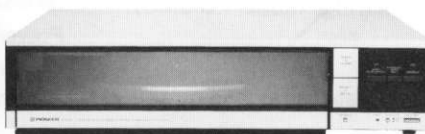




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Service Manual

REPAIR & ADJUSTMENTS

**ORDER NO.
ARP-139-0**
STEREO TURNTABLE

PL-44F

MODEL PL-44F COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	U.K. model
S	110V, 120V, 220V and 240V (Switchable)	General export model

- This is the service manual for model PL-44F/KU. For servicing of the HE, HB and S types, please refer to the additional service manual on page 25.
- For the circuit & mechanism description, please refer to the PL-88F service manual (ARP-143).
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

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1. SPECIFICATIONS

Motor and Turntable

Drive System	Belt-drive
Motor	DC motor
Turntable Platter	280 mm diam. aluminum alloy die-cast
Speeds	33-1/3 and 45 rpm
Wow and Flutter	Less than 0.045% (WRMS)
Signal-to-Noise Ratio	More than 70 dB (DIN-B)
(with Pioneer cartridge model PC-3MC)	

Tonearm

Type	Integrated straight pipe arm
------------	------------------------------

PC-3MC Specifications

Type	Moving coil type
Stylus	0.5 mil diamond (PN-3 MC)
Output Voltage	2.5 mV
(1 kHz, 50 mm/s Peak velocity, LAT)	
Tracking Force	1.7 g to 2.3 g (proper 2 g)
Frequency Response	10 to 32,000 Hz
Recommended Load	50 k Ω
Weight	3.1 g

Accessory mechanisms

Full-auto functions based on motor specially designed for tonearm
Auto disc size selector (17 cm, 30 cm)
Arm elevation mechanism, deck synchronization
Built-in anti-skating

Miscellaneous

Power Requirements	AC120V, 60Hz
Power Consumption	13W
Dimensions	420 (W) x 98 (H) x 335 (D) mm
16-1/2 (W) x 3-3/4 (H) x 14-1/4 (D) in.	
Weight	9 kg/19 lb 14 oz

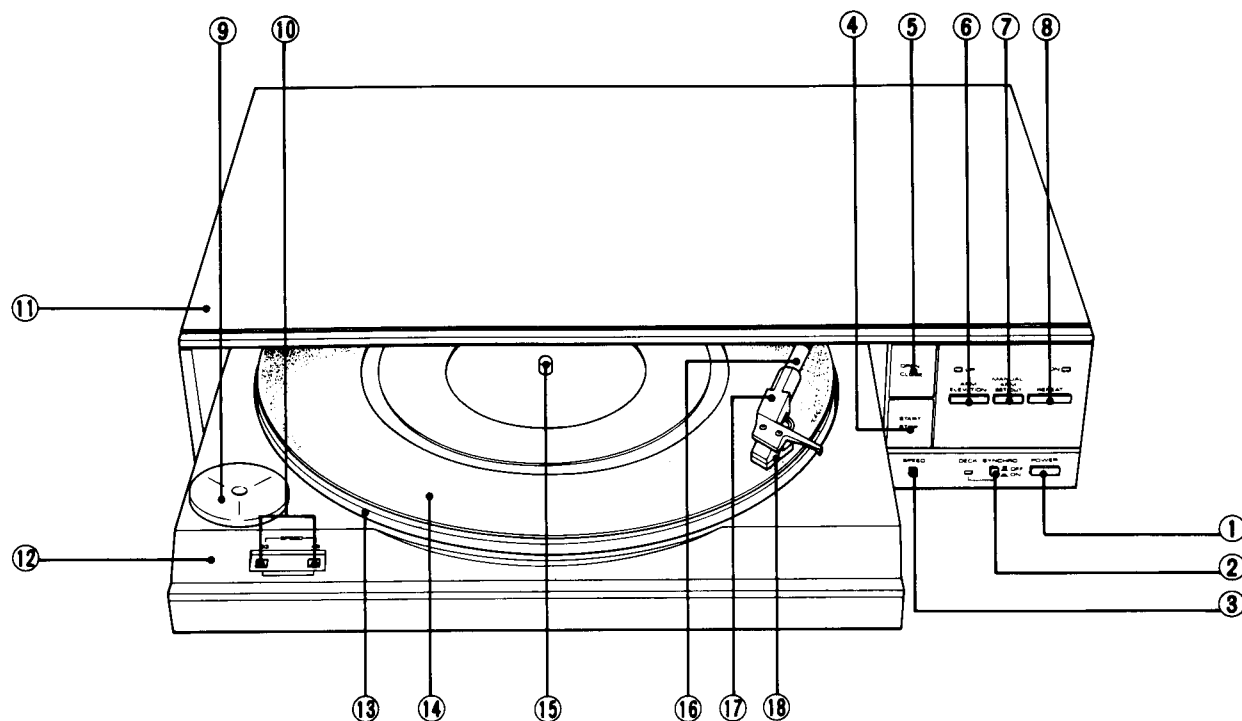
Accessories

Deck synchro cord	1
EP Adaptor	1
Operating Instructions	1

NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

2. FRONT PANEL FACILITIES



① POWER switch

Press this switch to turn the power on and off.

Depressed () position:

Power is switched ON.

Released () position:

Power is switched OFF.

When the POWER switch is set to ON, the following switches are set automatically.

ARM ELEVATION switch → UP, MANUAL ARM SET/CUT switch → OFF, REPEAT switch → OFF

② DECK SYNCHRO switch/indicator

This switch is used when a tape deck has been connected to this unit using the accessory cord.

Depressed () position:

For operations which are synchronized with the tape deck.

Released () position:

For operations which are not synchronized with the tape deck.

③ SPEED selector switch

This is pressed so that the speed indicator lights in line with the rated speed of the record which is to be played.

“(33)” lights:

For playing 33-1/3 rpm records.

“(45)” lights:

For playing 45 rpm records.

④ START/STOP switch

- Press this switch to start auto play.
- Press this switch to stop auto play.

⑤ OPEN/CLOSE switch

- This is pressed to open and close the door and to bring out and retract the slide base.
- It is also pressed to stop auto play.

⑥ ARM ELEVATION switch/indicator (UP)

- Press this switch to start manual play.
- Use the switch to suspend record play temporarily.
- Use the switch when changing the tracks (with manual play) during actual play.

“UP” indicator lights:

The tonearm rises (the stylus moves away from the record).

“UP” indicator goes off:

The tonearm descends (the stylus is lowered onto the record).

⑦ MANUAL ARM SET/CUT switch

- Press this switch for manual play.
- Press this switch to stop manual play.

⑧ REPEAT switch/indicator

Press this switch so that the indicator lights for repeat play.

⑨ EP adaptor/EP adaptor holder

Slide the EP adaptor over the platter shaft when the record you want to play does not have a “middle”.

Keep the adaptor on the holder when it is not in use.

NOTE:

Make sure that you use the EP adaptor which is supplied with this unit. Using any other adaptor may invite contact with the stylus with the result that the stylus may be damaged.

⑩ Speed indicators (33, 45)

These indicate the platter speed.

“(33)” lights:

Platter is rotating at 33-1/3 rpm.

“(45)” lights:

Platter is rotating at 45 rpm.

⑪ Bonnet

⑫ Slide base

⑬ Platter

⑭ Rubber mat

NOTE:

Always use the rubber mat which is supplied with this unit. Using a different rubber mat will change the stylus height and may cause malfunctions.

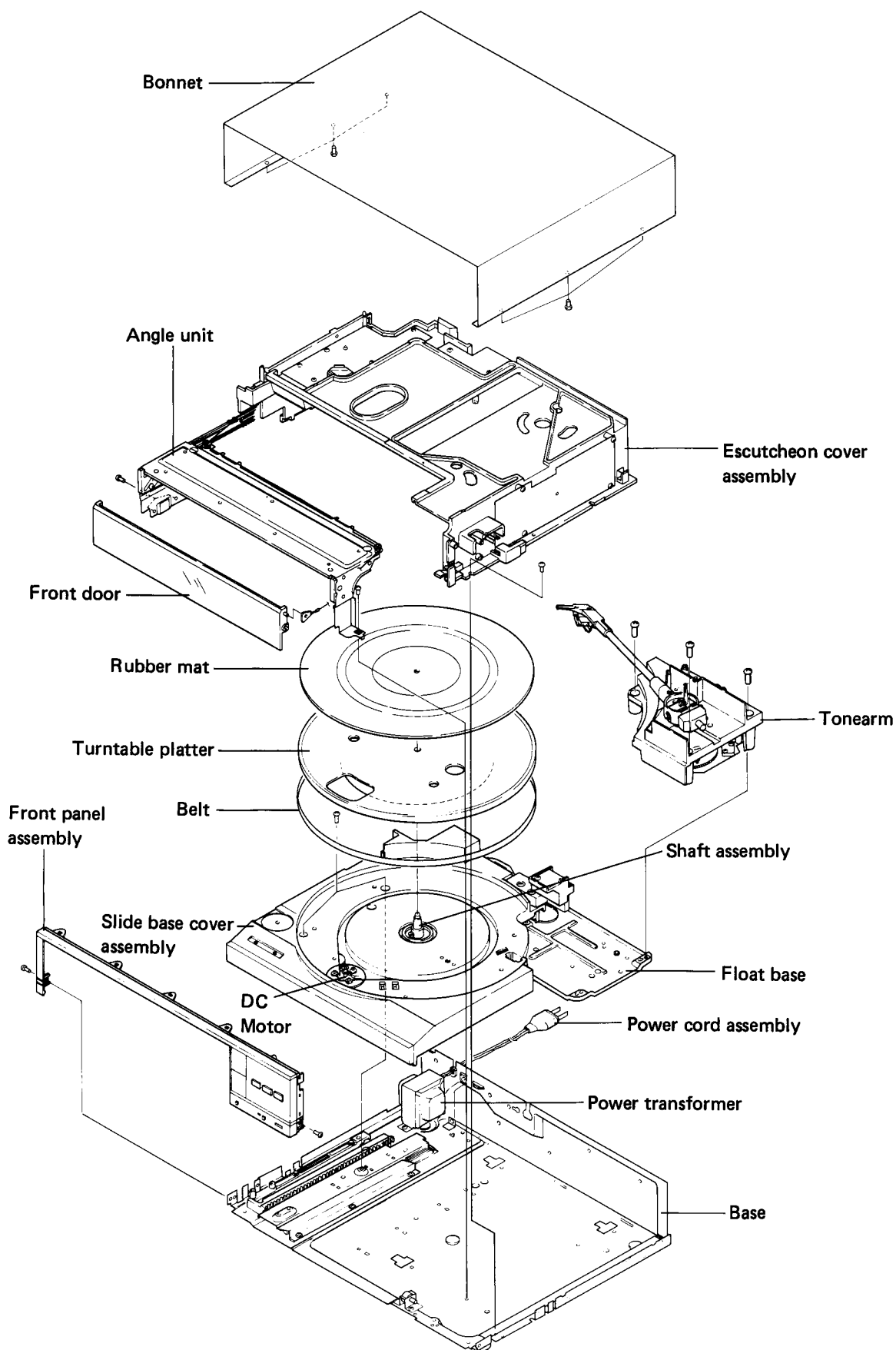
⑮ Platter shaft

⑯ Tonearm

⑰ Headshell

⑱ Cartridge (PC-3MC)

