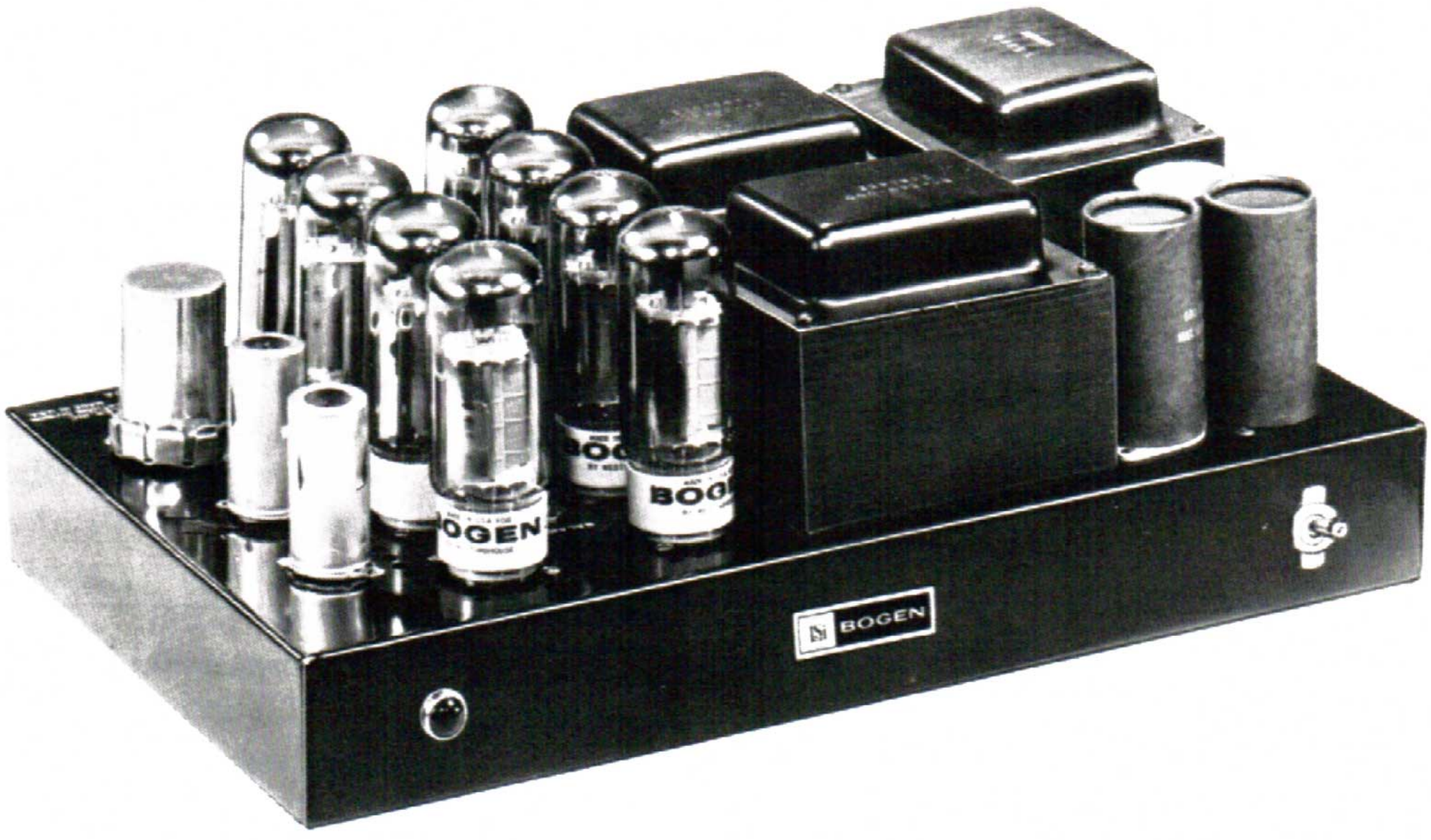
BOGEN®



MODEL MO200A

200 WATT
PUBLIC ADDRESS
BOOSTER AMPLIFIER

LEAR SIEGLER, INC.
BOGEN DIVISION
P.O. BOX 500
PARAMUS, N. J. 07652

INSTALLATION AND OPERATING MANUAL

READ THOROUGHLY BEFORE OPERATING EQUIPMENT

DESCRIPTION

The Bogen model MO200A is a booster amplifier designed to provide a power output of 200 watts audio power. The amplifier can be used with any P.A. amplifier or preamplifier which can provide a 2 volt signal across 500,000 ohms at its output terminals. The MO200A boosts area coverage, provides increased reserve power and overcomes high noise, conditions. It is excellent for use in stadiums, large auditoriums, industrial plants, schools and all other areas where maximum coverage is required. This high quality amplifier has exceptional power handling ability over the entire range of audio frequencies.

