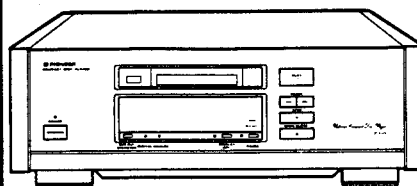




PIONEER®
The future of sound and vision.

Service Manual



ORDER. NO.
ARP2058

COMPACT DISC PLAYER

PD-93

MODEL PD-93 HAS FOLLOWING VERSIONS:

Type	Power requirement	Export destination
KU/CA	AC120V only	U.S.A. and Canada
HEM	AC220V, 240V (switchable) *	European continent

* Change the primary wiring of the power transformer.

- This manual is applicable to the KU/CA and HEM types.
- Ce manuel pour le service comprend les explications de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

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SI JUNE 1990 Printed in Japan

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

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

WARNING

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

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

1. SAFETY INFORMATION

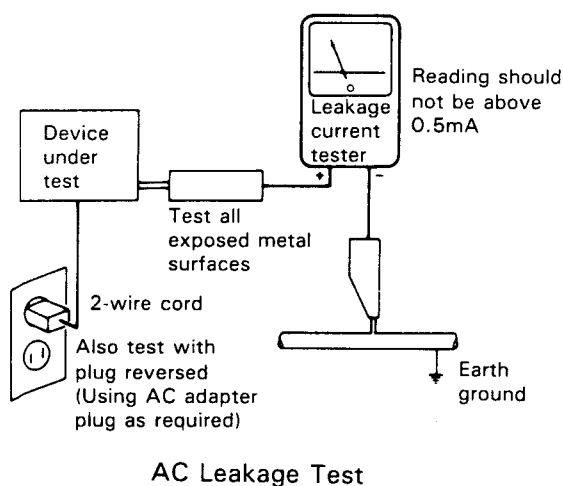
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

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

LEAKAGE CURRENT CHECK

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



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

2. PRODUCT SAFETY NOTICE

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

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

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

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

(FOR EUROPEAN MODEL ONLY)

VARO!

AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.
ÄLÄ KATSO SÄTEESEEN.

ADVERSEL:

USYNLIG LASERSTRÅLING VED ÅBNING
NÅR SIKKERHEDSAFBRYDERE ER UDE AF
FUNKTION. UNDGA UDSÆTTELSE FOR
STRÅLING.

VARNING!

OSYNLIG LASERSTRÅLNING NÅR DENNA
DEL ÄR ÖPPNAD OCH SPÄRREN
ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.



LASER
Kuva 1
Lasersäteilyn
varoituserkki

WARNING!

DEVICE INCLUDES LASER DIODE WHICH
EMITS INVISIBLE INFRARED RADIATION
WHICH IS DANGEROUS TO EYES. THERE IS
A WARNING SIGN ACCORDING TO PICTURE
1 INSIDE THE DEVICE CLOSE TO THE LASER
DIODE.



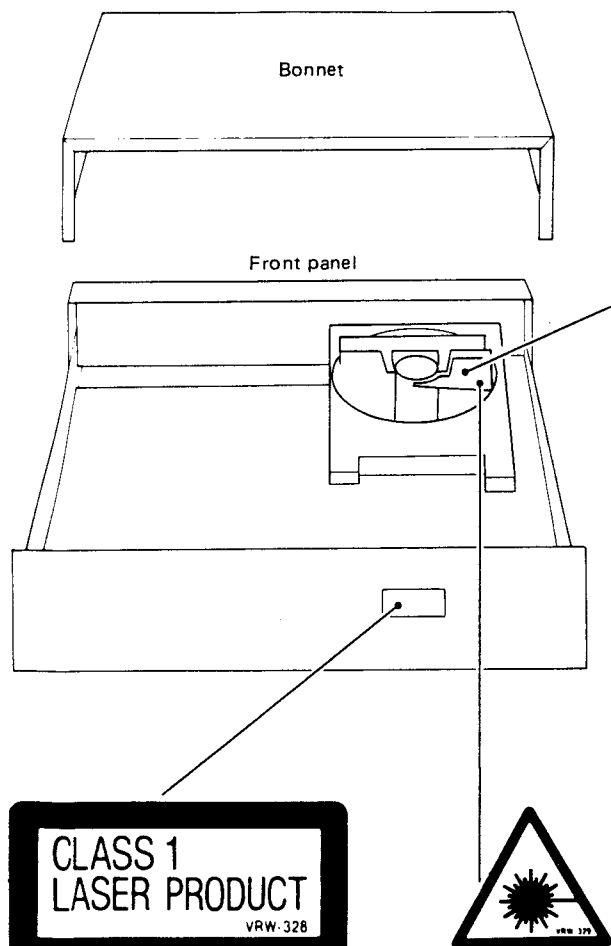
LASER
Picture 1
Warning sign for
laser radiation

IMPORTANT

THIS PIONEER APPARATUS CONTAINS
LASER OF HIGHER CLASS THAN 1.
SERVICING OPERATION OF THE APPARATUS
SHOULD BE DONE BY A SPECIALLY
INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS
MAXIMUM OUTPUT POWER: 5 mw
WAVELENGTH: 780-785 nm

LABEL CHECK



HEM model

HEM model

ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHED SAF-
BRYDERE ER UDE AF FUNKTION.
UNDGA UDSÆTTELSE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRÄHLUNG TRIT AUS, WENN DECKEL
(ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
VRW1094

Additional Laser Caution

- Laser Interlock Mechanism**
The ON/OFF status of the clamp switch (S102) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF. Thus, the interlock will no longer function if the clamp switch (S102) is deliberately shorted. In the test mode the interlock mechanism will not function (refer to page 49). Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (IC301) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).
- If the fault condition described in 1 is induced with the cover removed and the objective lens extending past the outer circumference of the disc clamper diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

2. DISASSEMBLY

● REMOVAL OF FRONT PANEL

1. Keep the side boards (L) and (R) apart from the upper plate by loosening the screws ((L, 4) (R, 4)) fixing them. (Be sure not to remove yet since the lead wire for ground is attached to the side sash on the side board (L) and (R).)
2. Remove the upper plate. (Remove the four black screws (upper side) and four copper screws (rear side).)
3. Remove the screws (A₁) and (A₂) fixing the ground lead wire for side sash. (Refer to Fig. 2-1.)
4. Remove the side boards (L) and (R).
5. Turn the power to draw out the tray. (Refer to Note 1 when opening the tray manually.)
6. Remove the tray name plate. (Loosen the screw (B₁) and (B₂) enough.)
7. Remove the tray fixing plate (Screws (C₁), (C₂)).
8. Remove the front panel (Remove the three screws of upper side and the four screws of lower side.)

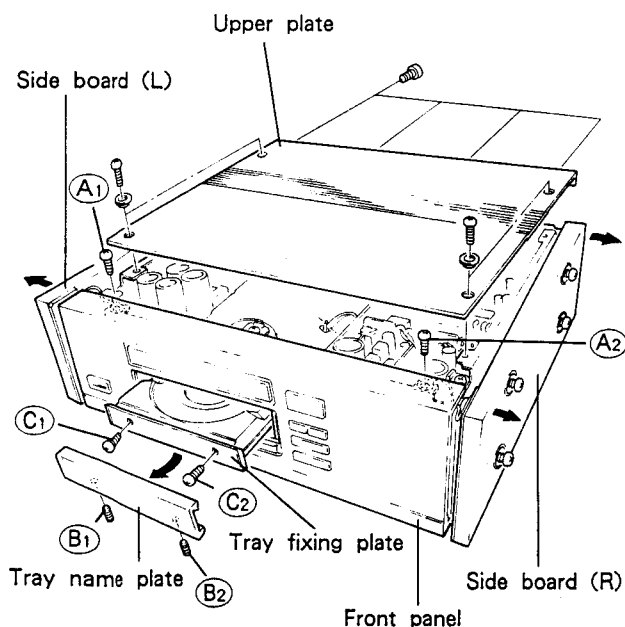


Fig. 2-1.

Note 1. How to open the tray manually

1. Loosen the screw (E) fixing the clamp motor.
2. Taking care not to drop the iron ball of the tip of the gear section of the clamp motor as shown in Fig. 2-2, keep the engaging section (G) of gear apart from the unit by tilting the clamp motor in the direction of arrow.
3. Turn the clamp cam counterclockwise to the position where the leaf switch turns on. (Set to the state that the clamp holder is raised.)
4. Mount the clamp motor again. (Drive the screw (E).)
5. Push the tray from behind to open it.

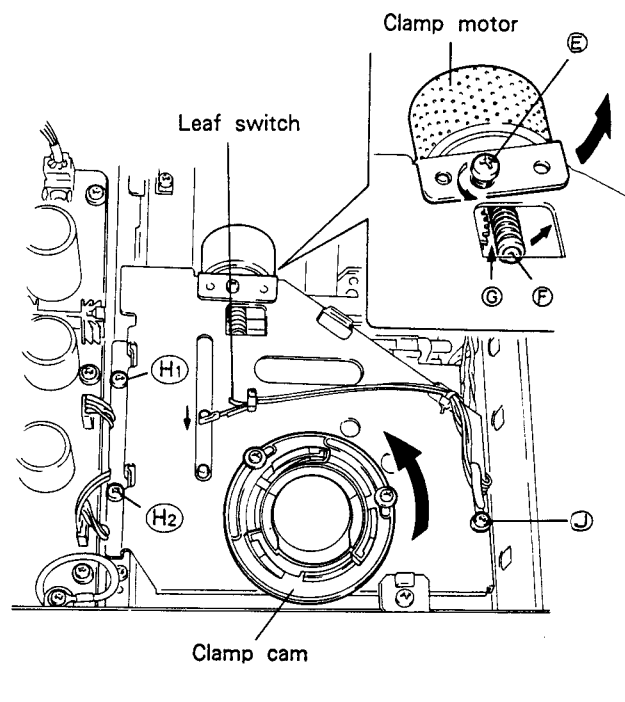


Fig. 2-2.

● REMOVAL OF TRAY ASSEMBLY

1. Remove the upper plate as in the steps 1 and 2 of "REMOVAL OF FRONT PANEL".
2. Remove by turning over the clamp mechanism assembly. (Screws $\textcircled{H}_1$, $\textcircled{H}_2$ and $\textcircled{J}$, Refer to Fig. 2-2.)
3. Remove the fixing screws $\textcircled{K}_1$ and $\textcircled{K}_2$ of the tray assembly and remove the slide base from the slider unit of the loading mechanism assembly by pushing the claw $\textcircled{L}$. (Refer to Fig. 2-3).
4. Remove the tray assembly by drawing out from the front panel.

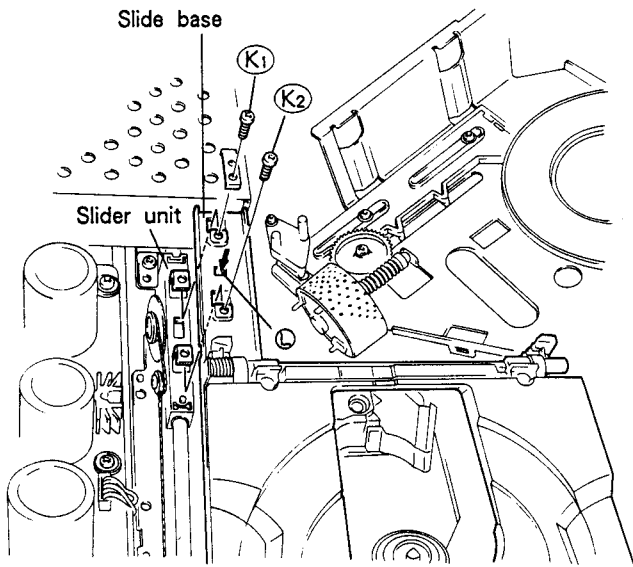


Fig. 2-3.

● REMOVAL OF PICKUP ASSEMBLY

1. Remove the upper plate as in the steps 1 and 2 of "REMOVAL OF FRONT PANEL".
2. Remove by turning over the clamp mechanism assembly. (Screws $\textcircled{H}_1$, $\textcircled{H}_2$ and $\textcircled{J}$, Refer to Fig. 2-2.)
3. Move the tray to the open position. (Refer to Note 1.)
4. Remove the fixing screws $\textcircled{M}$ (2) and the plastic rivet $\textcircled{N}$ of the pickup assembly in this state. (Refer to Fig. 2-4.)

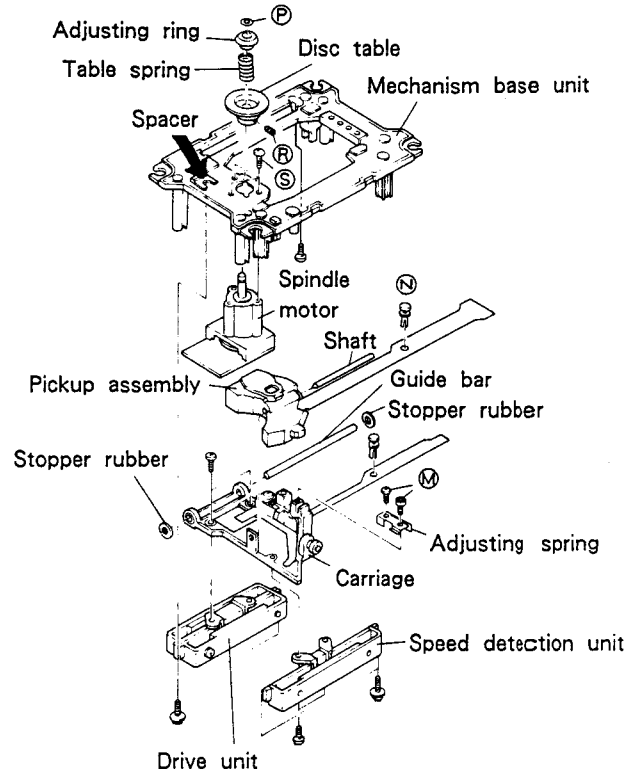


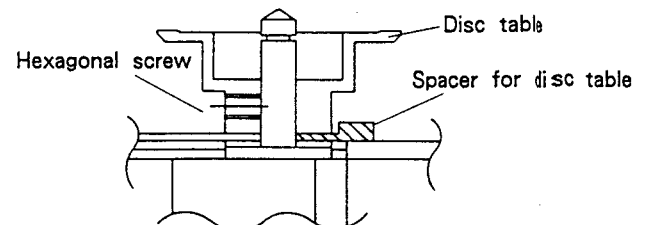
Fig. 2-4.

● INSTALLATION OF DISC TABLE

Cut the spacer shown by the arrow (refer to Fig. 2-4.) with a nipper (the rear side), enter it between the disc table and the mechanism base, and screw it. Torque over 5 kgcm to screw.

〈Reference〉 In the case of no torque driver, tighten firmly the hexagonal screw, press the disc table from the upper side, and check that it does not slip down.

Remove the spacer after installing the disc table. (The spacer is $1\frac{1}{16}$ in thickness.)



● REMOVAL OF SPINDLE MOTOR

1. Remove the base (alias bottom plate) (17 screws).
2. Remove the split washer ⑤ fixing the adjusting ring. (Refer to Fig. 2-5.)
(Remove it with a tweezers while pressing the adjusting ring ??.)
3. Move the tray to the open position. (Refer to Note 1.)
4. Loose the screws ⑥ of the disc table from the opening part of the front panel with the hexagonal driver and remove the disc table.
5. Remove the fixing screws ③ (3) of the spindle motor.
6. Remove the lead wires (7) wired as shown in Fig. 2-5, with a soldering iron.

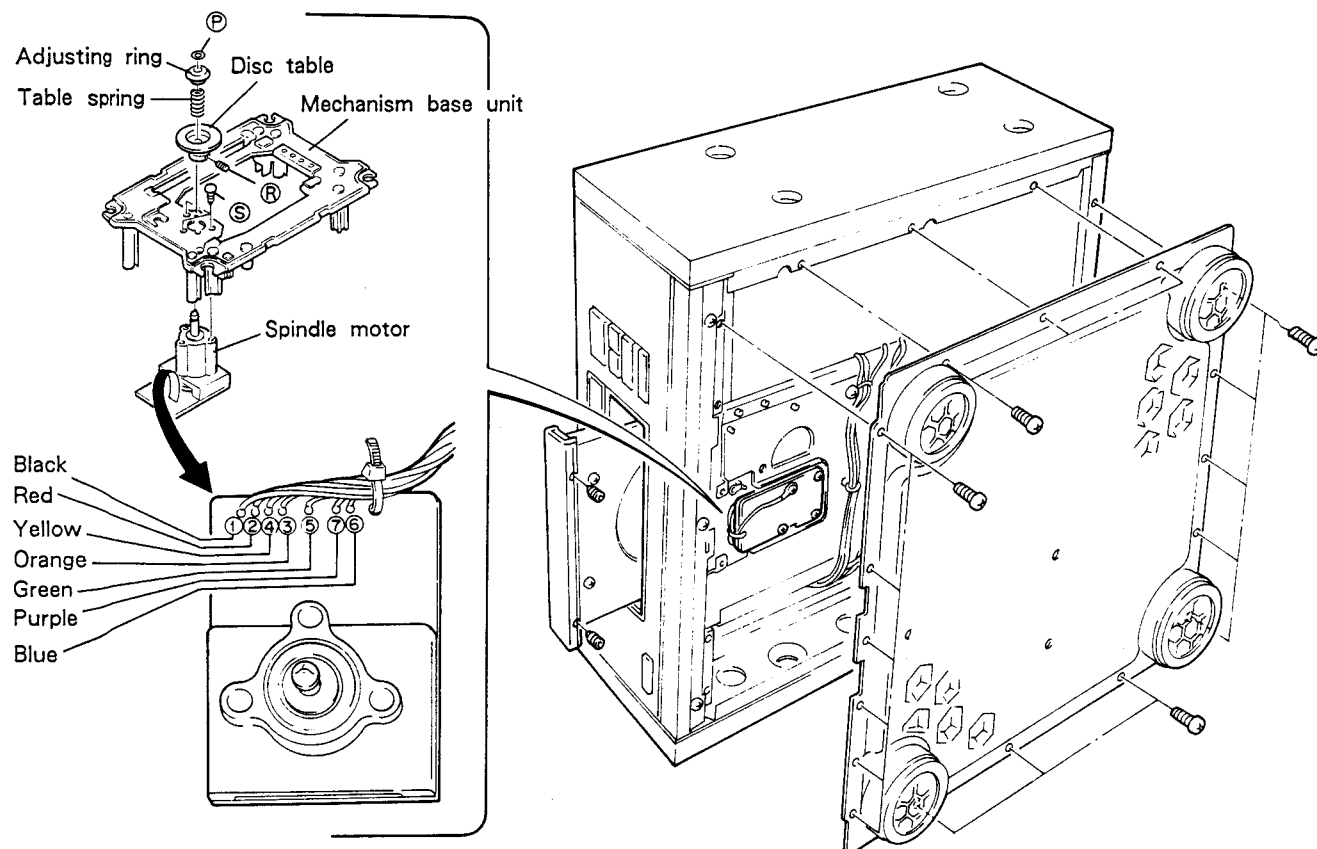


Fig. 2-5.

● REMOVAL OF SERVO MECHANISM ASSEMBLY

1. Remove the tray assembly. (Refer to REMOVAL OF TRAY ASSEMBLY.)
2. Remove the slide guide. (Screws T_1 and T_2 , refer to Fig. 2-6.)
3. Remove the four screws (U_1 to U_4) fixing the servo mechanism assembly.
4. Remove the flexible wire from the CN301 and CN302, and remove the servo mechanism assembly.

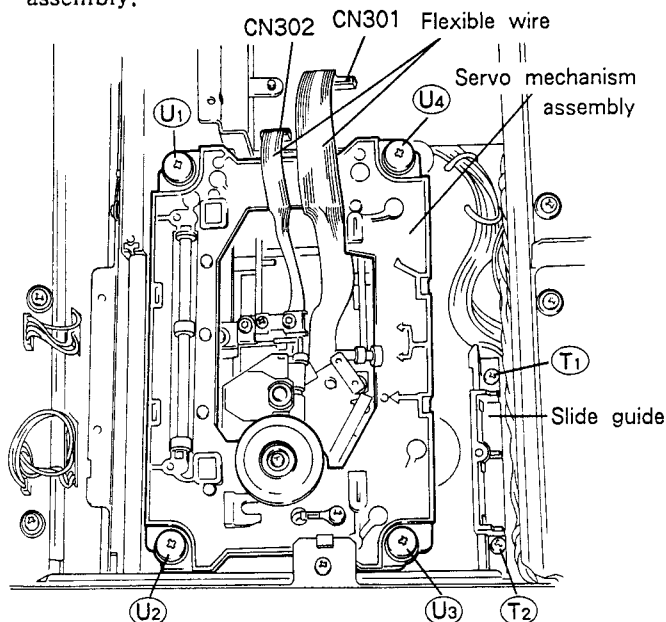


Fig. 2-6.

● REMOVAL OF LOADING MOTOR

1. Remove the loading mechanism assembly.

● REMOVAL OF LOADING MECHANISM ASSEMBLY

1. Remove the servo mechanism assembly. (Refer to REMOVAL OF SERVO MECHANISM ASSEMBLY.)
2. Remove the screws V_1 and V_2 fixing the loading mechanism assembly and the lead wire from cord stopper W . (Refer to Fig. 2-7.)
3. Move the loading mechanism assembly backward a little and remove it by raising the end of front panel.

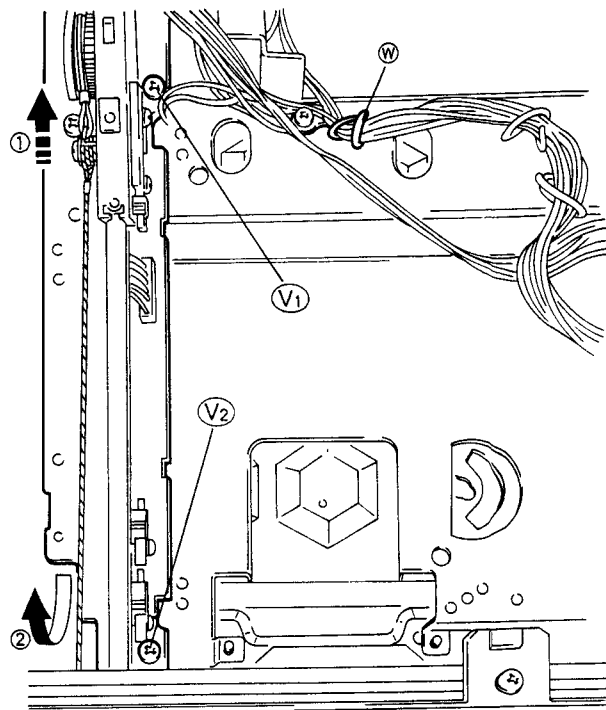


Fig. 2-7.

3. OPERATION CHECK OF MAIN BOARD ASSEMBLY

1. Remove the three assemblies of the audio monaural boards (Lch), (Rch) and the power supply board (A). (Remove for the output pin jack portion with a soldering iron.)
2. Remove the main shield plate (6 screws). It is possible to turn on the power and check the servo circuit in this state. (Refer to Fig. 3-1 for the position to install each assembly mentioned above.)

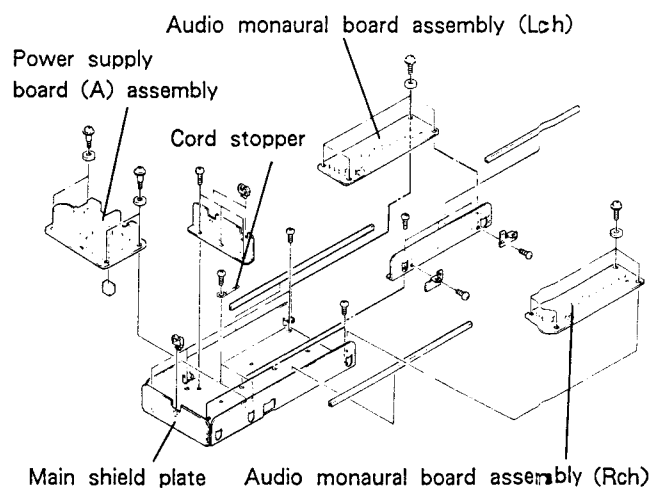


Fig. 3-1.

