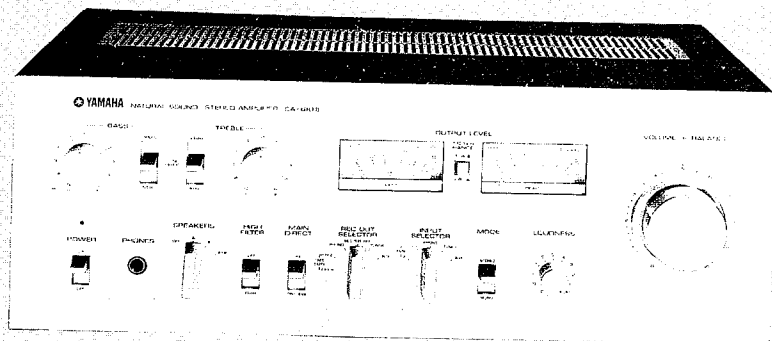


21

SERVICE MANUAL

CA-610 II

STEREO AMPLIFIER



SINCE 1887



YAMAHA

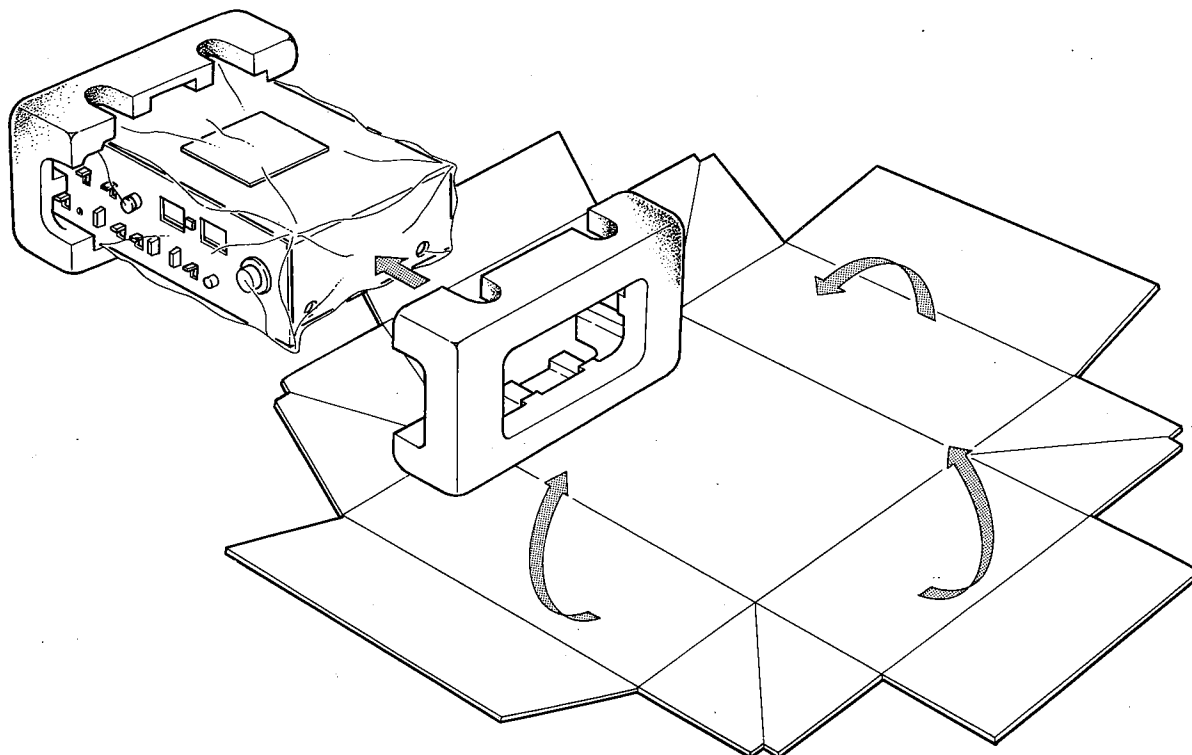
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN



