

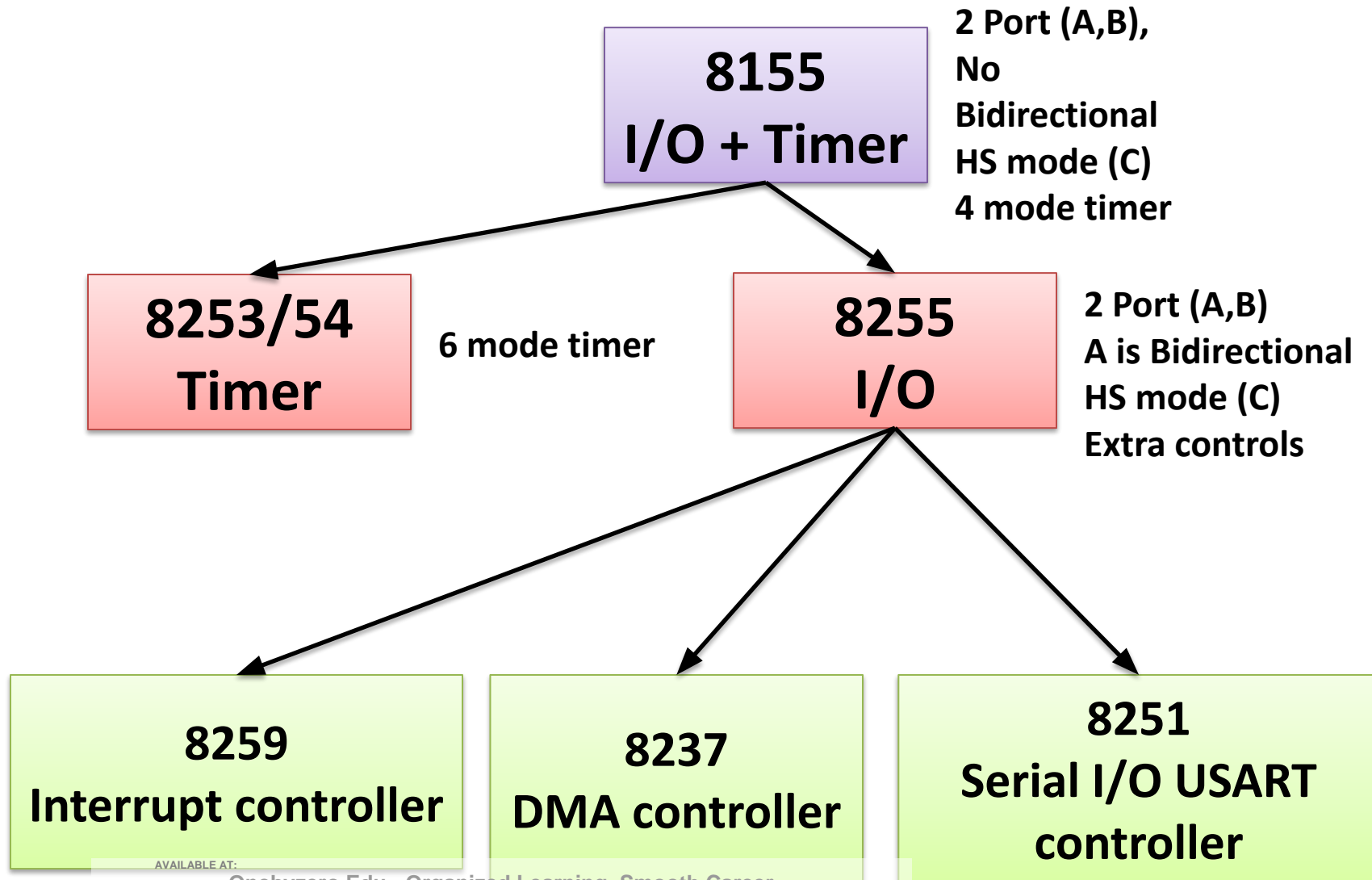
Dedicated Peripheral Interface Device (Introduction to 8255)

