

BOGEN



MODEL M120

120 WATT PUBLIC ADDRESS AMPLIFIER

LEAR SIEGLER, INC.



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

INSTALLATION AND OPERATING MANUAL

READ THOROUGHLY BEFORE OPERATING EQUIPMENT

INTRODUCTION

The Bogen model M120 is a general purpose 120 watt public address amplifier. Seven inputs are provided; three for microphones, two for magnetic phono or tape, and two auxiliary inputs for ceramic phono or other high level sound sources.

Separate volume controls are provided for the four input channels, and a master volume control to adjust the over-all gain. Separate bass and treble controls are provided for adjusting the tonal balance.

TECHNICAL SPECIFICATIONS

POWER OUTPUT: 120 watts at less than 3% distortion; 190 watts peak

FREQUENCY RESPONSE: 20 to 20,000 Hz ± 1 db

POWER RESPONSE: ± 3 db, 50 to 20,000 Hz at 120 watts less than 5% distortion.

HUM AND NOISE:

MIC Input: 65 db below rated power

AUX Input: 80 db below rated power

MAG Input: 65 db below rated power

GAIN:

MIC Input: 128 db

AUX Input: 102 db

MAG Input: 121 db

SENSITIVITY:

MIC Input: 9 millivolts

AUX Input: 0.4 volts

MAG Input: 24 millivolts

INPUTS

3 MIC high impedance (convertible to low impedance with plug-in transformer)

2 MAG phono (or tape head)

2 AUX (high level, high impedance)

OUTPUTS

8 and 16 ohm speakers

25 volt (5.2 ohm) balanced

70 volt (4.1 ohm) balanced (from quick disconnect sockets)

tone CONTROL ACTION

TREBLE: $-14\frac{1}{2}$ db to $+12$ db at 10 kHz

BASS: $-9\frac{1}{2}$ db to $+15$ db at 50 Hz

CONTROLS:

MIC 1 Volume, INPUT 2 Volume, INPUT 3 Volume

AUX 1 AUX 2 Volume (fader type)

MIC 1 Selector (high or low impedance)

INPUT 2 Selector (high impedance, low impedance or mag-tape)

INPUT 3 Selector (high impedance, low impedance or mag-tape)

MASTER Volume, BASS, TREBLE, POWER switch

TUBES AND RECTIFIERS:

Four 8417, one 7247, two 6EU7, three silicon rectifiers

POWER CONSUMPTION: 320 watts

SHIPPING WEIGHT: 36 lbs.

ACCESSORIES

PLUG-IN TRANSFORMERS

Plug-in transformers permit this amplifier to be used with low impedance as well as with high impedance microphones. Bogen transformer Model TM50 is used for 50 ohm input, Model TM200 for 150 to 250 ohms, and Model TM500 for 500 to 600 ohms.

MODEL SR2 AND SR4 REMOTE CONTROLLER

The Remote Controller permits the user to control the gain of the MIC 1, INPUT 2 and INPUT 3 inputs from distances up to 2,000 feet from amplifier without sacrificing power or signal quality. It also allows the user to mix and fade the three signal inputs.

LK-6 CONTROL GUARD LOCKING PLATE

Bogen Model LK-6 control guard locking plate is designed to prevent unauthorized tampering with the controls of amplifier. It comes complete with two sets of keys. The key cannot be removed when the lock is in open position.

MODEL LPC-4 PHONO PLAYER TOP

Model LPC-4 is a complete four-speed phono player

designed to be mounted directly on top of the amplifier. The unit comes complete with all necessary hardware. It can easily be installed and connected to the amplifier with only a screwdriver. It includes a vibration-isolated turntable and tone arm housing a dual-stylus turn-over cartridge.

MSK-1 MONITOR SPEAKER

The MSK-1 is an optional Monitor Speaker and Volume Control Accessory. The MSK-1 enables the operator to monitor the sound output level at the amplifier in installations with remotely located speakers or serves as an added convenience in any installation.

MODEL WMT-1 LINE MATCHING TRANSFORMER

The WMT-1 may be used as an input transformer to distribute music from a 500/600 ohm leased telephone line. The accessory also functions as an output transformer for feeding program material for transmission over a 500/600 ohm telephone line. Line input or output connections are made conveniently to a three-screw terminal strip. Connection to the amplifier is provided by a cable terminated in a phono plug.

