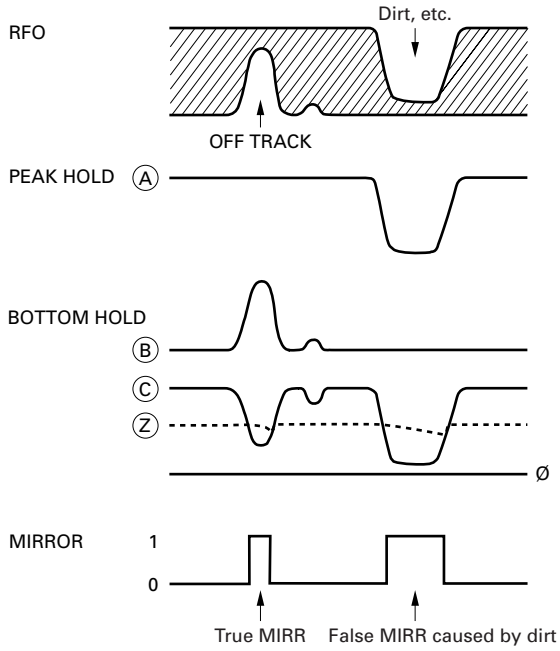


Fig. 7 MIRR Circuit

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 fc of 40 Hz. This signal is used for automatic adjustment of FE bias.

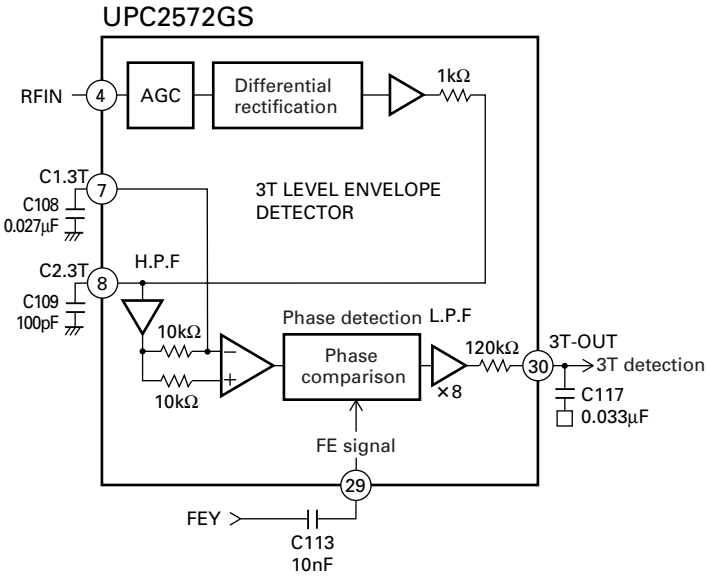


Fig. 8 3T OUT Circuit

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)

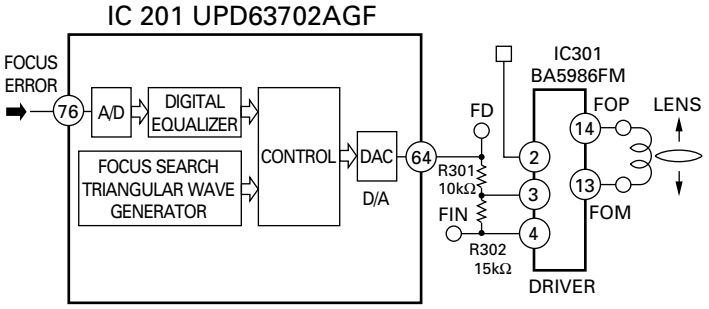


Fig. 9 Focus servo block diagram

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.

