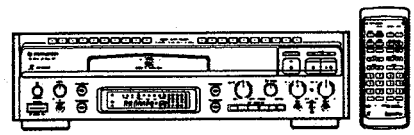
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
ARP2550

CD CDV LD PLAYER

CLD-1710K

CLD-1710K HAS THE FOLLOWING :

Type	Power Requirement	Remarks
SD	AC110V, 120-127V, 220V, 240V (switchable)	

- **This manual is applicable to CLD-1710K/SD.**
- **For the disassembly and mechanism descriptions, refer to the service manual ARP2528 for CLD-S201 and CLD-S250.**

CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R 0P2 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

IFO JULY 1992 Printed in Japan

2. EXPLODED VIEWS, PACKING AND PARTS LIST

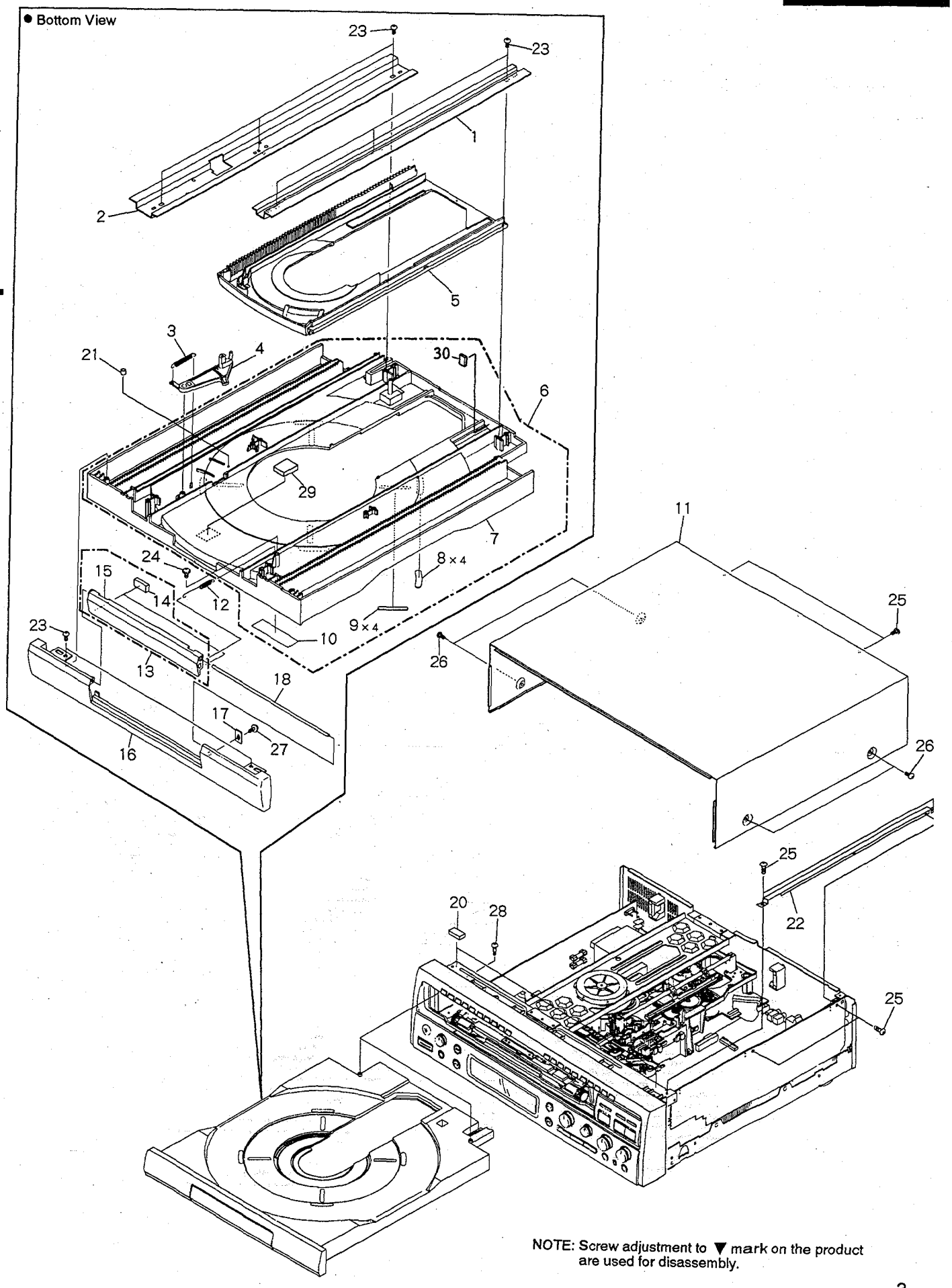
NOTES:

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

(1) EXTERIOR SECTION

Parts List

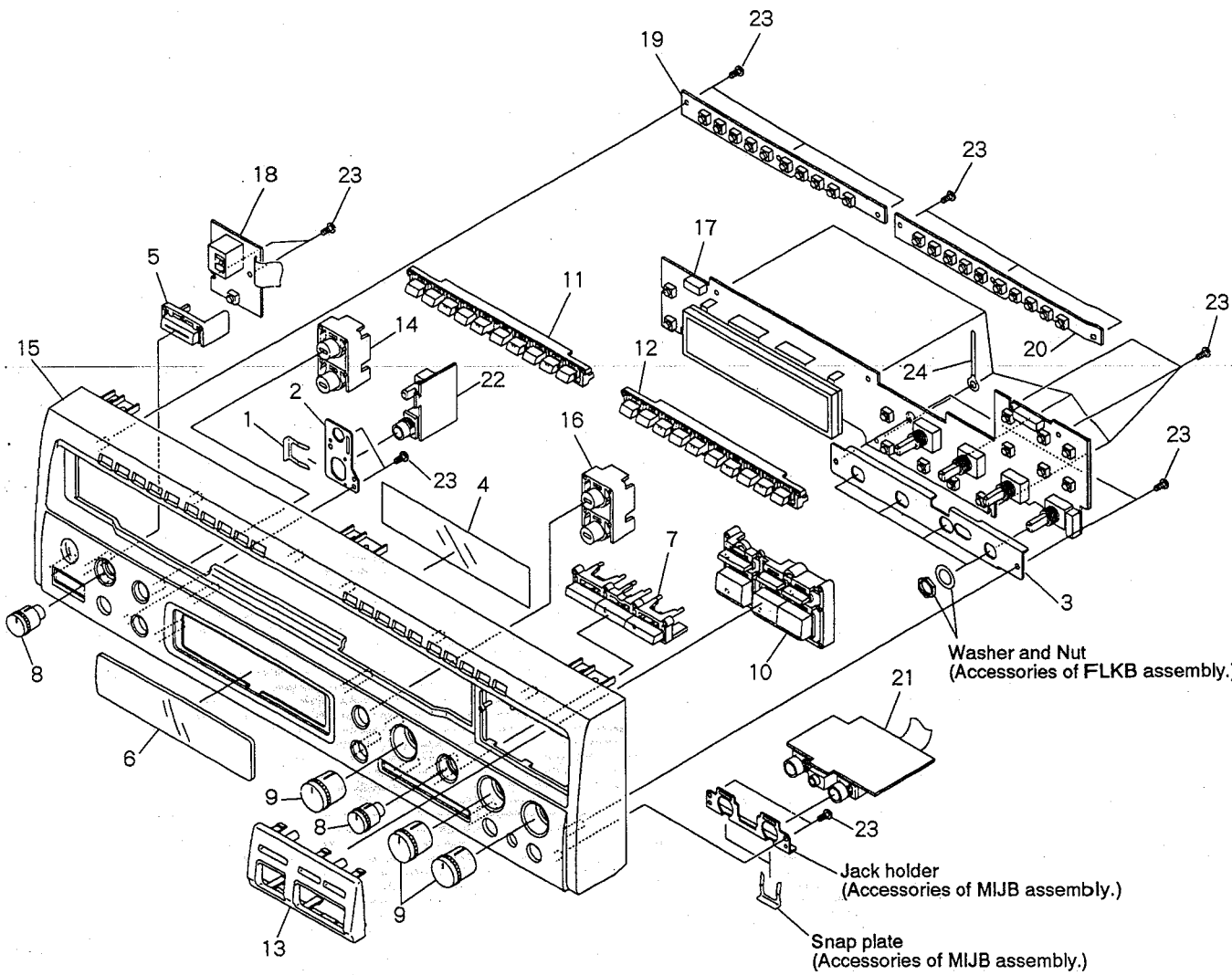
Mark	No.	Description	Part No.
	1	Guide plate (L)	VNE1805
	2	Guide plate (R)	VNE1806
	3	Lock plate spring	VBH1188
	4	Lock plate	VNL1513
	5	CD tray	VNK1992
	6	Tray assembly-S	VXX1729
NSP	7	LD tray	VNK1991
	8	Disc pad (Large)	VEC1191
	9	Disc pad (C)	VEC1380
NSP	10	Carry label	VRW1289
	11	Bonnet S	VXX1726
	12	Door spring	VBH1202
	13	CD door assembly-S	VXX1779
	14	Cushion	VEC1578
NSP	15	CD door	VNK2075
	16	Tray panel assembly	VXA1863
	17	Door holder	VNE1812
	18	Door shaft	VLL1441
	19	• • • • •	
NSP	20	Spacer	VEC1585
	21	Tray rubber	VEB1091
NSP	22	PCB holder	VNE1830
	23	Screw	BPZ30P060FCU
	24	Screw	IPZ26P060FMC
	25	Screw	BBZ30P080FCC
	26	Screw	BCZ40P060FZK
	27	Screw	IPZ20P050FMC
	28	Screw	VBA1032
NSP	29	Damp cushion	VEC1110
NSP	30	Stop cushion	VEC1605


● Bottom View
23
23
1
2
5
3
4
21
30
6
29
7
8 x 4
24
15
14
12
9 x 4
10
23
13
18
17
27
16
11
25
26
26
25
22
20
28
25
NOTE: Screw adjustment to ▼ mark on the product are used for disassembly.

(2) FRONT PANEL SECTION

Parts List

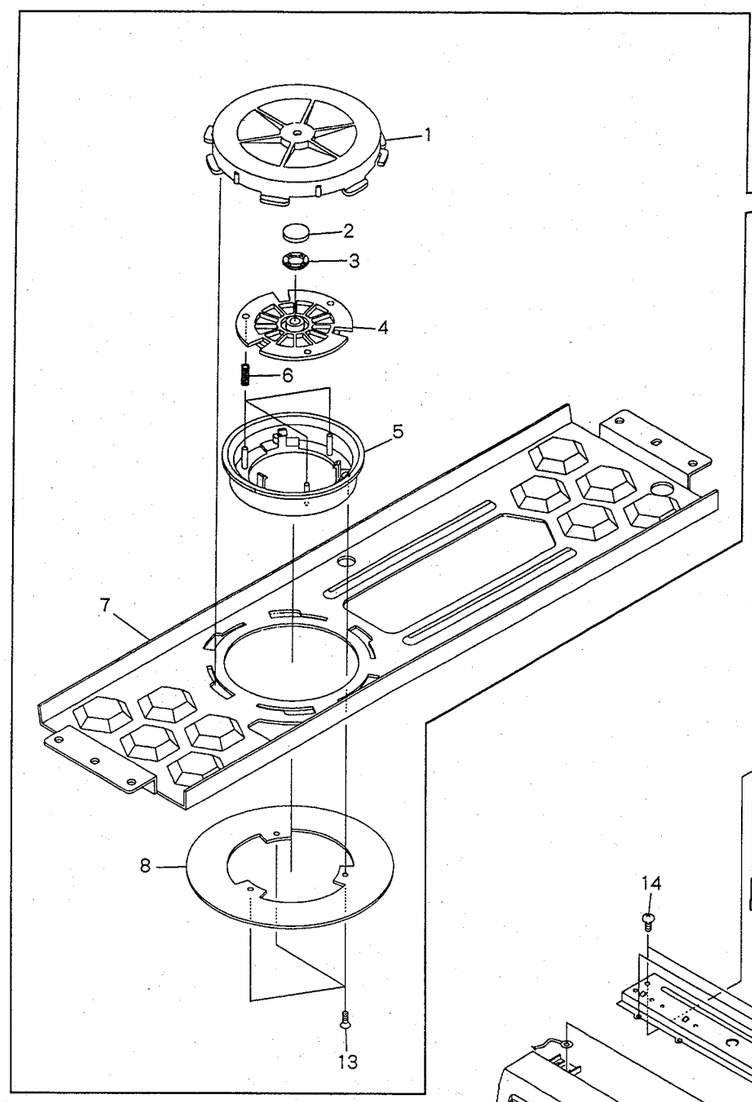
Mark	No.	Description	Part No.
	1	Snap plate	VNE1102
	2	Jack holder (L)	VNE1818
	3	Volume holder	VNE1823
	4	FL filter	VNK1659
	5	PW button	VNK2002
	6	FL lens	VNK2070
	7	Key con. button	VNK2071
	8	Volume knob (S)	VNK2072
	9	Volume knob (L)	VNK2073
	10	Main key	VNK2076
	11	Ten key (L)	VNK2077
	12	Ten key (R)	VNK2078
	13	Sub panel	VNK2119
	14	L key (L) assembly	VXA1864
	15	Front panel assembly	VXA1865
	16	L key (R) assembly	VXA1884
NSP	17	FLKB assembly	VWG1343
NSP	18	IRKB assembly	VWG1344
NSP	19	FDKB assembly	VWG1345
NSP	20	SDKB assembly	VWG1346
NSP	21	MIJB assembly	VWV1264
NSP	22	HEPB assembly	VWV1265
	23	Screw	BPZ26P060FCU
	24	Cord clamper	VNF-069

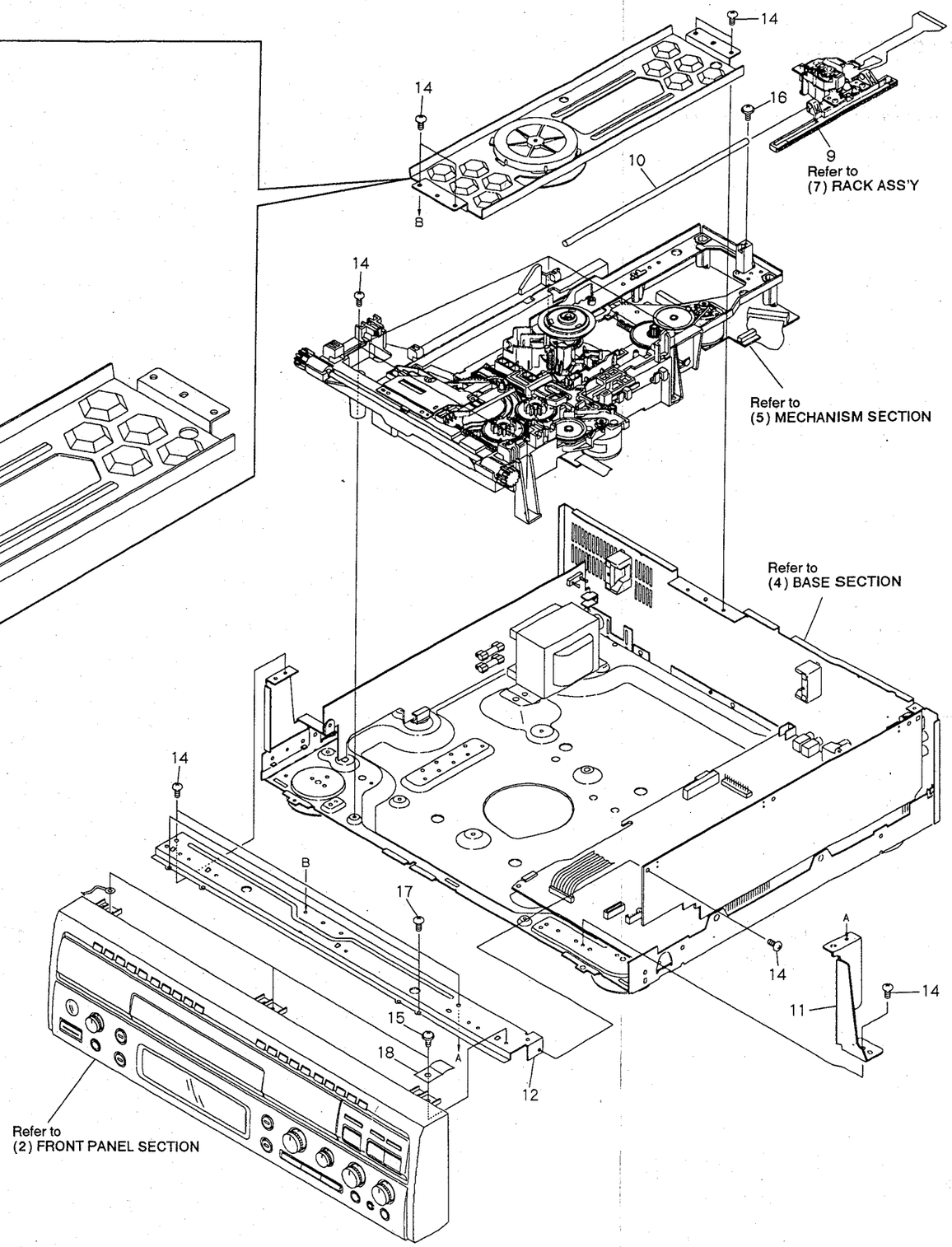


(3) TOP VIEW SECTION

Parts List

Mark	No.	Description	Part No.
	1	Clamper holder	VNL1514
	2	Rubber mat	VEB1114
	3	Thrust holder	VNL1289
	4	Clamper head	VNL1516
	5	Clamper	VNL1515
	6	Clamper spring	VBH1192
	7	Clamper arm	VNE1804
	8	Stabilizer	VNE1807
	9	Rack assembly	VWT1080
	10	Carriage shaft	VLL1434
NSP	11	Side stay (R)	VNE1810
NSP	12	Front angle	VNE1808
	13	Screw	CPZ20P050FMC
	14	Screw	BBZ30P080FCC
	15	Screw	IBZ30P060FCC
	16	Screw	IPZ30P060FMC
	17	Screw	PCZ30P060FMC
NSP	18	Earth plate	VNE1518

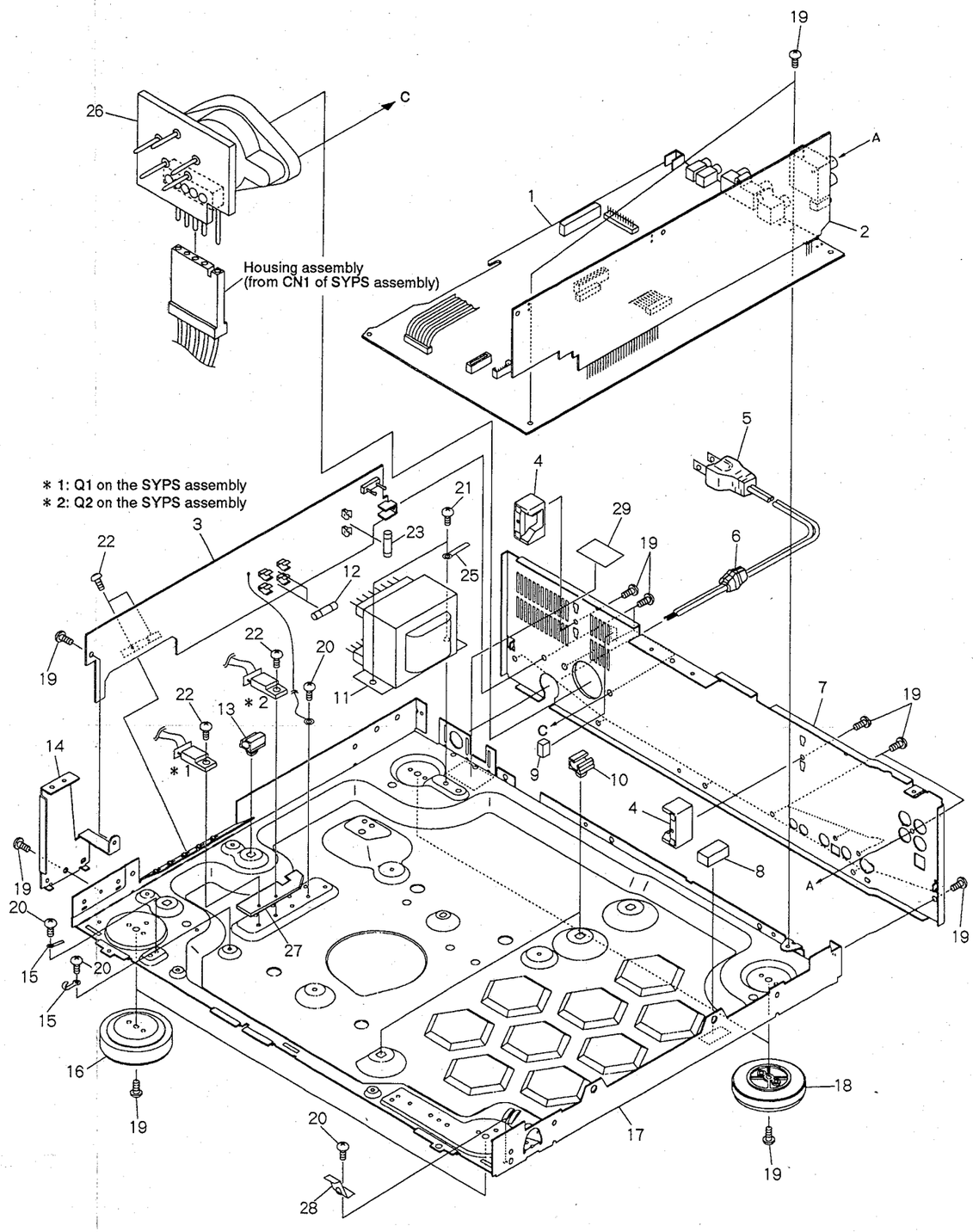




(4) BASE SECTION

Parts List

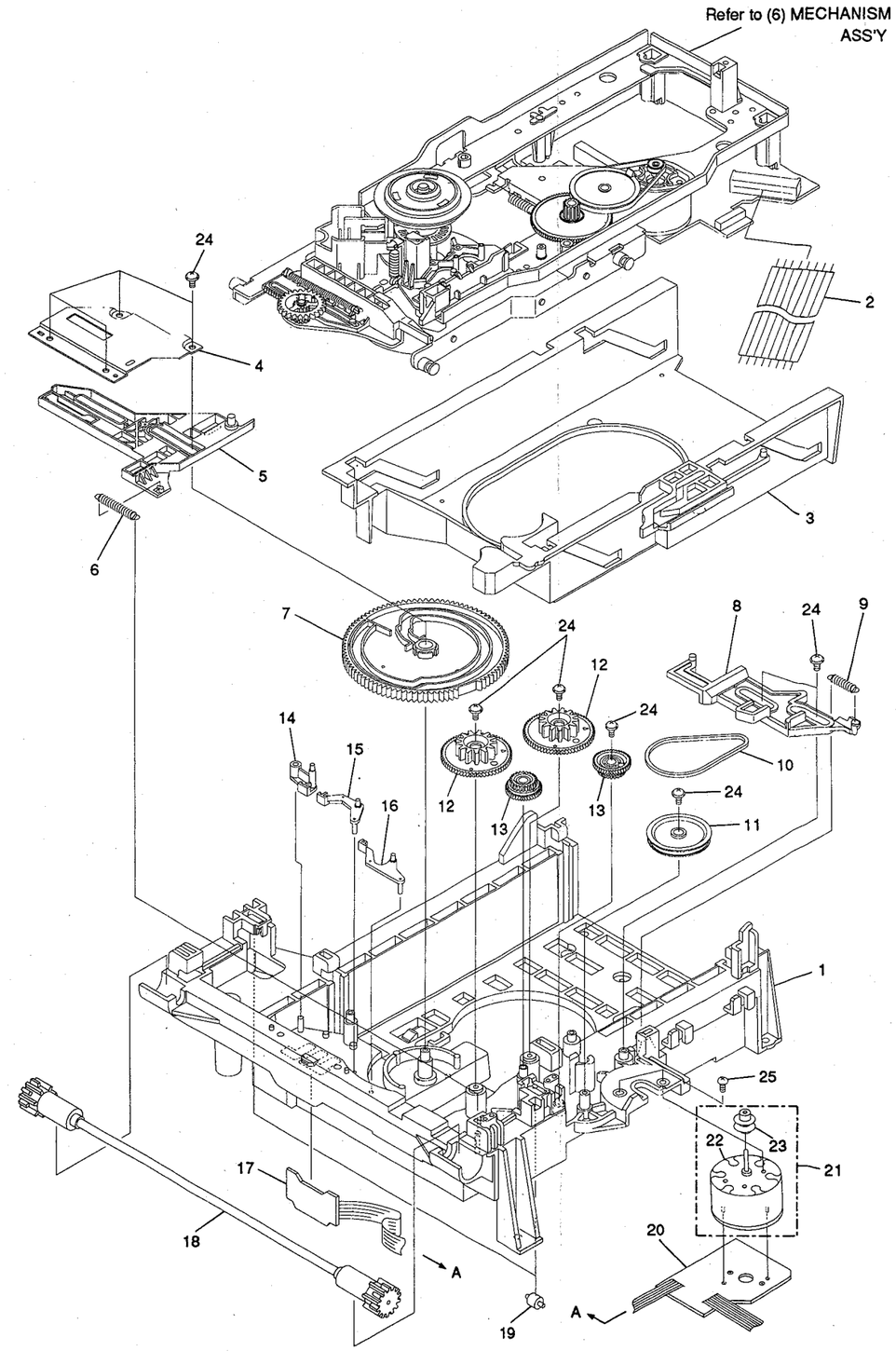
Mark	No.	Description	Part No.
NSP	1	MAIN assembly	VWX1128
NSP	2	AUDIO assembly	VWV1263
◉	3	SYPS assembly	VWR1150
	4	Tray stopper	VNL1519
⚠	5	AC power cord	PDG1013
⚠	6	Strain relief	CM-22B
NSP	7	Rear panel	VNA1292
	8	PCB cushion	VEC1573
NSP	9	Support cushion	VEC1601
NSP	10	PCB hinge	VEC1174
⚠	11	Power transformer	VTT1118
⚠	12	Fuse (FU1, FU2) (3A)	VEK-018
NSP	13	P. plate holder	PNY-405
NSP	14	Side stay (L)	VNE1809
	15	Cord clamper	VNF-069
	16	Insulator	PNW1912
NSP	17	Base chassis	VNA1255
	18	Insulator assembly	VXA1881
	19	Screw	BBZ30P080FCC
	20	Screw	BBZ30P040FMC
	21	Screw	BCZ40P060FZK
	22	Screw	BCZ30P080FCC
⚠	23	Fuse (FU3)(1A)	REK-080
	24	• • • • •	
NSP	25	Cord clamper	VNF-005
◉	26	VSBA assembly	VWR1151
NSP	27	Plate	VNE1854
NSP	28	Earth plate	VNE1839
NSP	29	Insulation sheet	VEC1406



(5) MECHANISM SECTION

Parts List

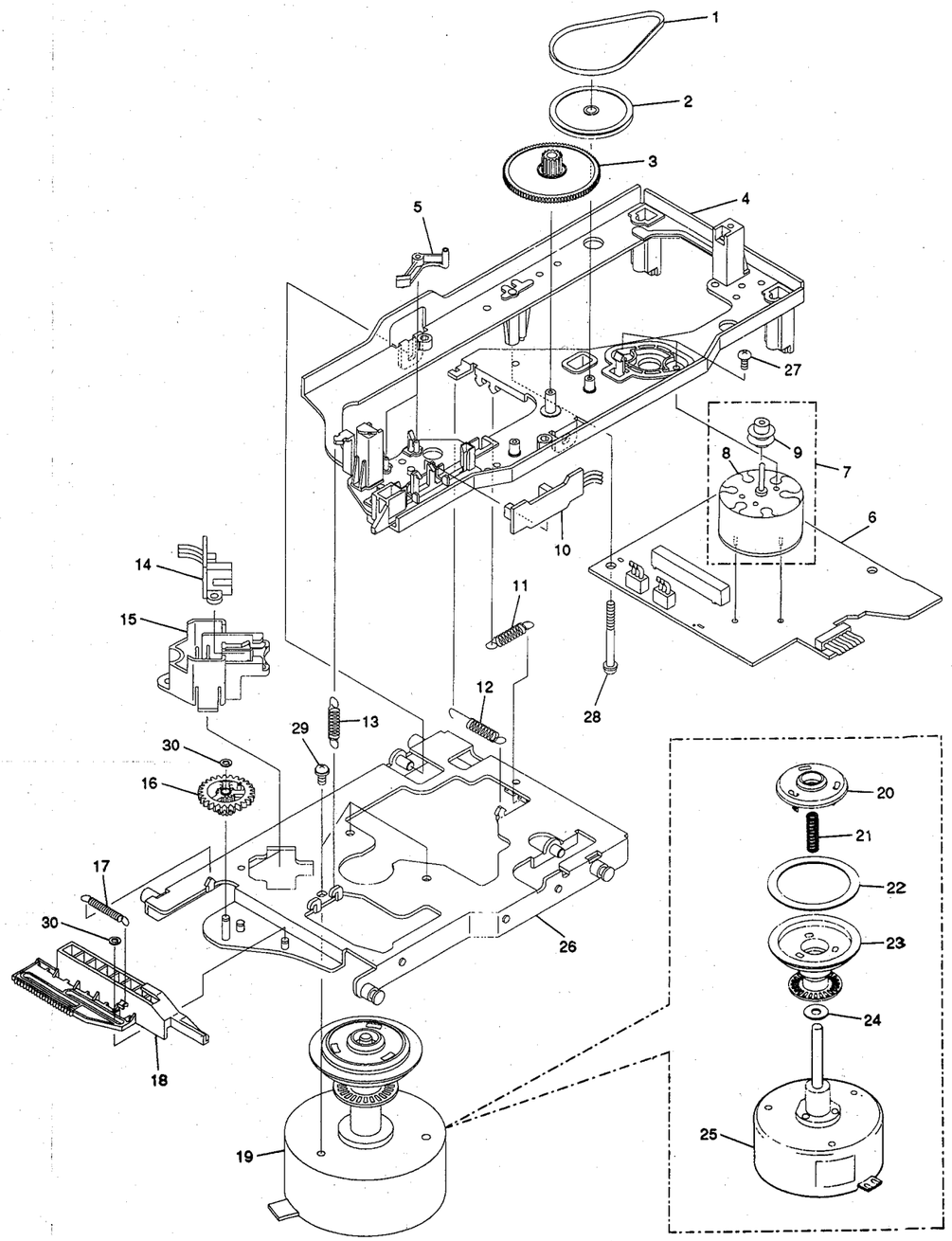
Mark	No.	Description	Part No.
	1	Mechanism base	VNK1990
	2	Flexible cable	VDA1409
	3	Clamp cam	VNL1500
	4	Shaft holder	VNE1817
	5	Cam plate	VNL1511
	6	CAS spring	VBH1190
	7	Cam gear	VNL1507
	8	CD plate	VNL1512
	9	CDP spring	VBH1191
	10	Rubber belt	VEB1184
	11	Gear pulley	VNL1510
	12	Twin gear	VNL1508
	13	Center gear	VNL1509
	14	L-SW lever	VNL1504
	15	C-SW lever	VNL1505
	16	R-SW lever	VNL1506
NSP	17	LOSB ASS'Y	VWG1307
	18	Synchro gear ASS'Y	VXA1822
	19	Roller	VNL1042
NSP	20	LOMB ASS'Y	VWG1308
	21	Loading motor ASS'Y	VXX1712
NSP	22	Slider motor	VXM1033
	23	Motor pulley	PNW1643
	24	Screw	Z39–019
	25	Screw	BMZ26P040FMC



(6) MECHANISM ASS'Y

Parts List

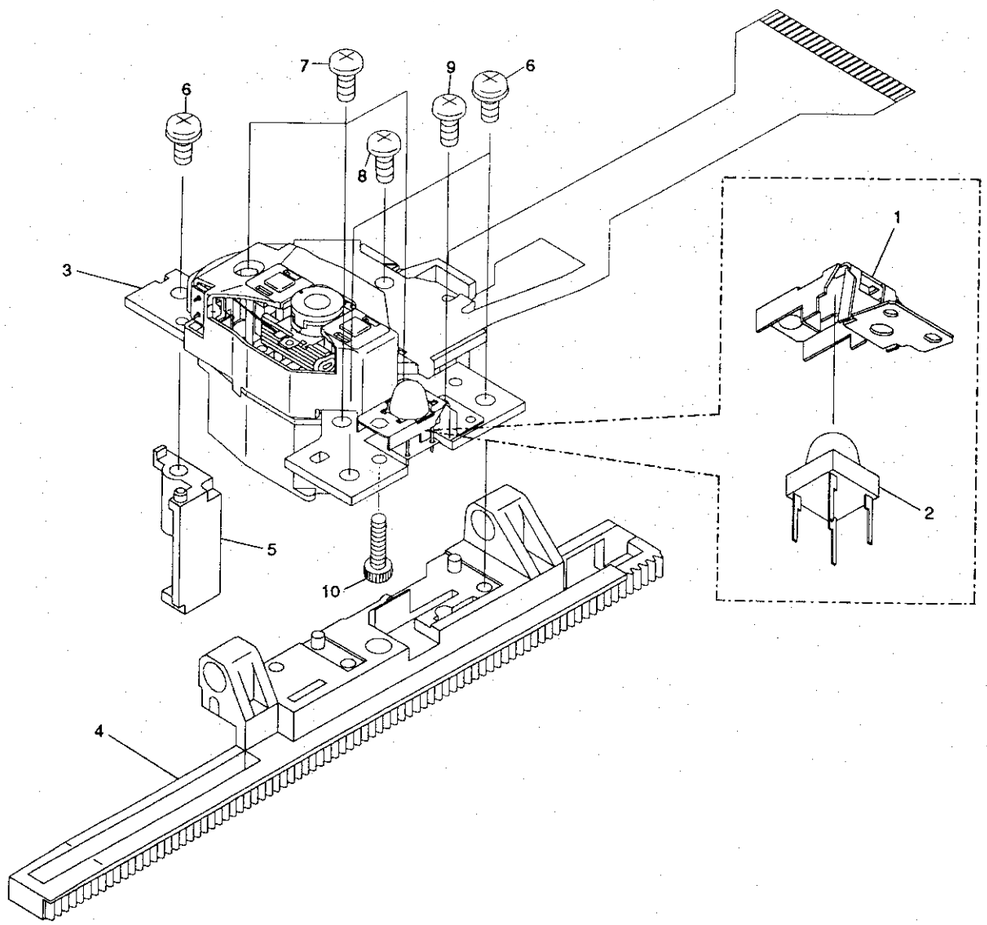
Mark	No.	Description	Part No.
	1	CA belt	VEB1077
	2	CA pulley	VNL1496
	3	CA gear	VNL1497
	4	Tilt base	VNL1499
	5	CA-SW lever	VNL1498
NSP	6	CAMB ASS'Y	VWG1306
	7	CRG motor ASS'Y	VXX1261
NSP	8	Slider motor	VXM1033
	9	CA pulley (1)	VNL1197
NSP	10	PKSB ASS'Y	VWG1305
	11	Radial spring	VBH1201
	12	Thrust spring	VBH1200
	13	Tilt tension	VBH1187
NSP	14	FG ASS'Y	VWG1304
	15	FG base	VNL1503
	16	Y gear	VNL1501
	17	Tilt cam spring	VBH1189
	18	Tilt cam	VNL1502
	19	Spindle motor ASS'Y	VXA1825
	20	Centering hab	VNL1174
	21	Centering spring	VBH1083
NSP	22	Rubber sheet	VEB1103
NSP	23	Turn table ASS'Y	VXA1283
NSP	24	Oil stopper	VBF1002
NSP	25	Spindle motor	VXM1050
	26	Motor base	VNE1803
	27	Screw	BMZ26P040FMC
	28	Screw	ABZ30P300FMC
	29	Screw	PMA30P050FMC
	30	Washer	WT26D060D025



(7) RACK ASS'Y

Parts List

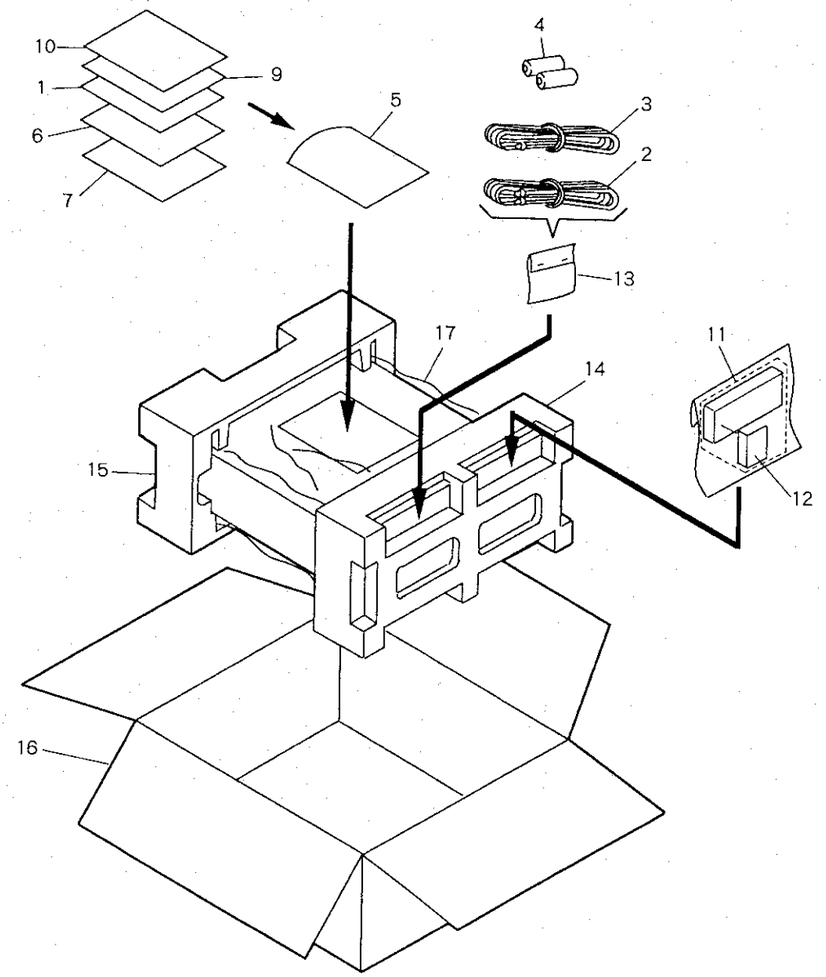
Mark	No.	Description	Part No.
NSP	1	Sensor stay	VBK1036
NSP	2	Tilt sensor	SG-302
NSP	3	Pick up ASS'Y	VWY1030
	4	Rack	VNL1495
	5	Tan. base	VNL1494
	6	Screw	PBB26P080FMC
	7	Screw	PMA20P060FMC
	8	Screw	PMA20P080FMC
	9	Screw	PMH20P040FMC
	10	Screw	SMZ20H120FZK



(8) PACKING

Parts List

Mark	No.	Description	Part No.
NSP	1	Warranty card	ARW1020
	2	Cord with plug	VDE-055
	3	Cord with plug	VDE-056
NSP	4	Battery (R03, AAA)	VEM-022
NSP	5	Vinyl bag	VHL-014
	6	Operating instructions (English)	VRB1075
	7	Operating instructions (Chinese)	VRC1014
	8	• • • • •	
NSP	9	Caution card (UC)	VRM1026
NSP	10	Caution card	VRR1009
	11	Remote control unit	VXX1761
	12	Baterry cover	VNK1293
NSP	13	Vinyl bag	Z21-029
	14	Pad (F)	VHA1112
	15	Pad (R)	VHA1113
	16	Packing case	VHG1234
	17	Mirror mat	VHL1006



2. SC

● NOTE

Note:

1. When or
"PARTS
PARTS L

2. Since these
values of se
ment.

3. RESISTORS
Unit: k:kΩ, M
Rated power
Tolerance:(F)
unless otherv

4. CAPACITOR
Unit : p:pF or
Ratings : cap
Rated voltage

5. COILS:
Unit : m:mH

6. VOLTAGE AN
: DC volta
⇨mA or ←mA

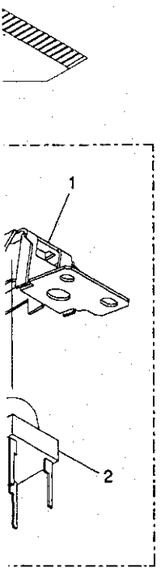
7. OTHERS
● ➡ : Signal
● ⊘ : Adjustn
●▼(Red) : Mea
● The ⚠ mark
portance of th
be sure to use

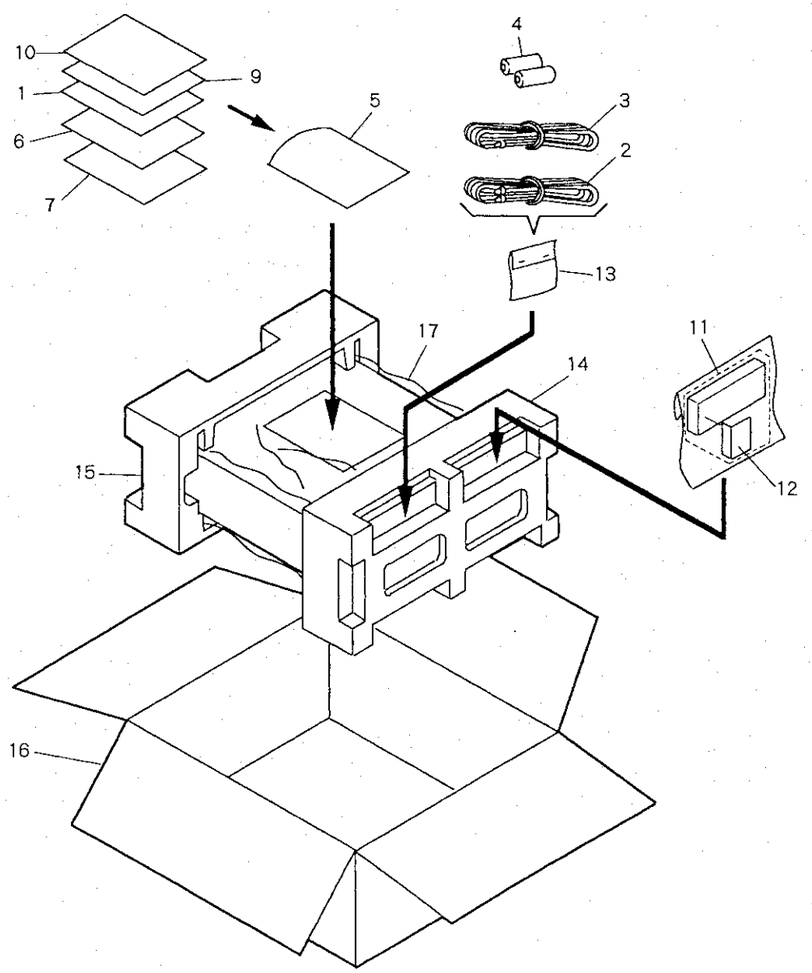
8. SWITCHES (U
AUDIO ASSEM
S301 :ATTEN
FLKB ASSEMB
S101 :ONE-T
S102 :SURRO
S103 : ♮
S104 :AUDIO
S105 : #
S106 : ♭
S107 :DIRECT
S108 :PROGR
S109 :STOP (
S110 :OPEN/
S111 :PLAY/P
S112 : ⏮
S113 : ⏭
IRKB ASSEMBL
S401 :POWER
FDKB ASSEMBL
S301 :10
S302 :9
S303 :7
S304 :8
S305 :3
S306 :1
S307 :2
S308 :4
S309 :6
S310 :5
SDKB ASSEMBL
S201 :12
S202 :11
S203 :13
S204 :17
S205 :20
S206 :16
S207 :19
S208 :15
S209 :18
S210 :14

(8) PACKING

Parts List

Mark	No.	Description	Part No.
NSP	1	Warranty card	ARW1020
	2	Cord with plug	VDE-055
	3	Cord with plug	VDE-056
NSP	4	Battery (R03, AAA)	VEM-022
NSP	5	Vinyl bag	VHL-014
	6	Operating instructions (English)	VRB1075
	7	Operating instructions (Chinese)	VRC1014
	8	• • • • •	
NSP	9	Caution card (UC)	VRM1026
NSP	10	Caution card	VRR1009
	11	Remote control unit	VXX1761
	12	Baterry cover	VNK1293
NSP	13	Vinyl bag	Z21-029
	14	Pad (F)	VHA1112
	15	Pad (R)	VHA1113
	16	Packing case	VHG1234
	17	Mirror mat	VHL1006





2. SCHEMATIC AND PCB CONNECTION DIAGRAMS

● NOTE OF THE SCHEMATIC DIAGRAM

Note: (Type 4)

1. When ordering service parts, be sure to refer to "PARTS LIST of EXPLODED VIEWS" or "PCB PARTS LIST".

2. Since these are basic circuits, some parts of them or the values of some components may be changed for improvement.

3. RESISTORS:
Unit: k:kΩ, M:MΩ, or Ω unless otherwise noted.
Rated power: 1/4W, 1/6W, 1/8W, 1/10W unless otherwise noted.
Tolerance:(F):±1%, (G):±2%, (K):±10%, (M):±20% or ±5% unless otherwise noted.

