

BOGEN®

Challenger Solid State Series

MODEL C20

20-WATT TRANSISTOR PUBLIC ADDRESS AMPLIFIER

DESCRIPTION

The Bogen Model C20 is a fully transistorized public address amplifier rated at 20 watts. The unit will accommodate a high-impedance microphone with a control provided for the microphone input. Two auxiliary inputs are provided for a tuner, tape recorder, or phonograph with a ceramic or crystal cartridge. A fader volume control selects and adjusts the level of the desired auxiliary input and permits a gradual changeover from one input to the other. A treble control permits adjustment for tonal balance.

Balanced outputs are provided for 4, 8 and 16-ohm speakers, for 25-volt and 70-volt constant-voltage systems. A quick-disconnect plug provides rapid and convenient connections to a speaker.

The C20 amplifier operates from a 120-volt, 60 Hz source and has a total power consumption of 54 watts. A 3/4 ampere slo-blo line fuse and a 2 ampere slo-blo output fuse protect the amplifier against overloads.

OPERATION

POWER

The power ON/OFF switch on the front panel turns the amplifier on or off and controls power to equipment connected to the auxiliary power receptacle.

MIC

Use the MIC control on the front panel to adjust the volume of the microphone 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.

AUX1-AUX2.

The AUX1-AUX2 control selects either of the two auxiliary inputs and also controls the volume of the selected auxiliary input. To select the AUX 1 input, rotate the control counterclockwise, past the center position (indicated by a triangle). Turning the control farther counterclockwise increases the AUX 1 volume.

To select the AUX 2 input, rotate the control clockwise past the center position. Turn the control farther clockwise to increase the AUX 2 volume. If the auxiliary input is not used, set the control to the mid position (off).

The AUX 1- AUX 2 control can be used as a "fader" control, when both auxiliary inputs are connected. With this control, you can gradually and smoothly decrease the level of one input and then gradually increase the other. The effect is one of fading from one auxiliary input to the other.

RESET MARKER

Each volume control has a red reset marker on the skirt of the knob. This marker is used to log a particular setting. Adjust the volume controls to the desired level and slide the reset markers to coincide with the midpoint mark on the front panel. The individual mark can now be returned to zero or any other point, allowing instant resetting to the predetermined level.

TREBLE

Use the TREBLE control to adjust the tonal balance of the amplifier output. Leave the control in the clockwise position for a flat high-frequency response. To reduce the high-frequency response, rotate the control in the counterclockwise (CUT) direction. This position can be used to remove high-frequency noise (such as record scratch).

ACCESSORIES

WMT-1 LINE MATCHING TRANSFORMER

The Bogen WMT-1 line-matching transformer provides an impedance match between the C20 amplifier output and a 0 level, 500/600-ohm line. This may be a telephone line connected to the switchboard for internal paging or used with a wired music system. No soldering is required to connect the WMT-1 to the amplifier.

CARRYING CASE AND SPEAKERS

Carrying cases for portable systems are available with or without speakers. The Bogen Model CC-12 is a carrying case only, while the Model CC-12S contains two 12-inch, high-efficiency speakers. Both speaker sections include 25 feet of interconnecting cable terminated in a connecting plug. Since the C20 will accommodate a single plug, a simple modification will be required in order to use the two.

SPECIFICATIONS

POWER OUTPUT: 20 Watts.
FREQUENCY RESPONSE: 100 to 10,000 Hz
 ± 2 db.

HUM AND NOISE: MIC Input — 68 db below rated output.

AUX Input — 70 db below rated output.

SENSITIVITY: MIC Input 3mV

AUX Input: 0.35 volts.

INPUTS: 1 microphone (high impedance), 2 auxiliary (high-impedance, high-level). Provision for WMT-1.

OUTPUTS: Speaker 4, 8 and 16-ohms, 25 volt, and 70 volt line. 1 quick-disconnect type socket and connectors provided.

TREBLE CONTROL ACTION: 12 kHz, — 14 db.
CONTROLS: Microphone Volume, AUX 1 and 2 Volume, Treble.

SEMI-CONDUCTORS: All Silicon, 7 Transistors, 6 Diodes.

