

UNIT- 4 PERIPHERAL INTERFACING

TWO MARKS

1. What is the use of 8051 chip? 1

Intel's 8251A is a universal synchronous asynchronous receiver and transmitter compatible with Intel's Processors. This may be programmed to operate in any of the serial communication modes built into it. This chip converts the parallel data into a serial stream of bits suitable for serial transmission. It is also able to receive a serial stream of bits and converts it into parallel data bytes to be read by a microprocessor.

2. What are the different types of methods used for data transmission?

The data transmission between points involves unidirectional or bi-directional transmission of meaningful digital data through a medium. There are basically three modes of data transmission

(a) Simplex

(b) Duplex

(c) Half Duplex

In simplex mode, data is transmitted only in one direction over a single communication channel. For example, a computer (CPU) may transmit data for a CRT display unit in this mode. In duplex mode, data may be transferred between two transceivers in both directions simultaneously. In half duplex mode, on the other hand, data transmission may take place in either direction, but at a time may be transmitted only in one direction. For example, a computer may communicate with a terminal in this mode. When the terminal sends data (i.e. terminal is sender). The message is received by the computer (i.e. computer is receiver). However, it is not possible to transmit data from the computer to terminal and from terminal to the computer simultaneously.

3. What is the various programmed data transfer method?

ii) Asynchronous data transfer

iii) Interrupt driven data transfer

4. What is synchronous data transfer?

It is a data method which is used when the I/O device and the microprocessor match in speed. The transfer of data to or from the device, the user program issues a suitable instruction addressing the device. The data transfer is completed at the end of the execution of this instruction.

5. What is asynchronous data transfer?

It is a data transfer method which is used when the speed of I/O device does not match with the speed of the microprocessor. Asynchronous data transfer is also called as Handshaking.

6. What are the functional types used in control words of 8251a?

The control words of 8251A are divided into two functional types

1. Mode Instruction control word

2. Command Instruction control word

Mode Instruction control word: - This defines the general operational characteristics of 8251A.

Command Instruction control word: - The command instruction controls the actual operations of the selected format like enable transmit/receiver, error reset and modem control.

7. 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, So as to support different types of applications, viz. mode 0, mode 1, and mode 2.

Mode 0- Basic I/O mode

Mode 1-Strobe I/O mode

Mode 2- Strobe bi-direction I/O

8. 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.

9. 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.

10. 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)

11. 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.

12. What are the modes of operation used in 8253?

Each of the three counters of 8253 can be operated in one of the following six modes of operation.

1. Mode 0 (Interrupt on terminal count)
2. Mode 1 (Programmable monoshot)
3. Mode 2 (Rate generator)
4. Mode 3 (Square wave generator)
5. Mode 4 (Software triggered strobe)
6. Mode 5 (Hardware triggered strobe)

13. What are the different types of write operations used in 8253?

There are two types write operation in 8253

- (1) Writing a control word register
 - (2) Writing a count value into a count register
- The control word register accepts data from the data buffer and initialize
- (a) Initializing the operating modes (mode 0- mode 4)
 - (b) Selection of counters (counter 0- counter 2)
 - (c) Choose binary /BCD counters.
 - (d) Loading of the counter registers.

The mode control register is a write only register and the CPU cannot read its contents.

14. Give the different types of command words used in 8259A

The command words of 8259A are classified in two groups

1. Initialization command words (ICWs)
2. Operation command words (OCWs)

15. Give the operation modes of 8259A?

- (a) Fully Nest Mode
- (b) End of Interrupt
- (c) Automatic Rotation
- (d) Automatic EOI mode
- (e) Specific Rotation
- (f) Special Mask Mode
- (g) Edge and level Triggered Mode
- (h) Reading 8259 Status
- (i) Poll command
- (j) Special Fully Nested Mode

(k) Buffered Mode (l) Cascade Mode

16. Define scan counter?

The scan counter has two modes to scan the key matrix and refresh the display. In the encoded mode, the counter provides binary count that is to be externally decoded to provide the scan lines for keyboard and display. In the decoded scan mode, the counter internally decodes the least significant 2 bit and provides a decoded 1 out of 4 scan on SL3-SL 3. The keyboard and display both are in the same mode at a time.

