**DS20613 - Assignment 2**

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**Question-1. Please find out the clock used in your Atmega328p.**

Internally, Atmega-328P consists of 2 clocks namely

* Calibrated Internal RC Oscillator (8.0MHz)
* Internal 128 kHz RC Oscillator (128 kHz)

By default, inbuilt clock Source of Atmega328P is a Calibrated Internal RC Oscillator at 8.0MHz resulting in 1.0MHz system clock.

However, the following external sources can also be used as a clock in Atmega328P.

* Low Power Crystal Oscillator (~0.4 – 20MHz Ceramic/Crystal)
* Full Swing Crystal Oscillator (~0.4 – 20MHz Ceramic/Crystal)
* Low Frequency Crystal Oscillator (~32.768 kHz)
* External Clock (0 - 20 MHz)

These sources can be used by setting the CKSEL Fuses.

**Question-2. What are timer registers available in Atmega328P and list their name.**

There are 3-Timers available in Atmega328P namely

* 8-bit Timer/Counter0 with PWM
* 16-bit Timer/Counter1 with PWM
* 8-bit Timer/Counter2 with PWM

**Registers associated with each Timers**

|  |  |  |
| --- | --- | --- |
| **8-bit Timer/Counter0 with PWM**  Timer/Counter (TCNT0)  Output Compare Registers (OCR0A/B)  Timer Interrupt Flag Register (TIFR0)  Timer Interrupt Mask Register (TIMSK0)  Output Compare Flag (OCF0A/B)  TCCR0A – Timer/Counter Control Register A | **16-bit Timer/Counter1 with PWM**  Timer/Counter (TCNT1)  Output Compare Registers (OCR1A/B)  Input Capture Register (ICR1)  Timer/Counter Control Registers (TCCR1A/B/C)  Timer Interrupt Flag Register (TIFR1)  Timer Interrupt Mask Register (TIMSK1) | **8-bit Timer/Counter2 with PWM and Asynchronous Operation**  Timer/Counter (TCNT2)  Output Compare Register (OCR2A/B)  Timer Interrupt Flag Register (TIFR2)  Timer Interrupt Mask Register (TIMSK2)  Timer/Counter Control Registers (TCCR2A/B/C)  Asynchronous Status Register (ASSR)  General Timer/Counter Control Register (GTCCR) |