SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

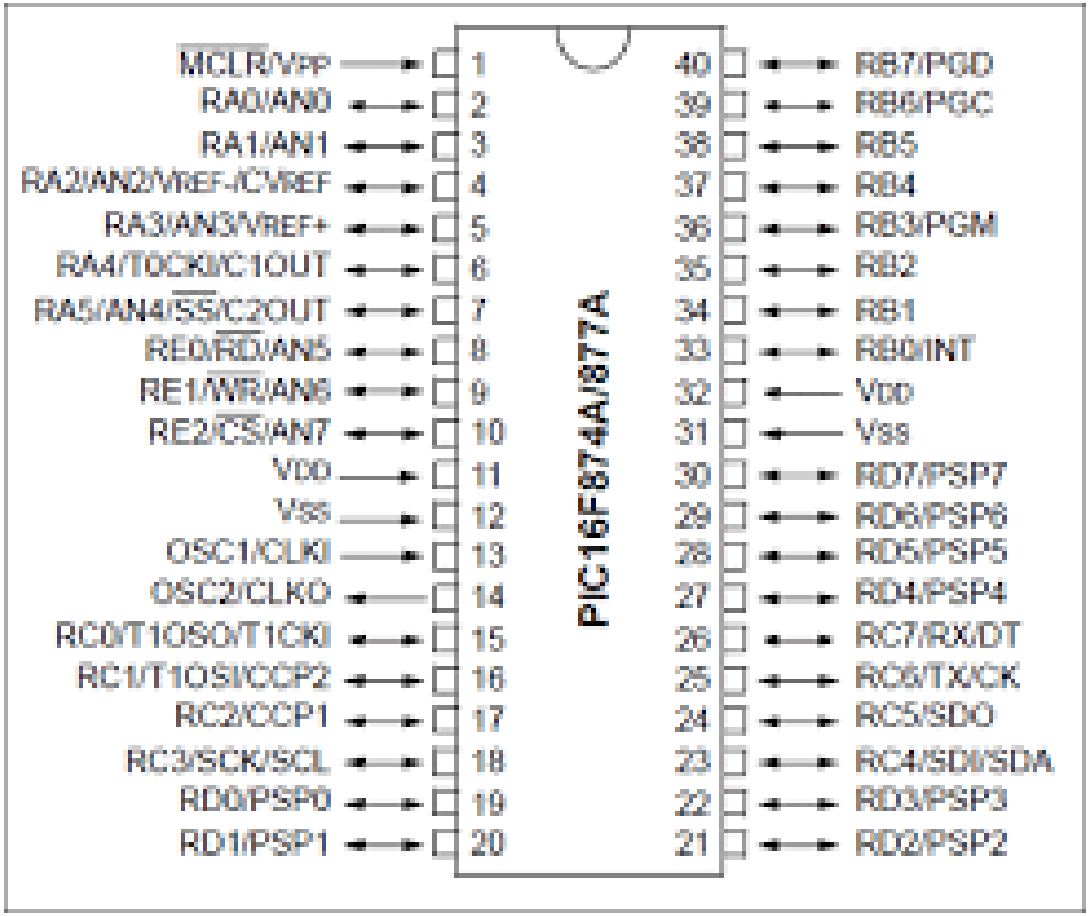
19EC404 – Microcontroller Programming and Interfacing

