

### Solid-State PA Components

60-Watt and 125-Watt  
Booster Amplifiers

#### INSTALLATION

##### UNPACKING

The amplifier was thoroughly checked before leaving the factory. Inspect the amplifier and shipping container carefully for evidence of improper handling during shipment. In case of damage, make an immediate claim to the dealer or distributor from whom the unit was purchased. If the amplifier was shipped to you, notify the carrier without delay and file a claim.

##### INPUT CONNECTIONS

Keep the input lead away from the output lead and ac power cables. Unless the driving source provides a low-impedance output, keep the input lead under ten feet

TABLE I. COMPANION UNITS AND ACCESSORIES

Model	Description
CAM	Five input solid-state preamplifier mixer.
CM	Five input solid-state preamplifier mixer.
CHS-M	Seven input solid-state preamplifier mixer.
CTM	Seven input solid-state preamplifier mixer.
MX6A-5	Six input solid-state preamplifier mixer.
RPK-I 8	Rack mounting kit 19" x 7" (mounts 2 units).
TL600	Low-impedance (500/600Ω) plug-in transformer.
TL10K	Bridging (10kΩ) plug-in transformer.

	MT60	MT125A
POWER OUTPUT:	60 watts	125 watts
PEAK OUTPUT:	120 watts	250 watts
*FREQUENCY RESPONSE:	±2 dB, 30 Hz to 20k Hz	±2 dB, 40 Hz to 20k Hz
TOTAL HARMONIC DISTORTION:	Less than 2% at rated output	Less than 2% at rated output
HUM & NOISE:	-80 dB below rated output	-80 dB below rated output
REGULATION:	Less than 2 dB variation from no load to	full load.
INPUT SENSITIVITY (FOR RATED OUTPUT):	Hi Z 0.2V; Lo Z balanced with TL600 xfmr, .045V; Hi Z with TL 10k xfmr, 0.1V.	
INPUT IMPEDANCE:	Hi Z 50k; Lo Z 500/600Ω with TL600 xfmr; Bridging 10k with TL 10k xfmr.	
OUTPUT CONNECTIONS:	8Ω, 25VCT, 25V, 16Ω, 70V terminals	8Ω, 25VCT, 25V, 16Ω, 70V terminals
OUTPUT IMPEDANCE (BALANCED OR UNBALANCED):	25VCT; 10.4Ω (25V); 8Ω; 16Ω; 83Ω (70V)	25VCT; 5Ω (25V); 8Ω, 16Ω; 40Ω (70V)
CONTROLS AND INDICATORS:	Ac power switch, ac power indicator lamp, volume control, music-speech selector switch.	
SEMICONDUCTORS:	6 silicon transistors; 7 diodes	8 silicon transistors; 7 diodes
POWER CONSUMPTION:	120VAC 60HZ. 168 watts @ Rated output 120VAC 60HZ, 22 watts @ Quiescent (No Output) 48-56 VDC, 1 Amp @ 30 watts output 48-56 VDC, 15 mA @ Quiescent (No Output)	120VAC 60HZ, 300 watts @ Rated output 120VAC 60HZ, 30 watts @ Quiescent (No Output) 48-56 VDC, 2.25 Amps @ 62.5 watts output 48-56 VDC, 15 mA @ Quiescent (No Output)
AUXPOWERRECEPTACLE :	550 watts	390 watts
OVERLOAD PROTECTION:	AC circuit breaker. 1.65A Hold; DC circuit breaker. 1.65A Hold; Thermal breaker, 95° C. with recovery in approximately 2 minutes.	AC circuit breaker. 2.5A Hold; DC circuit breaker, 2.5A Hold; Thermal breaker, 104° C. with recovery in approximately 2 minutes.
DIMENSIONS:	8" W. x 13" D. x 6¼" H.	8" W. x 13" D. x 6¼" H.
WEIGHT:	18½ lbs.	25 lbs.
<i>*Variations in performance characteristics normally will not exceed 1 dB.</i>		

in length. Refer to Table I for Bogen preamplifiers suitable for use with the amplifier.

