



SHURE

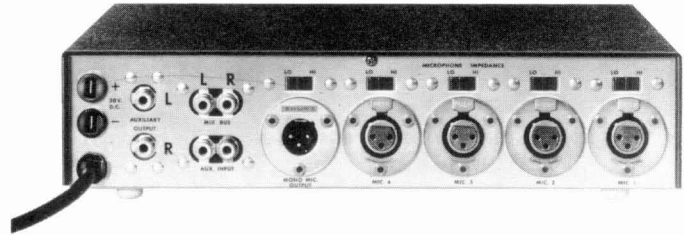
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MICROPHONES AND ELECTRONIC COMPONENTS

AREA CODE 312/328-9000 • CABLE: SHUREMICRO

DATA SHEET

MODEL M688 AND M688E STEREO MICROPHONE MIXERS



GENERAL:

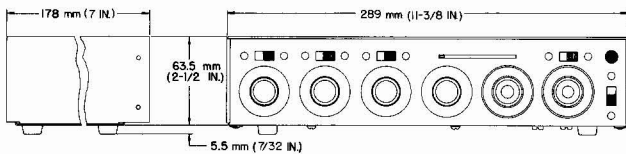
The Shure Model M688 is a completely transistorized, portable Stereo Microphone Mixer for use with sound reinforcement systems and tape recorders.

The Model M688E Stereo Microphone Mixer is similar to Model M688 except that it is designed to be connected to a 120 ±10% or 240 ±10% volt ac power line, as selected by a switch under the chassis.

Features include:

- Stereo High Impedance Auxiliary Outputs.
- Mono Microphone Level Output for mixed (L + R) monaural output.
- Four Microphone Inputs, low impedance (balanced) or high impedance (unbalanced).
- Stereo, High Level Auxiliary Inputs suitable for tape recorder, tuner, or the output of a stereo magnetic Phono Preamp such as the Shure Model M64.
- Individual Volume Controls for each input.
- A Stereo Master volume control to simultaneously adjust level of all inputs.
- A Mono-Stereo switch.
- Left-Right switches for Mics. 1, 2 and 3.
- A Pan Control used for adjusting the apparent location of the Mic. 4 input to either left channel or right channel position or anywhere between.
- Mix Bus jacks for paralleling two or more M688 units.
- Dc Power jacks to supply 27 Vdc for use with accessories or to allow powering the M688 from an external source, such as a Shure Model A67B Battery Power Supply.
- Underwriters' Laboratories, Inc., listed, and listed by C.S.A. as certified (M688 only).

Dimensions: See Figure A



OVERALL DIMENSIONS — FIGURE A

Net Weight:

2.27 kg (5 lb)

SPECIFICATIONS

Gain: At 1000 Hz (Stereo Position)

INPUT	OUTPUT			
	Mix Bus	Low Imp. Mic.	High Imp. Mic.	Aux. (High Imp.)
Low Imp. Mic.	+13.5 dB	+1.5 dB	+25.5 dB	+59.0 dB
High Imp. Mic.	-9.5 dB	-21.5 dB	+2.5 dB	+36.0 dB
Mix Bus	—	-23.0 dB	+1.0 dB	+34.5 dB
Aux.	-31.0 dB	-43.0 dB	-19.0 dB	+14.5 dB

Frequency Response:

Flat ±3 dB from 40 Hz to 20,000 Hz

Maximum Output Hum and Noise:

	300-20,000 Hz	20-20,000 Hz
(Aux. Output, All Controls Min.)	-80 dBV	-68 dBV
(Aux. Output, All Controls Max.)	-60 dBV	-50 dBV

Input Impedance:

Microphone inputs suitable for high- or low-impedance dynamic, ribbon, or capacitor (condenser) microphones. Auxiliary input - 50,000 ohms. Mix Bus - 3,300 ohms.

Recommended Load Impedance:

Low Impedance	
Microphone Output	25 to 600 ohms
High Impedance	
Microphone Output	20,000 ohms or greater
Auxiliary High Impedance Output	50,000 ohms or greater
Mix Bus	2,700 ohms or greater

Distortion:

Less than 1% Total Harmonic Distortion when Low Impedance Microphone Output is at 5 mV level, High Impedance Microphone Output is at 70 mV level, and Aux. Output is at 2.0 volt level.