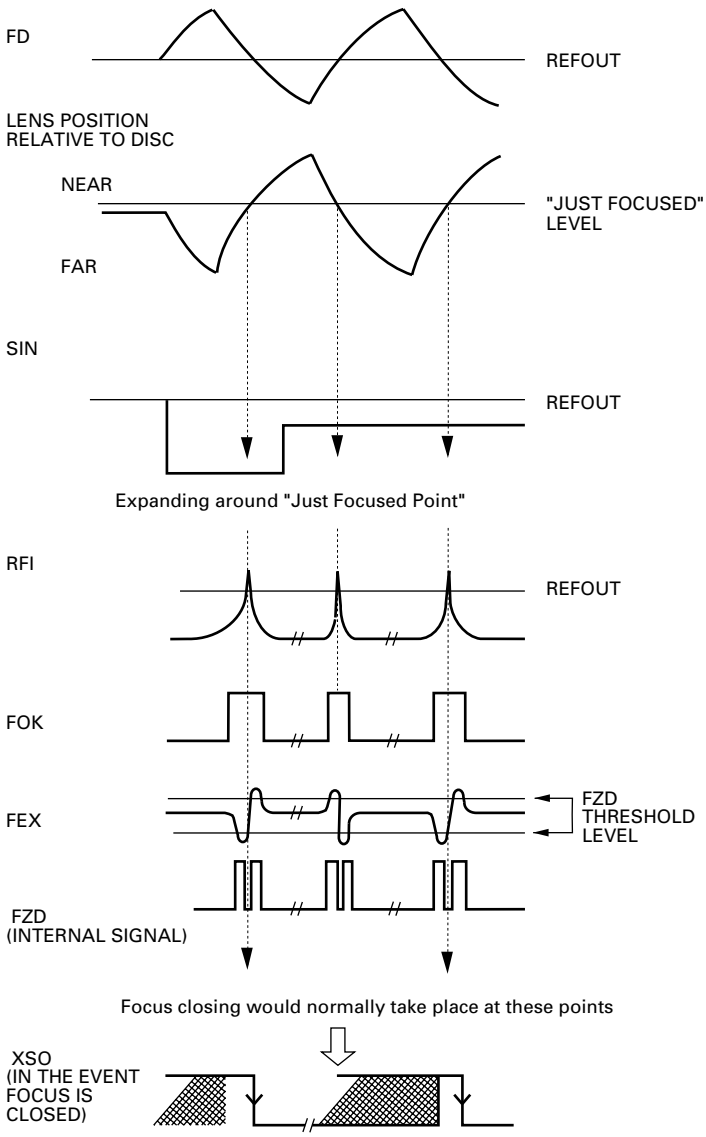


Fig. 10 Sequence of Focus Closing

2) Tracking servo system

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

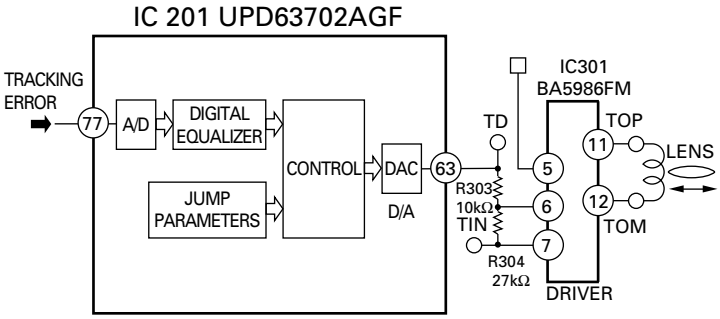


Fig. 11 Tracking servo block diagram

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 microcomputer 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.

