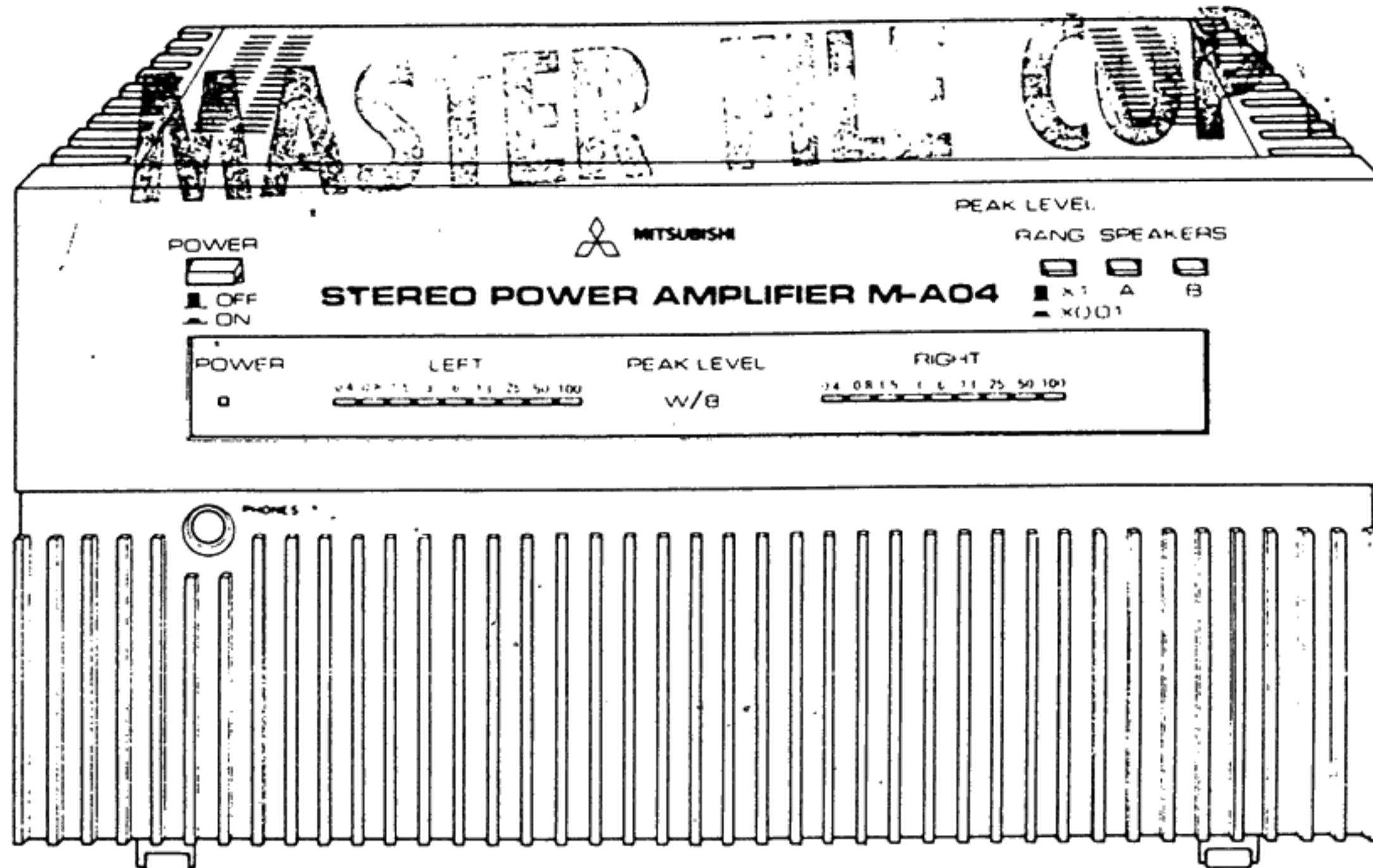




# SERVICE MANUAL

## STEREO POWER AMPLIFIER

### MODEL M-A04



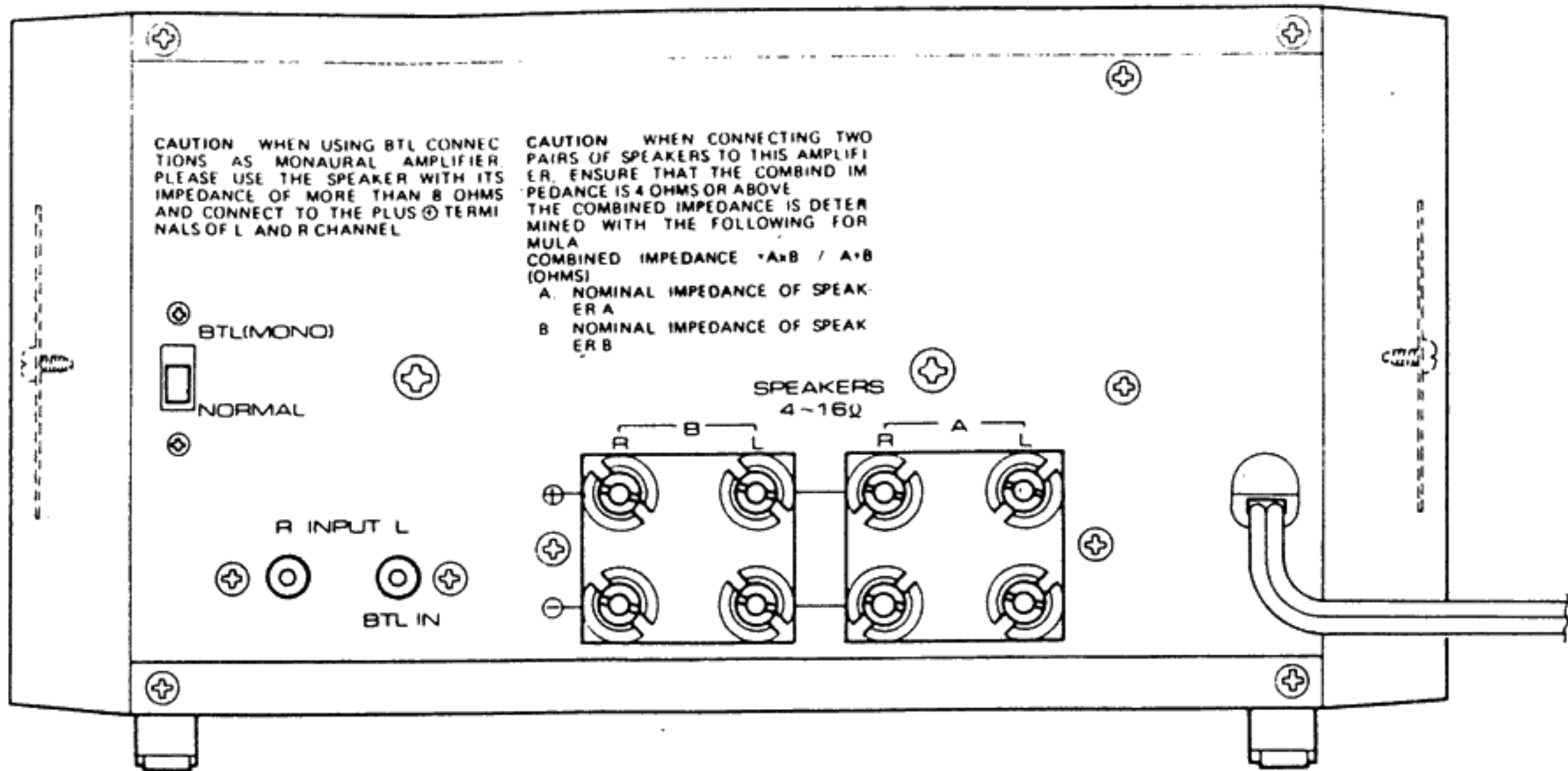
#### SPECIFICATIONS

**Min. RMS power output** . . . . .  
 50 watts per channel, min. RMS, at 8 ohms  
 from 20 Hz to 20 KHz with no more than  
 0.02% total harmonic distortion  
 60 watts per channel, min. RMS, at 4 ohms  
 from 20 Hz to 20 KHz with 0.02% total  
 harmonic distortion  
 100 watts with BTL connection at 8 ohms  
 from 20 Hz to 20 KHz with 0.05% total  
 harmonic distortion  
**Dynamic headroom** . . . . .  
 1.0 dB  
**Power bandwidth (IHF, 0.1% THD)** . . . . .  
 10 Hz ~ 100 KHz  
**Damping factor (20 Hz ~ 20 KHz)** . . . . .  
 55  
**Slew rate** . . . . .  
 120V/ $\mu$  sec  
**Total harmonic distortion** . . . . .  
 0.008% at half output (25W)  
 0.01% at 1W output  
 0.03% at 50W with BTL connection

