


### SIX CHANNEL MICROPHONE MIXER



### ! IMPORTANT SAFETY INSTRUCTIONS !

1. READ these instructions.
2. KEEP these instructions.
3. HEED all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. DO NOT install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. DO NOT defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12.  USE only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. REFER all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. DO NOT expose the apparatus to dripping and splashing. DO NOT put objects filled with liquids, such as vases, on the apparatus.
16. The MAINS plug or an appliance coupler shall remain readily operable.
17. The airborne noise of the apparatus does not exceed 70dB (A).
18. Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.
19. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
20. Do not attempt to modify this product. Doing so could result in personal injury and/or product failure.

### DESCRIPTION

The Shure M367 is a portable, six-input, two-output (mono), battery-powered microphone and line level mixer/preamplifier. Its transformer-isolated design, low-noise performance, and compact and rugged construction make the M367 an ideal choice for studio and mobile broadcast, electronic news gathering (ENG), and electronic field production (EFP) applications.

This versatile mixer can also be used for the following:

- Digital transmission links
- Digital video/audio recording media (ISDN, hard disk recording, and DAT)
- Sound reinforcement

The M367 comes with rubber feet, detachable power cord, and spare power line fuse. It can be rack mounted using the optional Model A367R rack mount kit.

### FEATURES

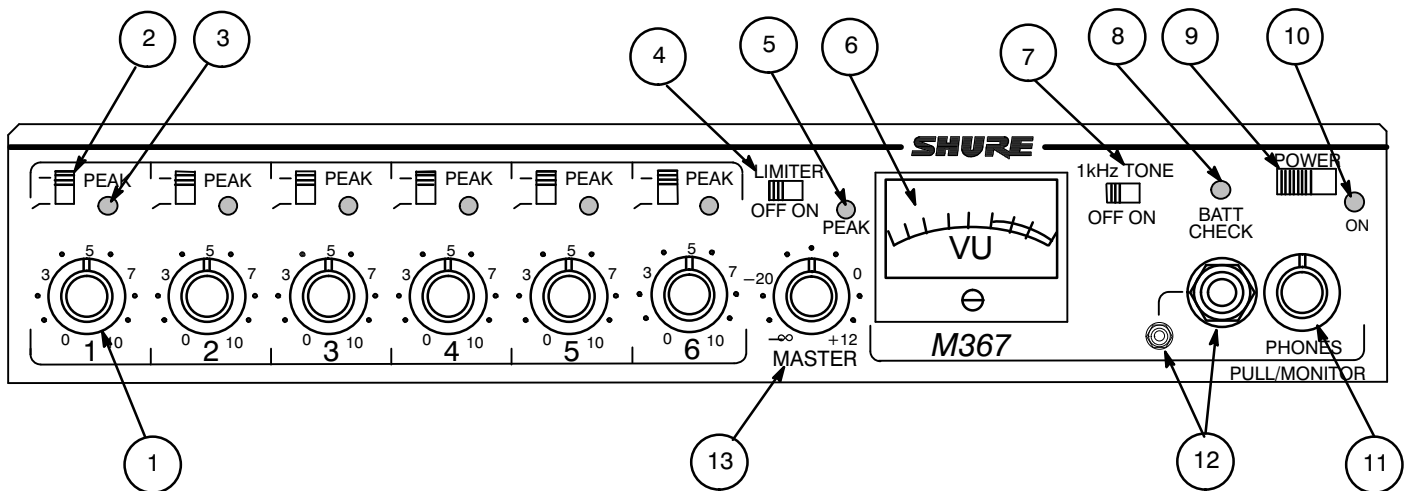
- Six selectable mic/line inputs
- Selectable mic/line output and dedicated line output
- Transformer-balanced inputs and outputs for superior rejection of RFI and electromagnetic hum
- Professional mechanical VU meter-LED backlighting for high reliability, no lamp replacement

- Headphone monitoring 3.5 mm, (1/4 in.)
- Output peak limiter with switchable threshold and bi-colored LED indicator
- Peak indicator LED, and switchable low-cut filters on each input 1/4 in. return monitor input
- AC power or (2) 9V battery operation

### ADDITIONAL FEATURES

- 48 Vdc or 12 V phantom power for condenser microphones
- 1 kHz tone oscillator
  - Mutes all input channels when activated
  - Tone level control is on the master
- Wide-range input gain controls handle hot signal levels without attenuators
- Customized operation via internal DIP switches, trim pots, and optional alternate wiring
- Battery check switch and low battery warning indication
- Power-on LED
- Input expansion via mix bus jack to link M367s or other mixers
- Rugged all metal chassis with protective end caps
- Detachable AC power cord