Input Clipping Level:

	Minimum Clipping Level
Low Impedance Microphone Input	25 mV
High Impedance Microphone Input	350 mV
Mix Bus	650 mV

Output Clipping Level:

Output		Minimum Clipping Level
Low Imp. Mic.	Stereo	7 mV
	Mono	14 mV
High Imp. Mic.	Stereo	110 mV
	Mono	220 mV
Aux.	Stereo	6.6V
	Mono	5.7V

Phase:

The Mono Mic. Output is in phase with all microphone inputs. The Mix Bus is out of phase with pin 3 of the microphone inputs. The Auxiliary Output is out of phase with pin 3 of the microphone inputs. The Auxiliary Output is in phase with the Aux. Input and the Mix Bus.

Operating Voltage:

MODEL M688

Ac Operation: 120 volts, ±10% at 50 to 60 Hz
Dc Operation: 30 volts, 7.5 mA

MODEL M688E

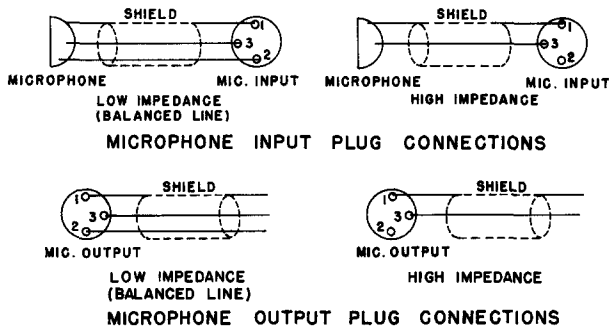
Ac Operation: 120 or 240 volts, ±10% at 50 to 60 Hz
Dc Operation: 30 volts, 7.5 mA

The Model M688E is supplied with a three-conductor power-line cord, but no plug. The power-line cord plug should be installed by a qualified person. The brown lead should be connected to the "live" or "hot" terminal of the plug, and the blue lead to the neutral terminal of the plug. The green/yellow lead is the grounding conductor and should be connected to the ground or earth terminal of the plug.

INSTALLATION:

CONNECTION BETWEEN COMPONENTS

For balanced-line connection use two-conductor, shielded, low-capacity cable. For unbalanced (high-impedance) connection, use single conductor, shielded, low-capacity cable.



MICROPHONE CONNECTIONS — FIGURE B

INPUT CONNECTIONS

Microphones: A maximum of four low or high-impedance dynamic, ribbon, or capacitor (condenser) microphones may be connected to receptacles marked Mic. 1, Mic. 2, Mic. 3 and Mic. 4. The inputs are designed for low-impedance microphones with 25 to 600 ohms impedance or high-impedance microphones, as selected by a slide switch above the input receptacle. The unit is not recommended for use with crystal or ceramic microphones. The input receptacles, Mic. 1, Mic. 2, Mic. 3 and Mic. 4 are female professional three-pin audio connectors* (mate, Shure Part 95A407). See Figure B for low-and high-impedance connections to receptacle.

(NOTE: Some capacitor (condenser) microphones produce very high output signals which may overload the input of a mixer. A Shure Model A15A Microphone Attenuator placed between the microphone and the mixer input will eliminate this problem.)

Aux. Input: The left channel (L) and right channel (R) phono jacks marked Aux. Input on the rear panel will accept the output from a high-impedance, high-level source such as a tape recorder, AM-FM tuner, or output from a phono cartridge preamplifier, such as the Shure Model M64 or A68P (2 Model A68P's required for Stereo). One or more Shure M68 Series Microphone Mixers may be connected to these jacks to add additional microphone inputs.

Mix Bus: The left channel (L) and right channel (R) phono jacks marked Mix Bus on the rear panel are used when paralleling M688 units to increase the number of input channels. Use a phono pin plug jumper cable between each L Mix Bus jack, and another between each R Mix Bus jack.