4. EXPLODED VIEWS AND PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

4.1 Parts List of Exterior(1)

Mark	No.	Symbol & Description	Part No.	Mark	No.	Symbol & Description	Part No.
	1	Name plate	AAM1001		41	Tray fixing plate	PNS1008
	2	LED lens	AMR1160		42	Clamp knob	PNW1236
	3	Screw	AMZ40P180FRD		43	Joint	
	4	Screw	BBT30P080FCU		44	Wood collar	PNW1238
	5	Screw	BBZ30P060FCC		45	Lens(A)	PNW1460
	6	Screw	BBZ30P080FRD		46	Control panel	PNW1579
	7	Screw	BBZ30P080FZK		47	Power button	PNW1580
	8	Screw	IBZ30P080FCC		48	Operating instructions (English)	PRB1121(KU/CA type)
	9	Screw	IBZ30P080FCC			(English/French/German/ Italian/Dutch/Spanish/ Swedish/Portuguese)	PRE1117(HEM type)
	10	Select button	PAC1325		49	Caution label	.....
	11	Main button assembly	PAD1053		50		.....
	12	FL sheet	PAM1290(KU/CA type)				
			PAM1251(HEM type)				
	13	Display window	PAM1344		51	Clamp caution label	.....
	14	Front panel	PAN1162(KU/CA type)	⊙	52	Main operation board assembly	PWZ1742
			PAN1161(HEM type)				
	15	Side sash	PAN1151		53	Remote control unit	PWW1045
	16	Tray name plate	PAN1152		54	Leg assembly	AMR1159
	17	Screw	PBA1017		55	Servo mechanism assembly	
	18		.....				
	19	Plate spring A			56	Loading mechanism assembly	
	20	Plate spring B			57	Tray assembly	
					58	Clamp mechanism assembly	
	21	Connection cord	PDE1032		59	Screw	RBA-093
	22	Cushion rubber			60	Battery	
	23	Vibration isolating rubber					
	24	Side rubber(R)	PEB1118		61	Washer	WA42N120W050
	25	Side rubber(L)	PEB1119		62	Plastic bag	Z21-037
					63	Sheet	Z23-024
	26	Protector(F)	PHA1111		64	Screw	ZMD30H040FBT
	27	Protector(R)	PHA1112		65	Battery cover	PZN1007
	28	Spacer	PHC1018				
	29	Sheet	PHC1022		66	Sub operation board assembly	
	30	Upper plate	PHC1047		67	LED board assembly	
					68	Screw	PYC30P100FMC
	31	Packing case	PHG1494(KU/CA type)		69	Play lens	PNW1258
			PHG1493(HEM type)		70	Stop rubber	PEB1140
	32	Collor	PLA1029				
	33	Side board(L)	PMM1019(KU/CA type)				
			PMM1027(HEM type)		71	Plastic bag	Z21-013
	34	Side board(R)	PMM1020(KU/CA type)		72	Front panel assembly	PEA1090(KU/CA type)
			PMM1028(HEM type)				PEA1091(HEM type)
	35	Screw	PMZ40P060FMC				
	36	Base					
	37	Vibration isolating material S					
	38	Cushion					
	39	Nois absorption material	PNM1102				
	40	Upper plate	PNS1002				

WHEN RE-TRANSPORTING THE UNIT

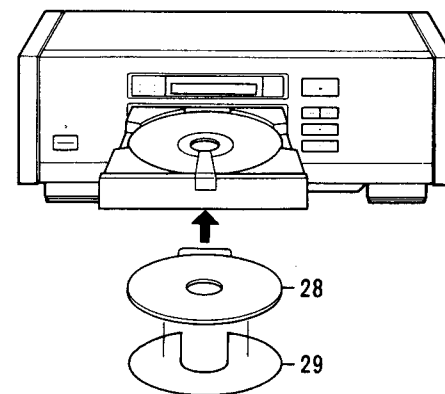
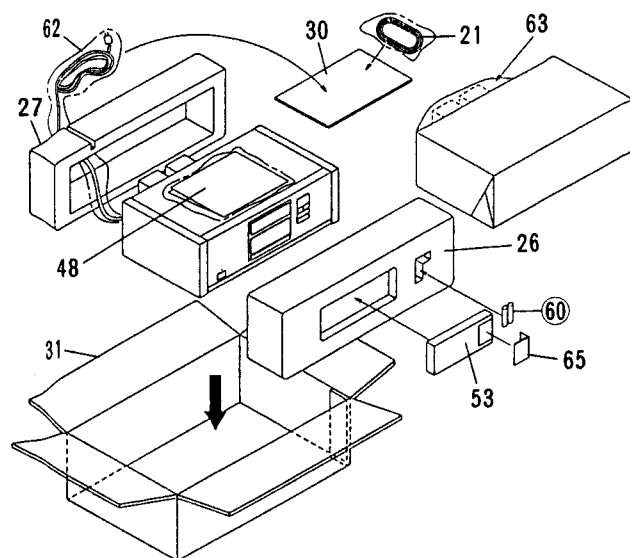
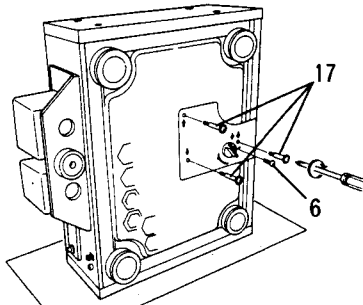
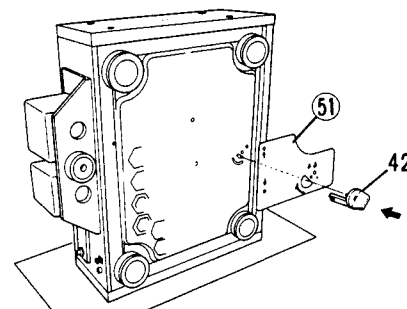
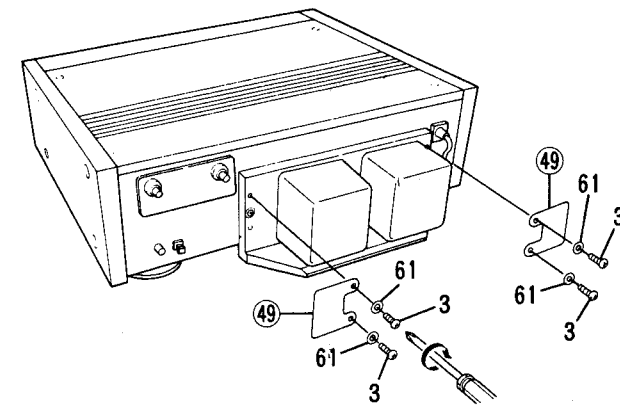
Mount the screws and knobs removed to the original positions.
Perform in the reverse order of removals.

1. Mount the fixing screw for transformer on the rear side.
2. Mount the fixing knob and screw on the bottom side.

- ① Stand this mechanism sideways.
- ② Match the mark Δ on the gray knob and the mark Δ on the bottom side, and insert the knob. Insert so as to enter the pole of the bottom lid into the round hole of the knob's end.
- ③ Turn the knob counterclockwise.
- ④ Match the screw holes, insert the screw and tighten it with a phillips screwdriver.

3. Remove the tray and insert the spacer for transport.

Note: Tighten the fixing knob and screw of the bottom lid, before inserting the spacer for transport.



29 is partially put on on 28 with a both-sides tape to prevent from damage by the vibration in transport.

4.1 EXTERIOR (1)

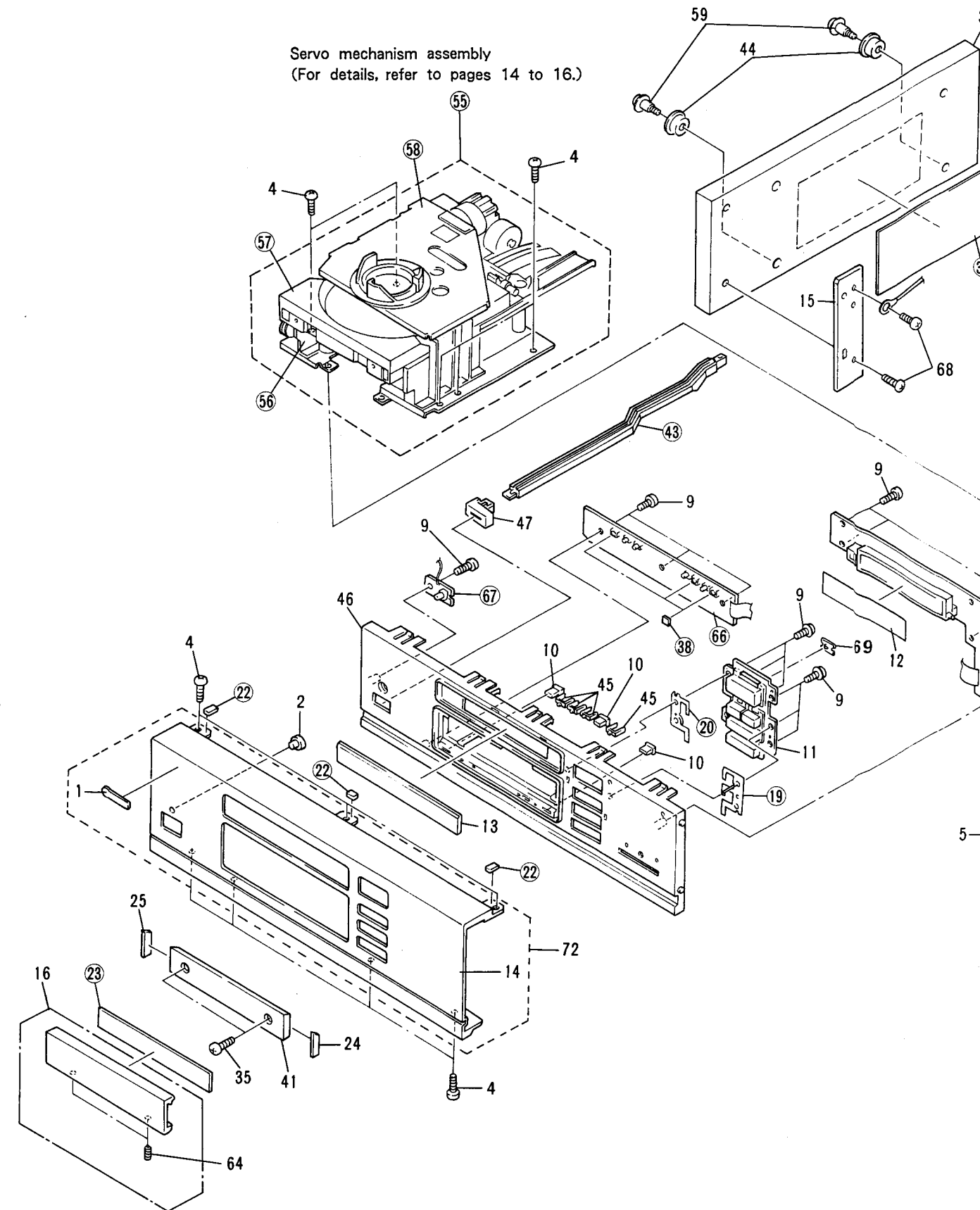
A

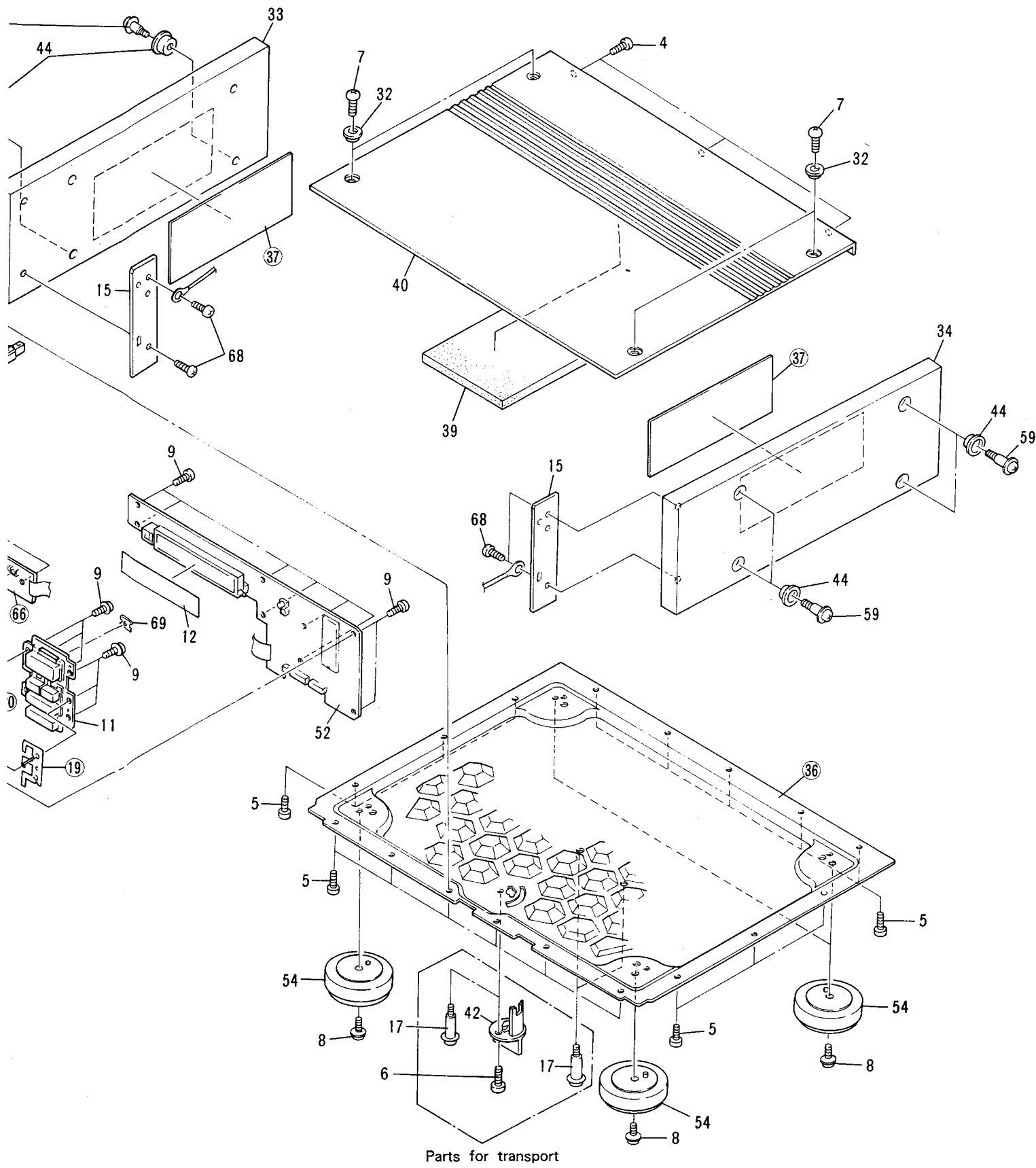
Servo mechanism assembly
(For details, refer to pages 14 to 16.)

B

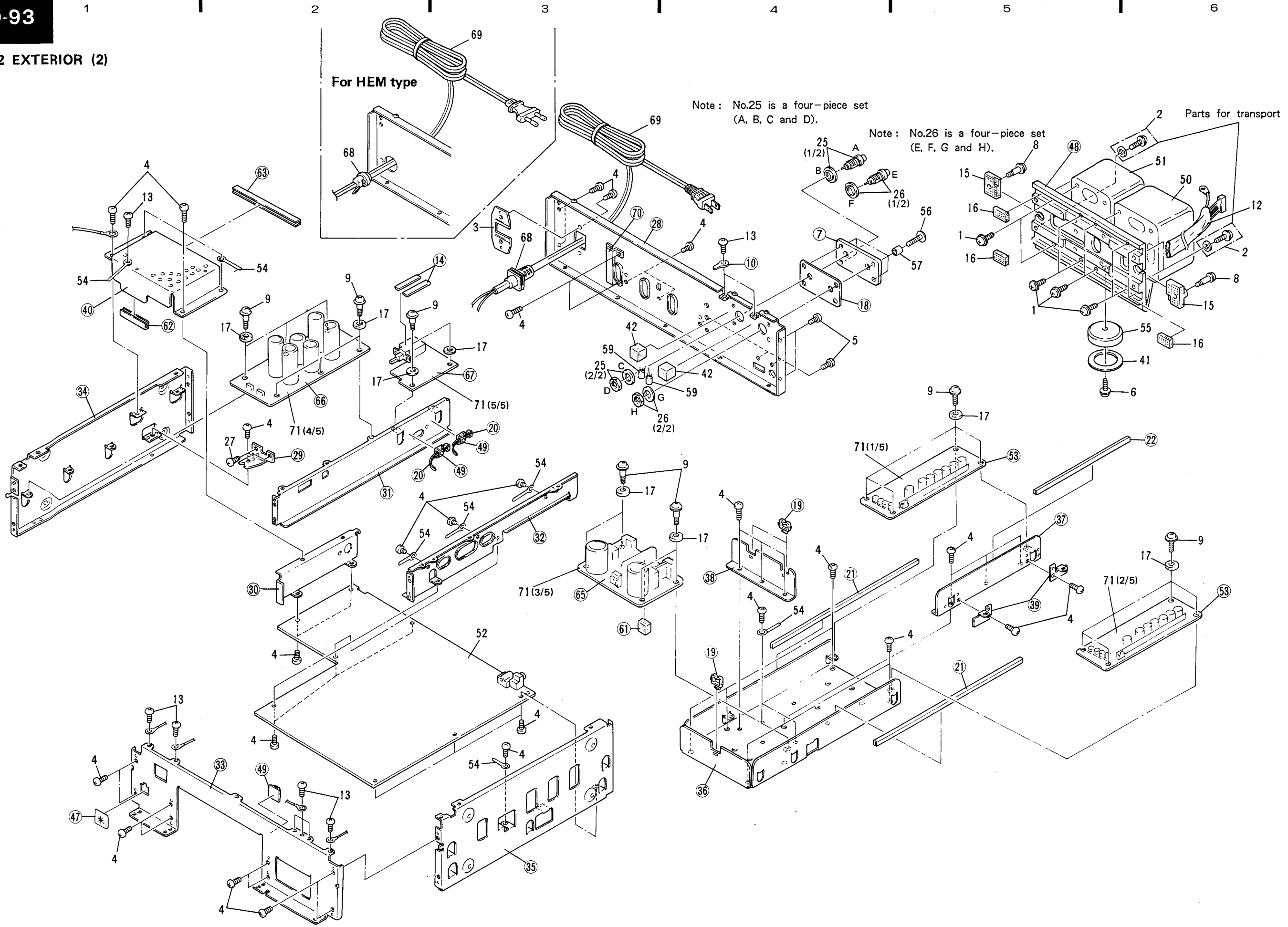
C

D





4.2 EXTERIOR (2)



4.2 Parts List of

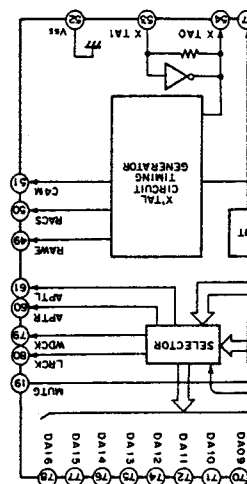
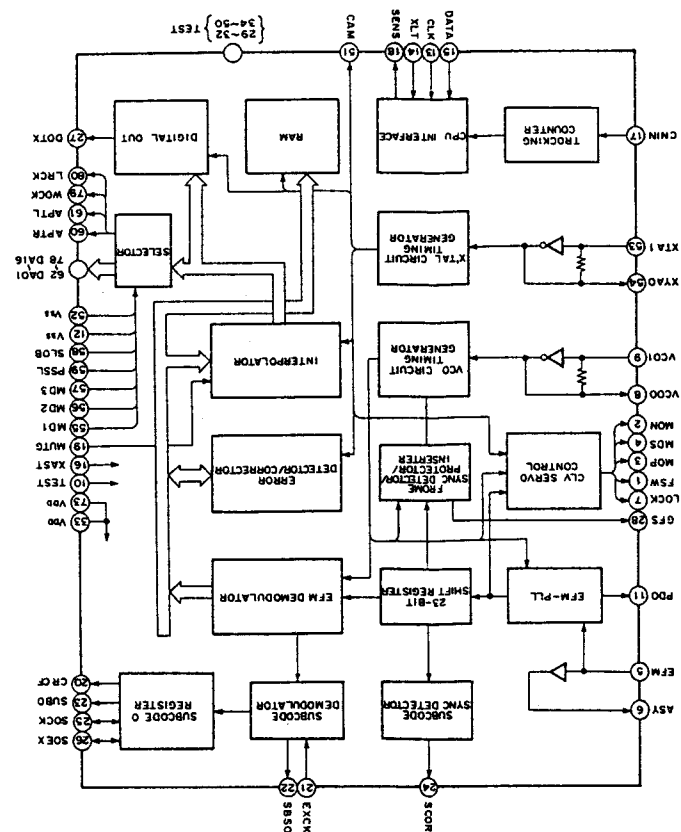
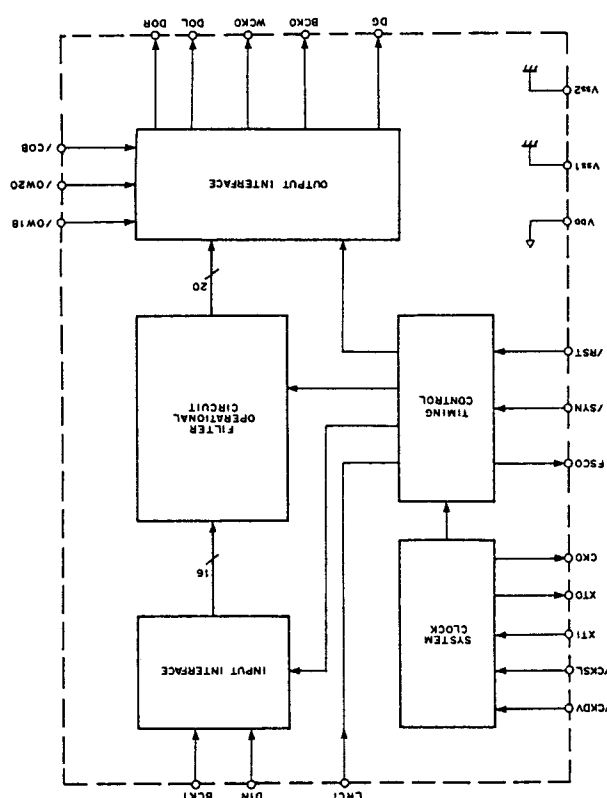
Mark	No.	Symbol
A	1	Screw
	2	Screw
	3	AC cord s
	4	Screw
	5	Screw
	6	Screw
	7	Pin jack
	8	Screw(A)
	9	Screw(B)
	10	BS-board
B	11	Shrink sh
	12	Shrink sh
	13	Screw
	14	Vibration rubber(B)
	15	Damper ru
	16	Damper ru
	17	Rubber wa
	18	RCA Damp
	19	Wire clip
	20	Binder
C	21	Edging A
	22	Edging B
	23	
	24	
	25	IP Pin ja
	26	IP Pin ja
	27	Screw
	28	Rear base
	29	Switch an
	30	Sub angle
D	31	Mechanism
	32	Mechanism
	33	Front ang
	34	Side plat
	35	Side plat
	36	Main shie
	37	Audio shi
	38	Power sup
	39	P. C. B ang
	40	Power sup
	41	Stopper
	42	Cushion
	43	
	44	
	45	
	46	
	47	Damper
	48	Rear angl
	49	Binder ho
	50	Power tra

