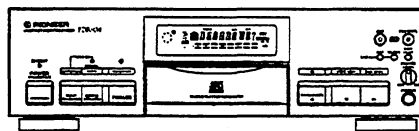


Service Manual

PIONEER
The Art of Entertainment



ORDER NO.
RRV1722

COMPACT DISC RECORDER **PDR-04**

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Type	Model	Power Requirement	Remarks
	PDR-04		
KU/CA	○	AC120V	

www.electronicrepair.net

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1. SAFETY INFORMATION

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 serving 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.

NOTICE

(FOR CANADIAN MODEL ONLY)

Fuse symbols  (fast operating fuse) and/or  (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

REMARQUE

(POUR MODÈLE CANADIEN SEULEMENT)

Les symboles de fusible  (fusible de type rapide) et/ou  (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

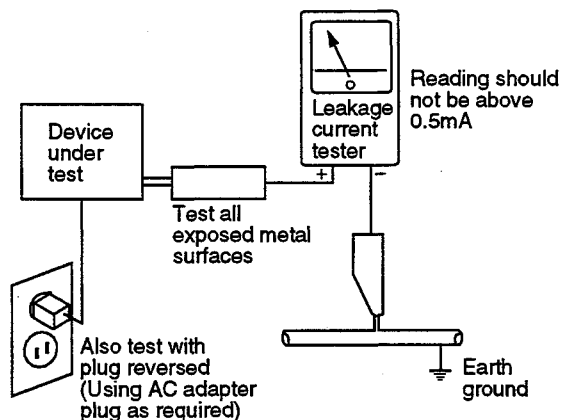
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

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

LEAKAGE CURRENT CHECK

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



AC Leakage Test

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

2. PRODUCT SAFETY NOTICE

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

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

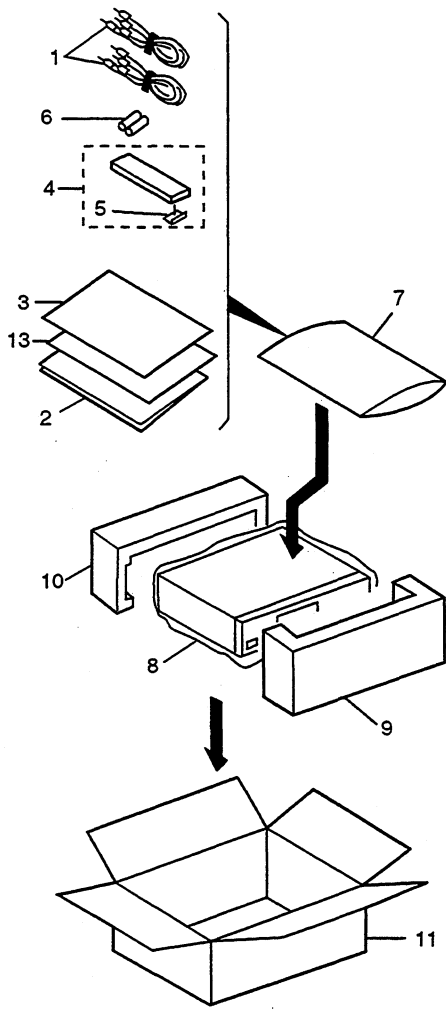
The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

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

2. EXPLODED VIEWS AND PARTS LIST

NOTES: • Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
• The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
• Screws adjacent to $\blacktriangledown$ mark on the product are used for disassembly.

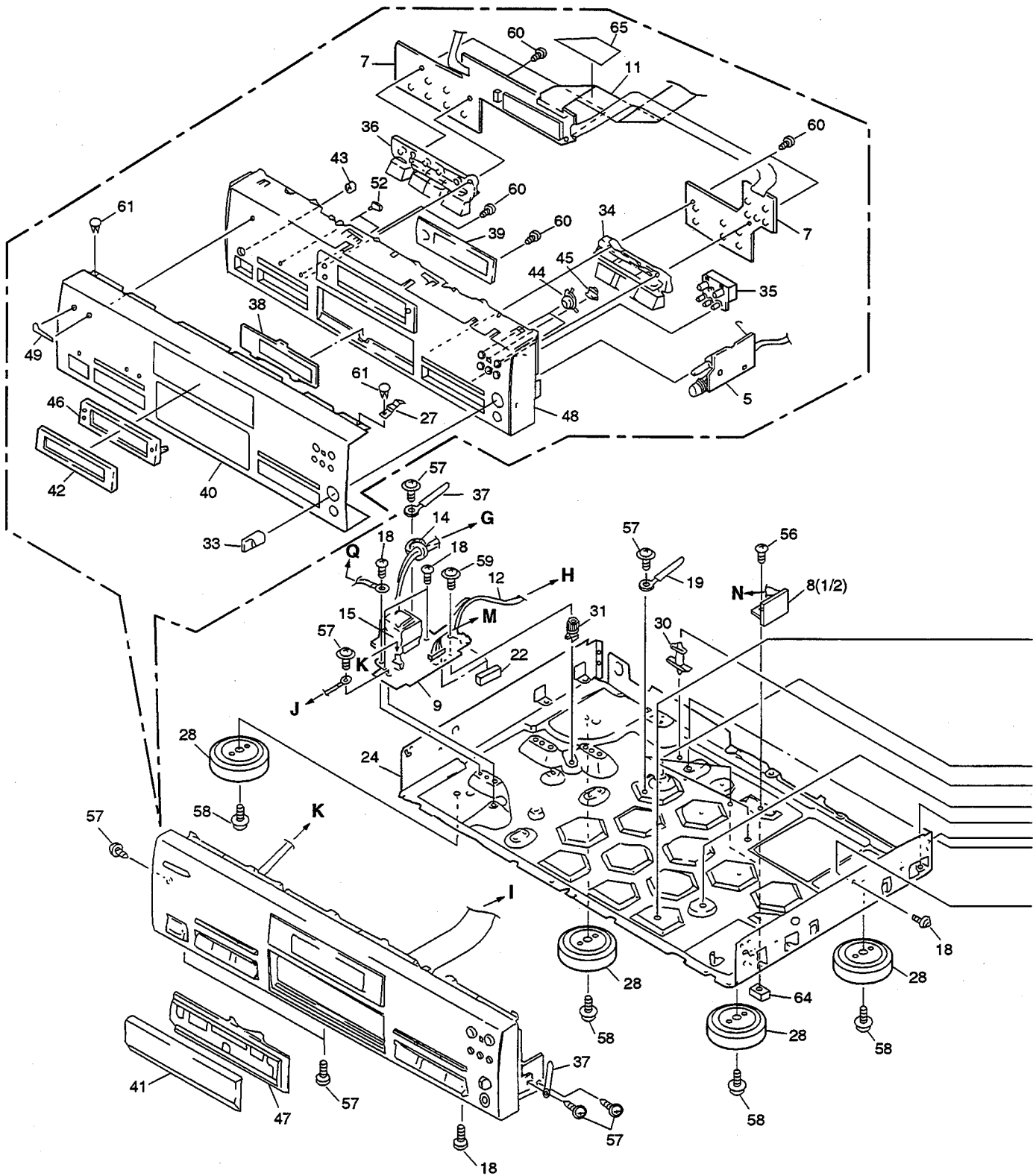
2.1 PACKING

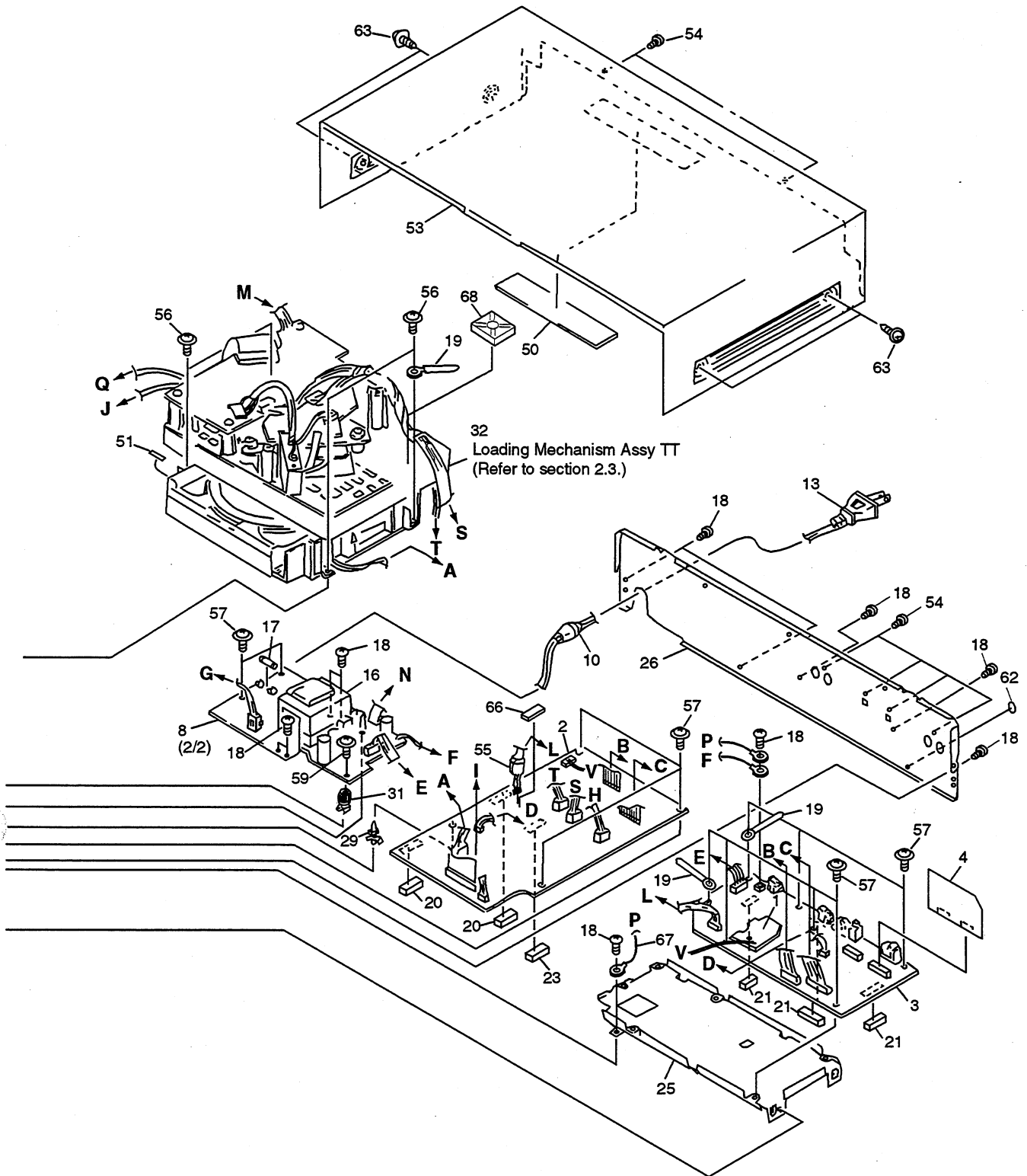


Parts List

Mark	No.	Description	Part No.
	1	Cord with Plug	PDE1248
	2	Operating Instructions (English)	PRB1251
	3	CD-R Disc Caution Card	PRM1046
	4	Wireless Remote Control Unit (CU-PD083)	PWW1116
NSP	5	Battery Cover	AZA7123
	6	Battery (R6P,AA)	VEM-013
	7	Polyethylene Bag	Z21-038
	8	Mirror Mat	Z23-007
	9	Styrol Protector F	PHA1243
	10	Styrol Protector R	PHA1245
	11	Packing Case	PHG2223
	12	•••••	
NSP	13	Warranty Card	ARY1044

2.2 EXTERIOR





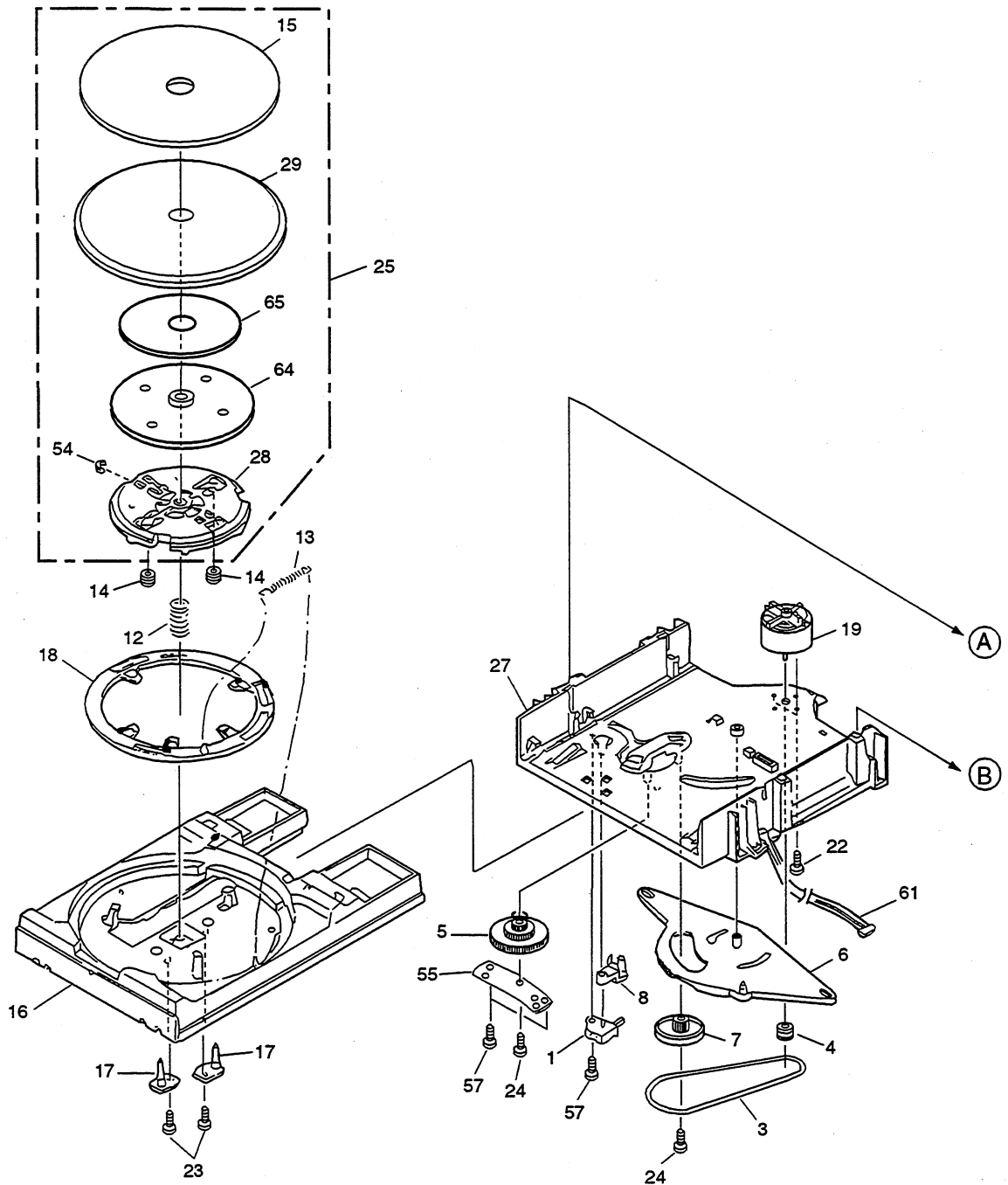
PDR-04

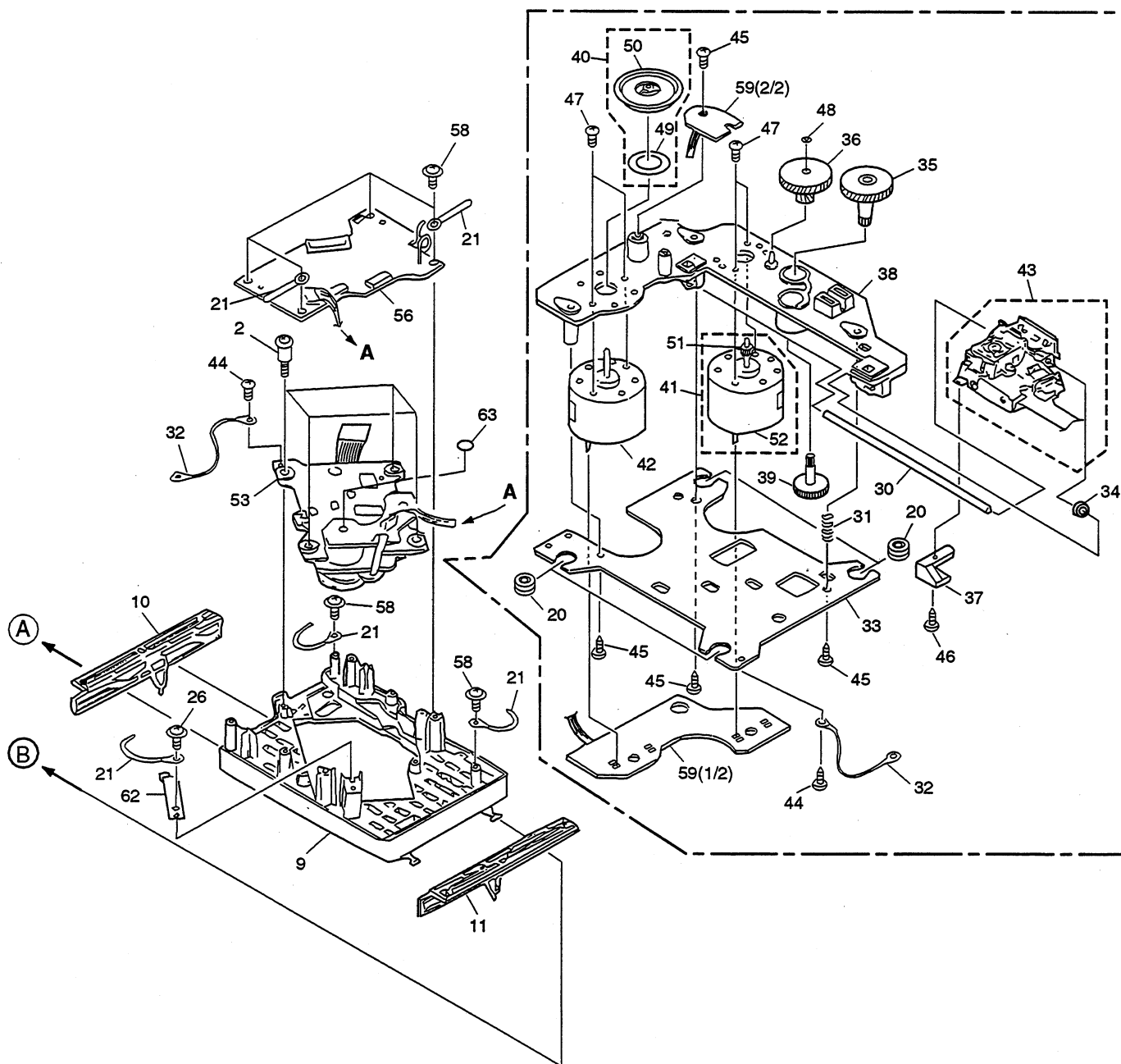
Parts List

Mark	No.	Description	Part No.
NSP	1	STRATEGY SMALL BOARD ASSY	PWX1518
NSP	2	SERVO UCOM BOARD ASSY	PWZ3387
NSP	3	AUDIO DIGITAL BOARD ASSY	PWZ3388
NSP	4	ALC BOARD ASSY	PWZ3389
NSP	5	HEADPHONE BOARD ASSY	PWZ3390
	6	*****	
	7	FUNCTION BOARD ASSY	PWZ3042
	8	POWER A BOARD ASSY	PWZ3354
	9	POWER B BOARD ASSY	PWZ3359
△	10	Strain Relief	CM-22C
	11	39P F.F.C/30V	PDD1181
	12	Connector Assy (5P)	PF05PP-D37
△	13	AC Power Cord	PDG1015
△	14	Ferrite Core	PTH1018
△	15	Power Transformer (Servo, AC120V)	PTT1308
△	16	Power Transformer (Audio, AC120V)	PTT1309
△	17	Fuse (FU11,1A)	REK1075
	18	Screw	ABA1207
	19	Cord Clamper	RNH-184
NSP	20	Cushion (3.5)	PEB1110
NSP	21	Spacer A	PEB1228
	22	Rubber Spacer A	PEB1280
	23	Rubber Spacer B	PEB1281
NSP	24	Under Base	PNA2195
	25	Audio Angle	PNA2197
	26	Rear Base	PNA2314
	27	Earth Plate	PBK1090
	28	Insulator	PNW1912
NSP	29	PCB Holder	PNW2100
	30	PCB Holder	PNW2562
NSP	31	PCB Spacer	PNY-404
NSP	32	Loading Mechanism Assy TT	PXA1568
	33	Headphone Knob	PAC1600
	34	Operation Button 78	PAC1744
	35	REC Button	PAC1804

Mark	No.	Description	Part No.
NSP	36	Power Button	PAC1805
	37	Cord Clamper	DNF1128
	38	Display Window	PAM1668
	39	FL Sheet	PAM1673
	40	Front Panel	PAN1349
	41	Tray Panel	PNW2701
	42	Display Panel 7	PNW2662
	43	LED Lens	PNW2019
	44	REC Ring	PNW2558
	45	REC Lens	PNW2559
	46	Holder	PNW2591
	47	Tray Holder	PNW2592
	48	Control Panel	PNW2703
	49	Name Plate	VAM1032
	50	65 Label	ORW1069
	51	*****	
	52	Indicator Lens	PEA1206
	53	Bonnet	PYY1175
	54	Screw	BBT30P080FCC
	55	Ferrite Core	PTH1009
	56	Screw	BBZ30P080FCC
	57	Screw	IBZ30P060FCC
	58	Screw	IBZ30P080FCC
	59	Screw	IBZ30P150FCC
	60	Screw	PPZ30P150FMC
	61	Rivet	RBM-003
	62	Black Label	PRW1470
	63	Screw	FBT40P080FZK
	64	Disc Guard	PNM1245
	65	Shield Sheet	PNM1308
	66	IC	PYY1196
	67	Earth Lead Unit	PDF1154
	68	Binder Holder	PNW1021

2.3 LOADING MECHANISM ASSY TT



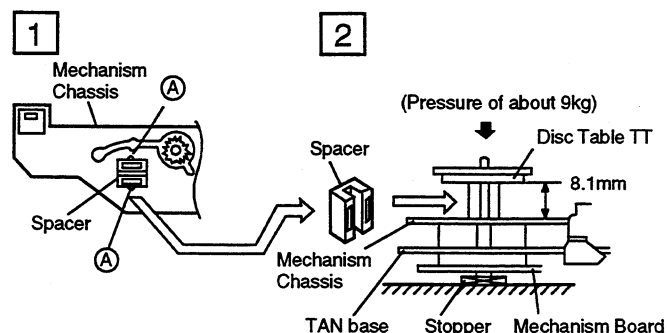


Parts List

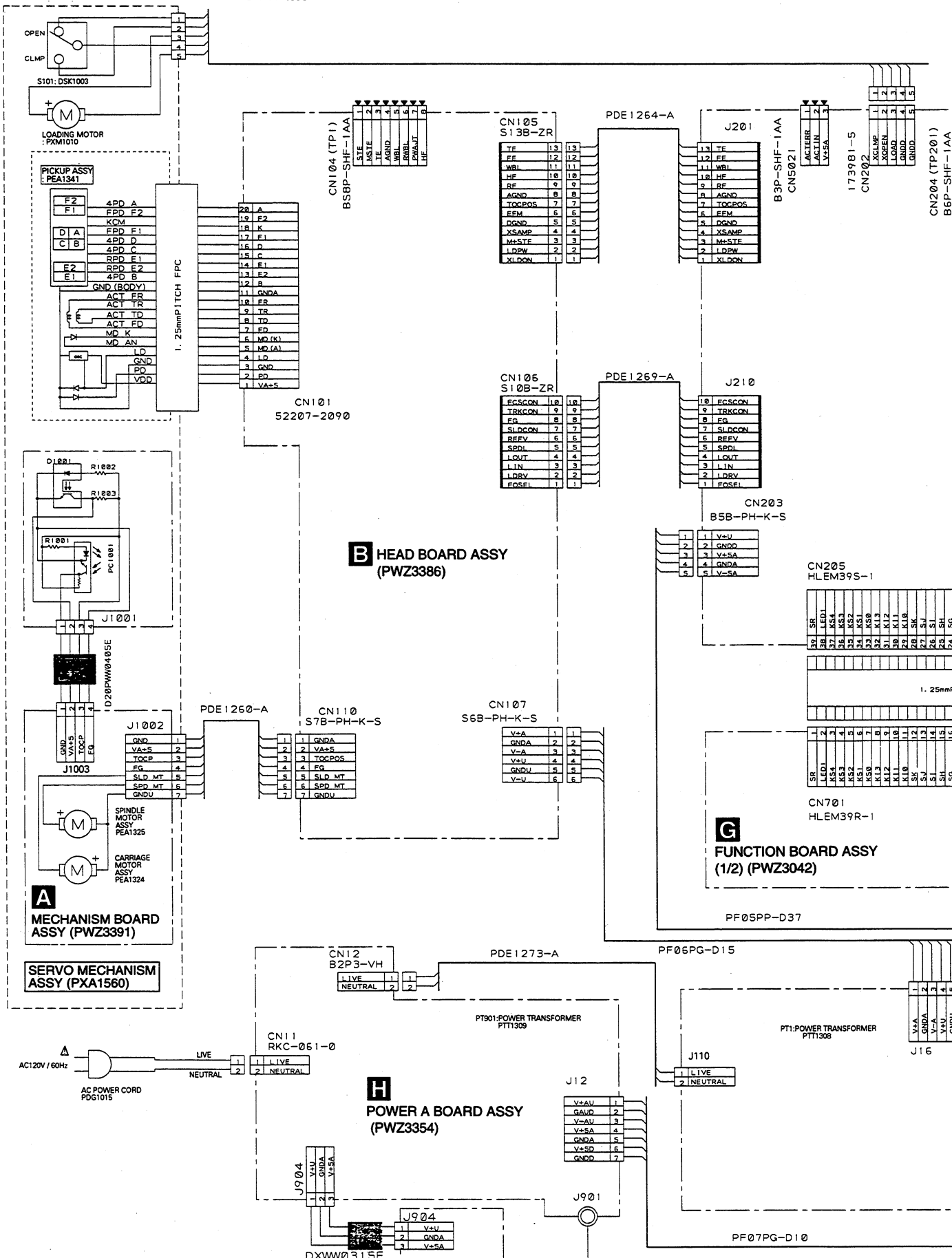
Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
	1	Lever Switch (S101)	DSK1003		51	Pinion Gear	PNW2515
	2	Float Screw	PBA1027	NSP	52	Spindle D.C Motor (0.3W)	PXM1033
	3	Rubber Belt	PEB1186	NSP	53	Servo Mechanism Assy	PXA1560
	4	Motor Pulley	PNW1634		54	Stop Ring	YE20S
	5	Drive Gear	PNW1996		55	Shaft Holder	PNB1382
	6	Timing Lever	PNW2168	NSP	56	HEAD BOARD ASSY	PWZ3386
	7	Gear Pulley	PNW1998		57	Screw	BPZ26P060FMC
	8	SW Head	PNW1999		58	Screw	IBZ30P080FCC
	9	Float Base	PNW2563	NSP	59	MECHANISM BOARD ASSY	PWZ3391
	10	Left Cam	PNW2001		60		
	11	Right Cam	PNW2002		61	Connector Assy 5P	PDE1243
	12	Float Spring	PBH1120		62	Clamp Spring	PBK1139
	13	Lock Spring	PBH1121		63	Spacer	PBF1014
	14	Float Rubber	PEB1014	NSP	64	Table Base Assy	PXA1382
	15	Table Rubber Sheet	PEB1181	NSP	65	Double Face Tape	PNM1114
	16	Tray	PNW2003				
	17	Table Guide	PNW2004				
	18	Lock Plate	PNW2005				
	19	D.C. Motor (0.75W,Loading)	PXM1010				
	20	Float Rubber	PEB1031				
	21	Cord Clamper	RNH-184				
	22	Screw	BMZ26P040FMC				
	23	Screw	IPZ26P060FCU				
	24	Screw	IPZ20P080FMC				
	25	Turn Table Assy	PEA1165				
	26	Screw	IPZ30P080FCU				
NSP	27	Loading Base	PNW1995				
NSP	28	Table Shaft Holder	PXA1383				
	29	Turn Table	PNR1035				
	30	Guide Shaft	DLA1530				
NSP	31	Earth Spring	PBH1196				
	32	Earth Lead Unit /300V	PDF1088				
	33	TAN Base	PNB1514				
	34	Stopper Ring	PNM1246				
	35	Gear 2	PNW2513				
	36	Gear 3	PNW2514				
	37	TAN Plate TT	PNW2518				
	38	Mechanism Chassis	PNW2520				
	39	Gear 1	PNW2521				
	40	Disc Table TT Assy	PEA1323				
	41	Carriage Motor Assy	PEA1324				
	42	D.C Motor Assy (Spindle)	PEA1325				
	43	Pickup Assy	PEA1341				
	44	Screw	BBZ26P040FMC				
	45	Screw	BBZ26P080FMC				
	46	Screw	BMZ20P040FMC				
	47	Screw	JFZ20P030FNI				
	48	Washer	WT12D032D025				
NSP	49	Mirror Mat	PNM1247				
	50	Disc Table TT	PNW2516				

•How to install the disc table

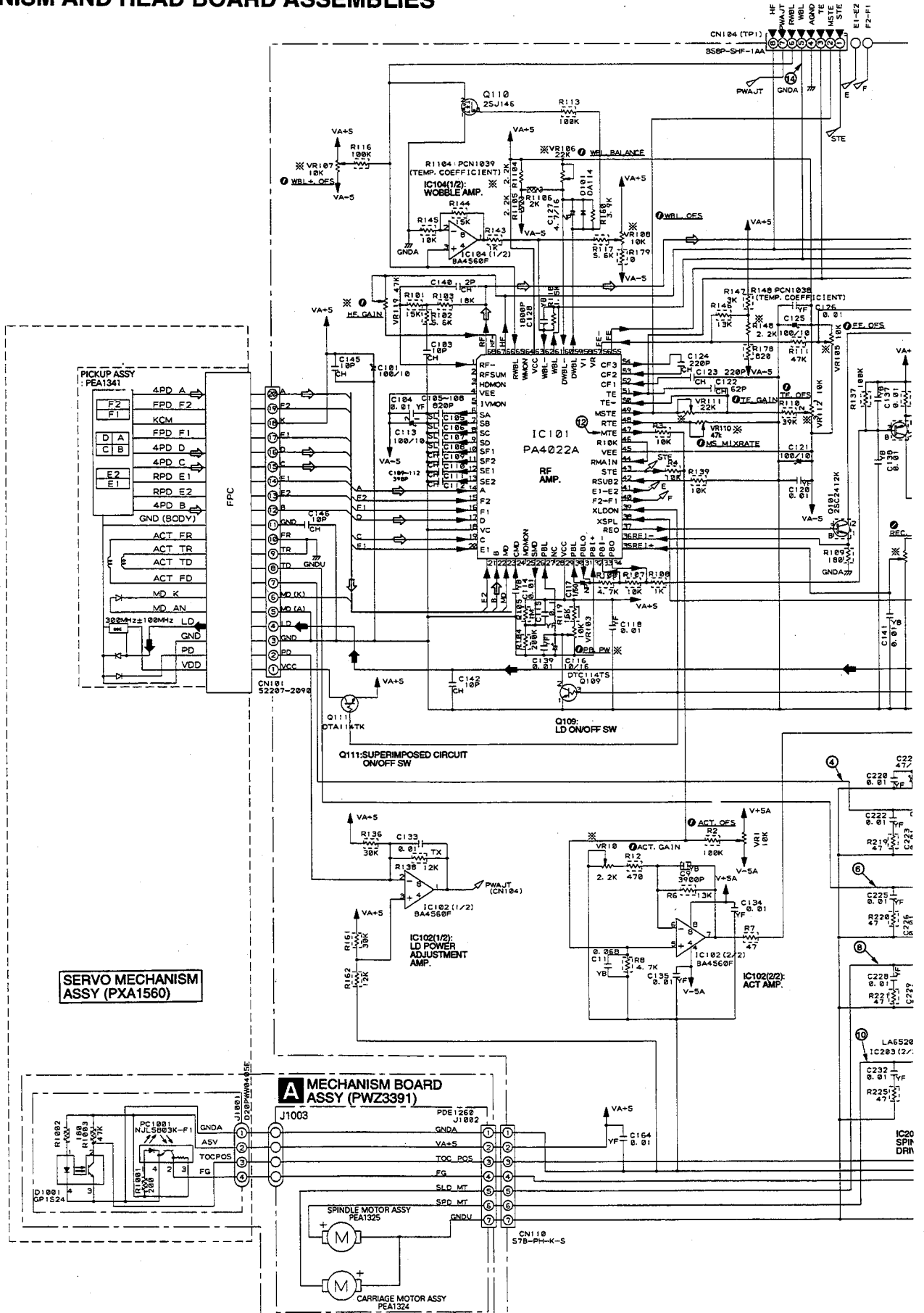
- 1 Use nippers or other tool to cut the two sections marked A in figure 1. Then remove the spacer.
- 2 While supporting the spindle motor shaft with the stopper, put the spacer on top of the mechanism chassis and stick the disc table TT on top (takes about 9kg pressure). Take off the spacer.

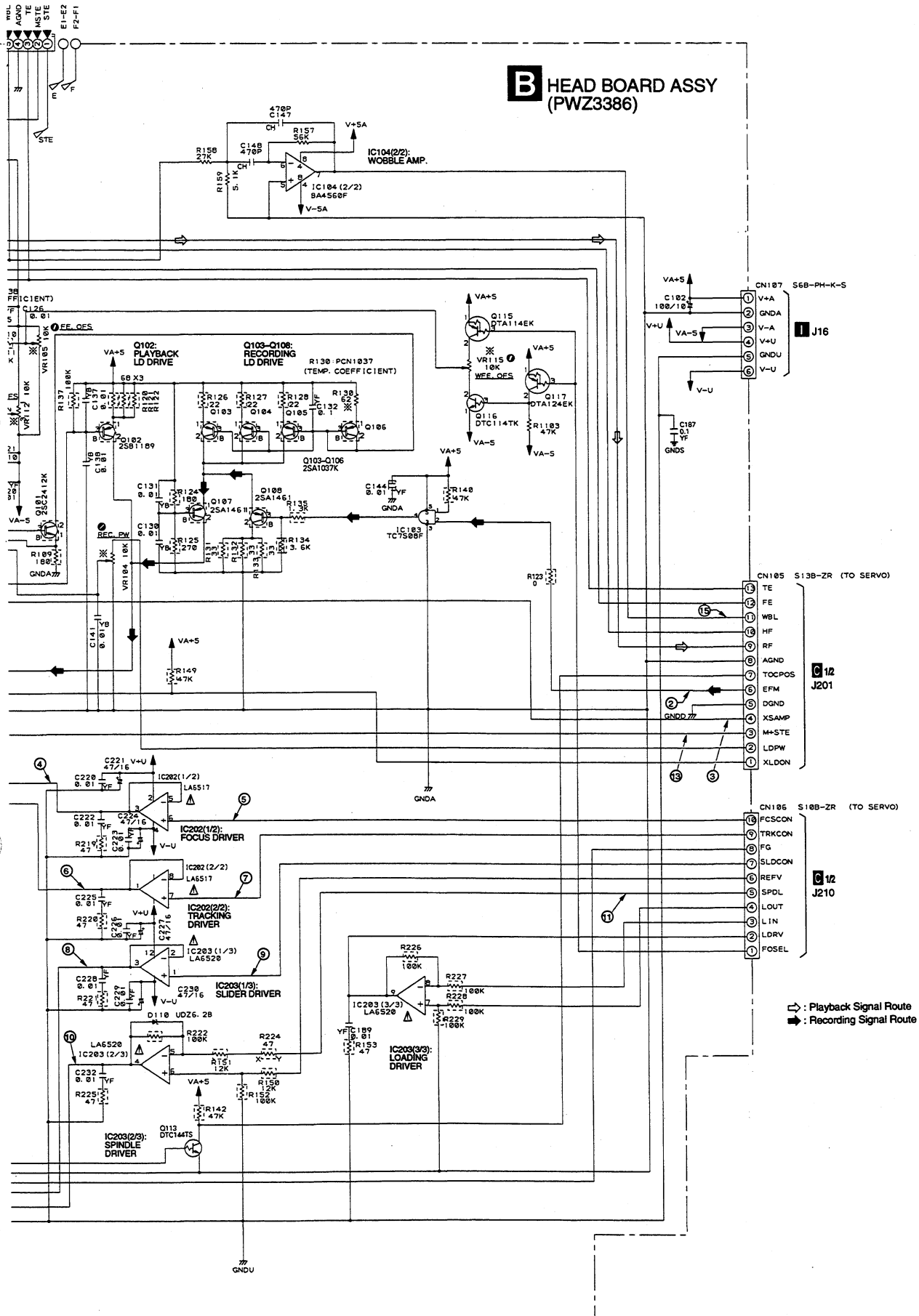


3. SCHEMATIC DIAGRAM 3.1 OVERALL WIRING DIAGRAM



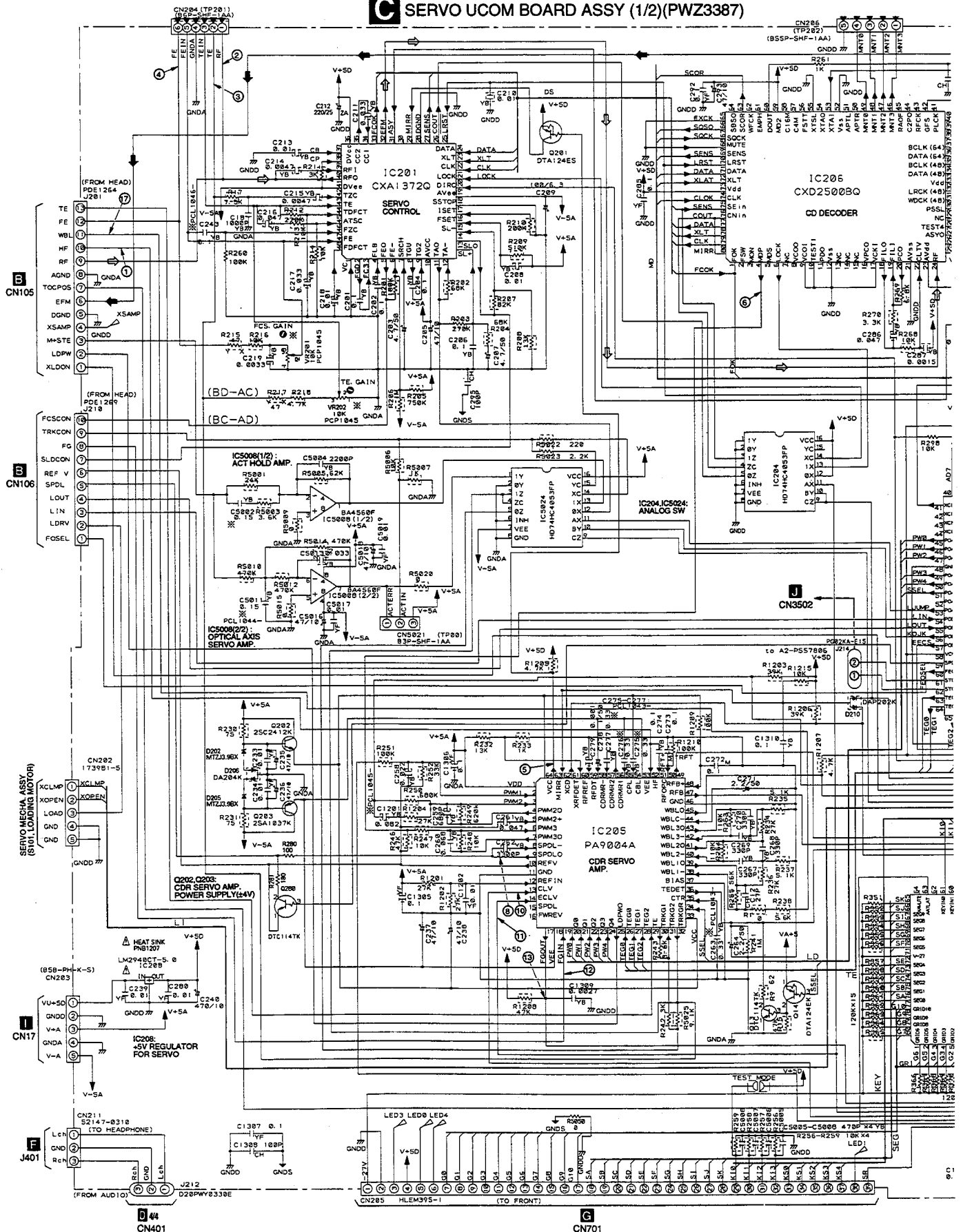
3.2 MECHANISM AND HEAD BOARD ASSEMBLIES

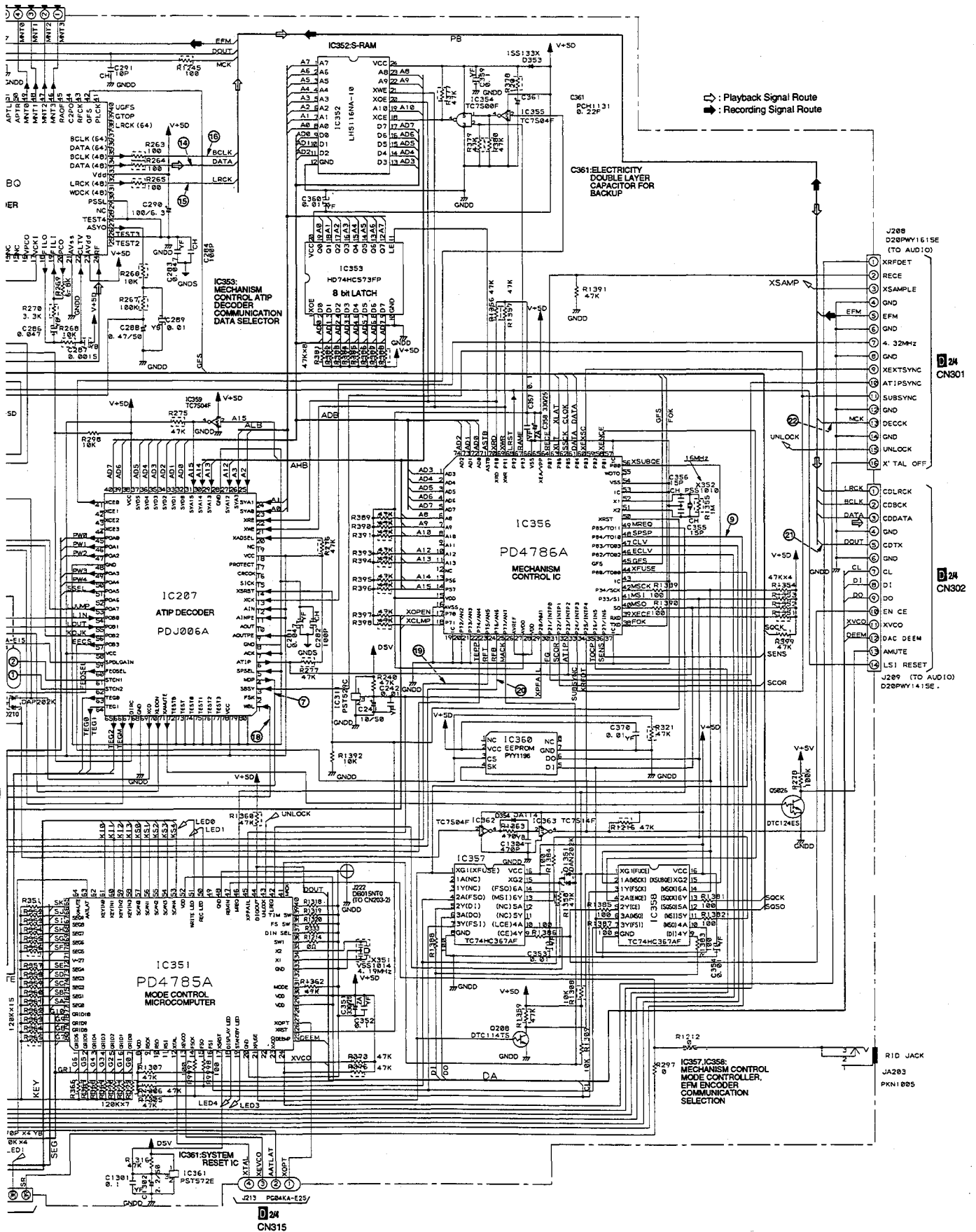




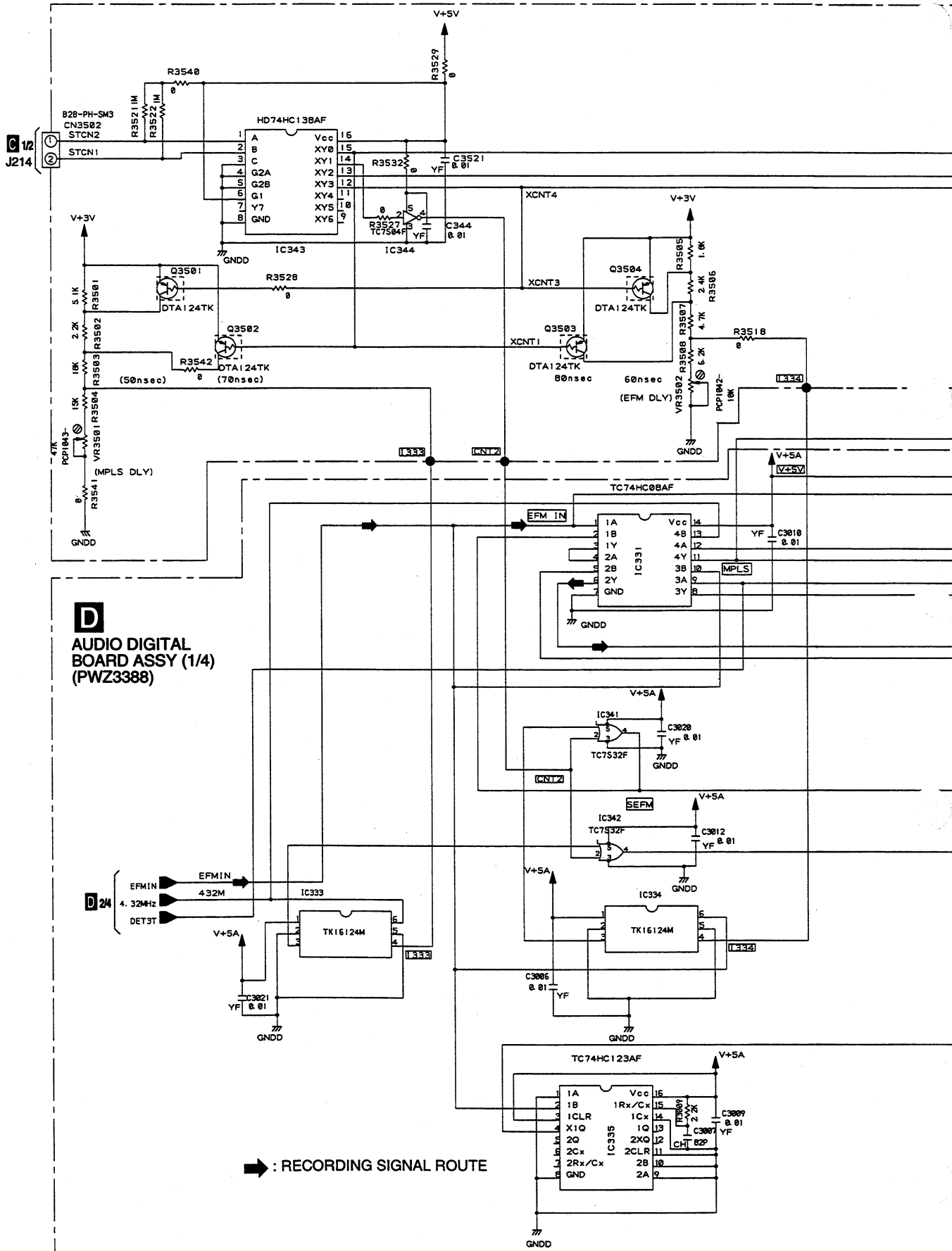
3.3 SERVO UCOM BOARD ASSY (1/2)