OUTPUT CONNECTIONS

Auxiliary Output: The left channel (L) and right channel (R) phono jacks marked Auxiliary Output are high-impedance high-level outputs designed primarily to feed power amplifiers requiring 0.1 to 2 volts, or the auxiliary or tuner inputs of an amplifier or tape recorder.

Mono Mic. Output: The receptacle marked Mono Mic. Output has a low- or high-impedance output selected

by the switch above the receptacle. This output is the "Mixed" (L + R) monaural output of all the input sources and is designed to work into a 25 to 600 ohm mic. input, or into a high-impedance amplifier or tape recorder microphone input. The receptacle is a male professional three-pin audio connector.* See Figure B for output receptacle connections.

30 V.D.C.: These rear panel jacks provide 27 Vdc open circuit (21 Vdc at 5 mA max.) for accessories. An external battery pack, such as the Shure Model A67B or A68B, or an external 26 to 30 Vdc source may also be used to power the M688 via these jacks.

OPERATION

Power: Connect the three conductor power line cord to a 120 volt, 50/60 Hertz ac power outlet. The power ON-OFF switch is on the front panel. A neon pilot lamp indicates that the ac power is on. (This lamp does not light when the unit is battery operated). If battery operation is desired, do not connect line cord. The ON-OFF switch also controls battery input power.

Volume Controls: The Master volume control and the individual volume controls for each of the five channels are identified on the front panel. Both the Aux. volume control and the Master volume control are clutched dual concentric controls. The left channel (L) control is the large outer knob. The right channel (R) control is the smaller inner knob. The relative setting of the left and right controls may be changed by restraining one knob and moving the other. Above the Master volume control is a Mono-Stereo switch used for selecting either monaural or stereo output at the Auxiliary Output L and R jacks on rear of chassis. Individual channel volume controls not being used should be kept at minimum setting (fully counterclockwise).

Mic. 4 Pan Control: The Mic. 4 Pan Control on the front panel is used for adjusting the apparent location of the Mic. 4 Signal to either left or right positions or anywhere between. When the Mic. 4 Pan Control is in the maximum left position, program material on Mic. 4 appears only at the Auxiliary Output left channel (L); likewise, when the Mic. 4 Pan Control is in the maximum Right position, the program material appears only at the Auxiliary Output right channel (R). When the Mic. 4 Pan Control is centered between Left and Right, the Mic. 4 program material appears equally on both left (L) and right (R) Auxiliary Output phono jacks. The program material on Mic. 4 appears at the Mono Mic. Output no matter where the Pan Control is set. In making a stereo recording or with a stereo sound reinforcement system, it may be desirable to place the vocalist on Mic. 4 so the voice may be "centered" between the left (L) and right (R) stereo channels containing the orchestra.

Guarantee: This Shure product is guaranteed in normal use to be free from electrical and mechanical defects for a period of one year from the date of purchase. Please retain proof of purchase date. This guarantee includes all parts and labor.

Shipping Instructions: Carefully repack the unit and return it prepaid to the factory. If outside the United States, return the unit to your dealer or Authorized Shure Service Center for repair. The unit will be returned to you prepaid.

* Designed to mate with Cannon XL series, Switchcraft A3 (Q.G.) series, or equivalent connector.

OPTIONAL ACCESSORIES

M64 STEREO PREAMPLIFIER

The M64 will furnish the voltage gain and equalization necessary to operate magnetic phono cartridges (such as Shure Stereo Dynetic Cartridges), and tape playback heads into stereo audio amplifiers and mixers that have aux. level inputs with no equalization such as the Model M688.

A68M MICROPHONE PREAMPLIFIER

The A68M will provide a balanced line input or an *additional microphone channel to the Model M688*. The input may be matched to a low impedance balanced microphone, a high impedance unbalanced microphone, or a balanced line. The Aux. Output is terminated in a shielded cable with phono pin plug for connection to the M688. The A68M mounts to the left side of the M688 and is powered by the M688 power jacks. The A68M's may be mounted side-by-side to provide a stereo pair.

