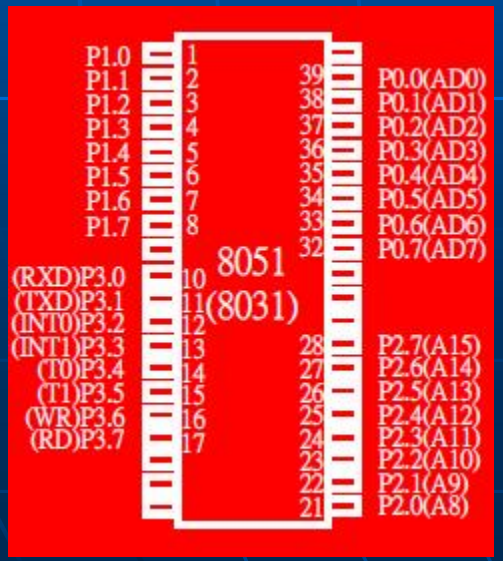
I/O Ports

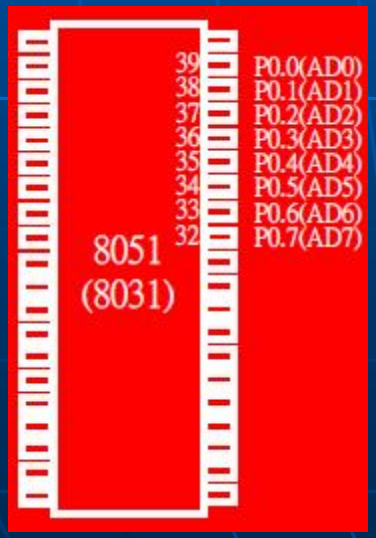
I/O Port Pins

- The four 8-bit I/O ports **P0, P1, P2 and P3** each uses 8 pins.
- All the ports upon RESET are configured as output, ready to be used as input ports by the external device.



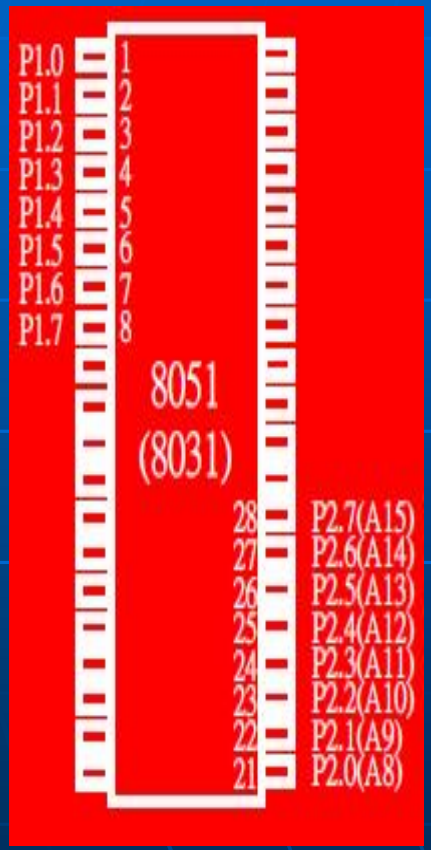
Port 0

- Port 0 is **also** designated as **AD0-AD7**.
- When connecting an 8051 to an external memory, port 0 provides both address and data.
- The 8051 multiplexes address and data through port 0 to save pins.



- **ALE** indicates if P0 has address or data.
  - *When ALE=0, it provides data D0-D7*
  - *When ALE=1, it has address A0-A7*

Port 1 and Port 2



- In 8051-based systems **with no external memory connection**:
  - Both P1 and P2 are used as simple I/O.
- In 8051-based systems **with external memory connections**:
  - Port 2 must be used along with P0 to provide the 16-bit address for the external memory.
  - P0 provides the lower 8 bits via A0 – A7.
  - P2 is used for the upper 8 bits of the 16-bit address, designated as A8 – A15, and it cannot be used for I/O.

Port 3

P3 Bit	Function	Pin
P3.0	RxD	10
P3.1	TxD	11
P3.2	$\overline{\text{INT0}}$	12
P3.3	$\overline{\text{INT1}}$	13
P3.4	T0	14
P3.5	T1	15
P3.6	$\overline{\text{WR}}$	16
P3.7	$\overline{\text{RD}}$	17