

# Miscellaneous Circuits Needed for EE133 Projects

## 1 4.5V Reference

We have to generate the 4.5V reference that we've been using in some of our circuits. This circuit will be used for a midpoint reference in the PLL (Lab 4) and IF amplifier (Lab 5), as well as to power the SA612 (Lab 1). We'll use a voltage divider and buffer it with an op-amp as shown in Figure 1. You should actually build two of these circuits, one on your transmitter board and one on your receiver board. You may choose later to use a voltage regulator to power some of the low-voltage circuits (like the SA612), but you will still need to have a 'midpoint' reference in cases described above.

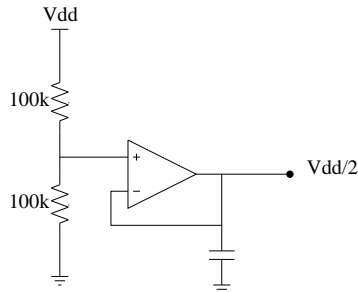


Figure 1: Low-current, 4.5V Voltage Reference

## 2 Your Audio Microphone Circuit

This circuit is used in an optional activity in the FM Modulation lab (Lab 2), but it is required for the FM demodulation lab (Lab 4).

We want a microphone circuit to drive the input of the VCO so we can transmit our voice. This circuit is shown in Figure 2. Connect  $V_{bias}$  to a low-current voltage divider that will guarantee your bias point to be half the voltage rails..

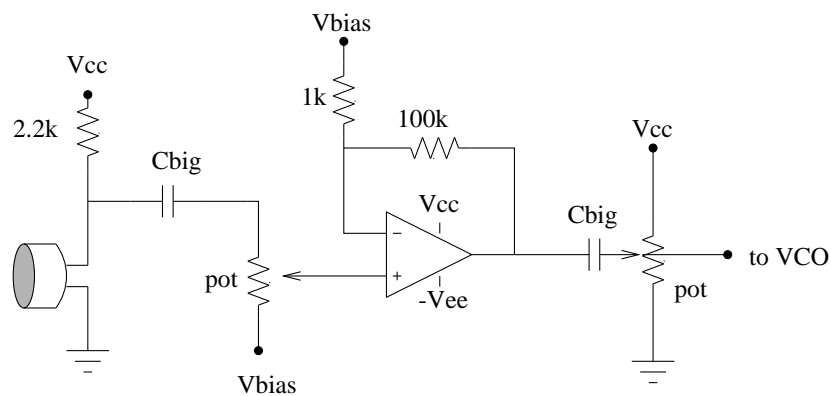


Figure 2: Microphone Circuit