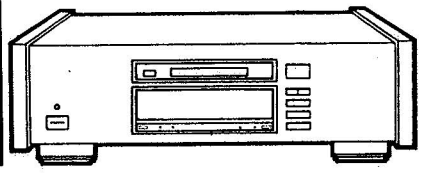
PIONEER®
The future of sound and vision.

Service Manual



COMPACT DISC PLAYER

PD-73

MODEL PD-73 HAS FOLLOWING VERSIONS :

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

* Change the transformer wire of terminal CN302.

- **This manual is applicable to the PD-73/KU/CA and HEM types.**
- **Ce manuel pour le service comprend les explications en français de réglage.**
- **Este manual de servicio trata del método ajuste escrito en español.**

CONTENTS

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

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

1. SAFETY INFORMATION

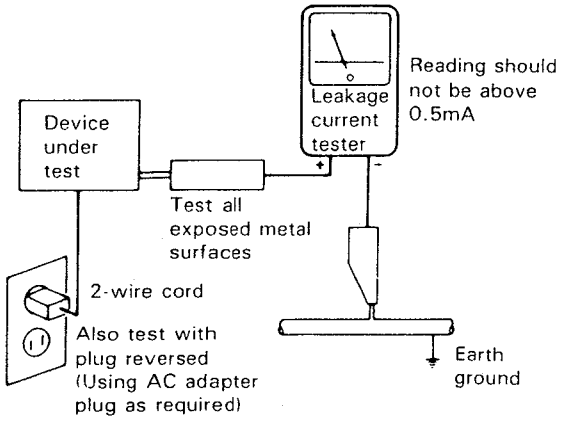
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

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

LEAKAGE CURRENT CHECK

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



AC Leakage Test

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

2. PRODUCT SAFETY NOTICE

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

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

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

(FOR EUROPEAN MODEL ONLY)

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

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

VARNING!
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

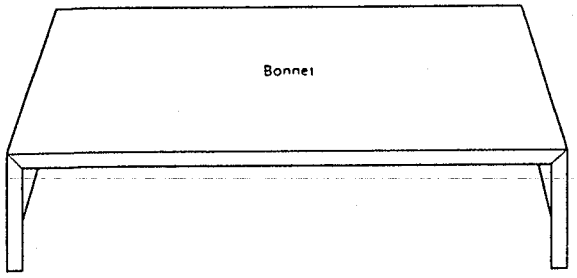
WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

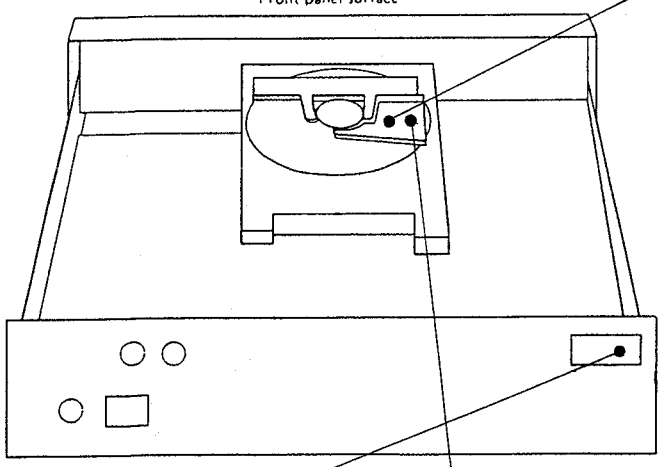
IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

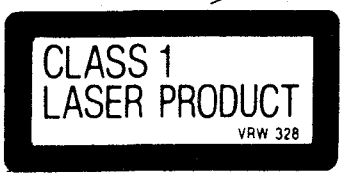
LASER DIODE CHARACTERISTICS
MAXIMUM OUTPUT POWER: 5 mw
WAVELENGTH: 780-785 nm

LASER
Picture 1
Warning sign for laser radiation

LABEL CHECK

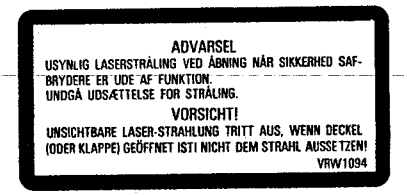






HEM model

HEM model



Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF status of the clamp switch (S102) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF.
   Thus, the interlock will no longer function if the clamp switch (S102) is deliverately shorted.
   In the test mode the interlock mechanism will not function (refer to page 34).
   Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (ICI) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).
2. If the fault condition described in 1 is induced with the cover removed and the objective lens extending past the outer circumference of the disc clamper diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

2. EXPLODED VIEWS AND PARTS LIST

NOTES:

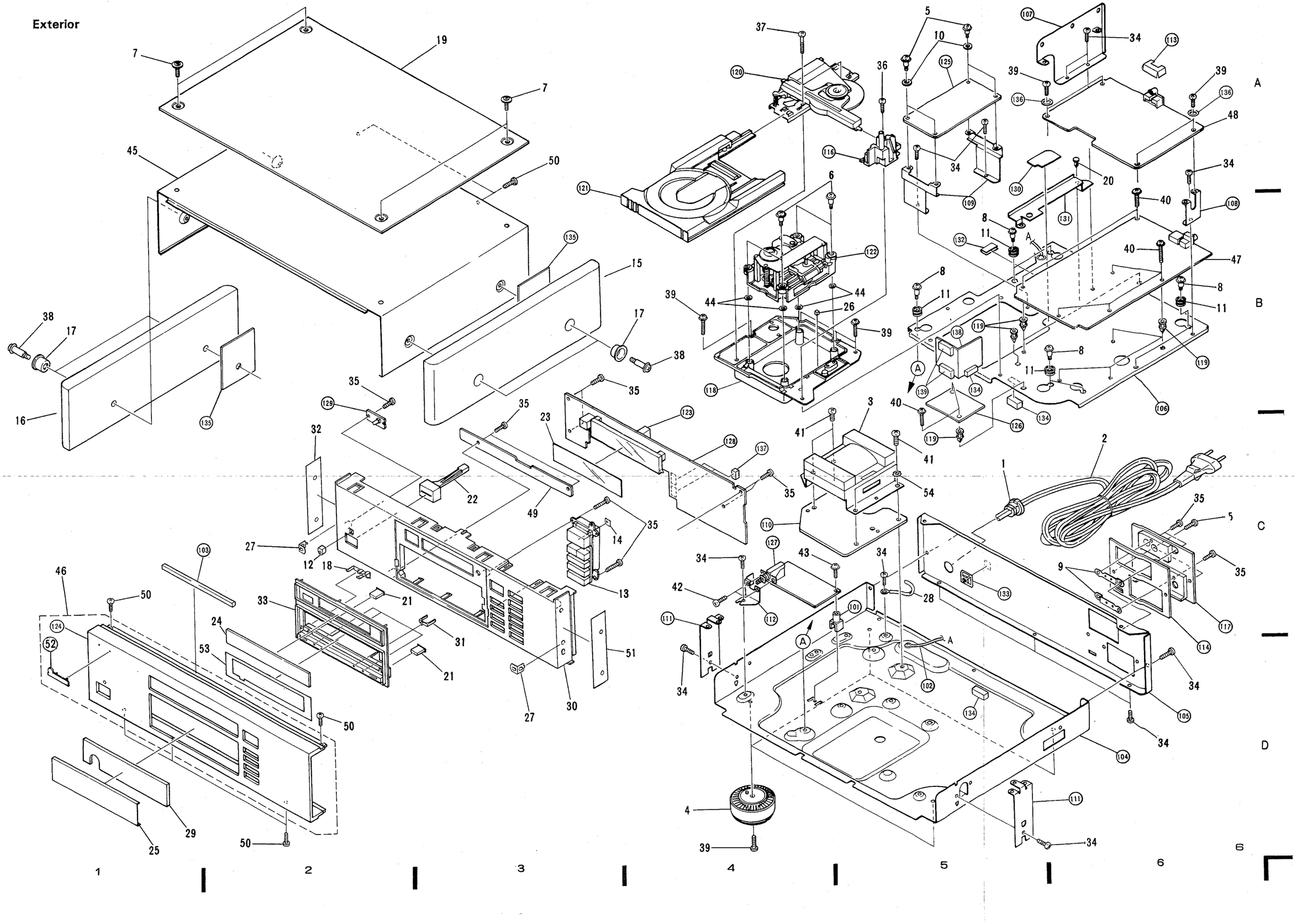
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time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

2.1 EXTERIOR

Parts List of Exterior

Mark	No.	Parts No.	Description
	1	CM−22C	Strain relief (KU/CA type)
	1	CM−22B	Strain relief (HEM type)
⚠	2	PDG1015	AC Power cord (KU/CA type)
⚠	2	PDG1003	AC Power cord (HEM type)
⚠	3	PTT1159	Power transformer (KU/CA type)
⚠	3	PTT1160	Power transformer (HEM type)
	4	AMR1159	Leg assembly
	5	PBA1014	Screw (B)
	6	PBA1027	Screw
	7	PBA1033	SH screw
	8	PBA1034	Screw
	9	PBK1056	Earth plate
	10	PEB1109	Rubber stopper
	11	PEB1101	Mount rubber
	12	AMR1160	LED lens
	13	PAC1317	Play button
	14	PNW1258	Play lens
	15	PMM1018	Side wood (R) (KU/CA type)
	15	PMM1036	Side board R (HEM type)
	16	PMM1017	Side wood (L) (KU/CA type)
	16	PMM1035	Side board L (HEM type)
	17	PNW1238	Wood color
	18	PBK1068	Earth plate
	19	PAN1123	Top plate
	20	PBM−015	Plastic revet
	21	PAC1325	Select button
	22	PAC1326	Power knob
	23	PAM1290	FL sheet (KU/CA type)
	23	PAM1251	FL sheet (HEM type)
	24	PAM1252	Display window
	25	PAN1132	Door name plate
	26	PNM1078	Cushion
	27	PBK1061	Plate spring
	28	RNH−184	Cord clamper
	29	PNW1595	Name plate holder
	30	PNW1459	Function panel
	31	PNW1460	Lens A
	32	PAN1130	Side sash (L)
	33	PNW1490	Center panel
	34	BBZ30P060FCC	Screw
	35	BBZ30P080FCC	Screw
	36	IBZ30P100FCC	Screw
	37	BPZ30P250FMC	Screw
	38	PBA1038	Screw
	39	IBZ30P080FCC	Screw
	40	IBZ30P150FCU	Screw
	41	BBZ40P100FCC	Screw
	42	PMZ30P060FCU	Screw
	43	IPZ30P180FCU	Screw
	44	WC30FCU	Washer
	45	PYY1071	Bonnet
	46	PYY1139	Front panel assembly (KU/CA type)
	46	PYY1140	Front panel assembly (HEM type)
⊙	47	PWZ1768	MAIN BOARD assembly
⊙	48	PWZ1769	AUDIO BOARD assembly
⊙	49	PWZ1499	SUB FUNCTION BOARD assembly
	50	BBT30P080FCU	Screw
	51	PAN1131	Side sash (R)
	52	.....	Name plate
	53	PAM1360	Panel sheet
	54	WH40FUC	Washer
	101		PCB mold
	102		Lead wire assembly
	103		Spacer
	104		Under base
	105		Rear base
	106		Float base
	107		L angle
	108		S angle
	109		M angle
	110		Trans base
	111		Side angle
	112		Switch angle
	113		Shield cover
	114		Rear shield
	115		.....
	116		Slide guide
	117		Rear cover
	118		Mecha base
	119		PCB spacer
	120		Loading base assembly
	121		Tray assembly
	122		Servo mechanism assembly
	123		Cushion rubber
	124		Front panel
	125		POWER SUPPLY BOARD assembly
	126		SERVO POWER SUPPLY BOARD assembly
	127		PRIMARY BOARD assembly
	128		FUNCTION BOARD assembly
	129		LED BOARD assembly
	130		Cord fixer
	131		Bracket
	132		Tape
	133		Binder holder
	134		Spacer
	135		Wood spacer
	136		Washer
	137		Cushion (3.5)
	138		Shield plate
	139		Absorber rubber (B)

Exterior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B
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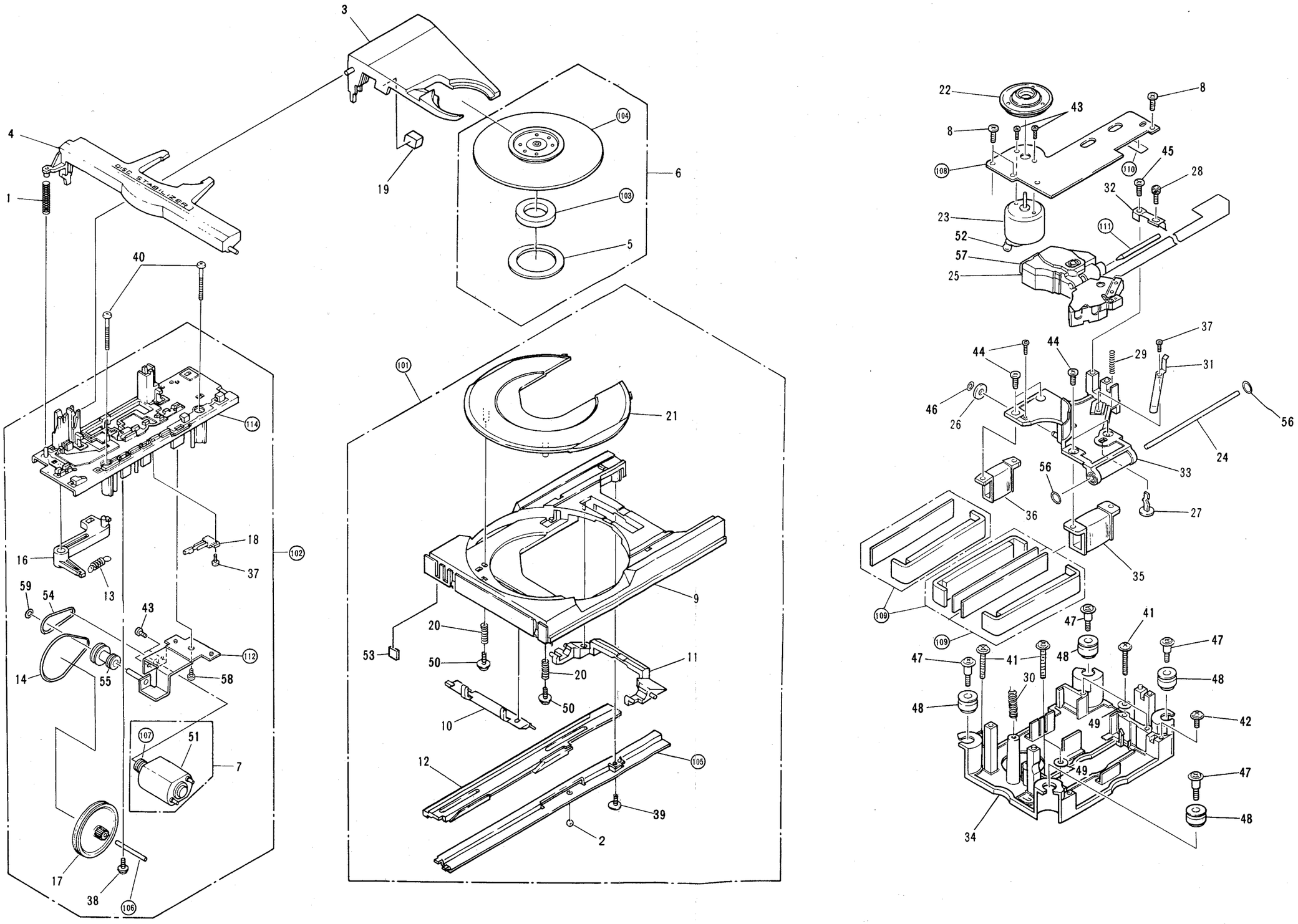
D

2.2 MECHANISM UNIT



Parts list of Mechanism unit

Mark	No.	Parts No.	Description
	1	PBH1013	Spring
	2	PBP−001	Steel ball ϕ4
	3	PNW1084	Clamp holder
	4	PNW1085	Clamp retainer
	5	PNM1010	Disc cushion
	6	PYY1084	Clamper assembly
	7	PYY1025	Motor assembly (LOADING)
	8	PBA1031	Screw
	9	PNW1627	Tray
	10	PNW1330	Plate lever (F)
	11	PNW1331	Plate lever (R)
	12	PNW1332	Rack
	13	PBH1012	Clamp spring
	14	PEB1013	Belt (LOADING)
	15	.....	.....
	16	PNW1083	Clamp lever
	17	PNW1171	Gear pully
	18	VSK−015	Leaf switch (CLAMP : S102)
	19	PEB1032	Stopper rubber
	20	PBH1045	Plate spring
	21	PNW1626	Disc plate
	22	PNW1064	Disc table
	23	PEA1086	Motor assembly
	24	PLA1061	Guide bar
	25	PWY1011	Pick−up assembly
	26	PNW1408	Roller
	27	PNW1407	Adjustment shaft
	28	PBA1026	Adjustment screw
	29	PBH1029	Shaft spring
	30	PBH1068	Earth spring
	31	PBK1045	Plate spring (T)
	32	PBK1046	Plate spring (R)
	33	PNW1405	Carriage
	34	PNW1406	Mechanism chassis
	35	PXP1003	Drive unit
	36	PXP1004	Detector unit
	37	BPZ20P080FZK	Screw
	38	IPZ30P050FZK	Screw
	39	PPZ30P080FMC	Screw
	40	BPZ30P250FMC	Screw
	41	IBZ30P180FMC	Screw
	42	IPZ30P080FMC	Screw
	43	PMZ20P030FMC	Screw
	44	PMZ26P040FMC	Screw
	45	PPZ26P080FMC	Screw
	46	WT25D047D025	Washer
	47	PBA1027	Screw
	48	PEB1031	Float rubber
	49	WA32F100M050	Washer
	50	PBA1025	Screw

Mark	No.	Parts No.	Description
	51	PXM1002	Motor (LOADING)
	52	CKDYF103Z50	Ceramic capacitor
	53	PNM1082	Spacer
	54	PEB1125	Belt
	55	PNW1594	Pully
	56	PEB1097	Rubber ring
	57	PNB1232	Weight
	58	PDZ30P050FMC	Screw
	59	WT26D047D050	Washer
	101		Tray assembly
	102		Loading base assembly
	103		Magnet
	104		Clamper
	105		Slide base
	106		Gear shaft
	107		Motor pully
	108		Base plate
	109		Yoke unit
	110		Absorber felt
	111		PU guide bar
	112		Pully angle
	113		.....
	114		Loading base

MOUNTING EACH COMPONENT

Mounting the disc table

To set the disc table, make sure to put the stopper below bottom of the spindle motor and apply pressure (about 9 kg) to the disc table.
The spacer (which is separated from the mechanical chassis) must also be inserted between the base plates as shown in figure 1.

