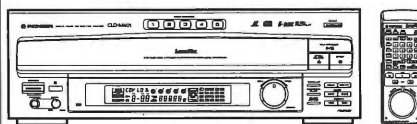


Service Manual



ORDER NO.
ARP2510

MULTI-PLAY CD CDV/LD PLAYER

CLD-M401

CLD-M301

CLD-M450

CLD - M401, CLD - M301 AND CLD - M450 HAVE THE FOLLOWING :

Type	Model			Power Requirement	Remarks
	CLD - M401	CLD - M301	CLD - M450		
KUC	○	○	-	AC120V only	
KUC/CA	○	○	-	AC120V only	
SD	-	-	○	AC110V/120-127V/220V/240V (switchable)	

- This manual is applicable to the following : CLD - M401/KUC, KUC/CA ; CLD - M301/KUC, KUC/CA and CLD - M450/SD.
- For the following : CLD - M401/KUC/CA ; CLD - M301/KUC, KUC/CA and CLD - M450/SD, refer to page 89.
- For the circuit and mechanism descriptions, refer to the service manual ARP2306 for CLD - M90.
- KUC/CA type is identical to KUC type with French operating instruction. For all information except for the instruction, refer to KUC type.

CONTENTS

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2. PACKING AND PARTS LIST	3	8. DISASSEMBLY	85
3. EXPLODED VIEWS AND PARTS LIST	4	9. FOR CLD-M401/KUC/CA, CLD-M301/KUC, KUC/CA AND CLD-M450/SD TYPES	89
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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

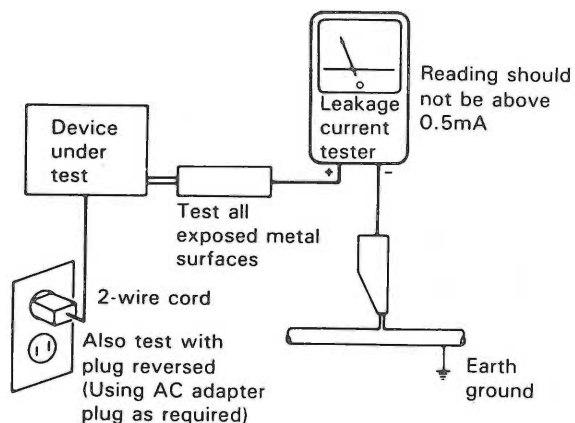
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

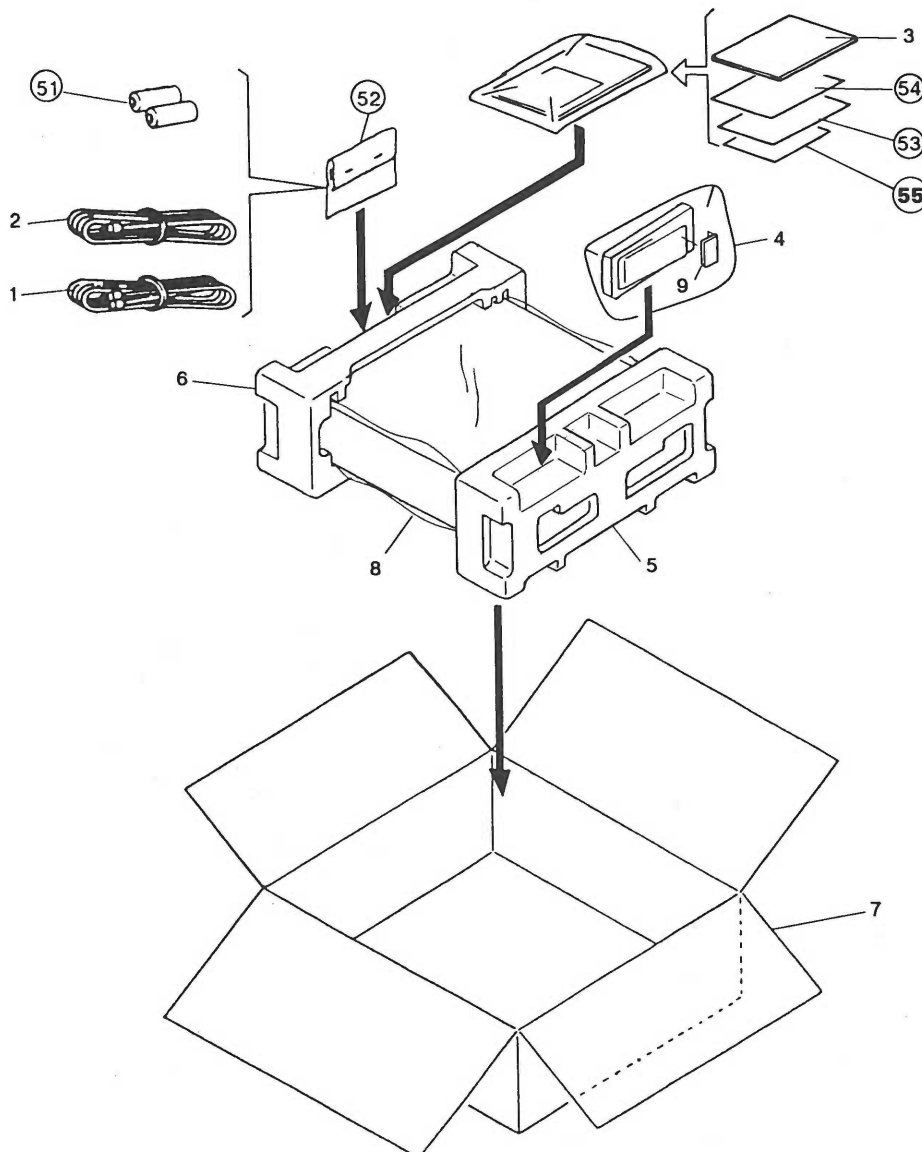
2. PACKING AND PARTS LIST

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
1	Connection cord	VDE-055	NSP 51	Dry cell battery(R03, AAA)	VEM-022
2	Video cable	VDE-056	NSP 52	Polyethylene bag	VHL-014
3	Operating instructions (English)	VRB1070	NSP 53	Caution card	VRR1009
4	Remote control unit	VXX1736	NSP 54	Caution card(UC)	VRM1026
5	Pad(F)	VHA1107	NSP 55	Warranty card	ARY1044
6	Pad(R)	VHA1108			
7	Packing case	VHG1215			
8	Mirror mat	VHL1012			
9	Battery cover	DNK2286			



3. EXPLODED VIEWS AND PARTS LIST

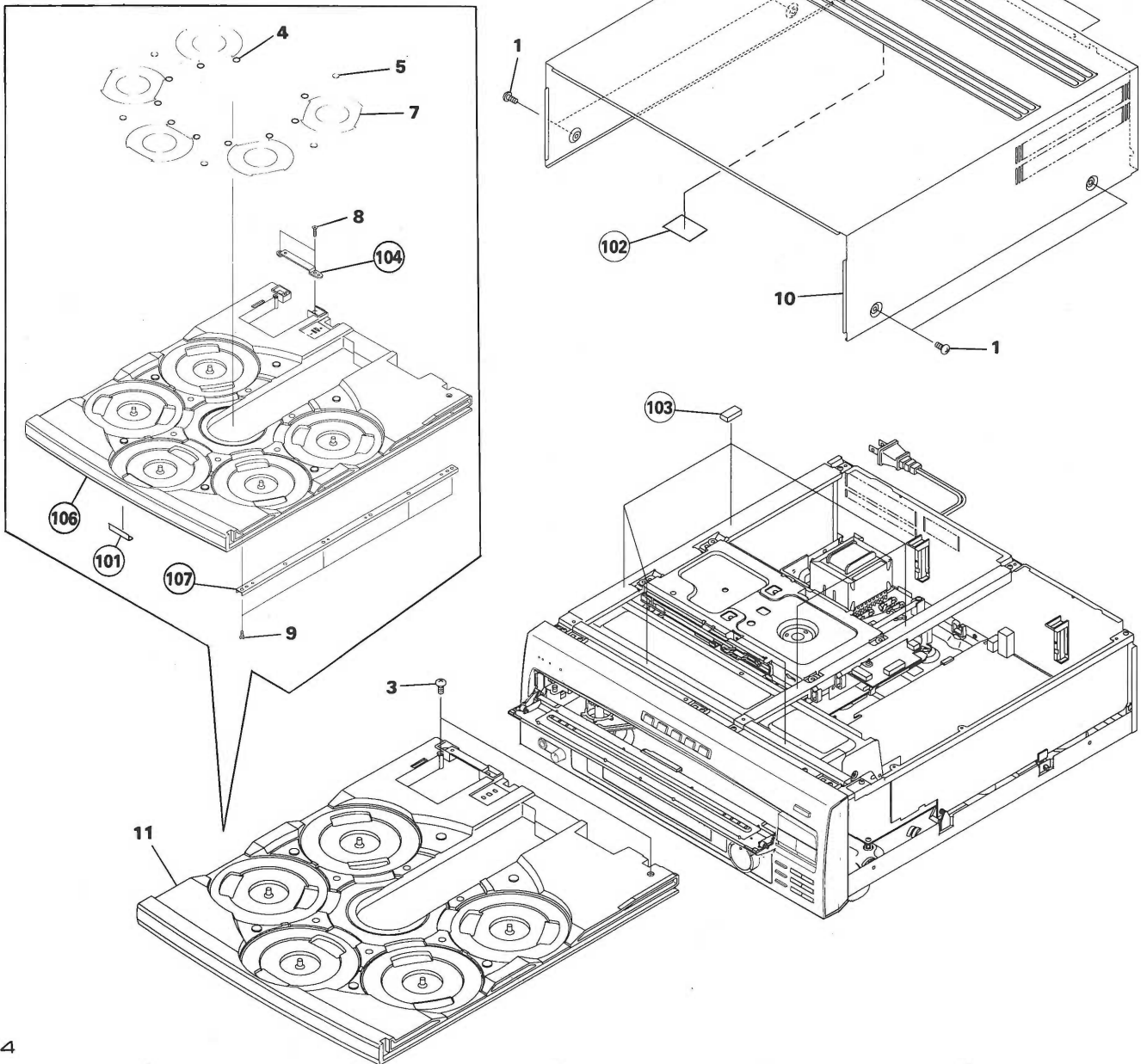
NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

3.1 EXTERIOR SECTION

Parts List

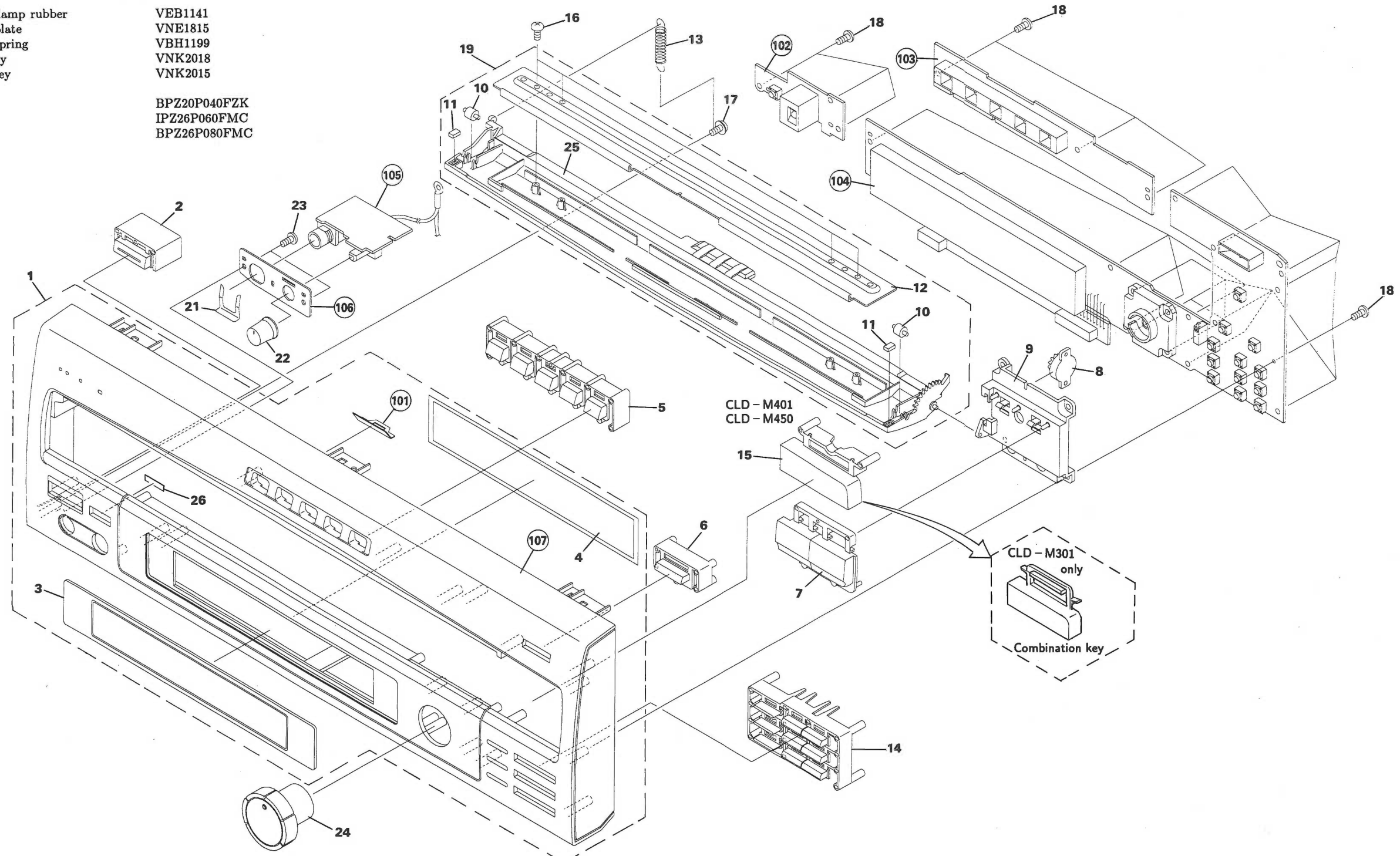
Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
1	Screw	BCZ40P060FZK	NSP 101	Tray spacer	VEC1537
2	Screw	BBZ30P080FCC	NSP 102	65 label	ORW1069
3	Screw	BPZ30P200FMC	NSP 103	Cushion	VEC1004
4	LD pad(S)	VEC1473	NSP 104	Tray metal	VNE1533
5	LD pad(L)	VEC1472	105	.....
6	.....		NSP 106	Tray	VNK1959
7	Tray sheet	VEC1582	NSP 107	Tray reinforced plate	VNK1528
8	Screw	BPZ30P060FCU			
9	Screw	BPZ30P060FCU			
10	Bonnet - S	VXX1668			
11	Tray assembly - S	VXX1627			



3.2 FRONT PANEL SECTION

Parts List

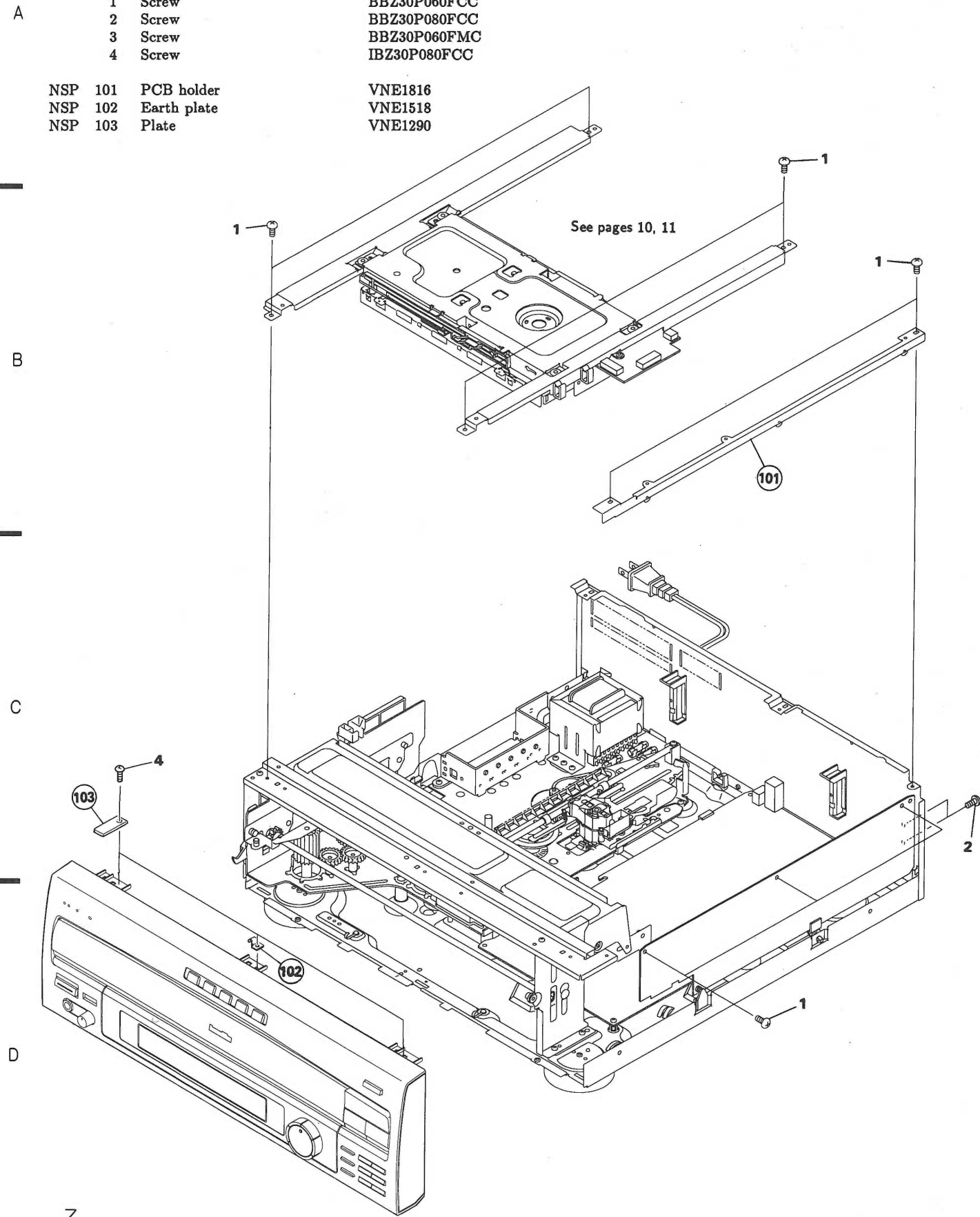
Mark No.	Description	Parts No.	Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
1	Front panel assembly—S	VXX1739	19	Door assembly—S	VXX1737	NSP 101	Reinforced plate	VNE1778
2	PW Button	VNK2002	20	.....		NSP 102	PSWB assembly	VWG1313
3	FL panel	VNK2022	21	Snap plate	VNE1102	NSP 103	SELD assembly	VWG1322
4	FL filter	VEC1567	22	Volume knob	VNK2003	NSP 104	FLKY assembly	VWG1320
5	Top key	VNK2017	23	Screw	BPZ26P060FCU	NSP 105	HEPB assembly	VWV1242
6	Surround key	VNK2016	24	Scan dial	VNK2020	NSP 106	Jack holder	VNE1555
7	O/C key	VNK2019	25	Front door assembly	VXA1842	NSP 107	Front panel assembly	VXA1841
8	Damper assembly	VXA1053	26	IR window	VNK2030			
9	Sub panel	VNK2021						
10	Roller	VNL1042						
11	Door damp rubber	VEB1141						
12	Door plate	VNE1815						
13	Door spring	VBH1199						
14	Sub key	VNK2018						
15	Play key	VNK2015						
16	Screw	BPZ20P040FZK						
17	Screw	IPZ26P060FMC						
18	Screw	BPZ26P080FMC						



3.3 TOP VIEW SECTION

Parts List

Mark No.	Description	Parts No.
1	Screw	BBZ30P060FCC
2	Screw	BBZ30P080FCC
3	Screw	BBZ30P060FMC
4	Screw	IBZ30P080FCC
NSP 101	PCB holder	VNE1816
NSP 102	Earth plate	VNE1518
NSP 103	Plate	VNE1290



3.4 CLAMPER ARM SECTION

Parts List

Mark No.	Description	Parts No.
1	Holding spring	VBK1033
2	Steel ball	PBP-001
3	Screw	VBA1029
4	Screw	BPZ26P060FMC
5	Screw	BBZ30P060FMC
6	.....
7	Clamp cam	VNL1393
8	Clamp shaft	VLL1342
9	Arm base	VNE1640
10	Clamper Spring	VBH1184
11	Rubber bushing	VEB1164
12	.....
13	Limiter plate	VNE1637
14	Slide plate	VNE1638
15	Limiter spring	VBH1182
16	Pivot screw	VBA1022
17	Washer	WT26D060D050
18	Screw	BPZ26P060FCU
19	Lever assembly	VXA1847
20	Lever (B) assembly	VXA1608
21	Lever (D) assembly	VXA1610
22	Center plate assembly	VXA1606
23	.....
24	E ring	YE40FUC
25	.....
26	Arm assembly	VWT1071
27	Guide sheet	VNE1834
28	Rubber spacer	VEB1187
NSP 101	Angle(L)	VNE1635
NSP 102	Center angle	VNE1634
NSP 103	Wire clip	VEC-139
104	.....
NSP 105	SR board assembly	VWG1251

A

B

C

D

B

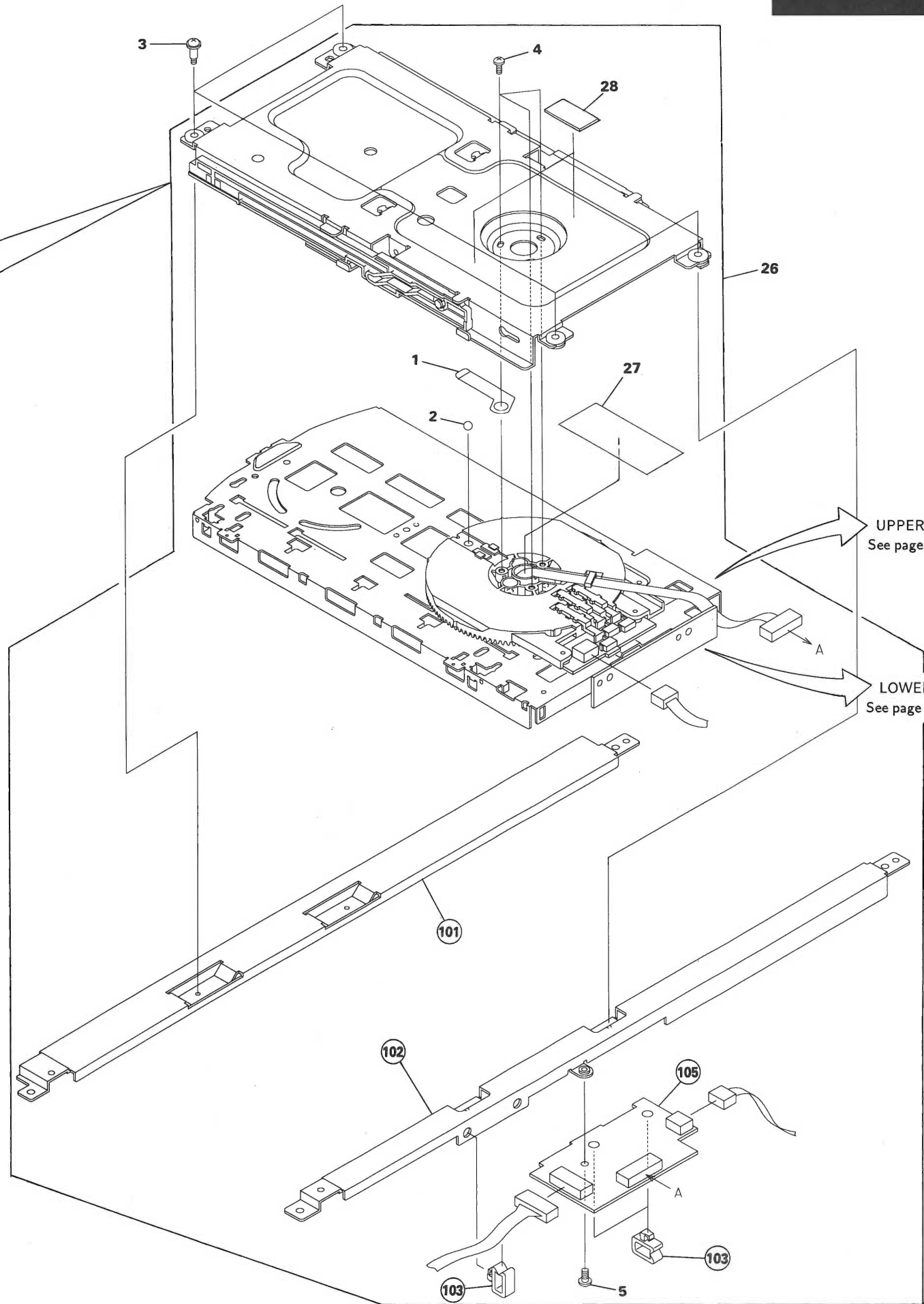
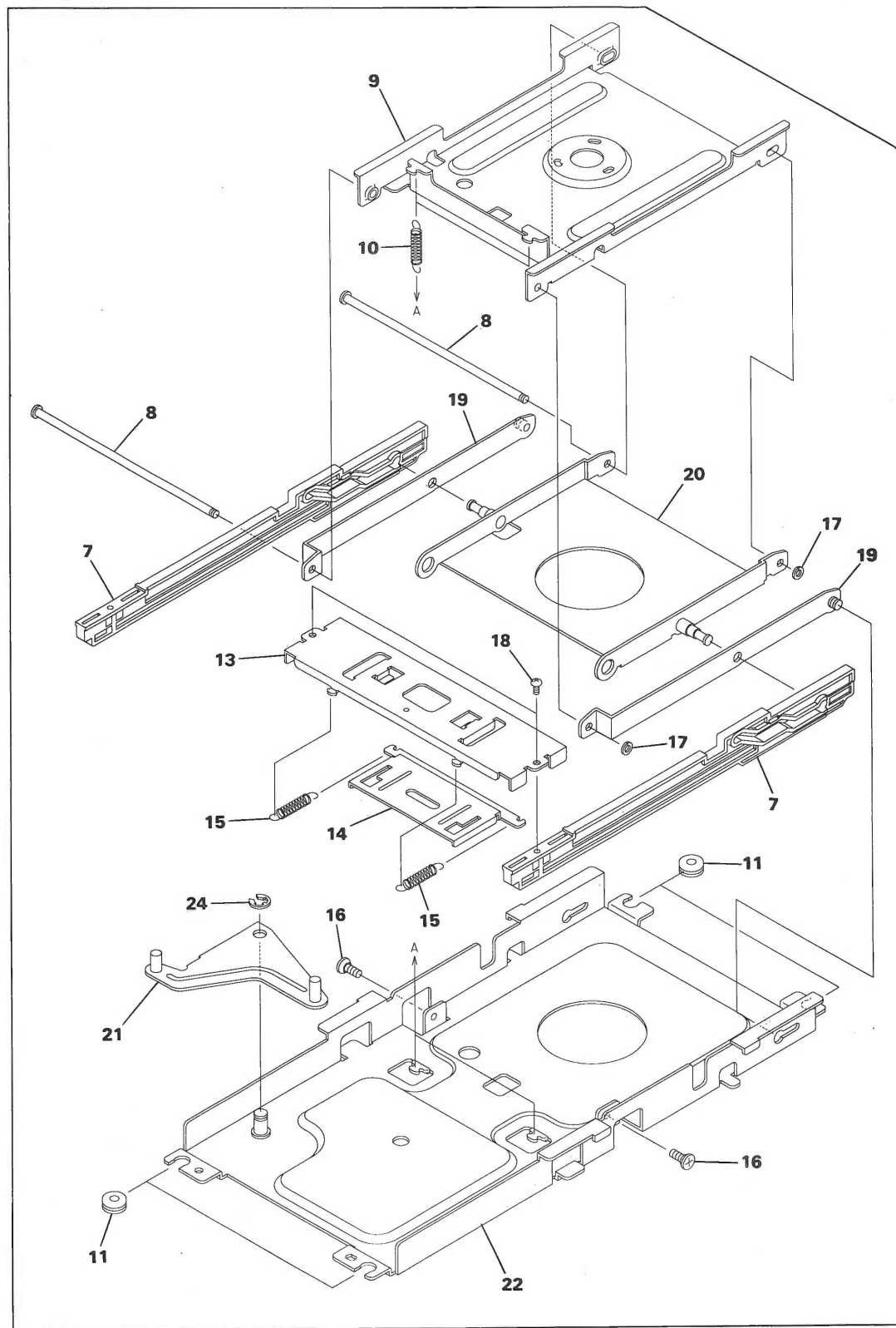
1 2 3 4 5

A

B

C

D



A

B

C

D

UPPER
See page 11

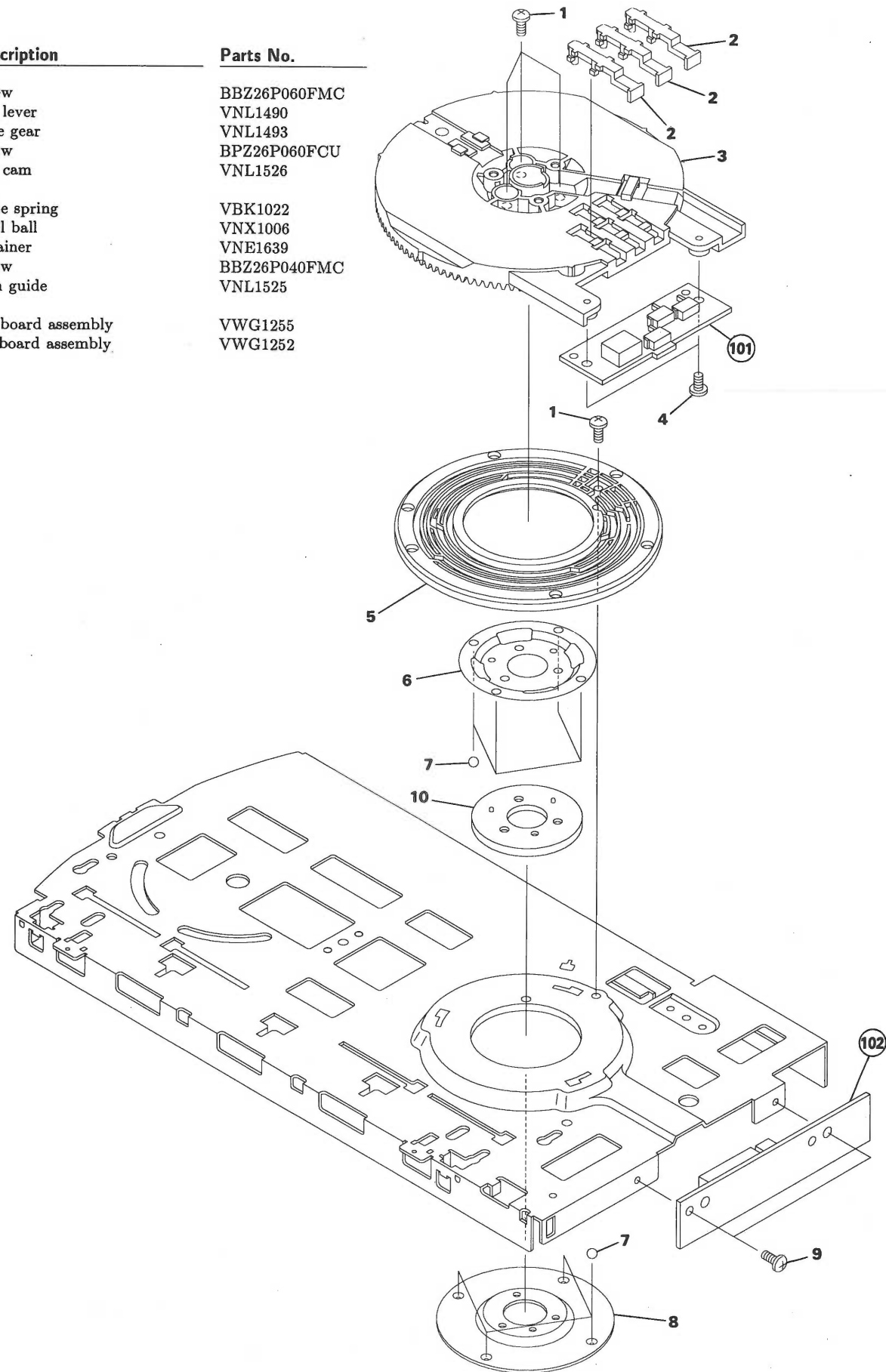
LOWER
See page 12

1 2 3 4 5 6 10

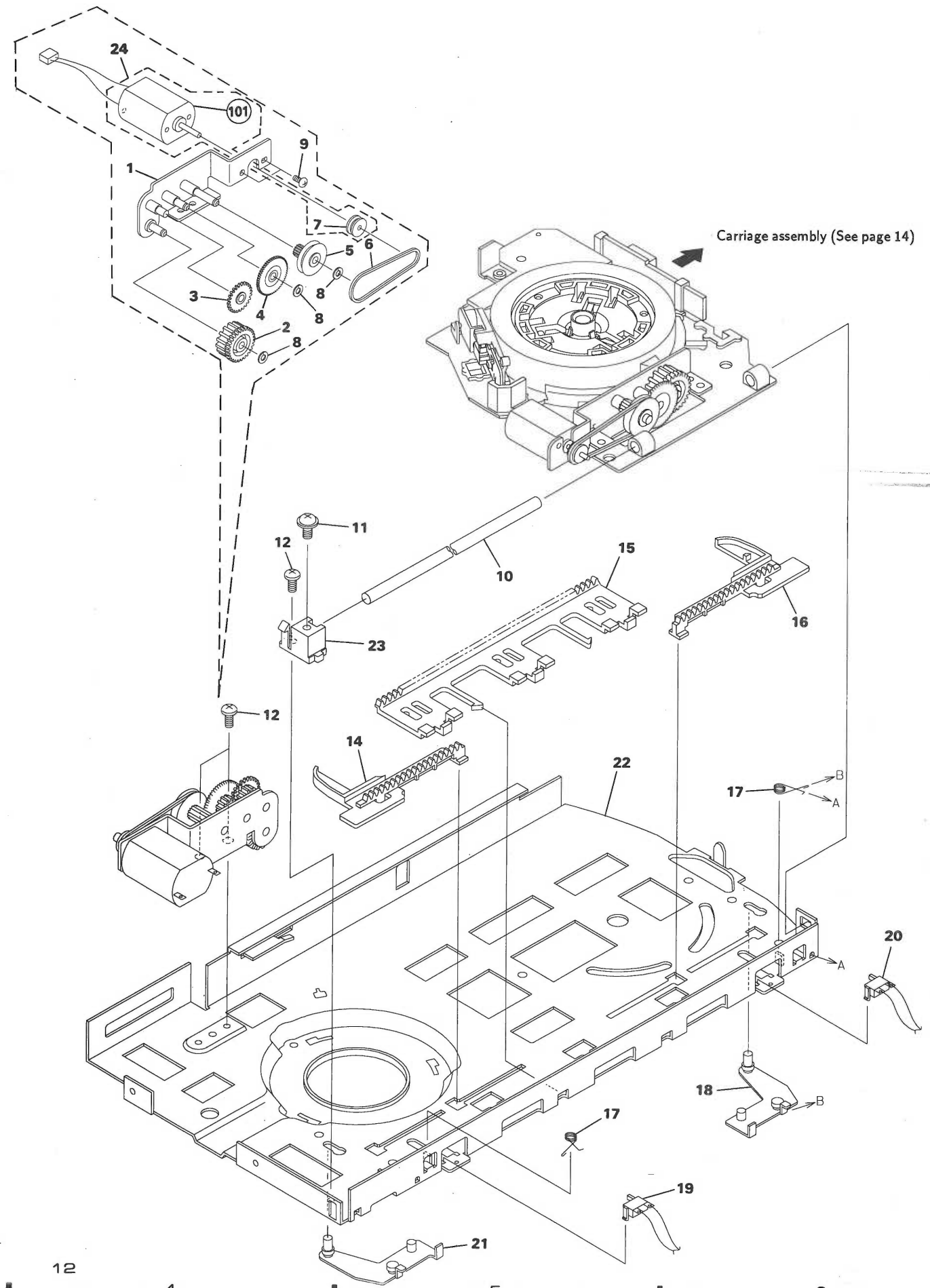
3.5 CLAMPER ARM (UPPER)

Parts List

Mark No.	Description	Parts No.
A	1 Screw	BBZ26P060FMC
	2 SW lever	VNL1490
	3 Base gear	VNL1493
	4 Screw	BPZ26P060FCU
	5 SW cam	VNL1526
	6 Plate spring	VBK1022
	7 Steel ball	VNX1006
	8 Retainer	VNE1639
	9 Screw	BBZ26P040FMC
	10 Arm guide	VNL1525
NSP	101 TD board assembly	VWG1255
NSP	102 FR board assembly	VWG1252