Dr A Sahu
Dept of Computer Science & Engineering
IIT Guwahati

AVAILABLE AT:

Onebyzero Edu - Organized Learning, Smooth Career
The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Hierarchy of I/O Control Devices



AVAILABLE AT:

Onebyzero Edu - Organized Learning, Smooth Career

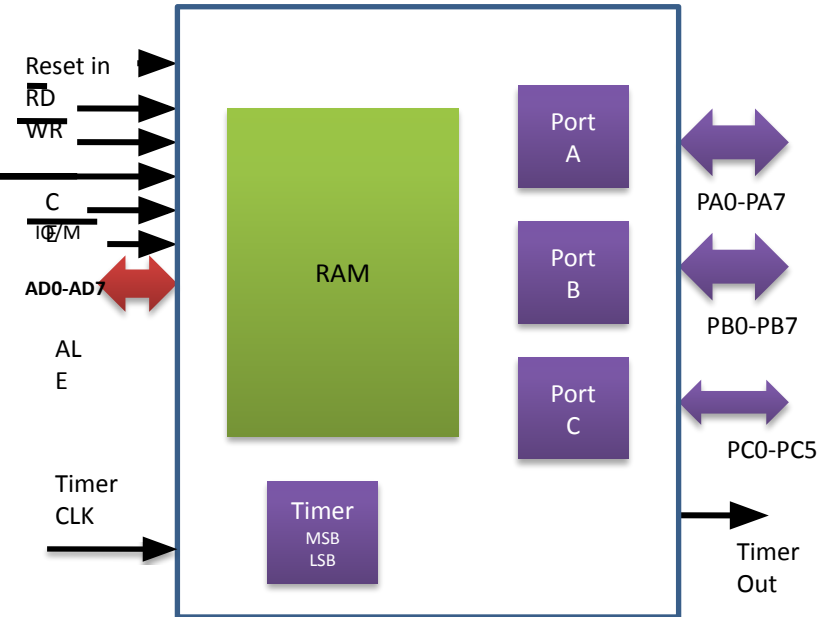
The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Outline

- 8155 I/O Interface & Timer
 - Dedicated I/O interface (8255)
 - Dedicated Timer (8254/8253)
- 8255 Ports and mode of operations
- Interfacing A/D Converter using Handshake mode using 8255

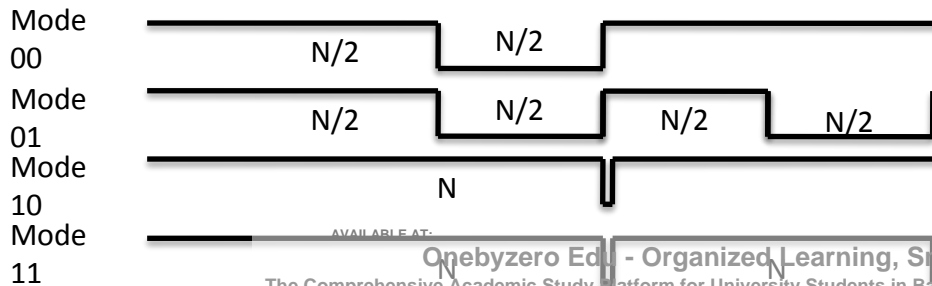
8155 Features

- IO Capability:
 - 2kbits static RAM 256x8
 - 2 programmable 8 bit I/O ports
 - 1 programmable 6 bit I/O port
- Timer Capability:
 - 1 programmable 14 bit binary counter/timer
 - 4 Modes