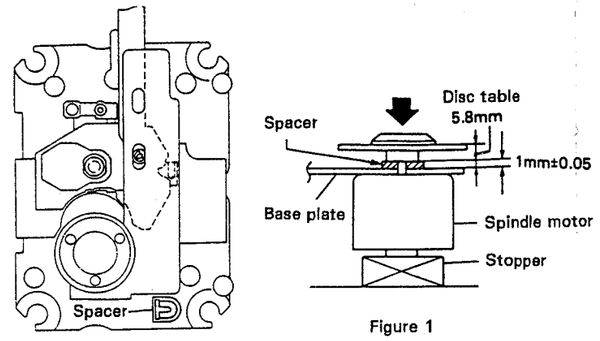


Figure 1

Precautions for mounting the pick−up assembly

1. Connect the lead wire from the linear motor as shown in figure 2.
2. When mounting the pick−up assembly, secure the tangential screw carefully as shown in figure 3, so that the adjustment shaft does not break.
3. Mount the P.U. guide driver carefully so that the spring does not jump out.

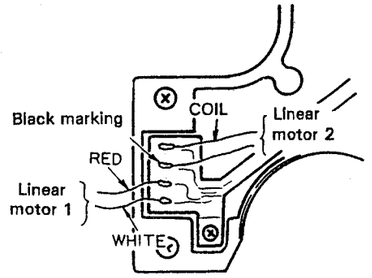


Figure 2

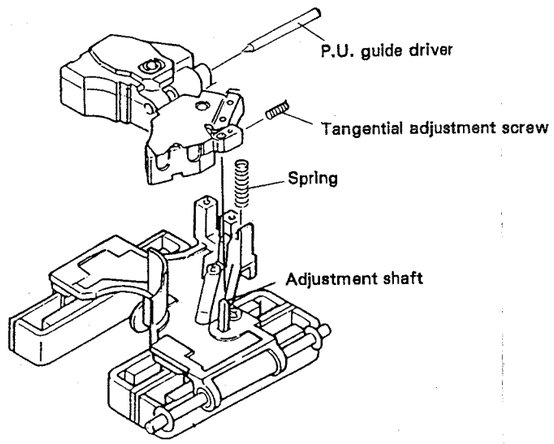
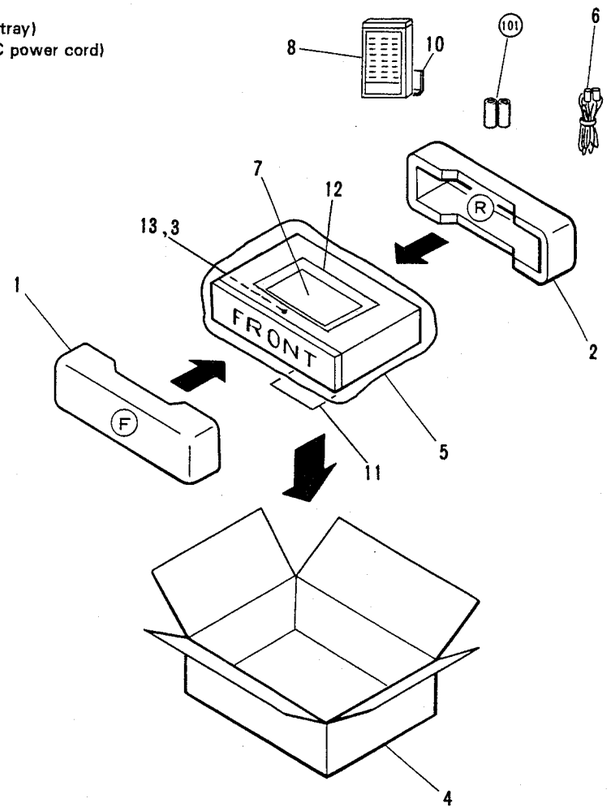


Figure 3

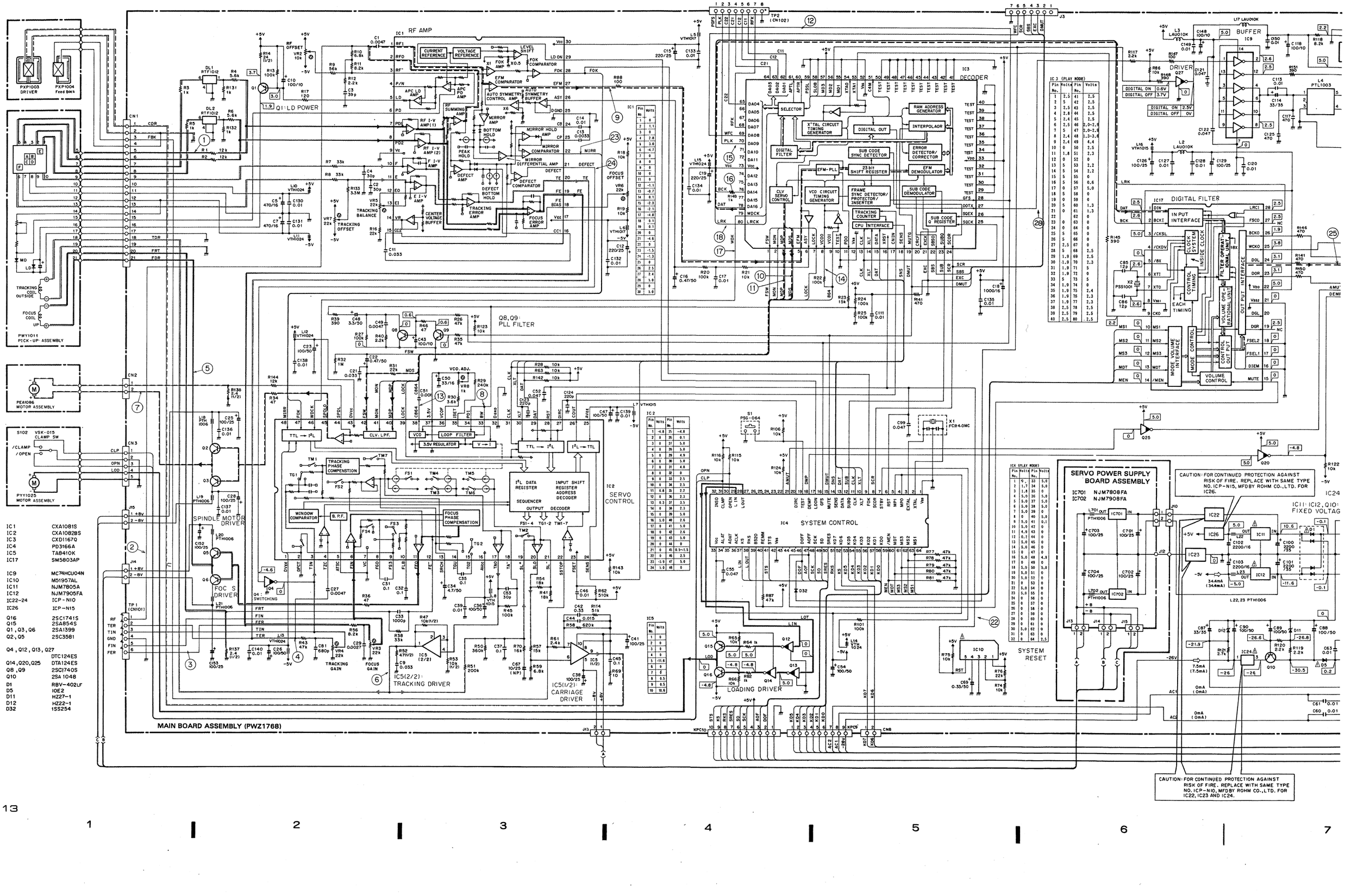
3. PACKING

Parts list of Packing

Mark	No.	Parts No.	Description
	1	PHA1095	Protector (F)
	2	PHA1096	Protector (R)
	3	PHC1030	Spacer(In the tray)
	4	PHG1503	Packing case (KU/CA type)
	4	PHG1502	Packing case (HEM type)
	5	VHL−037	Sheet
	6	PDE1003	Connection cord with pin plug
	7	PRB1129	Operating Instructions (English)(KU/CA type)
	7	PRE1129	Operating Instructions (English,French,German,Italian, Dutch,Swedish,Spanish, Portguese)(HEM type)
	8	PWW1037	Remote control unit
	9	.....	.....
	10	PNW1153	Battery cover
	11	PRM1016	Caution card
	12	Z21−038	Sheet
	13	PHC1022	Sheet (In the tray)
	14	Z21−013	Sheet (For AC power cord)
	101		Battry



4. SCHEMATIC DIAGRAM



IC1	CXA1081S
IC2	CXA1082BS
IC3	CXD1167Q
IC4	PD3166A
IC5	TA8410K
IC17	SM5803AP
IC9	MC74HCU04N
IC10	M51957AL
IC11	NJM7805A
IC12	NJM7905FA
IC22-24	ICP-N10
IC26	ICP-N15
Q16	2SC1741S
Q15	2SA854S
Q1,Q3,Q6	2SA1399
Q2,Q5	2SC3581
Q4,Q12,Q13,Q27	DTC124ES
Q14,Q20,Q25	DTA124ES
Q8,09	2SC1740S
Q10	2SA1048
D1	RBV-402LF
D5	1DE2
D11	HZ27-1
D12	HZ22-1
D32	1SS254

7 8 9 10 11 12

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

1. RESISTORS:
Indicated in Ω, ¼W, ⅛W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M) ; ±20% tolerance

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

3. VOLTAGE, CURRENT:
: DC voltage (V) at no input signal

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

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

SWITCHES:
MAIN BOARD ASSEMBLY
S1 TACT SW
PRIMARY BOARD ASSEMBLY
S301 POWER SW ON—OFF
FUNCTION BOARD ASSEMBLY
S213,214 TACT SW
S233–236 TACT SW

▶ADJUSTMENT POINT

IC613	NJM7812FA		
IC614	NJM7912FA	Q617 , Q622	2SB857
IC615	NJM5532DD	Q619 , Q624	2SD1133
IC620 , IC621	ICP-N10	Q620 , Q618	2SD755
		Q621 , Q623	2SB715
D620 ∿ D627	10DF2	Q625	2SA933S
D628 ∿ D631	HZ5CLL	Q626	2SC1740S

IC500, IC501 PCM63P-K
IC502, IC503 NJM5532DD
IC504 NJM7805FA
IC505 NJM7905FA
IC506, IC507 NJM2068DD
Q500,Q501,Q514,Q515 2SK364GR
Q502,Q503,Q516,Q517 2SJ104GR
Q512,Q513,Q520,Q521 2SC3068S
Q522 DTC124ES
D511 ∿ D513 1SS254

AUDIO BOARD ASSEMBLY (PWZ1769)

FUNCTION BOARD ASSEMBLY

SUB FUNCTION BOARD ASSEMBLY (PWZ1499)

IC201 PDG036 GP1U52X
REMOTE CONTROL UNIT
V201 PEL1025
Q204 2SC1740S
Q201 , Q202,
Q207 ∿ Q209
DTA124ES
D201 SLH-56MC3H
S213 , S214
S233 ∿ S236
PDG-065

D801 , D803 : SLH-34YC3H3 (YEL)
D802 , D804 : SLH-34VC3H3 (RED)
S801, S802 : PSG-065

POWER SUPPLY BOARD ASSEMBLY

POWER TRANSFORMER PTT1159

PRIMARY BOARD ASSEMBLY

AC POWER CORD PDG1015 AC120V 60Hz

LED BOARD ASSEMBLY

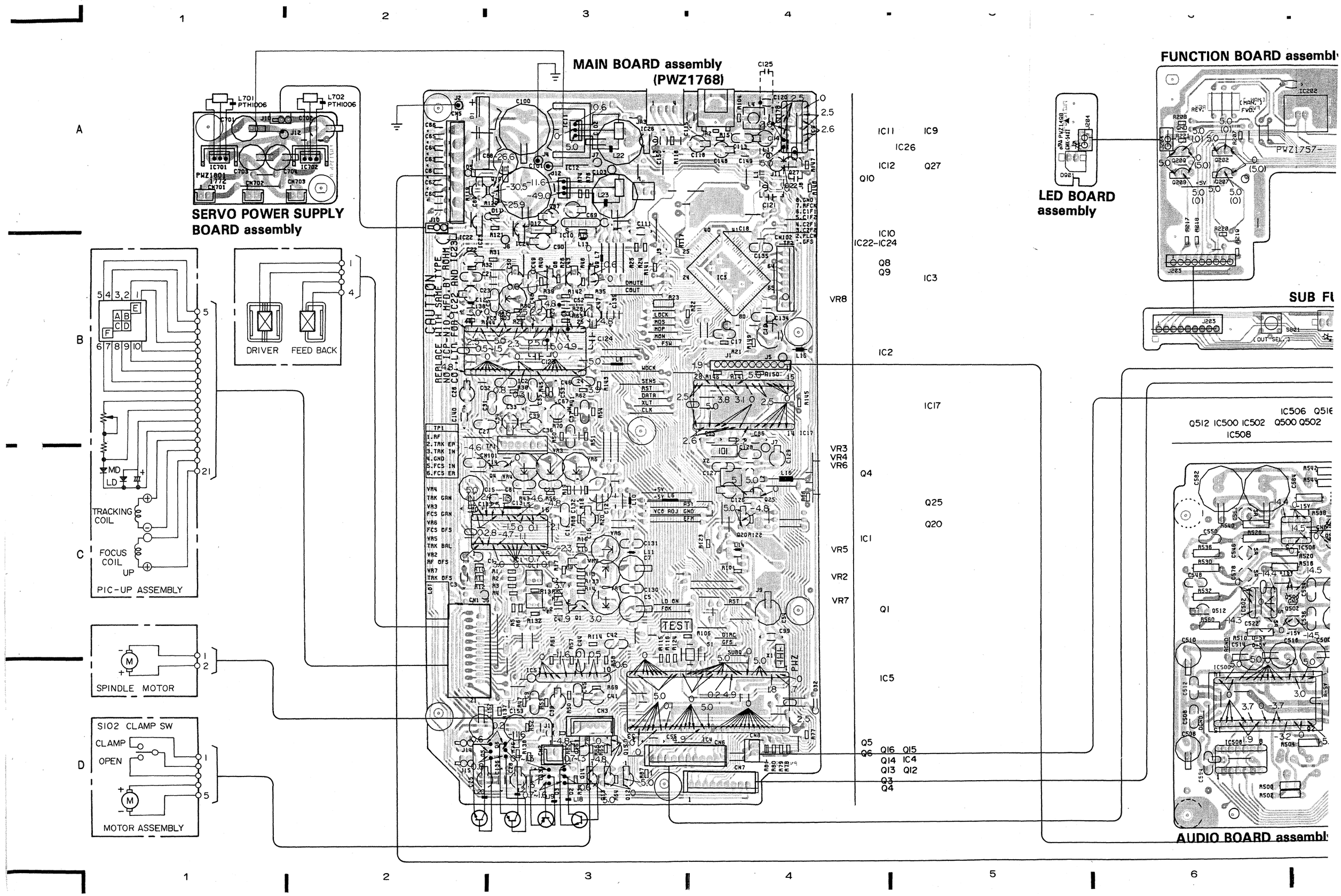
D901 SLH-56VC3H (RED)

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N15, MFD BY ROHM CO., LTD. FOR IC26.

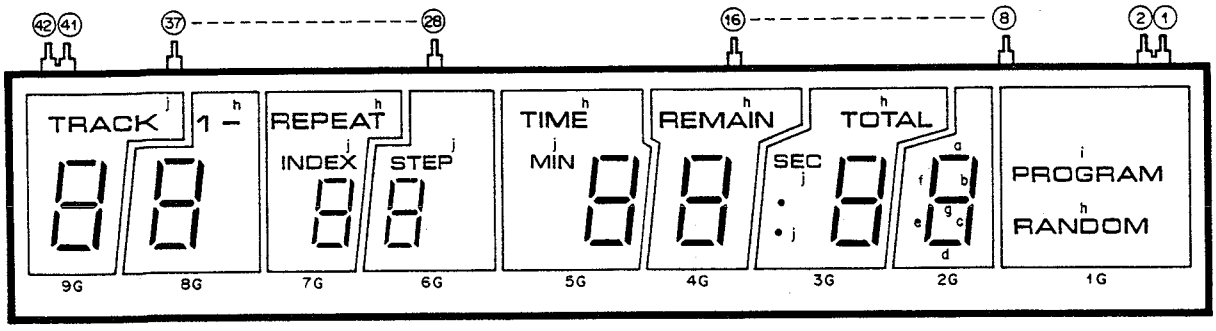
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N10, MFD BY ROHM CO., LTD. FOR IC22, IC23 AND IC24.

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N10, MFD BY ROHM CO., LTD. FOR IC620 AND IC621.

A B C D


SERVO POWER SUPPLY BOARD assembly
L701 PTH1006
L702 PTH1006
IC701
IC702
PWZ1801
CN701
CN702
CN703
MAIN BOARD assembly (PWZ1768)
CAUTION REPLACE WITH SAME TYPE NO. OF LD. FOR IC22 AND IC23 MFD. BY ROHM
TEST
FUNCTION BOARD assembly
PWZ1757
LED BOARD assembly
SUB FU
AUDIO BOARD assembl
IC11 IC9
IC26
IC12 Q27
Q10
IC10
IC22–IC24
Q8
Q9
IC3
VR8
IC2
IC17
VR3
VR4
VR6
Q4
Q25
Q20
IC1
VR5
VR2
VR7
Q1
IC5
Q5
Q6 Q16 Q15
Q14 IC4
Q13 Q12
Q3
Q4
IC506 Q516
Q512 IC500 IC502 Q500 Q502
IC508
DRIVER
FEED BACK
PIC-UP ASSEMBLY
MD
LD
TRACKING COIL
FOCUS COIL
UP
SPINDLE MOTOR
S102 CLAMP SW
CLAMP
OPEN
MOTOR ASSEMBLY

FL TUBE (PEL1025)



PIN CONNECTION

PIN NO.	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CONNECTION	F2	F2	NP	NP	NP	d	c	e	h	g	f	b	a	j	i	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	9G	8G	7G	6G	5G	4G	3G	2G	1G	NP	NP	NP	NP	NP	F1	F1

LINE VOLTAGE SELECTION

Line voltage can be changed with the following steps.

