

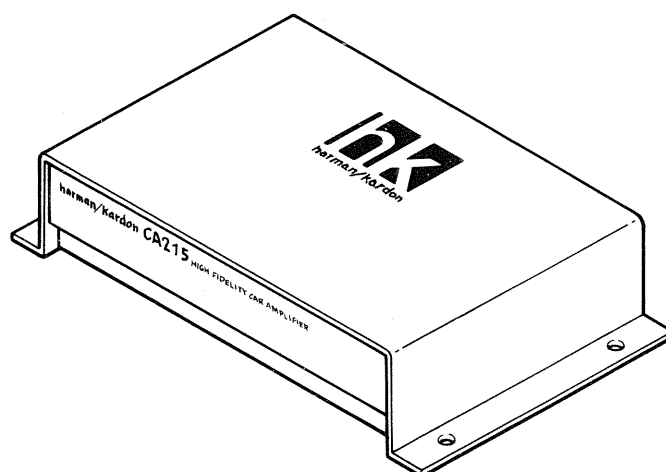
The Harman Kardon Model CA215

Manual 100A

HIGH FIDELITY CAR AMPLIFIER

Technical Manual

CA215



SPECIFICATIONS

Power Output, RMS	: 12 watts per channel into 4 Ohms, 20 ~ 20,000Hz	Power Supply	: DC +13.8V (11 ~ 16V usable), negative ground
HCC (High instantaneous Current Capability)	: 14A	Typical Input Current Requirements	
THD	: No more than 0.2% (4 Ohms)	At Idle	: 0.3A
Negative Feedback	: 25dB	Full Power Music Signal	: 1.2A (4 Ohms/ch.)
Power Bandwidth	: 10Hz to 100,000Hz	Full Power Sine Wave	: 3.6A (4 Ohms/ch.)
Frequency Response	: 10Hz to 100,000Hz +0, -3dB	Dimensions (W x H x D)	: 8-1/4" x 1-11/16" x 6-3/16" (208 x 42 x 156 mm)
Signal-to-Noise Ratio	: 84dB	Weight	: 2lbs. 3oz. (1kg)
Input Sensitivity/Impedance	: 0.1V/0.5V (Switchable)/ 22k Ohms		

Specifications and components subject to change without notice.
Overall performance will be maintained or improved.

harman/kardon

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1112-H152100A4 P-088601 1850 Printed in Japan

DISASSEMBLY PROCEDURES (REFER TO THE FOLLOWING FIGURE)

1 CABINET (131) REMOVAL

Remove 5 screws **A** and then remove the Cabinet (131).

