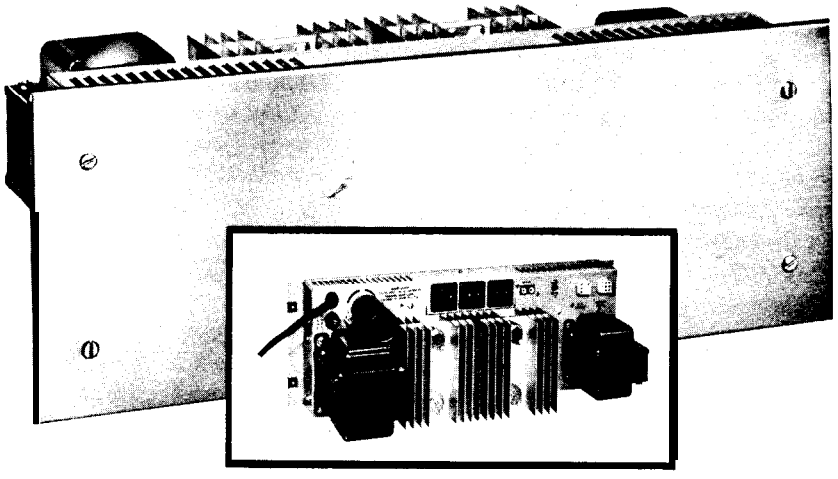
INSTALLATION AND SERVICE INSTRUCTIONS

Rauland

SAX100 SOLID STATE POWER AMPLIFIER



DESCRIPTION:

The SAX100 is a 100 watt solid state power amplifier with ½ Amp. switched and 0.1 Amp. direct auxiliary D.C. power supplies included. The unit is provided with a power relay which controls the amplifier, the ½ Amp. D.C. output, and the A.C. receptacles from a remote Off-On switch.

To secure the best performance it is suggested that the following instructions be read very carefully. Upon receipt of the amplifier the packing list should be checked to determine if all items have been received in good condition. Any physical damage found should be reported at once to the transportation company as all claims for damage must be made by the consignee. The amplifier should be tested immediately upon receipt as any damage due to rough handling by the transportation company should also be reported and claim filed for concealed damages.

SPECIFICATIONS:

Rated Output: 100 watts RMS
Peak Output: 200 watts
Gain: 77db
Frequency Response: ± 2 db 25 – 20,000 Hz
Distortion: Less than 3% at rated output 50 – 5,000 Hz
Noise Level: 80 db below rated output
Regulation: Less than 2 db
Operating Temperature Range: O°F to 130°F
Input Impedance: 50,000 ohms
Input Voltage Required: 0.3 volt for rated power output
Output Impedance: 6.25 ohms, 25 volts isolated or 50 ohms, 70.7 volts isolated. 105/130 VAC, 60 Hz
Power Requirements:
No **Signal: 25** watts
I/3 Rated Power Output: 165 watts
Rated Power Output & ½ Amp. D.C.: 275 watts
External Power Available: 28VDC ½ Amp.switched, and 0.1 Amp. not switched, negat ive ground.
Circuit Protection: 3 Amp. slow blow line fuse. Automatic reset thermal overload relay on 120 volt, 60 Hz line. Automatic reset thermal overload relay on external ½ Amp. DC line.
Tubes: None. 17 Transistors, 3 Diodes
Dimensions: 19" panel, 7" high, 7" deep
Controls: Input level adjustment
A.C. **Control Circuit:**
Current Rating: 6 Amps. 120 VAC 720 watts
No. of Outlets: 3, relay controlled
Associated Items:
MAX 2400A
MCX 1400A
PAX 2400A
PAX 2100A
PBX 1400A

Note: All tests conducted in accordance with EIA Standard SE-101-A where applicable.

INSTALLATION

The SAX100 amplifier may be operated in ambient temperatures as high as 130°F. Forced air ventilation may be required if the amplifier is installed in a confined space or a rack with other heat producing components.

