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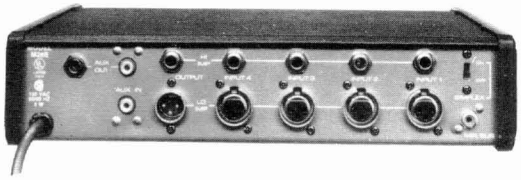
222 HARTREY AVENUE
EVANSTON, ILLINOIS 60202-3696 U.S.A.

MICROPHONES AND ELECTRONIC COMPONENTS

DATA SHEET

MODEL M268
MICROPHONE MIXER



GENERAL

The Shure Model M268 is a highly versatile portable microphone mixer designed for use with sound reinforcement, tape recording and audio-visual systems. Its excellent operational characteristics, compact size, and functional capabilities make the M268 a fine choice as a primary or add-on mixer in any sound system.

M268 Features:

- Wide, flat frequency response and extremely low distortion at full output
- Very low line noise and radio frequency interference susceptibility
- Four low-impedance balanced and four high-impedance unbalanced inputs
- High-level auxiliary input for tape, tuner and accessories
- Individual feedback-type active gain controls for all five inputs
- Master volume control sets overall output level
- Phantom power for condenser microphones
- High- (unbalanced) and low-impedance (balanced) microphone-level output matches most amplifier inputs
- High-impedance auxiliary outputs for high-level equipment inputs
- Direct mix bus for simple mixer interconnection ("stacking")
- Automatic muting circuit prevents speaker damage during turn-on and -off
- Regulated power supply is unaffected by line voltage fluctuations
- Compact and lightweight, with rugged, abrasion-resistant case
- Listed by Underwriters' Laboratories, Inc. and listed by Canadian Standards Association as Certified

SPECIFICATIONS

Frequency Response
40 Hz to 20,000 Hz, ±3 dB

Voltage Gain (at 1,000 Hz)
(Outputs terminated: mic 150 ohm/33 kilohms; aux 47 kilohms; mix bus 3.3 kilohms)

INPUT	OUTPUT			
	Lo Imp Mic	Hi Imp Mic	Aux Out	Mix Bus
Low-Impedance Microphone	+28 dB	+54 dB	+78 dB	+23 dB
High-Impedance Microphone	+5 dB	+31 dB	+55 dB	0 dB
Aux In	-16 dB	+10 dB	+34 dB	−21 dB
Mix Bus	-8 dB	+18 dB	+42 dB	— —

Inputs

INPUT	IMPEDANCE		Input Clipping Level
	Designed for use with	Actual (Internal)	
Lo Imp Mic	Bal or unbal 19 to 600 ohms	1,000 ohms	−32 to −5 dBV* (25 mV to 0.56V)
Hi Imp Mic	Unbal 10 to 50 kilohms	140 kilohms	−10 to +18 dBV* (0.32V to 7.9V)
Aux	100 ohms to 10 kilohms high-level unbalanced	43 kilohms	+14 to +30 dBV* (5.0V to 32V)
Mix Bus	3.3 kilohms	3.3 kilohms	+8 dBV (2.5V)

* Depending on control setting

Distortion
0.2% or less THD from 40 to 20,000 Hz with lo imp mic output at 60 mV level, hi imp mic output at 1.5V level, and aux out at 7.0V level

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Outputs

OUTPUT	IMPEDANCE		Output Clipping Level
	Designed for Use With	Actual (Internal)	
Low Imp Mic	Any low imp (19 to 600 Ω) mic circuit	120 Ω	–22 dB (100 mV)
High Imp Mic	Unbal 10 to 50 kΩ mic circuit	5 kΩ	+4.5 dBV (1.7 V)
Aux	10 kΩ or greater unbalanced high-level circuits	2.5 kΩ	18 dBV (7.9 V)
Mix Bus	3.3 kΩ	3.3 kΩ	–8 dBV (0.4 V)

