BOGEN®

A DIVISION OF LEAR SIEGLER, INC.

PUBLIC ADDRESS AMPLIFIERS

MODELS CT60B and CTIOOB

The Bogen Models CT60B and CT1OOB are versatile preamp-mixer-equalizer-amplifiers, designed for professional-quality sound systems that once required custom audio equipment. The CT60B, rated at 60 watts, and the CT100B, rated at 100 watts output, are comprised of integrated circuits, silicon transistors and diodes with the latest state-of-the-art active 2/ 3 octave equalization circuitry.

Four low-impedance, transformer isolated, balanced microphone inputs, (expandable to six with an accessory PMM-2B) each with individual volume controls, are convertible to high-impedance inputs by rearranging jumpers on the printed circuit board. A phantom supply for the use of condenser microphones is built into these units. Professional three-pin female, XLR-type microphone connectors are provided on the rear panel.

Two auxiliary channels, with an AUXl/ AUX2 fader control can be used for inputs from a tuner, tape/cassette player, phonograph with a ceramic cartridge, or an optional TG-4B Multiple Tone Generator.

Built-in microphone precedence, remote volume control, 500/600-ohm line input and output, with accessories, tape and tape/ booster outputs, amplifier bridging, and connecting amplifiers' outputs in series are among the many capabilities of these units.

Ten slide controls, with detented flat positions, allow the selected frequency equalizer filter circuit to meet individual installation requirements. Feedback is virtually eliminated, while intelligibility is greatly improved, and usable power is increased.

A recessed screwdriver-adjustable front panel control for an electronic compressor circuit is also provided. This circuit compensates for poor microphone technique or a variety of announcers, and it eliminates "blasting" in background music applications.

Screw terminals on the rear panel allow connections to standard speaker impedance taps, as well as connections for 25-volt and 70-volt balanced lines.

The amplifier operates from a 105-125 volt, 60 Hz source. A three-prong line cord provides automatic grounding when connected to a three-wire grounded power outlet. The power line is protected by a circuit breaker, and the output transistors by a thermal overload device, which shuts off the unit when the temperature of the heat sink rises excessively.

INSTALLATION

UNPACKING

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

POWER AND GROUNDING

The ac line cord has a three-prong plug which should be plugged into a three-wire grounded, 120 volt, 60 Hz outlet. As it is important to ground the amplifier, where a three-wire outlet is not available, use an adapter (e.g., Leviton No. 5017) and connect the grounding pigtail to the screw securing the wall plate. If the wall plate screw is not grounded, connect a wire from the GND terminal of the amplifier to a suitable ground.

AUXILIARY POWER

CAUTION

Use ***the ON/OFF switch on a phonograph or other accessory unit connected to the auxiliary receptacle, as the power switch on the amplifer does not control this receptacle.***

The auxiliary power receptacle on the rear chassis is a three-wire grounded outlet which can supply power to accessory equipment in the sound system. Be sure that the accessory component does not require more than 300 watts. The power switch does not control this receptacle.

Associated equipment connected to the auxiliary receptacle with a three-prong line cord will be grounded, providing the amplifier line cord has been properly grounded.

INPUT CONNECTIONS

LOW-IMPEDANCE BALANCED MICROPHONES: The amplifier is designed for direct connection of low-impedance balanced microphones to the MIC input receptacles of the amplifier. The microphone lead should be a two-conductor shielded cable terminated in a Cannon XLR312-C or Bogen CON-2 connector, as shown in Figure 1.

CONDENSER MICROPHONES: Connect in the same manner as for low-impedance balanced microphones.

HIGH-IMPEDANCE MICROPHONES: The microphone lead should be a singleconductor shielded cable under 35 feet in length and terminated in a Cannon XLR312-C or Bogen CON-2 connector, as shown in Figure 1. For information regarding the use of high-impedance microphones, see notes on the schematic diagram.

MICROPHONE PRECEDENCE: A built-in circuit provides microphone precedence for special announcements. A customer-supplied SPST switch with normally-open contacts is required for this function. When the contacts are closed, the auxiliary and other microphone inputs are muted. (See TSlOl in the schematic diagram and related notes.)

