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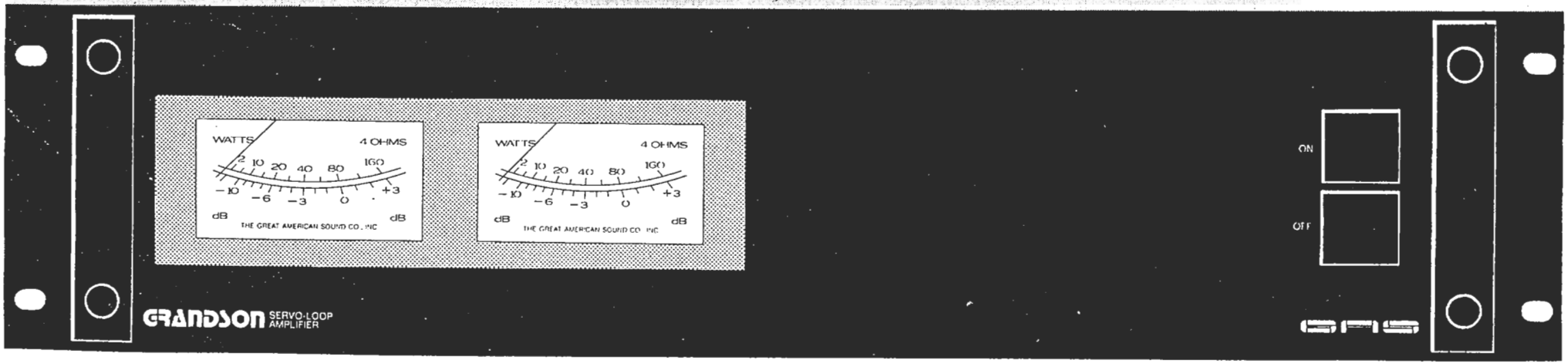


SPECS

POWER OUTPUT

2 OHMS	Minimum 120 Watts per channel, both channels driven, 20 Hz to 20 KHz
4 OHMS	Minimum 80 Watts per channel, both channels driven, 20 Hz to 20 KHz
8 OHMS	Minimum 40 Watts per channel, both channels driven, 20 Hz to 20 KHz
16 OHMS	Minimum 25 Watts per channel, both channels driven, 20 Hz to 20 KHz

TOTAL HARMONIC DISTORTION & I.M. DISTORTION

8 & 16 OHMS	Less than .1% at any frequency or combination of frequencies, and at any power level to clipping.
4 OHMS	Less than 0.3% at any frequency or combination of frequencies, and at any power level to clipping.
2 OHMS	Less than 1% at any frequency or combination of frequencies, and at any power level to clipping.

INPUT SENSITIVITY: 0.7 Volts RMS for 80 Watts into 4 Ohms.

INPUT IMPEDANCE: 56K Ohms at 20 KHz minimum.

FREQUENCY RESPONSE (Power Bandwidth) at rated power or at any level less than rated power:

8 & 16 OHMS	Better than ±0.1 dB, 15 Hz to 40 KHz
	Better than ±3 dB, 1.5 Hz to 185 KHz
4 OHMS	Better than ±0.1 dB, 15 Hz to 25 KHz
	Better than ±3 dB, 1.5 Hz to 140 KHz
2 OHMS	Better than ±0.1 dB, 15 Hz to 20 KHz
	Better than ±3 dB, 2.0 Hz to 90 KHz

RISE TIME INTO 8 OHMS LOAD:
Better than 2 microseconds AT 20 KHz FULL POWER.
Slew rate equal to 20 Volts per microsecond.

RISE TIME INTO 4 OHMS LOAD:
Better than 2.5 microseconds AT 20 KHz FULL POWER.
Slew rate equal to 20 Volts per microsecond.

STABILITY: 100% stable into any load angle 0° to 90°, capacitive or inductive.