INSTALLATION

UNPACKING

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

CONNECTIONS BETWEEN COMPONENTS

Use single conductor, low-capacity shielded audio wire for connecting the record player, tape recorder, and other components (except speakers) to amplifier. Keep leads under 35 feet in length.

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.

INPUT CONNECTIONS

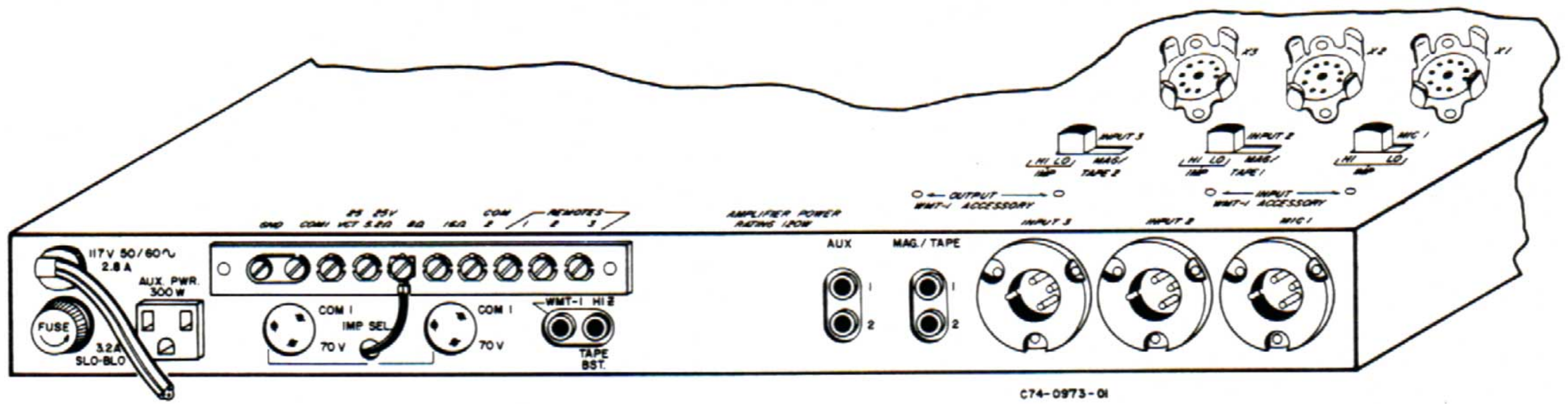


Figure 1 - Rear View of Amplifier

MICROPHONES

Up to three microphones may be connected to the amplifier simultaneously. The microphones should be connected to MIC 1, INPUT 2 and/or INPUT 3 receptacles. When using the microphone inputs, move the respective INPUT SELECTOR switch, located on top of the chassis, to either the HI or LO positions, depending on microphone impedance.

The amplifier, as shipped from the factory, is suitable for use with high impedance microphones. If a low impedance microphone is to be used, it is necessary to insert an impedance matching transformer. Recommended transformers for low impedance operation are: Bogen Model TM-50 for 50 ohms input, TM200 for 150 to 250 ohms and TM500 for 500 to 600 ohms.

terminated in a standard single-prong phono plug. It is recommended that a separate ground wire be connected between the phono player base and the amplifier GND terminal to minimize hum pickup. Grounding is not required when using the Bogen model LPC-4 phono player top.

WMT-1 ACCESSORY INPUT

To connect the input from a 500/600-ohm line, mount the WMT-1 transformer on the WMT-1 ACCESSORY INPUT mounting holes on the chassis (see figure 1). Connect the 500/600-ohm input to the three-screw terminal board on the accessory. Connect the phono plug on the WMT-1 to the AUX 1 or AUX 2 input of the amplifier.

If another sound source has been plugged into the AUX input, the WMT-1 may be connected to the MIC input of the amplifier. However, the WMT-1 wiring must first be modified, as described in the instruction sheet furnished with the accessory.

TAPE PLAYBACK

The playback signal from a tape recorder or tape deck may be connected directly to the amplifier. A tape recorder with a built-in preamplifier is connected to the AUX 1 or AUX 2 input.