Printed in USA 8305 54-5751-01

TECHNICAL SPECIFICATIONS

	CT100B	CT60B
Power Output: RMS @ 1000 Hz	**100 w @ less** than 2% total harmonic distortion	60 w @ less than 2% total harmonic distortion
Frequency Response:	50 Hz to 15 kHz ±2 dB	
Regulation	2dB	
Line Fusing	Resettable Circuit Breaker 2.5A	Resettable Circuit Breaker 1.6A
Sensitivity (for full output)	LO-Z balanced MIC, 0.3 mV; HI-Z MIC, 3 mV; AUX. 0.15V	
Hum & Noise (below rated output)	LO-Z balanced MIC -55 dB; HI-Z MIC -60 dB; AUX -70 dB	
Inputs (impedance)	**4** LO-Z balanced dynamic or condenser MIC inputs, each convertible to HI-Z MICs; 2 HI-Z AUX inputs with fader control; 500/ 6OO-ohm line input with optional WMT-1 accessory; remote volume control for all MIC & AUX. inputs.	
Outputs (impedance)	4,6-8, 16 ohm speaker taps, 25 VCT and 70V balanced or unbalanced lines.	8,16 ohm speaker taps, 25 VCT and 70V balanced or unbalanced lines.
	Tape and Tape/ Booster, 500/600-ohm line output with WMT-1 optional accessory.	
Input/Output Connectors	MIC, professional 3-pin audio connectors (female) Cannon XLR313 or Switchcraft C3F Series; HI-Z standard phono jacks for Tape, Tape/ Booster, Bridging, and optional accessory WMT-1 output; provision for optional WMT-I input; screw terminals for speaker connections.	
Controls	4 MIC Volume, AUX l/ AUX 2 — fader, MASTER VOLUME, 10 Equalizer Filter Slide Controls, Compressor Control, Power Switch	
Equalizer Filters	10 filters centered at preferred ISO center frequencies of 80, 125, 200, 315, 500, 800, 1250,2000,3150, and 5000 Hz. Boost/Cut: ±12 dB	
Compression	5 ms. attack time, 2 s. decay time, max. compression 30 dB	
Semi-conductors	21 silicon transistors, 10 IC's, 10 diodes	19 silicon transistors, 10 IC's, 10 diodes
Power Source/ Consumption	120 V, 50/60 Hz, 2.5A, 300W	120 V, 50/60 Hz, 1.6A, 170W
Dimensions	16 3/8" W x 13¾" D x 4¾" H (41.5 x 34.9 x 12 cm)	
Shipping Weight	23 lbs., 12 oz. (10.8 kg.)	22 lbs. (10 kg.)

AUX 1/AUX 2 INPUTS: Two auxiliary inputs with a fader control are provided for high-level, high impedance inputs. These may be used to connect a tuner, tape/cassette player, record player utilizing a ceramic cartridge, or the input from an accessory WMT-1 line-matching transformer. (Refer to Accessories Section.) An input signal of 0.15 volts is required to obtain full output from the amplifier.

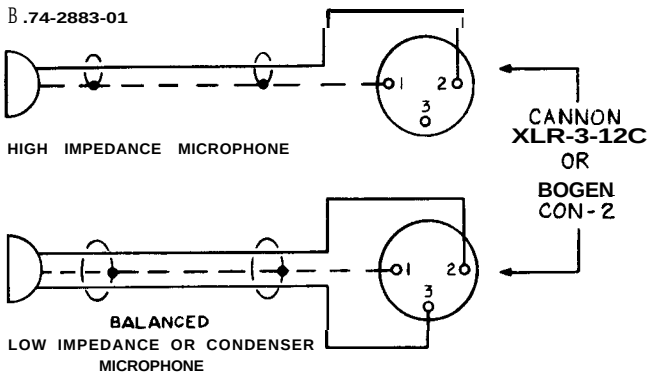

Figure 1 — Microphone Cable Connections

Use singleconductor shielded cable terminated in an RCA phono plug for connecting an auxiliary component. If hum is experienced after making connections, run a ground wire between the chassis of the auxiliary unit and the GND terminal of the amplifier.

BRIDGING: Two CT-B amplifiers can be bridged together to double the number of inputs and outputs. Connect a single-conductor shielded cable, terminated in an RCA phono plug at each end, between the rear panel BRIDGING receptacles of the two amplifiers. This cable should not exceed 20'in length. If more than two amplifiers are to be bridged use a "Y" adapter. The BRIDGING GND ONLY terminals on the rear panel terminal strip (TS101) must also be connected to each other. Any input to either amplifier will then be fed through and available at the output of both amplifiers. The amplifiers must each feed separate speaker systems.

When two amplifiers are bridged together, any adjustment of the MASTER, COMPRESSION or Acoustic Equalizer controls in one amplifier will not affect the output of the other amplifier.

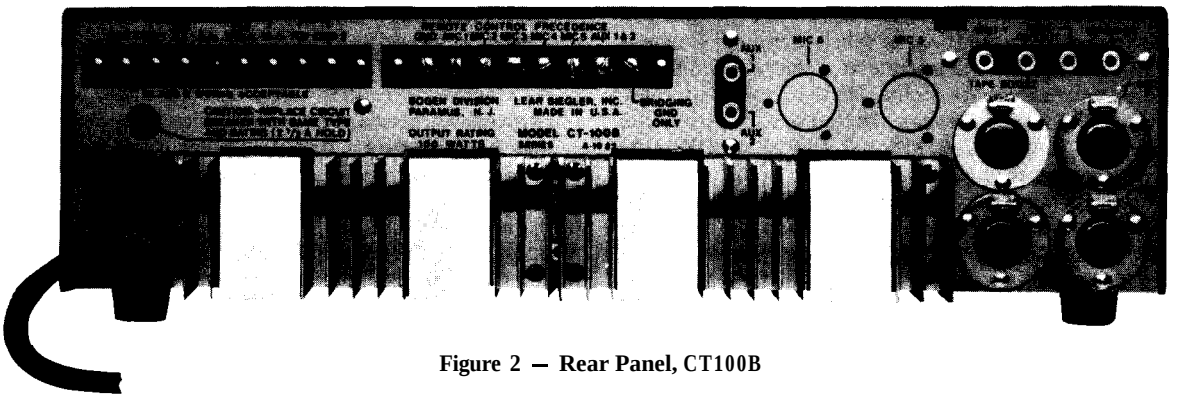

Figure 2 — Rear Panel, CT100B

OUTPUT CONNECTIONS

SPEAKERS: Output connections are available on the rear panel terminal strip for 4 (CT-lOOB), 8,16-ohm speakers, 25 volt center-tapped and 70 volt lines. Connections necessary are listed in Table I. Class 2 wiring may be used.