## FRONT PANEL CONTROLS AND INDICATORS



FRONT PANEL CONTROLS AND INDICATORS

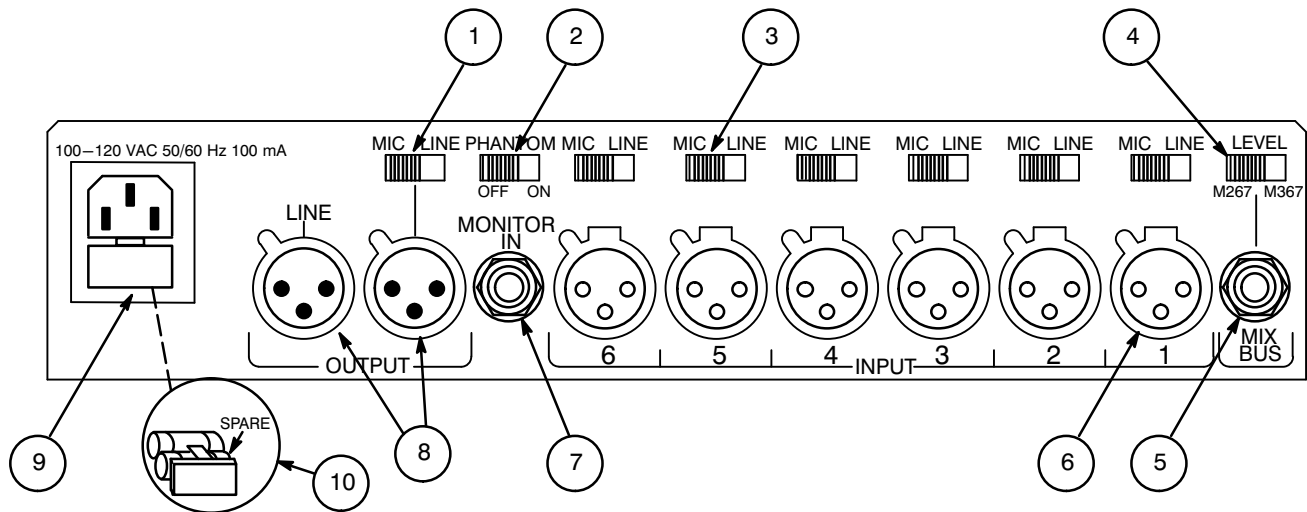
FIGURE 1

1. **Input Gain Control:** For best performance, adjust each Input Gain Control so the associated Input Peak LED illuminates red only on the loudest signal peaks.
2. **Input Low-Cut Filter Switch:** Provides low-frequency roll-off to reduce wind noise and rumble. When using the filter, the frequency response is down 7 dB at 150 Hz. Roll-off slope is 6 dB per octave.
3. **Input Peak LED:** Illuminates at 6 dB below clipping.
4. **Limiter Switch:** Activates a fast-acting, peak-responding limiter optimized for speech. An internal modification can provide a slower release time for music signals (see *DIP Switches*).
5. **Output Peak/Limiter Bi-Color LED:**
  - Red = output signal at +12 dBm (6 dB below clipping)
  - Green = output signal at limiter threshold (when limiter is on)
6. **Output Level (VU) Meter:** Meter response approximates true VU characteristics (about 300 ms rise and fall, 1% to 5% overshoot). For a slower response, see *Internal Modifiable Functions*. 0 VU is switchable between +4 and +8 dBm (see *DIP Switches*). When using batteries, use the BATT CHECK switch to illuminate the meter.
7. **1 kHz Tone Oscillator Switch:** Sends a 1 kHz tone to all outputs and mutes all inputs. The MASTER control adjusts tone level.
8. **Battery Check Button:** Press and hold to show battery level on the VU meter. Press once to illuminate the VU meter for 10 seconds, or set DIP switch 6 to toggle the meter light (see *DIP Switches*).
9. **Power-On/Off Switch:** Turns the mixer on and off.
10. **Power-On LED:**
  - Green = power on
  - Flashing = low batteries (about 30 minutes of operation remaining)
11. **Dual function control knob:**
  - Headphones Gain Control:** Rotate to adjust headphone level.
  - Pull/Monitor Switch:** When using headphones, pull out to listen to audio from the MONITOR IN jack. Add attenuated program signal using DIP switch 4 (see *DIP Switches*).
12. **Headphones Outputs:** Stereo 1/4 in. and 3.5 mm phone jacks.
13. **Master Gain Control:** Sets mixer output gain. Set to 0 dB position for unity gain.

### WARNING

The headphones circuit can produce high volume levels that can damage the user's hearing. Make sure headphone volume setting (PHONES) is low (Full CCW before putting headphones on).