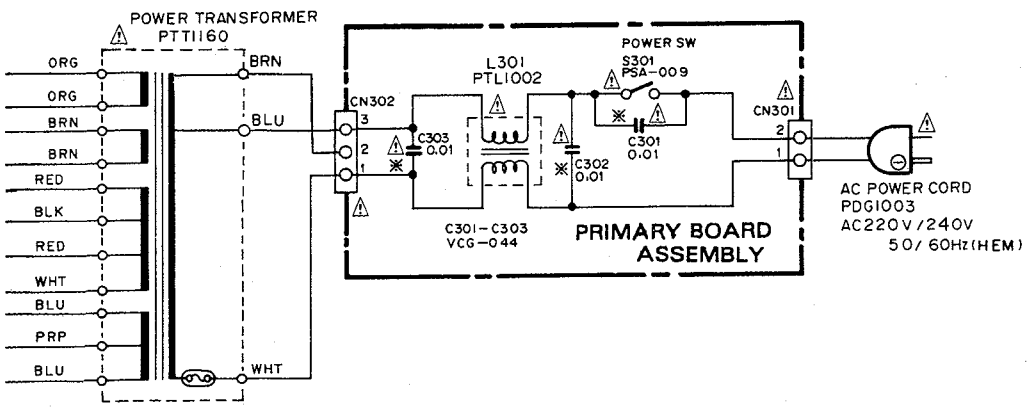
1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the transformer wire of terminal CN302–② and CN302–③ as follows.

Voltage	Terminal No.CN302–②	Terminal No.CN302–③
220V	PURPLE	BLUE
240V	BLUE	PURPLE

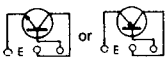
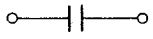
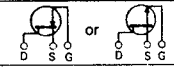
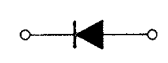
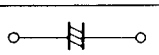
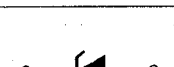
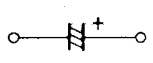
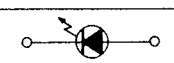
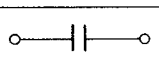
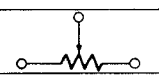
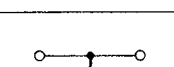
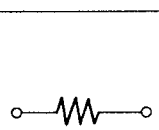
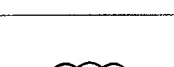
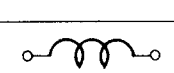
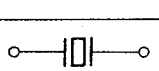
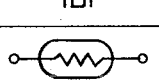
4. Stick the line voltage label on the rear panel.

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

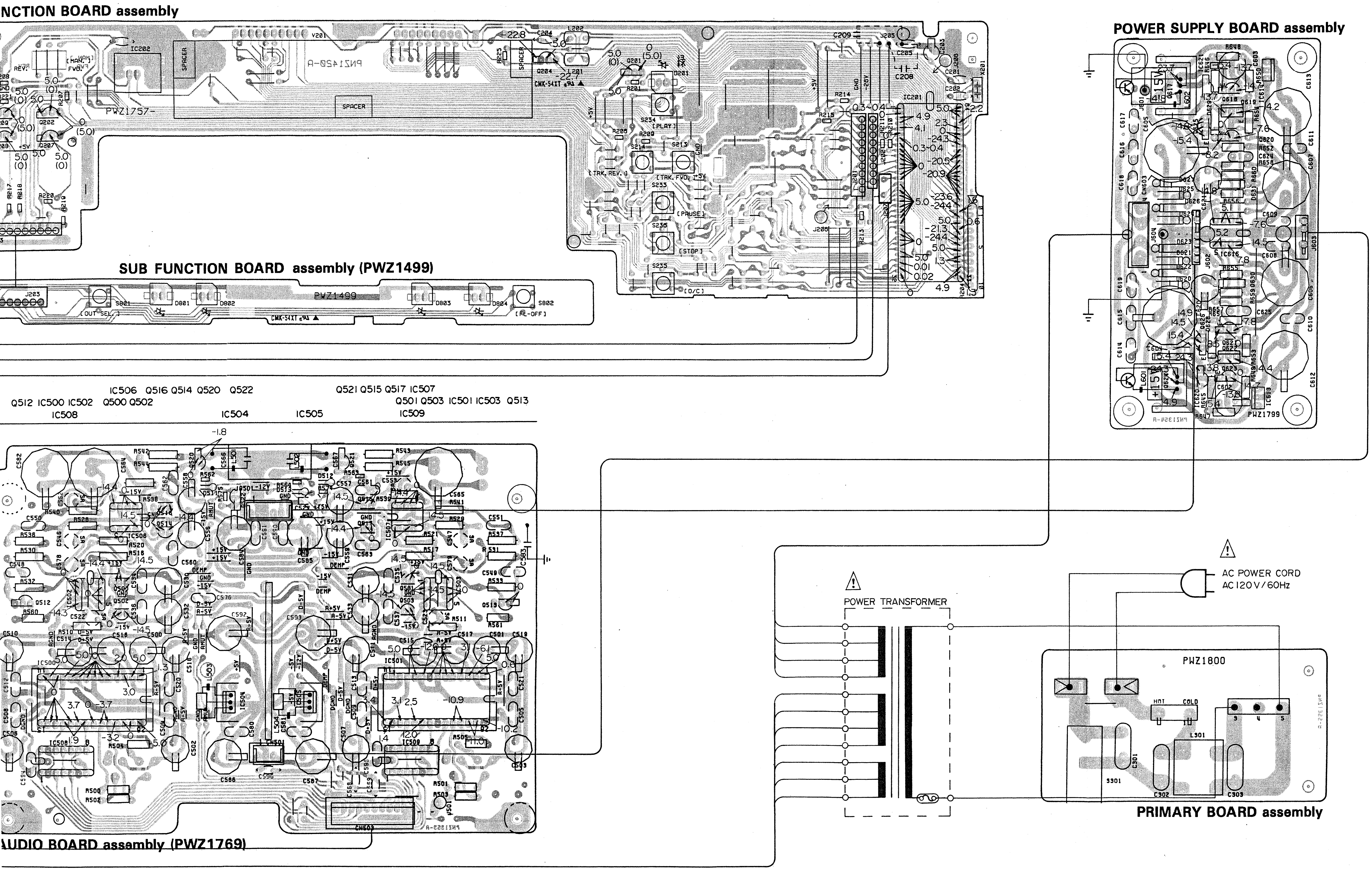
FOR HEM TYPE



5. P.C.BOARD CONNECTION DIAGRAM

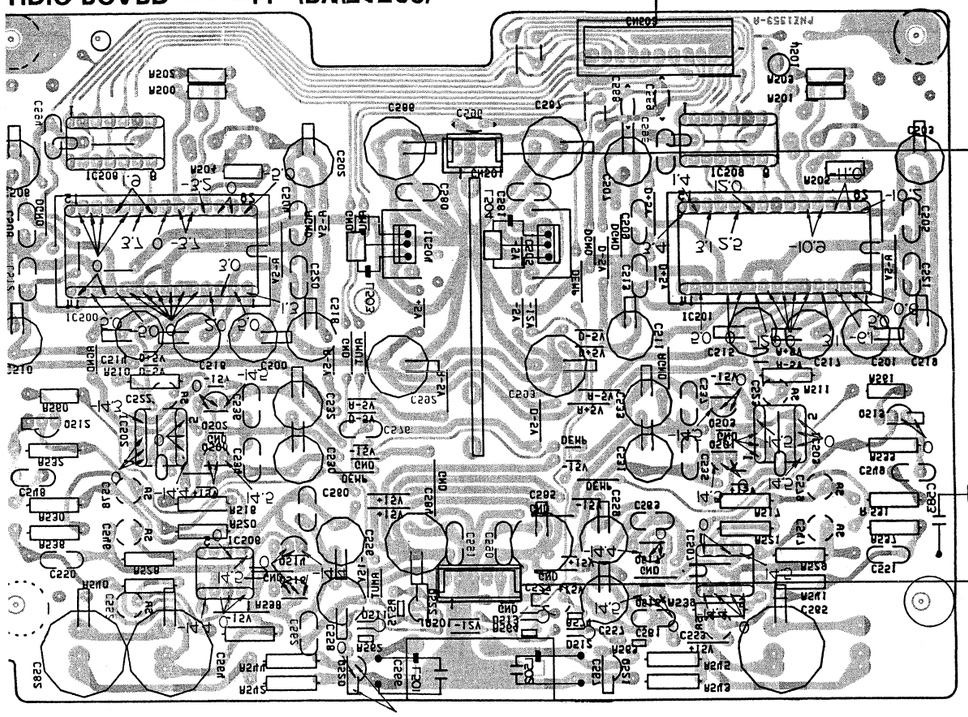
P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
					
		FET			Mylar capacitor
		Diode			Styrol capacitor
					Electrolytic capacitor (Non polarized)
					Electrolytic capacitor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

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



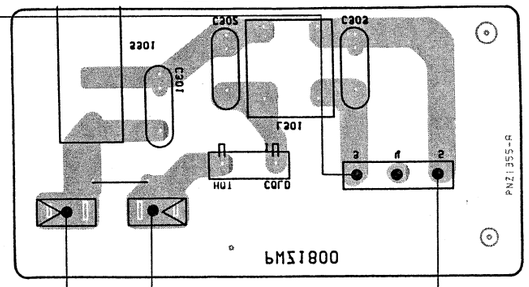
NCTION BOARD assembly
SUB FUNCTION BOARD assembly (PWZ1499)
POWER SUPPLY BOARD assembly
AUDIO BOARD assembly (PWZ1769)
PRIMARY BOARD assembly
PWZ1757
PWZ1499
PWZ1799
PWZ1800
POWER TRANSFORMER
AC POWER CORD
AC120V/60Hz
[PLAY]
[TRK. REV.]
[TRK. FWD.]
[PAUSE]
[STOP]
[O/C]
[OUT SEL.]
[FL-OFF]
HOT
COLD
IC506 Q516 Q514 Q520 Q522
Q512 IC500 IC502 Q500 Q502
IC508
IC504
IC505
Q521 Q515 Q517 IC507
Q501 Q503 IC501 IC503 Q513
IC509

AUDIO BOARD assembly (PWZ1268)



IC202 IC204 IC205 IC206 IC207 IC208 IC209 IC210 IC211 IC212 IC213 IC214 IC215 IC216 IC217 IC218 IC219 IC220 IC221 IC222 IC223 IC224 IC225 IC226 IC227 IC228 IC229 IC230 IC231 IC232 IC233 IC234 IC235 IC236 IC237 IC238 IC239 IC240 IC241 IC242 IC243 IC244 IC245 IC246 IC247 IC248 IC249 IC250 IC251 IC252 IC253 IC254 IC255 IC256 IC257 IC258 IC259 IC260 IC261 IC262 IC263 IC264 IC265 IC266 IC267 IC268 IC269 IC270 IC271 IC272 IC273 IC274 IC275 IC276 IC277 IC278 IC279 IC280 IC281 IC282 IC283 IC284 IC285 IC286 IC287 IC288 IC289 IC290 IC291 IC292 IC293 IC294 IC295 IC296 IC297 IC298 IC299 IC300 IC301 IC302 IC303 IC304 IC305 IC306 IC307 IC308 IC309 IC310 IC311 IC312 IC313 IC314 IC315 IC316 IC317 IC318 IC319 IC320 IC321 IC322 IC323 IC324 IC325 IC326 IC327 IC328 IC329 IC330 IC331 IC332 IC333 IC334 IC335 IC336 IC337 IC338 IC339 IC340 IC341 IC342 IC343 IC344 IC345 IC346 IC347 IC348 IC349 IC350 IC351 IC352 IC353 IC354 IC355 IC356 IC357 IC358 IC359 IC360 IC361 IC362 IC363 IC364 IC365 IC366 IC367 IC368 IC369 IC370 IC371 IC372 IC373 IC374 IC375 IC376 IC377 IC378 IC379 IC380 IC381 IC382 IC383 IC384 IC385 IC386 IC387 IC388 IC389 IC390 IC391 IC392 IC393 IC394 IC395 IC396 IC397 IC398 IC399 IC400 IC401 IC402 IC403 IC404 IC405 IC406 IC407 IC408 IC409 IC410 IC411 IC412 IC413 IC414 IC415 IC416 IC417 IC418 IC419 IC420 IC421 IC422 IC423 IC424 IC425 IC426 IC427 IC428 IC429 IC430 IC431 IC432 IC433 IC434 IC435 IC436 IC437 IC438 IC439 IC440 IC441 IC442 IC443 IC444 IC445 IC446 IC447 IC448 IC449 IC450 IC451 IC452 IC453 IC454 IC455 IC456 IC457 IC458 IC459 IC460 IC461 IC462 IC463 IC464 IC465 IC466 IC467 IC468 IC469 IC470 IC471 IC472 IC473 IC474 IC475 IC476 IC477 IC478 IC479 IC480 IC481 IC482 IC483 IC484 IC485 IC486 IC487 IC488 IC489 IC490 IC491 IC492 IC493 IC494 IC495 IC496 IC497 IC498 IC499 IC500 IC501 IC502 IC503 IC504 IC505 IC506 IC507 IC508 IC509 IC510 IC511 IC512 IC513 IC514 IC515 IC516 IC517 IC518 IC519 IC520 IC521 IC522 IC523 IC524 IC525 IC526 IC527 IC528 IC529 IC530 IC531 IC532 IC533 IC534 IC535 IC536 IC537 IC538 IC539 IC540 IC541 IC542 IC543 IC544 IC545 IC546 IC547 IC548 IC549 IC550 IC551 IC552 IC553 IC554 IC555 IC556 IC557 IC558 IC559 IC560 IC561 IC562 IC563 IC564 IC565 IC566 IC567 IC568 IC569 IC570 IC571 IC572 IC573 IC574 IC575 IC576 IC577 IC578 IC579 IC580 IC581 IC582 IC583 IC584 IC585 IC586 IC587 IC588 IC589 IC590 IC591 IC592 IC593 IC594 IC595 IC596 IC597 IC598 IC599 IC600 IC601 IC602 IC603 IC604 IC605 IC606 IC607 IC608 IC609 IC610 IC611 IC612 IC613 IC614 IC615 IC616 IC617 IC618 IC619 IC620 IC621 IC622 IC623 IC624 IC625 IC626 IC627 IC628 IC629 IC630 IC631 IC632 IC633 IC634 IC635 IC636 IC637 IC638 IC639 IC640 IC641 IC642 IC643 IC644 IC645 IC646 IC647 IC648 IC649 IC650 IC651 IC652 IC653 IC654 IC655 IC656 IC657 IC658 IC659 IC660 IC661 IC662 IC663 IC664 IC665 IC666 IC667 IC668 IC669 IC670 IC671 IC672 IC673 IC674 IC675 IC676 IC677 IC678 IC679 IC680 IC681 IC682 IC683 IC684 IC685 IC686 IC687 IC688 IC689 IC690 IC691 IC692 IC693 IC694 IC695 IC696 IC697 IC698 IC699 IC700 IC701 IC702 IC703 IC704 IC705 IC706 IC707 IC708 IC709 IC710 IC711 IC712 IC713 IC714 IC715 IC716 IC717 IC718 IC719 IC720 IC721 IC722 IC723 IC724 IC725 IC726 IC727 IC728 IC729 IC730 IC731 IC732 IC733 IC734 IC735 IC736 IC737 IC738 IC739 IC740 IC741 IC742 IC743 IC744 IC745 IC746 IC747 IC748 IC749 IC750 IC751 IC752 IC753 IC754 IC755 IC756 IC757 IC758 IC759 IC760 IC761 IC762 IC763 IC764 IC765 IC766 IC767 IC768 IC769 IC770 IC771 IC772 IC773 IC774 IC775 IC776 IC777 IC778 IC779 IC780 IC781 IC782 IC783 IC784 IC785 IC786 IC787 IC788 IC789 IC790 IC791 IC792 IC793 IC794 IC795 IC796 IC797 IC798 IC799 IC800 IC801 IC802 IC803 IC804 IC805 IC806 IC807 IC808 IC809 IC810 IC811 IC812 IC813 IC814 IC815 IC816 IC817 IC818 IC819 IC820 IC821 IC822 IC823 IC824 IC825 IC826 IC827 IC828 IC829 IC830 IC831 IC832 IC833 IC834 IC835 IC836 IC837 IC838 IC839 IC840 IC841 IC842 IC843 IC844 IC845 IC846 IC847 IC848 IC849 IC850 IC851 IC852 IC853 IC854 IC855 IC856 IC857 IC858 IC859 IC860 IC861 IC862 IC863 IC864 IC865 IC866 IC867 IC868 IC869 IC870 IC871 IC872 IC873 IC874 IC875 IC876 IC877 IC878 IC879 IC880 IC881 IC882 IC883 IC884 IC885 IC886 IC887 IC888 IC889 IC890 IC891 IC892 IC893 IC894 IC895 IC896 IC897 IC898 IC899 IC900 IC901 IC902 IC903 IC904 IC905 IC906 IC907 IC908 IC909 IC910 IC911 IC912 IC913 IC914 IC915 IC916 IC917 IC918 IC919 IC920 IC921 IC922 IC923 IC924 IC925 IC926 IC927 IC928 IC929 IC930 IC931 IC932 IC933 IC934 IC935 IC936 IC937 IC938 IC939 IC940 IC941 IC942 IC943 IC944 IC945 IC946 IC947 IC948 IC949 IC950 IC951 IC952 IC953 IC954 IC955 IC956 IC957 IC958 IC959 IC960 IC961 IC962 IC963 IC964 IC965 IC966 IC967 IC968 IC969 IC970 IC971 IC972 IC973 IC974 IC975 IC976 IC977 IC978 IC979 IC980 IC981 IC982 IC983 IC984 IC985 IC986 IC987 IC988 IC989 IC990 IC991 IC992 IC993 IC994 IC995 IC996 IC997 IC998 IC999 IC1000

