

Derivation of initial value for 500ms using TIMER1

$$\begin{aligned}\text{XTAL} = 16\text{MHz} &\rightarrow T_{\text{xtal_clock}} = 1/16 \text{ us} \\ \text{Prescaler} = 1:256 &\rightarrow T_{\text{counter_clock}} = 256 \times (1/16) \text{ us} = 16\text{us} \\ \text{Increment count} &= 500000\text{us} / 16\text{us} \\ &= 31250 \\ \text{Initial counter value} &= 65536 - 31250 \\ &= 34286\end{aligned}$$

Derivation of initial value for 50ms using TIMERO

$$\begin{aligned}\text{XTAL} = 16\text{MHz} &\rightarrow T_{\text{xtal_clock}} = 1/16 \text{ us} \\ \text{Prescaler} = 1:64 &\rightarrow T_{\text{counter_clock}} = 64 \times (1/16) \text{ us} \\ &= 4\text{us} \\ \text{Increment count} &= 50000\text{us} / 4\text{us} \\ &= 12500 \\ \text{Take 250 as the count} & \\ \text{Number of iterations} &= 12500/250 \\ &= 50 \\ \text{Initial counter value} &= 256 - 250 \\ &= 6\end{aligned}$$