For a tape deck, without electronics, connect the playback head directly to the MAG-TAPE 1 or MAG-TAPE 2 input. Set the appropriate INPUT SELECTOR to MAG-TAPE position.

NOTE: Use shielded single conductor audio cable and connect an extra ground wire between the chassis of the tape deck and the amplifier.

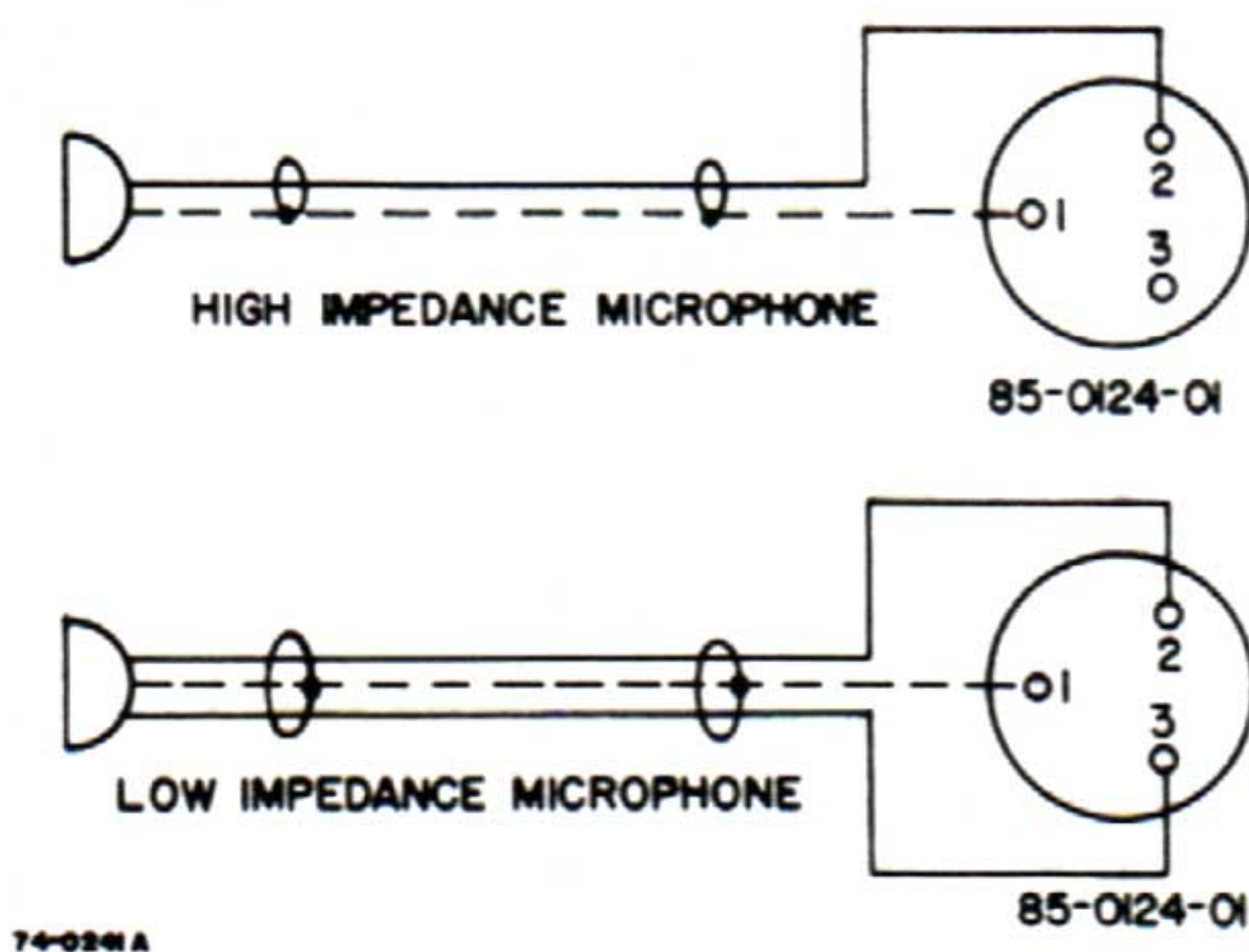


Figure 2 - High and Low Impedance Microphone Connections

Microphone cables should be shielded and wired to the microphone connector as shown in figure 2. For high impedance microphones, use single conductor shielded audio cable under 35 feet in length. With low impedance microphones, use two-conductor shielded cable, with maximum cable lengths of from 50 to 500 feet depending on the microphone. For making connections, a three-prong connector (Bogen 85-0124-01, Amphenol 91-854 or Cannon XLR-311C) is recommended.