OVERLOAD PROTECTION & FUSING:
Thermal breakers protect against overheating.
4 B+, B— power supply fuses, 1 AC slow-blow power fuse.

NOISE: Better than 95 dB below full power (unweighted, wide band).

DIMENSIONS: 19" (W) x 4¼" (H) x 11" (D).

SHIPPING WEIGHT: 20 lbs.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

INTRODUCTION

In the past, low-power amplifiers have suffered from sonic impurities forced upon them by hurry-up engineering and budget-plan components. GRANDSON incorporates the technology, engineering, and components found on today's most sophisticated designs. The result is unparalleled performance previously unavailable in amplifiers of this size.

GRANDSON is manufactured by the Great American Sound Company, a group of engineers and craftsmen who care intensely about the art of sound reproduction. We appreciate the vote of confidence that your selection of GRANDSON has given us.

OPERATIONAL THEORY

GRANDSON is a fully-complementary, push-pull design which, following the input coupling capacitors, is completely DC-coupled. The circuit employs a dual-differential amplifier input stage which allows the use of two independent complementary positive and negative drive stages. The drivers feed the Darlington configuration output stages directly, thus maintaining the balanced direct-coupled circuitry essential to providing exceptional overload (clipping) characteristics and inherent low distortion.

Output-overload protection is accomplished in two ways. The driver-stage current capability is balanced to achieve full-power output without driving the output transistors beyond their safe operating area (S.O.A.) thus eliminating the need for (and disadvantages of) conventional current limiters. In the event of extreme overload conditions (shorted output). DC supply fuses will open when output current exceeds 12 Amps RMS (still within the S.O.A. of the output devices).

OTHER CIRCUIT FEATURES INCLUDE:

I.C. Bias Current Regulation: An integrated circuit (I.C.) is thermally coupled to the output transistors and automatically maintains optimum output stage current at all times, regardless of load, drive or thermal conditions.

D.C. Servo-Control: Introduced to audio by Great American Sound Company, an operational amplifier continually monitors the output of the amplifier. The presence of any D.C. in excess of 25 mV generates a correction signal which is applied to the input stage. This maintains unconditional long-term D.C. stability and eliminates the possibility of a D.C. voltage at the output which might cause assymetrical (non-linear) operation of the loudspeaker.

