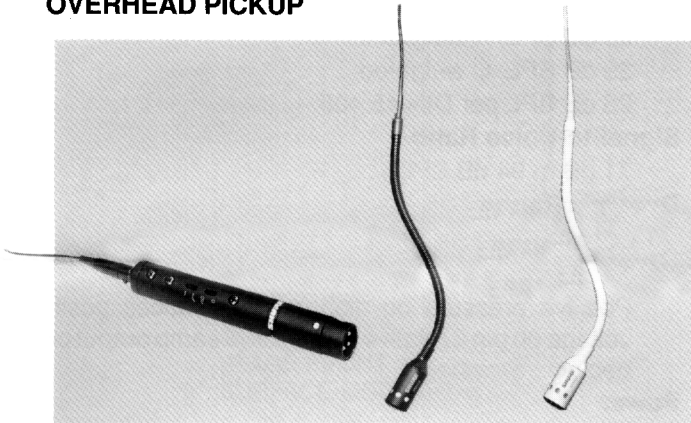


SHURE®

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Model SM102 User Guide

MODEL SM102 *microflex*® MINIATURE CONDENSER MICROPHONE FOR OVERHEAD PICKUP



GENERAL

The SM102 Miniature Condenser Microphone is primarily intended for pickup of vocal groups in choir or concert performance. This Model, supplied with an attached 6-inch gooseneck, is designed to be suspended over the heads of the performers. The microphone is available either in black, as Model SM102B, or white, as Model SM102W; each with matching cable. One of the two color options will allow the microphone to blend unobtrusively with most surroundings.

The high sensitivity of the SM102 microphone facilitates distant pickup while its unidirectional cardioid polar pattern minimizes ambient noise pickup. The smooth, flat response of the microphone-preamplifier combination provides faithful reproduction of male and/or female voices. The microphone is also suitable for overhead pickup of musical instruments in solo or group performance.

The furnished ILP-1 preamplifier is a high-clipping level low-noise unit, phantom powered by 11 to 52 Vdc. It has switchable low-frequency response, flat or low cut (rolled off at 12 dB/octave), and selectable gain of 0 or +10 dB. The low cut is useful when it is desirable to minimize ambient low-frequency noise from sources like heating or air-conditioner fans, for instance. In addition, the windscreen supplied with the microphone can be used to reduce sensitivity to air motion, indoors from fans or outdoors from wind.

The gooseneck fitting permits accurately aiming the microphone toward the sound source. Balanced weight distribution of the SM102 securely immobilizes the microphone in the desired configuration when it's suspended overhead for long periods of time. To accommodate most

setups, approximately 9 m (30 ft) of attached cable, matching the microphone color, is furnished between the gooseneck and the preamplifier connector. Additional lengths of cable (with Switchcraft Tini Q.G. connectors at each end) can easily be added between the microphone and preamp if needed.

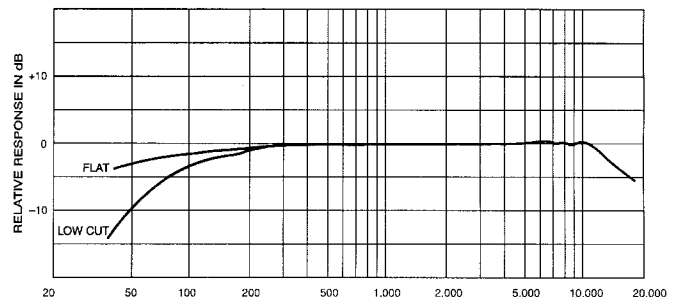
Features:

- High output unidirectional condenser cartridge permits distant pickup of desired signal with minimal background noise
- Smooth, flat response of microphone and preamplifier for natural audio quality
- High clipping-level, low noise preamplifier
- Low-cut switch on preamplifier permits reduction of low-frequency ambient noise when required
- Switch selectable preamp gain of 0 or +10 dB
- Accepts phantom power of 11 to 52 Vdc, permits use of wide variety of amplifiers or phantom supplies
- Standard 3-pin male XLR-type output connector on preamp can be directly connected to any 3-pin female XLR-type phantom-powered input
- White or black finish of microphone, gooseneck, and cable, unobtrusive against most backgrounds
- Gooseneck fitting immobilizes microphone configuration in desired location and direction, aimed toward sound source
- Supplied windscreen reduces sensitivity to air-motion or wind noise
- Bracket furnished with tube-shaped preamp simplifies fixed installation