■CONTENTS

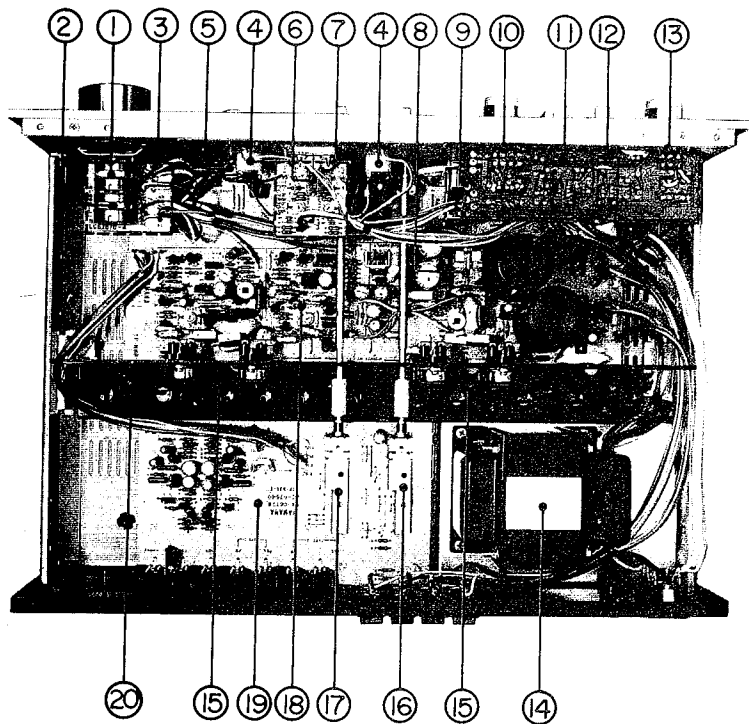
■ PACKAGE INSTRUCTION	1
■ EXTERNAL VIEW	2
■ PANEL OPERATION	
FRONT PANEL	3
REAR PANEL	3
■ DISASSEMBLY PROCEDURES	5
■ BLOCK DIAGRAM	7
■ LEVEL DIAGRAM	7
■ ADJUSTMENT	
MAIN AMPLIFIER	8
LEVEL METER	8
■ PATTERN DIAGRAM	
FUNCTION C, BOARD	9
MAIN C, BOARD (1 ~ 4)	10
■ SCHEMATIC DIAGRAM	11
■ SPECIFICATIONS	11
■ WIRING	12
■ PARTS LIST	13

■PACKAGE INSTRUCTION



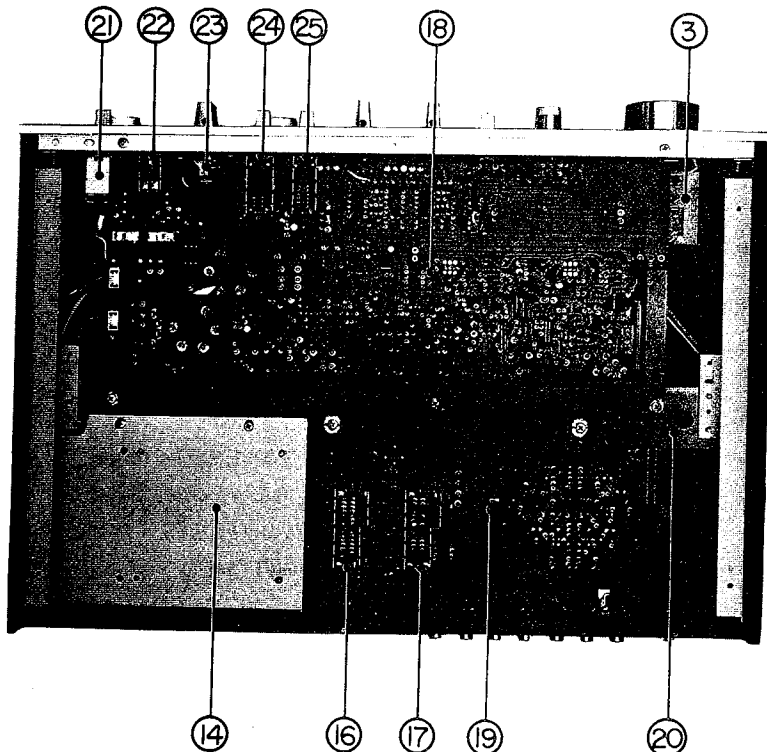
EXTERNAL VIEW

TOP VIEW



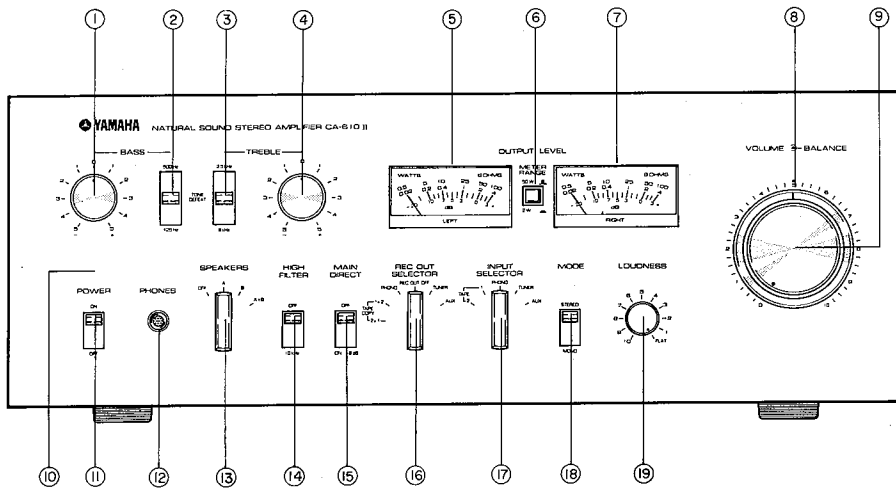
- ① Balance VR
- ② Level Control
- ③ Main C, Board 2 (Volume)
- ④ Level Meter
- ⑤ Loudness Control VR
- ⑥ Meter Range SW
- ⑦ Main C, Board 4 (Meter Drive)
- ⑧ Protector Relay
- ⑨ Main C, Board 3 (Tone Control)
- ⑩ Treble Control
- ⑪ Turnover Selector/Tone Defeat SW (TREBLE)
- ⑫ Turnover Selector/Tone Defeat SW (BASS)
- ⑬ Bass Control
- ⑭ Power Transformer
- ⑮ Power Transistor
- ⑯ Recording Output Selector
- ⑰ Input Selector
- ⑱ Main C, Board 1 (Power Supply, Main Amplifier)
- ⑲ Function C, Board
- ⑳ Heat-sink
- ㉑ Power SW
- ㉒ Head-phone Jack
- ㉓ Speaker Selector
- ㉔ High Filter
- ㉕ Main-Direct SW