4.2 Parts List of Exterior(2)

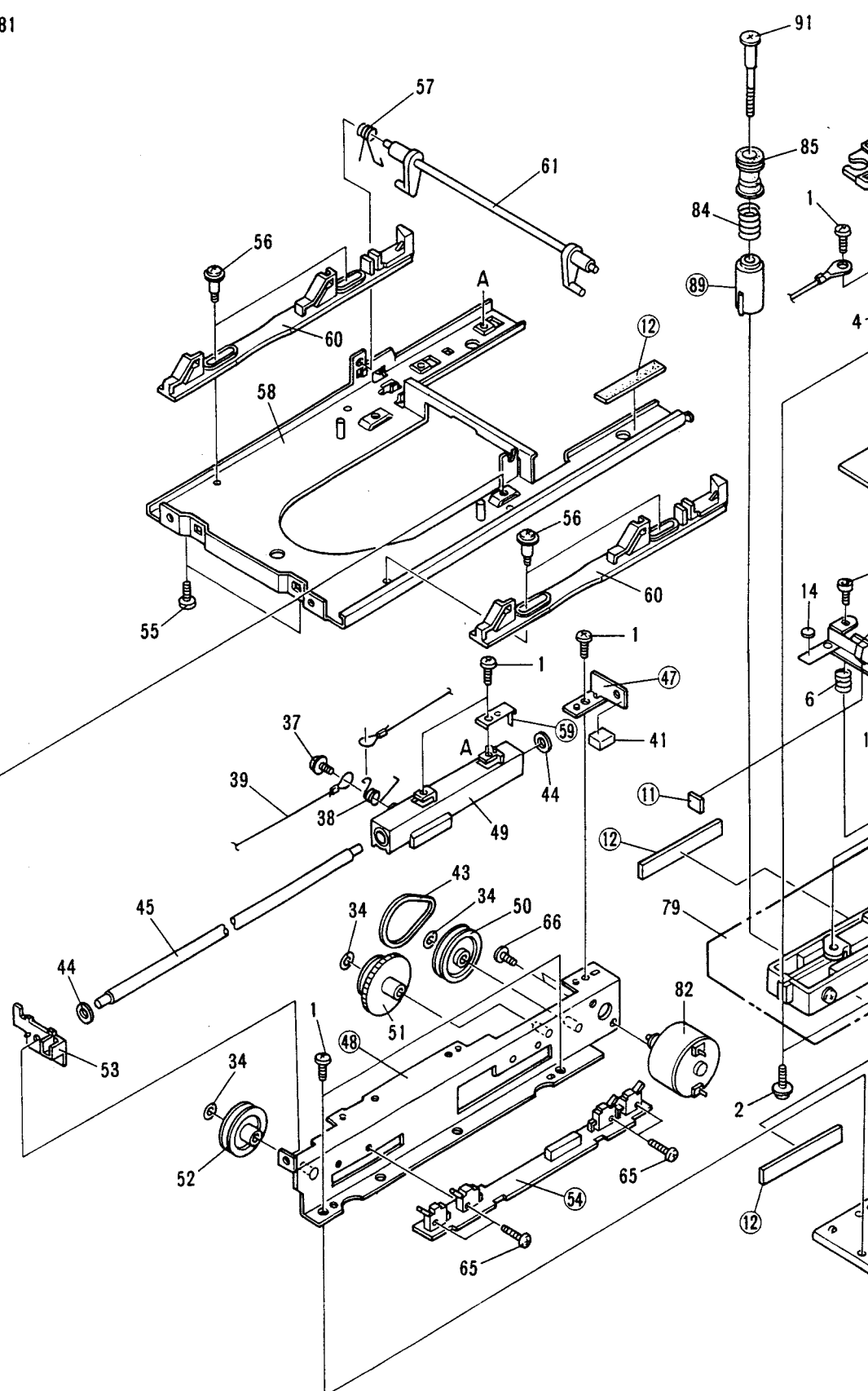
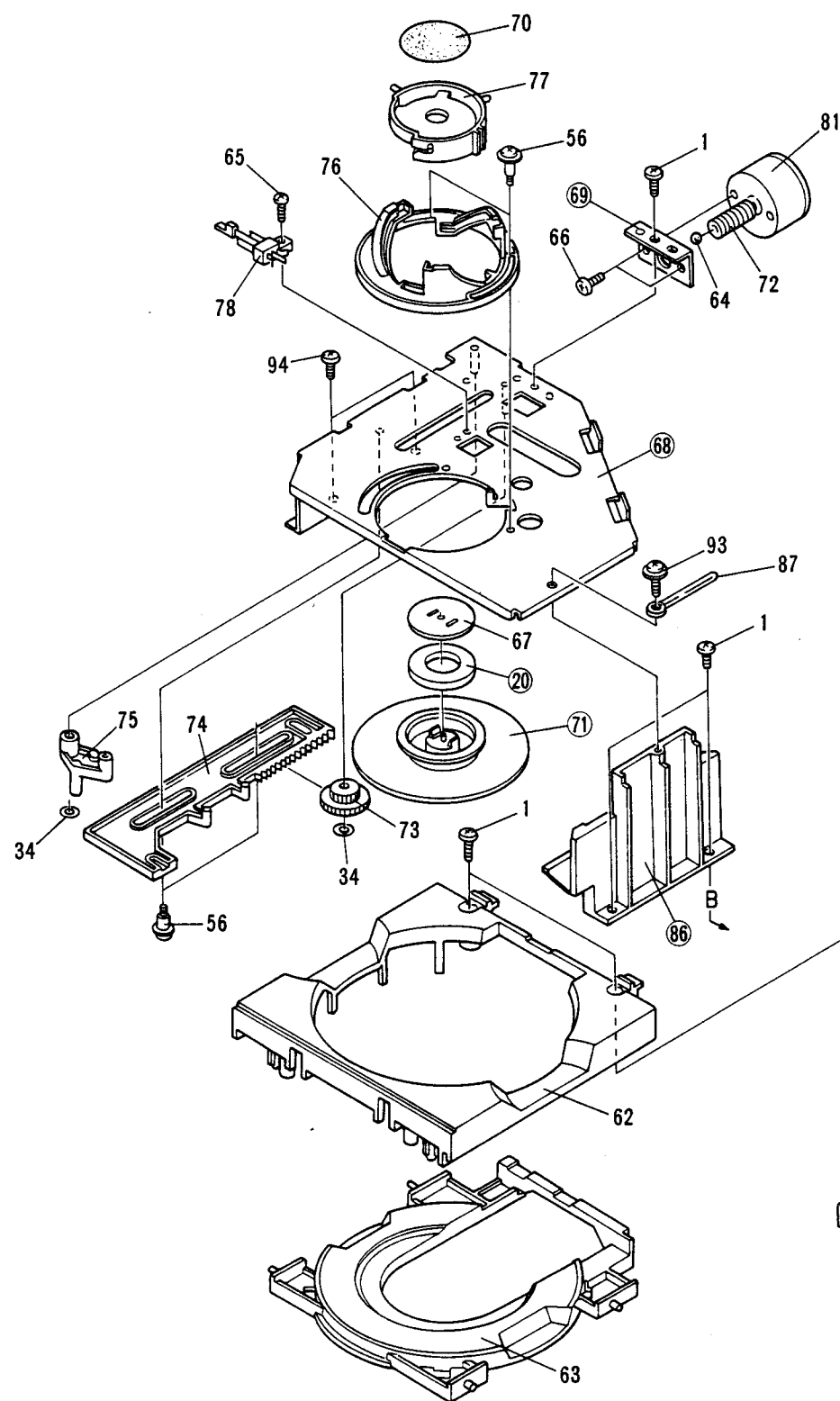
	Mark	No.	Symbol & Description	Part No.	Mark	No.	Symbol & Description	Part No.
A		1	Screw	AMZ40P080FMC	△	51	Power transformer S/24VA	PTT1158(KU/CA)
		2	Screw	AMZ40P180FRD				PTT1157(HEM)
	△	3	AC cord spacer	ANG1153(KU/CA type)	⊙△	52	Main board assembly	PWM1285
		4	Screw	BBZ30P060FCC		53	Audio monaural board assembly	
		5	Screw	BBZ30P080FCC		54	Cord clasper	RNH-184
		6	Screw	IBZ30P120FCC		55	Insulator	VLL1038
		7	Pin jack name plate					
		8	Screw(A)	PBA1008		56	Screw	Z39-012
		9	Screw(B)	PBA1014		57	Bush	Z39-013
		10	BS-board lug			58		.....
		11		.....	△	59	Capacitor	CQSF101J50
		12	Shrink shield 450L	PDM1003		60		.....
		13	Screw	PDZ30P060FCC		61	Rubber spacer	
		14	Vibration isolating rubber(B)			62	Edging C	
		15	Damper rubber(A)	PEB1054		63	Edging D	
B		16	Damper rubber(B)	PEB1055		64		.....
		17	Rubber washer	PEB1136		65	Power supply board (A) assembly	
		18	RCA Damper rubber			66	Power supply board (S) assembly	
		19	Wire clip			67	Primary board assembly	
		20	Binder			68	Strain relief	CM-22C(KU/CA type)
		21	Edging A					CM-22B(HEM type)
		22	Edging B		△	69	AC power cord	VDG1042(KU/CA type)
		23		.....				PDG1003(HEM type)
		24		.....		70	S cover	
		25	1P Pin jack L	PKB1012	⊙△	71	Audio board assembly	PWM1286
		26	1P Pin jack R	PKB1013				
		27	Screw	PMZ30P060FCC				
		28	Rear base					
		29	Switch angle					
		30	Sub angle					
C		31	Mechanism angle L					
		32	Mechanism angle R					
		33	Front angle					
		34	Side plate L					
		35	Side plate R					
		36	Main shield plate					
		37	Audio shield plate					
		38	Power supply shield plate					
		39	P.C.B angle					
		40	Power supply cover					
		41	Stopper	PNM-051				
		42	Cushion	PNM1008				
		43		.....				
		44		.....				
		45		.....				
D		46		.....				
		47	Damper					
		48	Rear angle					
		49	Binder holder					
	△	50	Power transformer A/13VA	PTT1156(KU/CA)				PTT1155(HEM)

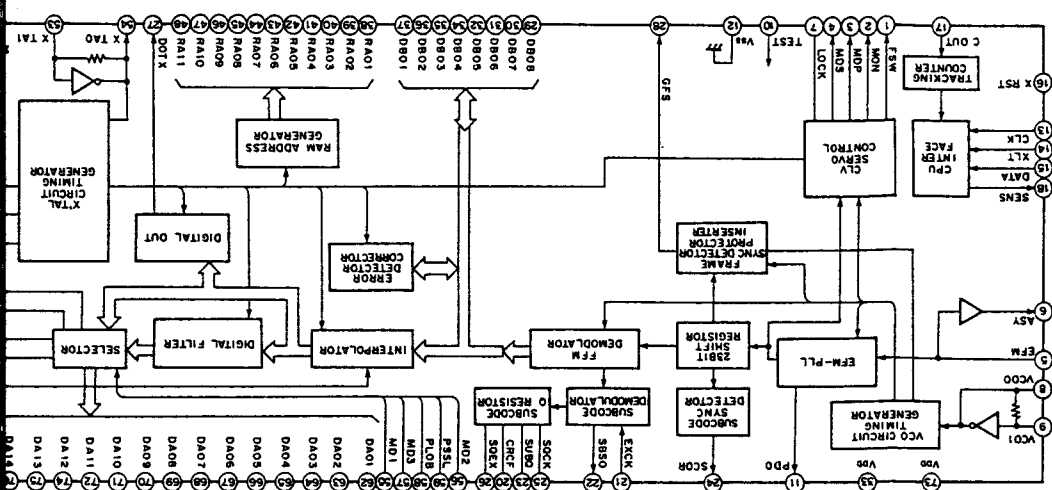
4.3 Parts List of Mechanism unit

	Mark	No.	Symbol & Description	Part No.	Mark	No.	Symbol & Description	Part No.
		1	Screw	BBZ30P060FCC		51	Drive pulley	PNW1212
		2	Screw	IBZ30P080FCC		52	Pulley	PNW1213
		3	Screw	PBA1020		53	L guide	PNW1214
		4	Screw	PBA1024		54	Loading board assembly	
		5	Spring	PBH1027		55	Screw	BBZ30P080FCC
		6	Spring	PBH1028		56	Screw	PBA-125
		7	Spring	PBH1029		57	Slide cam spring	PBH1026
		8	Spring	PBK1021		58	Slide base	
		9	Spring	PBK1022		59	Earth plate	
		10	Plastic rivet	PBM-015		60	Slide cam	PNW1217
		11	Cushion rubber			61	Interlocking lever unit	PNW1218
		12	Vibration isolating rubber(B)			62	Tray	PNW1745
		13	Stopper rubber	PEB1035		63	Disc plate	PNW1581
		14	Hold rubber	PEB1048		64	Steel ball φ4	PBP-001
		15	Disc table	PLA1024		65	Screw	PMZ20P080FMC
		16	Aligning ring	PLA1025		66	Screw	PMZ26P040FMC
		17	Guide bar	PLA1026		67	York	PNB1049
		18	Shaft	PLA1027		68	Clamp base	
		19	Roller	PLM1001		69	Motor holder	
		20	Magnet			70	Disc cushion	PNW1025
		21	Screw	PMZ26P030FCU		71	Clamper	
		22	Screw	PMZ26P060FCU		72	Worm	PNW1220
		23	Screw	PMZ30P080FCU		73	Worm wheel	PNW1221
		24		.....		74	Clamp drive plate	PNW1222
		25		.....		75	Clutch	PNW1223
		26	Adjust lever	PNB1048		76	Clamp cam	PNW1224
		27	Linear flexible board			77	Clamp holder	PNW1225
		28	Carriage			78	Reef switch	VSK-015
		29	Mechanism base unit			79	Drive unit	PYY1038
		30	Stopper	PNW1432		80	Speed sensor unit	PYY1039
		31	Pickup assembly	PWY1004		81	Motor assembly	PYY1097
		32	Spindle motor	PXM1005		82	Motor assembly	PYY-507
		33		.....		83	Float spring	PBH1030
		34	Washer	WT25D047D025		84	Float spring(F)	PBH1097
		35	Washer	WT40D065D025		85	Damper rubber	PEB1036
		36	Screw	ZMD30H040FBT		86	Slide guide	
		37	Screw	IBZ30P060FCC		87	Cord clasper	RNH-184
		38	Wire spring	PBH1025		88	Mechanism chassis	
		39	Wire unit	PBL1001		89	Mechanism support	
		40		.....		90	Earth lead unit	
		41	Cushion rubber			91	Screw	PBA1021
		42		.....		92		.....
		43	Belt	PEB1037		93	Screw	IBZ30P100FCC
		44	Stopper	PEB1076		94	Screw	PDZ30P060FCC
		45	Guide bar	PLA1028				
		46		.....				
		47	Holder					
		48	Loading base					
		49	Slider unit	PNW1210				
		50	Gear pulley	PNW1211				

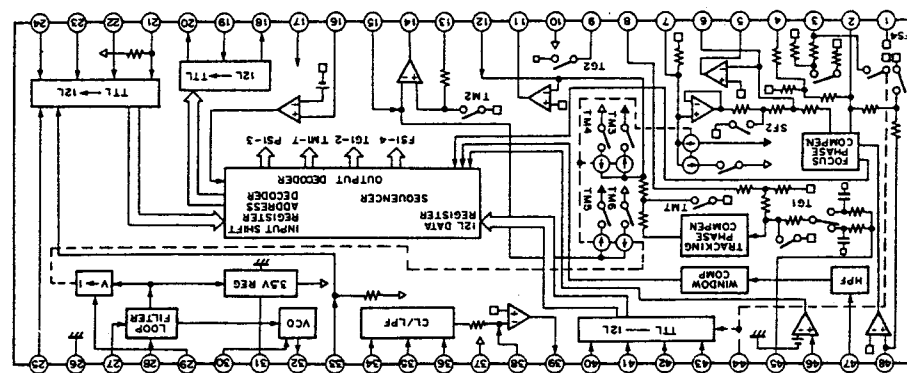


4.3 MECHANISM UNIT

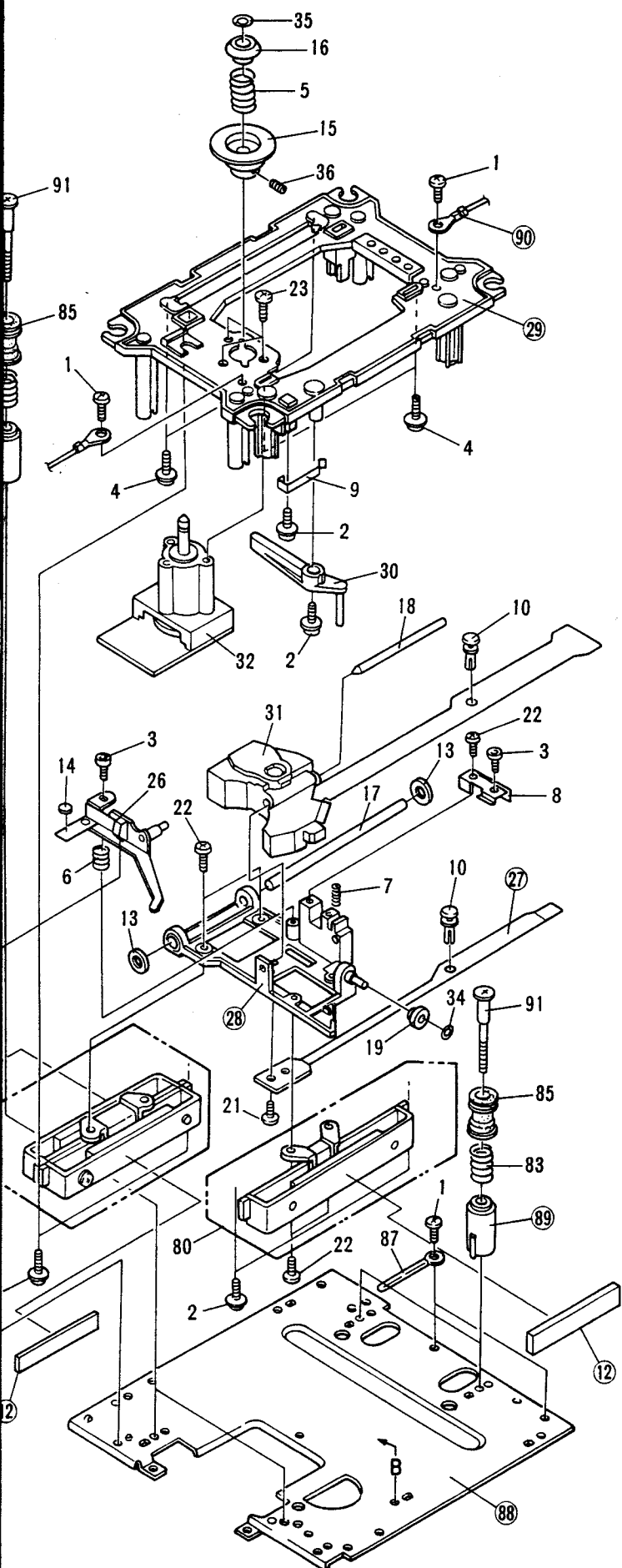




CXD1135Q2



CXA1082AS



5. LINE VOLTAGE SELECTION

- A Line voltage can be changed with the following steps.
1. Disconnect the AC power cord.
 2. Remove the top cover.
 3. Change the transformer S (24VA) wire of terminal CN(A) - ① and CN(A) - ② as follows.

Voltage	Terminal No. CN(A) - ①	Terminal No. CN(A) - ②
220V	BLUE	PURPLE
240V	PURPLE	BLUE

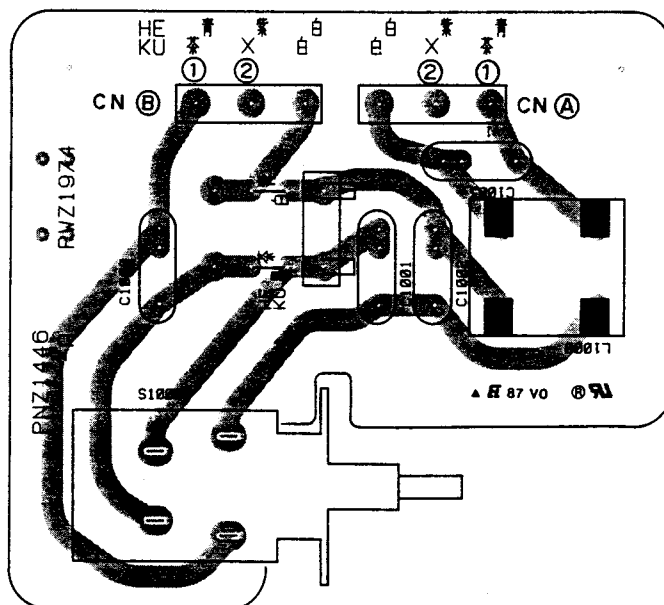
Change the transformer A (13VA) wire of terminal CN(B) - ① and CN(B) - ② as follows.

Voltage	Terminal No. CN(B) - ①	Terminal No. CN(B) - ②
220V	BLUE	PURPLE
240V	PURPLE	BLUE

4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-193	220V label
AAX-192	240V label

C



D

PRIMARY BOARD ASSEMBLY

6. SCHEMATIC AND P.C. BOARDS CONNECTION DIAGRAMS

6.1 SCHEMATIC DIAGRAMS AND P.C. BOARDS OF RESPECTIVE ASSEMBLIES FOR MAIN BOARD, LOADING BOARD, MAIN AND SUB OPERATION BOARDS, LED BOARD

A

B

C

D

E

F

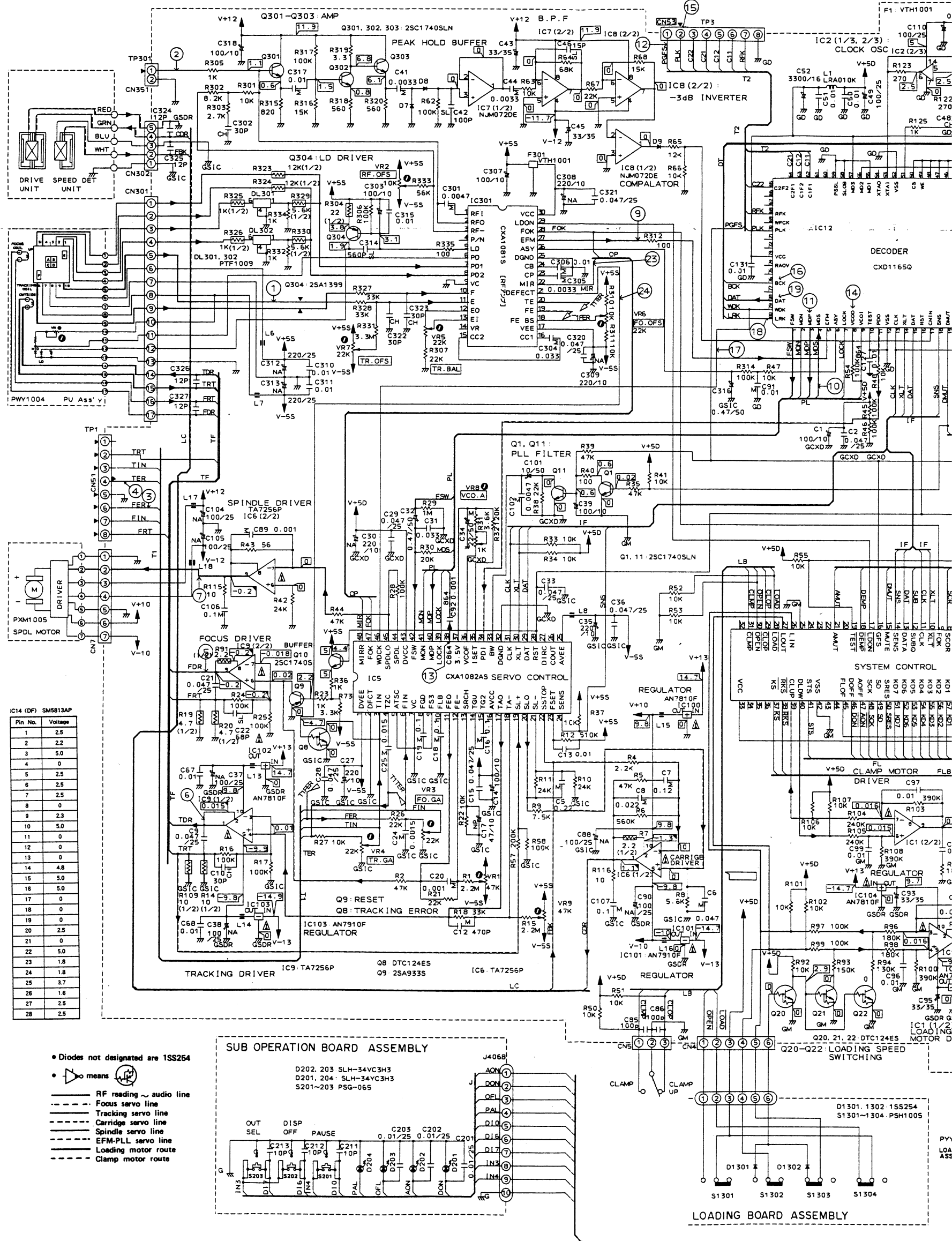
IC3 (System micro computer) P03154

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	0	17	0	33	5.0
2	0	18	5.0	34	5.0
3	2.4	19	5.0	35	5.0
4	5.0	20	0	36	5.0
5	5.0	21	0	37	5.0
6	5.0	22	0	38	5.0
7	5.5	23	0	39	5.0
8	0	24	0	40	0
9	5.0	25	0	41	0.3 to 0.4
10	5.0	26	0	42	0
11	5.0	27	0	43	0
12	1.3 to 1.9	28	0	44	0
13	5.0	29	5.0	45	0.021
14	5.0	30	5.0	46	0.021
15	0	31	0	47	0
16	5.0	32	0	48	5.0

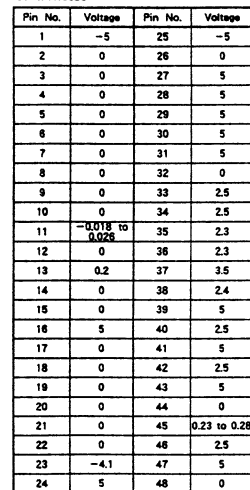
IC401 PDG036

Measure the voltages at Pins 33 to 46 at first program ('000') in the p...

