Real Time System

Third Level

Lecture Eighteen

Questions

RealTime Systems.
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Goals
Up-on completing this lecture, the student should be able to:

1- Identify the concepts introduced in lecture 10 till 17.
2- apply them in the RT designs.

Lec.10

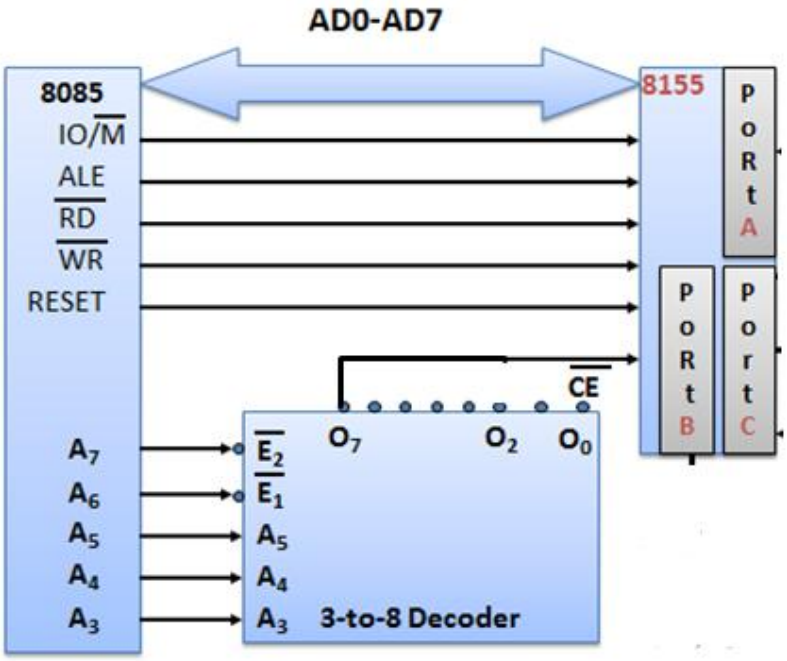
- What are the purposes of Programmable Devices? Or why the Programmable Devices are invented?
- What is the Multipurpose Programmable Interface or what is 8155/8156? What it does contain or what it's includes? And what is used for?
- Draw the block diagram of 8155 with its truth table for address line?
- List and explain the control signals of 8155?
- What is 8205 and how it can be enable?
- Design (draw) and determine the address of the control/status, I/O ports and timer register of the 8155 if the output of decoder O2, O4 ….?
- Design a full system contains microprocessor and 8155 and I/O device with its connections and shows how can any output of the decoder active the interfacing proses by using 8205?
- What type of Commands can be given to 8155?
- What is the format of Control word (command reg) of 8155?
- What is the timer of 8155? How many modes of operation it have? Explain the modes with drawing?
- What is the format of Status word (Status reg) of 8155?
- How the 8155 I/O ports can work in handshake mode? What are the signals used for handshake? And what the function of these signals?

Lec.11

- What are the signals of 8155 (what are the pins of 8155) and what its function of each pin?
- **Ex 1:** Design (draw and explain) an interfacing circuit using the 8155 to read and display data from an A/D converter to meet the following requirement:-
  1. Setup port A in the handshake mode to read data from A/D converter.
  2. Setup port B as O/P port to display data at seven segment LED.
  3. Use a 3 to 8 decoder to assign I/O port address (O2).
  4. Use line PC2, 1 for EOC and OE respectively, and PC5 for SOC.
- **Ex 2:** Design (draw and explain) an interfacing circuit using the 8155 to display data to meet the following requirement:-

1. Setup port A as O/P port to display data at seven segment LED.
2. Setup port B as O/P port to display data at seven segment LED.
3. Use a 3 to 8 decoder to assign I/O port address (O4).

- **EX 3: Same Ex 1:** to meet the following requirement:-
  1. Use a 3 to 8 decoder to assign I/O port address (O4).
  2. Set up Port A in the handshake mode to read data from A/D Converter.
  3. Setup port B as output port to display data at seven segment LEDs.
  4. Use line PC3 from port C to initiate a conversion.
  5. Use the 8155 Timer to record conversation time.
- **Ex 4:** In a programmable device, how does the processor differentiate between the control register and status register if both registers have the same port address?
- **Ex 5: S**how the control signal that enable the timer with count 3FF8 H in mode 3?
- **Ex 6:** For the following Fig.