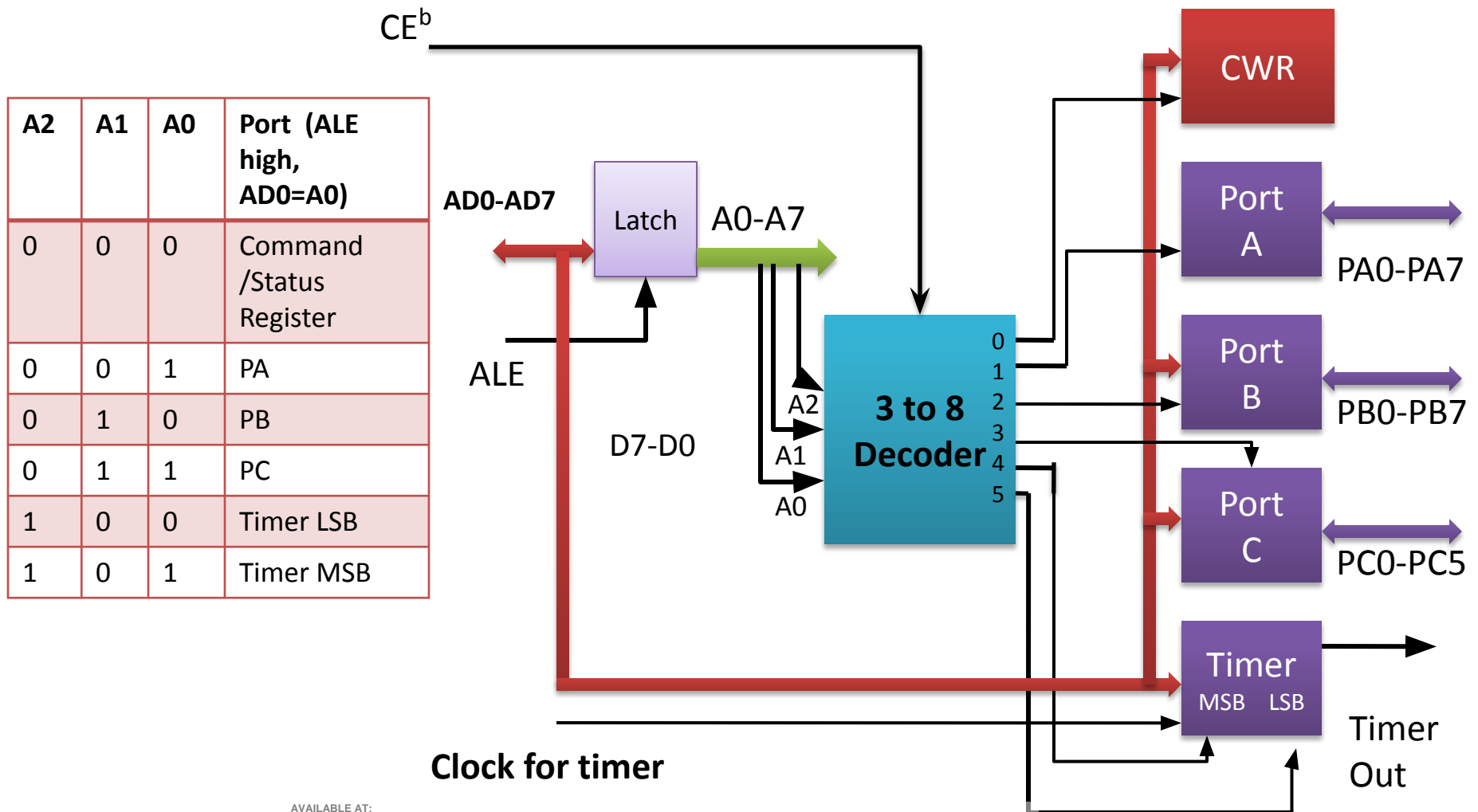


D7	D6	D5	D4	D3	D2	D1	D0
Timer Command		IEB	IEA	PC		PB	PA

A	D	D	PC5	PC4	PC3	PC2	PC1	PC0
LT	3	2						
1	0	0	IN	IN	IN	IN	IN	IN
2	0	1	OUT	OUT	OUT	OUT	OUT	OUT
3	1	0	OUT	OUT	OUT	STB _A	BF _A	INTR _A
4	1	1	STB _B	BF _B	INTR _B	STB _A	BF _A	INTR _A