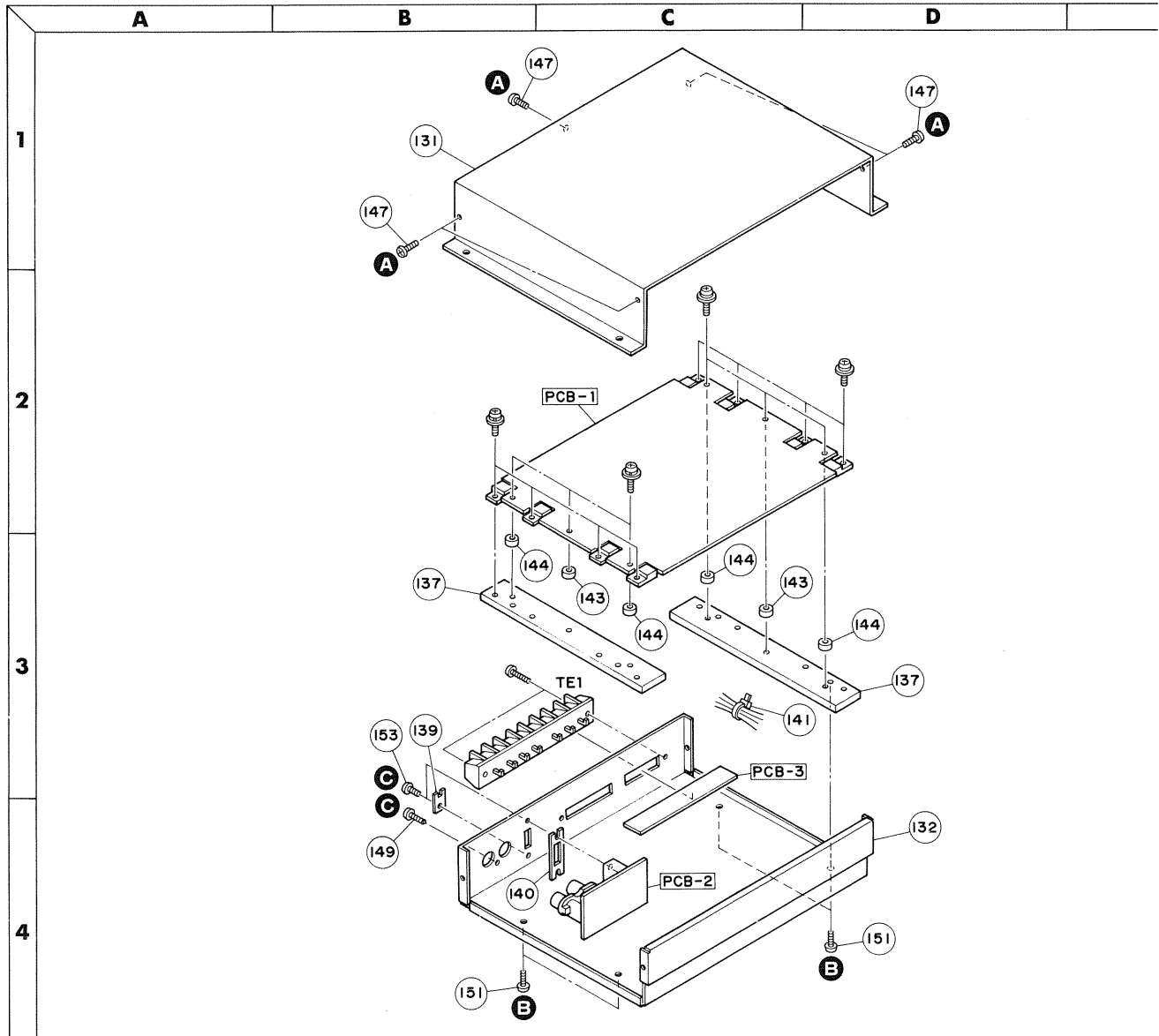
2 MAIN P. C. BOARD (PCB-1) REMOVAL

1. Remove the Cabinet (131), referring to the previous step **1**.
2. Remove 4 screws **B** and then remove the Main P. C. Board (PCB-1) with the Heat Sinks (137). If necessary, unsolder the lead wires.

3 INPUT JACK P. C. BOARD (PCB-2) REMOVAL

1. Remove the Main P. C. Board (PCB-1), referring to the previous step **2**.
2. Remove 3 screws **C** and then remove the Input Jack P. C. Board (PCB-2). If necessary, unsolder the lead wires.

GENERAL UNIT EXPLODED VIEW



PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
131	1414-06001	Cabinet		2310-7034	Mounting Screws and Washers (1 Set) (Accessory)
132	1424-17001	Cabinet Bottom		1221-717182	Packing Box
137	2222-7191	Heat Sink		1222-7285	Packing Cushion, Left
139	2240-7224	Holder		1222-7286	Packing Cushion, Right
140	2240-7225	Holder			
141	2240-7120	Holder			
143	2132-7141	Spacer			
144	2132-7119	Spacer			
147	2347-3006K7	Screw (3 × 6mm)			
149	2347-3010K1	Screw (3 × 10mm)			
151	2340-7003	Special Screw (3 × 8mm)			
153	2327-2605K9	Screw (2.6 × 5mm)			
	1111-J30227	Owner Guide U			
	1111-J30228	Owner Guide EW			

U : U.S.A. model

EW : General model

* The part with the above mark is used only in the model made for the particular market the mark indicates.

CIRCUIT DESCRIPTION

● PRINCIPLE OF OPERATION

In order to obtain 12 watts per channel rated output power from a 13.8 volt power supply a bridge type of circuit is employed. Each channel consists of two power amplifiers and the loudspeaker is connected between the outputs of these two power amplifiers. Since the phase of power amplifiers 2 and 4 (see block diagram below) is inverted when compared to power amplifiers 1 and 3 the voltage between the output terminals 1 and 2 respectively 3 and 4 is doubled.