## REAR PANEL CONNECTORS AND CONTROLS



REAR PANEL CONNECTORS AND CONTROLS

FIGURE 2

- Mic/Line Level Output Switch:** Sets output to microphone or line level.
- Phantom Power Switch:** Adds 12-volt phantom power to all inputs set to MIC. Use DIP switch 7 to increase voltage to 48 volts (see DIP Switches).
- Mic/Line Level Input Switches 1-6:** Sets input to microphone or line level. Phantom power is disabled for inputs set to LINE.
- M267/M367 Mix Bus Level Switch:** Set to M267 when connecting to a SHURE M267, FP42, FP51, M67, or SE30. Use the M367 setting with another M367 or SHURE FP32A.

### IMPORTANT

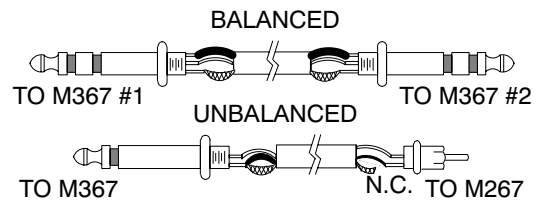
Unless required, leave the mix bus LEVEL switch in the M367 position. The M367 setting may increase mixer output noise up to 30 dB, depending on the MASTER output setting.

- Mix Bus Jack:** Allows you to connect the M367 to another mixer. The mix bus connection is "two-way" and pre-master. When two M367 mixers are connected, all 12 inputs appear at both mixers' outputs. The MASTER gain control of either M367 can be adjusted without affecting the other mixer's output.

### NOTE

The output level of each M367 mixer drops by 6 dB when connected through the MIX BUS, increase the Master Gain to compensate.

For a balanced mix bus connection between two M367s, use a mix bus cable with two 1/4 in. stereo (tip, ring, sleeve) plugs. When connecting other types of Shure mixers, construct a mix bus cable with a 1/4 in. mono phone plug (tip = signal, sleeve = ground) and the appropriate connector for the other mixer's mix bus jack (see Figure 3).



MIX BUS CONNECTIONS

FIGURE 3

- Channel Inputs:** These female XLR inputs are transformer-balanced to provide superior rejection of hum, RFI, and other interference.
- Monitor In Jack:** Accepts mono line-level signals (tip = signal, sleeve = ground) for "tape return" or a communications channel input. See *Pull/Monitor* switch description.  
You can also modify the MONITOR IN jack to accept a stereo input and provide a stereo sum monitor signal (see *Internal Modifiable Functions*).
- Mixer Output:** These male XLR outputs are transformer-balanced. The Line output is preset to line level, but can be modified to a true 600Ω output impedance or changed to microphone level (see *Internal Modifiable Functions*).
- Power Connector:** See *AC Operation*.
- Time Delay Fuses:** The slide-out compartment contains two power line fuses. The outer (toward you) is a spare.  
**M367:** 0.125A, 250V fuse  
**M367E:** 0.063A, 250V fuse

### WARNING

For continued protection against fire, replace with the same type and rating of fuse.

## AC OPERATION

Use the supplied power adapter to connect the M367 to a power outlet.

**M367:** 100-120 VAC, 50/60 Hz

**M367E:** 220-240 VAC, 50/60 Hz

The operating voltage can be switched internally (see *Internal Modifiable Functions*).

### NOTE

Appliance inlet is the main disconnect device (to power off the M367, you must unplug the power supply).

## BATTERY OPERATION

Open the battery compartment by grasping the sides of the compartment, squeezing to release the locks, and pulling the compartment outward. Insert two 9-volt batteries.

During battery operation, use the BATT CHECK button. Press and hold to show battery level on the VU meter. Press once to illuminate the VU switch for 10 seconds, or set DIP switch 6 for continuous illumination (see *DIP Switches*).

## BATTERY LIFE

With two fresh 9-volt alkaline batteries, the M367 operates for about eight hours. Some mixer features decrease battery life, as illustrated in the following table.

### NOTE

Momentary use of headphones or meter illumination will not appreciably affect battery life.

Mixer Operation	Battery Current (mA)	Battery Life (hours)*
No Signal	40	9
With +4 dBm continuous output	45	8
With six mics at 12 V phantom power	55	6.5
With six mics at 48 V phantom power	70	5
With output to headphones	50	7
With meter illumination continuously on	75	4.5

\*until Power LED begins to flash, allowing approximately 30 minutes to replace batteries.

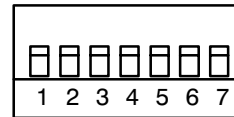
## CONNECTING M367 OUTPUTS TO TELEPHONE LINES

Use the XLR outputs at line level to drive dc-biased, "dialed up" telephone lines. A slight increase in distortion may occur. Use the M367 limiter with the limiter threshold set to +4 dBm. Modify the M367 output impedance to 600  $\Omega$  for proper fidelity (see *Internal Modifiable Functions*). When connecting the M367 to a telephone line, you must use an FCC-Registered interface adapter between the mixer and telephone line.