3.6 CLAMPER ARM (LOWER)



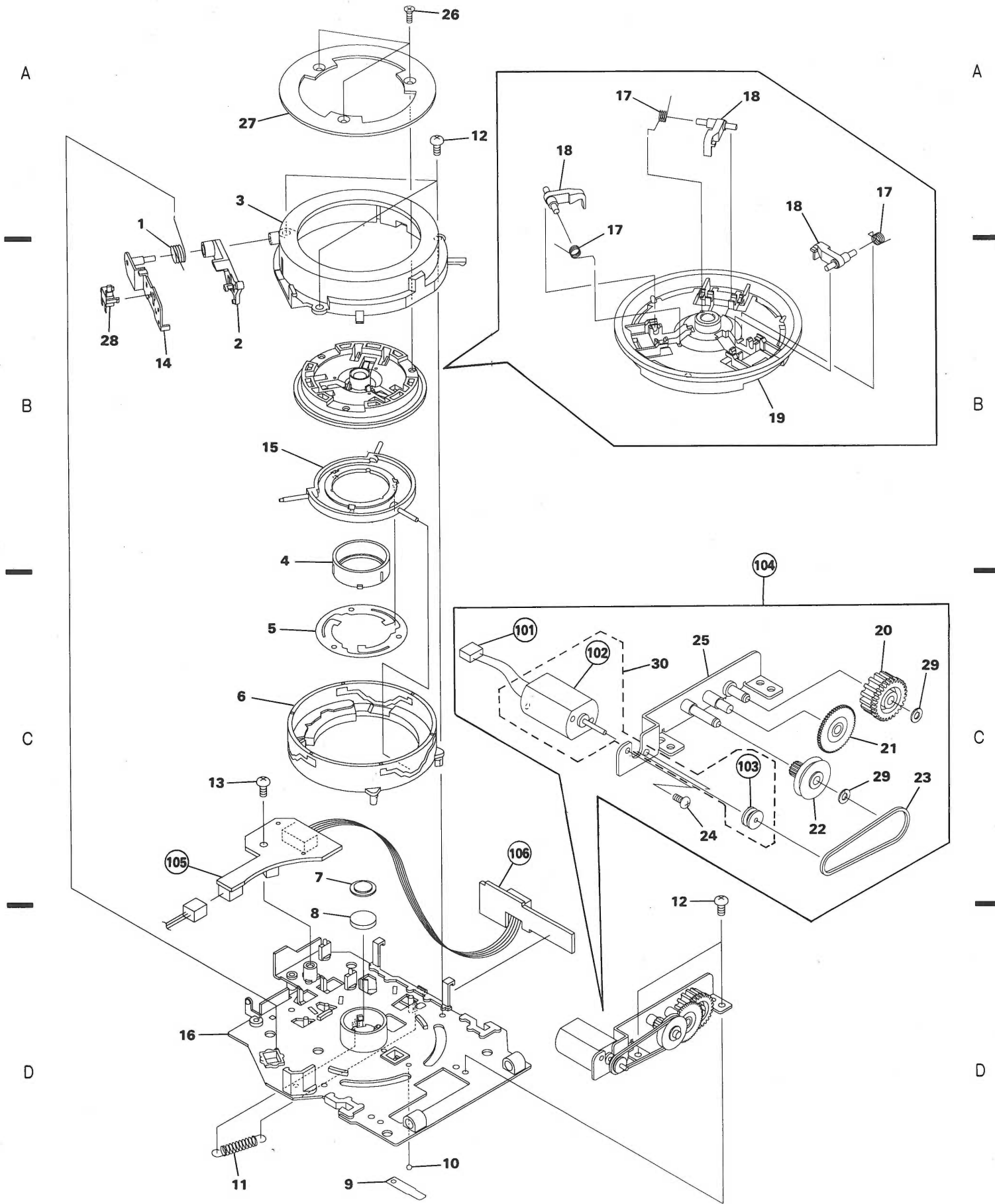
3.7 CARRIAGE ASSEMBLY

Parts List

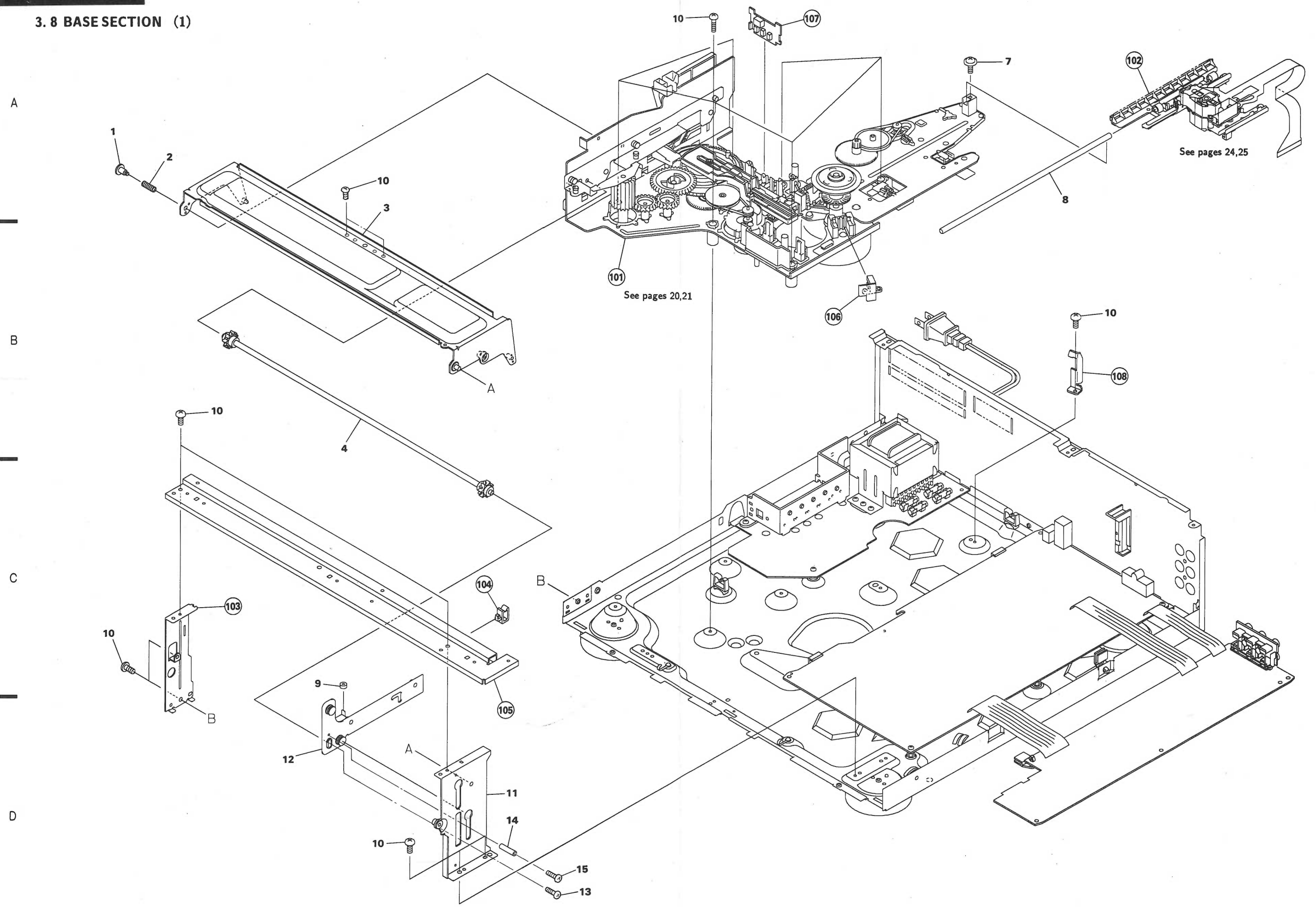
Mark No.	Description	Parts No.
1	M holder (T) assembly	VXA1596
2	Gear (C)	VNL1378
3	Idler gear	PNW1098
4	Gear (A)	VNL1376
5	Gear pulley	VNL1375
6	Belt	DEB1104
7	Motor pulley (T)	VLL1357
8	Washer	WT26D047D025
9	Screw	PMA20P040FMC
10	Guide shaft	VLL1444
11	Screw	IPZ30P060FMC
12	Screw	BBZ26P040FMC
13	.....
14	Slide rack (R)	VNL1382
15	Rack	VNL1380
16	Slide rack (F)	VNL1381
17	Lever spring	VBH1156
18	Change lever (F) assembly	VXA1598
19	SW (IN)	DSG1014
20	SW (OUT)	DSG1014
21	Change lever (R) assembly	VXA1599
22	Rotate arm	VNE1813
23	Shaft holder	VNL1384
24	Turn motor assembly	VXX1545
NSP 101	Turn motor	PXM1002

Parts List

Mark No.	Description	Parts No.
1	Sensor spring	VBH1158
2	Sensor lever	VNL1390
3	Clamper holder	VNL1386
4	Slider	VNL1388
5	Lock plate	VBK1028
6	Inside cam	VNL1389
7	Ball holder	VNL1289
8	Rubber sheet	VEB1114
9	Plate spring(C)	VBK1025
10	Steel ball	VNX1010
11	Lever spring(C)	VBH1165
12	Screw	BBZ26P040FMC
13	Screw	BPZ26P060FCU
14	Sensor base assembly	VXA1601
15	Cam lever assembly	VXA1600
16	Carriage assembly	VXA1809
17	Holder Spring	VBH1162
18	CD holder	VNL1387
19	Disc Clamper	VNL1385
20	Gear(C)	VNL1378
21	Gear(A)	VNL1376
22	Gear pulley	VNL1375
23	Belt	DEB1104
24	Screw	PMA20P040FMC
25	M holder (C) assembly	VXA1597
26	Screw	CPZ20P050FMC
27	Stabilizer	VNE1840
28	Sensor switch	DSG1014
29	Washer	WT26D047D025
30	Clump motor assembly	VXX1594
NSP 101	Housing assembly	VKP1912
NSP 102	Clump motor	VXM1045
NSP 103	Motor pulley (C)	VLL1360
NSP 104	Carriage motor assembly	VXX1545
NSP 105	CF assembly	VWG1253
NSP 106	CS assembly	VWG1254



3.8 BASE SECTION (1)



Parts List

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
1	Screw(B)	VBA1008	NSP 101	Mechanism assembly	VWT1082
2	Arm spring	VBH1093	NSP 102	Rack assembly	VWT1083
3	Synchronized arm assembly	VXA1795	NSP 103	Side stay (L)	VNE1636
4	Synchronized gear assembly	VXA1605	NSP 104	Wire clip	VEC-139
5	.....		NSP 105	Front angle	VNE1633
6	.....		NSP 106	FG board assembly	VWG1310
7	Screw (B)	VBA1018	NSP 107	SW board assembly	VWG1311
8	Carriage shaft	VLL1177	NSP 108	SM head stopper	VNE1592
9	Stop ring	VEB1091			
10	Screw	BBZ30P060FCC			
11	Stay (R) assembly	VXA1603			
12	Roller board (R) assembly	VXA1810			
13	Screw	PPZ26P080FMC			
14	Color	VLL1431			
15	Screw	BBZ26P080FMC			

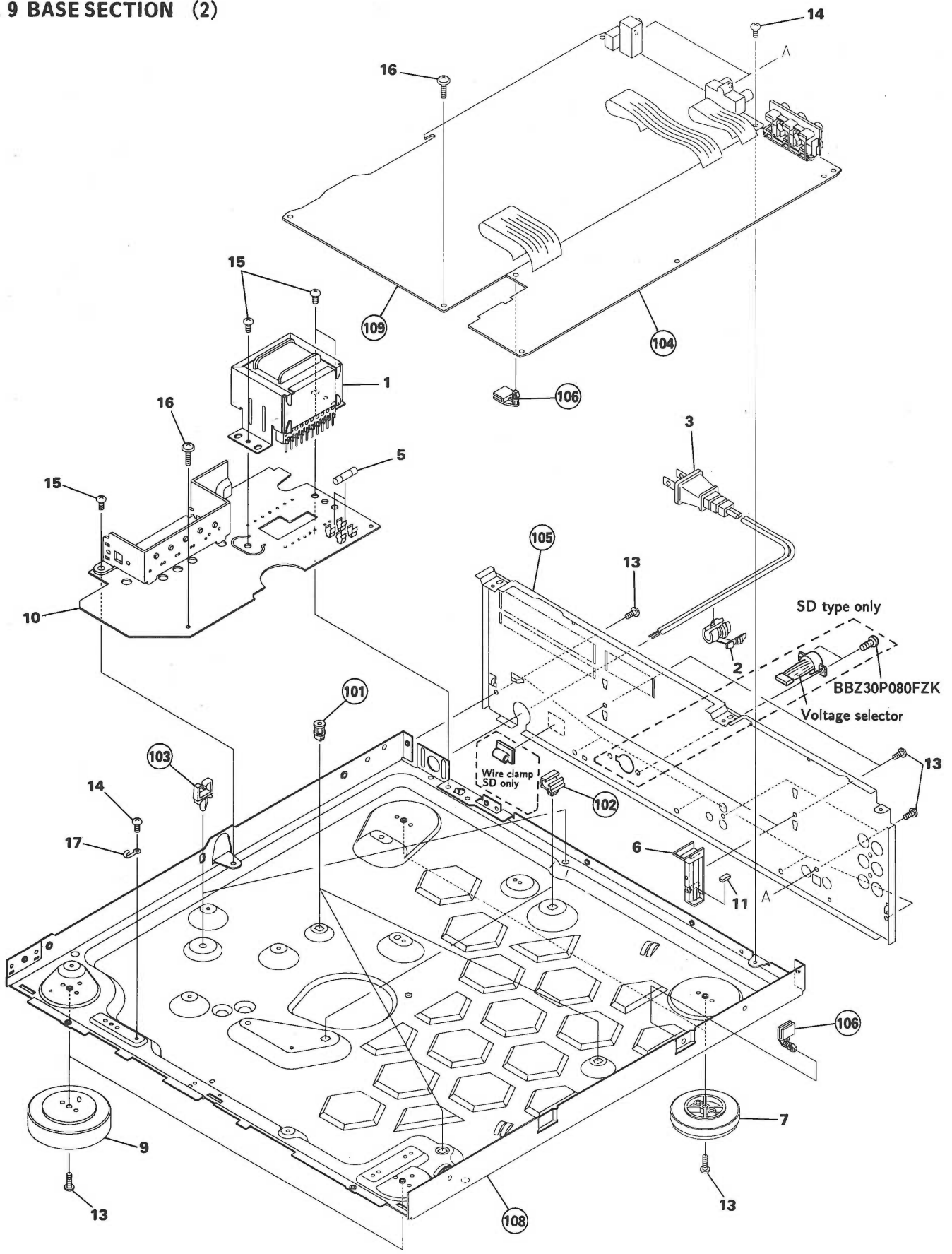
3.9 BASE SECTION (2)

A

B

C

D



Parts List

<u>Mark No.</u>	<u>Description</u>	<u>Parts No.</u>	<u>Mark No.</u>	<u>Description</u>	<u>Parts No.</u>	
△	1	Power transformer	VTT1113	NSP 101	PCB spacer	PNY-404
	2	AC cord stopper	CM-22C	NSP 102	P board holder	PNY-405
	3	AC power cord	PDG1015	NSP 103	Wire clip (B)	VEC1012
	4	.....		NSP 104	Audio board assembly	VWX1107
△	5	Fuse (3A, FU1,2)	VEK-018	NSP 105	Rear panel	VNA1265
	6	Tray stopper	VNL1202	NSP 106	PCB holder	VNL1221
	7	Insulator assembly	VXA1776	107	.....
	8	.....		NSP 108	Base chassis	VNA1180
	9	Insulator assembly	VXA1775	NSP 109	MAIN board assembly	VWX1118
●	10	SYPS assembly	VWR1140			
	11	Door damp rubber	VEB1181			
	12	.....			
	13	Screw	BBZ30P080FCC			
	14	Screw	BBZ30P060FCC			
	15	Screw	BCZ40P080FZK			
	16	Screw	IPZ30P160FMC			
	17	Cord holder	VNF-069			

3.10 MECHANISM ASSEMBLY (1)

Parts List

Mark No.	Description	Parts No.
1	Plate spring	VBK1013
2	Thrust spring	VBH1073
3	Tilt shaft	VLL1175
4	Tilt pulling spring	VBH1074
5	Belt	PEB1013
6	Screw	ABZ26P050FMC

A

A

B

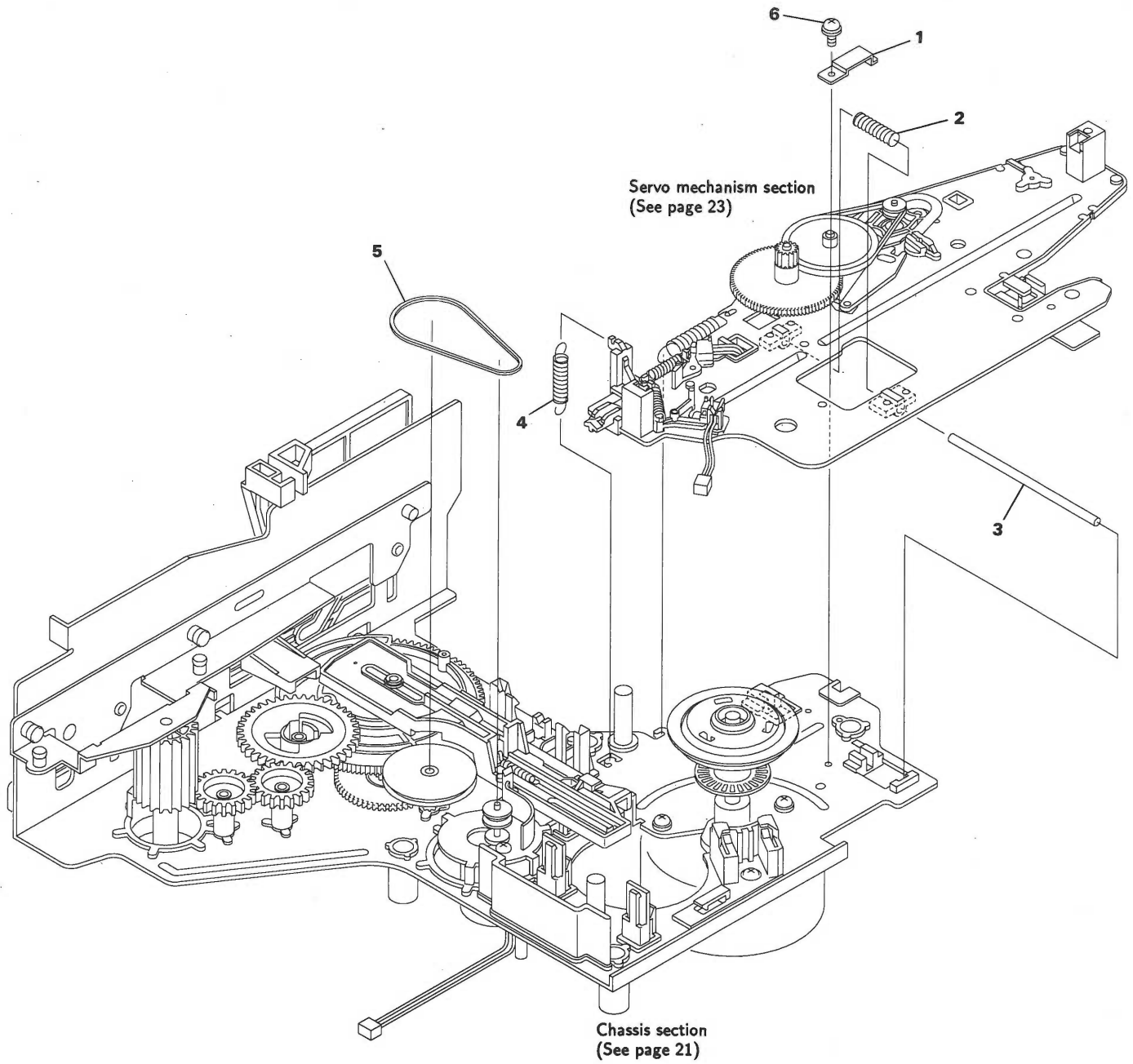
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C

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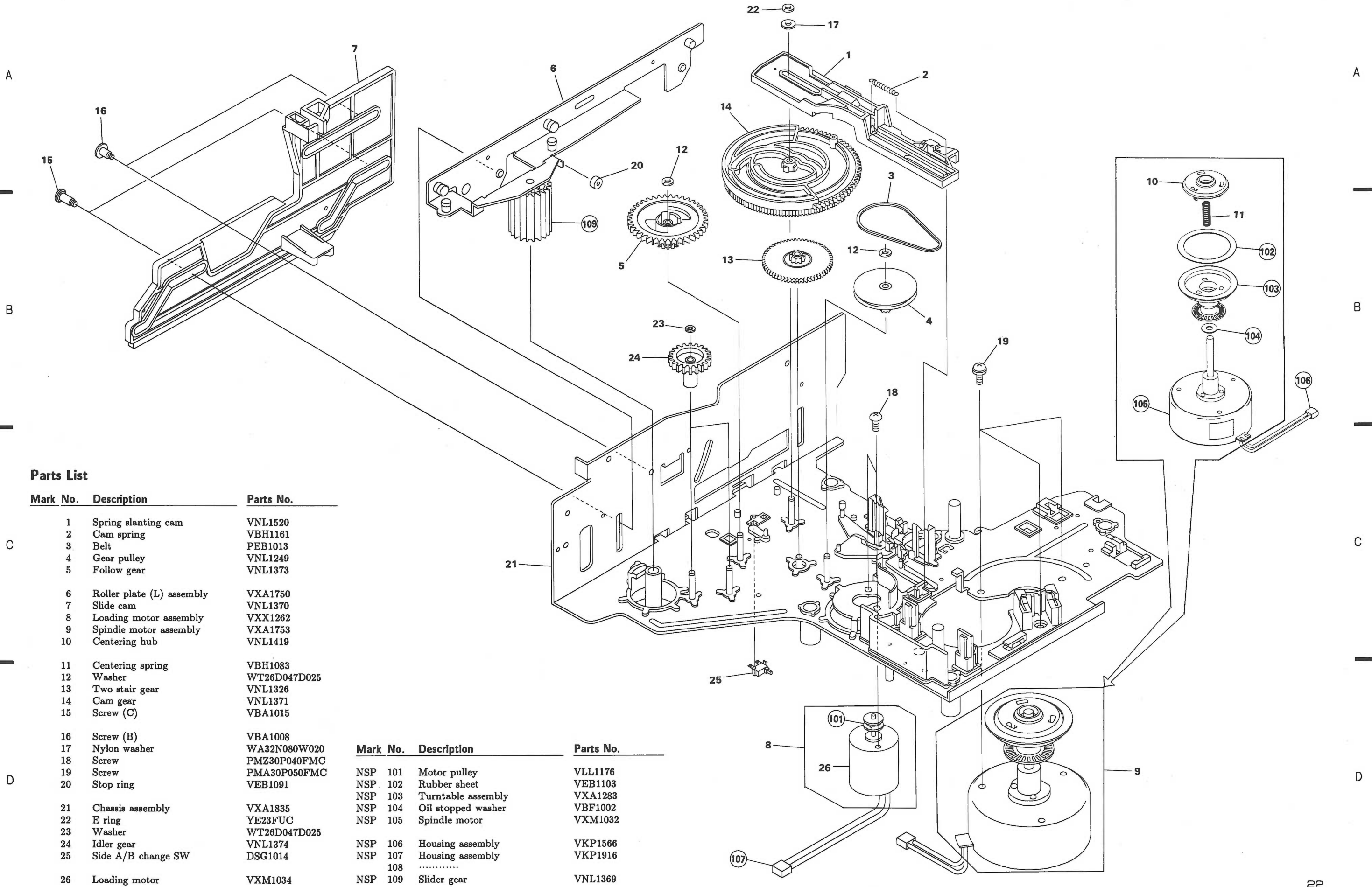
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Servo mechanism section
(See page 23)

Chassis section
(See page 21)

3.11 CHASIS SECTION



Parts List

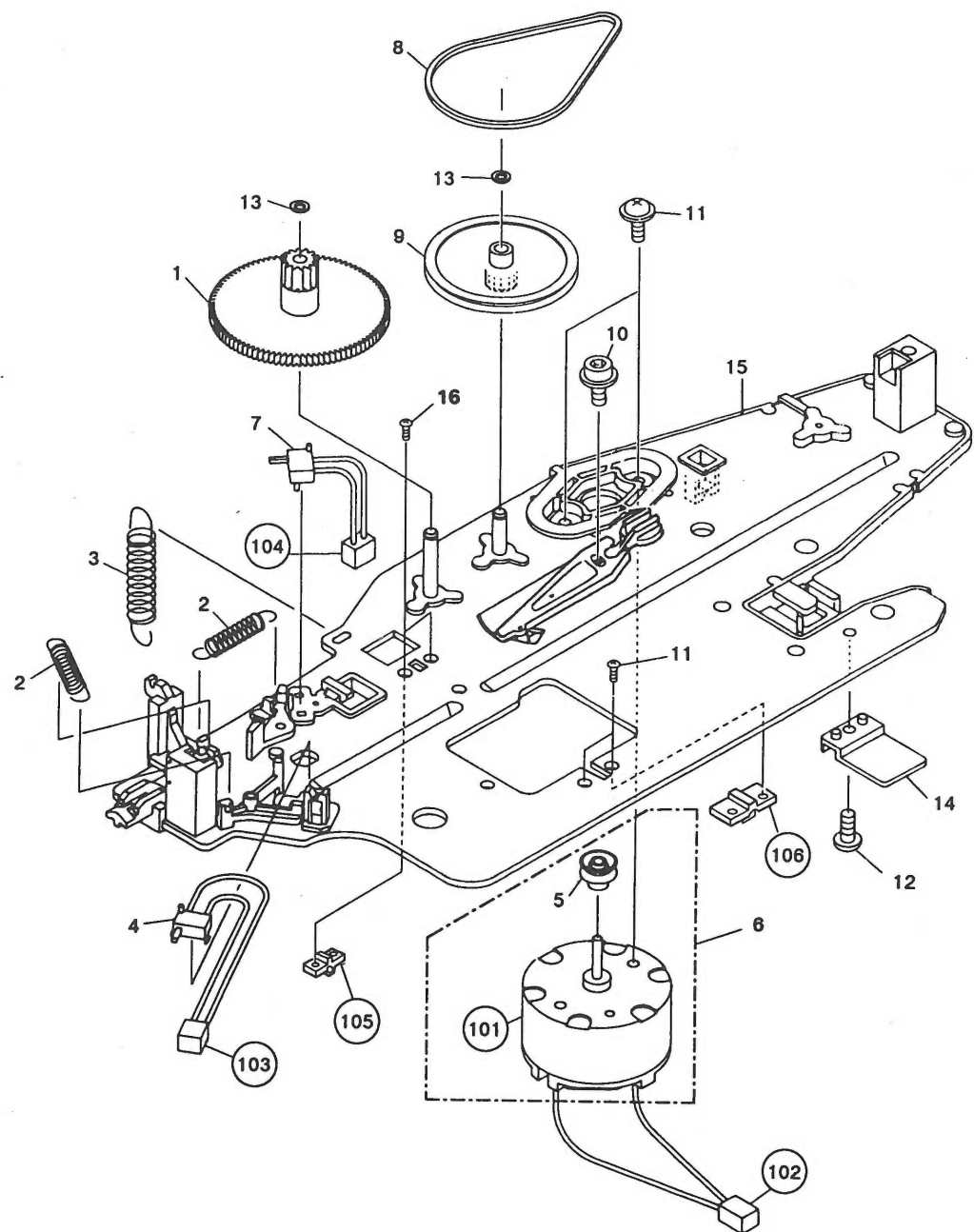
Mark No.	Description	Parts No.
1	Spring slanting cam	VNL1520
2	Cam spring	VBH1161
3	Belt	PEB1013
4	Gear pulley	VNL1249
5	Follow gear	VNL1373
6	Roller plate (L) assembly	VXA1750
7	Slide cam	VNL1370
8	Loading motor assembly	VXX1262
9	Spindle motor assembly	VXA1753
10	Centering hub	VNL1419
11	Centering spring	VBH1083
12	Washer	WT26D047D025
13	Two stair gear	VNL1326
14	Cam gear	VNL1371
15	Screw (C)	VBA1015
16	Screw (B)	VBA1008
17	Nylon washer	WA32N080W020
18	Screw	PMZ30P040FMC
19	Screw	PMA30P050FMC
20	Stop ring	VEB1091
21	Chassis assembly	VXA1835
22	E ring	YE23FUC
23	Washer	WT26D047D025
24	Idler gear	VNL1374
25	Side A/B change SW	DSG1014
26	Loading motor	VXM1034

Mark No.	Description	Parts No.
NSP 101	Motor pulley	VLL1176
NSP 102	Rubber sheet	VEB1103
NSP 103	Turntable assembly	VXA1283
NSP 104	Oil stopped washer	VBF1002
NSP 105	Spindle motor	VXM1032
NSP 106	Housing assembly	VKP1566
NSP 107	Housing assembly	VKP1916
NSP 108	.....	.....
NSP 109	Slider gear	VNL1369

3.12 SERVO MECHANISM BASE SECTION

Parts List

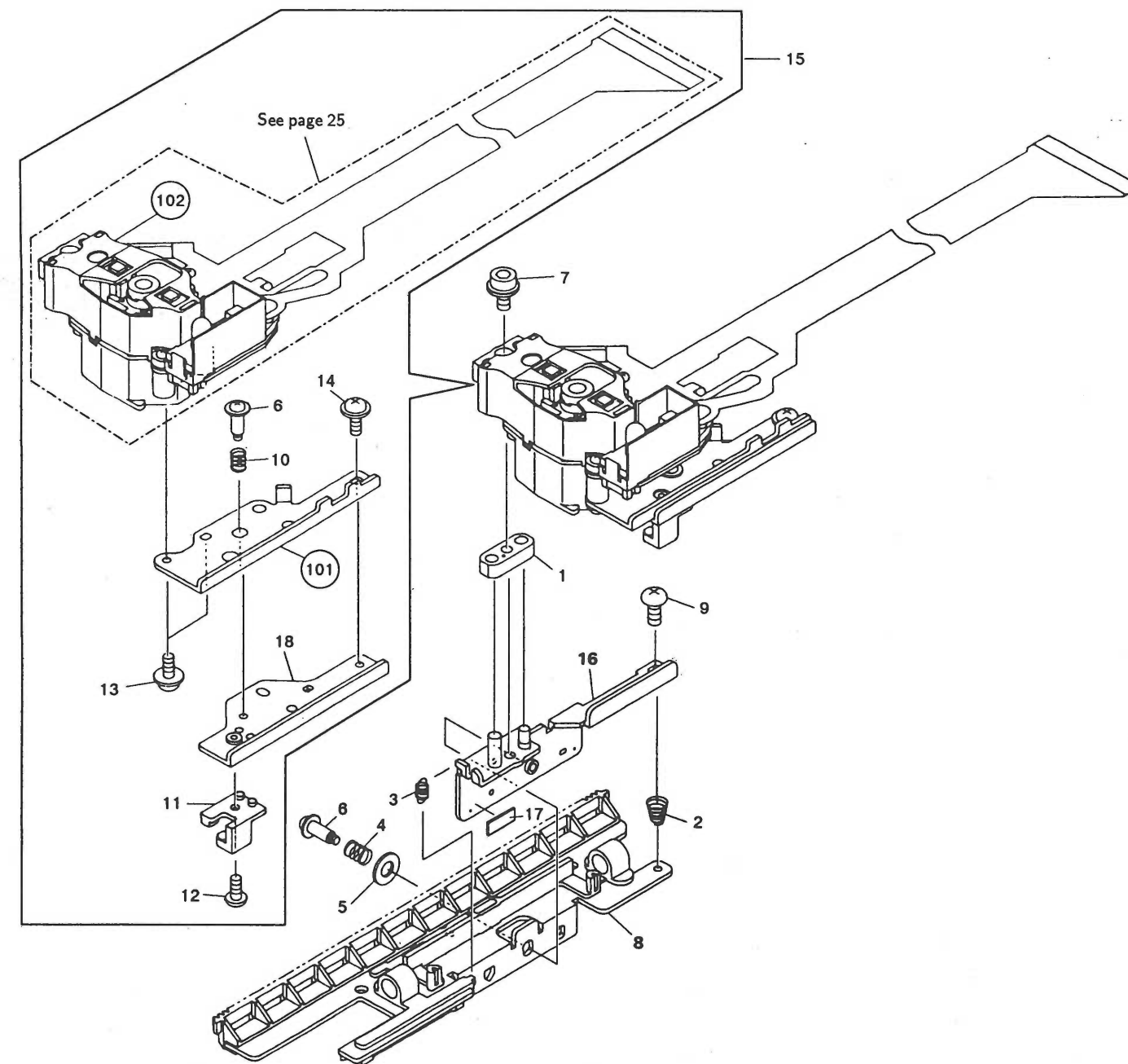
Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
1	CA gear (3)	VNL1196	13	Washer	WT26D047D025
2	Switch pulling spring	VBH1079	14	FLE base	VNL1341
3	TC pulling spring	VBH1181	15	Servo mechanism base assembly-S	VXX1583
4	Push switch(S5: CD/CDV)	DSG1014			
5	CA pulley(1)	VNL1197	16	Screw	PMZ26P040FMC
6	Carriage motor assembly	VXX1261	NSP 101	Carriage motor	VXM1033
7	Push switch(S4: LD/CD)	DSG1014	NSP 102	Housing assembly	VKP1917
8	CA belt	VEB1077	NSP 103	Housing assembly	VKP1554
9	CA pulley (2)	VNL1198	NSP 104	Housing assembly	VKP1553
10	Screw	SMF30H080FBT	NSP 105	Holder(A)	VNV1022
11	Screw	PMM26P040FMC	NSP 106	Holder(B)	VNV1023
12	Screw	BPZ26P050FMC			



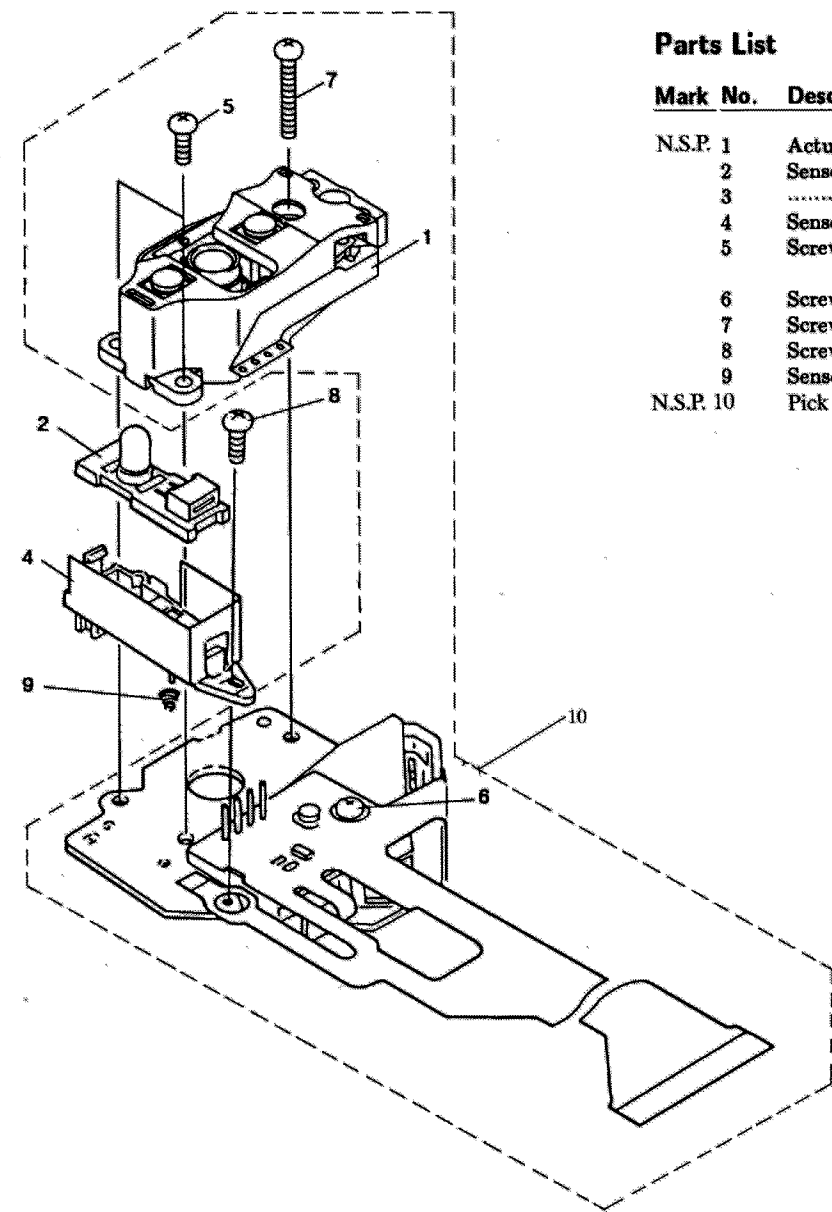
3.13 RACK SECTION

Parts List

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
1	PU base	VNL1209	11	TAN base	VNL1199
2	LP center spring	VBH1075	12	Screw	PMZ20P040FMC
3	PU pulling spring	VBH1089	13	Screw	PMA20P040FMC
4	L-2 spring	VBH1090	14	Screw	AMZ20P050FMC
5	Washer	WA32F070M080	15	Slider assembly	VWT1084
6	Screw	VBA1007	16	PU mount base assembly	VXA1762
7	Screw(2.6 x 10)	VLL1192	17	Spacer (S)	VEC1284
8	Rack	VNL1186	18	TAN plate (1)	VNE1606
9	Screw	BMZ26P080FMC			
10	TAN spring	VBH1081	NSP 101	TAN plate (2)	VNE1303
			NSP 102	Pickup assembly	VWY1031



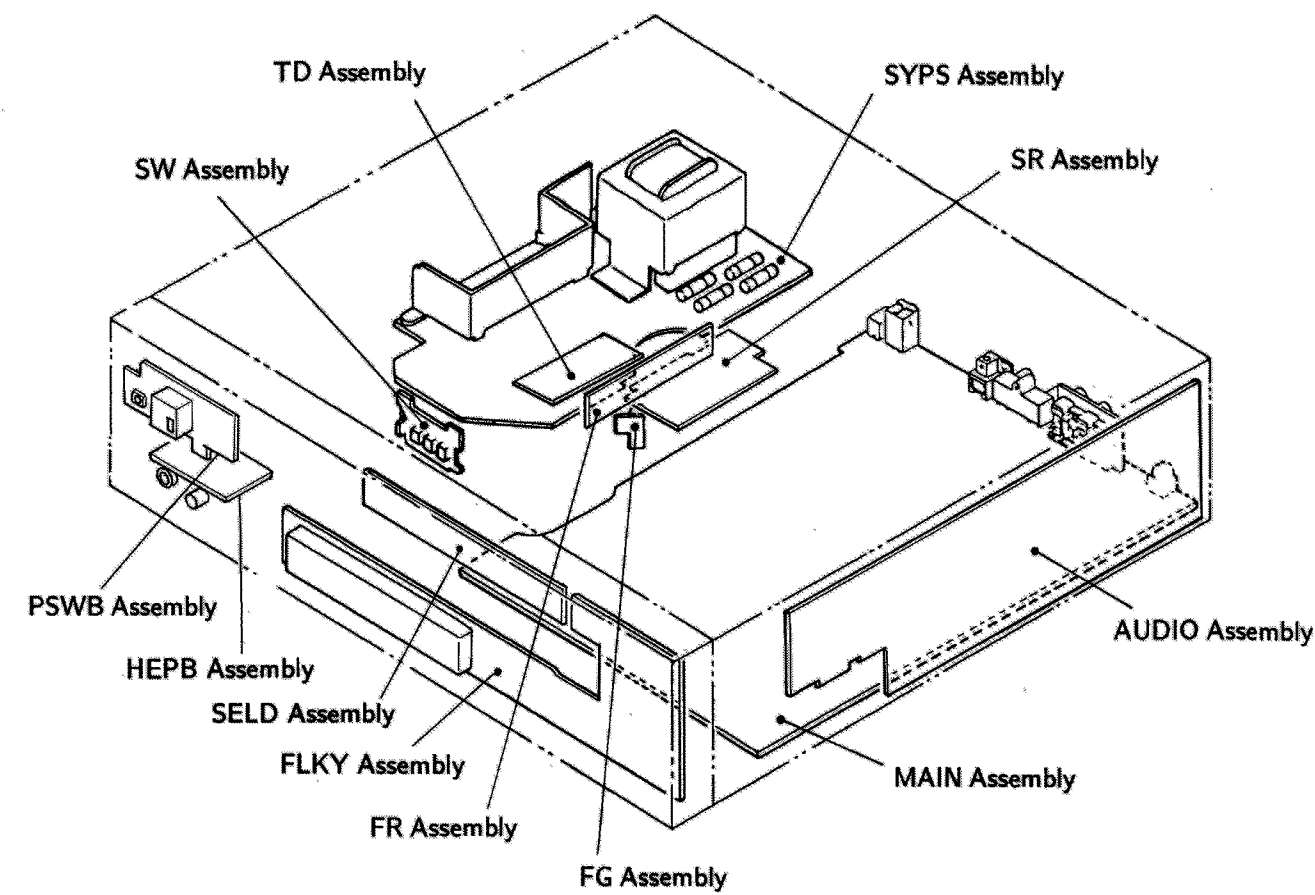
3. 14 PICKUP ASSEMBLY



Parts List

Mark No.	Description	Parts No.
N.S.P. 1	Actuator assembly	VXX1740
2	Sensor assembly	VEX1018
3	.....	.....
4	Sensor stay	VNH1024
5	Screw	PMA20P060FMC
6	Screw	PMA20P080FMC
7	Screw	PMA20P140FMC
8	Screw	BMZ20P060FMC
9	Sensor spring	VBH1087
N.S.P. 10	Pick up	.....

