

Computer Engineering and Mechatronics MM3CEM MMME/3085/01

Solution Sheet 10: Interrupts on AVR microcontrollers

1. Recall that this method of PWM generation works by incrementing TCNT1 until it reaches the value in register ICR1, when it wraps around to zero. To generate PWM we need some means of:
 - a. Making the output on Pin 13 go high at the start of each cycle i.e. when TCNT1 matches ICR1
 - b. Making the output on Pin 13 go low when TCNT1 matches (for example) OCR1A.

We can do this in hardware on the Arduino Mega and we can also do it for pin 9 on the Uno but not for pin 13, so we need to configure interrupts which are triggered when TCNT1 matches ICR1, and when it matches OCR1A. Specifically, these are enabled by setting bits TOIE1 (which enables the interrupt on overflow, linked to interrupt vector `TIMER1_OVF_vect`, in whose ISR we set pin 13 output to high) and OCIE1A (which enables the interrupt on compare match with ICR1A, linked to interrupt vector `TIMER1_COMPA_vect`, in whose ISR we reset the pin 13 output to low).

