

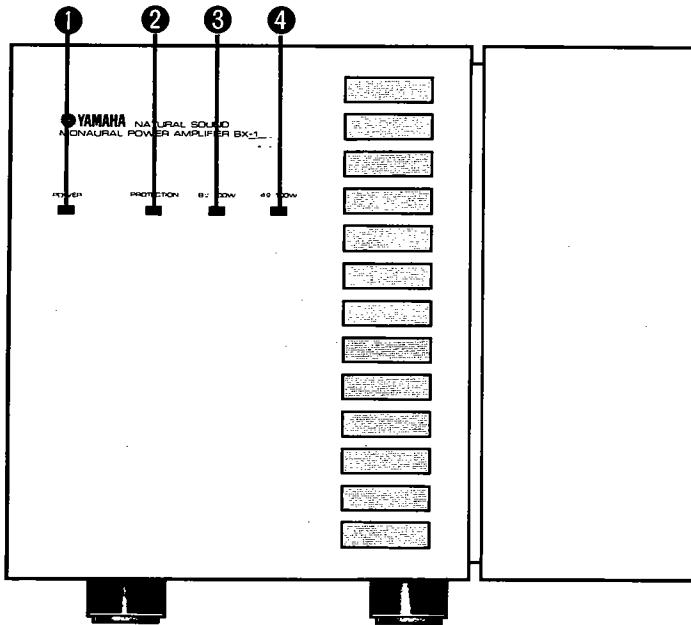
268

# MONAURAL POWER AMPLIFIER

# BX-1

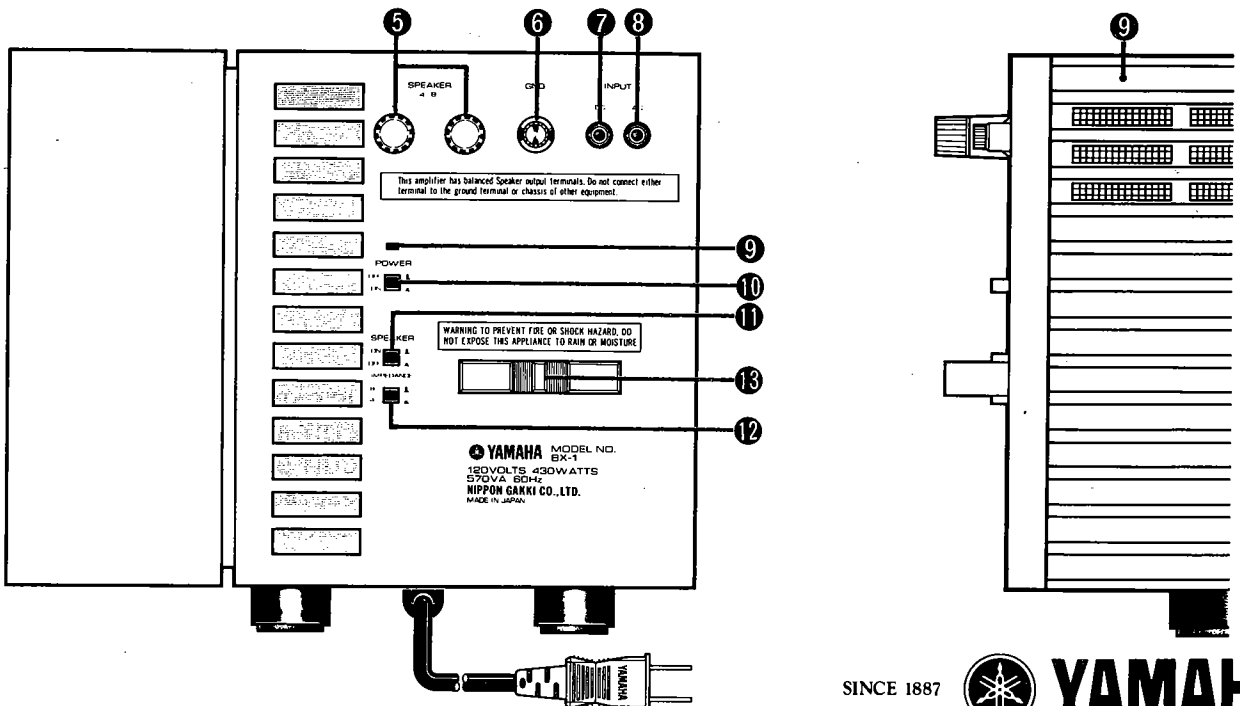
## SERVICE MANUAL

### FRONT PANEL



- ① POWER INDICATOR (POWER)
- ② PROTECTION INDICATOR (PROTECTION)
- ③ SPEAKER IMPEDANCE INDICATOR (8Ω/100W)
- ④ SPEAKER IMPEDANCE INDICATOR (4Ω/100W)
- ⑤ SPEAKER TERMINALS (SPEAKER)
- ⑥ GROUND TERMINAL (GND)
- ⑦ DC INPUT TERMINAL (INPUT DC)
- ⑧ AC INPUT TERMINAL (INPUT AC)
- ⑨ POWER INDICATOR
- ⑩ POWER SWITCH (POWER)
- ⑪ SPEAKER SWITCH (SPEAKER)
- ⑫ SPEAKER IMPEDANCE SELECTOR (IMPEDANCE)
- ⑬ CORD CLAMP

