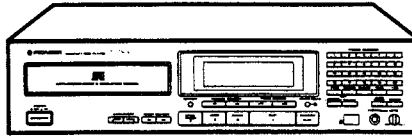




**PIONEER**  
The future of sound and vision.

# Service Manual



ORDER NO.  
ARP 1993

COMPACT DISC PLAYER

# PD-7500

## PD-6500

## PD-6500-S

PD-7500, PD-6500 AND PD-6500-S HAVE FOLLOWING VERSIONS:

Type	Applicable model			Power requirement	Export destination
	PD-7500	PD-6500	PD-6500-S		
KU	○	○	—	AC 120V only	U.S.A.
KC	○	○	—	AC 120V only	Canada
HEM	○	○	—	AC 220V, 240V (switchable)*	European continent
HB	○	○	—	AC 220V, 240V (switchable)*	United Kingdom
SD	○	○	—	AC 110V, 120-127V, 220V, 240V (switchable)	Kingdom of Saudi Arabia and general market
HPW	○	○	—	AC 220V, 240V (switchable)*	Australia
HEWM	—	—	○	AC 220V, 240V (switchable)*	European continent

\* Change the connection wire from PRIMARY BOARD assembly to TRANS BOARD assembly.

- This manual is applicable to the PD-7500/KU, KC, HEM, HB, SD, HPW, PD-6500/KU, KC, HEM, HB, SD, HPW and PD-6500-S/HEWM types.
- As to the PD-7500/KC, HEM, HB, SD, HPW, PD-6500/KC, HEM, HB, SD, HPW and PD-6500-S/HEWM types, refer to page 92-95.
- The PD-6500-S is the same as the PD-6500 except for color.
- Ce manuel pour le service comprend les explications de réglage en français.
- Este manual de servicio trata del método de ajuste escrito en español.

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

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

**WARNING**

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

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

# 1. SAFETY INFORMATION

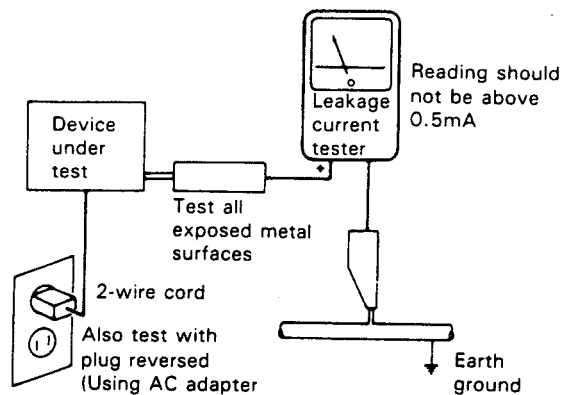
(FOR U.S.A. MODEL ONLY)

## 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  $\Delta$  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 UNDGÅ 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.

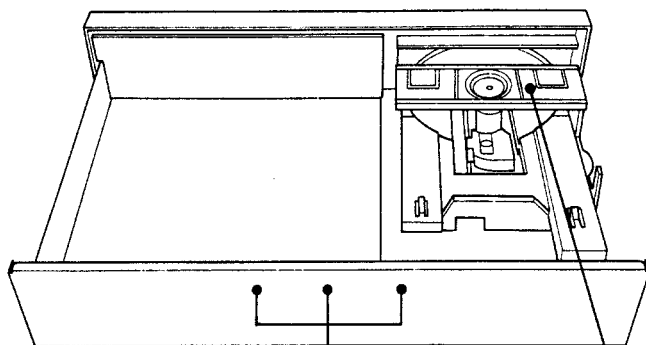


LASER  
Picture 1  
Warning sign for  
laser radiation

**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 (SINGLE type)**



HEM and HB types

**Additional Laser Caution**

- Laser Interlock Mechanism**  
The position of the switch (S601) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the switch (S601) is not in CLMP terminal side (when the mechanism is not clamped and CLMP signal is high level). Thus, the interlock will no longer function if the switch (S601) is deliberately set to CLMP terminal side (if CLMP signal is low level). In the test mode\*, the interlock mechanism will not function. Laser diode oscillation will continue if pin 10 of TAB137N (IC1) is connected to pin 11 or ground, or pin 12 is connected to high level (ON) or the terminals of Q1 is shorted to each other (fault condition).
- When the cover is opened, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

\* Refer to page 45.

**CAUTION**  
INVISIBLE LASER  
RADIATION WHEN OPEN,  
AVOID EXPOSURE  
TO BEAM  
PRW1018

HB type

**ADVERSEL**  
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.  
**VORSICHT!**  
UNSIHTBARE LASER-STRÅLUNG TRITTS AUS, WEIM DECKEL (ODER KLAPPE) GEÖFFNET IST NICHT DEM STRAHL AUSSETZEN!  
VRW1094

HEM type

**CLASS 1**  
LASER PRODUCT  
VRW 328

HEM and HB types

# 2. EXPLODED VIEW AND PARTS LIST

## 2.1 EXTERIOR

### NOTES:

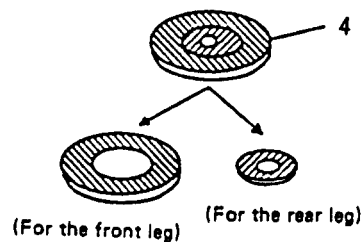
- Parts without part number cannot be supplied.
- The  $\triangle$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

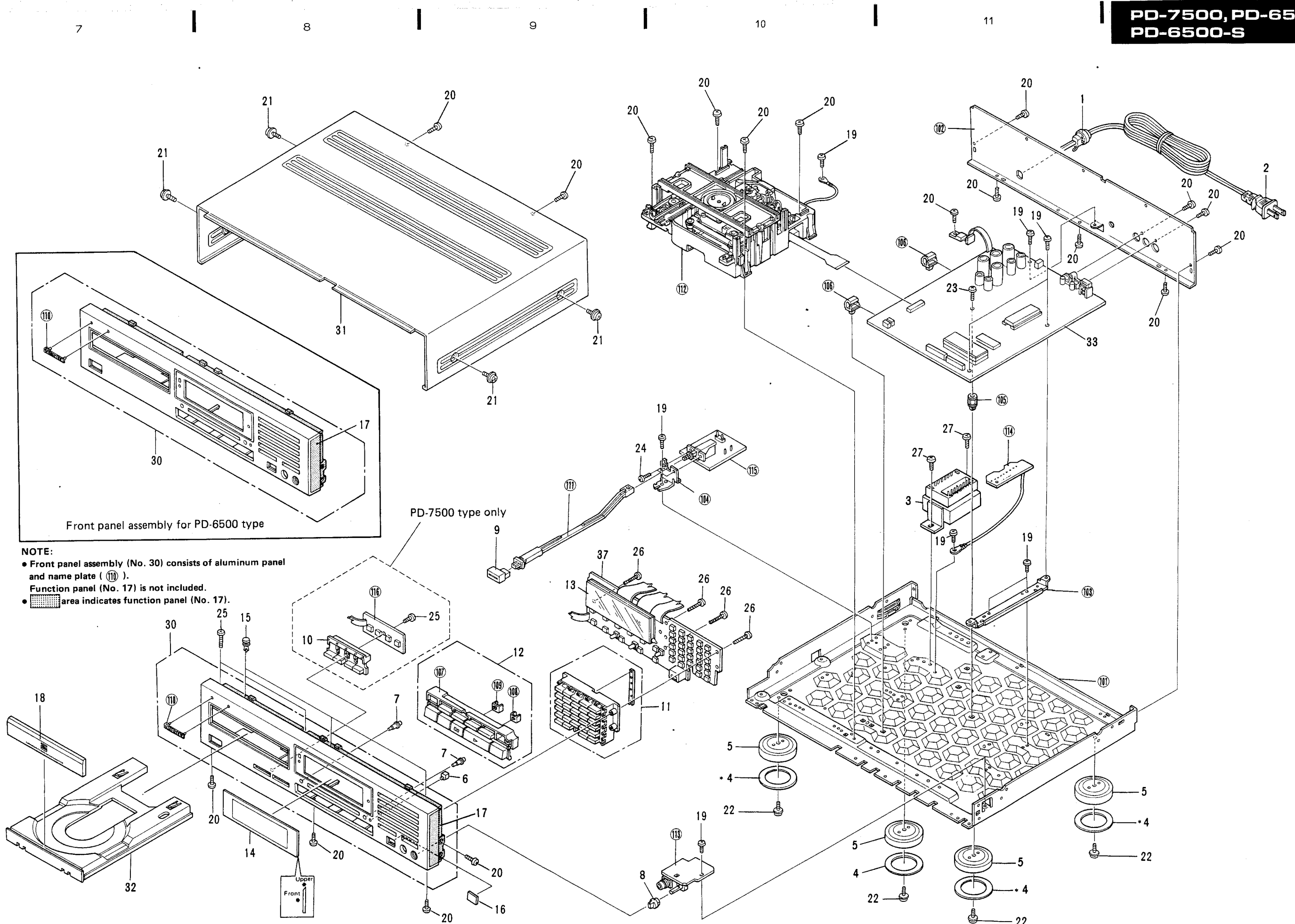
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
$\triangle$	1	CM-22C	Strain relief		101		Under base
$\triangle$	2	PDG1015	AC power cord		102		Rear base
$\triangle$	3	PTT1132	Power transformer (AC120V) (For PD-7500 type)		103		P.C.B. angle
					104		Switch angle
$\triangle$	3	PTT1128	Power transformer (AC120V) (For PD-6500 type)		105		P.C.B. spacer
	4	PNM1070	Stopper		106		P.C.B. holder
	5	VNK1095	Insulator		107		Function button
	6	AMR1160	LED lens		108		Lens (For Play)
	7	PAC1310	Chip button		109		Lens (For Pause)
	8	PAC1370	Headphone knob		110		Name plate
	9	PAC1372	Power button		111		Switch joint
	10	PAC1461	Fade button		112		Single mechanism
	11	PAC1462	29 Key		113		Headphone assembly
	12	PAD1054	Function button assembly		114		Transformer board assembly
	13	PAM1323	Display screen		115		Primary board assembly
	14	PAM1380	Window		116		Sub function board assembly (PD-7500 type only)
	15	PBM-012	Plastic rivet				
	16	PNW1075	Filter				
	17	PNW1696	Function panel				
	18	PNW1743	Plate (Tray)				
	19	BBZ30P060FCC	Screw				
	20	BBZ30P080FCC	Screw				
	21	FBT40P080FZK	Screw				
	22	IBZ30P100FCC	Screw				
	23	IBZ30P150FCC	Screw				
	24	PMZ30P060FCC	Screw				
	25	PPZ30P080FMC	Screw				
	26	PPZ30P150FMC	Screw				
	27	PSA40P080FZB	Screw				
	28	PDZ30P060FCC	Screw				
	29	.....	.....				
	30	PEA1068	Front panel assembly (For PD-7500/KU type)				
	30	PEA1066	Front panel assembly (For PD-6500/KU type)				
	31	PYY1058	Bonnet				
	32	PNW1792	S tray (For PD-7500 type)				
	32	PNW1838	Tray (For PD-6500 type)				
⊙	33	PWZ1785	Main board assembly (For PD-7500 type)				
⊙	33	PWZ1814	Main board assembly (For PD-6500 type)				
	34	.....	.....				
	35	.....	.....				
	36	.....	.....				
⊙	37	PWZ1795	Function board assembly				

- The stopper consists of the big ring part and the small ring part.  
If you stick the stopper to the leg, stick the big ring part to the front leg, and the small ring part to the rear leg.







Front panel assembly for PD-6500 type

**NOTE:**

- Front panel assembly (No. 30) consists of aluminum panel and name plate ( 110 ).
- Function panel (No. 17) is not included.
- [Hatched area symbol] area indicates function panel (No. 17).

PD-7500 type only

**NOTE:**  
Filter (No. 16) is located between aluminum panel and function panel (No. 17).

A  
B  
C  
D

7 8 9 10 11 12

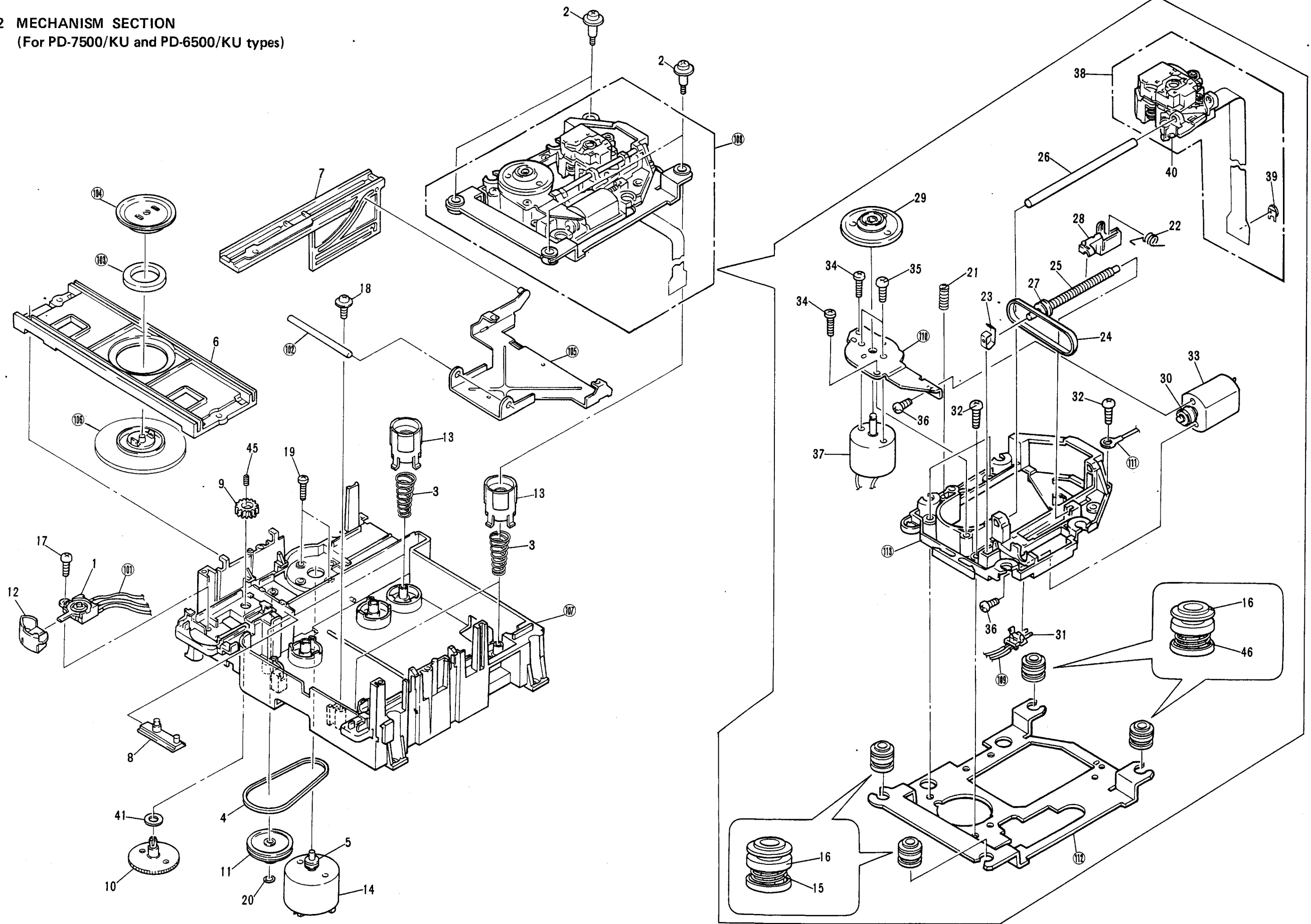
2.2 MECHANISM SECTION  
(For PD-7500/KU and PD-6500/KU types)

A

B

C

D



7

1

2

3

4

5

6

**NOTES:**

Parts without part number cannot be supplied.

The  $\Delta$  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.

A This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

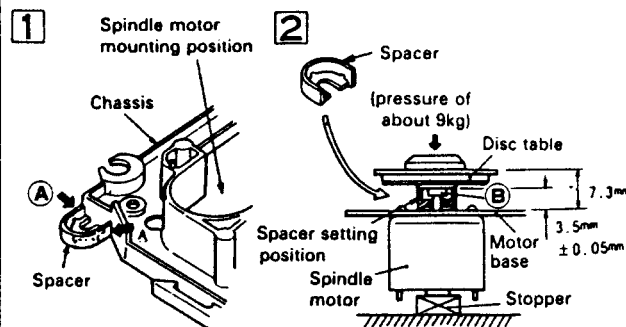
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

**Parts List of Mechanism Section**

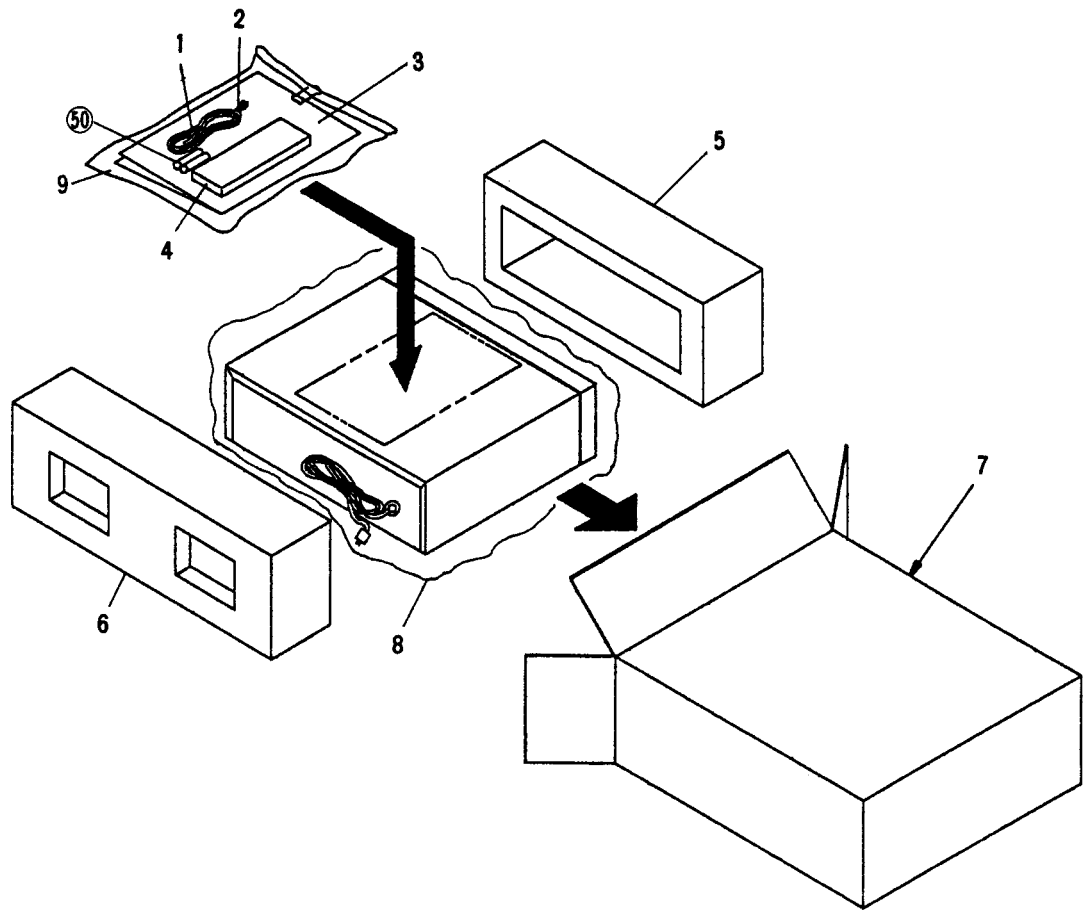
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	DSK1001	Lever switch (CLAMP)		38	PEA1030	Pickup assembly
	2	PBA1044	Floating screw		39	PCP1008	Variable resistor (VR1)
	3	PBH1085	Coil spring		40	CKSYF105Z16	Chip capacitor (C1001)
	4	PEB1127	Rubber belt		41	WA62D095D013	Washer
	5	PNW1634	Motor pulley		45	ZMK20H040FBT	Screw
	6	PNW1673	Clamper base		46	PBH1095	Floating spring (R) (BLACK)
	7	PNW1674	Rack				
	8	PNW1675	Synchronized plate				
B	9	PNW1676	Gear A		101		2mm pitch connector assembly (5P)
	10	PNW1677	Gear B		102		Shaft
	11	PNW1678	Gear Pulley		103		Magnet
	12	PNW1679	Sensor head		104		Yoke
	13	PNW1709	Slide bush B				
	14	PXM1010	D.C motor (0.75W) (LOADING)		105		Swing lever
					106		Clamper ST
					107		Loading base
	15	PBH1094	Floating spring (F) (SILVER)		108		Servo mechanism assembly
					109		2mm pitch connector assembly (6P)
	16	PEB1145	Dumper rubber				
	17	BPZ26P080FMC	Screw		110		Motor base
	18	IPZ30P080FMC	Screw		111		Earth lead unit (300V)
	19	PMZ26P040FMC	Screw		112		Mechanism base
					113		Mechanism chassis
	20	WT26D047D025	Washer				
	21	PBH1009	Earth spring				
	22	PBH1084	Drive spring				
	23	PBK1057	Plate spring				
C	24	PEB1072	Belt				
	25	PLA1003	Drive screw				
	26	PLA1071	Guide bar				
	27	PNW1066	Pulley				
	28	PNW1605	Half nut				
	29	PNW1608	Disc table				
	30	PNW1634	Motor pulley				
	31	PSH1003	Slide switch (INSIDE)				
	32	PBZ30P080FMC	Screw				
	33	PXM1013	D.C. motor (1.7W) (CARRIAGE)				
	34	BPZ20P080FZK	Screw				
	35	JFZ20P025FMC	Screw				
	36	PMZ20P030FMC	Screw				
	37	PEA1085	D.C. motor assembly (SPINDLE: For PD-7500)				
D	37	PEA1028	D.C. motor assembly (SPINDLE: For PD-6500)				

**• How to install the disc table**

- 1 Use nippers or other tool to cut the two sections marked  $\textcircled{A}$  in figure 1. Then remove the spacer.
- 2 While supporting the spindle motor shaft with the stopper, put spacer on top of the motor base (angled so it doesn't touch section  $\textcircled{B}$ ), and stick the disc table on top (takes about 9kg pressure).



# 3. PACKING

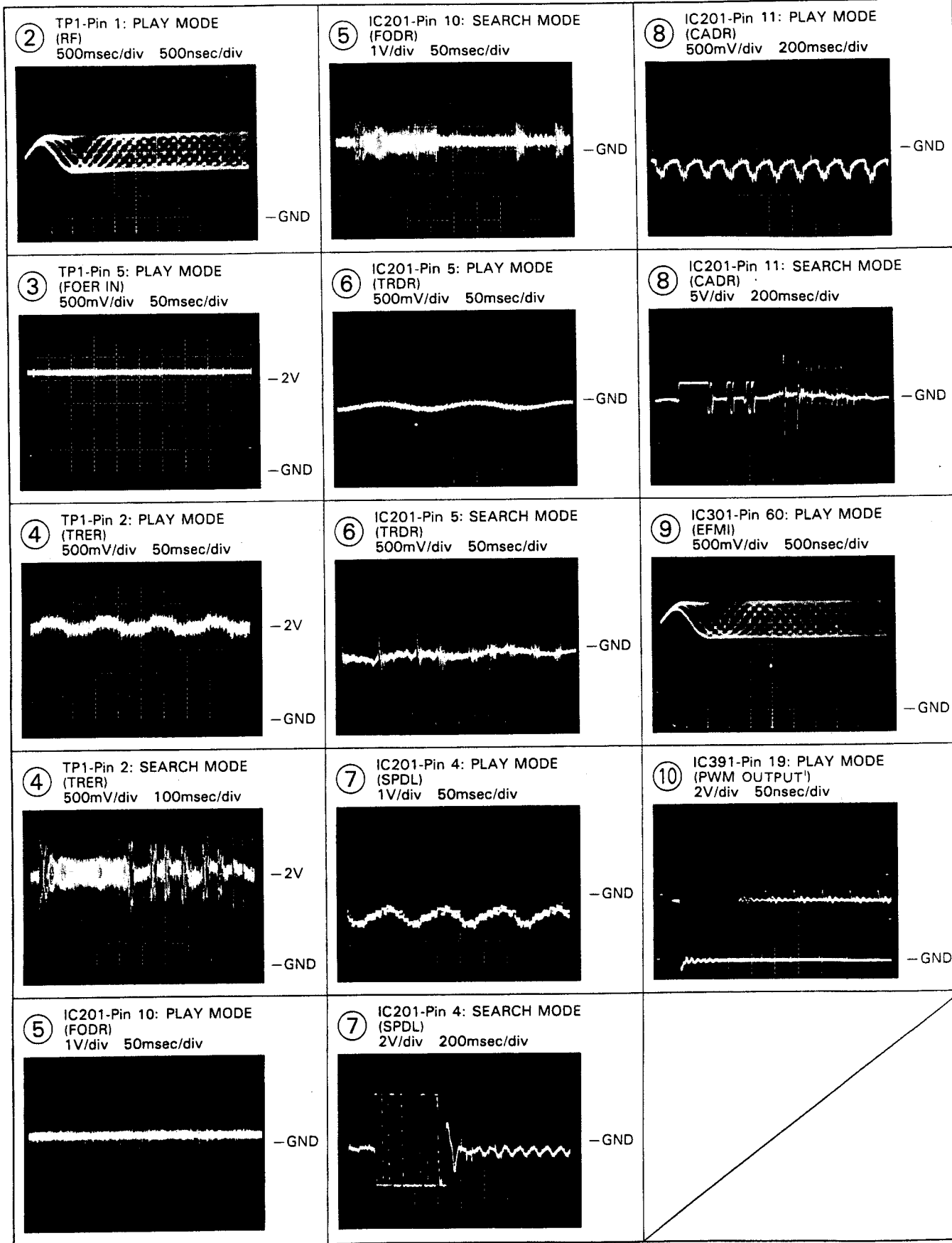


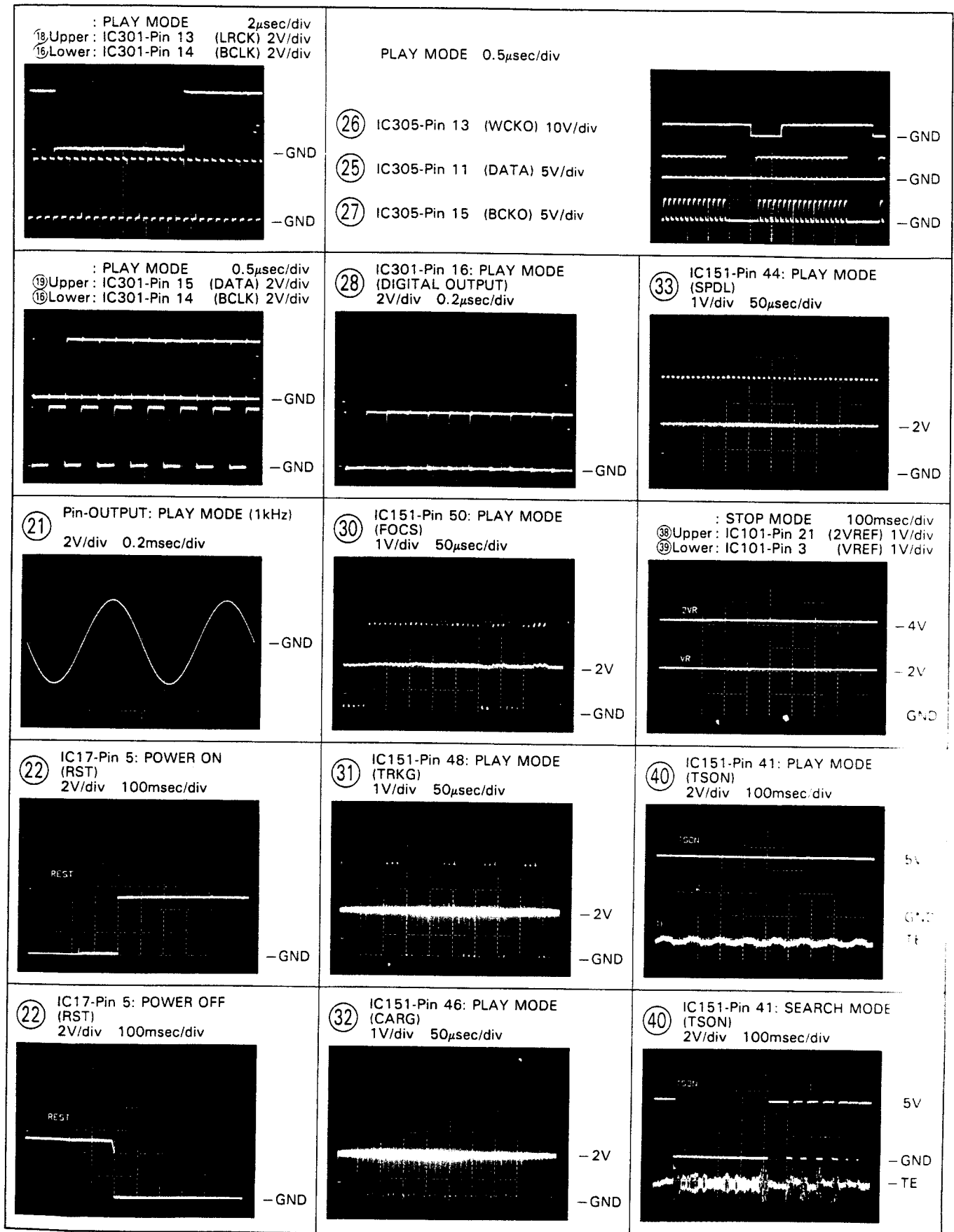
For PD-7500/KU and PD-6500/KU types)