The MO200A has provisions for high and low impedance inputs. Speaker output impedance of 8 ohms is provided as well as 25 volt (3 ohms) C.T. balanced, 70 volt (24.5 ohms) C.T. balanced and 115 volt constant voltage sources, to eliminate difficulties encountered in speaker matching when unequal amounts of power are required for different speakers of a distribution system. Sockets are provided on the chassis for power to an external preamplifier and for connecting a remote standby power control unit.

Two or more MO200A booster amplifiers may be connected in series or parallel to provide virtually any reasonable voltage at any frequency or wattage. This is made possible by interconnecting the C.P. jacks of the units and paralleling the inputs of the units. The C.P. connections tie the feedback components of the amplifier together, thereby balancing their characteristics.

The MO200A is also designed to serve as a power amplifier for many industrial applications such as ultrasonic devices, motors and servo systems. This is possible because the amplifier can be operated at continuous full power output (100% duty cycle) and has a 115 volt output for use in driving 115 volt AC motors.

SPECIFICATIONS

POWER OUTPUT: 200 watts

HARMONIC DISTORTION: Less than 2% at 200 watts output.

FREQUENCY RESPONSE: ±2 db, 8 to 50,000 cps.

HUM: 80 db below rated output.

SENSITIVITY (for rated output): High impedance input; better than 2 volts. Low impedance (using TL600 transformer); better than 0.5 volts.

INPUTS: High impedance 0.5 megohms; Low impedance 500 ohms (balanced) using TL600 transformer; bridging 10,000 ohms using TL10K line transformer.

OUTPUTS: 8 ohms balanced, 25 volt C.T. balanced (3Ω), 70V C.T. balanced (24.5Ω) and 115 volt output (for industrial applications).

POWER REQUIREMENTS: 500 watts (5 amps at 120 volts) 50-60 cycles AC (for P.A. applications).

TUBES: 7247 (2), 8417 (8), 3 silicon rectifiers.

DIMENSIONS: 16'' wide, 11½'' deep, 6'' high.

SHIPPING WEIGHT: 65 lbs.

INSTALLATION

UNPACKING

The unit was carefully checked before leaving the factory. Inspect shipping container and amplifier carefully for indications of improper handling in shipment. If unit has been damaged, make an immediate claim to the dealer or distributor from whom it was purchased. If unit was shipped to you, notify transportation company without delay and file a claim.

CONNECTIONS BETWEEN COMPONENTS

Use single-conductor, low capacity shielded wire for connecting preamplifier to amplifier. Keep leads under ten feet in length, unless cathode follower output is employed.

Speakers may be connected with standard flexible line cord (zip-cord) and up to 100 feet of cable may be used without appreciable loss.

Make certain that all audio cables are kept away from speaker cables, power cables, and power transformers, and that speaker cables are kept away from power cables.

POWER AND GROUNDING

The amplifier is furnished with an AC line cord terminated in a three-prong plug. Plug the line cord into a three-wire grounded outlet providing a nominal 120-volt, 50-60 cycle power source. This will ground the amplifier as well as supply power to it.

It is advisable to ground the amplifier. Therefore, if a three-wire outlet is not available, an adapter such as Leviton No. 5017 should be used to convert a standard two-wire outlet for use with three-wire plugs. The adapter is provided with a grounding pigtail which should be connected to the screw holding the wall plate to the receptacle.

NOTE

In some areas, the wall plate screw is not grounded. In this case it will be necessary to connect a grounding wire between the GND terminal on the rear chassis of the amplifier and a water or steam pipe.

AUXILIARY POWER

The auxiliary power receptacle on the rear panel is a three-wire grounded outlet. Hence, any associated equipment connected to it with a three-prong line cord will be grounded, providing the amplifier line cord has been properly grounded. Both the amplifier power switch and the phono on-off switch must be used in turning off a record player connected to the auxiliary receptacle. Flats may develop on the idler wheel of the phonograph if the amplifier power switch is used to stop the record player.

INPUT CONNECTIONS

HIGH IMPEDANCE: Using the high impedance input, the amplifier can be driven to full output from any preamplifier capable of developing 2.0 volts across a 500,000 ohm load. Connect the preamplifier output to either of the inputs marked HI Z on the rear of the amplifier.

The high impedance input may also be used when the input signal is obtained from another power amplifier with a 70 volt output tap. Make connections to the HI Z input receptacle as shown in the circuit below.

LOW IMPEDANCE: Using the low impedance input, the amplifier can be driven to full output from any preamplifier capable of developing 0.5 volts across a 500 ohm load.

A line matching transformer Bogen model TL600 is recommended for this application. The transformer is plugged into transformer socket XI on top of the amplifier chassis.