PHONO

Phonographs employing either ceramic, crystal or magnetic cartridges may be connected to the amplifier. For phonographs using a magnetic cartridge, connect the input cable to the MAG-TAPE 1 or 2 receptacles and move the appropriate INPUT SELECTOR switch to the MAG-TAPE position.

Phonographs employing a ceramic or crystal type cartridge may be connected to either the AUX 1 or AUX 2 receptacles. Use single-conductor shielded audio cable

AUXILIARY

AUX 1 and AUX 2 inputs may be used for sound sources other than crystal or ceramic phonos. Any high-level, high-impedance signal may be connected to these inputs, including virtually all tuners and tape recorders with preamplifiers. An input signal of approximately 0.4 volts is required to obtain full output from the amplifier.

REMOTE CONTROL

MIC Input 1, INPUT 2 and INPUT 3 may be remotely controlled using either BOGEN model SR-2 or SR-4 remote controllers. The SR-2 can control two inputs while the SR-4 can control up to four inputs. It is recommended that the model SR-4 be used when it is desired to control all three inputs from one point. (One control on SR-4 is then not used.) If it is desired to control different inputs from different points, then two model SR-2 remote controllers should be used.

AUXILIARY POWER

The auxiliary power receptacle on the rear panel is a three-wire grounded outlet with a capacity of 300 watts. 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. Note that both the am-

OUTPUT CONNECTIONS

EXTERNAL SPEAKERS

The amplifier may be used in conjunction with speakers rated at 8 or 16 ohms and with 25 volt (5.2 ohms) or 70 volt (41 ohms) constant-voltage speaker systems. For detailed information on installing multiple speaker systems, refer to the Speaker Installation Bulletin (No. 54-5001-02) furnished with this unit.

In permanent installations, where speakers will remain connected to the amplifier permanently, connect the speaker system directly to the Speaker Output terminals on the rear chassis. Connect one lead to the COM 1 terminal and the other to the terminal corresponding to the speaker system's impedance.

In systems that are moved continually, use the Speaker Sockets to provide quick-disconnect of speaker system. In this case, secure the Speaker Impedance Selector lead to the appropriate speaker impedance terminal. In systems where 70 volt output is used connect COM 1 to COM 2 on terminal strip.

plifier 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 only the amplifier power switch is used to stop the record player.

volt tap to pins 2 and 3 of speaker socket. This hookup is different from that shown in figure 4.

In some cases, it may be desirable to use both the speaker output terminal strip and the speaker socket for speaker connections. The speaker system connected to the speaker socket need not have the same impedance as the speaker system connected to the terminals. However, correct impedance matching between the amplifier output and all speaker systems is essential to obtain maximum power.

TAPE OR BOOSTER AMPLIFIER

To drive a booster amplifier or a tape recorder connect a patch cord (standard phono plug on each end) from the TAPE/BOOSTER output jack to the input of the booster amplifier or tape recorder.

WMT-1 ACCESSORY OUTPUT

By utilizing a Bogen WMT-1 transformer accessory, a zero level output at 500/600 ohms may be obtained for feeding a leased telephone line. Mount the unit to the WMT-1 ACCESSORY OUTPUT mounting holes on the chassis (see figure 1). To feed a 500/600 ohm line, connect the WMT-1 phono plug to the WMT-1 HI Z output jack of the amplifier. Connect the 500/600 ohm line to the terminals on the WMT-1.