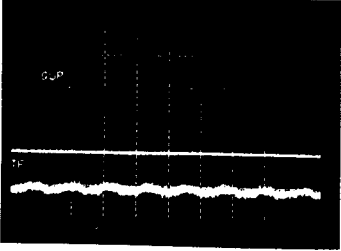
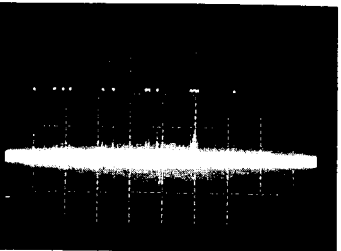
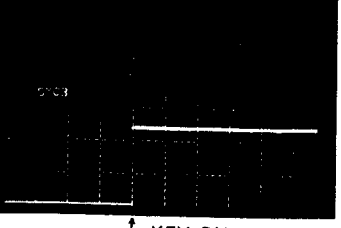
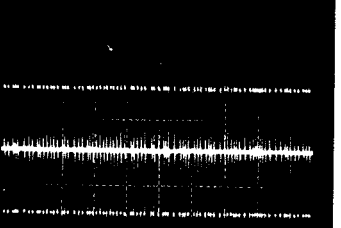
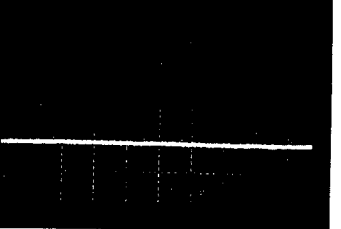
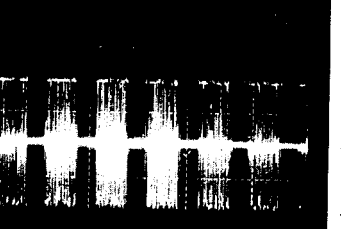
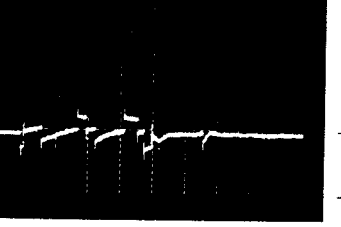
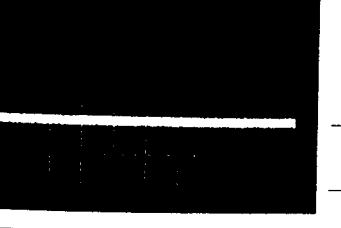
Mark	No.	Part No.	Description
	1	PDE-319	Control cord
	2	PDE1001	Connection cord
	3	PRB1127	Operating instructions (English)
	4	PWW1051	Remote control unit
		PZN1008	Battery cover (For remote control unit)
	5	PHA1134	Protector F
	6	PHA1135	Protector R
	7	PHG1497	CD packing case (For PD-7500/KU type)
	7	PHG1499	CD packing case (For PD-6500/KU type)
	8	Z23-007	Mirror mat
	9	Z21-038	Vinyl bag
50			Battery

**Wave Forms**

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



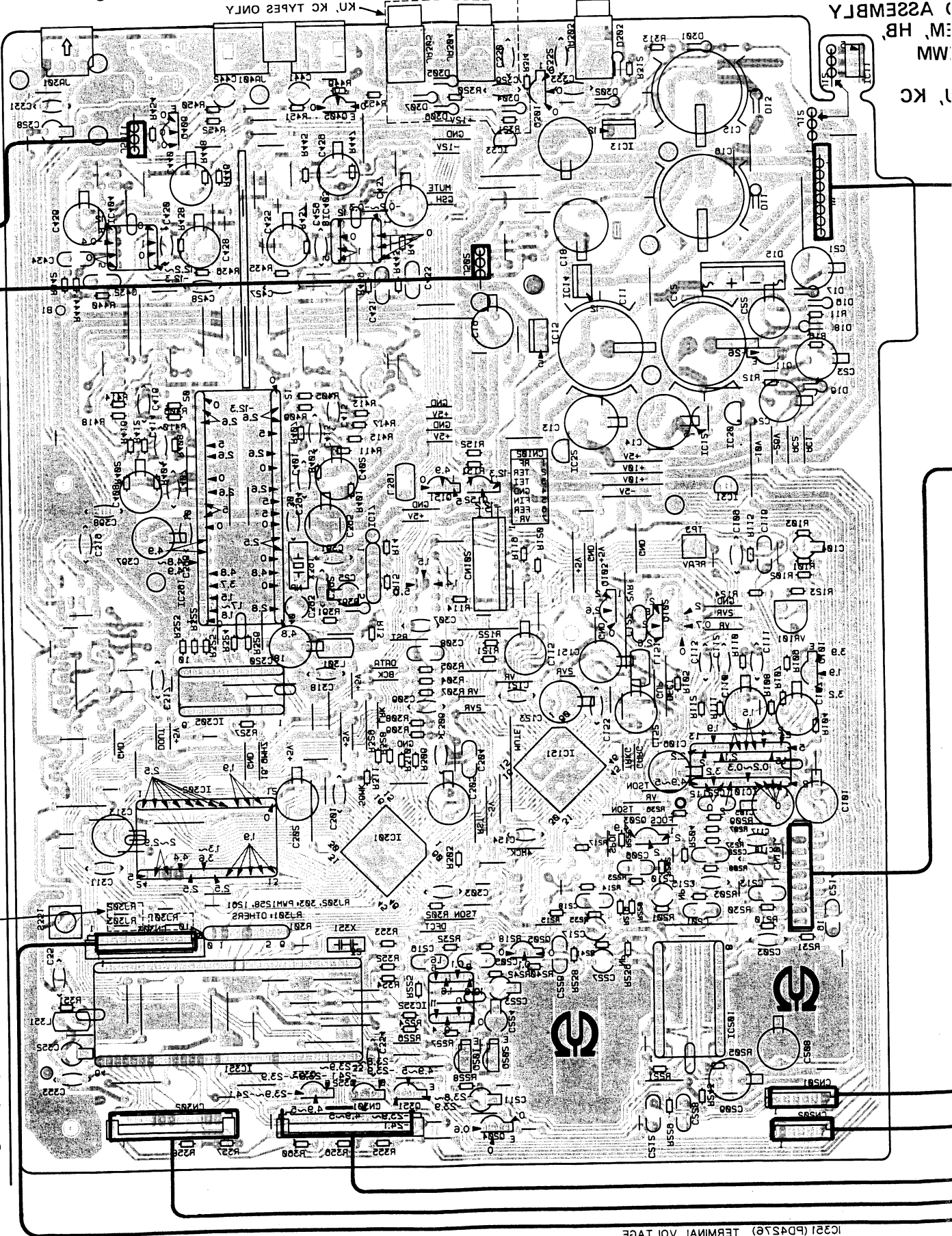


<p>④1 IC151-Pin 38: PLAY MODE (G.UP) 2V/div 100msec/div</p>  <p>-GND -TE</p>	<p>⑤1 IC301-Pin 6: SEARCH MODE (TMAX) 1V/div 100msec/div</p>  <p>-2V -GND</p>	
<p>④2 IC351-Pin 13: PLAY KEY ON (SYC3) 2V/div 100msec/div</p>  <p>KEY ON</p> <p>-GND</p>	<p>⑤2 IC301-Pin 7: PLAY MODE (PD) 1V/div 10μsec/div</p>  <p>-2V -GND</p>	
<p>⑤0 IC301-Pin 4: PLAY MODE (VCO LPF) 1V/div 50msec/div</p>  <p>-2V -GND</p>	<p>⑤2 IC301-Pin 7: SEARCH MODE (PD) 1V/div 100msec/div</p>  <p>-2V -GND</p>	
<p>⑤0 IC301-Pin 4: SEARCH MODE (VCO LPF) 1V/div 100msec/div</p>  <p>-2V -GND</p>		
<p>⑤1 IC301-Pin 6: PLAY MODE (TMAX) 1V/div 20msec/div</p>  <p>-2V -GND</p>		

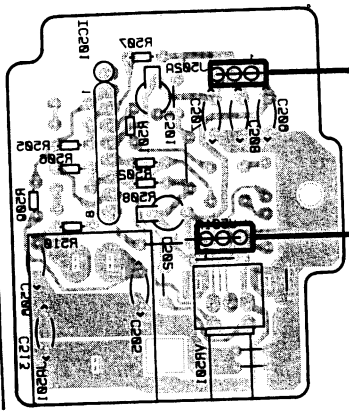




IC321 (PDA727) TERMINAL VOLTAGE	1	2	3	4	5	6	7	8	9	10	11	12
0	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
1	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
2	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
3	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
4	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
5	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
6	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
7	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
8	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
9	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
10	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
11	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
12	-2.5~3.2	-1.4~1.8	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2



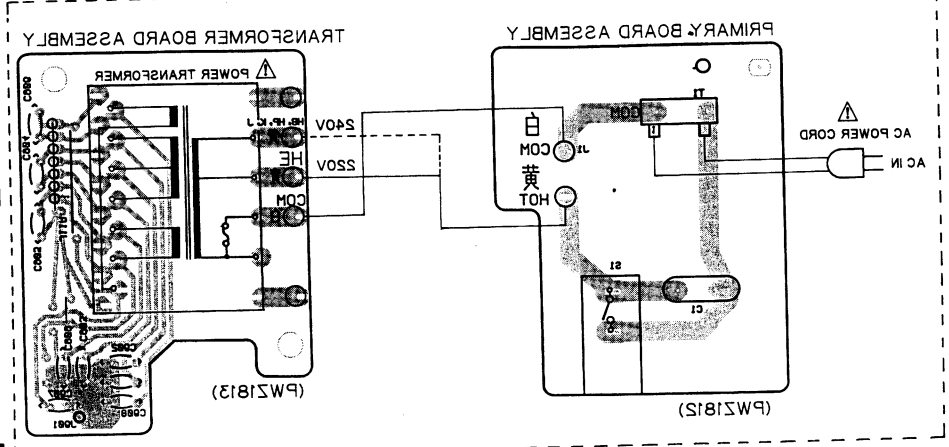
- Q504
- Q321 Q325 Q322
- Q505 Q501
- IC321
- IC325
- IC301 IC295
- Q502
- IC305 IC301
- IC101 IC121
- IC302
- Q101
- Q105
- Q103
- IC17
- IC361
- Q125 Q121
- IC31
- IC35
- IC401 IC405
- Q11
- IC12
- IC14
- IC403 IC404
- Q403 Q401
- Q406
- Q402
- Q405
- IC11



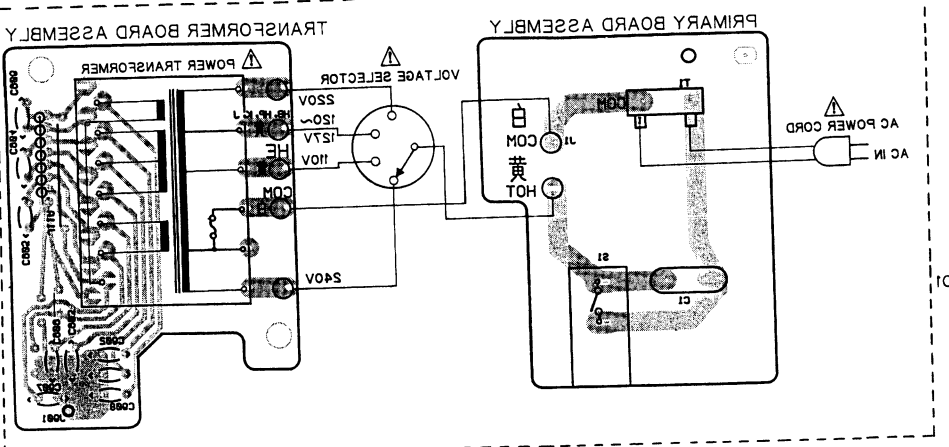
HEADPHONE BOARD ASSEMBLY

NUMBERS	HEM, HB, HPW	TYPE
R1301	Open	KU, KC
R1303	Open	HEM, HB, HPW

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



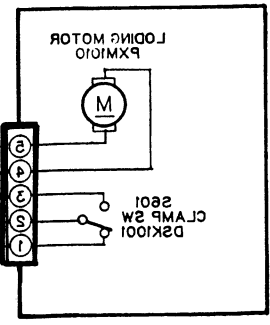
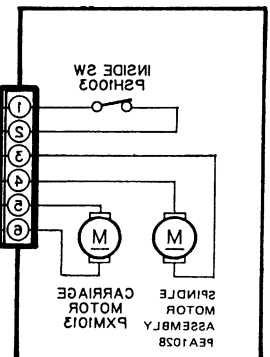
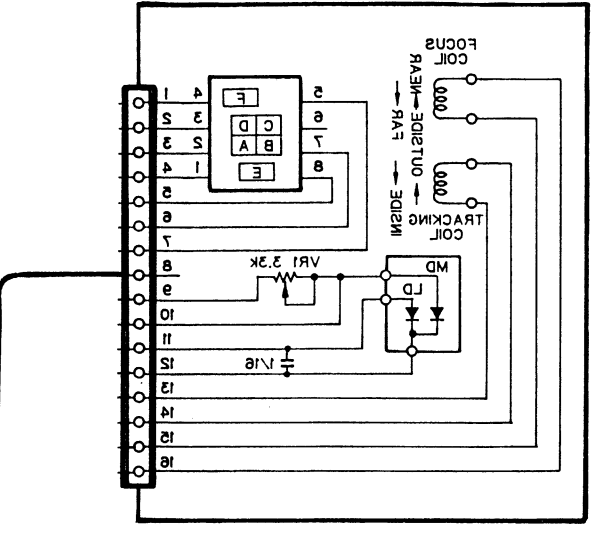
FOR HEM, HB, HPW AND HEWM TYPES



FOR 2D TYPE

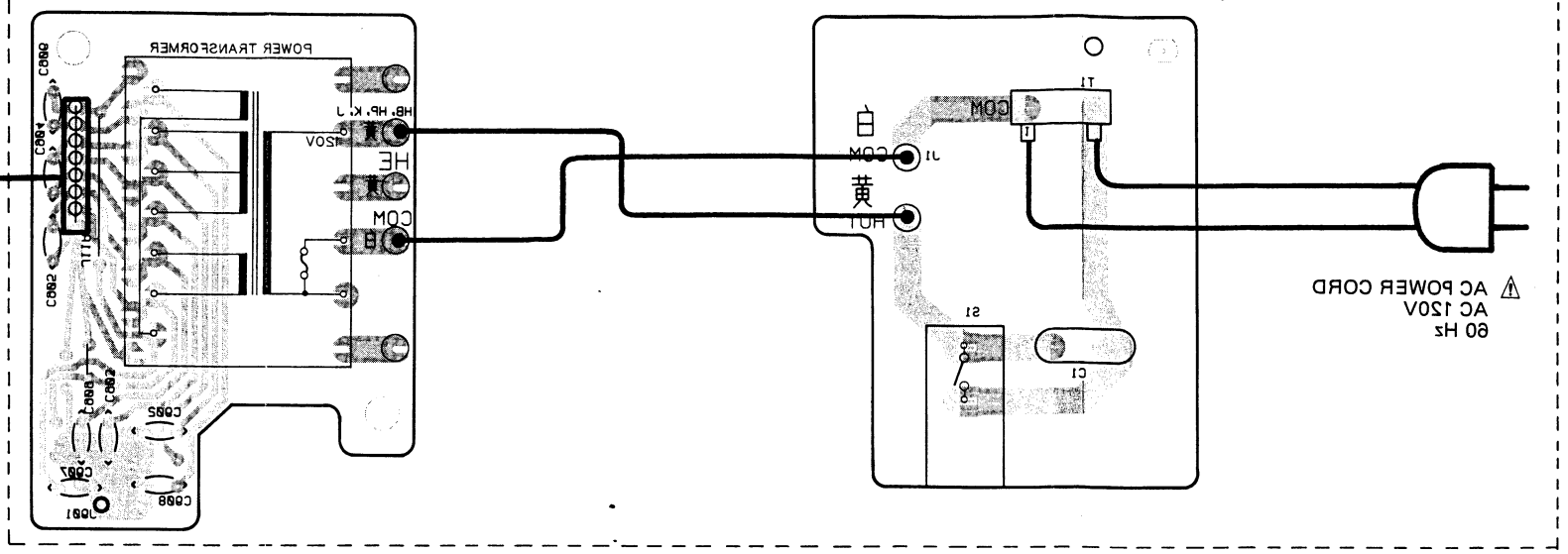
ASSEMBLY  
M, HB  
WM  
KC

PICK UP ASSEMBLY (PEA1030)

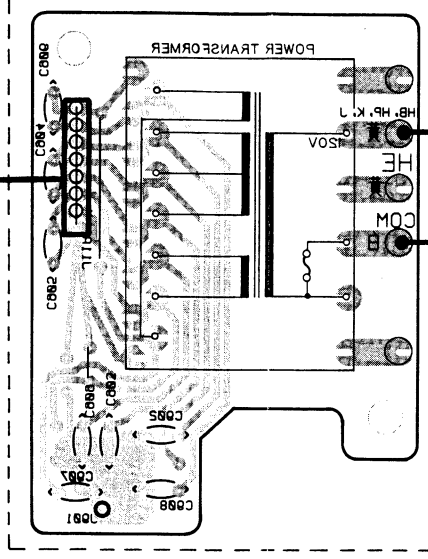


FOR KU AND KC TYPES

PRIMARY BOARD ASSEMBLY

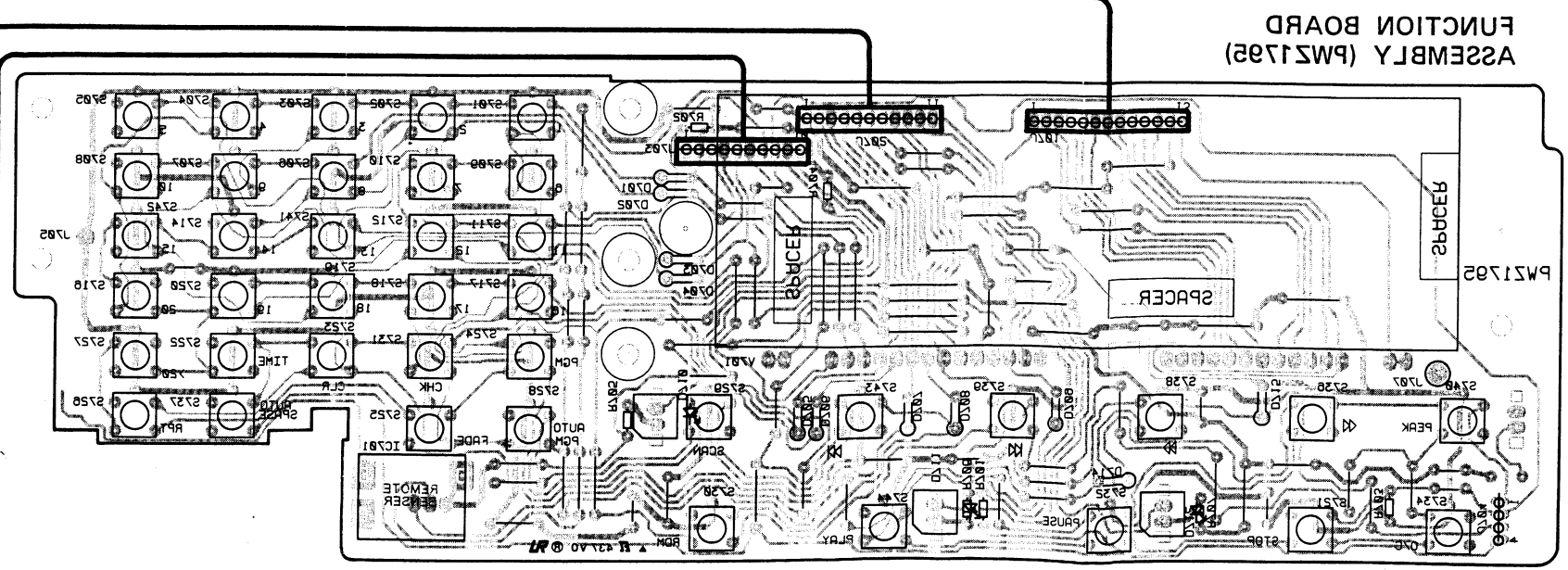


TRANSFORMER BOARD ASSEMBLY



MAIN BOARD ASSEMBLY (PW21810: HEM, HB, HPW, 2D, HEMW, TYPES) (PW21814: KU, KC, TYPES)

IC121 (CASSIF) TERMINAL VOLTAGE	IC121 (CASSIF) TERMINAL VOLTAGE
1 5.0	1 5.0
2 5.0	2 5.0
3 4.0	3 5.0
4 1.8	4 1.8
5 1.8	5 1.8
6 1.8	6 1.8
7 1.8	7 1.8
8 1.8	8 1.8
9 1.8	9 1.8
10 1.8	10 1.8
11 1.8	11 1.8
12 1.8	12 1.8
13 1.8	13 1.8
14 1.8	14 1.8
15 1.8	15 1.8
16 1.8	16 1.8
17 1.8	17 1.8
18 1.8	18 1.8
19 1.8	19 1.8
20 1.8	20 1.8
21 1.8	21 1.8
22 1.8	22 1.8
23 1.8	23 1.8
24 1.8	24 1.8
25 1.8	25 1.8
26 1.8	26 1.8
27 1.8	27 1.8
28 1.8	28 1.8
29 1.8	29 1.8
30 1.8	30 1.8
31 1.8	31 1.8
32 1.8	32 1.8
33 1.8	33 1.8
34 1.8	34 1.8
35 1.8	35 1.8
36 1.8	36 1.8
37 1.8	37 1.8
38 1.8	38 1.8
39 1.8	39 1.8
40 1.8	40 1.8
41 1.8	41 1.8
42 1.8	42 1.8
43 1.8	43 1.8
44 1.8	44 1.8
45 1.8	45 1.8
46 1.8	46 1.8
47 1.8	47 1.8
48 1.8	48 1.8
49 1.8	49 1.8
50 1.8	50 1.8
51 1.8	51 1.8
52 1.8	52 1.8
53 1.8	53 1.8
54 1.8	54 1.8
55 1.8	55 1.8
56 1.8	56 1.8
57 1.8	57 1.8
58 1.8	58 1.8
59 1.8	59 1.8
60 1.8	60 1.8
61 1.8	61 1.8
62 1.8	62 1.8
63 1.8	63 1.8
64 1.8	64 1.8
65 1.8	65 1.8
66 1.8	66 1.8
67 1.8	67 1.8
68 1.8	68 1.8
69 1.8	69 1.8
70 1.8	70 1.8
71 1.8	71 1.8
72 1.8	72 1.8
73 1.8	73 1.8
74 1.8	74 1.8
75 1.8	75 1.8
76 1.8	76 1.8
77 1.8	77 1.8
78 1.8	78 1.8
79 1.8	79 1.8
80 1.8	80 1.8
81 1.8	81 1.8
82 1.8	82 1.8
83 1.8	83 1.8
84 1.8	84 1.8
85 1.8	85 1.8
86 1.8	86 1.8
87 1.8	87 1.8
88 1.8	88 1.8
89 1.8	89 1.8
90 1.8	90 1.8
91 1.8	91 1.8
92 1.8	92 1.8
93 1.8	93 1.8
94 1.8	94 1.8
95 1.8	95 1.8
96 1.8	96 1.8
97 1.8	97 1.8
98 1.8	98 1.8
99 1.8	99 1.8
100 1.8	100 1.8



1	5.0
2	5.0
3	4.0
4	1.8
5	1.8
6	1.8
7	1.8
8	1.8
9	1.8
10	1.8
11	1.8
12	1.8
13	1.8
14	1.8
15	1.8
16	1.8
17	1.8
18	1.8
19	1.8
20	1.8
21	1.8
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23	1.8
24	1.8
25	1.8
26	1.8
27	1.8
28	1.8
29	1.8
30	1.8
31	1.8
32	1.8
33	1.8
34	1.8
35	1.8
36	1.8
37	1.8
38	1.8
39	1.8
40	1.8
41	1.8
42	1.8
43	1.8
44	1.8
45	1.8
46	1.8
47	1.8
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51	1.8
52	1.8
53	1.8
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62	1.8
63	1.8
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77	1.8
78	1.8
79	1.8
80	1.8
81	1.8
82	1.8
83	1.8
84	1.8
85	1.8
86	1.8
87	1.8
88	1.8
89	1.8
90	1.8
91	1.8
92	1.8
93	1.8
94	1.8
95	1.8
96	1.8
97	1.8
98	1.8
99	1.8
100	1.8