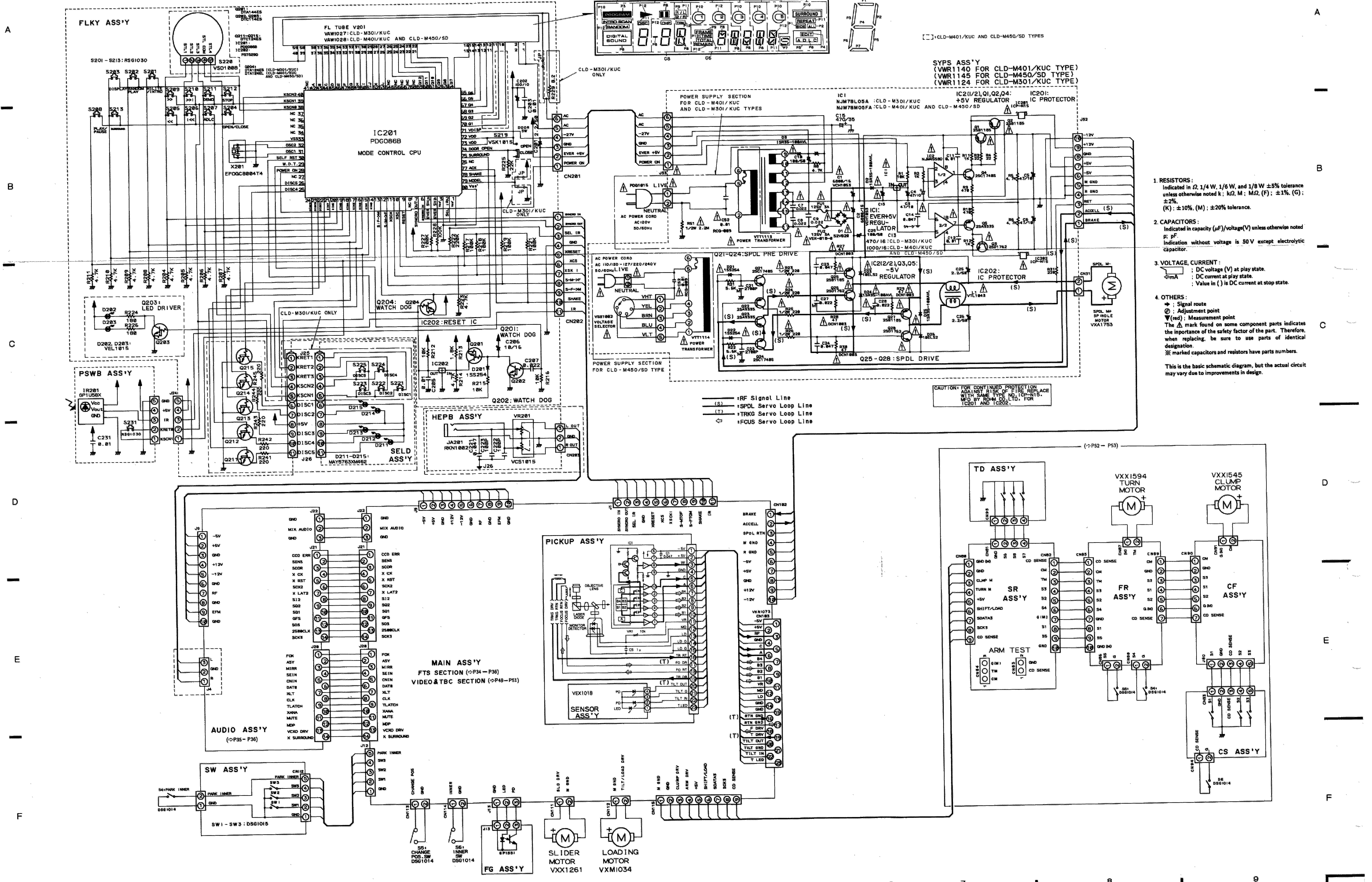
4. PCB LOCATIONS



- MAIN : MAIN BOARD
- FG : FG COUNTER BOARD
- SW : SW BOARD
- AUDIO : AUDIO BOARD
- FLKY : FL TUBE AND KEY BOARD
- PSWB : POWER SWITCH BOARD
- HEPB : HEADPHONE BOARD
- SYPS : SYSTEM POWER SUPPLY
- SR : SOLID RELAY BOARD
- FR : FLEXIBLE RELAY BOARD
- CF : CARRIAGE FLEXIBLE BOARD
- CS : CARRIAGE SWITCH BOARD
- TD : TURN DETECTION BOARD
- SELD : DISC SELECT DETECTION BOARD

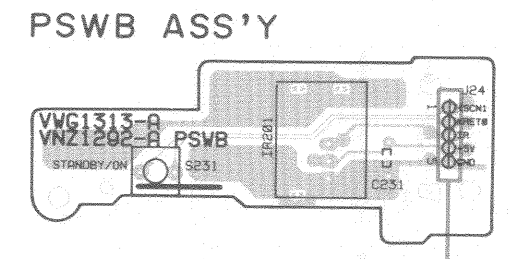
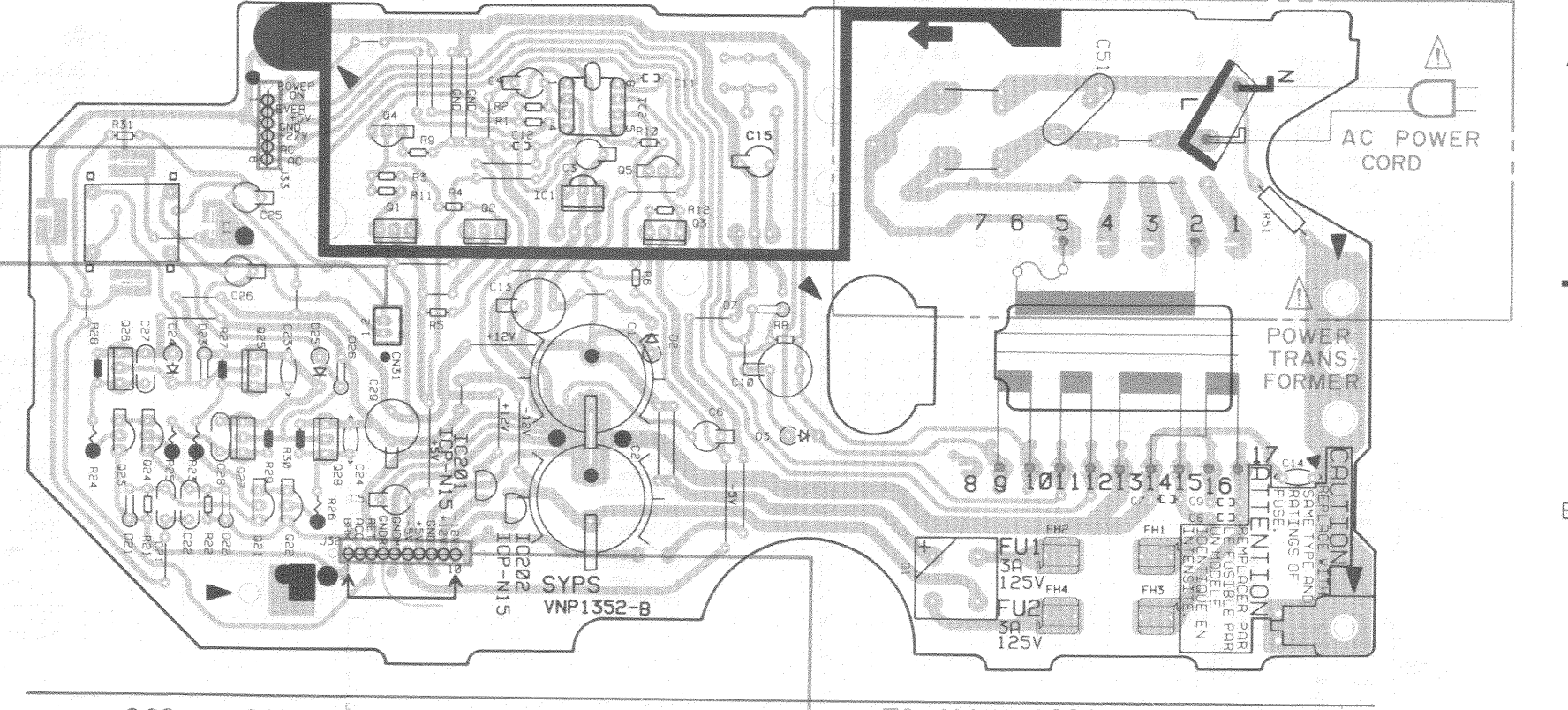
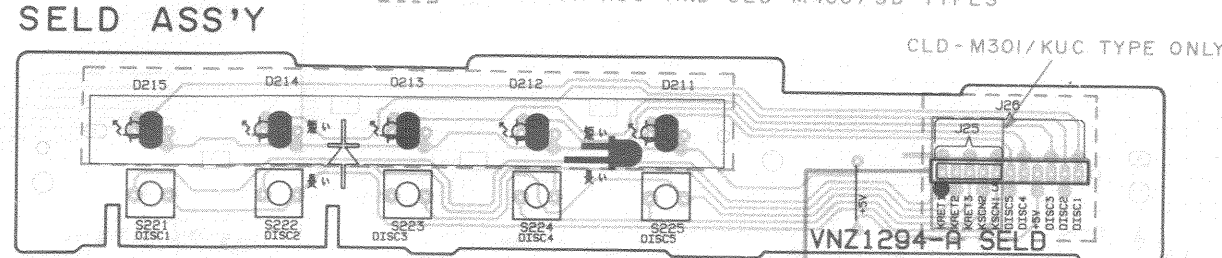
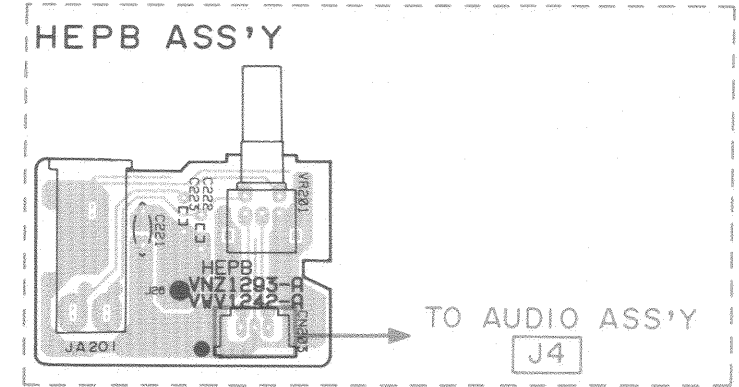
5. SCHEMATIC AND PCB CONNECTIONS DIAGRAMS

5.1 OVERALL CONNECTION DIAGRAM AND FLKY, PSWB, SELD, HEPB, PICKUP, FG, SW AND SYPS ASSEMBLIES

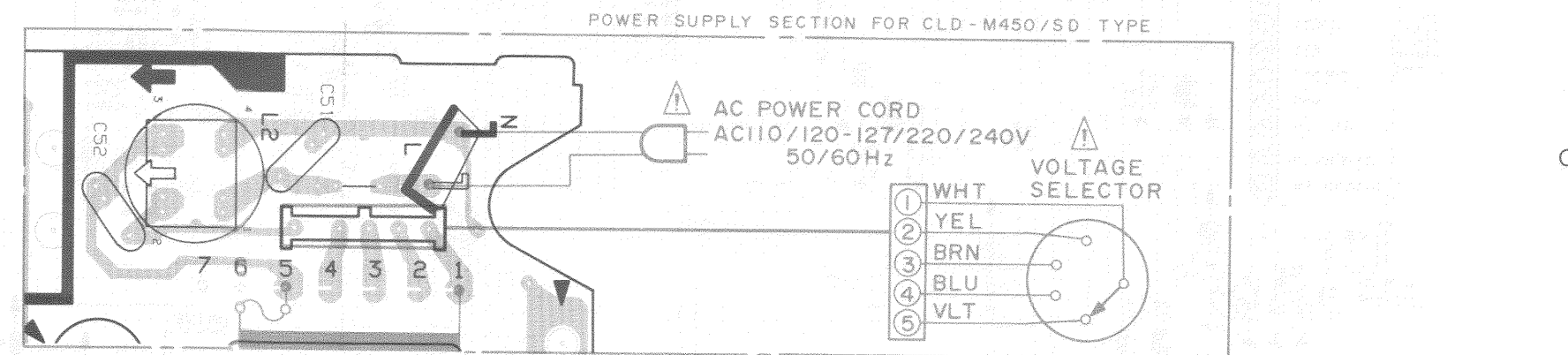
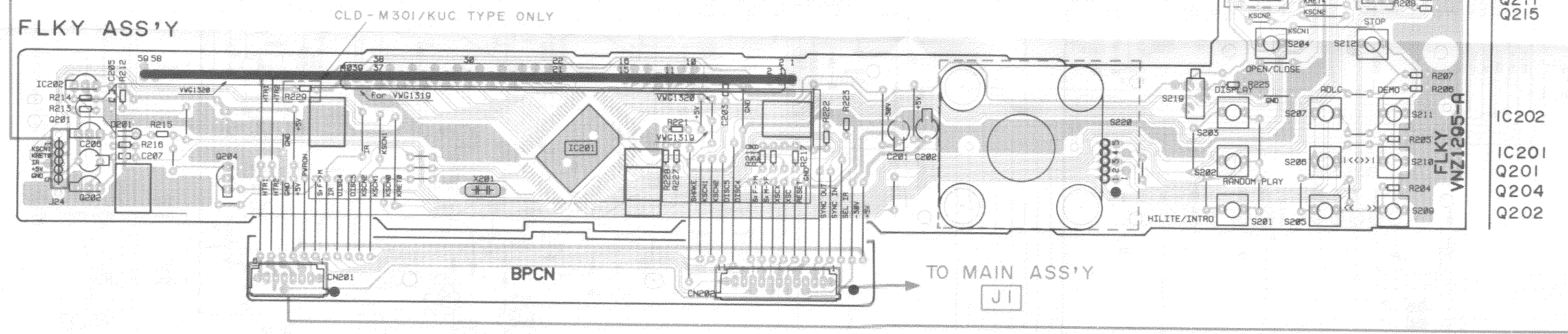


- RESISTORS:**
Indicated in Ω , 1/4 W, 1/6 W, and 1/8 W $\pm 5\%$ tolerance unless otherwise noted k; M; (F); $\pm 1\%$; (G); $\pm 2\%$; (K); $\pm 10\%$; (M); $\pm 20\%$ tolerance.
 - CAPACITORS:**
Indicated in capacity (μF)/voltage(V) unless otherwise noted p; pf
Indication without voltage is 50 V except electrolytic capacitor.
 - VOLTAGE, CURRENT:**
⊕: DC voltage (V) at play state.
⊖: DC current at play state.
⊗: Value in () is DC current at stop state.
 - OTHERS:**
⊕: Signal route
⊙: Adjustment point
⊖(nd): Measurement point
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
* marked capacitors and resistors have parts numbers.
- This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

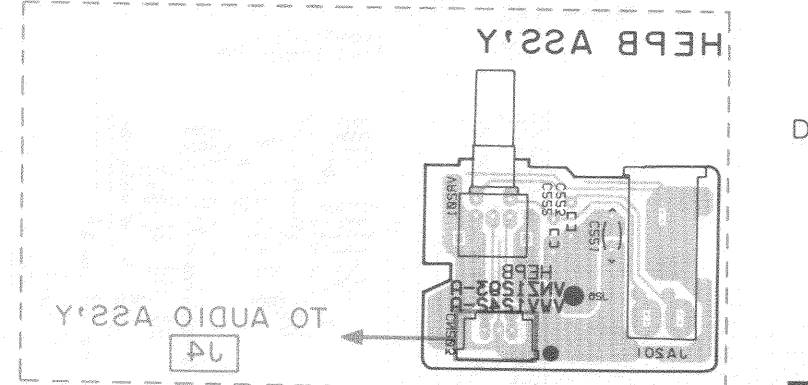
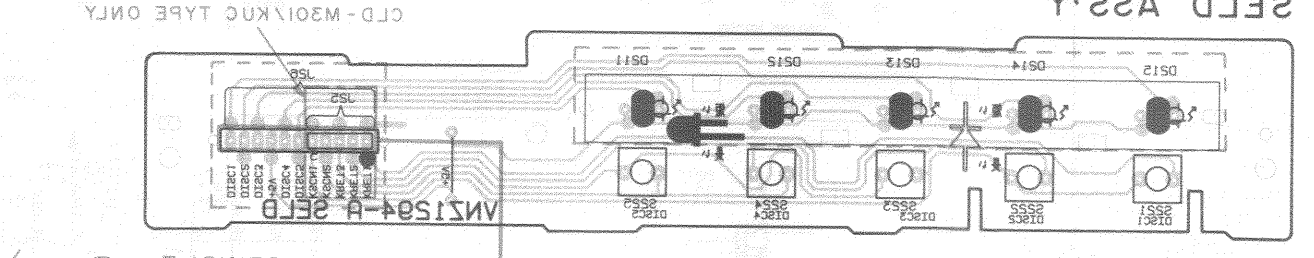
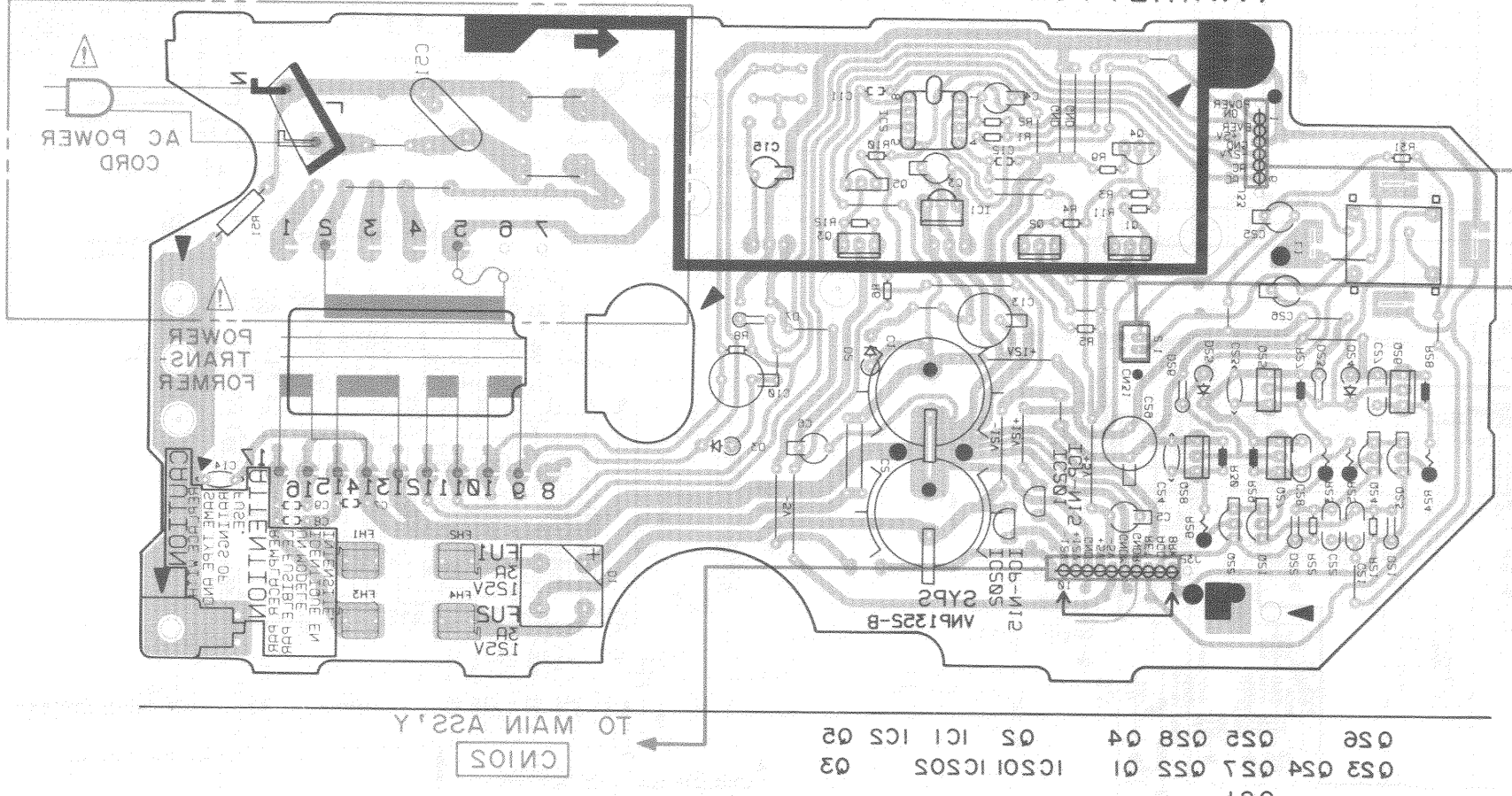
SYPS ASS'Y (VWR1140 FOR CLD-401/KUC TYPE)
(VWR1145 FOR CLD-301/KUC TYPE)
(VWR1124 FOR CLD-450/SD TYPE)
POWER SUPPLY SECTION FOR CLD-M401/KUC AND
CLD-M301/KUC TYPES



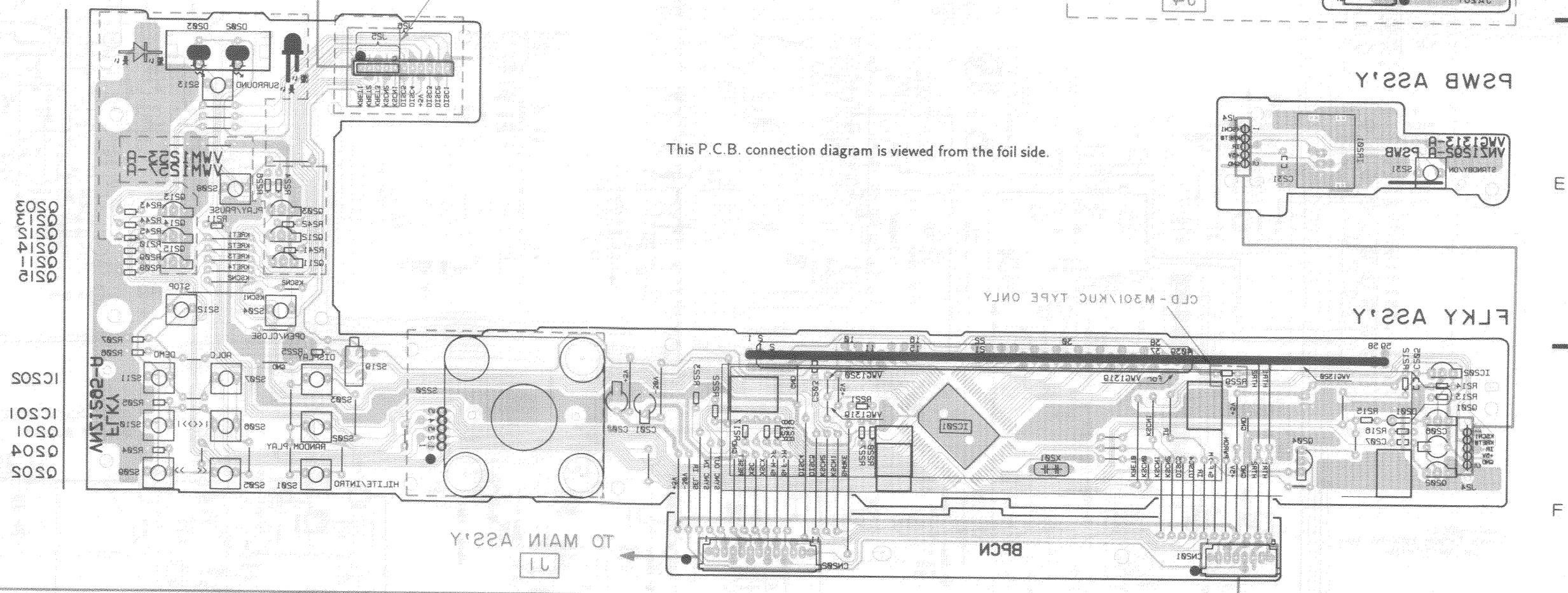
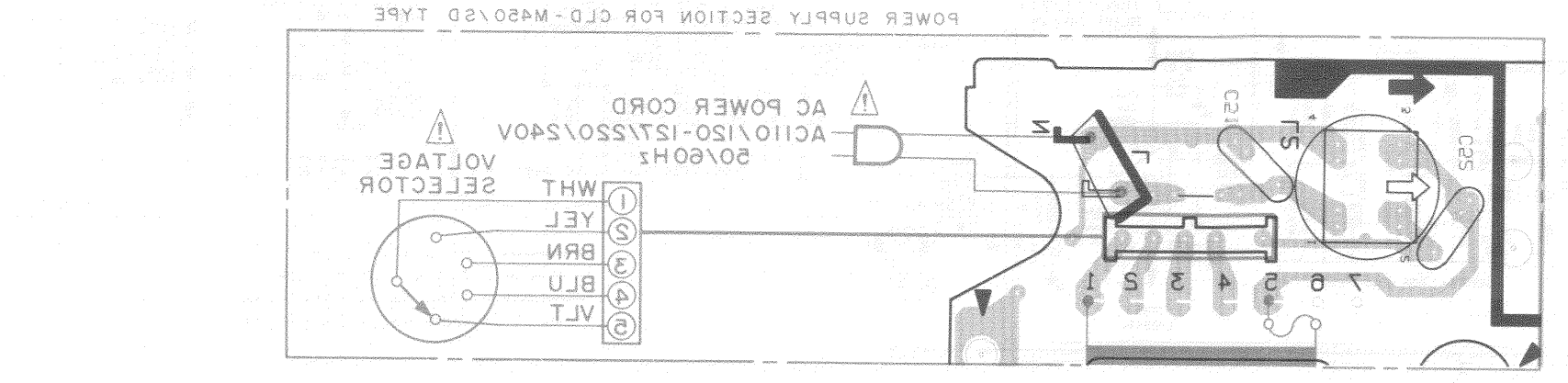
This P.C.B. connection diagram is viewed from the parts mounted side.



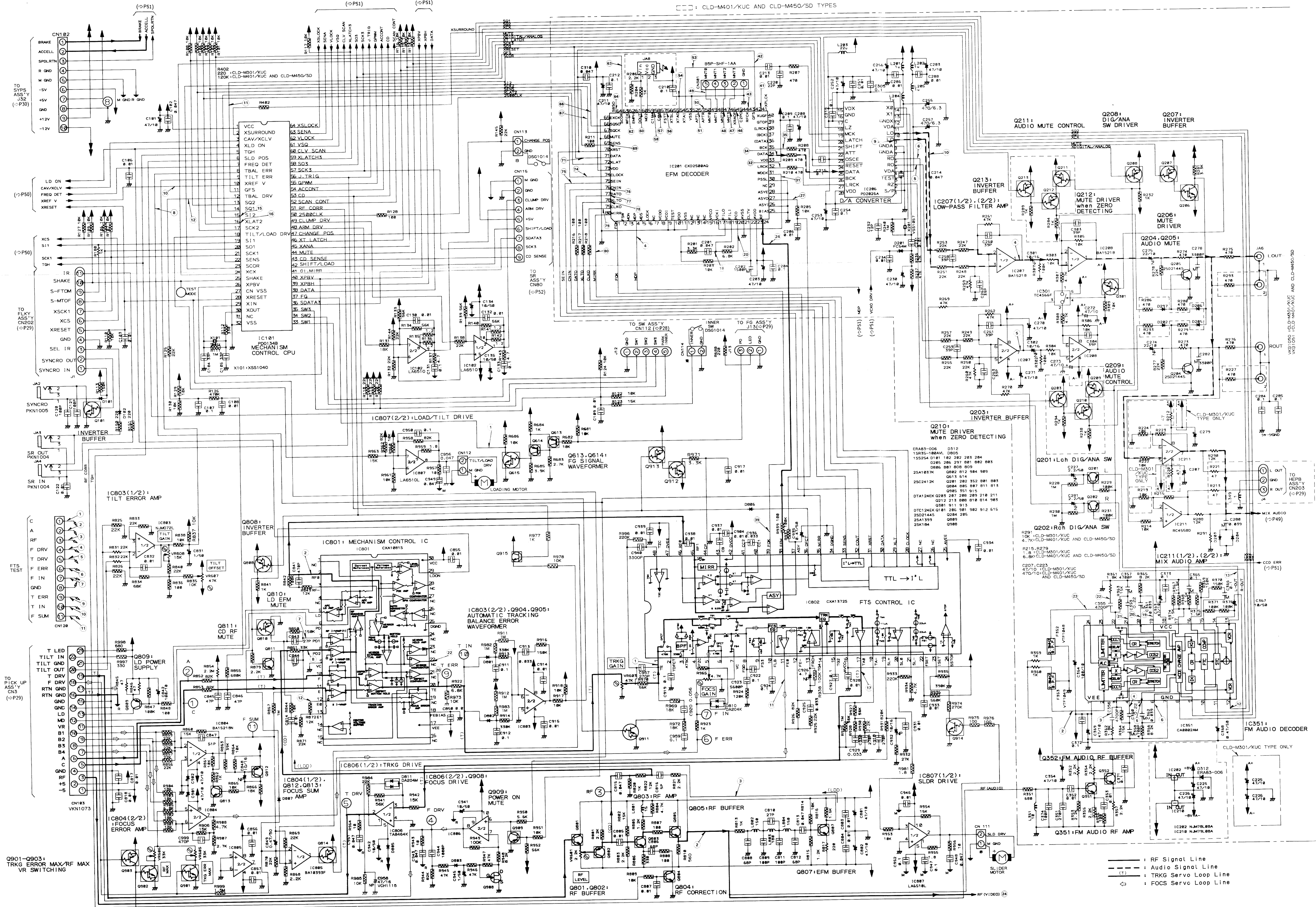
SYPS ASS'Y (VWR1140 FOR CLD-401/KUC TYPE)
(VWR1145 FOR CLD-301/KUC TYPE)
(VWR1124 FOR CLD-450/SD TYPE)
POWER SUPPLY SECTION FOR CLD-M401/KUC AND
CLD-M301/KUC TYPES



This P.C.B. connection diagram is viewed from the foil side.



5.2 MAIN ASSEMBLY (1/2) (FTS Section) AND AUDIO ASSEMBLY



WAVEFORMS AND VOLTAGES

FTS Section and AUDIO Assembly

Note : (No.) in the table correspond to the pin number.

IC101(PD0134B)		IC201 (CXD2500AQ)				IC206 (PD2026A)	
⑧ H: 5mS/Div. 2Vp-p DC mode	④ H: 10μS/Div. 2.7Vp-p OV	③⑥ 3.6 μs 4.8Vp-p	④⑨ 4.8Vp-p	⑥② 68 μs 5Vp-p	⑦⑥ H: 10mS/Div. 5Vp-p DC mode	⑤, ⑩ H: 0.5mS/Div. 4Vp-p DC mode	
⑩ H: 10mS/Div. 5Vp-p DC mode	⑱ 0.8Vp-p 2.8 μs	③⑦ 1.5 μs 4.8Vp-p	⑤⑩ 22.5 μs 4.8Vp-p	⑥③ 14 μs 5Vp-p	⑦⑦ H: 0.5mS/Div. 5Vp-p DC mode	⑥, ⑨ H: 0.5mS/Div. 4Vp-p DC mode	
⑪ H: 10mS/Div. 5Vp-p DC mode	⑳ H: 5μS/Div. 3.5Vpp OV	③⑧ 22 μs 4.8Vp-p	⑤① 22.5 μs 4.8Vp-p	⑥④ 13.5 μs 5Vp-p	⑦⑧ H: 0.5mS/Div. 5Vp-p DC mode		
⑫ H: 10mS/Div. 2.3Vp-p DC mode	⑲ 1Vp-p	④① 0.23 μs 4.8Vp-p	⑤③ 60 μs 4.8Vp-p	⑥⑥ 16 μs 5Vp-p	⑦⑨ H: 5μS/Div. 5Vp-p DC mode	①, ⑦ H: 0.5mS/Div. 6Vp-p DC mode	
⑮ H: 0.5mS/Div. 5Vp-p DC mode	⑲ 4.8Vp-p 0.23 μs	④② 4.8Vp-p 23 μs	⑤④ H: 50nS/Div. 2.7Vp-p DC mode	⑥⑦ 1.6 μs 5Vp-p	⑧⑩ H: 5mS/Div. 5Vp-p DC mode		
⑯ H: 2mS/Div. 4.7Vp-p DC mode	⑳ 4.8Vp-p 11.2 μs	④③ 17 μs 4.8Vp-p	⑤⑥ 90 μs 4.8Vp-p	⑥⑨ 16 μs 5Vp-p			
	⑳ 23 μs 4.8Vp-p	④⑥ 17 μs 4.8Vp-p	⑤⑦ 240ns 4.8Vp-p	⑦① 5Vp-p 16 μs			
	⑳ 5 μs 4.8Vp-p	④⑦ 17 μs 4.8Vp-p	⑤⑧ 60ns 4.8Vp-p	⑦④ 1.6 μs 5Vp-p			
	⑳ H: 0.5μS/Div. 5Vp-p DC mode	④⑧ 140 μs 4.8Vp-p	⑤⑩ 0.2 μs 5Vp-p	⑦⑤ H: 0.5mS/Div. 5Vp-p DC mode			

Note : (No.) in the table correspond to the pin number.

