

BOGEN



MODEL M60A

60 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

DESCRIPTION

The Bogen model M60A is a general purpose 60 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 sets

the over-all gain. Bass and treble controls are provided for adjusting the tonal balance.

A monitor speaker may be mounted behind the speaker grill on the front panel of the amplifier. The Bogen Model MSK-1 Monitor Speaker Accessory is available for this purpose.

TECHNICAL SPECIFICATIONS

POWER OUTPUT: 60 watts at 3% distortion; 100 watts peak

FREQUENCY RESPONSE: 20 to 20,000 cps ± 2 db

POWER RESPONSE: ± 3 db, 50 to 20,000 cps at 60 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: 122 db

AUX Input: 96 db

MAG Input: 115 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:

4, 8 and 16 ohm speakers

25 volt (10 ohm) balanced

70 volt (82 ohm) balanced (from quick disconnect sockets)

TONE CONTROL ACTION:

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

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

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:

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

POWER CONSUMPTION: 160 watts

SHIPPING WEIGHT: 29 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. Installation of the transformer is described in the Installation section.

MODEL SR2 AND SR4 REMOTE CONTROLLER

The Remote Controller permits the user to control the gain of the MIC 1, MIC 2 and INPUT 3 Mag Phono 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.

MODEL MSK-1 MONITOR SPEAKER

The Bogen Model MSK-1 Monitor Speaker consists of a loudspeaker and a level control, interconnected and ready for mounting behind the speaker grill on the front panel of the amplifier unit. Mounting instructions appear under Output Connections on page 5 of this manual.

MODEL LK8 LOCKING PLATE

The Model LK8 Locking plate is designed to prevent unauthorized tampering with controls of the amplifier. It comes complete with instructions and a set of two keys. As a safety factor, the key cannot be removed when lock is in open position.

MODEL LPC-4 PHONO PLAYER TO P

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 be easily 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.

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.

CARRYING CASE AND SPEAKERS

A carrying case with speakers is available for portable systems. The Bogen Model CC12S contains a 12" high-efficiency PM magnet speaker in each of two case sections. Both sections also include 25 feet of interconnecting cable and a 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 ten 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 wallplate to the receptacle, as shown in figure 2.

INPUT CONNECTIONS

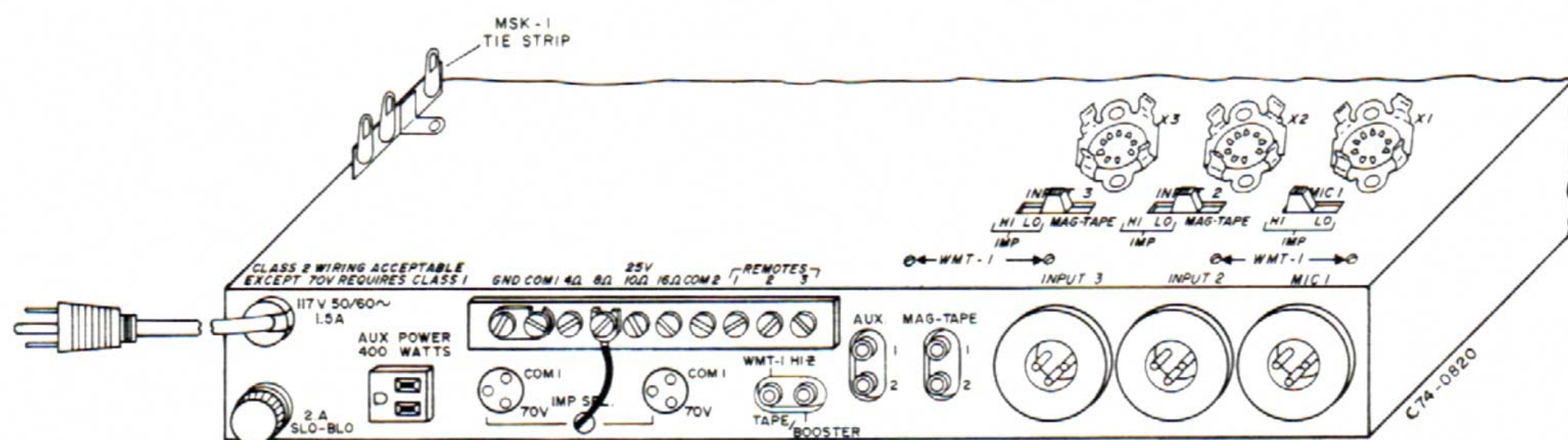


Figure 1 - Rear View of Amplifier

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 without modification. If a low-impedance microphone is to be used, it is necessary to insert an impedance matching transformer in the microphone channel selected. Recommended transformers for low-impedance operation are Bogen model TM50 for 50 ohms input, TM200 for 150 to 250 ohms, and TM500 for 500 to 600 ohms.