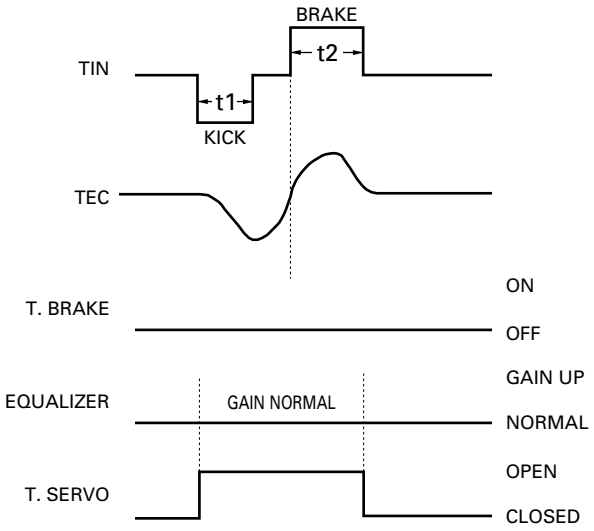


Fig. 12 Single track jump

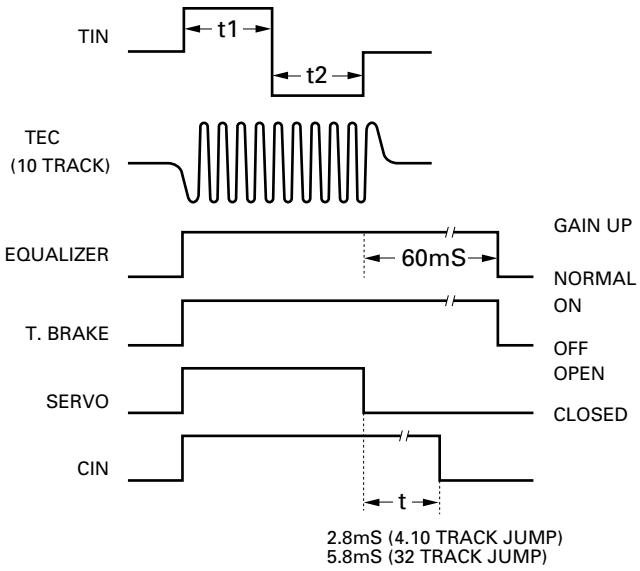
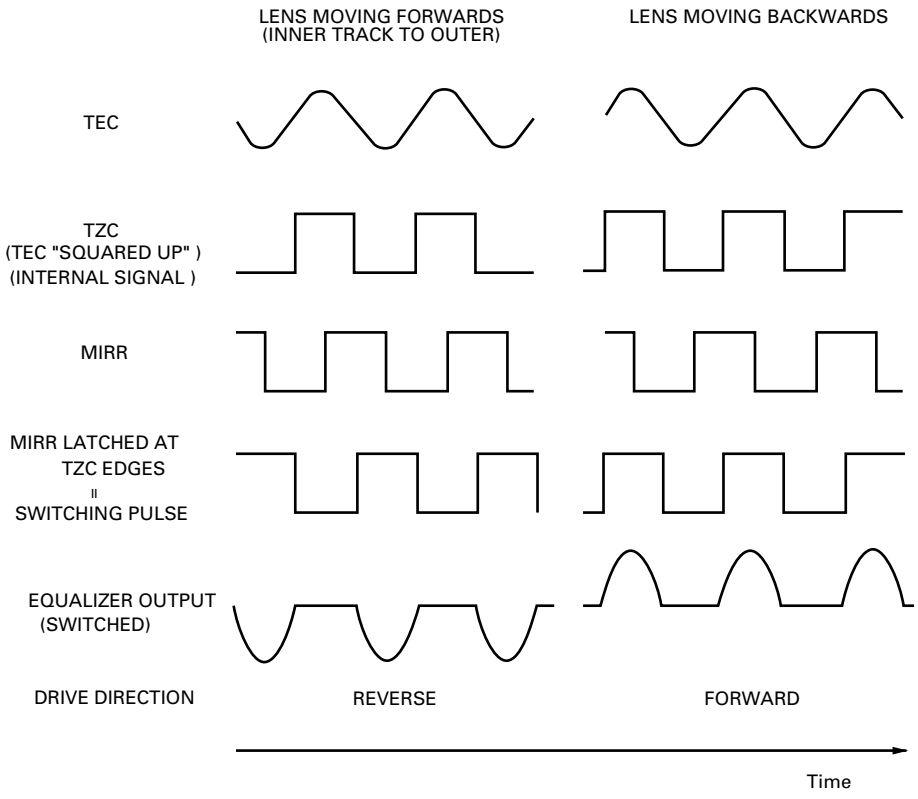


Fig. 13 Multi track jump

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 offset 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.

