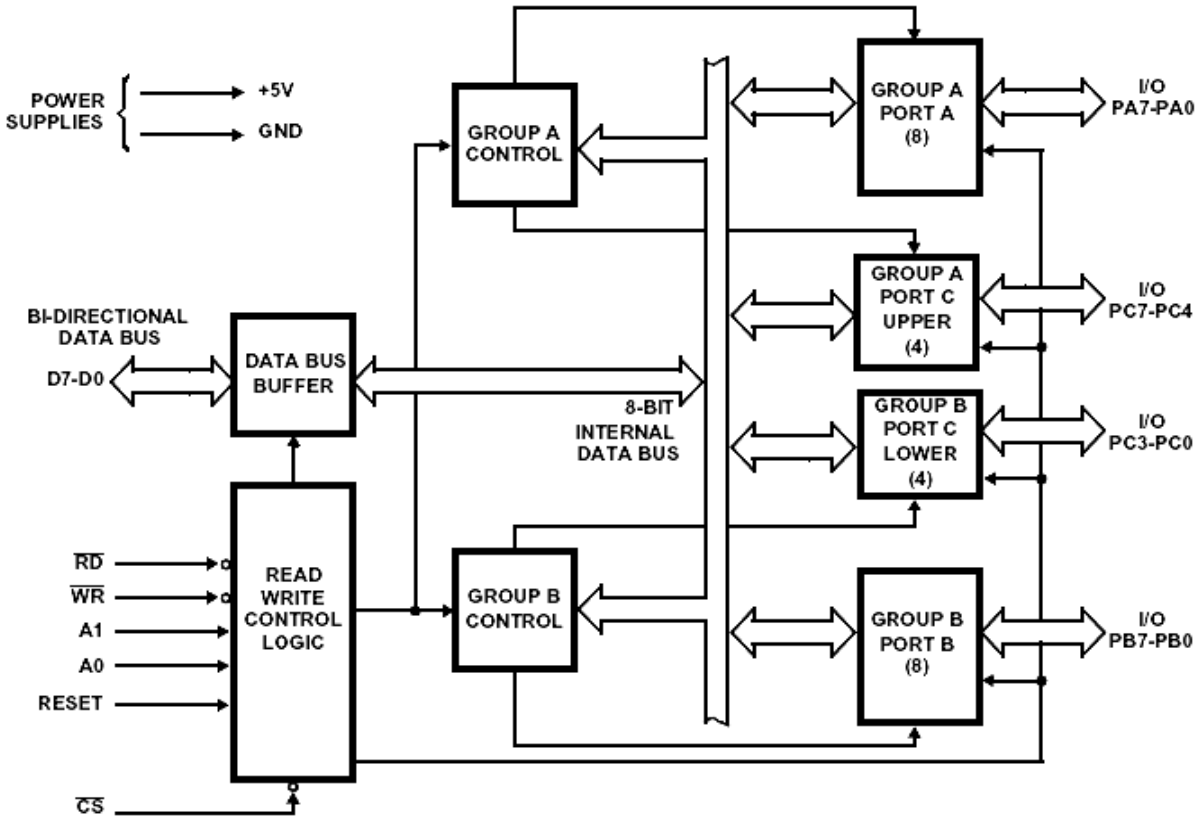
8255

PROGRAMMABLE PERIPHERAL INTERFACE

Salient Features of 8255 PPI

- It is a programmable general-purpose I/O device.
- It has 3 8-bit bi-directional I/O ports - **Port A**, **Port B**, and **Port C**.
- It provides **3 modes of data transfer** – Simple I/O, Handshake I/O and Bi-directional Handshake I/O.
- Additionally it also provides a **Bit Set Reset Mode** to alter individual bits of **Port C**, for bit interface devices.

Architecture of 8255



The architecture of 8259 can be divided into the following parts:

1) Data Bus Buffer

- This is a 8-bit bi-directional buffer used to interface the internal data bus of 8255 with the external (system) data bus.
- The CPU transfers data to and from the 8255 through this buffer.