Microphone cables should be shielded and wired to the microphone connector as shown in figure 3. For high impedance microphones, use single conductor shielded audio cable under ten 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 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.

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.

A tape deck, without electronics, has its playback head connected directly to the MAG-TAPE 1 or MAG-TAPE 2 input. The appropriate INPUT SELECTOR is then set to MAG-TAPE position.

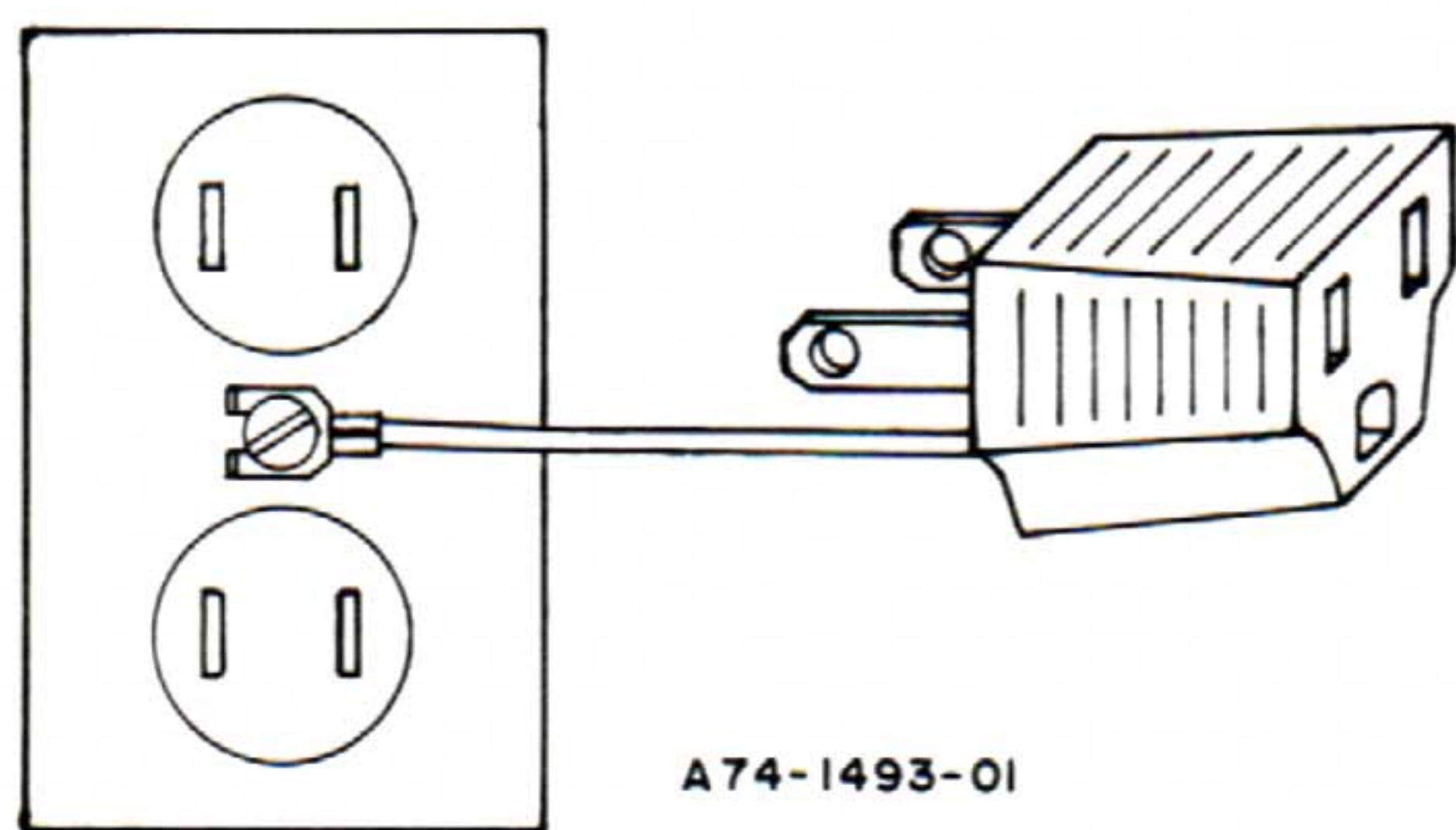


Figure 2 - Grounding Line Cord Adapter

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.

