

NOISE-CANCELING TRANSISTORIZED MICROPHONE**GENERAL**

The Shure Model 488T Microphone is designed for clear, crisp, natural voice reproduction combined with a highly effective noise-canceling function. The microphone is FAA Certified for aircraft application (TSO-C58).

Model 488T incorporates the Shure CONTROLLED MAGNETIC[®] Cartridge in a high-quality, extremely reliable, hand-held unit of professional design, small size, and light weight. The transistor amplifier of the Model 488T is designed to match carbon microphone type input circuitry.

Noise cancellation in the 488T microphone is obtained through the combination of highly directional operation and superior discrimination against noise or unwanted sounds from a relatively distant source. The microphone rejects sounds originating at distances over 15 cm (6 inches). This means that engine noise, wind noise, propeller noise, noise from vibrating panels and all other sources are discriminated against.

The shaped frequency response of the microphone optimizes performance in the frequency range of 200 to 4,000 Hertz, further eliminating sounds outside the desired frequency range and achieving proper control of those sounds within the desired voice range.

Microphone Features:

- Built-in transistor amplifier (powered by carbon microphone type circuit)
- Frequency response from 200 to 4,000 Hz, shaped for voice communications use
- Small, light, compact case for minimum space and maximum handling comfort
- Rugged leaf-type switch stands up under severe operating conditions and constant use
- High-impact ARMO-DUR[®] case—lighter and stronger than die-cast metal, comfortable to the touch in hot or cold weather
- Rugged and dependable under all operating conditions
- Long-life, neoprene-jacketed coil cord
- FAA Certified for aircraft use
- Supplied with PJ-068 connector on cable

APPLICATIONS

The Model 488T Noise-Canceling Transistorized Microphone is designed to provide highly intelligible speech communication under all types of noise conditions. It is specifically designed for use in all kinds of commercial and private aircraft. The Model 488T is FAA Certified for aircraft operation.

This microphone features distance discrimination that provides unparalleled intelligibility even when the operator cannot hear his own voice.

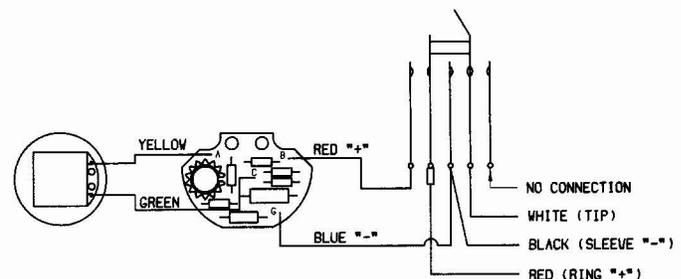
**ACOUSTIC CONSIDERATIONS**

The Model 488T microphone rejects noise through its inherent directional properties and discriminates against unwanted sounds arriving from a distance in favor of sounds from a near source. The microphone operates on the pressure-gradient principle and has two sound entry ports, spaced a small distance apart.

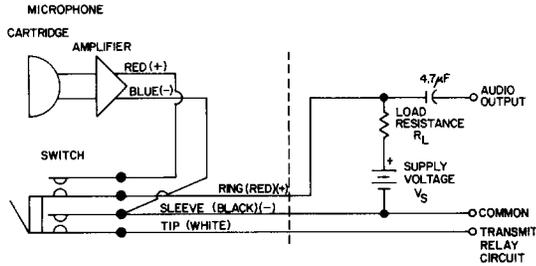
In order to obtain the best performance with this microphone, it must be used as "close-talking." The lips should be as close to the microphone grille as possible (pressed against the rubber lip guard), with a distance of up to 25 mm (1 in.) from the grille providing the greatest discrimination between voice sounds and background noise.

CONNECTIONS

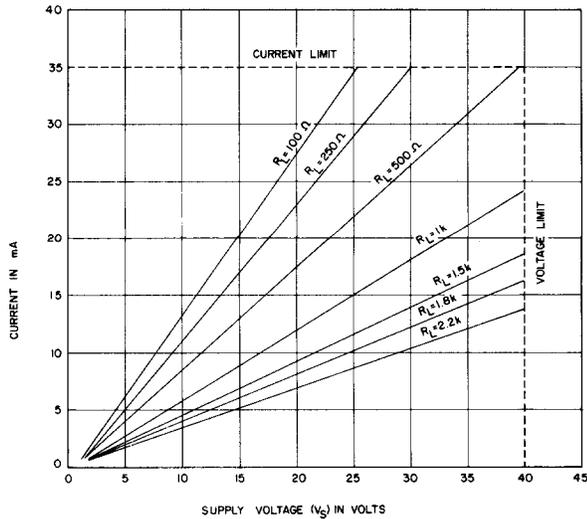
The Model 488T is a low-impedance transistor-amplified microphone with a three-conductor coiled-cord cable, an attached PJ-068 two-circuit phone plug, and a double-pole single-throw leaf-type switch to control the microphone circuit and an external relay or switching circuit. The RING (RED lead) is connected to the microphone circuit. The TIP (WHITE lead) controls the relay or switching circuit. The SLEEVE (BLACK lead) is common to the microphone and relay circuits.

