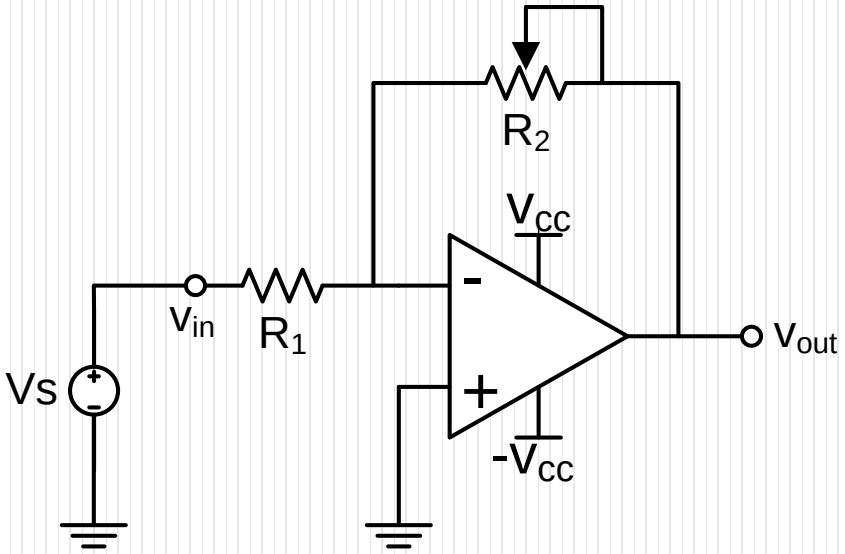
MAE 140: Linear Circuits – Winter 2013

Circuit Demonstration #2

Operational Amplifiers



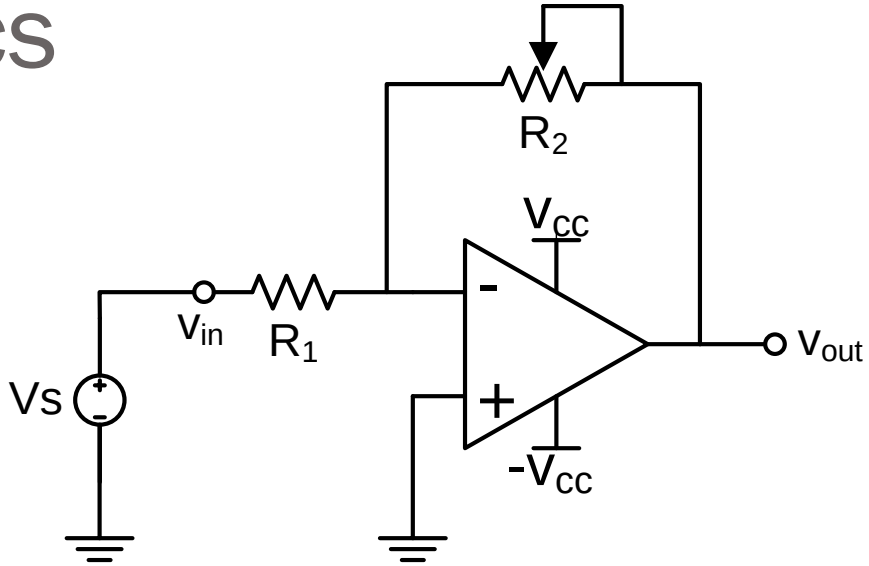
Circuit Schematics

- Inverting Amplifier

$$\text{Gain}: \frac{v_{\text{out}}}{v_{\text{in}}} = K = -\frac{R_2}{R_1}$$

$$\text{here: } R_1 = 10k, R_2 = 0 \sim 100k$$

$$\Rightarrow K = 0 \sim (-10)$$