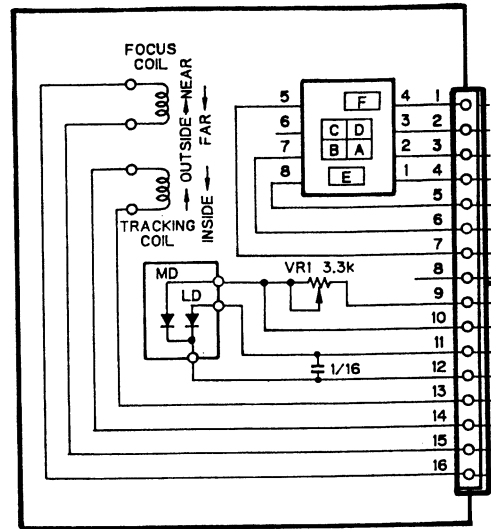
A  
B  
C  
D





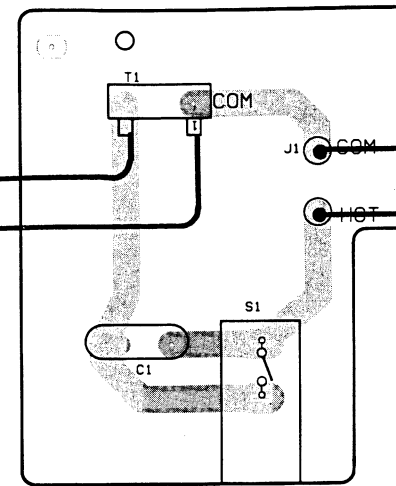


PICK UP ASSEMBLY (PEA1030)

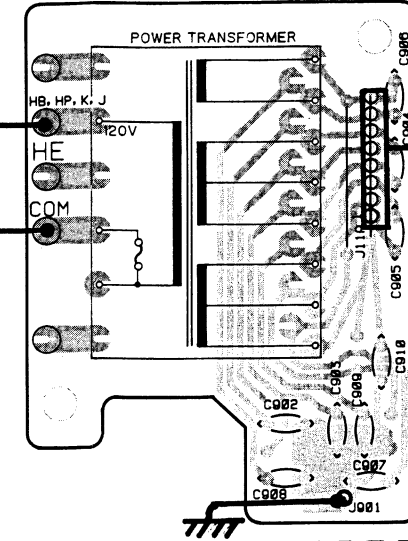


FOR KU AND KC TYPES

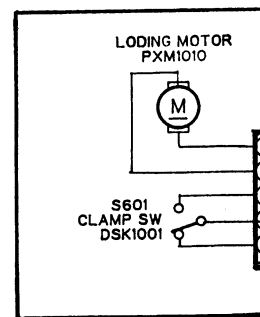
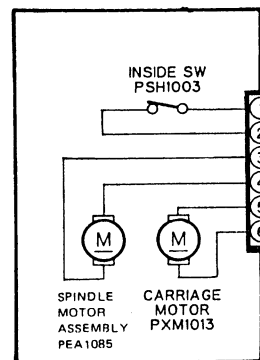
PRIMARY BOARD ASSEMBLY



TRANSFORMER BOARD ASSEMBLY



MAIN BOARD ASSEMBLY  
(PWZ1785: KU, KC,  
HPW TYPES)  
(PWZ1780: HEW,  
HB, SD TYPES)



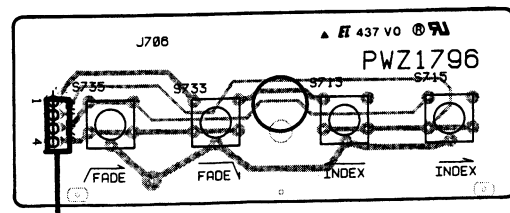
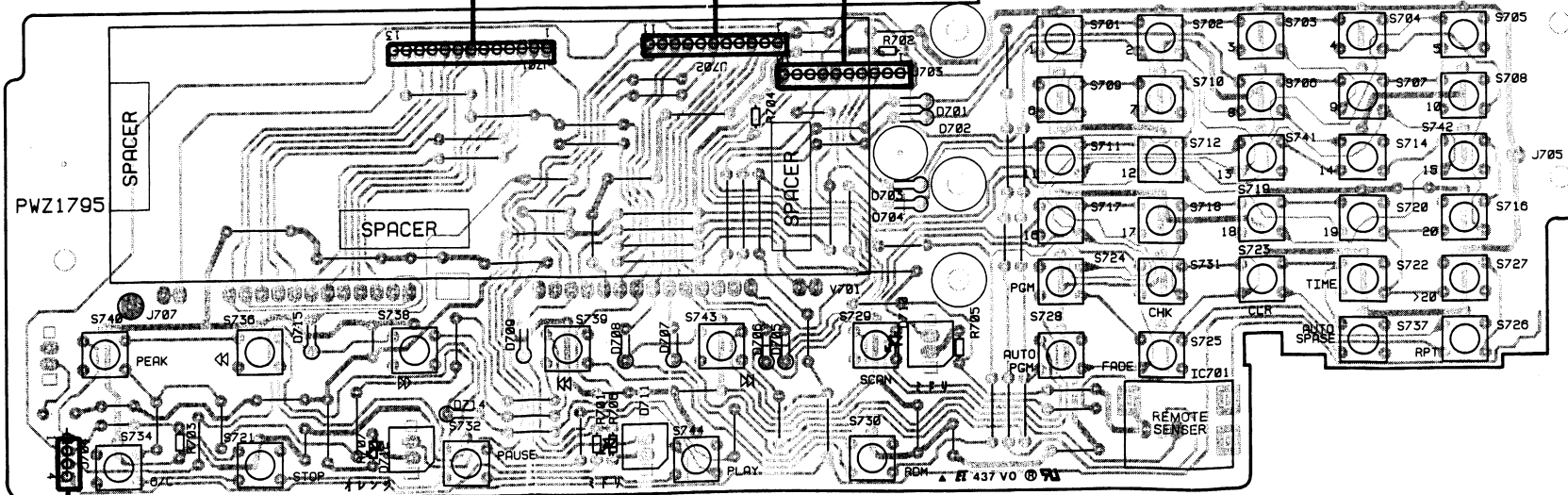
IC151 (TC9220F-002) TERMINAL VOLTAGE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.0	5.0	1.7	2.1	2.0	0	2.0	—	4.0	2.2	5.0	0	0	0	0
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2.5	2.5	2.5	1.8	3.5	2.5	0	5.0	4.7	—	2.5	—	0.1	0	1.7
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
—	—	—	—	—	4.9	4.9	0	4.9	—	4.9	—	—	—	—
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
2.0	—	2.0	—	2.0	—	4.0	5.0	0	4.9	4.9~5.0	4.9~5.0	5.0	5.0	1.2

IC301 (TC9221F) TERMINAL VOLTAGE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.0	2.0	4.0	1.8	2.0	2.0	2.0	—	—	—	—	—	—	2.5	2.5
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.1	2.7	—	2.4	2.5	2.5	—	5.0	2.5	2.5	2.5	2.5	2.5	2.4~2.7	2.1~2.5
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
3.9	2.5	1.6~3.4	1.6~1.7	1.6~1.7	1.5~1.7	1.6~1.7	1.6~1.7	1.3~1.4	1.4~1.5	1.3~1.4	—	—	—	3.6~3.8
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
4.6	4.6	0	4.5	4.3~4.4	2.5	4.7	5.0	0	2.9	3.5	1.8	2.5	—	2.0

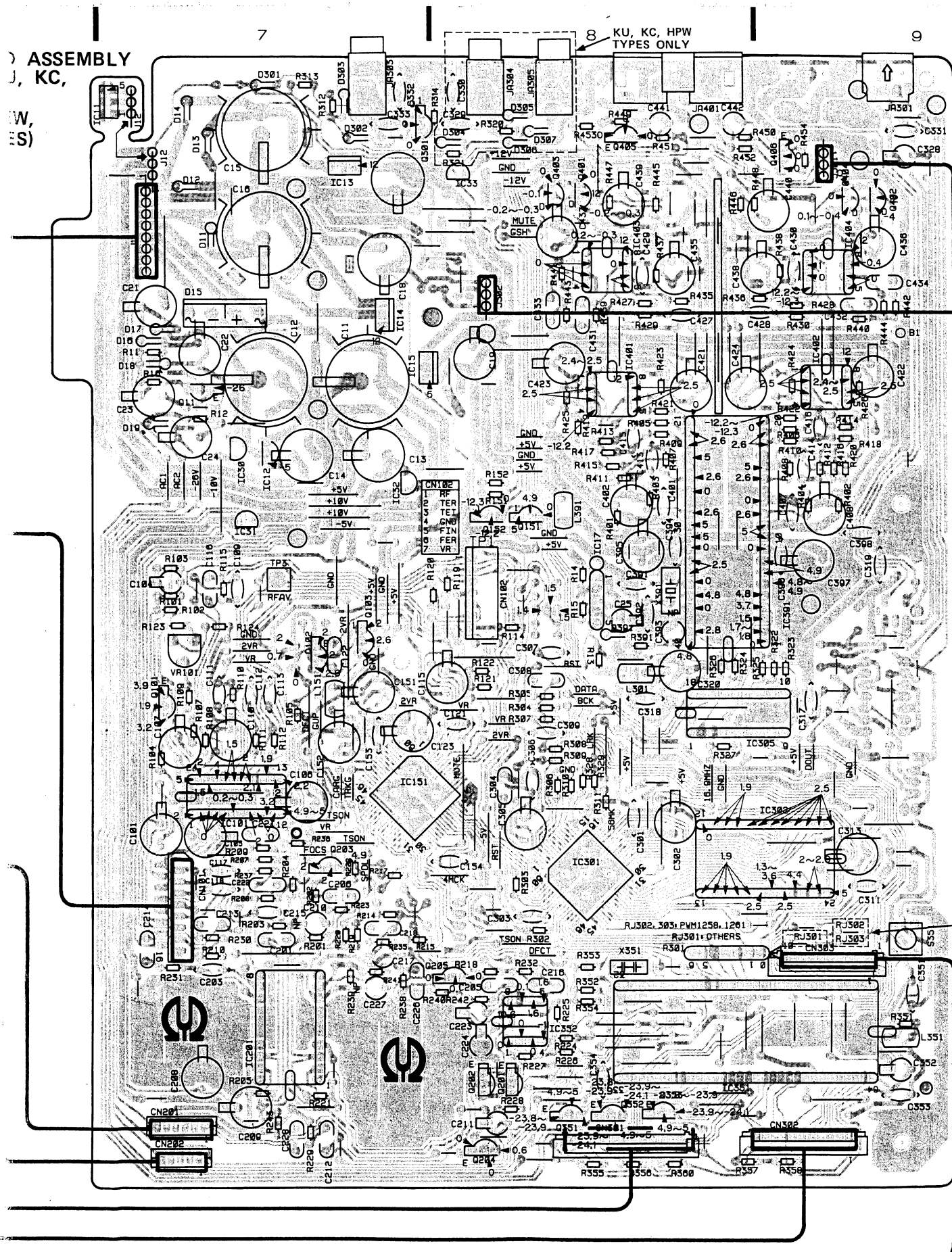
FUNCTION BOARD ASSEMBLY (PWZ1795)



1
-23.5
14
4.9
27
4.9
40
-23.9~
53
0



ASSEMBLY  
J, KC,  
W,  
S)

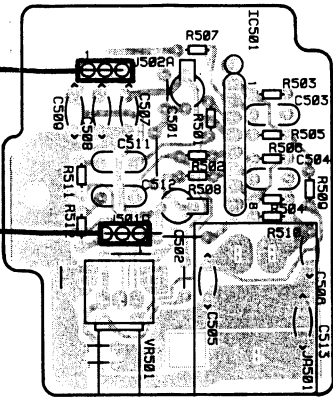


- IC11
- Q301
- Q405
- Q406
- IC13 IC33
- Q403 Q401
- Q404 Q402
- IC403 IC404
- IC14
- IC15
- Q11
- IC401 IC402
- IC30 IC12
- IC32
- IC31
- Q152 Q151
- IC391
- IC17
- Q103
- Q102
- Q101
- IC305
- IC101 IC151
- IC302
- Q203 IC301

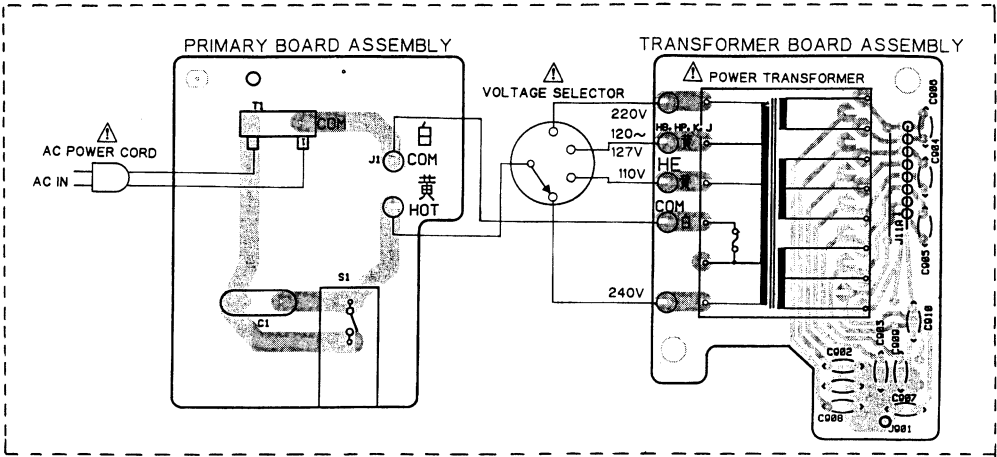
TYPES	KU, KC HPW	HEM, HB SD
JUMPERS		
RJ301	Open	Used
RJ302	Used	Open
RJ303		
Q205		

- IC201 IC352
- IC351
- Q202 Q201
- Q351 Q352 Q353
- Q204

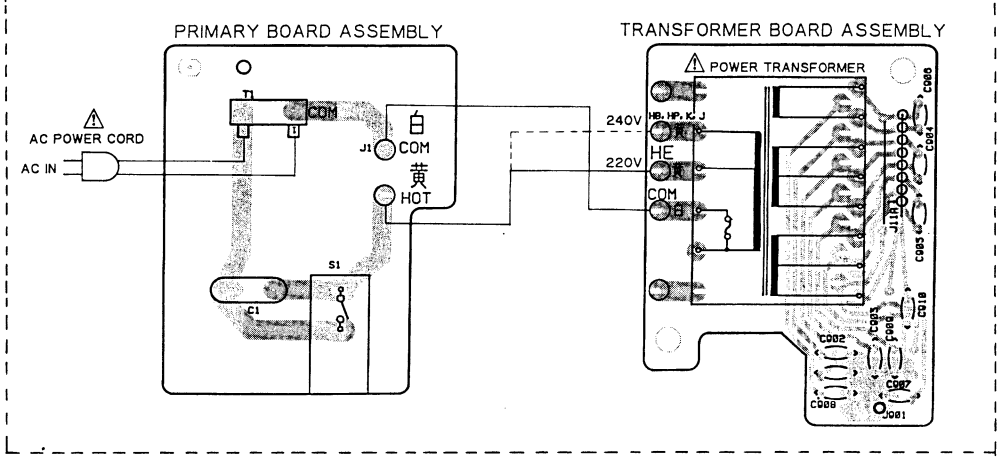
HEADPHONE BOARD ASSEMBLY



FOR SD TYPE



FOR HEM, HB AND HPW TYPES



IC351 (PD4276) TERMINAL VOLTAGE

1	2	3	4	5	6	7	8	9	10	11	12	13
-23.5	-17.2~14.4	-6.2~9.1	-3.3~6.0	0	0	0	0	4.9	4.9~5.0	0	5.0	4.9
14	15	16	17	18	19	20	21	22	23	24	25	26
4.9	3.8	4.6	4.5	4.5	4.5	4.3	4.9	0	0	0	5.0	0
27	28	29	30	31	32	33	34	35	36	37	38	39
4.9	0	0	2.3	2.5	0	0	4.9	0	4.9	0	4.9	4.6~4.7
40	41	42	43	44	45	46	47	48	49	50	51	52
-23.9~24.1	-23.9~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24	0	4.3	5.0
53	54	55	56	57	58	59	60	61	62	63	64	65
0	-3.2~3.5	-14.4~14.6	-26.7	-5	-5.2~5.6	-2.9~3.3	-0.7~3.5	2.0~2.1	-0.2~3.3	-0.6~3.7	4.9~5.0	

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

- This P.C.B. connection diagram is viewed from the parts mounted side.
- 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.
- The capacitor terminal marked with shows negative terminal.
- The diode marked with shows cathode side.
- The transistor terminal marked with shows emitter.

7

8 KU, KC, HPW  
TYPES ONLY

9

10

11

7

8

9

10

11

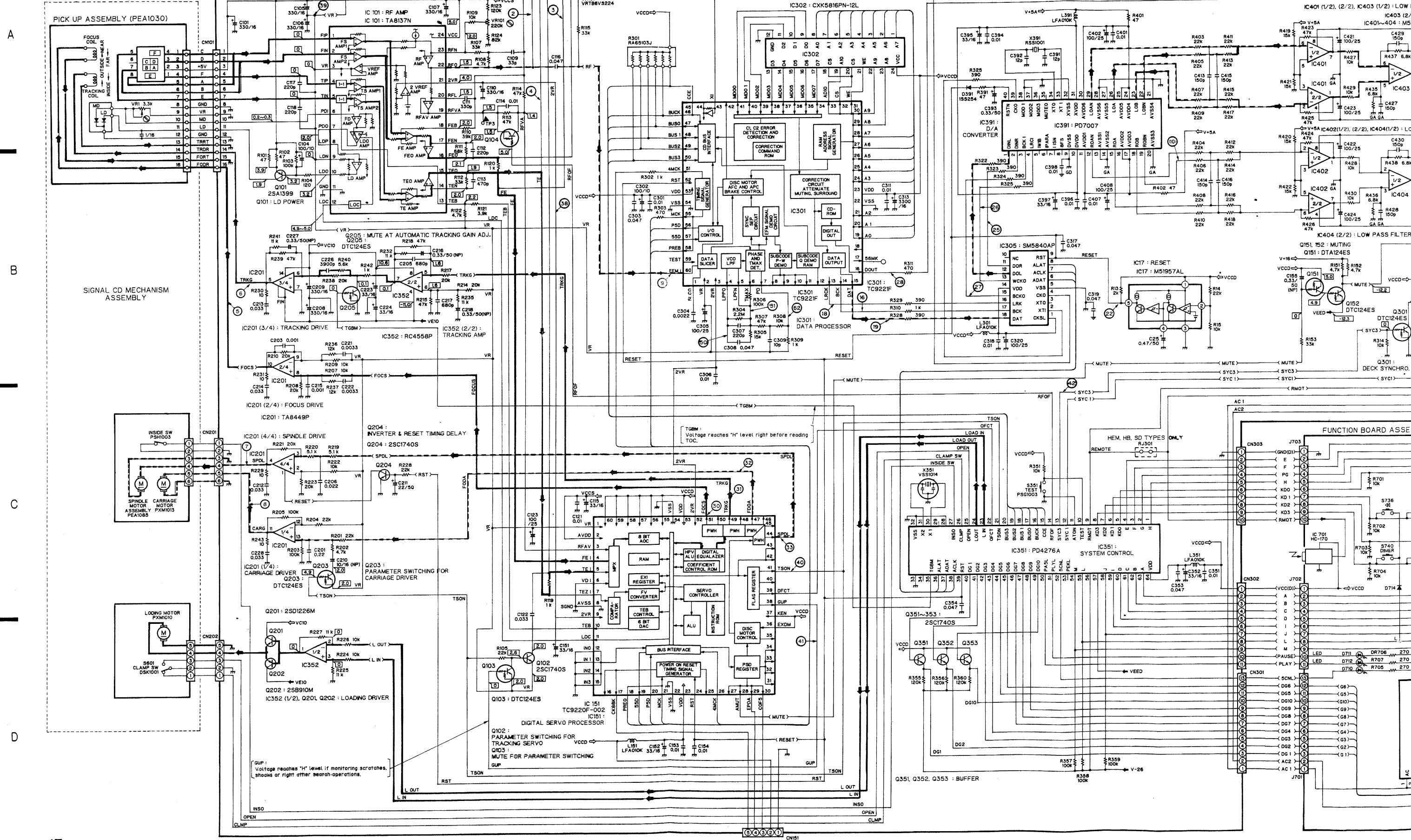
12

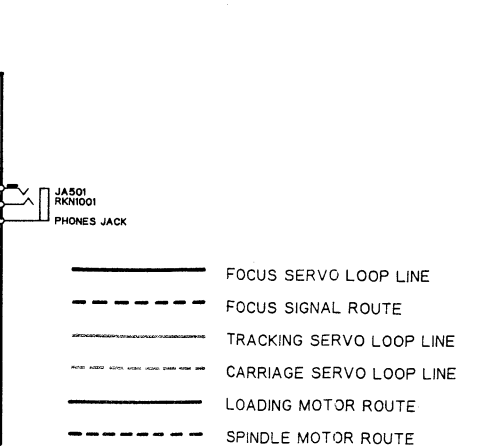
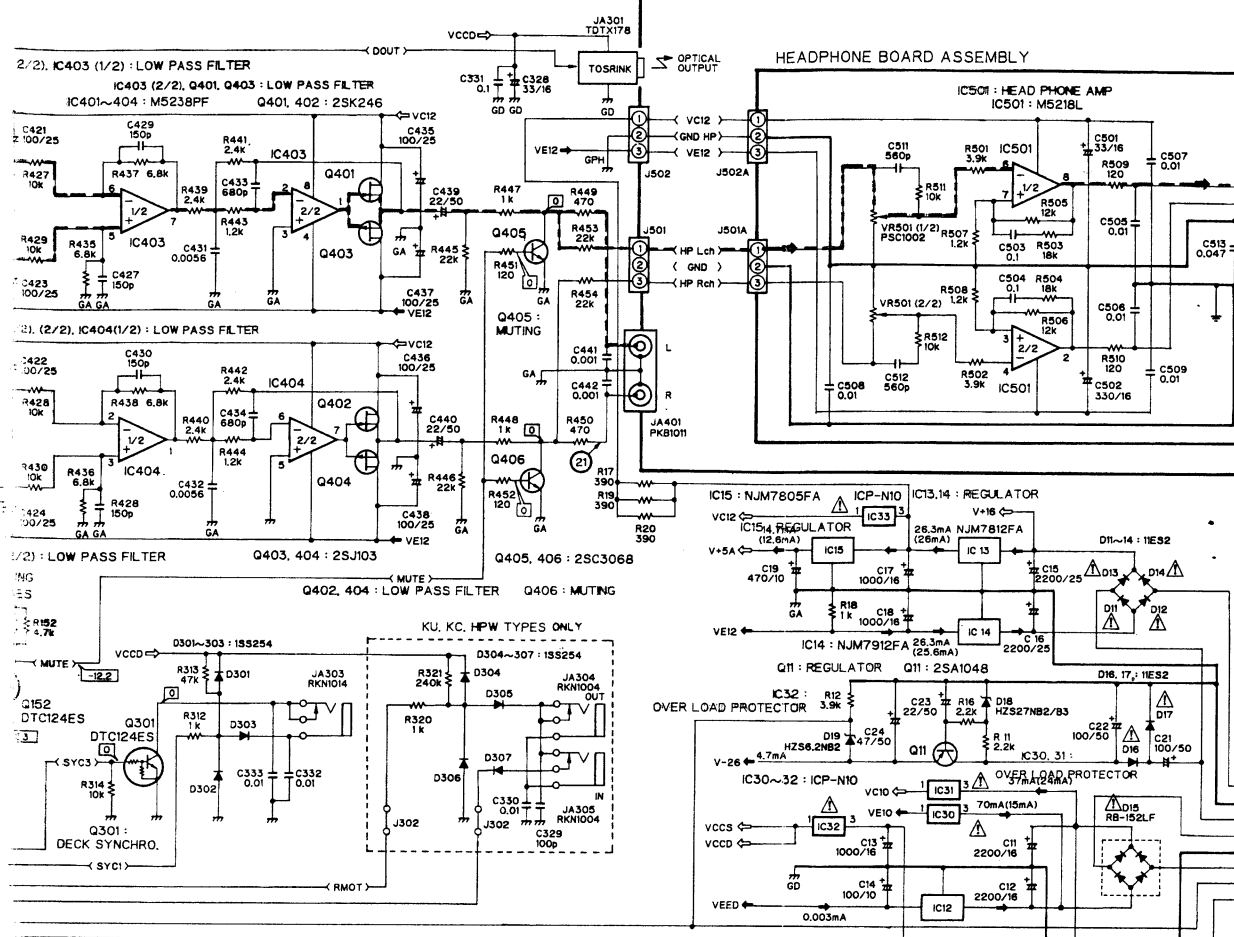
# 4. SCHEMATIC DIAGRAM AND P.C. BOARD CONNECTION DIAGRAM

(PWZ1785 : KU, KC, HPW TYPES)

MAIN BOARD ASSEMBLY (PWZ1780 : HEM, HB, SD TYPES)

(TP 1) (TP 2)

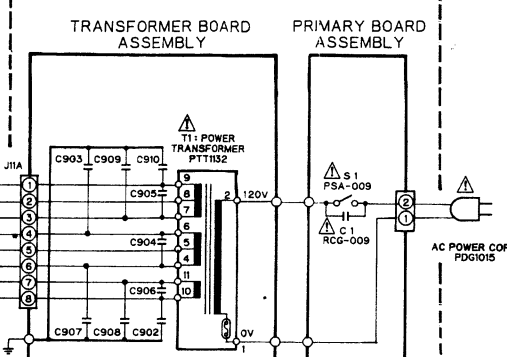




- FOCUS SERVO LOOP LINE
- - - - FOCUS SIGNAL ROUTE
- TRACKING SERVO LOOP LINE
- - - - CARRIAGE SERVO LOOP LINE
- LOADING MOTOR ROUTE
- - - - SPINDLE MOTOR ROUTE

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE REPLACE WITH SAME TYPE NO. ICP-N10. MFD BY ROHM CO. LTD. FOR IC30-IC33

FOR KU AND KC TYPES



IC301 (TC9221F) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	2.0	17	2.7	33	1.6~3.4	49	4.5
2	2.0	18	2.7	34	1.6~1.7	50	4.3~4.4
3	4.0	19	2.4	35	1.6~1.7	51	2.5
4	1.8	20	2.5	36	1.5~1.7	52	4.7
5	2.0	21	2.5	37	1.6~1.7	53	5.0
6	2.0	22	5.0	38	1.6~1.7	54	0
7	2.0	23	5.0	39	1.3~1.4	55	2.9
8	2.4	24	2.5	40	1.4~1.5	56	3.5
9	2.5	25	2.5	41	1.3~1.4	57	1.8
10	2.6	26	2.5	42	1.3~1.4	58	2.5
11	2.7	27	2.5	43	1.3~1.4	59	2.0
12	2.8	28	2.5	44	1.3~1.4	60	2.0
13	2.9	29	2.4~2.7	45	3.6~3.8		
14	2.5	30	2.1~2.5	46	4.6		
15	2.5	31	3.9	47	4.6		
16	6.1	32	2.5	48	0		

- NOTE:
- RESISTORS:**  
Indicated in  $\Omega$ , 1/8W & 1/4W,  $\pm 5\%$  tolerance unless otherwise noted k;  $k\Omega$ , M;  $M\Omega$ , (F);  $\pm 1\%$ , (G);  $\pm 2\%$ , (K);  $\pm 10\%$ , (M);  $\pm 20\%$  tolerance
  - CAPACITORS:**  
Indicated in capacity ( $\mu F$ )/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.
  - VOLTAGE, CURRENT:**  
□: DC voltage (V) at no input signal  
Value in ( ) is DC voltage in play state.  
mA; DC current at no input signal value in ( ) is DC current in play state.
  - OTHERS:**  
⊙: Signal route.  
⊙: Adjusting point.