SPECIFICATIONS

Frequency Response

50 to 18,000 Hz (see Figure 1)

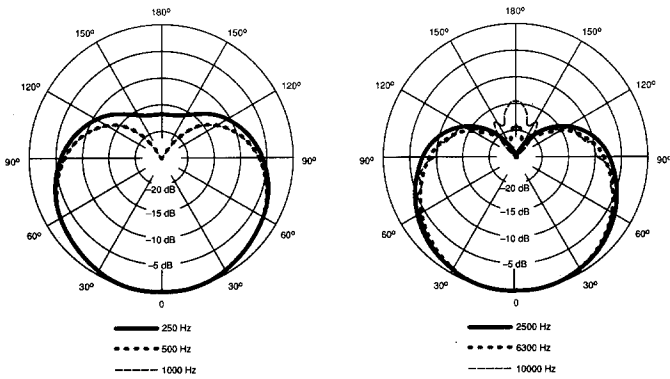


TYPICAL FREQUENCY RESPONSE

FIGURE 1

Polar Pattern

Cardioid, unidirectional, uniform with frequency, symmetrical about axis, see Figure 2



TYPICAL POLAR PATTERN
FIGURE 2

Output Impedance

Rated at 150 Ω (90 Ω actual)
Recommended minimum load impedance: 800 Ω
(May be used with loads as low as 150 Ω with reduced clipping level)

Output Level (at 1,000 Hz)

Open Circuit Voltage -69.5 dB (0.33 mV)
0 dB = 1 V/μbar

Preamplifier Output Clipping Level (at 1,000 Hz, less than 0.1% THD)

GAIN

	0	+10
800 Ω load	0 dBV (1.0 V)	-7.0 dBV (0.45 V)
150 Ω load	-13.0 dBV (0.22 V)	-21.0 dBV (0.09 V)

Maximum SPL (at 1,000 Hz, less than 1.0% THD)

800 Ω load
ILP-1 gain set at 0 dB 145 dB
ILP-1 gain set at +10 dB 128 dB

150 Ω load

ILP-1 gain set at 0 dB 134 dB
ILP-1 gain set at +10 dB 116 dB

Electromagnetic Hum Pickup (maximum)

-3 dB equivalent SPL in 1 mOe field (60 Hz)

Preamplifier Controls

Selectable Low-Frequency Response: Flat/Low Cut
(12 dB/octave rolloff below 80 Hz)

Selectable Gain: 0/+10 dB

Output Noise

23 dB SPL, A-weighted
29 dB SPL, C weighted
25 dB SPL per DIN 45 405

Signal-to-Noise Ratio

71 dB re 94 dB SPL

Dynamic Range

122 dB (800 Ω load, gain set at 0 dB)

Phasing

Positive pressure on diaphragm produces positive voltage on pin 2 relative to pin 3 of preamp output connector

Power

11 to 52 Vdc phantom (simplex) voltage (operational down to 9 Vdc with reduced clipping level); current drain 2.2 mA at 52 Vdc, 1.8 mA at 11 Vdc