IC351 (CA0002AM)		IC801 (CXA1081S)		IC802 (CXA1372S)		CN120		Other points	
② H: 5mS/Div. 100mVp-p AC mode	⑳ H: 5mS/Div. 1.1Vp-p DC mode	② H: 10mS/Div. 1.7Vp-p AC mode	① H: 10mS/Div. 50mVp-p DC mode	① H: 10mS/Div. 130mVp-p DC mode	① Q615 Collector H: 1mS/Div. 5Vp-p OV				
③ H: 0.5mS/Div. 1.5Vp-p DC mode	⑳ H: 0.5mS/Div. 1.35Vp-p AC mode	⑦ H: 5mS/Div. 50mVp-p DC mode	⑪ H: 1mS/Div. 1.2Vp-p DC mode	② H: 10mS/Div. 130mVp-p AC mode	② Q805 Emitter H: 5mS/Div. 2Vp-p OV				
④ H: 0.5mS/Div. 1.1Vp-p DC mode	⑳ H: 5mS/Div. 100mVp-p AC mode	⑧ H: 10mS/Div. 40mVp-p DC mode	⑰ H: 1mS/Div. 2.5Vp-p DC mode	③ H: 5mS/Div. 330mVp-p AC mode	③ Q807 Collector H: 5mS/Div. 1Vp-p OV				
⑤ H: 0.5mS/Div. 1.1Vp-p DC mode		⑫ H: 10mS/Div. 200mVp-p AC mode		④ H: 10mS/Div. 7.5Vp-p AC mode					
⑥ H: 0.5mS/Div. 1Vp-p DC mode		⑳ H: 10mS/Div. 0.35Vp-p DC mode		⑤ H: 10mS/Div. 13.6Vp-p AC mode					
⑫ H: 0.5mS/Div. 1.5Vp-p DC mode				⑥ H: 10mS/Div. 2.3Vp-p AC mode					
⑬ H: 0.5mS/Div. 1.5Vp-p DC mode				⑦ H: 10mS/Div. 2.3Vp-p AC mode					
⑰ H: 0.5mS/Div. 1Vp-p DC mode				⑨ H: 10mS/Div. 1.3Vp-p AC mode					
⑳ H: 0.5mS/Div. 1Vp-p DC mode				⑩ H: 10mS/Div. 1.3Vp-p AC mode					
				⑪ H: 10mS/Div. AC mode					

Note : Waveforms and voltages are at the PLAY mode.
IC201 (CXD2500AQ)

Pin No.	Voltage	Pin No.	Volgate	Pin No.	Volgate	Pin No.	Volgate	Pin No.	Volgate	Pin No.	Volgate
1	4.8	15	0	29	0	43	*	57	*	61	*
2	0	16	4.8	30	0	44	0	58	*	72	5
3	0	17	0	31	*	45	4.8	59	5	73	5
4	*	18	*	32	*	46	*	60	*	74	*
5	0	19	2.4	33	4.8	47	*	61	5	75	*
6	4.8	20	*	34	*	48	*	62	*	76	*
7	—	21	0	35	*	49	*	63	*	77	*
8	4.8	22	2.3	36	*	50	*	64	*	78	*
9	0	23	4.8	37	*	51	*	65	0	79	*
10	0	24	*	38	*	52	0	66	*	80	*
11	0	25	0	39	0	53	*	67	*		
12	0	26	0	40	4.8	54	*	68	0		
13	0	27	*	41	*	55	0	69	*		
14	0	28	0	42	*	56	*	70	5		

* : Refer to waveforms

Note : Waveforms and voltages are at the PLAY mode.
IC351 (CA0002AM)

Pin No.	Volgate	Pin No.	Volgate
1	-5	13	*
2	*	14	-0.6
3	*	15	-0.6
4	*	16	0
5	*	17	0
6	*	18	+5
7	0	19	*
8	0	20	*
9	0	21	*
10	+5	22	*
11	+2	23	*
12	*	24	-2.2

* : Refer to waveforms

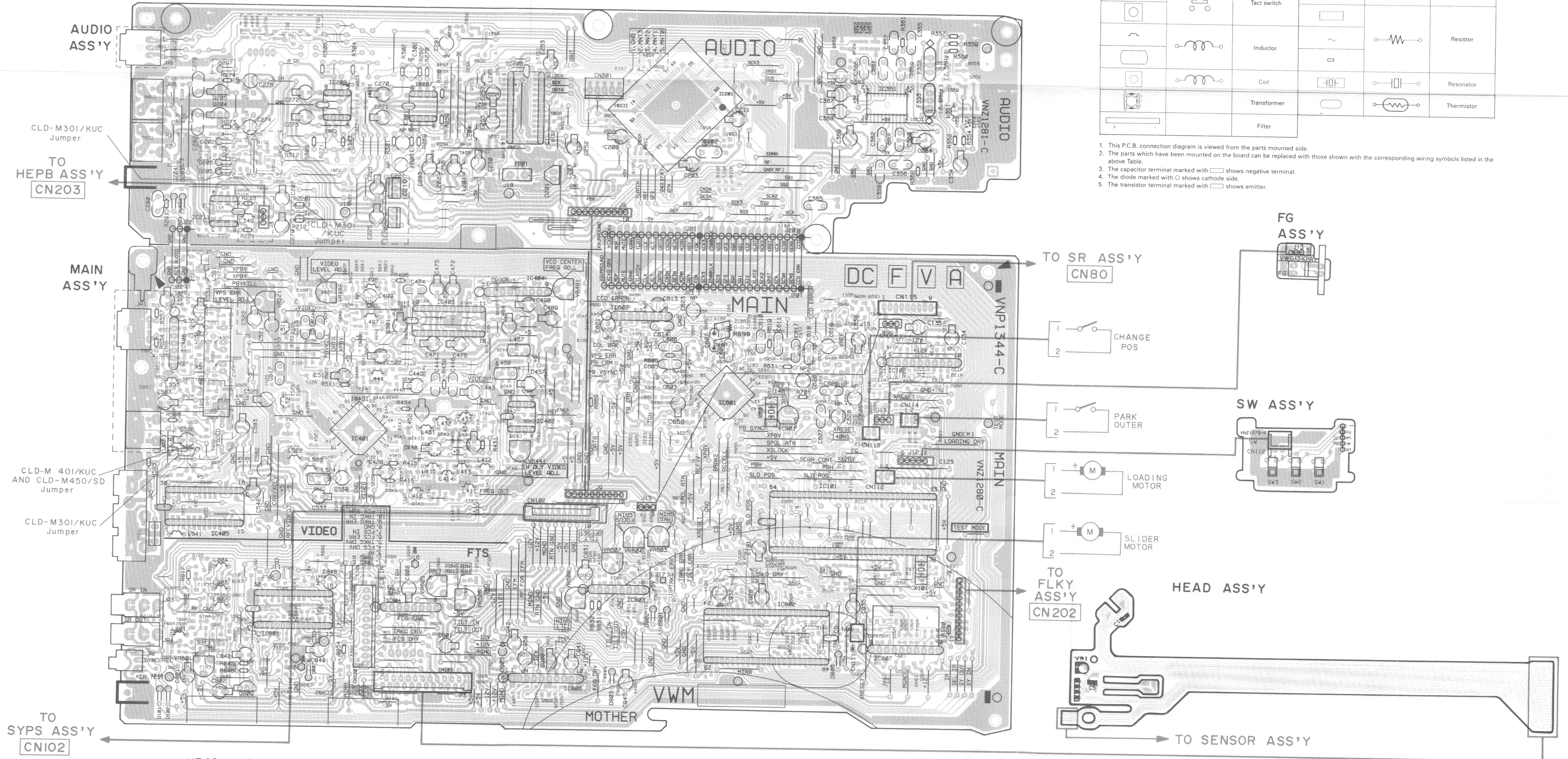
A
B
C
D
E
F

0150 0050
0500 0150
0205 0300 0130 0120 0200 0500
0050 0204 0211 0100 0201 0800 0202 0207 0508 0500 0206 0201 0321 0520

CLD-M401/KUC AND CLD-M450/SD TYPES

P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
					Styrol capacitor
		Diode			Electrolytic capacitor (Non polarized)
		Zener diode			Electrolytic capacitor (Noiseless)
		LED			Electrolytic capacitor (Polarized)
		Varactor			Power capacitor
		Tact switch			Semi-fixed resistor
		Resistor			Resistor
		Inductor			Resonator
		Coil			Thermistor
		Transformer			
		Filter			

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with shows negative terminal.
4. The diode marked with shows cathode side.
5. The transistor terminal marked with shows emitter.



VR601 VR521 VR482 VR605VR606 VR441 VR481 VR607VR604/R603 VC901

IC406 IC405 Q809 IC801 IC401 IC804 IC4032324IC404 Q908 0030IC602 0030 IC601 IC802 IC101 IC102

4220-1220 2100 1120 0020-2240 5240 1240IC402 IC806 0120IC803 4020 4120 5120 0020-2020IC102 4120 0120 0520

8220-7220 1120 8080 5180 1020 0020 5020 0020 7120 1020 4020 1120 2120 0520

0820-1820 0180 4180 8180 0020 5020 0020 0020 0020 0020 0020 0020 0020 0020

1420 7080 1180 2080 0020 0020 0020 0020 0020 0020 0020 0020 0020 0020

1010 2080-1080 0020 0020 0020 0020 0020 0020 0020 0020 0020 0020 0020 0020 0020

A
B
C
D
E
F

This P.C.B. connection diagram is viewed from the foil side.

CLD-M401KUC AND CLD-M402SD TYPES

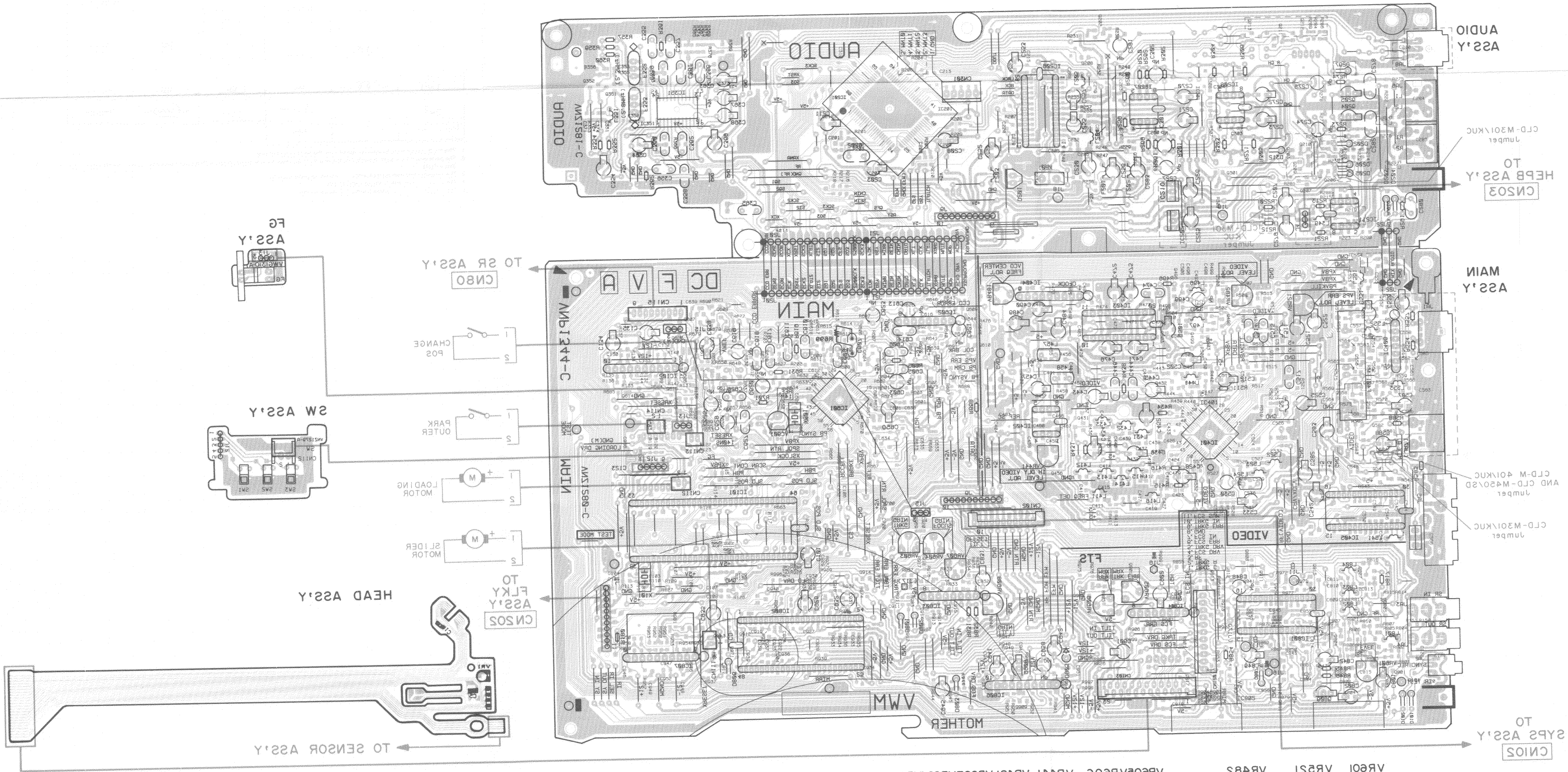
B

C

D

E

Q352 Q351 IC501 9020 9054 9051 9033 9050 9047 9024 9025 9026 9027 9028 9029 9030 9031 9032 9033 9034 9035 9036 9037 9038 9039 9040 9041 9042 9043 9044 9045 9046 9047 9048 9049 9050 9051 9052 9053 9054 9055 9056 9057 9058 9059 9060 9061 9062 9063 9064 9065 9066 9067 9068 9069 9070 9071 9072 9073 9074 9075 9076 9077 9078 9079 9080 9081 9082 9083 9084 9085 9086 9087 9088 9089 9090 9091 9092 9093 9094 9095 9096 9097 9098 9099 9100 9101 9102 9103 9104 9105 9106 9107 9108 9109 9110 9111 9112 9113 9114 9115 9116 9117 9118 9119 9120 9121 9122 9123 9124 9125 9126 9127 9128 9129 9130 9131 9132 9133 9134 9135 9136 9137 9138 9139 9140 9141 9142 9143 9144 9145 9146 9147 9148 9149 9150 9151 9152 9153 9154 9155 9156 9157 9158 9159 9160 9161 9162 9163 9164 9165 9166 9167 9168 9169 9170 9171 9172 9173 9174 9175 9176 9177 9178 9179 9180 9181 9182 9183 9184 9185 9186 9187 9188 9189 9190 9191 9192 9193 9194 9195 9196 9197 9198 9199 9200



F

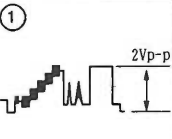
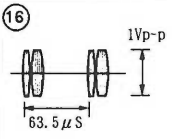
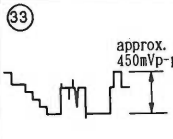
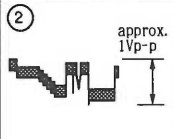
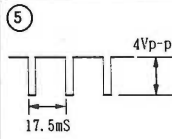
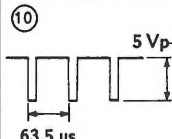
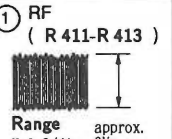
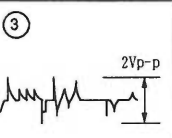
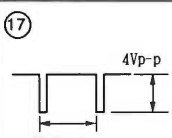
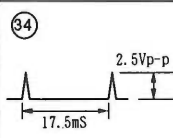
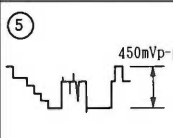
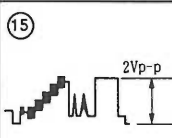
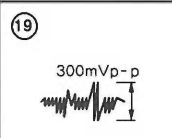
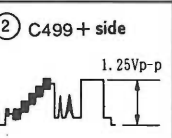
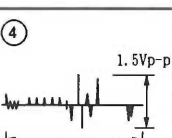
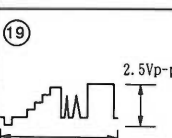
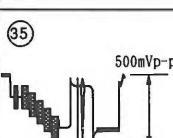
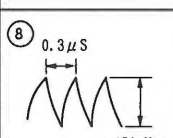
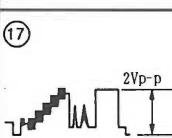
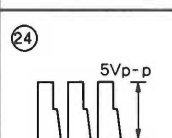
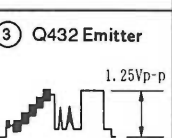
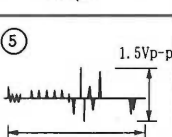
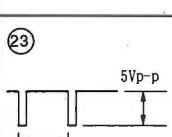
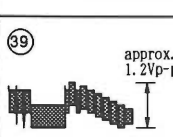
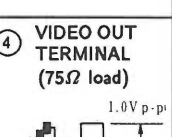
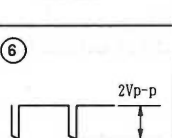
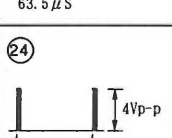
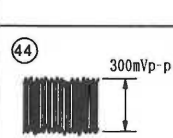
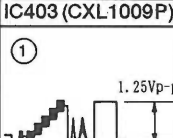
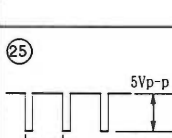
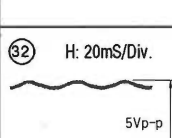
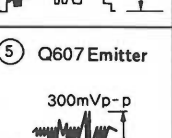
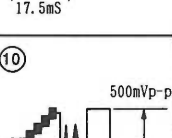
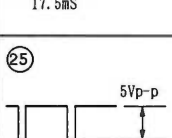
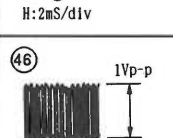
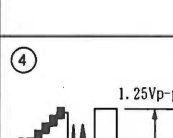
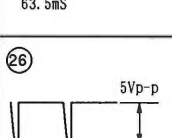
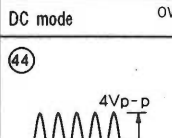
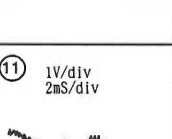
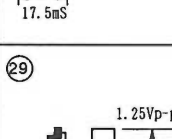
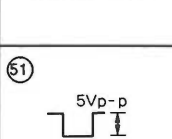
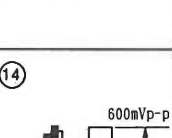
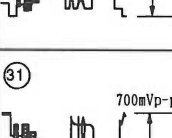
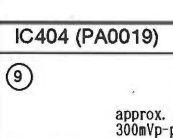
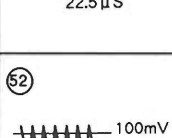
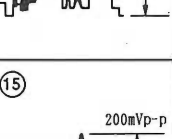
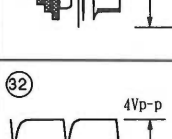
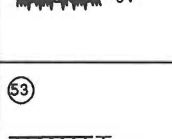
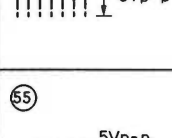
VC901 VR485 VR059R06 VR441 VR481 VR02VRR04VR03
 IC408 Q808 IC801 IC401 IC804 IC40359QIC404 Q908 609QIC035
 Q322 Q496-Q500 Q511 Q915 Q551-Q554
 Q812 Q808 Q911 Q801 Q810 Q903 Q901
 Q904 Q601 Q617 Q909 Q902 Q903 Q901
 Q602 Q905
 IC805 Q811 Q807 Q541
 Q801-Q805 Q101
 IC403 9024 9025 9026 9027 9028 9029 9030 9031 9032 9033 9034 9035 9036 9037 9038 9039 9040 9041 9042 9043 9044 9045 9046 9047 9048 9049 9050 9051 9052 9053 9054 9055 9056 9057 9058 9059 9060 9061 9062 9063 9064 9065 9066 9067 9068 9069 9070 9071 9072 9073 9074 9075 9076 9077 9078 9079 9080 9081 9082 9083 9084 9085 9086 9087 9088 9089 9090 9091 9092 9093 9094 9095 9096 9097 9098 9099 9100 9101 9102 9103 9104 9105 9106 9107 9108 9109 9110 9111 9112 9113 9114 9115 9116 9117 9118 9119 9120 9121 9122 9123 9124 9125 9126 9127 9128 9129 9130 9131 9132 9133 9134 9135 9136 9137 9138 9139 9140 9141 9142 9143 9144 9145 9146 9147 9148 9149 9150 9151 9152 9153 9154 9155 9156 9157 9158 9159 9160 9161 9162 9163 9164 9165 9166 9167 9168 9169 9170 9171 9172 9173 9174 9175 9176 9177 9178 9179 9180 9181 9182 9183 9184 9185 9186 9187 9188 9189 9190 9191 9192 9193 9194 9195 9196 9197 9198 9199 9200

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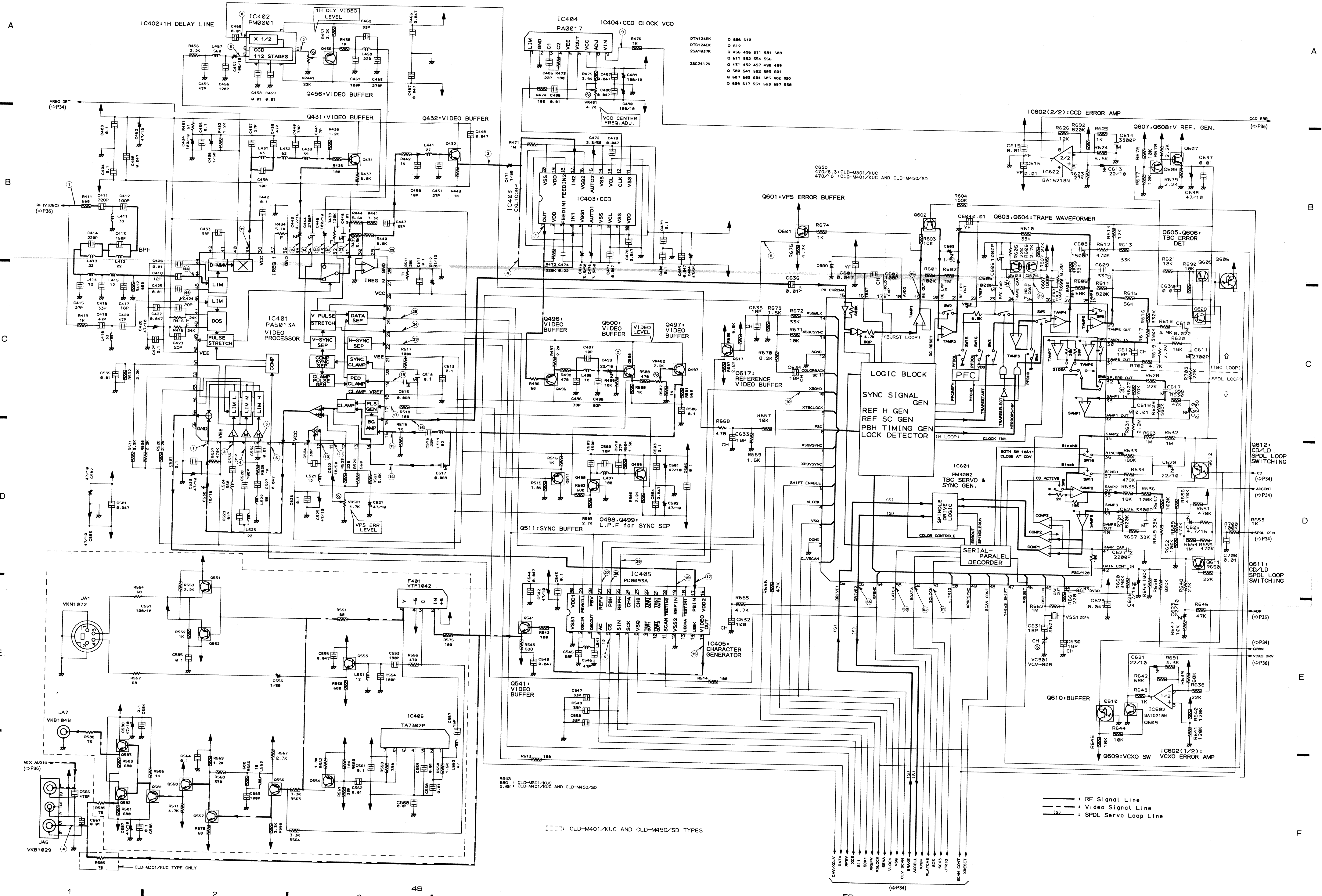
WAVEFORMS AND VOLTAGES

VIDEO and TBC Section

Note: (No.) in the table correspond to the pin number.

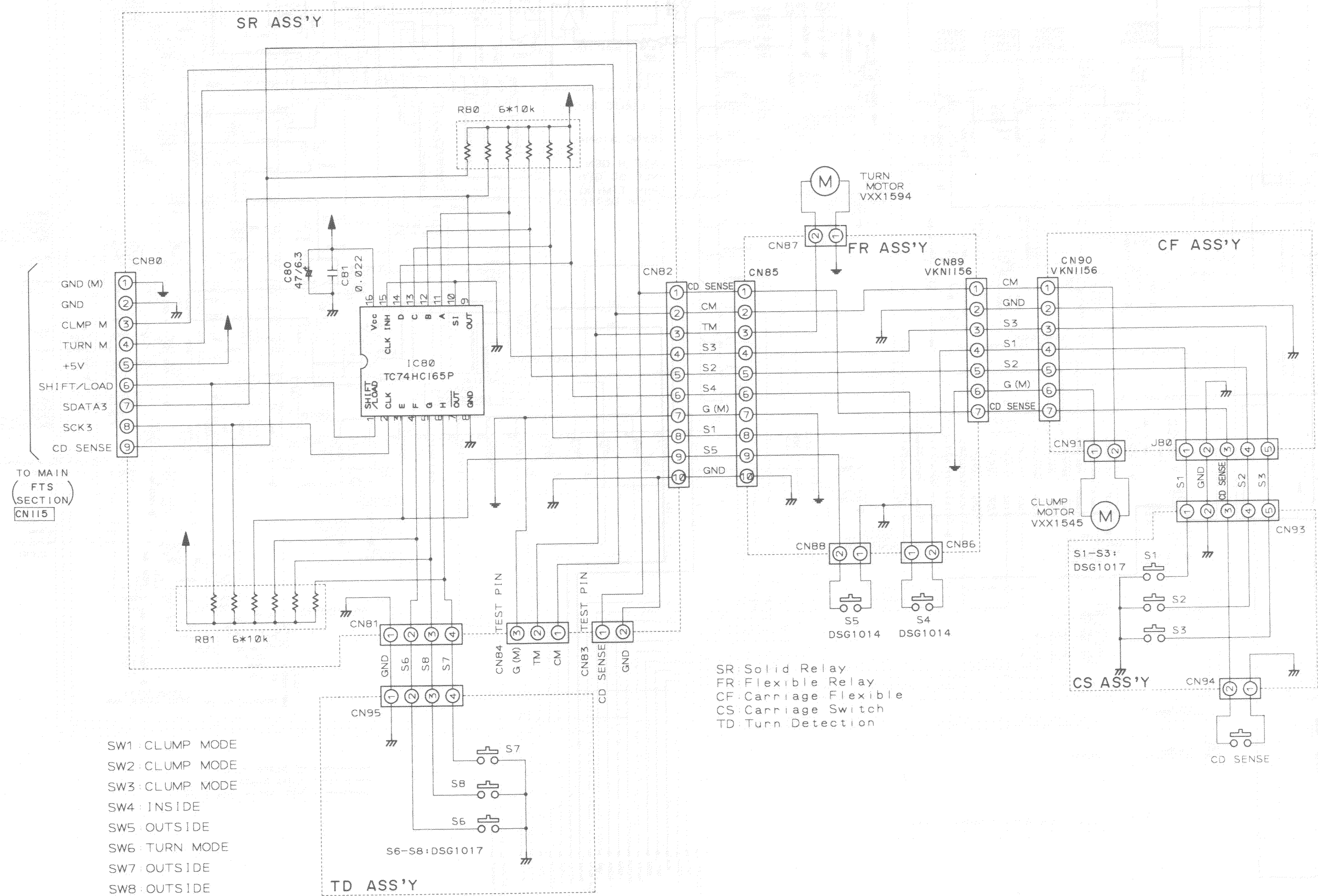
IC401 (PA5013A)		IC402 (PM0001)	IC405 (PD0093A)	IC601 (PM3002)	Other points	
① 	⑬ 	③③ 	② 	⑤ 	⑩ 	① RF (R 411-R 413) 
③ 	⑰ 	③④ 	⑤ 	⑮ 	⑰ 	② C499 + side 
④ 	⑰ 	③⑤ 	⑧ 	⑰ 	⑳ 	③ Q432 Emitter 
⑤ 	⑳ 	③⑨ 	IC403 (CXL1009P)		④ VIDEO OUT TERMINAL (75Ω load) 	
⑥ 	⑳ 	④④ 	① 	⑳ 	⑳ H: 20mS/Div. 	⑤ Q607 Emitter 
⑩ 	⑳ 	④⑥ 	④ 	⑳ 	④④ 	
⑪ 	⑳ 		IC404 (PA0019)		⑤① 	
⑭ 	⑳ 		⑨ 		⑤② 	
⑮ 	⑳ 				⑤③ 	
					⑤⑤ 	

5.3 MAIN ASSEMBLY (2/2) (VIDEO, TBC Section)



5.4 SR, TD, FR, CS AND CF ASSEMBLIES

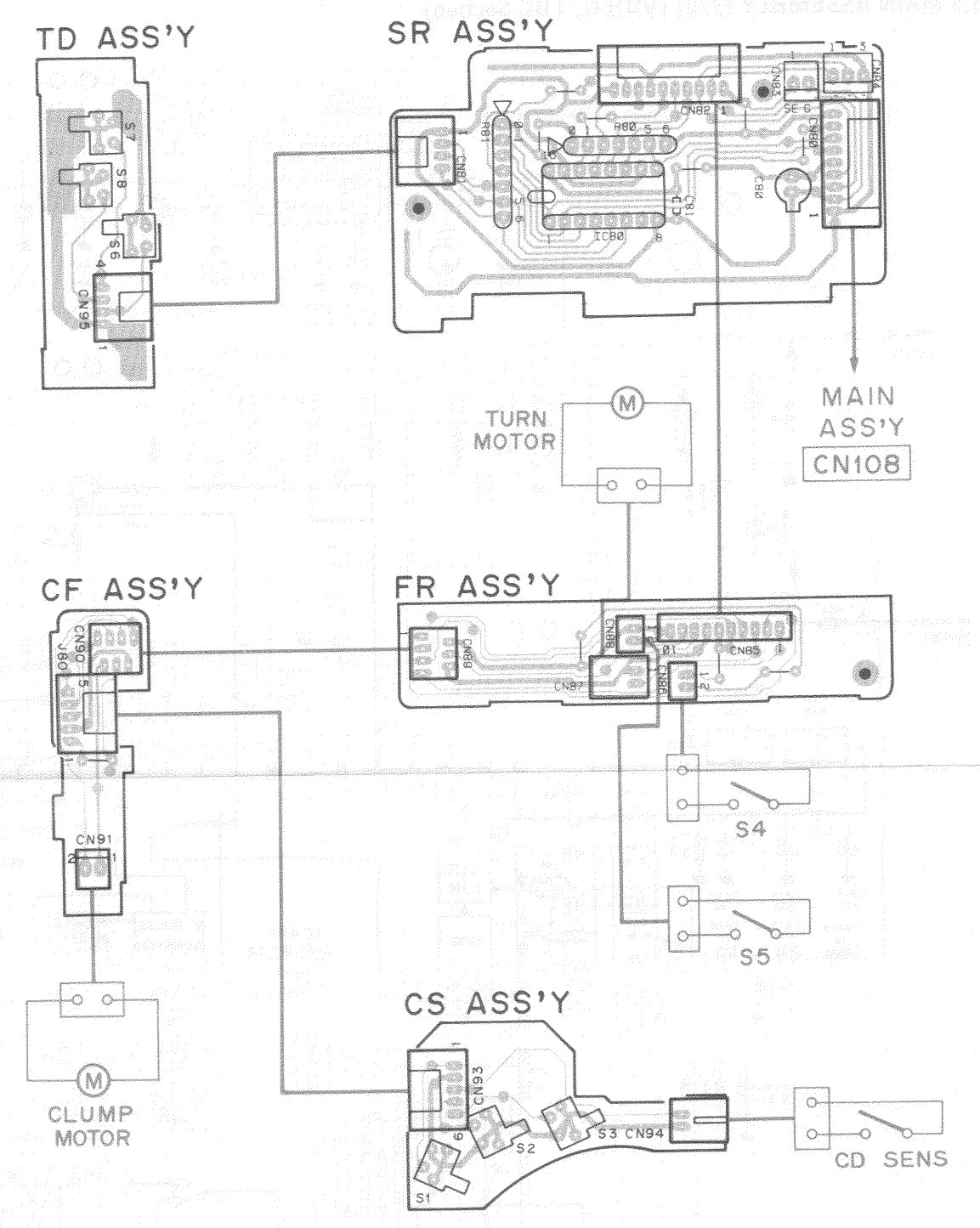
A
B
C
D
E
F



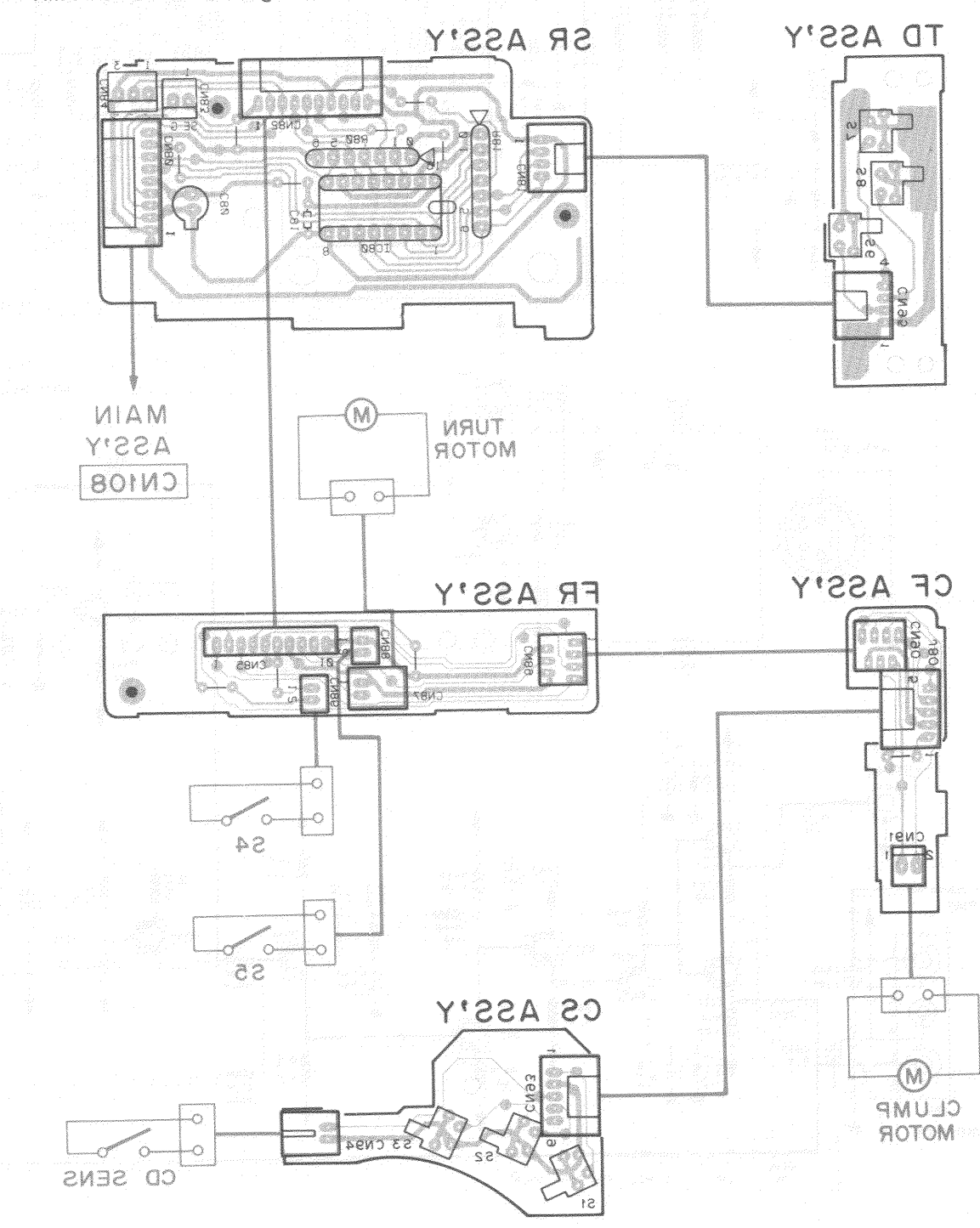
SR: Solid Relay
FR: Flexible Relay
CF: Carriage Flexible
CS: Carriage Switch
TD: Turn Detection

SW1: CLUMP MODE
SW2: CLUMP MODE
SW3: CLUMP MODE
SW4: INSIDE
SW5: OUTSIDE
SW6: TURN MODE
SW7: OUTSIDE
SW8: OUTSIDE

This P.C.B. connection diagram is viewed from the parts mounted side.