Expanded Block Diagram



AVAILABLE AT:

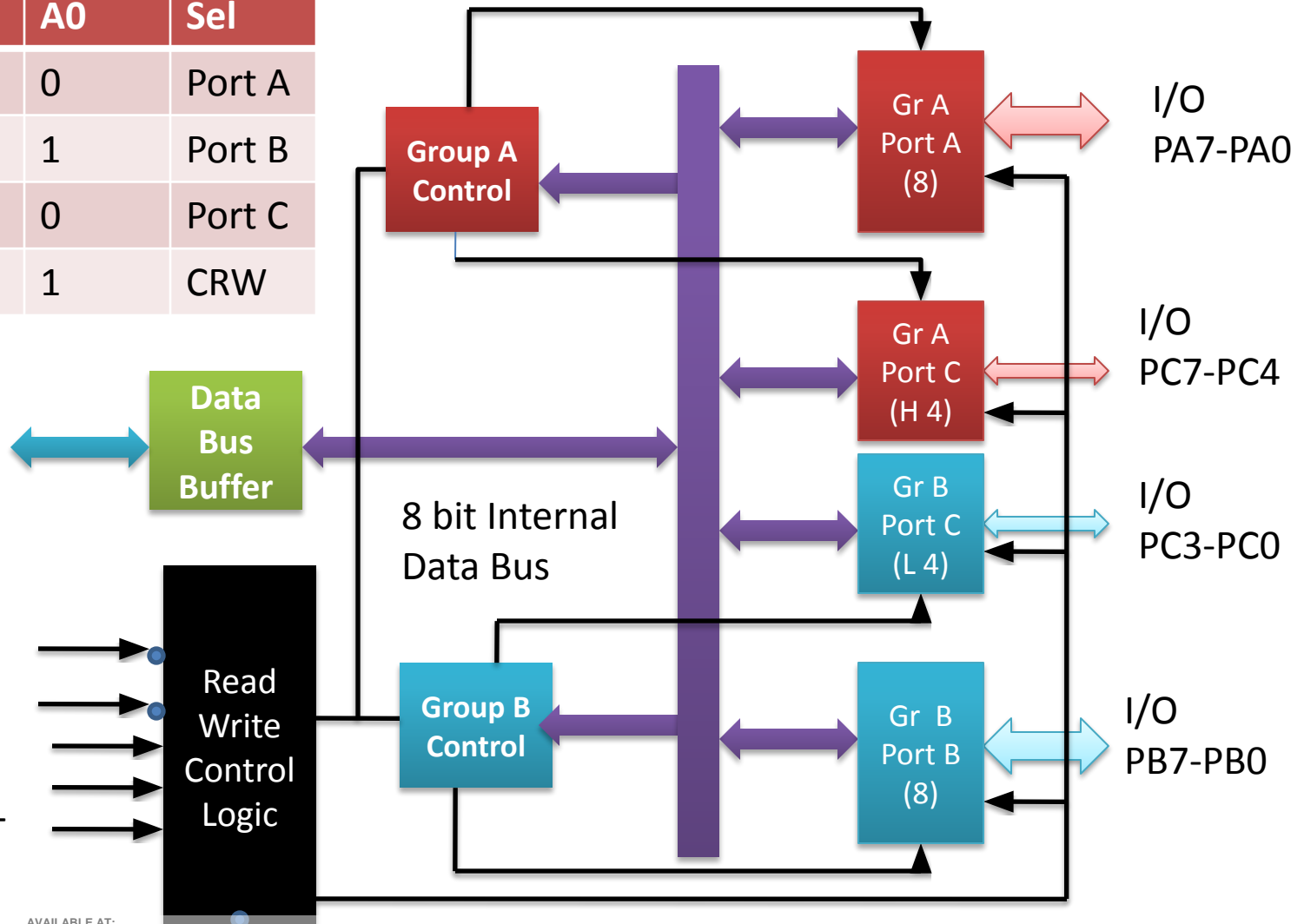
Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Block Diagram of 8255

