

Quiz

Write some C code to set up the MC9S12 to generate a Timer Overflow Interrupt (TOI) every 87 ms.

```
__asm(sei);    // Disable interrupts
TSCR1=0x80;   // Turn on timer
TSCR2=0x85;   // Enable interrupts, and OVF=87 ms
TFLG2=0x80;   // Clear interrupt flag.
__asm(cli);   // Enable interrupts
```

Quiz

You are required to measure the duration of an event. When the event starts, it generates a rising edge on a signal connected to Port T1. When the event ends, it creates a falling edge on a signal connected to Port T2. You also know before the experiment that the duration of the event will be between 80 ms and 100 ms.

(a) How do you set up the MC9S12 timer registers to capture the times of the rising and falling edges of the two signals? Write some C code to do this. Be sure your C code does not affect the function of any other timer channels

```
__asm(sei);
TSCR1 = 0x80;           // Turn on timer subsystem
TSCR2 = 0x06;           // Set prescaler to 174.76 ms
TIOS = TIOS & ~0x06;   // Set up channels 1 and 2 for input capture
TCTL4 = (TCTL4 | 0x24) & ~0x18; // Capture rising edge on Ch1 and falling edge on Ch2
TFLG1 = 0x06;          // Clear flags for channels 1 and 2
__asm(cli);
```

(b) After both edges have been captured, the following is in the MC9S12 timer registers:

TC7	TC6	TC5	TC4	TC3	TC2	TC1	TC0
0x3456	0x9023	0x1B45	0xA91C	0x1674	0x1053	0x8C29	0x901C

How long did the event last (in seconds)?

```
0xFFFF
-0x8C29
-----
0x73D6 → 29,654
0x1053 → 4,179
-----
33,833
```

Time = $33,833 \times 64/24 \times 10^6 = 33833 \text{ cycles} \times 2.66 \times 10^{-6} \text{ sec/cycle} = 90.22 \text{ msec.}$