The  $\Delta$  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.  
The underlined indicates the switch position.

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

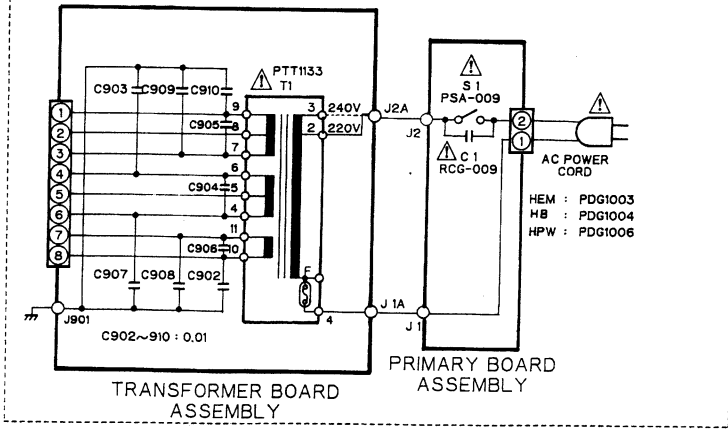
IC351 (PD4276A) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	-23.5	17	4.5	33	0	49	-24
2	-17.2~14.4	18	4.5	34	4.9	50	0
3	-6.2~-9.1	19	4.5	35	0	51	4.3
4	-3.3~-6.0	20	4.3	36	4.9	52	0
5	0	21	4.9	37	0	53	0
6	0	22	0	38	4.9	54	-3.2~-3.5
7	0	23	0	39	4.6~4.7	55	-14.4~-14.5
8	0	24	0	40	-23.9~-24.1	56	-26.7
9	4.9	25	5.0	41	-23.9~-24.1	57	-5
10	4.9~5.0	26	0	42	-24.0~-24.1	58	-5.2~-5.6
11	0	27	4.9	43	-24.0~-24.1	59	-2.9~-3.3
12	5.0	28	0	44	-24.0~-24.1	60	-0.7~-3.5
13	4.9	29	0	45	-24.0~-24.1	61	2.0~2.1
14	4.9	30	2.3	46	-24.0~-24.1	62	-0.2~-3.3
15	3.8	31	2.5	47	-24.0~-24.1	63	-0.6~-3.7
16	4.6	32	0	48	-24.0~-24.1	64	4.9~5.0

IC391 (PD7007) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	0	17	5.0	33	2.5
2	1.7~1.8	18	2.6	34	2.5
3	1.5	19	2.6	35	0
4	3.7	20	0	36	4.8
5	4.8	21	0	37	0
6	4.8~4.9	22	2.6	38	0
7	4.9	23	2.6	39	2.8
8	4.9	24	5.0	40	4.8
9	0	25	5.0		
10	5.0	26	2.6		
11	5.0	27	0		
12	2.6	28	0		
13	0	29	2.6		
14	0	30	5.0		
15	2.6	31	5.0		
16	5.0	32	0		

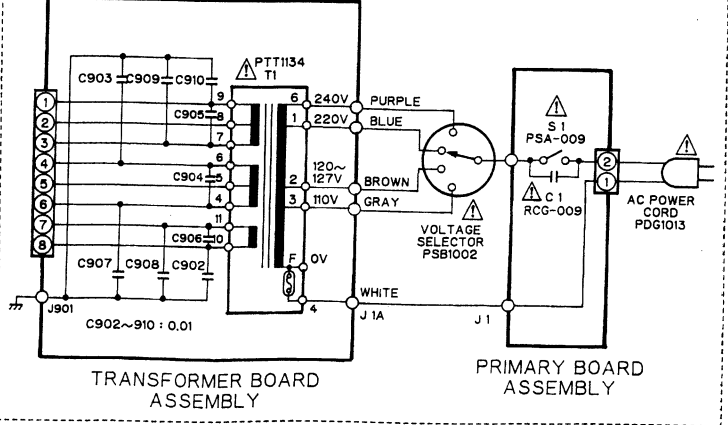
FOR HEM, HB AND HPW TYPES



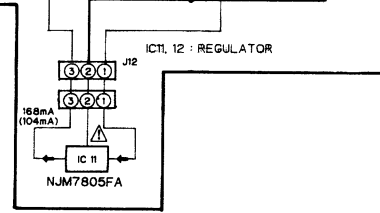
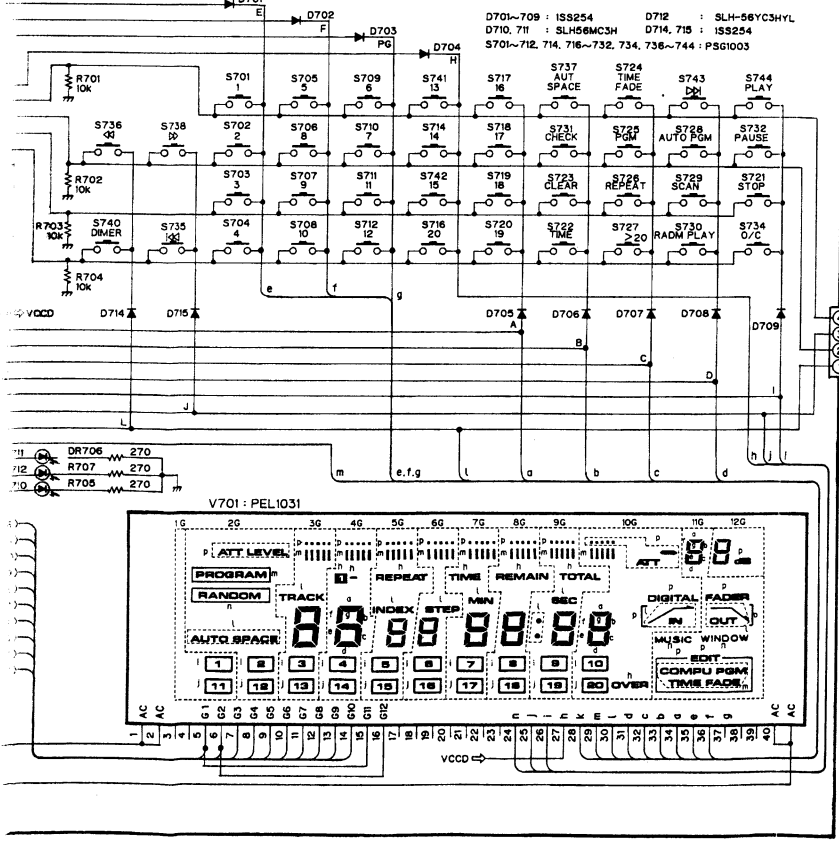
IC302 (CXK5816PN-12L) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	2.5				
2	2.5				
3	2.5				
4	2.5				
5	2.5				
6	2.5				
7	2.5				
8	2.5				
9	1.9				
10	1.9				
11	1.9				
12	0				
13	1.9				
14	1.9				
15	1.9				
16	1.9				
17	1.9				
18	2.5				
19	1.3~3.6				
20	2.5				
21	4.4				
22	2.0~2.9				
23	2.0~2.9				
24	5.0				

FOR SD TYPE



CONTROL BOARD ASSEMBLY (PW17195)



IC151 (TC9220F-002) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	2.0	17	2.5	33	4.9	49	2.2
2	5.0	18	2.5	34	5.0	50	2.2
3	1.7	19	1.8	35	5.0	51	2.2
4	2.1	20	3.5	36	4.9	52	4.0
5	2.0	21	2.5	37	1.9	53	5.0
6	0	22	0	38	0	54	0
7	2.0	23	5.0	39	4.9	55	4.9
8	2.4	24	4.7	40	5.6	56	4.9~5.0
9	4.0	25	4.1	41	4.9	57	4.9~5.0
10	2.2	26	2.5	42	5.6	58	5.0
11	5.0	27	4.3	43	5.9	59	5.0
12	0	28	0.1	44	2.4	60	1.2
13	0	29	0	45			
14	0	30	1.7	46	2.0		
15	0	31		47			
16	2.5	32		48	2.0		

IC401 (M5238PF) Terminal Voltages

Pin No.	Voltages
1	2.4~2.5
2	2.5
3	2.5
4	-12.2
5	2.5
6	2.5
7	2.5
8	12.0

IC402 (M5238PF) Terminal Voltages

Pin No.	Voltages
1	2.5
2	2.5
3	2.5
4	-12.2~12.3
5	2.5
6	2.5
7	2.4~2.5
8	12.0

IC403 (M5238PF) Terminal Voltages

Pin No.	Voltages
1	-0.2~0.3
2	0
3	0
4	0
5	1.0
6	1.0
7	0
8	12.0

IC404 (M5238PF) Terminal Voltages

Pin No.	Voltages
1	0
2	1.0
3	0
4	-12.2~12.3
5	0
6	0
7	-0.4
8	12

A

B

C

D



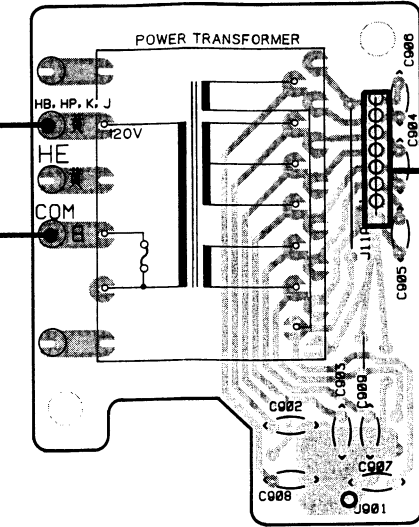
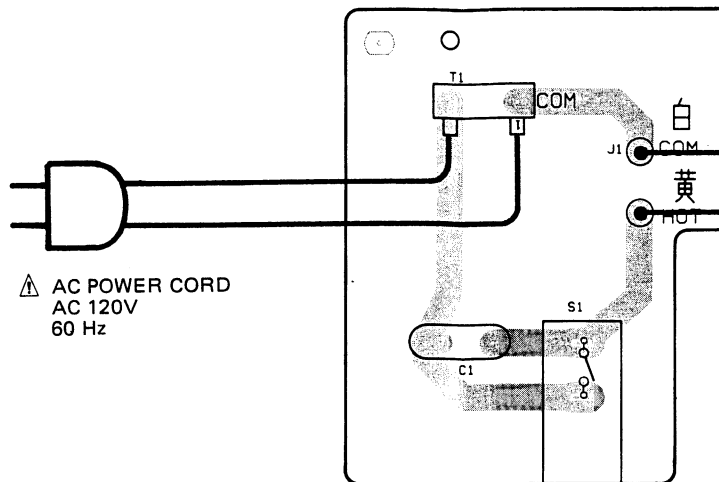
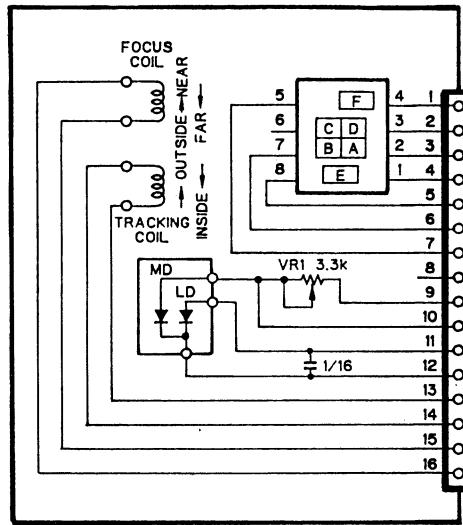
FOR KU AND KC TYPES

PRIMARY BOARD ASSEMBLY

TRANSFORMER BOARD ASSEMBLY

MAIN BOARD ASSEMBLY  
(PWZ1810: HEM, HB, HPW, SD, HEWM TYPES)  
(PWZ1814: KU, KC TYPES)

PICK UP ASSEMBLY (PEA1030)



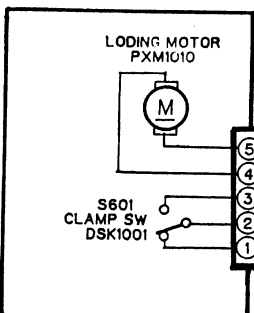
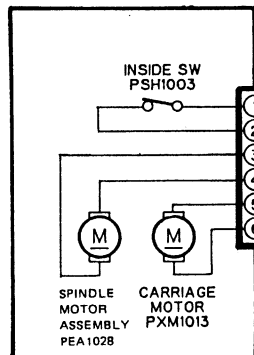
AC POWER CORD  
AC 120V  
60 Hz

IC151 (TC9220F-002) TERMINAL VOLTAGE

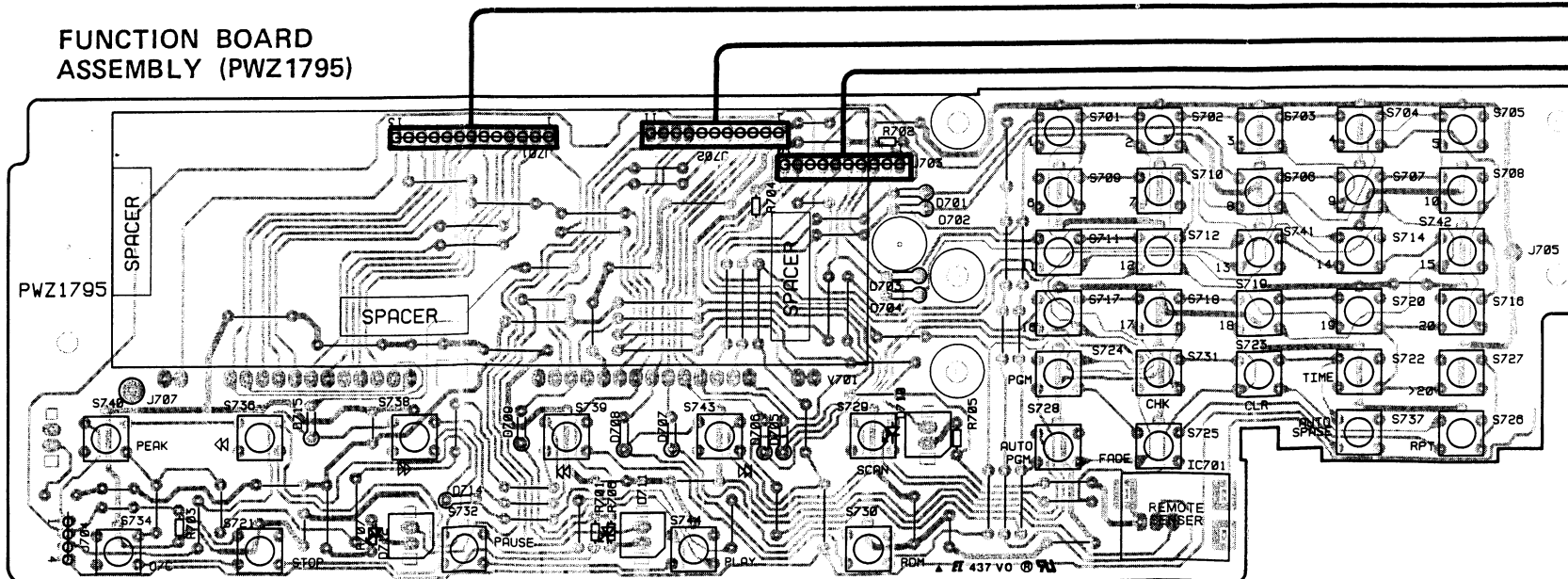
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.0	5.0	1.7	2.1	2.0	0	2.0	—	4.0	2.2	5.0	0	0	0	0
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2.5	2.5	2.5	1.8	3.5	2.5	0	5.0	4.7	—	2.5	—	0.1	0	1.7
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
—	—	—	—	—	4.9	4.9	0	4.9	—	4.9	—	—	2.4	—
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
2.0	—	2.0	—	2.0	—	4.0	5.0	0	4.9	4.9~5.0	4.9~5.0	5.0	5.0	1.2

IC301 (TC9221F) TERMINAL VOLTAGE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.0	2.0	4.0	1.8	2.0	2.0	2.0	—	—	—	—	—	—	2.5	2.5
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.1	2.7	—	2.4	2.5	2.5	—	5.0	2.5	2.5	2.5	2.5	2.5	2.4~2.7	2.1~2.5
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
3.9	2.5	1.6~3.4	1.6~1.7	1.6~1.7	1.5~1.7	1.6~1.7	1.6~1.7	1.3~1.4	1.4~1.5	1.3~1.4	—	—	—	3.6~3.8
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
4.6	4.6	0	4.5	4.3~4.4	2.5	4.7	5.0	0	2.9	3.5	1.8	2.5	—	2.0

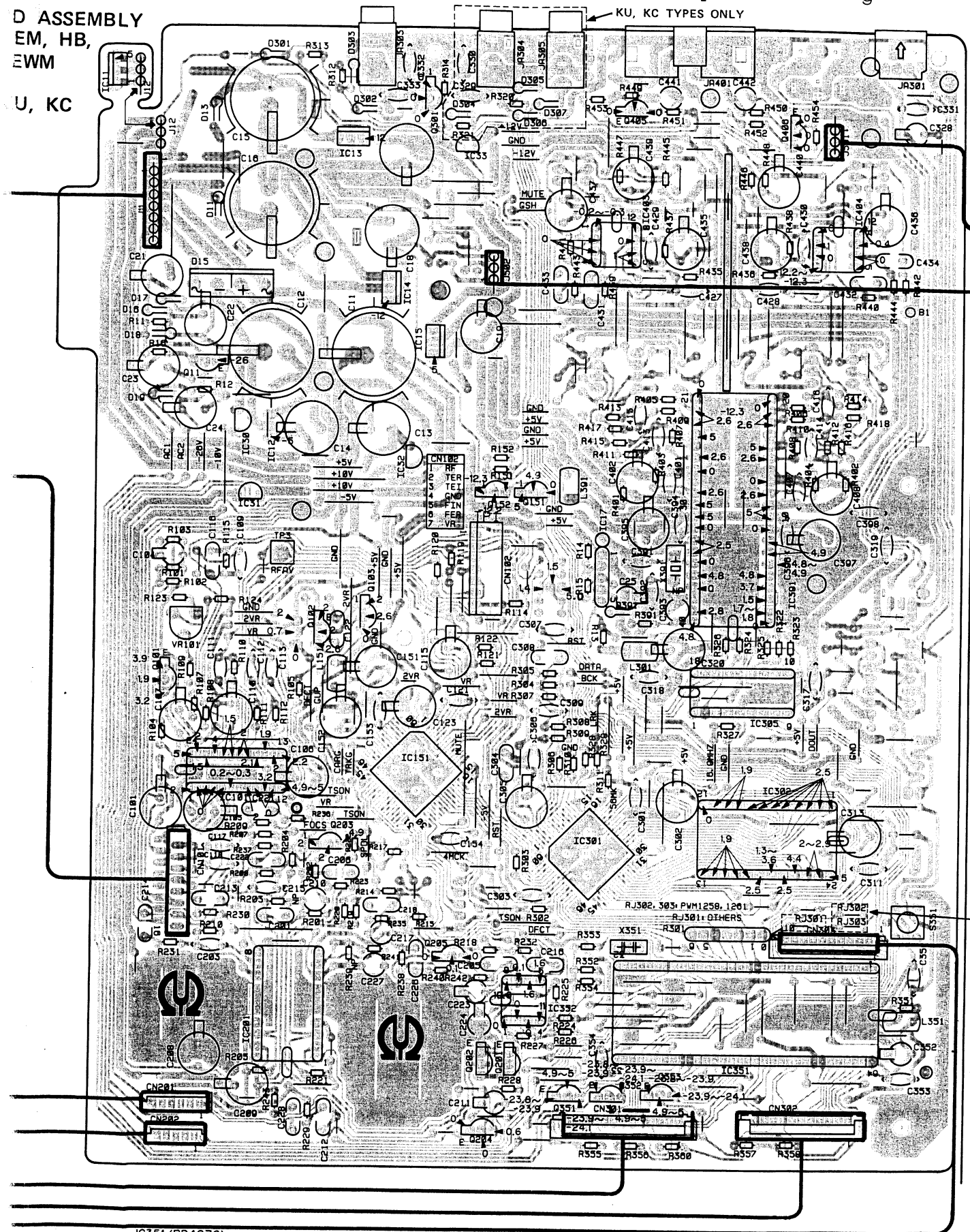


FUNCTION BOARD ASSEMBLY (PWZ1795)

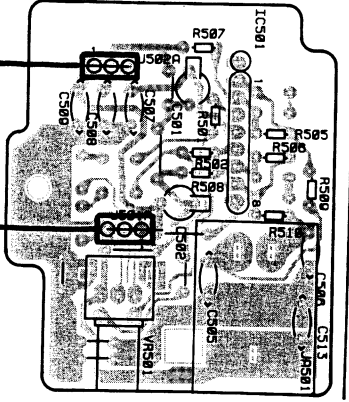


1
-23.5
14
4.9
27
4.9
40
-23.9~2
53
0

D ASSEMBLY  
EM, HB,  
EWM  
U, KC



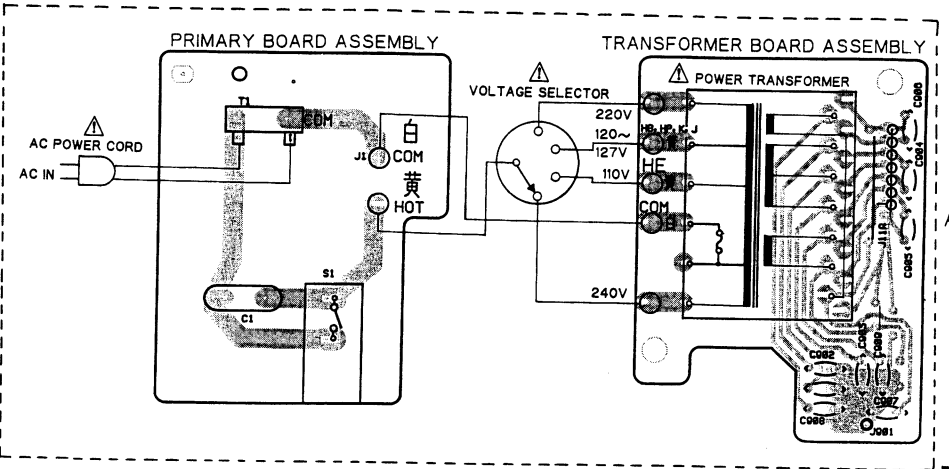
HEADPHONE BOARD ASSEMBLY



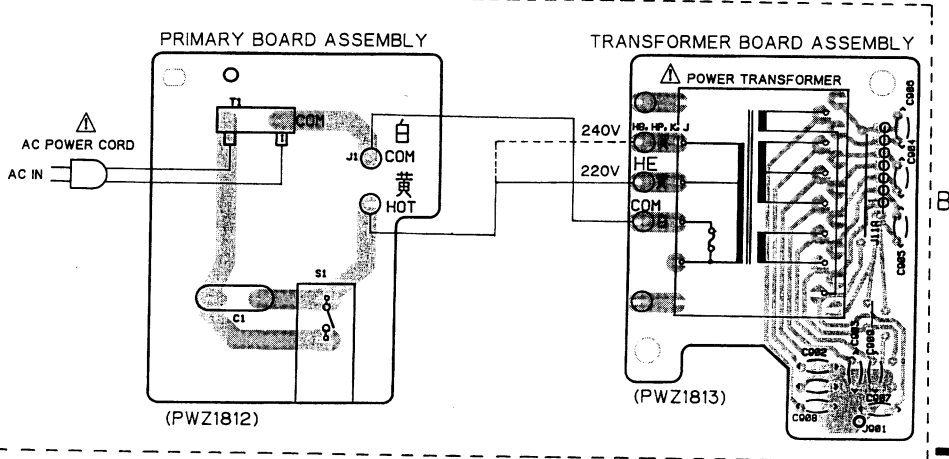
- IC11
- Q301
- Q405
- Q406
- IC13 IC33
- Q403 Q401
- Q404 Q402
- IC403 IC404
- IC14
- IC15
- Q11
- IC401 IC402
- IC30 IC12
- IC32
- IC31
- Q152 Q151
- IC391
- IC17
- Q103
- Q102
- Q101
- IC305
- IC101 IC151
- IC302
- Q203 IC301
- Q205
- IC201 IC352
- IC351
- Q202 Q201
- Q351 Q352 Q353
- Q204

TYPES	KU, KC	HEM, HB, HPW SD, HEWM
JUMPERS		
RJ301	Open	Used
RJ302 RJ303	Used	Open

