

# Proj1 Heartbeat LED

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EELE 465

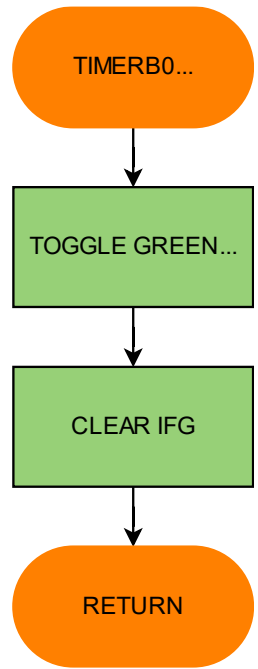
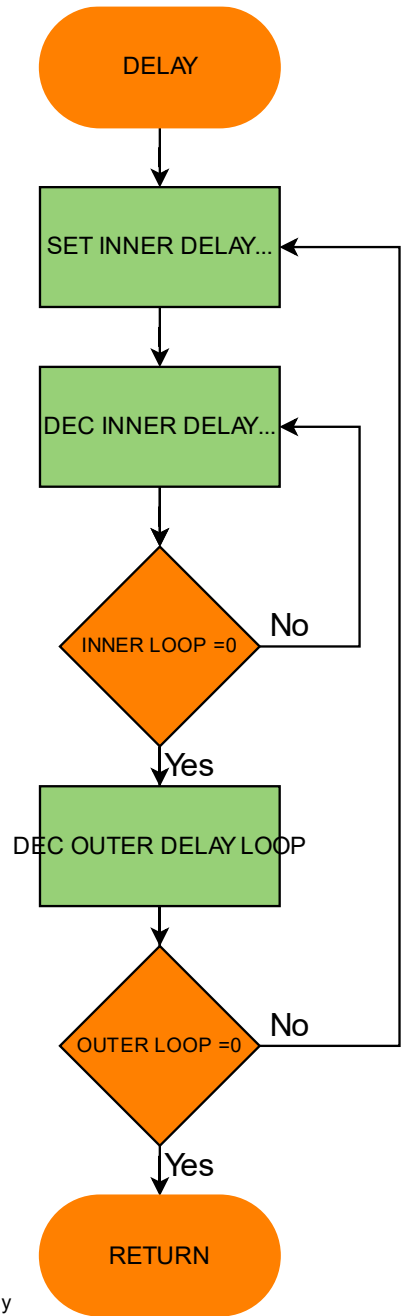
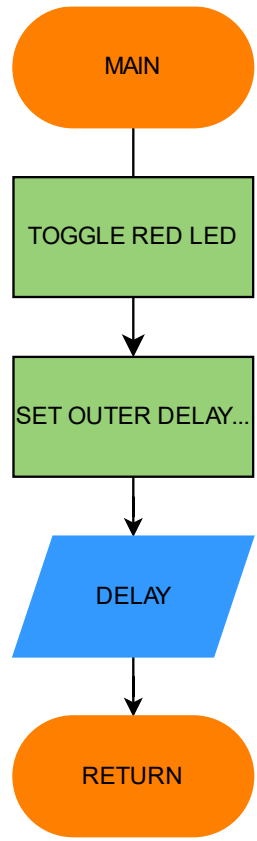
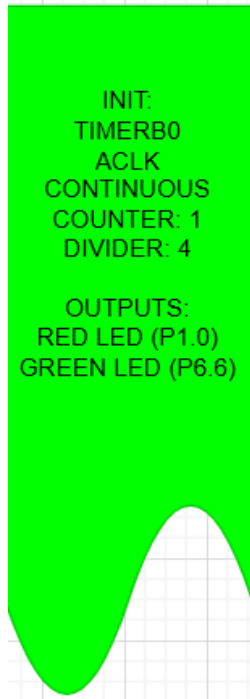
# Overview

Use two different ways to make a led flash at a frequency of 0.5 Hz. One is using delay loops, and the other is using the clock module of the MSP-EXP430FR2355.

