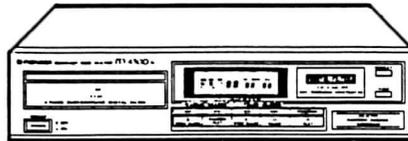


# Service Manual



ORDER NO.  
ARP1709

COMPACT DISC PLAYER

# PD-4300

MODELS PD-4300, PD-4300-S, PD-4350 AND PD-4350-S HAVE EIGHT VERSIONS :

Type	Applicable model				Power requirement	Export destination
	PD-4300	PD-4300-S	PD-4350	PD-4350-S		
KUXJ	○	—	○	—	AC120V only	U.S.A.
KCXJ	○	—	○	—	AC120V only	Canada
HEMXJ	○	○	○	○	AC220V,240V (switchable) *	European continent
HBXJ	○	○	○	—	AC220V,240V (switchable) *	United kingdom
HEM	○	○	—	—	AC220V,240V (switchable) *	European continent
HB	○	○	—	—	AC220V,240V (switchable) *	United Kingdom
SD	○	—	—	—	AC110V,120 - 127V,220V,240V (switchable)	Kingdom of Saudi Arabia and General market
HP	○	—	—	—	AC220V,240V (switchable) *	Australia

\* Change the position of jumper of the Transformer board assembly.

- This service manual is applicable to the KUXJ and KCXJ types.
- For the PD-4300/HEMXJ, HBXJ, HEM, HB and PD-4300-S/HEMXJ, HBXJ, HEM and HB types, refer to the additional service manual.
- For the PD-4300/SD and HP types, refer to additional service manual.
- For the PD-4350/KUXJ, KCXJ, HEMXJ, HBXJ and PD-4350-S/HEMXJ types, refer to the additional service manual.
- Ce manuel pour le service comprend les explications en français de réglage.
- Este manual de servicio trata del método ajuste escrito en español.

## CONTENTS

1. SAFETY INFORMATION .....	2	7. ADJUSTMENTS .....	27
2. EXPLODED VIEWS AND PARTS LIST .....	4	RÉGLAGE .....	39
3. PACKING .....	10	AJUSTE .....	51
4. P. C. BOARDS CONNECTION DIAGRAM .....	14	8. SPECIFICATIONS .....	63
5. SCHEMATIC DIAGRAM .....	17	9. PANEL FACILITIES .....	64
6. ELECTRICAL PARTS LIST .....	25		

# 1. SAFETY INFORMATION

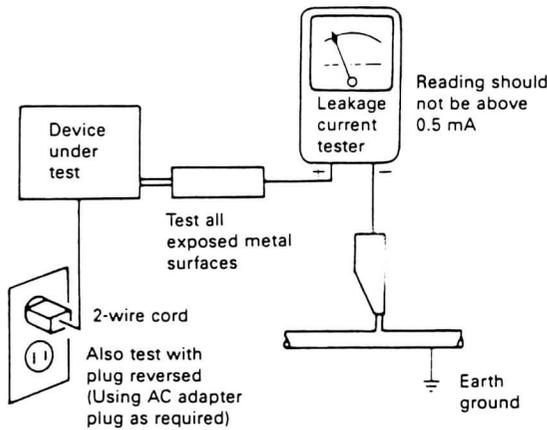
(FOR USA MODEL ONLY)

## 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 120 V AC 60 Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5 mA.



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

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

(FOR EUROPEAN MODEL ONLY)

**VAROITUS!**

LAITE SISALTTAA LASERDIODIN, JOKA LAHETTA A NAKYMATONTA, SILMILLE VAARALLISTA INFRAPUNASATEILYLA LAITTEEN SISALLA ON LASERDIODIN LAHEISYYDESSA KUVAN 1. MUKAINEN VAROITUSMERKKI.



LASER  
Kuva 1  
Lasersateilyn  
varoituserkki

**WARNING!**

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



LASER  
Picture 1  
Warning sign for  
laser radiation

**ADVERSEL:**

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

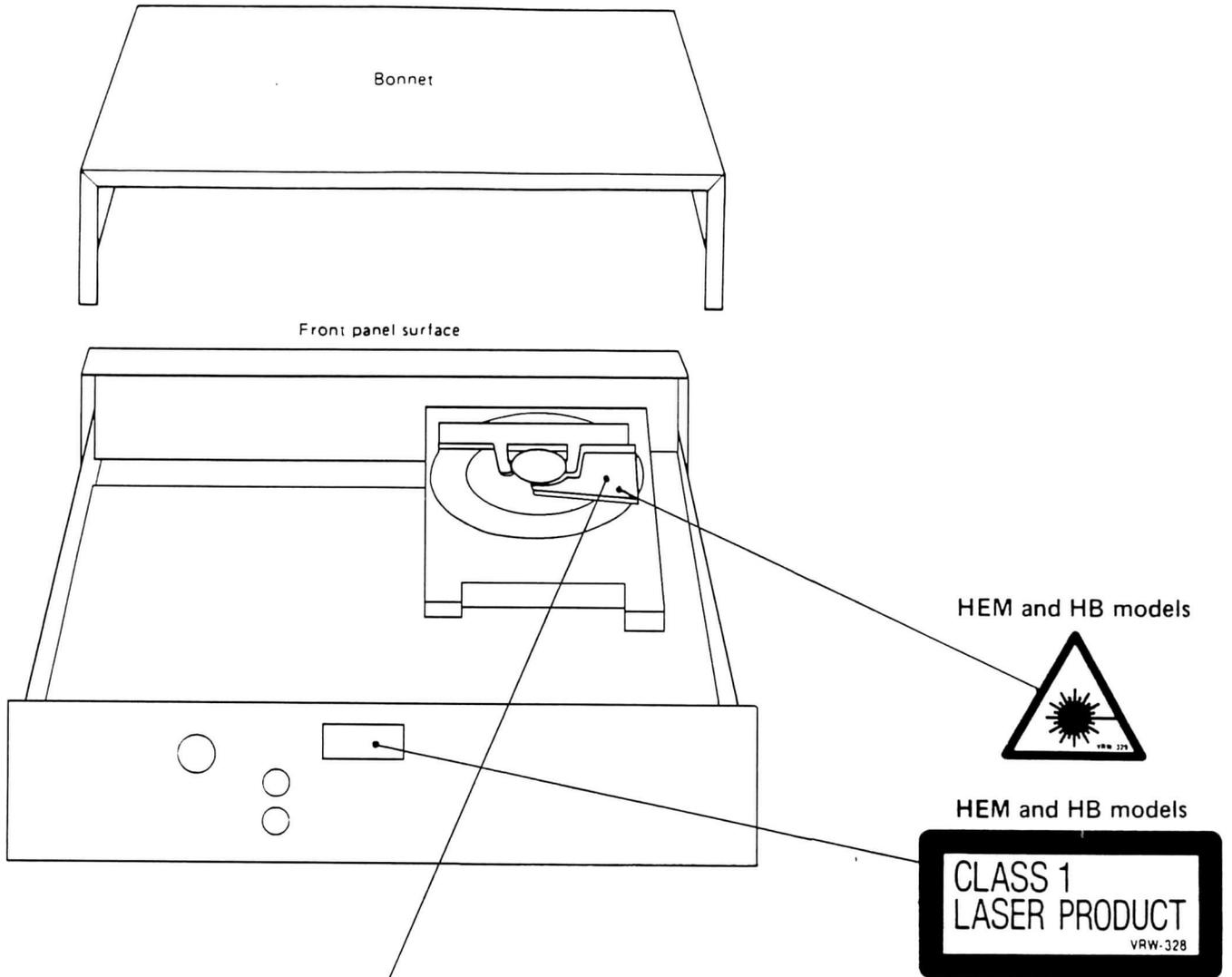
**VIKTIGT**

APARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

**IMPORTANT**

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

LABEL CHECK



HEM and HB models



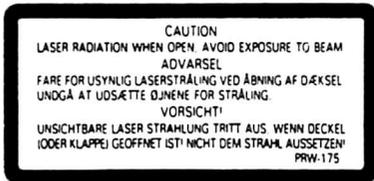
HEM and HB models



HB model



HEM model



**ADDITIONAL LASER CAUTION**

- 1. Laser Interlock Mechanism**

The ON/OFF status of the clamp switch (S102) for detecting loading IN completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF.

Thus, the interlock will no longer function if the clamp switch (S102) is deliberately shorted. In the test mode the interlock mechanism will not function (Refer to page 27).

Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (IC1) 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 clamped diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.**