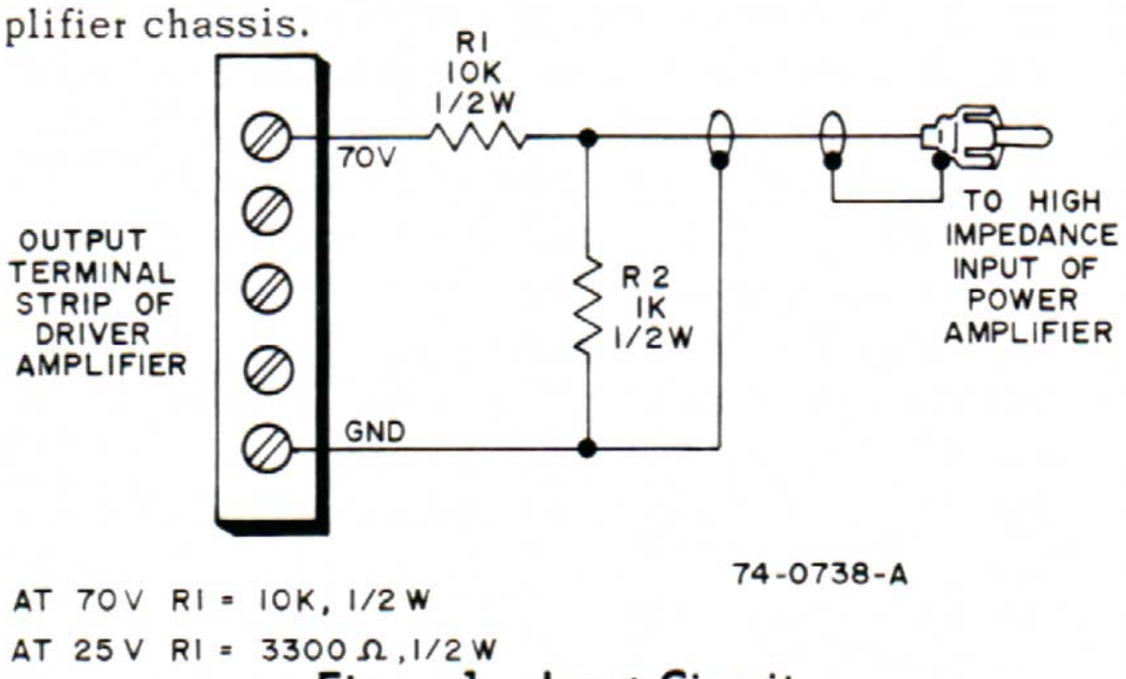


Figure 1 – Input Circuit

NOTE: the network above is in addition to the normal load (loudspeakers, etc.) on the output of the driver amplifier.

Obtaining signal from output of other power amplifier: For amplifiers with a 70 volt output tap the circuit shown in figure 1 is recommended to deliver the signal required to drive the HI IMP input receptacle of the MO200A.

OUTPUT CONNECTIONS

SPEAKERS: An output impedance of 8 ohms as well as constant voltage lines of 115, 70 and 25 volts have been provided to meet speaker and distribution line matching requirements. For 8 ohms connect leads to 8 ohm terminal and COM 1. For 70 volt balanced operation connect leads to 70 V (24.5Ω) and COM 2. For 70 volt balanced, if grounding is desired, connect a jumper from 70 V CT terminal to GND terminal. For 70 volt unbalanced operation connect a jumper wire from COM 2 terminal to GND and connect speaker leads from 70 V (24.5Ω) to COM 2.

For balanced 25 volt operation remove shorting link between COM 1 and GND and connect output leads from 25 V (3Ω) and COM 1 terminals. For unbalanced 25 volt operation leave shorting link in place and connect output leads to 25 V (3Ω) and COM 1 terminals

For 115 volt operation use Jones plug No. P-302-CCT and class 1 wiring.