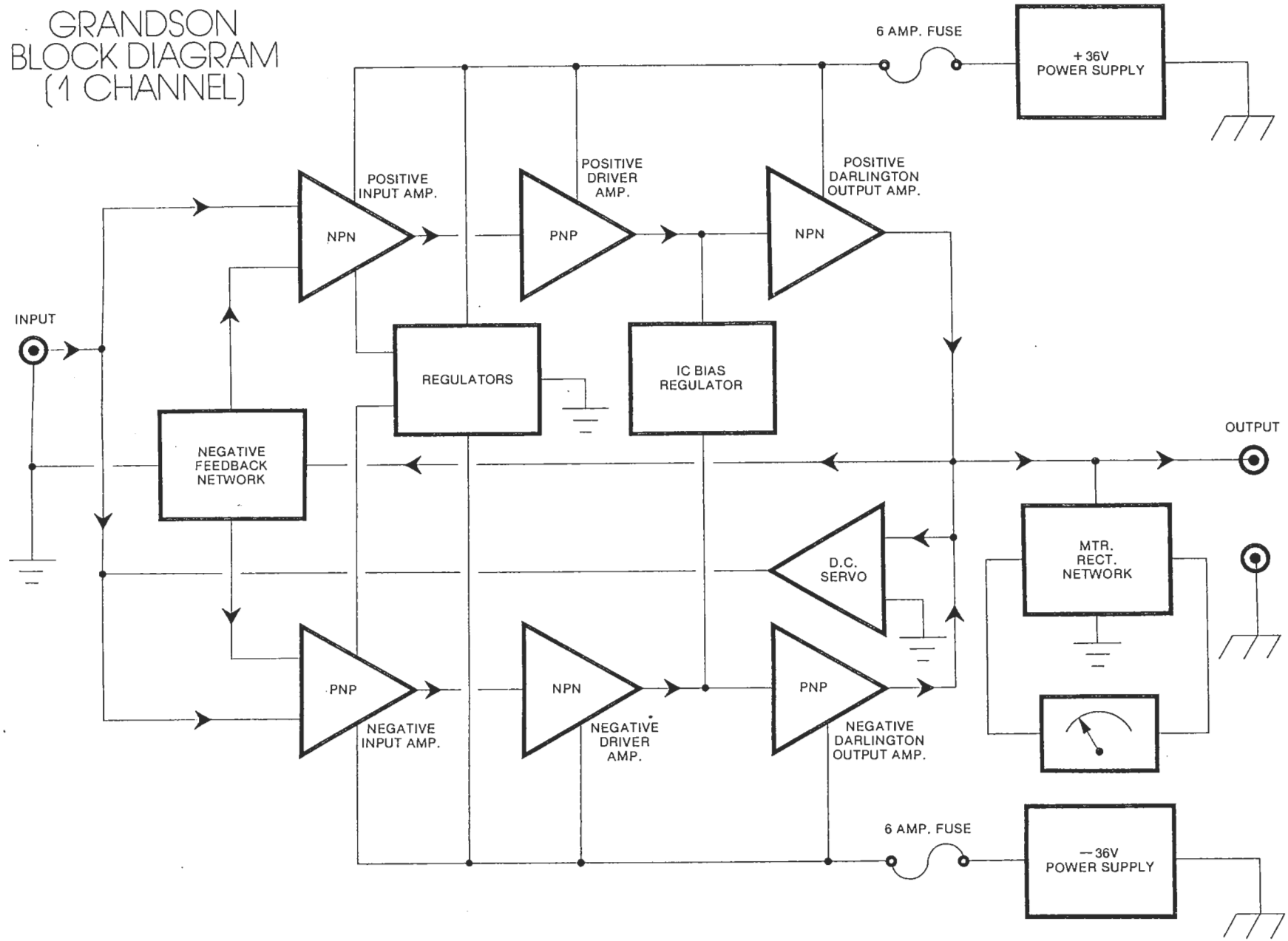
UNPACKING

Immediately upon receiving GRANDSON, carefully unpack the amplifier and inspect it for any sign of damage.

NOTE: In the event you discover some shipping damage, please contact your dealer immediately.

Save the shipping carton and all associated packing materials for later use, should you ever need to transport the unit. The shipping materials have been carefully designed to transport your GRANDSON with a minimum of disturbance.

GRANDSON BLOCK DIAGRAM (1 CHANNEL)



INSTALLATION

Although GRANDSON has an extensive heat-dissipating fin area, its effectiveness can be severely reduced should the air flow to the fins be restricted. Avoid locating GRANDSON in cabinetry which might block air flow to the fins. Provide adequate air vents or ports both below and above the amplifier to achieve a chimney effect. Care should also be exercised that the installation is not made near hot-air vents that might affect the efficiency of GRANDSON's fin cooling system.

If GRANDSON is to be installed in a cabinet panel, a 17¾-inch by 4-1/8-inch cutout must be provided. You may use the four front-panel mounting holes to hold the entire weight of GRANDSON. The unit can also be rack mounted, using the same front-panel holes. When mounted in a metal rack, you must use the insulating washers provided.

ELECTRICAL CONNECTIONS

All connections are made on the rear side of the amplifier so that the interconnecting wiring may be completely concealed from view.

CAUTION: All connections should be made with the AC power cord disconnected. Under no circumstances should either input or output wiring be attempted while the amplifier is powered.

