Microprocessor based System Design Laboratory (Gy)

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Experiment No. 7: Interfacing IO Devices through 8255 PPI

Complete all the assignments of the last laboratory session [August 30, 2024, Writing Interrupt Service Routines for hardware Interrupts (along with using Monitor Routines for IO Operation)]

Objective: To connect IO devices through the 8255 Programmable Peripheral Interface (PPI) of the SDK and to write 8085 Assembly Language Programs to interact those IO devices.

Assignments

1. Read the user manual of the SDK to identify how the available 8255 PPIs can be used.
   (a) Whether the 8255 PPIs have been interfaced in the **Memory Space** or **IO Space** of 8085 processor and what locations (addresses) they use. It is available in **Page 45** of the **SDK User Manual** and also summarized at the end of this document.
   (b) Where and how the pins of 8255 PPIs have been made available in the SDK. It is available in **Page 75** of the **SDK User Manual** and also summarized at the end of this document.
2. In an **infinite loop**, read from PB7 pin of Port B of one of the 8255 PPIs of your **8085 SDK** and display its **complement** (**00** if PB7 is 1, **01** if PB7 is 0) in the data field of the display section.
   [**Consult the Pin configuration of the C4 and C6 connectors of the Kit (as given in Page 75 of the SDK User Manual or given at the end of this document) to identify how to provide input for the PB7. Please note that Ground and Vcc signals too are also available at C4 and C6, and can be used to supply input to PB7**]
3. In an **infinite loop**, read from PB7 pin of Port B of one of the 8255 PPIs of your **8085 SDK** and passes its **complement** to PA7 of Port A of the same 8255 chip. Use an LED to display the bit at PA7.
   [**Consult the Pin configuration of the C4 and C6 connectors of the Kit (as given in Page 75 of the SDK User Manual or given at the end of this document) to identify how to provide input for the PB7 and use the output PA7. Please note that Ground and Vcc signals too are also available at C4 and C6, and can be used to supply input to PB7**. Use a breadboard to connect the LED to PA7. The LED (in between PA7 and Vcc/Ground) **must** be connected in series with a "suitable resistor".]
4. Generate a clock signal at PA7 pin of Port A of one of the 8255 chips. The frequency of the clock is determined by the input (00H – FFH) fed at Port B of the same 8255 chip, FFH will trigger the "slowest" clock. The data to be read form Port B after one clock period of the present clock signal. Use an LED to demonstrate the clock generated at PA7. **Analyze your program to compute the frequency of the clock signal being generated.**
   [**Consult the Pin configuration of the C4 and C6 connectors of the Kit (as given in Page 75 of the SDK User Manual or given at the end of this document) to identify how to provide input for the PB0 - PB7 pins and use the output at PA7 pin. Please note that Ground and Vcc signals too are also available at C4 and C6, and can be used to supply input to PB pins**. Use a breadboard to connect the LED to PA7. The LED (in between PA7 and Vcc/Ground) **must** be connected in series with a "suitable resistor".]

IO Addresses for the IO Devices in VMC8503 SDK (Vinytics)

IO Deice	Port Address	Selected Device	Details
8255 – 1 (PPI)	00H-03H		Connector C4 - Gnd (25, 26)
	00H	Port A	21(A0), 22(A1), 19(A2), 20(A3), 17(A4), 18(A5), 15(A6), 16(A7)
	01H	Port B	13(B0), 14(B1), 11(B2), 12(B3), 9(B4), 10(B5), 7(B6), 8(B7)
	02H	Port C	5(C0), 6(C1), 3(C2), 4(C3), 1(C4), 2(C5), 23(C6), 24(C7)
	03H	Control Port	
8255 - 2	04H-07H		Connector C6 - Gnd (25, 26)
	04H	Port A	21(A0), 22(A1), 19(A2), 20(A3), 17(A4), 18(A5), 15(A6), 16(A7)
	05H	Port B	13(B0), 14(B1), 11(B2), 12(B3), 9(B4), 10(B5), 7(B6), 8(B7)
	06H	Port C	5(C0), 6(C1), 3(C2), 4(C3), 1(C4), 2(C5), 23(C6), 24(C7)
	07H	Control Port	
8253 Programmable Interval Timer	10H-17H		
	10H & 14H	Counter 0	
	11H & 15H	Counter 1	
	12H & 16H	Counter 2	
	13H & 17H	Control Port	
8279 Keyboard Display Controller	18H-1FH		
	18H, 1CH	Mode Selector	
	19H, 1DH	Control Word	