PPI 8255

Lab2 - MP

PROGRAMMING & INTERFACING THE 8255

- The main advantage of the 8255 chip is that it is “Programable”, hence the name “Programable Peripheral Interface PPI”.
- We can connect three ‘8 bits’ ports (A,B,C) , and dynamically assign any of them as input/output prior reading/writing.
- Port C is the only port that can be accessed by 4 bits , the other two ports are 8-bits accessible only.

Port A (PA0–PA7)

Port B (PB0–PB7)

Port C (PC0–PC7)

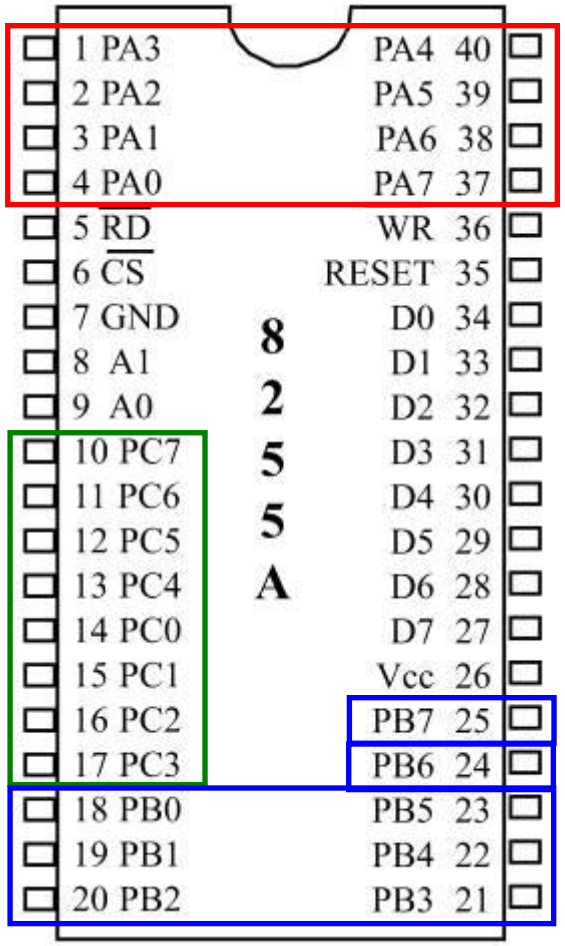


Figure 11-11 8255 PPI Chip

PROGRAMMING & INTERFACING THE 8255

- The are multiple modes of operation.
- To configure each port, control word should be sent to the control register inside the 8255 prior operation.
- Each one of the ports and the control registers is assigned an address defined by the bits [A1 A0].
- Also, the (CS) chip select should be enabled (active low).
- In cases of inputs, the (RD) signal is enabled.
- In cases of outputs, the (WR) signal is enabled.
- The reset signal re-initialize the control register.