C SERVO UCOM BOARD ASSY (1/2)(PWZ3387)

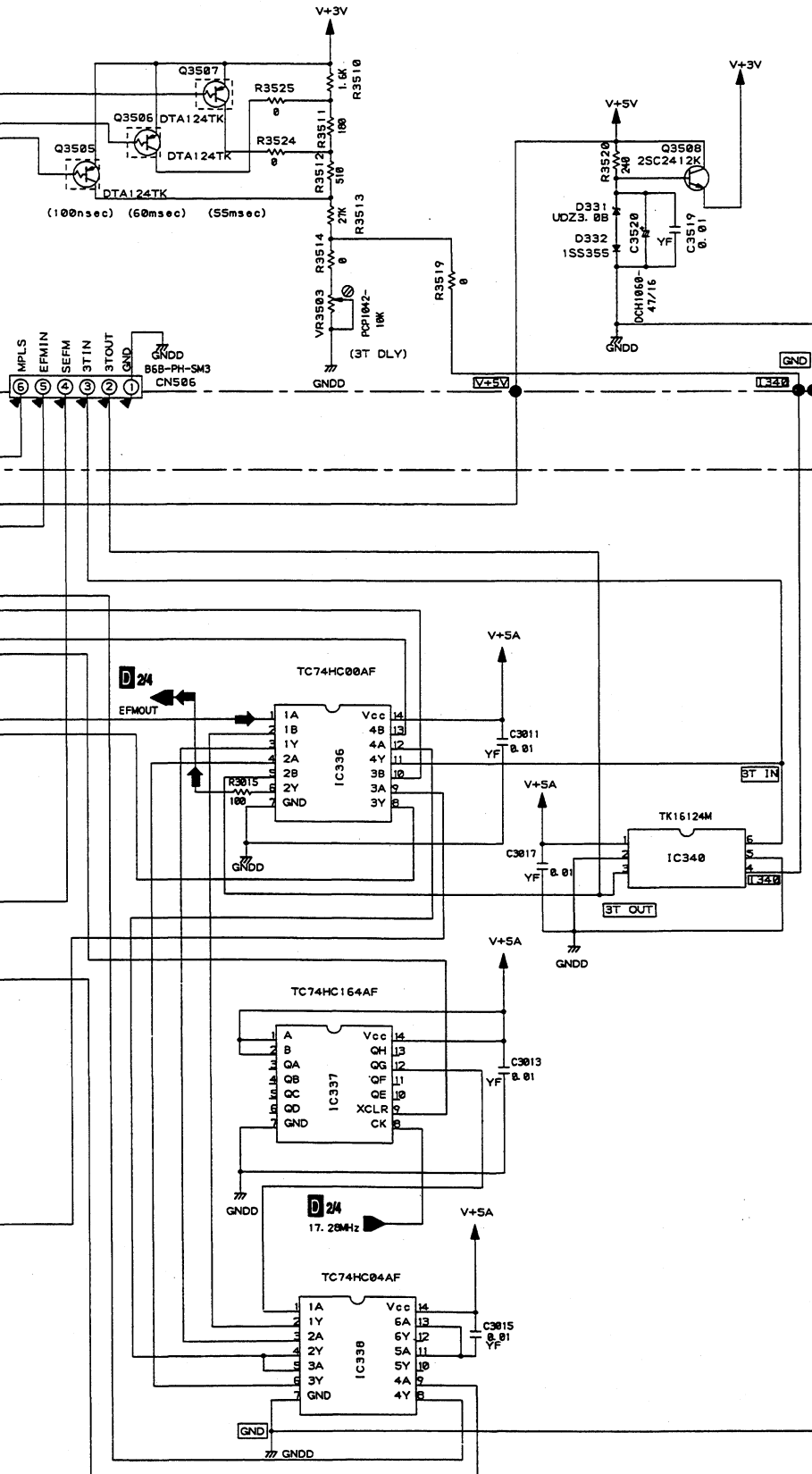




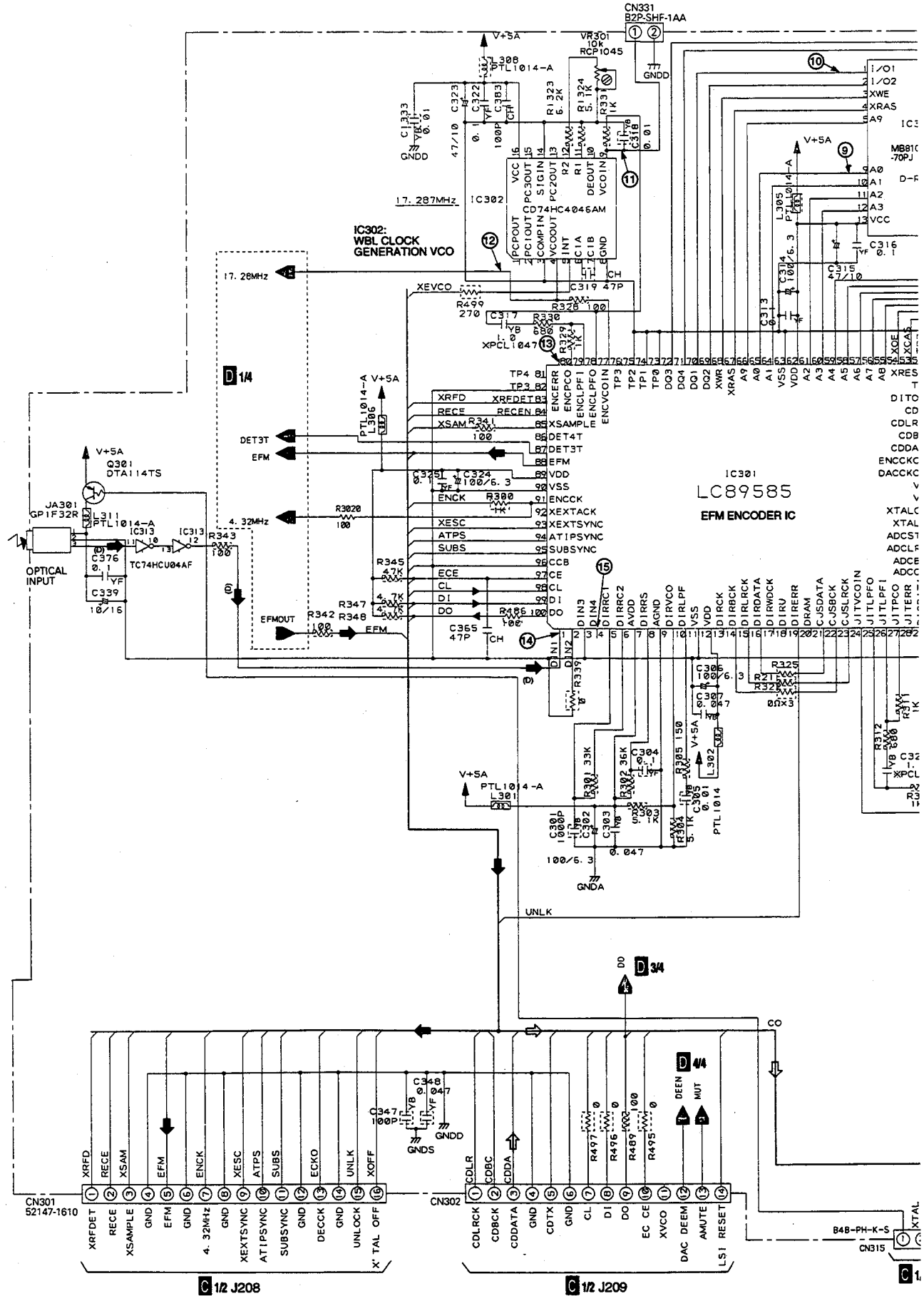
3.4 AUDIO DIGITAL BOARD ASSY (1/4) AND STRATEGY SMALL BOARD ASSY

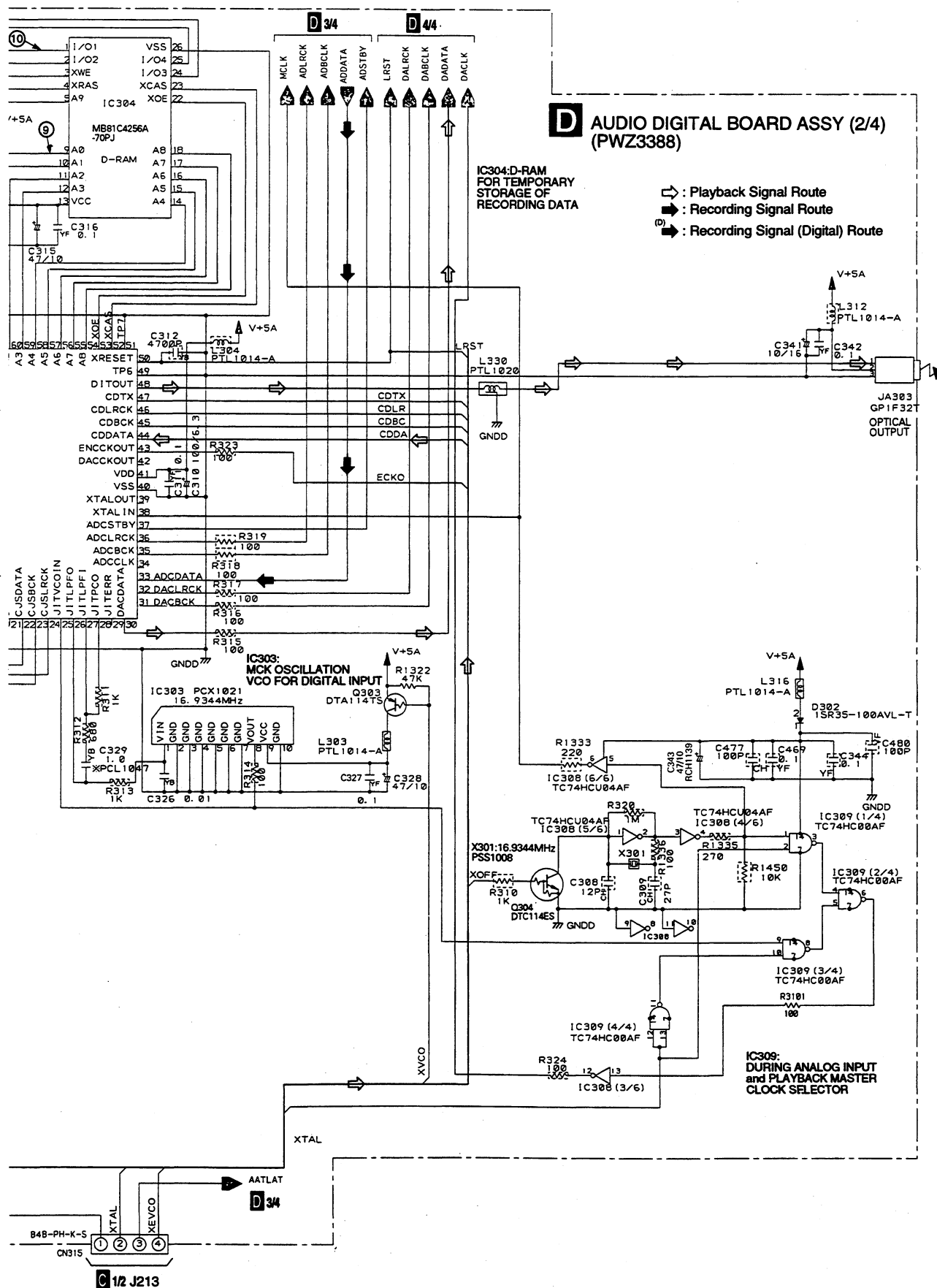


J STRATEGY SMALL BOARD ASSY
(PWX1518)

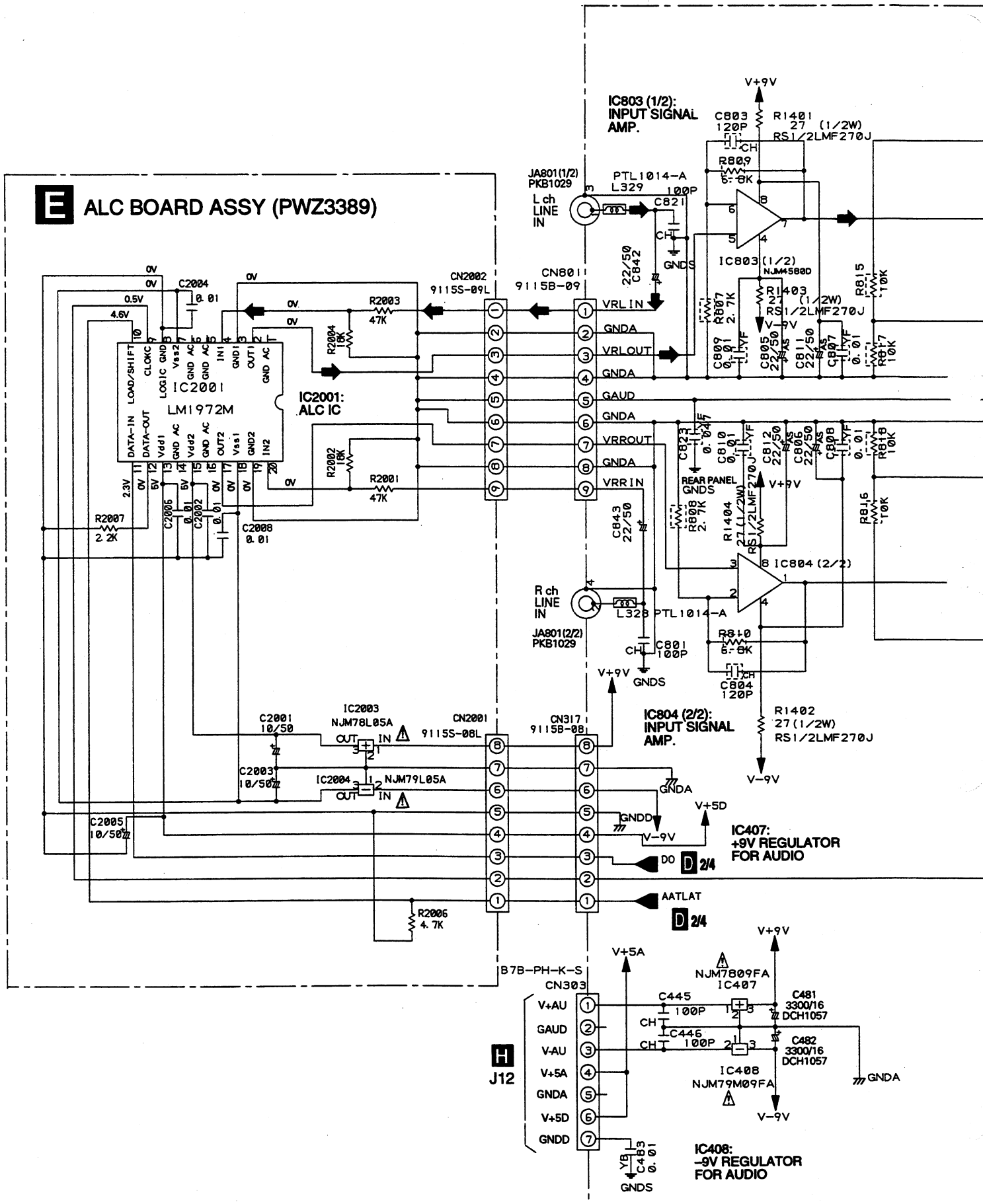


3.5 AUDIO DIGITAL BOARD ASSY (2/4)



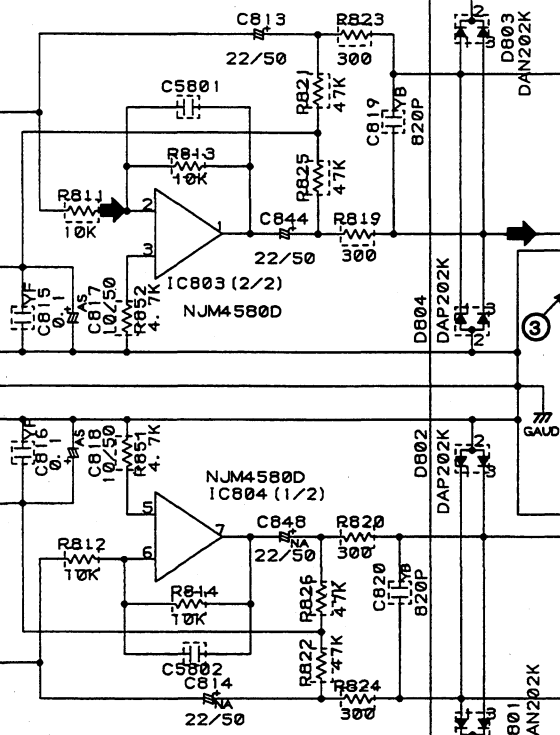


3.6 AUDIO DIGITAL BOARD ASSY (3/4) AND ALC BOARD ASSY

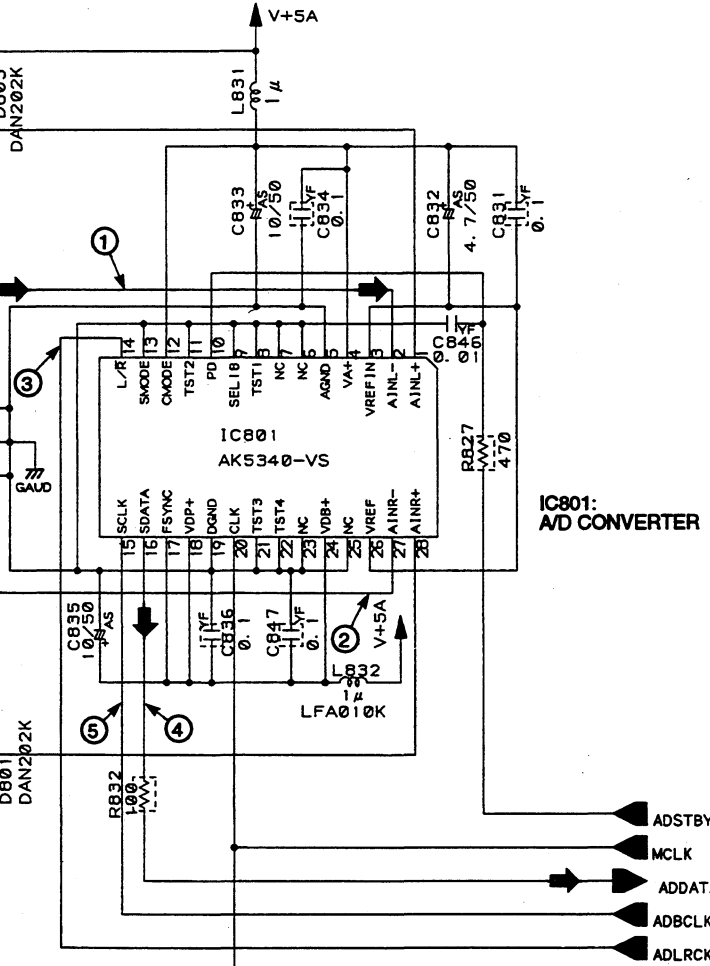
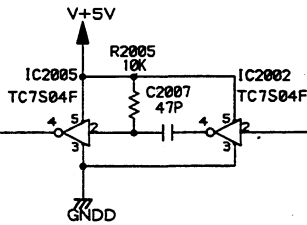


D AUDIO DIGITAL BOARD ASSY (3/4) (PWZ3388)

IC803 (2/2):
INPUT SIGNAL
INVERTER

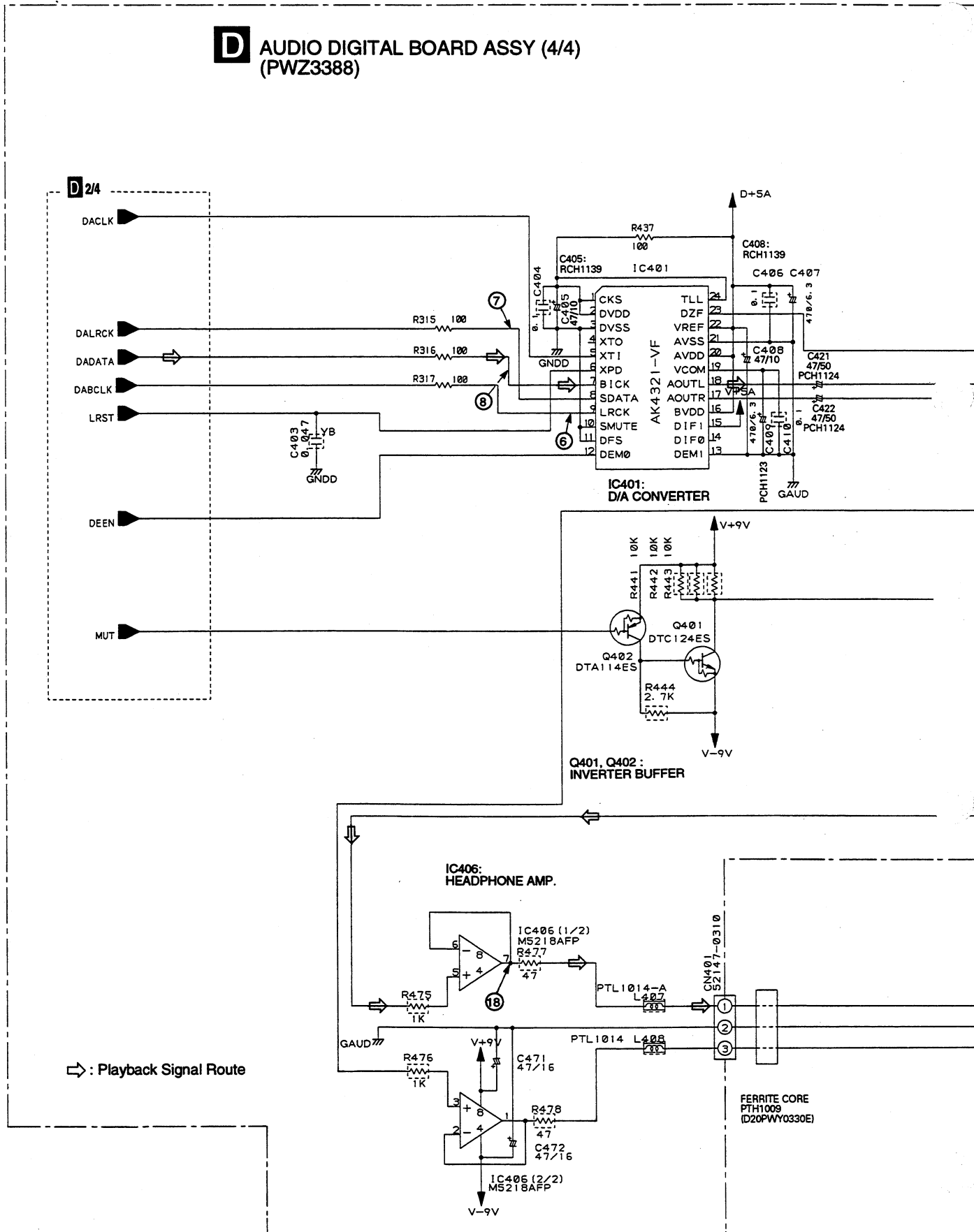


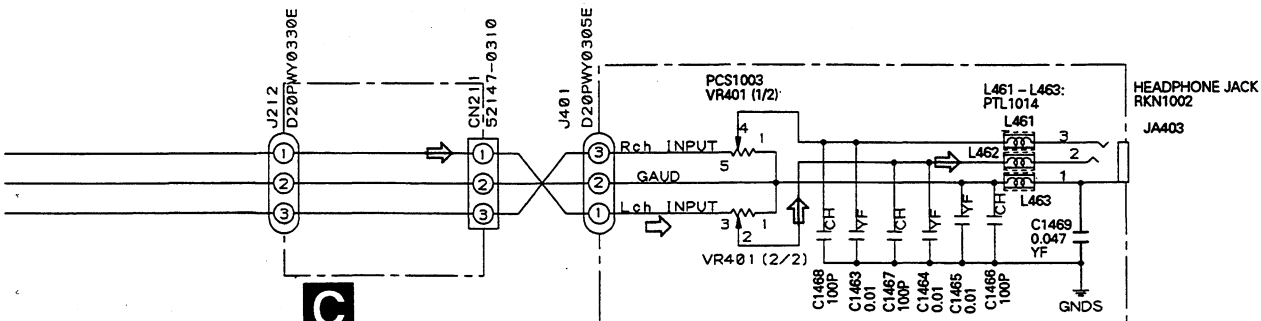
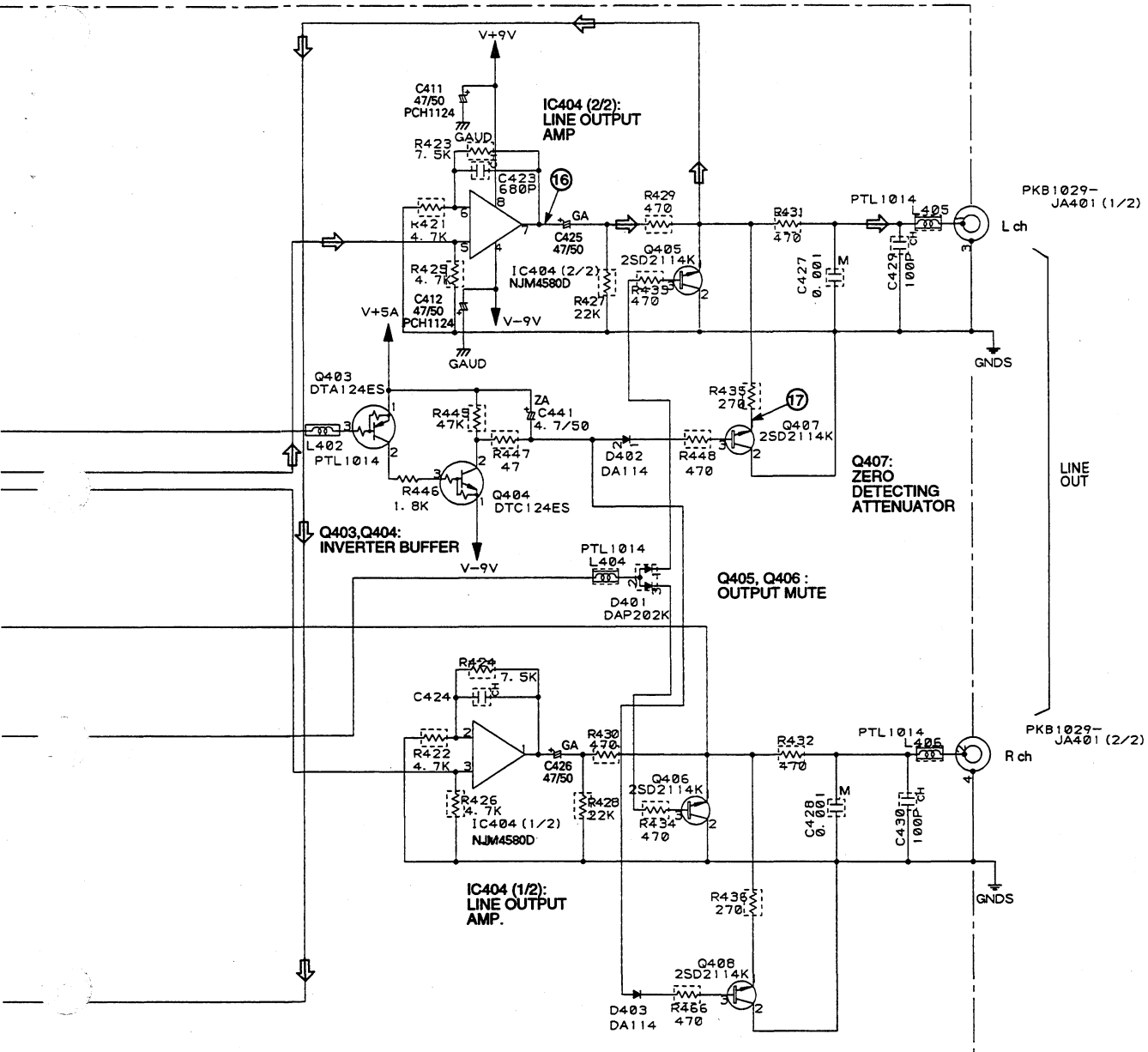
IC804 (1/2):
INPUT SIGNAL
INVERTER



➡ : Recording Signal Route

3.7 AUDIO DIGITAL BOARD ASSY (4/4), SERVO UCOM BOARD ASSY (2/2) AND HEADPHONE BOARD ASSY

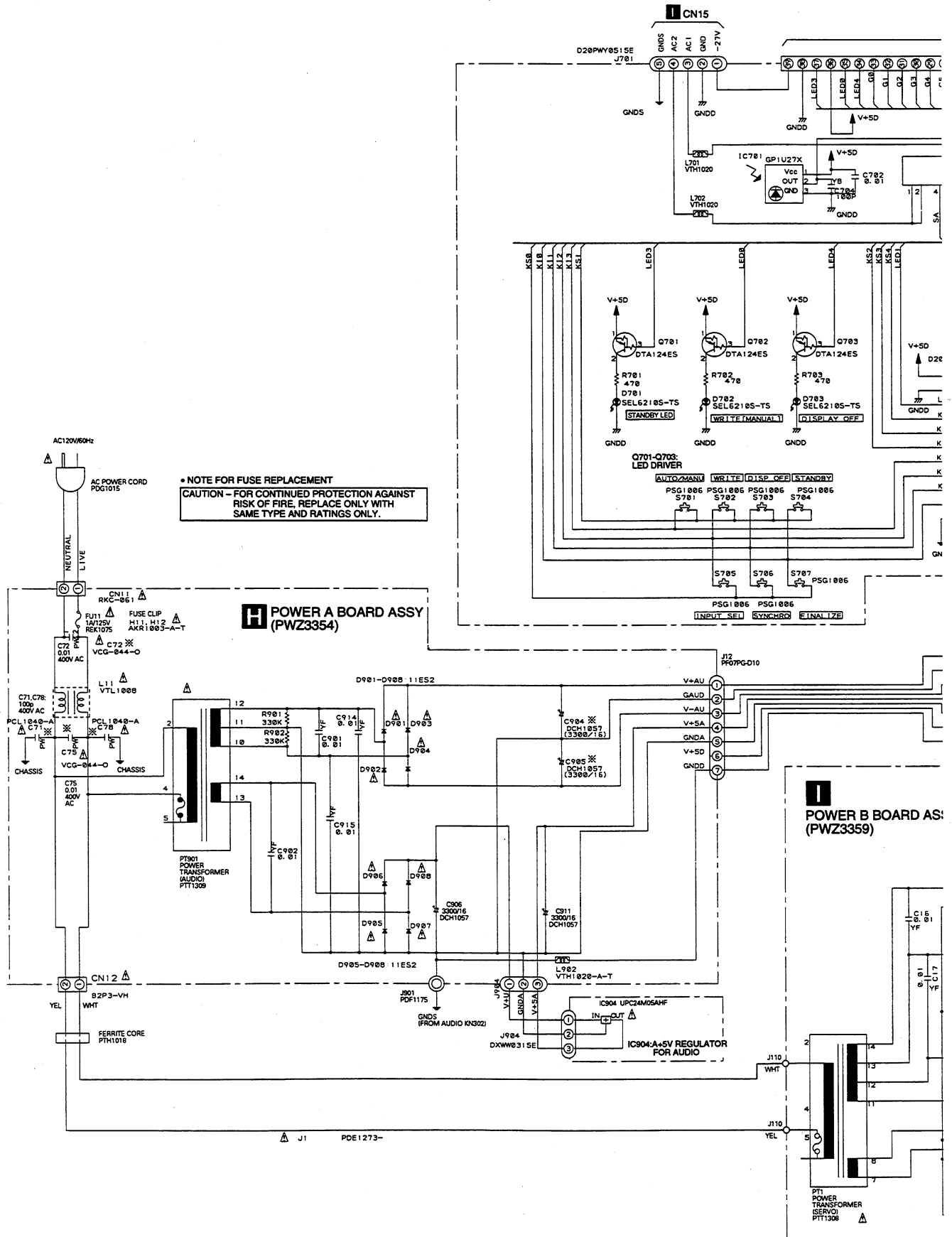




C
SERVO UCOM
BOARD ASSY (2/2)
(PWZ3387)

F HEADPHONE BOARD ASSY (PWZ3390)

3.8 FUNCTION, POWER A AND POWER B BOARD ASSEMBLIES

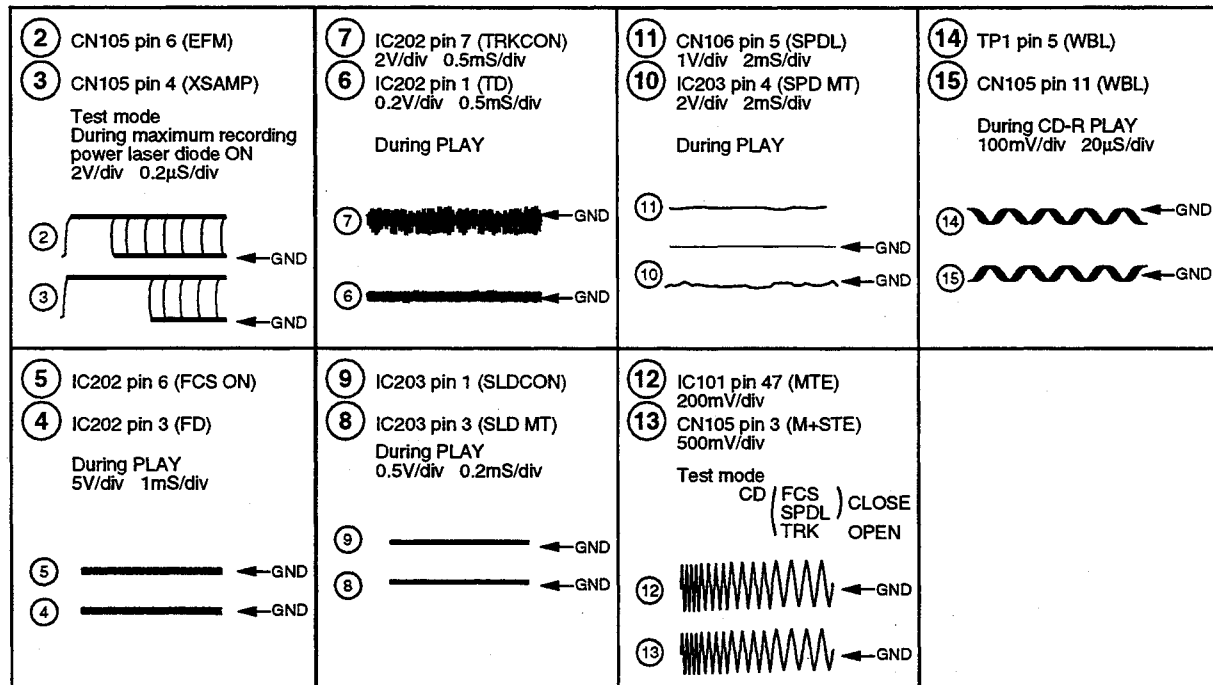


3.9 WAVEFORMS AND VOLTAGES

B HEAD BOARD ASSY

• Waveforms and voltages of HEAD BOARD ASSY

• Measuring condition : DC input unless otherwise noted.



IC101 (PA4022A) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	0.01	-	-0.1	35	0.6	0.6	0.8
2	0.02	-0.12	-0.4	36	0.6	0.6	0.8
3	0	-0.16	0	37	1.2	1.2	1.5
4	-4.9	-4.9	-4.9	38	0.1	0.1	3.1
5	0	0	0	39	5.0	0	0
6	0	0	0	40	0	0	-0.1
7	0	0	0	41	0	0	0
8	0	0	0	42	0	0	0
9	0	0	0	43	0	0	0.1
10	0	0	0	44	0	-0.1	-0.1
11	0	0	0	45	-4.9	-4.9	-4.9
12	0	0	0	46	0	-0.1	-0.1
13	0	0	0	47	0	0	0
14	0	0	0	48	0	0	0
15	0	0	0	49	0	0	0
16	0	0	-	50	0	0	0
17	0	0	0	51	0	0	0
18	0	0	0	52	0	-0.1	0
19	0	0	0	53	0	-0.1	-0.1
20	0	0	0	54	0	0.2	0.2
21	0	0	0	55	0	0	0
22	0	0	0	56	0	0	0
23	1.4	1.4	1.4	57	0.1	0.1	0.1
24	1.4	1.4	1.4	58	-4.0	-4.0	-4.0
25	0	0	0.9	59	-2.9	-2.7	-2.7
26	0	0.2	0.2	60	0	0	0
27	0	0	1.2	61	0	0	0
28	0	0	0	62	0	0	0
29	5.0	5.0	5.0	63	5.0	5.0	5.0
30	4.2	1.2	1.2	64	-0.1	0.3	0.3
31	-3.4	-1.7	-1.7	65	0	-0.1	0
32	0	0	0	66	-0.3	1.4	1.2
33	-1.0	0	0	67	0	0	0
34	4.3	3.6	3.6	68	-0.1	0	0

IC102 (BA4560F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0.2	1.5
2	1.4	1.4	1.5
3	4.4	1.4	1.4
4	-5.0	-5.0	-5.0
5	0	0	0
6	0	0	0
7	0	0	0.1 to 0.6
8	5	5	5

IC103 (TC7S08F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	0	0	2.0
3	0	-	-
4	0	0	2.0
5	5	-	-

IC104 (BA4560F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	-0.1	-0.2
2	0	-0.1	-0.1
3	0	-0.1	-0.1
4	-5.0	-	-
5	0	0	0
6	0	0	0
7	0	0	0
8	5.0	-	-

IC202 (LA6517) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	9.4	-	-
3	-0.4	-0.4	-0.4
4	-10.0	-	-
5	-0.4	-0.4	-0.4
6	-0.4	-0.4	-0.4
7	0	0	0
8	0	0	0

IC203 (LA6520) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0.01	0.01	0 to 0.2
2	0.01	0.3	0.1 to 0.4
3	0	0.3	0.2 to 0.3
4	0.04	-0.1	-0.5 to -0.7
5	2.2	2.2	2.2
6	2.2	2.2	2.2
7	0	0	0
8	0	0	0
9	0	0	0
10	-	-	-
11	-	-	-
12	9.4	-	-
FIN	-10.0	-	-

Q101 (2SC2412K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	0.6	0.6	0.8
C	-	-	-
B	1.2	1.2	1.4

Q102 (2SB1189) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	4.5
C	1.5	1.5	1.8
B	4.3	3.8	3.8

Q103 (2SA1037K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	4.8
C	1.0	1.0	2.2
B	-	-	-

Q104 (2SA1037K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	4.8
C	1.0	1.0	2.2
B	-	-	-

Q106 (2SA1037K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	4.8
C	-	-	-
B	-	-	-

Q109 (DTC114TS) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	0	-	-
C	0	1.1	1.2
B	5.0	0	0

Q105 (2SA1037K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	4.8
C	1.0	1.0	2.2
B	-	-	-

Q107 (2SA1461) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	-	-	-
C	1.5	1.5	1.8
B	3.0	3.0	3.0

Q111 (DTA114TK) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	-	-
C	0	0	4.4
B	5.0	0	0

C SERVO UCOM BOARD ASSY

• Waveforms and voltages of SERVO UCOM BOARD ASSY

• Measuring condition : DC input unless otherwise noted.

