

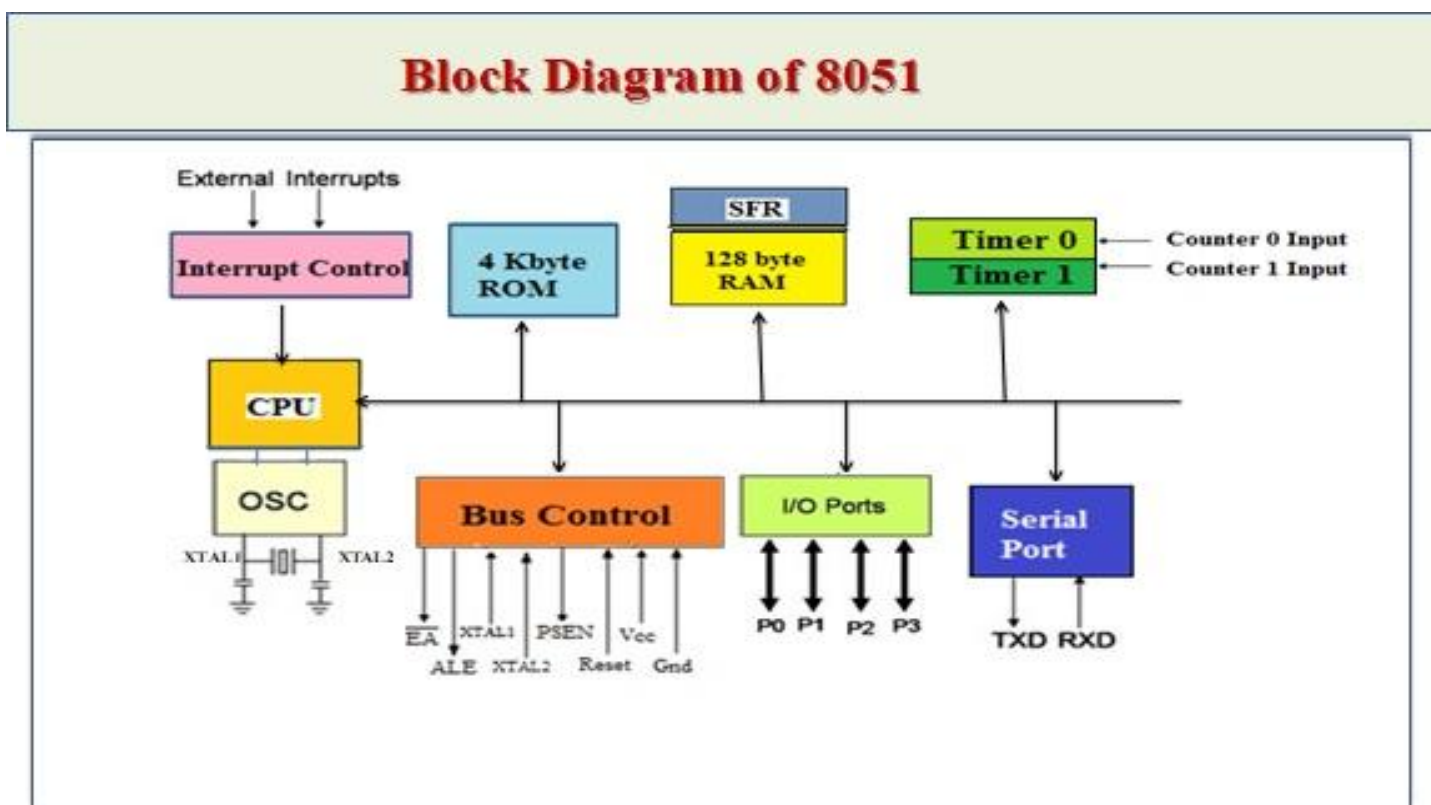
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### 8051 microprocessors

The 8051 series of microcontrollers is the second generations of 8-bit microcontrollers which is developed in 1980. They are more faster and powerful than Intel 8048 series. They contain a number of additional electronic circuitry for specific functions. The Intel MCS-51 is a single chip microcontroller (MCU) series developed by Intel. The 8-bit microcontrollers are used for a variety of applications involving limited calculations and relatively simple control strategies. They are used for commercial control applications, appliances control and instrumentation .etc.



### REGISTERS

The 8051 is an accumulator based microcontroller. Its registers are: A PSW, register B, 8-bit stack pointer, 16 bit data pointer, program counter, program address register, 16-bit timer registers for timer/counters, instructions register, control registers, RAM address register, serial data buffer, capture registers, special functions register, etc. Register B is used during multiply and divide operations. For other instructions it is used as another scratch pad register. The data pointer consists of a high byte and a low byte. It holds 16 – bit address. It can be used as a 16- bit register or two independent 8-bit registers. The serial data buffer is actually two separate registers: a transmit buffer and a receive buffer register.

**DESCRIPTION OF SOME REGISTERS ARE GIVEN BELOW –**

**Data pointer**-It consists of DPH(a high byte ) and DPL (a low byte ).It holds 16-bit address .It can be used as a 16- bit register or as two independent 8-bit registers .

P0,P1,P2, and P3. These are SFR latches for port 0,1,2 and 3 respectively.

**Serial Data Buffer** –It consists of two separate registers, a transmit buffer registers and receive a buffer register.