### REAR PANEL



004457

SINCE 1887



# YAMAHA

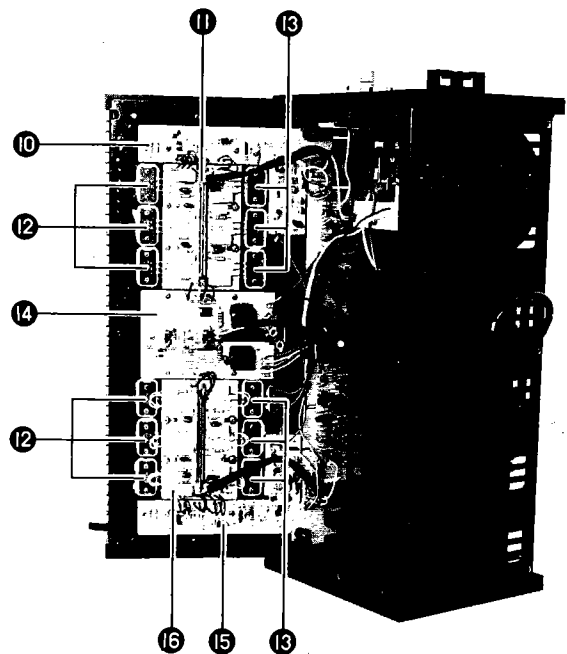
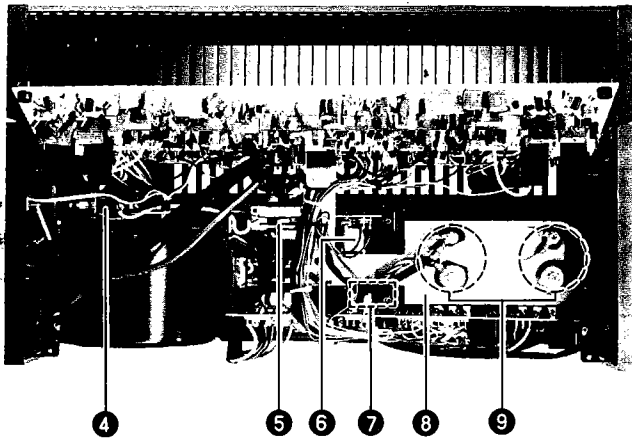
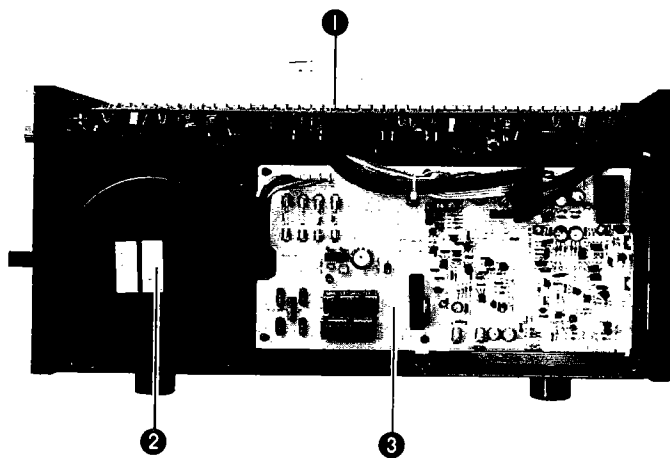
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

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## INTERNAL VIEW



- ① PREDRIVE CIRCUIT BOARD
- ② TROIDAL TRANSFORMER  
U.S. model: GA65650  
European model: GA65660
- ③ MUTING CIRCUIT BOARD
- ④ POWER SWITCH
- ⑤ POWER PRIMARY FUSE
- ⑥ RELAY CIRCUIT BOARD
- ⑦ DIODE BRIDGE (PB-152F)

- ⑧ BOOTH BAR EARTH
- ⑨ POWER ELECTROLYTIC CAPACITOR (47,000 $\mu$ F 35V)
- ⑩ BIAS POWER (+) CIRCUIT BOARD (1)
- ⑪ BIAS POWER (+) CIRCUIT BOARD (2)
- ⑫ POWER TRANSISTOR 2SC2565
- ⑬ POWER TRANSISTOR 2SA1095
- ⑭ OUTPUT CIRCUIT BOARD
- ⑮ BIAS POWER (-) CIRCUIT BOARD (1)
- ⑯ BIAS POWER (-) CIRCUIT BOARD (2)

## DISASSEMBLY PROCEDURES

### 1. Top panel unit removal

Remove screws ① through ⑥ in Photo. 1 and remove top panel unit.

① through ⑥: Flat Head Screw 4 x 12Bl

\* Washers are used for the screws ① through ⑥.

\* Spacers are used for the screws ① and ⑤.

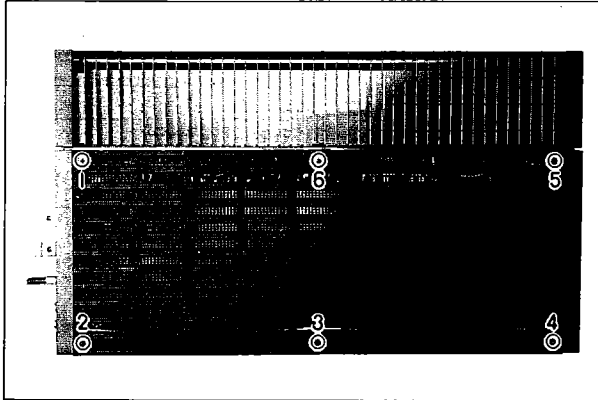


Photo 1

### 2. Side panel removal

a. Remove screws ① and ② in Photo. 2.

① and ② : Flat Head Screw 4 x 12Bl

b. Remove screws ① through ③ in Photo. 3.

① through ③ : Bind Head Tap-Tyte Screw 4 x 10Bl

\* When servicing, it is not necessary to remove the bottom cover. You must be able to remove the bottom cover by removing screws ① through ④ and screws ⑤ through ⑧ in Photo. 3.

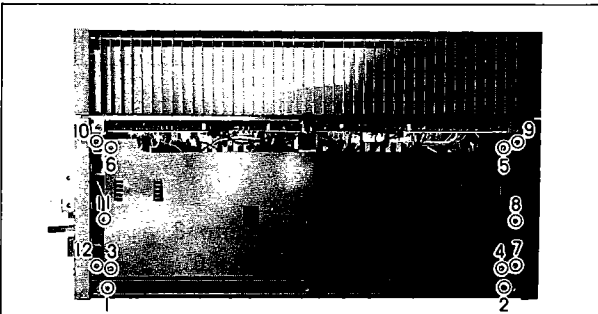


Photo 2

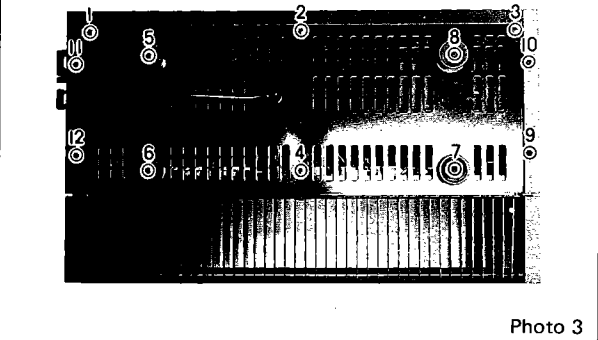


Photo 3

c. Remove the side panel and at this time disconnect the lead wires of LED from the snap mate connectors on the muting circuit board. (Refer to Fig. 1)

