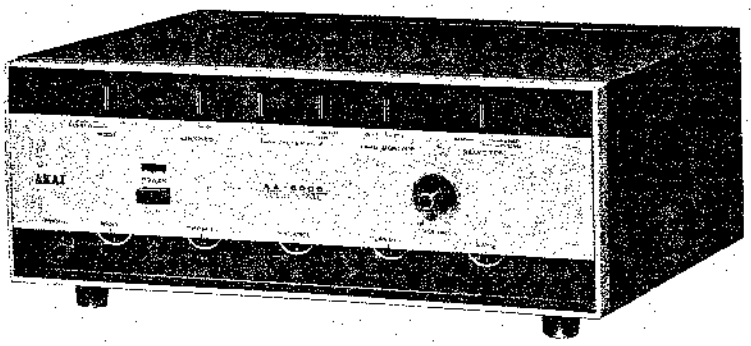
SERVICE MANUAL

AKAI AMPLIFIER

MODEL AA-6000



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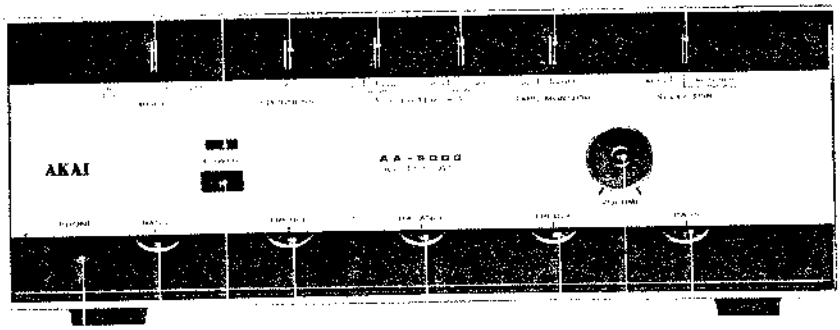
I. SPECIFICATIONS

POWER OUTPUT
MUSIC POWER : 120 W (60 W/60 W) at 8 Ω
RATED POWER : 90 W (45 W/45 W) at 8 Ω
FREQUENCY RESPONSE
PHONO : RIAA
AUX : 20 to 50,000 Hz –3 dB
S/N RATIO
PHONO : Better than 65 dB
TAPE, AUX : Better than 70 dB
HARMONIC DISTORTION
Less than 0.2% (45 W/8 Ω 1 kHz)
Less than 0.08% (30 W/8 Ω 1 kHz)
INPUT SENSITIVITY
PHONO : 3.0 mV in 50 KΩ
AUX : 150 mV in 100 KΩ
TAPE : 200 mV in 200 KΩ
TONE CONTROL
BASS : 100 Hz ± 10 dB
TREBLE : 10 kHz ± 10 dB
LOUDNESS CONTROL : 100 Hz + 6 dB
10 kHz + 6 dB
LOW CUT FILTER : 50 Hz –8 dB
HIGH CUT FILTER : 10 kHz –6 dB
CROSS TALK : Better than 60 dB
POWER BAND WIDTH
20 Hz to 35 kHz (Less than 0.5%)
SEMICONDUCTORS
SILICON TRANSISTOR : 26
GERMANIUM DIODE : 10
THERMISTER : 2
POWER SUPPLY
AC 100V/110V/120V/200V/220V/240V, 50/60 Hz
POWER CONSUMPTION
30 W at non signal
180 W at maximum power
DIMENSIONS : 6-1/4" x 15-7/8" x 11-3/8" (160 x 405 x 290 mm)
WEIGHT : 24.2 lbs. (11 kg)

II. CONTROLS & CONNECTIONS

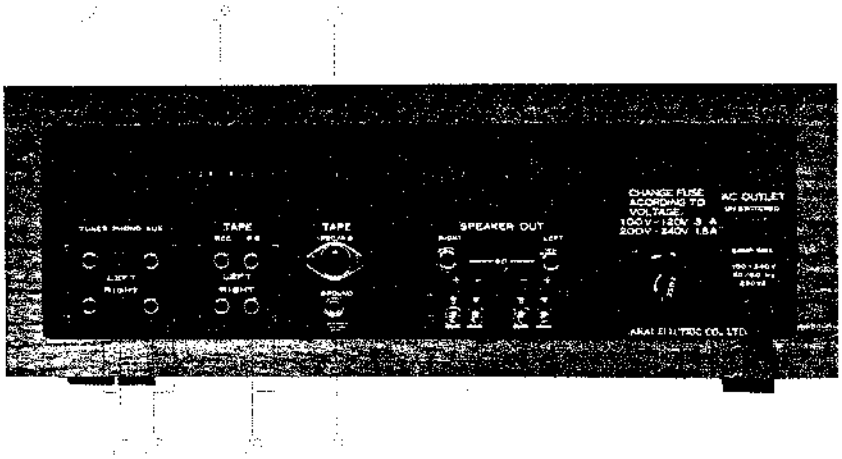


CONTROLS

1. INPUT SELECTOR SWITCH : Select the input.
   TUNER : For AM/FM radio reception (150 mV)
   PHONO : For turntable (3 mV)
   AUX : For input from external circuit (150 mV)
2. MONITOR SWITCH : Permits of recording with a three-head tape recorder when in "ON" position. Also used for playback.
3. LOW FILTER : For eliminating very low frequency noises, such as those produced by phone turntable or tape deck. The attenuated low notes is 8 db at 50 Hz.
4. HIGH FILTER : For eliminating annoying noises produced by record scratch, radio static, whistle and other interference. The attenuated high notes is 6 db at 10 KHz.
5. LOUDNESS CONTROL : Compensates for insufficient sound volume of bass and treble, during low-volume operation. The enhanced notes is 6 db.
6. MODE SELECTOR : Select the mode.