3. DISASSEMBLY



A

B

C

D

4. EXPLODED VIEWS

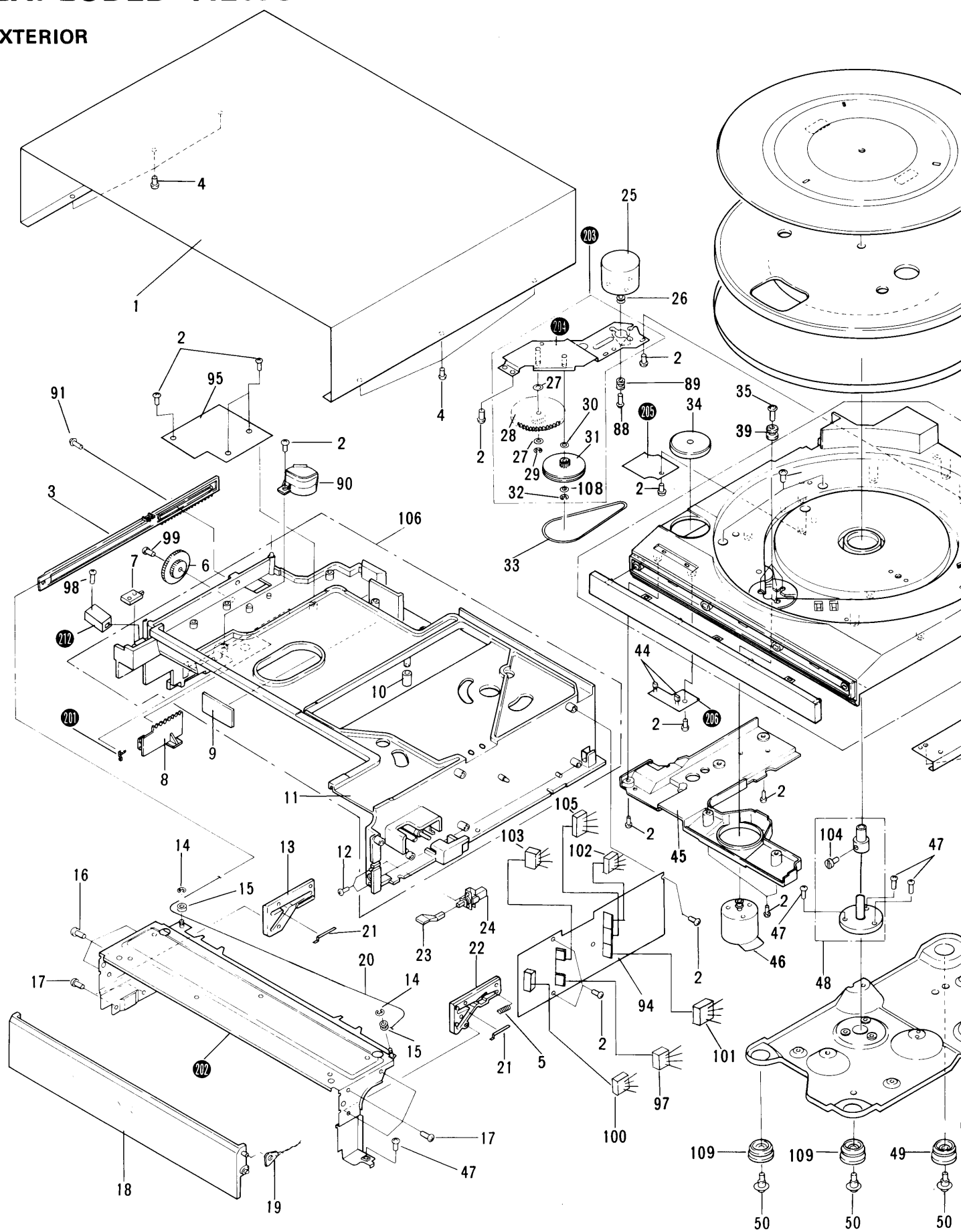
4.1 EXTERIOR

A

B

C

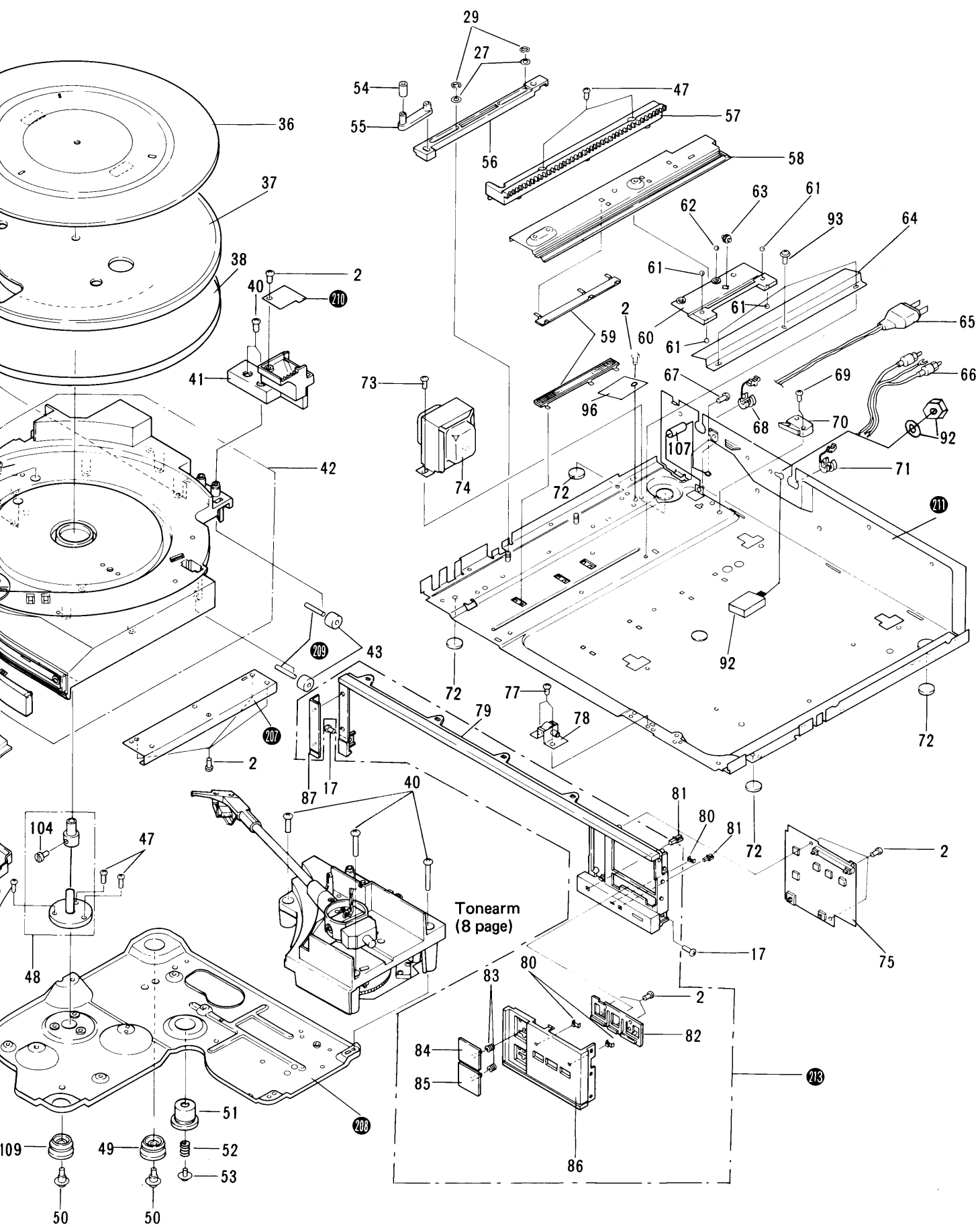
D



4

5

6



A

B

C

D

4

5

6

NOTES:

- Parts without part number cannot be supplied.
 - The $\triangle$ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
- $\star\star$ GENERALLY MOVES FASTER THAN $\star$**
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List

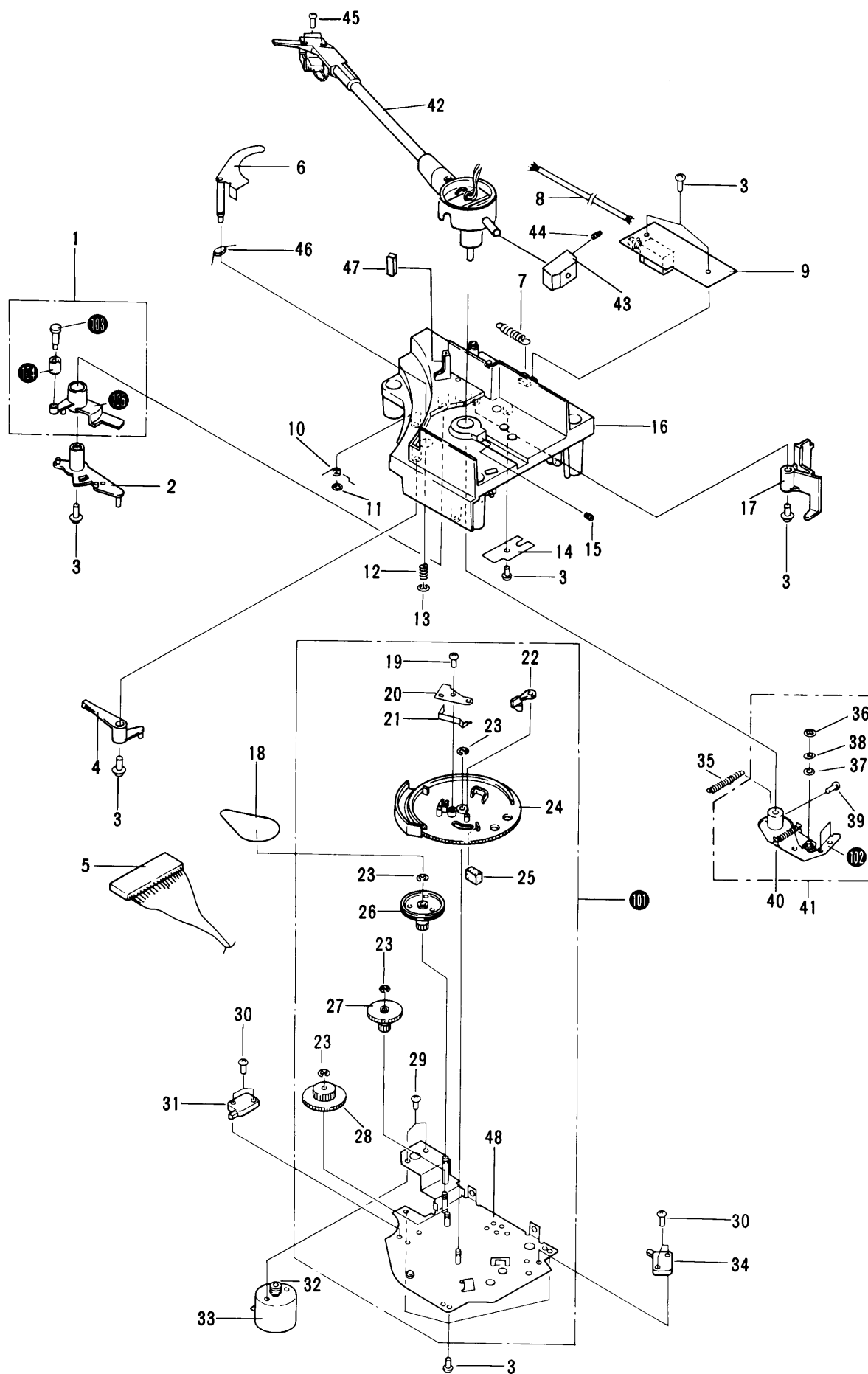
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
★★	1.	PNA-170	Bonnet	★★	46.	PYY-114	Motor assembly
	2.	PPZ30P080FMC	Screw		47.	PDZ30P080FMC	Screw
	3.	PNX-437	Driving lever rack		48.	PXB-274	Shaft assembly
	4.	PDZ30P060FZK	Screw		49.	PEB-209	Damper rubber
	5.	PBH-342	Spring		50.	PBA-141	Screw (B)
	6.	PNX-436	Gear (F)	51.	PEB-208	Damper rubber	
	7.	PSH-007	Slide switch	52.	PBH-335	Spring (A)	
	8.	PNX-435	Slider	53.	PBA-140	Screw (A)	
	9.	PED-023	Rubber cushion	54.	PNX-434	Lock lever roller	
	10.	PEB-207	Rubber	55.	PNX-433	Lock lever	
	11.	PXB-291	Escutcheon cover assembly	56.	PNX-432	Lock plate	
	12.	PMA30P080FMC	Screw	57.	PNX-431	Lowering rack	
	13.	PNX-438	Door holder (L)	58.	PNC-251	Slide rail	
	14.	YE25S	Washer	59.	PNX-428	Slide rail rack	
	15.	PNX-440	Pulley	60.	PNX-426	Retainer	
★★	16.	PPZ26P050FZK	Screw	61.		Steel 4φ	
	17.	PDZ30P050FMC	Screw	62.		Steel 6φ	
	18.	PNX-378	Front door	63.	PNX-231	Gear	
	19.	PYY-115	Door holder assembly	64.	PNC-253	Rail cover	
	20.	PBL-001	Wire	65.	PDG-040	Power cord assembly	
	21.	PBK-058	Spring	66.	PXB-294	PU cord assembly	
	22.	PNX-439	Door holder (R)	67.	PMZ30P150FMC	Screw	
	23.	PNX-387	P knob	68.	PEC-048	Strain relief (Power cord)	
	24.	PSG-024	Power switch	69.	PBA-138	Screw	
	25.	PXM-117	Motor	★★	70.	PSH-009	Slide switch
★★	26.	PNX-449	Motor pulley	★	71.	PEC-051	Strain relief (PU cord)
	27.	WA41D065D25	Flat washer		72.	PEC-073	Stopper (Rubber)
	28.	PNX-430	Gear (E)		73.	PMA40P060FMC	Screw
	29.	YE30S	Washer		74.	PTT-154	Power transformer (120V)
	30.	WA31D054D025	Flat washer		75.	PNX-076	Function assembly
	31.	PNX-429	Gear (D)		76.	PDZ30P100FMC	Screw
★★	32.	YE20S	Washer	77.	PDZ30P060FMC	Screw	
	33.	PEB-206	Belt	78.	PXB-278	Roller angle assembly	
	34.	PNX-442	45 adaptor	79.	PNX-402	Front panel (B)	
	35.	PBA-112	Screw	80.	PNX-413	Lens (A)	
	36.	PEB-205	Rubber mat assembly	81.	PNX-386	DS knob	
★★	37.	PNR-174	Turntable platter	82.	PNX-410	EV knob	
	38.	PEB-183	Belt	83.	PBH-328	Knob spring	
	39.	PEB-172	Rubber cushion	84.	PAD-105	O/C knob unit	
	40.	PDZ30P080FMC	Screw	85.	PAD-106	S/S knob unit	
	★	41.	PNX-450	Wire guide	86.	PNX-404	Operation panel
42.		PXB-263	Slide base cover assembly	87.	PNX-407	Panel holder	
43.		PNX-424	Roller	88.	PBA-125	Screw	
44.		GL-9PG12	LED	89.	PEB-184	Rubber cushion	
45.		PNY-026	Cover (KU Type)	90.	PNX-425	Lamp cover	
		PNX-441	Cover (HE,HB,S Types)				