## SETTING LEVELS

- Set the MASTER gain knob to the full off position.
- Activate the 1 kHz tone oscillator by setting the 1 KHZ TONE switch to ON. Adjust the MASTER gain until the VU meter needle indicates "0". Adjust the input levels on the equipment connected to the M367 outputs accordingly. Deactivate the tone by setting the 1 KHZ TONE switch to OFF.
- Adjust the Input gain controls based on the incoming signal levels. The input PEAK LEDs should flicker red only on loud input peaks.
- Observe the output on the VU meter and adjust the MASTER gain to obtain the desired levels. Try to keep the average levels around "0 VU". The PEAK LED adjacent to the VU meter should illuminate only on loud output peaks.

## DIP SWITCHES



S701

Access the DIP switches by removing the battery compartment and top cover. Use the following table to set the switches (**Bold** = factory setting.)

Switch	Function	Up	Down
1	Meter 0 VU	<b>0 VU = +4 dBm</b>	0 VU = +8 dBm
2	Limiter Threshold	See Figure 4	
3			
4	Program to Monitor	<b>Off</b>	On (adds attenuated program signal in headphones with Pull/Monitor switch on)
5	Monitor In Gain	<b>Normal</b>	High
6	VU Lamp (Batt Check button)	<b>Timed</b> (Turns off after 10 seconds)	Toggled (press on, press off)
7	Phantom Power	<b>12 Vdc</b>	48 Vdc

Limiter Threshold	
<input type="checkbox"/>	<input type="checkbox"/> = +16 dBm
<input type="checkbox"/>	<input type="checkbox"/> = +8 dBm
<input type="checkbox"/>	<input type="checkbox"/> = +4 dBm
<input type="checkbox"/>	<input type="checkbox"/> = 0 dBm
2	3

LIMITER THRESHOLD SETTINGS  
**FIGURE 4**

## SPECIFICATIONS

### Frequency Response

20 to 20,000 Hz  $\pm$  2.0 dB (channel controls centered)

### Total Harmonic Distortion

0.25% THD at +4 dBm output, 55 to 20,000 Hz

### Voltage Gain

Input	Output				
	Line	Mic	Phones	Mix Bus (M367)	Mix Bus (M267)
Low-Z Mic (150 $\Omega$ )	87 dB	40 dB	103 dB	66 dB	27 dB
Line	37 dB	-11 dB	53 dB	15 dB	-25 dB
Monitor	--	--	12 dB	--	--
Mix Bus (M367)	10 dB	-38 dB	26 dB	--	--
MixBus (M267)	50 dB	2 dB	66 dB	--	--

### Inputs

Input	IMPEDANCE		Input Clipping Level
	Designed for Use With	Actual (Internal)	
Mic	19 to 600 $\Omega$	1 k $\Omega$	-10 dBV
Line	$\leq$ 10 k $\Omega$	50 k $\Omega$	+36 dBV
Monitor	$\leq$ 1 k $\Omega$	13 k $\Omega$	0 dBV
Mix Bus (M367)	930 $\Omega$ bal.; 1860 $\Omega$ unbal.	930 $\Omega$ bal.; 1860 $\Omega$ unbal.	+23 dBV
Mix Bus (M267)	3.5 k $\Omega$	3.5 k $\Omega$	-17 dBV

### Outputs

Output	IMPEDANCE		Output Clipping Level
	Designed for Use With	Actual (Internal)	
Mic	Low-Z inputs	1 $\Omega$	-31 dBV
Line	600 $\Omega$	150 $\Omega$	+18 dBm
Phones	8 to 200 $\Omega$	300 $\Omega$	+11 dBV
Mix Bus (M367)	930 $\Omega$ bal.; 1860 $\Omega$ unbal.	930 $\Omega$ bal.; 1860 $\Omega$ unbal.	+11 dBV
Mix Bus (M267)	3.5 k $\Omega$	3.5 k $\Omega$	-28 dBV

### Equivalent Input Noise

$\leq$  -127 dBV with 150  $\Omega$  source, 400 to 20,000 Hz

### Output Noise

Master level full CCW: -100 dBV, 400 to 20,000 Hz

Master level full CW: -80 dBV, 400 to 20,000 Hz

### Hum and Noise

Equivalent Input:  $\leq$ 125 dBV, 20 to 20,000 Hz

Output: -95 dBV (Master CCW), -75 dBV; (Master CW), 20 to 20,000 Hz

### Common Mode Rejection Ratio

65 dB at 100 Hz, -20 dBV input

### Polarity

Mic/Line In to Mic/Line Out	Non-Inverting
Mic/Line In to Phones	Non-Inverting
Mic/Line In to Mix Bus (tip)	Inverting
Monitor to Phones	Non-Inverting
Mix Bus to Mic/Line Out	Inverting

### Overload and Shorting

Shorted outputs, even for prolonged periods, cause no damage. Microphone inputs of up to 3 Vrms cause no damage. Line and monitor can withstand signals of up to 30 Vrms.

