Arduino - microcontroller info

Microcontroller in Arduino - AVR microcontroller developed by Atmel
1.1 Mostly used - ATmega8, Atmega168, Atmega328
1.2 Microcontroller - small computer on a single integrated circuit
1.2.1 Major components

ALU
|
Data memory - Control Unit - Instruction memory
|
I/O Ports

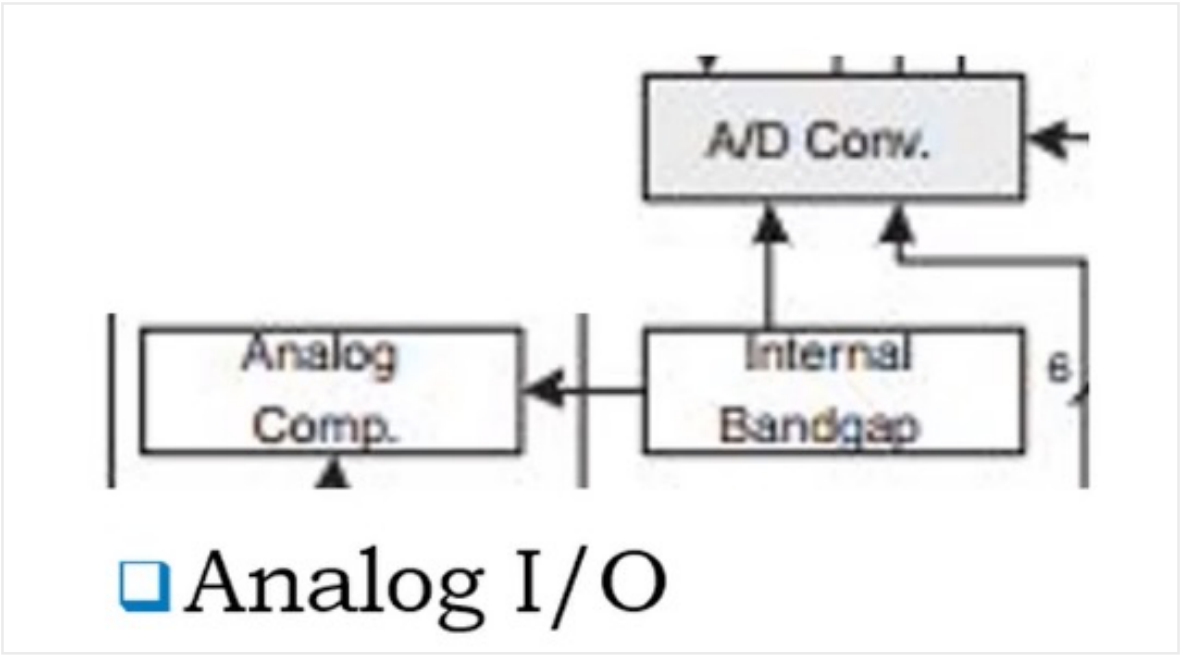
1.3 AVR architecture - CPU
- ALU
- General purpose registers (for both data + adr)
- Interrupts
- Instruction Control

1.4 AVR architecture - Memory
- volatile memory
  - SRAM
- non volatile
  - EEPROM - device configurations and access tables
  - Flash - program that needs to be executed is stored in it, faster accessibility than EEPROM

1.5 AVR architecture - Timers
- counting and timing
- frequency of instruction execution, interrupts generation, pam signals
- 8 bit T/C 0 , 16 bit T/C 1 , 8 bit T/C 2

