

PART A

1. What are the basic modes of operation of 8255?

There are two basic modes of operation of 8255, viz.

1. I/O mode.
2. BSR mode

In I/O mode, the 8255 ports work as programmable I/O ports, while in BSR mode only port C (PC0-PC7) can be used to set or reset its individual port bits. Under the IO mode of operation, further there are three modes of operation of 8255,

Mode 0- Basic I/O

mode Mode 1-Strobe I/O

mode Mode 2- Strobe bi-direction I/O

2. Write the features of mode 0 in 8255?

1. Two 8-bit ports (port A and port B) and two 4-bit ports (port C upper and lower) are available. The two 4-bit ports can be combined used as a third 8-bit port.
2. Any port can be used as an input or output port.
3. Output ports are latched. Input ports are not latched.
4. A maximum of four ports are available so that overall 16 I/O configurations are possible.

3. What are the features used mode 1 in 8255?

Two groups A and group B are available for strobe data transfer.

1. Each group contains one 8-bit data I/O port and one 4-bit control/data port. 2. The 8-bit data port can be either used as input or output port. The inputs and outputs both are latched.
3. Out of 8-bit port C, PC0-PC2 is used to generate control signals for port B and PC3=PC5 are used to generate control signals for port A. The inputs PC6, PC7 may be used as independent data lines.

4. What are the signals used in input control signal and output control signals?

Input control signals STB (Strobe input)

IBF (Input buffer full)

INTR (Interrupt request)

Output control signal OBF (Output buffer full)

ACK (Acknowledge input) INTR (Interrupt request)

5. What are the features used mode 2 in 8255?

The signals 8-bit port in group A is available.

1. The 8-bit port is bi-directional and additionally a 5-bit control port is available.
2. Three I/O lines are available at port C, viz PC2-PC0.
3. Inputs and output are both latched.
4. The 5-bit control port C (PC3-PC7) is used for generating/accepting handshake Signals for the 8-bit data transfer on port A.

6. What is the purpose of control word written to control register in 8255?

The control words written to control register specify an I/O function for each I/O port. The bit D7 of the control word determines either the I/O functions of the BSR function.

7. What is Key DEbouncing?

Mechanical switch are used as keys in most of the keyboard. When a key is pressed the contact bounce back and forth and settle down only after a small time delay (about 20ms). Even though a key is actuated once, it will appear to have been actuated several times. This problem is called Key DEBouncing.

8. What are the internal devices of a typical DAC?

The internal devices of a DAC are R/2R resistive network, an internal latch and current to voltage converting amplifier.

9. What is setting or conversion time in DAC?

The time taken by the DAC to convert a given digital data to corresponding analog signal is called conversion time.

10. What are the different types of ADC?

The different types of ADC are successive approximation ADC, counter type ADC, flash type ADC, integrator converters and voltage to frequency converters.

11. What is resolution?

Resolution of a converter determines the degree of accuracy in conversion. It is equal to $1/2^n$.

12. To interface an A/D converter with the microprocessor, what does the microprocessor do?

The microprocessor should:

- Send a pulse to the start pin
- Wait until the end of the conversation
- Read the digital signal at the input port

13. What is the need for interfacing a device?

The general purpose microprocessor has to communicate or involve in data transfer with other external devices. This is possible through a set of registers or making use of registers as input and output port. This arrangement is complex and makes the entire process of data transfer more challenging. The transfer of data and the control over it are easily achieved through dedicated devices. The devices that are used for such purposes are called interfacing devices.

14. What is the purpose of chip select in 8255?

The IC 8255 is selected using this signal. This signal is obtained from the decoder that decodes the microprocessor address lines. This is active for low value of input and it enables the communication between the 8255 and microprocessor.

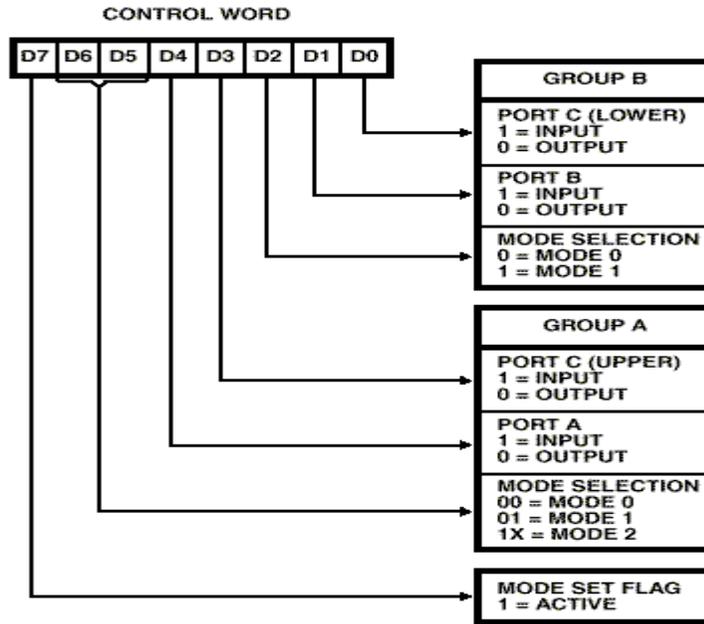
15. What are the input handshaking signals?

- IBF(INPUT BUFFER FULL) – output representing that the input latch contains information.
- STB(STROBE INPUT) – loads data into the port latch. This holds the data until it is sent to the microprocessor through IN instruction.
- INTR (INTERRUPT REQUEST) - output that requests and interrupt.
- INTE(INTERRUPT ENABLE) – neither an input nor an output. This is an internal bit programmed through the port PC4 or PC2.

16. What are the output handshaking signals?

- OBF(OUTPUT BUFFER FULL) – output that goes low, whenever data are output to the port A or B latch. This will be set to logic 1, whenever the acknowledgement returns from the external device.
- ACK (ACKNOWLEDGE) – response from an external device indicating that data has been from the 8255 port.
- INTR(INTERRUPT REQUEST) – signal that often interrupts the microprocessor when the external device receives the data.
- INTE(INTERRUPT ENABLE) – neither an input nor an output. This is an internal bit programmed through the port A or B.

17. Write the control word for I/O mode.



18. Write the control word for BSR mode.

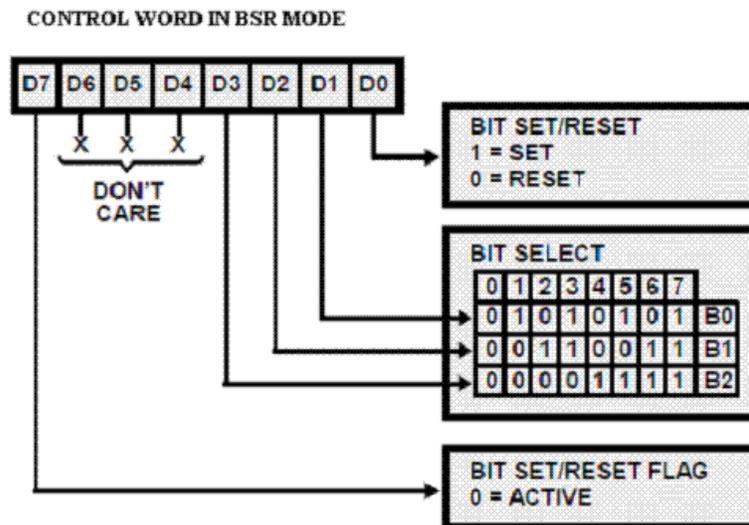


Fig 1.9