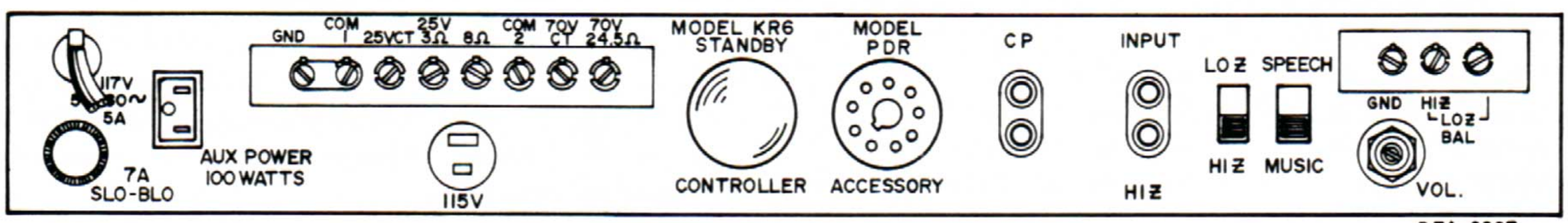


Figure 2 – MO200A Rear Panel

CAUTION – READ CAREFULLY

The high output and sensitivity of the model MXM-A preamplifier makes it possible to parallel up to three units with the MO200A booster, to provide a total of 15 available microphone inputs. However, the overall system gain should be adjusted when only one MXM-A preamp is used to drive the MO200A amplifier. Adjust the Volume control on the booster amplifier to provide a high-impedance booster sensitivity of 20 volts for full output or a sensitivity of about 4 volts for a 500/600 ohm input. This is accomplished by turning the Volume control approximately one-quarter turn clockwise from the off position and setting the Master Gain control on the MXM-A to about "6" position. When the amplifier and preamp level controls have been adjusted as described above, all input channels will have more than sufficient sensitivity. In addition, these settings will eliminate unnecessary and excessive system gain, hum, noise and possible oscillation.

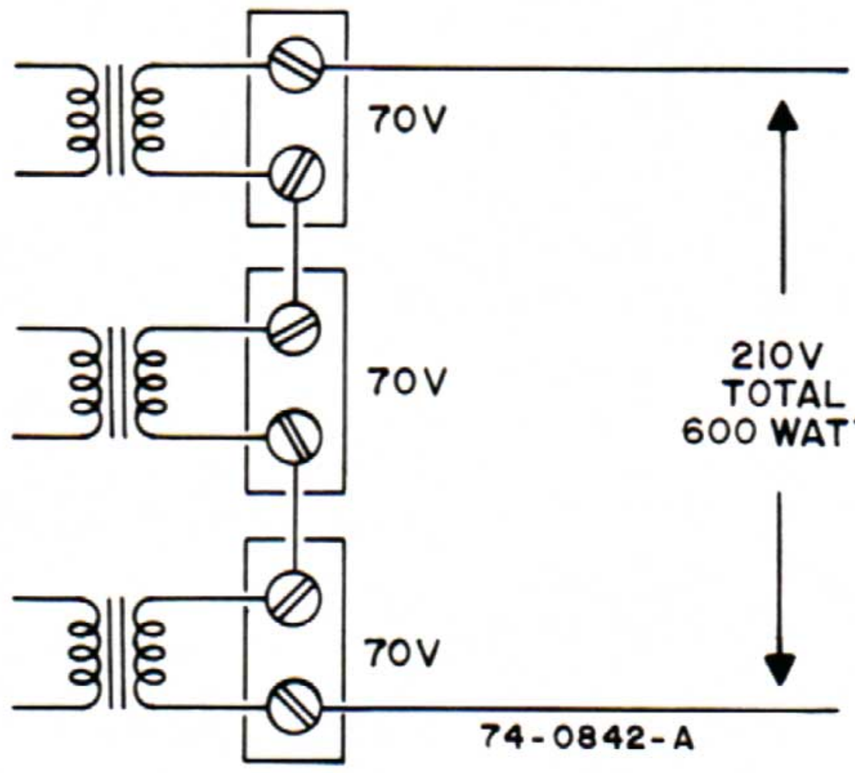


Figure 3 – Series Hookup of 70 Volt Outputs

PARALLELING AMPLIFIERS

Dual High Impedance Input and C.P. (cathode paralleling) receptacles are provided to facilitate paralleling of amplifiers without wiring. When paralleling amplifiers interconnect the units as shown in figure 4. Any number of units may be parallelled to provide the desired output power. The interconnecting cable for the "High Z" and "C.P." receptacles should be standard audio shielded cable with phono type plugs at both ends.

NOTE: Only transformer taps of the same output impedance should be paralleled. It must be borne in mind that paralleling outputs reduces the output impedance.

Be certain that each SPEECH-MUSIC switch is in the same position on all amplifiers. Rotate all VOLUME controls to maximum gain position. When it is desired to reduce the volume, each amplifier's VOLUME control should be set to achieve exactly equal gain for all amplifiers. Preferably, a common resistance loss circuit should be installed.

Any of the same output taps (115 V, 70 V or 25 V) of two or more MO200A units may be connected in series, parallel or series-parallel, to provide increased output voltage and power. An example of a series hookup of the 70 volt taps is shown in **figure 3.** The HI Z and C.P. outputs must be paralleled as described above and as shown in figure 4. It is preferable that all MO200A volume controls be at maximum gain position. However, in specific installations the gain of each amplifier may be reduced providing that the gain is set the same on all MO200A units.

STANDBY CONTROL UNIT

Model KR-6 standby control unit, which permits control of the amplifier from a remote location, is available as an accessory unit. The KR-6 cable can be plugged in on the rear of the chassis of the MO200A unit (a separate instruction sheet is furnished with the unit).

Control leads from this relay can be run to any desired point. By means of a control switch these leads can be shorted, placing the amplifier in a ready-to-operate condition. When the switch is open, the amplifier is placed in a standby condition. In standby, the filaments of the amplifier tubes are heated, but screen voltage and plate current are removed, reducing power consumption and extending the life of the tubes.

