



# Service Manual

## Nakamichi

### **PA-350**

Mobile Power Amplifier

### **PA-150**

Mobile Power Amplifier

### **EC-200**

Mobile Electronic Crossover

### **EC-200H**

Mobile Electronic Crossover

### **LA-50**

Mobile Line Amplifier

## CONTENTS

1. General	1
2. PA-350 (Mobile Power Amplifier)	2
2. 1. Electrical Adjustment	2
2. 2. Mechanism Ass'y and Parts List	3
2. 3. Mounting Diagrams and Parts List	4
2. 4. Schematic Diagram	7
3. PA-150 (Mobile Power Amplifier)	8
3. 1. Mechanism Ass'y and Parts List	8
3. 2. Mounting Diagrams and Parts List	9
3. 3. Schematic Diagram	10
4. EC-200/EC-200H (Mobile Electronic Crossover)	11
4. 1. Mechanism Ass'y and Parts List (EC-200/EC-200H)	11
4. 2. Mounting Diagram and Parts List (EC-200)	12
4. 3. Schematic Diagram (EC-200)	12
4. 4. Mounting Diagram and Parts List (EC-200H)	13
4. 5. Schematic Diagram (EC-200H)	13
5. LA-50 (Mobile Line Amplifier)	14
5. 1. Mechanism Ass'y and Parts List	14
5. 2. Mounting Diagram and Parts List	15
5. 3. Schematic Diagram	16
6. Specifications	17

## 1. GENERAL

### 1.1. Introduction

This manual consists of the following:

- o PA-350 (Mobile Power Amplifier)
- o PA-150 (Mobile Power Amplifier)
- o EC-200 (Mobile Electronic Crossover)
- o EC-200H (Mobile Electronic Crossover)
- o LA-50 (Mobile Line Amplifier)

### 1.2. Owner's Manual and Auxiliary Parts

#### (1) PA-350 (Mobile Power Amplifier)

Part No.	Description	Q'ty
0D04378A	Owner's Manual (U.S.A. & Canada)	1
DA03772A	Owner's Manual (Europe)	1
0D04377A	Owner's Manual (Japan)	1
0F03785A	Inner Carton (U.S.A. & Canada)	1
0F03778A	Outer Carton	1
0F03779A	Double Carton (contains two sets)	1
0F03703C	Packing	2
0D03903C	Plastic Driver	1
0D04390A	Adjustment Instruction	1
DA03764A	Isolation Ass'y (U.S.A. & Canada)	1

#### (2) PA-150 (Mobile Power Amplifier)

Part No.	Description	Q'ty
0D04301A	Owner's Manual (U.S.A. & Canada)	1
0D04300A	Owner's Manual (Europe)	1
0D04299A	Owner's Manual (Japan)	1
0D04341A	Fastening Bracket	1
0E03149A	TP 4x12 ⊕ Hex. (Black Chromate)	4
0E03151A	Spring Washer 4mm (Black Chromate)	4
0E00736A	Washer 4x10x0.8 (Black Chromate)	4
0E03155A	Washer 4.2x20x1 (Black Chromate)	4
0E03150A	M4x15 ⊕ Hex. (Black Chromate)	4
0E03139A	M4x8 ⊕ Pan with Washers (Black Chromate)	4
DA03700A	Remote On/Off Extension Cable (1m)	1
0D04389A	Screwdriver	1

#### (3) EC-200 (Mobile Electronic Crossover)

Part No.	Description	Q'ty
0D04309A	Owner's Manual (U.S.A. & Canada)	1
DA03754A	Owner's Manual (Europe)	1
0D04306A	Owner's Manual (Japan)	1
0D04341A	Mounting Bracket	1
0E03149A	TP 4x12 ⊕ Hex. (Black Chromate)	4
0E00736A	Washer 4x10x0.8 (Black Chromate)	4
0E03155A	Washer 4.2x20x1 (Black Chromate)	4
0E03150A	M4x15 ⊕ Hex. (Black Chromate)	4
0E03152A	Washer-faced Nut M4 (Black Chromate)	4
0E03139A	M4x8 ⊕ Pan with Washers (Black Chromate)	4

#### (4) EC-200H (Mobile Electronic Crossover)

Part No.	Description	Q'ty
0D04414A	Owner's Manual (U.S.A. & Canada)	1
DA03777A	Owner's Manual (Europe)	1
0D04417A	Owner's Manual (Japan)	1
0D04341A	Mounting Bracket	1
0E03149A	TP 4x12 ⊕ Hex. (Black Chromate)	4
0E00736A	Washer 4x10x0.8 (Black Chromate)	4
0E03155A	Washer 4.2x20x1 (Black Chromate)	4
0E03150A	M4x15 ⊕ Hex. (Black Chromate)	4
0E03152A	Washer-faced Nut M4 (Black Chromate)	4
0E03139A	M4x8 ⊕ Pan with Washers (Black Chromate)	4

#### (5) LA-50 (Mobile Line Amplifier)

Part No.	Description	Q'ty
0D04372A	Owner's Manual (U.S.A. & Canada)	1
0D04371A	Owner's Manual (Europe)	1
0D04370A	Owner's Manual (Japan)	1
0E00736A	Washer 4x10x0.8 (Black Chromate)	2
0E03149A	TP 4x12 ⊕ Hex. (Black Chromate)	2
0E03151A	Spring Washer 4mm (Black Chromate)	2

## 2. PA-350 (Mobile Power Amplifier)

### 2.1. Electrical Adjustment

#### (1) Adjustment of Dead Time and Voltage (D/D Converter P.C.B. Ass'y)

- Connect an oscilloscope across the center tap and other tap (either tap) of the secondary winding of the transformer T401.
- Supply DC 7 — 8 V to the +14.4 V terminal and the Remote terminal.
- Adjust VR403 to obtain the waveform shown in Fig. 2.1.1.
- Remove the oscilloscope.
- Connect 4-ohm resistors (120 W or more) and DC voltmeters across C411 and C413.
- Increase the supply voltage to +14.4 V.
- Adjust VR401 to obtain +22 V on the DC voltmeter.
- Adjust VR402 to obtain -22 V on the DC voltmeter.
- Remove the resistors and voltmeters.

#### (2) Idling Current and Gain Adjustment (Power Amp. P.C.B. Ass'y)

- Insert shorting-pins to the Input Jacks.
- Connect a DC millivoltmeter across R125 (R225, R725, R825).
- Adjust VR102 (VR202, VR702, VR802) to obtain 10 mV (about 30 mA) on the DC millivoltmeter.
- Remove the shorting-pins.
- Turn VR101 (VR201, VR701, VR801) fully counterclockwise.

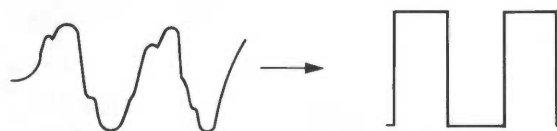


Fig. 2.1.1

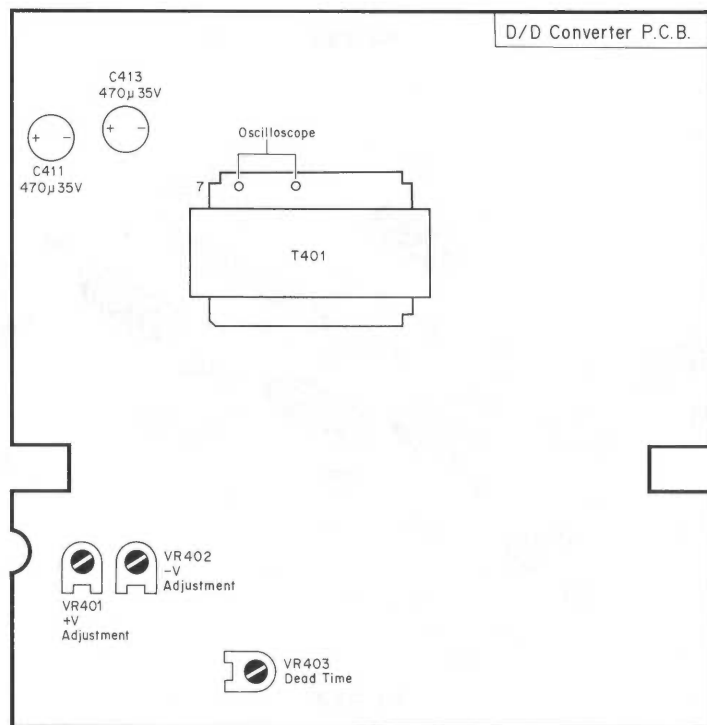
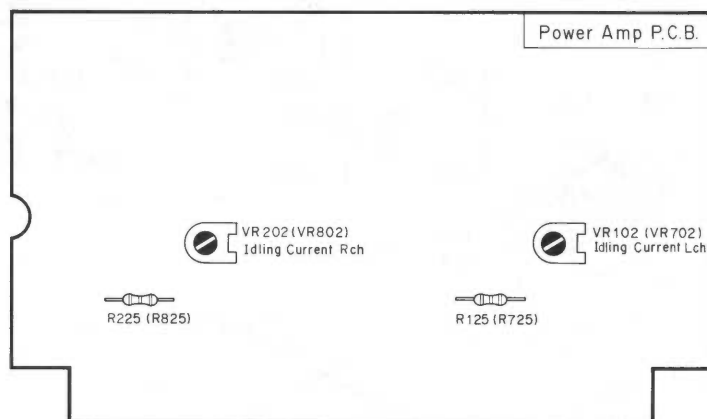