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
⚠	91.	IPZ30P100FMC	Screw	106.	PXB-291		Escutcheon cover assembly
	92.	PKN-001	Jack	107.	PLB-176		Caller
	93.	IDZ30P060FMC	Screw	108.	WA31D054D050		Flat washer
	94.	XWM-133	Control assembly	109.	PEB-236		Damper rubber (E) (KU)
	95.	XWR-039	Power supply assembly		PEB-209		Damper rubber
	96.	XWX-127	Regulator assembly	201.			Rail stopper
	97.	PDE-180	Connector assembly	202.			Angle unit
	98.	PBA-126	Screw	203.			Gear base assembly
	99.	PBA-146	Screw	204.			Gear base unit
	100.	PDE-174	Connector assembly	205.			Photo transistor assembly
	101.	PDE-176	Connector assembly	206.			LED assembly
	102.	PDE-178	Connector assembly	207.			Roller plate
	103.	PDE-179	Connector assembly	208.			Float base
	104.	PMZ30P040FMC	Screw	209.			Shaft
	105.	PDE-175	Connector assembly	210.			Plate
				211.			Base unit
				212.			Rubber
				213.			Front panel assembly

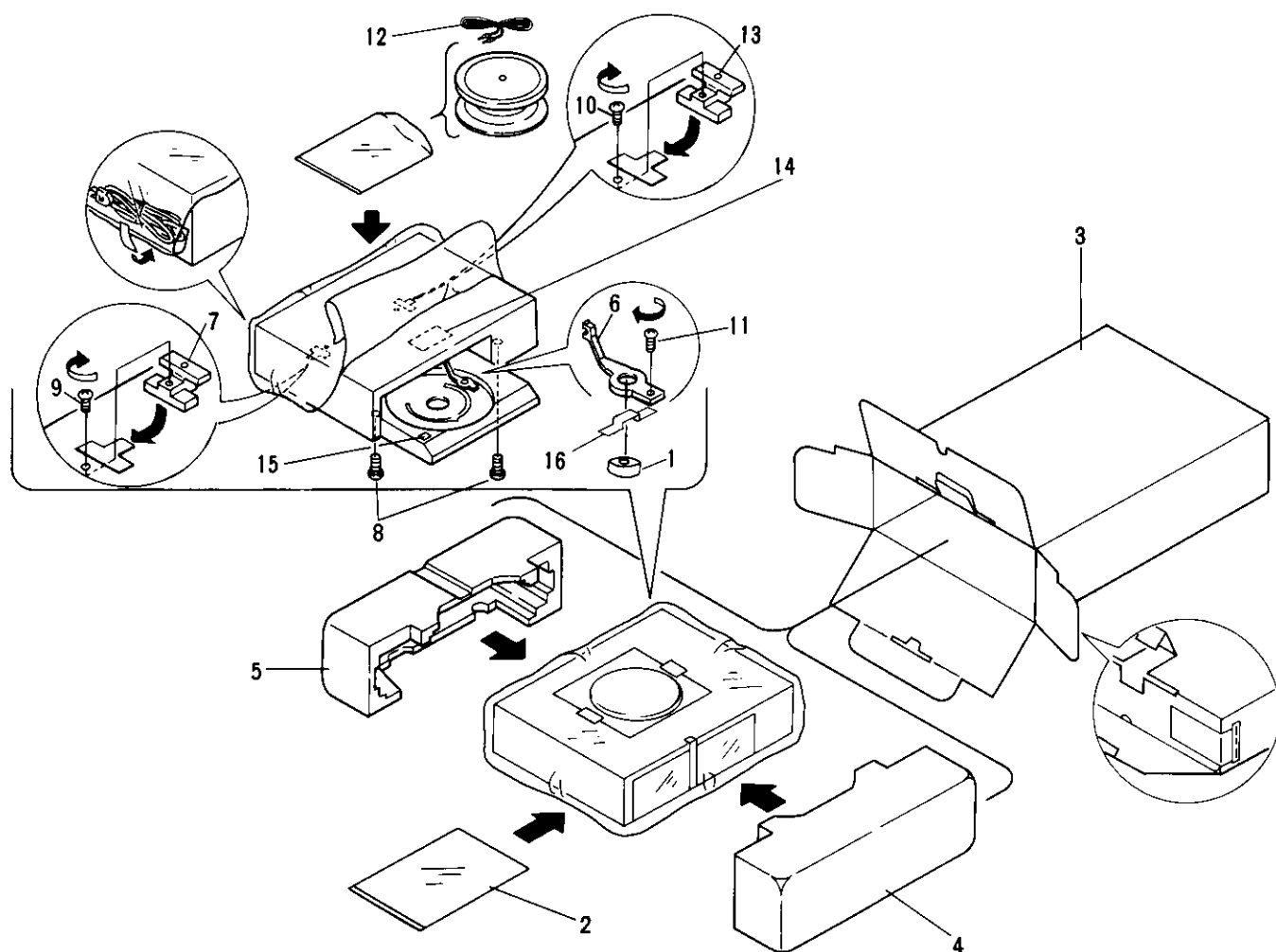
4.2 TONEARM

Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	PXB-275	Cam assembly		26.	PNX-396	Gear (C)
	2.	PNX-443	Adjust lever		27.	PNX-395	Gear (B)
	3.	IPZ30P080FMC	Screw		28.	PNX-394	Gear (A)
	4.	PNX-422	Reset lever		29.	PMZ20P040FMC	Screw
	5.	PDE-179	Connector assembly		30.	PBA-138	Screw
★	6.	PXT-477	EV sheet unit	★★	31.	PSH-007	Slide switch
	7.	PBH-332	Muting lever spring	★★	32.	PNW-392	Motor pulley
	8.	PDA-024	PU lead wire	★★	33.	PXM-116	Motor
	9.	XWX-093	Muting assembly	★★	34.	PSH-004	Slide switch
	10.	PBH-330	Set spring		35.	PBH-329	AS spring
	11.	YS40FBT	Washer		36.	YS40S	Washer
	12.	PBH-326	EV spring		37.	PBE-019	PU spring washer
	13.	YE50S	Washer		38.	WB40FMC	Flat washer
	14.	XWX-092	Sensing assembly		39.	PMD40P060FMC	Screw M4 X 6
	15.	ZMK40H100FBT	Screw		40.	PBH-331	PU plate spring
	16.	PNX-415	Tonearm base		41.	PXB-276	PU plate assembly
	17.	PNX-423	Muting lever	★	42.	PPD-630	Tonearm assembly
★★	18.	PEB-185	Belt	★	43.	PNR-532	Weight
	19.	PPZ30P050FMC	Screw		44.	ZMK50H100FBT	Screw
	20.	PNC-244	Holder		45.	PBA-537	Cartridge mounting screw
	21.	PBK-057	Plate spring		46.	PBH-344	Spring
	22.	PNX-398	Lead in ratch		47.	PED-024	Cushion
	23.	YE30S	Washer E-3		48.	PXT-485	Base unit
	24.	PNX-416	Driving plate				
	25.	PED-022	Cushion	101.			Base assembly
				102.			PU plate
				103.			Roller stopper
				104.			Roller
				105.			Cam



5. PACKING



Parts List

Mark	No.	Part No.	Description
	1.	PNX-442	45 adaptor
	2.	PRB-219	Operating instructions
	3.	PHH-014	Packing case
	4.	PHA-146	Protector (F)
	5.	PHA-147	Protector (R)
	6.	PNX-451	Tonearm holder
	7.	PNX-452	Spacer
	8.	PBA-141	Screw (B)
	9.	IPZ40P250FMC	Screw
	10.	PMZ40P160FMC	Screw
	11.	IPZ30P120FMC	Screw
	12.	PDE-157	Tape deck synchro cord
	13.	PNX-474	Spacer (A)
	14.	PRW-096	Note paper
	15.	PRW-098	Note paper
	16.	PRW-103	Note paper

6. ELECTRICAL PARTS LIST

NOTES:

- 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 × 10 ¹	561	RD4PS	561 J
47kΩ	47 × 10 ³	473	RD4PS	473 J
0.5Ω	0R5	RN2H	050	K
1Ω	010	RS1P	010	K

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

5.62kΩ	562 × 10 ¹	5621	RN4SR	5621 F
--------	-----------------------	----------------	-------	--------

- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD ASSEMBLY

Mark	Part No.	Symbol & Description
Δ	XWM-133	Control assembly
	XWR-039	Power supply assembly
	XWX-127	Regulator assembly
	PWX-076	Function assembly
		LED assembly
		LED assembly A
		Photo Transistor assembly
	XWX-092	Sensing assembly
	XWX-093	Muting assembly

*LED assembly is composed of LED assembly A, Photo transistor assembly.

SWITCH, SEMICONDUCTOR

Mark	Part No.	Symbol & Description
Δ $\star\star$	PSG-024	Power switch
$\star\star$	PSH-009	Slide switch
$\star\star$	PSH-007	Slide switch
$\star\star$	PSH-004	Slide switch
$\star$	GL-9PG12	LED

MOTORS, OTHERS

Mark	Part No.	Symbol & Description
$\star\star$	PYY-114	Motor assembly (Phono)
$\star\star$	PXM-116	Motor (Tonearm)
$\star\star$	PXM-117	Motor (Slide base)
Δ $\star$	PTT-154	Power transformer
Δ	PDG-040	Power cord assembly

CONTROL ASSEMBLY (XWM-133)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 16L	C6, C11, C14
	CEA 1R0M 50L	C8, C10, C15
	CKDYF 104Z 50	C13
	CKDYF 103Z 50	C7, C16, C17
	CSZA 6R8K 16	C12

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
$\star$	PCP-075	VR1 Semi-fixed
$\star$	PCP-069	VR2 Semi-fixed
$\star$	PCP-067	VR3 Semi-fixed
	RS1PF151J	R10
	RS2HSFB330JL	R15
	RGSD8X472J	R23
	RN4PR1503F	R7
	RD4PM □□□J	R3-R6, R9, R11-R14, R16-R22, R30, R31, R33-R43
	RN4PR 1503F	R7
	RN4PR 4R7F	R32

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★ ★	BA6109	IC3
★ ★	BA6208	IC4
★ ★	PD2003	IC5
★ ★	MB84001B	IC6
★ ★	2SC1815 (2SC2458) (2SC945)	Q1, Q4, Q5, Q7, Q8, Q10, Q11
★ ★	2SC945-P	Q2
★ ★	2SC1959	Q3
★ ★	2SC1815-Y	Q9
★	BZ-061	D2
★	RD3.6EB	D3
★	1S2473 (1S1555)	D4, D5
★	1S1885	D6
★	1S2473	D7
★	VD1222	D12, D13

OTHER

Mark	Part No.	Symbol & Description
	PKN-001	Jack

POWER SUPPLY ASSEMBLY (XWR-039)

CAPACITORS

Mark	Part No.	Symbol & Description
	PCL-040	C1
	CEA 471M 35L	C2
	CEA 1R0M 50L	C3
	CEA R47M 50L	C4, C5

RESISTORS

Mark	Part No.	Symbol & Description
	RS1HSFB220JL	R1
	RS2PF151J	R2

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★ ★	NJM78M05A	IC2
★	PCX-010 (WL-02)	D1

LAMP, OTHER

Mark	Part No.	Symbol & Description
★ ★	PEL-051 PNY-009	L1 Lamp Lamp holder

REGULATOR ASSEMBLY (XWX-127)

Mark	Part No.	Symbol & Description
★	NJM7815A PDE-177	IC1 Connector (3P)

OPERATION ASSEMBLY (PWX-076)

SWITCHES, RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★ ★	PSG-038	S1-S5
★ ★	PSG-039 RD%PM □□□J	S6, S7 R25-R27

SEMICONDUCTORS, OTHERS

Mark	Part No.	Symbol & Description
★	GL-9PR2	D9, D11
★	GL-9NG12 PNX-454 PNX-446 PDB-181	D10 LED holder (C) LED holder (B) Connector assembly (14P)

LED ASSEMBLY

Mark	Part No.	Symbol & Description
	PDE-182	Connector assembly

LED ASSEMBLY A

Mark	Part No.	Symbol & Description
	RD%PM271J	R28, R29

PHOTO TRANSISTOR ASSEMBLY

Mark	Part No.	Symbol & Description
★ ★	PH101	Q6

*LED assembly is composed of LED assembly A, Photo transistor assembly.