**INTERNAL CONNECTIONS
FIGURE 1**

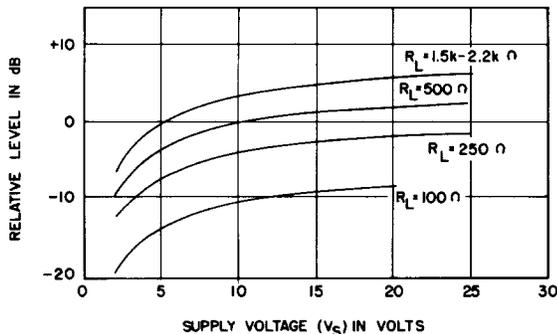
The internal switch connections of the Model 488T are shown in Figure 1 and a typical external operating circuit is shown in Figure 2. The design parameters of the operating circuit (supply voltage, load resistance, current, and sensitivity) may be selected using the curves shown in Figures 3 and 4. If, for instance, the available supply voltage is 16 Vdc and a current drain of 8 mA is desired, Figure 3 shows that a load resistance (R_L) of 1.5 k is necessary. In Figure 4, it can be seen that with a supply voltage of 16 Vdc and a load resistance of 1.5k, the relative sensitivity is approximately +6 dB higher than the specified output level of -5 dB with 10 Vdc and a 500-ohm load (see Specifications).



TYPICAL OPERATING CIRCUIT
FIGURE 2



MAXIMUM VOLTAGE AND CURRENT LIMITS
FIGURE 3



SENSITIVITY AS A FUNCTION OF SUPPLY VOLTAGE
AND LOAD RESISTANCE
FIGURE 4

CAUTION: The following should be observed to avoid damage to the Model 488T:

1. Supply voltage (V_S) must be between 2 and 40 Vdc. Voltages in excess of 40 Vdc may substantially reduce the life of the microphone amplifier. Voltages less than 2 Vdc are not sufficient for microphone amplifier operation (although no damage will result).

2. The top (dashed) line of Figure 3 determines the maximum allowable current (dissipation limit) for various combinations of supply voltages and load resistances.
3. Make certain proper polarity is followed for the phone plug RING (+) and SLEEVE (-) circuits as shown in Figures 1 and 2. In mobile and aircraft equipment installations, vehicle battery polarity verification is extremely important.

MOUNTING

The Model 488T is supplied with a mounting bracket to provide a snap-in hang-up for the microphone when not in use. The bracket has mounting holes with clearance for No. 8 screws (see Figure 6).

OPERATION

No special precautions beyond ordinary care are necessary in operating the 488T microphone. It will operate satisfactorily under most conditions of temperature and humidity. Dropping the microphone or other severe mechanical shocks should be avoided.

MODULATION LEVEL ADJUSTMENT

For optimum operation of your transmitter, it is important to have proper modulation. Proper modulation will give undistorted transmissions, greater range, and less interference from static.

To obtain proper modulation, the following points should be considered:

1. TALK CLEARLY AT NORMAL SPEAKING LEVELS. TALK DIRECTLY INTO THE GRILLE OF THE 488T, WITH THE LIPS AS CLOSE TO THE GRILLE AS COMFORT WILL PERMIT, A DISTANCE OF APPROXIMATELY 6 MM (1/4 IN.) GIVING THE ULTIMATE IN DISCRIMINATION AGAINST UNWANTED ACOUSTIC NOISES. USE THE RUBBER LIP GUARD FOR PROPER PLACEMENT OF MOUTH.
2. In the majority of applications, the 488T will work properly when simply plugged into the transmitter. If you want to check modulation or if you suspect improper modulation level, read points a and b.
 - a. When using the 488T to replace another make or model microphone, it is desirable to check the modulation to make sure it is set to the transmitter manufacturer's specifications. This is because the 488T may have more or less output than the previous microphone, depending upon the specific transmitter. The modulation control in aircraft transmitters will always provide proper adjustment when using the 488T. This check should always be made when installing any new microphone and should only be made by qualified persons.
 - b. If the 488T has excess output, resulting in over-modulation or distortion, the gain of the 488T transistor amplifier may be reduced 6 dB.

