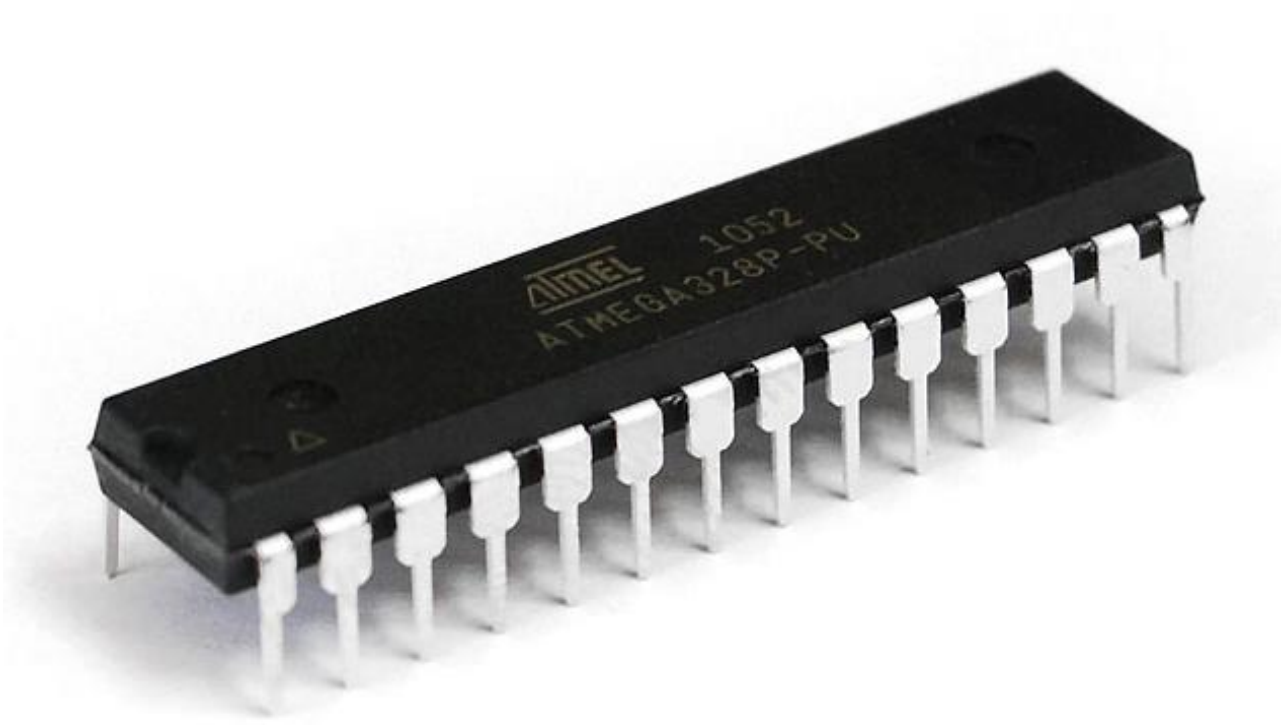