Case

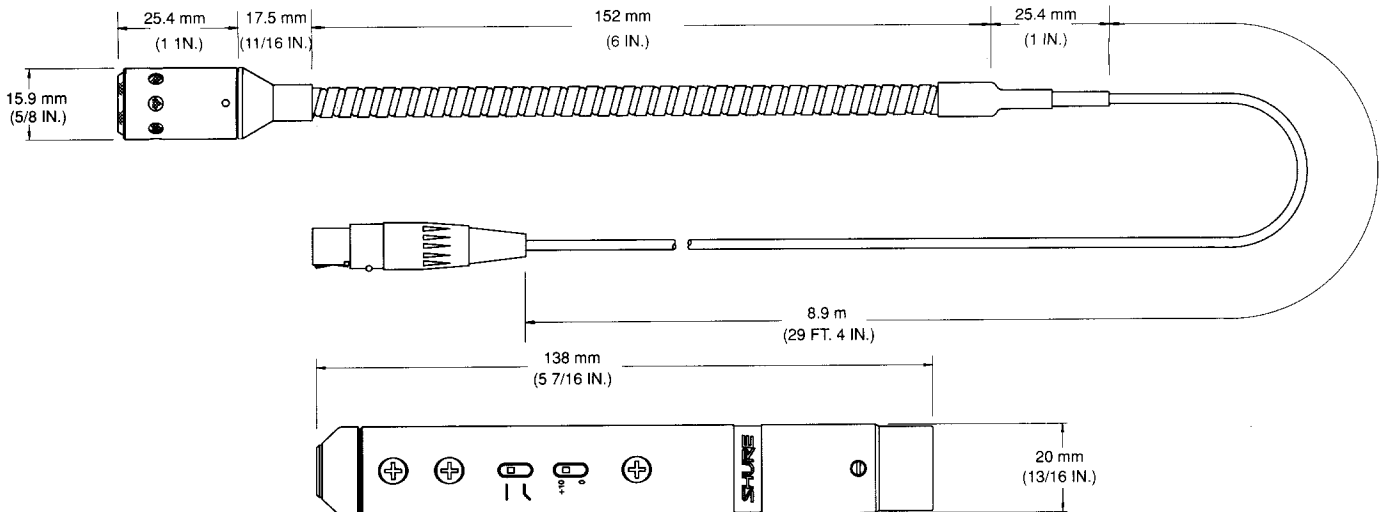
Preamp: steel, matte black enamel finished
Microphone Housing: brass, matte black or off-white enamel finished
Gooseneck: steel, matte black or off-white enamel finished

Environmental Conditions

Operating Temperature: -18 to 57° C (0 to 135° F)
Storage Temperature: -29 to 74° C (-20 to 168° F)
Relative Humidity: 0 to 95%

Dimensions

See Figure 3



OVERALL DIMENSIONS
FIGURE 3

Net Weight

Gooseneck microphone assembly: 142 g (5 oz) including cable and connector

Preamplifier: 170 g (6 oz)

Furnished Accessories

Mounting Clamps (2) 80A476
Hang Clip 80B489 (Black), 80A489 (White)
Windscreen 49A102 (Black,) 49B102 (White)

Optional Accessories

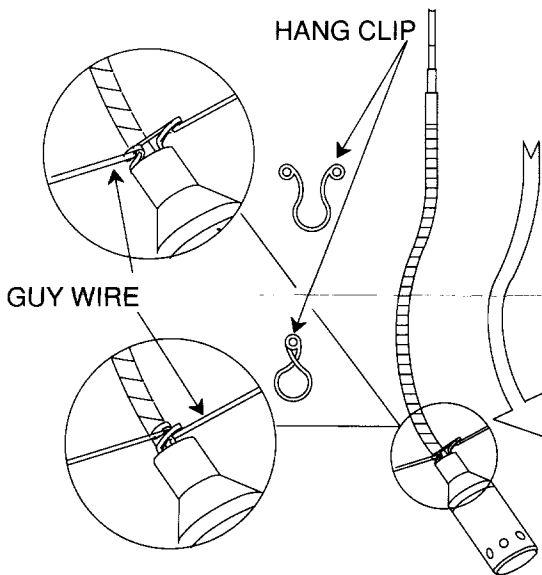
Desk Stand80A476
Stand Adapter90MB2600

INSTALLING THE MICROPHONE

Use a hook or other suitable means to suspend the microphone from its cable in the desired location at an appropriate height above the performers. Devise a method to prevent abrading the microphone cable area that contacts the fixture from which it is suspended.

The microphone is most stable when the gooseneck is bent into a "lazy S" shape as shown in Figure 4. Tests at Shure have shown that the microphone will maintain its position and orientation indefinitely if it is undisturbed in its suspension. However, at times a more positive method to control location and orientation is desirable.