BOTTOM VIEW



PANEL OPERATION

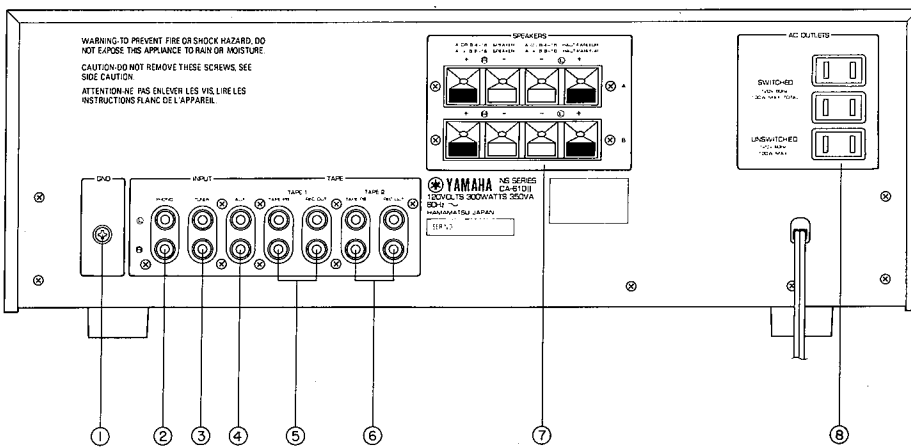
FRONT PANEL



- ① BASS Control
- ② Turnover TONE DEFEAT (BASS)
- ③ Turnover TONE DEFEAT (TREBLE)
- ④ TREBLE Control
- ⑤ OUTPUT LEVEL Meter (LEFT)
- ⑥ METER RANGE Switch
- ⑦ OUTPUT LEVEL Meter (RIGHT)
- ⑧ BALANCE Control
- ⑨ VOLUME Control
- ⑩ POWER Indicator
- ⑪ POWER Switch
- ⑫ Head Phone Jack
- ⑬ SPEAKERS Selector
- ⑭ HIGH FILTER Switch
- ⑮ MAIN DIRECT Switch
- ⑯ REC OUT SELECTOR
- ⑰ INPUT SELECTOR
- ⑱ MODE Switch
- ⑲ LOUDNESS Control