4. CAPACITORS:
Unit : p:pF or μF unless otherwise noted.
Ratings : capacitor (μF) / voltage (V) unless otherwise noted.
Rated voltage : 50V except for electrolytic capacitors.

5. COILS:
Unit : m:mH or μH unless otherwise noted.

6. VOLTAGE AND CURRENT:
▭ : DC voltage (V) in PLAY mode unless otherwise noted.
⇦mA or ←mA: DC current in PLAY mode unless otherwise noted.
Value in ( ) is DC current in STOP mode.

7. OTHERS
- ➡ : Signal route.
- ⊘ : Adjustment point.
- ▼(Red) : Measurement point.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the parts. Therefore, when replacing, be sure to use parts of identical designation.

8. SWITCHES (Underline indicates switch position):

AUDIO ASSEMBLY
- S301 :ATTENUATOR

FLKB ASSEMBLY
- S101 :ONE-TOUCH KARAOKE
- S102 :SURROUND
- S103 : ♮ ┐
- S104 :AUDIO MODE
- S105 : # ├ KEY CONTROL
- S106 : ♭ ┘
- S107 :DIRECT CD
- S108 :PROGRAM
- S109 :STOP (■)
- S110 :OPEN/CLOSE (⏏)
- S111 :PLAY/PAUSE (▶/❚❚)
- S112 : ⏮ ┐
- S113 : ⏭ ┘ SKIP

IRKB ASSEMBLY
- S401 :POWER STANDBY ON

FDKB ASSEMBLY
- S301 :10 ┐
- S302 :9
- S303 :7
- S304 :8
- S305 :3
- S306 :1
- S307 :2
- S308 :4
- S309 :6
- S310 :5 ┘ DIRECT MUSIC SEARCH

SDKB ASSEMBLY
- S201 :12 ┐
- S202 :11
- S203 :13
- S204 :17
- S205 :20
- S206 :16
- S207 :19
- S208 :15
- S209 :18
- S210 :14 ┘ DIRECT MUSIC SEARCH

VSBA ASSEMBLY
- VOLTAGE SELECTOR : AC 110V/120 - 127V/220V/240V

PKSB ASSEMBLY
- S4 :PARK OUT
- S5 :PARK IN

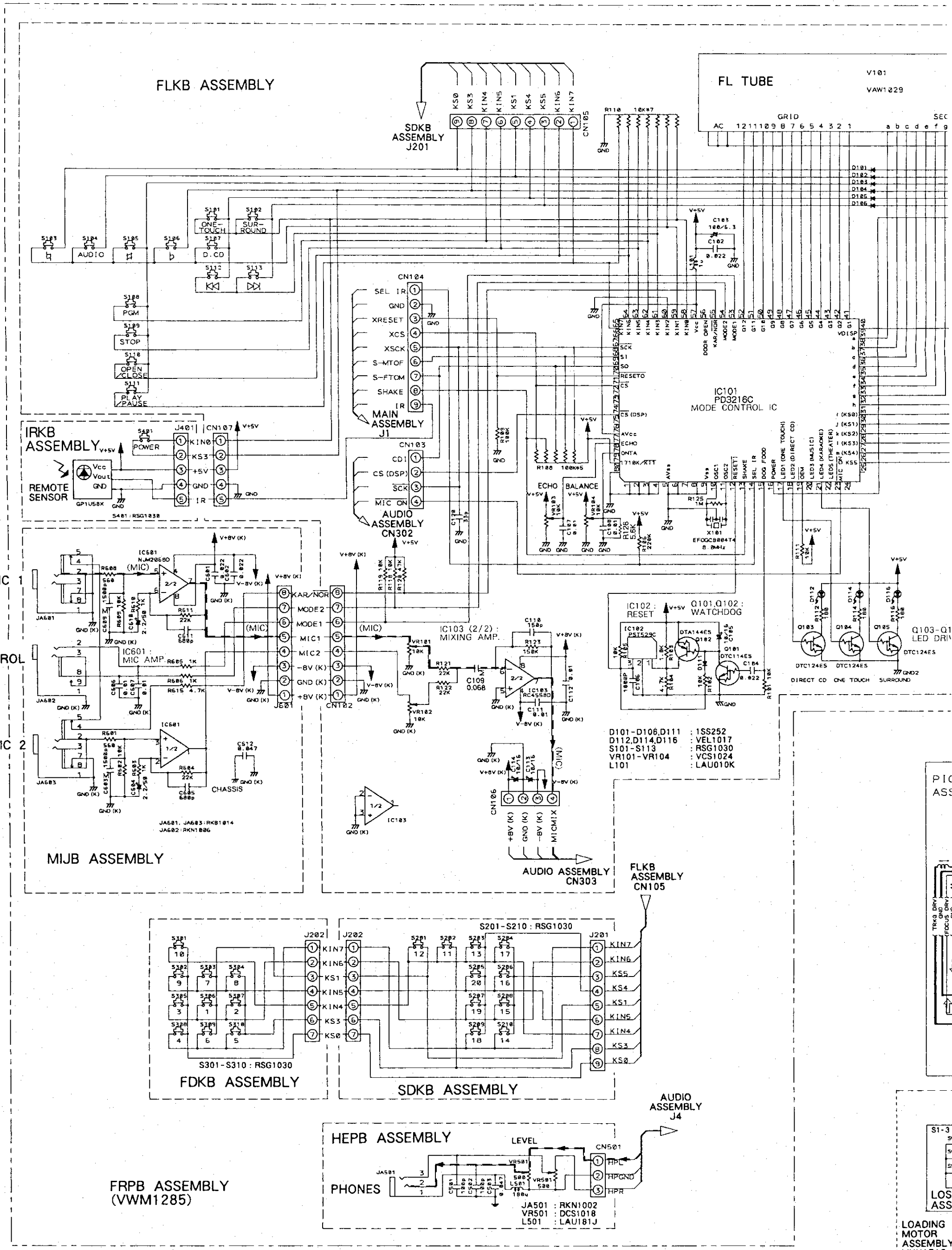
LOSB ASSEMBLY
- S1 :TILT LOADING1
- S2 :TILT LOADING2
- S3 :TILT LOADING3

● NOTE OF THE PCB CONNECTION DIAGRAMS

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

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.

2.1 SYPS, VSBA, FLKB, IRKB, SDKB, FDKB, HEPB, MIJB, CAMB, LOMB, LOSB, FG, PKSB, PICKUP ASSEMBLIES AND OVERALL WIRING DIAGRAM



FL TUBE
V101
VAW1029
GRID
SEGMENT
AC 12 11 10 9 8 7 6 5 4 3 2 1 a b c d e f g h i j k l m AC

PWSB ASSEMBLY
(VWM1292)

IC203 : IC PROTECTOR
IC1 : EVER + 5V REGULATOR
IC2 (2/2),Q3,Q5 : -5V REGULATOR
IC204 : IC PROTECTOR
Q21-Q24 : SPDL PRE DRIVE
Q25-Q28 : SPDL DRIVE

CN101
CN105
CN1
CN2
CN302
CN303
CN102
CN103
CN104
CN106
CN401
CN403
CN404
CN501
CN1003
CN1083

AC POWER CORD PDG1013
FU3 125V 1A REK-080
AC110V /120-127V/ 220V/240V 50/60Hz
NEUTRAL
LIVE
C52 0.01 RCG-009
VOLTAGE SELECTOR VSB1007
VSBA ASSEMBLY (VWR1151)
SYPS ASSEMBLY (VWR1150)
POWER TRANSFORMER VTT1118
VEK-018
CHASSIS
IC101 PD3216C MODE CONTROL IC
IC102 : RESET
Q101,Q102 : WATCHDOG
Q103-Q105 : LED DRIVE
DIRECT CD ONE TOUCH SURROUND

D101-D106,D111 : 1SS252
D112,D114,D116 : VEL1017
S101-S113 : RSG1030
VR101-VR104 : VCS1024
L101 : LAU010K

FLKB ASSEMBLY CN104
HEPB ASSEMBLY CN501
FLKB ASSEMBLY CN103
FLKB ASSEMBLY CN106
FLKB ASSEMBLY CN105
AUDIO ASSEMBLY J4
JA6 AUDIO OUT*2

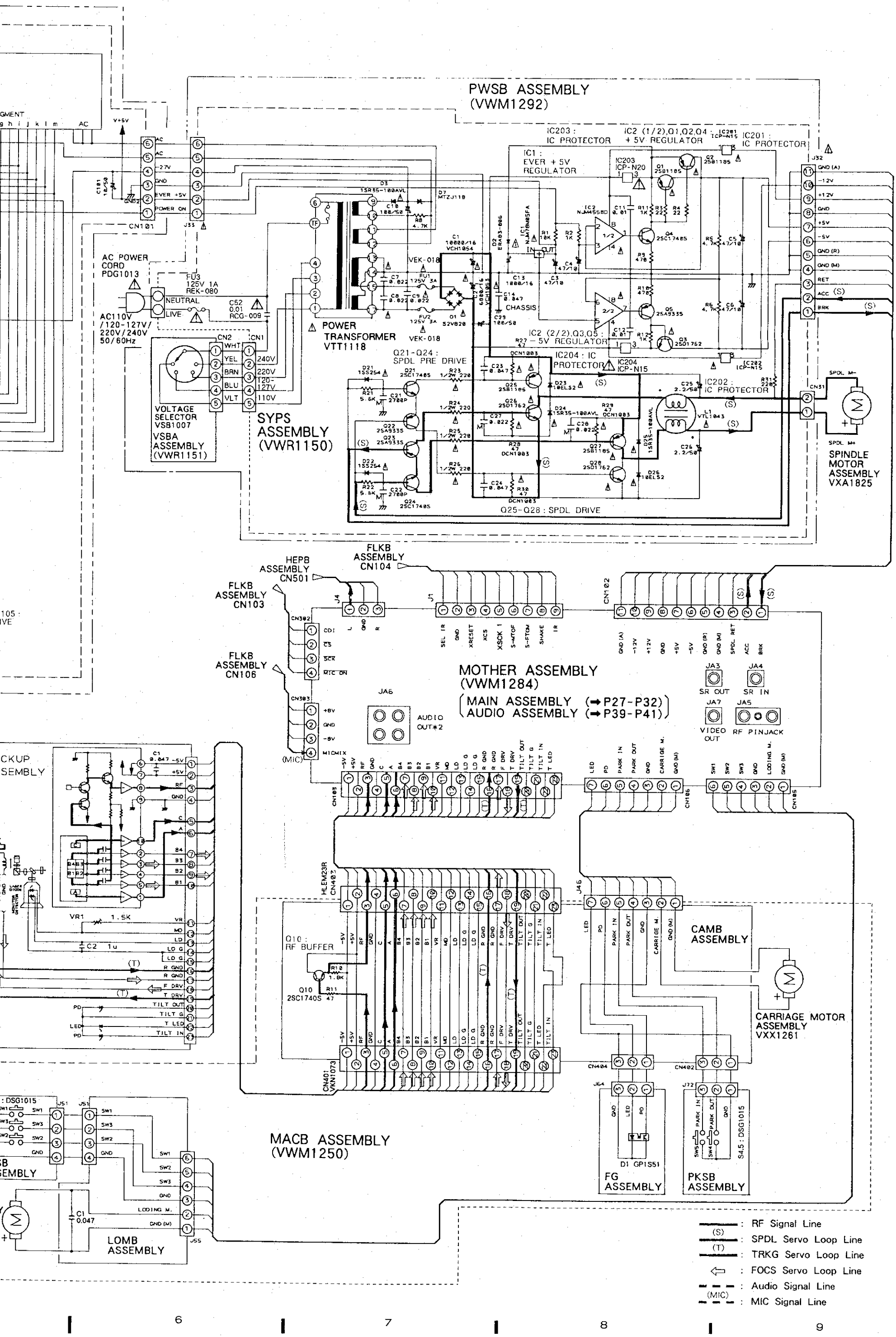
MOTHER ASSEMBLY
(VWM1284)
(➡P27-P3
AUDIO ASSEMBLY (➡P39-P4

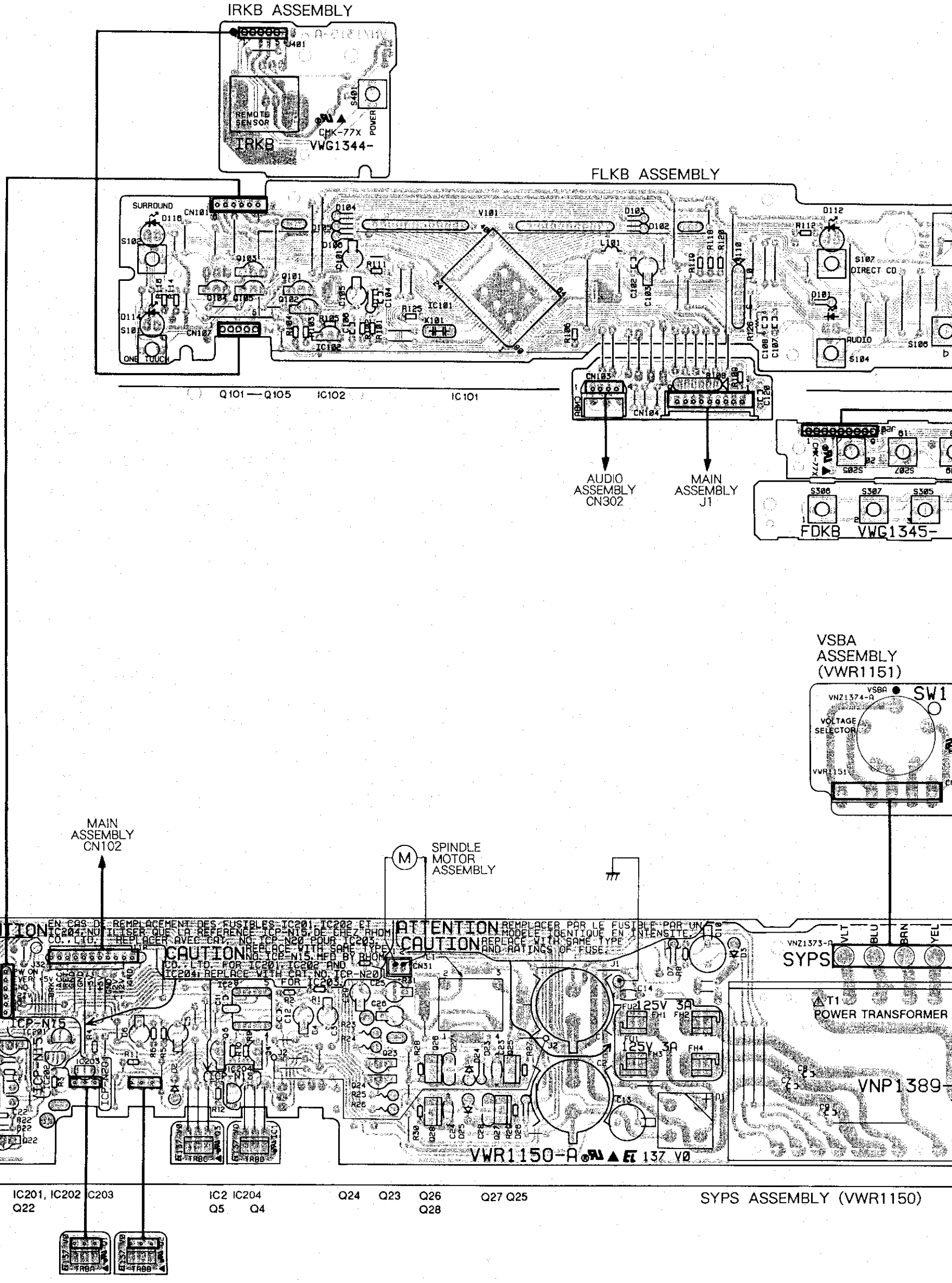
PICKUP ASSEMBLY
LOSB ASSEMBLY
LOADING MOTOR ASSEMBLY VXX1712
LOMB ASSEMBLY
S1-3 : DSG1015

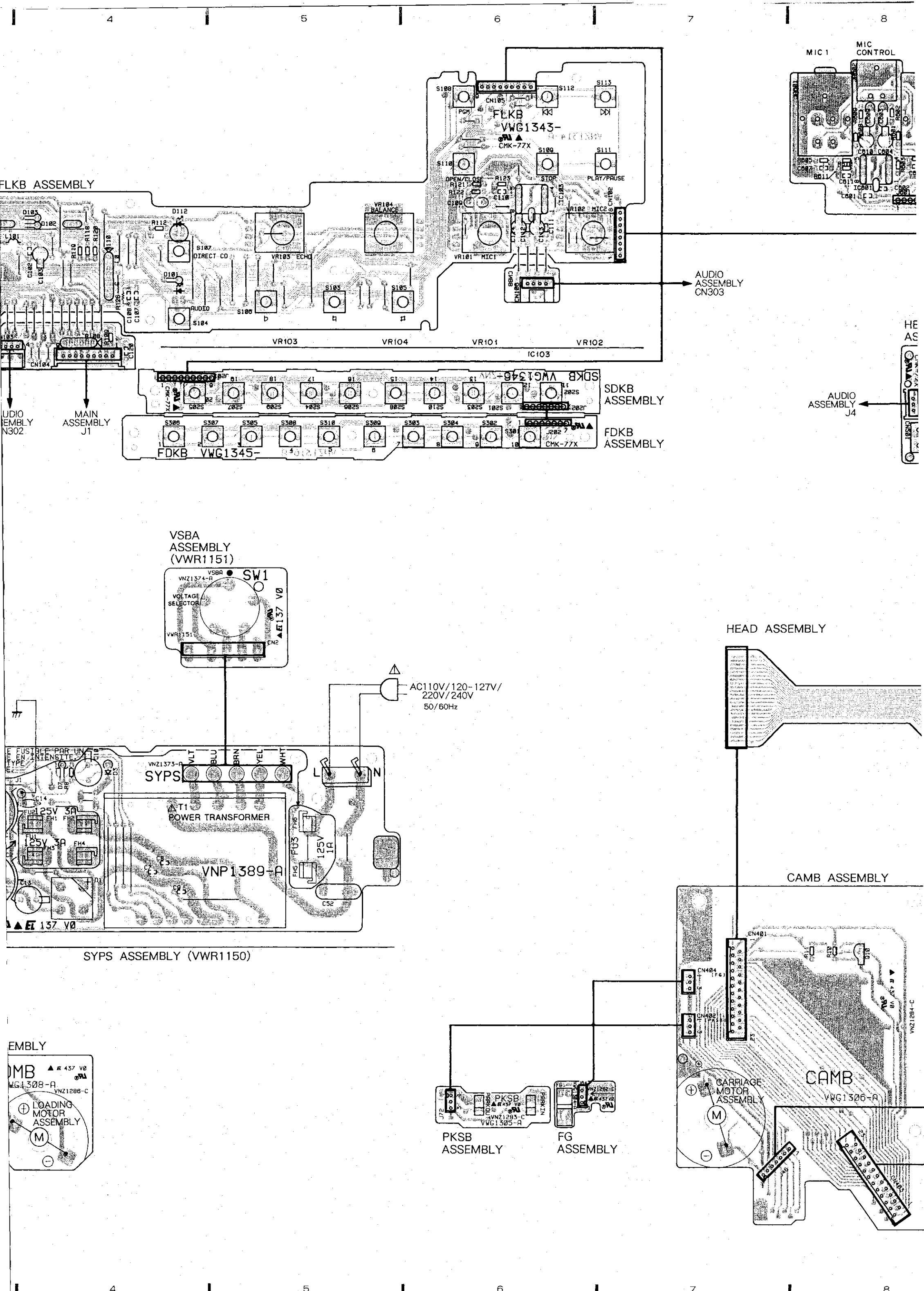
MACB ASSEMBLY
(VWM1250)

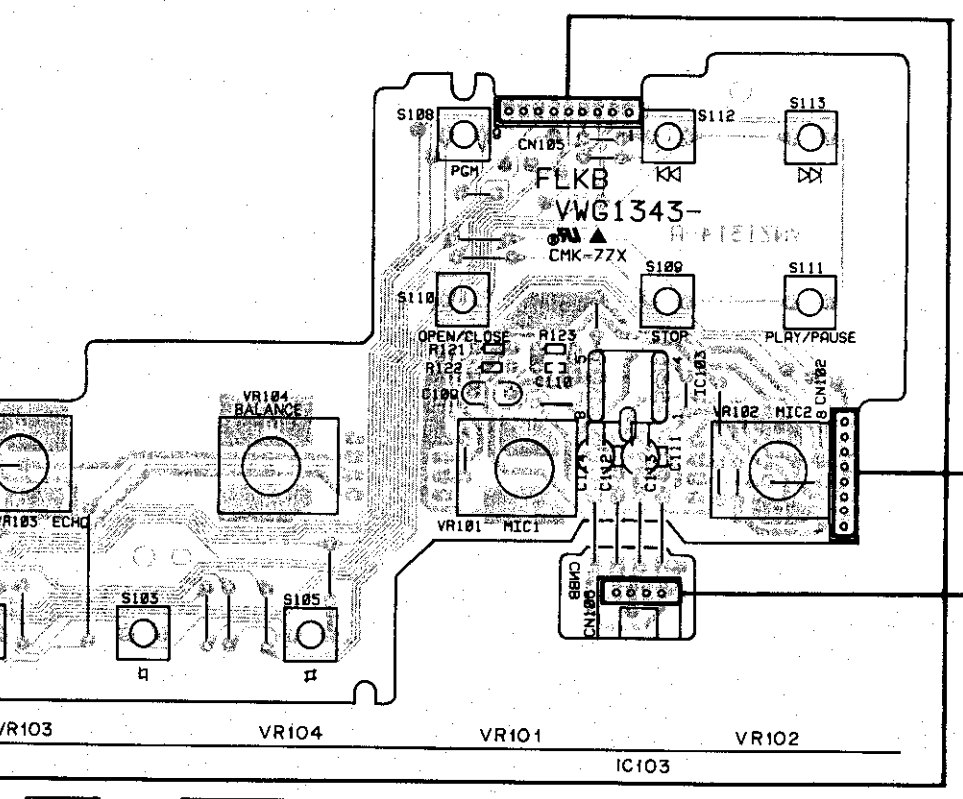
Q10 : RF BUFFER
Q10 2SC1740S

FG ASSEMB

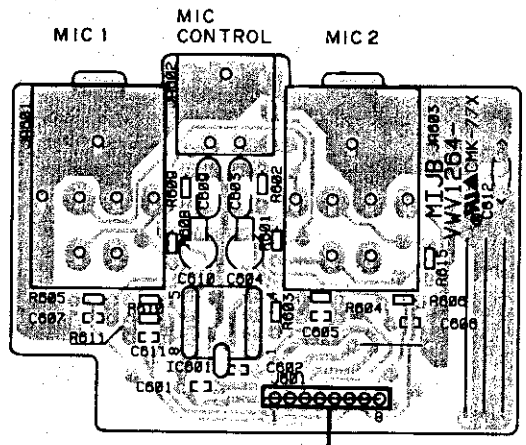

PWSB ASSEMBLY
(VWM1292)
IC203 : IC PROTECTOR
IC2 (1/2),Q1,Q2,Q4 : +5V REGULATOR
IC201 : IC PROTECTOR
IC1 : EVER + 5V REGULATOR
IC2 (2/2),Q3,Q5 : -5V REGULATOR
IC204 : IC PROTECTOR
IC202 : IC PROTECTOR
Q21-Q24 : SPDL PRE DRIVE
Q25-Q28 : SPDL DRIVE
AC POWER CORD PDG1013
AC110V /120-127V/ 220V/240V 50/60Hz
VOLTAGE SELECTOR VSB1007
VSBA ASSEMBLY (VWR1151)
SYPS ASSEMBLY (VWR1150)
POWER TRANSFORMER VTT1118
CHASSIS
SPINDLE MOTOR ASSEMBLY VXA1825
FLKB ASSEMBLY CN104
HEP8 ASSEMBLY CN501
FLKB ASSEMBLY CN103
FLKB ASSEMBLY CN106
MOTHER ASSEMBLY
(VWM1284)
MAIN ASSEMBLY (➡P27-P32)
AUDIO ASSEMBLY (➡P39-P41)
AUDIO OUT*2
SR OUT
SR IN
VIDEO OUT
RF PINJACK
Q10 : RF BUFFER
CAMB ASSEMBLY
CARRIAGE MOTOR ASSEMBLY VXX1261
MACB ASSEMBLY
(VWM1250)
FG ASSEMBLY
PKSB ASSEMBLY
LOMB ASSEMBLY
: RF Signal Line
(S) : SPDL Servo Loop Line
(T) : TRKG Servo Loop Line
: FOCS Servo Loop Line
: Audio Signal Line
(MIC) : MIC Signal Line


IRKB ASSEMBLY
IRKB
VWG1344-
REMOTE SENSOR
POWER
CMK-77x
FLKB ASSEMBLY
SURROUND
ONE TOUCH
DIRECT CD
AUDIO
Q101 — Q105
IC102
IC101
AUDIO ASSEMBLY CN302
MAIN ASSEMBLY J1
FDKB VWG1345-
VSBA ASSEMBLY (VWR1151)
VOLTAGE SELECTOR
VWR1151
MAIN ASSEMBLY CN102
SPINDLE MOTOR ASSEMBLY
ATTENTION
CAUTION
ICP-N15
SYPS
POWER TRANSFORMER
VNP1389-
VWR1150-A
Q21
IC201, IC202
IC203
Q22
IC2
Q5
IC204
Q4
Q24
Q23
Q26
Q28
Q27
Q25
SYPS ASSEMBLY (VWR1150)
LOMB ASSEMBLY
LOSB ASSEMBLY
LOMB
VWG1308-A
LOADING MOTOR ASSEMBLY
MAIN ASSEMBLY CN105

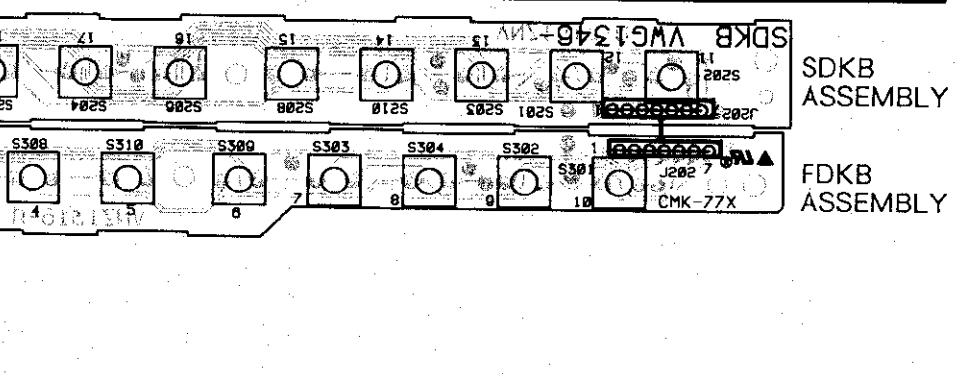

FLKB ASSEMBLY
FLKB VWG1343-
SDKB VWG1346-
FDKB VWG1345-
SDKB ASSEMBLY
FDKB ASSEMBLY
AUDIO ASSEMBLY CN303
AUDIO ASSEMBLY J4
MAIN ASSEMBLY J1
VR103 VR104 VR101 VR102
IC103
MIC 1
MIC CONTROL
VSBA ASSEMBLY (VWR1151)
AC110V/120-127V/ 220V/240V 50/60Hz
SYPS
VNP1389-A
T1 POWER TRANSFORMER
SYPS ASSEMBLY (VWR1150)
HEAD ASSEMBLY
CAMB ASSEMBLY
CAMB VWG1306-A
CARRIAGE MOTOR ASSEMBLY
LOADING MOTOR ASSEMBLY
PKSB ASSEMBLY
FG ASSEMBLY



