

1. Set up

1.1. Power supply

Create columns on the breadboard for +15, -15, ground, and output.

1.2. Oscilloscope

Connect a bnc to alligator cable from the oscilloscope to the breadboard output

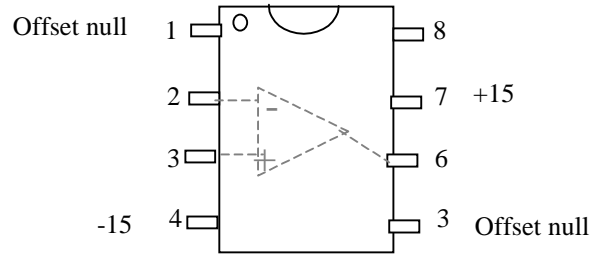


Figure 1. Top view of 741 op amp. Pin 4 should be connected to -15 and pin 7 to +15. Pin 3 is the noninverting input, Pin 2 the inverting input and pin 6 the output.

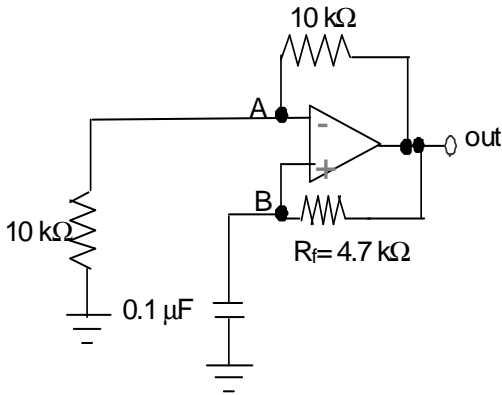


Figure 2. Op amp with negative feedback and positive frequency dependent feedback.

column.

1.3. Power

Using the pin diagram shown in Figure 1, connect the ± 15 Volts to the op amp.

1.4. Stable System

Wire the feedback network of Figure 2 and observe the output on an oscilloscope. **What is the output voltage? Is it stable?**

2. Relaxation Oscillator

2.1. Wire and observe

Wire a relaxation oscillator by exchanging the + and - inputs in Figure 2. Observe the output on an oscilloscope. **What is the**

frequency of the output? What is the shape of the output (square, sine, etc.)?

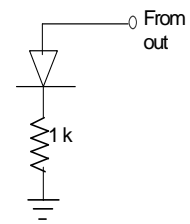


Figure 3. LED sensor.

2.2. Low Frequency

Without changing the resistors on the positive feedback network, change the negative feedback circuit elements so that the circuit oscillates at 10 Hz or less. **$R_f =$ _____ $C_f =$ _____ $f =$ _____ .**

2.3. Blinky

Connect the output to an LED sensor, as shown in Figure 3.

3. Sample and Hold

3.1. Integrator

Wire the integrator circuit of Figure 4. Use the Wavetek for input at about 100 Hz with zero dc bias. Look at the output on oscilloscope. Adjust the dc bias and observe the effect. Wire a switch to short the capacitor.

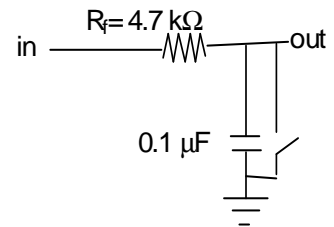


Figure 4. Integrator.

3.2. Peak hold

Replace the resistor with a diode, as shown in Figure 5. Set the Wavetek to dc. Start with a wire shorting the capacitor, and remove the wire as you watch the output on the scope. Change the input negative and positive and watch the output.

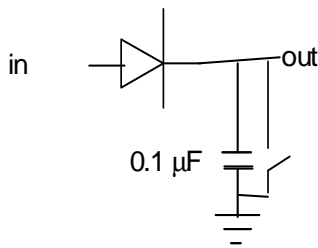


Figure 5. Peak hold.

3.3. Better Peak Hold

Add an op amp to isolate the input and avoid the diode drop offset, as shown in Figure 3. Observe the output on the oscilloscope.

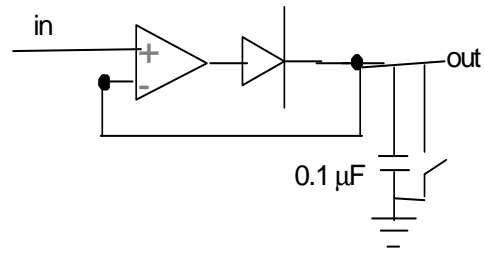


Figure 6. Op Amp peak hold.