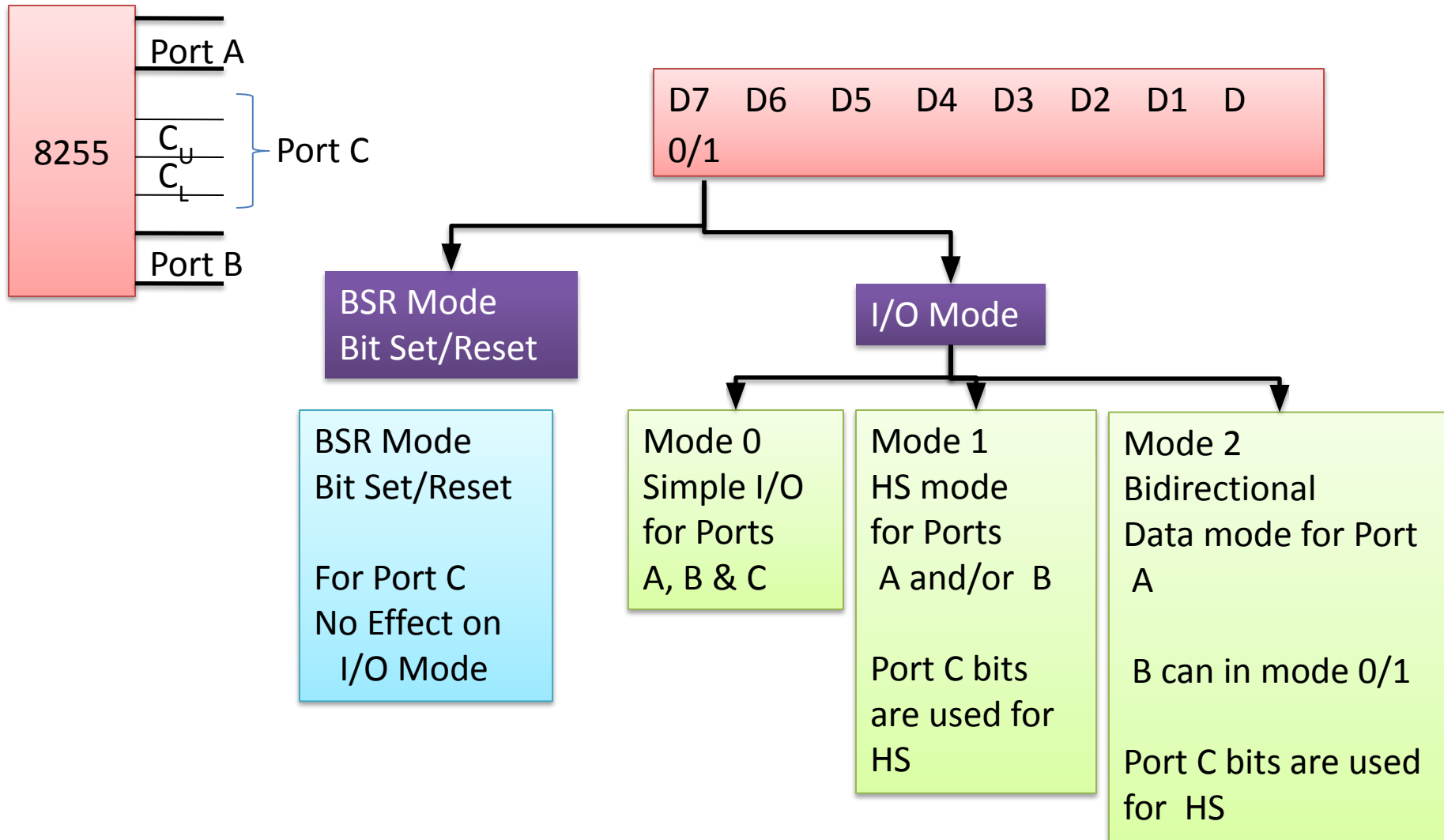
CS ^b	A1	A0	Sel
0	0	0	Port A
0	0	1	Port B
0	1	0	Port C
0	1	1	CRW