Noise

Equivalent Input Noise: –128 dBV (low impedance mic 150 Ω - 300-20,000 Hz) at full gain

Equivalent Input Hum and Noise: –125 dBV (low impedance mic 150 Ω - 20-20,000 Hz) at full gain

Output Noise: –90 dBV (master control down). –65 dBV (master up), (input controls down, 300-20,000 Hz)

Output Hum and Noise: –82 dBV (master down), –60 dBV (master up) (input controls down, 20-20,000 Hz)

Common Mode Rejection

65 dB minimum with 100 mV input at 100 Hz

Control Interaction

Less than 1 dB with any control combination

Phase

All microphone inputs and outputs in phase; tips of high-impedance inputs and mix bus jack in phase with pin 3; aux input in phase with aux outputs and pin 2

Phantom Power

30 Vdc open circuit, 3.3 kΩ series resistance

Operating Voltage

120 or 240 volts ±10%, 50/60 Hz, 5W, supplied wired for 120 Vac operation (see Service section for 240 Vac operation)

Temperature Range

Operating: –18° to 57° C (0° to 135° F)
Storage: –29° to 74°C (–20° to 165° F)

Dimensions

See Figure 1.

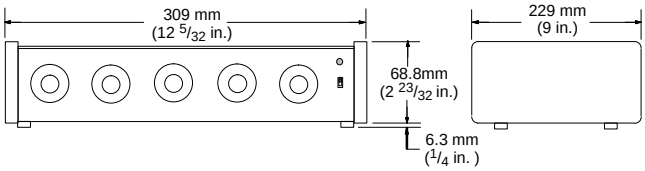


FIGURE 1

Weight

Net: 1.8 kg (4 lb 1 oz)

Packaged: 2.8 kg (6 lb 1 oz)

Certifications

Listed by Underwriters' Laboratories, Inc., and listed by Canadian Standards Association as Certified

CONTROLS AND CONNECTORS

WARNING

This apparatus must be earthed (grounded)! The M268 power supply is energized when the unit is connected to an ac source; disconnect mains (power) plug from supply when not in use.

Inputs

A maximum of four low- and four high-impedance dynamic, ribbon or condenser microphones can be connected to receptacles marked INPUT 1, INPUT 2, INPUT 3, and INPUT 4. The inputs are designed for low-impedance microphones with 19 to 600 Ω impedance, or high-impedance microphones. Both low- and high-impedance microphones can be used simultaneously. Crystal or ceramic microphones are not recommended. The input receptacles are professional three-pin XLR Audio-type connectors, and $^1/_4''$ phone jacks. See Figure 2 for low- and high-impedance connections to inputs. Note that some condenser microphones produce very high output signals which may overload the inputs of many mixers; the M268's feedback-type active gain controls virtually eliminate the need for in-line attenuators to compensate for these "hot" microphones.

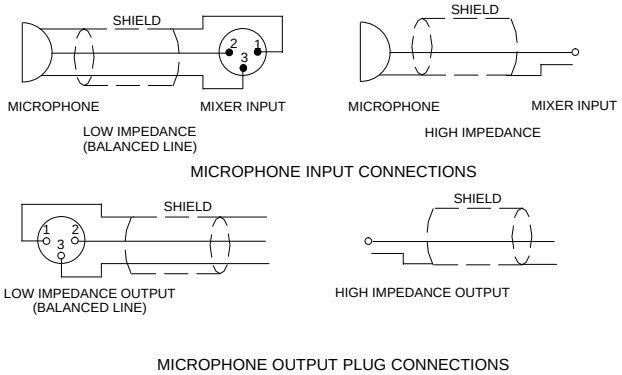


FIGURE 2

The rear-panel phone jack marked AUX IN will accept output from a high-impedance, high-level source such as a tape recorder or am-fm tuner.