An 8-prong shorting plug, inserted into the MODEL KR6 STANDBY CONTROLLER SOCKET, is furnished with the MO200A. When the relay is installed, this plug should be removed and the 8-prong plug furnished with the relay inserted into the socket.

The length of control cable which can be used between the remote switch and the KR-6 unit is limited only by the DC resistance of the control leads. The total length of control cable used, therefore, should not exceed the following:

#22 AWG wire - 45 feet
#18 AWG wire - 120 feet
#14 AWG wire - 300 feet
#12 AWG wire - 450 feet

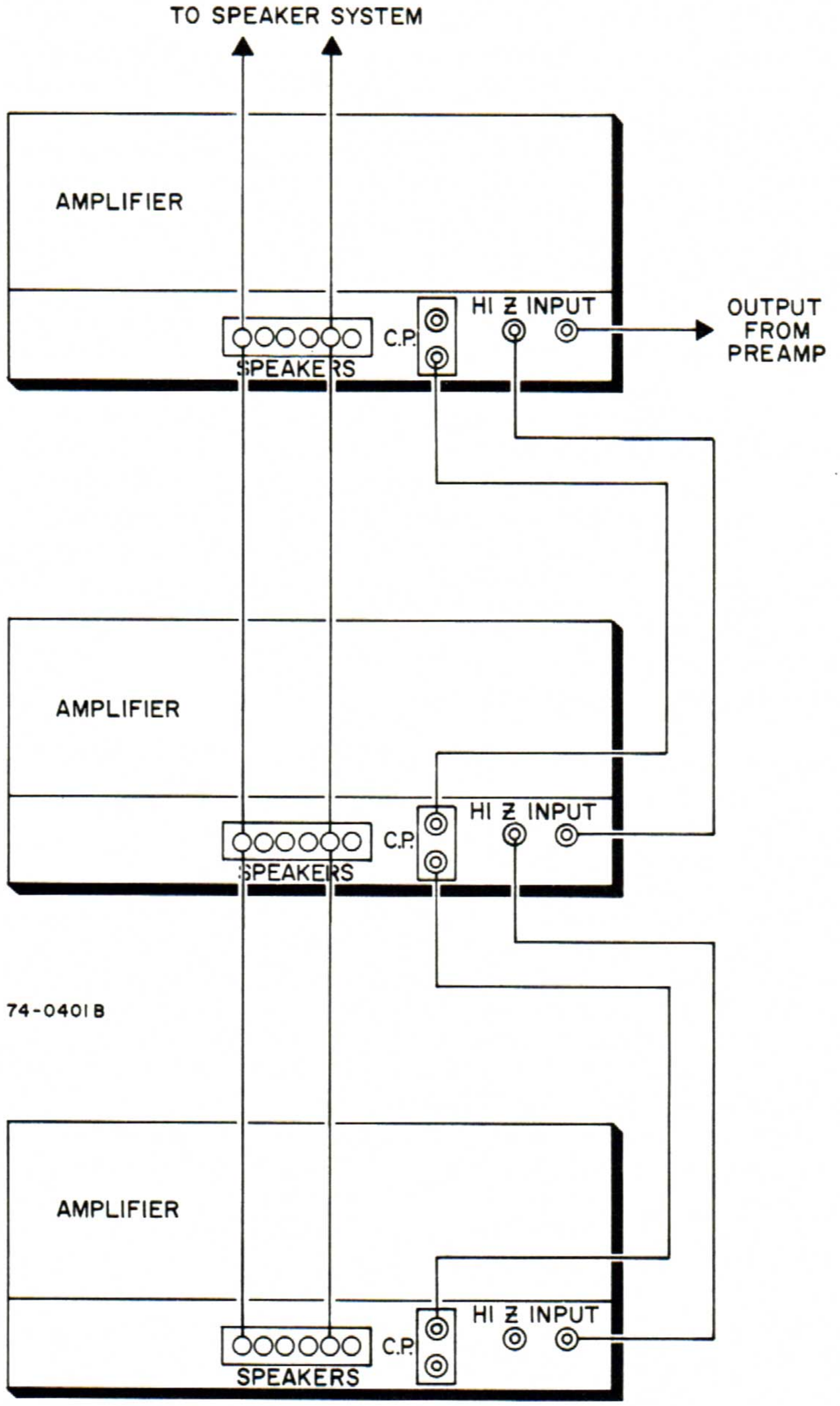


Figure 4 – Paralleling Amplifiers

OPERATION

Although the MO200A incorporates an ON-OFF switch, it is advantageous to control the unit from the preamplifier. In this way the MO200A will be switched on and off together with the preamplifier, thereby simplifying operation. The power cord of the MO200A should therefore be inserted into the controlled Auxiliary Power receptacle of the preamplifier, which is controlled by the unit's ON-OFF switch.