Fig. 2.1.2

2.2. Mechanism Ass'y and Parts List (PA-350)  
2.2.1. Synthesis

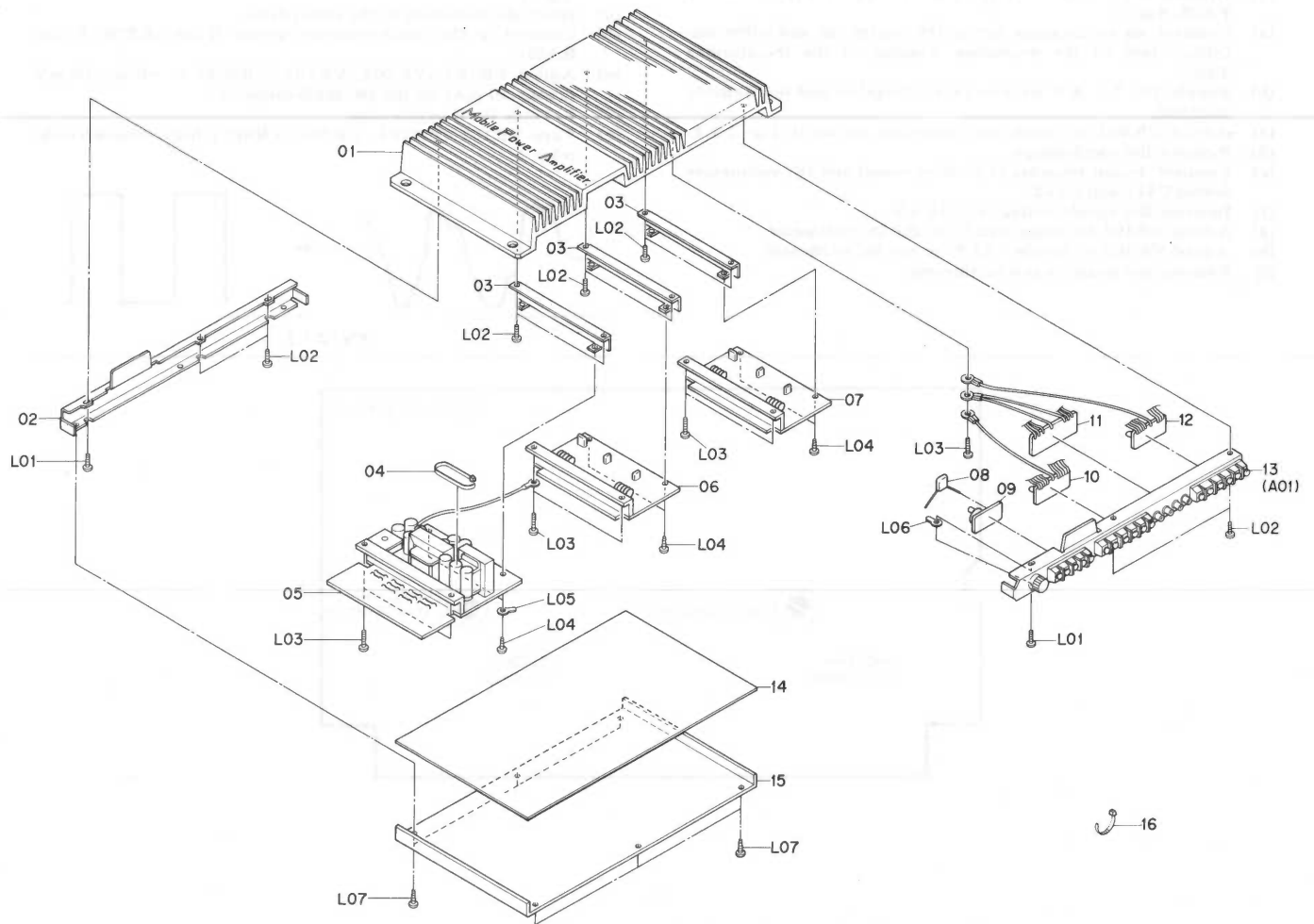


Fig. 2.2.1

2.2.2. Side Chassis Ass'y (A01)

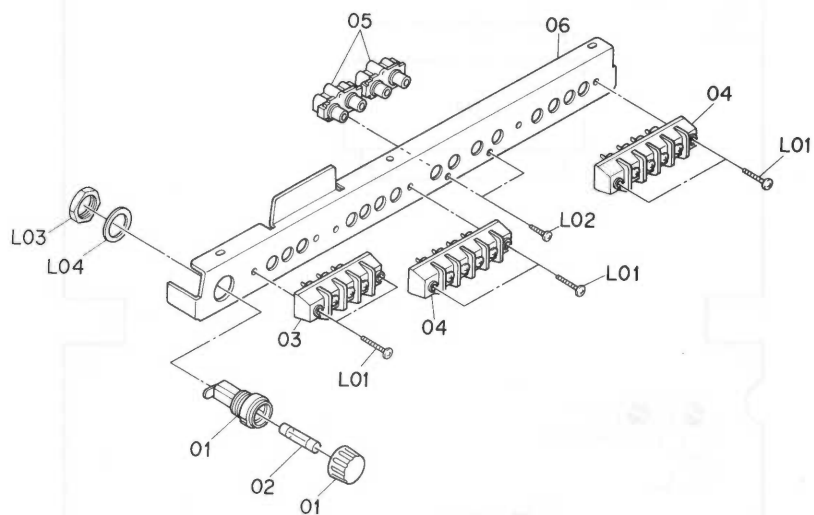


Fig. 2.2.2



### 2.3.5. Power Amp. P.C.B.-1 Ass'y

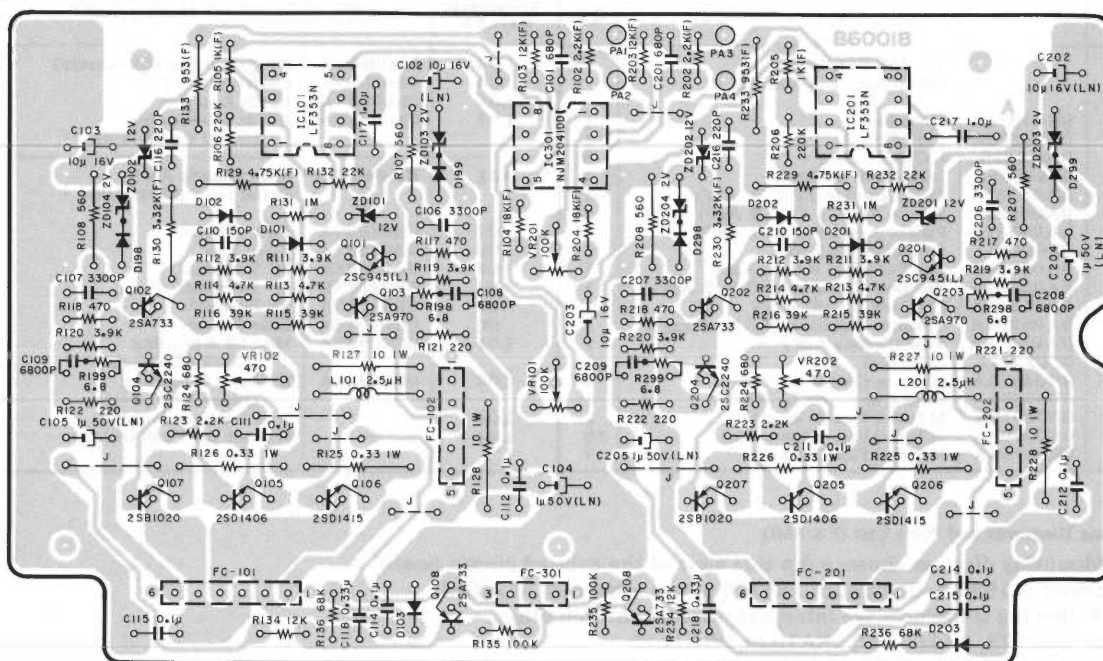


Fig. 2.3.5

### 2.3.6. Power Amp. P.C.B.-2 Ass'y

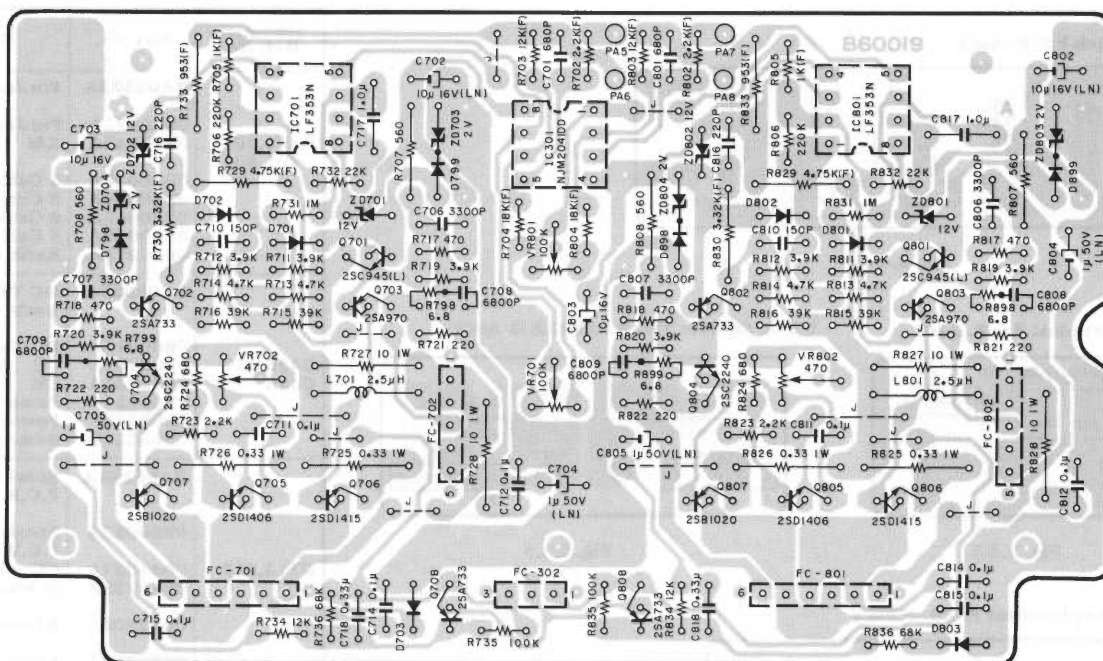


Fig. 2.3.6



Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	<b>BA05330A</b>	<b>Power Amp. P.C.B.-1 Ass'y</b>		<b>BA05331A</b>	<b>Power Amp. P.C.B.-2 Ass'y</b>		<b>BA05332A</b>	<b>D/D Converter P.C.B. Ass'y</b>
IC101,201	OB60018A	Power Amp. P.C.B.-1	IC701,801	OB60019A	Power Amp. P.C.B.-2	OB60020A	OB60020A	D/D Converter P.C.B.
IC301	OB11032A	IC LF353N	IC301	OB11032A	IC LF353N	IC	OB6427A	IC $\mu$ PC494C
Q101,201	OB11004A	IC NJM2041DD	Q701,801	OB11004A	IC NJM2041DD	TR	OB6372A	TR 2SA953 (K,L)
Q102,108	OB01872A	TR 2SC945L (P,Q)	Q702,708	OB01872A	TR 2SC945L (P,Q)	TR	OB01872A	TR 2SC945L (P,Q)
202,208	OB06013A	TR 2SA733 (P,Q)	802,808	OB06013A	TR 2SA733 (P,Q)			
Q103,203	OB06180A	TR 2SA970 (GR)	Q703,803	OB06180A	TR 2SA970 (GR)	TR	OB10038A	TR 2SD826G
Q104,204	OB06142A	TR 2SC2240 (BL)	Q704,804	OB06142A	TR 2SC2240 (BL)	TR	OB06316A	TR 2SD882 (P,Q)
ZD101,102	OB12130A	ZD 12V RD12JSB2	ZD701,702	OB12130A	ZD 12V RD12JSB2	TR	OB06303A	TR 2SB772 (P,Q)
201,202			801,802			TR	OB06013A	TR 2SA733 (P,Q)
ZD103,104	OB06403A	ZD 2V RD2.0EB	ZD703,704	OB06403A	ZD 2V RD2.0EB			
203,204			803,804					
D101,102	OB06398A	SiD 1SS176	D701,702	OB06398A	SiD 1SS176	OB12105A	ZD 27V RD27EB4	
103,201			703,801			OB06290A	ZD 5.6V RD5.6EB2	
202,203			802,803			OB06458A	SiD 30D-2	
D198,199	OB06181A	SiD 1SS53	D798,799	OB06181A	SiD 1SS53	OB12102A	SiD 10DF-2	
298,299			898,899					
L101,201	OB51042A	Output Coil	L701,801	OB51042A	Output Coil	OB06398A	SiD 1SS176	
VR101,201	OB32029A	Semi-fixed VR 100K	VR701,801	OB32029A	Semi-fixed VR 100K	OB50025B	Converter	
VR102,202	OB32007A	Semi-fixed VR 470	VR702,802	OB32007A	Semi-fixed VR 470	Transformer 3		
R102,202	OB22265A	RM 2.2K 1/6W F	R702,802	OB22265A	RM 2.2K 1/6W F	Choke Coil 2		
R103,203	OB22351A	RM 12K 1/6W F	R703,803	OB22351A	RM 12K 1/6W F	Semi-fixed VR 47K		
R104,204	OB22370A	RM 18K 1/6W F	R704,804	OB22370A	RM 18K 1/6W F	Semi-fixed VR 4.7K		
R105,205	OB22229A	RM 1K 1/6W F	R705,805	OB22229A	RM 1K 1/6W F			
R107,108	OB05575A	RK 560 1/4W J	R707,708	OB05575A	RK 560 1/4W J	OB01706A	RK 47 1/4W J	
207,208			807,808			OB09701A	RK 10K 1/6W J	
R111,112	OB09691A	RK 3.9K 1/6W J	R711,712	OB09691A	RK 3.9K 1/6W J			
119,120			719,720					
211,212			811,812			OB09691A	RK 3.9K 1/6W J	
219,220			819,820			OB09677A	RK 1K 1/6W J	
R113,114	OB09693A	RK 4.7K 1/6W J	R713,714	OB09693A	RK 4.7K 1/6W J			
213,214			813,814					
R115,116	OB09715A	RK 39K 1/6W J	R715,716	OB09715A	RK 39K 1/6W J	OB05576A	RK 470 1/4W J	
215,216			815,816			OB09665A	RK 330 1/6W J	
R117,118	OB09669A	RK 470 1/6W J	R717,718	OB09669A	RK 470 1/6W J	OB24017A	RF 47 2W J(8)	
217,218			817,818			OB24021A	RF 68 1W J	