MONITOR SPEAKER

The amplifier has been designed to permit a monitor speaker to be mounted behind the speaker grill on the front panel. The Bogen model MSK-1 Monitor Speaker and Volume Control are specifically designed for use with the M120 and may be installed with a minimum of effort; instructions are included with the kit. However, a 3½ inch diameter speaker of any standard impedance may be used. To install the monitor speaker, proceed as follows:

1. Remove the four corner screws from the bottom of the amplifier.
2. Remove the top cover enclosure to expose the amplifier chassis.
3. Loosen the two nuts which hold the speaker panel in place and remove the panel.
4. Remove the cardboard from behind the speaker grill.
5. Mount the 3½ inch monitor speaker on the bezel, using four No. 6-32 nuts.
6. Connect the speaker leads to the output terminal strips in the same manner as described above for the external speakers. Run wires carefully to clear intervening components. Be certain to match impedance. Use line matching transformer and series resistor where necessary.

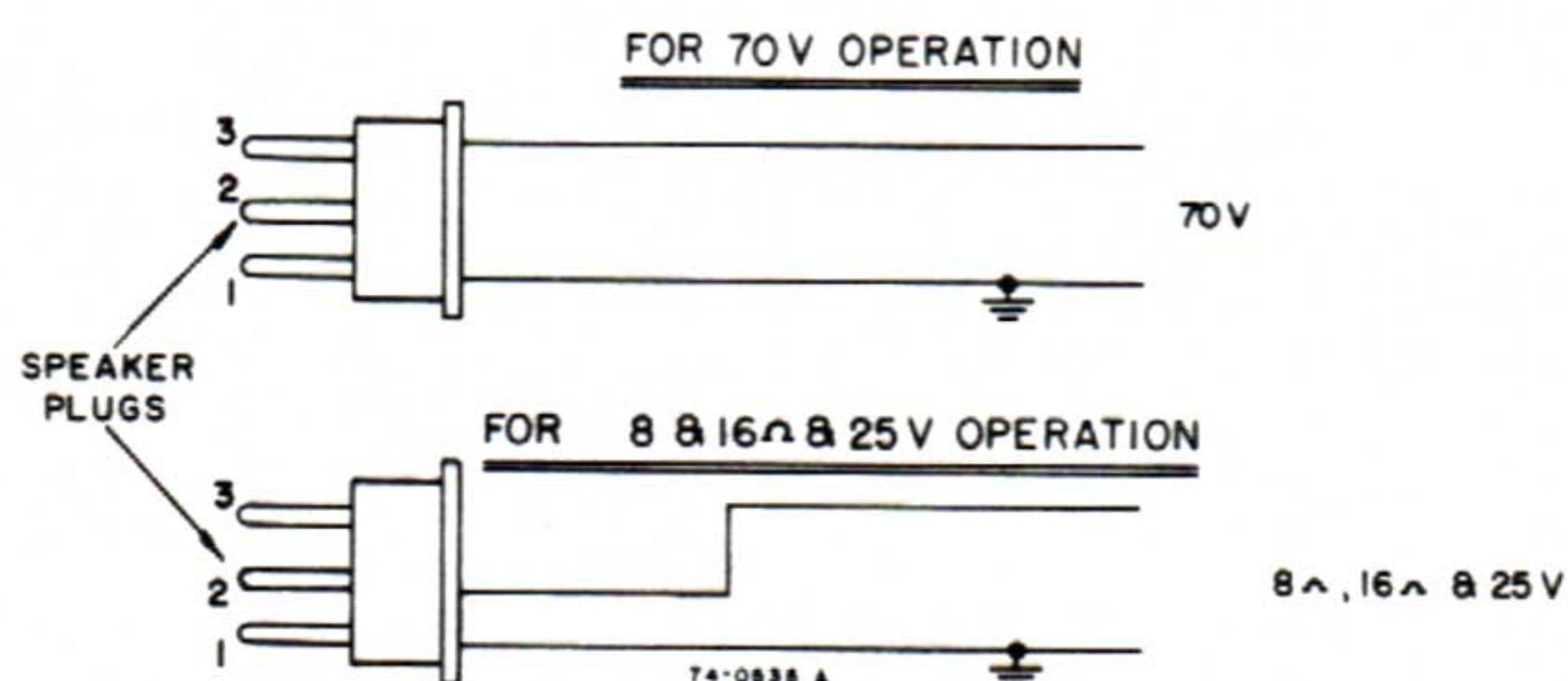


Figure 3 - Speaker Output Plug Wiring

Speaker plugs are supplied with this unit for connection to the speaker sockets. Wire to the connector as follows: for 70 volt operation, connect leads to pins 1 and 3; for standard impedance and 25 volt systems, connect leads to pins 1 and 2. Refer to figure 3.