**Intermodulation distortion** . . . . .  
 0.003% at rated output (50W)  
 0.006% at 1W output  
**Input sensitivity/impedance** . . . . .  
 1V/50K ohms (stereo, BTL connection)  
**Frequency response** . . . . .  
 -1 dB, DC ~ 250 KHz at 0.5W output  
**Signal to noise ratio** . . . . .  
 118 dB (A-weighted, closed circuit)  
 117 dB (new IHF, A-weighted)  
**Power consumption** . . . . .  
 150W  
**Dimensions (W x H x D)** . . . . .  
 270 x 140 x 243mm  
 (10-5/8 x 5-1/2 x 9-5/8")  
**Weight** . . . . .  
 7.2 Kg (16 lbs)

Design and specifications are subject to change  
 without notice for improvement.

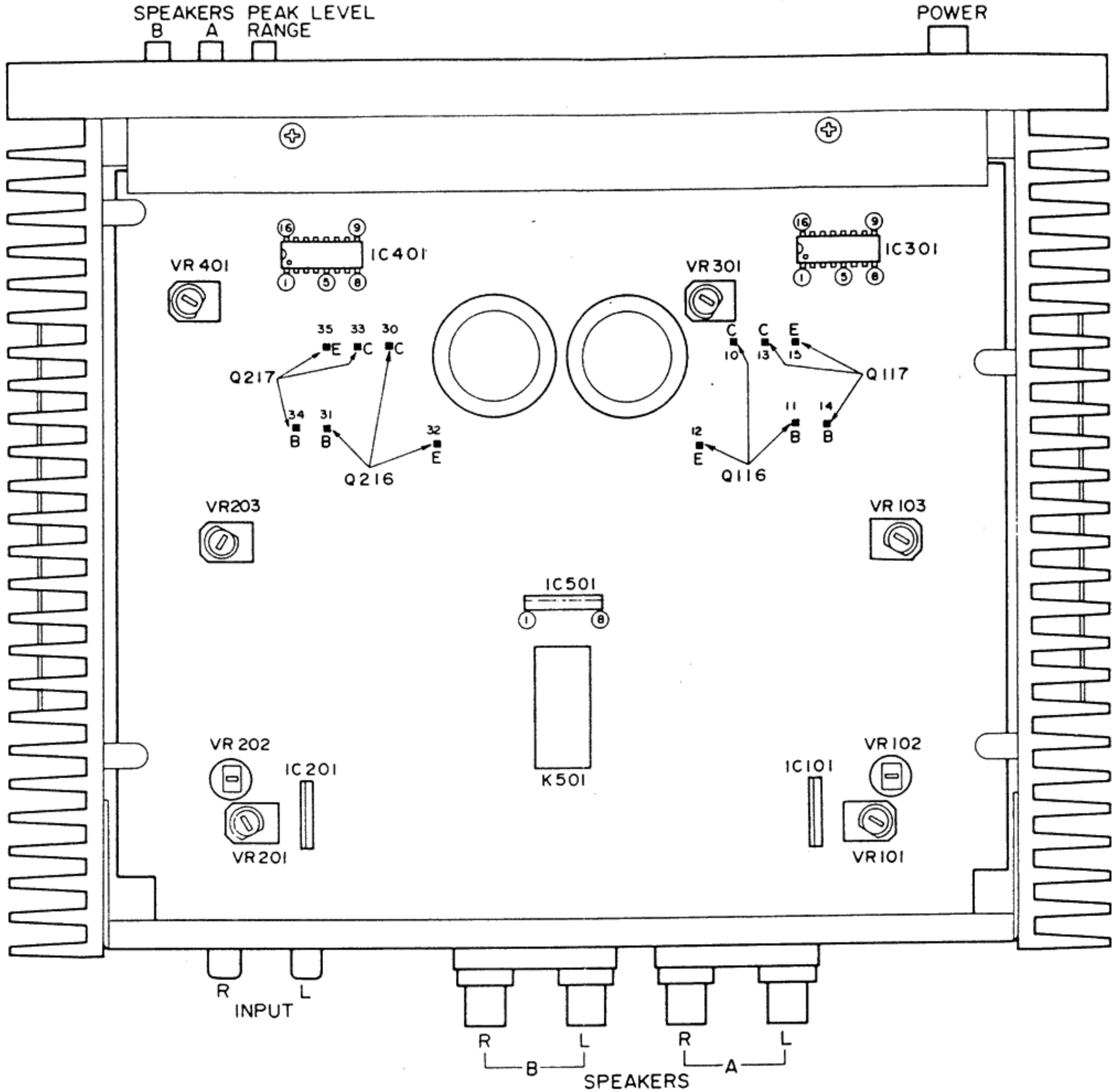
# BACK PANEL



## DISASSEMBLY INSTRUCTIONS

- 1. Remove upper and lower covers**
  - (1) Loosen two screws (black M3 x 6) fastening the upper cover and pull the cover backwards.
  - (2) Loosen two screws (black M3 x 6) fastening the lower cover from the rear side and three screws (black T1-3 x 20) fastening the cover from the lower side.
- 2. Remove the upper side of the front panel assembly.**
  - (1) Remove the upper cover according to 1, (1).
  - (2) Loosen two screws (black M3 x 10) each fastening the panel from the upper side right and left sides, respectively.
  - (3) Pull the entire panel forward from the rear of the upper side and both sides of the panel.
  - (4) To replace the panel, insert the tip of the left side knob about 2mm into the left side panel, and push the right side panel outward and at the same time, push the front panel in position.
- 3. Remove the front panel**
  - (1) Remove the upper side according to the step 2 above.
  - (2) Loosen four screws (flat head 3 x 6) fastening the panel from upper and lower sides.
- 4. Remove the lower side of the front panel.**
  - (1) Remove the lower cover according to the step 1, (2) above.
  - (2) Loosen the screw (T1-3 x 20) located at each of the upper side of right and left sides of the lower side of the panel.
- 5. Remove the left side panel or right side panel.**
  - (1) Remove the upper and lower cover according to step 1.
  - (2) Place the panel assembly with the side panel to be removed up.
  - (3) Loosen two screws (black T2-3 x 8), fastening the side panel from the rear of the base plate.
  - (4) Loosen three screws fastening the side panel from the front panel side.
  - (5) Remove two screws (black T2-3 x 8) fastening the decoration plate at the center of the side panel.
  - (6) Remove the decoration plate, and loosen one screw (black M4 x 8).

# ADJUSTMENTS



## 1. Adjustment of the idling current with no load and no signal applied

- 1-1 Connect a DC voltmeter between the emitters of Q116 (12) and Q117 (15) or the emitters of Q216 (32) and Q217 (35).
- 1-2 Turn VR103 and VR203 fully in the direction opposite of the arrow mark. (Minimum voltage)
- 1-3 Adjust the voltage so that the voltmeter indicates  $15\text{mV} \pm 5\text{mV}$ .

