Programmable Peripheral Interface

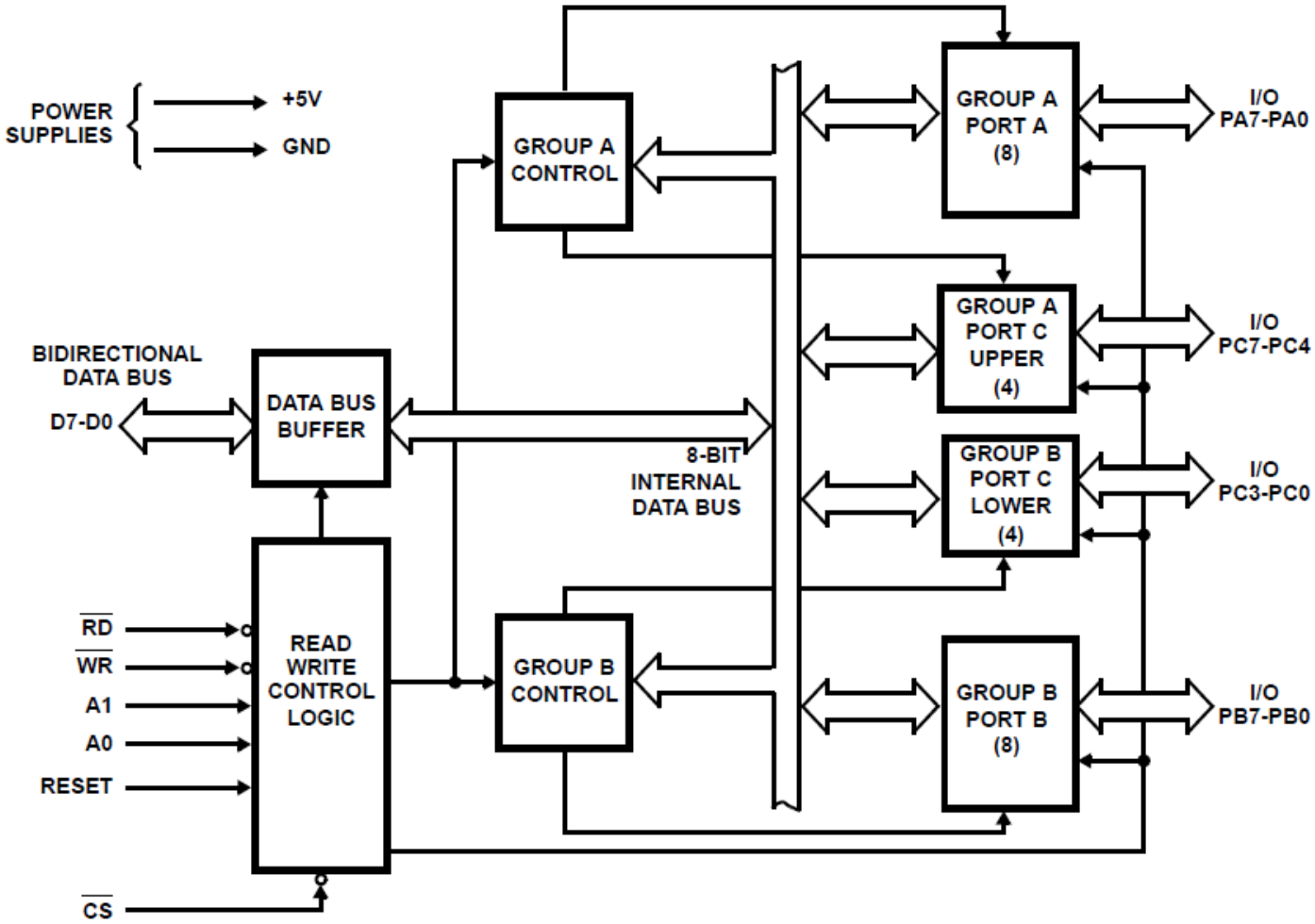
8255 | PPI

WWW.BHARATACHARYAEDUCATION.COM

Salient Features

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

ARCHITECTURE OF 8255



The architecture of 8255 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. **For doubts contact Bharat Sir on 98204 08217**
The Address bits (A_1, A_0) are used to select the Ports or the Control Word Register as shown:

For 8255 A_1 A_0	For 8086 A_2 A_1	Selection	Sample address
0 0	0 0	Port A	80 H (i.e. 1000 0**00**0)
0 1	0 1	Port B	82 H (i.e. 1000 0**01**0)
1 0	1 0	Port C	84 H (i.e. 1000 0**10**0)
1 1	1 1	Control Word	86 H (i.e. 1000 0**11**0)

