

WEEKEND PROJECT NO 4: HOMEBREW PRE-AMPLIFIED MICROPHONE



Above: Photo showing the ZS11 version of the pre-amp microphone described here.

(Note: This project has been published in PEARS QSX and Radio ZS a while back. The late Colin Robertson ZS2CR originally compiled it. I am of the opinion that the circuit described here must find a way into the shack of serious homebrewers and DX operators alike. I will only concentrate on one circuit here namely the desk/hand pre-amplified microphone. I have renamed the microphone described here as the IC SM8 Clone microphone.)

These days the sophisticated black boxes which most operators use leave little room for modification and experimentation other than the construction of external requirements, namely antennas, power supplies, and microphone circuits. I present here one excellent microphone circuit that will be most useful in the radio- and computer room. This microphone is of low cost, can be easily constructed and work very well in several applications.

What can I use this project for?

1. Desktop microphone for your HF Transceiver.
2. Handheld microphone for your HF Transceiver.
3. Audio pre-amplifier for your Soundcard.
4. Desktop microphone for Echolink use.
5. Desktop/handheld microphone for your VHF/UHF Radio.

Construction

This small circuit will work with all makes of transceivers, ideally with one having a 5 to 8 volt supply available on one of the microphone socket pins.

For Icom, Kenwood and Yaesu rigs the connection is straight forward. If yours is an older rig with a 4 pin mic socket with no voltage available there and you do not want to go fiddling on the inside of the rig, a switched 9v

PP3 externally mounted battery supply can be employed. However, check the manual or circuit of your rig first.

If you are qualified to open up your rig, find a suitable 5 volt source if you can otherwise locate a 12 volt take-off point and reduce this to 8 or 5 volts through a small 78L08 or 78L05 100mA regulator. Additional smoothing of this regulator is essential and pinouts must be correct. Refer to the datasheet for the regulator you use.

Constructing the circuit using the supplied PC board layout is a doddle. Keep to the stated values for best results you may find that a 5K or lesser value for RV1 would be more manageable. If your VHF/UHF rig has a Mic Gain control you may be able to omit this pot entirely. The 2-wire electret mic insert I used was gleaned from a broken telephone handset, but they are readily available from local components suppliers at under R15.00. Note the polarity when soldering onto the mic insert and the electrolytic capacitors.

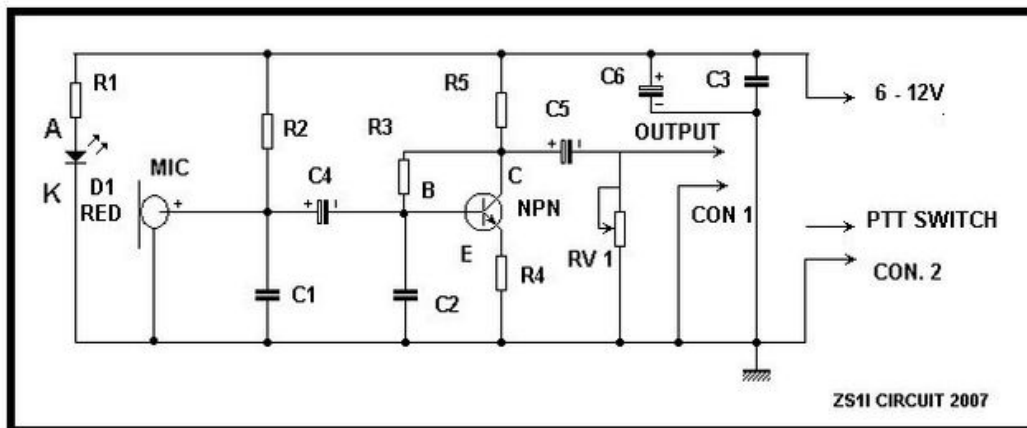
Complete the soldering on the mic insert as quickly as possible so as not to cause heat damage to it. Mic ground and PTT ground are connected together in the microphone plug. The circuit board can be built into an old handheld fist mic or old desk microphone, or with a little ingenuity you can build your own desk mike, as follows:

Use a small metal can or box as the base as well as to house an external PP3 9-volt battery (if used) and the optional "power on" LED, with a push-to-make switch or floor switch for the PTT. Shielded cable from the PC board audio output to the rig is essential. For the gooseneck, round 2.5mm twin and earth "space cable" can be used. This is then soldered or epoxyed onto the base. Either cover the gooseneck cable with black heatshrink tubing or spray-paint it black. The mike insert can be fixed onto the end of the gooseneck with epoxy putty and then hidden under a small foam microphone wind protector cover available from music or electronic shops. The end result can be a neat and professional looking job. This type of desk mic construction could also be adapted to make a hands-free mobile unit.

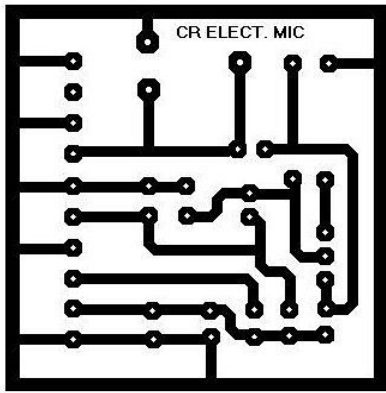
How does it work?

To set up the pre-amplifier output level on a HF rig, one method is to first set up the mic gain on your rig to a maximum of 50% and set the processor off. Then, starting from minimum output, increase the output level to the maximum permitted ALC level or to a point where your RF output indicator peaks full over. **Do not** overdrive the modulation level on your HF transceiver.

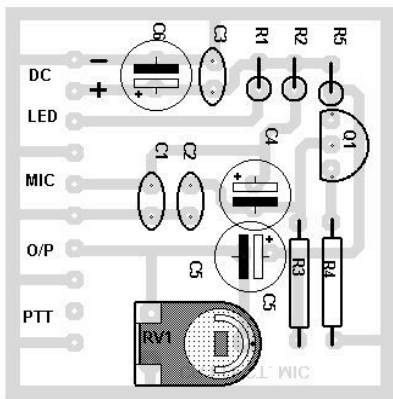
On a VHF/UHF rig, get a friend to monitor your signal on a simplex frequency and increase the output level in divisions of 12, starting from the minimum output position to the point where increasing the gain further results in no further increase in the monitored output level. There should be no need to adjust the internal deviation control in your rig.



Above: Electret microphone preamplifier for use with most makes of transceivers.



Above: PCB foil side (not to scale)



Above: Component overlay (not to scale)

List of Components:

R1 = 200 Ohm
 R2 = 10k
 R3 = 470K
 R4 = 220 Ohm
 R5 = 1K2

C1 = 100 pF Ceramic Capacitor
 C2 = 0.001 uF Ceramic Capacitor
 C3 = 0.001 uF Ceramic Capacitor
 C4 = 1 uF Electrolytic Capacitor
 C5 = 1 uF Electrolytic Capacitor
 C6 = 47 uF Electrolytic Capacitor

D1 = Red LED
 Mic = Electret 2 Pin

Q1 = BC182 NPN Transistor (BC109C, BC549C but check pinouts to ensure correct "polarity".)