17. What is the output modes used in 8279?

8279 provides two output modes for selecting the display options.

2. In this mode, 8279 provides 8 or 16 character- multiplexed displays those can be organized as dual 4-bit or single 8-bit display units.

3. Display Entry 8279 allows options for data entry on the displays. The display data is entered for display from the right side or from the left side.

18. What are the modes used in keyboard modes?

1. Scanned Keyboard mode with 2 Key Lockout 2. Scanned Keyboard with N-Key Rollover. 3. Scanned Keyboard Special Error Mode. 4. Scanned Matrix Mode.

19. What are the modes used in display modes?

1. Left Entry Mode In the left entry mode, the data is entered from the left side of the display unit.

2. Right Entry Mode In the right entry mode, the first entry to be displayed is entered on the rightmost display.

20. What is the use of modem control unit in 8251?

The modem control unit handles the modem handshake signals to coordinate the communication between the modem and the USART.

21. List the operation modes of 8255?

a) I/O Mode

i. Mode 0- Simple Input/Output.

ii. Mode 1- Strobe Input/Output (handshake mode)

iii. Mode 2- Strobe bi-directional mode

b) Bit Set/Reset Mode.

22. What is a control word?

It is a word stored in a register (control register) used to control the operation of a program digital device.

23. 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.

24. What is the size of ports in 8255?

Port - A : 8- bits Port - B : 8- bits

Port -CU : 4- bits Port -CL : 4- bits

25. What is an USART?

USART stands for universal Synchronous / Asynchronous Receiver / Transmitter. It is a programmable communication interface that can communicate by using either synchronous or asynchronous serial data.

26. What is the use of 8251 chip?

8251 chip is mainly used as the asynchronous serial interface between the processor and the external equipment.

27. The 8279 is a programmable ----- interface.

Keyboard/ Display

28. List the major components of the Keyboard/ Display interface.

a. Keyboard section b. Scan section c. Display section d. CPU interface section

29. What is Key bouncing?

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 Bouncing.

30. What is TXD?

TXD- Transmitter Data Output

This output pin carries serial of the transmitted data bits along with other information like start bit, stop bits and priority bit.

31. Define HRQ?

The hold request output request the access of the system bus. In non- cascaded 8257 systems, this is connected with HOLD pin of CPU. In cascade mode, this pin of a slave is connected with a DRQ input line of the master 8257, while that of the master is connected with HOLD input of the CPU.

32. What is RXD?

RXD- Receive Data Input

This input pin of 8251A receives a composite stream of the data to be received by 8251A.

33. 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.

34. 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.

35. 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.

PART B

1. Explain any one of the modes of 8255 in detail. (16)
2. With neat block diagram explain PPI. (16)
3. i) Using model, write a program to communicate between two microprocessors using 8255. (10)
- ii) Show the control word format of 8255 and explain how each bit is programmed. (6)
4. With neat block diagram explain the functions of 8259. (16)
5. i) Bring about the features of 8251. (6)
- ii) Discuss how 8251 is used for serial communication of data. (6)
- iii) Explain the advantages of using the USART chips in microprocessor based systems. (4)
6. Design an interface circuit needed to connect DIP switch as an input device and display the value of the key pressed using a 7 segment LED display. Using 8085 system, write a
7. Explain the 7 segment LED interface with microprocessor. (16)
8. i) Explain the advantages of using the keyboard and display controller chips in microprocessor based system. (6)
- ii) Write a program using RST 5.5 interrupt to get an input from keyboard and display it on the display system. (6)
- iii) Use RST 5.5 instead of RST 7.5 and change mask pattern accordingly.(4)
9. i) Explain the working of 8254 timer and write a program using it to generate a square waveform of period 3 msec. (10)
- ii) Describe with any one of the mode configurations of 8254 timer in detail.(6)
10. Explain how to convert an analog signal into digital signal. (16)