



BOGEN®

A DIVISION OF LEAR SIEGLER, INC.

PUBLIC ADDRESS AMPLIFIERS

Models CHS-35B, CHS-60B & CHS-100B

DESCRIPTION

The Bogen Models CHS-35B, CHS-60B, and CHS-100B solid-state public address amplifiers are rated 35 watts, 60 watts, and 100 watts, respectively.

Two input channels are provided for low-impedance balanced microphone inputs. Both channels may be converted for use with high-impedance microphones by means of rearranging jumpers on the printed circuit board (see schematic diagram, note 4). A phantom supply is provided for the use of condenser microphones. One of these channels is equipped with built-in microphone precedence, actuated by an external switch, and remote volume control (with optional RVC-2B).

An optional accessory, PMM-2B, designed to mount on the front panel of the amplifier, provides two additional microphone input channels. These added channels have all the capabilities of the basic channels, such as low-impedance microphones, precedence and/or an additional remote volume controlled channel—with an RVC-2B unit—and the same accessories are applicable to them.

Two auxiliary input channels, with separate controls, are provided on the amplifier for a tuner, tape/cassette player, a turntable with a ceramic cartridge, or a Multiple Tone Generator, Model TG-4B. These channels and one microphone channel can be muted for special announcements over another microphone channel.

IN and OUT receptacles are provided for easy connection of a reverb unit or an acoustic equalizer to the amplifier.

Provision is made for using an accessory transformer to feed a signal from a 500/600-ohm telephone line into the amplifier or to connect the output of the amplifier to a 500/600-ohm telephone line.

The output of the amplifier can also be connected from the Booster jack to a booster amplifier or from the Tape Out jack to a tape/cassette recorder. The tape output jack is independent of the amplifier master volume and tone controls.

INSTALLATION

The amplifier was carefully checked before leaving the factory. Inspect shipping container and unit carefully for indication of improper handling. If the unit has been damaged, make an immediate claim to 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 amplifier is furnished with an ac line cord terminated in a three-prong plug. The line cord should be plugged 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.

It is important to ground the amplifier. Therefore, if a three-wire outlet is not available, an adapter such as Leviton No. 5017 should be used to convert a standard two-wire outlet for use with three-wire plugs. The adapter is provided with a grounding pigtail which should be connected to the screw holding the wall plate to the receptacle.

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

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 amplifier 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 two MIC input receptacles of the amplifier. The microphone lead should be a two-conductor shielded cable terminated in a Cannon XLR-312-C or Bogen CON-2 connector, as shown in Figure 1.

HIGH-IMPEDANCE MICROPHONES: The microphone lead should be a single-conductor shielded cable under 35 feet in length and terminated in a Cannon XLR-312-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 at MIC 1, over the MIC 2 and AUX channels. An SPST normally-open switch is required for this function. When the contacts are closed, the MIC 2 and AUX channels are muted.

TECHNICAL SPECIFICATIONS

	CHS-100B	CHS-60B	CHS-35B
POWER OUTPUT (RMS @ 1000Hz)	100 watts	60 watts	35 watts
FREQUENCY RESPONSE	±2dB 70 Hz to 12 kHz		
SENSITIVITY (for full output)	Aux 0.15V; Hi-Z Mic 3mV; Lo-Z unbalanced 0.3 mV; Lo-Z balanced 0.3 mV		
HUM & NOISE (below rated output)	Mic-60dB; Aux-70dB		
INPUTS (Impedance)	2 Lo-Z balanced Mic inputs (200 ohms), each convertible to Hi-Z or condenser mics 2 Aux. (500k), Reverb (20k)		
OUTPUTS (Impedance)	4, 16 ohms, 25 V. center tapped (6.25 ohms) and 70 V. (49 ohms) bal. lines.	8, 16 ohms, 25 V. center tapped (10.4 ohms) and 70 V. (82 ohms) bal. lines.	8, 16 ohms, 25 V. center tapped (18 ohms) and 70 V. (140 ohms) bal. lines.
	Tape (650 mV at 1k ohms); Booster (5V at 10k ohms); WMT-1 output 500/600 ohms Reverb (650 mV at 1k ohms).		
CONTROLS	Mic. 1, 2, Volume; Aux. 1, 2, Volume; Master Volume, Bass, Treble, Power Switch (lighted)		
tone CONTROL ACTION	Bass 50 Hz + 9 dB to -12 dB; Treble 12 kHz + 9 dB to -12 dB		
SEMICONDUCTORS	13 silicon transistors 1 zener diode 7 silicon diodes 2 integrated circuits	11 silicon transistors 1 zener diode 7 silicon diodes 2 integrated circuits	11 silicon transistors 1 zener diode 7 silicon diodes 2 integrated circuits
POWER CONSUMPTION	120 V, 60 Hz, 2.5 A, 300 W.	120 V, 60 Hz, 1.6 A, 120 W.	120 V, 60 Hz, 0.86 A, 96 W.
LINE FUSING	2.5A Hold	Resettable Circuit Breaker 1.65A Hold	.93A Hold
DIMENSIONS	16½" W x 12" D x 3¾" H (41.9 x 30.5 x 9.5 cm)		
SHIPPING WEIGHT	19½ lbs. (8.85 kg.)	16 lbs. (7.26 kg.)	14 lbs. (6.35 kg.)