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	0.3 to 0.4	17	5.0	33	1.3
2	0	18	5.0	34	4.9
3	4.9	19	5.0	35	4.9
4	4.9	20	5.0	36	1.3
5	4.1	21	5.0	37	1.3
6	0	22	5.0	38	5.0
7	0.3 to 0.4	23	5.0	39	-24.4
8	0	24	0	40	-21.3
9	0	25	0	41	5.0
10	0	26	0	42	0.6
11	0	27	0	43	5.0
12	0	28	5.0	44	-24.4
13	0	29	5.0	45	1.8
14	0	30	0.01	46	-23.6
15	0	31	0.02	47	-20.9
16	5.0	32	0	48	-20.9



Pin No.	Voltage	Pin No.	Voltage
1	0	16	-3
2	1.3	17	-5
3	0	18	0
4	2.4	19	0
5	2.8	20	0
6	-4.8	21	-4.9
7	0	22	0
8	0	23	-1
9	0	24	-2.1
10	0	25	0
11	0	26	2.5
12	-1.2	27	2.4
13	-0.1	28	5
14	0	29	0
15	-3.1	30	5



MAIN BOARD ASSEMBLY (PWM1285)

DIGITAL
OUTPUT
TERMINALOPTICAL
OUTPUT
TERMINALTO AUDIO MONOURAL BOARD ASSEMBLY CN503(Rch)
TO AUDIO MONOURAL BOARD ASSEMBLY CN503(Lch)

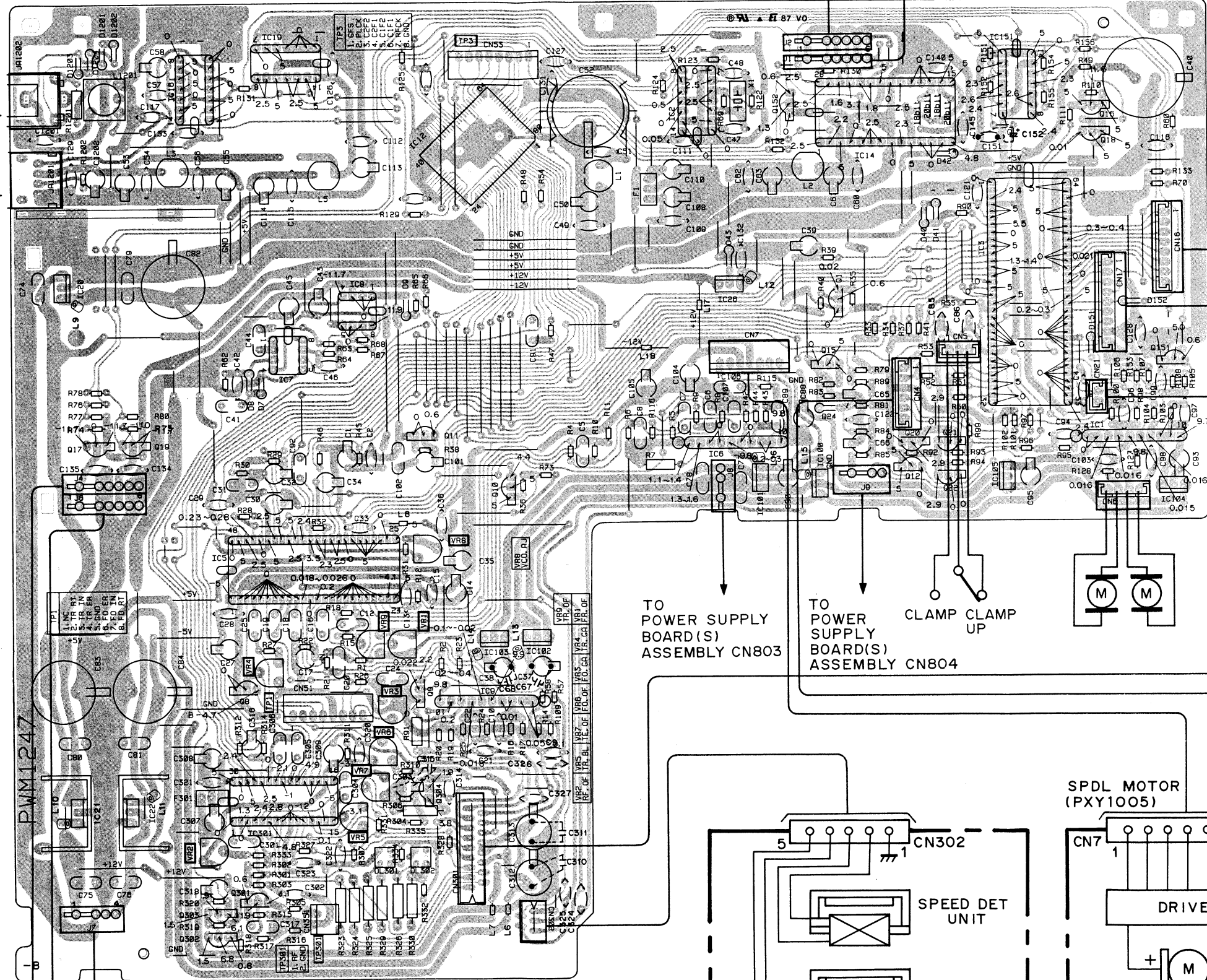
MAIN OF

TO POWER SUPPLY
BOARD(S)
ASSEMBLY CN806
TO POWER SUPPLY
BOARD(S)
ASSEMBLY CN805

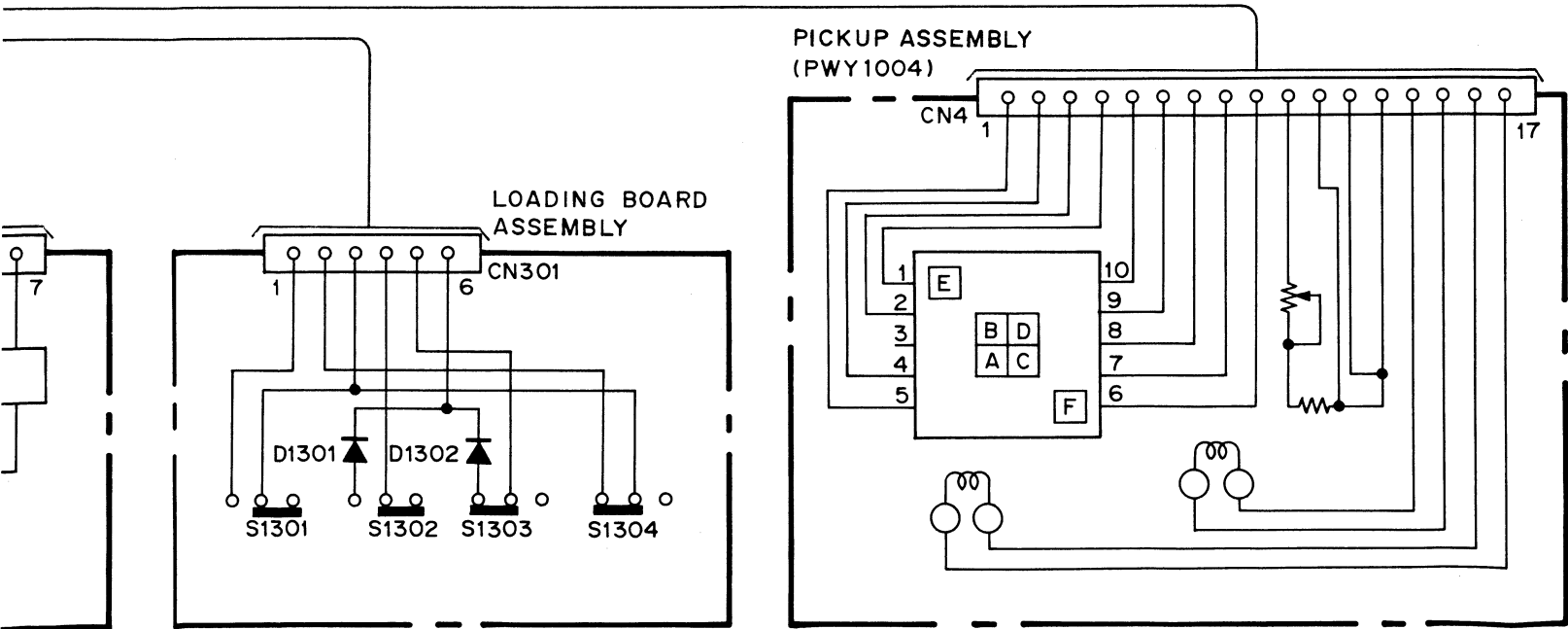
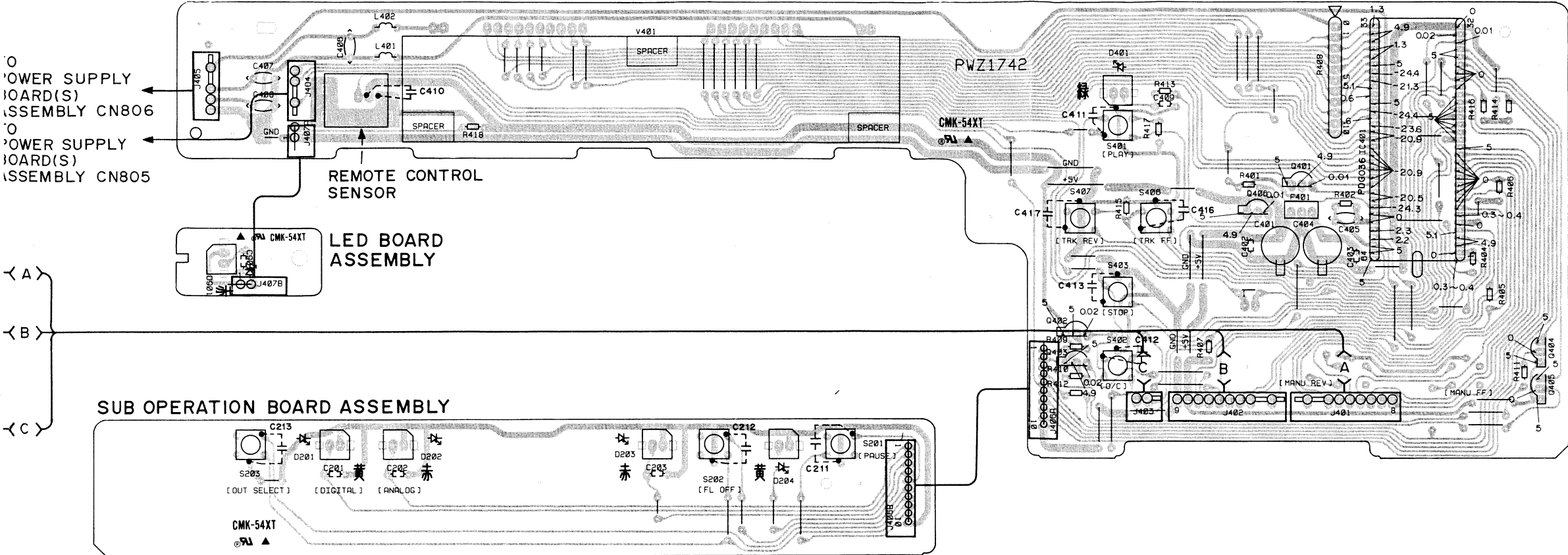
SUB OPERATION

CMK-5
© 91SPDL MOTOR
(PXY1005)SPEED DET
UNITDRIVE
UNIT

DRIVER

D1301
S1301

MBLY CN503(Rch)
MBLY CN503(L ch) MAIN OPERATION BOARD ASSEMBLY (PWZ1742)



IC12 (S-RAM built-in) CXD1165Q

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	2.5	31	1.9	61	1.3
2	5	32	1.9	62	0
3	2.5	33	5	63	0
4	2.8	34	1.9	64	0
5	2.4	35	1.9	65	0
6	2.5	36	1.9	66	0
7	5	37	1.9	67	0
8	2.4	38	2.5	68	2.5
9	2.4	39	2.5	69	2.5
10	0	40	2.5	70	2.3
11	1.8	41	2.5	71	5
12	0	42	2.5	72	0
13	5	43	2.5	73	5
14	5	44	2.5	74	0
15	5	45	2.5	75	2.4
16	5	46	2.0 to 2.9	76	2.3
17	0	47	2.0 to 2.9	77	2.3
18	5	48	1.3 to 3.6	78	2.5
19	0	49	4.4	79	2.5
20	5	50	2.5	80	2.5
21	0	51	2.3		
22		52	0		
23	0	53	2.2		
24	0	54	2.2		
25	5	55	1.8		
26	5	56	0		
27	2.5	57	2.5		
28	5	58	0		
29	1.9	59	0		
30	1.9	60	1.3		

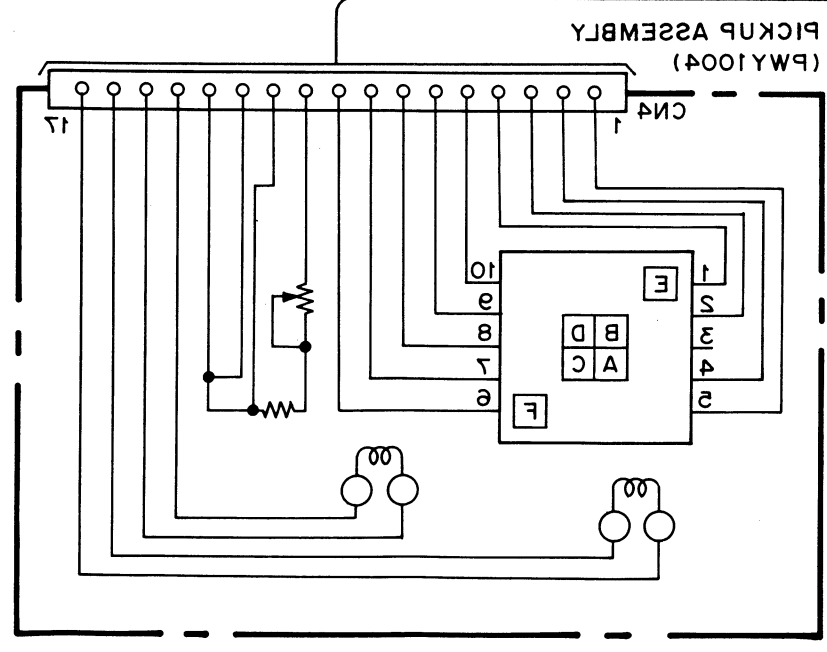
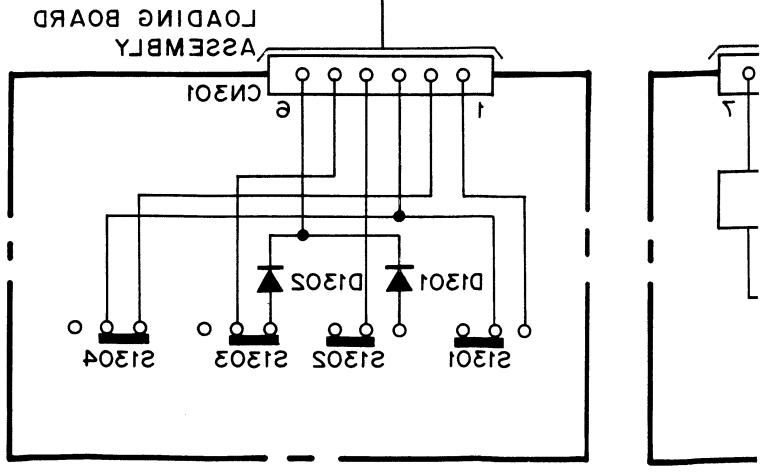
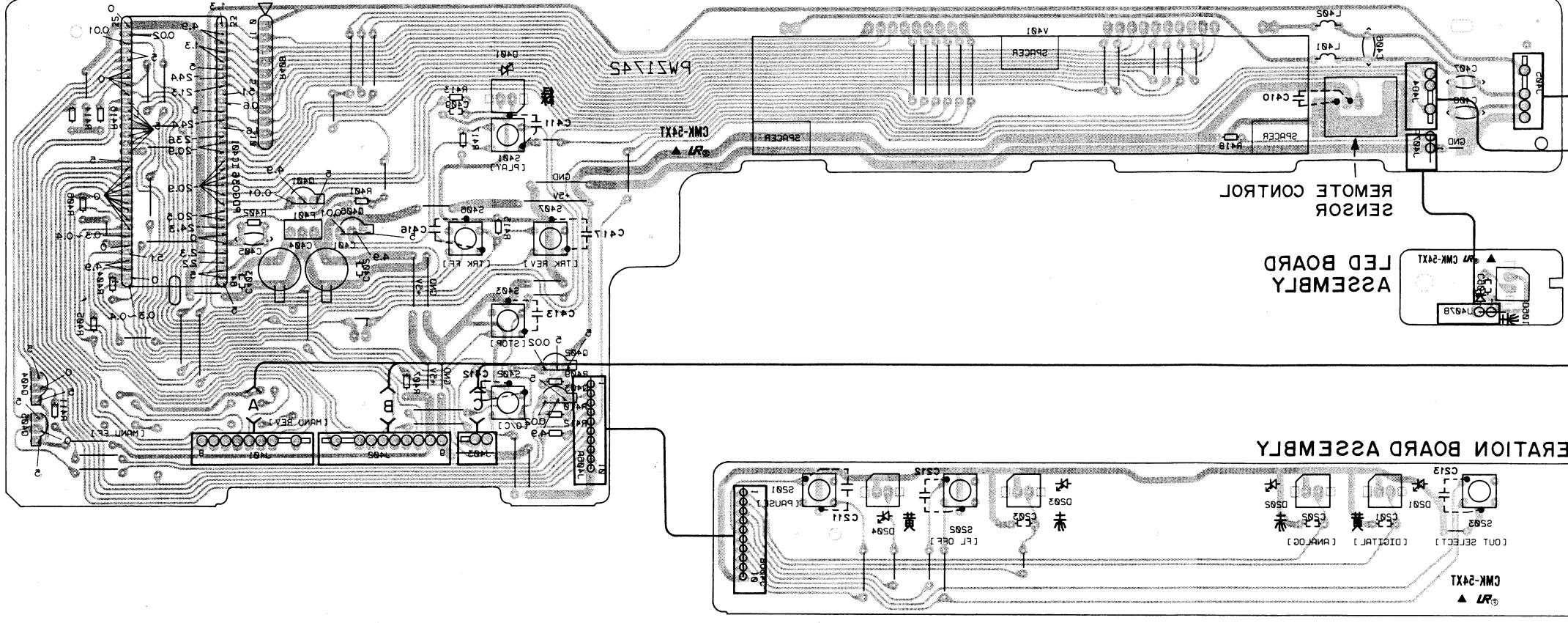
Note : (L9 to L16, L504, L700, L701, L800 and L801) are inserted to Pin of each semiconductor.

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

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

MBLY CN503(L ch)
MBLY CN503(R ch)

POWER SUPPLY
BOARD(2)
ASSEMBLY CN805
LO
POWER SUPPLY
BOARD(2)
ASSEMBLY CN805
LO

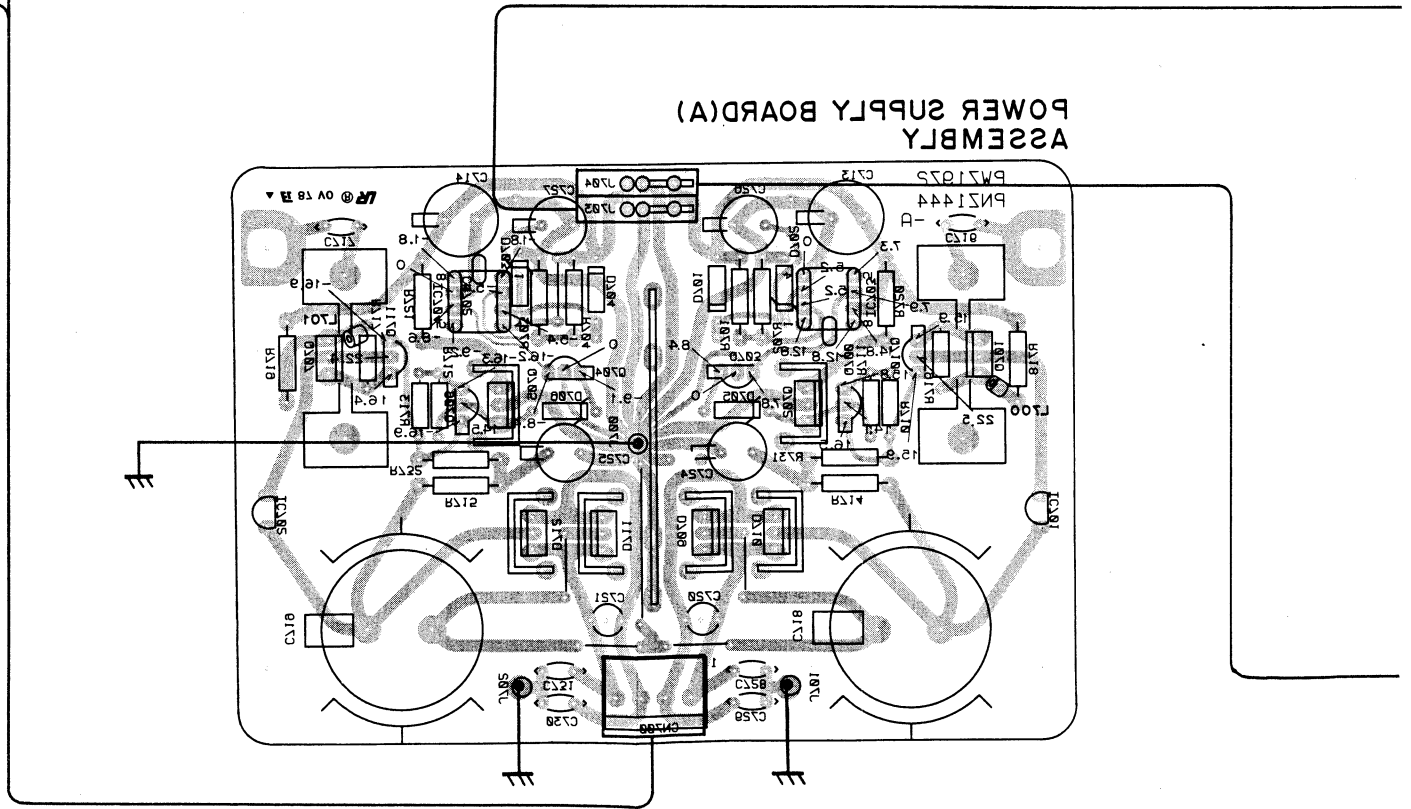
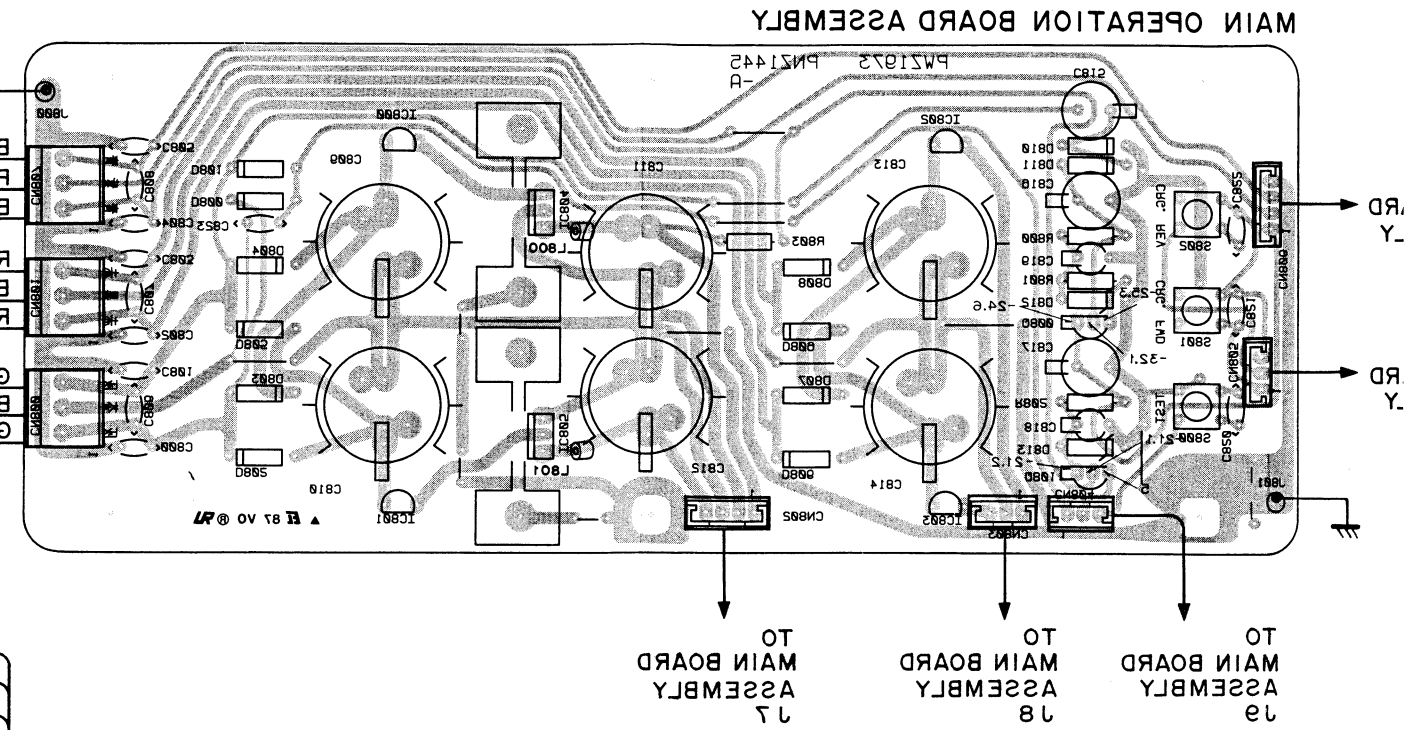
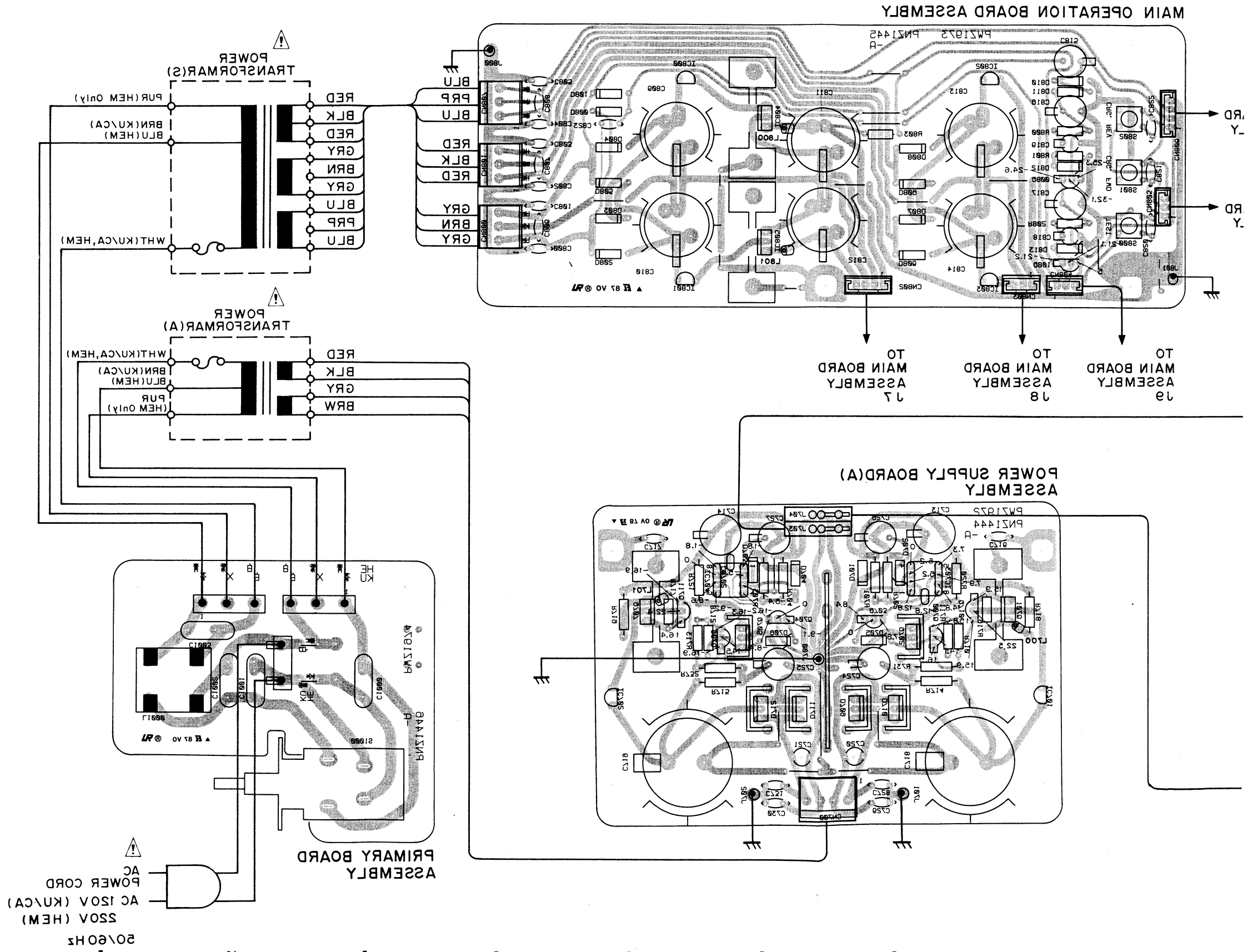


