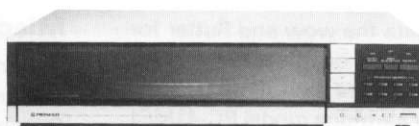




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Service Manual

REPAIR & ADJUSTMENTS

**ORDER NO.
ARP-141-0**
STEREO TURNTABLE

PL-88F

MODEL PL-88F COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
KC	120V only	Canada 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
S/G	110V, 120V, 220V and 240V Switchable	U.S. military model

- This is the service manual for model PL-88F/KU. For servicing of KC, HE, HB, S and S/G types, please refer to the additional service manual on page 45.
- 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 Direct-drive
Motor Quartz PLL Hall motor
Turntable Platter 280 mm diam. aluminum alloy die-cast
Speeds 33-1/3 and 45 rpm
Wow and Flutter Less than *0.012% (WRMS)
0.025% (WRMS)
±0.035% WTD Peak (DIN)

Values marked with an "*" designate the wow and flutter for motor, and do not include the cartridge or tonearm load.

Signal-to-Noise-Ratio More than 78 dB (DIN-B)
(with Pioneer cartridge model PC-41MC)

Tonearm

Type	Static-balance type, Straight pipe arm
Effective Arm Length	208 mm
Overhang	20.2 mm

PC-41MC Specifications

Type	Moving coil type
Stylus	0.3 × 0.7 mil diamond (PN-41MC)
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 35,000 Hz
Recommended Load	50 kΩ

Accessory mechanisms

Auto lead-in, auto return, auto cut, repeat
Arm elevation, program search play
Index play, manual play, manual location
Skip, auto disc size selector
Deck synchro, record detection
Built-in anti-skating

Miscellaneous

Power Requirements AC120 V, 60 Hz
Power Consumption 21W
Dimensions 420 (W) x 98 (H) x 335 (D) mm
 16-1/2 (W) x 3-3/4 (H) x 13-1/4 (D) in.
Weight 10.3 kg/22 lb 11 oz

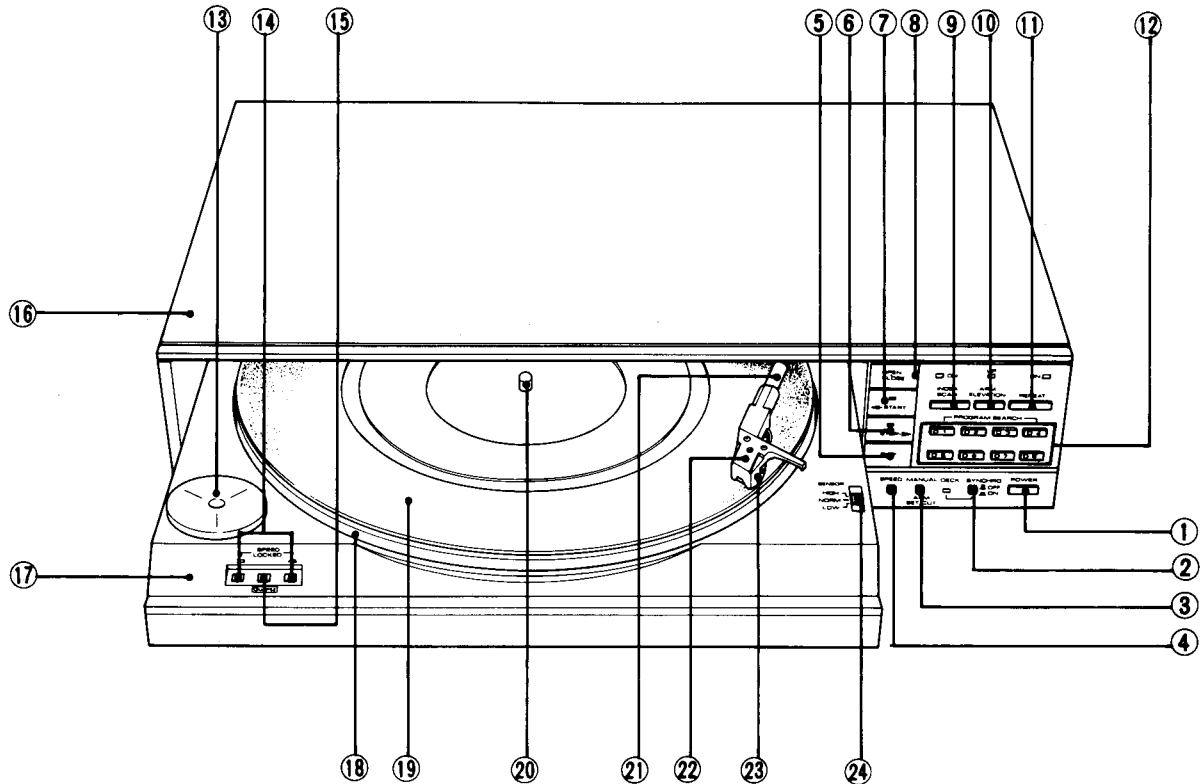
Accessories

EP Adaptor	1
Deck synchro cord	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, SPEED selector switch → 33

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 MANUAL ARM SET/CUT switch

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

④ 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 33-1/3rpm records.

“(45)” lights:

For playing 45 rpm records.

⑤ SKIP switch

- When this switch is pressed during play, the play of the current track is suspended and the stylus starts playing the next track.
- When the switch is pressed during programmed play, the play of the current track is suspended and the stylus moves on to the next track programmed and starts playing that track.

⑥ STOP switch/ARM LOCATE switch/indicator ()

- Press to stop auto play.
- Press when moving the tonearm toward the right (in the direction of the outside of the record) during manual play.
- Press this switch to release the program function.

⑦ START switch/ARM LOCATE switch/indicator (◀)

- Press to start automatic or programmed play.
- Press when moving the tonearm toward the left (in the direction of the inside of the record) during manual play.
- When the switch is pressed during actual play (whether automatic, programmed or index), a return is made to the first track (or the first programmed track with programmed play) and play begins (re-start function).

⑧ 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.

⑨ INDEX SCAN switch/indicator

Press for index play. The indicator flashes during play. When pressed again (the indicator goes off), index play is released and the normal auto play or programmed play mode is established.

⑩ 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 during manual 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).

⑪ REPEAT switch/indicator

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

⑫ PROGRAM SEARCH switches

- Press these switches in the desired sequence from [1] through [8] when programming the order in which the tracks are to be played. The tracks are programmed in the order in which the switches were pressed, and auto play, repeat play or index play is performed.
- The numbers [1] through [8] indicate the order of the tracks on the record (for instance, the [2] switch corresponds with the second track).
- The programmed play function is released when play ends or play is suspended.
- Programmed play is released when the stop switch is pressed. Press this switch when you have made a mistake in the programming.

⑬ 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.

⑭ 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.

⑮ Quartz Lock indicator

This lights when the platter is rotating at its 33-1/3 or 45 rpm speed.

⑯ Bonnet

⑰ Slide base

⑱ Platter

⑲ 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.

⑳ Platter shaft

㉑ Tonearm

㉒ Headshell

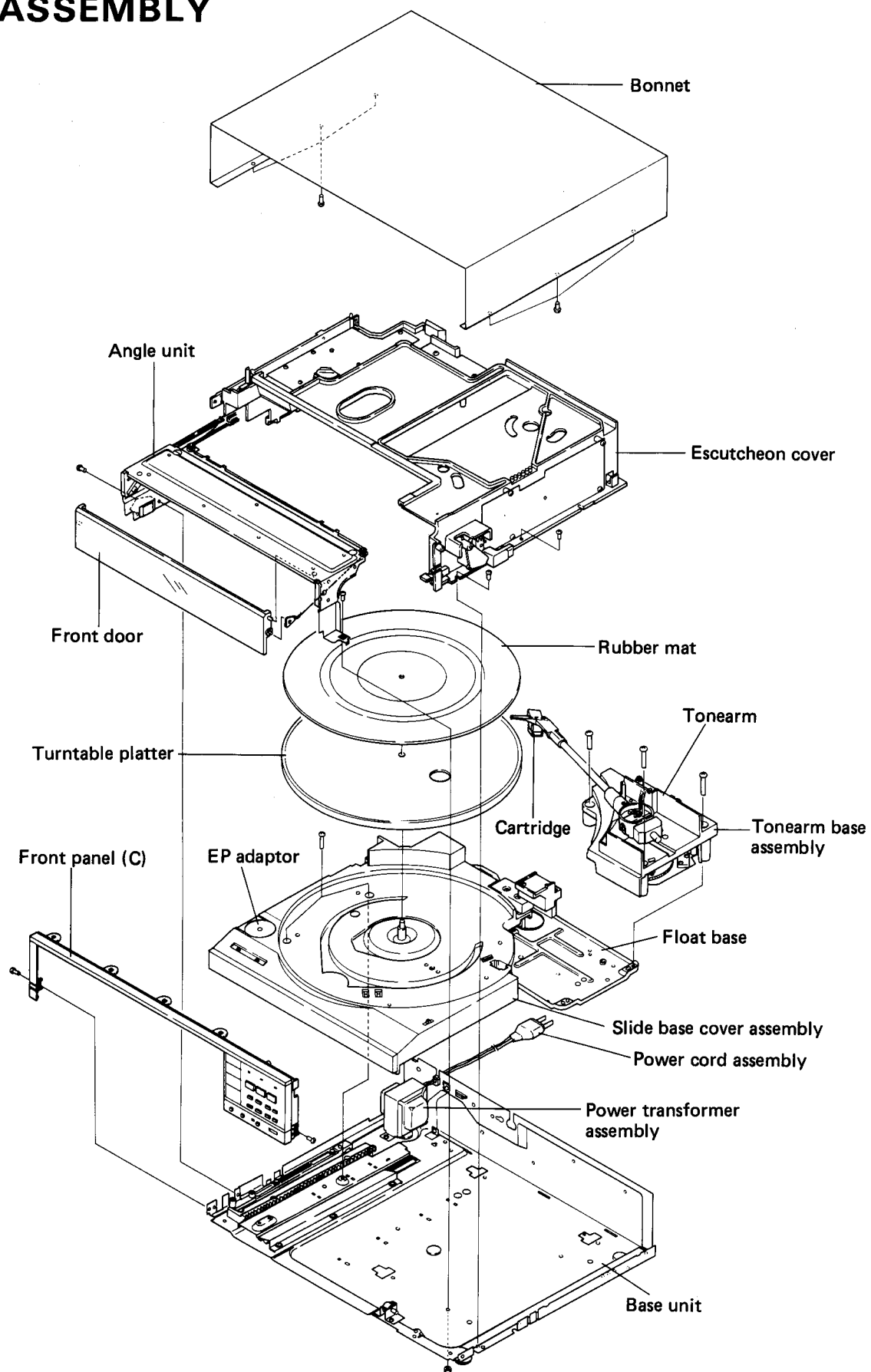
㉓ Cartridge (PC-41MC)

㉔ Sensitivity selector switch

Set to the position that corresponds to the type of record.

This switch is normally set to the "NORM" position.

3. DISASSEMBLY



4. EXPLODED VIEWS

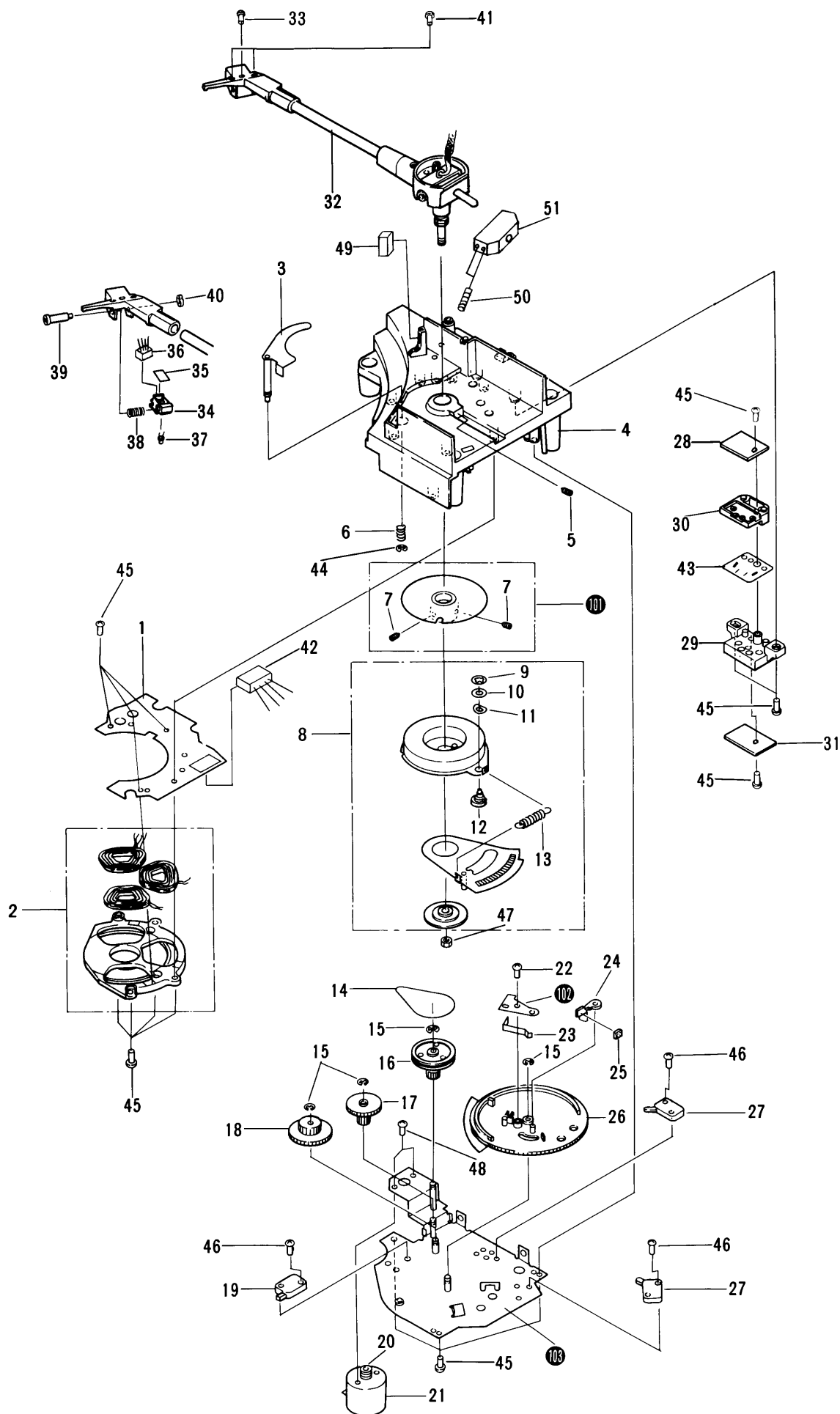
NOTES:

- Parts without part number cannot be supplied.
 - 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.*

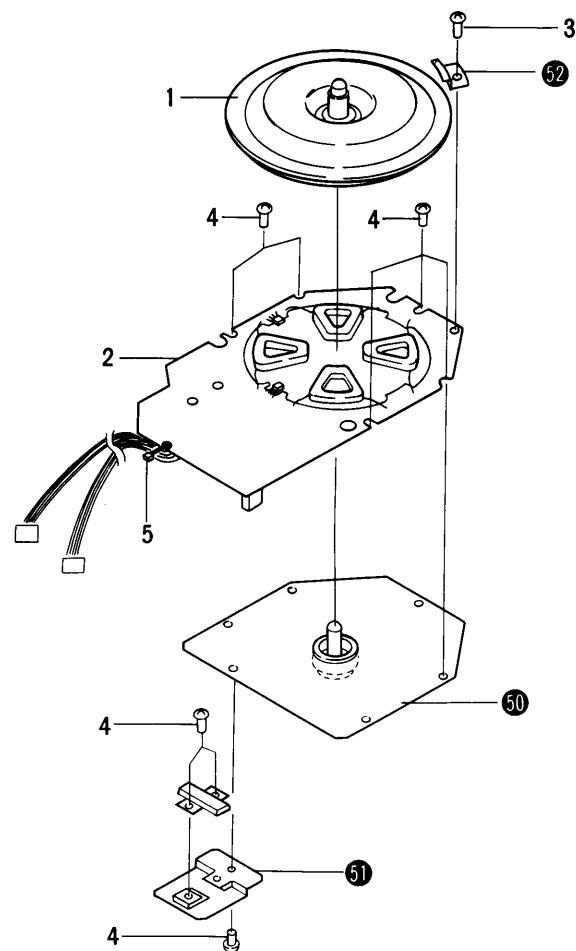
4.1 TONEARM

Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	XWX-085	Coil assembly	$\star\star$	36.	PCX-059	Transistor
	2.	PXT-484	Coil unit	$\star$	37.	NJL1102EH	LED
$\star$	3.	PXV-001	EV sheet unit		38.	PBH-325	Spring
	4.	PNX-391	Tonearm base		39.	PLB-151	Adjusting screw
	5.	ZMK40H100FBT	Screw		40.	PLB-152	Nut
	6.	PBH-326	EV spring		41.	PBA-537	Cartridge mounting screw
	7.	ZMD40H060FBT	Screw		42.	PDE-172	Connector assembly (8P)
	8.	PXB-271	Magnet assembly		43.	PNC-245	Plate
	9.	YS40FBT	Washer		44.	YE50S	Washer
	10.	WB40FMC	Flat washer		45.	PPZ30P080FMC	Screw
	11.	PBE-019	PU spring washer		46.	PBA-138	Screw
	12.	PNX-392	Adjusting cam		47.	NC50FMC	Nut
	13.	PBH-327	Spring		48.	PMZ20P040FMC	Screw
$\star\star$	14.	PEB-185	Belt		49.	PED-024	Cushion
	15.	YE30S	Washer		50.	ZMK50H100FBT	Screw
	16.	PNX-396	Gear (C)	$\star$	51.	PNR-533	Weight
	17.	PNX-395	Gear (B)				
	18.	PNX-394	Gear (A)		101.		Plate A unit
$\star\star$	19.	PSH-007	Slide switch		102.		Holder
$\star\star$	20.	PNW-392	Motor pulley		103.		Base assembly
					104.		
$\star\star$	21.	PXM-118	Motor		105.		
	22.	PPZ30P50FMC	Screw				
	23.	PBK-057	Plate spring				
	24.	PNX-398	Lead in ratch				
	25.	PED-022	Cushion				
	26.	PNX-397	Driving plate				
$\star\star$	27.	PSH-004	Slide switch				
	28.	XWX-084	LED assembly				
	29.	PNX-399	Sensor holder (A)				
	30.	PNX-400	Sensor holder (B)				
	31.	XWX-083	Photo transistor assembly				
$\star$	32.	PPD-636	Tonearm assembly				
	33.						
	34.	PNX-376	Sensor case				
	35.	PNP-254	Sensor P.C. board				



4.2 MOTOR



Parts List

Mark	No.	Part No.	Description
	1.	PXT-473	Rotor unit
	2.	PWM-115	Control assembly
	3.	PSZ30P080FMC	Screw
	4.	PSZ30P050FMC	Screw
	5.	PEC-030	Wire clamp
	50.		Base unit
	51.		Heat sink
	52.		Stopper

4.3 EXTERIOR

Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	PNA-170	Bonnet		51.	PNX-442	45 adaptor
	2.	XWR-040	Power supply assembly	 ★	52.	PTX-032	Power transformer assembly (120V)
★ ★	3.	PSH-007	Slide switch		53.		Shaft
	4.	PNX-425	Lamp cover		54.	PNX-424	Roller
	5.	PNX-437	Driving lever lack		55.	PNX-434	Lock lever roller
	6.	PNX-436	Gear (F)		56.	PNX-433	Lock lever
	7.	PBA-126	Screw		57.	PNX-432	Lock plate
	8.	XWX-126	PU assembly		58.	PNX-431	Lowering rack
	9.	PEB-207	Cushion		59.	PNC-251	Slide rail
	10.	PXB-291	Escutcheon cover assembly		60.	PNX-428	Slide rail rack
	11.	PED-023	Rubber cushion		61.		Steel ball 4φ
	12.	PNX-435	Slider		62.		Steel ball 6φ
	13.	YE25S	Washer		63.	PNX-231	Gear
	14.	PNX-440	Pulley		64.	PNX-426	Retainer
	15.	PNX-378	Front door		65.	PNC-253	Rail cover
	16.						
	17.	PNX-438	Door holder (L)		66.	PDF-178	Power cord assembly
	18.	PBK-058	Spring		67.	PDE-197	PU cord
	19.	PBH-342	Spring		68.	PEC-048	Strain relief (Power cord)
	20.	PNX-387	P knob		69.	PEC-051	Strain relief (PU cord)
					70.	XWX-129	Regulator IC assembly A
★ ★	21.	PSG-037	Push switch				
 ★ ★	22.	PSF-018	Microswitch		71.	XWX-130	Regulator IC assembly B
	23.	XWM-134	Control assembly		72.	PEC-082	Stopper
	24.	PNX-389	Power switch lever		73.	PNX-406	Operation panel
	25.	PBH-339	Spring		74.	PXB-278	Roller angle assembly
					75.	PNX-403	Front panel (C)
	26.	PEB-204	Rubber mat assembly				
	27.	PNR-175	Turntable platter		76.	PNX-407	Panel holder
★ ★	28.	PXM-121	Motor		77.	PNX-388	SP knob
★ ★	29.	PNX-449	Motor pulley		78.	PNX-386	DS knob
	30.	PEB-184	Rubber cushion		79.	PNX-413	Lens (A)
					80.	PWX-069	Function assembly
	31.	PNX-430	Gear (E)				
	32.	WA41D065D025	Flat washer		81.	PNX-410	EV knob
	33.	YE30S	Washer		82.	PNX-414	Lens (B)
	34.	PNX-429	Gear (D)		83.	PNX-412	Selector knob
	35.	WA31D054D025	Flat washer		84.	PBH-328	Knob spring
					85.	PAD-101	O/C knob unit
	36.	YE20S	Washer				
★ ★	37.	PEB-206	Belt		86.	PAD-102	Start knob unit
	38.	PXB-265	Slide base cover assembly		87.	PAD-103	Stop knob unit
★	39.	GL-9PG12	LED		88.	PAD-104	Skip knob unit
★	40.	GL-9PR12	LED		89.	PNX-450	Wire guide
					90.	PPZ30P060FZK	Screw
	41.	XWX-086	Speed indicator assembly				
	42.	PNY-026	Cover (KU Type)		91.	PDE-151	Connector assembly (2P)
		PNX-441	Cover (KC,HE,HB,S,S/G)		92.	PPZ30P080FMC	Screw
	43.	PAC-115	Slide knob		93.	IPZ30P100FMC	Screw
	44.	XWX-087	Sensibility selector assembly		94.	WA30F100M100	Flat washer
★ ★	45.	PXM-122	Motor assembly		95.	IDZ30P080FMC	Screw
	46.	PEB-234	Damper rubber (C) (KU)		96.	PPZ26P050FZK	Screw
		PEB-212	Damper rubber (A) (KC,HE,HB,S,S/G)		97.	IPZ30P160FMC	Screw
					98.	PBA-125	Screw
	47.	PBA-141	Screw (B)		99.	PBA-088	Screw
	48.	PEB-208	Damper rubber		100.	IPZ30P080FMC	Screw
	49.	PBH-336	Spring (B)				
	50.	PBA-140	Screw (A)				