For balanced 25 volt output, remove the shorting strap between the COM 1 and GND terminals. Connect the high sides of the line to COM 1 and 5.2 ohm terminals.

NOTE: To obtain 70 volt balanced output and still allow for grounding of the 8, 16 and 25 volt taps, secure the impedance selector lead to COM 2. Connect leads for 70

CONTROL FUNCTIONS

MICROPHONE 1

This control adjusts the volume level of the microphone 1 input. Rotate the control clockwise (to higher numbers) to increase volume. Set the control to the minimum position (0) when the microphone input is not used.

INPUT 2

This control adjusts the volume level of either the MIC 2 or MAG-TAPE 1 input, depending on the input selected with the INPUT 2 SELECTOR switch. Rotate the control clockwise (to higher numbers) to increase volume. Set the control to the minimum position (0) when input 2 is not used.

INPUT 3

This control adjusts the volume level of either the MIC 3 or MAG-TAPE 2 input, depending on the input selected with the INPUT 3 SELECTOR switch. Rotate the control clockwise (to higher numbers) to increase volume. Set the control to the minimum position (0) when input 3 is not used.

AUXILIARY

This control serves a two-fold purpose. It selects either

of the two auxiliary inputs and it controls the volume of the selected auxiliary input. Operate the controls as follows: To select the AUX 1 input rotate the control counterclockwise past the center position; rotating the control more counterclockwise increases the AUX 1 Volume. To select the AUX 2 input rotate the control clockwise past the center position; rotate the control more clockwise to increase the AUX 2 Volume. If the auxiliary input is not to be used, set the control to the mid position (off).

The control can also be used as a "fader" control when both auxiliary inputs are used. Hence, it is possible to gradually and smoothly reduce the level of one input and then increase the other when changing inputs. The effect is one of fading from one to the other.

MASTER

Rotate master volume control maximum clockwise, after first adjusting the MIC and AUX input Volume controls to the highest level likely to be used. Use the MASTER control to reduce the overall volume of the output signal.

RESET MARKER

Each volume control has a red reset marker on skirt of the knob. This marker is used to log a particular setting. This is done as follows:

Make a "dry-run" or rehearsal to adjust volume controls to desired levels. Slide reset markers to coincide with midpoint mark on front panel. Knob can now be set to zero or any other point allowing instant resetting to indicated levels.

BASS

This control is used to adjust the tonal balance of the amplifier output. The center position of the control, provides flat frequency response and is generally used when program sources and speaker systems are highest quality.

Rotation of the control, in the counterclockwise direction reduces (cuts) bass response of the amplifier. Clockwise rotation of the control increases bass response. The Bass control should be used to remove low frequency noise such as phono rumble or hum. In situations where acoustic feedback (howling) is likely, rotate control counterclockwise. This reduces the feedback effect and permits higher volume levels than would otherwise be possible.

TREBLE

This control adjusts the tonal balance of the amplifier output. The center position provides flat frequency response and is generally used when program sources and speaker system are of the highest quality. Rotation of the control in a counterclockwise direction reduces the high frequency response of the amplifier, clockwise rotation increases it. Hence, the control would be used to remove high frequency noise, such as record scratch.

MIC 1 SELECTOR

This switch located on the right side of the top rear of chassis, is used to select either HI or LO impedance for the MIC 1 input.

INPUT 2 SELECTOR

This control is located on the right side of the top rear of chassis. It is used to select either HI or LO impedance for a microphone input or MAG-TAPE position for a magnetic phono or tape head signal source to the INPUT 2 receptacle.

INPUT 3 SELECTOR

This control is located on the right side of the top rear of chassis. It is used to select either HI or LO impedance for a microphone input or MAG-TAPE position for a magnetic phono or tape head signal source to the INPUT 3 receptacle.

INSTALLATION AND OPERATING HINTS

FEEDBACK

If speakers are located too close to the microphone acoustic feedback (squealing or howling) may result. In this case, adjust the volume and/or Treble and Bass controls to the point where feedback is eliminated. In addition, move the speakers to increase the distance between the speakers and microphone.