This P.C.B. connection diagram is viewed from the foil side.



6. PCB PARTS LIST

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω → 56 × 10 ¹ → 561	RD1/8PM	5 6 1 J
47kΩ → 47 × 10 ³ → 473	RD1/4PS	4 7 3 J
0.5Ω → 0R5	RN2H	0 R 5 K
1Ω → 010	RS1P	0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ → 562 × 10 ¹ → 5621	RN1/4PC	5 6 2 1 F
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Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
LIST OF ASSEMBLIES			IC806	OP AMP	TA8464K
⊙	MOTHER Assembly	VWM1265	IC807	POWER OP AMP	LA6510L
NSP	— MAIN Assembly	VWX1118	Q101	DIGITAL TRANSISTOR	DTC124EK
NSP	— SW Assembly	VWG1311	Q431,432	CHIP TRANSISTOR	2SC2412K
NSP	— FG Assembly	VWG1310	Q456,496	CHIP TRANSISTOR	2SA1037K
NSP	— AUDIO Assembly	VWX1119	Q497-500	CHIP TRANSISTOR	2SC2412K
⊙	SYPS Assembly	VWR1140	Q511	CHIP TRANSISTOR	2SA1037K
⊙	FLKB Assembly	VWM1257	Q541,551	CHIP TRANSISTOR	2SC2412K
NSP	— FLKY Assembly	VWG1320	Q552	CHIP TRANSISTOR	2SA1037K
NSP	— PSWB Assembly	VWG1313	Q553	CHIP TRANSISTOR	2SC2412K
NSP	— HEPB Assembly	VWV1242	Q554,556	CHIP TRANSISTOR	2SA1037K
NSP	— SELD Assembly	VWG1322	Q557,558	CHIP TRANSISTOR	2SC2412K
NSP	SR Assembly	VWG1251	Q581	CHIP TRANSISTOR	2SA1037K
NSP	FR Assembly	VWG1252	Q582,583	CHIP TRANSISTOR	2SC2412K
NSP	CS Assembly	VWG1253	Q601-605	CHIP TRANSISTOR	2SC2412K
NSP	CF Assembly	VWG1254	Q606	DIGITAL TRANSISTOR	DTA124EK
NSP	TD Assembly	VWG1255	Q607	CHIP TRANSISTOR	2SC2412K
	HEAD Assembly	VWV1064	Q608	CHIP TRANSISTOR	2SA1037K
			Q609	CHIP TRANSISTOR	2SC2412K
			Q610	DIGITAL TRANSISTOR	DTA124EK
			Q611	CHIP TRANSISTOR	2SA1037K
			Q612	DIGITAL TRANSISTOR	DTC124EK
			Q613,614	CHIP TRANSISTOR	2SA1037K
			Q615	DIGITAL TRANSISTOR	DTC124EK
			Q617,620	CHIP TRANSISTOR	2SC2412K
			Q801	CHIP TRANSISTOR	2SC2412K
			Q802	CHIP TRANSISTOR	2SA1037K
			Q803-805	CHIP TRANSISTOR	2SC2412K
			Q807	CHIP TRANSISTOR	2SC2412K
			Q808	DIGITAL TRANSISTOR	DTA124EK
			Q809	TRANSISTOR	2SA1399
			Q810	DIGITAL TRANSISTOR	DTA124EK
			Q811	CHIP TRANSISTOR	2SC2412K
			Q812	CHIP TRANSISTOR	2SA1037K
			Q813	CHIP TRANSISTOR	2SC2412K
			Q814	DIGITAL TRANSISTOR	DTA124EK
			Q901,902	DIGITAL TRANSISTOR	DTC124EK
			Q903	DIGITAL TRANSISTOR	DTA124EK
			Q908	N-FET	2SK184
			Q909	CHIP TRANSISTOR	2SA1037K
			Q911,912	DIGITAL TRANSISTOR	DTC124EK

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
Q913	DIGITAL TRANSISTOR	DTA124EK	C416	CHIP CAPACITOR	CCSQCH330J50
Q914	DIGITAL TRANSISTOR	DTC124EK	C417	CHIP CAPACITOR	CCSQCH180J50
Q915	CHIP TRANSISTOR	2SC2412K	C418	CHIP CAPACITOR	CCSQCH120J50
D101,102	DIODE	1SS254	C419,420	CHIP CAPACITOR	CCSQCH470J50
D801-803	DIODE	1SS254	C423,424	CHIP CAPACITOR	CCSQCH200J50
D805	DIODE	1SR35-100AVL	C425,426	CHIP CAPACITOR	CKSQYF103Z50
D806-807	DIODE	1SS254	C427	CERAMIC CAPACITOR	CKSQYF473Z25
D810,811	DIODE	DA204K	C428	ELECT. CAPACITOR	CEAS470M10
			C429	CERAMIC CAPACITOR	CKSQYF104Z25
			C433	CHIP CAPACITOR	CCSQCH390J50
			C434	ELECT. CAPACITOR	CEAS101M10
			C435	CERAMIC CAPACITOR	CKSQYF104Z25
			C436	ELECT. CAPACITOR	CEAS101M50
			C437	CHIP CAPACITOR	CCSQCH270J50
			C438	CHIP CAPACITOR	CCSQCH100D50
			C439	CHIP CAPACITOR	CCSQCH470J50
			C440	CHIP CAPACITOR	CCSQCH390J50
			C441	CHIP CAPACITOR	CCSQCH070D50
			C442	CERAMIC CAPACITOR	CKSQYF104Z25
			C443	ELECT. CAPACITOR	CEANP4R7M16
			C444	MYLAR FILM CAPACITOR	CQMA272J50
			C445	ELECT. CAPACITOR	CEAS101M10
			C446	MYLAR FILM CAPACITOR	CQMA103J50
			C447	CHIP CAPACITOR	CCSQCH330J50
			C448	CERAMIC CAPACITOR	CKSQYF473Z25
			C450	CHIP CAPACITOR	CCSQCH100D50
			C451	CHIP CAPACITOR	CCSQCH270J50
			C452	ELECT. CAPACITOR	CEAS470M10
			C455	CHIP CAPACITOR	CCSQCH470J50
			C456	CHIP CAPACITOR	CCSQCH121J50
			C457	ELECT. CAPACITOR	CEAS101M10
			C458-460	CHIP CAPACITOR	CKSQYF103Z50
			C461	CHIP CAPACITOR	CCSQCH101J50
			C462	CHIP CAPACITOR	CCSQCH330J50
			C463	CHIP CERAMIC C.	CCSQCH271J50
			C466,467	CERAMIC CAPACITOR	CKSQYF473Z25
			C471	ELECT. CAPACITOR	CEAS010M50
			C472	ELECT. CAPACITOR	CEAS3R3M50
			C473	CERAMIC CAPACITOR	CKSQYF473Z25
			C474	AUDIO FILM CAPACITOR	CFTXA224J50
			C475,476	ELECT. CAPACITOR	CEAS3R3M50
			C477,478	CERAMIC CAPACITOR	CKSQYF473Z25
			C479,480	CERAMIC CAPACITOR	CKSQYF104Z25
			C483	CERAMIC CAPACITOR	CKSQYF473Z25
			C484	ELECT. CAPACITOR	CEAS470M25
			C485	CHIP CERAMIC C.	CCSQCH220J50
			C486	CHIP CAPACITOR	CKSQYF103Z50
			C487,488	CERAMIC CAPACITOR	CKSQYF473Z25
			C489,490	ELECT. CAPACITOR	CEAS101M10
			C496	CHIP CAPACITOR	CCSQCH390J50
			C497	CHIP CAPACITOR	CCSQCH100D50
			C498	CHIP CAPACITOR	CCSQCH820J50
			C499	ELECT. CAPACITOR	CEANP220M10
			C500	CHIP CAPACITOR	CCSQCH100D50
			C501,502	ELECT. CAPACITOR	CEAS470M10
			C503	CERAMIC CAPACITOR	CKSQYF104Z25
			C504	CERAMIC CAPACITOR	CKSQYF473Z25
			C505,506	CERAMIC CAPACITOR	CKSQYF104Z25
			C509	CHIP CAPACITOR	CCSQCH151J50
			C510	CHIP CAPACITOR	CCSQCH270J50

COILS, FILTERS

CAPACITORS

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
C511	CERAMIC CAPACITOR	CKSQYF104Z25	C618	MYLAR FILM CAPACITOR	CQMA103J50
C512	ELECT. CAPACITOR	CEAS470M10	C619	ELECT. CAPACITOR	CEANP2R2M50
C513	CERAMIC CAPACITOR	CKSQYF104Z25	C620,621	ELECT. CAPACITOR	CEANP220M10
C514	AUDIO FILM CAPACITOR	CFTXA104J50	C623	ELECT. CAPACITOR	CEANP220M10
C515	AUDIO FILM CAPACITOR	CFTXA683J50	C625	ELECT. CAPACITOR	CEANP4R7M16
C516	CHIP CERAMIC C.	CCSQCH220J50	C626	AUDIO FILM CAPACITOR	CFTXA332J50
C517	AUDIO FILM CAPACITOR	CFTXA683J50	C627	MYLAR FILM CAPACITOR	CQMA222J50
C521	ELECT. CAPACITOR	CEAS470M10	C628	ELECT. CAPACITOR	CEANP4R7M16
C522	ELECT. CAPACITOR	GEHAQ100M50	C629	CERAMIC CAPACITOR	CKSQYF473Z25
C524	CHIP CAPACITOR	CCSQCH390J50	C630,631	CHIP CAPACITOR	CCSQCH180J50
C525	ELECT. CAPACITOR	CEAS470M10	C632	CHIP CAPACITOR	CCSQCH101J50
C526	CERAMIC CAPACITOR	CKSQYF104Z25	C633-635	CHIP CAPACITOR	CCSQCH180J50
C527	CERAMIC CAPACITOR	CKSQYF473Z25	C636,637	CHIP CAPACITOR	CKSQYF103Z50
C528	CHIP CAPACITOR	CCSQCH101J50	C638	ELECT. CAPACITOR	CEAS470M10
C529	CHIP CAPACITOR	CCSQCH910J50	C639,700	CHIP CAPACITOR	CKSQYF103Z50
C530	ELECT. CAPACITOR	CEANP100M16	C650	ELECT. CAPACITOR	CEAS471M10
C531	CERAMIC CAPACITOR	CKSQYF104Z25	C801,802	ELECT. CAPACITOR	CEAS470M10
C532	CHIP CAPACITOR	CKSQYF103Z50	C803-805	CHIP CAPACITOR	CKSQYF103Z50
C533	ELECT. CAPACITOR	CEAS470M10	C806	CHIP CAPACITOR	CCSQCH680J50
C535	CHIP CAPACITOR	CKSQYF103Z50	C807	CHIP CAPACITOR	CKSQYF103Z50
C536	CHIP CAPACITOR	CCSQCH910J50	C808	CHIP CAPACITOR	CCSQCH680J50
C542	ELECT. CAPACITOR	CEAS470M10	C809	CHIP CAPACITOR	CCSQCH101J50
C543	CERAMIC CAPACITOR	CKSQYF104Z25	C810	CHIP CAPACITOR	CCSQCH270J50
C544	CERAMIC CAPACITOR	CKSQYF473Z25	C811	CHIP CAPACITOR	CCSQCH101J50
C545	CHIP CAPACITOR	CCSQCH680J50	C812	CHIP CAPACITOR	CCSQCH680J50
C546	CHIP CAPACITOR	CCSQCH470J50	C813	CERAMIC CAPACITOR	CKSQYF473Z25
C547	CHIP CAPACITOR	CCSQCH330J50	C814	CHIP CAPACITOR	CKSQYF103Z50
C548	CERAMIC CAPACITOR	CKSQYF473Z25	C815	CERAMIC CAPACITOR	CKSQYF473Z25
C549,550	CHIP CAPACITOR	CCSQCH330J50	C816	CHIP CAPACITOR	CCSQCH050C50
C551	ELECT. CAPACITOR	CEAS101M10	C817,818	CHIP CAPACITOR	CKSQYF103Z50
C553	CHIP CAPACITOR	CCSQCH181J50	C831	ELECT. CAPACITOR	CEAS010M50
C554	CHIP CAPACITOR	CCSQCH101J50	C832	CHIP CAPACITOR	CKSQYF103Z50
C555,568	CERAMIC CAPACITOR	CKSQYF473Z25	C841,999	CHIP CERAMIC C.	CCSQCH471J50
C556	ELECT. CAPACITOR	CEAS010M50	C842	ELECT. CAPACITOR	CEAS101M10
C557	CHIP CERAMIC C.	CCSQCH150J50	C843	CHIP CAPACITOR	CCSQCH270J50
C558,559	CHIP CAPACITOR	CKSQYF103Z50	C844	CHIP CAPACITOR	CCSQCH050C50
C561	CERAMIC CAPACITOR	CKSQYF104Z25	C845,846	CHIP CAPACITOR	CCSQCH470J50
C562	CHIP CAPACITOR	CKSQYF103Z50	C847	CERAMIC CAPACITOR	CCSQCH510J50
C563	CHIP CAPACITOR	CCSQCH101J50	C848	ELECT. CAPACITOR	CEANP100M16
C564	CERAMIC CAPACITOR	CKSQYF104Z25	C849	ELECT. CAPACITOR	CEJAR47M50
C566	CHIP CERAMIC C.	CCSQCH471J50	C850	CHIP CAPACITOR	CKSQYF103Z50
C581	CERAMIC CAPACITOR	CKSQYF473Z25	C855-857	CHIP CAPACITOR	CKSQYF103Z50
C582,583	ELECT. CAPACITOR	CEAS470M10	C901,902	ELECT. CAPACITOR	CEAS470M10
C584-586	CERAMIC CAPACITOR	CKSQYF104Z25	C904	CHIP CAPACITOR	CKSQYF103Z50
C587,588	ELECT. CAPACITOR	CEAS470M10	C911,912	CERAMIC CAPACITOR	CKSQYF104Z25
C601	CERAMIC CAPACITOR	CKSQYF473Z25	C913	CERAMIC CAPACITOR	CKSQYB333K25
C602	CHIP CAPACITOR	CCSQCH101J50	C914,915	CHIP CAPACITOR	CKSQYF103Z50
C603	ELECT. CAPACITOR	CEANP010M50	C917	CHIP CAPACITOR	CKSQYF103Z50
C604	CHIP CAPACITOR	CKSQYF103Z50	C918	CHIP CERAMIC C.	CCSQCH271J50
C605,606	AUDIO FILM CAPACITOR	CFTXA102J50	C919	CERAMIC CAPACITOR	CKSQYF104Z25
C607	MYLAR FILM CAPACITOR	CQMA102J50	C920	CERAMIC CAPACITOR	CKSQYB562K50
C608	AUDIO FILM CAPACITOR	CFTXA152J50	C922	CERAMIC CAPACITOR	CKSQYF104Z25
C609	CHIP CAPACITOR	CCSQCH330J50	C923	CERAMIC CAPACITOR	CKSQYB562K50
C610	MYLAR FILM CAPACITOR	CQMA223J50	C924	CERAMIC CAPACITOR	CKSQYF104Z25
C611	MYLAR FILM CAPACITOR	CQMA272J50	C925	CERAMIC CAPACITOR	CKSQYB333K25
C612	CHIP CAPACITOR	CCSQCH180J50	C926	ELECT. CAPACITOR	CEANP4R7M16
C613	ELECT. CAPACITOR	CEANP220M10	C927	CERAMIC CAPACITOR	CKSQYF104Z25
C614	AUDIO FILM CAPACITOR	CFTXA332J50	C928	CHIP CAPACITOR	CKSQYF103Z50
C615,616	CHIP CAPACITOR	CKSQYF103Z50	C929	CERAMIC CAPACITOR	CKSQYB333K25
C617	MYLAR FILM CAPACITOR	CQMA563J50	C930,957	CHIP CERAMIC C.	CCSQCH271J50

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
C931	CHIP CAPACITOR	CKSQYF103Z50	JA5	JACK	VKB1029
C932	ELECT. CAPACITOR	CEANP4R7M16	JA7	JACK	VKB1048
C933,934	CHIP CAPACITOR	CKSQYF103Z50	X101	CERAMIC RESO. (9.00MHz)	VSS1040
C935	ELECT. CAPACITOR	CEJAR47M50	X601	CRYSTAL RESO. (14.318MHz)	VSS1026
C936	CERAMIC CAPACITOR	CKSQYB333K25		TERMINAL	VNE1841
C937-939	CHIP CAPACITOR	CKSQYF103Z50			
C940	CERAMIC CAPACITOR	CKSQYB332K50	SW Assembly		
C941,942	ELECT. CAPACITOR	CEHAQ100M50	SWITCHES		
C943	CERAMIC CAPACITOR	CKSQYF473Z25	S1-3	PUSH SWITCH	DSG1015
C944	CHIP CAPACITOR	CKSQYB102K50	FG Assembly		
C945	ELECT. CAPACITOR	CEAS010M50	OTHERS		
C946	CHIP CAPACITOR	CKSQYF103Z50	D		GP1S51
C947	CERAMIC CAPACITOR	CKSQYF104Z25	AUDIO Assembly		
C948,949	CERAMIC CAPACITOR	CKSQYF473Z25	SEMICONDUCTORS		
C950	CERAMIC CAPACITOR	CKSQYF104Z25	IC201	EFM DEMODULATION IC	CXD2500AQ
C951	CERAMIC CAPACITOR	CKSQYF473Z25	IC202	REGULATOR IC	NJM78L08A
C952	CERAMIC CAPACITOR	CKSQYF104Z25	IC206	D/A CONVERTER IC	PD2026A
C956	CERAMIC CAPACITOR	CKSQYF473Z25	IC207,208	OP-AMP IC	BA15218
C958	CERAMIC TRIMMER	VCH1115	IC210	REGULATOR IC	NJM79L08A
C959	CERAMIC CAPACITOR	CKSQYF104Z25	IC211	OP-AMP IC	RC4558D
			IC301	LOGIC IC	TC4S66F-TR
			IC351	AUDIO IC	CA0002AM
			Q201,202	CHIP TRANSISTOR	2SC2412K
			Q203	DIGITAL TRANSISTOR	DTA124EK
			Q204,205	TRANSISTOR	2SD2144S
			Q206	DIGITAL TRANSISTOR	DTC124EK
			Q207-213	DIGITAL TRANSISTOR	DTA124EK
			Q301	DIGITAL TRANSISTOR	DTA124EK
			Q351,352	CHIP TRANSISTOR	2SC2412K
			D201	VARI-CAP	FC54M
			D202-206	DIODE	1SS254
			D297	DIODE	1SS254
			D312	SCHOTTKY DIODE	ERA83-006
			COILS, FILTERS		
			L201,202	AXIAL INDUCTOR	LAU010K
			L203	AXIAL INDUCTOR	LAU220J
			L204,205	AXIAL INDUCTOR	LAU010K
			L349	AXIAL INDUCTOR	LAU010K
			L351	AXIAL INDUCTOR	LAU100J
			F352		VTF1048
			F353		VTF1049
			CAPACITORS		
			C201	CERAMIC CAPACITOR	CKSQYF473Z25
			C202	AUDIO FILM CAPACITOR	CFTXA152J50
			C203	ELECT. CAPACITOR	CEAS470M10
			C204	CERAMIC CAPACITOR	CKSQYF104Z25
			C206	CHIP CAPACITOR	CKSQYF103Z50
			C207	ELECT. CAPACITOR	CEAS471M10
			C208	ELECT. CAPACITOR	CEAS470M10
			C209,210	CERAMIC CAPACITOR	CKSQYF104Z25
			C211	ELECT. CAPACITOR	CEAS470M10
			C212	CERAMIC CAPACITOR	CKSQYF104Z25
RESISTORS					
VR441	VR(22k)	VRTB6VS223			
VR481	VR(4.7K)	VRTB6VS472			
VR482	VR(2.2K)	VRTB6VS222			
VR521	VR(4.7K)	VRTB6VS472			
VR601	VR(2.2K)	VRTB6VS222			
VR603,604	VR	VRTB6VS473			
VR605,606	VARIABLE RESISTOR	VRTB6VS333			
VR607	VR	VRTB6VS473			
VR608	VR	VRTB6VS153			
R180	CARBON FILM RESISTOR	RD1/6PM102J			
R415	METALFILM RESISTOR	RN1/6PQ2402F			
R416	METALFILM RESISTOR	RN1/6PQ2402F			
R431	CARBON FILM RESISTOR	RD1/6PM510J			
R434	METALFILM RESISTOR	RN1/6PQ5101F			
R438	METALFILM RESISTOR	RN1/6PQ1203F			
R496	CARBON FILM RESISTOR	RD1/6PM680J			
R511	METALFILM RESISTOR	RN1/6PQ2002F			
R554	CARBON FILM RESISTOR	RD1/6PM680J			
R557	CARBON FILM RESISTOR	RD1/6PM680J			
R585	CARBON FILM RESISTOR	RD1/6PM750J			
R588	CARBON FILM RESISTOR	RD1/6PM750J			
R605	CARBON FILM RESISTOR	RD1/6PM221J			
R619	CARBON FILM RESISTOR	RD1/6PM225J			
R631	CARBON FILM RESISTOR	RD1/6PM225J			
R668	CARBON FILM RESISTOR	RD1/6PM471J			
R701	CARBON FILM RESISTOR	RD1/6PM824J			
R817	CARBON FILM RESISTOR	RD1/6PM221J			
R831,832	CARBON FILM RESISTOR	RD1/6PM223J			
R845,846	CARBON FILM RESISTOR	RD1/6PM470J			
R854	CARBON FILM RESISTOR	RD1/6PM225J			
	Other resistors	RS1/10S□□□J			
OTHERS					
CN103		VKN1073			
JA1	SOCKET	VKN1072			
JA2	JACK	PKN1005			
JA3	JACK/12V	PKN1004			
JA4	JACK/12V	PKN1004			

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
C213	CHIP CAPACITOR	CKSQYF103Z50	R357	CARBON FILM RESISTOR	RD1/6PM222J
C214	CERAMIC CAPACITOR	CKSQYF473Z25	R359,360	CARBON FILM RESISTOR	RD1/6PM102J
C215,219	CERAMIC CAPACITOR	CKSQYF104Z25	R361,362	CARBON FILM RESISTOR	RD1/6PM182J
C220	CHIP CERAMIC C.	CCSQCH220J50		Other resistors	RS1/10S□□□J
C225,226	ELECT. CAPACITOR	CEAS470M10			
C227	ELECT. CAPACITOR	CEANP2R2M50	OTHERS		
C230	ELECT. CAPACITOR	CEAS470M10	CN301		B5P-SHF-1AA
C231	CHIP CAPACITOR	CKSQYF103Z50	JA6	JACK	VKB1051
C232	CHIP CAPACITOR	CCSQCH120J50	JA8	OPTICAL OUTPUT JACK	TOTX178
C234,251	CHIP CAPACITOR	CKSQYF103Z50	X201	CRYSTAL RESONATOR	VSS1057
C252,253	ELECT. CAPACITOR	CEAS470M10		TERMINAL	VNE1841
C254	CERAMIC CAPACITOR	CKSQYF104Z25			
C255	ELECT. CAPACITOR	CEAS471M10			
C256	ELECT. CAPACITOR	CEAS470M10			
C257	ELECT. CAPACITOR	CEAS471M10			
C258-263	CHIP CAPACITOR	CCSQCH390J50	SYPS Assembly		
C270-273	ELECT. CAPACITOR	CEAS470M10	SEMICONDUCTORS		
C274,275	ELECT. CAPACITOR	CEANP220M10	△ IC1	REGULATOR IC	NJM78M05FA
C278	AUDIO FILM CAPACITOR	CFTXA332J50	△ IC2	LINEAR IC	NJM4558D
C279	ELECT. CAPACITOR	CEAS471M10	△ IC201	IC PROTECTOR	ICP-N15
C280	AUDIO FILM CAPACITOR	CFTXA393J50	△ IC202	IC PROTECTOR	ICP-N15
C281	ELECT. CAPACITOR	CEANP2R2M50			
C282	AUDIO FILM CAPACITOR	CFTXA332J50	△ Q1,2	TRANSISTOR	2SB1185
C283	ELECT. CAPACITOR	CEAS470M10	△ Q3	TRANSISTOR	2SD1762
C284,285	CERAMIC CAPACITOR	CKSQYF104Z25	Q4	TRANSISTOR	2SC1740S
C286,288	CHIP CAPACITOR	CKSQYF103Z50	Q5	TRANSISTOR	2SA933S
C301,302	ELECT. CAPACITOR	CEANP100M16	Q21	TRANSISTOR	2SC1740S
C303,304	CHIP CAPACITOR	CCSQCH390J50	Q22,23	TRANSISTOR	2SA933S
C305	CERAMIC CAPACITOR	CKSQYF104Z25	Q24	TRANSISTOR	2SC1740S
C310	CERAMIC CAPACITOR	CKSQYF473Z25	△ Q25	TRANSISTOR	2SB1185
C351	CHIP CERAMIC C.	CCSQCH271J50	△ Q26	TRANSISTOR	2SD1762
C352,353	CHIP CAPACITOR	CKSQYF103Z50	△ Q27	TRANSISTOR	2SB1185
C354	ELECT. CAPACITOR	CEAS470M10	△ Q28	TRANSISTOR	2SD1762
C355-358	MYLAR FILM CAPACITOR	CQMA472J50	△ D1		S2VB20
C359,360	AUDIO FILM CAPACITOR	CFTXA224J50	△ D2,3	DIODE	1SR35-100AVL
C361,362	AUDIO FILM CAPACITOR	CFTXA393J50	D7	ZENER DIODE	MTZJ11B
C363	ELECT. CAPACITOR	CEAS470M10	△ D21,22	DIODE	1SS254
C364	ELECT. CAPACITOR	CEAS101M10	△ D23	DIODE	10ELS2
C365,366	AUDIO FILM CAPACITOR	CFTXA104J50	△ D24,25	DIODE	1SR35-100AVL
C367	ELECT. CAPACITOR	CEHAQ100M50	△ D26	DIODE	10ELS2
C368	ELECT. CAPACITOR	CEJAR47M50	COILS, FILTERS		
C369	ELECT. CAPACITOR	CEAS470M10	△ L1	SPDL CHORK COIL	VTL1043
C371-373	CERAMIC CAPACITOR	CKSQYF104Z25	CAPACITORS		
C374	CHIP CAPACITOR	CCSQCH101J50	△ C1,2	ELECTR. CAP.(6800μ/16V)	VCH1053
RESISTORS			C3-6	ELECT. CAPACITOR	CEAS470M10
R212,213	CARBON FILM RESISTOR	RD1/6PM470J	△ C7-9	CERAMIC CAPACITOR	CKPUYF223Z25
R220,221	CARBON FILM RESISTOR	RD1/6PM470J	C10	ELECT. CAPACITOR	CEAS101M50
R259-262	CARBON FILM RESISTOR	RD1/6PM473J	C11,12	CERAMIC CAPACITOR	CKPUYF103Z25
R269-270	CARBON FILM RESISTOR	RD1/6PM473J			
R273,274	CARBON FILM RESISTOR	RD1/6PM471J	△ C13	ELECT. CAPACITOR	CEAS102M16
R291	CARBON FILM RESISTOR	RD1/6PM472J	△ C14	CERAMIC CAPACITOR	CGCYX473M25
R301,302	CARBON FILM RESISTOR	RD1/6PM104J	C15	ELECT. CAPACITOR	CEAS471M35
R303-306	CARBON FILM RESISTOR	RD1/6PM103J	C21,22	MYLAR FILM CAPACITOR	CQMA272J50
R352	CARBON FILM RESISTOR	RD1/6PM222J	C23,24	CERAMIC CAPACITOR	CGCYX473M25
R354	CARBON FILM RESISTOR	RD1/6PM222J			
			C25,26	ELECT. CAPACITOR	CEAS2R2M50
			C27,28	MYLAR FILM CAPACITOR	CQMA223J50
			C29	ELECT. CAPACITOR	CEAS101M50
			△ C52	CAPACITOR (CERAMIC)	RCG-009

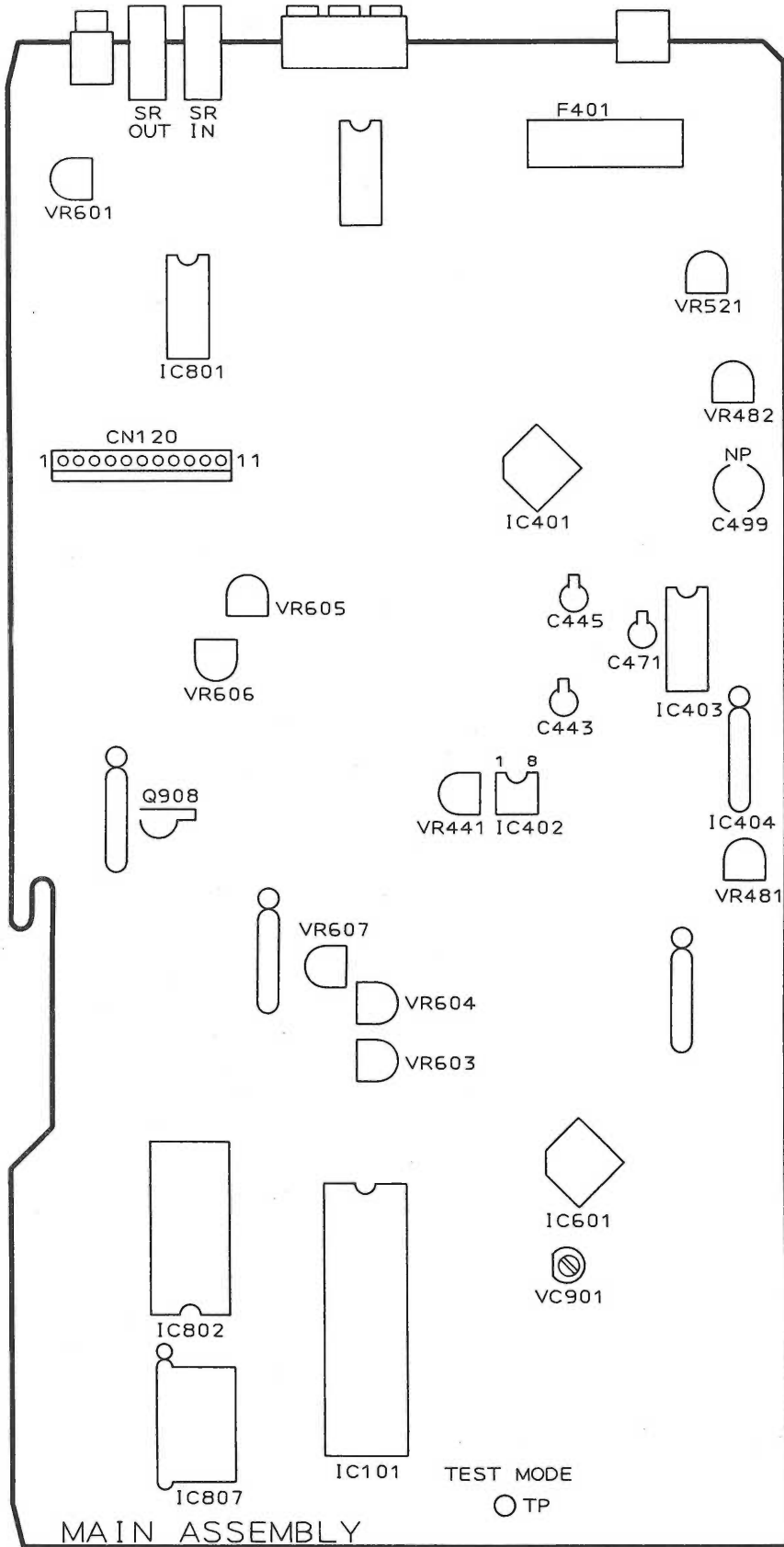
Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
RESISTORS			OTHERS		
△ R23-26	CARBON FILM RESISTOR	RD1/2VM221J	JA201	JACK	RKN1002
△ R27-30	RESISTOR	DCN1003			
△ R51	CARBON FILM RESISTOR	RD1/2PM225J			
	Other resistors	RD1/6PM□□□J	SR Assembly		
OTHERS			SEMICONDUCTORS		
	SCREW	BBZ30P080FMC	IC80	LOGIC IC	HD74HC165P
FLKY Assembly			CAPACITORS		
SEMICONDUCTORS			C80	ELECTR. CAPACITOR	CEAL470M6R3
IC201	MODE CONTROL MCU	PDG086B	C81	CERAMIC CAPACITOR	CKPUYF223Z25
IC202	RESET IC	PST5296D	RESISTORS		
Q201	TRANSISTOR	DTA144ES	R80,81	RESISTOR ARRAY (10K)	RA6S103J
Q202,203	TRANSISTOR	DTC114ES	FR Assembly		
Q204	TRANSISTOR	DTA124EL	OTHERS		
Q211-215	TRANSISTOR	DTC124ES	CN89		VKN1156
D201	DIODE	1SS254	CS Assembly		
D202,203	LED	VEL1015	OTHERS		
SWITCHES			CN90		VKN1156
S201-213	SWITCH	RSG1030	CF Assembly		
S219	DOOR SWITCH	VSK1015	SWITCHES		
S220	ROTARY ENCODER	VSD1008	S1-3	PUSH SWITCH	DSG1017
CAPACITORS			TD Assembly		
C201	ELECT. CAPACITOR	CEAS2R2M50	SWITCHES		
C202	ELECT. CAPACITOR	CEAS101M10	S6-8	PUSH SWITCH	DSG1017
C203,205	CERAMIC CAPACITOR	CKPUYF103Z25	HEAD Assembly		
C206	ELECT. CAPACITOR	CEAS100M16	CAPACITORS		
C207	CERAMIC CAPACITOR	CKPUYF223Z25	C1	CERAMIC CAPACITOR	CKSQYF473Z50
RESISTORS			C5	CAPACITOR(CERAMIC)	CKSYF105Z16
	All resistors	RD1/6PM□□□J	RESISTORS		
OTHERS			VR1	VARIABLE RESISTOR	VCP1020
V201	FL TUBE	VAW1028	SELD Assembly		
X201	CERAMIC RESONATOR FL SPACER	EFOGC8004T4 VEB1125	SEMICONDUCTORS		
PSWB Assembly			D211-215	LED INDICATOR (YELLOW)	MAY5763XM462
SWITCHES			SWITCHES		
S231	SWITCH	RSG1030	S221-225	TACT SWITCH	RSG1030
CAPACITORS			HEPB Assembly		
C231	CERAMIC CAPACITOR	CKPUYF103Z25	CAPACITORS		
OTHERS			C221	CERAMIC CAPACITOR	CGCYF473Z25
	REMOTE SENSOR	GP1U58X	C222,223	AXIAL CAPACITOR	CKPUYB101K50
HEPB Assembly			RESISTORS		
CAPACITORS			VR201	VR	VCS1015
C221	CERAMIC CAPACITOR	CGCYF473Z25			
C222,223	AXIAL CAPACITOR	CKPUYB101K50			
RESISTORS					
VR201	VR	VCS1015			

7. ADJUSTMENTS

MAIN ASSEMBLY ADJUSTMENT SUMMARY

	ADJUSTMENTS	Adjusting Point	Measurement equipment Connecting Point	Player Condition	Adjusting Specification
1	Tilt Servo Gain Adjustment	VR608	None	Power off	<ul style="list-style-type: none"> ● Marking of Tilt GAIN VR position Red : Turn to Right Clear : Center Blue : Turn to left
2	Coarse Adjustment of Grating	Grating	CN120-9(TRK ERR)	<ul style="list-style-type: none"> ● Test mode #15,000 TRK servo loop open Tilt Neutral 	<ul style="list-style-type: none"> ● Null point → TRK error MAX
3	Slider Shaft Horizontal Adjustment	Player SKIP key	CN120-4(FCS DRV)	<ul style="list-style-type: none"> ● Test mode Tilt servo loop off TRK servo loop open #5,200/#25,000 still 	<ul style="list-style-type: none"> ● Use the SKIP key to adjust to $0V \pm 80mV$.
4	Pickup Inclination Adjustment	Pickup Assembly TAN /TRK inclination adjustment screw	CN120-3(RF)	<ul style="list-style-type: none"> ● Test mode #2,701 still (Black screen) TRK servo loop close/open Tilt servo loop open 	<ul style="list-style-type: none"> ● RF waveform's amplitude MAX (Pickup TAN/ TRK adjustment screw) ● Minimized crosstalk.
5	FOCS Balance Adjustment TRKG ERR MAX, RF MAX	VR605(TE MAX) VR606(RF MAX)	CN120-9(TRK ERR) CN120-3(RF)	<ul style="list-style-type: none"> ● Test mode TRK servo close/open Tilt servo loop off #2,701/#115 	<ul style="list-style-type: none"> ● TRK error MAX(VR605) RF MAX(VR606)
6	Tilt Sensor Inclination Tilt Balance Adjustment	Tilt sensor inclination adjustment screw VR607(TILT OFFSET)	TV monitor Test mode screen	<ul style="list-style-type: none"> ● Test mode #16,200/#115 still TRK servo loop close Tilt servo loop off 	<ul style="list-style-type: none"> ● Adjust the adjustment screw so that the tilt error display code is 6, 7, or 8. ● Adjust VR607 so that the tilt error display becomes 7.
7	Verification and Adjustment of Spindle Motor Centering	Spindle motor centering adjustment screw	CH1: CN120-9(TRK ERR) CN2: CN120-1,2 (TRK SUM) 	<ul style="list-style-type: none"> ● Test mode #25,000/#3,000 still TRK servo loop open Tilt servo loop on 	<ul style="list-style-type: none"> ● Adjust the centering adjustment screw so that the lissajous figures of #3,000 and #25,000 are the same.
8	Fine Adjustment of Grating	Grating slit	CH1: CN120-9(TRK ERR) CN2: CN120-1,2 (TRK SUM) 	<ul style="list-style-type: none"> ● Test mode #3,000 still TRK servo loop open Tilt servo loop on 	<ul style="list-style-type: none"> ● Minimize the Y direction of the lissajous figure.
9	FCS Servo Loop Gain Adjustment	VR604	CH1: CN120-7(FCS IN) CH2: CN120-6(FCS ERR)	<ul style="list-style-type: none"> ● Test mode #15,000 still TRK servo loop close Tilt servo loop on 	<ul style="list-style-type: none"> ● Adjust VR604 so that the lissajous figure is symmetric with respect to the X and Y axes.
10	TRK Servo Loop Gain Adjustment	VR603	X: CN120-10(TRK IN) Y: CN120-9 (TRK ERR)	<ul style="list-style-type: none"> ● Test mode #15,000 still (Black screen) TRK servo loop close Tilt neutral 	<ul style="list-style-type: none"> ● Observe the lissajous figures at #15,000 still mode and when the power is ON, and adjust VR603 so that their inclinations become identical.
11	RF Gain Adjustment	VR601	CN120-3(RF)	<ul style="list-style-type: none"> ● #15,000 still 	<ul style="list-style-type: none"> ● Adjust VR601 so that the RF level becomes $300 mV \pm 50mV$.
12	Ref. Sub Carrier Adjustment	VC901	IC402 pin 8	<ul style="list-style-type: none"> ● STOP 	<ul style="list-style-type: none"> ● Adjust VC901 so that the frequency becomes $3.579545 MHz \pm 10Hz$.
13	VCO Center Frequency Adjustment	VR481	CH1: C471 lead wire CH2: C499 lead wire(NP)	<ul style="list-style-type: none"> ● #5,100 still 	<ul style="list-style-type: none"> ● The center of CH2's video signal jitter is delayed by $76\mu s (1H+12.5\mu s) \pm 2\mu sec$. with respect to CH1's video signal.
14	Output Video Level Adjustment	VR482	VIDEO OUT terminal	<ul style="list-style-type: none"> ● #19,900 still 	<ul style="list-style-type: none"> ● Adjust the VR482 so that the voltage between the sync tip and the white peak becomes $1V_{p-p} \pm 5\%$.
15	1H Delay Video Level Adjustment	VR441	CH1: C443 lead wire(NP) CH2: C445 lead wire	<ul style="list-style-type: none"> ● #3,800 still 	<ul style="list-style-type: none"> ● The 1H delay video level becomes the same as the main line video level ($\pm 3\%$).
16	VPS Error Adjustment	VR521	TV monitor	<ul style="list-style-type: none"> ● #8,000 still 	<ul style="list-style-type: none"> ● Color irregularity on the magenta screen is minimized.