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	101.	PMA40P060FMC	Screw		121.	PNX-468	Wire hold
	102.	IDZ30P060FMC	Screw		122.	PMA30P080FMC	Screw
	103.	PDZ30P060FZK	Screw		123.	PEB-235	Damper rubber (D) (KU)
	104.	PDZ30P050FMC	Screw			PEB-213	Damper rubber (B) (KC,HE,HB,S,S/G)
	105.	IDZ30P080FMC	Screw				
	106.	PEB-213	Damper rubber (B)		201.		Stopper
	107.	XWX-125	Jack assembly		202.		Angle assembly
★ ★	108.	PSH-009	Slide switch		203.		Gear base
	109.	PNX-439	Door holder (R)		204.		Roller catch
	110.	PYY-115	Door holder assembly		205.		Float base
	111.				206.		Base unit
	112.	PMZ30P150FMC	Screw		207.		Wire
	113.	PBA-138	Screw		208.		Cover
	114.	WA41D065D025	Flat washer				
	115.	PDZ30P060FMC	Screw				
	116.	PDZ30P080FMC	Screw				
	117.	WH30FMC	Washer				
	118.	PEB-211	Rubber				
	119.	PBA-126	Screw				
	120.	PDF-166	GND lead unit				

1

2

3

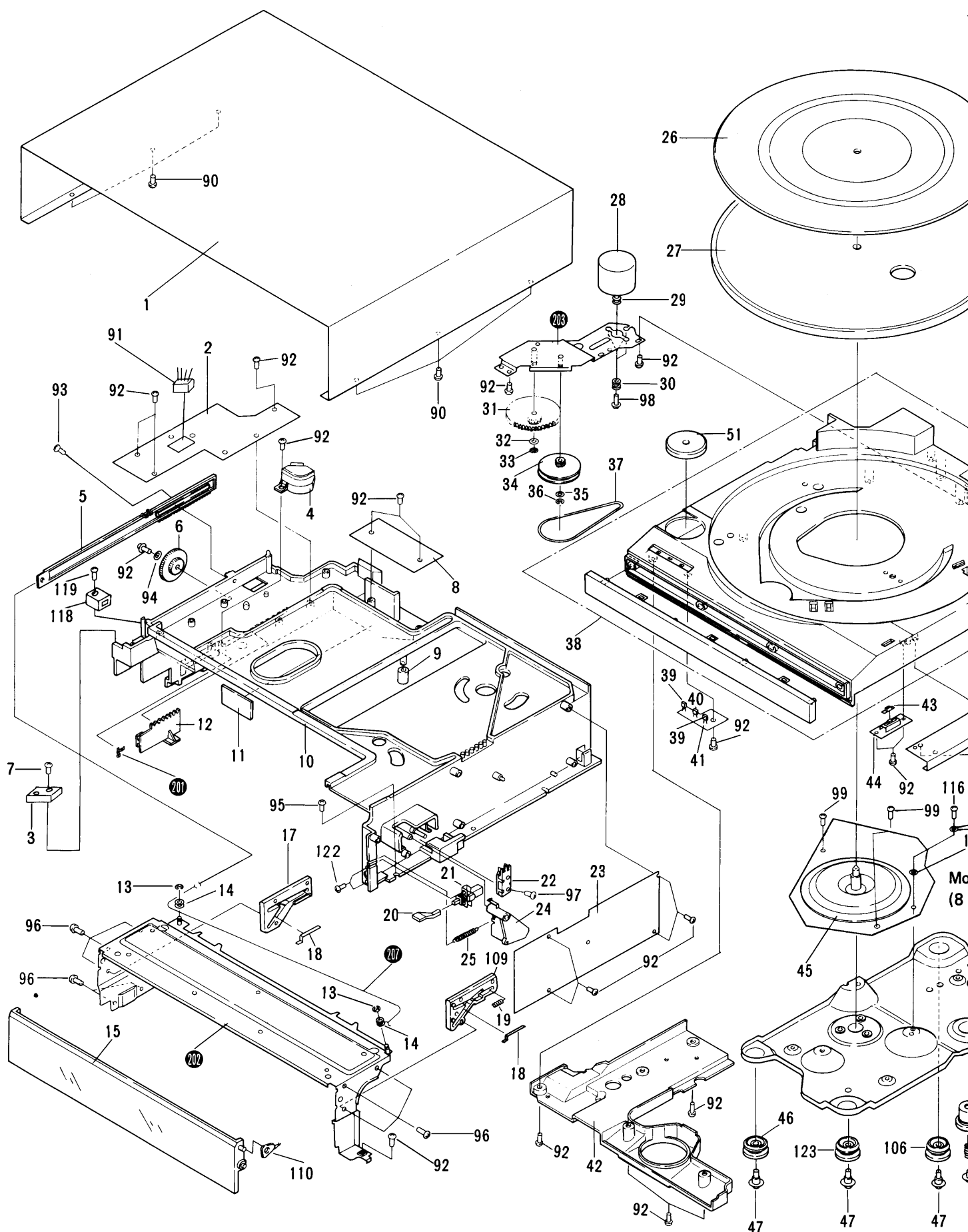
Exterior

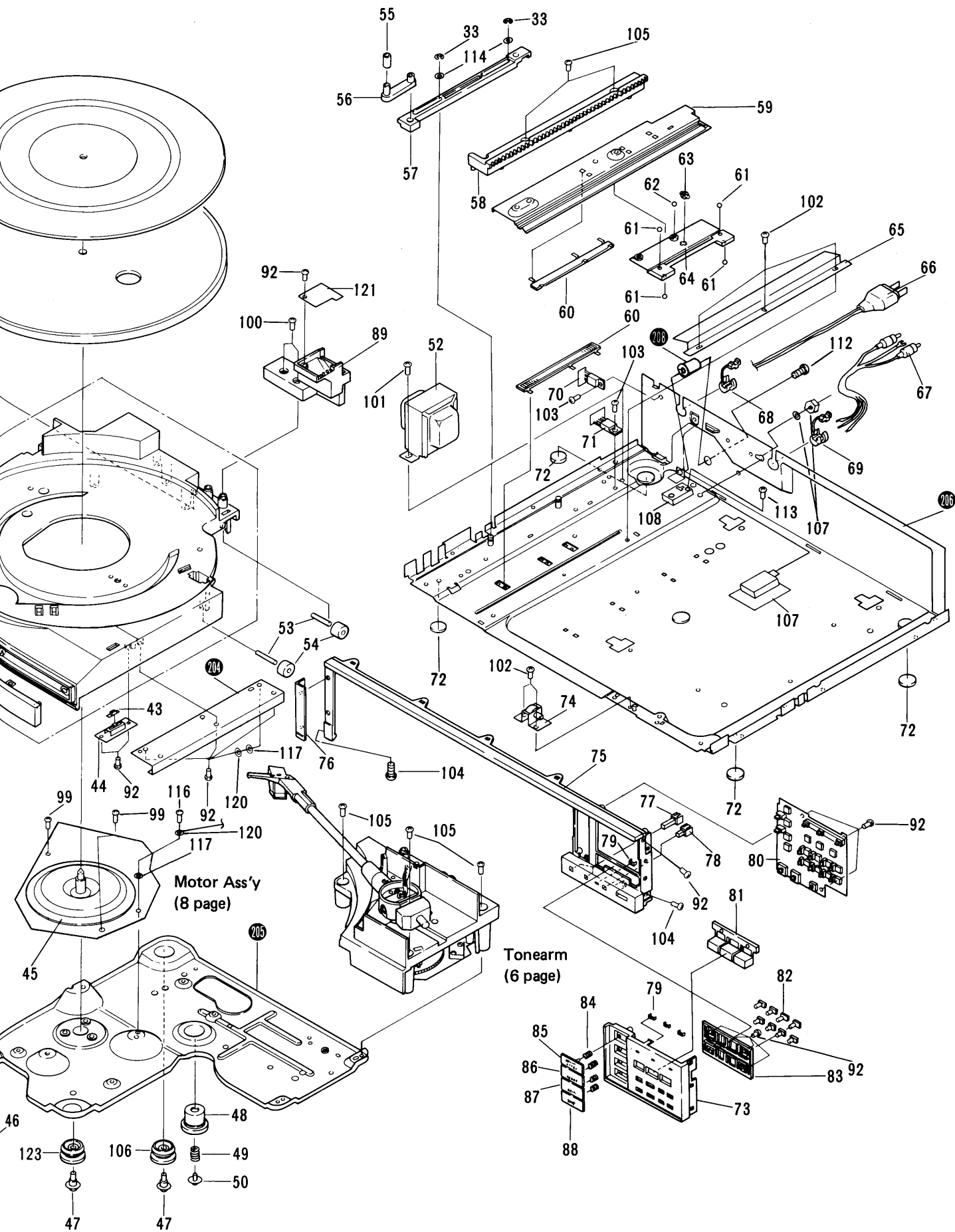
A

B

C

D





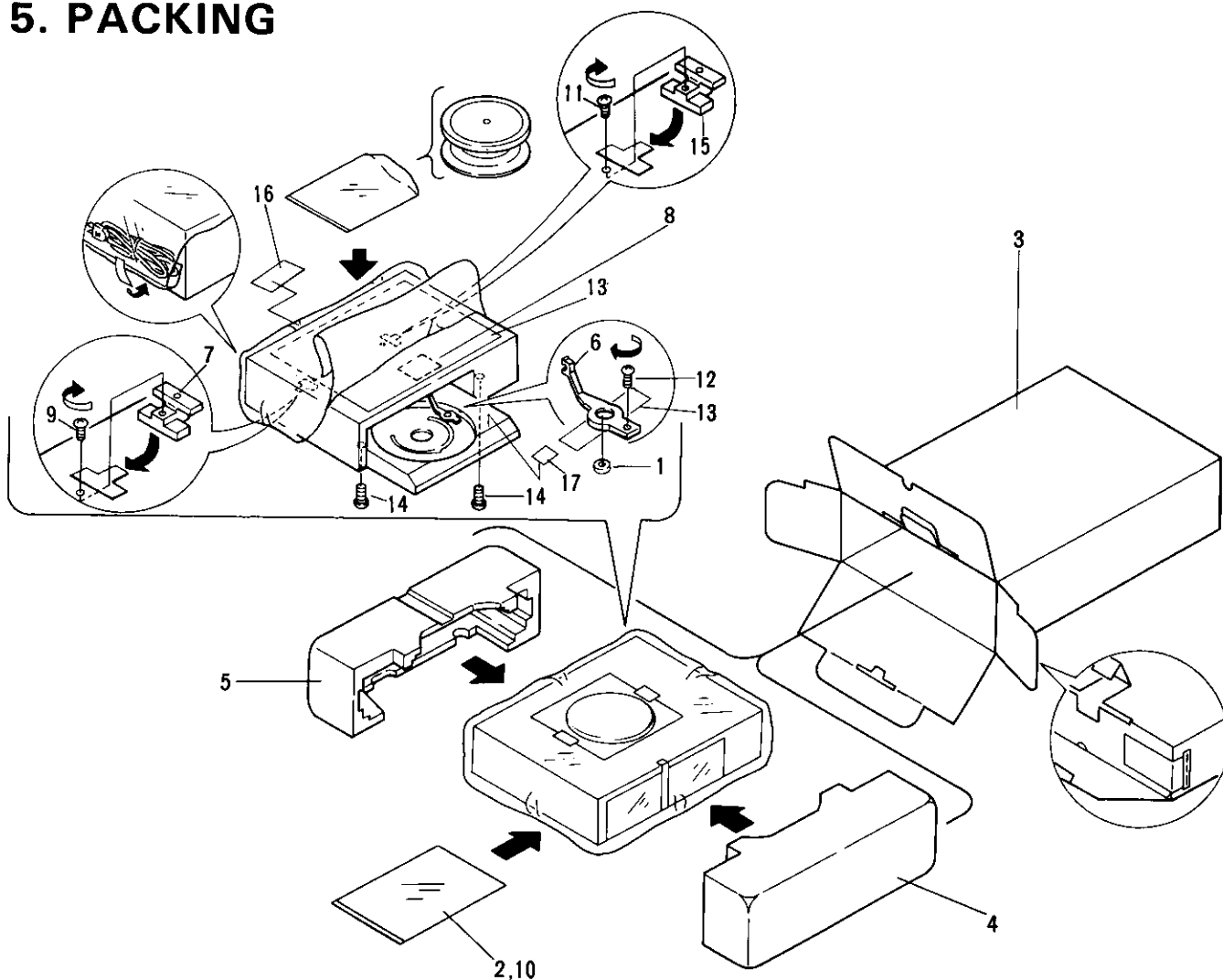
A

B

C

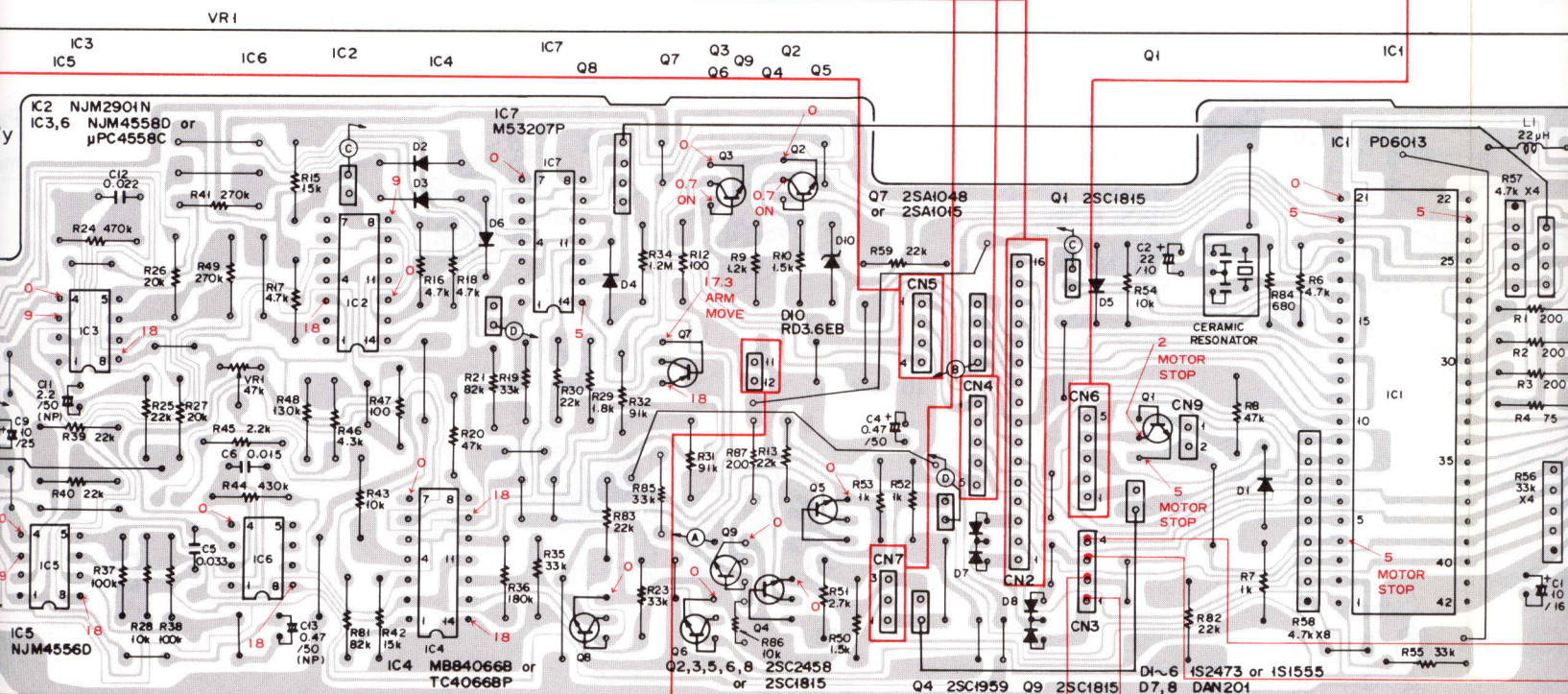
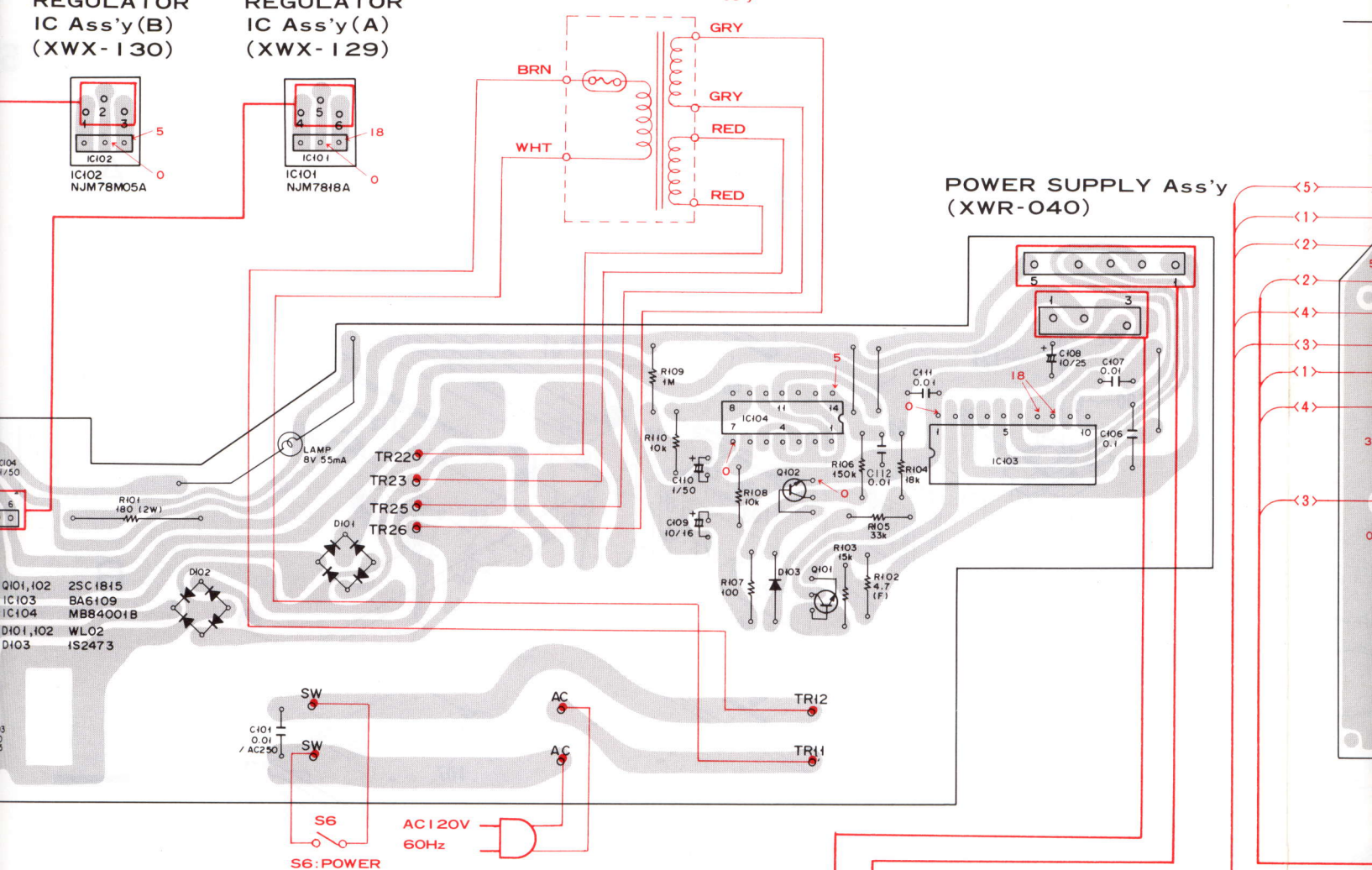
D