1 | 2 | 3 | 4 | 5 | 6

A

B

C

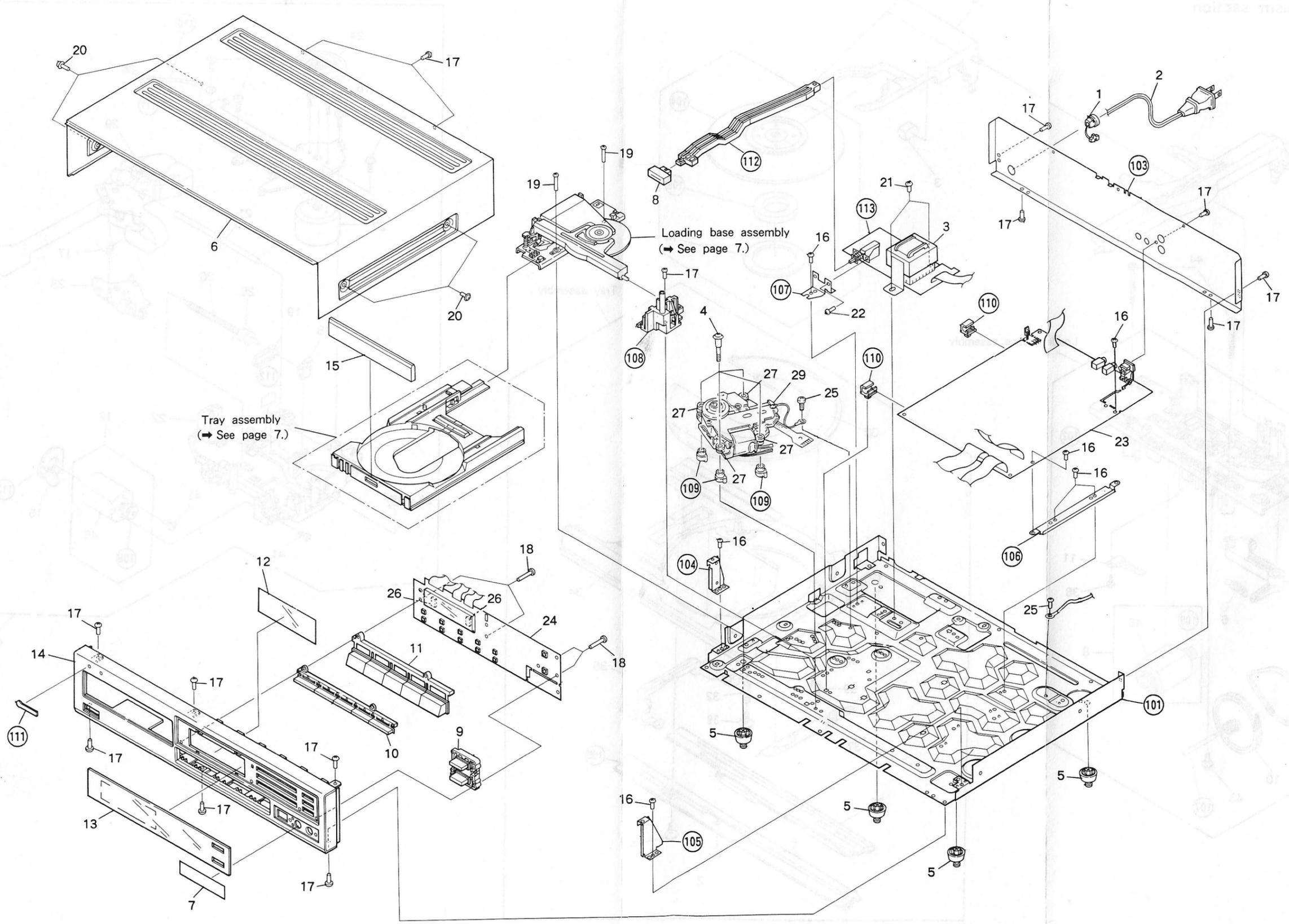
D

A

B

C

D



1 | 2 | 3 | 4 | 5 | 6

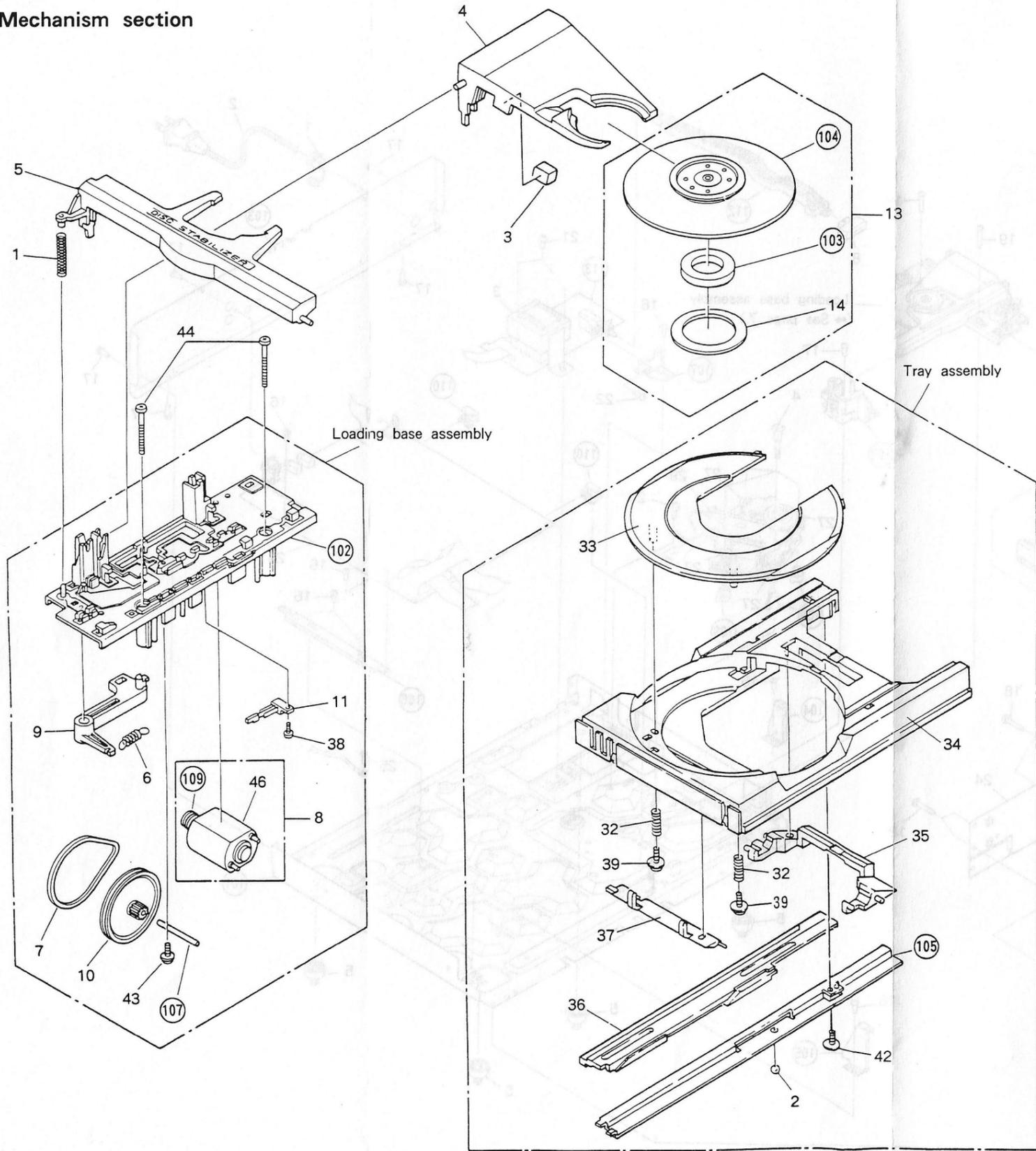
2.2 Mechanism section

A

B

C

D

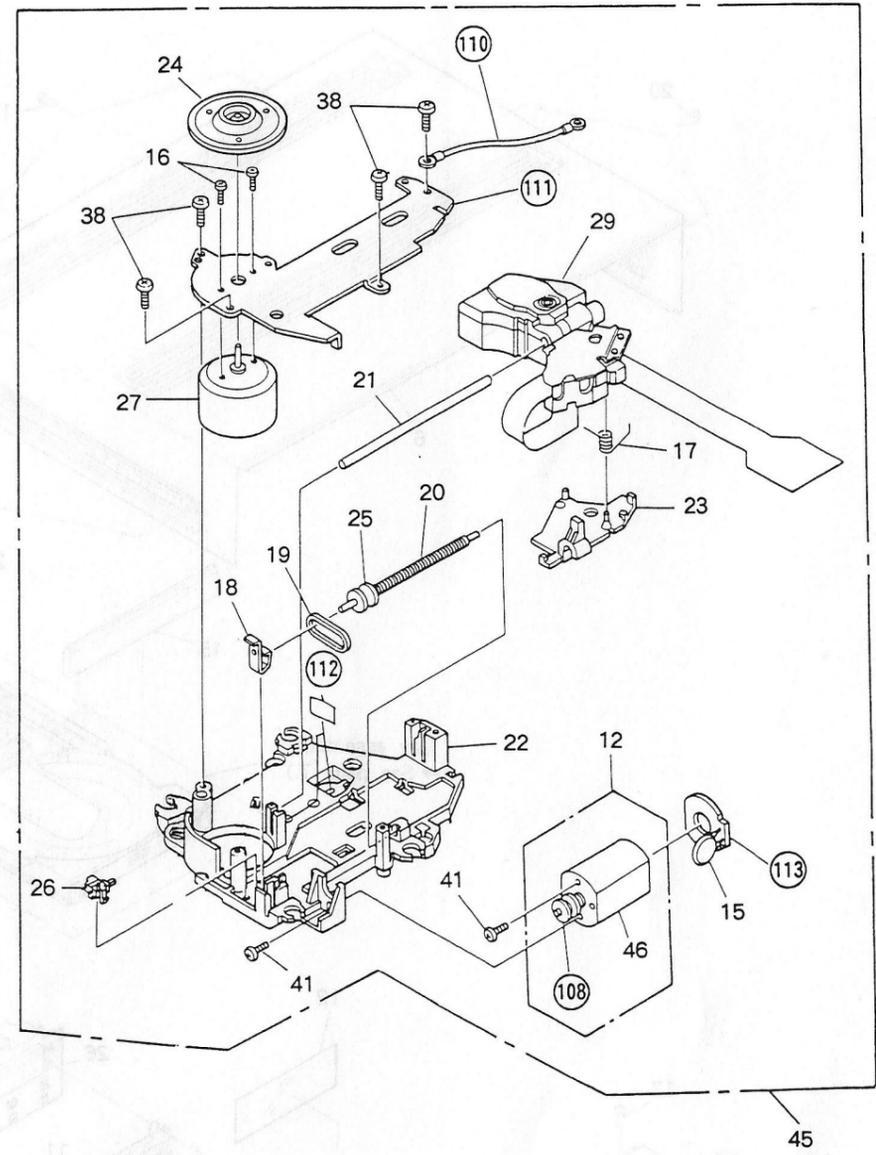


A

B

C

D

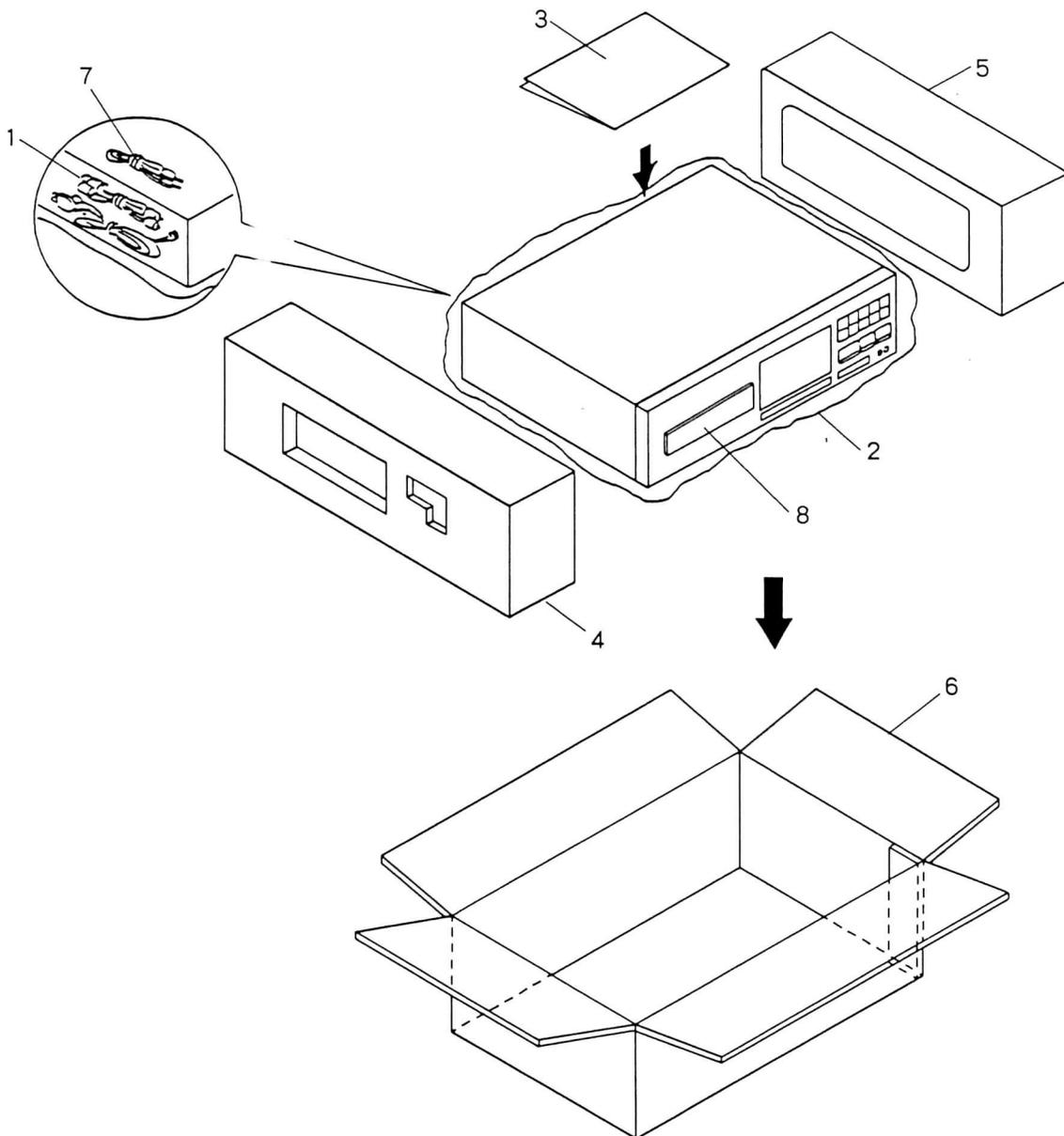


Parts List of Mechanism section

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	PBH1013	Spring		29	PWY1003	Pickup assembly
	2	PBP-001	Steel ball $\phi$ 4		30		. . . . .
	3	PEB1032	Stopper rubber		31		. . . . .
	4	PNW1084	Clamp holder		32	PBH1045	Plate spring
	5	PNW1085	Clamp retainer		33	PNW1329	Disc plate
	6	PBH1012	Clamp spring		34	PNW1390	Tray
	7	PEB1013	Belt (LOADING)		35	PNW1331	Plate lever (R)
	8	PYY1090	Motor assembly (LOADING)		36	PNW1332	Rack
	9	PNW1083	Clamp lever		37	PNW1330	Plate lever (F)
	10	PNW1171	Gear pulley		38	BPZ20P080FZK	Screw
	11	VSK-015	Leaf switch (CLAMP, S102)		39	PBA1025	Screw
	12	PYY1025	Motor assembly (CARRIAGE)		40		. . . . .
	13	PYY1084	Clamper assembly		41	PMZ20P030FMC	Screw
	14	PNM1010	Disc cushion		42	PPZ30P080FMC	Screw
	15	CGDYX104M25	Semiconductive ceramic capacitor		43	IPZ30P060FMC	Screw
	16	PBA1037	Screw M2 $\times$ 2.5		44	BBZ30P230FMC	Screw
	17	PBH1008	Drive spring		45	PYY1063	Servo mechanism assembly
	18	PBK1057	Plate spring		46	PXM1002	Motor (CARRIAGE, LOADING)
	19	PEB1072	Belt (CARRIAGE)		101		. . . . .
	20	PLA1003	Drive worm		102		Loading base
	21	PLA1004	Guide bar		103		Magnet
	22	PNW1520	Mechanism chassis		104		Clamper
	23	PNW1063	Carriage plate		105		Slide base
	24	PNW1064	Disc table		106		. . . . .
	25	PNW1066	Pulley		107		Gear shaft
	26	PSH1003	Slide switch (INSIDE, S101)		108		Motor pulley
	27	PXM1001	Spindle motor		109		Motor pulley
	28		. . . . .		110		Earth lead unit
					111		Base plate
					112		Cloth tape
					113		Carriage M board