IC15 (2-RAM built-in) CXD1180

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	5.2	31	1.9	61	1.3		
2	5.2	32	1.9	62	0		
3	5.2	33	1.9	63	0		
4	5.8	34	1.9	64	0		
5	5.4	35	1.9	65	0		
6	5.2	36	1.9	66	0		
7	5.2	37	1.9	67	0		
8	5.4	38	5.2	68	5.2		
9	5.4	39	5.2	69	5.2		
10	0	40	5.2	70	5.3		
11	1.8	41	5.2	71	5.2		
12	0	42	5.2	72	5.2		
13	5.2	43	5.2	73	5.2		
14	5.2	44	5.2	74	0		
15	5.2	45	5.2	75	5.2		
16	5.2	46	5.2	76	5.2		
17	5.2	47	5.2	77	5.2		
18	5.2	48	5.2	78	5.2		
19	5.2	49	5.2	79	5.2		
20	5.2	50	5.2	80	5.2		
21	5.2	51	5.2				
22	5.2	52	5.2				
23	5.2	53	5.2				
24	5.2	54	5.2				
25	5.2	55	5.2				
26	5.2	56	5.2				
27	5.2	57	5.2				
28	5.2	58	5.2				
29	5.2	59	5.2				
30	5.2	60	5.2				

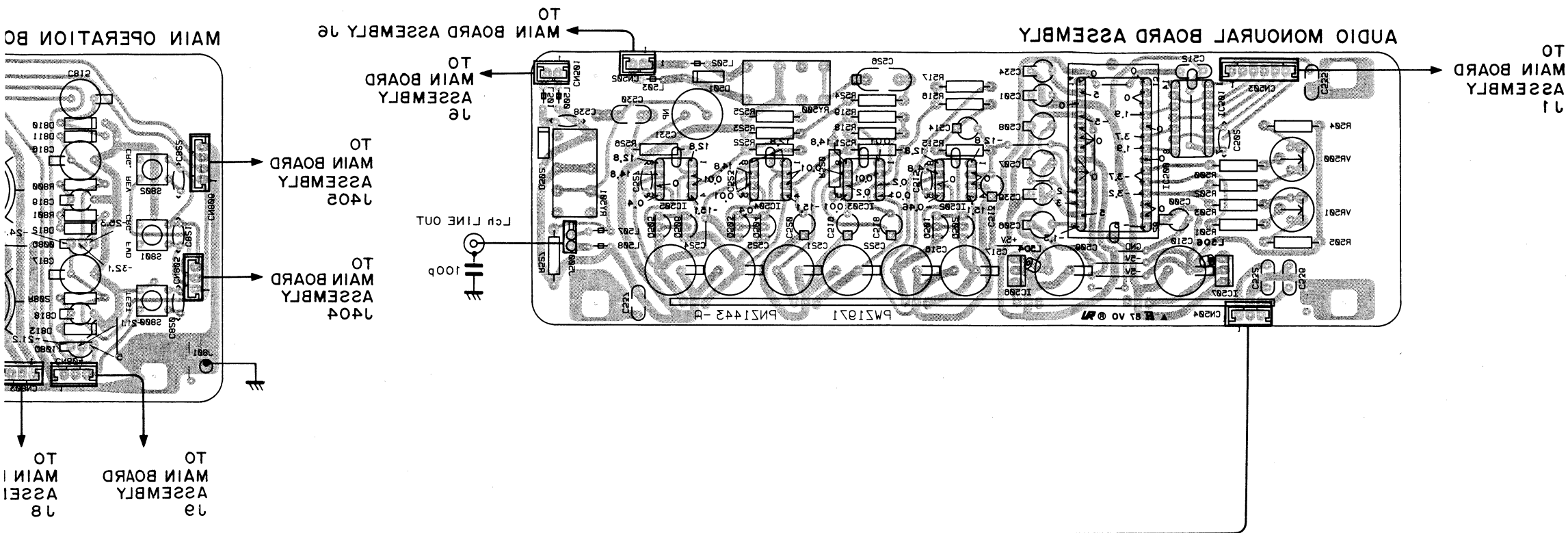
1 2 3 4 5 6



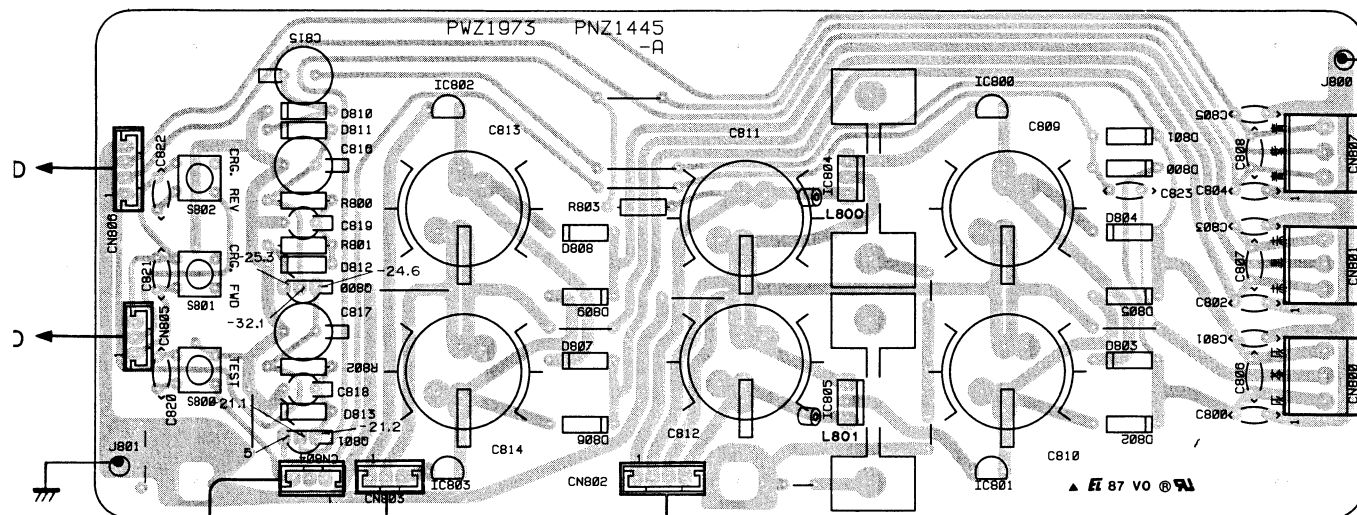


6.3 SCHEMATIC DIAGRAMS AND P.C. BOARDS OF RESPECTIVE ASSEMBLIES FOR
AUDIO MONORAL BOARDS (Lch), (Rch), POWER SUPPLY BOARDS (A), (S) AND PRIMARY BOARD

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



MAIN OPERATION BOARD ASSEMBLY

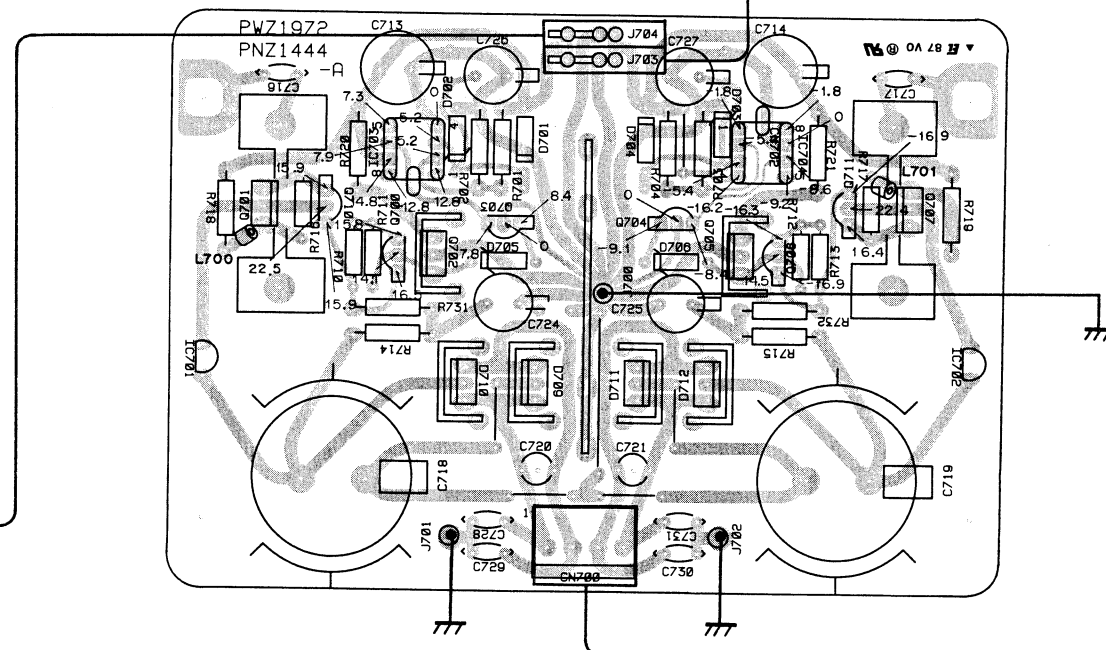


TO MAIN BOARD ASSEMBLY J9

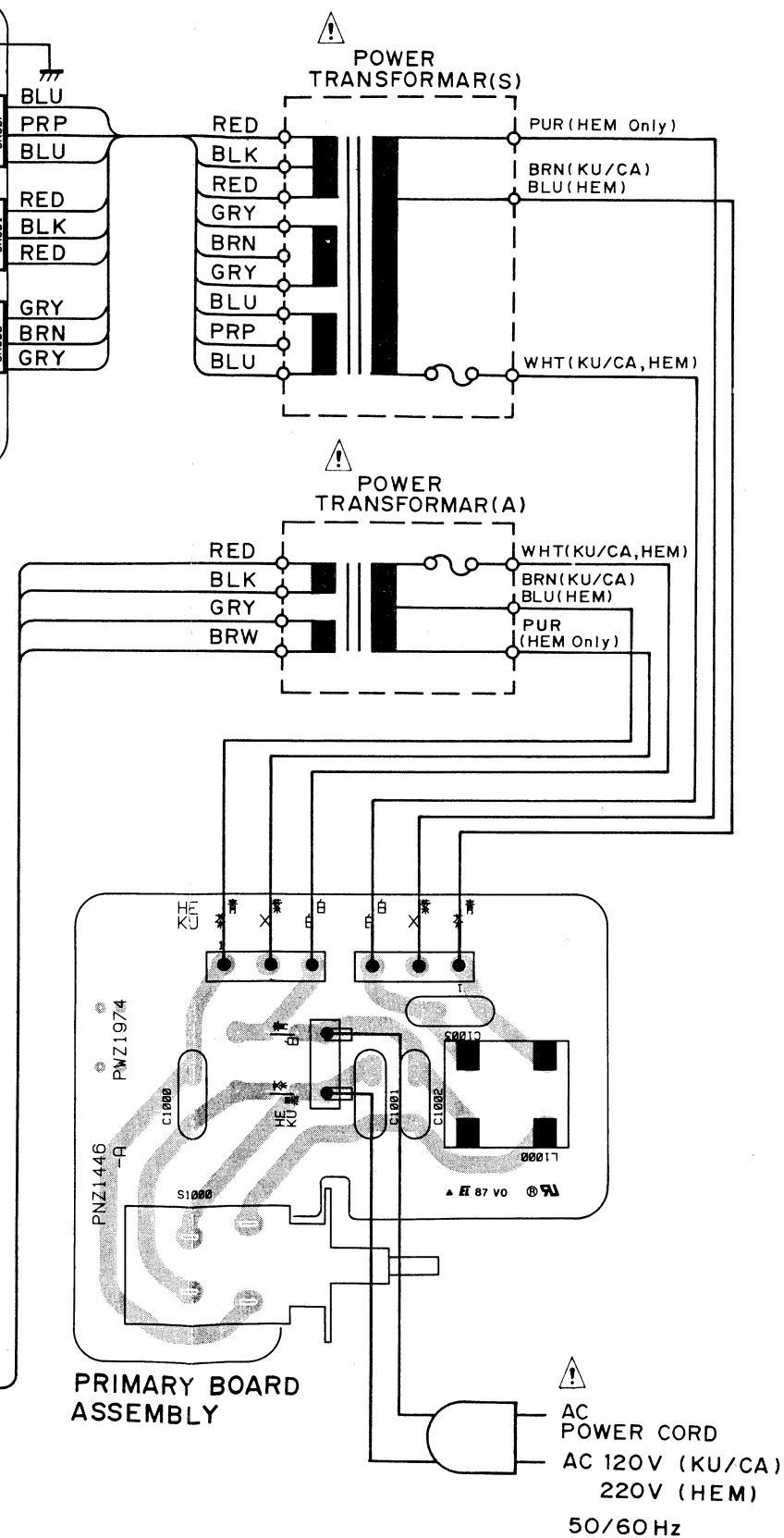
TO MAIN BOARD ASSEMBLY J8

TO MAIN BOARD ASSEMBLY J7

POWER SUPPLY BOARD(A) ASSEMBLY



PRIMARY BOARD ASSEMBLY



A

B

C

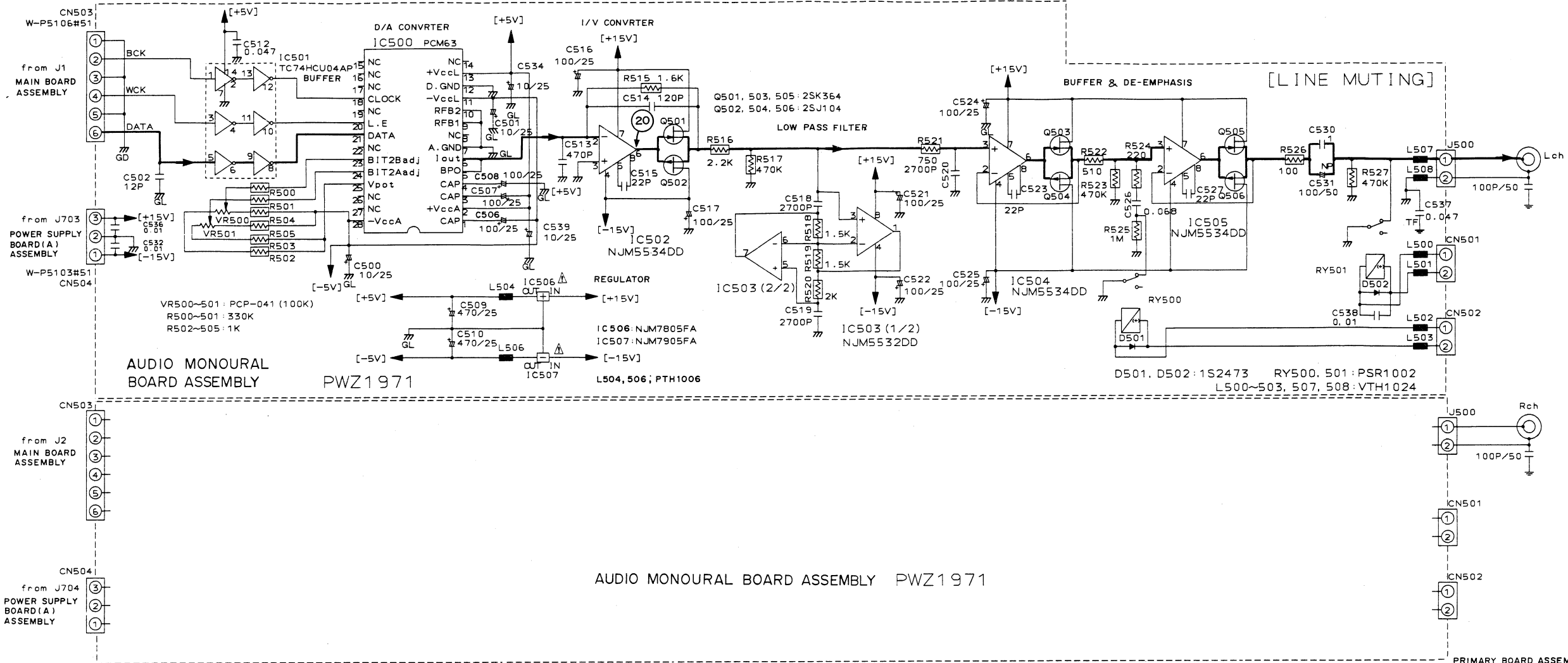
D

A

B

C

D

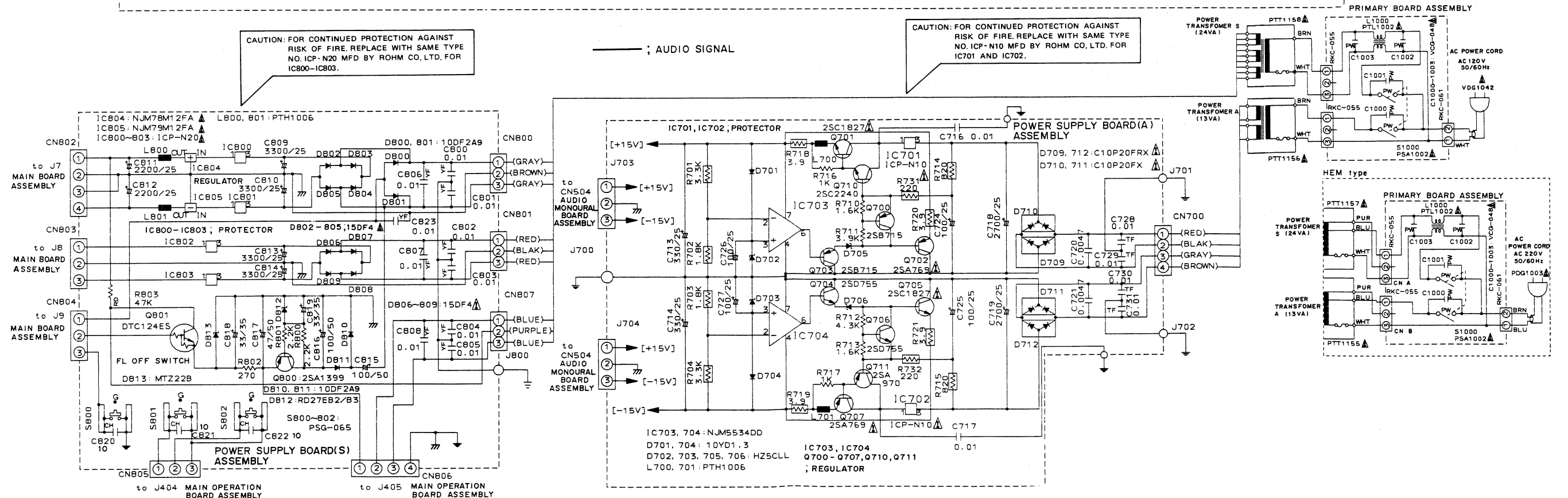


Pin No.	Voltage
1	-1.3
2	5.0
3	3.0
4	2.0
5	0
6	0
7	0
8	0
9	0
10	0
11	-5.0
12	0
13	5.0
14	0
15	0
16	0
17	0
18	1.9
19	0
20	3.7
21	1.9
22	0
23	-3.7
24	-3.7
25	-3.2
26	0
27	0
28	-5.0

(At 1 kHz/0 dB Playback)

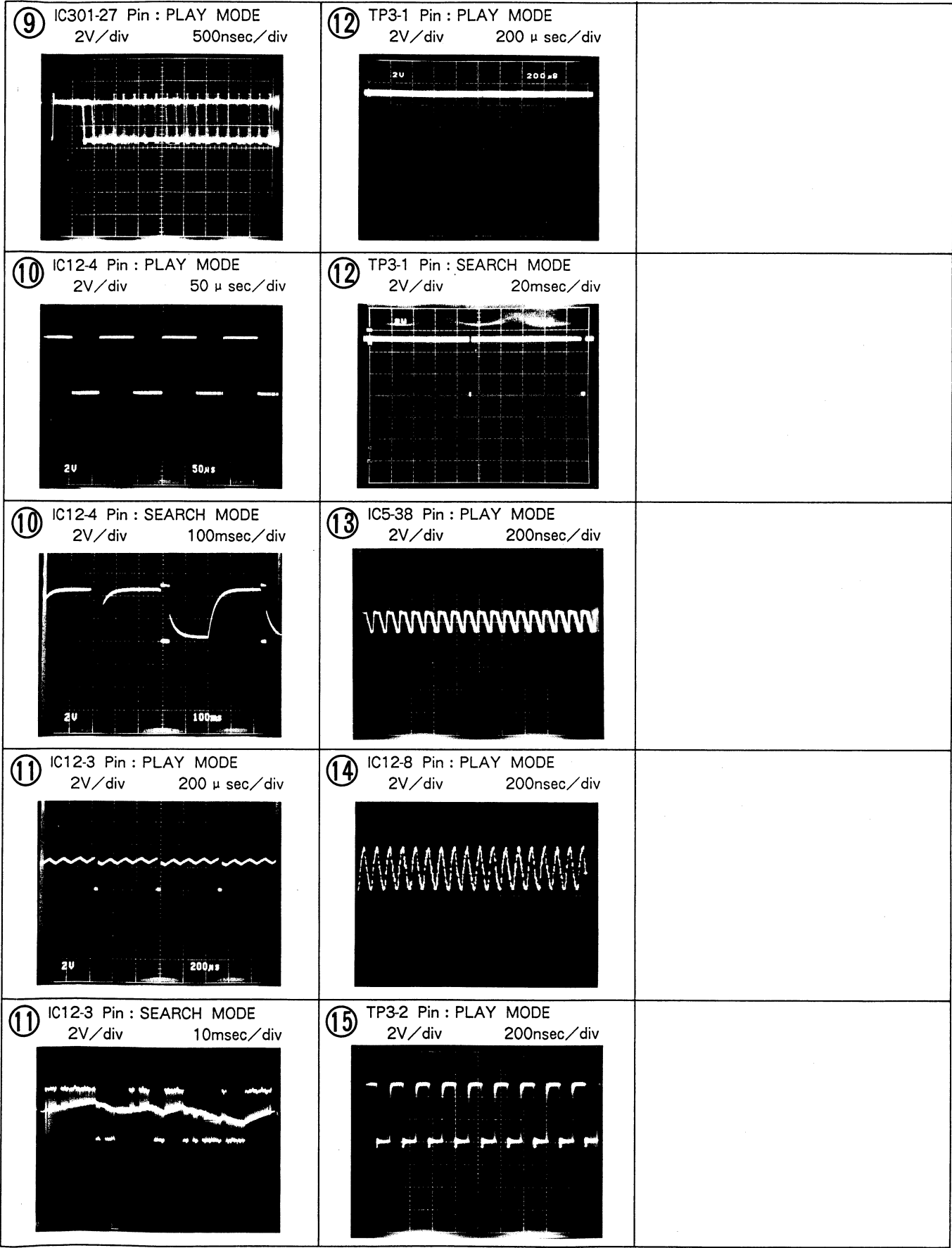
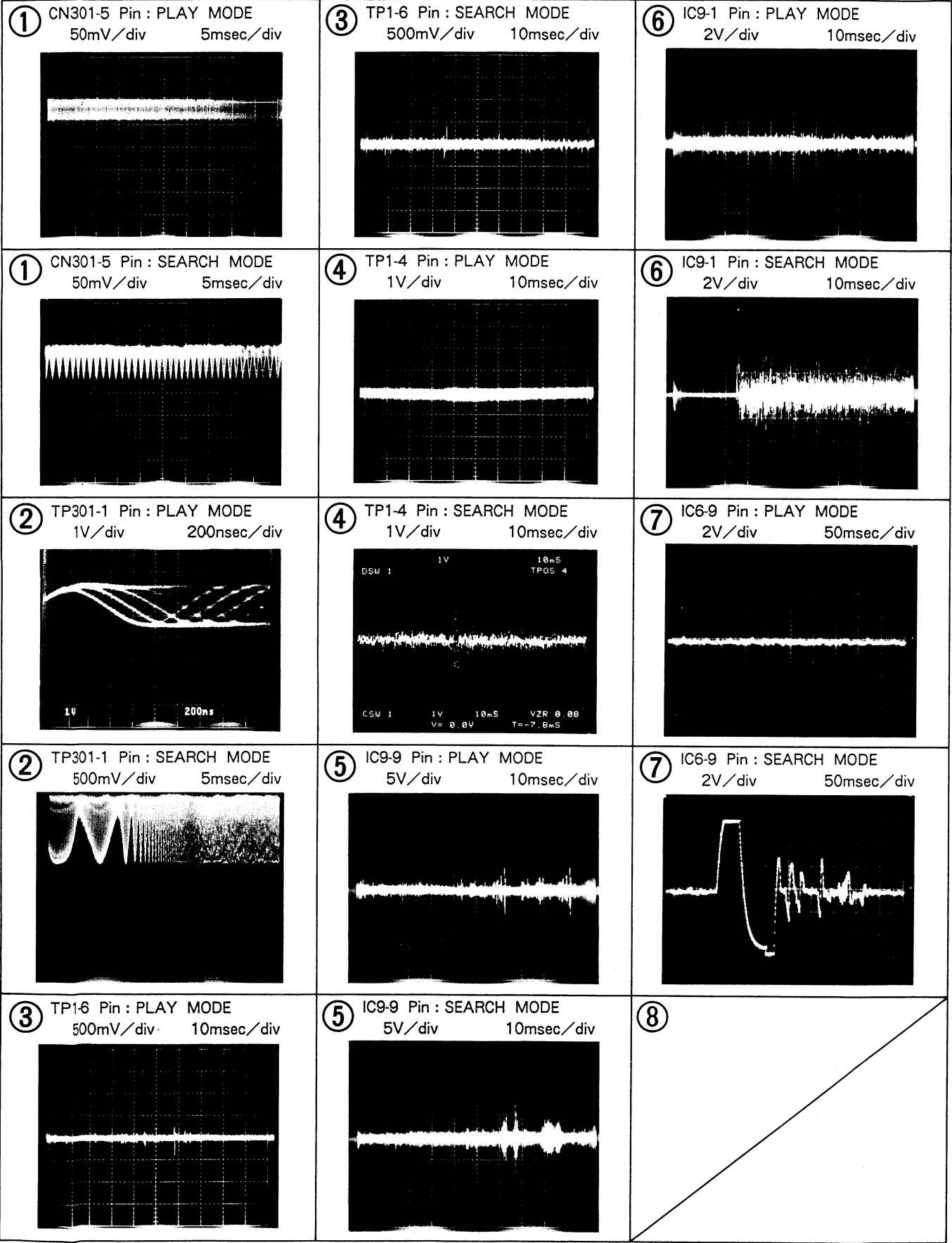
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE WITH SAME TYPE NO. ICP-N20 MFD BY ROHM CO., LTD. FOR IC800-IC803.