AUDIO ASSEMBLY CN303



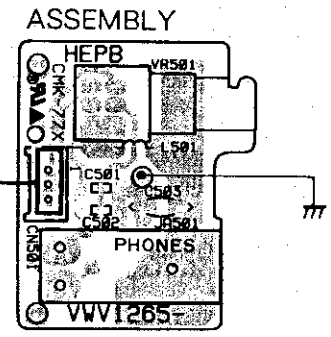
MIJB ASSEMBLY



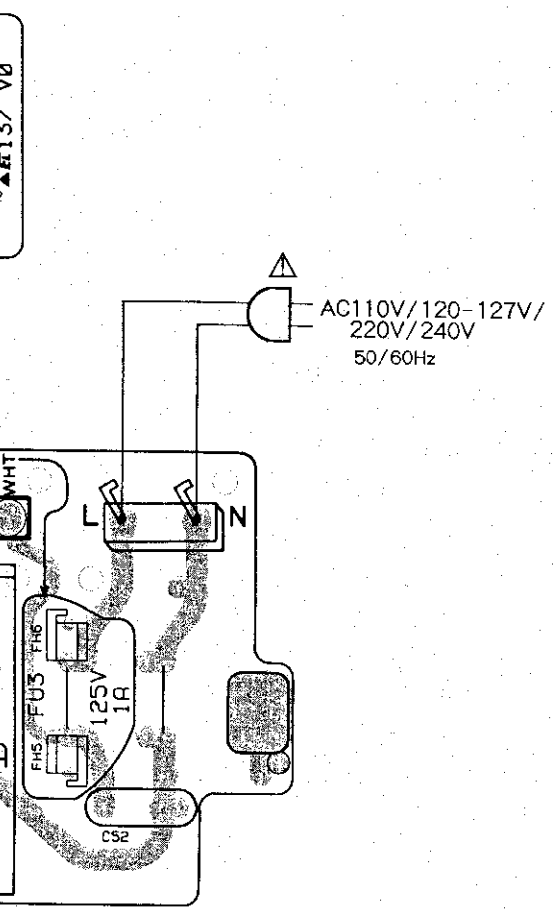
SDKB ASSEMBLY

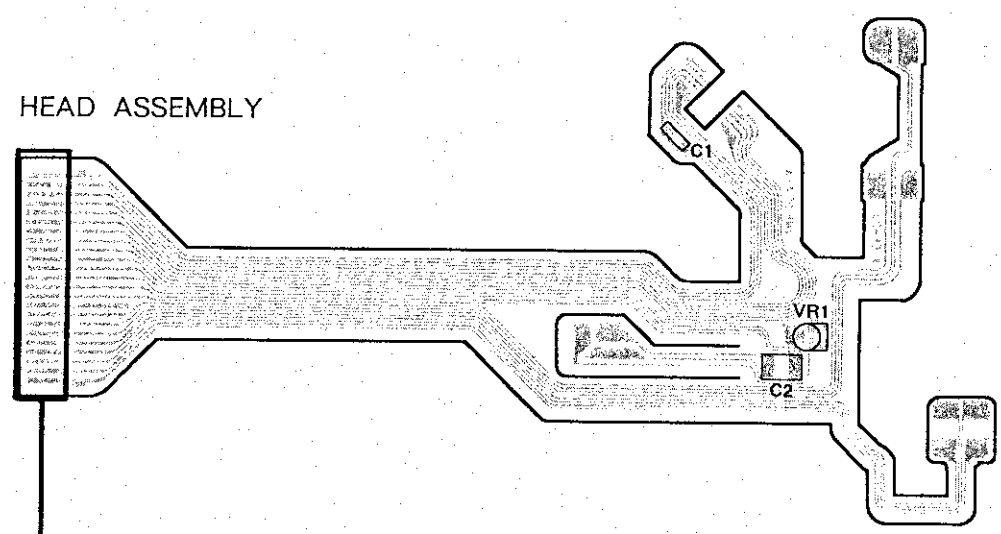
FDKB ASSEMBLY

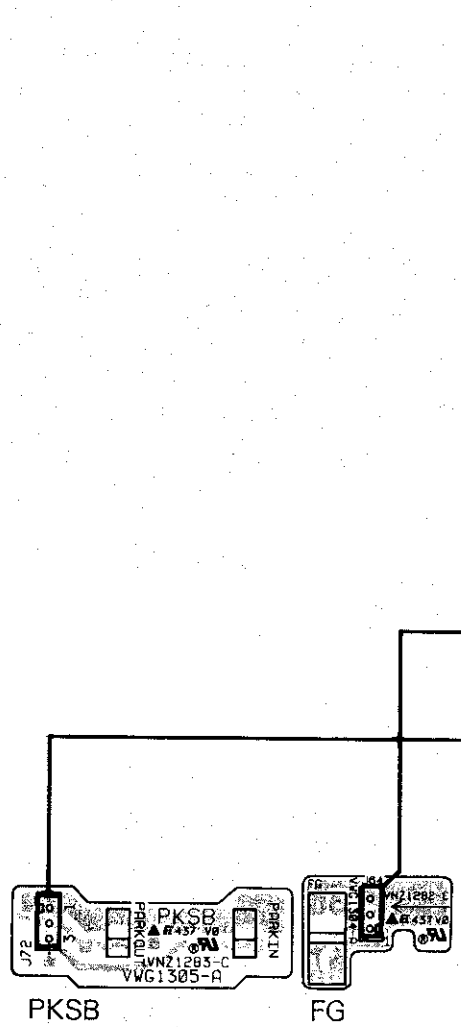
HEPB ASSEMBLY



AUDIO ASSEMBLY J4

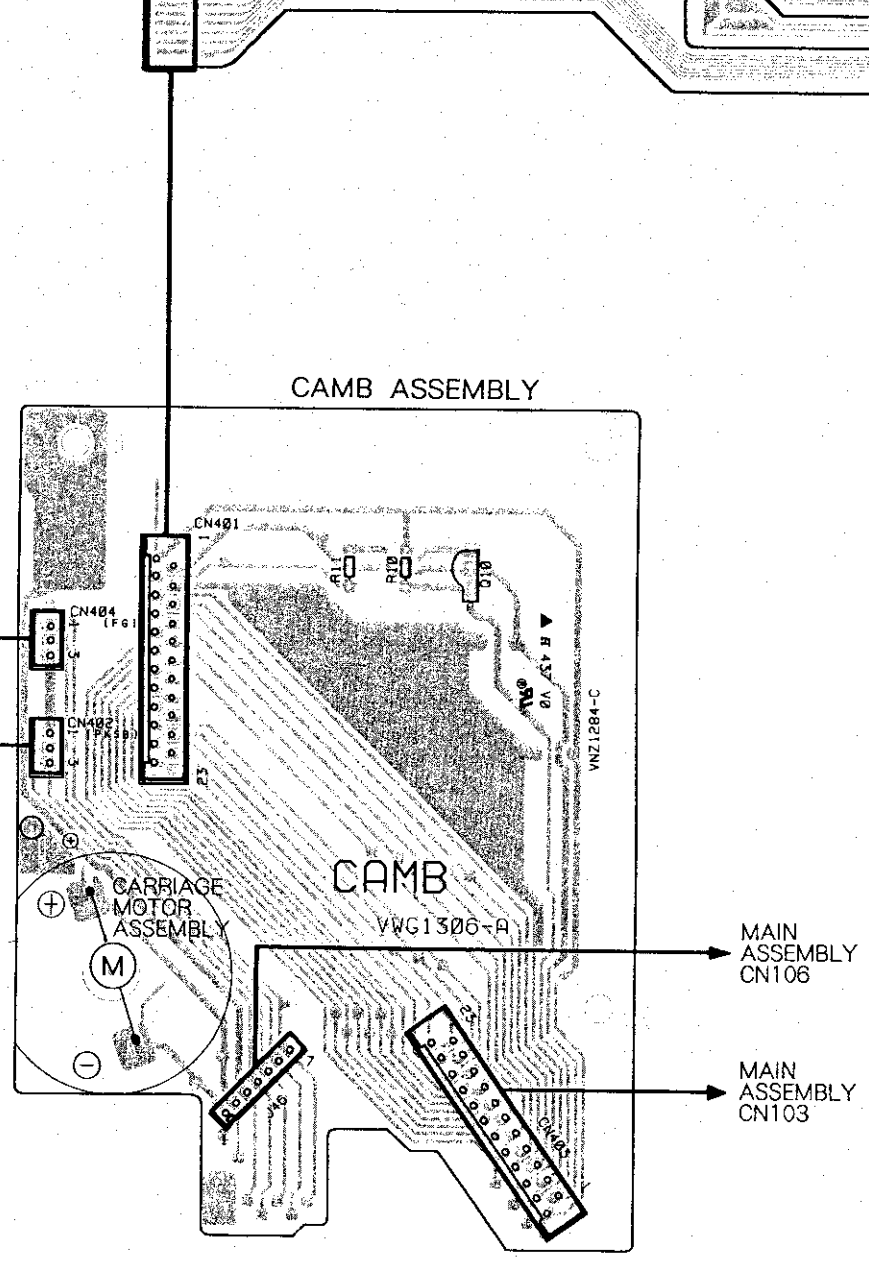






PKSB ASSEMBLY

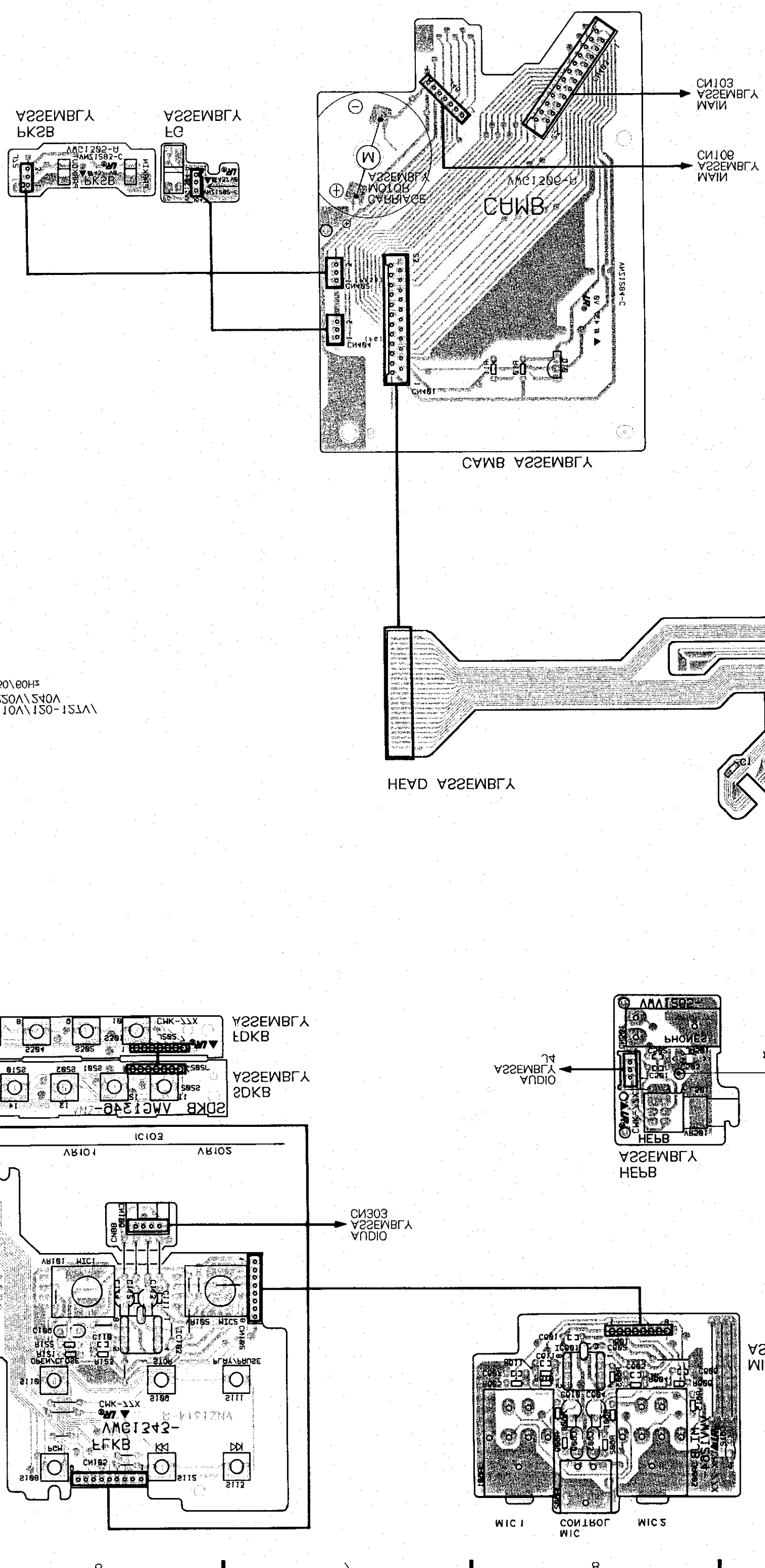
FG ASSEMBLY

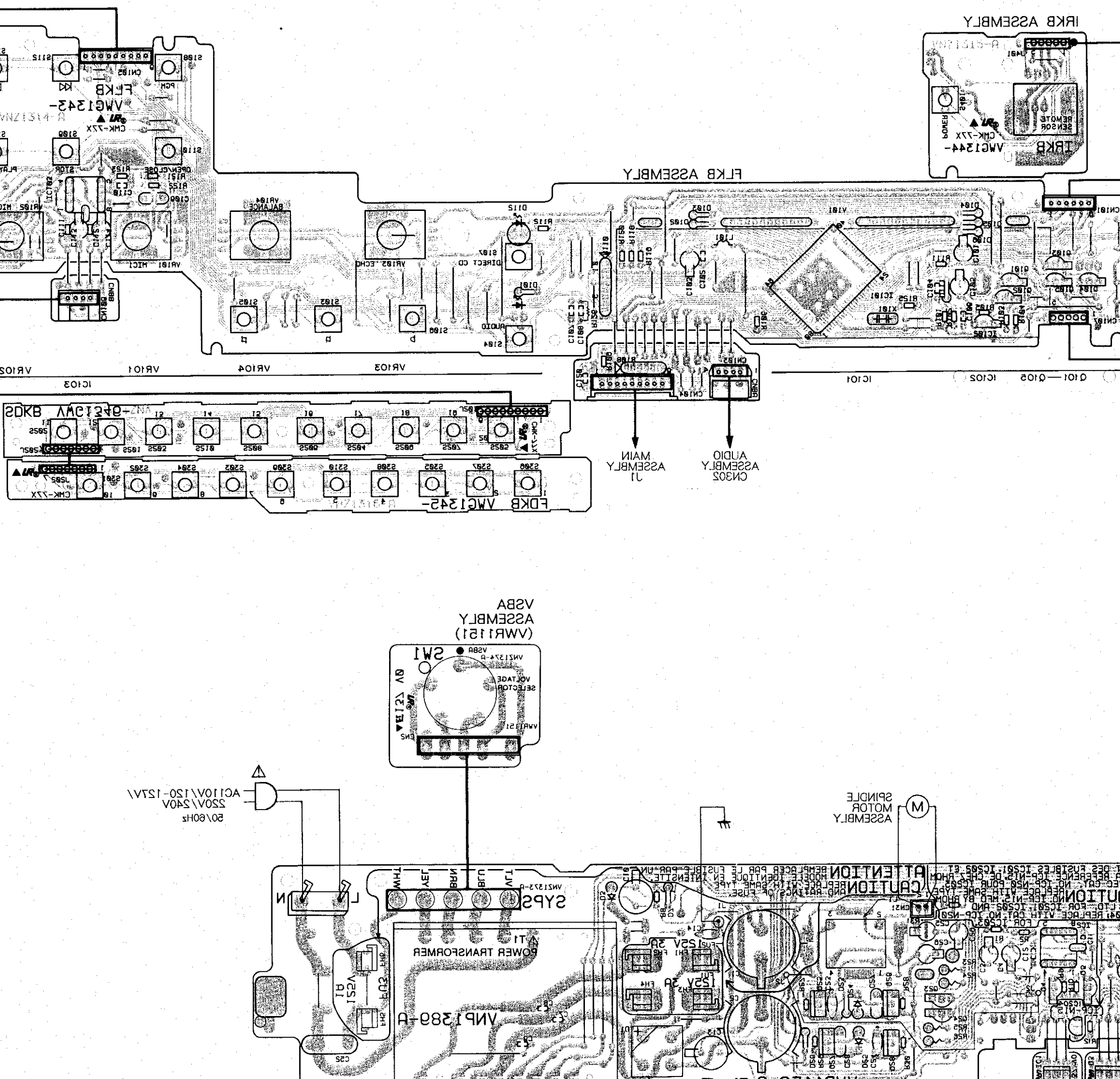


MAIN ASSEMBLY CN106

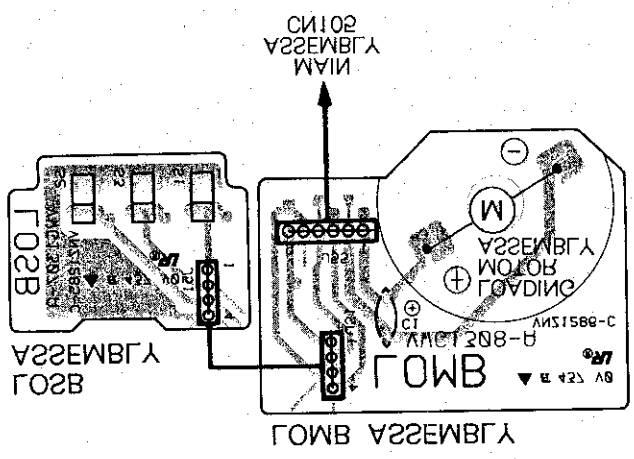
MAIN ASSEMBLY CN103

This P.C.B. connection diagram




IRKB ASSEMBLY
FLKB ASSEMBLY
FDKB VWG1345-
VSBA
ASSEMBLY
(VWR1151)
SW1
AC110V/120-127V/
220V/240V
50/60Hz
SYPS ASSEMBLY (VWR1150)
SPINDLE
MOTOR
ASSEMBLY
MAIN
ASSEMBLY
J1
AUDIO
ASSEMBLY
CN302
LOMB ASSEMBLY
LOMB
VWG1308-A
LOADING
MOTOR
ASSEMBLY
LOSB
ASSEMBLY
MAIN
ASSEMBLY
CN105
PKSB
ASSEMBLY
FG
ASSEMBLY
This P.C.B. connection diagram is viewed from the foil side.

m is viewed from the foil side.



FTS AND CONT SECTION

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

IC101 (PD0133B)

(8) H:5mS/div
2Vp-p
0V
DC mode

(10) H:10mS/div
5Vp-p
DC mode
0V

(11) H:10mS/div
5Vp-p
DC mode
0V

(12) H:0.5mS/div
2.3Vp-p
0V
DC mode

(15) H:10mS/div
5Vp-p
DC mode
0V

(16) H:2mS/div
4.7Vp-p
DC mode
0V

IC801 (CXA1081S)

(2) H:10mS/div
1.7Vp-p
AC mode

(7) H:5mS/div
50mVp-p
DC mode
0V

(8) H:10mS/div
40mVp-p
DC mode
0V

(12) H:10mS/div
200mVp-p
AC mode

(20) H:10mS/div
0.35Vp-p
DC mode
0V

IC802 (CXA1372S)

(1) H:10mS/div
50mVp-p
0V
DC mode

(11) H:1mS/div
1.2Vp-p
DC mode
0V

(17) H:1mS/div
0V
DC mode
2.5Vp-p

CN120

(1) H:10mS/div
130mVp-p
AC mode

(2) H:10mS/div
130mVp-p
AC mode

(3) H:5mS/div
330mVp-p
AC mode

(4) H:10mS/div
7.5Vp-p
AC mode

(5) H:10mS/div
13.6Vp-p
AC mode

(6) H:10mS/div
2.3Vp-p
AC mode

(7) H:10mS/div
2.3Vp-p
AC mode

(9) H:10mS/div
1.3Vp-p
AC mode

(10) H:10mS/div
1.3Vp-p
AC mode

(11) H:10mS/div
1Vp-p
AC mode

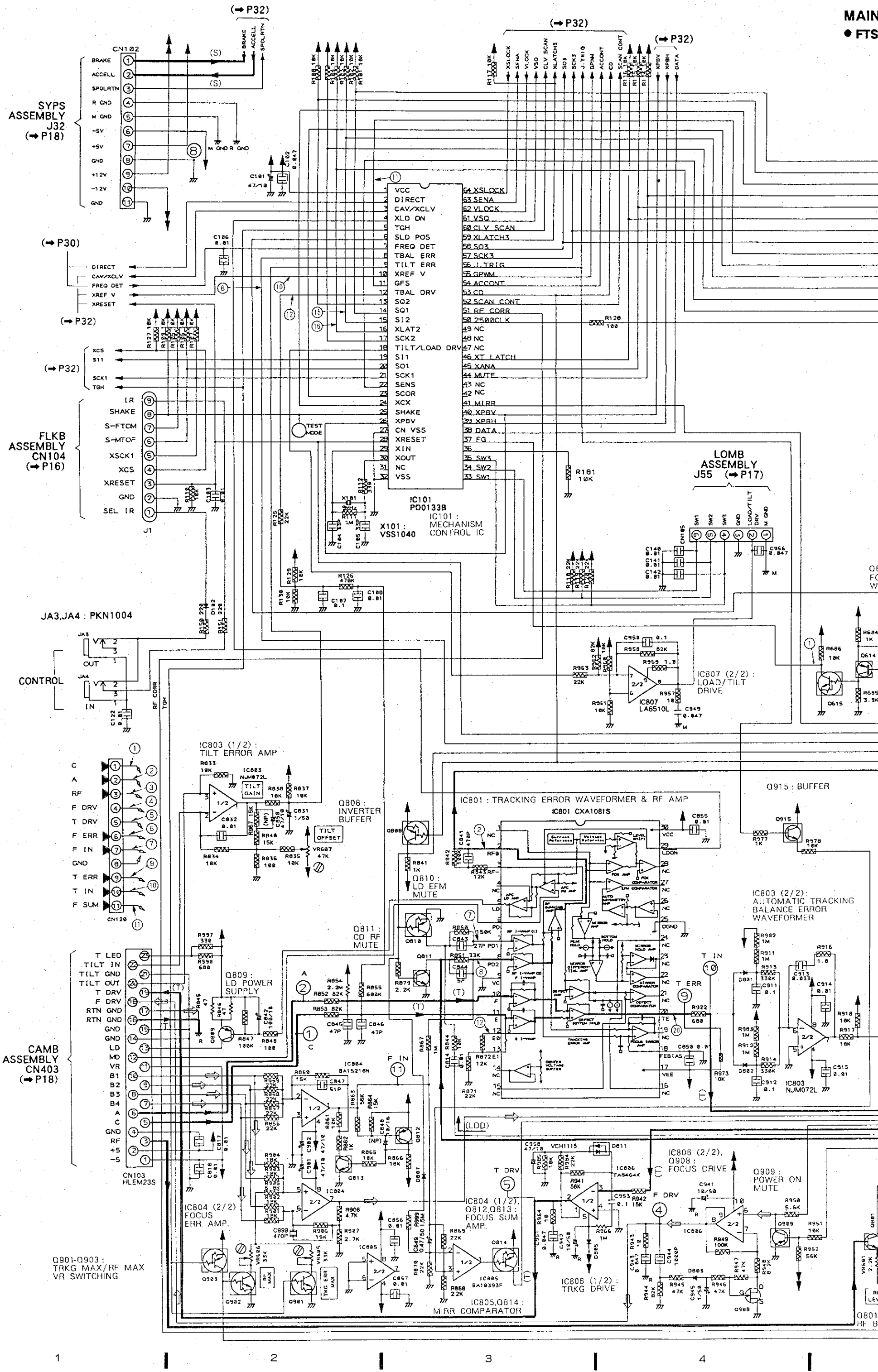
Others Point

(1) Q615 Collector
H:1mS/div
5Vp-p
0V
DC mode

(2) Q805 Emitter
H:5mS/div
2Vp-p
0V
DC mode

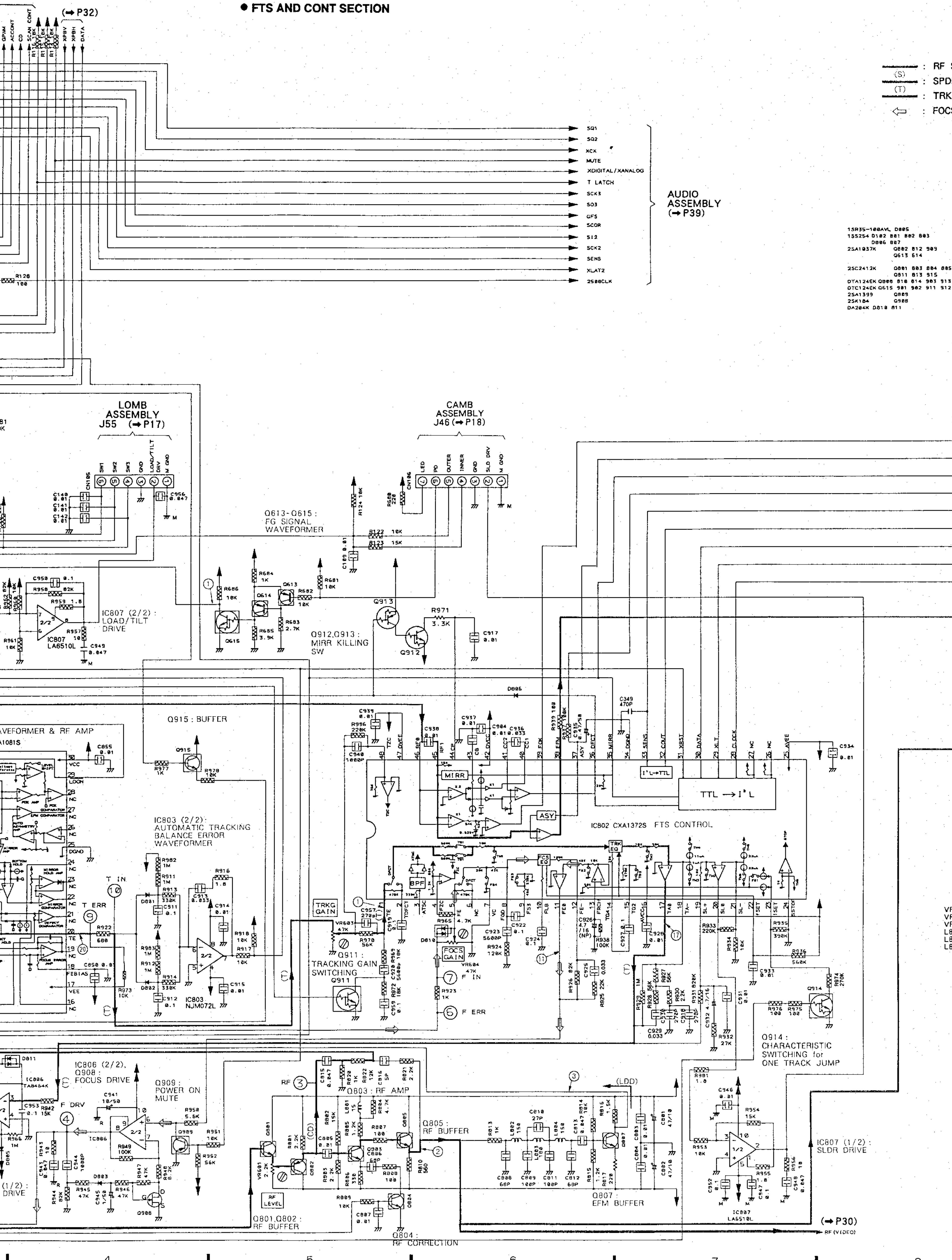
(3) Q807 Collector
H:5mS/div
1Vp-p
0V
DC mode

2.2 MAIN ASSEMBLY (1/2)



MAIN ASSEMBLY (1/2)

● FTS AND CONT SECTION



ASSEMBLY (1/2)
AND CONT SECTION

: RF Signal Line
(S) : SPDL Servo Loop Line
(T) : TRKG Servo Loop Line
: FOCS Servo Loop Line

SQ1
SQ2
XCK
MUTE
XDIGITAL/XANALOG
T LATCH
SCK3
SO3
GFS
SCOR
S12
SCK2
SENS
XLAT2
2S80CLK
AUDIO ASSEMBLY (➡ P39)

15R35-180AYL D805
1SS254 D102 801 802 803 D806 807
2SA1037K Q802 812 909 Q613 614
2SC2412K Q801 803 804 805 807 Q811 813 915
DTA124EK Q808 810 814 903 913
DTC124EK Q615 901 902 911 912 914
2SA1399 Q809
2SK184 Q908
DA204K D810 811

CAMB ASSEMBLY J46 (➡ P18)
LED PD OUTER INNER GND SLD DRV M GND
CN106
R688 220
R124 10K
R122 10K
R123 15K
C189 0.01
R681 10K
R682 10K
R683 2.7K
Q613
Q913
R971 3.3K
C917 0.01
Q912
Q912,Q913 : MIRR KILLING SW
13-Q615 : SIGNAL WAVEFORMER

FOK
XRST
MIRR
ASY
SEIN
CNIN
DATO
XLT
CLK
AUDIO ASSEMBLY (➡ P39)

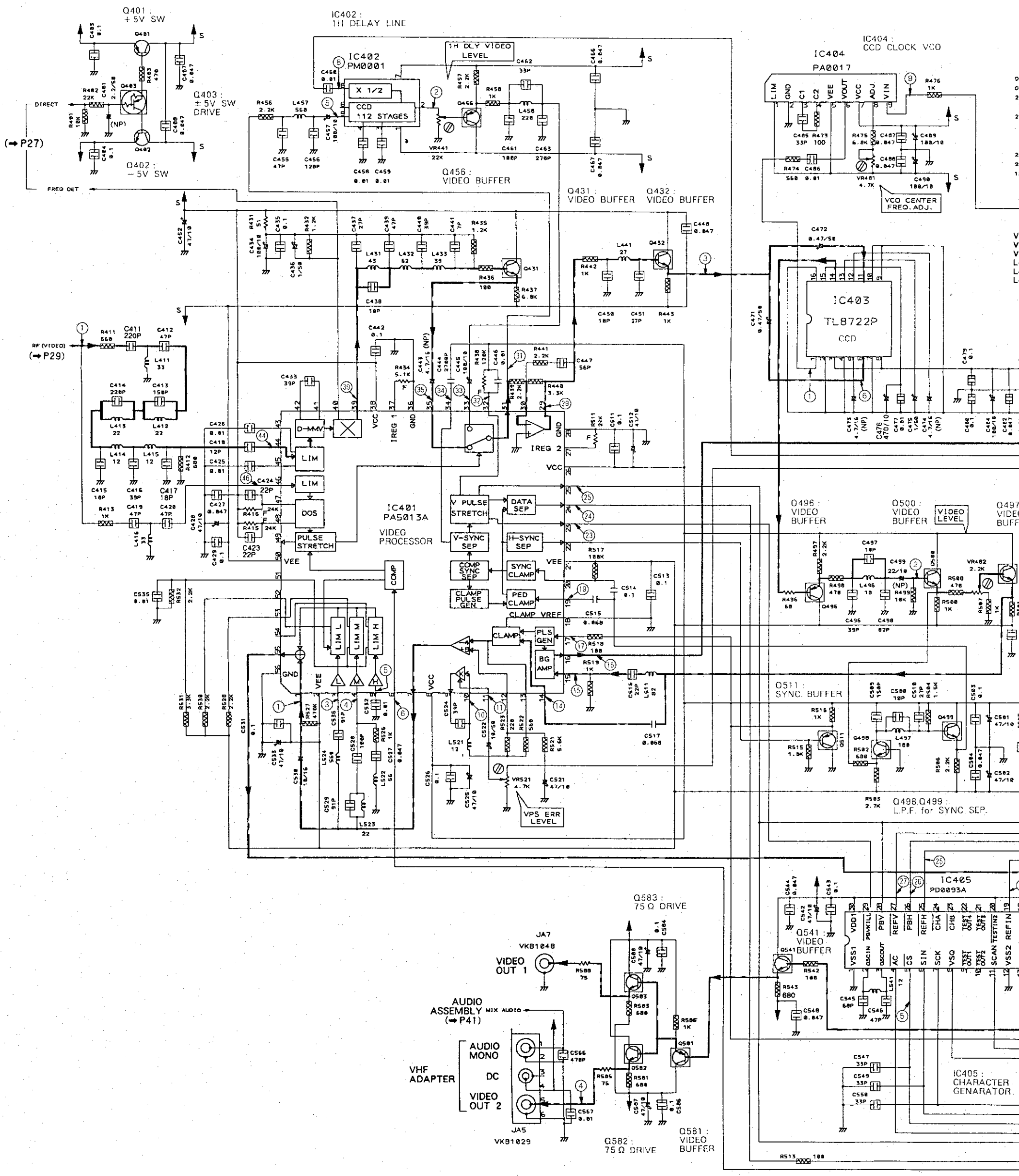
J9
-5V
+5V
GND
+12V
-12V
GND
RF
GND
EFM
GND
AUDIO ASSEMBLY J9 (➡ P41)

D806
C939 0.01
R996 220K
C948 1000P
C938 0.01
C937 0.01
C984 0.01
C935 0.033
C936 0.47/5B
R939 100
R937 10K
C349 470P
C934 0.01
MIRR
ASY
I²L→TTL
TTL → I²L
IC802 CXA1372S FTS CONTROL
TRK EQ
FCS EQ
BPF
TRKG GAIN
FOCS GAIN
VR603 47K
R970 56K
R965 4.7K
D810
VR604 47K
R923 1K
C957 270P
C919 TE 0.1
C920 R969 5600P 18K
C959 R972 0.1 18K
C923 5600P
C922 0.1
C924 0.1
R924 120K
C926 4.7/16 (NP)
R938 100K
C927 0.1
C928 0.01
R926 82K
C925 R925 22K 0.033
R933 220K
R934 16K
R955 390K
R936 560K
C933 0.01
R929 1M
R928 56K
R927 56K
R930 2.2K
R931 620K
C931 0.01
C930 270P
C910 270P
C932 4.7/16
C929 0.033
R932 27K
Q914
R976 100
R975 100
R974 270K
Q911 : TRACKING GAIN SWITCHING
Q914 : CHARACTERISTIC SWITCHING for ONE TRACK JUMP
F IN
F ERR

RF
Q803 : RF AMP
C815 0.047
R820 1K
R822 12K
C816 5P
R821 2.2K
R802 15K
L801 15
R804 4.7K
R805 1.2K
R807 100
Q805 : RF BUFFER
R801 2.2K
C805 0.01
Q803 C806 68P
R803 2.2K
R806 330
R808 100
R810 560
Q802
R809 10K
C807 0.01
Q834
Q804 : RF CORRECTION
C810 27P
L802 150
L803 150
L804 150
C813 0.047
R814 18K
R816 1.5K
R813 1K
C808 68P
C809 100P
C811 100P
C812 68P
R815 1.2K
R817 220
Q807
C803 0.01
C804 0.01
C801 47/10
C802 47/10
Q807 : EFM BUFFER
(LDD)
C946 0.01
R954 15K
R953 10K
R955
C952 0.1
C947 0.1
C948 0.047
R956 10
IC807 LA6510L
IC807 (1/2) : SLDR DRIVE
(➡ P30)
RF (VIDEO)

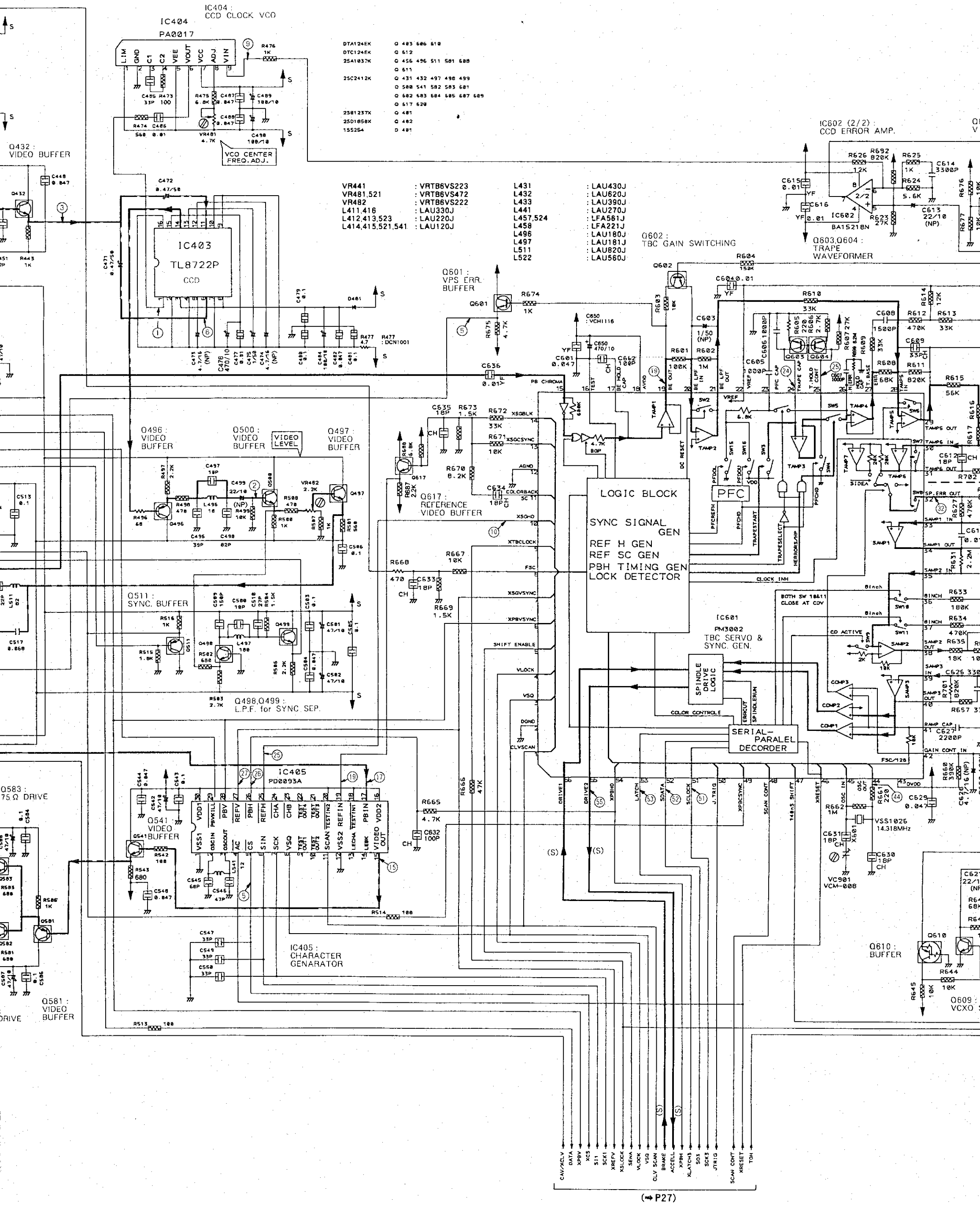
VR601 : VRTB6VS222
VR603,604,607 : VRTB6VS473
VR605,606 : VRTB6VS333
L801 : LAU150J
L802,804 : LAU151J
L803 : LAU181J

2.3 MAIN ASSEMBLY (2/2)



MAIN ASSEMBLY (2/2)

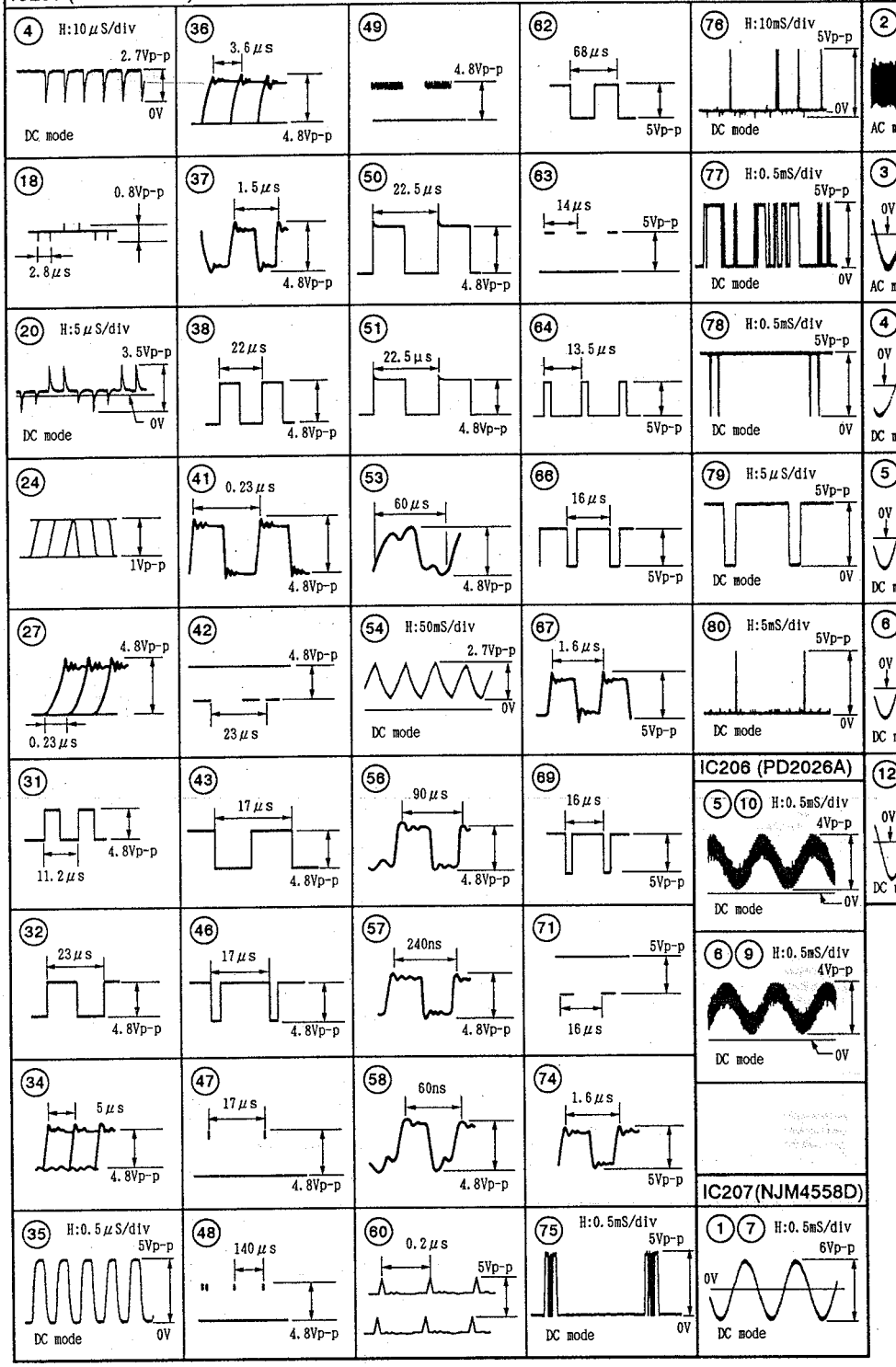
● VIDEO AND TBC SECTION



AUDIO ASSEMBLY

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

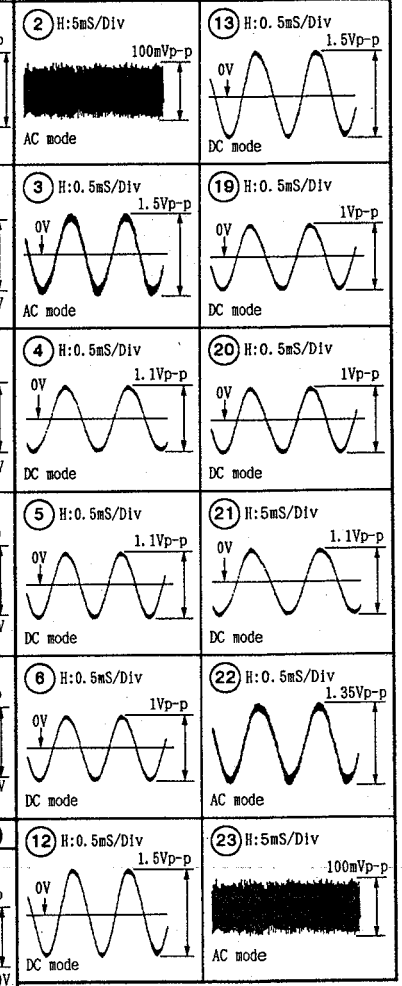
IC201 (CXD2500AQ)



IC206 (PD2026A)

IC207(NJM4558D)

IC351 (CA0002AM)



Note : Waveforms and voltages are at the PLAY mode.