INPUT CONNECTIONS

The SAX100 has a single ended, one side grounded input. The amplifier may be driven from any source capable of delivering 0.30 volt or more to a 50,000 ohm load. The input connection is available at either of the pin jack connections on the rear panel of the amplifier.

AUDIO OUTPUT CONNECTIONS

The output of the SAX100 can be connected for either 25 volt or 70 volt output. Either side of the output may be grounded; or if no ground connection is made, the output voltage will be balanced. If it is necessary that a center point between the two lines be grounded, a 2,200 ohm ±5% 1 watt composition resistor may be connected from each side of the output to ground.

The output connections are available on the nine pin plug on the rear of the unit. The mating plug should be wired as shown below in Fig. No. 1 for either 25 volt or 70 volt output. Assembly of the plug and pins is shown in Fig. No. 2.

USE MALE PINS IN OUTPUT PLUG

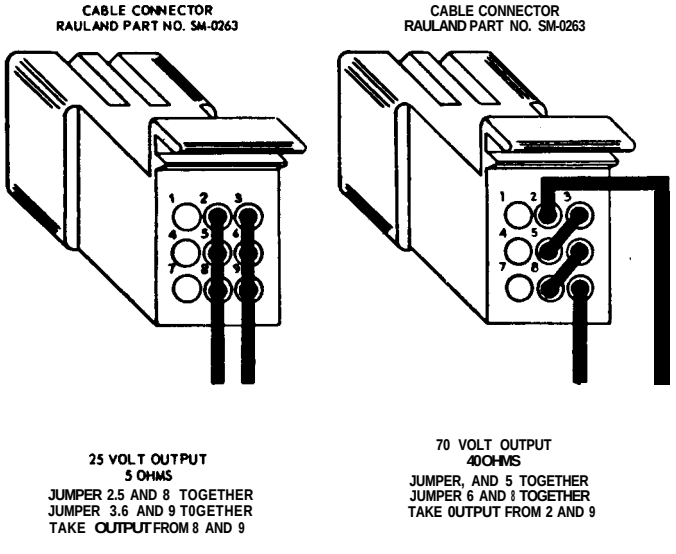


FIG. NO. 1.

POWER LINE CONNECTIONS

The amplifier is provided with two A.C. line power transformer taps. If the amplifier is to be used on a line voltage of less than 120 volts, the 120V tap should be used. If the line voltage is greater than 120V, the 130V tap should be used. These connections are accessible in the upper left hand corner of the front chassis of the amplifier. The amplifier is shipped from the factory wired for 130 volt operation. The red-black wire is used for the 130 volt connection, the yellow-black for the 120 volt connection. To change the line voltage tap, disconnect the wire going to the red-black lead and connect it to the yellow-black, or vice versa. CAUTION: BE SURE AC LINE CORD IS UNPLUGGED BEFORE MAKING THIS MODIFICATION.