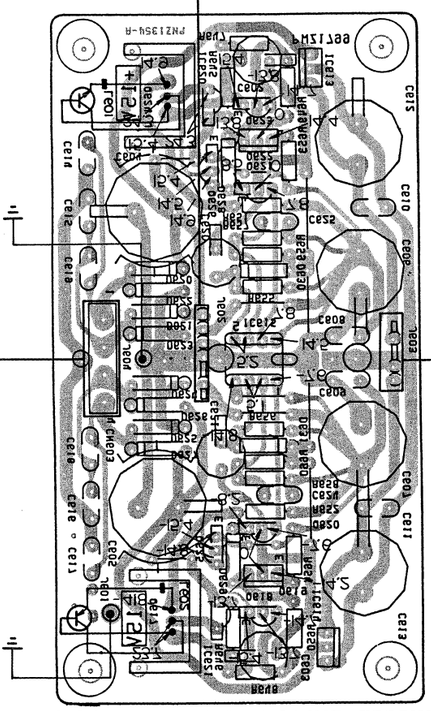
PRIMARY BOARD assembly



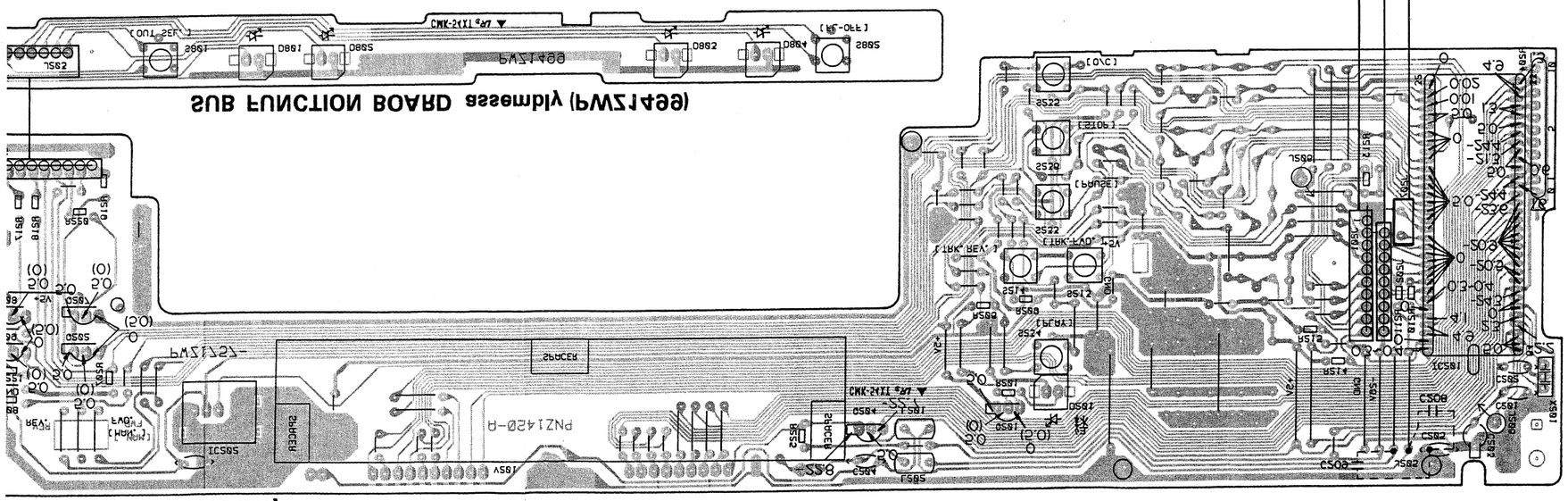
POWER TRANSFORMER

AC POWER CORD

POWER SUPPLY BOARD assembly

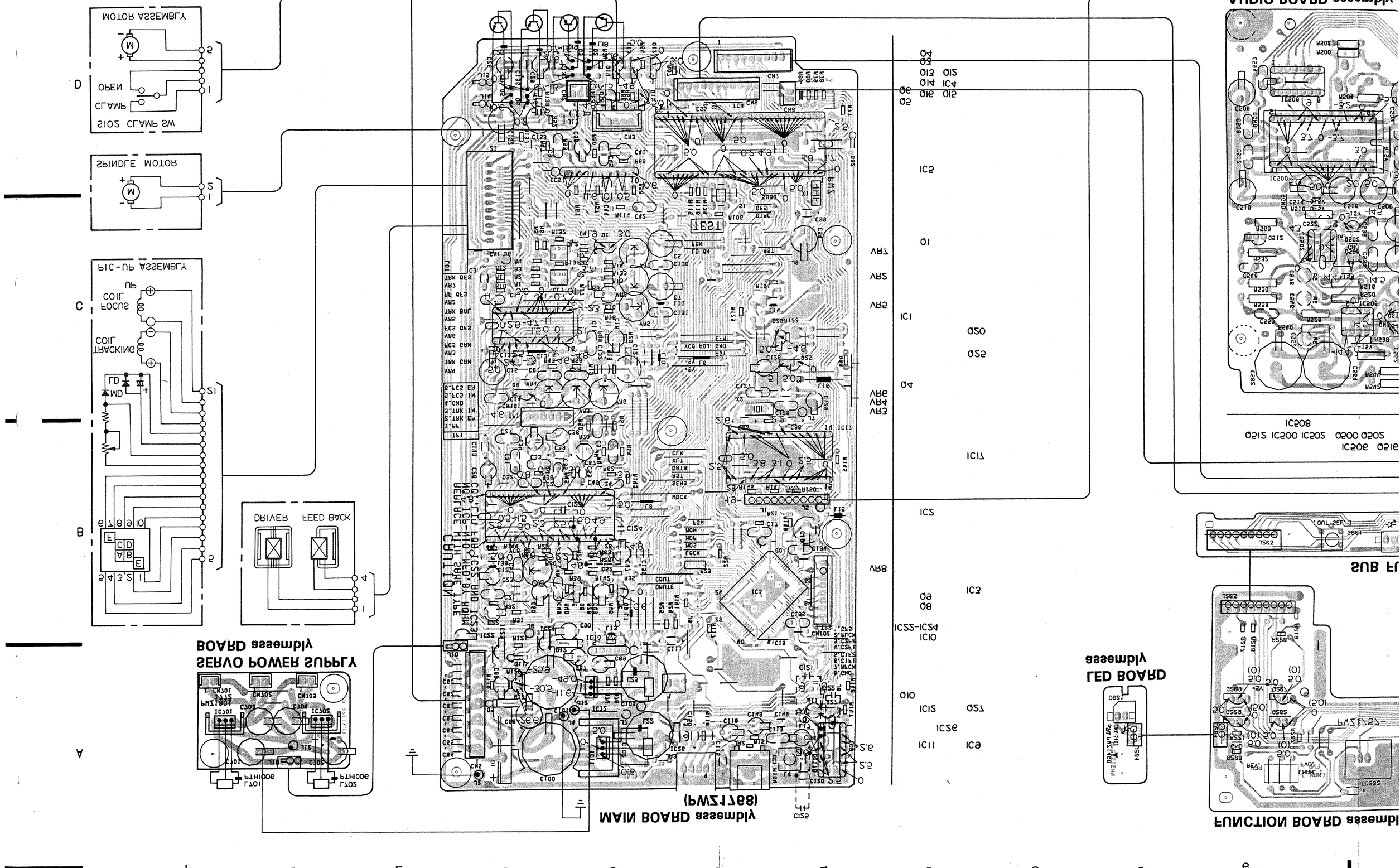


SUB FUNCTION BOARD assembly (PWZ1268)



FUNCTION BOARD assembly

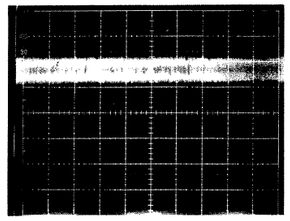
This P.C.B. connection diagram is viewed from the foil side.


MOTOR ASSEMBLY
SPINDLE MOTOR
PIC-UV ASSEMBLY
DRIVER
FEED BACK
SERVO POWER SUPPLY BOARD assembly
MAIN BOARD assembly (WV1718)
AUDIO BOARD assembly
LED BOARD assembly
FUNCTION BOARD assembly
USB FUNCTION

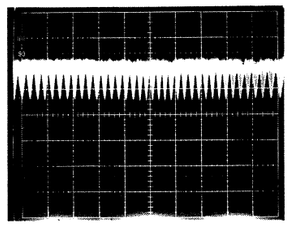
Wave Forms

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

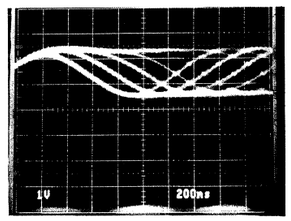
① CN1-5 Pin : PLAY MODE
50mV/div 5msec/div



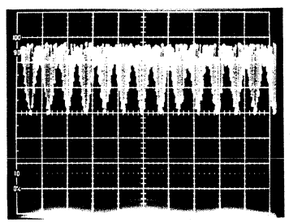
① CN11-5 Pin : SEARCH MODE
50mV/div 5msec/div



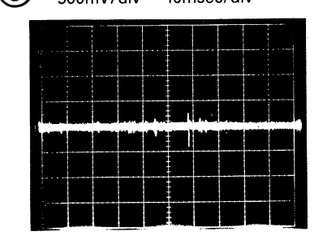
② TP1-1 Pin : PLAY MODE
1V/div 200nsec/div



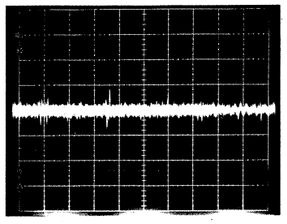
② TP1-1 Pin : SEARCH MODE
500mV/div 100μsec/div



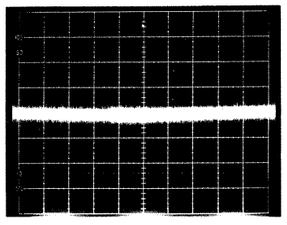
③ TP1-6 Pin : PLAY MODE
500mV/div 10msec/div



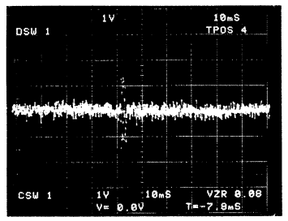
③ TP1-6 Pin : SEARCH MODE
500mV/div 10msec/div



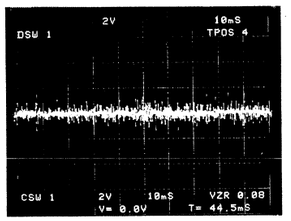
④ TP1-2 Pin : PLAY MODE
1V/div 10msec/div



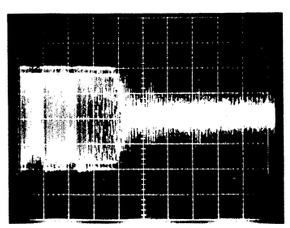
④ TP1-2 Pin : SEARCH MODE
1V/div 10msec/div



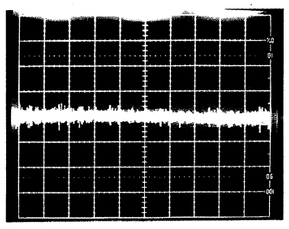
⑤ Q5 Emitter : PLAY MODE
2V/div 10msec/div



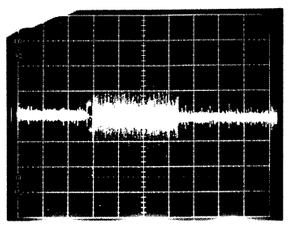
⑤ Q5 Emitter : SEARCH MODE
2V/div 10msec/div



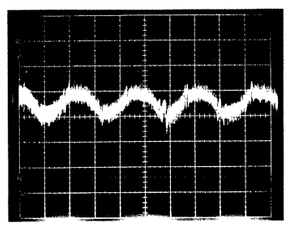
⑥ IC5-1 Pin : PLAY MODE
2V/div 10msec/div



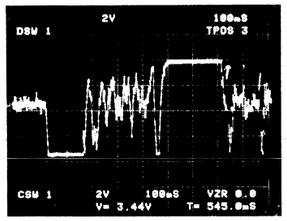
⑥ IC5-1 Pin : SEARCH MODE
2V/div 10msec/div



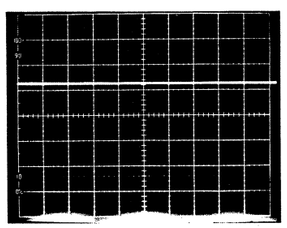
⑦ Q2 Emitter : PLAY MODE
2V/div 50msec/div



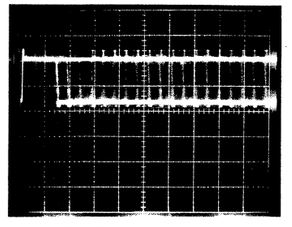
⑦ Q2 Emitter : SEARCH MODE
2V/div 100msec/div



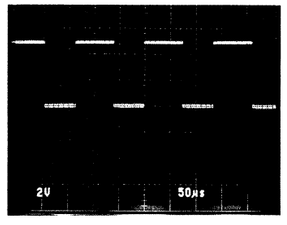
⑧ IC2-33, 34 Pin : PLAY MODE
2V/div 10msec/div



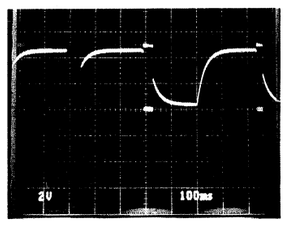
⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div



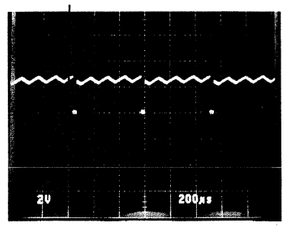
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



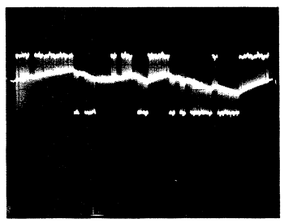
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



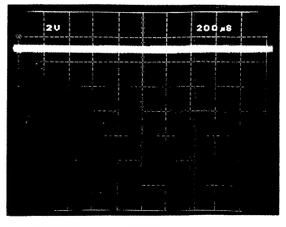
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



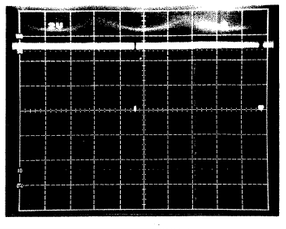
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



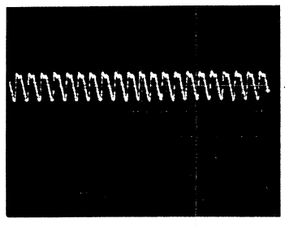
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



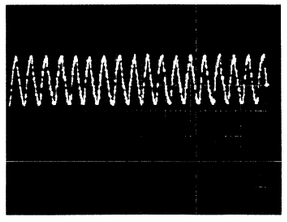
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



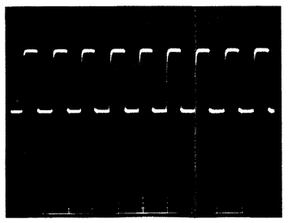
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div

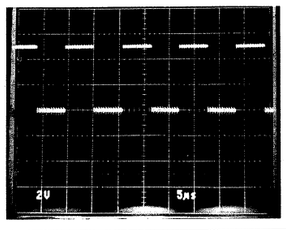


⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div

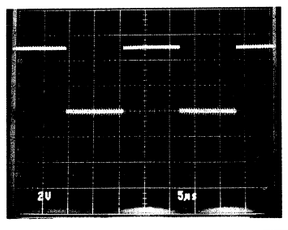


⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div

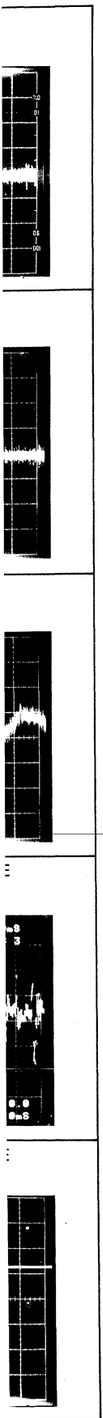
⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div



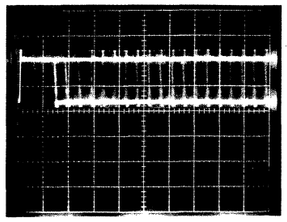
⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div



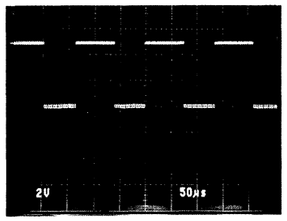
oints in the



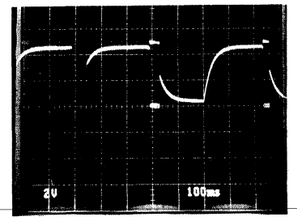
⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div



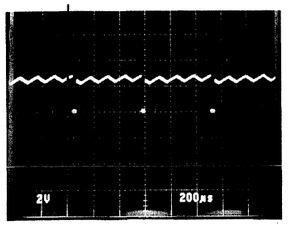
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



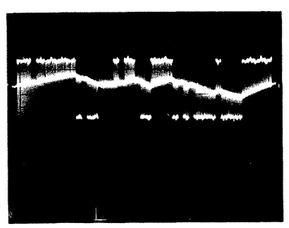
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



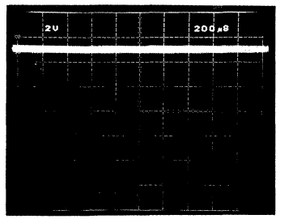
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



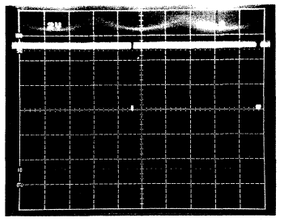
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



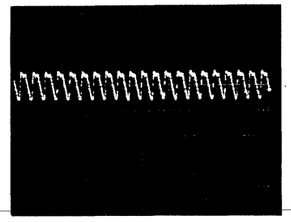
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



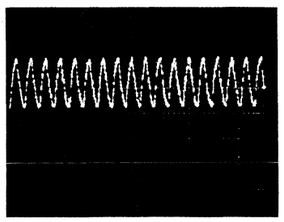
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



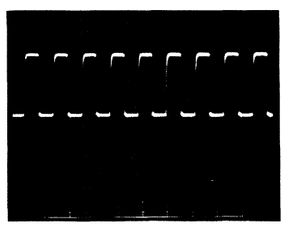
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



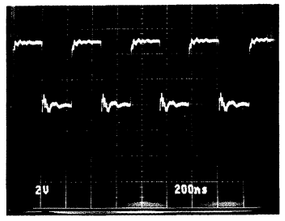
⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div



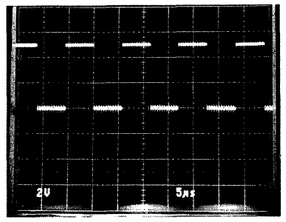
⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div



