

Calculos proyecto

Calculos timers:

Timer 0 y 2:

$$f_{pwm} = \frac{f_{clk}}{\text{Prescaler} \times 2^N}$$

$$\frac{1}{0.02} = \frac{1 \times 10^6}{\text{Prescaler} \times 2^8}$$

$$\text{Prescaler} = \frac{1 \times 10^6 \times 0.02}{2^8} = 78.125 \approx \underline{\underline{64}} \leftarrow \text{fs el m\u00e1s cercano.}$$

$$f_{pwm} = \frac{1 \times 10^6 \text{ Hz}}{64 \cdot 2^8} = 61 \text{ Hz}$$

$$T = \frac{1}{61 \text{ Hz}} = 0.016 \text{ s}$$

$$\text{Duty cycle} = \frac{\text{OCR}_{nx} + 1}{2^8} \times 100$$

$$\frac{0.0005}{0.016} \times 100 = \frac{\text{OCR}_{nx} + 1}{2^8} \times 100$$

Obtenido con calculadora:

$$\text{OCR}_{nx} = \underline{\underline{7}} \leftarrow \text{limite inferior}$$

$$\frac{0.0024}{0.016} \times 100 = \frac{OCR_{nx} + 1}{2^8} \times 100$$

Otendida com calculo:

$$OCR_{nx} = \underline{37} \leftarrow \text{limite superior}$$

Para timer 1:

$$f_{pwm} = \frac{f_{clk}}{\text{Prescaler} \times (1 + Top)}$$

$$\frac{1}{0.02} = \frac{1 \times 10^6 \text{ Hz}}{64 \times (1 + Top)}$$

Otendida com calculo:

$$Top = \underline{312}$$

$$\text{Duty Cycle} = \frac{OCR_{1x} + 1}{Top} \times 100$$

$$\frac{0.0005}{0.02} = \frac{OCR_{1x} + 1}{312} \times 100$$

$$OCR_{1x} = \underline{7} \leftarrow \text{limite inferior}$$

$$\frac{0.0021}{0.02} = \frac{OCR_x + 1}{312} \times 100$$

$$OCR_x = \underline{37} \leftarrow \text{limite superior}$$

Calculo de baudrate:

$$UBRR_n = \frac{f_{osc}}{8 \text{ BAUD}} - 1$$

$$UBRR_n = \frac{1 \times 10^6}{8 \cdot 9600} - 1$$

$$UBRR_n = \underline{12}$$

$$BAUD = \frac{1 \times 10^6}{8(12+1)} = \underline{9615.38}$$

$$BAUD = \left(\frac{9615.38}{9600} - 1 \right) \times 100 = 0.16\% \rightarrow > 2\% \therefore \text{Aceptable}$$