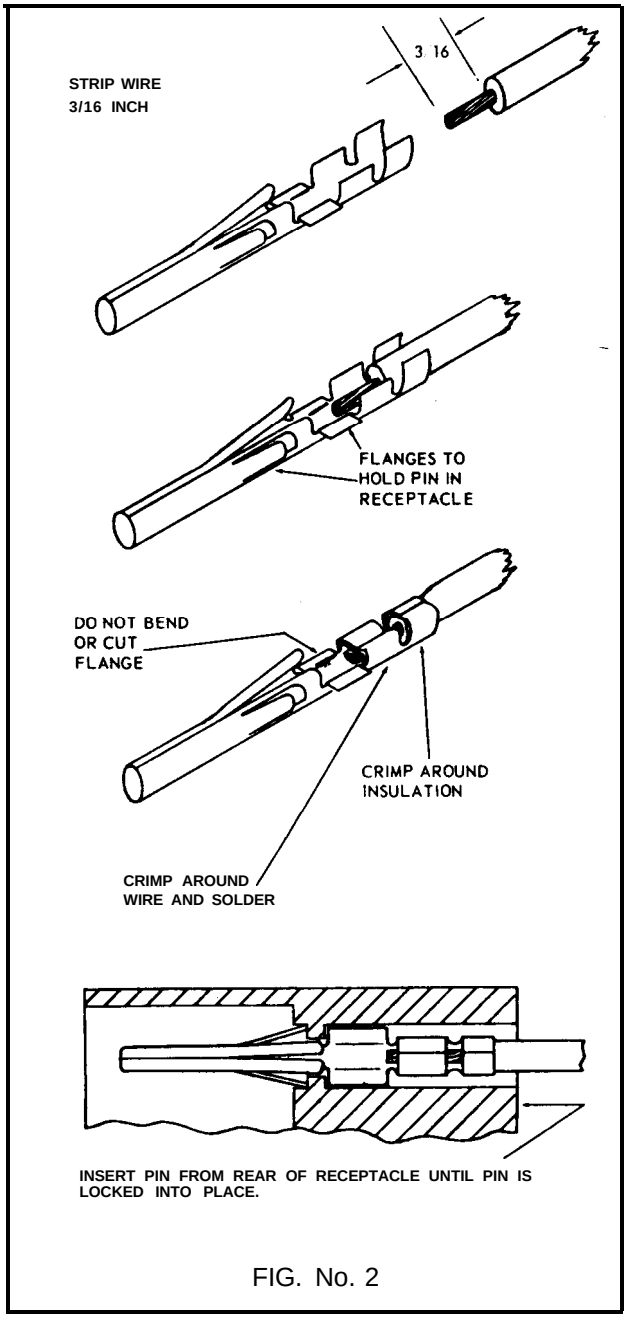


FIG. No. 2

SYSTEM GROUNDING

In any sound system it is necessary for the audio common to be connected to the equipment chassis somewhere in the system. On the SAX100 the NEGATIVE side of the power supply is also the audio common. Further, it is recommended that for best results ONLY ONE such connection be made in the entire system. It is not always possible to predict the best location for this connection, however, through experience Rauland has found that generally the best place for this connection is on the PRE-AMPLIFIER chassis. All Rauland pre-amplifiers are supplied with this chassis connection. If the amplifier is to be used without a Rauland pre-amplifier, some other chassis to negative connection MUST **BE PROVIDED.** As shipped, THE **SAX100 HAS NO CONNECTION FROM** CHASSIS TO POWER SUPPLY NEGATIVE.

AUXILIARY D.C. POWER OUTLET

The SAX100 is able to furnish D.C. power for the operation of relays and pre-ampl if iers.

The power available is shown below and in Fig. No. 3. Pin assembly is shown in Fig. No. 2.

VOLTAGES AVAILABLE	PIN CONNECTIONS	MAXIMUM CURRENT
28 Volts Pos (Switched)	No. 7	0.5 Amp.
28 Volts Pos (not-switched)	No. 3	loo MA.
Negative Common	No. 1	

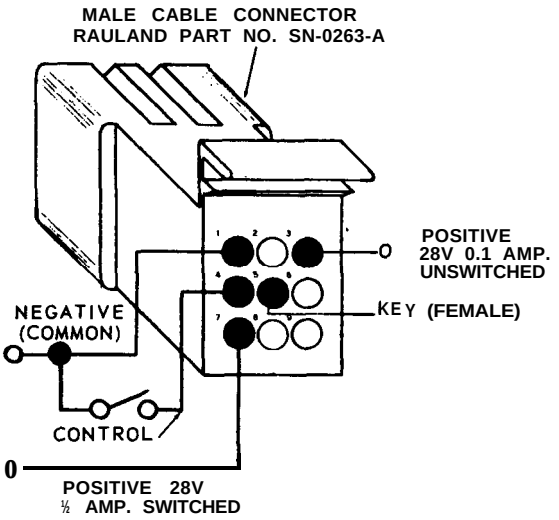


FIG. NO. 3

NOTE: Pins No. 1, 3, 4, and 7 are male pins. Pin No.5, the key pin, is female and must be in place to prevent accidental connection to the AUDIO OUTPUT SOCKET.

