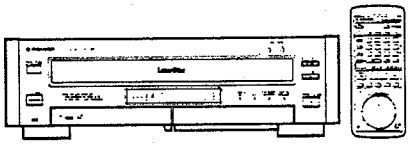
PIONEER®
The future of sound and vision.

Service Manual



ORDER NO.
ARP1999

CD CDV LD PLAYER

CLD-3080

- **This manual is applicable to the KU/CA type.**
- **As to the circuit descriptions, please refer to the CLD-3070 (ARP1702) service guide.**

CONTENTS

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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

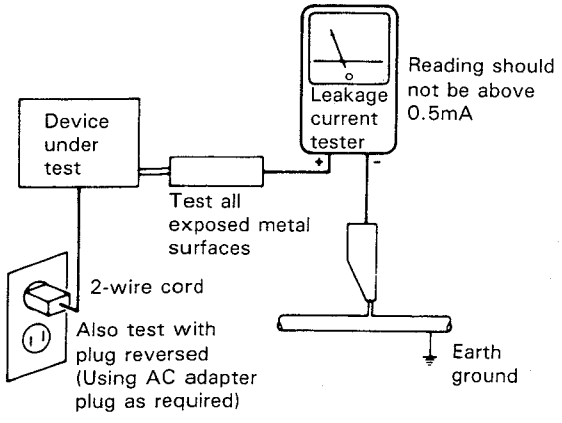
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

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

LEAKAGE CURRENT CHECK

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



AC Leakage Test

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

2. PRODUCT SAFETY NOTICE

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

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

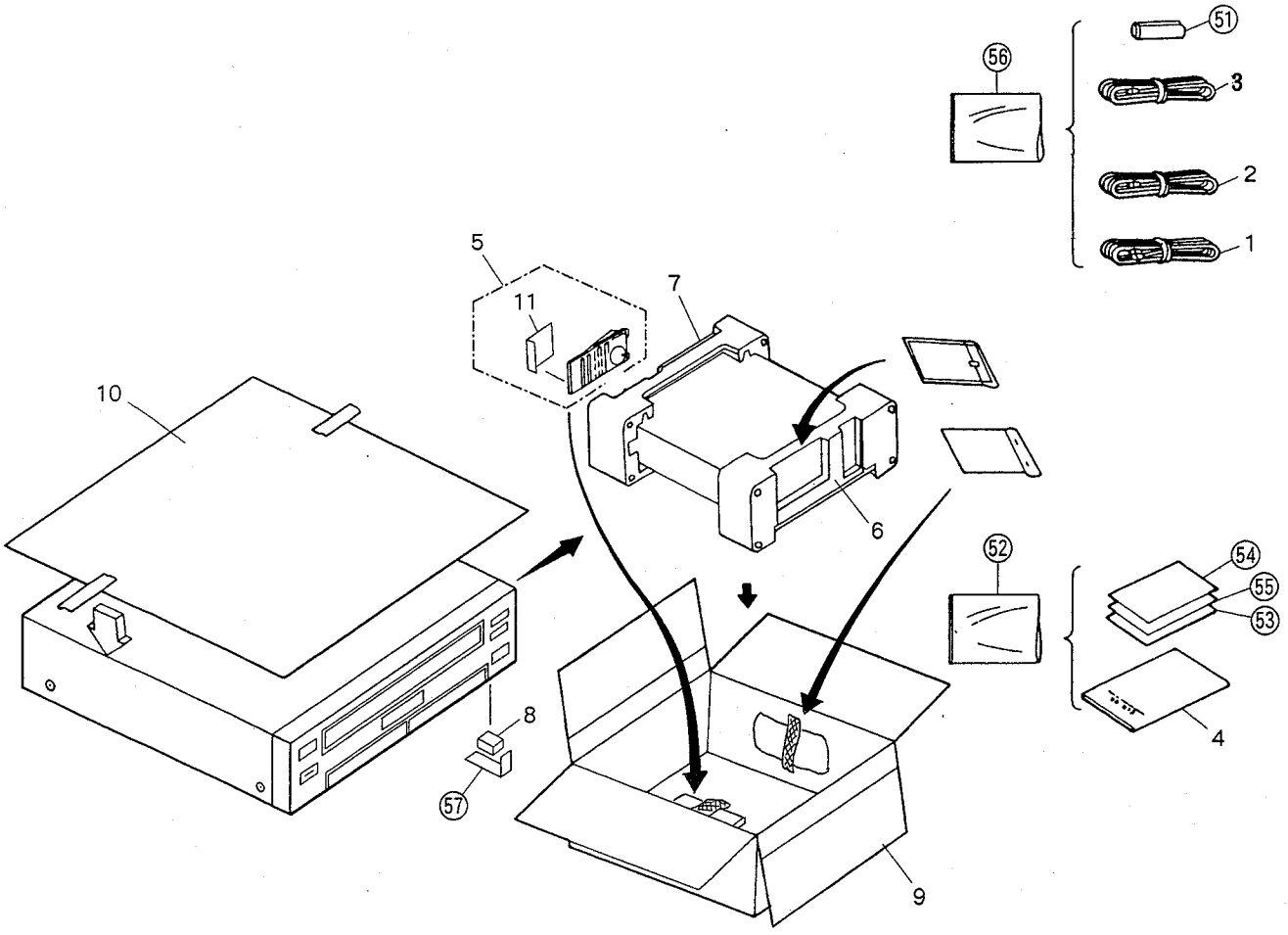
Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. PACKING

Parts List

Mark	No.	Part No.	Description
	1	VDE-055	Audio cord
	2	VDE-056	Video cable
	3	DDE1040	4P mini DIN cable
	4	VRB1031	Operating instructions (English)
	5	VXX1351	Remote control unit
	6	VHA1056	Pad (F)
	7	VHA1057	Pad (R)
	8	VHC1006	Spacer
	9	VHG1091	Packing case
	10	VHL1012	Mirror mat
	11	VNK1364	Battery cover

Mark	No.	Part No.	Description
	51		Battery
	52		Polyethylene bag
	53		Caution card
	54		Caution 220V
	55		Caution card (UC)
	56		Polyethylene bag
	57		Tape



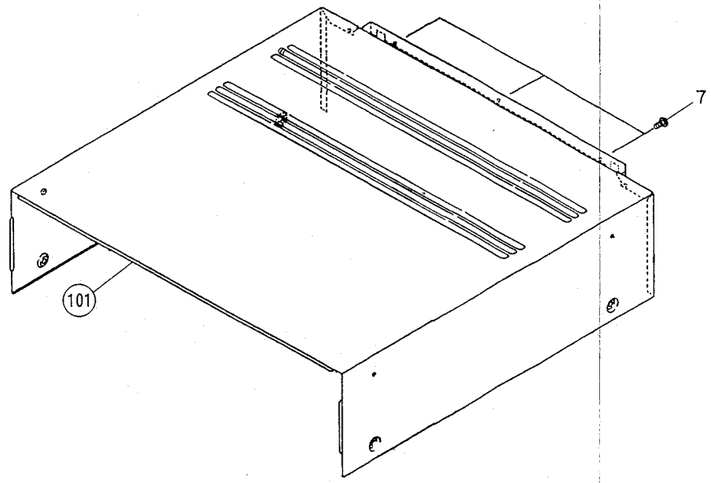
3. EXPLODED VIEWS AND PARTS LIST

NOTES :
- Parts without part number cannot be supplied.
- 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.

3.1 EXTERIOR SECTION

Parts List of Exterior Section

Mark	No.	Part No.	Description
	1		• • • • •
	2		• • • • •
	3		• • • • •
	4		• • • • •
	5		• • • • •
	6		• • • • •
	7	IBZ30P060FCC	Screw
	8	VXX1360	Carry assembly-S
	9	IPZ30P100FMC	Stopper screw
	10	VEC1191	Disc pad (L)
	11	VEC1192	Disc pad (S)
	12	VEB1060	Carry rubber
	13	VEB1119	Stopper rubber
	14	IBZ30P080FCC	Screw
	15	VBE1005	Nail washer
	101		Bonnet
	102		• • • • •
	103		• • • • •
	104		Rubber cushion
	105		Carry label
	106		• • • • •
	107		Carry assembly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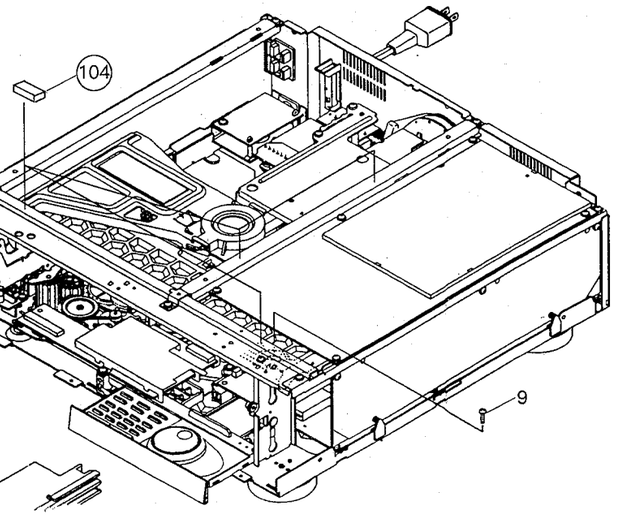
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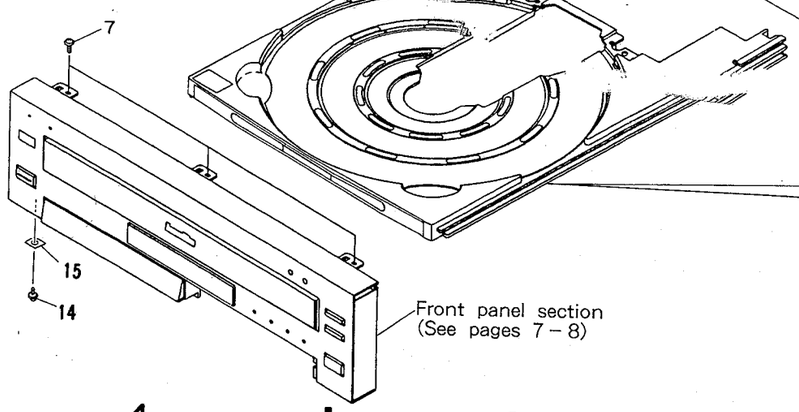
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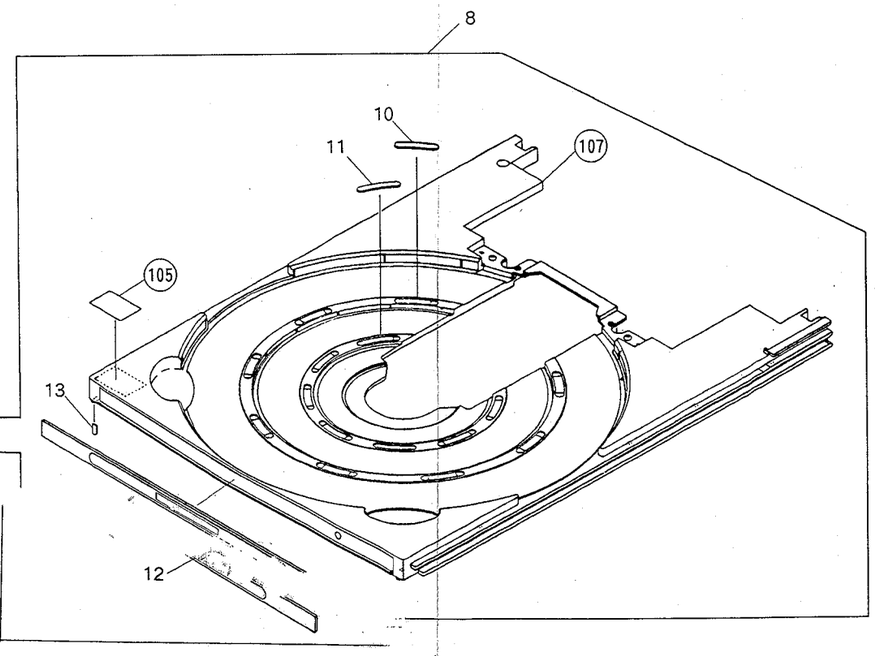
Front panel section
(See pages 7 – 8)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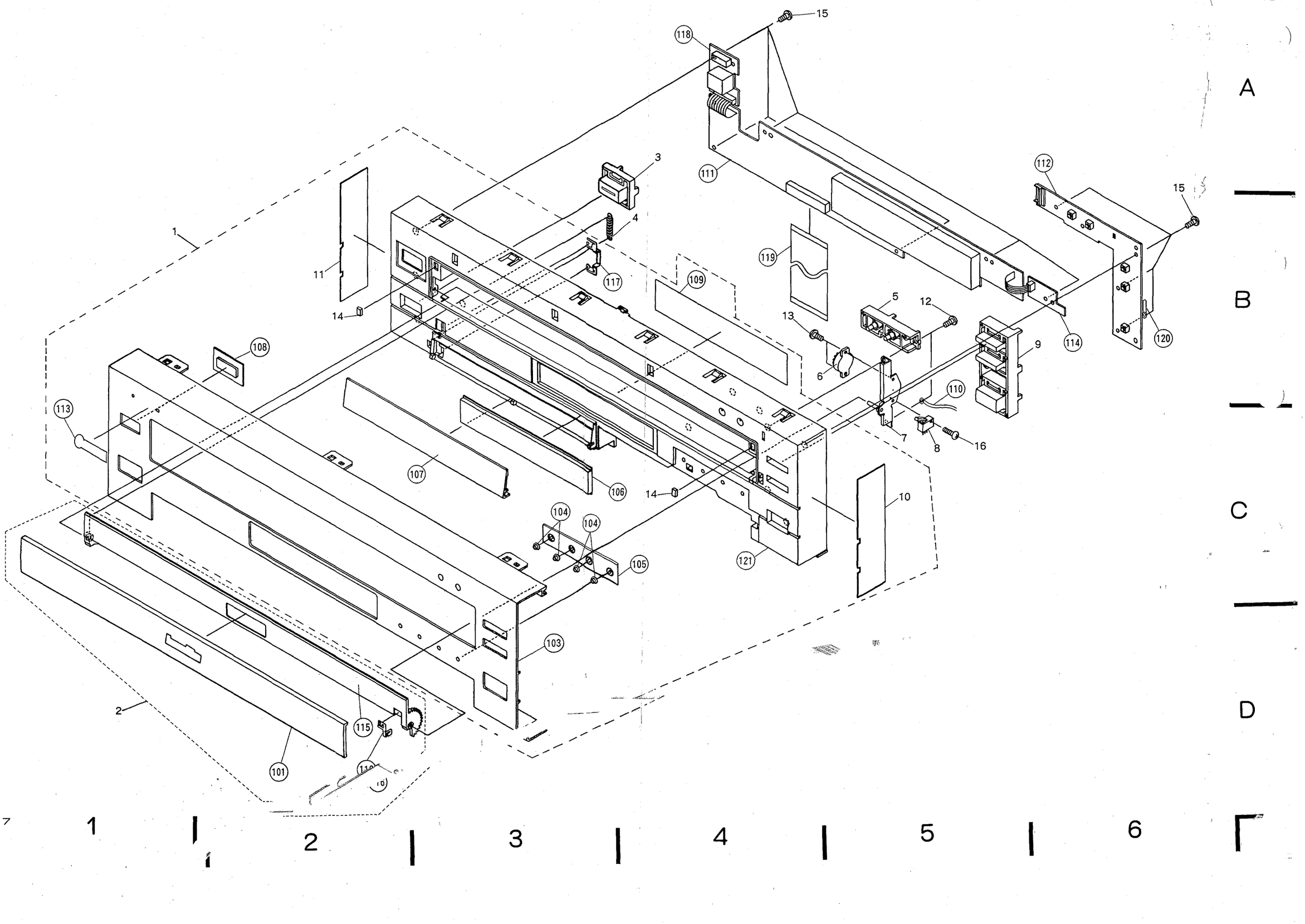
3.2 FRONT PANEL SECTION



Parts List of Front panel Section

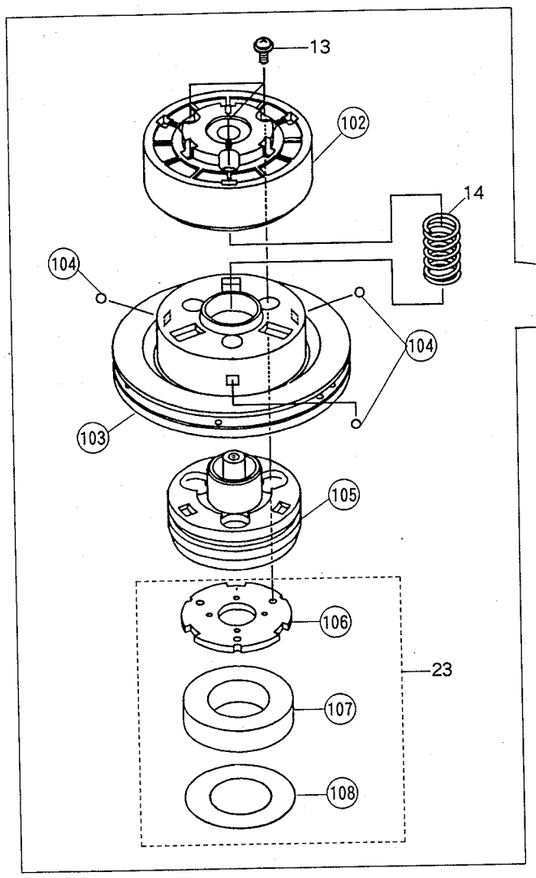
Mark	No.	Part No.	Description
	1	VXX1437	Front panel assembly-S
	2	VXX1325	Front door assembly-S
	3	VNK1334	Power button
	4	VBH1100	Door spring
	5	VXA1359	Side key assembly
	6	VXA1053	Dumper assembly
	7	VXA1341	Dumper board assembly
	8	VSK1014	Slide switch (S1) (DOOR SW)
	9	VNK1336	Function key
	10	VEC1368	Side plate R
	11	VEC1367	Side plate L
	12	PBZ30P080FCU	Screw
	13	PMZ20P040FCU	Screw
	14	VEB1106	Door rubber
	15	BPZ30P080FCU	Screw
	16	PMZ20P060FMC	Screw
	101		Door aluminum assembly
	102		• • • • •
	103		Front aluminum assembly
	104		Escutcheon L
	105		LED lens
	106		FL panel
	107		Under aluminum
	108		Sensor window
	109		FL filter
	110		Earth lug assembly
	111		VFDB assembly
	112		KEYB assembly
	113		Name plate
	114		LEDB assembly
	115		Door holder assembly
	116		Door earth
	117		Under earth
	118		IRAB assembly
	119		Van card
	120		Cord holder
	121		Front panel

3.3 CLAMPER SECTION

Parts List of Clamper Section

Mark	No.	Part No.	Description
	1		• • • • •
	2	VNL1237	Mechanism support
	3	BPZ30P080FCU	Screw
	4	VBA1010	Floating screw A
	5	VBA1013	Floating screw B
	6	PMB30P080FCU	Screw
	7	**VBA1016**	Screw (S)
	8	VBH1093	Arm spring
	9	VXA1344	Clamper holder assembly
	10	VXA1415	Clamper arm (B) assembly
	11	VXA1326	Roller plate (R) assembly
	12	VXA1329	Synchro gear assembly
	13	AMZ20P040FMC	Screw
	14	VBH1097	Centering spring (B)
	15	BPZ20P040FZK	Screw
	16	VNL1223	Clamper head
	17	VBH1099	Arm spring
	18	VNE1361	Plate spring
	19	VNL1246	Parallel link
	20	VEC1302	Plastic rivet
	21	VXA1424	Clamper arm (A) assembly
	22	IBZ30P060FCC	Screw
	23	VXX1333	Magnet assembly-S
	24	VXX1334	Clamper assembly-S
◉	25	**VWS1069**	HDTV assembly
	26	WT34D060D050	Washer
	27	WA32N080W050	Washer
	28	WT26D047D025	Washer
	29	BBZ26P060FMC	Screw

Mark	No.	Part No.	Description
	101		• • • • •
	102		Clamper cover
	103		Disc clamper assembly
	104		Steel ball
	105		Centering hab (B)
	106		Yoke plate (B)
	107		Magnet
	108		Gap sheet
	109		Rubber cushion
	110		Arm reinforcement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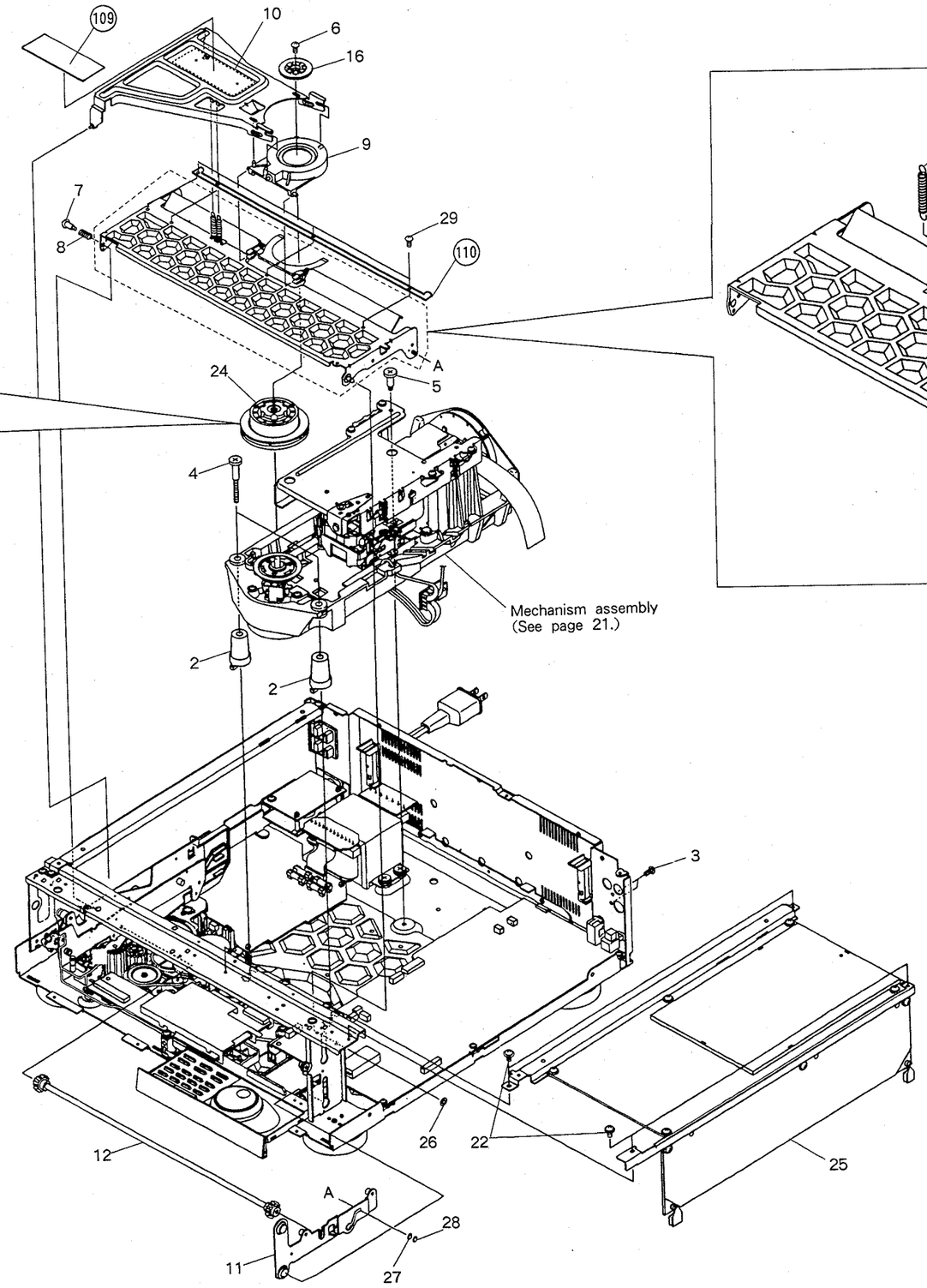
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A
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4
Mechanism assembly
(See page 21.)
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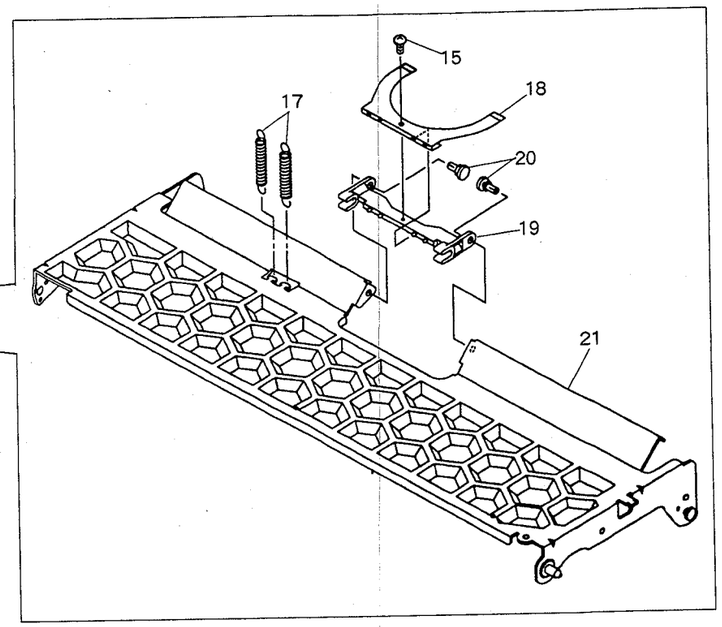
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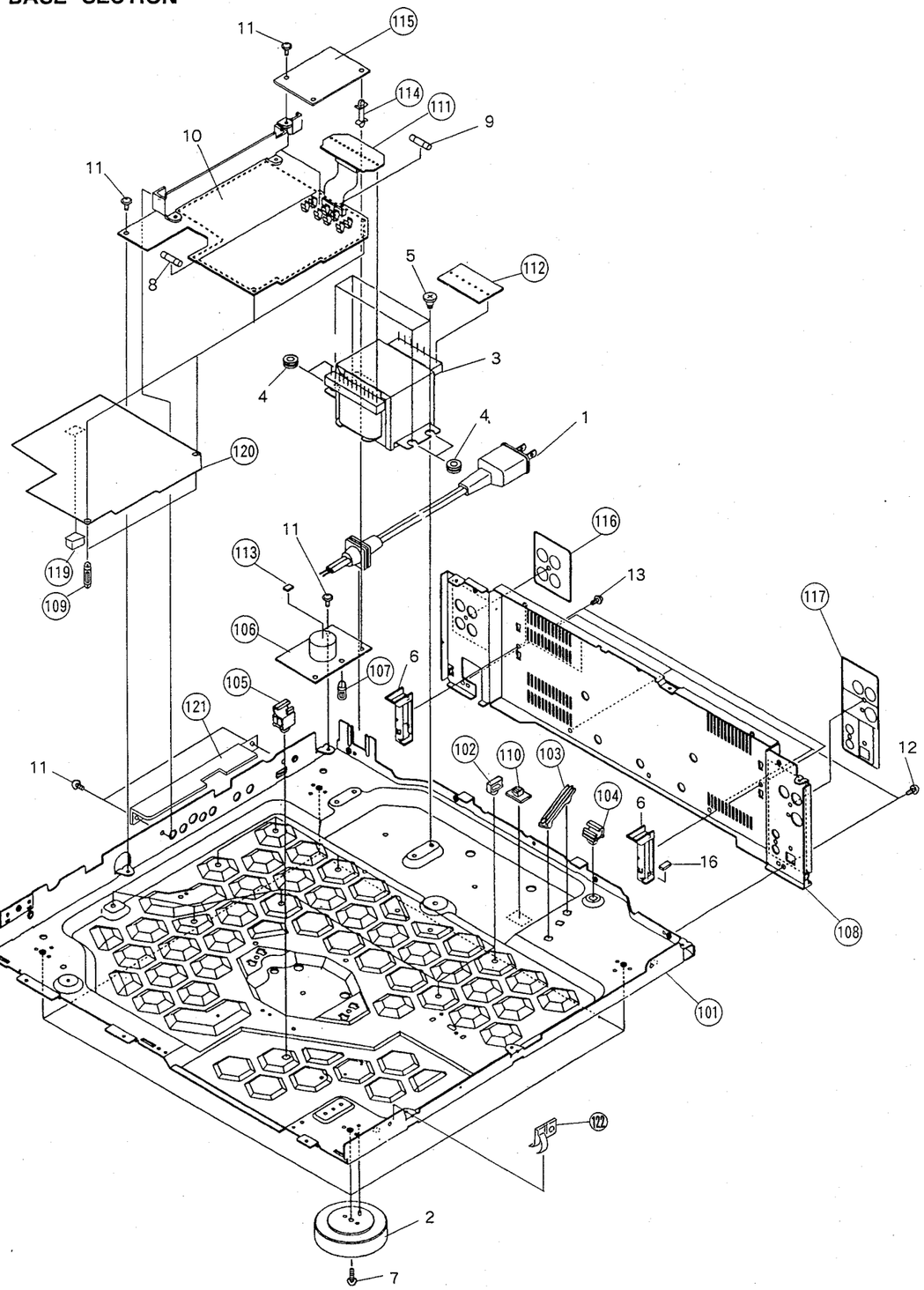
3.4 BASE SECTION



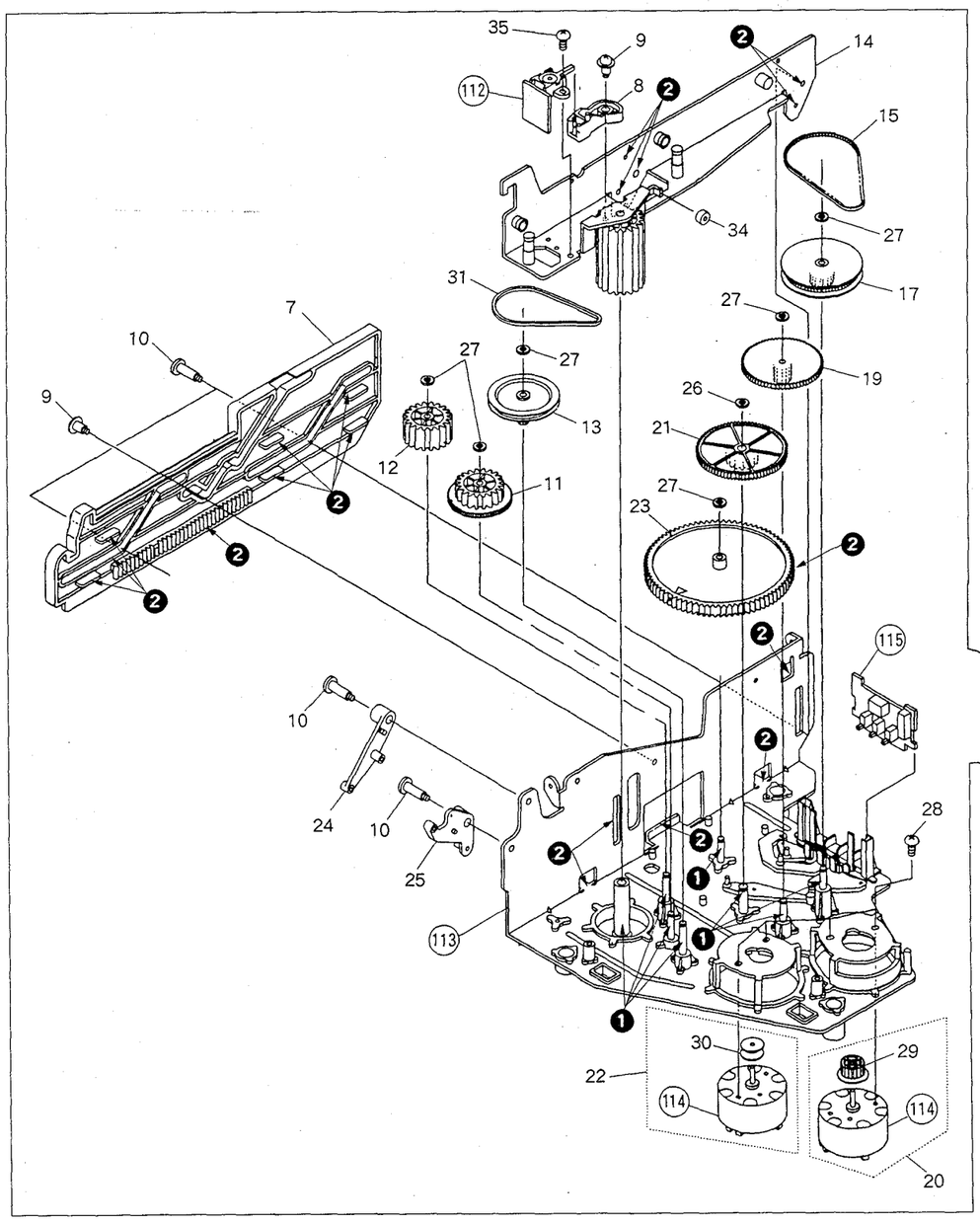
Parts List of Base section

Mark	No.	Part No.	Description
⚠	1	VDG1039	AC power cord
	2	VXA1337	Insulator assembly
⚠	3	VTT1074	Power transformer (AC110V, 120V, 220V, 240V)
	4	VEB1100	Transformer rubber
	5	VBA1011	Transformer screw
	6	VNL1202	Tray stopper
	7	IBZ30P150FCC	Screw
⚠	8	VEK-018	Fuse (FU1,FU2) (3A)
⚠	9	VEK-022	Fuse (FU3,FU4) (2A)
◉	10	**VWR1051**	SYPS assembly
	11	IBZ30P060FCC	Screw
	12	BBT30P060FCC	Screw
	13	IPZ30P080FCU	Screw
	14		• • • • •
	15		• • • • •
	16	VEB1033	Door dump rubber
	101		Under base
	102		Wire clip
	103		PCB support
	104		P plate holder
	105		PCB hinge
	106		LSFB assembly
	107		PCB support
	108		Rear panel
	109		PCB support
	110		Wire clamp (A)
	111		TRSS assembly
	112		TRSF assembly
	113		Filter cushion
	114		PC support
	115		LSSB assembly
	116		Label (L)
	117		Label (R)
	118		• • • • •
	119		Spacer
	120		Transformer sheet
	121		Shield plate
	122		**Earth Clip**

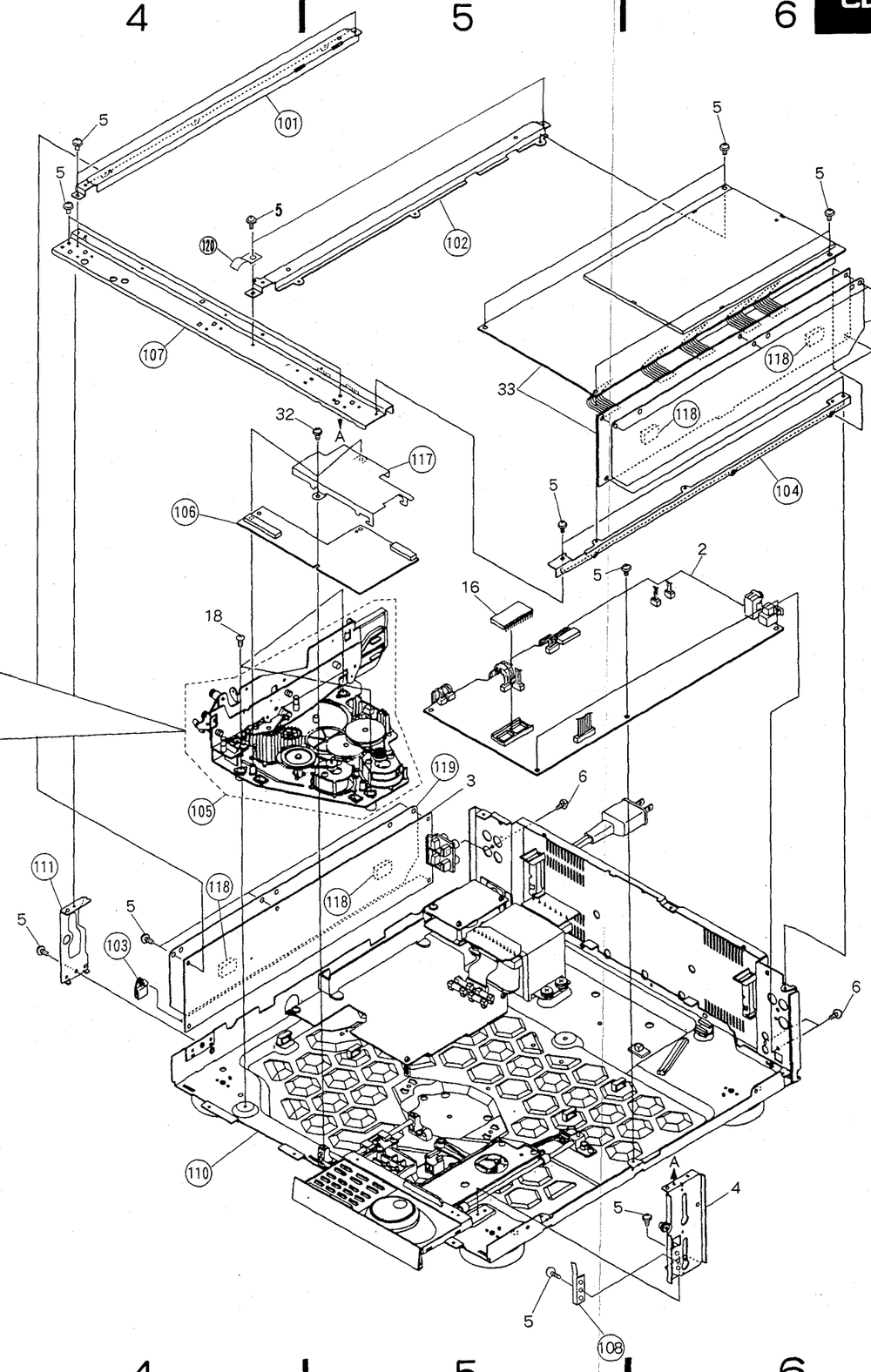
3.5 LOADING SECTION

Parts List of Loading section

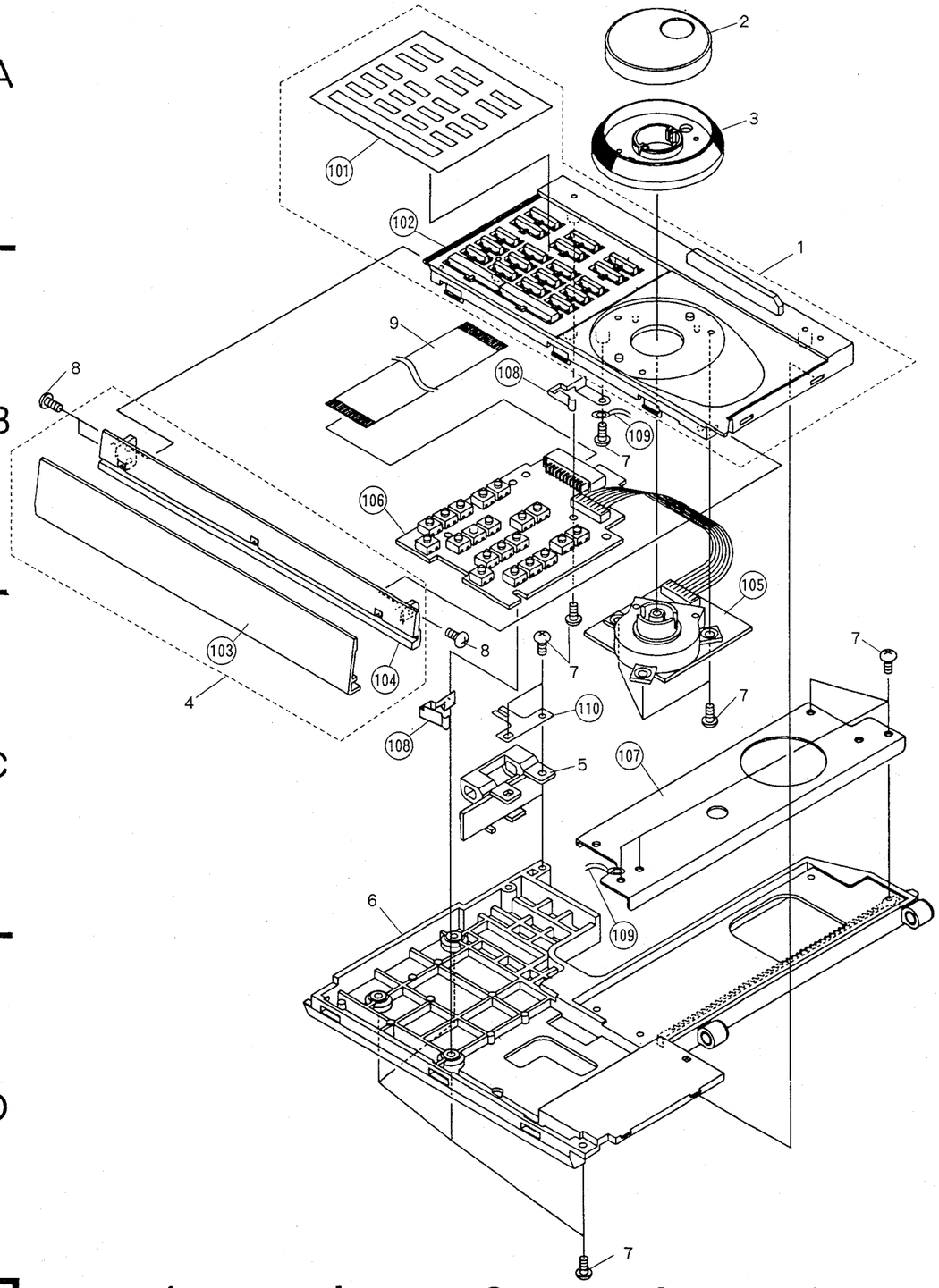
Mark	No.	Part No.	Description
	1		• • • • •
◉	2	**VWS1068**	MAIN assembly
◉	3	**VWV1118**	AUDB assembly
	4	VXA1417	Stay (R) assembly
	5	IBZ30P060FCC	Screw
	6	BPZ30P080FCU	Screw
	7	VNL1231	Slide cam
	8	VNL1239	SW lever
	9	VBA1008	Screw (B)
	10	VBA1014	Screw (C)
	11	VNL1229	Gear (B)
	12	VNL1230	Follow gear
	13	VNL1249	Gear pulley
	14	VXA1420	Roller plate (L) assembly
	15	VEB1069	Synchro belt
	16	VYW1480	One time P ROM-S (IC205)
	17	VXA1263	Timing pulley assembly
	18	BBZ30P080FCC	Screw
	19	VNL1280	Gear (D)
	20	VXX1324	Loading motor V assembly-S
	21	VNL1141	Gear (A)
	22	VXX1328	Loading motor H assembly-S
	23	VNL1228	Cam gear
	24	VNL1290	Lock arm
	25	VNL1247	Lever OC
	26	WT34D060D025	Washer
	27	WT26D047D025	Washer
	28	BMZ26P040FCU	Screw
	29	VNL1148	Motor pulley
	30	VLL1176	Motor pulley
	31	PEB1013	Belt
	32	IPZ30P080FCU	Screw
◉	33	**VWS1069**	HDTV assembly
	34	VEB1091	Stop ring
	35	BMZ26P040FMC	Screw
	36		• • • • •
	101		Angle (L)
	102		Center angle
	103		PCB holder
	104		PCB holder
	105		Loading assembly
	106		FFCB assembly
	107		Front angle
	108		Carry guide
	109		• • • • •
	110		Under base
	111		Side stay (L)
	112		LHSB assembly
	113		Loading base assembly
	114		Carriage motor
	115		LVSB assembly
	116		• • • • •
	117		Blind plate
	118		Insulation cushion
	119		Insulation sheet
	120		**Earth plate**



❶ : Apply the grease (G-501).
❷ : Apply the froil (G-397).



3.6 POCKET ASSEMBLY



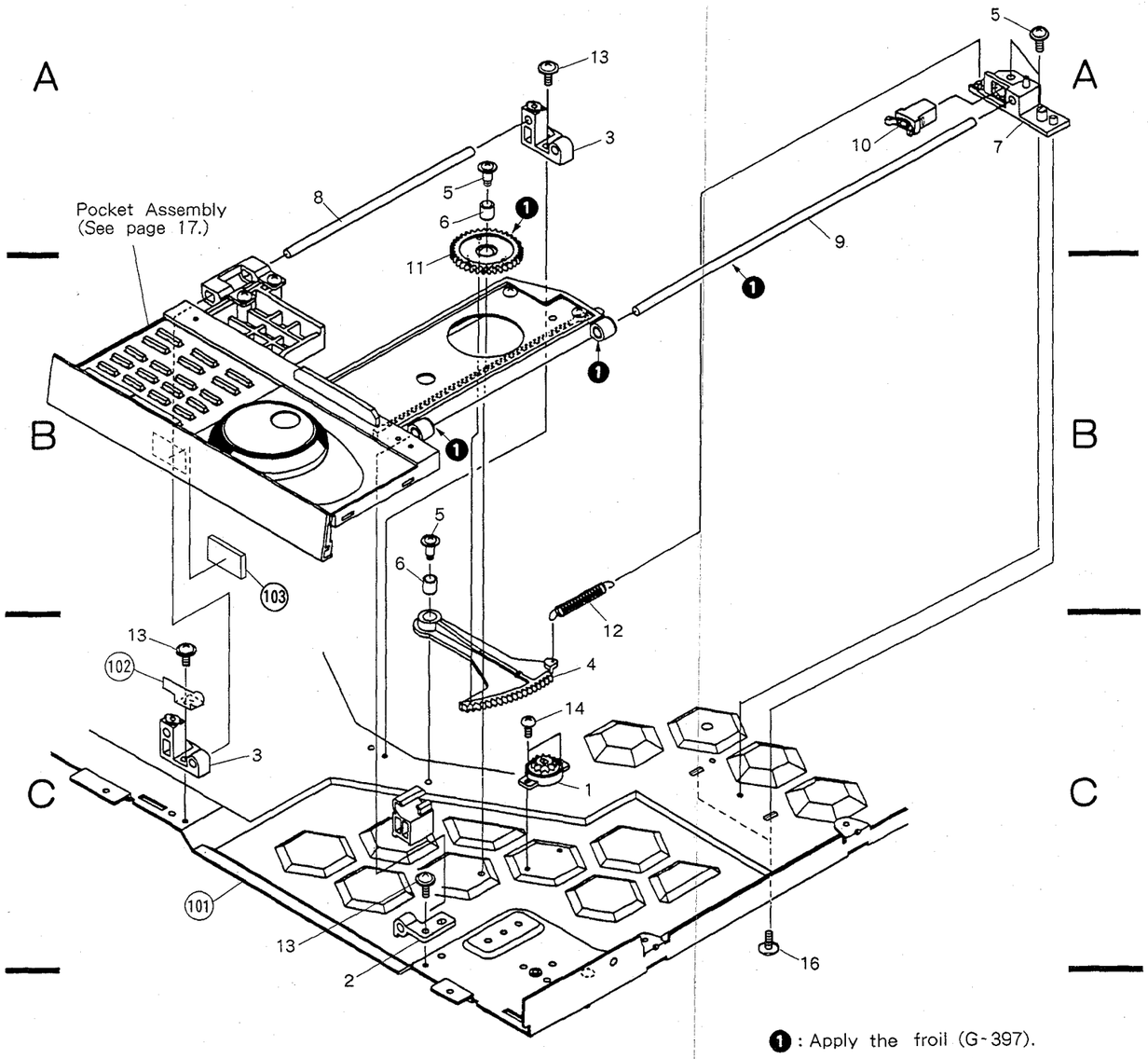
Parts List of Pocket Assembly

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	VXX1387	Pocket panel assembly-S		101		Pocket name plate
	2	VNK1341	Jog dial		102		Pocket panel
	3	VNK1342	Shuttle ring		103		Slide aluminum
	4	VXX1321	Panel base assembly-S		104		Panel base S
	5	VNK1340	Shaft holder B		105		JOGB assembly
	6	VXA1421	Slide base assembly		106		SWTB assembly
	7	BPZ26P080FZK	Screw		107		Reinforcement plate
	8	BPZ26P060FZK	Screw		108		Slide earth
	9	VDA1209	Van card		109		Earth lug assembly
					110		Shaft holder earth

3.7 PERIPHERY OF THE POCKET ASSEMBLY

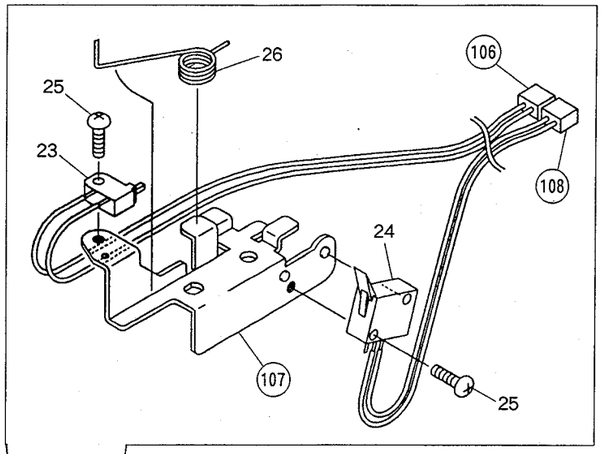
Parts List of Periphery of the Pocket Assembly

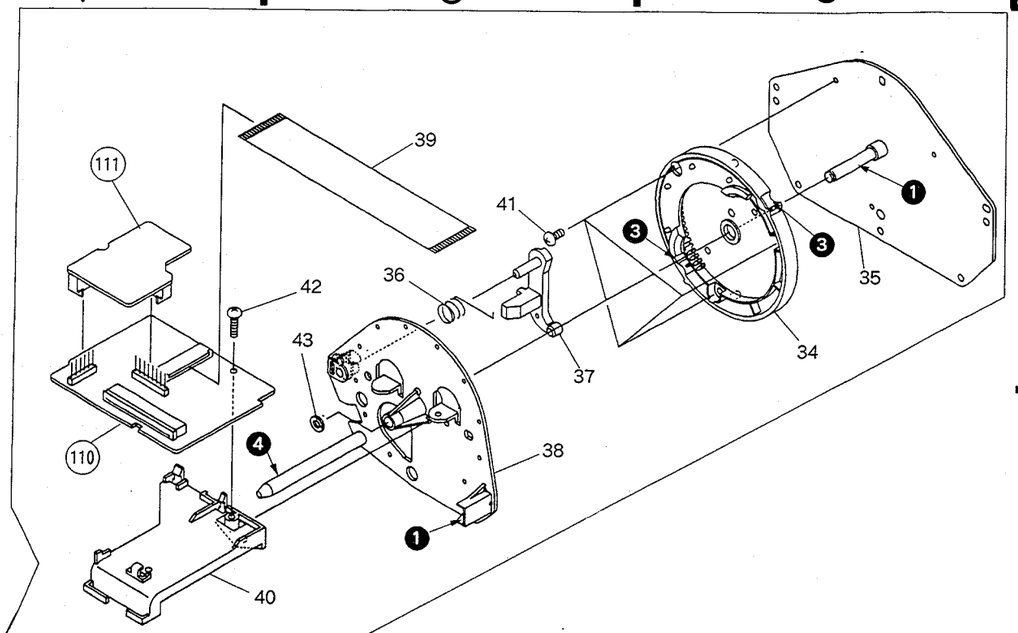
Mark	No.	Part No.	Description
	1	VXA1053	Damper assembly
	2	VNL1244	Shaft holder B
	3	VNL1245	Shaft holder C
	4	VNL1241	Fan-shaped arm
	5	VBA1016	Screw (S)
	6	VLL1219	Collar A
	7	VNL1243	Shaft holder A
	8	VLL1206	Shaft L
	9	VLL1207	Shaft R
	10	VXA1365	Slide latch assembly
	11	VNL1240	Gear R
	12	VBH1101	Panel spring
	13	IBZ30P060FCC	Screw
	14	PMZ20P040FCU	Screw
	15		• • • • •
	16	IPZ30P080FCU	Screw
	101		Under base
	102		Shaft earth
	103		Earth spacer

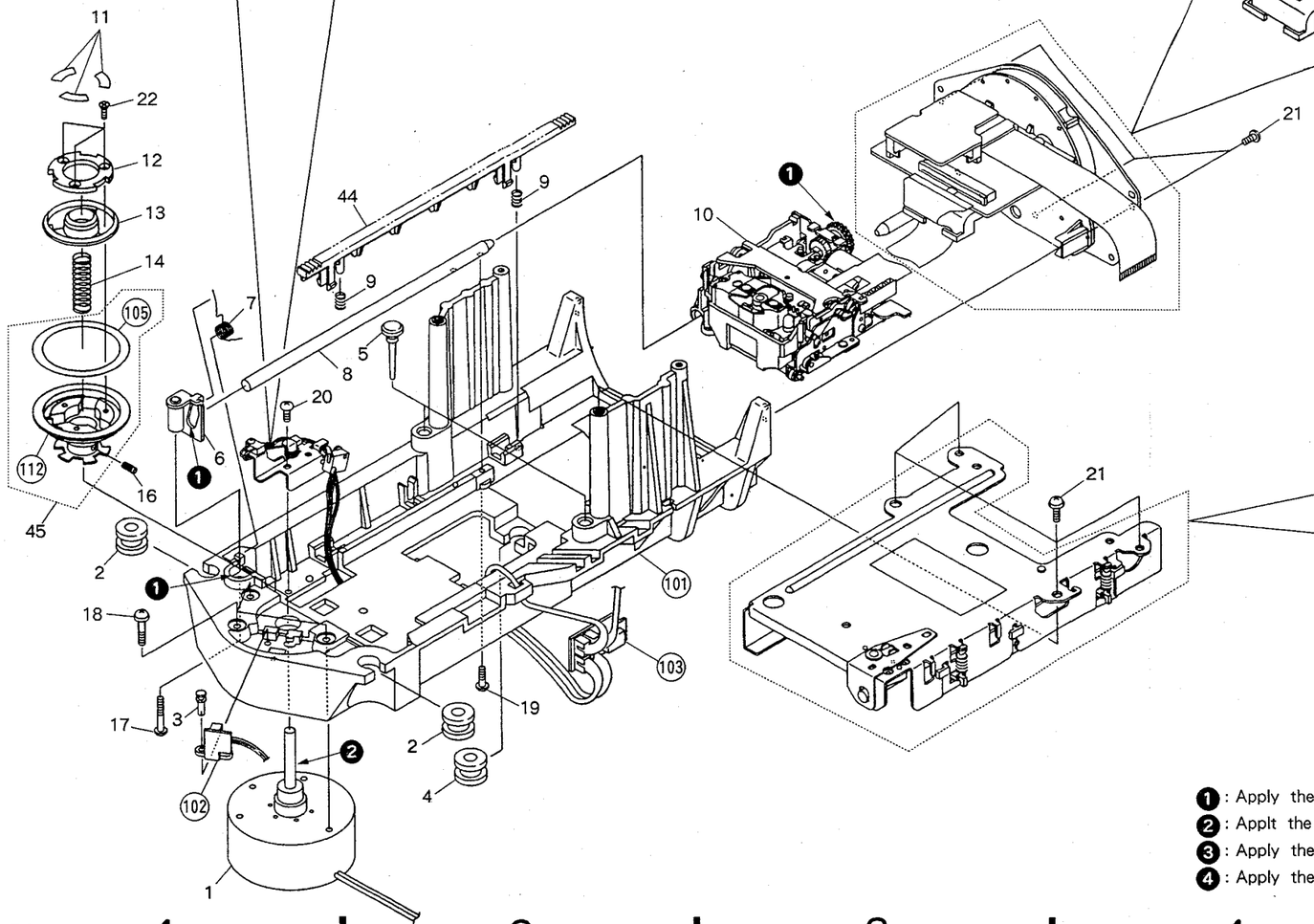


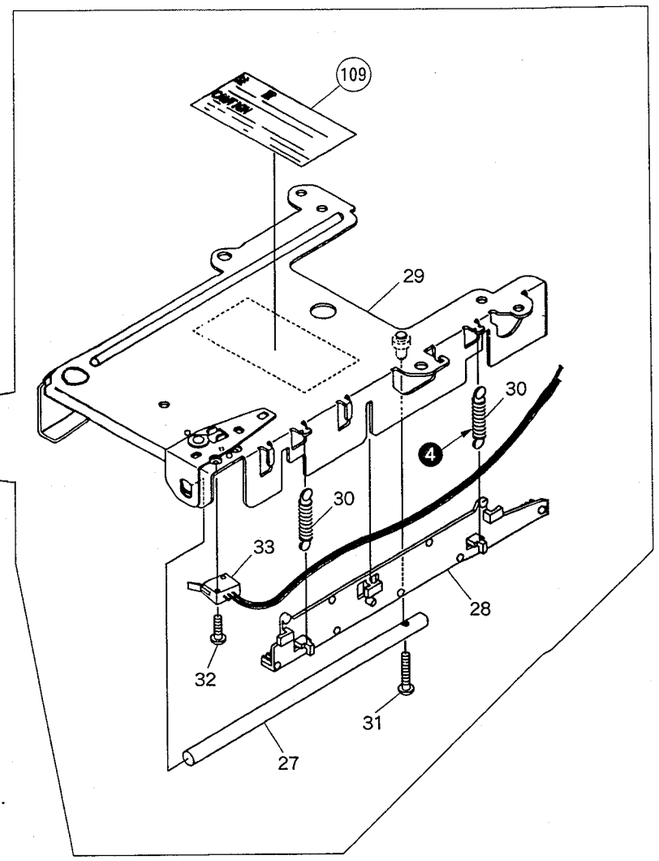
❶ : Apply the froil (G-397).

3.8 MECHANISM ASSEMBLY









❶ : Apply the froil (G-397).
❷ : Applt the froil (948P).
❸ : Apply the froil (GB-TS-1).
❹ : Apply the froil (GB-574).