ADJUSTMENT POINTS OF THE MAIN ASSEMBLY

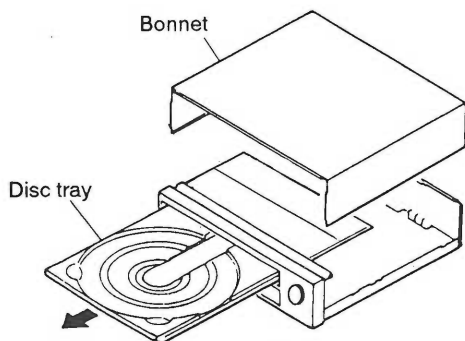


TEST MODE

Test Mode

The player has a test mode function which allows the servicer to check the player's status on the TV screen by executing the respective key operation.

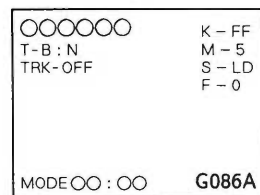
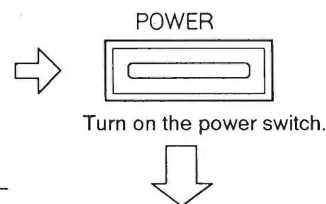
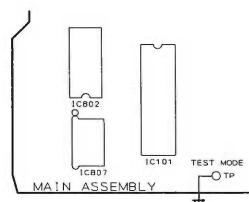
Also, since the TRK servo opens and closes easily, the test mode is especially useful for mechanical adjustments.



Test Mode Initiation

[Procedure]

1. Remove the bonnet and disc tray.
2. Connect the TEST MODE TP in the MAIN assembly to GND.
3. Turn on the power switch.
4. Disconnect the TEST MODE TP from GND.



TV screen display

Test Mode Cancellation

Turn off the power switch.

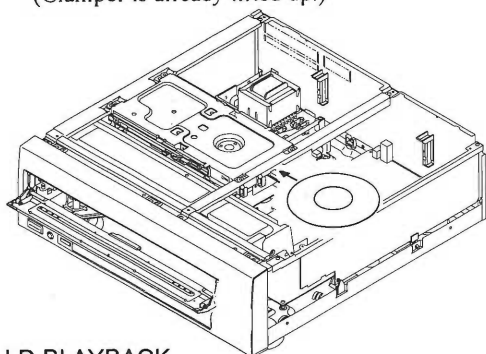
Note: Before cancelling the test mode, be sure to rotation of disc is stopped.

Player Operation in the Test Mode

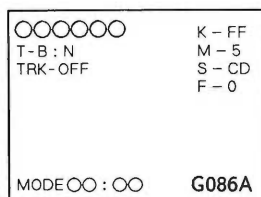
Operate the player by selecting a test mode function with the keys on the player or on the remote control unit.

● CD PLAYBACK

- ① Place the CD disc on the turn table.
(Clamper is already lifted up.)



- ② Press the ◀▶ or ▶▶ key to appear "S-CD" on the TV screen display.

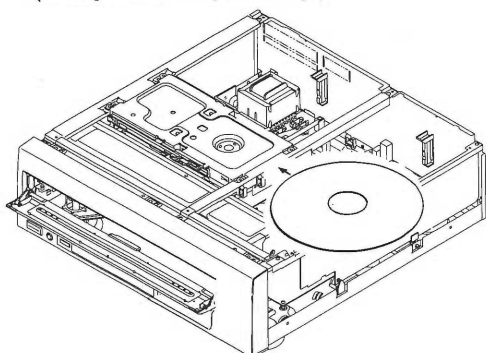


TV screen display

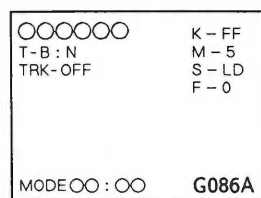
- ③ Clamp the disc by pressing the PLAY (▶) key once. Then, press the PLAY (▶) key twice, disc will be normal playbacked.

● LD PLAYBACK

- ① Place the LD disc on the turn table.
(Clamper is already lifted up.)



- ② Press the ◀▶ or ▶▶ key to appear "S-LD" on the TV screen display.



TV screen display

- ③ Clamp the disc by pressing the PLAY (▶) key once. Then, press the PLAY (▶) key twice, disc will be normal playbacked.

Function	Player Status	Key Operation	Remarks
Open Tray	STOP mode	▲	
Close Tray	Tray open	▲	
Stop	PLAY mode	■	
Play	Disc placement and tray closed.	▶	<ul style="list-style-type: none"> • Start play with the TRK servo open. • Start play with tilt neutral. • The disc type (LD/CD/CDV) is determined when playback starts at the SLDR position during start play.
TRK Servo Open/Close	PLAY mode	▶	<ul style="list-style-type: none"> • Each time the PLAY button (▶) is pressed, the TRK servo will open or close alternately.
Still	PLAY mode TRK servo closed.	|| (Remote control unit key)	<ul style="list-style-type: none"> • Each time the STILL button ( || ) is pressed, the player will switch between the PLAY and STILL modes alternately.
SLDR REV SCAN	PLAY mode	◀◀	<ul style="list-style-type: none"> • Counterclockwise • With the TRK servo open, the pickup can be damaged if the SLD moves further inward than the lead-in area on the disc. Do not allow the SLD to move further inward than the lead-in area .
SLDR FWD SCAN	PLAY mode	▶▶	<ul style="list-style-type: none"> • Clockwise • With the TRK servo open, the pickup can be damaged if the SLD moves further outward than the lead-in area on the disc. Do not allow the SLD to move further outward than the lead-in area.
TILT Neutral	POWER switch ON	(Main unit key)	
TILT Servo ON	PLAY mode	RANDOM PLAY	
TILT Minus TILT Servo OFF	PLAY mode	|◀◀	<ul style="list-style-type: none"> • Press and hold down the keys.
TILT Plus TILT Servo OFF	PLAY mode	▶▶|	<ul style="list-style-type: none"> • Press and hold down the keys.
Screen Display ON/OFF	POWER switch ON	PGM key	
Frame search	PLAY mode	+10 key ↓ 0-9 key ↓ ▶	<ul style="list-style-type: none"> • In the PLAY mode, press the +10 key. (The player will standby for the frame No. entry.) • Use the numeric keys(0 - 9) to enter the frame No.. Then press the player's PLAY key to search. • After the search is completed, the player will return to the previous mode before the search was performed.
Loading Motor Rotation Clockwise Counterclockwise	Tray open	▶▶| |◀◀	<ul style="list-style-type: none"> • FWD:Unloading • REV :Loading
FOCS OFFSET (CT BEST) VR606 Check	PLAY mode (TRK servo OPEN)	(Remote control unit) MULTI-SPEED FWD → F-1 REV → F-0 (Player) HILITE INTRO SCAN	<ul style="list-style-type: none"> • For checking VR604 F-0 : Normal mode <ul style="list-style-type: none"> •When closing the TRK servo, VR606 (CT BEST) is effectived. •When opening the TRK servo, VR605 (TE MAX) is effectived. F-1 : When opening the TRK servo, VR606 (CT BEST) is also effectived.

● Special Test Mode Operation of CLD – M401, M450, M301

① Aging mode

[Procedure]

Press the HILITE/INTRO key with the tray opened.

[Operation]

1. The tray is closed and Disc 1 is inserted.
2. Clamp Disc 1.
3. Disc 1 is returned to the original position on the tray
4. Operations 2 - 3 are also performed for Discs 2 - 5. (This chain of operation is performed in one cycle.)
5. Ten cycles are performed all together.

Note :

- If the STOP key is pressed during operation, the Disc is returned and stopped.
- If the Disc is not clamped, the stand-by function will be activated and the place of the FL display will become 1.

— FL display(example) —

09 00010-----9 cycles OK. Disc 4 is not clamped during the 10 th cycle.

10 00000-----Aging is normally completed.

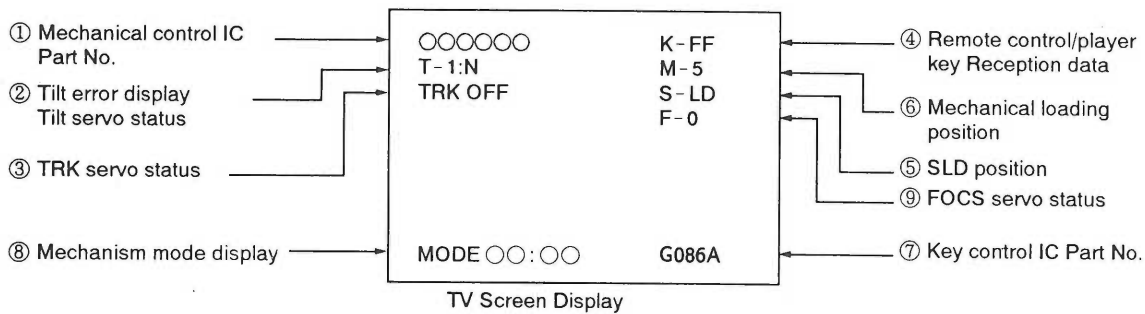
② Disc replacement

[Procedure and operation]

1. Set SLDR to CD position.
2. When pressing the Disc No. key, SPDL begins to rotate after the selected Disc has been moved to the center.
3. The Disc is returned to the disc tray when the STOP key is pressed.

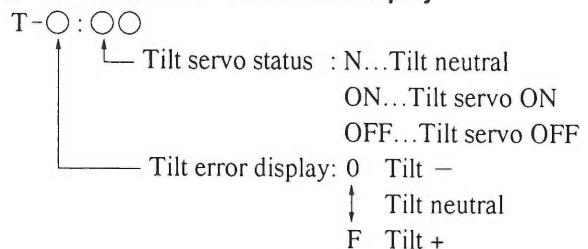
TV Screen in the Test Mode

THE TEST MODE



① The Mechanical Control IC (MAIN assembly) Part No. will be Displayed.

② Tilt Servo Status / Tilt Error Display



③ TRK Servo Status

TV screen display

TRK-○○○○

- ↑ ON...TRK servo close
- OFF...TRK servo open

④ Remote Control / Player Key Reception Data

TV screen display

K-○○

↑ See table below

Code	Function	Code	Function	Code	Function	Code	Function
00	0	20		40	(CHAP / TRK)	60	
01	1	21		41	(FRAM / TIM)	61	
02	2	22		42	(SEARCH)	62	
03	3	23		43	DISPLAY	63	
04	4	24		44	REPEAT B	64	
05	5	25		45	CLEAR	65	
06	6	26		46	SPEED -	66	
07	7	27		47	SPEED +	67	
08	8	28		48	REPEAT A	68	
09	9	29		49	(2 / R)	69	
0A		2A		4A	(STEREO)	6A	
0B		2B		4B	(1 / L)	6B	
0C	DGT / ANL	2C		4C	PROGRAM	6C	
0D		2D		4D		6D	PLAY / PAUSE
0E	CX	2E		4E		6E	STOP
0F		2F		4F		6F	OPEN / CLOSE
10	(F-SCAN)	30	(DISC TGL)	50	R-STEP	70	
11	(R-SCAN)	31	DISC 1	51		71	DIRECT CD
12		32	DISC 2	52	F-SKIP	72	
13	CHAP / FRME	33	DISC 3	53	R-SKIP	73	
14		34	DISC 4	54	R-STEP	74	ADLC
15		35	DISC 5	55	R-MULT	75	
16	STOP / OPEN	36		56		76	
17	PLAY/SERCH	37		57		77	
18	PAUSE	38		58	F-MULT	78	
19		39		59		79	
1A	(POW ON)	3A		5A	HILIT / INTR	7A	
1B	(POW OFF)	3B		5B		7B	
1C	POW ON/OFF	3C		5C		7C	
1D	EDIT	3D		5D		7D	
1E	AUDIO	3E		5E	RNDM (TEST)	7E	
1F	+10	3F		5F	(ESC)	7F	

⑤ SLD Position

TV screen display

S-○○○○

- ↑ IN ... CD inside SW ON
- CD ... CD active area
- CDV ... CDV active area
- LD ... LD active area

⑥ Mechanical Loading Position

TV screen display

M-○

- ↑ 0 ... Tray open
- 1 ... Loading
- 2 ... Standby
- 3 ... Clamped
- 5 ... Tilt minus
- 6 ... Tilt neutral (one side)
- 7 ... Tilt plus
- 8 ... Tilt limit
- 9 ... B side clamped (two sides)

⑦ Focus Offset VR Status

TV screen display

F-○

- ↑ 0 ... Normal mode
 - When closing the TRK servo, VR606 (RF MAX) is effected.
 - When opening the TRK servo, VR605 (TE MAX) is effected.
- 1 ... When opening the TRK servo, VR606 (RF MAX) is also effected.

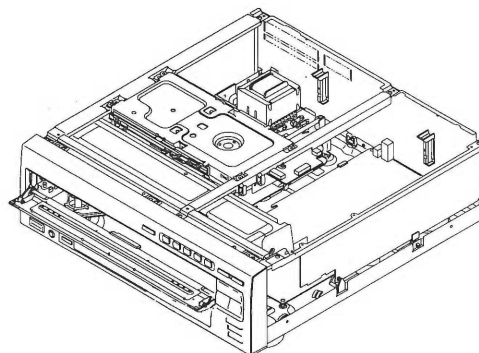
Required Instruments

- Small screwdriver (7 cm shaft)
- Small Phillips screwdriver (15 cm shaft)
- Low-pass filter (47k ohms+1 μ F / BP)
- Dual-trace oscilloscope (with delay)
- AF oscillator
- Frequency counter
- LD test disc (GGV1003)
- 8-inch LDD disc
- CDV disc
- Short clip
- TV monitor
- Resistor (100k ohms, 330k ohms)
- Capacitor (0.01 μ F)
- Remote control unit
- 2mm hexagonal wrench
- Resistor (47k ohms \times 2)

Adjustment Preparation and Notes

1. Player Preparation

Before perform the adjustment, remove the bonnet and the disc tray. Then place the player horizontally on a flat surface.



2. Disc Insertion

Insert the disc from the rear of the player. Place it securely on the turntable. When the PLAY key is pressed, the clamber will go down and secure the disc. Playback will then begin.

3. Use All the Oscilloscope's Probes at 10:1.

4. Only the MAIN Assembly Needs to be Adjusted.

Unless noted otherwise, all adjustment items and measuring instrument connections will be for the parts in the MAIN assembly.

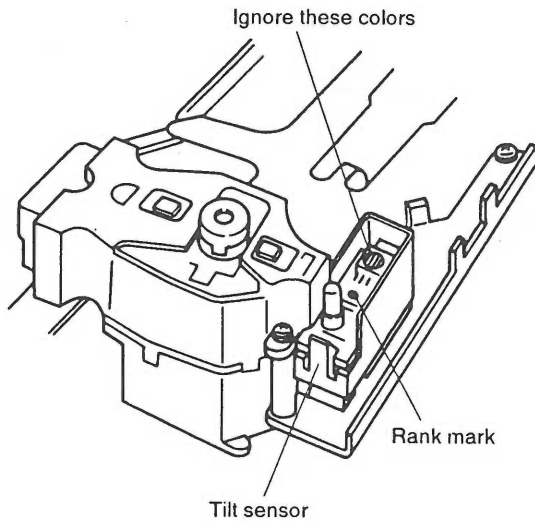
MECHANICAL ADJUSTMENTS
1. TILT SERVO GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: Adjustment of the tilt servo's gain according to the tilt sensor's sensitivity rank.
- When not properly adjusted: Increased tilt servo hunting and increased crosstalk.

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode | <ul style="list-style-type: none"> ● Small screwdriver |
| <ul style="list-style-type: none"> ● Positions to be adjusted | <ul style="list-style-type: none"> ● Power off ● VR608 |

Connection diagram



Adjustment Procedure

1. Use a screwdriver to adjust the angle of VR608 on the MAIN assembly according to the rank indicator's color.

Rank	Color	VR Angle
A	Red	Clockwise all the way
B	Clear	Mechanical center
C	Blue	Counterclockwise all the way

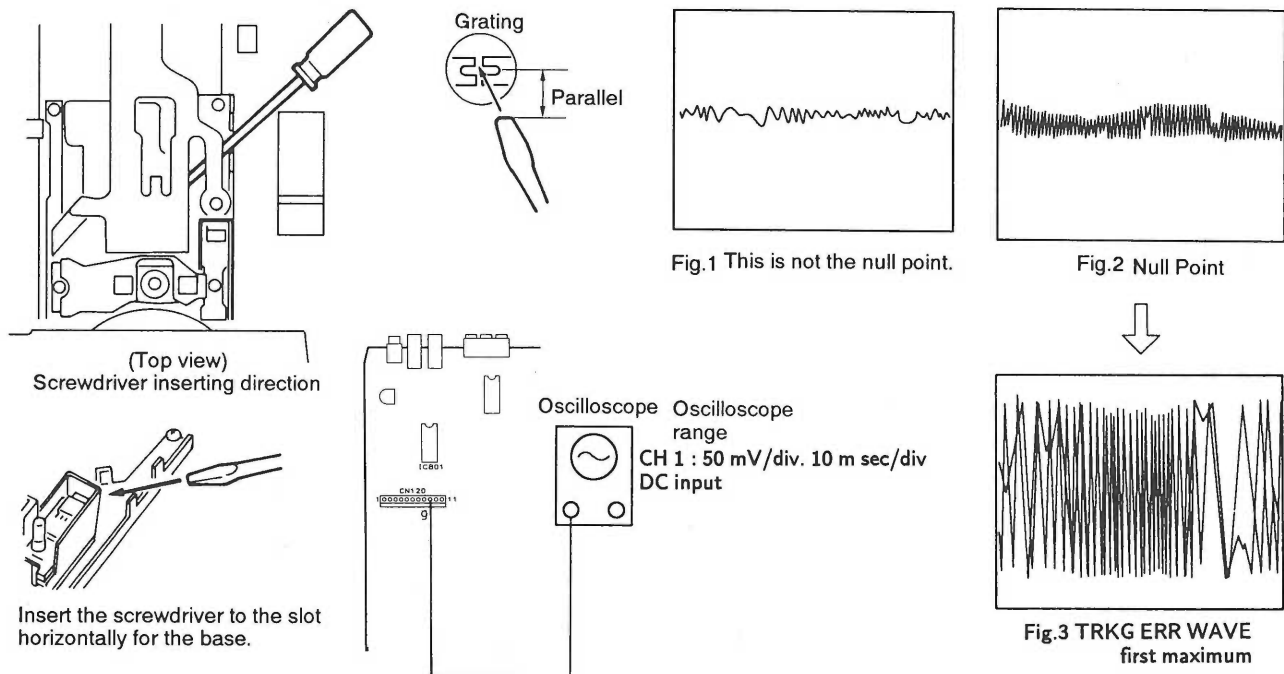
2. COARSE ADJUSTMENT OF GRATING

Mechanical Adjustment

- Purpose: Adjustment of the grating angle to enable disc playback and trick playback.
- When not properly adjusted: The disc cannot be played back. Track skipping occurs.

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Positions to be adjusted | <ul style="list-style-type: none"> ● TV monitor ● Small screwdriver ● Oscilloscope ● CN120 - 9 (TRK ERR) and GND ● 8 - inch LD test disc (GGV1003) ● Test Mode (#15,000 TRK servo open, Tilt neutral) ● Pickup assembly grating |
|--|--|

Connection diagram



Adjustment Procedure

1. Insert the test disc and press the PLAY key.
2. Search for frame #15,000 or thereabouts.
3. Open the TRK servo.
4. Connect CN120 - 9 to the oscilloscope and observe the waveform
5. Slide the tip of a small screwdriver through the guide and insert it horizontally into the grating adjustment slit. Adjust grating angle so that the waveform becomes small and its envelope is smooth. (This point is called null point.)
(See Fig. 1 and Fig. 2.)
6. Turn the screwdriver counterclockwise until the TRK waveform's amplitude reaches the first maximum from the null point. (See Fig. 3.)
7. Close the TRKG (Tracking) servo and confirm that the picture is normal.

3. SLIDER SHAFT HORIZONTAL ADJUSTMENT

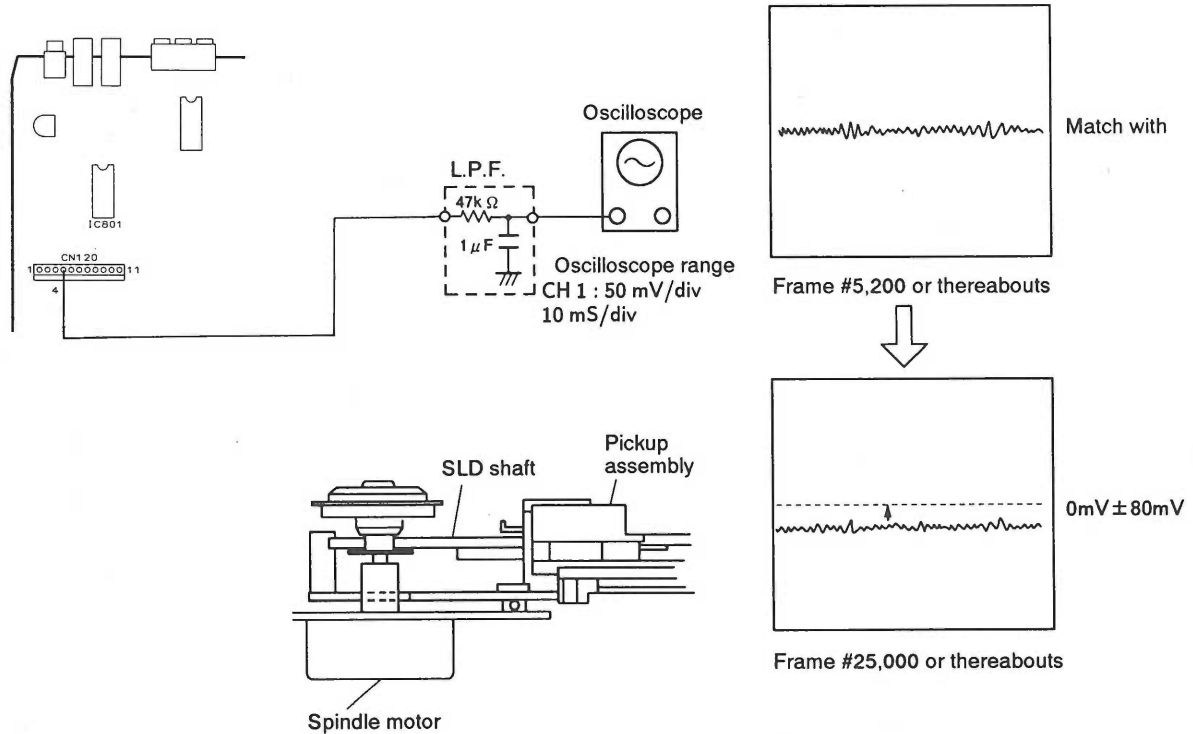
Mechanical Adjustment

- Purpose: Setting the slider shaft horizontally to enable the pickup to move over the disc horizontally.
- When not properly adjusted: With a warped disc, the FCS servo does not function at the inner or outer periphery.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- Oscilloscope ● Low-pass filter (47k Ω + 1 μ F)
- CN120 - 4 (FCS DRV) and GND
- 8-inch LD test disc GGV1003
- Test mode (#5,200/#25,000 still, TRK servo open, Tilt servo OFF)
- Player SKIP key (In the test mode)

Connection diagram



Adjustment Procedure

1. Use the SCAN key to send the slider to frame #5,200 or thereabouts (tilt fulcrum) on the test disc. Open the TRK servo.
2. Connect the oscilloscope to CN120 - 4 through L.P.F. and match the center of the waveform with the oscilloscope's GND.
3. Search for frame #25,000 and use the SKIP key to adjust the center of the waveform to 0mV \pm 80mV

Note : Regarding the test mode, see page 63.

Note : This adjustment is critical in that it will affect the adjustments following.

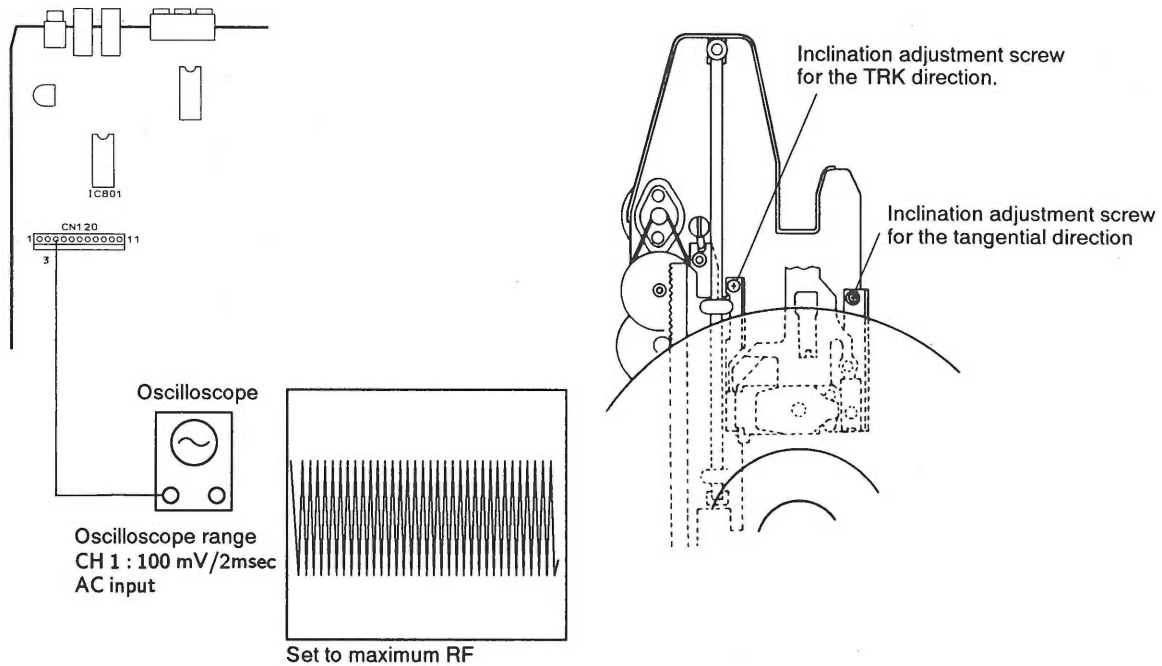
4. PICKUP INCLINATION ADJUSTMENT

Mechanical Adjustment

- Purpose: Adjustment of the pickup inclination to direct the laser beam vertically with respect to the disc.
- When not properly adjusted: Crosstalk will be generated.

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Positions to be adjusted | <ul style="list-style-type: none"> ● TV monitor ● Oscilloscope ● CN120 - 3(RF) ● 8 - inch LD test disc (GGV1003) ● Test Mode [#2,701 still (Black screen)] TRKG servo close / TILT servo open. ● Pickup assembly TRK / Tangential direction inclination adjustment screws |
|--|--|

Connection diagram



Adjustment Procedure

1. Connect the oscilloscope to CN120 - 3.
2. Search for #2,701 and observe the RF waveform.
3. Adjust the pickup's TRK / Tangential direction inclination adjustment screw to maximize the waveform's amplitude.
4. Look at the TV screen and make sure there is no crosstalk.

Note : If there is crosstalk on the TV screen even when the RF level is at the maximum, perform next steps .

5. FOCUS BALANCE ADJUSTMENT

TRKG Error MAX/RF MAX

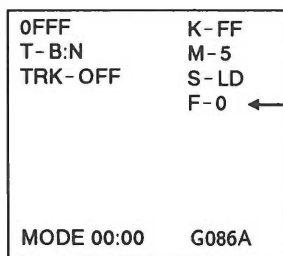
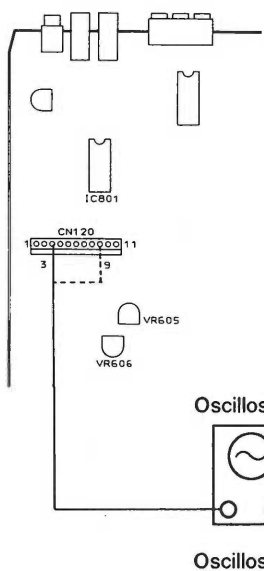
Mechanical Adjustment

- Purpose: To set the FOCUS servo to the optimum state when playing the normal playback and track jump (search).
- When not properly adjusted: Crosstalk will be generated.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

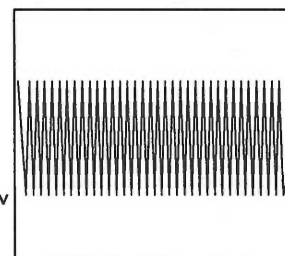
- TV monitor ● Oscilloscope
- CN120 - 3(RF) ● CN120 - 9(TRK ERR) ● Player's VIDEO OUT terminal
- 8-inch LD test disc (GGV1003)
- Test Mode (TRK servo close / open, Tilt servo OFF)
- VR605 (TE MAX) ● VR606(RF MAX)

Connection diagram



Screen display of test mode

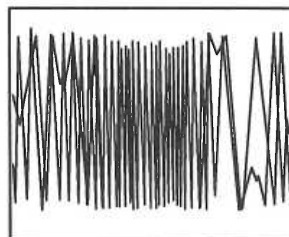
CH1:
100mV/div
2mS/div
AC input



Set to maximum RF amplitude at frame #2,701.

Oscilloscope range

CH1:
50 mV/div
10 ms/div
DC input



Maximize the TRKG error.



#115 crosstalk minimum

Adjustment Procedure

Note: Perform this adjustment when there is still noticeable crosstalk on the TV screen in section "4. Pickup Inclination Adjustment".

1. Connect the oscilloscope to CN120 - 9.
2. Open the TRK servo.
3. Confirm that the test mode screen display is F-0.
If not, set the MULTI-SPEED REV button of the remote control unit to F-0.
4. Adjust VR605 so that the amplitude of the TRKG error waveform becomes maximum.
5. Close the TRKG servo.
6. Connect the oscilloscope to CN120 - 3.
7. Press the MULTI-SPEED FWD button of the remote control unit to display "F-1" on the TV screen.
8. Search frame #2,701 and adjust VR606 so that the amplitude of the RF waveform becomes maximum.
9. Confirm that the crosstalk on the TV screen becomes minimum at frame #115.

6. TILT SENSOR INCLINATION / TILT BALANCE ADJUSTMENT

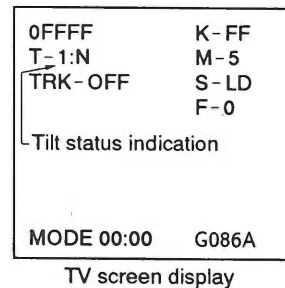
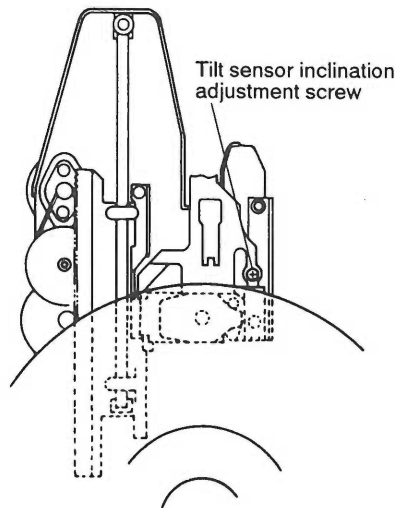
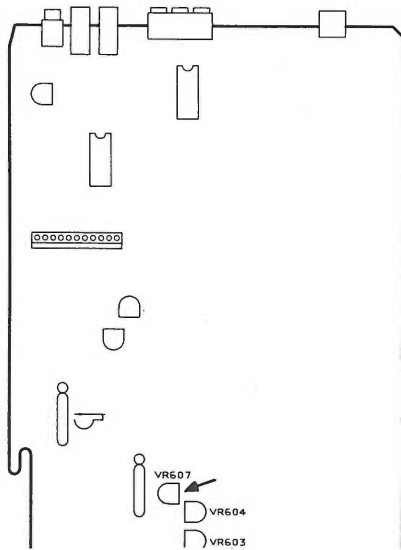
Mechanical Adjustment

- Purpose: Adjustment of the tilt sensor's inclination to direct the tilt sensor's LED vertically with respect to the disc. Also, compensation for the sensitivity difference between the two sensors.
- When not properly adjusted: Crosstalk will be generated.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- TV monitor ● Small Phillips screwdriver
- Player's VIDEO OUT terminal
- 8-inch LD test disc (GGV1003)
- Test Mode (#16,200/#115 still, TRK servo closed, Tilt servo OFF)
- Tilt sensor inclination adjustment screw
- VR607(TILT OFFSET)

Connection diagram



Note: This display indicates the tilt error display's location. Other displays may differ slightly from the actual.