OPERATION:

When plugged into the power line, only the power transformer of the SAX100 remains energized. This provides a voltage for the control relay. The control relay is actuated by completing the circuit between wires from pins #1 (Negative Common) and #4 of the D.C. output and control plug. This turns on the amplifier, D.C. supply, and A.C. receptacles. Once on, the output level of the amplifier may be adjusted with the input level control.

Protective Devices:

Line Fuse: The amplifier has a 3 ampere line fuse. This is located inside the front chassis of the amplifier in the upper left hand corner. Replace only with a 3 amp 3 AG SLO-BLO fuse.

Thermal Overload Relay: If the temperature of the amplifier rises to an unsafe level, the thermal overload relay located on one of the output stage heat sinks will turn off the primary power. When the amplifier cools to a safe operating level once more, the thermal overload relay will automatically reset.

A second thermal overload relay protects the ½ Amp. D.C. output circuit. If an overload should occur the thermal overload relay will open the circuit for several seconds and then automatically reset. This cycle will continue until the overload is removed.

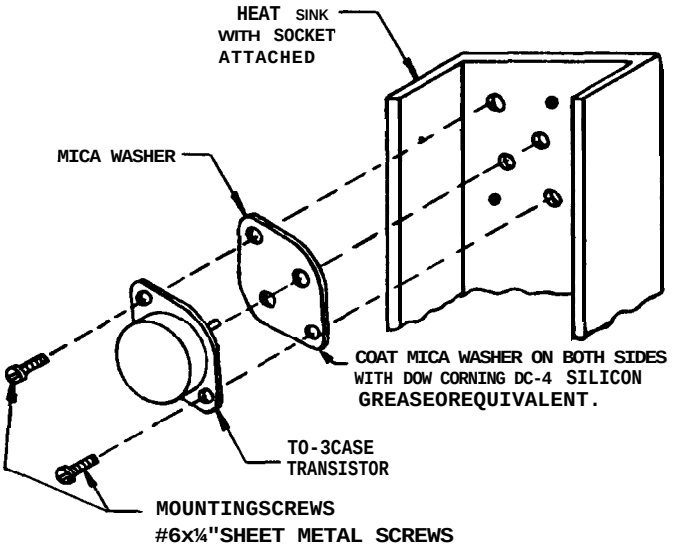


FIG. NO. 4

(Continued)

SERVICE NOTES

1) **REPLACEMENT OF POWER TRANSISTORS:**
If it is necessary to replace power transistors, the following diagram (Fig. No. 4) must be followed to mount new transistors. Also, there is a colored number indicating the transistor gain group on the case of the transistor. The replacement transistor(s) must have the same number and color as the one removed.

After a new transistor has been mounted with the mica insulating washer, check to see if its case is insulated from the heat sink. To do this, check between the transistor case and the heat sink, with an ohmmeter. If there is a resistance indicated, the case of the transistor is shorted to the heat sink. **ANY CHASSIS TO COMMON CONNECTION MUST BE DISCONNECTED WHEN MAKING THIS MEASUREMENT.**

OUTPUT ADJUSTMENTS

The output stages of the SAX100 amplifier are direct coupled from capacitors Cl4 and Cl5 through transistors Q10, Q11, Q12, Q13, Q14, Q15, Q16 and Q17 to the output transformer primary. Replacement of transistors in this circuit will require a check of the output balance to insure best performance.

Required Equipment:

1) 50 mi II ivolt D.C. meter.

2) A.C. voltmeter capable of indicating .003 volt or less.

Potentiometer RP-2 and RP-3 control the zero signal bias for Q10, Q13, Q16 & Q17 and Q11, Q12, Q14, & Q15 respectively.

1) Connect the O-50 mi llivolt meter across one of th 0.25 ohm 5 watt output emitter resistors. (R64, R66 or R63, R65).

2) Adjust RP-2 or RP-3, whichever is associated with the side of the amplifier being adjusted, set the voltage to 10 millivolts. ($I_e = \frac{.01}{.25}$ = 40ma).

3) Adjust the opposite side bias pot for minimum hum and noise at the output as shown by the A.C. voltmeter.