MODE SELECTOR	Ⓐ CHANNEL-L (INPUT) Ⓐ CHANNEL-L (OUTPUT) Ⓑ CHANNEL-R (INPUT) Ⓐ CHANNEL-R (OUTPUT)		
REVERSE	Ⓐ	CHAN-L	CHAN-L → Ⓐ
	Ⓑ	CHAN-R	CHAN-R → Ⓐ
STEREO	Ⓐ	CHAN-L	CHAN-L → Ⓐ
	Ⓑ	CHAN-R	CHAN-R → Ⓐ
L-MONO	Ⓐ	CHAN-L	CHAN-L → Ⓐ
		CHAN-R	CHAN-R → Ⓐ

7. PILOT LAMP : It indicates whether the power is supplied or not.
8. POWER SWITCH : Controls main power supply.
9. ST. PHONE JACK : For stereo headphones. Effective in all conditions. When the headphones plug is inserted to this jack, the speaker jacks and terminals are moperative.
10. L-CHANNEL BASS CONTROL : Bass response control for left loudspeaker. Designed to be got the most naturalized bass reproduction when this knob is made site at the flat position. By turning it to clockwise, the bass response can be increased.
11. L-CHANNEL TREBLE CONTROL : Treble response control for left loudspeaker. By turning this knob to clockwise the treble response can be increased.
12. L-R CHANNEL BALANCE : It can be used to adjust the balance of volume for right and left speaker out. When it turns to counterclockwise, the volume of right channel is decreased. When it turns to clockwise, on the contrary, the volume of the left channel is decreased.
13. R-CHANNEL TREBLE CONTROL
14. VOLUME CONTROL : It can be controlled for both left and right speaker volume simultaneously.
15. R-CHANNEL BASS CONTROL



⑬ TUNER JACK : Used for external tuner connection. (100 mV ~ 400 mV)

⑭ PHONO JACK : Used with a low input cartridge (2 mV to 5 mV). This jack must be shorted by a shorting pin when not in use, to avoid hum.

⑮ AUX JACK : Used for relatively high voltage input, such as radio tuner, output from the amplifier of a tape recorder or record player with ceramic or crystal cartridge. (100 mV ~ 400 mV)

⑯ TAPE-REC. JACK : Connected to the input terminal of a tape recorder. The recording source may be selected by SELECTOR SWITCH.

⑰ TAPE-P.B. JACK : Connect to the output terminal of a three-head tape recorder, and there-by permits monitoring the progress of performance by using MONITOR SWITCH.

⑱ GROUNDING TERMINAL : Used to ground the phono motor and arm of record player. This ground connection occasionally invites noise ; choose either this or the ground connection of PHONO JACK, as the case may be.

⑲ DIN CONNECTOR : This connection is used instead of TAPE-REC. JACK and TAPE-P.B. JACK, if the tape recorder has corresponding connections.

㉓ SPEAKER OUTPUT TERMINAL : Supplies out-put to Speaker System. Connect plus and minus terminals to correspond with polarity of the speaker. Use a speaker with the impedance preferably of more than 8 ohms.

㉔ SPEAKER OUTPUT JACK : For connection of 2P plug permitting speaker system operation.

㉕ VOLTAGE SELECTOR & FUSE : Permits power voltage change ranging from AC 100 to 240 volts.
Fuse must be as follows :
100 ~ 120 V . . . 3A, 200 ~ 240 V . . . 1.5A

㉖ AC OUTLET : A power supply for record player or tape recorder. This power supply provides up to 300 watts. Note that this power is not interlocked with POWER SWITCH.

㉗ AC CORD : 100 V ~ 240 V 50/60 Hz. Connect this cord to AC power source after checking power voltage.

III. DISASSEMBLY PROCEDURES

In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs.
Remantle in reverse order.

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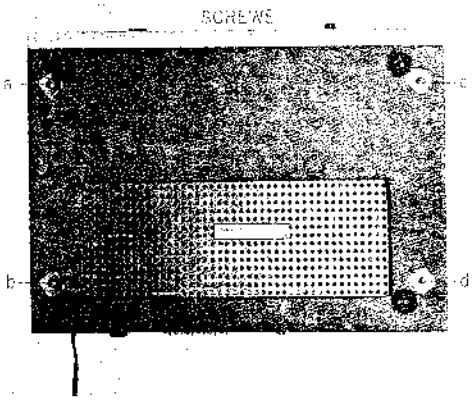

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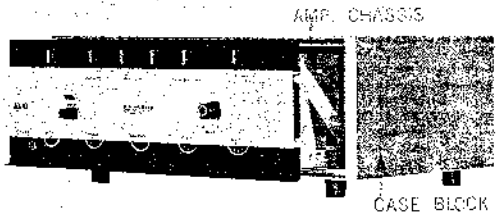

