# ADC Signal Scaling

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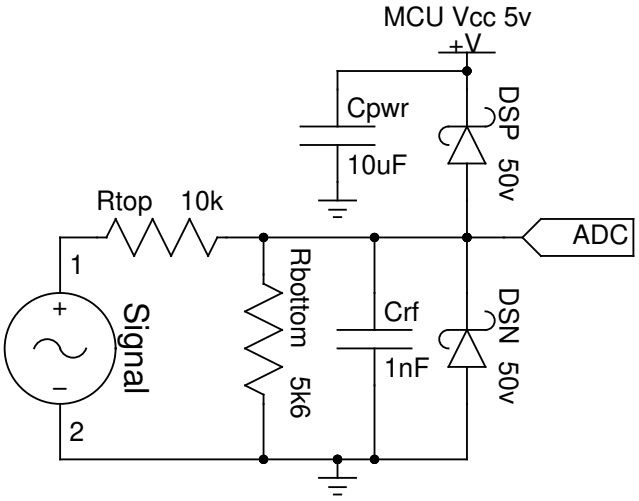


Calculations for the standard setup.
Voltage divider equations:
Rtop = (Vin * Rbottom) / Vmid – Rbottom
Vmid = Vin * (Rbottom / (Rtop + Rbottom))

Rtop provides current limiting so the ADC's protection diodes won't blow out if the signal exceeds Vcc or ground. If the signal is still received when the MCU is off, the signal will go straight into the MCU's power rails via the protection diodes. DSN provides protection against reverse voltage.

Schottky diodes should be used for protection given their lower forward voltage drop and hopefully faster response than the ADC's built in protection diodes. On weaker signals, Schottky's reverse current leakage may change the input signal.

Replacing the protection diodes with a single zener diode is not recommended. Low voltage zeners start to conduct far before their zener voltage and will distort the signal.

Rtop + Crf form an RC filter can can be calculated with:
Freq = 1 / (2 * PI * R * C)
A larger Crf will have a slower response to the ADC. This can be desirable to filter out excessive noise on the line.