Adjustment Procedure

1. Search for frame #16,200 on the test disc.
2. Set VR 607 to mechanical center.
3. Adjust the tilt sensor inclination adjustment screw so that the tilt status display code is 6, 7, or 8 on the TV monitor.

Note : At this time, rotate the tilt sensor inclination screw 1/4 rotation in the clockwise direction then return it 1/4 rotation in the counterclockwise direction to complete the adjustment.

4. Search for frame #115.
5. Adjust VR607 so that the tilt error display becomes 7.

7. VERIFICATION AND ADJUSTMENT OF SPINDLE MOTOR CENTERING

Mechanical Adjustment

- Purpose: Adjustment of the mechanical assembly position to set the spindle motor over the center of the laser beam path when the pickup assembly moves toward the inner or outer periphery of the disc.
- When not properly adjusted: There is track skipping and the search time is long.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- Oscilloscope ● Small screwdriver ● L.P.F. (0.01 μ F + 1k Ω), (0.0027 μ F)
- Resister (10 k \times 2)
- 2mm Hexagonal wrench
- X : CN 120-9(TRK ERR), Y : CN 120-1,2(TRK SUM)
- 8- inch LD test disc (GGV1003)
- Test Mode (#25,000 / #3,000 still, TRK servo open, TILT servo ON)
- Spindle motor centering adjustment screw

Connection diagram

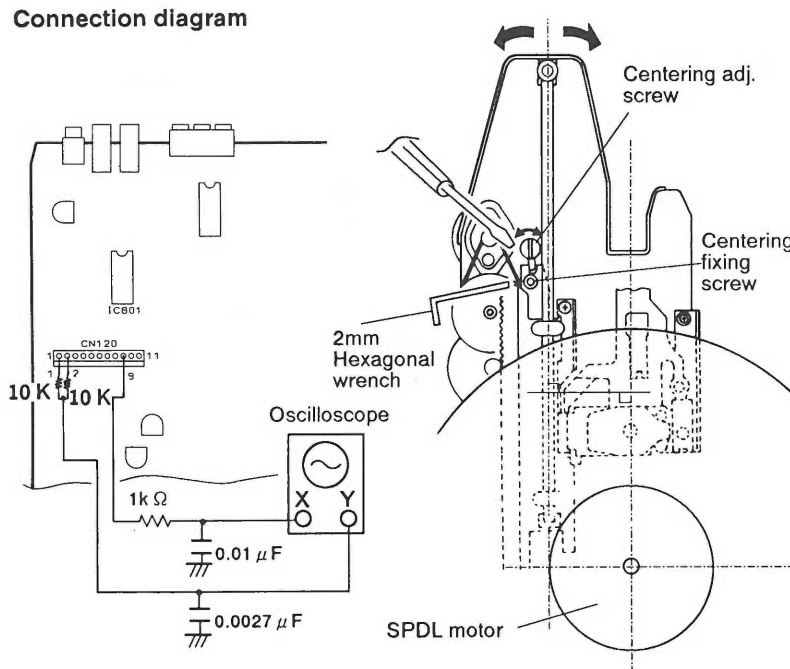


Fig. 1 Frame #25,000 lissajous

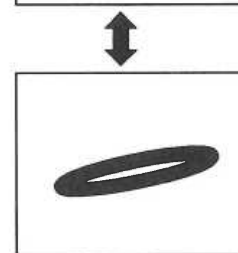


Fig. 2 Frame #3,000 lissajous



Fig. 3 CD inner periphery lissajous figure

X - Y mode
X : 500 mV/div
Y : 50 mV/div

Adjustment Procedure

Note: Adjust the position of the slider shaft against the center line of the SPDL motor in this adjustment.

1. Set the oscilloscope to the X - Y mode and connect CH 1 (X input) and CH 2 (Y input) to CN120-9 and CN120-1,2 respectively.
 2. Search for frame #25,000 on the test disc and look at the lissajous figure.
 3. Search for frame #3,000 and check if the bulge of the lissajous figure is the same as that of frame #25,000's lissajous figure
- Note : If the bulge of the lissajous waveform in step 3 differs for the inner and outer peripheries, do steps 4 to 6 .
4. Search for frame #25,000 and #3,000 alternately. Loosen a centering fixing screw and adjust the spindle motor centering adjustment screw so that the bulge of the lissajous figures become identical.

5. Change to a compact disc and playback the inner periphery. Check if the lissajous figure is the same as the one shown in Fig. 3.
6. If the compact disc's inner periphery lissajous figure differs from the one shown in Fig. 3, repeat steps 4 to 5.
7. Fix the centering fixing screw.

8. FINE ADJUSTMENT OF GRATING

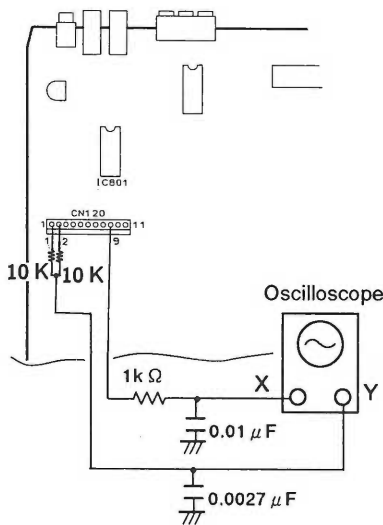
Mechanical Adjustment

- Purpose: Fine adjustment of the grating to direct the two TRK servo laser beams at the disc at the optimum position over the track.
- When not properly adjusted: There is track skipping.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

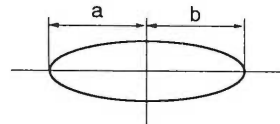
- Oscilloscope ● Small screwdriver ● L.P.F. (0.01 μ F + 1k Ω), (0.0027 μ F)
- CH1 (X) : CN120-9(TRK ERR), CH2 (Y) : CN120-1,2(TRK SUM)
- 8-inch LD test disc (GGV1003)
- Test Mode (Play mode, TRK servo loop open, TILT servo ON)
- Grating slit in the pickup assembly

Connection diagram



Set the probe to $\times 1$ only for Y.

- Oscilloscope range:
X : 500 mV/div
Y : 50 mV/div X-Y mode



Frame #3,000
Lissajous figure
Y direction minimum, a=b.

Adjustment Procedure

1. Playback the test disc at frame #3,000 (inner periphery) or thereabouts.
2. Set the oscilloscope to the X-Y mode, and connect CN401-8 (TRK ERR) and CN401-7 (TRK SUM) to the X input and the Y input respectively. Then observe the lissajous figure.
3. Insert the small screwdriver tip into the grating adjustment slit. Fine adjust the grating to minimize the Y direction of the lissajous figure.
4. Close the TRK servo loop and check if the image on the TV screen is normal.

9. FCS SERVO LOOP GAIN ADJUSTMENT

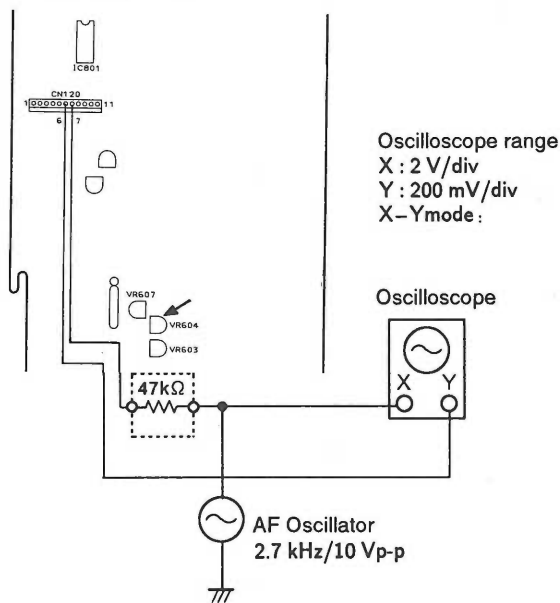
Mechanical Adjustment

- Purpose: Setting the FCS servo's loop gain to the optimum setting.
- When not properly adjusted: Playability is poor.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- Oscilloscope ● AF oscillator (1.7kHz / 10Vp-p) ● Resistor (47k Ω)
- CH1 (X) : CN120-7(FCS IN), CH2 (Y) : CN120-6(FCS ERR)
- 8-inch LD test disc (GGV1003)
- Test Mode (#15,000 still TRK servo loop close, TILT servo ON)
- VR604

Connection diagram



Oscilloscope range
 X : 2 V/div
 Y : 200 mV/div
 X-Y mode :

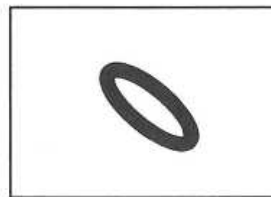


Fig. 1
Inadequate adjustment

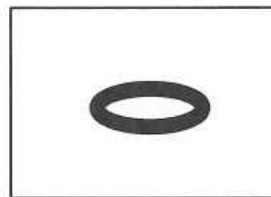


Fig. 2
After adjustment

Adjustment Procedure

1. Search for frame #15,000 on the test disc.
2. Connect the oscilloscope to CN120-6 and CN120-7 as shown above.
3. Set the oscilloscope to the X-Y mode and observe the lissajous figure.
4. Adjust VR604 so that the lissajous figure is symmetric with respect to the X and Y axes. (See Fig. 1 and 2.)

10. TRK SERVO LOOP GAIN ADJUSTMENT

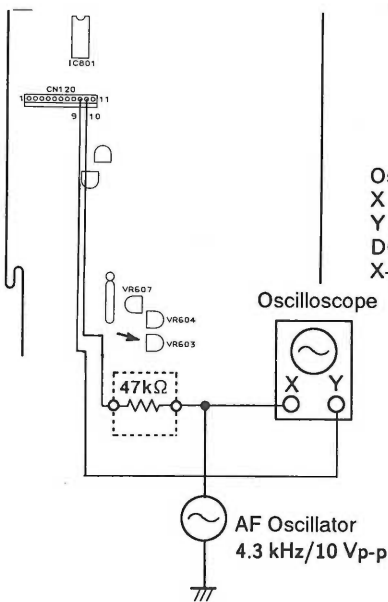
Mechanical Adjustment

- Purpose: Optimum setting of the TRK servo's loop gain.
- When not properly adjusted: Playability is poor.

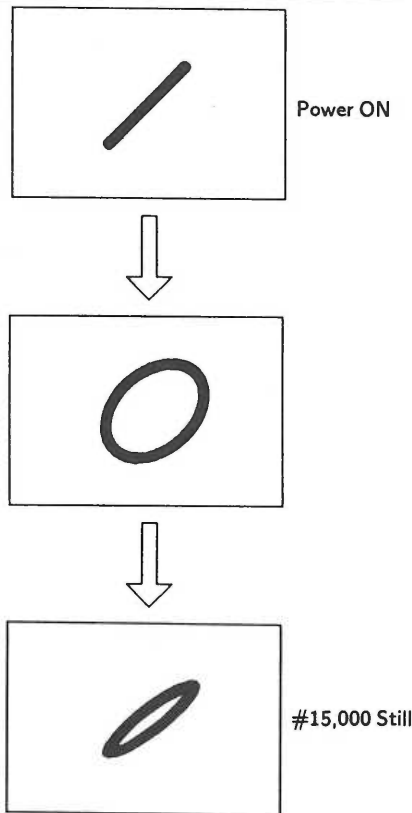
- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- Oscilloscope ● AF oscillator (3.0kHz / 10Vp-p) ● Resistor (47k Ω)
- CH1 (X) : CN120-10(TRK IN), CH2 (Y) : CN120-9(TRK ERR)
- 8-inch LD test disc (GGV1003)
- Test Mode [Still mode at #15,000 (Black screen), TRK servo closed, TILT neutral]
- VR603

Connection diagram



Oscilloscope range
 X : 200 mV/div
 Y : 10 mV/div
 DC input
 X-Y mode



Adjustment Procedure

1. Connect the X ch of an oscilloscope to CN 120-10 (TRKIN) via 47 k Ω of a resistor and connect the Y ch of an oscilloscope to CN 120-9 (TRK ERR).
2. Connect an oscilloscope between the X ch and 47 k Ω of a resistor.
3. Observe the inclination of the waveform when the power in ON.
4. Search #15,000 of GGV 1003 and observe the inclination of the lissajous waveform when it is set in still mode.
5. Adjust VR 603 so that the inclination of the waveforms described in step 3 and 4 above become identical.

Note : If the waveform is not observable, either change the 47k Ω resistor to 33k Ω or increase the oscillator's output.

11. RF GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: Optimum of the RF signal's amplitude.
- When not properly adjusted: There is prominent dropout. Scan and search operations are unstable.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- Oscilloscope
- CH1 : CN120-3(RF)
- 8-inch LD test disc (GGV1003)
- Test Mode (#15,000 still, TRK servo loop close, TILT servo ON)
- VR601

Connection diagram

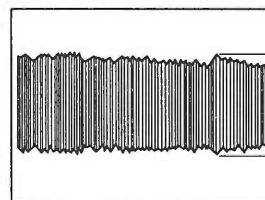
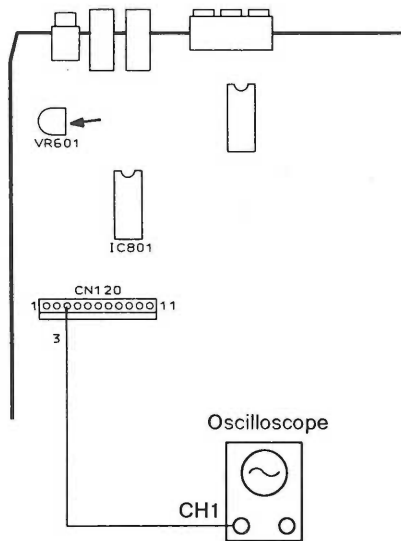


Fig. 1 RF signal

Oscilloscope range
100 mV/div
2 mS/div
AC mode

Adjustment Procedure

1. Search for frame #15,000 on the test disc.
2. Connect the oscilloscope to CN120-3(RF) and observe the RF signal.
3. Adjust VR601 so that the RF signal's amplitude becomes $300\text{mV} \pm 50\text{mV}$. (See Fig. 1.)

ELECTRICAL ADJUSTMENTS

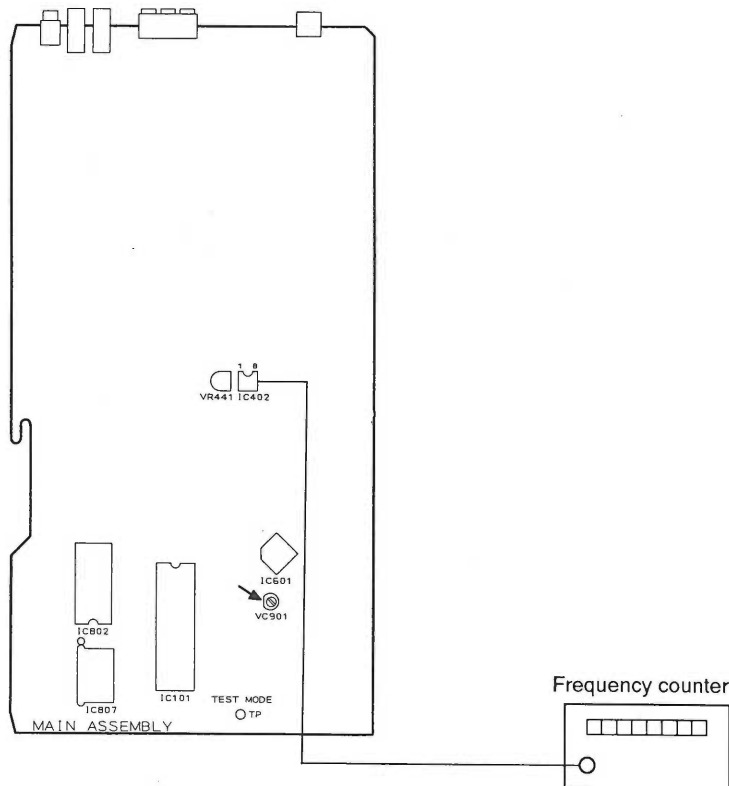
12. Ref. SUB CARRIER ADJUSTMENT

Electrical Adjustment

- Purpose: Adjustment of the standard clock frequency.
- When not properly adjusted: Incorrect color tint, no TV color lock.

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Positions to be adjusted | <ul style="list-style-type: none"> ● Frequency counter ● Oscilloscope 10:1 probe ● IC402 (PM0001) pin 8 ● Normal mode[Stop mode (Blueback screen)] ● VC901 |
|--|--|

Connection diagram



Adjustment Procedure

1. Adjust VC 901 on the MAIN assembly so that the frequency of IC 402 pin 8 becomes $3.579545 \text{ MHz} \pm 10 \text{ Hz}$ in the stop mode (blueback screen),

Note : The frequency counter probe should be an oscilloscope 10 : 1 probe.

13. VCO CENTER FREQUENCY ADJUSTMENT

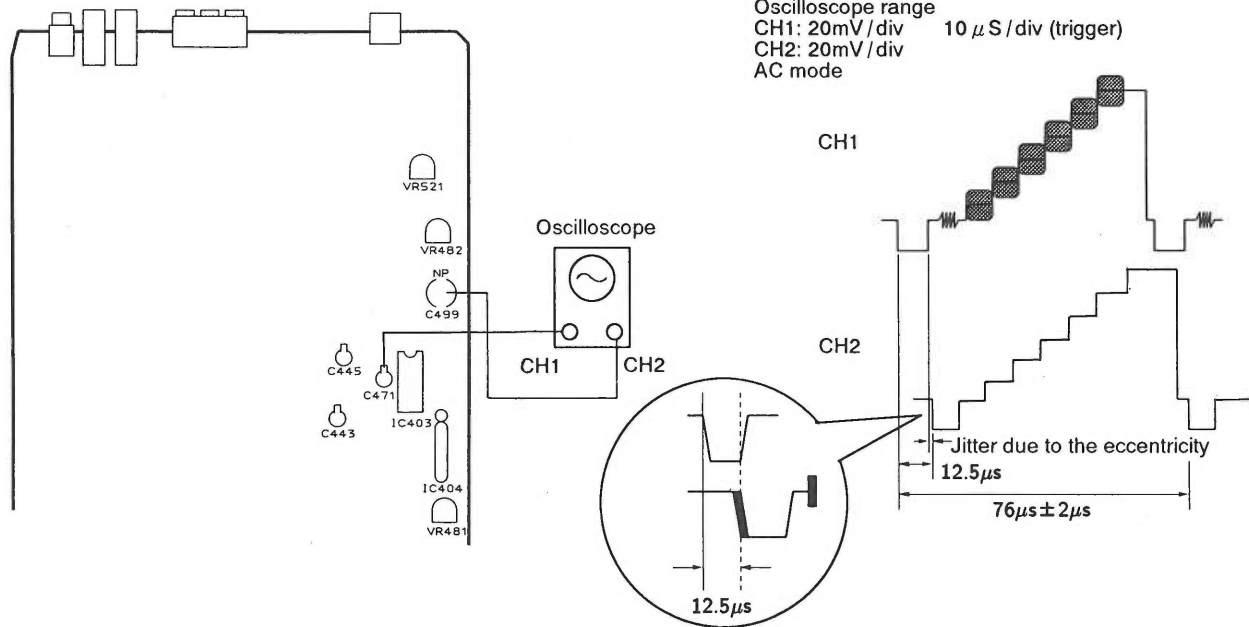
Electrical Adjustment

- Purpose: Setting the optimum delay time for the time base error compensation CCD.
- When not properly adjusted: Difficult to color lock, there is color lock delay after a search, and flicker on the white screen.

- Measuring instruments and jigs:
- Measuring point:
- Test disc and player mode
- Positions to be adjusted

- Oscilloscope
- CH 1 : + side lead wire of C471. ● CH 2 : NP side lead wire of C499.
- 8- inch LD test disc (GGV1003)
- Normal mode (#5,100 still mode)
- VR481

Connection diagram



Adjustment Procedure

1. Connect the + side lead wire of C471 and the NP side lead wire of C499 to CH 1 and CH 2 of the oscilloscope respectively.
 CH 1 : Video signal before time axis error compensation.
 CH 2 : Video signal after time base error compensation.
2. Search for frame #5,100 on the test disc. Adjust VR 481 so that the center of CH 2' s video signal jitter is delayed by 76 μs (1 H+12.5 μs) ± 2 μs with respect to the CH 1' s video signal.

Note : Do not confuse CH 1 and CH 2.

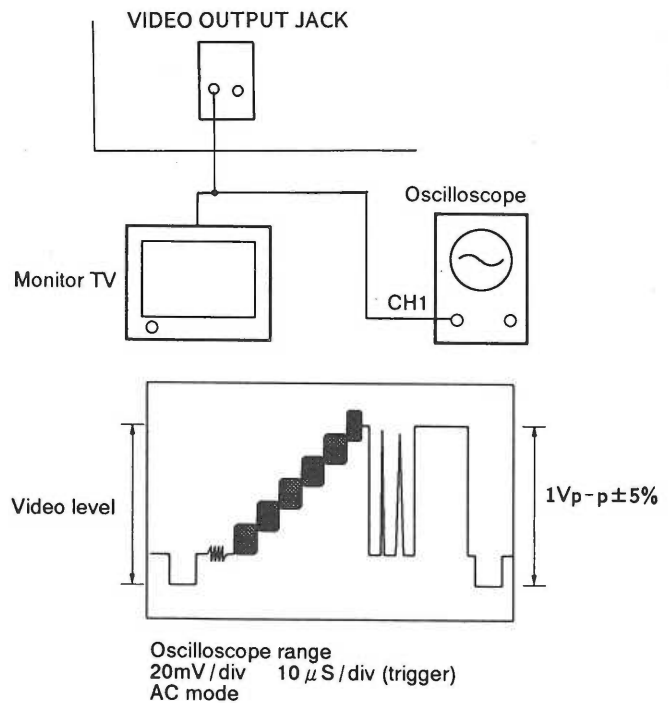
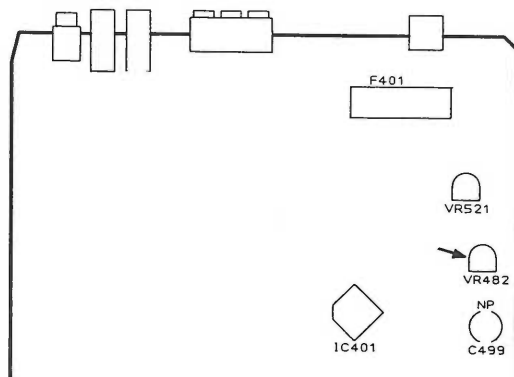
14. OUTPUT VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Setting the video signal level to 1Vp-p (75 Ω termination).
- When not properly adjusted: The player starts up midway without reading the data. The screen is too bright or too dark.

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Positions to be adjusted | <ul style="list-style-type: none"> ● Oscilloscope ● Player's VIDEO OUT terminal ● 8-inch LD test disc (GGV1003) ● Normal mode (Still mode, #19,900) ● VR482 |
|--|--|

Connection diagram



Adjustment Procedure

Note : Since the VIDEO OUT terminal is connected to a TV monitor, it is to have 75Ω termination. (If it is connected to a TV via VHF OUT, terminate the VIDEO OUT terminal with a 75Ω resistor).

1. Search for frame #19,900 on the test disc.
2. Adjust VR 482 so that the white level becomes 1 Vp-p ± 5% from the video signal's sync tip level.

15. 1H DELAY VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Equalization of the video levels of the 1H delay video signal and the main line video signal.
- When not properly adjusted: If the 1H delay video signal level is high, white dropout will be noticeable and there will be H shifting. (Horizontal stripes across the screen.)

- | | |
|--|---|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Positions to be adjusted | <ul style="list-style-type: none"> ● Oscilloscope ● CH 1 : lead wire of C443 ● CH 2 : - side lead wire of C445 ● 8-inch LD test disc (GGV1003) ● Normal mode (Still mode at #3,800) ● VR441 |
|--|---|

Connection diagram

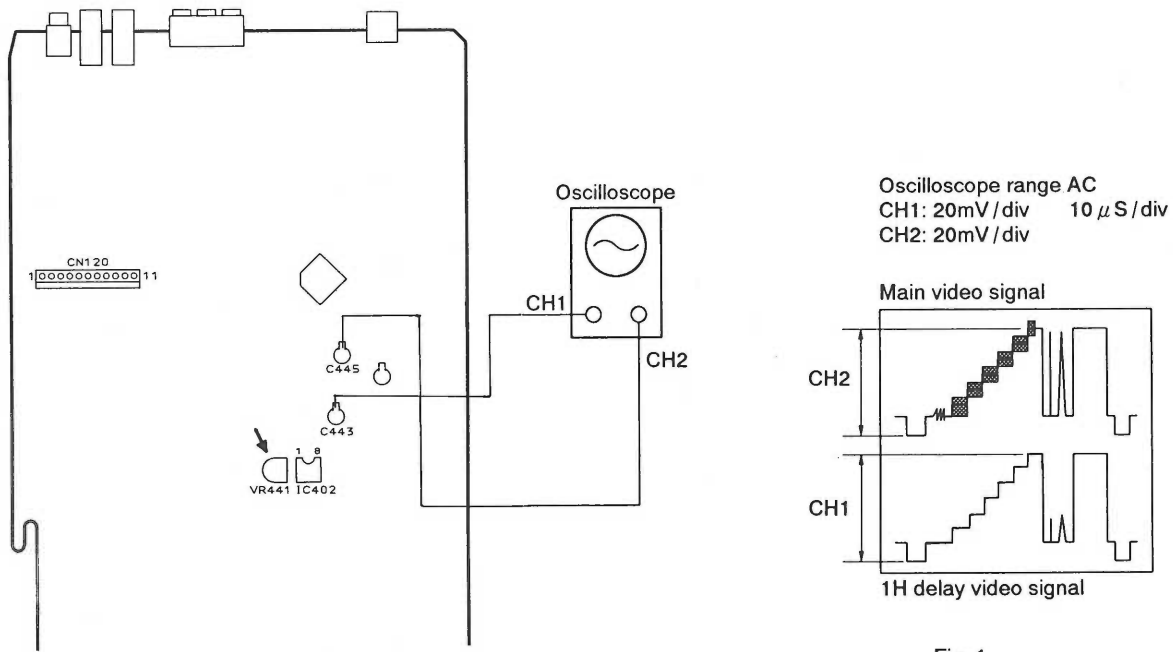


Fig. 1

Adjustment Procedure

1. Search for frame #3,800 on the test disc.
2. Connect - side lead wire of C443 to the oscilloscope's CH 1 and - side lead wire of C445 to the CH 2.
3. Adjust VR441 so that the 1H delay video level (CH 1) becomes the same as the main line video level (CH 2). (See Fig. 1)

Note : The video level is the level between the SYNC tip and the white peak.

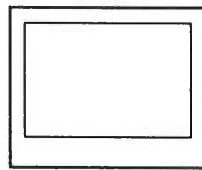
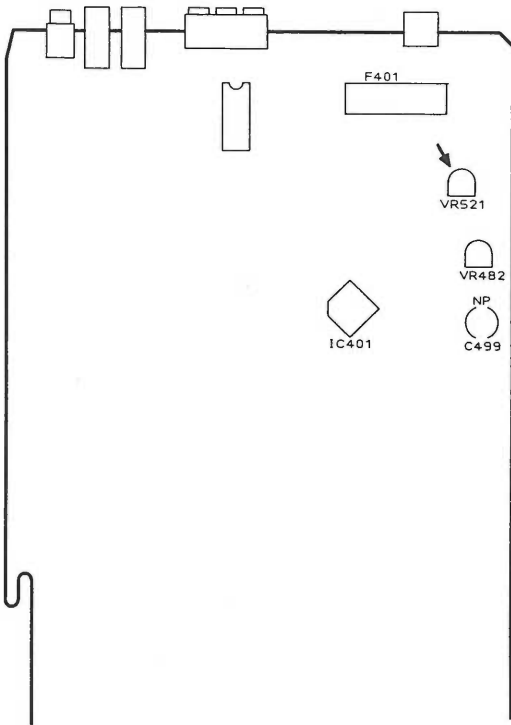
16. VPS ERROR ADJUSTMENT

Electrical Adjustment

- Purpose: Optimization of the color tint compensation section's error signal level.
- When not properly adjusted: Substantial color irregularity. (especially on CDV.)

- | | |
|--|--|
| <ul style="list-style-type: none"> ● Measuring instruments and jigs: ● Measuring point: ● Test disc and player mode ● Positions to be adjusted | <ul style="list-style-type: none"> ● TV monitor ● 8-inch LD test disc (GGV1003) ● Normal mode (Still mode at #8,000) ● VR521 |
|--|--|

Connection diagram



Color irregularity on the magenta screen is minimized.

Adjustment Procedure

1. Search for frame #8,000 on the test disc. (Magenta screen)
2. Adjust VR521 until the color irregularity on the magenta screen is minimized.

ANGLE ADJUSTMENT JIG GGV-151

Note : Applicable models

CLD - M90, CLD - M301

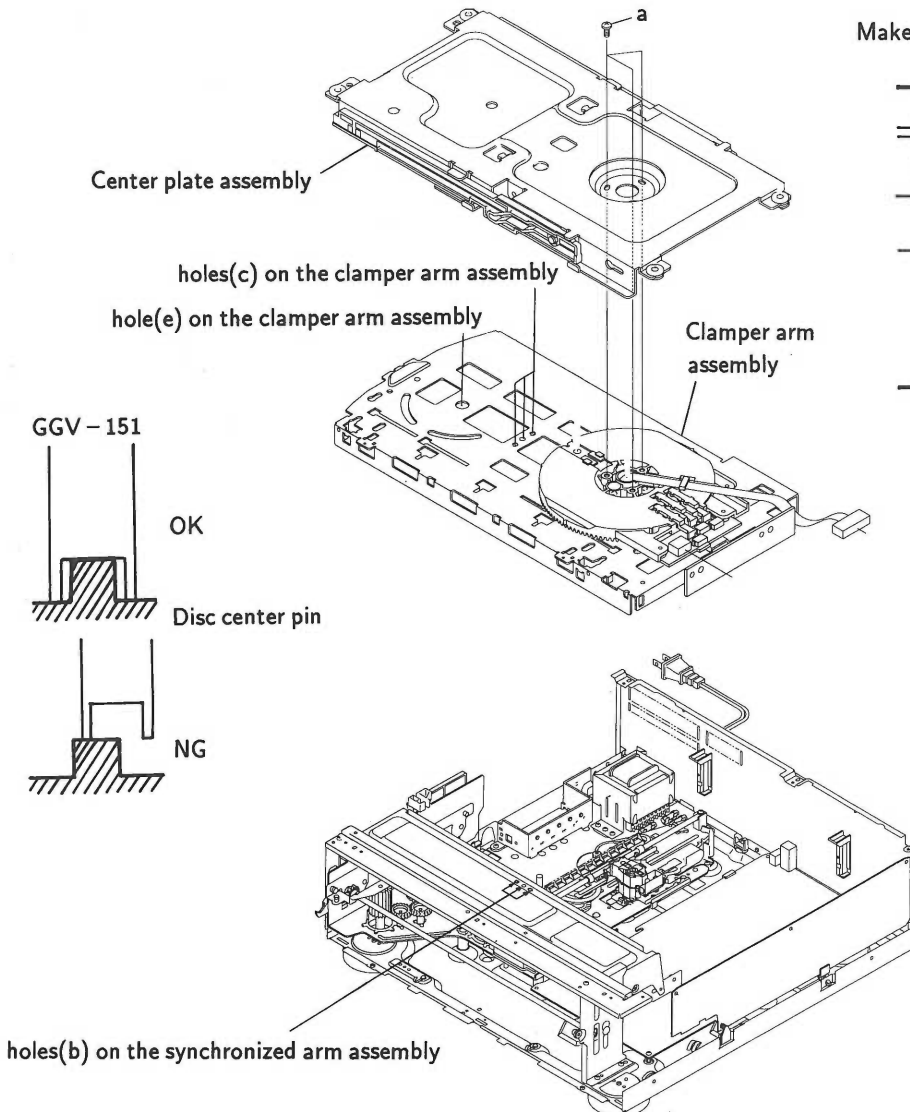
CLD - M401, CLD - M450

[ROUGH ADJUSTMENT]

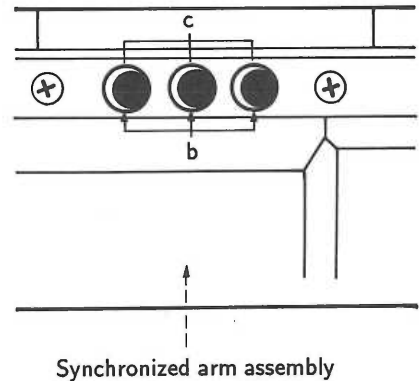
1. Turn Power on.
When the power is turned on with no disc loaded, Clamper arm assembly stops at Disc - 3 under tray - up condition.
2. Loosen three screws (a).
3. Turn Clamper arm assembly manually so that holes (c) comes to a little right in holes (b).
4. Tighten screws (a).

[FINE ADJUSTMENT]

5. Choose Disc - 1 and push the STOP button when Clamper arm assembly starts to turn.
6. Then, the assembly will stop at Disc - 1 under tray - up condition.
7. Insert GGV - 151 in hole (e) and check if it lands right on a disc center pin of the tray. If it is deviated, loosen the screws (a) and adjust the position of the assembly so that the jig comes right on the pin, and tighten the screws(a).
8. Choose Disc - 5 and push the STOP button when the assembly starts to turn.
9. Then, the assembly stops at Disc - 5 under tray - up condition.
10. Insert GGV - 151 in hole(e) and check if it lands right on the disc center pin of tray. If it is deviated, return to step 5.
11. If GGV - 151 can land right on the center pins of both Disc - 1 and Disc - 5, the adjustment is completed.



Make holes(c) come to a little right in holes(b)

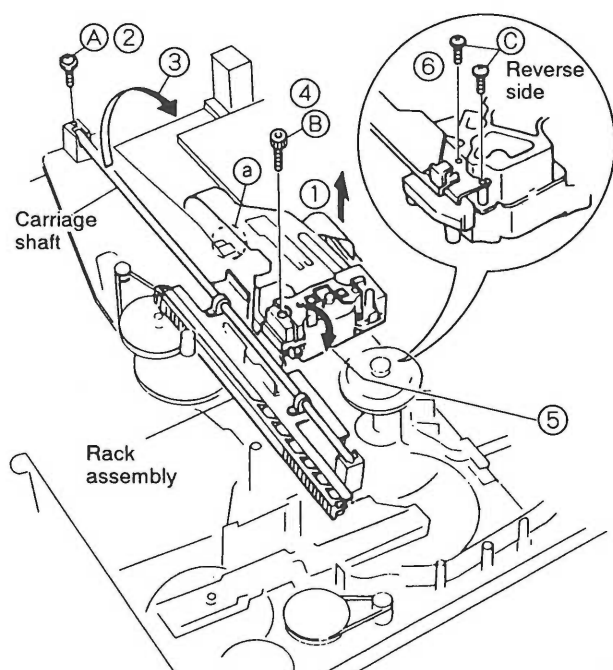


8. DISASSEMBLY

8.1 REMOVING THE PICKUP ASSEMBLY

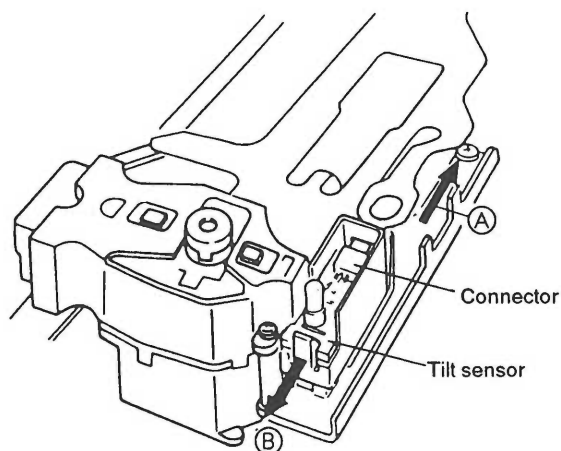
- ① Remove the flexible cable from the connector and also remove the flexible cable installed at section ②.
- ② Remove a screw (A) holding the carriage shaft.
- ③ Raise the shaft in the direction of the arrow to remove the rack assembly.
- ④ Remove a hexagonal screw (B) and lift up the pickup assembly lightly and turn the pickup assembly in the direction of arrow ⑤.
- ⑤ Remove two screws (C) on the back of the pickup assembly.