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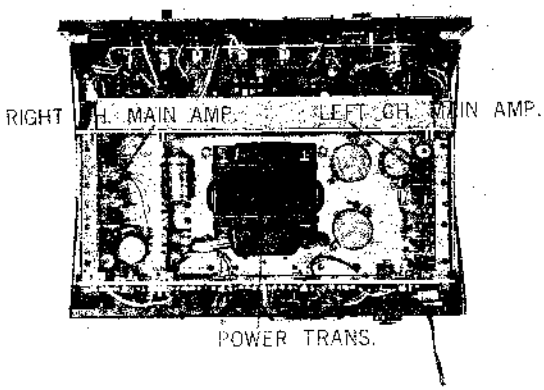

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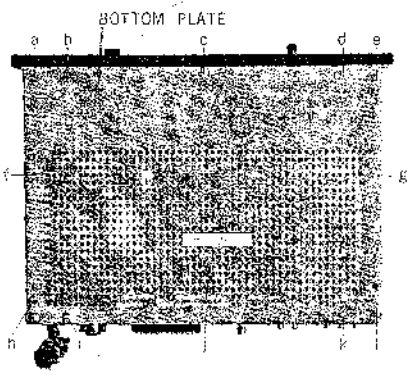

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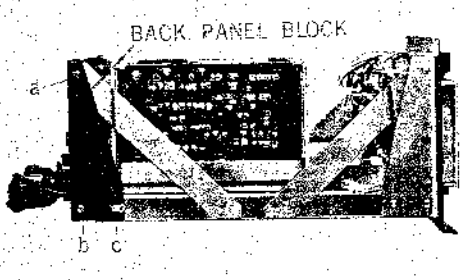

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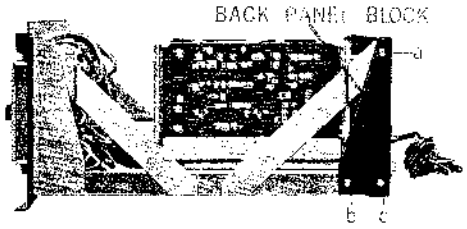

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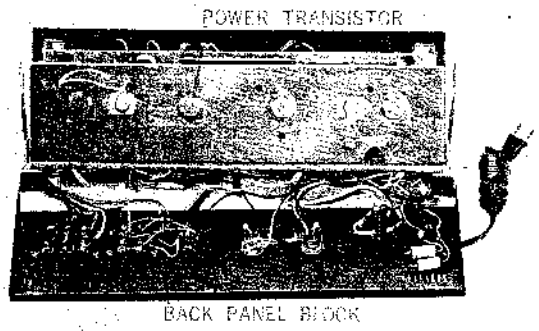

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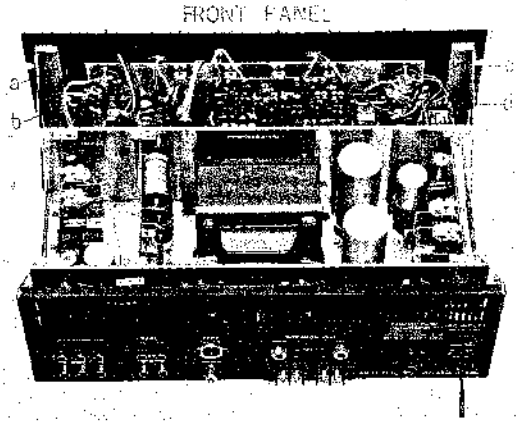

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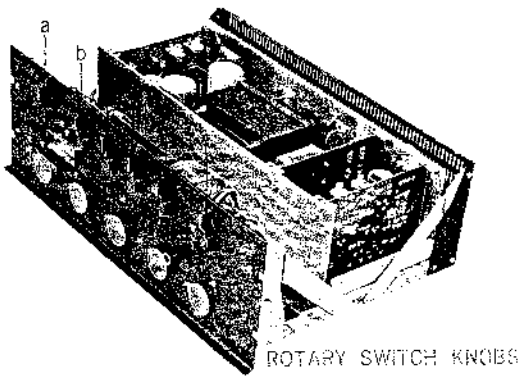

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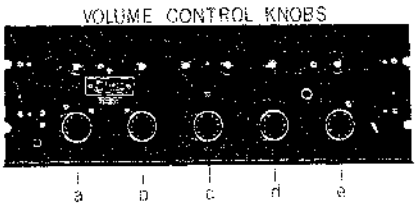

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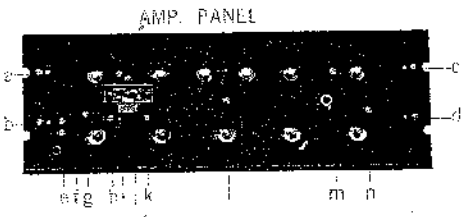

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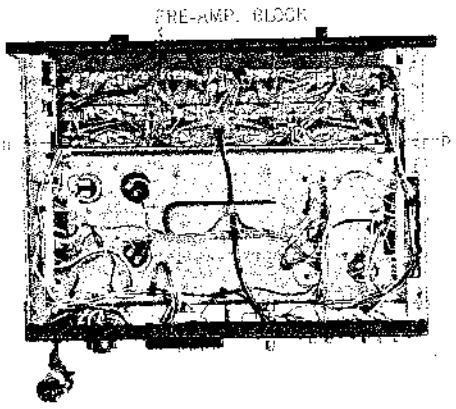


IV. POWER AMPLIFIER CIRCUIT ADJUSTMENTS

1. POWER AMPLIFIER CIRCUIT ADJUSTMENT

In case power amplifier circuit has been repaired or power transistors have been replaced, the following adjustments are necessary for each channel.