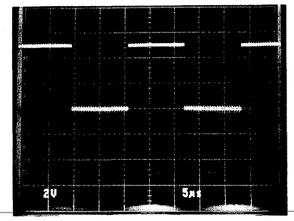
⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div



⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div

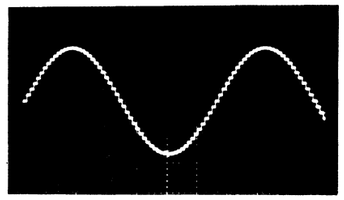


⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div

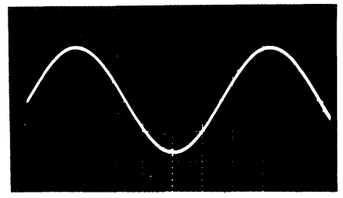


⑲

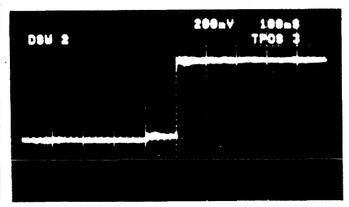
⑳ Q500 **Source** : PLAY MODE
2V/div 50μsec/div



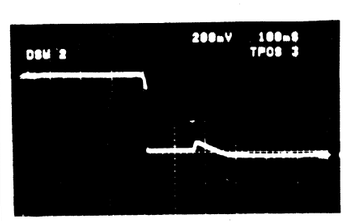
㉑ OUTPUT Lch : PLAY MODE
2V/div 50μsec/div



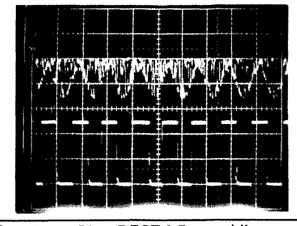
㉒ IC10-5 Pin : POWER ON
2V/div 100msec/div



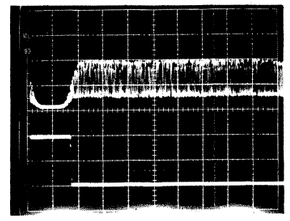
㉒ IC10-5 Pin : POWER OFF
2V/div 100msec/div



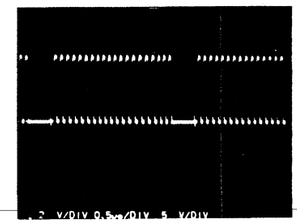
㉓ IC1-22 Pin : TRACKING OPEN
0.1msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-22 Pin : 2V/div



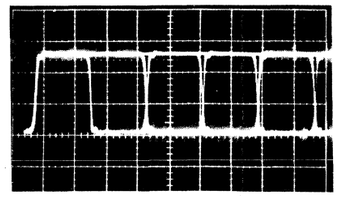
㉔ IC1-21 Pin : DFCT 0.5msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-21 Pin : 5V/div



㉕ IC17-24 Pin : STOP MODE
2V/div 0.5μsec/div



㉘ IC9-1 Pin : DOTX
2V/div 50nsec/div



6. P.C.B 's PARTS LIST

NOTES:

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

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

560Ω	*56 × 10¹*	*561*	*..... RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*..... RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*..... RN2H 0 R 5 K*
1Ω	*010*		*..... RS1P 0 1 0 K*

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

5.62kΩ	*562 × 10¹*	*5621*	*..... RN1/4SR 5 6 2 1 F*

Mark	No.	Description	Parts No.
LED BOARD ASSEMBLY			
SEMICONDUCTORS			
	D901	LED WITH HOLDER	SLH−56VC3H
◉ SUB FUNCTION BOARD ASSEMBLY (PWZ1499)			
SEMICONDUCTORS			
	D801,803	LED WITH HOLDER	SLH−34YC3H3
	D802,804	LED WITH HOLDER	SLH−34VC3H3
SWITCHES			
	S801,802	TACT SW	PSG−065
FUNCTION BOARD ASSEMBLY			
SEMICONDUCTORS			
	IC201	FL UCOM	PDG036
	Q201,202	TRANSISTOR	DTA124ES
	Q204	TRANSISTOR	2SC1740S
	Q207−209	TRANSISTOR	DTA124ES
	D201	LED WITH HOLDER	SLH−56MC3H
SWITCHES			
	S213,214	TACT SW	PSG−065
	S233−236	TACT SW	PSG−065
COILS			
	L201	RADIAL INDUCTOR	LRA010K
	L202	COIL (1UH)	LRA010K
CAPACITORS			
	C201,202	CERAMIC CAPACITOR	CKCYF473Z50
	C203	ELECTR. CAPACITOR	CEAS330M16
	C204	CERAMIC CAPACITOR	CKCYF103Z50
	C205	CERAMIC CAPACITOR	CKCYF473Z50
	C208,209	CERAMIC CAPACITOR	CKCYF473Z50

Mark	No.	Description	Parts No.
RESISTORS			
	R204	RESISTOR ARRAY	RA10S473J
		Other resistors	RD1/6PM□□□J
OTHERS			
	V201	FL TUBE	PEL1025
	X201	CERAMIC RESONATOR	VSS1014
		REMOTE RECEIVER UNIT	GP1U52X
◉ MAIN BOARD ASSEMBLY (PWZ1768)			
SEMICONDUCTORS			
	IC1		CXA1081S
⚠	IC10	IC	M51957AL
⚠	IC11	REGULATOR IC	NJM7805A
⚠	IC12	REGULATOR IC	NJM7905FA
	IC17	DIGITAL FILTER	SM5803AP
	IC2	SERVO CONT. IC	CXA1082BS
⚠	IC22−24	IC PROTECTOR	ICP−N10
⚠	IC26	IC PROTECTOR	ICP−N15
	IC3	EFM DE−MODULATION IC	CXD1167Q
	IC4	UCOM	PD3166A
⚠	IC5	OP−AMP	TA8410K
	IC9	LOGIC IC	MC74HCU04N
	Q1	TRANSISTOR	2SA1399
	Q10	TRANSISTOR	2SA1048
	Q12,13	TRANSISTOR	DTC124ES
	Q14	TRANSISTOR	DTA124ES
	Q15	TRANSISTOR	2SA854S
	Q16	TRANSISTOR	2SC1741S
	Q2	TRANSISTOR	2SC3581
	Q20	TRANSISTOR	DTA124ES
	Q25	TRANSISTOR	DTA124ES
	Q27	TRANSISTOR	DTC124ES

Mark	No.	Description	Parts No.
	Q3	TRANSISTOR	2SA1399
	Q4	TRANSISTOR	DTC124ES
	Q5	TRANSISTOR	2SC3581
	Q6	TRANSISTOR	2SA1399
	Q8,9	TRANSISTOR	2SC1740S
⚠	D1	BRIDGE DIODE	RBV−402LF
⚠	D11	ZENER DIODE	HZ27−1
⚠	D12	ZENER DIODE	HZ22−1
	D32	DIODE	1SS254
⚠	D5	DIODE	10E2
COILS			
	L1	AXIAL INDUCTOR	LAV010K
	L10−15	FERRITE BEAD	VTH1024
	L16	FERRITE BEAD	VTH1015
	L17	AXIAL INDUCTOR	LAU010K
	L18−23		PTH1006
	L2	AXIAL INDUCTOR	LAU010K
	L3	AXIAL INDUCTOR	LAU010K
	L4	PULSE TRANS	PTL1003
	L5,6	FERRITE BEAD	VTH1017
	L7,8	FERRITE BEAD	VTH1015
SWITCHES			
	S1	TACT SW	PSG−064
CAPACITORS			
	C1	AUDIO FILM CAPACITOR	CFTXA472J50
	C10	ELECTR. CAPACITOR	CEAS101M10
	C100,101	ELECTR. CAPACITOR	CENA222M35
	C102,103	ELECTR. CAPACITOR	CENA222M16
	C11	AUDIO FILM CAPACITOR	CFTXA333J50
	C111	CERAMIC CAPACITOR	CKCYF103Z50
	C113	AUDIO FILM CAPACITOR	CFTXA103J50
	C114	ELECTR. CAPACITOR	CEAS330M35
	C115	CERAMIC CAPACITOR	CKCYF473Z50
	C117	CERAMIC CAPACITOR	CCCSL471J50
	C118	ELECTR. CAPACITOR	CEAS101M10
	C12	ELECTR. CAPACITOR	CEAS221M25
	C120	CERAMIC CAPACITOR	CKDYF103Z50
	C121,122	CERAMIC CAPACITOR	CKDYF473Z50
	C123,124	CERAMIC CAPACITOR	CCDSL221J50
	C125	CERAMIC CAPACITOR	CCDSL471J50
	C126	ELECTR. CAPACITOR	CENA101M25
	C127,128	AUDIO FILM CAPACITOR	CFTXA103J50
	C129	ELECTR. CAPACITOR	CENA101M25
	C13	AUDIO FILM CAPACITOR	CFTXA332J50
	C130,131	AUDIO FILM CAPACITOR	CFTXA103J50
	C132,133	CERAMIC CAPACITOR	CKCYF103Z50
	C134,135	AUDIO FILM CAPACITOR	CFTXA103J50

Mark	No.	Description	Parts No.
	C136−139	CERAMIC CAPACITOR	CKCYF103Z50
	C14	AUDIO FILM CAPACITOR	CFTXA103J50
	C140	CERAMIC CAPACITOR	CKCYF103Z50
	C148	ELECTR. CAPACITOR	CEAS101M10
	C149	CERAMIC CAPACITOR	CKCYF103Z50
	C15	ELECTR. CAPACITOR	CEAS221M25
	C150	CERAMIC CAPACITOR	CKCYF103Z50
	C152,153	ELECTR. CAPACITOR	CENA101M25
	C16	ELECTR. CAPACITOR	CEASR47M50
	C17	AUDIO FILM CAPACITOR	CFTXA103J50
	C18	ELECTR. CAPACITOR	CEAS102M16
	C19	ELECTR. CAPACITOR	CENA221M25
	C2	CERAMIC CAPACITOR	CCCCH300J50
	C21	AUDIO FILM CAPACITOR	CFTXA333J50
	C22	ELECTR. CAPACITOR	CEASR47M50
	C23	ELECTR. CAPACITOR	CEAS101M50
	C25	ELECTR. CAPACITOR	CENA101M25
	C26	ELECTR. CAPACITOR	CEAS101M50
	C27	AUDIO FILM CAPACITOR	CFTXA472J50
	C28	ELECTR. CAPACITOR	CENA101M25
	C29	AUDIO FILM CAPACITOR	CFTXA272J50
	C3	CERAMIC CAPACITOR	CCCCH390J50
	C31,32	AUDIO FILM CAPACITOR	CFTXA104J50
	C33	AUDIO FILM CAPACITOR	CFTXA102J50
	C34	ELECTR. CAPACITOR	CEAS4R7M50
	C35	AUDIO FILM CAPACITOR	CFTXA104J50
	C36	ELECTR. CAPACITOR	CEAS101M50
	C37	AUDIO FILM CAPACITOR	CFTXA104J50
	C38	ELECTR. CAPACITOR	CENA101M25
	C39	CERAMIC CAPACITOR	CKCYF103Z50
	C4	CERAMIC CAPACITOR	CCCCH300J50
	C41	ELECTR. CAPACITOR	CENA101M25
	C42	AUDIO FILM CAPACITOR	CFTXA334J50
	C43	ELECTR. CAPACITOR	CEAS101M10
	C44	AUDIO FILM CAPACITOR	CFTXA153J50
	C45	AUDIO FILM CAPACITOR	CFTXA104J50
	C46	AUDIO FILM CAPACITOR	CFTXA103J50
	C47	ELECTR. CAPACITOR	CEAS101M50
	C48	ELECTR. CAPACITOR	CEAS3R3M50
	C49	AUDIO FILM CAPACITOR	CFTXA472J50
	C5	ELECTR. CAPACITOR	CENA471M16
	C50	ELECTR. CAPACITOR	CEAS330M16
	C51	AUDIO FILM CAPACITOR	CFTXA102J50

Mark	No.
	C52
	C53
	C54
	C55
	C60−6
	C67
	C69
	C7
	C81
	C85,86
	C87
	C88,89
	C9
	C90
	C99
RESISTORS	
	VR2
	VR3−7
	VR8
	R137,1
	R14
	R23
	R30
	R47
	R52
	R53
OTHERS	
	CN1
	CN6
	CN7
	DL1,2
	JA2
	JA3
	X1
	X2

Mark	No.	Description	Parts No.
	Q3	TRANSISTOR	2SA1399
	Q4	TRANSISTOR	DTC124ES
	Q5	TRANSISTOR	2SC3581
	Q6	TRANSISTOR	2SA1399
	Q8,9	TRANSISTOR	2SC1740S
⚠	D1	BRIDGE DIODE	RBV−402LF
⚠	D11	ZENER DIODE	HZ27−1
⚠	D12	ZENER DIODE	HZ22−1
	D32	DIODE	1SS254
⚠	D5	DIODE	10E2
COILS			
	L1	AXIAL INDUCTOR	LAV010K
	L10−15	FERRITE BEAD	VTH1024
	L16	FERRITE BEAD	VTH1015
	L17	AXIAL INDUCTOR	LAU010K
	L18−23		PTH1006
	L2	AXIAL INDUCTOR	LAU010K
	L3	AXIAL INDUCTOR	LAU010K
	L4	PULSE TRANS	PTL1003
	L5,6	FERRITE BEAD	VTH1017
	L7,8	FERRITE BEAD	VTH1015
SWITCHES			
	S1	TACT SW	PSG−064
CAPACITORS			
	C1	AUDIO FILM CAPACITOR	CFTXA472J50
	C10	ELECTR. CAPACITOR	CEAS101M10
	C100,101	ELECTR. CAPACITOR	CENA222M35
	C102,103	ELECTR. CAPACITOR	CENA222M16
	C11	AUDIO FILM CAPACITOR	CFTXA333J50
	C111	CERAMIC CAPACITOR	CKCYF103Z50
	C113	AUDIO FILM CAPACITOR	CFTXA103J50
	C114	ELECTR. CAPACITOR	CEAS330M35
	C115	CERAMIC CAPACITOR	CKCYF473Z50
	C117	CERAMIC CAPACITOR	CCCSL471J50
	C118	ELECTR. CAPACITOR	CEAS101M10
	C12	ELECTR. CAPACITOR	CEAS221M25
	C120	CERAMIC CAPACITOR	CKDYF103Z50
	C121,122	CERAMIC CAPACITOR	CKDYF473Z50
	C123,124	CERAMIC CAPACITOR	CCDSL221J50
	C125	CERAMIC CAPACITOR	CCDSL471J50
	C126	ELECTR. CAPACITOR	CENA101M25
	C127,128	AUDIO FILM CAPACITOR	CFTXA103J50
	C129	ELECTR. CAPACITOR	CENA101M25
	C13	AUDIO FILM CAPACITOR	CFTXA332J50
	C130,131	AUDIO FILM CAPACITOR	CFTXA103J50
	C132,133	CERAMIC CAPACITOR	CKCYF103Z50
	C134,135	AUDIO FILM CAPACITOR	CFTXA103J50

Mark	No.	Description	Parts No.
	C136−139	CERAMIC CAPACITOR	CKCYF103Z50
	C14	AUDIO FILM CAPACITOR	CFTXA103J50
	C140	CERAMIC CAPACITOR	CKCYF103Z50
	C148	ELECTR. CAPACITOR	CEAS101M10
	C149	CERAMIC CAPACITOR	CKCYF103Z50
	C15	ELECTR. CAPACITOR	CEAS221M25
	C150	CERAMIC CAPACITOR	CKCYF103Z50
	C152,153	ELECTR. CAPACITOR	CENA101M25
	C16	ELECTR. CAPACITOR	CEASR47M50
	C17	AUDIO FILM CAPACITOR	CFTXA103J50
	C18	ELECTR. CAPACITOR	CEAS102M16
	C19	ELECTR. CAPACITOR	CENA221M25
	C2	CERAMIC CAPACITOR	CCCCH300J50
	C21	AUDIO FILM CAPACITOR	CFTXA333J50
	C22	ELECTR. CAPACITOR	CEASR47M50
	C23	ELECTR. CAPACITOR	CEAS101M50
	C25	ELECTR. CAPACITOR	CENA101M25
	C26	ELECTR. CAPACITOR	CEAS101M50
	C27	AUDIO FILM CAPACITOR	CFTXA472J50
	C28	ELECTR. CAPACITOR	CENA101M25
	C29	AUDIO FILM CAPACITOR	CFTXA272J50
	C3	CERAMIC CAPACITOR	CCCCH390J50
	C31,32	AUDIO FILM CAPACITOR	CFTXA104J50
	C33	AUDIO FILM CAPACITOR	CFTXA102J50
	C34	ELECTR. CAPACITOR	CEAS4R7M50
	C35	AUDIO FILM CAPACITOR	CFTXA104J50
	C36	ELECTR. CAPACITOR	CEAS101M50
	C37	AUDIO FILM CAPACITOR	CFTXA104J50
	C38	ELECTR. CAPACITOR	CENA101M25
	C39	CERAMIC CAPACITOR	CKCYF103Z50
	C4	CERAMIC CAPACITOR	CCCCH300J50
	C41	ELECTR. CAPACITOR	CENA101M25
	C42	AUDIO FILM CAPACITOR	CFTXA334J50
	C43	ELECTR. CAPACITOR	CEAS101M10
	C44	AUDIO FILM CAPACITOR	CFTXA153J50
	C45	AUDIO FILM CAPACITOR	CFTXA104J50
	C46	AUDIO FILM CAPACITOR	CFTXA103J50
	C47	ELECTR. CAPACITOR	CEAS101M50
	C48	ELECTR. CAPACITOR	CEAS3R3M50
	C49	AUDIO FILM CAPACITOR	CFTXA472J50
	C5	ELECTR. CAPACITOR	CENA471M16
	C50	ELECTR. CAPACITOR	CEAS330M16
	C51	AUDIO FILM CAPACITOR	CFTXA102J50