Outputs

The connectors marked LOW IMP OUTPUT and HI IMP OUTPUT are the "mixed" output of all the input sources and are designed to work into a balanced (low impedance only) or unbalanced 150- to 600-Ω microphone line or into a high-impedance unbalanced amplifier or tape recorder microphone input. The output connectors are a professional three-pin XLR audio connector and a $^1/_4''$ phone jack. See Figure 2 for output connector configurations.

The phone and phono jacks marked AUX OUT are high-impedance, high-level, unbalanced outputs designed primarily to feed a power amplifier requiring 0.1 to 2 volts input, or the auxiliary or tuner input of an amplifier or tape recorder. Interconnecting cables should be limited to a maximum length of about 25m (75 ft).

Controls

In addition to the power ON/OFF switch (an adjacent LED indicates power-on in ac operation), the front panel contains five individual input gain controls designated 1 through 4 and AUX, and a MASTER gain control for the total program output. Note that the input connectors are located on the rear panel directly behind their corresponding gain controls.

The M268 has feedback-type active gain controls for lower noise and greater dynamic range. In general, the individual gain control should be set to 5 or higher (clockwise), and the MASTER control adjusted for the required output. If overload distortion (clipping) occurs when using high-level sources, reduce the individual gain control settings. Unused individual gain controls should be kept at the minimum setting (counterclockwise).

Mix Bus

The rear panel MIX BUS phono jack facilitates the "stacking" of mixers to obtain additional inputs without using any of the M268 inputs. Connecting the mix buses of two M268s, for instance, directly connects their mixing systems, providing two independent master controls and two isolated output amplifiers with 10 individually controlled inputs. Note that the gain will be reduced by 6 dB, but noise specifications are not adversely affected by this interconnection. Mix bus interconnections can also be made with other Shure mixers such as the M267 and the M67.

Phantom Power

The M268 provides power for condenser microphones such as the Shure SM81 and SM85. The rear-panel PHANTOM OFF/ON switch controls the application of phantom voltage to all low-impedance inputs. With the PHANTOM switch on, +30 Vdc is applied to pins 2 and 3 of each LO IMP connector. Series current-limiting resistance is 3.3 kΩ for each input. When using other condenser microphones with the M268, verify that the voltage and resistance are compatible.

Balanced low-impedance microphones (dynamic, ribbon, self-powered condensers) can be used in combination with phantom-powered condenser microphones.

IMPORTANT: Do not turn on the PHANTOM switch when using **unbalanced** low-impedance microphones: objectionable hum will result. Turn off the PHANTOM switch when condenser microphones are not being used.

Use only high-quality cable, as intermittent shorts between broken shied wires and balanced conductors will cause offensive noise transients in the system.

ACCESSORIES

The **Model A268R** Rack Panel Kit consists of a 483 mm x 89 mm (19 in. x $3^1/_2$ in.) precut rack panel and necessary hardware for rack mounting the M268 in a standard 483 mm (19 in.) rack panel.

The **Model RKC169** Rack Panel Bracket Kit enables users of the Shure A68R Rack Panel Kit (originally designed for the Shure M67 and M68 Mixers) to rack-mount the M268 with the A68R.

SERVICE

WARNING

Voltages in this equipment are hazardous.
Refer servicing to qualified service personnel.