1-1 No-Signal Current Adjustment of Power Amplifier.

a) Connect a 1.5 A full scale DC Ammeter in place of the protector fuse in the left channel amplifier. An Ammeter with range selector covering 1.5 ~ 0.1 A is recommended.

b) Set VOLUME Knob (VR-501) on the front panel to the full counterclockwise (minimum) position.

c) Turn Potentiometer VR-202 (1 KΩ-B, L. ch.) of the power amplifier printed board full counterclockwise, and VR-201 (100 KΩ-B, L. ch.) to the half way position of its movable range.

d) Depress the power switch to "ON" position, and adjust VR-202 so that the Ammeter indicates 50 mA (0.05 A).

e) Adjust VR-202 of the right channel amplifier in the same way.

1-2 DC Balance Adjustments.

Adjust the DC Balance after completing current adjustment of the power amplifier.

a) Connect the audio oscillator to the AUX. input terminals of both the left and right channel amplifiers, and supply a 1,000 Hz sine wave, setting the oscillator output to zero.

b) Connect an 8 Ω 60 W resistor to the left and right channel speaker terminals, and connect the oscilloscope across this resistor (See Fig. 1).

c) Set VOLUME Knob on the front panel to the full clockwise (maximum position).

d) Gradually increase the output of the audio osillator until the wave form on the oscilloscope (See Fig. 2) begins to be clipped. Adjust the left channel potentiometer VR-201 (100 KΩ-B) and the right channel VR-251 (100 KΩ-B) so that both upper and lower peaks of the wave forms begin to be clipped simultaneously at the same point of the curve. In case an audio oscillator or an oscilloscope is not available, adjust Potentiometer VR-201 (L. ch.) and VR-251 (R. ch.) so that the voltage between the plus side of the large capacity condenser which is connected to the speaker and ground is half of the supply voltage. At this time, the Volume Control Knob on the front panel should be kept at minimum position.

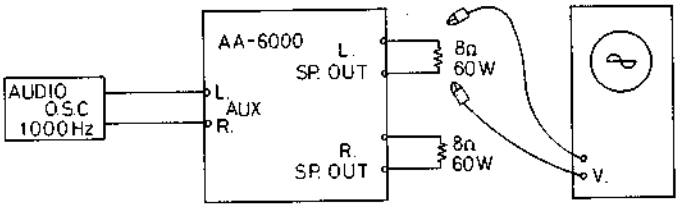


Fig. 1

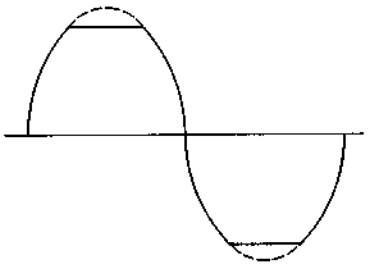


Fig. 2

V. TROUBLE SHOOTING CHART

NO SOUND

Symptom	REMARKS	
Defective speaker system.	• Speaker cables open or shorted. • Speaker voice coil open.	• Check speaker terminals for looseness. • Repair or replace speaker.
No electrical supply.	• Absence of power supply. • Defective power switch. • Line cord plug has faulty contact or is disconnected. • Line fuse blown.	• Replace power switch. • Replace fuse (3 A).
Protector fuse blown.	• Check protector fuse (F102, F103) blown.	• Replace fuse (1.5 A).
Blown protector fuse upon replacement.	• Short in power transistor. (TR-205, TR-206, TR-255, TR-256)	
Blown power fuse upon replacement	• Short in power transformer. • Shorted Diodes (D-101 ~ D-106). • Shorted electrolytic capacitors (C-103 ~ C-107).	• Replace transformer. • Replace defective diodes. • Replace defective capacitors.
Pilot lamp lights, but no sound from speaker.	• Headphones plug is inserted in PHONE jack. • "TAPE MONITOR" switch at "ON" position.	• Remove headphone plug from PHONE jack. • Set switch to "OFF".
Internal Failure.	• Inoperative B power Source circuit.	• Secondary winding in power transformer open. Resistors R-101 ~ R-104 open.
Sound from one channel only.	• Improper position of balance control. • Defective audio circuit of the channel.	• Adjust balance control. • Check for defect by measuring voltages at check points, comparing them with normal channel.