Unit -1

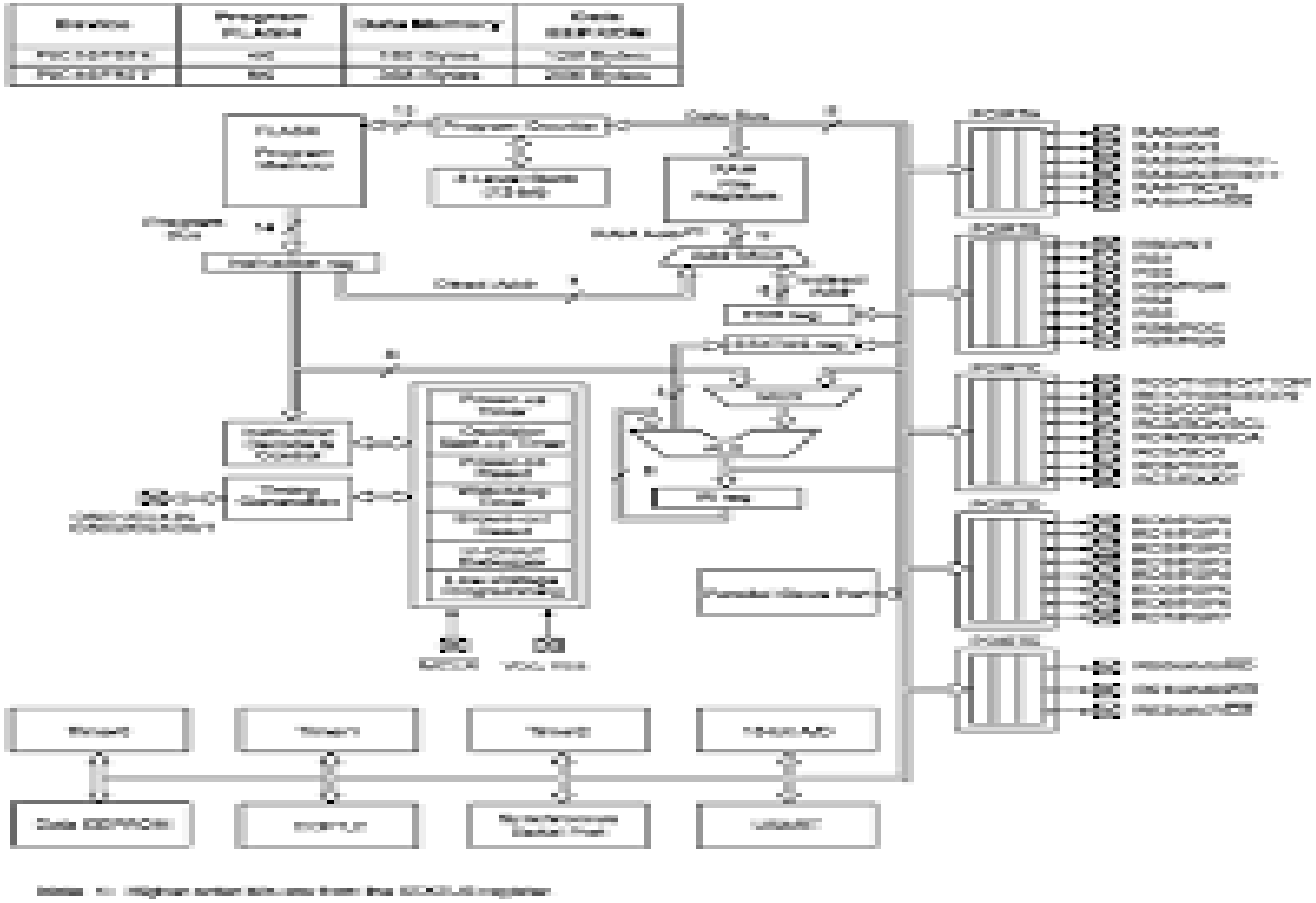
PIC Microcontrollers: History, Features& Architecture