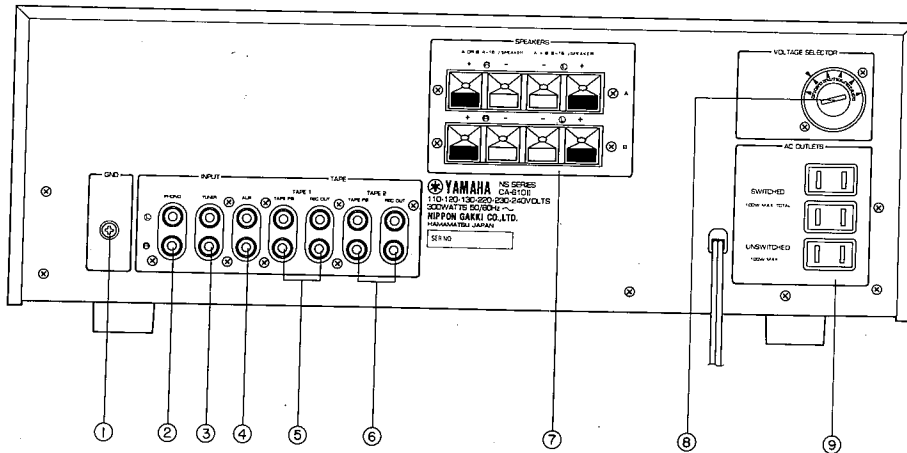
REAR PANEL

U.S.A. & Canadian Model



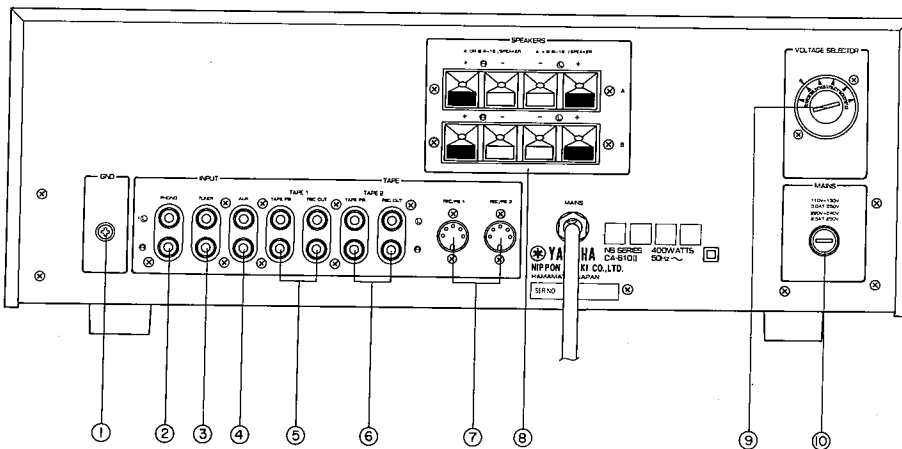
- ① GND Terminal
- ② PHONO Input
- ③ TUNER Input
- ④ AUX Input
- ⑤ TAPE 1 (REC Out, TAPE PB)
- ⑥ TAPE 2 (REC Out, TAPE PB)
- ⑦ SPEAKERS Terminal A, B
- ⑧ AC OUTLETS (SWITCHED, UNSWITCHED)

General Export Model



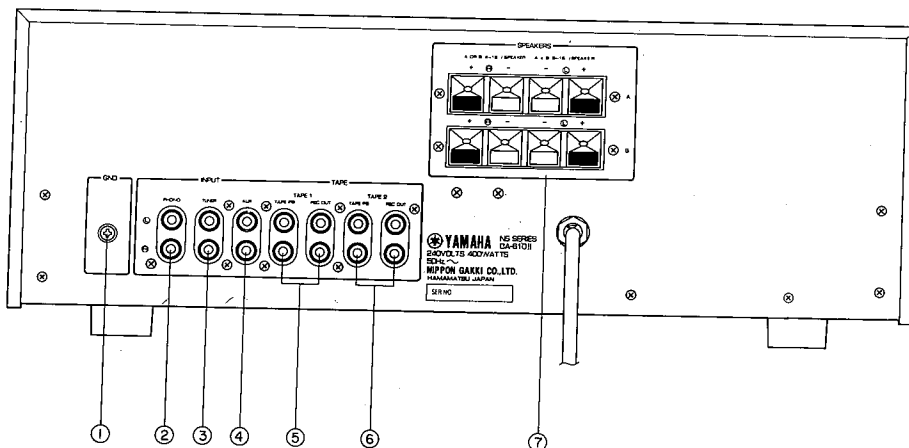
- ① GND Terminal
- ② PHONO Input
- ③ TUNER Input
- ④ AUX Input
- ⑤ TAPE 1 (REC Out, TAPE PB)
- ⑥ TAPE 2 (REC Out, TAPE PB)
- ⑦ SPEAKERS Terminal A, B
- ⑧ VOLTAGE SELECTOR
- ⑨ AC OUTLETS (SWITCHED, UNSWITCHED)

British & European Model



- ① GND Terminal
- ② PHONO Input
- ③ TUNER Input
- ④ AUX Input
- ⑤ TAPE 1 (REC Out, TAPE PB)
- ⑥ TAPE 2 (REC Out, TAPE PB)
- ⑦ REC/PB 1, 2
- ⑧ SPEAKERS Terminal A, B
- ⑨ VOLTAGE SELECTOR
- ⑩ Fuse Holder (MAINS)

Australian Model



- ① GND Terminal
- ② PHONO Input
- ③ TUNER Input
- ④ AUX Input
- ⑤ TAPE 1 (REC Out, TAPE PB)
- ⑥ TAPE 2 (REC Out, TAPE PB)
- ⑦ SPEAKER Terminal A, B

DISASSEMBLY PROCEDURES

1. Cabinet Removal

Remove four screws from both sides of the cabinet and remove the cabinet by pulling it backward. Do not lift the cabinet.

Note: In this condition, fuses, meter lamps, etc. can be replaced.

2. Bottom Cover Removal

Turn the unit upside down and remove five screws on the bottom cover.

Note: In this condition, at each PCB, parts not directly secured to the sub-panel can be checked and replaced.