NOTE

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

For installation information, refer to instructions included with remote controller.

WMT-1 ACCESSORY INPUT

For matching the input from a 500/600-ohm music transmission or other telephone line, mount the WMT-1 accessory to the amplifier chassis. Connect the 500/600-ohm line to the three-screw terminal board on the WMT-1, and the phono plug to the AUX 1 or AUX 2 input. See the instruction sheet furnished with the WMT-1 accessory for detailed installation instructions.

NOTE

If another sound source has been plugged into the AUX 1 or AUX 2 input, the WMT-1 may be connected to the MIC input of the M60A amplifier. However, it is first necessary to modify the secondary of the transformer accessory, as described in the WMT-1 installation sheet.

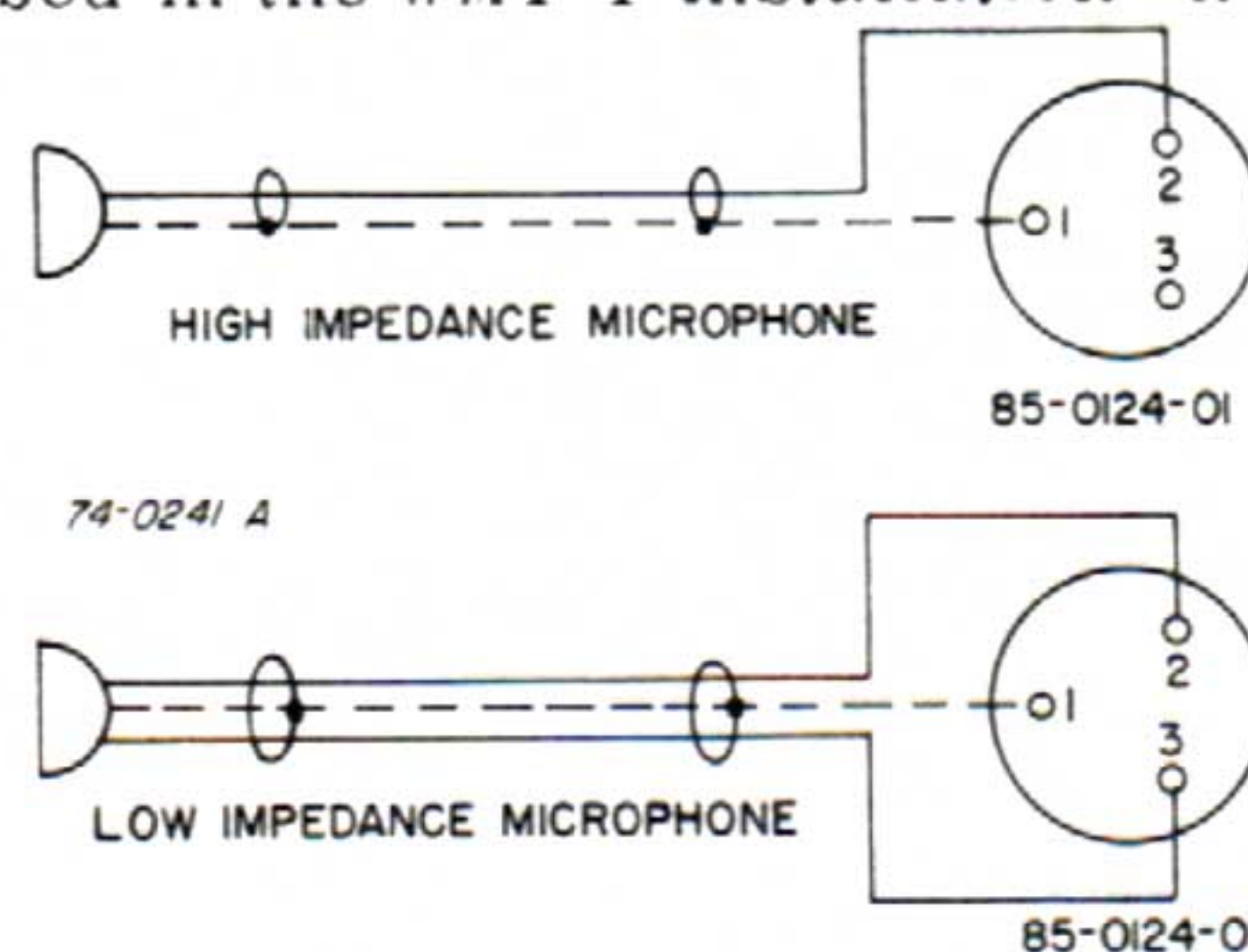


Figure 3 - High and Low Impedance Microphone Connections

AUXILIARY POWER

The auxiliary power receptacle 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 only the amplifier power switch is used to stop the record player.

OUTPUT CONNECTIONS

EXTERNAL SPEAKERS

The amplifier may be used in conjunction with speakers rated at 4, 8 or 16 ohms and with 25 volt (10 ohms) or 70 volt (82 ohms) constant voltage speaker systems. For detailed information on installing multiple speaker systems, refer to the Speaker Installation Bulletin (No. 54-5001) 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.

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.

Speaker plugs are supplied with this unit for connection to the speaker sockets. 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.