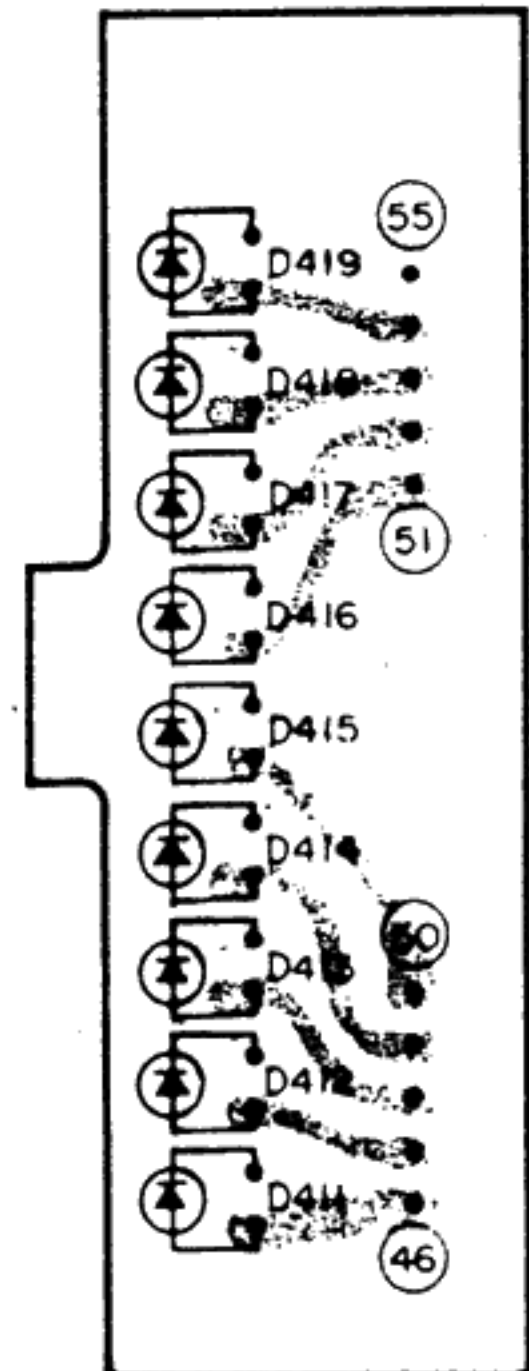
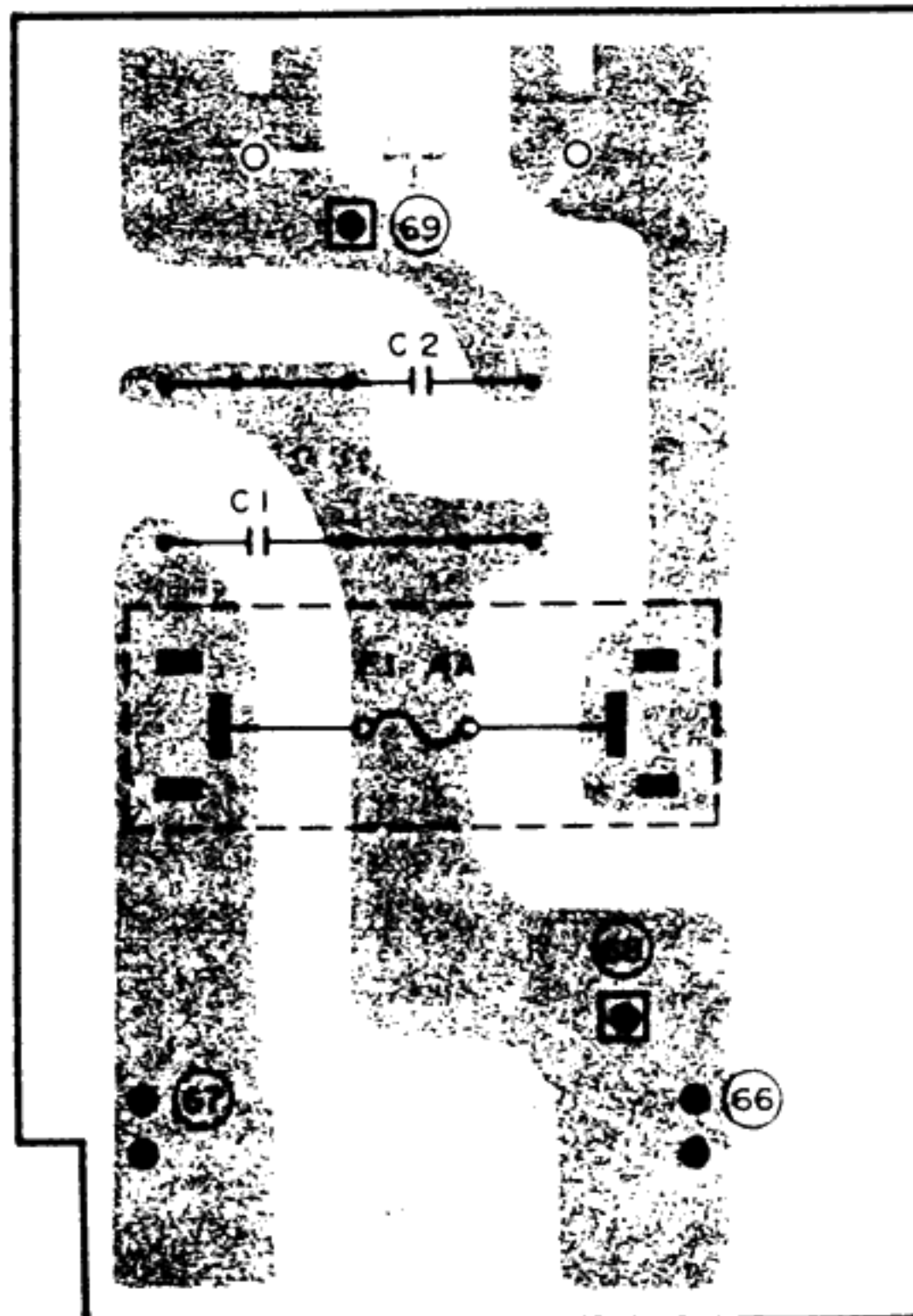
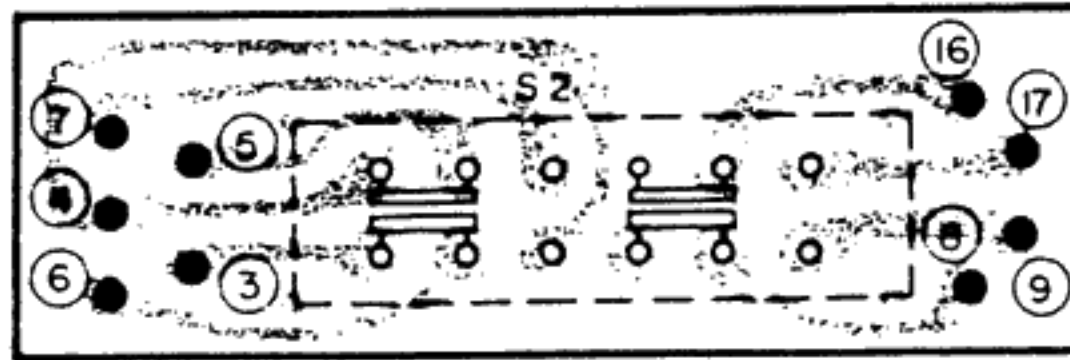
