

# Application Note

## Lead Free Soldering Notes for ECM Microphone

Electret Microphones suffer from heat and/or electrostatic related damage if not handled properly. The internal JFET should be treated with the same respect as CMOS IC's. A properly grounded soldering iron, and ESD protected workstation, is required. Timing (solder dwell time) and heat sink are also imperative. The FET is somewhat heat sensitive, but the Condenser Diaphragm and plastic chassis are usually the victims in heat damage. They can become distorted causing a change in sensitivity, an increase in audio distortion, or even failure.

### Minimum Recommended for Electret Soldering:

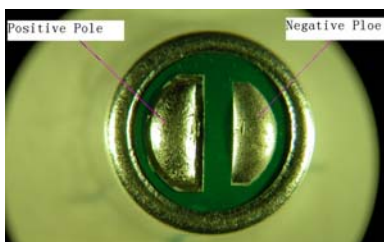
1. **Soldering Iron:** 25 to 60 Watt ESD safe (i.e. Hakko 936 solder station) Tip: smallest practical (R0.2mm) for 4.0 series; R0.5mm tip for 4.5, 6.0 & 9.7 series.
2. **Solder Type:** Lead free soldering tin (i.e. Sn/Ag/Cu RMA98 Super). Soldering tin Diameter: 0.4mm for 4.5 & 4.0 series; 0.5mm for 6.0 & 9.7 series.

(Note: Care should be taken with the use of flux, flux which leaks into the microphone will cause damage.)

3. **Soldering Temperature:**

9.7 series:	350+/-20C(660+/-30 Degrees F)
4.5 & 6.0 series:	330+/-20C (620+/-30Degrees F)
	for negative pole, 270+/-20C
	(520+/-30 Degree F) for positive pole.

(Figure 1 – 6.0 series)



4. **Soldering Time:** <3 seconds total. (Iron contact to removal time). Soldering alternation between positive pole and negative pole: Less than 10 seconds.

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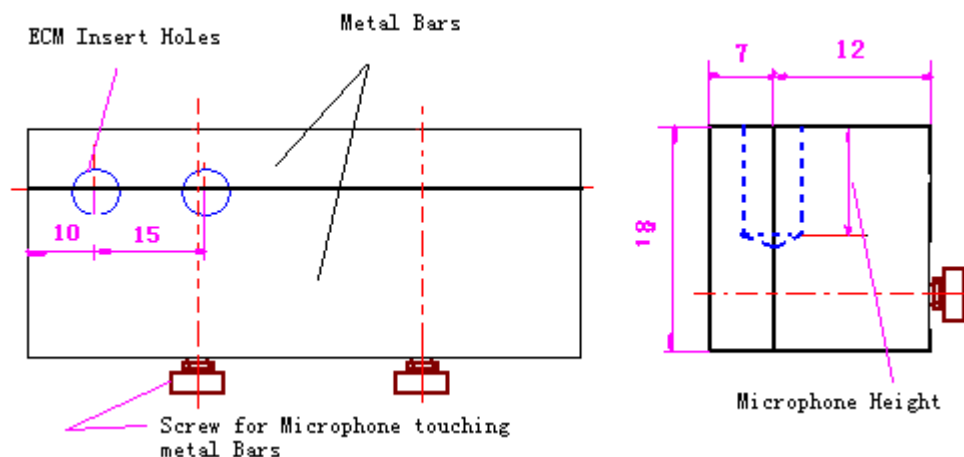
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5. **Holder Heat Sink:** A good thermal conducting material (Brass, Aluminum, Copper) in bar form to be fabricated with corresponding diameters when two bars are positioned together. The bars should have appropriate diameter drilled holes that are properly vented to not allow any pressure to form on diaphragms. (See **Figure 2** below)



**Figure 2**

6. **Clean up:** Not necessary if above solder is used. If cleaning is opted; care must be taken not to allow any cleaning liquid to contact the front of the unit (diaphragm end). This can saturate the condenser, causing it to completely short out. Even after drying, residue can prevent the diaphragm's free movement. Aerosols of any kind should not be used. Cements i.e. cyanoacrylate need to properly vent when used to assembly microphones to housings or rubber boots.

(Note: Electret condenser plates are spaced only a few microns apart.)

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