AUX 1 & AUX 2 INPUTS: Two auxiliary inputs with separate controls 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 WMT-1 telephone line-matching transformer. An input signal of 0.15 volts is required to obtain full output from the amplifier.

Use single-conductor shielded cable terminated in an RCA phono plug for connecting 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.

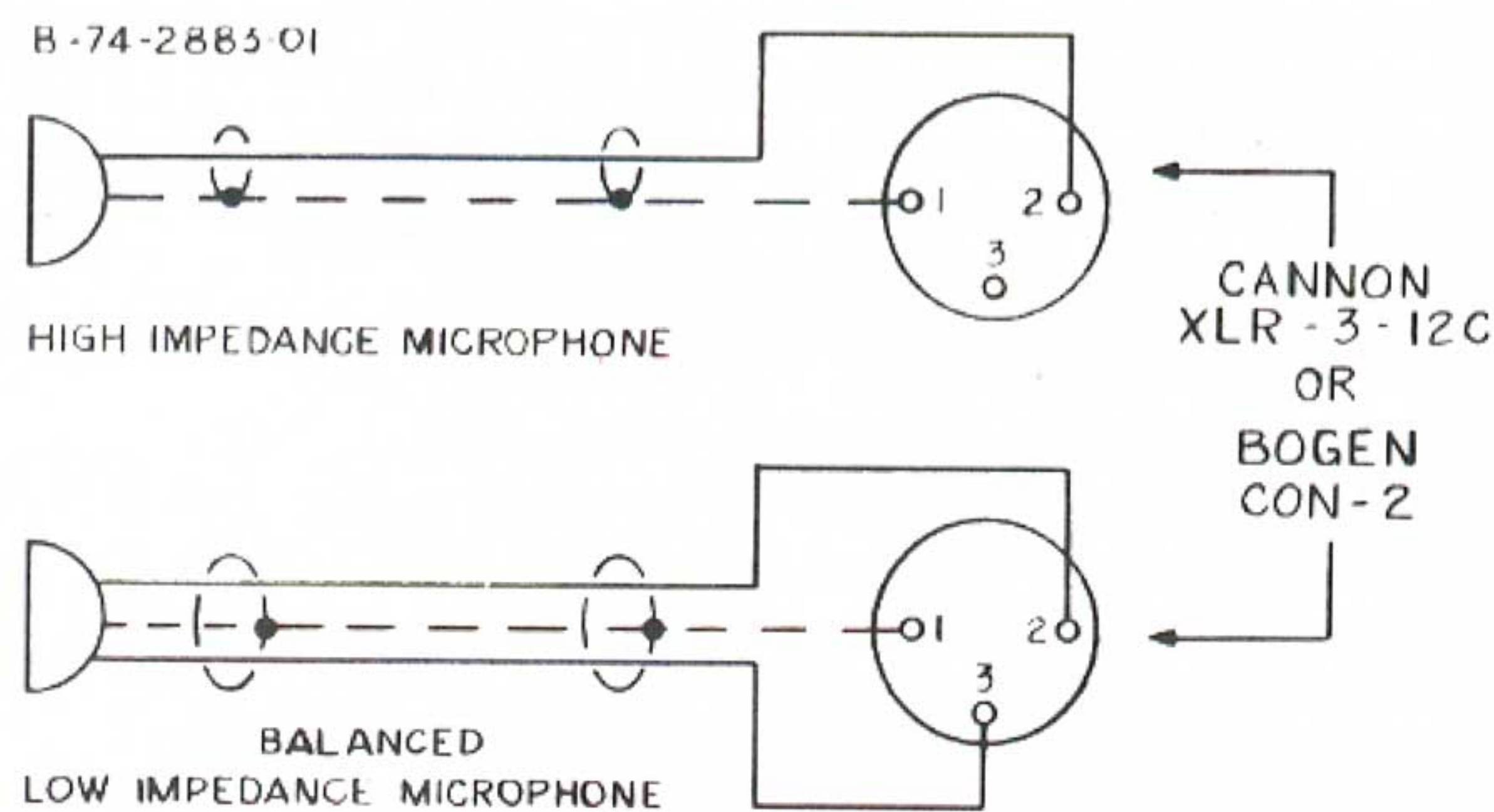


Figure 1 — Microphone Cable Connections

OUTPUT CONNECTIONS

SPEAKERS: The amplifier may be used with most conventional speaker systems. For detailed information on the installation of multiple speaker systems, refer to the Speaker Installation Bulletin (No. 54-5001) 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 amplifier. Connect one speaker lead to the COM terminal and the other to the terminal corresponding to the impedance of the speaker system. For balanced output lines, remove the link between COM and GND output terminals. If the line is shielded, connect the shield to GND. For unbalanced speaker lines, close the link between COM and GND output terminals. Class 2 wiring may be used.