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE WITH SAME TYPE NO. ICP-N10 MFD BY ROHM CO., LTD. FOR IC701 AND IC702.



Wave Forms

NOTE : The encircled numbers denote measuring points in the schematic diagram.



IC12 (CXD1165Q)

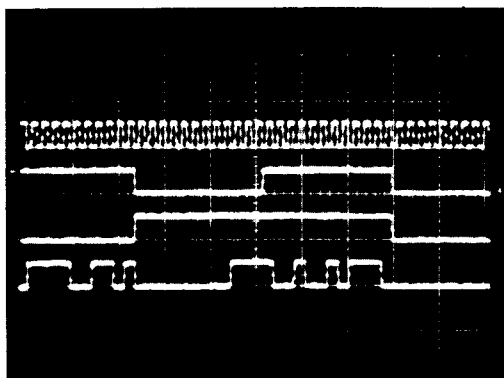
PLAY MODE

⑮ BCLK (Pin76)

⑯ WDCK (Pin79)

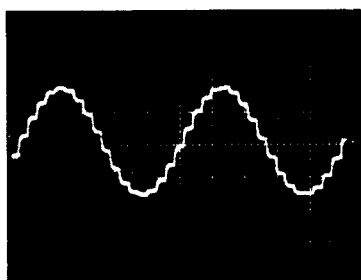
⑰ LRCK (Pin80)

⑱ DATA (Pin78)

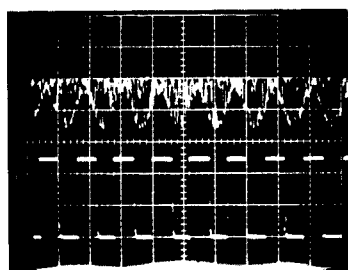


10V/div
2 μsec/div
} Indefinite

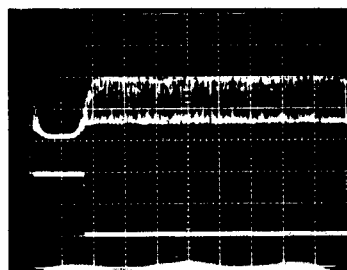
⑳ Q501, Q502-6 Pin : PLAY MODE
(When playing back in 20 kHz, 0 dB.)
2V/div 10 μsec/div



㉓ IC301-22 Pin : TRACKING OPEN
0.1msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-22 Pin : 2V/div



㉔ IC301-21 Pin : DFCT 0.5msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-21 Pin : 5V/div



IC14 (SM5813AP)

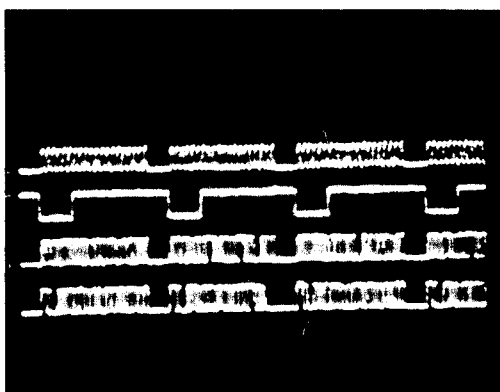
PLAY MODE

㉕ BCKO (Pin26)

㉖ WCKO (Pin25)

㉗ DOL (Pin24)

㉘ DOR (Pin23)



10V/div
5 μsec/div
} Indefinite

7. P.C.B's 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 Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- 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 $\rightarrow 56 \times 10^1 \rightarrow 561$ RD1/4PS $\boxed{5}\boxed{6}\boxed{1}$ J

47k Ω $\rightarrow 47 \times 10^3 \rightarrow 473$ RD1/4PS $\boxed{4}\boxed{7}\boxed{3}$ J

0.5 Ω $\rightarrow 0R5$ RN2H $\boxed{0}\boxed{R}\boxed{5}$ K

1 Ω $\rightarrow 010$ RS1P $\boxed{0}\boxed{1}\boxed{0}$ K

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

5.62k $\Omega \rightarrow 562 \times 10^1 \rightarrow 5621$ RN1/4SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$ F

Mark	No.	Symbol & Description	Part No.
⊙ MAIN OPERATION BOARD ASSEMBLY (PWZ1742)			
SEMICONDUCTORS			
	IC401	MICROCOMPUTER	PDG036
	Q401	TRANSISTOR	2SC1740S
	Q402-406	TRANSISTOR	DTA124ES
	D401		SLH-56MC3H
SWITCHES			
	S401-403	SWITCH	PSG-065
	S406, 407	SWITCH	PSG-065
COILS/TRANSFORMERS			
	L401, 402		LRA010K
	F401	FILTER	VTH1001
CAPACITORS			
	C401	ELECTR. CAPACITOR	CEJA101M10
	C402, 403		CKPUYF103Z25
	C404	ELECTR. CAPACITOR	CEJA101M10
	C405	CERAMIC CAPACITOR	CGCYF473Z25
	C406	CERAMIC CAPACITOR	CKCYF103Z50
	C407, 408	CERAMIC CAPACITOR	CGCYF473Z25
	C409, 410		CKPUYF103Z25
	C411-413		CCPUCH100J50
	C416, 417		CCPUCH100J50
RESISTORS			
	R401, 402	CARBONFILM RESISTOR	RD1/6PM□□□J
	R404-407	CARBONFILM RESISTOR	RD1/6PM□□□J
	R408	RESISTOR ARRAY (47K)	RA10S□□□J
	R409-418	CARBONFILM RESISTOR	RD1/6PM□□□J
OTHERS			
		INFRARED RAYS RECEIVER	GPIU52X
	V401	FLUORESCENT TUBE	PEL1025

SUB OPERATION BOARD ASSEMBLY

SEMICONDUCTORS

D201	SLH-34YC3H3
D202, 203	SLH-34VC3H3
D204	SLH-34YC3H3

Mark	No.	Symbol & Description	Part No.
SWITCHES			
	S201-203	SWITCH	PSG-065
CAPACITORS			
	C201-203		CKPUYF103Z25
	C211-213		CCPUCH100J50
LED BOARD ASSEMBLY			
SEMICONDUCTORS			
	D901		SLH-56VC3H
CAPACITORS			
	C901		CKPUYF103Z25
AUDIO MONAURAL BOARD ASSEMBLY			
SEMICONDUCTORS			
	IC500	D/A CONVERTER, IC	PCM63P-K
	IC501		TC74HCU04AP
	IC502		NJM5534DD
	IC503		NJM5532DD
	IC504, 505		NJM5534DD
Δ	IC506		NJM7805FA
Δ	IC507		NJM7905FA
	Q501		2SK364
	Q502		2SJ104
	Q503		2SK364
	Q504		2SJ104
	Q505		2SK364
	Q506		2SJ104
	D501, 502	DIODE	1S2473
RELAYS			
	RY500, 501	RELAY	PSR1002
COILS/TRANSFORMERS			
	L500-503	FERRITE BEAD	VTH1024
	L504		PTH1006
	L506		PTH1006
	L507, 508	FERRITE BEAD	VTH1024

SWITCHES

CAPACITORS

LED BOARD ASSEMBLY

SEMICONDUCTORS

CAPACITORS

AUDIO MONAURAL BOARD ASSEMBLY

SEMICONDUCTORS

RELAYS

COILS/TRANSFORMERS

Mark	No.	Symbol & Description	Part No.
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CAPACITORS

C500, 501 (10/25)	PCH1063
C502 CERAMIC CAPACITOR	CCCCH120J50
C506-508 ELECTR. CAPACITOR	CENA101M25
C509, 510 ELECTR. CAPACITOR	CENA471M25
C512 AUDIO FILM CAPACITOR	CFTXA473J50

C513	PCL1008
C514	PCL1007
C515 MICA CAPACITOR	CMA220J500
C516, 517 (100/25)	PCH1084
C518-520	PCL1026

C521, 522 (100/25)	PCH1084
C523 MICA CAPACITOR	CMA220J500
C524, 525 (100/25)	PCH1084
C526	PCL1009
C527 MICA CAPACITOR	CMA220J500

C530	PCL1025
C531 (100/50)	PCH1088
C532 AUDIO FILM CAPACITOR	CFTXA103J50
C534 (10/25)	PCH1063
C536 AUDIO FILM CAPACITOR	CFTXA103J50

C537 AUDIO FILM CAPACITOR	CFTXA473J50
C538 CERAMIC CAPACITOR	CKCYF103Z50
C539 (10/25)	PCH1063

RESISTORS

R500-505	RDM1/2P□□□J
R515, 516 CARBONFILM RESISTOR	RDM1/4PM□□□F
R517	RDM1/2P□□□J
R518-522 CARBONFILM RESISTOR	RDM1/2P□□□F
R523-527	RDM1/2P□□□J

VR500, 501	PCP-041
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POWER SUPPLY BOARD (A) ASSEMBLY**SEMICONDUCTORS**

△ IC701, 702 IC PROTECTOR	ICP-N10
IC703, 704	NJM5534DD
Q700 TRANSISTOR	2SB715
△ Q701 TRANSISTOR	2SC1827
△ Q702 TRANSISTOR	2SA769

Q703 TRANSISTOR	2SB715
Q704 TRANSISTOR	2SD755
△ Q705 TRANSISTOR	2SC1827
Q706 TRANSISTOR	2SD755
△ Q707 TRANSISTOR	2SA769

Q710 TRANSISTOR	2SC2240
Q711 TRANSISTOR	2SA970
D701 C. R. D.	10YD1.3
D702, 703	HZ5CLL
D704 C. R. D.	10YD1.3

D705, 706	HZ5CLL
△ D709	C10P20FRX
△ D710, 711	C10P20FX
△ D712	C10P20FRX

Mark	No.	Symbol & Description	Part No.
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COILS/TRANSFORMERS

L700, 701	PTH1006
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CAPACITORS

C713, 714 ELECTR. CAPACITOR	CENA331M25
C716, 717 CERAMIC CAPACITOR	CKCYF103Z50
C718, 719 (2700/25)	PCH1064
C720, 721	PCL1006
C724-727 ELECTR. CAPACITOR	CENA101M25

C728-731 AUDIO FILM CAPACITOR	CFTXA103J50
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RESISTORS

R701-704	RDM1/2P□□□J
R710-713 CARBONFILM RESISTOR	RDR1/4PM□□□F
R714, 715	RDM1/2P□□□J
R716, 717 CARBONFILM RESISTOR	RDR1/4PM□□□J
R718-721	RDM1/2P□□□J

R731, 732	RDM1/2P□□□J
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POWER SUPPLY BOARD (S) ASSEMBLY**SEMICONDUCTORS**

△ IC800-803 IC PROTECTOR	ICP-N20
△ IC804	NJM78M12FA
△ IC805	NJM79M12FA
Q800 TRANSISTOR	2SA1399
Q801 TRANSISTOR	DTC124ES

D800, 801	10DF2FA9
△ D802-809	15DF4
D810, 811	10DF2FA9
D812 ZENER DIODE	RD27EB2
D813	MTZ22B

SWITCHES

S800-802 SWITCH	PSG-065
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COILS/TRANSFORMERS

L800, 801	PTH1006
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CAPACITORS

C800-808 CERAMIC CAPACITOR	CKCYF103Z50
C809, 810 (3300/25)	PCH1086
C811, 812 (2200/25)	PCH1087
C813, 814 (3300/25)	PCH1086
C815, 816 ELECTR. CAPACITOR	CENA101M50

C817 ELECTR. CAPACITOR	CENA470M50
C818, 819 ELECTR. CAPACITOR	CEAS330M35
C820-822 CERAMIC CAPACITOR	CCCCH100D50
C823 CERAMIC CAPACITOR	CKCYF103Z50

RESISTORS

R800-802 CARBONFILM RESISTOR	RDR1/4PM□□□J
R803 CARBONFILM RESISTOR	RD1/4PM□□□J

PRIMARY BOARD ASSEMBLY**SWITCHES**

△ S1000	PSA1002
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COILS/TRANSFORMERS

△ L1000 FILTER	PTL1002
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Mark	No.	Symbol & Description	Part No.
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CAPACITORS

△		C1000-1003 CAPACITOR (CERAMIC)	VCG-048
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OTHERS

		CAPACITOR COVER	REC-297
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⊙ MAIN BOARD ASSEMBLY(PWM1285)**SEMICONDUCTORS**

△		IC1	TA7256P
△		IC100	AN7810F
△		IC101	AN7910F
△		IC102	AN7810F
△		IC103	AN7910F
△		IC104	AN7810F
△		IC105	AN7910F
		IC12 EFM DEMODULATION IC	CXD1165Q
		IC14 IC	SM5813AP
		IC151	TC74HCU04AP
		IC16	TC74HCU04AP
		IC19	TC74HC74AP
		IC2	TC74HCU04AP
△		IC20, 21	NJM7805FA
△		IC22	NJM7905FA
△		IC26	NJM7805FA
		IC3 MICROCOMPUTER, IC	PD3154
		IC301 PRE AMP IC	CXA1081S
		IC5 SERVO CONTROL IC	CXA1082AS
△		IC6	TA7256P
		IC7, 8	NJM072DE
△		IC9	TA7256P
		Q1 TRANSISTOR	2SC1740SLN
		Q11 TRANSISTOR	2SC1740SLN
		Q12 TRANSISTOR	DTA124ES
		Q10, Q15 TRANSISTOR	2SC1740S
		Q151, 152 TRANSISTOR	DTC124ES
		Q16 TRANSISTOR	2SA933S
		Q17 TRANSISTOR	2SC3581
		Q18 TRANSISTOR	DTA124ES
		Q19 TRANSISTOR	2SC3581
		Q20-22 TRANSISTOR	DTC124ES
		Q301-303 TRANSISTOR	2SC1740SLN
		Q304 TRANSISTOR	2SA1399
		Q8 TRANSISTOR	DTC124ES
		Q9 TRANSISTOR	2SA933S
		D1201-1204 DIODE	1SS254
		D151, 152 DIODE	1SS254
		D24 DIODE	1SS254
		D40-43 DIODE	1SS254
		D7-9 DIODE	1SS254

COILS/TRANSFORMERS

		L1	LRA010K
		L10-12	PTH1006
		L1201 COIL	PTL1001
		L13-16	PTH1006
		L17, 18	VTH1017

Mark	No.	Symbol & Description	Part No.
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		L2, 3	LRA010K
		L5	LRA010K
		L6, 7 FERRITE BEAD	VTH1024
		L8	VTH1013
		L9	PTH1006

		F1 FILTER	VTH1001
		F301 FILTER	VTH1001

CAPACITORS

		C1 ELECT. CAPACITOR	CEAS101M10
		C10 CERAMIC CAPACITOR	CCCCH300J50
		C101 ELECT. CAPACITOR	CEAS100M50
		C102 MYLOR FILM CAPACITOR	CQMA472J50
		C103 CERAMIC CAPACITOR	CKCYF103Z50
		C104, 105 ELECT. CAPACITOR	CENA101M25
		C106, 107 MYLOR FILM CAPACITOR	CQMA104J50
		C108 CERAMIC CAPACITOR	CKCYF103Z50
		C109, 110 ELECT. CAPACITOR	CENA101M25
		C111 CERAMIC CAPACITOR	CKCYF103Z50
		C112 (3. 3/25)	PCH1083
		C113, 114 ELECT. CAPACITOR	CENA101M25
		C115, 116 CERAMIC CAPACITOR	CKCYF103Z50
		C117 CERAMIC CAPACITOR	CCCSL471J50
		C12 MYLOR FILM CAPACITOR	CQMA471J50
		C1201 CERAMIC CAPACITOR	CGCYF473Z25
		C1202 ELECT. CAPACITOR	CENA101M25
		C121, 122 CERAMIC CAPACITOR	CGCYF473Z25
		C126-128 CERAMIC CAPACITOR	CKCYF103Z50
		C129 CERAMIC CAPACITOR	CGCYF473Z25
		C13 CERAMIC CAPACITOR	CKCYF103Z50
		C131-135 CERAMIC CAPACITOR	CKCYF103Z50
		C14 ELECT. CAPACITOR	CEAS101M10
		C140 CERAMIC CAPACITOR	CKCYF103Z50
		C145 CERAMIC CAPACITOR	CCCSL101J50
		C15 CERAMIC CAPACITOR	CGCYF473Z25
		C151 CERAMIC CAPACITOR	CKCYF103Z50
		C152 ELECT. CAPACITOR	CENA101M25
		C16 MYLOR FILM CAPACITOR	CQMA104J50
		C17 ELECT. CAPACITOR	CEANP470M10
		C18, 19 MYLOR FILM CAPACITOR	CQMA104J50
		C2 CERAMIC CAPACITOR	CGCYF473Z25
		C20 MYLOR FILM CAPACITOR	CQMA102J50
		C21 CERAMIC CAPACITOR	CGCYF473Z25
		C22 CERAMIC CAPACITOR	CCCSL680J50
		C24 MYLOR FILM CAPACITOR	CQMA152J50
		C25 MYLOR FILM CAPACITOR	CQMA153J50
		C27 ELECT. CAPACITOR	CENA221M10
		C28, 29 CERAMIC CAPACITOR	CGCYF473Z25
		C30 ELECT. CAPACITOR	CENA221M10
		C301 MYLOR FILM CAPACITOR	CQMA472J50
		C302 CERAMIC CAPACITOR	CCCCH300J50
		C303 ELECT. CAPACITOR	CEAS101M10
		C304 MYLOR FILM CAPACITOR	CQMA333J50
		C305 MYLOR FILM CAPACITOR	CQMA332J50
		C306 MYLOR FILM CAPACITOR	CQMA103J50

Mark	No.	Symbol & Description	Part No.
	C307	ELECTR. CAPACITOR	CEAS101M10
	C308, 309	ELECTR. CAPACITOR	CENA221M10
	C31	MYLOR FILM CAPACITOR	CQMA333J50
	C310, 311	CERAMIC CAPACITOR	CKDYF103Z50
	C312, 313	ELECTR. CAPACITOR	CENA221M25
	C314		CCCSL561J50
	C315	CERAMIC CAPACITOR	CKDYF103Z50
	C316	ELECTR. CAPACITOR	CEASR47M50
	C317	MYLOR FILM CAPACITOR	CQMA103J50
	C318	ELECTR. CAPACITOR	CEAS101M10
	C32	ELECTR. CAPACITOR	CEASR47M50
	C320, 321	CERAMIC CAPACITOR	CGCYF473Z25
	C322, 323	CERAMIC CAPACITOR	CCCCH300J50
	C324-327	CERAMIC CAPACITOR	CCCCH120J50
	C33	CERAMIC CAPACITOR	CGCYF473Z25
	C34	ELECTR. CAPACITOR	CEAS220M50
	C35	ELECTR. CAPACITOR	CENA221M10
	C36	CERAMIC CAPACITOR	CGCYF473Z25
	C37, 38	ELECTR. CAPACITOR	CENA101M25
	C39	ELECTR. CAPACITOR	CEAS101M10
	C4	CERAMIC CAPACITOR	CGCYF473Z25
	C40 (47000/5.5)		PCH1062
	C41	MYLOR FILM CAPACITOR	CQMA332J50
	C42	CERAMIC CAPACITOR	CCCSL101J50
	C43	ELECTR. CAPACITOR	CEAS330M35
	C44	MYLOR FILM CAPACITOR	CQMA332J50
	C45	ELECTR. CAPACITOR	CEAS330M35
	C46	CERAMIC CAPACITOR	CCCSL150J50
	C47, 48	CERAMIC CAPACITOR	CCCCH080D50
	C49	ELECTR. CAPACITOR	CENA101M25
	C5	MYLOR FILM CAPACITOR	CQMA224J50
	C50, 51	CERAMIC CAPACITOR	CKCYF103Z50
	C52	ELECTR. CAPACITOR	CEAS332M16
	C53 (3.3/25)		PCH1083
	C54	CERAMIC CAPACITOR	CKCYF103Z50
	C55	ELECTR. CAPACITOR	CENA101M25
	C56	CERAMIC CAPACITOR	CKCYF103Z50
	C57	AUDIO FILM CAPACITOR	CFTXA103J50
	C58	ELECTR. CAPACITOR	CEYA330M25
	C6	MYLOR FILM CAPACITOR	CQMA473J50
	C60	ELECTR. CAPACITOR	CENA101M25
	C61, 62	CERAMIC CAPACITOR	CKCYF103Z50
	C63	ELECTR. CAPACITOR	CENA101M25
	C65	ELECTR. CAPACITOR	CEAS101M10
	C66	ELECTR. CAPACITOR	CEANP100M25
	C67, 68	CERAMIC CAPACITOR	CKDYF103Z50
	C7	MYLOR FILM CAPACITOR	CQMA124J50
	C74-76	AUDIO FILM CAPACITOR	CFTXA103J50
	C77, 78 (3.3/25)		PCH1083
	C79, AUDIO	FILM CAPACITOR	CFTXA103J50
	C8	MYLOR FILM CAPACITOR	CQMA223J50
	C80, 81	AUDIO FILM CAPACITOR	CFTXA103J50
	C82-84	ELECTR. CAPACITOR	CENA222M16
	C85, 86	CERAMIC CAPACITOR	CCCSL101J50

Mark	No.	Symbol & Description	Part No.
	C88	ELECTR. CAPACITOR	CENA101M25
	C89	MYLOR FILM CAPACITOR	CQMA102J50
	C9	CERAMIC CAPACITOR	CGCYF473Z25
	C90	ELECTR. CAPACITOR	CENA101M25
	C91	MYLOR FILM CAPACITOR	CQMA103J50
	C92	MYLOR FILM CAPACITOR	CQMA102J50
	C93	ELECTR. CAPACITOR	CEAS330M35
	C94	CERAMIC CAPACITOR	CKCYF103Z50
	C95	ELECTR. CAPACITOR	CEAS330M35
	C96-99	CERAMIC CAPACITOR	CKCYF103Z50
RESISTORS			
	R1	CARBONFILM RESISTOR	RD1/6PM□□□J
	R10	CARBONFILM RESISTOR	RD1/6PM□□□J
	R100-108	CARBONFILM RESISTOR	RD1/6PM□□□J
	R109	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R11	CARBONFILM RESISTOR	RD1/6PM□□□J
	R110, 111	CARBONFILM RESISTOR	RD1/6PM□□□J
	R115, 116	CARBONFILM RESISTOR	RD1/6PM□□□J
	R12	CARBONFILM RESISTOR	RD1/6PM□□□J
	R1201	CARBONFILM RESISTOR	RDR1/4PM□□□J
	R1202	CARBONFILM RESISTOR	RD1/6PM□□□J
	R122-125	CARBONFILM RESISTOR	RD1/6PM□□□J
	R127-133	CARBONFILM RESISTOR	RD1/6PM□□□J
	R14	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R15	CARBONFILM RESISTOR	RD1/6PM□□□J
	R151-156	CARBONFILM RESISTOR	RD1/6PM□□□J
	R16-18	CARBONFILM RESISTOR	RD1/6PM□□□J
	R19	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R2	CARBONFILM RESISTOR	RD1/6PM□□□J
	R20	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R21-30	CARBONFILM RESISTOR	RD1/6PM□□□J
	R301-303	CARBONFILM RESISTOR	RD1/6PM□□□J
	R304	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R305-307	CARBONFILM RESISTOR	RD1/6PM□□□J
	R31	METAL FILM RESISTOR	RN1/6PQ□□□□F
	R310-312	CARBONFILM RESISTOR	RD1/6PM□□□J
	R314-319	CARBONFILM RESISTOR	RD1/6PM□□□J
	R32	CARBONFILM RESISTOR	RD1/6PM□□□J
	R320	CARBONFILM RESISTOR	RD1/6PM□□□J
	R323-326	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R327, 328	CARBONFILM RESISTOR	RD1/6PM□□□J
	R329	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R33	CARBONFILM RESISTOR	RD1/6PM□□□J
	R330	CARBONFILM RESISTOR	RDR1/2PM□□□J
	R331-335	CARBONFILM RESISTOR	RD1/6PM□□□J
	R34-39	CARBONFILM RESISTOR	RD1/6PM□□□J
	R4	CARBONFILM RESISTOR	RD1/6PM□□□J
	R40-49	CARBONFILM RESISTOR	RD1/6PM□□□J
	R5	CARBONFILM RESISTOR	RD1/6PM□□□J
	R50-55	CARBONFILM RESISTOR	RD1/6PM□□□J
	R57, 58	CARBONFILM RESISTOR	RD1/6PM□□□J
	R6	CARBONFILM RESISTOR	RD1/6PM□□□J
	R60	CARBONFILM RESISTOR	RD1/6PM□□□J
	R62-69	CARBONFILM RESISTOR	RD1/6PM□□□J
	R7	CARBONFILM RESISTOR	RD1/2PM2R2J

Mark	No.	Symbol & Description	Part No.
		R70 CARBONFILM RESISTOR	RD1/6PM□□□J
		R73-79 CARBONFILM RESISTOR	RD1/6PM□□□J
		R8 CARBONFILM RESISTOR	RD1/6PM□□□J
		R80-85 CARBONFILM RESISTOR	RD1/6PM□□□J
		R89 CARBONFILM RESISTOR	RD1/6PM□□□J
		R9 CARBONFILM RESISTOR	RD1/6PM□□□J
		R90 CARBONFILM RESISTOR	RD1/6PM□□□J
		R91 CARBONFILM RESISTOR	RD1/2PM2R2J
		R92-99 CARBONFILM RESISTOR	RD1/6PM□□□J
		VR1 VR	VRTB6VS473
		VR2 SEMI-FIXED RESISTOR	VRTB6VS103
		VR3-7 VR	VRTB6VS223
		VR8 VR	VRTS6VS102
		VR9 VR	VRTB6VS473
OTHERS			
		CN301	5597-17CPB
		CN302	5597-05CPB
		DL301, 302 FILTER	PTF1009
		JA1201	TOTX174
		JA1202 JACK	PKB1004
		X1 XTAL RES (OSC)	PSS1001

8. ADJUSTMENTS

Perform the following adjustments in the indicated order.