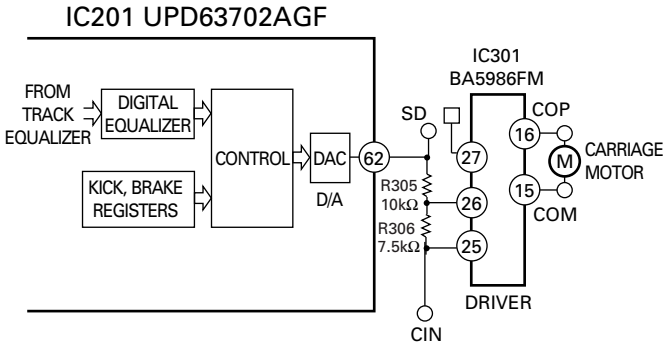


Fig. 15 Carriage Servo Circuit

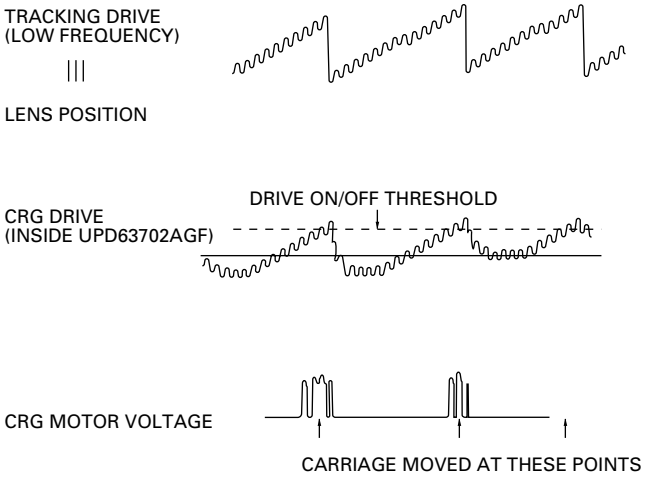


Fig. 16 Carriage Signal Waveforms

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 comple tion 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.

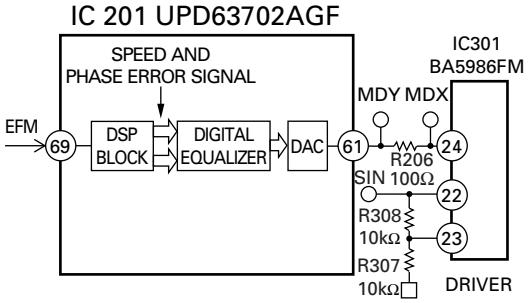


Fig. 17 Spindle servo block diagram

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:

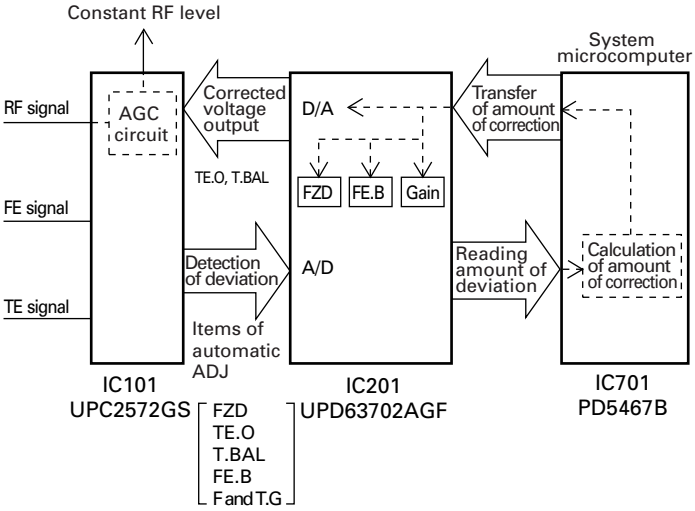


Fig. 18 Outline of Automatic Adjustment

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:

TOFST2 = TOFST1 + TE1 x R110 / 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 3 x 40 mV = 120 mV
Corrected amount is approximately +120 mV.
Thus, FE offset before adjustment is -120 mV.