FOR SD TYPE



FOR HEM, HB, HPW AND HEWM TYPES



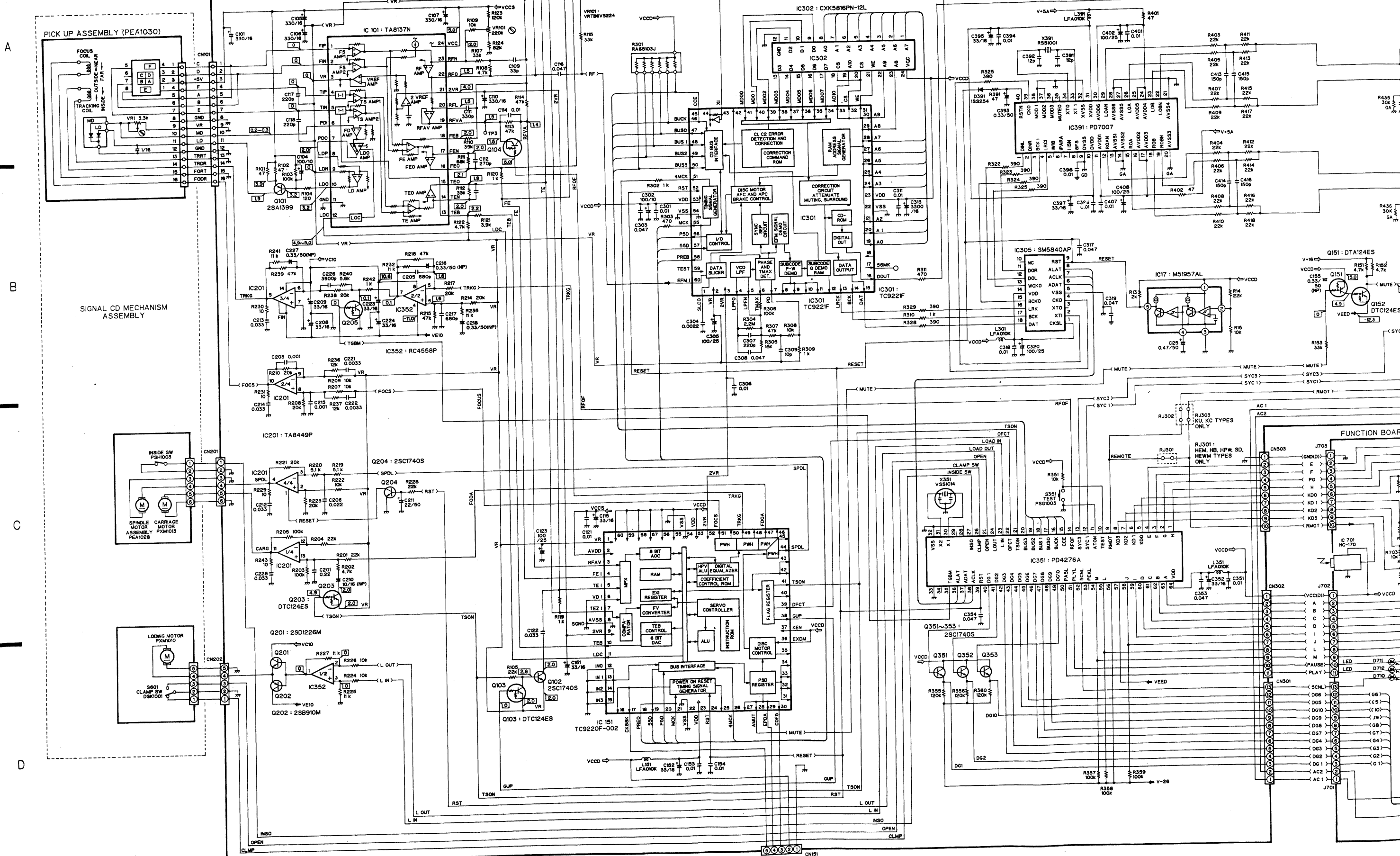
IC351 (PD4276) TERMINAL VOLTAGE

1	2	3	4	5	6	7	8	9	10	11	12	13
-23.5	-17.2~14.4	-6.2~9.1	-3.3~6.0	0	0	0	0	4.9	4.9~5.0	0	5.0	4.9
4.9	3.8	4.6	4.5	4.5	4.5	4.3	4.9	0	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
4.9	0	0	2.3	2.5	0	0	4.9	0	4.9	0	4.9	4.6~4.7
40	41	42	43	44	45	46	47	48	49	50	51	52
-23.9~24.1	-23.9~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	-24.0~24.1	0
53	54	55	56	57	58	59	60	61	62	63	64	0
0	-3.2~3.5	-14.4~14.6	-26.7	-5	-5.2~5.6	-2.9~3.3	-0.7~3.5	2.0~2.1	-0.2~3.3	-0.6~3.7	4.9~5.0	

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
		Zener diode			Electrolytic capacitor (Non polarized)
		LED			Electrolytic capacitor (Noiseless)
		Varactor			Electrolytic capacitor (Polarized)
		Tact switch			Power capacitor
		Resistor array			Semi-fixed resistor
		Resistor			Resistor
		Inductor			Resonator
		Coil			Thermistor
		Filter			

- This P.C.B. connection diagram is viewed from the parts mounted side.
- 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.
- The capacitor terminal marked with shows negative terminal.
- The diode marked with shows cathode side.
- The transistor terminal marked with shows emitter.

MAIN BOARD ASSEMBLY (PWZ1810 : HEM, HB, HPW, SD, HEWM TYPES)



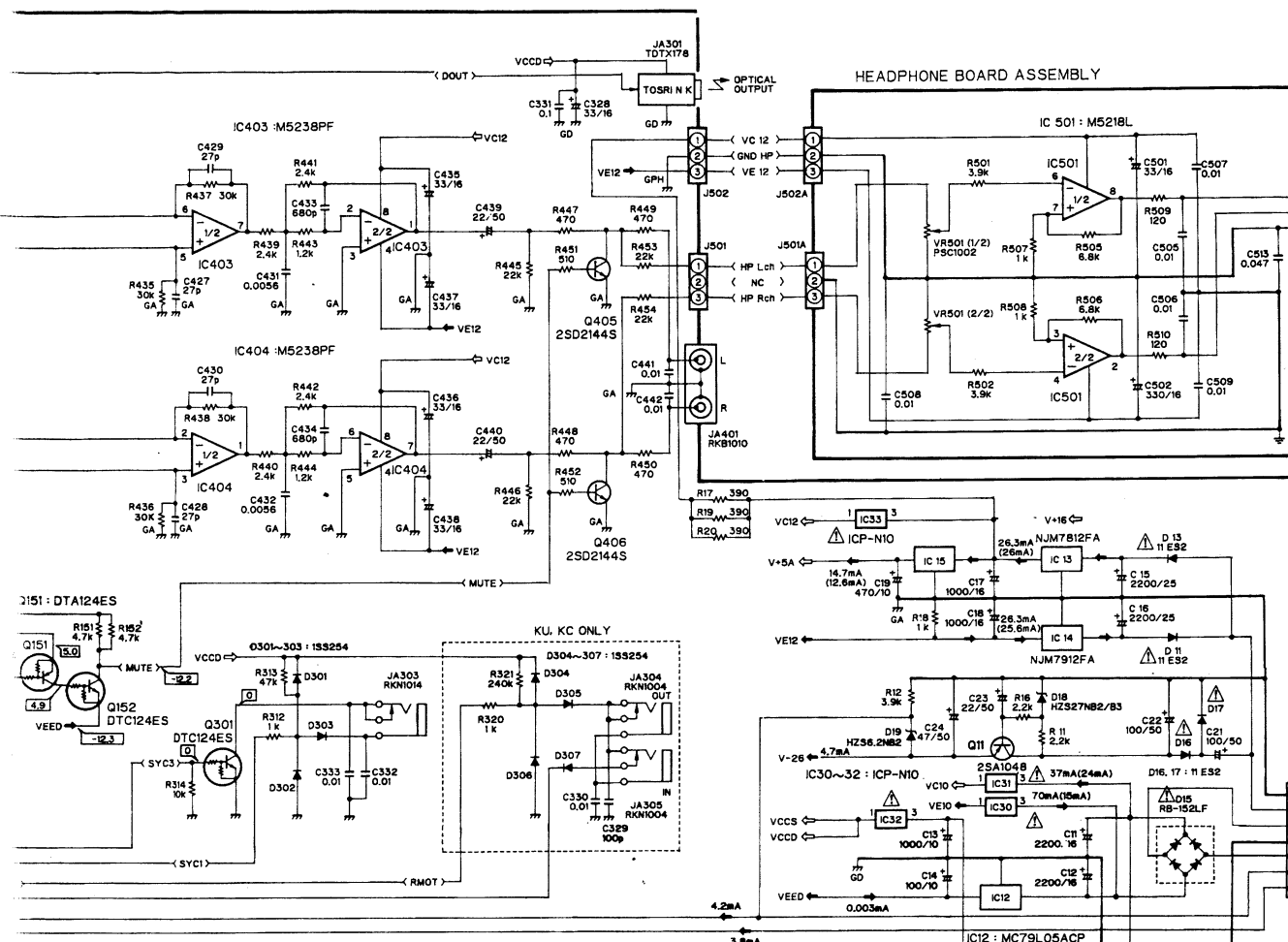
A

B

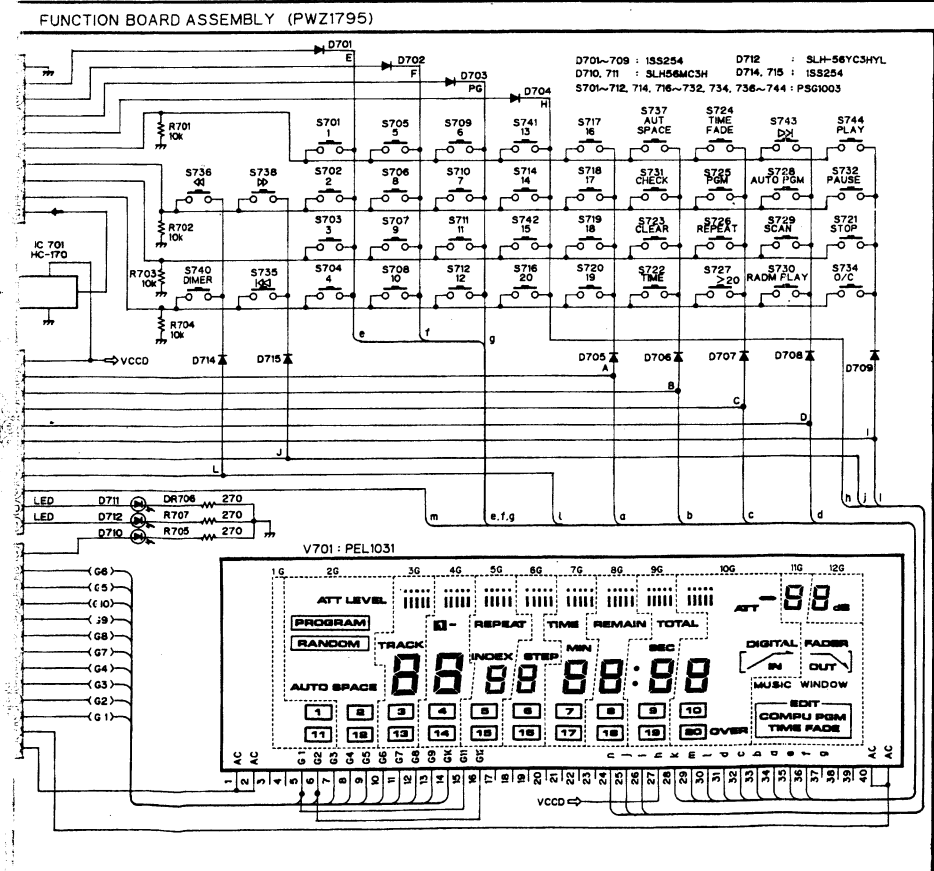
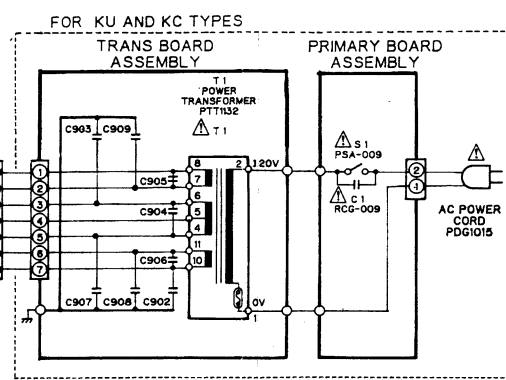
C

D





CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE REPLACE WITH SAME TYPE NO. ICP-N10, MFD BY ROHM CO. LTD., FOR IC30-IC33



IC151 (TC9220F-002) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	2.0	17	2.5	33	4.9
2	5.0	18	2.5	34	5.0
3	1.7	19	1.8	35	5.0
4	2.1	20	3.5	36	4.9
5	2.0	21	2.5	37	4.9
6	0	22	0	38	0
7	2.0	23	5.0	39	4.9
8	0	24	4.7	40	5.0
9	4.0	25	4.1	41	4.9
10	2.2	26	2.5	42	5.0
11	5.0	27	4.3	43	5.0
12	0	28	0.1	44	2.4
13	0	29	0	45	6.0
14	0	30	1.7	46	2.0
15	0	31	1.7	47	2.0
16	2.5	32	4.8	48	2.0

IC403 (M5238PBF) Terminal Voltages

Pin No.	Voltages
1	0
2	0
3	0
4	0
5	1.0
6	1.0
7	0
8	12.0

IC404 (M5238PBF) Terminal Voltages

Pin No.	Voltages
1	0
2	1.0
3	0
4	-1.5~-2.3
5	0
6	0
7	-0.4
8	12

IC301 (TC9221F) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	2.0	17	2.7	33	1.6~3.4
2	2.0	18	2.4	34	1.6~1.7
3	4.0	19	2.4	35	1.6~1.7
4	1.8	20	2.5	36	1.6~1.7
5	2.0	21	2.5	37	1.6~1.7
6	2.0	22	3.8	38	1.6~1.7
7	2.0	23	5.0	39	1.3~1.4
8	0	24	2.5	40	1.4~1.5
9	0	25	2.5	41	1.3~1.4
10	0	26	2.5	42	5.8
11	0	27	2.5	43	5.9
12	0	28	2.5	44	6.0
13	0	29	2.4~2.7	45	3.6~3.8
14	2.5	30	2.1~2.5	46	4.6
15	2.5	31	3.9	47	4.6
16	6.1	32	2.5	48	0

IC351 (PD4276A) Terminal Voltages

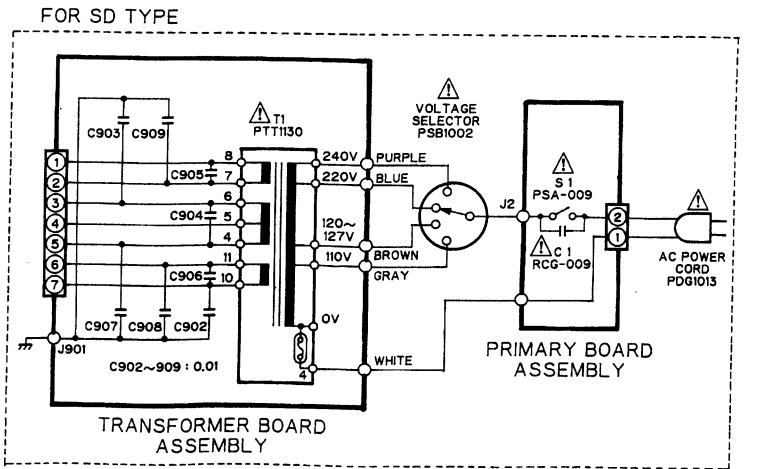
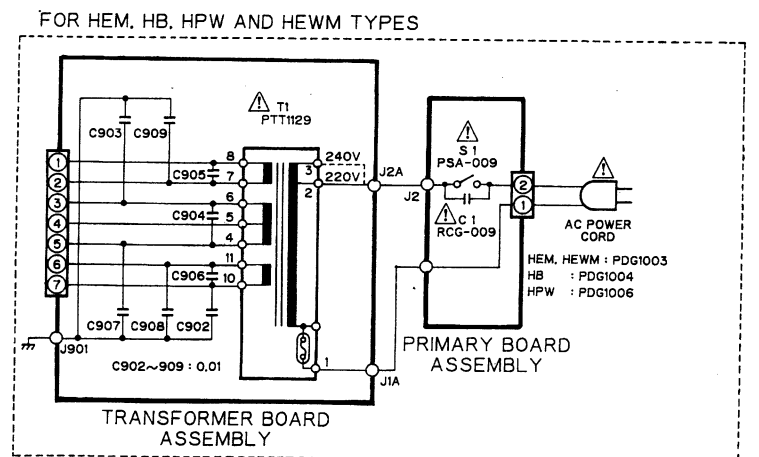
Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	-23.5	17	4.5	33	0
2	-17.2~-14.4	18	4.5	34	4.9
3	-8.2~-8.1	19	4.5	35	0
4	-3.3~-6.0	20	4.3	36	4.9
5	0	21	4.9	37	0
6	0	22	0	38	4.9
7	0	23	0	39	4.8~4.7
8	0	24	0	40	-23.9~-24.1
9	4.9	25	5.0	41	-23.9~-24.1
10	4.9~5.0	26	0	42	-24.0~-24.1
11	0	27	4.9	43	-24.0~-24.1
12	5.0	28	0	44	-24.0~-24.1
13	4.9	29	0	45	-24.0~-24.1
14	4.9	30	2.3	46	-24.0~-24.1
15	3.8	31	2.5	47	-24.0~-24.1
16	4.6	32	0	48	-24.0~-24.1

IC391 (PD7007) Terminal Voltages

Pin No.	Voltages	Pin No.	Voltages	Pin No.	Voltages
1	0	17	5.0	33	2.5
2	1.7~1.8	18	2.8	34	2.5
3	1.5	19	2.6	35	0
4	3.7	20	0	36	4.8
5	4.8	21	0	37	0
6	4.8~4.9	22	2.6	38	0
7	4.9	23	2.6	39	2.8
8	4.9	24	5.0	40	4.8
9	0	25	5.0	41	0
10	5.0	26	2.6	42	0
11	5.0	27	0	43	0
12	2.6	28	0	44	0
13	0	29	2.6	45	0
14	0	30	5.0	46	0
15	2.6	31	5.0	47	0
16	5.0	32	0	48	0

IC302 (CXX5816PN-12L) Terminal Voltages

Pin No.	Voltages
1	2.5
2	2.5
3	2.5
4	2.5
5	2.5
6	2.5
7	2.5
8	2.5
9	1.9
10	1.9
11	1.9
12	0
13	1.9
14	1.9
15	1.9
16	1.9
17	1.9
18	2.5
19	1.3~3.6
20	2.5
21	4.4
22	2.0~2.9
23	2.0~2.9
24	5.0



- NOTE:
- RESISTORS: Indicated in Ω, 1/8W & 1/4W, ±5% tolerance unless otherwise noted; kΩ, MΩ, MΩ (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance
  - CAPACITORS: Indicated in capacity (μF)/voltage (V) unless otherwise noted; p; pF. Indication without voltage is 50V except electrolytic capacitor.
  - VOLTAGE, CURRENT: □: DC voltage (V) at no input signal; Value in ( ) is DC voltage in play state. mA; DC current at no input signal value in ( ) is DC current in play state.
  - OTHERS: ●: Signal route. ○: Adjusting point.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation. \* marked capacitors and resistors have parts numbers. The underlined indicates the switch position.

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

# 5. 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%).

560Ω 56X10 1→561.....RD1/4PS000J  
 47kΩ 47X10 3→473.....RD1/4PS000J  
 0.5Ω 0R5.....RN2H000K  
 1Ω 010.....RS1P000K

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

5.62kΩ 563X10 1→562J.....RN1/4R0000F

Mark NO	Description	Part NO	Mark NO	Description	Part NO
⊙	MAIN BOARD ASSY (PWZ1785) (FOR PD-7500/KU)			Q405,406 TRANSISTOR	2SC3068
	SEMICONDUCTORS		Δ	D11-14 DIODE	11ES2
	IC101 PRE AMP, IC	TA8137N	Δ	D15	RB-152LF
Δ	IC11	NJM7805FA	Δ	D16,17 DIODE	11ES2
	IC12 IC	MC79L05ACP		D18 ZENER DIODE	HZS27NB2
	IC13	NJM7812FA		D19 ZENER DIODE	HZS6.2NB2
	IC14	NJM7912FA		D301-307 DIODE	1SS254
	IC15	NJM7805FA		D391 DIODE	1SS254
	IC151	TC9220F-002		SWITCHES	
	IC17 SYSTEM RESET IC	M51957AL		S351 SWITCH	PSG1003
	IC201 OP AMP, IC	TA8449P		COIL & FILTER & TRANSFORMERS	
Δ	IC30 IC PROTECTOR	ICP-N10		L151 RADIAL INDUCTOR	LFA010K
	IC301	TC9221F		L301 RADIAL INDUCTOR	LFA010K
	IC302 MEMORY IC	CXK5816PN-12L		L351 RADIAL INDUCTOR	LFA010K
	IC305 DIGITAL FILTER, IC	SM5840AP		L391 RADIAL INDUCTOR	LFA010K
Δ	IC31-33 IC PROTECTOR	ICP-N10		CAPACITORS	
	IC351 MICROCOMPUTER	PD4276A		C101 ELECTR.CAPACITOR	CEAS331M16
	IC352 IC	RC4558P		C104 ELECTR.CAPACITOR	CEAS101M10
	IC391 IC	PD7007		C105-107 ELECTR.CAPACITOR	CEAS331M16
	IC401-404	M5238PF		C109 CERAMIC CAPACITOR	CCCCH330J50
	Q101 TRANSISTOR	2SA1399		C11 ELECTR.CAPACITOR	CENA222M16
	Q102 TRANSISTOR	2SC1740S		C110 ELECTR.CAPACITOR	CEAS331M16
	Q103,104 TRANSISTOR	DTC124ES		C111 CERAMIC CAPACITOR	CCCSL331J50
Δ	Q11 TRANSISTOR	2SA1048		C112 CERAMIC CAPACITOR	CCCSL221J50
	Q151 TRANSISTOR	DTA124ES		C113 MYLOR FILM CAPACITOR	CQMA471J50
	Q152 TRANSISTOR	DTC124ES		C114 MYLOR FILM CAPACITOR	CQMA103J50
	Q201	2SD1226M		C115 ELECTR.CAPACITOR	CEAS330M16
	Q202	2SB910M		C116 MYLOR FILM CAPACITOR	CQMA473J50
	Q203 TRANSISTOR	DTC124ES		C117,118 CERAMIC CAPACITOR	CCCSL221J50
	Q204 TRANSISTOR	2SC1740S		C12 ELECTR.CAPACITOR	CENA222M16
	Q205 TRANSISTOR	DTC124ES		C121 CERAMIC CAPACITOR	KCYF103Z50
	Q301 TRANSISTOR	DTC124ES		C122 MYLOR FILM CAPACITOR	CQMA333J50
	Q351-353 TRANSISTOR	2SC1740S		C123 ELECTR.CAPACITOR	CENA101M25
	Q401,402 N-FET	2SK246		C13 ELECTR.CAPACITOR	CENA102M16
	Q403,404 P-FET	2SJ103		C14 ELECTR.CAPACITOR	CEAS101M10
				C15 ELECTR.CAPACITOR	CENA222M25

Mark NO	Description	Part NO
C151, 152	ELECTR. CAPACITOR	CEAS330M16
C153, 154	CERAMIC CAPACITOR	CKCYF103Z50
C155	ELECTR. CAPACITOR	CEANPR33M50
C16	ELECTR. CAPACITOR	CENA222M25
C17, 18	ELECTR. CAPACITOR	CENA102M16
C19	ELECTROLYTIC CAPACITOR	CENA471M10
C201	AUDIO FILM CAPACITOR	CFTXA224J50
C203	MYLOR FILM CAPACITOR	CQMA102J50
C205	MYLOR FILM CAPACITOR	CQMA681J50
C206	MYLOR FILM CAPACITOR	CQMA223J50
C208, 209	ELECTR. CAPACITOR	CEAS331M16
C21	ELECTR. CAPACITOR	CEAS101M50
C210	ELECTR. CAPACITOR	CEANP100M16
C211	ELECTR. CAPACITOR	CENA220M50
C212-214	MYLOR FILM CAPACITOR	CQMA333J50
C215	MYLOR FILM CAPACITOR	CQMA102J50
C216	ELECTROLYTIC CAPACITOR	CEANPR33M50
C217	MYLOR FILM CAPACITOR	CQMA681J50
C218	ELECTROLYTIC CAPACITOR	CEANPR33M50
C22	ELECTR. CAPACITOR	CEAS101M50
C221, 222	MYLOR FILM CAPACITOR	CQMA332J50
C223, 224	ELECTR. CAPACITOR	CEAS330M16
C226	MYLOR FILM CAPACITOR	CQMA392J50
C227	ELECTROLYTIC CAPACITOR	CEANPR33M50
C228	MYLOR FILM CAPACITOR	CQMA333J50
C23	ELECTR. CAPACITOR	CENA220M50
C24	ELECTR. CAPACITOR	CEAS470M50
C25	ELECTR. CAPACITOR	CEASR47M50
C301	CERAMIC CAPACITOR	CKCYF103Z50
C302	ELECTR. CAPACITOR	CEAS101M10
C303	CERAMIC CAPACITOR	CGCYF473Z25
C304	MYLOR FILM CAPACITOR	CQMA222J50
C305	ELECTR. CAPACITOR	CENA101M25
C306	CERAMIC CAPACITOR	CKCYF103Z50
C307	CERAMIC CAPACITOR	CCCSL221J50
C308	MYLOR FILM CAPACITOR	CQMA473J50
C309	CERAMIC CAPACITOR	CCCCH100D50
C311	CERAMIC CAPACITOR	CKCYF103Z50
C313	ELECTR. CAPACITOR	CEAS331M16
C317	CERAMIC CAPACITOR	CGCYF473Z25
C318	CERAMIC CAPACITOR	CKCYF103Z50
C319	CERAMIC CAPACITOR	CGCYF473Z25
C320	ELECTR. CAPACITOR	CENA101M25
C328	ELECTR. CAPACITOR	CEAS330M16
C329	CERAMIC CAPACITOR	CCCSL101J50
C330	CERAMIC CAPACITOR	CKCYF103Z50
C331	AUDIO FILM CAPACITOR	CFTXA104J50
C332, 333	CERAMIC CAPACITOR	CKCYF103Z50
C351	CERAMIC CAPACITOR	CKCYF103Z50
C352	ELECTR. CAPACITOR	CEAS330M16
C353, 354	CERAMIC CAPACITOR	CGCYF473Z25
C391, 392	CERAMIC CAPACITOR	CCCCH120J50
C393	ELECTROLYTIC CAPACITOR	CEANPR33M50
C394	CERAMIC CAPACITOR	CKCYF103Z50
C395	ELECTR. CAPACITOR	CEAS330M16
C396	CERAMIC CAPACITOR	CKCYF103Z50
C397	ELECTR. CAPACITOR	CEAS330M16
C398	CERAMIC CAPACITOR	CKCYF103Z50
C401	CERAMIC CAPACITOR	CKCYF103Z50
C402	ELECTR. CAPACITOR	CENA101M25

