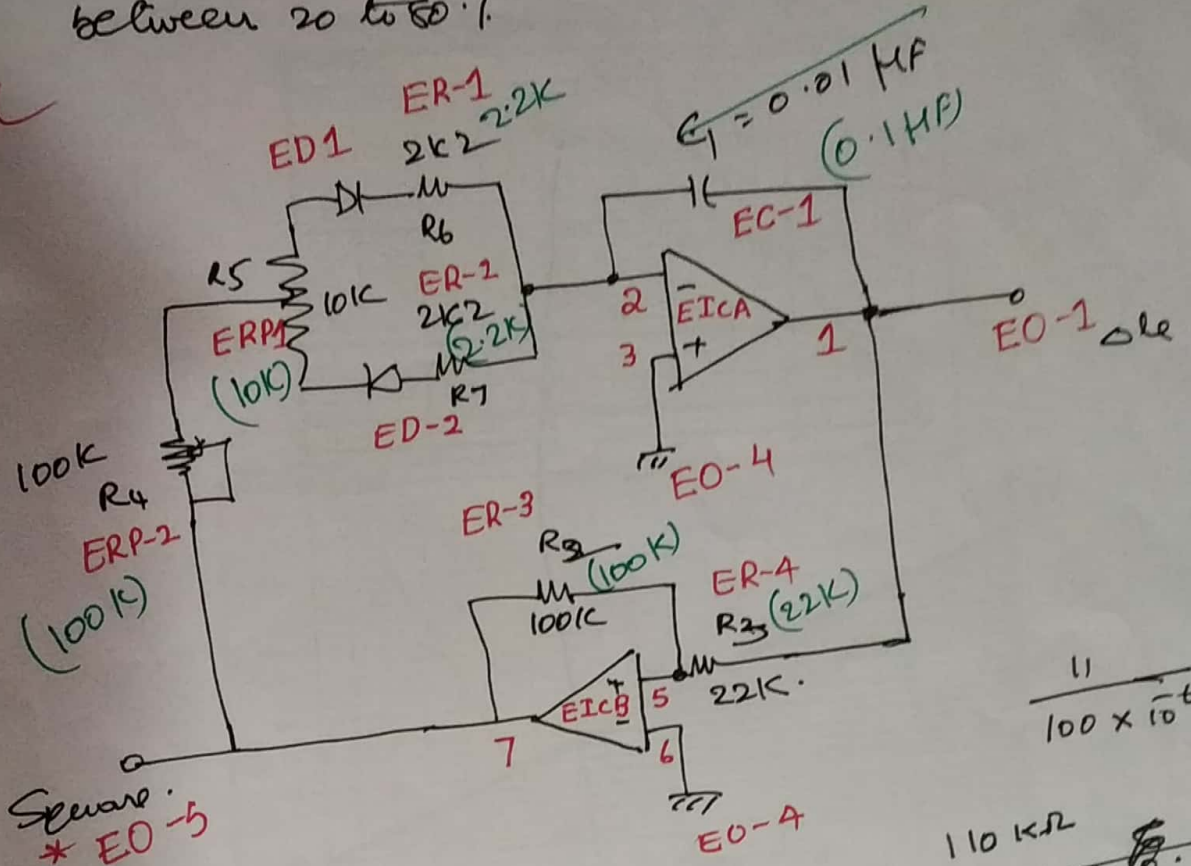


Expt: 5: Square wave & pulse waveform generator with selected a range of frequency and duty cycle adjustable between 20 to 50%.

3K



$$\frac{11}{100 \times 10^{-6}} = \frac{11}{10^4} = 110 \times 10^3$$

$$110 \text{ k}\Omega \times 10^{-3}$$

Let $I_3 = 100 \mu\text{A}$, then $R_3 = \frac{11\text{V}}{100 \mu\text{A}} = 110 \text{ k}\Omega$.
 use standard $100 \text{ k}\Omega$.

$$\frac{11\text{V}}{100 \times 10^{-3}} = 11 \times 10^{-5} = 110 \mu\text{A}$$

ole output \rightarrow 5V peak to peak
 $\Rightarrow R_3 = \frac{2.5\text{V}}{110 \times 10^{-6}} = \frac{2.5}{1.1} \times 10^4 = 2.27 \times 10^4$

$$f_{\text{max}} = 200 \text{ Hz} \quad \text{or } f_{\text{max}} = 2 \text{ kHz}$$

$$C_1 = \frac{100 \times 10^{-6} \times 4 \times 10^{-3}}{5} = \frac{4}{5} \times 10^{-6} \times 10^{-1} = 0.8 \times 10^{-6} \text{ F}$$

$$C_1 \approx 0.1 \mu\text{F}$$

$$R_4 + R_5 + R_6 = \frac{11 - 0.7}{100 \times 10^{-6}} = 10.3 \times 10^4 \approx 100 \text{ k}\Omega$$

$$I_{f2} = \frac{.1 \cancel{0} \cancel{0} \times 10^{-6} \times \cancel{2} \times 10^3}{\cancel{2} \cancel{0} \cancel{0}} = 1 \text{ mA.}$$

$$R_5 + R_6 = \frac{11 - 0.7}{1 \times 10^{-3}} = 10.3 \text{ k}\Omega \approx 10 \text{ k}$$

$$R_4 = 100 \text{ k} - 10 \text{ k} = 90 \text{ k}.$$

$$P_{W_{\min}} = 20 \text{ f. } \tau_{\text{max}} = 0.2 \times \frac{1}{200 \text{ Hz}} = 1 \text{ ms.}$$

$$R_6 = \frac{(R_5 + R_6) \times P_{W_{\min}}}{P_{W_{\max}}} = \frac{10 \text{ k} \times 1 \text{ ms}}{4 \times 10^{-3}} = 2.5 \text{ k}\Omega.$$

$$R_6 = R_7 = 2.7 \text{ k}\Omega.$$

$$R_5 = (R_5 + R_6) - R_6 = 10 \text{ k} - 2.7 \text{ k} = 7.3 \text{ k}\Omega.$$

STD value = 10 k pot.