IC351 (CA0002AM)

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

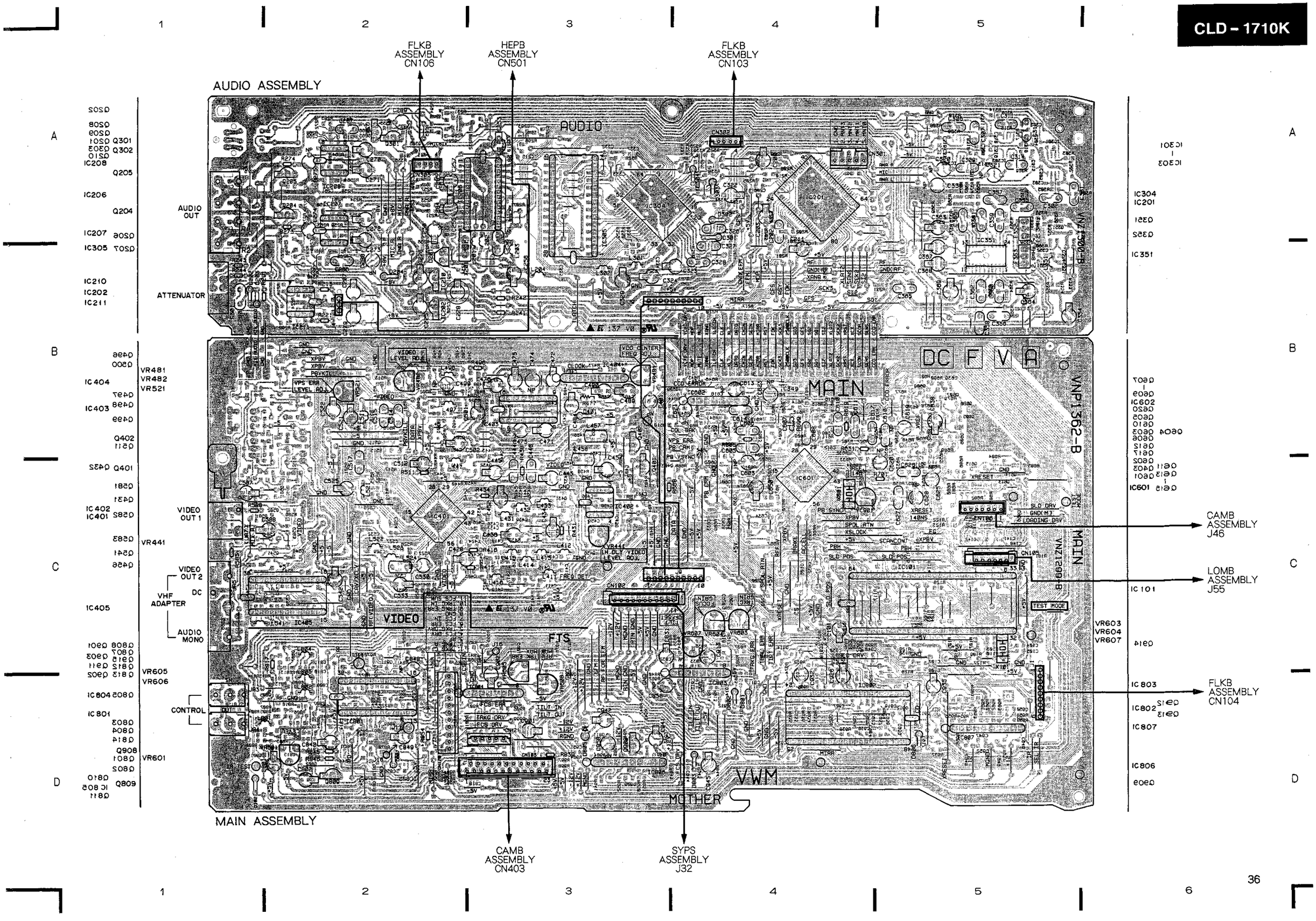
*: Refer to waveform

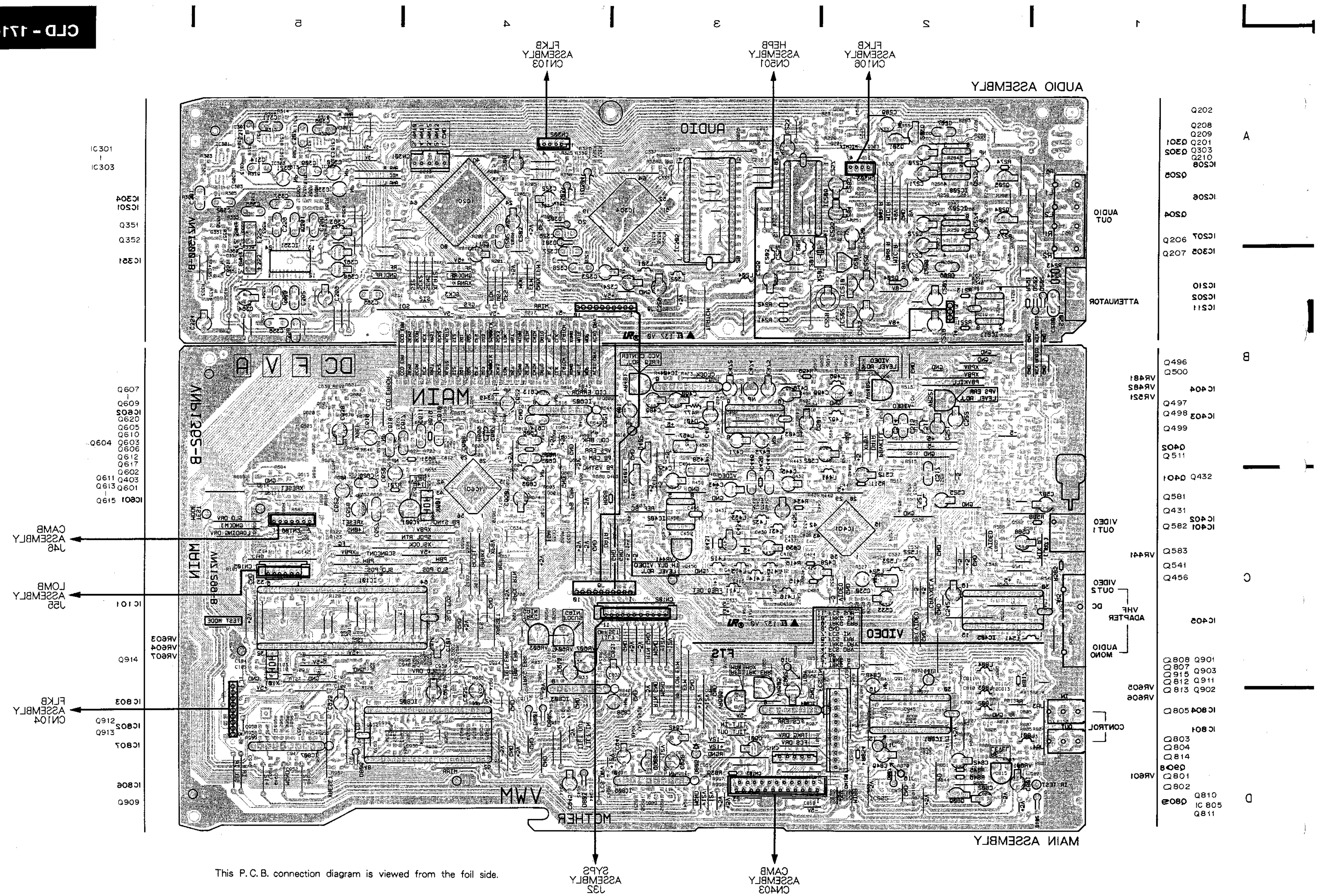
Note : Waveforms and voltages are at the PLAY mode.

IC201 (CXD2500AQ)

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	4.8	21	0	41	*	61	5
2	0	22	2.3	42	*	62	*
3	0	23	4.8	43	*	63	*
4	*	24	*	44	0	64	*
5	0	25	0	45	4.8	65	0
6	4.8	26	0	46	*	66	*
7	–	27	*	47	*	67	*
8	4.8	28	0	48	*	68	0
9	0	29	0	49	*	69	*
10	0	30	0	50	*	70	5
11	0	31	*	51	*	71	*
12	0	32	*	52	0	72	5
13	0	33	4.8	53	*	73	5
14	0	34	*	54	*	74	*
15	0	35	*	55	0	75	*
16	4.8	36	*	56	*	76	*
17	0	37	*	57	*	77	*
18	*	38	*	58	*	78	*
19	2.4	39	0	59	5	79	*
20	*	40	4.8	60	*	80	*

*: Refer to waveform


1
2
3
4
5
6
A
B
C
D
FLKB ASSEMBLY CN106
HEPB ASSEMBLY CN501
FLKB ASSEMBLY CN103
AUDIO ASSEMBLY
AUDIO
AUDIO OUT
ATTENUATOR
IC208
Q205
IC206
Q204
IC207
IC305
IC210
IC202
IC211
VR481
VR482
VR521
IC404
IC403
VIDEO OUT 1
VR441
VIDEO OUT 2
VHF ADAPTER
DC
IC405
AUDIO MONO
VR605
VR606
CONTROL
IC804
IC801
VR601
Q808
MAIN
VIDEO
FIS
VWM
MOTHER
VNP1362-B
VNZ1299-B
MAIN ASSEMBLY
IC304
IC201
IC351
IC601
CAMB ASSEMBLY J46
LOMB ASSEMBLY J55
IC101
VR603
VR604
VR607
IC803
FLKB ASSEMBLY CN104
IC802
IC807
IC806
CAMB ASSEMBLY CN403
SYPS ASSEMBLY J32



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

Mark	No.	Description	Part No.

IRKB ASSEMBLY

SWITCH

	S401	TACT SWITCH	RSG1030

OTHERS

		REMOTE SENSOR	GP1U58X

FDKB ASSEMBLY

SWITCHES

	S301-S310	TACT SWITCH	RSG1030

SDKB ASSEMBLY

SWITCHES

	S201-S210	TACT SWITCH	RSG1030

MIJB ASSEMBLY

SEMICONDUCTOR

	IC601		NJM2068D

CAPACITORS

	C604, C610		CEJA2R2M50
	C612		CKCYF473Z50
	C605, C611		CKPUYB681K50
	C601, C602		CKPUYF223Z25
	C606, C607		CKPUYY103N16
	C603, C609		CQMA152J50

RESISTORS

	ALL RESISTORS		RD1/6PM□□□J

OTHERS

	JA601, JA603	JACK(MIC 1, 2)	RKB1014
	JA602	JACK(MIC CONTROL)	RKN1006
		SNAP PLATE	VNE1102
		JACK HOLDER	VNE1822

HEPB ASSEMBLY

COIL

	L501		LAU181J

CAPACITORS

	C503		CKCYF473Z50
	C501, C502		CKPUYB101K50

RESISTOR

	VR501	ROTARY VR(LEVEL)	DCS1018

OTHERS

	JA501	JACK(PHONES)	RKN1002

Mark	No.	Description	Part No.

SYPS ASSEMBLY

SEMICONDUCTORS

⚠	IC201, IC202, IC204		ICP-N15
⚠	IC203		ICP-N20
⚠	IC2		NJM4558D
⚠	IC1		NJM78M05FA
	Q5, Q22, Q23		2SA933S
⚠	Q1, Q2, Q25, Q27		2SB1185
	Q4, Q21, Q24		2SC1740S
⚠	Q3, Q26, Q28		2SD1762
⚠	D2		ERA83-006
	D7		MTZJ11B
⚠	D1		S2VB20
⚠	D3, D24, D25		1SR35-100AVL
⚠	D21, D22		1SS254
⚠	D23, D26		10ELS2

COIL

⚠	L1		VTL1043

CAPACITORS

	C10, C29		CEAS101M50
	C13		CEAS102M16
	C25, C26		CEAS2R2M50
	C3-C6		CEAS470M10
⚠	C14		CGCYX473M25
	C23, C24		CGCYX473M25
	C11, C12		CKPUYF103Z25
⚠	C7-C9		CKPUYF223Z25
	C27, C28		CQMA223J50
	C21, C22		CQMA272J50
⚠	C52	(0.01μ/400)	RCG-009
⚠	C2	(6800μ/16)	VCH1053
⚠	C1	(10000μ/16)	VCH1054

RESISTORS

⚠	R27-R30	FUSIBLE(47Ω)	DCN1003
⚠	R23-R26		RD1/2VM221J
	OTHER RESISTORS		RD1/6PM□□□J

VSBA ASSEMBLY

SWITCH

	VOLTAGE SELECTOR		VSB1007

Mark	No.	Description	Part No.

FG ASSEMBLY

SEMICONDUCTOR

	D1		GP1S51

PKSB ASSEMBLY

SWITCHES

	S4, S5	PUSH SWITCH	DSG1015

CAMB ASSEMBLY

SEMICONDUCTOR

	Q10		2SC1740S

RESISTORS

	ALL RESISTORS		RD1/6PM□□□J

OTHERS

	CN403	FFC CONNECTOR 23P	HLEM23R
	CN401	23P TOP CONNECTOR	VKN1073

LOSB ASSEMBLY

SWITCHES

	S1-S3	PUSH SWITCH	DSG1015

LOMB ASSEMBLY

CAPACITOR

	C1		CGCYX473M25

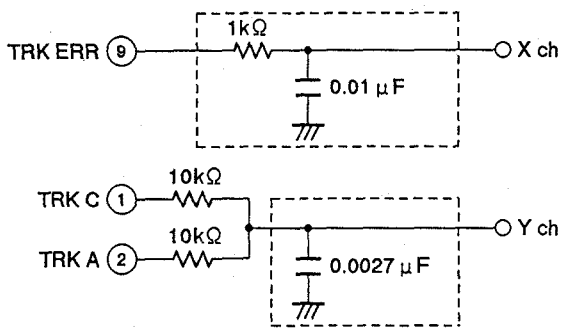
4. ADJUSTMENTS

4.1 PRELIMINARIES

• Jigs for Adjustment

- CD test disc (STD - 901 or STD - 902)
- LD test disc (GGV1003)
- (−) screwdriver (medium)
- (−) screwdriver (small)
- Hexagonal wrench driver (straight type, size: 3mm)
- Resistors (10kΩ × 2, 47kΩ)
- Dual - trace oscilloscope (with delay)
- AF oscillator
- Frequency counter
- TV monitor
- Low-pass filter

Use the low-pass filters below in the coarse centering adjustment 2. and fine centering adjustment 6. when the S/N of the waveform is hard to observe.



• Rack Assembly During Centering Adjustment

The S - IN position (without hitting the mechanism stopper) of the rack assembly during centering adjustment is indicated below.

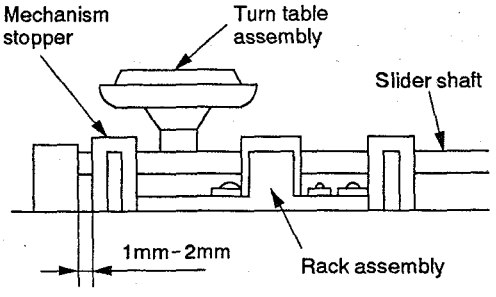


Fig. 1 Right side view

• Adjustment Locations

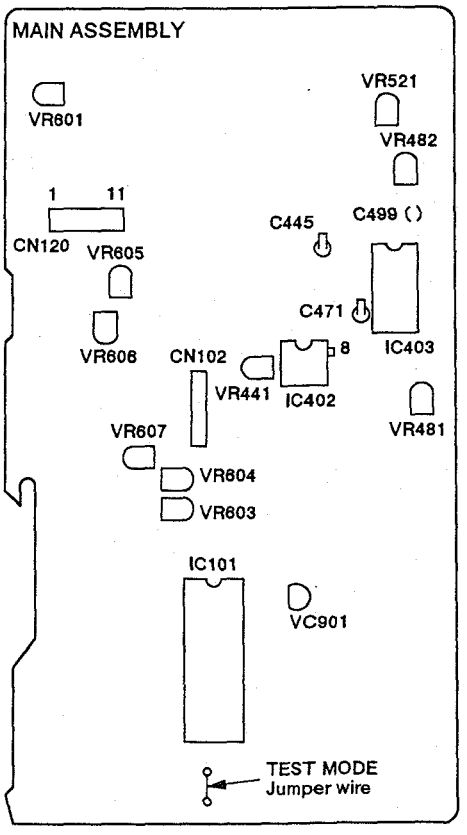
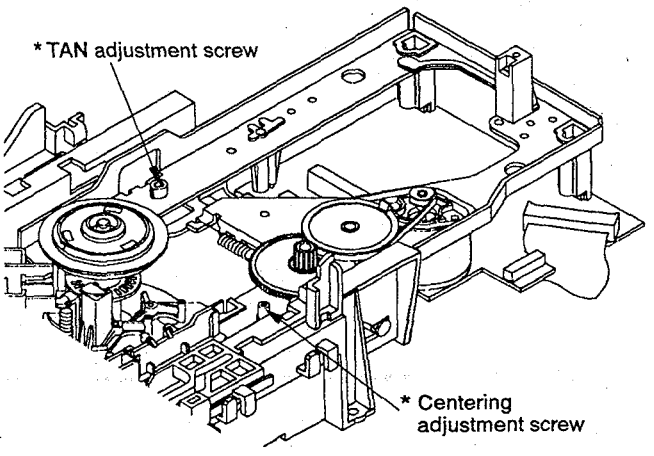


Fig. 2 MAIN assembly section



* : As the adjustment range of both the TAN and centering adjustment screws is only ± 90° form the center, do not turn the screws beyond this range.

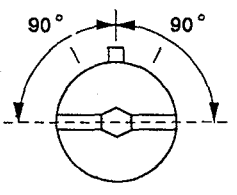


Fig. 3 TILT base section

• Test Mode

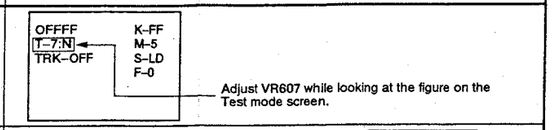
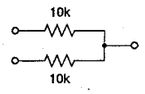
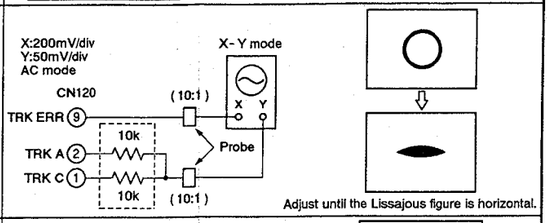
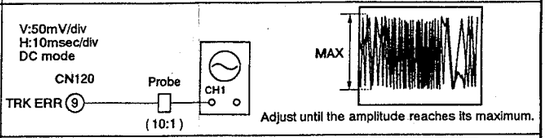
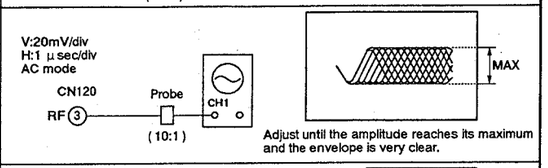
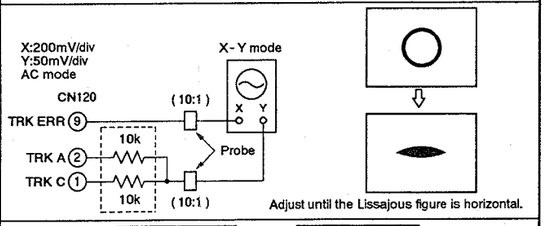
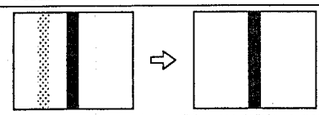
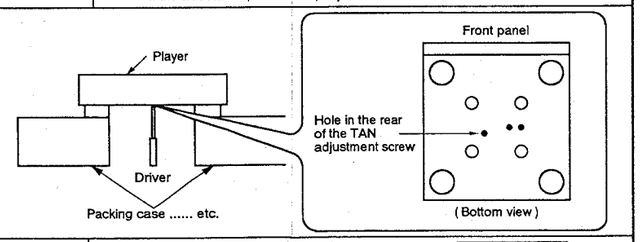
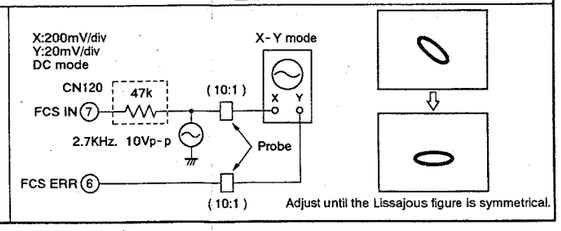
1) Activating the Test Mode
   1. While power is ON, connect the Test mode jumper wire (Fig. 2) to the GND for about one second.
   2. After checking whether the FL display device is fully lit, disconnect the Test mode jumper wire from GND.
2) Canceling the Test Mode
   1. Turn the power OFF.

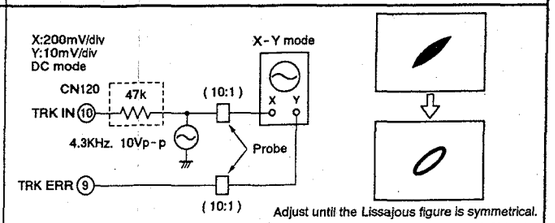
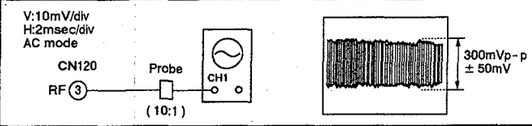
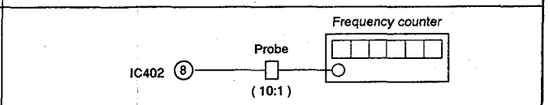
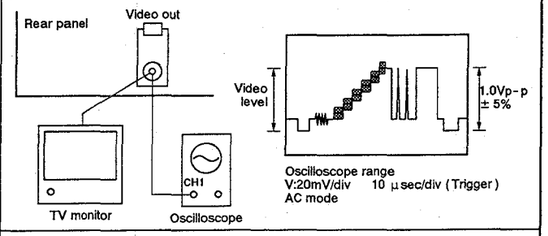
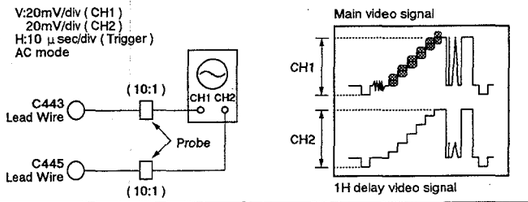
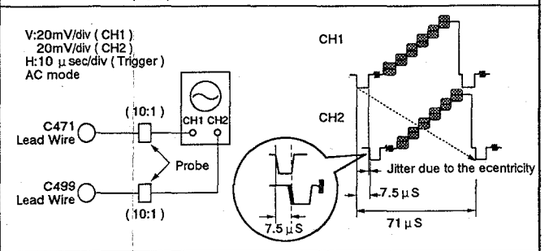
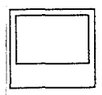
• Key operation in the Test mode

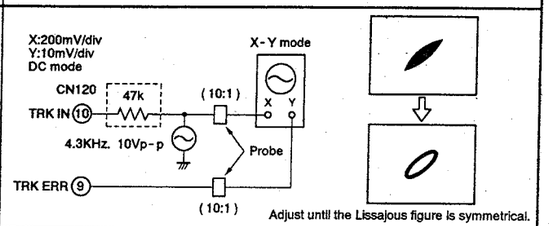
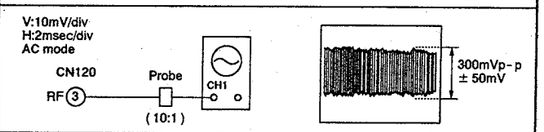
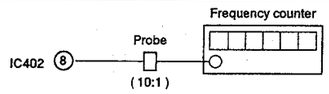
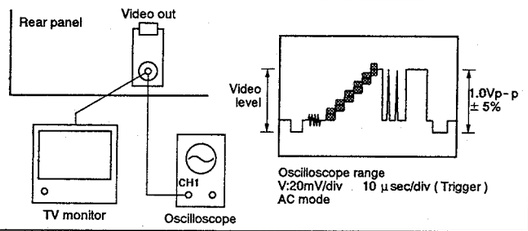
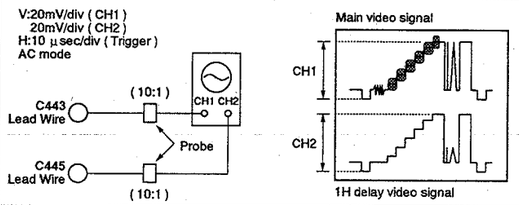
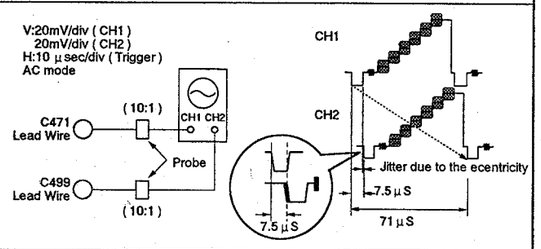
Player Status	Key Operation	Function	Remarks
Tray Open	⏮/⏭ SKIP (Refer to Note 1)	⏮: Shifts the tray in the closed direction and also raises the turn table while it is held down. ⏭: Shifts the tray in the open direction and also lowers the turn table while it is held down.	
Tray Open	▶ Play	Clamps	
Clamp	▶ Play	Turns the disc through TRK Servo Open	TRK-OFF
TRK Servo Open	▶ Play	TRK Servo Close	TRK-ON
TILT Neutral	+MULTI-SPEED or # (sharp)	TILT Servo Close	T-□:ON
TILT ON	-MULTI-SPEED or ♭ (flat)	TILT Neutral	T-□:N
TILT Neutral or ON	⏮/⏭ SKIP	Setting TILT Servo to OFF, can force TILT to move.	T-1 to T-E
Clamp	◀◀/▶▶ SCAN	Can force the slider to move	S-LD S-CDV S-CD S-IN
Play	❙❙ PAUSE	Still	
Play	■ STOP	Stop	
Stop	▲ OPEN	Open	
Play	[+10] ⇩ [0] to [9] ⇩ [▶ PLAY]	Set to SEARCH lead address input mode. Designates the SEARCH lead address through keys 0 to 9. Press the CLEAR [C] key if the designated address is incorrect. Searches the designated address upon pressing the PLAY key.	

Note 1: Press SKIP (⏮/⏭) keys after the tray is set to open state by pressing OPEN (▲) key.
In tray open state, pressing PLAY (▶) key causes is to TILT control state and SKIP keys cannot function properly.

4.2 ADJUSTMENT TABLE

	Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition	Adjustment procedure	Waveform and connection diagram
1	Tilt Offset Check and Adjustment	VR607	• TV monitor	Tilt indication on Test mode screen	• Power ON • Test mode • Disc not installed	1. Check if the tilt indication on the Test mode screen is at T-6 to T-8. 2. If the tilt indication is not at T-6 to T-8, adjust VR607 until the tilt indication reaches T-6 to T-8.	
2	Coarse centering adjustment	Tilt base centering adjustment screw	• Oscilloscope • STD-901 or STD-902 • MIX resistor 	CN120 X: ⑨ Pin (TRK ERR) Y: ①+② Pin (TRK SUM)	• Test mode TRK Servo Open Tilt Servo ON • Innermost track of STD-901 or STD-902 which does not come in contact with the mechanical stopper.	1. Move the slider until it does not come in contact with the mechanical stopper at the slider position indication S-IN. 2. Observe TRK ERR (Xch) and TRK SUM (Ych) at the X-Y mode during TRK Servo Open. 3. Turn the centering adjustment screw until the Lissajous figure is horizontal.	
3	FCS balance adjustment (1) TRK ERR MAX	VR605	• Oscilloscope • STD-901 or STD-902	CN120 ⑨ Pin (TRK ERR)	• Test mode TRK Servo Open Tilt Servo ON • Inner track of STD-901 or STD-902	1. Observe TRK ERR at CH1 of the oscilloscope during TRK Servo Open. 2. Adjust VR605 until the amplitude of the waveform reaches its maximum.	
4	FCS balance adjustment (2) RF MAX	VR606	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (RF)	• Test mode TRK Servo Close Tilt Servo ON • Inner track of STD-901 or STD-902	1. Close the TRK Servo and observe RF at CH1 of the oscilloscope. 2. Adjust VR606 until the amplitude of the waveform reaches its maximum and the envelope is very clear.	
5	Tangential direction angle adjustment	Tilt base TAN adjustment screw	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (RF)	• Test mode TRK Servo Close Tilt Servo ON • Inner track of STD-901 or STD-902	1. Observe RF at CH1 of the oscilloscope during TRK Servo Close. 2. Adjust the TAN adjustment screw until the amplitude of the waveform reaches its maximum and the envelope is very clear.	
6	Fine centering adjustment	Tilt base Centering adjustment screw	• Oscilloscope • STD-901 or STD-902	CN120 X: ⑨ Pin (TRK ERR) Y: ①+② Pin (TRK SUM)	• Test mode TRK Servo Open Tilt Servo ON • Innermost track of STD-901 or STD-902 which does not come in contact with the mechanical stopper.	Perform fine centering adjustment by following the same procedure as in "(2) Coarse centering adjustment".	
7	Crosstalk check and Tilt offset adjustment	VR607	• TV monitor • GGV1003	Crosstalk check screen	• Test mode TRK Servo Close Tilt Servo ON • GGV1003 #115 STILL	1. Search for address 115 of GGV1003 and still the address. 2. Check the crosstalk . If the crosstalk is pronounced, adjust VR607 until the crosstalk is not noticeable.	
7	When the crosstalk is still noticeable in spite of the adjustment in (7), use a hexagonal wrench driver (straight type, size: 3 mm) to adjust the TAN adjustment screw on the bottom side of the player through the GGV1003 #115 STILL screen. Afterwards, perform the adjustment procedures from (6).						
8	FCS Servo loop gain adjustment	VR604	• Oscilloscope • GGV1003 • AF Oscillator • Resistor (47kΩ)	CN120 X: ⑦ Pin (FCS IN) Y: ⑥ Pin (FCS ERR)	• Test mode TRK Servo Close Tilt Servo ON • GGV1003 #15,000 STILL	1. Search for address 15,000 of GGV1003 and still the address. 2. Xch: Connect the resistor (47kΩ) to the channel and connect to FCS IN. Ych: Connect to FCS ERR. 3. Connect the AF oscillator between Xch and the 47kΩ resistor, and adjust VR604 until the Lissajous figure is symmetrical.	

	Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition	Adjustment procedure	Waveform and connection diagram
9	TRK Servo loop gain adjustment	VR601	• Oscilloscope • GGV1003 • AF Oscillator • Resistor (47kΩ)	CN120 X: ⑩ Pin (TRK IN) Y: ⑨ Pin (TRK ERR)	• Test mode Stop mode or TRK Servo Close Tilt Servo ON • GGV1003 #15,000 STILL	1. Xch: Connect the 47kΩ resistor to channel and connect to TRK IN. Ych: Connect to TRK ERR. 2. Connect the AF oscillator between Xch and the 47kΩ resistor and note the tilt angle against the horizon with the disc in the stopped state. 3. Search for address 15,000 of GGV1003 and still the address. 4. Set the disc PLAY mode (TRK servo closed, TILT on). Adjust VR603 so that the tilt angle of the waveform will be the same as the tilt angle noted in step 3.	
10	RF level adjustment	VR601	• Oscilloscope • GGV1003	CN120 ③ Pin (RF)	• Test mode TRK Servo Close Tilt Servo ON • GGV1003 #15,000 STILL	1. Search for address 15,000 of GGV1003 and still the address. Observe RF at CH1 of the oscilloscope. 2. Adjust VR601 until the RF amplitude is 300mV ± 50mVp-p.	
11	REF-H adjustment	VC901	• Frequency counter	IC402 (PM0001) ⑧ Pin	• Power ON • Stop mode	Adjust FSC (3.579545 MHz) ± 10Hz.	
12	Video level adjustment	VR482	• TV monitor • Oscilloscope • GGV1003	Video output terminal	• Normal mode • GGV1003 #19,900 STILL	Connect a 75Ω resistor to the VIDEO output terminal (possibly by connecting to the monitor) and adjust until the sync tip to 100% white level is 1Vp-p ± 5% at the composite TEST signal.	
13	1H DLY video level adjustment	VR441	• Oscilloscope • GGV1003	CH1: C443 lead wire CH2: C445 lead wire	• Normal mode • GGV1003 #19,900 STILL	Adjust until the sync tip to 100% white level at the composite TEST signal is the same as in CH1 and CH2.	
14	VCO center frequency adjustment	VR481	• Oscilloscope • GGV1003	CH1: C471 lead wire CH2: C499 lead wire	• Normal mode • GGV1003 #5,100 STILL	Place a trigger in CH1 and adjust until the center of the CH2 video signal jitter is 71 µsec (1H + 7.5 µsec) $^{+3.5}_{-0.5}$ µsec compared to the CH1 video signal.	
15	VPS error level adjustment	VR521	• TV monitor • GGV1003	TV monitor	• Normal mode • GGV1003 #7,201-#8,100 PLAY (Magenta screen)	Adjust until the color irregularity on the magenta screen is minimized.	

Adjustment procedure	Waveform and connection diagram
Connect the 47kΩ resistor to channel and connect to TRK IN. Connect to TRK ERR. ect the AF oscillator between Xch and the 47kΩ resistor and he tilt angle against the horizon with the disc in the stopped h for address 15,000 of GGV1003 and still the address. e disc PLAY mode (TRK servo closed, TILT on). Adjust 3 so that the tilt angle of the waveform will be the same as the gle noted in step 3.	
h for address 15,000 of GGV1003 and still the address. ve RF at CH1 of the oscilloscope. VR601 until the RF amplitude is 300mV ± 50mVp-p.	
SC (3.579545 MHz) ± 10Hz.	
a 75Ω resistor to the VIDEO output terminal (possibly by g to the monitor) and adjust until the sync tip to 100% white Vp-p ± 5% at the composite TEST signal.	
til the sync tip to 100% white level at the composite TEST he same as in CH1 and CH2.	
igger in CH1 and adjust until the center of the CH2 video r is 71 µsec (1H + 7.5 µsec) $^{+3.5}_{-0.5}$ µsec compared to the o signal.	
til the color irregularity on the magenta screen is minimized.	

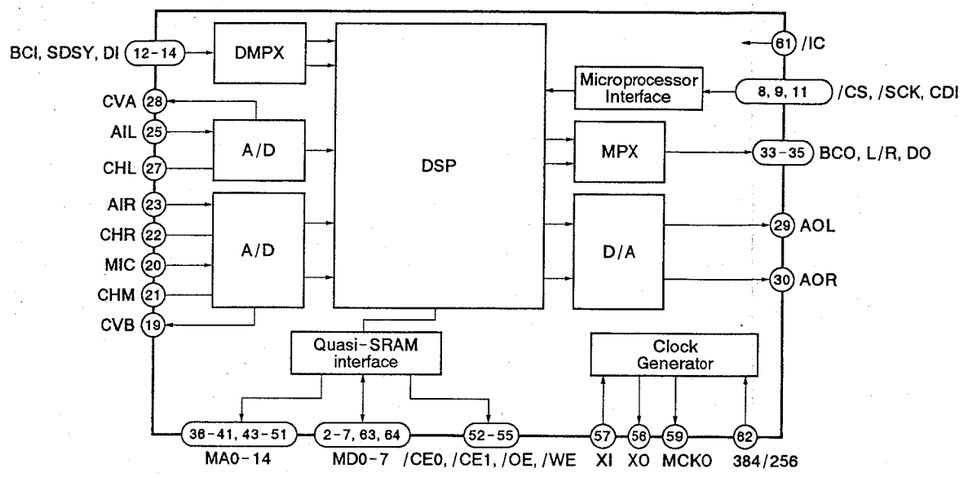
5. IC INFORMATION

- The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

5.1 PDQ001A (IC304)

• DSP IC

● Block Diagram



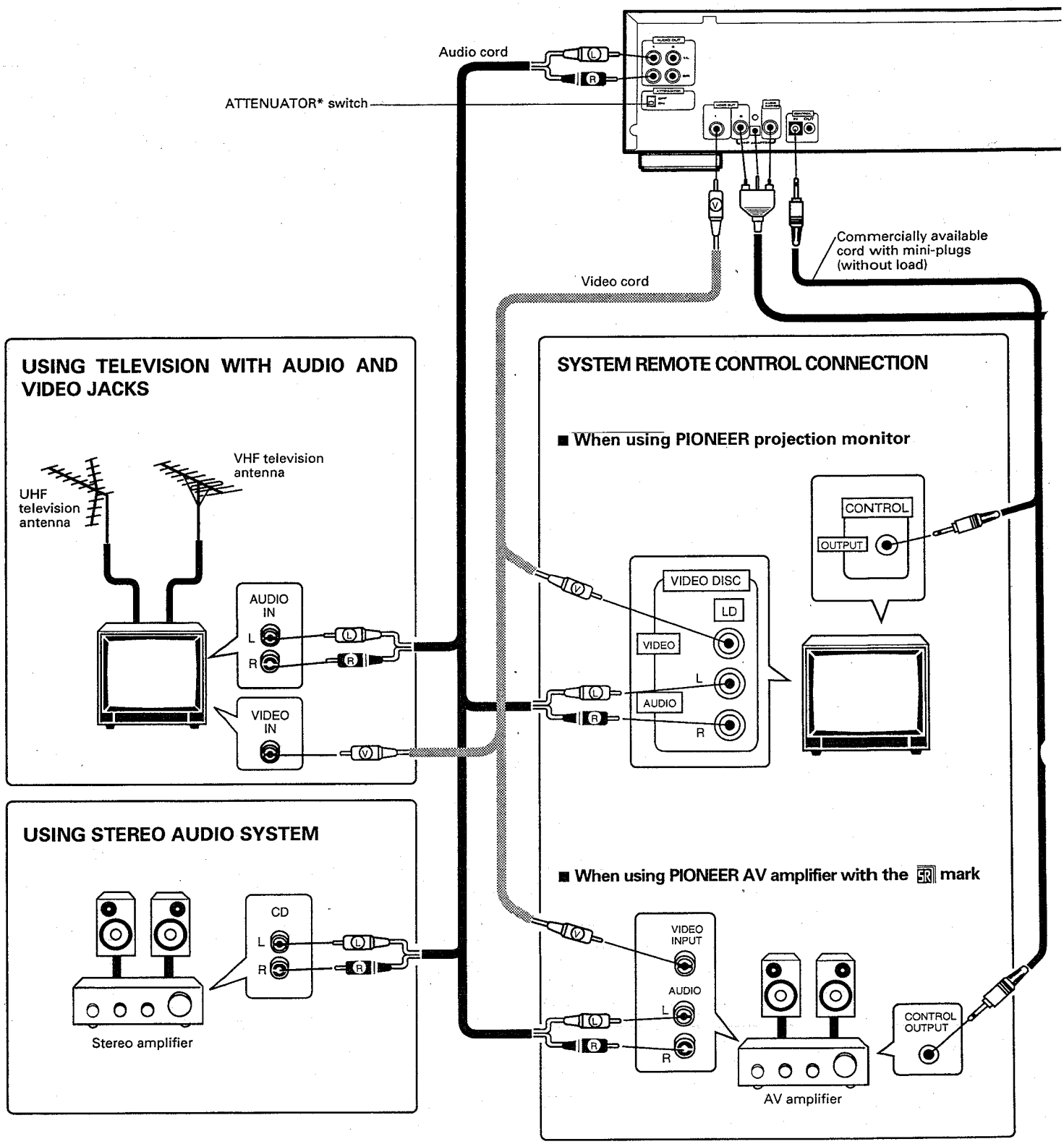
● Pin Function

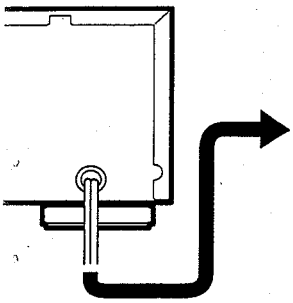
No.	Pin Name	I/O	Function
1	N.C.		Not used.
2	MD2	I/O	Data terminals of external quasi - SRAM interface.
3	MD7		
4	MD6		
5	MD5		
6	MD4		
7	MD3		
8	CDI	I	Serial data of microprocessor interface.
9	/CS	I	Chip select of microprocessor interface.
10	VDD	–	+5V power supply (Digital section)
11	/SCK	I	Serial clock of microprocessor interface.
12	DI	I+	Serial data of digital audio input.
13	SDSY	I+	L/R clock of digital audio input.
14	BCI	I+	Bit clock of digital audio input.
15	N.C.		Not used.
16	VSS	–	Ground (Digital section)
17	N.C.		Not used.
18	AVSS	A	Connect to VSS at outside of ground (A/D and D/A sections).
19	CVB	AO	A/D center voltage of R channel and MIC channel.
20	MIC	AI	A/D input of analog audio MIC channel.

No.	Pin Name	I/O	Function
21	CHM	A	Connect a capacitor for sample/hold of MIC input.
22	CHR	A	Connect a capacitor for sample /hold of AIR input.
23	AIR	AI	A/D input of analog audio R channel.
24	AVDD	A	Connect to VDD at outside of +5V power supply (A/D and D/A sections).
25	AIL	AI	A/D input of analog audio L channel.
26	AVDD	A	Connect to VDD at outside of +5V power supply (A/D and D/A sections).
27	CHL	A	Connect a capacitor for sample/hold of AIL input.
28	CVA	AO	A/D center voltage of L channel.
29	AOL	AO	D/A output of analog audio L channel.
30	AOR	AO	D/A output of analog audio R channel.
31	AVSS	A	Connect to VSS at outside of ground (A/D and D/A sections).
32	VSS	–	Ground (Digital section).
33	BCO	O	Bit clock of digital audio output.
34	L/R	O	L/R clock of digital audio output.
35	DO	O	Serial data of digital audio output.
36	MA13	O	Address terminals of external quasi-SRAM interface.
37	MA8		
38	MA9		
39	MA11		
40	MA10		
41	MA14		
42	VDD	–	+5V power supply (Digital section)
43	MA12	O	Address terminals of external quasi-SRAM interface.
44	MA7		
45	MA6		
46	MA5		
47	MA4		
48	MA3		
49	MA2		
50	MA1		
51	MA0		
52	/CE0	O	Chip select of external quasi-SRAM interface. =0
53	/CE1	O	Chip select of external quasi-SRAM interface. =1 (Effective for connecting two terminals.)
54	/OE	O	OE terminal of external quasi-SRAM interface.
55	/WE	O	WE terminal of external quasi-SRAM interface.
56	XO	O	Connect a crystal oscillator.
57	XI	I	Connect a crystal oscillator or external clock input.
58	VDD	–	+5V power supply (Digital section)
59	MCKO	O	Master clock (XI clock) output.
60	VSS	–	Ground (Digital section)
61	/IC	I	Initial clear terminal.
62	384/256	I+	Switch the master clock rate. ("H"=384fs , "L"=256fs)
63	MD0	I/O	Data terminals of external quasi-SRAM interface.
64	MD1		

Note : + : Pull-up terminal , A : Analog terminal

6. CONNECTIONS

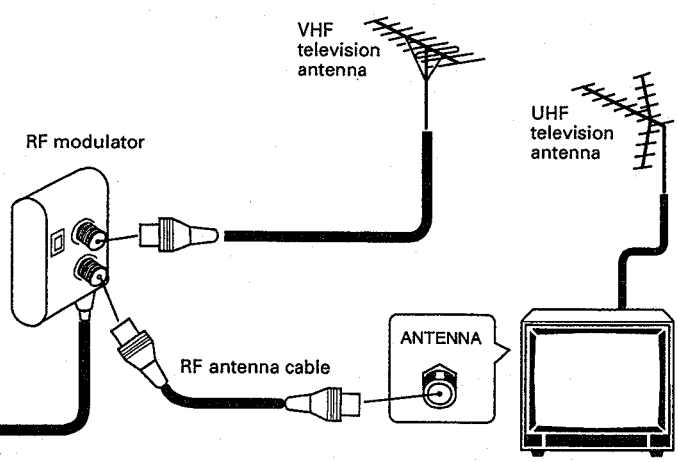




Plug the power cords into AC outlet.
Plug the AC power cords of the player, stereo amplifier and TV set into an AC outlet.
When the power cord of this unit is connected to an AC outlet, power is supplied to the unit's internal memory (such as the last memory) even when the POWER switch is off (STANDBY). Therefore, be sure to connect the power cord directly to a wall outlet. If the power cord is connected to an outlet such as a switched outlet on an amplifier, the various memory contents will be erased whenever the amplifier's power switch is turned off.