If the MO200A cannot be controlled from the preamplifier unit then the ON-OFF switch on the MO200A should be used to turn it ON and OFF.

The volume control on the MO200A is used to compensate for a great variation in preamplifier output levels. Thus, if the preamplifier output is very high, the user will find that it is necessary to operate the preamplifier's volume control near minimum to prevent "blasting" volume output from the speaker system. Conversely, if the preamplifier output is low, the preamplifier's volume control may have to be operated near maximum to achieve sufficient volume. The volume control on the MO200A thus permits the user to adjust the gain of the MO200A so that the preamplifier's vol-

ume control is operated in its mid-range to achieve the desired volume level range. This control need be set only once, on installation (therefore it is a screwdriver adjustment).

The SPEECH-MUSIC switch, located on the rear of the chassis, is used to provide optimum response for speech when placed in speech position.

The Input Terminal switch located on the rear of the chassis, is used for switching between high impedance and low impedance inputs on the input terminals. When low impedance input is desired the proper impedance matching transformers (TL600 or TL 10K) should be plugged into socket XI and the switch placed in LO Z position.

MAINTENANCE

PILOT LIGHT REPLACEMENT

The pilot light is located in a holder behind a jewel on the front panel. To replace bulb, disconnect power first and then remove eight self tapping screws holding chassis bottom plate. Press bulb in and rotate counterclockwise slightly. The bulb will then spring free. Use only a #47 bulb for replacement.

FUSE REPLACEMENT

A seven ampere slow-blow fuse is located on the rear of the chassis. To replace fuse press the spring-loaded cap slightly inward and withdraw cap and fuse. Use only a fuse of the same rating for replacement. If a second fuse blows, do not attempt to further operate the equipment. Consult an experienced technician or Bogen representative for inspection of the unit.

BALANCING OUTPUT TUBES

If any of the two sets of four output tubes are replaced, balance tubes as follows:

1. Connect a dummy load across amplifier output, which is capable of handling full rated power output. In addition connect an AC VTVM and an oscilloscope across dummy load.

2. Feed a 1,000 cycle signal into the HI Z input and adjust signal level (to point where clipping occurs) to provide slightly over full rated output of amplifier as measured with AC VTVM.

3. BALANCE ADJUSTMENT CONTROLS are located on top of chassis adjacent to output tubes. These controls are a screwdriver adjustment. Rotate control to position which provides equal clipping on oscilloscope.

NOTE: If a distortion analyzer is available, this should be used in preference to oscilloscope. In this case, a distortion reading of approximately 1 per cent should be measured at full output provided everything else in amplifier is operating properly.

For field service, where test equipment is not available, set balance control to approximately center position.

BOGEN SERVICE

We are interested in your Bogen unit for as long as you have it. If trouble ever develops with your unit, please do not hesitate to ask our advice or assistance. Information can be obtained by writing to: Service Department, Bogen, P. O. Box 500, Paramus, New Jersey.

When communicating with us give the model number and serial number of your unit. Completely describe the difficulty encountered. Describe the effects each operating control has upon the symptoms of trouble. Include details on electrical connections to associated equipment and list such equipment.

When we receive this information we will send you service information if the trouble appears to be simple (e.g. bad vacuum tube, incorrect connections). If trouble requires servicing, we shall send you the name and address of the nearest Bogen authorized service agency to which you can send your unit for repair.