Operation at 210-250 Vac

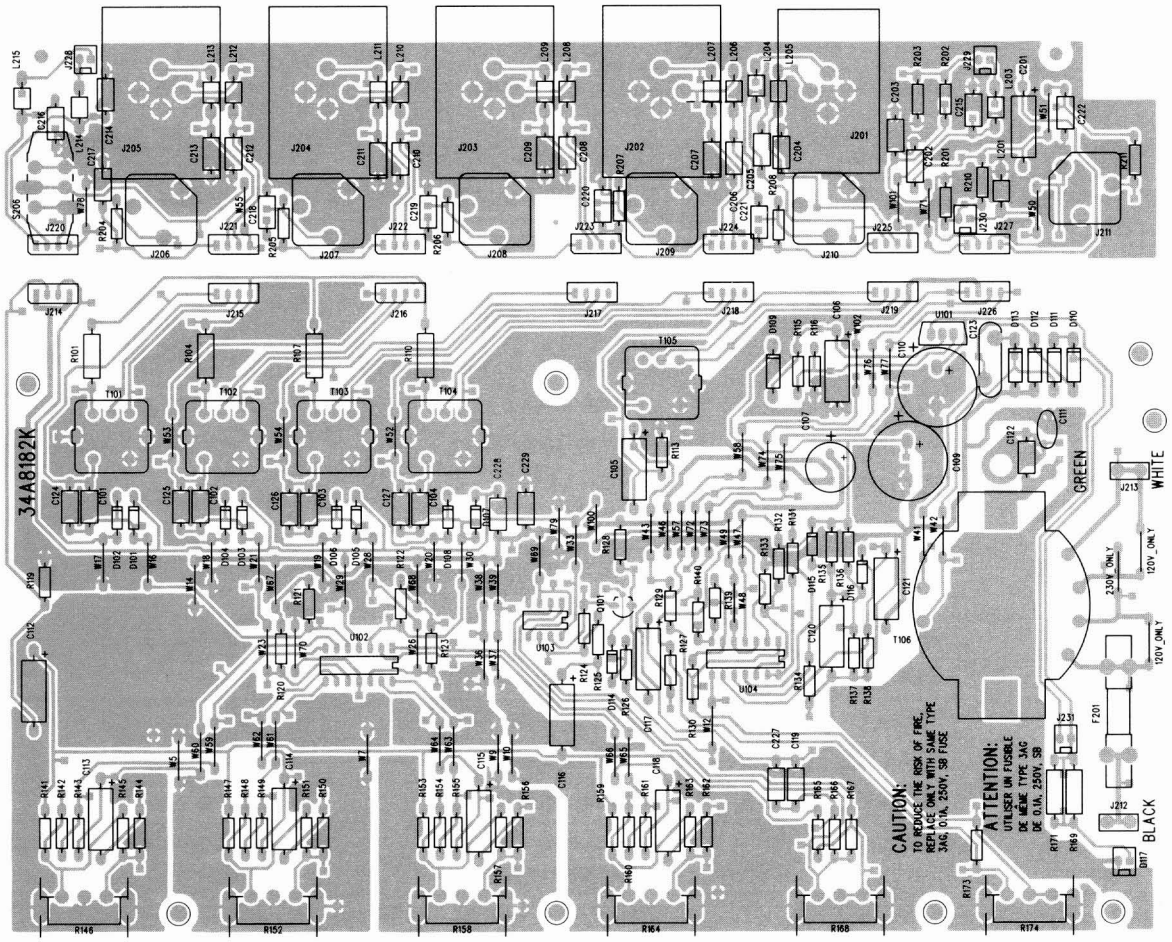
The M268 is supplied wired for operation at 105-125 Vac. To rewire the M268 for operation at 210-250 Vac, proceed as follows:

1. Disconnect the M268 from the ac line
2. Remove end caps and cover.
3. Locate Power Transformer T106 at right center of printed circuit board. Remove two jumpers between holes marked "120V ONLY." Add jumper between holes marked "230V ONLY" at right of T206.
4. Replace ac connector with one designed for 210-250 Vac source. If M268 is to be used outside U.S. and Canada, local regulations may require replacing line cord with one having wire insulation colors as follows:

	"Live" or "Hot"	Neutral	Earth or Ground
U.S., Canada	Black	White	Green
Europe	Brown	Blue	Green/ Yellow