RF modulator JA-RF3L (Optional RF modulator is sold in the U.S. and Canada only.)

USING TELEVISION WITHOUT AUDIO AND VIDEO JACKS



1. Detach the antenna cable from the antenna terminal of your TV set, and connect the cable to the IN terminal of the RF modulator.
2. Connect the OUT terminal of the RF modulator to the antenna terminal of your TV set.
3. Connect the socket (3-pin) of the RF modulator to the VHF ADAPTER jacks.

NOTE:
Push the plug in firmly. If the plug is not properly inserted, it may result in snow on the screen or noise.

When the sound from a LaserDisc or Compact Disc is output from a television speaker it becomes monaural sound. (This is the same as stereo television).

NOTE:
- *Stripe patterns may appear when a LaserDisc is played on a television. Move the antenna cable away from the power cord to avoid this.*
- *Be sure to turn off the power of this player when you watch a TV broadcast.*
- *With some televisions, when CD is played in Direct CD mode , no sound will be heard. Therefore, when using television speakers, turn off DIRECT CD.*

USING TELEVISION WITH AUDIO AND VIDEO JACKS

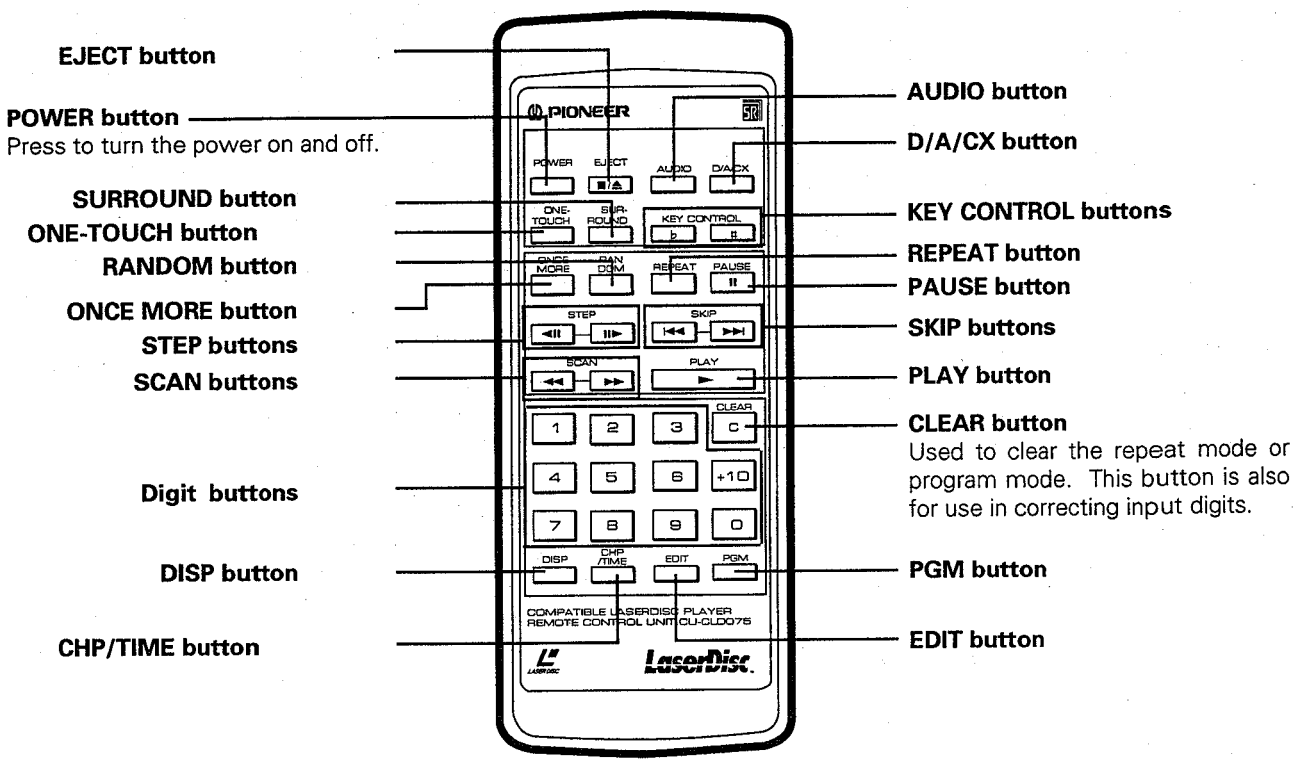
Monitor television connections
Connect the VIDEO OUT jack of the player to the video input jack of the monitor television.
- The television speakers can be used by connecting the television audio input jacks and the player AUDIO OUT jacks. However, connection to a stereo amplifier is recommended to obtain superior audio playback quality for Compact Discs and LaserDiscs. Do not change the television antenna and VCR connections.
- **ATTENUATOR switch (*)**
  When the television speakers are used, the sound may be distorted. In this case, set ATTENUATOR to ON to reduce the distortion.

Stereo amplifier connections
Connect the AUDIO OUT jacks to the stereo amplifier AUX, CD, LD, VDP or other jacks.
- Do not connect these jacks to your amplifier PHONO input jacks.

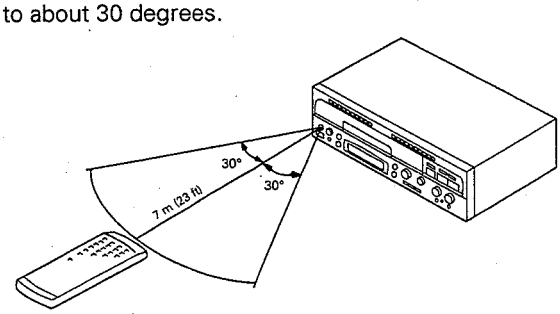
Power cord connections
Connect the power cord to an AC wall outlet after connecting all components.

7. PANEL FACILITIES

- Remote control buttons with the same names or marks as buttons on the front panel of the player control the same operations as the corresponding front panel buttons.



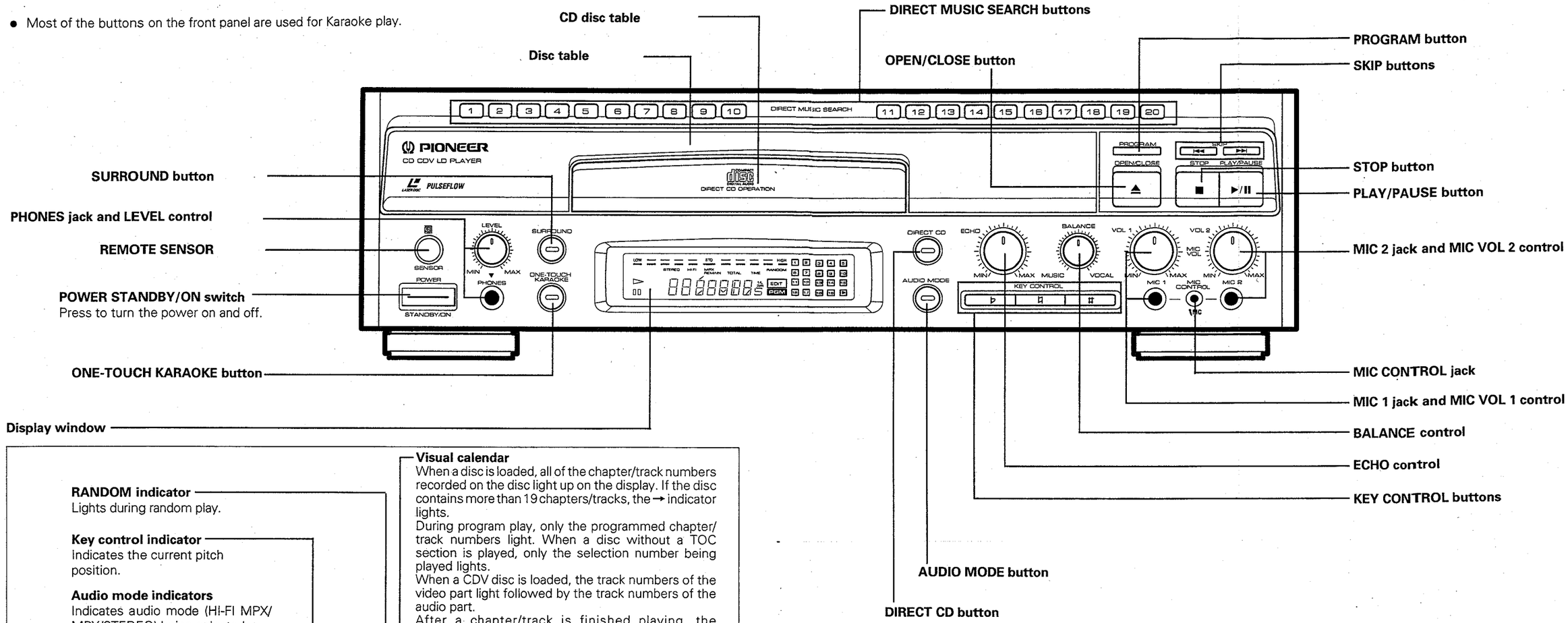
When operating the remote control unit, point the unit's infrared signal transmitter at the remote control receiver (REMOTE SENSOR) on the front panel of the player. The remote control unit can be used within a range of about 7 meters (23 feet) from the remote sensor, and within angles of up to about 30 degrees.

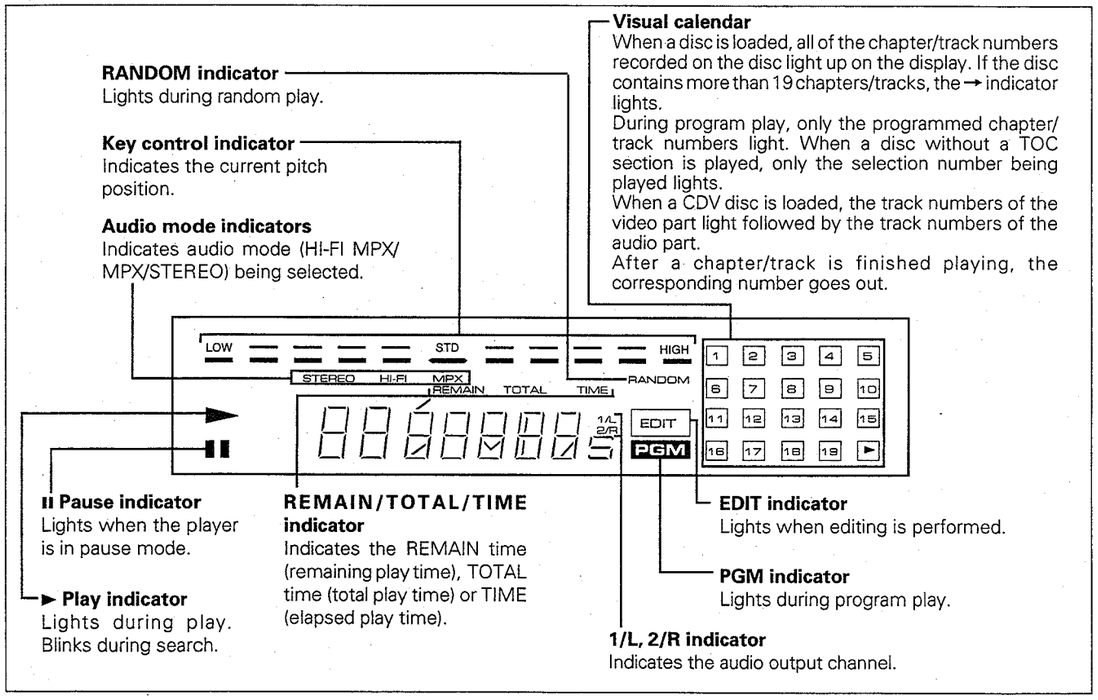


NOTE FOR USING THE REMOTE CONTROL UNIT

- *If a plug is connected to the CONTROL IN terminal at the rear of the player, remote control operations cannot be done with the remote control unit aimed at the player's remote control sensor. Aim the remote control unit at the AV amplifier or the component display's sensor instead.*
- *If there is any obstacle between the remote control unit and the player, or if the unit is held at too large an angle relative to the front panel of the player, the signal from the remote control unit will fail to reach the remote sensor.*
- *If the player is operating in the vicinity of other appliances generating infrared rays, or if other remote control devices using infrared rays are used near the player, the player may operate improperly. Conversely, if the player's remote control unit is operated in the vicinity of other appliances which use an infrared remote control device, the other appliance may operate improperly. If this should happen, change the place of installation so that improper operation does not occur.*
- *If the range of operation of the remote control unit becomes too short, replace the batteries.*
- *When the unit is not to be used for a long period of time (more than one month), remove the batteries to prevent them from leaking inside the compartment. If leakage occurs, wipe up the liquid inside the compartment and before inserting new batteries.*
- *Do not place books or other objects on the remote control unit, since they might depress the buttons and run down the batteries.*
- *If the remote control sensor window is in a position where it receives strong light such as sunlight or fluorescent light, control may not be possible.*

- Most of the buttons on the front panel are used for Karaoke play.





8. SPECIFICATIONS

1. General

System ..... LaserVision Disc system and Compact Disc digital audio system
Laser ..... Semiconductor laser wavelength 780 nm
Power requirements
CLD-V730 ..... AC 120 V, 60 Hz
CLD-1710K ..... AC 110/120~127/220/240 V (Switchable), 50/60 Hz
Power consumption
CLD-V730 ..... 41 W
CLD-1710K ..... 41 W
Weight ..... 7.5 kg (16 lbs 7 oz)
Dimensions ..... 420 (W) x 392 (D) x 122 (H) mm
16-9/16 (W) x 15-7/16 (D) x 4-13/16 (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 (two pairs)

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

4. Audio characteristics (two pairs)

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

5. Other Terminals

Microphone input 2
MIC control input ..... miniature jack
Headphones output 1
Control input/output ..... Both miniature jacks
VHF adapter output (Video/Audio) ..... Both RCA jacks with DC jack

6. Accessories

Remote control unit (CU-CLD075) 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 (CU-CLD075)

	Function	Standard play Disc (CAV)	Extended play Disc (CLV)	Compact Disc with Video	Compact Disc
Basic Functions	Pause	YES	YES	YES	YES
	Stop	YES	YES	YES	YES
	Eject	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
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
	Program repeat	YES	YES	YES	YES
	Random repeat	YES*1	YES*1	YES	YES
	Program random repeat	YES	YES	YES	YES
Trick play	Still/Step	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	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)*4	YES	YES	YES	YES
	Compu/Auto program edit	YES*1	YES*1	YES	YES
	Random play	YES*1	YES*1	YES	YES

*1 Only discs with TOC
*2 Valid for analog audio playing a disc with the CX mark.
*3 Can only be used with discs with digital audio tracks.

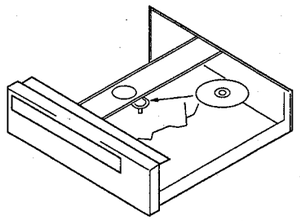
NOTE:
The specifications and design of this product are subject to change without notice, due to improvements.

● 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.



② Press the PLAY (▶) key once.
(Twin gear starts to move.)

③ Push the cam plate (Fig. 4) in the direction of the arrow and wait until the CD disc is clamped.

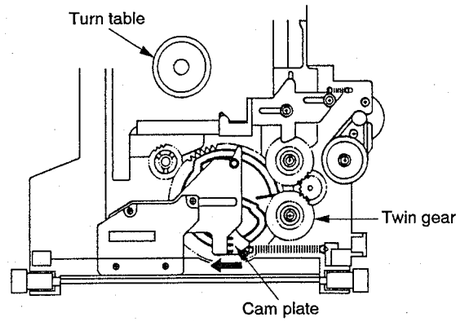
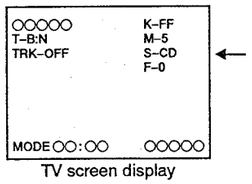


Fig. 4

④ Press the ◀◀ or ▶▶ keys to appear "S - CD" on the TV screen display.

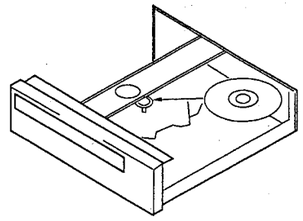


TV screen display

⑤ Press the PLAY (▶) key twice, disc will be normally playbacked.

• LD PLAYBACK

① Place the LD disc on the turn table.

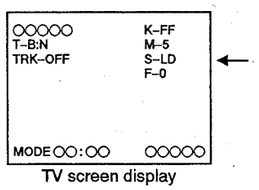


② Press the PLAY (▶) key once. (Twin gear starts to move.)

③ Press the SKIP REV (|◀◀) key to raise the turn table (spindle motor section) while pressing the cam plate (Fig. 4) in the direction of the arrow.
Raise it to the position where the LD disc can be easily placed on the turn table.
If the turn table is raised too high, lower it with the SKIP FWD (▶▶|) key.

④ Place the LD disc on the turn table and press the PLAY (▶) key once to clamp the disc.

⑤ Press the ◀◀ or ▶▶ keys to appear "S - LD" on the TV screen display.



TV screen display

⑥ Press the PLAY (▶) key twice, disc will be normally playbacked.

4.2 ADJUSTMENT TABLE

	Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition
1	Tilt Offset Check and Adjustment	VR607	• TV monitor	Tilt indication on Test mode screen	• Power ON • Test mode • Disc not installed
2	Coarse centering adjustment	Tilt base centering adjustment screw	• Oscilloscope • STD-901 or STD-902 • MIX resistor 10k 10k	CN120 X: ⑨ Pin (TRK ERR) Y: ① + ② Pin (TRK SUM)	• Test mode TRK Servo Open Tilt Servo • Innermost track of STD-90 902 which does not come i with the mechanical stoppe
3	FCS balance adjustment (1) TRK ERR MAX	VR605	• Oscilloscope • STD-901 or STD-902	CN120 ⑨ Pin (TRK ERR)	• Test mode TRK Servo Open Tilt Servo • Inner track of STD-901 or
4	FCS balance adjustment (2) RF MAX	VR606	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (RF)	• Test mode TRK Servo Close Tilt Servo • Inner track of STD-901 or
5	Tangential direction angle adjustment	Tilt base TAN adjustment screw	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (RF)	• Test mode TRK Servo Close Tilt Servo • Inner track of STD-901 or
6	Fine centering adjustment	Tilt base Centering adjustment screw	• Oscilloscope • STD-901 or STD-902	CN120 X: ⑨ Pin (TRK ERR) Y: ① + ② Pin (TRK SUM)	• Test mode TRK Servo Open Tilt Servo • Innermost track of STD-90 902 which does not come i with the mechanical stoppe
7	Crosstalk check and Tilt offset adjustment	VR607	• TV monitor • GGV1003	Crosstalk check screen	• Test mode TRK Servo Close Tilt Serv • GGV1003 #115 STILL
	When the crosstalk is still noticeable in spite of the adjustment in (7), use a hexagonal wrench driver (straight type, size: 3 adjust the TAN adjustment screw on the bottom side of the player through the GGV1003 #115 STILL screen. Afterwards, pe adjustment procedures from (6).				
8	FCS Servo loop gain adjustment	VR604	• Oscilloscope • GGV1003 • AF Oscillator • Resistor (47kΩ)	CN120 X: ⑦ Pin (FCS IN) Y: ⑥ Pin (FCS ERR)	• Test mode TRK Servo Close Tilt Serv • GGV1003 #15,000 STILL

3887

PIONEER®
The Art of Entertainment

Service Manual

SERVICE GUIDE

ORDER NO.
ARP2528

CD CDV LD PLAYER

CLD-S201
CLD-S250

CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R 0P2 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

AO MAY 1992 Printed in Japan

3889

1. DISASSEMBLY

• Removing the Tray Unit

1. Set DIRECT CD to OFF (indicator lamp goes OFF).
2. Remove the two fixing screws Ⓩ (Fig. 1–1).
3. Press the OPEN/CLOSE button to set the tray unit to its OPEN position.

* When manually setting the tray unit to its OPEN position, refer to Notes 1 and 2.

4. Pull out the tray unit while pressing the hook Ⓐ (Fig. 1–1), located on the rear right side of the tray unit, to the left.

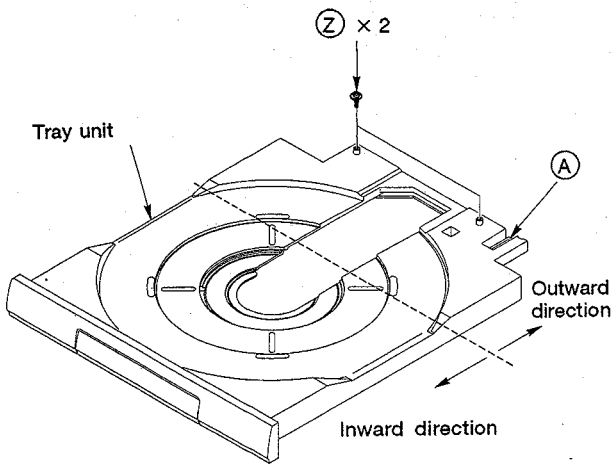


Fig. 1–1

Note 1. Manually setting the tray unit to its OPEN position

1. Remove the clamper unit Ⓑ (Fig. 1–2) by loosening its four screws.

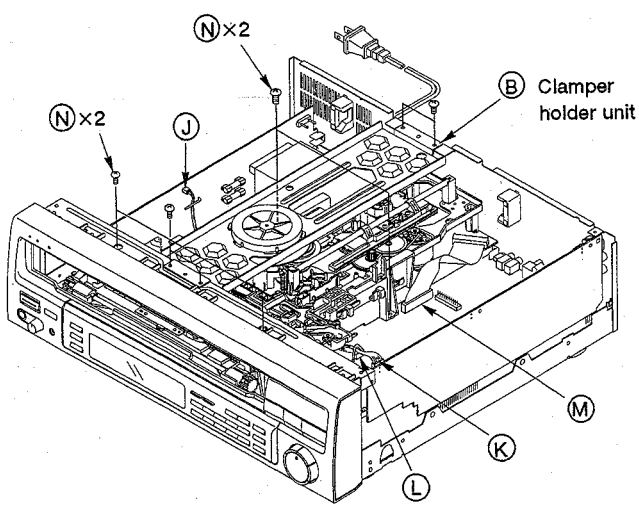


Fig. 1–2

2. Make sure that the position of the lens in the pickup assembly is such that the lens stops outside the position indicated by the dotted line in Fig. 1–1.
When the lens stops inside the dotted line, slowly press the Ⓠ portion of the rack assembly (Fig. 1–3) to move the lens in the pickup assembly until the lens is outside the position indicated by the dotted line in Fig. 1–1.
Note that by not going through this process, opening the CD tray and removing the tray ASS'Y would be more time-consuming.

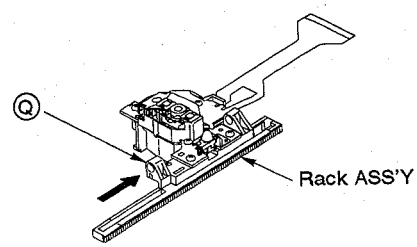


Fig. 1–3

3. Insert your hand through the right side of the tray unit and turn the gear pulley Ⓒ (Fig. 1–4) in a clockwise direction until the servo-mechanism unit Ⓓ (Fig. 1–5) lowers. Keep turning the pulley until the tray unit starts to move towards the front.

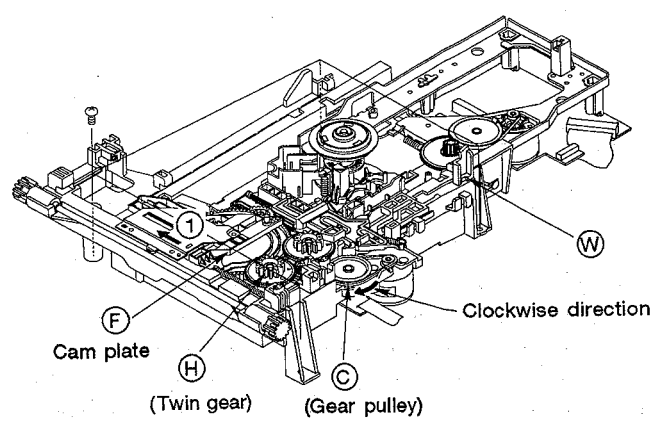


Fig. 1–4

4. Slowly pull out the tray unit to the OPEN position.

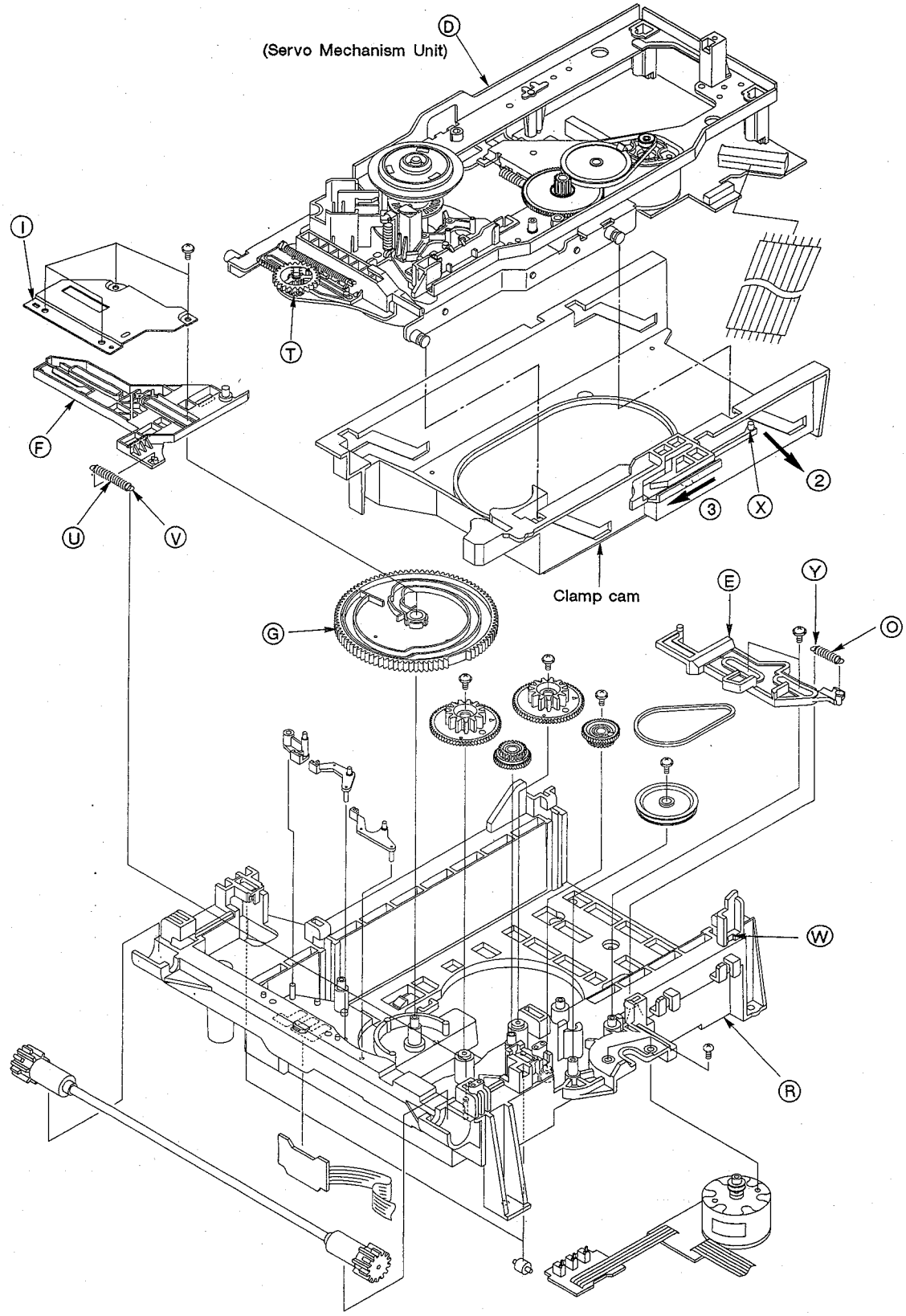


Fig. 1-5

Note 2. Setting the tray unit to its OPEN position when the CD tray is completely or partially OPEN

1. Remove the clamper unit Ⓑ (Fig. 1–2) by loosening its four screws.
2. Slowly push in the CD tray to the CLOSE position.
3. Slowly press the Ⓠ portion of the rack assembly (Fig. 1–3) to move the lens in the pickup assembly until the lens is outside the position indicated by the dotted line in Fig. 1–1.
4. Insert your hand through the right side of the tray unit and turn the gear pulley Ⓒ (Fig. 1–4) in a counterclockwise direction until the servo-mechanism unit Ⓓ (Fig. 1–5) starts to move upward. Keep turning the pulley until the clamp position is reached (the LD tray and CD tray become one unit).
5. When the clamp position has been reached, turn the gear pulley Ⓒ (Fig. 1–4) in a clockwise direction until the servo-mechanism unit Ⓓ lowers. Keep turning the pulley until the tray unit starts to move towards the front.
6. Slowly pull out the tray unit to the OPEN position.

• Attaching the Tray Unit

1. Make sure that the CD plate Ⓔ is positioned to the left (LD Tray mode) as in Fig. 1–6. When the CD plate Ⓔ is positioned to the right (CD Tray mode) as in Fig. 1–6, perform steps 1) to 2).
1) Turn the power ON. While DIRECT CD is OFF, push cam plate Ⓕ (Fig. 1-6) towards the direction of the arrow ①.
2) Wait until the cam gear Ⓖ (Fig. 1–6) turns, the servo-mechanism unit Ⓓ (Fig. 1–5) goes upward, and the pickup assembly stops moving.
2. Press the OPEN/CLOSE button to open the tray unit, or pull out the power cord from the AC outlet and turn the twin gear Ⓗ (Fig. 1–4) in a counterclockwise direction until the cam gear Ⓖ (Fig. 1–6) can no longer turn.
3. Keeping the tray unit parallel with the front panel, slowly insert the tray unit through the opening of the front panel.

Note that if you insert the tray unit in the front panel when the tray unit and the front panel are not parallel with each other, the tray unit might get stuck while being inserted.

• Removing the Servo-Mechanism Unit

1. Remove the clamper unit Ⓑ (Fig. 1–2) by loosening its four screws, and remove the tray unit.
2. Remove the four connectors Ⓙ to Ⓜ (Fig. 1–2).
3. Remove the four fixing screws Ⓝ of the mechanism base and remove the whole servo-mechanism unit from its casing.
4. Remove the Ⓨ side of the CDP spring Ⓞ (Fig. 1–5) as well as the CD plate Ⓔ by loosening the CD plate's two screws.
5. Remove the lead wire from the lead wire hook Ⓢ (Fig. 1–7) for the spindle motor at the rear of the mechanism base Ⓡ.

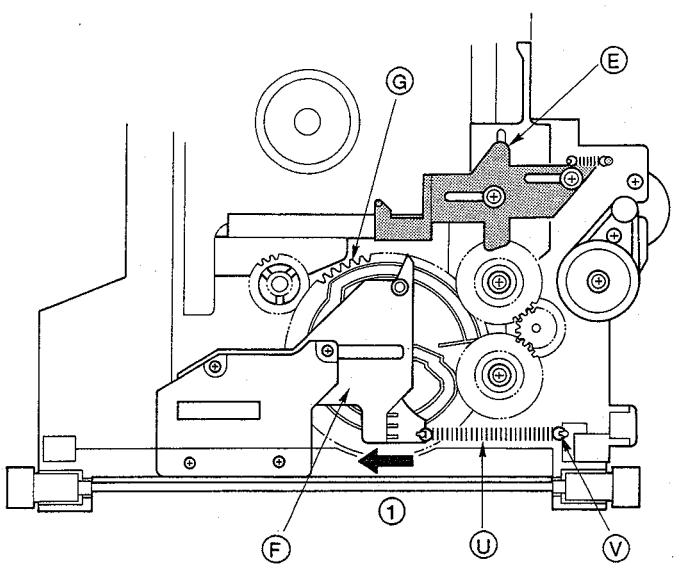


Fig. 1–6

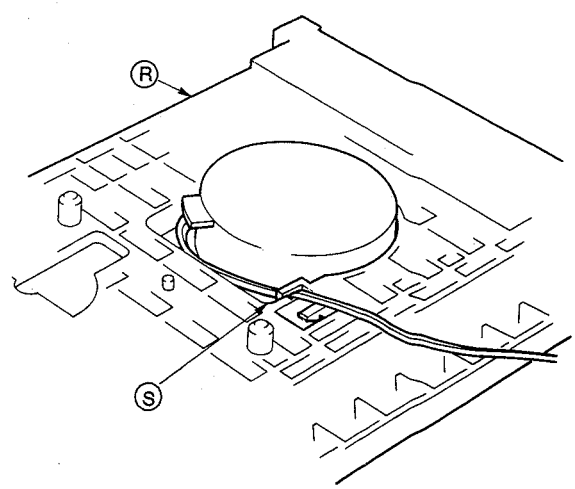


Fig. 1–7

6. While pushing the cam plate Ⓕ (Fig. 1–4) towards the direction of the arrow ①, turn the twin gear Ⓗ (Fig. 1–4) in a clockwise direction.
7. Stop turning the twin gear Ⓗ (Fig. 1–4) when the servo-mechanism unit Ⓓ (Fig. 1–5) has gone upward and the Y-gear Ⓣ is engaged with the cam gear Ⓖ by three to five teeth.
8. While bending the clamp cam hook Ⓧ (Fig. 1–5) in the direction of the arrow ②, move the hook to its "built-in position" Ⓦ (Fig. 1–4) towards the rear.
9. Lift the servo-mechanism unit Ⓓ straight up and remove the unit from the clamp cam (Fig. 1–5).

• Attaching the Servo-Mechanism Unit

1. Return the clamp cam and other parts to their original positions (when the servo-mechanism unit was removed).
2. While turning the Y-gear Ⓣ in a clockwise direction by three to five teeth (Fig. 1–8) in the same manner as when the Y-gear was removed, attach the servo-mechanism unit from above to the clamp cam (Fig. 1–5).
3. While bending the clamp cam hook Ⓧ in the direction of the arrow ② , move the hook in the direction of the arrow ③ (Fig. 1–5).
4. While the servo-mechanism unit is raised, hook the lead wire from the spindle motor to hook Ⓢ (Fig. 1–7) on the rear of the mechanism base Ⓡ .
5. Turn the twin gear Ⓗ (Fig. 1–4) in a counterclockwise direction until the servo-mechanism unit lowers, the cam gear Ⓖ (Fig. 1–5) stops turning, and the twin gear Ⓗ (Fig. 1–4) runs idle.

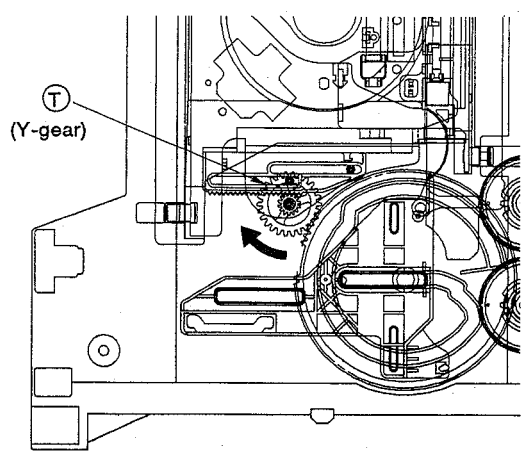


Fig. 1–8

• Attaching the Cam Gear and Cam Plate

1. Bring the clamp cam (Fig. 1–5) close towards you (while the servo-mechanism unit is being lowered).
2. Insert the cam gear Ⓖ upon directing the rib horizontally as shown in Fig. 1–9.

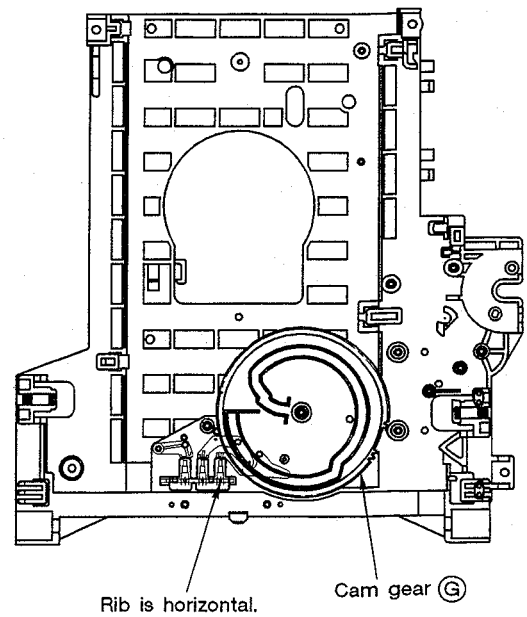


Fig. 1–9

3. Attach the CAS spring, Ⓤ (Fig. 1–6) to the cam plate Ⓕ , and hook the Ⓥ side of the CAS spring to the spring-latching part of the mechanism base.

4. Slightly turn the cam gear Ⓖ in a counterclockwise direction until the cam gear reaches the position shown in Fig. 1–10.

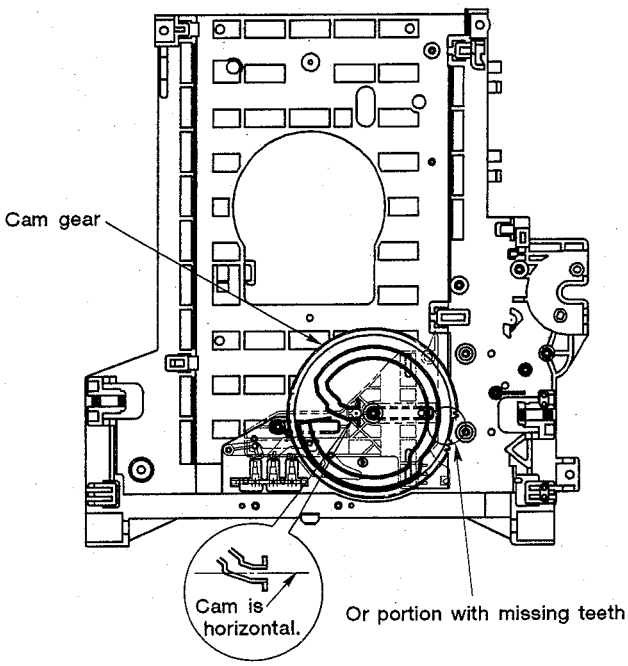


Fig. 1–10

5. Attach the cam plate Ⓕ on the cam gear Ⓖ when the plate has moved to the rightmost position (Fig. 1–6).
6. Fix the shaft holder Ⓘ using four screws (Fig. 1–5).