R121,122	OB09661A	RK 220 1/6W J	R721,722	OB09661A	RK 220 1/6W J	OB09719A	RK 56K 1/6W J	
221,222			821,822			OB09722A	RK 75K 1/6W J	
R123,223	OB09685A	RK 2.2K 1/6W J	R723,823	OB09685A	RK 2.2K 1/6W J	OB09683A	RK 1.8K 1/6W J	
R124,224	OB09673A	RK 680 1/6W J	R724,824	OB09673A	RK 680 1/6W J	OB09709A	RK 22K 1/6W J	
R125,126	OB24010A	RF 0.33 1W J	R725,726	OB24010A	RF 0.33 1W J			
225,226			825,826					
R127,128	OB24020A	RF 10 1W J	R727,728	OB24020A	RF 10 1W J	OB09693A	RK 4.7K 1/6W J	
227,228			827,828			OB09739A	RK 390K 1/6W J	
R129,229	OB09424A	RM 4.75K 1/4W F	R729,829	OB09424A	RM 4.75K 1/4W F	OB09707A	RK 18K 1/6W J	
R130,230	OB09829A	RM 3.32K 1/4W F	R730,830	OB09829A	RM 3.32K 1/4W F	OB09725A	RK 100K 1/6W J	
R131,231	OB09749A	RK 1M 1/6W J	R731,831	OB09749A	RK 1M 1/6W J	OB09689A	RK 3.3K 1/6W J	
R132,232	OB09709A	RK 22K 1/6W J	R732,832	OB09709A	RK 22K 1/6W J	OB09737A	RK 330K 1/6W J	
R133,233	OB22569A	RM 953 1/4W F	R733,833	OB22569A	RM 953 1/4W F			
R134,234	OB09703A	RK 12K 1/6W J	R734,834	OB09703A	RK 12K 1/6W J	OB09735A	RK 270K 1/6W J	
R135,235	OB09725A	RK 100K 1/6W J	R735,835	OB09725A	RK 100K 1/6W J	OB09717A	RK 47K 1/6W J	
R136,236	OB09721A	RK 68K 1/6W J	R736,836	OB09721A	RK 68K 1/6W J	OB09727A	RK 120K 1/6W J	
R198,199	OB09625A	RK 6.8 1/6W J	R798,799	OB09625A	RK 6.8 1/6W J	OB09749A	RK 1M 1/6W J	
298,299			898,899			OB09679A	RK 1.2K 1/6W J	
C101,201	OB09235A	CP 680P 100V J	C701,801	OB09235A	CP 680P 100V J	OB09703A	RK 12K 1/6W J	
C102,103	OB09816A	CE 10 $\mu$ 16V (LN)	C702,703	OB09816A	CE 10 $\mu$ 16V (LN)	OB09671A	RK 560 1/6W J	
202,203			802,803			OB22309A	RM 5.1K 1/6W F	
C104,105	OB09814A	CE 1 $\mu$ 50V (LN)	C704,705	OB09814A	CE 1 $\mu$ 50V (LN)	OB22154A	RM 232 1/6W F	
204,205			804,805			OB09629A	RK 10 1/6W J	
C106,107	OB01914A	CM 3300P 50V J	C706,707	OB01914A	CM 3300P 50V J			
206,207			806,807					
C108,109	OB05530A	CM 6800P 50V J	C708,709	OB05530A	CM 6800P 50V J			
208,209			808,809					
C110,210	OB09246A	CM 150P 50V J	C710,810	OB09246A	CM 150P 50V J			
C111,112	OB09868A	CF 0.1 $\mu$ 50V J	C711,712	OB09868A	CF 0.1 $\mu$ 50V J			
211,212			811,812					
C114,115	OB09292A	CC 0.1 $\mu$ 50V Z	C714,715	OB09292A	CC 0.1 $\mu$ 50V Z			
214,215			814,815					
C116,216	OB09247A	CM 220P 50V J	C716,816	OB09247A	CM 220P 50V J			
C117,217	OB41180A	CM 1 $\mu$ 50V J	C717,817	OB41180A	CM 1 $\mu$ 50V J			
C118,218	OB09874A	CF 0.33 $\mu$ 50V J	C718,818	OB09874A	CF 0.33 $\mu$ 50V J			
	OB81012A	Dip Mate 5P (2)		OB81012A	Dip Mate 5P (2)			
	OB81013A	Dip Mate 6P (2)		OB81013A	Dip Mate 6P (2)			
	OB81010A	Dip Mate 3P (1)		OB81010A	Dip Mate 3P (1)			
	OE00754A	M3x8 $\oplus$ Pan (3)		OE00754A	M3x8 $\oplus$ Pan (3)			
	OE03069A	Earth Lug B-2 (2)		OE03069A	Earth Lug B-2 (2)			
	OB06452A	TR 2SD1406 (Y)		OB06452A	TR 2SD1406 (Y)			
	OB10012A	TR 2SD1415		OB10012A	TR 2SD1415			
	OB10011A	TR 2SB1020		OB10011A	TR 2SB1020			
	OJ04755A	Heat Sink 3 (1)		OJ04755A	Heat Sink 3 (1)			
	OE00754A	M3x8 $\oplus$ Pan (Nickel) (6)		OE00754A	M3x8 $\oplus$ Pan (Nickel) (6)			
Q105,205			Q705,805					
Q106,206			Q706,806					
Q107,207			Q707,807					