SPEAKER-OUTPUT WIRING

Either dynamic or electrostatic-type loudspeakers may be connected to the output binding posts. Each loudspeaker requires two leads. One is connected between the amplifier's red binding post and the "hot" or positive terminal of the loudspeaker system. The second lead is connected between the amplifier's black binding post and the negative terminal of the loudspeaker system. Connect the left speaker to Channel A and right speaker to Channel B. (See diagram on page 6.) Use at least 16 AWG wiring.

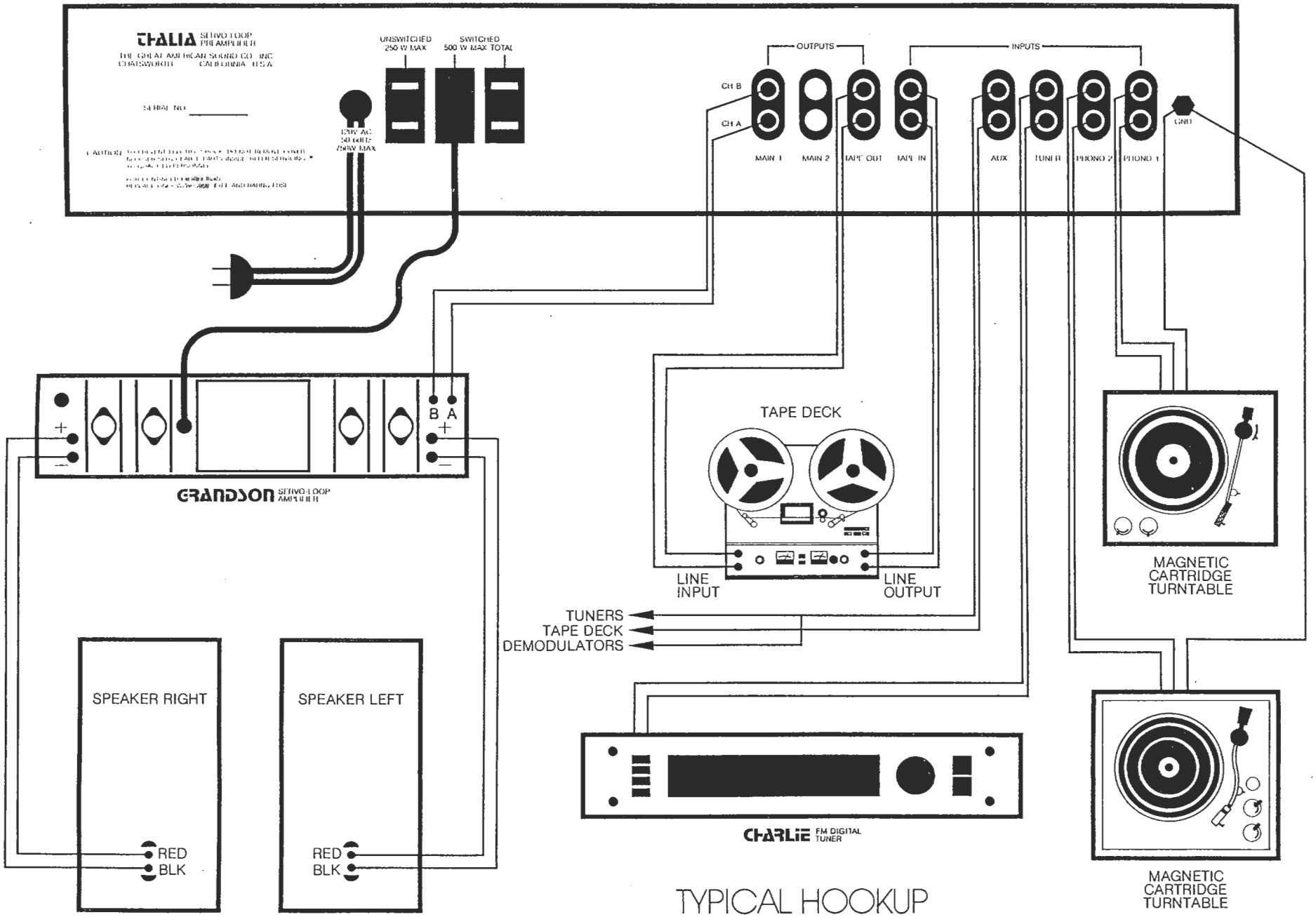
IMPEDANCE RATINGS

Most speakers have either 16, 8, or 4-Ohm impedance ratings. Consult the specifications accompanying the speaker to determine their ratings.