**Timer register**–(TL0, TH0),(TL1,TH1) and (TL2,TH2) are register pairs. These registers pair are 16-bit counting registers for Timer/Counter 0,1 and respectively.

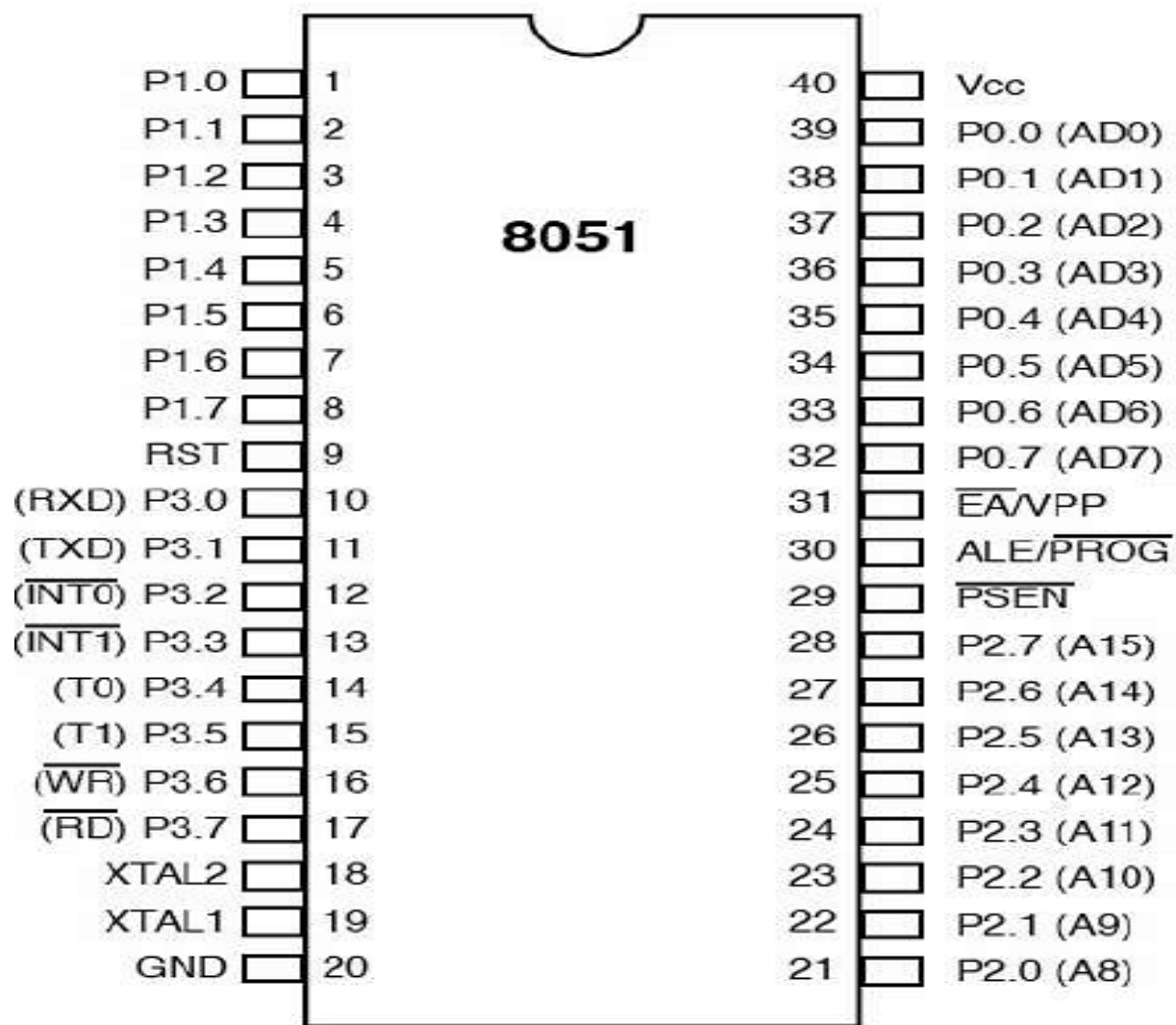
**Capture register** – RCAP2L and RCAP2H is a register pair. These registers are capture registers for the Timer2 capture mode.

**Control Registers** –Special function register IE,IP TMOD ,TCON,T2CON andSCON hold control and status bits for the interrupt system ,timer /counters, and the serial port .PCON is power control register. The 8051 is provided with power saving modes of operation .For application where power consumption is critical, both HMOS and CHMOS versions provide reduced power modes of operation .For CHMOS versions of the 8051 microcontroller ,the reduced power modes ,idle and power down modes are the standard features. In HMOS versions only reduced power mode is available.

**PSW(program status word)**-PSW register contains program status information.

**Stack pointer-(SP).** Intel 8051 microcontroller contains as 8-bit stack pointer register. It is incremented before data is stored during PUSH and CALL operations. It is decremented when POP or RET (return) operations takes place. Any area of on-chip RAM can be used as stack.

**Program Counter( PC)**-The Intel 8051 microcontroller contains a 16-bit program counter (PC) register. It points to the address of the next instruction of the program, which is to be fetched and executed. It is automatically incremented after fetching an instruction. It is affected by JUMP and CALL instructions.



For more theory and brief you can read microprocessor book, chapter-8051.