(2)Adjustment of F and T gain
Reference: Focus = 20, tracking = 20
The amount of reduced gain in comparison with the reference is known by looking at the coefficient dis played.
Example: AGC coefficient = 40
Amount of reduced gain = 20 log (20/40) = -6dB

4 Power Supply and Mechanism Control

The power supply VM (7.5V) is produced from the power supply VD (9.0V) supplied from the Commander , 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.

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.

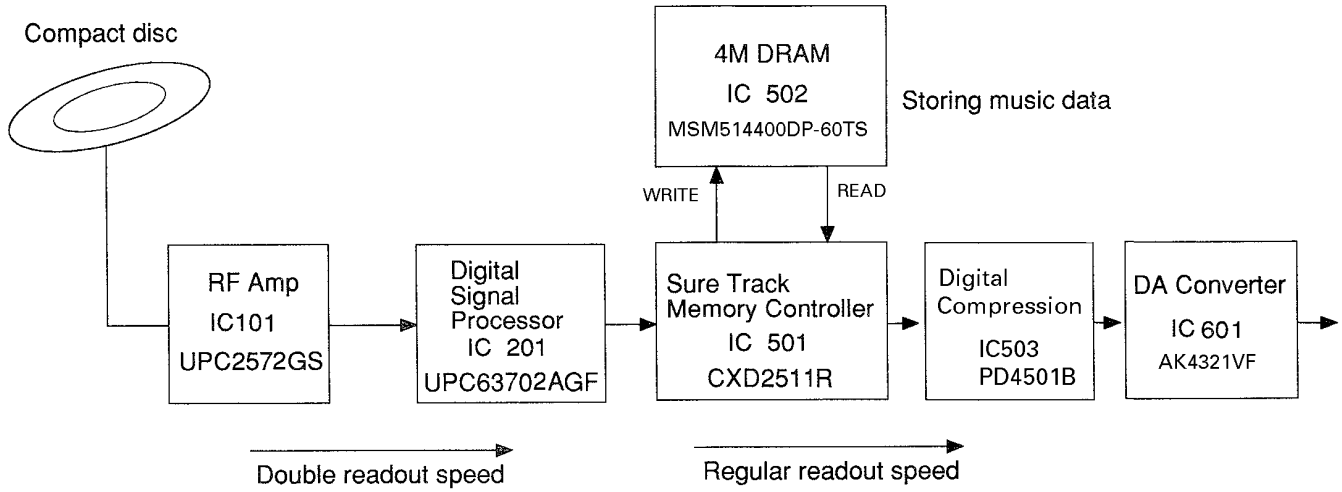


Fig. 19

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.

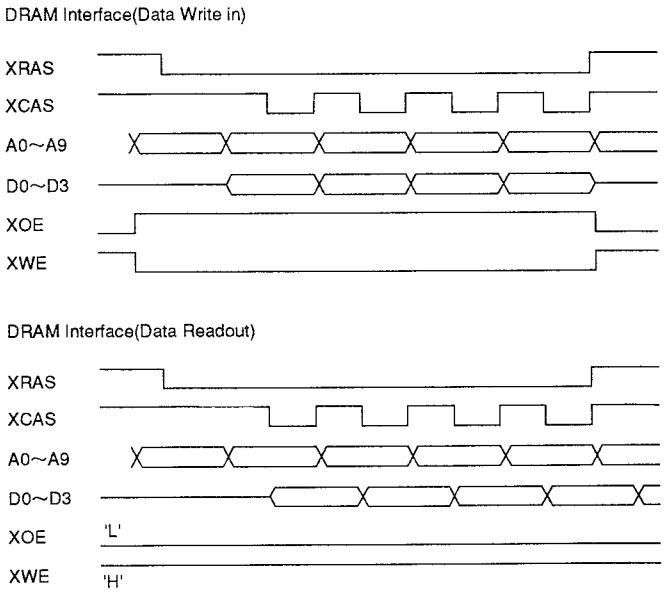


Fig. 20 TIMING CHART

7.3.2 MECHANISM OPERATIONS

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.