TAPE OUTPUT: A tape recorder may be driven from the TAPE OUT jack on the amplifier. In this case, the output is not subject to the volume or tone setting of the amplifier and is controlled at the tape recorder. A patch cord terminated in a standard phono plug is connected between the TAPE OUT 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 panel of the amplifier to the input of the booster amplifier. The output at this jack is controlled by the amplifier's volume.

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 qualified 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 pre-amplifier 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. The unit is installed and connected as described in the instruction manual furnished with the PMM-2B accessory. See note 6 on the schematic diagram.

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 in the mounting holes provided on the chassis (see Figure 3). 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 in the mounting holes provided in the chassis (see Figure 3). 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.

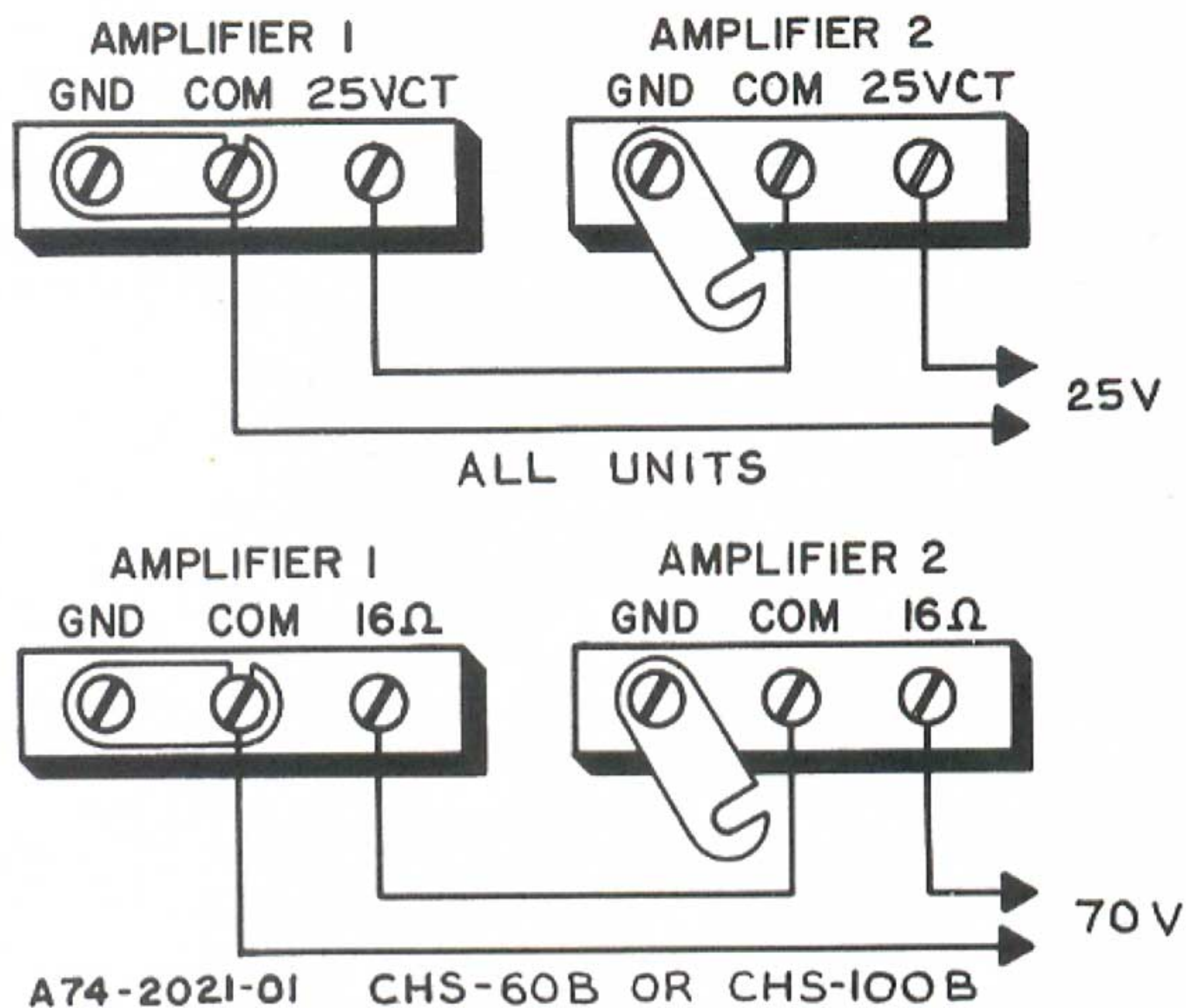


Figure 2 — Connecting Amplifiers in Series

REVERB/ACOUSTIC EQUALIZER: Provision is made to insert a reverb unit or an acoustic equalizer unit into the amplifier signal path, using the EQUALIZER TO and FROM jacks at the rear of the amplifier. Remove the link connecting these two jacks. Connect patch cords terminated with standard phono plugs between (1) the CHS-B EQUALIZER TO jack and the reverb or equalizer INPUT and (2) the CHS-B EQUALIZER FROM jack and the reverb/equalizer OUTPUT. All input signals to the amplifier will be affected by the reverb or acoustic equalizer operation.