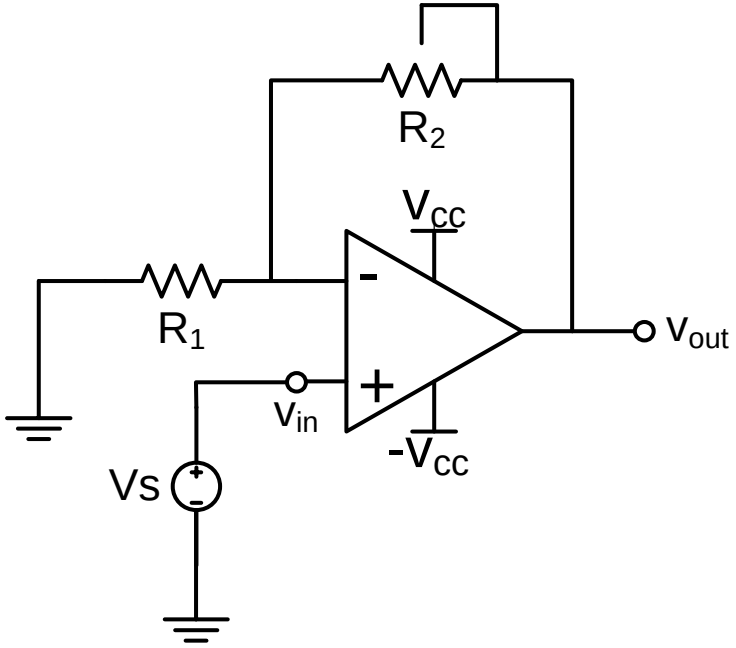


- Non-inverting Amplifier

$$\text{Gain}: \frac{v_{\text{out}}}{v_{\text{in}}} = K = 1 + \frac{R_2}{R_1}$$

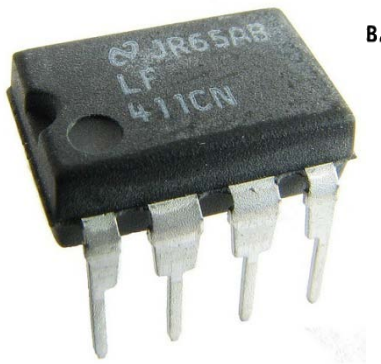
$$\text{here: } R_1 = 10k, R_2 = 0 \sim 100k$$

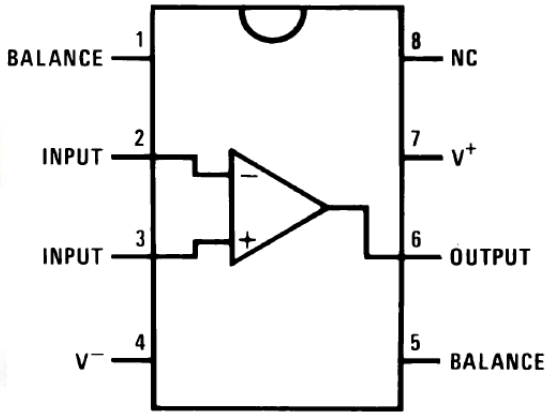
$$\Rightarrow K = 1 \sim 11$$



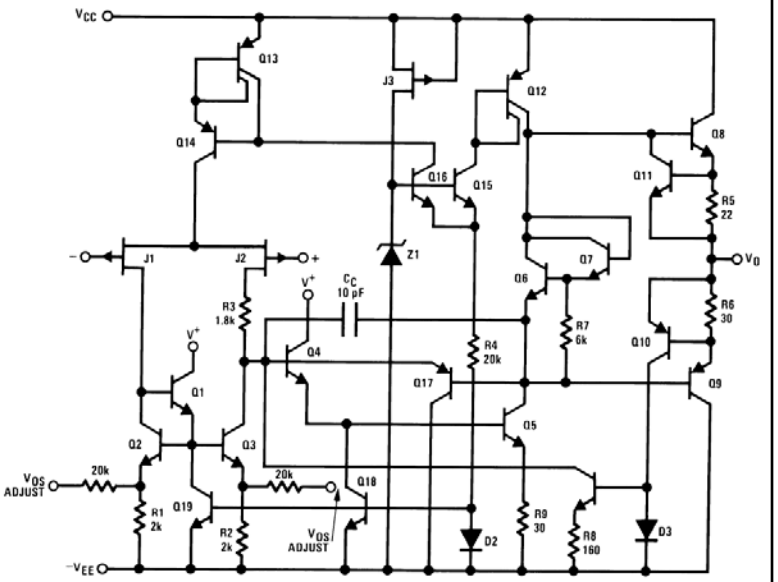
Components

- OpAmp (LF 411)