It is not recommended that a speaker or speaker-system combination be used with GRANDSON where its resulting impedance is less than 2 Ohms. Although no damage will result, some of the protection fuses might blow.

Where two sets of stereo speakers are to be driven simultaneously, their combined impedance can be calculated by the following formulas.

Parallel Connection: $Zp = \frac{R1 \times R2}{R1 + R2}$



TYPICAL HOOKUP

If the speakers are identical, then the resulting impedance is one-half of each speaker's impedance. (For example, two 8-Ohm speakers result in 4 Ohms when connected in parallel.)

Series Connection: $Zs = R1 + R2$

If the speakers are identical, the resulting impedance is two times each speaker's individual impedance. (For example, two 4-Ohm speakers in series will make an 8-Ohm load.)

Where applications require use of more than two speakers, try to arrange the use of 4 identical speakers, which when connected in two series sets of two speakers in parallel, result in an impedance the same as that of each individual speaker. Consult your dealer for a more detailed explanation when attempting an installation of this complexity.

ELECTROSTATIC SPEAKERS

The use of electrostatic speakers in high-quality audio systems has become increasingly popular. Because speaker systems incorporating electrostatic speaker elements represent especially difficult loads for audio amplifiers to handle, potential users of this type of equipment should become acquainted with unique characteristics involved. An electrostatic speaker is a capacitive-type load. It is not unusual for its capacitance, as seen by the amplifiers, to equal 10μF.

Such a large capacitance represents 1.6 Ohms at 10 KHz and falls proportionally at higher frequencies. Although GRANDSON is designed to drive this load easily, it is an especially demanding situation. Consequently, it is not recommended that more than one stereo pair of electrostatic speakers be driven by GRANDSON.

SPEAKER LEVEL CONTROLS

Sometimes, with multiple speaker installations, it is desired to have speaker level controls or attenuator pads attached to speakers. Although this might be desirable, an unusually high-power rating is required for the controls or pads that are used. Variable attenuator pads having the necessary 80-Watt rating at 4 Ohms are not widely available. Substituting lower-wattage controls is not recommended because of the high-current requirements involved which will eventually overheat the control elements and result in their destruction. It is recommended that when it is necessary to reduce the speaker output volume, it be done prior to the GRANDSON input and not in the speaker circuitry. If it becomes mandatory that a speaker attenuator pad be used to balance the sound in a multiple-speaker installation, then a fixed high-wattage resistor pad is recommended. (Consult dealer).

AMPLIFIER INPUT

Before proceeding, verify that the power switch is in the "Off" position. Only a pair of well-shielded audio cables should be used for the input wiring to GRANDSON. Connect the output of your preamplifier to the inputs of GRANDSON marked "CH A" and "CH B". Be certain that you have connected the corresponding cable to the preamplifier output with a similar channel identification. Make sure that the cable plug is inserted fully into the preamplifier and amplifier jack so that the plug's outer-shield prongs are engaged with the jack's outer shell to maintain "ground" circuit continuity.

To prevent loss of high-frequency response, the length of input cabling should generally be limited to 10 feet.

POWER-CORD WIRING

Before plugging the GRANDSON power line cord into the power outlet receptacle on your preamplifier, check the rating of the receptacle and of the associated power off-on switch. GRANDSON power requirements are 3 Amperes at 120 Volts continuous duty and 25 Amperes at 120 Volts initial turn-on surge. The Great American Sound Company cannot be responsible for damage to a preamplifier power switch when its rating is inadequate to handle the power requirements of GRANDSON.