Parts List of Mechanism Assembly

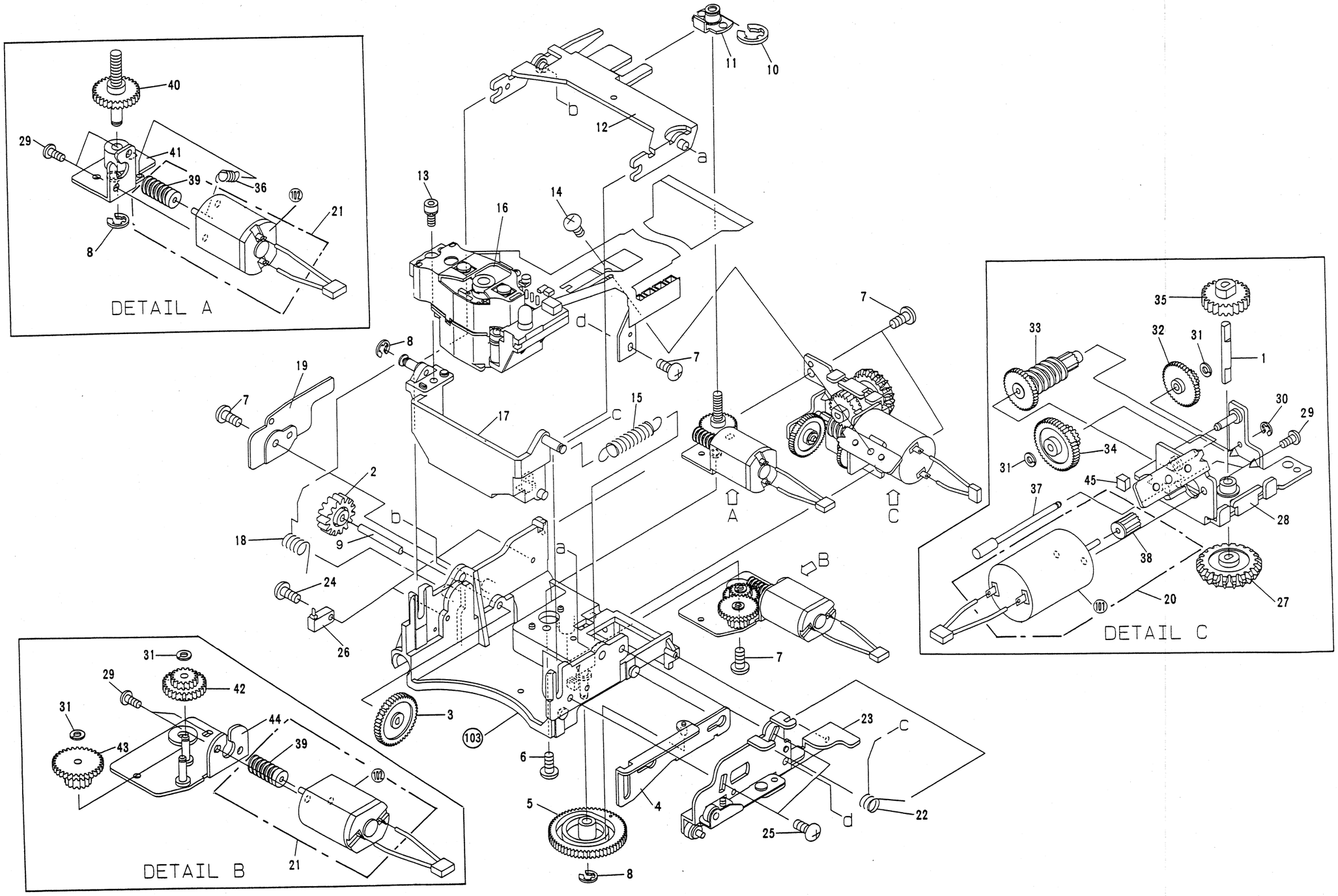
Mark	No.	Part No.	Description
	1	VXM1035	Spindle motor
	2	VEB1095	Floating rubber A
	3	VEC1298	Plastic rivet
	4	VEB1099	Floating rubber B
	5	VEB1094	Damper
	6	VXA1345	Holder assembly
	7	VBH1098	Holder spring A
	8	VLL1202	Carriage shaft (Lower)
	9	VBH1057	Rack spring (Lower)
◉	10	VWT1054	Carriage assembly
	11	**VEC1332**	Sheet
	12	VNE1360	Yoke plate A
	13	VNT1020	Centering hab (A)
	14	VBH1024	Centering spring
	15		• • • • •
	16	ZMD30H050FBT	Screw
	17	BMZ30P160FCU	Screw
	18	PMB30P200FCU	Screw
	19	PMZ26P120FMC	Screw
	20	BPZ30P100FCU	Screw
	21	IPZ30P100FCU	Screw
	22	CBZ30P080FMC	Screw
	23	VSK1009	Slide switch (CD INSIDE)
	24	VSK1003	Slide switch (CDV, LD A INSIDE)
	25	PMZ20P070FCU	Screw
	26	VBH1104	Holder spring B
	27	VLL1201	Carriage shaft (Upper)
	28	VNL1153	Rack gear (Upper)
	29	VXA1334	Mechanism shassis assembly (Upper)
	30	VBH1058	Rack spring (Upper)
	31	PMZ20P160FMC	Screw
	32	PMZ20P080FMC	Screw
	33	VSK1003	Slide switch (LD B INSIDE)
	34	VXA1335	Internal gear assembly
	35	VXA1333	G plate assembly
	36	VBH1072	Lever spring
	37	VNL1234	Lock lever
	38	VXA1332	R plate assembly
	39	VDA1207	Flexible cable (FFC)
	40	VNL1235	Harness guide
	41	BBZ26P060FCC	Screw
	42	BBZ30P140FCC	Screw
	43	WT36D072D050	Washer
	44	VNL1238	Rack gear (Lower)
	45	VXX1323	Turn table assembly-S

Mark	No.	Part No.	Description
	101		Mechanism shassis (Lower)
	102		FGSB assembly
	103		CNNB assembly
	104		• • • • •
	105		Rubber sheet
	106		Housing assembly
	107		SW holder
	108		Housing assembly
	109		Caution label
	110		PREB assembly
	111		PRET assembly
	112		Turn table assembly

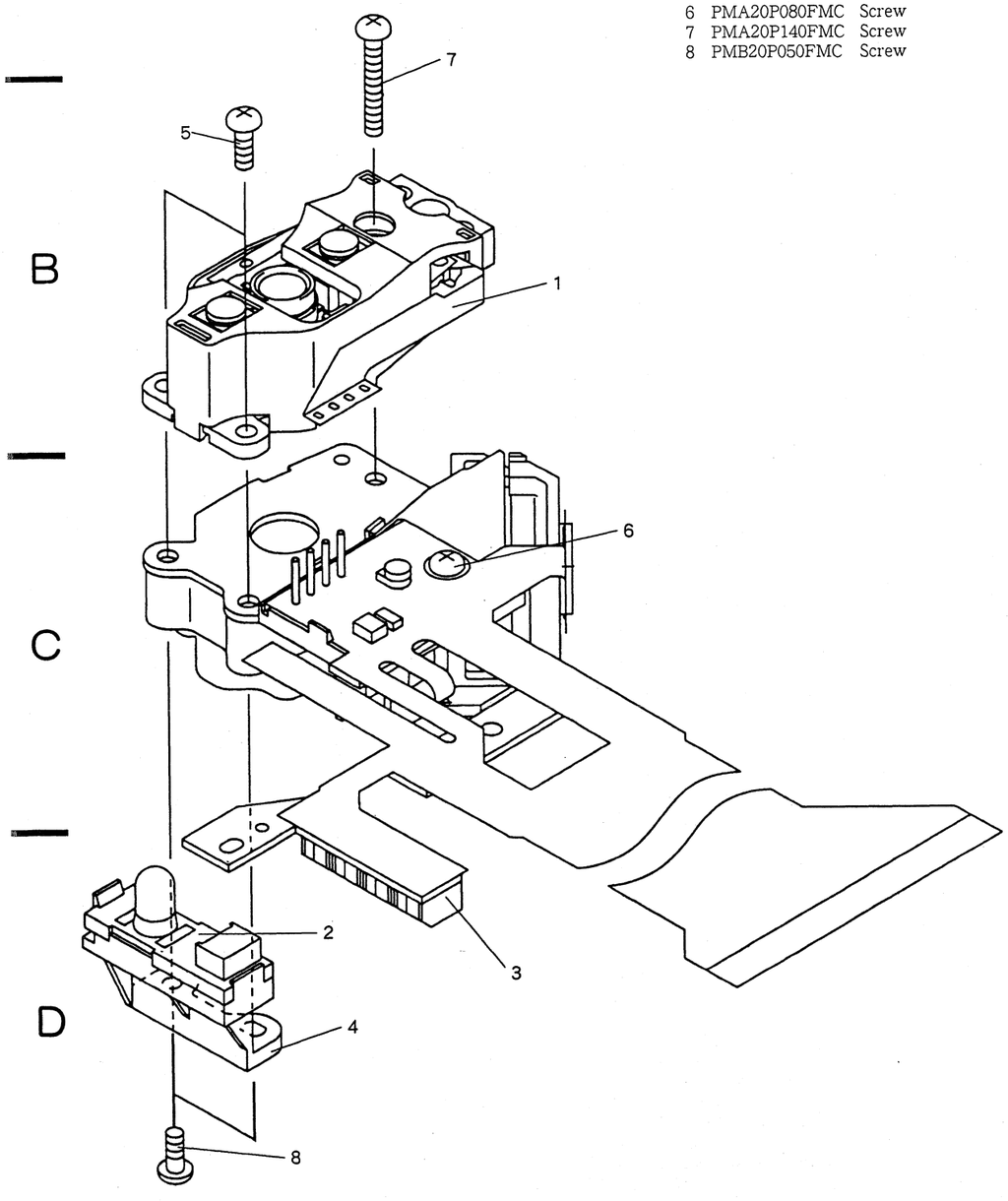
3.9 CARRIAGE ASSEMBLY (VWT1054)

Parts List of Carriage Assembly

Mark	No.	Part No.	Description
	1	VLL1152	SL shaft (B)
	2	VNL1158	SL gear (F)
	3	VNL1253	SL gear (E)
	4	VXA1243	Slide plate assembly
	5	VNL1166	TL cam gear
	6	PMA26P050FMC	Screw
	7	BBZ26P050FCC	Screw
	8	YE20FUC	E ring
	9	VLL1270	SL shaft (C)
	10	YE40FUC	Stop ring
	11	VXA1259	AF plate assembly
	12	VXA1246	AF arm assembly
	13	VLL1107	Bolt 2.6 × 6
	14	PBZ26P040FCC	Screw
	15	VBH1063	Tilt spring
	16	VWY1019	Pickup assembly
	17	VXA1336	PU holder assembly
	18	VBH1061	AF spring (L)
	19	VNE1284	AF stopper
	20	VXX1329	Slider motor assembly-S
	21	VXX1227	Tilt (Height) motor assembly-S
	22	VBH1088	AF spring (R)
	23	VXA1331	TAN base assembly
	24	PBZ20P070FCC	Screw
	25	PMB26P050FCU	Screw
	26	VSK1009	Slide switch (S5) (HEIGHT UP, DOWN)
	27	VNL1163	SL gear (H)
	28	VXA1241	SL base assembly
	29	JGZ20P022FMC	Screw
	30	YE12FUC	Stop ring
	31	WT17D034D050	Washer
	32	VNL1251	SL gear (B)
	33	VNL1137	SL gear (C)
	34	VNL1252	SL gear (D)
	35	VNL1159	SL gear (G)
	36	VBH1122	M spring
	37	VLL1151	SL shaft (A)
	38	VNL1250	SL gear (A)
	39	VNL1138	AF worm
	40	VXA1244	AF gear assembly
	41	VXA1245	AF holder assembly
	42	VNL1164	TL gear (A)
	43	VNL1165	TL gear (B)
	44	VXA1242	TL base assembly
	45	VEB1108	Dump rubber
	101		Slider motor
	102		Tilt motor
	103		Carriage


DETAIL A
DETAIL B
DETAIL C

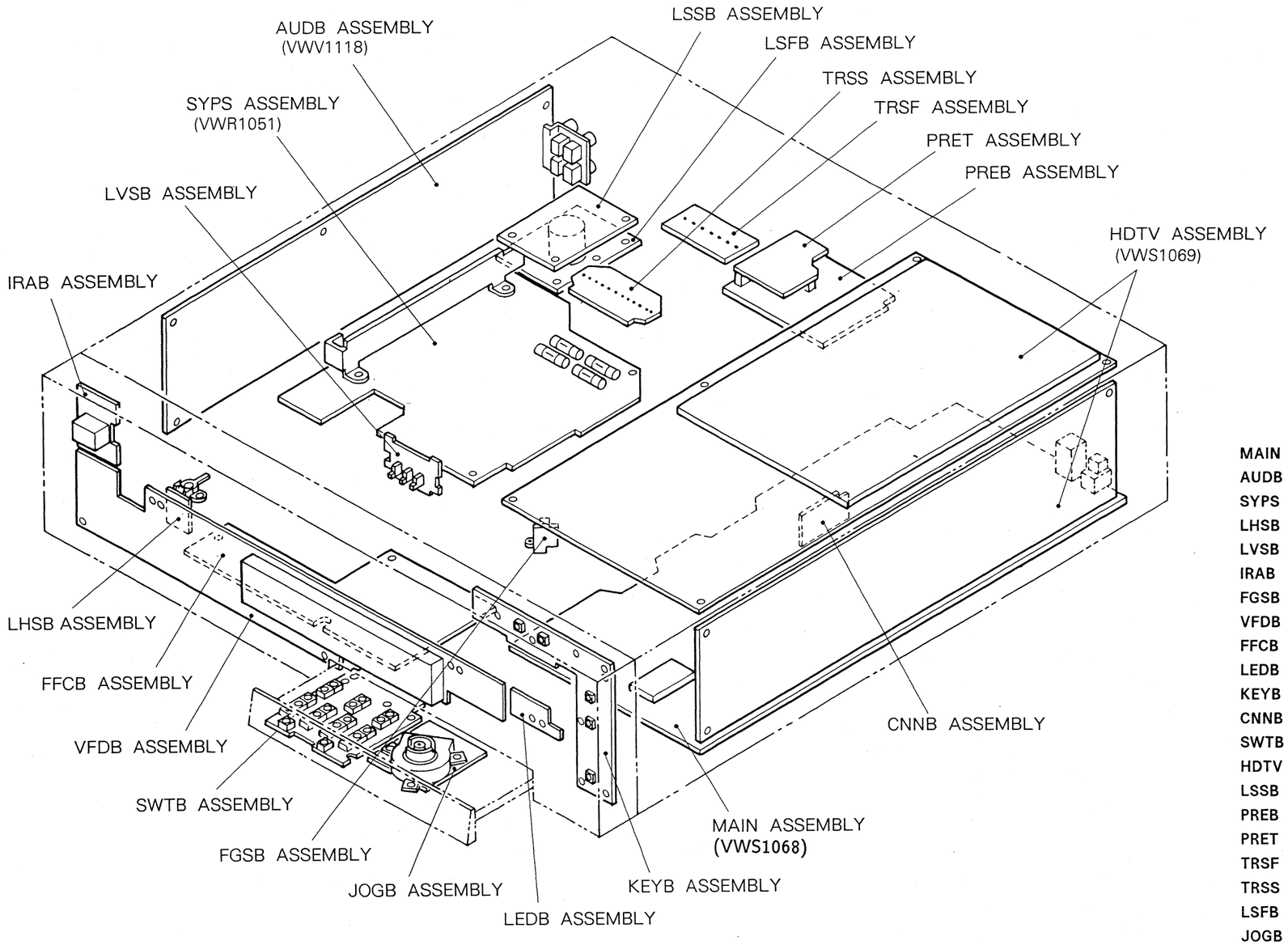
3.10 PICKUP ASSEMBLY (VWY1019)



Parts List of Pickup Assembly

Mark	No.	Part No.	Description
	1	VXX1241	Actuator assembly
	2	VEX1018	Sensor assembly
	3	VXX1332	Pre pickup assembly
	4	VNH1020	Sensor stay
	5	PMA20P060FMC	Screw
	6	PMA20P080FMC	Screw
	7	PMA20P140FMC	Screw
	8	PMB20P050FMC	Screw

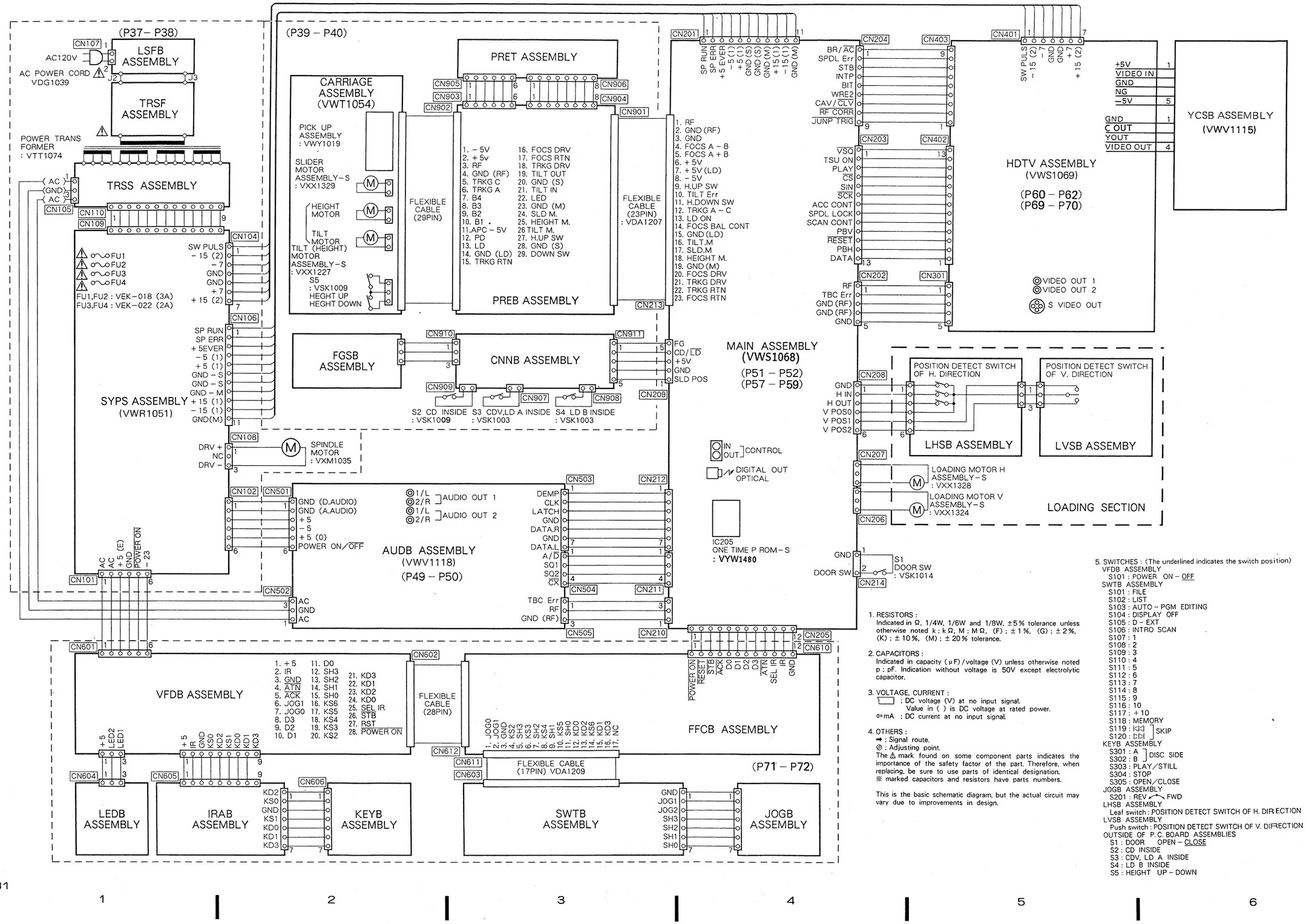
4. P. C. BOARDS LOCATION



MAIN : **MAIN** BOARD
AUDB : **AUD**IO **B**OARD
SYPS : **SY**STEM **P**OWER **S**UPPLY
LHSB : **L**OADING **H**ORIZONTAL **S**WITCH **B**OARD
LVSB : **L**OADING **V**ERTICAL **S**WITCH **B**OARD
IRAB : **I**NFR**A**RED **A**MPLIFIER **B**OARD
FGSB : **FG** **S**WITCH **B**OARD
VFDB : **VF** **D**ISPLAY **B**OARD
FFCB : **F**LEXIBLE **F**LAT **C**ABLE **B**OARD
LEDB : **LED** **B**OARD
KEYB : **KEY** **B**OARD
CNNB : **C**O**NN**ECTOR **B**OARD
SWTB : **SW**I**T**CH **B**OARD
HDTV : **H**IGH-BRED CIRCUIT OF **D**IGITAL **T**BC A**N**D **V**IDEO
LSSB : **L**INE **S**URGE **S**HIELD **B**OARD
PREB : **PRE** AMPLIFIER **B**OTTOM BOARD
PRET : **PRE** AMPLIFIER **T**OP BOARD
TRSF : **TR**A**NSF**ORMER PRIMARY BOARD
TRSS : **TR**A**NS**FORMER **S**ECONDARY BOARD
LSFB : **L**INE **S**URGE **F**ILTER **B**OARD
JOGB : **JOG** **B**OARD

5. SCHEMATIC AND P. C. BOARDS DIAGRAM

5.1 OVERALL WIRING DIAGRAM



1. RESISTORS :
Indicated in Ω, 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ±1%, (G) ; ±2%, (K) ; ±10%, (M) ; ±20% tolerance.

2. CAPACITORS :
Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT :
▭ ; DC voltage (V) at no input signal.
Value in ( ) is DC voltage at rated power.
⇦mA ; DC current at no input signal.

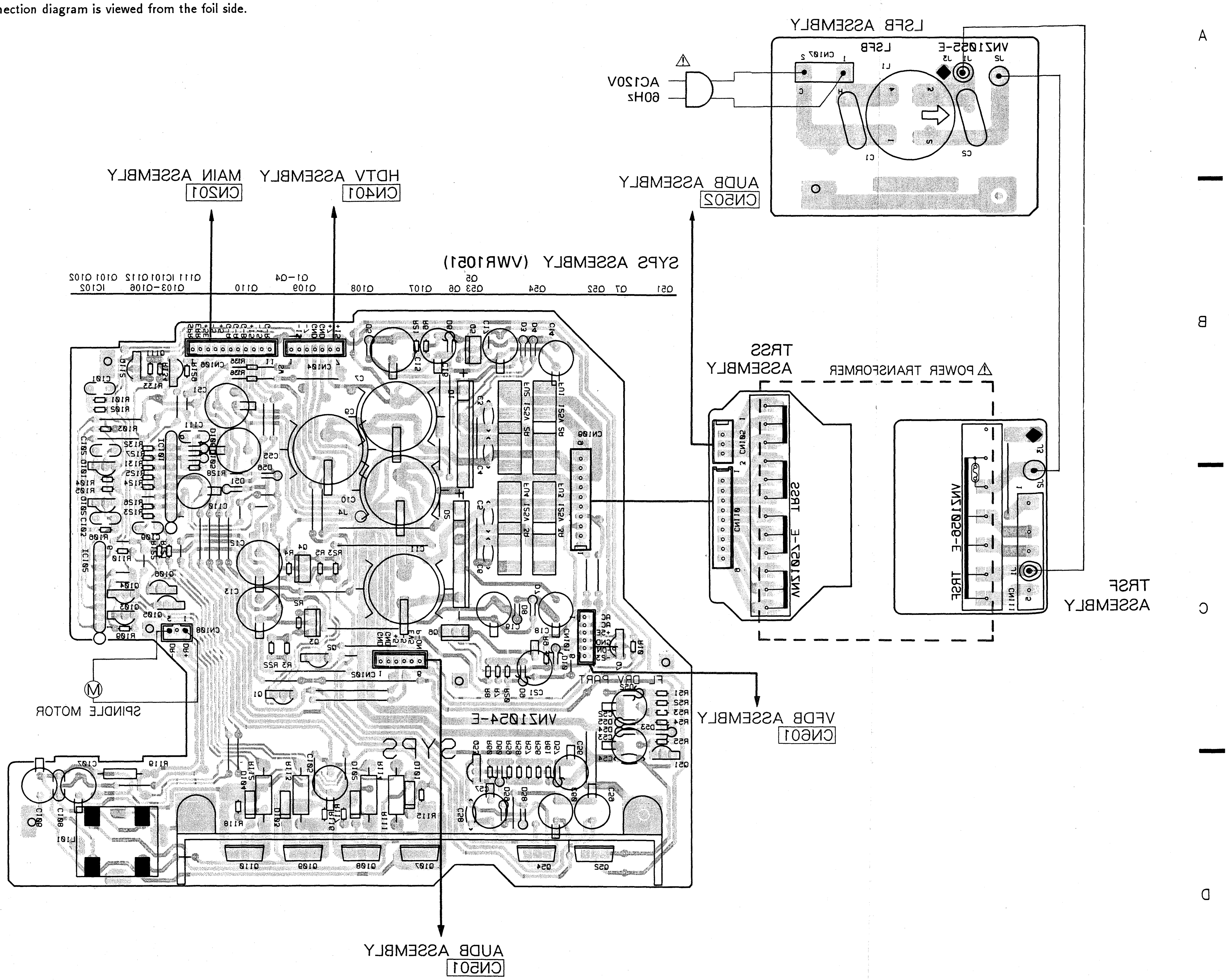
4. OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

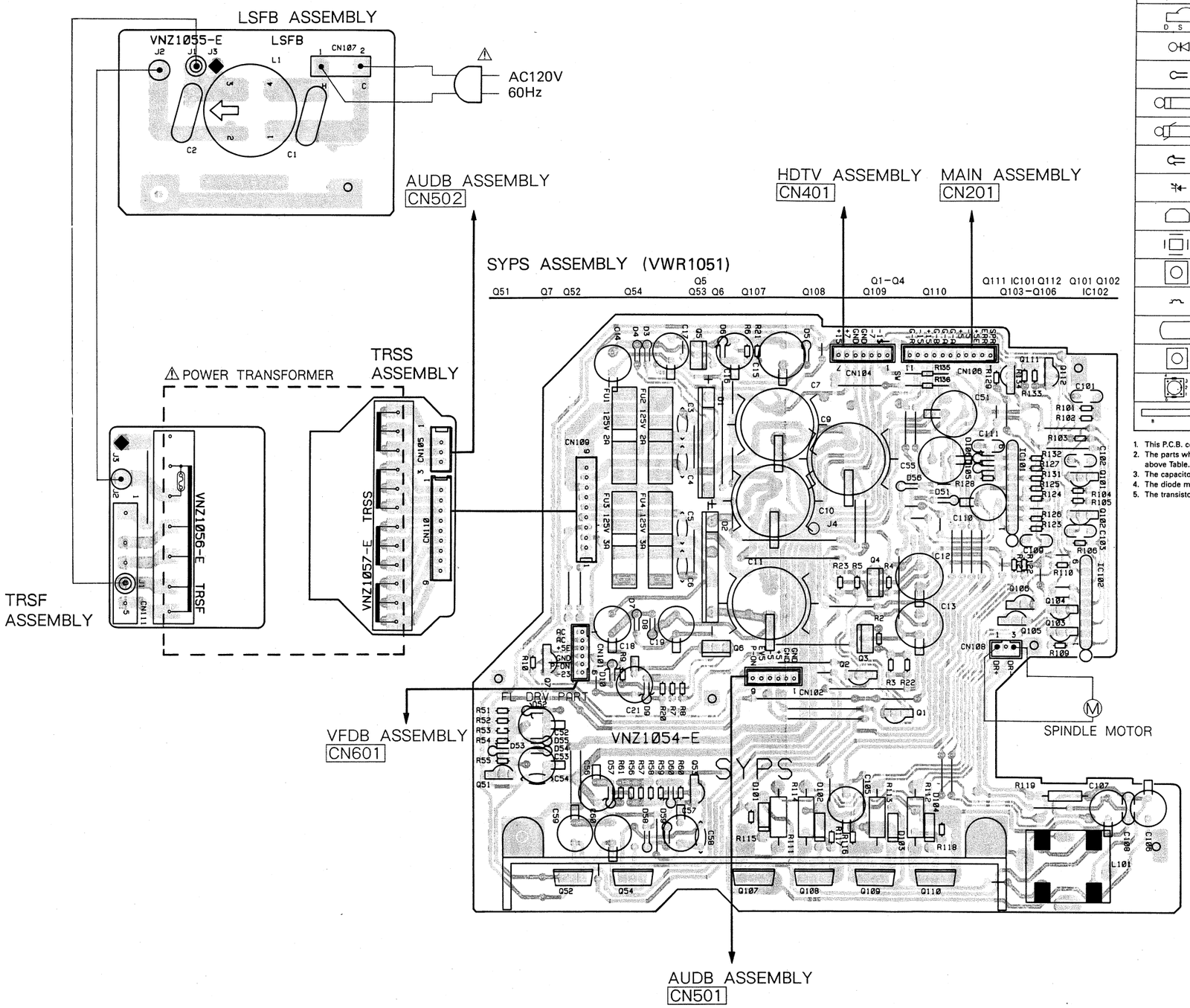
5. SWITCHES : (The underlined indicates the switch position)
VFDB ASSEMBLY
S101 : POWER ON – OFF
SWTB ASSEMBLY
S101 : FILE
S102 : LIST
S103 : AUTO – PGM EDITING
S104 : DISPLAY OFF
S105 : D – EXT
S106 : INTRO SCAN
S107 : 1
S108 : 2
S109 : 3
S110 : 4
S111 : 5
S112 : 6
S113 : 7
S114 : 8
S115 : 9
S116 : 10
S117 : +10
S118 : MEMORY
S119 : ⏮ SKIP
S120 : ⏭
KEYB ASSEMBLY
S301 : A DISC SIDE
S302 : B
S303 : PLAY/STILL
S304 : STOP
S305 : OPEN/CLOSE
JOGB ASSEMBLY
S201 : REV ↶ FWD
LHSB ASSEMBLY
Leaf switch : POSITION DETECT SWITCH OF H. DIRECTION
LVSB ASSEMBLY
Push switch : POSITION DETECT SWITCH OF V. DIRECTION
OUTSIDE OF P.C. BOARD ASSEMBLIES
S1 : DOOR OPEN – CLOSE
S2 : CD INSIDE
S3 : CDV, LD A INSIDE
S4 : LD B INSIDE
S5 : HEIGHT UP – DOWN

5.2 LSFB, TRSF, TRSS, SYPS ASSEMBLIES

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

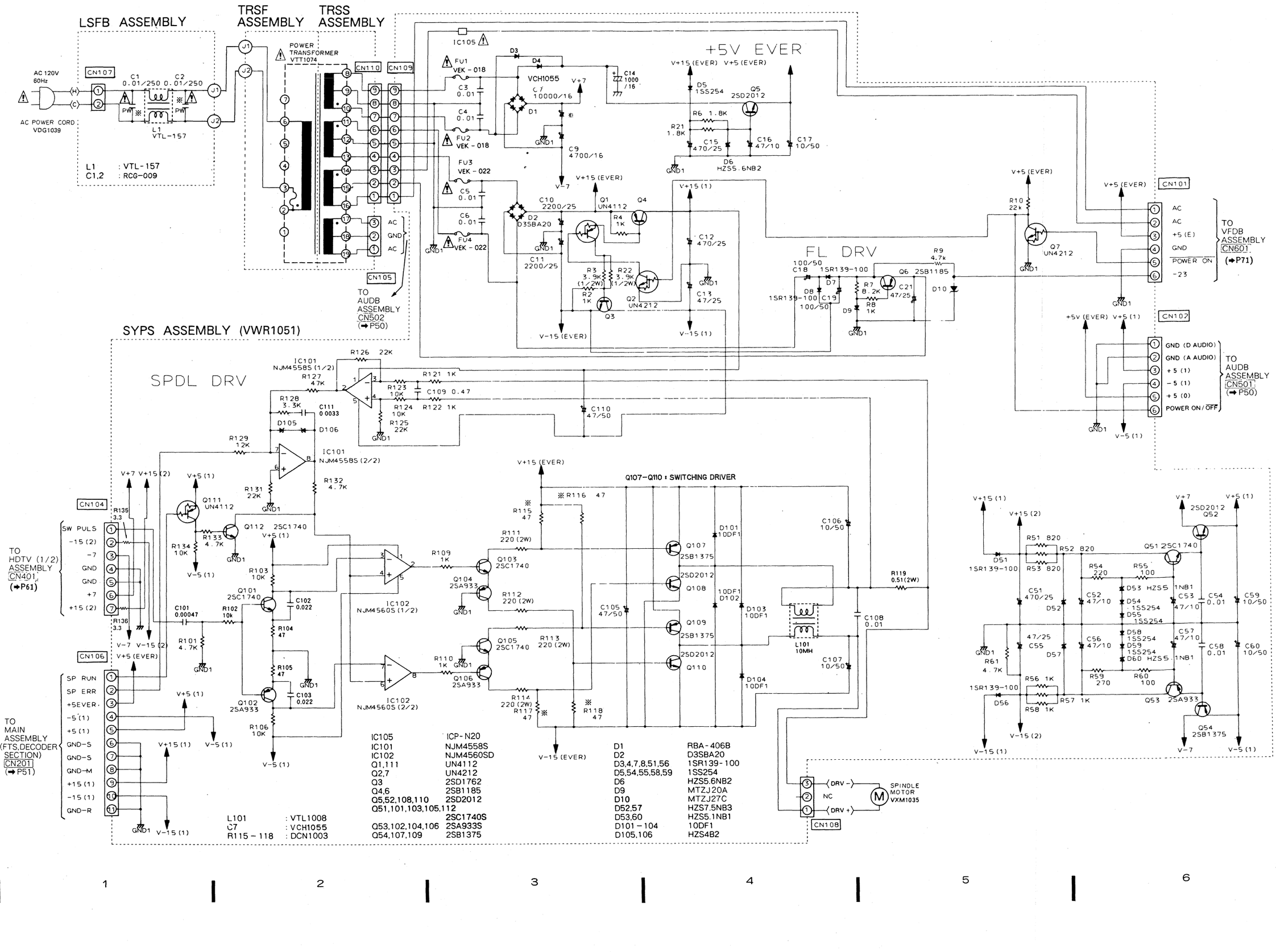


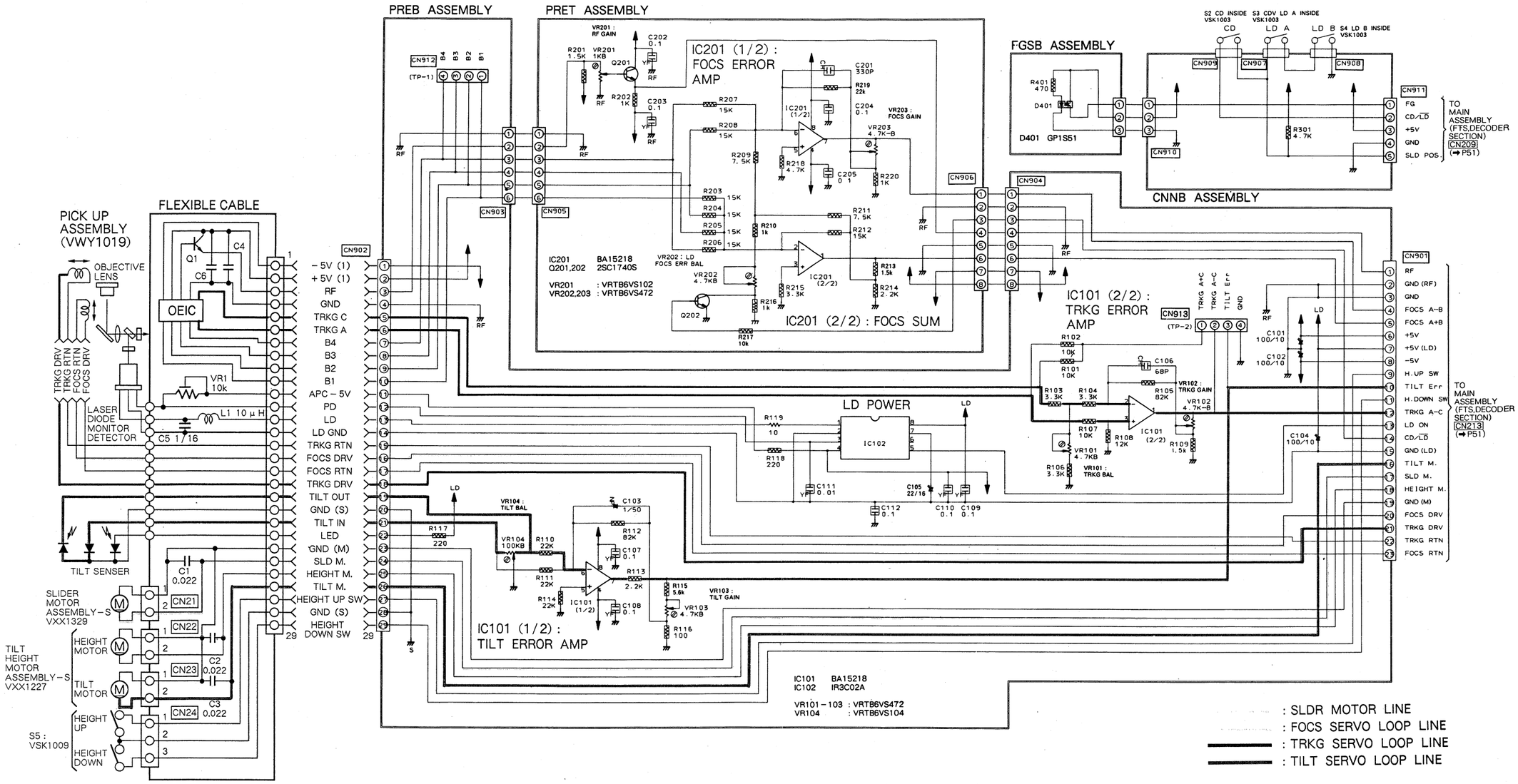
5.2 LSFB, TRSF, TRSS, SYPS ASSEMBLIES



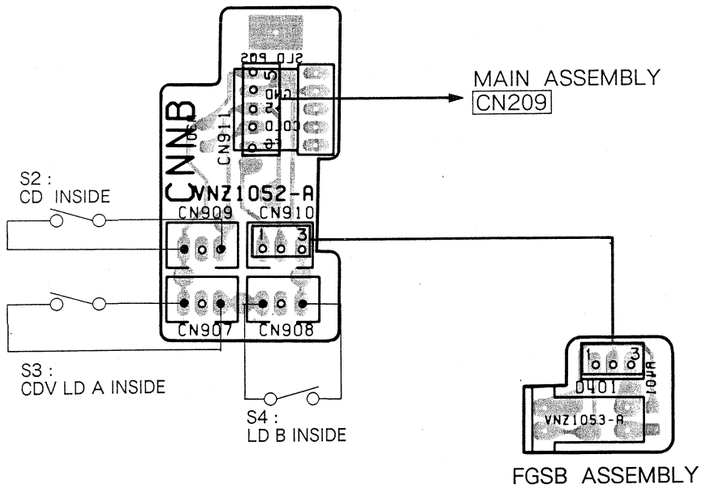
P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
		Diode			Styrol capacitor
					Electrolytic capacitor (Non polarized)
					Electrolytic capacitor (Noiseless)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

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

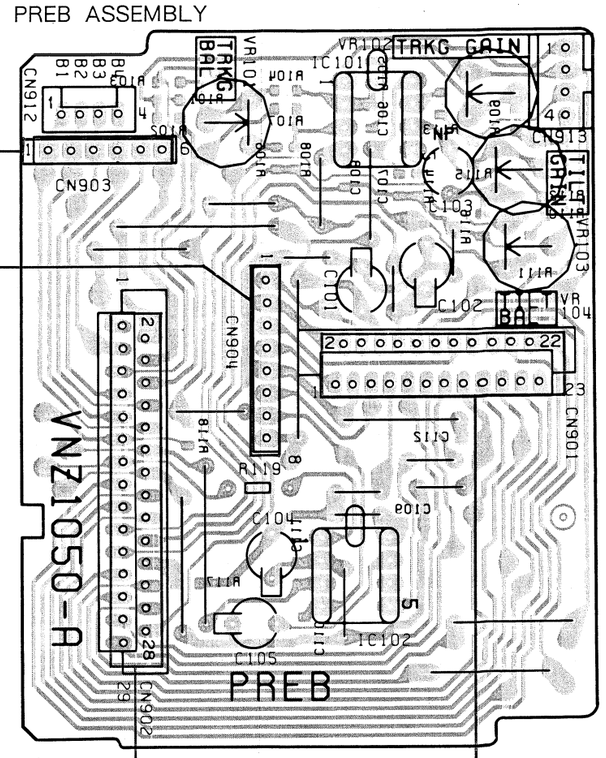

LSFB ASSEMBLY
TRSF ASSEMBLY
TRSS ASSEMBLY
AC 120V 60Hz
AC POWER CORD VDG1039
CN107
C1 0.01/250
C2 0.01/250
PW
L1 VTL-157
L1 : VTL-157
C1,2 : RCG-009
POWER TRANSFORMER VTT1074
CN110
CN109
IC105
FU1 VEK-018
FU2 VEK-018
FU3 VEK-022
FU4 VEK-022
C3 0.01
C4 0.01
C5 0.01
C6 0.01
D3
D4
VCH1055
C7 10000/16
D1
C14 1000/16
C9 4700/16
V+7
V-7
+5V EVER
V+15(EVER) V+5(EVER)
D5 1SS254
Q5 2SD2012
R6 1.8K
R21 1.8K
C15 470/25
C16 47/10
C17 10/50
D6 HZS5.6NB2
V+15(EVER)
Q1 UN4112
Q4
R4 1K
D2 D3SBA20
C10 2200/25
C11 2200/25
R3 3.9K (1/2W)
R22 3.9K (1/2W)
R2 1K
Q2 UN4212
Q3
C12 470/25
C13 47/25
V+15(1)
V-15(EVER)
V-15(1)
FL DRV
C18 100/50
1SR139-100
D8
D7
C19 100/50
D9
R7 8.2K
R8 1K
C21 47/25
Q6 2SB1185
R9 4.7K
D10
R10 22K
Q7 UN4212
V+5(EVER)
CN101
AC
AC
+5(E)
GND
POWER ON
-23
TO VFDB ASSEMBLY CN601 (➡P71)
CN102
GND (D AUDIO)
GND (A AUDIO)
+5(1)
-5(1)
+5(0)
POWER ON/OFF
TO AUDB ASSEMBLY CN501 (➡P50)
CN105
TO AUDB ASSEMBLY CN502 (➡P50)
SYPS ASSEMBLY (VWR1051)
SPDL DRV
IC101 NJM4558S(1/2)
R126 22K
R127 47K
R121 1K
R123 10K
C109 0.47
R122 1K
R124 10K
R125 22K
C110 47/50
R128 3.3K
C111 0.0033
D105
D106
R129 12K
IC101 NJM4558S(2/2)
R131 22K
R132 4.7K
V+7 V+15(2)
V+5(1)
Q111 UN4112
R133 4.7K
R134 10K
V-5(1)
Q112 2SC1740
R103 10K
Q101 2SC1740
C102 0.022
R104 47
R105 47
C103 0.022
Q102 2SA933
R106 10K
C101 0.00047
R102 10k
R101 4.7K
R135 3.3
R136 3.3
V-7 V-15(2)
V+5(EVER)
CN104
SW PULS
-15(2)
-7
GND
GND
+7
+15(2)
TO HDTV(1/2) ASSEMBLY CN401 (➡P61)
CN106
SP RUN
SP ERR
+5EVER
-5(1)
+5(1)
GND-S
GND-S
GND-M
+15(1)
-15(1)
GND-R
TO MAIN ASSEMBLY (FTS,DECODER SECTION) CN201 (➡P51)
IC102 NJM4560S(1/2)
IC102 NJM4560S(2/2)
V+15(EVER)
※R116 47
※R115 47
R111 220(2W)
R112 220(2W)
R113 220(2W)
R114 220(2W)
※R117 47
※R118 47
R109 1K
R110 1K
Q104 2SA933
Q106 2SA933
Q103 2SC1740
Q105 2SC1740
Q107 2SB1375
Q108 2SD2012
Q109 2SB1375
Q110 2SD2012
Q107~Q110 : SWITCHING DRIVER
D101 10DF1
D102 10DF1
D103 10DF1
D104 10DF1
C105 47/50
C106 10/50
C107 10/50
C108 0.01
L101 10MH
R119 0.51(2W)
V-15(EVER)
CN108
DRV-
NC
DRV+
SPINDLE MOTOR VXM1035
IC105 ICP-N20
IC101 NJM4558S
IC102 NJM4560SD
Q1,111 UN4112
Q2,7 UN4212
Q3 2SD1762
Q4,6 2SB1185
Q5,52,108,110 2SD2012
Q51,101,103,105,112 2SC1740S
Q53,102,104,106 2SA933S
Q54,107,109 2SB1375
D1 RBA-406B
D2 D3SBA20
D3,4,7,8,51,56 1SR139-100
D5,54,55,58,59 1SS254
D6 HZS5.6NB2
D9 MTZJ20A
D10 MTZJ27C
D52,57 HZS7.5NB3
D53,60 HZS5.1NB1
D101-104 10DF1
D105,106 HZS4B2
L101 : VTL1008
C7 : VCH1055
R115-118 : DCN1003
V+5(1) V+15(2)
R51 820
R52 820
R53 820
D51 1SR139-100
Q51 2SC1740
Q52 2SD2012
R54 220
R55 100
C51 470/25
D52
C52 47/10
D53 HZS5.1NB1
D54 1SS254
D55 1SS254
C53 47/10
C54 0.01
C59 10/50
C55 47/25
D57
C56 47/10
D58 1SS254
D59 1SS254
D60 HZS5.1NB1
C57 47/10
C58 0.01
C60 10/50
R61 4.7K
R56 1K
R57 1K
R58 1K
R59 270
R60 100
D56 1SR139-100
Q53 2SA933
Q54 2SB1375
V-15(2)
V-15(1)
V-7
V-5(1)


PREB ASSEMBLY
PRET ASSEMBLY
FGSB ASSEMBLY
CNNB ASSEMBLY
PICK UP ASSEMBLY (VWY1019)
FLEXIBLE CABLE
OBJECTIVE LENS
OEIC
LASER DIODE MONITOR DETECTOR
TILT SENSER
SLIDER MOTOR ASSEMBLY-S VXX1329
TILT HEIGHT MOTOR ASSEMBLY-S VXX1227
S5 : VSK1009
HEIGHT UP
HEIGHT DOWN
IC201 (1/2) : FOCS ERROR AMP
IC201 (2/2) : FOCS SUM
IC101 (1/2) : TILT ERROR AMP
IC101 (2/2) : TRKG ERROR AMP
LD POWER
IC201 BA15218
Q201,202 2SC1740S
VR201 : VRTB6VS102
VR202,203 : VRTB6VS472
IC101 BA15218
IC102 IR3C02A
VR101-103 : VRTB6VS472
VR104 : VRTB6VS104
D401 GP1S51
S2 CD INSIDE VSK1003
S3 CDV LD A INSIDE VSK1003
S4 LD B INSIDE VSK1003
TO MAIN ASSEMBLY (FTS,DECODER SECTION) CN209 (➡P51)
TO MAIN ASSEMBLY (FTS,DECODER SECTION) CN213 (➡P51)
: SLDR MOTOR LINE
: FOCS SERVO LOOP LINE
: TRKG SERVO LOOP LINE
: TILT SERVO LOOP LINE

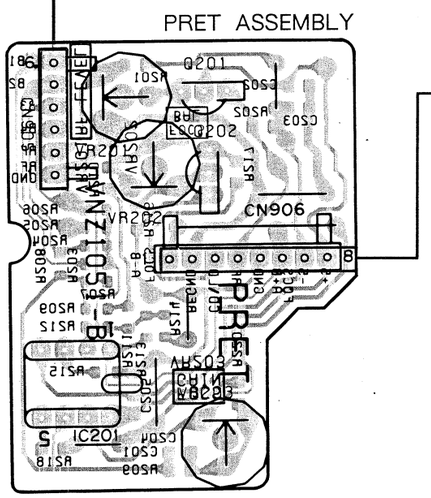
CNNB ASSEMBLY



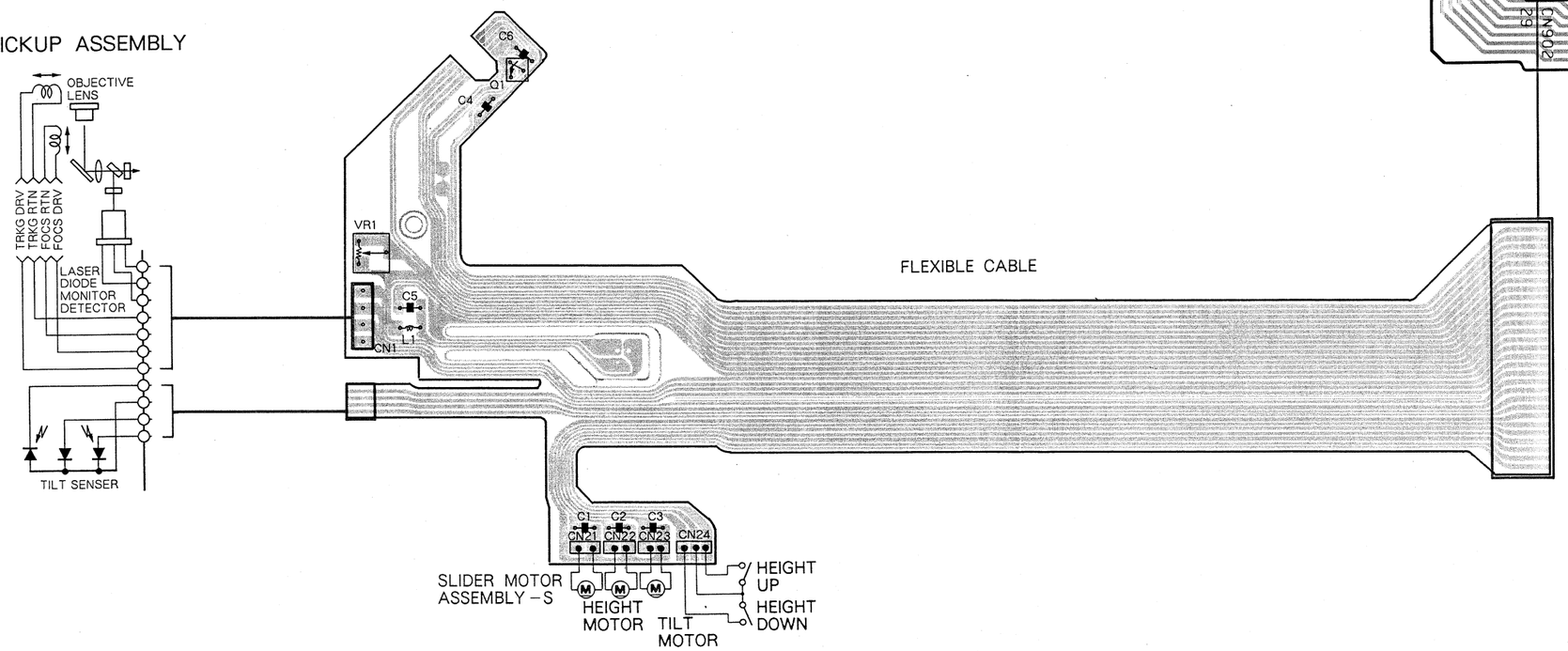
PREB ASSEMBLY



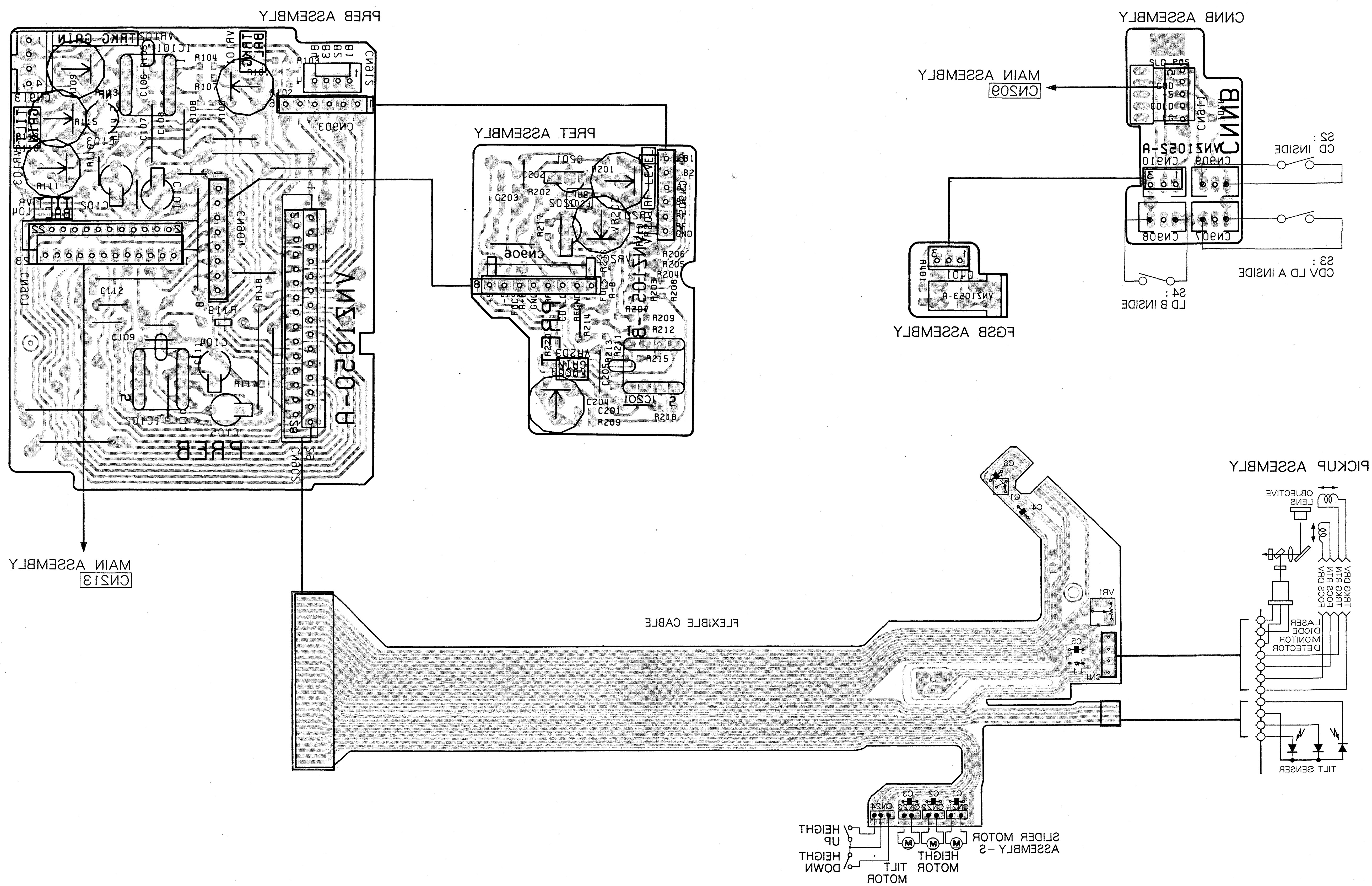
PRET ASSEMBLY



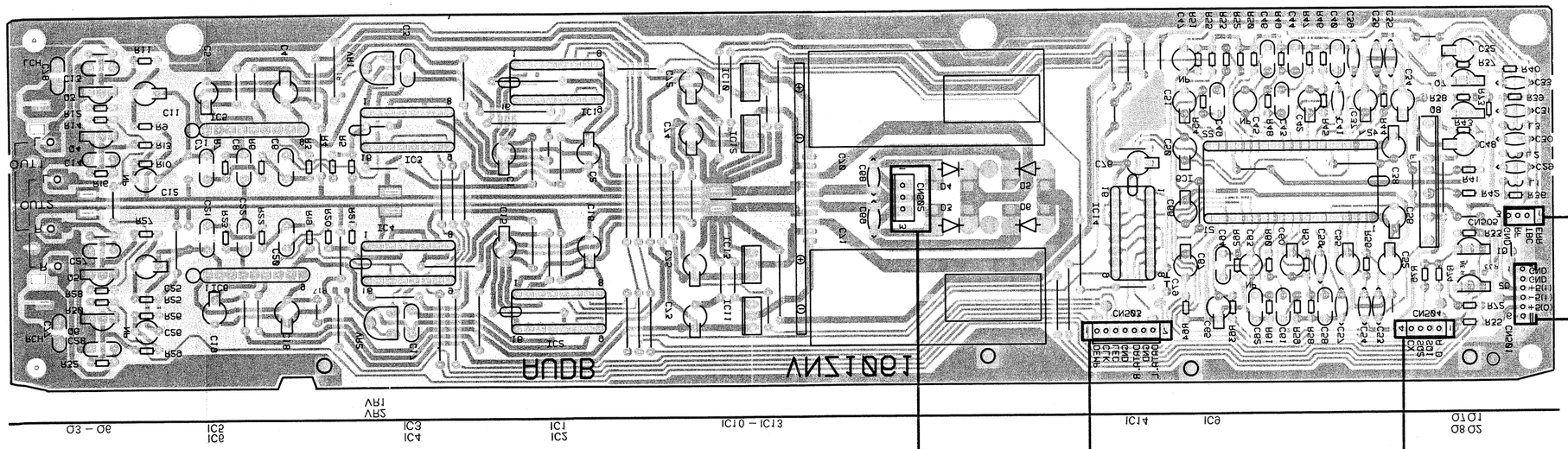
PICKUP ASSEMBLY



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



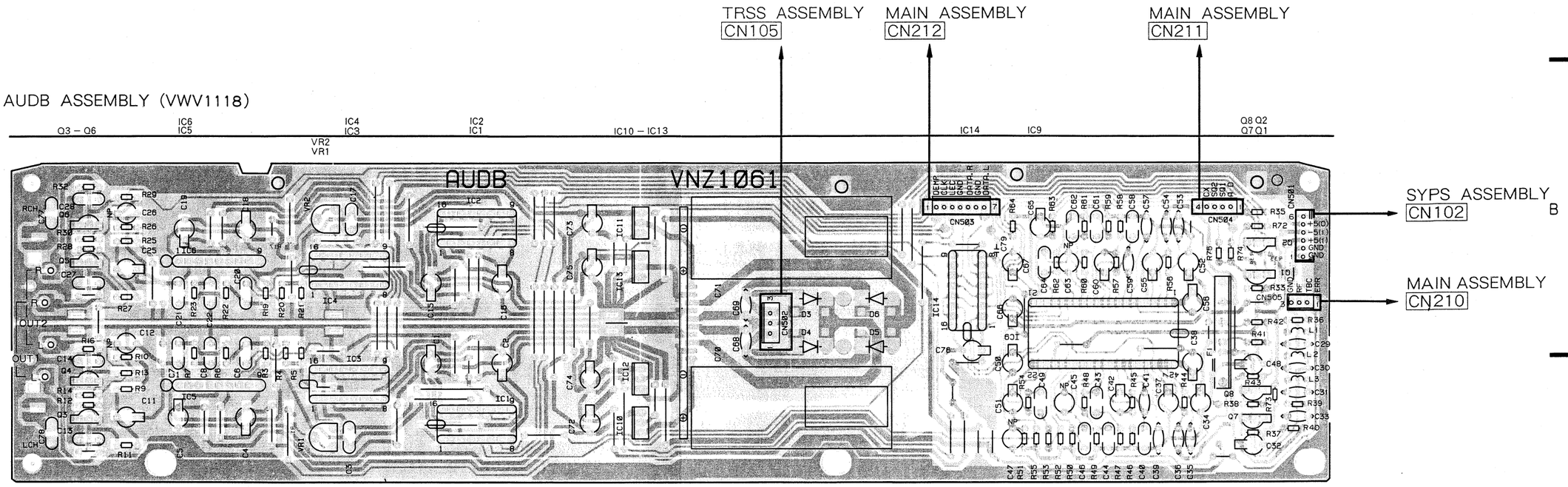
P.C.B. ADUA ASSEMBLY



ADUA ASSEMBLY (8111WV)

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

5.4 AUDB ASSEMBLY



AUDB ASSEMBLY (VWV 1118)

: RF SIGNAL LINE
: DIGITAL AUDIO SIGNAL LINE
: ANALOG AUDIO SIGNAL LINE
: AUDIO SIGNAL LINE

IC1, IC2 : D/A CONVERTER

IC9 : AUDIO DEMODULATOR & CX NOISE REDUCTION

Q7,Q8 : BUFFER AMP.