### Input Peak Indicators

6 dB below clipping level

### Output Peak Indicator

Lights red at 6 dB below clipping level

### Output Clipping Level

$\leq$  +18 dBm at line output into 600  $\Omega$

### Low-Cut Filters

7 dB down at 150 Hz; 6 dB/octave slope (3 dB down at 260 Hz)

### Tone Oscillator

1 kHz  $\pm$  20%

### Limiter

Threshold: Switchable: 0, +4, +8, +16 dBm

Attack Time: 1 ms  $\pm$  0.5 ms

Release Time Constant: 100 ms  $\pm$  30 ms

Indicator: Green when limiting by 1 dB or more

### Phantom Power

12 V Phantom: 12 V through 340  $\Omega$

48 V Phantom : 48 V through 3.4 k $\Omega$

### AC Power

**M367:** 100–120 Vac, 50/60 Hz, 100 mA

**M367E:** 220–240 Vac, 50/60 Hz, 50 mA; no-signal current drain 25 mA

### DC Power

18 Vdc nominal at 40 mA typical no-signal, 45 mA typical at +4 dBm output; 13.5 Vdc minimum

### Batteries

Two 9 V alkaline batteries

### Battery Life

Up to 8 hours\* at +4 dBm output in continuous use.

\*(see *Battery Operation*)

### Temperature Range

Operating: -18° to 57° C (0° to 135° F)

Storage: -29° to 74°C (-20° to 165° F)

### Overall Dimensions (H x W x D)

71.9 mm x 308 mm x 233 mm (2 13/16 in. x 12

5/32 in. x 9 5/32 in.) including feet.

### Weight (without batteries)

3 kg (6.6 lb)

*Measurement conditions (unless otherwise specified): operating voltage 120 Vac, 60 Hz (18  $\pm$  1 Vdc for dc test); operating temperature 22° C (72° F); input signal 1 kHz; internal DIP switches 1–7 open; Power switch on; Mic/Line switches to Line; low-cut switches to flat; Limiter out; Phantom power off; Mix Bus to M367; channel 1 gain full CW; channel 2 through 6 full CCW; Master full CW; Phones level full CCW; Line output terminations 600  $\Omega$  (pins 2 and 3); Mic output terminations 150  $\Omega$  (pins 2 and 3); Phones (1/4"-ring) 300  $\Omega$  to ground; Phones (1/4"-tip) 300  $\Omega$  to ground; Phones (3.5 mm) unloaded; Mix Bus 930  $\Omega$  (M367 position) or 3.5 k $\Omega$  (M267 position), not connected unless specified; 1 kHz input signal.*

## REPLACEMENT PARTS

Foot Kit (4 in kit).....	90S8100
M367 Fuse, 0.125 A, 250 V .....	80E380
M367E Fuse, 0.063 A, 250 V .....	80G380

### Knob

Master .....	95A8238
Channel Gain, Phones .....	95B8238

### Line (Power) Cord

M367 .....	95A8389
M367E .....	95B8389

## OPTIONAL ACCESSORIES

Rack Mount Kit.....	A367R
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## STATEMENT OF CONFORMITY

Conforms to European Union directives, eligible to bear CE marking; VDE GS-Certified to EN60065; meets European Union EMC Immunity Requirements (EN 50 082-1, 1992): RF radiated (IEC 801-3): meets Criterion A, ESD: meets Criterion B, EFT (IEC 801-4): meets Criterion B.

## GENERAL INFORMATION

Changes or modifications not expressly approved by Shure, Inc. could void your authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules and as set out in the Radio Interference Regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, determined by turning the equipment off and on, try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

## INTERNAL ADJUSTMENTS

### NOTE

Only qualified service technicians should perform these modifications.

**These internal adjustments require only removal of the top cover:**

1. Remove battery compartment.
2. Remove four screws securing two plastic end caps and one ground-bonding screw on the side opposite the battery compartment.
3. Slowly slide cover up and off chassis.

### VCA DISTORTION TRIMPOT (R607)

**DO NOT ADJUST!** This potentiometer is precisely calibrated on each mixer for minimum distortion.

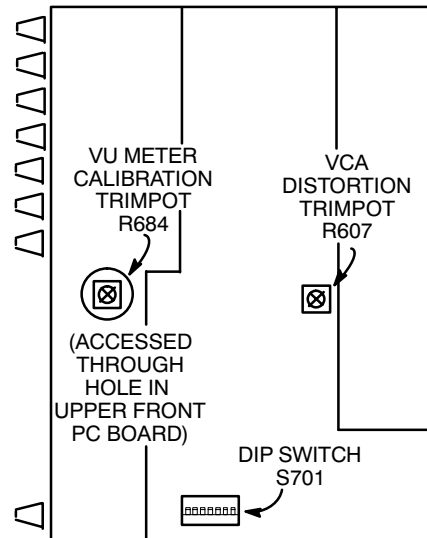
### VU METER ADJUSTMENT (R684)

This trimpot adjusts the VU meter to indicate 0 VU at a preset output level. The factory setting is +4 dBm. The user adjustment range is -10 dBV to +4 dBm (-6 dBV to +8 dBm with DIP switch 1 down).