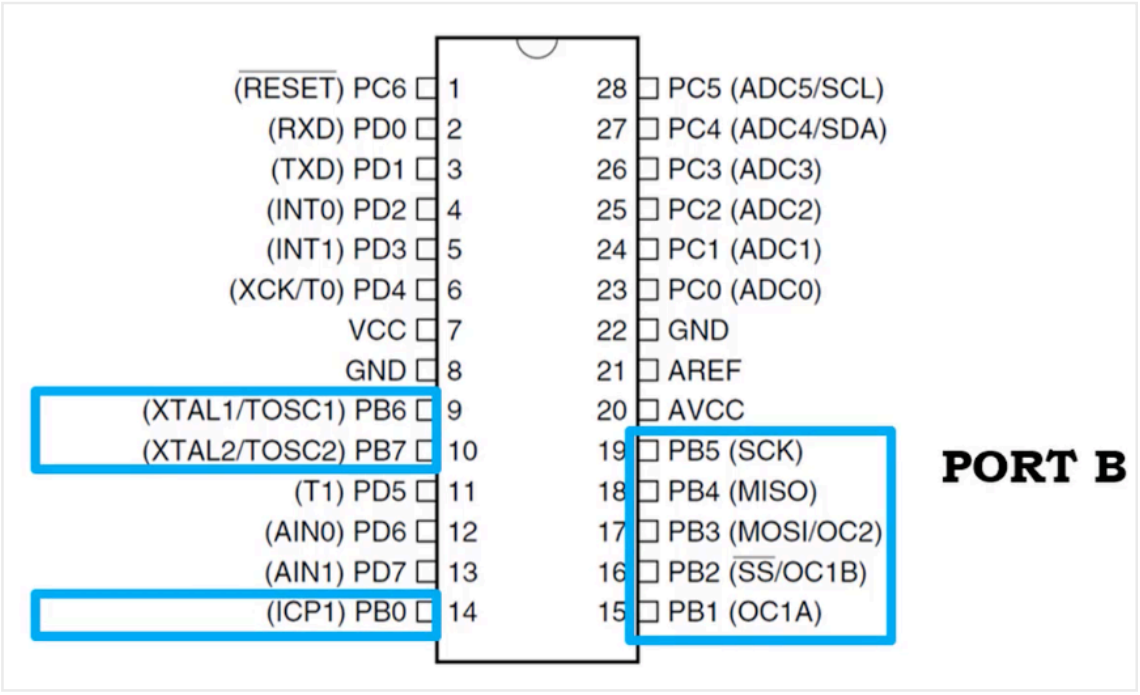
1.6 AVR architecture - I/O ports
- 8 bit ports
- each bit -> one I/O pin
- pins are digital nature
- port D(8), port B(8), port C(7)