TO MAIN ASSEMBLY (FTS,DECODER SECTION) CN212 (➡P52)
CN503: DEMP, CLK, LEC, GND, DATA.R, GND, DATA.L

TO MAIN ASSEMBLY (CONT SECTION) CN211 (➡P59)
CN504: A/D, SQ1, SQ2, CX

TO MAIN ASSEMBLY (FTS,DECODER SECTION) CN210 (➡P51)
CN505: TBC Err, RF, GND (RF)

TO SYPS ASSEMBLY CN102 (➡P38)
CN501: GND (D.AUDIO), GND (A.AUDIO), +5, -5, +5 (O), POWER ON/OFF

TO TRSS ASSEMBLY CN105 (➡P37)
CN502: AC, GND, AC

Lch (OUT1)
Lch (OUT2)
Rch (OUT1)
Rch (OUT2)

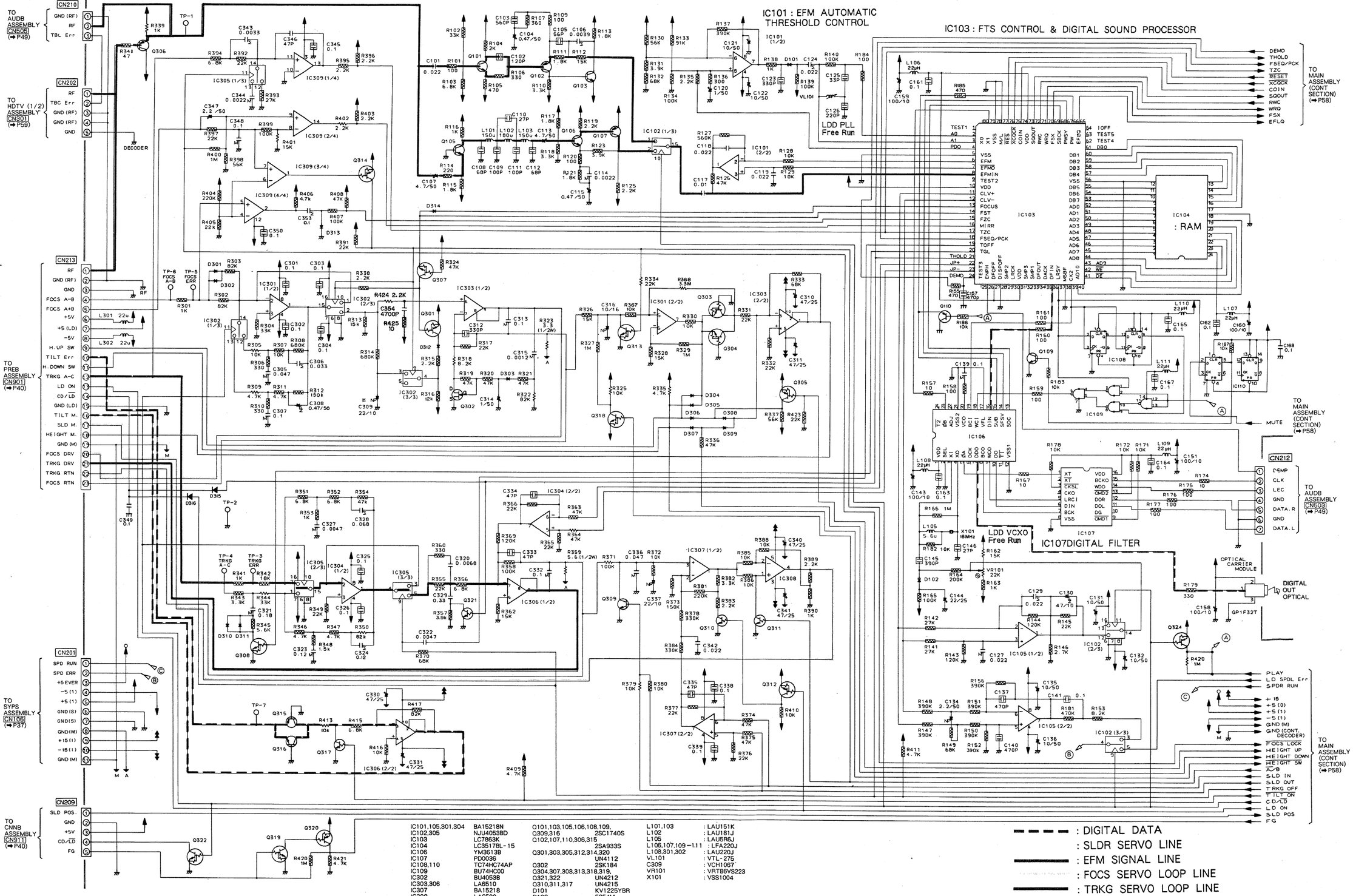
IC1,2	AD1860N-K
IC3,4	BU4053B
IC5,6	NJM5532SD
IC9	PA0034A
IC10	M5F78M12L
IC11	M5F78M12L
IC12	M5F78M12L
IC13	M5F78M12L
IC14	HD74HC153P
Q1	UN4112
Q2	2SA933S
Q3 – 6	2SD2144S
Q7	2SC2786
Q8	2SC1740S
D3 – 6	1SR35-100AVL

L1,3	: LAU560J
L2	: LAU270J
F1	: RTF1084
VR1,2	: VRTB6VS222
R11,27	: VCN1006

V:100mV/div, H:10μS/div
V:0.5V/div, H 0.5mS/div

5.5 MAIN ASSEMBLY (FTS, DECODER SECTION)

MAIN ASSEMBLY (VWS1068) (FTS, DECODER SECTION)



IC101,105,301,304	BA15218N	Q101,103,105,106,108,109,		L101,103	: LAU151K
IC102,305	NJU4053BD	Q309,316	2SC1740S	L102	: LAU181J
IC103	LC7863K	Q102,107,110,306,315		L105	: LAU5R6J
IC104	LC3517BL-15		2SA933S	L106,107,109~111	: LFA220J
IC106	YM3613B	Q301,303,305,312,314,320		L108,301,302	: LAU220J
IC107	PD0036		UN4112	VL101	: VTL-275
IC108,110	TC74HC74AP	Q302	2SK184	C309	: VCH1067
IC109	BU74HC00	Q304,307,308,313,318,319,		VR101	: VRT86VS223
IC302	BU4053B	Q321,322	UN4212	X101	: VSS1004
IC303,306	LA6510	Q310,311,317	UN4215		
IC307	BA15218	D101	KV1225YBR		
IC308	LA6500	D102	FC54M		
IC309	IR2339	D301~316	1SS254		

- : DIGITAL DATA
- : SLDR SERVO LINE
- : EFM SIGNAL LINE
- : FOCS SERVO LOOP LINE
- : TRKG SERVO LOOP LINE
- : TILT ERRER LINE

AUDB ASSEMBLY CN503

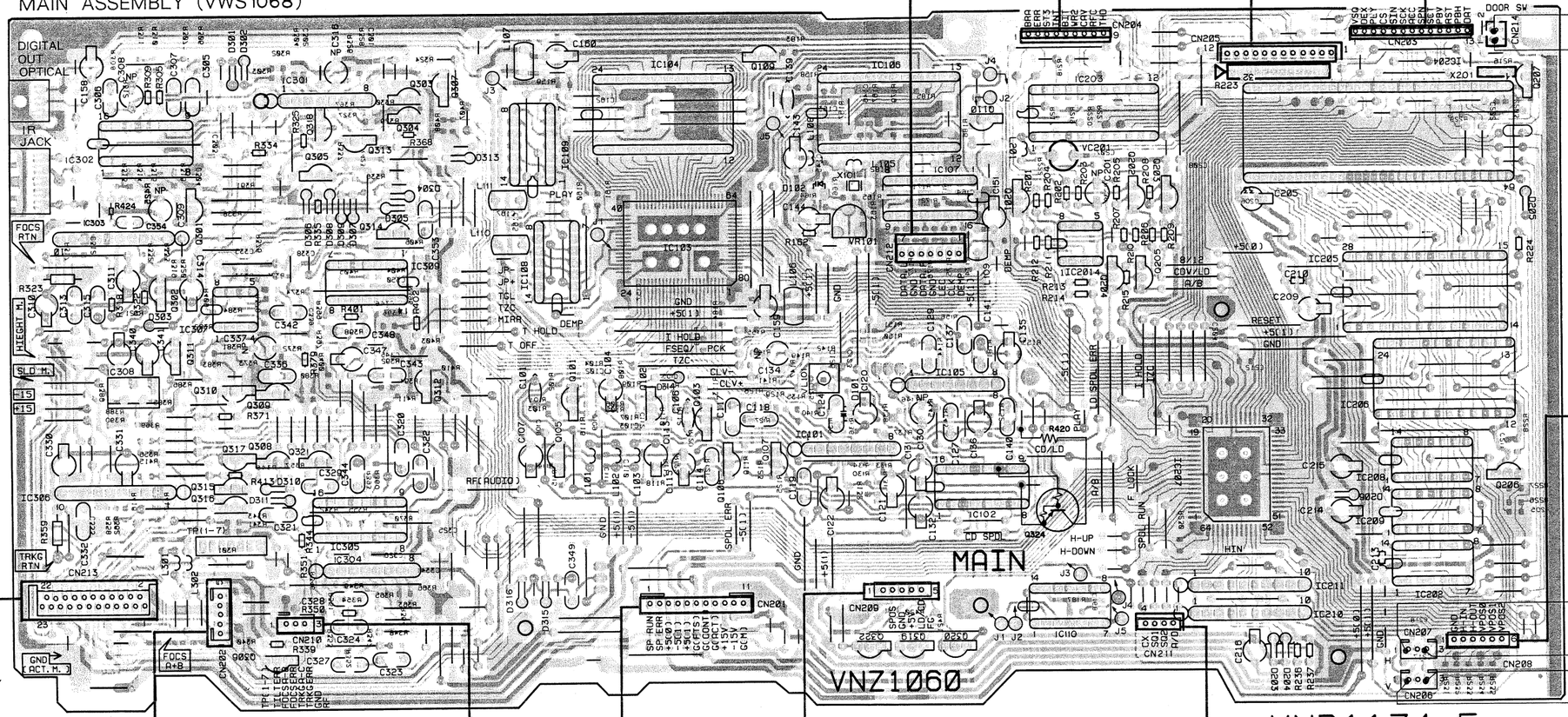
HDTV ASSEMBLY CN403

FFCB ASSEMBLY CN610

HDTV ASSEMBLY CN402

S1 : DOOR SW

MAIN ASSEMBLY (VWS1068)



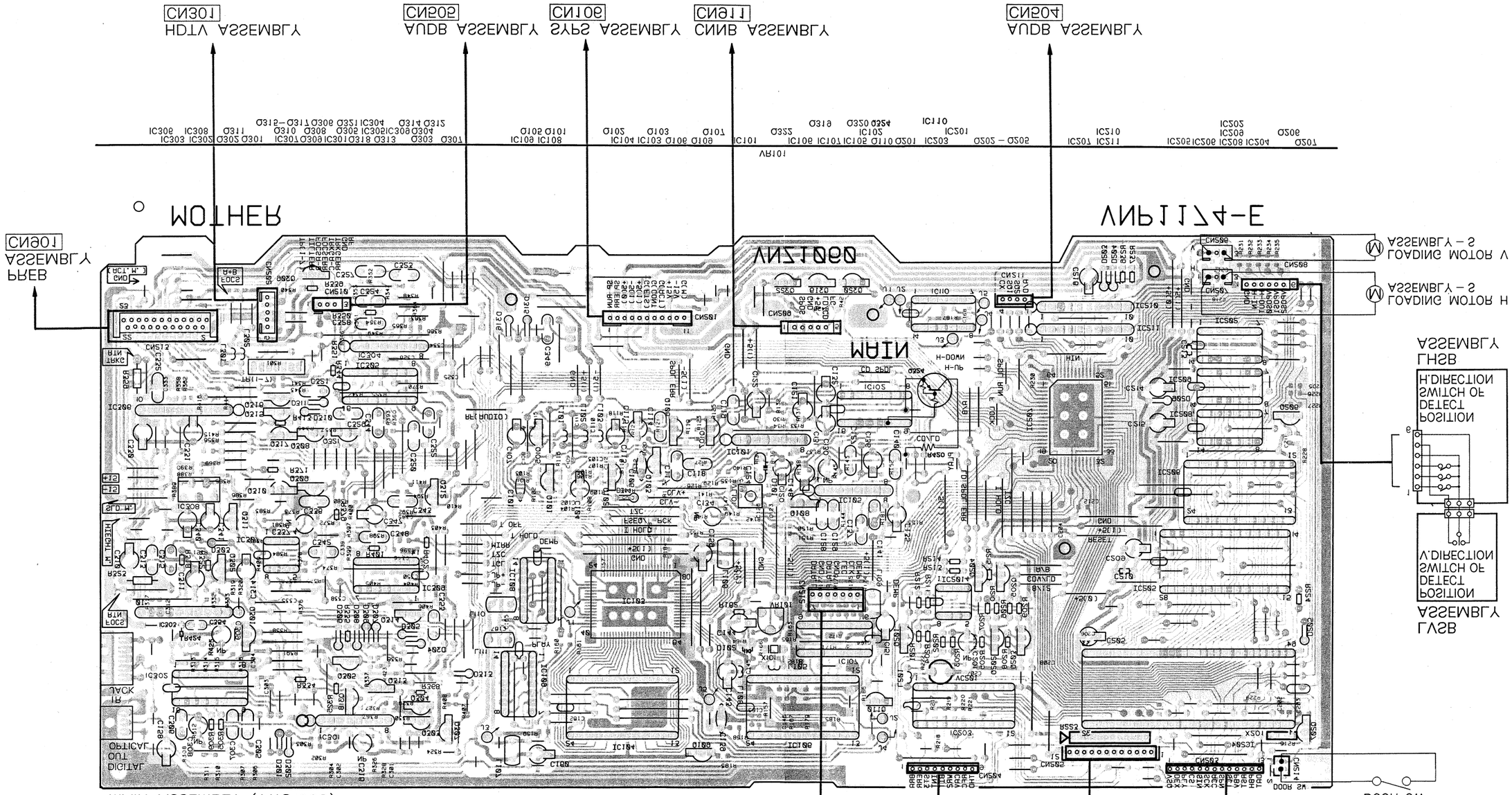
HDTV ASSEMBLY CN301

AUDB ASSEMBLY CN505

SYPS ASSEMBLY CN106

CNNB ASSEMBLY CN911

AUDB ASSEMBLY CN504

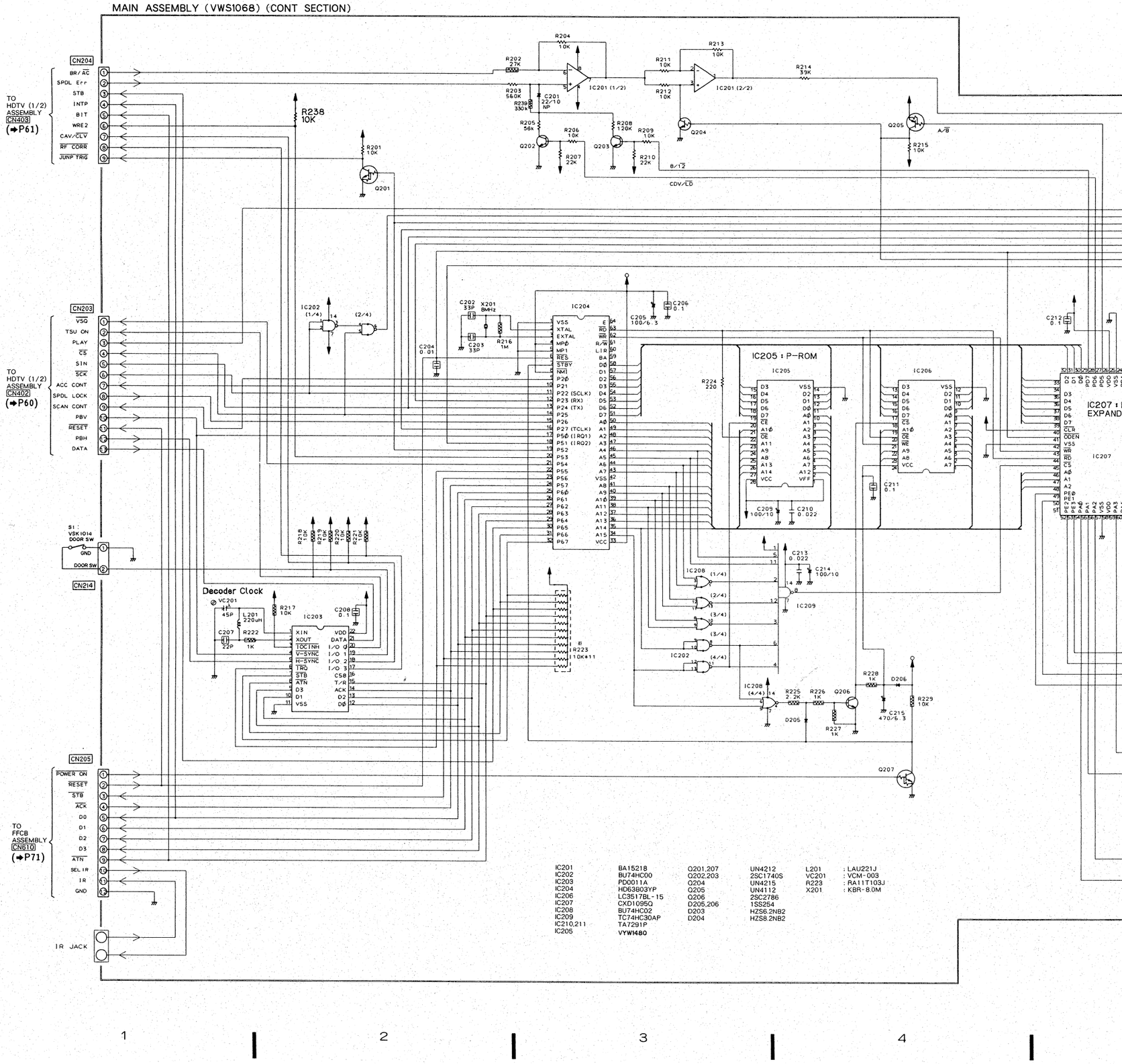


This P. C. B. connection diagram is viewed from the foil side.

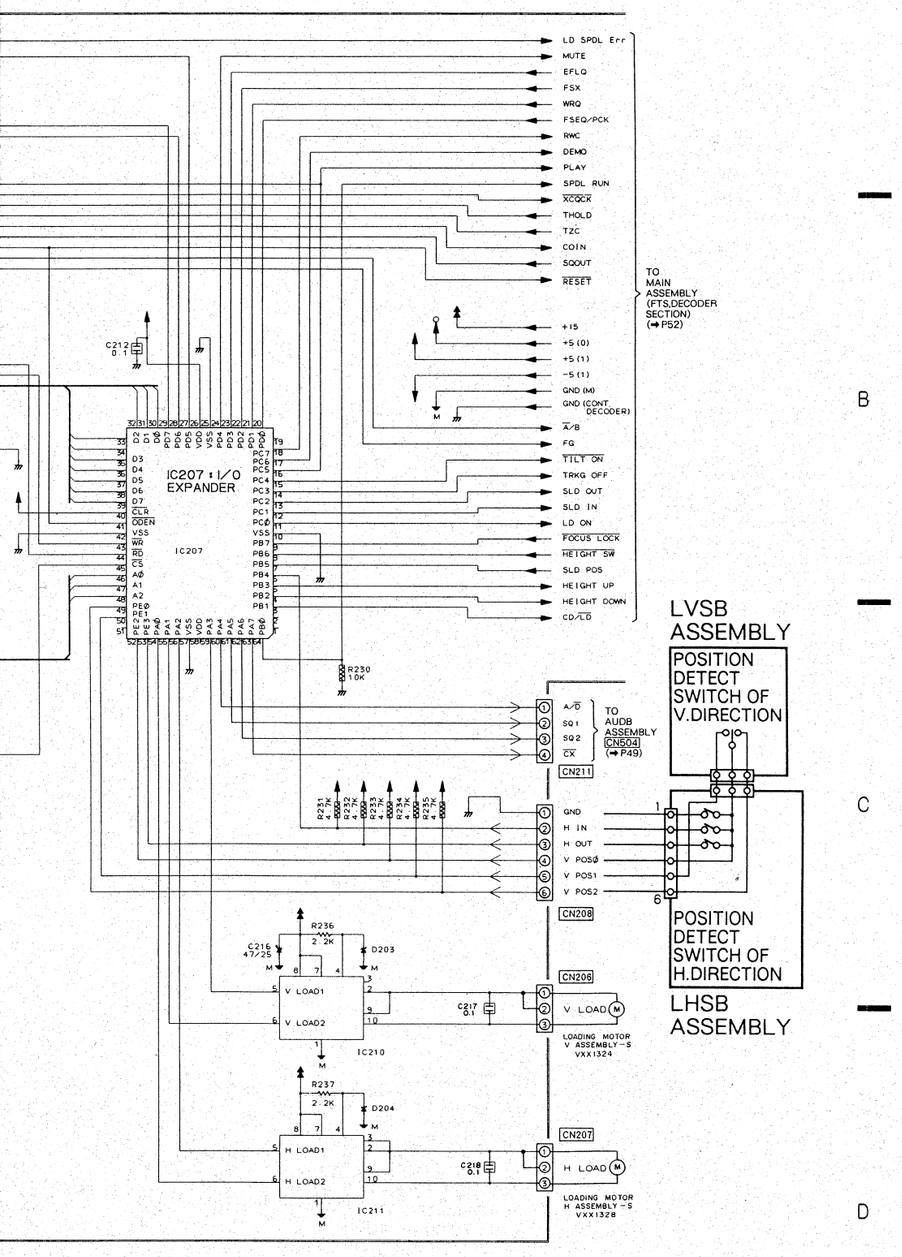
CRD-3080

5.6 MAIN ASSEMBLY (CONT SECTION)

MAIN ASSEMBLY (VWS1068) (CONT SECTION)



IC201	BA15218	Q201,207	UN4212	L201	: LAU221J
IC202	BU74HC00	Q202,203	2SC1740S	VC201	: VCM-003
IC203	PD0011A	Q204	UN4215	R223	: RA11T103J
IC204	HD63B03YP	Q205	UN4112	X201	: KBR-8.0M
IC206	LC3517BL-15	Q206	2SC2786		
IC207	CXD1095Q	D205,206	1SS254		
IC208	BU74HC02	D203	HZS6.2NB2		
IC209	TC74HC30AP	D204	HZS8.2NB2		
IC210,211	TA7291P				
IC205	VYW1480				


LD SPDL Err
MUTE
EFLQ
FSX
WRQ
FSEQ/PCK
RWC
DEMO
PLAY
SPDL RUN
XCOCK
THOLD
TZC
COIN
SQOUT
RESET
TO MAIN ASSEMBLY (FTS,DECODER SECTION) (→P52)
+15
+5 (0)
+5 (1)
−5 (1)
GND (M)
GND (CONT DECODER)
A/B
FG
TILT ON
TRKG OFF
SLD OUT
SLD IN
LD ON
FOCUS LOCK
HEIGHT SW
SLD POS
HEIGHT UP
HEIGHT DOWN
CD/LD
C212 0.1
IC207 I/O EXPANDER
IC207
R230 10K
A/D
SQ1
SQ2
CK
TO AUDB ASSEMBLY CN504 (→P49)
CN211
R231 4.7K
R232 4.7K
R233 4.7K
R234 4.7K
R235 4.7K
GND
H IN
H OUT
V POS0
V POS1
V POS2
CN208
LVSB ASSEMBLY
POSITION DETECT SWITCH OF V.DIRECTION
POSITION DETECT SWITCH OF H.DIRECTION
LHSB ASSEMBLY
R236 2.2K
C216 47/25
D203
V LOAD1
V LOAD2
IC210
CN206
C217 0.1
V LOAD
LOADING MOTOR V ASSEMBLY-S VXX1324
R237 2.2K
D204
H LOAD1
H LOAD2
IC211
CN207
C218 0.1
H LOAD
LOADING MOTOR H ASSEMBLY-S VXX1328

5.7 HDTV (1/2), YCSB ASSEMBLIES

IC101	PA5010	L101,115	: LAU560J
IC103	PM0001	L102,103	: LAU220J
IC501	M50552-132SP	L104,105,113,501	: LAU120J
IC502	TC74HC00AP	L106	: LAU430J
IC601	NJM4558D	L107	: LAU620J
IC602	IR9393	L108	: LAU390J
Q503,505-507, Q510,512,702	2SA933S	L109,111	: LAU221J
		L110	: LAU101J
		L112	: LAU121J
Q501,502,701,529		L114	: LAU180J
Q504,508,511,513-515,518,520,	2SC1740S	L116	: LRA561K
Q509	RN1203	F503	: VTF1039
Q516,517	2SC3064		
Q601,602	RN2203	VR101	: VRTB6VS221
Q703,705,707	2SD2012	VR102	: VRTB6VS222
Q704,708	2SB1375	VR103	: VRTB6VS102
Q706	2SB1238X	VR104	: VRTG6VS472
D601-603,651,		VR501	: VRTB6VS471
D652,705-708	1SS254		
D701,702	HZS8.2NB2		
D703,704	HZS5C1		

IC1	TA7302P	L2	LAU120J
IC2.IC3	MC1496P	L4	LAU150J
Q1.Q6.Q16.Q18	2SA933S	L5	LAU100J
Q17	2SC1674	L6	LAU180J
Q2-Q5.Q7-Q15	2SC1740S	F1.F2	VTF1032
Q19		VR1	VRTB6VS222
D1	1SS254		
L1.L3	LAU470J		

YCSB ASSEMBLY (VWV1115)

IC1 : TA7302P
IC2,3 : MC1496P
Q1,6,16,18 : 2SA933S
Q2-5,7-15, 17,19 : 2SC1740S
D1 : 1SS254

IC501 M50552-132SP

V : 2V/div. H : 20μsec/div

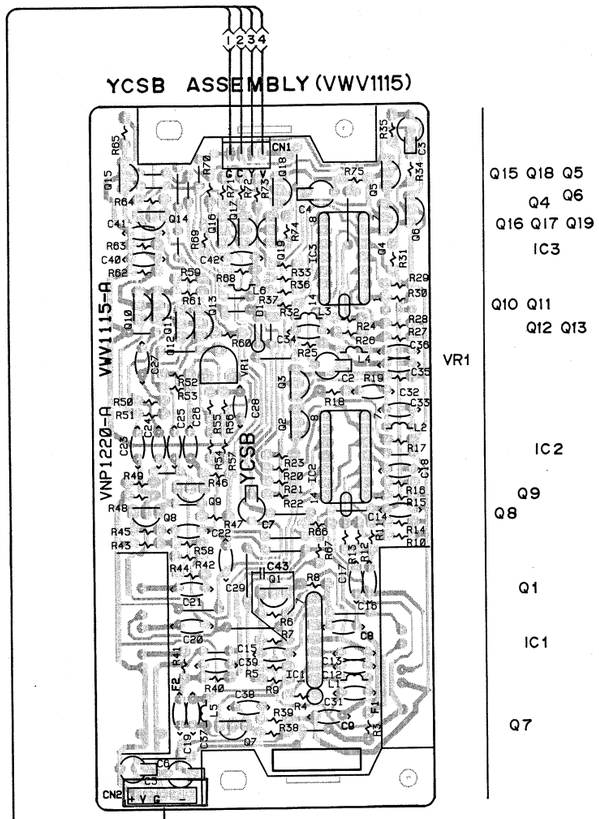
4V 192μsec

600mVp-p

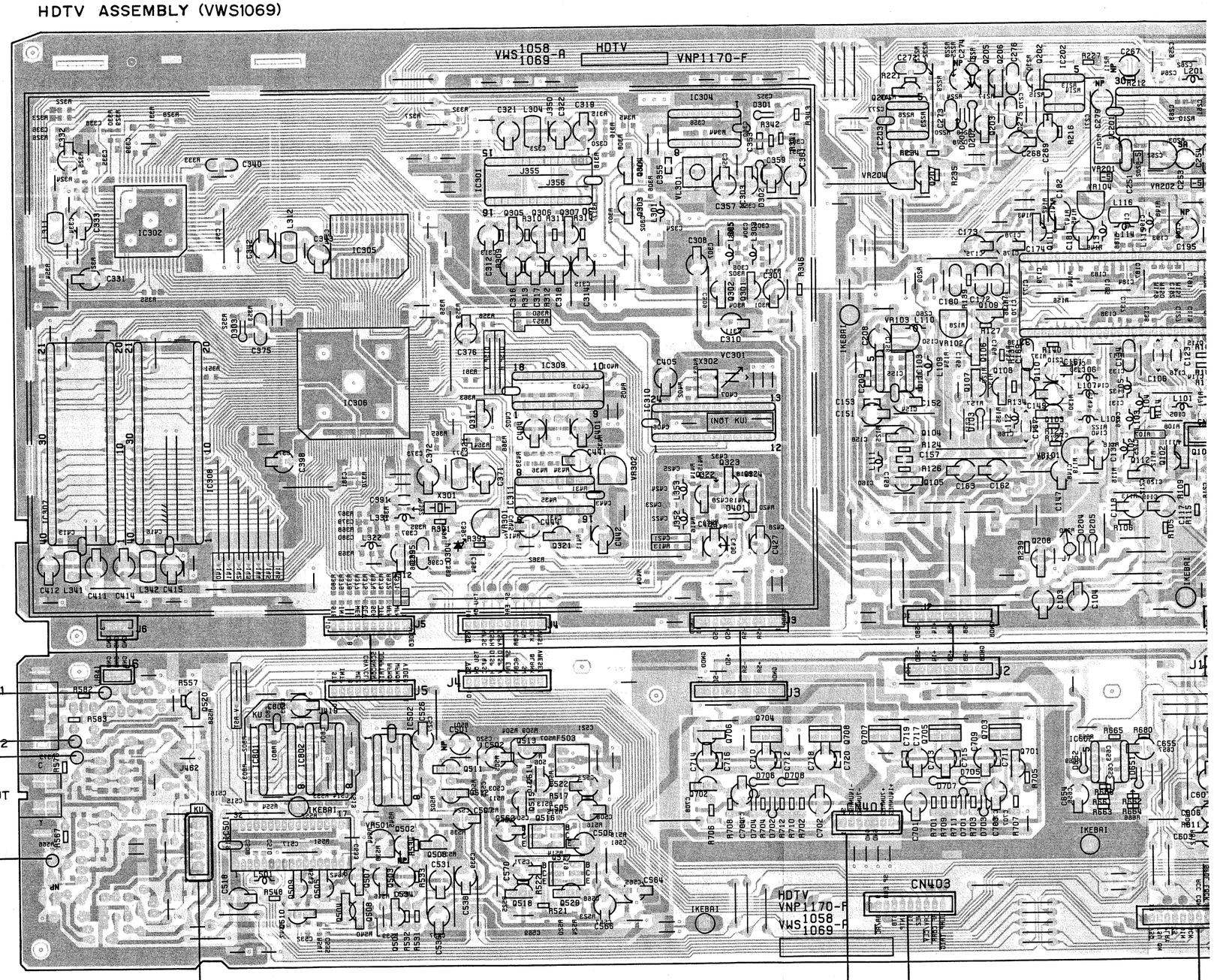
TO MAIN ASSEMBLY.

TO HDTV (2/2) ASSEMBLY (→P65)

YCSB ASSEMBLY (VWV1115)



HDTV ASSEMBLY (VWS1069)



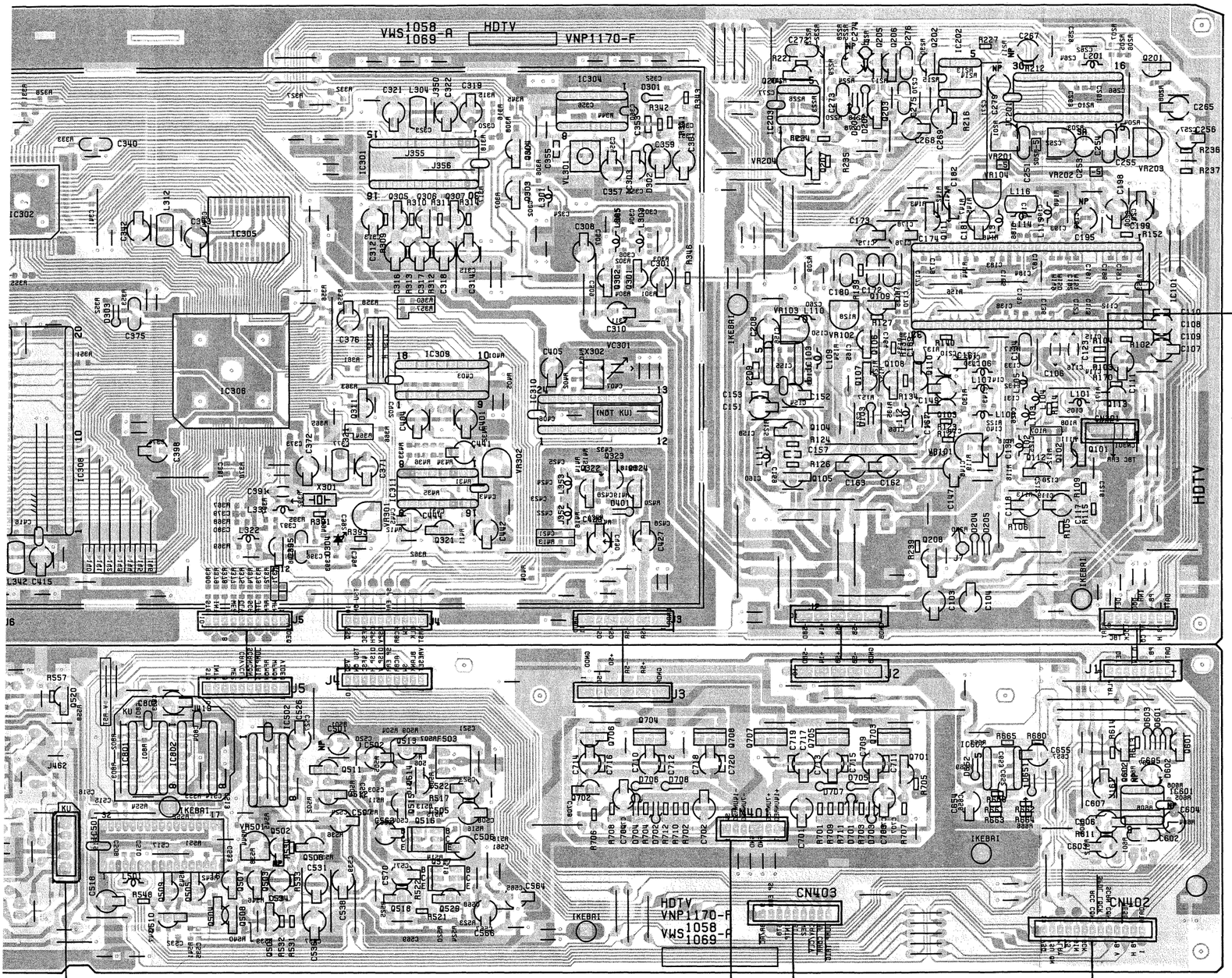
1 VIDEO OUT
2 S-VIDEO OUT
3
4

SYPS ASSEMBLY CN104

MAIN ASSEMBLY CN204

MAIN AS CN203

:MBLY (VWS1069)



VR201 VR202 VR203 VR204 VR104 VR102 VR103 VC301 VR101 VR302 VR301 VR501

Q205 Q206 Q202 Q201
Q204 IC202
IC201
IC304 IC203
Q304
IC301 IC303 Q207
Q303
IC302 IC305 Q305 Q306 Q307 Q111

Q302 Q301
IC101
MAIN
ASSEMBLY
CN202
Q109
IC306 IC309 IC103 Q106
Q110
Q107 Q108
IC306 Q311 IC310
Q113
Q103
IC307 IC308
Q104
Q102 Q101
Q323 Q105
IC311 Q322 Q324 Q112
Q321
Q312
Q208

Q520
Q706 Q704 Q708 Q707 Q705
IC801 IC802 IC502
Q703 Q601
Q602
Q511 Q513
Q701 IC602
Q514
Q512 Q515 Q702
IC601
Q516
IC501 Q502 Q506
Q509 Q505 Q507 Q503
Q518 Q517
Q529
Q510 Q504 Q508 Q501

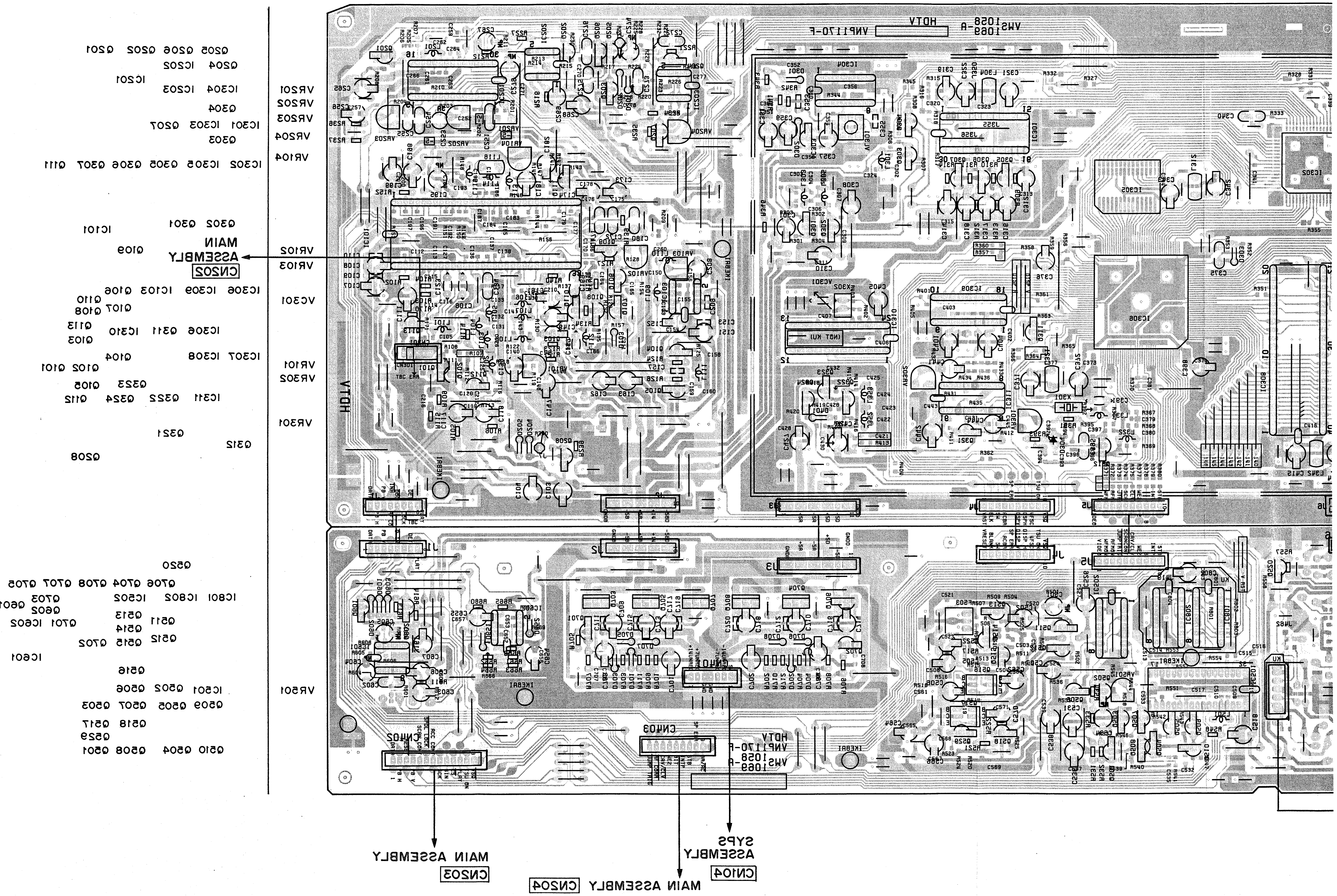
SYPS ASSEMBLY CN104

MAIN ASSEMBLY CN204

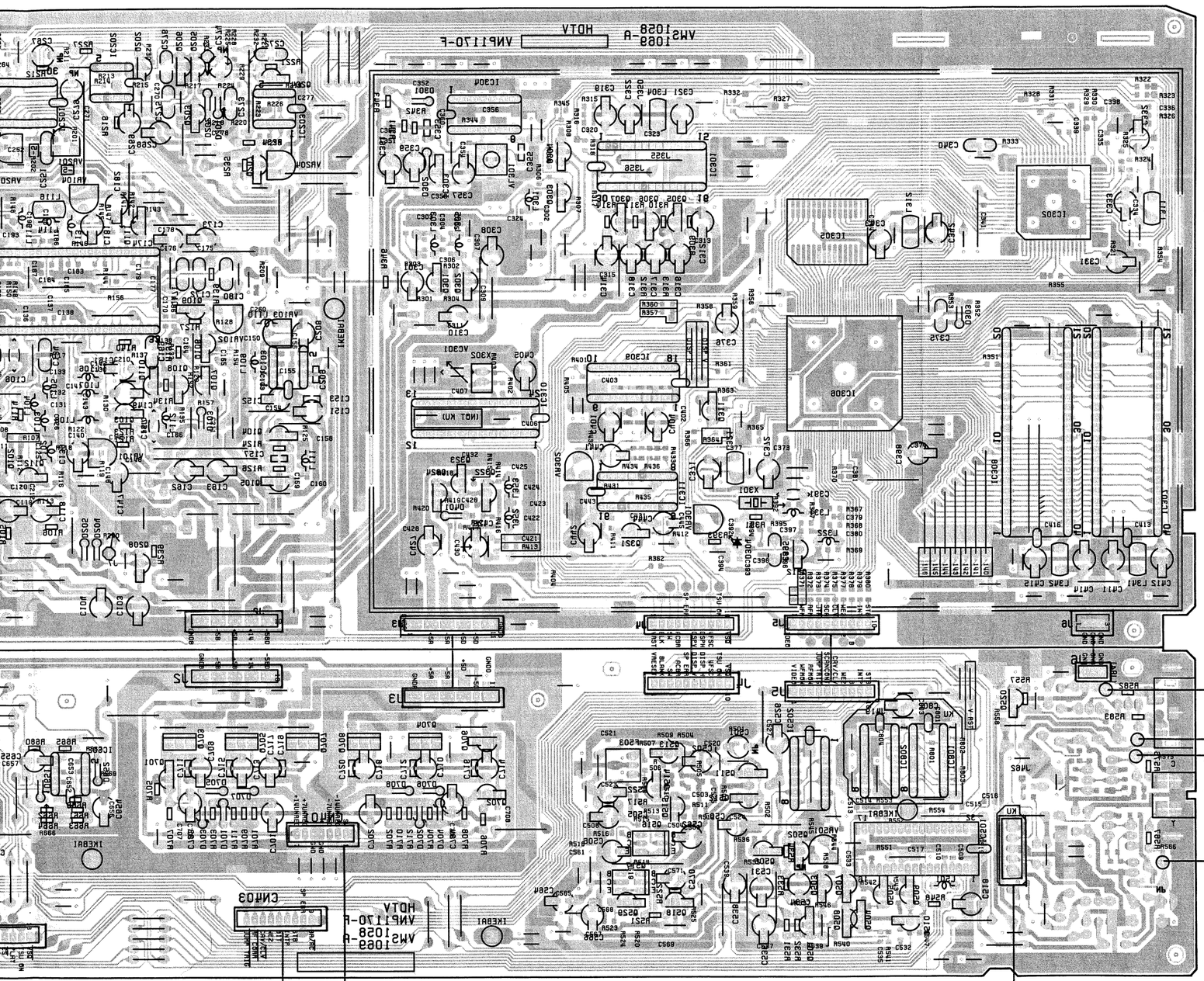
MAIN ASSEMBLY CN203

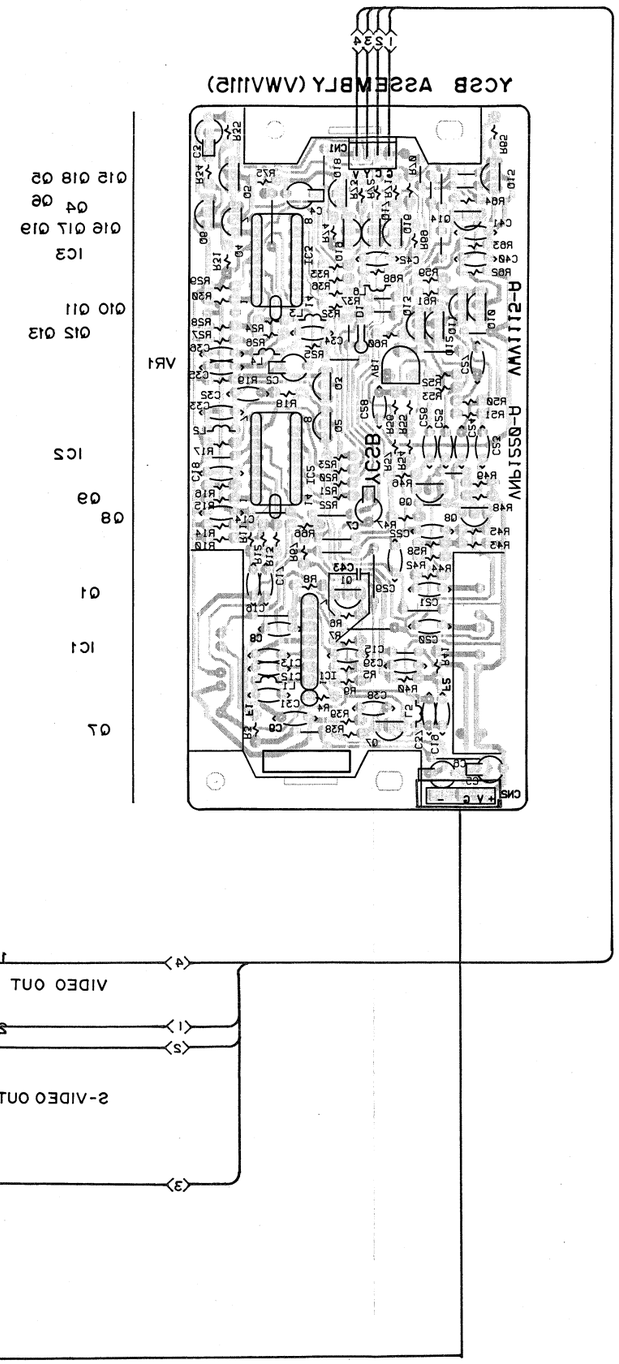
This P.C.B. connection diagram is viewed from the foil side.

SEMBLY (VWS1069)



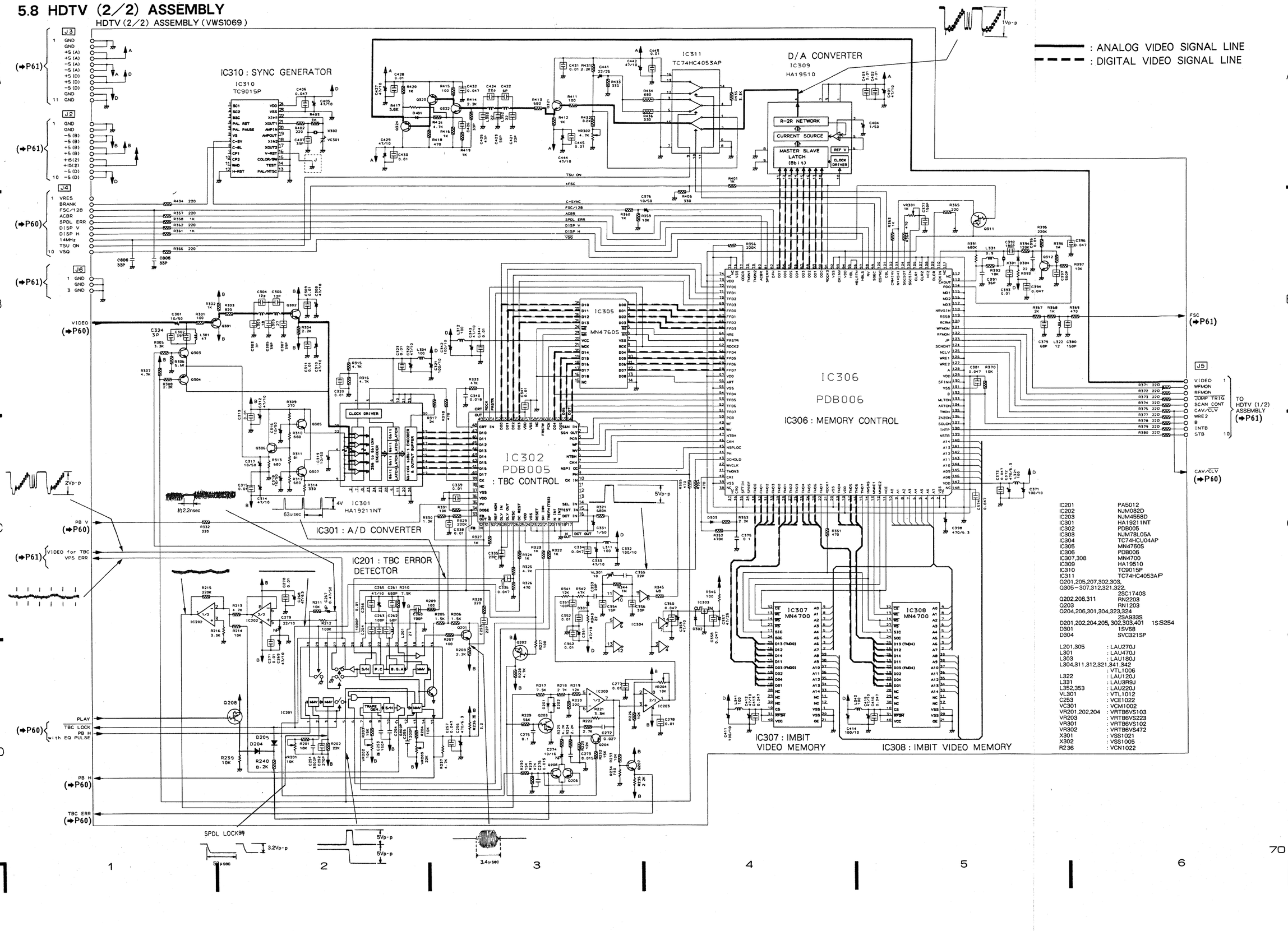
This P.C.B. connection diagram is viewed from the foil side.