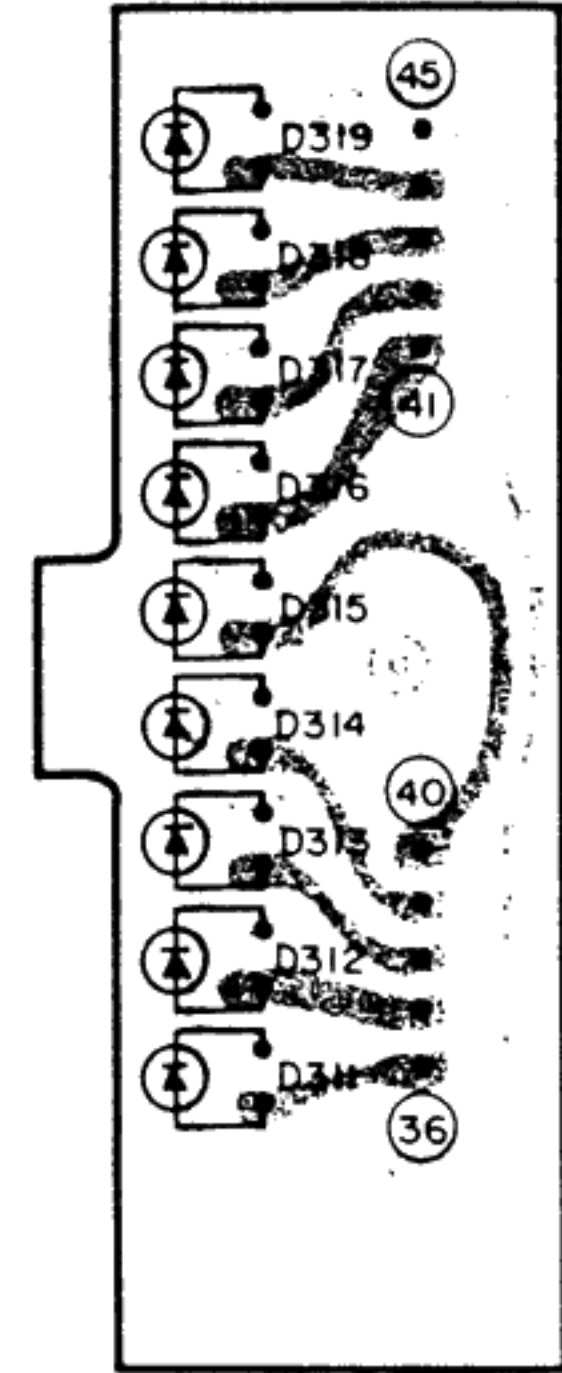
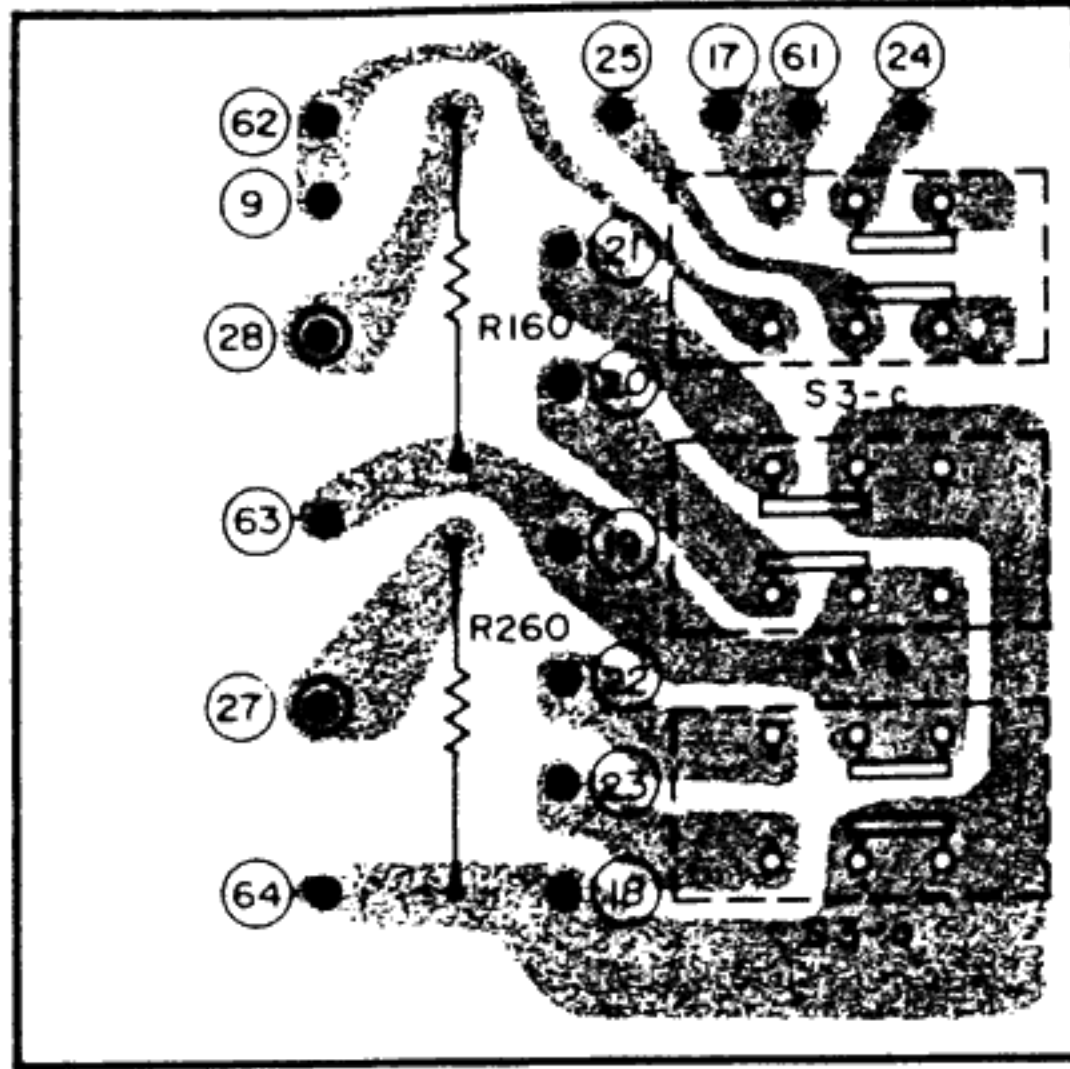
## 2. Adjustment of the midpoint potential