5. PACKING



Parts List

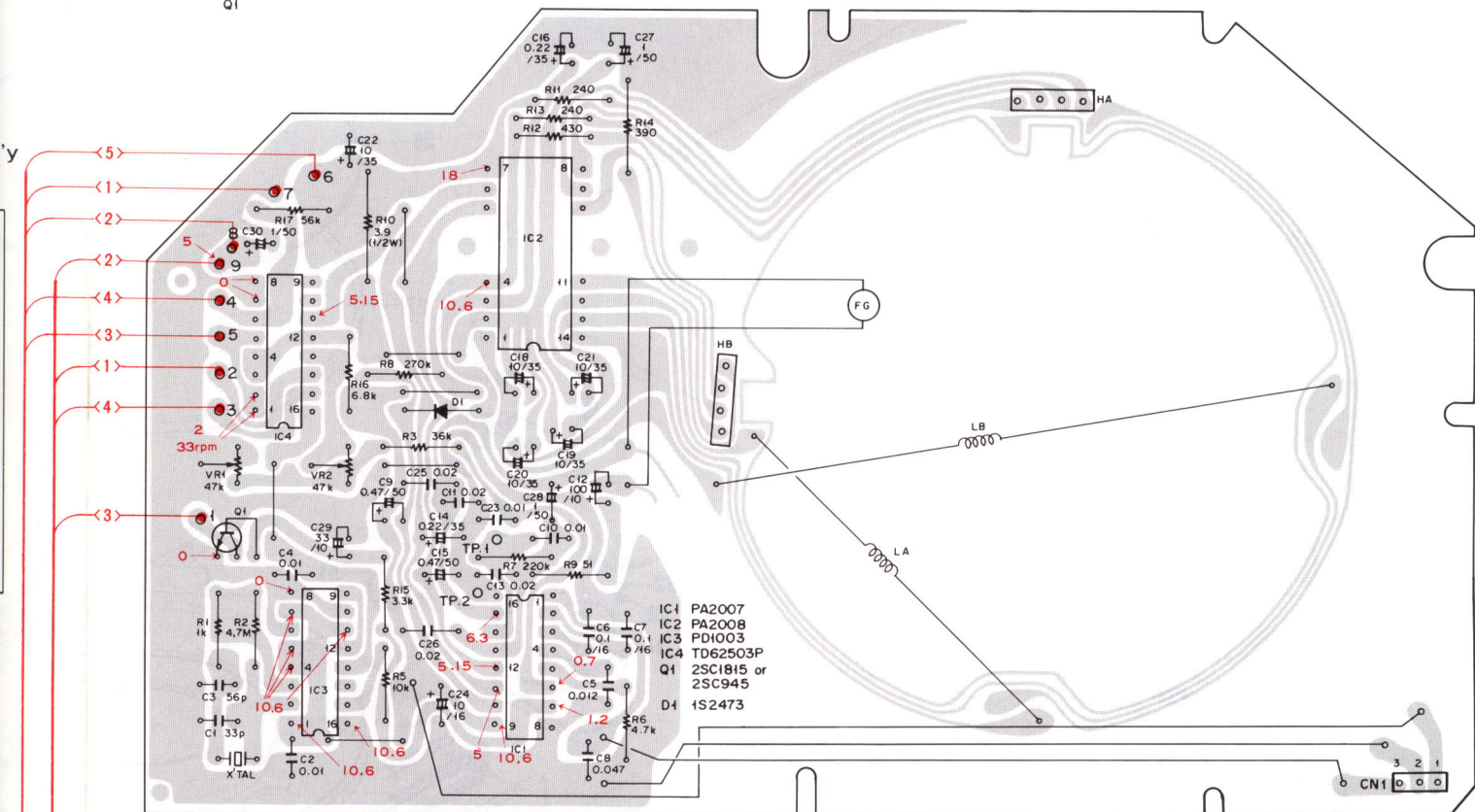
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	PNX-442	45 adaptor		11.	PMB40P160FMC	Screw
	2.	PRB-220	Operating instructions		12.	IPZ30P120FMC	Screw
	3.	PHH-016	Packing case		13.	PRW-098	Note paper (adaptor)
	4.	PHA-146	Protector (F)		14.	PBA-141	Screw (B)
	5.	PHA-147	Protector (R)		15.	PNX-474	Spacer (A)
	6.	PNX-451	Tonearm holder		16.	PDE-157	Tape deck connection cord
	7.	PNX-452	Spacer		17.		
	8.	PRW-096	Note paper				
	9.	IPZ40P250FMC	Screw				
	10.	PRN-015	Note paper				

**REGULATOR
IC Ass'y(B)
(XWX-130)****REGULATOR
IC Ass'y(A)
(XWX-129)****POWER TRANSFORMER Ass'y****POWER SUPPLY Ass'y
(XWR-040)**

VR1 VR2 TP2 TP1

IC4 IC3 IC2 IC1

MOTOR CONTROL Ass'y (PWM-122)

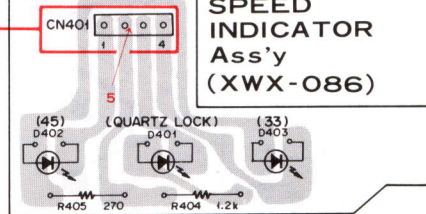


A

B

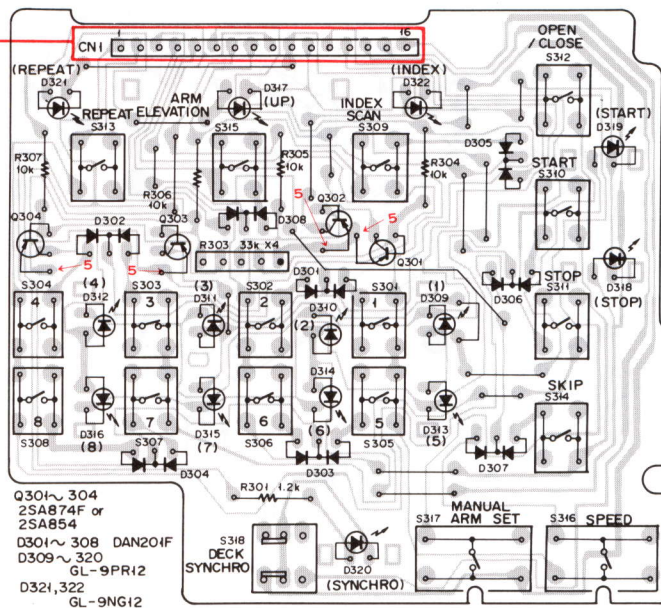
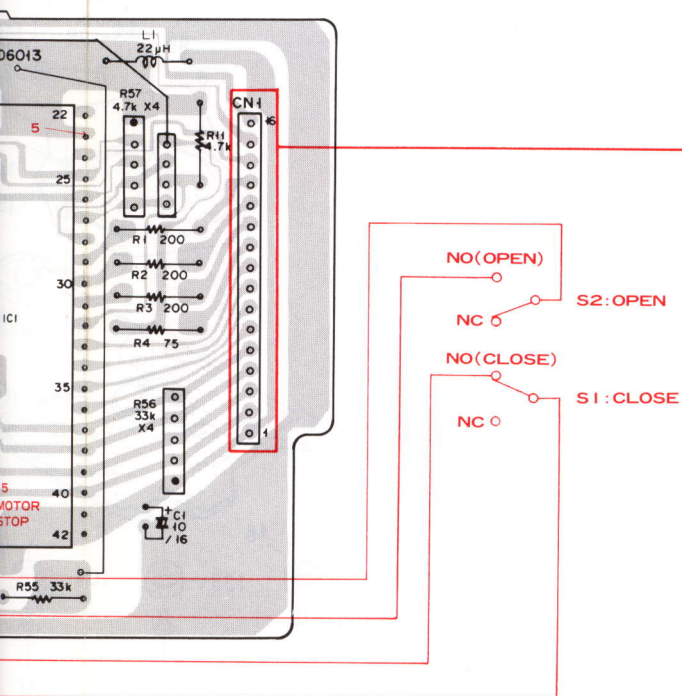
D401 GL-9PRI2
D402,403 GL-9PG12

SPEED INDICATOR Ass'y (XWX-086)

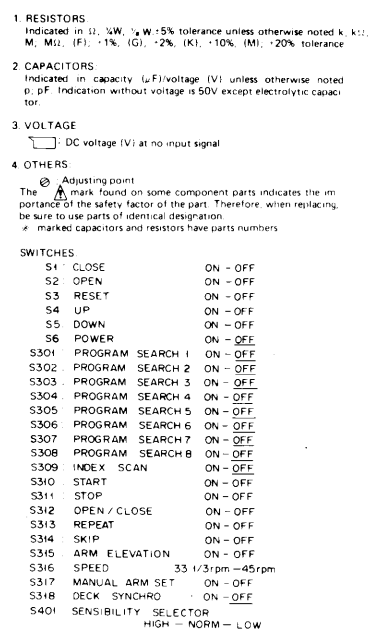


C

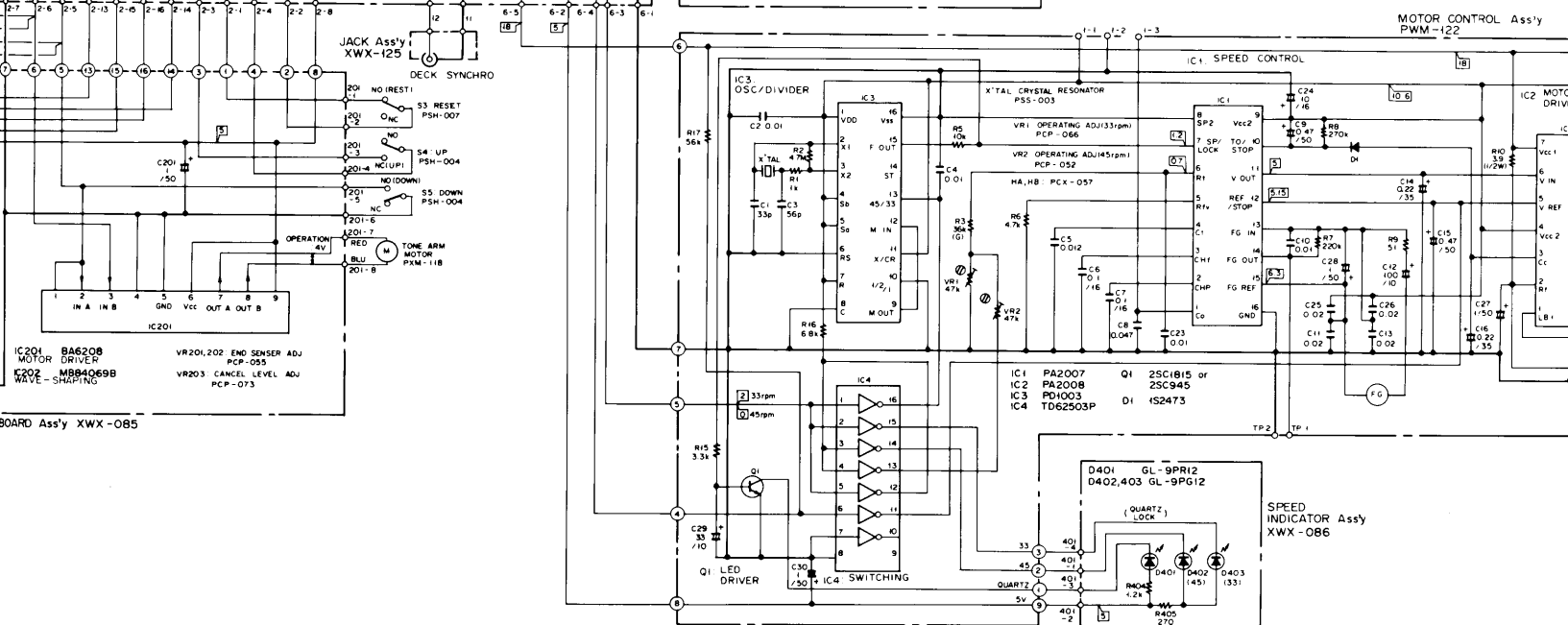
FUNCTION Ass'y (PWX-069)



D



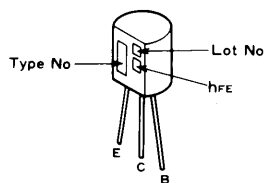
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.



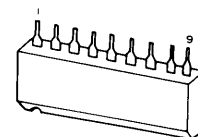
NOTE:
The indicated semiconductors are used only. Other alternative semiconductors are listed in the parts list.

External Appearance of Transistors and ICs

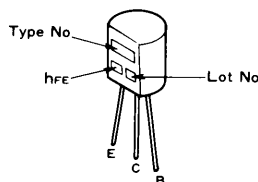
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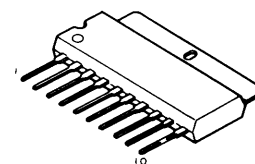
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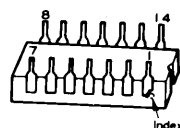
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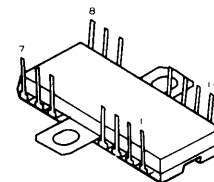
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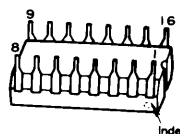
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TC4069BP
MB84001B
TC4001BP
TC4066BP
NJM2901N



PA2008



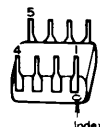
PA2007
PD1003
TD62503P



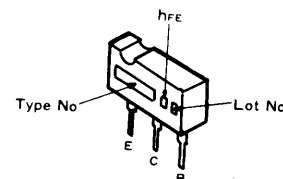
PH101R
PH101S



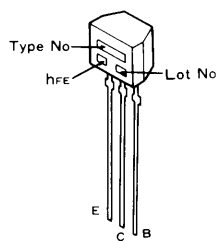
NJM4556D
NJM4558D
μPC4558C
NJM072D



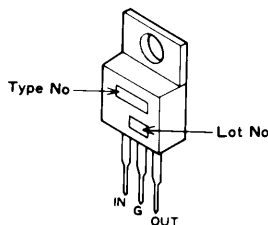
2SA874F



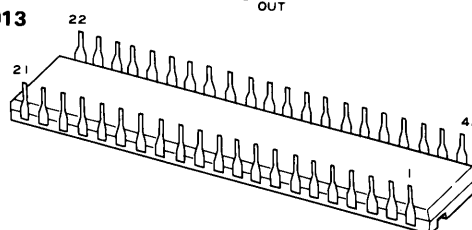
2SC2458
2SA1048



NJM7818A
NJM78M05A



PD6013



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(M), ±20% tolerance

less otherwise noted
not electrolytic capacitors

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indicated semiconductors are representative ones
Other alternative semiconductors may be used and
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8. 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 × 10¹ 561 RD¼PS 561 J
 47kΩ 47 × 10³ 473 RD¼PS 473 J
 0.5Ω 0R5 RN2H 0R5 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 × 10¹ 5621 RN¼SR 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 **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★
 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
	PWM-115	Motor control assembly
	XWM-134	Control assembly
	XWX-126	PU assembly
	XWX-125	Jack assembly
	PWX-069	Function assembly
	XWX-083	Photo transistor assembly
	XWX-084	LED assembly
	XWX-085	Coil assembly
Δ	XWR-040	Power supply assembly
Δ	XWX-129	Regulator IC assembly A
Δ	XWX-130	Regulator IC assembly B
	XWX-086	Speed indicator assembly
	XWX-087	Sensibility selector assembly

Mark	Part No.	Symbol & Description
	PDE-171	Connector assembly (4P)
	PDE-172	Connector assembly (8P)
	PDE-151	Connector assembly (2P)

CONTROL ASSEMBLY (XWM-134)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 16L	C1
	CEA 100M 25L	C9
	CEA 220M 10L	C2
	CEA R47M 50NP	C13
	CEA R47M 50L	C4
	CEA 2R2M 50NP	C11
	CKDYF 153Z 50	C6
	CKDYF 333Z 50	C5
	QOMA 223K 50	C12

SWITCHES, SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PSH-004	Slide switch
★★	PSH-007	Slide switch
★★	PSH-009	Slide switch
Δ ★★	PSF-018	Microswitch
★★	PSG-037	Push switch
★	NJL1102EH	LED
★	GL-9PR12	LED
★	GL-9PG12	LED
★★	PCX-059	Photo transistor

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-072	VR1 Semi-fixed 47k
	RGSD 8X472J	R58
	RGSD 4X472J	R57
	RGSD 4X333J	R56
	RD¼PM □□□J	R1—R4, R6—R13, R15—R21, R23—R32, R34—R55, R59, R81—R85, R87
	RD¼VM 103J	R86

MOTORS OTHERS

Mark	Part No.	Symbol & Description
★★	PXM-122	Motor assembly (Phono)
★★	PXM-118	Motor (Tonearm)
★★	PXM-121	Motor (Slide base)
Δ ★	PTX-032	Power transformer assembly (120V)
Δ	PDF-178	Power cord assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PD6013	IC1
★★	NJM2901N	IC2
★★	NJM4558D	IC3, IC6
	(μPC4558C)	
★★	MB84066B	IC4
	(TC4066BP)	

Mark	Part No.	Symbol & Description
★★	NJM4556D	IC5
★★	M53207P	IC7
★★	2SC1815 (2SC2458)	Q1
★★	2SC2458 (2SC1815)	Q2, Q3, Q5, Q6, Q8
★★	2SC1959	Q4
★★	2SA1048 (2SA1015)	Q7
★★	2SC1815-Y	Q9
★	1S2473 (1S1555)	D1-D6
★	DAN 201F	D7, D8
★	RD3.6EB	D10
★	KMFC1001T	OSC

OTHER

Mark	Part No.	Symbol & Description
	LAL03KH220K	L1

PU ASSEMBLY (XWX-126)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 470M 25L	C14
	CKDYF 102Z 50	C15, C16

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-074	VR2, VR3 Semi-fixed 6.8k
★	PCP-012	VR4 Semi-fixed 10k
	RD¼VM 562J	R72
	RD¼PM □□□J	R61-R68, R70, R71, R73

SEMICONDUCTOR, OTHER

Mark	Part No.	Symbol & Description
★★	NJM072D	IC8
★★	PSR-004	Relay
	PDF-165	GND wire

JACK ASSEMBLY (XWX-125)

Mark	Part No.	Symbol & Description
	PKN-001	Jack

MOTOR CONTROL ASSEMBLY (PWM-115)

CAPACITORS

Mark	Part No.	Symbol & Description
	CCDCH 330J 50	C1
	CQMA 123K 50	C5
	CQPA 473J 50	C8
	CKDYF 103Z 50	C2, C4, C10, C23
	CKDYF 203Z 50	C11, C13, C25, C26

CKDYF 104Z 50	C6, C7
CCDCH 560J 50	C3
CEA R47M 50L	C9, C15
CEA 100M 16L	C24
CEA 100M 35L	C18-C22

Mark	Part No.	Symbol & Description
	CEA 101M 10L	C12
	CEA 010M 50L	C27, C28, C30
	CEA 330M 10L	C29
	CSZA R22M 35	C14, C16

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-066	VR1 Semi-fixed 47k
★	PCP-052	VR2 Semi-fixed 47k
	RN¼PR 363G	R3
	RD¼PS 3R9J	R10
	RD¼PM □□□J	R1, R2, R5-R9, R11-R17

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PA2007	IC1
★★	PA2008	IC2
★★	PD1003	IC3
★★	TD62503P	IC4
★★	2SC1815-GR (2SC945-P)	Q1
★	1S2473	D1

OTHERS

Mark	Part No.	Symbol & Description
★	PSS-003	Crystal
★	PCX-057	Hole element
	PDE-164	Connector 4P
	PDE-165	Connector 5P

FUNCTION ASSEMBLY (PWX-069)

SWITCHES

Mark	Part No.	Symbol & Description
★★	PSG-038	S301-S315
★★	PSG-040	S316, S317
★★	PSG-039	S318

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
	RD¼PM □□□J	R301, R304-R307
	RGSD 4X 333J	R303

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SA874F-R (2SA854-GR)	Q301-Q304
★	DAN201F	D301-D308
★	GL9PR12	D309-D320
★	GL-9NG12	D321, D322

OTHERS

Mark	Part No.	Symbol & Description
	PNX-446	LED holder (B)
	PNX-454	LED holder (C)
	PNX-455	LED holder (D)
	PDE-185	Connector assembly (10P)
	PDE-186	Connector assembly (6P)

PHOTO TRANSISTOR ASSEMBLY (XWX-083)

Mark	Part No.	Symbol & Description
★ ★	PH101	Q201-Q204

LED ASSEMBLY (XWX-084)

Mark	Part No.	Symbol & Description
	RGSD4X391J	R205
★	SE302A	D201, D202
★	SR106D-LC	D203, D204

COIL ASSEMBLY (XWX-085)

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

Mark	Part No.	Symbol & Description
	CEA 1R0M 50L	C201
★	PCP-055	VR201, VR202 Semi-fixed 4.7k
★	PCP-073	VR203 Semi-fixed 220
	PD%PM □□□J	R201-R204
★ ★	BA6208	IC201
★ ★	MB84069B (TC4069BP)	IC202

POWER SUPPLY ASSEMBLY (XWR-040)

CAPACITORS

Mark	Part No.	Symbol & Description
⚠	PCL-040	C101 0.01μF
	CEA 471M 50L	C102
	CEA 471M 25L	C103
	CEA 1R0M 50L	C104, C105, C110
	CKDYF 104Z 50	C106
	CKDYF 103Z 50	C107, C111, C112
	CEA 100M 25L	C108
	CEA 100M 16L	C109

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
	RS2PF181J	R101
	RN%PR4R70F	R102
	RD%PM □□□J	R103-R110

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★ ★	BA6109	IC103
★ ★	MB84001B (TC4001BP)	IC104
★ ★	2SC1815-Y	Q101, Q102
★	WL02	D101, D102
★	1S2473	D3

OTHERS

Mark	Part No.	Symbol & Description
★ ★	PEL-051	Lamp
	PNY-009	Lamp holder
	PDE-188	Connector assembly (3P)
	PDE-213	Connector assembly (5P)

REGULATOR IC ASSEMBLY A (XWX-129)

Mark	Part No.	Symbol & Description
★ ★	NJM7818A	IC101
	PDE-190	Connector assembly (6P)

REGULATOR IC ASSEMBLY B (XWX-130)

Mark	Part No.	Symbol & Description
★ ★	NJM78M05A	IC102

SPEED INDICATOR ASSEMBLY (XWX-086)

Mark	Part No.	Symbol & Description
	RD%PM 122J	R404
	RD%PM 271J	R405

SENSIBILITY SELECTOR ASSEMBLY (XWX-087)

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

Mark	Part No.	Symbol & Description
★ ★	PSH-008	S401
	RD%PM □□□J	R401-R403
	PDE-187	Connector assembly (4P)

9. ADJUSTMENTS

Dummy Play Mode Setting

The PL-88F can be set to a dummy play mode (in "loading out" mode) by the following method.

1. Remove the bonnet, and set to "loading out" mode.
2. Switch the power off.
3. Disconnect the CN3 connector on the control ass'y, and short pin (1) to pin (2).
4. Then switch the power on, thereby putting the turntable into play mode.

Notes:

1. When using this setting (bonnet removed, and loading out mode) for track selection operations and adjustments, make sure that the tonearm cartridge section is protected from extraneous light.
2. When checking address-related operations (including operations during track selection and play), do not manipulate the tonearm by hand. If the tonearm has to be operated, use the operation keys.
3. Do not operate the OPEN/CLOSE key.
4. Always make sure that the power is off when connecting or disconnecting the connectors.

Adjustments

Different methods are used to adjust the stylus lowering position for track 1 and the other tracks for automatic play operation in the PL-88F. The lowering position for track 1 is adjusted according to "Stylus Lowering Position Adjustment", while the lowering position for other tracks is adjusted according to "Adjustment of Stylus Lowering Position between Tracks".

9.1 STYLUS LOWERING POSITION ADJUSTMENT

1. Press the OPEN/CLOSE key, pull the slide base out forward, place a 30cm record on the turntable platter, and set the correct rpm 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).