2) Read/Write Control Logic

- It accepts address and control signals from the µP.
- The Control signals determine whether it is a read or a write operation and also select or reset the 8255 chip.
- The Address bits (A_1, A_0) are used to select the Ports or the Control Word Register as shown:

A_1	A_0	Selection	Sample address
0	0	Port A	80 H (i.e. 1000 00**00**)
0	1	Port B	81 H (i.e. 1000 00**01**)
1	0	Port C	82 H (i.e. 1000 00**10**)
1	1	Control Word	83 H (i.e. 1000 00**11**)

- The Ports are controlled by their respective Group Control Registers.

3) Group A Control

- This Control block controls Port A and Port C_{Upper} i.e. PC_7-PC_4.
- It accepts Control signals from the Control Word and forwards them to the respective Ports.

4) Group B Control

- This Control block controls Port B and Port C_{Lower} i.e. PC_3-PC_0.
- It accepts Control signals from the Control Word and forwards them to the respective Ports.

5) Port A, Port B, Port C

- These are 8-bit Bi-directional Ports.
- They can be programmed to wok in the various modes as follows:

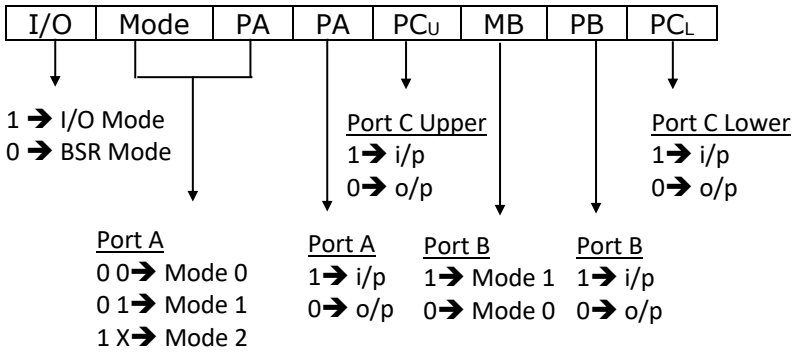
Port	Mode 0	Mode 1	Mode 2
Port A	✔	✔	✔
Port B	✔	✔	✘ (Mode 0 or Mode 1)
Port C	✔	✘ (Handshake signals)	✘ (Handshake signals)

- ONLY Port C can also be programmed to work in Bit Set reset Mode to manipulate its individual bits.

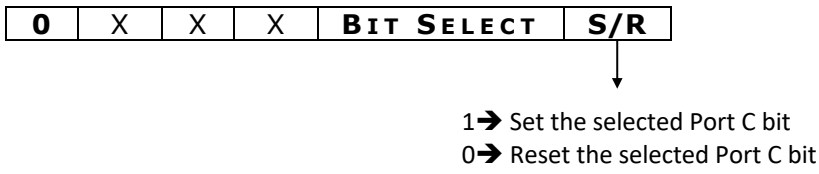
☺ In case of doubts, contact Bharat Sir: - 98204 08217.

6) Control Word of 8255 (I/O Mode)

To do 8-bit data transfer using the Ports A, B or C, 8255 needs to be in the IO mode.
The bit pattern for the control word in the IO mode is as follows:



7) Control Word of 8255 (BSR Mode – Applicable ONLY for Port C)



Bit Select			Bit	
0	0	0	PC_0	Select respective bit of Port C
0	0	1	PC_1	
0	1	0	PC_2	
0	1	1	PC_3	
1	0	0	PC_4	
1	0	1	PC_5	
1	1	0	PC_6	
1	1	1	PC_7	

- The BSR Mode is used ONLY for Port C.
- In this Mode the individual bits of Port C can be set or reset.
- This is very useful for interfacing those devices, which accept bit-wise data.
  Eg: ADC Converters.
- The individual bit is selected and Set/reset through the control word.
- Since the D7 bit of the Control Word is 0, the BSR operation will not affect the I/O operations of 8255.