For detailed information see Installation Manual No. 54-5001 furnished with the amplifiers.

TAPE OUTPUT: A tape recorder may also be driven from the TAPE OUTPUT jack on the amplifier. In this case, the output is not subject to the master volume and equalization settings of the amplifier and is controlled at the tape recorder. A patch cord terminated in an RCA phono plug is connected between the TAPE OUTPUT jack on the amplifier and the input of the tape recorder.

BOOSTER OUTPUT: The amplifier may be used to drive a booster amplifier. Connect a patch cord with an RCA phono plug from the BOOSTER jack on the rear pane1 of the amplifier to the high impedence input of the booster amplifier. The output at this jack is controlled by the amplifier's volume and equalization controls.

WMT-1 OUTPUT: This receptacle is used to accommodate a Bogen accessory which provides connections to a 500/600-ohm telephone line. (Refer to Accessories Section).

CONNECTING AMPLIFIERS IN SERIES

Pairs of the ***same amplifier models*** can be connected in series to effectively double the power output into the same loadline, as well as increase the input capacity. See Figure 3 for connection diagram. Be certain to remove the link between COM and GND of amplifier No. 2.

Tone and master volume controls of both amplifiers should be at the same setting to assure that each amplifier will share the load equally.

Connect a single conductor shielded cable, terminated in an RCA phono plug at each end, between the rear panel BRIDGING receptacles and BRIDGING GND terminal of both amplifiers. This assures that any input will have equal amplification.

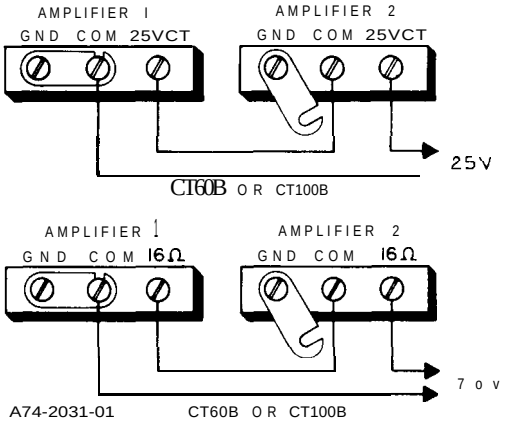

Figure 3 — Connecting Like Amplifiers in Series

TABLE 1 — OUTPUT CONNECTIONS

Models	Speaker Line	Terminal Connections*	Other Connections
CTlOOB	4Ω Unbalanced	4Ω and COM 1	Close link between COM 1 and GND
	4Ω Balanced	4Ω and COM 1	Open link between COM 1 and GND
Both models	8Ω Unbalanced	8Ω and COM 1	Close link between COM 1 and GND
	8Ω Balanced	8Ω and COM 1	Open link between COM 1 and GND
Both models	16Ω Unbalanced	16Ω and COM 1	Close link between COM 1 and GND
	16Ω Balanced	16Ω and COM 1	Open link between COM 1 and GND
Both models	25V Unbalanced	25V and COM 1	Close link between COM 1 and GND
	25V Balanced	25V and COM 1	Open link between COM 1 and GND
	25V Balanced, CT gnd.	25V and COM 1	Connect jumper between 25V CT and GND Open link between COM 1 and GND
Both models	70V Unbalanced	70V and COM 2	Add jumper between COM 2 and GND
	70V Balanced	70V and COM 2	No jumper required

Also see text under "Output Connections"

ACOUSTIC EQUALIZER: The Acoustic Equalizer permits you to "tune" the amplifier to the room in which the sound system is used, so that the amplifier will operate at a substantially higher output before acoustic feedback occurs. Ten slide controls, located on the front panel, boost or attenuate the output at preferred IS0 center frequencies-80, 125,200,315,500,800, 1250,2000,3150 and 5000 Hz-to compensate for varying room acoustics.

Microphone placement may also cause feedback or howling at or near some of these frequencies. If so, feedback can be greatly attenuated by setting the slidecontrolfor that particular frequency, as described below.

ACOUSTIC EQUALIZER FILTER ADJUSTMENT

MICROPHONE SOURCE:

The following adjustments of the slide filter controls will permit "tuning" the system so that the output level is substantially higher before acoustic feedback ("squeal" or "ringing") occurs.

1. Set MIC controls and MASTER control to zero (counter-clockwise).

2. Set all slide controls to center (flat) position, with speakers connected to the amplifier and microphone(s) in normal operating location(s).

3. Turn the appropriate MIC volume control half-way up, leaving the three other MIC volume controls at zero.

4. Advance MASTER control slowly until feedback ("ringing" or "squeal") is heard.

5. If the feedback sound is high-pitched, one of the five high frequency filter controls-800 Hz to 5 KHz-will be most effective in its elimination. Likewise, a low-end tone will be controlled by a low frequency filter.

6. Individually, move each filter control slowly from the center position to bottom and back to center while listening **for** change of feedback. The control which eliminates feedback with the least movement should then be moved down only as far as is necessary to eliminate the feedback.

7. Having eliminated the first feedback condition, slowly increase the MASTER control until feedback is heard again. Repeat the procedures of steps 5,6.

8. If the position of the microphone is changed or if additional microphones are used some adjustment to these controls may be necessary.

9. Output level, reduced because of attenuating one frequency, may be partly restored by boosting the adjacent frequency filter control toward maximum.