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

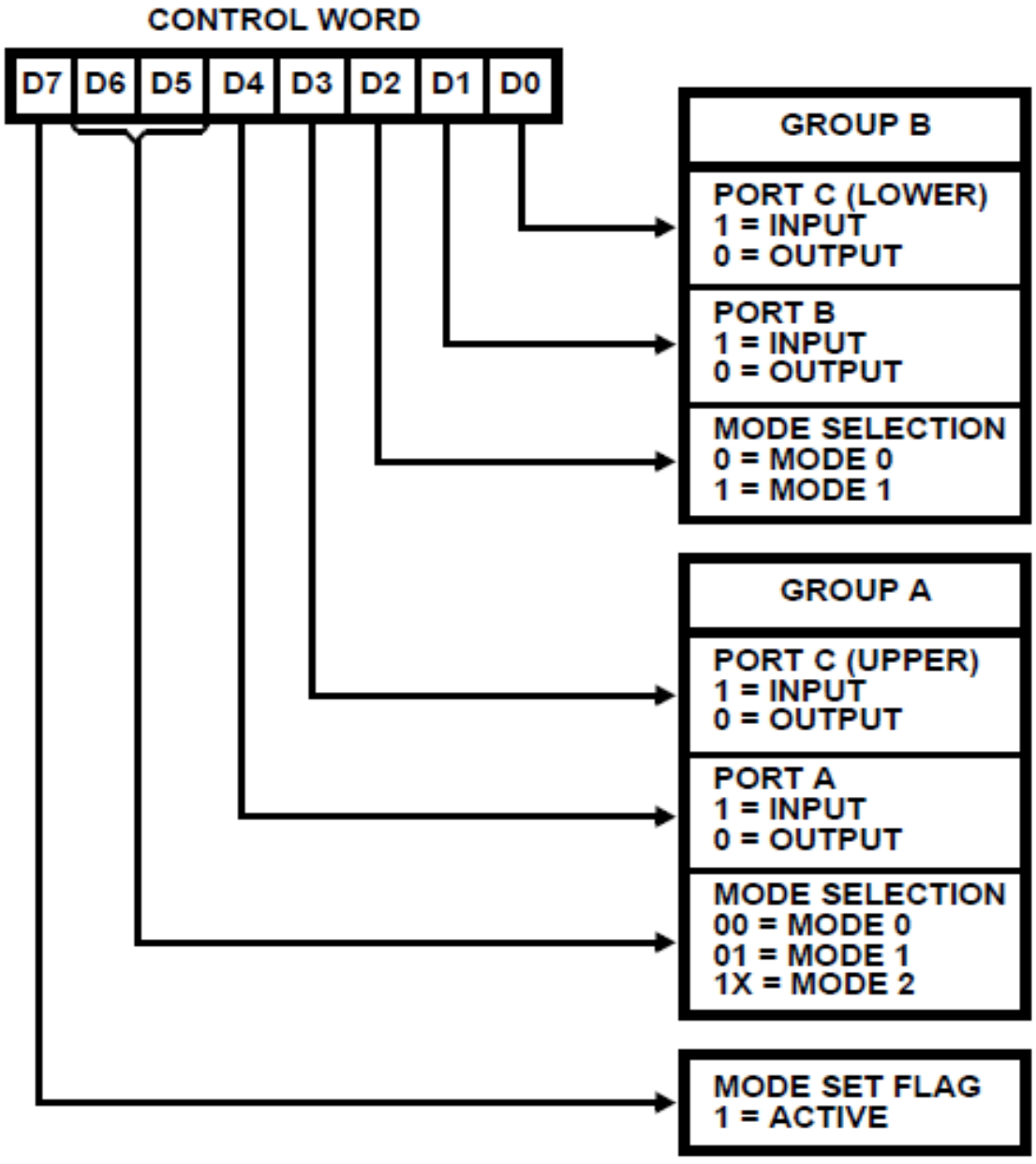
These are 8-bit Bi-directional Ports.
They can be programmed to wok in the various modes as follows:

Port	Mode 0	Mode 1	Mode 2
Port A	Yes	Yes	Yes
Port B	Yes	Yes	**No** *(Mode 0 or Mode 1)*
Port C	Yes	**No** *(Handshake signals)*	**No** *(Handshake signals)*

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

1)Control Word of 8255 - I/O Mode (I/O Command)

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:



2)Control Word of 8255 - BSR Mode (BSR Command) { ONLY for Port C}

- 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 as it provides **8 individually controllable lines** which can be used while interfacing with devices like an **A to D Converter** or a 7-segment display etc.
- 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. **For doubts contact Bharat Sir on 98204 08217**