● CIRCUIT DESCRIPTION (FOR LEFT CHANNEL)

Q101, Q105 and Q103, Q107 form differential amplifier stages. Q117 and Q119 are unity gain stages. Q121, Q125 and Q127, Q123 are common emitter gain stages. Q133, Q141, Q137, Q145 and Q139, Q147, Q135, Q143 form push pull output stages in a compound darlington configuration. The input signal is applied to the base of Q101 and amplified in amplifier number 1. The output signal from amplifier number 1 is in phase with the input signal at the base of Q101. This

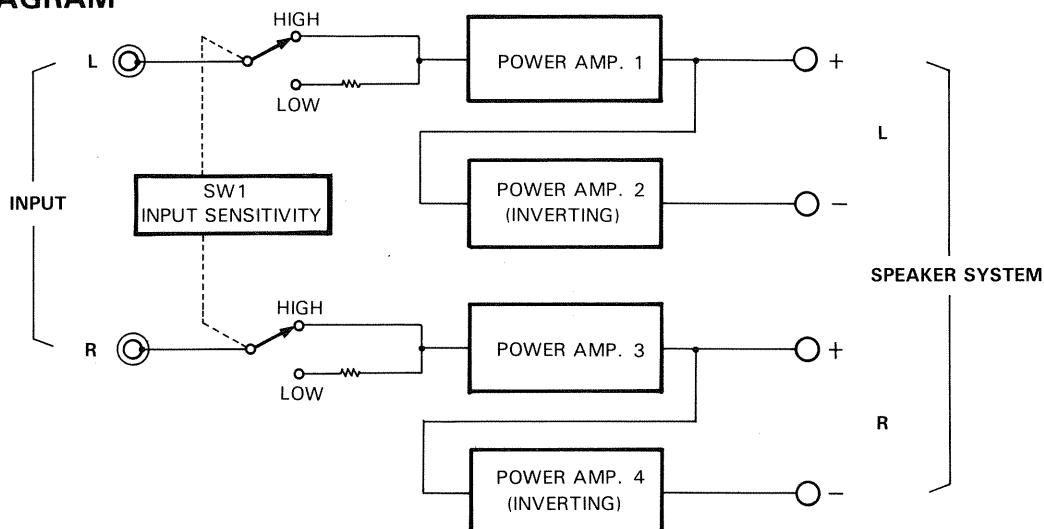
output signal is fed to the base of Q107 in amplifier number 2 through R215/R217 and C109.

When the base of Q107 is driven positive, the output voltage of power amplifier number 2 goes negative. The combination of resistors R215, R217 and R145 determines the gain of amplifier number 2. This gain is one. Therefore, the voltage between the output terminals of power amplifier number 1 and power amplifier number 2 is double the output voltage of the individual power amplifiers. The loudspeaker is connected between these two output terminals.

● REMOTE

When +12V is fed to the REMOTE terminal, Q1 and Q2 turn ON and thereby Q109-Q113, Q111-Q115 (L ch.) and Q110-Q114, Q112-Q116 (R ch.) are turned ON. Also, the differential input transistor of each channel from Q101 to Q108 is turned ON and thus the power stage becomes ON.

BLOCK DIAGRAM



ALIGNMENT PROCEDURES

■ IDLING ADJUSTMENT

Conditions:

- Connect a 13.8V power supply to the 12V BATTERY POWER IN terminal.
- After the power on, wait for 15 minutes before measuring to be sure of the most stable operation.
- Connect a DC voltmeter each of between a and b, c and d, e and f, g and h on the Main P. C. Board (PCB-1). (Refer to Fig.1.)

Inspection:

1. Check if the voltage between each of the following is 5 to 20mV.
a-b, c-d, e-f, g-h
2. If not, connect one of the following carbon resistors between A and B, C and D, E and F or G and H, whichever corresponds to the one where a proper voltage is not obtained in the above check and adjust so that a voltage between 5 and 20mV is obtained.
(The resistor should be wound to the terminal and then soldered.)

● 6.8k Ω , 1/4W	● 8.2k Ω , 1/4W
● 10k Ω , 1/4W	● 12k Ω , 1/4W
● 15k Ω , 1/4W	
3. After the above adjustment, wait for 15 minutes and recheck the voltage.

