

EE 308/MENG 483 – Homework 4

1. An MC9S12 has the following data in its memory:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
FFC0	AC	23	65	87	23	92	BA	E5	3A	12	90	42	22	50	91	23
FFD0	B2	A6	C1	25	90	F2	C2	69	09	01	B2	C2	76	23	22	54
FFE0	75	43	20	C4	21	D0	23	24	A5	29	BC	B1	21	70	32	61
FFF0	25	2D	24	DC	82	A3	5B	9A	CA	3A	9F	2C	60	11	20	4F

- (a) What happens to the program counter when the MC9S12 is powered up or reset? What is the address of the first instruction the MC9S12 will execute after a reset?
- (b) What is the address of the first instruction the MC9S12 will execute when it receives a Timer Overflow interrupt?
- (c) What is the address of the first instruction the MC9S12 will execute when it receives a Real Time interrupt?

2. Below are the values of some timer registers in the MC9S12:

TSCR1	TSCR2	TIE	TCLT1	TCTL2	TCTL3	TCTL4	TFLG1	TFLG2
00	87	05	C2	A4	5F	76	15	00

- (a) Is the Timer enabled?
- (b) Is the Timer Overflow Interrupt enabled?
- (c) Is the Timer Overflow Flag set?
3. Write some C code to do the following:
- (a) Enable the timer subsystem for an overflow rate of at least 25 ms.
- (b) Set up one of the timer channels for Input Capture, with interrupts enabled.
- (c) Write an Input Capture interrupt service routine which latches the time of the rising edge on the timer channel you are using.

4. The prescaler bits of the TSCR2 register are set to $PR2:0 = 100$. The first time the TCNT register is read the value is $0xA23C$. The next time the TCNT register is read, the value is $0x251A$.

(a) Assuming the time between reads was less than the overflow period of the counter, how much time (in seconds) passed between the two reads?

(b) What is the overflow time for the TCNT register; i.e., how long does it take for the TCNT register to count from $0x0000$ to $0xFFFF$, then back to $0x0000$?

5. Write an interrupt service routine in C called `toc4_isr` which generates a 10 Hz square wave to Bit 4 of Port T.