To set the VU meter to a value other than the factory setting (0 VU = +4 dBm), proceed as follows:

1. Connect a 600  $\Omega$  load to an XLR output set for Line.
2. Connect an ac voltmeter with 1 M $\Omega$  or greater input impedance (Fluke 77 or equivalent) in parallel with the load.
3. Set the 1 kHz tone oscillator switch to the ON position.

4. Adjust the 1 kHz tone oscillator level with the Master gain control until the ac voltmeter reading is at the level desired
5. With the M367 top cover removed, adjust the VU Level Calibration trim pot R684 with a screwdriver until the VU Meter reads 0.
6. For 0 VU settings between +4 and +8 dBm, set internal DIP switch S701 position 1 "down", and perform steps 1 through 5.



INTERNAL ADJUSTMENTS  
**FIGURE 5**

## INTERNAL MODIFIABLE FUNCTIONS

**NOTE**

Only qualified service technicians should perform these modifications.

Perform all modifications through solder points accessible on the main PC board.

### DISASSEMBLING THE M367

1. Remove the mixer top cover as previously described.
2. Carefully remove three multi-pin cable assembly connectors from upper front PC board (nearest front panel). Remove the three Phillips head screws securing the PC board. Remove upper front PC board.
3. Carefully remove four multi-pin cable assembly connectors from upper rear PC board (nearest rear panel). Remove the three Phillips head screws securing the PC board. Remove upper rear PC board.
4. Perform modification (refer to appropriate following procedure). Note that all modifications can be performed without removing the main PC board.
5. Reassemble M367 by performing above steps in reverse, assembling the Phillips screws in the order indicated on the upper front and upper rear PC boards.

### CHANGING LINE LEVEL OUTPUT IMPEDANCE TO 600 Ω

Locate resistor R621 (near IC U602 pin 8) on the main PC board and remove it. Locate empty pads X621 (near resistor R621). Solder a 430 Ω, 1/2 W resistor through the holes at X621.

### CHANGING UNSWITCHED LINE OUTPUT TO MIC LEVEL

Locate resistor R632 (near output transformer T601) and remove. Locate empty pads X632 (near transformer T601). Solder a jumper wire through the holes of X632.

### CHANGING MIXER AUDIO LEVELS IN HEADPHONES (Pull/Monitor Switch Activated, DIP Switch S701 Position 4 Closed)

Locate empty pads X649 (near Phones potentiometer R648). Solder a 68 kΩ, 1/4 W resistor through the holes at X649 to hear program audio 12 dB down from standard headphones level with Pull/ Monitor switch on (pulled out). Solder a 24 kΩ, 1/4 W resistor through the holes at X649 to hear program audio 6 dB from standard headphones level with Pull/Monitor switch on (pulled out).

### CHANGING LOW-CUT FILTER CORNER FREQUENCY (3 DB DOWN POINT)

*To decrease corner frequency:*

1. Calculate new capacitor value for lower low-cut corner frequency. Use the following formula:

$$C \text{ in } \mu\text{F} = (85/\text{frequency}) - 0.33$$

Example: for 200 Hz corner frequency,

$$85/200 \approx 0.43$$

$$0.43 - 0.33 = 0.1$$

For 200 Hz corner frequency, use a 0.1 μF capacitor.

**NOTE:**

Capacitor must be non-polarized; ceramic or film type; 16V rating or higher.

Pad	Channel	Pad	Channel
X421	1	X451	4
X431	2	X521	5
X441	3	X531	6

2. Locate the following empty pads:

Find all pads near ribbon cable assemblies W811, W812 and W813.

3. Solder a new capacitor through the holes of the empty pads for each channel to be modified.

*To increase corner frequency:*

*Note:* Low-cut corner frequencies much higher than the factory preset of 260 Hz may excessively attenuate desired low- to mid-frequency program material.

1. Locate the following capacitors near empty pads:

Capacitor	Pad	Channel	Capacitor	Pad	Channel
C425	X421	1	C455	X451	4
C435	X431	2	C525	X521	5
C445	X441	3	C535	X531	6

2. Remove the indicated capacitor for each channel to be modified.
3. Calculate new capacitor value for higher high-cut corner frequency. Use the following formula:

$$C \text{ in } \mu\text{F} = (85/\text{frequency})$$

Example: for 400 Hz corner frequency,

$$C = (85/400) = 0.21$$

For 400 Hz corner frequency, use a 0.22 μF capacitor.