Mark	No.	Description	Parts No.
	C52	CERAMIC CAPACITOR	CKCYF473Z50
	C53	CERAMIC CAPACITOR	CCCCH300J50
	C54	ELECTR. CAPACITOR	CEAS101M50
	C55	CERAMIC CAPACITOR	CKCYF473Z50
	C60−66	CERAMIC CAPACITOR	CKCYF103Z50
	C67	ELECTR. CAPACITOR	CEANP100M25
	C69	ELECTR. CAPACITOR	CEASR33M50
	C7	ELECTR. CAPACITOR	CENA471M16
	C81	AUDIO FILM CAPACITOR	CFTXA681J50
	C85,86	CERAMIC CAPACITOR	CCCCH120J50
	C87	ELECTR. CAPACITOR	CEAS330M50
	C88,89	ELECTR. CAPACITOR	CEAS101M50
	C9	AUDIO FILM CAPACITOR	CFTXA333J50
	C90	ELECTR. CAPACITOR	CEAS101M50
	C99	CERAMIC CAPACITOR	CKCYF473Z50
RESISTORS			
	VR2	VR	VRTB6VS103
	VR3−7	VR	VRTB6VS223
	VR8	VR	VRTS6VS102
	R137,138	CARBON FILM RESISTOR	RDR1/2PM2R4J
	R14	CARBON FILM RESISTOR	RDR1/2PM240J
	R23		RD1/4PM153J
	R30	METAL OXIDE RESISTOR	RN1/6PQ3601F
	R47	CARBON FILM RESISTOR	RDR1/2PM103J
	R52	CARBON FILM RESISTOR	RDR1/2PM470J
	R53	CARBON FILM RESISTOR	RDR1/2PM103J
	Other resistors		RD1/6PM□□□J
OTHERS			
	CN1	CONNECTOR	5597−21APB
	CN6	JUMPER CONNECTOR 10−P	KPC10
	CN7	JUMPER CONNECTOR 9−P	KPC9
	DL1,2	DELAY LINE	PTE1012
	JA2	PIN JACK 1−P	PKB1004
	JA3		TOTX173
	X1	CERAMIC OSCILATOR (4.0MHZ)	FCR4.0MC
	X2	CRISTAL RESONATOR	PSS1001

Mark	No.	Description	Parts No.
◉ **AUDIO BOARD ASSEMBLY (PWZ1769)**			
SEMICONDUCTORS			
	IC500,501	D/A CONVERTER	PCM63P−K
	IC502,503	OP−AMP IC	NJM5532DD
⚠	IC504	REGULATOR IC	NJM7805FA
⚠	IC505	REGULATOR IC	NJM7905FA
	IC506,507	OP−AMP IC	NJM2068DD
	IC508,509	LOGIC IC	MC74HCU04N
	Q500,501	FET	2SK364
	Q502,503	FET	2SJ104
	Q512,513	TRANSISTOR	2SC3068
	Q514,515	FET	2SK364
	Q516,517	FET	2SJ104
	Q520,521	TRANSISTOR	2SC3068
	Q522	FET	DTC124ES
	D511−513	DIODE	1SS254
COILS			
	L501,502	FERRAITE BEAD	PTH1002
	L503,504		PTH1006
CAPACITOR			
	C500−503	ELECTR. CAPACITOR	CENA101M25
	C504,505	AUDIO FILM CAPACITOR	CFTXA104J50
	C506,507	ELECTR. CAPACITOR	CENA101M25
	C508,509	AUDIO FILM CAPACITOR	CFTXA104J50
	C510,511	ELECTR. CAPACITOR	CENA101M25
	C512,513	AUDIO FILM CAPACITOR	CFTXA104J50
	C514−519	ELECTR. CAPACITOR	CENA101M25
	C520,521	AUDIO FILM CAPACITOR	CFTXA104J50
	C522,523	STYRENE CAPACITOR	CQSF101J50
	C527	ELECTR. CAPACITOR	CENA100M50
	C530−533	ELECTR. CAPACITOR	CENA101M25
	C534−537	AUDIO FILM CAPACITOR	CFTXA103J50
	C546,547	STYRENE CAPACITOR	CQSF681J50
	C548,549	PP CAPACITOR	CQPYA752J2A
	C550,551	CAPACITOR(0.01)	PCL1023
	C552,553	STYRENE CAPACITOR	CQSF122J50
	C556−559	ELECTR. CAPACITOR	CENA101M25
	C560−563	AUDIO FILM CAPACITOR	CFTXA103J50
	C564,565	ELECTR. CAPACITOR	PCH1094
	C566,567	STYRENE CAPACITOR	CQSF102J50
	C568,569	CERAMIC CAPACITOR	CKCYF473Z50
	C576	AUDIO FILM CAPACITOR	CFTXA473J50
	C578,579	STYRENE CAPACITOR	CFTXA103J50
	C580,581	AUDIO FILM CAPACITOR	CFTXA103J50

Mark	No.	Description	Parts No.
	C582,583	CERAMIC CAPACITOR	CKDYF473Z50
	C584–587	ELECTR. CAPACITOR	CENA221M50
	C590,591	AUDIO FILM CAPACITOR	CFTXA103J50
	C592,593	ELECTR. CAPACITOR	CENA221M50
	C594,595	AUDIO FILM CAPACITOR	CFTXA103J50
	C596	CERAMIC CAPACITOR	CKCYF473Z50
RESISTORS			
	VR506–509	VR	PCP–041
	R500,501	CARBON FILM RESISTOR	RDR1/4PM102J
	R502,503	CARBON FILM RESISTOR	RDR1/4PM334J
	R504,505	CARBON FILM RESISTOR	RDR1/4PM102J
	R510,511	CARBON FILM RESISTOR	RDM1/2P472J
	R544,545	RESISTOR	RDM1/2P471J
	R560,561	CARBON FILM RESISTOR	RDR1/4PM361J
	R562,563	CARBON FILM RESISTOR	RD1/6PM361J
	R564	CARBON FILM RESISTOR	RDR1/4PM562J
	R574	CARBON FILM RESISTOR	RD1/6PM103J
	R575	CARBON FILM RESISTOR	RD1/6PM473J
		Other resistors	RDR1/2PM□□□J
OTHERS			
	CN503	JUMPER CONNECTOR 10–P	KPC10
	JA501	JACK 2–P	PKB1011

POWER SUPPLY BOARD ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
⚠	IC613	REGULATOR IC	NJM7812FA
⚠	IC614	REGULATOR IC	NJM7912FA
	IC615	OP AMP	NJM5532DD
⚠	IC620,621	IC PROTECTOR	ICP–N10
⚠	Q617	POWER TRANSISTOR	2SB857
	Q618	TRANSISTOR	2SD755
⚠	Q619	POWER TRANSISTOR	2SD1133
	Q620	TRANSISTOR	2SD755
	Q621	TRANSISTOR	2SB715
⚠	Q622	POWER TRANSISTOR	2SB857
	Q623	TRANSISTOR	2SB715
⚠	Q624	POWER TRANSISTOR	2SD1133
	Q625	TRANSISTOR	2SA933S
	Q626	TRANSISTOR	2SC1740S
⚠	D620–627	DIODE	10DF2
⚠	D628–631	ZENER DIODE	HZ5CLL

Mark	No.	Description	Parts No.
COILS			
	L601,602		PTH1006
CAPACITORS			
	C602,603	ELECTR. CAPACITOR	CENA470M50
	C604,605	ELECTR. CAPACITOR	CENA222M35
	C606,607	ELECTR. CAPACITOR	CENA102M35
	C608–611	CERAMIC CAPACITOR	CKCYF103Z50
	C612,613	ELECTR. CAPACITOR	CENA102M35
	C614–619	CERAMIC CAPACITOR	CKCYF103Z50
	C620,621	ELECTR. CAPACITOR	CENA470M50
	C624,625	AUDIO FILM CAPACITOR	CFTXA103J50
RESISTORS			
	R647,648	METAL OXIDE RESISTOR	RN1/4PQ3001F
	R649,650	METAL OXIDE RESISTOR	RN1/4PQ4301F
		Other resistors	RDR1/4PM□□□J

PRIMARY BOARD ASSEMBLY

COIL

Mark	No.	Description	Parts No.
⚠	L301	LINE FILTER	PTL1002

SWITCH

Mark	No.	Description	Parts No.
⚠	S301	POWER SW	PSA–009

CAPACITORS

Mark	No.	Description	Parts No.
⚠	C301–303	POWER CAPACITOR (0.01μF)	VCG–048

SERVO POWER SUPPLY BOARD ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
⚠	IC701	REGULATOR IC	NJM7808FA
⚠	IC702	REGULATOR IC	NJM7908FA

CAPACITORS

No.	Description	Parts No.
C701–704	ELECTR. CAPACITOR	CENA101M50

COILS

No.	Description	Parts No.
L701,702	BEAD	PTH1006

7. ADJUSTMENTS

The following adjustments have to be performed in the given order.

• Adjustment items

1. Adjusting the tracking error offset, focus offset, and RF offset.
2. Adjusting the RF level.
3. Checking the LD (laser diode) power.
4. Checking the focus lock and spindle lock.
5. Adjusting the grating.
6. Adjusting the tracking balance.
7. Adjusting the tangential screw.
8. Adjusting the radial screw.
9. Adjusting the focus gain.
10. Adjusting the tracking gain.
11. Adjusting the VCO free run frequency.
12. D/A converter

• Instruments required for adjustments

1. Dual channel oscilloscope
2. Optical power meter
3. Test disc (YEDS-7), 8-cm-disc
4. Loop gain adjustment filter
5. Signal generator
6. Frequency counter
7. Other standard tools

• Test mode

All adjustments have to be performed in the test mode.

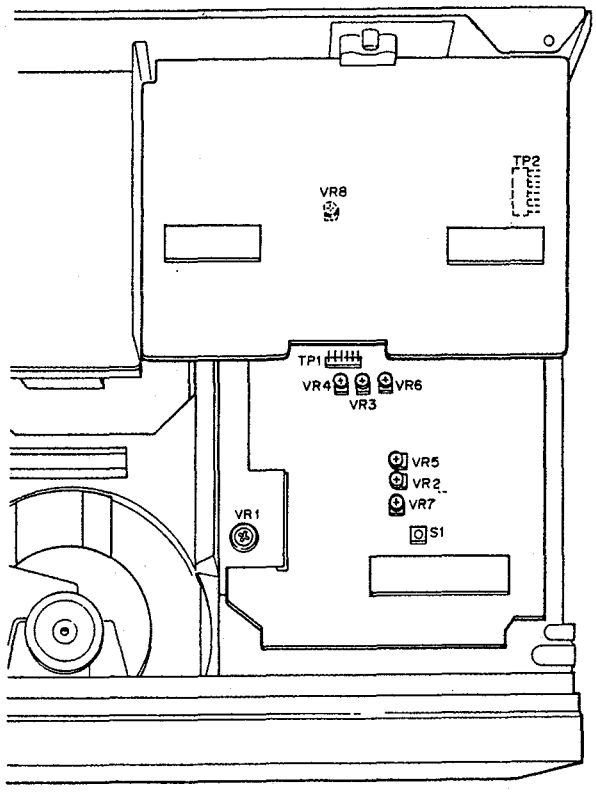
Procedures for setting and cancelling the test mode.

1. Turn on the power switch (S301) to set the test mode while holding down the test mode switch (S1).
2. Turn off the power switch to cancel the test mode.

In the test mode, the keys have the functions shown in table 7-1.

•Adjustment VRs (variable resistor) and their names

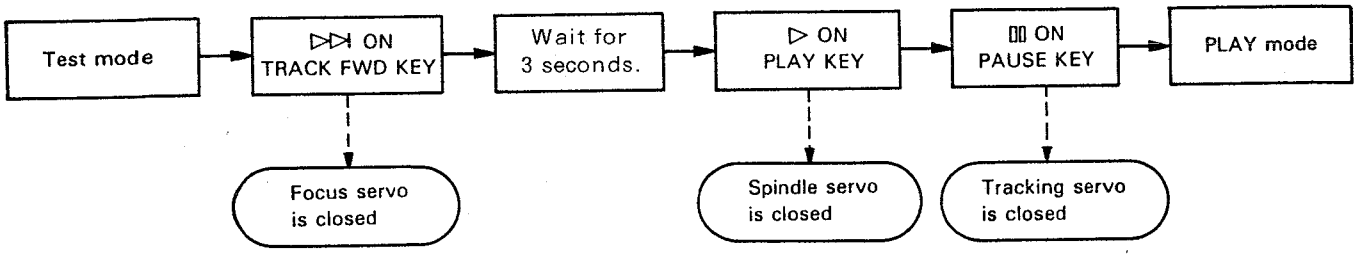
VR1: Laser power
VR2: RF offset (RF OFS)
VR3: Focus gain (FCS GAN)
VR4: Tracking gain (TRK GAN)
VR5: Tracking balance (TRK BAL)
VR6: Focus offset (FCS OFS)
VR7: Tracking offset (TRK OFS)
VR8: VCO adjustment (VCO ADJ)



Components to be adjusted

Each servo is closed or opened independently by an appropriate operation in the test mode. To set the normal play mode, each servo should be closed one by one in the serial sequence. You cannot enter the play mode by depressing the PAUSE key (⏸) in the test mode. The keys should be depressed in the following sequence to enter the play mode from the stop mode.

* Each servo should be operated in the serial sequence in the test mode.

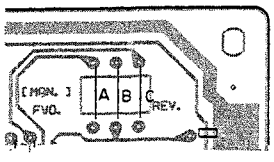


•Key Functions in Test Mode

Symbol	Key name	Function in the test mode	Remarks
⏭	TRACK FWD	Focus servo closed	To turn on the laser diode, move the focus actuator up and down, and close the focus servo.
▷	PLAY	Spindle servo closed	To close the servo in the CLV-A mode after activating the spindle motor.
⏸	PAUSE	Tracking servo closed/opened	To perform toggle operations. When it is depressed, the tracking servo is closed and the system switches to the play status. (The focus servo and spindle servo must be closed when it is depressed.) Then the PAUSE indicator is lit. Depress it again to open the tracking servo.
□	STOP	Stop	To stop all the servos and reset the system to the initial status.
⏏	OPEN/CLOSE	(Disc tray) Open/close	To open or close the disc tray. The pickup, however, will not return to the home position when the tray is open and will remain in the current status when it is closed.
	DISPLAY (MANUAL, OFF SEARCH FWD in the remote mode)	Carriage forward	To move the carriage rapidly (at the rate of about 1 cm/sec) toward the outer radius. Do not move it too far since there are no safety devices to stop the carriage.
	OUTPUT SEL (MANUAL SEARCH REV in the remote mode)	Carriage reverse	To move the carriage rapidly (at the rate of about 1 cm/sec) toward the inner radius. Do not move it too far since there are no safety devices to stop the carriage.

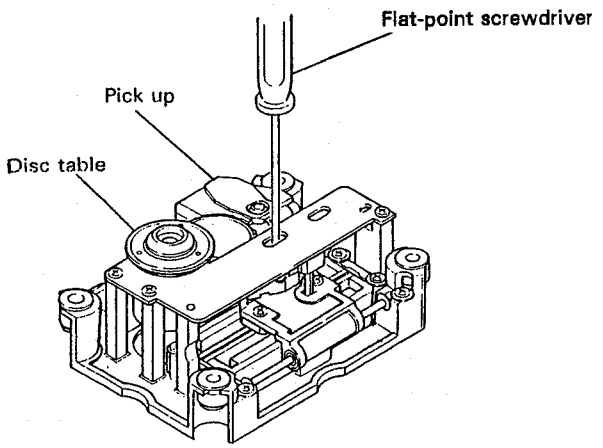
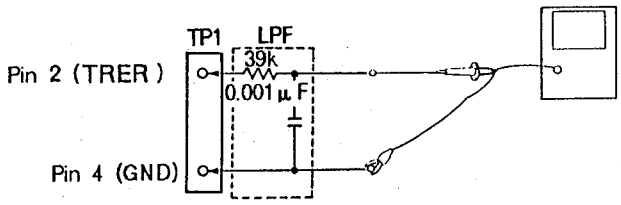
Table 7-1
The above keys can be used for remote control in the test mode.

•When performing a manual search



* Connect the JPs on the control circuit board to perform a MANUAL SEARCH. Layout of the control circuit board Connecting between JPs, C and B: MANUAL SEARCH REV Connecting between JPs, A and B: MANUAL SEARCH FWD

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
1 Adjusting the tracking error offset, focus offset, and RF offset.						
					Tracking error offset	•Switch to the test mode (see page 34).
				VR5 (TRX BAL)	45°	• Rotate VR5, TRK BAL (tracking balance) about 45° leftward from the center.
			Pin 2 in TP1 (TRK ER)	VR7 (TRX OFS)	0V±50mV	• Adjust VR7, TRK OFS (tracking offset) so that the TRK ER (tracking error) voltage at pin 2 of TR1 becomes 0V±50mV.
			Pin 6 in TP1 (FCS ER)	VR6 (FCS OFS)	Focus offset 0V±50mV	• Adjust VR6, FCS OFS (focus offset) so that the FCS ER (focus error) voltage at pin 6 of TR1 becomes 0V±50mV.
			Pin 1 in TP1 (RF output)	VR2 (RF.OFS)	RF offset 100mV-±50mV	• Adjust VR2, RF OFS (RF offset) so that the output (RF output) voltage at pin 1 of TR1 becomes 100mV±50mV.
						Note: When adjusting the tracking error offset, "the tracking balance adjustment in procedure 6" must always be performed.
2 Adjusting the RF level						
						•Switch to the test mode (see page 34).
						•Measure the P-P voltage in the RF waveform by playing the test disc and connecting pin 1 of TP1 (RF output) to the oscilloscope.
			Pin 1 of TP1 (RF output)	VR1 (laser power)	1.5V $^{+0.2V}_{-0V}$	• Adjust VR1 so that the voltage becomes 1.5V $^{+0.2V}_{-0V}$.
3 Checking the LD (laser diode) power						
						•Switch to the test mode (see page 34).
						•Turn on the LD (laser diode) by depressing the TRACK FWD key (▷▷I).
				Check	0.13mV or less	•Check that the LD power is 0.13mV or less by placing the optical power meter right above the object lens.