2.3.7. D/D Converter P.C.B. Ass'y

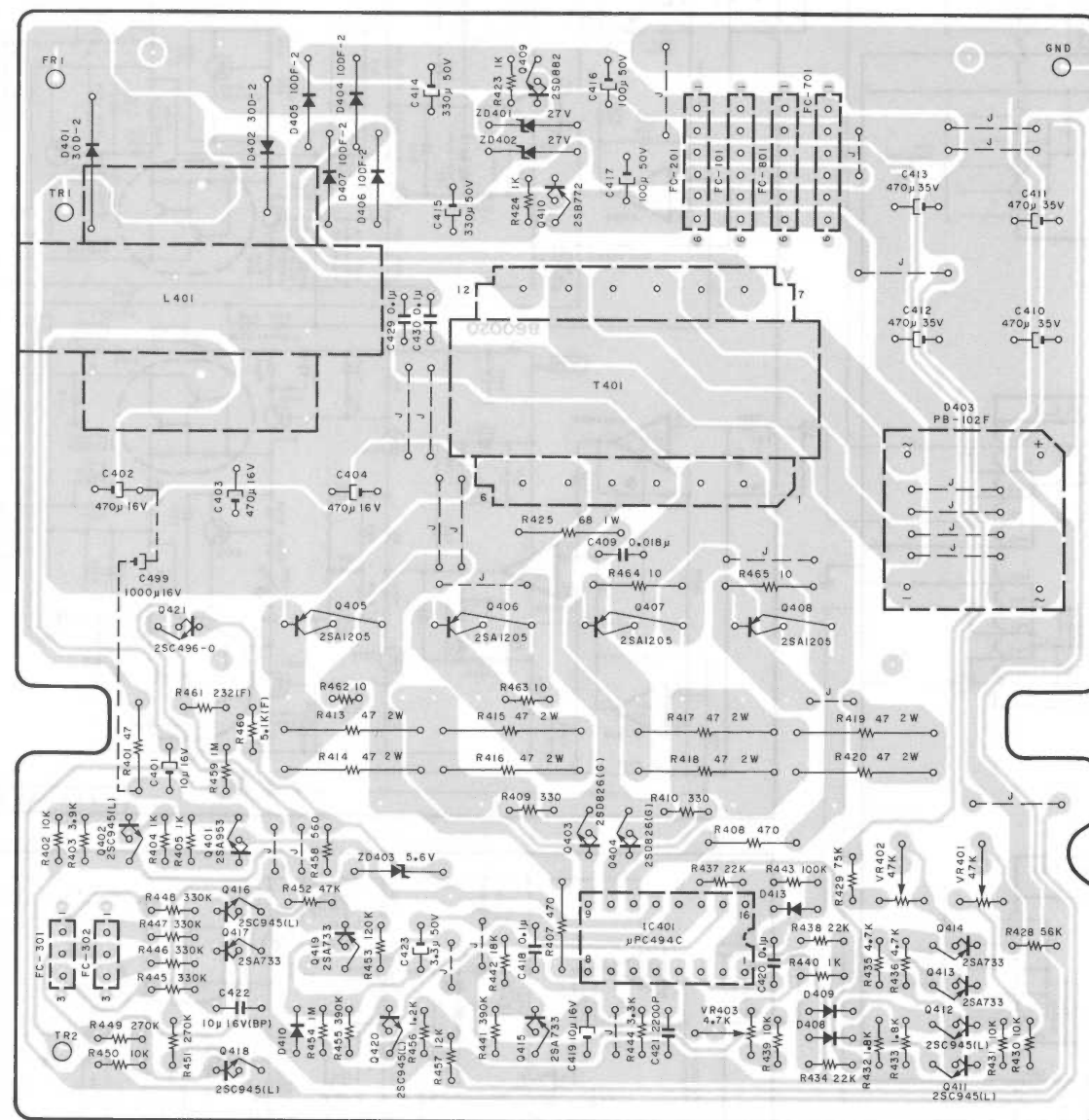


Fig. 2.4



### 3. PA-150 (Mobile Power Amplifier)

#### 3.1. Mechanism Ass'y and Parts List (PA-150)

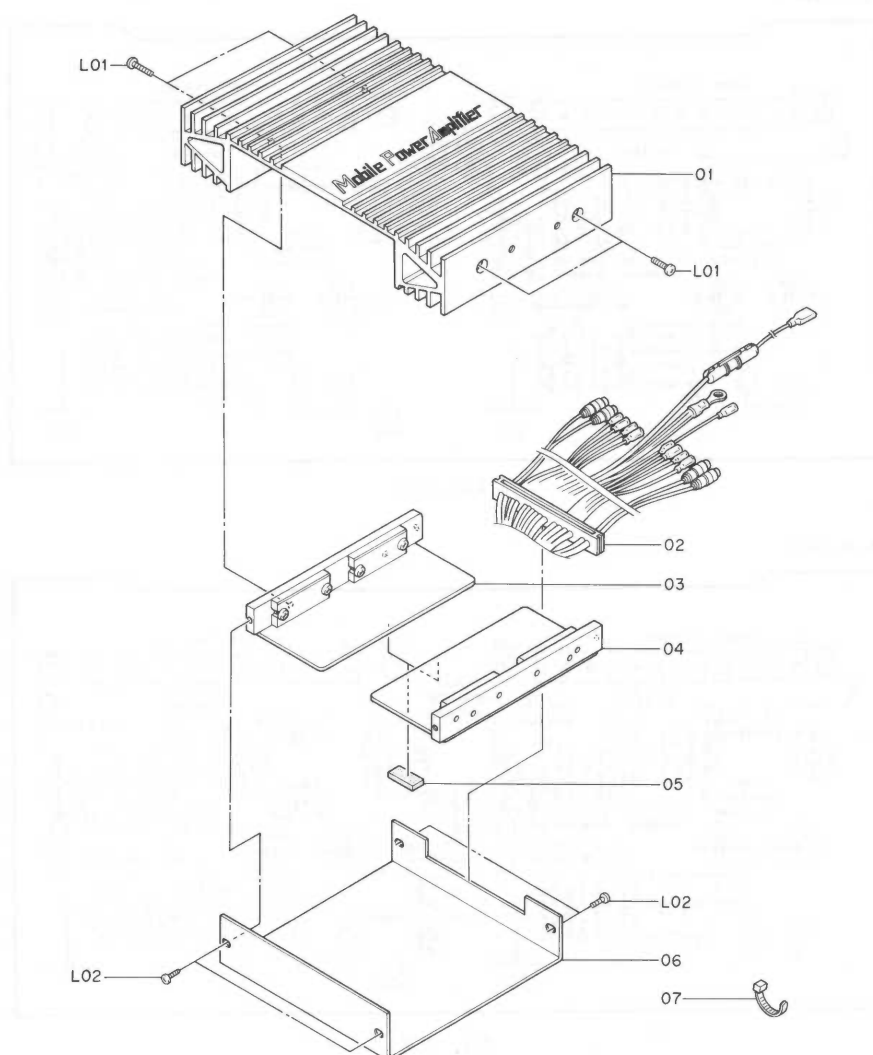


Fig. 3.1

Schematic Ref. No.	Part No.	Description	Q'ty
		<b>PA-150</b>	
01	0H04258A	Heat Sink	1
02	0B82141A	Cord Ass'y	1
03	BA05281B	Power Amp. P.C.B. B Ass'y (U.S.A., Canada & Europe)	1
	BA05207B	Power Amp. P.C.B. B Ass'y (Japan)	1
04	BA05280A	Power Amp. P.C.B. A Ass'y (U.S.A., Canada & Europe)	1
	BA05208B	Power Amp. P.C.B. A Ass'y (Japan)	1
05	0J04411A	Cushion	1
06	0H04389A	Bottom Cover (U.S.A., Canada & Europe)	1
	0H04259A	Bottom Cover (Japan)	1
07	0B08515A	Insu-Lock	3
L01	0E03137A	M3x10 ⊕ Binding (Black Chromate)	4
L02	0E00945A	M2.6x4 ⊕ Binding (Black Chromate)	4