> ***If feedback is not a problem, the controls should be used to improve the voice quality and intelligibility of the paging system. In most cases, the 80 Hzcontrol should be placed in minimum*** *position* ***while the 2 KHz, 3150 Hz and 5 KHz should be moved to ward maximum for improved response. Each system, depending on the speakers used and room acoustics, will require some experimentation with the controls for optimum results.***

10. Note and record the settings of the individual filter controls and the MASTER control. These settings are generally applicable to all four MIC input channels. Rubber washers (supplied) can be placed on the slide controls to avoid accidental movement. To do so, pull the slide control knobs off the shafts, insert the rubber washers, and replace the knobs securely.

COMPRESSOR LIMITER: The COMPRESSION control (which is screwdriver-adjustable through the front panel-to avoid tampering) is used to provide relatively uniform output from the amplifier, regardless of variations in the input levels. This is particularly important in speech applications, where a microphone may be used by a number of people with varying voices and microphone techniques. It is also useful for musical programs, particularly when handling background music.

The COMPRESSION control is turned clockwise to reduce the output range for a given variation in input range. Turn the control counterclockwise to increase the output range. To remove compression and restore the normal full range of the amplifier, turn the control fully counterclockwise.

To determine the optimum setting of the COMPRESSION control for speech applications, proceed as indicated below. (For music, the setting will generally be lower than for speech.)

Set the COMPRESSION control fully counterclockwise. Set the MASTER volume control to the highest level likely to be required. Use a level setting that will permit you to pick up clearly spoken inputs in a low voice at a distance of three feet on axis from the microphone. However, do not set the volume level so high as to produce feedback or howling.

Then, speaking in a loud voice directly into the microphone, turn the COMPRESSION control clockwise to the point where the output of the amplifier is reduced to the same level as obtained above. The MASTER control can be used to vary the overall volume without upsetting the COMPRESSION adjustments.

OPERATION

POWER: This switch applies power to the amplifier. It does not control any associated equipment which may be connected to the auxiliary power receptacle on the rear panel. The POWER indicator lamp will go on to show that power has been applied to the unit.

MIC VOLUME: The four individual MIC volume controls are used to adjust the level of each microphone input channel. The control is turned clockwise (to the higher numbers) to increase the volume and counterclockwise to reduce it.

AUX VOLUME: 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. To select the AUX 1 input, rotate the control counterclockwise past the center position. Turning this control counterclockwise to the higher numbers increases the AUX 1 volume. To select the AUX 2 input, rotate the control clockwise past the center position. Turn the control more clock-wise to increase the AUX 2 volume.

If the auxiliary input is not to be used, set the control to the center position. The center position is indicated when the triangle on the control knob coincides with the vertical line between the AUX 1 and AUX 2 designations.

MASTER: This control is used to regulate the overall volume of the amplifier, which may include the mixed output of two or more input channels. To set this control, rotate it to the center position, then set the individual MIC and AUX controls to the highest level likely to be used and consistent with the operation of the limiter compressor. Adjust the MASTER control to the desired listening level for the mixed output.

ACCESSORIES

CAUTION

The *installation of internal accessories requires the removal of the cover, which presents an electrical shock hazard. For this reason, these accessories should be installed by qualifed technicians only.*

PMM-2B MICROPHONE MODULE: The Bogen PMM-2B Microphone Module is a preamplifier designed to provide two additional microphone channels for the amplifier. Each preamplifier channel has its own volume control and will accommodate either low-impedance balanced or high-impedance microphones. These added channels have all the characteristics of the basic channels, and the same accessories are applicable to them, except that provision for remote control, and precedence is made on one of the two additional inputs.

The Model PMM-2B mounts through the front panel of the CT-B amplifiers. Holes are incorporated in the front panel of the amplifiers to receive the control shafts of the PMM-2B unit.

To install the PMM-2B in the amplifier:

1. Remove the four screws on each side of the amplifier cover and lift it away from the chassis.

2. Remove the plug buttons on the front panel of the amplifier where the Volume Controls for MIC 5 and MIC 6 are to be inserted.

3. Open accessory bag furnished with the PMM-2B.

4. Two metal brackets are furnished to support the rear of the preamplifier circuit board assembly. Note two predrilled holes and locator holes in the chassis directly below and at the rear of the circuit board assembly. Turn the chassis on one side. Position one bracket, locating tongue into locating hole in chassis. Secure with machine screws and nuts supplied. Repeat this procedure with the other bracket. Turn the chassis right side up.

Before installing the circuit board assembly, note that the PMM-2B is shipped for low-impedance microphone inputs. For high impedance microphone input connections, see Note 3 on the schematic diagram.

5. Use a screwdriver to pry out two knockouts at the rear panel of amplifier chassis.

6. Remove the push-on lugs from the PMM-2B printed circuit board (pins 1 through 6). Guide the orange cable through the MIC 6 opening on the rear panel and the yellow cable through the MIC 5 opening; reconnect the push-on lugs to pins 1 through 6. The following table lists correct connections.

	Color	PMM-2B Term. No.
MIC 6 (Orange Cable)	Red	1
	Black	2
	White	3
MIC 5 (Yellow Cable)	Black	5
	Red	4
	White	6

7. A .047 disc capacitor is attached to the MIC 5 microphone connector. Remove the loose end of the wire from the sleeve on the yellow cable and connect it to the ground lug on the tie strip directly below MIC 6 connector.