**HIGH IMPEDANCE INPUT:** The amplifier can be driven to full output from any source developing 200 mV across one of the Hi-Z inputs. Wire a single-conductor, low-capacity shielded input cable to a standard phono plug (Cinch 18A, or equivalent) and connect to one of the Hi-Z jacks on the rear of the chassis.

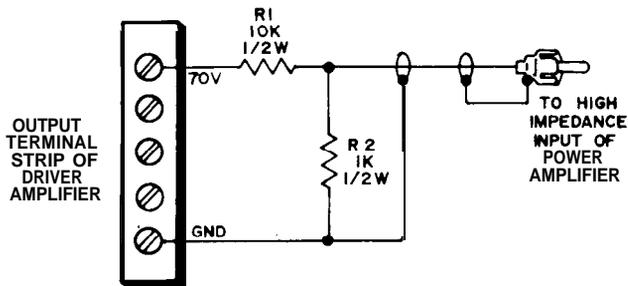
**LOW IMPEDANCE INPUT:** The amplifier may be driven from a low-impedance (500/600Ω) input, if a Bogen Model TL-600 transformer is installed in socket X1 on top of the chassis. Connect a twisted, shielded pair (Bogen BB-8450, or equiv.) input cable to the BAL. INPUT LOW Z terminal strip on the rear of the unit. Use the two terminals on the right of the strip and connect the cable shield to the GND terminal on the left. If an unbalanced input is required, connect a jumper from the GND terminal to the adjacent input terminal.

**CAUTION**

*Remove all power from unit before installing transformers.*

**BRIDGING INPUT:** The inputs for two or more amplifiers may be paralleled without loss of gain. To do this, install a Bogen Model TL-IOK transformer in socket X1 on top of the chassis. Connect the bridged inputs to BAL LOW Z terminal strip on the rear of the unit. Use the two terminals on the right of the strip and connect the cable shields to the GND terminal on the left. If an unbalanced input is required, connect a jumper from the GND terminal to the adjacent input terminal.

**CONSTANT-VOLTAGE INPUT:** The amplifier can be driven from a standard public address amplifier that provides a 25volt or 70-volt constant voltage output. To do this, connect the output of the amplifier to one of the Hi-Z INPUT jacks via a resistor network (see figure 1). The resistors shown in figure 1 are in addition to the normal loudspeaker load on the output of the public address amplifier.



AT 70V RI - 10K, 1/2 W  
AT 25V RI - 3.3K, 1/2 W

74-0730-A

Figure 1 - Connection to Constant - Voltage P.A. Amplifier Driver.

**OUTPUT CONNECTIONS**

Speakers may be connected with standard flexible line cord (zip-cord) and up to 100 feet of cable may be used without appreciable loss. Class II wiring is acceptable unless prohibited by local codes.

**70V CONSTANT-VOLTAGE OUTPUT.** For 70V constant-voltage operation, connect the speaker leads to the 70V and COM 2 terminals on the rear of unit. If grounding is required, connect a jumper from the COM 2 to GND.

**25V CONSTANT-VOLTAGE OUTPUT.** For 25V constant-voltage unbalanced operation, connect the speaker leads to 25V and COM 1, leaving the link connected between COM 1 and GND. For balanced operation, *open the link between COM 1 and GND*. If the output transformer center tap must be grounded, connect a jumper between 25VCT and GND.

**16 OHM & 8 OHM OUTPUT.** For 16Ω or 8Ω operation, connect the speaker leads between the desired output terminal and COM 1. If ungrounded operation is desired, open the link between COM 1 and GND.

**CONNECTING AMPLIFIERS IN SERIES**

Pairs of Bogen MT1 25A amplifiers or MT60 amplifiers can be connected in series to effectively double the power output into the same loadline. See Figure 2 for connection diagrams. Be certain to remove the link between COM 1 and GND of amplifier No. 2.

Depending on the impedance of the signal source, apply the input signal to the HI Z or LO Z input of amplifier No. 1. Use jumpers to connect the appropriate input of amplifier No. 2 in parallel with that of amplifier No. 1.

It is necessary that both amplifier volume controls be at the same setting to assure that each amplifier will share the load equally.