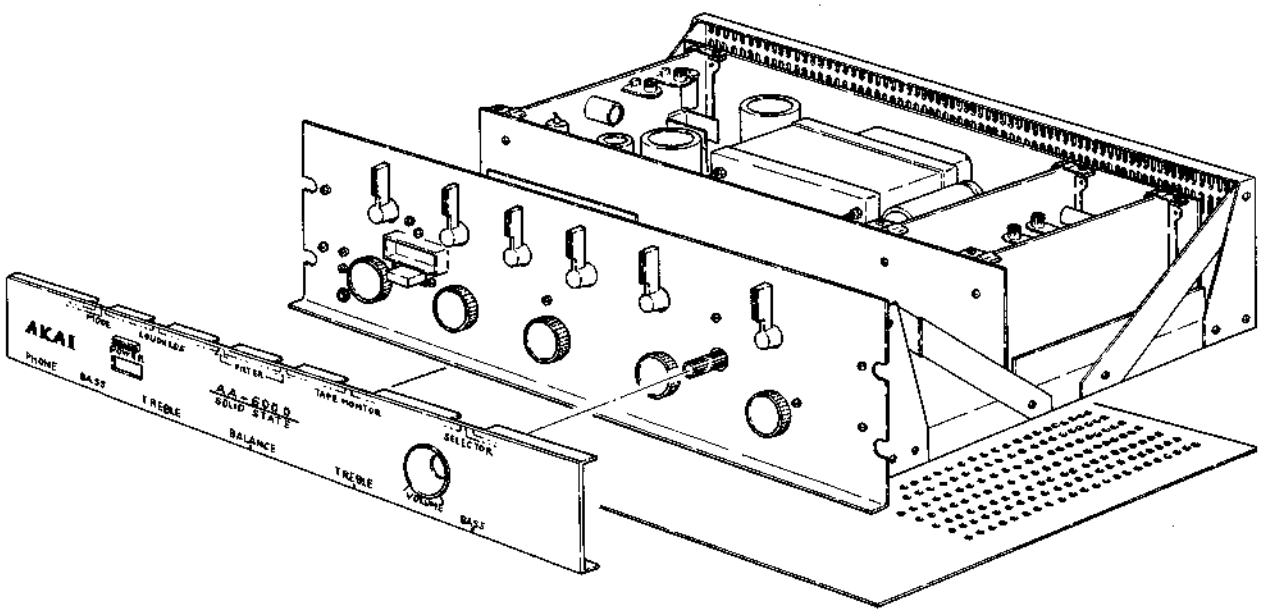
LOW SOUND LEVEL, DISTORTION, HUM AND NOISE

Symptom	REMARKS	
Low sound on both channels.	• Defective power supply circuit.	• Check wiring and voltage.
Low sound on one channel.	• Defective speaker. • Discharged coupling capacitor.	• Replace speaker. • Replace defective capacitor.
Distorted sound on both channels.	• Defective power supply circuit.	• Check power supply circuit.
Distorted sound on one channel.	• Defective speaker. • Leaky coupling capacitor. • Defective or unbalanced power transistors.	• Replace, speaker. • Replace defective capacitor. • Adjust or replace.
Excessive hum.	• Discharged capacitor in power supply circuit. • Defective rectifying diodes in power supply circuit.	• Check C-103 ~ C-107. • Check D-101 ~ D-106.
Excessive noise.	• Defective transistor in pre-amplifier circuit. • Defective volume control variable resistor.	• Check TR-301 ~ TR-307. • Check VR-501.
Loudness control inoperative.	• Defective loudness circuit.	• Check C-401, 402, R-401 and VR-501.
Tone control inoperative.	• At "TREBLE" • At "BASS"	• Check C-312, 313 and VR-301. • Check C-314, 315 and VR-302.

WHEN EXTERNAL INPUT IS USED (Tape recorder etc.)

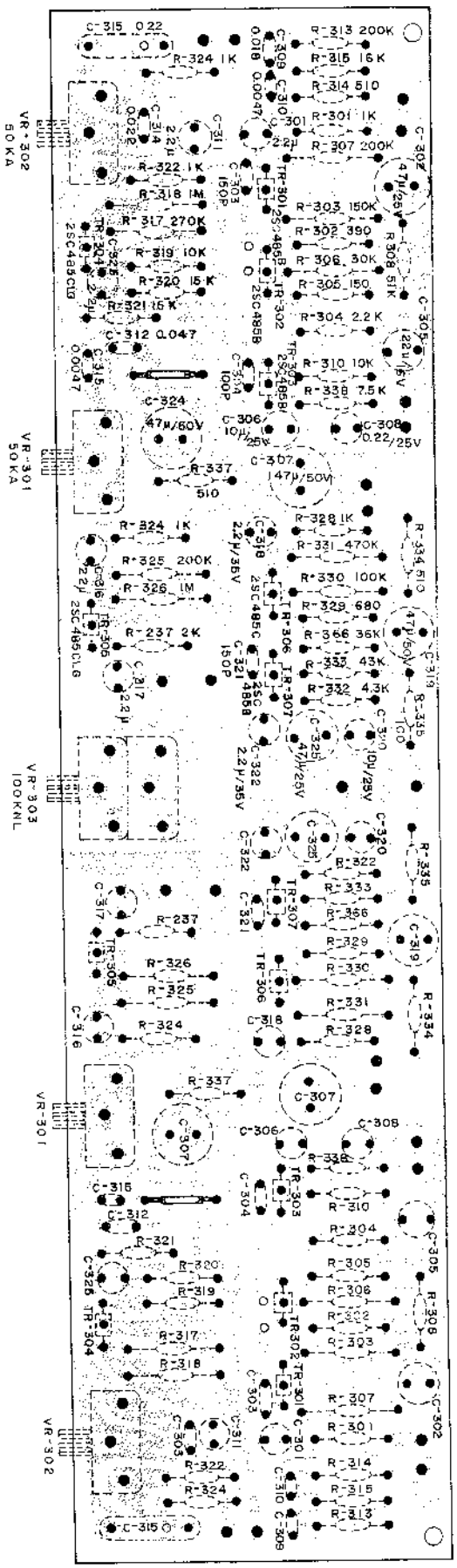
Symptom	REMARKS	
No sound or increase of noise or Hum.	• Faulty connection.	• Check connections and polarity referring to operator's manual. • Check selector switch.