• Matching the Position of the Gears

1. Attach the center gear Ⓟ, twin gears Ⓗ1 and Ⓗ2, and Y-gear Ⓣ in the positions indicated in Fig. 1–11.

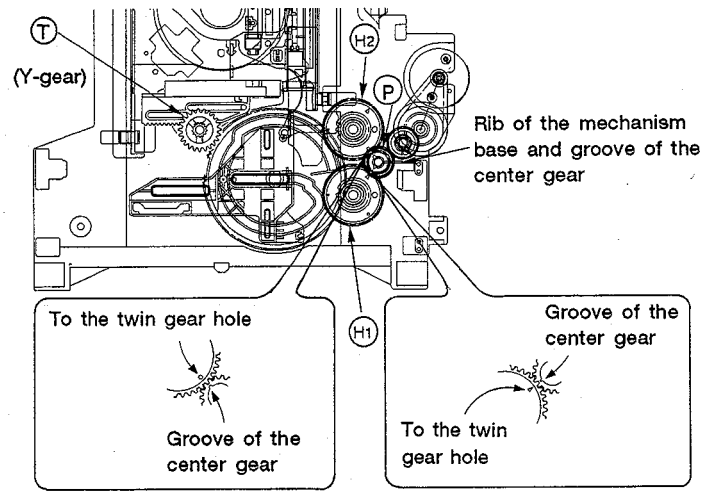


Fig. 1–11

• Attaching the CD Plate

1. Upon attaching the CD spring Ⓞ (Fig. 1–5) to the CD plate Ⓔ, hook the Ⓨ side of the CD spring to the mechanism base hook.
2. Attach the CD plate Ⓔ (from the left side) into the position shown in Fig. 1–6.

2. DESCRIPTION OF MECHANISM

2.1 OUTLINE OF MECHANISM

The mechanism consists of the following four independent units:

① Loading mechanism unit (Fig. 2–2)
② Servo-mechanism unit (Fig. 2–3)
③ Tray unit (Fig. 2–4)
④ Clamper unit (Fig. 2–6)

The tray unit only moves in the horizontal direction (forward and backward) due to the ascending and descending movements of the servo-mechanism unit, while the clamper unit is fixed inside a casing. These are some of the distinct features of the mechanism. Moreover, a CD tray is added to the LD tray in the tray unit, a feature not found in previous models.

The major components of each unit are described below.

① Loading Mechanism Unit (Refer to Fig. 2–2)

The loading mechanism unit consists of the following: a DC motor (carriage motor) which is the drive source of the mechanical base, a clamp cam which guides the ascending and descending movements of the servo-mechanism unit, a tray unit, a cam gear which engages the movement of the loading mechanism unit with that of the tray unit, a cam plate, and gears for reducing speed during operation. A detection system for each operation mode of the mechanism is included in the loading mechanism unit through the switch circuit board assembly and is connected together with the power supply of the DC motor.

By attaching the servo-mechanism unit and tray unit to the loading mechanism unit, the operations of the mechanism are completed without using the casing and other supporting components (Fig. 2–2) (excluding the operations of the clamper unit and clamp).

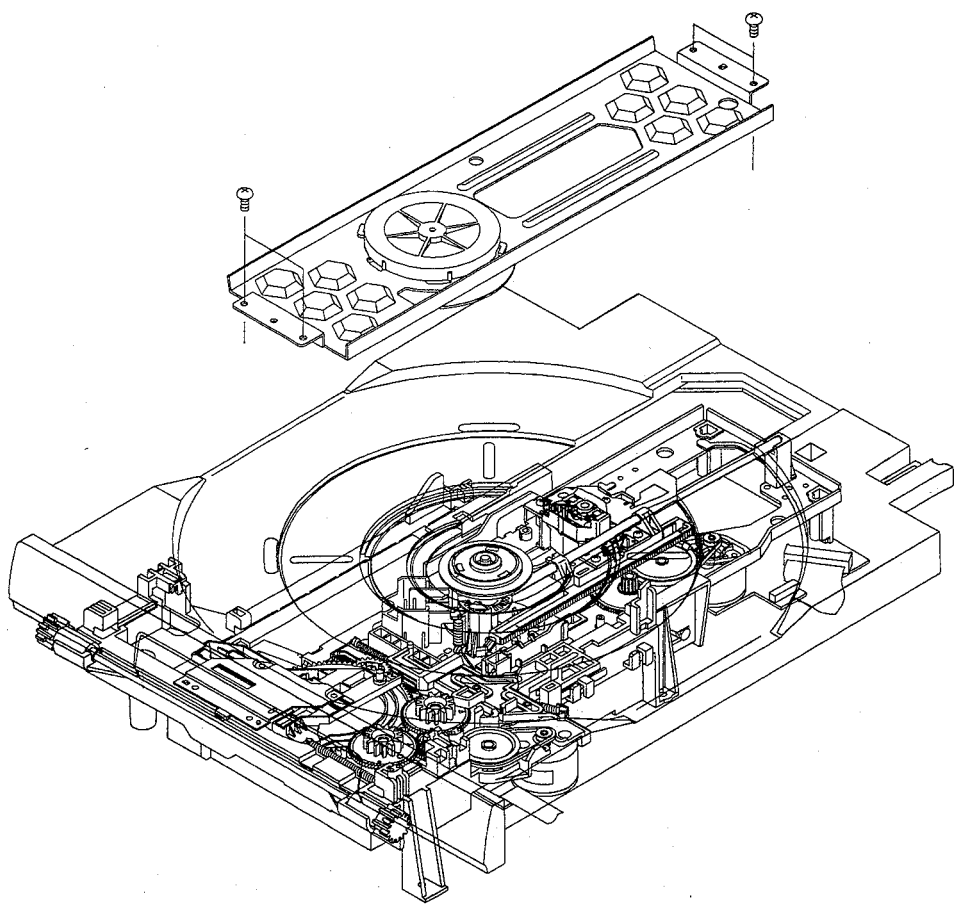


Fig. 2–1

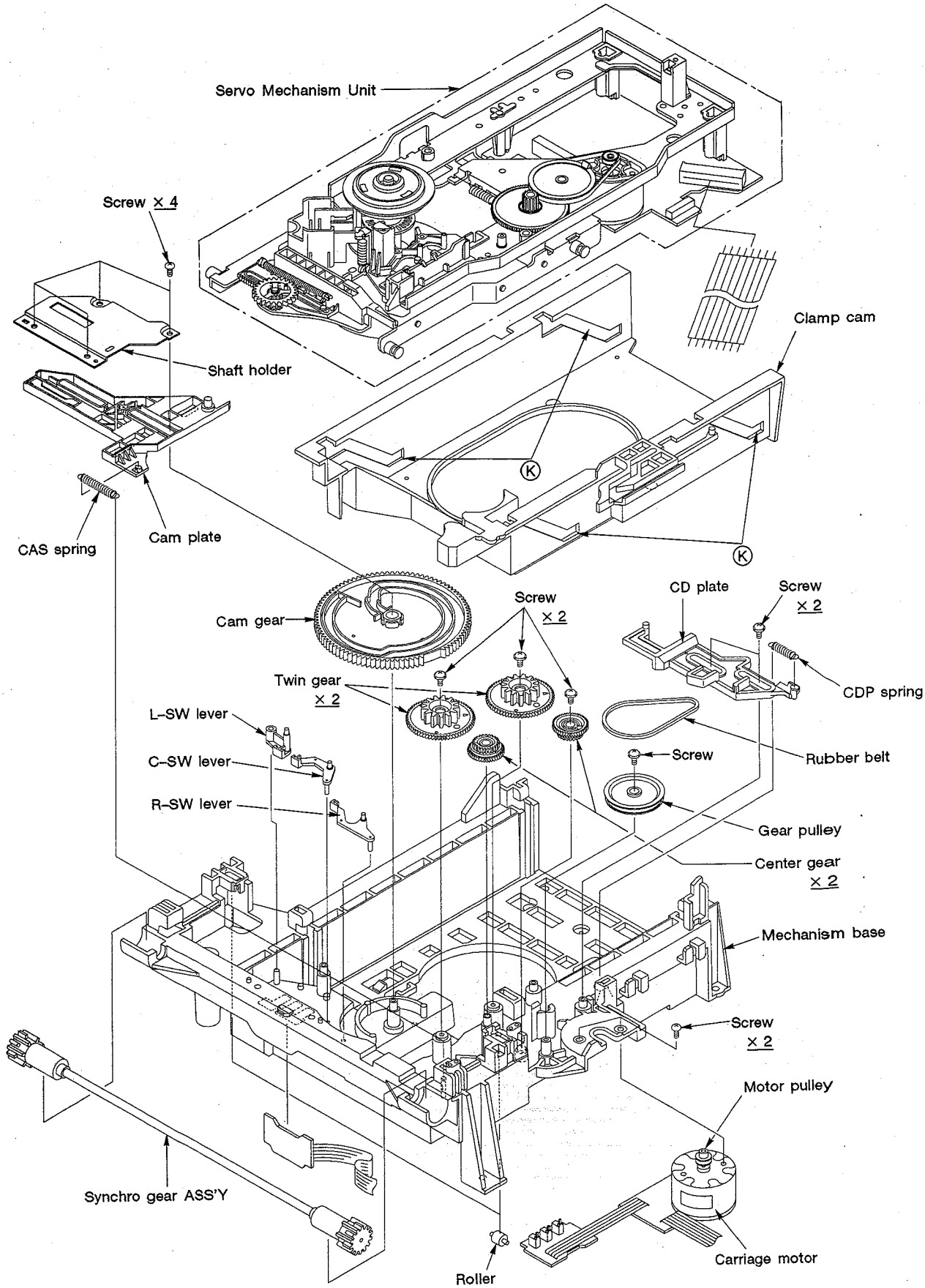


Fig. 2-2 Loading Mechanism unit

② Servo-Mechanism Unit (Refer to Fig. 2–3)

The servo-mechanism unit is mainly divided into two parts: one is related to the tilt base, while the other is related to the motor base.

The tilt base consists mainly of the following: a rack assembly which includes the pickup assembly, a carriage shaft for the guide of the rack assembly, a DC motor (shared with the loading mechanism unit) for driving the rack assembly, and various gears. Similar to the loading mechanism unit, a detection system for the pickup assembly is included through the switch circuit board assembly and is connected to the exterior of the servo-mechanism unit, together with the signal lines from the DC motor power supply and pickup assembly, via the CAMB assembly.

The motor base consists of the following: a spindle motor assembly, a tilt cam which guides the tilt operation of the tilt base, and a Y-gear which engages the loading mechanism unit with the tilt cam.

The tilt base is set on top of the motor base. Both bases are fixed with screws in every direction (up/down, left/right, and front/rear).

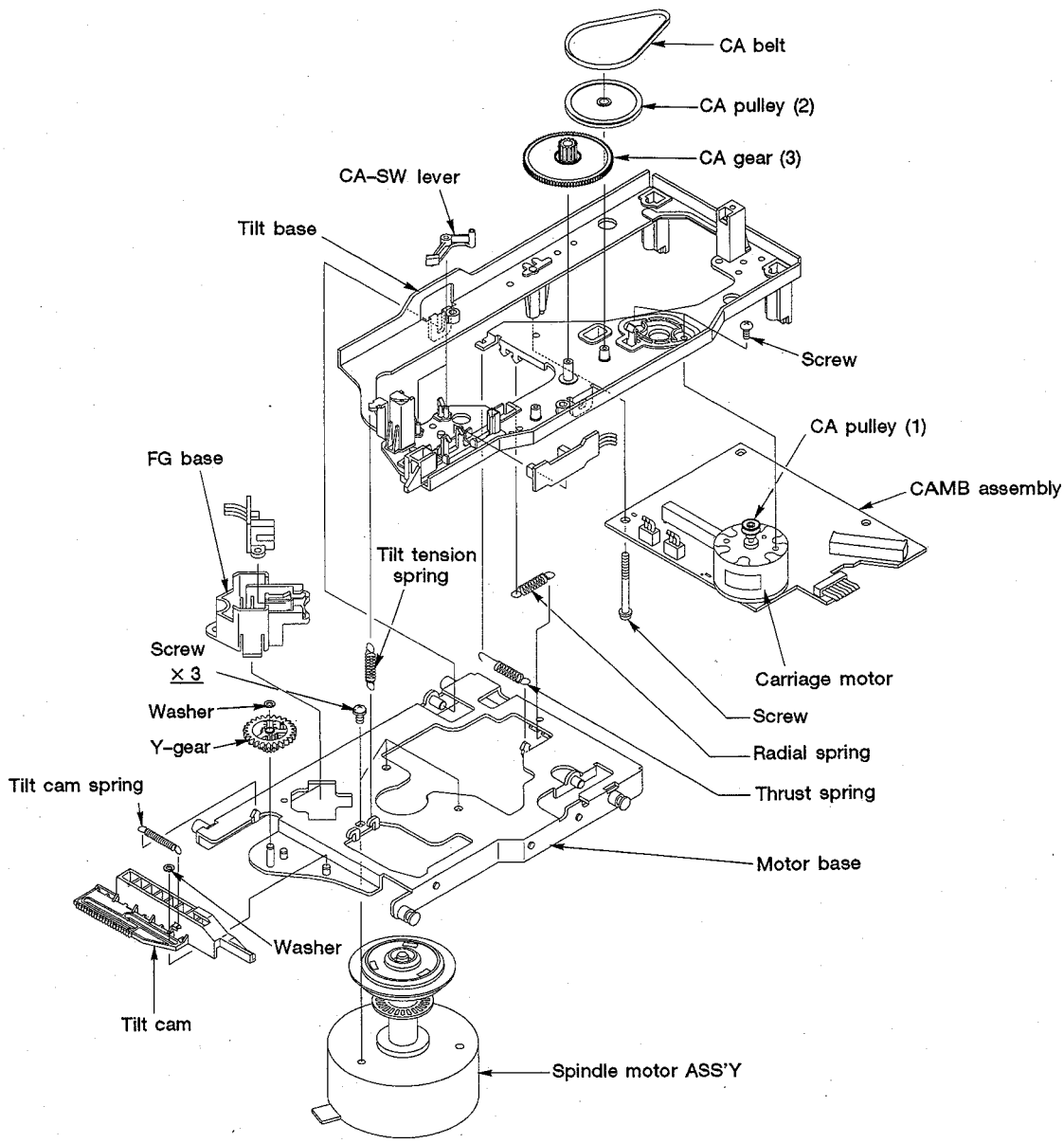


Fig. 2–3 Servo Mechanism unit

③ Tray Unit (Refer to Fig. 2–4 and Fig. 2–5)

Two guide plates (left and right) are attached on the bottom side of the LD tray. In between the guide plates is a lock plate used in CD/LD tray operation switching and a lock plate spring.

As a support system to the tray unit, two protruding portions Ⓐ (Fig. 2–5) are located on the front, left of the mechanism base, and a cam groove Ⓑ (Fig. 2–4) is located on the bottom side for the left/right movements of the LD tray. Rollers Ⓒ (Fig. 2–5) are located on the left and right of the mechanism base, and a synchro gear assembly Ⓓ exists for the up/down movements of the LD tray. The synchro gear assembly ensures left/right synchronization. As for the CD tray, a protruding rib Ⓔ (Fig. 2–4) is located on the bottom side of the LD tray for the left/right movements, while guide plates are located on the left and right of the rib for the up/down movements.

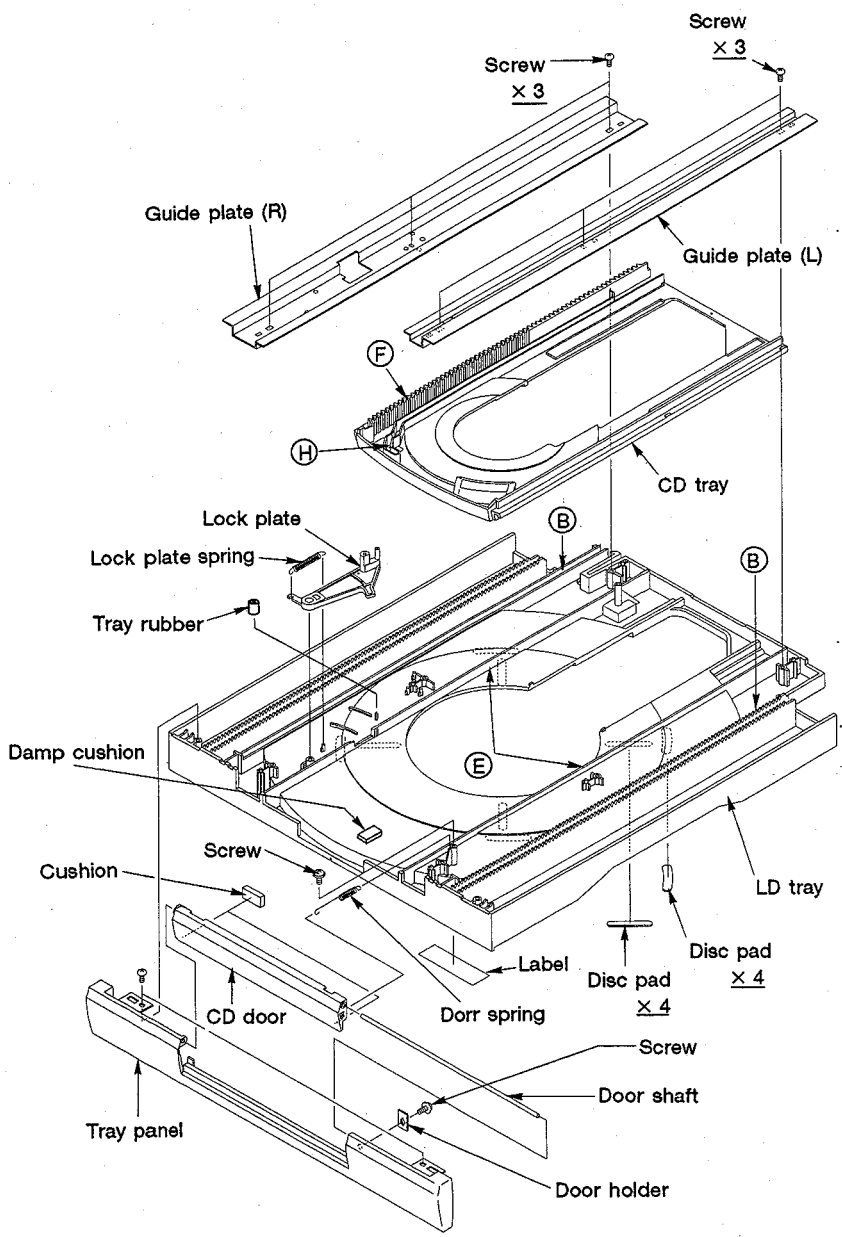


Fig. 2-4 Tray unit (Bottom view)

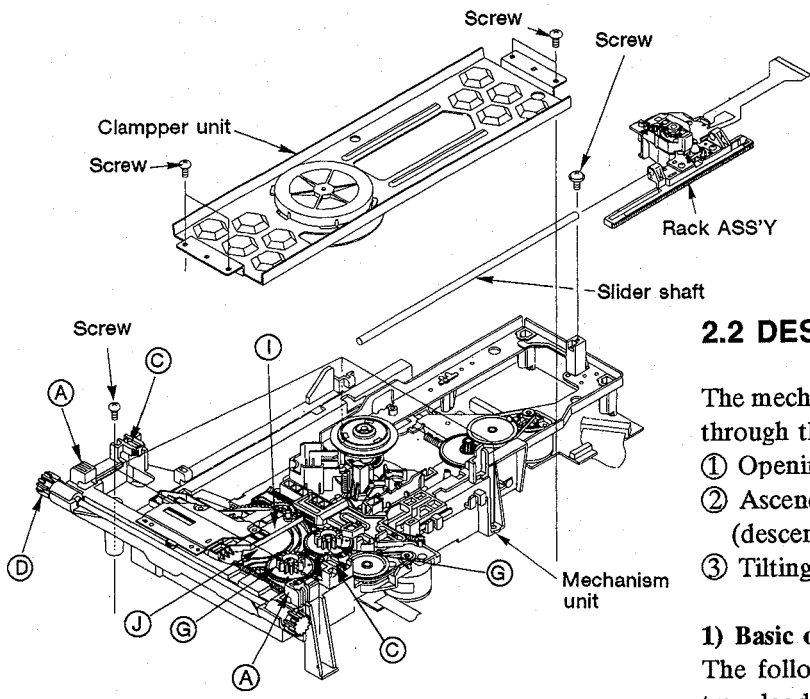


Fig. 2-5 Mechanical unit

④ Clamper Unit (Refer to Fig. 2-6)

A clamper head and three clamper springs are temporarily fixed onto the clamper. The clamper is fixed as a unit by the clamper holder via the clamper arm. The clamp is held in place by later attaching a stabilizer.

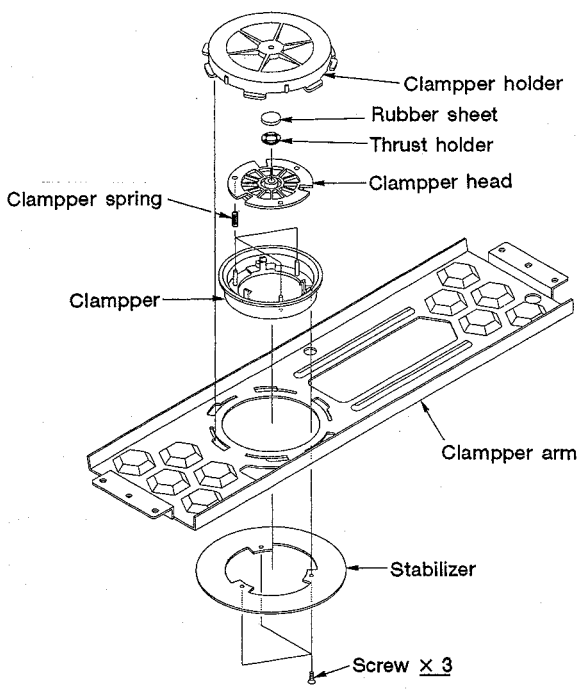


Fig. 2-6 Clampper unit

2.2 DESCRIPTION OF OPERATION

The mechanism performs the following operation modes through the loading motor:

① Opening/closing of tray unit
② Ascending/descending of servo-mechanism unit (descending: disc clamp)
③ Tilting of servo-mechanism unit

1) Basic operations

The following describes operations from ejecting the tray, loading the disc, to playback.

① Loading the Tray

While the rack gear Ⓕ (Fig. 2-4) and twin gear Ⓖ (Fig. 2-5) the bottom side of the CD tray are engaged, the cam gear Ⓙ is engaged with the twin gear Ⓖ. by moving the cam plate Ⓘ through the cam Ⓗ (Fig.2-4) on the bottom side of the CD tray. (The rack gear on the bottom side of the CD tray is separated from the twin gear.)

② Ascending of the Servo-Mechanism Unit

The clamp cam is moved towards the rear by engaging the cam and boss on the back side of the cam gear to the clamp cam (Fig. 2-7). The servo-mechanism assembly ascends through the cam Ⓚ (Fig. 2-2) on the clamp cam.

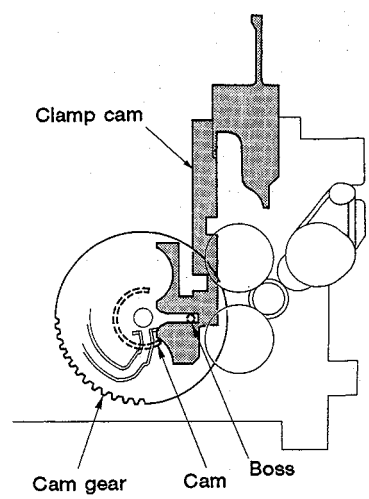


Fig. 2-7

③ Clamping the Disc
While the servo-mechanism unit is ascending, the disc on the tray is lifted and the clamper waiting on top is pushed up. Clamping force is generated (Fig. 2–6) from the force of the clamp spring between the clamper and clamper head.

④ Tilting the Servo-Mechanism Unit
The Y-gear on the motor base, from ascending of the servo-mechanism unit to clamping, and cam gear are engaged to drive the tilt cam (Fig. 2–8). Since support points from the tilt base are provided on the slanted side Ⓛ (Fig. 2–8) of the tilt cam, tilting is performed by the left/right movements of the tilt cam.

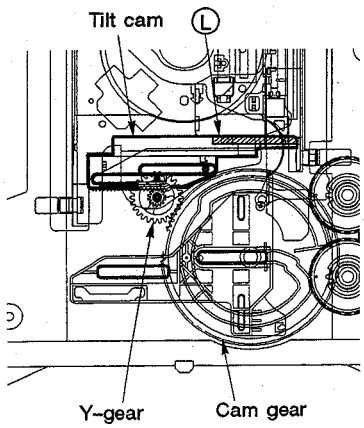


Fig. 2–8

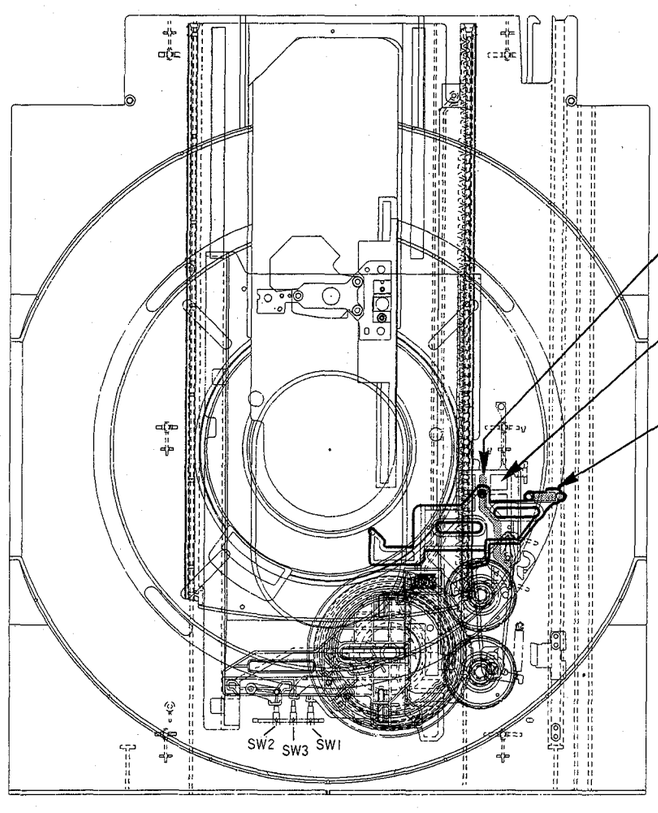
2) LD/CD Tray Identification → Eject Operations

① Selecting the LD Tray (Refer to Fig. 2–9)
To unclamp (when the servo-mechanism unit is lowered), the clamp cam moves in reverse (towards the front panel). Since the CD plate is forced to the left by the CD spring (Fig. 2–9 ⓐ), the plate is inserted in the (LD) direction of the cam on the upper right side of the clamp cam. The lock plate on the tray is turned to the left by the lock plate spring (Fig. 2–9 ⓑ) and the CD tray and LD tray become one whole unit.

② Ejecting the LD Tray → Pause (Refer to Fig. 2–9)
After the clamp cam operation, the LD tray, which has become one whole unit with the CD tray, is ejected. While the LD tray is being ejected, the pin on the bottom side of the LD tray comes in contact with the cam (Fig. 2–9 ⓒ) on the right side of the cam plate. The cam plate is then moved to the right from a specified position by the CAS spring and the switch is detected by the cam on the bottom side of the cam plate via the left switch lever.

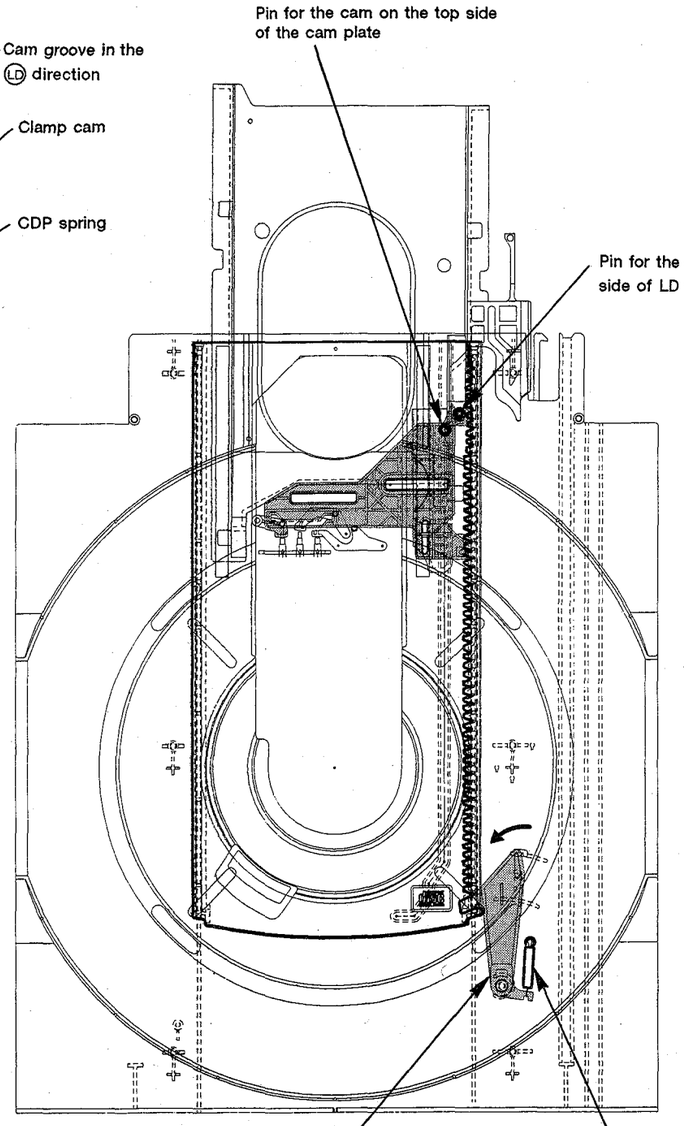
③ Selecting the CD Tray (Refer to Fig. 2–10)
Similar to "Selecting the LD tray" ①, when the CD plate is forced to the left, the rack assembly which has become one whole unit with the pickup assembly hits the lead edge of the CD plate in the CD mode (CD in playback position) and enters in the ⓒ direction of the clamp cam (Fig. 2–10 ⓐ). The lock plate is then turned to the right and the CD tray is separated from the LD tray. At the same time, the LD tray is fixed to the mechanism base by the lock plate (Figs. 2–10 ⓑ and 2–10 ⓒ).

④ Ejecting the CD Tray to Pause (Refer to Fig. 2–10)
In this case, the LD tray is fixed and only the CD tray is ejected and moved towards the front. When the CD tray has moved into the specified position Ⓐ, the cam plate is moved to the right by the cam on the bottom side of the CD tray and the switch is detected as in "Ejecting the LD tray to Pause" ② (Fig. 2–10 ⓒ and 2–10 ⓓ).



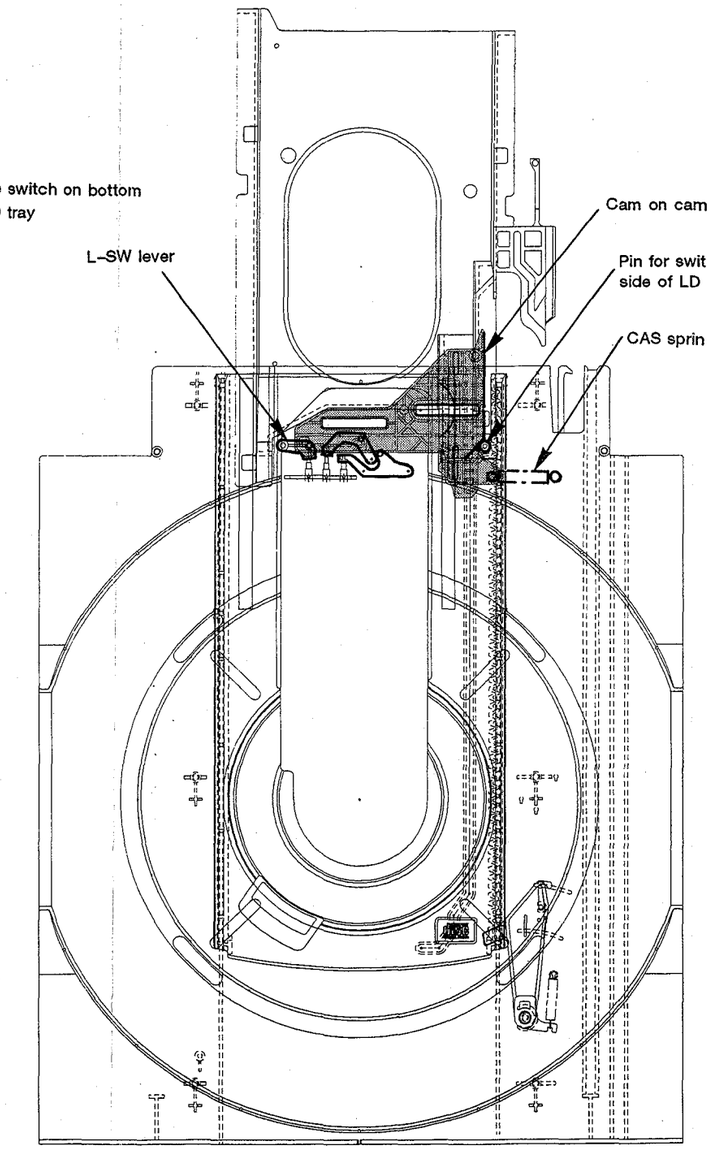
Detection of <<Tray Loading Completed>> switch
(SW1 — ON → OFF)

Fig. 2-9 ⓐ When Loading the Tray



<Tray Open Completed> switch detection check
(fixes the cam plate)

Fig. 2-9 ⓑ During EJECT



Detection of <<Tray Open Completed>> switch
(SW 3 — ON → OFF)

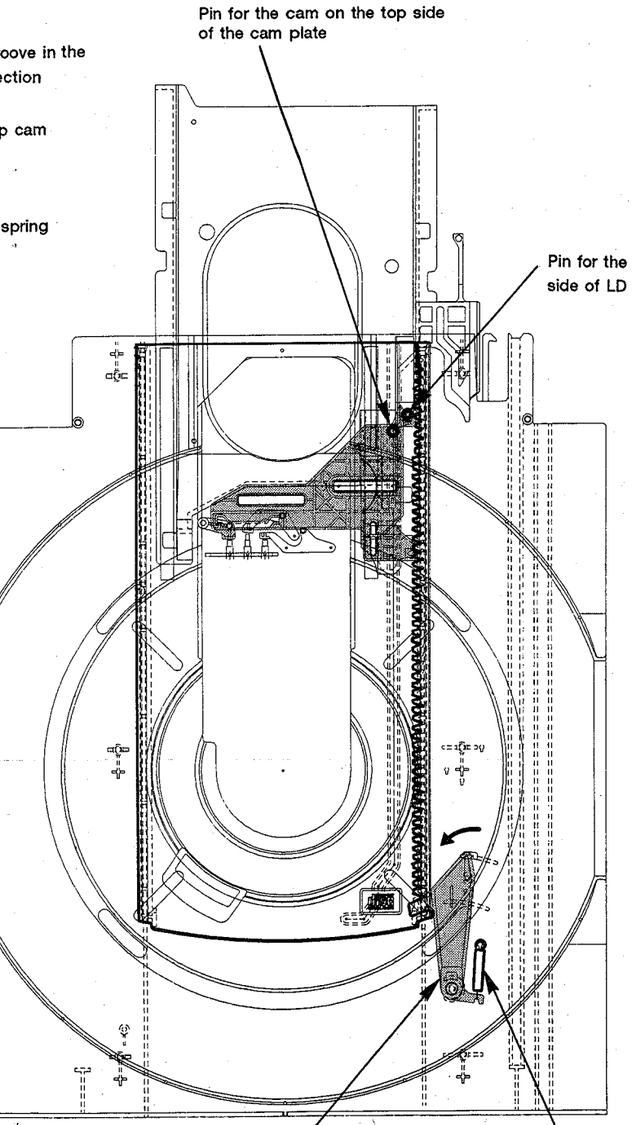
Fig. 2-9 ⓒ EJECT <Open Switch> Detection

Schematic Diagram of LD Tray Open/Close Operation

oove in the
ection

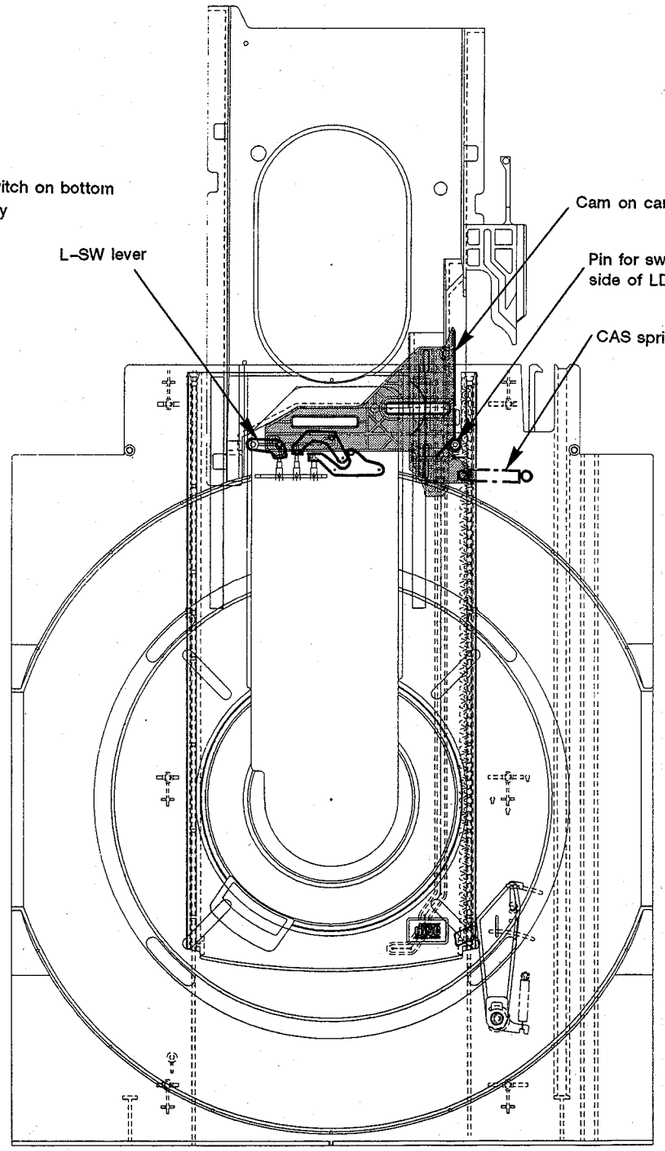
p cam

spring



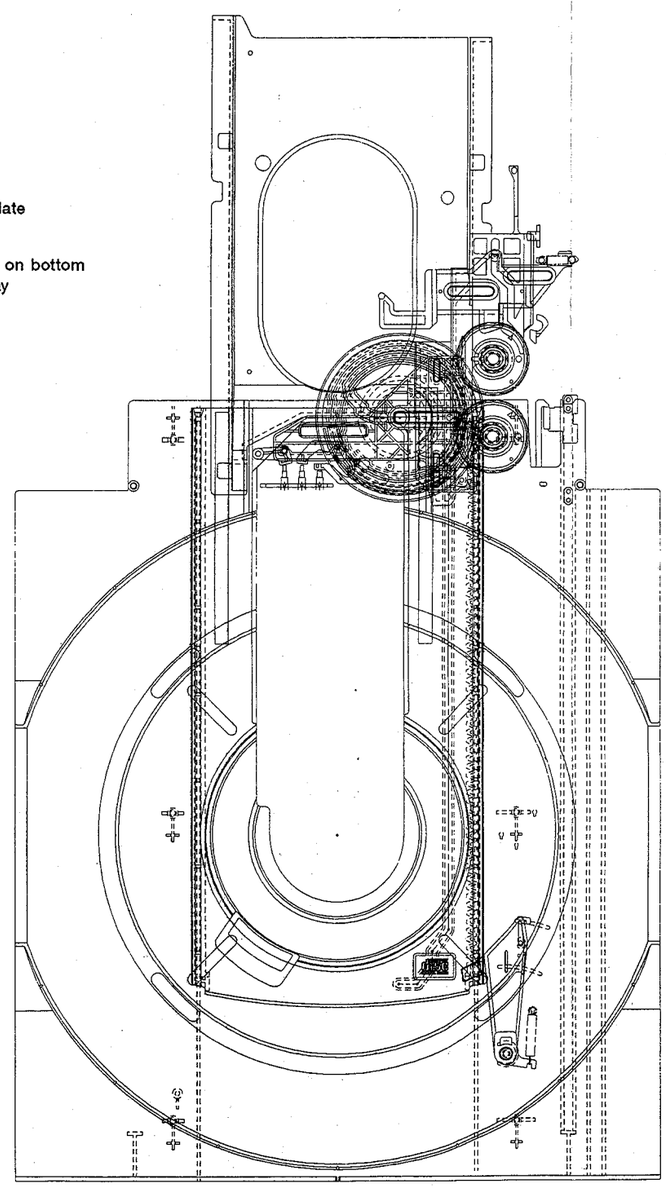
Tray Open Completed> switch detection check
ixes the cam plate)