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. See Figure 2 for connection diagram. Be certain to remove the link between COM and GND of amplifier No. 2.

It is preferable that tone and master volume controls of both amplifiers be at the same setting to assure that each amplifier will share the load equally.

OPERATION

POWER: The front panel switch applies power to the amplifier and is lighted when the amplifier is on. It does not control the accessory receptacle on the rear panel.

VOLUME: Individual volume controls are used to adjust the two MIC input channels, the two AUX input channels and for Master volume control. Turn each control clockwise (to the higher numbers) to increase volume. In adjusting these controls, it is recommended that each MIC and AUX control be set to the highest level likely to be used, and regulate overall volume with the Master control.

BASS AND TREBLE: Individual knobs control these functions. Use the BASS control to adjust the tonal balance of the amplifier output. Rotation in the counterclockwise direction reduces the bass response. It may also be used to remove low-frequency noise such as phono rumble or hum. In situations where acoustic feedback is likely, rotate the Bass control counterclockwise to reduce the feedback and to obtain higher volume levels than would otherwise be possible.

Rotation of the Treble control counterclockwise reduces the high frequency response of the amplifier. It may also be used to remove high-frequency noise, such as record scratch.

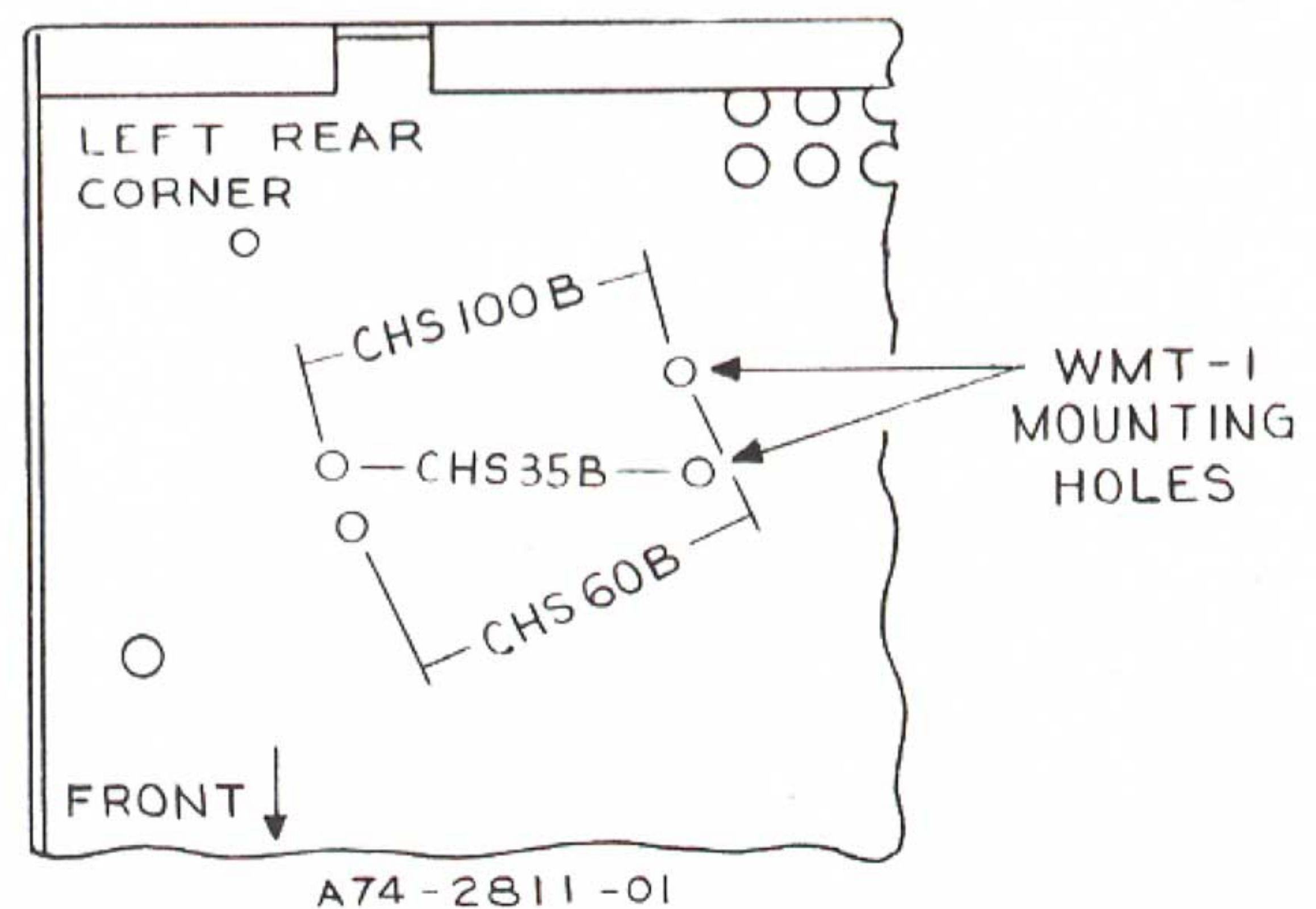
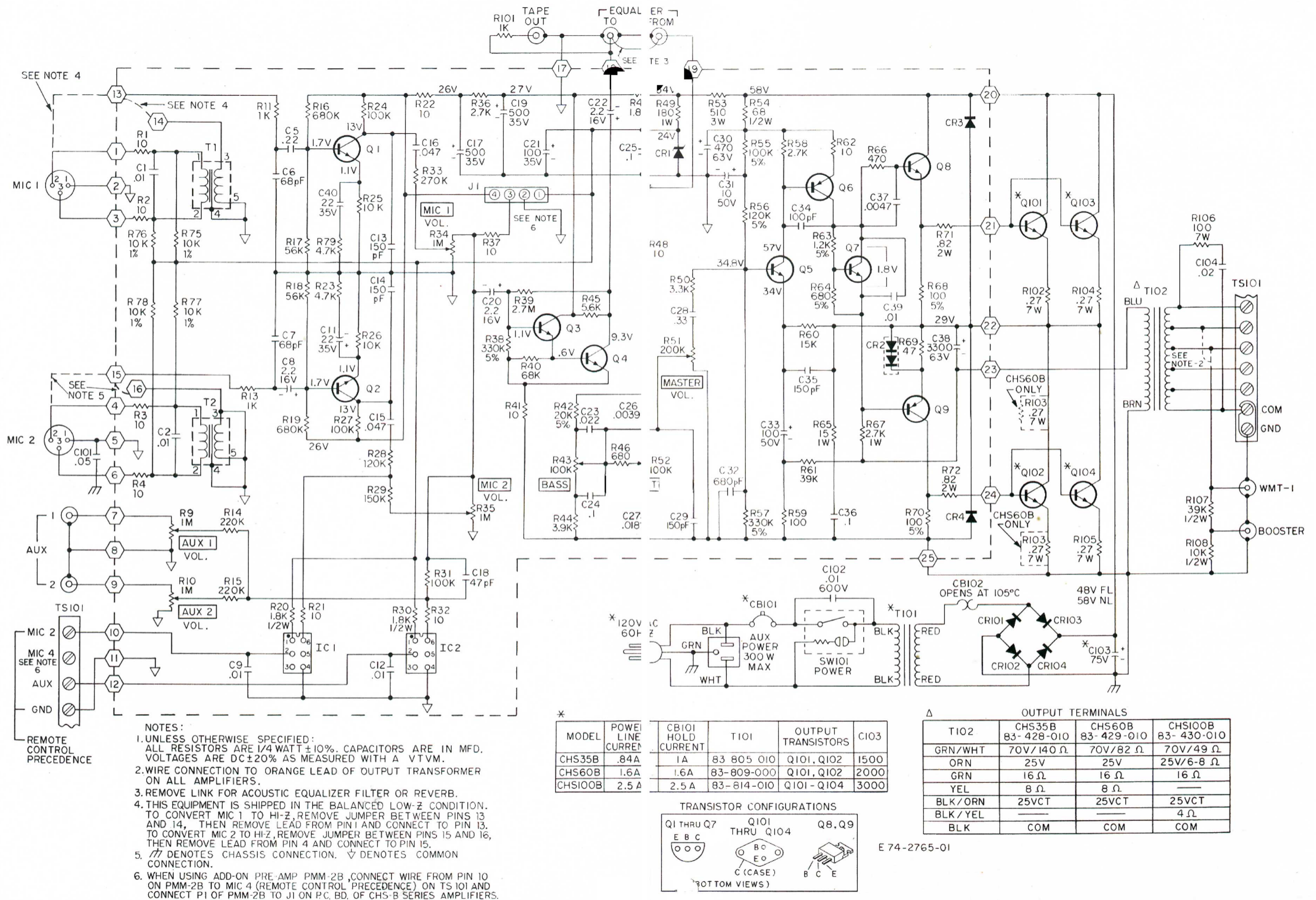


Figure 3 — Mounting Holes for WMT-1



- NOTES:**
- UNLESS OTHERWISE SPECIFIED: ALL RESISTORS ARE 1/4 WATT ±10%. CAPACITORS ARE IN MFD. VOLTAGES ARE DC ±20% AS MEASURED WITH A VTVM.
 - WIRE CONNECTION TO ORANGE LEAD OF OUTPUT TRANSFORMER ON ALL AMPLIFIERS.
 - REMOVE LINK FOR ACOUSTIC EQUALIZER FILTER OR REVERB.
 - THIS EQUIPMENT IS SHIPPED IN THE BALANCED LOW-Z CONDITION. TO CONVERT MIC 1 TO HI-Z, REMOVE JUMPER BETWEEN PINS 13 AND 14, THEN REMOVE LEAD FROM PIN 1 AND CONNECT TO PIN 13. TO CONVERT MIC 2 TO HI-Z, REMOVE JUMPER BETWEEN PINS 15 AND 16, THEN REMOVE LEAD FROM PIN 4 AND CONNECT TO PIN 15.
 - /// DENOTES CHASSIS CONNECTION. ∇ DENOTES COMMON CONNECTION.
 - WHEN USING ADD-ON PRE-AMP PMM-2B, CONNECT WIRE FROM PIN 10 ON PMM-2B TO MIC 4 (REMOTE CONTROL PRECEDENCE) ON TS101 AND CONNECT P1 OF PMM-2B TO J1 ON P.C. BD. OF CHS-B SERIES AMPLIFIERS.