- 2-1 Connect a DC voltmeter between the speaker output terminal and ground.
  - 2-2 Turn VR101 and VR201 to their center positions.
  - 2-3 Adjust VR102, VR101\*, VR202 and VR201\* in this order so that the voltmeter indicates  $0 \pm 5\text{mV}$ .
- \*VR101 and VR201 are for fine adjustment.

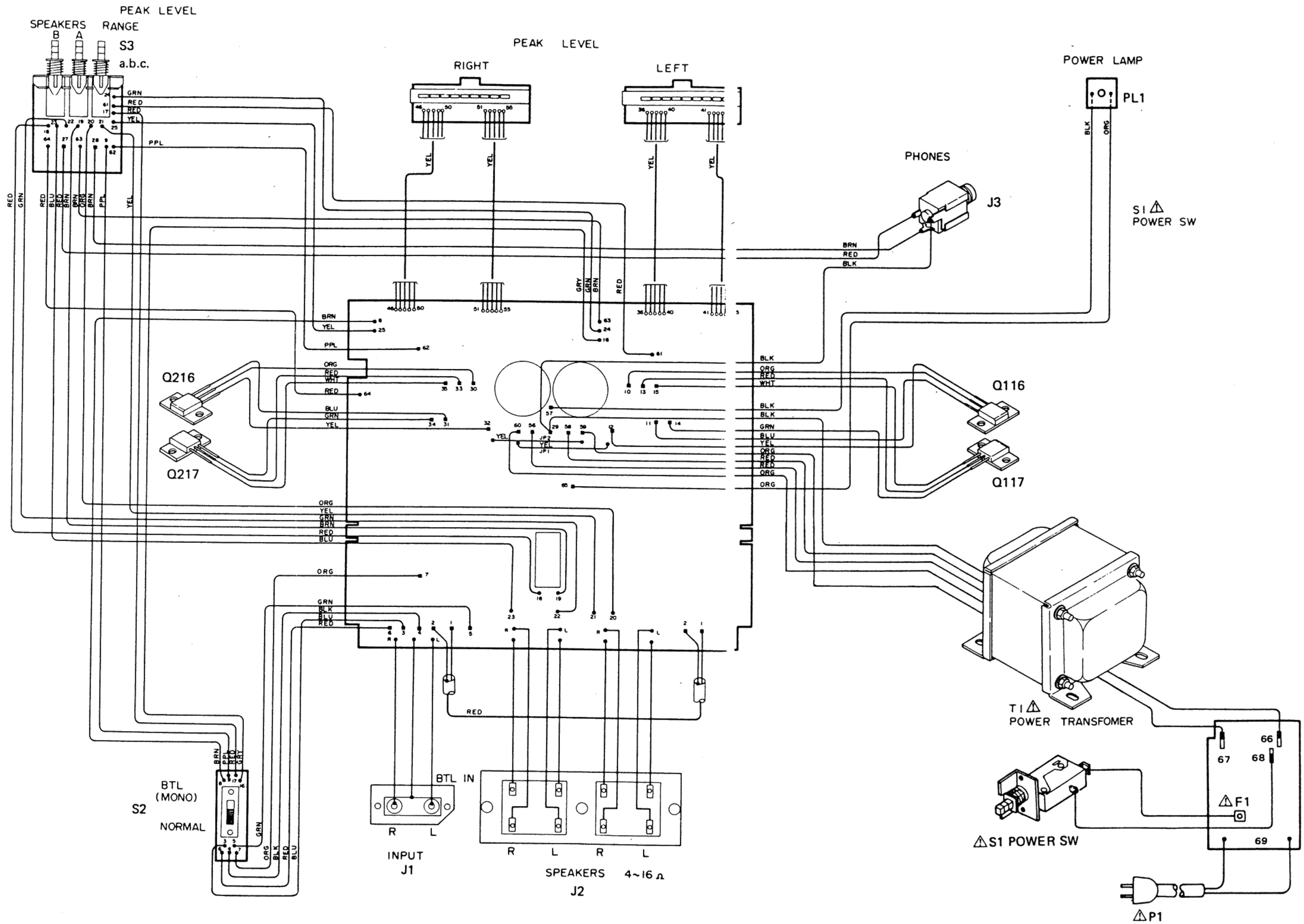
## 3. Adjustment of the peak indicator offset voltage (with no signal applied)