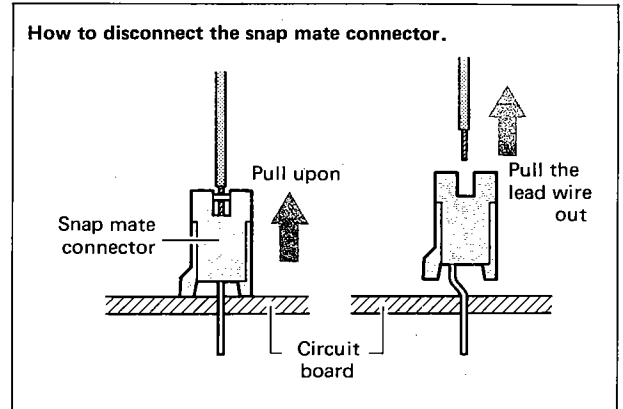


Fig. 1

### 3. Pre-drive circuit board removal

a. Remove screws ③ through ⑥ in Photo. 2 and remove the blind.

③ through ⑥ : BW Head Tapping Screw 3 x 20Bl

b. Remove screws ① and ② in Photo. 4, and raise up the muting circuit board to the side of the heat sink fin.

① and ② : Bind Head Screw 3 x 6

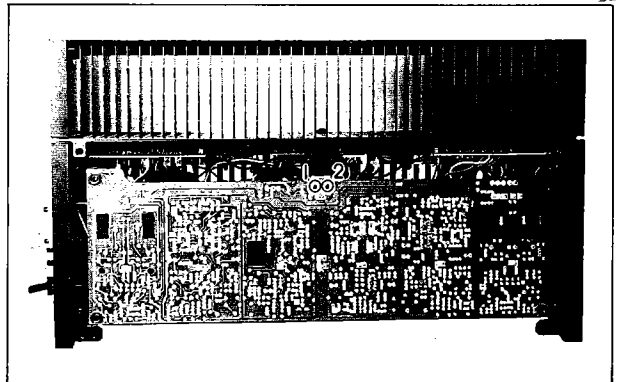


Photo 4

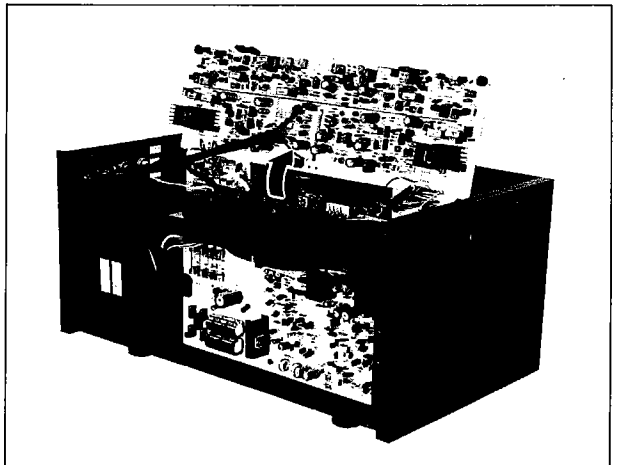


Photo 5

- c. Remove screws ① through ③ in Photo. 6 and slide the shield plate to the side of the transformer and then remove the pre-drive circuit board.

① through ③ : Bind Head Tap-Tyte Screw 3 x 8Bℓ

\* In this state you will be able to try almost all adjustments.

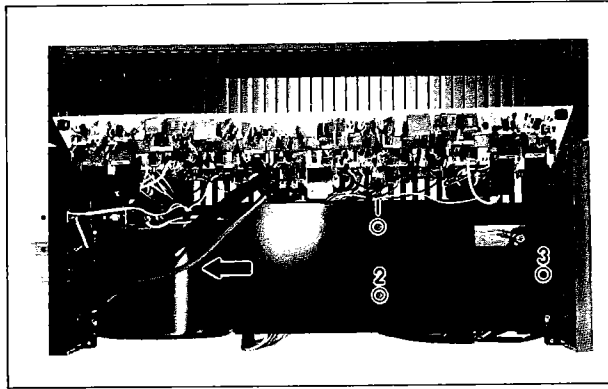


Photo 6

**4. Front panel removal**

- a. Remove screws ⑦ through ⑨ in Photo. 2 and screws ⑨ and ⑩ in Photo. 3.

⑦ through ⑨ : Bind Head Tap-Tyte Screw 4 x 25Bℓ

⑨ and ⑩ : Bind Head Tap-Tyte Screw 3 x 8Bℓ

- b. Disconnect the LED (Triple) wires and LED (Single) wires from the snap mate connectors on the muting circuit board, and remove the front panel.

**5. Rear panel removal**

- a. Remove screws ⑩ and ⑪ in Photo. 2 and screws ⑨ and ⑩ in Photo. 3.

⑨ and ⑩ : Bind Head Tap-Tyte Screw 3 x 8Bℓ

⑩ and ⑪ : Bind Head Tap-Tyte Screw 4 x 25Bℓ

- b. Detach the lead wires of the speakers terminal and GND terminal.

- c. Disconnect the LED (Single) wire from the snap mate connector on the push switch circuit board, and remove the rear panel.

**6. Muting circuit board removal**

Remove screws ① through ⑥ in Photo. 7 and remove the muting circuit board.