8. Using the six mounting screws provided, secure the microphone connectors to the rear panel with the PUSH tabs at the top (same position as MIC 1 and MIC 2).

9. A brown wire is connected to pin 10 on the PMM-2B printed circuit board. Connect the other end of this wire to the terminal lug inside the rear panel, corresponding to the screw terminal marked MIC 5 PRECEDENCE on the rear panel.

10. Insert the four-wire Molex plug into the four-prong male socket J1 on the amplifier's main printed circuit board. Note that the four-wire plug can be inserted one way only. Do not twist or turn.

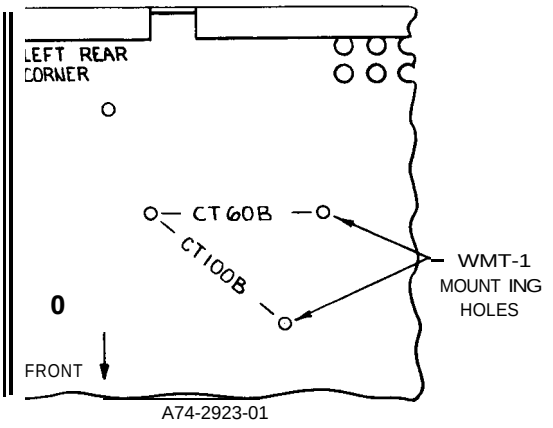

Figure 4 — Mounting Holes for WMT-1

11. Install the PMM-2B, component side down, inserting control shafts and bushings through holes in front panel. Run up two hex nuts over bushings of control shafts.

12. Press the control knobs onto the flatted volume control shafts. Replace the amplifier cover, using the original screws provided.

WMT-1 LINE-MATCHING TRANSFORMER: The Bogen WMT-1 line-matching transformer provides an impedance match between the amplifier 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.

To connect the input from a balanced 500/600-ohm telephone line, remove the amplifier cover and mount the WMT-1 using the mounting holes provided on the chassis (see Figure 4). Connect the input line to the three-screw terminal board on the WMT-1. Connect the phono plug on the WMT-1 cable to the AUX 1 or AUX 2 jack on the rear of the amplifier. If these jacks are being used for other sound inputs, the WMT-1 may be connected to one of the MIC inputs. In order to do this, the WMT-1 wiring must be modified as described in the instruction sheet supplied with the WMT-1.

To connect the amplifier output to a 500/600-ohm telephone line, remove the amplifier cover and mount the WMT-1 using the mounting holes provided in the chassis (see Figure 4). Connect the 500/600-ohm line to the three-screw terminal board on the WMT-1. Connect the phono plug on the WMT-1 cable to the WMT-1 (OUTPUT) jack (next to the BOOSTER jack) on the rear of the amplifier.

RVC-2B REMOTE VOLUME CONTROL: Connect the RVC-2B to the Remote Control/ Precedence terminal (TSlOl) on the rear of the amplifier. Connect one lead from the accessory to the appropriate MIC or AUX terminal and the other lead to GND. Complete installation instructions are supplied with the RVC-2B accessory.

MODEL TG-4B MULTIPLE TONE GENERATOR: Model TG4B Multiple Tone Generator is capable of generating four distinct signals: pulsed tone, slow whoop, repeating chime, and steady tone. Each of these four signals may be applied continuously or limited to a double burst (single burst only of the steady tone) for alarm signalling or pre-anouncement. Signals are triggered by an external device that provides a contact closure. Both tone level and pitch are adjustable. May be powered from 15-26 VDC source, or use optional Bogen PRS-40 Power Supply for 120 VAC operation.

MODEL RPK-33A RACK PANEL: The RPK-33A rack panel is designed to mount the CT-B amplifiers in a standard 19" sound rack. Instructions are furnished with the RPK-33A.

CON-2 **MICROPHONE CONNECTOR:** The Bogen CON-2 is a 3-pin male microphone connector, similar to the Cannon XLR-3-12C or the Switchcraft A3M. The CT60B, CT100B and the PMM-2B microphone connectors are designed to accept mic inputs with these terminations.

TP SERIES TUNERS: The Bogen TP Series solid-state tuners provide FM/ AM or FM/ AM/ FM-Stereo reception of superior signal quality with precise tuning indicators. Output jacks permit connection to an amplifier and/ or a tape recorder. Rack mounting kits are also available for these units.

MAINTENANCE

CAUTION

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

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 at the rear panel. 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 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 the output transistor heat sink reaches 105" C (221° F) on all models.

REMOVING PC BOARD FOR SERVICING

To remove the PC board:

1. Remove all knobs and nuts from the front panel controls.
2. Remove four PK screws from the slide control mounting bracket (inside the front panel).
3. Remove two PK screws at either end (toward the front) of the PC board.
4. Disengage the four nylon standoffs that support the rear of the PC board by raising the board gently with one finger while depressing the standoff locking tab with a screwdriver blade or small pliers.
5. Lift the rear portion of the PC board so as to clear the adjacent components and guide it toward the rear of the unit for removal.

REPLACING COMPONENTS

CAUTION

Improper soldering may damage components or the printed circuit ***board, and such damage can void the warranty.***

Many semiconductor components are soldered in place to ensure maximum reliability. When soldering transistors or diodes, use a heat sink (such as a small alligator clip) between the component and the source of heat. Unless you are experienced in the removal of IC micromodules, do not attempt to remove them since excessive heat can damage an IC and/ or the printed circuit board. If you are certain that an IC is defective, the easiest method of removal is to cut the leads off close to the component and unsolder the leads individually. If you are not certain an IC is defective, the use of a low-wattage, vacuum-type desoldering tool (such as Ungar Type 7800) is advised.