- 3-1 After adjusting the midpoint potential, connect a DC voltmeter between pin No. 5 of IC301 or IC401 and ground.
- 3-2 Adjust VR301 or VR401 for minimum voltage.

# PRINTED CIRCUIT BOARDS

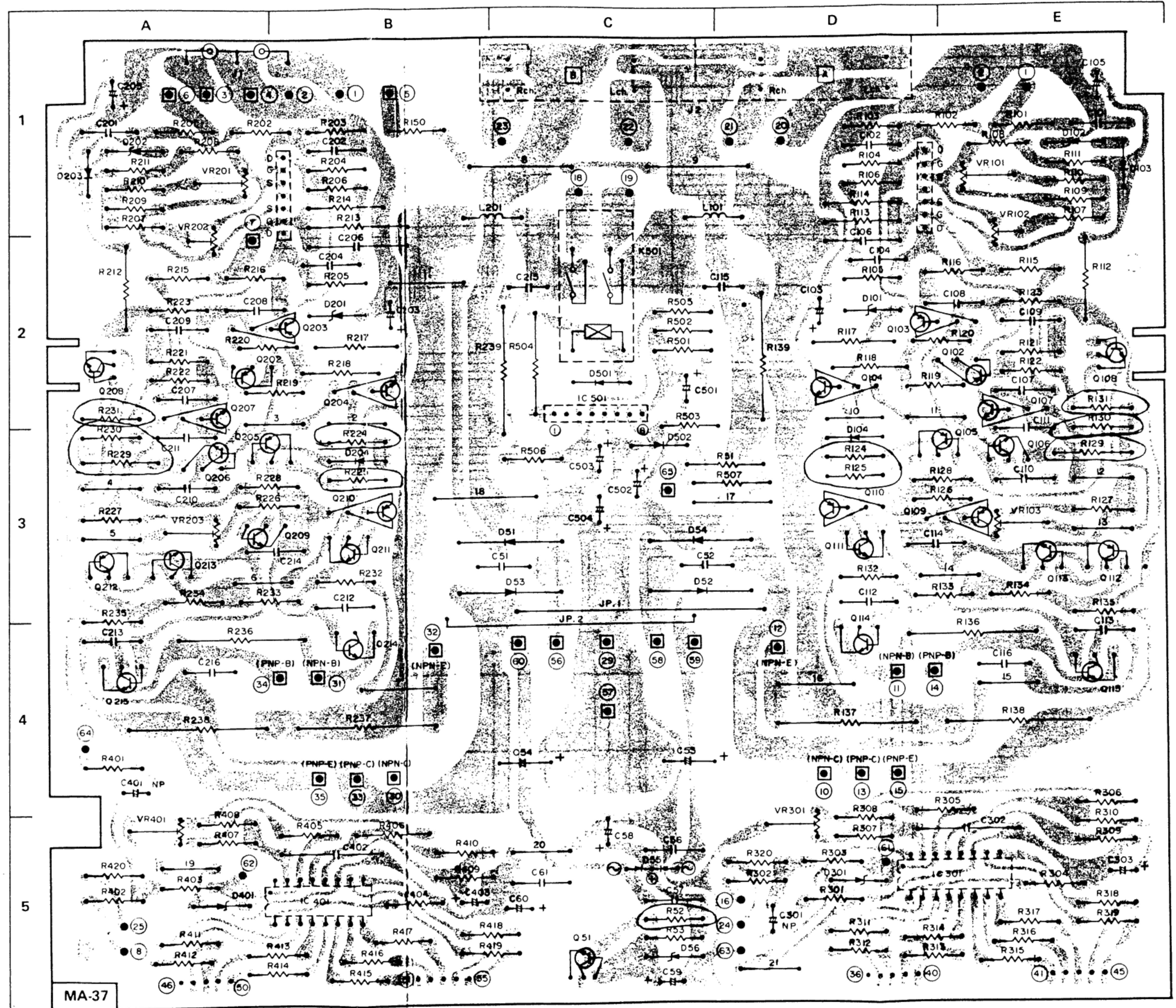


# WIRING DIAGRAM

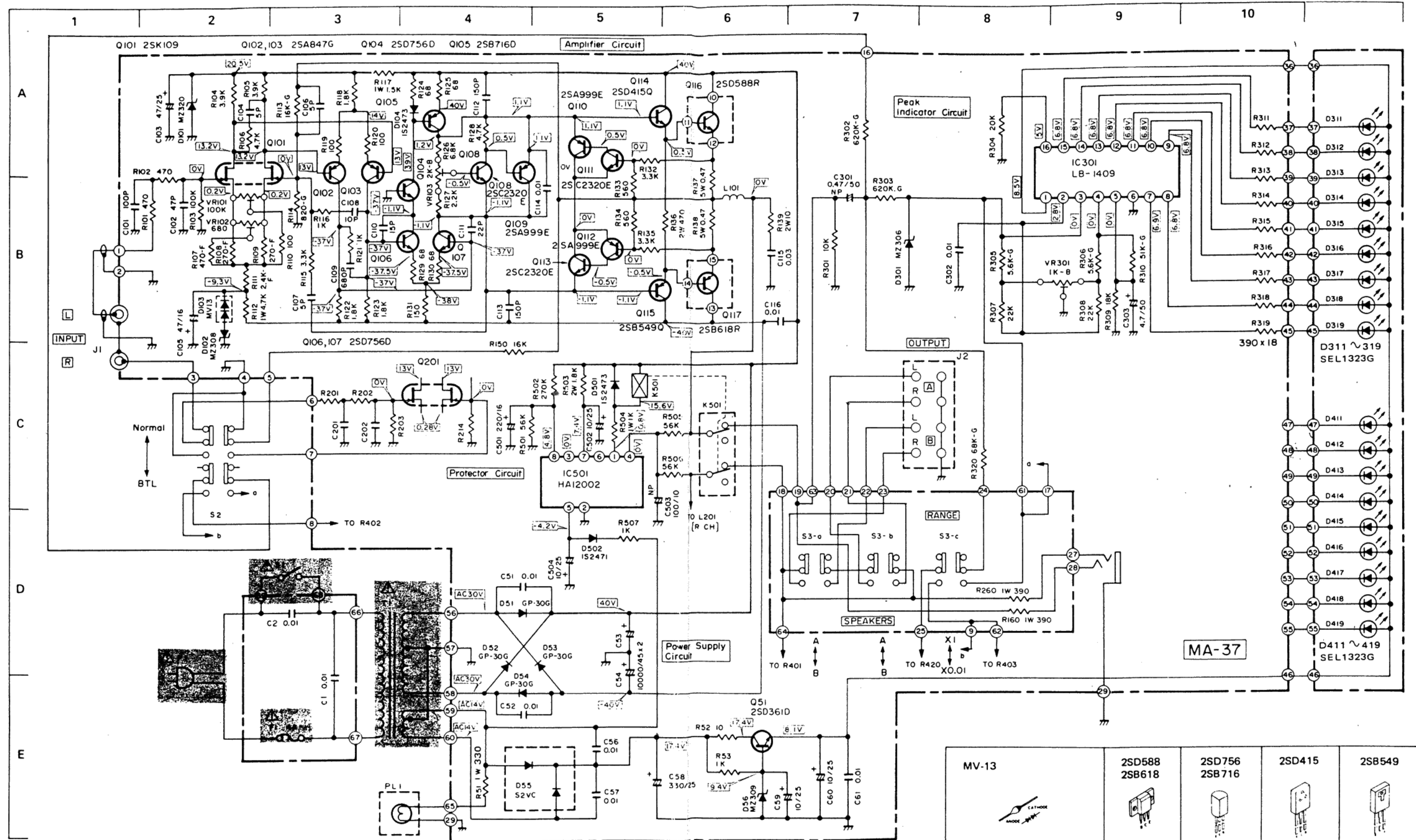


SYMBOL & LOCATION

C51	C-3	JP2	C-4	R201	A-1	R501	C-2
C52	C-3			R202	A-1	R502	C-2
C53	C-4	K501	C-2	R203	B-1	R503	C-3
C54	C-4			R204	B-1	R504	C-2
C56	C-5	L101	D-1	R205	B-2	R505	C-2
C57	C-5	L201	C-1	R206	B-1	R506	C-3
C58	C-5	Q51	C-5	R207	A-1	R507	D-3
C59	C-5	Q102	E-2	R208	A-1	VR101	E-1
C60	C-5	Q103	D-2	R209	A-1	VR102	E-2
C61	C-5	Q104	D-2	R210	A-1	VR103	E-3
C101	E-1	Q105	E-3	R211	A-1	VR201	A-1
C102	D-1	Q106	E-3	R212	A-2	VR202	A-2
C103	D-2	Q107	E-2	R213	B-1	VR203	A-3
C104	D-2	Q108	E-2	R214	B-1	VR301	D-5
C105	E-1	Q109	E-3	R215	A-2	VR401	A-5
C106	D-2	Q110	D-3	R216	A-2		
C107	E-2	Q111	D-3	R217	B-2		
C108	E-2	Q112	E-3	R218	B-2		
C109	E-2	Q113	E-3	R219	B-2		
C110	E-3	Q114	D-4	R220	A-2		
C111	E-3	Q115	E-4	R221	A-2		
C112	D-3	Q202	A-2	R222	A-2		
C113	E-4	Q203	B-2	R223	A-2		
C114	D-3	Q204	B-2	R224	B-3		
C115	D-2	Q205	A-3	R225	B-3		
C116	E-4	Q206	A-3	R226	A-3		
C201	A-1	Q207	A-2	R227	A-3		
C202	B-1	Q208	A-2	R228	A-3		
C203	B-2	Q209	A-3	R229	A-3		
C204	B-2	Q210	B-3	R230	A-3		
C205	A-1	Q211	B-3	R231	A-2		
C206	B-2	Q212	A-3	R232	B-3		
C207	A-2	Q213	A-3	R233	B-3		
C208	A-2	Q214	B-4	R234	A-3		
C209	A-2	Q215	A-4	R235	A-3		
C210	A-3			R236	A-4		
C211	A-3	R51	D-3	R237	B-4		
C212	B-3	R52	C-5	R238	A-4		
C213	A-4	R53	C-5	R239	C-2		
C214	B-3	R101	E-1	R301	D-5		
C215	C-2	R102	E-1	R302	D-5		
C216	A-4	R103	D-1	R303	D-5		
C301	D-5	R104	D-1	R304	E-5		
C302	E-5	R105	D-2	R305	E-5		
C303	E-5	R106	D-1	R306	E-4		
C401	A-4	R107	E-1	R307	D-5		
C402	B-5	R108	E-1	R308	D-5		
C403	B-5	R109	E-1	R309	E-5		
C501	C-2	R110	E-1	R310	E-5		
C502	C-3	R111	E-1	R311	D-5		
C503	C-3	R112	E-2	R312	D-5		
C504	C-3	R113	D-1	R313	D-5		
		R114	D-1	R314	D-5		
D51	C-3	R115	E-2	R315	E-5		
D52	C-3	R116	E-2	R316	E-5		
D53	C-3	R117	D-2	R317	E-5		
D54	C-3	R118	D-2	R318	E-5		
D55	C-5	R119	D-2	R319	E-5		
D56	C-5	R120	E-2	R320	D-5		
D101	D-2	R121	E-2	R401	A-4		
D102	E-1	R122	E-2	R402	A-5		
D103	E-1	R123	E-2	R403	A-5		
D104	D-3	R124	D-3	R404	B-5		
D201	B-2	R125	D-3	R405	B-5		
D202	A-1	R126	E-3	R406	B-5		
D203	A-1	R127	E-3	R407	A-5		
D204	B-3	R128	E-3	R408	A-5		
D301	D-5	R129	E-3	R409	B-5		
D401	A-5	R130	E-3	R410	B-5		
D501	C-2	R131	E-2	R411	A-5		
D502	C-3	R132	D-3	R412	A-5		
		R133	E-3	R413	B-5		
IC301	E-5	R134	E-3	R414	B-5		
IC401	B-5	R135	E-4	R415	B-5		
IC501	C-2	R136	E-4	R416	B-5		
		R137	D-4	R417	B-5		
J1	A-1	R138	E-4	R418	B-5		
J2	C-1	R139	D-2	R419	B-5		
JP1	C-3	R150	B-1	R420	A-5		



# SCHEMATIC DIAGRAM



## NOTE

1. Capacitor and resistor units  
 C...no-symbol:  $\mu$ F  
 P symbol: pF  
 R ..... no-symbol:  $\Omega$   
 K symbol: K  $\Omega$
2. All the resistors are carbon 1/4 W units unless otherwise specified.
3. The voltages are the values measured with a DC voltmeter on 100V range, no signal applied.

4. The right channel is omitted from the circuit below.  
 Right channel circuit ..... Specifications are 200 series  
 Peak indicator circuit ..... Specifications are 400 series
  5.  $\Delta$  and  $\square$  marks components that are critical for continued safety and performance of this unit. Replace only with components of exact type as specified.
- \*Specifications of this unit are subject to change without notice for improvement.

MV-13 	2SD588 2SB618 	2SD756 2SB716 	2SD415 	2SB549 
2SD361 	SEL1323G 	2SC2320 2SA999 	2SA847 	2SK 109 

# PARTS LIST

NOTE:  $\Delta$  and ~~XXXX~~ marked components on the parts list have special characteristics to maintain the safety performance of this unit. When replacing any of these parts, be sure to use only the specified parts.

