

Chapter 1

Types, Selection, and Applications of Microcontrollers

Lesson 4

Microcontroller Selection

CPU

Memory

Interrupt Handler unit

Timing Devices

Application specific Devices

ADC

**Micro-
computer**

Ports

Serial Devices

Watchdog Timer

PWM

Microcontroller Chip or VLSI Core

Check-list for selecting an MCU

- Performance- 8-bit,16-bit or 32-bit
- Clock rate
- Power dissipation
- Intensive computations
- DSP calculations
- Cache
- Memory Management Unit

Memory Check-list for selecting an MCU

- CISC/RISC, Memory architecture- Princeton/Harvard
- DMAC
- Embedded MCU or External 64 kB or External Extended MCU System
- Internal ROM/EPROM/ EEPROM/ Flash

Timing Devices Check-list for selecting an MCU

- Timer-Counters- 1, 2, 3;
- Free running
- Timer-Counter,
- Out-compares,
- In-captures
- Real-time clock periodic interrupts
- Software timers

Timing Devices Check-list for selecting an MCU

- Pulse-width Modulators 0, 1, 2, 3, .. 8
- Watchdog timer
- Timer processing unit

Serial and Analog Devices Check-list for selecting an MCU

- Serial Synchronous Communication (SPI) and Serial Asynchronous Communication (SCI)
- I²C/CAN/Serial Buses
- PCI/USB/HPI Devices
- Other application specific device
- Analog Input Channels-1/4/8

Software Development Tools Support and cost Factors

- MCU specific tools availability - for examples, Device support, Compiler, Real time operating system, simulator, debugger, test tool
- Cost of the above

Hardware Development Tools Support and cost Factors

- Emulators, demonstration board, evaluation board
- Cost of the above

Cost and Availability Factors

- Cost for on-chip application specific feature
- Major hardware building blocks cost and availability
- Major software building blocks cost and availability

Summary

We learnt

- Selection of Processing unit
- Selection of Memory unit
- Selection of Internal Devices
- Software development tools
- Hardware development tools