① through ⑥ : BW Head Tapping Screw 3 x 8Bℓ

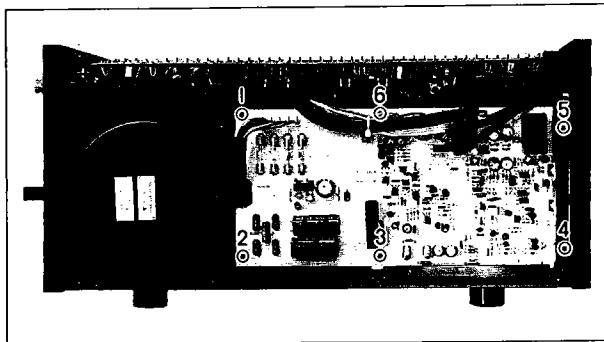


Photo 7

**7. Relay circuit board removal**

- a. Remove screws ① through ③ in Fig. 2 and remove the diode bridge.

① and ② : Bind Head Tap-Tyte Screw 3 x 6Bℓ

③ : Bind Head Tap-Tyte Screw 4 x 8Bℓ

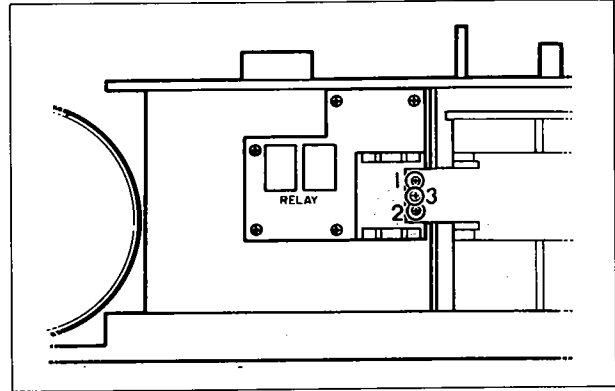


Fig. 2

- b. Remove screws ① through ⑥ in Fig. 3 and remove the relay circuit board.

① through ⑥ : Bind Head Tap-Tyte Screw 3 x 16Bℓ

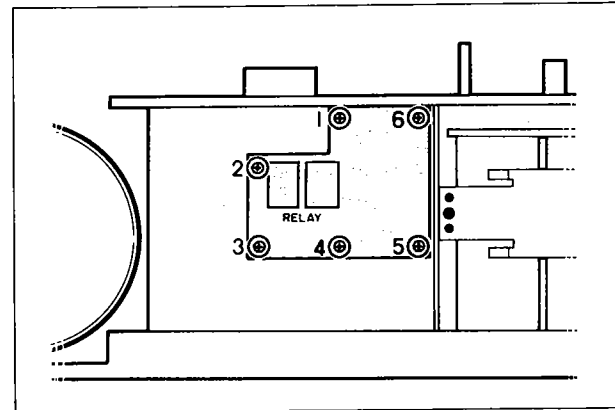


Fig. 3

**8. Heat sink unit removal**

- a. Remove screws ① and ② in Photo. 8.

① and ② : Bind Head Screw 3 x 6

- b. Remove the out put cords on out put circuit board.

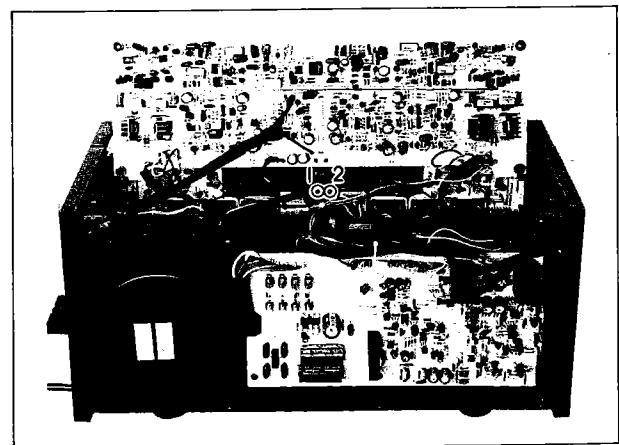


Photo 8

- c. Remove screws ① through ⑤ in Photo. 9.  
 ① through ⑤ : Bind Head Screw 4 x 12Bℓ

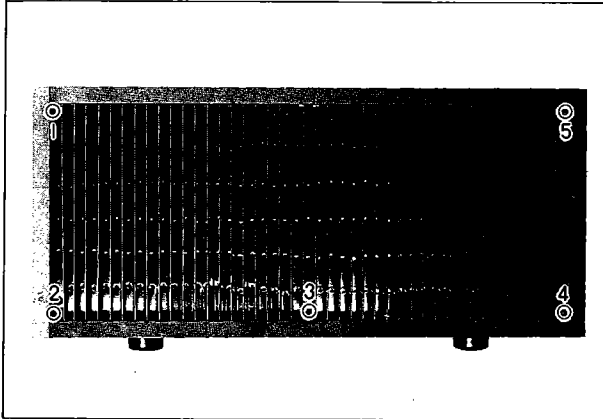


Photo 9

- d. Place the side of front panel down and open the unit as shown in Photo. 10. In this state servicing the heat sink unit is possible.

\*Since the earth of bias power (+), bias power (-) circuit boards and output circuit board are floated in this condition, when checks are done by turning on an electric current, make sure to connect the earth of each circuit boards to the power booth bar earth with somewhat thick lead wires.

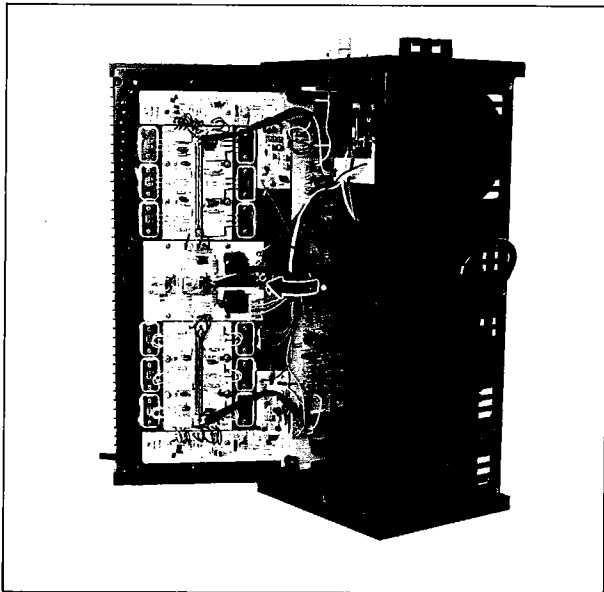


Photo 10

**9. Power transistor replacement**

Remove screws ① through ⑫ in Photo. 11 and unsoldering lead wires and then replace the power transistors.