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MODEL	POWER LINE CURRENT	CB101 HOLD CURRENT	T101	OUTPUT TRANSISTORS	C103
CHS35B	.84A	1A	83-805-010	Q101, Q102	1500
CHS60B	1.6A	1.6A	83-809-000	Q101, Q102	2000
CHS100B	2.5A	2.5A	83-814-010	Q101-Q104	3000

Δ **OUTPUT TERMINALS**

T102	CHS35B 83-428-010	CHS60B 83-429-010	CHS100B 83-430-010
GRN/WHT	70V/140 Ω	70V/82 Ω	70V/49 Ω
ORN	25V	25V	25V/6-8 Ω
GRN	16 Ω	16 Ω	16 Ω
YEL	8 Ω	8 Ω	—
BLK/ORN	25VCT	25VCT	25VCT
BLK/YEL	—	—	4 Ω
BLK	COM	COM	COM

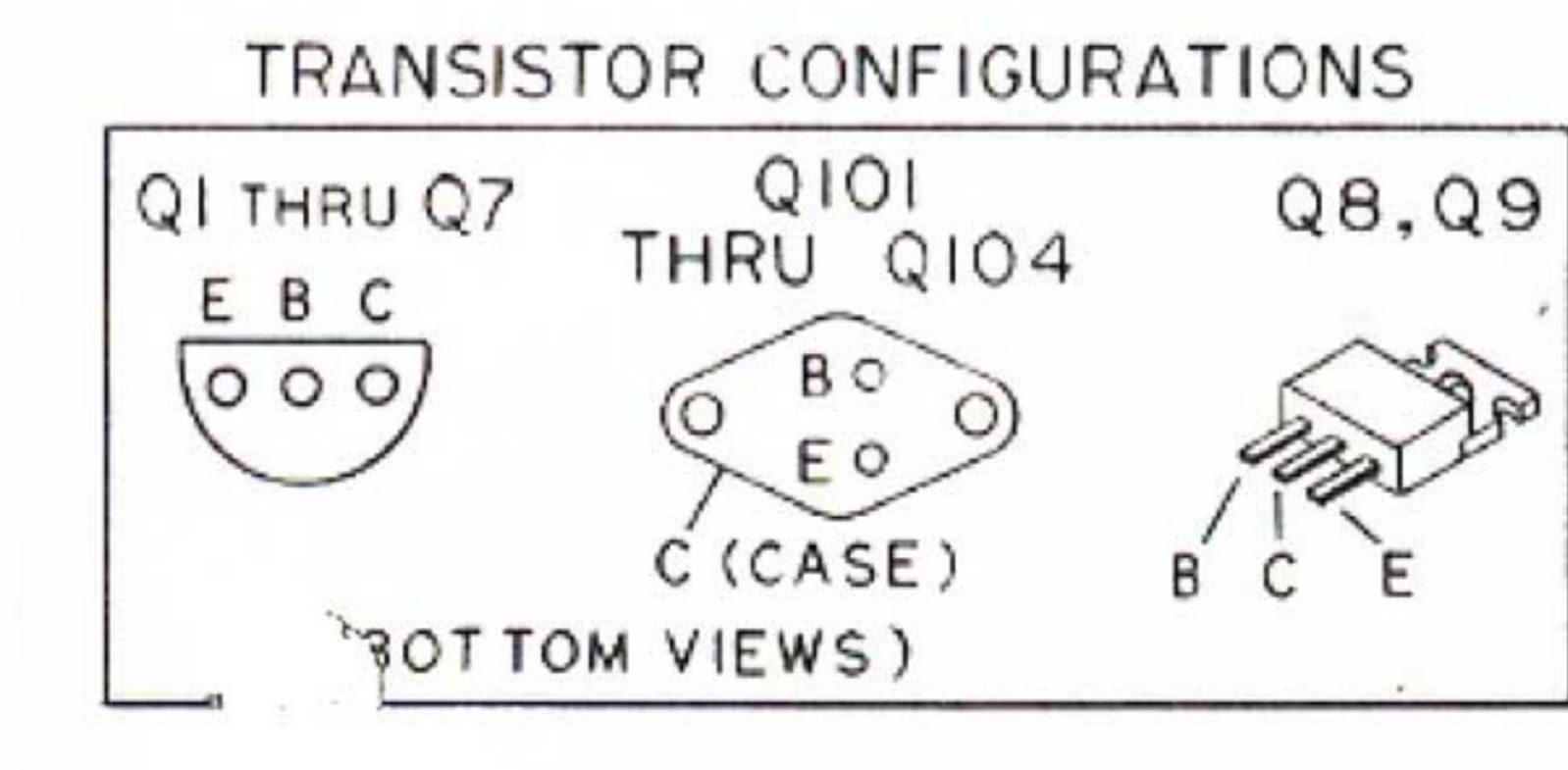


Figure 4 — Schematic Diagram, Models CHS-35B, CHS-60B, & CHS-100B

RVC-2B REMOTE VOLUME CONTROL: Connect the RVC-2B to the Remote Control/ Precedence terminal (TS101) on the rear of the amplifier. Connect one lead from the accessory to the appropriate MIC 2 or AUX terminal and the other lead to GND. Complete installation instructions are supplied with the RVC-2B accessory.

CFC-1 ACOUSTIC FEEDBACK CONTROLLER: The Bogen Model CFC-1 is a 2/3 Octave Equalizer incorporating ten active 2/3-octave band filters. The CFC-1 can be used with CHS-B amplifiers by removing the Reverb/ Equal Link from the rear of the amplifier and connecting the CFC-1 AUX input and output to those jacks.

MODEL TG-4B MULTIPLE TONE GENERATOR: Model TG-4B 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-announcement. Signals are triggered by an external device that provides a contact closure. Both tone level and pitch are adjustable.

MODEL LPC-4A PHONO PLAYER: The Model LPC-4A is a three-speed AC-operated phono player.

RPK-44 RACK MOUNTING KIT: The RPK-44 rack-mounting brackets are designed to mount the amplifier (with or without the PMM-2B pre-amplifier) in a standard 19-inch sound rack. The brackets are finished in gray metalustre.

To install, refer to Figure 5. Remove the eight screws (four from each side) securing the sides of the amplifier cover. Do not remove the cover. Align three of the holes in each mounting bracket with the corresponding holes in the cover. Secure the brackets to the cover with the six $\frac{3}{8}$ " screws provided in the kit. Each bracket has two elongated holes on 3" centers for fastening to a standard 19" equipment rack.