Mark NO	Description	Part NO
C407	CERAMIC CAPACITOR	CKCYF103Z50
C408	ELECTR. CAPACITOR	CENA101M25
C413-416	CERAMIC CAPACITOR	CQSA151J50
C421-424	ELECTR. CAPACITOR	CENA101M25
C427-430	CERAMIC CAPACITOR	CQSA151J50
C431, 432	MYLOR FILM CAPACITOR	CFTXA562J50
C433, 434	MYLOR FILM CAPACITOR	CFTXA681J50
C435-438	ELECTR. CAPACITOR	CENA101M25
C439, 440	ELECTR. CAPACITOR	CENA220M50
C441, 442	PL. STYRENE CAPACITOR	CQSF102J50
<b>RESISTORS</b>		
VR101	VR	VRTB6VS224
R101-105	CARBONFILM RESISTOR	RD1/6PM000J
R107-109	CARBONFILM RESISTOR	RD1/6PM000J
R11	CARBONFILM RESISTOR	RD1/6PM222J
R110-115	CARBONFILM RESISTOR	RD1/6PM000J
R119	CARBONFILM RESISTOR	RD1/6PM102J
R12	CARBONFILM RESISTOR	RD1/6PM392J
R120-124	CARBONFILM RESISTOR	RD1/6PM000J
R13-15	CARBONFILM RESISTOR	RD1/6PM000J
R151, 152	CARBONFILM RESISTOR	RD1/6PM472J
R153	CARBONFILM RESISTOR	RD1/6PM333J
R16	CARBONFILM RESISTOR	RD1/6PM222J
R17	CARBONFILM RESISTOR	RD1/6PM391J
R18	CARBONFILM RESISTOR	RD1/6PM102J
R19, 20	CARBONFILM RESISTOR	RD1/6PM391J
R201-205	CARBONFILM RESISTOR	RD1/6PM000J
R207-210	CARBONFILM RESISTOR	RD1/6PM000J
R214, 215	CARBONFILM RESISTOR	RD1/6PM000J
R217-232	CARBONFILM RESISTOR	RD1/6PM000J
R235-243	CARBONFILM RESISTOR	RD1/6PM000J
R301	RESISTOR ARRAY (10K)	RA6S103J
R302-314	CARBONFILM RESISTOR	RD1/6PM000J
R320-329	CARBONFILM RESISTOR	RD1/6PM000J
R351-358	CARBONFILM RESISTOR	RD1/6PM000J
R360	CARBONFILM RESISTOR	RD1/6PM124J
R391	CARBONFILM RESISTOR	RD1/6PM470J
R401-430	CARBONFILM RESISTOR	RD1/6PM000J
R435-454	CARBONFILM RESISTOR	RD1/6PM000J
<b>OTHERS</b>		
CN101	CONNECTOR	52045-1610
JA301	OPTICAL OUTPUT JACK	TOTX178
JA303	JACK	RKN1014
JA304, 305	JACK	RKN1004
JA401	JACK	PKB1011
X351	CERAMIC RESONATOR	VSS1014
X391	XTAL RES (OSC)	PSS1001
⊙ MAIN BOARD ASSY (PWZ1814) (FOR PD-8500/KU)		
<b>SEMICONDUCTORS</b>		
IC101	PRE AMP. IC	TA8137N
△ IC11		NJM7805FA
IC12	IC	MC79L05ACP
IC13		NJM7812FA
IC14		NJM7912FA

Mark NO	Description	Part NO	Mark NO	Description	Part NO
	IC15	NJM7805FA	C122	MYLOR FILM CAPACITOR	CQMA333J50
	IC151	TC9220F-002	C123	ELECTR.CAPACITOR	CEAS101M25
	IC17 SYSTEM RESET IC	M51957AL	C13	ELECTR.CAPACITOR	CEAS102M10
	IC201 OP AMP, IC	TA8449P	C14	ELECTR.CAPACITOR	CEAS101M10
△	IC30 IC PROTECTOR	ICP-N10	C15	ELECTR.CAPACITOR	CEAS222M25
	IC301	TC9221F	C151,152	ELECTR.CAPACITOR	CEAS330M18
	IC302 MEMORY IC	CXK5818PN-12L	C153,154	CERAMIC CAPACITOR	CKCYF103Z50
	IC305 DIGITAL FILTER, IC	SM5840AP	C155	ELECTR.CAPACITOR	CEANPR33M50
△	IC31-33 IC PROTECTOR	ICP-N10	C16	ELECTR.CAPACITOR	CEAS222M25
	IC351 MICROCOMPUTER	PD4276A	C17,18	ELECTR.CAPACITOR	CEAS102M18
	IC352 IC	RC4558P	C19	ELECTROLYTIC CAPACITOR	CEAS471M10
	IC391 IC	PD7007	C201	AUDIO FILM CAPACITOR	CFTXA224J50
	IC403,404	M5238PF	C203	MYLOR FILM CAPACITOR	CQMA102J50
	Q101 TRANSISTOR	2SA1399	C205	MYLOR FILM CAPACITOR	CQMA881J50
	Q102 TRANSISTOR	2SC1740S	C206	MYLOR FILM CAPACITOR	CQMA223J50
	Q103,104 TRANSISTOR	DTC124ES	C208,209	ELECTR.CAPACITOR	CEAS330M18
△	Q11 TRANSISTOR	2SA1048	C21	ELECTR.CAPACITOR	CEAS101M50
	Q151 TRANSISTOR	DTA124ES	C210	ELECTR.CAPACITOR	CEANP100M18
	Q152 TRANSISTOR	DTC124ES	C211	ELECTR.CAPACITOR	CEAS220M50
	Q201	2SD1226M	C212-214	MYLOR FILM CAPACITOR	CQMA333J50
	Q202	2SB910M	C215	MYLOR FILM CAPACITOR	CQMA102J50
	Q203 TRANSISTOR	DTC124ES	C216	ELECTROLYTIC CAPACITOR	CEANPR33M50
	Q204 TRANSISTOR	2SC1740S	C217	MYLOR FILM CAPACITOR	CQMA881J50
	Q205 TRANSISTOR	DTC124ES	C218	ELECTROLYTIC CAPACITOR	CEANPR33M50
	Q301 TRANSISTOR	DTC124ES	C22	ELECTR.CAPACITOR	CEAS101M50
	Q351-353 TRANSISTOR	2SC1740S	C221,222	MYLOR FILM CAPACITOR	CQMA332J50
	Q405,406 TRANSISTOR	2SD2144S	C223,224	ELECTR.CAPACITOR	CEAS330M18
△	D11 DIODE	11ES2	C226	MYLOR FILM CAPACITOR	CQMA392J50
△	D13 DIODE	11ES2	C227	ELECTROLYTIC CAPACITOR	CEANPR33M50
△	D15	RB-152LF	C228	MYLOR FILM CAPACITOR	CQMA333J50
△	D16,17 DIODE	11ES2	C23	ELECTR.CAPACITOR	CEAS220M50
	D18 ZENER DIODE	HZS27NB2	C24	ELECTR.CAPACITOR	CEAS470M50
	D19 ZENER DIODE	HZS6.2NB2	C25	ELECTR.CAPACITOR	CEASR47M50
	D301-307 DIODE	1SS254	C301	CERAMIC CAPACITOR	CKCYF103Z50
	D391 DIODE	1SS254	C302	ELECTR.CAPACITOR	CEAS101M10
	SWITCHES		C303	CERAMIC CAPACITOR	CGCYF473Z25
	S351 SWITCH	PSG1003	C304	MYLOR FILM CAPACITOR	CQMA222J50
	COIL & FILTER & TRANSFORMERS		C305	ELECTR.CAPACITOR	CEAS101M25
	L151 RADIAL INDUCTOR	LFA010K	C306	CERAMIC CAPACITOR	CKCYF103Z50
	L301 RADIAL INDUCTOR	LFA010K	C307	CERAMIC CAPACITOR	CCCSL221J50
	L351 RADIAL INDUCTOR	LFA010K	C308	MYLOR FILM CAPACITOR	CQMA473J50
	L391 RADIAL INDUCTOR	LFA010K	C309	CERAMIC CAPACITOR	CCCCH100D50
	CAPACITORS		C311	CERAMIC CAPACITOR	CKCYF103Z50
	C101 ELECTR.CAPACITOR	CEAS331M18	C313	ELECTR.CAPACITOR	CEAS331M18
	C104 ELECTR.CAPACITOR	CEAS101M10	C317	CERAMIC CAPACITOR	CGCYF473Z25
	C105-107 ELECTR.CAPACITOR	CEAS331M18	C318	CERAMIC CAPACITOR	CKCYF103Z50
	C109 CERAMIC CAPACITOR	CCCCH330J50	C319	CERAMIC CAPACITOR	CGCYF473Z25
	C11 ELECTR.CAPACITOR	CEAS222M18	C320	ELECTR.CAPACITOR	CEAS101M25
	C110 ELECTR.CAPACITOR	CEAS331M18	C328	ELECTR.CAPACITOR	CEAS330M18
	C111 CERAMIC CAPACITOR	CCCSL331J50	C329	CERAMIC CAPACITOR	CCCSL101J50
	C112 CERAMIC CAPACITOR	CCCSL221J50	C330	CERAMIC CAPACITOR	CKCYF103Z50
	C113 MYLOR FILM CAPACITOR	CQMA471J50	C331	AUDIO FILM CAPACITOR	CFTXA104J50
	C114 MYLOR FILM CAPACITOR	CQMA103J50	C332,333	CERAMIC CAPACITOR	CKCYF103Z50
	C115 ELECTR.CAPACITOR	CEAS330M18	C351	CERAMIC CAPACITOR	CKCYF103Z50
	C116 MYLOR FILM CAPACITOR	CQMA473J50	C352	ELECTR.CAPACITOR	CEAS330M18
	C117,118 CERAMIC CAPACITOR	CCCSL221J50	C353,354	CERAMIC CAPACITOR	CGCYF473Z25
	C12 ELECTR.CAPACITOR	CEAS222M18	C391,392	CERAMIC CAPACITOR	CCCCH120J50
	C121 CERAMIC CAPACITOR	CKCYF103Z50	C393	ELECTROLYTIC CAPACITOR	CEANPR33M50
			C394	CERAMIC CAPACITOR	CKCYF103Z50
			C395	ELECTR.CAPACITOR	CEAS330M18

Mark NO	Description	Part NO
C396	CERAMIC CAPACITOR	CKCYF103Z50
C397	ELECTR.CAPACITOR	CEAS330M16
C398	CERAMIC CAPACITOR	CKCYF103Z50
C401	CERAMIC CAPACITOR	CKCYF103Z50
C402	ELECTR.CAPACITOR	CEAS101M25
C407	CERAMIC CAPACITOR	CKCYF103Z50
C408	ELECTR.CAPACITOR	CEAS101M25
C413-418	CERAMIC CAPACITOR	CCCSL151J50
C427-430	CERAMIC CAPACITOR	CCCSL270J50
C431,432	MYLOR FILM CAPACITOR	CQMA562J50
C433,434	MYLOR FILM CAPACITOR	CQMA681J50
C435-438	ELECTR.CAPACITOR	CEAS330M16
C439,440	ELECTR.CAPACITOR	CEAS220M50
C441,442	PL.STYRENE CAPACITOR	CQSA102J50
RESISTORS		
VR101	VR	VRTB6VS224
R101-105	CARBONFILM RESISTOR	RD1/6PM000J
R107-109	CARBONFILM RESISTOR	RD1/6PM000J
R11	CARBONFILM RESISTOR	RD1/6PM222J
R110-115	CARBONFILM RESISTOR	RD1/6PM000J
R119	CARBONFILM RESISTOR	RD1/6PM102J
R12	CARBONFILM RESISTOR	RD1/6PM392J
R120-125	CARBONFILM RESISTOR	RD1/6PM000J
R13-15	CARBONFILM RESISTOR	RD1/6PM000J
R151,152	CARBONFILM RESISTOR	RD1/6PM472J
R153	CARBONFILM RESISTOR	RD1/6PM333J
R16	CARBONFILM RESISTOR	RD1/6PM222J
R17	CARBONFILM RESISTOR	RD1/6PM391J
R18	CARBONFILM RESISTOR	RD1/6PM102J
R19,20	CARBONFILM RESISTOR	RD1/6PM391J
R201-205	CARBONFILM RESISTOR	RD1/6PM000J
R207-210	CARBONFILM RESISTOR	RD1/6PM000J
R214,215	CARBONFILM RESISTOR	RD1/6PM000J
R217-232	CARBONFILM RESISTOR	RD1/6PM000J
R235-243	CARBONFILM RESISTOR	RD1/6PM000J
R301	RESISTOR ARRAY (10K)	RA6S103J
R302-314	CARBONFILM RESISTOR	RD1/6PM000J
R320-329	CARBONFILM RESISTOR	RD1/6PM000J
R351-358	CARBONFILM RESISTOR	RD1/6PM000J
R360	CARBONFILM RESISTOR	RD1/6PM124J
R391	CARBONFILM RESISTOR	RD1/6PM470J
R401-418	CARBONFILM RESISTOR	RD1/6PM000J
R435-454	CARBONFILM RESISTOR	RD1/6PM000J
OTHERS		
CN101	CONNECTOR	52045-1810
JA301	OPTICAL OUTPUT JACK	TOTX178
JA303	JACK	RKN1014
JA304,305	JACK	RKN1004
JA401	JACK	PKB1010
X351	CERAMIC RESONATOR	VSS1014
X391	XTAL RES (OSC)	PSS1001

Mark NO	Description	Part NO
HEADPHONE BOARD ASSY (FOR PD-7500/KU)		
SEMICONDUCTORS		
IC501		M5218L
CAPACITORS		
C501	ELECTR.CAPACITOR	CEAS330M16
C502	ELECTR.CAPACITOR	CEA331M16
C503,504	AUDIO FILM CAPACITOR	CFTXA104J50
C505-509	CERAMIC CAPACITOR	CKCYF103Z50
C511,512	MYLOR FILM CAPACITOR	CQMA561J50
C513	CERAMIC CAPACITOR	CGCYF473Z25
RESISTORS		
VR501	VARIABLE RESISTOR	PCS1002
R501-512	CARBONFILM RESISTOR	RD1/6PM000J
OTHERS		
JA501	JACK	RKN1001
HEADPHONE BOARD ASSY (FOR PD-6500/KU)		
SEMICONDUCTORS		
IC501		M5218L
CAPACITORS		
C501	ELECTR.CAPACITOR	CEAS330M16
C502	ELECTR.CAPACITOR	CEAS331M16
C505-509	CERAMIC CAPACITOR	CKCYF103Z50
C513	CERAMIC CAPACITOR	CGCYF473Z25
RESISTORS		
VR501	VARIABLE RESISTOR	PCS1002
R501,512	CARBONFILM RESISTOR	RD1/6PM000J
R505-510	CARBONFILM RESISTOR	RD1/6PM000J
OTHERS		
JA501	JACK	RKN1001
TRANSFORMER BOARD ASSY (FOR PD-7500/KU)		
CAPACITORS		
C902-910	CERAMIC CAPACITOR	CKCYF103Z50
TRANSFORMER BOARD ASSY (FOR PD-6500/KU)		
CAPACITORS		
C902-909	CERAMIC CAPACITOR	CKCYF103Z50
PRIMARY BOARD ASSY (FOR PD-7500/KU AND PD-6500/KU)		
SWITCHES		
△ S1	SWITCH (POWER)	PSA-009



Mark NO	Description	Part NO
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⊙ FUNCTION BOARD ASSY (PWZ1795)  
(FOR PD-7500/KU AND PD-6500/KU)

SEMICONDUCTORS

D701-709 DIODE	1SS254
D710, 711	SLH-58MC3H
D712	SLH-56YC3HYL
D714, 715 DIODE	1SS254

SWITCHES

S701-712 SWITCH	PSG1003
S714 SWITCH	PSG1003
S716-732 SWITCH	PSG1003
S734 SWITCH	PSG1003
S736-744 SWITCH	PSG1003

RESISTORS

R701-707 CARBONFILM RESISTOR	RD1/6PM000J
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OTHERS

V701 FLUORESCENT INDICATO	PEL1031
REMOTE SENSOR	HC-170

SUB BOARD ASSY  
(FOR PD-7500/KU)

SWITCHES

S713 SWITCH	PSG1003
S715 SWITCH	PSG1003
S733 SWITCH	PSG1003
S735 SWITCH	PSG1003

Mark NO	Description	Part NO
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## 6. ADJUSTMENTS

### Adjustments

A compact disc player, though free from any defect in a pickup or circuitry, may develop malfunction if adjustment is wrong or incomplete, and may become totally inoperative in extreme cases. Correct adjustment according to the adjustment procedure is therefore mandatory.

#### ● Adjustment/confirmation items and sequence

Sequence	Item	Test point	Adjustment point
1	Focus lock and spindle lock check	TP 1, Pin 1 (RF)	—
2	Tracking gain and tracking balance auto adjustment check	TP 1, Pin 2 (TRK. ERR)	—
3	Grating adjustment	TP 1, Pin 2 (TRK. ERR)	Grating adjustment slit
4	Pickup radial/ tangential inclination adjustment	TP 1, Pin 1 (RF)	Radial inclination adjustment screw Tangential inclination adjustment screw
5	RF level adjustment	TP 1, Pin 1 (RF)	VR1 (RF level)
6	RF offset adjustment	TP 3 (RFAV)	VR101 (RF OFS)
7	Focus error signal check	TP 1, Pin 6 (FCS. ERR)	—

#### ● Measuring equipment/jigs and tools

1. Dual trace oscilloscope, with a 10:1 probe
2. Test disc (YEDS-7)
3. 12 cm disc (with sound recorded for about 70 minutes or more)
4. Low-pass filter (39 k $\Omega$  + 0.001  $\mu$ F)
5. Hex wrench (M 3 mm)
6. Standard tools

● Positions of test point and adjustment potentiometers

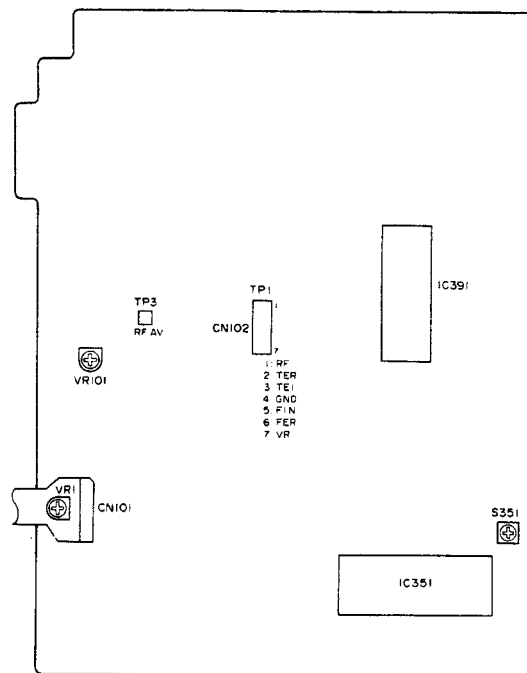


Fig. 1 Adjustment points

● Cautions

1. Use the 10:1 probe for the oscilloscope.
2. The knob position (set value) of the oscilloscope described in the adjustment procedure is for a condition that the 10:1 probe is used.

● Test mode

This model is provided with a test mode to facilitate easy adjustment and confirmation necessary during servicing. When this is in the test mode, keys on a front panel function differently from a case of normal operation. Operation of these keys according to the correct procedure enables adjustments and confirmations. All adjustments of this model are performed in the test mode.

[Setting the test mode]

Set the test mode as follows:

1. Turn off the power switch.
2. Press the S351 and while holding it turn on the power switch.
3. Turn on the power switch and release the S351.

With the test mode, the display becomes completely different from that when the power switch is turned on for normal operation. Repeat steps 1 through 3 when the display is for normal operation because it means that the test mode has not been set correctly.

[Releasing the test mode]

Release the test mode as follows:

1. Press the STOP key to stop operation entirely.
2. Turn off the power switch on the front panel.

[Key functions in the test mode]

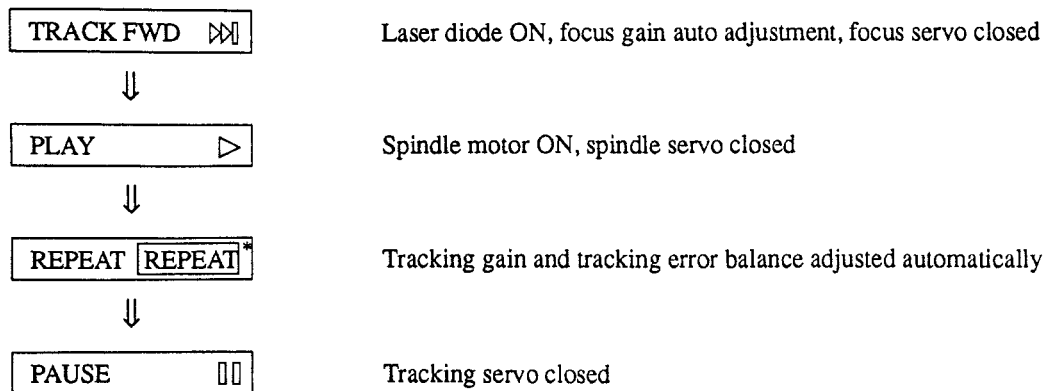
Symbol	Key name	Function in test mode	Description.
⏪	TRACK FWD	Focus servo close and focus gain auto adjustment.	<p>Turns on the laser diode. Kicks the disc slightly and lower the focus actuator. Then raise it slowly for automatic adjustment of focus gain. Then, the key closes the focus servo when an objective lens is focused to a disc. Turn the disc, which is stationary in this state, lightly with a finger. Operating sound of the focus servo can be heard.</p> <p>This sound indicates that the focus servo is operating correctly. Pressing this key without loading a disc causes the laser diode to go ON, then causes kicking of a spindle motor slightly. The focus actuator is lowered, then raised and lowered three times, and finally returned to an original position. This operation is made twice.</p>
▶	PLAY	Spindle servo close	<p>Drives the spindle motor clockwise and puts the spindle servo into a closed loop when the disc rotation reaches a specified speed (about 500 rpm on an internal periphery). Note that the spindle motor does not run unless the focus servo is closed.</p>
REPEAT	REPEAT	Tracking gain and tracking error balance auto adjustment	<p>Measures the level of error waveform when tracking is open for auto adjustment of tracking gain and tracking error balance.</p> <p><b>CAUTION:</b> Once TRACK FWD and PLAY keys have been pressed, automatic adjustment of tracking gain and tracking error balance in the test mode is executed each time the REPEAT key is pressed. However, if initial automatic adjustment has been completed, no correct adjustment is obtained even when the second automatic adjustment is attempted. Accordingly, before pressing the REPEAT key, confirm that each adjustment is the first attempt after entry into the test mode. When the play state in the test mode has been stopped by pressing the STOP key, press the OPEN/CLOSE key to open the tray once and close it again, then proceed with automatic adjustment.</p> <p>Another method is to turn OFF power switch once and subsequently to enter the test mode again.</p>

Symbol	Key name	Function In test mode	Description
⏸	PAUSE	Tracking servo close/open	<p>When focus servo and spindle servo are correctly in a closed loop and the tracking gain balance has been automatically adjusted, pressing this key causes the tracking servo into a closed loop. The track number current play and time elapsed are indicated on the front panel and the play signal is output.</p> <p>Failures of time indication, of regular counting, or of correct play of the sound may be possibly due to a peripheral portion of disc without sound or faulty adjustment or other defects. This key is of a toggle type, which causes open/close of the tracking servo each time it is pressed.</p> <p>No change occurs when this key is pressed without loading of the disc.</p>
⏮	MANUAL SEARCH REV	Carriage reverse (moves inward)	<p>Moves the pickup inward of the disc.</p> <p>Pressing this key when the tracking servo is in a closed loop causes the tracking servo into an open loop automatically. Key operation must be made with care in the test mode because the motor does not stop automatically even when the pickup reaches the mechanical end point.</p>
⏭	MANUAL SEARCH FWD	Carriage forward (moves outward)	<p>Moves the pickup outward of the disc.</p> <p>Pressing this key when the tracking servo is in a closed loop causes the tracking servo into an open loop automatically. Key operation must be made with care in the test mode because the motor does not stop automatically even when the pickup reaches the mechanical end point.</p>
⏹	STOP	Stop	<p>Stops all servos and causes initialization.</p> <p>Note that the pickup remains in a position when the STOP key is pressed.</p>
⏴	OPEN/CLOSE	Disc tray open/close	<p>Opens/closes the disc tray.</p> <p>This key is of a toggle type, which causes open/close of the disc tray each time it is pressed.</p> <p>Note that pressing this key while the disc is rotating causes the disc tray to open after stop of the disc.</p> <p>This key operation does not displace the pickup position.</p>

[Disc play method in the test mode]


Since each servo operates independently in the test mode, it is necessary for playing of the disc to close servos sequentially by operating keys according to the correct sequence.

Keys are operated in the following sequence for playing of the disc:



Operate each key in an interval of two to three seconds or more. Note that offset adjustment is made automatically when power supply is turned ON.

CAUTION:

- Press the  key only once (do not press it twice).

\* : see page 46.

## 1. Focus Lock and Spindle Lock Check

• Purpose	Confirmation that auto adjustment of focus gain has been made and the spindle locked		
• Connection of measuring instruments	Connect the oscilloscope to TP1, Pin1 (RF).  [Setting]    5 V/div 100 mSec/div DC mode	• Disc used	12 cm disc
<p>[Procedure]</p> <ol style="list-style-type: none"> <li>1. Move the pickup toward a center of the disc by the MANUAL SEARCH FWD key ( ⏩ ) (Note: Be sure to perform this operation.)</li> <li>2. Check 1 pin RF (RF output) of TP1 with the oscilloscope to see if the RF signal is output when the TRACK FWD ( ⏩ ) key is pressed.</li> <li>3. Press the PLAY key ( ▶ ) and check if the disc rotates in a normal direction (clockwise) approximately at a given speed (about 300 rpm near the center of disc) without overrun and reversing.</li> </ol>			

## 2. Tracking Gain and Tracking Error Balance Auto Adjustment Check

• Purpose	Confirmation that auto adjustment of tracking gain and tracking error balance have been completed.		
• Connection of measuring instruments	Connect the oscilloscope to TP1, Pin 2 (TRK ERR). (Connection may be made via a low-pass filter.)  [Setting]    50 mV/div 5 mSec/div DC mode	• Player state  • Disc used	Test mode, focus and spindle servo closed, and tracking servo open  YEDS-7

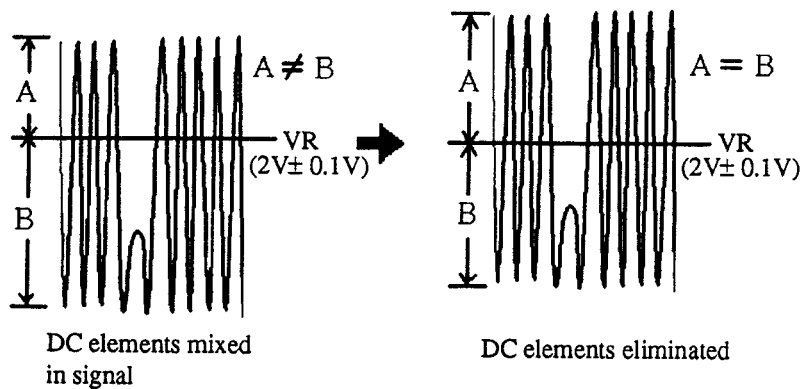
[Procedure]

CAUTION:

- Before this adjustment, press the OPEN/CLOSE key to open the tray and close it again.
1. Adjust DC offset of the oscilloscope so that a bright line comes to a center of the oscilloscope.
  2. Move the pickup to a center (R = 35 mm) of the disc with the MANUAL SEARCH FWD  $\gg$  or  $\ll$  key.
  3. Press TRACK FWD  $\gg$  and PLAY  $\triangleright$  keys sequentially to close focus and spindle servos.
  4. Press the repeat key **REPEAT**\* to check if the DC component of the tracking error waveform is eliminated (A = B).