REPLACING TRANSISTORS

CAUTION

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

When replacing the driver transistors, press a small screwdriver blade into the side of the U-clip heat sink to spread the jaws of the clip. Draw the clip and screwdriver off the metal tab on the driver transistor. Reverse the procedure to install the clip on the replacement transistor. Since the U-clip heat sink is a spring clip, avoid spreading the jaws too wide.

When replacing the output transistors, clean all foreign matter from the heat sink, insulator, and transistor. Brush a light coating of silicon compound, such as Dow Corning No. 340, to completely cover both surfaces of the insulator (Part No. 16-9278-01). Place the insulator between the heat sink and the replacement transistor. Use the original transistor mounting hardware to mount the replacement transistor.

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/ Lear Siegler, Inc., PO. Box 500, Paramus, New Jersey 07652.

When communicating with us, give the model number and series designation of your unit. 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 shall send you the name and address of the nearest Bogen authorized service agency to which you can send your unit for repairs.

When shipping 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 UPS or any responsible carrier. The unit will be promptly repaired and returned to you collect.

REPLACEMENT PARTS

Most components used in the amplifier are standard parts available through reputable parts suppliers. 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, the model of the unit, and give the series designation, which is a letter followed by numbers, printed 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 products. These are designated by "AB" on the schematic diagram.