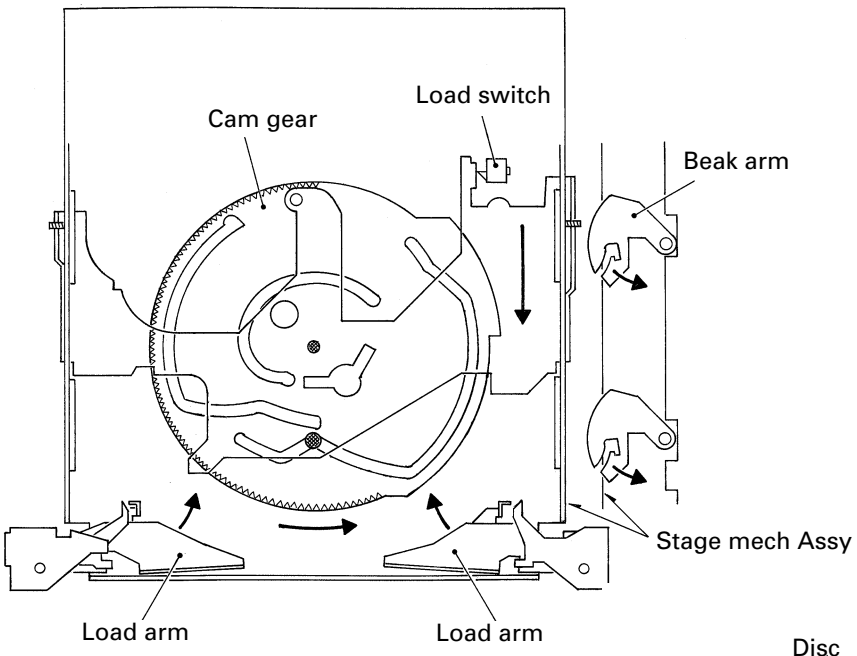


Fig. 21: Elevation OK position

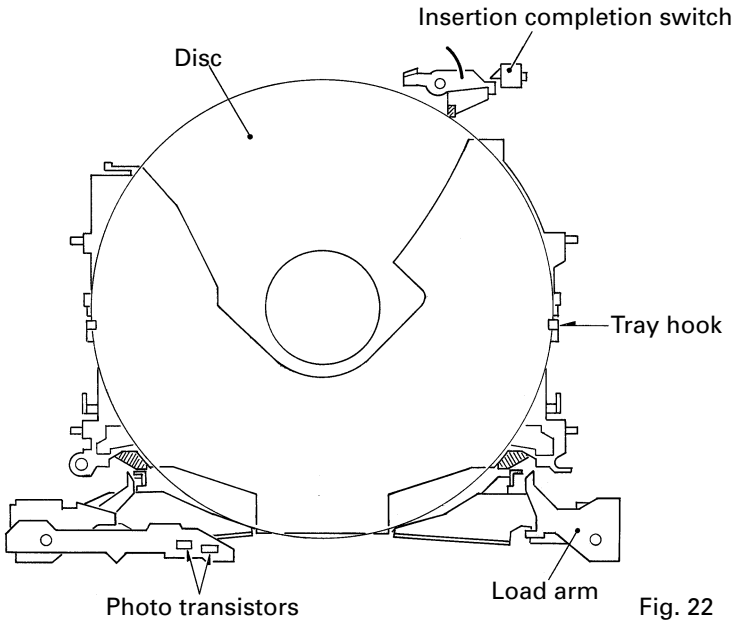


Fig. 22

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 vertical holes in the Main chassis via the rollers.
e) When the elevation levers slide, the Stage Mech Assy moves up and down.