5.8 HDTV (2/2) ASSEMBLY

HDTV (2/2) ASSEMBLY (VWS1069)



IC201	PA5012
IC202	NJM082D
IC203	NJM4558D
IC301	HA19211NT
IC302	PDB005
IC303	NJM78L05A
IC304	TC74HCU04AP
IC305	MN4760S
IC306	PDB006
IC307,308	MN4700
IC309	HA19510
IC310	TC9015P
IC311	TC74HC4053AP
Q201,205,207,302,303, Q305−307,312,321,322	2SC1740S
Q202,208,311	RN2203
Q203	RN1203
Q204,206,301,304,323,324	2SA933S
D201,202,204,205, 302,303,401	1SS254
D301	1SV68
D304	SVC321SP
L201,305	: LAU270J
L301	: LAU470J
L303	: LAU180J
L304,311,312,321,341,342	: VTL1006
L322	: LAU120J
L331	: LAU3R9J
L352,353	: LAU220J
VL301	: VTL1012
C253	: VCE1022
VC301	: VCM1002
VR201,202,204	: VRTB6VS103
VR203	: VRTB6VS223
VR301	: VRTB6VS102
VR302	: VRTB6VS472
X301	: VSS1021
X302	: VSS1005
R236	: VCN1022

5.9 VFDB, LEDB, IRAB, KEYB, FFCB ASSEMBLIES

KEYB ASSEMBLY

IRAB ASSEMBLY

FFCB ASSEMBLY

SWTB ASSEMBLY

JOGB ASSEMBLY

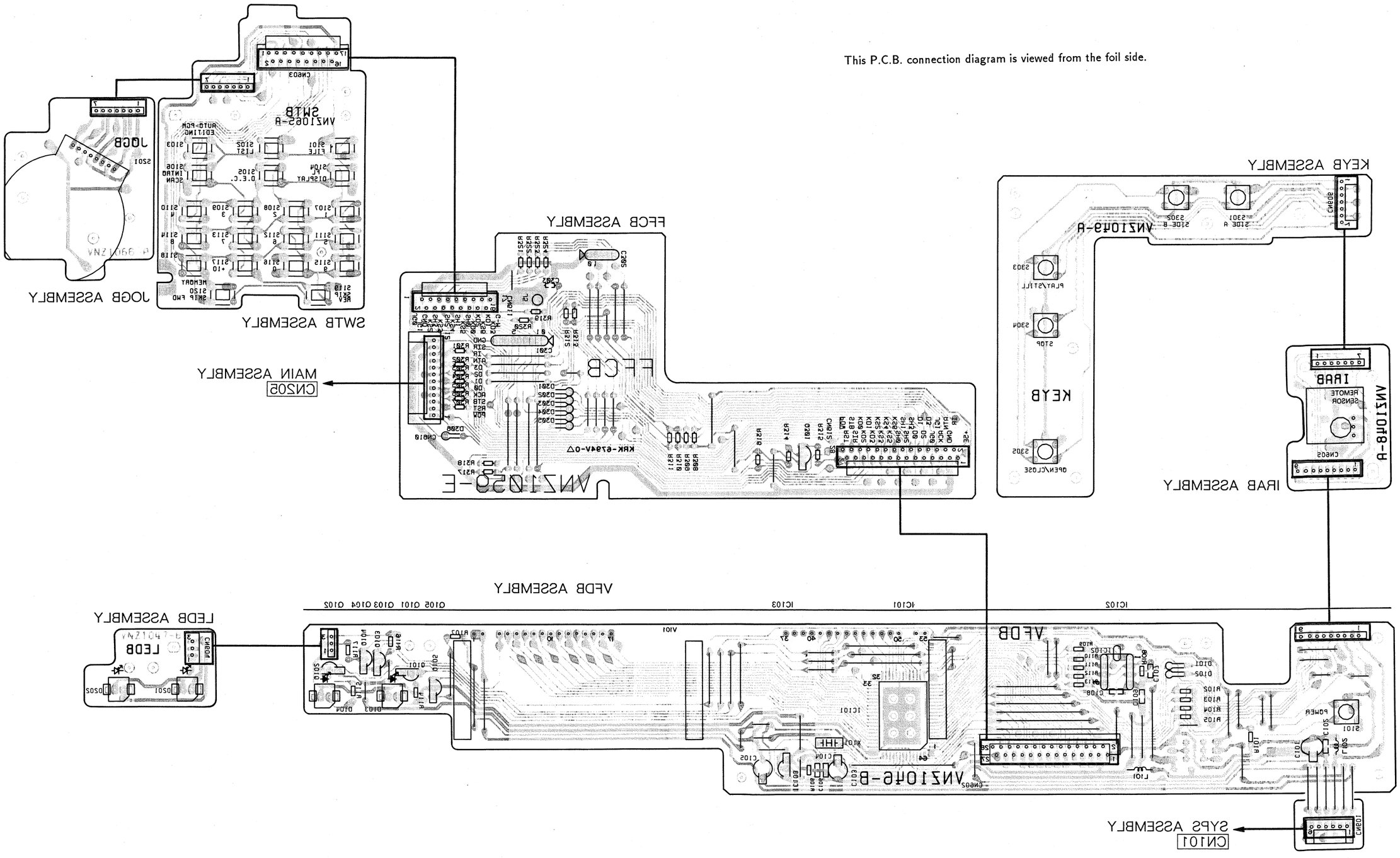
MAIN ASSEMBLY
CN205

VFDB ASSEMBLY

LEDB ASSEMBLY

SYPS ASSEMBLY
CN101

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



6. ELECTRICAL PARTS LIST

NOTES :

- Parts without part number cannot be supplied.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- 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.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

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

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

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

5.62k Ω → 562 × 10^1 → 5621 ····· RN1/4SR 5 6 2 1 F

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	PRET assembly	
◉	MAIN assembly	VWS1068
	VFDB assembly	
◉	SYPS assembly	VWR1051
◉	HDTV assembly	VWS1069
	LSFB assembly	
◉	AUDB assembly	VWV1118
	FFCB assembly	
	CNNB assembly	
	PREB assembly	
	FGSB assembly	
	LEDB assembly	
	IRAB assembly	
	KEYB assembly	
	SWTB assembly	
	JOGB assembly	
	TRSF assembly	
	TRSS assembly	
	LHSB assembly	
	LVSB assembly	
◉	YCSB assembly	VWV1115
	IC205 Onetime P ROM-S (Install in the MAIN assembly)	VYW1480
⚠	FU1,FU2 Fuse (3A)	VEK-018
⚠	FU3,FU4 Fuse (2A)	VEK-022
	S1 Slide switch (DOOR SW)	VSK1014
	S3, S4 Slide switch (CDV/LD A INSIDE, LD B INSIDE)	VSK1003
	S2, S5 Slide switch (CD INSIDE, HEIGHT UP, DOWN)	VSK1009
⚠	AC power cord	VDG1039
⚠	Power transformer (AC 120V)	VTT1074
	Remote control unit	VXX1351

Mark	Symbol & Description	Part No.
	Pickup assembly	VWY1019
	Flexible cable (FFC)	VDA1207
	Spindle motor	VXM1035
	Tilt (Height) motor assembly-S	VXX1227
	Slider motor assembly-S	VXX1329
	Loading motor V assembly-S	VXX1324
	Loading motor H assembly-S	VXX1328

PRET Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC201	BA15218
	Q201,Q202	2SC1740S

CAPACITORS

Mark	Symbol & Description	Part No.
	C201	CCSQSL331J50
	C202 – C205	CKSQYF104Z25

RESISTORS

Mark	Symbol & Description	Part No.
	VR201 Semi-fixed (1kΩ)	VRTB6VS102
	VR202,VR203 Semi-fixed (4.7kΩ)	VRTB6VS472
	Other resistors	RS1/10S□□□J

OTHERS

Mark	Symbol & Description	Part No.
	CN905 6P connector	VKN1082
	CN906 8P connector	VKN1083

◉MAIN Assembly (VWS1068)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC201,IC307	BA15218
	IC101,IC105,IC301,IC304	BA15218N
	IC302	BU4053B
	IC109,IC202	BU74HC00
	IC208	BU74HC02
	IC207	CXD1095Q
	IC204	HD63B03YP
	IC309	IR2339
	IC308	LA6500
	IC303,IC306	LA6510
	IC104,IC206	LC3517BL-15
	IC103	LC7863K
	IC102,IC305	NJU4053BD
	IC203	PD0011A
	IC107	PD0036
	IC210,IC211	TA7291P
	IC209	TC74HC30AP
	IC108,IC110	TC74HC74AP
	IC106	YM3613B
	Q205,Q301,Q303,Q305,Q312,Q314, Q320	UN4112
	Q324	DTA124ES
	Q201,Q207,Q304,Q307,Q308,Q313, Q318,Q319,Q321,Q322	UN4212
	Q204,Q310,Q311,Q317	UN4215
	Q102,Q107,Q110,Q306,Q315	2SA933S
	Q101,Q103,Q105,Q106,Q108,Q109, Q202,Q203,Q309,Q316	2SC1740S
	Q206	2SC2786
	Q302	2SK184
	D102	FC54M
	D203	HZS6.2NB2
	D204	HZS8.2NB2
	D101	KV1225YBR
	D105,D205,D206,D301 – D316	1SS254

COILS

Mark	Symbol & Description	Part No.
	L101,L103	LAU151K
	L102	LAU181J
	L108,L301,L302	LAU220J
	L201	LAU221J
	L105	LAU5R6J
	L106,L107,L109,L110,L111	LFA220J
	VL101 Variable coil	VTL-275

CAPACITORS

Mark	Symbol & Description	Part No.
	C109,C111	CCSQCH101J50
	C102	CCSQCH121J50
	C207	CCSQCH220J50
	C110,C146	CCSQCH270J50
	C202,C203	CCSQCH330J50
	C333 – C335,C346	CCSQCH470J50
	C105	CCSQCH560J50
	C108,C112	CCSQCH680J50
	C157	CCSQSL471J50
	C123,C312	CCSQSL331J50
	C145	CCSQSL391J50
	C103	CCSQSL561J50
	C125	CCSQUJ330J50
	C126	CCSQUJ221J50
	C205	CEAL101M6R3
	C308	CEANPR47M50
	C316	CEANP100M16
	C134	CEANP2R2M50
	C201,C337	CEANP220M10
	C130	CEANP470M10
	C120,C314	CEAS010M50
	C121,C122,C131,C132,C135,C136	CEAS100M50
	C143,C151,C158 – C160,C209, C214	CEAS101M10
	C144	CEAS220M50
	C104,C115	CEASR47M50
	C107,C113	CEAS4R7M50
	C311,C330,C331,C340,C341	CEHAQ470M25
	C216,C310	CEAS470M25
	C215	CEAS471M6R3
	C139,C141,C307,C313,C332,C348, C349,C353	CFTXA104J50
	C347	CEAS2R2M50
	C323	CFTXA124J50
	C321,C324	CFTXA184J50
	C128	CFTXA224J50
	C137,C140	CFTXA471J50
	C305,C336	CFTXA473J50
	C329	CFTXA334J50
	C328	CFTXA683J50
	C219	CGCYX473M25
	C117	CKCYF103Z50
	C101,C118,C119	CKCYF223Z50
	C210,C213	CKPUYF223Z25
	C204	CKSQYF103Z50
	C161 – C165,C167,C168,C206, C208,C211,C212,C217,C218, C301 – C304,C325,C326,C338, C339,C345,C350	CKSQYF104Z25
	C315	CQMA122J50
	C114,C344	CQMA222J50
	C124,C127,C129,C342	CQMA223J50
	C343	CQMA332J50
	C306	CQMA333J50
	C106	CQMA392J50
	C322,C327,C354	CQMA472J50
	C320	CQMA682J50
	C309 (22μ/10)	VCH1067
	VC201 Ceramic trimmer (45p)	VCM-003

RESISTORS

Mark	Symbol & Description	Part No.
	VR101 Semi-fixed (22kΩ)	VRTB6VS223
	R223 Resistor array	RA11T103J
	R323,R359	RD1/2PMF□□□J
	R162,R201 – R215,R224,R236, R237,R305,R309,R318,R322,R325, R334,R335,R339,R344,R350,R368, **R371,R379,R401,R402,R413,R424**	RD1/6PM□□□J
	Other resistors	RS1/10S□□□J

OTHERS

Mark	Symbol & Description	Part No.
	CN209 5P wafer	VKN1087
	CN213 23P flexible cable (FFC)	VKN1088
	JA101 Optical digital module	GP1F32T
	X201 Ceramic resonator (8MHz)	KBR-8.0M
	X101 Crystal resonator (16MHz)	VSS1004
	28P IC socket	VKH1001
	2P mini jack	VKN1034

VFDB Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC102	IR9393
	IC101	PDG048A
	IC103	PST529C
	Q101 – Q104	UN4212
	Q105	2SC2458
	D103,D104	**VEL1003**
	D101,D102	1SS254

SWITCH

Mark	Symbol & Description	Part No.
	S101 Tact switch (POWER)	VSC-010

COILS

Mark	Symbol & Description	Part No.
	L101,L102 Ferrite bead	VTH1026

CAPACITORS

Mark	Symbol & Description	Part No.
	C105	CEJA100M35
	C101,C103	CEJA470M6R3
	C106	CKPUYB102K50
	C102,C104,C107 – C109	CKPUYY103N16

RESISTORS

Mark	Symbol & Description	Part No.
	All resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	CN602 28P connector	VKN1016
	V101 Fluorescent incicator tube	VAW1011
	X101 Ceramic resonator	VSS1014

◉SYPS Assembly (**VWR1051**)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠	IC105 IC PROTECTOR	ICP-N20
	IC101	NJM4558S
	IC102	NJM4560SD
	Q1,Q111	UN4112
	Q2,Q7	UN4212
	Q53,Q102,Q104,Q106	2SA933S
	Q4,Q6	2SB1185
	Q54,Q107,Q109	2SB1375
	Q51,Q101,Q103,Q105,Q112	2SC1740S
	Q5,Q52,Q108,Q110	2SD2012
	Q3	2SD1762
	D1	RBA-406B
	D2	D3SBA20
	D9	MTZJ20A
	D105,D106	HZS4B2
	D53,D60	HZS5.1NB1
	D6	HZS5.6NB2
	D10	MTZJ27C
	D52,D57	HZS7.5NB3
	D3,D4,D7,D8,D51,D56	1SR139-100
	D5,D54,D55,D58,D59	1SS254
	D101 – D104	10DF1

COIL

Mark	Symbol & Description	Part No.
	L101	VTL1008

CAPACITORS

Mark	Symbol & Description	Part No.
	C17,C59,C60,C106,C107	CEAS100M50
	C18,C19	CEAS101M50
	C10,C11	CEAS222M25
	C16,C52,C53,C56,C57	CEAS470M10
	C13,C21,C55	CEAS470M25
	C14	CEAS102M16
	C105,C110	CEAS470M50
	C12,C15,C51	CEAS471M25
	C9	CEAS472M16
	C101	CFTXA471J50
	C108	CFTXA103J50
	C102,C103	CFTXA223J50
	C109	CFTXA473J50
	C3 – C6,C54,C58	CKPUYF103Z25
	C111	CQMA332J50
	C7 (10000/16)	**VCH1055**

RESISTORS

Mark	Symbol & Description	Part No.
	R115 – R118 (47Ω)	DCN1003
	R3,R22,	RD1/2PM□□□J
	R121 – R126	RN1/6PQ□□□□F
	R119	RS2LMFR51J
	R111 – R114	RS2PMF221J
	Other resistors	RD1/6PM□□□J

◉HDTV Assembly (VWS1069)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC802	**HD74HC74P**
	IC301	HA19211NT
	IC309	HA19510
	IC602	IR9393
	IC307,IC308	MN4700
	IC305	MN4760S
	IC501	M50552-132SP
	IC202	NJM082D
	IC203,IC601	NJM4558D
	IC303	NJM78L05A
	IC101	PA5010
	IC201	PA5012
	IC302	PDB005
	IC306	PDB006
	IC103	PM0001
	IC304	TC74HCU04AP
	IC502,IC801	TC74HC00AP
	IC311	TC74HC4053AP
	IC310	TC9015P
	Q202,Q208,Q311,Q601,Q602	RN2203
	Q203,Q509	RN1203
	Q709	**DTC124ES**
	Q101,Q102,Q105,Q112,Q204,Q206, Q301,Q304,Q323,Q324,Q503, Q505 – Q507,Q510,Q512,Q702	2SA933S
	Q706	2SB1238X
	Q704,Q708	2SB1375
	Q103,Q104,Q106 – Q111,Q113, Q201,Q205,Q207,Q302,Q303, Q305 – Q307,Q312,Q321,Q322, Q501,Q502,Q504,Q508,Q511, **Q513 - Q515,Q518,Q520,Q529,Q701**	2SC1740S
	Q516,Q517	2SC3064
	Q703,Q705,Q707	2SD2012
	D703,D704	HZS5C1
	D701,D702	HZS8.2NB2
	D304	SVC321SP
	D103,D201,D202,D204,D205,D302, D303,D401,D501,D502,D601 – D603, D651,D652,D705 – D708	1SS254
	D301	1SV68

COILS AND FILTERS

Mark	Symbol & Description	Part No.
	L110	LAU101J
	L104,L105,L113,L322,L501	LAU120J
	L112	LAU121J
	L114,L303	LAU180J
	L102,L103,L352,L353	LAU220J
	L109,L111	LAU221J
	L201,L305	LAU270J
	L331	LAU3R9J
	L107	LAU620J
	L106	LAU430J
	L108	LAU390J
	L301	LAU470J
	L101,L115	LAU560J
	L116	LRA561K
	L304,L311,L312,L321,L341,L342 Coil (100μH)	VTL1006
	VL301 Valiable coil	VTL1012
	F501 COMB filter	VTF1032
	F502 3.58MHz B.P.F.	VTF1038
	F503 3.58MHz TRAP	VTF1039

CAPACITORS

Mark	Symbol & Description	Part No.
	C123	CCCCH101J50
	C106	CCCCH151J50
	C391	CCCCH360J50
	C167	CCCSL241J50
	C353	CCPUCH200J50
	C805,C806	**CCDCH330J50**
	C324	CCSQCH030C50
	C355	CCPUUJ220J50
	C422	CCSQCH060D50
	C145,C303	CCSQCH070D50
	C142	CCSQCH100D50
	C158,C187,C260,C263,C351,C530	CCSQCH101J50
	C186	CCSQCH111J50
	C133,C304,C306	CCSQCH120J50
	C114,C115,C124,C216,C354,C504	CCSQCH150J50
	C126,C177,C179,C377,C380	CCSQCH151J50
	C112	CCSQCH180J50
	C165,C392	CCSQCH181J50
	C259,C335,C421,C424	CCSQCH220J50
	C125,C150	CCSQCH221J50
	C130,C131	CCSQCH270J50
	C160,C252,C516	CCSQCH271J50
	C159,C356,C407,C426,C509,C510	CCSQCH330J50
	C132,C143,C302,C305,C307	CCSQCH390J50
	C138,C183	CCSQCH430J50
	C105,C141,C166,C196,C425	CCSQCH470J50
	C188,C423	CCSQCH560J50
	C262,C379	CCSQCH680J50
	C190	CCSQCH910J50
	C503,C535	CCSQSL471J50
	C397	CCSQSL561J50
	C261	CCSQSL681J50
	C149,C161,C181	CEAL100M16
	C371	CEAL101M6R3
	C182	CEAL330M10
	C268,C269	CEAL470M6R3
	C604	CEANP010M50
	C267	CEANPR47M50
	C274,C534	CEANP100M16
	C195,C279	CEANP220M10
	C605	CEANP4R7M25

Mark	Symbol & Description	Part No.
	C501	CEANP470M10
	C111	CEASR47M50
	C331,C404	CEAS010M50
	C301,C316 – C319,C376,C502, C552 – C554	CEAS100M50
	C103,C104,C147,C208,C321,C332, C342,C411,C414,C703,C704	CEAS101M10
	C441,C603	CEAS220M25
	C531	CEAS221M10
	C701,C702	CEAS221M25
	C107,C108,C117,C118,C139,C151, C152,C162,C163,C173,C174,C198, C199,C265,C308,C310,C312,C314, C322,C333,C343,C359,C361,C401, C405,C412,C415,C427,C429,C442, C444,C505 – C507,C518,C522, **C526,C536,C538,C562,C564,C566, C570,C606,C607,C654,C655,C709, C710,C713,C714,C717,C718,C802**	CEAS470M10
	C357	CEAS470M25
	C256,C372,C398	CEAS471M6R3
	C169,C275,C375	CFTXA104J50
	C602	CFTXA273J50
	C340	CFTXA183J50
	C180	CFTXA683J50
	C109,C110,C153,C157,C209,C711, C712,C715,C716,C719,C720	CKPUYY103N16
	C264, **C801**	CKSQYB102K50
	C113,C116,C119,C120,C127, **C136,C137,C140,C146,C148** C154 – C156,C164,C175,C176, C178,C184,C185,C191 – C193, C197,C200,C201,C212,C266,C270, C271,C277,C278,C309,C311,C313, C315,C320,C323,C338,C339,C352, C362,C393,C402,C403,C428,C430, C431,C443,C445,C513,C514,C517, **C519,C523,C527,C537,C539, C563,C571,C576,C608,C609,C652, C653,C656,C657,C705,C706**	CKSQYF103Z50
	C170,C189,C210,C211,C257,C334, C336,C341,C344,C358,C360,C373, C374,C381,C394,C396,C406,C413, C416,C432,C508,C515,C520,C521, C524,C525,C532,C533,C561,C565, **C567 – C569, C707,C708, C803,C804**	CKSQYF473Z25
	C172,C395	CQMA103J50
	C255	CQMA122J50
	C273,C276	CQMA153J50
	C171	CQMA272J50
	C272	CQMA273J50
	C251	CQMA332J50
	C134	CQMA473J50
	C254	CQMA682J50
	C253 (150P)	VCE1022
	VC301 Ceramic trimmer (45p)	VCM1002

RESISTORS

Mark	Symbol & Description	Part No.
	VR103,VR301 Semi-fixed (1kΩ)	VRTB6VS102
	VR201,VR202,VR204 Semi-fixed (10kΩ)	VRTB6VS103
	VR101 Semi-fixed (220Ω)	VRTB6VS221
	VR102 Semi-fixed (2.2kΩ)	VRTB6VS222
	VR203 Semi-fixed (22kΩ)	VRTB6VS223
	VR501 Semi-fixed (470Ω)	VRTB6VS471
	VR302 Semi-fixed (4.7kΩ)	VRTB6VS472
	VR104 Semi-fixed (4.7KΩ)	VRTG6VS472
	R102 – R104,R139,R140,R152, R531 – R534,R661 – R664	RN1/6PQ□□□□F
	R105,R106,R109,R114,R115,R121, R123,R124,R126,R127,R131,R134, R170,R212,R216,R221,R227,R234, R235,R237,R239,R309 – R314, R341 – R343,R346,R391,R393, R517,R521,R522,R548,R557,R567, R576,R580 – R583,R611,R613, R614,R665,R668,R680, **R701 - R712,R804**	RD1/6PM□□□J
	R236 (2.2Ω/1/6W)	VCN1022
	Other resistors	RS1/10S□□□J

OTHERS

Mark	Symbol & Description	Part No.
	X302 Crystal resonator	VSS1005
	X301 Crystal resonator	VSS1021
	DL501 380ns delay line	VTN1001
	2P pin jack	VKB1009
	4P mini DIN socket	VKN1072

LSFB Assembly

COIL

Mark	Symbol & Description	Part No.
⚠	L1 Line filter	VTL-157

CAPACITORS

Mark	Symbol & Description	Part No.
⚠	C1,C2 (0.01μ/AC250V)	RCG-009

◉ AUDB Assembly (VWV1118)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1,IC2	AD1860N-K
	IC3,IC4	BU4053B
	IC14	HD74HC153P
	IC12	M5F78M06L
	IC10	M5F78M12L
	IC13	M5F79M06L
	IC11	M5F79M12L
	IC5,IC6	NJM5532SD
	IC9	PA0034A
	Q1	UN4112
	Q2	2SA933S
	Q8	2SC1740S
	Q7	2SC2786
	Q3 – Q6	2SD2144S
	D3 – D6	1SR35-100AVL

COILS AND FILTER

Mark	Symbol & Description	Part No.
	L2	LAU270J
	L1,L3	LAU560J
	F1 BPF (2.30, 2.81MHz)	RTF1084

CAPACITORS

Mark	Symbol & Description	Part No.
	C41,C59	CCCCH560J50
	C29,C31	CCCCH910J50
	C30	CCCSL221J50
	C57	CCCSL271J50
	C39	CCCSL301J50
	C12,C26,C45,C63	CEANP220M10
	C47	CEANP330M16
	C66	CEASR47M50
	C32,C50,C76	CEAS100M50
	C38,C56	CEAS101M10
	C4,C5,C18,C19	CEAS101M25
	C11,C25,C42,C51,C60,C67	CEAS220M50
	C34,C37,C48,C52,C55	CEAS221M6R3
	C65	CEAS4R7M50
	C49	CFTXA104J50
	C14,C28	CFTXA471J50
	C70,C71	CEAS222M25
	C79	CKPUYB102K50
	C33	CKCYF103Z50
	C35,C36,C53,C54	CKCYF223Z50
	C46,C64	CQMA393J50
	C43,C44,C61,C62	CQMA472J50
	C40,C58	CQMA682J50
	C3,C8,C13,C17,C22,C27 (470p)	CQSA471J50
	C6,C20 (22000p)	CQMA223J50
	C7,C21 (1000p)	CQSA102J50
	C68,C69 (10000p)	CQMA103J50
	C1,C2,C15,C16,C72 – C75 (330μ/25)	CEAS331M25
	C4,C5,C18,C19 (100μ/25)	CEAS101M25

RESISTORS

Mark	Symbol & Description	Part No.
	VR1,VR2 Semi-fixed (2.2kΩ)	VRTB6VS222
	R11,R27 (330Ω/0.5W)	VCN1006
	R1,R17,R33,R34	RS1/10S□□□J
	R3 – R7,R9,R19 – R23,R25	RDR1/4PM□□□J
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA1 4P pin jack	VKB1015

FFCB Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q301	2SC1740S
	D301 – D306	1SS254

CAPACITORS

Mark	Symbol & Description	Part No.
	C301 Capacitor array (100p × 8)	VCG1016
	C302 Capacitor array (100p × 4)	VCG1017
	C303	CKPUYB101K50

RESISTORS

Mark	Symbol & Description	Part No.
	All resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	CN612 28P connector	VKN1015
	CN611 17P connector	VKN1084

CNNB Assembly

RESISTOR

Mark	Symbol & Description	Part No.
	R301	RS1/10S472J

OTHERS

Mark	Symbol & Description	Part No.
	CN911 5P connector	VKN1086

PREB Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC101	BA15218
	IC102	IR3C02A

CAPACITORS

Mark	Symbol & Description	Part No.
	C106	CCSQCH680J50
	C104	CEAS101M10
	C105	CEAL220M16
	C103	CEJANP010M50
	C101,C102	CEJA101M10
	C111	CKSQYF103Z50
	C107 – C110,C112	CKSQYF104Z25

RESISTORS

Mark	Symbol & Description	Part No.
	VR104 Semi-fixed (100kΩ)	VRTB6VS104
	VR101 – VR103 Semi-fixed (4.7kΩ)	VRTB6VS472
	R119	RD1/4PM100J
	Other resistors	RS1/10S□□□J

OTHERS

Mark	Symbol & Description	Part No.
	CN902 29P connector	VKN1025
	CN901 23P connector	VKN1079
	CN903 6P wafer	VKN1080
	CN904 8P wafer	VKN1081

FGSB Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
	D401	GP1S51

RESISTOR

Mark	Symbol & Description	Part No.
	R401	RS1/10S471J

LEDB Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D201,D202	VEL1003

IRAB Assembly

OTHERS

Mark	Symbol & Description	Part No.
	Remote control sensor	GP1U50X

KEYB Assembly

SWITCHES

Mark	Symbol & Description	Part No.
	S301 – S305 Tact switch (SIDE A, SIDE B, PLAY/STILL, STOP, OPEN/CLOSE)	VSC-010

SWTB Assembly

SWITCHES

Mark	Symbol & Description	Part No.
	S101 – S118 Tact switch (FILE, LIST, AUTO-PGM EDITING, DISPLAY OFF, D-EXT, INTRO SCAN, 1–9, 0, +10, MEMORY (⏮, ⏭) SKIP	VSC-010
	S119,S120	VSC-012

OTHERS

Mark	Symbol & Description	Part No.
	CN603 17P connector	VKN1085

JOGB Assembly

SWITCHE

Mark	Symbol & Description	Part No.
	S201 Rotary encoder (REV ↶ FWD)	VSD1006

TRSF Assembly

There is not supplied parts in this assembly.

TRSS Assembly

There is not supplied parts in this assembly.

LHSB Assembly

SWITCH

Mark	Symbol & Description	Part No.
	Leaf switch (Position detect switch of H. direction)	VSK1011

LVSB Assembly

SWITCH

Mark	Symbol & Description	Part No.
	Push switch (Position detect switch of V. direction)	PSH1008

◉ YCSB Assembly (VWV1115)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC2, IC3	MC1496P
	IC1	TA7302P
	Q1, Q6, Q16, Q18	2SA933S
	Q17	SC1674
	Q2 – Q5, Q7 – Q15, Q19	2SC1740S
	D1	1SS254

COILS AND FILTERS

Mark	Symbol & Description		Part No.
	L5	Axial inductor	LAU100J
	L2	Axial inductor	LAU120J
	L4	Axial inductor	LAU150J
	L6	Axial inductor	LAU180J
	L1, L3	Axial inductor	LAU470J
	F1, F2	COMB filter	VTF1032

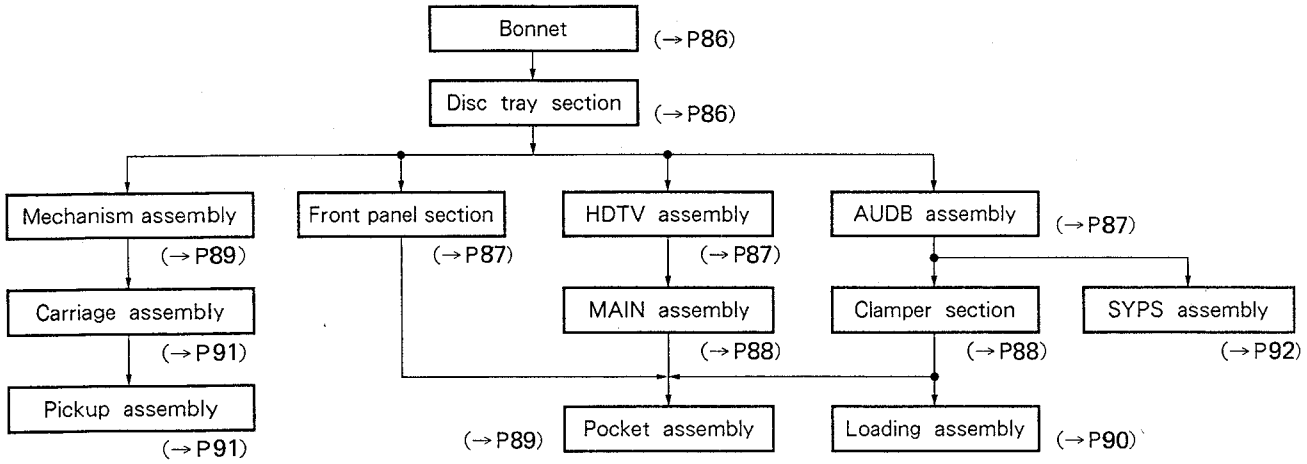
CAPACITORS

Mark	Symbol & Description	Part No.
	C34	CCCCH390J50
	C31, C39	CCPUCH150J50
	C35	CCPUSL270J50
	C38, C40, C41	CCPUSL470J50
	C36	CCPUSL680J50
	C7	CEAS101M10
	C3, C4	CEAS101M16
	C2	CEAS220M16
	C5, C6	CEAS471M10
	C42	CKPUYB101K50
	C43	CGDYX473M25
	C33	CKPUYB151K50
	C32, C37	CKPUYB181K50
	C8, C9, C12 – C29	CKPUYY103N16

RESISTORS

Mark	Symbol & Description		Part No.
	VR1	Semi-fixed (2.2kΩ)	VRTB6VS222
		Other resistors	RD1/6PM□□□J

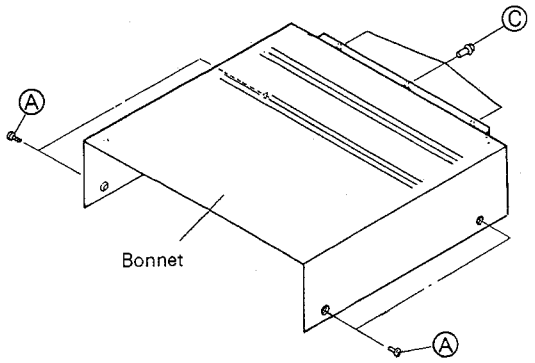
7. DISASSEMBLY

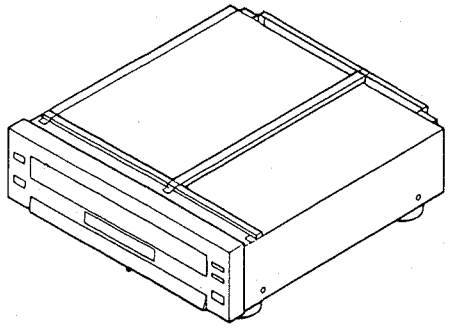


1. Bonnet

① Remove three screws Ⓒ at the rear of the bonnet.

② **Remove four screws Ⓐ from the both side of the bonnet. bonnet.**





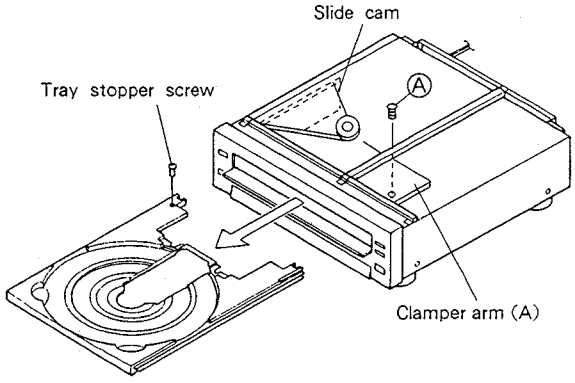
2. Disc tray

Note : The bonnet should be removed first.

① Push the slide cam with your hand toward the front until it stops. (Have the unit's front door open.)

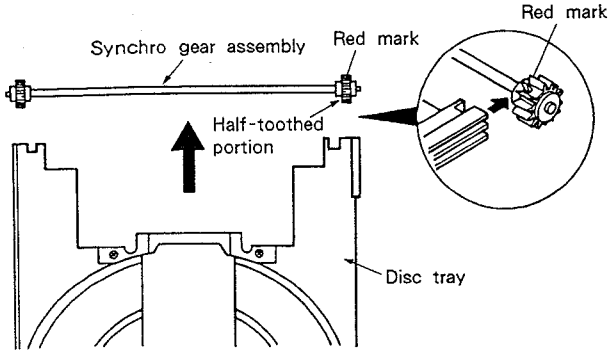
② Remove the tray stopper screw and the screw Ⓐ located on the right front side of the clamper arm (A).

③ Pull the tray straight out.



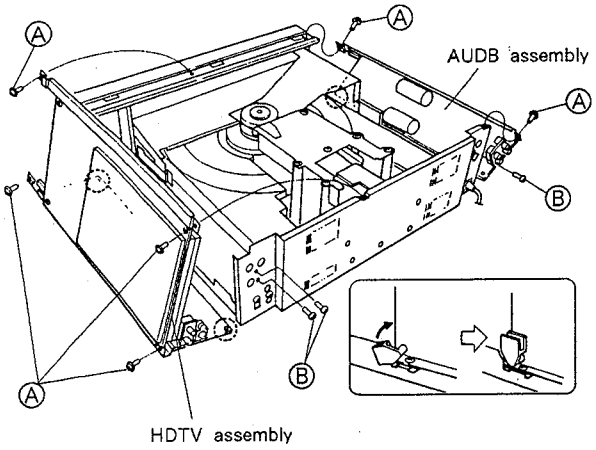
— How to install the disc tray —

To install the disc tray, align the synchro-gear assembly with the disc tray so that the one-tooth missing portion (red mark) of the gear is one tooth under the vertical position as illustrated below. Then, push the tray straight in.



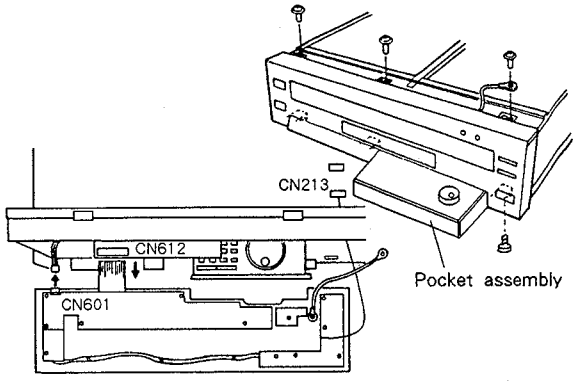
3. HDTV and AUDB assembly

① Remove the six screws Ⓐ from the reinforced bridge.
② Remove the three screws Ⓑ of the audio output terminals from the rear.



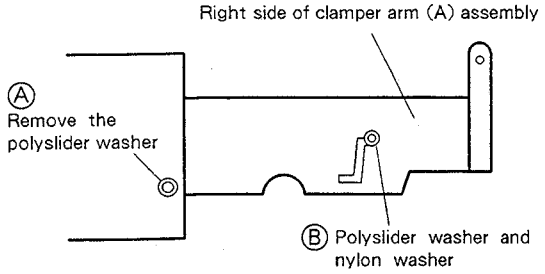
4. Front panel

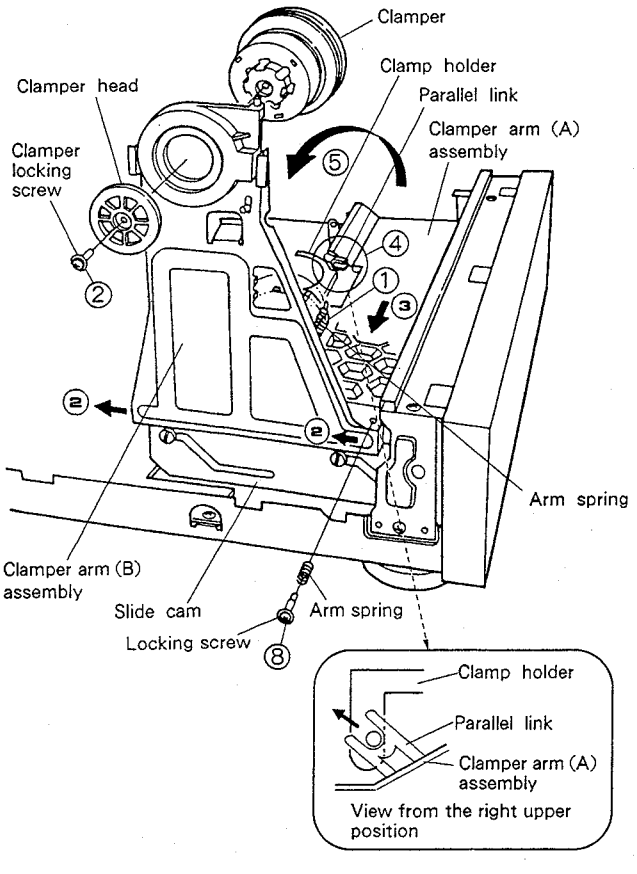
① Pull out the pocket assembly to the front.
② Remove the three screws from the upper side of the front panel and one screw from the lower side.
③ Remove the CN612 from the FFCB assembly.
④ Remove the CN601 from the VFDB assembly.
⑤ Remove the CN213 from the MAIN assembly.



5. Clamper arm (B) and (A) assemblies

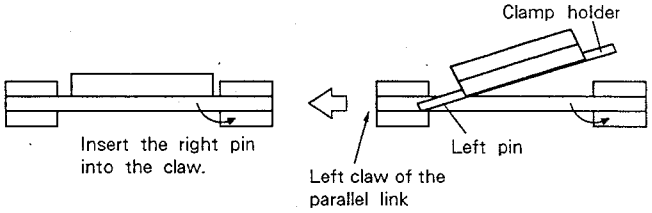
① Remove the two clamp springs.
② Unscrew the clamper locking screw, and remove the clamper.
③ Remove the AUDB assembly.
④ While pulling the notch located at the right side of the clamp holder toward you, detach the clamp holder from the parallel link.
⑤ Raise the clamper arm (B) assembly in the direction of the arrow.
⑥ Remove the HDTV assembly. (→P86)
⑦ Remove the carriage assembly. (→P91)
⑧ Remove the washer Ⓐ, washer Ⓑ and nylon washer from the right side of the clamper arm (A) assembly, and the locking screw and the arm spring from the left side.





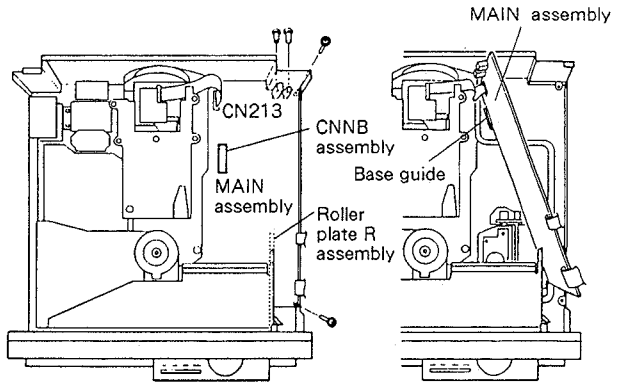
Clamper section mounting

① Insert the left pin of the clamp holder into the left claw of the parallel link.
② Insert the right pin of the clamp holder into the right claw in the same way.



6. MAIN Assembly

Note : The bonnet and the clamper arms (A) and (B) should be removed first.
① Remove the roller plate R assembly.
② Remove the four screws from the MAIN assembly
③ Disconnect the flexible cable which connects the PREB and MAIN assemblies. (CN213)
④ Remove the CNNB assembly.
⑤ Disconnect all the connectors from the MAIN assembly.

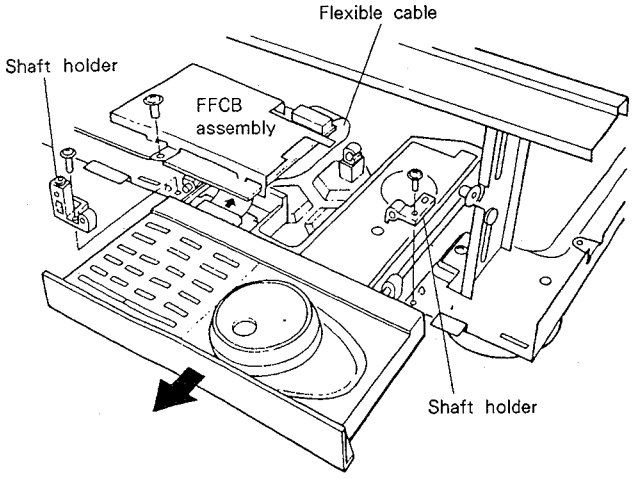


How to remove the MAIN assembly Diagnosis of the MAIN assembly

Diagnosis of the MAIN assembly

Note : The bonnet, HDTV assembly and the carriage assembly should be removed first.
① Remove the five screws.
② Disconnect the flexible cable which connects the PREB and MAIN assemblies.
③ Unfasten the harness bind of the CN205.
④ Slide the printed circuit board to the right and lift it on the right side.
⑤ Replace and connect the flexible cable which is removed in step ②.
⑥ Install the printed circuit board into the base guide and raise the board.

7. Pocket assembly



Note : The bonnet, front panel and HDTV assembly should be removed first.

① Remove the two screws from the FFCB assembly and dislocate the printed circuit board to the inner position.

② Remove the two screws located on your side from the shaft holders, and remove both shaft holders.

③ Disconnect the flexible cable which connects the pocket assembly and the FFCB assembly.

④ Unhook the panel spring.

⑤ Ungear the pocket assembly by dislocating it toward the right, and pull it out slowly toward you.

– How to install the pocket assembly –

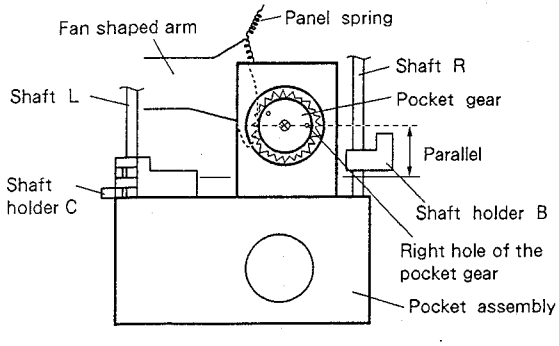
① Install the shafts R and L to the shaft holders B and C respectively, first on the right side and then the left side.

② Align the Fan shaped arm and a hole of the pocket gear by pushing the pocket toward the right side to avoid grinding the gear teeth against the arm.

③ Set the right hole of the pocket gear in the horizontal position and let the slide pocket gear engage with the Fan shaped arm gear. (This is the pocket assembly open position.)

④ Fix shaft holders B and C with the locking screws and washers.

⑤ Hook the panel spring.



8. Mechanism assembly

Note : The bonnet should be removed first.

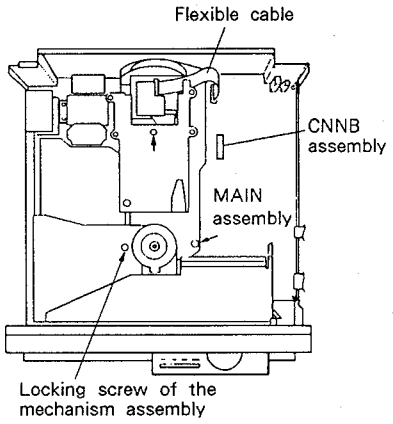
① Remove the upper side of the HDTV assembly.

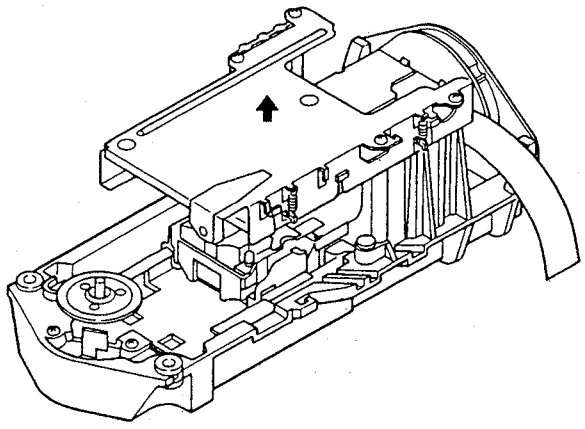
② Remove the disc tray. (→P80)

③ Remove the CN108 from the SYPS assembly, and also remove the CNNB assembly and the flexible cable from the MAIN assembly.

④ Remove the three locking screws from the mechanism assembly. Pull out the mechanism assembly by lifting its rear side.

Note : Completely remove the two front locking screws from the mechanism assembly.





9. Loading assembly

(Remove the loading assembly only when the motor is replaced. Gears can be removed from the top.)

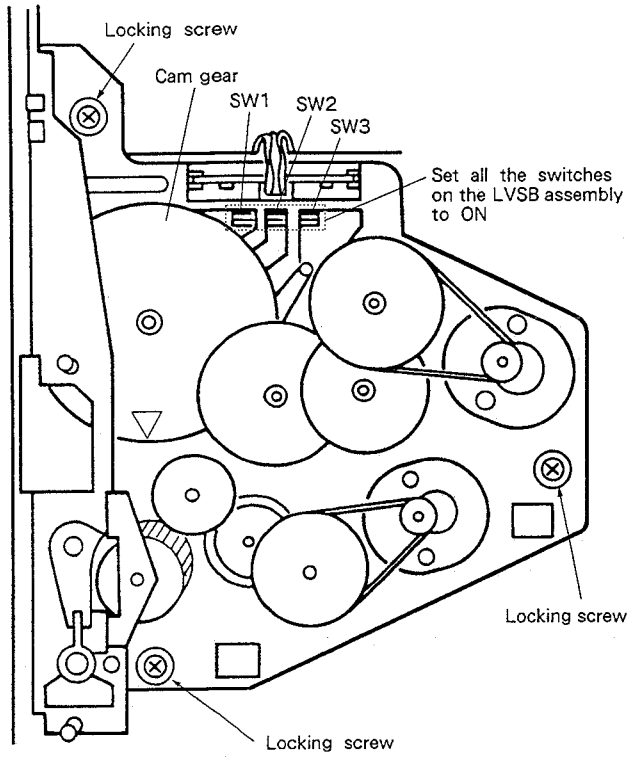
– How to install the cam gear –

Set all the switches on the LVSB assembly to ON and install the cam gear with the ▽ mark pointing to the front.

	SW1 V POS 0	SW2 V POS 1	SW3 V POS 2
Side A playback position	0	0	0
Side B clamp position	0	0	1
Door open position	1	0	1
Side B→Side A	1	1	0
Carry up	1	1	1

1 = ON 0 = OFF

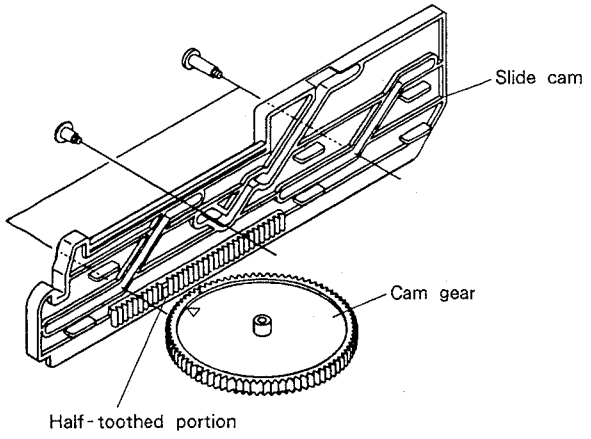
Table :Switch position and the status of the unit
(SW1 to 3 are named in this manual for convenience.)



How to instal the cam gear

– How to install the slide cam –

① Align the ▽ mark of the cam gear and the half -toothed gear of the slide cam.
② Fix the slide cam with the locking screw.
③ Fully pull out the slide cam in the front direction and fix the roller plate (L) to the slide cam with two screws.



Alignment of the cam gear and the slide cam

10. Carriage assembly

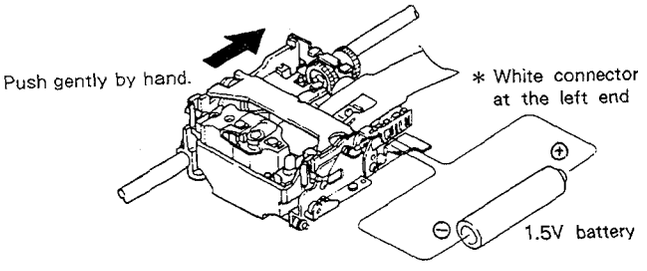
Note 1 : In this section, the R plate, G plate and the internal gear assembly are together called the "turn plate".

Note 2 : The mechanism assembly should be removed first.

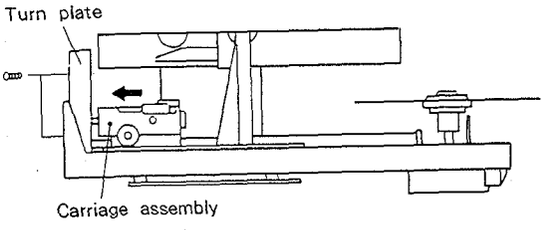
① Move the carriage assembly toward the shaft of the turn plate.

– How to move the carriage assembly –

Move the carriage assembly by pushing its end near the slider shaft gently by hand, or by connecting a 1.5V battery to the slider motor connector.



Move the carriage assembly



Carriage assembly turn position

② Disconnect the flexible cable which connects the PREB and MAIN assemblies from the CN901 of the PREB assembly

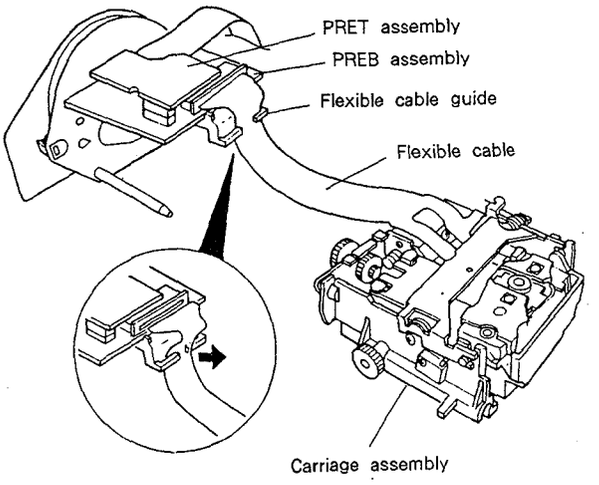
③ Disconnect the flexible cable which connects the pickup assembly and the PREB assembly from the PREB assembly.

④ Remove the three screws from behind the turn plate assembly.

⑤ Remove the carriage assembly together with the turn plate from the mechanism assembly.

⑥ Remove the carriage assembly from the turn plate.

⑦ Disengage the flexible cable from the flexible cable guide on the back of the PREB assembly. Take care not to expose the unit to static electricity.



11. Pickup assembly

Note : The carriage assembly should be removed first.

① Check that the AF plate assembly is in the middle or bottom position of the shaft of the AF gear assembly. If not, connect the battery to the AF motor connectors to make the shaft of the AF gear assembly rotate until the AF plate assembly comes to the middle or bottom of the shaft.

② Remove the height springs on both sides on the height side.

③ Remove the AF stopper locking screw.

④ Remove the E-ring for holding pins from the pickup holder assembly.

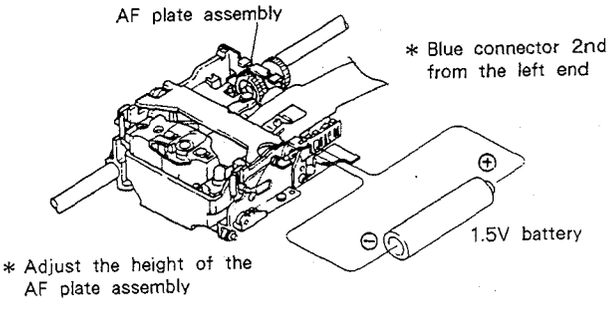
⑤ Remove the E-ring from the AF plate assembly.

⑥ While slightly lifting the AF arm on the AF gear assembly side, slide the AF arm and remove it.

⑦ Remove the two pickup connector locking screws.

⑧ Remove all four connectors from the connector board on the flexible cable.

⑨ Remove the pickup locking screw.



12. Tilt motor

Note : The carriage assembly should be removed first.

① Disconnect the tilt motor connector.

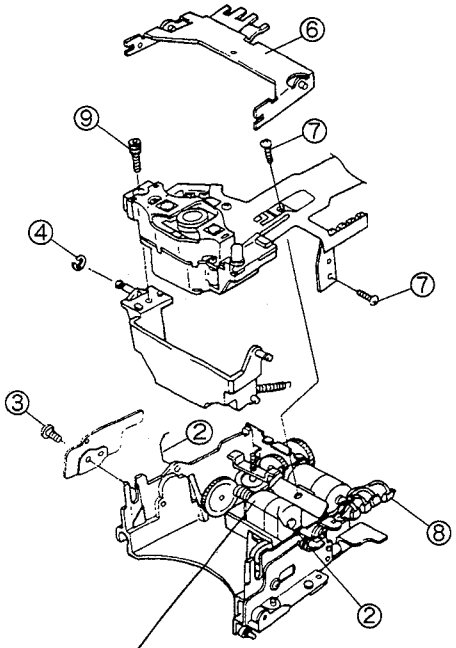
② Remove the screw fixing the tilt motor assembly -S and the carriage assembly from the bottom of the carriage assembly.

13. Height motor

Note : The pickup and tilt motor assemblies should be removed first.

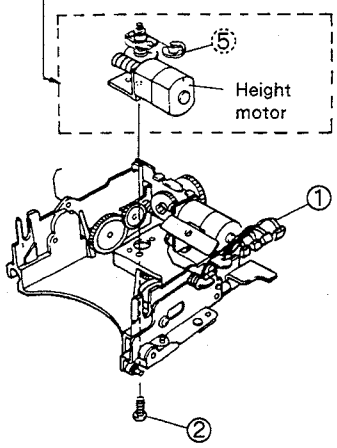
① Disconnect the height motor connector.

② Remove one screw which attaches the height motor assembly and the carriage assembly.

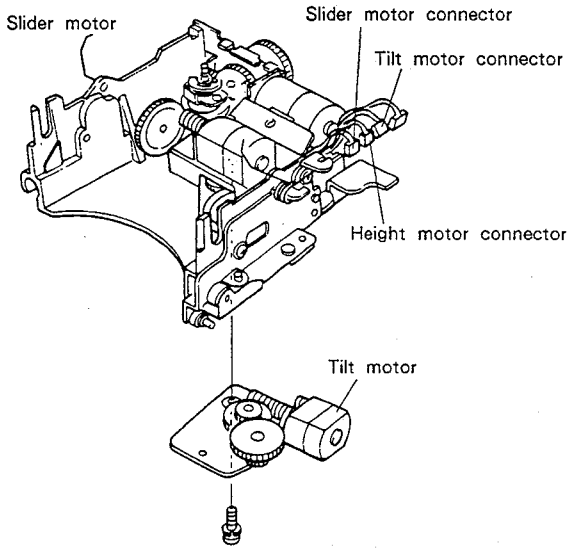


Note : The circled numbers in the figures correspond to those of the removing procedures.

11. How to remove the pickup assembly



13. How to remove the height motor



12. How to remove the tilt motor
14. How to remove the slider motor

14. Slider motor

Note : The pickup assembly, AF motor assembly and the tilt motor assembly should be removed first.

① Disconnect the slider motor connector.

② Remove the harness wrapped around the slider base.

③ Remove the two screws fixing the slider motor.

15. SYPS assembly

① Remove the three screws fixing the heat sink and the screw fixing the PC board.

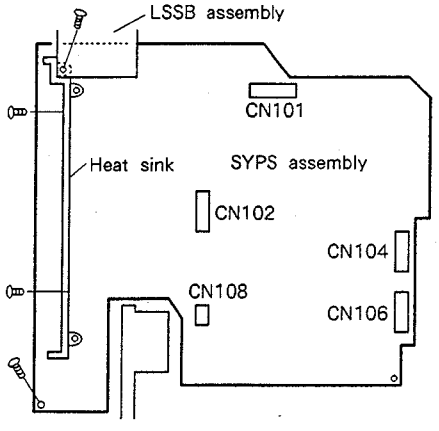
② Remove the LSSB assembly.

③ Remove the board hook from the back of the bottom plate.

④ Disconnect the CN102 and CN108 from the SYPS assembly.

⑤ Pull out the SYPS assembly by slightly lifting it on the left side and sliding it.

Note : After step ⑤, if the PC board is turned over and the connectors are engaged, checking of the SYPS assembly from the pattern side is possible.



8. ADJUSTMENT

8.1 TEST MODE

8.1.1 ENTRY

There are two ways a and b to enter test mode.

a. Push remote control code ESC (5F) + TEST (5E).
b. Open the door and turn the power on. (This is not possible when an LD has been in.) This operation is not necessary when the door has been open by the carry, or during opening, ejecting and loading of a disc.

8.1.2 CLEAR

There are two ways a and b to clear test mode.

a. [CX] + [9]
b. Power OFF

Notes :

- In the Test Mode, lifting the clamper or ejecting the disc is impossible as they would be dangerous. However, if there is no disc on the tray, ejecting is possible.
- Be careful of the clamper as it will rise up when changing the play mode from side B to side A.
- In the Test Mode, the initial search function can be released with the Clear key.
- When an LD disc is placed on the tray in the Test Mode, the power will be switched off about 20 seconds after the POWER button is pressed to OFF.
- Search with the image remains on the screen and side-change with the image remains on the screen will not be executed during test mode, and search and side-change with blue back screen will be done instead.
- Playback of side B does not take place after finishing playback of side A in test mode. Side B can be played back by pressing side B key.

8.1.3 FUNCTION

After the Test Mode is activated, the following functions will be engaged by pressing a combination of the [CX] key and a numeric key.

[CX] + [0] : The FL display and LEDs light, and the ROM version will be displayed on the screen of the monitor TV.
(Because AC power of the FL (fluorescent) tube is turned on and off by the drive output of the DISPLAY OFF LED, the FL tube and DISPLAY OFF LED cannot be lit simultaneously.)

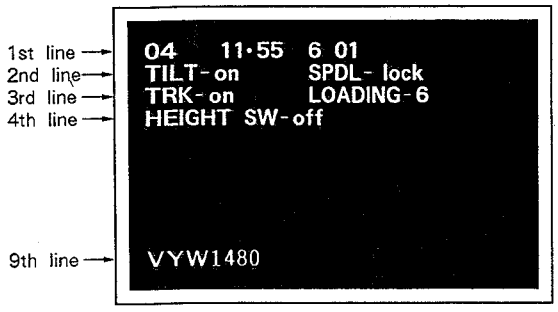
[CX] + [1] : Error rate measurement. Either an LD or CD will be measured for 15 seconds, then the result will be displayd on the screen of the monitor TV.
[CX] + [2] : Alternately opens and closes the tracking servo. (Toggle switch)
[CX] + [3] : Alternates the CX (noise reduction) circuit between CX default and default. (Toggle switch)
[CX] + [4] : Turns the tilt OFF forcibly.
[CX] + [5] : Sets the tilt to the normal position.
[CX] + [6] : 3.0MHz oscillation (toggle switch) of the PD0011 : Output from PORT 3.
[CX] + [7] :
[CX] + [8] : Clears the external RAM. (The RAM is not cleared when these keys are pressed, but the contents of the RAM will be cleared the next time the power is turned ON.)
[CX] + [9] : Releases the Test Mode.

Other test mode functions

- Open setup :
  The unit will be set up with tracking and tilt off when the unit is set to test mode during stop mode, then playback is started.
- Manual operation of the slider and height :
  During stop mode, the slider can be manually moved and the height can be manually changed up and down.
  Forward : Moving the slider to the outer part.
  Reverse : Moving the slider to the inner part.
  Note : The remote control unit of CLD-3380 has not forward and reverse keys, use the other remote control unit if necessary.
  Shuttle FWD : Height up
  Shuttle REV : Height down
- Side B setup :
  Side B is set up without sensing side A when test mode is entered with the tray out with B key being pressed.
- Focus check :
  Setup of an LD can be executed without disc sensing when the playback key is pressed. During LD setup, the unit will wait a maximum of 9 seconds for the focus to be locked. Therfore, this function can be used to check the focus system in case disc sensing is not accomplished even with a disc inside.

8.1.4 Display

In the Test Mode, the statuses of switches and other data are displayed on the screen of the monitor TV.



TV monitor display

[1st line]

04 11·55 6 01

(Chapter Frame/Time)

(IMODE : Major modes such as "SETUP", "PLAY" and "SEARCH"

0 : PARK
2 : OPEN
4 : SETUP
6 : PLAY
8 : SEARCH

(SMODE : Minor modes in each mode)

[2nd line]

TILT-on (off) SPDL-lock (unlock)

[3rd line]

TRK-on (off) LOADING-6 (0~7)

[4th line]

HEIGHT SW-on (off)

[9th line]

Two indications are displayed on the ninth line.

a. Error rate indication

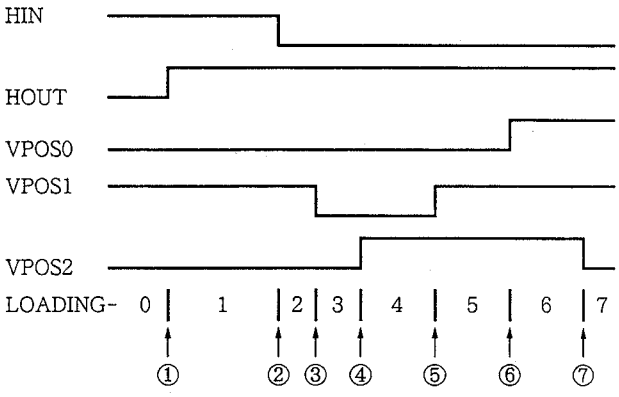
000 0384

b. Rom version indication (VYW1480 89_____)

- When the Test Mode is activated while opening the door with the Power switch ON, the "b" indication will appear, in the same way when activated by pressing the CX + 0 key

* Because SPDL-lock/unlock on the second line is displayed as a result of monitoring SPDL LOCK, "unlock" is always displayed during playback of a CD.

* "LOADING-" on the third line indicates the loading position.