① J201 pin 10 (HF) ② CN204 pin 1 (RF) During CD PLAY 500mV/div 0.5μS/div	⑤ IC205 pin 63 (MIRR) 2V/div ② CN204 pin 1 (RF) 0.5V/div During manual search 0.5mS/div	⑨ IC356 pin 48 (SPSP) 2V/div ⑩ IC205 pin 13 (CLV) 10V/div ⑪ IC205 pin 14 (ECLV) 10V/div In the test mode (FCS ON, SPDL ON (CD), TRK OPEN) 20μS/div	① J201 pin 10 (HF) ⑱ IC356 pin 23 (RFT) ⑳ IC356 pin 24 (RFB) During CD-R PLAY (in common with GND of ② and ⑱) 1V/div 1mS/div
③ CN204 pin 2 (TE) Test mode TRK, CLOSE state Top : FILTER exist Bottom : FILTER none 500mV/div 0.5mS/div	⑥ IC206 pin 4 (MDP) 2V/div ⑩ IC205 pin 13 (CLV) 10V/div ⑪ IC205 pin 14 (ECLV) 10V/div During CD PLAY 20μS/div	⑫ IC205 pin 19 (FGIN) ⑬ IC205 pin 17 (FGOUT) In the test mode (FCS ON, SPDL ON (CD), TRK OPEN) 2V/div 2mS/div	⑳ J209 pin 5 (DOUT) 5V/div ㉒ J208 pin 13 (MCK) 2V/div During CD PLAY 0.1μS/div
③ CN204 pin 2 (TE) Test mode (FCS, SPDL ON, TRK, OPEN state) Top : FILTER exist Bottom : FILTER none 500mV/div 0.5mS/div	⑦ IC207 pin 4 (MDP) 2V/div ⑩ IC205 pin 13 (CLV) 10V/div ⑪ IC205 pin 14 (ECLV) 10V/div During CD-R REC 20μS/div	⑭ IC206 pin 34 (DATA) ⑮ IC206 pin 32 (LRCK) ⑯ IC206 pin 35 (BCLK) During CD PLAY (1kHz 0dB) 10V/div 2μS/div	
④ CN204 pin 6 (FE) Test mode TRK, CLOSE state 0.5V/div 2mS/div	⑧ IC205 pin 9 (SPDLO) 1V/div ⑩ IC205 pin 13 (CLV) 10V/div ⑪ IC205 pin 14 (ECLV) 10V/div During STOP 20μS/div	⑰ J201 pin 11 (WBL) 50mV/div ⑱ IC207 pin 1 (WBL) 2V/div During CD-R PLAY 20μS/div	

PDR-04

IC201 (CXA1372Q) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	0	0	0	25	4.9	4.9	0
2	0	0	0	26	0.1	0.1	1.2
3	0	0	0	27	0.8	1.5	1.9
4	0	0	0	28	0	0	0
5	-0.4	-0.4	-0.4	29	0	0	3.7
6	0	0	0	30	-4.9	-4.9	-4.9
7	0.3	0.3	0.3	31	2.5	2.5	2.5
8	0	0	0	32	2.6	2.6	2.8
9	0	0	0	33	0.1	5.0	5.0
10	5.0	5.0	5.0	34	1.4	-1.1	-4.8
11	0	0	0	35	-1.0	-1.4	-4.8
12	0	0	0	36	5.0	5.0	5.0
13	0	0	0	37	0	-0.4	-4.0
14	0	0.3	0.3	38	-4.0	-3.2	-1.9
15	0	0	0	39	0	0	0
16	-4.0	-4.0	-4.0	40	-0.1	0.1	3.9
17	1.3	1.3	1.3	41	-4.9	-4.9	-4.9
18	0	0	0	42	0	0	0
19	-4.0	-4.9	-4.9	43	0	0	0
20	5.0	5.0	5.0	44	0	0	0
21	5.0	5.0	5.0	45	0	0	0
22	4.8	4.9	5.0	46	0	0	0
23	5.0	5.0	5.0	47	0.2	0	0
24	0.7	0.7	0.7	48	0.2	0	0

IC205 (PA9004A) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	5.0	5.0	5.0	33	3.9	3.9	3.9
2	2.5	2.4	2.5	34	0	0	0
3	3.1	3.1	2.5	35	0.6	0.6	0.6
4	0.8	0.8	2.3	36	0.1	0.1	0.1
5	0.8	0.8	2.3	37	0	0	0
6	2.5	2.5	2.5	38	0	0	0
7	2.5	2.4	1.8	39	0	0	0
8	2.5	2.5	2.5	40	0	0	0
9	2.4	2.6	2.6	41	0	0	0
10	2.5	2.5	2.5	42	0	0	0
11	0	0	0	43	0	0	0
12	2.4	2.4	2.4	44	0	0	0
13	0	4.9	4.9	45	5.0	2.4	2.4
14	0	4.9	0	46	0	0	0
15	2.5	2.5	2.6	47	1.6	0.9	1.2
16	0	0	0	48	1.6	2.6	1.2
17	5.0	2.8	2.8	49	1.6	2.6	1.9
18	-4.0	-4.0	-4.0	50	1.6	2.6	1.9
19	0	3.3	3.3	51	1.6	1.6	1.6
20	0	0	0	52	-0.3	1.4	1.8
21	0	0	0	53	-4.0	-4.0	-4.0
22	0	0	5.0	54	0.3	1.4	2.3
23	0	0	5.0	55	-1.0	1.5	1.3
24	0	0	0	56	-0.3	1.9	1.9
25	1.0	1.0	1.4	57	0	0	0
26	5.0	5.0	5.0	58	-0.8	-0.6	-0.8
27	0	5.0	0	59	0	0.9	0.3
28	0	0	0	60	0.4	0.4	0.4
29	0	0	0	61	5.0	0	5.0
30	0	0	0	62	1.7	0.4	1.7
31	0	0	0	63	5.0	5.0	2.8
32	0	0	0	64	3.9	3.9	3.9

IC206 (CXD2500BQ) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	0.1	4.9	4.8	41	1.1	1.1	1.1
2	0	0.2	0.6	42	0	5.0	5.0
3	0	5.0	5.0	43	2.5	2.5	2.5
4	2.4	2.5	3.8	44	5.0	0	0
5	0.1	0.2	0.6	45	0	5.0	5
6	0	5.0	5.0	46	4.3	4.4	4.4
7	0.1	0.2	0.6	47	3.3	0	0
8	5.0	5.0	5.0	48	3.3	0	0
9	0	0	0	49	0	0	0
10	0	0	0	50	1.2	1.2	1.2
11	0.1	0.2	0.6	51	1.2	1.2	1.2
12	0	0	0	52	0	0	0
13	0.1	0.2	0.6	53	2.1	2.1	2.1
14	0.1	0.2	0.6	54	2.8	2.7	2.7
15	0.1	0.2	0.3	55	0	0	0
16	5.0	5.0	5.0	56	2.8	2.7	2.7
17	0	0	0	57	1.0	1.0	1.0
18	2.6	2.6	2.6	58	2.1	2.1	2.1
19	2.5	2.5	2.5	59	5.0	5.0	5.0
20	2.5	2.5	2.5	60	2.1	2.1	2.1
21	0	0	0	61	0	0	0
22	2.6	2.6	2.6	62	2.5	2.5	2.5
23	5.0	5.0	5.0	63	0	0.1	0.1
24	2.6	2.6	2.8	64	1.5	0.1	0.1
25	0	0.1	0.4	65	0	0	0
26	0	0	0	66	0	4.6	4.7
27	2.5	2.5	2.5	67	4.9	4.9	4.9
28	0	0	0	68	0	0	0
29	0	0.1	0.4	69	0.1	2.7	2.8
30	0	0	0	70	4.9	4.9	4.9
31	2.5	2.5	2.5	71	0.7	0.6	0.7
32	0	0.1	2.5	72	4.9	4.9	4.9
33	5.0	5.0	5.0	73	5.0	5.0	5.0
34	0	1.2	0	74	4.8	4.9	4.9
35	1.9	1.9	1.9	75	0.9	1.4	1.7
36	0	1.2	0	76	0.8	0.1	1.7
37	1.9	1.9	1.9	77	0.7	0.6	0.7
38	2.5	2.5	2.5	78	5.0	5.0	5.0
39	5.0	0	0	79	4.8	4.9	4.9
40	5.0	5.0	5.0	80	0.9	0.1	1.8

IC207 (PDJ006A) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	0.1	2.3	2.1	41	4.9	5.0	4.9
2	5.0	0	2.8	42	5.0	5.0	5.0
3	0.1	0	0.1	43	5.0	5.0	5.0
4	5.0	5.0	2.5	44	5.0	5.0	5.0
5	0	0	0	45	0	0	0
6	0.3	0	0.2	46	0	0	0
7	0	0	0	47	0	0	0
8	0	0	0	48	0	0	0
9	5.0	5.0	5.0	49	0	0	0
10	0.1	0.1	0.2	50	0	0	0
11	5.0	5.0	5.0	51	0	0	0
12	5.0	5.0	5.0	52	0	0	0
13	2.4	0	2.4	53	0	0	0
14	4.9	4.9	4.9	54	0	0	0
15	0	0	5.0	55	0	0	0
16	0	0	5.0	56	0	0	0
17	0	5.0	5.0	57	0	0	0
18	5.0	5.0	5.0	58	5.0	5.0	5.0
19	0.1	0.1	0.4	59	1.9	1.6	2.5
20	4.9	4.9	-	60	5.0	5.0	5.0
21	4.9	4.9	4.9	61	0	0	0
22	4.9	4.9	4.9	62	0	0	0
23	1.6	0.9	1.3	63	0	5.0	5.0
24	3.3	2.4	2.2	64	0	5.0	0
25	3.6	3.3	2.2	65	5.0	0	0
26	4.1	3.2	3.5	66	5.0	5.0	5.0
27	1.1	0.9	1.1	67	5.0	5.0	5.0
28	0	0	0	68	0	0	0
29	1.4	1.0	1.7	69	5.0	0	5.0
30	0.5	0.7	0.8	70	5.0	0	0
31	4.7	4.7	4.7	71	0	5.0	5.0
32	2.8	3.4	3.1	72	0	0	0
33	3.0	3.1	3.3	73	0	0	0
34	3.2	3.2	2.8	74	0	0	0
35	3.2	3.4	2.9	75	0	0	0
36	1.8	1.8	2.5	76	0	0	0
37	3.4	3.2	3.4	77	0	0	0
38	5.0	5.0	5.0	78	5.0	5.0	5.0
39	1.2	1.4	1.3	79	0	0	0
40	2.9	2.6	3.3	80	0	0	0

IC208 (LM2940CT-5.0) [V]

Pin No.	MODE		
	STOP	PLAY	REC
U	9.3	-	-
G	0	-	-
+5	5.0	-	-

IC311 (PST529C) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	5.0	5.0	5.0
2	0	0	0
3	5.0	5.0	5.0

IC204 (HD74HC4053FP) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	0	0	0
3	0.9	1.5	1.9
4	0.9	0.1	9
5	0.1	0.1	1.3
6	0	0	0
7	0	0	0
8	0	0	0
9	5.0	0	5.0
10	0	0	0
11	0	4.9	0.2
12	5.0	5.0	5.0
13	0	5.0	5.0
14	5.0	5.0	5.0
15	0	0	0
16	5.0	5.0	5.0

IC352 (LH5116NA-10) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	2.8	2.7	2.7
2	0.7	1.4	1.1
3	3.8	3.3	3.7
4	2.7	2.0	2.5
5	4.0	3.4	3.7
6	3.6	3.0	2.6
7	3.2	2.5	2.6
8	1.5	0.9	1.1
9	2.7	3.3	3.1
10	3.0	3.1	3.3
11	3.2	3.1	3.0
12	0	0	0
13	3.3	3.4	3.2
14	1.8	1.8	2.0
15	3.4	3.3	3.4
16	1.2	1.5	1.4
17	2.9	2.7	2.8
18	4.5	4.5	4.5
19	0.9	0.8	1.1
20	4.9	4.9	4.9
21	4.9	4.9	4.9
22	2.7	2.5	2.5
23	2.8	2.8	2.9
24	4.6	4.6	4.5

IC353 (HD74HC573FP) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	2.7	3.4	3.1
3	3.0	3.2	3.4
4	3.2	3.2	3.0
5	3.2	3.3	3.2
6	1.9	1.8	2.1
7	3.5	3.1	3.3
8	1.2	1.4	1.4
9	2.8	2.7	2.7
10	0	0	0
11	0.1	0.1	0.1
12	2.8	2.7	3.0
13	0.8	1.6	1

IC351 (PD4785A) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	-22.6	-22.0	-22.0	41	4.8	4.8	4.8
2	0	0	0	42	4.8	4.8	4.8
3	0	0	0	43	0	5.0	5.0
4	0	0	-22.0	44	0.1	4.9	0.1
5	-22.6	0	-22.0	45	5.0	0	0.1
6	0	-22.0	-22.0	46	0.08	0	0.1
7	-22.6	-22.0	-22.0	47	0.08	0	0.1
8	5.0	5.0	5.0	48	0.07	0	0.1
9	0.06	5.0	5.0	49	0.07	0	0.1
10	0.06	0	0 or 5	50	4.9	4.9	0
11	0	0	0	51	4.9	4.9	0
12	5.0	5.0		52	5.0	5.0	5.0
13	5.0	5.0	0	53	4.7	4.7	4.7
14	5.0	0	0	54	4.7	4.7	4.7
15	4.5	0	0	55	4.7	4.7	4.7
16	0.8	0	0	56	-23.6	-23.2	-23.2
17	5.0	0	0	57	-23.6	-23.3	-23.1
18	5.0	5.0	0	58	0	0	0
19	0.08	0	0	59	0	0	0
20	0.08	0	0	60	0	0	0
21	0.08	0	0	61	0	0	0
22	0.05	0	0	62	0	0	0
23	5.0	5.0		63	4.6	4.6	4.6
24	0	0	0	64	0	5.0	5.0
25	5.0	5.0	5.0	65	-24.6	-24.3	-16.0
26	0.06	5.0	-	66	-13.8	-13.6	-10.9
27	5.0	5.0		67	-21.8	-13.4	-13.3
28	0	0	0.1	68	-24.5	-24.4	-21.4
29	0.06	0	0.1	69	-24.6	-16.3	-16.2
30	0.06	0	0.1	70	-8.8	-13.3	-13.4
31	0	0	0.1	71	-25.0	-24.6	-24.7
32	0.07	0	0.1	72	-12.1	-11.7	(-12 to 14)
33	0.07	0	0.1	73	-12.0	(-14 to 8)	0
34	0.07	0	0.1	74	-9.6	-9.4	0
35	0.06	0	0.1	75	-9.6	-9.4	0
36	0	0	0.1	76	-12.1	-6.9	-9.3
37	0.06	0	0.1	77	-22.4	-22.1	-22.0
38	0	0	0	78	-22.4	-22.1	-22.0
39	0	0		79	-22.3	-22.0	-22.0
40	0.05	4.9	4.9	80	-22.4	-22.0	-22.0

IC356 (PD4786A) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	3.3	3.4	3.3	38	0.1	5.0	5.0
2	1.9	1.8	2.0	39	4.7	4.8	4.8
3	3.4	3.3	3.4	40	4.3	2.0	2.6
4	1.2	1.6	1.3	41	4.8	4.7	4.7
5	0	0	0.3	42	4.9	4.9	4.8
6	0	0	0.2	43	0	0	0
7	0	0	0.2	44	4.3	4.3	4.2
8	0	0	1.0	45	0	5.0	5.0
9	0	0	0.2	46	0	4.9	0
10	0	0	0.2	47	0	4.9	4.9
11	0	0	1.4	48	2.5	2.6	2.3
12	0	0	0.2	49	0.1	0.1	0.1
13	0.6	0.8	0.9	50	0.1	0.1	4.9
14	0.2	0.3	0.3	51	2.6	-	-
15	5.0	5.0	5.0	52	2.6	-	-
16	0	0	0	53	0	0	0
17	4.9	4.9	4.9	54	0	0	0
18	0	0	0	55	5.0	5.0	5.0
19	0	0	0	56	0.1	4.8	4.8
20	0	0	0	57	0	0	0
21	0	0	0	58	5.0	4.9	4.9
22	0	0.1	0	59			
23	1.7	2.6	2.0	60	0.1	5.0	5.0
24	1.6	0.8	1.2	61			
25	4.8	4.8	4.8	62			
26	5.0	5.0	5.0	63	0.1	5.0	4.9
27	5.0	5.0	5.0	64	0.1	0	4.9
28	5.0	5.0	5.0	65	0.1	5.0	5.0
29	4.9	5.0	4.9	66	0.1	0	0
30	0.4	2.8	2.8	67	4.9	4.9	4.9
31	0.4	0	0	68	4.9	4.9	4.9
32	0.3	0	0	69	4.9	4.9	4.9
33	0	0	0	70	4.9	4.9	4.9
34	5.0	0	5.0	71	0.1	0.1	0.1
35	0	5.0	5.0	72	3.5	3.3	3.1
36	0.8	0	2.8	73	0.1	3.2	3.3
37	0.2	0	0	74	0.1	3.2	3.0

IC357 (TC74HC367AF) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	4.4	4.3	4.3
2	0	0	0
3	0	0	0
4	4.5	4.4	4.4
5	4.5	2.3	2.3
6	5.4	5.0	5.0
7	4.7	2.5	2.5
8	0	0	0
9	4.8	4.8	4.7
10	4.8	4.8	4.8
11	0	0	0
12	0	0	0
13	4.8	4.7	4.7
14	4.5	4.4	4.5
15	4.5	4.4	4.5
16	5.0	5.0	5.0

IC358 (TC74HC367AF) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0.6	0.6	0.6
2	4.9	4.9	4.8
3	4.9	4.9	-
4	4.9	4.9	4.8
5	4.8	4.8	4.7
6	4.3	1.8 to 2.2 to 2.3 to 2.7	
7	4.7	2.5	2.5
8	0	0	0
9	4.4	2.2	2.2
10	4.4	2.2	2.3
11	4.8	4.7	4.7
12	0	4.6	4.6
13	5.0	4.9	4.9
14	4.9	4.8	4.8
15	5.0	4.8	4.8
16	5.0	5.0	5.0

IC359 (TC7S04F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0.1
2	0.2	0.3	0.3
3	0	0	0
4	4.7	4.7	4.7
5	5.0	5.0	5.0

IC354 (TC7S00F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	4.9	4.9	4.9
3	0	0	0
4	4.5	4.5	4.5
5	4.5	4.5	4.5

IC355 (TC7S04F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	4.9	5.0	5.0
3	0	0	0
4	0	0	0
5	5.0	5.0	5.0

IC360 (XL93LC46AF) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	5.0	5.0	5.0
3	0	0	0
4	4.9	4.8	4.8
5	4.3	2.2	2.2
6	4.8	4.7	4.7
7	0	0	0
8	0	0	0

IC361 (PST572E) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	5.0	5.0	5.0
2	0	0	0
3	4.9	5.0	5.0

IC362 (TC7S04F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0.2	0	0.1
2	5.0	0	5.0
3	0	0	0
4	0	5.0	0
5	5.0	5.0	5.0

IC363 (TC7S14F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0.2	0	0.1
2	0	5.0	0
3	0	0	0
4	5.0	0	5.0
5	5.0	5.0	5.0

IC5008 (BA4560F) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	-0.2	-0.5
2	0	0	0
3	0	0	0
4	-5.0	-5.0	-5.0
5	0	0	0
6	0	0	0
7	0	0.1	-0.3
8	5.0	5.0	5.0

IC5024 (HD74HC4053FP) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0.3	-0.5
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	-4.9	-4.9	-5.0
8	0	0	0
9	0	4.9	5.0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	-0.7 to -0.2	-1.0 to -0.5
14	0	0	0
15	0	0	0
16	5.0	5.0	5.0

PDR-04

Q13 (DTC114TK) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	0	0	0
C	0	0	0
B	5.0	5.0	5.0

Q201 (DTA124ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	0	0	3.4
B	5.0	5.0	2.8

Q208 (DTC114TS) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	0	0	0
C	0.6	0.6	0.6
B	4.4	4.3	4.3

Q14 (DTA124EK) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	5.0	5.0	5.0
B	0	0	0

Q202 (2SC2412K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	-3.8	0	3.9
C	-4.9	5.0	5.0
B	-4.7	4.6	4.6

Q5026 (DTC124ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	5.0	3.6	3.6
B	0	5.0	5.0

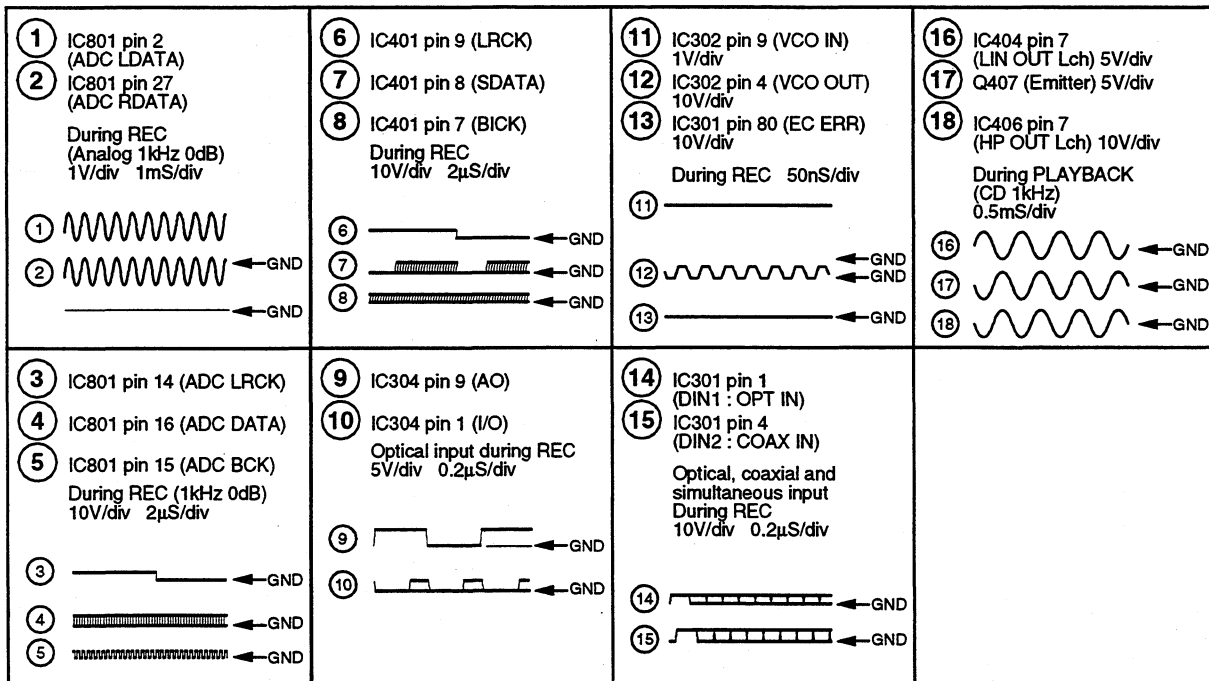
Q203 (2SA1037K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	3.9	-3.9	-3.9
C	5.0	-4.9	-4.9
B	4.6	-4.7	-4.7

D AUDIO DIGITAL BOARD ASSY

• Waveforms and voltages of AUDIO DIGITAL BOARD ASSY

• Measuring condition : DC input unless otherwise noted.



IC301 (LC89585) [V]

Pin No.	MODE			Pin No.	MODE		
	STOP	PLAY	REC		STOP	PLAY	REC
1	0	0	0	51	0	0	0
2	0	0	0	52	5.0	5.0	3.9
3	0	0	0	53	5.0	5.0	4.1
4	0	0	0	54	0	0	2.3
5	2.4	2.4	2.4	55	0	0	2.3
6	2.4	2.4	2.4	56	0	0	2.4
7	5.0	5.0	5.0	57	0	0	2.5
8	1.8	1.8	1.8	58	0	0	2.5
9	0	0	0	59	0	0	2.5
10	2.5	2.5	2.5	60	0	0	2.4
11	2.5	2.5	2.5	61	5.0	5.0	5.0
12	0	0	0	62	0	0	0
13	5.0	5.0	5.0	63	0	0	1.4
14	2.0	2.3	2.4	64	0	0	1.3
15	0	0	0	65	0	0	2.4
16	0	0	0	66	5.0	5.0	2.0
17	0	0	0	67	5.0	5.0	4.1
18	0	5.0	5.0	68	0	0	0.9
19	0	5.0	5.0	69	0	0	0.8
20	5.0	5.0	5.0	70	0	0	0
21	0	0	0	71	0	0	0.7
22	0	0	0	72	0	0	0
23	0	0	0	73	0	0	0
24	0	0	0	74	0	0	0
25	0	0	0.1	75	5.0	5.0	5.0
26	2.4	2.4	5.0	76	2.6	0	2.5
27	2.4	2.4	0 to 3.4	77	2.7	5.0	2.7
28	2.4	2.4	0 to 2.4	78	2.4	0	2.4
29	5.0	5.0	5.0	79	2.4	0	2.4
30	0	1.6	0	80	0	5.0	0
31	2.0	2.0	2.2	81	0	0	0
32	2.5	0	2.5	82	0	0	0
33	0	0	0.6	83	5.0	0	5.0
34	0	0.6	0.6	84	0	0	4.9
35	2.0	2.0	2.0	85	0	0	3.1
36	0	2.5	2.5	86	0	0	0.6
37	0	5.0	0	87	0	0	0.7
38	2.2	2.2	2.2	88	0	0	1.9
39	2.7	2.7	2.6	89	5.0	5.0	5.0
40	0	0	0	90	0	0	0
41	5.0	5.0	5.0	91	1.4	5.0	1.3
42	2.0	2.0	2.2	92	5.0	5.0	5.0
43	2.0	2.2	2.2	93	5.0	4.9	4.9
44	0	2.4	0	94	0.2	0	0.3
45	2.0	2.0	2.0	95	0	0	0
46	2.5	2.5	2.5	96	0	0	0
47	2.4	2.4	2.4	97	4.8	4.8	4.8
48	2.0	2.0	2.1	98	4.9	4.8	4.8
49	0	0	0	99	0.6	2.3	2.3
50	4.9	4.9	4.9	100	5.0	5.0	5.0

IC302 (CD74HC4046AM) [V]

Pin No.	MODE
1	5.0
2	0
3	0
4	2.5
5	0
6	0.7
7	0.7
8	0
9	2.5
10	0
11	2.5
12	4.4
13	0
14	0
15	5.0
16	5.0

IC304 (MB81C4256A-70PJ)[V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	1.4
2	0	0	1.4
3	5.0	5.0	4.1
4	5.0	5.0	2.0
5	0	0	2.5
6	-	-	-
7	-	-	-
8	-	-	-
9	0	0	1.3
10	0	0	1.4
11	0	0	2.5
12	0	0	2.5
13	5.0	5.0	5.0
14	0	0	2.5
15	0	0	2.5
16	0	0	2.5
17	0	0	2.5
18	0	0	2.5
19	-	-	-
20	-	-	-
21	-	-	-
22	5.0	5.0	4.1
23	5.0	5.0	3.9
24	0	0	0.9
25	0	0	0.8
26	0	0	0

IC803 (NJM4580D) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	0	0	0
3	0	0	0
4	-9	-9	-9
5	0	0	0
6	0	0	0
7	0	0	0
8	9	9	9

IC804 (NJM4580D) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	0	0	0
3	0	0	0
4	-9	-9	-9
5	0	0	0
6	0	0	0
7	0	0	0
8	9	9	9

IC404 (NJM4580D) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	1.2	1.2	1.2
3	1.2	1.2	1.2
4	-9	-9	-9
5	0	0	0
6	0	0	0
7	0	0	0
8	9	9	9

IC406 (M5218AFP) [V]

Pin No.	MODE		
	STOP	PLAY	REC
1	0	0	0
2	0	0	0
3	0	0	0
4	-9	-9	-9
5	0	0	0
6	0	0	0
7	0	0	0
8	9	9	9

Q301 (DTA114TS) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	0.5	0.4	0.4
B	5.0	5.0	5.0

Q303 (DTA114TS) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	0.9	0.8	0.8
B	5.0	5.0	5.0

Q304 (DTC114ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	0	0	0
C	2.0	-	-
B	0.2	-0.1 to 0	0

Q401 (DTC124ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	-9	-9	-9
C	1.4	-9	-9
B	-9	2.0	2.0

Q402 (DTA114ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	-9	5.0	5.0
B	5.0	3.6	3.6

IC801 (AK5340-VS)[V]

Pin No.	MODE		
	STOP	PLAY	REC
1	2.5	2.5	2.5
2	2.5	2.5	2.5
3	5.0	5.0	2.4
4	5.0	5.0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	5.0	5.0	0
11	0	0	0
12	5.0	5.0	5.0
13	0	0	0
14	2.5	2.5	2.5
15	2.0	2.0	2.2
16	0	0	2.5
17	5.0	5.0	5.0
18	5.0	5.0	5.0
19	0	0	0
20	2.1	2.1	2.1
21	0	0	0
22	0	0	0
23	0	0	0
24	5.0	5.0	5.0
25	0	0	0
26	5.0	5.0	2.4
27	2.5	2.5	2.5
28	2.5	2.5	2.5

Q403 (DTA124ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	-9	5.0	5.0
B	5.0	0.2	0.2

Q404 (DTC124ES) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	5.0	5.0	5.0
C	-9	5.0	5.0
B	5.0	0.2	0.2

Q405 (2SD2114K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	-9	-9	-9
C	1.1	-9	-9
B	-9	3.7	3.7

Q406 (2SD2114K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	-9	-9	-9
C	1.1	-9	-9
B	-9	3.7	3.7

Q408 (2SD2114K) [V]

Pin No.	MODE		
	STOP	PLAY	REC
E	0	0	0
C	0	0	0
B	0.6	-0.7	-0.1

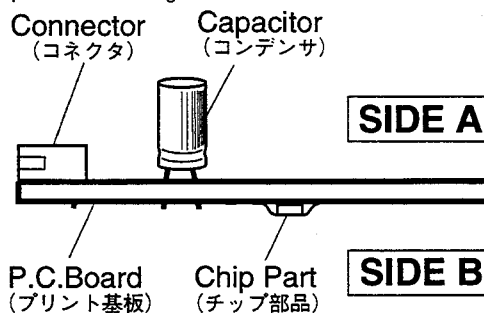
4. PCB CONNECTION DIAGRAM

NOTE FOR PCB DIAGRAMS :

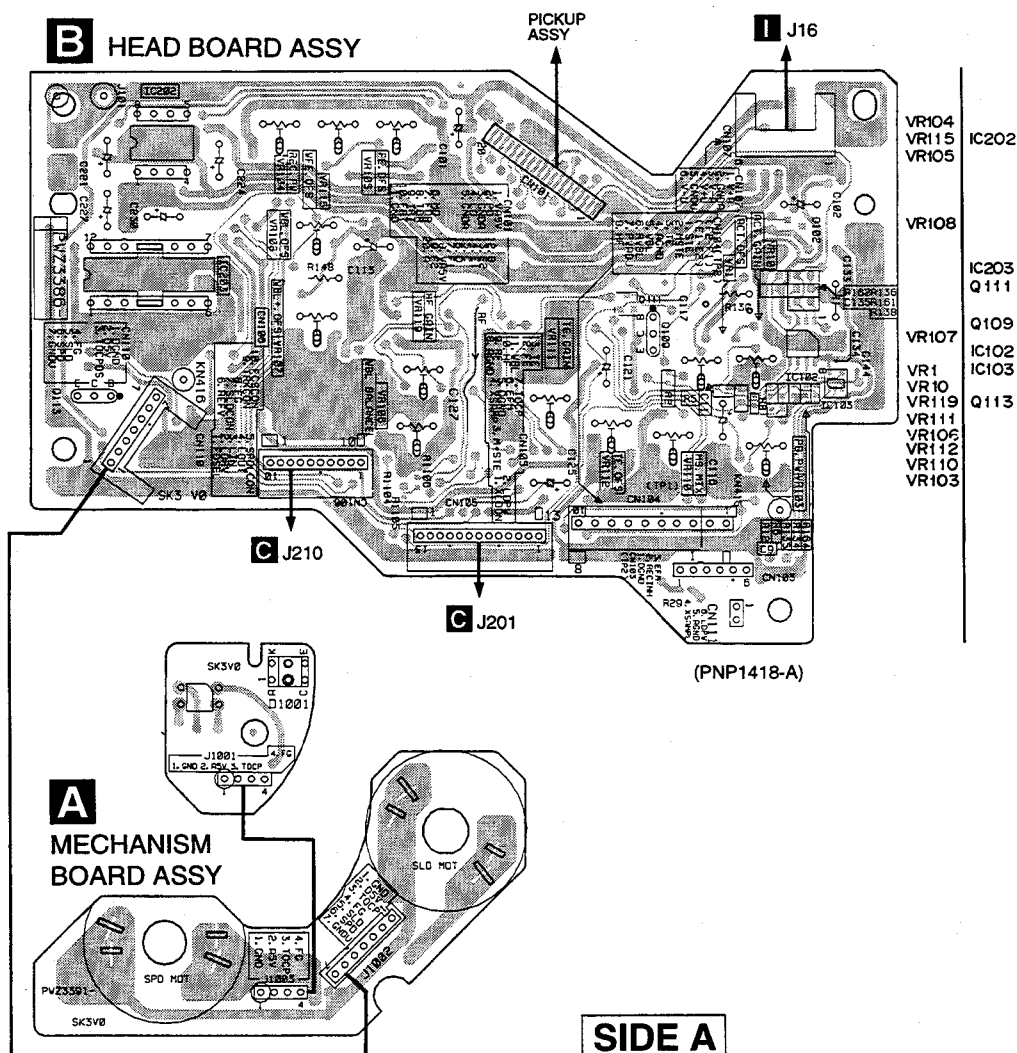
1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

Symbol in PCB Diagrams	Symbol in Schematic Diagrams	Part Name
		Transistor
		Transistor with resistor
		Field effect transistor
		Resistor array
		3-terminal regulator

3. The parts mounted on this PCB include all necessary parts for several destinations.
- For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.



4.1 MECHANISM AND HEAD BOARD ASSEMBLIES



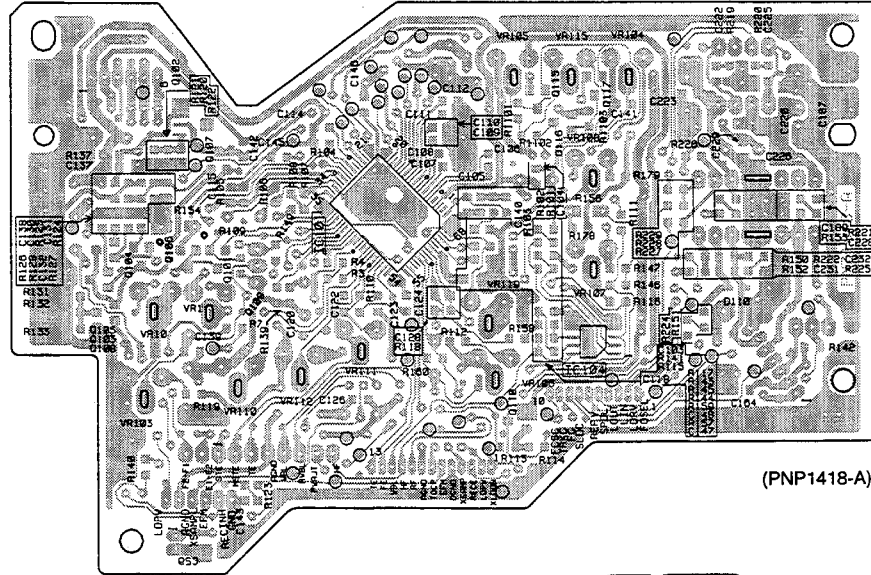
B HEAD BOARD ASSY

Q102
Q115
Q117

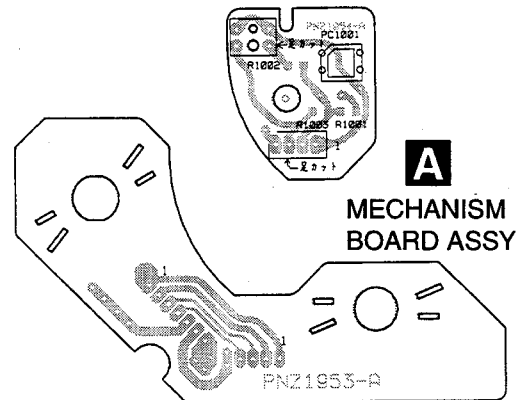
Q116
Q107

IC101
Q106
Q104
Q101

Q109
Q105
Q103
Q108
IC104
Q110



(PNP1418-A)



A

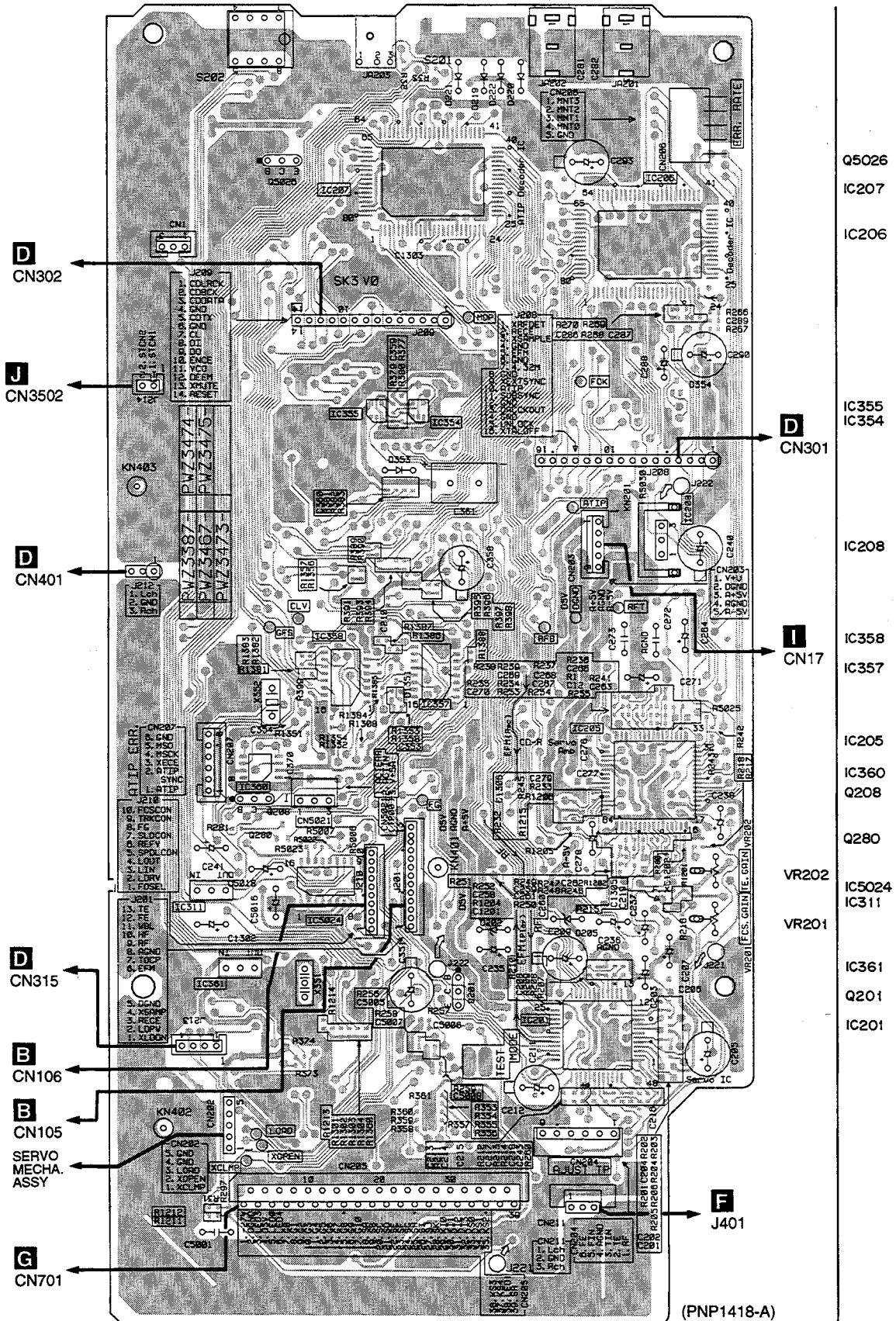
MECHANISM
BOARD ASSY

PNZ1953-A

SIDE B

4.2 SERVO UCOM BOARD ASSY

C SERVO UCOM BOARD ASSY



- Q5026
- IC207
- IC206
- IC355
- IC354
- IC208
- IC358
- IC357
- IC205
- IC360
- Q208
- Q280
- VR202
- IC5024
- VR201
- IC311
- IC361
- Q201
- IC201