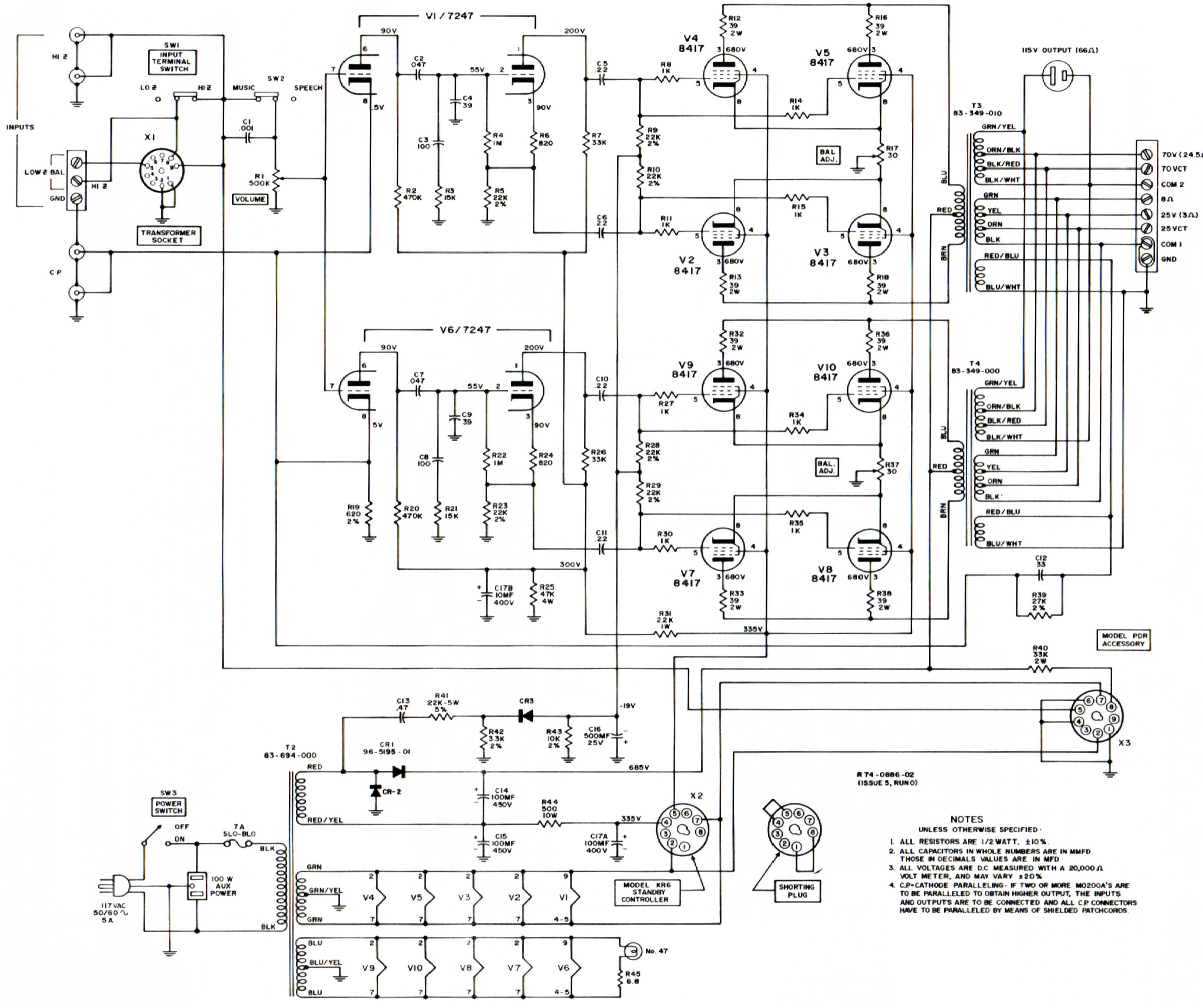
When shipping your unit, pack instrument well using the equivalent of the original shipping carton and filler material to prevent damage in transit. Send unit, fully insured and prepaid, via railway express. Do not ship via parcel post unless so instructed. The unit will be promptly repaired and returned to you via express collect.

REPLACEMENT PARTS

The components used in Bogen equipment, with exception of items listed below, are standard parts available through most parts jobbers. However, several parts should be replaced only with genuine Bogen parts. These parts are listed here and are available through Bogen distributors, service agencies or directly from the factory.

When ordering a part, specify part number and description of the part as listed below. Specify the model and give the series designation, which is a sun letter followed by numbers, stamped or screened on the rear of the chasis.

Ref. No.	Part No.	Description
	45-9306-01	Shorting Plug Assy.
C14	79-010-046	Capacitor, Electrolytic, 100 mfd, 450 V
C15	79-010-046	Capacitor, Electrolytic, 100 mfd, 450 V
C16	79-001-050	Capacitor, Electrolytic, 500 mfd, 25 V
C17	79-010-047	Capacitor, Electrolytic, 100 mfd, 10 mfd, 400 V



NOTES

UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTORS ARE 1/2 WATT, ±10%.
2. ALL CAPACITORS IN WHOLE NUMBERS ARE IN MMFD. THOSE IN DECIMALS VALUES ARE IN MFD.
3. ALL VOLTAGES ARE D.C. MEASURED WITH A 20,000Ω VOLT METER, AND MAY VARY ±20%
4. C.P=CATHODE PARALLELING - IF TWO OR MORE MO200A'S ARE TO BE PARALLELED TO OBTAIN HIGHER OUTPUT, THE INPUTS AND OUTPUTS ARE TO BE CONNECTED AND ALL C.P. CONNECTORS HAVE TO BE PARALLELED BY MEANS OF SHIELDED PATCHCORDS.