PIC 16F877A PIN DIAGRAM &PIC CONFIGURATION

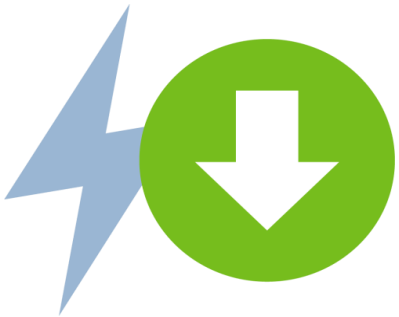
Pic pin Diagram



PIC Microcontroller ARCHITECTURE



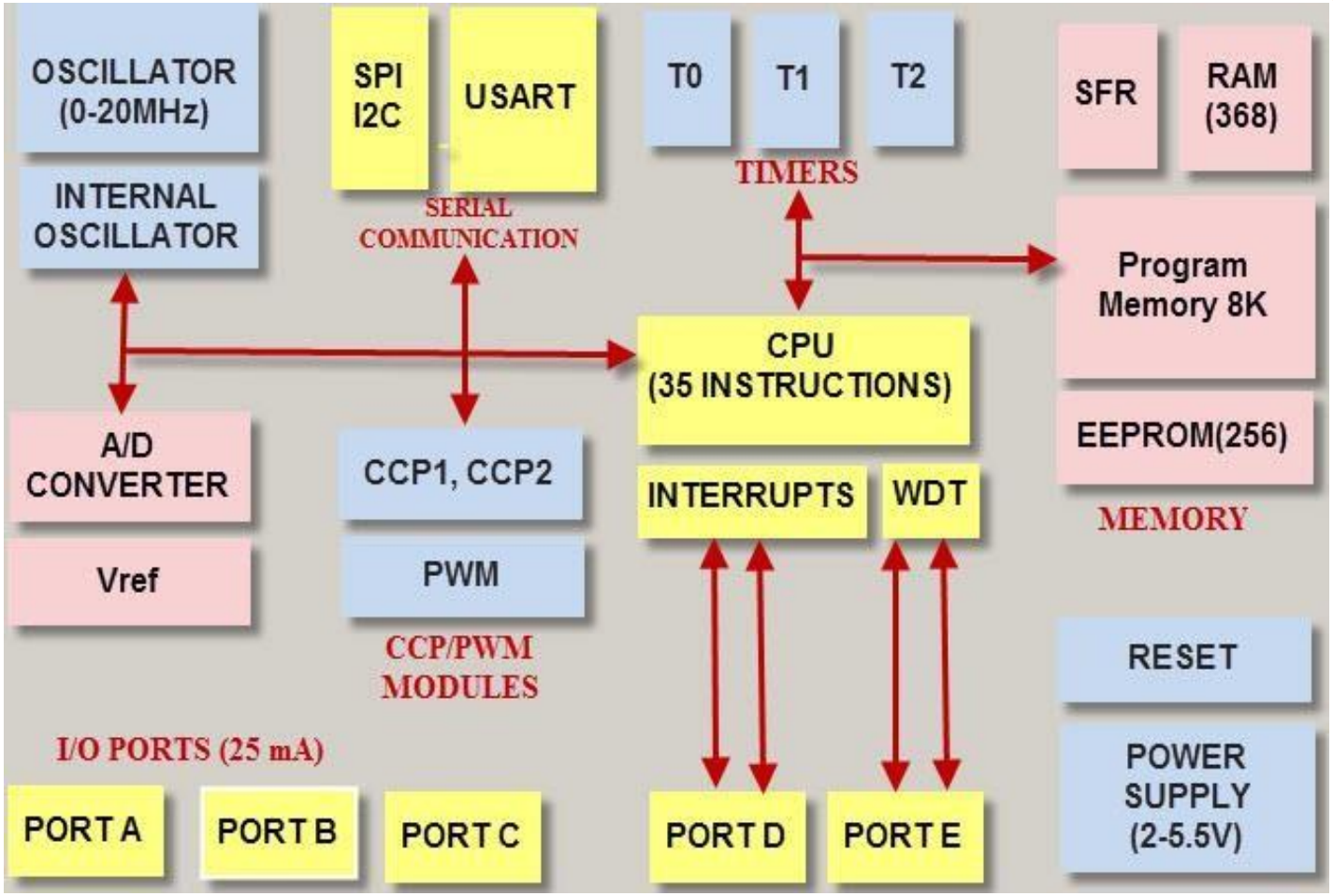
Advantages



Low power consumption

High Performance

Supports hardware and softwareare tools

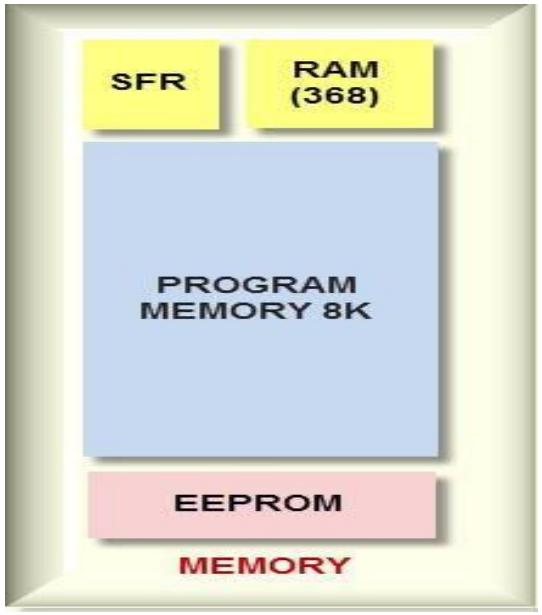

OSCILLATOR (0-20MHz)
INTERNAL OSCILLATOR
SPI I2C
USART
SERIAL COMMUNICATION
T0
T1
T2
TIMERS
SFR
RAM (368)
Program Memory 8K
CPU (35 INSTRUCTIONS)
EEPROM(256)
MEMORY
A/D CONVERTER
Vref
CCP1, CCP2
PWM
CCP/PWM MODULES
INTERRUPTS
WDT
RESET
POWER SUPPLY (2-5.5V)
I/O PORTS (25 mA)
PORT A
PORT B
PORT C
PORT D
PORT E