A68S STACKING KIT

This accessory consists of brackets for vertical *stacking of an M688 Mixer and any combination of Shure Mixers or Controllers*. An interconnecting cable is included for connecting one channel. An additional A68SC (see next column) interconnecting cable is required for connecting the second stereo channel.

A68C OUTPUT CABLE KIT

The A68C Output Cable Kit provides a convenient and flexible method of connecting the microphone level output of the M688 Mixer to the great variety of amplifier and input receptacle configurations. *Enables you to connect to virtually any PA system.*
Kit Includes:

- One 4.6 m (15 ft) two-conductor shielded cable with male and female professional three-pin connectors.*
- One 305 mm (12 in.) two-conductor shielded adapter cable with female professional three-pin audio connector* on one end and Hubbell twist lock plug on other end.
- One 305 mm (12 in.) single conductor shielded adapter cable with female professional three-pin audio connector* on one end and Amphenol type MC1 on the other end.
- One Phone Plug adapter for use with Amphenol type MC1 Connector.

A68SC INTERCONNECTING CABLE

This cable is a 305 mm (12 in.) long single conductor shielded cable with a phono plug on each end for interconnecting an M688 Mixer in combination with other Shure mixers or controllers.

A68R RACK PANEL KIT

The kit consists of a 483 mm x 90 mm (19 in. x 3½ in.) precut rack panel and necessary hardware for rack mounting of the M688 with its cover in place.

A68L LOCKING PANEL

This panel fits within the front hood of the M688 cover and locks in place to prevent tampering with the front panel controls.

A67H HANDLE/TILT STAND

The A67H provides a convenient means of tilting the M688 to permit better panel visibility and greater ease of operation in some conditions. In the locked (tilt) position, the front panel will be elevated about 20°. In the free position, the A67H serves as a rugged carrying handle.

AC60 ATTACHÉ CARRYING CASE

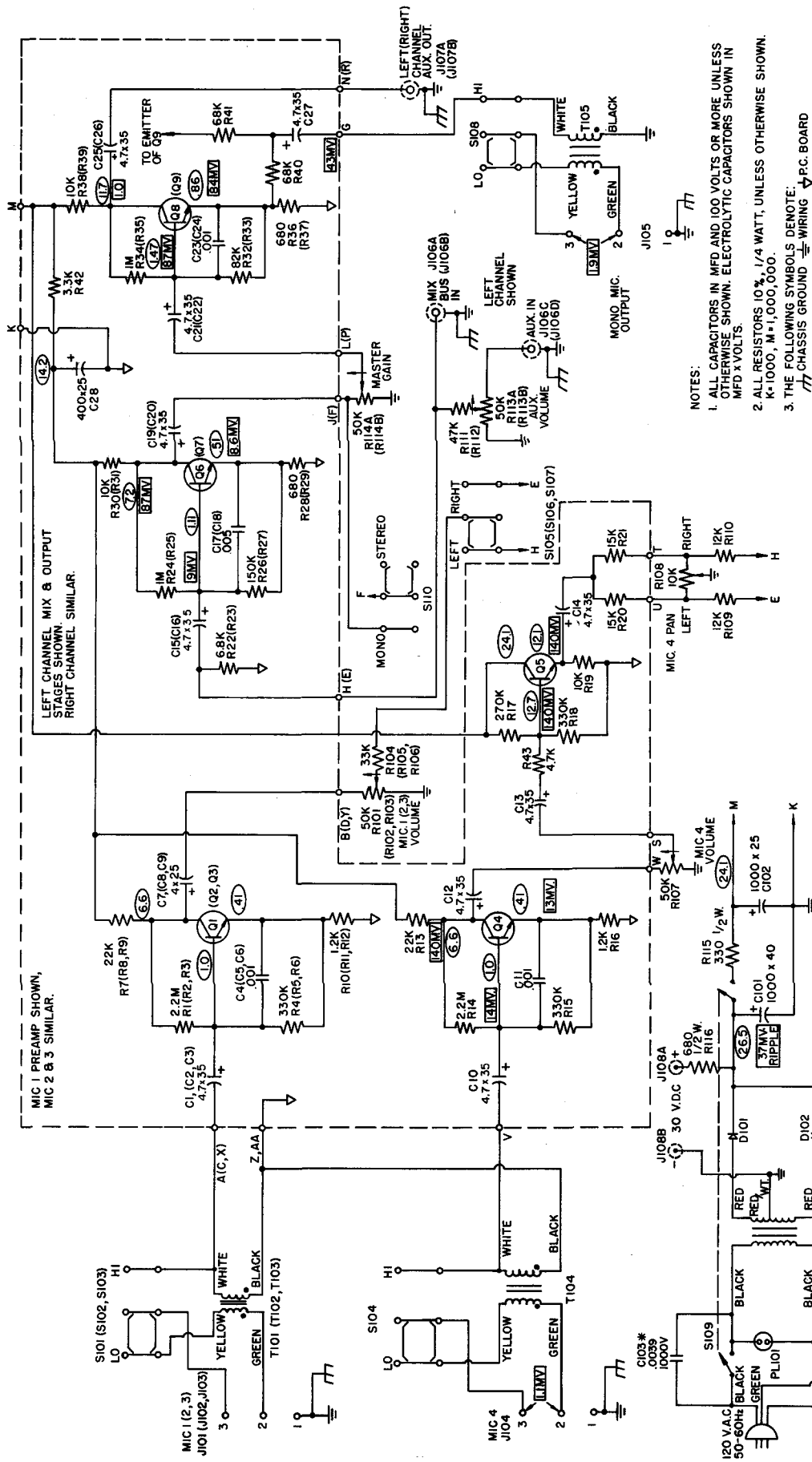
This case is compartmentalized and foam lined for an M688 and accessories.