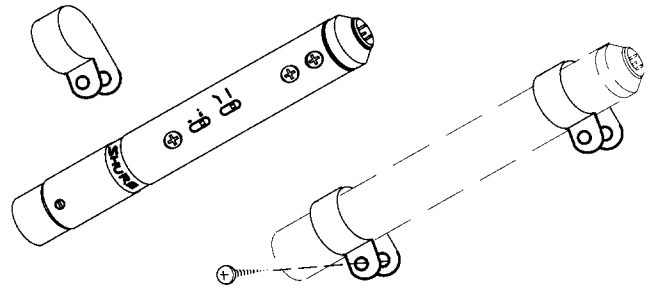
The supplied small hang clip (loop with eyelets) can be used as shown below with a guy wire when additional stabilization in a particular position is required. Fishing line can be threaded through the eyelets to hold the microphone in position.



MOUNTING METHODS, MICROPHONE

FIGURE 4

The supplied mounting clamps are intended to hold the preamplifier in place in permanent installations (see Figure 5). Use either one or two clamps depending on location and application.



MOUNTING CLAMPS, PREAMPLIFIER

FIGURE 5

AREA MIKING

General Rules

When overhead hanging microphones are used for either vocal or instrumental pickup, the same general rules apply as in other multiple microphone installations.

1. Use the minimum number of microphones necessary.

This reduces pickup of ambient noise and allows higher gain before feedback from the sound reinforcement system.

2. To minimize feedback, locate microphones for minimum loudspeaker pickup.

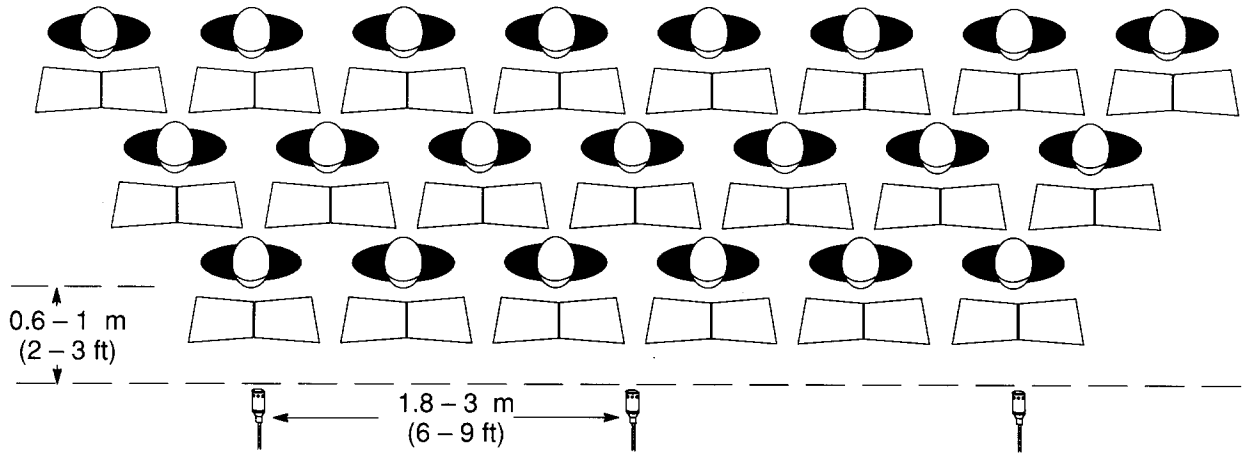
*For **cardioid** microphones such as the SM102, the greatest sound rejection is directly to the rear. Therefore, aim the rear of the SM102 toward the loudspeaker if possible. Avoid aiming the front pickup area of the microphone directly at the loudspeaker; and keep the microphone as far away from the loudspeaker as practical. Always check out the setup well before any performance.*

Microphone Placement

Note that, if overhead microphones are used for sound reinforcement, the placement guidelines that follow may have to be compromised in order to avoid feedback. Location of loudspeakers, room acoustics, or other factors may require the microphones to be placed closer to the sound source or in different locations from those described below.