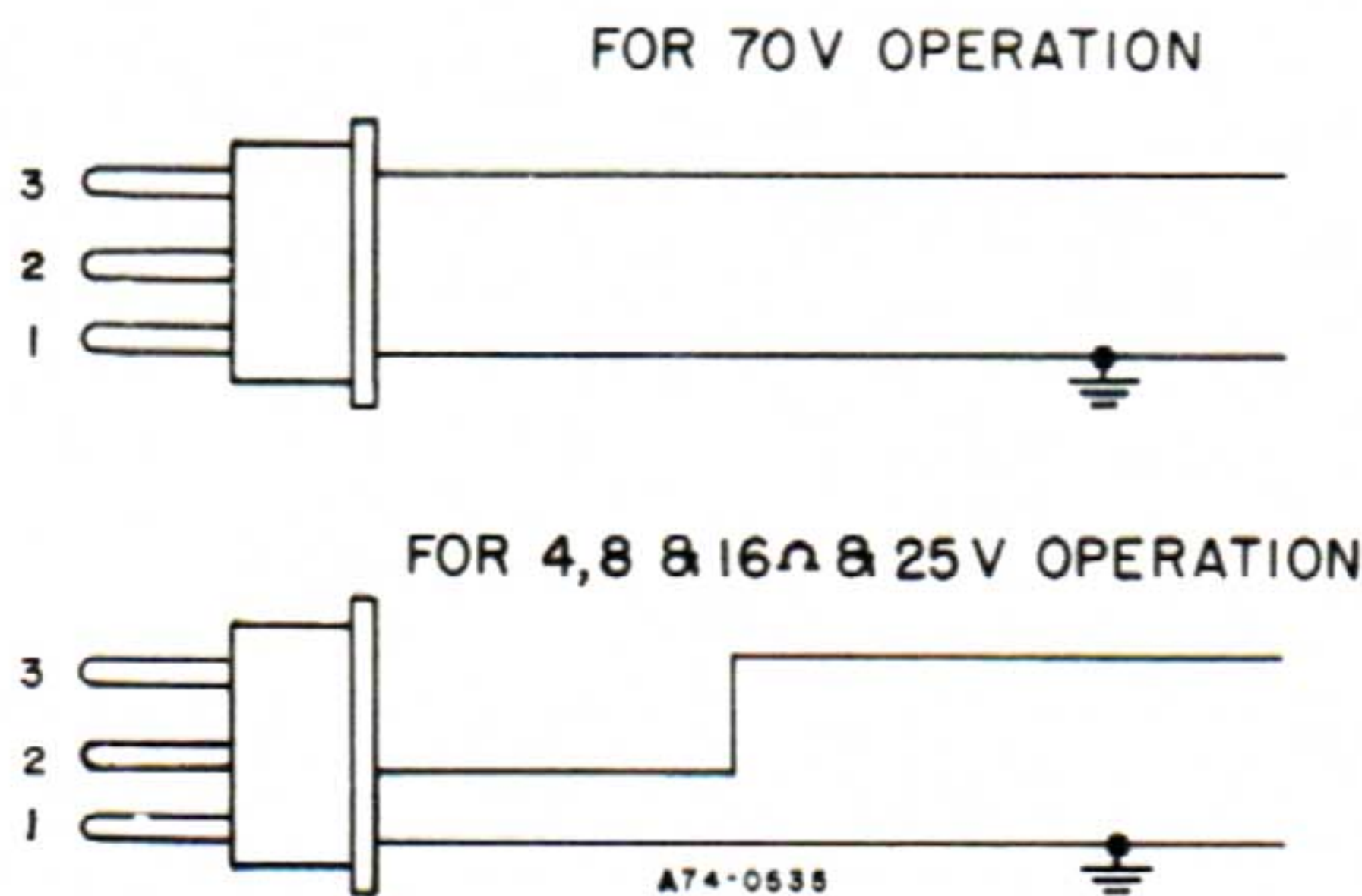


Figure 4 - Speaker Output Plug Wiring

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 and 10 ohm terminals.

Note

To obtain 70 volt balanced output and still allow for grounding of the 4, 8, 16 and 25 volt taps secure the impedance selector lead to COM 2. Connect leads for 70 volt tap to pins 2 and 3 of speaker socket. This hookup is different from that shown in figure 4.

WMT-1 TRANSFORMER

By utilizing a Bogen WMT-1 transformer, a zero-level output at 500/600 ohms may be obtained for feeding a leased telephone line. 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. Holes are provided on the chassis for mounting the WMT-1.

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.

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 M60A and may be installed with a minimum of effort. Instructions are included with the kit.

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 ampli-

fier are incorrect or defective. Recheck all connections for continuity if hum occurs. Try reversing the amplifier power plug and the plugs of other units such as the phono player connected in the system.