4. Solder a new capacitor through the holes of the empty pads for each channel to be modified.

### SLOWING OUTPUT METER FROM "True VU" BALLISTICS

Locate empty pads X691 (at left of VU meter M1). Solder a 100 μF x 6.3 V electrolytic capacitor through the holes of X691. Observe capacitor polarity as marked on the PC board. The response time is now 500 ms with no overshoot. To further slow the meter response, use a larger capacitor value.

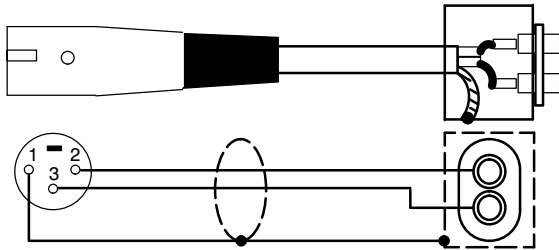
### CHANGING MIC LEVEL OUTPUT IMPEDANCE

Locate resistor R631 (near output transformer T601) and remove it. Locate empty pads X631 (near T601). Solder desired value 1/4 W resistor through the holes of X631. For example, use a 150 Ω, 1/4 W resistor for 150 Ω output impedance.



## ADAPTING LINE OUT TO DUAL BANANA JACK

Add a dual banana jack, balanced, line-level output capability by purchasing a commercial unit (Sescom XLR F-3BP or equivalent), or obtaining a female XLR connector (Radio Shack 274-011 or equivalent), a dual banana jack (ITT 2269 or equivalent), a small utility box, and a short length of high-quality shielded output cable and constructing the adapter shown in Figure 6.



DUAL BANANA JACK OUTPUT  
FIGURE 6

Connect this adapter to the M367 Line output.

## CHANGING MONITOR IN TO AUX IN

**NOTE:**  
This modification disables the M367's monitor function.

Remove resistors R642 and R647 (near Phones potentiometer R648).

Locate empty pads X601 (near output transformer T601) and X643 (near Monitor In jack J863).

Solder a jumper wire from X643 to X601. The Monitor In jack is now an unbalanced (tip positive, sleeve ground) Aux In jack, with an input impedance of 11 k $\Omega$  and a maximum gain to Line Out (loaded with 600  $\Omega$ ) of 17 dB. The Aux In signal is only controlled by the Master control.

To change Aux In gain, locate resistor R605 (near X601). Carefully remove R605 and replace it with a surface-mount resistor (0805 package) of the desired value. If replacing R605 with 15 k $\Omega$ , maximum Aux In to Line Out gain equals 14 dB and input impedance equals 16 k $\Omega$ ; if replaced with 6.8 k $\Omega$ , maximum Aux In to Line Out gain equals 20 dB and input impedance equals 7.8 k $\Omega$ .

## CHANGING MONITOR IN HIGH GAIN (DIP Switch S701 Position 5 Down)

Locate resistor R647 (near Phones potentiometer R648) and remove it. Locate empty pads X647 (near R647). Solder a 330  $\Omega$ , 1/4 W resistor in the holes of X647 for 6 dB gain boost with DIP switch S701 position 5 down (input impedance equals 6.5 k $\Omega$  in this position).

## CHANGING MONITOR IN JACK FROM MONO INPUT TO STEREO SUM INPUT

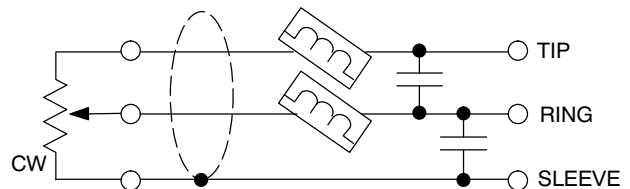
Locate empty pads X645 (near Monitor In jack J863). Solder a 1 k $\Omega$ , 1%, 1/4 W resistor in the holes of X645. The Monitor In jack will now accept a stereo input signal (tip left, ring right, sleeve ground), and sum these signals to the monitor circuit.

**NOTE**  
If using a true stereo feed to drive the M367 Monitor In and another stereo device, the source impedance must be 20  $\Omega$  or less to maintain at least 40 dB separation in the stereo device. Use a stereo distribution amplifier or buffer to maintain optimum stereo separation.

## MASTER GAIN REMOTE CONTROL

**NOTE**  
This modification disables both the M367's monitor function and its front-panel Master gain control.

1. Remove resistor R641 (near Monitor In jack J863).
2. Remove resistor R746 (near Master potentiometer R706).
3. Locate empty pad X702 (near Master potentiometer R706). Solder one end of a 100  $\Omega$ , 1/4 W resistor in the hole of X702. Solder an insulated wire to the other end of the 100  $\Omega$  resistor. Locate empty pad X644 (near jack J863). Solder the other end of the insulated wire to X644.
4. Locate empty pad X701 (next to empty pad X702). Solder an insulated wire to X701. Locate empty pads X645 (near jack J863). Solder the other end of the insulated wire to the empty pad X645 nearest channel 6 input connector J856.
5. Construct a remote control potentiometer/cable assembly as shown in Figure 7.