### 3.2.1. Power Amp. P.C.B.-A Ass'y



## Fig. 3.2.2

9

### 3.3. Schematic Diagram (PA-150)

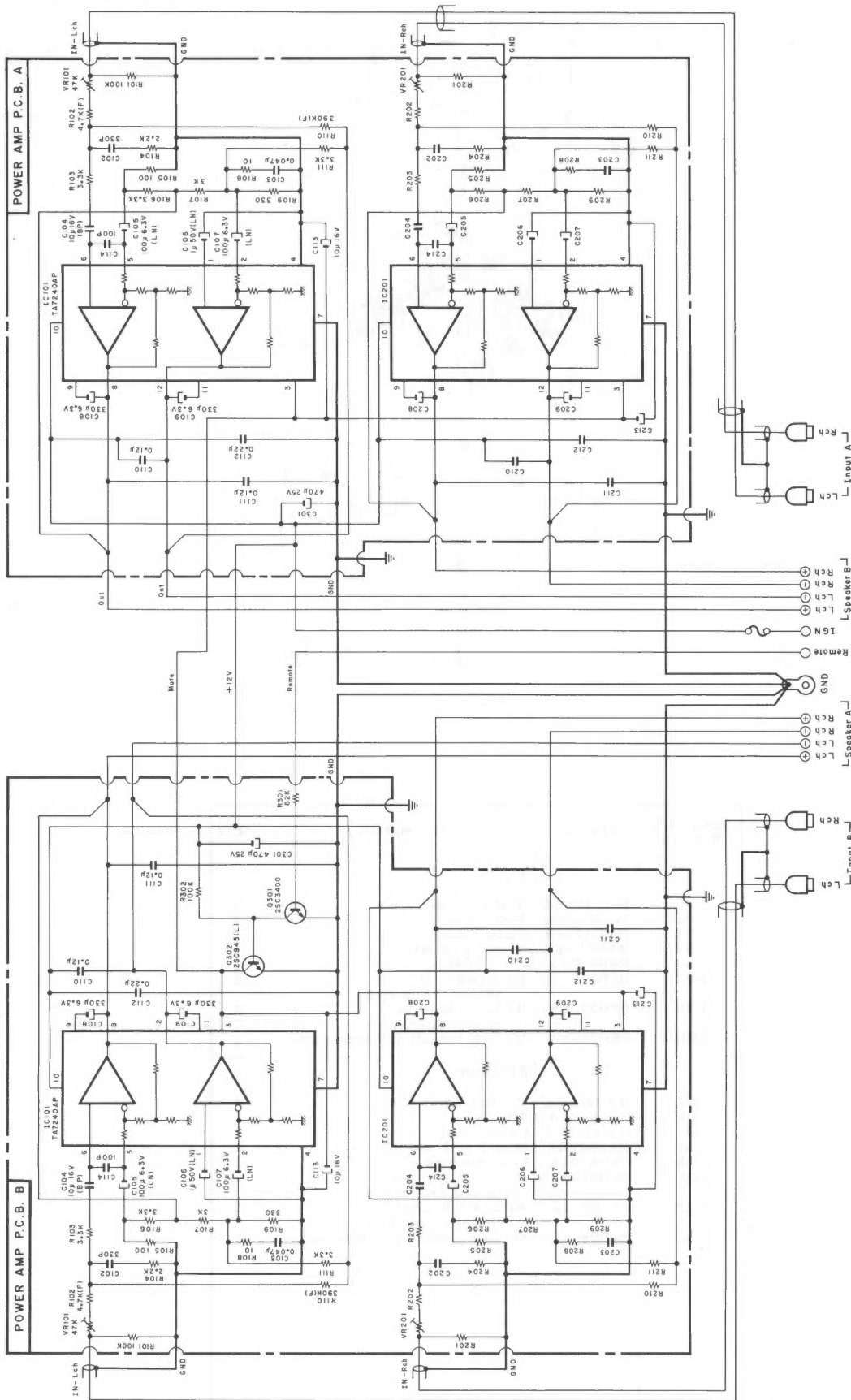


Fig. 3.3

- Notes:
1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
  2. Resistor and capacitor marked with \* show typical value.
  3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
  4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

4. EC-200/EC-200H (Mobile Electronic Crossover)

4.1. Mechanism Ass'y and Parts List (EC-200/EC-200H)

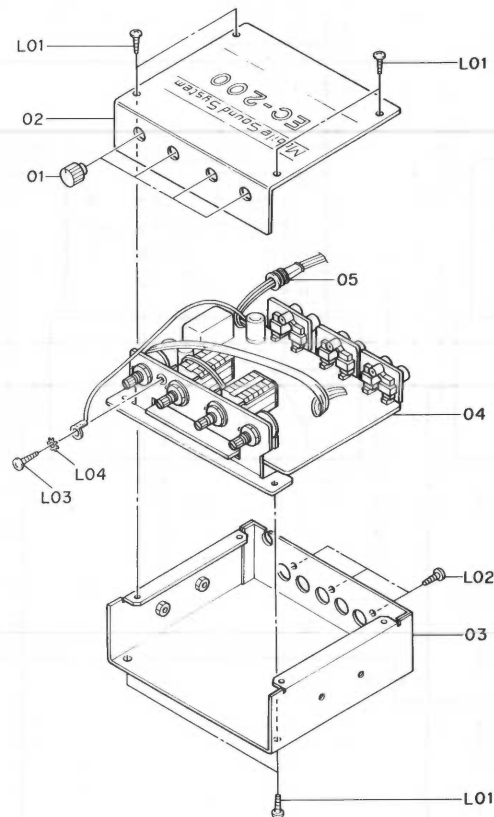


Fig. 4.1

Schematic Ref. No.	Part No.	Description	Q'ty
		<b>EC-200</b>	
01	HA04550A	Volume Knob Ass'y	4
02	0H04260B	Top Cover	1
03	HA04457A	Chassis Ass'y	1
04	BA05134A	Main P.C.B. Ass'y	1
05	0B08703A	Cord Bushing	1
L01	0E03142A	BT 2.6x8 ⊕ Truss (Black Chromate)	6
L02	0E00921A	BT 3x8 ⊕ Binding (Black Chromate)	3
L03	0E00868A	BT 3x8 ⊕ Binding (Chromate)	1
		<b>EC-200H</b>	
01	HA04550A	Volume Knob Ass'y	4
02	0H04398A	Top Cover	1
03	HA04457A	Chassis Ass'y	1
04	BA05320A	Main P.C.B. Ass'y	1
05	0B08703A	Cord Bushing	1
L01	0E03142A	BT 2.6x8 ⊕ Truss (Black Chromate)	6
L02	0E00921A	BT 3x8 ⊕ Binding (Black Chromate)	3
L03	0E00868A	BT 3x8 ⊕ Binding (Chromate)	1