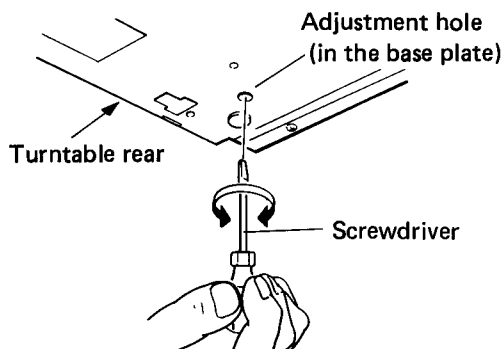


Fig. 9.1 Stylus Lowering Position Adjustment

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, nor apply excessive pressure to the adjustment screw during the adjustment operation.

9.2 ADJUSTMENT OF STYLUS LOWERING POSITION BETWEEN TRACKS

Use this adjustment method when the stylus fails to lower correctly into position between tracks during normal programmed play (when the sensitivity switch is in the NORM position and an ordinary record is being used). This position should also be adjusted after stylus replacements.

1. Press the OPEN/CLOSE key, pull the slide base out forwards, place a 30cm record on the turntable platter, and set the correct rpm by the speed selector.
2. Press the START key and proceed in programmed play mode (excluding the first track from the program). Estimate the direction and degree of displacement in the lowering position at this time.
3. Press the OPEN/CLOSE key and pull the slide base out. Then press the manual play switch and move the tonearm forward.

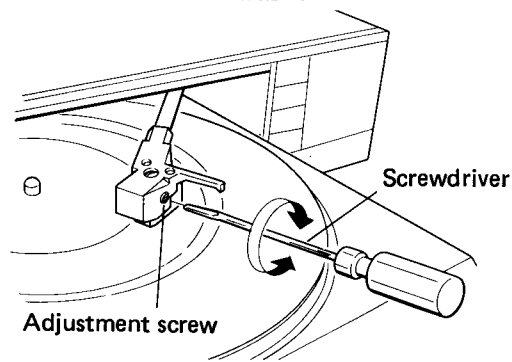


Fig. 9.2 Adjustment of Stylus Lowering Position Between Tracks

4. Depending on the degree of displacement, adjust the adjustment screw in the head shell (see Fig. 9.2) with a small screwdriver.
 - Turn the adjustment screw clockwise if the stylus lowers in the track on the outside of the programmed track.
 - Turn the adjustment screw counter clockwise if the stylus lowers inside the programmed track.
 - One full turn of the screw corresponds to a shift of 0.2mm in the lowering position.
5. Proceed with programmed play again (excluding the first track from the program) and check that the stylus lowers correctly between tracks.
6. When adjusting with the GGF-021 test record, set the sensitivity switch to the HIGH position, and then adjust the screw to obtain the 1kHz output signal for three to four seconds when the stylus is lowered in front of the second track of the GGF-021 record.
7. After completing the adjustment, proceed with programmed play, and check that the 1kHz output signal is obtained for three to four seconds for tracks after the first track, and that the 1kHz is also obtained for tracks after the sixth track.

Note:

If the correct lowering position cannot be obtained by this adjustment method, or if the stylus lowering operation is unsteady, proceed with the "Horizontal DD offset adjustment" and then repeat the above adjustment.

9.3 HORIZONTAL DD OFFSET ADJUSTMENT

1. Remove the bonnet, press the OPEN/CLOSE key, and pull the slide base forward.
2. Press the manual key for lead-in of the tonearm, and press the arm elevation key to put the tonearm in the UP position.
3. Connect a DC voltmeter between the humped jumpers JP43 and JP44 (see Fig. 9.3).
4. Adjust VR1 to obtain a meter reading of $\pm 50\text{mV}$ max.
5. Then press the arm elevation key to lower the tonearm and check that the tonearm descent is perpendicular.

9.4 BAND SENSOR OFFSET ADJUSTMENT

1. Remove the bonnet and P1 and P2 lead wires indicated in Fig. 9.4 (using a soldering iron to disconnect the lead wires).
2. Using a small screwdriver, turn VR2 and VR3 fully clockwise as seen from above.
3. Connect a DC voltmeter between P2 and P3 (TP terminals) of CN8, and adjust VR4 to obtain a meter reading of $\pm 0.1\text{V}$ max.

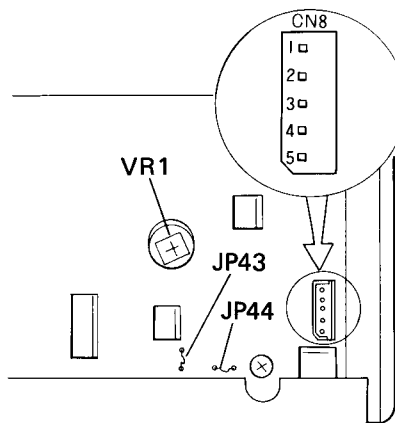


Fig. 9.3 Horizontal DD Offset Adjustment

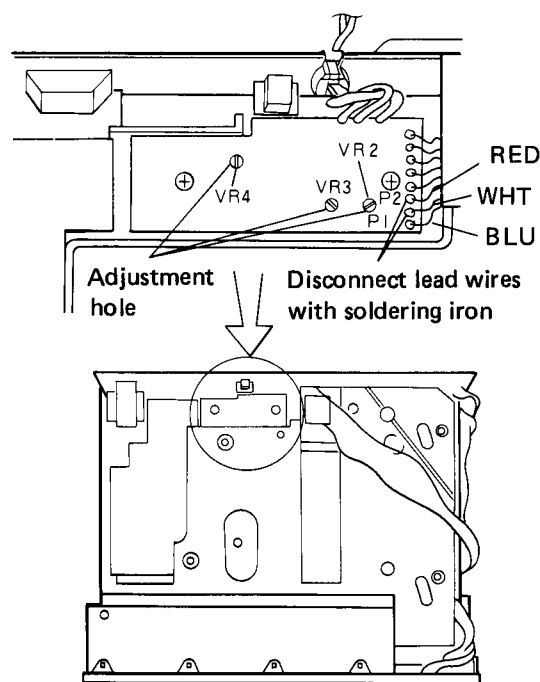


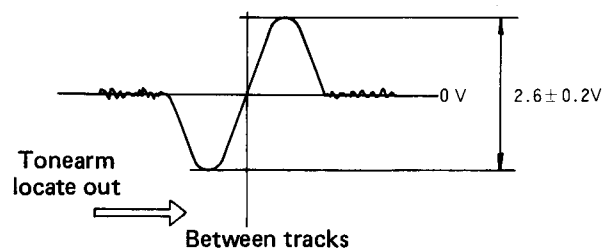
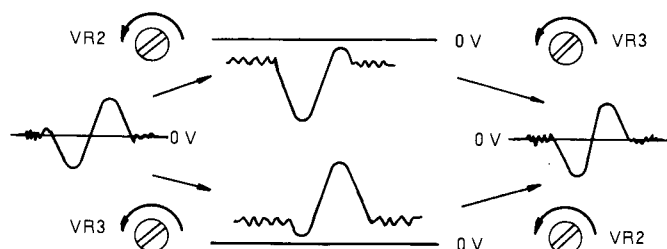
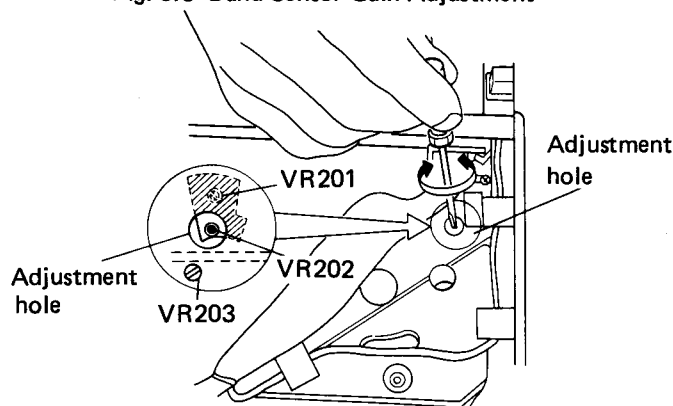
Fig. 9.4 Band Sensor Offset Adjustment

Notes:

- * VR2 and VR3 are the band sensor gain adjustment controls. Always adjust the band sensor gain after completing the band sensor offset adjustment.
- * Resolder the P1 and P2 lead wires back into position after completing the band sensor offset adjustment.

9.5 BAND SENSOR GAIN ADJUSTMENT

1. Remove the bonnet, press the OPEN/CLOSE key, and pull the slide base out forwards.
2. Place the GGF-021 test record on the turntable platter, press the manual key, and bring the tonearm into position.
3. Shade the record surface from strong illumination sources by using the record jacket or other suitable shade.
4. Position the tonearm for "locate out" operation (shift of the tonearm outwards) between the eighth and tenth tracks of the test record. Perform this step by using the STOP and START keys.
5. Connect an oscilloscope to observe the voltage differences between P2(+) and P3 (TP terminals) of CN8.
6. The waveforms shown in Fig. 9.5 should be obtained in the inter-track sections between tracks 8 and 9, and 10.
7. Adjust VR 2 and VR3 (see Fig. 9.4) to obtain a waveform peak-to-peak voltage of $2.6 \pm 0.2V_{p-p}$, and an average value in the sound track portion of $\pm 0.1V$.

**Fig. 9.5 Oscilloscope Waveform Display****Fig. 9.6 Band Sensor Gain Adjustment**

- * Switch the power off and pull the slide base out.

Fig. 9.7 Address Sensor Adjustment**9.6 ADDRESS SENSOR ADJUSTMENT**

Referring to the time charts described in the service manual (ARP-143), adjust as follows.

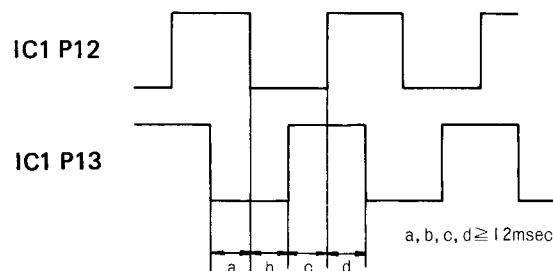
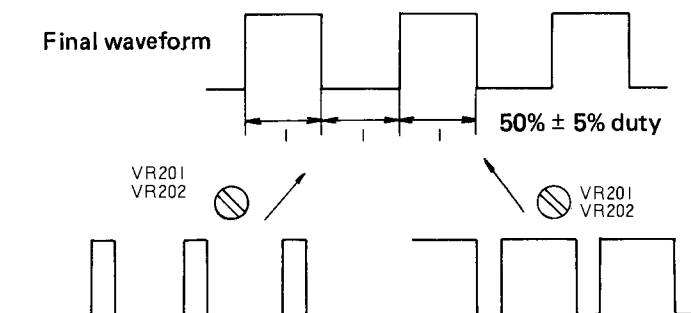
1. Remove the bonnet, press the OPEN/CLOSE key, and pull the slide base out forwards.
2. Place a record on the turntable platter, and press the START key for lead-in of the tonearm.
3. Use an oscilloscope to observe the waveforms of the voltage changes between P12(+) and GND (address A sensor), and between P13 (+) and GND (address B sensor) of IC1.
4. Adjust VR201 to obtain the waveform shown in Fig. 9.8, for address A sensor, and adjust VR202 to obtain the same kind of waveform for address B sensor.

Note:

To adjust VR201 and VR202, first switch the PL-88F power off, disconnect CN3, short P1 and P2, pull the slide base out by hand (to the position where the VR can be turned through the adjustment hole), and then switch the power back on.

Whenever the tonearm is to be moved, always use the operation keys. Do not move it by hand.

5. After the adjustment is completed, connect P12 and P13 of IC1 to a dual-display oscilloscope, and proceed with lead-in of the tonearm from the spindle to the outer edge (start operation or manual tonearm setting).

**Fig. 9.8 Oscilloscope Waveform****Fig. 9.9 Waveform Adjustment**

6. Check that the P13 waveform is ahead of the P12 as indicated in Fig. 9.8, and that a, b, c, and d in this diagram are all greater than 12msec. The tonearm must always move from the spindle towards the outer edge of the record. If it moves towards the center of the record, the P12 waveform should be ahead of the P13 waveform.

	Lead wire	IC1 pin	Adjustment control
Address A sensor	CN2 P16	P12	VR202
Address B sensor	CN2 P14	P13	VR201

9.7 HORIZONTAL DD CANCEL ADJUSTMENT

1. Remove the bonnet, press the START key, and switch the power off when the tonearm comes close to the lowering position for 30cm records. The tonearm remains elevated in this case.
2. Connect an oscillator to P9 and P10 in the socket side of the CN 2 connector, connect an oscilloscope to P11 and P12, and short P10 to P11.
3. Generate a 10Vp-p 450Hz sine wave signal in the oscillator, and check that a 450Hz sine wave signal is displayed in the oscilloscope.
4. Adjust VR203 to obtain a 120mVp-p ($\pm 10\text{mV}$) waveform signal in the oscilloscope.
5. Move the tonearm slowly by hand towards the center of the record. As the tonearm is moved towards the center from the 30cm lowering position, the waveform amplitude is gradually decreased, reaching a minimum at a point a little before the spindle. Moving the tonearm any further inwards results in the amplitude increasing again.
6. Set the tonearm in the position where minimum amplitude was achieved, and readjust VR203 to obtain an amplitude of less than 20mVp-p (approx). (See Fig. 9.11).

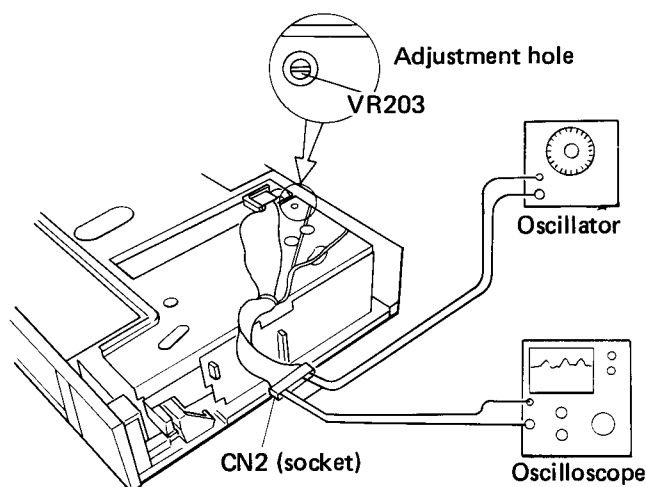


Fig. 9.10 Horizontal DD Cancel Adjustment

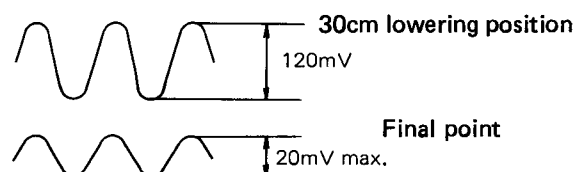


Fig. 9.11 Adjustment Waveform

9.8 STYLUS HEIGHT ADJUSTMENT

1. Remove the bonnet and 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 button to move the tonearm forward.
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. 9.12.
4. Adjust the stylus tip to a height 5 to 7mm above the record.

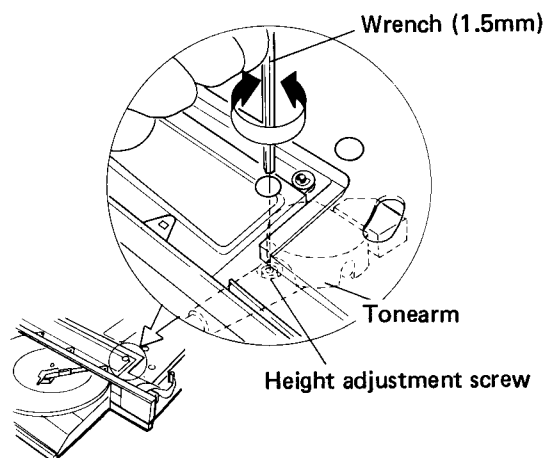


Fig. 9.12 Stylus Tip adjustment Screw

9.9 MOTOR OPERATION POINT ADJUSTMENT

1. Open the slide base as described in "Dummy Play Mode Setting", and run the motor at 33-1/3rpm.
2. Connect the buffer amplifier shown in Fig. 9.14 to the 3P connector from the motor base plate, and connect the output to a oscilloscope (making the lead wire length less than 10cm to reduce the effects of extraneous electrical noise).
3. With a waveform like that shown in Fig. 9.15 in the synchroscope, vary the gain to adjust the peak-to-peak distance in the sawtooth waveform to five divisions.
4. Then adjust VR1 to obtain an a:b ratio of 3:2 in Fig. 9.15 (taking every precaution to eliminate unwanted noise).
5. After completing the 33-1/3rpm adjustment, repeat the process for 45rpm. Always adjust the 33-1/3rpm speed before the 45rpm speed. And even if only the 33-1/3 rpm speed initially needs adjustment, also adjust the 45rpm speed after the 33-1/3rpm adjustment. Adjust VR2 for 45rpm. After completing the 45rpm adjustment, check the 33-1/3rpm speed.

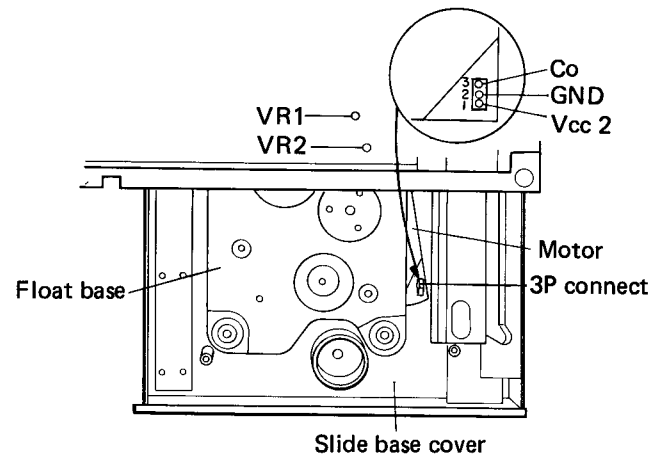


Fig. 9-13 Motor Operation Point Adjustment

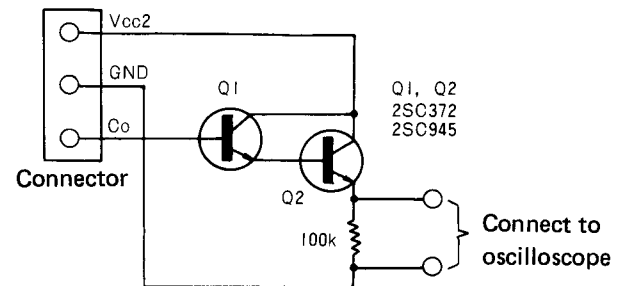


Fig. 9.14 Buffer Amplifier

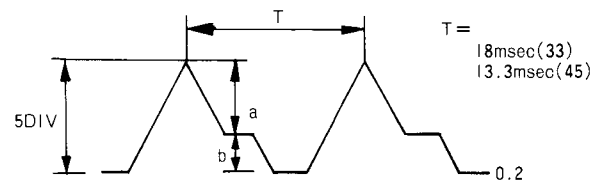


Fig. 9.15 Adjustment Waveform

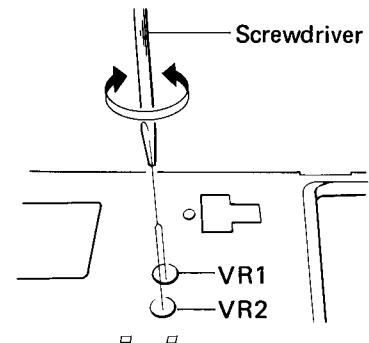
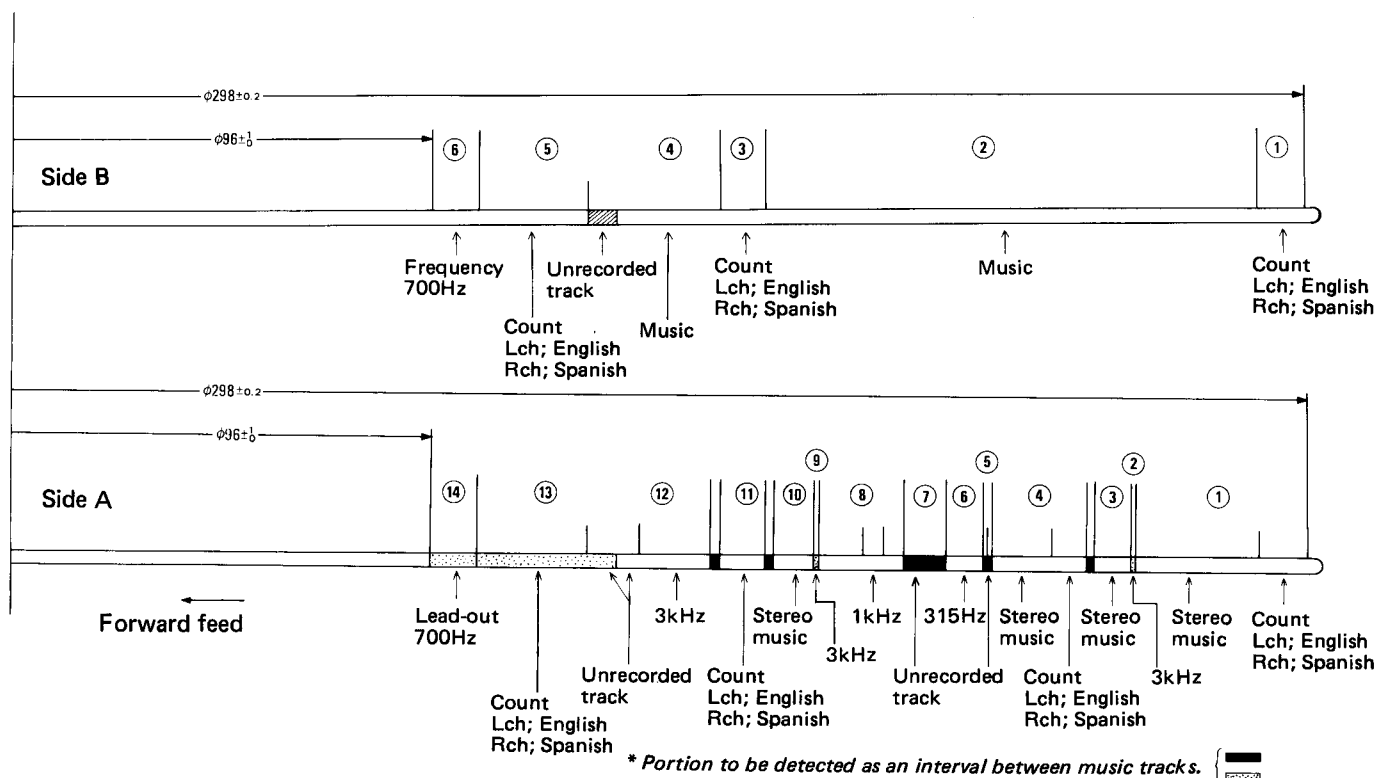