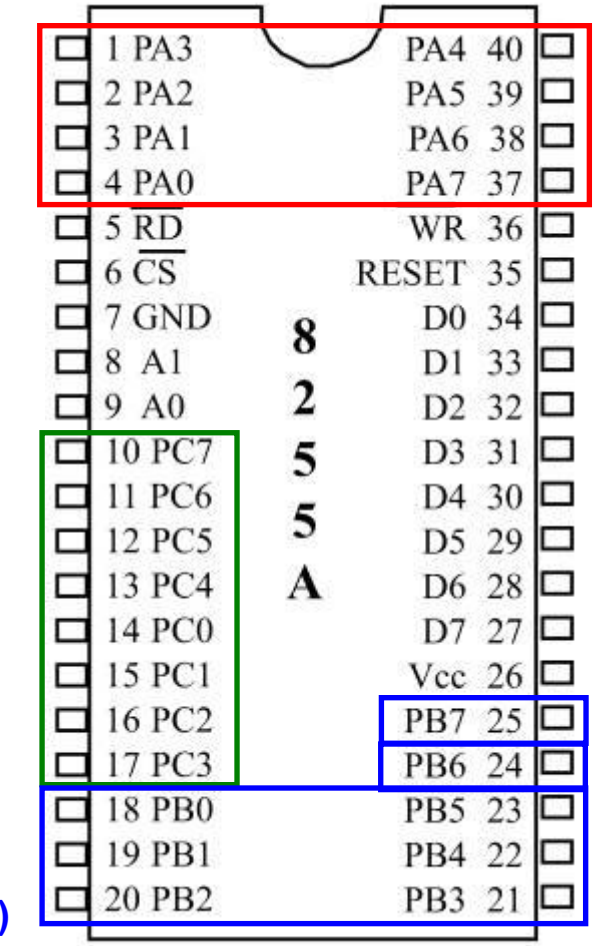


Figure 11-11 8255 PPI Chip

PROGRAMMING & INTERFACING THE 8255

- The address selection

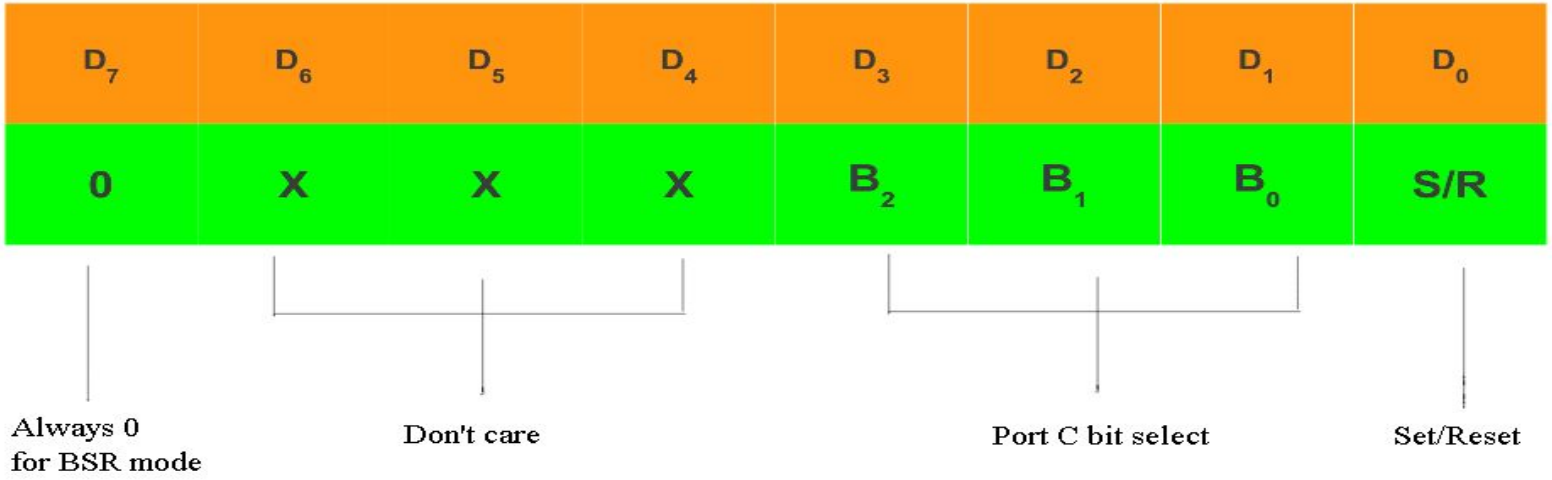
These three pins are used to access ports A, B, C, or the control register.

CS	A1	A0	Selects
0	0	0	Port A
0	0	1	Port B
0	1	0	Port C
0	1	1	Control register
1	x	x	8255 is not selected

The control register must be programmed to select the operation mode of the three ports A, B, and C.