A. Choir Pickup

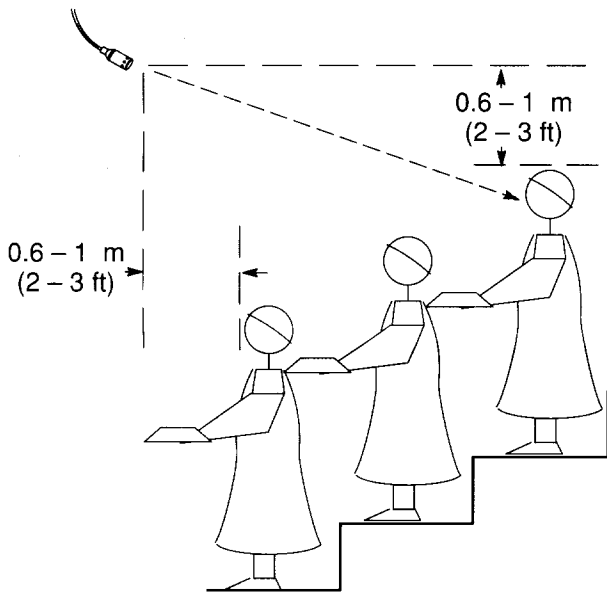
1. Hang the microphone approximately two to three feet in front of the first row that is covered by that microphone, and approximately two to three feet higher than the heads of singers in the last row covered by the microphone (see Figures 6 and 7.) For a choir with three or four rows, for example, this results in an effective pickup width of 5 to 6 meters (15 to 18 feet) for each microphone.
2. Adjust the SM102's flexible gooseneck so that the microphone is aimed at the back row of the choir (see Figure 7). This compensates for the varying distances from the microphone to each row, by placing the nearest singers slightly off-axis to the microphone. Using this positioning, the difference in level between the first and last rows will be limited to approximately 3 dB.



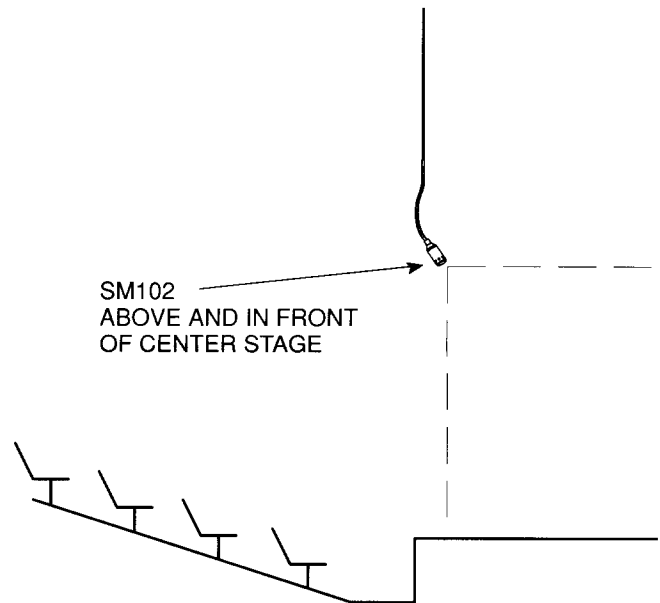
CHOIR – TOP VIEW
FIGURE 6

3. Use only enough microphones to provide even coverage.
4. If necessary, use guy wires to prevent microphones from moving as a result of structure vibrations or air currents. (See illustration of hang clip and guy wire in Figure 4 above.)

in front of that area (see Figure 8). This ensures that sound from center stage will be closest to the center microphone, resulting in optimum sound quality. If necessary, additional microphones can be placed on each side of or further up-stage from the center stage microphone.