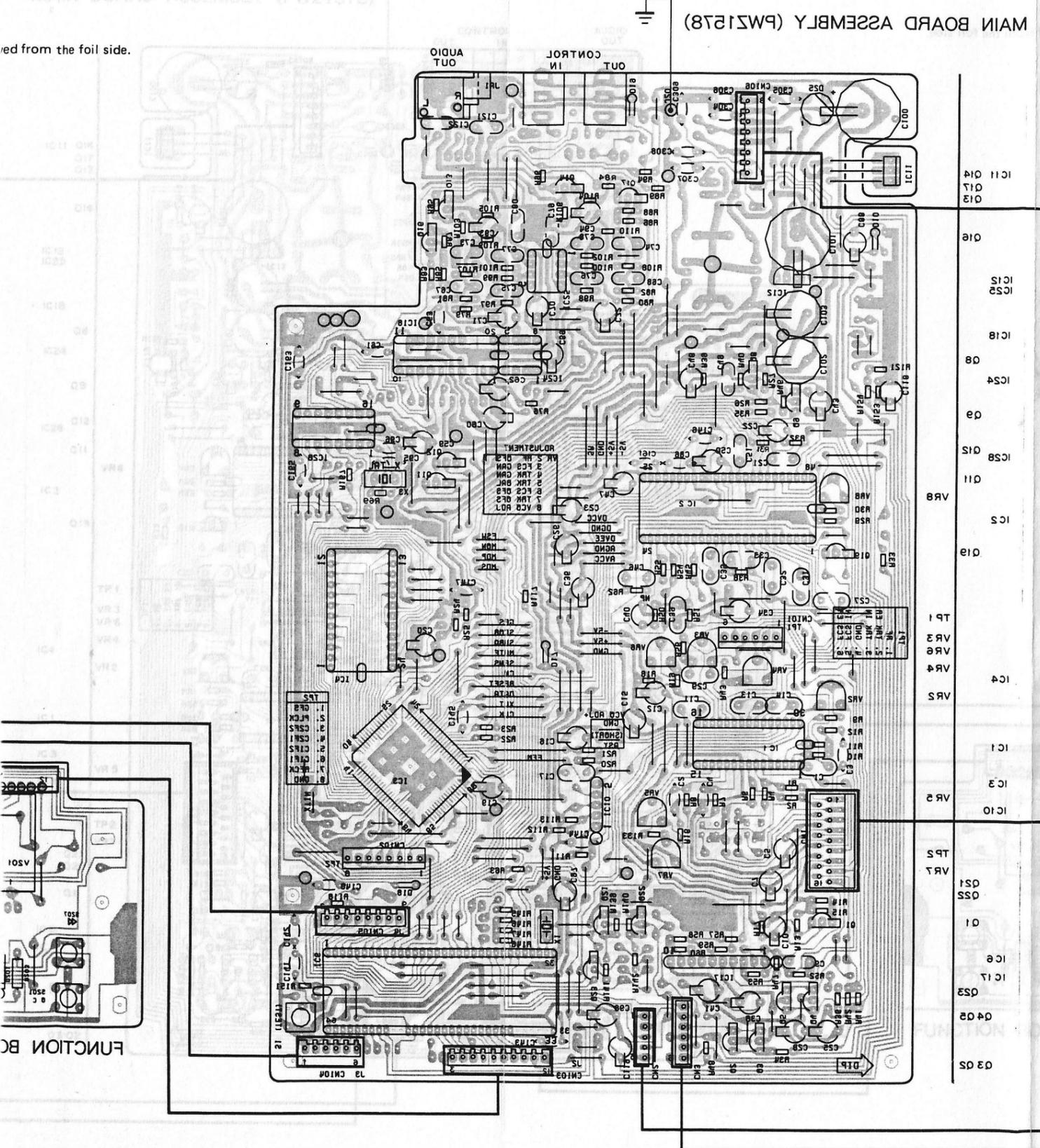
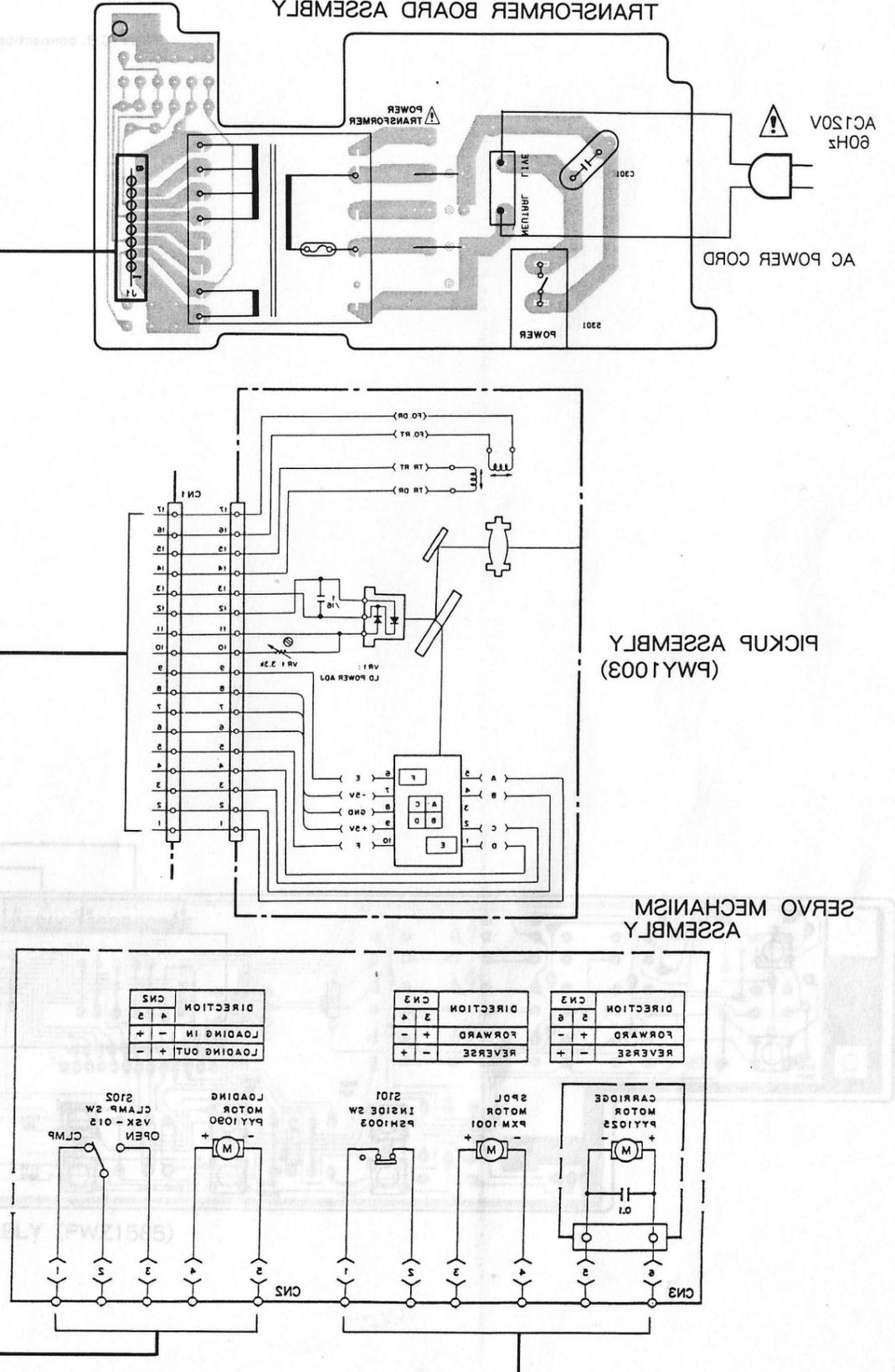
### 3. PACKING

Mark	No.	Part No.	Description
	1	PDE1002	Connection cord with pin plug
	2	Z23-007	Sheet
	3	PRB1083	Operating instructions (English : KUXJ type)
		PRE1081	Operating instructions (English/French : KCXJ type)
	4	PHA1089	Protector (L)
	5	PHA1090	Protector (R)
	6	PHG1304	Packing case
	7	PDE-319	Connection cord with mini plug
	8	PHC1030	Spacer (into the tray)





A  
B  
C  
D



red from the foil side.

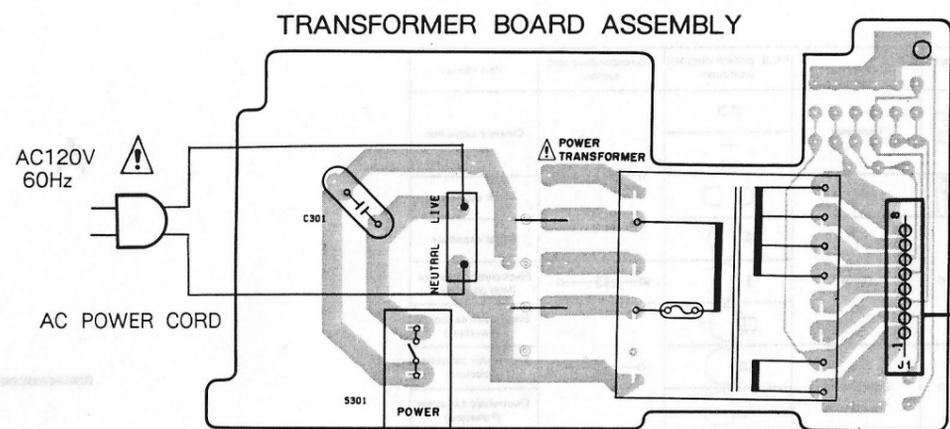
MAIN BOARD ASSEMBLY (PWZ1578)

FUNCTION BC

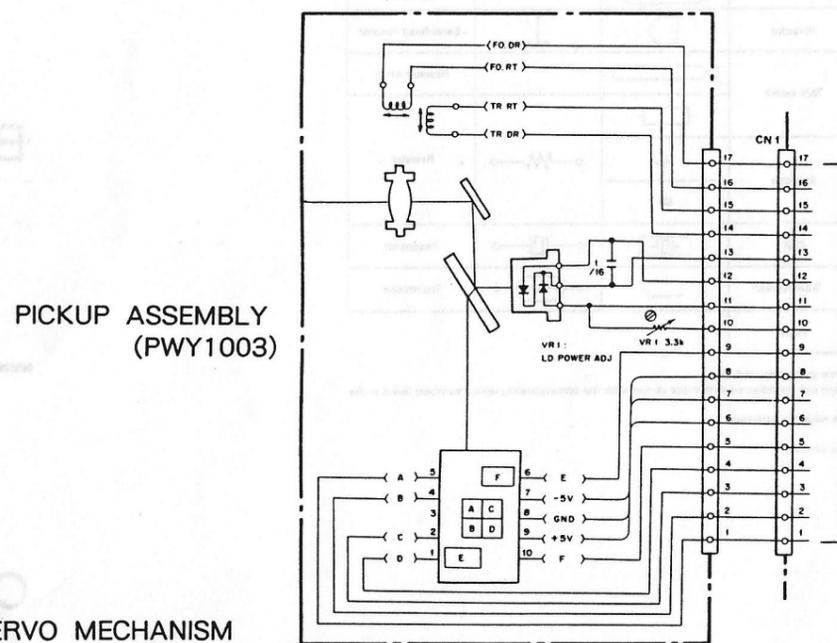
FUNCTION BOARD ASSEMBLY (PW1559)

### 4. P. C. BOARDS CONNECTION DIAGRAM

A

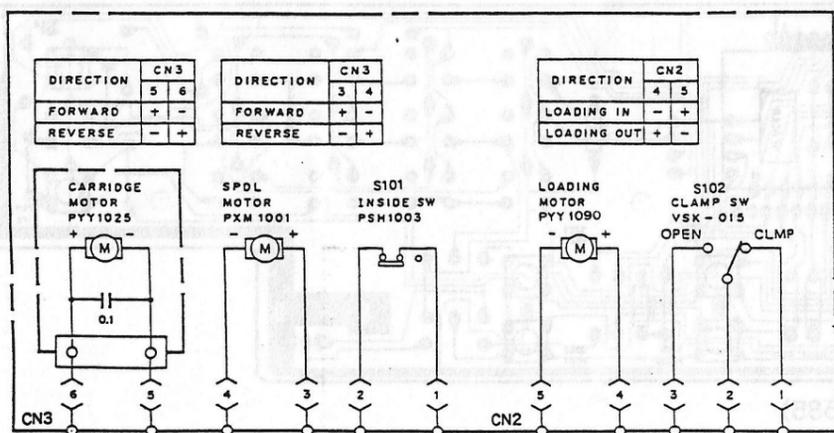


B



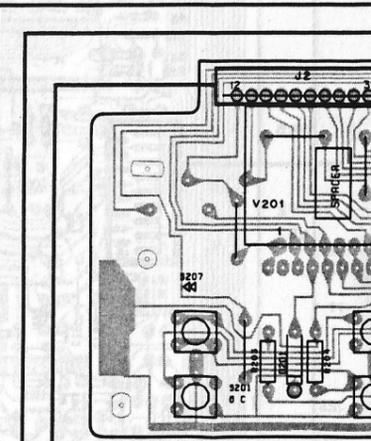
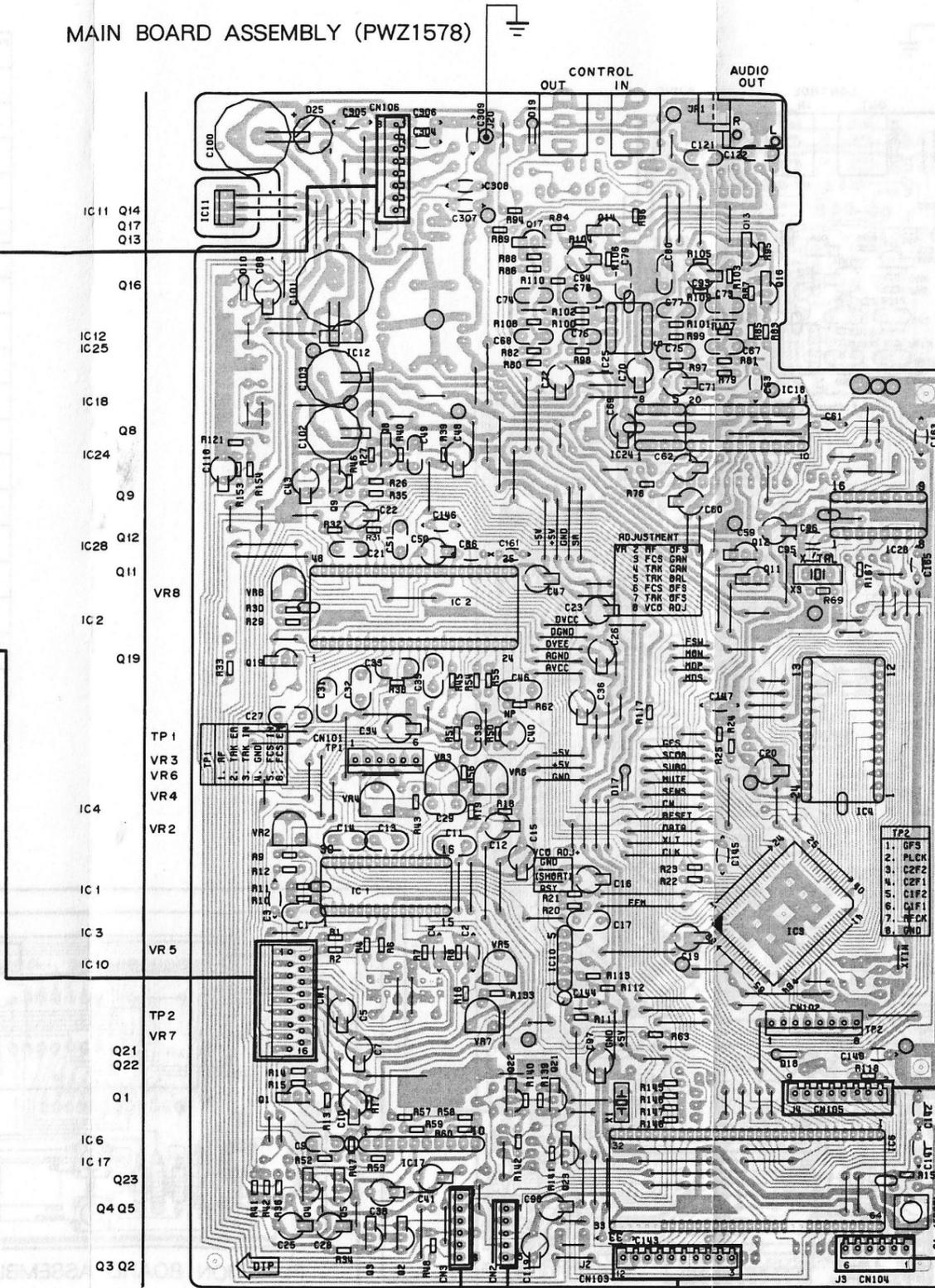
C