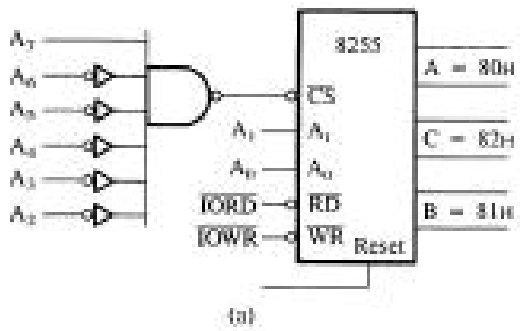
1. Specify all assign I/O port address if the O7 of the decoder is connecting to CE.
2. Assume that the decoder is eliminated and address line A7 is connect to CE through an inverter, specify the address of all ports assuming all other line don't care.
3. Can any port be accessed with port address FD_H.

- **Ex 7:** If the address $F7_H$ is input to 3 to 8 decoder 8205, how can we make the decoder works, and what is the O/P of the decoder?

Lec.12

- What is the Programmable Peripheral Interface or what is 8255? What it does contain or what it's includes? And what is used for?
- What are the signals of 8255 (what are the pins of 8255) and what is the function of each pin?
- Draw the block diagram of 8255? How many groups it has? Explain it?
- Explain the Control word of 8255 and draw its format?
- What are the modes of operation in 8255? Explain it in details?
- **Ex. 1:** Configure Port A as i/p in Mode 0, Port B as o/p in mode 0, Port C (Lower) as o/p and Port C (Upper) as i/p ports.
- **Ex. 2:** Configure Port A as i/p in Mode 1, Port B as o/p in mode 1, Port C7-8 as i/p ports. (PC5-0 are handshake lines, some i/p lines and others o/p. So they are shown as X)
- **Ex. 3:** Configure Port A in Mode 2, Port B as o/p in mode 1. (PC5-0 are handshake lines for Port A and PC2-0 are handshake signals for port B)
- **Ex. 4:** what is the control word for the following:

1. Port A: simple input, Port B: simple output, Port CL: output, Port CU: input
2. Port A: output with handshake, Port B: input with handshake, Port CL: output, Port CU: input
3. Port A: Output, Port B: Output, Port CU: Output, Port CL: Output all mode 0.
4. Port A: Input, Port B: Input, Port CU: Input, Port CL: Input all mode 0.



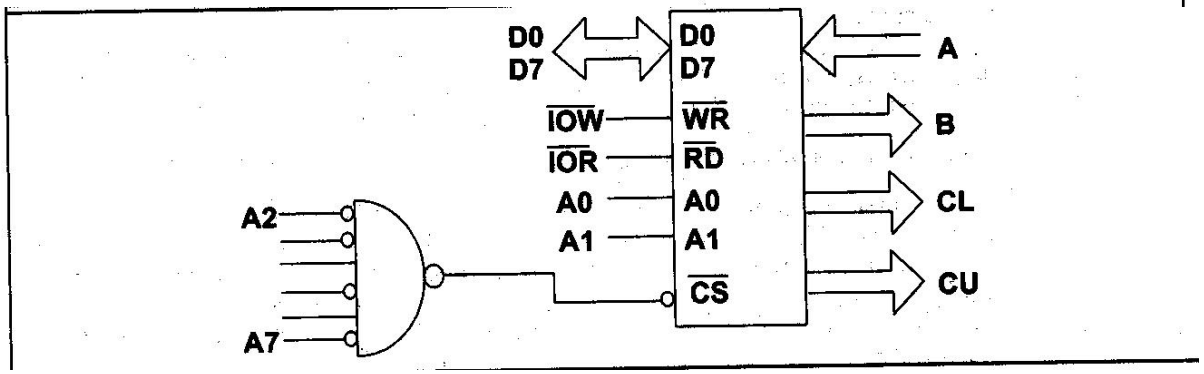
(a)

CS		Hex Address	Port
A_7 A_6 A_5 A_4 A_3 A_2	A_1 A_0		
1 0 0 0 0 0	0 0	= 80H	A
	0 1	= 81H	B
	1 0	= 82H	C
	1 1	= 83H	Control Register

(b)

Example 4-5

The 8255 shown in Figure 4-6 is configured as follows: port A as input, B as output, and all the bits of port C as output.
(a) Find the port addresses assigned to A, B, C, and the control register.
(b) Find the control byte (word) for this configuration.
(c) Program the ports to input data from port A and send it to both ports B and C.



Example 4-6

(a) Find the port address for Figure 4-7.
(b) Find the control word if PA =out, PB=in, PC0 - PC3 =in, and PC4 - PC7=out.