3. Front Panel Removal

3.1 Remove the control knobs on the front panel.

- a. Pull off the level control VR knob, tone control knobs and LOUDNESS control knob.
- b. Remove the selector knobs and BALANCE VR knob after loosening set screws with a hexagonal wrench. For the BALANCE VR knob, insert the wrench between the front panel and sub-panel in arrow direction, and loosen two screws. (See Photo 1)

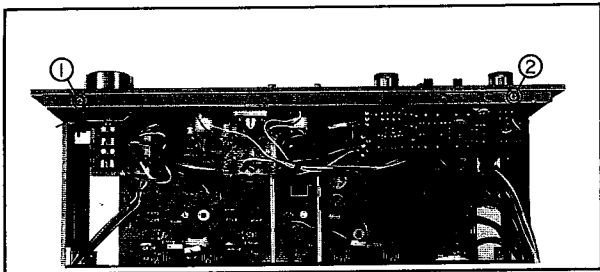


Photo. 1

3.2 Pull out the socket from the POWER IND. LED as shown in Photo 2.

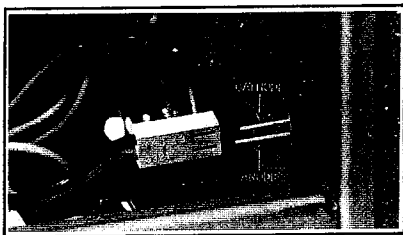


Photo. 2

3.3 Remove the screws ① and ② in Photo 1 as well as two front-panel-securing screws on the bottom side of the unit and remove the panel.

Note: Photo 3 shows the unit without the front panel and level meters.

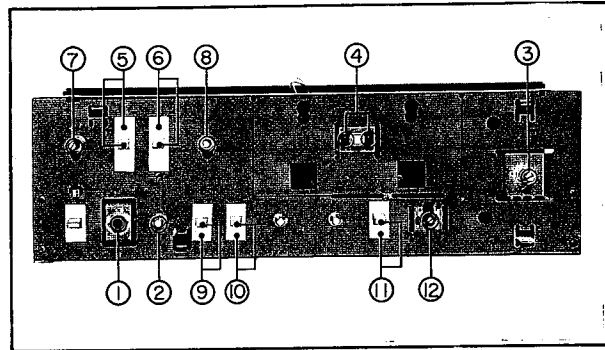


Photo. 3

In this condition, parts secured to the sub-panel can be replaced after removing the hexagon nuts ① to ④ and screws. For the switches whose bases are directly soldered to the PCB, unsolder them for removal with a soldering iron.

- a. Headphone jack Nut ①
- b. Speaker selector switch Nut ②
- c. Main circuit board 4 (level control and balance control section) Nut ③
- d. Main circuit board 2 (meter drive section) Screw ④

The selector switch is directly soldered to the PCB.

Note: The level meters can be removed merely by removing lead wires. At this time, be careful not to tear the protection tape.

4. Main Circuit Board 3 (Tone Control Section) Removal

To remove the main circuit board 3, withdraw ⑤ and ⑥ shown in Photo 3, then unscrew hexagon nuts ⑦ and ⑧ in Photo 3 as well as screws ① and ② in Photo 5.

5. Main Circuit Board 1 (Main Amp Section) Removal

- 5.1 Remove screws ① and ② in Photo 4, then withdraw the power transistors from the sockets. (Condition (B))
- 5.2 Withdraw ⑨ to ⑪ and unscrew hexagon nut ⑫ shown in Photo 3, then remove screws ③ to ⑤ in Photo 5.
- 5.3 Remove screws ① to ③ shown in Photo 6.
Note: Replace the selector switches by removing the hexagon nuts according to Item 5.2, skipping the step 5.1.