SENSING ASSEMBLY (XWX-092)

Mark	Part No.	Symbol & Description
★	PCX-031	Cds
★ ★	PEL-048 PNX-302 PDE-176	L2 Lamp Lamp holder Connector assembly

MUTING ASSEMBLY (XWX-093)

Mark	Part No.	Symbol & Description
★ ★	PSG-043 PDF-145	S13 Push switch GND wire

A

B

C

D

7. P.C. BOARDS CONNECTION DIAGRAM

A

S14:POWER

S14

POWER SUPPLY Ass'y
(XWR-039)T1:POWER
TRANSFORMER

BRN

RED

AC 120V
60Hz

WHT

PHONO MOTOR

+ - 1 2

DECK SYNCHRO

CONTROL Ass'y
(XWM-133)

IC6 Q10 Q9 Q11 Q2 Q8 Q7 Q3 Q1 Q4

VR1 VR3 VR2 TP

B

C5

0.47/50

R2

150

(2W)

C4

0.47/50

L1

NJM78M05A

IC2

R1

22

(1W)

C3

1/50

D E F

CN7

3 1

15

5

1

2

3

4

5

6

7

8

9

10

11

12

13

14

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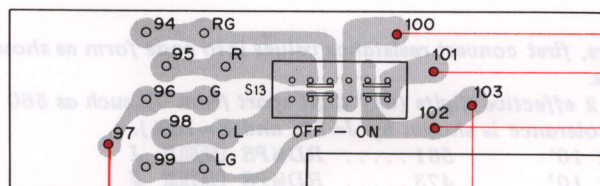
326

327

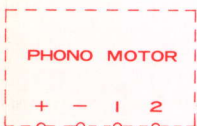
328

329

MUTING Ass'y



PHONO MOTOR



NC NO

S8: UP

NC NO

S9:RESET

IC3 Q5

IC4

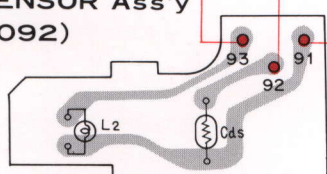
TC5

IC3	BA6109	D2 BZ-061	D6 1S1885
IC4	BA6208	D3 RD3.6EB	D12,13 VD1222
IC5	PD2003	D4,5,7 1S2473	
IC6	M884001B		CN1

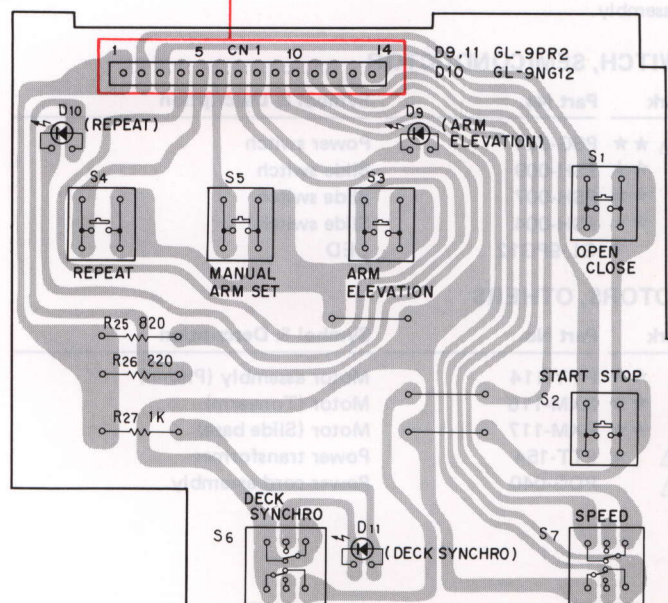
MOTO

ARM MOTOR

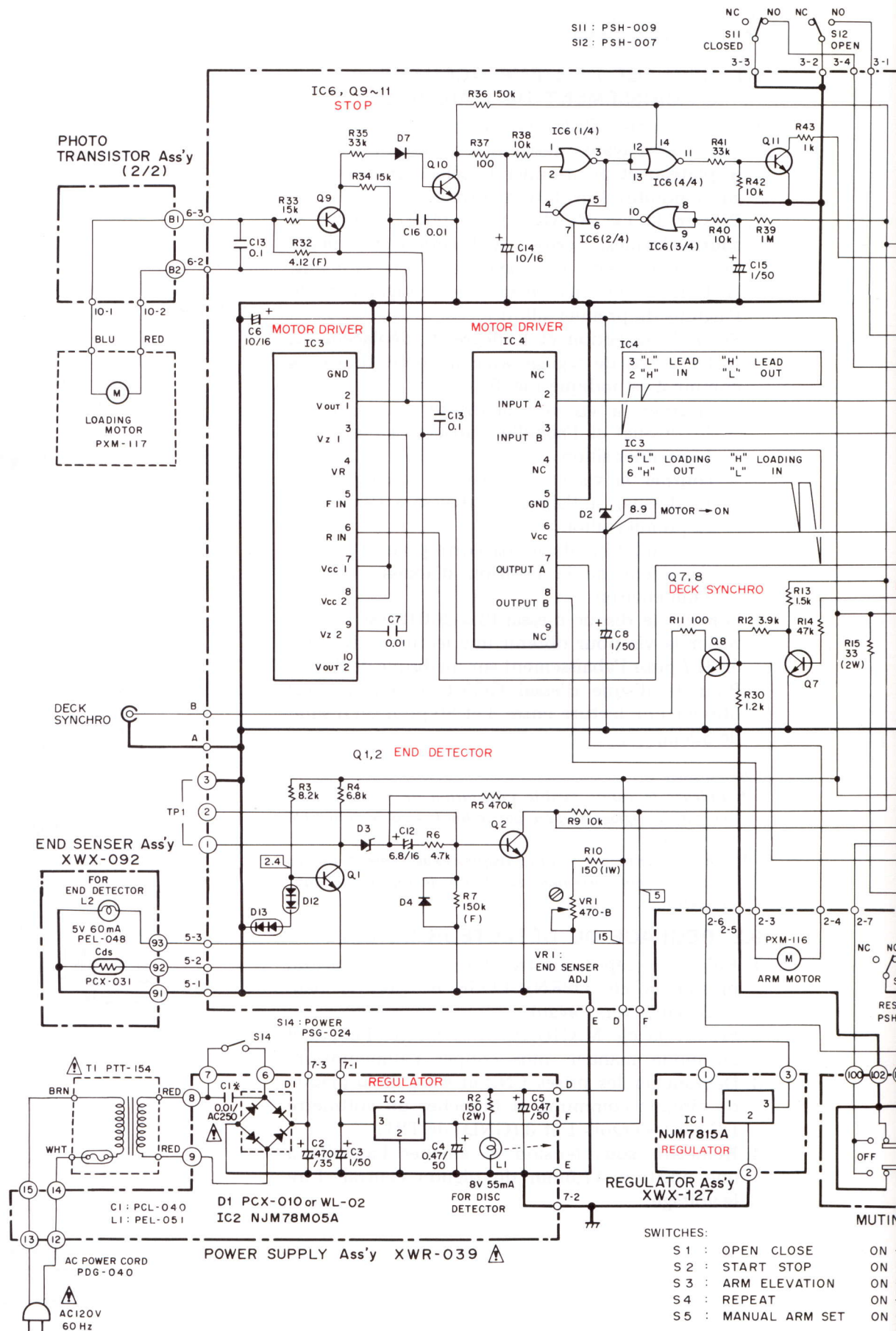
END SENSOR Ass'y
(XWX-092)



FUNCTION Ass'y



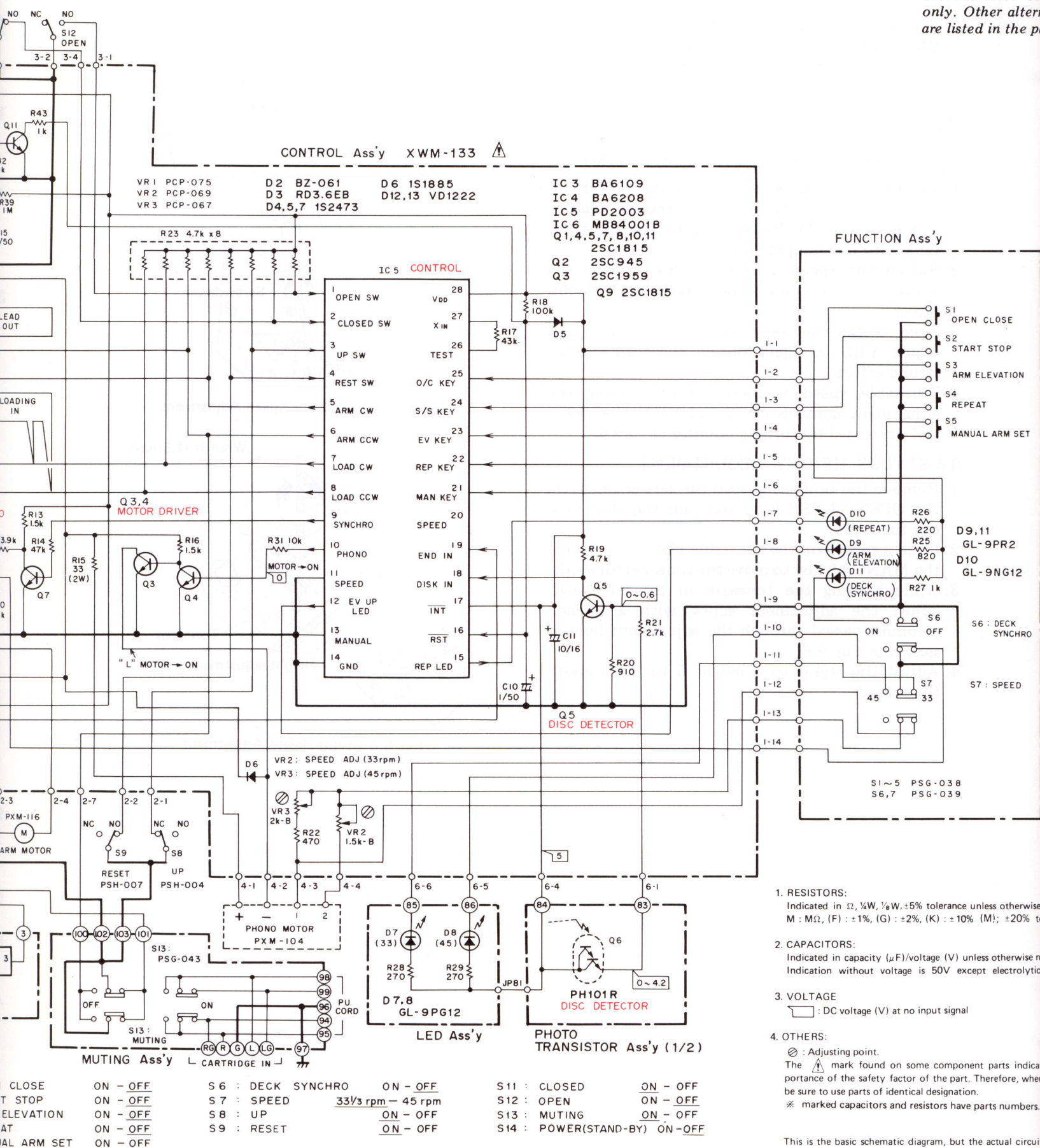
8. SCHEMATIC DIAGRAM



SWITCHES:

S1 : OPEN	CLOSE	ON
S2 : START	STOP	ON
S3 : ARM	ELEVATION	ON
S4 : REPEAT		ON
S5 : MANUAL	ARM SET	ON

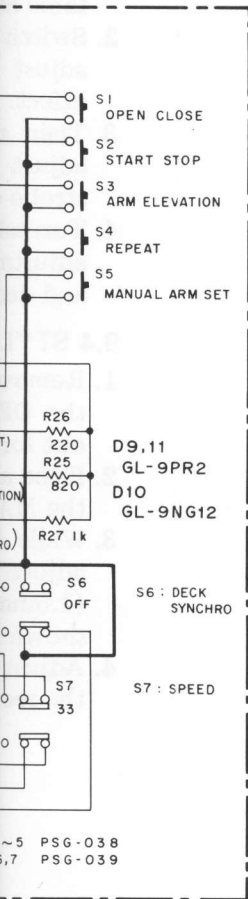
NOTE:
The indicated se
only. Other alter
are listed in the p



NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

ION Ass'y



W, $\pm 5\%$ tolerance unless otherwise noted k : k Ω ,
G) : $\pm 2\%$, (K) : $\pm 10\%$ (M) : $\pm 20\%$ tolerance

(μ F)/voltage (V) unless otherwise noted p : pF
voltage is 50V except electrolytic capacitor.

) at no input signal

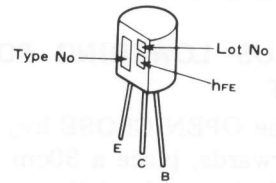
on some component parts indicates the im-
factor of the part. Therefore, when replacing,
identical designation.

s and resistors have parts numbers.

matic diagram, but the actual circuit may vary
n design.

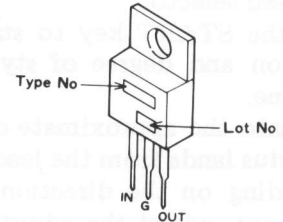
External Appearance of Transistors and ICs

2SC945
2SC1815
2SC1959

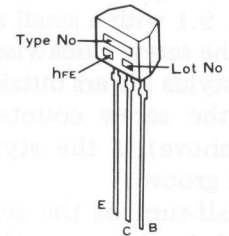


A

NJM78M05A
NJM7815A

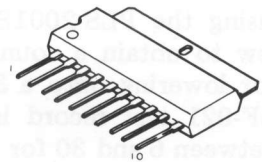


2SC2458

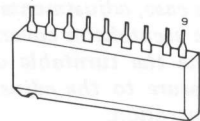


B

BA6109

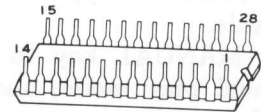


BA6208



C

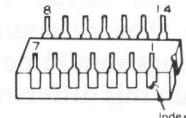
PD2003



PH101R



MB84001B



D

9. ADJUSTMENTS

9.1 STYLUS LOWERING POSITION ADJUSTMENT

1. Press the OPEN/CLOSE key, pull the slide base out forwards, place a 30cm record on the turntable platter, and set the correct Revolution by the speed selector.