HUM

A low frequency hum may be heard if the connections between the signal sources and the amplifier are incorrect or defective. Recheck all connections for continuity if hum occurs. Try reversing the plugs of other units connected to the amplifier, such as the phono player.

Check for broken wires, shields and poor connector contacts. Keep input cables away from speaker cables. Keep speaker cables away from transformers and AC powerlines. In the case of a phono player, it may be necessary to connect a separate ground wire from the chassis of the phono player to the GND on the rear of the amplifier.

MICROPHONE TECHNIQUE

Speak directly into microphone in a normal voice, at a distance of approximately 6 inches to one foot from the microphone.

Speak deliberately with even speed and loudness. Don't shout. Leave a space between words and pronounce each word. Sound final consonants. Do not sing-song or drop words here and there.

SERVICE

FUSE

A 3.2 ampere slow-blow fuse is located in a holder at the rear of the amplifier. To replace fuse, press spring loaded cap slightly inward, rotate counterclockwise, and withdraw cap and fuse. Use only a fuse of the same rating for replacement. If a second fuse blows, do not make any further attempt to operate unit. Consult a Bogen representative or other competent technician for inspection of unit.

TUBE REPLACEMENT

Tubes should be tested at least once every six months to insure optimum high-fidelity performance. To avoid possibility of shock, do not remove chassis when replacing tubes.

BALANCING OUTPUT TUBES

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

1. Connect a dummy load across amplifier output, which is capable of handling rated power output. In addition, connect an AC VTVM and oscilloscope across dummy load.
2. Feed a 1,000 cycle signal into Auxiliary input and adjust signal level to provide rated output of amplifier as measured with AC VTVM.
3. Locate BALANCE ADJUSTMENT on underside of chassis adjacent to output tubes. This control is a screwdriver adjustment. Rotate control to position which provides minimum clipping of signal on oscilloscope. If a distortion analyzer is available, this should be used in preference to oscilloscope. In this case, a distortion reading

of 2 percent or less should be measured at full output, provided everything else in amplifier is operating properly. NOTE: If the amplifier is serviced in the field and no test equipment is available, set the balance control to approximately the center position after replacing output tubes.

BOGEN SERVICE

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

When communicating with us give the model number of your unit. Completely describe the difficulty encountered and 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 a simple one such as a bad vacuum tube or 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 carefully, using 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 all reputable parts jobbers. However, several parts are custom-made and should be replaced only with genuine Bogen parts. These parts are listed here and are available through Bogen distributors, service agencies or direct 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 run letter followed by numbers, stamped or screened on the rear of the chassis.

Ref. No.	Part No.	Description
C16	79-005-046	Electrolytic, 25 mfd, 20 V
C22	79-005-046	Electrolytic, 25 mfd, 20 V
C23	79-010-063	Electrolytic, 60-20-10 mfd, 350 V
C28	79-010-066	Electrolytic, 60 mfd, 350 V
C29	79-005-052	Electrolytic, 500 mfd, 25 V
C31	79-010-066	Electrolytic, 60 mfd, 350 V
CR1	96-5195-01	Diode, Silicon, 1000 PIV
CR2	96-5195-01	Diode, Silicon, 1000 PIV
CR3	96-5109-01	Diode, Silicon, 150 PIV
R6, 12, 18, 23	77-001-515 or 75-001-706	Control, Mic 1, Input 2, Input 3
R22	77-001-580	Control, Auxiliary, Fader
R27, 29	77-001-515	Control, Master, Bass, Treble
R47	75-653-223	Resistor, 22 K, 5 W, 5%
R48	75-742-511	Resistor, 510, 7 W, W. W.
R54	77-001-563	Control, Balance
SW1	81-003-016	Switch, MIC 1 Selector
SW2	81-003-012	Switch, Input 2 Selector
SW3	81-003-012	Switch, Input 3 Selector
SW4	81-003-017	Switch, Power
T1	83-702-000	Transformer, Power
T2	83-371-000	Transformer, Output
	94-0302-01	Pilot Light Assy
	03-0592-01	Knob, (0-10)
	03-0593-01	Knob, (0-5-0)
	02-9029-01	Reset Marker
	85-0146-01	Socket, Speaker
	85-0147-01	Plug, Speaker (Amphenol 71-3S)