A67B BATTERY POWER SUPPLY

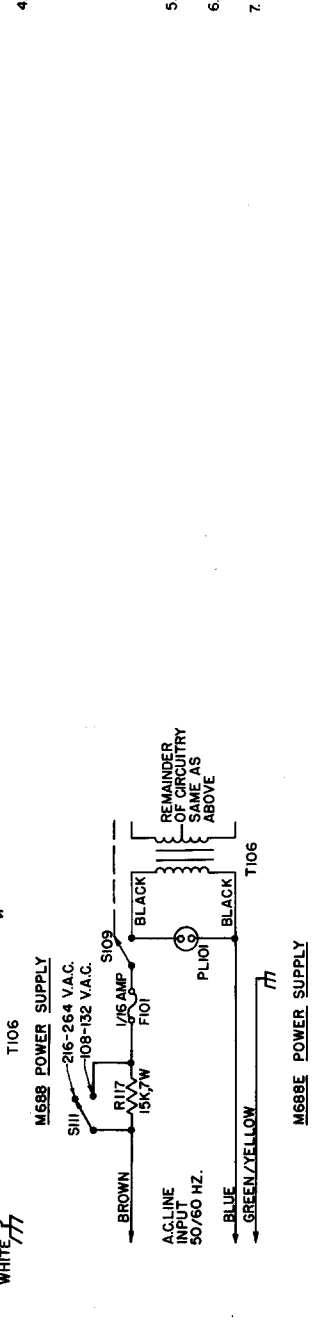
The A67B eliminates need to connect the M688 Mixer to a wall outlet. The battery complement is three Eveready type 222, 216, or equivalent 9 volt batteries. At room temperature, the A67B will operate the M688 continuously for approximately 40 hours.

* Designed to mate with Cannon XL series, Switchcraft A3 (Q.G.) series, or equivalent connector.