① through ⑫: Bind Head Screw 3 x 6

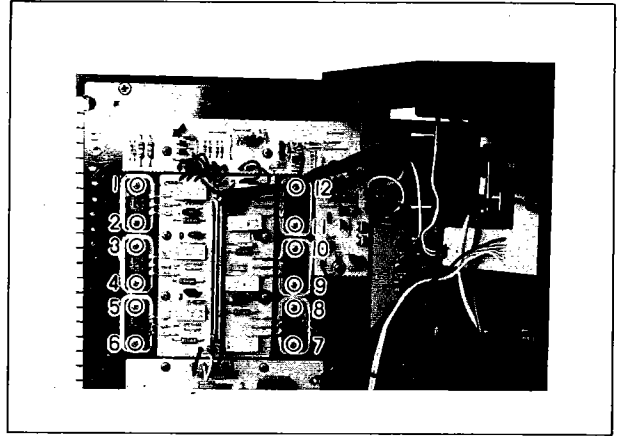


Photo 11

## ADJUSTMENTS

### AC line voltages under adjustments

Models	AC line voltage	Frequency
US	120V	60 Hz
European	220V	50 Hz

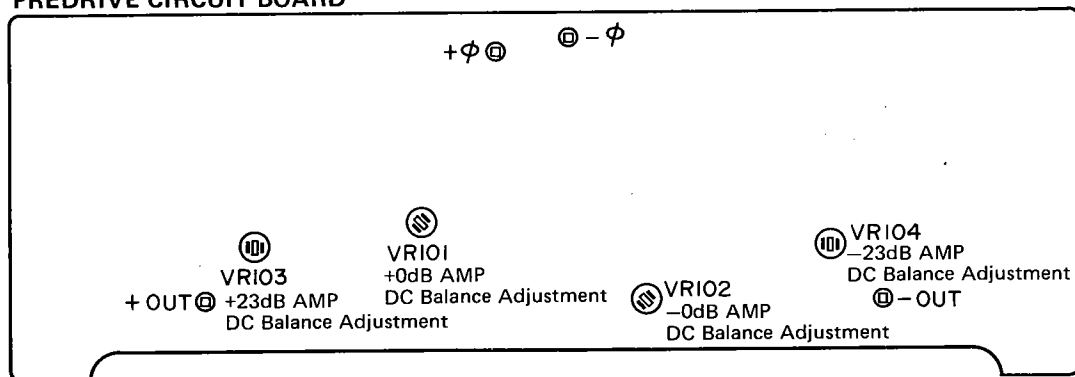
Step	Adjustments item	Adjustments point	Test points	Standard or ratings	Remarks
1	±40V adjustment	Muting circuit board VR801 (+40V) VR802 (-40V)	Between +40 and E terminals Between -40 and E terminals	±40V ±0.15V	
2	8Ω idling current adjustment (+AMP)	Bias power (+) circuit board VR402	Between NE(+) and PE(-)	400mV ± 10mV	Impedance SW 8Ω
3	4Ω idling current adjustment (+AMP)	Bias power (+) circuit board VR401	Between NE(+) and PE(-)	530mV ± 10mV	Impedance SW 4Ω
4	8Ω idling current adjustment (-AMP)	Bias power (-) circuit board VR502	Between NE(+) and PE(-)	400mV ± 10mV	Impedance SW 8Ω
5	4Ω idling current adjustment (-AMP)	Bias power (-) circuit board VR501	Between NE(+) and PE(-)	530mV ± 10mV	Impedance SW 4Ω
6	DC balance adjustment (+0dB AMP)	Pre drive circuit board VR101	Between test point +φ and E	0 ± 0.5mV	
7	DC balance adjustment (-0dB AMP)	Pre drive circuit board VR102	Between test point -φ and E	0 ± 1mV	
8	DC balance adjustment (+23dB AMP)	Pre drive circuit board VR103	Between test point +OUT and E	0 ± 5mV	
9	DC balance adjustment (-23dB AMP)	Pre drive circuit board VR104	Between test point -OUT and E	0 ± 5mV	

※ After adjusting as above, repeat the idling adjustments of Step 2 and 3 again. (For readjustments, be sure to make amplifier warm by turning the power on through 5 minutes more.)

### • AGING

After completing the adjustments, for the purpose of finding out the inferior, try aging of an hour's time electrification in condition of speakers switch- ON, impedance switch- 8Ω non load and signal.

### PREDRIVE CIRCUIT BOARD



**NOTE ON MEASURING**

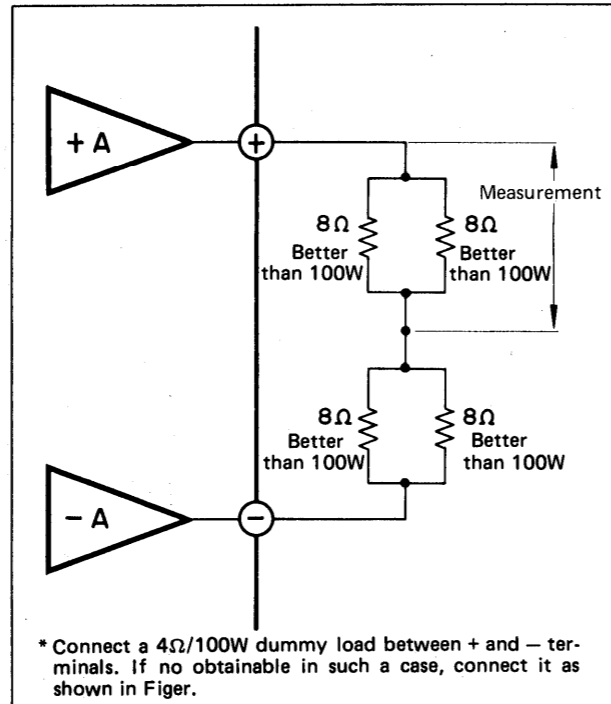
Since BX-1 is a balanced output type amplifier (BTL output), measure the output signal with special care. Output(+) and (-) terminals are connected to each individual amplification circuit output terminals. The output same as the input signal is produced from output(+) terminal and the reversed one from output(-) terminal.