**SERVO MECHANISM ASSEMBLY**



D

**MAIN BOARD ASSEMBLY (PWZ1578)**



4

5

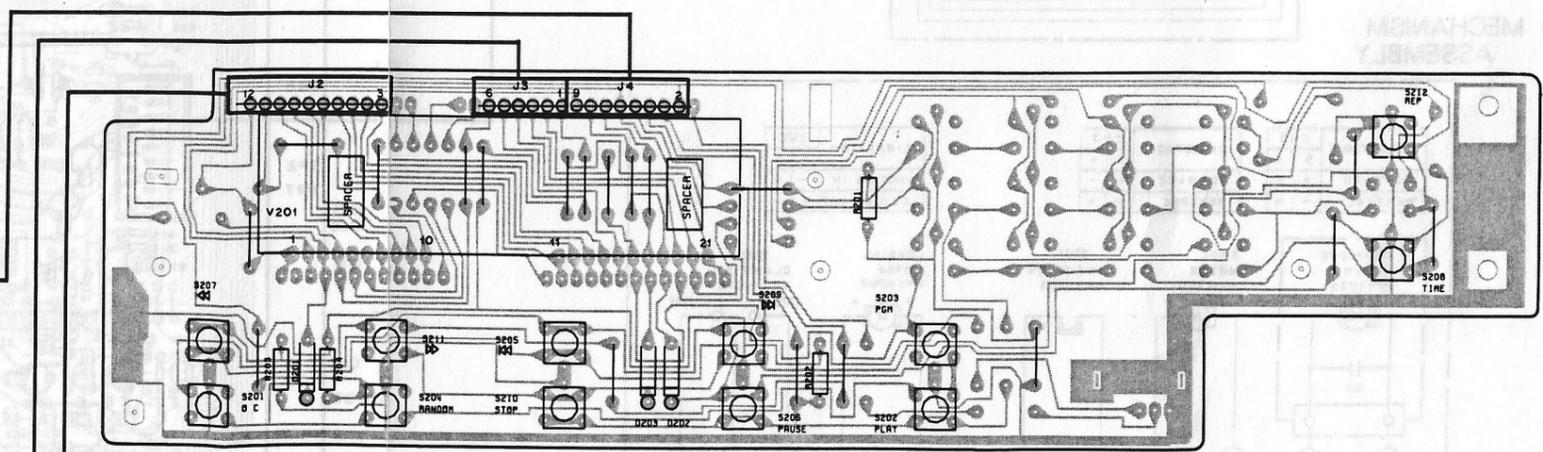
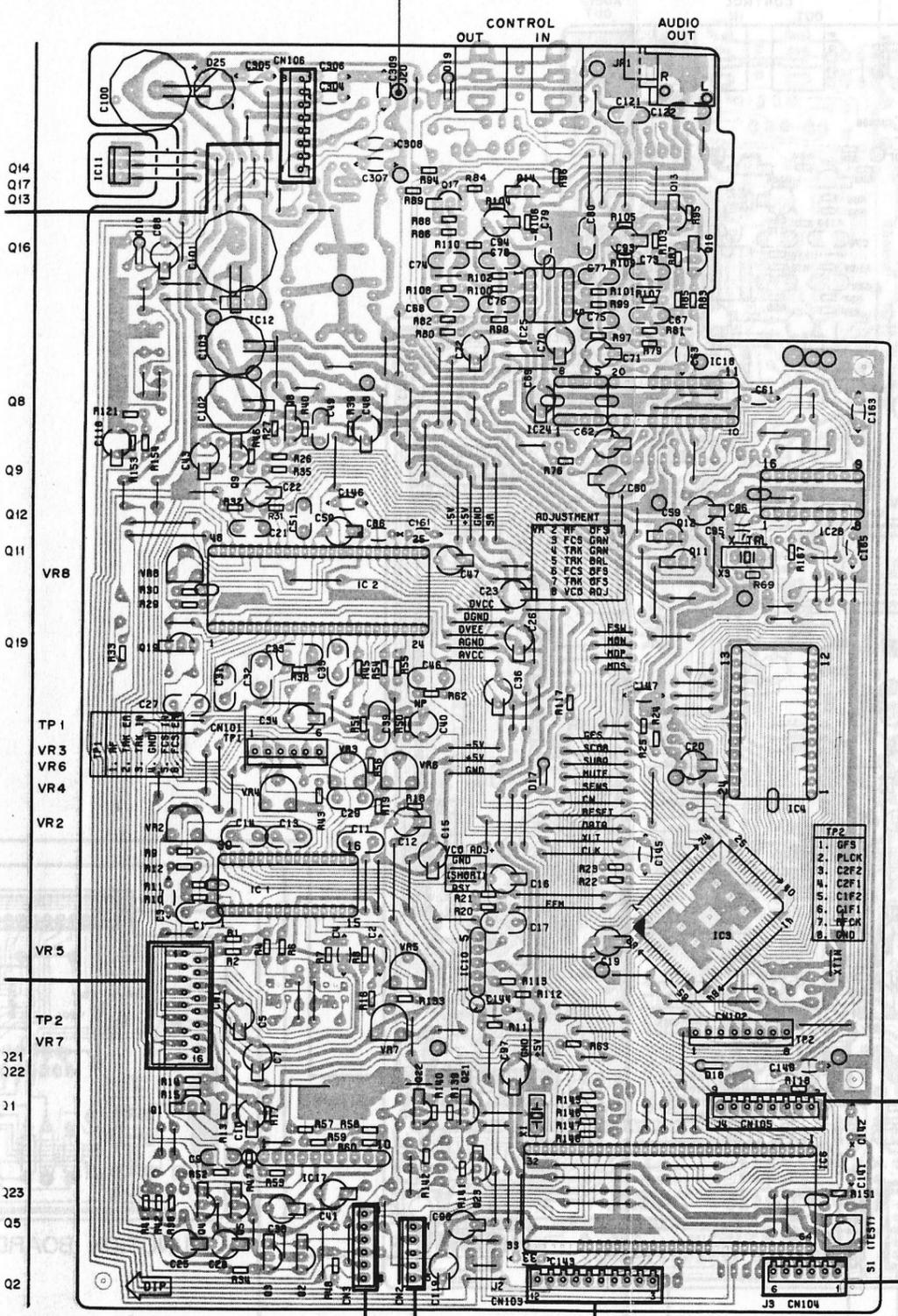
6

7

8

9

J BOARD ASSEMBLY (PWZ1578)



FUNCTION BOARD ASSEMBLY (PWZ1585)

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

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

4

5

6

7

8

9

A

B

C

D

# 5. SCHEMATIC DIAGRAM

PICK UP ASSEMBLY PWY1003

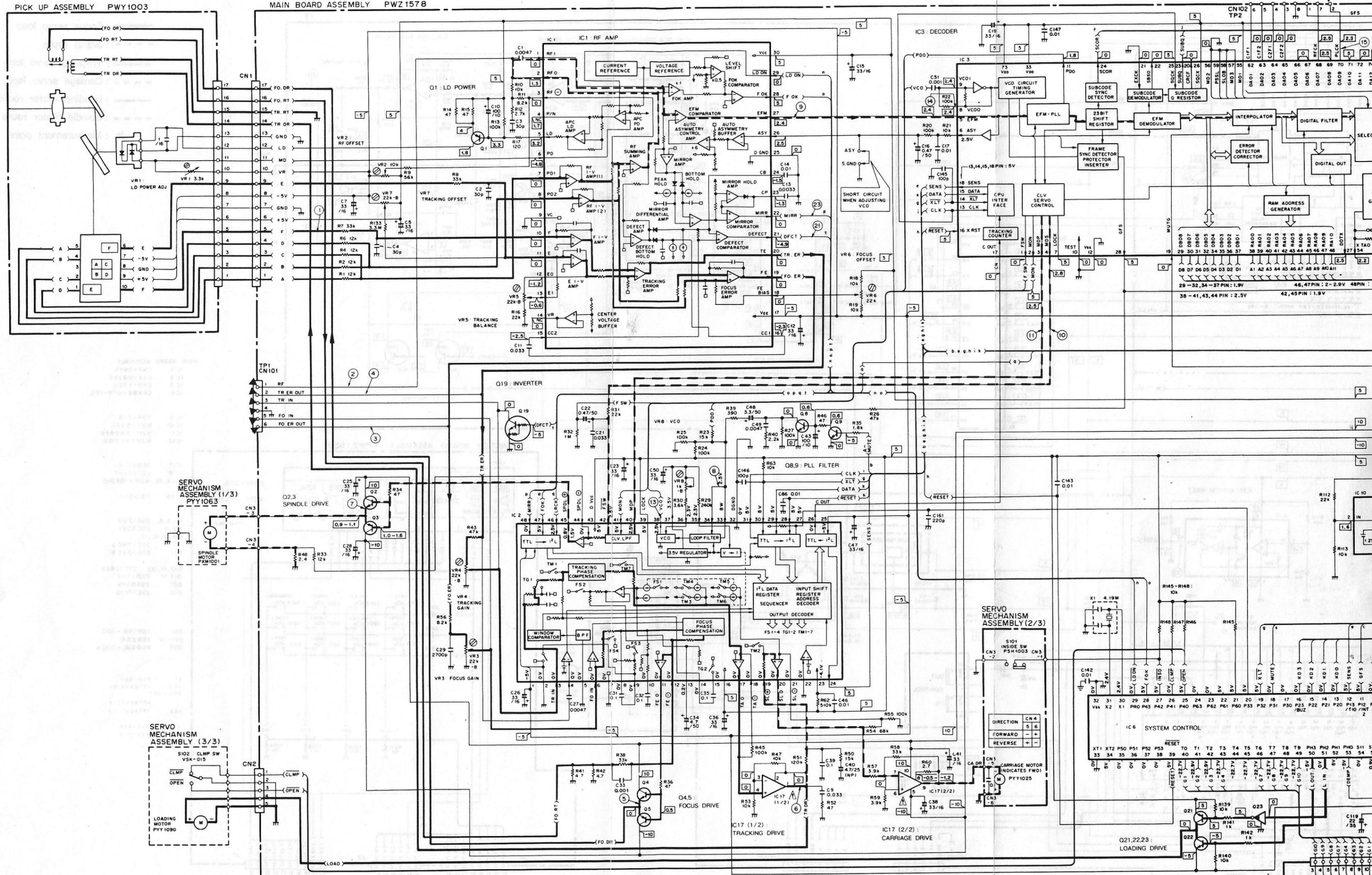
MAIN BOARD ASSEMBLY PWZ1578

A

B

C

D



1

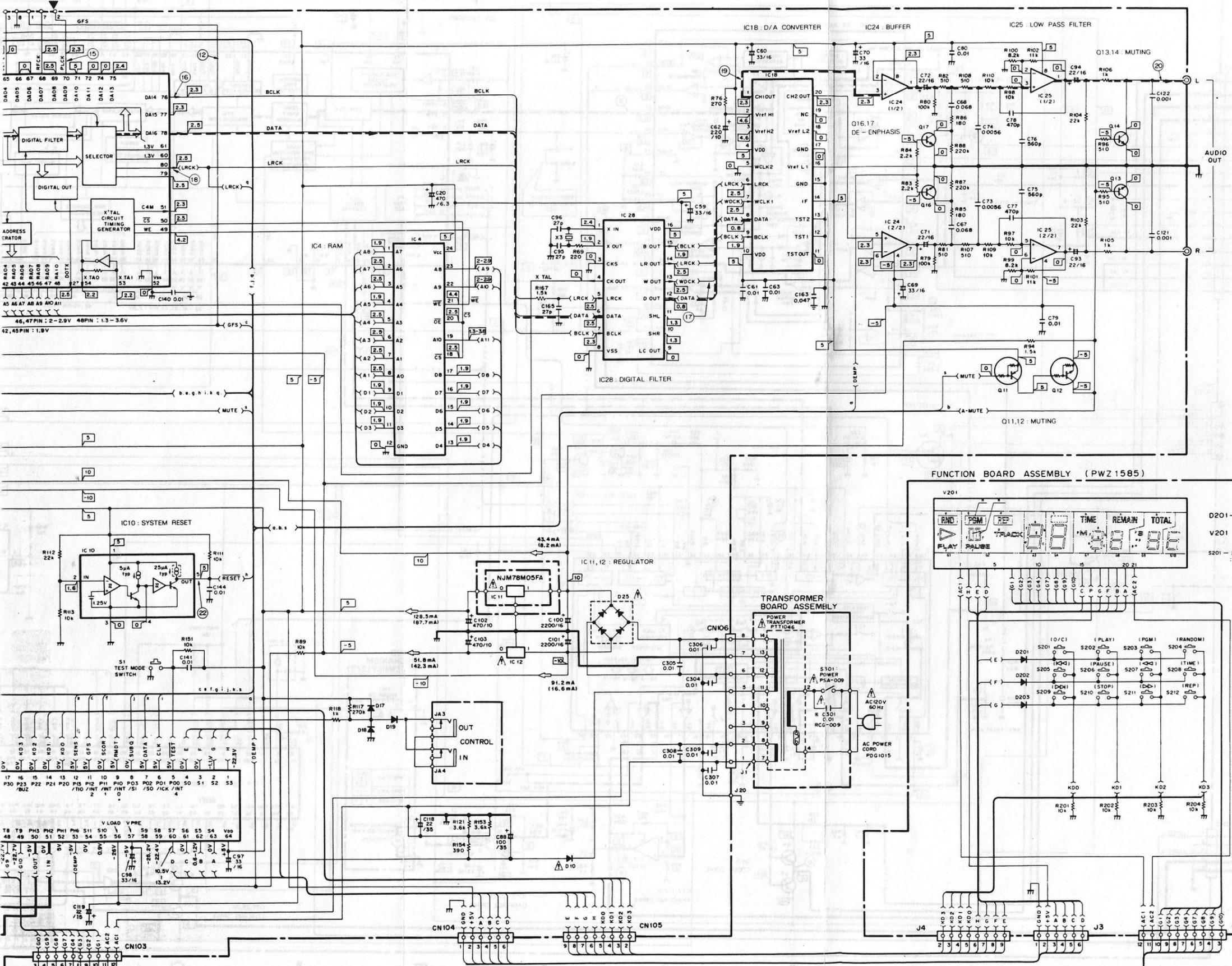
2

3

4

5

6



- : Focus servo loop
- - - : Signal route
- : Tracking servo loop
- - - : Carriage servo loop
- : Loading motor route
- - - : Spindle motor route
- ▶ : Measurement point