- Language: Assembly

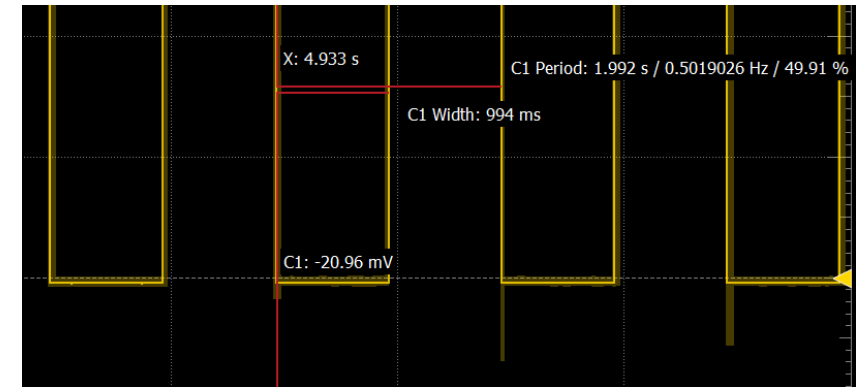
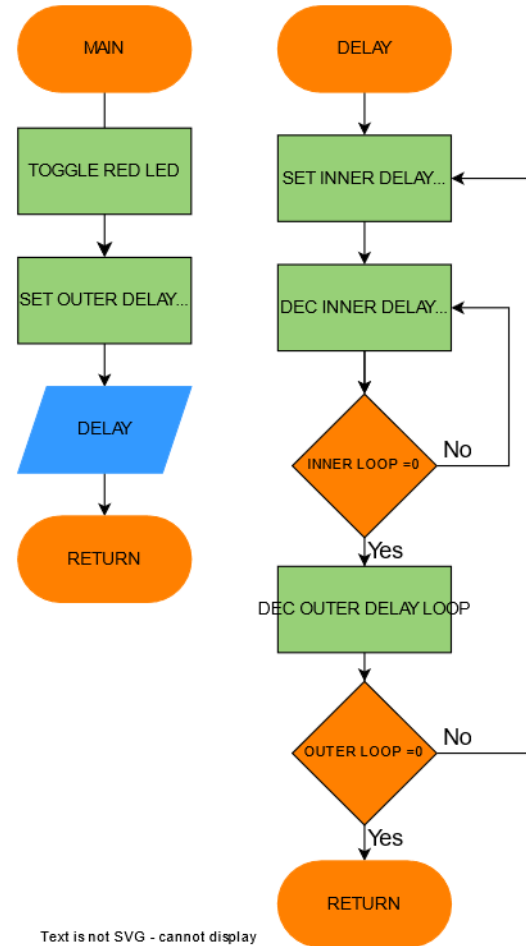
Demonstrates the use of delay loops or a timer module to obtain a frequency of ~0.5 Hz

- Delay loop featured two nested compare statements which was passed when a variable equaled 0.
  - Inner and outer loops were decremented each time.
- Timer used (ACLK) in continuous mode.
  - Divided to achieve frequency
  - Interrupts



# Delay Loop

- Delay:
- Testing and refinement
  - Outer loop: 1000
  - Inner Loop: 348
- Produced ~0.5 Hz
- With inner loop @ 500, period
- Was roughly 2s
- Decrement inner loop
- until desired frequency was
- obtained.