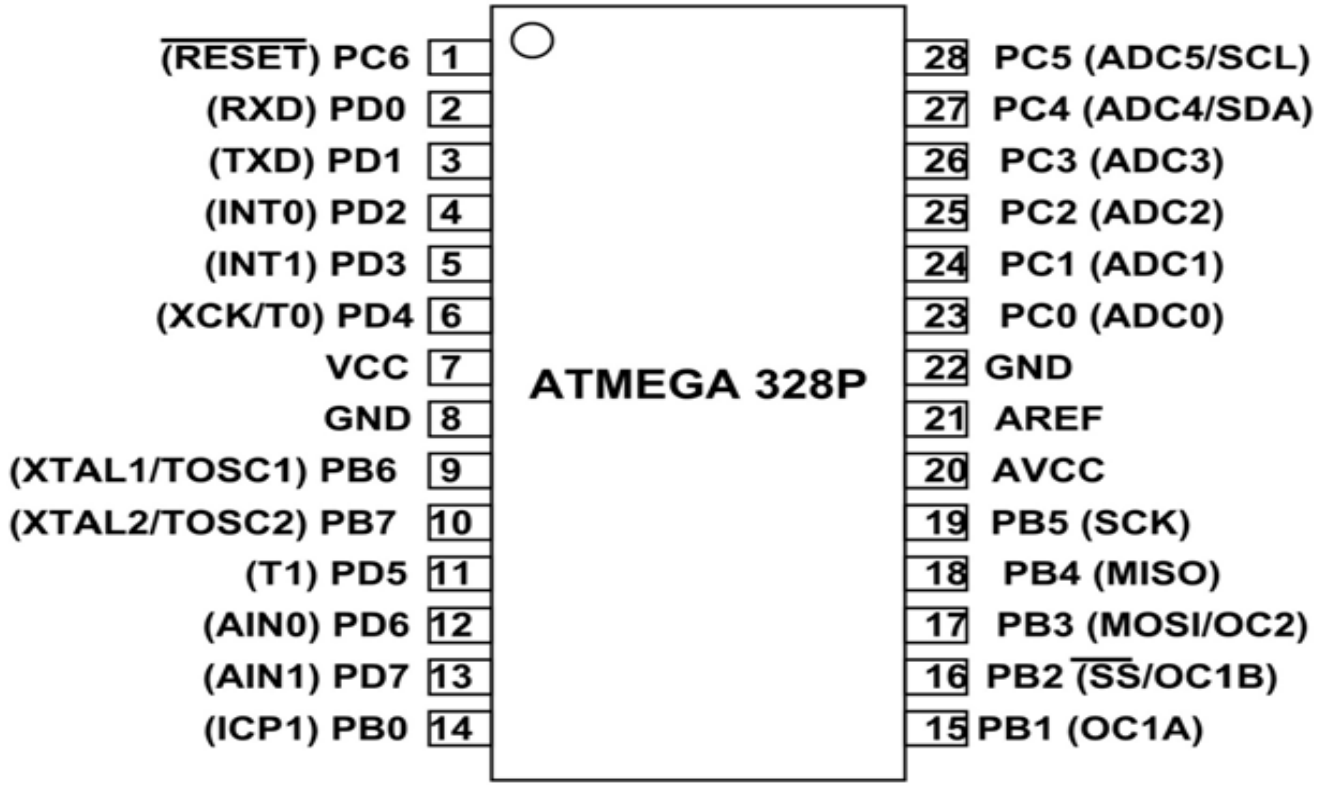
Arduino Target Processor (ATmega 328)