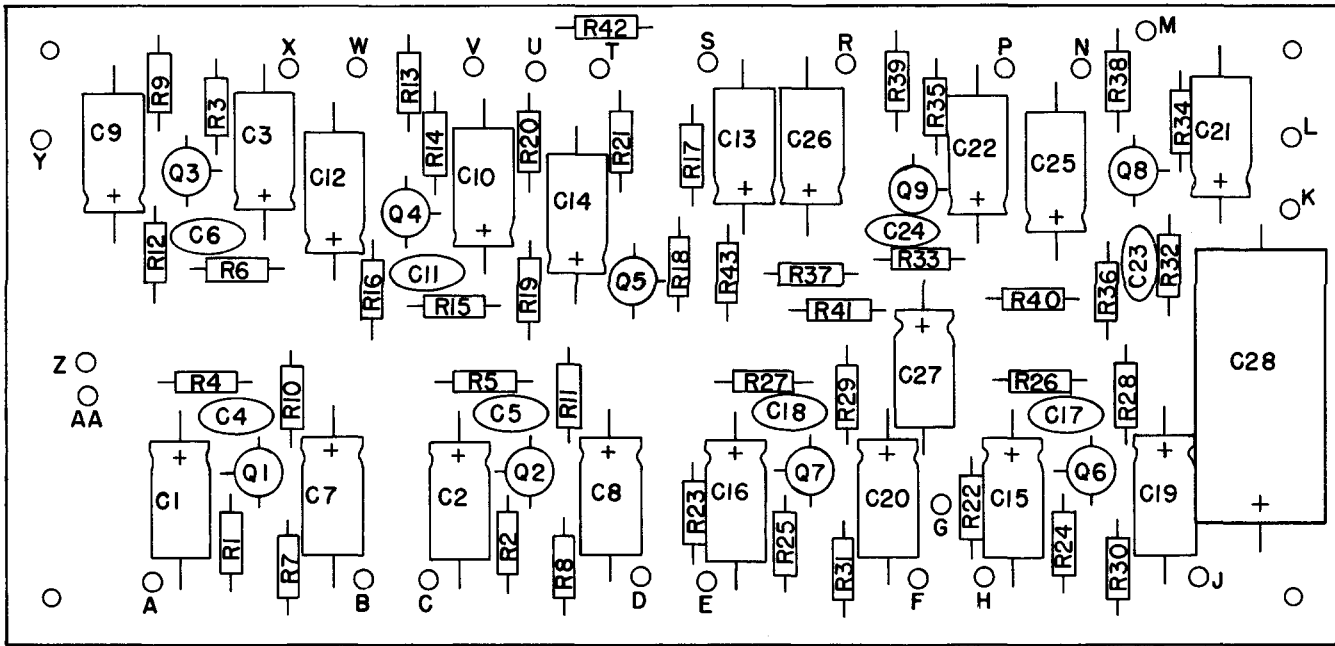
MODEL M688 STEREO MICROPHONE MIXER CIRCUIT DIAGRAM