**NOTE 1)** Make sure that both output (+) and output (-) terminals are never connected to the GND terminal any time, since output to the amplifier is shorted.

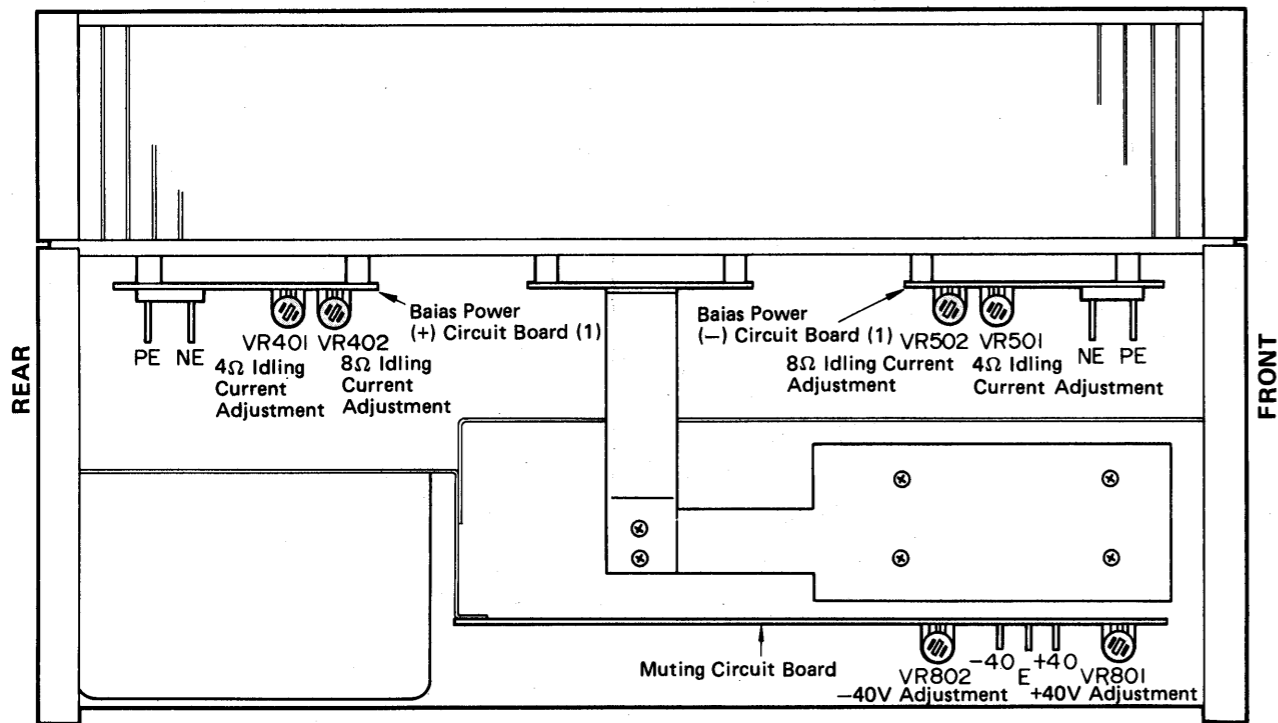
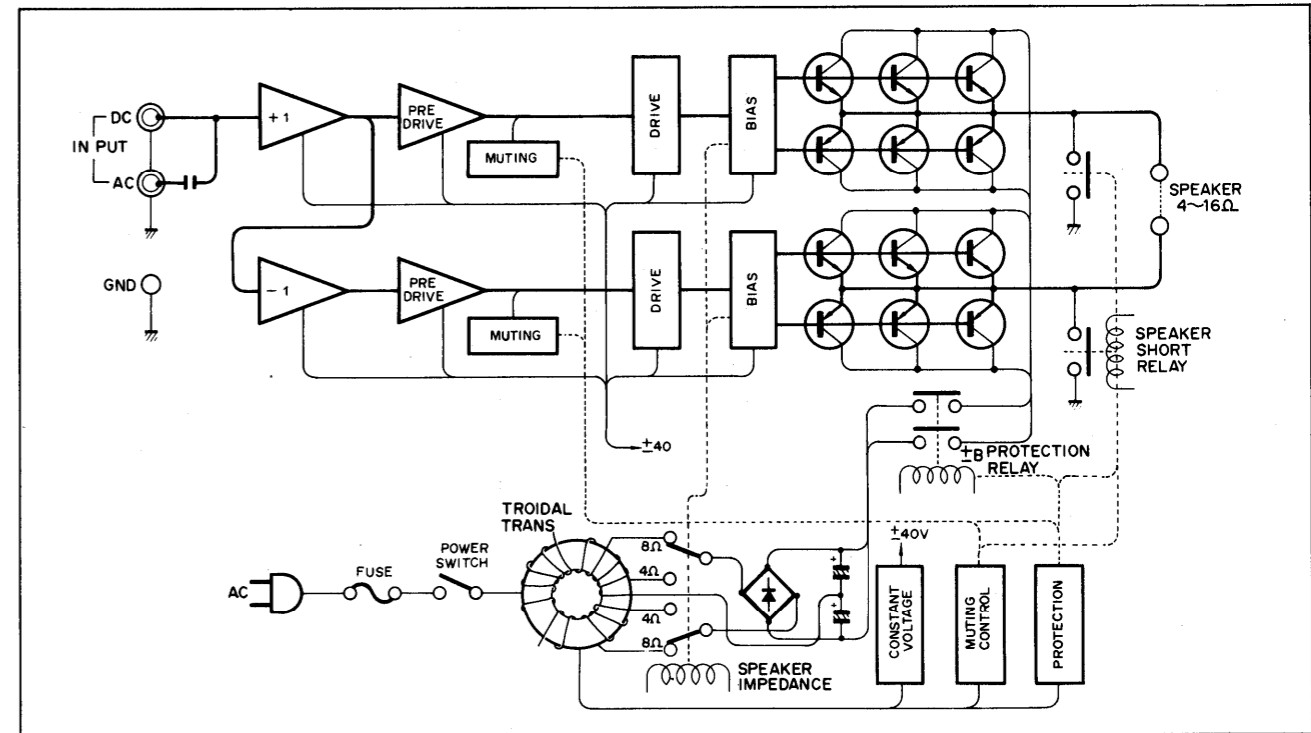
**NOTE 2)** Make sure that the earth of the measuring instrument for output and one for input are separately connected to the center of load.