Check for broken wires, shields and poor connector contacts. Keep input cables away from speaker cables. Keep speaker cables away from transformers and AC power lines. 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.

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 re-setting 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 of 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.

SERVICE

FUSE

A 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.

BALANCING OUTPUT TUBES

If either of the two 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 oscillo-

scope. 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

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 Division, P. O. Box 500, Paramus, N. J. 07652.

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.

REPLACEMENT PARTS

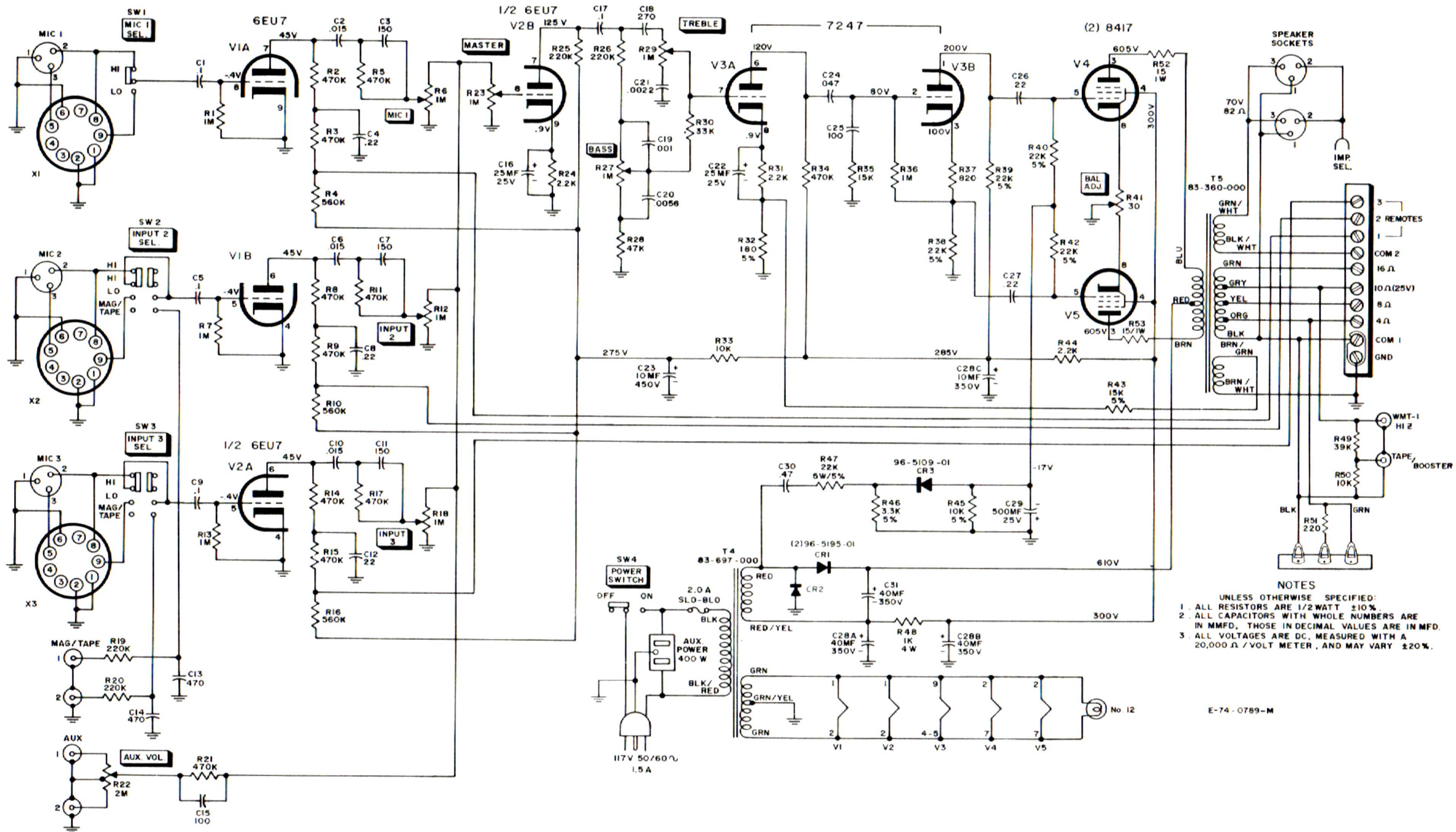
The components used in Bogen equipment, with exception of items listed below, are standard parts available through all reputable parts jobbers. However, several parts are custom-made and should be replaced only with genuine Bogen parts. These parts