4.2. Mounting Diagram and  
Parts List (EC-200)  
4.2.1. Main P.C.B. Ass'y

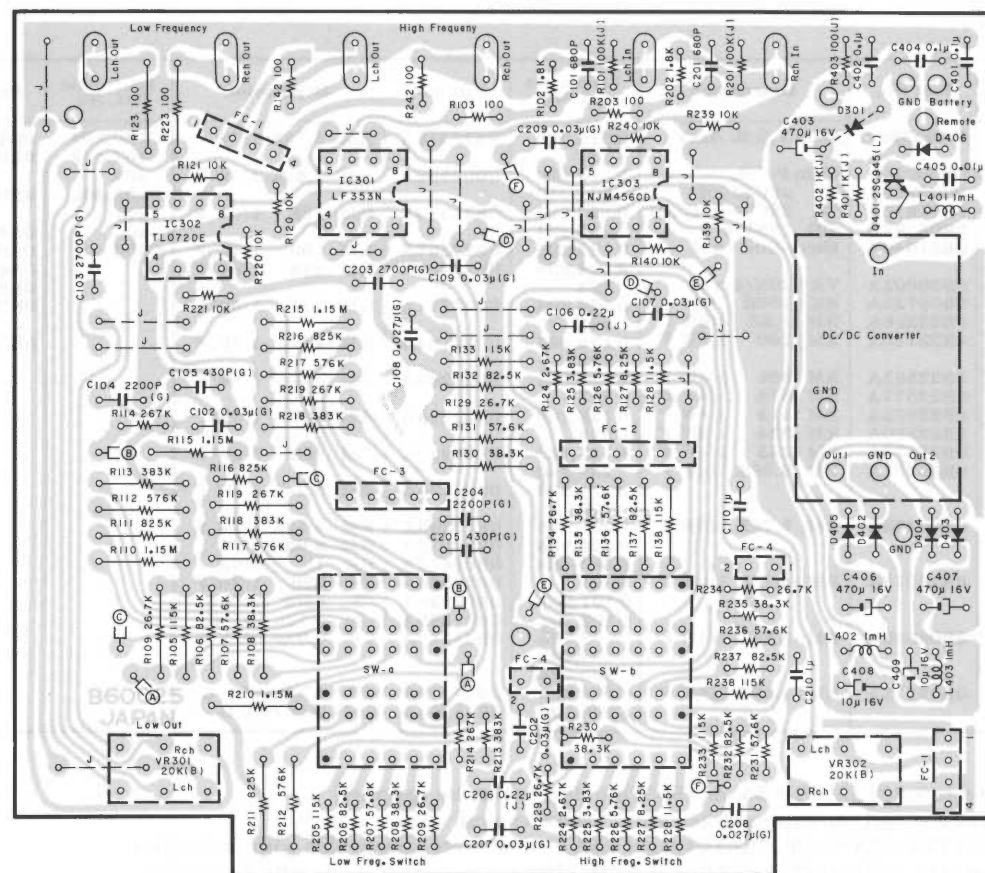


Fig. 4.2.1

4.3. Schematic Diagram (EC-200)

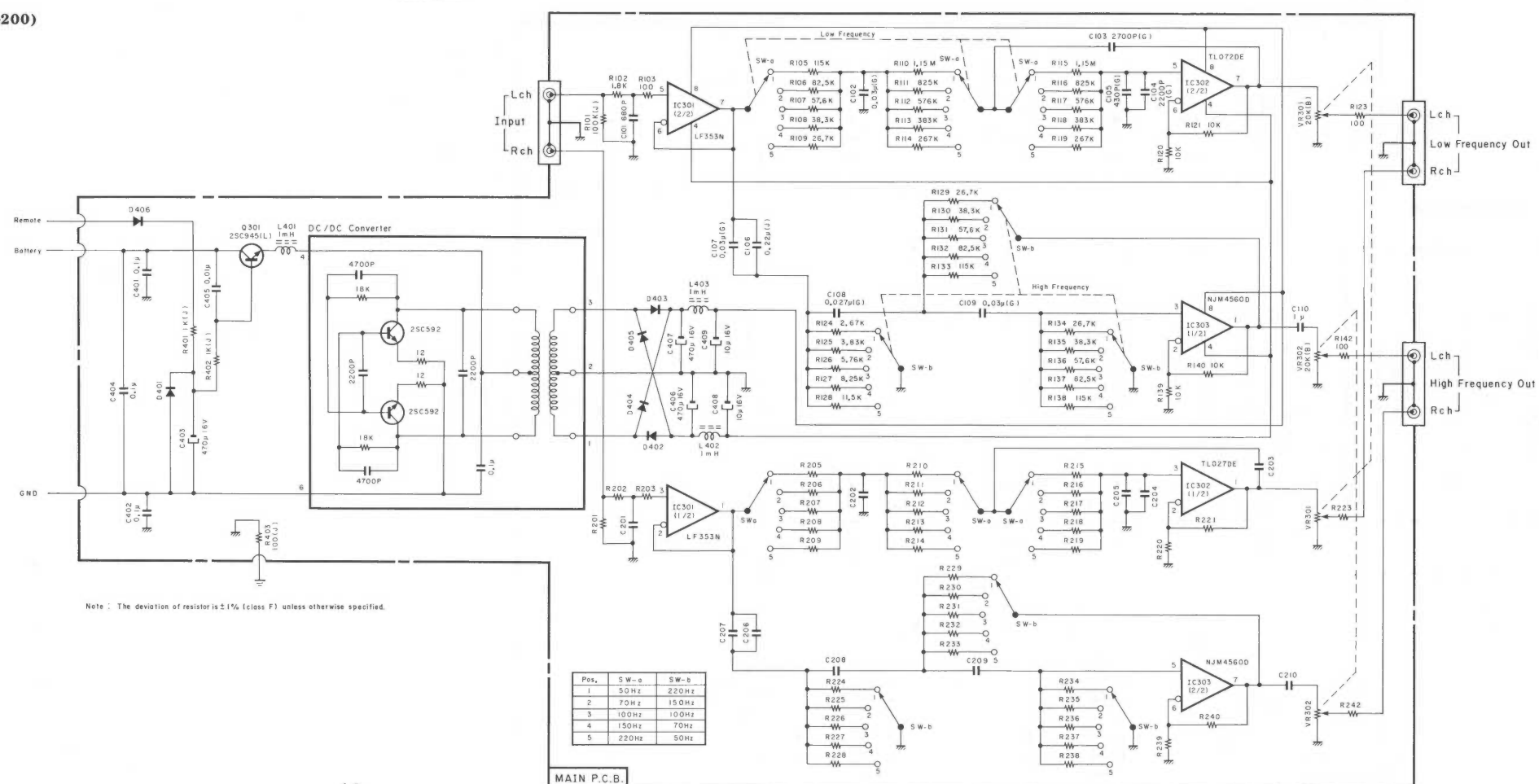


Fig. 4.3

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
IC301	BA05039A	Main P.C.B. Ass'y	R114,214	OB22503A	RM 267K 1/6W F	C401,402	OB09292A	CC 0.1μ 50V Z
IC302	OB60025E	Main P.C.B.	R119,219	OB22568A	RM 267K 1/4W F	404	OB01392A	CE 470μ 16V
IC303	OB11032A	IC LF353N	R120,121	OB09929A	RM 10K 1/6W F	C403,406		
Q301	OB11005A	IC NJM072DE				407	OB41019A	CC 0.01μ 25V M
D401,402	OB06217A	IC 4560D	R123,223	OB22567A	RM 100 1/4W F	C405	OB01412A	CE 10μ 16V
403,404	OB01872A	TR 2SC945L (P,Q)	R124,224	OB22275A	RM 2.67K 1/6W F	C408,409	OB51043A	DC-DC Converter
405,406	OB06398A	SiD 1SS176	R125,225	OB22294A	RM 3.83K 1/6W F		OB70007A	Rotary Switch (1)
L401,402	OB51040A	Micro Coil 1mH	R126,226	OB22316A	RM 5.76K 1/6W F		OB81022A	2P Pin Jack (2)
403			R127,227	OB22334A	RM 8.25K 1/6W F		OB80036A	Earth Wire (1)
VR301,302	OB30001A	VR 20K(B)x2	R128,228	OB22349A	RM 11.5K 1/6W F		OB82160A	Ribbon Cable 4P(1)
R101,201	OB09725A	RK 100K 1/6W J	R205,233	OB22463A	RM 115K 1/6W F		OB82212A	Ribbon Cable 2P(1)
R102,202	OB22256A	RM 1.8K 1/6W F						
R103,142	OB22115A	RM 100 1/6W F	R206,232	OB22448A	RM 82.5K 1/6W F			
203,242			237	OB22430A	RM 57.6K 1/6W F			
R105,133	OB09771A	RM 115K 1/4W F	R207,231	OB22408A	RM 38.3K 1/6W F			
138			236					
R106,132	OB22562A	RM 82.5K 1/4W F	R208,230	OB22389A	RM 26.7K 1/6W F			
137			235					
R107,131	OB09454A	RM 57.6K 1/4W F	R209,229	OB22522A	RM 383K 1/6W F			
136			234					
R108,130	OB22563A	RM 38.3K 1/4W F	R213	OB09677A	RK 1K 1/6W J			
135			R401,402	OB24026A	RF 220 1/2W J			
R109,129	OB22564A	RM 26.7K 1/4W F	R403	OB09235A	CP 680P 100V J			
134			C101,201	OB41160A	CP 0.03μ 100V G			
R110,115	OB22557A	RM 1.15M 1/4W F	C102,107					
210,215			109,202					
R111,116	OB09589A	RM 825K 1/4W F	207,209					
211,216			C103,203	OB41135A	CP 2700P 100V G			
R112,117	OB09770A	RM 576K 1/4W F	C104,204	OB41133A	CP 2200P 100V G			
212,217			C105,205	OB41116A	CP 430P 100V G			
R113,118	OB22566A	RM 383K 1/4W F	C106,206	OB41368A	CM 0.22μ 50V J			
218			C108,208	OB41159A	CP 0.027μ 100V G			
			C110,210	OB41180A	CM 1μ 50V J			

Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.  
2. Resistor and capacitor marked with \* show typical value.  
3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.  
4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.