VI. REMOVALS DISASSEMBLE

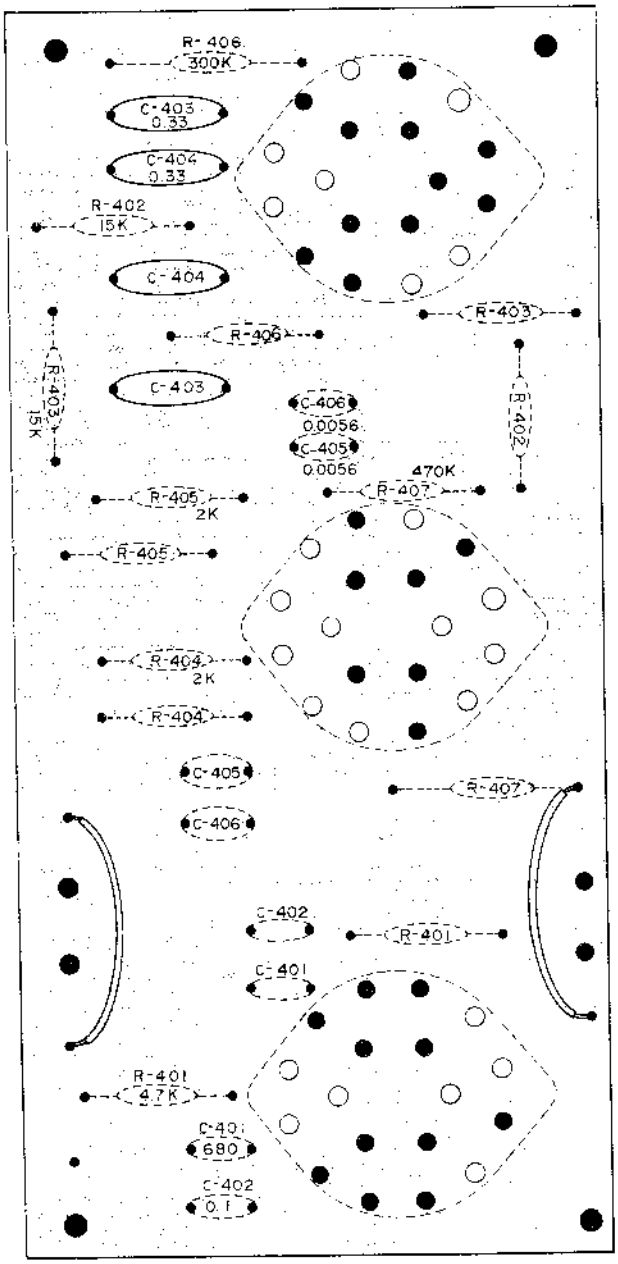


VII. COMPOSITE VIEW OF COMPONENTS

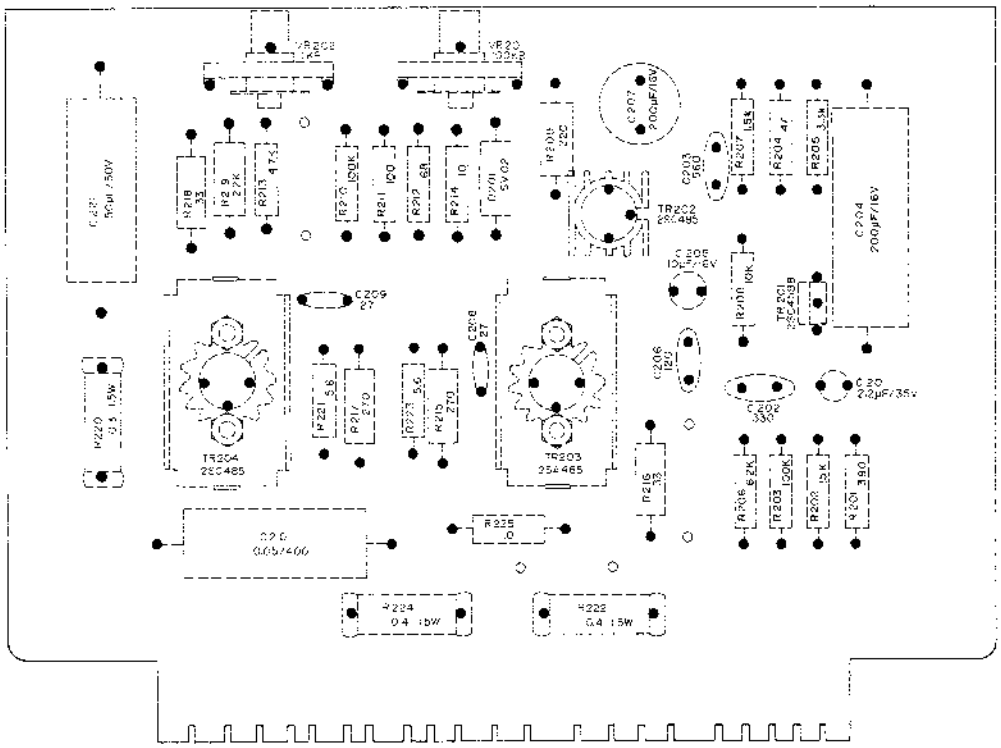
PRE-AMP. PRINTED CARD (5007)



