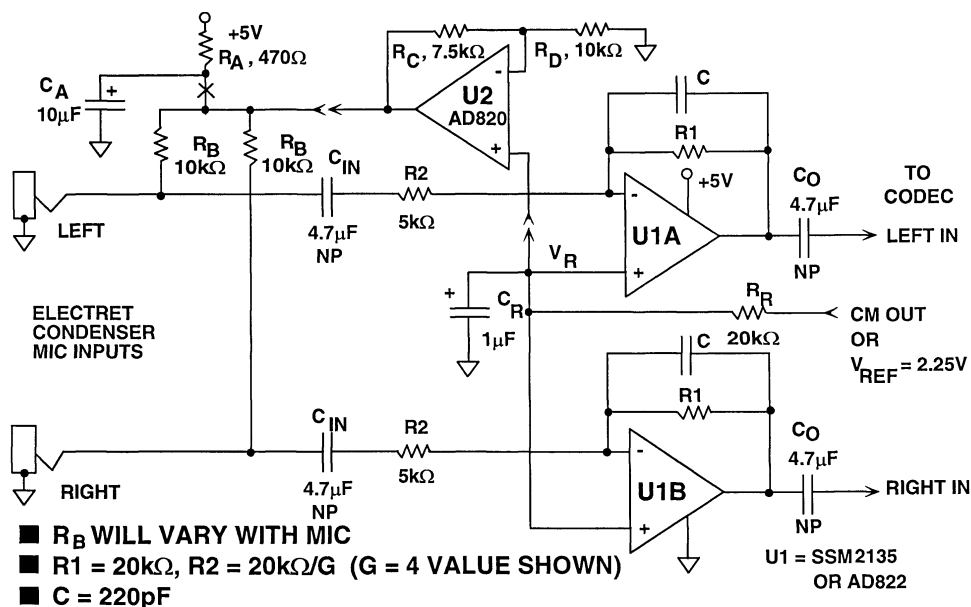


## ■ OP AMP APPLICATIONS

### Electret Mic Preamp Interface

A popular mic type for speech recording and other non-critical applications is the electret type. This is a permanently polarized condenser mic, typically with a built in common-source FET amplifier. The amplified output signal is taken from the same single ended lead which supplies the microphone with DC power, typically from a 3-10V DC source.

Figure 6-2 illustrates a basic interface circuit which is useful in powering and scaling the output signal of an electret mic for further use. In this case the scaled output signal from this interface is fed into the LEFT and RIGHT inputs of a +5V supply powered CODEC, for digitization and processing. DC phantom power is fed to the mic capsules by the  $R_A$ - $C_A$ - $R_B$  decoupling network from the +5V supply, and the AC output signal is tapped off by  $C_{IN}$ - $R_2$ , and fed to U1. The  $R_B$  resistors will vary with different mics and supply voltages, and the values shown are typical. For a quiet mic supply voltage, a filtered/scaled  $V_R$  can be generated by the optional U2 connection shown.



**Figure 6-2:** An electret mic interface for 5V powered CODECs

The U1 dual scaling amplifier is an SSM2135 or AD822, and is used to normalize the mic signal to either a 1Vrms line level or 100mVrms mic level typically required by CODEC inputs, and also to low pass filter it prior to digitization. With a wide variety of electret mics and operating parameters, some signal level scaling is often required.

The scaling gain is simply  $R_1/R_2$ , and  $R_2$  is selected to provide a gain "G", to yield 0.1Vrms at the mic inputs of the CODEC, with the rated output from the mic. The U1 stages are inverting, so G can be greater or less than unity, i.e., other than 4 as is shown here, to normalize any practical input signal to an optimum CODEC level. The amplifier's low pass corner frequency is set by the time constant  $R_1$ - $C$ , which results in a -3dB point of 36kHz. Bias for the U1 stages is provided from the CODEC, via the reference or CMOUT pins, typically a 2.25-2.5V reference voltage. The low frequency time constants  $C_{IN}$ - $R_B/R_2$  and  $C_O$ - $20k\Omega$  are wideband to minimize LF phase shift. These (non-polar) capacitors can be reduced to 1 $\mu$ F or less, for narrowband uses.