Fig. 9.16 Adjustment Point

9.10 TEST RECORDS (GGF-021)



RECORD CONTENTS (SIDE B)

Side	Band	Recording contents	Size (φmm)	Recording level (cm/sec)	Recording time (sec)	Pitch (mm)	Speed (rpm)	Remarks
Side B	1	30cm stylus lowering position count	298±0.2 ~ 287			0.1	33 1/3	Count 301~55 *
	2	Forward feed	287 ~ 173.3			4.0	33 1/3	Music (1)
	3	17cm stylus lowering position count	173.3±0.2 ~ 163			0.1	33 1/3	Count 171~50 *
	4	Forward feed	163 ~ 140			4.0	33 1/3	Music (2)
	5	Unrecorded track	140±0.2 ~ 133			1.0	45	
		Return count	133 ~ 107			1.0	45	Count 1~12 *
	6	Lead-out	107~96 ⁺¹ ₋₀			4.0	45	Frequency 700 Hz

* Lch; English
Rch; Spanish

RECORD CONTENTS (SIDE A)

Side	Band	Recording contents	Size (ϕ mm)	Recording level (cm/sec)	Recording time (sec)	Pitch (mm)	Speed (rpm)	Remarks
Side A	1	30cm stylus lowering position count	298 $\pm$ 0.2 ~ 287		99	0.1	33 1/3	Count 301 ~ 55 Lch; English Rch; Spanish
		Stereo music (1)	287 ~ 258.5				33 1/3	
	2	Frequency 3,000 Hz (horizontal)	258.5 $\pm$ 0.2 ~ 257.5 257.5 ~ 257.3			0.5 0.1	33 1/3	Turn the re- cording level to min. (one turn)
	3	Stereo music (2)	257.3 ~ 249				33 1/3	
	4	25cm stylus lowering position count	247.1 $\pm$ 0.2 ~ 239			0.1	33 1/3	Count 251 ~ 50 Lch; English Rch; Spanish
		Stereo music (3) ~ cocentricity	239 ~ 226				33 1/3	
	5	Unrecorded track (cocentricity)	225				33 1/3	
	6	Frequency 315 Hz (horizontal)	224 ~ 216	5.42		0.1	33 1/3	
	7	Unrecorded track (cocentricity)	216 ~ 206				33 1/3	
	8	Frequency 1,000 Hz (left channel)	206 ~ 201.2	3.54		0.1	33 1/3	
		Frequency 1,000 Hz (right channel)	201.2 ~ 196.4	3.54		0.1	33 1/3	
		Frequency 1,000 Hz (horizontal)	196.4 ~ 185.8	5.0		0.1	33 1/3	
	9	Frequency 3,000 Hz (horizontal)	185.8 $\pm$ 0.2 ~ 184.8 184.8 ~ 184.6			0.5 0.1	33 1/3	Turn the re- cording level to min. (one turn)
	10	Stereo music (4)	184.6 ~ 175.3				33 1/3	
	11	17cm stylus lowering position	173.3 $\pm$ 0.2 ~ 163			0.1	33 1/3	Count 171 ~ 50 Lch; English Rch; Spanish
	12	Frequency 3,000 Hz (horizontal)	161 ~ 145	5.0		0.1	33 1/3	
		Unrecorded track	145 ~ 140			0.1	33 1/3	
	13	Unrecorded track	140 $\pm$ 0.2 ~ 133			1.0	45	
		Return count	133 ~ 107			1.0	45	Count 1 ~ 12 *
	14	Lead-out	107 ~ 96 $^{+1}_{-0}$			4.0	45	Frequency 700 Hz

Note:

Sizes given in this list are general values (but limits must be observed where given).

The inner/outer circumference 0.5mm pitch for concentricity in band 5 must lie within ± 0.05 .

* Lch; English
Rch; Spanish

9. RÉGLAGE

Ajustement de Mode de Lecture Fictive

Le PL-88F peut être mis en mode de lecture fictive (en mode "loading out") de la manière suivante.

1. Enlever le capot et mettre en mode "loading out".
2. Couper le courant.
3. Débrancher la fiche CN3 sur le assemblée de contrôle et mettre un cavalier de l'ergot 1 à l'ergot 2.
4. Puis, mettre sous tension, mettant ainsi le tournedisques en mode de lecture.

Remarques:

1. Pour utiliser ce système (capot enlevé, mode "loading-out") dans les opérations de sélection de sillon et de réglage, s'assurer que la section de cartouche de bras de pick-up est protégé de toute lumière extérieure.
2. Pour vérifier les opérations relatives à l'adresse (y compris les opérations pendant la sélection de sillon et la lecture) ne pas manipuler le bras de pick-up à la main. Se servir des clés d'opération.
3. Ne pas toucher à la clé OPEN/CLOSE.
4. Toujours s'assurer que l'alimentation est coupée pour brancher ou débrancher les fiches.

Réglages

Différentes méthodes sont utilisées pour régler la position d'abaissement de l'aiguille pour le premier sillon ou pour les autres sillons dans les opérations automatiques de lecture du PL-88F. La position d'abaissement pour le premier sillon est réglée selon "Réglage de l'emplacement d'abaissement de l'aiguille", tandis que le réglage pour les autres sillons se fait selon "Réglage de l'emplacement d'abaissement de l'aiguille entre les pistes".

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

1. Presser la clé OPEN/CLOSE, tirer la base coulissante vers l'avant, mettre un disque sur le plateau et positionner le sélecteur de vitesse sur le nb. de tpm. correct.

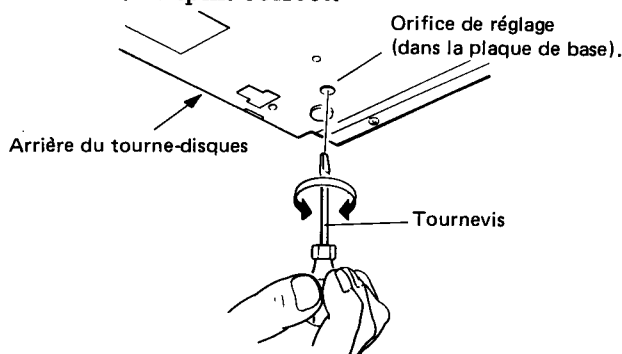


Fig. 9-1 Réglage de l'emplacement d'abaissement de l'aiguille

2. Presser la clé START pour commencer la lecture. 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 30 cm. 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 de 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 DE L'EMPLACEMENT D'ABAISSEMENT DE L'AIGUILLE ENTRE LES PISTES

Se servir de cette méthode de réglage lorsque l'aiguille ne descend pas correctement en position entre les pistes au cours d'une lecture de programme normal (lorsque le commutateur de sensibilité est en position NORMAL et qu'un disque ordinaire est utilisé.) Cette position devrait également être réglée après remplacement de l'aiguille.

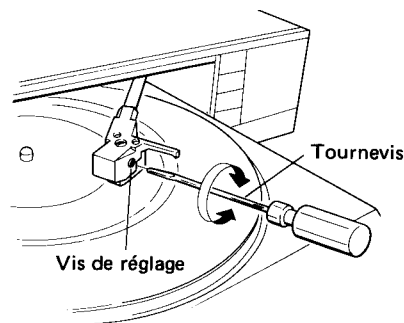


Fig. 9-2 Réglage de l'emplacement d'abaissement de l'aiguille entre les pistes

1. Presser la clé OPEN/CLOSE, tirer la base coulissante vers l'avant, placer un disque de 30cm sur le plateau et positionner le sélecteur de vitesse sur le nombre de tpm. correct.
2. Presser la clé START et continuer en mode de lecture de programme (à l'exclusion du premier sillon du programme). Estimer la direction et le degré de déplacement à ce moment.
3. Presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant. Puis presser la clé MANUAL et déplacer le bras de pick-up vers l'avant.
4. Selon le degré de déplacement, régler la vis de réglage dans la coquille de tête à l'aide d'un petit tournevis. (Voir Fig. 9-2)
 - Tourner la vis de réglage vers la droite si l'aiguille s'abaisse à l'extérieur des sillons programmés.
 - Tourner la vis de réglage vers la gauche si l'aiguille s'abaisse à l'intérieur des sillons programmés.
 - Un tour complet de la vis correspond à un déplacement de 0,2mm de la position d'abaissement.
5. Recommencer la lecture d'un programme (à l'exclusion des premiers sillons du programme), et vérifier que l'aiguilles s'abaisse correctement entre les pistes.
6. Lorsque le disque d'essai GGF-021 est utilisé, positionner le commutateur de sensibilité sur la position HIGH, puis régler la vis pour obtenir un signal de sortie de 1kHz pendant 3 ou 4 secondes, temps nécessaire pour que l'aiguille s'abaisse sur la deuxième piste du disque GGF-021.
7. Après avoir terminé le réglage, continuer la lecture du programme et vérifier que la sortie de 1kHz est bien obtenue pendant 3 ou 4 secondes pour les pistes qui suivent la première piste, et que 1kHz est également obtenu après la sixième piste.

Remarque:

Si une position d'abaissement ne pouvait pas être obtenue au moyen de cette méthode, ou si l'abaissement de l'aiguille n'est pas assuré, continuer au moyen du "Réglage d'écart DD horizontal" puis renouveler le réglage ci-dessus.

9.3 RÉGLAGE D'ÉCART DD HORIZONTAL

1. Enlever le capot, presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant.
2. Presser la clé manuelle de conduite du bras de pick-up, presser la clé d'élévation du bras de pick-up pour le mettre en position haute.
3. Brancher un voltmètre DC entre les coupleurs bossus JP 43 et JP 44 (Voir Fig. 9-3)

4. Régler VR1 pour obtenir une lecture de voltmètre DC de $\pm 50\text{mV}$ maximum.
5. Puis, presser la clé d'élévation de bras de pick-up et vérifier qu'il descend perpendiculairement.

9.4 RÉGLAGE D'ÉCART DE SONDE DE BANDE

1. Enlever le capot et les fils de plomb P1 et P2 indiqués dans la Fig. 9-4 (au moyen d'un fer à souder pour les détacher).
2. Au moyen d'un petit tournevis tourner VR2 et VR3 complètement vers la droite (en regardant du dessus).
3. Brancher un voltmètre DC entre P2 et P3 (bornes TP) de CN8, and régler VR4 pour obtenir une lecture maximum de $\pm 0,1\text{V}$.

Remarques:

- * VR2 et VR3 sont les réglages de contrôle du gain des sondes de bandes. Régler toujours le gain de la sonde de bandes après avoir terminé le réglage d'écart de sonde de bandes.
- * Resouder les fils de P1 et P2 dans leur position après avoir effectué le réglage de décalage de sonde de bande.

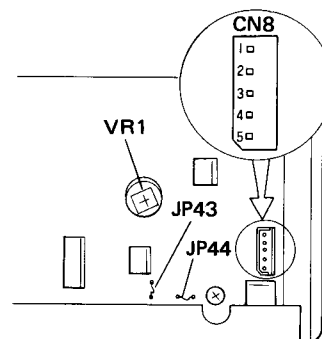


Fig. 9-3 Réglage d'écart DD horizontal

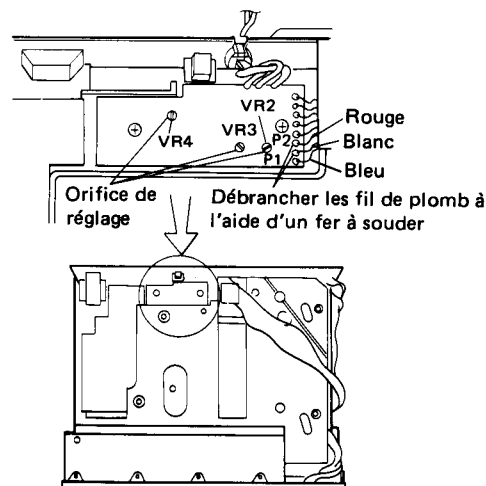


Fig. 9-4 Réglage d'écart de sonde de bande

9.5 RÉGLAGE DE GAIN DE SONDE DE BANDES

1. Enlever le capot, presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant.
2. Placer le disque d'essai GGF-021 sur le plateau, presser la clé MANUAL et mettre le bras de pick-up en position.
3. Empêcher toute forte illumination d'atteindre le disque en le protégeant au moyen de l'enveloppe du disque, par exemple.
4. Positionner le bras pour opération de recherche (déplacement du bras vers l'extérieur) entre les huitième et dixième pistes du disque d'essai. Arriver à ce résultat au moyen des clés STOP et START.
5. Brancher un oscilloscope pour observer les différences de voltage entre P2 (+) et P3 (bornes TP) de CN8.
6. La forme ondulatoire montrée dans la Fig. 9-5 doit être obtenue dans les sections entre les pistes 8 et 9, et 10.
7. Régler VR2 et VR3 (Voir Fig. 9-4) pour obtenir une forme ondulatoire avec un voltage de $2,6 \pm 0,2V$ de sommet à sommet, ainsi qu'une valeur moyenne de $\pm 0,1V$ dans les portions de pistes sonores.

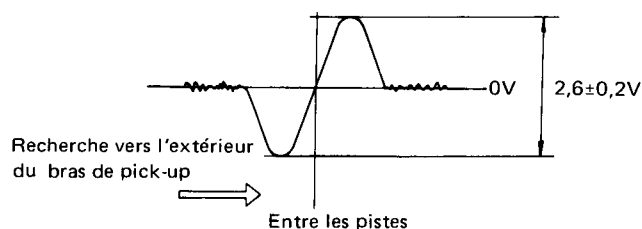


Fig. 9-5 Indication de forme ondulatoire de l'oscilloscope

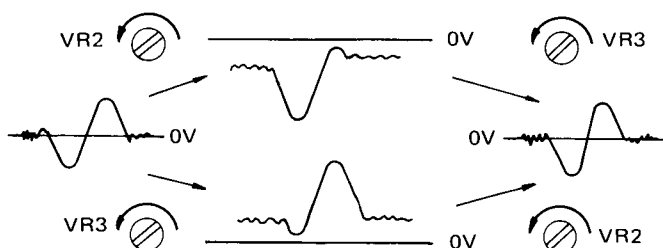


Fig. 9-6 Réglage de gain de sonde de bande

9.6 RÉGLAGE DE SONDE ADRESSÉE

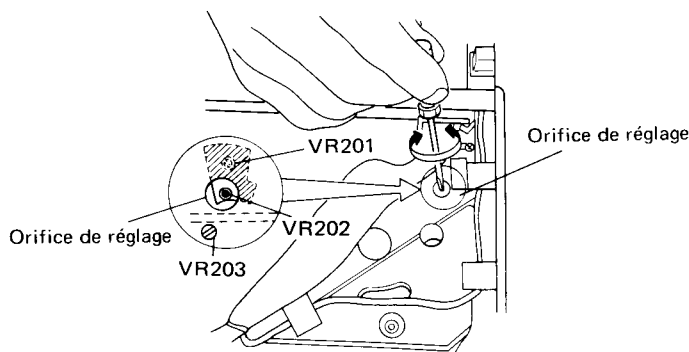
Tout en se référant au tableau du temps du manuel de service (ARP-143), régler de la façon décrite ci-dessous.

1. Enlever le capot, presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant.
2. Placer un disque sur le plateau et presser la clé START pour conduite du bras de pick-up.
3. Se servir d'un oscilloscope pour observer la forme ondulatoire des changements de voltage entre P12 (+) et GND (Sonde A adressée), et entre P13 (+) et GND (Sonde B adressée) de IC1.
4. Régler VR201 pour obtenir la forme ondulatoire montrée dans la Fig. 9-8 pour la sonde A adressée. Régler VR202 pour obtenir la même forme ondulatoire pour la sonde B adressée.

Remarque:

Pour régler VR201 et VR202, commencer par couper le courant du PL-88F, débrancher CN3, court-circuiter P1 et P2, tirer la base coulissante à la main (en une position telle que les VR puissent être tournés à travers les trous de réglage), puis remettre le courant.

Chaque fois que le bras de pick-up doit être déplacé, se servir des clés de commandes. Ne pas le déplacer à la main.



*Couper le courant et tirer la base coulissante au dehors.

Fig. 9-7 Réglage de sonde d'adresse

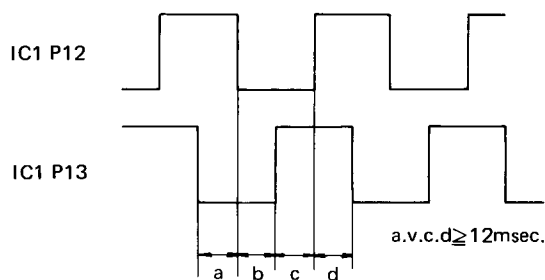


Fig. 9-8 Forme ondulatoire de l'oscilloscope

- Une fois le réglage terminé, brancher P12 et P13 de IC1 à un oscilloscope à double voyant et poursuivre la conduite du bras du pivot central vers l'extérieur (opération de départ ou positionnement manuel du bras de pick-up).
- Vérifier que la forme ondulatoire de P13 est en avant sur celle de P12 comme il est indiqué sur la Fig. 9-8, et que a, b, c et d du diagramme sont plus grands que 12 msec. Le bras de pick-up doit toujours se déplacer du pivot central vers l'extérieur du disque. S'il se déplace vers le centre du disque, la forme ondulatoire de P12 doit devancer celle de P13.

	Fil de plomb	Ergot IC1	Contrôle de réglage
Sonde A adressée	CN2 P16	P12	VR202
Sonde B adressée	CN2 P14	P13	VR201

9.7 RÉGLAGE D'ANNULEMENT DD HORIZONTAL

- Enlever le capot, presser la clé START et couper le courant lorsque le bras va s'abaisser pour un disque de 30cm. Le bras doit rester en position haute dans ce cas.
- Brancher un oscillateur sur P9 et P10 du côté prise de la borne CN2, brancher un oscilloscope sur P11 et P12, court-circuiter P10 et P11.
- Produire un signal ondulatoire sinusoïdal de 10Vp-p 450Hz, et s'assurer qu'un signal d'onde sinusoïdale de 450Hz apparaît sur l'oscilloscope.
- Régler VR203 pour obtenir un signal ondulatoire de 120mVp-p ($\pm 10\text{mV}$) sur l'oscilloscope.
- Déplacer doucement le bras de pick-up vers le centre. En même temps que le bras est déplacé à la main vers le centre en partant du point d'abaissement de 30cm, la forme ondulatoire est graduellement diminuée, atteignant un minimum à un point non loin du pivot central. Déplacer le bras plus loin vers l'intérieur fait accroître l'amplitude à nouveau.
- Positionner le bras à l'endroit de minimum d'amplitude et régler à nouveau VR203 pour obtenir une amplitude inférieure à 20mVp-p (approximativement). (Voir Fig. 9-11)

9.8 RÉGLAGE DE HAUTEUR DE L'AIGUILLE

- Enlever le capot et mettre sous tension. Presser la clé OPEN/CLOSE et tirer la base coulissante vers l'avant.
- 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.

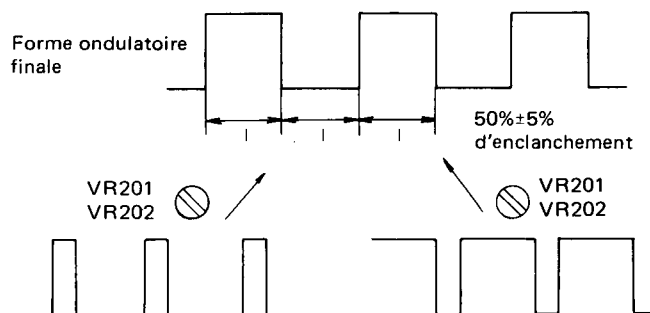


Fig. 9-9 Réglage de forme ondulatoire

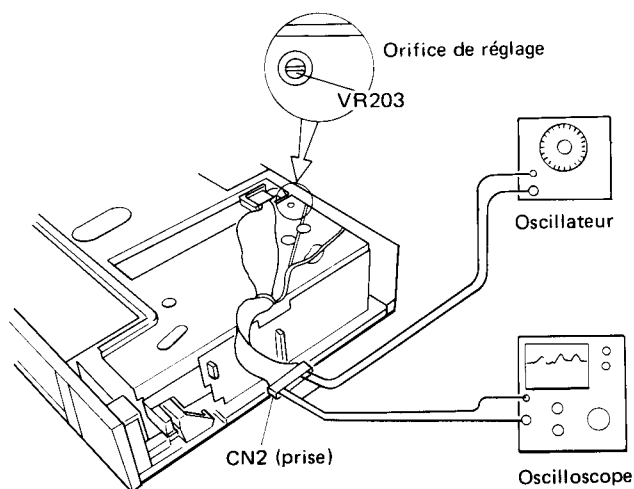


Fig. 9-10 Réglage d'annulement DD horizontal

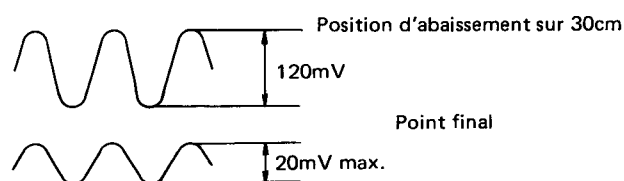


Fig. 9-11 Réglage de forme ondulatoire

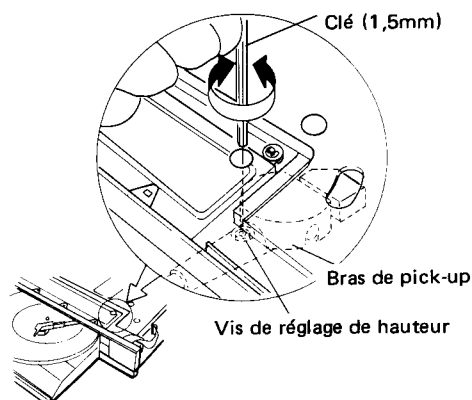


Fig. 9-12 Vis de réglage de bout d'aiguille

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 l'orifice de réglage comme indiqué Fig. 9-12.
4. Régler l'aiguille à une hauteur de 5 à 7mm au-dessus du disque.