MAIN BOARD ASSEMBLY  
 IC 1 CXA10815  
 IC 2 CXA1082B5  
 IC 3 CXD1130Q  
 IC 4 CXK5816PN-15L

IC 6 PD4151B  
 IC10 M51955AL  
 IC11 NJM78M05FA  
 IC12 NJM79L05A

IC17 TAB410K  
 IC18 LC7881-C  
 IC24,25 NJM4558D-D

IC 28 PD0034

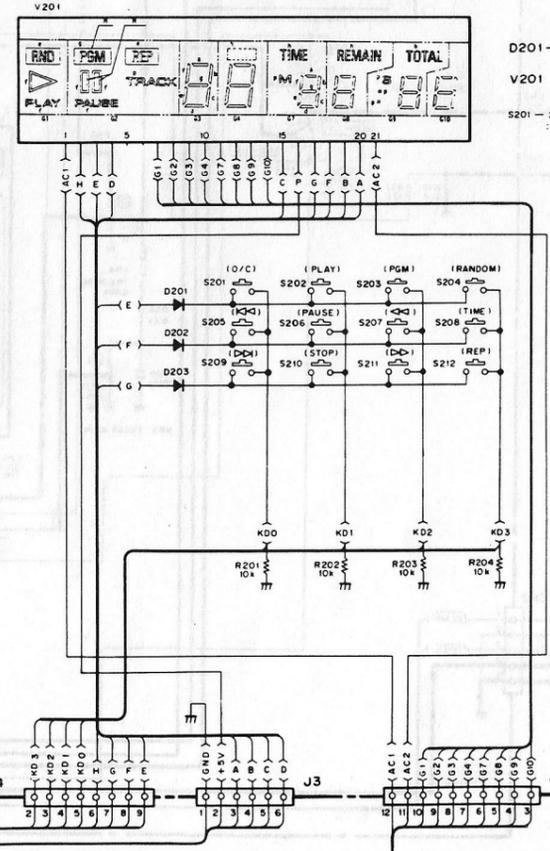
Q1,3,5 2SA1399  
 Q2,4 2SC3581  
 Q8,9,16,17 2SC1740S  
 Q11 DTA124ES

Q12,19,23 DTC124ES  
 Q13,14 2SD1302  
 Q21 2SA854S  
 Q22 2SC1741S

D10 1SR139-100  
 D17-19 1S5254  
 D25 WLO2ML-5004

S1 PSG-065  
 VR2 VRTB6V5103  
 VR3 - VR7 VRTB6V5223  
 VR8 VRTS6V5102  
 Y1 V55-014  
 X3 P55-0-2

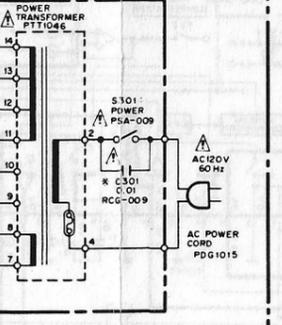
FUNCTION BOARD ASSEMBLY (PWZ 1585)



D201-203 1SS254  
 V201 PELI018

S201-212 PSG-065

TRANSFORMER BOARD ASSEMBLY



A

B

C

D

1. RESISTORS :

Indicated in  $\Omega$ , 1/4W, 1/6W and 1/8W,  $\pm 5\%$  tolerance unless otherwise noted k ; k  $\Omega$ , M ; M  $\Omega$ , (F) ;  $\pm 1\%$ , (G) ;  $\pm 2\%$ , (K) ;  $\pm 10\%$ , (M) ;  $\pm 20\%$  tolerance.

2. CAPACITORS :

Indicated in capacity ( $\mu F$ ) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT :

 ; DC voltage (V) at play state.

 mA ; DC current at play state.

Value in ( ) is DC current at stop state.

4. OTHERS :

 ; Signal route.

 ; Adjusting point.

The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

\* marked capacitors and resistors have parts numbers.

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

5. SWITCHES : (The underlined indicates the switch position)

MAIN BOARD ASSEMBLY

S1 : TEST MODE

FUNCTION BOARD ASSEMBLY

S201 : OPEN / CLOSE (  )

S202 : PLAY (  )

S203 : PROGRAM

S204 : RANDOM PLAY

S205 : TRACK SEARCH ( |   )

S206 : PAUSE (  )

S207 : MANUAL SEARCH (   )

S208 : TIME

S209 : TRACK SEARCH (   | )

S210 : STOP / CLEAR (  )

S211 : MANUAL SEARCH (   )

S212 : REPEAT

TRANSFORMER BOARD ASSEMBLY

S301 : POWER ON — OFF

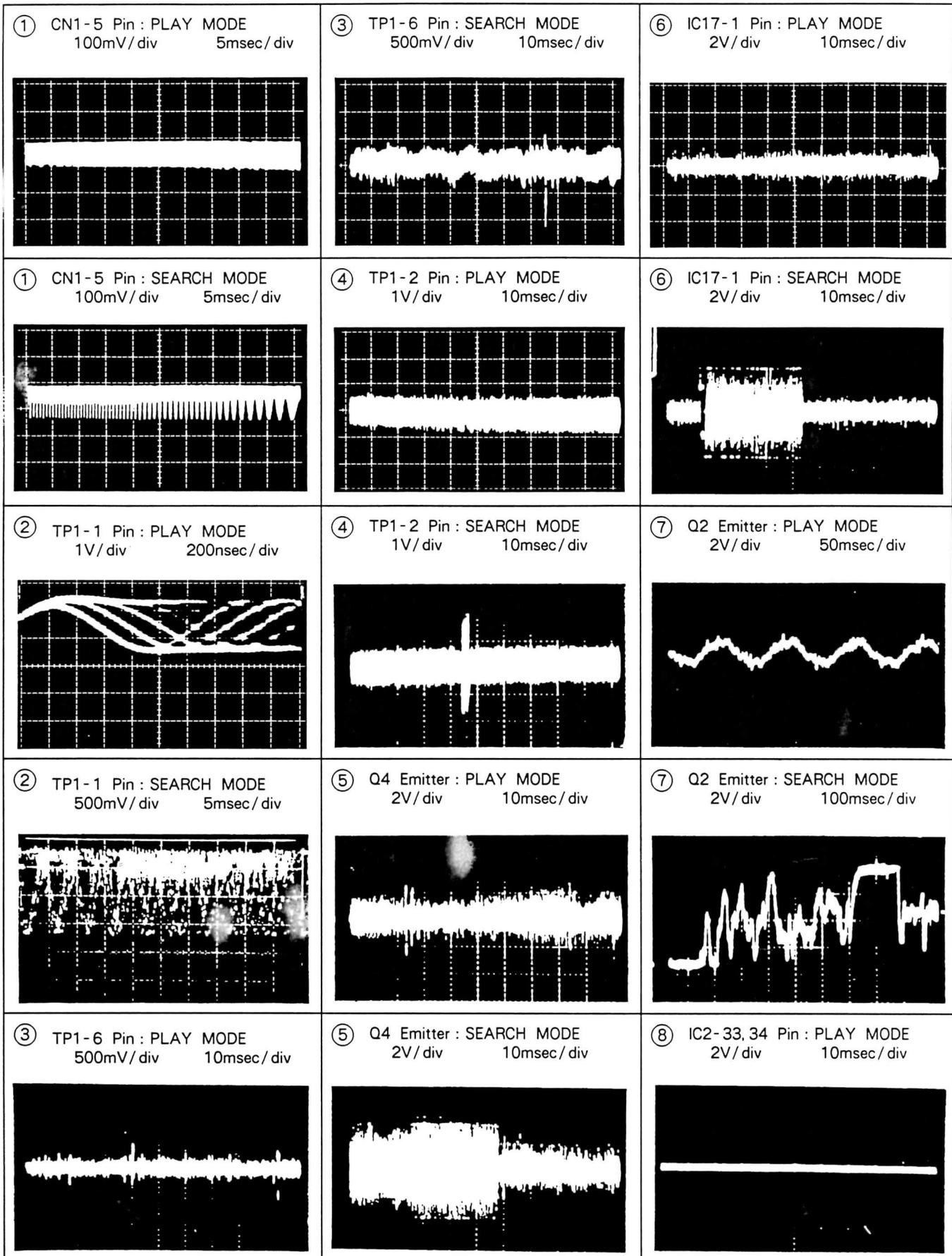
MISCELLANEOU

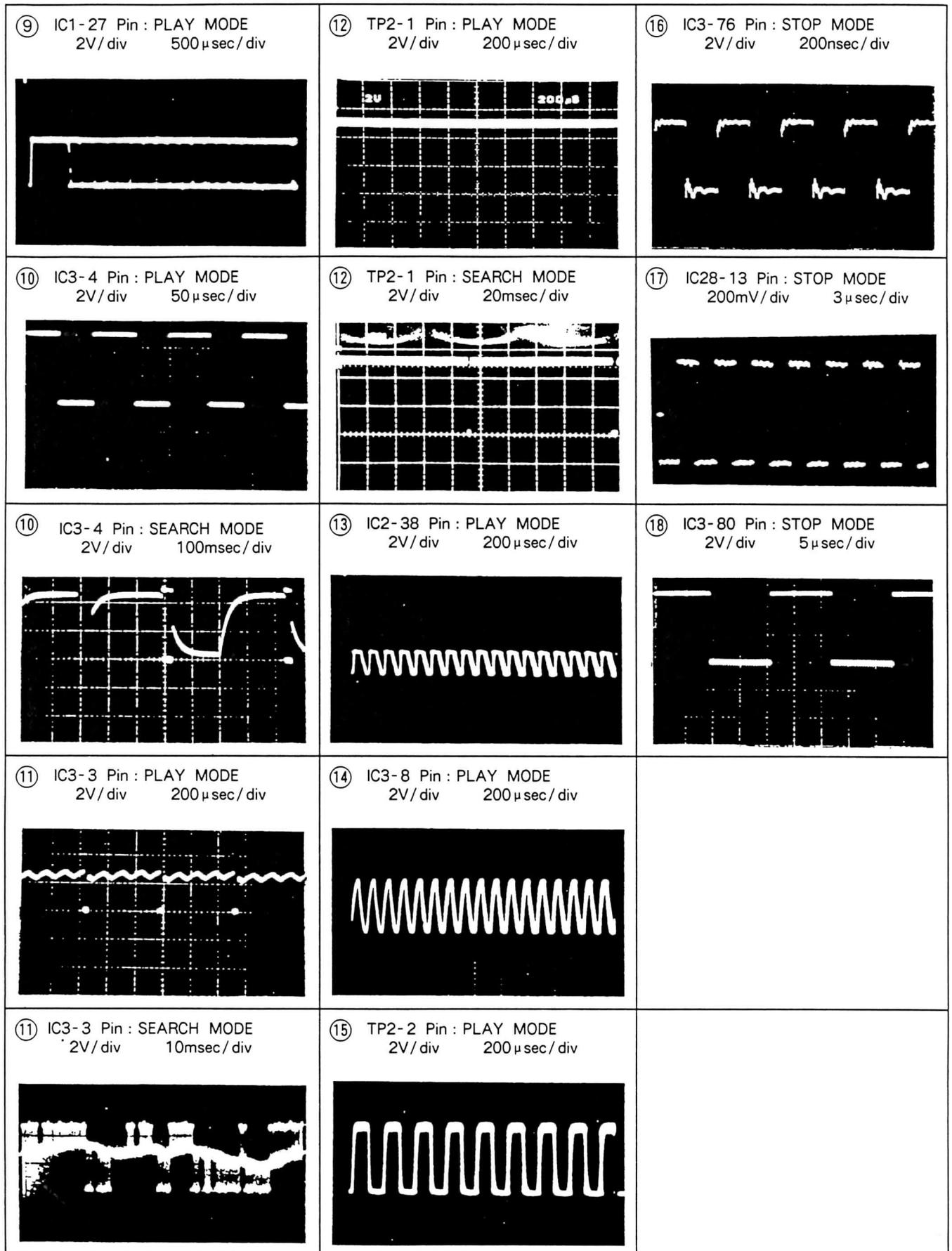
S101 : INSIDE

S102 : CLAMP OPEN — CLAMP

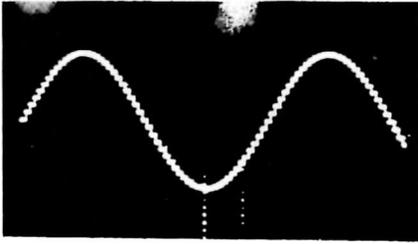
WAVE FORMS

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

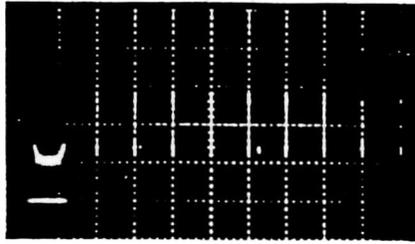




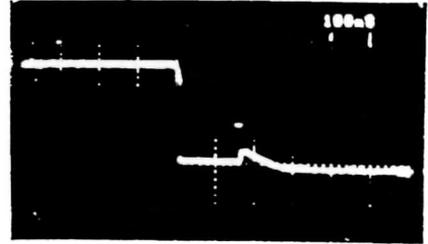
⑲ IC18-1 Pin : PLAY MODE  
2V/div 50μsec/div



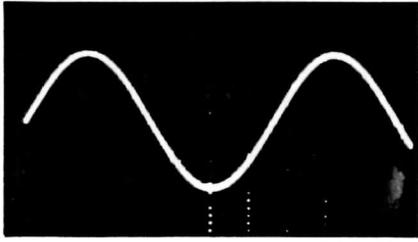
⑳ IC1-21 Pin : DFCT  
1msec/div  
Upper TP1-1, 1V/div  
Lower IC1-21, 5V/div



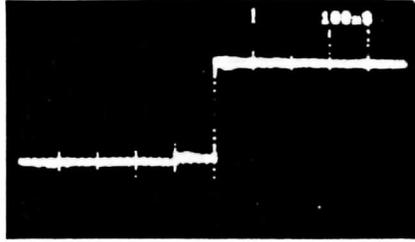
㉑ IC10-5 Pin : POWER OFF  
2V/div 100msec/div



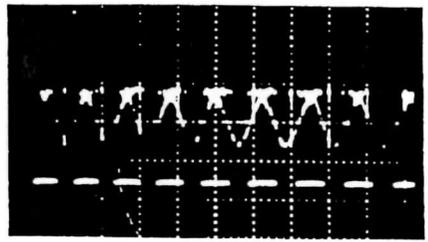
㉒ OUTPUT L ch : PLAY MODE  
2V/div 50μsec/div



㉓ IC10-5 Pin : POWER ON  
2V/div 100msec/div



㉔ IC1-22 Pin : TR OPEN  
1msec/div  
Upper TP1-1, 1V/div  
Lower IC1-22, 2V/div



## 6. ELECTRICAL PARTS LIST

NOTES :