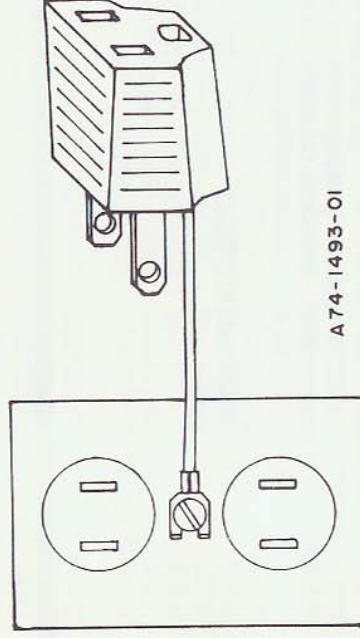
POWER CONSUMPTION: 54 W @ 120 vac, 60 Hz

DIMENSIONS: 11 $\frac{1}{4}$ " W x 3 $\frac{3}{4}$ " H x 11" D.

WEIGHT: 11 lbs.

CAUTION

Do not connect any device drawing more than 200 watts to the auxiliary receptacle.



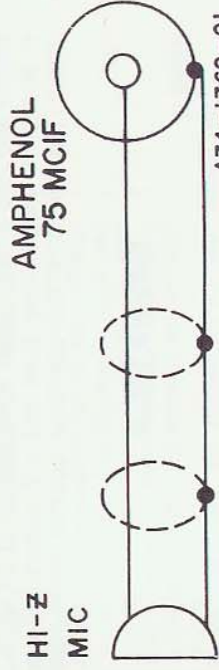
A 74-1493-01

Figure 1 — Grounding Line Cord Adapter

INPUT CONNECTIONS

MICROPHONE

The microphone should be of the high-impedance ceramic, crystal or dynamic type. Connect the microphone as shown in figure 2. The length of the interconnecting cable should be under 35 feet.



A 74-1769-01

Figure 2 — Connecting Hi-Z Mic

MICROPHONE PRECEDENCE

Microphone precedence may be accomplished by connecting the circuit shown in figure 3. The equipment consists of a microphone, a Y-adaptor (Switchcraft Part No. 330F1), a single-conductor shielded cable (20 feet maximum length) and a SPDT switch. If the microphone switch has an extra set of contacts for controlling an external circuit, such as on the Shure Model 450, the SPDT switch is not required.

Plug the Y-adaptor into the AUX 1 or AUX 2 input jack on the rear of the amplifier. Connect the program source and precedence switch to the Y-adaptor, as shown in the figure. Connect the microphone input to the MIC input jack.

PHONO

Connect a phonograph (with ceramic or crystal cartridge) to either the AUX 1 or AUX 2 jack, using a single-conductor shielded cable terminated in a standard phono plug (Bogen Part No. 85-1005-01, or equivalent). It is recommended that a separate ground wire be connected between the phono player base and the amplifier GND terminal to minimize hum pick-up. This ground wire is **not** required when using the Bogen Model LPC-4 phono player top.

INSTALLATION

UNPACKING

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

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, 60 Hz power source. This will ground the amplifier as well as supply power to it.

Always ground the amplifier. If a three-wire outlet is not available, an adapter such as Leviton No. 5017 should be used to connect 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 securing the wall plate to the receptacle as shown in figure 1.

NOTE

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

AUXILIARY POWER

The auxiliary power receptacle is a three-wire grounded outlet. Any associated equipment connected to it by means of a three-prong line cord will be grounded, providing the amplifier line cord has been properly grounded.