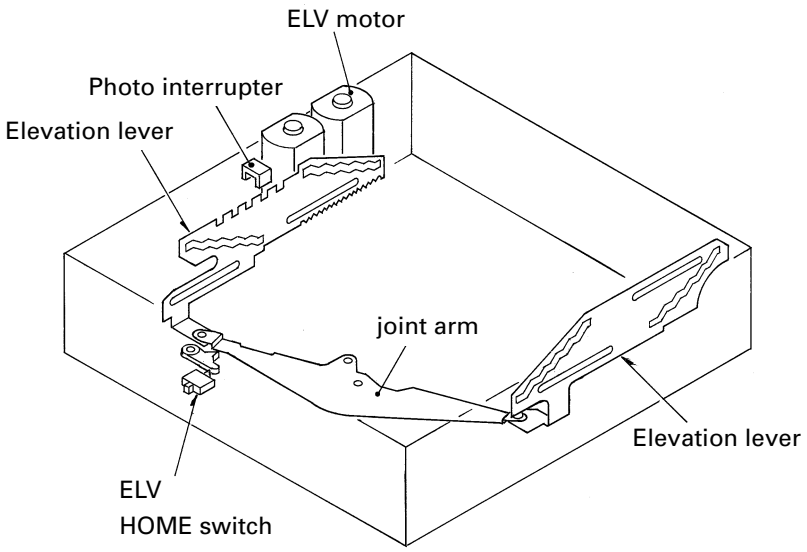


Fig. 23

3 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 ELV HOME switch is turned on (not detected by the photo interrupter).

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.

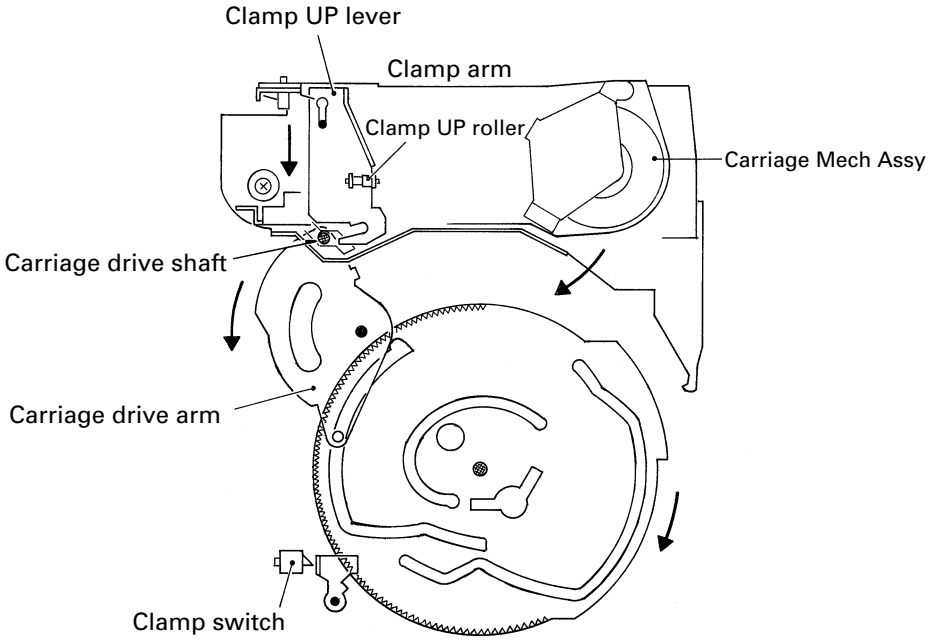


Fig. 24

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 robber rollers, the disc pushes the insertion completion switch via the arm to sense that a disc is loaded.

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 stops.

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.