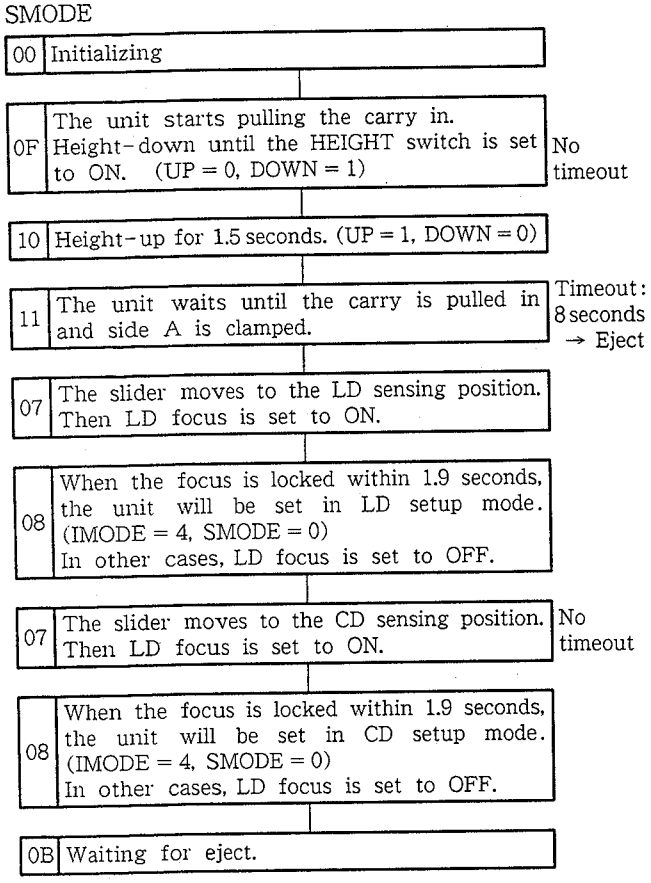


①Tray out position
②Tray in position
③Door open position
④Tray up position (Position during LD stop mode)
⑤Reversing position from side B to side A
⑥Side A clamp position
⑦Side B clamp position

8.1.5 Explanation of the microcomputer software

(1) During loading
IMODE = 0

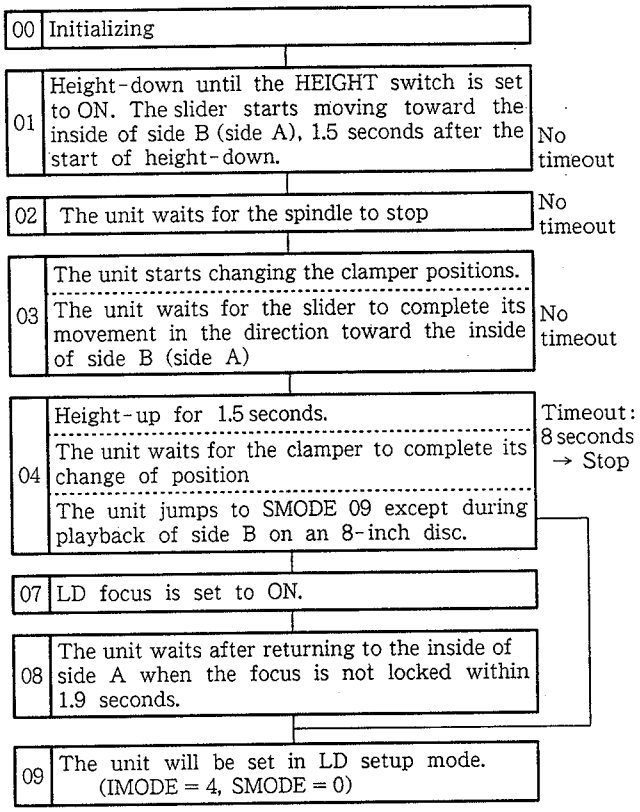
SMODE



Height-down and up at SMODE 0F and 10 are executed only after the power is turned on. Normally, immediately after beginning to pull the carry in at 0F, the unit jumps to SMODE 11 and enters side A clamp wait mode.

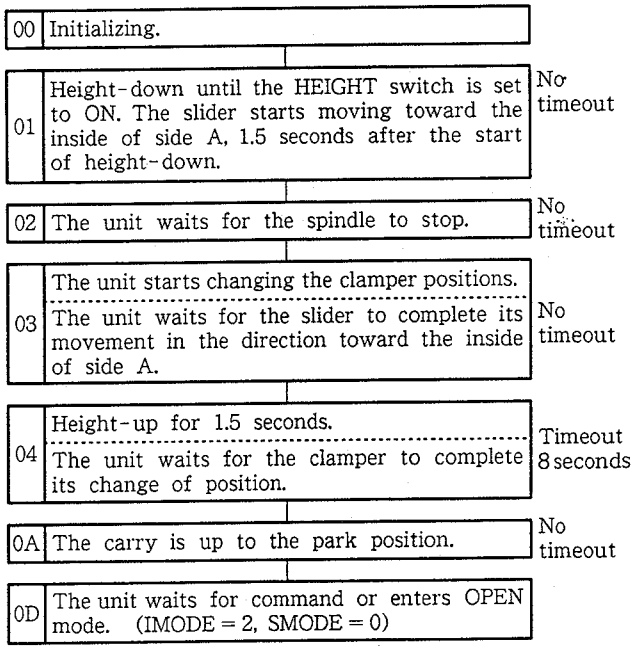
(2) During playback of side A to side B and during playback of side B to side A
IMODE = 0

SMODE



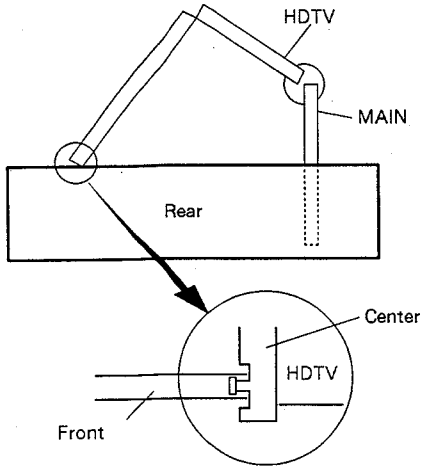
(3) During the transition from playback of side B to stop, or during eject.
IMODE = 0

SMODE



3) Condition of the unit when adjusting

During the adjustment, set the unit as follows. Remove the bonnet and disc tray. Place the MAIN assembly against the base guide. Place the HDTV assembly against the front angle and rear panel.

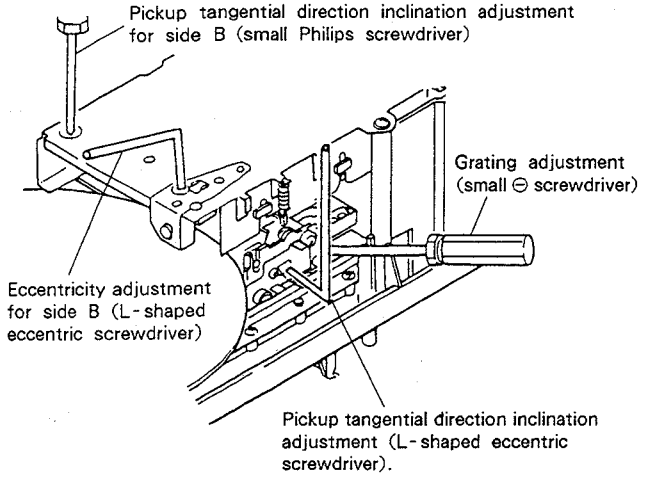


4) Precautions when reversing the carriage assembly

- The carriage assembly cannot be reversed unless it is advanced by playing a disc.
- If the power switch is turned OFF with the carriage assembly reversed, the backup power supply functions to resume the forward status of the carriage assembly.

5) Where to insert the screwdriver when adjusting the pickup assembly

– Carriage assembly in forward state –



6) Test disc

The LD test disc used for mechanical adjustment and PREB assembly adjustment may either be the GGV1002 or 8-inch F2. The frame numbers given in the text are for the GGV1002 while those enclosed in parentheses are for the F2.

The LD test disc used for electrical adjustments can be either N series or F series. The frame numbers given in the text are for the N series while those enclosed in parentheses are for the F series.

7) Abbreviation in the text indicate the following

FOCS	=	Focus
TRKG	=	Tracking
SPDL	=	Spindle
SLDR	=	Slider
TAN	=	Tangential

8) Replacement of IC205 program PROM-S (VYW1480) on the MAIN assembly (CONT section)

In the test mode, pressing the key combination [CX] +[8] on the remote control clears the external RAM. (Refer to "8.1 Test Mode".)

9) Numbers given in connection diagram correspond to those in the text covering the adjustment procedure.

10) Frame numbers are not displayed on the monitor TV, please read the FL display.

8.4 MECHANICAL ADJUSTMENT

1. Coarse Grating and Tracking (TRKG) Balance Adjustment

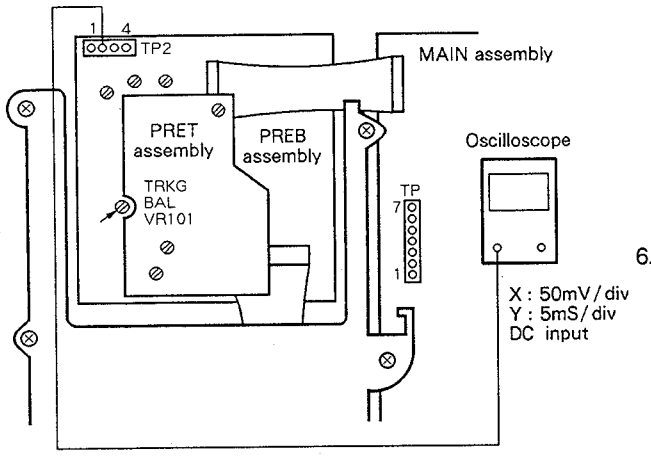
Mechanical Adjustment

● Purpose : To adjust the laser beam which is divided into three by the grating to the optimum position on the track. Set the TRKG servo offset voltage to 0 V.

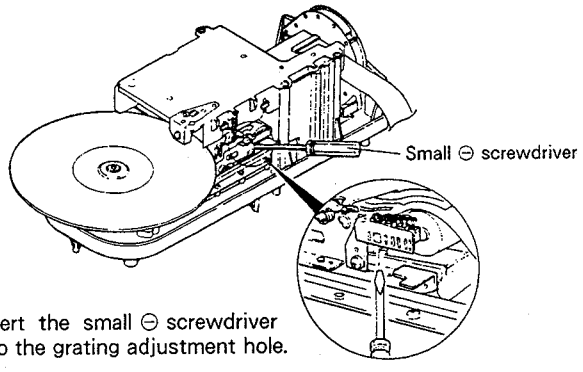
● When not properly adjusted : Disc playback will be impossible. During play, tracks may be skipped.

● Measuring instruments and jigs :	● Small ⊖ screwdriver (flat blade) ● Oscilloscope
● Measuring point :	● PREB assembly TP2-2 (TRKG error)
● Test disc and player mode	● 8-inch LD test disc GGV1002···#6,500 (F2···#300) ● Still mode ● Test Mode (TRKG servo : Open) ● The carriage assembly should be in the forward state.
● Positions to be adjusted	● Grating ● PREB assembly VR101 (TRKG balance)

Connection diagram



5. Connect an oscilloscope to TP2-2 in the PREB assembly.



6. Insert the small ⊖ screwdriver into the grating adjustment hole.

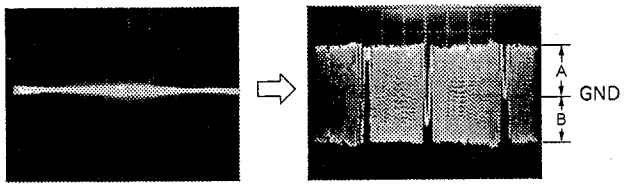


Photo 1 On-track position

Photo 2 Maximum amplitude A = B

Adjustment Procedure

< Coarse Grating Adjustment >

1. Play the LD test disc.
2. Press the DISPLAY key to display the frame # (No.) on the TV screen.
3. Move the pickup to frame #6,500 (#300) by scanning or searching.
4. Open the TRKG servo. (See page 87)
5. Connect an oscilloscope to TP2-2 in the PREB assembly and observe the waveform.
6. Insert the small ⊖ screwdriver into the grating adjustment hole. Turning the grating will allow you to vary the amplitude of the TRKG error waveform. Find the position where the waveform amplitude becomes minimum with a smooth envelope. (Photo 1) (This indicates that the 3-way split laser beams are directed onto the track. This is called the "on-track" position.)
7. Slowly turn the grating counterclockwise from the on track position until the waveform amplitude becomes maximum. (Photo 2)
8. Close the TRKG servo and check that a normal picture is displayed on the TV screen.

< TRKG Balance Adjustment >

1. Align the oscilloscope GND so that it comes to the center of the oscilloscope screen.
2. Adjust VR101 in the PREB assembly so that the positive and negative amplitude of the TRKG error waveform become equal. (Photo 2)

2. Crosstalk Adjustment

(1) Pickup Tangential Direction Angle Adjustment and Tilt Servo Balance Adjustment (Pickup TRKG direction angle adjustment)

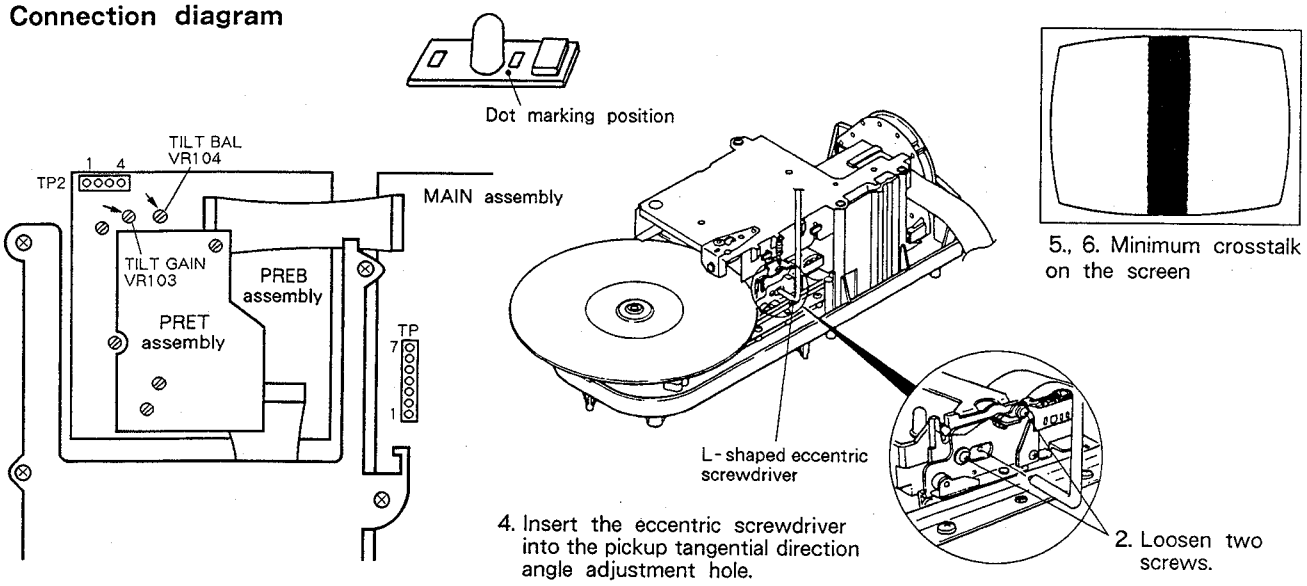
Mechanical Adjustment

● Purpose : To adjust the pickup tangential direction angle so as to minimize crosstalk.

● When not properly adjusted : Noticeable crosstalk will appear.

● Measuring instruments and jigs :	● TV monitor ● L-shaped eccentric screwdriver (GGV-129) ● Oscilloscope
● Measuring point :	● Crosstalk on the screen
● Test disc and player mode	● 8-inch LD test disc GGV1002···#115 (F2···#104) ● Still mode ● Test Mode (TRKG servo : Open/Close)
● Positions to be adjusted	● The carriage assembly should be in the forward state. ● Pickup tangential direction angle adjustment screw ● PREB assembly VR103 (TILT gain) and VR104 (TILT balance).

Connection diagram



Adjustment Procedure

1. Check the color of the dot marked on the top of the tilt sensor, at the side of the post.
   Some players have red and blue dots. According to the color of the dot, adjust the PREB assembly VR103 as follows :
   Red dot : Turn VR103 fully counterclockwise.
   Blue dot : Turn VR103 fully clockwise.
   No dot : Set VR103 to the center position.

—Pickup Tangential Direction Angle Adjustment—

2. Loosen the two locking screws shown in the figure.
3. Play the 8-inch LD test disc, and search frame #115 (#104).
4. Insert the eccentric screwdriver into the pickup tangential direction angle adjustment hole.
5. While watching the TV monitor screen, adjust the pickup tangential direction angle adjustment screw so that the crosstalk on the TV screen becomes minimum.

—Tilt Servo Balance Adjustment—
(Pickup TRKG Direction Angle Adjustment)

6. In the condition in 5, adjust VR104 in the PREB assembly so that the crosstalk on the TV screen becomes minimum or the left and right halves become equal. (Turn VR104 to alter the tilt of the pickup assembly TRKG direction.)
7. If there is still noticeable crosstalk on the TV screen, repeat adjustment steps 5 and 6.
8. After adjustment is complete, tighten the two locking screws.

Note : When the pickup tangential angle is changed in the side A play mode, be sure to perform "3. Spindle Motor Centering Check", "9. Centering Adjustment for Side B Play" and "10. Pickup Tangential Direction Angle Adjustment for Side B Play".

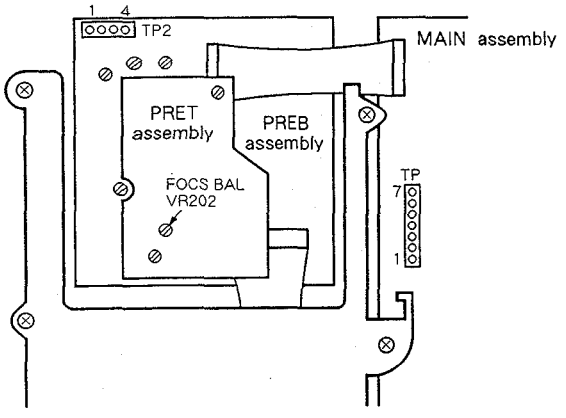
(2) LD FOCS Error Balance Adjustment

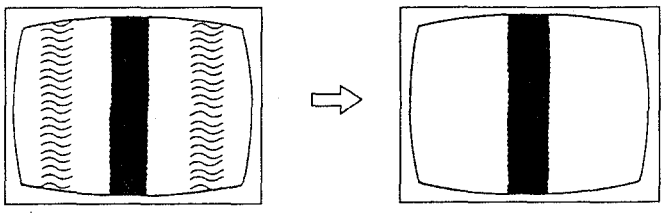
● Purpose : To ensure that the FOCS servo maintains the objective lens at the optimum distance from the disc surface.

● When not properly adjusted : Crosstalk will be generated.

● Measuring instruments and jigs :	● TV monitor
● Measuring point :	● Video signal output terminal
● Test disc and player mode	● 8-inch LD test disc GGV1002···#115 (F2···#104) ● Still mode
● Positions to be adjusted	● The carriage assembly should be in the forward state. ● PRET assembly VR202 (FOCS balance)

Connection diagram





Crosstalk generated on the screen

Minimum crosstalk

2. Adjust VR202 in the PRET assembly for minimum crosstalk.

2. Adjust so taht the crosstalk on the screen is minimum.

Adjustment Procedure

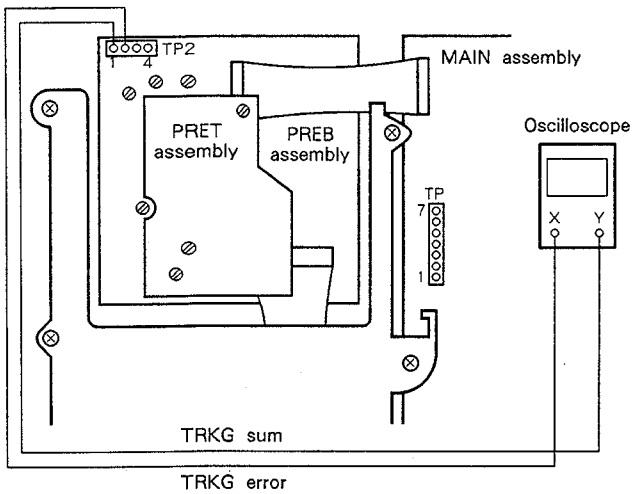
1. Play the 8-inch LD test disc and search frame #115 (#104).
2. Adjust VR202 in the PRET assembly so that the crosstalk on the left and right sides on the TV screen is minimized.
   If adjustment of VR202 fails to reduce crosstalk to an allowable level, perform "(1) Pickup Tangential Direction Angle Adjustment and Tilt Servo Balance Adjustment".

3. Spindle Motor Centering Check

● Purpose : To check that the center of the spindle motor is on the orbit of the laser beam.

● Measuring instruments and jigs :	● Oscilloscope
● Measuring point :	● PREB assembly TP2-2 (TRKG error) and TP2-1 (TRKG sum)
● Test disc and player mode	● 8-inch LD test disc GGV1002···#100 and #22,000 (#100 and #22,000 with a commercially available "karaoke" LD disc) ● Play mode ● CD test disc (YEDS-7) ● Test Mode (TRKG servo : Open)
● Positions to be adjusted	● The carriage assembly should be in the forward state. ● Check the Lissajous figure

Connection diagram



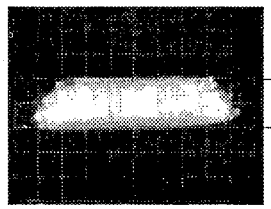


Photo 3

X : 20mV/div, AC input
Y : 20mV/div (1 : 1), AC input
X – Y mode

Lissajous figure of the inner track of the disc (CD)

Check that Y = Y'

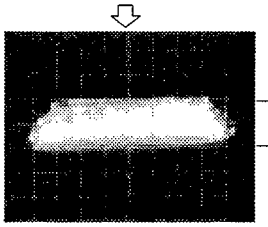


Photo 4

Lissajous figure of the outer track of the disc (CD)

5. The Y-axis of the Lissajous figure should be the same for the inner and the outer tracks.

Note : LD test disc F2 is not suitable for this adjustment because the recorded portion with a track pitch of 1.52μm is present only around inner tracks #1 to #500.

Checking Procedure

1. Play the 8-inch LD test disc.
2. Move the pickup to frame #22,000 by scanning or searching, then open the TRKG servo.
3. Connect TP2-2 in the PREB assembly to the X-input (CH-1) of the oscilloscope and TP2-1 to the Y-input (CH-2).
   Set the oscilloscope to the X-Y mode and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
4. Write down the Y-axis amplitudes of the Lissajous figures. (Photo 3)
5. Close the TRKG servo and search frame #100, then open the TRKG servo again to observe the Lissajous figure.

   At this time, check that the Y-axis amplitude of the Lissajous figure is the same as that noted in step 4. (Photo 4)
6. Remove the 8-inch LD test disc from the player, then load the CD test disc and repeat the checking procedures steps 1 to 5. However, it is not necessary to specify the inner or outer track positions of the disc. If the Y-axis amplitude of the Lissajous figure is different for the inner and outer tracks, perform "4. Spindle Motor Centering Adjustment".

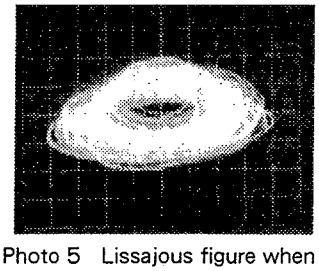


Photo 5 Lissajous figure when not properly adjusted

4. Spindle Motor Centering Adjustment

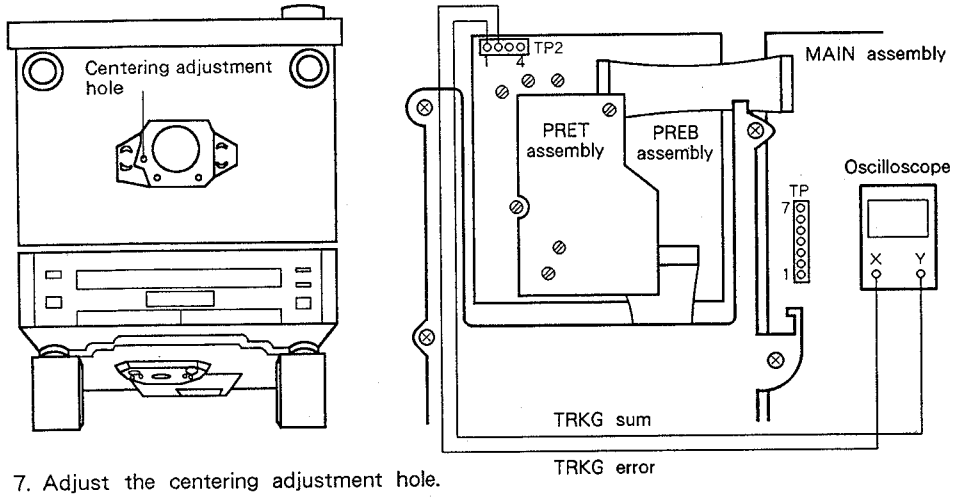
Mechanical Adjustment

● Purpose : To adjust so that the center of the spindle motor is on the orbit of the laser beam.

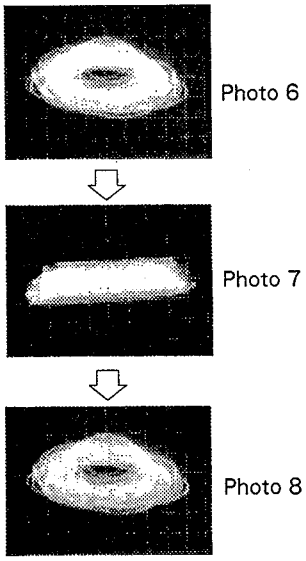
● When not properly adjusted : Track skips, or searching takes too long.

● Measuring instruments and jigs : ● Measuring point : ● Test disc and player mode ● Positions to be adjusted	● L-shaped eccentric screwdriver (GGV-129) ● Oscilloscope ● PREB assembly TP2-2 (TRKG error) and TP2-1 (TRKG sum) ● 8-inch LD test disc GGV1002···#100 and #22,000 (Or a commercially available "karaoke" LD disc) ● Play mode ● Test Mode (TRKG servo : Open/Close) ● CD test disc (YEDS-7) ● The carriage assembly should be in the forward state. ● Spindle motor centering adjustment hole

Connection diagram



7. Adjust the centering adjustment hole.



7. Lissajous figure.

Adjustment Procedure

Note : For the same reasons given in the "Note" in section 8.4.3, the LD test disc F2 is not suitable for this adjustment.

1. Connect TP2-2 in the PREB assembly to the X-input (CH-1) of the oscilloscope and TP2-1 to the Y-input (CH-2).
2. Play the 8-inch LD test disc and search frame #22,000.
3. Open the TRKG servo and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
4. Fine-ajust the grating so that the Y-axis amplitude of the Lissajous figure is minimized. (Photo 7)
5. Close the TRKG servo and search frame #100.
6. Open the TRKG servo again and observe the Lissajous figure and write the values down. (Photo 6)
7. Insert the L-shaped eccentric screwdriver into the adjusting hole from the left bottom of the unit, and turn slowly so that the Y-axis amplitude of the Lissajous figure is reduced.
   After the Y-axis amplitude of the Lissajous figure is minimized, turn the adjusting screw further until the amplitude becomes the same shape as that observed in procedure 7. (Photos 6 – 8)
8. Close the TRKG servo, and move the pickup assembly to the outer track of the disc (#22,000), then perform the adjustments in steps 4 to 6 again.
9. Re-open the TRKG servo and observe the Lissajous figure to check that the Y-axis amplitude is minimum. (Photo 7)
   If the Y-axis amplitude of the Lissajous figure is larger than specified, repeat the adjustment procedures from steps 5 to 8.
10. After adjustment is complete, perform the adjustment in "3. Spindle Motor Centering Check" item 6.

5. Fine Grating Adjustment

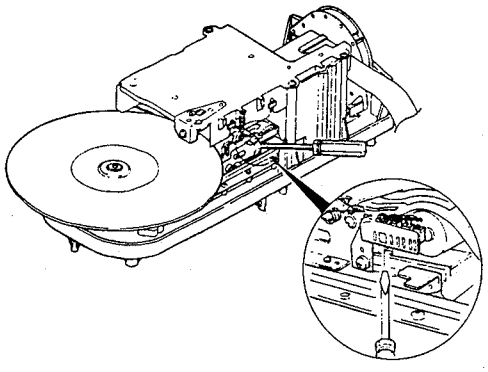
Mechanical Adjustment

● Purpose : To fine adjust the grating so that the two tracking beams for the TRKG servo are projected in the optimum positions on the tracks being played. Set the TRKG servo loop offset voltage to 0V.

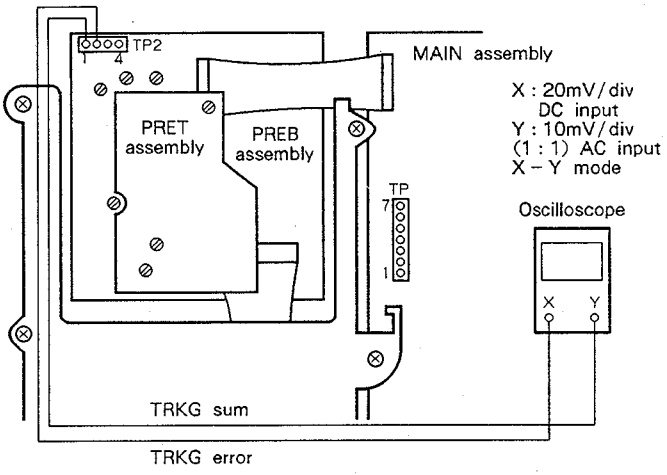
● When not properly adjusted : During play, tracks may be skipped.

● Measuring instruments and jigs :	● Oscilloscope ● Small ⊖ screwdriver
● Measuring point :	● PREB assembly TP2-2 (TRKG error) and TP2-1 (TRKG sum)
● Test disc and player mode	● 8-inch LD test disc GGV1002··· #6,500 (F2··· #300) ● Still mode ● Test Mode (TRKG servo : Open)
● Positions to be adjusted	● The carriage assembly should be in the forward state. ● Grating

Connection diagram



3. Insert the small ⊖ screwdriver into the grating adjustment hole to fine adjust it.



Adjustment Procedure

1. Play the LD test disc and search frame #6,500 (#300), then open the TRKG servo.
2. Connect TP2-2 in the PREB assembly to the X-input (CH-1) of the oscilloscope and TP2-1 to the Y-input (CH2)
   Set the oscilloscope to the X-Y mode and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
3. Insert the small ⊖ screwdriver into the grating adjustment hole, and fine-adjust the grating so that the Y-axis amplitude of the Lissajous figures is minimized. (Photo 9)
   If the grating is turned too much and the optimum position can no longer be found, repeat the "1. Coarse Grating Adjustment".
4. Select the oscilloscope's X-input (CH-1) and check that the positive and negative amplitudes of the TRKG error signal are equal. (Photo 10)
   If they are not, repeat the "1. Tracking Balance Adjustment".
5. Close the TRKG servo and check that the picture (image) on the TV screen is normal.

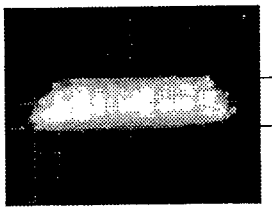


Photo 9
Fine grating adjustment

3. Y-axis amplitude of Lissajous figure becomes minimum.

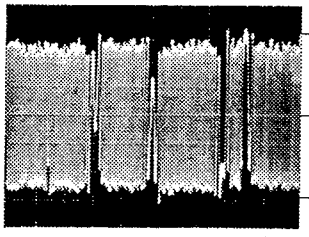


Photo 10
TRKG balance adjustment

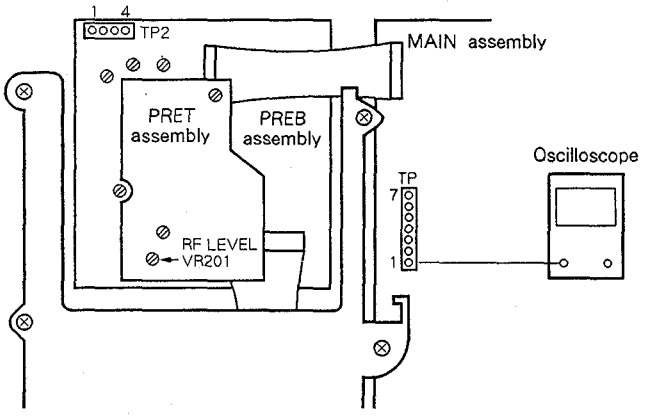
6. RF Gain Adjustment

● Purpose : To adjust the RF signal amplitude to the optimum value.

● When not properly adjusted : Dropout occurs frequently.

● Measuring instruments and jigs :	● Oscilloscope
● Measuring point :	● Main assembly TP1 (RF signal)
● Test disc and player mode	● 8-inch LD test disc GGV1002···#15,000 (F2···#15,000) ● Still mode ● Test Mode (TRKG servo : Close) ● The carriage assembly should be in the forward state.
● Positions to be adjusted	● PRET assembly VR201 (RF gain)

Connection diagram



2. Connect MAIN assembly TP1 to an oscilloscope.

Adjustment Procedure

1. Play the LD test disc and search frame #15,000 (#15,000).
2. Connect an oscilloscope to MAIN assembly TP1 (RF signal) and observe the RF signal.
3. Adjust PRET assembly VR201 so that the amplitude of the RF signal becomes 300 mV ± 50 mV. (Photo 11)

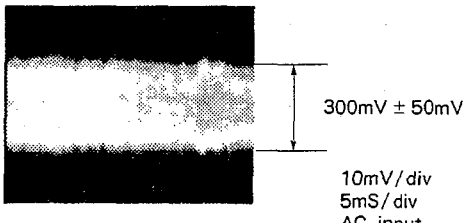


Photo 11 RF signal

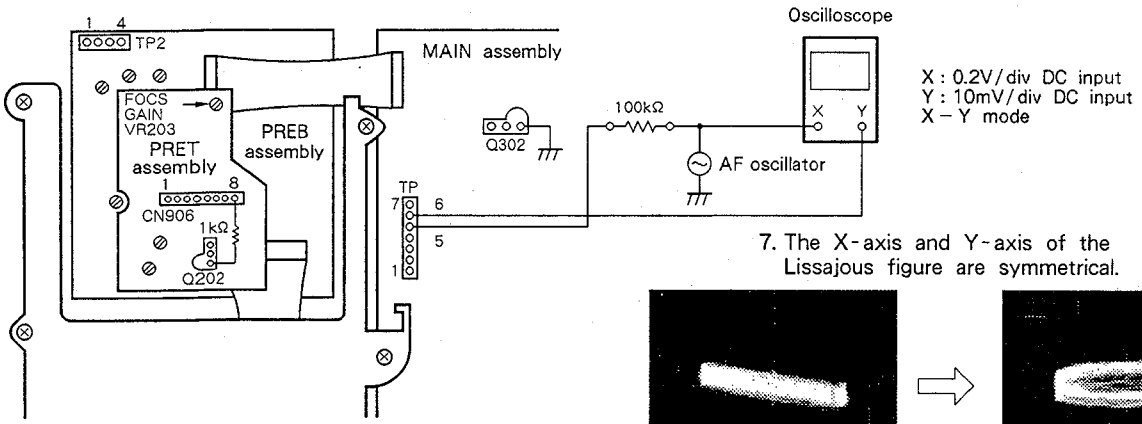
7. FOCS Servo Loop Gain Adjustment

● Purpose : To set the loop gain of the FOCS servo to the optimum value.

● When not properly adjusted : Performance deteriorates.

● Measuring instruments and jigs : ● Measuring point : ● Test disc and player mode ● Positions to be adjusted	● Oscilloscope ● AF oscillator ● Resistor (100k ohms) ● MAIN assembly TP5 (FOCS error) and TP6 (FOCS gain) ● 8-inch LD test disc GGV1002··· #15,000 (F2··· #15,000) ● Still mode ● TRKG servo : Close ● The FOCS motor protection circuit is disabled. ● The carriage assembly should be in the forward state. ● PRET assembly VR203

Connection diagram



1. Ground the gate of MAIN assembly Q302.
2. Connect MAIN assembly TP5, resistor, AF oscillator and the oscilloscope as shown.

7. The X-axis and Y-axis of the Lissajous figure are symmetrical.

Adjustment not complete — Photo 12 — Properly adjusted

Adjustment Procedure

1. Connect the base of Q202 in the PRET assembly to GND to inhibit the operation of the CN906 pin 8.
2. Ground the Q302 gate of the MAIN assembly to stop the function of the focus motor protection circuit.
3. Connect MAIN assembly TP5 to the oscilloscope's X-input (CH-1) via the resistor and AF oscillator, and TP6 to the Y-input (CH-2), as shown in the above diagram.
4. Set the AF oscillator output to 1.6 kHz/6 Vp-p for GGV1002, or 1.8kHz/6Vp-p for F2, according to the test disc used.
5. Play the 8-inch LD test disc and search frame #15,000 (#15,000).
6. Set the oscilloscope to the X-Y mode and observe the Lissajous figure.
7. Adjust VR203 in the PRET assembly so that the Lissajous figure is symmetrical on both the X-axis and Y-axis of the oscilloscope. (Photo 12)
8. Release the grounding from Q302 in the MAIN assembly.

Note : If the AF oscillator output does not exceed 6Vp-p, reduce the value of the resistor (100k ohms) in the above diagram, for easier observation of the Lissajous figure. (not below 33k ohms)

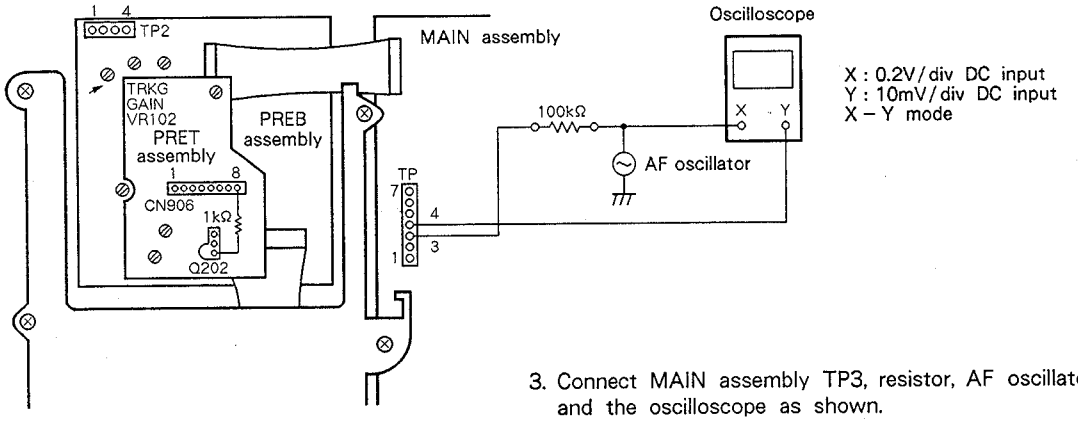
8. TRKG Servo Loop Gain Adjustment

● Purpose : To set the loop gain of the TRKG servo to the optimum value.

● When not properly adjusted : Performance deteriorates

● Measuring instruments and jigs : ● Measuring point : ● Test disc and player mode ● Positions to be adjusted	● Oscilloscope ● Resistor (100k ohms) ● AF oscillator ● MAIN assembly TP3 (TRKG error) and TP4 (TRKG gain) ● 8-inch LD test disc GGV1002··· #15,000 (F2··· #15,000) ● Still mode ● TRKG servo : Close ● The carriage assembly should be in the forward state. ● PREB assembly VR102

Connection diagram

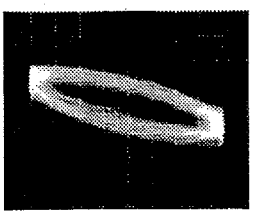


3. Connect MAIN assembly TP3, resistor, AF oscillator and the oscilloscope as shown.

Adjustment Procedure

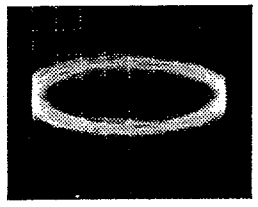
1. Connect the base of the PRET assembly Q202 to GND to inhibit the operation of the CN906 pin 8.
2. Play the LD test disc and search frame #15,000 (#15,000).
3. Connect MAIN assembly TP3 to the oscilloscope's X-input (CH-1) via the reisitor and AF oscillator, and TP4 to the Y-input (CH-2), as shown in the above diagram.
4. Set the AF oscillator output to 3.4kHz/6Vp-p for GGV1002, or 2.7kHz/6Vp-p for F2, according to the test disc used.
5. Set the oscilloscope to the X-Y mode and observe the Lissajous figure.
6. Adjust VR102 in the PREB assembly so that the Lissajous figure is symmetrical on both the X-axis and Y-axis of the oscilloscope. (Photo 13)

Note : If the AF oscillator output does not exceed 6 Vp-p, reduce the value of the resistor (100k ohms) in the above diagram, for easier observation of the Lissajous figure. (not below 33k ohms)



6. The X-axis and Y-axis of the Lissajous figure are symmetrical.

Adjustment not complete



Properly adjusted

Photo 13

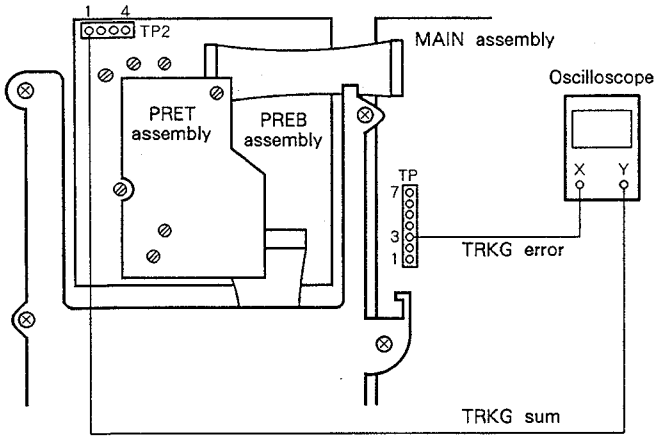
9. Centering Adjustment for Side B Play

Mechanical Adjustment

- Purpose : To set the center of the spindle motor on the path of the laser beam when playing the side B of the disc.
- When not properly adjusted : Tracks skipped, longer searching time or searching is impossible when playing side B of the disc.

● Measuring instruments and jigs :	● L-shaped eccentric screwdriver (GGV-129) ● Oscilloscope
● Measuring point :	● MAIN assembly TP3 (TRKG error), PREB assembly TP2-1 (TRKG sum)
● Test disc and player mode	● 8-inch LD test disc GGV1002···#100 (F2···#300) ● Play mode ● The carriage assembly should be in the reverse state. ● Test mode (TRKG servo : Open/Close)
● Positions to be adjusted	● Centering adjustment hole for side B

Connection diagram



4. Centering adjustment for side B play.

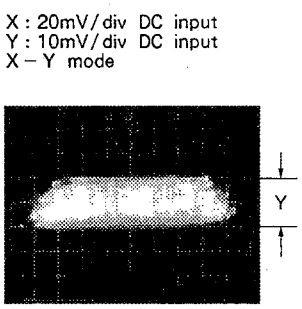


Photo 14

4. Properly adjusted (X : maximum).

Adjustment Procedure

1. Turn the LD test disc upside-down (change from side A to side B).
2. Set the oscilloscope to the X-Y mode, and connect MAIN assembly TP3 (TRKG error) to the oscilloscope's X-input (CH-1) and PREB assembly TP2-1 (TRKG sum) to the Y-input (CH-2).
3. Play the LD test disc and search frame #100 (#300), then open the tracking servo.

Note : If the center is too eccentric on side B of the disc, since searching will be impossible on side B, open the TRKG servo when the carriage assembly moves to the side B play position and searches around frame #100.

4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure is minimized (on-track position). Then turn the eccentric screwdriver clockwise further until the X-axis amplitude of the Lissajous figure becomes maximum. (Photo 14)

Note : When "2 (1) Tangential Direction Angle Adjustment" is performed with the pickup in the forward state, perform "10. Pickup Tangential Direction Angle Adjustment for Side B Play" and "11. Fine Centering Adjustment for Side B play".

10. Pickup Tangential Direction Angle Adjustment for Side B Play

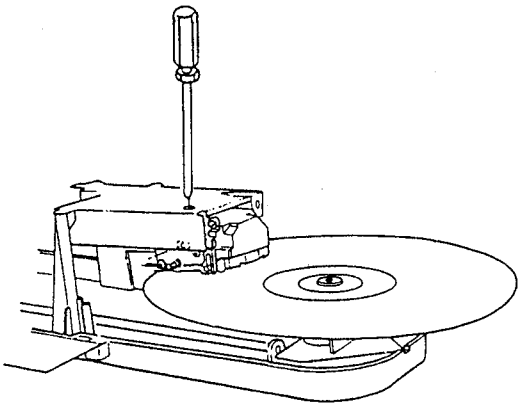
Mechanical Adjustment

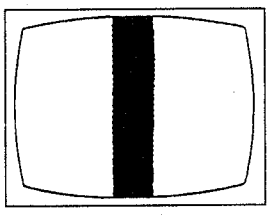
● Purpose : To adjust the crosstalk to become minimum in the tangential direction angle of the pickup assembly when playing side B of the disc.

● When not properly adjusted : Crosstalk is significant.

● Measuring instruments and jigs :	● TV monitor ● Small Philips screwdriver (cross-bladed)
● Measuring point :	● Monitor screen
● Test disc and player mode	● 8-inch LD test disc GGV1002···#115 (F2···#104) ● Still mode
● Positions to be adjusted	● The carriage assembly should be in the reverse state. ● Pickup tangential direction angle adjustment screw

Connection diagram





2. Minimum crosstalk

Adjustment Procedure

1. Play the LD test disc and search frame #115 (#104).
2. Check if crosstalk appears on the screen of the TV monitor, and adjust the pickup tangential direction angle adjustment screw so that the crosstalk is minimized.
3. After steps 1 and 2 have been completed, perform "9. Centering Adjustment for Side B Play" again.

Note : When the pickup tangential direction angle for side B play is varied by this adjustment, the center of the disc for side B may be shifted slightly. As a countermeasure, perform the centering adjustment again.

11. Fine Centering Adjustment for Side B Play

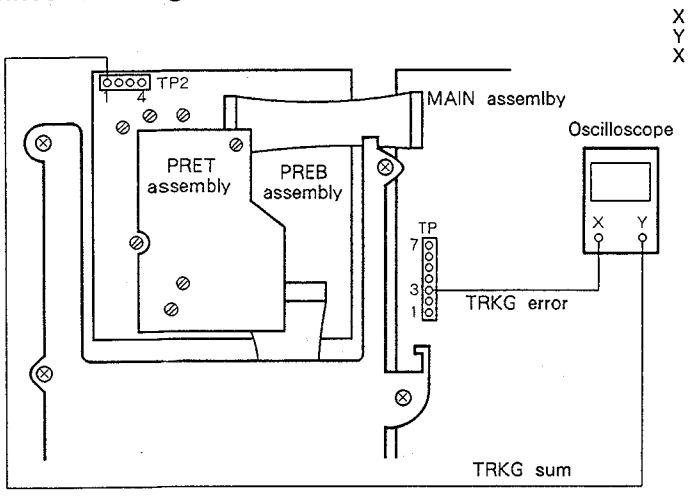
Mechanical Adjustment

● Purpose : To set the center of the spindle motor on the track of the laser beam when playing the side B of the disc.

● When not properly adjusted : Tracks skipped when playing side B of the disc.

● Measuring instruments and jigs :	● Oscilloscope ● L-Shaped eccentric screwdriver (GGV-129)
● Measuring point :	● MAIN assembly TP3 (TRKG error), PREB assembly TP2-1 (TRKG sum)
● Test disc and player mode	● 8-inch LD test disc GGV1002··· #100 (F2··· #300) ● Test mode (TRKG servo : Open)
● Positions to be adjusted	● Play mode ● The carriage assembly should be in the reverse state. ● Centering adjustment hole for side B

Connection diagram



4. Fine centering adjustment for side B play.

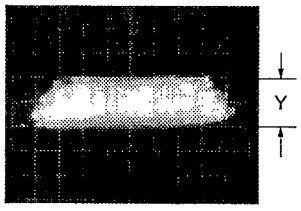


Photo 15

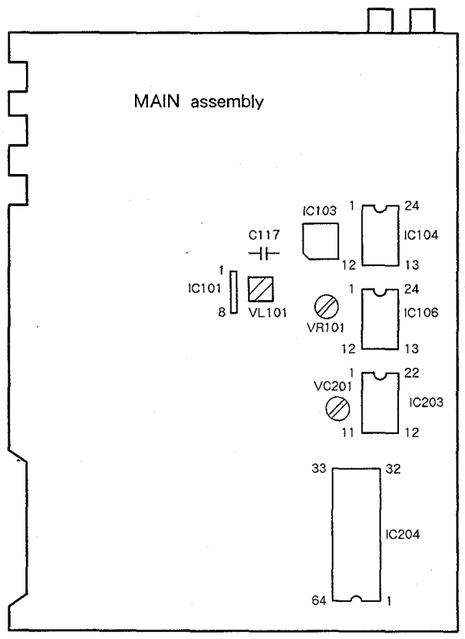
4. X-axis of Lissajous figure maximum.

Adjustment Procedure

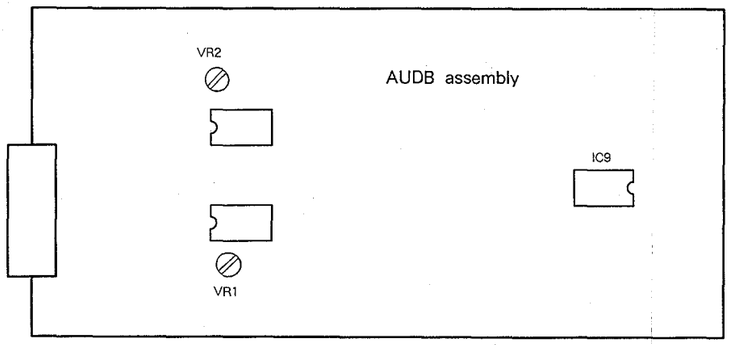
1. Set the oscilloscope to the X-Y mode, and connect MAIN assembly TP3 (TRKG error) to the oscilloscope's X-input (CH-1) and PREB assembly TP2-1 (TRKG sum) to the Y-input (CH-2).
2. Play the LD test disc and search frame #100 (#300).
3. Open the TRKG servo.
4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure becomes maximum. (Phot 15)

8.5 ELECTRICAL ADJUSTMENT

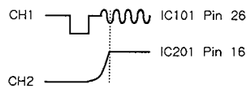
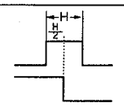
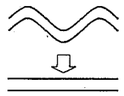
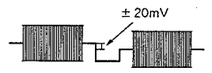
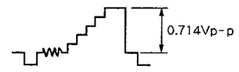
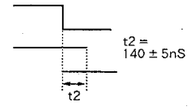
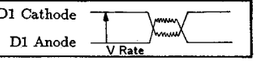
Assembly Adjustment Name		Adjustment Point	Measurement Point	Adjustment Description	Condition for Adjustment	Oscilloscope	Remarks
MAIN assembly							
1	Decoder Clock Adjustment	VC201	IC203 Pin 3	Adjust VC201 so that the frequency at the pin 3 of IC203 becomes 3 MHz ± 0.1 MHz. (See page 87.)	3MHz oscillation mode of the test mode	Frequency counter	
2	LDD VCXO Freerunning Frequency Adjustment	VR101	IC106 Pin 23	Adjust VR101 so that the frequency at the pin 23 of IC106 becomes 8.6436 MHz ± 400 Hz.	LDD disc playback	Frequency counter	
3	LDD PLL Freerunning Frequency Adjustment	VL101	IC101 Pin 1 Lead wire of C117 near the IC103	Connect a 0.01 μF capacitor to the lead wire of C117 near the IC103. Ground another lead wire of capacitor. Playback an LDD disc, and adjust VL101 so that the voltage of the lead wire of C117 near the IC103 and that of pin 1 of IC101 are identical.	LDD disc playback	Oscilloscope	
AUDB Assembly							
4	Audio Output Level Adjustment	VR1 (VR2)		Search for frame #18,901 (#18,901) (1 kHz 100 %) of the test disc and set the CX noise reduction system to OFF. Adjust the VR1 (VR2) so that the output level of the audio output terminal L (R) becomes 500 mVrms ± 20 %.	GGV1002···#18,901, playback	Digital voltmeter	



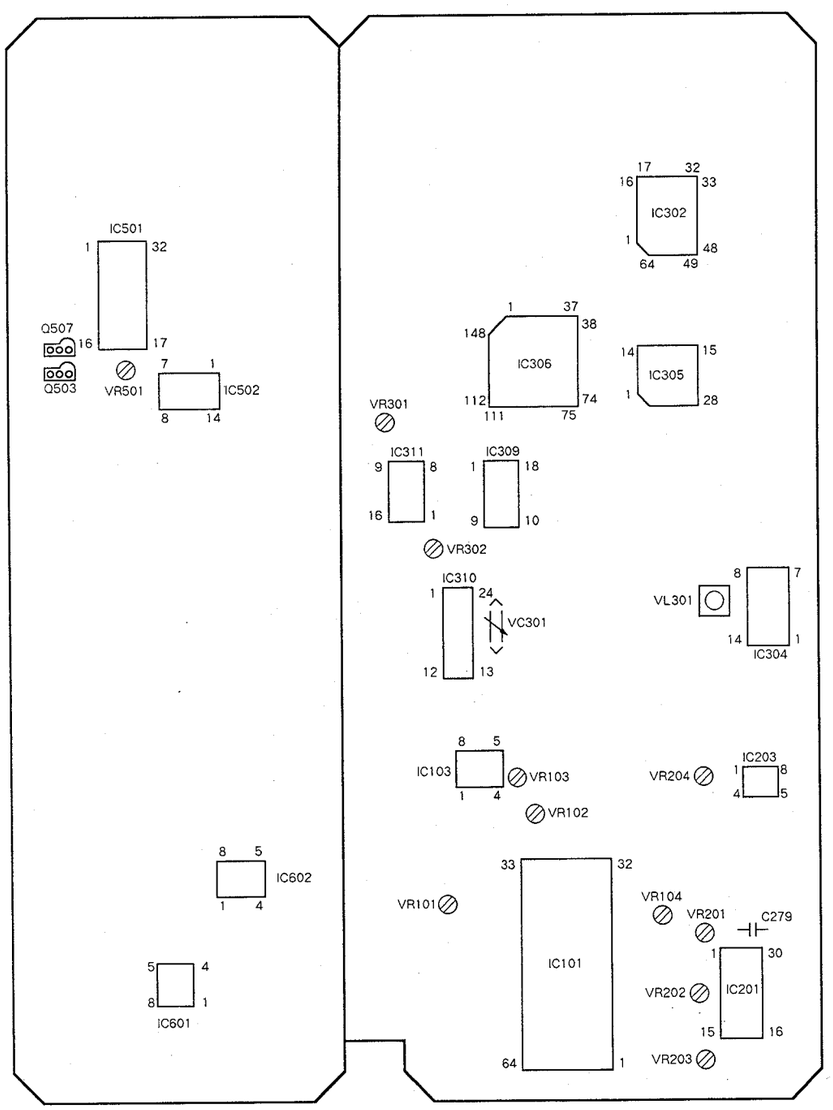
● ADJUSTMENT POINT



● ADJUSTMENT POINT

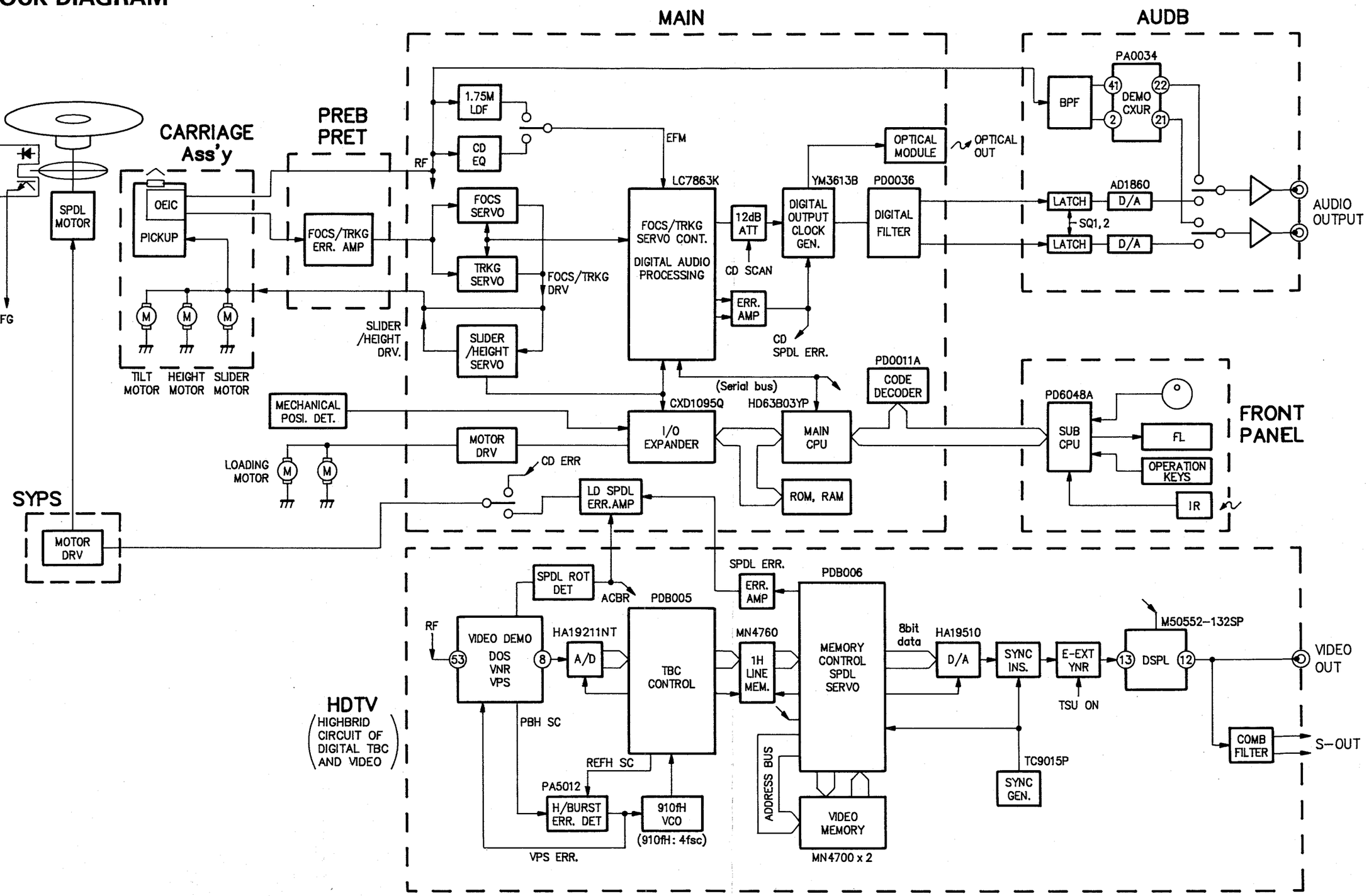
	Assembly Adjustment Name	Adjustment point	Measurement Point	Adjustment Description	Condition for Adjustment	Oscilloscope	Remarks
	HDTV assembly						
1	Master Clock Adjustment	VC301	IC302 Pin 2	Adjust VC301 so that the frequency at the pin 2 of IC302 in the HDTV assembly becomes 3.579545 MHz ± 200 Hz just after the power of the player is turned on.	POWER ON	Frequency counter	
2	Half H Rejection Adjustment	VR201	IC201 Pin 3	Adjust VR201 so that the pulse width at the pin 3 of IC201 in the HDTV assembly becomes 52 ± 2μsec.	LD disc playback	X : 2V/div Y : 10μsec/div	
3	Burst Gate Timing Adjustment	VR203	IC101 Pin 26 IC201 Pin 16	Adjust VR203 so that the rising edge of the pulse at pin 16 of IC201 and the first wave of the video burst signal at pin 26 of IC101 becomes same timing.	LD disc playback		
4	VCO offset Adjustment	VL301	IC203 Pin 1	Adjust VL301 so that the DC level at the pin 1 of IC203 becomes 0 ± 100 mV.	LD disc playback		0 ± 100mV
5	Detection Level Adjustment	VR101	IC602 Pin 6 IC602 Pin 5	Adjust VR101 so that the voltage at the pin 5 of IC602 is equal to the voltage at pin 6 plus 218mV ± 20mV.	LD test disc #4,801 (#5,401), playback		Pin 5 voltage = Pin 6 voltage + 218mV ± 20mV
6	Trapezoid incrination Adjustment	VR202	IC302 Pin 1 IC201 Pin 5	Adjust VR202 so that the falling edge of the pulse at pin 5 (PB-H) of IC201 is in the center of the H duration at pin 1 of IC302 when C279 is short-circuited.	Memory : WRITE side PLL LOCK DC reset mode		
7	PLL Gain Adjustment	VR204	Audio output terminal (Lch, Rch)	* Adjust VR204 so that the amplitude of a signal supplied from the audio output terminal and the difference in level between L and R are minimum when frame #2,701 (#2,701) of the LD test disc which is decentered is played back. * To have the disc decentered, adhere a piece of vinyl tape on the center hole of the disc.	Have the test disc decentered by adhering a piece of vinyl tape on the center hole of the test disc. #2,701 (#2,701), playback	10mV/div 5msec/div	
8	Sync DC Level Adjustment	VR302	Video output terminal	Adjust VR302 so that the difference in pedestal level becomes 0 ± 20 mV, by monitoring the V-rate of the signal suppplied from the video output terminal with an oscilloscope.	#2,701 (#2,701), playback	200mV/div 500μsec/div V rate	
9	Video Level Adjustment	VR102	Video output terminal	Adjust VR102 so that the amplitude from the pedestal level to the white level becomes 0.714Vp-p ± 5%, by monitoring the video signal on the oscilloscope.	#19,801 (#19,801) STILL	50mV/div 50mV/div	
10	1H Delay Video Level Adjustment	VR103	IC101 Pin 40 Pin 42	Adjust VR103 so that the amplitude between the sync chip and the white peak of video signal output from pins 40 and 42 of IC101 to the same level.	#19,801 (#19,801) STILL	50mV/div 50mV/div	
11	VPS Error Level Adjustment	VR104	TV monitor screen	Adjust VR104 so that color shading in a magenta picture is minimized.	#7,201 (#26,101) STILL		
12	140nsec Adjustment	VR301	IC311 Pin 11 IC310 Pin 7	By monitoring the waveformes at pin 11 of IC311 and pin 7 of IC310, adjust VR301 so that t2 in the figure becomes 140 nsec ± 5 nsec against the falling edge of the signal output from pin 11 of IC311.	#7,201 (#6,301) STILL		
13	D-EXT Adjustment	VR501		Adjust VR501 so that the base level of Q507 and the sync pedestal level of Q503 to the same level in D-EXT mode.	LD disc playback D-EXT mode		
	YCSB assembly						
14		VR1	CH1: D1 Anode CH2: D1 Cathode	**Adjust VR1 so that the DC voltage level between the Anode and the Cathode of D1 become +0.4 ±0.1V.**	#5401 STILL	V Rate	