9.9 RÉGLAGE DU POINT D'OPÉRATION DU MOTEUR

1. Ouvrir la base coulissante ainsi qu'il est décrit dans "AJUSTMENT DE MODE DE LECTURE FICTIVE" et faire tourner le moteur à 33-1/3 tpm.
2. Brancher l'amplificateur tampon montré en Fig. 9-14 sur la borne 3P à la base de la plaque de moteur, et brancher la borne 3P à la base de la plaque de moteur, et brancher la sortie à un oscilloscope (en limitant la longueur du fil de branchement à moins de 10cm pour réduire l'effet des bruits électriques extérieurs).
3. Avec une forme ondulatoire telle que celle de la Fig. 9-15 du synchroscope, changer le gain pour amener la distance sommet à sommet à 5 divisions.
4. Puis régler VR1 pour obtenir un rapport a:b de 3:2 dans la Fig. 9-15 (en prenant toute précaution pour éliminer les bruits indésirables).
5. Après avoir terminé le réglage pour 33-1/3 tpm, recommencer l'opération pour 45 tpm. Régler toujours 33-1/3 tpm avant 45 tpm. Et même si la vitesse 33-1/3 a seule besoin d'être réglée, régler également la vitesse de 45 tpm. Régler VR2 pour 45 tpm après avoir réglé la vitesse 45 tpm, vérifier la vitesse 33-1/3 tpm.

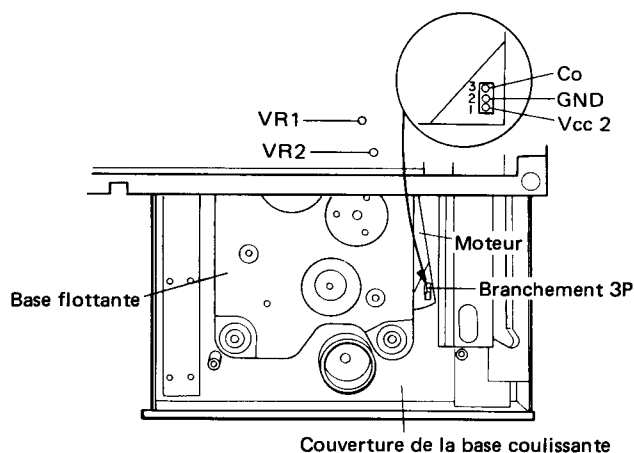


Fig. 9-13 Réglage du point d'opération du moteur

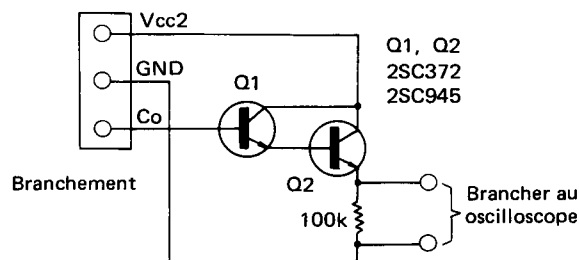


Fig. 9-14 Amplificateur tampon

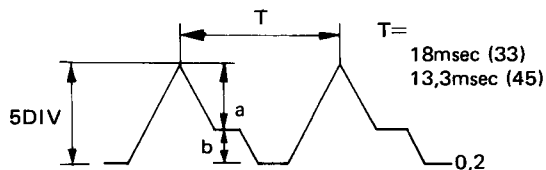


Fig. 9-15 Réglage de forme ondulatoire

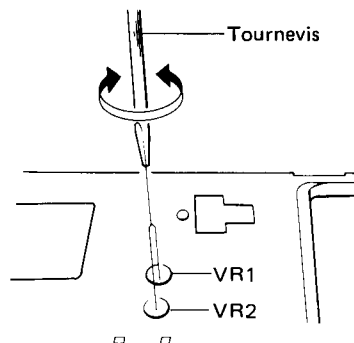
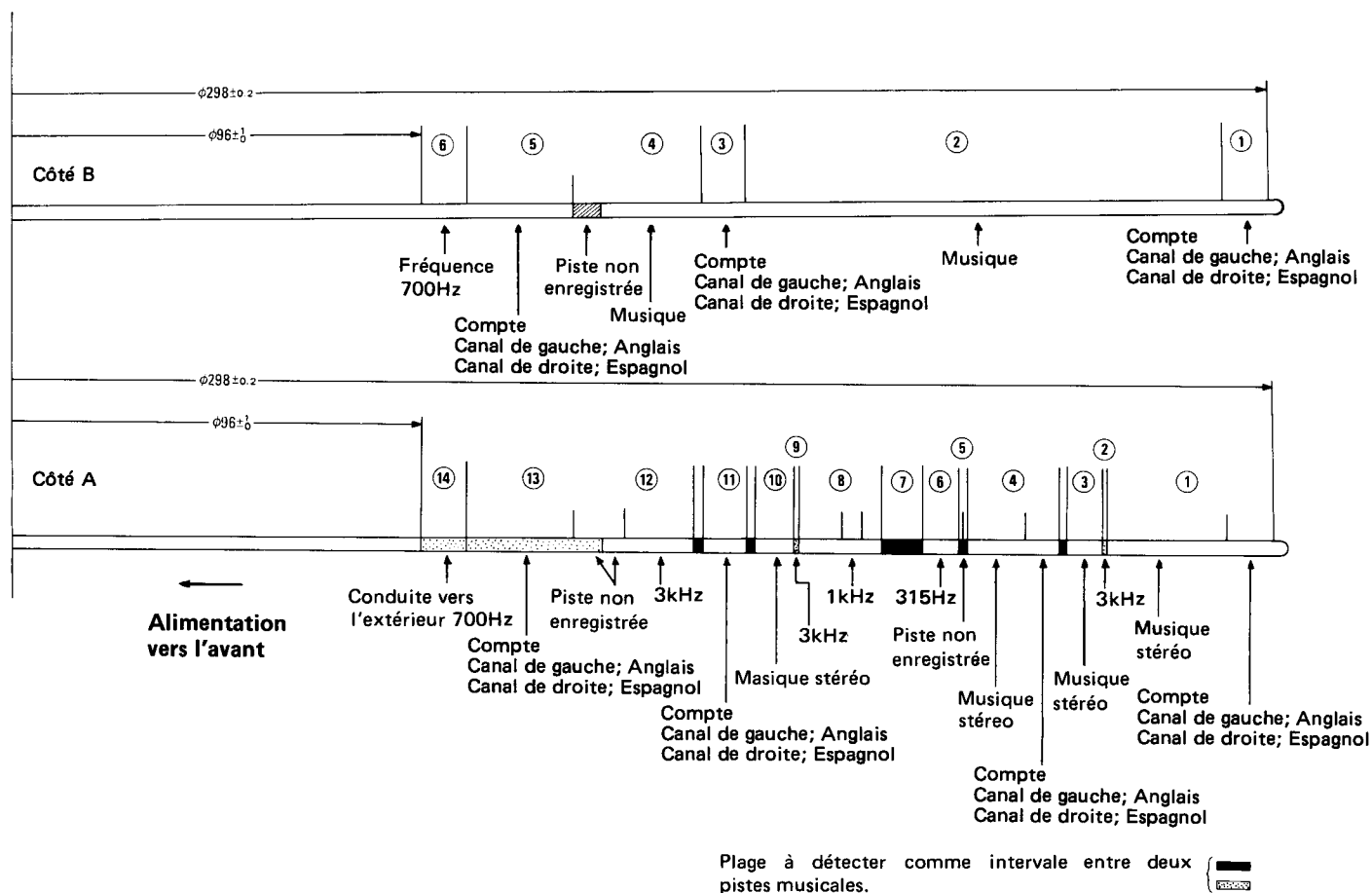


Fig. 9-16 Points de réglage

9.10 DISQUES D'ESSAI (GGF-021)



MÉTIERE DU DISQUE (Côté B)

Côté	Bande	Matière enregistrée	Dimension (ϕ mm)	Niveau d'enregistrement (cm/sec)	Temps d'enregistrement (sec)	Hauteur de son (mm)	Vitesse (tpm)	Remarques
Côté B	1	Compte de position d'abaissement de l'aiguille sur 30cm.	298 $\pm$ 0,5~287			0,1	33 1/3	Compte de 301 à 55 *
	2	Alimentation vers l'avant.	287~173,3			4,0	33 1/3	Musique (1)
	3	Compte de position d'abaissement de l'aiguille sur 17cm.	173,3 $\pm$ 0,2~163			0,1	33 1/3	Compte de 171 à 50 *
	4	Alimentation vers l'avant.	163~140			4,0	33 1/3	Musique (2)
	5	Piste non enregistrée.	140 $\pm$ 0,2~133			1,0	45	
		Compte de retour.	133~107			1,0	45	Compte de 1 à 12 *
	6	Conduite vers l'extérieur.	107~96 $^{+1}_{-0}$			4,0	45	Fréquence 700Hz

* Canal de gauche; Anglais
Canal de droite; Espagnol

METIÈRES DU DISQUE (Côté A)

Côté	Bande	Matière enregistrée	Dimension (φmm)	Niveau d'enregistrement (cm/sec)	Temps d'enregistrement (sec)	Hauteur de son (mm)	Vitesse (tpm)	Remarques
Côté A	1	Compte de position d'abaissement de l'aiguille à 30cm.	298±0,2~287		99	0,1	33 1/3	Compte de 301 à 55 Canal de gauche; Anglais Canal de droite; Espagnol
		Musique stéréo (1).	287~258,5				33 1/3	
	2	Fréquence 3,000Hz (horizontal).	258,5±0,2 ~257,5 257,5~257,3			0,5 0,1	33 1/3	Baisser le niveau d'enregistrement au minimum (1 tour).
	3	Musique stéréo (2).	257,3~249				33 1/3	
	4	Compte de position d'abaissement de l'aiguille à 25cm.	247,1±0,2~239			0,1	33 1/3	Compte de 251 à 50 Canal de gauche; Anglais Canal de droite; Espagnol
		Musique stéréo (3) ~concentricité.	239~226				33 1/3	
	5	Piste non enregistrée (concentricité).	225				33 1/3	
	6	Fréquence 315Hz (horizontal).	224~216	5,42		0,1	33 1/3	
	7	Piste non enregistrée (concentricité).	216~206				33 1/3	
	8	Fréquence 1,000Hz (canal de gauche).	206~201,2	3,54		0,1	33 1/3	
		Fréquence 1,000Hz (canal de droite).	201,2~196,4	3,54		0,1	33 1/3	
		Fréquence 1,000Hz (horizontal).	196,4~185,8	5,0		0,1	33 1/3	
	9	Fréquence 3,000Hz (horizontal).	185,8±0,2 ~184,8 184,8~184,6			0,5 0,1	33 1/3	Baisser le niveau d'enregistrement au minimum (1 tour).
	10	Musique stéréo (4).	184,6~175,3				33 1/3	
	11	Position d'abaissement de l'aiguille à 17cm.	173,3±0,2 ~163			0,1	33 1/3	Compte de 171 à 50 Canal de gauche; Anglais Canal de droite; Espagnol
	12	Fréquence 3,000Hz (horizontal).	161~145	5,0		0,1	33 1/3	
		Piste non enregistrée.	145~140			0,1	33 1/3	
	13	Piste non enregistrée.	140±0,2~133			1,0	45	
		Compte de retour.	133~107			1,0	45	Compte de * 1 à 12
	14	Conduite vers l'extérieur.	107~96 ⁺¹ ₋₀			4,0	45	Fréquence 700Hz

* Canal de gauche; Anglais
Canal de droite; Espagnol

Remarques:

Les mesures données dans cette liste sont des valeurs générales (mais les limites doivent être observées quand elles sont données.)

La circonférence intérieure-extérieure de 0,5mm niveau de son pour concentricité de la bande 5 doit se trouver dans ±0,05.

9. AJUSTE

Establecimiento del Modo Ficticio de Reproducción

Se puede establecer el modo ficticio de reproducción (en el modo de "disposición de colocación del disco") mediante el método siguiente.

1. Extraer la cubierta y establecer el modo de "disposición de colocación del disco".
2. Desconectar la alimentación.
3. Desconectar el conector CN3 del conjunto de control y cortocircuitar entre las patillas (1) y (2).
4. Después conectar la alimentación, poniendo el girael giradiscos en el modo de reproducción.

Nota:

1. Cuando se utilice este modo (cubierta sacada y disposición de colocación del disco) para operaciones de selección de pista y ajustes, asegurarse de que la sección de la cápsula del brazo fonocaptor está protegida contra la luz extraña.
2. Al comprobar las operaciones relativas a la dirección (que incluyan operaciones durante la selección de pista y reproducción), NO tocar con la mano el brazo fonocaptor. Cuando haya que utilizar el brazo fonocaptor, usar las teclas de operación.
3. NO utilizar la tecla abertura/cierre OPEN/CLOSE.
4. Asegurarse siempre de que la alimentación está desconectada cuando se conecten o desconecten los desconectores.

Ajustes

Se utilizan diferentes métodos para ajustar la posición de descenso de la aguja para pista 1 para las otras pistas para operación de reproducción automática del PL-88F. La posición de descenso para pista 1 se ajusta de acuerdo a "Ajuste de la Posición de Descenso de la Aguja", mientras que la posición de descenso para otras pistas se ajusta de acuerdo a "Ajuste de la Posición de Descenso de la Aguja entre Pistas".

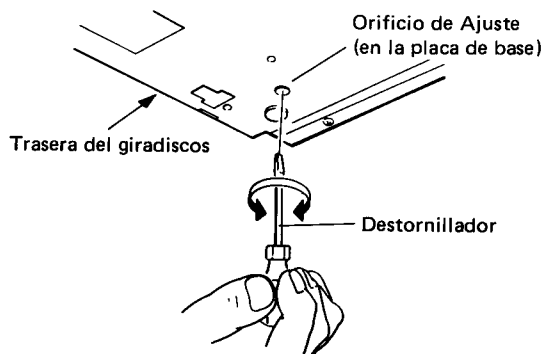


Fig. 9-1 Ajuste de la posición de descenso de la Aguja

9.1 AJUSTE DE LA POSICIÓN DE DESCENSO DE LA AGUJA

1. Presionar la tecla de abertura/cierre OPEN/CLOSE, tirar hacia afuera de la base deslizante, colocar un disco de 30cm sobre el plato y poner las rpm 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 hasta el 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 (visto desde arriba) si la aguja desciende hacia el exterior del surco inicial del disco.
 - * Girar el tornillo hacia la izquierda (visto 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 de 9mm en la posición de descenso.
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, ajustar a un valor comprendido entre 6 y 30 para un disco de 30cm.

Nota:

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

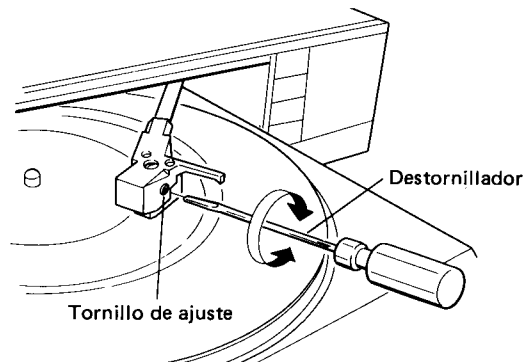


Fig 9-2 Ajuste de la Posición de Descenso de la Aguja entre Pistas

9.2 AJUSTE DE LA POSICIÓN DE DESCENSO DE LA AGUJA ENTRE PISTAS

Utilizar este método de ajuste cuando la aguja no desciende correctamente a la posición entre las pistas durante reproducción programada normal (cuando el conmutador de sensibilidad está en la posición normal NORM y se está utilizando un disco ordinario). Esta posición también se debe ajustar cada vez que se sustituya la aguja.

1. Presionar la tecla de apertura/cierre OPEN/CLOSE, tirar hacia afuera de la base deslizable, colocar un disco de 30cm sobre el plato y ajustar las rpm correctas mediante el selector de velocidad.
2. Presionar la tecla de inicio START y pasar al modo de reproducción programada (excluyendo la primera pista del programa). Estimar la dirección y el grado de desplazamiento al mismo tiempo en la posición de descenso.
3. Presionar la tecla de apertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizable. Después presionar la tecla de reproducción manual y mover el brazo fonocaptor hacia el disco.
4. Dependiendo del grado de desplazamiento, ajustar el tornillo de ajuste del casco de la cápsula (consultar Figura 9-2) con un pequeño destornillador.
 - Girar el tornillo de ajuste hacia la derecha si la aguja desciende en la pista hacia el exterior de la pista programada.
 - Girar el tornillo de ajuste hacia la izquierda si la aguja desciende hacia el interior de la pista programada.
 - Una vuelta completa del tornillo corresponde a un desplazamiento de 0,2mm en la posición de descenso.
5. Proceder otra vez con reproducción programada (excluyendo la pista primera del programa) y comprobar que la aguja desciende correctamente entre las pistas.
6. Al ajustarse con el disco de prueba GGF-021, poner el conmutador de sensibilidad en la posición alta HIGH y después ajustar el tornillo para obtener la señal de salida de 1kHz durante tres o cuatro segundos para pistas después de la pista primera y esa misma señal de 1kHz se obtiene también para pistas después de la pista sexta.
7. Después de sinalizar el ajuste, activar la reproducción programada y comprobar si se obtiene señal de salida de 1kHz durante tres o cuatro segundos en pistas posteriores a la primera y también, a la sexta.

Nota:

Si no se puede obtener la posición de descenso correcta mediante este método de ajuste, o si la posición de descenso de la aguja no es permanente, efectuar el "ajuste de equilibrio Horizontal DD".

9.3 AJUSTE DE EQUILIBRIO HORIZONTAL DD

1. Sacar la cubierta, presionar la tecla de apertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizable.
2. Presionar la tecla manual para llevar el brazo fonocaptor al disco y presionar la tecla de elevación del brazo para poner el brazo fonocaptor en la posición UP.
3. Conectar un voltímetro de CC entre los puentes salientes JP43 y JP44 (consultar Figura 9-3).
4. Ajustar VR1 para obtener una lectura en el medidor de $\pm 50\text{mV}$ máximos.
5. Después presionar la tecla de elevación del brazo para bajar el brazo fonocaptor y comprobar que el descenso del mismo es perpendicular.

9.4 AJUSTE DE EQUILIBRIO DEL SENSOR DE BANDA

1. Sacar la cubierta y los hilos conductores P1 y P2 indicados en la Figura 9-4 (utilizando un soldador para desconectar los conductores).
2. Utilizando un pequeño destornillador, girar VR2 y VR3 completamente hacia la derecha visto desde arriba.
3. Conectar un voltímetro de CC entre P2 y P3 (terminales de TP) de CN8 y ajustar VR4 para obtener una lectura en el medidor de $\pm 0,1\text{V}$ máximo.

Nota:

* VR2 y VR3 son los controles de ajuste de ganancia del sensor de banda. Ajustar siempre la ganancia del sensor de banda después de completar el ajuste de equilibrio del sensor de banda.

* Volver a soldar en la misma posición los hilos conductores P1 y P2 después de completar el ajuste de equilibrio del sensor de banda.

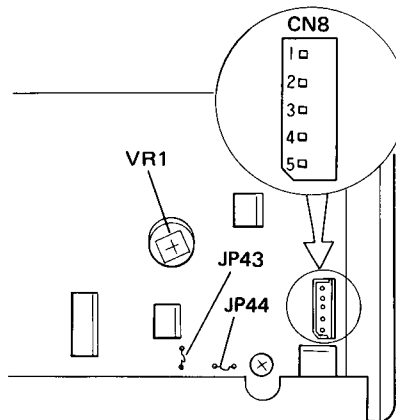


Fig. 9-3 Ajuste de Equilibrio Horizontal DD

9.5 AJUSTE DE GANANCIA DEL SENSOR DE BANDA

1. Sacar la cubierta, presionar la tecla de apertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizante.
2. Colocar el disco de prueba GGF-021 sobre el plato, presionar la tecla manual y poner en posición el brazo fonocaptor.
3. Proteger la superficie del disco contra fuentes de iluminación fuertes utilizando la funda del disco u otro protector adecuado.
4. Colocar el brazo fonocaptor para operación de "posicionado afuera" (desplazamiento hacia afuera del brazo fonocaptor) entre las pistas octava y décima del disco de prueba. Realizar este paso utilizando las teclas de parada STOP e inicio START.
5. Conectar un osciloscopio para observar las diferencias de tensión entre P2 (+) y P3 (terminales de TP) de CN8.
6. En las secciones entre pistas entre las pistas 8 y 9 y 10 se deben obtener las formas de onda mostradas en la Figura 9-5.
7. Ajustar VR2 y VR3 (consultar Figura 9-4) para obtener una tensión de pico a pico de forma de onda de $2,6 \pm 0,2V_{p-p}$ y un valor medio de la porción de pista de sonido de $\pm 0,1V$.

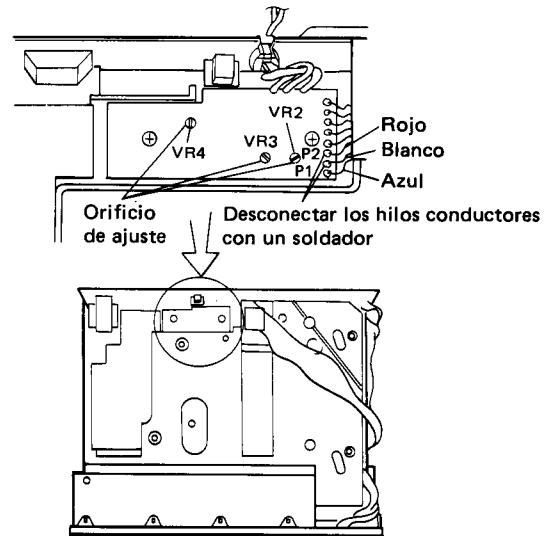


Fig. 9-4 Ajuste de Equilibrio del Sensor de Banda

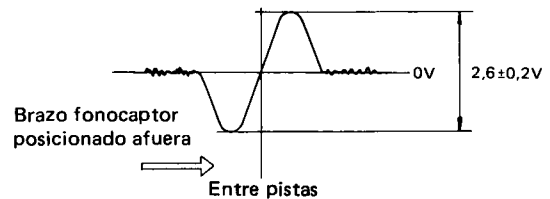


Fig. 9-5 Visualización de Forma de Onda de Osciloscopio

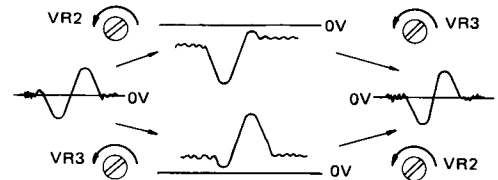


Fig. 9-6 Ajuste de Ganancia del Sensor de Banda

9.6 AJUSTE DEL SENSOR DE DIRECCIÓN

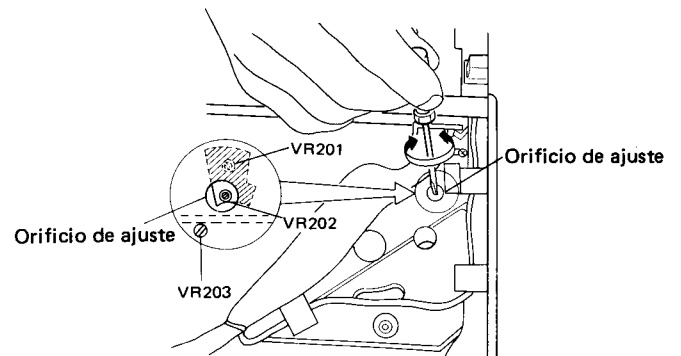
Refiriéndose a los gráficos de tiempo descritos en el manual de servicio (ARP-143), ajustar del modo siguiente.