Physical structure



Pinout Diagram



- The ATmega328 is a low-power CMOS 8-bit microcontroller based on AVR enhanced RISC (Reduced Instruction Set Computer) architecture.
- In order to maximize performance and parallelism, it uses Harvard architecture.
- It belongs to AVR family of microcontrollers.
- AVR stands for Advanced Virtual RISC (RISC stands for Reduced Instructions Set Computers).
- AVRs executes most of the instructions in single execution cycle, They consume less power and they can be designed to operate in different power saving modes.

AVR microcontrollers categories

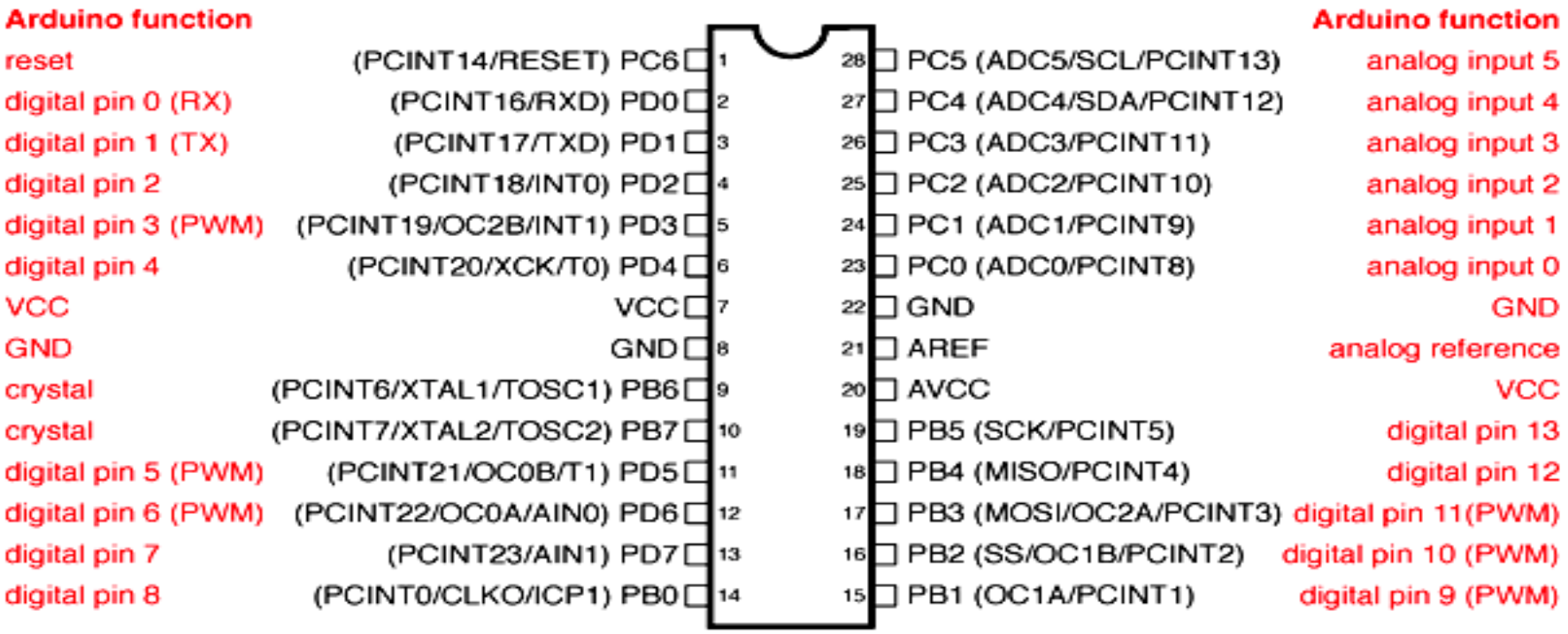
- There are three categories namely TinyAVR, MegaAVR and XMegaAVR
- MegaAVR are the most popular ones having good amount of memory (upto 256KB), higher number of inbuilt peripherals and suitable from moderate to complex applications.
- The naming convention of the AVR is such that, taking ATmega328, the "AT" stands for ATMEL the manufacturer, the "mega" means that the microcontroller belong to the MegaAVR category and "32" signify the memory of the microcontroller which is 32KB and the "8" signify the system type which is 8-bit

Arduino UNO ATmega328 Features

- The operating voltage ranges from 1.8V to 5.5V (normally it operates in a range of 3.3V to 5.5V)
- Many arduino boards operate at 5V but some of the newer cards operates at 3.3V.
- It is an 8 – bit and 28 pins AVR microcontroller, 32KB of flash memory, 1KB of EEPROM, 2KB of SRAM, 8 pins for ADC operations, 3 built-in timers (2 are 8-bit timers, 1 is a 16-bit timer) and 6 PWM pins.
- It has both general purpose registers and special purpose registers.

- An electronic register is a form of memory that uses a series of flip flops to store the individual bits of a binary word.
- The general purpose registers do not have side effects, they can be used by most instructions. One can do arithmetics with them, use them for memory addresses and so on.
- Special purpose registers can only be used for certain purposes and only by certain instructions.
- A timer is a control device that outputs a signal at a present time after an input signal is received.
- A counter is a device which stores the number of times a particular event or process has occurred (often in relationship to a clock).

ATMega328P and Arduino Uno Pin Mapping



Digital Pins 11,12 & 13 are used by the ICSP header for MOSI, MISO, SCK connections (Atmega168 pins 17,18 & 19). Avoid low-impedance loads on these pins when using the ICSP header.


Thank you!