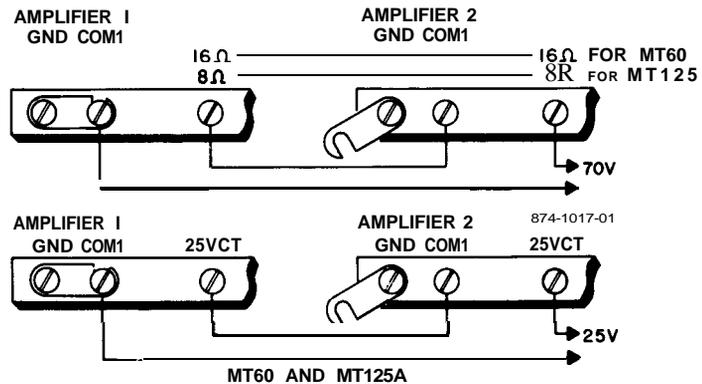


Figure 2 - Connecting Amplifiers in Series

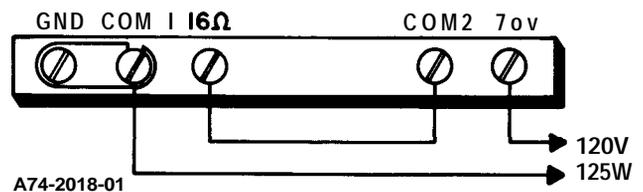


Figure 3 - MT1 25A Connections for 120-Volt Operation

## CONNECTIONS FOR 120-VOLT OUTPUT (MT125A ONLY)

Figure 3 shows connections for 120-volt output at selected frequencies for laboratory or industrial applications.

### POWER CONNECTIONS.

The booster amplifier may be operated from 120 vac or 48V to 56V dc.

**120 VAC SOURCE.** Connect the ac power cord to a 120 vac. source. Use a 3-wire receptacle with the center pin connected to earth ground.

If desired, auxiliary equipment may be connected to the AUX POWER receptacle on top of the unit. Do not exceed power ratings on the schematic diagram.

**48V - 56V DC SOURCE.** Connect the amplifier to a dc source capable of delivering power indicated in the Technical Specifications table. A two-prong polarized plug (Bogen Part No. 85-0109-01; Cinch Jones No. P-302-CCT) is supplied with the amplifier for making dc connections. Connect dc cable to source making certain to observe proper polarity.

## OPERATION

### VOLUME CONTROL

A volume control located on the rear of the unit is used primarily to compensate for variations in preamplifier output levels. The VOLUME control permits the gain of the amplifier to be preset so that the preamplifier volume control may be operated near the center of its range, rather than at an extreme maximum or minimum. The VOLUME control is a screwdriver adjustment which needs to be set only once for any given preamplifier input.

### DC POWER OPERATION

When the amplifier is operated from a dc power source, the ac power switch and ac power indicator lamp will be inoperative and there will be no power at the AUX POWER receptacle on top of the chassis. Turn the amplifier on and off from the power switch on the dc power supply or by inserting and removing the dc power leads on the rear of the unit.

## MAINTENANCE

### CAUTION

*There are no user replaceable parts within the unit. Have all internal servicing done by a qualified technician.*

### AC OPERATION

There are two overload protective devices used with ac operation, the circuit breaker and the temperature overload thermal breaker.

**AC CIRCUIT BREAKER.** If the circuit breaker opens, the ac power lamp will go out and the amplifier will have no output, but there will be power at the AUX POWER

receptacle on top of the unit. Set the ac power switch to off and momentarily depress the red button on the circuit breaker to reset it. Return the ac power switch to on. If the breaker trips again, do not attempt to reset it but have the trouble investigated by a qualified technician.

**THERMAL BREAKER.** If the temperature thermal breaker opens, there will be no audio output but the ac power lamp will remain on. Wait approximately two minutes for the breaker to reset. If the breaker resets and then opens again, investigate the cause of the temperature overload. This may be due to improper connections at the output terminals or to excessive environmental heat with inadequate ventilation. The thermal breaker will open when the temperature at any one of the output transistors is excessive.