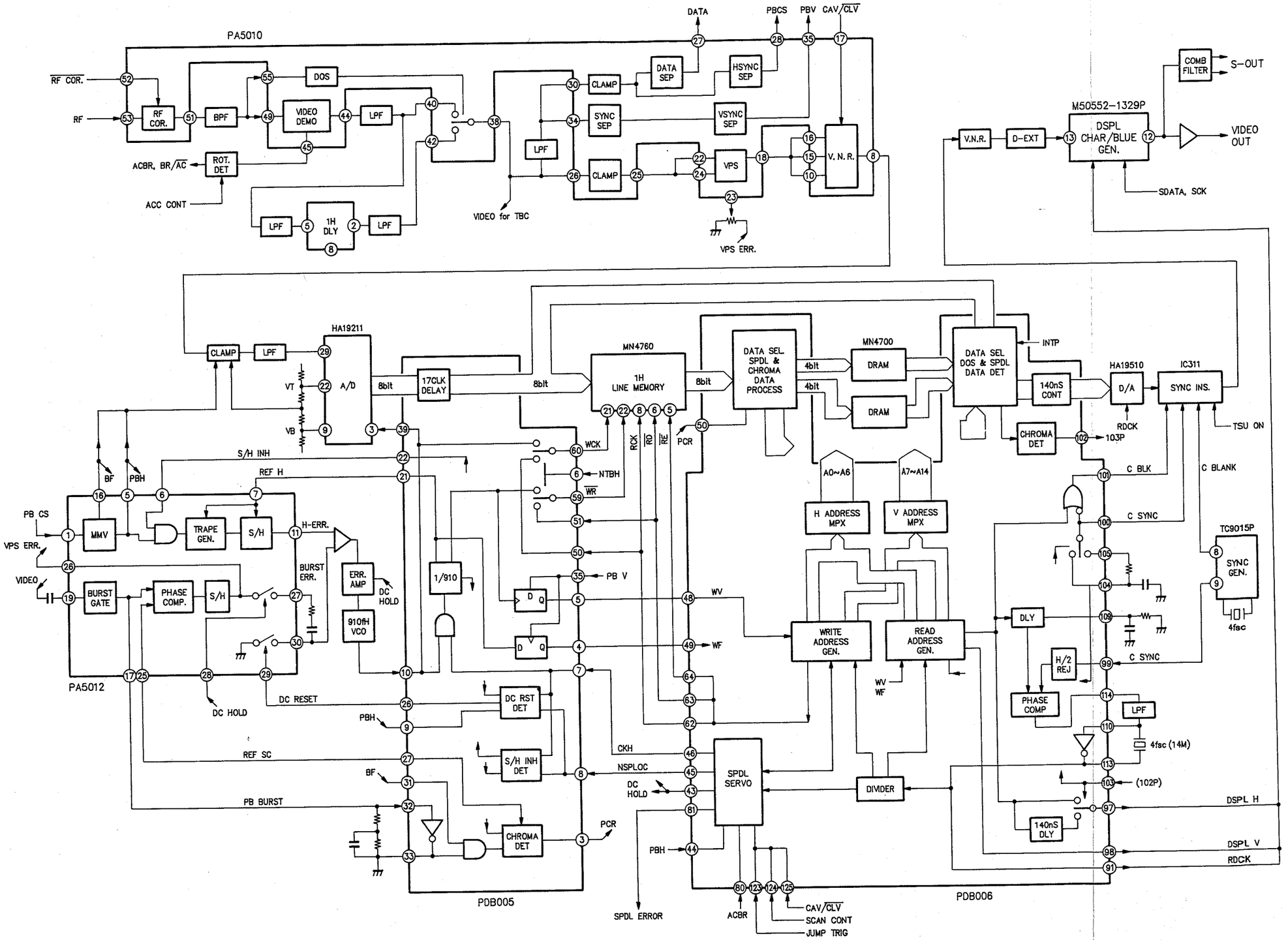
HDTV assembly



● ADJUSTMENT POINT

9. BLOCK DIAGRAM

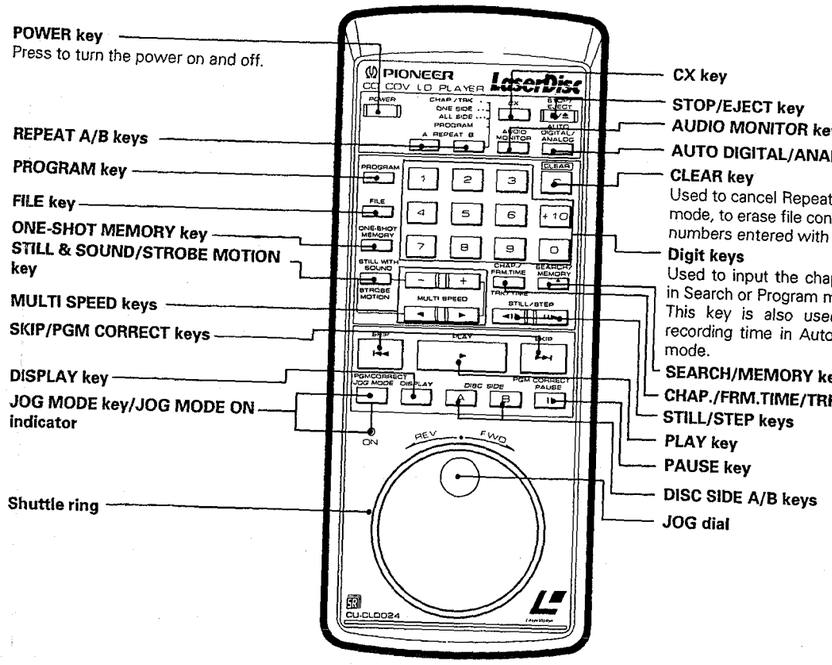



PA5010
DATA
PBCS
PBV
CAV/CLV
RF COR.
RF
RF COR.
BPF
DOS
VIDEO DEMO
LPF
CLAMP
DATA SEP
HSYNC SEP
SYNC SEP
VSYNC SEP
VPS
V. N. R.
ACBR, BR/AC
ROT. DET
ACC CONT
LPF
1H DLY
LPF
VIDEO for TBC
VPS ERR.
COMB FILTER
S-OUT
M50552-1329P
V.N.R.
D-EXT
DSPL CHAR/BLUE GEN.
VIDEO OUT
SDATA, SCK
HA19211
CLAMP
LPF
VT
A/D
VB
8bit
17CLK DELAY
8bit
MN4760
1H LINE MEMORY
8bit
DATA SEL. SPDL & CHROMA DATA PROCESS
4bit
4bit
MN4700
DRAM
DRAM
DATA SEL DOS & SPDL DATA DET
INTP
140nS CONT
HA19510
D/A
IC311
SYNC INS.
CHROMA DET
RDCK
103P
TSU ON
C BLK
C BLANK
C SYNC
TC9015P
SYNC GEN.
4fsc
WCK
NTBH
WR
RCK
RD
RE
PCR
A0~A6
A7~A14
H ADDRESS MPX
V ADDRESS MPX
WRITE ADDRESS GEN.
READ ADDRESS GEN.
WV
WF
DLY
H/2 REJ
PHASE COMP
LPF
4fsc (14M)
(102P)
DSPL H
DSPL V
RDCK
140nS DLY
DIVIDER
SPDL SERVO
CKH
NSPLOC
DC HOLD
PBH
SPDL ERROR
ACBR
CAV/CLV
SCAN CONT
JUMP TRIG
BF
PBH
S/H INH
REF H
PB CS
VPS ERR.
VIDEO
MMV
TRAPE GEN.
S/H
H-ERR.
BURST GATE
PHASE COMP.
S/H
BURST ERR.
ERR. AMP
DC HOLD
910fH VCO
1/910
D Q
D Q
PB V
WV
WF
PA5012
DC HOLD
DC RESET
DC RST DET
PBH
S/H INH DET
REF SC
BF
PB BURST
CHROMA DET
PCR
PDB005
PDB006

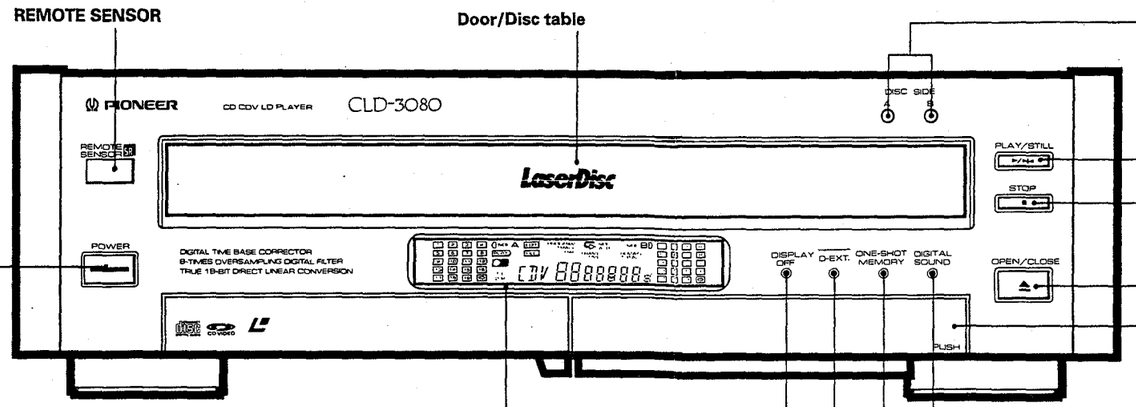
10. PANEL FACILITIES

● REMOTE CONTROL UNIT

Remote control keys 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.



● FRONT PANEL



POWER switch
Press to turn the power on and off.

DISC SIDE A/B buttons
When a two-sided LD is loaded, side A is the side with the label facing upward, and side B is the side with the label facing downward.
Depending on how the LD is loaded, the A and B buttons may not correspond with the indications on the label (A, B or 1, 2).

PLAY/STILL button

STOP button

OPEN/CLOSE button

DIGITAL SOUND indicator
Lights when a disc with digital sound is played. Also lights when the digital signal is selected during LD playback.

ONE-SHOT MEMORY indicator
Lights during One-Shot Memory playback.

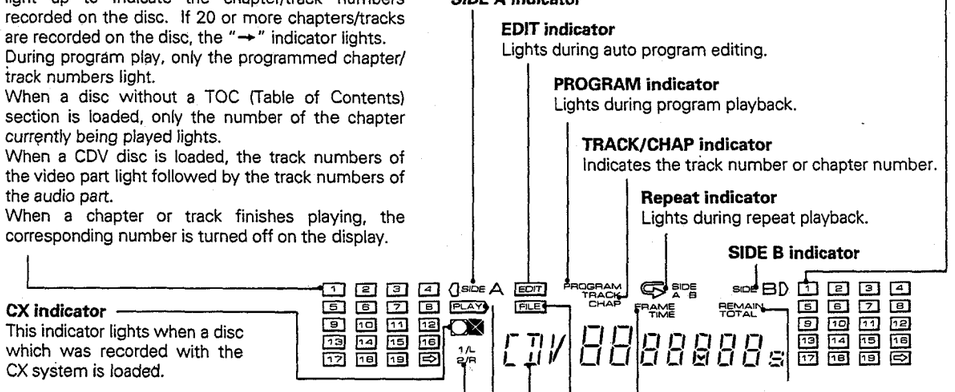
D-EXT. (dynamic range extension) indicator
Lights when the dynamic range extension circuit is ON.

DISPLAY OFF indicator
Lights when the display window and TV screen are turned off using DISPLAY OFF button.

Display window

LD side A/CD/CDV visual calendar
When a disc is loaded, the numbers on this calendar light up to indicate the chapter/track numbers recorded on the disc. If 20 or more chapters/tracks are recorded on the disc, the "→" indicator lights.
During program play, only the programmed chapter/track numbers light.
When a disc without a TOC (Table of Contents) section is loaded, only the number of the chapter currently being played lights.
When a CDV disc is loaded, the track numbers of the video part light followed by the track numbers of the audio part.
When a chapter or track finishes playing, the corresponding number is turned off on the display.

LD side B visual calendar
A visual calendar for the B side of two-sided LDs. Numbers light in the same way as on the side A visual calendar.



CX indicator
This indicator lights when a disc which was recorded with the CX system is loaded.

1/L channel, 2/R channel indicator
Indicates the audio output channel(s).

PLAY indicator
Lights when a disc is being played.

Disc indicator
Indicates the type of disc loaded.

EDIT indicator
Lights during auto program editing.

PROGRAM indicator
Lights during program playback.

TRACK/CHAP indicator
Indicates the track number or chapter number.

Repeat indicator
Lights during repeat playback.

SIDE B indicator

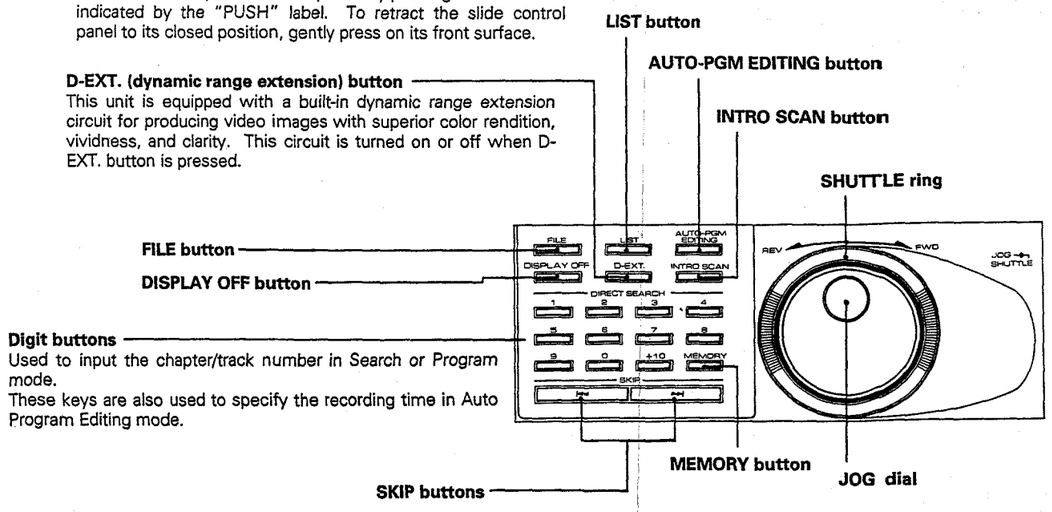
REMAIN/TOTAL indicator
Indicates the remaining play time or the total play time of the current side.

FRAME/TIME indicator
Indicates the frame number or the elapsed time.

FILE indicator
Lights when a file is stored in memory.

Slide control panel
The slide control panel can be opened by pushing on the section indicated by the "PUSH" label. To retract the slide control panel to its closed position, gently press on its front surface.

D-EXT. (dynamic range extension) button
This unit is equipped with a built-in dynamic range extension circuit for producing video images with superior color rendition, vividness, and clarity. This circuit is turned on or off when D-EXT. button is pressed.



Digit buttons
Used to input the chapter/track number in Search or Program mode.
These keys are also used to specify the recording time in Auto Program Editing mode.

11. SPECIFICATIONS

1. General

System ..... LaserVision Disc system and Compact Disc digital audio system
Laser ..... Semiconductor laser wavelength 780 nm
Power requirements ..... AC 110V/120V/220V/240V (Switchable), 50/60 Hz
Power consumption 43W
Weight ..... 13.3 kg (29 lbs 5 oz)
Dimensions ..... 445 (W) x 438 (D) x 132 (H) mm
17-15/16 (W) x 17-1/4 (D) x 5-3/16 (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
Liner speed ..... 1.2 ~ 1.4m/sec
*Maximum playing time
60 min. or more: 5-inch discs
20 min. or more: 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

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

4. S-Video output

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

5. Other Terminals

Control imput/output ..... Both miniature jacks
Optical digital output ..... Optical digital jack

6. Accessories

Remote control unit (CU-CLD024) 1
Size "AAA" (IEC R03) dry cell batteries 2
Video cord 1
Audio cord 1
Screws 4
(used when removing the side wood panaels.)
Operating instructions 1

7. Audio characteristics

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

Digital Audio Characteristics

Frequency response	4 Hz - 20 kHz (±0.2dB) (EIAJ)
SN ratio	108 dB (EIAJ)
Dynamic range	99 dB (EIAJ)
Channel separation	102 (EIAJ)
Total harmonic distortion	0.003% (EIAJ)
Wow and flutter	Limit of measurement (0.001% W. PEAK) or less (EIAJ)

8. Player Functions

- Display ON/OFF
- Visual Calender Display
- Dynamic Range Extension
- File
- File List
- Intro Scan
- Auto Program Edit
- Last Memory

9. Functions

Remote control unit operations (CU-CLD024)

	Function	Standard play Disc (CAV)	Extended play Disc (CLV)	Compact Disc with Video	Compact Disc
Basic Functions	Two-side play	YES	YES	NO	NO
	Single-side play	YES	YES	YES	YES
	Pause	YES	YES	YES	YES
	Stop	YES	YES	YES	YES
Search	Fast forward and reverse (Jog dial/Shuttle ring)	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
Program	Chapter/Track program play	YES	YES	YES	YES
	Picture window program	YES	YES	NO	NO
	One-shot program	YES	YES	NO	NO
	Program correction	YES	YES	YES	YES
Repeat	Repeat between 2 points	YES	YES	YES	YES
	Memory repeat	YES	YES	YES	YES
	Chapter/Track repeat	YES	YES	YES	YES
	One-side repeat	YES	YES	YES	YES
	Two-side repeat	YES	YES	NO	NO
	Program repeat	YES	YES	YES	YES
Trick play	Still/Step	YES	YES	YES*1	NO
	Multi-speed (Forward/reverse 9-level variable)	YES	YES	YES*1	NO
	Sill with Sound	YES	YES	YES*1	NO
	Strobe motion	YES	YES	YES*1	NO
	Jog dial/Shuttle ring	YES	YES	YES	YES
Time display	Elapsed time display	YES*2	YES	YES	YES
	Remaining track time display	NO	NO	YES	YES
	Remaining total time display	YES*2	YES*2	YES	YES
	Total number of selections, total time display	YES*2	YES*2	YES	YES
Others	CX system ON/OFF	YES*3	YES*3	—	—
	AUTO DIGITAL/ANALOG switch	YES*4	YES*4	—	—
	One-shot memory	YES	YES	YES*1	NO
	Audio channel selection (Stereo, 1/L, 2/R)	YES	YES	YES	YES

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

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

XR392

2418

PIONEER®
The future of sound and vision.

Service Manual

17. April 1989

SERVICE GUIDE

ORDER NO.
ARP 1702

CD CDV LD PLAYER

CLD-3070

US

CONTENTS

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PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 6B8 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

FJ JAN 1989 Printed in Japan

2418

1. DESCRIPTION OF BOTH-SIDES PLAYBACK MECHANISM (α-TURN SYSTEM)

1-1 OUTLINE

The both-sides playback mechanism is called "α-Turn System" and has the following features:

- The signal reading by the pickup ass'y from the disc surface is performed in the same way when playing both sides A and B.
- The relationship of the three beams (zero and first order beams) for signal read-out is the same when playing both sides A and B.
- The direction of rotation of the spindle motor is reversed when playing side B.

1-2 OUTLINE OF OPERATION

Fig. 1-1-1 shows the operating principles of the system.

The carriage assembly for side-A play moves toward the inner or outer edge of the disc guided by the carriage shaft (A). When the Carriage Assembly is inverted from Side A to Side B, the carriage assembly is moved toward the outer edge of the disc, through the carriage shaft (A) to the guide shaft at the inversion mechanism, and at the same time, the inversion mechanism starts rotating. At the position where the inversion mechanism is rotated by 180°, the carriage assembly is fed toward the inner edge of the disc, and passed by the guide of the guide shaft to the carriage shaft (B) then the carriage assembly is moved toward the inner edge of the disc to start playing side B.

Changing from sides B to A is performed in the opposite way.

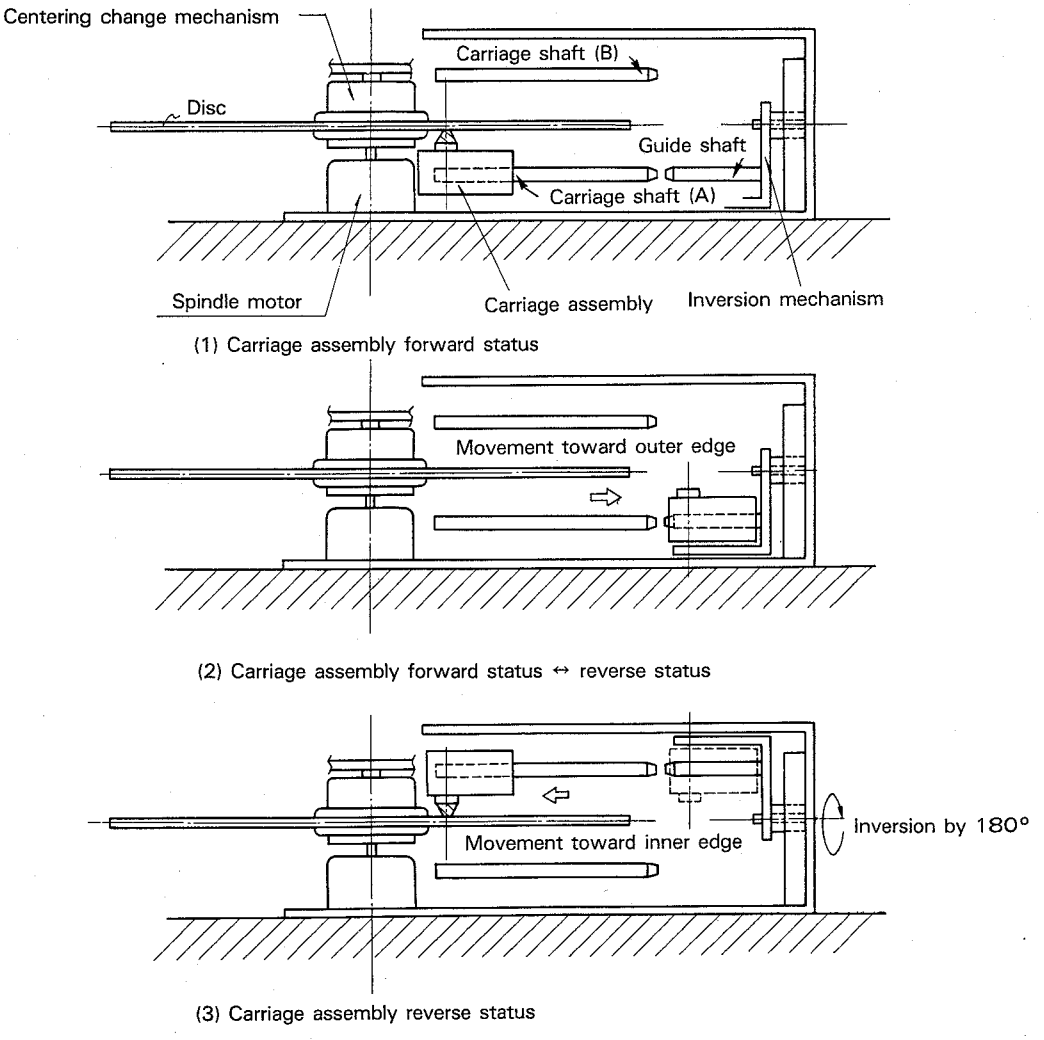


Fig. 1-1-1 Operating principle of "both-sides playback mechanism" (α-turn system)

Fig. 1-1-2 is a diagram showing the outline of the "α-turn" system both-sides playback mechanism. In this system, since the two carriage shafts (A) and (B) are securely fixed along the upper and lower surfaces of the disc, while the guide shaft in the inversion mechanism is located on the same axis with respect to each carriage shaft (A) and (B) when playing both sides A and B, the transition of the carriage assembly can be performed smoothly.

The pickup assembly is located inside the carriage assembly, in which the slider drive mechanism used for the movement of the pickup assembly (it is also used for driving the turn-gear to invert the carriage assembly), tilt drive mechanism and height drive mechanism (described below) are also incorporated.

The above inversion operation is started when the turn gear located at the rear of the carriage section is engaged with the internal gear (sun gear). Then the entire carriage section is turned by 180° by means of the rotation of the turn gear (planetary gear). In this system, the invertion mechanism itself does not have an exclusive drive section.

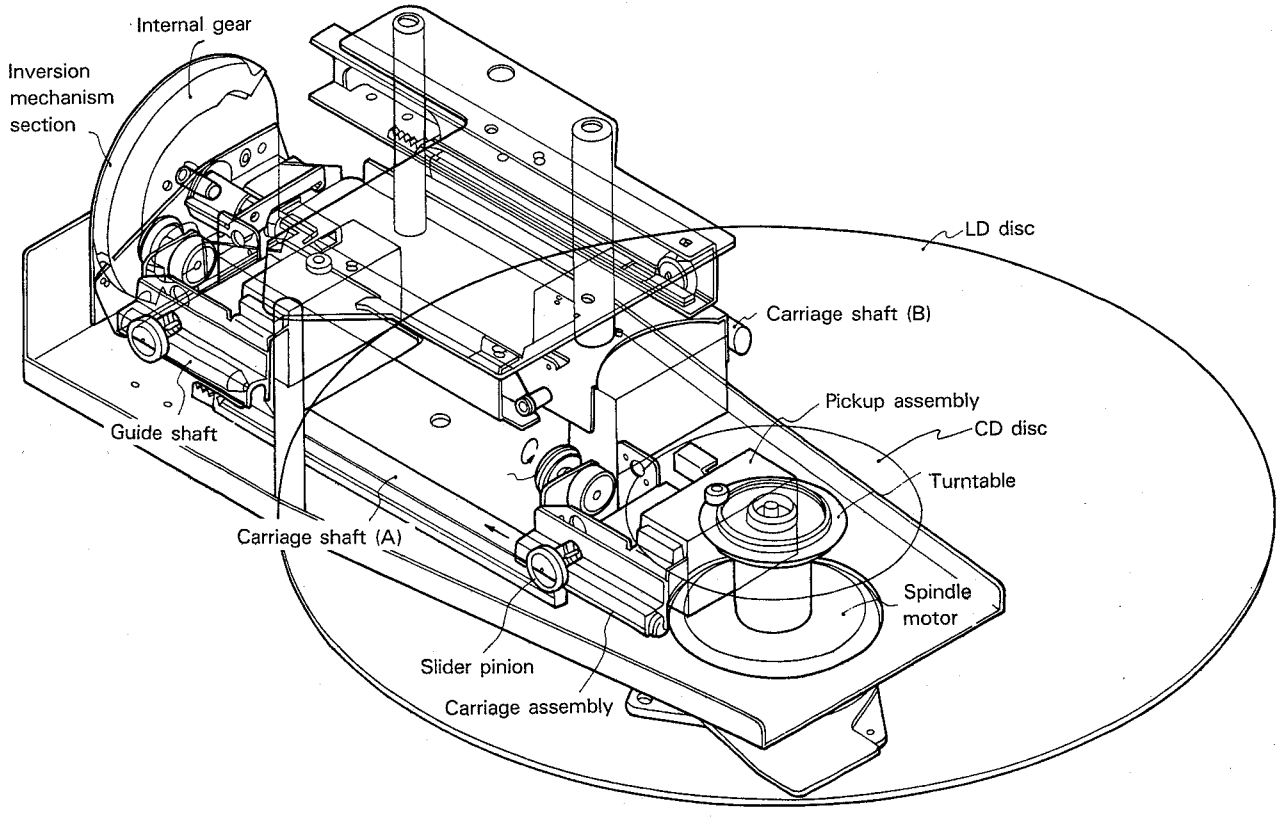


Fig. 1-1-2 Overall diagram of the "Alpha-Turn" both-sides playback mechanism

2. DESCRIPTION OF CLAMPER MECHANISM

2-1. OUTLINE

Eccentricity due to errors when the two sides of the disc are attached may increase time base errors and cause Color Band. Therefore, the centering ability of the clamper mechanism is especially important in a both-sides playback system.

Because of this, the CLD-3070 is equipped with a clamper mechanism having an independent centering system for sides A and B and side B of the disc can be played back with the same stability as side A.

2-2 OUTLINE OF OPERATION

In the side A/B independent centering system, the centering hub (B) is pointed inside the disc clamper. Fig. 2-2-1 shows its structure and the operation. In status (2) when side A is clamped, in the same way as in the conventional system, the center of side A is adjusted to the center of the spindle motor by applying the tapered section of the centering hub (A) to the inside of the center hole on side A of the disc and the disc is clamped to the turntable by the disc clamper.

When playing side B from this condition, the clamper holder which maintains the clamper mechanism is lowered to lower the centering hub (B) located inside the disc clamper. Then, while the centering hub (A) is lowered, the tapered section of the centering hub (B) comes into contact with the inner edge of the center hole on side B of the disc in which there is a displacement between sides A and B. When the clamper holder is further lowered, the centering hub (A) is completely released from the disc while the disc is pressed by the tapered section of centering hub (B). So that this is possible, the disc is held at the center of the spindle motor while it is shifted to the surface of the turntable, then the mechanism goes to status (3).

As described above, the side A/B independent centering mechanism is constructed simply by furnishing the independent centering hubs (A) and (B) and provides the same centering accuracy as the conventional system.

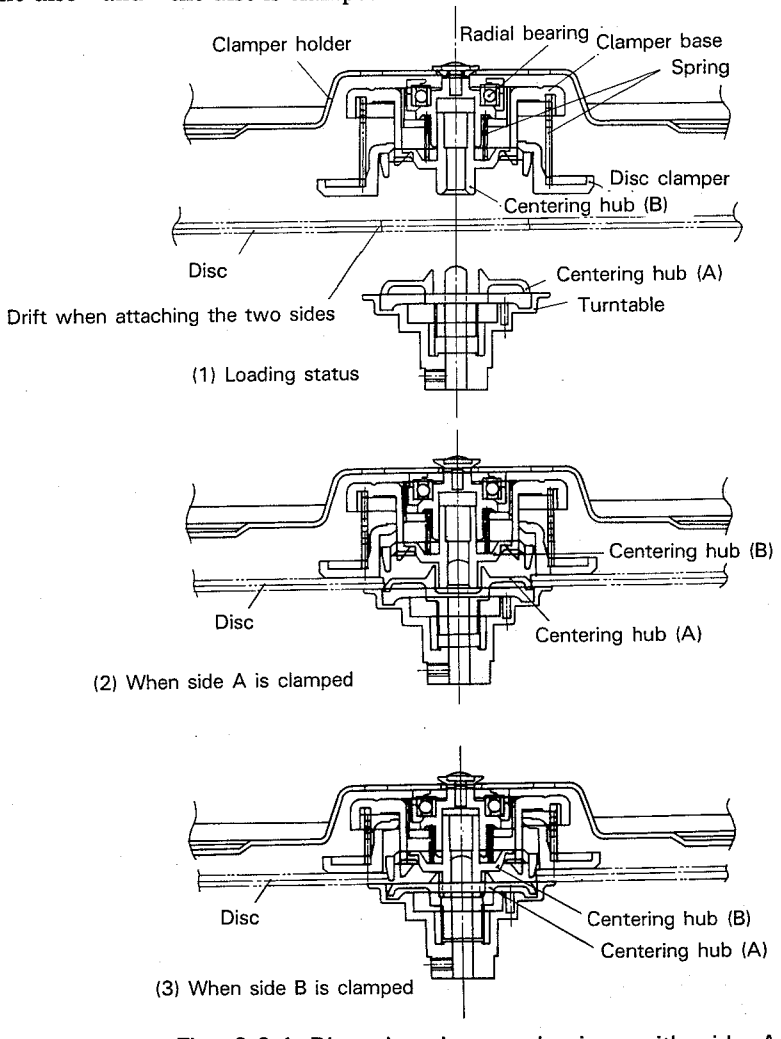


Fig. 2-2-1 Disc clamping mechanism with side A/B independent centering system

3. TILT & HEIGHT SERVO MECHANISM

3-1 OUTLINE OF OPERATION

Fig. 3-1-1 shows a comparison between the conventional tilt mechanism and the newly developed Tilt & Height Mechanism.

Fig. 3-1-2 shows the structure of the Tilt & Height Mechanism.

In this system, since the tilt fulcrum is located on the extension of the center line of the beam axis of the pickup, the light axis angle can be swung by the exclusive tilt drive mechanism. And since this tilt fulcrum is supported by the AF arm, it can also be moved up/down by swinging the AF arm with the exclusive height drive mechanism. The tilt servo is controlled by the output of the tilt sensor which detects the angle of the warpage of the disc so that the laser beam is always emitted at right angles to the disc. The height servo mechanism controls it so that the operating distance (the optimum distance for the focus servo) of the pickup above the disc is always kept at a fixed value.

With the above method, since the angle and displacement can be compensated independently, there will be no residual tilt error with uneven or warped discs while discs are played back with optimum focus servo. Therefore, the optimum pickup performance will be obtained and the playing ability will be greatly improved.

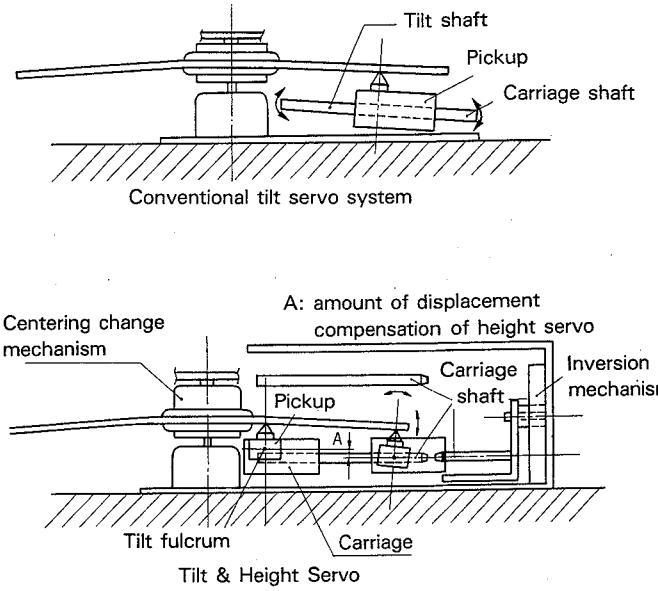


Fig. 3-1-1 Comparison between the conventional tilt servo and the "tilt & height servo"

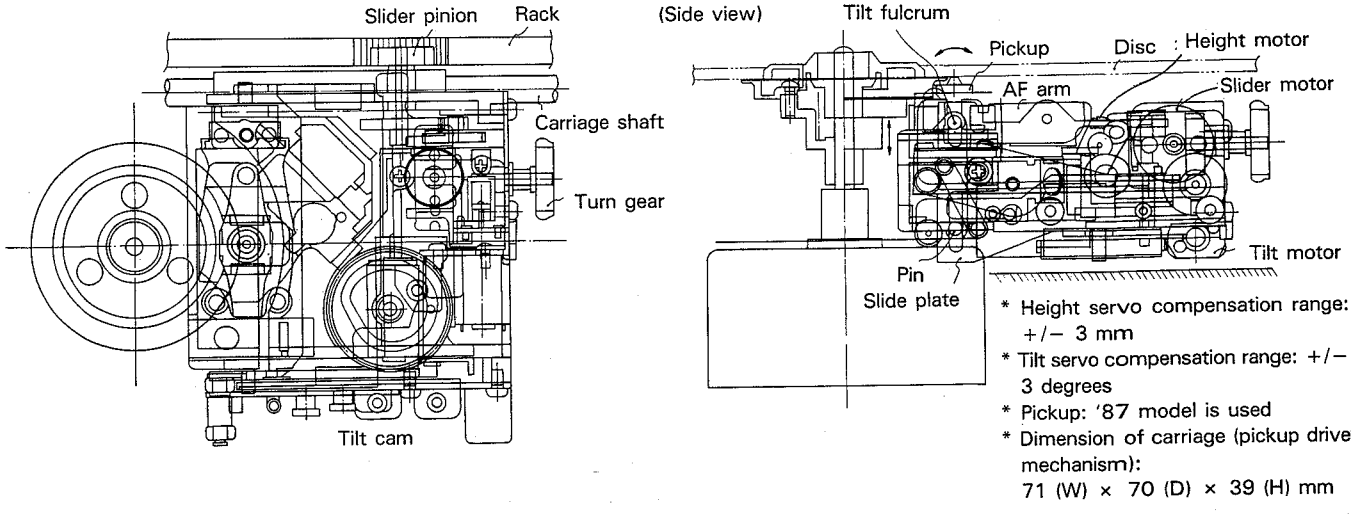


Fig. 3-1-2 Structure of pickup drive mechanism used in both-sides CLD player

3-2 DESCRIPTION OF HEIGHT SERVO

The focus lens focuses the laser beam on the pit surface of the disc to read out the recorded signal. If a warped disc is loaded, normally the lens is moved up and down slightly to position the fulcrum center of the stroke. When the inner area of the disc is being played back, and is moved much more due to the warping of the disc when the outer area is being played back. Therefore, the dynamic range of the lens may become uneven for the top and bottom sides.

To compensate for this, in the conventional system, the slidershaft is rotated while it is swung up and down using the point where the shaft is located as a supporting point to assure the dynamic range of the lens. (Fig. 3-2-1)

As opposed to this, in the Tilt & Height Servo Mechanism, the entire pickup assembly is moved up and down.

The DC component of the current flowing in the focus lens is proportional to the distance from the pickup body (l_2). To operate, this current is converted into voltage E_R by the resistor R_1 and this is used to move the entire pickup assembly up and down by rotating the motor when E_R exceeds a positive or negative fixed value (E_{TH}), so that the focus lens is used within its effective stroke. Fixed value E_{TH} is set at 1/4 of the stroke between the upper and lower limits, considering the operating sensitivity of the lens. (Fig 3-2-2)

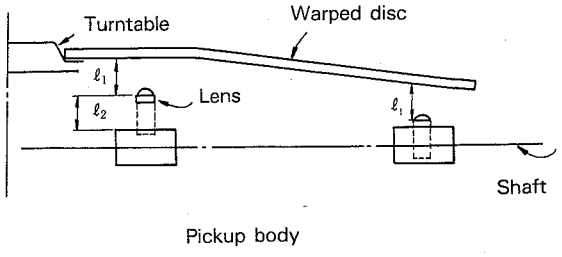


Fig. 3-2-1

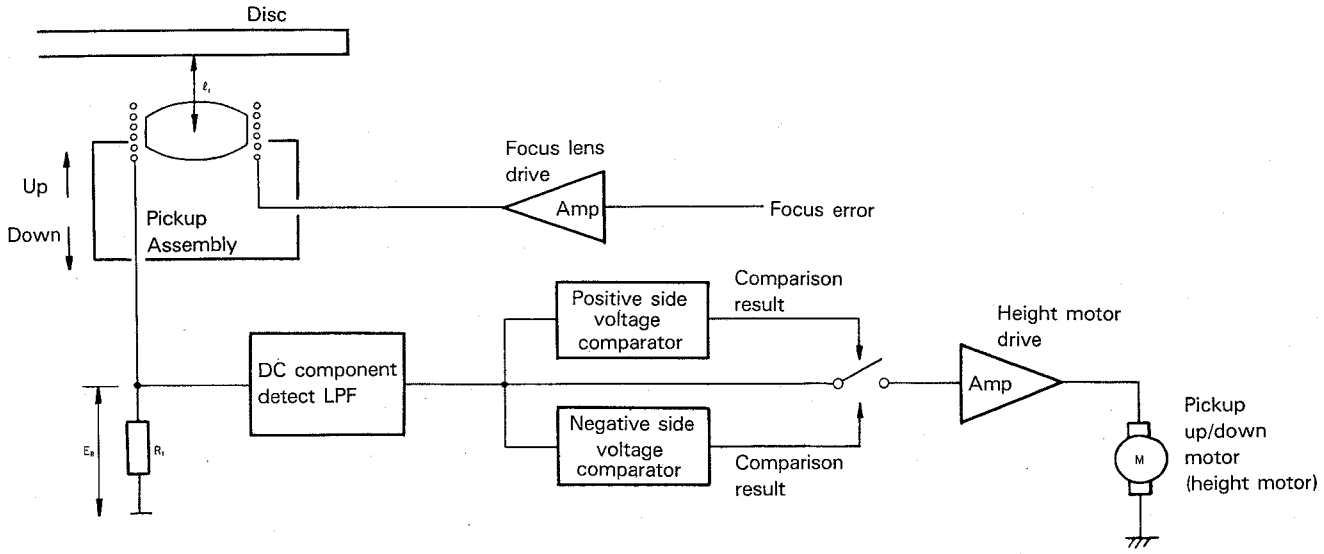
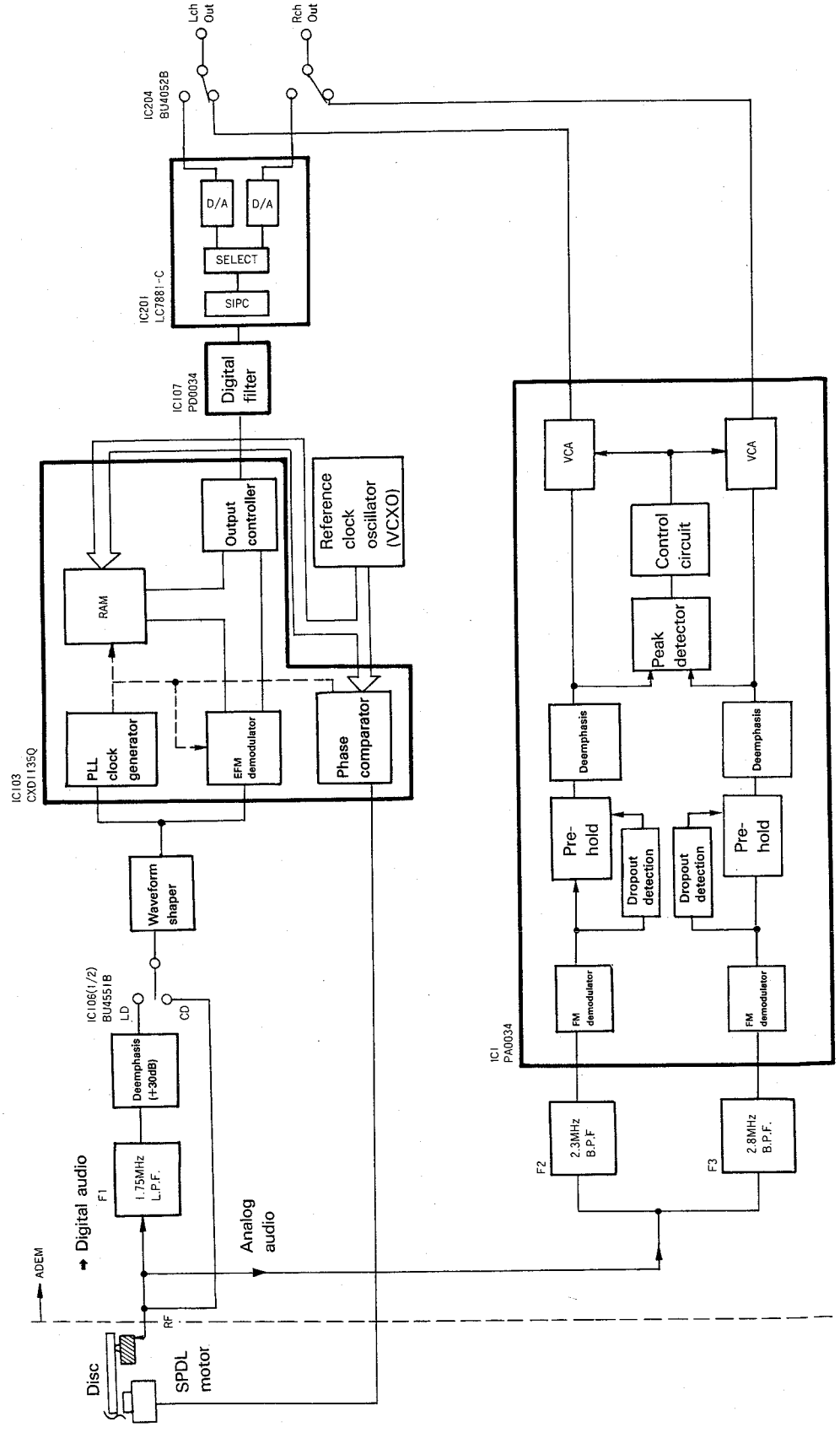


Fig. 3-2-2 Height servo block diagram

4. AUDIO SIGNAL PROCESSING CIRCUIT



Audio Signal Processing Circuit Block Diagram

4-1 OUTLINE

The ADEM assembly accepts the RF signal from the VSOP assembly and performs the required audio signal processing. The main IC in the analog audio circuit is PA0034 (Audio Demodulation & CX Demodulation), while the main IC in the digital audio circuit is CXD1135Q.

4-2 DESCRIPTION OF PA0034

After the FM audio signal from the band-pass filters (2.3 MHz for L-channel and 2.8 MHz for R-channel) is demodulated, the resultant signal is passed through the pre-hold circuit, deemphasis circuit and VCA (voltage controlled amplifier), and is then output as the analog audio signal.

If dropout occurs, it is detected by the dropout detector. When dropout is detected, the signal level is maintained at the value immediately before the dropout occurs by the pre-hold circuit, to prevent noise from occurring. Further, CX noise reduction is provided to improve the audio dynamic range as well as the signal-to-noise ratio.

PA0034 is a one-chip IC exclusively for LD audio, and performs the whole of the above signal processing. Fig. 4-2-1 shows the functions of each pin, while the internal block diagram is shown in FIg. 4-2-2.

4-3 DESCRIPTION OF CXD1135Q

CXD1135Q has the following function

1. Generation of the bit clock (PLCK: 4.3218M) by EFM-PLL
2. EFM signal demodulation, error correction and interpolation
3. Frame synch. signal detection, protection and interpolation
4. Subcode signal demodulation and error detection
5. SPDL servo (obligatory deceleration/acceleration, brake, speed servo, phase servo)
6. Zero cross counter for 8-bit tracking error (not found in these models)
7. Double oversampling digital filter (35-stage)
8. Digital audio interphase output

The pin connection diagram of CXD1135Q and its internal block diagram are shown in Fig. 4-3-1.

Item No.	Symbol	Function	Item No.	Symbol	Function
1	VEER	Power supply pin	22	LOUT	L-ch output
2	VINR	FM signal input	23	STC2	STC pin 2
3	BIASR	Input bias	24	STC1	STC pin 1
4	VREFR	Internal reference power supply	25	VCC	Power supply pin
5	GNDR	Ground pin	26	COMP	Compensator pin
6	ALCR	ALC capacitor pin	27	TBC	TBC error signal input pin
7	CSR	Carrier removal pin	28	CINL	CX control signal input
8	DOS2R	DOS2 input	29	CXINL	CX input
9	DEMOR	Demodulator output	30	SWOL	Mode select amp output
10	SINR	Dropout compensator switch input	31	SWINL	Mode select amp input
11	DOCR	Dropout compensator switch output	32	DOCL	Dropout compensator switch output
12	SWINR	Mode select amp input	33	SINL	Dropout compensator switch input
13	SWOR	Mode select amp output	34	DEMOL	Demodulator output
14	CXINR	CX input	35	DOS2L	DOS2 input
15	CINR	CX control signal input	36	CSL	Carrier removal pin
16	R	Mode select pin R	37	ALCL	ALC capacitor pin
17	L	Model select pin L	38	GNDL	Ground pin
18	CX	CX control	39	VREFL	Internal reference power supply
19	FTC	For connection of FTC capacitor	40	BIASL	Input bias
20	GNDCX	Ground pin	41	VINL	FM signal input
21	ROUT	R-ch output	42	VEEL	Power supply pin

Fig. 4-2-1 PA0034 pin functions

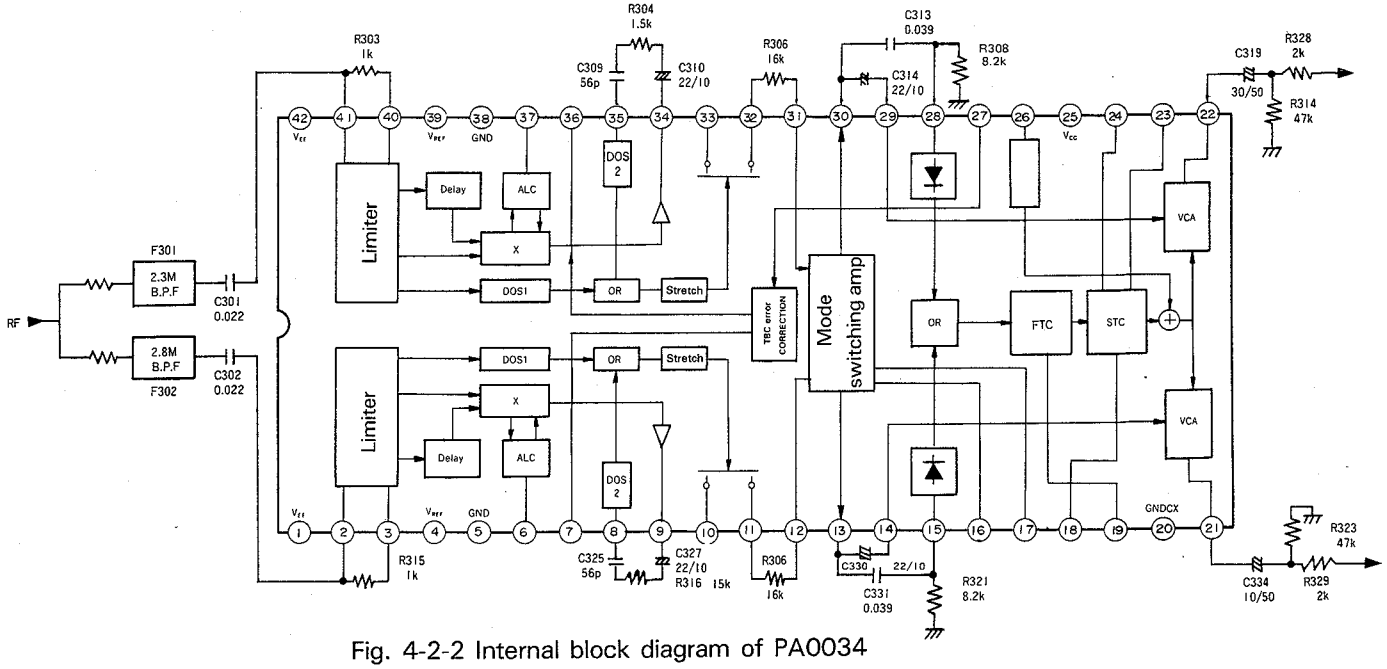


Fig. 4-2-2 Internal block diagram of PA0034

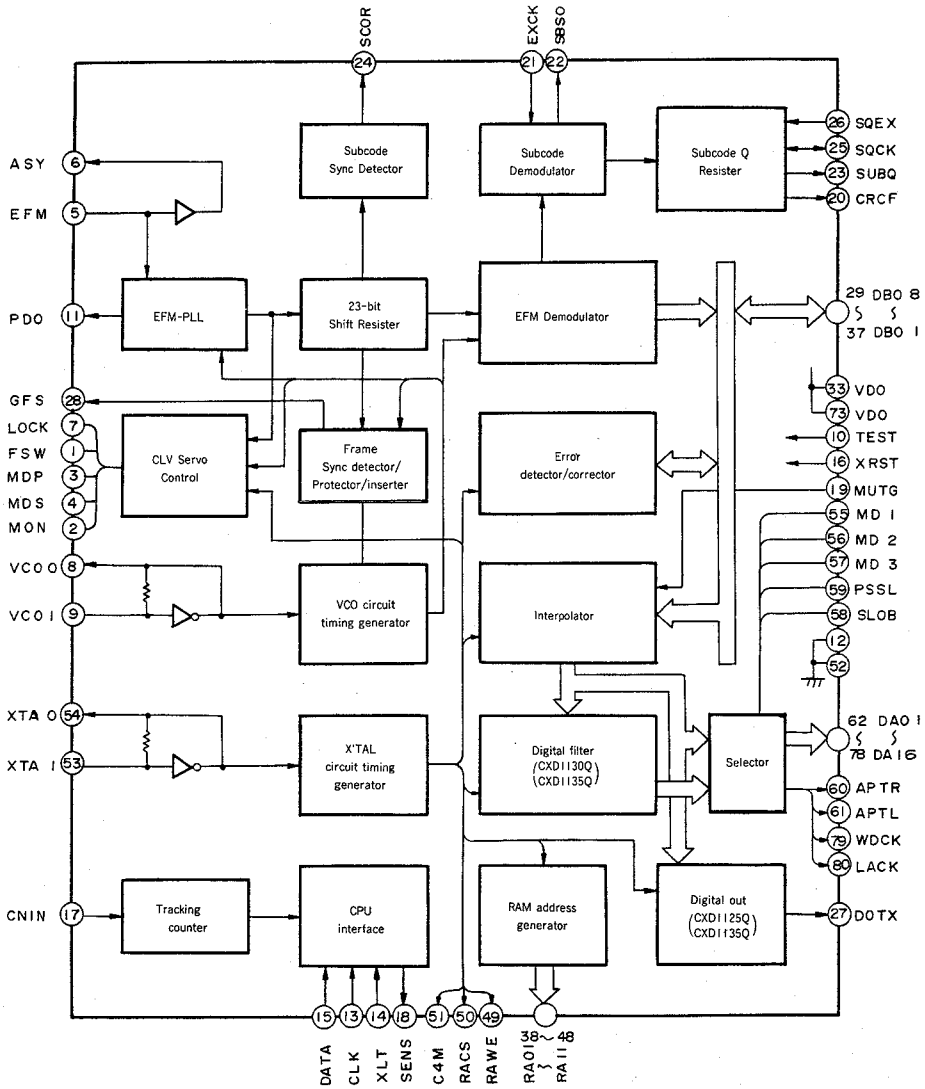


Fig. 4.3.1 Internal block diagram of CXD1135Q

4-4 CXD1135Q COMMAND CODE

As the table below shows, CXD1135Q has a 4-bit register containing addresses 9 through E. Player operations can be performed by sending 8-bit data (command code) containing address and data (totalling 8-bits) to these addresses.

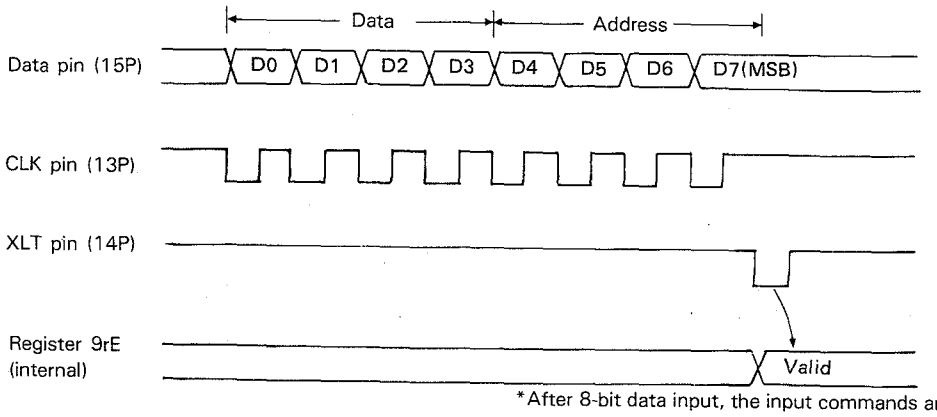
*Note: FOR STATUS
H: High Level
L: Low Level
Hi-Z or Z: High impedance
P: Pin No. of IC

<Register Chart>

Register Name	Command	Addresses D7 – D4	Data				SENS pin (18P)
			D3	D2	D1	D0	
9	Control of new functions	1001	ZCMT	HZPD	NCLV	CRCQ	Z
A	Synch protection, attenuation control	1010	GSEM	GSEL	WSEL	ATTM	Z
B	Counter set, Lower 4-bits	1011	Tc3	Tc2	Tc1	Tc0	COMPLETE
C	Counter set, Upper 4-bits	1100	Tc7	Tc6	Tc5	Tc4	COUNT
D	CLV control	1101	DIV	Tz	Tp	GAIN	Z
E	CLV mode	1100		CLV mode			Pw≧64

* The B.C register is for tracking error zero cross count and is not employed in the 1988 models.