4) Check emitter resistor voltages. All should be within the range of 5 – 20 millivolts. Adjust up or down as required until all emitter voltages are within limits. There is no interaction between the adjusting potentiometers RP-2 and RP-3.

5) Potentiometer RP-1 is factory set for lowest distortion at rated power output at 1KC, and normally should not require adjustment.

CAUTION: To obtain accuracy and to prevent meter damage be absolutely certain that there is no signal while making output adjustments. Turn volume control down and do not introduce transients or hum by accidentally touching low-level components.

Rauland

RAULAND-BORG CORPORATION

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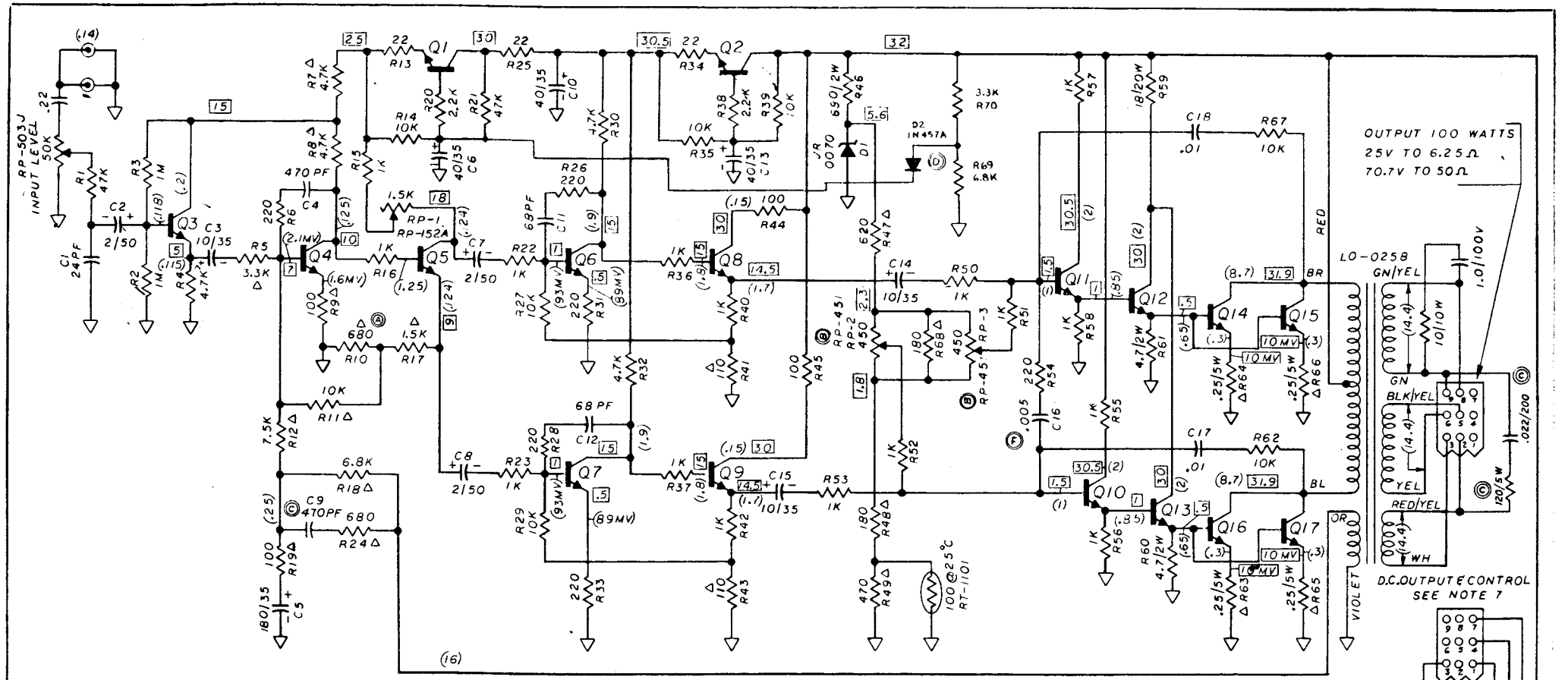