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
4	Adjusting the focus lock and spindle lock					
	V 0.5V/div	H 100msec/div	Pin 1 in TP1 (RF output)		With the RF output Rotation in the positive (clockwise) direction	• Set the test disc. • Turn the test mode (see page 34). • Move the pickup near the center of the disc by using the MANUAL SEARCH FWD JPs. • While observing the RF output at pin 1 of TP1 on the oscilloscope, check that RF signals are output after the TRACK FWD key (▷▷I) has been depressed. • Depress the PLAY key (▷) and check that the disc rotates in the positive (clockwise) direction at a nearly constant rate (about 300rpm near the center) and does not rotate in the negative direction or run with irregular speed.
5	Adjusting the grating (1) (In the case of a 8-cm-disc)					
	 Figure 7-1					• Switch to the test mode (see page 34) • Move the pickup near the inner radius by using the MANUAL SEARCH FWD JPs so that the grating adjustment screw of the pickup can be seen from the hole on the spindle motor side, one of the elliptical holes which are located on the base plate of the servo mechanism. • Insert an appropriate slotted screwdriver (2mm precision screwdriver) from the upper side of the mechanism as shown in figure 7-1, and make sure that the grating adjustment screw can be turned. • Put the disc on it.
	 Figure 7-2					• Depress the TRACK FWD key (▷▷I) and then the PLAY key (▷) to close the focus servo and spindle servo (the tracking servo will not close). • Observe the TRER (tracking error) waveform at pin 2 of TP1 on the oscilloscope. To perform this, insert the lowpass filter with the cutoff frequency of 4kHz between pin 2 (TRER) and pin 4 (GND) of TP1 (figure 7-2).

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
	0.5V/div	5msec/div	Pin 2 of TP1 (TRK ER)	Grating adjustment screw	Zero point	• Locate the zero point (see photo 7-1) by turning the slotted screwdriver.
				Grating adjustment screw	Maximum amplitude	• Then locate the first peak of the waveform (tracking error signals; see photo 7-3) by rotating the slotted screwdriver slowly from the zero point in the counter-clockwise direction. Note: If there is too much pressure on the slotted screwdriver, the pickup will lean in the tangential direction, making the adjustment difficult. • Finally remove the lowpass filter, and check that the P-P voltage of the tracking error signals does not vary with a large amplitude when the pickup is moved near the inner disc radius and to the outer disc radius. If the level shifts by ±10% or more, turn the grating adjustment screw again to locate the position where the error amplitude becomes maximum.

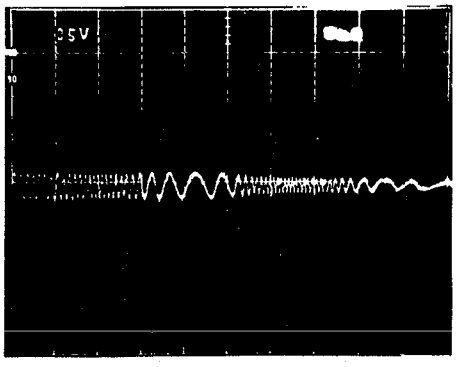


Photo 7-1 Zero point

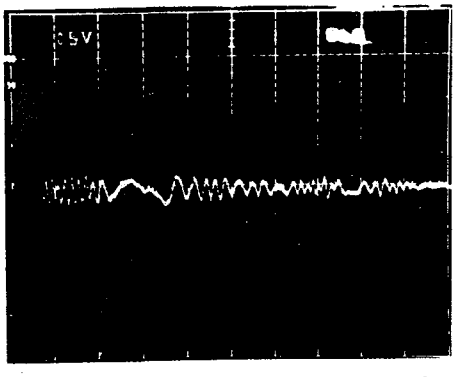


Photo 7-2 Waveform off from the zero point

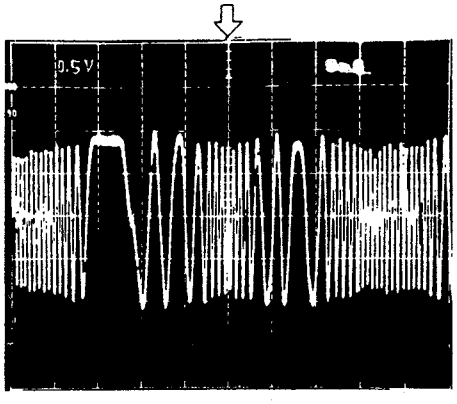


Photo 7-3 Maximum amplitude

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
5	Adjusting the grating (2) (in the case of a disc with 60 minutes recording time or more)					

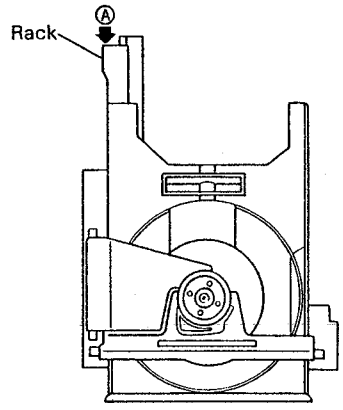


Figure 7-3

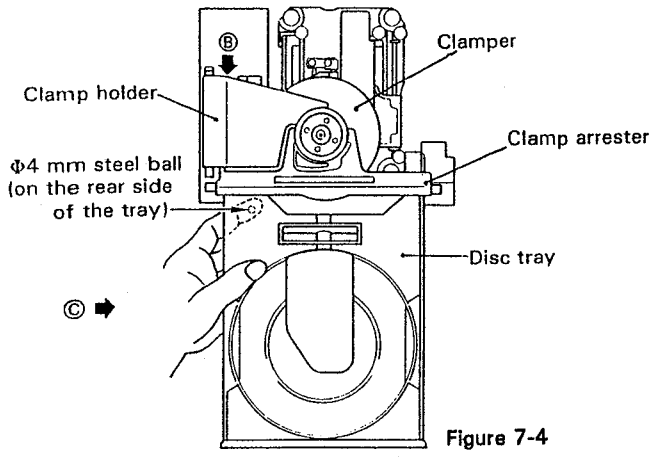


Figure 7-4

The following adjustments must be performed after the disc tray has been removed.

- Removing the disc tray

1. While pressing the back end Ⓐ on the rack in figure 7-3, pull the disk tray (*1) until it stops (this stop position is shown in figure 7-4).

(*1) Pressing the back end Ⓐ of the rack first unlocks the clamp of the disc. By holding it pressed after unlocking, the disc tray can be pulled.

2. While lifting part Ⓑ of the clamp holder in figure 7-4 with your right hand, hold and pull part Ⓒ of the tray with your left hand. Care is required not to drop the ϕ4 steel ball (hold the ball with your index finger).

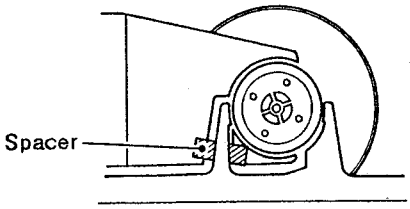


Figure 7-5

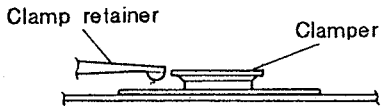


Figure 7-6

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
						This adjustment is only possible on those discs that have pits up to 115mm in a radial direction; it cannot be performed with the test disc (YEDS-7). • Switch to the test mode (see page 34) • Set the test disc. Move the pickup to the outermost radius so that the pickup is on the pit surface of the disc, and the grating adjustment screw of the pickup can be seen through the hole on the servo mechanism (see figure 7-7). • Depress the TRACK FWD key (▷▷|) and then the PLAY key (▷) to close the focus servo and spindle servo (the tracking servo will not close). • Insert the 4kHz lowpass filter and observe the TRK ER (tracking error) waveform at pin 2 of TP1 on an appropriate oscilloscope (see figure 7-8).
	0.5V/div	5msec/div	Pin 2 of TP1	Grating Grating	Zero point Maximum amplitude	• Locate the zero point (photo 7-1) by turning the slotted screwdriver. • Then locate the first peak of the waveform (tracking error signals; see photo 7-3) by rotating the screwdriver slowly from the zero point in the counter-clockwise direction. Note: If there is too much pressure on the slotted screwdriver, the pickup will lean in the tangential direction, making the adjustment difficult. • Finally remove the lowpass filter, and check that the P-P voltage of tracking error signals does not indicate a large amplitude when the pickup is moved near the inner disc radius and to the outer disc radius. If the level shifts by ±10% or more, turn the grating adjustment screw again to locate the position where the error amplitude becomes maximum.

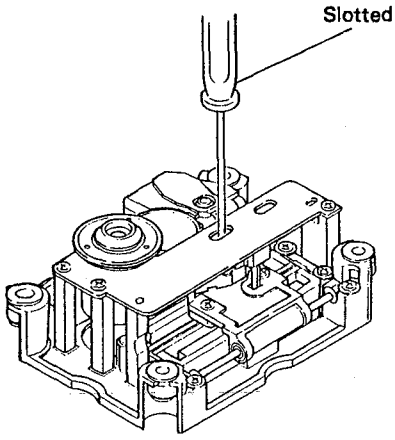


Figure 7-7

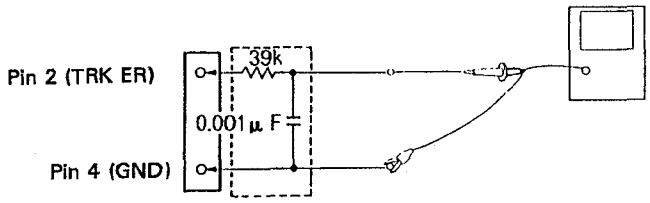


Figure 7-8

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
6 Adjusting the tracking balance						
	0.5V/div	5msec/div	Pin 2 of TP1 (TRK ER)	VR5 (TRK BAL)		• Set the test disc. • Switch to the test mode (see page 34). • Move the pickup near the center of the disc by using MANUAL SEARCH FWD JPs. • Depress the TRACK FWD key (▷▷I) and the PLAY key (▷) to rotate the disc. • While observing the TRK ER (tracking error) at pin 2 of TP1 on the oscilloscope, adjust VR5, TRK BAL (tracking balance) so that the DC component in the tracking error becomes zero.

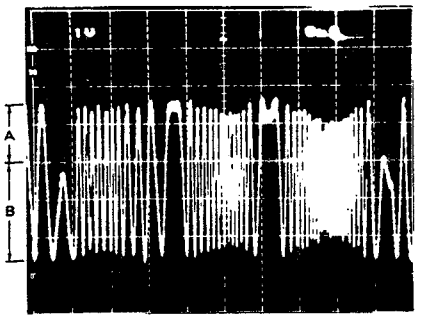


Photo 7-4 With DC component

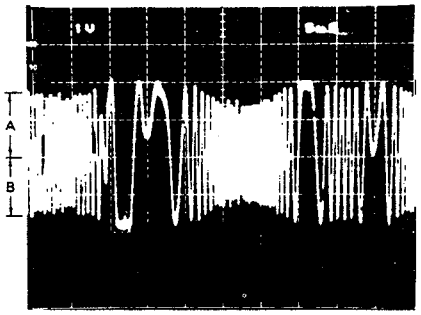
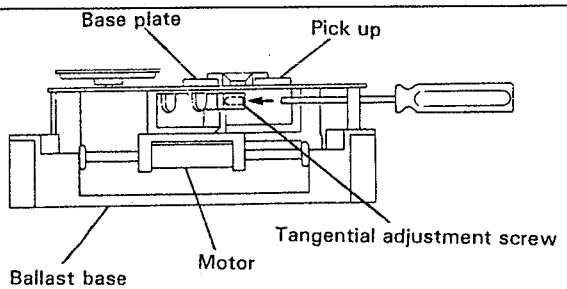


Photo 7-5 Without DC component

7 Adjusting the tangential screw (which must be done with the mechanism removed or with the audio board assembly on the rear removed)



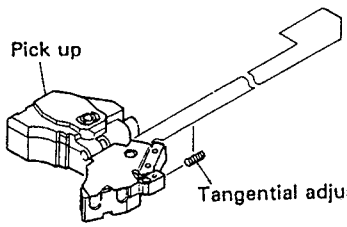
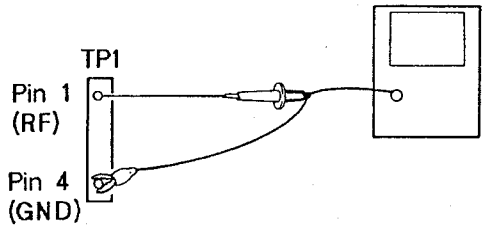


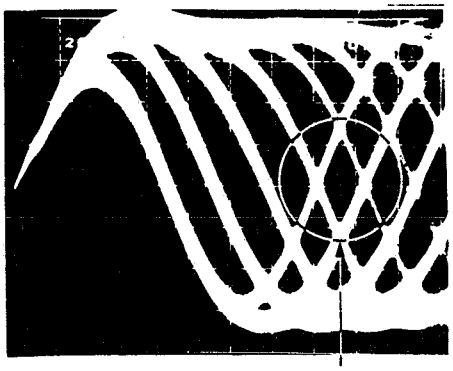
Figure 7-9

•Turn the test mode (see page 34).
• Open the tray and set the disc.
• Move the pickup near the center of the disc by using the MANUAL SEARCH FWD JPs.
• Put an appropriate hexagon head screw driver on the tangential adjustment screw from the rear side of the mechanism.
• Close the tray.

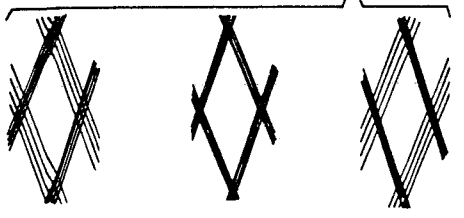
Note: Do not use an L shape type hexagon head screwdriver. Use a straight one as shown in figure 7-9. If only an L shape type screw driver is available, the tray must be removed (refer to item 1 for the grating adjustment in procedure 5 on page 37).

• Close all the servos by depressing the TRACK FWD key (▷▷I), the PLAY key (▷), and the PAUSE key (II) in this order (the pause indicator is lit).

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
		200nsec/div	Pin 1 of TP1 (RF output)	Tangential adjustment screw	Best I-pattern setting	• Close the focus, spindle and tracking servos by depressing the TRACK FWD key (▷▷I), the PLAY key (▷), and the PAUSE key (▯▯) in this order. • While observing the RF output at pin 1 of TP1 on the oscilloscope, adjust the tangential adjustment screw so that the I-pattern looks fine. • Put the tangential adjustment screw at the midpoint between the two settings where the I-pattern starts to become distorted while turning this screw in the clockwise or counter-clockwise direction. The best I-pattern may be obtained when the I-pattern looks fine and the diamonds in the I-pattern are formed with the thinnest lines possible (see Photo 7-8).  Figure 7-10 Note: While adjusting, lift the hexagon head screwdriver a bit so that the pickup will not move down.



Diamond to be observed



Off from the best setting

Best setting

Off from the best setting

Photo 7–6

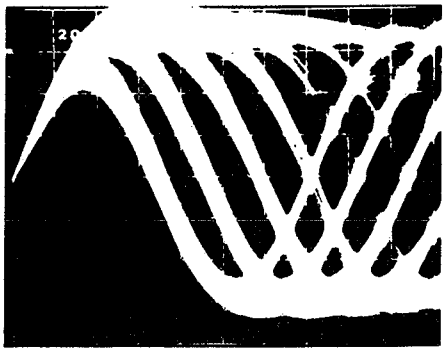


Photo 7–7

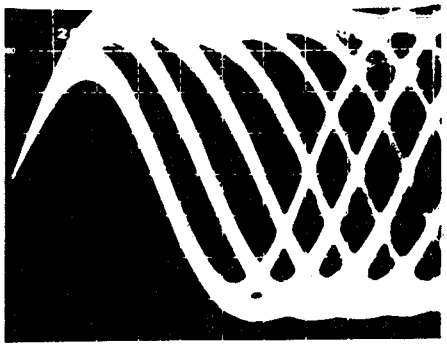


Photo 7–8

Photo 7–9

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
8	Radial adjustment					
			Pin 1 of TP1 (RF output)	Adjusting the radial adjustment screw	Best I-pattern setting	• This adjustment must be performed after the disc tray has been removed. Note: Refer to "5. Adjusting the grating (2)" on page 39 for removing the tray. • Set the test disc. • Switch to the test mode (see page 34). • Move the pickup near the center so that the tangential adjustment screw can be seen from the top surface by using the MANUAL SEARCH FWD JPs (see figure 7-5). • Close all the servos by depressing the TRACK FWD key (▷▷I), the PLAY key (▷), and the PAUSE key (▯▯) in this order (the pause indicator is lit). • While observing the RF output at pin 1 of TP1 on the oscilloscope, adjust the radial adjustment screw so that the I-pattern looks fine (figure 7-11). •Put the radial adjustment screw at the midpoint between the two settings where the I-pattern starts to become distorted while turning this screw in the clockwise or counter-clockwise direction. The best I-pattern may be obtained when the I-pattern looks fine and the diamonds in the I-pattern are formed with the thinnest lines possible (see figure 7-8). • Repeat the tangential and radial adjustments alternately at least twice.

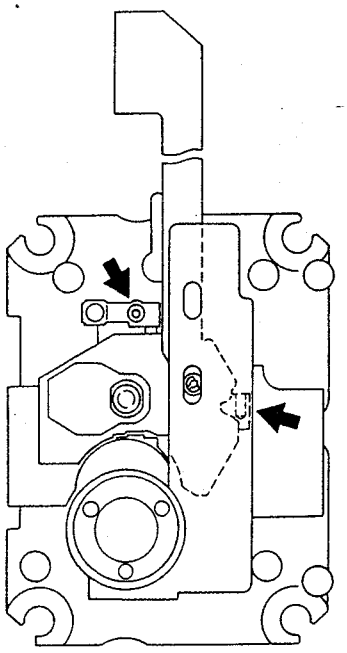


Figure 7-11

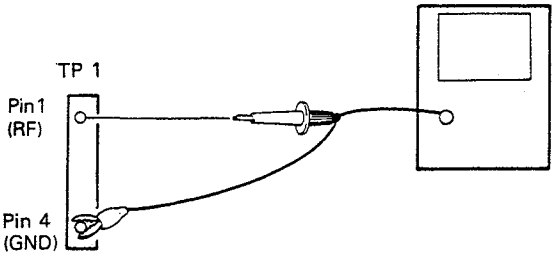


Figure 7-12

Pro-cedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
						• Mount the disc tray according to the following procedure after the adjustments. 1. Remove the disc and then the spacer. 2. While lifting part Ⓑ of the clamp holder in figure 7-4 with your right hand, hold part Ⓒ of the tray with your left hand (hold the ϕ4 steel ball with your index finger of the left hand in order not to drop the ball), insert the tray while putting the slide base into the plastic part on the loading base as shown in figure 7-13. (Care is required not to damage the front panel which may be occured when the front side of the front panel touches the burring on the slide base in the ϕ4 steel ball section.) 3. Insert the slide base into the two plastic parts at the back of the loading base (figure 7-14). 4. Push the tray all the way down.