Fig. 2-9 ⓑ During EJECT



Detection of <<Tray Open Completed>> switch
(SW 3 — ON → OFF)

Fig. 2-9 ⓒ EJECT <Open Switch> Detection



Tray stopper (cam plate END)

Fig. 2-9 ⓓ Full OPEN

Schematic Diagram of LD Tray Open/Close Operation

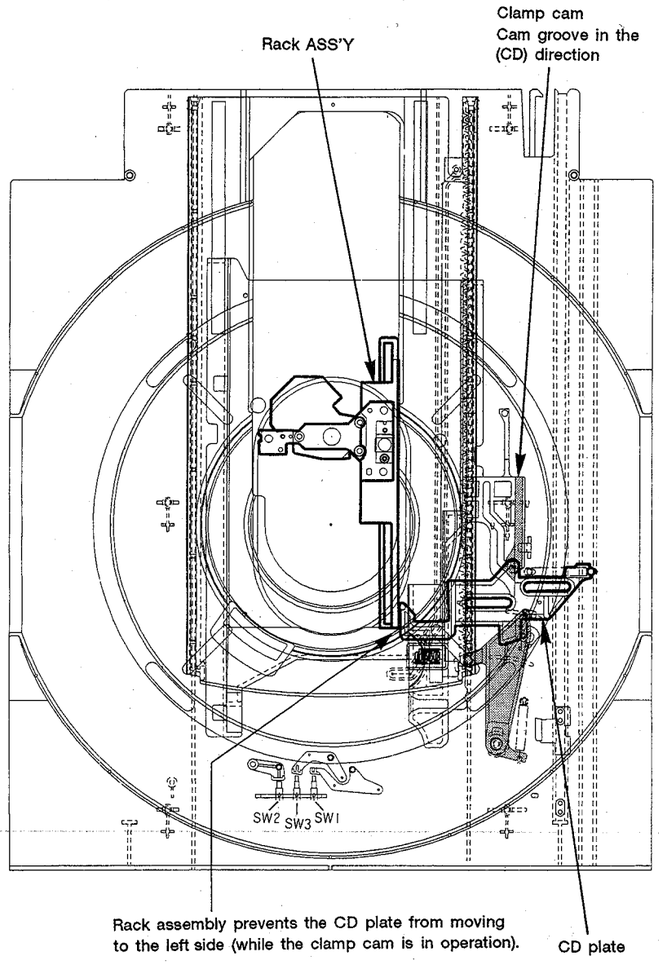


Fig. 2–10 ⓐ Detection of the CD Mode when Loading the Tray

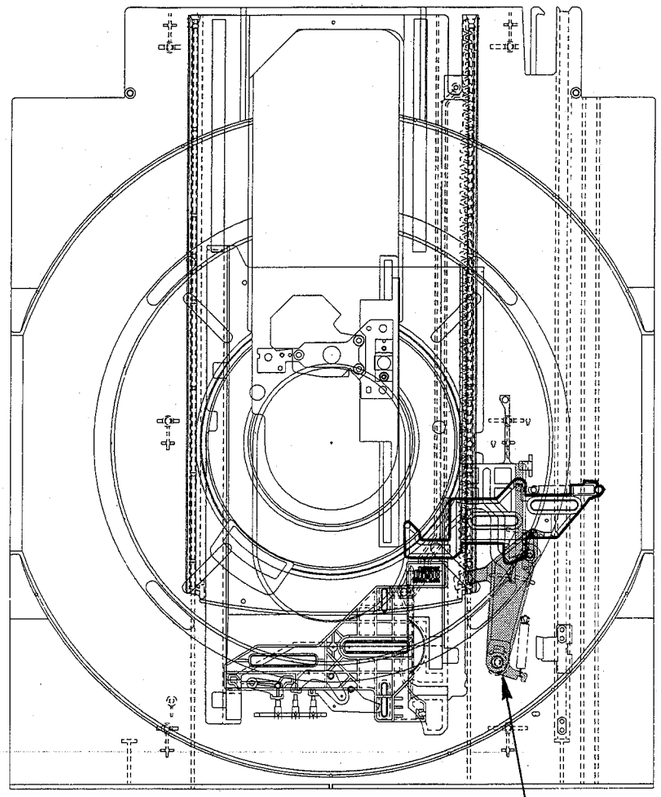


Fig. 2–10 ⓑ When Loading the Tray

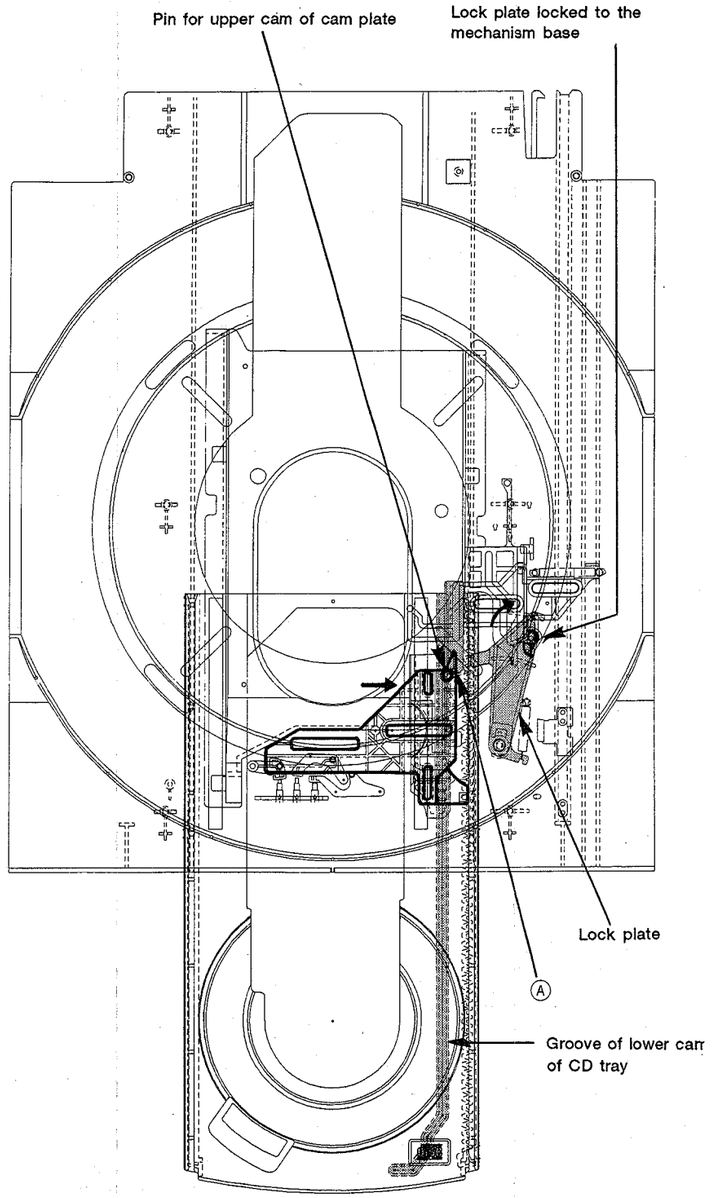


Fig. 2–10 ⓒ Detection of EJECT <OPEN SW>

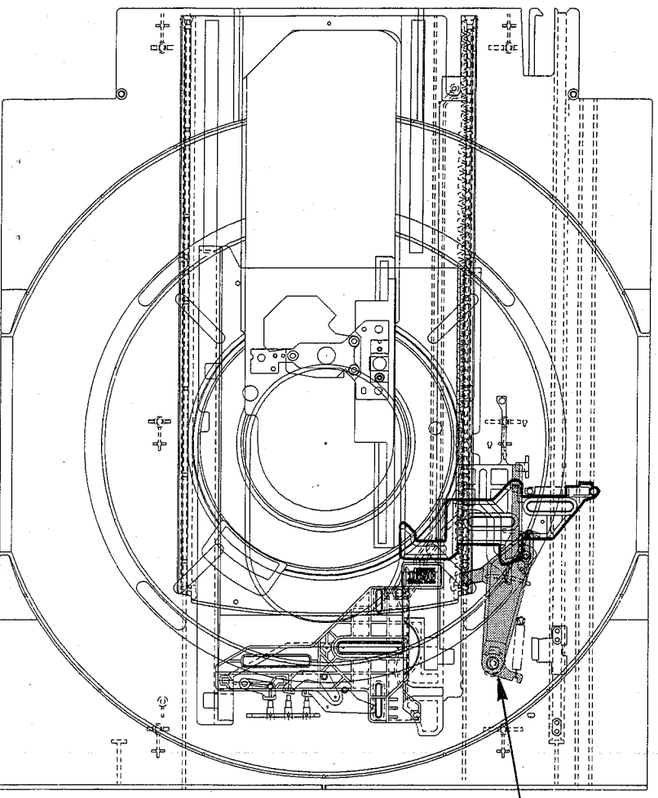


Fig. 2–10 ⓑ When Loading the Tray

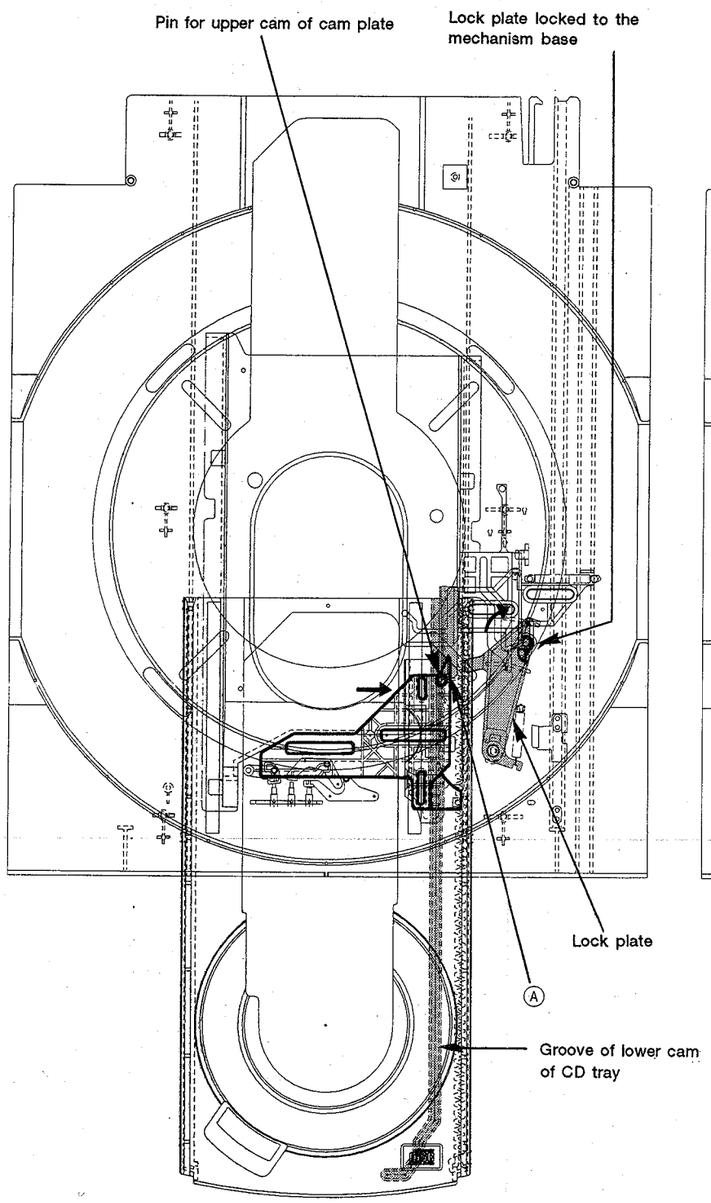


Fig. 2–10 ⓒ Detection of EJECT <OPEN SW>

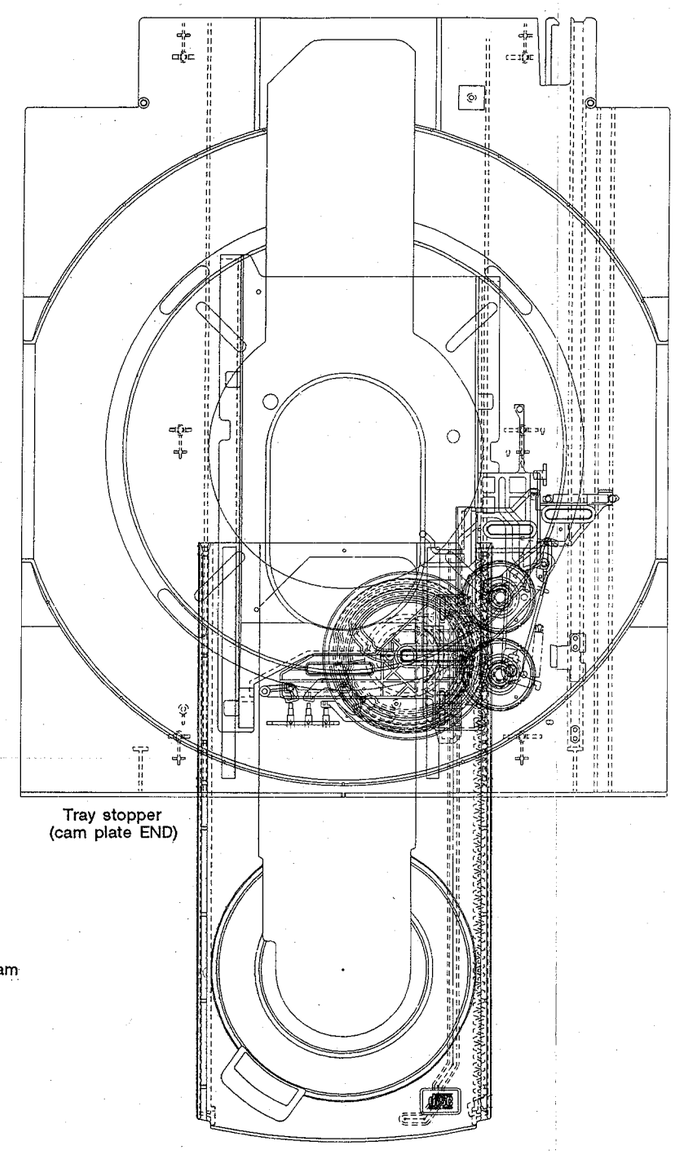


Fig. 2–10 ⓓ Full OPEN

3) Each mode of Mechanism

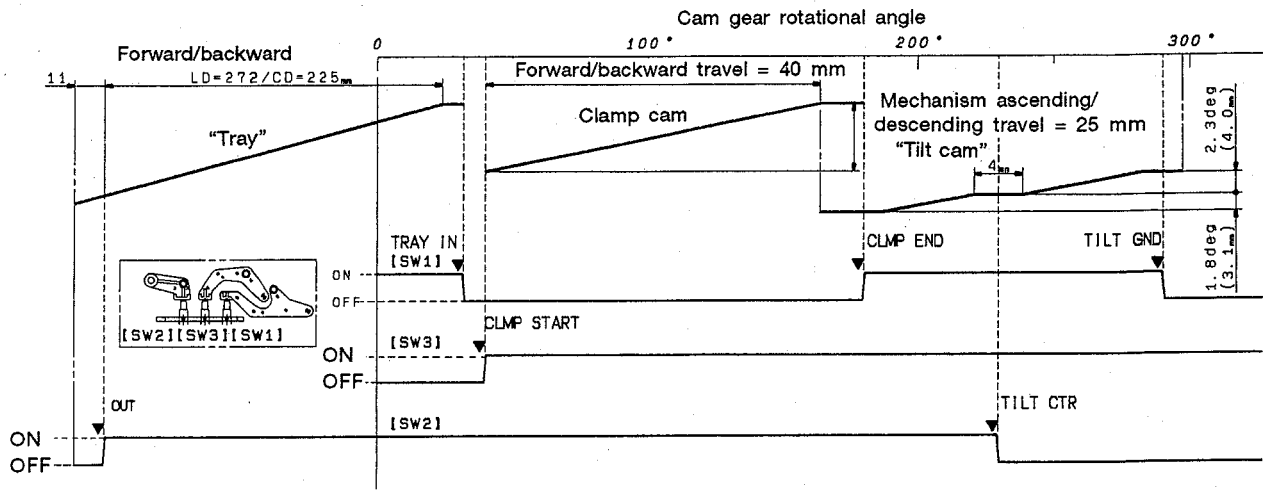


Fig. 2–11 Each mode of Mechanism

3. DESCRIPTION OF THE SYSTEM CONTROL

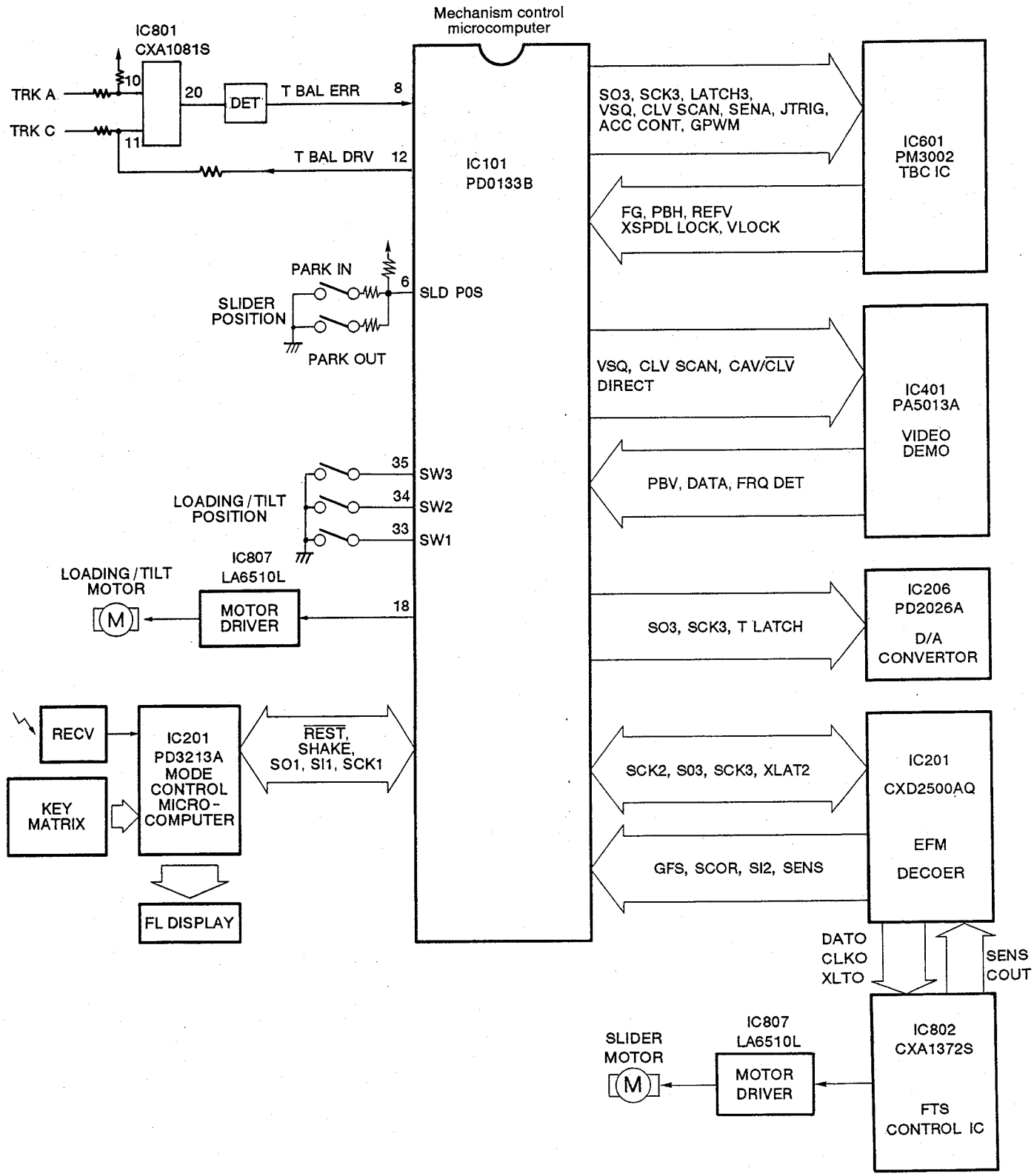


Fig. 3-1 Block diagram of the control system

3.1 MICROCOMPUTER INTERFACE

The microcomputer system of this model consists of two chips, an 8-bit microcomputer (IC101: PD0133B) which controls the mechanism and a 4-bit microcomputer (IC201: PD3213A) which controls the operations and displays.
These two microcomputers are connected via a serial interface. The communication lines are also used for controlling the character generator IC (IC405: PD0093A).

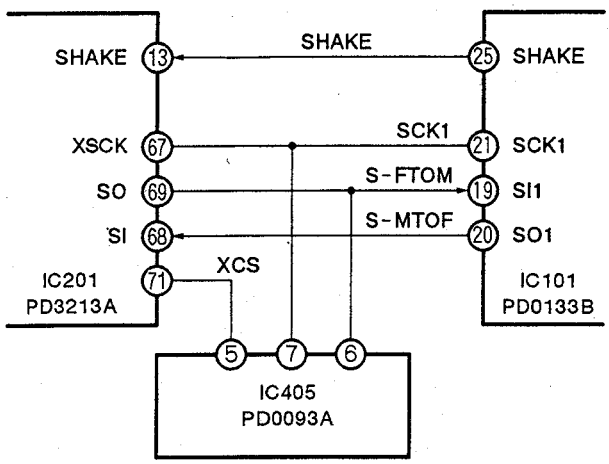


Fig. 3-2 Serial interface connection

3.2 MICROCOMPUTER COMMUNICATION SEQUENCE

1. The PD0133B sets the SHAKE terminal (pin 25) to "L" for several microseconds as a request to the PD3213A for the start of a communication.
2. When the PD3213A receives the communication start request, it sets the SHAKE terminal (pin 13) to "L" and informs the PD0133B that it is ready for communication.
3. The PD0133B then sets SCK1 (pin 21), which has been used as an input port, to output mode. The PD3213A sets XSCK (pin 67) to the input mode, connecting the communication lines between the microcomputers.
4. The PD0133B sends the transfer clock (500KHz) in 8 bits. The data are then sent and received in synchronization with this clock.
5. When PD3213A receives data of 8 bits, it sets the SHAKE terminal (pin 13) to "H" and reports that a single communication is completed.
6. The PD0133B sets SCK1 (pin 21) to input mode, and the PD3213A sets XSCK (pin 67) to output mode. The communication line is thereby disconnected and a single communication is completed.

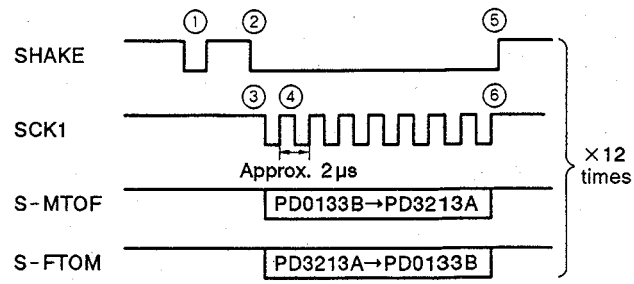


Fig. 3-3 Timing chart of the microcomputer interface

- The communication takes place within a cycle between 10 and 30 ms. Twelve bytes of data are transmitted at one time.
- The handshake is done on a single line. Both the PD0133B and the PD3213A use a single port for both input and output. The port is set to output mode when the output is "L". In other conditions, it will be set to input mode (high impedance). Before "L" is output, both ports mutually confirm that the SHAKE terminal is "H". This is to prevent signal interference between tray output signals.
- The communication data is appended with a check code to prevent transfer errors. If sixteen consecutive transfer errors are detected, the PD3213A will send the reset signal to the PD0133B to reset it to its initial state. This will also happen when the communication is not executed for 300 ms or longer.

3.3 OUTLINE OF THE MECHANISM CONTROL SYSTEM

1) Processing immediately after power ON

When power is applied, the mechanism-control micro-computer (IC101: PD0133B) will execute initialization in the following sequence upon reset cancellation (pin 28: L to H).

1. The internal RAM and ports are initialized.
2. The CXD2500AQ is initialized.
3. The tray position is detected.
4. The FTS-IC CXA1372S is initialized.
5. The TBC-IC PM3002 is initialized.
6. Communication with the PD3213A is confirmed. (If any trouble is found, the subsequent initialization procedures will not be performed.)
7. The pickup position is initialized.
8. Disc rotation stops.
9. Loading mode is initialized.

After all the initialization procedures are completed, normal operations can begin.

2) Control of the loading motor

Driving of the loading motor is controlled by a PWM signal supplied via the OP amplifier (IC807) from pin 18 of the mechanism-control CPU (IC101) in the CONT section. The voltage applied to the loading motor is switched according to the duty of the PWM signal as follows. The PWM cycle is approximately 910μsec.

- **Loading/clamp operation**

For the disc tray open/close and disc clamp and stop operations, the motor is operated while the position of the cam gear is detected by the loading/tilt-position detection switch connected to pins 33 through 35 of the IC101.

- **Tilt servo operation**

When an LD disc or a CDV disc (video portion) is played back and when a CDV disc is started up, the loading motor is used for the tilt servo. The loading motor is driven by a PWM drive in this mode as well.

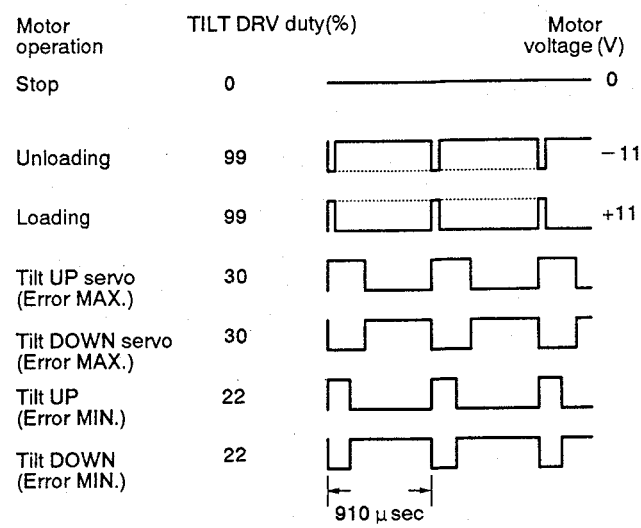


Fig. 3-4

The tilt servo operates the loading motor so that the input voltage at pin 9 (TILT ERR) of the IC101 becomes 2.5 V.

The tilt servo operates in the following ranges during normal playback.

CAV disc (12-inch) : Frames 0 – 40999
(8-inch) : Frames 0 – 16999
CLV disc (12-inch) : 0 min. – 44 min. 59 sec.
(8-inch) : 0 min. – 13 min. 59 sec.
CDV disc (video portion) : 0 min. 0 sec. – (Recording time – 1 min. 23 sec.)
CD disc : The tilt servo is ON only at start-up.

If some trouble occurs with the disc or tilt sensor circuit which prevents the input voltage at the TILT terminal from being within the specified range even if the pickup inclines to more than ±2° (degrees), the loading motor will be stopped upon detection of the state of the mechanism switch.

The tilt servo switches the duty of the PWM signal in 2 levels according to the error value. When the error value is small (1.25 V – 3.75 V), a PWM signal for small duty 22% is output, and when the error value is large (0 V – 1.25 V, 3.75 – 5 V), a PWM signal for large duty 30% is output. (See Fig. 3-4.)

• Automatic tracking balance operation

The tracking balance error signal is obtained firstly by detecting the waves, for both the top and bottom sides at the time of TRK open, of the tracking error signals output from CXA10815 (IC801 ⑳ pin) then by adding them. This error signal, after being smoothened and level-converted, is input as the TBAL ERR into the IC101 (8) pin. After the duty pulse, that is based upon this error is output from the IC101 (12) pin and smoothened, it is then added to the IC801 (11) pin TRK C side so that the tracking balance becomes 0V center. Every time a disc is started up the tracking balance is obtained in between the tracking open distance and then maintains the voltage thereafter. It always operates at the time of tracking open in the test mode.

3) Slider motor control

The mechanism-control IC (IC101) controls the drive signal output from pin 20 of the FTS servo IC CXA1372S (IC802) by the serial command.

The voltage applied to the slider motor is switched according to the duty of the PWM signal as follows. The PWM cycle is 36mS.

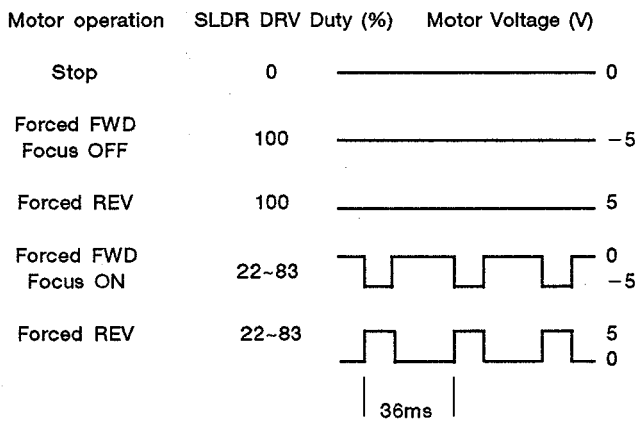


Fig. 3-5

4) Audio control

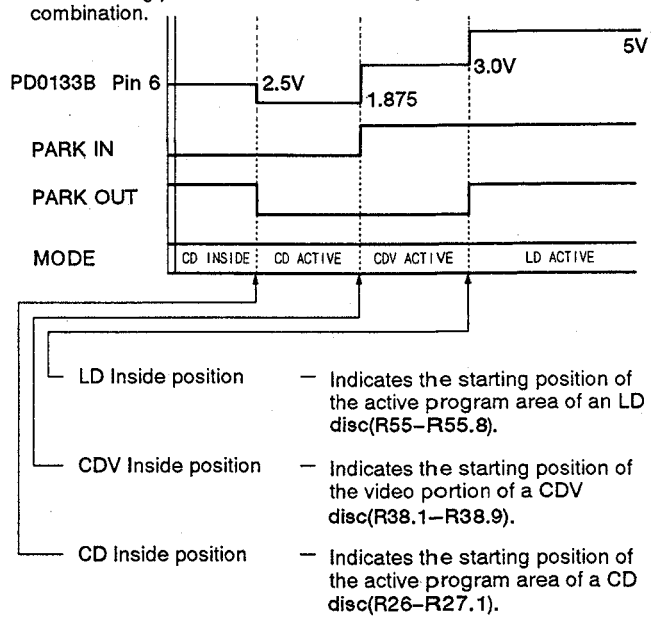
Digital audio channel switching is performed by the CXD2500AQ by using a command from the microcomputer.

DIGITAL 45	SQ1 14	SQ2 13	L-ch Line Out	R-ch Line Out
L	L	L	Analog L ch	Analog R ch
	H	L	Analog L ch	Analog L ch
	L	H	Analog R ch	Analog R ch
	H	H	Mute	Mute
H	L	L	Digital L ch	Digital R ch
			Digital L ch	Digital L ch
			Digital R ch	Digital R ch
			Digital – 12dB-L	Digital – 12dB-L

Table 3-1

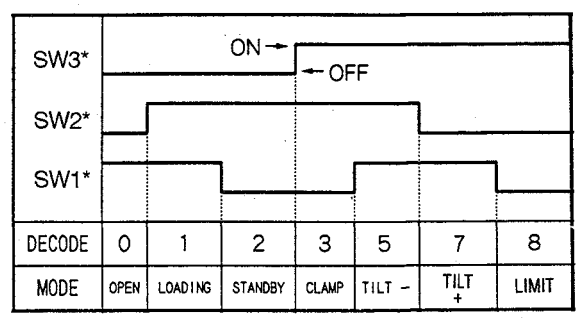
• SLDR POSITION

* The following positions can be detected by using two switches in combination.



R:The distance from the center of the spindle motor.

Fig. 3-6



*For the places where SW1 – SW3 are attached, refer to Figure 2-10 (a).

Fig. 3-7 LOADING / TILT POSITION

5) Direct CD Mode

When the direct CD switch is turned ON for CD playback, the following operations are performed (controlled by a microcomputer).

1. The power supply to the video system which is not required for CD playback is turned OFF. (No picture is obtained.)
2. The self-illuminating switch lights, and direct CD mode is activated.
3. The slider changes its park position for starting up a CD.
4. If the tray is in the closed condition, the CD tray will also open when the tray opens.

With these operations, the time required from the pressing of the PLAY button to the start of the CD playback can be shortened to 2/3. In addition, purer audio playback is possible by turning off the unnecessary power supply.
Direct CD mode cannot be activated in LD playback or when an LD is set.
When LD playback is started in direct CD mode, the mode is automatically canceled to enable normal LD play back. Direct CD mode can be selected in playing back the video portion as well as the audio portion of the CDV disk.

Disc	Direct CD	Video System Power	Tray Open
CD	ON	OFF	CD Tray
CD	OFF	ON	LD Tray
LD	OFF	ON	LD Tray
CDV video portion	OFF	ON	LD Tray
CDV video portion	ON	ON	CD Tray
CDV audio portion	ON	OFF	CD Tray
CDV audio portion	OFF	ON	LD Tray

Table 3–2

6) CLV Clear Scan

Clear scan without picture distortion is possible also for CLV discs by using the shuttle ring (either on the player or the remote control unit).

The conventional color-lock scan and the clear scan can be switched depending on the angle of the shuttle ring rotation. In a clear-scan operation, scanning is performed while outputting digital audio at −12 dB (the same as scanning on CD). (No audio is output when analog audio is selected.)

The principle of the operation is as follows.

1. When clear scan mode is activated, the specified number of tracks is skipped in a multitrack jump operation.
2. Measures the time lag (phase difference) between PB − V and REF − V and when the measured value is within a certain range, decreases REF − H by 7 H until the phase difference between PB − V and REF − V is lost (VLOCK), then cancels squelch, displaying the video portion of the disc for a certain period. Returns to step 1 and repeats steps 1 and 2.

When the time lag between PB − V and REF − V exceeds a certain range, performs a 1-track jump (2-track jump in the REV direction) and measures the lag again. When the measured value is within a certain range, decreases REF − H by 7 H waiting for VLOCK between PB − V and REF − V. Otherwise, repeats a 1-track jump and time-lag measurement.

If the time lag does not enter a certain range even after repeating the 1-track jump and time-lag measurement operation three times, a multitrack jump is performed for a larger skip and is repeated step 2 from the beginning.

If the lag persists in not entering a certain range, VLOCK wait state is activated.

* Gray-background video is output when no disc video is supplied.
* Digital audio to be played during clear scan is output while the disc video is being supplied and in VLOCK wait state.
* For CAV discs, nearly the same operation is performed.
* PB − V (playback V) means V − sync of the playback video signal.
* REF − V (reference V) means V − sync used as the reference.
* VLOCK means the signal generated when the PB − V and REF − V are in a certain range.

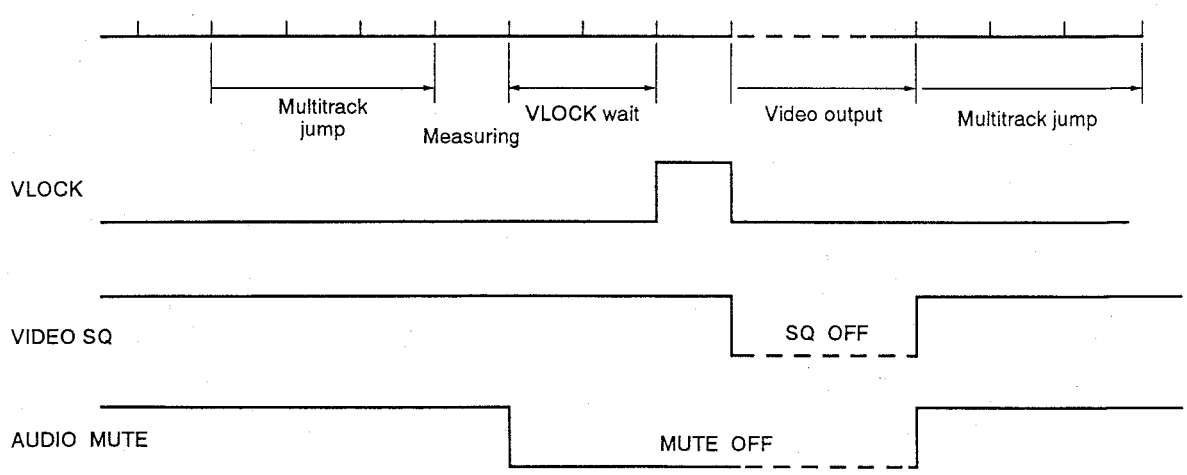
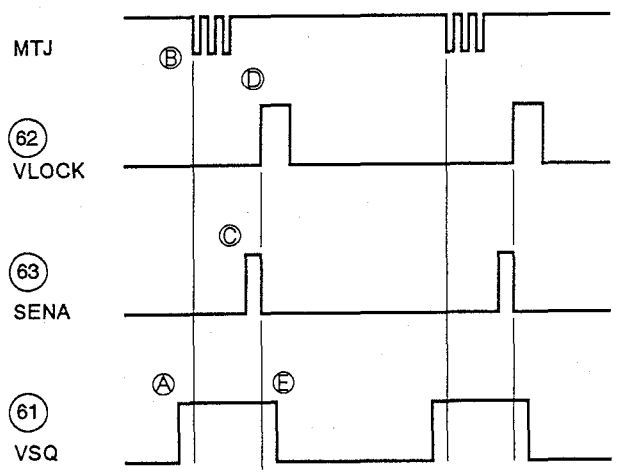


Fig. 3-8

● Timing Chart of the Clear Scan

CAV

32 × 2 × 3 jump



The audio mute signal is applied at the same time with VSQ but is canceled before VSQ is canceled.

- Ⓐ :Activates video squelch.
- Ⓑ :Executes a multitrack jump 32 × 2 × 3.
- Ⓒ :Decreases Reference H to match the playback V-sync phase and the reference V-sync phase. Shift enable (SENA)ON.
- Ⓓ :As the phases have matched (VLOCK).
- Ⓔ :Cancels video squelch and plays the disc for a certain time.

CLV

Compared with CAV, a longer time is required to match the phases after a jump operation. Ⓒ

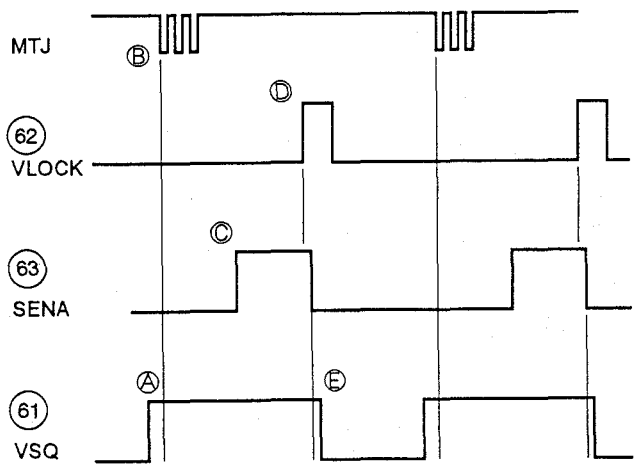
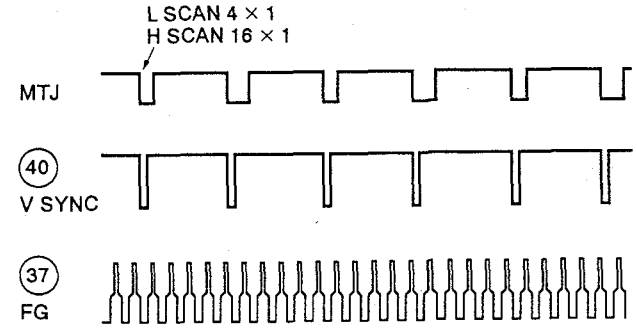


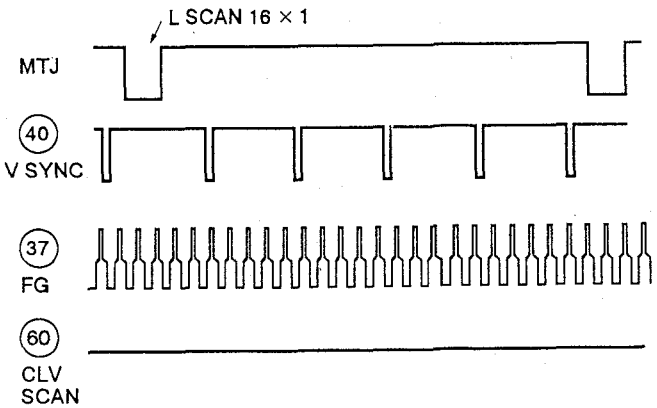
Fig. 3-9

● Timing Chart of the Normal Scan

CAV Performs a multitrack jump in synchronization with the playback V SYNC.



