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Introduction:

A microcontroller is an integrated circuit doing a specific task. We can consider the microcontroller is a small computer, because it contains some of computer components. We can use microcontrollers in many applications such as cars, house devices, medical devices, etc.

Microcontrollers consist of many components such as: CPU, memory (storing the program and data), Timers, Analog to Digital converter, Digital to Analog converter and input/output devices.

Microcontroller families:

Microcontroller is used in many applications, and the following some of microcontrollers families and microcontrollers brands:

- ARM-Cortex-M:
  - Cortex-M4
    - TM4C123GH6PM
    - STM32F407VGT6
    - MSP432P401R (for floating point)
    - NRF52840
  - Cortex-M3
    - STM32F103C8T6
    - LPC1768

    - Cortex-M33
        - LPC55S6x
    - Cortex-M0+
        - ATSAMD21G18
    - Cortex-M7
        - STM32H743ZI
- PIC
    - PIC32
        - PIC32MX795F512L
    - PIC18
        - PIC18F46K22
    - PIC24
        - PIC24FJ256GA702
    - PIC32MX
        - PIC32MX795F512L
- AVR
    - ATmega
        - ATmega328P
        - ATmega2560
        - ATmega16
    - ATtiny
        - ATtiny85
        - ATtiny13A
        - ATtiny2313
    - ATxmega
        - ATxmega128A1U
    - AVR32
        - AT32UC3A0512
        - AT32UC3C0512C
        - AT32UC3B0256

Comparison between PIC16F877A and TM4C123GH6PM

Property	PIC16F877A	TM4C123GH6PM
manufacturers	Microchip	Texas Instruments
family	Pic16	Arm cortex m4
dimensions	25.4mm x 10.16mm	10mm x 10mm
SRam	368Bytes	32kB (start from 0x2000.0000)
EEPROM	256Byte	2KB
Bus size	8bits	32bits
Frequency	20 MHz	80 MHz
Flash Memory	8KB	256kB
Number of comparators	2	2 Analog / 16 Digital Comparators
Temperature	-40 to 125C	Industrial(-40°Cto85°C) temperature range Extended(-40°Cto105°C) temperature range
Pin Count	40(33 input/output pins)	64(43 GPIO)
Number of ports	5 ports	6 ports
Number of general-purpose registers	16 register (from 0 to 15)	13 register (from 0 to 12)
Size of general-purpose register	8bit	32bit

Supporting floating point operations	No	Yes
Architecture	Harvard	Harvard
Sleep modes	Simple sleep mode	Sleep mode, Deep sleep mode
Operating voltage	2 to 5.5 volts	5 volts