MASTER GAIN REMOTE CONTROL  
FIGURE 7

Recommended parts are:

Potentiometer, 10-25 k $\Omega$ , linear taper (Radio Shack 271-1715)

1/4 in. Stereo Phone Plug (Switchcraft 280)

Ferrite Bead Rings (Ferronics 21-031J)

Capacitors, ceramic, 0.001  $\mu$ F, 50 V

Cable, 2-conductor, shielded, 50 ft maximum (15 m)

Ferrite bead rings and capacitors should be as close to the phone plug as possible.

6. Insert the phone plug in the Monitor In jack. The remote control potentiometer now controls M367 gain with a control taper similar to that of the Master gain control.

## CHANGING LIMITER RELEASE TIME TO ONE SECOND

Remove resistor R741 (about 15 mm behind ribbon cable assembly W813).

## CHANGING LIMITER THRESHOLD PRESETS

1. Select the equivalent resistor values for the desired limiter thresholds from the following table. Then fill in the following work sheet with the resistor selections.

Limiter Threshold (dBm into 600 Ω)	R <sub>equiv</sub> (kΩ)	Limiter Threshold (dBm into 600 Ω)	R <sub>equiv</sub> (kΩ)
0	18	10	81
1	21	11	93
2	25	12	105
3	30	13	122
4	35	14	139
5	41	15	156
6	47	16	175
7	54	17	194
8	62	18	215
9	71		

DIP Switch S701		Limiter Threshold		R <sub>equiv</sub> (above)
Position 2	Position 3	—	dBm	—
up	up	high	_____	kΩ = R1
down	up	med. high	_____	kΩ = R2
up	down	med. low	_____	kΩ = R3
down	down	low	_____	kΩ = R4

2. Remove resistors R721, R731, R732, R733, R734 and R735 (surrounding IC U704).
3. Locate empty pads X732, X733, X734 and X735 (surrounding IC U704).
4. Select a 1/4 W, 1% resistor closest in value to R1 (from the work sheet), and solder it to the holes of X732.

*Note:* Use parallel or series combinations of resistors to match the chosen values as closely as possible if 1% resistors are not available.

5. Calculate resistor R5 value as follows:

$$R5 = \left( \frac{1}{\frac{1}{R2} - \frac{1}{R1}} \right)$$

Select a 1/4 W, 1% resistor closest in value to R5 and solder it to the holes of X733.

6. Calculate resistor R6 value as follows:

$$R6 = \left( \frac{1}{\frac{1}{R3} - \frac{1}{R1}} \right)$$

Select a 1/4 W, 1% resistor closest in value to R6 and solder it to the holes of X734.

7. Calculate resistor R7 value as follows:

$$R7 = \left( \frac{1}{\frac{1}{R4} - \frac{1}{R1} - \frac{1}{R5} - \frac{1}{R6}} \right)$$

Select a 1/4 W, 1% resistor closest in value to R7 and solder it to the holes of X735. (See *Changing Limiter Threshold Presets: Samples Calculations* later in the *Appendix* for an example of limiter threshold preset component calculations.)

## CHANGING LIMITER THRESHOLD PRESETS: SAMPLES CALCULATIONS

For the following limiter thresholds:

DIP Switch S701		Limiter Threshold		R <sub>equiv</sub>
Position 2	Position 3	—	dBm	—
up	up	high	12	105 kΩ=R1
down	up	med. high	8	62 kΩ=R2
up	down	med. low	4	35 kΩ=R3
down	down	low	0	18 kΩ=R4

1. Obtain a 105 kΩ, 1/4 W, 1% resistor and solder it to the holes of X732.
2. Obtain a 150 kΩ, 1/4 W, 1% resistor and solder it to the holes of X733.

$$R5 = \left( \frac{1}{\frac{1}{62,000} - \frac{1}{105,000}} \right) = 151.4 \text{ k}\Omega$$

3. Obtain a 52.3 kΩ, 1/4 W, 1% resistor and solder it to the holes of X734.

$$R6 = \left( \frac{1}{\frac{1}{35,000} - \frac{1}{105,000}} \right) = 52.5 \text{ k}\Omega$$

4. Obtain a 49.9 kΩ, 1/4 W, 1% resistor and solder it to the holes of X735.

$$R7 = \left( \frac{1}{\frac{1}{18,000} - \frac{1}{105,000} - \frac{1}{150,000} - \frac{1}{52,300}} \right)$$

$$= 49.4 \text{ k}\Omega$$

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