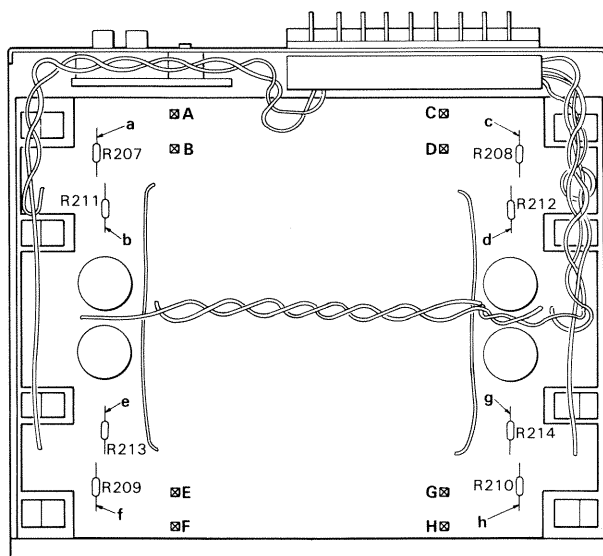
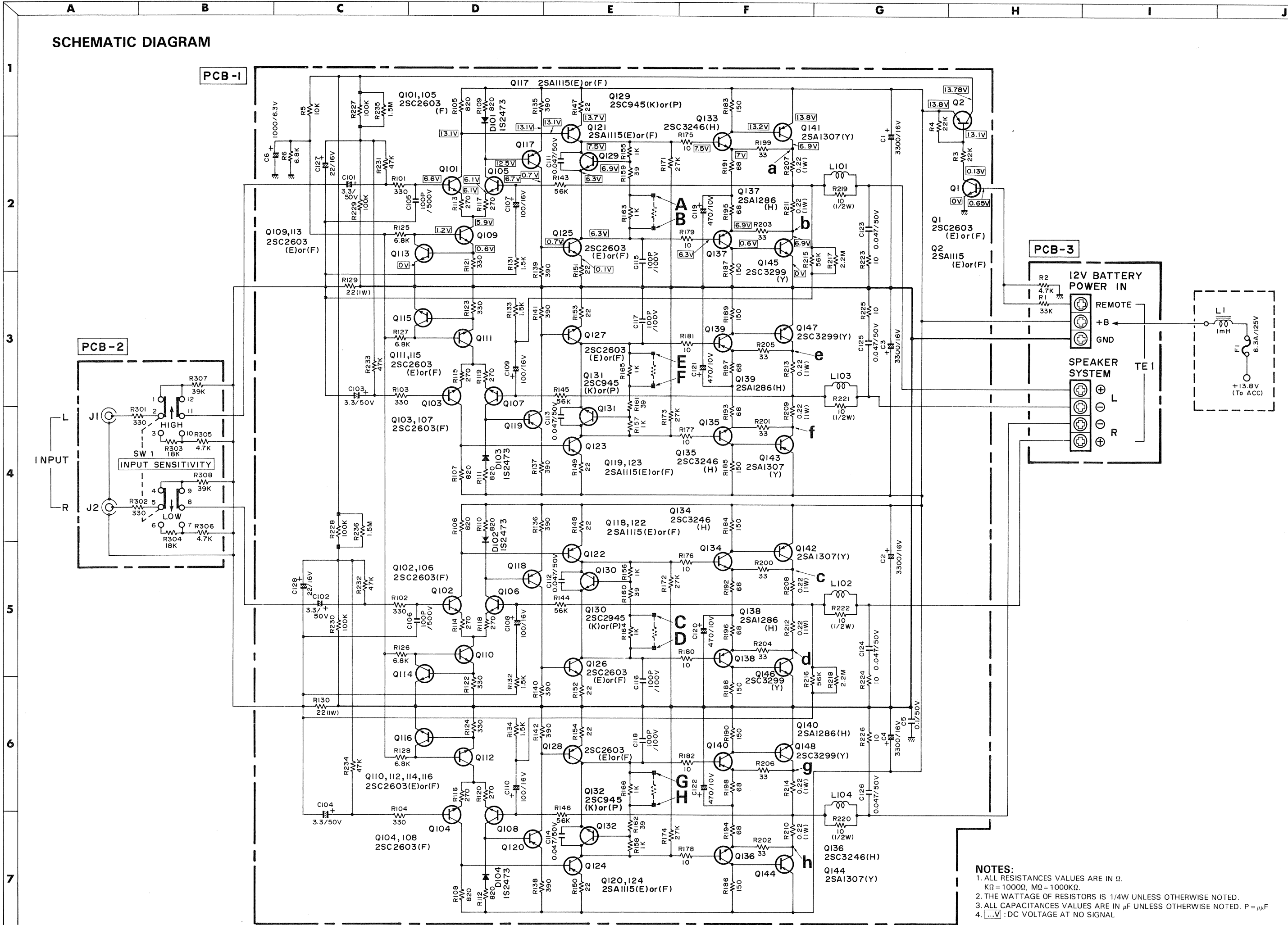