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

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

560 Ω → 56 × 10<sup>1</sup> → 561 ..... RD1/4PS 

5	6	1
---	---	---

 J  
 47k Ω → 47 × 10<sup>3</sup> → 473 ..... RD1/4PS 

4	7	3
---	---	---

 J  
 0.5 Ω → 0R5 ..... RN2H 

0	R	5
---	---	---

 K  
 1 Ω → 010 ..... RS1P 

0	1	0
---	---	---

 K

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

5.62k Ω → 562 × 10<sup>1</sup> → 5621 ..... RN1/4SR 

5	6	2	1
---	---	---	---

 F

### Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Transformer board assembly	
⊙	Main board assembly	PWZ1578
⊙	Function board assembly	PWZ1585
△	AC power cord	PDG1015
△	Power transformer (120V)	PTT1046
△	Strain relief	CM-22C
	Pickup assembly	PWY1003
	Spindle motor	PXM1001
	Motor assembly (LOADING)	PYY1090
	Motor assembly (CARRIAGE)	PYY1025
	S101 Slide switch (INSIDE)	PSH1003
	S102 Leaf switch (CLAMP)	VSK-015
	Semiconductive ceramic capacitor	CGDYX104M25

### Transformer board Assembly

#### SWITCH

Mark	Symbol & Description	Part No.
△	S301 Push switch (POWER)	PSA-009

#### CAPACITOR

Mark	Symbol & Description	Part No.
△	C301 (0.01μF)	RCG-009

### ⊙ Main board Assembly (PWZ1578)

#### SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1130Q
	IC4	CXK5816PN-15L
	IC28	PD0034
	IC18	LC7881-C
	IC10	M51955AL
	IC24,IC25	NJM4558D-D
△	IC11	NJM78M05FA
△	IC12	NJM79L05A
	IC6	PD4151B
△	IC17	TA8410K
	Q11	DTA124ES
	Q12,Q19,Q23	DTC124ES
	Q1,Q3,Q5	2SA1399
	Q21	2SA854S
	Q8,Q9,Q16,Q17	2SC1740S
	Q22	2SC1741S
	Q2,Q4	2SC3581
	Q13,Q14	2SD1302
△	D25	WL02ML-5004
△	D10	1SR139-100
	D17 - D19	1SS254

◎ Function board Assembly (PWZ1585)

**SWITCH**

Mark	Symbol & Description	Part No.
	S1 Tact switch (TEST)	PSG-065

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C95,C96,C165 C2 - C4 C145,C146 C161 C40	CCCCH270J50 CCCCH300J50 CCCCL101J50 CCCCL221J50 CEANP4R7M25
	C16,C22 C10,C43 C88 C34 C71,C72,C93,C94	CEASR47M50 CEAS101M10 CEAS101M35 CEAS4R7M50 CEAS220M16
	C118,C119 C100,C101 C48 C102,C103 C5,C7,C12,C15,C19,C23,C25, C26,C28,C36,C38,C41,C47,C50, C59,C60,C69,C70,C97,C98	CEAS220M35 CEAS222M16 CEAS3R3M50 CEAS471M10 CEAS330M16
	C62 C163 C61,C63C86,C140 - C144,C147, C304 - C309 C33,C51,C121,C122	CEAS221M10 CKCYF473Z50 CKCYF103Z50
	C14,C17,C46,C79,C80 C31,C32,C35,C39 C29 C13 C9,C11,C21	CQMA102K50  CQMA103K50 CQMA104K50 CQMA272J50 CQMA332J50 CQMA333K50
	C75,C76 C73,C74 C1,C27,C49 C67,C68 C77,C78 C20	CQMA561J50 CQMA562J50 CQMA472J50 CQMA683J50 CQMA471J50 CEAS471M6R3

**RESISTORS**

Mark	Symbol & Description	Part No.
	VR2 Semi-fixed (10k)	VRTB6VS103
	VR3 - VR7 Semi-fixed (22k)	VRTB6VS223
	VR8 Semi-fixed (1k)	VRTS6VS102
	R30 Metal thin film	RN1/6PQ3601F
	Other resistors	RD1/6PM□□□J

**OTHERS**

Mark	Symbol & Description	Part No.
	JA1 2P terminal (OUTPUT)	PKB1009
	X3 Crystal resonator	PSS-012
	X1 Ceramic resonator	VSS1014
	JA3,JA4 Remote control jack	RKN1004

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	D201 - D203	1SS254

**SWITCHES**

Mark	Symbol & Description	Part No.
	S201 - S212 Tact switch (OPEN/CLOSE, PLAY, PROGRAM, TIME, RANDOM PLAY, PAUSE, TRACK SEARCH ( ◀◀, ▶▶ ), MANUAL SEARCH (◀◀, ▶▶), REPEAT, STOP/CLEAR)	PSG-065

**RESISTORS**

Mark	Symbol & Description	Part No.
	R201 - R204	RD1/4PM103J

**OTHERS**

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube	PEL1018

## 7. ADJUSTMENTS

The adjustments for this unit are given below. Adjustments must be made in the order in which they are listed.

### ● Adjustments and check items

1. Tracking offset, focus offset and RF offset adjustment
2. RF level adjustment
3. LD (Laser Diode) power check
4. Focus lock and spindle lock check
5. Grating adjustment
6. Tracking balance adjustment
7. Tangential adjustment
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment
11. Method for confirming S character (focus error)

### ● Measuring equipment

1. Dual trace 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 regular measuring equipment

### ● About the test mode

#### How to activate and release the test mode

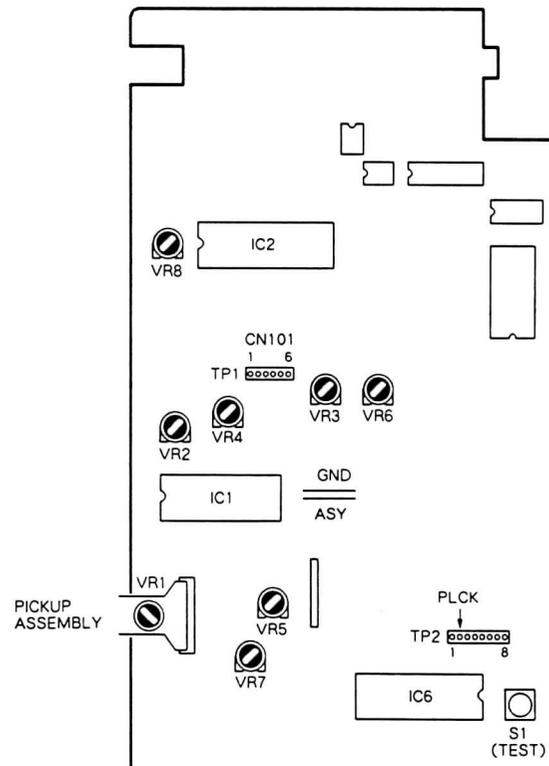
- ① To activate the test mode, turn ON the power switch (S301) with the test mode switch (S1) in the ON position.
- ② The test mode is released by turning the power switch OFF.

The functions of the keys in the test mode are outlined in Table 7-1.

### ● Adjustment VRs 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)

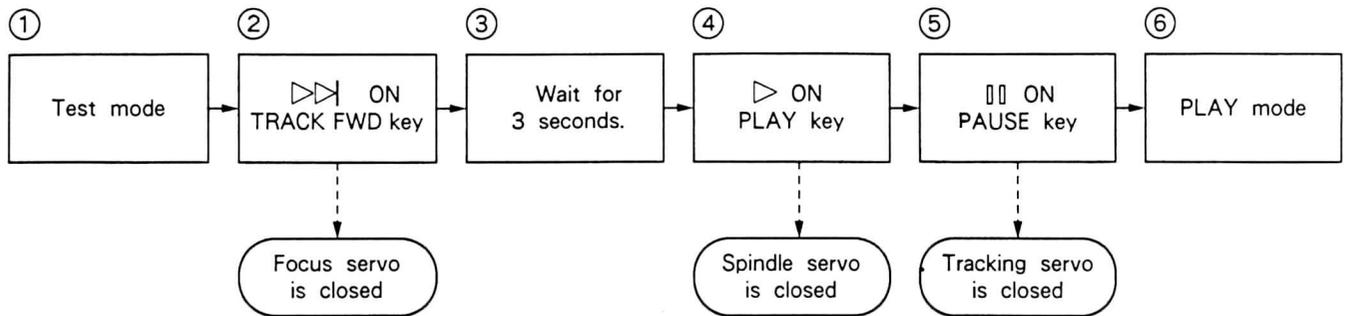
Adjustment Point



In the test mode, the servos must be closed and opened individually. Consequently, the servos must each be closed in the proper sequence (serial sequence) in order to put the machine into the play mode. Note also that the machine will not enter the play mode when the PAUSE (⏸) key is pressed.

For example, in order to change from the stop to the play mode, the function keys must be pressed in the following order.

\* In the test mode, the servos must be operated in serial sequence.

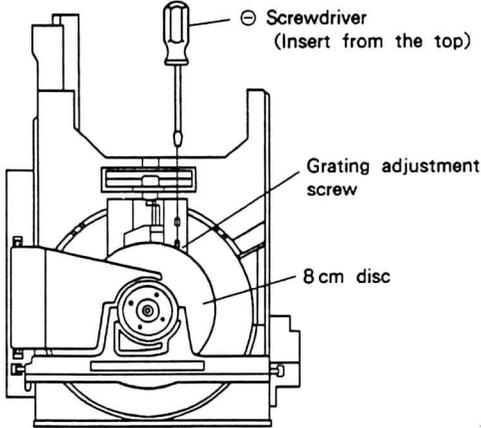
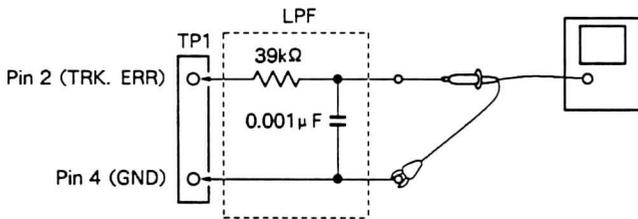


• Key Functions in Test Mode

Symbol	Key name	Function in test mode	Description
>>	TRACK FWD	Focus servo close	Turns ON the laser diode, and raises and lowers the focusing actuator to close the focus servo.
>	PLAY	Spindle servo close	Closes the servo in the CLV-A mode after kicking the spindle motor.
	PAUSE	Tracking servo close/open	Acts as a toggle : closes the tracking servo and activates play mode when pressed (provided the focus and spindle servos are closed), at which time the PAUSE indicator illuminates ; opens the tracking servo when pressed again.
<<	MANUAL SEARCH REV	Carriage reverse (moves inward)	Moves carriage quickly (3cm/s) toward innermost track. Be careful not to move too far as there is no safety device to stop the carriage.
>>	MANUAL SEARCH FWD	Carriage forward (moves outward)	Moves carriage quickly (3cm/s) toward outermost track. Be careful not to move too far as there is no safety device to stop the carriage.
□	STOP	Stop	Stops all servos and returns system to its initial state.
△	OPEN/CLOSE	Disc tray open/close	Opens and closes the disc tray. However, pickup does not return to rest on OPEN, and it remains stationary on CLOSE.

Table 7-1

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
<b>1 Tracking offset, focus offset and RF offset adjustment</b>						
			TP1 Pin 2 (TRK. ERR) TP1 Pin 6 (FCS. ERR) TP1 Pin 1 (RF OUTPUT)	VR5 (TRK. BAL) VR7 (TRK. OFS)  VR6 (FCS. OFS)  VR2 (RF. OFS)	Tracking offset 45°  0V ± 50mV  FOCUS offset 0V ± 50mV  RF offset 100mV ± 50mV	<ul style="list-style-type: none"> <li>● Put unit in the TEST mode (see page 27).</li> <li>● Set VR5 TRK. BAL (tracking balance) to the position about 45° to the left of center.</li> <li>● Adjust VR7 TRK. OFS (tracking offset) so that the TRK. ERR (tracking error) voltage at TP1 pin 2 becomes 0V ± 50mV.</li> <li>● Adjust VR6 FCS. OFS (focus offset) so that the FCS. ERR (focus error) voltage at TP1 pin 6 becomes 0V ± 50mV.</li> <li>● Adjust VR2 RF. OFS (RF offset) so that the RF output voltage at TP1 pin 1 becomes 100mV ± 50mV.</li> </ul> <p>Note : When adjusting the tracking offset, always perform "6. Tracking Balance Adjustment."</p>
<b>2 RF level adjustment</b>						
			TP1 Pin 1 (RF OUTPUT)	VR1 (Laser power)	1.5Vp-p ± 0.2V 0V	<ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Connect the oscilloscope to TP1 pin 1 (RF output), play the test disc, and measure the P-P voltage of the RF waveform.</li> <li>● Adjust VR1 (Laser power) so that the voltage is 1.5Vp-p ± 0.2V.</li> </ul>
<b>3 LD (laser diode) power check</b>						
					Less than 0.13mW	<ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Press the TRACK FWD (▷▷ ) key to turn ON the laser diode (LD).</li> <li>● Place the sensor of the optical power meter directly above the objective lens and confirm that the LD power is less than 0.13mW.</li> </ul>
<b>4 Focus lock and spindle lock check</b>						
	0.5V/div	100msec /div	TP1 Pin 1 (RF output)		RF signal is output.  Forward (clockwise) rotation	<ul style="list-style-type: none"> <li>● Set the test disc.</li> <li>● Put unit in the test mode (see page 27).</li> <li>● Press the MANUAL SEARCH FWD (▷▷) key to move the pickup to the center of the disc.</li> <li>● Observe the output of TP1 pin 1 (RF output) on the oscilloscope. Confirm that the RF signal is output after the TRACK FWD (▷▷ ) key is pressed.</li> <li>● Press the PLAY (▷) key and confirm that the disc rotates at constant speed (approx. 300 rpm near center of disc in the forward (clockwise) direction; disc may not run away or rotate counterclockwise).</li> </ul>

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
<b>5</b>	<b>Grating Adjustment (1) (When an 8 cm disc is used.)</b>					
	 <p style="text-align: center;">Fig. 7-1</p>					<p>Note : This adjustment can be made by using an 8 cm disc, having pits within the diameter range of 75 mm.</p> <ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Load the 8 cm disc, move the pickup to the outer periphery so that the pickup grating adjustment hole is visible from the pit surface of the disc or from the hole in the servo mechanism (see Fig. 7-1).</li> <li>● Press the TRACK FWD key (▷) and PLAY key (▷) in sequence to close the focus servo and spindle servo (do not turn on the tracking servo).</li> <li>● Observe the TRK.ERR (tracking error) waveform at TP1 pin 2 on an oscilloscope, inserting a 4 kHz low-pass filter (see Fig. 7-2).</li> </ul>
0.5V/div	5msec/div	TP1 Pin 2 (TRK. ERR)	Grating adjustment screw  Grating adjustment screw	Null point  Maximum amplitude	<ul style="list-style-type: none"> <li>● Insert a ⊖ screwdriver into the grating hole, turn and find the null point (see Photo 7-1).</li> <li>● Next, slowly turn the ⊖ screwdriver COUNTERCLOCKWISE from the null point and adjust until the waveform (tracking error signal) reaches maximum amplitude (see Photo 7-2).</li> </ul> <p>Note : Use caution since inserting the ⊖ screwdriver forcefully will cause the pickup unit to float upward.</p> <ul style="list-style-type: none"> <li>● Lastly, make sure that there is no major fluctuation in the p-p voltage of the tracking error signal (do not insert the cutoff 4 kHz low-pass filter) when the pickup is moved to the inner and outer periphery. If there is a difference of more than ±10% again turn the grating adjustment screw and adjust the tracking error signal to maximum.</li> </ul>	
 <p style="text-align: center;">Fig. 7-2</p>						