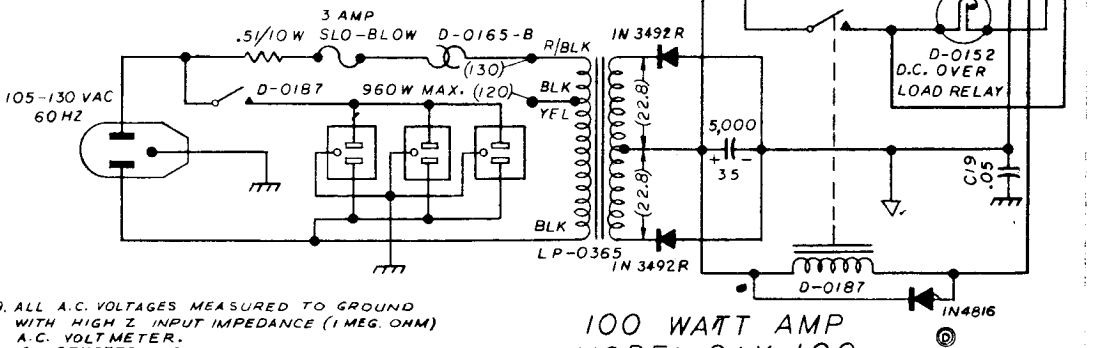

TRANSISTOR TABLE	
NO.	TYPE
Q1 AND Q2	NOTE 10
Q3	2N5088 OR ETS-019
Q4	2N5088
Q6, Q8, Q10 Q11 Q5, Q7, Q9	NOTE 11
Q12 AND Q13	MJE 521
Q14, Q15 Q16, Q17	ETS-003

REVISION	
A	680 Ω NAS 240 Ω 11-11-70
B	RP451 WAS RP-201, 450Ω WAS 200Ω 5-3-71
C	C9 WAS 150 PF; 120/5W WAS 68/5W; .022/200 WAS .1/100 1-18-72
D	ADDED (1) IN4816, (1) IN457A, D2; R70, 3.3K; (1) R69, 6.8K; Q3-2N5088 OR ETS-019 WAS 2N5088 8-23-72
E	ADDED NOTE 10 AND 11 2-6-74
F	C16 WAS .001 2-26-74

NOTES:

1. ALL RESISTORS ARE RATED IN OHMS, HAVE A TOLERANCE OF ±10% AND A WATTAGE RATING OF 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. DELTA (Δ) DENOTES ±5% TOLERANCE COMPONENT.
3. K=1000, M=1,000,000, MV=MILLIVOLTS
4. ALL CAPACITORS ARE RATED IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
5. ⏚ CONNECTION TO CKT GROUND.
   ⏚ CONNECTION TO CHASSIS.
6. FACTORY SET CONTROLS:
   RP1 - FOR MINIMUM DISTORTION.
   RP2 - RP3 FOR 20-60 MA. OUTPUT STAGE EMITTER CURRENT & MINIMUM HUM & NOISE.
7. D.C. OUTPUT AND CONTROL:
   CONNECT PIN 4 TO PIN 1 TO ACTIVATE TURN-ON RELAY AND A.C. RECEPTACLES.
   PIN 7 IS +32.0 V.D.C. AT 0.5 AMP. MAX.
   PIN 3 IS +31.0 V.D.C. AT 100 MA. MAX.
8. ALL D.C. VOLTAGES MEASURED TO GROUND WITH 20,000 Ω/VOLTMETER.
   ▭ DENOTES D.C. VOLTAGE, NO SIGNAL INPUT.
9. ALL A.C. VOLTAGES MEASURED TO GROUND WITH HIGH Z INPUT IMPEDANCE (1 MEG. OHM) A.C. VOLTMETER.
   ( ) DENOTES A.C. VOLTAGE.
10. ETS 013A OR MPS 6514
11. ETS 014A OR MPS 6515

100 WATT AMP
MODEL SAX-100
RAULAND BORG CORP
CHICAGO, ILL.
MADE IN U.S.A.