

# Addressing Modes

Prof. F. Schoenfeld  
ENS/PHY/TECH Department  
Nassau Community College

## Six Modes Will Be Considered

- ◆ Immediate Addressing Mode
- ◆ Register Addressing Mode
- ◆ Direct Addressing Mode
- ◆ Indirect Addressing Mode
- ◆ External Direct Addressing Mode
- ◆ Code Indirect Addressing Mode

## Immediate Mode

- ◆ Uses a number or constant as the operand
- ◆ e.g. `mov A,#027h`
  - # indicates the “literal” value to be moved
  - The literal value 27h is moved into the accumulator

## Register Addressing Mode

- ◆ Source or destination operands are registers
- ◆ e.g.  
`mov A, R0`
  - The contents of R0 is moved into the accumulator

## Direct Addressing Mode

- ◆ Source or Destination is a specific memory location
  - Location may be defined by address number or label
- ◆ e.g. `mov A, 035h`
  - the contents of 35h is moved into the accumulator
- ◆ e.g. `mov A, data1`
  - the contents of the memory location labeled data1 is moved into the accumulator

## Direct Addressing Mode

- ◆ Addresses between 80h and FFh refer to SFRs

## Indirect Addressing Mode

- ◆ Memory address is not directly given
  - Register containing the memory address is given
  - Only refers to internal RAM, not SFR's
- ◆ e.g. `mov A, @R1`
  - Contents of the memory whose address is in R1 is moved to the accumulator
- ◆ Indirect is indicated by `@`
- ◆ In the example above register R1 contains an address, *not data*

## External Direct Addressing Mode

- ◆ Used to access external memory
- ◆ Used data pointer
- ◆ e.g. `movx A, @dptr`
  - Moves the contents of the memory location found in the data pointer into the accumulator
  - Data pointer (dph & dpl sfr's) must be first loaded with the address

## External Direct Addressing Mode

- ◆ Only other External direct instruction is:  
`movx @dptr, A`
  - Note `movx`
  - Moves the contents of the accumulator into the memory location found in the data pointer
  - Data pointer (dph & dpl sfr's) must be first loaded with the address

## External Indirect

- ◆ Used to access the first 256 bytes of external RAM
- ◆ Similar to external direct except a register is used instead of the data pointer
- ◆ e.g. `movx A, @R0`  
`movx @R0, A`