<Data Input Timing Chart>



*After 8-bit data input, the input commands are executed during the time period when XLT is L. Data input timing is the same as in the CXA1082A.

«Information about the Registers»

- **Register 9**

		Dn=0	Dn=1
ZCMT	D3	Zero cross MUTE OFF	Zero cross MUTE ON
HZPD	D2	The PDO pin is always active	The PDO pin is Z at the trailing edge of GFS
NCLV	D1	CLV-P servo supported by frame synch signal	CLV-P servo supported by base count
CRCQ	D0	CRCF is not superimposed on SUBQ	At the leading edge of SCOR, SUBQ= CRCF
		(Functions identical to those of the CX23035)	(New functions)

ZCMT: Turns zero cross MUTE ON/OFF.
HZPD: Switches PD output to Hi-Z (ON/OFF) from the trailing edge of the GFS pulse (GFS is H when SPDL LOCK is activated) to a maximum of 0.55nS. (PLCK and play EFM undergo phase comparison, and the PD output controls the VCO.)
NCLV: Switches the SPDL phase servo error detection method when PLL is locked.
CRCQ: Switches the output of CRCF data from the subcode data Qoutput pin, SUBQ, ON/OFF.

If the content of Register 9 is cancelled out by activating POWER ON RESET and none of its commands are active, the IC will function exactly like the CX23035.

• **Register A**

Controls the 4 signals: GSEM, GSEL, WSEL, ATTM.

GSEM	GSEL	Frame
0	0	2
0	1	4
1	0	8
1	1	13

When frame synch detection is not working properly, a dummy frame synch is interpolated, but the number of frames for which interpolation will be performed is fixed: during LD play, 8 frames; during CD play 8 frames; and during SCAN, 13 frames.

WSEL	Clock
0	±3
1	±7

To prevent errors during frame synch detection, a detection window of a certain width is set and synch patterns which fall outside the detection window are ignored.

The width of the detection window is set as follows: (set at ±7 clock)

ATTM	MUTG pin	dB
0	0	0
0	1	−∞
1	0	−12
1	1	−12

In combination with the MUTG pin (19P), MUTE ON/OFF and the application of -12dB attenuation can be controlled.

In terms of actual command code, $AA is being input. Since A = 1010 and GSEL = 1, GSEL = 0, there are 8 interpolation frames with detection width parameter set at 7 clock.

• **Register D**

DIV	D3	0	RFCK/4 and WFCK/4	Phase comparison frequency in CLV-P mode
		1	RFCK/8 and WFCK/8	
TB	D2	0	RFCK/32	Bottom hold cycles in CLV-S, CLV-H modes
		1	RFCK/16	
TP	D1	0	RFCK/4	Peak hold cycle in CLV-S mode
		0	RFCK/2	
GAIN	D0	0	−12dB	MDP pin gain in CLV-S, CLV-H modes
		1	0dB	

RFCK: Read Frame Clock (frequency divided from X'TAL, 7.35k)

WFCK: Write Frame Clock (Frame synch during play EFM)

CLV-P mode: Phase servo which operates when the PLL loop is locked

CLV-S mode: Speed servo which operates when the PLL loop is not locked

CLV-H mode: Speed servo during search (when pickup is moving)

In terms of actual command code, $D4 is being input. Since 4 = 0100, RFCK, WFCK are frequency divided by 4 for phase error, RFCK is frequency divided by 16 for bottom hold in the CLV-S mode, RFCK is frequency divided by 4 for peak hold and MDP pin gain is −12dB.

• **Register E**

		(3P)	(4P)	(1P)	(2P)
Mode	D3–D0	MDP pin	MDS pin	FSW pin	MON pin
STOP	1000	L	Z	L	L
KICK	1000	H	Z	L	H
BRAKE	1010	L	Z	L	H
CLV-S	1110	CLV-S	Z	L	H
CLV-H	1100	CLV-H	Z	L	H
CLV-P	1111	CLV-P	Z	L	H
CLV-A	0110	CLV-S or CLV-P	Z or CLV-P	L or Z'	H
CLV-A'	0101	CLV-S' or CLV-P	Z or CLV-P	L or Z	H

This register sets the operating mode for the SPDL servo. In this mode, the SENS pin, 19P, registers L when the frame sync pulse amplitude detected at CLV-S is over 64T. This output, however, is not utilized.

From commands 0000 to 0110, the system is identical to that of the CX23035.

After the focus servo lock check, actual SPDL start is performed by $E8, i.e., command code 1000 puts the unit into KICK mode which force starts the SPDL. Next, $E6 puts the unit into CLV-A mode which closes the SPDL servo and PLL loop. The lock can be checked by verifying that GFS registers an H.

When stopping, $EA, command code 1010, applies the brake, and after SPDL stop detection at FG, $EO puts the unit into stop mode. Because the CLD-3070 has a 4-times oversampling digital filter IC (PD0034), the digital filter in the CXD1135Q is not utilized.

As a digital OUT terminal, the toss link for optical fiber transmission is passed through a buffer and connected to 27P. However, since the function assigned to MODE 0 of the digital OUT IC, 27P is no longer needed for this purpose. Instead, modulated output for the digital audio interface format is obtained from 27P.

ON/OFF for digital filter and OUT functions can be fixed according to the H and L signals from MD1, 2 and 3 of 55, 56 and 57P. On the CLD-3070 these are set at L, L, H corresponding to digital, OFF and digital OUT, ON.

4-5 SIGNAL PROCESSING AND CXD1135Q PERIPHERAL CIRCUITRY

The EFM signal passes through the ATC circuit made up of IC101 (BU74HCU04) and IC108 (2/2) (NJM082D) and is input to IC103 — 5P (CXD1135Q). The result of phase comparison between EFM and the VCO output of IC108 (1/2) is output from IC103 — 11P and controls the VCO. These compose a PLL loop.

IC103 performs SPDL servo error detection from EFM and the output of 1 through 4P is utilized for the SPDL servo. The function of the pins is as follows:

FSW (1P): When the PLL loop is locked, it is Hi-Z. At other times it is L.
IC105 (1/2) (NJM082S) is the phase and speed error mix filter, and is used to switch the cut-off frequency. (Hi-Z, 500Hz, L: 20Hz).

MON (2P): When the motor is stopped: L, when rotating: H.

MDP (3P): SPDL phase error when PLL is locked and otherwise, speed error

MDS (4P): Speed error when PLL is locked and, otherwise, Hi-Z

Internal detection of whether PLL is locked or not, is performed at the GFS pin, 28P, which registers H when PLL is locked.

During CD or the audio section of a CDV play, the error signal of IC105 — 8P is input as CD ERR to the absolute value amp for the SPDL servo section from IC106 — 5P (BU4551B) and drives the SPDL motor.

During LDD play or the video section of a CDV, error signal is output from IC106 — 5P to control IC108 VCXO. As a clock signal, VCXO output signal is input to IC103 — 8P. At IC103 the demodulated digital audio data is input as serial data to IC107 (PD0034) along with 80P LRCK (44.1k) and 76P C210 (2.1168M).

IC107 is a 4-times oversampling digital filter.

The CLD-3070 utilizes a sub-CPU, IC102 (PDE024), to handle the transmission of 8-bit serial command data to IC103 (CXD1135Q) and the reception of sub-code data from IC103.

IC102 is connected to the main CPU by the 4-bit data bus and by the signal lines ATN, STB and ACK.

However, with the introduction of TOC (ADR = 4) in LDD discs, the reading of the TOC renders processing time too long and it is no longer practical for the main CPU to directly read the data.

For this reason, sub-code data from CXD1135Q is placed in a buffer at IC102 (PDE024) and, in response to a command from the main CPU, is transmitted by 4-bit bus. In addition, command code destined for CXD1135Q is input through IC102.

On the basis of data received from CXD1135Q and the main CPU, IC102 performs digital/analog switching, LD/CD switching and Emphasis ON/OFF.

Another function of IC102 is to output LSEL and RSEL signals used for switching Left/Right channels during LDD play:

	Both CH	RCH only	LCH only
LSEL	L	L	H
RSEL	L	H	L

5. VIDEO SIGNAL PROCESSING SYSTEM

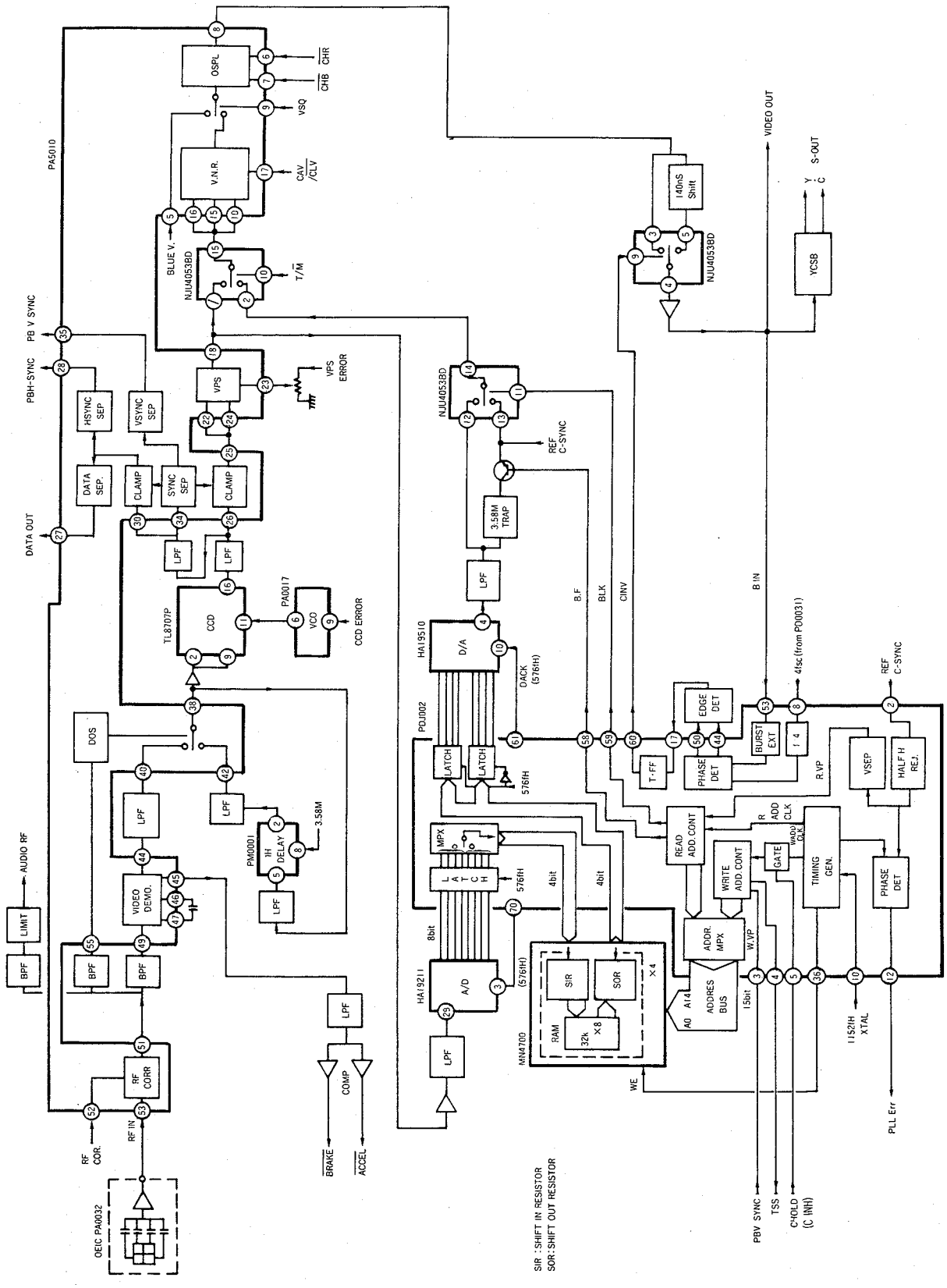


Fig. 5-1 Video signal processing system block diagram

5.1. OUTLINE

The pickup of this model incorporates a unitized IC (PA0032) containing both photodetectors and head amp section. After gain adjustments have been made on the FTSB board, the RF output of PA0032 is input to the PA5010 (Video signal processor) of VSOP assembly and is processed.

5.2 DESCRIPTION OF PA5010 (VIDEO SIGNAL PROCESSOR)

PA5010 has the following functions.

- RF signal correction
- Video signal demodulation
- Dropout detection/Video correction SW
- EFM amp
- V-H synch and data separation
- VPS (Video Phase Shifter)
- VNR (Video Noise Reduction)
- Blue background SW and squelch
- Screen display
  (when video memory is OFF or when using blue background screen)

The pin connection diagram of PA5010 and its internal block diagram are shown in Fig. 5-2-1 and Fig. 5-2-2 respectively.

With video that passes through memory, unless the characters (screen display) are inserted before the 140nS (equivalent to one half the cycle of the sub-carrier) shift circuit that is used to maintain sub-carrier continuity between frames (every successive frame undergoes phase inversion). Because only the characters on screen will not be 140nS shifted.

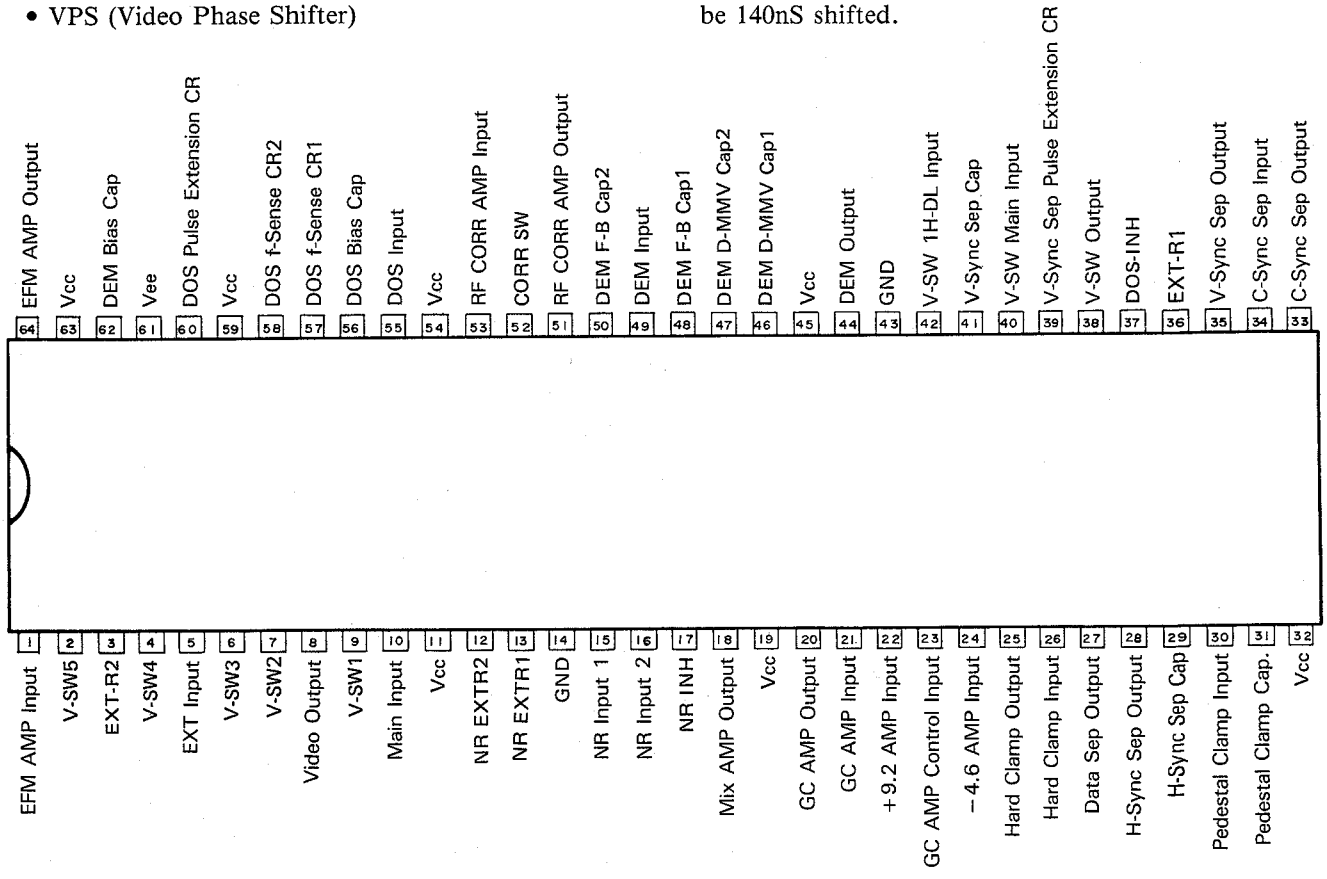
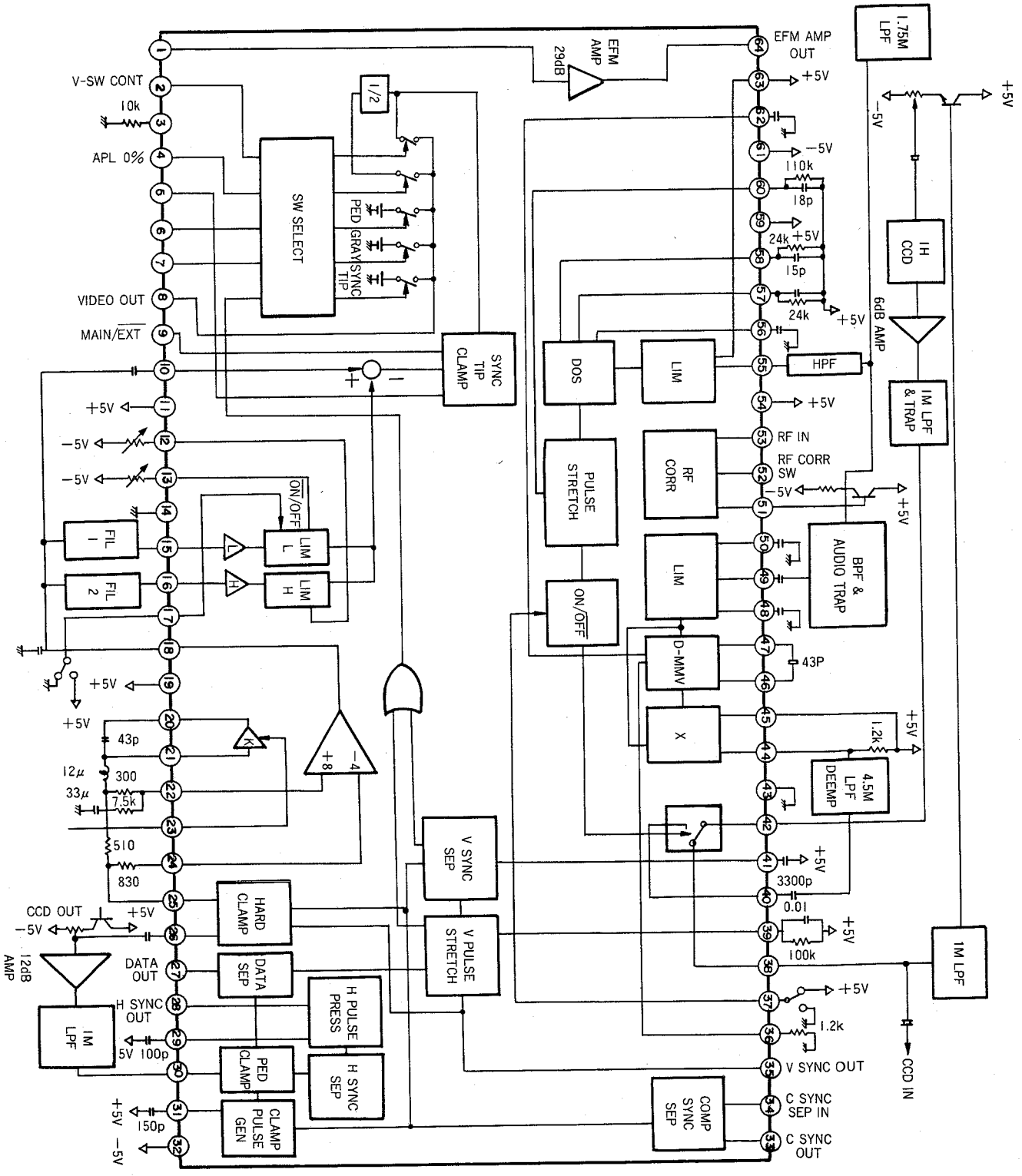


Fig. 5-2-1 PA5010 Pin Connections


EFM AMP OUT
EFM AMP 29dB
1/2
V-SW CONT
10k
APL 0%
SW SELECT
PED
GRAY
SYNC TIP
VIDEO OUT
MAIN/EXT
SYNC TIP CLAMP
+5V
-5V
FIL 1
FIL 2
ON/OFF
LIM L
LIM H
43p
12μ
33μ
300
7.5k
510
830
CCD OUT
12dB AMP
IM LPF
HARD CLAMP
DATA SEP
DATA OUT
H SYNC OUT
5V 100p
H PULSE PRESS
PED CLAMP
H SYNC SEP
CLAMP PULSE GEN
150p
V SYNC SEP
V PULSE STRETCH
DOS
LIM
HPF
PULSE STRETCH
RF CORR
RF IN
RF CORR SW
ON/OFF
D-MMV
X
43P
1.2k
4.5M LPF DEEMP
3300p
0.01
100k
1.2k
V SYNC OUT
COMP SYNC SEP
C SYNC SEP IN
C SYNC OUT
1.75M LPF
IH CCD
6dB AMP
IM LPF & TRAP
110k
18p
24k
15p
BPF & AUDIO TRAP
1M LPF
CCD IN

5.3. SIGNAL PROCESSING IN THE VIDEO MEMORY SECTION

5.3.1. Signal Flow

At the heart of the Video memory section is the 1 M bit D-RAM (MN4700) and RAM control IC (PDJ002). It also includes the A/D (HA19211NT) D/A converter (HA19510).

The IC401 (HA19211NT) is a parallel comparator type A/D converter and the A/D conversion reference voltage has been set at 26P (VRB pin) and 18P (VRT pin). The video signal level is shifted to coincide with the reference voltage, passed through an LPF (low pass filter) and then input to 9P. Reference voltage is 0 and −2V, and signals within that range undergo 8-bits A/D conversion.
The A/D conversion clock signal, which is set at 576fH (=9.06M) is input to IC401 — 3P from IC501 (PDJ002) — 70P.

The 8-bits data is divided at IC401 into an upper and lower 4-bits and transmitted in 4-bits form into memory. 1152fH VCXO is comprised of Q501, Q502 and IC503 (BU74HCU04P) and is controlled at IC503 on the basis of error (output from IC501 — 12P) derived by phase comparison of REF-C-SYNC and memory READ address clock (READ REF-H). If the two signals are not phase locked, REF-C-SYNC insertion position and the D/A converted video signal will not coincide.

Writing to memory is indicated by a WE (WRITE ENABLE) signal from the system controller.

A fixed time difference is maintained between write timing and memory readout timing, and the latter is always performed synchronously with REF-C-SYNC. Furthermore, unless a new frame is written to memory, the previous frame will continue to be output.

The VDEM section of VSOP assembly contains the circuitry that follows D/A conversion. 8-bits data and the 576fH clock signal from IC501 are input to IC505 (HA19510).

If DSPL signal insertion is performed in the VDEM section when memory is ON, dislocation of 140mS occurs between the DSPL display and the memory video due to the fact that the memory video has been passed through the 140nS shift circuit. For this reason DSPL insertion must be performed before 140nS shift.

5.3.2. Necessity of the 140nS Shift

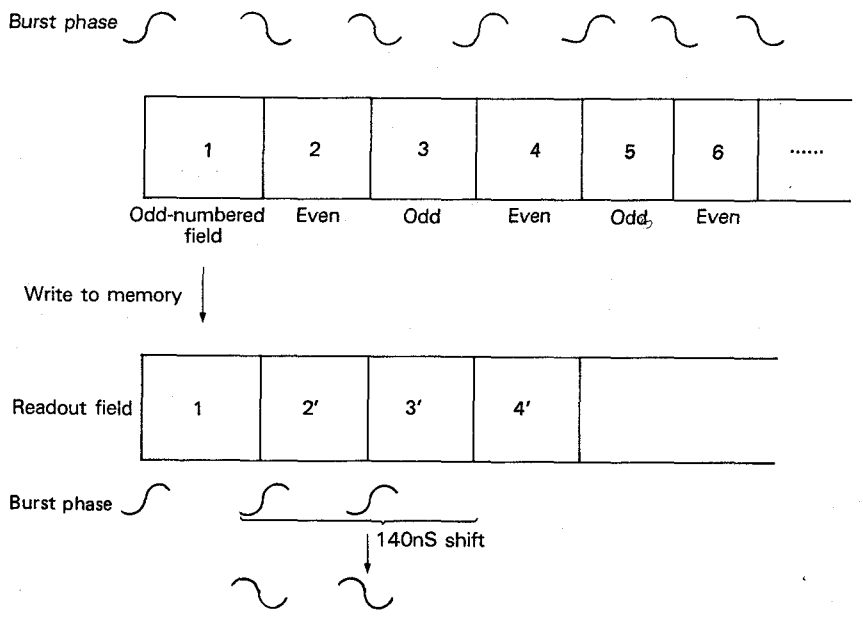
As the figure below shows, the burst phase of the NTSC video signal is reversed for each frame.

If by a still operation as shown below, field No. 1 is written to memory and then continuously read out, the burst phase for every field will become the same. In order to normalize the burst phase, the timing of fields 2' and 3' must be delayed for a period of time equal to one half the periodicity of the burst signal, or 140nS.

By delaying the video signal it is possible to perform an equivalent reversal of burst phase and thereby activate the color lock.

Detection of the discontinuous burst phase is done by comparing the 3.58MHz signal derived by frequency division of the reference clock 4fsc signal input from VSOP at IC501 (PDJ002) of MEM section, with the play burst signal, and then performing edge detection at IC504. The output of edge detection is the C-TRIG signal. This is input to IC501 — 17P and triggers FF in IC501 to output the C-INV signal from 60P which acts as the 140nS shift circuit control signal.

The C-INV signal is then input to IC351 (3/3) — 9P of VDEM section where switching to activate and deactivate 140nS delay is performed.



5.3.3. RAM Control IC (PDJ002)

The CLD-3070 incorporates the PDJ002 as its RAM control IC.

1. V-SYNC separation for REF-C-SYNC, MMV for half H rejection
2. Phase comparator for 4fsc VCXO drive
3. Burst extraction for D/A converted video signal
4. Control signal generation (WRS, CE, RE) for D-RAM (MN4700)
   Address signal generation (A0 — A14) for D-RAM (MN4700)
5. Clock for D-RAM, A/D converter, D/A converter (SCK, LTCK, DACK)
6. Phase comparator to check burst continuity in the D/A converted video signal

5.3.4 Writing Data to RAM

Sampling of the video signal is done at 576fH (=9.06M) with 8-bit quantization.
Data recorded in RAM has 512 samples on the H axis and 256 on the V axis.

$8 \times 256 \times 512 = 1048576$ (bits).

In the CLD-3070, one chip of RAM (MN4700) has the capacity to handle this volume of data.

First of all, the 8-bit parallel data from the A/D converter is divided into an upper and lower 4-bits. Because the D-RAM (MN4700) employed in the CLD-3070 has been specifically designed for video memory applications, it has separate 4-bit data buses for write and readout.

As the figures to the right show, data is sent in 4-bit increments, the upper 4-bits first and then the lower 4-bits, to RAM.

Furthermore, the MN4700 is equipped with an 8-bit serial shift register that can realize 8-bits of information for each bit input to the 4-bit data bus.

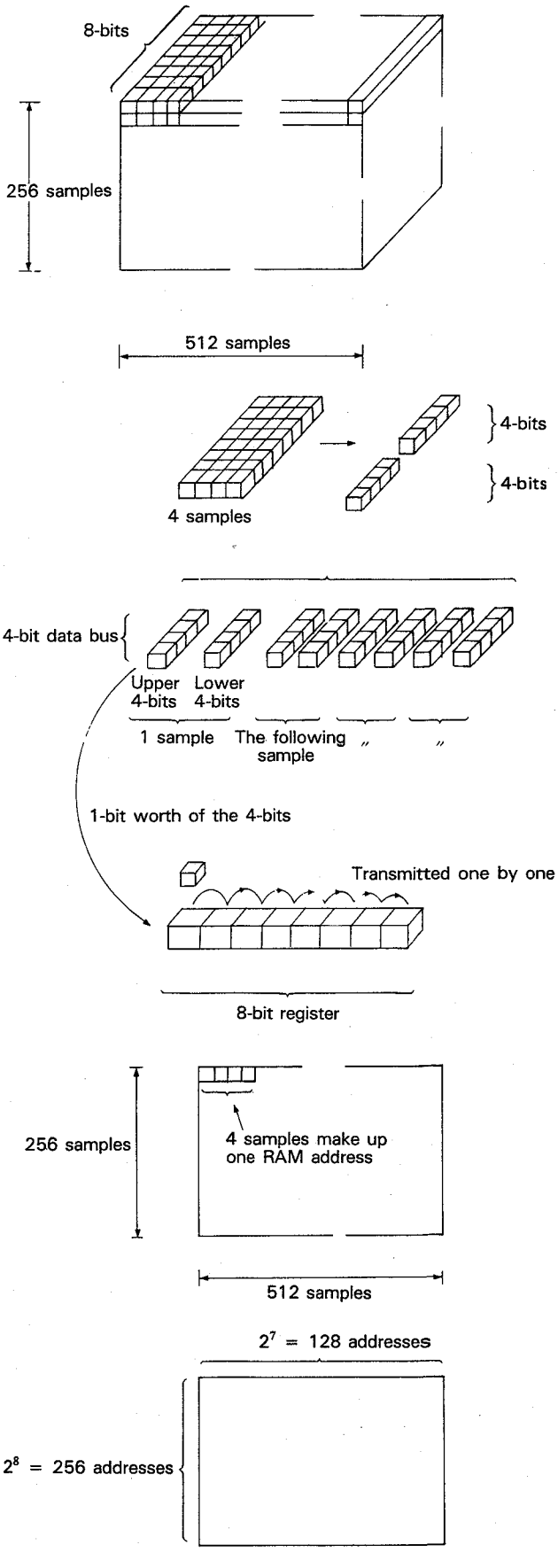
The 8-bit register is transmitted in sequence and when all 8-bits are assembled they are sent to the memory cell to complete recording to memory.

Because 8-bit serial data processing is being employed, one line of the 4-bit data bus, in fact, yields a total of 32-bits. In other words, one block of data handled by the system is equivalent to 4 samples.

In order to arrange and process 4 samples worth of data (=32 bits) in RAM, one RAM address corresponds to 4 samples worth of data. Consequently, the number of RAM addresses required is:

H axis: $512/4 = 128 = 2^7 = 7$-bits
V axis: $256 = 2^8 = 8$-bits
Total bits required = 15-bits.

Because the MN4700 does not employ the address multiplexing normally found in D-RAM which allows switching between row and column addresses, it inputs the addresses as 15bit data.



<Data Processing in RAM>

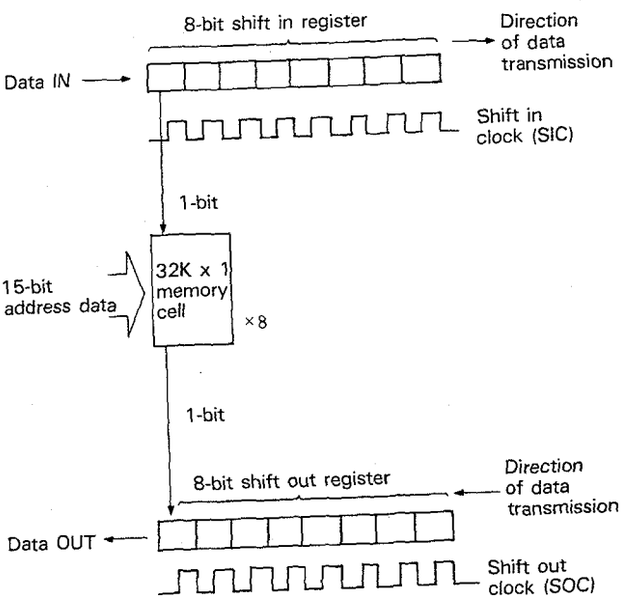
The figure to the right shows one bit worth of data from a 4-bit data bus. Each 8-bit register is connected to a 32K-bit memory cell and in RAM there are a total of 8 × 4 = 32 of these 32K-bit memory cells yielding a memory storage capacity of

32,768 × 32 = 1,048,576.

Because of the need to process the 8-bit data sampled at 576fH in 4-bit units, the frequency of the shift-in, shift-out clock has been set at

576 × 2 = 1152fH (=18.12M).

The necessary clock and timing signals needed for the operation of MN4700, as well as data I/O are all input from the RAM control IC, PDJ002.



6. SPDL SERVO AND TBC (TIME BASE CORRECTOR)

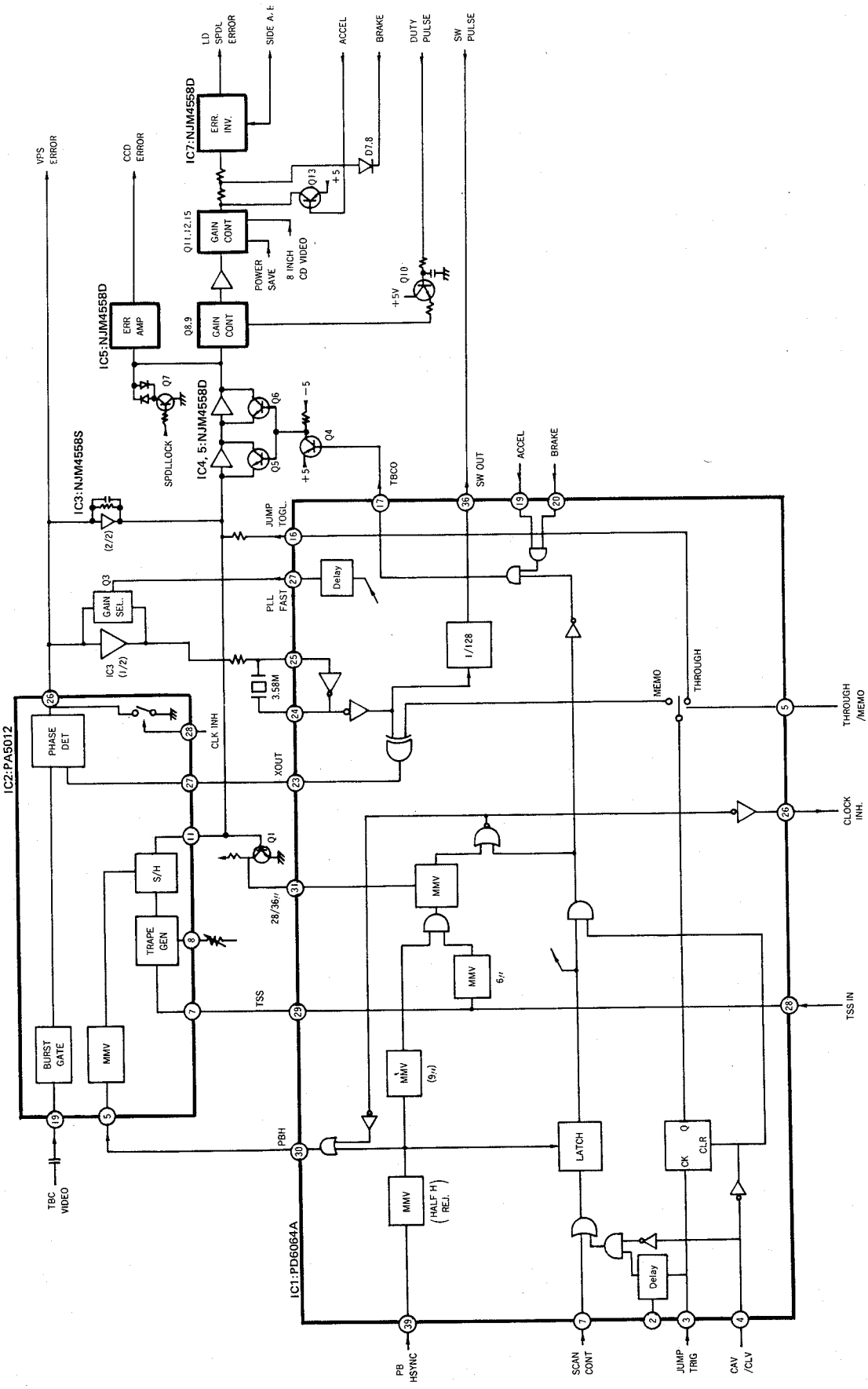


Fig. 6-1 SPDL and TBC block diagram

6.1. DESCRIPTION OF VSOP ASSEMBLY (TBC, CONT) BLOCK DIAGRAM (CLD-3070)

Comparison error between the trapezoid derived from the TSS signal (576fH/576) and PB-H (Playback H-synch) is output by IC2-11P (PA5012) and amplified by error amp IC4 (NJM4558D).

IC5 is the CCD error amp. After the SPDL servo locked, Q7 becomes an error limiter. Q9 and 8 are variable gain amps and, as the collector voltage to Q9 rises, GAIN is lowered.

During CLV disc play, Q10 smooths out the duty pulse which is output by the system microprocessor CPU for SPDL servo loop gain control.

Q11 and 12 are gain switches for 8INCH disc play and CDV disc play, respectively.

- **VPS (Video Phase Shift)**

VPS error is derived by phase shift comparison between PB-B (Playback-Burst) at IC2 and the output of 3.58MHz VCXO near 25 Pin, IC1 — 24 Pin.

Error output from IC2 — 26 Pin is input to the error amp of IC3 (1/2).

Gain switches Q2 and Q3 are for IC3 (1/2). When Q3 is OFF, error detection loop gain increases and activates the FAST mode.

When Q3 is ON, gain is lowered and because the detection loop trails only the low frequency components, high frequency error components remain in the error output of 26 Pin. These are output as VPS error to the VSOP Assembly (VDEM section).

The switch into the FAST mode is performed by means of the PLL FAST signal from 27P which delays TBCO output from IC1 — 17P.

- **CD/CDV play**

The operation of CDV video play sections is exactly the same as for LD video play.

During the audio play sections of CD or CDV, CD SPDL error is input to the absolute value amp IC7 on the VSOP Assembly (TBC section) and the SPDL motor driven.

6.2. SUMMARY OF SPDL & TBC

	CLD-3070
SPDL error detection CCD/CPC error detection	} PD6064A + PA5012
SPDL REF-H	T.S.S. (regardless of memory ON/OFF)

Frequency phase errors and CCD errors are detected by using the trapezoid generated from REF-H (Reference-H-synch) and PB-H (Playback-H synch), as well as the method of reference shift which delays REF-H by either 28μsec or 36μsec when necessary. Furthermore, spindle and CCD servos are always operating at the same time.

During SCAN and other operations, when the TRKG servo loop is open, REF-H is being held. And when the servo loop is closed, REF-H is activated in phase with PB-H. The fact that SPDL servos and CCD servos are turned on at the same time after a jump, with the CCD servo operating until the SPDL motor has been able to absorb frequency component errors, allows the color lock to be activated immediately after a jump.

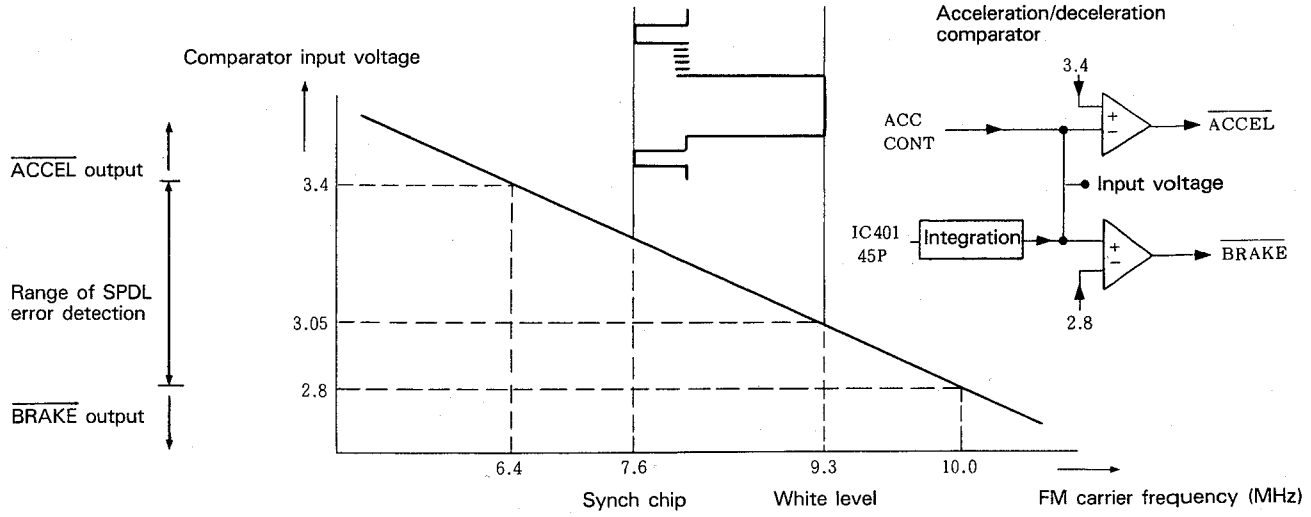
Consequently, in the CLD-3070, since the TSS signal, which is the 576fH, A/D, D/A conversion clock of the video memory section, undergoes frequency division by 576 at PDJ002, is being employed, memory ON/OFF no longer has any bearing on the status of REF-H..

6.3 DETECTION AND CONTROL OF RUNAWAY SPDL MOTOR

In cases where the SPDL motor runs out of control, if the number of revolution of the SPDL motor for whatever reason get out of the servo's tracking range, speed can be controlled by using either acceleration ($\overline{\text{ACCEL}}$) or deceleration ($\overline{\text{BRAKE}}$) signals.

In this manual, voltage inversely proportional to the video FM carrier frequency in the RF signal from the screen image demodulation section is extracted and input to the acceleration/deceleration signal detection comparator.

The output of IC202 (PA5010) — 45P of the VSOP Assembly (VDEM) is integrated and input to the comparator of IC201 (NJM2903S). The input voltage to the comparator is as shown in the figure below.

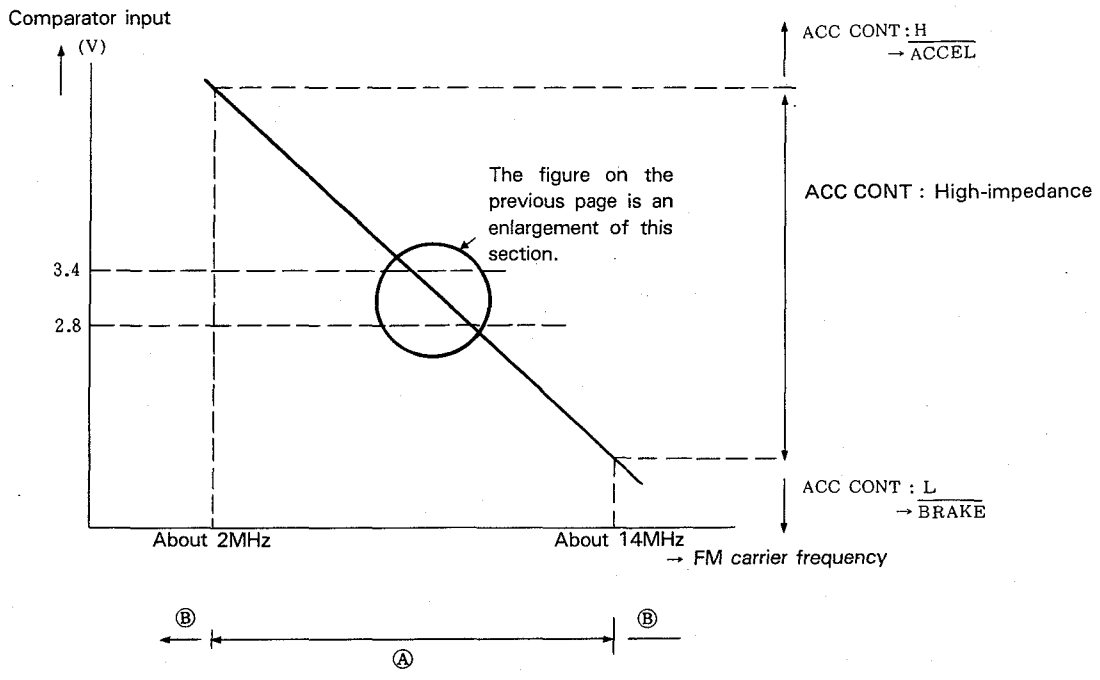


When the FM carrier frequency is at the 100% white level, equivalent to 9.3M, the comparator input voltage is at 3.05V. The upper and lower threshold voltage levels are then set at the detection limits of the SPDL servo frequency error. The $\overline{\text{ACCEL}}$ signal is over 3.4V and the $\overline{\text{BRAKE}}$ signal is under 2.8V. Both are labeled L.

Detection works on the basis of DC voltage when the SPDL servo LOCK goes out of order and rotational speed is thrown off. $\overline{\text{ACCEL}}$ or $\overline{\text{BRAKE}}$ signals are output when disc speed goes beyond the tracking range of the servo. These oblige the spindle motor to accelerate or decelerate until rotational speed again falls within the range of servo control.

When the outer tracks of a CLV disc are being played and the SPDL motor is rotating relatively slowly, it may be possible, if the SPDL servo is locked, to detect acceleration or deceleration signals being used to maintain the FM carrier frequency within the range shown in the figure above.

However, if the LOCK goes out of order and SPDL motor rotation is radically disrupted, the relation between frequency and DC voltage becomes non-linear and detection is no longer possible.



For this reason, the FG output cycle of the SPDL motor is measured by the system microprocessor CPU. If it falls into the areas marked B in the figure below, i.e., beyond 80% of reference speed, ACC CONT (ACCEL CONTROL) which is input to the acceleration/deceleration comparator registers either H or L and SPDL motor speed control is performed by the CPU.

In addition, the system microprocessor CPU also performs SPDL motor stop detection at the conclusion of play based on the FG output cycle.

When rotational speed is within 80% of reference speed (the area marked off as A in the figure below), the ACC CONT signal is in a Hi-Z state and speed control is not performed by the CPU.

7. FOCUS (FOCS), TRACKING (TRKG), SLIDER (SLDR) AND TILT SERVOS (DESCRIPTION OF THE HA11529).

7.1. SUMMARY

The HA11529 is an analog/digital hybrid bipolar IC which performs the following functions:

1. FOCS servo control (FOCS servo loop pull in control, FOCS servo loop gain control)
2. TRKG servo control (TRKG servo loop ON/OFF and brake control of spindle motor rotation during track jump and SCAN operations)
3. SLDR servo control (SLDR servo loop ON/OFF, variable speed transport, motor PWM drive)
4. TILT servo control (TILT servo loop ON/OFF)
5. CD/LD FOCS and TRKG servo switch
6. All of the above functions are controlled by 8-bit serial data passed through a serial bus (DATA, CLK, LATCH).
   The 8-bit serial data commands are as shown below.

MODE	ADDRESS				DATA			
	D7	D6	D5	D4	D3	D2	D1	D0
SCAN MODE CONT	1	0	0	0	SCAN SPEED 1	SCAN SPEED 2	SCAN SPEED 3	1: SCAN ON 2: SCAN OFF
SERVO CONTROL 1	1	0	0	1	FOCS 1: ON 0: OFF	DIRECTION 1: FWD 0: RVS	TILT 1: ON 0: OFF	1: LD 0: CD
SERVO MODE CONTROL 2	1	0	1	0	TRKG Zero cross output 1: 1/256 0: Through	TRKG 1: OFF 0: ON	TEST 1: TEST 0: NORMAL	—

* It is possible to set SCAN SPEED at 7 stages using the 3 bits, D3/D2/D1.

7.2. HA11529 Pin Functions

Pin No.	Pin Function
1.	Vee: −5V
2.	FOCS ERROR signal input: OP AMP input to which a SW is connected for gain control during SCAN operation
3.	FOCS SUM input: For DISC detection. Comparator input threshold is +0.4V.
4.	Comparator input threshold for the FOCS S-curve detection is +0.3V.
5.	Comparator input threshold for MAIN BEAM ON/OFF track detection is +0.5V. FOCS SUM input.
6.	TRKG ERROR input: Comparator input threshold for TRKG ERROR zero cross detection is 0V.
7.	GND
8.	TRKG ERROR AMP for CD input
9.	TRKG ERROR AMP for LD input
10.	TRKG ERROR AMP output. TRKG servo phase compensation is connected between this pin and pins 8, 10.
11.	Output for switching the TRKG servo loop characteristics during track jump. (Open or Close)
12.	Outputs the actuator drive and brake pulse during track jump and the actuator brake pulse during SCAN.
13.	Window comparator input to detect the amount of movement in the TRKG actuator during SCAN. Threshold voltage is 0.2V. Actually, an FTS SCAN signal is being input.
14.	Current setting terminal for TRKG actuator brake.
15.	Current setting terminal for pins other than 14P
16.	TRKG RTN input: TRKG RTN input for SLDR servo.
17.	SLDR servo amp output: During play, the SLDR motor is PWM driven and at that time this pin becomes the window comparator input.
18.	SLDR drive signal output during play or when high speed slider is in operation.
19.	SLDR drive signal input when SLDR is operating at low or mid speeds.
20.	Capacitor connected pin for setting the slope of the reference triangular wave for the SLDR motor PWM drive during play.
21.	Resistor-connected pin to set comparator threshold for turning off the TILT servo drive.
22.	TILT ERROR input: op amp input.
23.	A VR is connected for setting the TILT servo gain with the output of the op amp from 22P.
24.	Output for TILT motor drive.
25.	T-CROSS output: TRKG ERROR zero cross count output. Depending on the serial data command, output may be divided by 256.
26.	$\overline{\text{F-LOCK}}$: L when FOCS lock activated.
27.	J-TRIG input: triggered at startup. L under normal operating conditions.
28.	$\overline{\text{RESET}}$ input:
29.	$\overline{\text{LATCH}}$ input: serial interface bus to the system microprocessor CPU. (29, 30, 31P) Data is latched on the trailing edge.
30.	SDATA input: 8-bit serial command data input.
31.	$\overline{\text{SCLK}}$ input: clock for serial data transmission.
32.	500kHz input: internal logic clock input.
33.	TEST pin: normal state = L.
34.	Pin for setting the injection current used by internal I^2L logic.
35.	Capacitor connected pin for setting the lens UP/DOWN cycle when FOCS ON is activated.
36.	Drive voltage output for lens UP/DOWN.
37.	FOCS Error amp output: FOCS servo phase compensation is connected between 38, 39P.
38.	FOCS Error LD input.
39.	FOCS Error CD input.
40.	Pin with connected offset adjustment VR that uses the uninverted FOCS Error amp input
41.	Op amp output for FOCS gain control
42.	Vcc: +5V.

7.3. DESCRIPTION OF FUNCTIONS

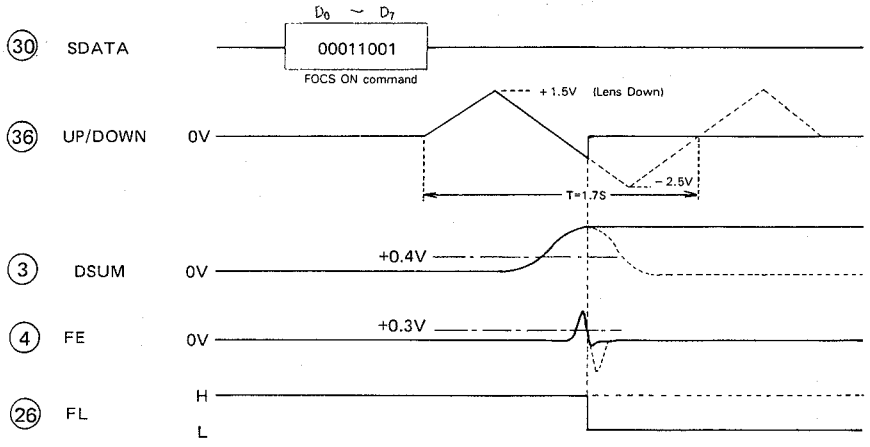
7.3.1. FOCS Assembly

1) FOCS pull in operation

The pull in operation of the FOCS servo raises the objective lens UP/DOWN and, when the input of DSUM (pin ③) and FE (pin ④) fulfill FOCS lock conditions, turns the FOCS servo loop ON. In the case of a defocus caused by damaged disc, the FOCS servo loop is turned OFF and, about 0.5 seconds later, a voltage of +0.6V is output at pin 36.

2) FOCS down and repeat pull in

When the input of DSUM (pin ③) falls below +0.4V as a result of a damaged disc or excessive external vibration, the unit detects an abnormal condition. When this occurs the FOCS servo loop is turned off and at the same time the objective lens is automatically moved UP/DOWN. When conditions as described in 1) have been fulfilled the FOCS servo loop turns to ON.



* The dotted line indicates the wave form when the FOCS servo loop is not ON.

Fig. 7-3-1 FOCS Servo pull in Timing Chart

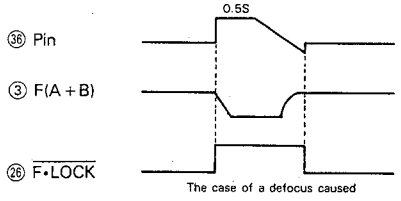


Fig. 7-3-2 Defocus Timing Chart

3) CD/LD switching

Depending on what type of disc is being played, compact disc or laser disc (CD or LD), a switch alters the loop gain and phase compensation of the FOCS servo for the particular disc type. The serial data bit for the CD/LD switch has the same address as the FOCS ON command bit and both can be set with a single transmission.

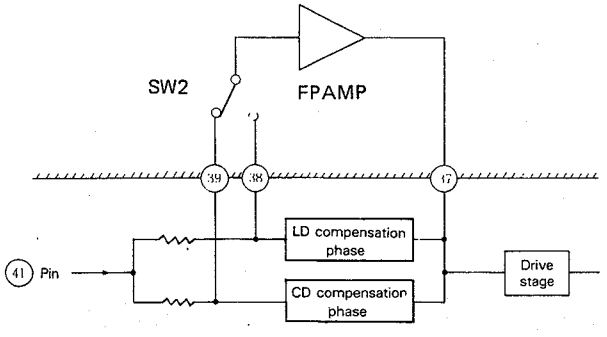
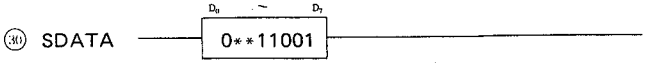
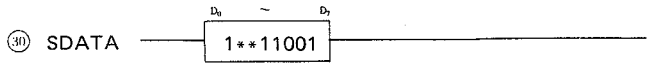


Fig. 7-3-3 CD/LD switching

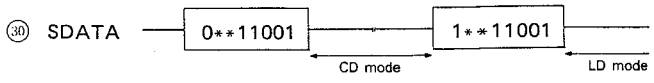
i) Focus ON command when the CD mode is set.



ii) FOCS ON command when the LD mode is set.



iii) When the CD/LD mode is switched in the middle of playback (CD mode → LD mode)



Note 1) The asterisks (*) represent bits which bear no relation to the operation under examination. (This convention will be used throughout the manual.)

7.3.2. TRKG Assembly

1) Track jump operation

Track jump commences when the jump trigger startup pulse is received from JUMP (pin ㉗). Acceleration and deceleration switching are performed by monitoring tracking error zero cross. During a jump operation, SW12 and SW24 are activated sequentially. SW12 is used to switch TRKG loop characteristics and SW24 for adjusting the position of TRKG error zero cross.

Switching between forward and reverse jump is performed by serial data transmission.

The jump trigger signal, controls so that the phase of the input signal to 6P can be pushed forward beyond its position during normal operation.

i) Forward jump

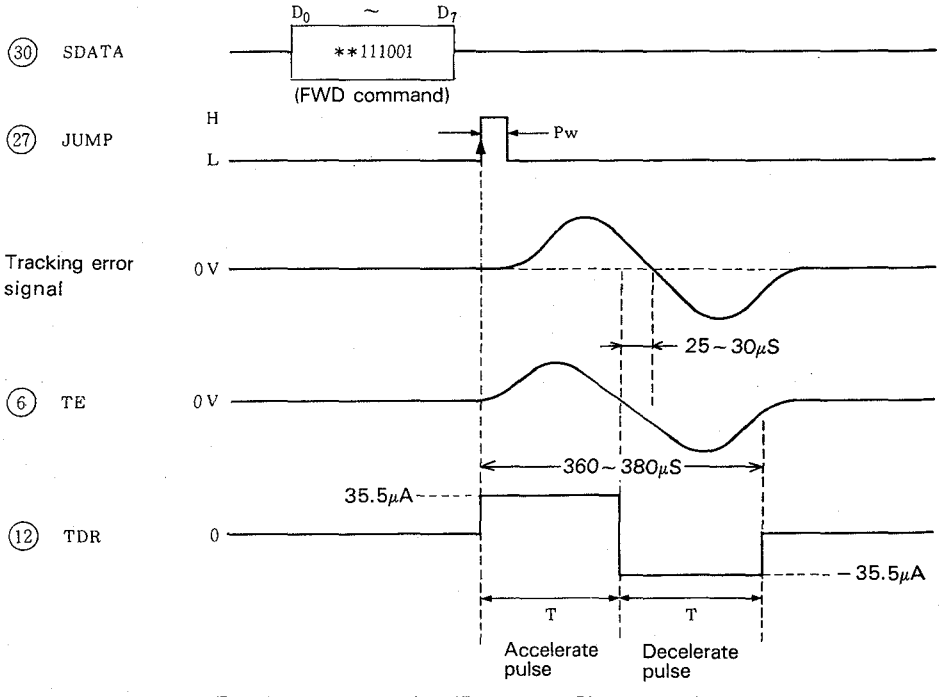
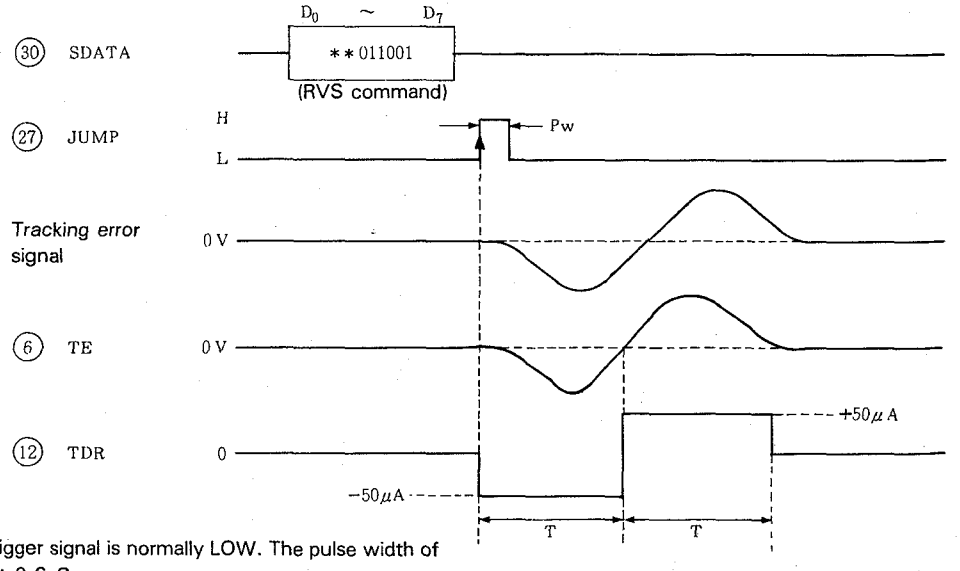


Fig. 7-3-4 FWD JUMP Timing Chart

ii) Reverse jump



Note 1) The jump trigger signal is normally LOW. The pulse width of Pw is set at 9.6μS.