1. Sacar la cubierta, presionar la tecla de apertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizante.
2. Colocar un disco sobre el plato y presionar la tecla de inicio START para llevar el brazo fonocaptor al disco.
3. Usar un osciloscopio para observar las formas de ondas de los cambios de tensión entre P12 (+) y GND (sensor A de dirección) y entre P13 (+) y GND (sensor B de dirección) de IC1.
4. Ajustar VR201 para obtener la forma de onda mostrada en la Figura 9-8 para sensor A de dirección y ajustar VR202 para obtener el mismo tipo de forma de onda para sensor B de dirección.

Nota:

Para ajustar VR201 y VR202 primero desconectar la alimentación de PL-88F, desconectar CN3, cortocircuitar P1 y P2, tirar con la mano hacia afuera de la base deslizante (hasta la posición donde se pueda girar el VR a través del orificio de ajuste) y después volver a conectar la alimentación.

Cuando quiera que se vaya a mover el brazo fonocaptor, usar siempre las teclas de operación. No moverlo con la mano.



* Desconectar la alimentación y tirar hacia afuera de la base deslizante.

Fig. 9-7 Ajuste del Sensor de Dirección

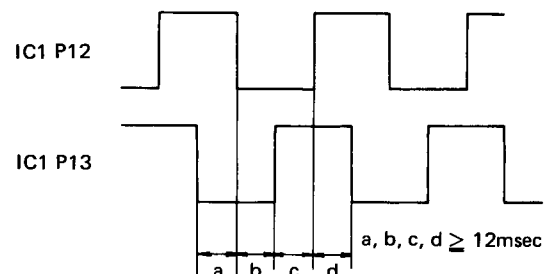


Fig. 9-8 Forma de Onda de Osciloscopio

5. Después de completar el ajuste, conectar P12 y P13 de IC1 a un osciloscopio de visualización doble y llevar el brazo fonocaptor al disco desde el eje central al borde exterior (operación de inicio o colocación del brazo fonocaptor manual).

6. Comprobar que la forma de onda P13 está delante de P12 tal como se indica en la Figura 9-8 y que a, b, c y d de este diagrama son todos de más de 12msec.

Se debe mover siempre el brazo fonocaptor desde el eje central hacia el borde exterior del disco. Si se mueve hacia el centro del disco, la forma de onda P12 debe estar delante de forma de onda P13.

	Hilo conductor	Patilla IC1	Control de ajuste
Senor A de dirección	CN2 P16	P12	VR202
Sensor B de dirección	CN2 P14	P13	VR201

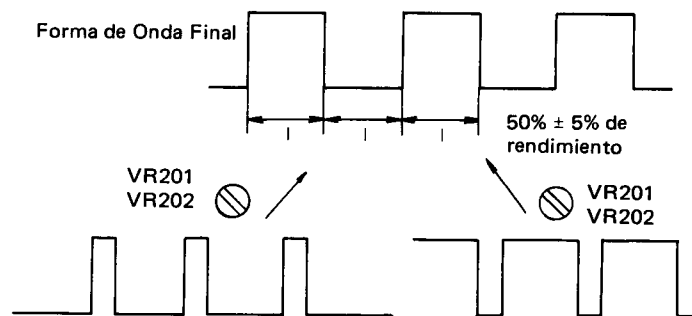


Fig. 9-9 Ajuste de Forma de Onda

9.7 AJUSTE DE ANULACIÓN HORIZONTAL DD

1. Sacar la cubierta, presionar la tecla de inicio START y desconectar la alimentación cuando el brazo fonocaptor se acerque a la posición de descenso de la aguja para discos de 30cm. En este caso el brazo fonocaptor permanece elevado.
2. Conectar un oscilador a P9 y P10 en el lado de enchufe del conector CN2, conectar un osciloscopio a P11 y P12 y cortocircuitar entre P10 y P11.
3. Generar una señal de onda sinusoidal de 10Vp-p 450Hz en el oscilador y comprobar que se visualiza en el osciloscopio una señal de onda sinusoidal de 450Hz.
4. Ajustar VR203 para obtener una señal de forma de onda de 120mVp-p ($\pm 10\text{mV}$) en el osciloscopio.
5. Mover suavemente con la mano el brazo fonocaptor hacia el centro del disco. Al moverse el brazo fonocaptor hacia el centro del disco desde los 30cm de posición de descenso, la amplitud de la forma de onda disminuye gradualmente, alcanzando un mínimo en un punto un poco antes del eje central. Al mover el brazo fonocaptor algo más hacia adentro resulta que vuelve a aumentar la amplitud.
6. Poner el brazo fonocaptor en la posición donde se alcanzaba una mínima amplitud y reajustar VR203 para obtener una amplitud de menos de 20mVp-p (aproximadamente). (Consultar Figura 9-11).

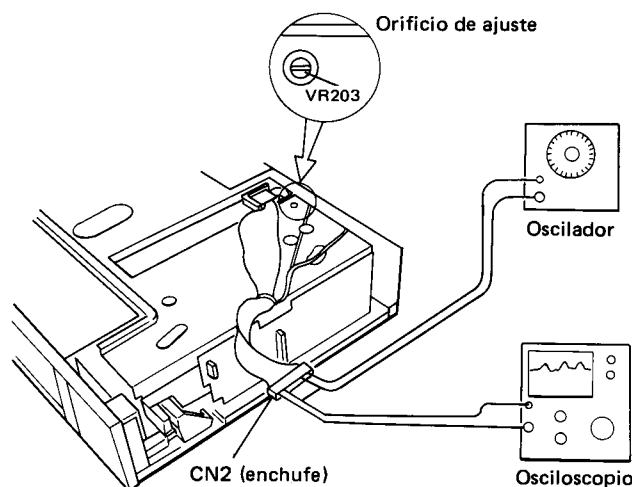


Fig. 9-10 Ajuste de Anulación Horizontal DD

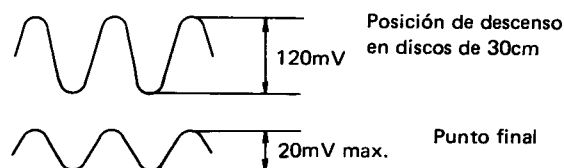


Fig. 9-11 Forma de Onda de Ajuste

9.8 AJUSTE DE LA ALTURA DE LA AGUJA

1. Sacar la cubierta y conectar la alimentación. Presionar la tecla de abertura/cierre OPEN/CLOSE y tirar hacia afuera de la base deslizante.
2. Colocar un disco sobre el plato y presionar la tecla manual MANUAL para mover hacia el disco el brazo fonocaptor.
3. A la vez que se sostiene con la mano izquierda el brazo fonocaptor, ajustar el tornillo de ajuste con una llave (1,5mm) pasándola a través del orificio de ajuste tal y como se muestra en la Figura 9-12.
4. Ajustar la punta de la aguja a una altura de 5 a 7mm sobre el disco.

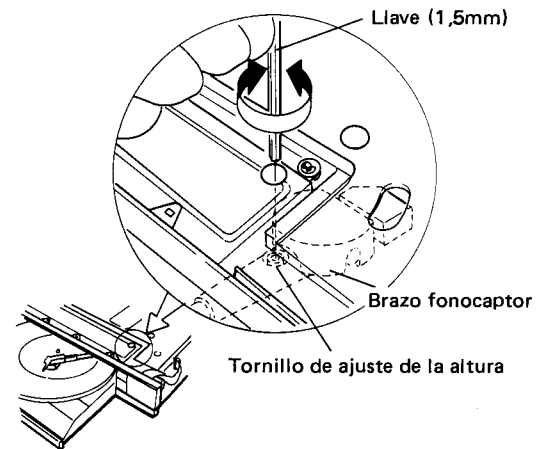


Fig. 9-12 Tornillo de Ajuste de la Punta de la Aguja

9.9 AJUSTE DEL PUNTO DE FUNCIONAMIENTO DEL MOTOR

1. Sacar la base deslizante como se describe en "Establecimiento del Modo Ficticio de Reproducción" y poner el motor en 33-1/3 rpm.
2. Conectar el amplificador separador mostrador en la Figura 9-14 al conector 3P desde la placa de base del motor y conectar la salida a un osciloscopio (reduciendo la longitud del hilo conductor a menos de 10cm para reducir los efectos de ruidos eléctricos extraños).
3. Con una forma de onda como la que se muestra en la Figura 9-15 en el sincroscopio, variar la ganancia para ajustar la distancia de pico a pico a cinco divisiones en la forma de onda de dientes de sierra.
4. Después ajustar VR1 para obtener una relación a:b de 3:2 en la Figura 9-15 (tomando todas las precauciones para eliminar ruido no deseado).
5. Después de completar el ajuste de 33-1/3 rpm, repetir el proceso para 45 rpm. Ajustar siempre la velocidad de 33-1/3 rpm antes de la de 45 rpm. Y aun cuando sólo se necesite ajustar inicialmente la velocidad de 33-1/3 rpm, ajustar también la de 45 rpm después de haber ajustado la de 33-1/3 rpm. Ajustar VR2 para 45 rpm una vez completado el ajuste de 45 rpm, comprobar la velocidad de 33-1/3.

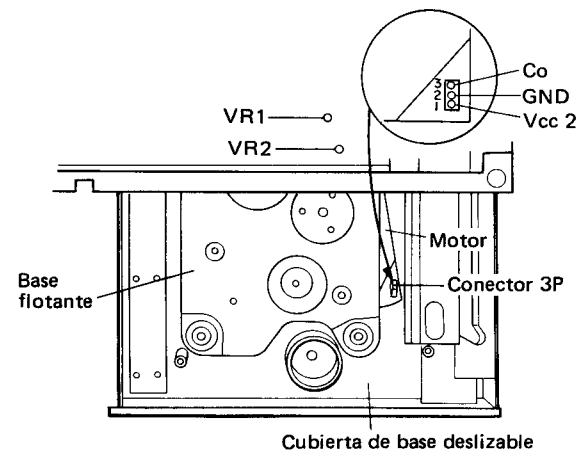


Fig. 9-13 Ajuste del Punto de Funcionamiento del Motor

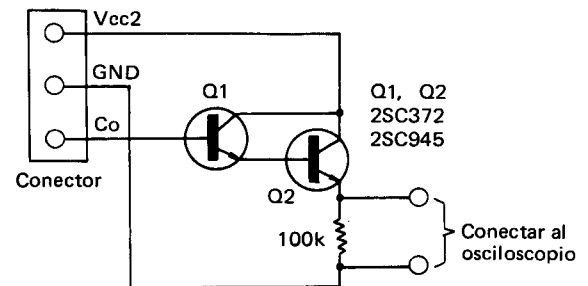


Fig. 9-14 Amplificador separador

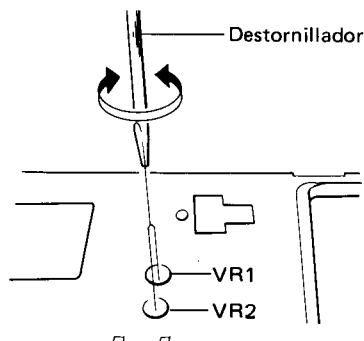


Fig. 9-16 Puntos de ajuste

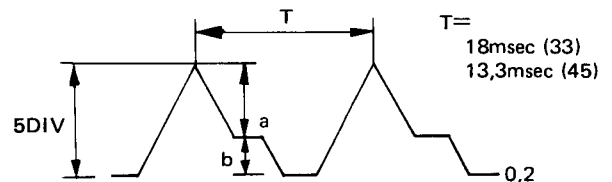
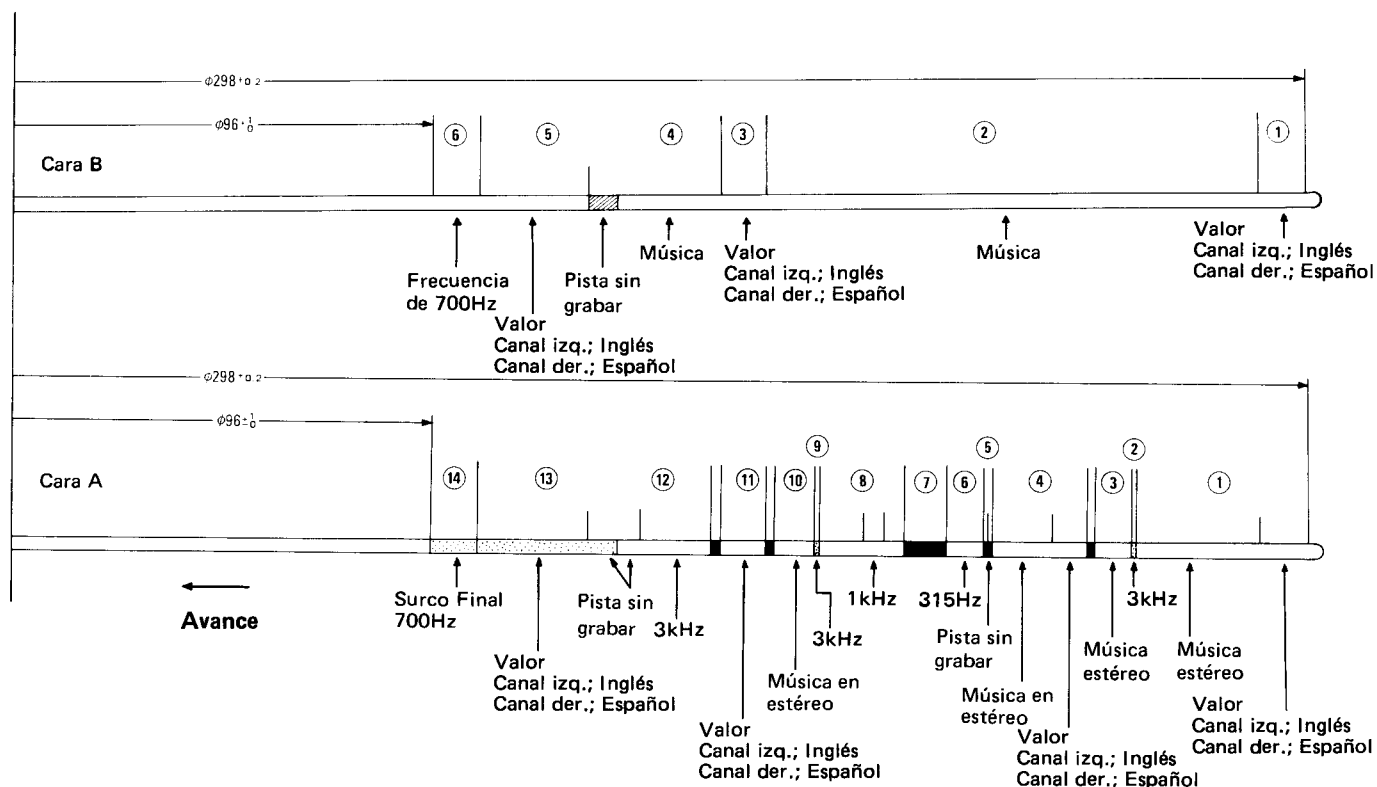


Fig. 9-15 Forma de Onda de Ajuste

9.10 DISCOS DE PRUEBA (GGF-021)



Parte a detectarse como intervalo entre canciones.

CONTENIDO DEL DISCO (CARA B)

Cara	Banda	Contenido grabado	Tamaño (φmm)	Nivel de grabación (cm/segundos)	Tiempo de grabación (segundos)	Paso (mm)	Velocidad (rpm)	Observaciones
Cara B	1	Valor de posición de descenso de la aguja en discos de 30cm.	298±0,5~287			0,1	33 1/3	Valor 301~55*
	2	Avance.	287~173,3			4,0	33 1/3	Música (1)
	3	Valor de posición de descenso de la aguja en discos de 17cm.	173,3±0,2~163			0,1	33 1/3	Valor 171~50*
	4	Avance.	163~140			4,0	33 1/3	Música (2)
	5	Pista sin grabar.	140±0,2~133			1,0	45	
		Valor de retorno.	133~107			1,0	45	Valor 1~12*
	6	Surco Final.	107~96 ⁺¹ ₋₀			4,0	45	Frecuencia de 700Hz

* Canal izq.; Inglés Canal der.; Español

CONTENIDO DEL DISCO (CARA A)

Cara	Banda	Contenido grabado	Tamaño (φmm)	Nivel de grabación (cm/segundos)	Tiempo de grabación (segundos)	Paso (mm)	Velocidad (rpm)	Observaciones
Cara A	1	Valor de posición de descenso de la aguja en discos de 30cm.	298±0,2~287		99	0,1	33 1/3	Valor 301 ~ 55 Canal izq.; Inglés Canal der.; Español
		Música en estéreo (1).	287~258,5				33 1/3	
	2	Frecuencia de 3,000Hz (horizontal).	258,5±0,2 ~257,5 257,5~257,3			0,5 0,1	33 1/3	Girar el nivel de grabación a la posición mínima (MIN) (1 vuelta).
	3	Música en estéreo (2).	257,3~249				33 1/3	
	4	Valor de posición de descenso de la aguja en discos de 25cm.	247,1±0,2 ~239			0,1	33 1/3	Valor 251 ~ 50 Canal izq.; Inglés Canal der.; Español
		Música en estéreo (3)~concentricidad.	239~226				33 1/3	
	5	Pista sin grabar (concentricidad).	225				33 1/3	
	6	Frecuencia de 315Hz (horizontal).	224~216	5,42		0,1	33 1/3	
	7	Pista sin grabar (concentricidad).	216~206				33 1/3	
	8	Frecuencia de 1,000Hz (canal izq.)	206~201,2	3,54		0,1	33 1/3	
		Frecuencia de 1,000Hz (canal der.)	201,2~196,4	3,54		0,1	33 1/3	
		Frecuencia de 1,000Hz (horizontal).	196,4~185,8	5,0		0,1	33 1/3	
	9	Frecuencia de 3,000Hz (horizontal).	185,8±0,2 ~184,8 184,8~184,6			0,5 0,1	33 1/3	Girar el nivel de grabación a la posición mínima (MIN) (1 vuelta).
	10	Música en estéreo (4).	184,6~175,3				33 1/3	
	11	Posición de descenso de la aguja en discos de 17cm.	173,3±0,2 ~163			0,1	33 1/3	Valor 171 ~ 50 Canal izq.; Inglés Canal der.; Español
	12	Frecuencia de 3,000Hz (horizontal).	161~145	5,0		0,1	33 1/3	
		Pista sin grabar.	145~140			0,1	33 1/3	
	13	Pista sin grabar.	140±0,2 ~133			1,0	45	
		Valor de retorno.	133~107			1,0	45	Valor 1~12 *
	14	Surco Final.	107~96 ⁺¹ ₀			4,0	45	Frecuencia de 700Hz

* Canal izq.; Inglés
Canal der.; Español

Nota:

Los tamaños que se dan en esta lista son valores generales (pero se deben tener en cuenta los límites donde se den).
El paso de 0,5mm de circunferencia interior/exterior para concentricidad en banda 5 debe caer dentro de ±0,05.



Service Manual

PL-88F

1.1 HE TYPE

Drive System	Direct-drive
Motor	Quartz PLL Hall motor
Turntable Platter	280 mm diam. aluminum alloy die-cast
Speeds	33-1/3 and 45 rpm
Wow and Flutter	Less than *0.012% (WRMS)
	0.025% (WRMS)
	±0.035% WTD Peak (DIN)

Signal-to-Noise-Ratio .....	More than 78 dB (DIN-B)
	(with Pioneer cartridge model PC-41MC)

Type	Static-balance type, Straight pipe arm
Effective Arm Length	208 mm
Overhang	20.2 mm

Type	Moving coil type
Stylus	0.3 × 0.7 mil diamond (PN-41MC)
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 35,000 Hz
Recommended Load	50 kΩ

Auto lead-in, auto return, auto cut, repeat
Arm elevation, program search play
Index play, manual play, manual location
Skip, auto disc size selector
Deck synchro, record detection
Built-in anti-skating

Power Requirements AC220/240 V ~ (switchable),
50, 60 Hz

Power Consumption 21 W
Dimensions 420 (W) x 98 (H) x 335 (D) mm
 16-1/2 (W) x 3-3/4 (H) x 13-1/4 (D) in.

Weight 10.3 kg/22 lb 11 oz

EP Adaptor	1
Deck synchro cord	1
Operating Instructions	1

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

1.2 HB, S, S/G TYPES

Motor and Turntable

Drive System	Direct-drive
Motor	Quartz PLL Hall motor
Turntable Platter	280 mm diam. aluminum alloy die-cast
Speeds	33-1/3 and 45 rpm
Wow and Flutter	Less than *0.012% (WRMS)
	0.025% (WRMS)
	±0.035% WTD Peak (DIN)

Values marked with an “*” designate the wow and flutter for motor, and do not include the cartridge or tonearm load.