SIDE A

C SERVO UCOM BOARD ASSY

IC359

IC352
IC204
IC362
IC363
IC353

IC356

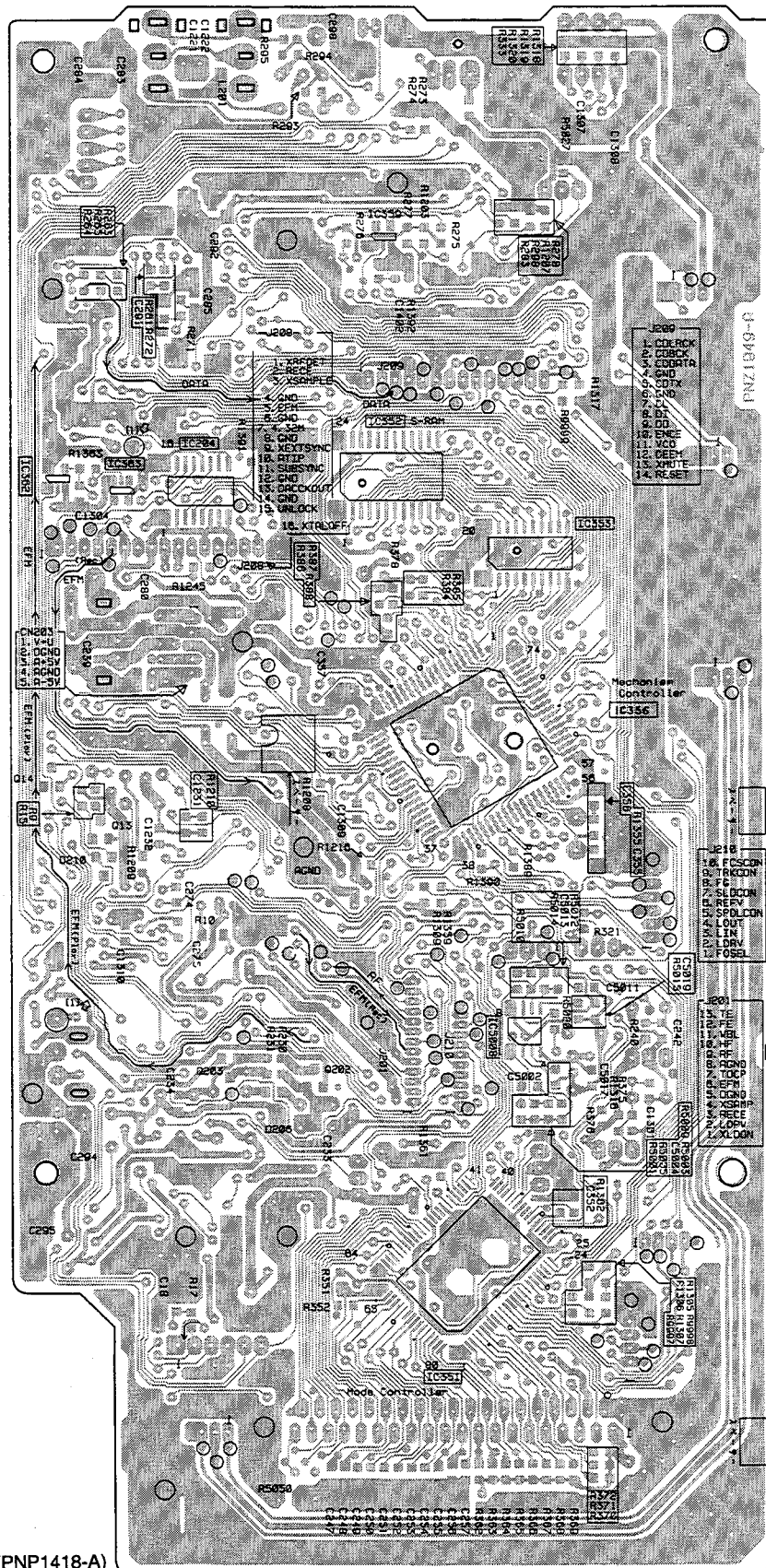
Q14

Q13

IC5008
Q202
Q203

IC351

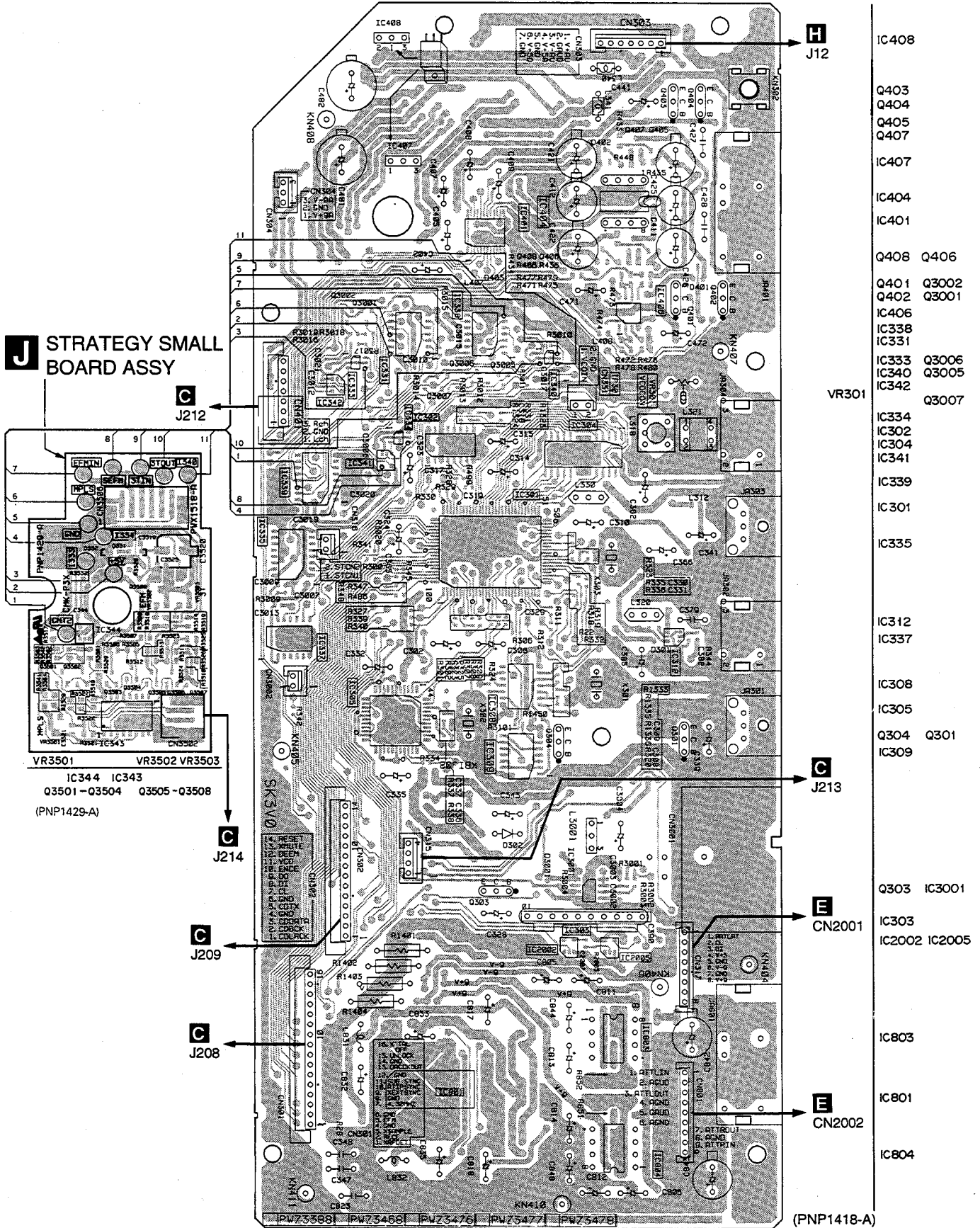
(PNP1418-A)



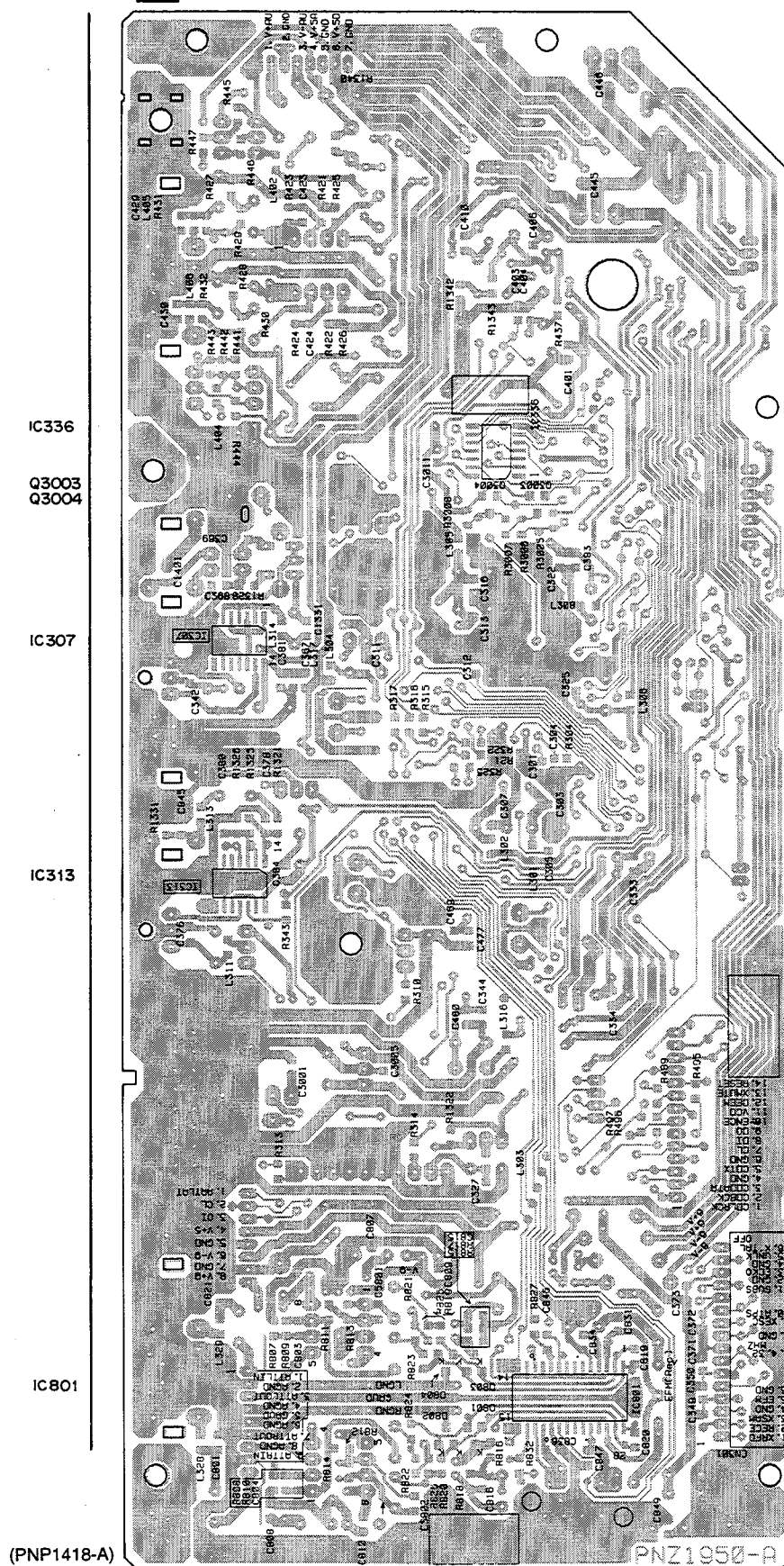
SIDE B

4.3 AUDIO DIGITAL AND STRATEGY SMALL BOARD ASSEMBLIES

D AUDIO DIGITAL BOARD ASSY



D AUDIO DIGITAL BOARD ASSY



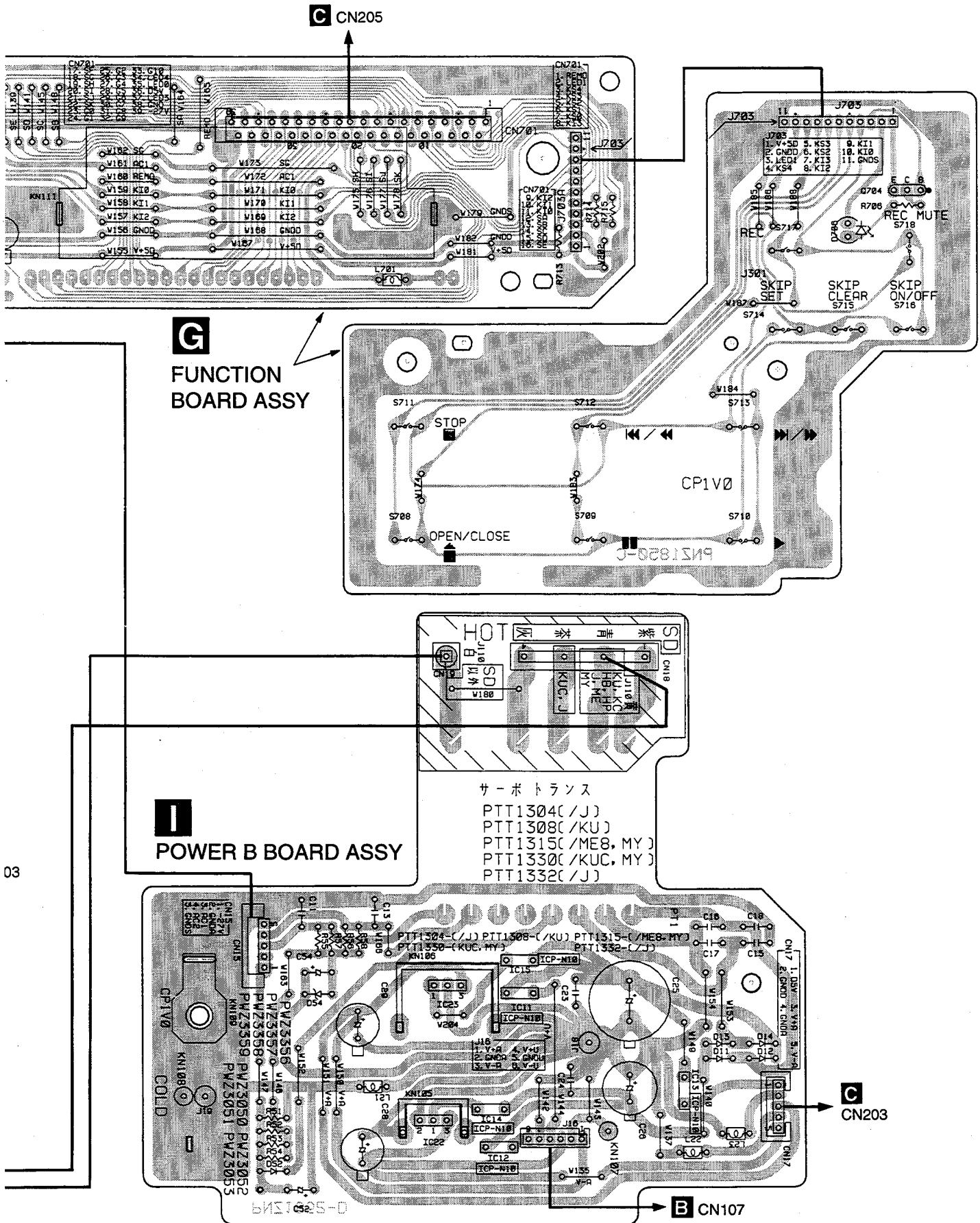
SIDE B

G H



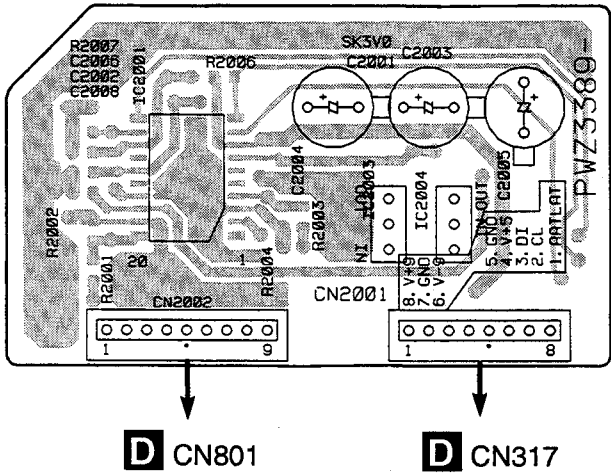
(PNP1393-D)



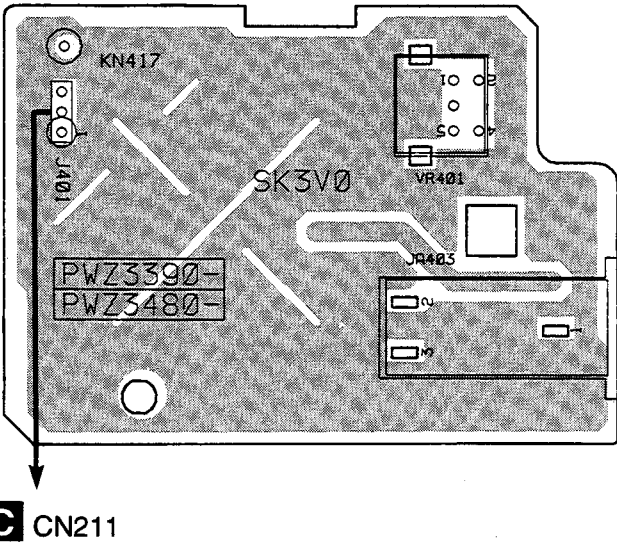


4.5 ALC AND HEADPHONE BOARD ASSEMBLIES

E ALC BOARD ASSY

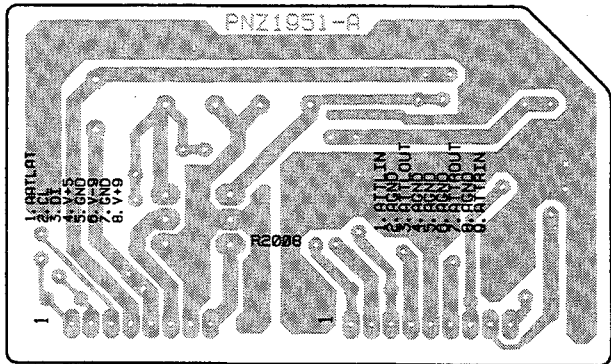


F HEADPHONE BOARD ASSY

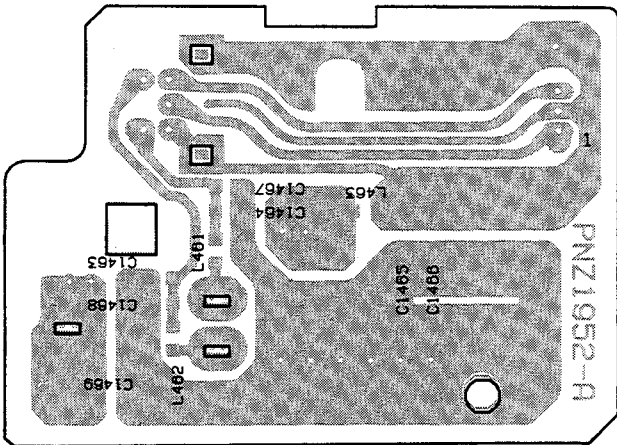


SIDE A

E ALC BOARD ASSY



F HEADPHONE BOARD ASSY



SIDE B

(PNP1418-A)

5. PCB PARTS LIST

NOTES: • Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.

- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

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

560 Ω $\rightarrow$ 56×10^1 $\rightarrow$ 561 RD1/APU 5 6 1 J
 47k Ω $\rightarrow$ 47×10^3 $\rightarrow$ 473 RD1/APU 4 7 3 J
 0.5 Ω $\rightarrow$ R50 RN2H R 5 0 K
 1 Ω $\rightarrow$ 1R0 RS1P 1 R 0 K

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

5.62k Ω $\rightarrow$ 562×10^1 $\rightarrow$ 5621 RN1/4PC 5 6 2 1 F

Mark	No.	Description	Part No.
LIST OF ASSEMBLIES			
NSP	MOTHER BOARD ASSY	PYY1209	
	HEAD BOARD ASSY	PYY1211	
NSP	HEAD BOARD ASSY	PWZ3386	
NSP	ALC BOARD ASSY	PWZ3389	
NSP	HEADPHONE BOARD ASSY	PWZ3390	
NSP	MECHANISM BOARD ASSY	PWZ3391	
	AUDIO DIGITAL BOARD ASSY	PYY1212	
NSP	AUDIO DIGITAL BOARD ASSY	PWZ3388	
	SERVO UCOM BOARD ASSY	PYY1214	
NSP	SERVO UCOM BOARD ASSY	PWZ3387	
NSP	STRATEGY SMALL BOARD ASSY	PWX1518	
NSP	SUB BOARD ASSY	PWX1505	
	FUNCTION BOARD ASSY	PWZ3042	
	POWER A BOARD ASSY	PWZ3354	
	POWER B BOARD ASSY	PWZ3359	

MOTHER BOARD ASSY

OTHERS

PC BOARD PNP1418

A MECHANISM BOARD ASSY

SEMICONDUCTORS

D1001 GP1S24
 PC1001 NJL5803K-F1

RESISTORS

All Resistors RS1/10S□□□J

OTHERS

J1002 CONNECTOR ASSY 7P PDE1260

B HEAD BOARD ASSY

SEMICONDUCTORS

IC102, IC104 BA4560F
 Δ IC202 LA6517
 Δ IC203 LA6520
 IC101 PA4022A
 IC103 TC7S08F

Mark	No.	Description	Part No.
	Q103-Q106		2SA1037K
	Q107, Q108		2SA1461
	Q102		2SB1189
	Q101		2SC2412K
	Q110		2SJ146
	Q115		DTA114EK
	Q111		DTA114TK
	Q117		DTA124EK
	Q116		DTC114TK
	Q109		DTC114TS
	Q113		DTC144TS
	D101		DA114
	D110		UDZ6.2B

CAPACITORS

C103, C142, C145, C146 CCSQCH100D50
 C123, C124 CCSQCH221J50
 C109-C112 CCSQCH391J50
 C147, C148 CCSQCH471J50
 C122 CCSQCH620J50
 C140 CCSQCK2R0C50
 C105-C108 CCSQSL821J50
 C116 CEJA100M16
 C101, C102, C113, C121, C125 CEJA101M10
 C221, C224, C227, C230 CEJA470M16

C117 CEJANP1R0M50
 C127 CEJANP4R7M16
 C133 CFTXA103J50
 C114, C130, C131, C137, C138 KKSQYB103K50
 C141 KKSQYB103K50

C128 KKSQYB182K50
 C11 KKSQYB683K25
 C104, C118, C120, C126 KKSQYF103Z50
 C134, C135, C139, C164, C189 KKSQYF103Z50
 C220, C222, C223, C225, C226 KKSQYF103Z50

C228, C229, C232 KKSQYF103Z50
 C115, C132, C187 KKSQYF104Z25
 C9 KKSRYB392K50
 C144 KKSRYF103Z50

RESISTORS

R130 (62 Ω) PCN1037
 R148 (2.2k Ω) PCN1038
 R1104 (2.2k Ω) PCN1039
 R138, R162 RN1/10SE1202D
 R136, R161 RN1/10SE3002D

PDR-04

Mark	No.	Description	Part No.
	R2		RS1/16S104J
	R135		RS1/16S132J
	R6		RS1/16S133J
	R1106		RS1/16S202J
	R1105		RS1/16S222J
	R134		RS1/16S362J
	R12		RS1/16S471J
	R8		RS1/16S472J
	VR10 (2.2k Ω)		RCP1019
	VR1, VR103-VR105, VR107 (10k Ω)		RCP1045
	VR108, VR112, VR115 (10k Ω)		RCP1045
	VR106, VR111 (22k Ω)		RCP1046
	VR110, VR119 (47k Ω)		RCP1047
	Other Resistors		RS1/10S□□□□J

OTHERS

CN106	ZH CONNECTOR 10P	S10B-ZR
CN105	ZH CONNECTOR 13P	S13B-ZR
CN107	KR CONNECTOR	S6B-PH-K-S
PCB BINDER		VEF1008

SERVO UCOM BOARD ASSY SEMICONDUCTORS

IC5008	BA4560F
IC201	CXA1372Q
IC206	CXD2500BQ
IC204, IC5024	HD74HC4053FP
IC353	HD74HC573FP
IC352	LH5116NA-10
△ IC208	LM2940CT-5.0
IC205	PA9004A
IC351	PD4785A
IC356	PD4786A
IC207	PDJ006A
IC311	PST529C
IC361	PST572E
IC357, IC358	TC74HC367AF
IC354	TC7S00F
IC355, IC359, IC362	TC7S04F
IC363	TC7S14F
IC360	PYY1196
Q203	2SA1037K
Q202	2SC2412K
Q14	DTA124EK
Q201	DTA124ES
Q13, Q280	DTC114TK
Q208	DTC114TS
Q5026	DTC124ES
D353	1SS133X
D354	DA114
D206	DA204K
D1351	DAN202K
D210	DAP202K
D202, D205	MTZJ3.9BX

CAPACITORS

C291	CCS0CH100D50
C1308, C284, C295	CCS0CH101J50
C247-C257	CCS0CH121J50
C355, C356	CCS0CH150J50
C282	CCSRCH101J50

Mark	No.	Description	Part No.
	C12		CCSRCH270J50
	C241		CEAS100M50
	C209, C212, C290		CEAS101M6R3
	C278		CEAS1R0M50
	C1302, C264, C271		CEAS2R2M50
	C205, C235-C238, C293, C5016		CEAS470M10
	C5018		CEAS470M10
	C240		CEAS471M10
	C351, C358		CEAS471M6R3
	C203, C207		CEAS4R7M50
	C288		CEASR47M50
	C18		CKS0YB102K50
	C1310, C201, C202, C204, C206		CKS0YB104K25
	C274		CKS0YB104K25
	C5004		CKS0YB222K50
	C1309		CKS0YB272K50
	C5013		CKS0YB333K50
	C1304		CKS0YB471K50
	C260		CKS0YB683K25
	C233, C234, C239, C242, C280		CKS0YF103Z50
	C5017, C5019		CKS0YF103Z50
	C1301, C1307, C285, C292, C352		CKS0YF104Z25
	C357		CKS0YF104Z25
	C283		CKS0YF473Z50
	C279		CKSRYB102K50
	C208, C210, C213, C218, C289		CKSRYB103K50
	C287		CKSRYB152K50
	C258		CKSRYB223K25
	C267-C270		CKSRYB331K50
	C219, C262		CKSRYB332K50
	C211, C217		CKSRYB333K16
	C5005-C5008		CKSRYB471K50
	C214, C215		CKSRYB472K50
	C216, C261, C286		CKSRYB473K16
	C259		CKSRYB681K50
	C1202, C353, C354, C360, C370		CKSRYF103Z50
	C1305, C1306, C359		CKSRYF104Z25
	C281		CKSRYF473Z25
	C272, C273		QMA104J50
	C361 (0.22F, 5.5V)		PCH1131
	C263, C275-C277 (0.33 μ F, 16V)		PCL1043
	C5002, C5011 (0.15 μ F, 16V)		PCL1044
	C1201 (0.082 μ F, 16V)		PCL1045
	C243 (0.1 μ F, 16V)		PCL1046

RESISTORS

R1, R1212, R1214, R297, R32	RS1/16S0R0J
R1381-R1388, R280	RS1/16S101J
R233, R5007	RS1/16S102J
R1215, R1308, R213, R214, R216	RS1/16S103J
R247, R248, R256-R259, R266	RS1/16S103J
R268, R5006	RS1/16S103J
R251, R260, R267	RS1/16S104J
R206, R241	RS1/16S105J
R253, R254	RS1/16S114J
R353-R361	RS1/16S124J
R208, R232	RS1/16S133J
R281	RS1/16S181J
R201	RS1/16S184J
R210	RS1/16S204J
R5022	RS1/16S221J

Mark	No.	Description	Part No.
	R5023		RS1/16S222J
	R1202, R1204, R234, R236		RS1/16S273J
	R203, R212		RS1/16S274J
	R211, R242		RS1/16S302J
	R270		RS1/16S332J
	R252		RS1/16S333J
	R243		RS1/16S362J
	R1206		RS1/16S393J
	R215, R217		RS1/16S470J
	R1205, R218		RS1/16S472J
	R1351-R1354, R1356-R1358, R1360		RS1/16S473J
	R246, R373, R377, R379-R383		RS1/16S473J
	R389-R391, R393-R399		RS1/16S473J
	R235, R237		RS1/16S512J
	R209		RS1/16S514J
	R238		RS1/16S562J
	R255		RS1/16S563J
	R249		RS1/16S624J
	R269		RS1/16S682J
	R202, R204		RS1/16S683J
	R250		RS1/16S684J
	R205		RS1/16S754J
	R207		RS1/16S823J
	R5025		RS1/16S912J
	VR201, VR202 (10k Ω)		RCP1045
	Other Resistors		RS1/10S□□□J

OTHERS

CN202	MT 5P CONNECTOR	173981-5
CN211	3P JUMPER CONNECTOR	52147-0310
CN5021	3P TOP POST	B3P-SHF-1AA
CN203	KR CONNECTOR 5P	B5B-PH-K-S
CN204	6P TOP POST	B6P-SHF-1AA
CN206	5P SIDE POST	BS5P-SHF-1AA
J222	LEAD WIRE UNIT	DB015NT0
CN205	FFC CONNECTOR 39P	HLEM39S-1
J201	CONNECTOR ASSY 13P	PDE1264
J210	CONNECTOR ASSY 10P	PDE1269
J214	CONNECTOR ASSY 2P	PG02KA-E15
J213	CONNECTOR ASSY 4P	PG04KA-E25
JA203	MINI JACK	PKN1005
X352	CERAMIC RESONATOR(16MHz)	PSS1010
	PCB BINDER	VEF1008
X351	CERAMIC RESONATOR(4.19MHz)	VSS1014

D AUDIO DIGITAL BOARD ASSY

SEMICONDUCTORS

	IC401	AK4321-VF
	IC801	AK5340-VS
	IC302	CD74HC4046AM
	IC301	LC89585
	IC406	M5218AFP
	IC304	MB81C4256A-70PJ
	IC404, IC803, IC804	NJM4580D
△	IC407	NJM7809FA
△	IC408	NJM79M09FA
	IC303	PCX1021
	IC309, IC336	TC74HC00AF
	IC338	TC74HC04AF
	IC331	TC74HC08AF
	IC335	TC74HC123AF
	IC337	TC74HC164AF

Mark	No.	Description	Part No.
	IC308, IC313		TC74HC04AF
	IC2002, IC2005		TC7S04F
	IC341, IC342		TC7S32F
	IC333, IC334, IC340		TK16124M
	Q405-Q408		2SD2114K
	Q402		DTA114ES
	Q301, Q303		DTA114TS
	Q403		DTA124ES
	Q304		DTC114ES
	Q401, Q404		DTC124ES
	D302		1SR35-100AVL
	D402, D403		DA114
	D801, D803		DAN202K
	D401, D802, D804		DAP202K

COILS

L831, L832	LFA1R0K
L301-L306, L308, L311, L312	PTL1014
L316, L328, L329, L402	PTL1014
L404-L408	PTL1014
L330 EMI FILTER	PTL1020

CAPACITORS

C383, C429, C430, C445, C446	CCSOCH101J50
C477, C480, C801, C821	CCSQCH101J50
C803, C804	CCSQCH121J50
C308, C331	CCSRCH120J50
C330	CCSRCH180J50
C309	CCSRCH270J50
C2007, C319, C365	CCSRCH470J50
C3007	CCSRCH820J50
C339, C341	CEAS100M50
C817, C818, C833, C835	CEAS100M50
C385	CEAS101M25
C302, C306, C310, C314, C324	CEAS101M6R3
C332, C335, C402	CEAS101M6R3
C805, C806	CEAS220M50
C811-C814, C842-C844, C848	CEAS220M50
C411, C412	CEAS221M25
C315, C323, C328	CEAS470M10
C471, C472	CEAS470M16
C407, C409	CEAS471M6R3
C441, C832	CEAS4R7M50
C347	CKCYB101K50
C348, C823	CKCYF473Z50
C301	CKSQYB102K50
C421, C422, C425, C426	CEZA470M50
C305	CKSQYB103K50

C312, C390	CKSQYB472K50
C303, C307, C333, C334	CKSQYB473K25
C403	CKSQYB473K50
C819, C820	CKSQYB821K50
C807-C810, C846	CKSQYF103Z50

C3011, C304, C311, C313, C316	CKSQYF104Z25
C322, C325, C327, C342, C344	CKSQYF104Z25
C376, C406, C410, C815, C816	CKSQYF104Z25
C831, C834, C836, C847	CKSQYF104Z25
C401, C404, C469	CKSQYF104Z50

C318	CKSRYB103K50
C3006, C3009, C3010, C3012, C3013	CKSRYF104Z25
C3015, C3017, C3019-C3021	CKSRYF104Z25
C427, C428	COMA102Z50
C317, C329 (1 μ F/16V)	PCL1047

C343, C405, C408 (47 μ F/10V)	RCH1139
C481, C482 (3300 μ F/16V)	DCH1057

PDR-04

Mark	No.	Description	Part No.
RESISTORS			
	R421, R422		RN1/10SE1002D
	R423, R424		RN1/10SE1602D
	R342		RS1/16S0R0J
	R1336, R3015, R3020, R3101		RS1/16S101J
	R318, R319, R323, R324, R328		RS1/16S101J
	R341, R486		RS1/16S101J
	R300, R311, R329, R331		RS1/16S102J
	R1450, R2005, R339		RS1/16S103J
	R320		RS1/16S105J
	R305		RS1/16S151J
	R1333		RS1/16S221J
	R3009		RS1/16S222J
	R1335, R499		RS1/16S271J
	R301		RS1/16S333J
	R302		RS1/16S363J
	R347, R348		RS1/16S472J
	R345		RS1/16S473J
	R1324, R303		RS1/16S512J
	R1323		RS1/16S622J
	R312, R330		RS1/16S681J
	R1401-R1404		RS1/2LMF270J
	VR301 (10kΩ)		RCP1045
	Other Resistors		RS1/10S□□□J
OTHERS			
	CN401 3P JUMPER CONNECTOR		52147-0310
	CN317 CONNECTOR 8P		9115B-08
	CN801 CONNECTOR 9P		9115B-09
	CN331 2P TOP POST		B2P-SHF-1AA
	CN315 KE CONNECTOR 4P		B4B-PH-K-S
	JA301 OPTICAL TRANS. MODULE		GP1F32R
	JA303 OPTICAL TRANS. MODULE		GP1F32T
	JA401, JA801 2P JACK		PKB1029
	KN302 SCREW TERMINAL		PNB1558
	X301 CRYSTAL RESONATOR (16.9344MHz)		PSS1008
	PCB BINDER		VEF1008

E ALC BOARD ASSY

SEMICONDUCTORS

	IC2001	LM1972M
△	IC2003	NJM78L05A
△	IC2004	NJM79L05A

CAPACITORS

C2001, C2003, C2005	CEAS100M50
C2002, C2004, C2006, C2008	CKSQYF104Z25

RESISTORS

All Resistors	RS1/10S□□□J
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OTHERS

CN2001 CONNECTOR 8P	9115S-08L
CN2002 CONNECTOR 9P	9115S-09L

Mark	No.	Description	Part No.
F HEADPHONE BOARD ASSY			
COILS			
	L461-L463		PTL1014
CAPACITORS			
	C1466-C1468		CCSQCH101J50
	C1463-C1465		CKSQYF103Z50
	C1469		CKSQYF473Z50
RESISTORS			
	VR401 VARIABLE RESISTOR (5kΩ)		PCS1003
OTHERS			
	JA403 HEADPHONE JACK		RKN1002

SUB BOARD ASSY

OTHERS

PC BOARD	PNP1393
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G FUNCTION BOARD ASSY

SEMICONDUCTORS

Q701-Q704	DTA124ES
D701-D703, D706	SEL6210S

COILS

L701, L702 FERRITE BEADS	VTH1020
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SWITCHES

S701-S718	PSG1006
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CAPACITORS

C704	CKCYB101K50
C702	CKCYF103Z50

RESISTORS

All Resistors	RD1/4PU□□□J
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OTHERS

IC701 REMOTE RECEIVER UNIT	GP1U27X
CN701 FFC CONNECTOR 39P	HLEM39R-1
V701 FL INDICATOR TUBE	PEL1086

H POWER A BOARD ASSY

SEMICONDUCTORS

△ IC904	UPC24M05AHF
△ D901-D908	11ES2

COILS

L902 FERRITE BEADS	VTH1020
△ L11 LINE FILTER	VTL1008

CAPACITORS

C901, C902, C914, C915	CKCYF103Z50
C904-C906, C911 (3300μF, 16V)	DCH1057
△ C71, C78 (100pF, 400V AC)	PCL1040
△ C72, C75 (0.01μF, 400V AC)	VCG-044

RESISTORS

All Resistors	RD1/4PU□□□J
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Mark	No.	Description	Part No.
OTHERS			
△	H11, H12	FUSE CLIP	AKR1003
△	CN12	2P-VH CONNECTOR	B2P3-VH
	J901	EARTH LEAD UNIT	PDF1175
	J12	CONNECTOR	PF07PG-D10
△	CN11	TERMINAL	RKC-061
		PCB BINDER	VEF1040
	J905		PDF1176

I POWER B BOARD ASSY

SEMICONDUCTORS

△	IC11-IC15	ICP-N10
△	IC23	LM2940CT-5.0
△	IC22	NJM7905FA
△	D11-D14, D52	11ES2
△	D54	MTZJ20A

COILS

L21-L23	FERRITE BEADS	VTH1020
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CAPACITORS

C52	CEAS101M35
C54	CEAS470M35
C28, C29	CEAS471M10
C11, C13, C15-C18	CKCYF103Z50
C23, C24	COMZA472J50

C26 (3300μF, 16V)	DCH1057
C25 (10000μF, 16V)	VCH1124

RESISTORS

Other Resistors	RD1/4PU□□□J
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OTHERS

CN15	5P JUMPER CONNECTOR	52147-0510
CN17	KR CONNECTOR 5P	B5B-PH-K-S
△ J1	CONNECTOR ASSY 2P	PDE1273
J16	CONNECTOR 6P	PF06PG-D15
	PCB BINDER	VEF1008
	EARTH METAL	VNF-091

Mark	No.	Description	Part No.
J	STRATEGY SMALL BOARD ASSY		
SEMICONDUCTORS			
	IC343		TC74HC138AF
	IC344		TC7S04F
	Q3508		2SC2412K
	Q3501-Q3507		DTA124TK
	D332		1SS355
	D331		UDZ3.0B

CAPACITORS

C3520	CEV470M16
C344, C3519, C3521	CKSQYF103Z50

RESISTORS

R3514	PCN1039
R3504	RN1/10SE1502D
R3510	RN1/10SE1601D
R3511	RN1/10SE1800D
R3505	RN1/10SE1801D
R3503	RN1/10SE1802D
R3502	RN1/10SE2201D
R3520	RN1/10SE2400D
R3506	RN1/10SE2401D
R3513	RN1/10SE2701D
R3507	RN1/10SE4701D
R3512	RN1/10SE5100D
R3501	RN1/10SE5101D
R3508	RN1/10SE6201D
VR3502, VR3503 (10kΩ)	PCP1042
VR3501 (47kΩ)	PCP1043
Other Resistors	RS1/10S□□□J

OTHERS

CN3502	PH CONNECTOR(2P)	B2B-PH-SM3
CN3506	PH CONNECTOR(6P)	B6B-PH-SM3

6. ADJUSTMENT

6.1 ADJUSTMENT METHODS

If a compact disc recorder is adjusted incorrectly or inadequately, it may malfunction or not work at all even though there is nothing at all wrong with the pickup or the circuitry. Adjust correctly following the adjustment procedure.