\* The value of the amplifier's output voltage is the double of the measured one.

\* In case of the measurement (non-load) or of the meter connection, they are connected between the chassis earth and each output terminals.



**BLOCK DIAGRAM**



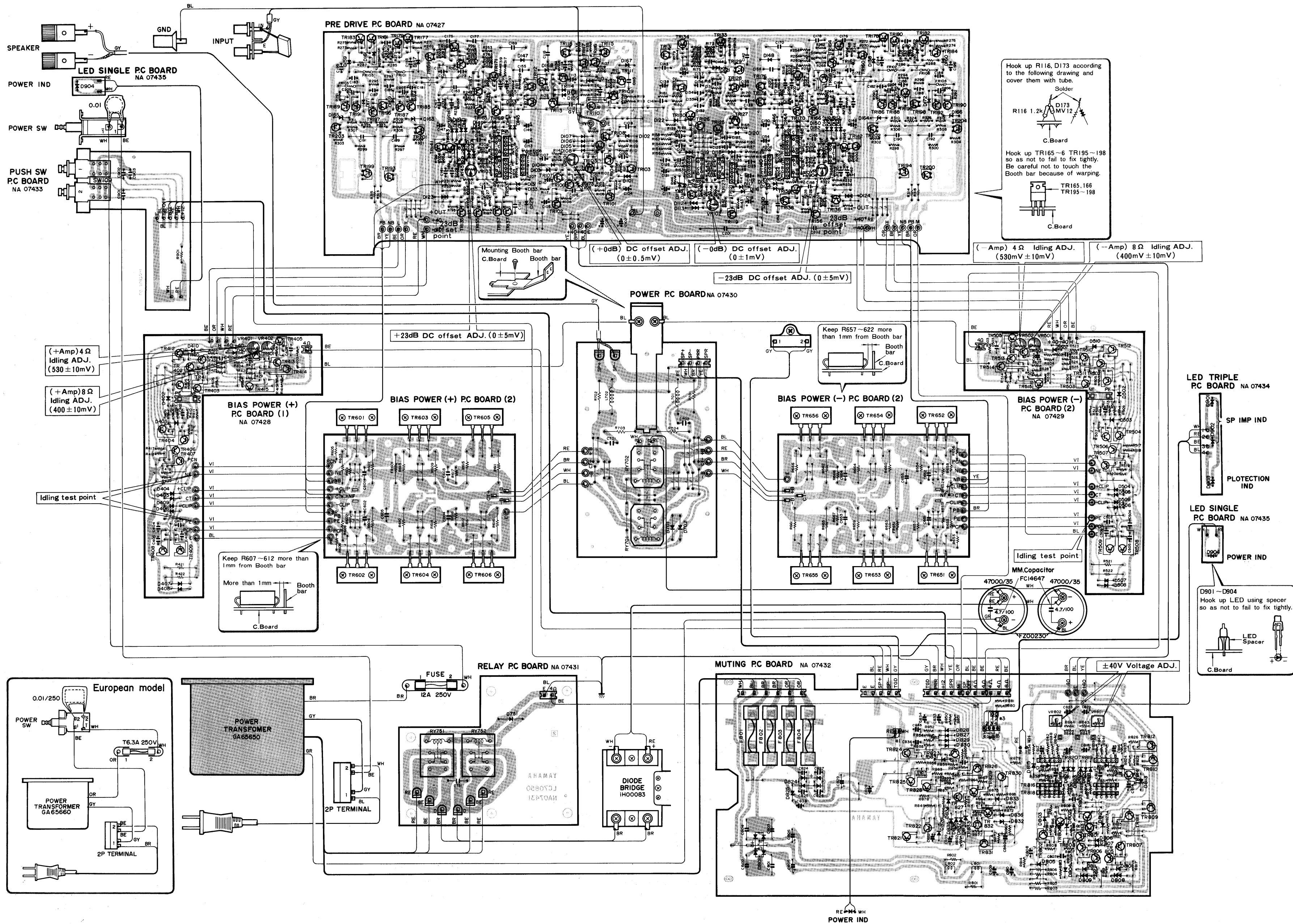
**SPECIFICATIONS**

<b>Minimum RMS Outlet Power</b>	10Hz to 20kHz	100W (8Ω, 4Ω)
	0.002% THD	
<b>Total Harmonic Distortion</b>	10Hz to 20kHz, 50W	0.001% (8Ω, 4Ω)
	100kHz, 50W	0.005% (8Ω, 4Ω)
<b>IM Distortion Ratio (50Hz : 7kHz)</b>	8Ω, 4Ω, 50W	Less than 0.001%
	(50Hz : 7kHz = 4 : 1)	
<b>Power Bandwidth</b>	8Ω, 4Ω, 50W	10Hz to 100kHz
	(0.005% THD)	
<b>Damping Factor</b>	8Ω, 1kHz	160
<b>Frequency Response (8Ω, 1W)</b>	DC Input	10Hz 0dB 1kHz 0dB 100kHz -0.8±0.5dB
	AC Input	10Hz -1.5±1dB 1kHz 0dB 100kHz -0.8±0.5dB
<b>Input Sensitivity/Impedance</b>	8Ω, 100W, 1kHz	1V/27kΩ
<b>Signal-to-Noise Ratio (IHF-A-Network)</b>	8Ω, input shorted	123dB
<b>Residual Noise (IHF-A-Network)</b>	8Ω input shorted	Less than 20μV
<b>Rise Time</b>		0.3μsec.
<b>Slew Rate</b>		600V/μsec.
<b>Power Supply</b>	U.S.	120V, 60Hz
	European	220V, 50Hz
<b>Power Consumption</b>	U.S.	430W
	European	470W
<b>Dimensions (WxHxD)</b>		271 x 230 x 488mm (10-5/8"x9"x19-1/4")
<b>Weight</b>		18.4kg (40.5 lbs.)