4.4. Mounting Diagram and  
Parts List (EC-200H)  
4.4.1. Main P.C.B. Ass'y

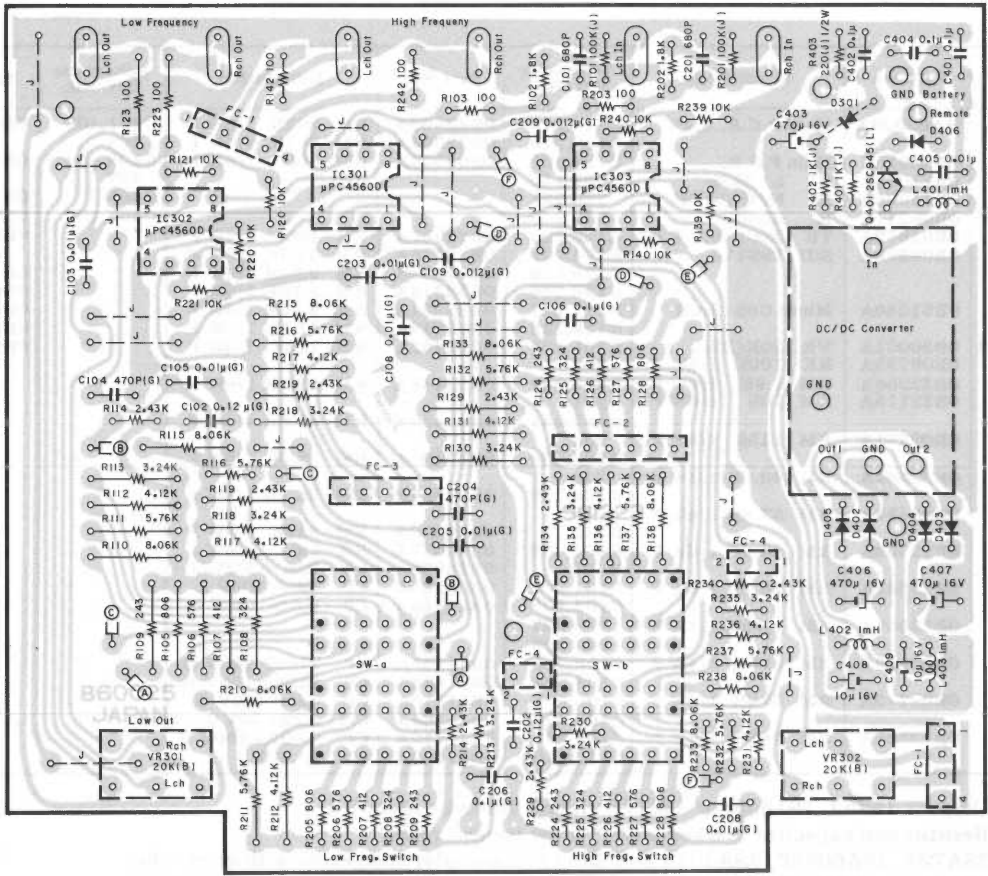


Fig. 4.4.1

4.5. Schematic Diagram (EC-200H)

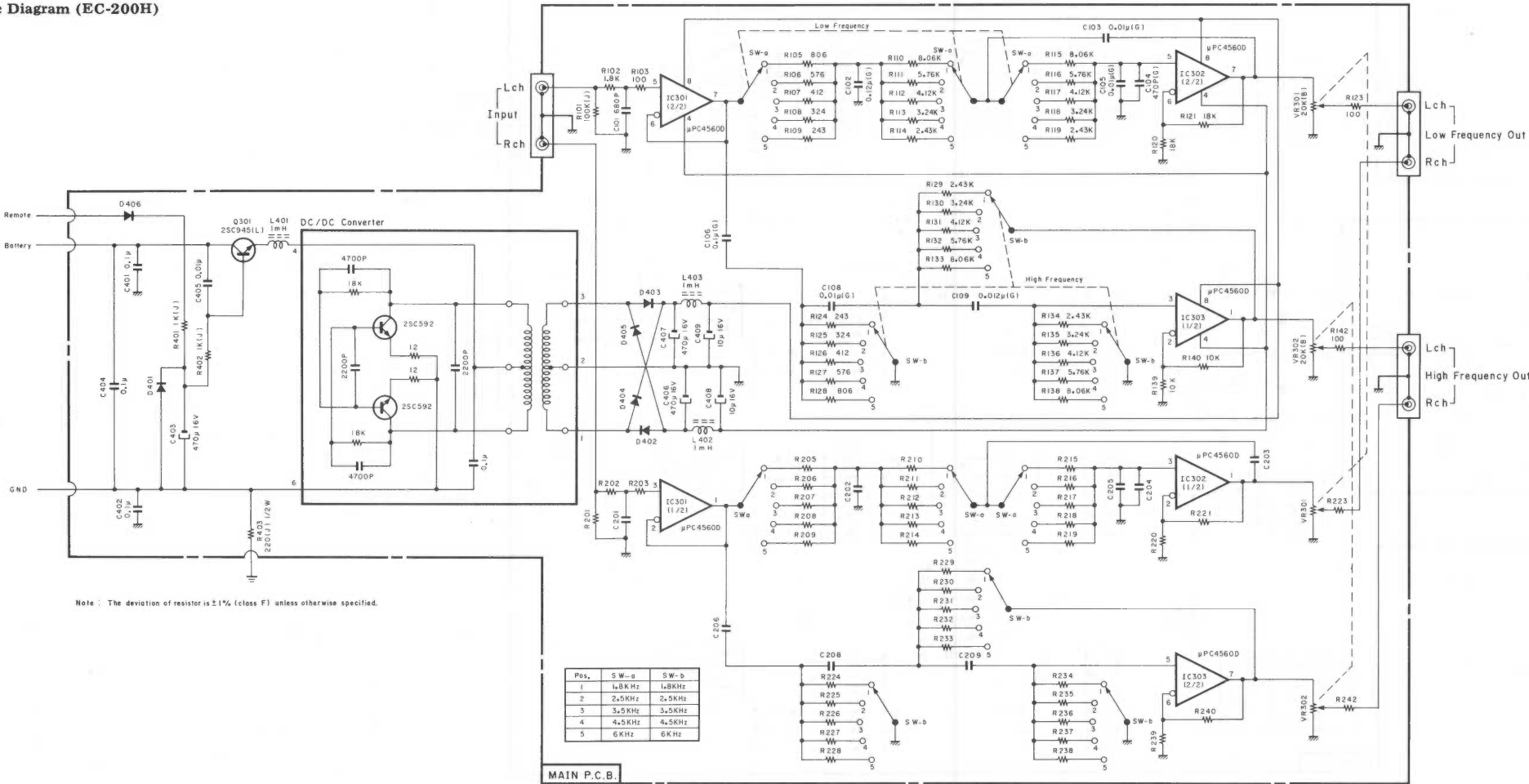


Fig. 4.5

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
IC301-303	BA05320A	Main P.C.B. Ass'y	R116,232	OB22316A	RM 5.76K 1/6W F	C109,209	OB41151A	CP 0.012μ 100V G
Q301	OB60025E	Main P.C.B.	R119,129	OB09596A	RM 2.43K 1/4W F	C401,402	OB09292A	CC 0.1μ 50V Z
D401-406	OB06217A	IC μPC4560D	R120,121	OB22370A	RM 18K 1/6W F	C403,406	OB01392A	CE 470μ 16V
L401,402	OB01872A	TR 2SC945L (P,Q)	R220,221	OB22567A	RM 100 1/4W F	C405	OB41019A	CC 0.01μ 25V M
VR301,302	OB06398A	SiD 1SS176	R123,223	OB22157A	RM 243 1/6W F	C408,409	OB01412A	CE 10μ 16V
R101,201	OB30001A	VR 20K(B)x2	R124,209	OB22171A	RM 324 1/6W F		OB82160A	Ribbon Cable 4P (1)
R102,202	OB09725A	RK 100K 1/6W J	R125,208	OB22184A	RM 412 1/6W F		OB82212B	Ribbon Cable 2P (1)
R103,142	OB22256A	RM 1.8K 1/6W F	R126,207	OB22202A	RM 576 1/6W F		OB51043A	DC-DC Converter (1)
203,242	OB22115A	RM 100 1/6W F	R127,206	OB22218A	RM 806 1/6W F		OB70007A	Rotary Switch (2)
R105	OB22581A	RM 806 1/4W F	R128,205	OB09929A	RM 10K 1/6W F			
R106	OB22577A	RM 576 1/4W F	R139,140	OB22285A	RM 3.24K 1/6W F			
R107	OB22575A	RM 412 1/4W F	R231,236	OB22298A	RM 4.12K 1/6W F			
R108	OB22580A	RM 324 1/4W F	R233,238	OB22332A	RM 8.06K 1/6W F			
R109	OB22579A	RM 243 1/4W F	R401,402	OB09677A	RK 1K 1/6W J			
R110,115	OB09431A	RM 8.06K 1/4W F	R403	OB24026A	RF 220 1/2W J			
R111,132	OB09428A	RM 5.76K 1/4W F	C101,201	OB09235A	CP 680P 100V J			
R112,117	OB22578A	RM 4.12K 1/4W F	C102,202	OB41385A	CM 0.12μ 50V G			
R113,118	OB09540A	RM 3.24K 1/4W F	C103,105	OB41149A	CP 0.01μ 100V G			
130,135			108,203					
218			205,208					
R114,214	OB22271A	RM 2.43K 1/6W F	C104,204	OB41117A	CP 470P 100V G			
229,234			C106,206	OB41384A	CM 0.1μ 50V G			

Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.  
2. Resistor and capacitor marked with \* show typical value.  
3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.  
4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

## 5. LA-50 (Mobile Line Amplifier)

### 5.1. Mechanism Ass'y and Parts List (LA-50)

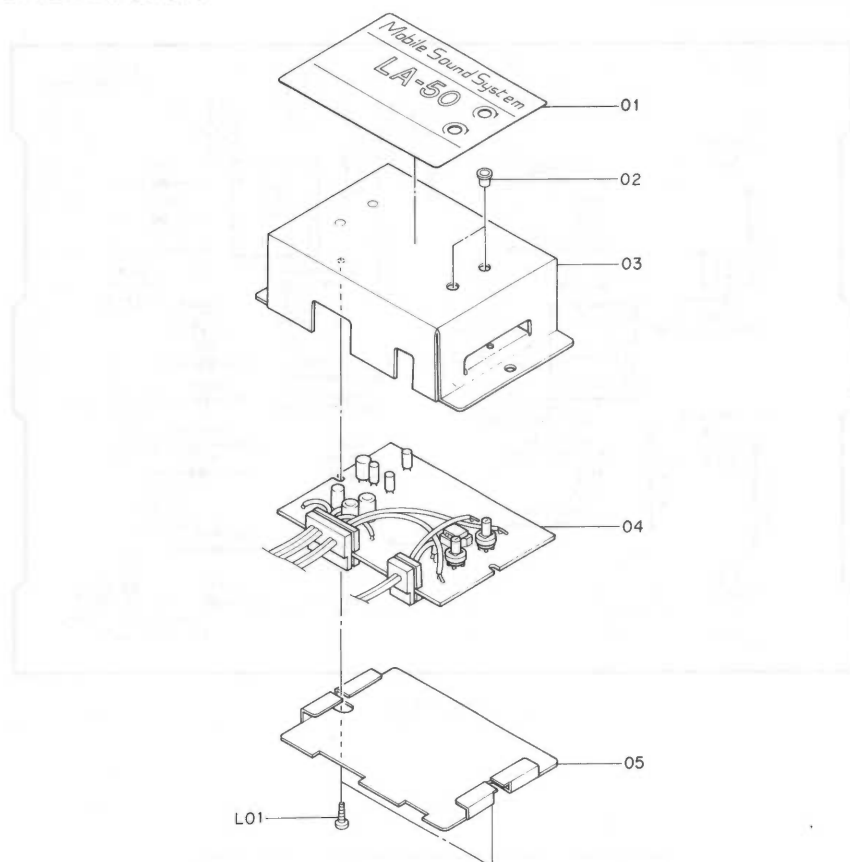


Fig. 5.1

Schematic Ref. No.	Part No.	Description	Q'ty
		<b>LA-50</b>	
01	OM04525A	Label for LA-50	1
02	OJ04812A	Sleeve	2
03	OH04372A	Case	1
04	BA05234A	Main P.C.B. Ass'y	1
05	OJ04810A	Insulator	1
L01	OE03028A	BT 3x8 $\oplus$ Binding (Nickel)	2