● Measuring instruments and Tools

- | | |
|--|---|
| (1) Dual trace oscilloscope (10 : 1 probe) | (6) Resistor (100k Ω) |
| (2) Low-frequency oscillator | (7) Hexagonal screwdriver (1.27mm diagonal) |
| (3) Test disc (STD-903), (STD-R03) | (8) Standard tools |
| (4) Low-pass filter (15k Ω + 0.001 μ F), (39k Ω + 0.001 μ F) | (9) Small screwdriver |
| (5) Hi-pass filter (3.9k Ω + 180pF) | (10) Multimeter (Voltage accuracy : Below 1 mV) |

● Adjustment Items / Verification Items and Order

Adjustment 1

Step	Item	Test Point	Adjustment Location
1	Playback Power Adjustment	CN104 (TP1), Pin 7 (PWAJT)	VR103 (PB. PW)
2	Coarse Focus Offset Adjustment	CN204 (TP201), Pin 1 (RF)	VR105 (FE. OFS)
3	Coarse Skew Adjustment	CN204 (TP201), Pin 1 (RF)	Radial tilt adjustment screw and Tangential tilt adjustment screw
4	Coarse Grating Adjustment	CN104 (TP1), Pin 3 (TE)	Grating adjustment slit
5	DPP (Tracking Offset) Adjustment	CN104 (TP1), Pin 3 (TE)	VR112 (TE. OFS)
6	Fine Focus Offset Adjustment	CN204 (TP201), Pin 1 (RF)	VR105 (FE. OFS)
7	Fine Skew Adjustment	CN204 (TP201), Pin 1 (RF)	Radial tilt adjustment screw and Tangential tilt adjustment screw
8	Grating Re-adjustment	CN104 (TP1), Pin 3 (TE)	Grating adjustment slit

Adjustment 2

Step	Item	Test Point	Adjustment Location
1	CD-R VCO Control Voltage Adjustment	CN331 (TP30), Pin 1 (VCOIN)	VR301 (VCO CON)
2	Multi Pulse Time Adjustment	CN3506, Pin 6 (MPLS)	VR3501 (MPLS DLY)
3	EFM Rising Edge Time Adjustment	CN3506, Pin 5 (EFM IN) CN3506, Pin 4 (SEFM)	VR3502 (EFM DLY)
4	3T Falling Edge Time Adjustment	CN3506, Pin 3 (3T IN) CN3506, Pin 2 (3T OUT)	VR3503 (3T DLY)
5	WBL+ Offset Adjustment	CN104 (TP1), Pin 6 (RWBL)	VR107 (WBL+. OFS)
6	Coarse WBL Offset Adjustment	CN104 (TP1), Pin 5 (WBL)	VR108 (WBL. OFS)
7	Playback Power Re-adjustment	CN104 (TP1), Pin 7 (PWAJT)	VR103 (PB. PW)
8	Coarse Focus Offset Adjustment	CN204 (TP201), Pin 1 (RF)	VR105 (FE. OFS)
9	Main and Sub Mix Ratio Adjustment	CN104 (TP1), Pin 1 (STE) CN104 (TP1), Pin 2 (MSTE)	VR110 (MS. MIX)
10	Tracking Amp. Gain Adjustment	CN104 (TP1), Pin 3 (TE)	VR111 (TE. GAIN)
11	Tracking Offset Adjustment	CN104 (TP1), Pin 3 (TE)	VR112 (TE. OFS)
12	ACT Offset Adjustment	CN5021 (TP00), Pin 1 (ACT ERR)	VR1 (ACT. OFS)
13	ACT GAIN Adjustment	CN5021 (TP00), Pin 1 (ACT ERR)	VR10 (ACT. GAIN)
14	Fine Focus Offset Adjustment	CN204 (TP201), Pin 1 (RF)	VR105 (FE. OFS)
15	WBL BALANCE Adjustment	CN104 (TP1), Pin 5 (WBL)	VR106 (WBL. BALANCE)

Step	Item	Test Point	Adjustment Location
16	Fine WBL Offset Adjustment	CN104 (TP1), Pin 5 (WBL)	VR108 (WBL. OFS)
17	WBL Focus Offset Adjustment	CN104 (TP1), Pin 5 (WBL)	VR115 (WFE. OFS)
18	Recording Power Adjustment	CN104 (TP1), Pin 7 (PWAJT)	VR104 (REC. PW)
19	HF Amp. Gain Adjustment	CN104 (TP1), Pin 8 (HF)	VR119 (HF. GAIN)
20	Focus Servo Loop Gain Adjustment	CN204 (TP201), Pin 5 (FCSIN) CN204 (TP201), Pin 6 (FCSER)	VR201 (FCS. GAIN)
21	Tracking Servo Loop Gain Adjustment	CN204 (TP201), Pin 2 (TRKER) CN204 (TP201), Pin 3 (TRKIN)	VR202 (TE. GAIN)

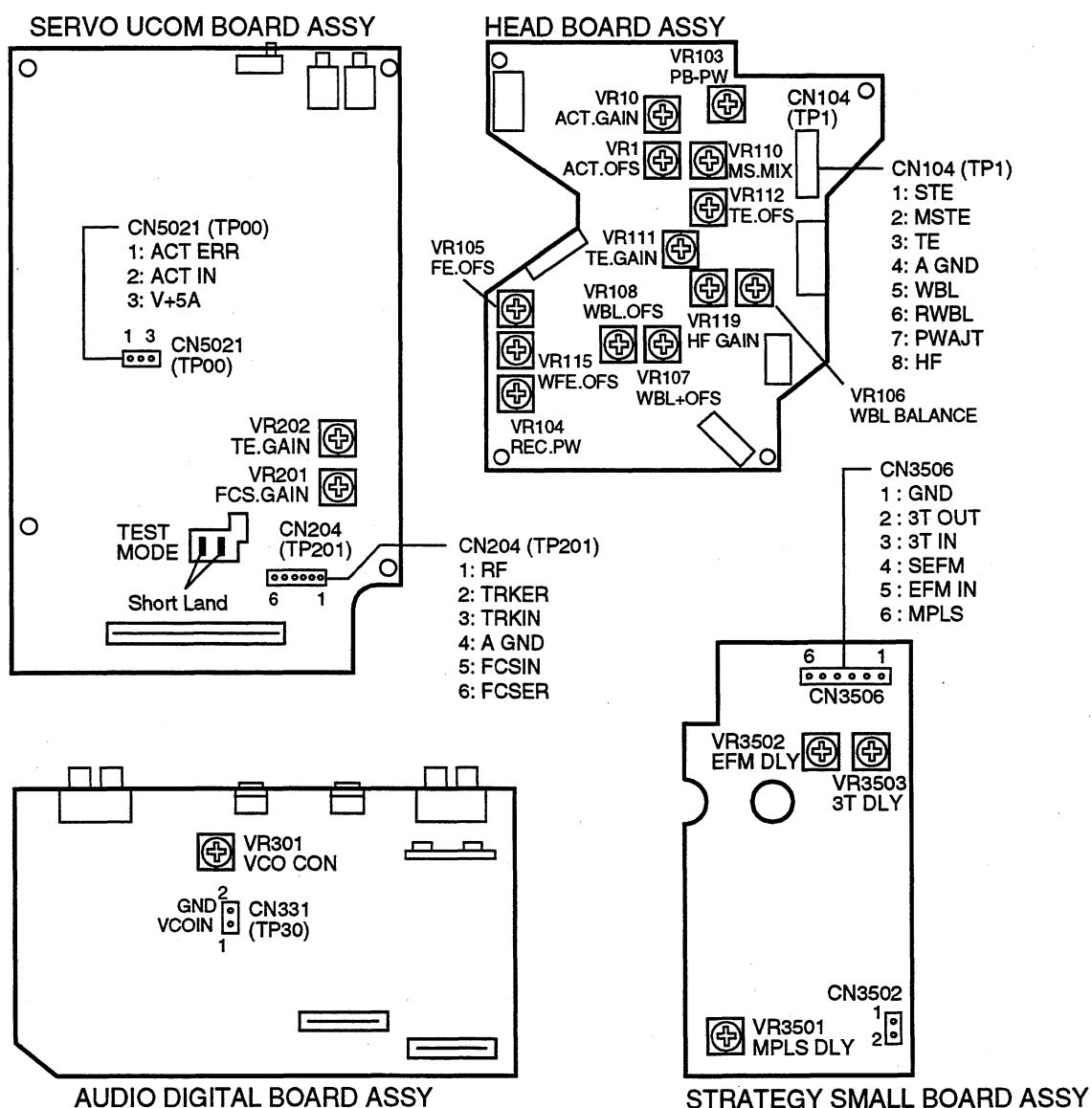


Fig. 1 Adjustment points

● Notes

- (1) Use a 10 : 1 probe for the oscilloscope.
- (2) All the knob positions (settings) for the oscilloscope in the adjustment procedures are for when a 10 : 1 probe is used.

● Test Mode

This model has a test mode so that the adjustments and checks required for service can be carried out easily. When this model is in test mode, the keys on the front panel work differently from normal. Adjustments and checks can be carried out by operating these keys with the correct procedure. For this model, all adjustments are carried out in test mode.

[Setting to Test Mode]

How to set this model into test mode.

- (1) Unplug the power cord from the AC socket.
- (2) Short the test mode short land. (See Fig. 1.)
- (3) Plug the power cord back into the AC socket.

When the test mode is set correctly, the display is different from what it usually is when the power is turned on. (lights up all FL display) If the display is still the same as usual, test mode has not been set correctly, so repeat Steps 1 – 3.

[Release from Test Mode]

Here is the procedure for releasing the test mode.

- (1) Press the STOP key and stop all operations.
- (2) Unplug the power cord from the AC socket.

[Operations of the Keys in Test Mode]

Code	Key Name	Function In Test Mode	Explanation
	DIGITAL SYNCHRO	Playback laser diode ON	Lights up the laser diode by playback power.
	FINALIZE	Focus servo closes	The laser diode is lit up and the focus acuator is lowered, then raised slowly and the focus servo is closed at the point where the objective lens is focused on the disc. With the player in this state, if you lightly rotate the stopped disc by hand, you can here the sound the focus servo. If you can hear this sound, the focus servo is operating correctly. If you press this key with no disc mounted, the laser diode lights up, the focus acuator is pulled down, then the acuator is raised and lowered three times and returned to its original position.
▶	PLAY	Spindle servo ON	Starts the spindle motor in the clockwise direction and when the disc rotation reaches the prescribed speed (about 500 rpm at the inner periphery), sets the spindle servo in a closed loop.

Code	Key Name	Function In Test Mode	Explanation
⏸	PAUSE	Tracking servo close/open	Pressing this key when the focus servo and spindle servo are operating correctly in closed loops puts the tracking servo into a closed loop, displays the track number being played back and the elapsed time on the front panel. If the elapsed time is not displayed or not counted correctly, it may be that something is out of adjustment, or that there is some other problem. This key is a toggle key and open/close the tracking servo alternately. This key has no effect if no disc is mounted.
⏮ • ⏮	MANUAL/ TRACK SEARCH REV	Carriage reverse (inwards)	Moves the pickup position toward the inner diameter of the disc. When this key is pressed with the tracking servo in a closed loop, the tracking servo automatically goes into an open loop. Since the motor does not automatically stop at the mechanical end point in test mode, be careful with this operation.
⏭ • ⏭	MANUAL/ TRACK SEARCH FWD	Carriage forward (outwards)	Moves the pickup position toward the outer diameter of the disc. When this key is pressed with the tracking servo in a closed loop, the tracking servo automatically goes into an open loop. Since the motor does not automatically stop at the mechanical end point in test mode, be careful with this operation.
■	STOP	Stop	Initializes and the disc rotation stops. The pickup and disc remain where they are when this key is pressed.
▲	OPEN/CLOSE	Disc tray open/close	Open/close the disc tray. This key is a toggle key and open/close tray alternately. Pressing this key when the disc is turning stops the disc, then opens the tray. This key operation does not affect the position of the pickup.
○ ↓ ○	REC ↓ REC MUTE	Maximum recording power Laser diode ON	Lights up the laser diode with maximum recording power and normal EFM by pressing REC and REC MUTE keys in order. * The laser diode may be damaged if adjustments are made before pressing these keys.
	DISPLAY OFF	Focus offset switching	Switches the focus offset state. DISPLAY OFF LED Lights UP : C/N in the best condition Lights OFF : Jitter in the best condition
	WRITE	Optical axis servo switching	Switches the ON/OFF of the optical axis servo. (MANUAL) LED Lights UP : Optical axis servo ON Lights OFF : Optical axis servo OFF

[How to Play Back a Disc in Test Mode]

In test mode, since the servos operate independently, playing back a disc requires that you operate the keys in the correct order to close the servos.

Here is the key operation sequence for playing back a disc in test mode.

FINALIZE Lights up the laser diode and closes the focus servo.



PLAY ► Starts the spindle motor and closes the spindle servo.



PAUSE ⏸ Closes the tracking servo.

Wait at least 2 – 3 seconds between each of these operations.

6.2 Adjustment 1

6.2.1 Playback Power Adjustment

Adjustment 1

• Objective	To optimize the playback power of the laser diode.		
• Symptom when out of adjustment	Play does not start, track search is impossible, track are skipped.		
• Measurement instrument connections	Connect the multimeter to CN104 (TP1), Pin 7 (PWAJT)	• Player state	Test mode, Playback laser diode ON
		• Adjustment location	VR103 (PB. PW) (HEAD BOARD assy)
		• Disc	None needed

[Procedure]

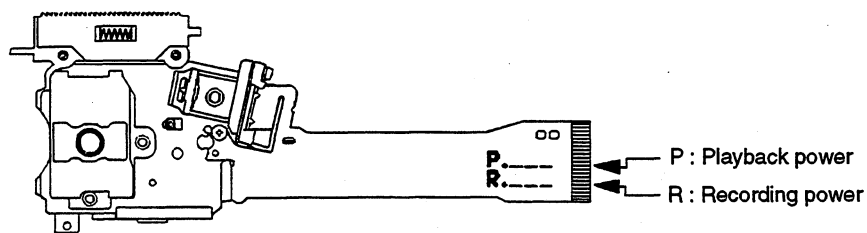
When adjusting with the multimeter.

- (1) Lights up the playback laser diode using the DIGITAL SYNCHRO key.
- (2) Adjust the voltage value of Pin 7 (PWAJT) of CN104 (TP1) to the voltage value (PB PW voltage $\pm 5\text{mV}$) displayed on the pickup flexible cable using VR103 (PB PW).

Note) This adjustment cannot be performed accurately if disc is set. Be sure to remove disc first before adjustments.

Reference: When adjusting with the optical power meter.

- (1) Move the pickup to the outer edge of the disc with the MANUAL / TRACK SEARCH FWD ►►► key.
- (2) Lights up the playback laser diode by DIGITAL SYNCHRO key.
- (3) Shine the light discharged from the objective lens in the pickup on the light power meter sensor. Adjust VR103 (PB. PW) so that the playback laser diode output is an average $0.6\text{ mW} \pm 0.05\text{mW}$.
(Wavelength 790nm, Average mode)



* Recording on the disc is not possible in test mode.

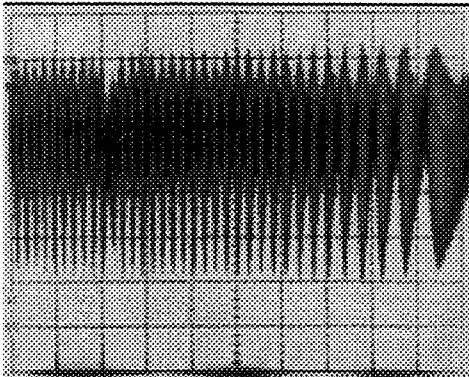
6.2.2 Coarse Focus Offset Adjustment

Adjustment 1

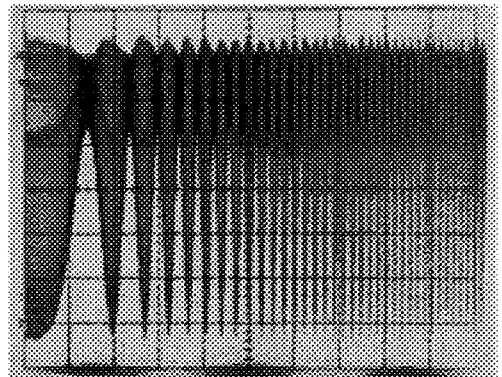
• Objective	To coarse adjust the DC offset voltage of the focus servo circuit for perform the tracking and slider adjustments correctly.		
• Symptom when out of adjustment	The model does not focus in, sound broken and the RF signal is dirty.		
• Measurement instrument connections	Connect the oscilloscope to CN204 (TP201), Pin 1 (RF) (SERVO UCOM BOARD assy) [Settings] 20 mV/div. 2 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open. VR105 (FE. OFS) (HEAD BOARD assy) STD-903

[Procedure]

- (1) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo.
- (2) Adjust VR105 (FE. OFS) so that the amplitude of waveform at CN204 (TP201), Pin 1 (RF) is maximum.



Out of adjustment



Optimum adjustment

6.2.3 Coarse Skew Adjustment

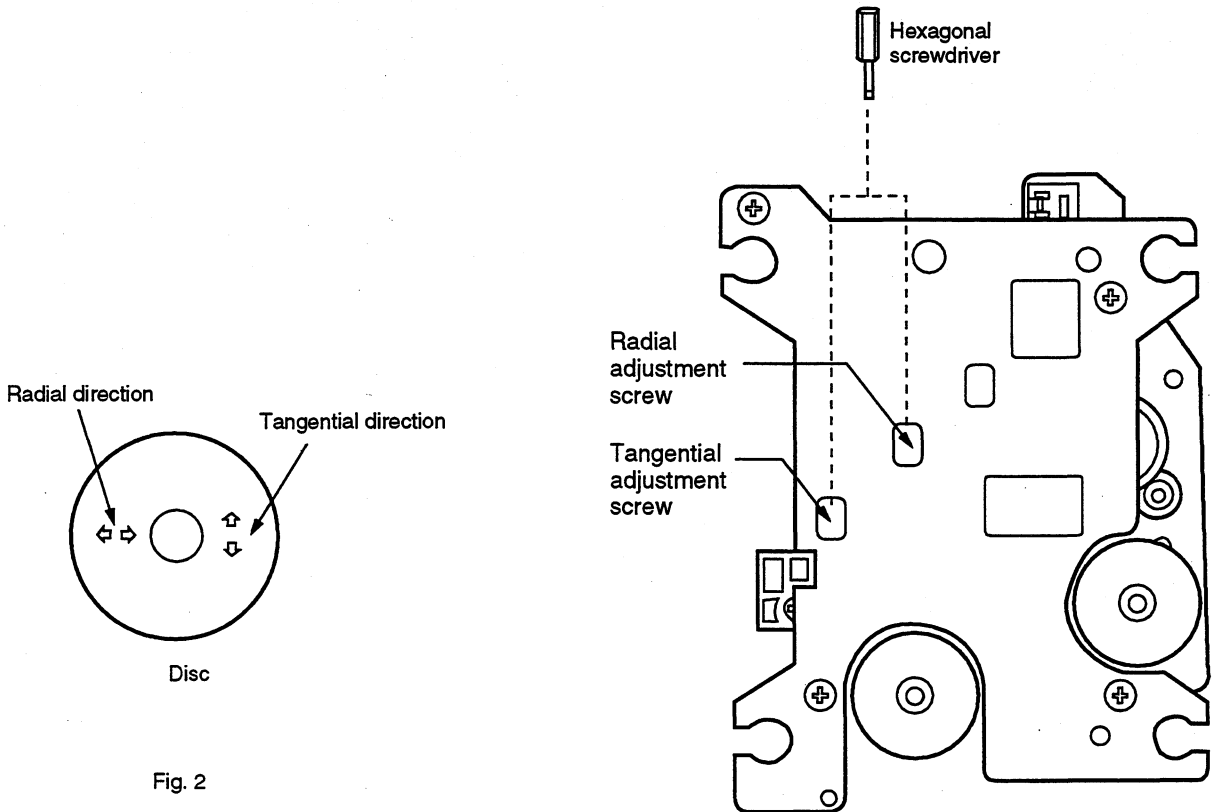
Adjustment 1

• Objective	To coarse adjust the angle of pickup to the disc for perform the grating and DPP (tracking offset) adjustments correctly.		
• Symptom when out of adjustment	Sound broken, some discs can be played but not others.		
• Measurement instrument connections	Connect the oscilloscope to CN204 (TP201), Pin 1 (RF) (SERVO UCOM BOARD assy) [Settings] 20 mV/div. 200 nS/div. AC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open. Radial adjustment screw and tangential adjustment screw STD-903

[Procedure]

- (1) Move the pickup to the position where the radial/tangential adjustment screws will be seen with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys so that the radial/tangential adjustment screws can be adjusted.
- (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo.
- (3) Adjust the RAD (radial direction) and TAN (tangential direction) adjustment screws alternately with hexagonal screwdriver (1.27 mm diagonal) to maximize the RF output at CN204 (TP201), Pin 1.

Note : Radial direction and tangential direction mean the direction relative to the disc shown in Fig. 2.



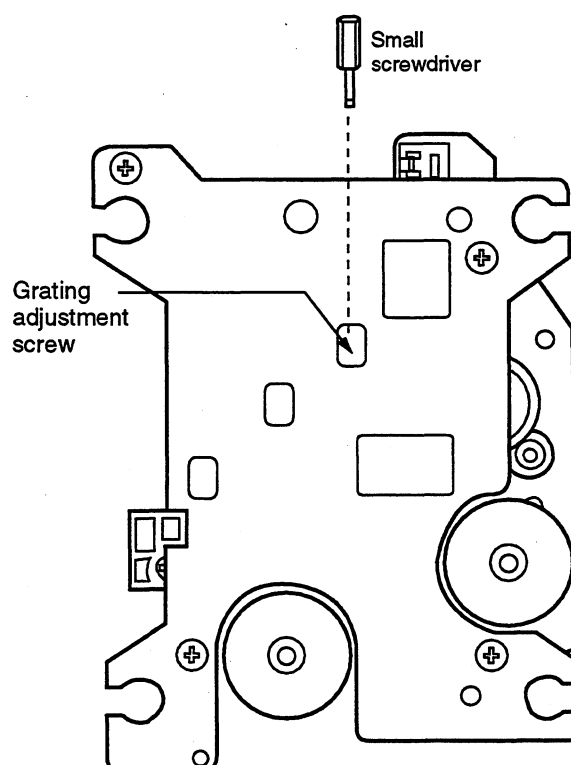
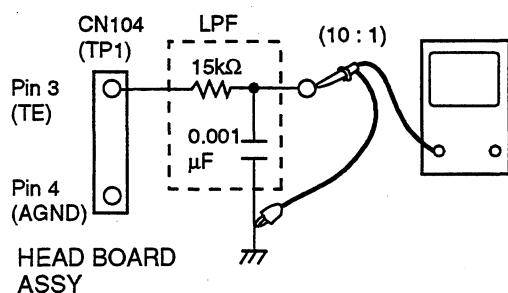
6.2.4 Coarse Grating Adjustment

Adjustment 1

• Objective	To align the tracking error generation laser beam spots to the optimum angle on the track.		
• Symptom when out of adjustment	Play does not start, track search is impossible, tracks are skipped.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 3 (TE) This connection may be via a low pass filter. (See Fig. 3) [Settings] 50 mV/div. 5 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open. Grating slit on pickup STD-903

[Procedure]

- (1) Move the pickup to the position where the grating adjustment slit will be seen with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys so that the grating adjustment can be adjusted.
- (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then spindle servo.
- (3) Insert a screwdriver into the grating adjustment slit and adjust the grating to find the null point.
For more details, see next page.
- (4) If you slowly turn the screwdriver clockwise from the null point, the amplitude of the wave gradually increases, then if you continue turning the screwdriver, the amplitude of the wave becomes smaller again. Turn the screwdriver counterclockwise from the null point and set the grating to the first point where the wave amplitude reaches its maximum.
Reference : Fig. 4 shows the relation between the angle of the tracking beam with the track and the waveform.
- (5) Return the pickup to more or less midway across disc with the MANUAL / TRACK SEARCH ◄◄◄◄ key, press the PAUSE ■■ key and check that the track number and elapsed time are displayed on the front panel. If they are not displayed at this time or the elapsed time changes irregularly, check the null point and adjust the grating again.



[How to find the null point]

When you insert the small screwdriver into the slit for the grating adjustment and change the grating angle, the amplitude of the tracking error signal at CN104 (TP1), Pin 3 (TE) changes. Within the range for the grating, there are five or six locations where the amplitude of the wave reaches a minimum. Of these five or six locations, there is only one at which the envelope of the waveform is smooth. This location is where the three laser beams divided by the grating are all right above the same track. (See Fig. 4.)

This point is called the null point. When adjusting the grating, this null point is found and used as the reference position.

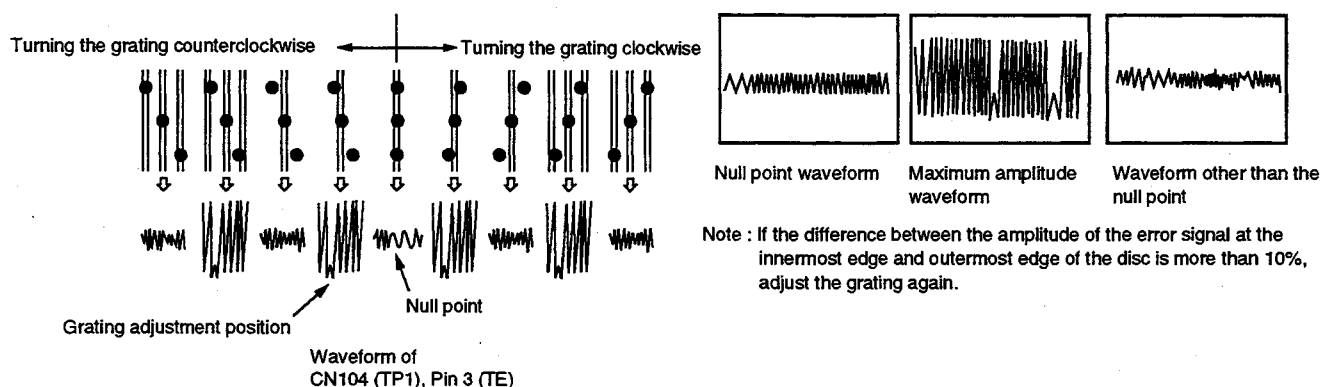


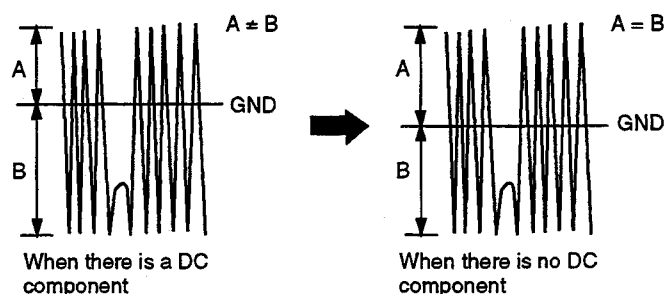
Fig. 4

6.2.5 DPP (Tracking Offset) Adjustment

• Objective	To correct for the variation in the sensitivity of the tracking photodiode.		
• Symptom when out of adjustment	Play does not playback, track search is impossible, tracks are skipped.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 3 (TE) [This connection may be via a low pass filter. (15kΩ + 0.001μF)] [Settings] 50 mV/div. 5 mS/div. DC mode	• Player state	Test mode, focus and spindle servos closed and tracking servo open.
		• Adjustment location	VR112 (TE. OFS) (HEAD BOARD assy)
		• Disc	STD-903

[Procedure]

- (1) Move the pickup to the midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►► or REV ◄◄◄ keys.
- (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then spindle servo.
- (3) Line up the bright line (ground) at the center of the oscilloscope screen and put the oscilloscope into DC mode.
- (4) Adjust VR112 (TE. OFS) so that the positive amplitude and negative amplitude of the tracking error signal at CN104 (TP1), Pin 3 (TE) are the same (in other words, so that there is no DC component).



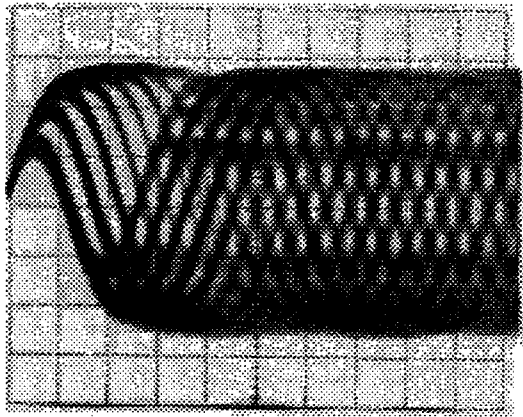
6.2.6 Fine Focus Offset Adjustment

Adjustment 1

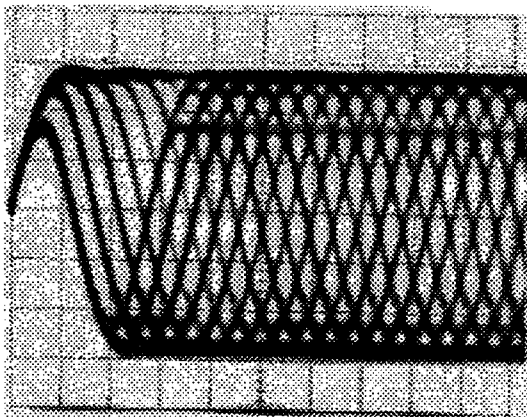
• Objective	To optimize the DC offset voltage of the focus servo circuit.		
• Symptom when out of adjustment	The player does not focus in, sound broken and the RF signal is dirty.		
• Measurement instrument connections	Connect the oscilloscope to CN204 (TP201), Pin 1 (RF). (SERVO UCOM BOARD assy)	• Player state	Test mode, play
	[Settings] 20 mV/div. 500 nS/div. AC mode	• Adjustment location	VR105 (FE. OFS) (HEAD BOARD assy)
		• Disc	STD-903

[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, the play ► key, then the PAUSE || key in that order to close the respective servos and put the player into play mode.
- (3) Adjust VR105 (FE. OFS) so that the 3T waveform at CN204 (TP201), Pin 1 (RF) is maximum.



Out of adjustment



Optimum adjustment

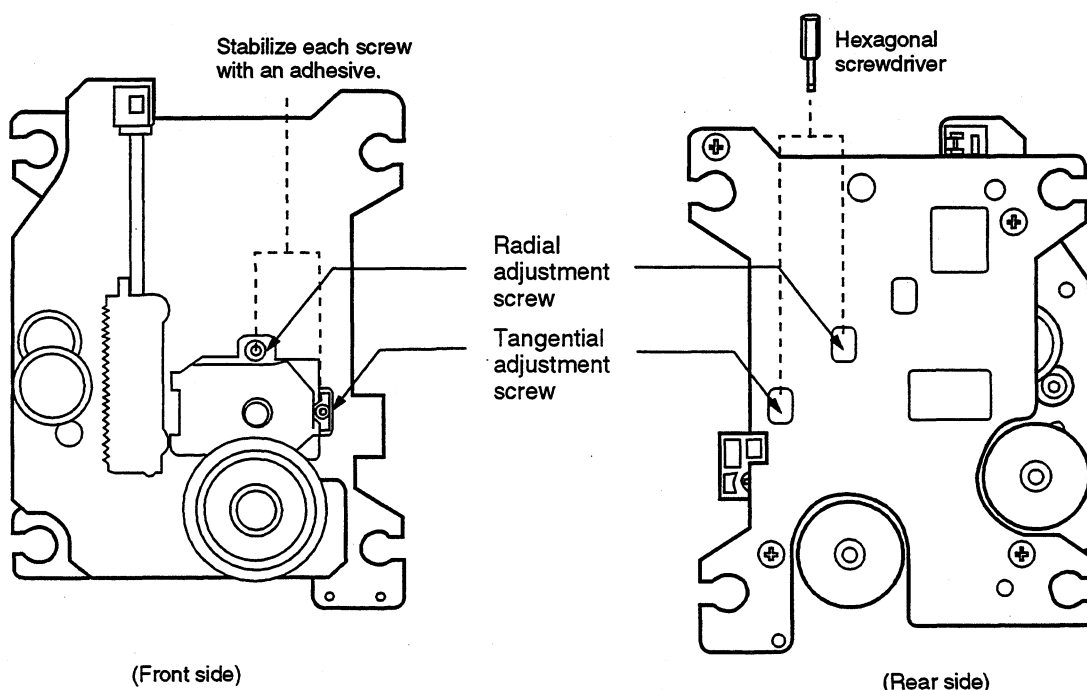
6.2.7 Fine Skew Adjustment

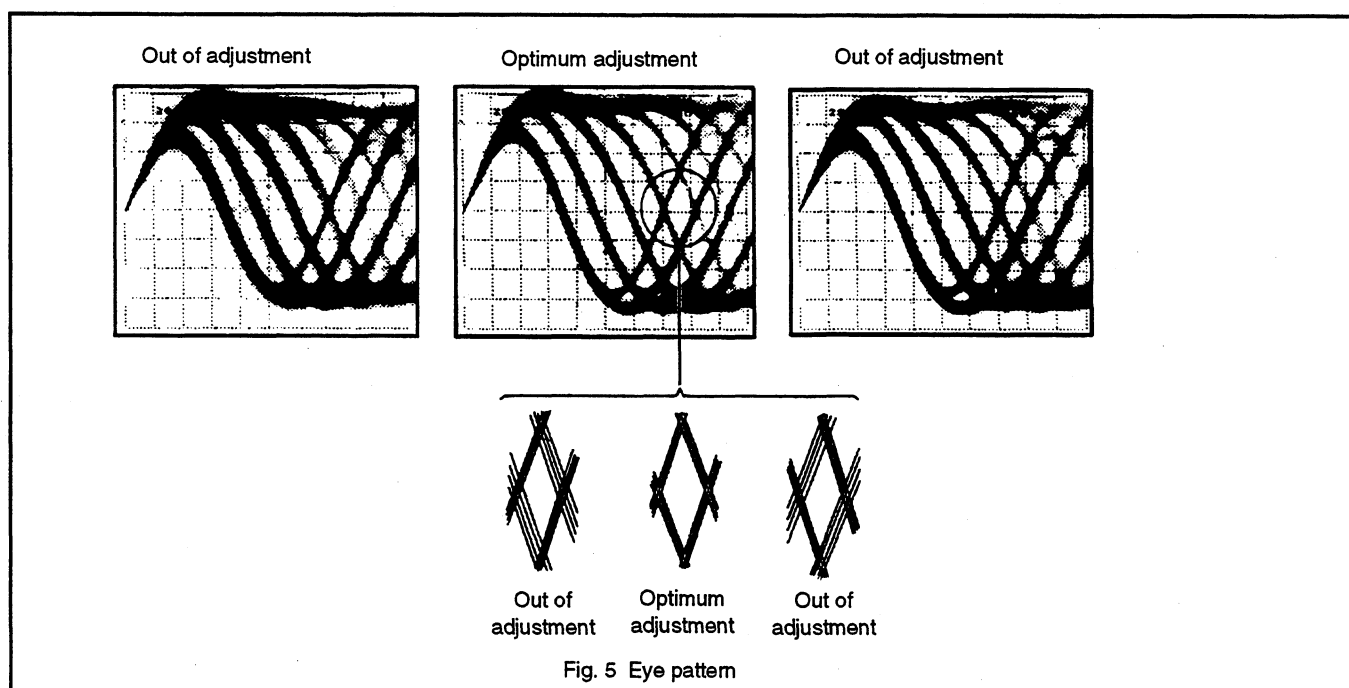
Adjustment 1

• Objective	To adjust the angle of the pickup relative to the disc so that the laser beams are shone straight down into the disc for the best read out of the RF signals.		
• Symptom when out of adjustment	Sound broken, some discs can be played but not others.		
• Measurement instrument connections	Connect the oscilloscope to CN204 (TP201), Pin 1 (RF) (SERVO UCOM BOARD assy) [Settings] 20 mV/div. 200 nS/div. AC mode	• Player state	Test mode, play
		• Adjustment location	Pickup radial adjustment screw and tangential adjustment screw
		• Disc	STD-903

[Procedure]

- (1) Move the pickup to the position where the radial/tangential adjustment screws will be seen with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys so that the radial/tangential adjustment screws can be adjusted.
- (2) Press the FINALIZE key, then the PLAY ► key to the PAUSE || key in that order to close the respective servos and put the player into play mode.
- (3) First, adjust the radial adjustment screw with the hexagonal screwdriver (1.27 mm) so that the eye pattern (the diamond shape at the center of the RF signal) can be seen the most clearly.
- (4) Next, adjust the tangential adjustment screw with the hexagonal screwdriver so that the eye pattern can be seen the most clearly. (Fig. 5).
- (5) Adjust in the order of the radial adjustment screw and the tangential screw again, so that the eye pattern can be seen the most clearly. As necessary, adjust the two screws alternately so that the eye pattern can be seen the most clearly.
- (6) After the adjustment, remove the float screw, turn over the servo mechanism assembly, then stabilize the radial adjustment screw and the tangential adjustment screw with an adhesive.



Adjustment 1**6.2.8 Grating Re-adjustment**Adjustment 1

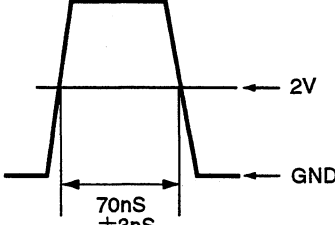
Adjust in the same manner as "4. Coarse Grating Adjustment " in Adjustment 1.

6.3 Adjustment 2**6.3.1 CD-R VCO Control Voltage Adjustment**Adjustment 2

• Objective	To optimize the CD-R VCO control voltage adjustment of VCO IC.		
• Symptom when out of adjustment	Player does not record or playback CD-R discs.		
• Measurement instrument connections	Connect the multimeter to CN331 (TP30), Pin 1 (VCOIN) (AUDIO DIGITAL BOARD assy)	• Player state	Test mode, stop
		• Adjustment location	VR301 (VCOIN) (AUDIO DIGITAL BOARD assy)
		• Disc	None needed
[Procedure] (1) Adjust VR301 (VCO CON) so that the voltage at Pin 1 (VCOIN) of CN331 (TP30) becomes $2.5 \pm 0.1V$.			

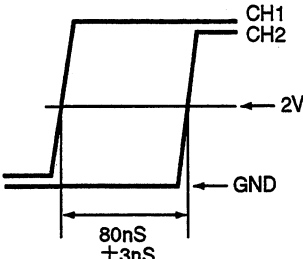
6.3.2 Multi Pulse Time Adjustment

Adjustment 2

• Objective	Pulse adjustment for recording (1)		
• Symptom when out of adjustment	Player does not playback CD-R discs which was recorded with this player .		
• Measurement instrument connections	Connect the oscilloscope to CN3506, Pin 6 (MPLS). (STRATEGY SMALL BOARD assy) [Settings] 1 mV/div. 20 nS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, stop VR3501 (MPLS DLY) (STRATEGY SMALL BOARD assy) None needed
[Procedure] (1) Disconnect a connector CN3502. (2) Adjust the time from rising edge to falling edge of Waveform with 2V level. (3) Adjust VR3501 (MPLS DLY) so that the DC voltage at CN3506 pin 6 (MPLS) becomes $70\text{nS} \pm 3\text{nS}$.			
			

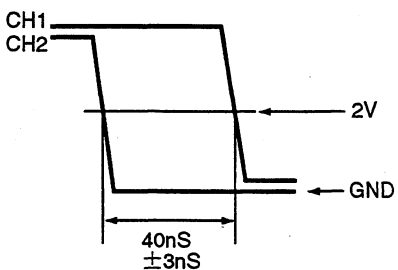
6.3.3 EFM Rising Edge Time Adjustment

Adjustment 2

• Objective	Pulse adjustment for recording (2)		
• Symptom when out of adjustment	Player does not playback CD-R discs which was recorded with this player .		
• Measurement instrument connections	Connect the oscilloscope to CH1 : CN3506, Pin 5 (EFM IN). CH2 : CN3506, Pin 4 (SEFM). (STRATEGY SMALL BOARD assy) [Settings] CH1 : 1 V/div. DC mode 20 nS/div. CH2 : 1 V/div. DC mode	• Player state • Adjustment location • Disc	Test mode, recording power ON VR3502 (EFM DLY) (STRATEGY SMALL BOARD assy) None needed
[Procedure] (1) Disconnect a connector CN3502. (2) Turn VR104 (REC. PW) fully counterclockwise to reduce the power is minimum. (3) Press REC  and REC MUTE  keys in this order to lights up the laser diode. (4) Adjust the time from rising edge of CN3506 pin 5 to rising edge of pin 4 of waveform with 2V level. (5) Adjust VR3502 (EFM DLY) so that the DC voltage becomes $80\text{nS} \pm 3\text{nS}$.			
			

6.3.4 3T Falling Edge Time Adjustment

Adjustment 2

• Objective	Pulse adjustment for recording (3)		
• Symptom when out of adjustment	Player does not playback CD-R discs which was recorded with this player .		
• Measurement instrument connections	Connect the oscilloscope to CH1 : CN3506, Pin 3 (3T IN). CH2 : CN3506, Pin 2 (3T OUT). (STRATEGY SMALL BOARD assy) [Settings] CH1 : 1 V/div. DC mode 20 nS/div. CH2 : 1 V/div. DC mode	• Player state • Adjustment location • Disc	Test mode, recording power ON VR3503 (3T DLY) (STRATEGY SMALL BOARD assy) None needed
[Procedure] (1) Disconnect a connector CN3502. (2) Turn VR104 (REC. PW) fully counterclockwise to reduce the power is minimum. (3) Press REC  and REC MUTE  keys in this order to lights up the laser diode. (4) Adjust the time from falling edge of CN3506 pin 3 to falling edge of pin 2 of waveform with 2V level. (5) Adjust VR3503 (3T DLY) so that the DC voltage becomes 40nS ± 3nS.			
			

6.3.5 WBL+ Offset Adjustment

Adjustment 2

• Objective	To adjust the gain balance of the wobble signal.		
• Symptom when out of adjustment	Player does not record or playback CD-R discs.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 6 (RWBL). (HEAD BOARD assy) [Settings] 1 mV/div. 5 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, stop VR107 (WBL+. OFS) (HEAD BOARD assy) None needed
[Procedure] (1) Turn VR108 (WBL. OFS) to fully counterclockwise. (2) Adjust VR107 (WBL+. OFS) so that the DC voltage at CN104 (TP1), Pin 6 (RWBL) is -20mV ± 10mV.			

PDR-04

6.3.6 Coarse WBL Offset Adjustment

Adjustment 2

• Objective	To optimize the DC offset voltage of the wobble amp.		
• Symptom when out of adjustment	Player does not record or playback CD-R discs.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 5 (WBL). (HEAD BOARD assy) [Settings] 1 mV/div. 5 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, stop VR108 (WBL. OFS) (HEAD BOARD assy) None needed
[Procedure] (1) Adjust VR108 (WBL. OFS) so that the DC voltage at Pin 5 (WBL) of CN104 (TP1) becomes $0 \pm 10\text{mV}$.			

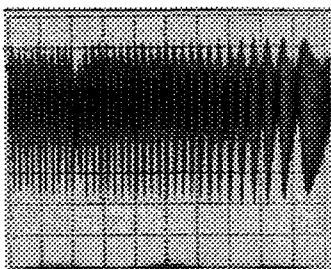
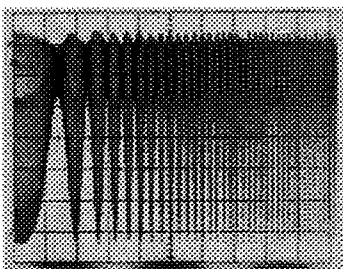
6.3.7 Playback Power Re-adjustment

Adjustment 2

Adjust in the same manner as "1. Playback Power Adjustment " in Adjustment 1.

6.3.8 Coarse Focus Offset Adjustment

Adjustment 2

• Objective	To optimize the DC offset voltage of the focus error amp.		
• Symptom when out of adjustment	The player does not focus in add the RF signal is dirty.		
• Measurement instrument connections	Connect the oscilloscope to CN204 (TP201), Pin 1 (RF). (SERVO UCOM BOARD assy) [Settings] 20 mV/div. 2 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open. VR105 (FE. OFS) (HEAD BOARD assy) STD-903
[Procedure] (1) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo. (2) Adjust VR105 (FE. OFS) so that the amplitude of RF signal at CN204 (TP201), Pin 1 (RF) is maximum.			
			
Out of adjustment		Optimum adjustment	

6.3.9 Main and Sub Mix Ratio Adjustment

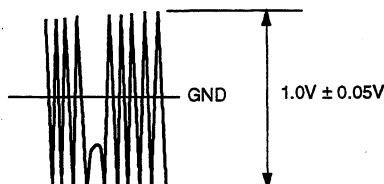
Adjustment 2

• Objective	To mix the gain of the main signal output and sub signal output of the pickup.		
• Symptom when out of adjustment	Player does not playback.		
• Measurement instrument connections	Connect the oscilloscope to CH1: CN104 (TP1), Pin 1 (STE) CH2: CN104 (TP1), Pin 2 (MSTE) [These connections must be via low pass filters.] [Settings] CH1 : 50 mV/div. AC mode 10 mS/div. ADD mode CH2 : 100 mV/div. AC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open VR110 (MS. MIX) (HEAD BOARD assy) STD-903
[Procedure] (1) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo. (2) Set the oscilloscope to ADD mode (waveform adding mode of CH1 and CH2) and observe the adding waveform of CH1 and CH2. (3) Adjust VR110 (MS. MIX) so that the amplitude of waveform becomes minimum.			

6.3.10 Tracking Amp. Gain Adjustment

Adjustment 2

• Objective	To correct the discrepancy in the tracking error level with the pickup.		
• Symptom when out of adjustment	Player does not playback, track search is impossible, tracks are skipped.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 3 (TE) [These connection must be via a low pass filter (15k Ω + 0.001 μ F).] [Settings] 20 mV/div. 5 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open VR111 (TE. GAIN) (HEAD BOARD assy) STD-903
[Procedure] (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►► or REV ◄◄◄ keys. (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo. (3) Line up the bright line (ground) at the center of the oscilloscope screen and put the oscilloscope into DC mode. (4) Adjust VR111 (TE. GAIN) so that the positive amplitude and negative amplitude of the tracking error signal at CN104 (TP1), Pin 3 (TE) is 1.0V $\pm$ 0.05V.			