● Adjustments

1. Tracking error offset, focus error offset and RF offset adjustment.
2. Tracking return offset and focus return offset adjustment.
3. Focus lock and spindle lock check.
4. Grating adjustment.
5. Tracking balance adjustment.
6. Tangential adjustment
7. Radial adjustment
8. RF level check
9. LD (laser diode) power check
10. Focus gain adjustment
11. Tracking gain adjustment
12. VCO free-running frequency adjustment
13. Method of focus error check
14. D/A converter adjustment

● Measuring Devices

1. Dual-trace oscilloscope
2. Light power meter
3. YEDS-7 test disc
4. Focus and tracking adjustment filter
5. Loop gain adjustment band-pass filter
6. Signal generator
7. Grating driver
8. General-use tools
9. Commercial available disc (8 cm and 12 cm)

Note) The volumes of VR500 to VR503 and VR501 of D/A converter section are adjusted when shipping, therefore, do not touch or adjust them.

(Adjust them when D/A converter IC (PCM63MP-K) is exchanged.)

● Test Mode

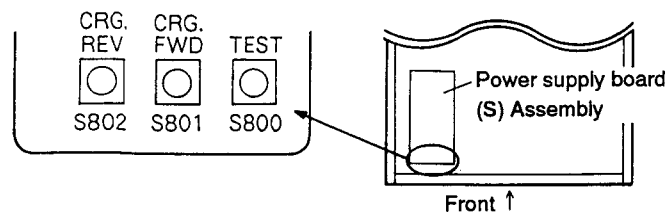
Setting and Canceling the Test Mode

- ① Turn the POWER switch (S1000) while pressing the test mode switch (S800).
- ② To cancel the test mode, turn the POWER switch OFF.

In the test mode, each key works as shown in Table 1.

● Adjustment Volume Name

- VR1: Focus return offset (FR. OF)
- VR2: RF offset (RF. OF)
- VR3: Focus gain (FO. GA)
- VR4: Tracking gain (TR. GA)
- VR5: Tracking balance (TR. BL)
- VR6: Focus error offset (FO. OF)
- VR7: Tracking error offset (TE. OF)
- VR8: VCO frequency counter (VCOA)
- VR9: Tracking return offset (TR. OF)



Note) In PD-93, MANUAL SEARCH is not set on the front panel. Therefore, use the switches of the power supply board (S) assembly when moving the carriage in the test mode.

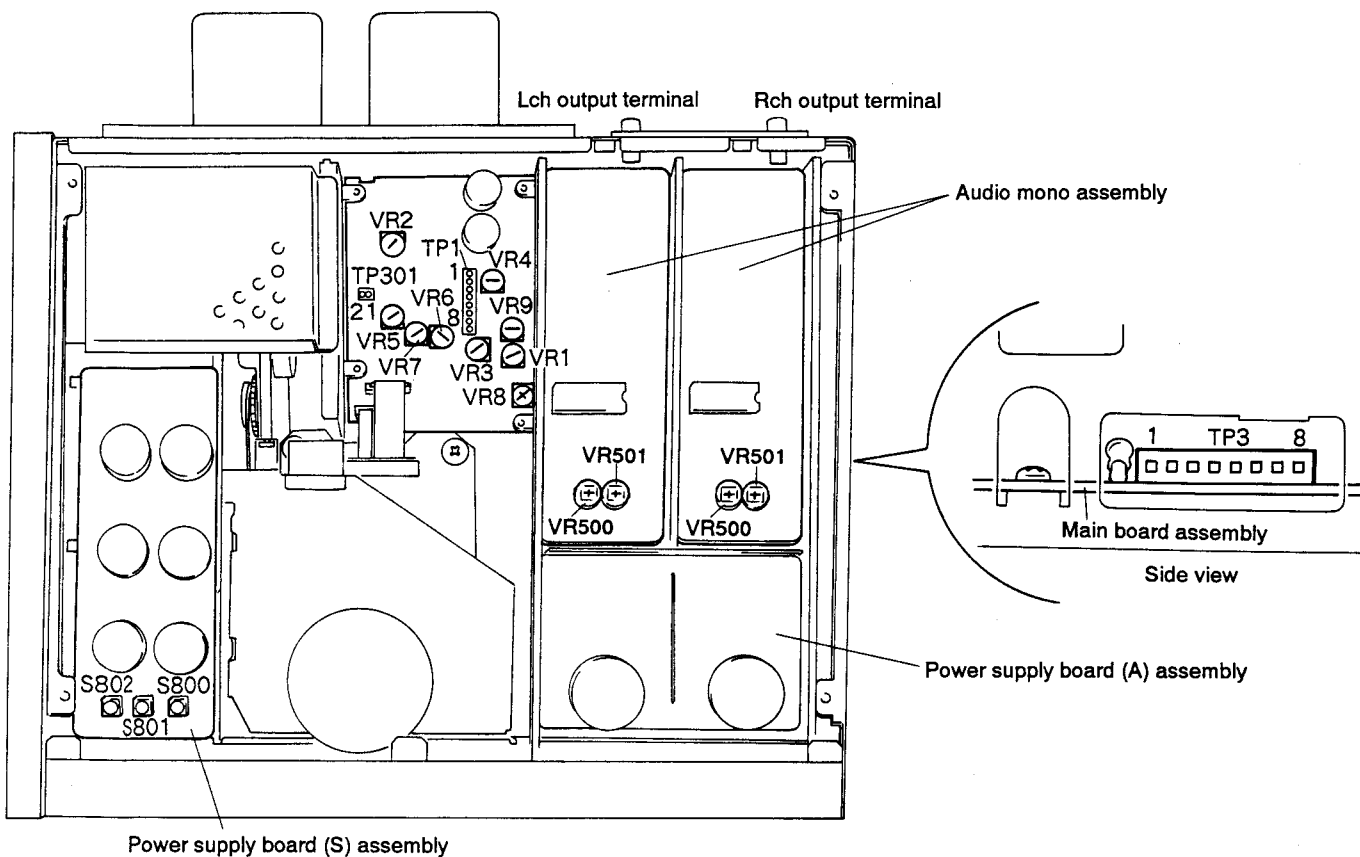
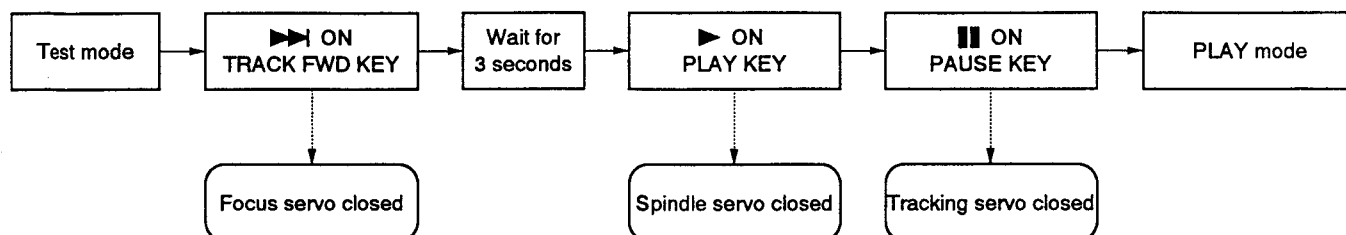


Fig. 1. Adjusting Points

In the test mode, closing and opening of servos is performed independently. Therefore, to set the play mode the servos have to be closed in (serial) sequence. Remember that in the test mode the play mode can't be set simply by pressing PAUSE (||) key.

For example, to set the play mode from the stop mode, press the following keys in the indicated order.



* In the test mode, servos keep a serial sequence.

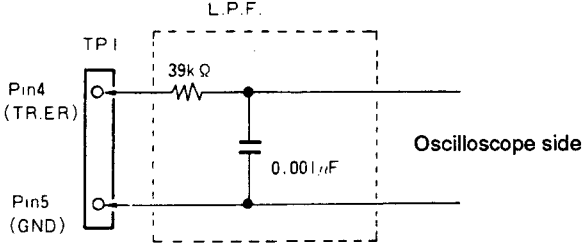
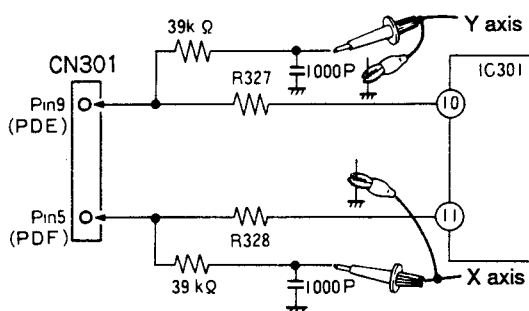
● Function of Each Key In the Test Mode

Symbol	Key name	Function during test mode	Description
◀◀	TRACK BACK	Laser diode ON	Lights the laser diode.
▶▶	TRACK FWD	Focus servo close	Lights the laser diode and sets the focus actuator UP/DOWN to close the focus servo.
▶	PLAY	Spindle servo close	After kicking the spindle motor, it closes the servo in the CLV-H mode.
||	PAUSE	Tracking servo close/open	Performs a toggle operation. When pressed, the tracking servo is closed and the unit enters the play mode (the focus servo and spindle servo should be already closed). At this time the PAUSE indicator lights. If pressed again, the tracking servo opens.
S802	CRG. REV	Carriage reverse (inward)	Moves the carriage inwards at high (approx. 1 cm/s) speed. Since there is no safety device to stop the carriage, be sure to stop it manually in time.
S801	CRG. FWD	Carriage forward (outward)	Moves the carriage outwards at high (approx. 1 cm/s) speed. Since there is no safety device to stop the carriage, be sure to stop it manually in time.
■	STOP	Stop	Stops all servos and returns the unit to the initial condition.
▲	OPEN/CLOSE	(Disc tray) open/close	Opens and closes the disc tray. However, the pickup does not return to the rest position when the tray is opened. It does not move either when the tray is closed.

Table 1.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
1	Tracking error offset, focus error offset and RF offset adjustment					
		TP1	TP1 Pin 4 (TR. ER)	VR7 (TE. OF)	0V ± 50 mV	● Set the test mode. (*) ● Adjust VR7 (TE. OF: tracking error offset) so that the voltage at Pin 4 (TE: tracking error) of TP1 becomes 0V ± 50 mV. ● Adjust VR6 (FO. OF: focus error offset) so that the voltage at Pin 6 (FO. ER: focus error) of TP1 becomes 0V ± 50 mV. ● Adjust VR2 (RF. OF: RF offset) so that RF output voltage at Pin 1 of TP301 becomes 100 mV ± 50 mV.
		TP1	TP1 Pin 6 (FO. ER)	VR6 (FO.OF)	0V ± 50 mV	
		TP301	TP301 Pin 1 (RF)	VR2 (RF. OF)	100 mV ± 50 mV	
2	Tracking return offset and focus return offset adjustment					
		TP1	TP1 Pin 2 (TR. RT)	VR9 (TR. OF)	0V ± 10 mV	● Set the test mode. (*) ● Adjust VR9 (TR. OF: tracking return offset) so that the voltage at Pin 2 TR. RT (tracking return) of TP1 becomes 0V ± 10 mV. ● Adjust VR1 (FR. OF: focus return offset) so that the voltage at Pin 8 FO. RT (focus return) of TP1 becomes 35 mV ± 17.5 mV.
		TP1	TP1 Pin 8 (FO. RT)	VR1 (FR. OF)	35 mV ± 17.5 mV	
3	Focus lock and spindle lock check					
	V 0.5V/div	H 100 msec /div	TP301 Pin 1 (RF output)		RF output Clockwise rotation	● Load the disc. ● Set the test mode. (*) ● Move the pickup close to the center of the disc using CRG. FWD key (S801). Be sure to perform this operation. ● Observe Pin 1 RF (RF output) of TP301 with an oscilloscope and confirm that RF signal is output after pressing TRACK FWD key (▶▶). ● Press PLAY key (▶) and confirm that the disc rotates clockwise at approx. normal speed (about 300 rpm around the center of the disc), without running wildly or in reverse direction.

* See page 49.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
4-1	Grating adjustment (1) (with an 8 cm disc)					
	1V/div	5 ms/div	TP1 Pin 4 (TR. ER)	Grating	Null point	● This adjustment can be performed with an 8 cm disc having pits over a 75 mm in diameter. ● Load the disc. (8 cm) ● Set the test mode. (*) ● Press TRACK FWD (▶▶) and PLAY (▶) keys in that order to close the focus and spindle servos (the tracking servo is open state.) ● Press CRG. FWD key (S801) and move the pickup to the outer track of the 8 cm disc. When moving the pickup, it is possible to insert a slotted screwdriver in the grating adjustment plate slot from above the unit. (Fig. 3.) ● Observe the waveform at Pin 4 TR. ER (tracking error) of TP1 with an oscilloscope and at this time, insert cut off 4 kHz low-pass filter (Fig. 2). ● Insert the tracking driver in the adjustment slot and turn it so as to find out the null point (Photo-1).
 Fig. 2.						
	5 mV/div	XY	X axis: R328 Y axis: R327	Grating Grating	Maximum amplitude Phase difference 180°	● Turn the grating driver slowly clockwise from the null point and set to the first point where the waveform amplitude (tracking error signal) is maximum. (See photo-2.) ● Connect CN301 (PDF) of R328 to X axis of an oscilloscope and CN301 (PDE) of R327 to Y axis on inserting the filters of about 4 kHz of cutoff respectively. Move the pickup to the most outer track of 8 cm disc. At this time, check that the resurge waveform almost is one line, if not adjust. (Photos-4, 5)
						

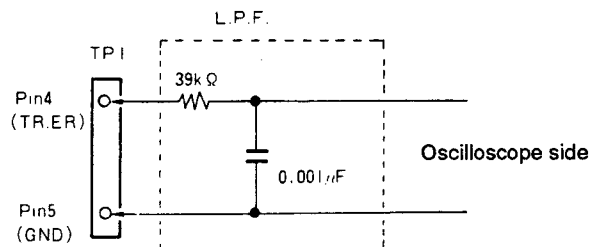
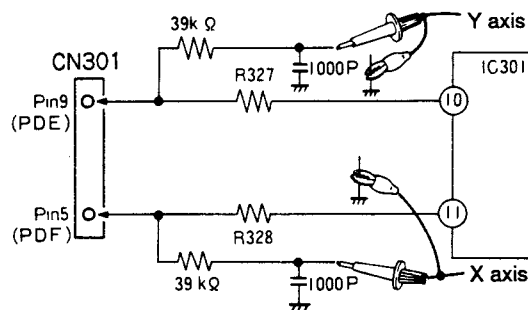
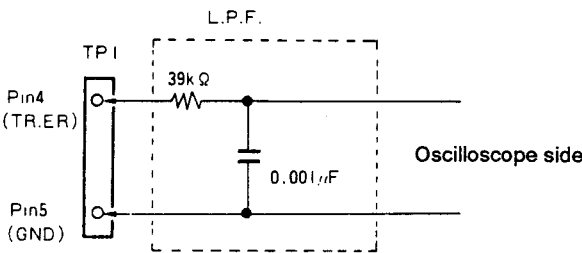


Fig. 2.



* See page 49.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
4-2	Grating adjustment (2) (with an 12 cm disc playing more than 60 minutes)					
	1V/div	5 ms/div	TP1 Pin 4 (TR. ER)	Grating	Null point	● Load the disc (playing more than 60 minutes). ● Set the test mode. (*) ● Press TRACK FWD (▶▶) and PLAY (▶) keys in that order to close the focus and spindle servos (the tracking servo is open state). ● Press CRG. FWD key (S801) and move the pickup to the outer track of the disc. When moving the pickup, it is possible to insert a slotted screwdriver in the grating adjustment plate slot from above the unit. (Fig. 3.) ● Observe the waveform at Pin 4 TR. ER (tracking error) of TP1 with an oscilloscope and at this time, insert cut off 4 kHz low-pass filter. (Fig. 2.) ● Insert the tracking driver in the adjustment slot and turn it so as to find out the null point (Photo-1).
 Fig. 2.						
				Grating	Maximum amplitude	● Turn the grating driver slowly clockwise from the null point and set to at the first point where the waveform amplitude (tracking error signal) is maximum. (See photo-2)
	5 mV/div	5 ms/div	X axis: R328 Y axis: R327	Grating	Phase difference 180°	● Connect CN301 (PDF) of R328 to X axis of an oscilloscope and CN301 (PDE) of R327 to Y axis to input with AC coupling, and then move the pickup close to the center track of the disc. At this time, adjust so that the surge waveform almost becomes one line, if not, adjust in the outer track again. (Photos-4, 5)

* See page 49.

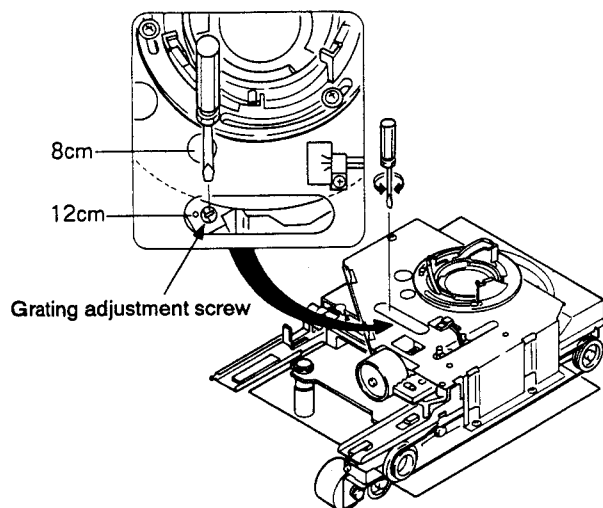


Fig. 3. Grating Adjustment

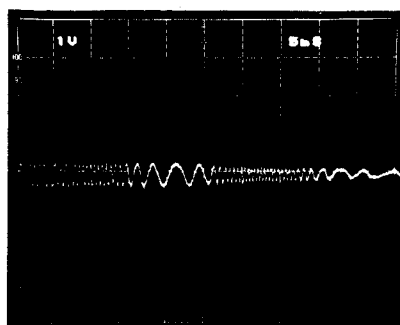


Photo-1 Null point

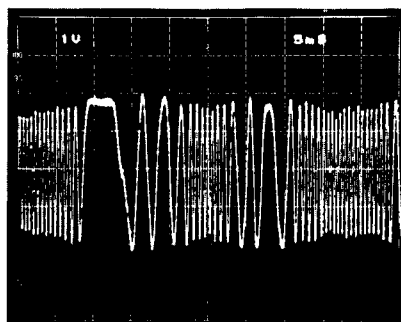


Photo-2 Maximum amplitude

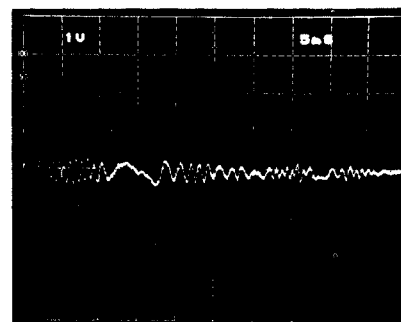


Photo-3 Out of null point

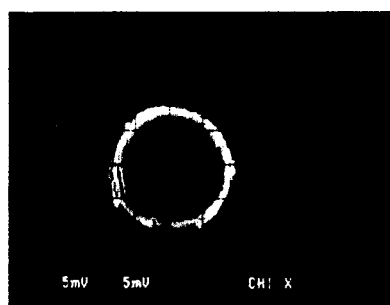


Photo-4

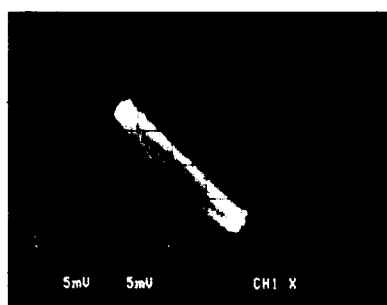


Photo-5

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
5	Tracking balance adjustment					
	0.5V/div	5 msec/div	TP1 Pin 4 (TR. ER)	VR5 (TR. BL)		● Load the disc. ● Set the test mode. (*) ● Press CRG. FWD key (S801) and move carriage close to the center track of the disc. ● Press TRACK FWD (▶▶) and PLAY (▶) keys in that order to turn the disc. ● Observe Pin 4 TR. ER (tracking error) of TP1 with an oscilloscope. And adjust VR5 TR. BL (tracking balance) so as to remove DC elements from the tracking error waveform.

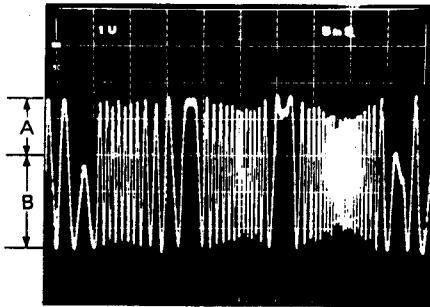


Photo-6

➔

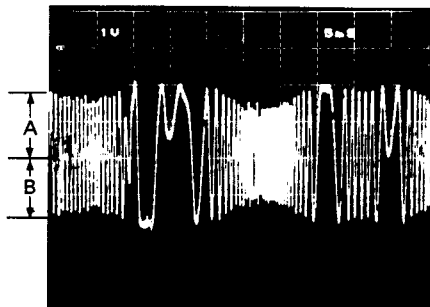


Photo-7

* See page 49.

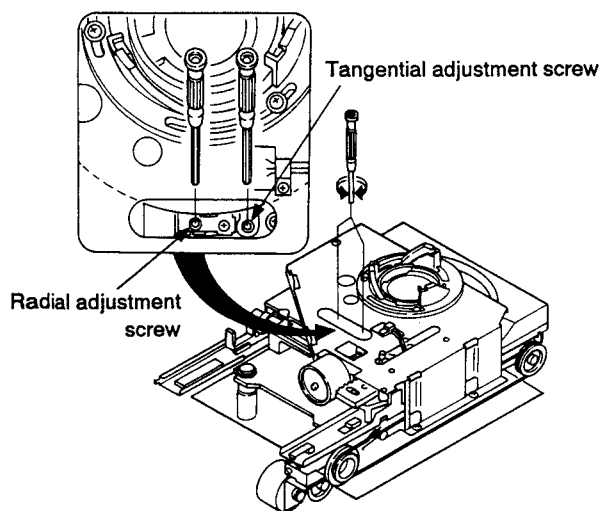


Fig. 4. Tangential Adjustment

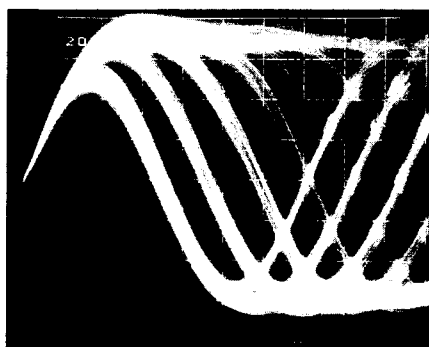


Photo-8

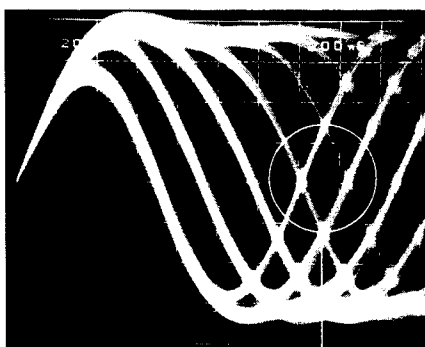


Photo-9

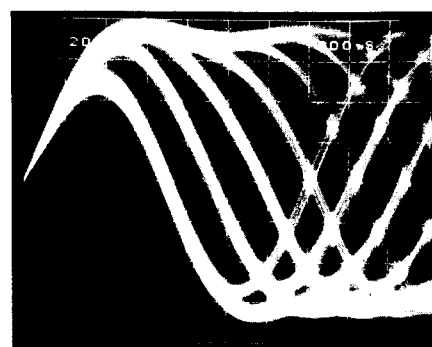
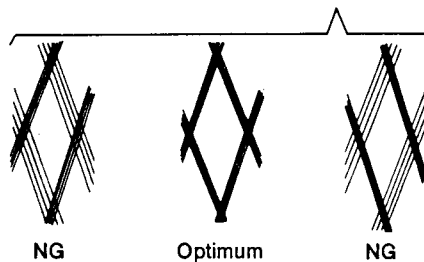


Photo-10

Part to be observed



Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
6	Tangential adjustment					
			TP301 Pin 1 (RF output)	Tangential adjustment screw	Eye pattern optimum point	● Load the disc. ● Set the test mode. (*) ● Press CRG. FWD key (S801) and move the pickup to the center track of the disc (set it to such a location that the tangential screw can be seen from above the servo mechanism. (See fig. 4.) ● Press TRACK FWD (▶▶), PLAY (▶) and PAUSE (■) keys in that order to close all servos. (Pause indicator lights.) ● Observe Pin 1 RF (RF output) of TP301 with an oscilloscope and adjust the tangential screw so that the eye pattern becomes clear. (Fig. 4.) ● The adjustment point is located around the middle location between the point where the eye pattern becomes blurred when turning the tangential screw clockwise and the point where the eye pattern becomes blurred when turning the adjustment screw counterclockwise. Observe the overall clearness of the waveform and one of the diamond shapes in the eye pattern (photo-9). Optimum adjustment is attained at the point where diamond shape lines are relatively thin.

