

EE361 Microprocessor-based Digital Design

Fall 2009

Timer 0

Assignment 13

1. A PIC16F884 with a crystal oscillator frequency $f_{XTAL} = 12$ MHz is to be used in a system that automatically loads 9 mm ammunition rounds into a 160-round bandolier. To accomplish this, the RA4/TOCI input of the PIC16 is connected to a sensor that detects each individual round as it passes through an optical sensing unit. Each time it detects such a round, it issues a low-going pulse to the PIC16.

To make the hardware work correctly, your assistance is required. Use hexadecimal to show suitable initial contents for the registers TMR0, INTCON, and OPTION_REG so that Timer 0 will increment once for every 32nd falling signal presented at the RA4/TOCI input and will generate an interrupt after the fifth such period has elapsed.

It is essential that you explain all your choices thoroughly, using an intelligent combination of English statements and mathematics. Giving the correct answers but offering either no explanations or wholly inadequate explanations is not acceptable.