6.3.11 Tracking Offset Adjustment

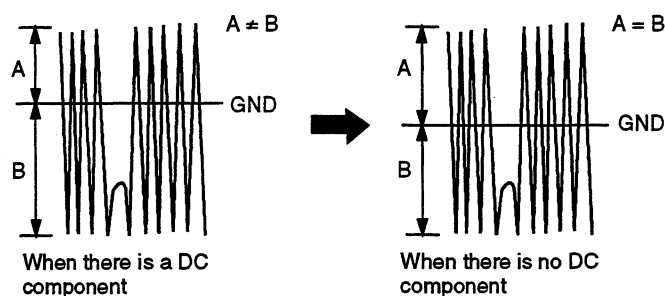
Adjustment 2

• Objective	To correct for the variation in the sensitivity of the tracking photodiode.		
• Symptom when out of adjustment	Player does not playback, track search is impossible, tracks are skipped.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 3 (TE). [This connection must be via a low pass filter (15k Ω + 0.001 μ F).] [Settings] 20 mV/div. 5 mS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, focus and spindle servos closed and tracking servo open. VR112 (TE. OFS) (HEAD BOARD assy) STD-903

[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo.
- (3) Line up the bright line (ground) at the center of the oscilloscope screen and put the oscilloscope into DC mode.
- (4) Adjust VR112 (TE. OFS) so that the positive amplitude and negative amplitude of the tracking error signal at CN104 (TP1), Pin 3 (TE) are the same (in other words, so that there is no DC component).

Note : Perform the run-on adjustment in the section 7 and 8.



6.3.12 ACT Offset Adjustment

Adjustment 2

• Objective	To optimize the DC offset voltage of the actuator servo.		
• Symptom when out of adjustment	Player does not pause, track search is impossible, tracks are skipped.		
• Measurement instrument connections	Connect the oscilloscope to CN5021 (TP00), Pin 1 (ACT ERR). (SERVO UCOM BOARD assy)	• Player state	Test mode, focus and spindle servos closed and tracking servo open.
	[Settings] 5 mV/div. 5 mS/div. DC mode	• Adjustment location	VR1 (ACT. OFS) (HEAD BOARD assy)
		• Disc	STD-903
[Procedure] (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys. (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo. (3) Adjust VR1 (ACT. OFS) so that the DC voltage at CN5021 (TP00), Pin 1 (ACT ERR) is $0 \pm 20\text{mV}$.			

6.3.13 ACT Gain Adjustment

Adjustment 2

• Objective	To optimize the actuator servo gain.		
• Symptom when out of adjustment	Player does not pause, track search is impossible, tracks are skipped.		
• Measurement instrument connections	Connect the oscilloscope to CN5021 (TP00), Pin 1 (ACT ERR). (SERVO UCOM BOARD assy)	• Player state	Test mode, focus and spindle servos closed and tracking servo open.
	[Settings] 10 mV/div. 5 mS/div. DC mode	• Adjustment location	VR10 (ACT. GAIN) (HEAD BOARD assy)
		• Disc	STD-903
[Procedure] (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys. (2) Press the FINALIZE key, then the PLAY ► key in that order to close the focus servo then the spindle servo. (3) Press the WRITE key to light up the WRITE KEY LED, and short-circuit the Pin 2 and Pin 3 of CN5021 (TP00). (4) Adjust VR10 (ACT. GAIN) so that the DC voltage at CN5021 (TP00), Pin 1 (ACT ERR) is $-380 \pm 20\text{mV}$. Note : Perform the run-on adjustment in the section 9 and 10.			

6.3.14 Fine Focus Offset Adjustment

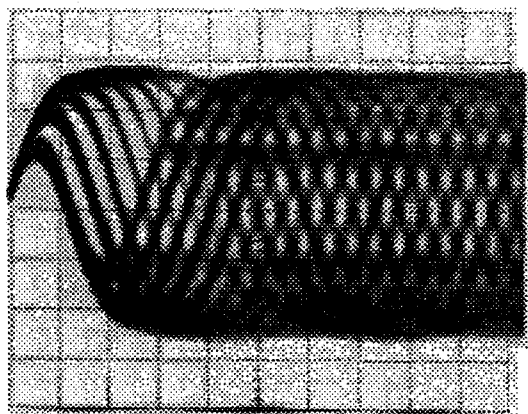
Adjustment 2

• Objective	To optimize the DC offset voltage of the focus servo circuit.		
• Symptom when out of adjustment	The player does not focus in, sound broken and the RF signal is dirty.		
• Measurement instrument connections	Connect the oscilloscope to CN204 (TP201), Pin 1 (RF). (SERVO UCOM BOARD assy)	• Player state	Test mode, play
	[Settings] 20 mV/div. 500 nS/div. AC mode	• Adjustment location	VR105 (FE. OFS) (HEAD BOARD assy)
		• Disc	STD-R03

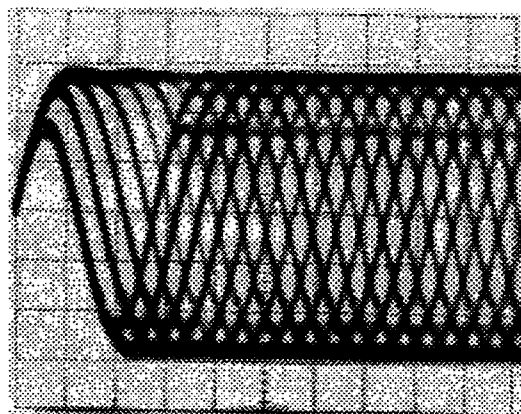
[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, the PLAY ► key, then the PAUSE || key in that order to close the respective servos and put the player into play mode.
- (3) Adjust VR105 (FE. OFS) so that the 3T waveform at CN204 (TP201), Pin 1 (RF) is maximum.

Note : Adjust after confirming that the WRITE KEY LED is OFF.



Out of adjustment



Optimum adjustment

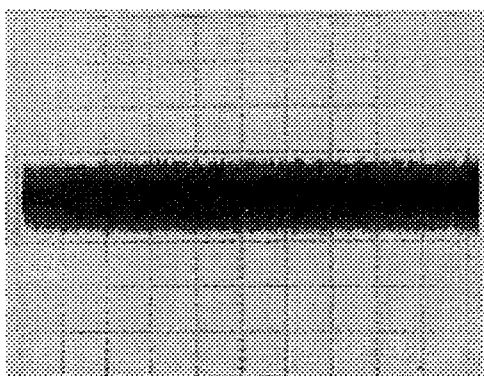
6.3.15 WBL Balance Adjustment

Adjustment 2

• Objective	To adjust the gain balance of the wobble signal.		
• Symptom when out of adjustment	Player does not record or search or pause CD-R discs.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 5 (WBL). [This connection must be via a high-pass filter (180pF+3.9kΩ).] [Settings] 5 mV/div. 20 μS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, play VR106 (WBL. BALANCE) (HEAD BOARD assy) STD-R03

[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, the PLAY ► key, then the PAUSE || key in that order to close the respective servos and put the player into play mode.
- (3) Adjust VR106 (WBL. BALANCE) so that the amplitude of waveform at CN104 (TP1), Pin 5 (WBL) is minimum.



Out of adjustment



Optimum adjustment

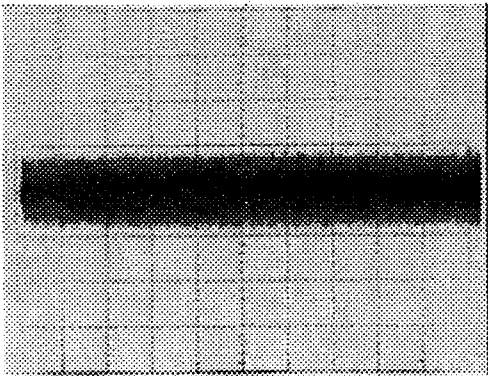
6.3.16 Fine WBL Offset Adjustment

Adjustment 2

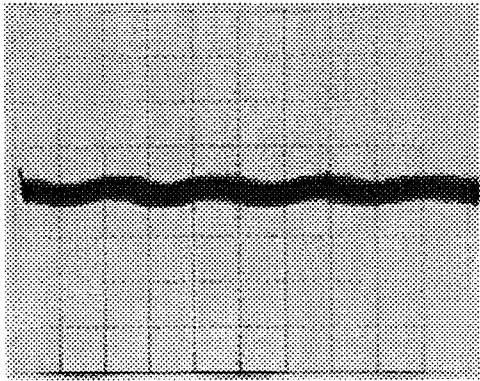
• Objective	To adjust the gain balance of the wobble signal.		
• Symptom when out of adjustment	Player does not record or search or pause CD-R discs.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 5 (WBL). [This connection must be via a high-pass filter (180pF+3.9kΩ).] [Settings] 5 mV/div. 20 μS/div. DC mode	• Player state • Adjustment location • Disc	Test mode, play VR108 (WBL. OFS) (HEAD BOARD assy) STD-R03

[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, the PLAY ► key, then the PAUSE ■■ key in that order to close the respective servos and put the player into play mode.
- (3) Adjust VR108 (WBL. OFS) so that the amplitude of waveform at CN104 (TP1), Pin 5 (WBL) is minimum.



Out of adjustment



Optimum adjustment

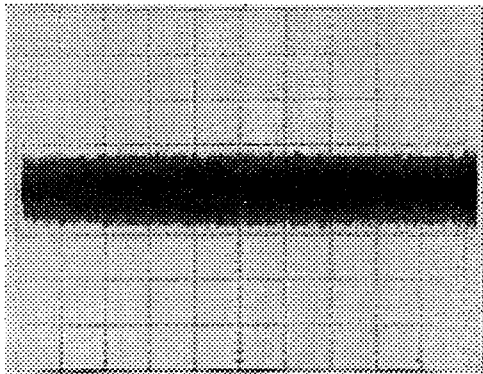
6.3.17 WBL Focus Offset Adjustment

Adjustment 2

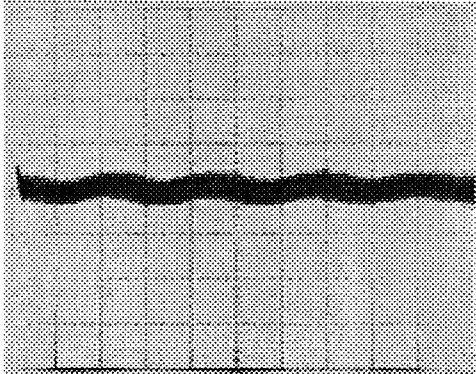
• Objective	To adjust the gain balance of the wobble signal.		
• Symptom when out of adjustment	Player does not record or search or pause CD-R discs.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 5 (WBL). [This connection must be via a high-pass filter (180pF+3.9kΩ).] [Settings] 5 mV/div. 20 μS/div. DC mode	• Player state	Test mode, play
		• Adjustment location	VR115 (WFE. OFS) (HEAD BOARD assy)
		• Disc	STD-R03

[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, the PLAY ► key, then the PAUSE ■■ key in that order to close the respective servos and put the player into play mode.
- (3) Press the DISPLAY OFF key to light up the DISPLAY OFF KEY LED.
- (4) Adjust VR115 (WFE. OFS) so that the amplitude of waveform at CN104 (TP1), Pin 5 (WBL) is minimum.



Out of adjustment



Optimum adjustment

6.3.18 Recording Power Adjustment

Adjustment 2

• Objective	To optimize the recording power of the laser diode.		
• Symptom when out of adjustment	The player does not record nor playback self-recorded discs. It also skips tracks and the RF waveform is dirty. (No problem during CD playback)		
• Measurement instrument connections	Connect the multimeter to CN104 (TP1), Pin 7 (PWAJT).	• Player state	Test mode, maximum recording power ON
		• Adjustment location	VR104 (REC. PW) (HEAD BOARD assy)
		• Disc	None needed

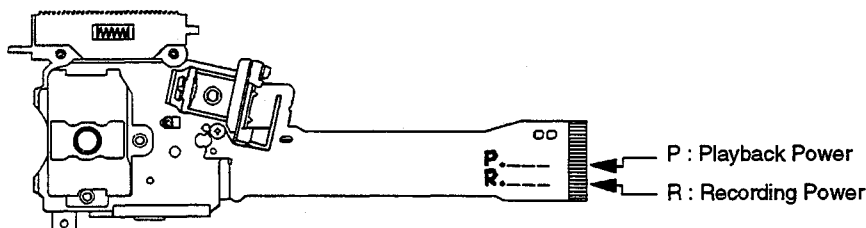
[Procedure]

When Adjusting with the multimeter

- (1) Fully turn VR104 (REC. PW) counterclockwise to reduce the power to the minimum.
- (2) Press REC ○ and REC MUTE ○ keys in this order to lights up the laser diode.
- (3) Adjust the voltage value of Pin 7 (PWAJT) of CN104 (TP1) to the voltage value (REC. PW voltage $\pm 10\text{mV}$) displayed on the pickup flexible cable using VR104 (REC. PW).

Notes:

- Power more than ten times greater than playback power is released during these adjustment.
Never look directly at the objective lens.
- This adjustment cannot be performed accurately if disc is set. Be sure to remove disc first before adjustments.
- Perform this adjustment more than two minutes after starting up the test mode (after inserting the AC plug).
- The laser diode may be damaged if the recording power is greater than the specified value.
Always perform step 1 before making adjustments and be careful not to exceed the adjustment value by more than 50mV (specified value in step 3).



Reference : When adjusting with optical power meter.

- (1) Fully turn VR104 (REC. PW) counterclockwise to reduce the power to the minimum.
- (2) Move the pickup to the outer edge of the disc with the MANUAL / TRACK SEARCH FWD ►►► key.
- (3) Press REC ○ and REC MUTE ○ keys in that order to lights up the laser diode.
- (4) Shine the light discharged from the objective lens in the pickup on the light power meter sensor and adjust VR104 (REC. PW) so that the recording laser diode output is an average of $4.7\text{mW} \pm 0.1\text{mW}$ (Wavelength 790nm, Average mode).

Notes:

- Perform this adjustment more than two minutes after starting up the test mode (after inserting the AC plug).
- The laser diode may be damaged if the recording power is greater than the specified value.
Always perform step 1 before making adjustments and be careful not to exceed the adjustment value by more than 0.3mW (specified value in step 3).
- Power more than ten times greater than playback power is released during these adjustment.
Never look directly at the objective lens.

6.3.19 HF Amp. Gain Adjustment

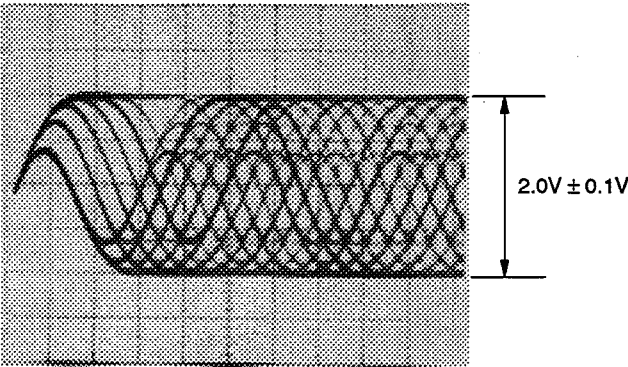
Adjustment 2

• Objective	To correct the discrepancy in the HF level with the pickup.		
• Symptom when out of adjustment	Player does not record, track search is impossible.		
• Measurement instrument connections	Connect the oscilloscope to CN104 (TP1), Pin 8 (HF).	• Player state	Test mode, play
	[Settings] 50 mV/div. 500 nS/div. DC mode	• Adjustment location	VR119 (HF. GAIN) (HEAD BOARD assy)
		• Disc	STD-903

[Procedure]

- (1) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (2) Press the FINALIZE key, the PLAY ► key, then the PAUSE || key in that order to close the respective servos and put the player into play mode.
- (3) Line up bright line (ground) at the center of the oscilloscope screen and put the oscilloscope into DC mode.
- (4) Adjust VR119 (HF. GAIN) so that the amplitude of waveform at CN104 (TP1), Pin 8 (HF) is $2.0V \pm 0.1V$.

Note : Adjust after checking that the DISPLAY OFF KEY LED is OFF.



6.3.20 Focus Servo Loop Gain Adjustment

Adjustment 2

• Objective	To optimize the focus servo loop gain.		
• Symptom when out of adjustment	Playback does not start or focus acuator noisy.		
• Measurement instru- ment connections	See Fig.6. (SERVO UCOM BOARD assy)	• Player state	Test mode, play
	[Settings] CH1 : 0.1 V/div. X-Y mode CH2 : 10 mV/div.	• Adjustment location	VR201 (FCS. GAIN) (SERVO UCOM BOARD assy)
		• Disc	STD-903

[Procedure]

- (1) Set the AF generator output to 1.4kHz and 1Vp-p.
- (2) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (3) Press the FINALIZE key, the PLAY ► key, then the PAUSE ■■ key in that order to close the respective servos and put the player into play mode.
- (4) Adjust VR201 (FCS. GAIN) so that the lissajous waveform is symmetrical about X axis and the Y axis.

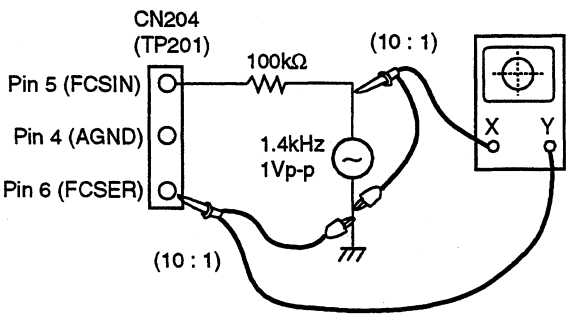
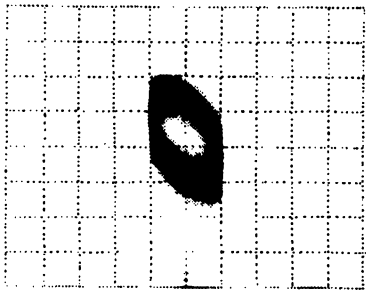
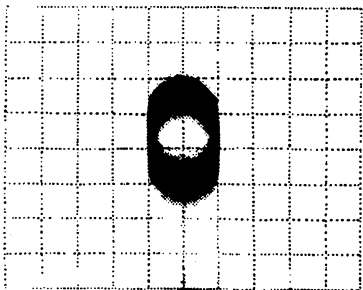


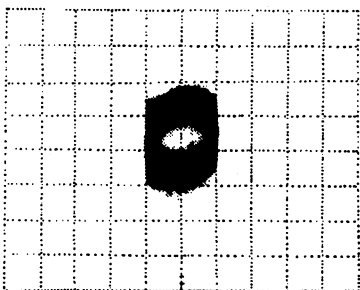
Fig. 6



Higher gain



Optimum gain



Lower gain

6.3.21 Tracking Servo Loop Gain Adjustment

Adjustment 2

• Objective	To optimize the tracking servo loop gain.		
• Symptom when out of adjustment	Playback does not start, during searches the acutuator is noisy, or tracks are skipped.		
• Measurement instrument connections	See Fig.7. (SERVO UCOM BOARD assy) [Settings] CH1 : 0.1 V/div. X-Y mode CH2 : 10 mV/div.	• Player state • Adjustment location • Disc	Test mode, play VR202 (TE. GAIN) (SERVO UCOM BOARD assy) STD-903

[Procedure]

- (1) Set the AF generator output to 1.2kHz and 2Vp-p.
- (2) Move the pickup to midway across the disc (R = 35mm) with the MANUAL / TRACK SEARCH FWD ►►►► or REV ◄◄◄◄ keys.
- (3) Press the FINALIZE key, the PLAY ► key, then the PAUSE ■■ key in that order to close the respective servos and put the player into play mode.
- (4) Adjust VR202 (TE. GAIN) so that the lissajous waveform is symmetrical about X axis and the Y axis.

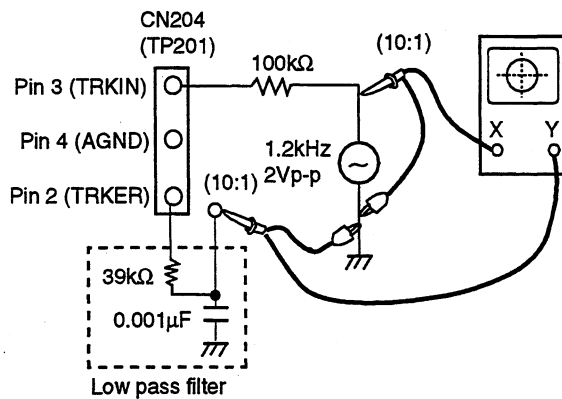
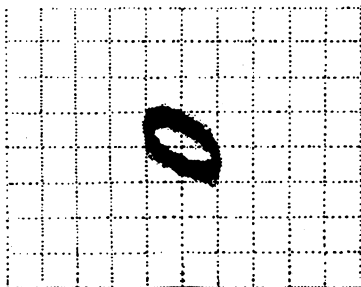
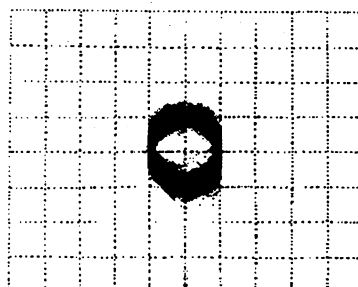


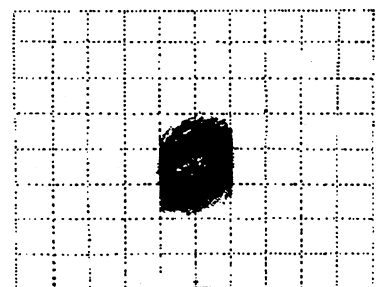
Fig. 7



Higher gain



Optimum gain



Lower gain

7. GENERAL INFORMATION

7.1 PARTS

7.1.1 IC

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

■ PD4786A (SERVO UCOM BOARD ASSY : IC356)

Mechanism Control Microcomputer

(1) Pin Function

Pin No.	Mark	Name	I/O	Initial	Function
1	P43/AD3	AD3	I/O	—	Data address line
2	P44/AD4	AD4	I/O	—	
3	P45/AD5	AD5	I/O	—	
4	P46/AD6	AD6	I/O	—	
5	P47/AD7	AD7	I/O	—	
6	P50/A8	A8	O	—	Address line
7	P51/A9	A9	O	—	
8	P52/A10	A10	O	—	
9	P53/A11	A11	O	—	
10	P54/A12	A12	O	—	
11	P55/A13	A13	O	—	
12	NC	GND	—	—	Not used
13	P56/A14	A14	O	—	Address line
14	P57/A15	A15	O	—	
15	Vdd	+5V	—	—	Positive power supply voltage
16	AVss	GND	—	—	A/D converter GND
17	P70/AN0	XOPEN	I	—	OPEN SW. "L" when open is completed
18	P71/AN1	XCLMP	I	—	CLAMP SW. "L" when clamp DOWN
19	NC	GND	—	—	Not used
20	P72/AN2	GND	I	—	
21	P73/AN3	GND	I	—	
22	P74/AN4	TEPP	I (A)	—	Tracking error peak to peak (For tracking gain adjustment)
23	P75/AN5	RFT	I (A)	—	Playback RF upper envelope
24	P76/AN6	RFB	I (A)	—	Playback RF lower envelope
25	P77/AN7	MACK	I	—	"L" when opposite mode controller serial handshake is input
26	AVref	+5V	—	—	A/D converter reference voltage input
27	AVdd	+5V	—	—	A/D converter analog power supply
28	Vdd	+5V	—	—	Positive power supply pin
29	P20/NM1	XPFAIL	I	—	"L" when power failure is detected. ↓ detection
30	P21/INTP0	FG	I	—	Spindle FG ↓ detection
31	P22/INTP1	SCOR	I	—	EFM decoder frame sync ↓ detection
32	P23/INTP2	ATIP	I	—	ATIP sync ↑ ↓ detection
33	P24/INTP3	ESYN	I	—	EFM encoder frame sync ↓ detection
34	P25/INTP4	XRFDI	I	—	"L" when EFM playback RF detected. ↓ detection
35	P26/INTP5	TOCP	I	—	TOC position sensor (For slider stop processing at TOC position (=L))
36	P27/INTP3/TI	SENS	I	—	SONY servo IC SENS signal (For details, refer to 7. Timing Chart.)
37	NC	GND	—	—	Not used
38	P30/TxD	FOK	I	—	Focus OK input ("H" when Focus OK)
39	P31/RxD	XECE	O	H	"L" when test tool reading enable is output
40	P32/SO/SBO	MSO	O	L	Clock sync serial transformer data output

Note) "A" in the I/O column indicates analog.

Pin No.	Mark	Name	I/O	Initial	Function
41	P33/SI/SBI	MSI	I	L	Clock sync serial transfer data input
42	P34/SCK	MSCK	O	H	Clock sync serial transfer clock output
43	NC	GND	–	–	Not used
44	P80/T000	XFUSE	I	H	"L" when communication between LC89585 ↔ Mode controller
45	P81/T001	GFS	I	–	GFS input ("H" when GFS OK)
46	P82/T002	ECLV	O	H	Spindle servo EFM/Wobble CLV mode
47	P83/T003	CLV	O	H	Spindle servo CLV/CAV mode
48	P84/T010	SPSQ	O	–	Spindle drive PWM output during spindle CAV
49	P85/T001	MREQ	O	H	"L" when opposite mode controller serial handshake is output
50	RESET	XRST	I	–	"L" when reset input
51	X1	CLOCK	I	–	System clock oscillation crystal connection pin
52	X2	CLOCK	–	–	Input to X1 pin when clock is supplied from outside
53	NC	GND	–	–	Not used
54	Vss	GND	–	–	GND pin
55	WDT0	NC	O	L	Not used
56	P00/RTP0	XSUBQE	O	H	"L" when EFM decoder sub code Q reading is enabled
57	NC	GND	–	–	Not used
58	P01/RTP1	XENCE	O	L	"H" when LC89585 serial enable is output
59	P02/RTP2	XASYN	O	L	ATIP frame sync "L"
60	P03/RTP3	XEXSC	O	H	"L" when LC89585 external sync enable is output
61	P04/RTP4	SSO	O	L	SONY servo IC command special serial data output
62	P05/RTP5	SSCK	O	H	SONY servo IC command special serial clock output
63	P06/RTP6	XLT	O	H	"L" when SONY servo IC command is latched
64	P07/RTP7	RECE	O	L	"H" when laser diode recording power is on
65	EA [–] /Vpp	EA [–]	I	–	Used as internal ROM mode when connected to +5V
66	Vss	GND	–	–	GND pin
67	P93/TMD	RAME	O	H	"H" when external SRAM is enable
68	P92/TAS	XSVRST	O	L	"L" when servo system IC mode control reset is output
69	P91/WR	XWR	O	L	Strobe signal output for external memory write operations
70	P90/RD	XRD	O	L	Strobe signal output for external memory read operations
71	ASTB	ASTB	O	–	Signal which latches lower address signal for external memory access externally
72	P40/ADD	AD0	I/O	–	Data address line
73	P41/AD1	AD1	I/O	–	
74	P42/AD2	AD2	I/O	–	

PDR-04

(2) "External Port"-output from PDJ006A (SERVO UCOM BOARD ASSY : IC207) (External RAM area (8000H to 8FFFH))

Pin No.	Mark	Name	I/O	Initial	Function
45	POA0	LDPW0	O	L	LSB 5 bit (D/A out) recording laser power output setting MSB
46	POA1	LDPW1	O	L	
47	POA2	LDPW2	O	L	
49	POA3	LDPW3	O	L	
50	POA4	LDPW4	O	L	
51	POA5	SSEL	O	L	"L" when tracking error envelope detection is reset
52	POA6	—	O	L	Not used
53	POA7	LJUMP	O	L	"H" during N track jump
54	POB0	LIN	O	L	"H" during loading close
55	POB1	LOUT	O	L	"H" during loading open
56	POB2	KOJK	O	L	Optical axis switching circuit ON/OFF
57	POB3	EECS	O	L	EEPROM data writing and reading enable output
59	POB4	—	O	L	Not used
60	POB5	FC_OST	O	L	Focus offset switching output. During search: L. Other than search: H
61	POB6	STCN1	O	L	Strategy control output 1
62	POB7	STCN2	O	L	Strategy control output 2
63	POC0	TEG0	O	L	LSB Tracking error amplifier gain adjustment MSB
64	POC1	TEG1	O	L	
65	POC2	TEG2	O	L	
66	POC3	TEGM	O	L	
67	POC4	DIRC	O	H	"L" when SONY servo IC DIRC is output
69	POC5	XCDMIR	O	H	Mirror detection circuit selection SW CD_R/ $\overline{\text{CD}}$
70	POC6	XLDON	O	H	Laser diode OFF/ $\overline{\text{ON}}$
71	POC7	AMUTE	O	H	Audio final stage mute H (According to mode controller instructions) Turns mute ON during REC PAUSE, when input selector is switched, and during STOP

PDR-04 switches the record EFM in accordance with the characteristic of CD-R disc.

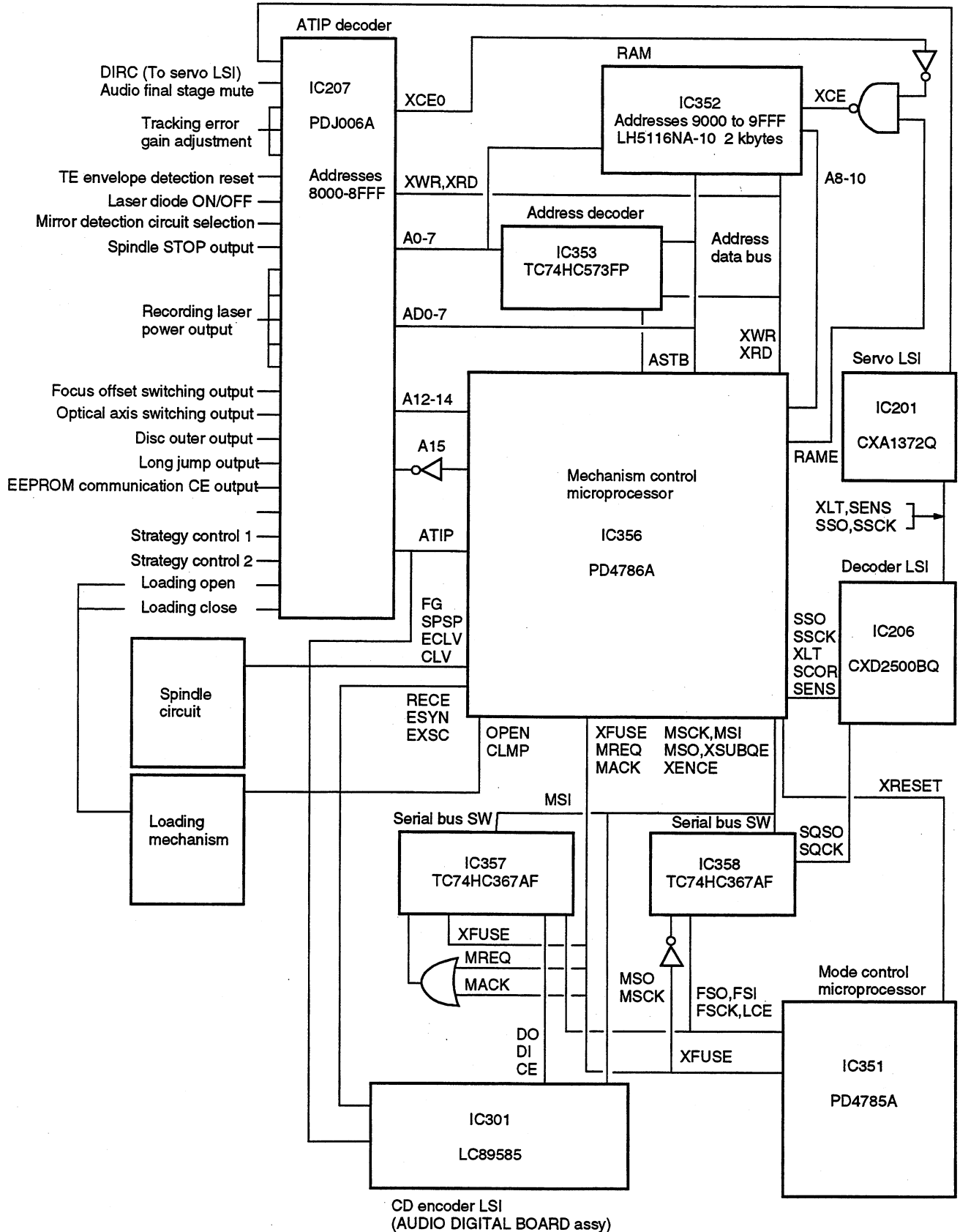
Pulse has four varieties (strategy) which is controlled by strategy control output 1 and 2 (STCN1, STCN2).

Logical setting table of STCN1 and STCN2

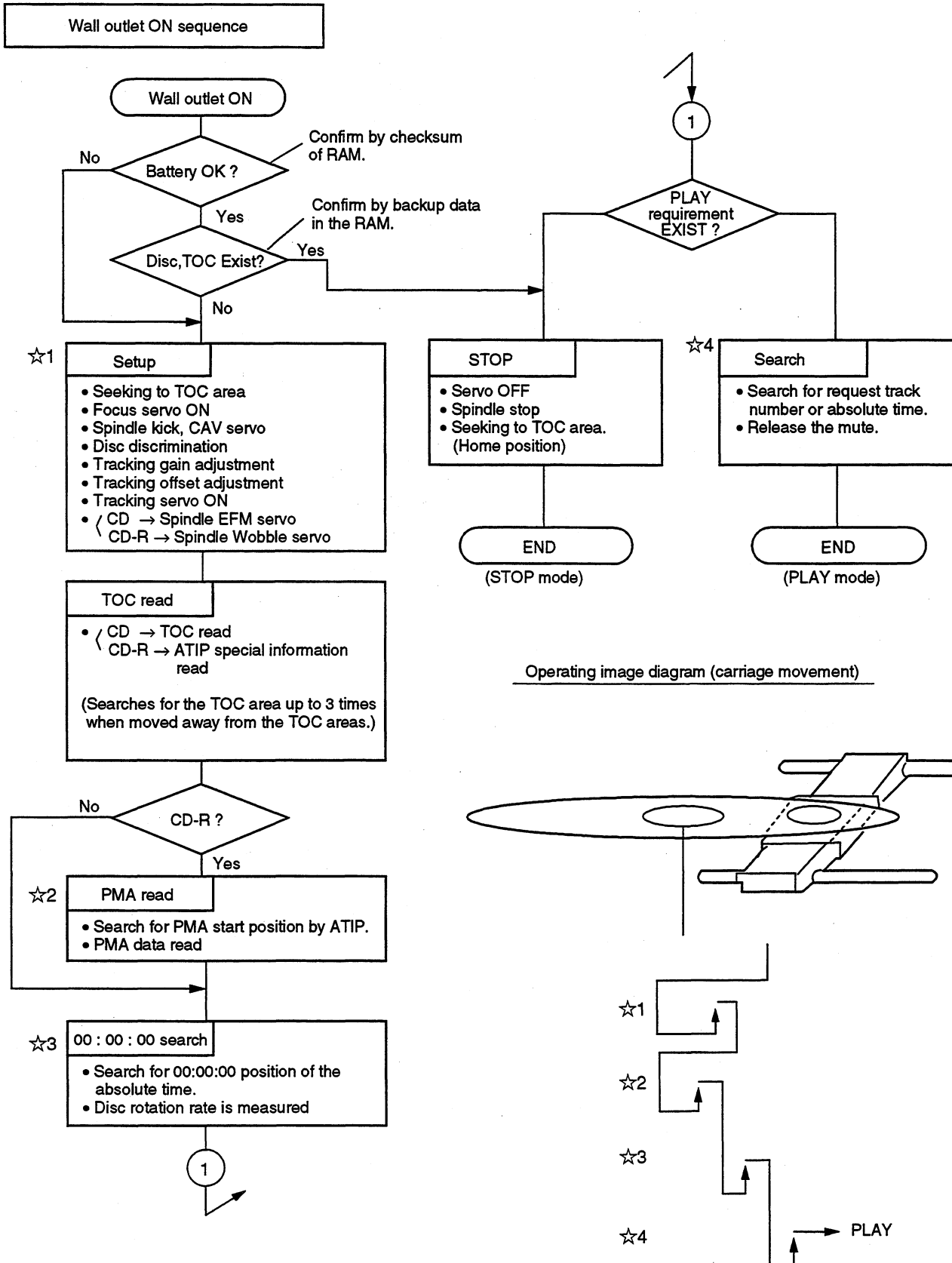
STCN1	STCN2	Strategy Type
0	0	EFM1
0	1	EFM2
1	0	EFM3
1	1	EFM4

Note) In the Test mode, "EFM2" is selected only.