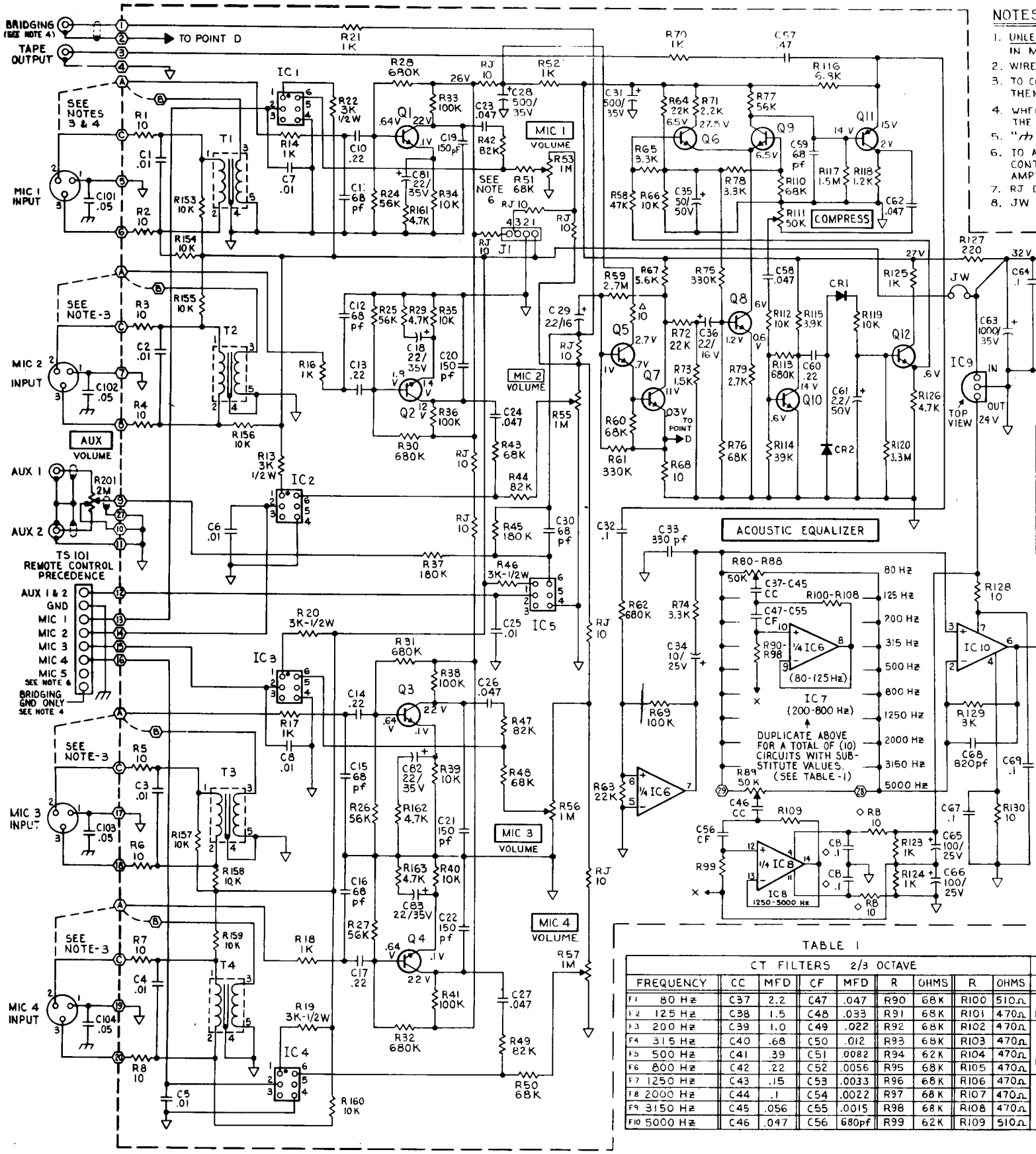

TABLE I

	CT FILTERS 2/3 OCTAVE							
FREQUENCY	CC	MFD	CF	MFD	R	OHMS	R	OHMS
F1 80 Hz	C37	2.2	C47	.047	R90	68K	R100	510Ω
F2 125 Hz	C38	1.5	C48	.033	R91	68K	R101	470Ω
F3 200 Hz	C39	1.0	C49	.022	R92	68K	R102	470Ω
F4 315 Hz	C40	.68	C50	.012	R93	68K	R103	470Ω
F5 500 Hz	C41	.39	C51	.0082	R94	62K	R104	470Ω
F6 800 Hz	C42	.22	C52	.0056	R95	68K	R105	470Ω
F7 1250 Hz	C43	.15	C53	.0033	R96	68K	R106	470Ω
F8 2000 Hz	C44	.1	C54	.0022	R97	68K	R107	470Ω
F9 3150 Hz	C45	.056	C55	.0015	R98	68K	R108	470Ω
F10 5000 Hz	C46	.047	C56	680pf	R99	62K	R109	510Ω

Figure 5 — Schematic diagram, Models CT60B & CT

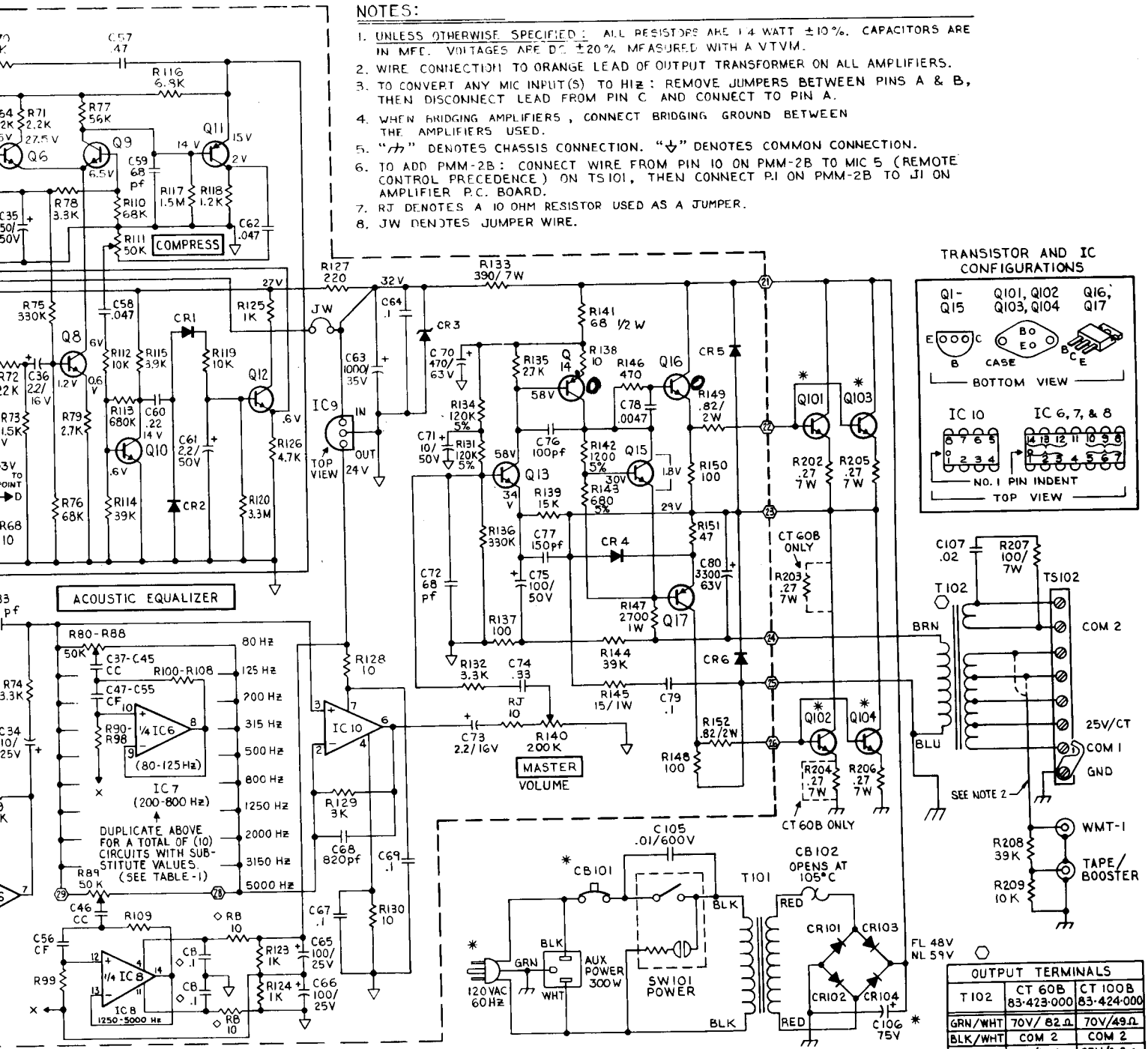

TABLE 1

CT FILTERS 2/3 OCTAVE											
QUENCY	CC	MFD	CF	MFD	R	OHMS	R	OHMS	RB	CB	IC
80 Hz	C37	2.2	C47	.047	R90	68K	R100	510Ω	10Ω	.1	IC 6
25 Hz	C38	1.5	C48	.033	R91	68K	R101	470Ω			
00 Hz	C39	1.0	C49	.022	R92	68K	R102	470Ω			
15 Hz	C40	.68	C50	.012	R93	68K	R103	470Ω			
00 Hz	C41	.39	C51	.0082	R94	62K	R104	470Ω	10Ω	.1	IC 7
00 Hz	C42	.22	C52	.0056	R95	68K	R105	470Ω			
50 Hz	C43	.15	C53	.0033	R96	68K	R106	470Ω			
00 Hz	C44	.1	C54	.0022	R97	68K	R107	470Ω			
50 Hz	C45	.056	C55	.0015	R98	68K	R108	470Ω	10Ω	.1	IC 8
00 Hz	C46	.047	C56	680pf	R99	62K	R109	510Ω			

