

ET-341/L
Lab 12 (Rev.1) 555 Timer

1. Assemble the circuit in Fig. 1:
2. Calculate the frequency of oscillation:

$$f = \frac{1.44}{(R_1 + 2R_2)C_1}$$

3. Connect channel 1 of the oscilloscope to Vout; measure the frequency and amplitude of the output waveform and sketch this waveform in Fig. 2.

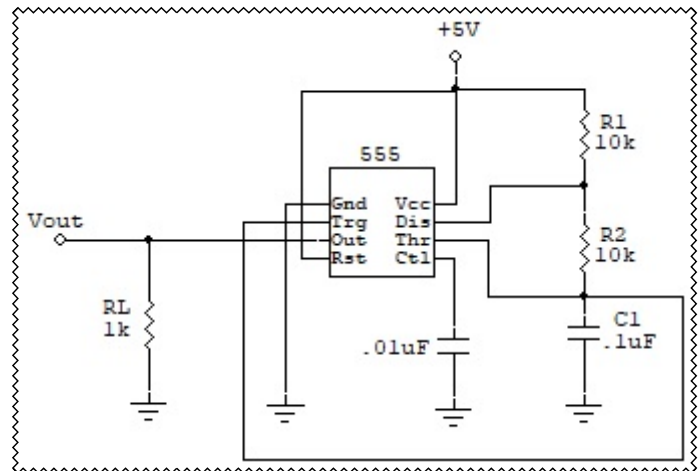


Fig. 1

4. The output should be a square wave but the duty cycle is not symmetrical; it is not 50%. Calculate the duty cycle:

$$D = \frac{R_1 + R_2}{R_1 + 2R_2} =$$

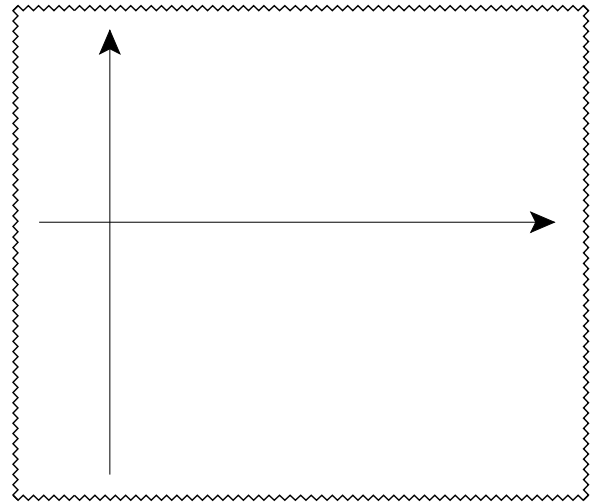


Fig. 2

5. To create a duty cycle of 50%, R_1 must be smaller than R_2 . Change R_2 to $13k\ \Omega$ then calculate a new value for R_1 ; rearrange the formula from step 2 to solve for R_1 ; but the frequency is not changed.

$$\frac{1.44}{C_1 f} - 2R_2 = R_1$$

6. Rebuild the circuit with the new values of R_1 and R_2 . Is the frequency the same? What happens to the duty cycle?