

# Multivibrator Circuits

## Monostable Multivibrator

Build circuit 11.2 and find the lowest amplitude square-wave that causes triggering. Compare your results with a calculated value (refer to exercise 11.3). Increase the amplitude by factor of 2 then check that the output pulse width is independent of trigger frequency.

### Milestone 1

## Astable Multivibrators

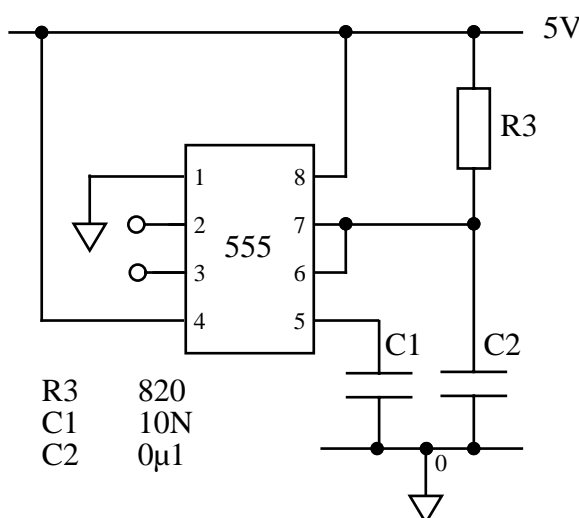
Build circuit 11.1, measure its frequency and sketch the signals at nodes 2 and 3. Compare your measurements with your answers to exercises 11.1 and 11.2.

### Milestone 2

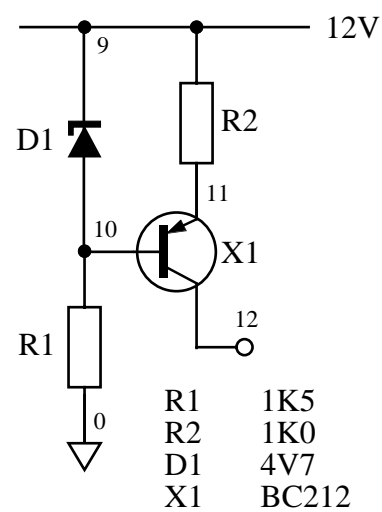
Build and test the circuit you designed in exercise 11.5. Correct your design if necessary. How accurately does the finished circuit match the design specification?

Build circuit 12.1 (note the 5 V supply rail). Use the TTL output the signal generator (set  $t_{high} = 150 \mu s$  and  $t_{low} \sim 20 \mu s$  to start with) applied to node 2 as a trigger and sketch carefully the voltage at nodes 3 and 7. Keep this circuit intact as it will be required in Mile 5.

### Milestone 3



Circuit 12.1 Monostable Multivibrator



Circuit 12.2 Constant current source

## Constant Current Source

Circuit 12.2 is intended to be a constant current source. Investigate its performance by measuring the voltage at node 12 (with a DMM) and connecting various different resistors between node 12 and ground. Determine the **compliance** (*i.e.* output impedance) of the source when  $R_{\text{load}} \sim 500 \Omega$ .

### Milestone 4

## Ramp Generator

Using an AC-coupled oscilloscope examine what happens to the voltage at node 8 when the 555 changes state, investigate the effect of using a  $0.1 \mu\text{F}$  capacitor to ‘decouple’ the supply. Next, remove R3 from circuit 12.1 and connect the output of your constant current generator to node 7 of circuit 12.1. Carefully draw the waveform at node 7 and explain how and why it differs from the one you recorded in Mile 3. You will need to join the 0V terminals of the two power supplies as they are ‘floating’ with respect to each other.

### Milestone 5