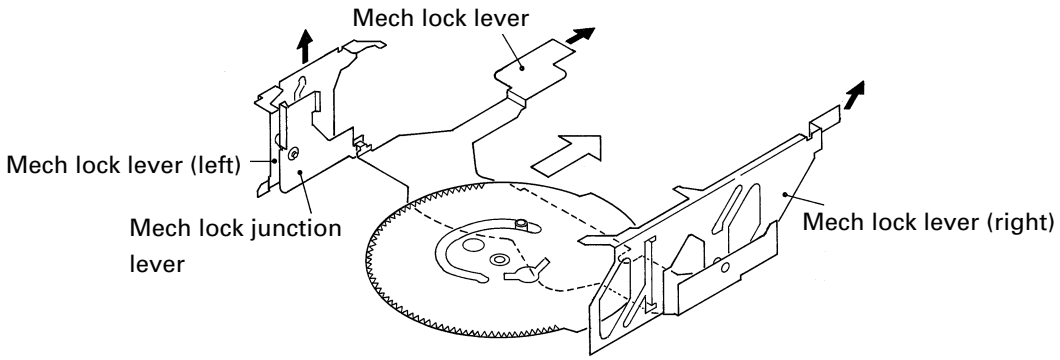


Fig. 25

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.

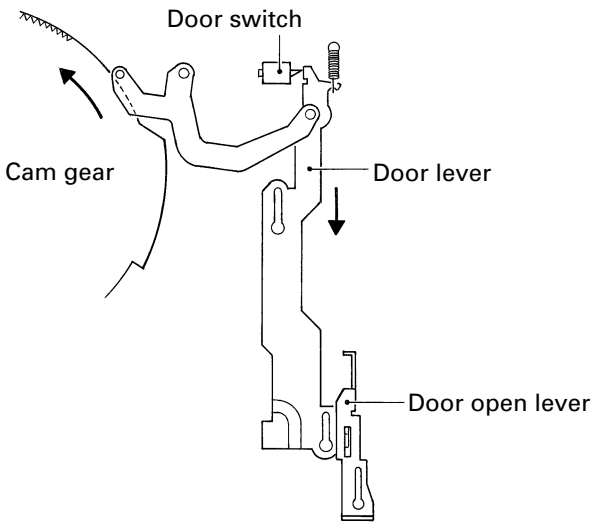


Fig. 26

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.

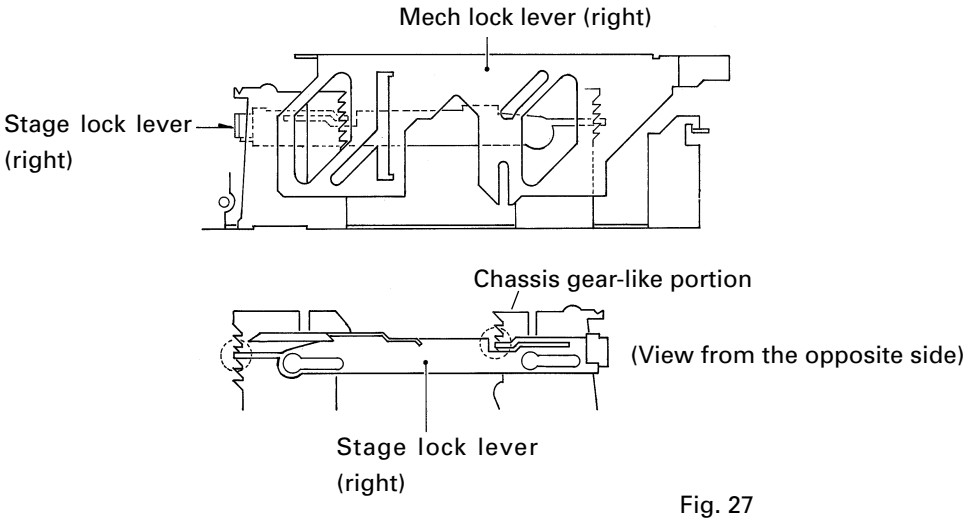


Fig. 27