CAUTION:

- Press the **REPEAT**\* key only once (do not press it twice).



\* : see page 46.



### 3. Grating Adjustment

<ul style="list-style-type: none"> <li>• Purpose</li> </ul>	Matching of two laser beam spots for tracking error generation onto the track at an optimum angle.		
<ul style="list-style-type: none"> <li>• Symptom in case of misadjustment</li> </ul>	Play not started, with failure of track search and track skipping.		
<ul style="list-style-type: none"> <li>• Connection of measuring instruments</li> </ul>	Connect the oscilloscope to TP1, Pin2 (TRK ERR) via a low-pass filter. (See Fig. 2)	<ul style="list-style-type: none"> <li>• Player state</li> </ul>	Test mode, focus and spindle servo closed, tracking gain/balance automatically adjusted, tracking servo open
	[Setting]      50 mV/div 5 mSec/div DC mode	<ul style="list-style-type: none"> <li>• Adjusting point</li> </ul>	Slit for adjustment of grating of pickup
		<ul style="list-style-type: none"> <li>• Disc used</li> </ul>	12 cm disc (YEDS-7 not to be used)

[Procedure]

1. Move the pickup outward of the disc by the MANUAL SEARCH FWD  $\gg$  key or  $\ll$  key. This is to move the grating adjustment slit to the outward portion of the disc for adjustment.
2. Press the TRACK FWD  $\gg$  key and PLAY  $\triangleright$  key sequentially to close focus and spindle servos.
3. Insert a standard (-) screwdriver into the grating adjustment slit and adjust grating to find the null point. (Details are given in a next page.)
4. Turn the screwdriver slowly counterclockwise from the null point. The amplitude of waveform increases gradually, then decreases again when the screwdriver is turned further. Set grating to a point where the amplitude of waveform becomes maximum initially during counterclockwise turn of the screwdriver from the null point.

Reference : The angle of tracking beam to a track and the waveform can be related as shown in Fig. 3.

Caution : The amplitude of tracking error signal is about 1.2 Vp-p (when LPF of 39 k $\Omega$  + 0.001  $\mu$ F is used). When this amplitude is extremely small (0.8 Vp-p), either the objective lens is contaminated or the pickup may be faulty. Repeat adjustment when the difference in amplitude of error signals between inward and outward portions of the disc is 10% or more because adjustment has not been made to the optimum point.

5. Return the pickup to near the center of the disc once by the MANUAL SEARCH REV  $\ll$  key, and press the repeat key **REPEAT** for automatic adjustment of tracking gain and tracking error balance. Then, press the PAUSE  $\square$  key to see if the track number and time elapsed are indicated on the front panel. If they are not indicated or the time elapsed changes irregularly, recheck the null point and repeat adjustment of grating. For readjustment of grating, press the OPEN/CLOSE  $\triangle$  key first to open, then to close the tray beforehand.

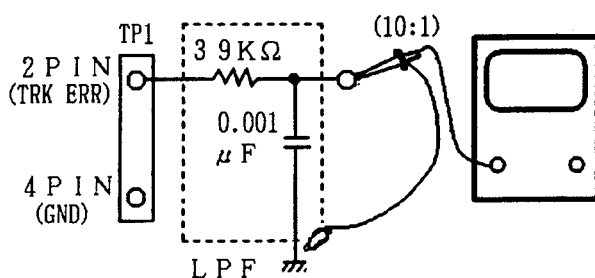
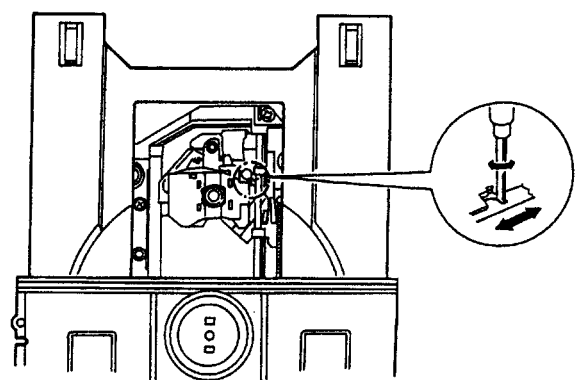


Fig. 2



Adjustment point

[How to find the null point]

Insert a (-) screwdriver into a grating adjustment slit to change the grating angle. In this state, the amplitude of tracking error signal on TP1, Pin2 changes. Within the grating variable range, there are five to six points where the amplitude of waveform decreases. In this waveform, there is only one point where an envelope becomes smooth. This point corresponds to a state in which three laser beams divided with grating are directly above the same track. (See Fig. 3)

This point is called a null point. Adjust grating to find out this null point and use this point as a reference position for grating adjustment.

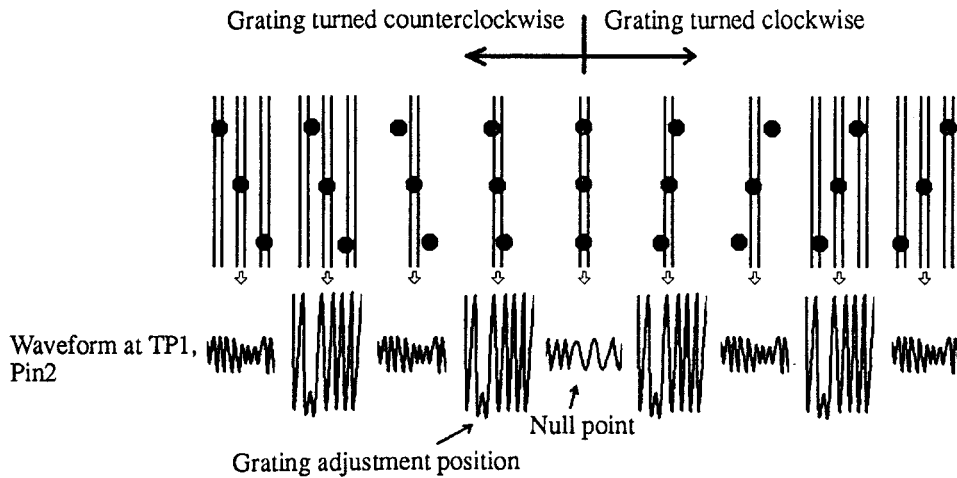
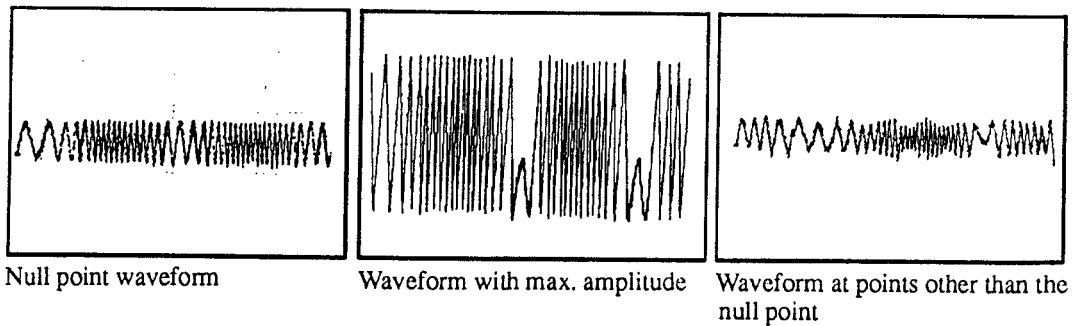


Fig. 3



## 4. Pickup Tangential/Radial Inclination Adjustment

• Purpose	Adjustment of an angle of pickup to the disc to achieve vertical irradiation of laser beam onto the disc, thereby ensuring reading of optimum RF signal.		
• Symptom in case of misadjustment	Sound missing, failure of play depending on a disc.		
• Connection of measuring instruments	Connect the oscilloscope to TP1, Pin1 (RF)  [Setting]    20 mV/div 200 nSec/div AC mode	• Player state  • Adjusting point  • Disc used	Test mode, play state  Pickup radial inclination adjustment screw, Pickup tangential inclination adjustment screw  12 cm disc (YEDS-7 not to be used)

[Procedure]

1. Move the pickup outward of the disc by the MANUAL SEARCH FWD  $\gg$  key to enable adjustment with the radial/tracking inclination adjustment screw. Press the TRACK FWD  $\gg$  key, PLAY  $\triangleright$  key, REPEAT REPEAT\* key, and PAUSE  $\square\square$  key sequentially to close focus, spindle, and tracking servos to enter the play state.
2. Adjust first the radial inclination adjustment screw with a hex wrench (M 3 mm) until the sharpest possible eye pattern (a diamond waveform appearing in a center of RF signal) is obtained.
3. Then, adjust the tangential inclination adjustment screw with a hex wrench (M 3 mm) until the sharpest possible eye pattern is obtained. (Fig. 5)
4. Repeat adjustment of radial inclination adjustment screw, then tangential inclination adjustment screw in this order until the sharpest possible eye pattern is obtained. Adjust two screws alternately as required until the eye pattern becomes most sharp.

Caution : Radial and tangential directions are respectively as shown in Fig. 4 when viewed toward the disc.

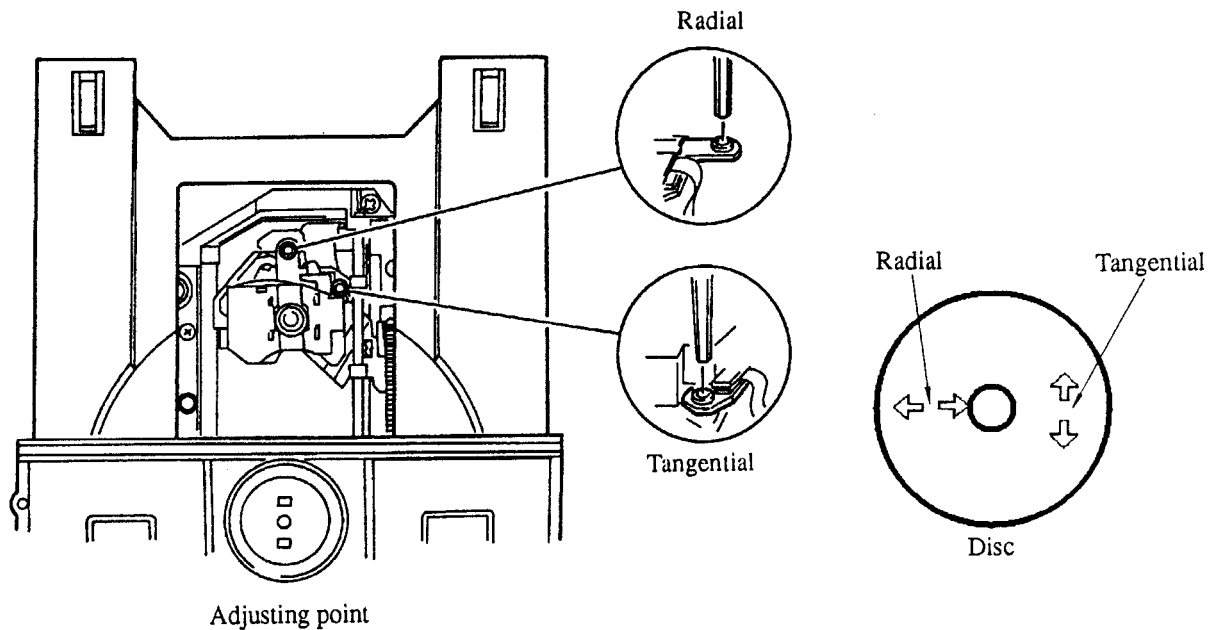


Fig. 4

\* : see page 46.

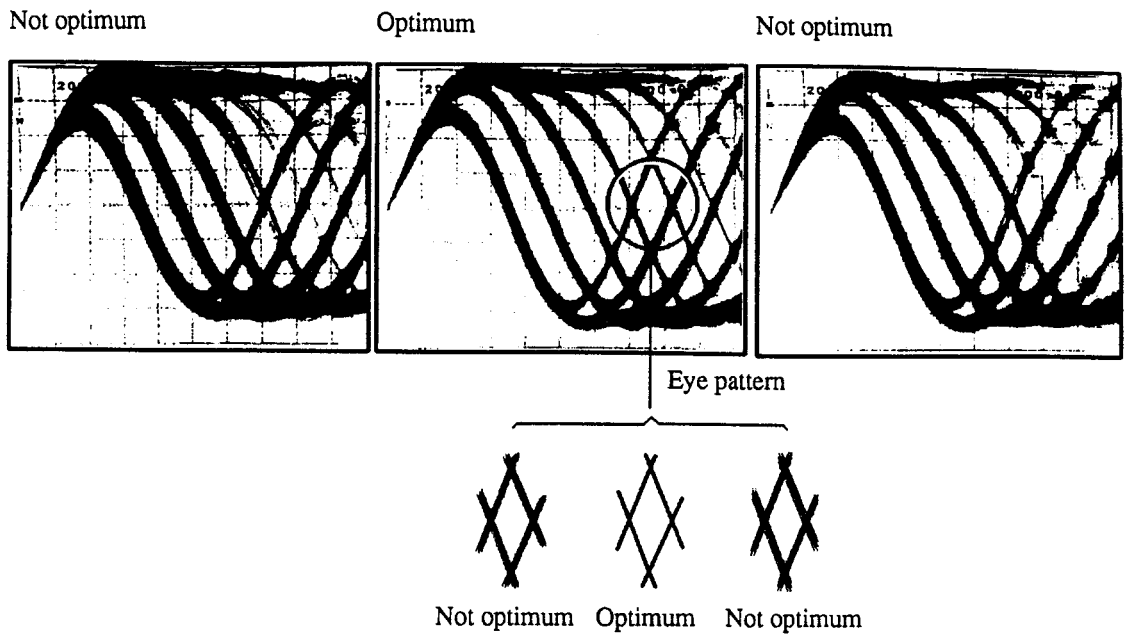


Fig. 5 Eye pattern

## 5. RF Level Adjustment

• Purpose	Optimization of the amplitude of play RF signal		
• Symptom in case of misadjustment	No play, no search		
• Connection of measuring instruments	Connect oscilloscope to TP1, Pin1 (RF).	• Player state	Test mode, play state
	[Setting] 50 mV/div 10 mSec/div AC mode	• Adjusting point	VR1 (laser power)
		• Disc used	YEDS-7
[Procedure]			
CAUTION:			
<ul style="list-style-type: none"> <li>• Before this adjustment, press the OPEN/CLOSE key to open the tray and close it again.</li> <li>• Press the <b>REPEAT</b>* key only once (do not press it twice).</li> </ul>			
<ol style="list-style-type: none"> <li>1. Move the pickup to a center (R = 35 mm) of the disc by the MANUAL SEARCH FWD <math>\gg</math> key or <math>\ll</math> key. Press the TRACK FWD <math>\gg</math> key, PLAY <math>\triangleright</math> key, REPEAT <b>REPEAT</b>* key, and PAUSE <math>\square\square</math> key sequentially to close each servo to enter the play state.</li> <li>2. Adjust the amplitude of RF signal to <math>0.9 \text{ Vp-p} \pm 0.07 \text{ V}</math> by VR1 (laser power).</li> </ol>			

\* : see page 46.

## 6. RF Offset Adjustment

• Purpose	Adjustment of RF signal offset		
• Connection of measuring instruments	Connect the oscilloscope to TP3 (RFAV).  [Setting]     50 mV/div 10 mSec/div DC mode	• Player state  • Adjusting point  • Disc used	Test mode, play state  VR101 (RF, OFS)  YEDS-7

[Procedure]

**CAUTION:**

- Before this adjustment, press the OPEN/CLOSE key to open the tray and close it again.
  - Press the **REPEAT**\* key only once (do not press it twice).
1. Move the pickup to a center (R = 35 mm) of the disc by the MANUAL SEARCH FWD **▶▶** key or **◀◀** key. Press the TRACK FWD **▶▶** key, PLAY **▷** key, REPEAT **REPEAT**\* key, and PAUSE **⏏** key sequentially to close each servo.
  2. Adjust the DC voltage of TP3 (RFAV) to 1.5 V ± 50 mV by VR101 (RF, OFS).

Note :     As RFAV indicates the mean value of RF signal, the RFAV waveform may vary in a damaged disc. In this case, adjustment should be made in a portion free of damage.

\* : see page 46.

## 7. Focus Error Signal (Focus S Curve) Check

• Purpose	Observation of the focus error signal to judge appropriateness of the pickup. This judgment of the pickup is made by checking the magnitude of the tracking error signal amplitude (see the item describing the tracking error balance adjustment) and this focus error signal waveform.		
• Connection of measuring instruments	Connect the oscilloscope to TP1, Pin6 (FOCS ERR).  [Setting]     100 mV/div 5 mSec/div DC mode	• Player state  • Adjusting point  • Disc used	Test mode, stop state  None  YEDS-7

### [Procedure]

1. Connect TP1, Pin5 to VR (TP1, Pin7).
2. Load a disc.
3. When the TRACK FWD  $\llcorner\llcorner$  key is pressed while observing the oscilloscope screen, the waveform shown in Fig. 8 can be observed instantaneously. Confirm that the amplitude in this state is 1.3 Vp-p or more and that the amplitude is nearly equal on positive and negative sides. Since the waveform appears only instantaneously when the TRACK FWD  $\llcorner\llcorner$  key is pressed, repeat pressing this key until confirmation of the waveform is completed.

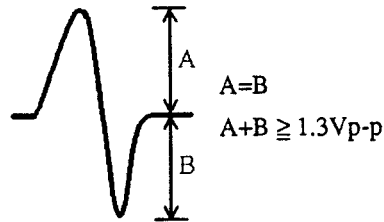


Fig. 8

### [Pickup appropriateness judgment]

This judgment should be made after completion of correct adjustments. The pickup may be faulty in following cases:

Extremely small amplitude (0.7 Vp-p or less) of the tracking error signal

Extremely small amplitude (0.8 Vp-p or less) of the focus error signal

Extremely asymmetrical amplitudes on positive and negative sides of the focus error signal (2:1 or more)

Small RF signal (0.7 Vp-p or less). The standard value is not reached even after adjustment of VR1 (laser power)



## 7. IC INFORMATION

### TA8137N (RF Amplifier)

The TA8137N is an IC that was developed to produce a 3-beam type of pickup focus signal and tracking error signal for CD players.

When used in combination with the TC9220F-002 (digital servo processor), servo systems can be created with fewer, externally connected parts.

- It is equipped with an internal on-track data and defect detection RFAV amplifier.
- Automatic adjustment of the tracking error balance can be performed when used together with the TC9220F-002.
- It is also equipped with an internal ALPC (Auto Laser Power Control) circuit.
- Operation is possible with a single-phase, 5V power supply.
- Low power consumption is another attractive feature.
- This IC is supplied in a shrink DIP24 pin chip.

### ● Pin Functions (TA8137N)

Pin	Pin Name	I/O	Function
1	FIP	I	Main beam I-V amplifier, 1, 2 input pin
2	FIN		
3	VR	O	Reference voltage output pin (2V)
4	TIP	I	Sub-beam I-V amplifier 1, 2 input pin
5	TIN		
6	PDI		
7	PDO	O	Photo diode amplifier output pin
8	LDP	I	Laser diode amplifier positive phase input pin
9	LDN		Laser diode amplifier negative phase input pin
10	LDO	O	Laser diode amplifier output pin
11	GND	-	Ground pin
12	LDC	I	Laser diode control input pin
13	TEB		Tracking error balance adjustment input pin
14	TEN		Tracking error output amplifier negative phase input pin
15	TEO	O	Tracking error output amplifier output pin
16	FEO		Focus error output amplifier output pin
17	FEN	I	Focus error output amplifier negative phase input pin
18	FEB		Focus error balance adjustment input pin
19	RFAV	O	RF average amplifier output pin
20	RFL	I	RF average amplifier positive phase input pin
21	2VR	O	Double reference voltage output pin (4V)
22	RFO		RF amplifier output pin
23	RFN	I	RF amplifier negative phase input pin
24	Vcc	-	Power supply pin (5V)

**TC9220F-022  
(Digital Servo Processor)**

The TC9220F-002 is a CMOS LSI that was developed for CD player digital servo control.

Simply configured CD player systems can be realized with high-performance functions by combining TA8137N (bipolar IC) and the data processor TC9221F (CMOS LSI) as servo IC's.

- Totally digital servo systems are used to enable a reduction in the total number of parts.
- The chip contains an internal digital equalizer for phase compensation operations.  
It is equipped with an internal coefficient used for phase compensation that corresponds to each type of pickup.
- It also contains an internal PWM driver (4-channel).

- The focus, tracking loop gain and offset are adjusted automatically.
- The tracking error balance is also adjusted automatically.
- An abnormality detection circuit which operates during play and search operations is contained internally.
- High-speed searches can be performed by using the search speed control circuit.

• Pin Functions (TC9220F-002)

Pin	Pin Name	I/O	Function
1	VR	-	Reference power supply voltage pin (2V)
2	AVDD	-	Analog power supply voltage pin
3	RFAV	I	RF average value signal input pin
4	FEI	I	Focus error signal input pin
5	TEI	I	Tracking error signal input pin
6	VDI	I	Battery potential fall detection pin
7	TEZI	I	Tracking error zero cross input pin
8	AVSS	-	Analog ground pin
9	2VR	-	Reference power voltage pin (4V)
10	TEB	O	Tracking error balance output pin
11	LDC	O	Laser diode control signal output pin
12	IN0	I	General purpose input port
13	IN1		
14	IN2		
15	IN3		
16	CK33K	O	33K clock output pin
17	CK88K	O	88K clock output pin
18	PREB	I	Preamble signal input pin
19	SSD	O	Servo serial data output pin
20	PSD	I	Processor serial data input pin
21	MCK	I	Master clock input pin (16.9344 MHz)
22	VSS	-	Ground pin
23	VDD	-	Power supply voltage pin
24	RST	I	Reset input pin
25	RSTO	O	Reset output pin
26	4MCK	I	4M clock input pin
27	SMUT	O	Soft mute output pin
28	AMUT		Analog mute output pin
29	EPDA		Processor internal status output pin
30	COFS	O	Correction system frame synchronized clock output pin.

Pin	Pin Name	I/O	Function
31	PFCK	O	Playback system frame synchronized clock output pin.
32	SBOK		Sub-code signal Q data CRC check judgment result output pin
33	SUBQ		Sub-code signal Q data output pin
34	SBSY		Sub-code synchronization signal output pin
35	DXCK		2M clock output pin
36	EXDM	I	Disc mode PWM data external setting pin
37	KEN		Key enable input pin
38	GUP	O	Gain-up signal output pin
39	DFCT		Defect detection pin
40	SRCH		Search signal output pin
41	TSON		Tracking servo ON signal output pin
42	OUT0		General purpose output port
43	OUT1		
44	DMOA		Disc motor control PWM output pin
45	DMOB		
46	FDOA		Feed motor control PWM output pin
47	FDOB		
48	TROA	Tracking coil control PWM output pin	
49	TROB		
50	FOOA	Focus coil control PWM output pin	
51	FOOB		
52	2VR	-	Reference power supply voltage pin (4V)
53	VDD		Power supply voltage pin
54	VSS		Ground pin
55	CONT0	I	Control (for test use) input pin Normally used as "H" or open.
56	CONT1		
57	TEST0		Test pins. Normally used as "H" or open.
58	TEST1		
59	TEST2		
60	TEST3		

### TC9221F (Data Processor)

The TC9221F is a CMOS LSI that was developed for simultaneous separation, EFM signal demodulation, error detection and correction processing for compact disc players. High performance and simply configured CD player systems can be realized by the combination of the servo IC TA8137N (bipolar IC) and servo processor TC9220F-002 (CMOS LSI).

- Synchronized pattern detection and synchronized signal protection and insertion operation can be realized.
- An analog PLL circuit and VCO are contained internally.
- A disc motor control circuit is also contained internally.
- The TC9221F is equipped with an internal microcomputer interface circuit that contains a total of six components including four bus lines, a clock line and a chip select which enables total data processing.

- A CIRC correction logic system is employed which performs double correction for C1 and triple correction for C2. (12 frame burst errors are completely corrected.)
- A 16K-SRAM or 256K-DRAM chip is used for signal processing.
- Digital out and CDROM format signals are externally output.
- There is also an internal sub-code signal demodulation circuit.
- A 2-block buffer RAM for sub-code Q data is contained internally and can be read freely.

● Pin Functions (TC9221F)

Pin	Pin Name	I/O	Function	
1	SCLO	I	Data slice comparator level setting pin	
2	VR	-	Reference power voltage pin (2V)	
3	2VR		Reference power voltage pin (4V)	
4	LPFO	O	Low-pass filter amplifier output pin	
5	LPFN	I	Low-pass filter amplifier negative input pin	
6	TMAX	O	PLL frequency control signal output pin	
7	PD		PLL phase error signal output pin	
8	CLCK	I	Sub-code data read clock input pin	
9	DATA	O	Sub-code data output pin	
10	SFSY		Sub-code frame synchronization signal output pin	
11	SBSY		Sub-code synchronization output pin	
12	EMPA		Emphasis output pin	
13	LRCK		LR clock output pin	
14	BCK		Bit clock output pin	
15	AOUT		Audio data output pin	
16	DOUT		Digital out output pin	
17	56MK		5.6M clock output pin	
18	CSIN		I	Digital out C bit data input pin
19	AD0		O	External RAM address signal output pin
20	AD1			
21	AD2			
22	VSS	-	Ground pin	
23	VDD	-	Power supply voltage pin	
24	AD3	O	External RAM address signal output pin	
25	AD4			
26	AD5			
27	AD6			
28	AD7			
29	AD8			
30	AD9			
31	R/W	O	External RAM read/write signal output pin	

Pin	Pin Name	I/O	Function
32	$\overline{CE}$	O	External RAM chip enable signal output pin
33	AD10		External RAM address signal output pin
34	MDB7	I/O	External RAM data bus lines
35	MDB6		
36	MDB5		
37	MDB4		
38	MDB3		
39	MDB2		
40	MDB1		
41	MDB0		
42	X'PD	O	VCXO control output pin
43	XI	I	The quartz crystal oscillator connection pins connect the quartz crystal oscillator and generate the required system clock. Crystal = 16.9344 MHz
44	XO	O	
45	$\overline{CCE}$	I	Command and data transmission/reception chip enable pin
46	BUCK	I	Command and data transmission/reception clock input pin
47	BUS0	I/O	Command and data transmission/reception bus lines
48	BUS1		
49	BUS2		
50	BUS3		
51	4MCK	O	4M clock output pin
52	$\overline{RST}$	I	Reset input pin
53	VDD	-	Power supply voltage pin
54	VSS		Ground pin
55	MCK	O	Master clock output pin
56	PSD		Processor serial data output pin
57	SSD	I	Servo serial data input pin
58	PREB	O	Preamble output pin (7.35 kHz/32)
59	TEST	I	Test pin, normally used as "H" or open
60	EFMI		EFM signal input pin

**SM5840AP**  
**(8 TIMES OVER SAMPLING DIGITAL FILTER)**

● Pin Functions

Pin	Pin Name	I/O	Function	
1	$\overline{\text{CKSL}}$	ip **	Selection of oscillation and input frequency. (384fs at $\overline{\text{CKSL}} = \text{"H"}$ )* (256fs at $\overline{\text{CKSL}} = \text{"L"}$ )*	
2	XTI	I	Oscillating circuit input (Frequency is selected by $\overline{\text{CKSL}}$ ).	
3	XTO	O	Oscillating circuit output	
4	CKO		Oscillating circuit output clock (Frequency is same as XTI pin).	
5	VSS	-	GND	
6	MDT	ip **	Mode set data	Set the digital attenuator and mode flag register.
7	MCK		Mode set clock	
8	$\overline{\text{MLE}}$		Mode set latch enable	
9	$\overline{\text{RST}}$		System reset (initialize)	

\*: fs means sample frequency of the input data.