Note: Make sure that the rack assembly is not close to the turntable when it is removed.



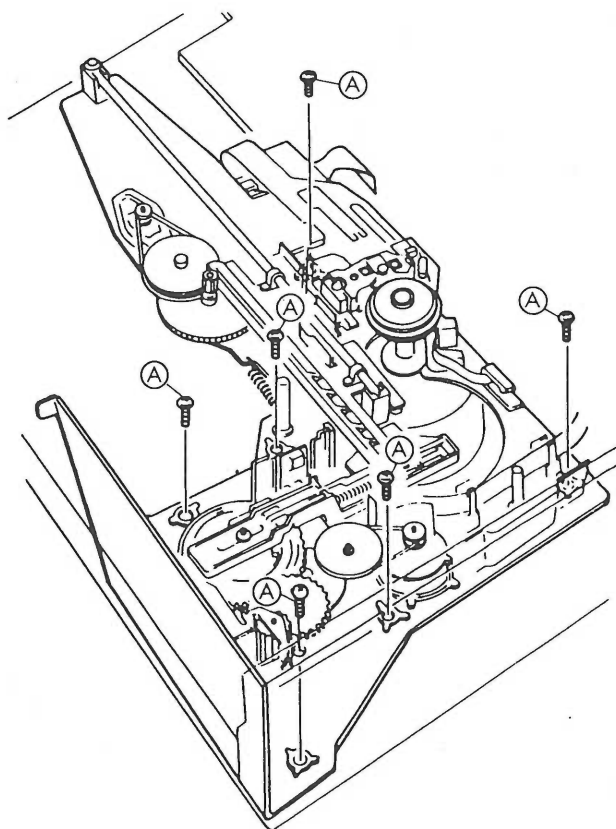
8.2 REMOVING THE TILT SENSOR

- ① Remove the connector (arrow A) of the flexible cable and release the claw (arrow B) to remove the tilt sensor.



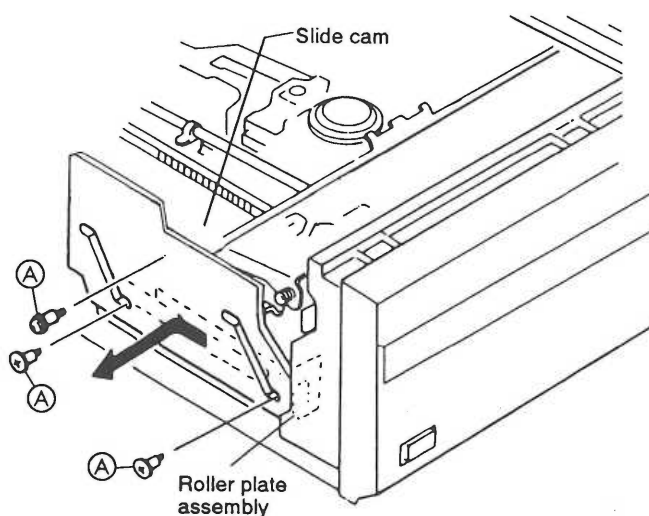
8.3 REMOVING THE MECHANISM SECTION

Remove six screws (A), and the entire mechanism section can be removed.



8.4 REMOVING THE SLIDE CAM AND ROLLER PLATE ASSEMBLY

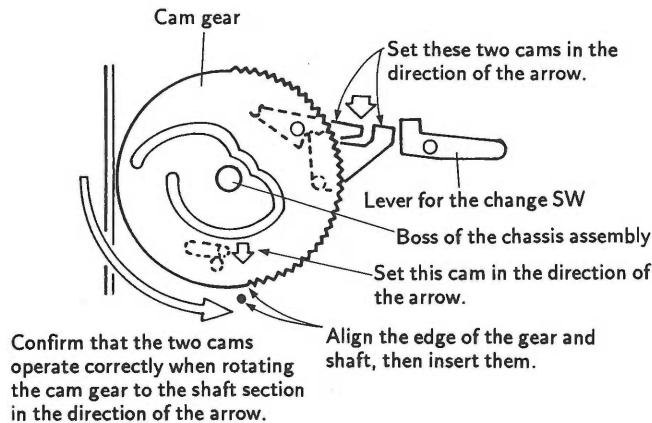
- ① Set the player with the tray down.
- ② Remove three screws (A) and slide the slide cam toward the rear to remove it.
- ③ Remove the clamber arm (A) assembly after removing slide cam to remove the roller plate assembly.



8.5 POSITIONING THE CAM AND THE CAM GEAR

Attaching the Cam Gear

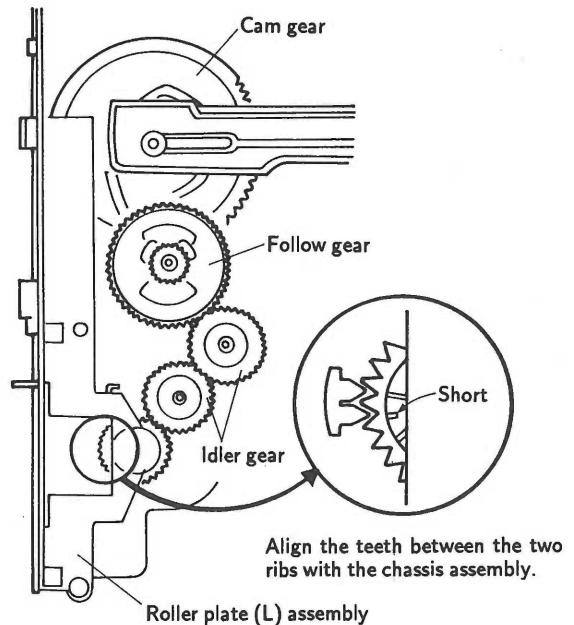
- ① Press the two cams of the chassis assembly and the lever for the change SW to downward. (See figure.)
- ② Insert the cam gear into the boss of the chassis assembly at the position shown in the figure.
- ③ After attaching, rotate the cam gear in the direction of the arrow to confirm the lever operation.



8.6 POSITIONING THE ROLLER PLATE ASSEMBLY

Attaching the Idler Gear

- ① Since there is no engagement between the follow gear and the two idler gears, insert the idler gears as they are.
- ② Since there is an engagement between the idler gear and the gear of the roller plate (L) assembly, mount them in the following manner :
Attach the gear of the roller plate (L) assembly to the chassis assembly while aligning their teeth at the position where the arm with no teeth of the follow gear contacts with the cam gear.



8.7 POSITIONING THE TRAY

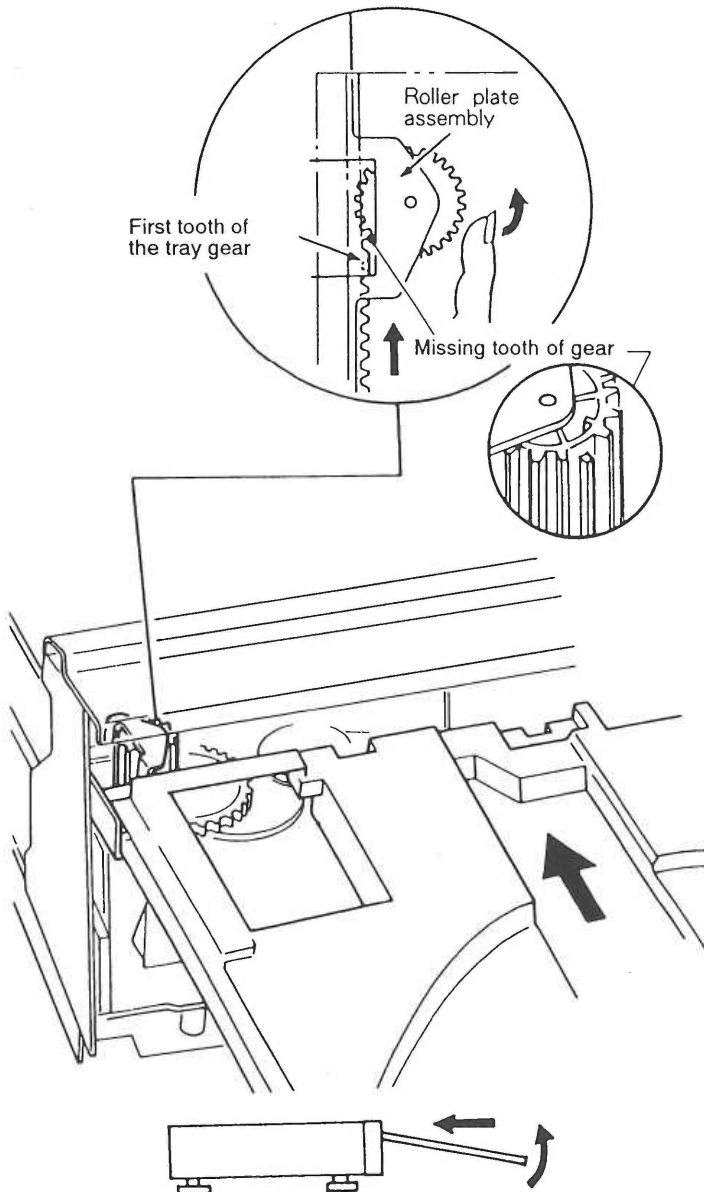
- ① Set the player with the tray open.
- ② Set the roller plate gear so that the roller plate line intersects with the mid-point of missing tooth of the roller plate gear.

(At this time, adjust the position by the method shown in Figure, or turn the power ON and use the SKIP (⏮, ⏭) buttons in the direction of OUT tilt it stops as shown.)

- ③ Insert the tray.

At this time, the tray can be inserted only when the first missing tooth of the tray gear is engaged with the missing tooth section of the roller plate gear, as shown in the figure.

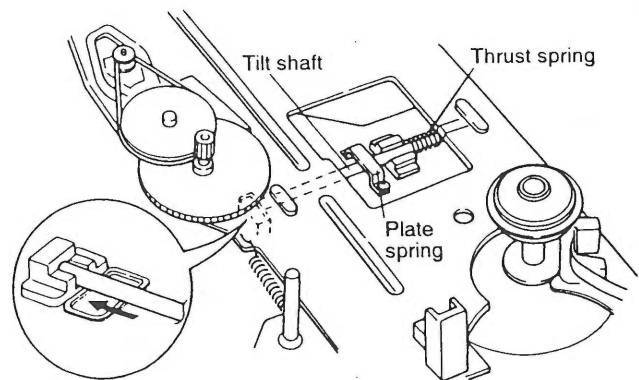
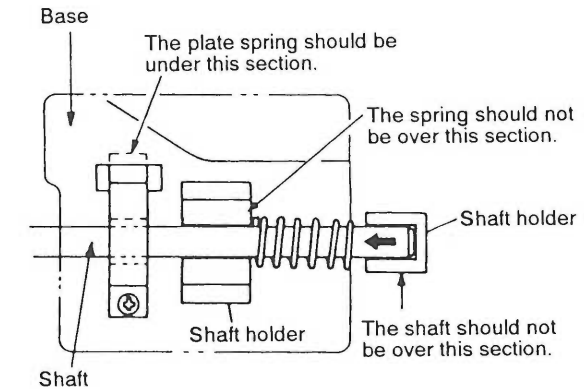
Tray is easier to insert by pushing slightly upwards.



8.8 ASSEMBLING THE SERVO MECHANISM BASE ASSEMBLY

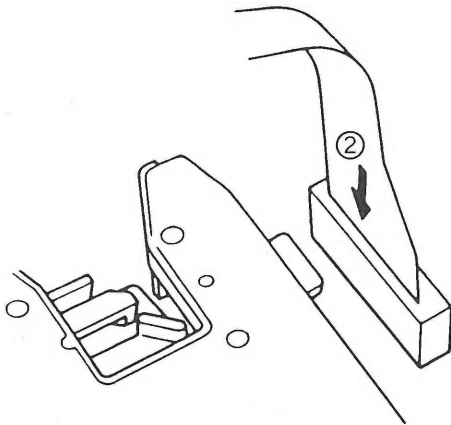
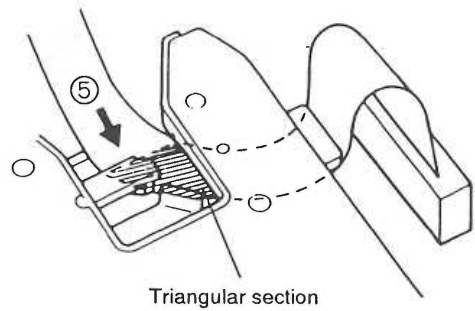
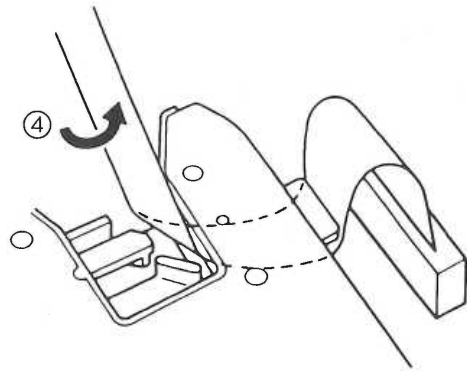
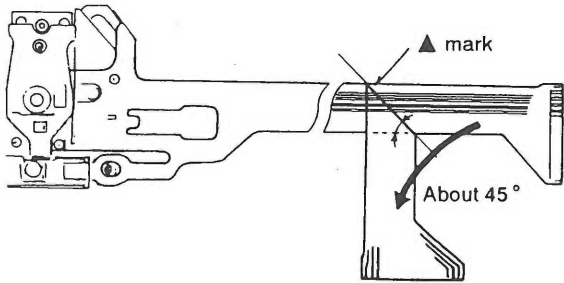
When assembling the servo mechanism base assembly, pay special attention to the following points.

- After inserting the tilt shaft in the position shown in Figure of mechanism chassis assembly, mount the servo mechanism base assembly in the direction of the arrow so that the tilt shaft does not come over the shaft holder as shown.
- The thrust spring should not come over the shaft holder.
- Check that the end of the plate spring is inserted under the base.

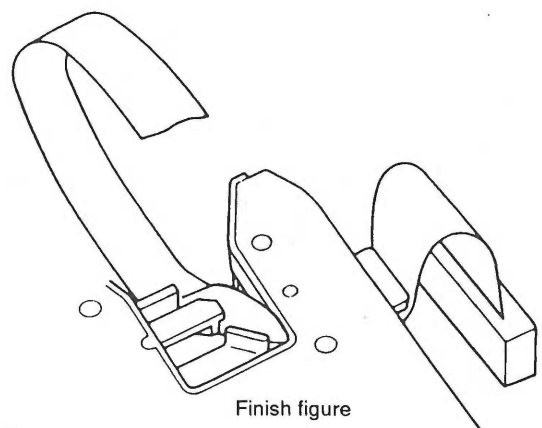
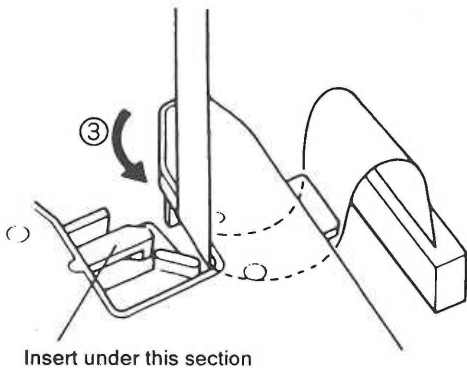
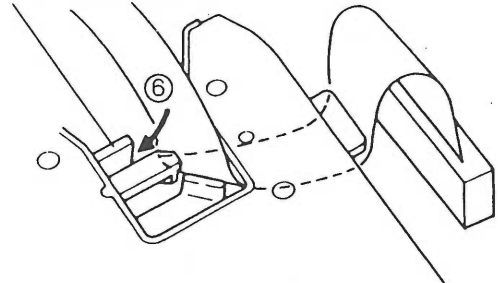


8.9 STYLING OF THE FLEXIBLE CABLE

- ① Bend the flexible cable of the pickup assembly by about 45° at the ▲ mark.
- ② Insert the flexible cable into the connector.
- ③ Set the flexible cable under the protruding section.
- ④ Twist the flexible cable by a half turn.
- ⑤ Insert the triangular section.
- ⑥ Further insert the flexible cable under the protruding section.



Insert under this section



9. FOR CLD – M401/KUC/CA, CLD – M301/KUC, KUC/CA AND CLD – M450/SD TYPES

● KUC/CA type is identical to KUC type but with additional(French) operating instructions :

Model Name	Operating Instructions(French)
CLD-M401/KUC/CA	VRC1013
CLD-M301/KUC/CA	VRC1013

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

CLD-M301/KUC, CLD-M450/SD and CLD-M401/KUC have the same construction except for the following:

Mark	Symbol & Description	Part No.			Remarks
		CLD – M401 /KUC	CLD – M301 /KUC	CLD – M450 /SD	
⊙	MOTHER assembly	VWM1265	VWM1252	VWM1265	for packing
NSP	MAIN assembly	VWX1118	VWX1106	VWX1118	
Δ ⊙	SYPS assembly	VWR1140	VWR1124	VWR1145	
⊙	FLKB assembly	VWM1257	VWM1253	VWM1257	
NSP	FLKY assembly	VWG1320	VWG1319	VWG1320	
NSP	SELD assembly	VWG1322	VWG1321	VWG1322	
NSP	HEPB assembly	VWV1242	.....	VWV1242
NSP	AUDIO assembly	VWX1119	VWX1107	VWX1119	
Δ	AC power cord	PDG1015	PDG1015	PDG1013	
Δ	Power transformer	VTT1113	VTT1113	VTT1114	
Δ	Voltage selector (AC110V,120 – 127V,220V,240V)	.....	.....	VSB1002
	Volume knob	VNK2003	.....	VNK2003
	Play key	VNK2015	.....	VNK2015
	Surround key	VNK2016	.....	VNK2016
	Top key	VNK2017	VNK2023	VNK2017	
	Sub key	VNK2018	VNK2025	VNK2018	
	Scan dial	VNK2020	.....	VNK2020
	FL panel	VNK2022	VNK2024	VNK2022	
	Combination key	.....	VNK2045	.....
	FL filter	VEC1567	VNK1659	VEC1567	
	Tray sheet	VEC1582	.....	VEC1582
NSP	Rear panel	VNA1265	VNA1264	VNA1273	
	Packing case	VHG1215	VHG1214	VHG1225	
	Snap plate	VNE1102	.....	VNE1102
NSP	Jack holder	VNE1555	.....	VNE1555
	Insulator assembly	VXA1775	VXA1686	VXA1775	
	Tray assembly – S	VXX1627	VXX1792	VXX1627	
NSP	Front panel assembly	VXA1841	VXA1844	VXA1860	
	Remote control unit	VXX1736	VXX1735	VXX1736	
	Battery cover	DNK2286	VNK1293	DNK2286	
	Front panel assembly – S	VXX1739	VXX1738	VXX1753	
NSP	Warranty card	ARY1044	ARY1044	ARW1020	
	Strain relief	CM – 22C	CM – 22C	CM – 22B	
NSP	65 label	ORW1069	ORW1069	.....

MAIN ASSEMBLY

VWX1106 and VWX1118 have the same construction except for the following :

Mark	Symbol & Description	Part No.		Remarks
		VWX1118	VWX1106	
	IC406	TA7302P	.....
	Q551,553,557,558,582,583	2SC2412K	.....
	Q552,554,556,581	2SA1037K	.....
	F401	VTF1042	.....
	L551	LAU120J	.....
	L552	LAU470J	.....
	L553	LAU180J	.....
	C551	CEAS101M10	.....
	C553	CCSQCH181J50	.....
	C554,563	CCSQCH101J50	.....
	C555	CCSQYF473Z50	.....
	C556	CEAS010M50	.....
	C557	CCSQCH150J50	.....
	C558,559,562	CKSQYF103Z50	.....
	C561,564,584 - 586	CKSQYF104Z25	.....
	C587,588	CEAS470M10	.....
	C650	CEAS471M10	CEAS471M6R3	
	R402	RS1/10S124J	RS1/10S221J	
	R543	RS1/10S562J	RS1/10S681J	
	R551,570	RS1/10S680J	.....
	R552,586	RS1/10S102J	.....
	R553	RS1/10S222J	.....
	R554,557	RD1/6PM680J	.....
	R555	RS1/10S471J	.....
	R556,566,581,583	RS1/10S681J	.....
	R558	RS1/10S152J	.....
	R559,568	RS1/10S331J	.....
	R560	RS1/10S103J	.....
	R561	RS1/10S333J	.....
	R562	RS1/10S182J	.....
	R563 - 565	RS1/10S332J	.....
	R567	RS1/10S272J	.....
	R569	RS1/10S122J	.....
	R571	RS1/10S472J	.....
	R575	RS1/10S101J	.....
	R588	RD1/6PM750J	.....
	JA1	VKN1072	.....
	JA7	VKB1048	.....

SYPS ASSEMBLY

VWR1124, VWR1145 and VWR1140 have the same construction except for the following :

Mark	Symbol & Description	Part No.			Remarks
		VWR1140	VWR1124	VWR1145	
△	IC1	NJM78M05FA	NJM78L05A	NJM78M05FA	
△	C13	CEAS102M16	CEAS471M16	CEAS102M16	
△	R51	RD1/2PM225J	RD1/2PM225J	.....

FLKY ASSEMBLY

VWG1319 and VWG1320 have the same construction except for the following :

Mark	Symbol & Description	Part No.		Remarks
		VWG1320	VWG1319	
	D202,203	VEL1015	.....
	Q203	DTC114ES	.....
	Q204	DTA124EL	DTA124ES	
	Q211—215	DTC124ES	.....
	S220	VSD1008	.....
	R224,226	RD1/6PM181J	.....
	R229	.....	RD1/6PM8R2J	
	R241—245	RD1/6PM221J	.....
	V201	VAW1028	VAW1027	

SELD ASSEMBLY

VWG1321 and VWG1322 have the same construction except for the following :

Mark	Symbol & Description	Part No.		Remarks
		VWG1322	VWG1321	
	D211—215	MAY5763XM462	.....

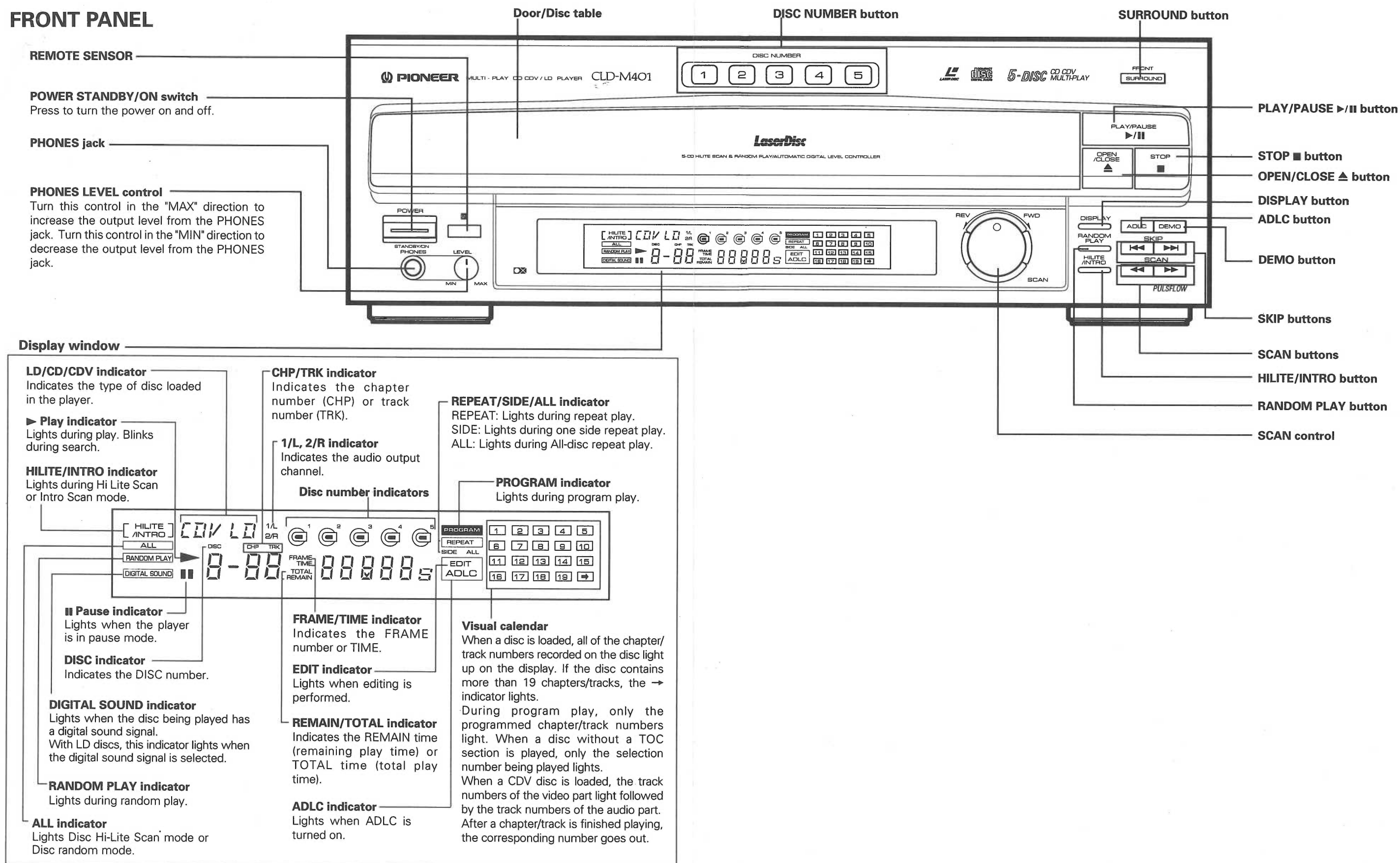
AUDIO ASSEMBLY

VWX1107 and VWX1119 have the same construction except for the following :

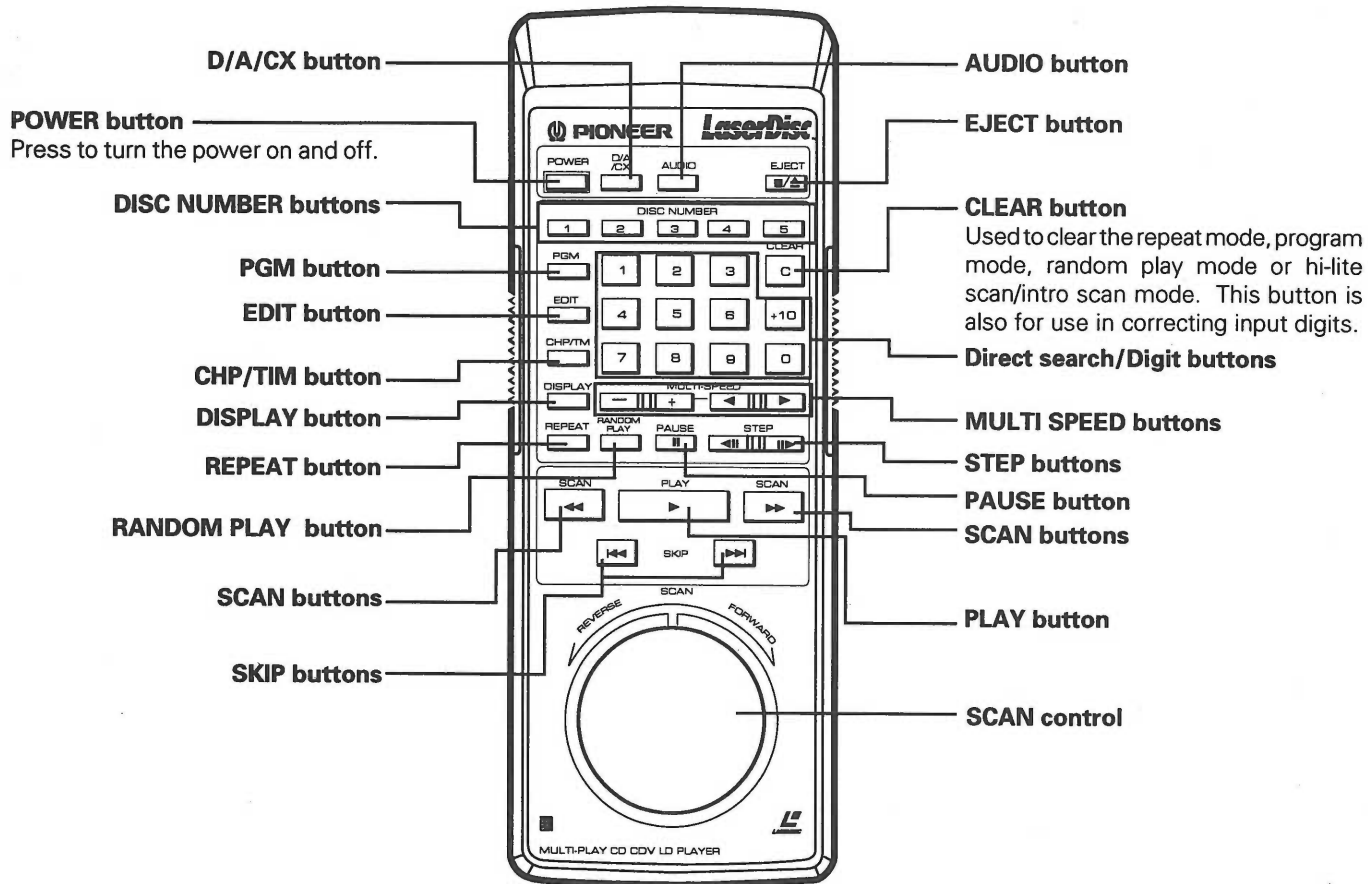
Mark	Symbol & Description	Part No.		Remarks
		VWX1119	VWX1107	
	IC202	NJM78L08A	.....
	IC210	NJM79L08A	.....
	Q203,209—213	DTA124EK	.....
	D202,205,206,297	1SS254	.....
	D312	ERA83—006	.....
	L349	LAU010K	.....
	C207,279	CEAS471M10	CEAS470M10	
	C210	CKSQYF104Z25	.....
	C255,257	CEAS471M10	CEAS471M6R3	
	R204,238,284,289,294	RS1/10S102J	.....
	R206	RS1/10S222J	.....
	R212,213,220,221	RD1/6PM470J	.....
	R215,223	RS1/10S682J	RS1/10S1R8J	
	R219,224	RS1/10S103J	.....
	R227,233,286,293	RS1/10S471J	.....
	R291	RD1/6PM472J	RD1/6PM103J	
	JA6	VKB1051	VKB1050	
	JA8	TOTX178	.....

10. PANEL FACILITIES

FRONT PANEL



Remote control unit



11. SPECIFICATIONS

1. General

System LaserVision Disc system and Compact Disc digital audio system
 Laser Semiconductor laser wavelength 780 nm
 Power requirements
 U.S. and Canadian models AC 120V, 60 Hz
 Multi-voltage model AC 110V/120-127V/220V/240V (Switchable), 50/60 Hz
 Power consumption 39 W
 Weight
 CLD-M450/CLD-M401 9.6 Kg (21 lb 3 oz)
 CLD-M301 9.5 Kg
 Dimensions
 CLD-M450/CLD-M401 ... 420 (W) x 453 (D) x 142 (H) mm
 16-9/16 (W) x 17-13/16 (D) x 5-9/16 (H) in
 CLD-M301 420 (W) X 444 (D) X 142 (H) mm
 16-9/16 (W) X 17-1/2 (D) X 5-9/16 (H) in
 Operating temperature +5°C ~ +35°C
 (41°F - 95°F)
 Operating humidity 5% ~ 90%
 (There should be no condensation of moisture.)

2. Disc

LaserVision Discs

*Maximum playing times
 12-inch standard play disc 1 hour/both sides
 12-inch extended play disc 2 hours/both sides
 8-inch standard play disc 28 min/both sides
 14 min/one side
 8-inch extended play disc 40 min/both sides
 20 min/one side
 Spindle motor speed
 Standard play disc 1,800 rpm
 Extended play disc 1,800 rpm (inner circumference)
 to 600 rpm (outer circumference)
 (For a 12-inch disc)

Compact Discs

DISC Diameter: 5-inch, 3-inch, Thickness: 1.2 mm
 Rotation direction (pickup side) Counterclockwise
 Linear speed 1.2 ~ 1.4m/sec
 *Maximum playing time
 74 min. 5-inch discs
 20 min. 3-inch discs
 (For stereo playback)

Compact Discs with Video

Disc Diameter: 5-inch, Thickness: 1.2 mm
 Rotation direction (pickup side) Counterclockwise
 Linear speed Audio portion: 1.2 ~ 1.4m/sec
 Video portion: 11 ~ 12m/sec
 *Maximum playing time Video portion: 5 min. (CLV)
 Audio portion: 20 min. (Digital)

* Actual playback time differs for each disc.

3. Video characteristics (CLD-M450/CLD-M401: two jacks, CLD-M301: one jack)

Format NTSC specifications
 Video output
 Level 1 Vp-p nominal, sync. negative, terminated
 Impedance 75Ω unbalanced
 Jack RCA jack

4. S-Video output (CLD-M450/CLD-M401 only)

Y (luminance) - Output level 1Vp-p (75Ω)
 C (color) - Output level 286mVp-p (75Ω)
 Jack S-VIDEO jack

5. Audio characteristics (CLD-M450/CLD-M401: two pairs, CLD-M301: one pair)

Output level
 During analog audio output 200 mVrms
 (1 kHz, 40%)
 During digital audio output 200 mVrms
 (1 kHz, -20 dB)
 Jacks Both RCA jacks
 Number of channels 2

Digital Audio Characteristics

Frequency response	4 Hz - 20 kHz
SN ratio	(CLD-M401/CLD-M450) 112dB (CLD-M301) 102 dB
Dynamic range	(CLD-M401/CLD-M450) 98 dB (CLD-M301) 96dB
Total harmonic distortion	(CLD-M401/CLD-M450) 0.0025% (CLD-M301) 0.003%
Wow and flutter	Limit of measurement (EIAJ)

6. Other Terminals

Control input/output Both miniature jacks
 CD-DECK synchro Miniature jack
 VHF adapter output (Video/Audio) Both RCA jacks
 with DC jack
 Optical digital output
 (CLD-M450/CLD-M401 only) Optical digital jack

7. Accessories


Remote control unit (CLD-M450: CU-CLD063, CLD-M401: CU-CLD063, CLD-M301: CU-CLD064) 1
 Size "AAA" (IEC R03) dry cell batteries 2
 Video cord 1
 Audio cord 1
 Operating instructions 1
 Warranty card 1

7. Functions

Remote control unit operations (CLD-M450: CU-CLD063, CLD-M401: CU-CLD063, CLD-M301: CU-CLD064)

	Function	Standard play Disc (CAV)	Extended play Disc (CLV)	Compact Disc with Video	Compact Disc
Basic Functions	Single-side play	YES	YES	YES	YES
	Pause	YES	YES	YES	YES
	Stop	YES	YES	YES	YES
Search	Fast forward (forward and reverse)	YES	YES	YES	YES
	Chapter/Track skip	YES	YES	YES	YES
	Direct chapter/Track number search	YES	YES	YES	YES
	Frame number search	YES	NO	NO	NO
	Time number search	NO	YES	YES	YES
	Absolute time search	NO	NO	NO	YES
	Disc search*6	NO	NO	YES	YES
Program	Chapter/Track program play	YES	YES	YES	YES
	Program correction	YES	YES	YES	YES
Repeat	Chapter/Track repeat	YES	YES	YES	YES
	One-side repeat	YES	YES	YES	YES
	All-disc repeat	NO	NO	YES	YES
	Program repeat	YES	YES	YES	YES
	Random repeat	YES*1	YES*1	YES	YES
Trick play	Still/Step	YES	NO	NO	NO
	Multi-speed (Forward/reverse 9-level variable)*6	YES	NO	NO	NO
Time display	Elapsed time display	NO	YES	YES	YES
	Absolute time display	YES*1	NO	NO	YES
	Remaining track time display	NO	NO	YES	YES
	Remaining total time display	YES*1	YES*1	YES	YES
	Total number of selections, total time display	YES*1	YES*1	YES	YES
Others	Hi-Lite scan	NO	NO	YES*4	YES
	Intro scan	YES	YES	YES*5	NO
	CX system ON/OFF	YES*2	YES*2	NO	NO
	AUTO DIGITAL/ANALOG switch	YES*3	YES*3	NO	NO
	Audio channel selection (Stereo, 1/L, 2/R)	YES	YES	YES	YES

*1 Only discs with TOC

*2 Valid for analog sound playing a disc with the  mark.

*3 Can only be used with discs with digital sound tracks.

*4 Audio part only

*5 Video part only

*6 CLD-M450/CLD-M401 only

NOTE:

The specifications and design of this product are subject to change without notice, due to improvements.

PLAYER FUNCTIONS

- Display, Visual Calendar Display
- Intro Scan, Hi-Lite Scan, Direct CD, ADLC, Random Playback, Disc Random Playback, Program Random Playback and Compu Program/Auto Program Edit
- Digital Sound for Laser/Vision Discs
- Last Memory