PROGRAMMING & INTERFACING THE 8255

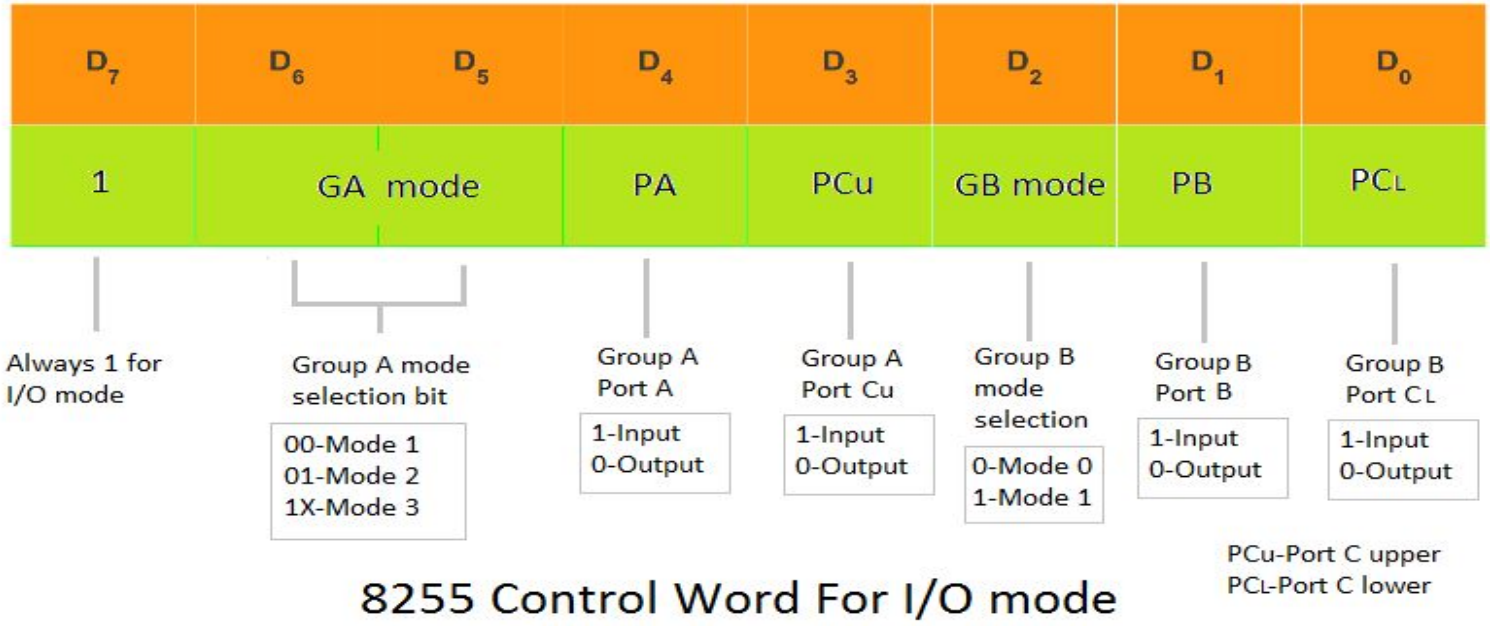
- The control word
  the most significant bit =0 -> bit set rest mode



8255 Control Register format for BSR Mode

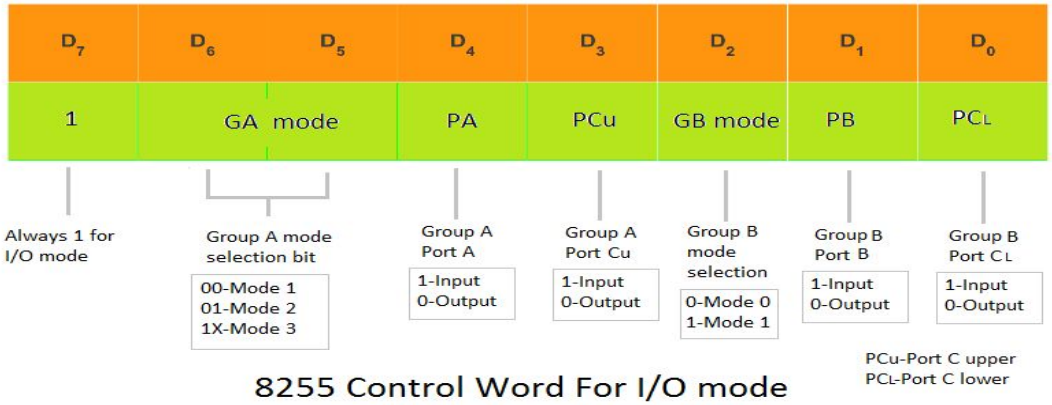
PROGRAMMING & INTERFACING THE 8255

- The control word
  the most significant bit =1 -> the Input/output mode



8255 Control Word For I/O mode

PROGRAMMING & INTERFACING THE 8255



8255 Control Word For I/O mode

- The control word
  the most significant bit =0 -> the Input/output mode

- Bit D2 indicates the modes inside the I/O mode
  for group B
  0 -> (mode0) Simple I/O
  1-> (mode1) Strobed Input/output mode [handshaking signals in portC]
  - Some of the pins of port C function as handshake lines
- Bits D6 D5 indicates the modes inside the I/O mode
  for group A
  00 -> (mode1) Simple I/O
  01-> (mode2) Strobed Input/output mode [handshaking signals in portC]
  1X-> (mode3) Strobed Bidirectional Input/Output mode [only portA works here]

Lab requirement

You are required to implement 8255 I/O mode (mode 0) for port A, and B using chips 373 and 244.

The steps are:

1- Read from port A any value

2- Write to port A any value

3- Disable WR input then change the value of the databus (Show us the reaction of the system)

4- Read from port B any value

5- Write to port B any value

6- Make the control register Read from B, and Enable WR signal input and disable RD signal (Show us the reaction of the system)

7- Back to Read from port A any value

8- Write to port A any value

Note: Each step you should (may) change the inputs (WR/RD/CS/A0/A1) and should (may) change the control register individual bits