Symbol No.	Parts No.	Description
<b>Diodes</b>		
D51	M07447321	GP30D
D52	M07447321	GP30D
D53	M07447321	GP30D
D54	M07447321	GP30D
D55	M05163321	S2VC10
D56	M07447322	MZ309
D101	M07493320	MZ320
D102	M07493321	MZ308
D103	M04091331	MV13
D104	M05200320	1S2473
D201	M07493320	MZ320
D202	M07493321	MZ308
D203	M04091331	MV13
D204	M05200320	1S2473
D301	M07492320	MZ306
D311	M07447320	SEL1323G (Peak Level)
D312	M07447320	SEL1323G (Peak Level)
D313	M07447320	SEL1323G (Peak Level)
D314	M07447320	SEL1323G (Peak Level)
D315	M07447320	SEL1323G (Peak Level)
D316	M07447320	SEL1323G (Peak Level)
D317	M07447320	SEL1323G (Peak Level)
D318	M07447320	SEL1323G (Peak Level)
D319	M07447320	SEL1323G (Peak Level)
D401	M07492320	MZ306
D411	M07447320	SEL1323G (Peak Level)
D412	M07447320	SEL1323G (Peak Level)
D413	M07447320	SEL1323G (Peak Level)
D414	M07447320	SEL1323G (Peak Level)
D415	M07447320	SEL1323G (Peak Level)
D416	M07447320	SEL1323G (Peak Level)
D417	M07447320	SEL1323G (Peak Level)
D418	M07447320	SEL1323G (Peak Level)
D419	M07447320	SEL1323G (Peak Level)
D501	M05200320	1S2473
D502	M07492321	1S2471
<b>Transistors</b>		
Q51	M07506303	2SD361
Q101	M07213303	2SK109
Q102	M07140303	2SA847
Q103	M07140303	2SA847
Q104	M07370305	2SD756
Q105	M07370306	2SB716
Q106	M07370305	2SD756
Q107	M07370305	2SD756
Q108	M07390303	2SC2320
Q109	M07390304	2SA999

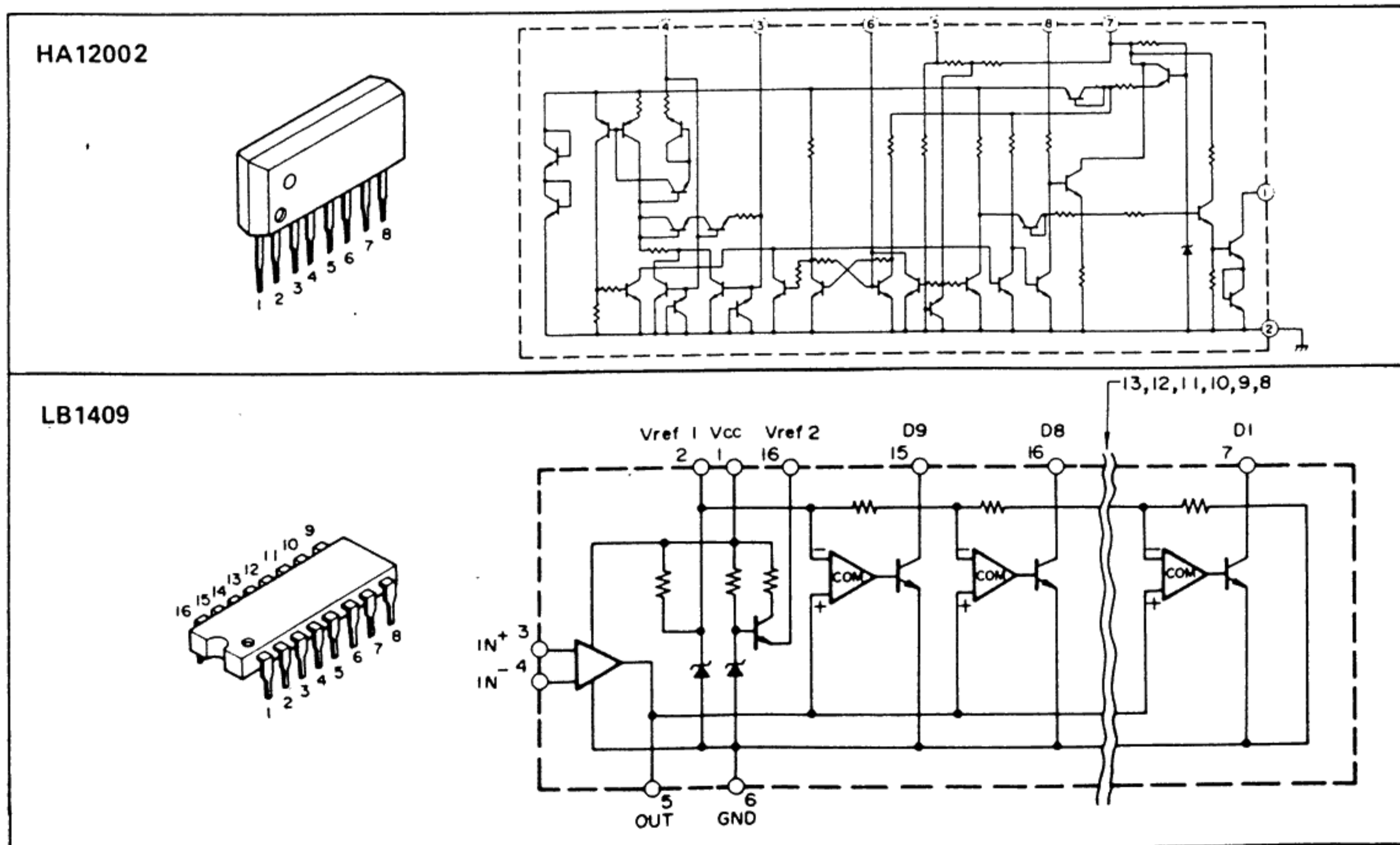
Symbol No.	Parts No.	Description
Q110	M07390304	2SA999
Q111	M07390303	2SC2320
Q112	M07390304	2SA999
Q113	M07390303	2SC2320
Q114	M07230306	2SD415
Q115	M07230307	2SB549
Q116	M07230308	2SD588
Q117	M07230309	2SB618
Q201	M07213303	2SK109
Q202	M07140303	2SA847
Q203	M07140303	2SA847
Q204	M07370305	2SD756
Q205	M07370306	2SB716
Q206	M07370305	2SD756
Q207	M07370305	2SD756
Q208	M07390303	2SC2320
Q209	M07390304	2SA999
Q210	M07390304	2SA999
Q211	M07390303	2SC2320
Q212	M07390304	2SA999
Q213	M07390303	2SC2320
Q214	M07230306	2SD415
Q215	M07230307	2SB549
Q216	M07230308	2SD588
Q217	M07230309	2SB618
<b>IC's</b>		
IC301	M07447344	LB1409
IC401	M07447344	LB1409
IC501	M07447343	HA12002
<b>Electrical Parts</b>		
C53, 54	M07461360	C-Electrolytic-45V 10000
C116, 216	M07492360	C-Ceramic-500V 103M
<del>M07514490 For SA-311</del>		
J1	M07447475	Pin Jack
J2	M07440575	Terminal Board
J3	M05104441	Jack (Phones)
K501	M07447465	Relay
L101, 201	M07072530	Coil
<del>M07234300</del>		
PL-1	M07370250	Lamp
<del>M07234300</del>		
S2	M07447450	SW-Slide
S3-a ~ c	M07389450	SW-Push (Peak level range, Speakers)
<del>M07234300</del>		