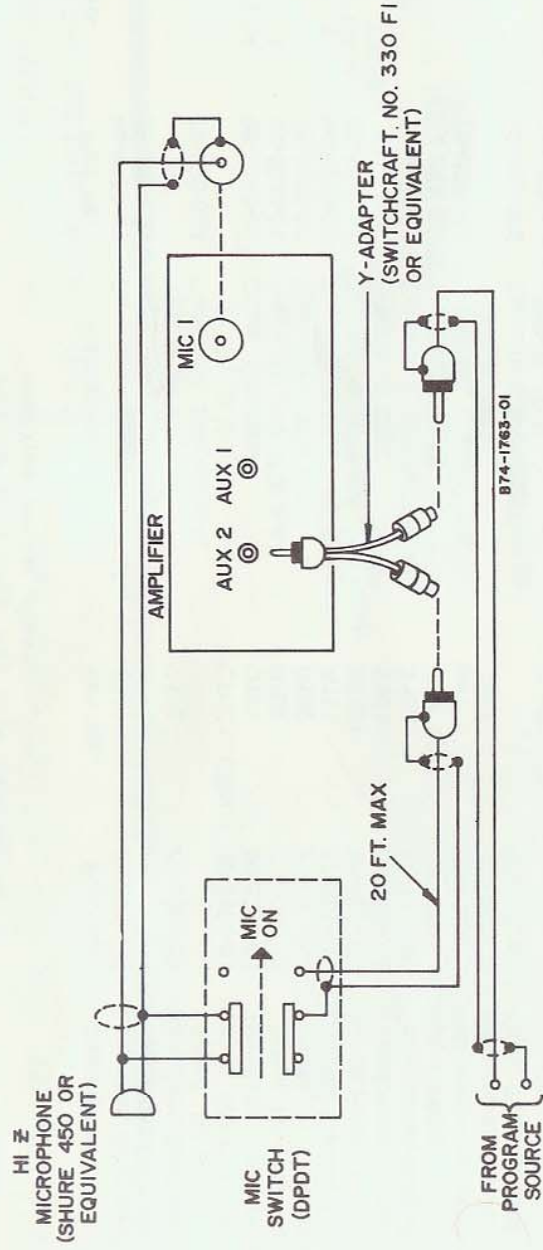


Figure 3 — Microphone Precedence Circuit

CAUTION

When a record player is connected to the auxiliary power receptacle, both the amplifier power switch and the record player power switch must be used to turn off the record player. Flats may develop on the idler wheel of the record player if only the amplifier power switch is used.

AUXILIARY

The AUX inputs may be used for sources other than a phonograph. Any signal source having a high-level (0.35-2.0V) output may be connected to these inputs.

To connect the amplifier output to a 500/600 ohm telephone line, remove the amplifier cover and mount the WMT-1 transformer in the WMT-1 mounting holes provided on the chassis just behind the component board assembly (see figure 4). Feed the 500/600-ohm input cable through the cutout provided on the top right side of the rear panel and connect it to the three-screw terminal board on the WMT-1. Feed the lead from the WMT-1 (with the phono plug attached) through the cutout and connect to the AUX 1 or AUX 2 input of the amplifier. If another sound source has been plugged into the AUX inputs, the WMT-1 may be connected to the MIC input of the amplifier. However, the WMT-1 wiring must be modified, as described in the instruction sheet furnished with the WMT-1.

OUTPUT CONNECTIONS

WMT-1 ACCESSORY

WARNING

Removing the amplifier cover presents an electrical shock hazard. Only a qualified technician should install this accessory.

CAUTION

When replacing the cover, make certain input and output cables are dressed in the cutout and cannot be pinched between the cover and the chassis.

SPEAKERS

The amplifier may be used with speaker systems rated at 4, 8 and 16 ohms and with 25-volt and 70-volt constant voltage systems. For detailed information on the installation of multiple speaker systems, refer to the Speaker Installation Bulletin (No. 54-5001-02) included with this unit.

In permanent installations, where speakers will remain connected to the amplifier, connect the speaker system directly to the Speaker Output terminals on the rear of the C20. Connect one speaker lead to the COM terminal and the other to the terminal corresponding to the impedance of the speaker system.

NOTE

For balanced output lines, remove the link between COM and GND output terminals. If the line is shielded, connect the shield to GND.

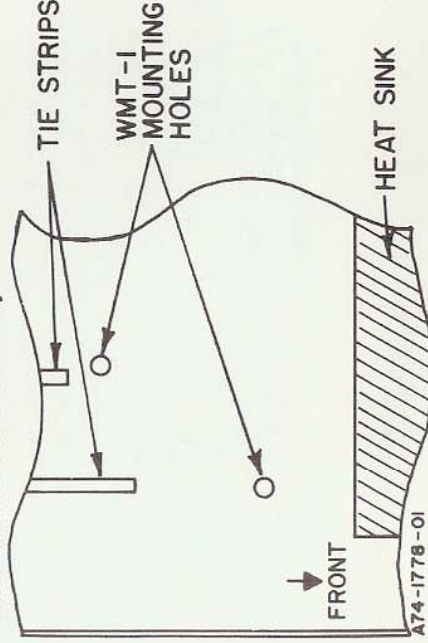
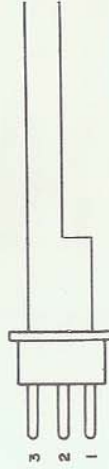


Figure 4 — Mounting Holes for WMT-1

FOR 70V OPERATION



FOR 4, 8 & 16Ω & 25V OPERATION

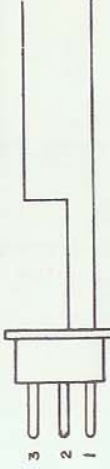


Figure 5 — Speaker Output Plug Wiring

For frequently moved installations, connect the speaker to the speaker socket on the rear panel. A quick-disconnect speaker plug (Bogen Part No. 85-0147-01) is furnished with the amplifier to make connections to the speaker socket. To wire the speaker output plug, refer to figure 5.