### DC OPERATION

There are two overload protective devices used with dc operation, the circuit breaker and the temperature overload thermal breaker. If either device opens, there will be no audio output. The ac power lamp does not light during dc operation.

**THERMAL BREAKER.** See the applicable paragraph under "AC OPERATION".

### REPLACING TRANSISTORS

Transistors show little, if any, deterioration with age and are considerably more reliable than the best vacuum tubes. This is why some transistors are soldered into equipment like resistors or capacitors. If the unit is inoperative, it generally is safe to assume that the transistors have not failed and that the trouble is elsewhere in the equipment.

If a transistor must be unsoldered for testing or replacement, be certain to remove all power from the unit to prevent possible voltage transients in the circuit which might damage the transistor. To prevent overheating the transistor when soldering or unsoldering a lead, grip the lead between the point of heat and the case with pliers or tweezers. These will act as a heat sink to conduct heat away from the transistor. Do not bend a transistor lead closer than 1/16" from the transistor case.

Power transistors must be properly mounted to insure good heat dissipation. Make certain there is no foreign matter on the contact surfaces between the transistor and the heat sink and brush a thin coating of heat transfer compound (such as Dow Corning No. 340 Compound silicon grease or equivalent) on both surfaces. Similarly coat any insulators used between the transistor and the heat sink and secure the transistor firmly to the heat sink.

### BOGEN SERVICE

We are interested in your Bogen equipment for as long as you have it. If trouble ever develops, 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 and series designation of your unit. Describe the difficulty and include details on the electrical connections to and the types of associated equipment, such as preamplifier, speakers, etc. We will send you service information if the trouble appears simple. If the trouble requires servicing, we

will send you the name and address of the nearest authorized Bogen service agency.

Do not return the unit to Bogen without prior clearance from our Service Department. If you do ship the unit, pack it carefully to avoid damage in transit. Send the unit, fully insured and prepaid, via United Parcel or Railway Express. Do not ship via parcel post unless so instructed.

## REPLACEMENT PARTS

Most components used in the amplifier are standard parts available through reputable parts jobbers. The parts listed here may be obtained from Bogen distributors,

service agencies or directly from the factory. When ordering a part, specify a part number and description of the part as listed. Specify the model of the unit and give the series designation, which is a letter followed by numbers, screened on the chassis. For parts on circuit boards, also give the component board assembly number, which begins with "45".

When replacing transistors, use those made by the specified manufacturers. Transistors from other suppliers may not be satisfactory. Certain resistors must be Allen-Bradley. These are designated by "AB" on the schematic diagram.

Ref. No.	Part No.	Ref. No.	Part No.
A1	45-9933-01 (MT60)	<b>CHASSIS ELECTRICAL PARTS</b>	
	45-9938-01 (MT1 25A)	<b>CI04</b>	<b>79-509-054</b> (MT60)
	94-5067-01		79-509-075 (MT1 25A)
	Printed Circuit Board	CI05	79-009-07 1
c2	79-008-063	CBIO1, 102	94-0017-15 (MT125A)
C5	79-008-062	CB103	94-00 14-03
C9,11	79-112-002 (MT1 25A)	CR 101,102,	
C10	79-1 12-007 (MT60)	103	96-5241-01 (MT60)
CR1,3,4,5	96-5333-01		96-5355-01 (MT125A)
CR2	96-5202-01	1101	94-0302-04
Q1	96-5321-01	QIO1, 103	96-5351-01
	MPS-6767 (Motorola)		2N6254 (RCA) (MT60)
Q2	96-5342-01		or
	MJE 172 (Motorola)		96-5352-01 (MT60)
Q3	45-9866-01	QIO1-104	96-5315-01 (MT125A)
Q4	45-9865-01	RIO1	77-001-372
R17,19	76-107-105	SW1	81-003-059
R18,20	76-1 16-003	SW102	8 1-002-098
		TIO1	83-776-000 (MT60)
			83-766-000 (MT1 25A)
		T102	83-427-O 10 (MT60)
			83-425-000 (MT1 25A)