1.6.1 Analog ports
- Analog - Digital conversion
- Application in PWM

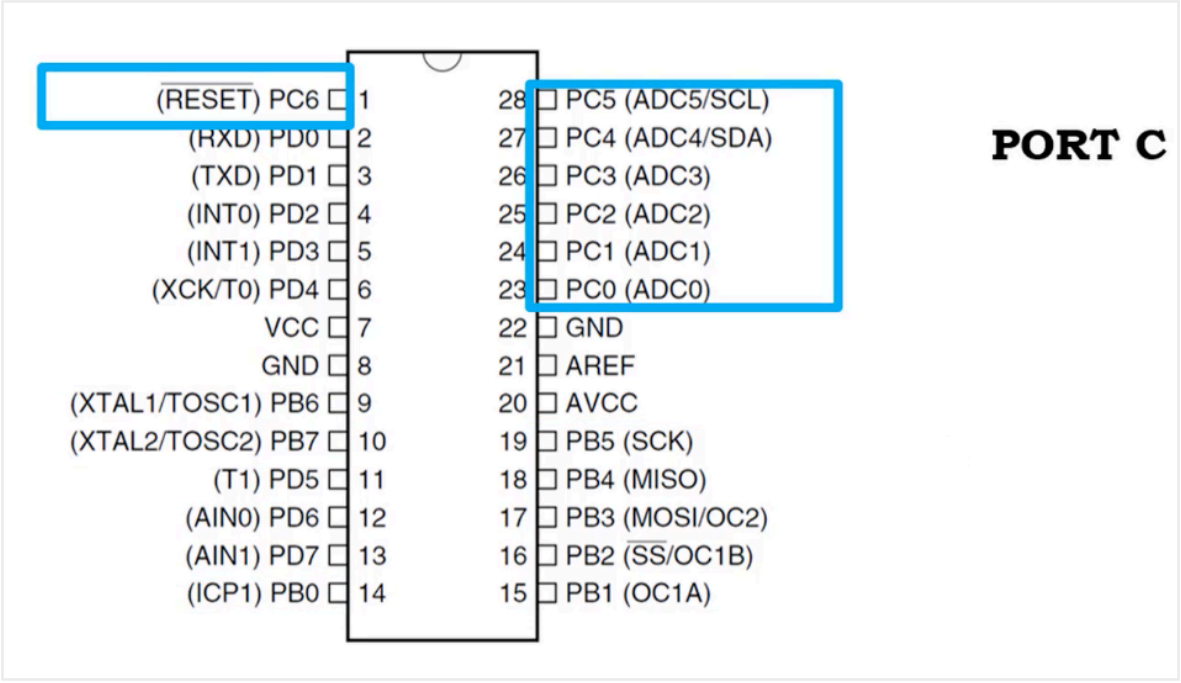


2.1 Structure of 28 pin Atmega 328 controller

2.1.1 Port B

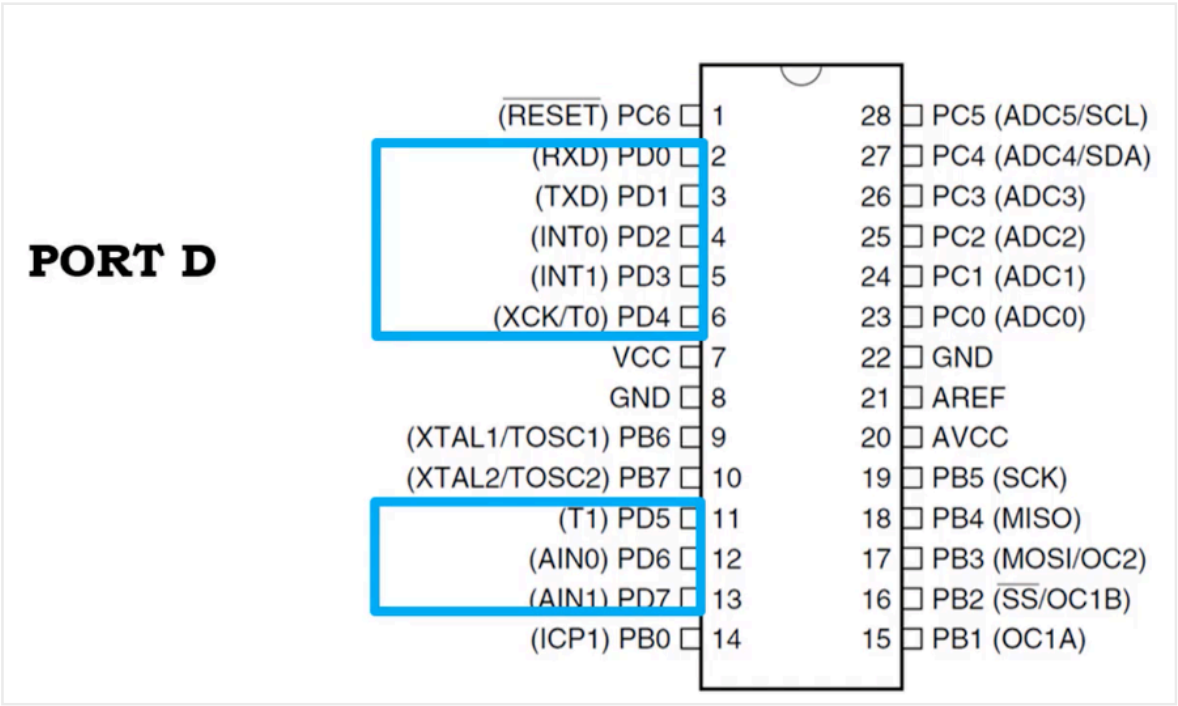


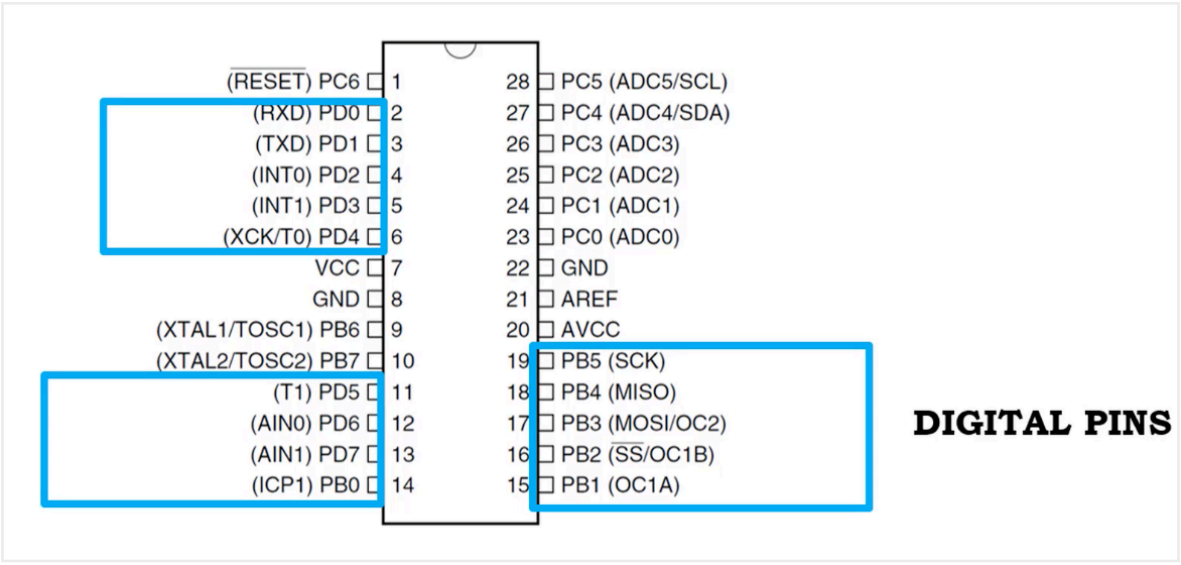
2.1.2 Port C

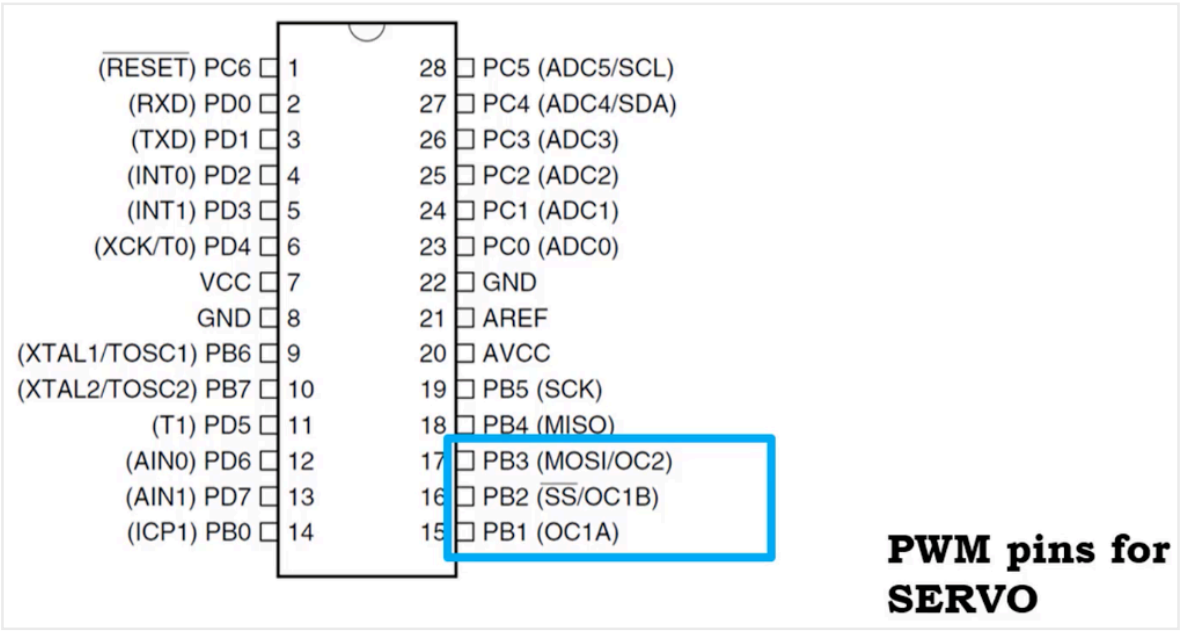


Pins 23-28, i.e PC5 - PC0 -> Analog pins