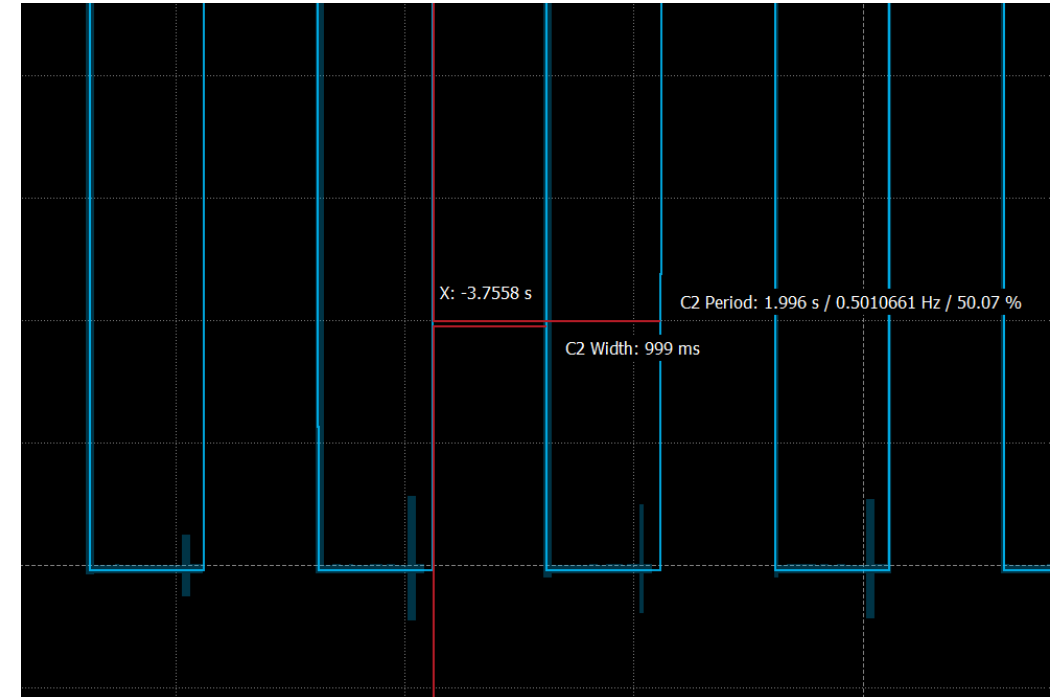
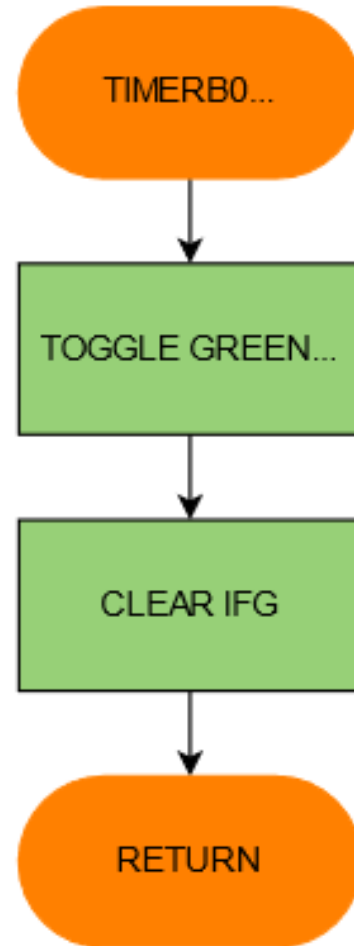


