Build An Audio Speech Processor
By N1HFX

Although most modern HF rigs have built in speech processors, a lot of the low power SSB rigs and kits do not have any real speech processor circuitry. When one operates at low power on SSB, speech processing becomes almost essential to get through the QRM. The circuit in figure 1 is a low cost speech processor that will perform well with a minimum of construction effort. The circuit even includes the microphone element so that a complete speech processor microphone can be assembled in an old defunct desk mike.

The circuit consists of an audio preamplifier and a feedback amplifier for the necessary speech processing. To use the speech processor, S1 must be closed first. Leaving S1 open gives us a basic preamplified microphone with R5 as the gain control. When S1 is closed, voice peaks from the feedback amplifier trigger Q2 to conduct causing the gate of Q1 to become negative. This action causes the resistance between the drain and source of Q1 to substantially increase. Resistor R1 allows a small amount of audio to pass during very large voice peaks. This circuit is similar to the audio muting switch found in many QRP transceiver circuits. Capacitor C2 smoothes out the voice limiting action while C6 provides a time delay giving us the fast attack, slow release action.

The gain of the preamplifier is set by R3 and R4 giving us a voltage gain of 100. The feedback amplifier's gain is set by R6 and R7 and is set at a voltage gain of 10. Because of the large amount of gain in the circuit, background noises (even music) can easily be picked up in a noisy room. It is recommended that this circuit only be turned on in a relatively quiet environment. If desired, the level of compression can be made adjustable by replacing R7 with a 1K resistor and a 10K or 47K potentiometer as in figure 2. If a different microphone than a condenser element is used, remove R13 and R14 from the circuit. It may be necessary to increase or decrease R7 for different microphones or to use the circuit in figure 2.

While speech processors can make a difference getting through the QRM, they can cause unnatural sounding voice audio and should not be used when chatting locally. S1 provides an easy on/off switch for the speech processor during the local rag chew.

This circuit can be easily constructed on any universal PC or perf board and should be housed in some type of metal enclosure to keep RF out. All parts are available at Radio Shack for those who hate mail order.

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Parts List

R1	22K ¼ Watt Resistor
R2	1Meg ¼ Watt Resistor
R3,R6,R11	1K ¼ Watt Resistor
R4	100K ¼ Watt Resistor
R5	10K Potentiometer (RS271-1721)
R7	10K ¼ Watt Resistor
R8	10 Ohm ¼ Watt Resistor
R9,R10,R12	47K ¼ Watt Resistor
C1,C2,C5	.1 Microfarad Ceramic Disk Capacitor
C3,C4,C6	10 Microfarad Electrolytic Capacitor (observe polarity)
C7	100 Microfarad Electrolytic Capacitor (observe polarity)
D1,D2	1N4148/1N914 (RS276-1122) Switching Diode
IC1	1458 (RS276-038) Dual Op Amp IC. Socket is recommended.

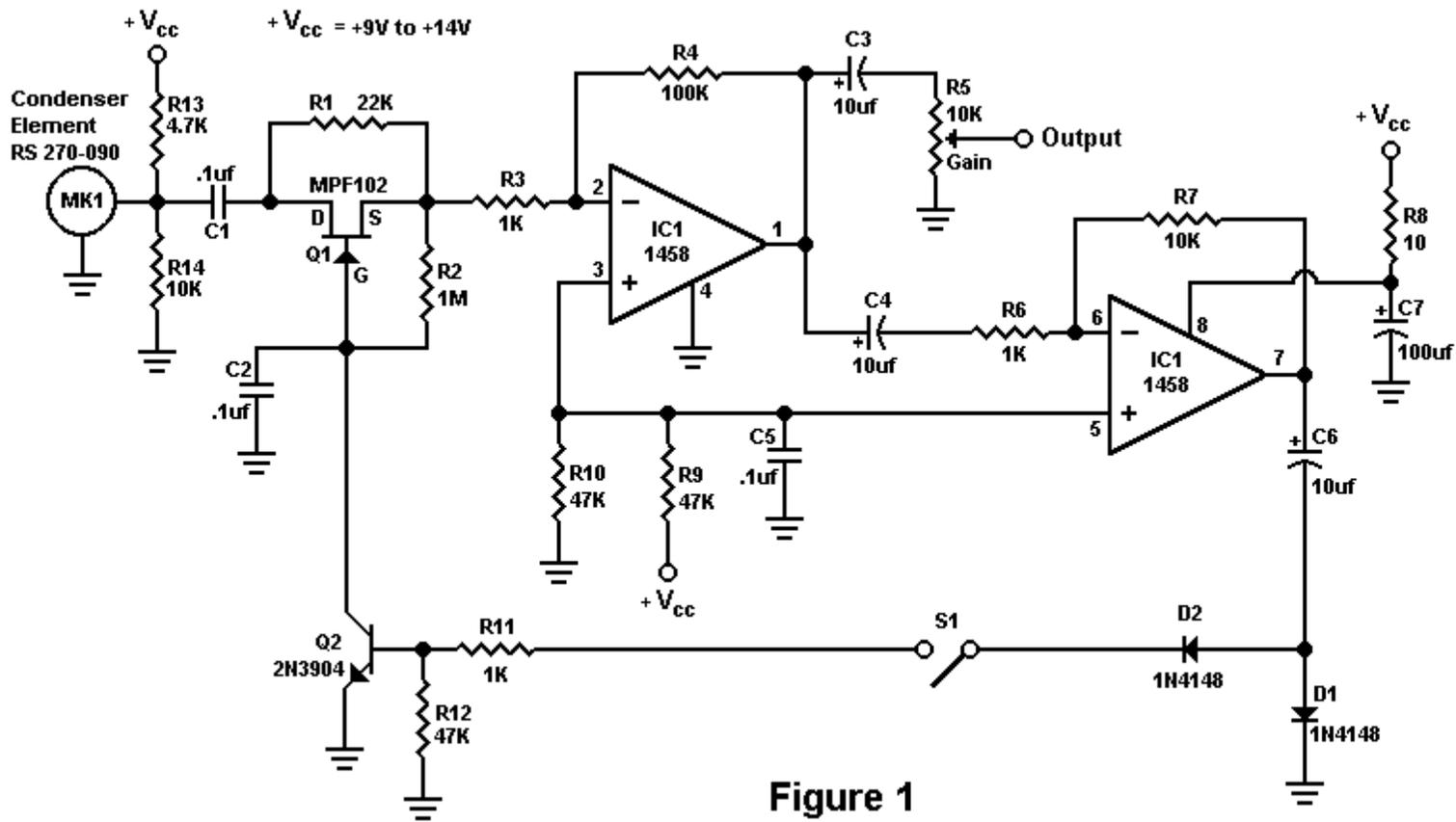|	
Q1	**2N3904 (RS276-2016) NPN Transistor**
Q2	**MPF102 (RS276-2062) or 2N3819 (RS276-2035) JFET Transistor. (observe different pin out for 2N3819)**
S1	**Any SPST Toggle Switch**

Figure 1
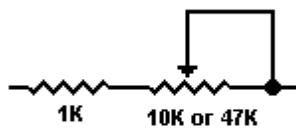
Replace R7 as follows for variable speech compression control:

1K   10K or 47K

Figure 2