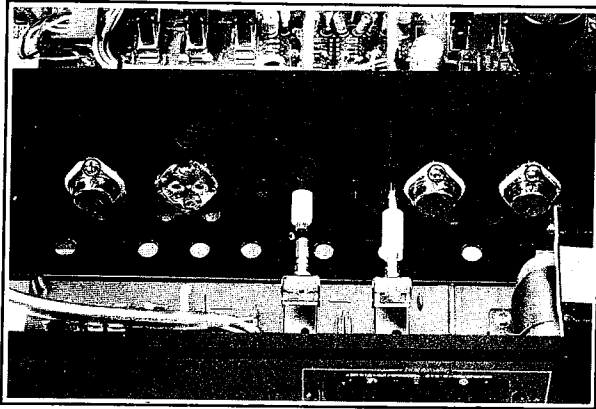


Photo. 4

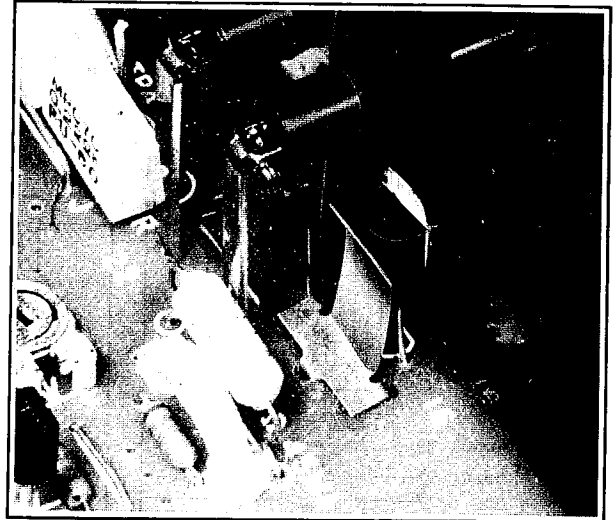


Photo. 7

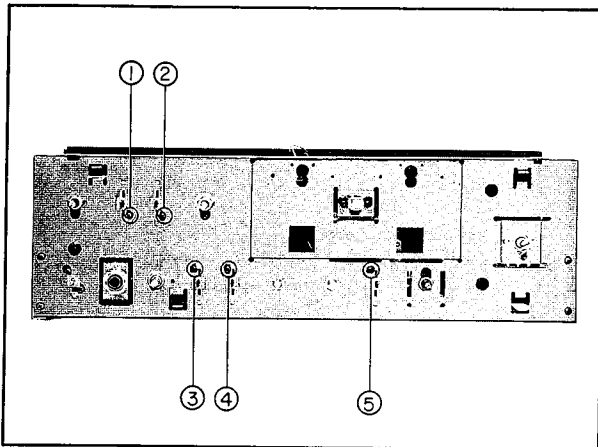


Photo. 5

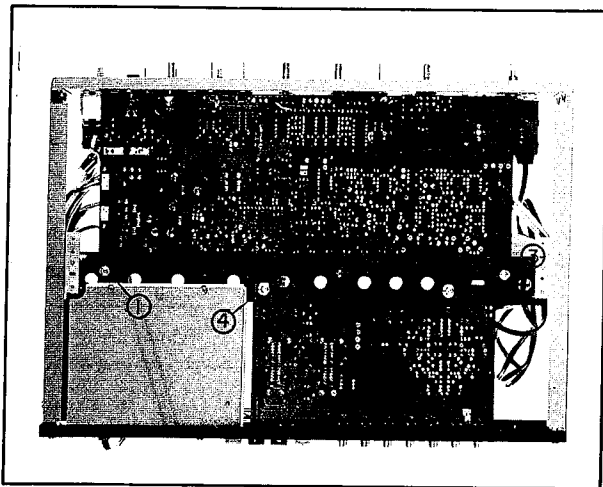


Photo. 6

Photo 7 shows TR490 (right) and TR489 (left) which are temperature-compensating transistors being heat-coupled with the heat sink. When assembling the main circuit board as well as the power transistors, be sure to closely fit the joint surfaces.

6. Function Circuit Board Removal

- 6.1 To disengage the shaft, shift the joint in arrow direction like (A) shown in Photo 4.
- 6.2 Remove eight screws shown in Photo 8.
- 6.3 Remove screws (4) and (5) shown in Photo 6.