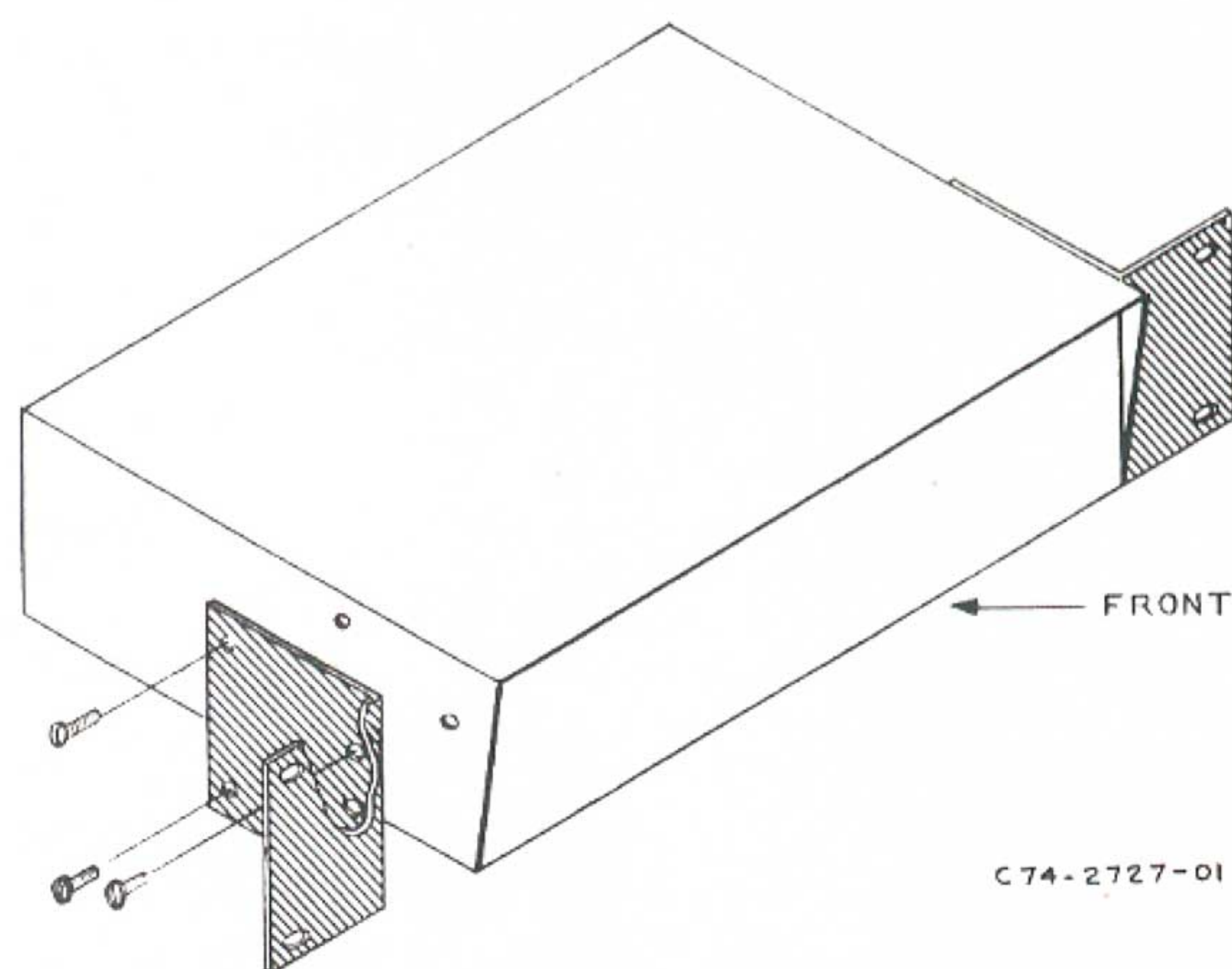


Figure 5 — Installing Rack-Mounting Brackets

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

Remove the front panel knobs and nuts over the bushings of the front panel controls.

Three nylon standoffs are used to support the rear of the PC board. Progressively disengage the three standoffs at the rear by raising the edge of the board with one finger, while depressing the locking tab on the standoff with a screwdriver blade.

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

All 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 on 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.

The preceding procedure may require some dismantling of the heat sink. It is therefore important to also clean the contact surface of the thermal breaker and to apply the silicon compound to the thermal breaker before reassembling the heat sink. Make certain the thermal breaker makes firm contact with 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 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. *Remove any plug-in transformer from the p.c. board before shipping.* 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 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, 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.

Ref. No.	Part No.	Description
<i>PC Board</i>		
—	45-7186-05	P.C. Board Assembly
C8, 22, 29	79-008-033	Cap., Elect., 2.2 μ F, 16V
C10, 11, 40	79-008-046	Cap., Elect., 22 μ F, 35V
C17, 19	79-008-049	Cap., Elect., 500 μ F, 35V
C21, 33	79-008-062	Cap., Elect., 100 μ F, 50V
C30	79-119-001	Cap., Elect., 470 μ F, 63V
C31	79-008-058	Cap., Elect., 10 μ F, 50V