Fig. 1

ELECTRIC PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CHASSIS MISCELLANEOUS					
TE1	4214-169	Terminal, 12V Battery Power In, Speaker System	Q114	5613-2603(E)	2SC2603(E) or (F)
F1	5732-632029	Fuse, 6.3A, 125V	Q115	5613-2603(E)	2SC2603(E) or (F)
	4163-703133	Ground Cord (Black)	Q116	5613-2603(E)	2SC2603(E) or (F)
	4163-702133	Power Supply Cord with Fuse (F1) and Filter (L1) (Red)	Q117	5611-1115(E)	2SA1115(E) or (F)
	4211-32	Spade Lug with Tube	Q118	5611-1115(E)	2SA1115(E) or (F)
			Q119	5611-1115(E)	2SA1115(E) or (F)
			Q120	5611-1115(E)	2SA1115(E) or (F)
			Q121	5611-1115(E)	2SA1115(E) or (F)
			Q122	5611-1115(E)	2SA1115(E) or (F)
			Q123	5611-1115(E)	2SA1115(E) or (F)
			Q124	5611-1115(E)	2SA1115(E) or (F)
			Q125	5613-2603(E)	2SC2603(E) or (F)
			Q126	5613-2603(E)	2SC2603(E) or (F)
			Q127	5613-2603(E)	2SC2603(E) or (F)
			Q128	5613-2603(E)	2SC2603(E) or (F)
			Q129	5613-945(K)	2SC945(K) or (P)
			Q130	5613-945(K)	2SC945(K) or (P)
			Q131	5613-945(K)	2SC945(K) or (P)
			Q132	5613-945(K)	2SC945(K) or (P)
			Q133	5613-3246(H)	2SC3246(H)
			Q134	5613-3246(H)	2SC3246(H)
			Q135	5613-3246(H)	2SC3246(H)
			Q136	5613-3246(H)	2SC3246(H)
			Q137	5611-1286(H)	2SA1286(H)
			Q138	5611-1286(H)	2SA1286(H)
			Q139	5611-1286(H)	2SA1286(H)
			Q140	5611-1286(H)	2SA1286(H)
			Q141	5611-1307(Y)	2SA1307(Y)
			Q142	5611-1307(Y)	2SA1307(Y)
			Q143	5611-1307(Y)	2SA1307(Y)
			Q144	5611-1307(Y)	2SA1307(Y)
			Q145	5613-3299(Y)	2SC3299(Y)
			Q146	5613-3299(Y)	2SC3299(Y)
			Q147	5613-3299(Y)	2SC3299(Y)
			Q148	5613-3299(Y)	2SC3299(Y)
PCB-1 MAIN P. C. BOARD					
RESISTORS					
R129	5171-220581	22Ω, 1W, MR			
R130	5171-220581	22Ω, 1W, MR			
R207	5171-R22593	0.22Ω, 1W, MR			
R208	5171-R22593	0.22Ω, 1W, MR			
R209	5171-R22593	0.22Ω, 1W, MR			
R210	5171-R22593	0.22Ω, 1W, MR			
R211	5171-R22593	0.22Ω, 1W, MR			
R212	5171-R22593	0.22Ω, 1W, MR			
R213	5171-R22593	0.22Ω, 1W, MR			
R214	5171-R22593	0.22Ω, 1W, MR			