Specifications subject to change without notice.



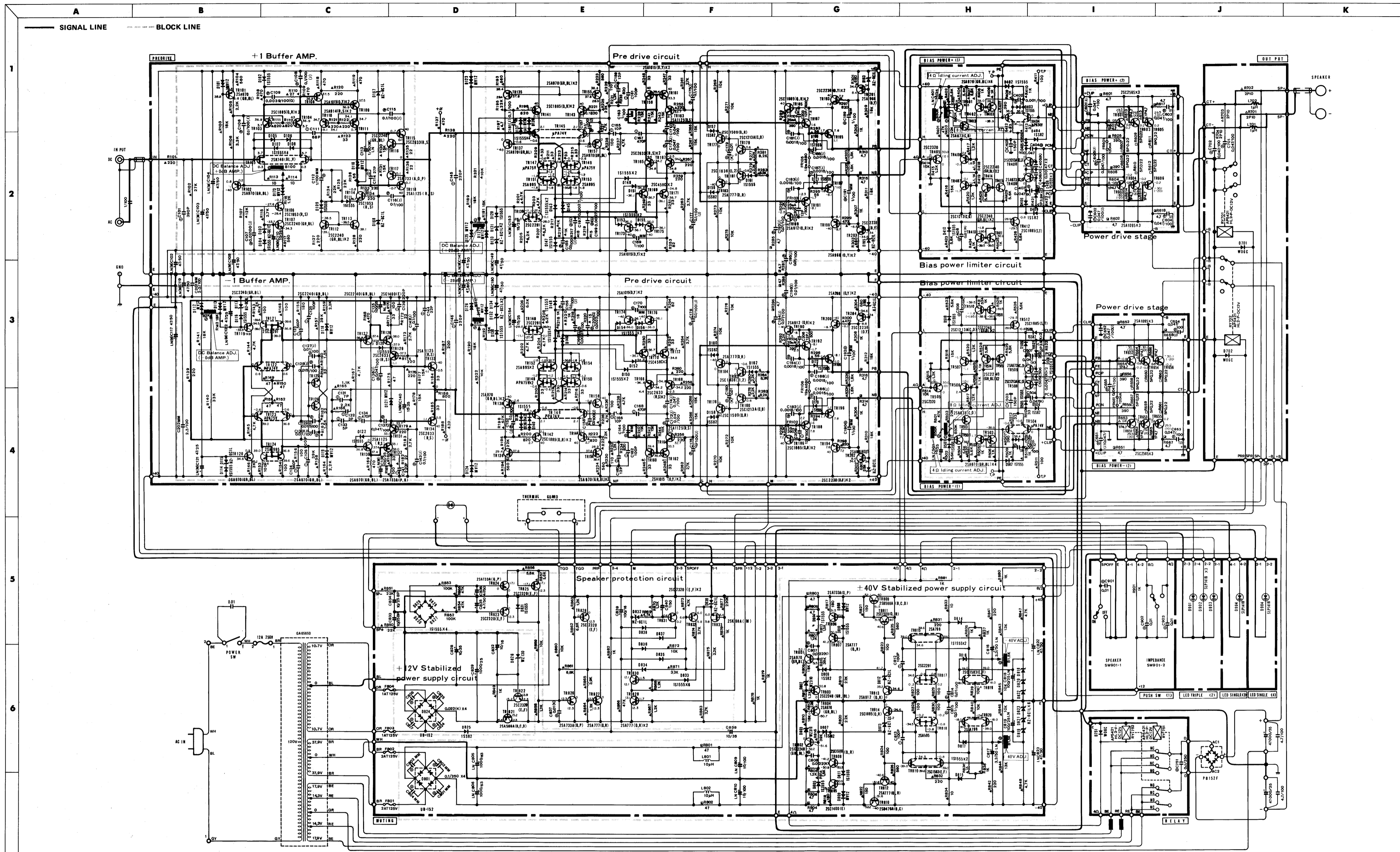
PRINTED CIRCUIT BOARD/WIRING



\* Wiring Diagram is subject to change without notice.



SCHEMATIC DIAGRAM



**RESISTOR**

REMARKS: NO MARK CARBON RESISTOR  
 Δ METALIZED OXIDATION RESISTOR  
 ▲ METALIZED FILM RESISTOR  
 ⊕ SEMI VARIABLE RESISTOR  
 □ CEMENT RESISTOR  
 ▨ FIREFREE CARBON RESISTOR

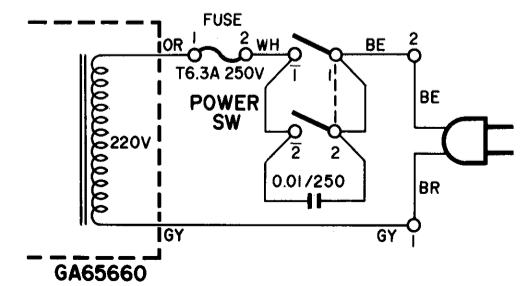
**CAPACITOR**

REMARKS: NO MARK CERAMIC CAPACITOR  
 ○ MICA CAPACITOR  
 ⊙ POLYPROPYLENE CAPACITOR  
 ⊖ MYLAR CAPACITOR

TRANSISTORS, DIODES PIN CONNECTION

2SA733	2SA1095	2SA968	2SC1636	2SC1953	2SK146	2SC1683	2SC2291
2SA750	2SC2565	2SA1125					
2SA777		2SC2238					
2SA912		2SC2633					
2SA914		2SB566A					
2SA970		2SD476A					
2SC458							
2SC1400	μPA74V	1S1555	MV12	2SC1213	2SK68A	2SA798	2SA995
2SC1509	μPA75V	1S82		2SA673			
2SC1885		HZ6C1L					
2SC2240		W06C					
2SC2320		WZ130					
2SA1015		WZ310					

EUROPEAN MODEL ONLY



\* All voltages measured with a 10MΩ/V DC electric volt meter, under no-signal condition.  
 \* Schematic Diagram is subject to change without notice.