### OWNER'S WARRANTY

Bogen solid state sound and intercom 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.*

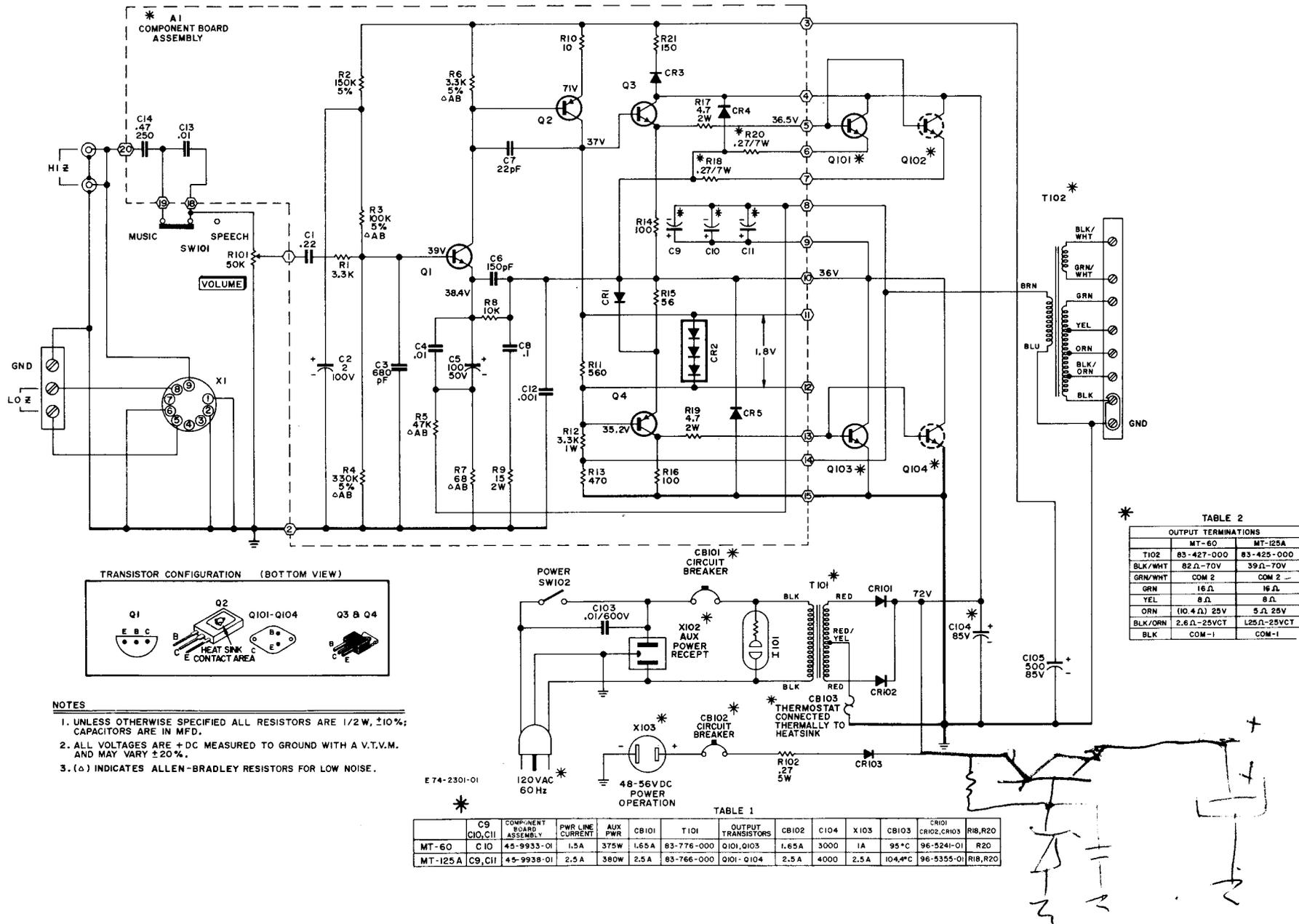


Figure 4 – Models MT60 and MT125A Booster Amplifiers, Schematic Diagram