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				

**5' Grating adjustment (2) (When no 8 cm disc is available.)**

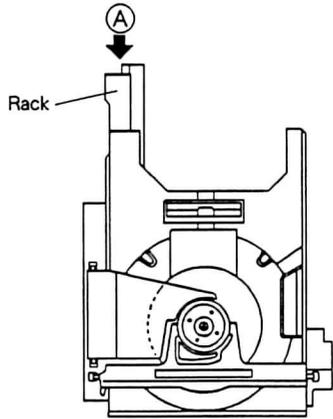


Fig. 7-3

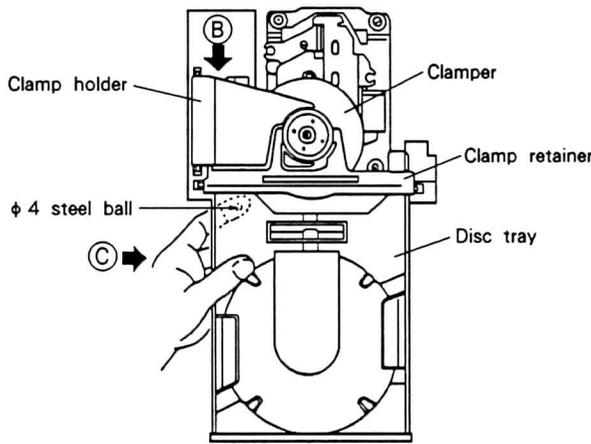


Fig. 7-4

This adjustment is made if no 8 cm disc is available and the grating adjustment (1) cannot be effectuated. Remove the disc tray to perform this adjustment.

● Removal of the disc tray

1. Press the rear edge of the rack, (\*1) marked **A** in Fig. 7-3, while pulling the disc tray out to the position where it catches, illustrated in Fig. 7-4.
- (\*1) When the rear edge of rack **A** is pressed, first the disc clamp is released. If you continue pressing after it has been released completely, the disc tray is ejected.
2. While pulling the clamp holder **B** (see Fig. 7-4) upward with the right hand, hold the tray as indicated by **C** in the left hand and pull it outward. Take care not to allow the  $\phi 4$  steel ball to fall (we recommend holding the ball in place with the left index finger while extracting the tray.)

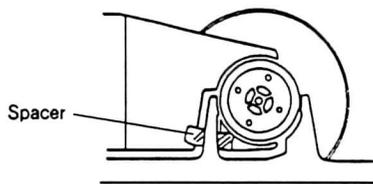


Fig. 7-5

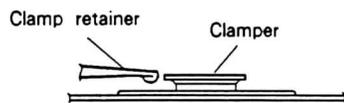


Fig. 7-6

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items / Adjustment specifications	Adjustment procedure
	V	H				
						<ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Press the MANUAL SEARCH FWD (▷▷) key to move the pickup to the vicinity of what would be the center of the disc. Position the pick up so its grating adjusting screw is visible through the elongated hole on the spindle motor side of the servo mechanism base plate.</li> <li>● As shown in Fig. 7-7, insert a (slotted) ⊖ screwdriver from the rear of the mechanism and check that the grating adjusting screw can be rotated.</li> <li>● Mount the test disc ; be sure to insert a 3-5 mm spacer (if no spacer is available, use a hex wrench) between the clamp holder and clamp retainer, as shown in Fig. 7-5.</li> <li>● Confirm that the clamber and the clamp retainer are not contacting one another (Fig. 7-6).</li> <li>● Press the TRACK FWD (▷▷ ) and the PLAY (▷) keys sequentially to close the focus and spindle servos (do not close the tracking servo).</li> <li>● Insert a 4 kHz-cutoff low pass filter between the oscilloscope and TP1 pins 2 (TRK. ERR) and 4 (GND) as shown in Fig. 7-8 and observe the waveform of TP1 pin 2 (tracking error) on the oscilloscope.</li> </ul>
						<ul style="list-style-type: none"> <li>● Turn the grating adjusting screw with the ⊖ screwdriver to find the null point (see Photo 7-1).</li> <li>● Next , slowly turn the ⊖ screwdriver COUNTERCLOCKWISE and adjust to the point where the waveform (tracking error signal) first achieves its maximum amplitude (see Photo 7-2).</li> </ul> <p>Note : Avoid applying pressure to the ⊖ screwdriver while adjusting the screw. Doing so causes the pickup to move inward, making adjustment more difficult.</p> <ul style="list-style-type: none"> <li>● Lastly, remove the low pass filter and confirm that the tracking error signal (do not insert the cutoff 4 kHz low-pass filter) p-p voltage does not greatly vary when the pickup is moved to the inner-most and outer-most tracks of the disc. If the levels diverge by ±10% or more, re-adjust the maximum error amplitude point by turn the grating adjusting screw.</li> </ul>

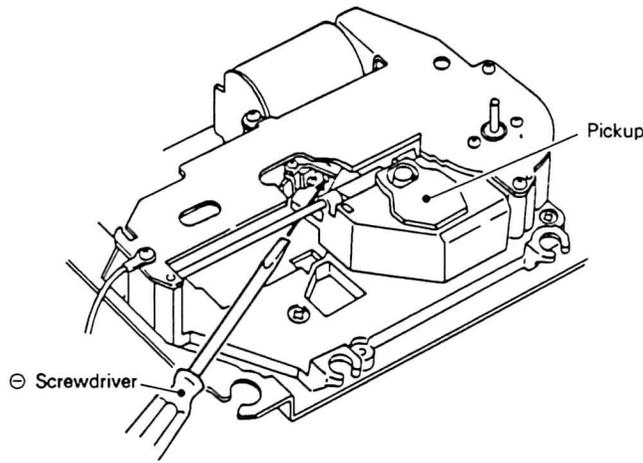


Fig. 7-7

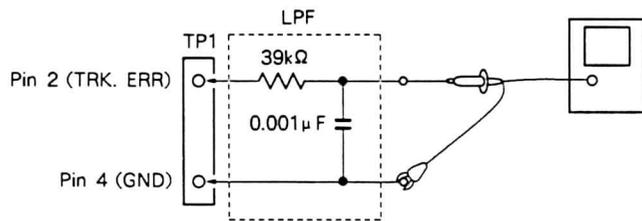


Fig. 7-8

/div

5msec /div

TP1 Pin 2 (TRK. ERR)

Grating adjusting screw  
Grating adjusting screw

Null point  
Maximum amplitude

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
						<p>Re-mount the disc tray according to the following procedure when the grating adjustment is complete.</p> <ol style="list-style-type: none"> <li>1. Remove the disc and the spacer.</li> <li>2. While lifting the clamp holder [marked ㊸ in Fig. 7-4] with the right hand, hold the tray in the left hand as indicated by ㊹ and slide the slide base into the hard resin fittings on the loading base as shown in Fig. 7-9 to re-insert the disc tray. At this time, be sure to hold the steel ball in place with the index finger of the left hand. Also, be careful that the front panel is not damaged by the slide base and bearing of the steel ball's bearing (in the slide base) coming into contact with the panel.</li> <li>3. Insert the slide base so that it fits into the two hard resin fittings at the rear of the loading base (see Fig. 7-10).</li> <li>4. Insert the tray tightly.</li> </ol>

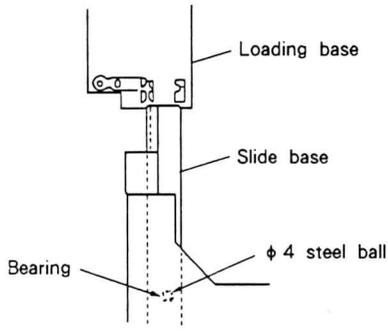


Fig. 7-9

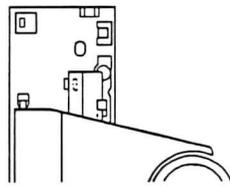


Fig. 7-10

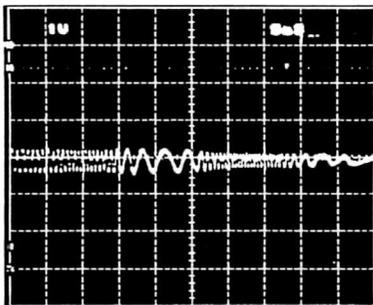


Photo 7-1  
Null point

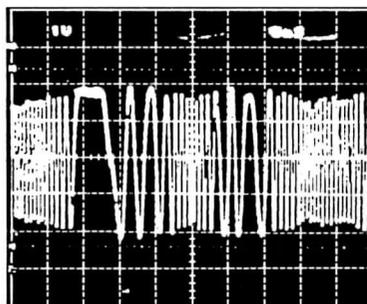


Photo 7-2  
Maximum amplitude

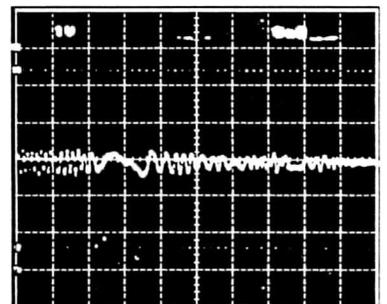
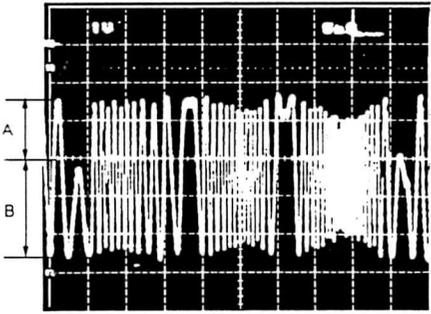
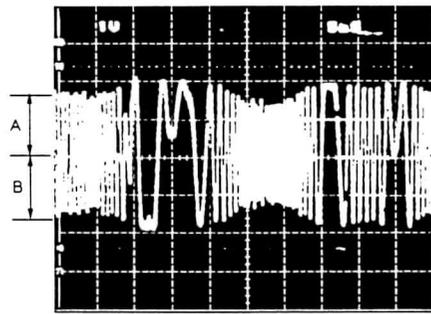
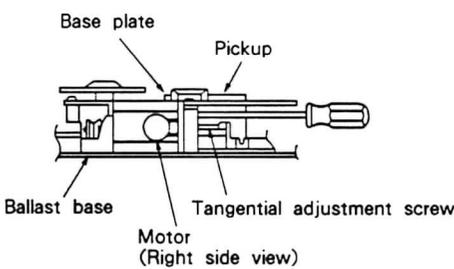
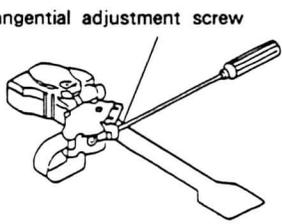


Photo 7-3  
This is not the null-point waveform.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
<b>6 Tracking balance adjustment</b>						
	0.5V/div	5msec/div	TP1 Pin 2 (TRK. ERR)	VR5 (TRK. BAL)		<ul style="list-style-type: none"> <li>● Load the test disc.</li> <li>● Put unit in the test mode (see page 27).</li> <li>● Press the MANUAL SEARCH FWD (▷▷) key to position the pickup near the center of the disc.</li> <li>● Press the TRACK FWD (▷▷ ) and PLAY (▷) keys sequentially to cause the disc to rotate.</li> <li>● Observe TP1 pin 2 TRK. ERR (tracking error) on the oscilloscope and adjust VR5 TRK. BAL (tracking balance) to eliminate the DC elements from the tracking error signal.</li> </ul>
			 <p>A ≠ B</p> <p>Photo 7-4 DC elements mixed in signal</p>		 <p>A = B</p> <p>Photo 7-5 DC elements eliminated</p>	
<b>7 Tangential adjustment</b>						
					<ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Open the tray and load the test disc.</li> <li>● Press the MANUAL SEARCH FWD (▷▷) key to position the pickup near the center of the disc.</li> <li>● Insert a hex wrench into the tangential adjustment screw section from the rear of the mechanism.</li> <li>● Close the tray.</li> </ul> <p>Note : Do not use an L-shaped hex wrench. Use one such as shown to the left. Using an L-shaped hex wrench can cause the tray to come loose (see page 31 5'. Grating Adjustment (2)).</p>	
	 <p>Tangential adjustment screw</p> <p>Fig. 7-11</p>				<ul style="list-style-type: none"> <li>● Press the TRACK FWD (▷▷ ), PLAY (▷), and PAUSE (⏸) keys sequentially to close the all servos (PAUSE indicator will illuminate).</li> </ul>	

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
		200nsec /div	TP1 Pin 1 RF output	Tangential adjustment screw	Sharpest possible eye pattern	<ul style="list-style-type: none"> <li>● Observe TP1 pin 1 (RF output) on the oscilloscope and adjust the tangential adjustment screw to achieve the sharpest possible eye pattern.</li> <li>● The point to which the adjusting screw should be set lies about halfway between the points at which the eye pattern becomes most blurred when the screw is rotated clockwise and counterclockwise. When the whole waveform becomes clear, concentrate on sharpening the fine lines forming the diamond at the center of the eye pattern (see Photo 7-8). Adjust until the fine lines on all four sides of the diamond are both sharply defined and dense, as shown in Photo 7-6.</li> </ul> <p>Note: Use a hex wrench to raise the pickup some what while making this adjustment.</p>

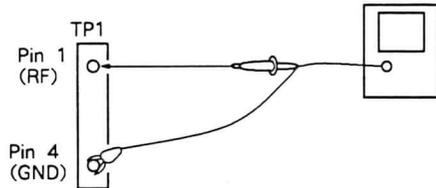
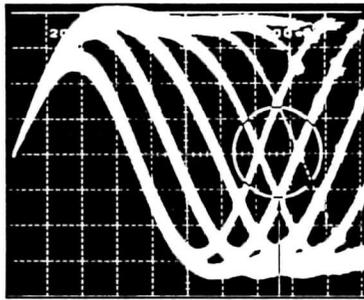


Fig. 7-12



Part to be observed

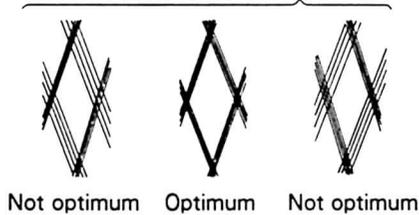


Photo 7-6

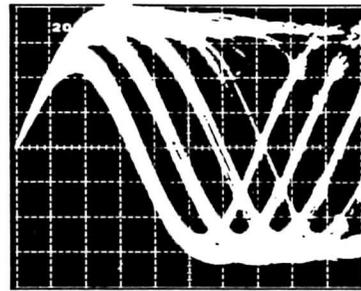


Photo 7-7

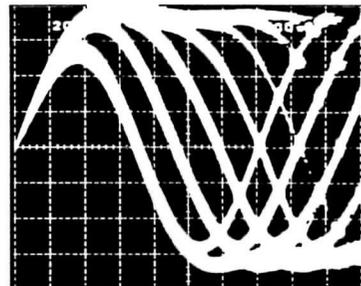


Photo 7-8

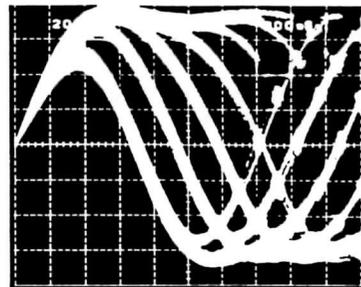


Photo 7-9

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				

**9 Tracking gain adjustment**

50mV/div  
CH1 (X)  
5mV/div  
CH2 (Y)  
(probe 10 : 1)

X-axis :  
TP1  
Pin 3  
(TRK. IN)  
Y-axis :  
TP1  
Pin 2  
(TRK. ERR)

VR4  
(TRK. GAN)

Phase difference  
of 90°

- In the POWER OFF state, connect the oscilloscope and oscillator as shown in Fig. 7-14.
- Set the unit to the normal PLAY mode.
- Turn ON the power to the oscillator and set it to output a 1.2kHz 2Vp-p signal.