To modify the 488T for reduced output, proceed as follows:

1. Remove the three No. 5-40 round head screws and washers from the back of the microphone case. (Caution: the microphone case is spring-loaded and care must be taken to hold the two halves of the microphone case firmly together.)
2. Separate the case front and back. See Figure 5.
3. Note transistor amplifier board at the bottom of the front case half. Clip leads of the indicated resistor at the upper right hand side of the transistor amplifier board. This reduces the output level approximately 6 dB.

To reassemble microphone proceed as follows:

1. Be certain that the cartridge shield retaining springs are in proper position.
2. Place case back on case front and firmly press cases together; fasten with the three No. 5-40 screws and washers previously removed.

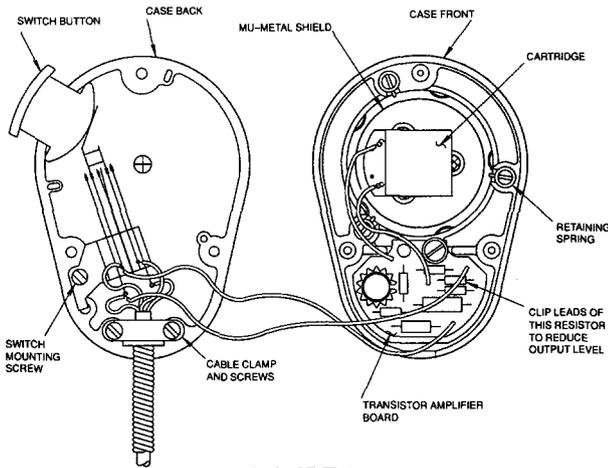
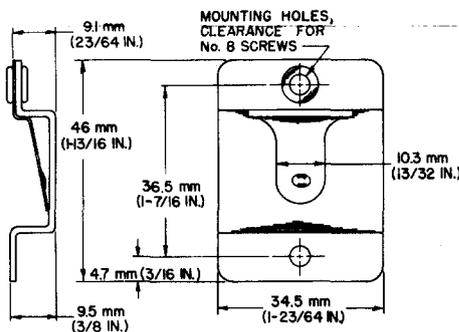


FIGURE 5

FAA CERTIFICATION

The Model 488T is FAA certified for aircraft use and is within the FAA TSO-C58 requirements. To maintain this FAA certification, any service required for the Model 488T must be performed by Shure Brothers Inc. or by an FAA approved service facility.

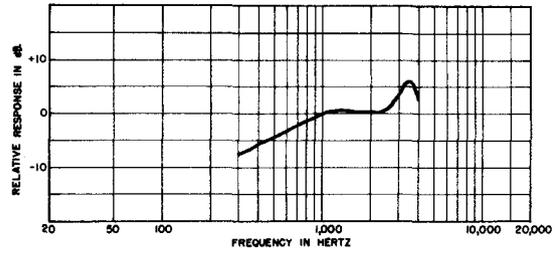


MOUNTING BRACKET
FIGURE 6

SPECIFICATIONS

- Type**
CONTROLLED MAGNETIC®, Noise-Canceling (with transistor amplifier)
- Frequency Response**
200 to 4,000 Hz (see Figure 7)
- Load Impedance Range**
100 to 2,200 ohms (see Figures 3 and 4)
- Output level (at 1,000 Hz, 5/16 in.)**
-5.0 dB (.560 V) with 10 Vdc, 500-ohm load
(0 dB = 1 volt per 100 microbars) (See Figure 4)

DC Supply Voltage and Current
2 to 40 Vdc (see Figure 3)



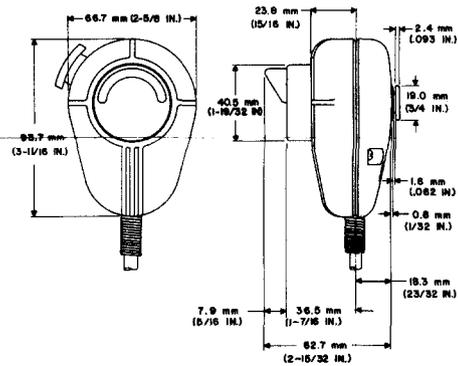
TYPICAL FREQUENCY RESPONSE
FIGURE 7

Switch
Double-pole, single-throw, leaf-type, push-to-talk

Cable
Nondetachable, 1.7m (5½ ft), 3-conductor, tinsel, neoprene-jacketed, coil cord with PJ-068 2-circuit phone plug on equipment end

Case
High-impact ARMO-DUR® with perforated steel grille and rubber lip guard

Dimensions
See Figure 8



OVERALL DIMENSIONS
FIGURE 8

Net Weight
340 grams (12 oz)

Packaged Weight
510 grams (18 oz)

Certification
FAA certified for aircraft use within TSO-C58

FURNISHED ACCESSORY

Mounting Bracket (3 in kit) RK6MB

REPLACEMENT PARTS

Cartridge Assembly R88T
Switch 90A2990
Cable C22C