CLV Performs a multitrack jump in synchronization with FG.



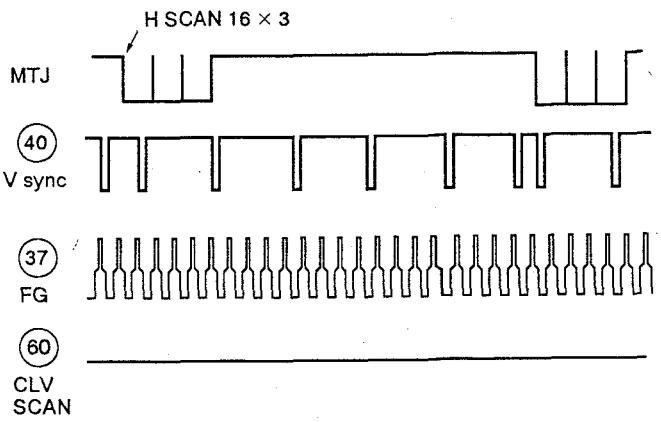


Fig. 3-10

7) Description of the Mechanism-control IC (IC101: PD0133B)

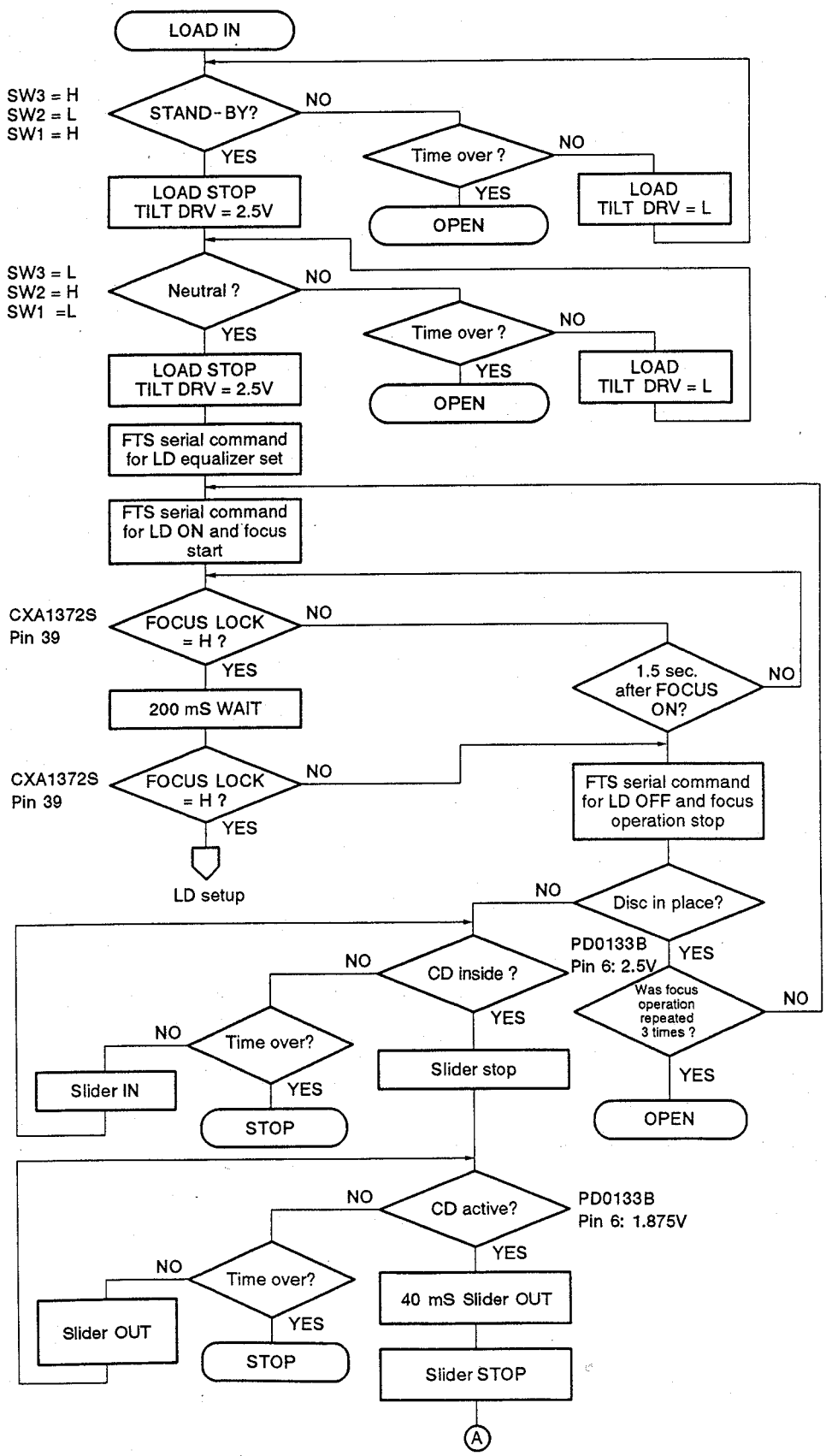
No.	Pin name	I/O	Function
1	VCC	–	Power supply connection pin. Set to 5 V ±10%.
2	DIRECT	O	CD DIRECT video system power OFF signal output pin "H" = video system power OFF, "L" = ON
3	CAV/XCLV	O	CAV/CLV switching signal output pin "H" = CAV, "L" = CLV Connected to Pin 6 of PA5013A and used as a VIDEO NR switching signal.
4	XLD ON	O	Laser video ON/OFF switching signal output L: ON, H: OFF
5	TGH	O	Tracking operation control signal output pin The control signal supports ON/OFF of the tracking servo-mechanism operation. "H" = OFF, "L" = ON
6	SLDR POS	I	Pick-up position detection switch input pin (analog signal) Divides the resistance among the switches, reads the value of the A/D input, and detects the position.
7	FREQ DET	I	RF detection signal input pin (analog signal) Inputs the A/D conversion of the RF detection output and is used in the spindle luff servo-mechanism. Voltage and frequency are proportional.
8	TBAL ERR	I	Tracking balance error signal input pin (analog signal) Signal is A/D converted and is input as the tracking offset control.
9	TILT ERR	I	Tilt sensor output signal input pin (analog signal) Inputs (0 to 5 V) the tilt sensor output amplified to a 40 to 50 dB signal. The signal is A/D converted and is input as the tilt sensor control. Controls the tilt motor until the signal is 2.5 V.
10	XREF-V	I	Clear scan reference V-SYNC signal input pin
11	GFS	I	CD (EFM signal) frame lock signal input pin Connected to Pin 12 of the EFM decoder IC: CXD2500AQ. "H" = Lock, "L" = Unlock GFS is an abbreviation for Good Frame Sync.
12	TBAL DRV	O	Tracking offset control signal output pin Outputs the tracking offset after PWM and is used in auto tracking offset. Cycle: 910 µsec; 3-value control H, L, Z.
13	SQ2	O	Analog audio switching signal output pin 2/R Squelch: H
14	SQ1	O	Analog audio switching signal output pin 1/L Squelch: H When in digital audio mode, the signal is output through the control of the EFM decoder IC: CXD2500AQ.
15	SI2	I	EFM decoder IC: CXD2500AQ subcode input pin Reads the subcodes of SCK2 and the signal.
16	XLAT2	O	EFM decoder IC: CXD2500AQ control latch signal output pin Sends the control command using SO3 and 2500CLK.
17	SCK2	O	EFM decoder IC: CXD2500AQ subcode read clock signal output pin Sets the clock to 96 and reads the subcode.

No.	Pin name	I/O	Function
18	TILT/ LOAD DRV	O	Loading and tilt control signal output pin Output in PWM format to control loading and tilt servo-mechanism.
19	S-FTOM	I	Input pin of data from the mode control IC Serial Used with the data signal to the carriage generating IC.
20	S-MTOF	O	Serial data output to the mode control IC Serial
21	SCK1	I/O	Clock for serial communication with the mode control IC In the input mode except during serial communication with the mode control IC Used with the clock signal to the carriage generating IC
22	SENS	I	SENS signal input pin All of the following signals from 2500 are switched and are output to the signal: SEIN, FZC, A.S, TZC, XBUSY, FOK, GFS, COMP, COUT, and OV64.
23	SCOR	I	Subcode SYNC signal input pin Inputs the subcode signal from the EFM decoder IC: CXD2500AQ when the signal is "H." Supervises the disc playback depending on the presence of the signal.
24	XCX	O	Analog audio CX noise reduction switching signal output pin ON: L, OFF: H
25	SHAKE	I/O	Pin of hand shake signal for data communication with the mode control IC This pin is a bi-directional data path which sends the data transfer timing through the I/O mode switching of the respective microcomputers.
26	XPBV	I	LD/CDV playback V-SYNC signal input pin IC basically operates in sync hronization (rising and leading edges) with the signal. Setting the signal as standard in the special CAV playback mode, generates jump timing. "L"= V-SYNC ongoing
27	CN VSS	–	GND for A/D conversion
28	XRESET	I	Reset signal input pin "L" = Reset, "H" = Cancel reset
29	XTAL IN	I	9 MHz clock generation input pin
30	XTAL OUT	O	9 MHz clock generation output pin
31	N. C.	O	Not used
32	VSS	–	GND
33	SW1	I	Loading/tilt position detection switch input pin
34	SW2	I	Loading/tilt position detection switch input pin
35	SW3	I	Loading/tilt position detection switch input pin
36	N.C.	I	Not used Processing needed when used for input
37	FG	I	Spindle motor-FG signal input pin 24 pulses per signal Divided into thirds and used inside the microcomputer.
38	DATA	I	Input pin for Philips code decoder in the mechanism controller
39	XPBH	I	Playback H-SYNC input for Philips code decoder
40	XPBV	I	Playback V-SYNC input for Philips code decoder

No.	Pin name	I/O	Function
41	GI. MIRR	O	False MIRR signal output pin to jump 1 track for LD.
42	N.C.	–	Not used
43	N.C.	–	Not used
44	MUTE	O	Audio system audio mute control output pin "H" = MUTE ON, "L" = MUTE OFF
45	XANA	O	Digital/analog audio switching signal output pin "H" = digital, "L" = analog Signals output by the line out and headphone are switched by the signal.
46	XT LATCH	O	DAC & Digital PD2026 serial control latch signal output pin
47	N.C.	–	Not used
48	N.C.	–	Not used
49	N.C.	–	Not used
50	2500CLK	O	2500 command clock signal output pin The commands for 2500 are the following: 2500CLK; SO3 and XLAT2.
51	RFCORR	O	RF correction switching signal output pin "H" = gain up. Increases gain (#8000 to #8100) within the CAV.
52	SCAN CONT	O	TBC control signal output pin H: multi-track jump ongoing, L: others
53	CD	O	CD/LD switching signal output pin H: CD, CDV-A, L: LD, CDV-V
54	ACC CONT	O	Spindle acceleration signal output pin H= acceleration, L= deceleration, Z= CD, stop, and play
55	GPWM	O	Spindle gain switching duty pulse signal output pin CLV inner circumference: L, outer circumference: H, CAV: L, CDV: H
56	J.TRIG	O	Track jump signal output pin Used for single track jump H: start of track, L: others, Width of "H": approx. 20 µsec
57	SCK3	O	Serial 3 clock signal output pin Reads the leading edge "H" = within 2 µsec, "L" = within 20 µsec
58	SO3	O	Serial 3 data signal output pin With the serial signal as the common signal, divides the signals into three types of latch signals (XLAT3, XLAT2, and XT LATCH). LSB first
59	XLATCH3	O	Spindle servo-mechanism IC latch signal output pin
60	CLV SCAN	O	CLV V-SYNC scan mode signal output pin
61	VSQ	O	Video output switching signal output pin "H" = squelch, "L" = playback video
62	VLOCK	I	V-SYNC lock detection signal input pin. Is used in CLV clear scan and is set to "H" for a period of time if the REF-V is in phase with PBV.
63	SENA	O	Shift enable signal output pin. Is used in CLV clear scan. Thinning out H, is set to "H" while REF-V approaches PBV.
64	XSLOCK	I	Spindle lock signal input pin L: lock, H: unlock

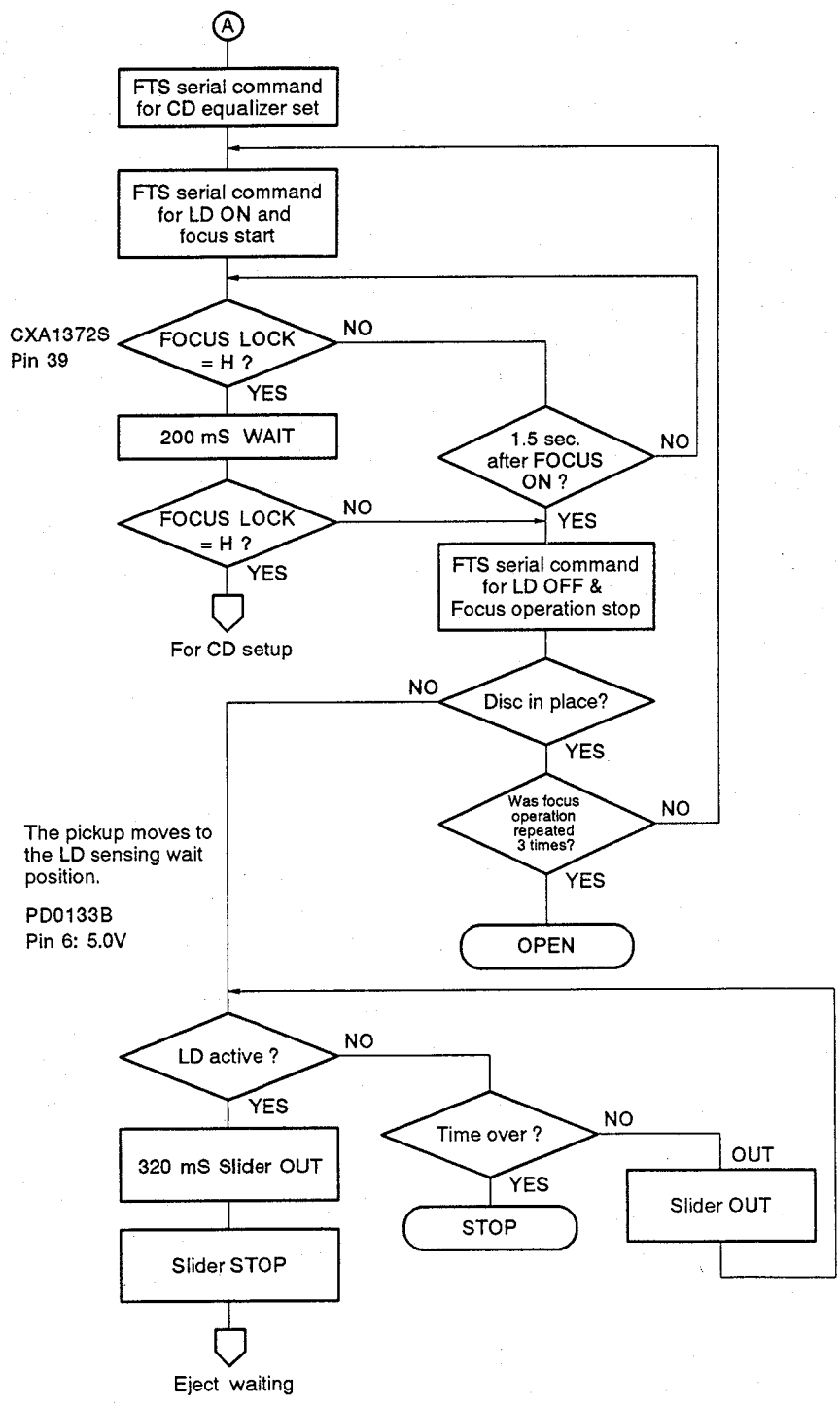
3.4 FLOW CHARTS OF VARIOUS OPERATIONS

Flow from the tray-opening to tray-IN operations



- From the state that the tray is open to the completion of the tray-IN operation.
- If the loading operation does not enter the stand-by position with in five seconds, it is judged as an abnormal condition, and the tray opens.
- Clamp operation
  Timer = 10 seconds
- Pickup position in LD focusing ≒ around R65
  R:Distance from the center of the spindle motor.
- Judged as "Disc in place" when FOCUS LOCK becomes "L" during focus sweeping.
- If the focus is not locked even if focus sweeping is repeated three times with the disc in place, the tray opens, judging it to be an abnormal condition.
- Slider operation limit timer ≒ approx. 10 seconds.
- If the slider operation is not completed within a certain time, the operation stops and any key other than OPEN is not accepted.

Fig. 3-11



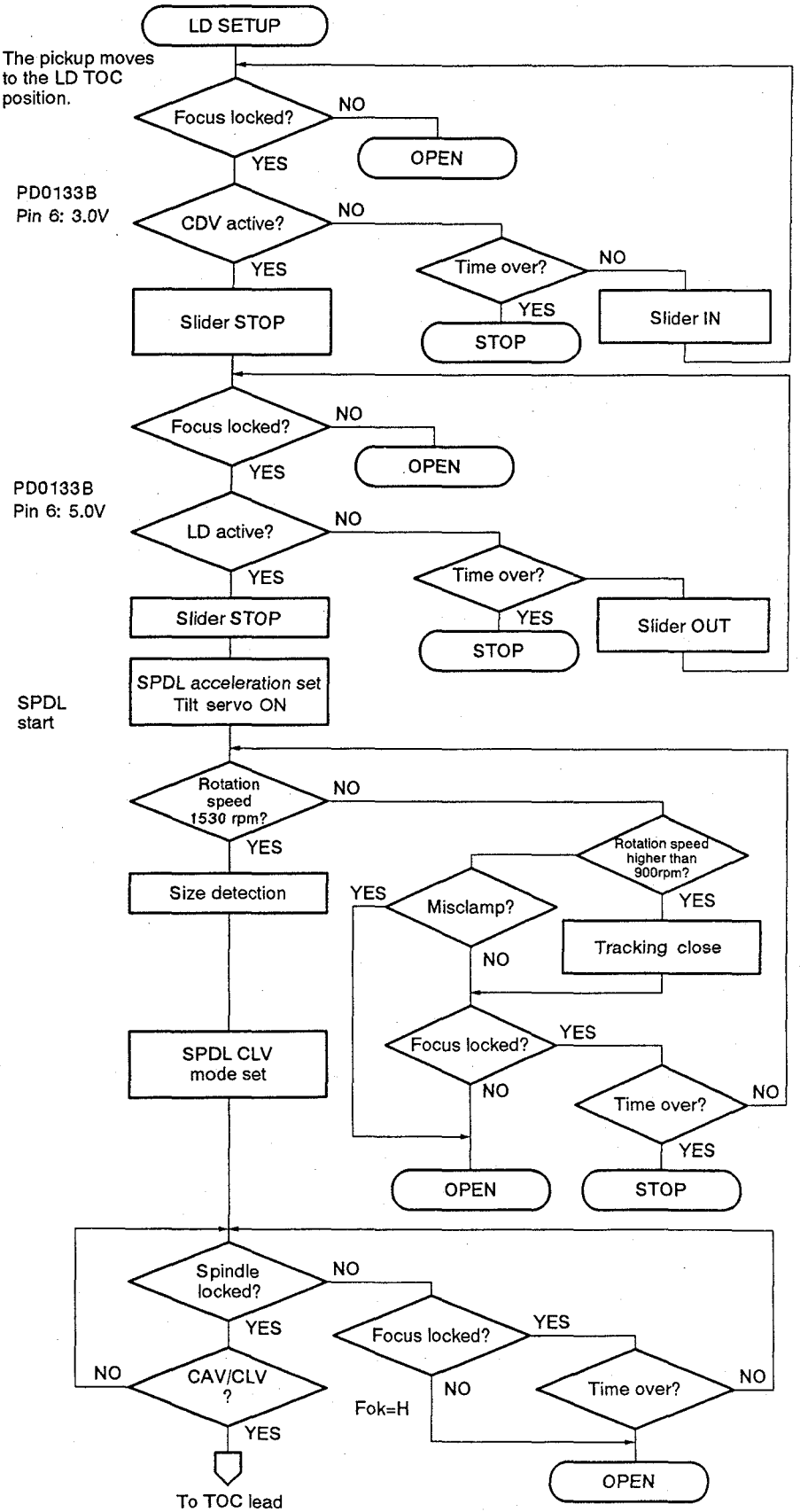
- Pickup position for CD focusing ≒ R30
- CD focusing is the same as LD focusing.
  R:Distance from the center of the spindle motor.

- R65, the LD sensing position
  R:Distance from the center of the spindle motor.

- Timer for 10 seconds
  Timer indicates the time over.

Fig. 3-12

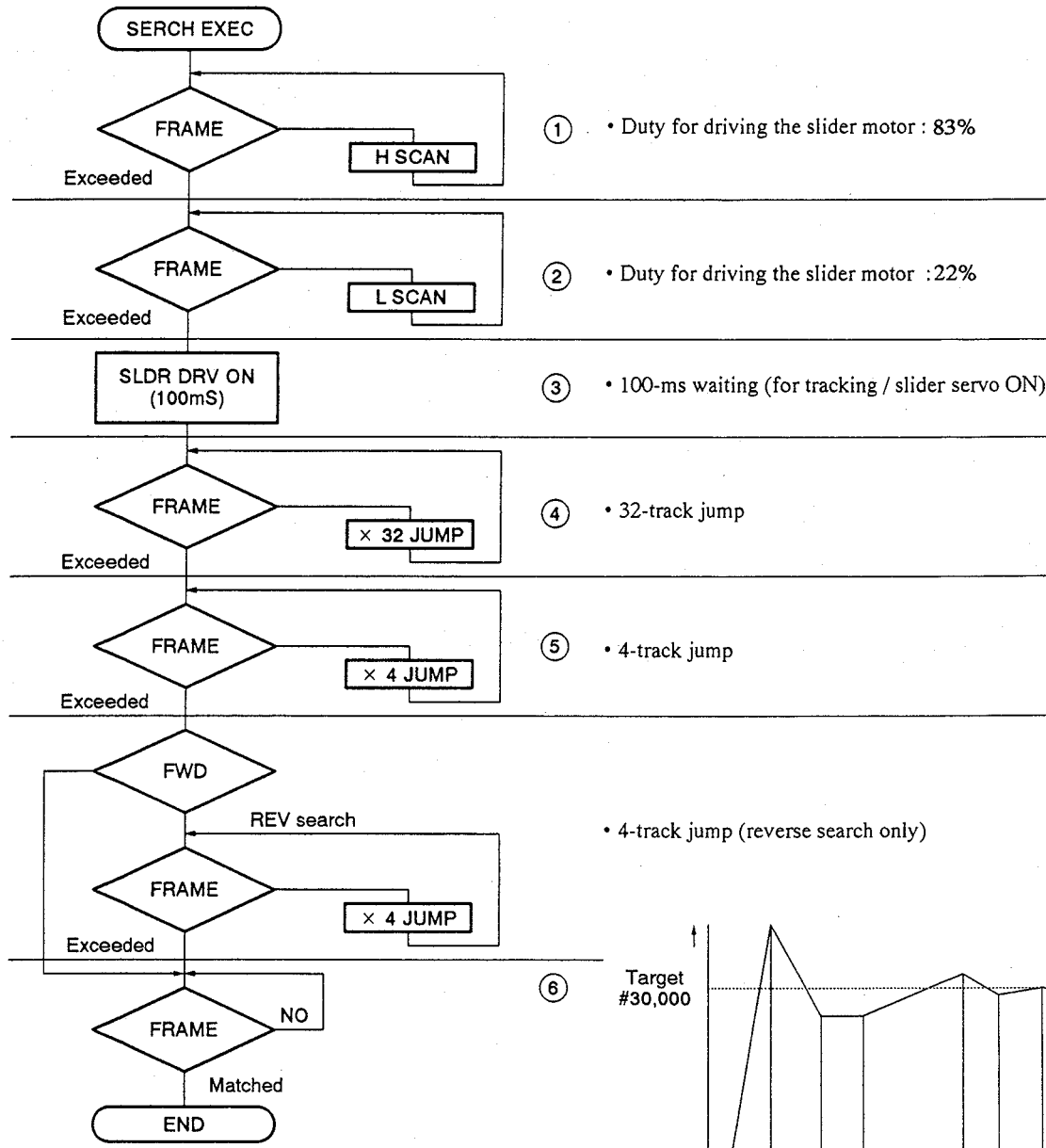
Flow of the LD Setup Operation

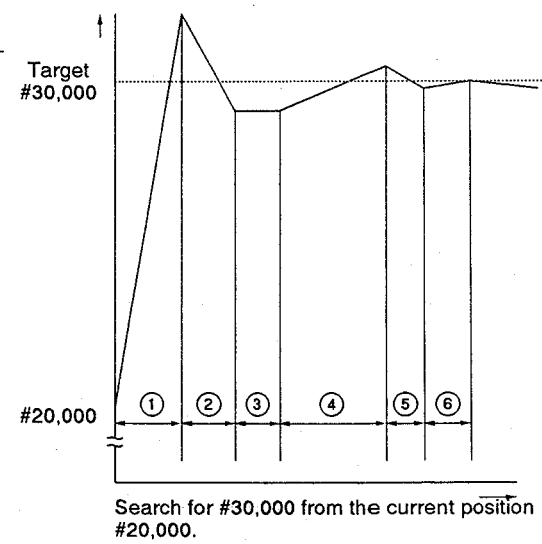


- If focus is lost while the pickup is moving to the spindle startup position, the tray opens, judging it to be CD and LD disc-stacking error.
- Timer for approx. 10 seconds Timer indicates the time over.
- Timer for approx. 10 seconds.
- Tracking servo open mode is active until disc rotation exceeds 900 rpm.
- The disc rotation is forcibly accelerated until it reaches 1530 rpm, and the disc size is determined by the time required to reach 1200rpm.
- If 800 or more tracks are crossed in a single rotation of the disc, the tray opens, regarding it to be a misclamp.
- If focus is lost during the startup operation, the tray opens, assuming a damaged disc or the flip side of a single-sided disc.
- If the spindle is not locked within 60 seconds after beginning SPDL acceleration, the operation stops.

Fig. 3-13

Flow of the Frame Search Operation





Frame search operation

Fig. 3-14

● Player Operation Modes

MODE 1 – OPEN

Step	Operation
0	Clears internal registers, sets the spindle to STOP and waits for focus OFF.
1	↓
2	
3	
4	
5	
6	
7	
8	
9	Starts to move the slider to the LD sensing position.
A	Waits for the spindle to stop.
B	Waits for the slider to reach the LD sensing position.
C	Starts unloading.
D	Performs unloading until the OUT SW activates.
E	Sets the 100 ms timer.
F	Waits for 100 ms.
	Completed

MODE 2 – STANDBY

Step	Operation
0	Clears internal registers, sets the spindle to STOP and waits for focus OFF.
1	↓
2	
3	
4	
5	
6	
7	
8	
9	Starts to move the slider to the LD sensing position.
A	Waits for the spindle to stop.
B	Waits for the slider to reach the LD sensing position.
C	Starts to move the tilt to the neutral position.
D	Waits for the tilt to reach the neutral position.
	Completed

MODE 3 – STOP

Step	Operation
0	Clears internal registers, sets the spindle to STOP and waits for focus OFF.
1	↓
2	
3	
4	
5	
6	
7	
8	
9	Starts to move the slider to the LD sensing position.
A	Waits for the spindle to stop.
B	Waits for the slider to reach the LD sensing position.
C	Starts to move the tilt to the neutral position.
D	↓
E	Waits for the tilt to reach the neutral position.
	Completed

MODE 4 – DISC SENSING

Step	Operation
0	Waits for the tilt to be neutral. Normal: LD sensing CD direct mode: CD sensing
1	Starts to move the slider to the LD sensing position. Clears the focus-try counter.
2	Waits until the slider reaches the LD sensing position.
3	Tries focusing. Focus unlocked Focus locked: LD presence assured. Completed.
4	Focus OFF
5	Starts to move the slider to the CD sensing position.
6	Waits until the slider reaches the CD sensing position.
7	Tries focusing. Focus unlocked Focus locked: CD presence assured. Completed.
8	Focus OFF
9	Starts to move the slider to the LD sensing position. Clears the focus-try counter.
A	Starts to move the slider to the LD sensing position.
B	Checks for CD direct mode. CD direct mode. Normal
C	Tries focusing. Focus unlocked Focus locked: LD presence assured. Completed.
D	Focus OFF
E	No disc assured. Completed.

MODE 5 – SETUP

Step	Operation
0	Waits for the tilt to be neutral. Sets the slider target position. CD: Starts to move the slider to the CD TOC position. LD: Starts to move the slider to the LD TOC position.
1	Checks focus. Simultaneously checks for disc stacking (LD + CD) Focus locked (OK): Waits until the slider reaches the target position. Focus unloked (NG): LD: Ends with the focus error status. CD: Ends with the focus error after three unsuccessful tries.
2	Sets the spindle. CD set / CDV set / LD set Sets the 60-second timer. Starts to run the spindle.
3	Checks focus. Focus locked (OK): Waits until the spindle locks while checking for misclamping. Sets the 60-second timer. Time over. Ends with the spindle error status. Focus unlocked (NG): Ends with the clamping error status.
4	LD: Distinguishes CAV / CLV. Not distinguished / Distinguished CD, CDV
5	Checks focus. Focus locked (OK): Waits the codes to be read. Time over. Ends with the code error. Focus unlocked (NG): Ends with the focus error. Slowly moves the slider to the inner or outer periphery until the PGM area code is read. After reading the code, sets the 60-second timer and returns to step 4.
6	Completed.

MODE 6 – TOC READ

Step	Operation
0	Diverges depending on the disc type.
	LD / CD, CDV
1	Clears 1st address. Sets the 15-second timer.
2	Moves to the lead-in area and checks the focus time.
	A 24-bit code read. / Not read
	Lead-in area / PGM area, lead-out area
	↓ / 32-track REV jump / Playback
3	Moves to the PGM area and checks the focus time.
	A 24-bit code read. / Not read
	PGM area / Lead-in area
	↓ / 16-track FWD jump / Playback
4	Moves to the lead-in area and checks the focus time.
	A 24-bit code read. / Not read
	Lead-in area / PGM area
	↓ / 4-track REV jump / Playback
5	Plays to the PGM area and checks the focus time.
	A 24-bit code read. / Not read
	PGM area / Lead-in
	Sets the 0.5-second timer. ↓ / Playback
6	Stores the 1st address (CH, time) in memory and checks the focus time.
	After 0.5 seconds, checks for CH and the seconds.
	Sets the 0.5-second timer. ↓
7	Checks for TOC (subcodes) and checks the focus time.
	TOC available ↓ / Ends with no TOC if no subcode can be read in 0.5 seconds.
8	Sets the15-second timer.
9	Waits until TOC is read. / Time over. / TOC reading completed
	PGM area / Lead-in area. Subcode NG. / Ends with the TOC error status. / Ends.
	↓ / Playback
A	Subcode OK and focus check NG.
	32-track REV jump ↓ / Playback
B	Subcode OK and focus check NG
	32-track REV jump ↓ / Playback
C	Subcode OK and focus check NG
	32-track REV jump ↓ / Playback
D	Subcode OK and focus check NG
	32-track REV jump ↓ / Playback
E	Returns to step 9.

MODE 8 – SEARCH

Step	Operation
0	Focus ON / Focus OFF
	Sets the 15-second timer. / Ends with the recovery error.
	Diverges depending on the disc search target.
	CDV / CD / LD
	Track search / (Absolute time wait)
	A↔V / A↔V V↔A
	↓
1	Clears the focus-try counter and starts the spindle STOP operation. Starts to move the slider.
	To A→V CDV TOC position. / To V→A CD TOC position.
2	Waits until the slider reaches the specified position.
	Waits for spindle STOP. → Ends with the disc stack (clamp) error if the spindle does not stop in 1.6 seconds.
	Focus locked (Sets the 15-second timer.) / Tries focusing.
	Sets the spindle for CD audio. / Sets the spindle for CDV video. / Ends with the recovery error after four unsuccessful tries.
3	Waits until the spindle locks.
	Waits until the subcode is read. ↓
4	Sets the 10-time track counter.
5 6	Drives the slider while counting tracks.
	When the lag from the target address is more than 1 minute. / When the slider comes close to the target within about 1 minute.
	Drives the slider.
7	Drives the slider to cross the target address (H SCAN).
8	Drives the slider to cross the target address (L SCAN). ↓
9	Performs 32-track jumps to cross the target address.
A	Performs 4-track jumps to cross the target address. Sets the 5-second timer.
B	Performs 4-track jumps to reach the front of the target address. / Time check NG →Ends with the search error.
C	Plays until the target address is reached.
	Time out / Reached
	LD,CDV-V / CD, CDV-A / LD,CDV-V / CD, CDV-A
	Ends with the search error. / Spindle locked / Unlocked / REV 1 jump
	Completed / LD / CDV-V
	To step B / REV jump
D	Performs 4-track jumps to a point before the target address. Time check NG → Ends with the search error.
E	Plays until the target address is reached.
F	If another new search target is specified during search, waits the spindle to lock and returns to step 0.

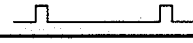
3.5 OUTLINE OF THE MODE CONTROL SYSTEM

1)Description of the Mode Microcomputer (IC201)

The mode microcomputer performs the following processing:

1. Key data/remote control signal processing
   Accepts the key switch and remote control signals and processes them for the specified keys.
2. FL (fluorescent) display operation
   Operates the FL tube (VAW1026) display.
3. Screen-display control
   Controls the character generator IC (IC405: PD0093A and superimposes characters on the screen.
   The blue-background screen is also controlled.
4. Mechanism-control IC control
   Gives operational instructions to the mechanism conrol microcomputer (IC101: PD0133B) and simultaneously reads the time data, etc.
5. System reset management
   If any problem occurs in communication with the mechanism-control IC, activates system reset to return the IC to its initial state.

- **Description of the Mode microcomputer (IC201: PD3213A)**

Pin	Pin name	Signal name	I/O	Function
01	P04/AN4	NC	I	Not used
02	P05/AN5	NC	I	Not used
03	P06/AN6	NC	I	Not used
04	P07/AN7	NC	I	Not used
05	AVss	AVss	–	Connected to standard power supply (Vss) for A/D conversion
06	TEST	TEST	I	Test pin Connected to Vss
07	X2	X2	O	Subclock Release
08	X1	X1	I	Subclock Connected to Vcc
09	Vss	Vss	–	Ground
10	OSC1	OSC1	I	System clock Connects 8 MHz ceramic lock
11	OSC2	OSC2	O	System clock Connects 8 MHz ceramic lock
12	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	I	Reset
13	P10/IRQ0	SHAKE	I/O	Communication timing clock with mechanism control
14	P11/$\overline{\text{IRP1}}$	SEL IR	I	Remote control signal (including SR)
15	P12/$\overline{\text{IRQ2}}$	W.D.F	O	For watchdog timer Pulse output 
16	P13/$\overline{\text{IRQ3}}$	POWER On	O	Power ON  Power OFF
17	P14/IRQ4	NC	O	Not used
18	P15/$\overline{\text{IRQ5}}$	NC	O	Not used
19	P16/EVENT	NC	I	Not used
20	P33/FS27	NC	O	Not used

Pin	Pin name	Signal name	I/O	Function
21	P32/FS26	NC	O	Not used
22	P31/FS25	NC	O	Not used
23	P30/FS24	STANBY LED	O	Standby LED drive output
24	P47/FS23	NC	O	Not used
25	P46/FS22	NC	O	Not used
26	P45/FS21	NC	O	Not used
27	P44/FS20	NC	O	Not used
28	P43/FS19	seg 1 / KS3	O	FL segment l output and key scan 3 output
29	P42/FS18	seg k / KS2	O	FL segment k output and key scan 2 output
30	P41/FS17	seg j / KS1	O	FL segment j output and key scan 1 output
31	P40/FS16	seg i / KS0	O	FL segment i output and key scan 0 output
32	P50/FS15	seg h	O	FL segment h output
33	P51/FS14	seg g	O	FL segment g output
34	P52/FS13	seg f	O	FL segment f output
35	P53/FS12	seg e	O	FL segment e output
36	P54/FS11	seg d	O	FL segment d output
37	P55/FS10	seg c	O	FL segment c output
38	P56/FS9	seg b	O	FL segment b output
39	P57/FS8	seg a	O	FL segment a output
40	P17/Vdisp	-30V	–	FL drive power supply
41	P60/FD0/FS7	G9	O	FL grid 9 output
42	P61/FD1/FS6	G8	O	FL grid 8 output
43	P62/FD2/FS5	G7	O	FL grid 7 output
44	P63/FD3/FS4	G6	O	FL grid 6 output
45	P64/FD4/FS3	G5	O	FL grid 5 output
46	P65/FD5/FS2	G4	O	FL grid 4 output
47	P66/FD6/FS1	G3	O	FL grid 3 output
48	P67/FD7/FS0	G2	O	FL grid 2 output
49	P70/FD8	G1	O	FL grid 1 output
50	P71/FD9	NC	O	Not used
51	P72/FD10	NC	O	Not used
52	P73/FD11	NC	O	Not used
53	P74/FD12	NC	O	Not used
54	P75/FD13	D.CD LED	O	DIRECT CD LED drive output
55	P76/FD14	S-SCAN	I/O	SHUTTER SCAN output
56	P77/FS15	NC	O	Not used
57	Vcc	Vcc	–	Power supply

Pin	Pin name	Signal name	I/O	Function
58	P80	KIN0	I	Key input 0
59	P81	KIN1	I	Key input 1
60	P82	KIN2	I	Key input 2
61	P83	KIN3	I	Key input 3
62	P84	KIN4	I	Key input 4
63	P85	KIN5	I	Key input 5
64	P86	KIN6	I	Key input 6
65	P87	NC	–	Not used
66	P90/PWM	SYNCRO OUT	O	SYNCHRO REC output
67	P91/SCK1	XSCK	I/O	Communication clock with mechanism control/OSD
68	P92/SI1	SI	I	Receive data from mechanism control
69	P93/SO1	SO	O	Send data to mechanism control/OSD
70	P94/SCK2	XRESET	O	RESET output from other than mechanism control/OSD
71	P95/SI2/CS	XCS	O	OSD chip select
72	P96/SO2	SYNCRO IN	I	SYNCHRO REC input
73	P97/UD	NC	O	Not used
74	PA0	NC	O	Not used
75	PA1	NC	O	Not used
76	AVcc	AVcc	–	Connection to Vcc of standard power supply for A/D conversion
77	P00/AN0	NC	I	Not used
78	P01/AN1	NC	I	Not used
79	P02/AN2	NC	I	Not used
80	P03/AN3	NC	I	Not used

2) Hilite Scan

The middle (regarded as the hilite or climax) of each recording on a disc is played back for about 8 seconds.
During a hilite scan operation, the Hilite/intro FL indication lights, and the Hilite indication appears on the screen.
When the Hilite/Intro key on the player is pressed, the following operations are performed depending on the player's status.

1. When the key is pressed during disc playback, the time (e.g. 1 min. 30 sec.) from the beginning of the recording when the key is pressed is stored in memory and 8 seconds from that specified time (e.g. 1 min. 30 sec. to 1 min. 38 sec.) for all the recordings from track 1 to the end are played back.
2. When the key is pressed in stop, tray-open or search modes, the parts from 1 min. 00 sec. to 1 min. 08 sec. of all the recordings on the disc are played back.
3. When the key is pressed during CDV video portion playback, an introduction scan is executed for the video portion, and the highlight scan is performed for the audio portion as in 2 above.
4. When the key is pressed during playback of the audio portion of a CDV, an introduction scan is executed for the video portion, and the highlight scan is performed for the audio portion as in 1 above.

This function is enabled only for CDs and the audio portions of CDV discs. For LDs and the video portions of CDV discs, introduction scanning is performed.