# Clock

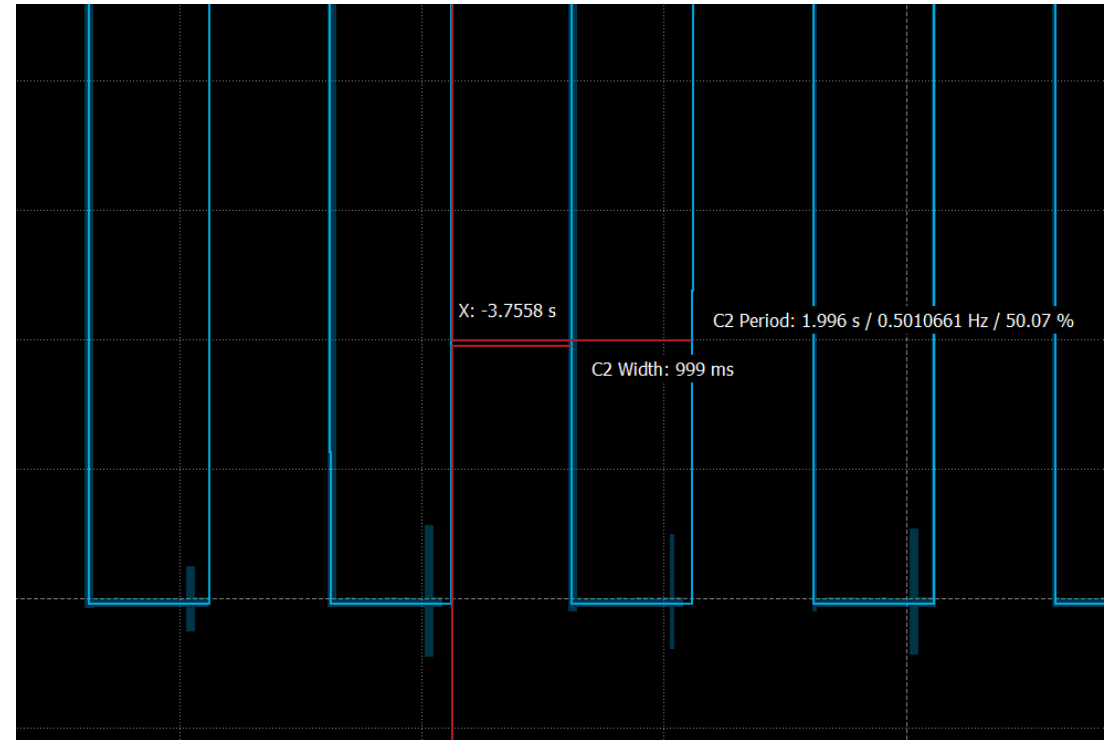
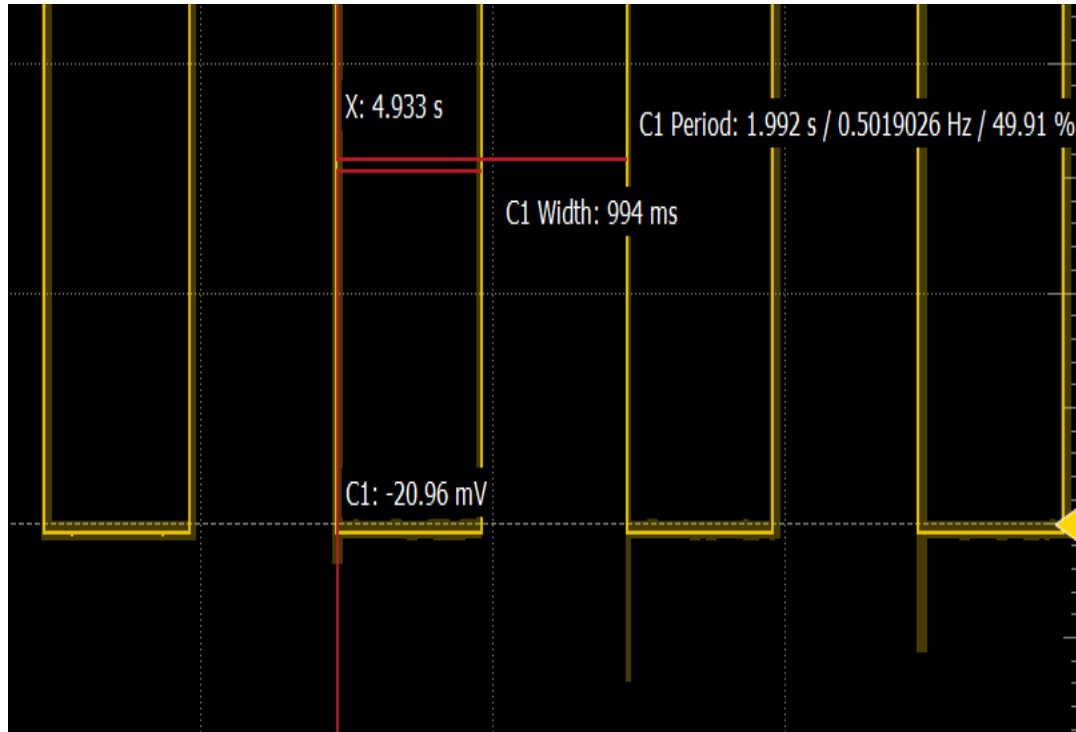
- ACLK (32768 Hz)
- Less code, more calculations.
- Interrupt triggered whenever clock overflowed, the overflow point was divided out.

## Math

- $T_{overflow} = T \times N = \left(\frac{1}{f}\right) \times 2^n \times D$
- $T_{overflow} = \left(\frac{1}{32.768k}\right) \times 2^{12} \times 4 = 0.5 \text{ Hz}$



# Comparison



# End