Fig. 7-3-5 Reverse jump Timing Chart

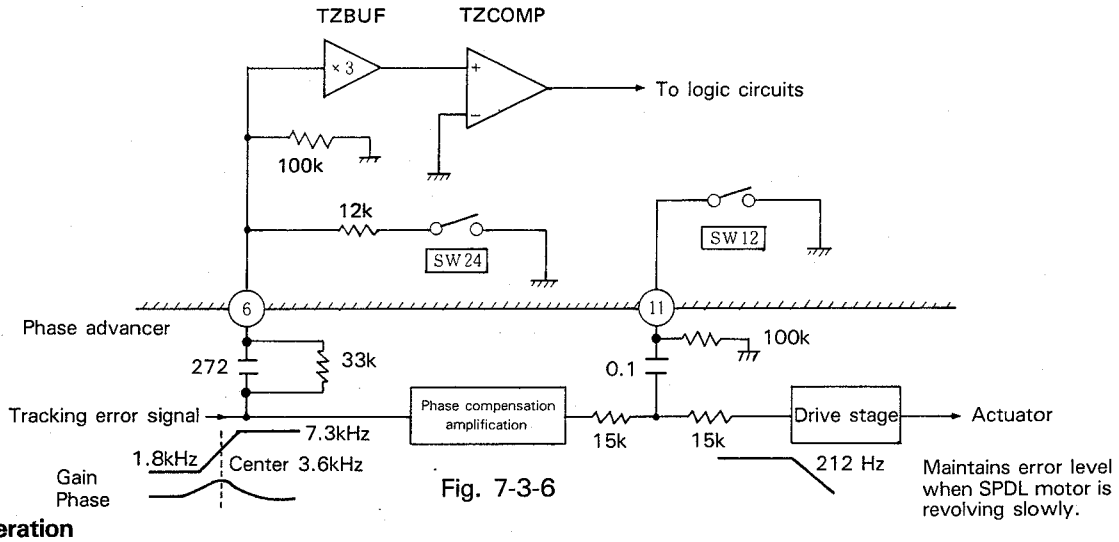


Fig. 7-3-6

2) Scan operation

During slow or medium scan the TRKG servo performs ON/OFF control of the TRKG loop. Input to ST (pin ⑬) signals displacement of the actuator position and the TRKG servo loop is turned OFF. When the error signal at TE (pin ⑥) drops below a set frequency, the TRKG servo loop is turned back ON.

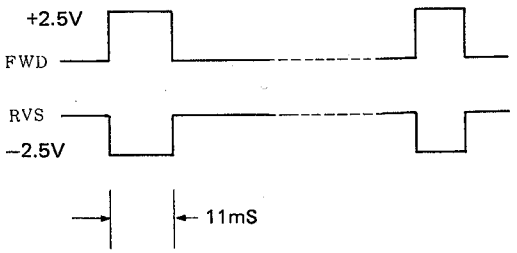
While the TRKG servo loop is OFF, a brake pulse is output by TDR (pin ⑫) according to the timing charts shown below. The polarity of the brake pulse is not a direction command sent via serial data but is determined by the polarity of the signal input to ST (pin ⑬). Corresponding to actuator speed as detected by TE (pin ⑥), brake pulse duty is automatically set to operate in 5 stages (50%-100%). Brake current IB can be adjusted at BSET (pin ⑭).

Because switch timing for the open/close operation of the TRKG servo loop during SCAN is determined by the system microprocessor, an FTS signal like that shown below is actually input to pin ⑬.

This signal also flows into pin ⑫, but the polarity of the brake pulse is opposite to it, which acts to improve convergence during braking.

The cycle of the FTS SCAN signal varies depending on the absence or presence of video memory.

After a jump, the TRKG servo loop closes and if one field worth of data has been properly written to memory, the following FTS scan signal is output. To account for possible mistakes in writing to memory, the period for this operation is not fixed.



i) Forward scan

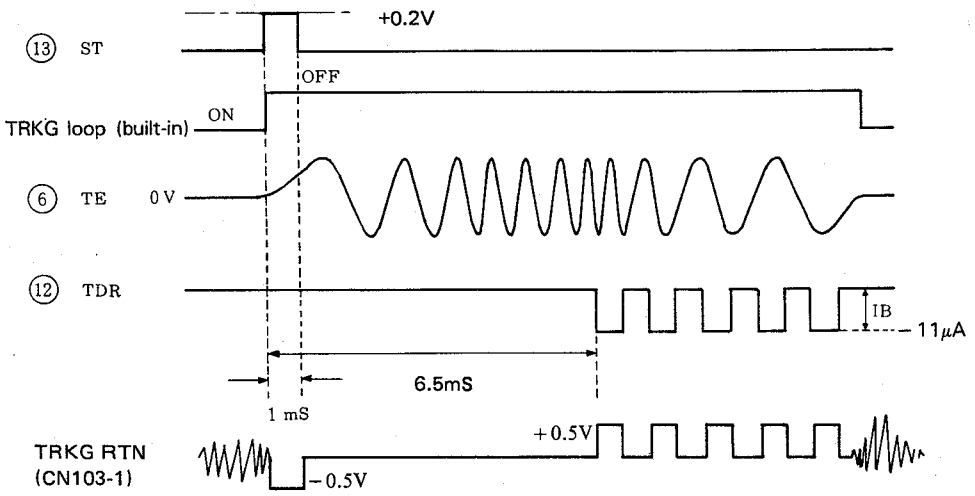


Fig. 7-3-7 Timing Chart of Forward scan

ii) Reverse scan

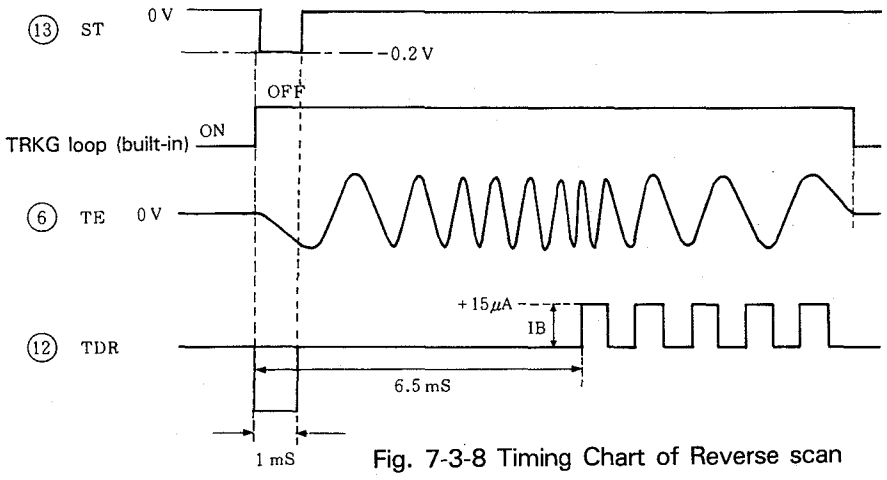


Fig. 7-3-8 Timing Chart of Reverse scan

3) CD/LD switching

Switching between CD and LD is performed in exactly the same way as CD/LD switching for the FOCS servo.

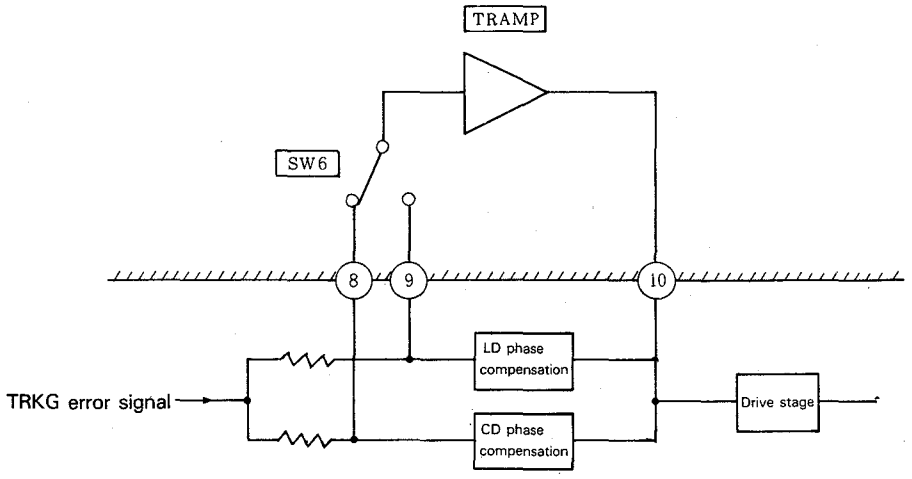


Fig. 7-3-9 CD/LD switching

4) TRKG servo loop ON/OFF control

Switching the TRKG servo loop ON/OFF is done by means of serial data transmission.

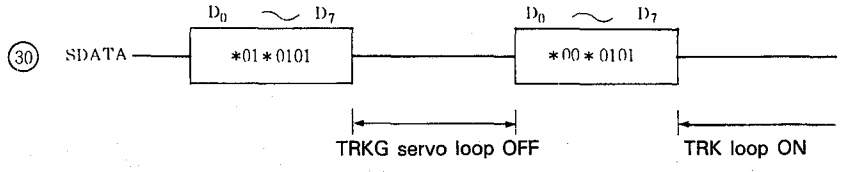


Fig. 7-3-10 TRKG servo loop ON/OFF

5) TRKG count

The number of tracks crossed during high speed scan is counted and then, according to the serial data transmission, a choice is made to either divide (1/256) the output TCNT (pin ㉕) pulse or output it as is.

When a misclamp is detected at the beginning of play, the pulse is divided (1/256) and when tracks are counted during CD search the pulse is output as is.

Once play has begun and the TRKG servo loop is open, track crossing is normal if the number of tracks crossed per disc rotation (6 FG pulses = 1 rotation) is under 1,280 tracks (TRKG count, 5 times: 1mm of eccentricity). If this number is exceeded, however, a misclamp is detected and the disc is ejected from the unit.

7.3.3. Slider Servo Operation

1) Operation in the normal play mode

During normal play DC components in the drive current of the TRKG actuator are PWM modulated at SCOMP1 and SCOMP2. This PWM pulse turns SW16 and SW17 ON and activates the output of the drive signal. The slope of the reference triangular wave can be altered by means of the capacitor connected to SLP (pin ⑳).

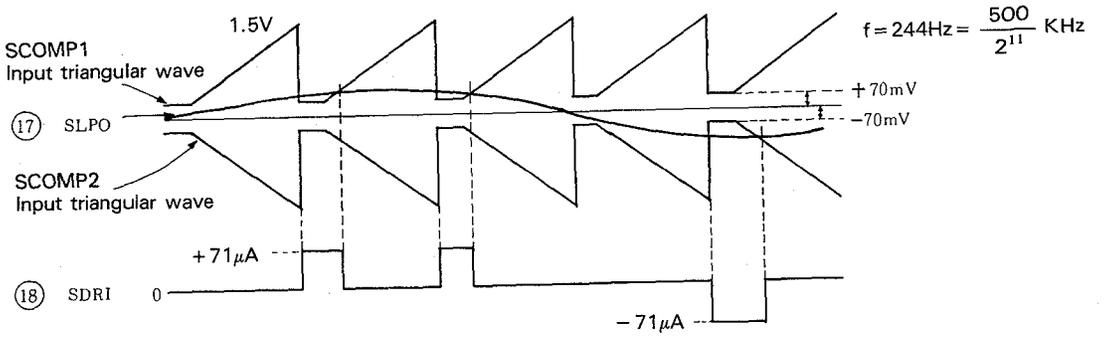


Fig. 7-3-11 SLDR Servo Operation

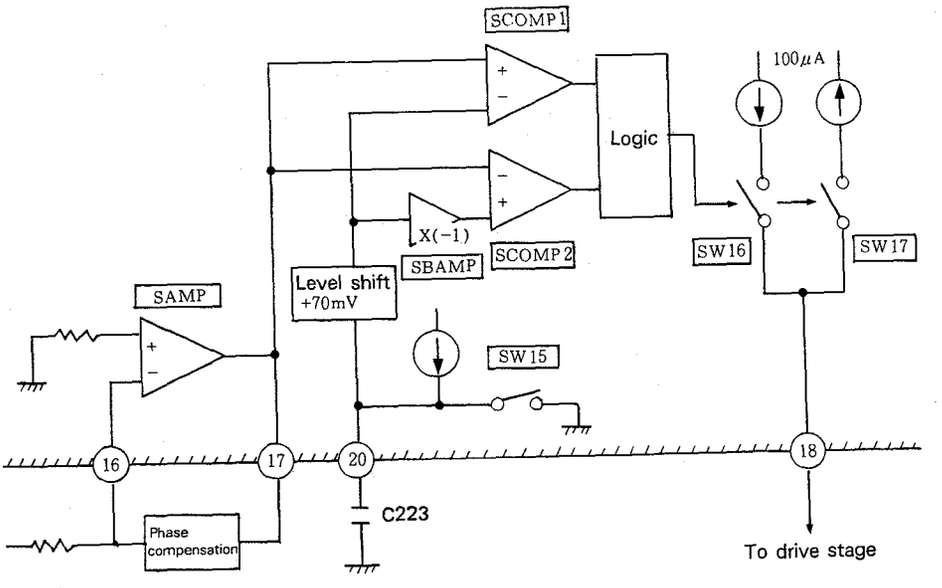


Fig. 7-3-12 SLDR Servo Part (HA11529)

2) Operation in the scan mode

During a scan operation, the SLDR servo loop is OFF and a signal that agrees with the set speed as given by serial data transmission is output either from SDR2 (pin ⑲) or SDR1 (pin ⑱).

i) Low and mid speed scan

SW18, SW20 and SW22 (when set in the FWD direction) or SW19, SW21 and SW23 (when set in the RVS direction) correspond to the serial data, D3, D2 and D1. When the bit is "0", it is OFF, and when the bit is "1", it is ON. Furthermore, on the basis of these three bit combinations a current of 10μA — 110μA (FWD) or −10μA — −110μA (RVS) is output as a duty 50% pulse from SDR2 (pin ⑲). Actually, however, when the unit is used as a CD player, only ±110μA is used.

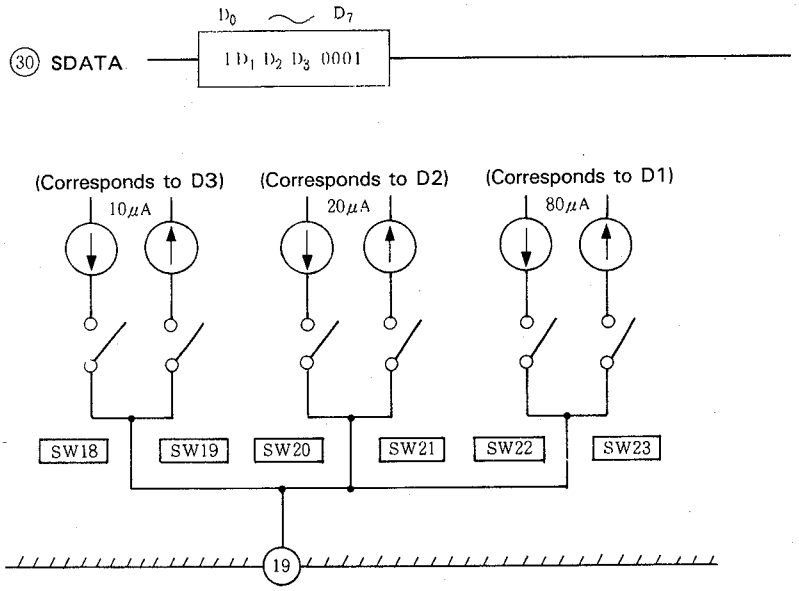
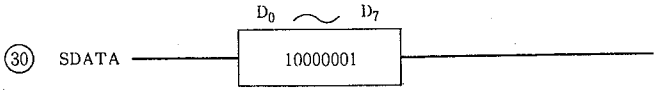


Fig. 7-3-13

ii) High speed scan

By means of the serial data transmission shown at the right, SW16 or SW17 can be turned ON and a ±100μA drive signal output from SDR1 (pin ⑱). The direction is as given in the serial data transmission.

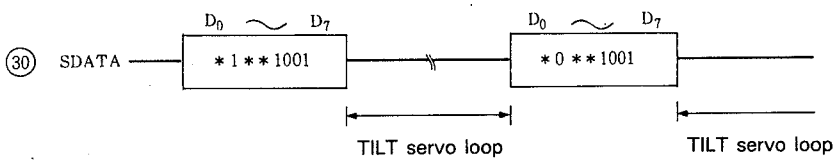


When the unit is used as an LD, the SCAN SPEED control function discussed above is not employed. A combination of the two commands, 10000001 for high speed SCAN and 10001110 that turns the SLDR servo loop OFF are used to control SLDR drive voltage and set SCAN SPEED.

7.3.4. TILT Assembly

1) Loop ON/OFF switch

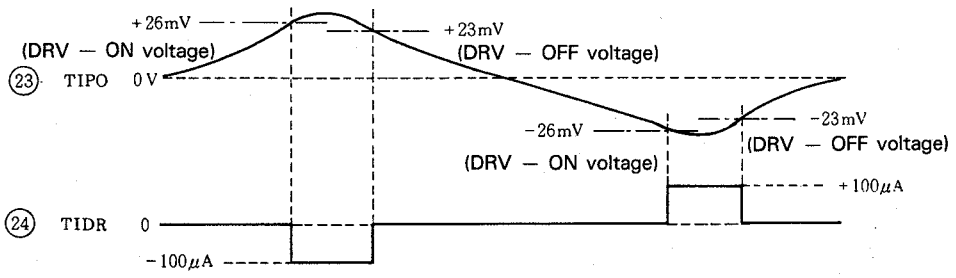
The ON/OFF control of the TILT servo loop is performed by means of serial data transmission.

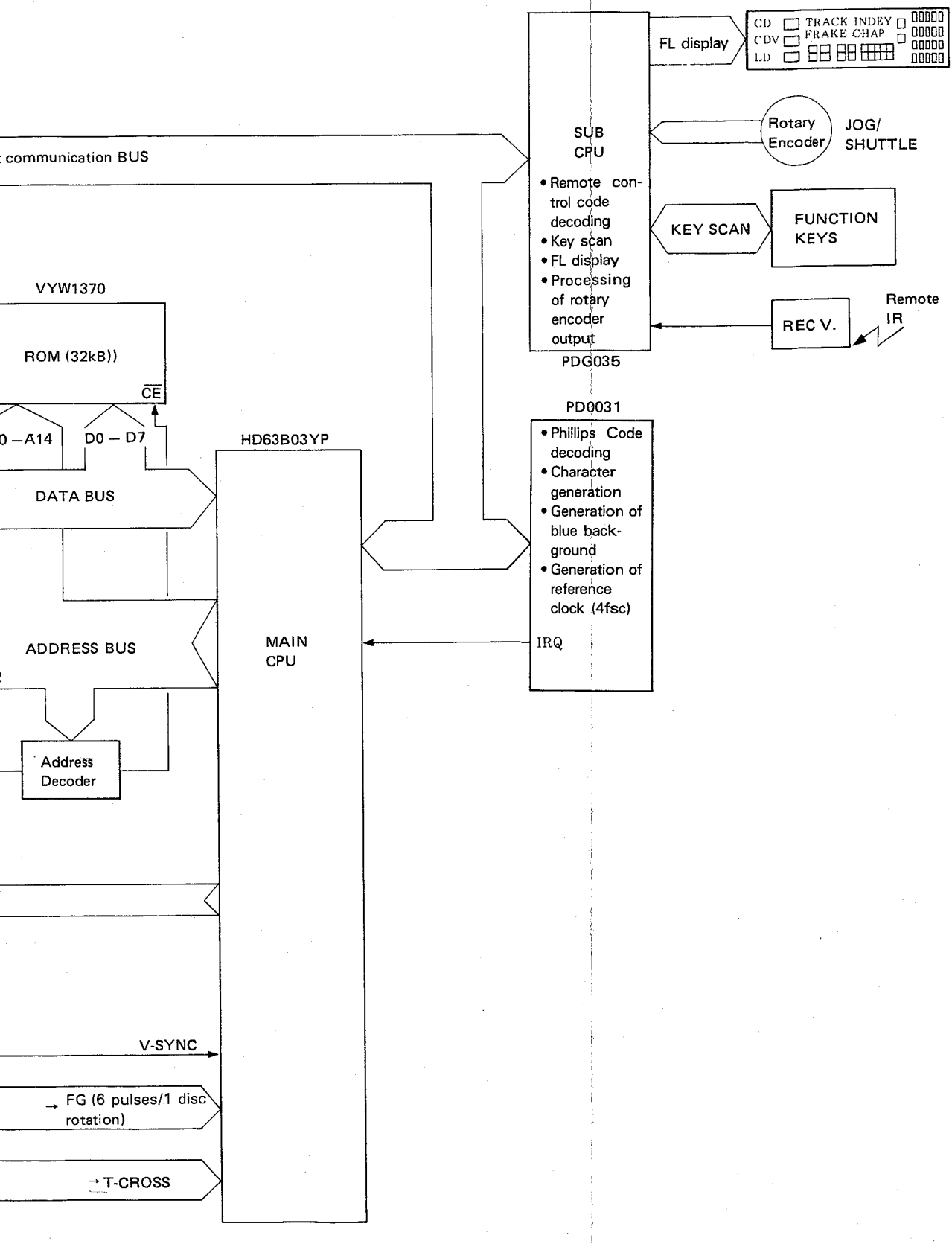


2) TILT servo operation

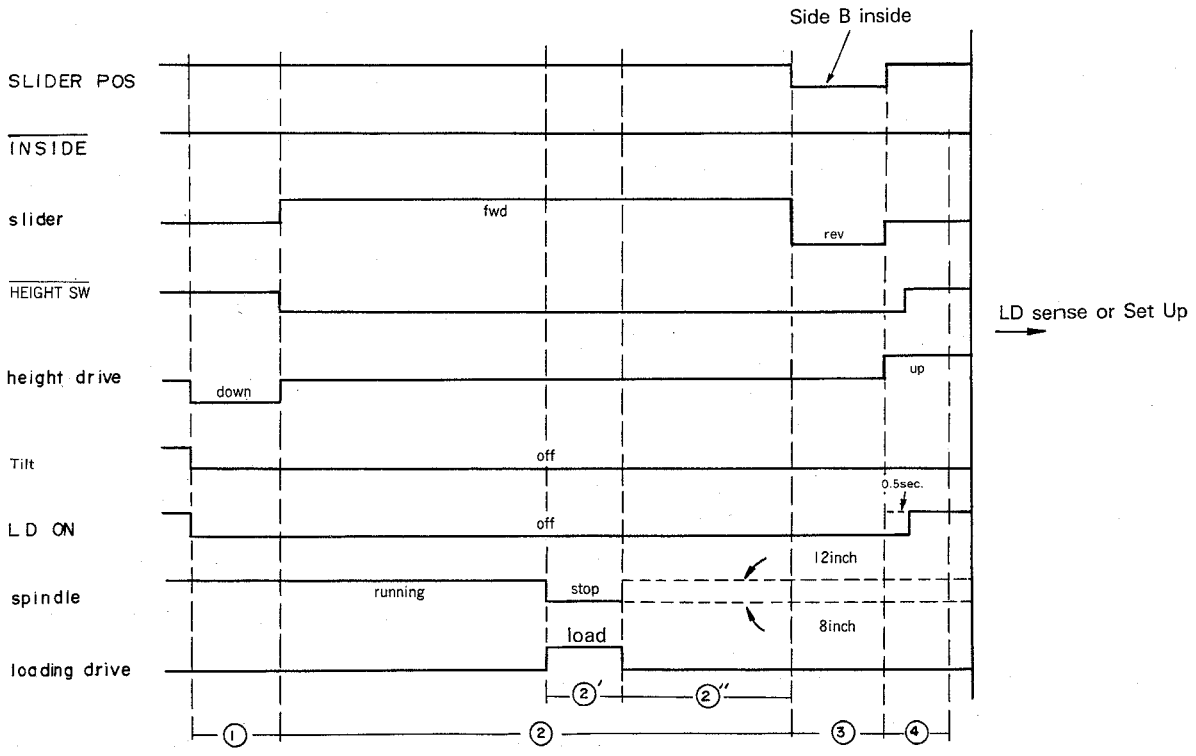
The TILT error signal is input to the window comparators TCOMP1 and TCOMP2. The drive voltage which is output at TSEF (pin ㉑) operates on an ON/OFF basis. If input is higher than the TCOMP2 reference voltage (DRV — ON voltage), then ON; if input is lower than the TCOMP1 reference voltage (DRV — OFF voltage), then OFF.

DRV — OFF voltage can be adjusted at TSEF (pin ㉑).




FL display
CD
CDV
LD
TRACK INDEX
FRAME CHAP
SUB CPU
• Remote control code decoding
• Key scan
• FL display
• Processing of rotary encoder output
PDG035
Rotary Encoder
JOG/ SHUTTLE
KEY SCAN
FUNCTION KEYS
REC V.
Remote IR
communication BUS
VYW1370
ROM (32kB))
CE
PD0031
• Phillips Code decoding
• Character generation
• Generation of blue back-ground
• Generation of reference clock (4fsc)
IRQ
0 –A14
D0 – D7
HD63B03YP
DATA BUS
ADDRESS BUS
MAIN CPU
Address Decoder
V-SYNC
FG (6 pulses/1 disc rotation)
T-CROSS

ching from side A play status to side B play
is:
eight motor is rotated in the direction in which
ickup is lowered.
e the slider is moved to the side B inside position,
tatus is monitored to see whether the spindle
r has stopped rotating or not.
n the spindle motor stops rotating, side B of the
is clamped.
en a 12-inch disc is loaded, the spindle motor
ts rotating.
the side B inside SW is turned ON, the slider
ved to the position where the side B inside SW
ned OFF.
e side B inside position, the height motor is
d in the direction in which the pickup is moved
d the disc. Then, after 0.5 sec. has elapsed after
on has started, LD ON signal is turned to H.



(3) Switching from side B play status to side A play status:

①The height motor is rotated in the direction in which the pickup is lowered.

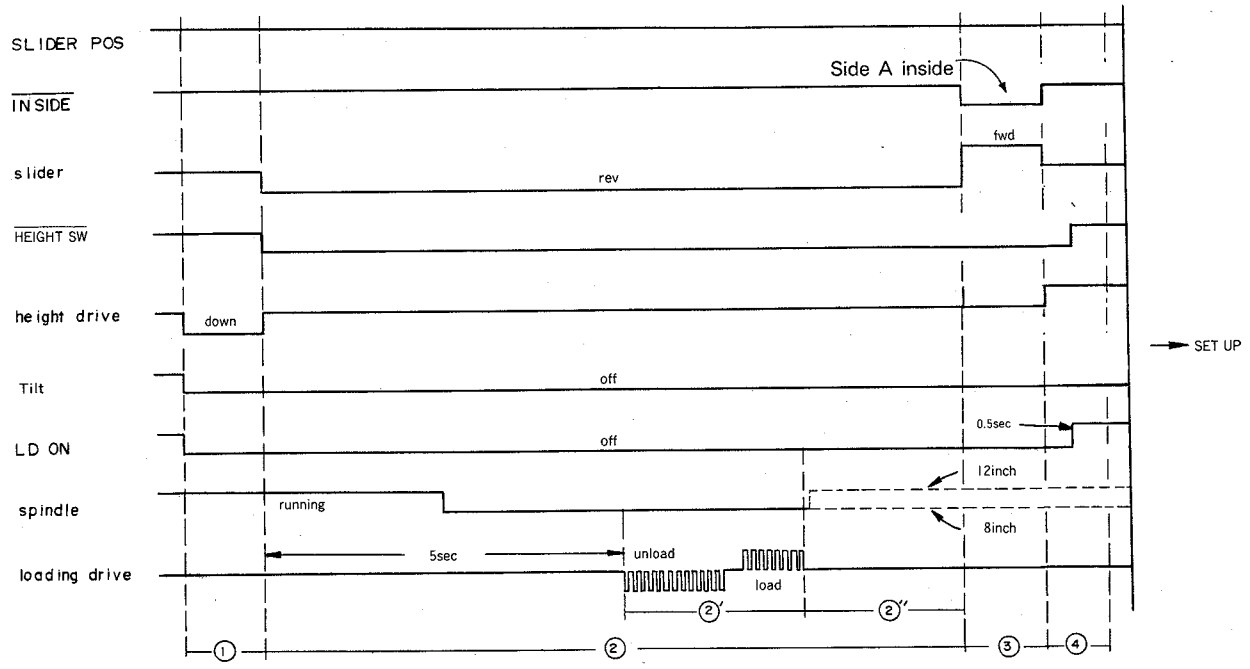
②While the slider is moved to the side A inside position, the status is monitored to see whether the spindle motor has stopped rotating or not. (Monitoring continues for 5 seconds even when rotation has stopped.)

②When the spindle motor has stopped rotating and 5 sec. has elapsed after the slider begins moving in the reverse direction, side A of the disc is clamped.

②" When a 12-inch disc is loaded, the spindle motor starts rotating.

③When the side A inside SW is turned ON, the slider is moved to the position where the side A inside SW is turned OFF.

④At the side A inside position, the height motor is rotated in the direction in which the pickup is raised. Then, after 0.5 sec. has elapsed after rotation has started, LD is turned ON.



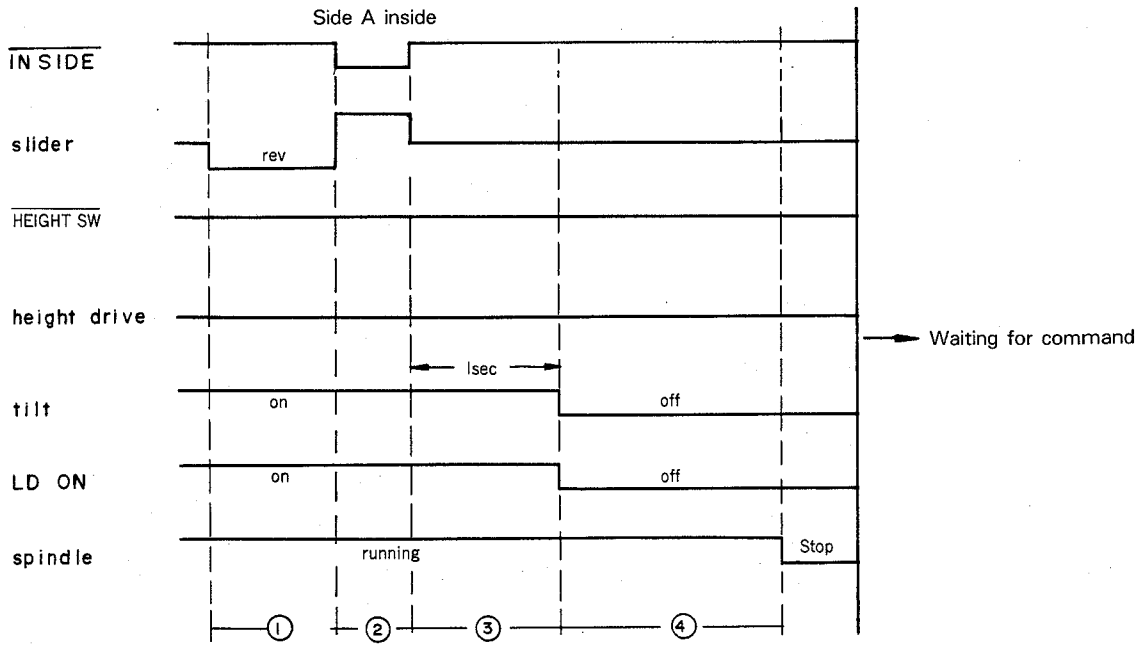
(4) Operation from the side A play status to the stop mode:

①While the LD tilt servo is operating, the slider is moved to the side A inside position.

②When the side A inside SW is turned ON, the slider is moved to the position where the side A inside SW is turned OFF.

③1 sec. later, the operation of the LD tilt servo stops.

④No operation will be performed until the spindle motor stops rotating.



(5) Operation from the side B play status to the stop mode:

①The height motor is rotated in the direction in which the pickup is lowered.

②When the slider has moved to the side A inside position, the status is monitored to see whether the spindle motor has stopped rotating or not.

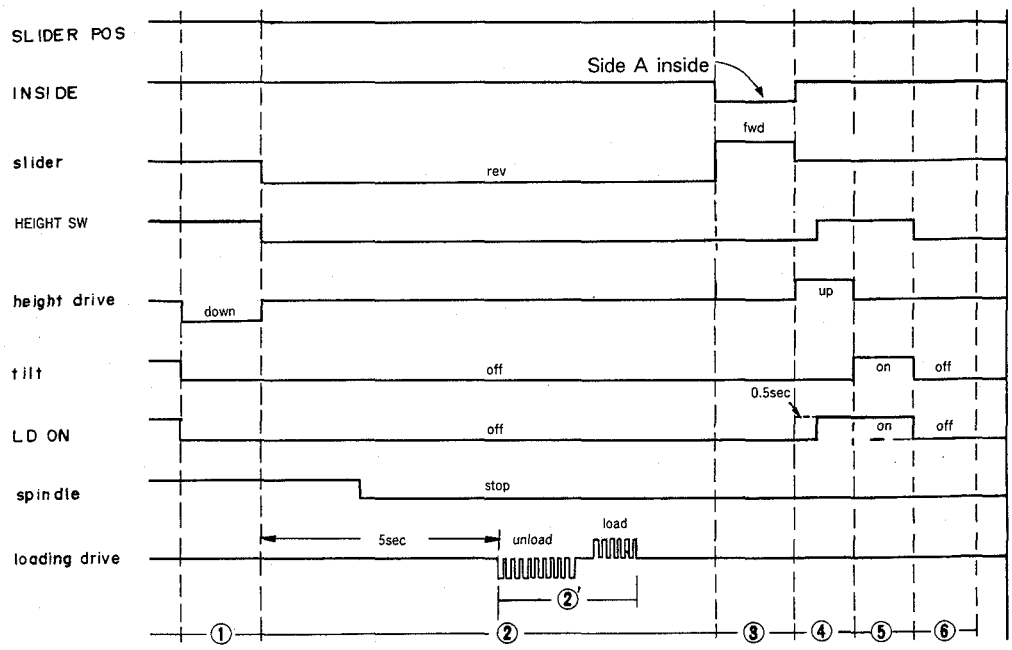
②'When the spindle motor stops rotating and 5 sec. has elapsed after the slider begins moving toward the reverse direction, side A of the disc is clamped.

③When the side A inside SW is turned ON, the slider is moved to the position where the side A inside SW is turned OFF.

④At the side A inside position, the height motor is rotated in the direction in which the pickup is raised.

⑤The LD tilt servo is turned ON and tilt adjustment is performed for side A (for 3 sec.).

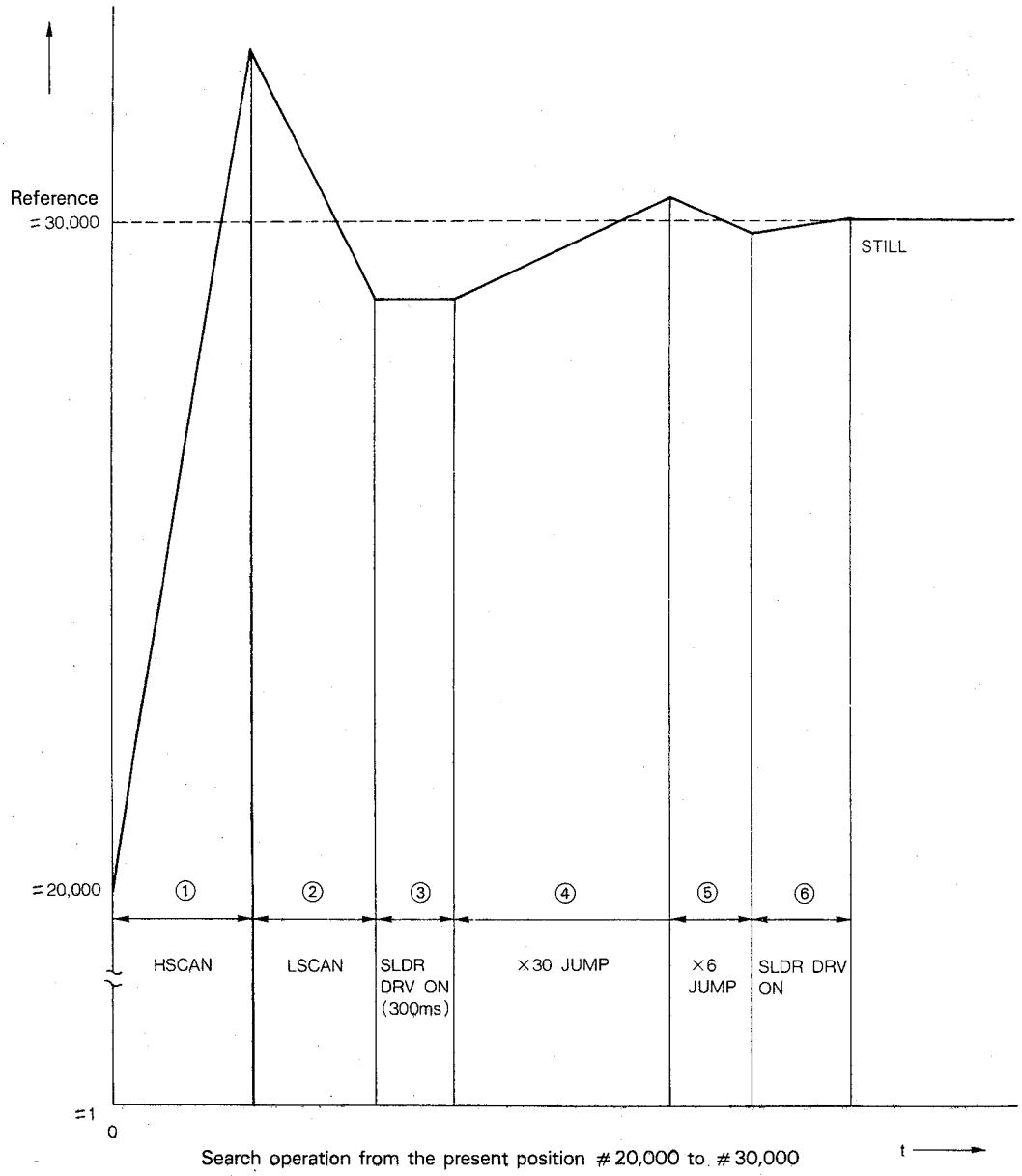
⑥The LD and the tilt servo are turned ON.



(6) When the power is turned ON:

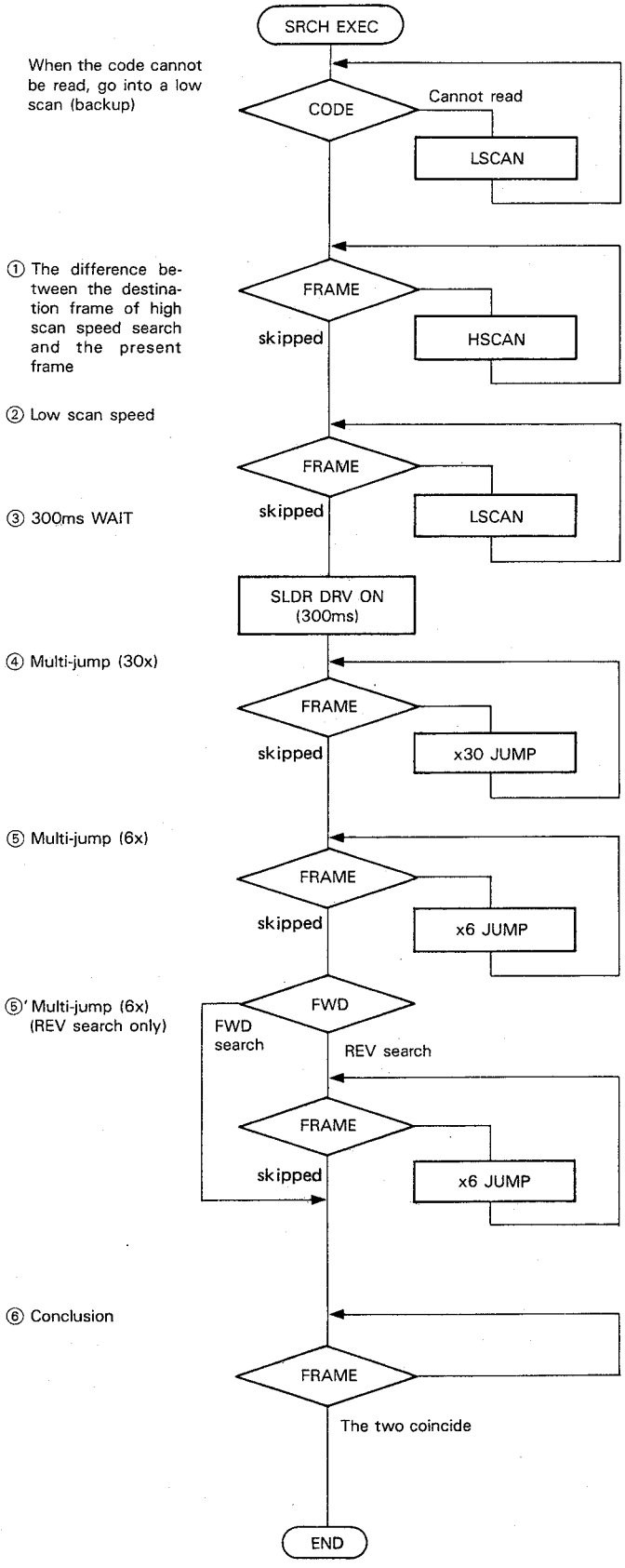
1) The height motor is rotated in the direction in which the pickup is lowered.
2) The height motor is rotated in the direction in which the pickup is raised for 1.4 sec.
3) As the presence of a disc or the type of disc, etc. before the power is turned OFF are stored in memory, after this, operation is performed according to the mode. That is, if an LD is loaded, the slider is stopped at the position where the LD inside SW is turned ON/OFF. If a CD is loaded, the TOC (table of contents) is read. If there is no disc, the slider is moved to the transportation position.

(7) Flame search operation

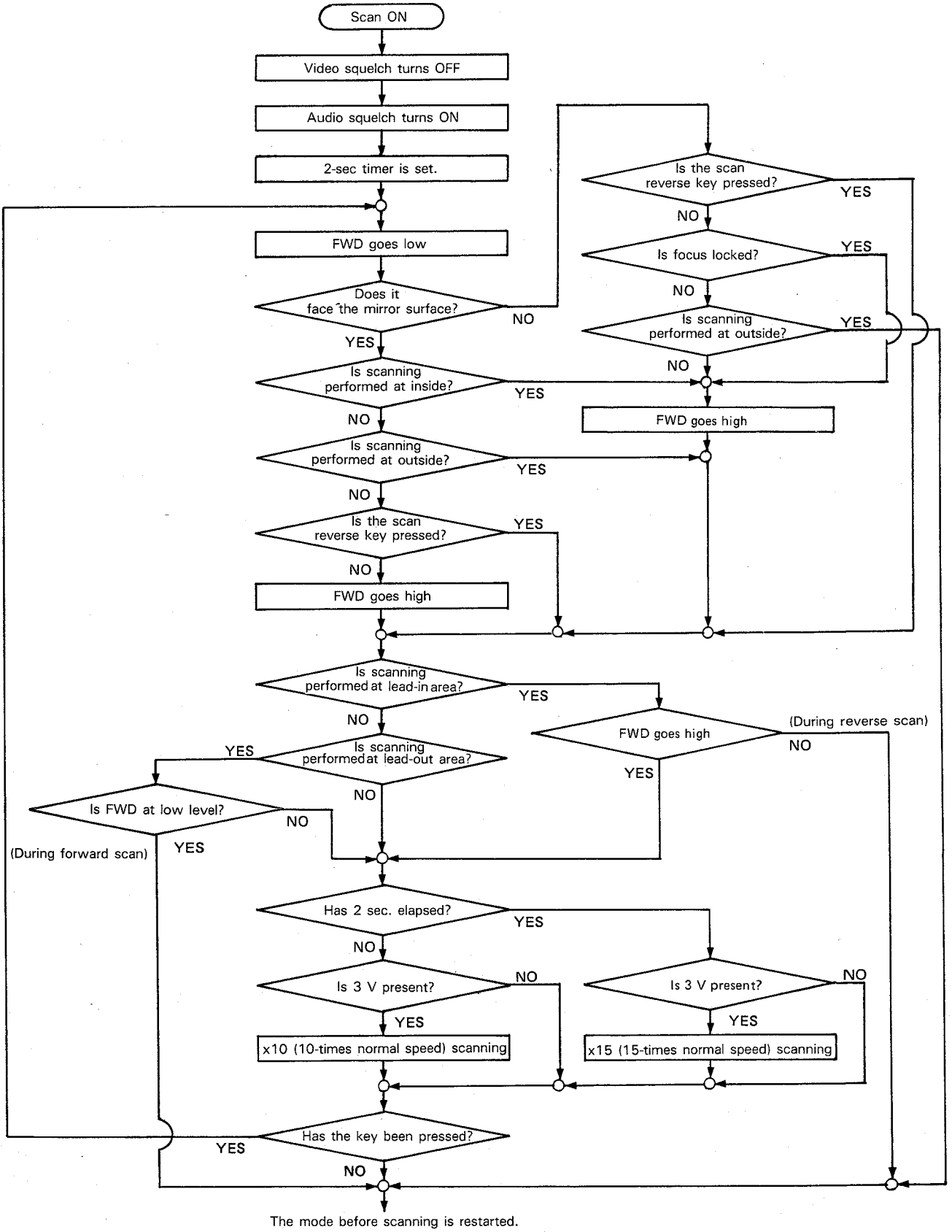


Flame search operation

Flow chart of frame search

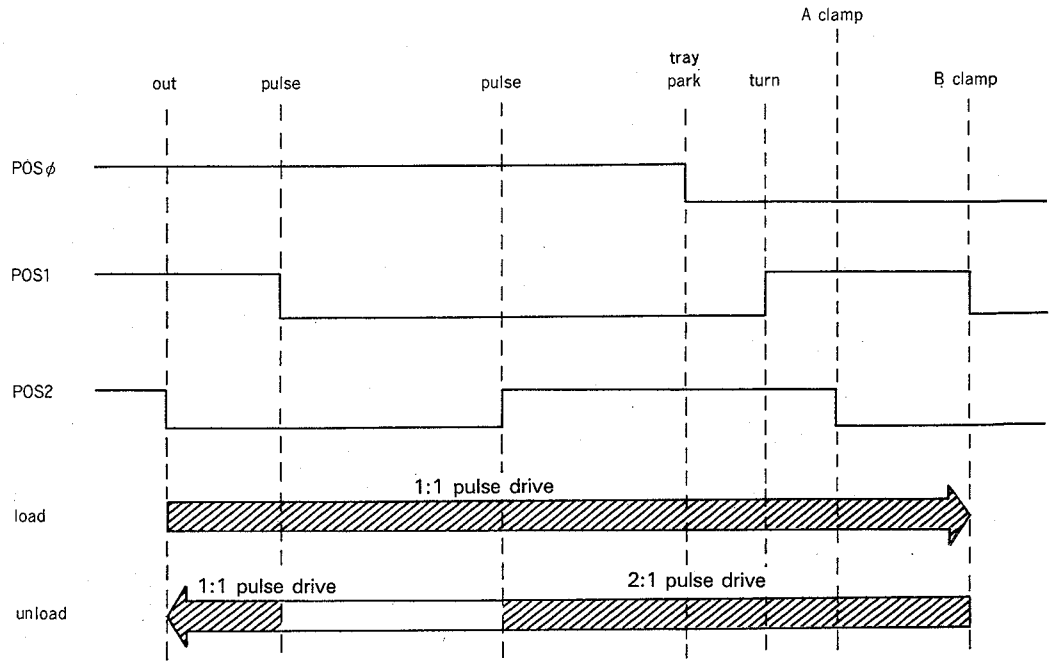


(8) Flow chart of scanning operation



(9) Loading operation:

To recognize the loading position, a rotary encoder is provided which outputs a signal using 3 bits to designate eight positions. The loading operation is performed by pulse drive according to the position detected by the above method.

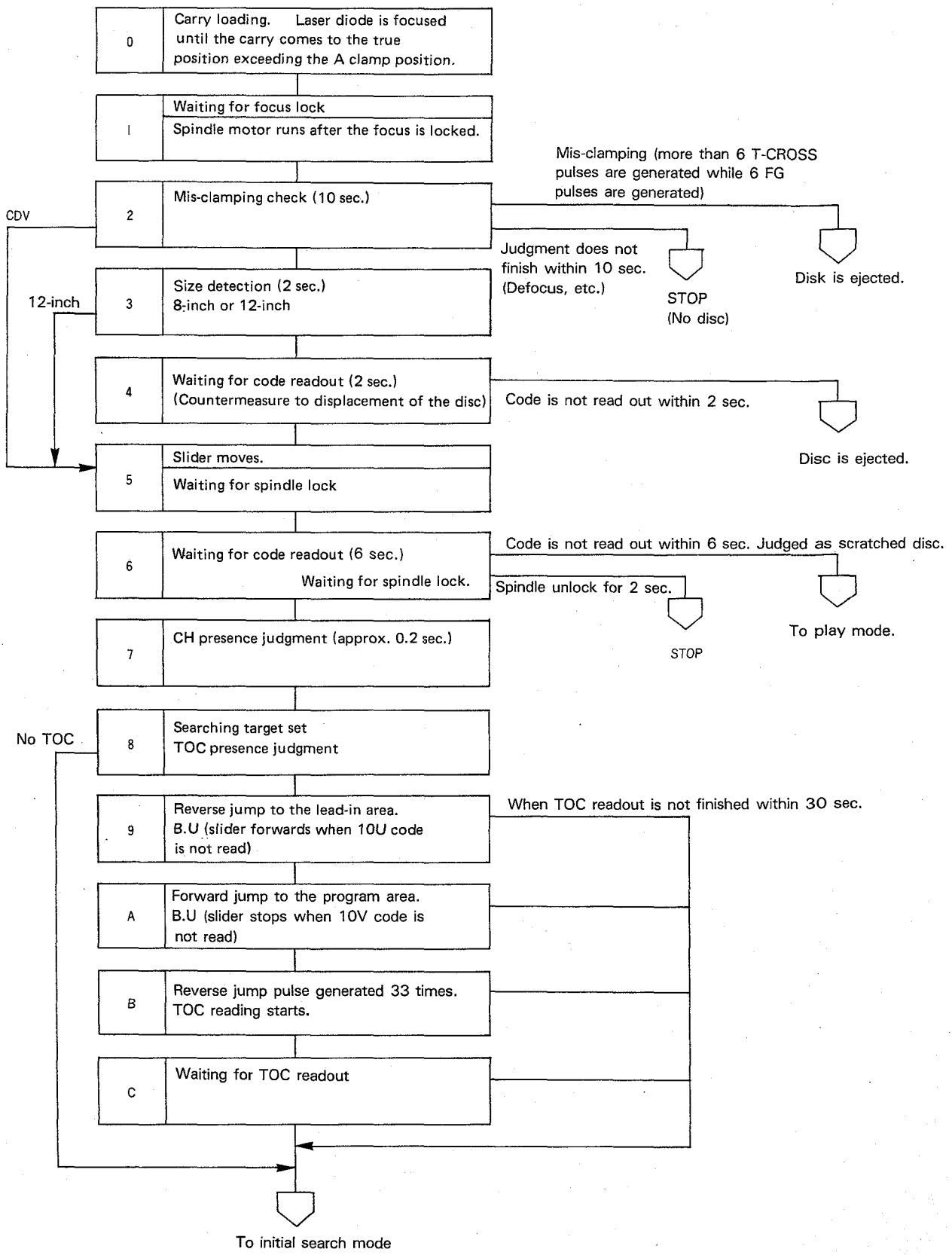


(10) Height servo:

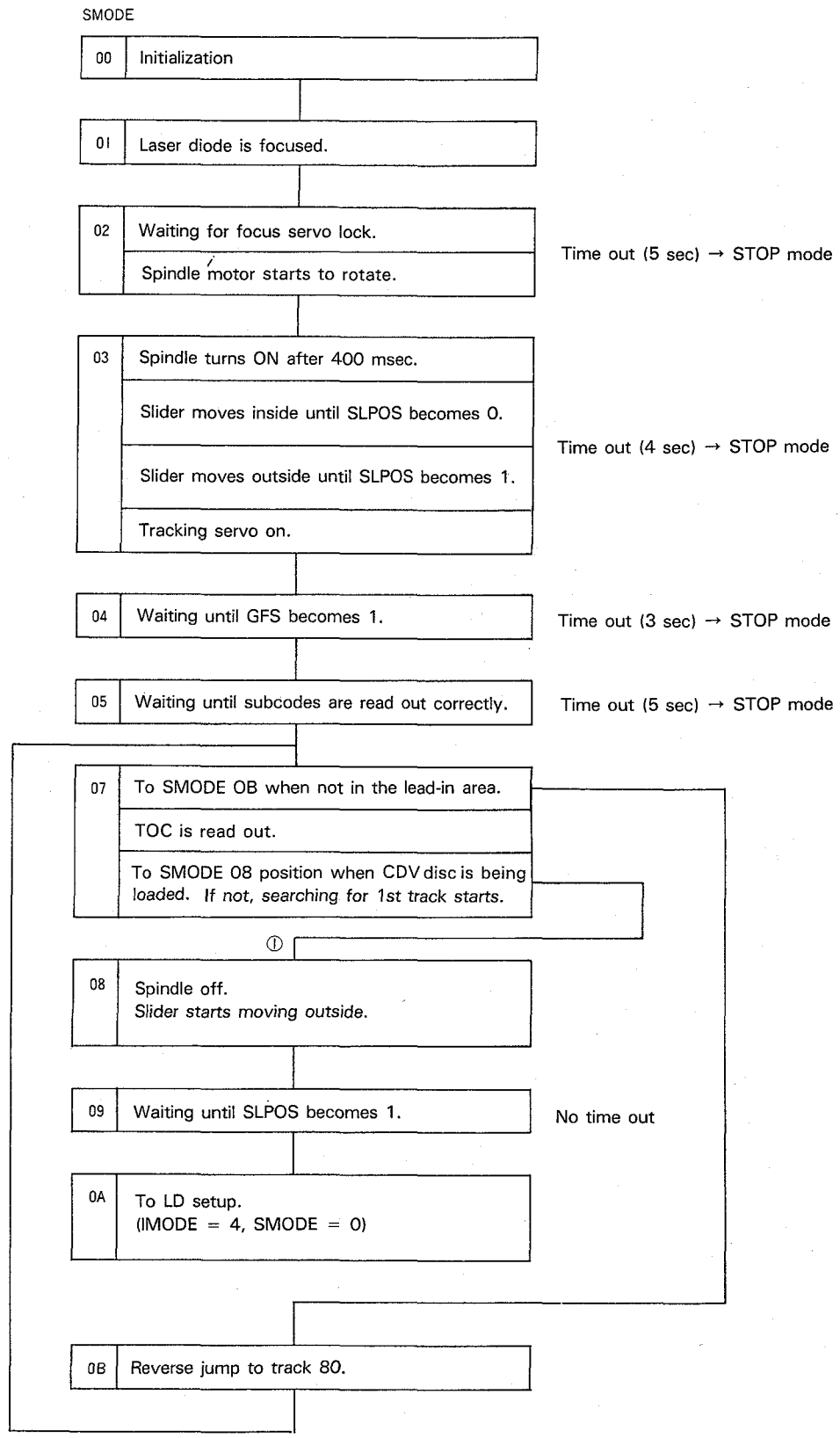
The height servo is used to obtain the sufficient focus stroke for any position on the disc. When LD (focus) is turned ON, it is controlled by the DC component of the focus servo signal. When LD is turned OFF, the height motor can be moved up/down under the control of the microcomputer.

The height servo is normally maintained in the condition of the disc which was played last. However, when the power is turned ON or when playback of the side B of the disc is finished, the height motor is lowered until the $\overline{\text{HIGHT SW}}$ signal is turned ON under the control of the microcomputer, then the height motor is raised (height neutral) after approx. 1.4 sec. has elapsed.

(11) LD setup (contents of SMODE display when IMODE = 4):



(12) CD setup:


SMODE
00
Initialization
01
Laser diode is focused.
02
Waiting for focus servo lock.
Spindle motor starts to rotate.
Time out (5 sec) → STOP mode
03
Spindle turns ON after 400 msec.
Slider moves inside until SLPOS becomes 0.
Slider moves outside until SLPOS becomes 1.
Tracking servo on.
Time out (4 sec) → STOP mode
04
Waiting until GFS becomes 1.
Time out (3 sec) → STOP mode
05
Waiting until subcodes are read out correctly.
Time out (5 sec) → STOP mode
07
To SMODE 0B when not in the lead-in area.
TOC is read out.
To SMODE 08 position when CDV disc is being loaded. If not, searching for 1st track starts.
①
08
Spindle off.
Slider starts moving outside.
09
Waiting until SLPOS becomes 1.
No time out
0A
To LD setup.
(IMODE = 4, SMODE = 0)
0B
Reverse jump to track 80.