5.2. Mounting Diagram and Parts List (LA-50)  
5.2.1. Amp. P.C.B. Ass'y

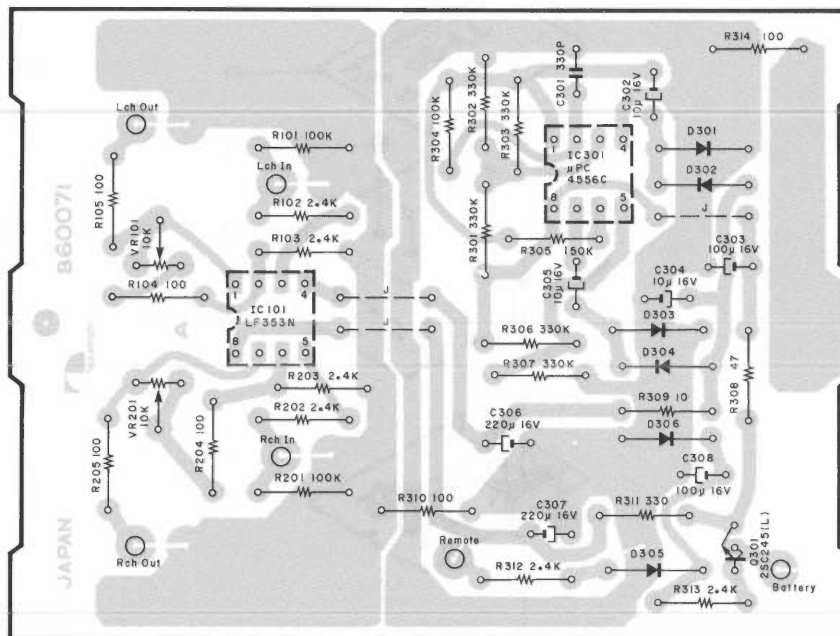


Fig. 5.2.1

Schematic Ref. No.	Part No.	Description
	<b>BA05234A</b>	<b>Amp. P.C.B. Ass'y</b>
IC101	OB60071A	Amp. P.C.B.
IC301	OB11032A	IC LF353N
Q301	OB06216A	IC $\mu$ PC4556C
D301,302	OB01872A	TR 2SC945L (P,Q)
303,304	OB06181A	SiD 1SS53
305,306		
VR101,201	OB32028A	Semi-fixed VR 10K
R101,201	OB01889A	RK 100K 1/4W J
304		
R102,103	OB09588A	RK 2.4K 1/4W J
202,203		
312,313		
R104,105	OB01679A	RK 100 1/4W J
204,205		
310,314		
R301,302	OB05627A	RK 330K 1/4W J
303,306		
307		
R305	OB05626A	RK 150K 1/4W J
R308	OB01706A	RK 47 1/4W J
R309	OB05936A	RK 10 1/4W J
R311	OB09754A	RK 330 1/4W J
C301	OB09285A	CC 330P 50V K
C302,304	OB01412A	CE 10 $\mu$ 16V
305		
C303,308	OB01400A	CE 100 $\mu$ 16V
C306,307	OB40079A	CE 220 $\mu$ 16V
	OE00174A	Earth Lug B-4 (1)
	OB80037B	Cord A (1)
	OB80038A	Cord B (1)

### 5.3. Schematic Diagram (LA-50)

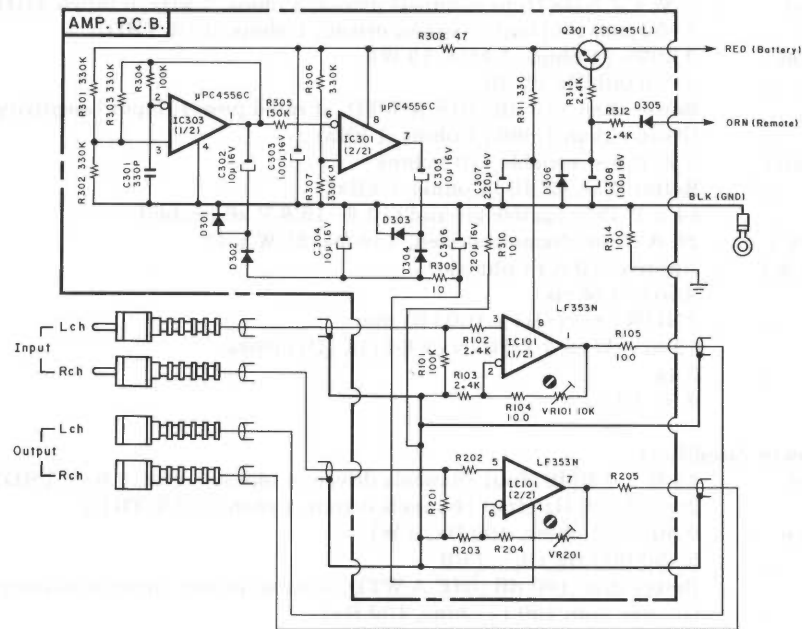


Fig. 5.3

- Notes:
1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
  2. Resistor and capacitor marked with \* show typical value.
  3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
  4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

## 6. SPECIFICATIONS

### 6.1. PA-350 (Mobile Power Amplifier)

Continuous Power Output	35 W x 4 RMS (four channels driven, 4 ohms, 1 kHz, 0.005% THD)
Power Bandwidth	5—50,000 Hz (four channels driven, 4 ohms, 0.1% THD)
Total Harmonic Distortion	0.003% (4 ohms, 1 kHz, 10 W)
Frequency Response	5—50,000 Hz $\pm$ 1 dB
Signal to Noise Ratio	Better than 110 dB (IHF A-WTD, at rated power, input sensitivity control at min.)
Damping Factor	Greater than 1,000 (4 ohms, 1 kHz)
Input Sensitivity/Impedance	0.2—0.8 V variable /10 kohms
Stereo Separation	Better than 80 dB (4 ohms, 1 kHz)
Power Source	14.4 V DC negative ground (10.8—15.6 V allowable)
Power Consumption (Max.)	26 A (four channels driven, 4 ohms, 35 W x 4)
(Music)	Approx. 10 A (4 ohms)
Load Impedance	Above 4 ohms
Dimensions	320 (W) x 52 (H) x 160 (D) mm
	12-5/8 (W) x 2-1/16 (H) x 6-5/16 (D) inches
Approximate Weight	3 kg
	6 lb. 10 oz.

### 6.2. PA-150 (Mobile Power Amplifier)

Continuous Power Output	14 W x 4 RMS (four channels driven, 4 ohms, 1 kHz, 0.05% THD)
Power Bandwidth	20—20,000 Hz (four channels driven, 4 ohms, 0.5% THD)
Total Harmonic Distortion	0.008% (4 ohms, 400 Hz, 5 W)
Frequency Response	5—50,000 Hz +0, -3 dB
Signal to Noise Ratio	Better than 100 dB (IHF A-WTD, at rated power, input sensitivity control at min.)
Damping Factor	Greater than 150 (4 ohms, 400 Hz)
Input Sensitivity/Impedance	0.2—0.8 V variable/47 kohms
Stereo Separation	Better than 80 dB (4 ohms, 400 Hz)
Power Source	14.4 V DC negative ground (10.8—15.6 V allowable)
Power Consumption (Max.)	10 A (four channels driven, 4 ohms, 14 W x 4)
(Music)	Approx. 3 A (4 ohms)
Load Impedance	Above 4 ohms
Dimensions	150 (W) x 30.5 (H) x 112 (D) mm
	5-7/8 (W) x 1-1/4 (H) x 4-1/2 (D) inches
Approximate Weight	0.8 kg
	1 lb. 12 oz.

### 6.3. EC-200 (Mobile Electronic Crossover)

Maximum Power Consumption	0.53 W
Rated Current Consumption	37 mA
Attenuation Slope	18 dB/oct
Crossover Frequencies	50, 70, 100, 150, 220 Hz (independent selection for low and high range)
Total Harmonic Distortion	Less than 0.003% (1 kHz, output 2 V)
Signal to Noise Ratio	Better than 105 dB
Input Level/Input Impedance	1 V/100 kohms
Output Level/Output	
Impedance	0—2 V (variable)/5 kohms
Maximum Input Level	3.5 V
Power Source	14.4 V DC, negative ground (10.8 V—15.6 V allowable)
Dimensions	120 (W) x 35 (H) x 105 (D) mm
	4-3/4 (W) x 1-3/8 (H) x 4-1/8 (D) inches
Approximate Weight	320 g
	11 oz.

### 6.4. EC-200H (Mobile Electronic Crossover)

Maximum Power Consumption	0.73 W
Rated Current Consumption	50 mA
Attenuation Slope	18 dB/oct
Crossover Frequencies	1.8 k, 2.5 k, 3.5 k, 4.5 k, 6 kHz (independent selection for low and high range)
Total Harmonic Distortion	Less than 0.003% (1 kHz, output 2 V)
Signal to Noise Ratio	Better than 105 dB
Input Level/Input Impedance	1 V/100 kohms
Output Level/Output	
Impedance	0—2 V (variable)/5 kohms
Maximum Input Level	3.5 V
Power Source	14.4 V DC, negative ground (10.8—15.6 V allowable)
Dimensions	120 (W) x 35 (H) x 105 (D) mm
	4-3/4 (W) x 1-3/8 (H) x 4-1/8 (D) inches



Approximate Weight . . . . . 320 g  
11 oz.

#### 6.5. LA-50 (Mobile Line Amplifier)

Voltage Gain . . . . . 0 — +14 dB  
Total Harmonic Distortion . . . . Less than 0.003% (0 dB, 1 kHz, output level 1 V)  
Frequency Response . . . . . DC—100,000 Hz  $\pm 0.5$  dB  
Signal to Noise Ratio . . . . . Better than 110 dB (IHF A-WTD, 0 dB)  
Input Level/Input Impedance . . . 0.16—0.8 V (variable)/100 kohms  
Output Level/Output  
Impedance . . . . . 0.8 V/100 ohms  
Power Source . . . . . 14.4 V DC, negative ground (10.8 V — 15.6 V allowable)  
Power Consumption . . . . . 170 mW  
Rated Current Consumption . . . 11.8 mA  
Dimensions . . . . . 115 (W) x 37 (H) x 72 (D) mm  
4-1/2 (W) x 1-1/2 (H) x 3 (D) inches  
Approximate Weight . . . . . 180 g  
6 oz.  
Supplied Mounting Hardware . . . Tapping Screw x 2, Flat Washer x 2, Spring Washer x 2

- Specifications and appearance design are subject to change for further improvement without notice.

# Service Manual

# Nakamichi

# PA-350/PA-150/EC-200/EC-200H/LA-50

## Nakamichi Corporation

Tokyo Office  
Shinjuku Daiichi Seimei Bldg.  
2-7-1 Nishishinjuku, Tokyo  
Phone (03) 342-4461  
Telex : 2324721 (NAKAM J)

## Nakamichi U.S.A. Corporation

19701 South Vermont Avenue  
Torrance, California 90502  
Phone : (213) 538-8150

## Nakamichi GmbH

Stephanienstrasse 6, 4000 Düsseldorf 1  
Phone : (0211) 359036