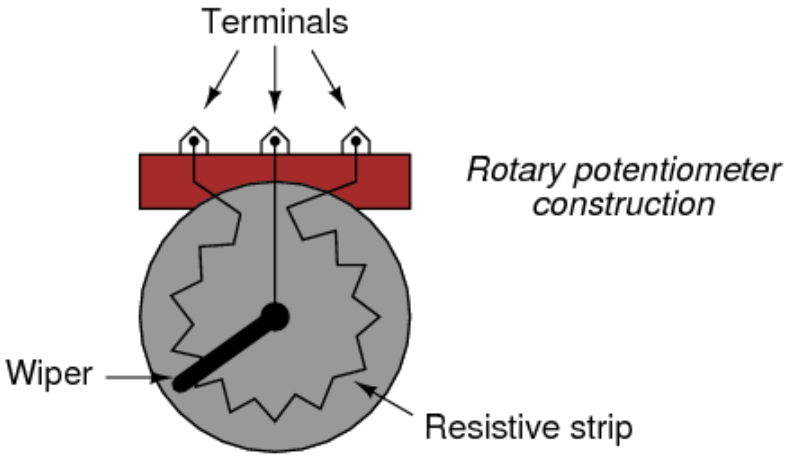




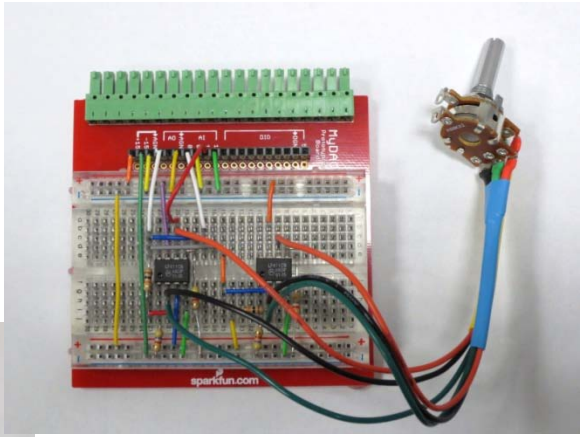
00565507

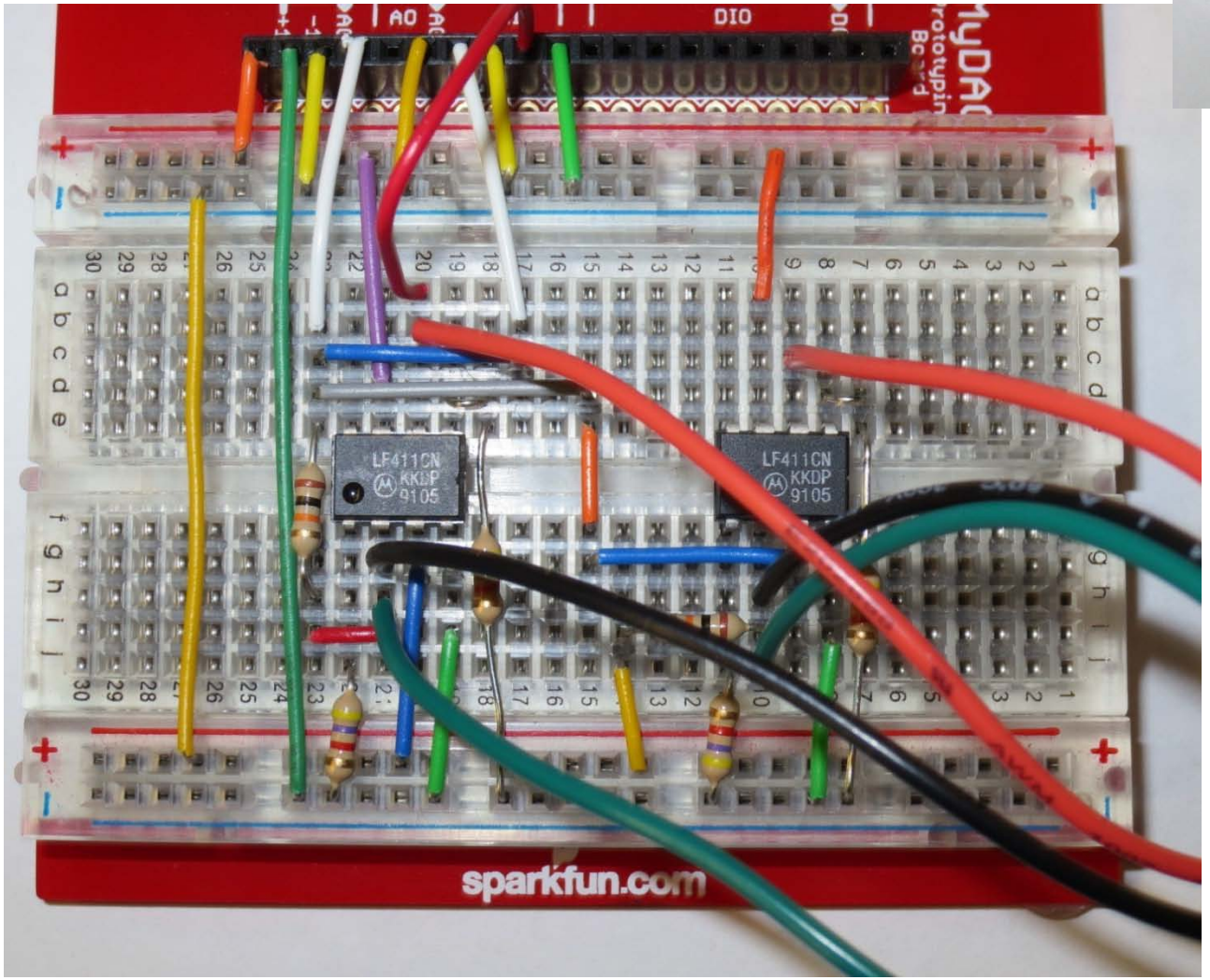


- Potentiometer



Constructed circuit

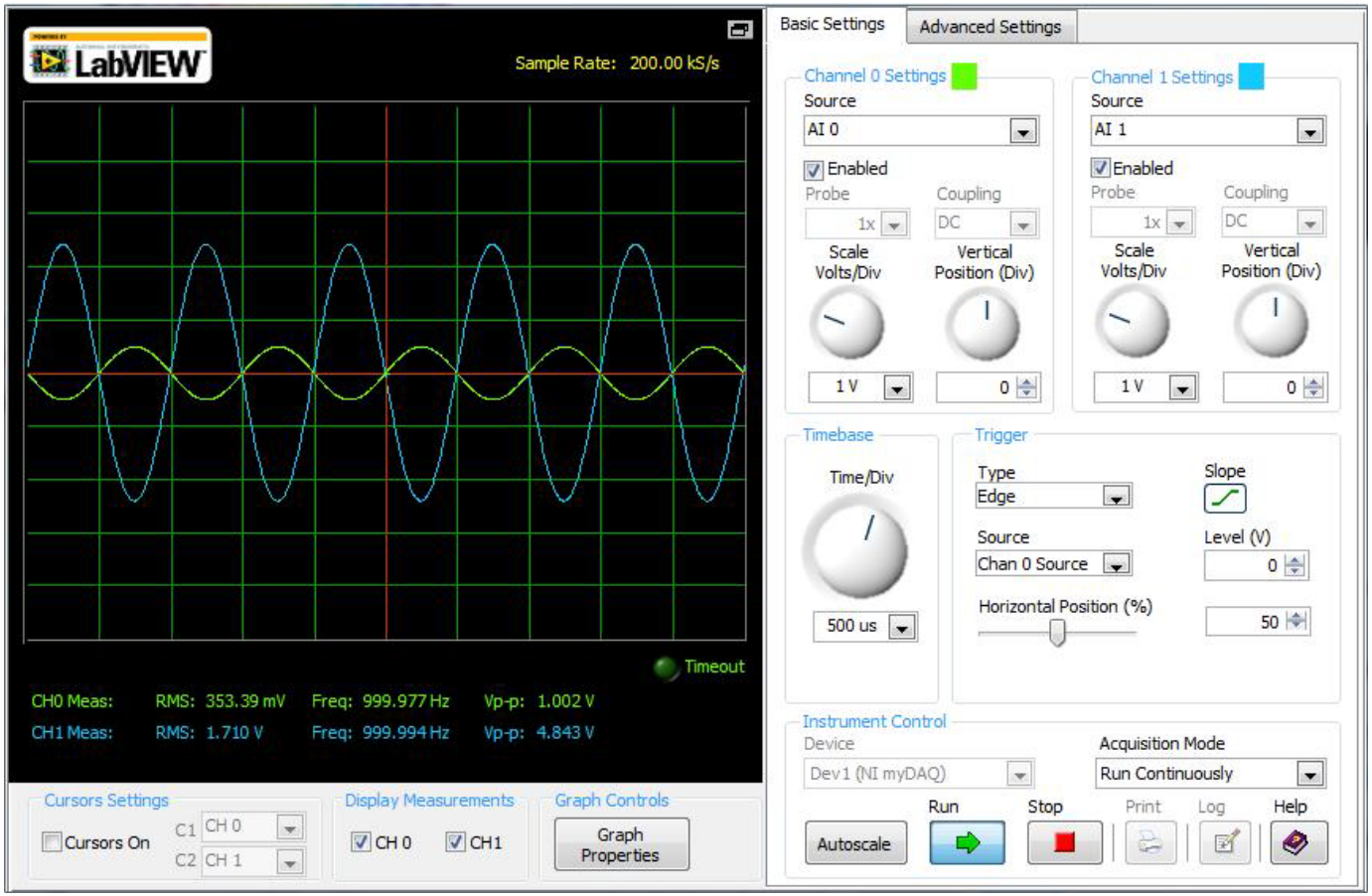




Experimental results

- Input and output of inverting amplifier when R2 = 50k.

  Input: sinusoidal, frequency 1 kHz, peak to peak 0.5 V.



Experimental results

- Input and output of non-inverting amplifier when R2 = 50k.

  Input: sinusoidal, frequency 1 kHz, peak to peak 0.5 V.