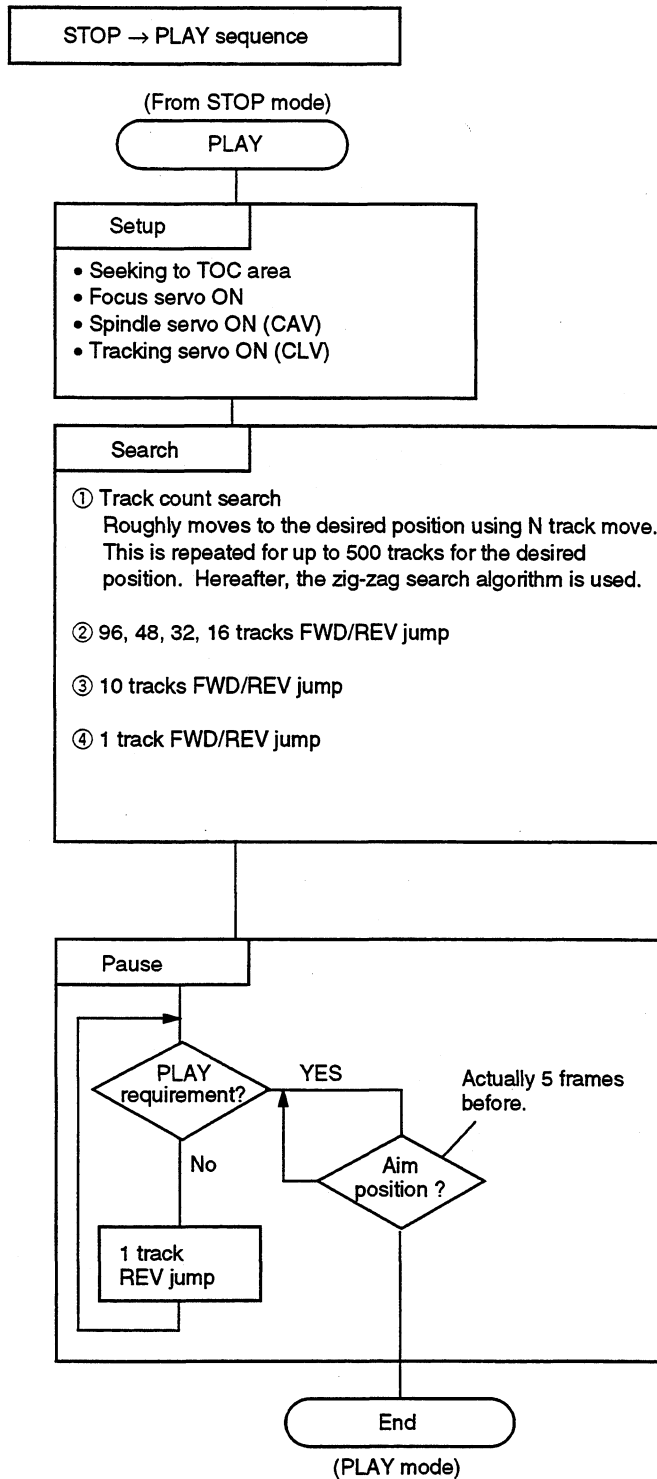
(3) Peripheral Block Diagram (Servo Section)



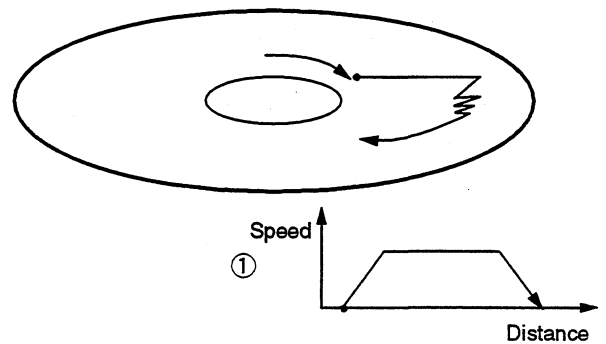
(4) Operating Flow Chart (1)



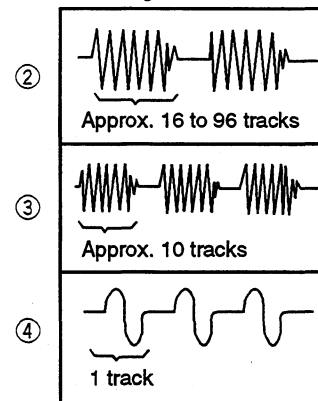
(5) Operating Flow Chart (2)



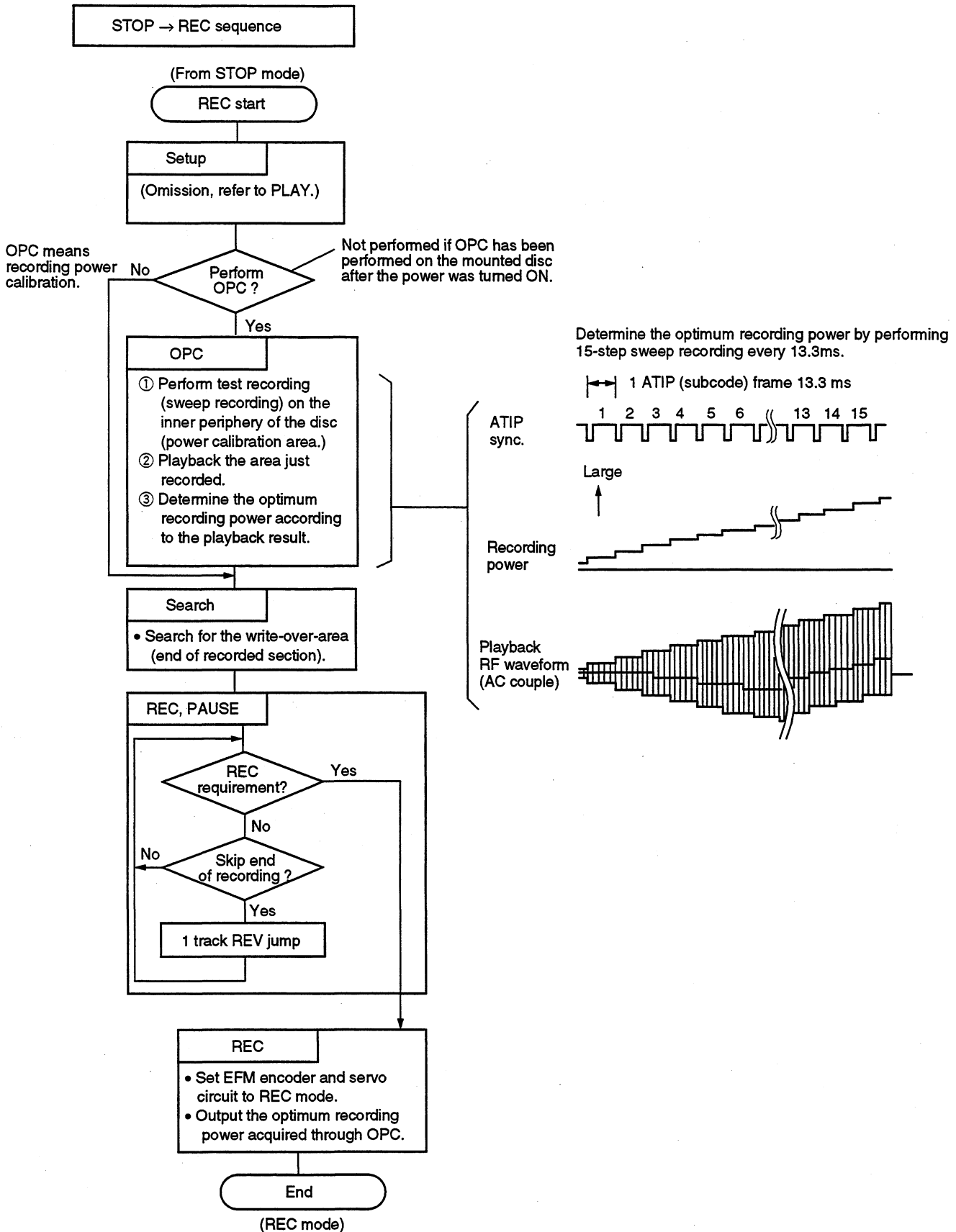
Operating image diagram



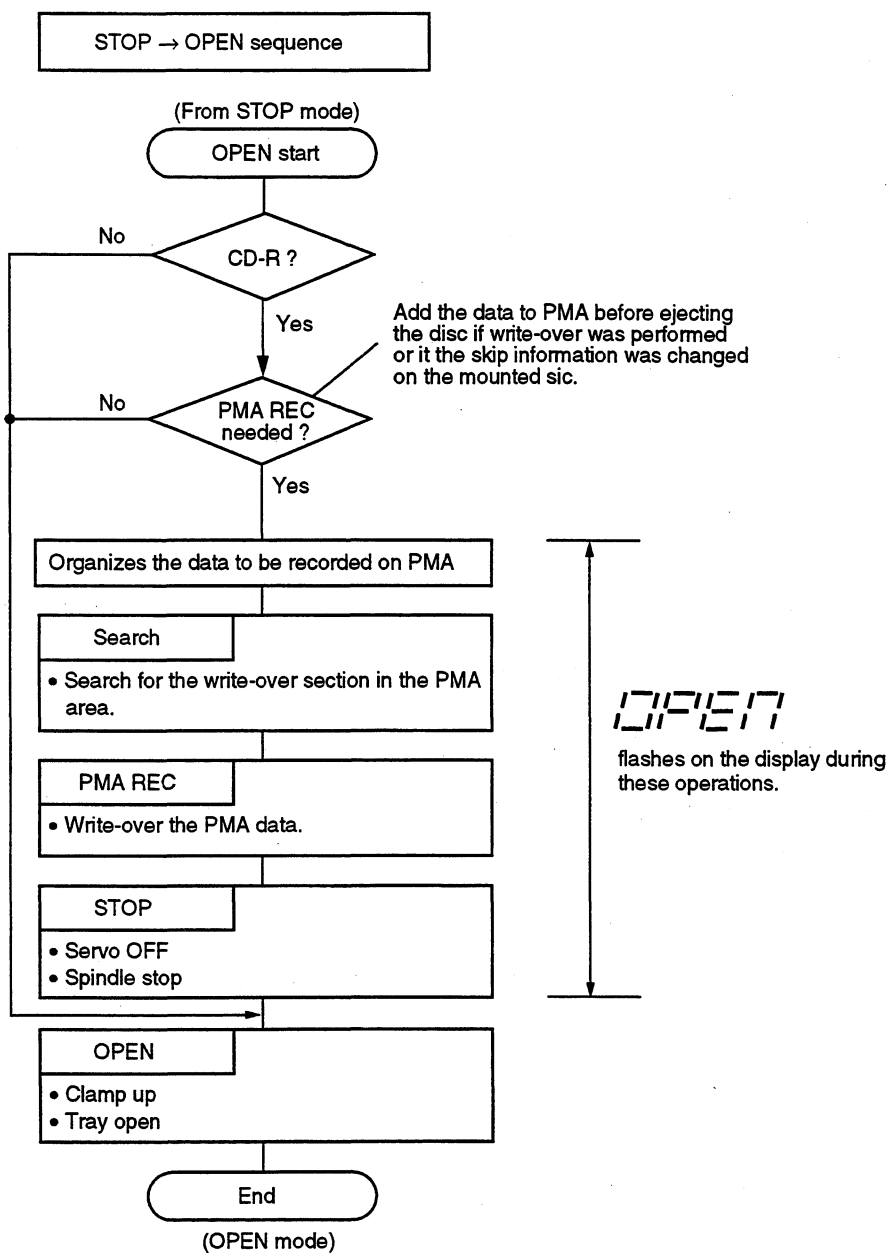
Tracking error waveforms



(6) Operating Flow Chart (3)



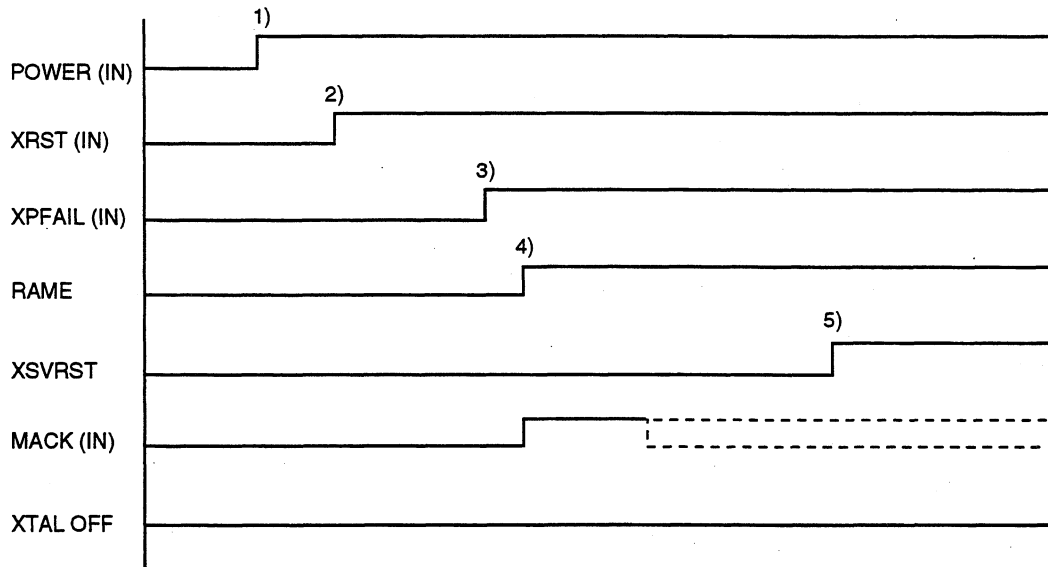
(7) Operating Flow Chart (4)



PDR-04

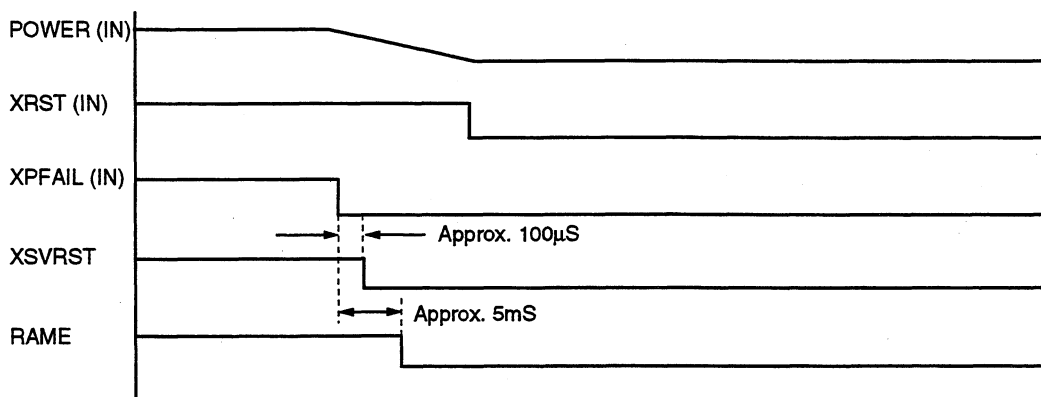
(8) Timing Chart

① Timing Chart when Power ON (Outlet ON)



- 1) Power turns on.
- 2) XRST becomes H and reset is turned off.
- 3) After reset is turned off, wait for XPFAIL to become H.
- 4) After XPFAIL becomes H, the microprocessor starts.
RAME becomes H, and the external SRAM is set to the enable state.
- 5) XSVRST becomes H, and servo circuit operations start.

② Timing Chart when Power Failure

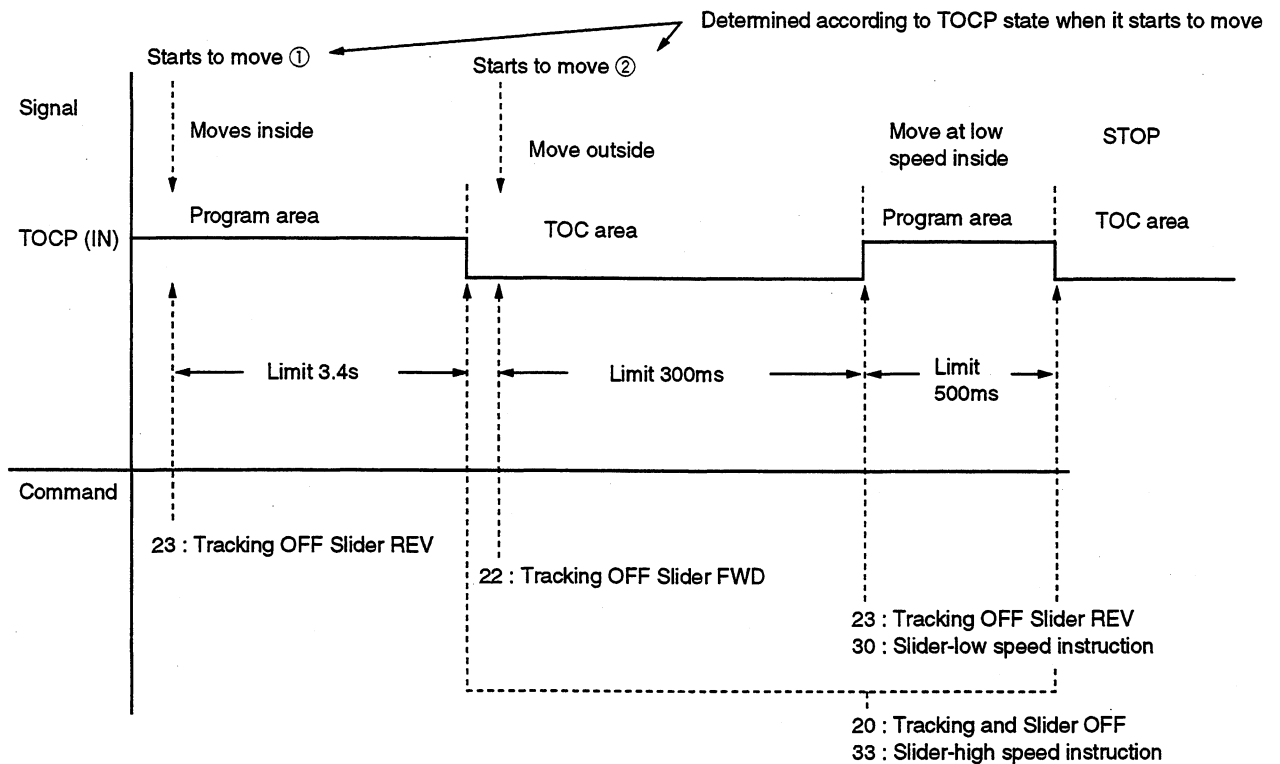


- 1) The power starts dropping and after a certain point, XPFAIL becomes L.
- 2) When XPFAIL becomes L, an internal interrupt is imposed, and the current operation mode and disc data are backed up.
- 3) At the same time, XSVRST becomes L, servo is reset, RAME is set to L, and the external SRAM is set to the disable state.
- 4) XRST then becomes L, and reset is set.

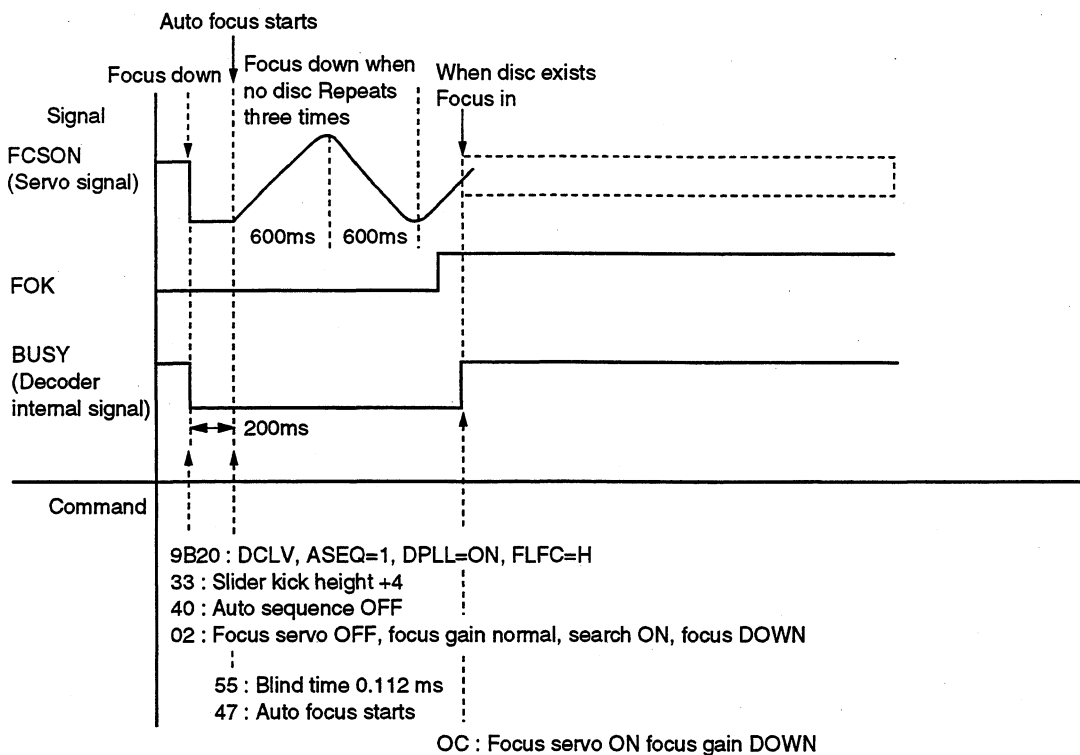
Note : If XRST becomes L first before RAME becomes L, the value of the backup RAM (IC352) will not be stored properly.

③ Seek Track 0

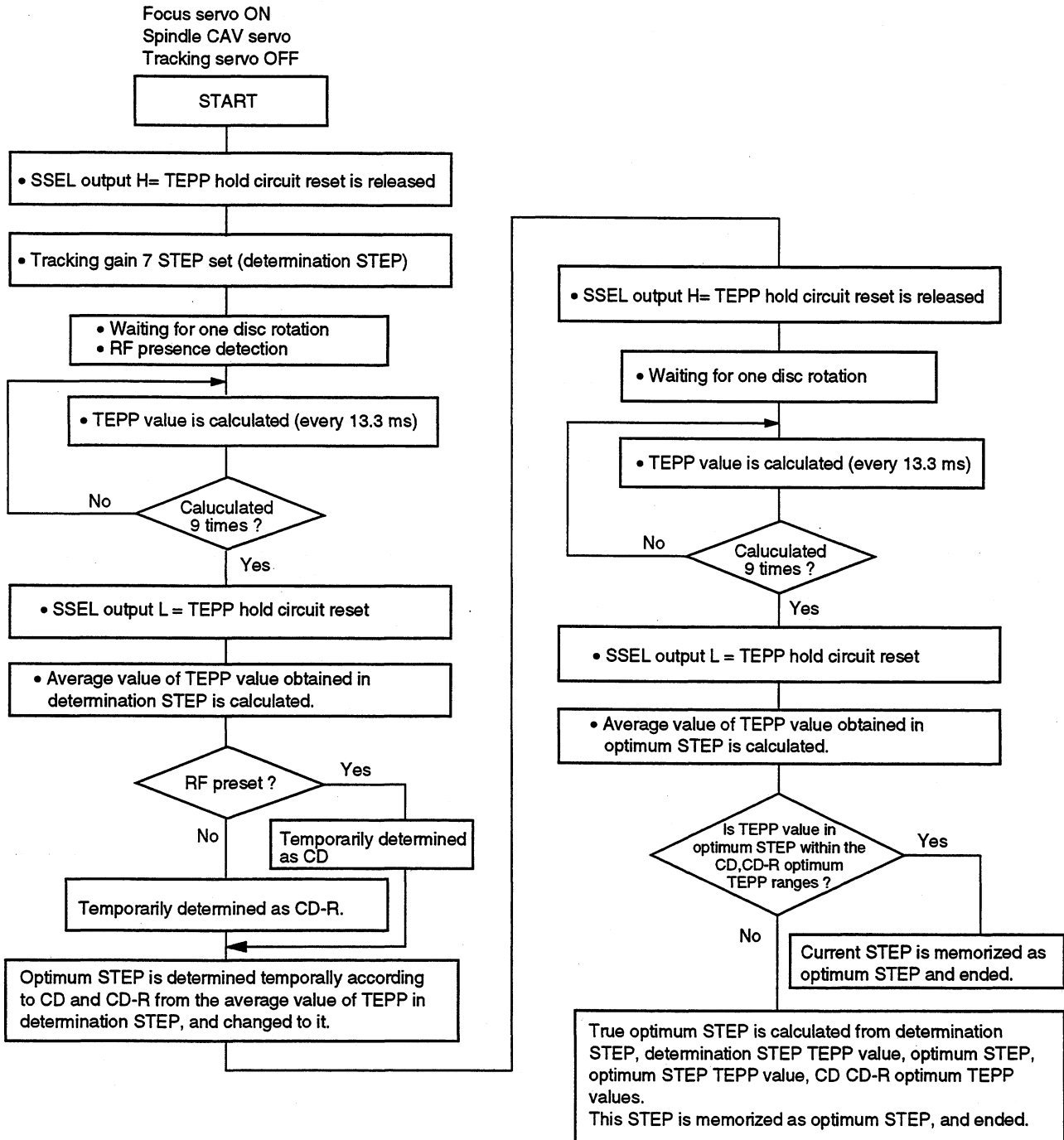
Carriage is moved to TOC area (Home position).



④ Focus ON



(9) Tracking Error Gain Adjustment Flow Chart



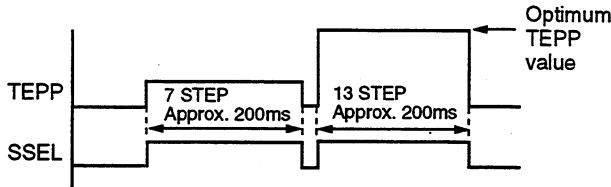
Reference : True optimum STEP =

$$= \frac{\text{Determination STEP} - \text{Optimum STEP}}{\text{TEPP value of determination STEP} - \text{Optimum STEP TEPP value}} (\text{CD, CD-R optimum TEPP value} - \text{optimum STEP TEPP value}) + \text{Optimum STEP}$$

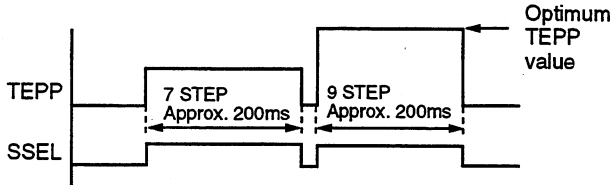
(10) Tracking Gain Adjustment Timing Chart

Optimum TEPP value : $2.494V \pm 0.103V$ (2.372 to 2.649V)

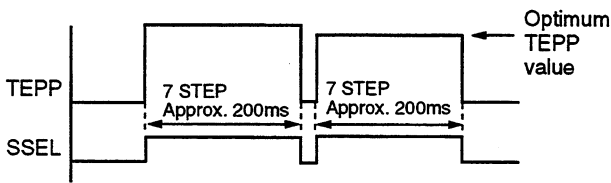
1) Example of increasing gain to maximum after disc gain became low



2) Example of increasing gain after disc gain became low



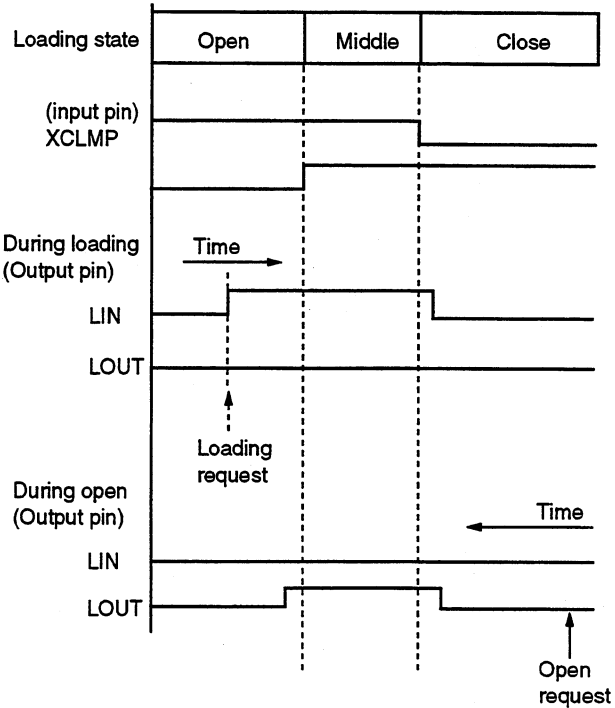
3) Example of decreasing gain to minimum after disc gain became high



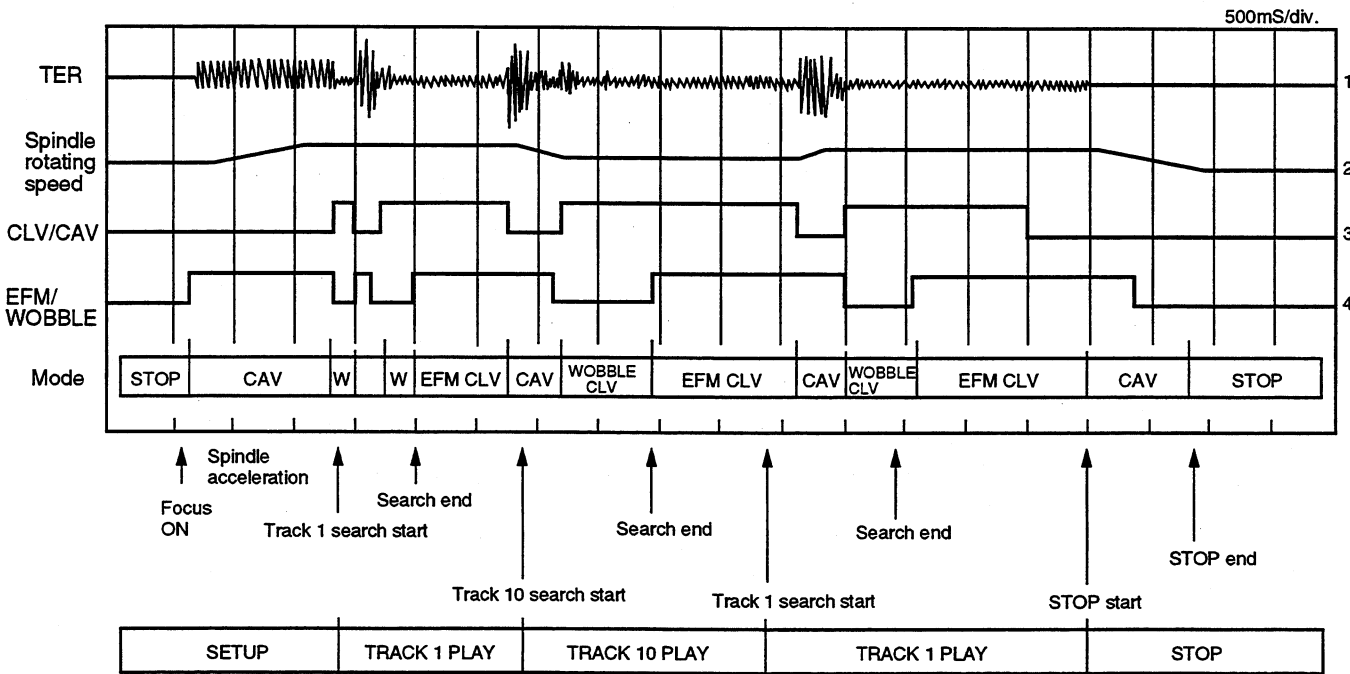
(11) Loading Control for Turn Table

Open/Close control and SW states

The following shows the chart of the loading-related input/output pins.



(12) Spindle Servo Mode Selection During CD-R, STOP → PLAY → Search → Operations



■ PD4785A (SERVO UCOM BOARD ASSY : IC351)

Mode Control Microcomputer

(1) Pin Function

Pin No.	Mark	Name	I/O	Initial	Function
1	FIP6	GRID 6	O	L	FL grid output 5
2	FIP5	GRID 5	O	L	FL grid output 6
3	FIP4	GRID 4	O	L	FL grid output 7
4	FIP3	GRID 3	O	L	FL grid output 8
5	FIP2	GRID 2	O	L	FL grid output 9
6	FIP1	GRID 1	O	L	FL grid output 10
7	FIP0	GRID 0	O	L	FL grid output 11
8	VDD	VDD	O	L	Connected to VDD
9	SCK0	RSCK	O	H	Serial clock for JIG communication
10	SO0	RSO	O	L	Serial output for JIG communication
11	SI0	RSI	I	U	Serial input for JIG communication
12	P24	XTAL	O	L	XTAL ON/OFF (L : No FS model and at digital selection only)
13	P23	XEVCO	O	L	Encoder VCO ON/OFF (at CD = H)
14	SCK1	FSCK	I/O	H	Mechanism controller, LSI serial clock
15	SO1	FSO	O	L	Mechanism controller, serial output
16	SI	FSI	I	–	Mechanism controller, serial input
17	RESET	XRESET	O	L	Mode controller reset input
18	P74	LED4	O	H	Standby LED (L: ON)
19	P73	LED5	O	H	Display ON/OFF LED (L: ON)
20	AVSS	GND	I	–	Connected to GND
21	P17	XFUSE	O	H	Between mode controller and LC89585 serial communication currently used (L)
22	P16	–	O	L	Not used
23	P15	XVCO	O	H	PLL ON/OFF (No FS model and at digital selection : L (PLL oscillation)
24	P14	XTALOFF	O	L	XTAL ON (L), OFF (H)
25	P13	XEMP	O	H	Emphasis control L: deemphasis
26	P12	XRST	O	L	Mechanism controller, ATIP decoder reset H : Release reset
27	P11	XOPT	O	L	Optical input selection (at optical input selection (DIGITAL1)= L)
28	P10	–	O	L	Not used
29	AVDD	VDD	–	–	Connect to VDD
30	AVREF	VDD	–	–	
31	P04	MODE	I	–	Not used L: Fixed
32	XT2	–	O	–	Not used
33	VSS	GND	–	–	Connected to GND
34	X1	–	I	–	System oscillation 4.19MHz
35	X2	–	O	–	
36	P37	SW1	I	L	Demo mode ON/OFF L: DEMO display
37	P36	DIN_SEL	I	–	Digital input 1/2 selection (H: 2)
38	P35	FS_SW	I	–	FS converter present/absent selection (H: present)
39	P34	TIM_SW	I	–	Timer play selection (H: certainly perform the timer play at power ON)
40	P33	DIP4	O	L	Not used

Note) U: Pull-up, D: Pull-down

Pin No.	Mark	Name	I/O	Initial	Function
41	P32	MACK	O	H	Mechanism controller communication response
42	P31	LREQ	O	H	CE signal for LC89585
43	P30	UNLOCK	I	–	Digital unlock detection
44	INTP3	DIGOUT	I	–	Digital output ON/OFF (H: DIGITAL OUTPUT ON)
45	INTP2	XPFAIL	I	–	Power down detection L: Power down
46	INTP1	MREQ	I	–	Mechanism controller communication request (Interrupt)
47	INTP0	REMIN	I	–	Remote control input (Interrupt)
48	IC	VPP	I	–	Connected to GND
49	P72	LED2	O	L	Not used
50	P71	LED1	O	L	REC indicator LED (L: LED ON)
51	P70	LED0	O	L	Manual track increment enable (L: LED ON)
52	VDD	VDD	–	–	Connected to VDD
53	P127	SCAN4	O	L	Key matrix output 4
54	P126	SCAN3	O	L	Key matrix output 3
55	P125	SCAN2	O	L	Key matrix output 2
56	P124	SCAN1	O	L	Key matrix output 1
57	P123	SCAN0	O	L	Key matrix output 0
58	P122	KEYIN3	I	–	Key matrix input 3
59	P121	KEYIN2	I	–	Key matrix input 2
60	P120	KEYIN1	I	–	Key matrix input 1
61	P117	KEYIN0	I	–	Key matrix input 0 (Including test SW)
62	P116	–	O	L	Not used
63	P115	AATLAT	O	H	Communication latch output for analog input ATT IC (L: during used)
64	P114	–	O	L	XAUTE output L: MUTE ON
65	P113	SEG 10	O	L	FL segment output 10
66	P112	SEG 9	O	L	FL segment output 9
67	P111	SEG 8	O	L	FL segment output 8
68	P110	SEG 7	O	L	FL segment output 7
69	P107	SEG 6	O	L	FL segment output 6
70	P106	SEG 5	O	L	FL segment output 5
71	VLOAD	VLOAD	–	–	VLOAD
72	P105	SEG 4	O	L	FL segment output 4
73	P104	SEG 3	O	L	FL segment output 3
74	P103	SEG 2	O	L	FL segment output 2
75	P102	SEG 1	O	L	FL segment output 1
76	P101	SEG 0	O	L	FL segment output 0
77	P100	GRID 10	O	L	FL grid output 10
78	FIP9	GRID 9	O	L	FL grid output 9
79	FIP8	GRID 8	O	L	FL grid output 8
80	FIP7	GRID 7	O	L	FL grid output 7

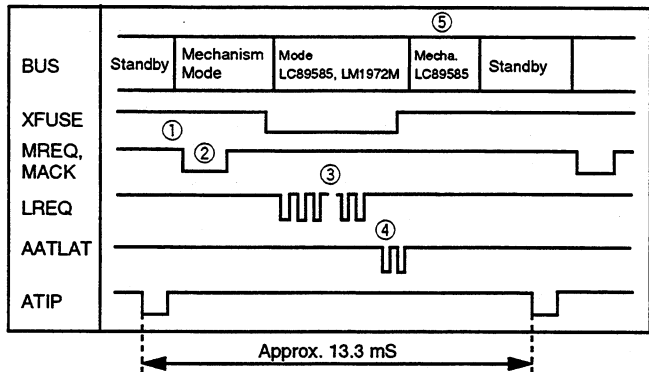
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(2) System serial communication

The mode controller performed serial communication between the mechanism controller and LC89585 (digital interface LSI) and PDC020A (FS converter LSI).

The mechanism controller also performed communication with LC89585 at the following timings.

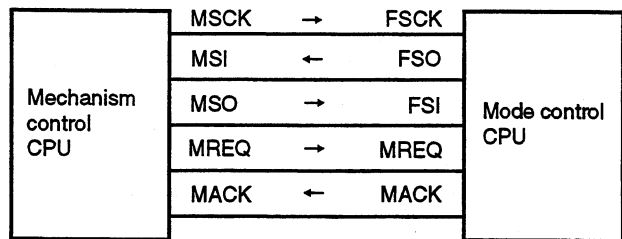
- ① Communication request from mechanism controller.
- ② Mechanism/mode controller communication
- ③ Communication with mode controller/LC89585
- During this time, XFUSE is set to L and serial communication of mechanism controller is disabled.
- ④ Serial communication with mode controller/LM1972M
- ⑤ Communication with mechanism controller/LC89585



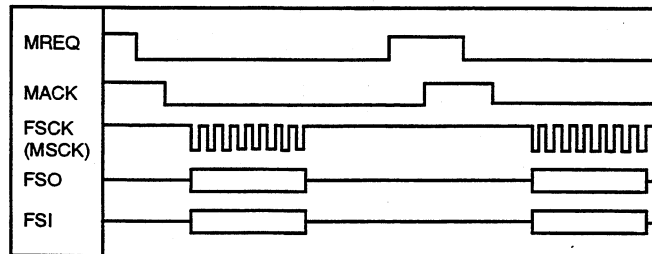
(3) Communication with Mechanism Controller and Mode Controller

Communication Format

This CPU and the mechanism control CPU performed serial communication with 5 signal lines.



- FSCK Serial transmission clock (1 MHz)
 - FSI/FS0 Serial data transmission line
 - MREQ/MACK Handshake line
- The communication timing is control by the mechanism control CPU. 13 byte data is transmitted every 13.33 to 40 ms. (Average:13.33 msec)



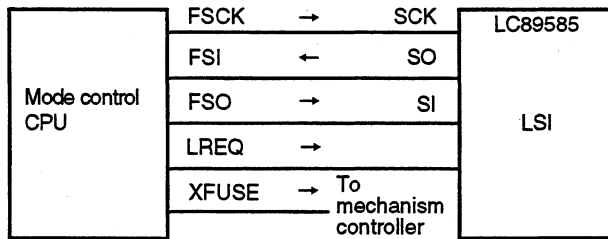
- Communication is performed by the following procedure.
- ① The MREQ signal becomes L as communication request from the mechanism control microprocessor.
 - ② This microprocessor sets the MACK signal to L as communication enable signal.
 - ③ The mechanism controller sets the MREQ signal to H after 1 byte serial transmission.
 - ④ This microprocessor sets MACK to H if serial transmission has ended normally.
 - ⑤ Hereafter ① to ④ are repeated until the 13 byte data transmission has completed.
- ※ The mechanism controller and mode controller observes the state of the other side's control line, and stops communication processing of transmission if conditions are not satisfied after a certain time.

(4) Communication with digital interface LSI (LC89585, IC301)

Communication format

Communication with the digital interface LSI is performed using four lines.

XFUSE is set to L during communication so that there are no clashes with the mechanism controller.



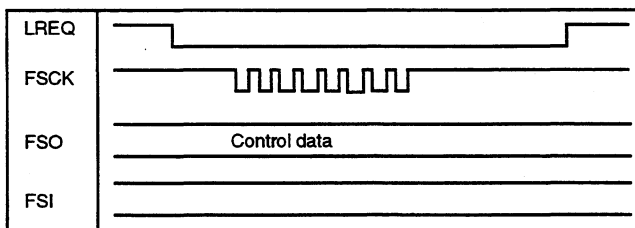
- FSCK Serial transmission clock (1 MHz)
- FSI/FSO .. Serial data transmission line
- BLREQ ... Data enable
- XFUSE L when the mode controller is using the communication line

Communication is performed in one main routine.

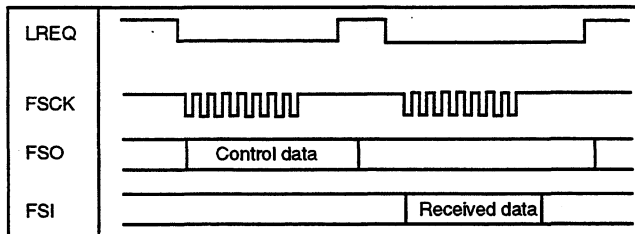
The communication timing is controlled by the mode controller.

No transmission is performed during communication between the mechanism controller and LC89585.

(Command control)



(Data reading)



(5) Communication with Analog Input ATT LSI (LM1972M)

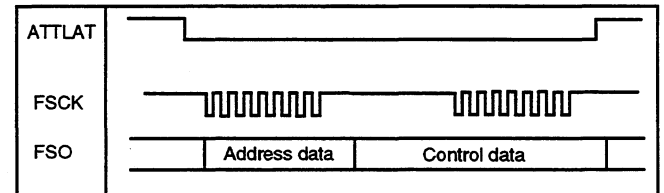
Confirm that the communication is performed by the following procedure.

- FSCK Serial transmission clock (1 MHz)
- FSI/FSO .. Serial data transmission line
- AATLAT Data enable

When analog ATT data is changed, communication is performed in twice in one main routine.

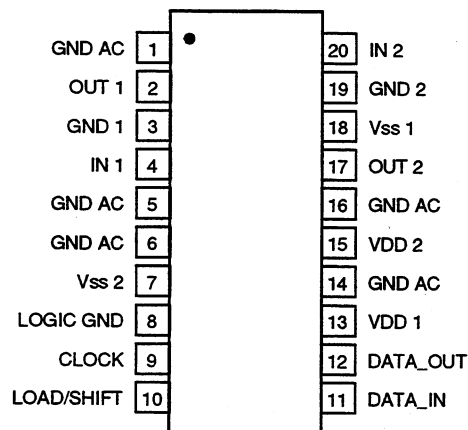
The communication timing is controlled by the mode controller.