2. Press the START key to start play. Check the direction and degree of stylus displacement at this time.

(Estimate the approximate distance in mm that the stylus lands from the lead-in groove).

3. Depending on the direction and degree of displacement, adjust the adjustment screw indicated in Fig. 9.1 with a small screwdriver.

* Turn the screw clockwise (as seen from above) if the stylus lowers outside the lead-in groove.

* Turn the screw counter clockwise (as seen from above) if the stylus lowers inside the lead-in groove.

* One half-turn of the screw corresponds to a shift of about 9mm in the lowering position.

4. When using the PLS-2001S test record, adjust the screw to obtain a count in the 305 to 317 range for lowering onto a 30cm record. And if the GGF-021 test record is used, adjust to a count between 6 and 30 for a 30cm record.

Notes:

* Removal of the bonnet simplifies adjustment operations. In this case, adjustments can be performed from the top of the escutcheon cover.

* Do not incline the turntable over too far, not apply excessive pressure to the adjustment screw during the adjustment operation.

9.2 END DETECTOR ADJUSTMENT

1. Remove the bonnet, switch the power on, press the OPEN/CLOSE key, and pull the slide base out forwards.

2. Press the MANUAL key to put the turntable into manual play mode, and then switch the power off.

3. Disconnect the CN2 and CN4 connectors on the common circuit board, and connect a DC voltmeter to pin 1 and pin 3 (GND) of TP1.

4. Switch the power back on, move the stylus to a position 47.5mm from the center spindle, and read the voltage.

5. Then move the stylus to a position 57.5mm away from the center spindle and read the meter again. The difference between the two voltage readings should be $5.6V \pm 0.2V$. Adjust VR1 to obtain this difference.

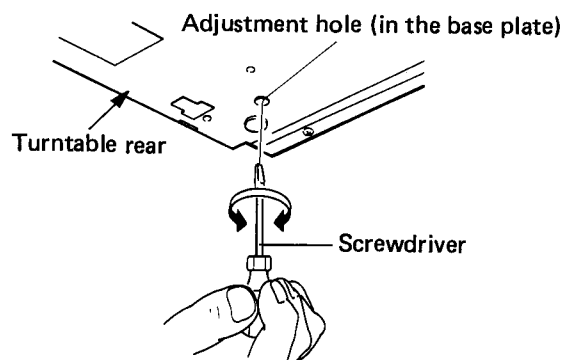


Fig. 9.1 Stylus Lowering Position Adjustment

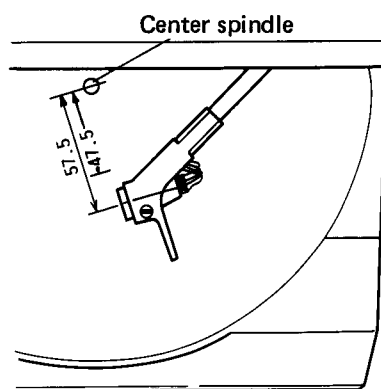


Fig. 9.2 End detector Adjustment 1

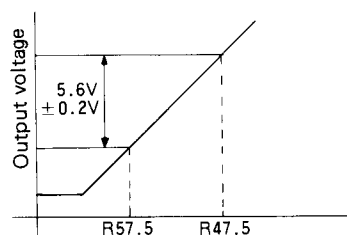


Fig. 9.3 End Detector Adjustment 2

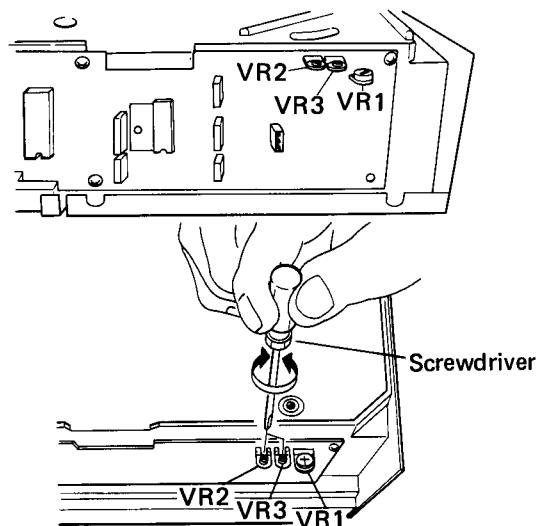


Fig. 9.4 Adjustment Position

6. The voltage difference is decreased by turning VR1 clockwise, and increased by turning counter clockwise (see Fig. 9.4).

Note:

Shade the sensor section from external light during this adjustment.

9.3 PHONO MOTOR SPEED ADJUSTMENT

1. Remove the bonnet and switch the power on. Place a stroboscope on the turntable platter, and press the MANUAL key to put the turntable into manual play mode.
2. Switch the speed selector to 33-1/3rpm, and adjust VR2 to obtain the "stationary" strobo effect.
3. Then switch the speed selector to 45rpm, and adjust VR3 to again obtain the "stationary" strobo effect.
4. Turntable speed is increased by turning the adjustment controls (VR2 and VR3) clockwise, and decreased by turning counter clockwise.

9.4 STYLUS HEIGHT ADJUSTMENT

1. Remove the bonnet, switch the power on, press the OPEN/CLOSE key, and pull the slide base out forwards.
2. Place a record on the turntable platter, and press the MANUAL key to move the tonearm forwards.
3. While holding the tonearm in the left hand, adjust the adjustment screw with a wrench (1.5mm) passed through the adjustment hole as shown in Fig. 9.6.
4. Adjust the stylus to a height 5 to 9mm above the record.

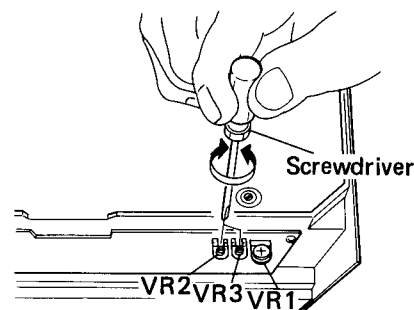
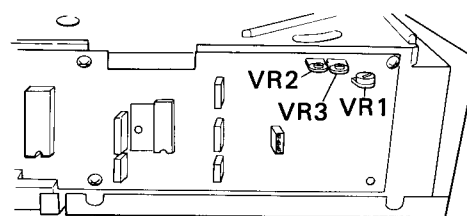


Fig. 9.5 Phono Motor Speed Adjustment

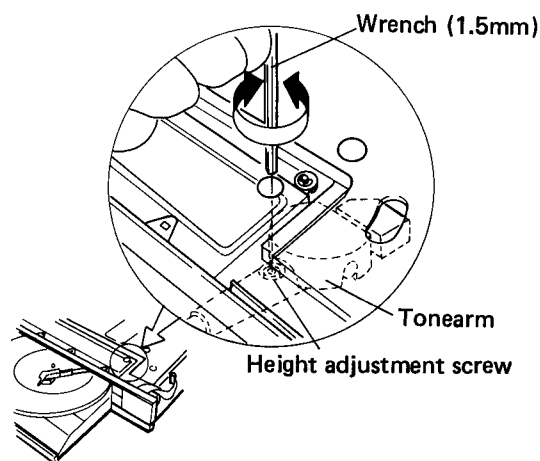


Fig. 9.6 Stylus Height Adjustment

9. RÉGLAGE

9.1 RÉGLAGE DE L'EMPLACEMENT D'ABAISSEMENT DE L'AIGUILLE.

1. Presser la clé OPEN/COLSE, tirer la base coulissante vers l'avant, mettre un disque de 30cm. sur le plateau et positionner le sélecteur de vitesse sur le nombre Révolution correct.
2. Presser la clé START pour faire marcher le tourne-disques. Vérifier la direction et le degré de déplacement de l'aiguille à ce moment. (Estimer la distance en mm. de l'éloignement de l'aiguille du premier sillon.)
3. Selon la direction et le degré de déplacement, régler la vis de réglage avec un petit tournevis comme il est indiqué Fig. 9.1.
 - * Tourner la vis vers la droite (en regardant du dessus) si l'aiguille s'abaisse à l'intérieur du premier sillon.
 - * Tourner la vis vers la gauche (en regardant du dessus) si l'aiguille s'abaisse à l'extérieur du premier sillon.
 - * Un demi tour de la vis correspond à un déplacement de la position d'abaissement de 9mm environ.
4. Lorsque le disque d'essai PLS-2001S est utilisé, régler la vis pour obtenir une lecture entre 305 et 317 pour l'abaissement sur un disque de 30cm. Pour le disque d'essai GGF-021, régler pour obtenir une lecture entre 3 et 30 pour un disque de 30cm.

Remarques:

- * Enlever le capot facilite l'opération de réglage. Dans ce cas, le réglage s'opère par le haut, sous le couvercle à blason.
- * Ne pas incliner le tourne-disques exagérément, ne pas appuyer trop fortement sur la vis de réglage pendant l'opération.

9.2 RÉGLAGE DU DÉTECTEUR DE FIN

1. Enlever le capot, mettre l'appareil sous tension, presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant.
2. Presser la clé MANUAL pour mettre l'appareil en mode manuel, puis couper l'alimentation.
3. Débrancher les prises CN2 et CN4 de la plaque de circuits commune et brancher un voltmètre DC sur les ergots 1 et 3 (GND) de TP1.
4. Remettre sous tension et amener l'aiguille à une position 47,5mm du pignon central. Lire le voltage.

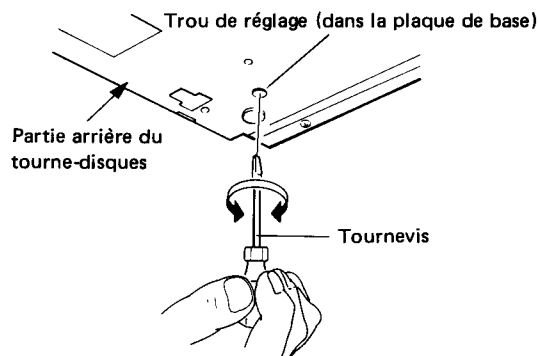


Fig. 9-1 Réglage d'abaissement de position de l'aiguille

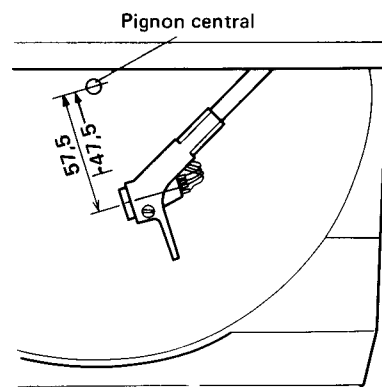


Fig. 9-2 Réglage 1 du détecteur de fin

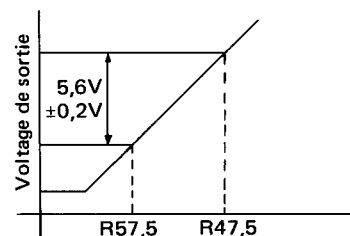


Fig. 9-3 Réglage 2 du détecteur de fin

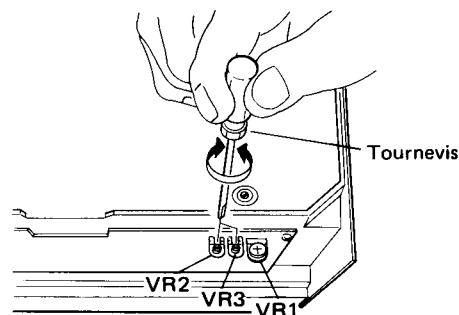
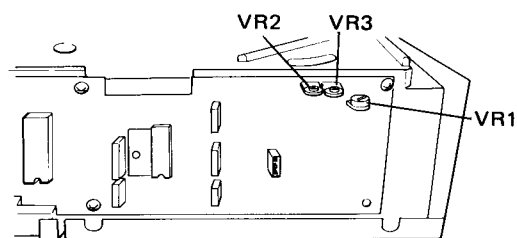


Fig. 9-4 Réglage de position

5. Puis, déplacer l'aiguille vers une position 57,5 mm du pignon central et lire à nouveau l'indication du voltmètre. La différence entre les deux voltages devrait être de $5,6V \pm 0,2V$. Régler VR1 pour obtenir cette différence.
6. La différence de voltage est diminuée en tournant VR1 vers la droite, et augmentée en le tournant vers la gauche. (Voir Fig. 9.4)

Remarque:

Faire de l'ombre au-dessus du senseur pendant ce réglage.

9.3 RÉGLAGE DE LA VITESSE DU MOTEUR PHONO

1. Enlever le capot et mettre sous tension. Placer un stroboscope sur le plateau du tourne-disques et presser la clé MANUAL pour mettre l'appareil en mode manuel.
2. Positionner le sélecteur de vitesse sur 33-1/3 tpm. et régler VR2 pour obtenir l'effet stroboscopique stationnaire.
3. Puis positionner le sélecteur de vitesse sur 45 tpm. et régler VR3 pour obtenir à nouveau l'effet stroboscopique stationnaire.
4. La vitesse du plateau est augmentée en tournant les contrôles de réglage (VR2 et VR3) vers la droite, elle est diminuée en tournant vers la gauche.

9.4 RÉGLAGE DE HAUTEUR DE L'AIGUILLE

1. Enlever le capot, mettre sous tension, presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant.
2. Placer un disque sur le plateau du tourne-disques et presser la clé MANUAL pour faire avancer le bras de pick-up vers l'avant.
3. Tout en tenant le bras de pick-up de la main gauche, régler la vis de réglage avec une clé (1,5mm) passée à travers le trou de réglage comme indiqué Fig. 9.6.
4. Régler l'aiguille à une hauteur de 5 à 9mm au-dessus du disque.