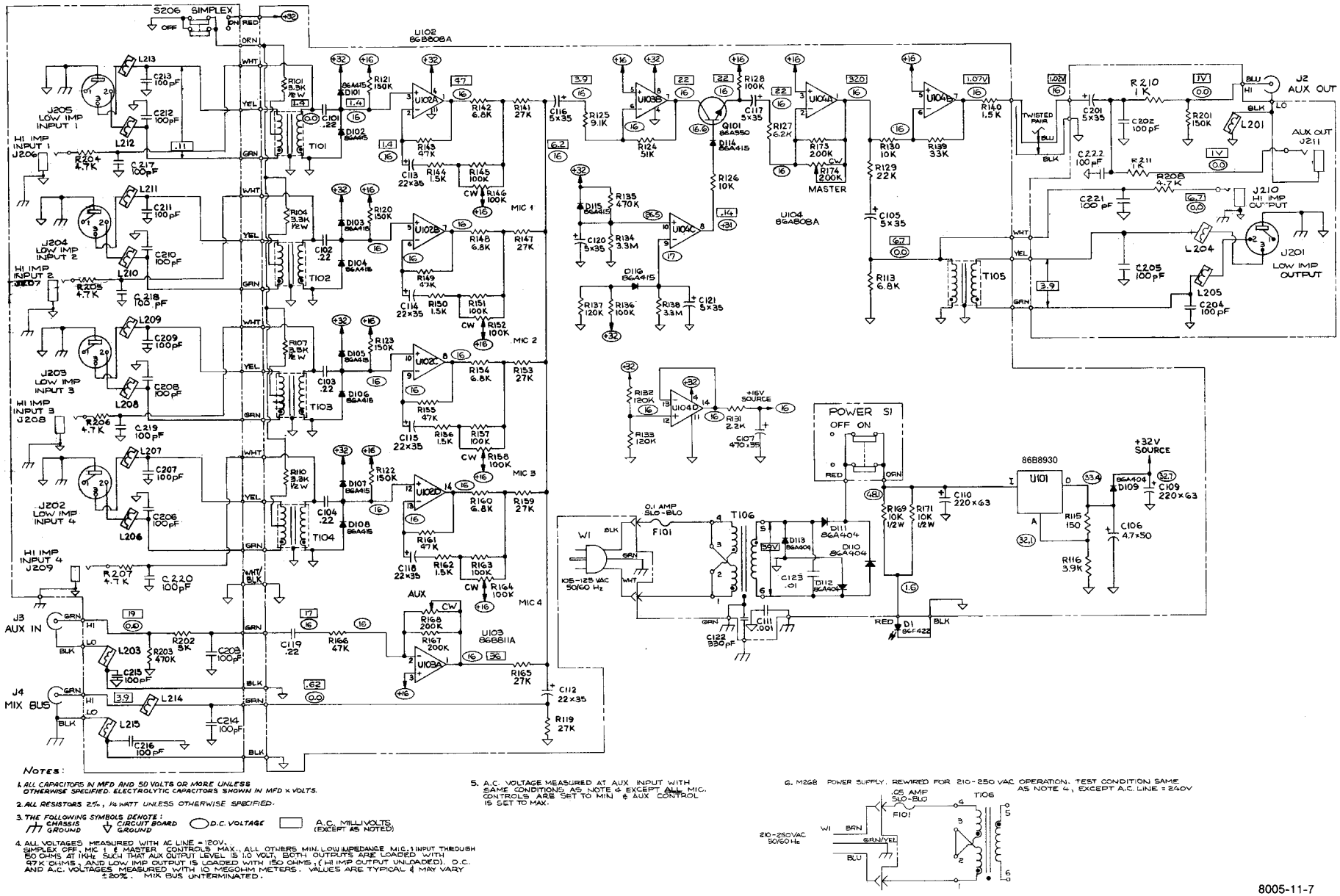
5. Replace Fuse F101 (presently 0.1A, 250V, slow-blow) with 0.05A, 250V, time lag unit (Shure 80C380, Schurter 034.3104) using supplied fuse clips (Shure 80A8008, Schurter OG 751.0052).
6. Replace cover and end caps. Affix new label to rear panel to reflect new operating voltage range.