When the speaker socket is used, connect the wired plug to the socket. Attach the impedance selector lead, on the rear panel, to the output terminal which corresponds to the speaker's impedance. For 70-volt operation, it is only necessary to connect the wired plug to the quick-disconnect speaker socket, leaving the impedance selector disconnected.

MAINTENANCE

TROUBLESHOOTING 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 control until the feedback is eliminated. In addition, move the speakers to increase the distance between the speakers and the microphone.

HUM. Hum can occur if the connections between the signal sources and amplifier are incorrect or defective. Recheck all connections for continuity (especially ground connections) in cases where hum occurs. Try reversing the power plugs of other units used in the system. Check for broken wires, shields and poor connector contacts.

FUSE REPLACEMENT. A 2 ampere slo-blo fuse is located on the rear panel. If this fuse blows, there will be no audio output but the pilot lamp will light. A 3/4 slo-blo fuse located above the auxiliary power receptacle on the rear panel protects the power supply circuit. If this fuse blows, the power lamp will not light, but there will be power at the AUXILIARY socket.

CAUTION

Disconnect ac line cord from power outlet before replacing fuse.

To remove a fuse, press inward on the spring loaded fuse, rotate the fuse counterclockwise and re-

move it from the holder. Use only a fuse of the same rating for replacement. If the replacement fuse blows, do not attempt further operation. Consult a Bogen representative or other competent technician to inspect the amplifier.

BOGEN SERVICE

We are interested in your Bogen amplifier 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 and series designation 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 simple. If the trouble requires servicing, we will send you the name and address of the nearest Bogen authorized service agency to which you can send your unit for repairs.

If you ship your unit, pack the amplifier well, using the original shipping carton, or a similar container and filler material, to prevent damage in transit. Send the unit, fully insured and prepaid, via railway express. **Do not ship via parcel post unless so instructed.**

ROUTINE SERVICE

WARNING

There are no user serviceable parts inside the amplifier and removal of the amplifier cover presents an electrical shock hazard. Interior servicing should be attempted only by a qualified technician.

TRANSISTOR REPLACEMENT.

When replacing power transistors, clean all foreign matter from the heat sink, insulator and transistor. Brush a silicon compound (such as Dow Corning No. 340) on the surfaces before assembling the parts to the heat sink.

CAUTION

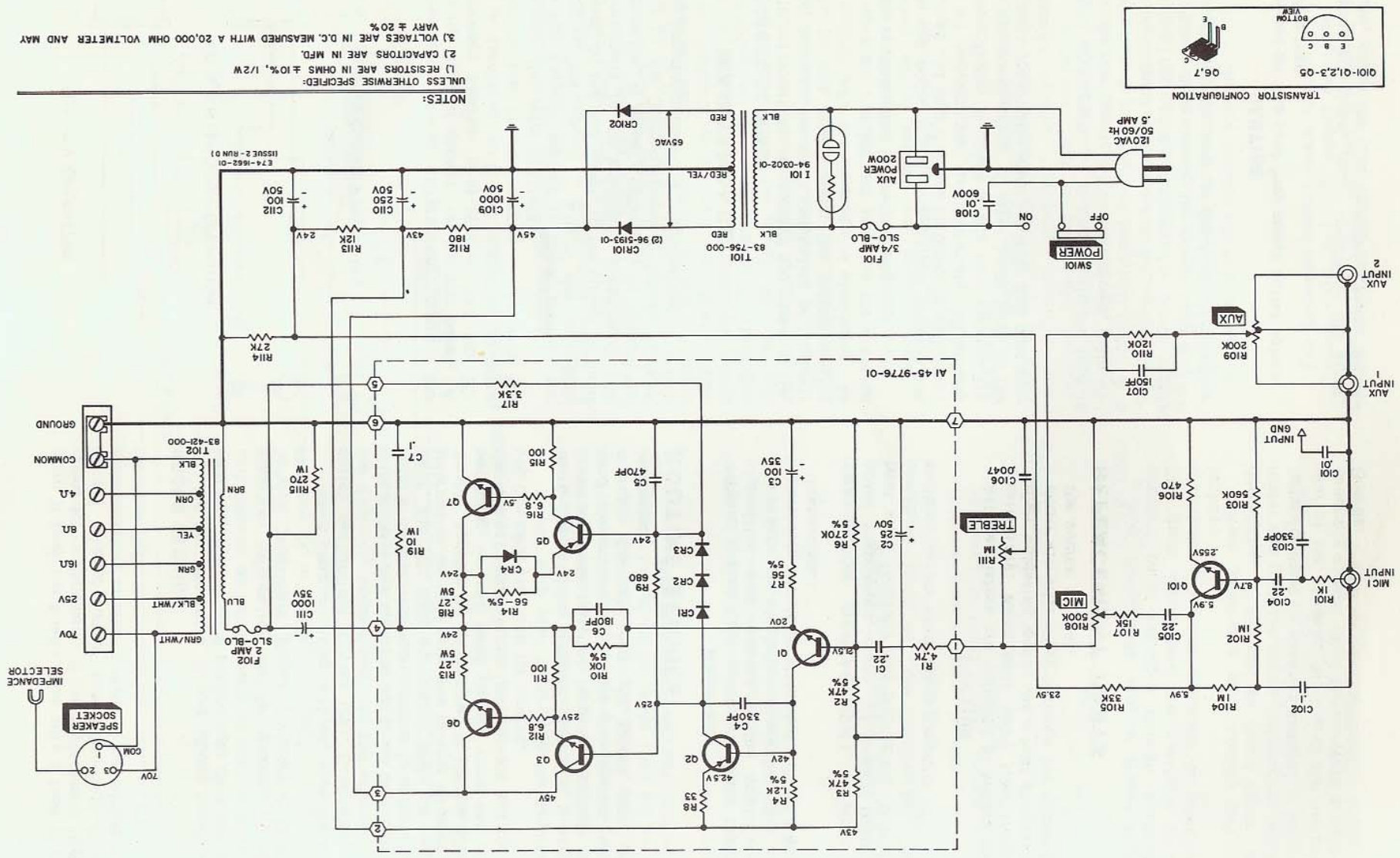
All transistors are soldered to ensure maximum reliability. Keep heat away from transistors. When soldering leads, use a heat sink (such as a small alligator clip) between the transistor and the source of heat.