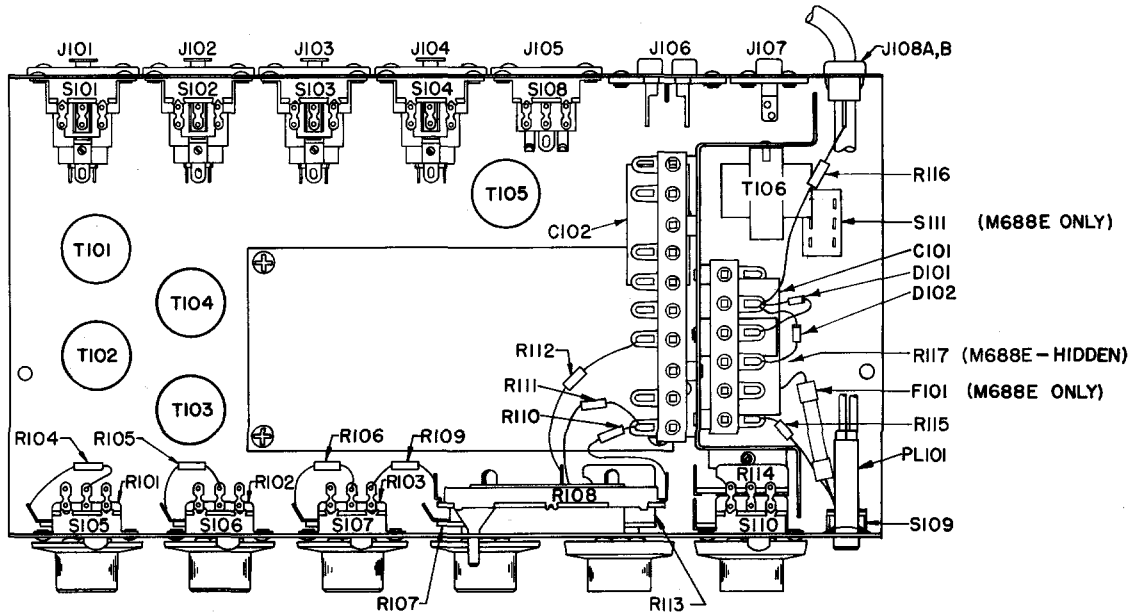
- NOTES:
1. ALL CAPACITORS IN MFD AND 100 VOLTS OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN MFD x VOLTS.
 2. ALL RESISTORS 10%, 1/4 WATT, UNLESS OTHERWISE SHOWN. K=1000, M=1,000,000.
 3. THE FOLLOWING SYMBOLS DENOTE:
 - WIRING
 - PC BOARD
 - COMMON GROUND BUSES
 4. DENOTES A C. VOLTAGES. DENOTES D.C. VOLTAGES. ALL VOLTAGES MEASURED WITH A.C. LINE - 120V, ALL IMPEDANCE SWITCHES SET TO LO, MIC4 AND MASTER CONTROLS MAX., ALL OTHERS MIN., MIC4 INPUT 1KHZ SUCH THAT LEFT AUX. OUTPUT IS 1 VOLT. AUX. OUTPUT LOADED WITH 47K OHMS AND MIC OUTPUT LOADED WITH 150 OHMS. ALL INPUT SWITCHES AND PAN POT. SET TO LEFT POSITION. D.C. VOLTAGES MEASURED WITH 11 MEGOHM V.T.V.M. A.C. VOLTAGES MEASURED WITH 1 MEG OHM A.C. V.T.V.M. VALUES ARE TYPICAL AND MAY VARY ± 1%.
 5. ALL COMPONENTS AND CONNECTIONS ENCLOSED BY DASHED LINES ARE PARTS OF PRINTED CIRCUIT BOARD ASSEMBLY.
 6. ARROWS ON POTENTIOMETERS DENOTE CLOCKWISE ROTATION.
 7. * C103 WAS .047, 600V AND WIRED ACROSS PRIMARY OF T106.



PRINTED CIRCUIT BOARD ASSEMBLY



PARTS PLACEMENT



PARTS LIST				
ITEM	SHURE PART NO.	SHURE KIT NO.	QTY. IN KIT	DESCRIPTION
D101, D102	86A404	RKC21	4	DIODE, SILICON, IN4002 OR EQUIVALENT.
PL101	80A79	RKC45	1	PILOT LIGHT, NEON, WITH RESISTOR.
Q1-Q9*	86C349	RKC9	4	NPN TRANSISTOR, SILICON, SELECTED HIGH GAIN, LOW NOISE. SIMILAR TO MOTOROLA MPS 6521
R101-R103, R107	46A011	---	---	POTENTIOMETER, ROTARY, 50K, SPECIAL LINEAR TAPER.
R108	46A029	---	---	POTENTIOMETER, SLIDE, 10K, SPECIAL LINEAR TAPER.
R113, R114	46A030	---	---	POTENTIOMETER, DUAL ROTARY, 50K, AUDIO TAPER.
S101-S104, S108	55A54	RKC10	4	SWITCH, SLIDE, SLOTTED BUTTON, DPDT.
S105-S107, S110	55B83	---	---	SWITCH, SLIDE, DPDT.
S109	55B103	---	---	SWITCH, SLIDE, DPDT, 3 AMP.
S111	55A66	---	---	SWITCH, SLIDE, DPDT
T101-T105	90E2150	---	---	TRANSFORMER AND SHIELD ASSEMBLY.
T106	51A252	---	---	TRANSFORMER, POWER.
F101	80A155	---	---	FUSE, 1/16 A, 250 V

* TO INSURE LOW NOISE FIGURE, PURCHASE REPLACEMENTS FOR Q1-Q9 FROM SHURE BROTHERS' INCORPORATED.