(Command control)



■ LM1972M (ALC BOARD ASSY : IC2001)
2-CHANNEL 78dB AUDIO ATTENUATOR WITH MUTE

• Pin Arrangement (Top view)



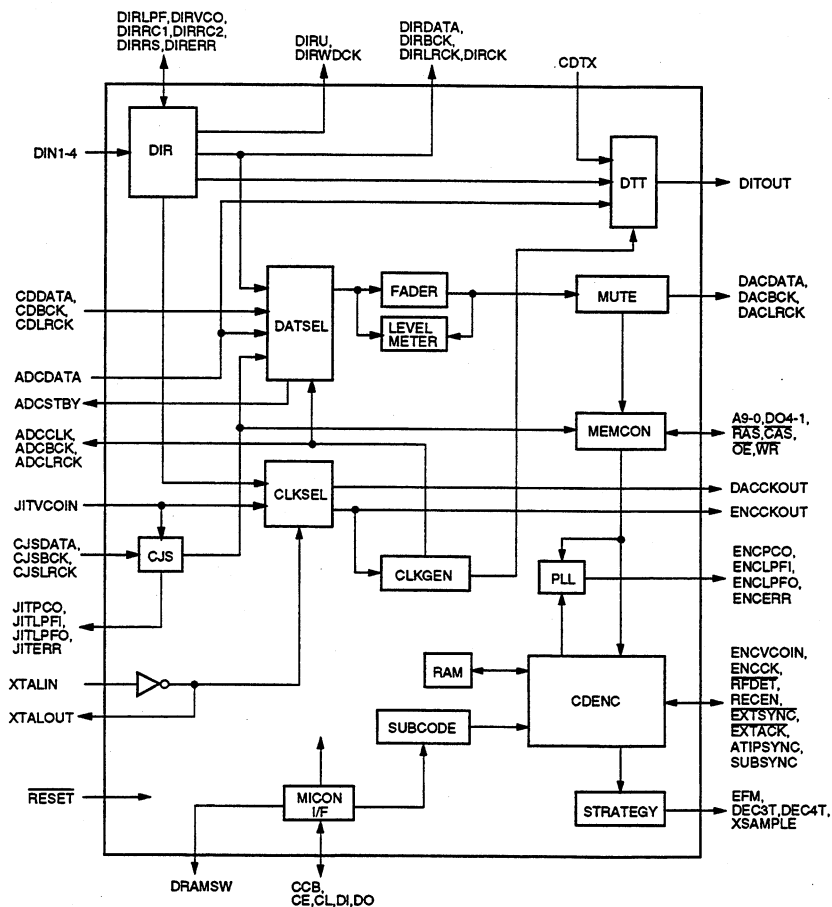
• Pin Function

Pin No.	Pin Name	Function
1	GND AC	Ground
2	OUT1	Signal output (L ch)
3	GND1	Signal ground
4	IN1	Signal input (L ch)
5	GND AC	Ground
6	GND AC	Ground
7	VSS2	– 5V power supply
8	LOGIC GND	Logic ground
9	CLOCK	Signal clock
10	LOAD/SHIFT	Load/Shift input
11	DATA-IN	Data input
12	DATA-OUT	Data output
13	VDD1	Power supply
14	GND AC	Ground
15	VDD2	+5V power supply
16	GND AC	Ground
17	OUT2	Signal output (R ch)
18	VSS1	Power supply
19	GND2	Signal ground
20	IN2	Signal input (R ch)

■ LC89585 (AUDIO DIGITAL BOARD ASSY : IC301)

EFM ENCODER

• Block Diagram



• Pin Function

Pin No.	Name	I/O	Function
1	DIN 1	I	Optical module responding data input pin
2	DIN 2	I	Optical module responding data input pin
3	DIN 3	I	Optical module responding data input pin
4	DIN 4	I	Optical module responding data input pin
5	DIRRC 1	I	RC oscillation input pin
6	DIRRC 2	O	RC oscillation output pin
7	AVDD	–	Analog power supply pin
8	DIRRS	I	VCO oscillation band adjustment input pin
9	AGND	–	Analog ground pin
10	DIRVCO	I	VCO freerunning oscillation setting input pin
11	DIRLPF	O	PLL low pass filter pin
12	VSS	–	Ground pin
13	VDD	–	+5V power supply pin
14	DIRCK	O	DIR system clock output pin
15	DIRBCK	O	DIR bit clock output pin
16	DIRLRCK	O	DIR LR clock output pin
17	DIRDATA	O	DIR demodulation data output pin
18	DIRWDCK	O	DIR word clock output pin
19	DIRU	O	User bit output pin
20	DIRERR	O	Data error or lock state monitor output pin. H : Unlocked. L : Locked
21	DRAMSW	O	External DRAM capacity setting output pin. H : 4Mbit. L : 1Mbit
22	CJSDATA	I	Clock jitter suppresser data input pin
23	CJSBCK	I	Clock jitter suppresser bit clock input pin
24	CJSLRCK	I	Clock jitter suppresser LR clock input pin
25	JITVCOIN	I	VCO input pin
26	JITLPFO	O	LPF output pin
27	JITLPFI	I	LPF input pin
28	JITPCO	O	Phase comparator output pin
29	JITERR	O	Lock state monitor signal output pin. H : Unlocked. L : Locked
30	DACDATA	O	DAC data output pin
31	DACBCK	O	DAC bit clock output pin
32	DACLCK	O	DAC LR clock output pin
33	ADCDATA	I	ADC recording data input pin
34	ADCCLK	O	ADC clock output pin
35	ADCBCK	O	ADC bit clock output pin
36	ADCLRCK	O	ADC LR clock output pin
37	ADCSTBY	O	ADC standby signal output pin. H:Operating. L:Standby
38	XTALIN	I	System clock input pin
39	XTALOUT	O	System clock output pin
40	VSS	–	Ground pin

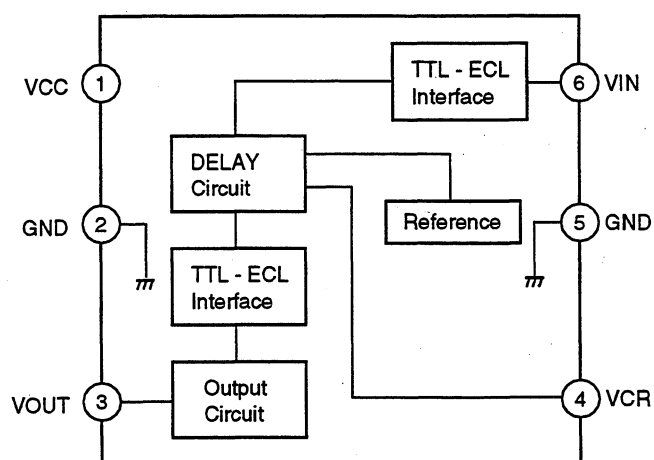
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Pin No.	Name	I/O	Function
41	VDD	—	+5V power supply pin
42	DACCKOUT	O	DAC system clock output pin
43	ENCCKOUT	O	CD decoder system clock output pin
44	CDDATA	I	CD decoder data input pin
45	CDBCK	I	CD decoder bit clock input pin
46	CDLRCK	I	CD decoder LR clock input pin
47	CDTX	I	Pin for inputting signal from CD decoder output
48	DITOUT	O	Bi-phase modulation output pin
49	TP6	I	For tests
50	XRESET	I	System reset input pin. L : Reset
51	TP7	I	For tests
52	XCAS	O	DRAM row address strobe signal output pin
53	XOE	O	DRAM output enable signal output pin
54	A8	O	DRAM address output pin
55	A7	O	
56	A6	O	
57	A5	O	
58	A4	O	
59	A3	O	
60	A2	O	
61	VDD	—	+5V power supply pin
62	VSS	—	Ground pin
63	A1	O	DRAM address output pin
64	A0	O	
65	A9	O	
66	XRAS	O	DRAM column address strobe signal output pin
67	XWR	O	DRAM read/write signal output pin
68	DQ2	I/O	DRAM data input/output pin
69	DQ1	I/O	
70	DQ4	I/O	
71	DQ3	I/O	
72	TP0	I	For tests
73	TP1	I	
74	TP2	I	
75	TP3	O	
76	ENCVCOIN	I	Encode circuit clock input pin
77	ENCLPFO	O	LPF output pin
78	ENCLPFI	I	LPF input pin
79	ENCPCO	O	Phase comparator output pin
80	ENCERR	O	Lock state monitor signal output pin. H : Unlocked. L : Locked

Pin No.	Name	I/O	Function
81	TP4	O	For tests
82	TP5	I	
83	XRFDET	I	RF detection signal input pin. H : No RF. L : RF
84	RECEN	I	Recording enable signal input pin. H : Recordable. L : Not recordable
85	TP8	O	Test pin
86	DET4T	O	4T detection signal output pin
87	DET3T	O	3T detection signal output pin
88	EFM	O	EFM signal output pin
89	VDD	—	+5V power supply pin
90	VSS	—	Ground pin
91	ENCCK	O	Encode clock output pin
92	XEXTACK	O	ATIP synchronization notification signal output pin
93	XEXTSYNC	I	ATIP synchronization enable signal input pin
94	ATIPSYNC	I	ATIP sync signal input pin
95	SUBSYNC	O	Subcode sync signal output pin
96	CCB	I	CPU interface method selection signal input pin. H : Sanyo CCB format. L : General serial format
97	CE	I	CPU interface chip enable signal input pin
98	CL	I	CPU interface data transfer clock input pin
99	DI	I	CPU interface data input pin
100	DO	O	CPU interface data output pin

■ TK16124M (AUDIO DIGITAL BOARD ASSY : IC333, IC334, IC340) DIGITAL DELAY LINE

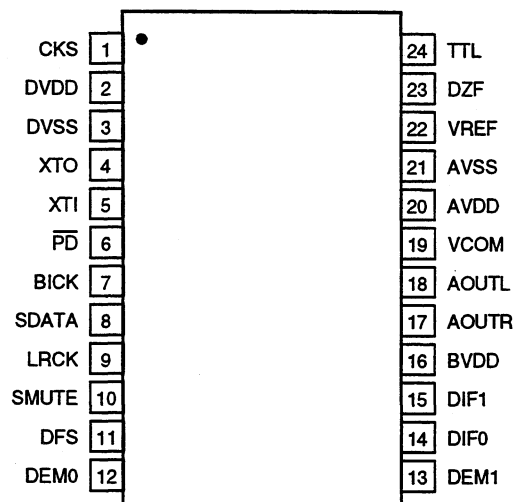
• Block Diagram



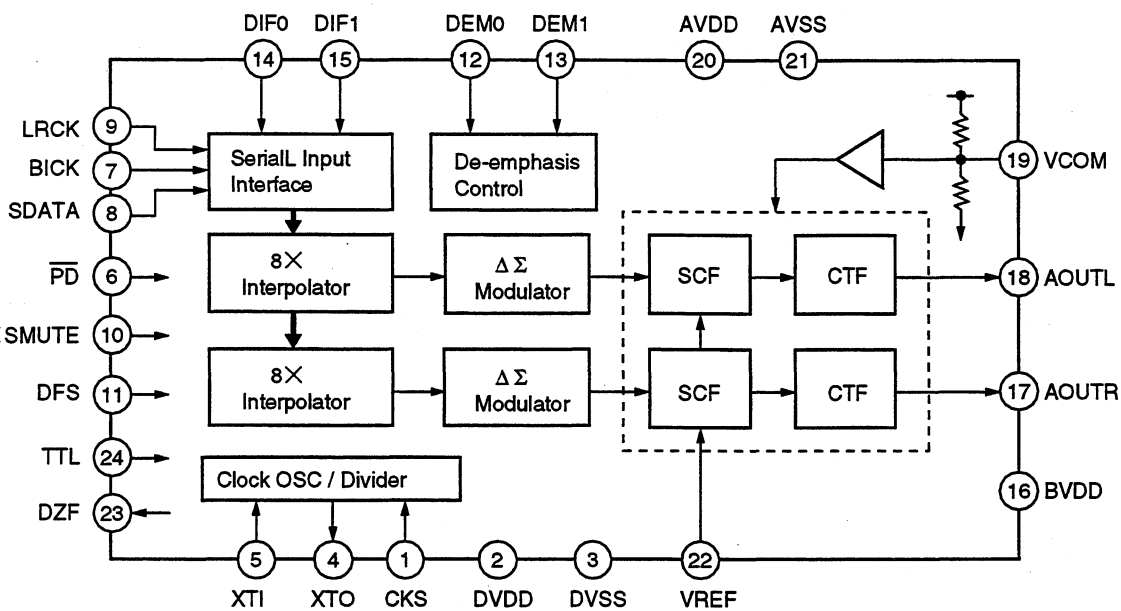
■ AK4321-VF (AUDIO DIGITAL BOARD ASSY : IC401)

D/A CONVERTER IC

• Pin Arrangement (Top view)



• Block Diagram



• Pin Function

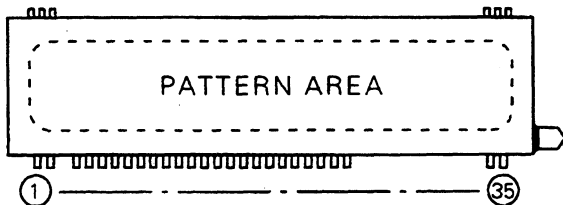
Pin No.	Pin Name	I/O	Function
1	CKS	I	Clock selection At normal speed ; L : XTl= 256fs, H : XTl= 384fs At double speed ; L : XTl= 128fs , H : XTl= 192fs
2	DVDD	–	Digital power supply
3	DVSS	–	Digital ground
4	XTO	O	Crystal resonator output
5	XTI	I	Clock input
6	PD	I	Power down When this pin is set to L, reset the filter and modulator, and it becomes power down state.
7	BICK	I	Serial bit clock 64fs is recommended.
8	SDATA	I	Serial data input 2's complement, MSB first
9	LRCK	I	L/R clock
10	SMUTE	I	Soft mute H: start the soft mute L: release
11	DFS	I	Double speed sampling mode L: Normal speed H: Double speed
12	DEMO	I	Deemphasis mode
13	DEM1	I	It correspond to tri-frequency
14	DIF0	I	Input format
15	DIF1	I	
16	BVDD	–	Power supply
17	AOUTR	O	R ch analog output
18	AOUTL	O	L ch analog output
19	VCOM	O	Common voltage pin, AVDD/2
20	AVDD	–	Analog power supply
21	AVSS	–	Analog ground
22	VREF	I	Reference voltage input The voltage difference between this pin and AVSS pin decide to full scale of D/A output.
23	DZF	O	Zero Input detection pin When the data is input to SDATA pin which is continuously zero for 8192 times on both channels, this pin becomes "H".
24	TTL	I	I/F level selection "L" : CMOS level (DVDD= 2.7V to 5.5V) "H" : TTL level (DVDD= 4.5V to 5.5V)

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7.1.2 DISPLAY

■ PEL1086 (FUNCTION BOARD ASSY : V701)

• FL INDICATOR TUBE



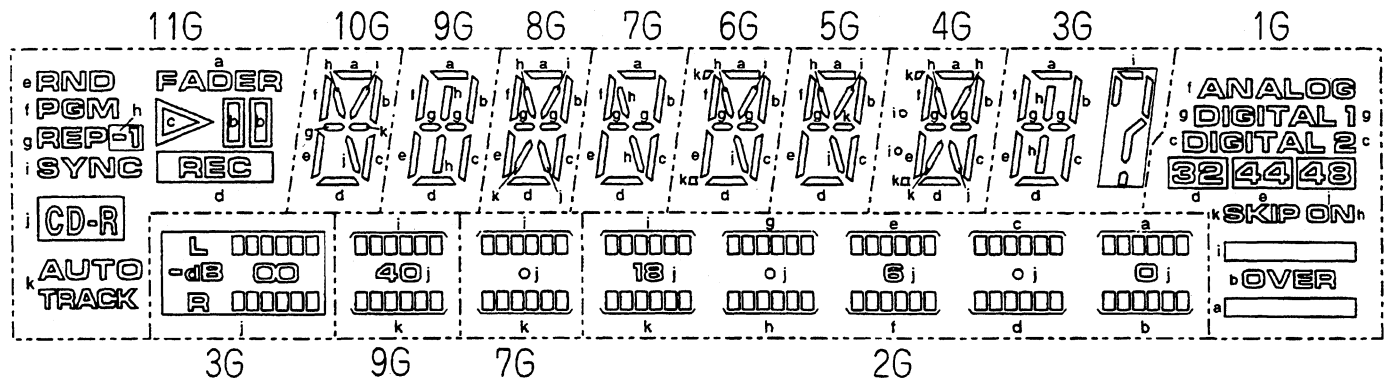
Pin Connection

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Connection	F1	F1	NP	P _a	P _b	P _c	P _d	P _e	P _f	P _g	P _h	P _i	P _j	P _k	11G	10G	9G

Pin No.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Connection	8G	7G	6G	5G	4G	3G	2G	1G	NP	NP	NP	NP	NP	NP	NP	NP	F2	F2

Notes : 1) F: Filament 2) G: Grid 3) P: Anode 4) NP : No Pin

Grid Assignment



Anode Connection

	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	FADER	a	a	a	a	a	a	a	a	a	
b	REC	b	b	b	b	b	b	b	b	b	OVER
c	CD-R	c	c	c	c	c	c	c	c	c	DIGITAL 2
d	AUTO TRACK	d	d	d	d	d	d	d	d	d	32
e	L	e	e	e	e	e	e	e	e	e	44
f	CO	f	f	f	f	f	f	f	f	f	ANALOG
g	40	g	g	g	g	g	g	g	g	g	DIGITAL 1
h	oj	h	h	h	h	h	h	h	h	h	ON
i	18	i	i	i	i	i	i	i	i	i	
j	oj	j	j	j	j	j	j	j	j	j	48
k	6j	k	k	k	k	k	k	k	k	k	SKIP

7.2 DIAGNOSIS

7.2.1 DISASSEMBLY

(1) REMOVE THE TRAY PANEL

Hold the tray panel with your hands as shown in Fig. 1, and grasp the tray with your thumbs and then lift the tray panel up while pulling it toward you with the other fingers. (Fig. 2)

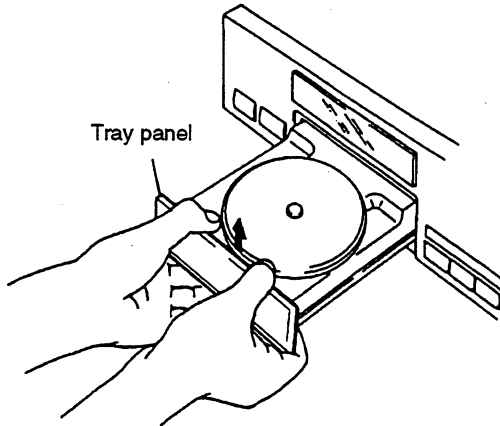


Fig. 1

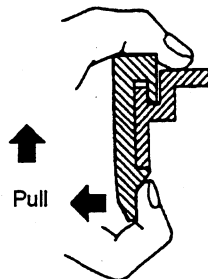


Fig. 2

(2) INSTALL THE TRAY PANEL

Align the tray panel with the grooves located at both edges of the tray. And then press it down till it stops. (Fig. 3)

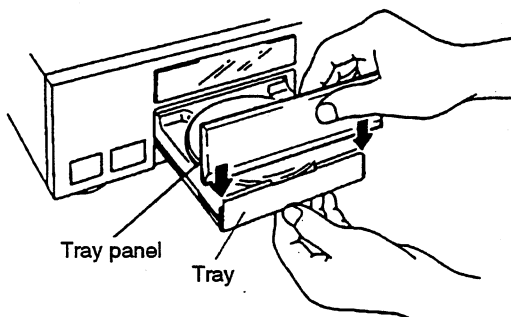


Fig. 3

(3) REMOVE AND SET UP THE HEAD BOARD ASSY

- ① Remove the bonnet.
- ② Remove the tray panel (Refer to section 1).
- ③ Remove the five screws of the front panel.

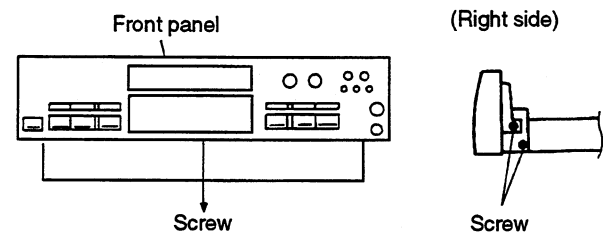


Fig. 4

- ④ Pull out the right side of the front panel to the front and remove the four screws of the board.

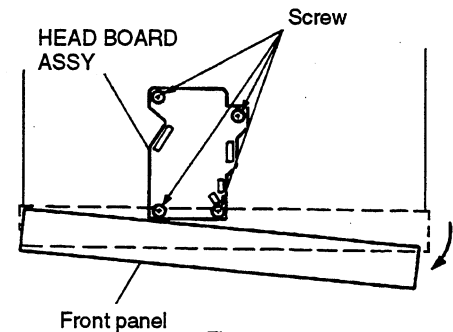


Fig. 5

- ⑤ Remove the fixtures of the wires connected to the board (cord holder, PCB binder).
- ⑥ Place the HEAD BOARD ASSY upright against the slit of the float base.

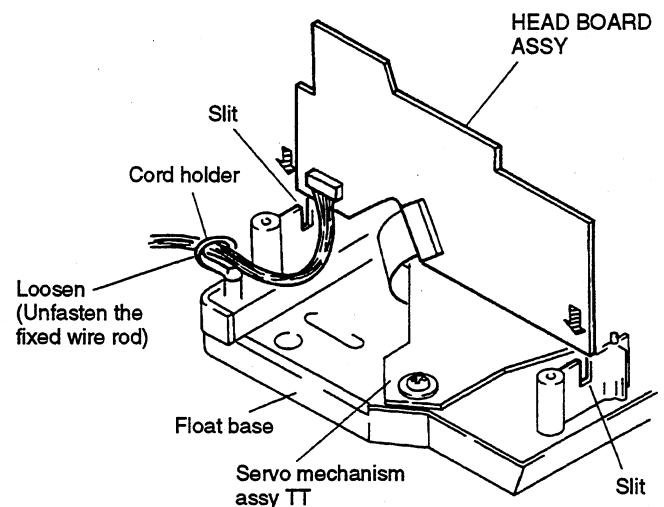


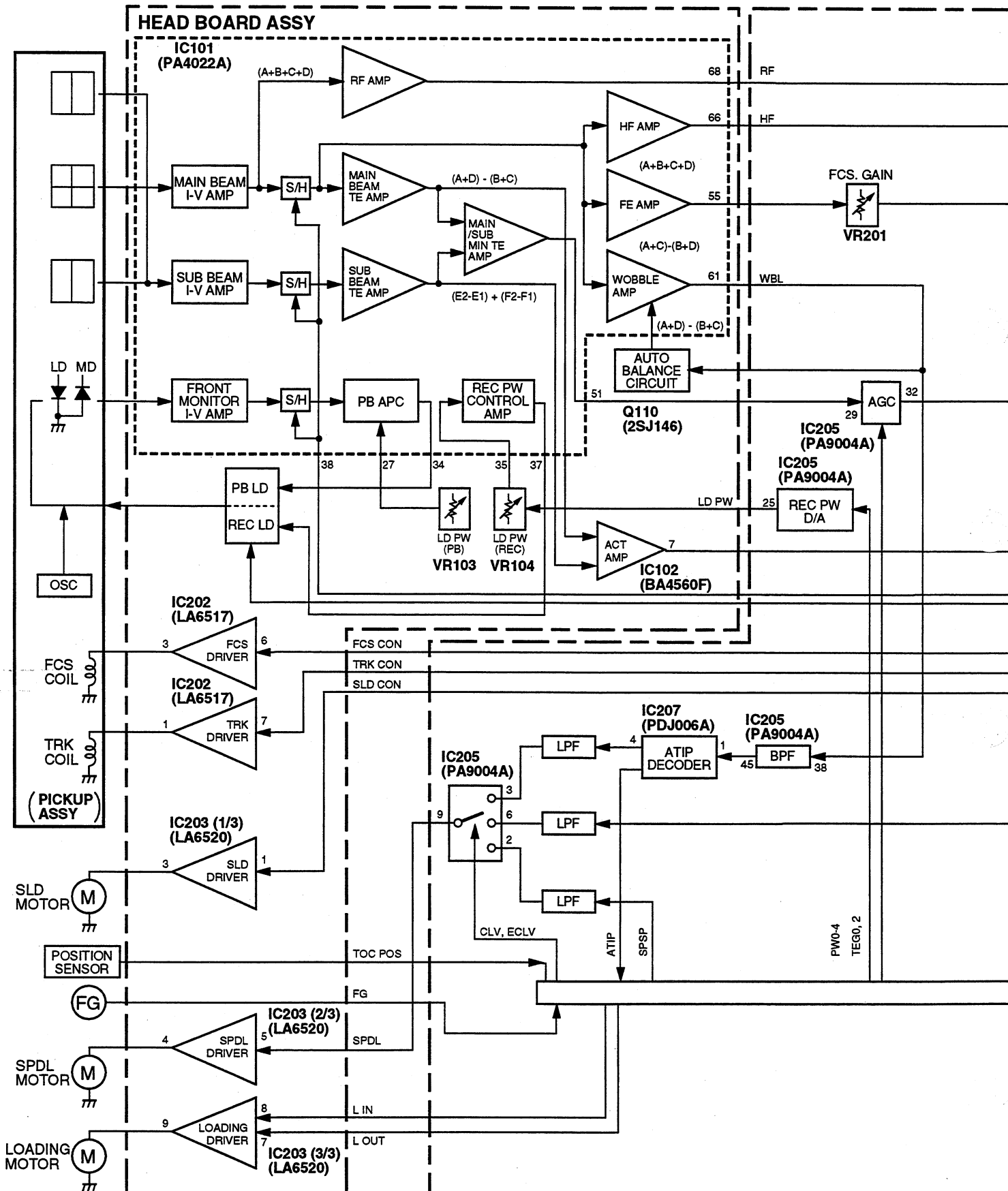
Fig. 6

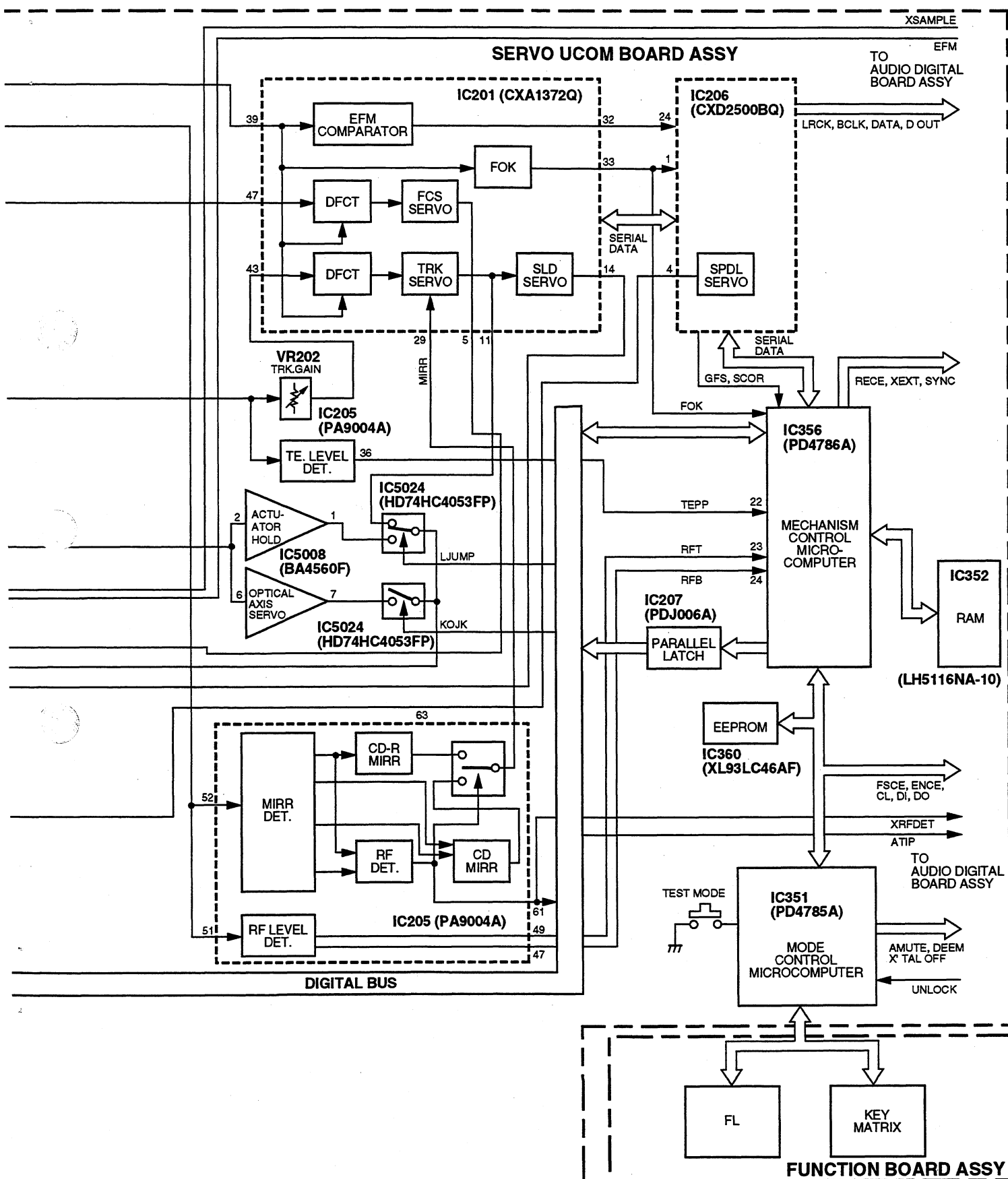
PDR-04

7.3 EXPLANATION

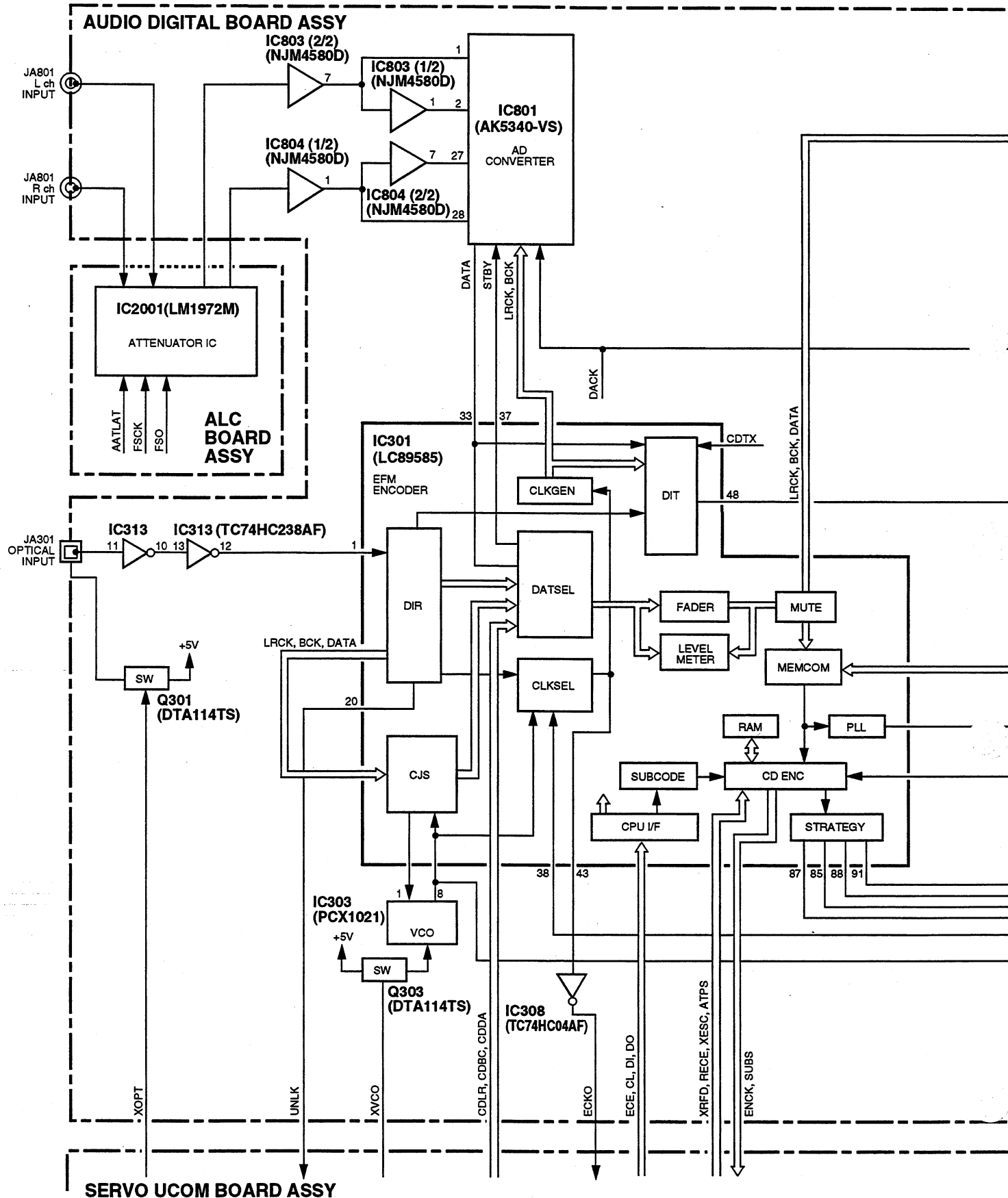
7.3.1 BLOCK DIAGRAM

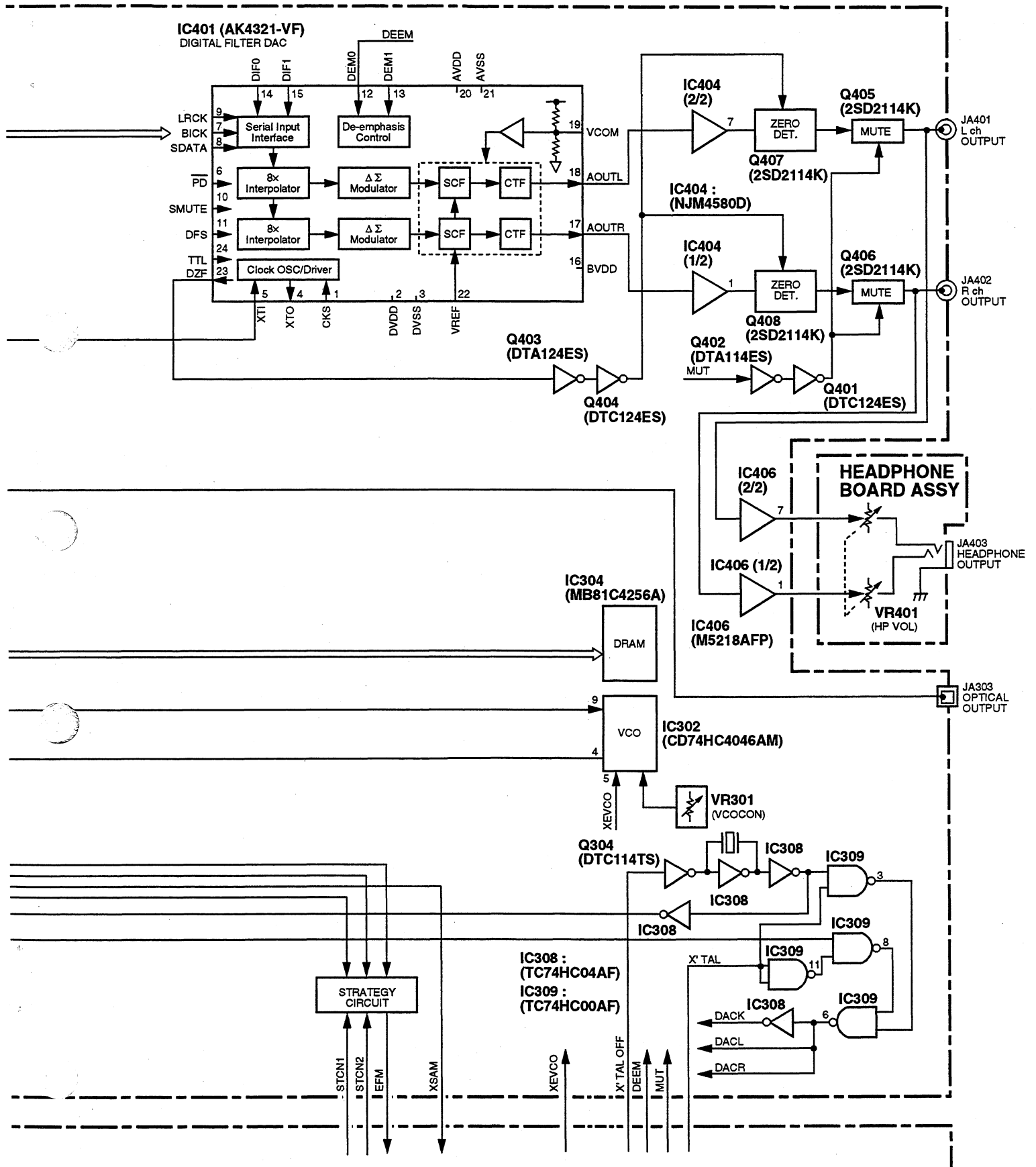
(1) SERVO SYSTEM BLOCK





(2) AUDIO SYSTEM BLOCK





8. PANEL FACILITIES AND SPECIFICATIONS

■ PANEL FACILITIES

• FRONT PANEL

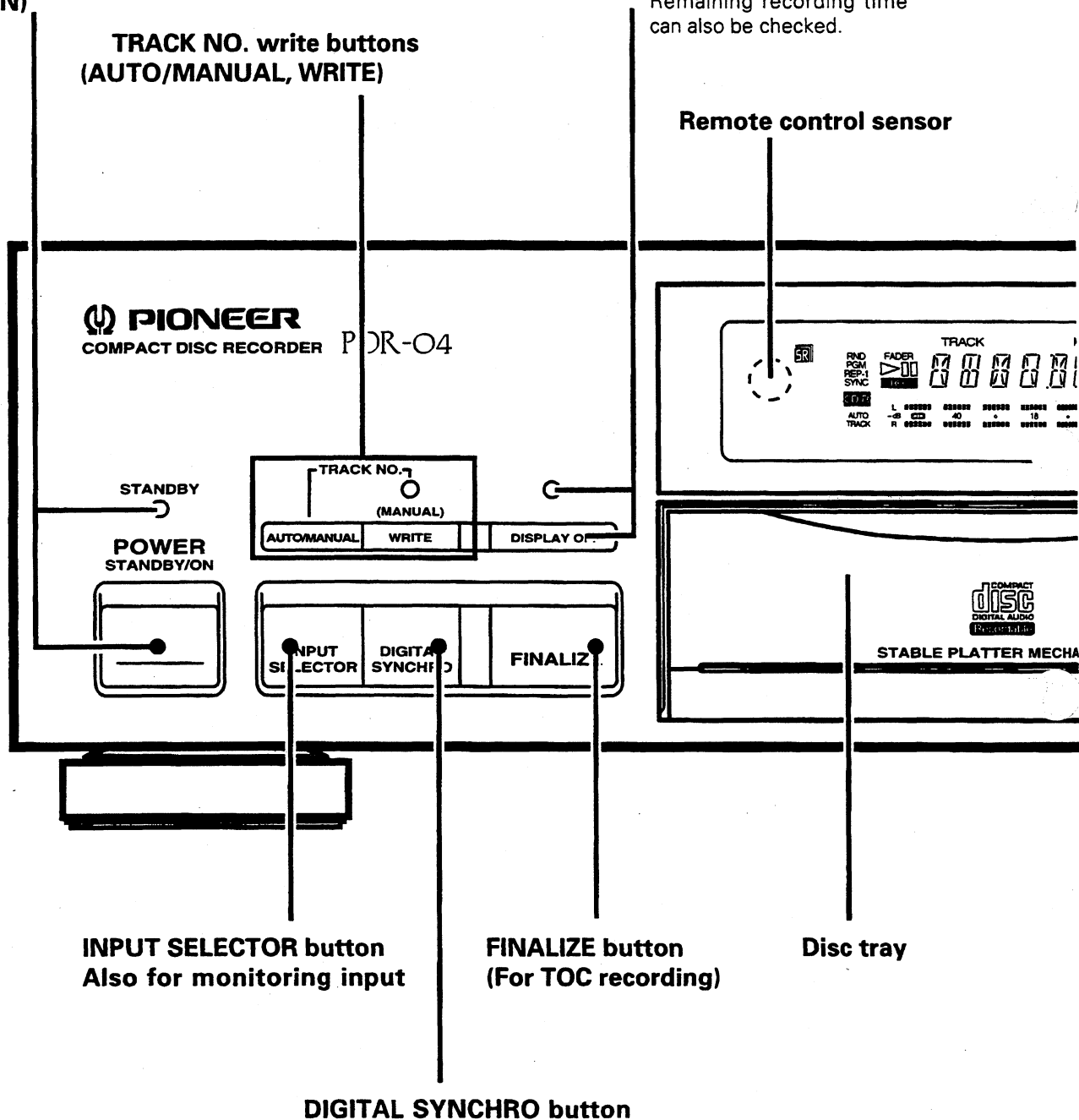
**POWER switch and STANDBY indicator
(STANDBY/ON)**

DISPLAY OFF button and indicator

Remaining recording time
can also be checked.

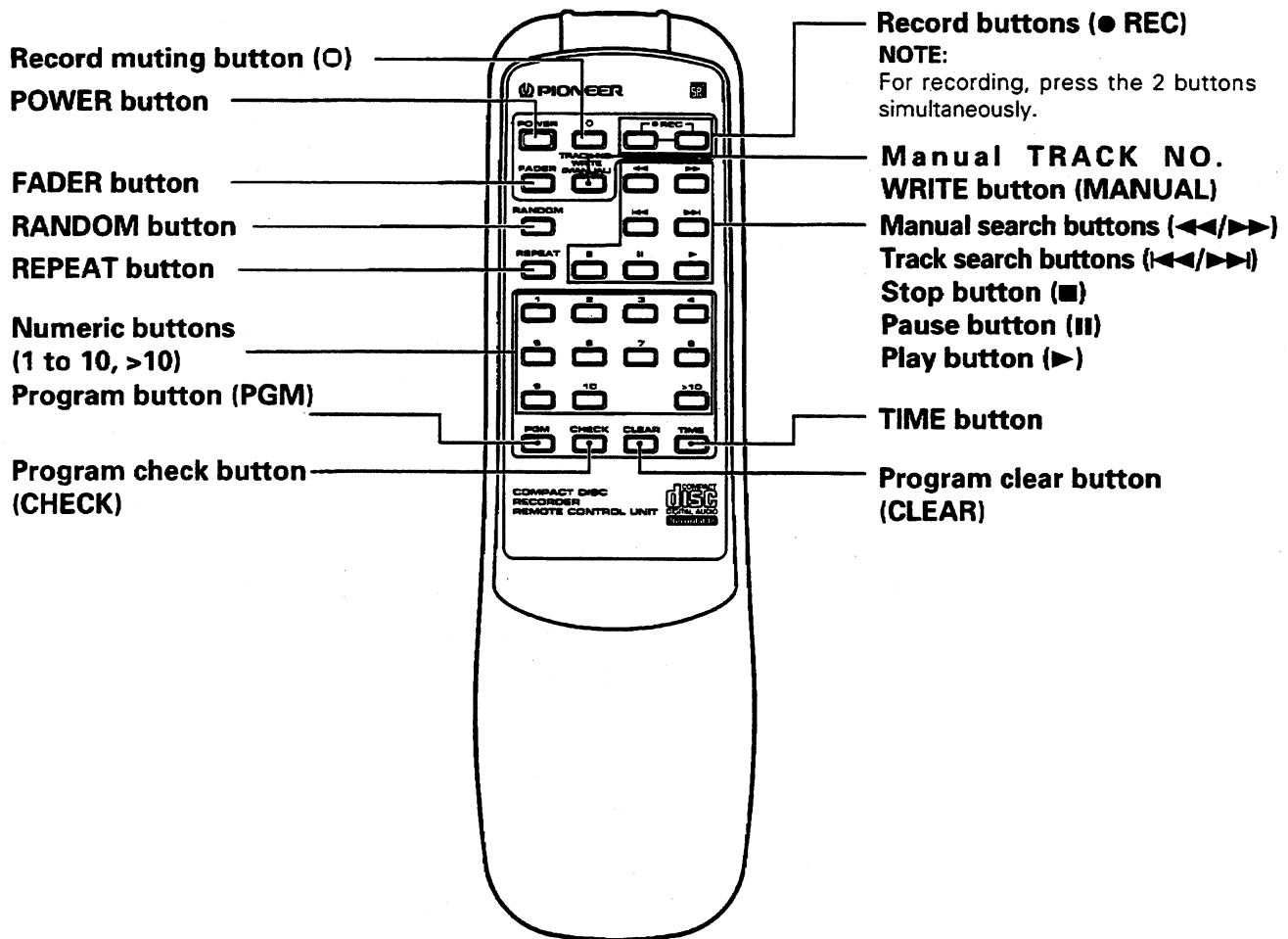
**TRACK NO. write buttons
(AUTO/MANUAL, WRITE)**

Remote control sensor



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• REMOTE CONTROL UNIT



■ SPECIFICATIONS

1. GENERAL

Model Compact disc audio system
 Applicable discs CDs and CD-Rs
 Power supply AC 120 V, 60 Hz
 Power consumption 16 W
 Operating temperature +5 °C to +35 °C
 (+41 °F to +95 °F)
 Weight (without package) 5 kg (11 lb)
 Max. dimensions 420 (W) x 285 (D) x 125 (H) mm
 16-9/16 (W) x 11-7/32 (D) x 4-15/16 (H) in.

2. AUDIO UNIT

Frequency characteristics 2 Hz to 20 kHz
 Playback S/N 108 dB (EIAJ)
 Playback dynamic range 97 dB (EIAJ)
 Playback total harmonic distortion 0.004 % (EIAJ)
 Playback channel separation 96 dB
 Recording S/N 92 dB
 Recording dynamic range 92 dB
 Recording total harmonic distortion 0.005 %
 Output voltage 2 V
 Wow-flutter Less than measurement limit
 ((±0.001 % W.PEAK) (EIAJ))
 Number of channels 2 channels (stereo)
 Optical output: -15 to -20 dBm (wavelength: 660 nm)
 Frequency deflection: Level 2 (standard mode)

* Recording specification values are for the LINE input (ANALOG).

3. INPUT JACKS

Optical digital input jack
 Audio LINE input jack

4. OUTPUT JACKS

Optical digital output jack
 Audio LINE output jack

5. RECORDING FUNCTIONS

- Recording
- Automatic digital-source synchro recording (1-track recording)
- Automatic digital-source synchro recording (All-track recording)
- EASY RECORDING OPERATION (ANALOG)

• ACCESSORIES

- REC MUTE
- AUTO TRACK INCREMENT
- AUTO REC/PAUSE
- Remaining recording time display
- PREVIOUS
- MANUAL TRACK INCREMENT
- INPUT SELECTOR
- TOC Write
- Fade-in/fade-out
- SCMS (Serial Copy Management System)
- Sampling monitor

6. PLAYBACK FUNCTIONS

- PLAY
- PAUSE
- STOP
- MANUAL search
- TRACK search
- Direct song selection
- 1-Track repeat
- All-track repeat
- Programmed repeat
- Programmed playback (max. 24 tracks)
- Program check
- Program correction
- Program clear
- Pause programming
- Program reservation
- SKIP playback
- DISPLAY OFF
- TIME display switching
- Random playback
- Fade-in/Fade-out

7. ACCESSORIES

- Remote control unit (CU-PD083) 1
- Size AA/R6P dry cell batteries 2
- Audio cables 2
- Operating Instructions 1

NOTE:

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