CAPACITORS					
C1	5345-338C0962	3300μF/16V, EC			
C2	5345-338C0962	3300μF/16V, EC			
C3	5345-338C0962	3300μF/16V, EC			
C4	5345-338C0962	3300μF/16V, EC			
C6	5345-108A045	1000μF/6.3V, EC			
C101	5345-335F0951	3.3μF/50V, EC			
C102	5345-335F0951	3.3μF/50V, EC			
C103	5345-335F0951	3.3μF/50V, EC			
C104	5345-335F0951	3.3μF/50V, EC			
C105	5353-101534	100pF/500V, MC			
C106	5353-101534	100pF/500V, MC			
C107	5345-107C041	100μF/16V, EC			
C108	5345-107C041	100μF/16V, EC			
C109	5345-107C041	100μF/16V, EC			
C110	5345-107C041	100μF/16V, EC			
C115	5359-1015851	100pF/100V, PC			
C116	5359-1015851	100pF/100V, PC			
C117	5359-1015851	100pF/100V, PC			
C118	5359-1015851	100pF/100V, PC			
C119	5345-477B041	470μF/10V, EC			
C120	5345-477B041	470μF/10V, EC			
C121	5345-477B041	470μF/10V, EC			
C122	5345-477B041	470μF/10V, EC			
C127	5345-226C041	22μF/16V, EC			
C128	5345-226C041	22μF/16V, EC			
TRANSISTORS					
Q1	5613-2603(E)	2SC2603(E) or (F)			
Q2	5611-1115(E)	2SA1115(E) or (F)			
Q101	5613-2603(F)	2SC2603(F)			
Q102	5613-2603(F)	2SC2603(F)			
Q103	5613-2603(F)	2SC2603(F)			
Q104	5613-2603(F)	2SC2603(F)			
Q105	5613-2603(F)	2SC2603(F)			
Q106	5613-2603(F)	2SC2603(F)			
Q107	5613-2603(F)	2SC2603(F)			
Q108	5613-2603(F)	2SC2603(F)			
Q109	5613-2603(E)	2SC2603(E) or (F)			
Q110	5613-2603(E)	2SC2603(E) or (F)			
Q111	5613-2603(E)	2SC2603(E) or (F)			
Q112	5613-2603(E)	2SC2603(E) or (F)			
Q113	5613-2603(E)	2SC2603(E) or (F)			
PCB-2 INPUT JACK P. C. BOARD					
SW1	4421-0427126	Slide Switch, Input Sensitivity			
J1/J2	4482-7128	2-Pin Jack, Input			
KEY TO ABBREVIATIONS					
	FR	: Fuse Resistor			
	MR	: Metal Resistor			
	CR	: Cement Resistor			
	CAR	: Carbon Resistor			
	EC	: Electrolytic Capacitor			
	PC	: Polypropylene Capacitor			
	MC	: Mica Capacitor			
	CC	: Ceramic Capacitor			
	MPC	: Metalized Polyester Capacitor			
	ZD	: Zener Diode			
	CLW	: Connector with Lead Wire			