Signal-to-Noise-Ratio	More than 78 dB (DIN-B)
	(with Pioneer cartridge model PC-41MC)

Tonearm

Type	Static-balance type, Straight pipe arm
Effective Arm Length	208 mm
Overhang	20.2 mm

PC-41MC Specifications

Type	Moving coil type
Stylus	0.3 × 0.7 mil diamond (PN-41MC)
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 35,000 Hz
Recommended Load	50 kΩ

Accessory mechanisms

Auto lead-in, auto return, auto cut, repeat
Arm elevation, program search play
Index play, manual play, manual location
Skip, auto disc size selector
Deck synchro, record detection
Built-in anti-skating

Miscellaneous

Power Requirements	
HB model	AC 220/240 V ~ (switchable), 50, 60 Hz
S, S/G models	AC 110/120/220/240 V ~ (switchable), 50, 60 Hz
Power Consumption	21W

Accessories

EP Adaptor	1
Deck synchro cord	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 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.

Mark	Symbol & Description	Part No.					
		KU type	KC type	HE Type	HB Type	S Type	S/G Type
	Control assembly	XWM-134	XWM-098	XWM-098	XWM-098	XWM-098	XWM-098
	Jack assembly	XWX-125	XWX-102	XWM-102	XWM-102	XWM-102	XWM-102
	Regulator IC assembly A	XWX-129	XWX-094	XWX-094	XWX-094	XWX-094	XWX-094
	Regulator IC assembly B	XWX-130	XWX-095	XWX-095	XWX-095	XWX-095	XWX-095
	PU assembly	XWX-126	XWX-101	XWX-101	XWX-101	XWX-101	XWX-101
Δ	Power supply assembly	XWR-040	XWR-022	XWR-031	XWR-031	XWR-022	XWR-022
$\Delta \star\star$	Microswitch	PSF-018	PSF-018	PSF-020	PSF-020	PSF-020	PSF-020
	Tonearm assembly	PPD-636	PPD-636	PPD-636	PPD-636	PPD-636	PPD-636
	Wire holder	PED-507	PED-507	.....	.....	.....	.....
$\Delta \star$	Power transformer assembly (120V)	PTX-032	PTX-032	.....	.....	.....	.....
$\Delta \star$	Power transformer assembly (220V, 240V)	.....	.....	PTX-030	PTX-030	.....	.....
$\Delta \star$	Power transformer assembly (110V, 120V, 220V, 240V)	.....	.....	.....	.....	PTX-031	PTX-031
Δ	Power cord assembly	PDF-178	PDF-178	PDF-170	PDF-171	PDF-147	PDF-147
	PU cord assembly	PDX-016	PDX-015	PDX-015	PDX-015	PDX-015	PDX-015
	Connector assembly (2P)	PDE-151	PDE-151	PDE-198	PDE-198	PDE-151	PDE-151
	PU lead wire	PDA-022	PDA-022	PDA-022	PDA-022	PDA-022	PDA-022
	PU lead wire	PDA-023	PDA-023	PDA-023	PDA-023	PDA-023	PDA-023
$\Delta \star\star$	Line voltage selector	.....	.....	PSB-002	PSB-002	PSB-007	PSB-007
	Operating instructions	PRB-220	PRB-223	PRD-084	PRB-221	PRB-221	PRB-221
	Packing case	PHH-016	PHH-017	PHH-015	PHH-015	PHH-015	PHH-019
	Note paper	.....	.....	PRW-095	PRW-095	PRW-095	PRW-095
	Cover	PNY-026	PNX-441	PNX-441	PNX-441	PNX-441	PNX-441
	Damper rubber (C)	PEB-234	.....	.....	.....	.....	.....
	Damper rubber (A)	.....	PEB-212	PEB-212	PEB-212	PEB-212	PEB-212
	Damper rubber (D)	PEB-235	.....	.....	.....	.....	.....
	Damper rubber (B)	.....	PEB-213	PEB-213	PEB-213	PEB-213	PEB-213

* Jack assembly (XWX-125) $\rightarrow$ Jack assembly (XWX-102)

Regulator IC assembly A (XWX-129) $\rightarrow$ Regulator IC assembly A (XWX-094)

Regulator IC assembly B (XWX-130) $\rightarrow$ Regulator IC assembly B (XWX-095)

Three assemblies are mentioned above have different numbers, however, the component parts are same.

3. ELECTRICAL PARTS LIST

3.1 POWER SUPPLY ASSEMBLY (XWR-022)

CAPACITORS

Mark	Part No.	Symbol & Description
Δ	PCL-040	C101
	CEA 471M 50L	C102
	CEA 471M 25L	C103
	CEA 1R0M 50L	C104, C105
	CKDYF 104Z 50	C106
	CKDYF 103Z 50	C107
	CEA 100M 25L	C108

SEMICONDUCTORS, RESISTORS

Mark	Part No.	Symbol & Description
$\star\star$	BA6019	IC103
$\star$	WL02	D101, D102
	RS2PFB 181J	R101

OTHERS

Mark	Part No.	Symbol & Description
	PEL-051	Lamp
	PNY-009	Lamp holder
	PDE-188	Connector assembly (3P)
	PDE-189	Connector assembly (4P)

3.2 PU ASSEMBLY (XWX-101)**CAPACITORS**

Mark	Part No.	Symbol & Description
	CEA 470M 25L	C14
	CKDYF 102Z 50	C15, C16

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-074	VR2, VR3 Semi-fixed 68k
★	PCP-012	VR4 Semi-fixed 10k
	RD%VM 562J	R72
	RD%PM □□□J	R61-R68, R70, R71

SEMICONDUCTOR, OTHERS

Mark	Part No.	Symbol & Description
★★	NJM072D	IC8
★★	PSR-004	Relay
	PDF-165	GND wire

3.3 POWER SUPPLY ASSEMBLY (XWR-031)**CAPACITORS**

Mark	Part No.	Symbol & Description
⚠	PCL-041	C101
	CEA 471M 50L	C102
	CEA 471M 25L	C103
	CEA 100M 25L	C108
	CEA 1R0M 50L	C104, C105
	CKDYF 103Z 50	C107
	CKDYF 104Z 50	C106

RESISTOR

Mark	Part No.	Symbol & Description
	RS2PF 181J	R101

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	BA6109	IC103
★	WL02	D101, D102

LAMP, FUSE, OTHER

Mark	Part No.	Symbol & Description
★★	PEL-051	Lamp
⚠ ★★	PEA-044	Fuse 1A
⚠ ★★	PEK-037	Fuse 500mA
	PNY-009	Lamp holder
	PDE-188	Connector assembly (3P)
	PDE-189	Connector assembly (4P)

3.4 CONTROL ASSEMBLY (XWM-098)**CAPACITORS**

Mark	Part No.	Symbol & Description
	CEA 100M 16L	C1
	CEA 100M 25L	C9
	CEA 220M 10L	C2
	CEA R47M 50 NP	C13
	CEA R47M 50L	C4
	CEA 2R2M 50NP	C11
	CKDYF 153Z 50	C6
	CKDYF 333Z 50	C5
	CQMA 223K 50	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-072	VR1 Semi-fixed 47k
	RGSD 8X472J	R58
	RGSD 4X472J	R57
	RGSD 4X333J	R56
	RD%PM □□□J	R1-R4, R6-R13, R15-R21, R23-R32, R34-R55, R59, R81-R84

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PD6013	IC1
★★	NJM2901N	IC2
★★	NJM4558D (μPC4558C)	IC3, IC6
★★	MB84066B (TC4066BP)	IC4
★★	NJM4556D	IC5
★★	M53207P	IC7
★★	2SC1815 (2SC2458)	Q1
★★	2SC2458 (2SC1815)	Q2, Q3, Q5, Q6, Q8
★★	2SC1959	Q4
★★	2SA1048 (2SA1015)	Q7
★	1S2473 (1S1555)	D1-D6
★	DAN201F	D7, D8
★	RD3.6EB	D10
★	KMFC1001T	OSC

OTHER

Mark	Part No.	Symbol & Description
	LAL03KH220K	L1, L2

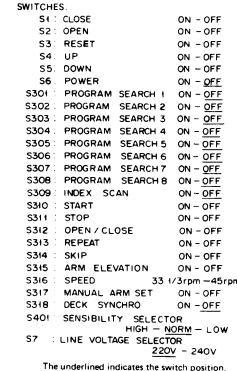
A

B

C

D

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



MOTOR CONTROL Assy

PWM-122

JACK Assy WXX-102

DECK SYNCHRO

NO REST
VCC
OHC
S3 RESET PSH-DOF
54 UP PSH-DOH
NCUPI
NO DOWN
SS DOWN PSH-DOH
IC

OPERATION 4V

TONE ARM MOTOR
PXM-118

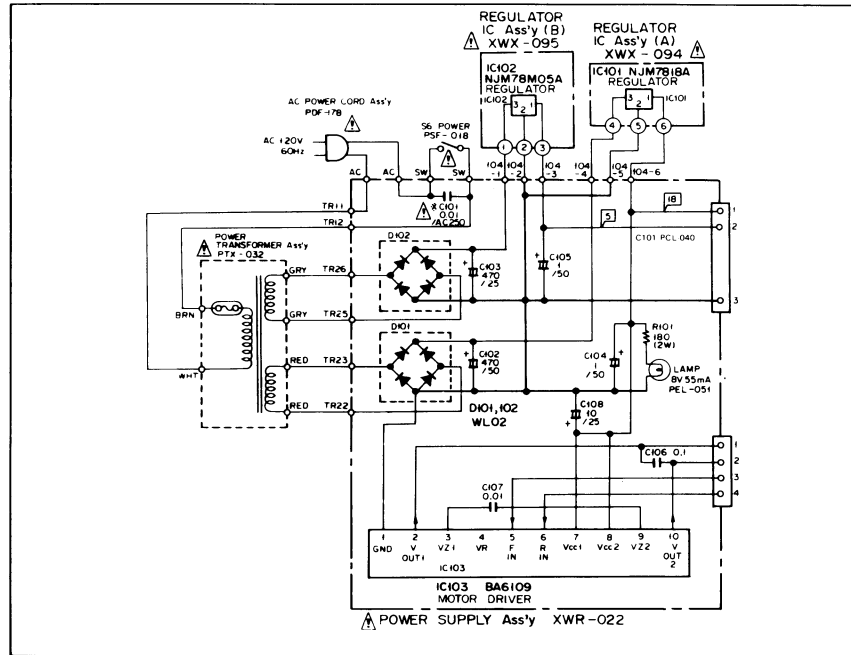
VR201, 202 END SENSER ADJ PCP-055
VR203 CANCEL LEVEL ADJ PCP-073

BA6208 DRIVER
MB840698 SHAPING

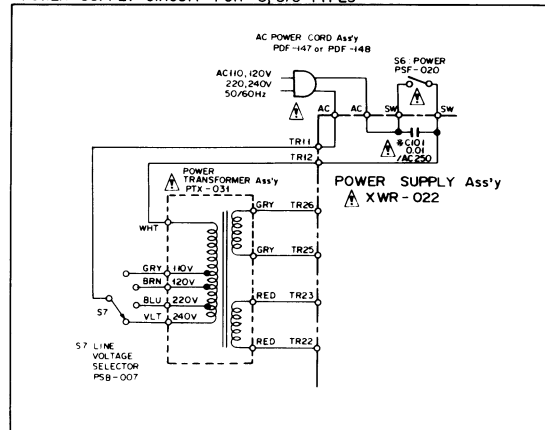
WXX-OB5

IC3 OSC/DIVIDER
C2 0.01
VDD V5
X1 15
X2 F 10
X3 14
X4 12
X5 13
X6 12
X7 13
X8 12
X9 13
X10 12
X11 13
X12 12
X13 13
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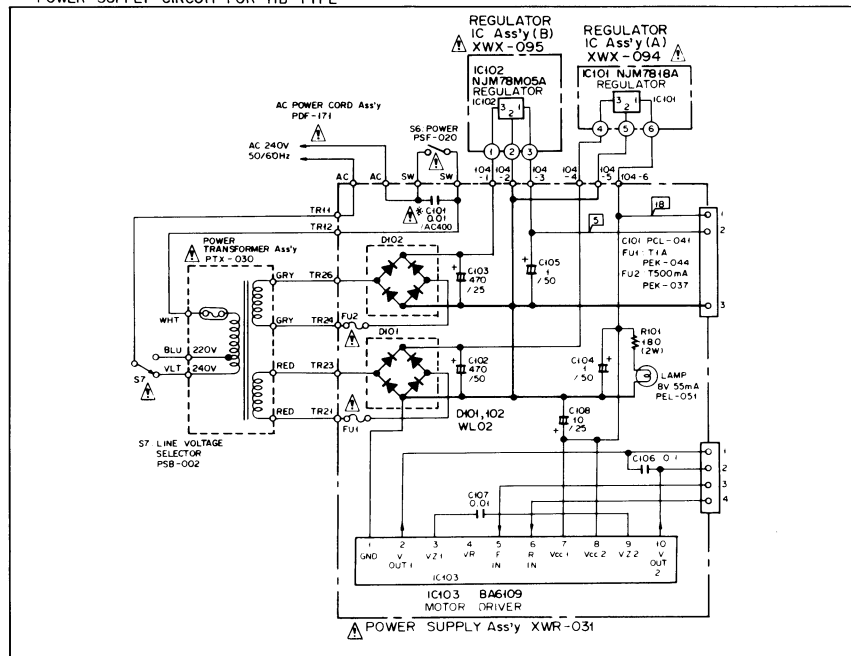
POWER SUPPLY CIRCUIT FOR KC TYPE



POWER SUPPLY CIRCUIT FOR S,S/G TYPES

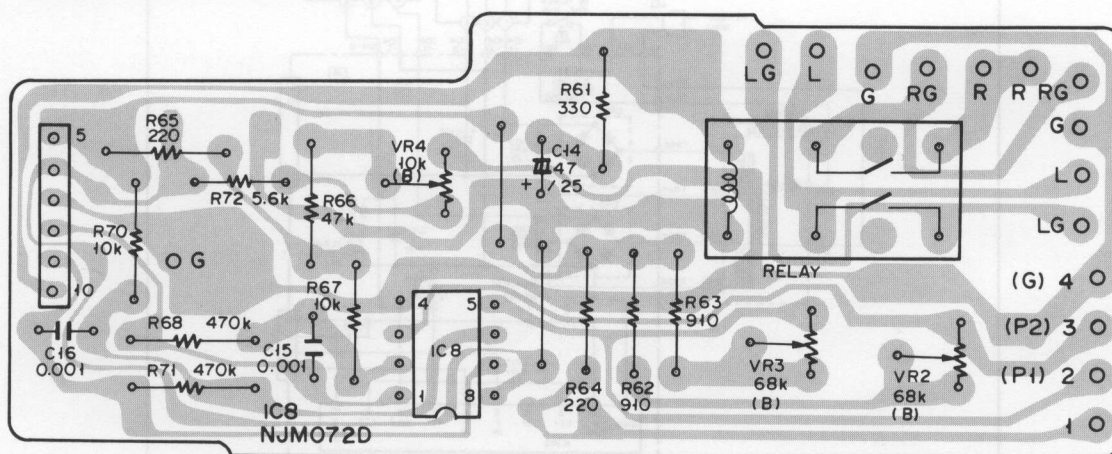


POWER SUPPLY CIRCUIT FOR HB TYPE

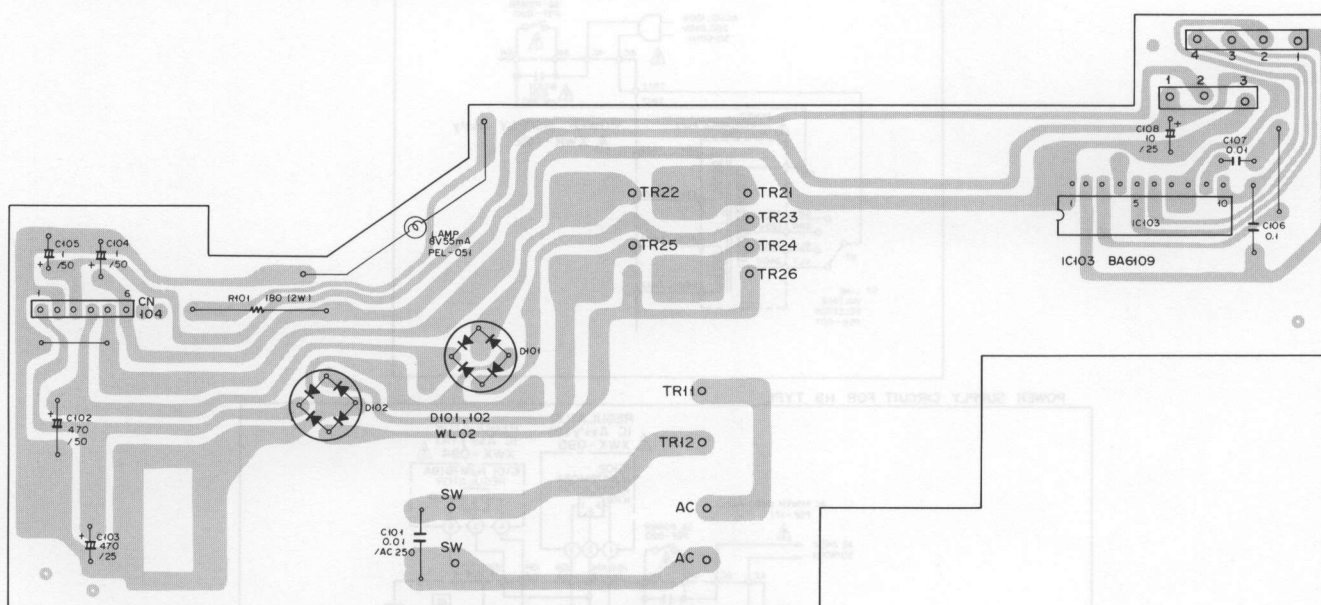


5. P.C. BOARD ASSEMBLY

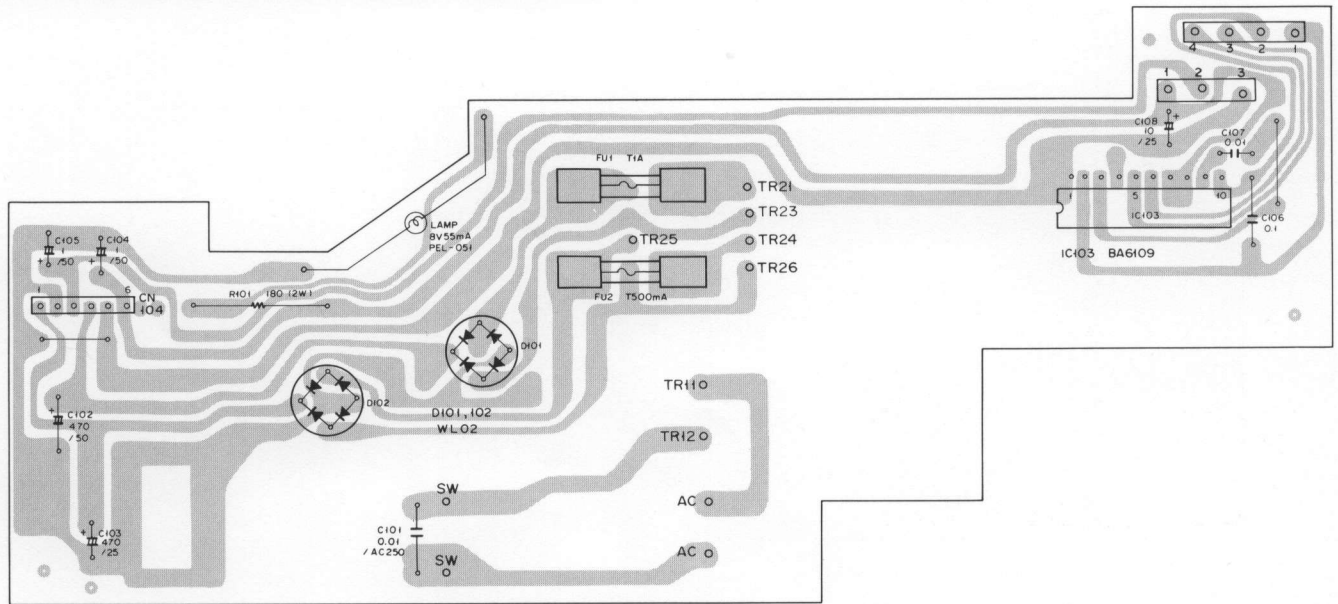
5.1 PU ASSEMBLY (XWX-101)



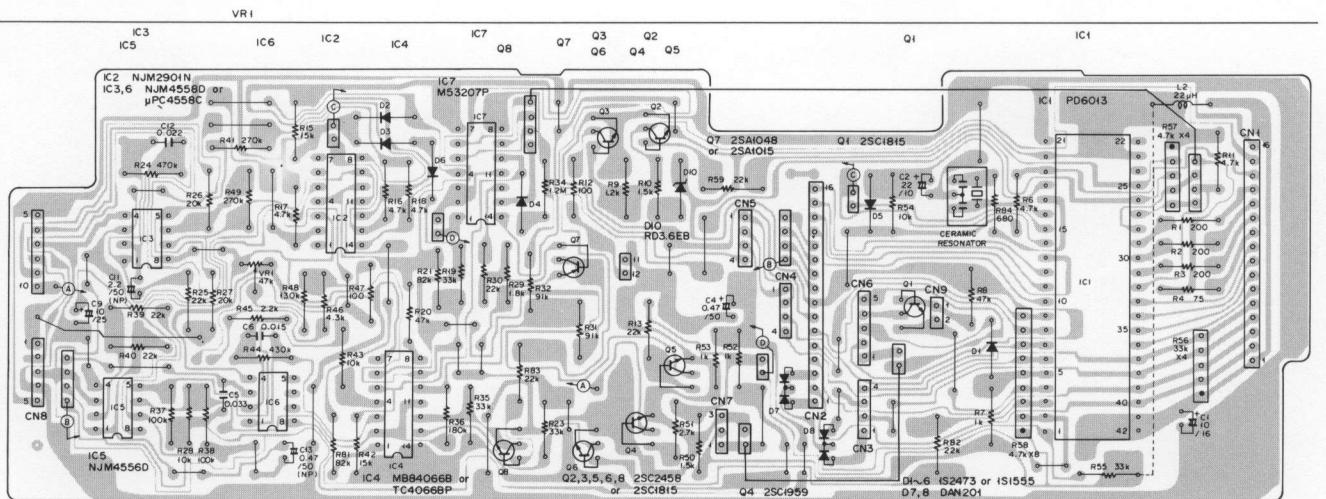
5.2 POWER SUPPLY ASSEMBLY (XWR-022)



5.3 POWER SUPPLY ASSEMBLY (XWR-031)



5.4 CONTROL ASSEMBLY (XWM-098)



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