1. Central Processing Unit (CPU)

- Includes
  - ALU,
  - Controller unit,
  - Memory unit,
  - Accumulator.
- ALU is mainly used for arithmetic and logical operations.
- The memory unit is used to store the commands after processing.
- The control unit is used to control the internal & external peripherals
- The accumulator is used to store the final results and further process.

2. Memory Organization

- The memory module in the PIC microcontroller architecture consists of Random Access Memory, Read Only Memory and STACK.



RAM (Random Access Memory)

- RAM is used to store the information temporarily in its registers. It is categorized into two banks, each bank has so many registers.
- The RAM registers are categorized into two types, namely

➢ SFR (Special Function Registers)

➢ GPR (General Purpose Registers).

GPR (General Purpose Registers)

- As the name implies, these registers are used for general purpose only. For instance, if we want to multiply any two numbers by using this microcontroller. Usually, registers are used for multiplying and storing in other registers. So, GPR registers don't have any superior function,- CPU can simply access the data in the registers.

Special Function Registers

- As the name implies, SFRs are used only for special purposes. These registers will work based on the function assigned to them, and these registers cannot work as a normal register. For instance, if you cannot use the STATUS register for storing the information, SFRs are used for viewing the status of the program. So, a consumer cannot change the SFR's function; the function is given by the retailer at the time of built-up.

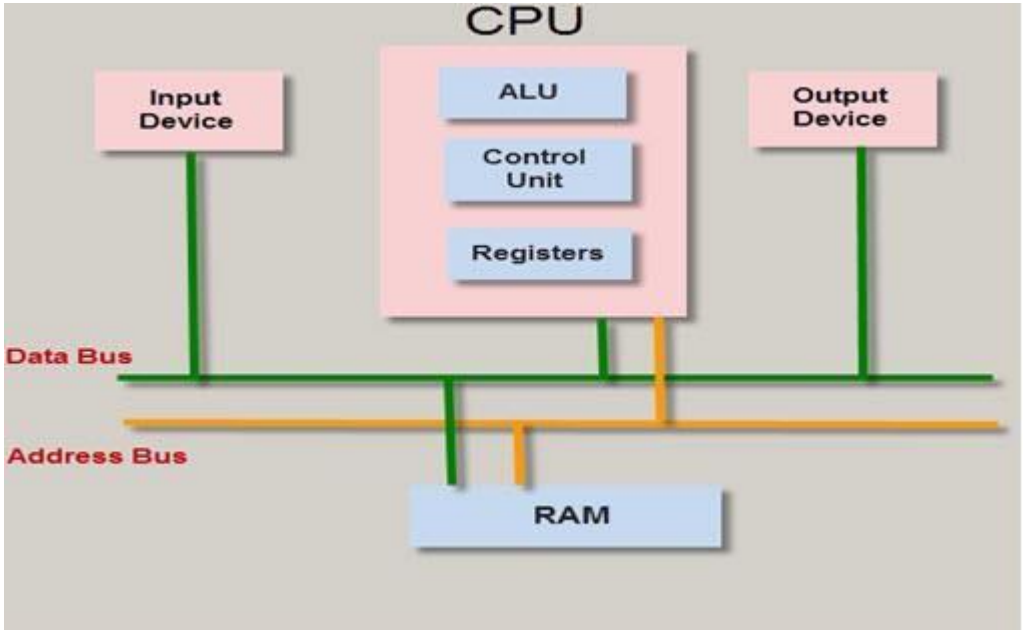
3. I/O Ports

- The PIC microcontroller consists of 5-ports, namely Port A, Port B, Port C, Port D and Port E.

4. BUS

- BUS is used to transfer & receive the data from one peripheral to another. It is categorized into two types like
  - Data bus
  - Address bus
- Data Bus is used to transfer or receive the data.

- The address bus is used to transfer the memory address from the peripherals to the central processing unit.




Thank
you