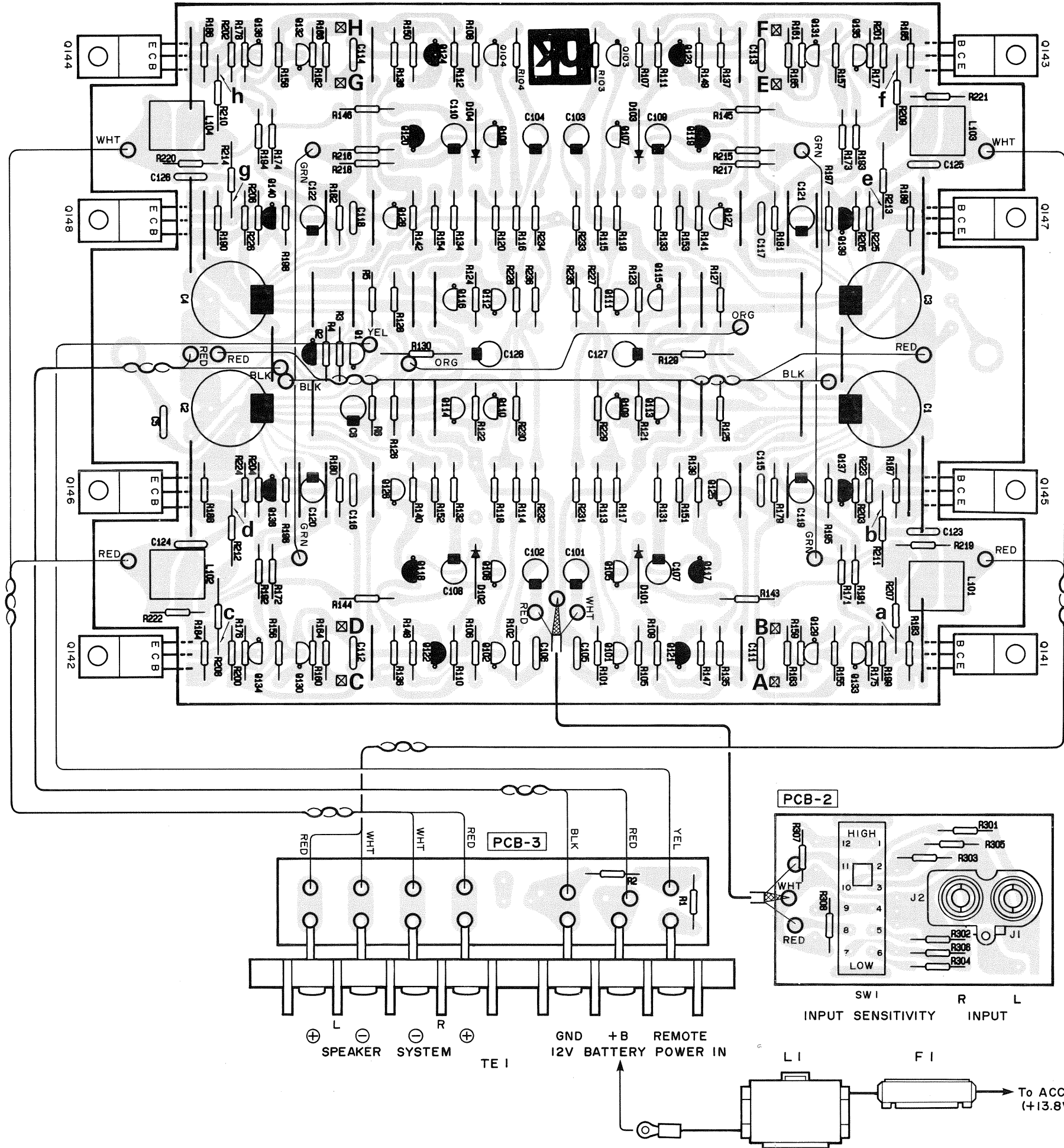
SCHEMATIC DIAGRAM



- NOTES:**
1. ALL RESISTANCES VALUES ARE IN Ω .
K Ω = 1000 Ω , M Ω = 1000K Ω .
 2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
 3. ALL CAPACITANCES VALUES ARE IN μ F UNLESS OTHERWISE NOTED. P = μ F.
 4. [V]: DC VOLTAGE AT NO SIGNAL

WIRING DIAGRAM

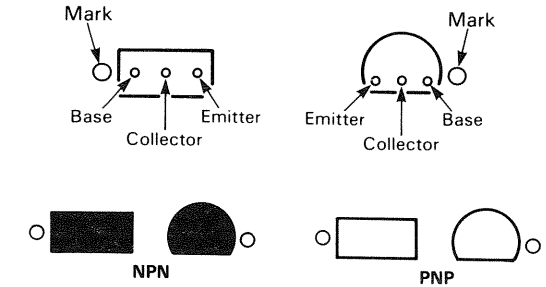
PCB-1



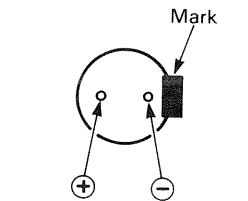
NOTES

In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.

Transistors



Electrolytic Capacitors



WIRE COLOR ABBREVIATIONS

- RED : Red
- ORG : Orange
- BLU : Blue
- WHT : White
- GRN : Green
- BLK : Black
- YEL : Yellow
- PUP : Purple
- PIK : Pink
- BRN : Brown

PIN CONNECTION DIAGRAM OF TRANSISTORS AND DIODES.