\*\* : ip is input pins with pull-up resistor. Therefore, don't mind that pins are opened at setting the B level.

Pin	Pin Name	I/O	Function	
10	DG	O	Deglitch output at 8fs LR parallel output mode.*	
			Deglitch output at 4fs LR mutual output mode.*	
11	DOR		R ch data output at 8fs LR parallel output mode.*	
			LR clock output at 4fs LR mutual output mode.*	
12	DOL	O	L ch data output at 8fs LR parallel output mode.*	
			L ch/R ch data output at 4fs LR mutual output mode.*	
13	WCKO	O	Word clock output	
14	VDD	-	+5V power supply	
15	BCKO	O	Bit clock output	
16	LRCI	ip **	Sample rate (fs) clock of input data.*	
17	BCKI		Bit clock input	
18	DIN		Data input	

- Note: ● The indication "fs" in the explanation indicates the original signal (digitally recorded data) sampling frequency.  
● The pins indicated in the I/O column use the IC internal preamplifier. Consequently, they cannot be opened by H level fixed input.

PD7007 (D/A CONVERTER)

Pin Explanation

Pin Number	Pin Name	I/O	Function
1	DINL	ip	Left channel serial data input
2	DINR	ip	Right channel serial data input
3	BCKI	ip	Serial input data bit clock (reads data on rising edge)
4	LRCI	ip	Input data sample frequency clock
5	IW18	ip	Input data word word-length selection H (or open) ..... 18 bit length L ..... 16 bit length
6	IPARA	ip	Input data word timing selection H (or open) ..... L ch/R ch (parallel) L ..... L ch/R ch (mutual)
7	IISN	ip	I <sup>2</sup> S input mode selection H (or open) ..... Normal input mode L ..... I <sup>2</sup> S input mode
8	X8FS	ip	Input data sampling frequency selection H ..... 8*fs input mode L ..... 4*fs input mode
9	DVSS	—	Digital unit GND
10	DVDD	—	Digital unit power supply
11	AVDD1	—	Analog unit power supply (5V) 1
12	ROAN	O	Data output PWM output (right channel A negative phase)
13	AVSS1	—	Analog unit GND 1
14	AVSS2	—	Analog unit GND 2
15	ROA	O	Data output PWM output (right channel A positive phase)
16	AVDD2	—	Analog unit power supply (5V) 2
17	AVDD3	—	Analog unit power supply (5V) 3
18	ROB	O	Data output PWM output (right channel B positive phase)
19	ROBN	O	Data output PWM output (right channel B negative phase)
20	AVSS3	—	Analog unit GND 3
21	AVSS4	—	Analog unit GND 4
22	LOBN	O	Data output PWM output (left channel B negative phase)
23	LOB	O	Data output PWM output (left channel B positive phase)
24	AVDD4	—	Analog unit power supply (5V) 4
25	AVDD5	—	Analog unit power supply (5V) 5
26	LOA	O	Data output PWM output (left channel A positive phase)
27	AVSS5	—	Analog unit GND 5
28	AVSS6	—	Analog unit GND 6
29	LOANM	O	Data output PWM output (left channel A negative phase)
30	AVDD6	—	Analog unit power supply (5V) 6
31	XVDD	—	Clock power supply (5V)
32	XVSS	—	Clock GND
33	XTI	i	Crystal connection pin/external clock input pin
34	XTO	O	Crystal connection pin
35	MUTEO	O	Muting output
36	MOD3	ip	System clock input frequency and noise cycle operation frequency combination selection
37	MOD2	ip	
38	MOD1	ip	
39	CKO	O	256fs/384fs clock output
40	RSTN	ip	Reset input (active on L level)

- Note:
- The indication "fs" in the explanation indicates the original signal (digitally recorded data) sampling frequency.
  - The pins indicated in the I/O column use the IC internal preamplifier. Consequently, they cannot be opened by H level fixed input.

## 8. FOR PD-7500/KC, HEM, HB, HPW, SD, PD-6500/KC, HEM, HB, HPW, SD AND PD-6500-S/HEWM TYPES

### 8.1 FOR PD-7500/KC, HEM, HB, HPW AND SD TYPES CONTRAST OF MISCELLANEOUS PARTS

**NOTES:**

- Parts without part number cannot be supplied.
- The  $\Delta$  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.

The PD-7500/KC, HEM, HB, HPW and SD types are the same as the PD-7500/KU type with the exception of the following sections.

Mark	Symbol & Description	Part No.					
		PD-7500/KU	PD-7500/KC	PD-7500/HEM	PD-7500/HB	PD-7500/HPW	PD-7500/SD
$\Delta$	Main board assembly	PWZ1785	PWZ1785	PWZ1780	PWZ1780	PWZ1785	PWZ1780
	Headphone board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply
	Transformer board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply
	Primary board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply
$\Delta$	Power transformer (AC120V)	PTT1132	PTT1132	.....	.....	.....	.....
$\Delta$	Power transformer (AC220V/240V)	.....	.....	PTT1133	PTT1133	PTT1133	.....
$\Delta$	Power transformer (AC110V/120-127V/220V/240V)	.....	.....	.....	.....	.....	PTT1134
$\Delta$	AC power cord	PDG1015	PDG1015	PDG1003	PDG1004	PDG1006	PDG1013
$\Delta$	Voltage selector	.....	.....	.....	.....	.....	PSB1002
$\Delta$	CD packing case	PHG1497	PHG1457	PHG1457	PHG1457	PHG1457	PHG1457
	Strain relief	CM-22C	CM-22C	CM-22B	CM-22B	CM-22B	CM-22B
	Display screen	PAM1323	PAM1323	PAM1305	PAM1305	PAM1323	PAM1323
	Front panel assembly	PEA1068	PEA1068	PEA1098	PEA1098	PEA1068	PEA1068
	Connection cord with mini plug	PDE-319	PDE-319	.....	.....	PDE-319	.....
	Operating instructions (English)	PRB1127	.....	.....	PRB1127	PRB1127	PRB1127
	Operating instructions (English/French)	.....	PRE1125	PRE1125	.....	.....	.....
	Operating instructions (German/Italian/Dutch/Swedish/Spanish/Portuguese)	.....	.....	PRF1038	.....	.....	.....

### MAIN BOARD ASSEMBLY (PWZ1780) (PWZ1785)

The main board assembly (PWZ1780) is the same as the Main board assembly (PWZ1785) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1785	PWZ1780	
	C329	CCCSL101J50	.....	
	C330	CKCYF103Z50	.....	
	D304-D307	1SS254	.....	
	R320	RD1/6PM102J	.....	
	R321	RD1/6PM244J	.....	



### HEADPHONE BOARD ASSEMBLY

The Headphone board assembly of PD-7500/KC, HEM, HB, HPW and SD types are the same as that of PD-7500/KU type for the service supply parts.

### TRANSFORMER BOARD ASSEMBLY

The Transformer board assembly of PD-7500/KC, HEM, HB, HPW and SD types are the same as that of PD-7500/KU type for the service supply parts.

### PRIMARY BOARD ASSEMBLY

The Primary board assembly of PD-7500/KC, HEM, HB, HPW and SD types are the same as that of PD-7500/KU type for the service supply parts.

## 8.2 FOR PD-6500/KC, HEM, HB, HPW, SD AND PD-6500-S/HEWM CONTRAST OF MISCELLANEOUS PARTS

The PD-6500/KC, HEM, HB, HPW, SD and PD-6500-S/HEWM types are the same as the PD-6500/KU type with the exception of the following sections.

Mark	Symbol & Description	Part No.						
		PD-6500/ KU	PD-6500/ KC	PD-6500/ HEM	PD-6500/ HB	PD-6500/ HPW	PD-6500/ SD	PD-6500-S/ HEWM
	Main board assembly	PWZ1814	PWZ1814	PWZ1810	PWZ1810	PWZ1810	PWZ1810	PWZ1810
	Headphone board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply
	Transformer board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply
	Primary board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply	Non supply
⚠	Power transformer (AC 120V)	PTT1128	PTT1128	.....	.....	.....	.....	.....
⚠	Power transformer (AC 220V/240V)	.....	.....	PTT1129	PTT1129	PTT1129	.....	PTT1129
⚠	Power transformer (AC 110V/120-127V/220V/240V)	.....	.....	.....	.....	.....	PTT1120	.....
⚠	AC power cord	PDG1015	PDG1015	PDG1003	PDG1004	PDG1006	PDG1013	PDG1003
⚠	Voltage selector	.....	.....	.....	.....	.....	PSB1002	.....
⚠	CD packing case	PHG1499	PHG1498	PHG1498	PHG1498	PHG1498	PHG1498	PHG1500
⚠	Strain relief	CM-22C	CM-22C	CM-22B	CM-22B	CM-22B	CM-22B	CM-22B
	Display screen	PAM1323	PAM1323	PAM1305	PAM1305	PAM1323	PAM1323	PAM1305
	Front panel assembly	PEA1066	PEA1066	PEA1097	PEA1097	PEA1066	PEA1066	PEA1067
	Connection cord with mini plug	PDE-319	PDE-319	.....	.....	.....	.....	.....
	Power button	PAC1372	PAC1372	PAC1372	PAC1372	PAC1372	PAC1372	PAC1299
	Headphone knob	PAC1370	PAC1370	PAC1370	PAC1370	PAC1370	PAC1370	PAC1402
	Tip button	PAC1310	PAC1310	PAC1310	PAC1310	PAC1310	PAC1310	.....
	Tip button S	.....	.....	.....	.....	.....	.....	PAC1486
	29 key	PAC1462	PAC1462	PAC1462	PAC1462	PAC1462	PAC1462	.....
	29 key S	.....	.....	.....	.....	.....	.....	PAC1485
	Function button assembly	PAD1054	PAD1054	PAD1054	PAD1054	PAD1054	PAD1054	PAD1055
	Function panel	PNW1696	PNW1696	PNW1696	PNW1696	PNW1696	PNW1696	PNW1737
	Bonnet case	PYY1058	PYY1058	PYY1058	PYY1058	PYY1058	PYY1058	PYY1137
	Insulator	VNK1095	VNK1095	VNK1095	VNK1095	.....	.....	VNK1095
	Plate (Tray)	PNW1743	PNW1743	PNW1743	PNW1743	PNW1743	PNW1743	.....
	Plate S (Tray)	.....	.....	.....	.....	.....	.....	PNW1738
	Foot	.....	.....	.....	.....	PNW1323	PNW1323	.....
	Operating instructions (English)	PRB1127	.....	.....	PRB1127	PRB1127	PRB1127	.....
	Operating instructions (English/French)	.....	PRE1125	PRE1125	.....	.....	.....	PRE1125
	Operating instructions (German/Italian/Dutch/Swedish/Spanish/Portuguese)	.....	.....	PRF1038	.....	.....	.....	PRF1038

**MAIN BOARD ASSEMBLY (PWZ1810)**

The main board assembly (PWZ1810) is the same as the Main board assembly (PWZ1814) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1814	PWZ1810	
	C329	CCCSL101J50	.....	
	C330	CKCYF103Z50	.....	
	D304-D307	1SS254	.....	
	R320	RD1/6PM102J	.....	
	R321	RD1/6PM244J	.....	

**HEADPHONE BOARD ASSEMBLY**

The Headphone board assembly of PD-6500/KC, HEM, HB, HPW, SD and PD-6500-S/HEWM types are the same as that of PD-6500/KU type for the service supply parts.

**TRANSFORMER BOARD ASSEMBLY**

The Transformer board assembly of PD-6500/KC, HEM, HB, HPW, SD and PD-6500-S/HEWM types are the same as that of PD-6500/KU type for the service supply parts.

**PRIMARY BOARD ASSEMBLY**

The Primary board assembly of PD-6500/KC, HEM, HB, HPW, SD and PD-6500-S/HEWM types are the same as that of PD-6500/KU type for the service supply parts.

**Line Voltage Selection (for HEM, HB, HPW and HEWM types)**

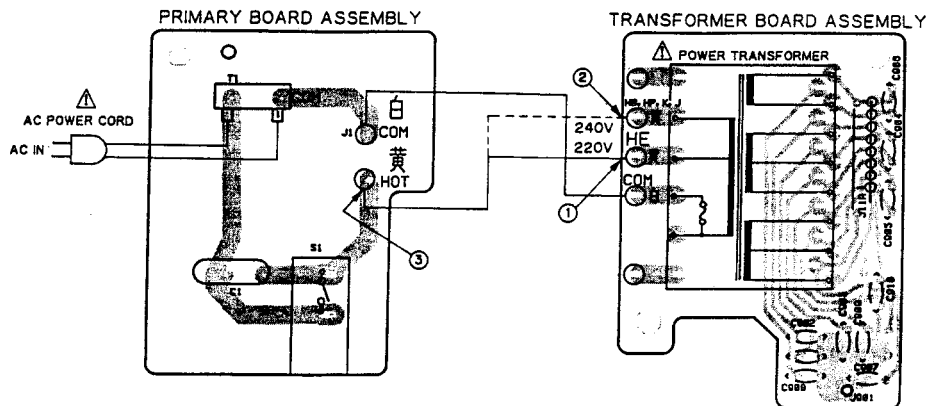
• Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection wire from Power switch board assembly (Terminal NO. ③) to Transformer board assembly (Terminal NO. ① or ②) as follows.

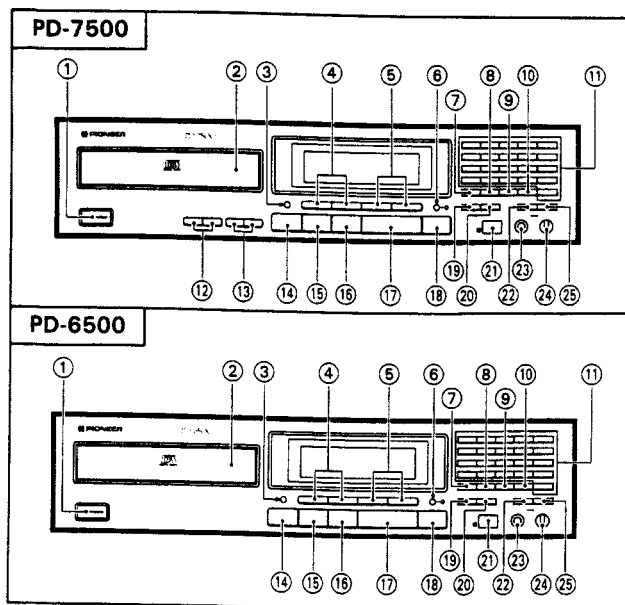
Voltage	Terminal NO. of Transformer board assembly
220V	①
240V	②

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

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

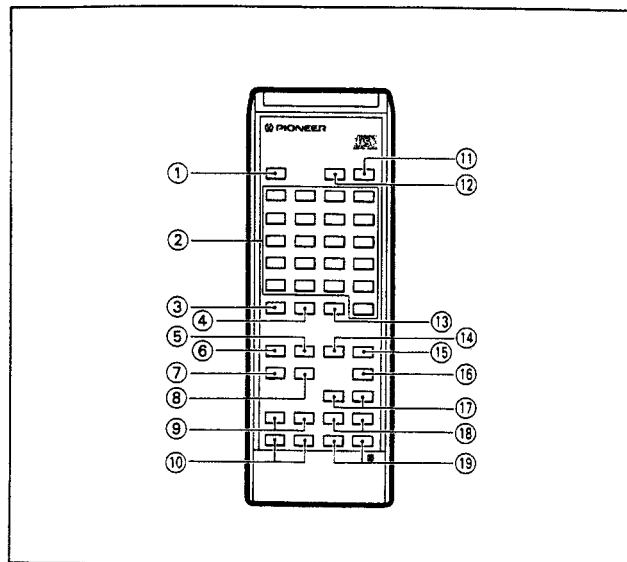


## 9. PANEL FACILITIES



### FRONT PANEL

- ① **POWER switch**  
Press to turn power ON and OFF. If the power is turned ON when a disc is already loaded, the player will automatically enter the play mode (timer start function).
- ② **Disc tray**
- ③ **DIMMER button**
- ④ **MANUAL SEARCH buttons (◀◀, ▶▶)**
- ⑤ **TRACK SEARCH buttons (◀◀, ▶▶)**
- ⑥ **HI-LITE SCAN button**
- ⑦ **Program button (PGM)**
- ⑧ **CHECK button**
- ⑨ **CLEAR button**
- ⑩ **TIME button**
- ⑪ **TRACK NUMBER buttons (1–20, >20)**
- ⑫ **AUTO FADER buttons (↗, ↘) (PD-7500 only)**
- ⑬ **INDEX SEARCH buttons (↖, ↗) (PD-7500 only)**
- ⑭ **OPEN/CLOSE button**
- ⑮ **STOP button (■)**
- ⑯ **PAUSE button/indicator (■)**
- ⑰ **PLAY button/indicator (▶)**
- ⑱ **RANDOM PLAY button**
- ⑲ **Program edit button (EDIT)  
(■ AUTO PGM/ ■■ COMPU PGM)**
- ⑳ **TIME FADE EDIT button**
- ㉑ **Remote sensor**
- ㉒ **AUTO SPACE button**
- ㉓ **Headphones jack (PHONES)**
- ㉔ **Headphones volume control (PHONES LEVEL)**
- ㉕ **REPEAT button**

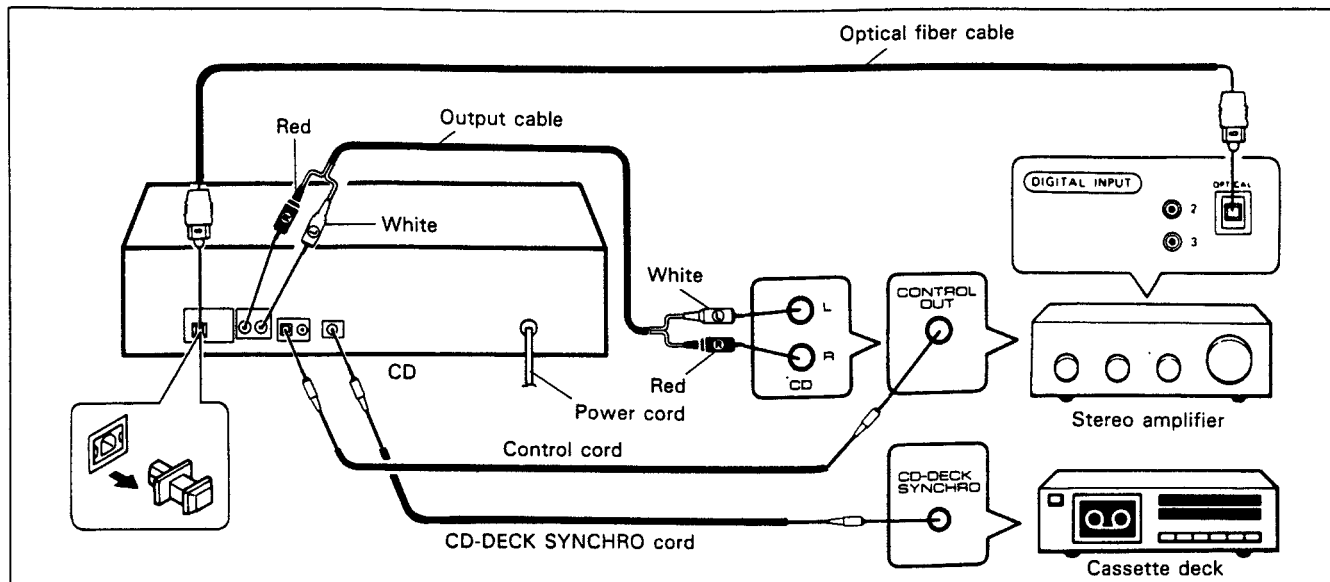


### REMOTE CONTROL UNIT

Buttons listed here but not accompanied with explanations have the same functions as the corresponding front-panel buttons.

- ① **OPEN/CLOSE button**
- ② **Track number buttons (1–20, >20)**
- ③ **Program button (PGM)**
- ④ **CHECK button**
- ⑤ **REPEAT button**
- ⑥ **TIME button**
- ⑦ **STOP button (■)**
- ⑧ **PAUSE button (■)**
- ⑨ **FADE IN/OUT buttons (↗, ↘)**
- ⑩ **OUTPUT LEVEL buttons (–, +)**
- ⑪ **TIME FADE EDIT button**
- ⑫ **Program edit button (EDIT)  
(■ AUTO/ ■■ COMPU)**
- ⑬ **CLEAR button**
- ⑭ **Hi-lite scan button (HI-LITE SCAN)**
- ⑮ **RANDOM PLAY button**
- ⑯ **PLAY button (▶)**
- ⑰ **Track search buttons (TRACK ◀◀, ▶▶)**
- ⑱ **Index search buttons (INDEX ↖, ↗)**
- ⑲ **Manual search buttons (MANUAL ◀◀, ▶▶)**

## 10. CONNECTIONS



### CONNECTING THE OUTPUT CABLE:

Connect the plugs on one end of the cable to your amplifier's input terminals (CD or AUX), and those on the other end to the output terminals on this CD player.

- When connecting the cord, insert the white plugs into the left (L) channel, and the red plugs to the right (R) channel.
- Be sure to connect all plugs fully into their terminals.
- Never connect the CD player to your amplifier's turntable (PHONO) terminals, since sound will be distorted and proper playback will not be possible.

### CONNECTING THE POWER CORD:

Insert the power cord's plug into an accessory AC outlet on your amplifier, or into a normal household outlet.

### CONNECTING THE OPTICAL FIBER CABLE:

#### NOTE:

- No sound may be produced if optical connections are made with an amplifier having different optical signal standards.
- Volume control is not possible when a digital output connector is used.


### Handling precautions for the optical fiber cable (sold separately)

- Do not bend the cable at sharp angles. Doing so may damage the cable. When installing in a rack, take special care. When storing the cable for storage, coil with 5-15/16 in (15 cm) diameter or larger.
- When connecting, insert the plug fully. Avoid an incomplete connection.
- Use an optical fiber cable 10 feet (3 m) or less.
- Avoid the optical fiber cable plug being scratched or exposed to dust. If there is dust, wipe off with a soft cloth.
- When an optical fiber cable is not connected, place the dust cap on the optical terminal (OPTICAL).

### REMOTE CONTROL AMPLIFIER OPERATION:

PD-7500 (U.S., Canadian and Australian models)

PD-6500 (U.S. and Canadian models)

If your amplifier features the  mark, connect the accessory control cord between the Amplifier's CONTROL OUT terminal and the CD player's CONTROL IN terminal.

- You can then use the remote control unit furnished with your amplifier to perform PLAY, PAUSE, STOP and TRACK operations on the CD player.
- For details regarding connection and operation, consult the Operating Instructions accompanying your stereo amplifier.
- These terminals do not need to be connected if you do not intend to use this function.

#### NOTE:

- When the control cord is connected to the CONTROL IN terminal, the remote control unit cannot be used to control the player directly. The remote control unit must be pointed at the amplifier's remote sensor.
- Be sure to connect both of the control cord's plugs securely to the CONTROL IN and CONTROL OUT terminals. Do not connect only one end of the cable.
- When only the digital output is connected, the remote sensor of the amplifier does not function. To operate it, connect the output cable to the stereo amplifier as well as connecting the digital output.

### About the CD-DECK SYNCHRO recording function:

- This function facilitates edit recording from CD to cassette tape when the CD player is connected to a Pioneer cassette deck equipped with a CD-DECK SYNCHRO terminal. For details, consult the Operating Instructions accompanying the cassette deck featuring the CD-DECK SYNCHRO mark.
- When only the digital output is connected, the CD-DECK SYNCHRO recording does not function. To operate it, connect the output cable to the stereo amplifier as well as connecting the digital output.

# 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 .....	16W
Operating temperature .....	+5°C - +35°C (+41°F - +95°F)
Weight .....	4.3kg (9lb, 8oz)
External dimensions .....	420(W) x 326(D) x 106(H)mm 16-9/16(W) x 12-13/16(D) x 4-3/16(H) in.

## 2. Audio section

### PD-7500:

Frequency response .....	2Hz-20kHz
S/N .....	108dB or more (EIAJ)
Dynamic range .....	96dB or more (EIAJ)
Channel separation .....	98dB or more (EIAJ)
Total harmonic distortion .....	0.0024% 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)

### PD-6500:

Frequency response .....	2Hz-20kHz
S/N .....	106dB or more (EIAJ)
Dynamic range .....	96dB or more (EIAJ)
Channel separation .....	98dB or more (EIAJ)
Total harmonic distortion .....	0.0027% 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
- CD-DECK SYNCHRO terminal
- Control input/output terminals  
PD-6500: U.S. and Canadian models only  
PD-7500: U.S., Canadian and Australian models only
- Headphone jack (with volume control)
- Optical digital output terminal

## 4. Functions

- Play
- Pause
- Stop
- Manual search
- Track search
- Index search (PD-6500: remote control only)
- Hi-lite scan (with auto fader)
- Direct selection
- Single track repeat
- All track repeat
- Programmed repeat
- Random play repeat
- Programmed random play repeat
- Programmed playback (up to 24 tracks)
- Pause program
- Program check
- Program correction
- Program clear
- Auto program edit
- Compu program edit
- Time fade edit (Fade time variable)
- One touch fade (Fade time variable)  
(PD-6500: remote control only)
- Digital level control (Remote control only)
- Random play
- Programmed random play
- Auto space
- Dimmer
- Timer start
- CD-deck synchro

## 5. Accessories

- Remote control unit ..... 1
- Size AAA/RO3 dry cell batteries ..... 2
- Output cable ..... 1
- Control cord ..... 1
- PD-6500: U.S. and Canadian models
- PD-7500: U.S., Canadian and Australian models
- Operating instructions ..... 1

### NOTE:

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