C38	79-119-015	Cap., Elect., 3300 μ F, 63V
CR1	96-5344-07	Diode, Zener, 24V, 2W
CR2A,		
2B, 3, 4	96-5333-01	Diode, 400 prv @ 1A
IC1, 2	96-5436-01	IC, H11F3
Q1-4, 7	96-5213-01	Transistor, 2N5089/KSC945L
Q5	96-5298-01	Transistor, SPS1910/KSC945L
Q6	96-5283-01	Transistor, MPS-A55/KSA539Y
Q8	96-5357-01	Transistor, 2SD389(P)/ 2SD313D/TIP31A/KSD288Y
Q9	96-5356-01	Transistor, 2SB512(P)/ 2SB507D/TIP32A/KSA614Y
R9, 10, 34,		
35	77-001-808	Control, 1 megohm
R43, 52	77-001-810	Control, 100k Ω
R51	77-001-812	Control, 200k Ω
R71, 72	76-107-096	Resistor, .82 Ω , 2W
T1, 2	83-058-000	Transformer, Mic
<i>Chassis Electrical Components</i>		
C103	79-509-051	Cap., Elect., 1500 μ F, 75V (CHS35B)
	79-509-052	Cap., Elect., 2000 μ F, 75V (CHS60B)
	79-509-053	Cap., Elect., 3000 μ F, 75V (CHS100B)
CB101	94-0023-03	Circuit Breaker, 1A (CHS35B)
	94-0023-05	Circuit Breaker, 1.6A (CHS60B)
	94-0023-08	Circuit Breaker, 2.5A (CHS100B)
CB102	94-0014-07	Thermal Breaker
CR101-104	96-5241-01	Diode, 300prv @ 3A
Q101, 102	96-5385-01	Transistor, 2N3055H RCA
Q103, 104	96-5385-01	Transistor, 2N3055H RCA (CHS100B)
R102, 103	76-116-003	Resistor, .27 Ω , 7W
R104, 105	76-116-003	Resistor, .27 Ω , 7W (CHS100B)
R106	75-742-101	Resistor, 100 Ω , 7W
SW101	81-009-035	Rocker Switch, Lighted, 10A SPST
T101	83-805-010	Transformer, Power (CHS35B)
	83-809-000	Transformer, Power (CHS60B)
	83-814-010	Transformer, Power (CHS100B)
T102	83-428-010	Transformer, Output (CHS35B)
	83-429-010	Transformer, Output (CHS60B)
	83-430-010	Transformer, Output (CHS100B)
<i>Mechanical Components</i>		
—	03-0670-01	Knob (0-10)
—	03-0671-01	Knob (5-0-5)
—	14-9088-01	Foot
—	70-9313-01	Heat Sink Clip (2)