Ref. No.	Part No.	Description
C16	79-001-047	Capacitor, Electrolytic, 25 mfd, 25V
C22	79-005-049	Capacitor, Electrolytic, 25 mfd, 25V
C23	79-001-137	Capacitor, Electrolytic, 10 mfd, 450V
C28	79-010-050	Capacitor, Electrolytic, 40/40/10 mfd, 350V
C29	79-005-052	Capacitor, Electrolytic, 500 mfd, 25V
C31	79-001-117	Capacitor, Electrolytic, 40 mfd, 350V
CR1,2	96-5195-01	Diode
CR3	96-5109-01	Diode
R6	77-001-515	Control, MIC 1
R12	77-001-515	Control, Input 2
R18	77-001-515	Control, Input 3
R22	77-001-580	Control, Auxiliary, Fader-type
R23	77-001-515	Control, Master
R27	77-001-515	Control, Bass
R29	77-001-515	Control, Treble

are listed here and are available through Bogen distributors, service agencies or direct from the factory.

When ordering parts, specify part number and description as indicated below and give the model and series number of the equipment.

Ref. No.	Part No.	Description
R41	77-001-520	Control, Balance
R32	75-213-181	Resistor, 180, ½W, 5%
R38,	75-213-223	Resistor, 22K, ½W, 5%
R39		
R40,	75-213-223	Resistor, 22K, ½W, 5%
R42		
R43	75-213-153	Resistor, 15K, ½W, 5%
R45	75-213-103	Resistor, 10K, ½W, 5%
R46	75-213-332	Resistor, 3.3K, ½W, 5%
R47	75-653-223	Resistor, 22K, 5W, 5%
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	81-003-015	Switch, Power
T4	83-697-000	Transformer, Power
T5	83-360-000	Transformer, Output
	03-0592-01	Knob, MIC 1, Input 2, Input 3, Master
	03-0593-01	Knob, Aux, Bass, Treble
	02-9029-01	Reset Marker
	85-0146-01	Socket, Speaker
	85-0147-01	Plug, Speaker (Amphenol 71-3S)



NOTES
 UNLESS OTHERWISE SPECIFIED:
 1. ALL RESISTORS ARE 1/2 WATT ±10%.
 2. ALL CAPACITORS WITH WHOLE NUMBERS ARE IN MMFD, THOSE IN DECIMAL VALUES ARE IN MFD.
 3. ALL VOLTAGES ARE DC, MEASURED WITH A 20,000 Ω/VOLT METER, AND MAY VARY ±20%.

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Figure 5 – M60A Schematic Diagram