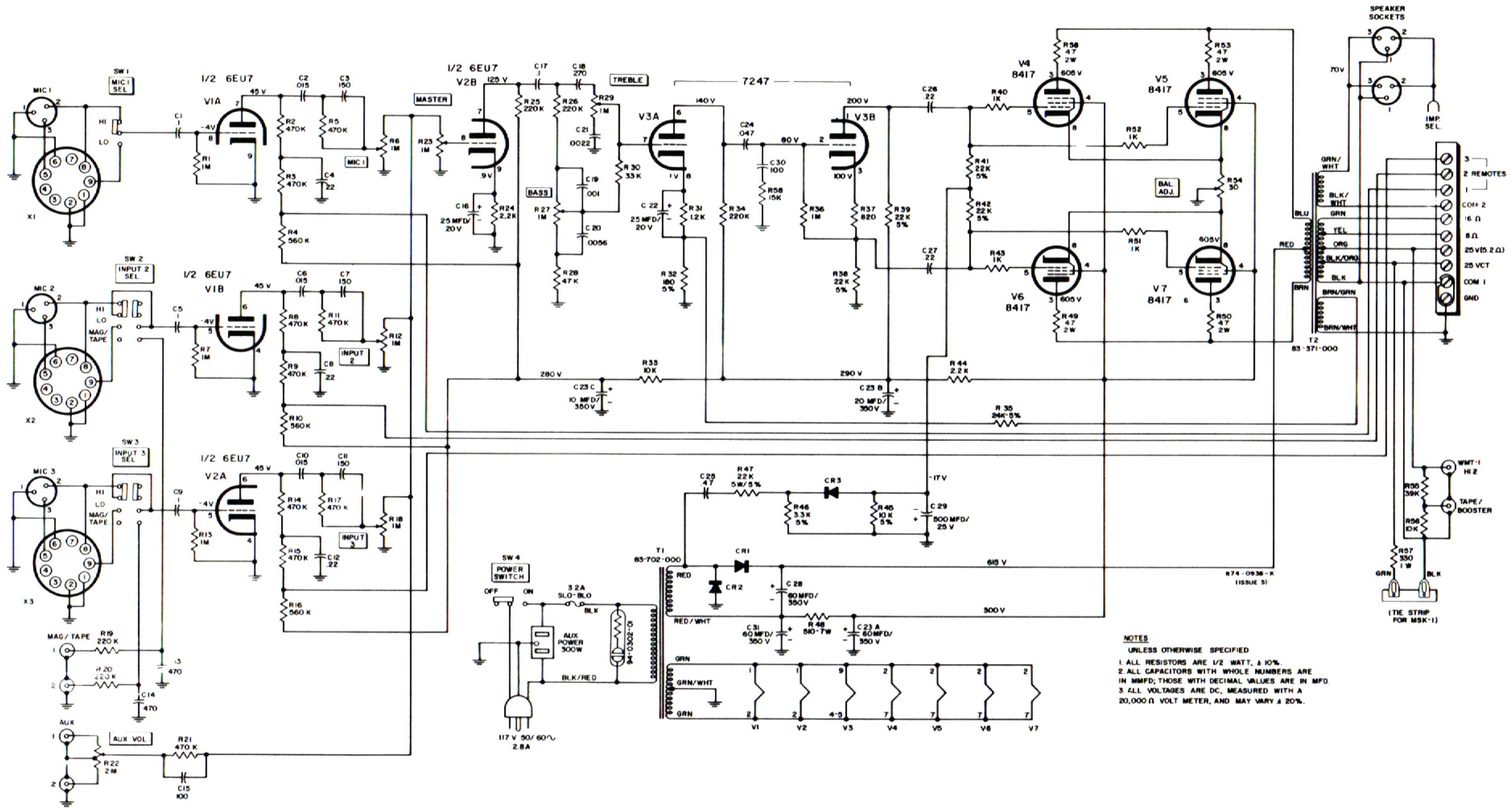


Figure 4 – M120 Schematic Diagram

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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