CHOIR – SIDE VIEW
FIGURE 7



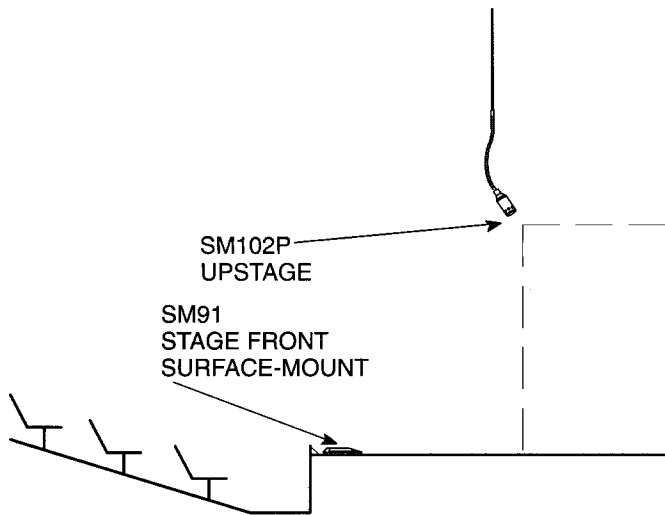
THEATER WITH SUSPENDED MICROPHONES ONLY
FIGURE 8

B. Theater Pickup

Overhead microphones can be effectively used for sound reinforcement in live theater applications. Since most of the important action takes place at or near center stage, it is desirable to hang one SM102 above and slightly

Note that using the center-stage microphone as an “anchor” dictates that an odd number of microphones be used across the stage for uniform coverage.

In some theaters, the front of the stage is located forward from the proscenium, making the use of hanging microphones impractical. In this case, surface-mount microphones (such as the Shure SM91) can be placed on the stage floor in the footlight area, supplemented by hanging microphones upstage (see Figure 9.) Surface or “boundary effect” microphones are designed to take advantage of the reflected signal from the floor, without causing phase cancellation or comb filtering. Again, use a center microphone for best pickup of important dialogue.



THEATER WITH SUSPENDED AND SURFACE-MOUNT MICROPHONES

FIGURE 9

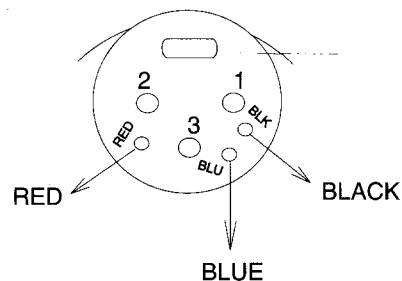
DISASSEMBLING AND REASSEMBLING THE ILP-1

1. At the XLR-3 end of the preamplifier, turn the slotted head setscrew fully inward (counterclockwise), and use a long-nose pliers to withdraw the connector from the case.
2. Unsolder the three lead wires from the XLR-3 board.

3. Remove all four Phillips-head screws from the ILP-1 case (three on the switch side, one on the back).
4. Grasp the end cap and withdraw the cap assembly, pc board assembly, and connecting wires and jacks from the case.

REASSEMBLY

1. Make sure the pc board is seated in the slot of the endcap and that no wires are pinched.
2. With the XLR-3 connecting wires foremost, feed the endcap-board assembly into the case. Again, take care not to pinch the wires connecting the board to the endcap.
3. Rotate the assembly until the four holes for Phillips screws line up with the holes in the case.
4. Replace the four Phillips screws.
5. Resolder the three lead wires to the back of the XLR-3 board as shown below.