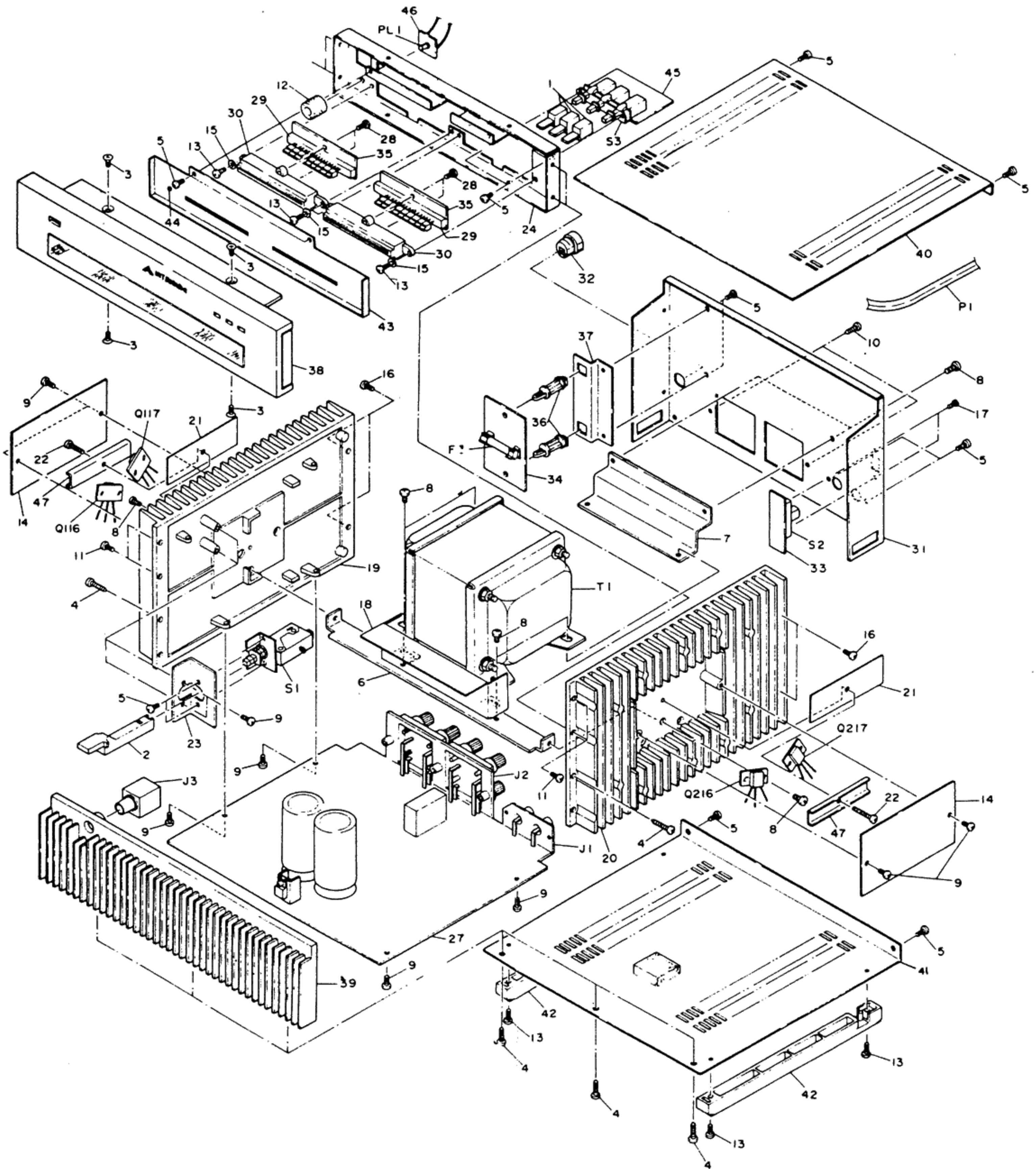
Symbol No.	Parts No.	Description
VR101, 201	M05175362	VR-SEMI-B100K
VR102, 202	M07213436	VR-SEMI-B680
VR103, 203	M07440437	VR-SEMI-B2K
VR301, 401	M07440435	VR-SEMI-B1K
Cabinet Parts		
1	M07357211	Knob (Peak, SP)
2	M05147120	Knob (Power)
3		Screw-F M3 x 6
4		T-Screw 1-3 x 20
5		Screw-B M3 x 6
6		Holder
7		Holder
8		Screw-B 2-3 x 8
9		T-Screw 2-3 x 8
10		T-Screw 1-3 x 12
11		Screw-B M3 x 10
12		Shade (Lamp)
13		T-Screw 2-3 x 10
14		Cover (Side Plate)
15		Washer 3
16		T-Screw M3 x 10
17		Screw-B M2.6 x 4
18		Holder
19	M07534113	Radiator-Ass'y (L)
20	M07534114	Radiator-Ass'y (R)

Symbol No.	Parts No.	Description
21		Sheet
22		Screw-B M3 x 16
23		Holder-Z
24		Panel-Front (Sub)
27		P.C.B. Assy
28		T-Screw 2-3 x 8
29		Cushion-PL
30		Bush Mold
31	M07534102	Panel Back
32	M07510060	Clamper(for Panel Back)
33		P.C.B
34		P.C.B
35		P.C.B
36		Clamper (P.C.B)
37		Holder-Z
38	M07534100	Panel-Ass'y (Front)
39	M07534225	Ornament-Ass'y (J3)
40	M07534104	Cover Assy (Top)
41	M07534106	Cover-Assy (Bottom)
42	M07534190	Leg-Assy
43		Ornament-Assy (Indicator)
44		Indicator (Power)
45		P.C.B
46		P.C.B
47		Holder-U

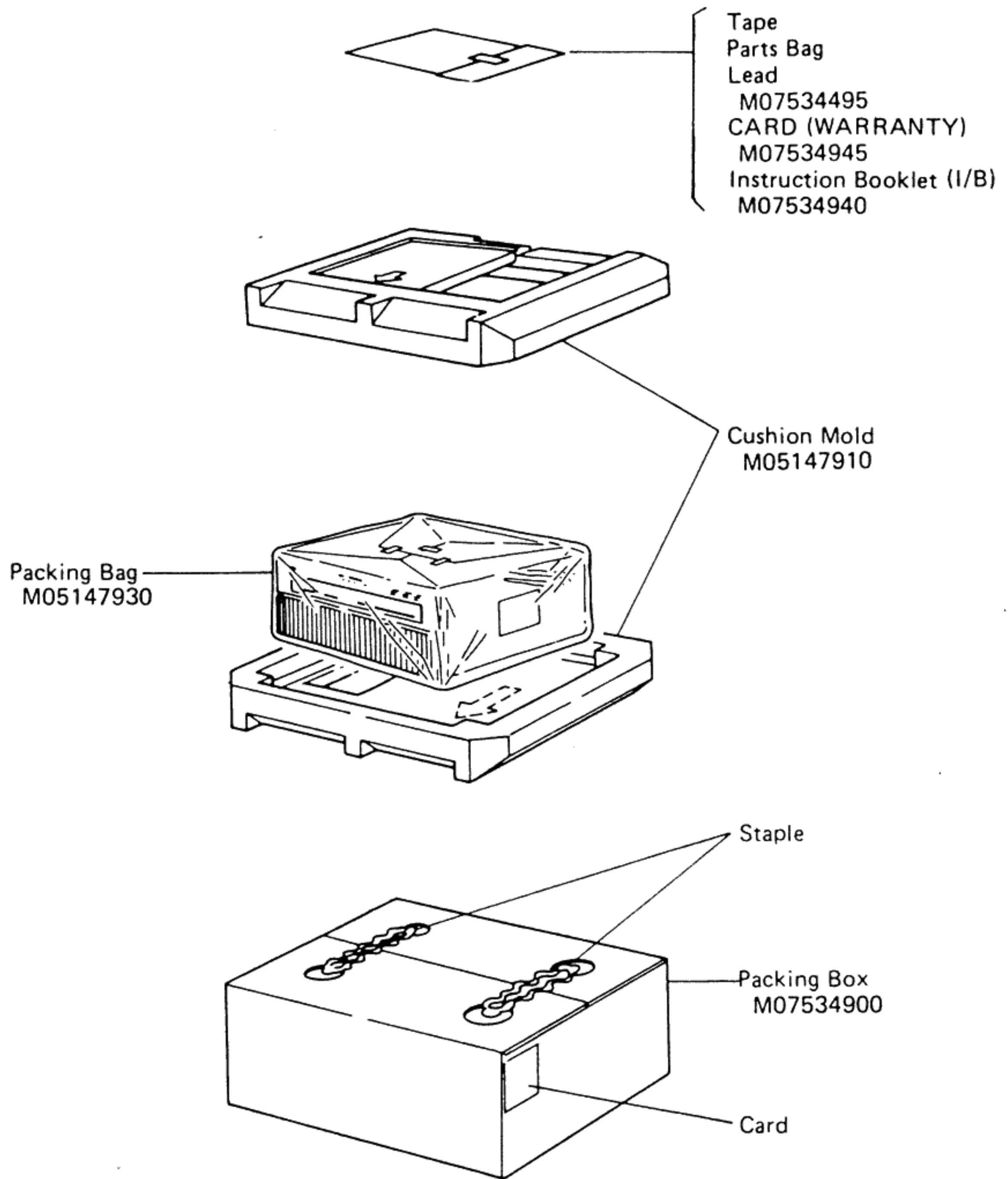
## INTERNAL DIAGRAMS AND PINOUT OF INTEGRATED CIRCUITS



# EXPLODED VIEW



# PACKING INSTRUCTIONS:



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