COMMON GROUNDING

It is not unusual for installers of audio systems to refer to the negative side of the input cables as "ground" and also to refer to the negative lead of the speaker terminals similarly as the "ground" wire. However, these two connections are not the same in a high-powered audio amplifier and must never be connected together. Because of the high currents involved in the leads connected to the speaker loads, these leads must never be interconnected to any part of the amplifier chassis or input cable connections. Otherwise, a feedback circuit can be established which would result in potential instabilities ("motor boating") and possible amplifier damage.

PRECAUTIONS

It must be remembered that GRANDSON is an extremely wide-band amplifier with extensive output power driving capabilities. Certain considerations must be exercised when operating it. Read and carefully observe these precautionary considerations before connecting or using GRANDSON.

1. Never plug an input cable into the amplifier while the power is on. This may cause R-F burn-out of your speakers and is not covered under the Great American Sound Company warranty.

2. Never apply the "thumb test" (touching with your finger) to the input jack. Speaker damage is a strong possibility due to R-F rectification and hum. The Great American Sound Company, Inc., is not liable for speaker damage caused by improper use of its equipment.

3. Loads below 2 Ohms impedance should not be connected to the amplifier. Although no damage will result, repeated fuse blowing may occur.

4. Do not restrict the airflow near the heat-dissipating fins of the amplifier. Even though GRANDSON is designed to operate with moderate heat rise, air circulation around the amplifier is necessary for proper operation.

5. Because of the power limitations of some preamplifiers' AC convenience outlets and AC power off-on switches, do not connect GRANDSON's power cord into your preamplifier AC convenience outlets unless you are certain that they are capable of 3 Amperes at 120 V continuous duty and 25 Amperes at 120 V surge. Great American Sound Company is not responsible for damage incurred to an underrated preamplifier AC power switch or outlet.

6. Allow at least 45 seconds after turning off GRANDSON before reapplying AC power. Rapid off-on cycling will upset the stability of the D.C. Servo-loop and may deliver an excessive amount of D.C. to the speakers. Although no speaker damage should result during this period, it is a condition which may be avoided by giving the Servo-loop a few seconds to stabilize after turn off. (See operational theory Pg. 3).

7. Note that when GRANDSON is turned on, some meter movement is normal.

OPERATION

After all connections are made, rotate the volume control on the associated preamplifier to minimum setting (maximum counter-clockwise). Now turn on the preamplifier AC power. Then turn on GRANDSON. Finally, adjust the volume control (on the preamplifier) for the desired sound output level.

METERS

The meters (if so equipped) will indicate the power levels at which the amplifier channels are being driven. The power Wattage indications are correct for 4-Ohm speakers. If 8-Ohm speakers are being used, halve the Wattage indications to obtain the correct power-level readings. For 2-Ohm speakers, double the readings.

HEADPHONES

The GRANDSON is easily capable of driving any type of headphone available. However, frequently the sensitivity of the headphones must be reduced to permit matching their output level to that of most loudspeakers. This can be done by inserting a 50 to 100-Ohm, 5- Watt resistor in series with each phone signal lead.

SERIAL NUMBER

The Serial Number may be found on the rear panel of GRANDSON, just below the input jacks.

GENERAL MAINTAINANCE

Great care has been taken at Great American Sound Co. to assure that your amplifier is as flawless in appearance as it is electronically. All metal work is heavy-gauge aluminum which is black anodized inside and out for protection from corrosion.

The plastic lens over the two meters should be cleaned with only a soft cloth and a mild detergent such as Windex. Use of an abrasive-type cleanser might permanently scratch the meter faces.

AC FUSE: The amplifer is protected by an AC line fuse on the rear panel. When power is applied to the amplifier and the meter lights or pilot light do not illuminate, check the line fuse. If the fuse seems faulty, replace it with only a slow-blow fuse of equal value. Replacement with a fuse of a higher current rating will not protect the amplifier and will void the warranty.