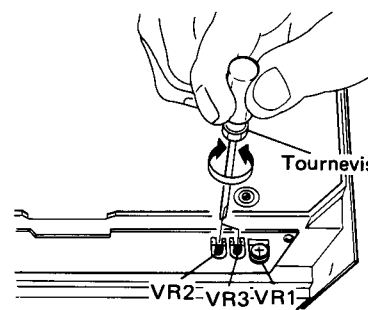
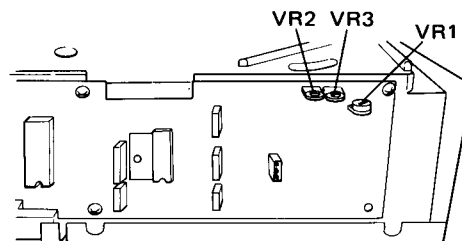


Fig. 9-5 Réglage de la vitesse du moteur phono

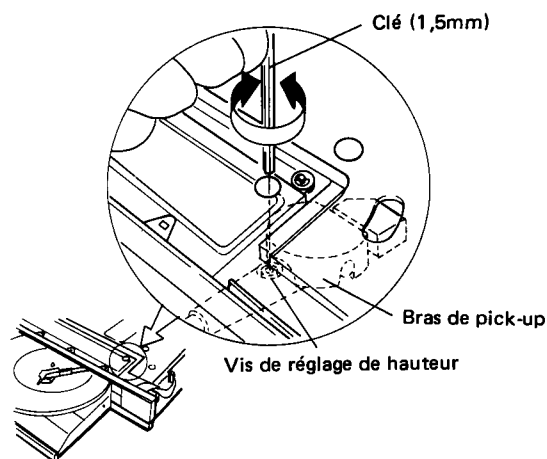


Fig. 9-6 Réglage de hauteur de l'aiguille

9. AJUSTE

9.1 AJUSTE DE LA POSICIÓN DE DESCENSO DE LA AGUJA

1. Presionar la tecla de apertura/cierre (OPEN/CLOSE), tirar hacia afuera de la base deslizante, colocar un disco de 30cm sobre el plato y poner las Revoluciones correctas mediante el selector de velocidad.
2. Presionar la tecla de inicio START para comenzar la reproducción. Comprobar al mismo tiempo la dirección y el grado de desplazamiento de la aguja. (Estimar la distancia aproximada que hay en mm desde la aguja al surco inicial del disco).
3. Dependiendo de la dirección y el grado de desplazamiento, ajustar el tornillo de ajuste indicado en la Figura 9-1 con un pequeño destornillador.
 - * Girar el tornillo hacia la derecha (mirando desde arriba) si la aguja desciende hacia el exterior del surco inicial del disco.
 - * Girar el tornillo hacia la izquierda (mirando desde arriba) si la aguja desciende hacia el interior del surco inicial del disco.
 - * Una media vuelta del tornillo corresponde a un desplazamiento de aproximadamente 9mm en la posición de bajada.
4. Cuando se utilice el disco de prueba PLS-2001S, Ajustar el tornillo para obtener un valor comprendido entre 305 a 317 de descenso sobre un disco de 30cm. Y si se utiliza el disco de prueba GGF-021, ajustarlo a un valor entre 6 y 30 para un disco de 30cm.

Nota:

- * La extracción de la cubierta simplifica las operaciones de ajuste. En este caso, los ajustes se pueden realizar desde la parte superior de la cubierta ornamental.
- * No incline demasiado el giradiscos ni aplique excesiva presión al tornillo de ajuste durante la operación de ajuste.

9.2 AJUSTE DEL DETECTOR DEL EXTREMO

1. Extraer la cubierta, conectar la alimentación, presionar la tecla de apertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizante.
2. Presione la tecla manual MANUTL para poner el giradiscos en el modo de reproducción manual y después desconectar la alimentación.
3. Desconectar los conectores CN2 y CN4 de la tarjeta de circuitos comunes y conectar un voltímetro de CC a la patilla 1 y a la patilla 3 (GND) de TP1.
4. Volver a conectar la alimentación, mover la aguja a una posición de 47,5mm desde el eje central y leer la tensión.

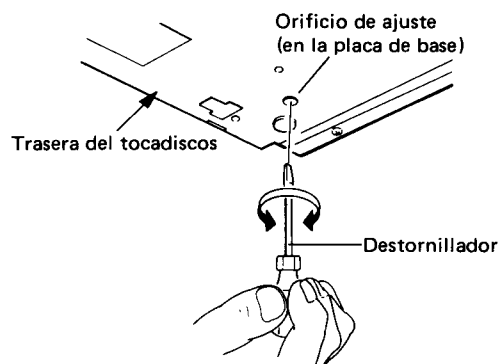


Fig. 9-1 Ajuste de la Posición de Descenso de la Aguja

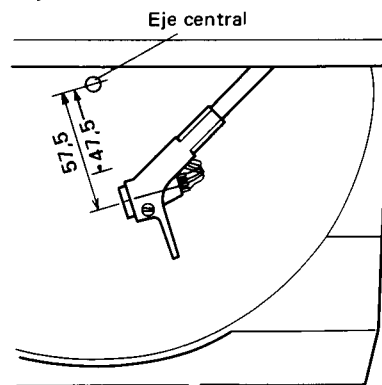


Fig. 9-2 Ajuste del Detector del Extremo 1

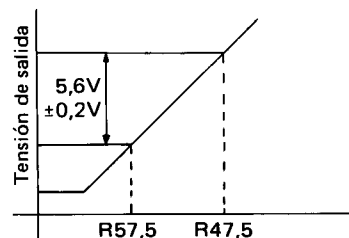


Fig. 9-3 Ajuste del Detector del Extremo 2

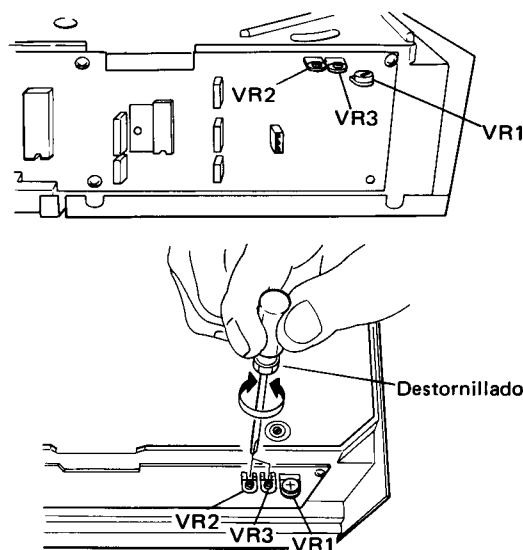


Fig. 9-4 Posición de Ajuste

5. Después mover la aguja a una posición de 57,5 mm alejada desde el eje central y leer de nuevo el medidor. La diferencia entre la lectura de las dos tensiones debe ser de $5,6 \pm 0,2V$. Ajustar VR1 para obtener esta diferencia.
6. La diferencia de tensión disminuye girando el VR1 hacia la derecha y aumenta girándolo hacia la izquierda (consultar Figura 9-4).

Nota:

Durante este ajuste proteger la sección del sensor contra la luz exterior.

9.3 AJUSTE DE LA VELOCIDAD DEL MOTOR GIRADISCOS

1. Sacar la cubierta y conectar la alimentación. Colocar un estroboscopio sobre el plato y presionar la tecla manual MANUAL para poner el tocadiscos en el modo de reproducción manual.
2. Cambiar el selector de velocidad a 33-1/3 rpm y ajustar VR2 para obtener el efecto de estrobo "estacionario".
3. Después cambiar el selector de velocidad a 45 rpm y ajustar otra vez VR3 para obtener el efecto de estrobo "estacionario".
4. La velocidad del giradiscos aumenta girando los controles de ajuste (VR2 y VR3) hacia la derecha y disminuye girándolos hacia la izquierda.

9.4 AJUSTE DE LA ALTURA DE AGUJA

1. Sacar la cubierta, conectar la alimentación, presionar la tecla de apertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizable.
2. Colocar un disco sobre el plato y presionar la tecla manual MANUAL para mover el brazo fonocaptor hacia el disco.
3. A la vez de retener el brazo fonocaptor con la mano izquierda, ajustar con una llave el tornillo de ajuste (1,5mm) pasándolo através del orificio de ajuste tal y como se muestra en la Figura 9-6.
4. Ajustar la aguja a una altura de 5 a 9mm sobre el disco.

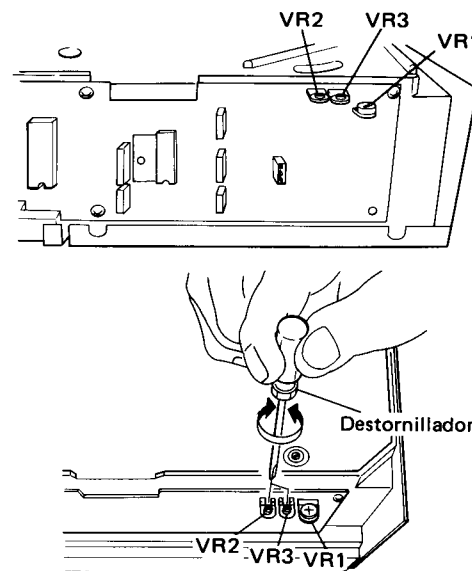


Fig. 9-5 Ajuste de la velocidad del motor giradiscos

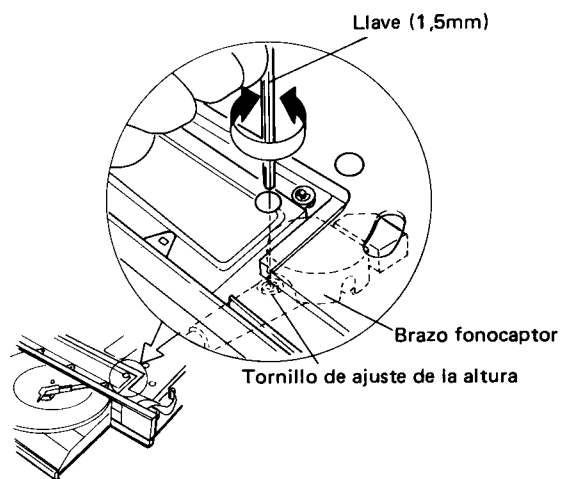


Fig. 9-6 Ajuste de la altura de aguja

ADDITIONAL

 PIONEER®

Service Manual

STEREO TURNTABLE

PL-44F

HE, HB, S

1. SPECIFICATIONS

1.1 HE TYPE

Motor and Turntable

Drive System Belt-drive
Motor DC motor
Turntable Platter 280 mm diam. aluminum alloy die-cast
Speeds 33-1/3 and 45 rpm
Wow and Flutter Less than 0.045% (WRMS)
Signal-to-Noise Ratio More than 70 dB (DIN-B)
(with Pioneer cartridge model PC-3MC)

Tonearm

Type Integrated straight pipe arm

PC-3MC Specifications

Type Moving coil type
Stylus 0.5 mil diamond (PN-3 MC)
Output Voltage 2.5 mV
(1 kHz, 50 mm/s Peak velocity, LAT)
Tracking Force 1.7 g to 2.3 g (proper 2 g)
Frequency Response 10 to 32,000 Hz
Recommended Load 50 k Ω
Weight 3.1 g

Accessory mechanisms

Full-auto functions based on motor specially designed for tonearm
Auto disc size selector (17 cm, 30 cm)
Arm elevation mechanism, deck synchronization
Built-in anti-skating

Miscellaneous

Power Requirements AC220/240 V $\sim$ (switchable),
50, 60 Hz
Power Consumption 15 W
Dimensions 420 (W) x 98 (H) x 335 (D) mm
16-1/2 (W) x 3-3/4 (H) x 14-1/4 (D) in.
Weight 9 kg/19 lb 14 oz

Accessories

Deck synchro cord 1
EP Adaptor 1
Operating Instructions 1

NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

1.2 HB, S TYPES

Motor and Turntable

Drive System	Belt-drive
Motor	DC motor
Turntable Platter	280 mm diam. aluminum alloy die-cast
Speeds	33-1/3 and 45 rpm
Wow and Flutter	Less than 0.045% (WRMS)
Signal-to-Noise Ratio	More than 70 dB (DIN-B)
	(with Pioneer cartridge model PC-3MC)

Tonearm

Type	Integrated straight pipe arm
------------	------------------------------

PC-3MC Specifications

Type	Moving coil type
Stylus	0.5 mil diamond (PN-3 MC)
Output Voltage	2.5 mV
	(1 kHz, 50 mm/s Peak velocity, LAT)
Tracking Force	1.7 g to 2.3 g (proper 2 g)
Frequency Response	10 to 32,000 Hz
Recommended Load	50 kΩ
Weight	3.1 g

Accessory mechanisms

Full-auto functions based on motor specially designed for tonearm
 Auto disc size selector (17 cm, 30 cm)
 Arm elevation mechanism, deck synchronization
 Built-in anti-skating

Miscellaneous

Power Requirements	
HB model	AC220/240V ~ (switchable), 50, 60 Hz
S model	AC110/120/220/240 V ~ (switchable), 50, 60 Hz