Figure 5 – MO200A Schematic Diagram

R10	75-235-223	Resistor, 22 K ohm, 2%
R17	77-001-563	Control, Balance Adjust
R19	75-235-621	Resistor, 620 ohm, 2%
R23	75-235-223	Resistor, 22 K ohm, 2%
R25	75-552-473	Resistor, 47 K ohm, 4 W
R28	75-235-223	Resistor, 22 K ohm, 2%
R29	75-235-223	Resistor, 22 K ohm, 2%
R44	76-119-019	Resistor, Wirewound, 500 ohm, 10 W
SW1	81-003-016	Switch, Input
SW2	81-003-016	Switch, Music-Speech
SW3	81-002-098	Switch, Power
T2	83-694-000	Transformer, Power
T3	83-349-010	Transformer, Output
T4	83-349-000	Transformer, Output

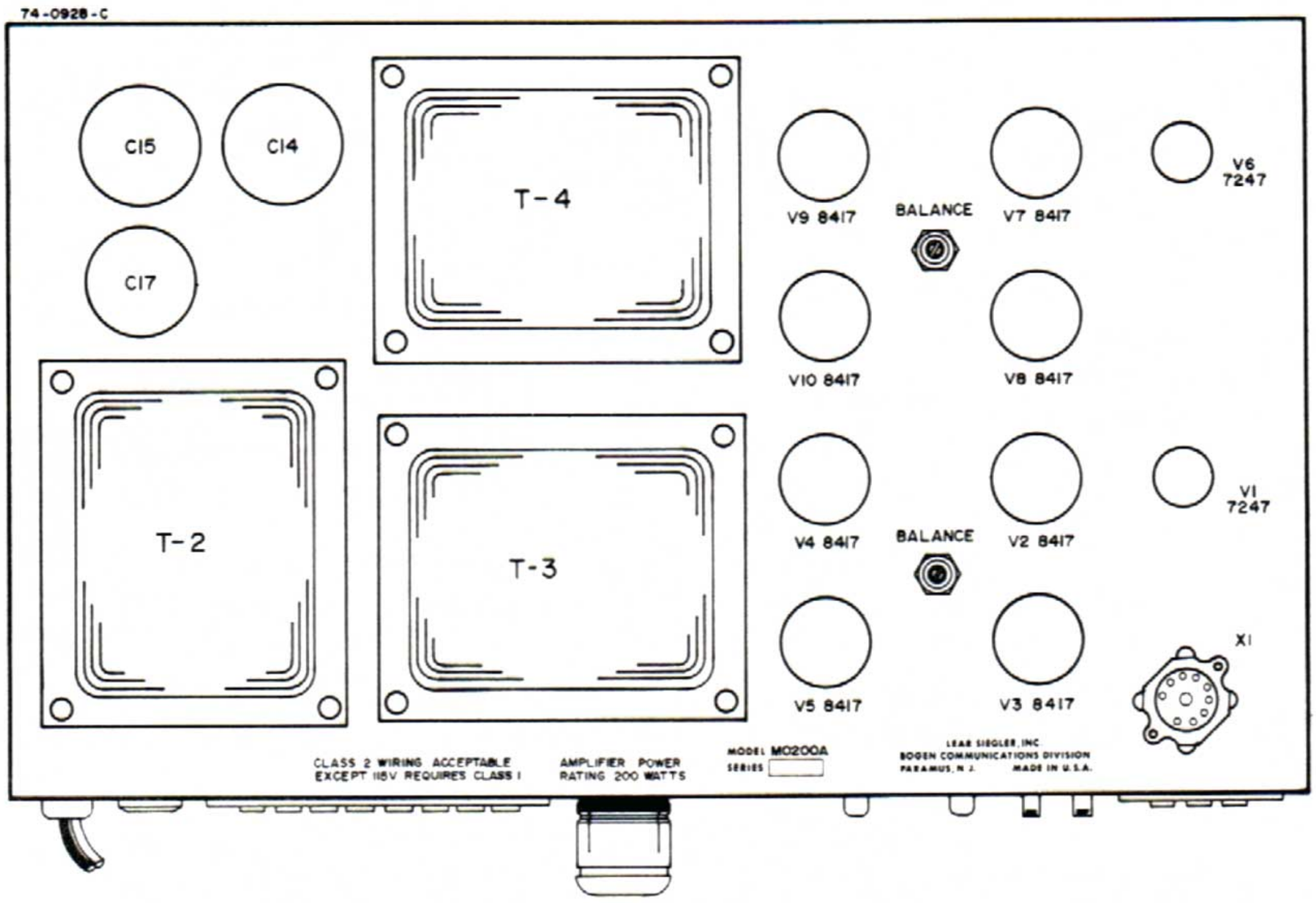


Figure 6 – Top View of Chassis

OWNER'S WARRANTY

Bogen solid state sound equipment is guaranteed against defects in material and workmanship for one year from the date of sale to the original purchaser, provided that the equipment has not been subjected to abuse or accident or altered in any way. Any part of the equipment covered by this warranty which, with normal installation and use, becomes defective will be repaired or replaced by Bogen, provided the equipment is delivered or shipped prepaid and insured to our authorized service station or to the Bogen Factory Service Department, Route 4 and Forest Avenue, Paramus, New Jersey 07652. The equipment may be picked up by you personally or will be returned to you freight prepaid.

Models containing vacuum tubes carry the same warranty as above, except that it does not apply to the vacuum tubes, which are guaranteed for 90 days.

The registration card enclosed with the equipment must be completed and mailed within five days of purchase to place the warranty in effect.

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