Note : some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on.

- Adjust VR4 TRK. GAN (tracking gain) so that the Lissajous's figure becomes a horizontal circle (phase difference of 90°).

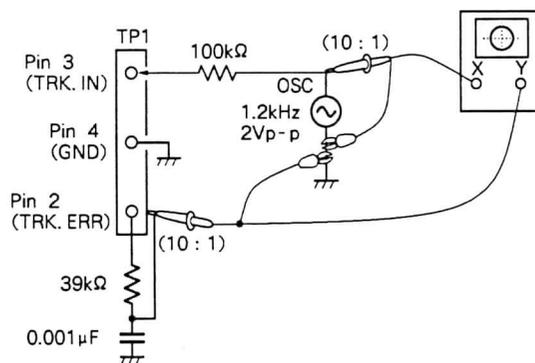


Fig. 7-14

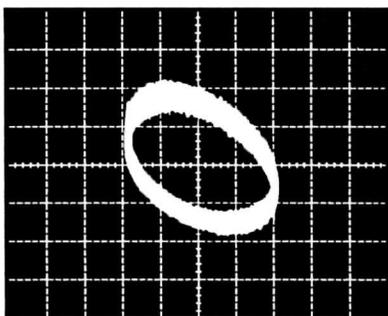


Photo 7-13  
High gain

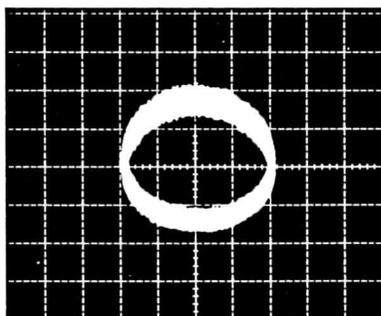


Photo 7-14  
Optimum gain

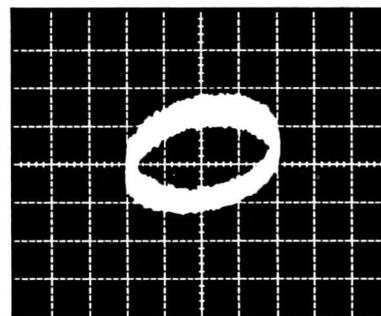


Photo 7-15  
Low gain

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
<b>10</b>	<b>VCO free-run frequency adjustment</b>					
			TP2 Pin 2 (PLCK)	VR8 (VCO. ADJ)	4.275 ± 0.025MHz	<ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Short the ASY and GND jumper with a ⊖ screwdriver or similar tool (see page 27).</li> <li>● Connect a frequency counter capable of measuring frequencies of 10MHz and above to TP2 pin 2 (PLCK).</li> <li>● Adjust VR8 (VCO adjustment) so that the frequency counter reading becomes 4.275 ± 0.025MHz.</li> </ul>
<b>11</b>	<b>Method for confirming S character (focus error)</b>					
			TP1 Pin 6 (FCS. ERR)			<ul style="list-style-type: none"> <li>● Put unit in the test mode (see page 27).</li> <li>● Ground TP1 pin 5 FCS.IN (focus in) to GND.</li> <li>● Observe the waveform output by TP1 pin 6 FCS.ERR (focus error) when the TRACK FWD (▷▷ ) key is pressed.</li> </ul>

## 8. SPECIFICATIONS

### 1. General

Type .....	Compact disc digital audio system
Power requirements	
European models .....	AC 220V, 50/60Hz
U.K., Australian models .....	AC 240V, 50/60Hz
U.S., Canadian models .....	AC 120V, 60Hz
Other models .....	AC 110/120–127/220/240V (switchable), 50/60Hz
Power consumption .....	11W
Operating temperature .....	+5°C – +35°C (+41°F – +95°F)
Weight .....	3.8kg (8lb, 6oz)
External dimensions .....	420(W) × 324(D) × 90(H)mm 16-9/16(W) × 12-3/4(D) × 3-9/16(H) in.

### 2. Audio section

Frequency response .....	4Hz–20kHz (±0.5dB) (EIAJ)
S/N .....	102dB or more (EIAJ)
Dynamic range .....	90dB or more (EIAJ)
Channel separation .....	95dB or more (EIAJ)
Output voltage .....	1.8V
Wow and flutter .....	Limit of measurement (±0.001% W.PEAK) or less (EIAJ)
Number of channels .....	2 channels (stereo)

### 3. Functions

- Play
- Pause
- Manual search
- Programmed playback
- Track search
- Programmed repeat
- Pause program
- All track repeat
- Random play
- Timer start

### 4. Accessories

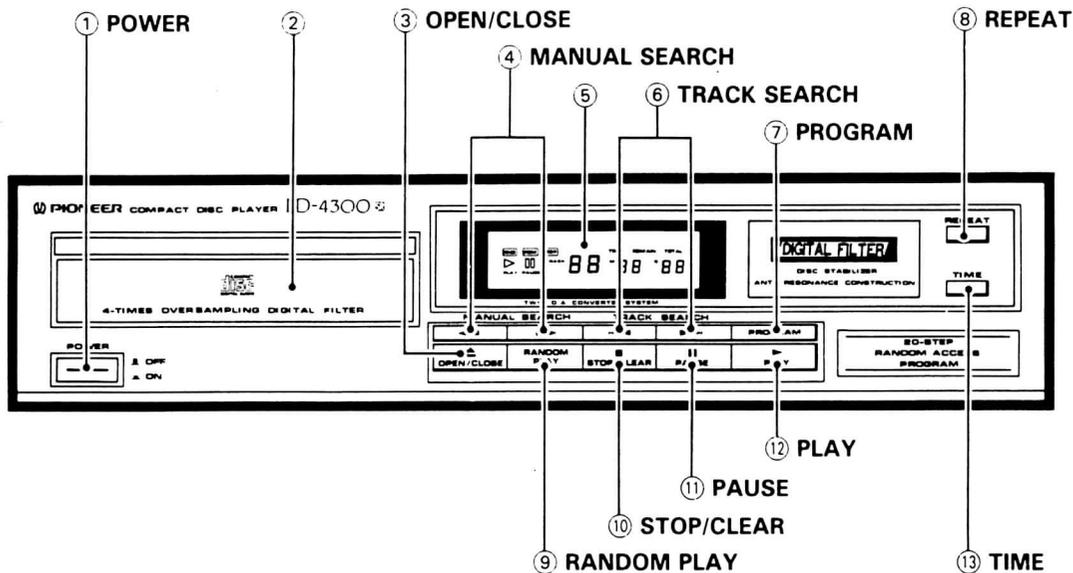
- Remote control cord ..... 1
- Output cable ..... 1
- Operating instructions ..... 1

#### NOTE:

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

## 9. PANEL FACILITIES

### FRONT PANEL



#### ① POWER switch

Press to turn power to the unit ON and OFF.  
If there is a disc in the unit when power is turned ON, playback will begin automatically. (Timer start function)

#### ② Disc Tray

This is where the disc is set. When power is switched ON and the OPEN/CLOSE key is pressed, the tray is ejected forward. To insert the tray, press the OPEN/CLOSE key, or lightly push the tray in with your finger. With the disc tray open, pressing the PLAY key will close the disc tray and start playback.

#### ③ OPEN/CLOSE key ( ▲ )

Press when you wish to eject or load a disc. Each time the key is pressed, the tray is alternately pushed out or pulled in.

#### ④ MANUAL SEARCH keys

When the player is in playback or pause modes, these keys are pressed to perform fast forward or reverse operations to allow manual searching. These operations are only carried out during the time either key is pressed.

[▶▶] : For fast forward operation. If the end of the disc is reached during fast forward operation, "End" will be displayed and the player will enter the pause mode. [During programmed playback, the player will enter the pause mode right before it reaches the next track (program step).]

[◀◀] : For fast reverse operation. If the beginning of the disc is reached during fast reverse operation, the player will enter the playback mode. [During programmed playback, the player will enter the playback mode right before it reaches the previous track (program step).]

#### ⑤ Indicators

- RND : Lights during random playback.
- PGM : Lights after programming (after program has been memorized).
- REP : Lights during repeat play.
- > PLAY : Lights during playback.
- || PAUSE : Lights during temporarily interrupted playback.
- TRACK : Displays the current track number (during normal playback and programmed playback) or the track being programmed during programming operation.
- TIME/REMAIN/TOTAL : Changes each time the TIME key is pressed.
  - TIME : Displays the track number of the track being played (TRACK) and the elapsed time (minutes and seconds).
  - REMAIN : Displays the remaining time on the track being played. When the TIME key is pressed again, the remaining time on the disc will be displayed.
  - TOTAL : Displays the total number of tracks on the disc (TRACK) and the overall playback time (minutes and seconds). During playback, the display goes on for about 5 seconds before changing to the TIME display.
- M (minute) : Displays the minutes of the elapsed time, total playback time, and remaining time.
- S (second) : Displays the seconds of the elapsed time, total playback time, and remaining time.

## ⑥ TRACK SEARCH keys

During normal playback, programmed playback or pause modes, these keys are pressed to search for the desired track. Pressing either key causes the player to advance to the next track or to return to the previous track. Even in stop mode, these keys can be used to select the desired track. Press the PLAY key to playback the desired track.

[▶▶] : When pressed once, playback advances to the beginning of the next track on the disc; when pressed continuously, playback advances to the beginning of succeeding tracks on the disc. (During programmed playback, it advances to the beginning of the next programmed track.)

[◀◀] : When pressed once, playback returns to the beginning of the currently playing track; when pressed continuously, playback shifts to the beginning of previous tracks on the disc. (During programmed playback it returns to the beginning of the previous programmed track.)

## ⑦ PROGRAM key

Use to program a sequence of tracks.

- Press this key after selecting a desired track with the TRACK SEARCH keys. Tracks will be added to the program in the order in which they are selected.

## ⑧ REPEAT key

Press to perform repeat playback

- If pressed during normal playback mode, all tracks on the disc will be repeatedly played back.

- If pressed during programmed playback, the programmed tracks will be repeatedly played back in the programmed order.
- In the case of random play mode, after all the tracks have been played, random play will start again.

## ⑨ RANDOM PLAY key

Press to begin random playback.

## ⑩ STOP/CLEAR key (■)

Press to stop playback. When pressed, the player goes into stop mode and all operations stop.

Press to clear a program. When pressed during stop mode, the program stored in memory is cleared.

## ⑪ PAUSE key (⏸)

Press to temporarily interrupt playback. When pressed again, the pause mode is cancelled and playback resumes.

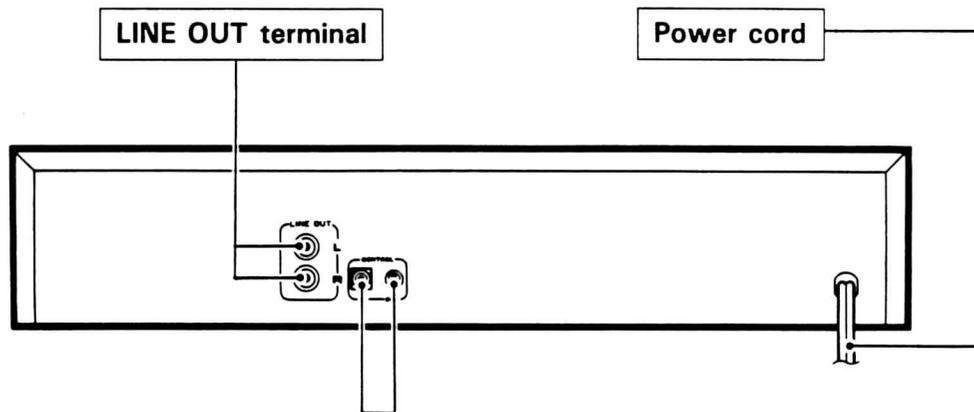
## ⑫ PLAY key (▶)

Press to begin playback, and to cancel the pause mode.

## ⑬ TIME key

This key selects the display mode of the indicator panel. Each time the key is pressed, the indication changes from TIME, REMAIN, to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

## REAR PANEL



### CONTROL IN terminal

This terminal is for inputting the remote control signals relayed from an amplifier or other component with a sensor for receiving control signals from a remote control unit and carrying the Pioneer SR mark. Please connect to the control output terminal of the other component.

### CONTROL OUT terminal

This terminal is for further relaying remote control signals to other components carrying the Pioneer SR mark. For instructions regarding connection and operation, please refer to the operating instruction manual for your stereo amplifier.