Power Consumption

HB model	15W
S model	10W

Dimensions	420 (W) x 98 (H) x 335 (D) mm 16-1/2 (W) x 3-3/4 (H) x 14-1/4 (D) in.
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Weight	9 kg/19 lb 14 oz
--------------	------------------

Accessories

Deck synchro cord	1
EP Adaptor	1
Operating Instructions	1

NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

2. CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts without part number cannot be supplied.*
- *The $\triangle$ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.*
 $\star\star$ **GENERALLY MOVES FASTER THAN $\star$**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	Symbol & Description	Part No.			
		KU Type	HE Type	HB Type	S Type
⚠	Control assembly	XWM-133	XWM-113	XWM-118	XWM-100
	Power supply assembly	XWR-039	XWR-033	XWR-036	XWR-023
	Regulator assembly	XWX-127	XWX-108	XWX-110	XWX-103
	Front panel	PNX-402	PNX-481	PNX-481	PNX-402
⚠ ★	Power transformer (120V)	PTT-154	....	....	....
⚠ ★	Power transformer (220V, 240V)	....	PTT-152	PTT-152	....
⚠ ★	Power transformer (110V, 120V, 220V, 240V)	....	....	....	PTT-153
⚠	Power cord (assembly)	PDG-040	PDF-170	PDF-171	PDG-028
	PU cord assembly	PXB-294	PXB-280	PXB-280	PXB-280
⚠ ★★	Line voltage selector	....	PSB-002	PSB-002	PSB-007
	Operating instructions	PRB-219	PRD-082	PRB-218	PRB-218
	Packing case	PHH-014	PHH-012	PHH-012	PHH-012
	Cover	PNY-026	PNX-441	PNX-441	PNX-441
	Damper rubber (E)	PEB-236	....	....	....
	Damper rubber	....	PEB-209	PEB-209	PEB-209

3. ELECTRICAL PARTS LIST

3.1 CONTROL ASSEMBLY (XWM-113)(XWM-100)

CAPACITORS

Mark	Part No.	Symbol & Description	Mark	Part No.	Symbol & Description
	CEA 100M 16L	C6, C11	★	BZ-061	D2
	CEA 1R0M 50L	C8, C10	★	1S1885	D6
	CKDYF 104Z 50	C13	★	1S2473 (1S1555)	D4, D5
	CKDYF 103Z 50	C7			
	CSZA 6R8K 16	C12	★	RD3.6EB	D3
			★	VD1222	D12, D13

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	PCP-075	VR1 Semi-fixed
★	PCP-069	VR2 Semi-fixed
★	PCP-067	VR3 Semi-fixed
	RS2HSFB330JL	R15
	RS1PF151J	R10
	RGSD8X472J	R23
	RN%PR1503F	R7
	RD%PM □□□J	R3-R6, R9, R11-R14, R16-R21, R30, R31

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	BA6109	IC3
★★	BA6208	IC4
★★	PD2003	IC5
★★	2SC1815 (2SC2458) (2SC945)	Q1, Q4, Q5, Q7, Q8
★★	2SC945-P	Q2
★★	2SC1959	Q3

OTHER

Mark	Part No.	Symbol & Description
	PKN-001	Jack

3.2 POWER SUPPLY ASSEMBLY (XWR-033)

CAPACITORS

Mark	Part No.	Symbol & Description
	PCL-040	C1
	CEA 471M 35L	C2
	CEA 1R0M 50L	C3
	CEA R47M 50L	C4, C5

RESISTORS

Mark	Part No.	Symbol & Description
	RS1HSFB220JL	R1
	RS2PF151J	R2

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	NJM78M05A	IC2
★	PCX-010 (WL-02)	D1

LAMP, FUSE, OTHER

Mark	Part No.	Symbol & Description
★★	PEL-051	L1 Lamp
⚠ ★★	PEK-038	Fuse
	PNY-009	Lamp holder

3.3 REGULATOR ASSEMBLY (XWX-108)

Mark	Part No.	Symbol & Description
★ ★	NJM7815A PDE-196	IC1 Connector assembly (3P)

3.4 CONTROL ASSEMBLY (XWM-118)**CAPACITORS**

Mark	Part No.	Symbol & Description
	CEA 100M 16L	C6, C11
	CEA 1R0M 50L	C8, C10
	CKDYF 104Z 50	C13
	CKDYF 103Z 50	C7
	CSZA 6R8K 16	C12

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	PCP-075	VR1 Semi-fixed
★	PCP-069	VR2 Semi-fixed
★	PCP-067	VR3 Semi-fixed
	RS2HSFB330JL	R15
	RS1PF151J	R10
	RGSD8X472J	R23
	RN%PR1503F	R7
	RD%PM □□□J	R3—R6, R9, R11—R14, R16—R22, R30, R31

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★ ★	BA6109	IC3
★ ★	BA6208	IC4
★ ★	PD2003	IC5
★ ★	2SC1815 (2SC2458) (2SC945)	Q1, Q4, Q5, Q7, Q8
★ ★	2SC945	Q2
★ ★	2SC1959	Q3
★	BZ-061	D2
★	1S1885	D6
★	1S2473 (1S1555)	D4, D5
★	RD3.6EB	D3
★	VD1222	D12, D13

OTHER

Mark	Part No.	Symbol & Description
	RKN-001	Jack

3.5 POWER SUPPLY ASSEMBLY (XWR-036)**CAPACITORS**

Mark	Part No.	Symbol & Description
	PCL-040	C1
	CEA 471M 35L	C2
	CEA 1R0M 50L	C3
	CEA R47M 50L	C4, C5

RESISTOR

Mark	Part No.	Symbol & Description
	RS2PF 151J	R2

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★ ★	NJM 78M 05A	IC2
★	PCX-010 (WL-02)	D1

LAMP, FUSE, OTHER

Mark	Part No.	Symbol & Description
★ ★	PEL-051	L1 Lamp
★ ★	PEK-038	Fuse
	PNY-009	Lamp holder

3.6 REGULATOR ASSEMBLY (XWX-110)

Mark	Part No.	Symbol & Description
★ ★	NJM7815A PDE-196	IC1 Connector assembly (3P)

3.7 POWER SUPPLY ASSEMBLY (XWR-023)**CAPACITORS**

Mark	Part No.	Symbol & Description
	PCL-040	C1
	CEA 471M 35L	C2
	CEA 1R0M 50L	C3
	CEA R47M 50L	C4, C5

RESISTORS

Mark	Part No.	Symbol & Description
	RS1HSF220JL	R1
	RS2PF 151J	R2

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★ ★	NJM78M05A	IC2
★	PCX-010 (WL-02)	D1

LAMP, OTHER

Mark	Part No.	Symbol & Description
★ ★	PEL-051 PNY-009	L1 Lamp Lamp holder

3.8 REGULATOR ASSEMBLY (XWX-103)

Mark	Part No.	Symbol & Description
★	NJM7815A PDE-177	IC1 Connector (3P)

