

Schmitt Trigger, Monostable, and Astable Circuits

Experiment: Procedure/Observation

(I) Schmitt trigger

1. Wire up the Schmitt trigger circuit shown in the figure. Use $\pm 15\text{ V}$ supply for the Op Amp. Let $V_a = 0\text{ V}$ (ground).
2. Connect a sinusoidal input (6 V peak, 1 kHz) and observe $V_o(t)$. Also, display V_o versus V_i using the X - Y mode of the oscilloscope. Compare the threshold voltages V_{TH} and V_{TL} with the values you expect theoretically.
3. Repeat for $V_a = 3\text{ V}$.

(II) Astable multivibrator

1. For the astable multivibrator shown in the figure, calculate the minimum and maximum period of oscillation (as the 10 k pot is changed).
2. Wire up the circuit and observe the voltages V_C and V_o on the oscilloscope.
3. Vary the 10 k pot and see its effect on the waveforms. Compare the minimum and maximum period of oscillation with your calculation.

(III) Monostable multivibrator

1. Calculate the output pulse width for the monostable circuit shown in the figure when the push button is closed and released.
2. Adjust the oscilloscope Volts/div setting so that both the high and low values of the output voltage can be seen on the display. Close and release the push button, and measure the duration of the output pulse using your wrist watch. Compare with your calculation.
3. Using CH1 and CH2 of the oscilloscope, observe V_- and V_o simultaneously (use the same Volts/div setting for CH1 and CH2, and make their ground traces coincide).