The diagram illustrates the setup for measuring the RF output of TP301. An oscilloscope is represented by a rectangle on the right. A probe is connected to Pin 1 (RF) of the TP301 component, which is shown as a vertical bar with two pins. The ground lead of the probe is connected to Pin 2 (GND) of the same component. Labels 'Pin1 (RF)' and 'Pin2 (GND)' are placed next to their respective pins. The label 'TP301' is placed above the component.

Fig. 5

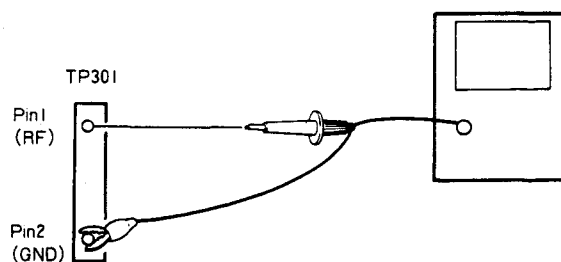


Fig. 5

* See page 49.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
7	Radial adjustment					
			TP301 Pin 1 (RF output)	Radial adjustment screw	Eye pattern optimum point	● Load the disc. ● Set the test mode. (*) ● Press CRG. FWD key (S801) and move the pickup to the center track of the disc (set it to such a location that the tangential screw can be seen from above the servo mechanism. (See fig. 4.) ● Press TRACK FWD (▶▶), PLAY (▶) and PAUSE (■) keys in that order to close all servos. (Pause indicator lights.) ● Observe Pin 1 RF (RF output) of TP301 with an oscilloscope and adjust the tangential screw so that the eye pattern becomes clear. (Fig. 4.) ● The adjustment point is located around the middle location between the point where the eye pattern becomes blurred when turning the tangential screw clockwise and the point where the eye pattern becomes blurred when turning the adjustment screw counterclockwise. Observe the overall clearness of the waveform and one of the diamond shapes in the eye pattern (photo-9). Optimum adjustment is attained at the point where diamond shape lines are relatively thin. ● Perform the tangential and radial adjustments alternately two or more times.

The diagram illustrates the setup for measuring the RF output of TP301 Pin 1. An oscilloscope probe is connected to Pin 1 (RF), and its ground lead is connected to Pin 2 (GND). The oscilloscope unit is shown to the right of the connection point.

Fig. 5

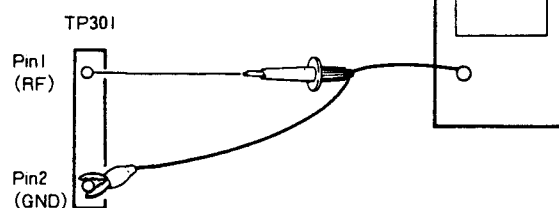


Fig. 5

* See page 49.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
8	RF level check					
			TP301 Pin 1 (RF)	Check	1.5V $\begin{smallmatrix} +0.2V \\ -0V \end{smallmatrix}$	● Set the test mode. (*) ● Connect the probe of the oscilloscope to Pin 1 RF (RF output) of TP301. ● Play back the disc, measure the RF waveform p-p voltage and confirm that it becomes 1.5V $\begin{smallmatrix} +0.2V \\ -0V \end{smallmatrix}$.
			TP301 Pin 1 (RF)	VR Ⓐ	1.5V $\begin{smallmatrix} +0.2V \\ -0V \end{smallmatrix}$	
9	LD (Laser diode) power check					
				VR Ⓐ	Specified value 0.13 mW or less	● Set the test mode. (*) ● Press TRACK BACK key (◀◀) and turn the LD (laser diode) on. ● Place the sensor of the light power meter directly above the objective lens and confirm that LD power is the specified value (0.13 mW or less).

* See page 49.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check Items/ adjustment specifications	Adjustment procedure
	V	H				
10	Focus gain adjustment					
	CH1 (X) , CH2 (Y) 20 mV/div, 5 mV/div (probe 10:1)	X axis: TP1 Pin 5 (FO. IN) Y axis: TP1 Pin 6 (FO. ER)	VR3 (FO. GA)	Phase difference 90°	● With the power off, connect the oscilloscope and the oscillator as shown in Fig. 6. ● Set the normal playback mode. ● Turn the oscillators power on and set it to output a 1.2 kHz, 1 Vp-p signal. Note: (Some oscillators output DC when turned ON. In that case, High gain connect the oscillator after turning it on.) ● Adjust VR3 FO. GA (focus gain) so that the resurge waveform on an oscilloscope becomes a horizontal circle (phase difference 90°).	

TP1

Pin7 (FO.IN)

Pin5 (GND)

Pin6 (FO.ER)

100kΩ

OSC

1.2kHz

1Vp-p

(10 : 1)

(10 : 1)

Fig. 6.

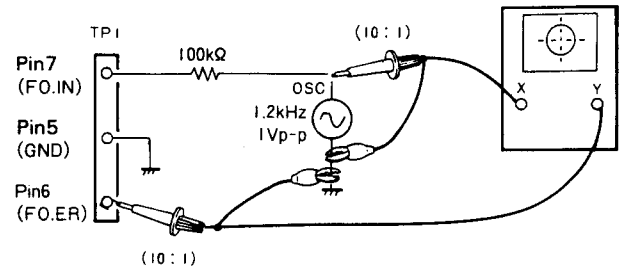
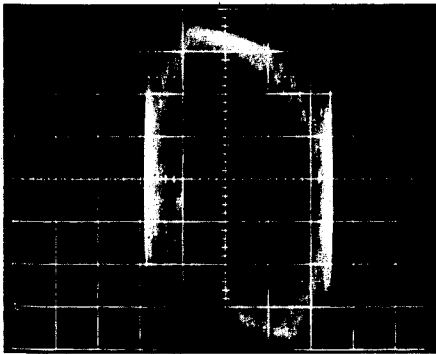
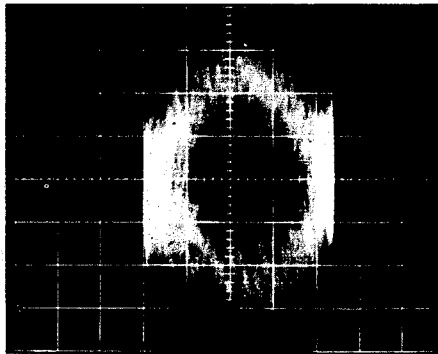


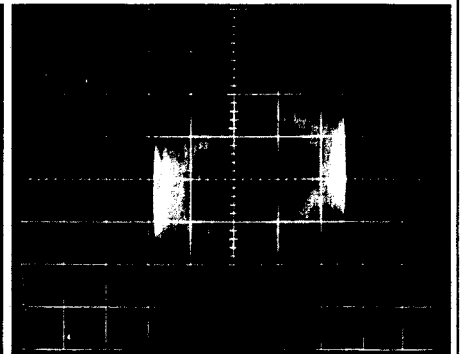
Fig. 6.



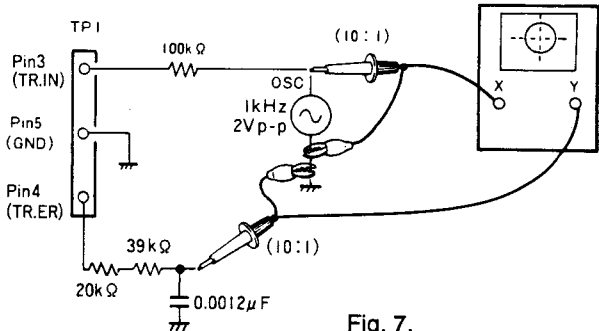
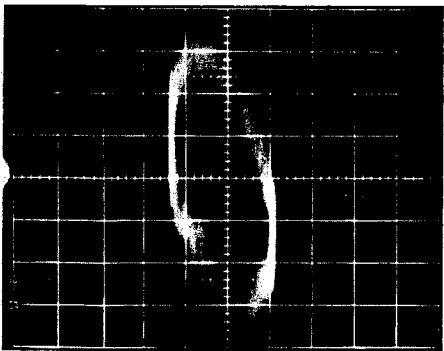
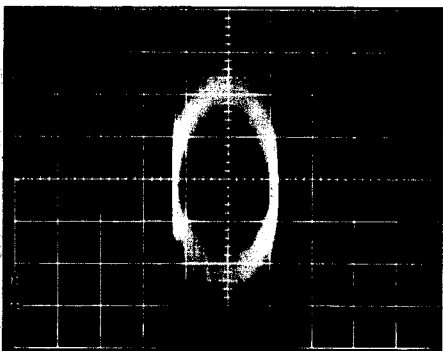
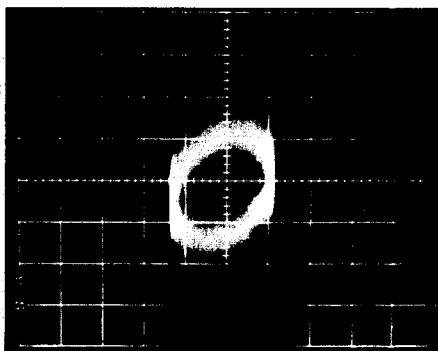
High gain
Photo-11



Optimum gain
Photo-12

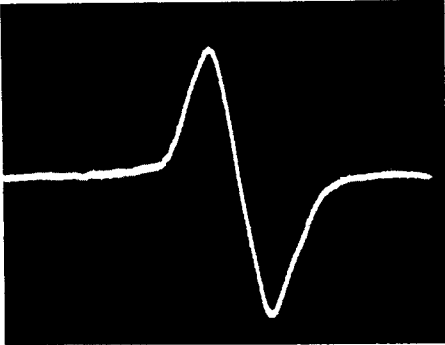


Low gain
Photo-13

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
11	Tracking gain adjustment					
	CH1 (X), CH2 (Y) 50 mV/div, 5 mV/div (Probe 10:1)	X axis: TP1 Pin 3 (TR. IN) Y axis: TP1 Pin 2 (TR. ER)	VR4 (TR. GA)	Phase difference 90°	- With the power off, connect the oscilloscope and the oscillator as shown in Fig. 7. - Set the normal playback mode. - Turn the oscillators power on and set it to output a 1 kHz, 2 Vp-p signal. Note: (Some oscillators output DC when turned on. In that case, connect the oscillator after turning it on.) - Adjust VR4 TR. GA (tracking gain) so that the resurge waveform on an oscilloscope becomes a horizontal circle (phase difference 90°).  Fig. 7.	
 High gain Photo-14  Optimum gain Photo-15  Low gain Photo-16						
12	VCO free-running frequency adjustment					
		TP3 Pin 2		Frequency 4.275 MHz ± 0.025 MHz	- Set the test mode. (*) - Connect the frequency counter (10 MHz range) to Pin 2 of TP3. - Adjust VR8 (VCO. A) so that the frequency counter reads 4.275 MHz ± 0.025 MHz. Note: Adjust with the stop mode.	

* See page 49.

Step No.	Oscilloscope setting		Test points	Adjusting points	Check items/ adjustment specifications	Adjustment procedure
	V	H				
13	Focus error check					
	1V/div	2 ms/div	TP1 Pin 6 (FO. ER)	Check	Waveform	● Set the test mode. (*) ● Connect Pin 7 FO. IN (focus in) of TP1 to GND. ● Press TRACK FWD key and check the waveform on Pin 6 FO. ER (focus error) of TP1 with the oscilloscope.

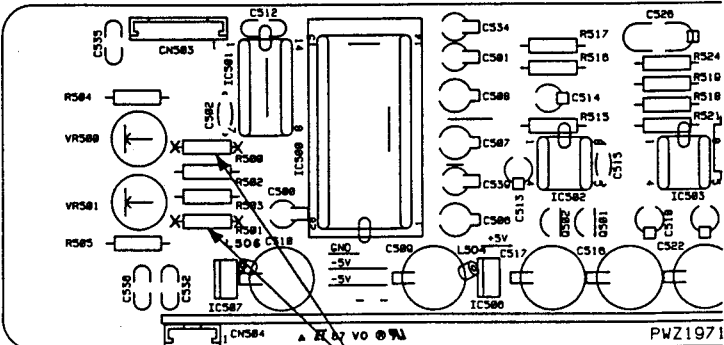


Focus error
Photo-17

14	D/A converter adjustment					
			LINE OUT (L), (R) terminal	VR500 (Lch) VR501 (Lch) VR500 (Rch) VR501 (Rch)	Minimum distortion ratio	● Set the test disc (YEDS-7) and connect the distortion meter to LINE OUT (L or R) of the main unit. ● Play back the 1 kHz/0 dB signal and adjust VR500 and VR501 alternately so that the distortion ratio becomes minimum.

Note: When a distortion meter is not available, cut the lead wires of R500 and R501 of the AUDIO MONAURAL BOARD ASSEMBLY using nippers and remove the resistors.

AUDIO MONOURAL BOARD ASSEMBLY



Cut the lead wires of R500 and R501 using nippers.

Fig. 8.

* See page 49.

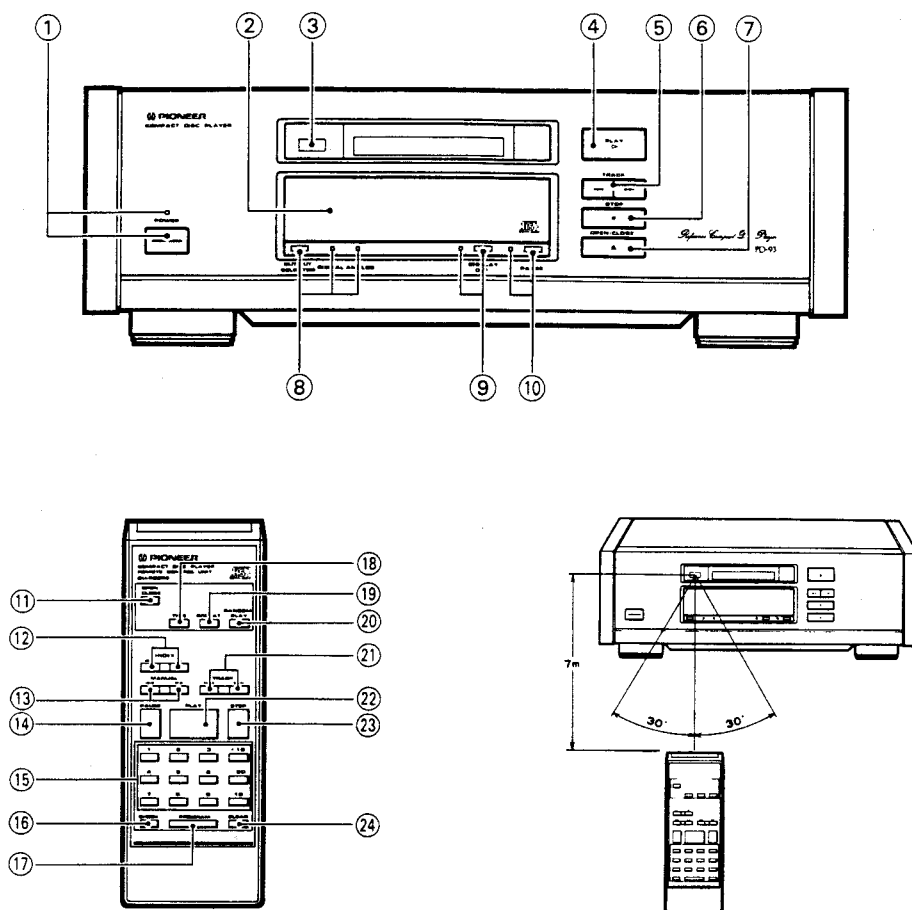
9. IC DESCRIPTIONS (CXD1165Q)

Pin Descriptions

Pin No.	Name	I/O	Descriptions
1	FSW	O	Time constant selection output of spindle motor output filter.
2	MON	O	ON/OFF control output of spindle motor.
3	MDP	O	Drive output of spindle motor, rough control when CLV-S mode and phase control when CLV-P mode.
4	MDS	O	Drive output of spindle motor, speed control when CLV-P mode.
5	EFM	I	EFM signal input from RF amplifier.
6	ASY	O	Output to control slice level of EFM signal, "L" when stop.
7	LOCK	O	After sampling GFS signal in WFCK/16, if it is "H", "H" is output, and if it is "L" for eight successive times, "L" is output.
8	VCOO	O	VCO output, $f=8.6436$ MHz when locked to EFM signal.
9	VCOI	I	VCO input.
10	TEST	I	(0V)
11	PDO	O	Phase comparison output (compared EFM signal with $VCO/2$), "Hi-Z" when stop.
12	Vss	-	GND (0V)
13	CLK	I	Serial data transfer clock input from CPU, Data is latched at rising edge of clock.
14	XLT	I	Latch input from CPU, 8 bits shift register data (serial data from CPU) are latched to the respective registers.
15	DATA	I	Serial data input from CPU.
16	XRST	I	System reset input, reset when "L".
17	CNIN	I	Tracking pulse input.
18	SENS	O	Outputs internal condition according to address.
19	MUTG	I	Muting input, when ATTM of internal register A is "L", it is normal state at MUTG "L", and no sound state at "H".
20	CRCF	O	Outputs CRC check results of sub code Q.
21	EXCK	I	Clock input for serial output of sub code.
22	SBSO	O	Serial output of sub code.
23	SUBQ	O	Sub code Q output.
24	SCOR	O	S0+S1 output of sub code sync.
25	SQCK	I/O	Read clock of sub code Q.
26	SQEX	I	SQCK selection input. Refer to 1CPU interface.
27	DOTX	O	Digital output (WFCK is output when DO off.)
28	GFS	O	Display output of lock state for frame sync.
29	TEST	I	Fix to "H" or "L". Do not open.
30	TEST		
31	TEST		
32	TEST		
33	Vdd	-	Power supply (+5V)
34	TEST	I	Fix to "H" or "L". Do not open.
35	TEST		
36	TEST		
37	TEST		
38	TEST		
39	TEST		
40	TEST		

Pin No.	Name	I/O	Descriptions
41	TEST	I	Fix to "H" or "L". Do not open.
42	TEST		
43	TEST		
44	TEST		
45	TEST		
46	TEST		
47	TEST		
48	TEST		
49	TEST		
50	TEST		
51	C4M	O	Crystal dividing frequency output, $f=4.2336$ MHz.
52	Vss	—	GND (0V)
53	XTAI	I	Crystal oscillation circuit input, $f=8.4672$ MHz or 16.9344 MHz by mode selection.
54	XTAO	O	Crystal oscillation circuit output, $f=8.4672$ MHz or 16.9344 MHz by mode selection.
55	MD1	I	Mode selection input 1
56	MD2	I	Mode selection input 2
57	MD3	I	Mode selection input 3
58	SLOB	I	Code selection input of audio data output, 2's compliment output when "L", offset binary output when "H".
59	PSSL	I	Mode selection input of audio data output, serial output when "L", parallel output when "H".
60	APTR	O	Control output for aperture compensation, "H" when R-ch.
61	APTL	O	Control output for aperture compensation, "H" when L-ch.
62	DA01	O	DA01 output (LSB of parallel audio data) when PSSL = "H", C1F1 output when PSSL = "L".
63	DA02	O	DA02 output when PSSL = "H", C1F2 output when PSSL = "L".
64	DA03	O	DA03 output when PSSL = "H", C2F1 output when PSSL = "L".
65	DA04	O	DA04 output when PSSL = "H", C2F2 output when PSSL = "L".
66	DA05	O	DA05 output when PSSL = "H", C2FL output when PSSL = "L".
67	DA06	O	DA06 output when PSSL = "H", C2PO output when PSSL = "L".
68	DA07	O	DA07 output when PSSL = "H", RFCK output when PSSL = "L".
69	DA08	O	DA08 output when PSSL = "H", WFCK output when PSSL = "L".
70	DA09	O	DA09 output when PSSL = "H", PLCK output when PSSL = "L".
71	DA10	O	DA10 output when PSSL = "H", UGFS output when PSSL = "L".
72	DA11	O	DA11 output when PSSL = "H", GTOP output when PSSL = "L".
73	Vdd	—	Power supply (+5V)
74	DA12	O	DA12 output when PSSL = "H", RAOV output when PSSL = "L".
75	DA13	O	DA13 output when PSSL = "H", C4LR output when PSSL = "L".
76	DA14	O	DA14 output when PSSL = "H", BLCK output when PSSL = "L".
77	DA15	O	DA15 output when PSSL = "H", BLCK output when PSSL = "L".
78	DA16	O	DA16 output (MSB of parallel audio data) when PSSL = "H", data output when PSSL = "L".
79	WDCK	O	Strobe signal output, 88.2 kHz.
80	LRCK	O	Strobe signal output, 44.1 kHz.

10. PANEL FACILITIES



FRONT PANEL

- ① **POWER switch/indicator**
Press to turn power ON and OFF.
- ② **Disc tray**
- ③ **Remote sensor**
- ④ **PLAY button/indicator (▷)**
- ⑤ **TRACK search buttons (◀◀, ▶▶)**
- ⑥ **STOP button (■)**
- ⑦ **OPEN/CLOSE button (⬆)**
- ⑧ **OUTPUT SELECTOR button/indicators**
- ⑨ **DISPLAY OFF button/indicator**
- ⑩ **PAUSE button/indicator**

REMOTE CONTROL UNIT

Buttons listed here but not accompanied with explanations have the same functions as the corresponding front-panel buttons. If use is made of the supplied remote control unit, remote operation is possible.

To use the remote control unit, aim at the remote sensor.

The remote control unit can operate over a range of approximately 23 feet (7 meters), within angles of 30 degrees left and right.

NOTE:

If the remote control sensor window is in a position where it receives strong light such as sunlight or fluorescent light, control may not be possible.

- ⑪ **OPEN/CLOSE button**
- ⑫ **INDEX search buttons (◀, ▶)**
- ⑬ **MANUAL search buttons (◀◀, ▶▶)**
- ⑭ **PAUSE button**
- ⑮ **Track number buttons (1–10, +10, ≥20)**
- ⑯ **CHECK button**
- ⑰ **PROGRAM button**
- ⑱ **TIME button**
- ⑲ **REPEAT button**
- ⑲ **RANDOM PLAY button**
- ⑲ **TRACK search buttons (◀◀, ▶▶)**
- ⑲ **PLAY button**
- ⑲ **STOP button**
- ⑲ **CLEAR button**

11. SPECIFICATIONS

1. General

Type	Compact disc digital audio system
Usable discs	Compact Disc
Power requirements	
U.K. and Australian models	AC 240V, 50/60Hz
European model	AC 220V, 50/60Hz
U.S. and Canadian models	AC 120V, 60Hz
Multi-voltage model	AC 110/120—127/220/240V (switchable) 50/60Hz
Power consumption	30W
Operating temperature	+ 5°C — + 35°C (+ 41°F — + 95°F)
Weight	15.2kg (33lb, 8oz)
External dimensions	459(W) × 435(D) × 151(H)mm 18-1/16(W) × 17-1/8(D) × 5-15/16(H) in.

2. Audio section

Frequency response	2Hz—20kHz
S/N	115dB or more (EIAJ)
Dynamic range	99dB or more (EIAJ)
Channel separation	110dB or more (EIAJ)
Total harmonic distortion	0.0015% or less (EIAJ)
Output voltage	2.0V
Wow and flutter	Limit of measurement (±0.001% W.PEAK) or less (EIAJ)
Number of channels	2 channels (stereo)

3. Output terminal

- Audio line output terminals
- Optical digital output terminal
- Coaxial digital output terminal

4. Functions

- Play
- Pause
- Stop
- Track search
- Manual search
- Index search
- Direct selection
- Single track repeat
- All track repeat
- Programmed repeat
- Random play repeat
- Programmed random play repeat
- Programmed playback (up to 24 steps)
- Pause program
- Program check
- Program correction
- Program clear
- Random play
- Programmed random play
- Time location
- Display off
- Timer start
- Digital/analog output select

5. Accessories

• Remote control unit	1
• Size AAA/R03 dry cell batteries	2
• Output cable	1
• Operating instructions	1

NOTE:

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