A

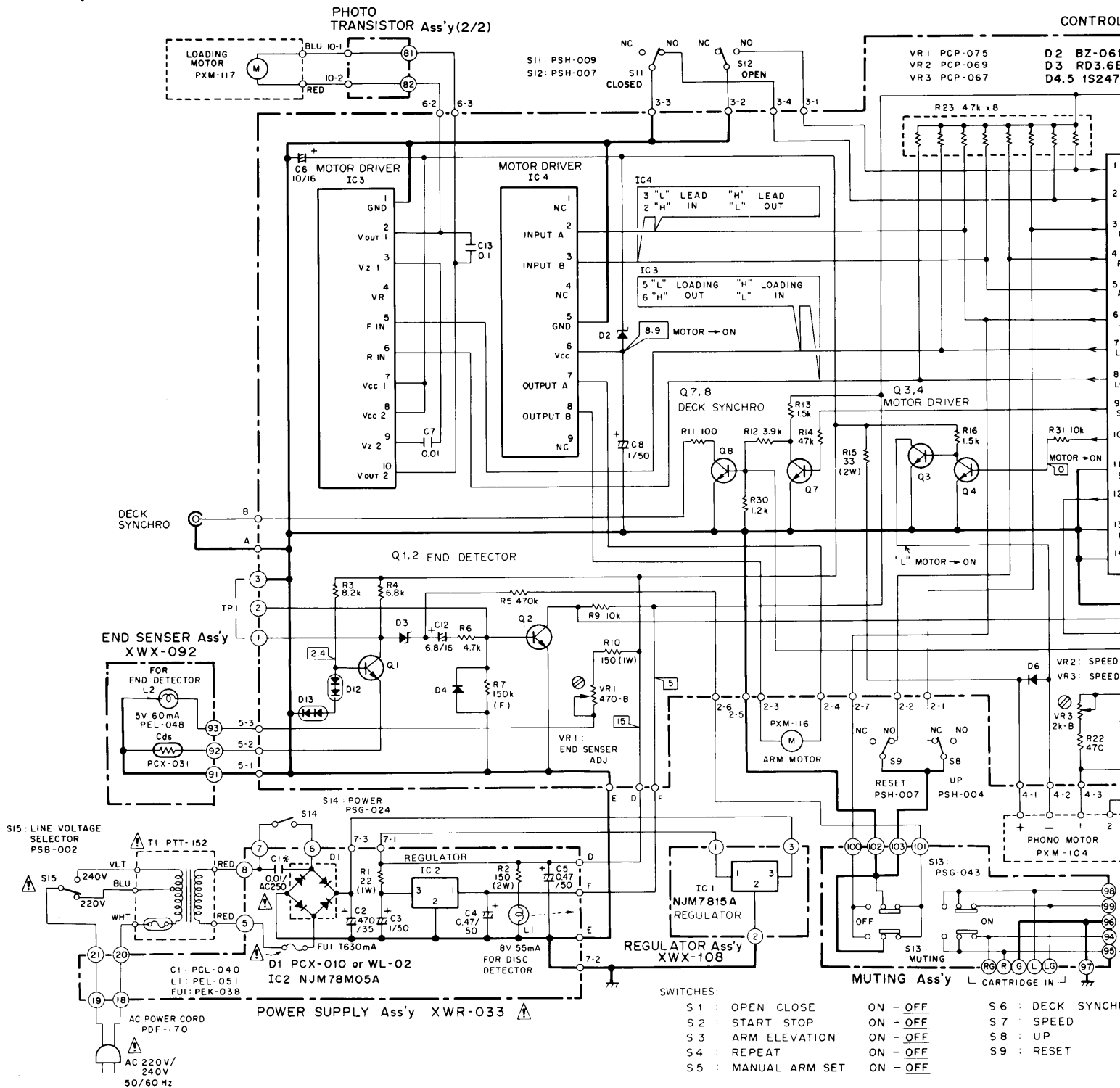
B

C

D

4. SCHEMATIC DIAGRAM

4.1 HE, S TYPES



- RESISTORS:**
Indicated in Ω , $\frac{1}{2}W$, $\frac{1}{4}W$, $\frac{1}{8}W$, $\frac{1}{16}W$, $\frac{1}{32}W$, $\frac{1}{64}W$, $\frac{1}{128}W$, $\frac{1}{256}W$, $\frac{1}{512}W$, $\frac{1}{1024}W$, $\frac{1}{2048}W$, $\frac{1}{4096}W$, $\frac{1}{8192}W$, $\frac{1}{16384}W$, $\frac{1}{32768}W$, $\frac{1}{65536}W$, $\frac{1}{131072}W$, $\frac{1}{262144}W$, $\frac{1}{524288}W$, $\frac{1}{1048576}W$, $\frac{1}{2097152}W$, $\frac{1}{4194304}W$, $\frac{1}{8388608}W$, $\frac{1}{16777216}W$, $\frac{1}{33554432}W$, $\frac{1}{67108864}W$, $\frac{1}{134217728}W$, $\frac{1}{268435456}W$, $\frac{1}{536870912}W$, $\frac{1}{1073741824}W$, $\frac{1}{2147483648}W$, $\frac{1}{4294967296}W$, $\frac{1}{8589934592}W$, $\frac{1}{17179869184}W$, $\frac{1}{34359738368}W$, $\frac{1}{68719476736}W$, $\frac{1}{137438953472}W$, $\frac{1}{274877906944}W$, $\frac{1}{549755813888}W$, $\frac{1}{1099511627776}W$, $\frac{1}{2199023255552}W$, $\frac{1}{4398046511104}W$, $\frac{1}{8796093022208}W$, $\frac{1}{17592186044416}W$, $\frac{1}{35184372088832}W$, $\frac{1}{70368744177664}W$, $\frac{1}{140737488355328}W$, $\frac{1}{281474976710656}W$, $\frac{1}{562949953421312}W$, $\frac{1}{1125899906842624}W$, $\frac{1}{2251799813685248}W$, $\frac{1}{4503599627370496}W$, $\frac{1}{9007199254740992}W$, $\frac{1}{18014398509481984}W$, $\frac{1}{36028797018963968}W$, $\frac{1}{72057594037927936}W$, $\frac{1}{144115188075855872}W$, $\frac{1}{288230376151711744}W$, $\frac{1}{576460752303423488}W$, $\frac{1}{1152921504606846976}W$, $\frac{1}{2305843009213693952}W$, $\frac{1}{4611686018427387904}W$, $\frac{1}{9223372036854775808}W$, $\frac{1}{18446744073709551616}W$, $\frac{1}{36893488147419103232}W$, $\frac{1}{73786976294838206464}W$, $\frac{1}{147573952589676412928}W$, $\frac{1}{295147905179352825856}W$, $\frac{1}{590295810358705651712}W$, $\frac{1}{1180591620717411303424}W$, $\frac{1}{2361183241434822606848}W$, $\frac{1}{4722366482869645213696}W$, $\frac{1}{9444732965739290427392}W$, 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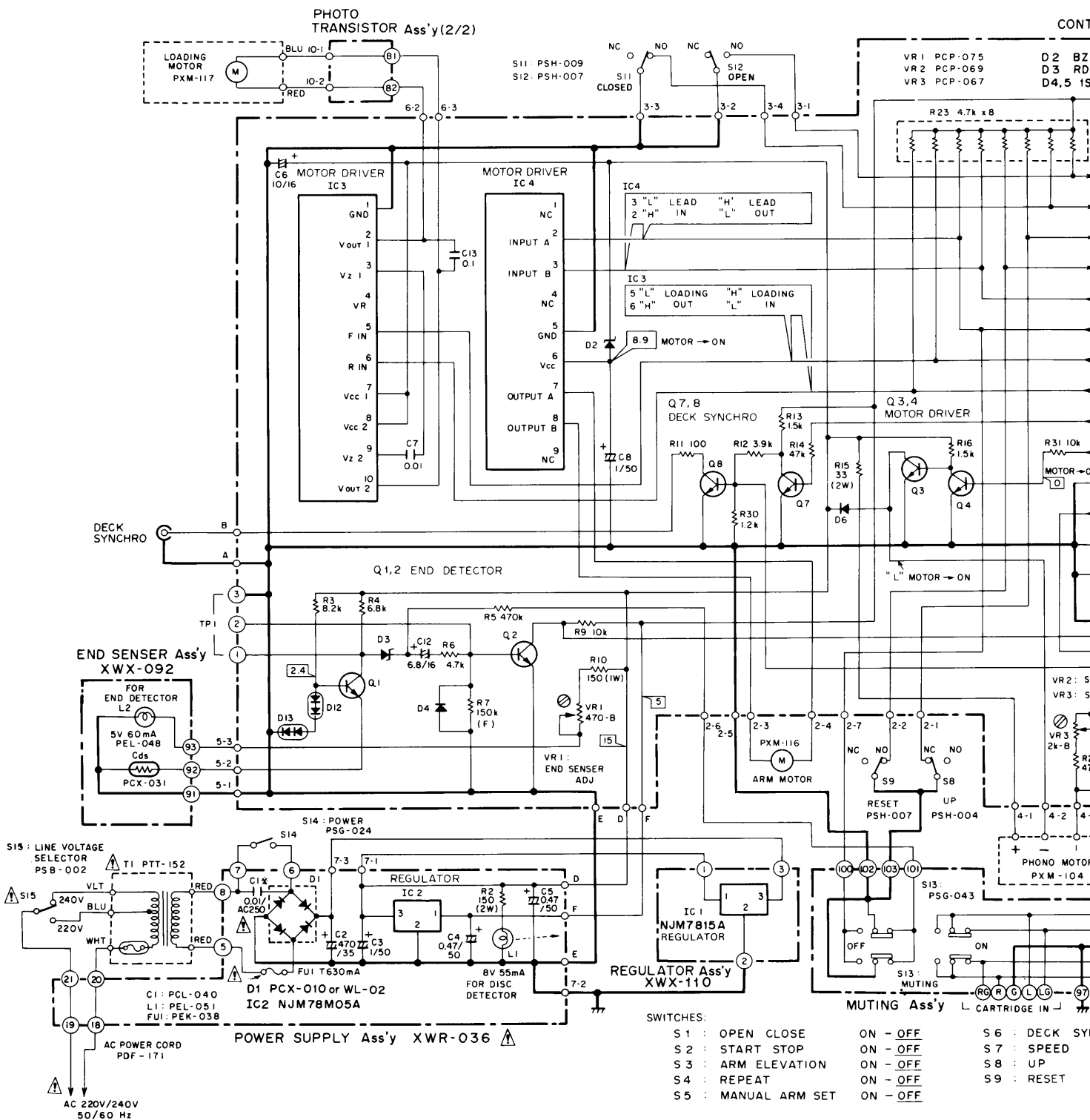
4.2 HB TYPE

A

B

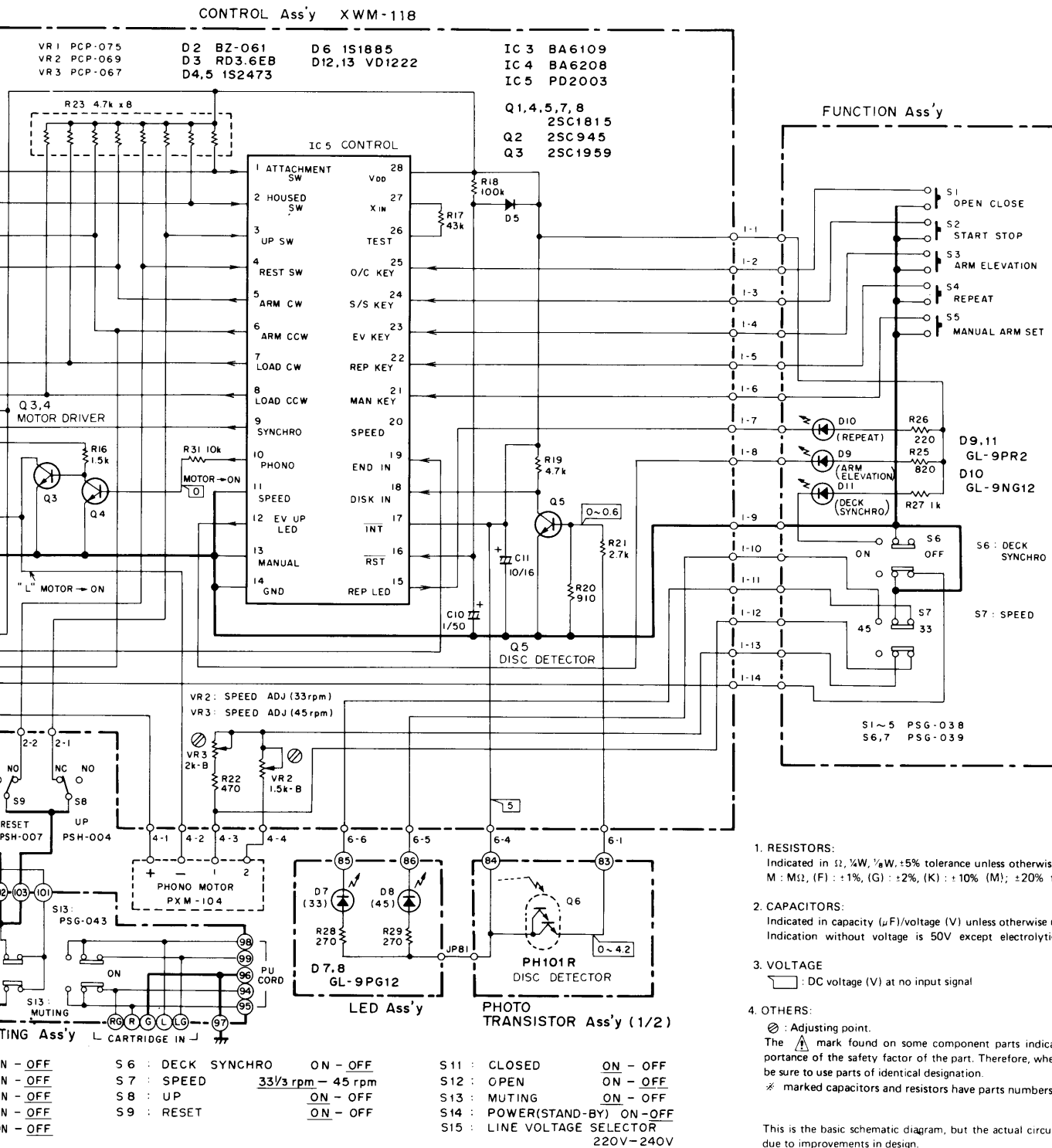
C

D



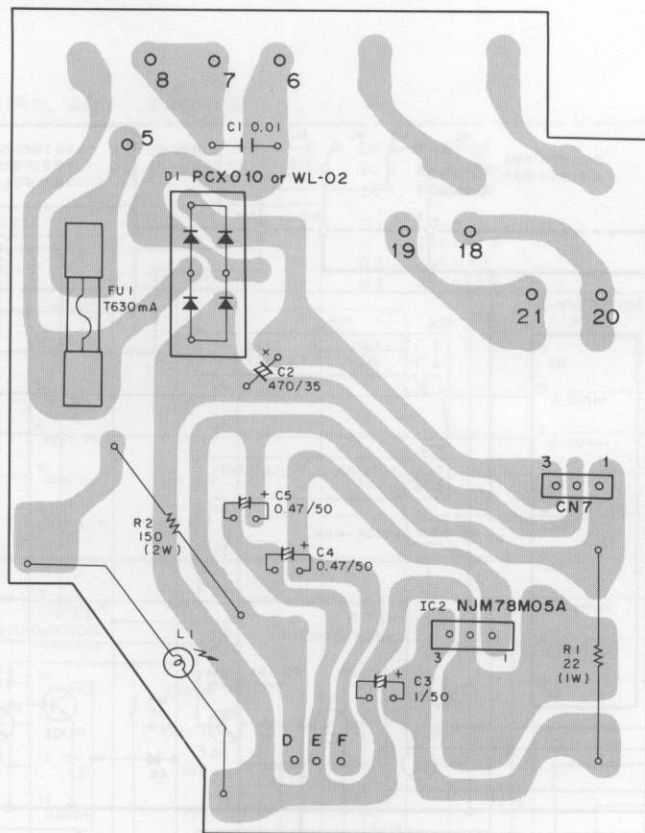
NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

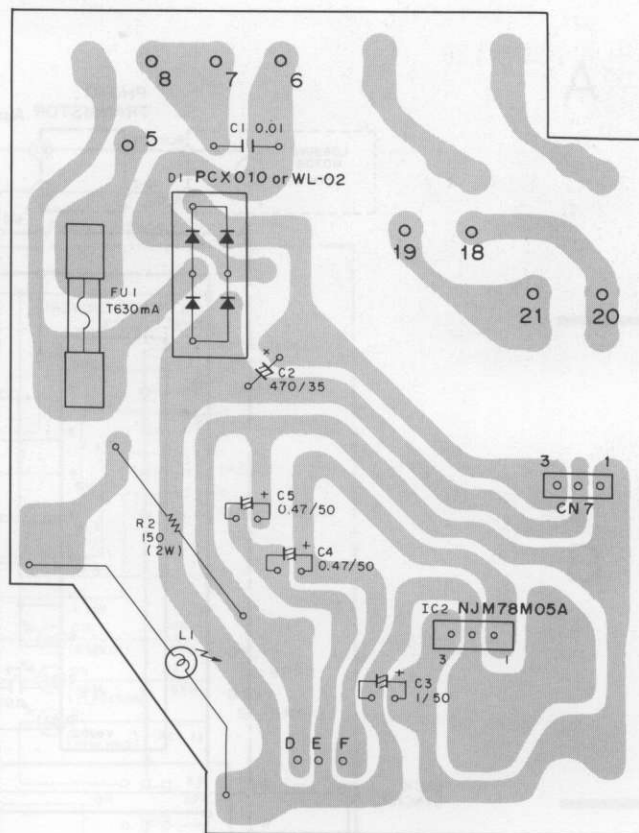


5.2 POWER SUPPLY ASSEMBLY

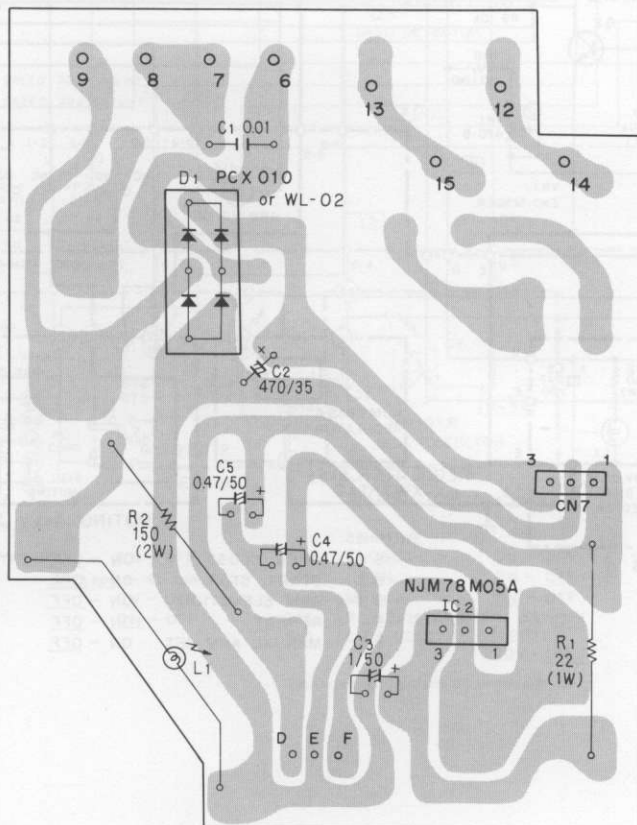
■ XWR-033



■ XWR-036



■ XWR-023



5.3 REGULATOR ASSEMBLY

■ XWX-110, XWX-108, XWX-103