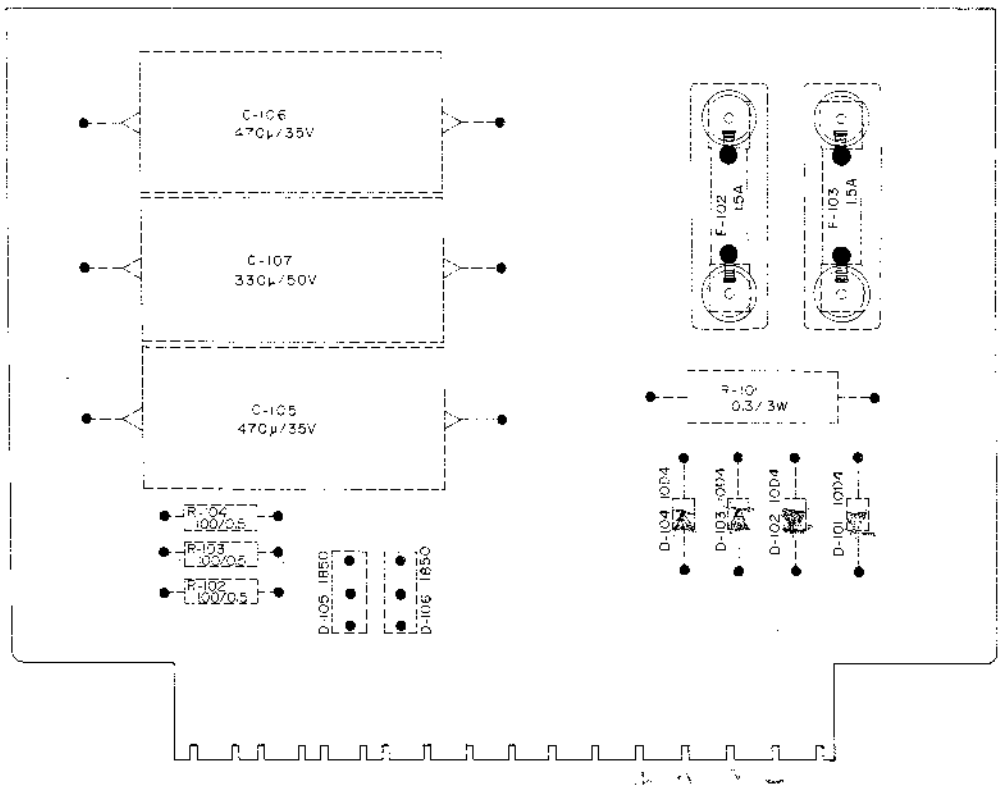
SWITCH BLOCK PRINTED CARD (9007)



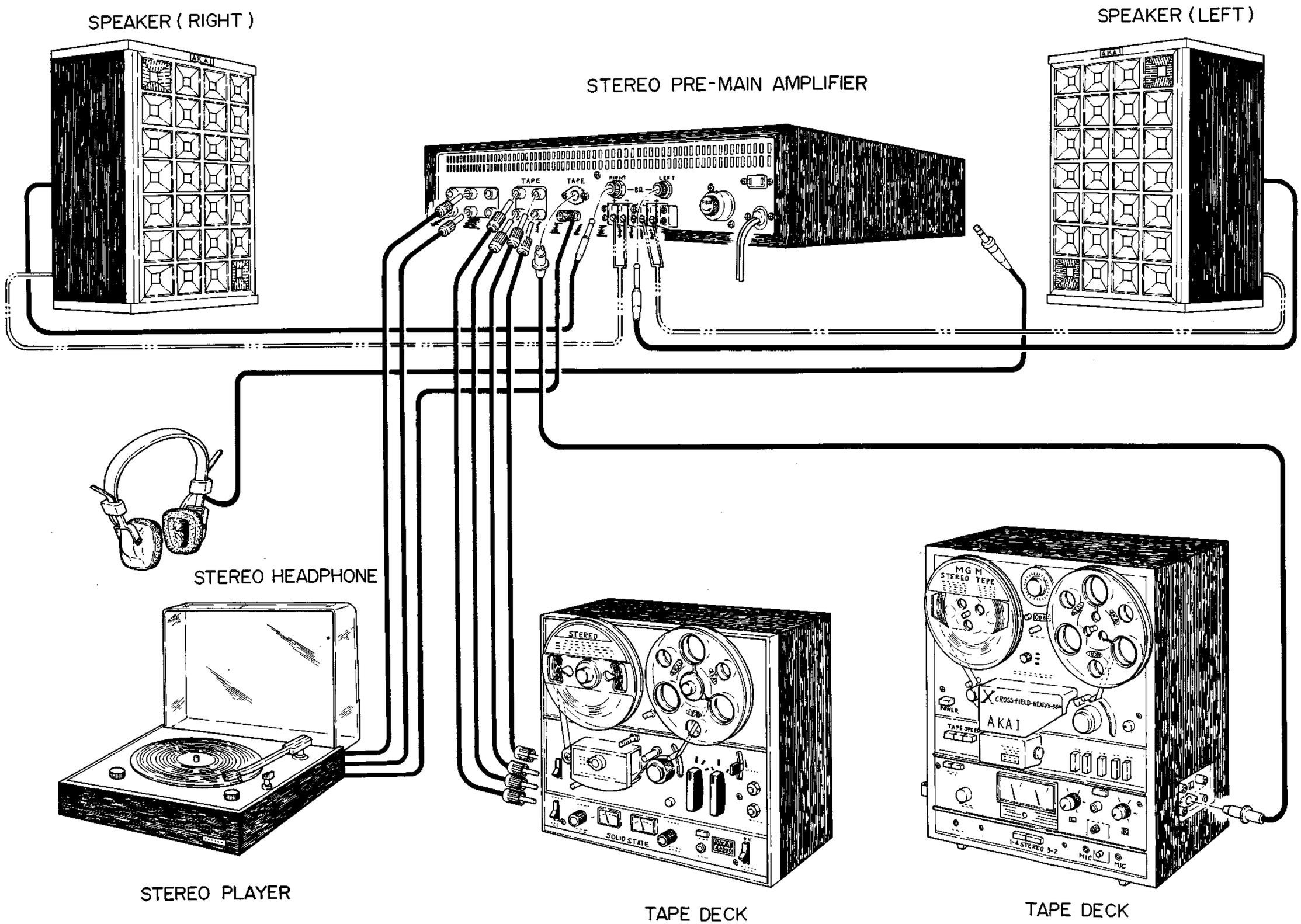
MAIN AMP. PRINTED CARD (6005)