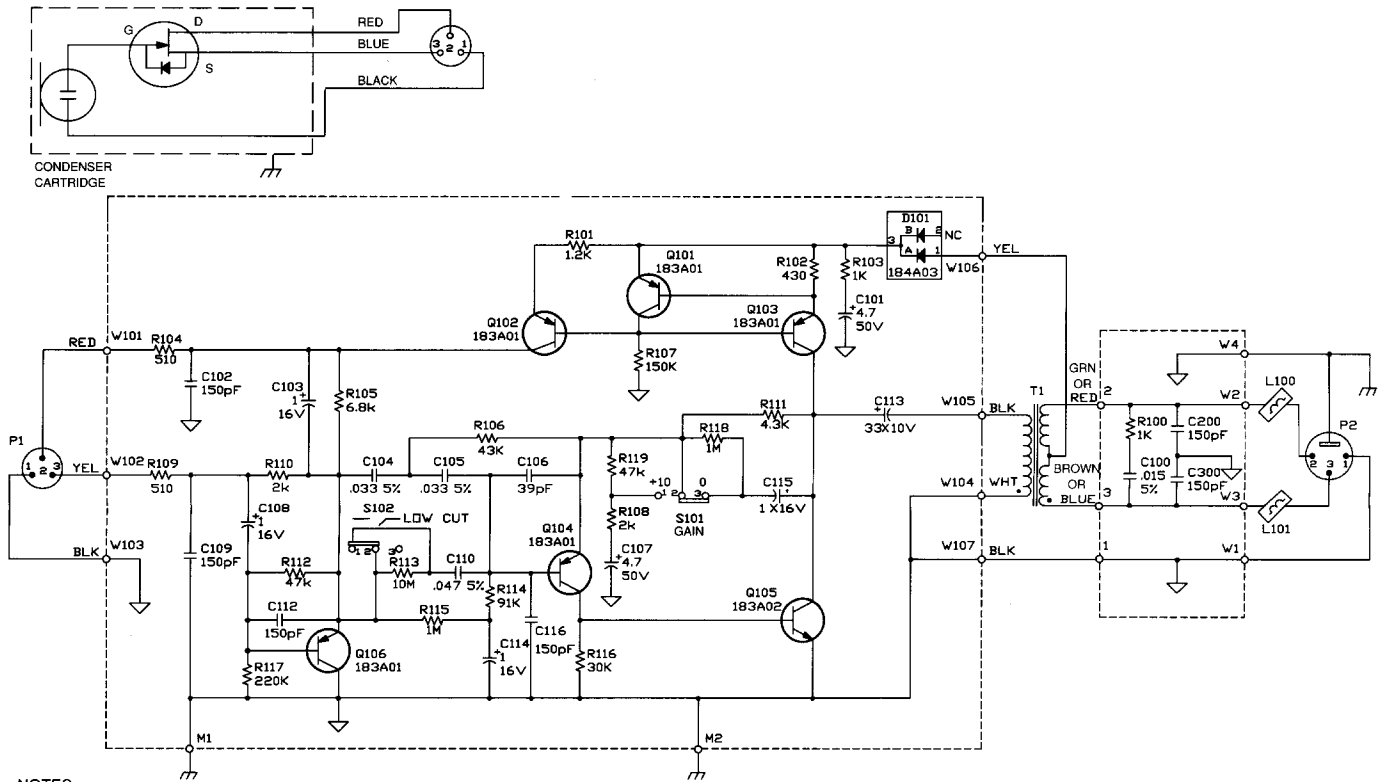


WIRING TO XLR-3 PC BOARD TERMINALS

FIGURE 10

6. Replace the XLR-3 board-connector assembly in the case lining up the key in the connector with the slot in the case. Take care not to engage the butterfly-shaped ground contact in the key slot as it will prevent seating the connector properly.
7. Insert the connector fully in the case until the slotted setscrew can be seen in the case hole; tighten the setscrew firmly by turning it clockwise.

Reference Designation	Part Number	Description	Commercial Alternate
Preamplifier			
A1	90B4220	ILP-1 Preamplifier Assembly	None
A2	90HZ2600	Pc Board Assembly	None
MP1	66A264	Preamp Switch Cover	None
MP2	80A476	Mounting Clamp	All States 3/4-HNB
P1	95A8077	Plug Assembly, Male, Mini	Switchcraft, TB3M Tini
P2	90HV2600	XLR-3M Connector and Pc Board Assembly	None
Microphone			
A3	90GT2600	Microphone Cartridge and Housing (Black)	None
A4	90GV2600	Microphone Cartridge and Housing (White)	None
MP3	49A102	Windscreen (Black)	None
MP4	49B102	Windscreen (White)	None
MP5	80A489	Hang Clip (White)	Richco KL-250 (White)
MP6	80B489	Hang Clip (Black)	Richco KL-250 (Black)



- NOTES:
- 1 UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/8 WATT, 5%.
 - 2 UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS IN μ F, 10%, 50 V OR GREATER. ELECTROLYTIC CAPACITORS SHOWN IN μ F X VOLTS, 20%.
 - 3 THE FOLLOWING SYMBOLS DENOTE:
 PC BOARD GROUND
 CHASSIS GROUND

**CIRCUIT DIAGRAM
FIGURE 11**