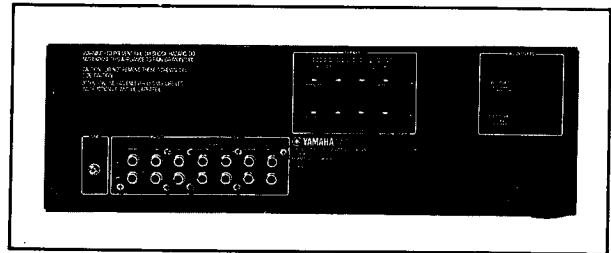
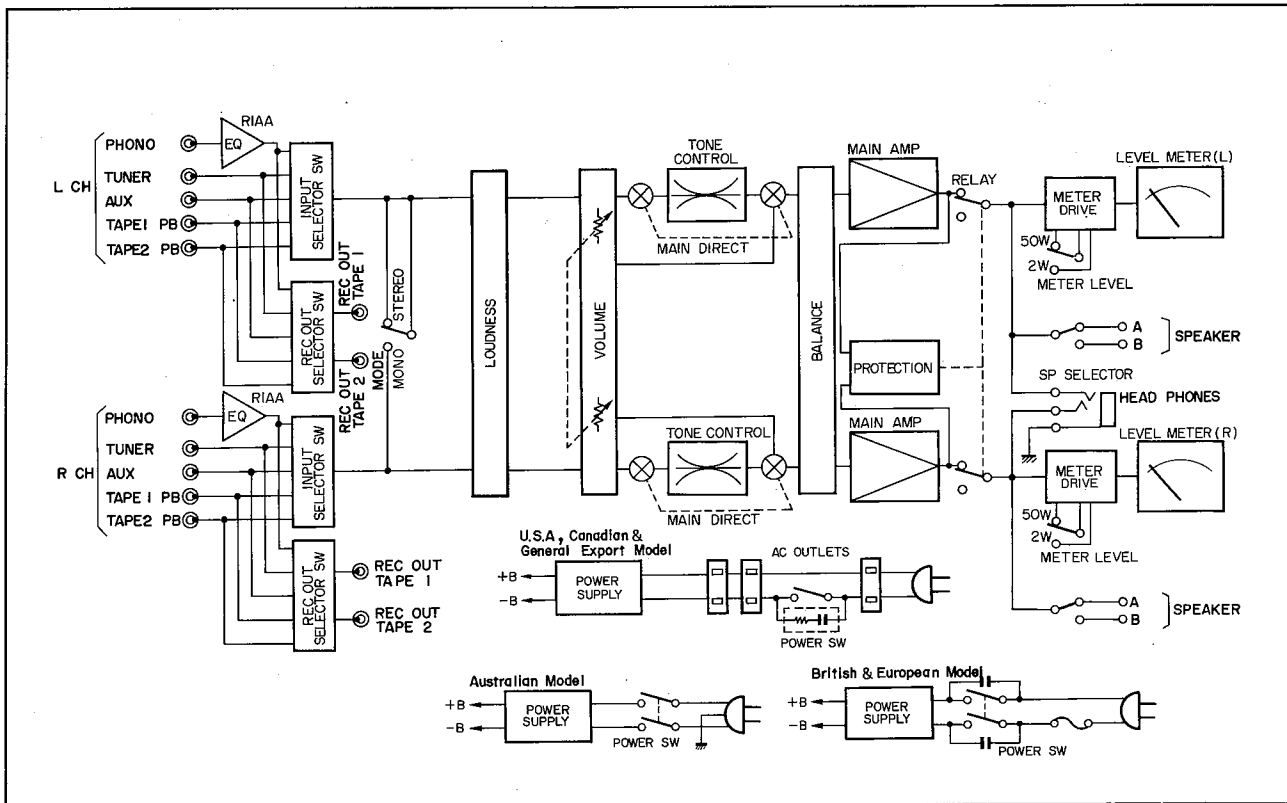


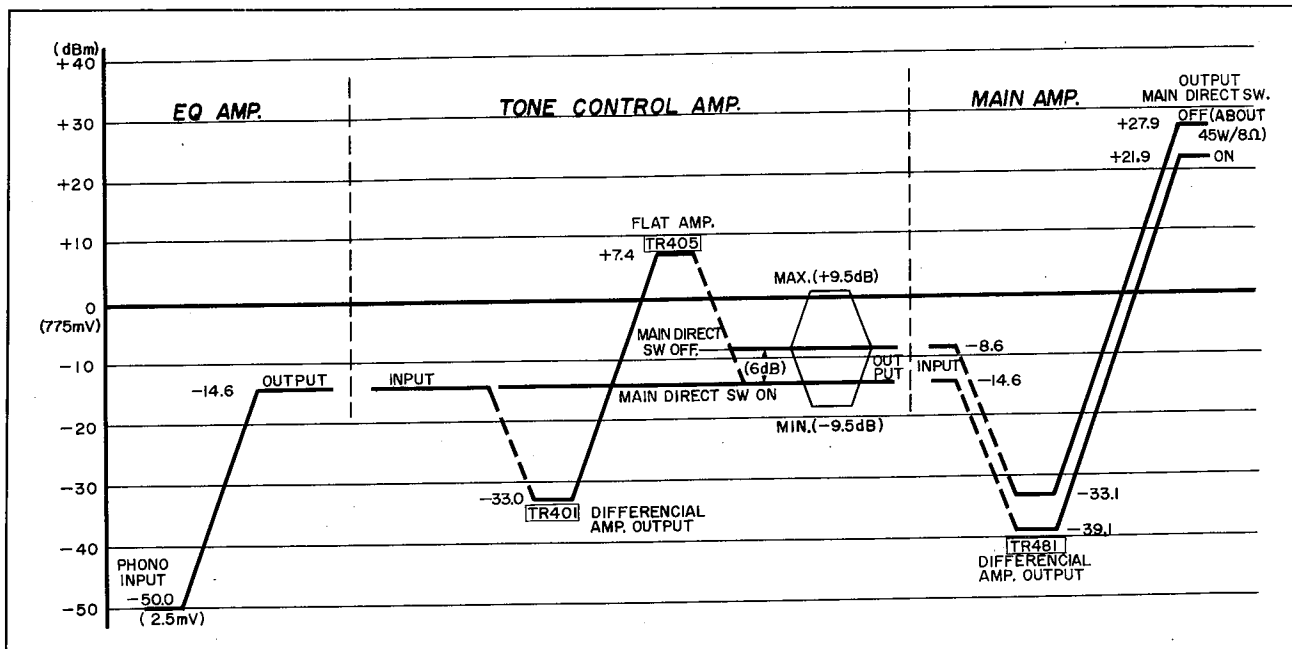
Photo. 8

Note: The photos depict the U.S.A. model.