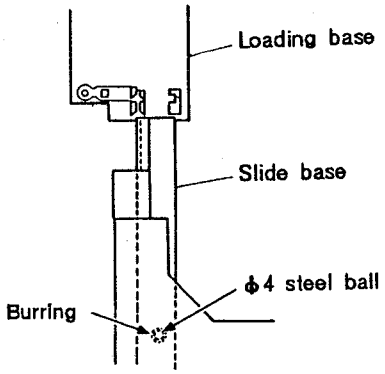


Figure 7-13

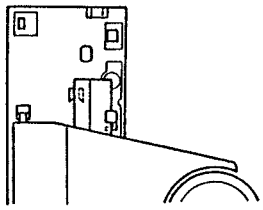


Figure 7-14

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
9	Adjusting the focus gain					
	CH1(X), CH2(Y), 20mv/div, 5mv/div (probe 10:1)		X-axis Pin 5 of TP1 (FCS IN) Y-axis Pin 6 of TP1 (FCS ER)	VR3 (FCS GAN)	Phase difference 90°	• Connect the oscillator to the oscilloscope as shown in figure 7-15 while the power is off. • Set the unit to the normal PLAY mode. • Turn on the power on the oscilloscope and output 1.2kHz 1Vp-p. Note: Some oscillators output a DC signal when the power is turned on. In this case, connect the oscillator after its power has been turned on. • Adjust VR3, FCS GAN (focus gain) so that the Lissajous circle on the oscilloscope becomes a horizontal circle (with 90° for the phase difference).

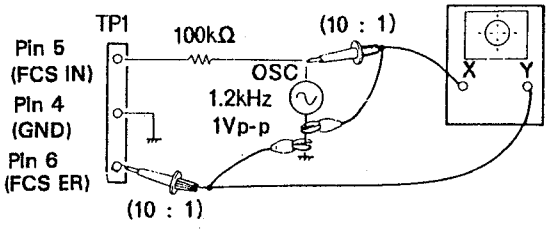
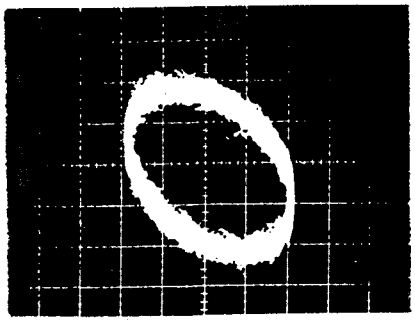
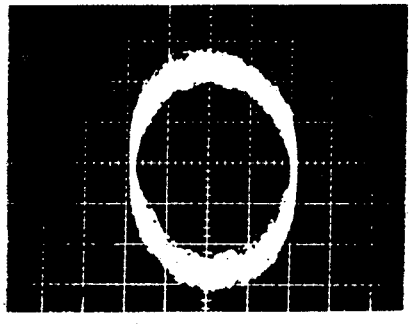


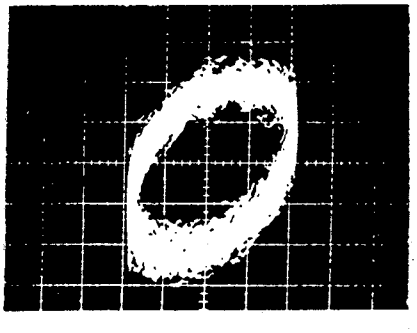
Figure 7-15



Large gain
Photo 7-10



Optimal gain
Photo 7-11



Small gain
Photo 7-12

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
10	Adjusting the tracking gain					
	CH1(X), CH2(Y), 50mv/div, 5mv/div (probe 10:1)		X-axis Pin 3 of TP1 (TRK IN) Y-axis Pin 2 of TP1 (TRK ER)	VR4 (TRR GAN)	Phase difference 90°	• Connect the oscillator to the oscilloscope as shown in figure 7-16 while the power is off. • Set the unit to the normal PLAY mode. • Turn on the power on the oscilloscope and output 1.2kHz 2Vp-p. *Note: Some oscillators output a DC signal when the power is turned on. In this case, connect the oscillator after its power has been turned on.* • Adjust VR4, TRK GAN (focus gain) so that the Lissajous circle on the oscilloscope becomes a horizontal circle (with 90° for the phase difference).

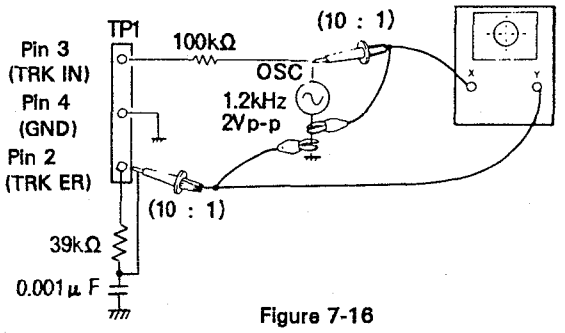
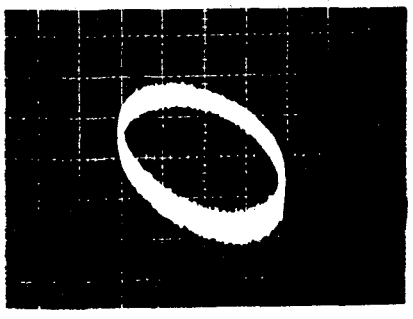
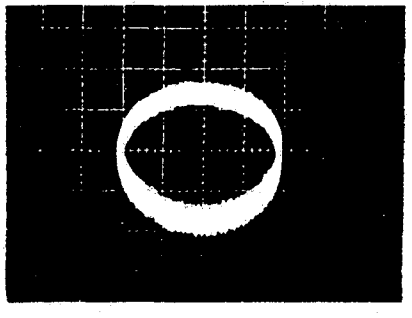


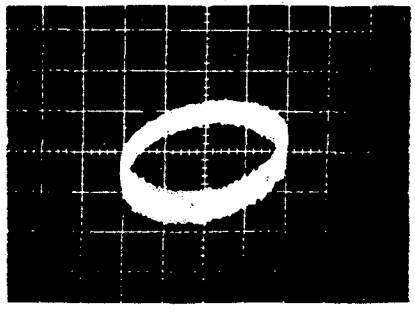
Figure 7-16



Large gain
Photo 7-13



Optimal gain
Photo 7-14



Small gain
Photo 7-15

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
11	Adjusting the VCO free run					
			Pin 2 of TP2	VR8 (VCO.ADJ)	4.275±0.025 MHz	• Switch to the test mode (see page 34). • Shunt the ASY and GND jumpers by using a slotted screwdriver or similar (see figure 7-17). • Connect pin 2 of TP2 to a relevant frequency counter that can be used at 10MHz or higher. • Adjust VR8, VCO ADJ (VCO free run adjustment) so that the frequency counter indicates 4.275±0.025MHz.
12	**Checking the S shape (focus error)**					
			Pin 6 of TP1 (FCS ER)			• Switch to the test mode (see page 34). • Shunt pin 5 (FCS IN: focus in) of TP1 to GND. • Depress the TRACK FWD key (▷▷I) and observe the waveform at pin 6 (FCS ER: focus in) of TP1.

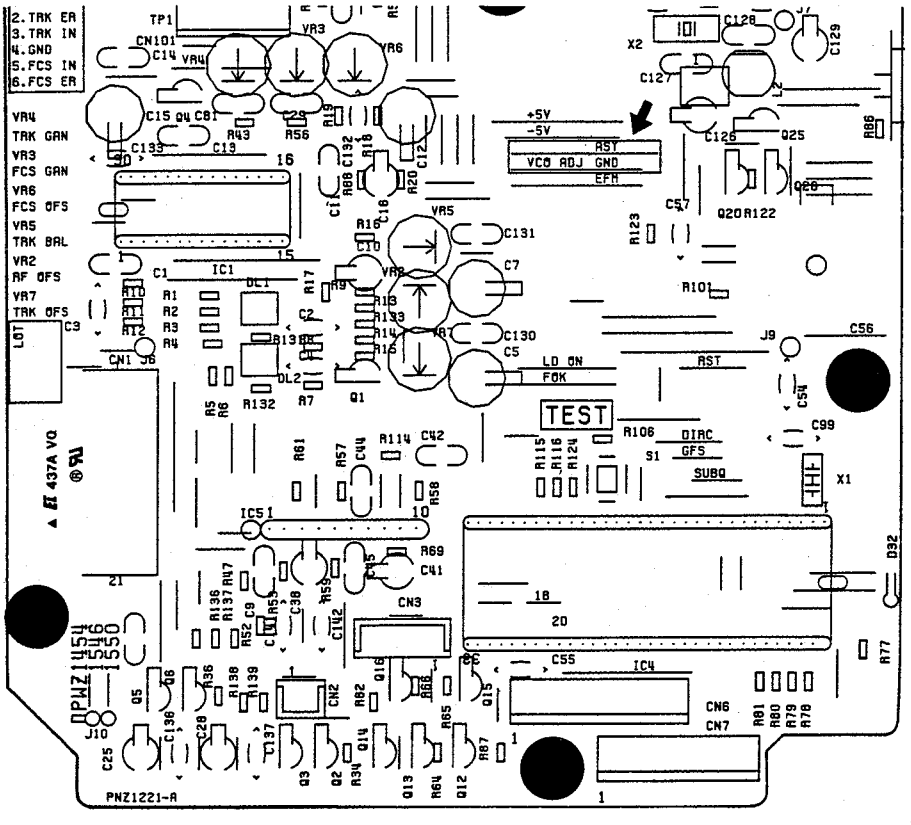


Figure 7-17

Pro-cedure	Oscilloscope range		Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
	V	H				
13	Adjusting the D/A converter (BIT2)					
						• Remove the six registers (R500-R505) in the audio board assembly shown in figure 8.

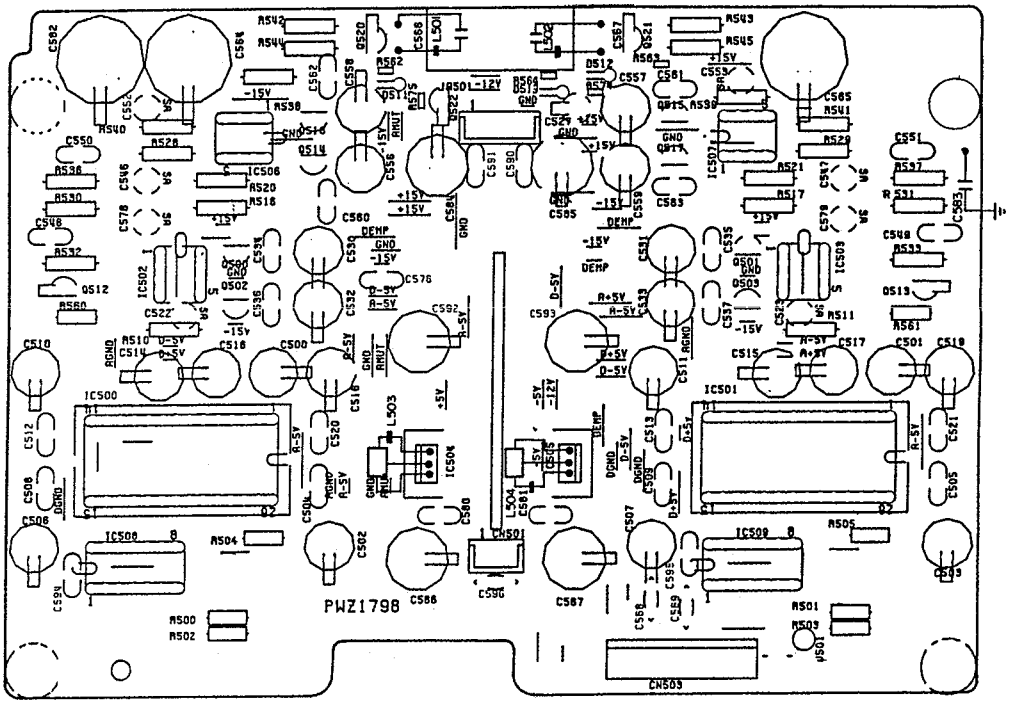
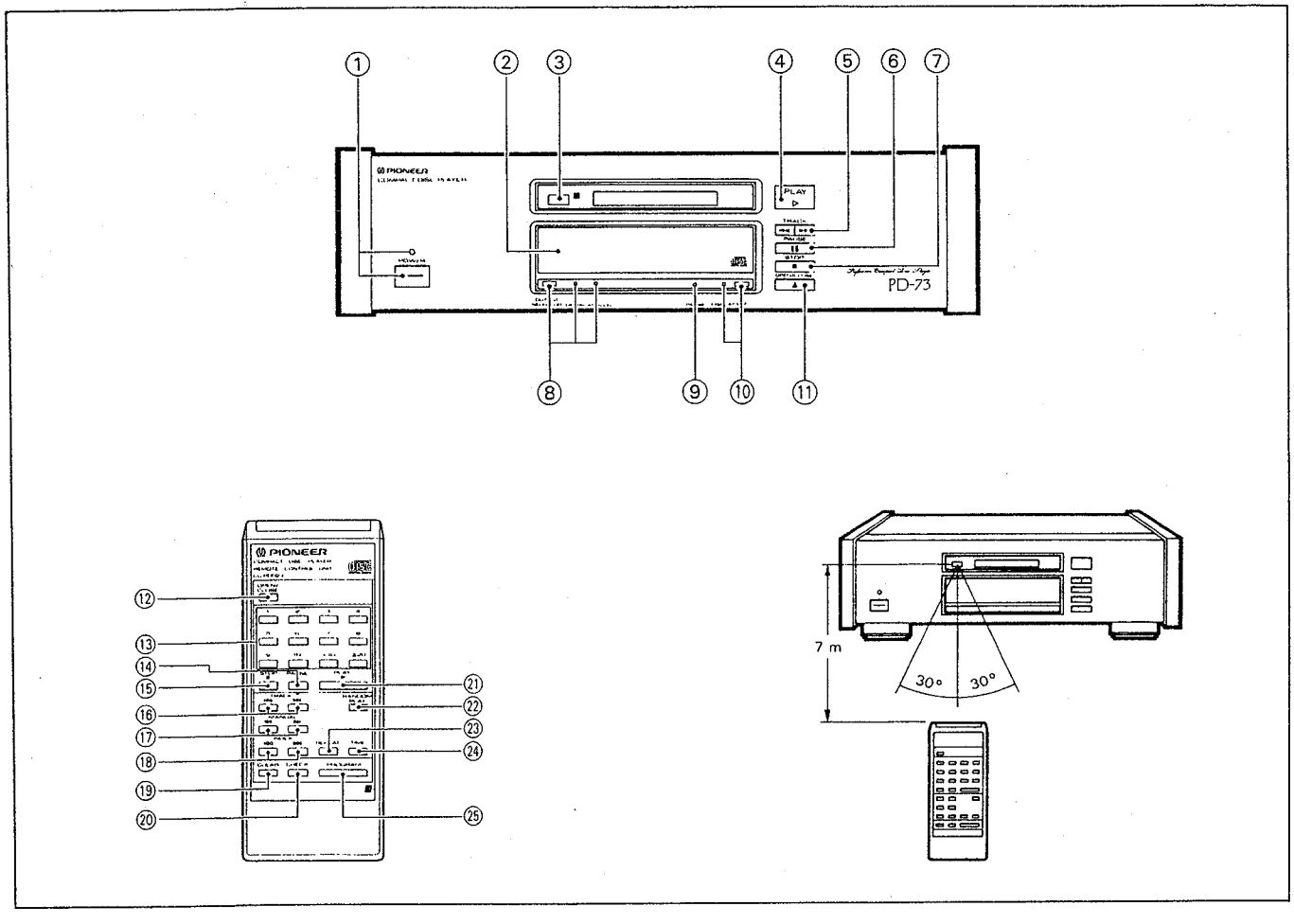


Figure 8

8. PANEL FACILITIES



FRONT PANEL

① **POWER switch/indicator**
Press to turn power ON and OFF.
② **Disc tray**
③ **Remote sensor**
④ **PLAY button/indicator (▷)**
⑤ **TRACK search buttons (|◀◀, ▶▶|)**
⑥ **PAUSE button (▮▮)**
⑦ **STOP button (■)**
⑧ **OUTPUT SELECTOR button/indicators**
⑨ **PAUSE indicator**
⑩ **DISPLAY OFF button/indicator**
⑪ **OPEN/CLOSE button (≜)**

REMOTE CONTROL UNIT

Buttons listed here but not accompanied with explanations have the same functions as the corresponding front-panel buttons.
If use is made of the supplied remote control unit, remote operation is possible.
To use the remote control unit, aim at the remote sensor.
The remote control unit can operate over a range of approximately 23 feet (7 meters), within angles of 30 degrees left and right.

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

⑫ **OPEN/CLOSE button**
⑬ **Track number buttons (1—10, +10, ≧20)**
⑭ **PAUSE button (▮▮)**
⑮ **STOP button (■)**
⑯ **TRACK search buttons (|◀◀, ▶▶|)**
⑰ **MANUAL search buttons (◀◀, ▶▶)**
⑱ **INDEX search buttons (|◁◁, ▷▷|)**
⑲ **CLEAR button**
⑳ **CHECK button**
㉑ **PLAY button (▶)**
㉒ **RANDOM PLAY button**
㉓ **REPEAT button**
㉔ **TIME button**
㉕ **PROGRAM button**

9. SPECIFICATIONS

1. General

Type ..... Compact disc digital audio system
Usable discs ..... Compact Disc
Power requirements
U.K.and Australian models ..... AC 240V, 50/60Hz
European model ..... AC 220V, 50/60Hz
U.S. and Canadian models ..... AC 120V, 60Hz
Multi-voltage model ..... AC 110/120–127/220/240V (switchable) 50/60Hz
Power consumption 22W
Operating temperature ..... +5°C–+35°C (+41°F–+95°F)
Weight 9.5kg (20lb,15oz)
External dimensions ..... 459(W) × 324(D) × 127(H)mm 18-1/16(W) × 12-3/4(D) × 5(H) in.

2. Audio section

Frequency response 2Hz–20kHz
S/N ..... 113dB or more (EIAJ)
Dynamic range ..... 99dB or more (EIAJ)
Channel separation ..... 110dB or more (EIAJ)
Total harmonic distortion ..... 0.0018% or less (EIAJ)
Output voltage 2.0V
Wow and flutter ..... Limit of measurement (±0.001% W.PEAK) or less (EIAJ)
Number of channels ..... 2 channels (stereo)

3. Output terminal

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

4. Functions

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

5. Accessories

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

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