PRINTED CIRCUIT BOARDS
TOP VIEW



REPLACEMENT PARTS LIST

Reference Designation	Part No.	Description	Commercial Alternate
C105, 106, 116, 117, 120, 121, 201	86A630	Capacitor, Electrolytic 470 μF, 35 V	NIC NAE4R7M50V5X13TR
C107	86BP629	Capacitor, Electrolytic 470 μF, 35 V	NIC NRSA471M35V10X20
C109-C110	86K629	Capacitor, Electrolytic 220 μF, 60 V	NIC NRSA221M100V16X25
D1	86B8402	Diode, Light-Emitting	GI MV5075C
D101-108, D114-D116	86A415	Diode, Silicon, Computer 75 V	Motorola IN4148
D109-D113	86B404	Silicon Rectifier, 100 V, $^1/_2$ A	Motorola IN4002
F101	80F159	Fuse, Slow-Blow, 0.1 A, 250 V	Littlefuse 313000 Series
J201	95B8012	Connector, 3-pin	Switchcraft Y3MPC
J202–J205	95B8011	Connector, 3-Socket	Switchcraft Y3FDPC
J206–211	95X8025	Phone Jack	Switchcraft L-112BPC
L201, L203-L215	80A365R	Ferrite Bead Ring	Panasonic EXC–ELSA35
MP1-MP6	90A8028	Knob	None
Q101	86A350	Transistor, Silicon, NPN	Motorola 2N5210
R146, R152, R158, R164	46A8001	Potentiometer, 100 k	None
R168, R174	46B8001	Potentiometer, 200 k	None
S1	55A53	Switch, Slide, DPDT	None
S206	55B8001	Switch, Slide, DPDT	None
T101-T105	90A4323	Transformer, Input	None
T106	51A8009	Transformer, Power	None
U101	86B8930	Integrated Circuit, Voltage Regulator	National Semiconductor LM317AT
U102, U104	86B8983	Integrated Circuit, Quad Op Ampl (Selected for NF)	Motorola MC33179P
U103	86A8953	Integrated Circuit, Dual Op Amp (Selected for NF)	Motorola MC331788
W1	90A8045	Line Cord	None



Notes:

1. ALL CAPACITORS IN MFD AND 50 VOLTS OR MORE UNLESS OTHERWISE SPECIFIED. ELECTROLYTIC CAPACITORS SHOWN IN MFD x VOLTS.
2. ALL RESISTORS 2%, ¼ WATT UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE: CHASSIS GROUND; CIRCUIT BOARD GROUND; D.C. VOLTAGE; A.C. MILLIVOLTS (EXCEPT AS NOTED)
4. ALL VOLTAGES MEASURED WITH AC LINE = 120V., SIMPLEX OFF, MIC 1 & MASTER CONTROLS MAX., ALL OTHERS MIN, LOW IMPEDANCE MIC-1 INPUT THROUGH 150 OHMS AT 1KHz SUCH THAT AUX OUTPUT LEVEL IS 1.0 VOLT, BOTH OUTPUTS ARE LOADED WITH 47K OHMS, AND LOW IMP OUTPUT IS LOADED WITH 150 OHMS, (HI IMP OUTPUT UNLOADED). D.C. AND A.C. VOLTAGES MEASURED WITH 10 MEGOHM METERS. VALUES ARE TYPICAL & MAY VARY ±20%. MIX BUS UNTERMINATED.
5. A.C. VOLTAGE MEASURED AT AUX INPUT WITH SAME CONDITIONS AS NOTE 4 EXCEPT ALL MIC. CONTROLS ARE SET TO MIN & AUX CONTROL IS SET TO MAX.
6. M268 POWER SUPPLY, REWIRED FOR 210-250 VAC OPERATION. TEST CONDITION SAME AS NOTE 4, EXCEPT A.C. LINE = 240V

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MODEL M268 CIRCUIT DIAGRAM