MODEL	POWER LINE CURRENT	CB101 HOLD CURRENT	T101	OUTPUT TRANSISTORS	C106
CT 60 B	1.6 A	1.6 A	83-809-000	Q101, Q102	2000
CT 100 B	2.5A	2.5 A	83-814-010	Q101-Q104	3000

OUTPUT TERMINALS		
T102	CT 60B 83-423-000	CT 100B 83-424-000
GRN/WHT	70V/ 82Ω	70V/49Ω
BLK/WHT	COM 2	COM 2
ORN	25V/10.4Ω	25V/6-8Ω
GRN	16Ω	16Ω
YEL	8Ω	—
BLK/ORN	25VCT/2.6Ω	25VCT/1.56Ω
BLK	COM 1	COM 1
BLK/YEL	—	4Ω

E74-2804-01

Figure 5 — Schematic diagram, Models CT60B & CT100B

Ref. No.	Part No.	Description
		P. C. ***Board***
	45-7176-05	***P. C.*** Board Assembly
C18,81-83	79-008-046	Cap., Elect., 22µF 35V
C28,3 I	79-008-049	Cap., Elect., 5OOµF 35V
C34,7 I	79-008-058	Cap., Elect., lOµF, 50V
c35	79-008-057	Cap., Elect., 50µF 5OV
C29,36,73	79-008-033	Cap., Elect., 2.2µF 16V
C56	781104-l 50	Cap., Dura Mica, 680pF
C61	79-120-005	Cap., Elect., Low Leakage, 2.2µF 50V
C63	79-008-044	Cap., Elect., 1OOOµF 35V
C65,66,75	79-008-062	Cap., Elect., lOOµF, 50V
C68	78404-l 52	Cap., Dura Mica, 820pF
C70	79-119-001	Cap., Elect., 470µF 63V
C80	79-119-015	Cap., Elect., 33OOµF 63V
CR1,2,4-6	96-5333-01	Diode, 400 prv @ 1 A
CR3	96-5344-08	Zener Diode, 30V, 2W
ICI-5	96-5436-O 1	I. C., HllF3
IC6-8	96-5488-O 1	I. C., LM348N
IC9	96-5437-O 1	I. C., MC78L24CP
IC10	96-5489-0 1	1. C., LF356N
Ql-l0, 12, 15		Transistor, 2N5089
Q11	96-5213-01 96-5 176-O 1	Transistor, MPS6518
Q13	96-5298-01	Transistor, SPSl910
Ql4	96-5283-01	Transistor, MPS-A55
Q16	96-5357-01	Transistor, 2SD389P/2SD313D/ TIP3lA
Q17	96-5356-0 1	Transistor, 2SB512P/2SB507D/ TIP32A
R53,55-57	77-001-808	Control, 1 megohm
Rlll	77-007-003	Trimpot, 50kilohms
R140	77-001-812	Control, 200 kilohms
Rl49,152	76-107-096	Resistor, .82 ohms, 2W
T1-4	83-058-000	Mic Input Transformer
—	85-1287-01	4-Point Header
	70-93 13-0 1	Heat Sink Clip
		Chassis
ClOl-104	96-5241-01	Diode, 300 prv @ 3A
Cl06	79-509-052	Cap., Elect., 2OOOµF 75V (CT60B)
	79-509-053	Cap., Elect., 3000µF 75V (CTlOOB)
CBlOl	94-0023-05	Circuit Breaker, 1.6A (CT60B)
	94-0023-08	Circuit Breaker, 2.5A (CT100B)
CB102	94-0014-07	Thermal Breaker, 105° C
4101,102	96-5385-01	Transistor, 2N3055H RCA, or
	96-5397-01	Transistor, 2N3055 Solitron (CT60B)
QlOl-104	96-5385-01	Transistor, 2N3055H RCA, or
	96-5397-01	Transistor, 2N3055 Solitron (CTlOOB)
R201	77-001-825	Control, 2 megohm
R202,203	76-116-003	Resistor, .27 ohms, 7W (CT60B)
R202, 204-206	76-l 16-003	Resistor, .27 ohms, 7W (CTlOOB)
R207	75-742-101	Resistor, 100 ohms, 7W
R80-89	77-001-826	Slide Control, 50 kilohms
SW101	8 l-009-035	Lighted Rocker Switch, lOA, SPST
TlOl	83-809-000	Power Transformer (CT60B)
	83-814-010	Power Transformer (CTlOOB)
T102	83-423-000	Output Transformer (CT60B)
	83424-000	Output Transformer (CTlOOB)
	14-9088-01	Foot
	03-0670-0 1	Knob (O-10)
	03-0671-0l	Knob (5-O-5)
	03-0628-03	Slide Control Knob (Black)