2.1.3 Port D





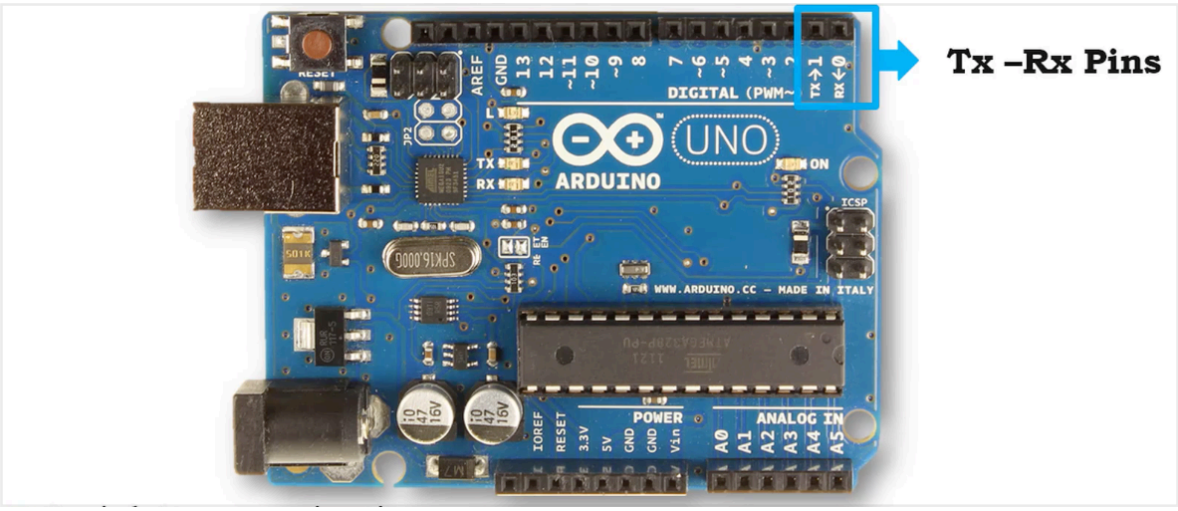


3.1 Features of Arduino Uno

- Advanced RISC architecture
- 3 PWM Channels
- Programmable Serial USART
- External and Internal Interrupt Sources
- Operating voltages 4.5-5.5 V
- On-Chip Analog Comparator
- 8-channel ADC with 10-bit accuracy

3.2 Structure of Arduino Uno

- Atmega 328 controller
- Tx- Rx pins - Serial communication
  - PWM -> control servo motors



- PWM Pins (pins with ~ sign)
- DIgital Pins

- A0 - A5 Analog pins, above it power supply pins
- 16 MHz crystal oscillator acts as clock for the board
- USB plug - interface Arduino board with computer
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