POWER SUPPLY PRINTED CARD (8004)



VIII. CONNECTION DIAGRAM



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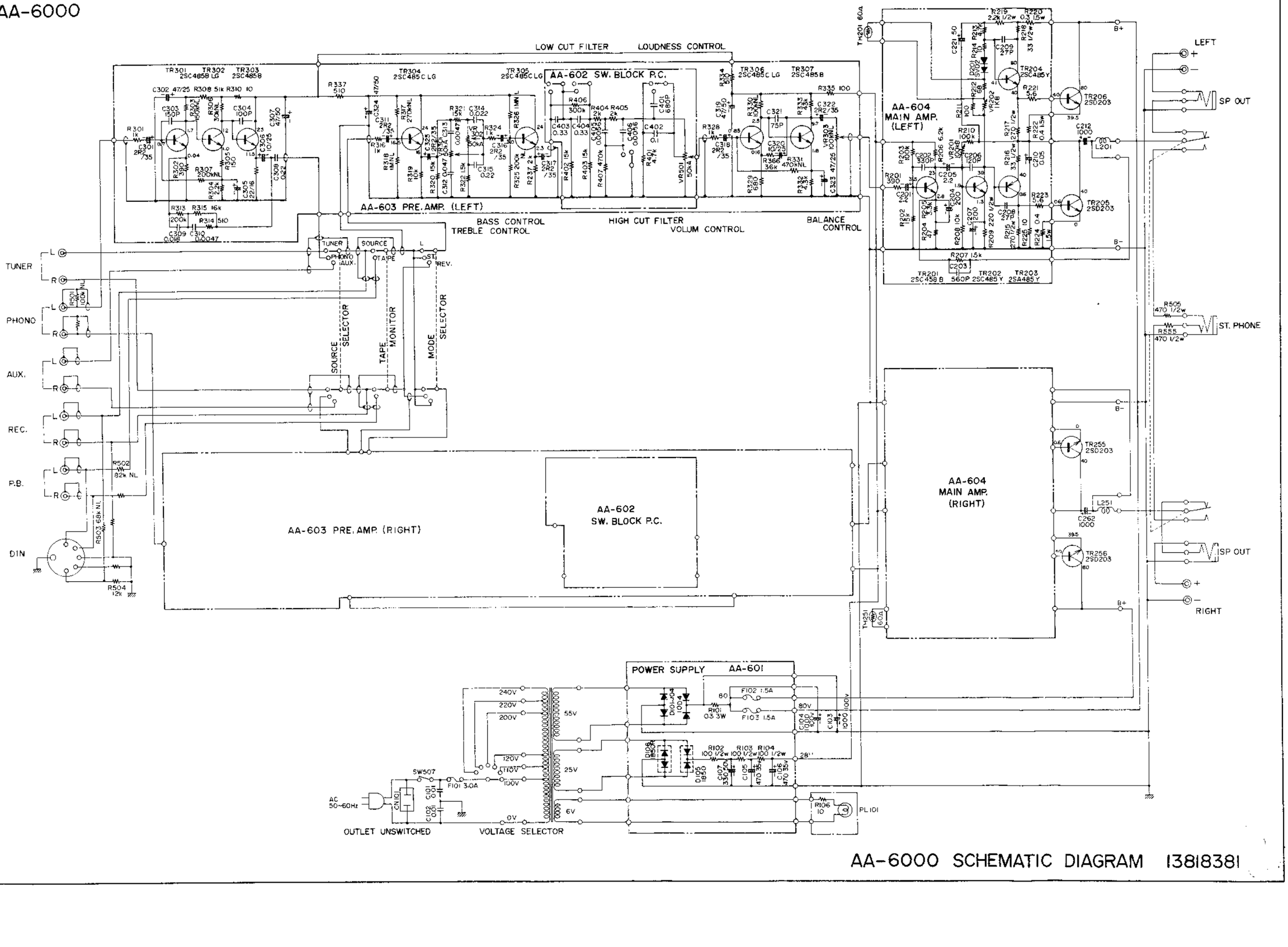

AA-6000 SCHEMATIC DIAGRAM 13818381