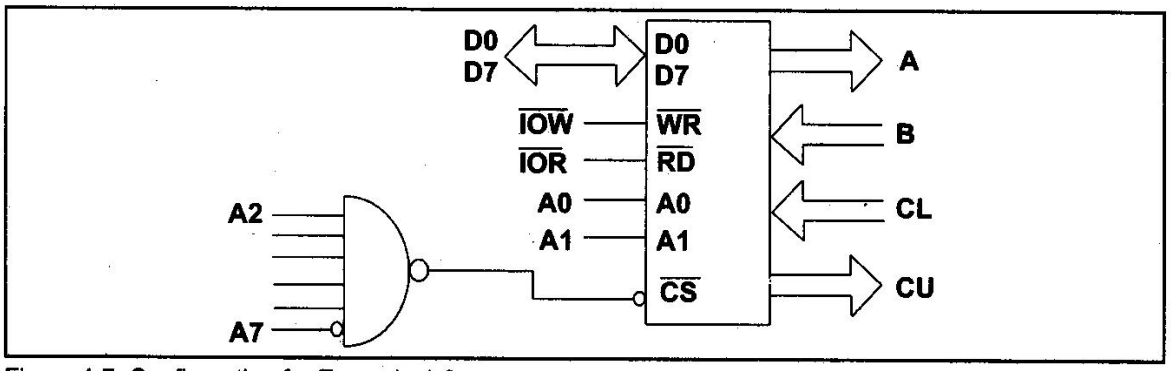


Figure 4-7. Configuration for Example 4-6

- **Ex. 5:-** Design (draw and explain) an interfacing circuit using the 8255 to read data from an A/D converter and then display the data to meet the following requirement:-

1. Setup port A to read data.
2. Setup PC0 to start of conversion and PC7 to read the ready status of the converter.
3. Display current data on 7 segment connected to port B
4. Write the CW and BSR for port C.

Lec.13

- What is the Programmable Interval Timer or what is 8253/8254? What it does contain or what it's includes? And what is used for?
- What is the difference between 8253 and 8254?
- What are the signals of 8253 (what are the pins of 8253) and what is the function of each pin?
- Draw the block diagram of 8253? How many groups it has? Explain it?
- Explain the Control word of 8253 and draw its format?
- What are the modes of operation in 8253? Explain it in details with drawing?
- What is the format of Status word (Status reg) of 8253?

Lec.14

- What is interrupt? When it used?
- What are the classifications of interrupts?
- Explain in details what is the software interrupts?
- Explain in details what is the hardware interrupts?
- The 8085 has five hardware interrupts, list it and explain each one in details?
- What are the sequences of event when INTR signal goes high?
- Explain in details what is vectored / Non-Vectored and Maskable / Non-Maskable Interrupts?
- What happens when MP is interrupted?
- What are the Process steps of 8085 Maskable/Vectored Interrupt?

Lec.15

- What is the Interrupt Driven Data Transfer Mode? Support your answer with drawing?
- What is the Programmable Interrupt Controller or what is 8259? What it does contain or what it's includes? And what is used for? What its features?
- What are the signals of 8259 (what are the pins of 8259) and what is the function of each pin?
- Draw the block diagram of 8259? How many groups it has? Explain it?

- Draw and explain the interfacing between 8259 with 8085? And how the 8259 working with 8085?

Lec.16

- What is the DMA mode?
- What are the 8085 signals for DMA?
- What are the steps of data transfer technique directly between memory and I/O device using DMA?
- What is DMA controller or what is 8257? And what is used for?
- What are the signals of 8257 (what are the pins of 8257) and what is the function of each pin?
- Draw the block diagram of 8257? How many groups it has? Explain it?
- What is 8212? And what is used for?
- What are the modes of DMA execution? Explain it in details?

Lec.17

- What is the parallel I/O mode? What is the serial I/O mode? What is the parallel to serial and serial to parallel conversion?
- What is the RS232 port? And what is the pin configuration of it; list them with direction?
- What are the different between serial and parallel I/O?
- What are the differences between Synchronous and Asynchronous transmission in serial? Support your answer with drawing?
- What is the format of serial data transmission?
- Explain how the data transfer by using a serial transmission?
- What is the baud rate? And what is the purpose of it?
- What is the serial data transmission and UART? Explain them in details?
- Draw and explain the logic structure of the RS232 port (the RS232 driver/receivers)? Or draw the logic structure of the RS232 port, showing its input and output direction and function of each line?