REPLACEMENT PARTS

Most components used in Bogen amplifiers are standard parts available through reputable jobbers. The parts listed here 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 run letter followed by numbers stamped or screened on the rear of the chassis. Also, give the component board assembly number (45-) for all parts mounted on P. C. Boards.

Figure 6 - Model C20 PA Amplifier, Schematic Diagram



TRANSISTOR CONFIGURATION

NOTES:
 UNLESS OTHERWISE SPECIFIED:
 1) RESISTORS ARE IN OHMS ± 10%, 1/2 W
 2) CAPACITORS ARE IN MFD.
 3) VOLTAGES ARE IN D.C. MEASURED WITH A 20,000 OHM VOLTMETER AND MAY VARY ± 20%
 ISSUE 2 - (RUN 0)

NOTE
 Replace transistors only with manufacturer
 and type number shown.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
A1	45-9776-01	Component Board Assembly,	C111	79-005-064	Capacitor, Electrolytic,
C2	79-008-056	Capacitor, Electrolytic,	C112	79-005-058	1000 μ F, 35 V
C3	79-008-053	25 μ F, 50 V	CR101, CR102		Capacitor, Electrolytic,
CR1, CR4	96-5242-01	Capacitor, Electrolytic,	Q101	96-5193-01	100 μ F, 50 V
CR2, CR3	96-5022-01	Diode, Stabistor	R108	96-5213-01	Diode, 200 PIV, 2A
Q1	96-5298-01	Diode, 50 PIV, 750 mA	R109	77-001-716	Transistor, 2N5089 (Motorola)
Q2	96-5283-01	Transistor, SPS 1910	R111	77-001-713	Control, Mic Volume, 500K
Q3	96-5290-01	Transistor, MPS A55 (Motorola)	SW101	77-001-715	Control, AUX Volume, 200 K
Q5		Transistor, MPS A05 (Motorola)	T101	81-003-050	Control, Treble, 1 Meg.
Q6, Q7	96-5232-01	(Same as Q2)	T102	83-756-000	Switch Power SPST, 3 Amp.
C109	79-009-063	Transistor, 2N5493 (RCA)		83-421-000	Transformer, Power
C110	79-005-063	CHASSIS ELECTRICAL PARTS			Transformer, Output
		Capacitor, Electrolytic,			FRONT PANEL PARTS
		1000 μ F, 50 V		02-9064-01	Indicator, Control Knob
		Capacitor, Electrolytic,		03-0593-01	Knob, Aux, Mic Control
		250 μ F, 50 V		03-0592-01	Knob, Tone Control

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.



LEAR SIEGLER, INC.

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