BLOCK DIAGRAM



LEVEL DIAGRAM



ADJUSTMENT

1. Main Amplifier

Adjusting Preparations

- * For adjustment, wait three to four minutes after the POWER switch is turned on.
- * Connect a dummy load of 8Ω (50W or more) to the speaker terminal).
- * Set the level control volume to minimum.

1.1 Idling Current Adjustment

- Left channel: By turning VR481, adjust the voltage between TP1 and TP2 to $10 \pm 3mV$.
- Right channel: By turning VR482, adjust the voltage between TP3 and TP4 to $10 \pm 3mV$.

Notes:

- Turn the adjusting volume knob gently.
- Pay attention to the polarity of test points. (TP1 and TP3 are ⊕, and TP2 and TP4 are ⊖.)

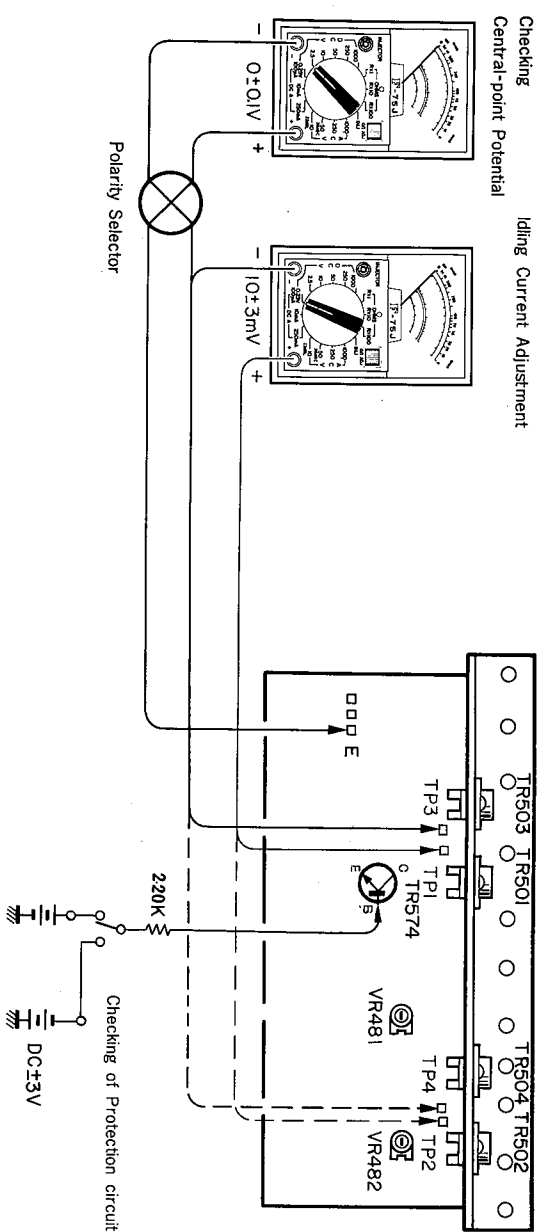
- Repeat the above adjustment several times.

1.2 Checking Central-point Potential

- Confirm that potential difference between E and TP2 or TP4 is within $0 \pm 0.1V$.

1.3 Checking Speaker Protection Circuit

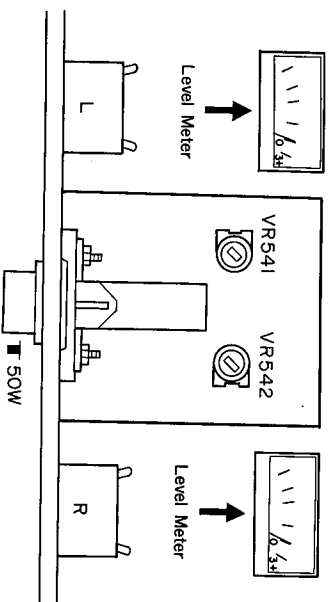
- Confirm that the relay switches to on within 4 ± 1 seconds after the power is supplied.
- Confirm that the relay is switched off within three seconds after DC $\pm 3V$ is supplied between TR574 (Base) and Earth as shown below.



2. Level Meters

Adjusting Preparations

- * Connect a dummy load of 8Ω (50W or more) and VTVM to the output terminal in parallel.
- * Connect an audio signal generator to the AUX input terminal, and supply a sine wave at 1kHz.
- * Set the sensitivity selector switch to 50W position.



2.1 Meter Indication Adjustment

Adjust the meter indication so that the pointer of the meter reads 0dB when the output is 50W (VTVM voltage is 20Vrms) by turning the level control knob as well as VR541 (left channel) and VR542 (right channel).

PATTERN DIAGRAM

FUNCTION C. BOARD (Function, EQ) NAO6937 (R,A,C), NAO6938 (U), NAO6939 (E,B)

British & European Model Only.