Bi directional
Data Bus
D7-D0



AVAILABLE AT:

Ports & Modes in 8255

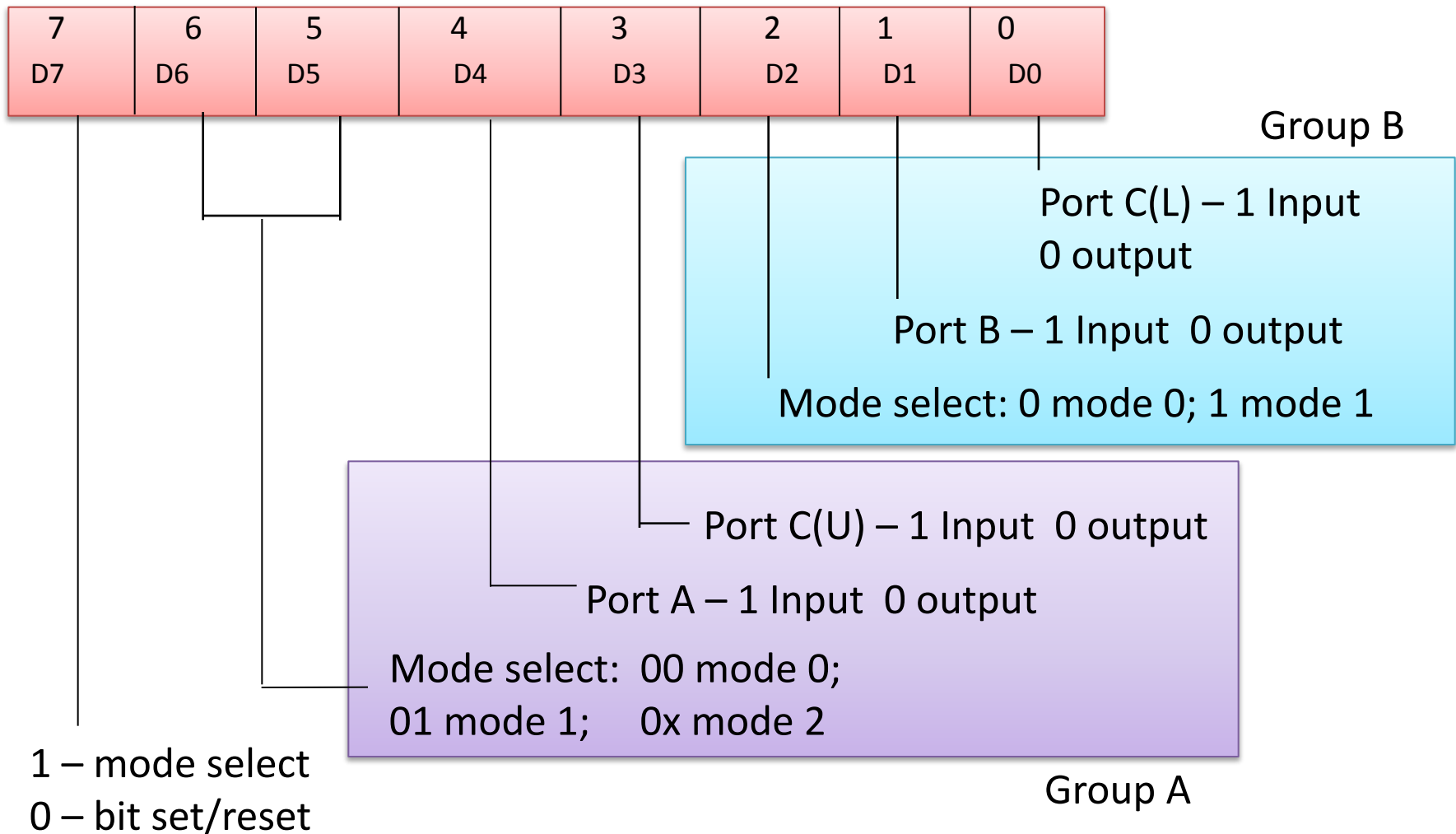


AVAILABLE AT:

Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Ports & Modes in 8255 : Control register

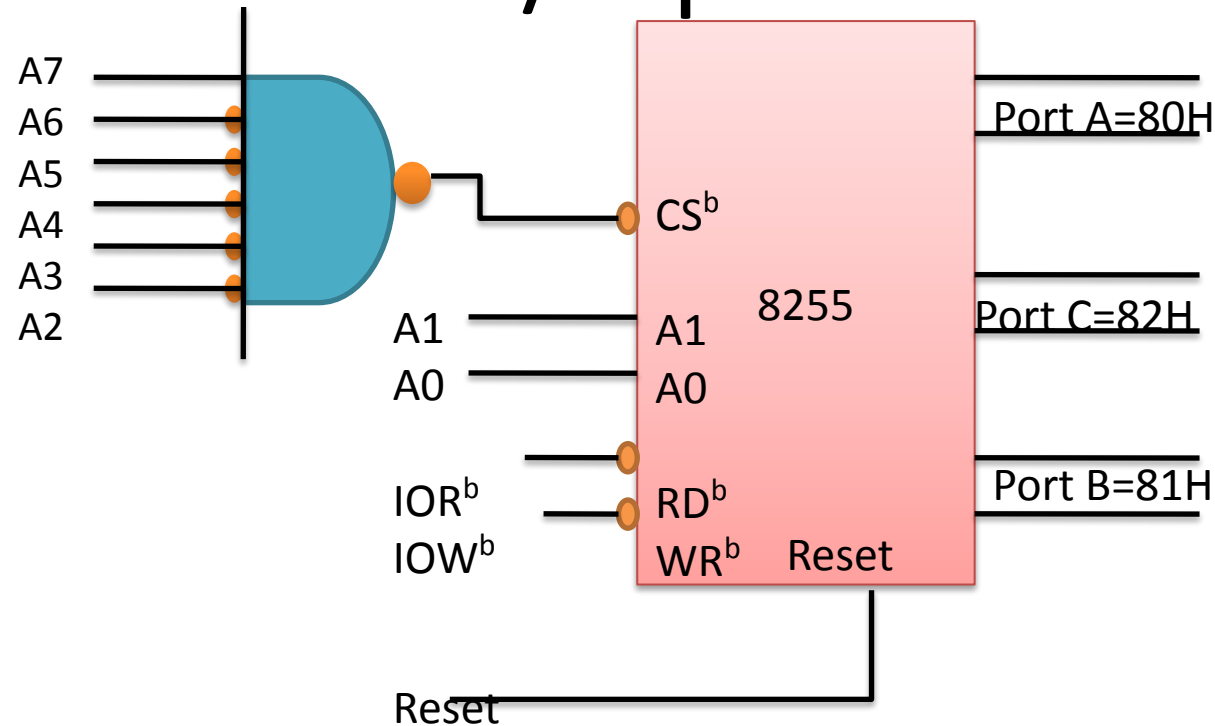


AVAILABLE AT:

Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

I/O port Addressing



CS ^b	A1	A0	HEX Address	Port
A7 A6 A5 A4 A3 A2	A1	A0		
1 0 0 0 0 0	0	0	= 80H	A
	0	1	=81H	B
	1	0	=82H	C
AVAILABLE AT: Onebyzero Edu - Organized Learning, Smooth Career	1	1	=83H	Control Register

BSR (Bit Set or Reset Mode)

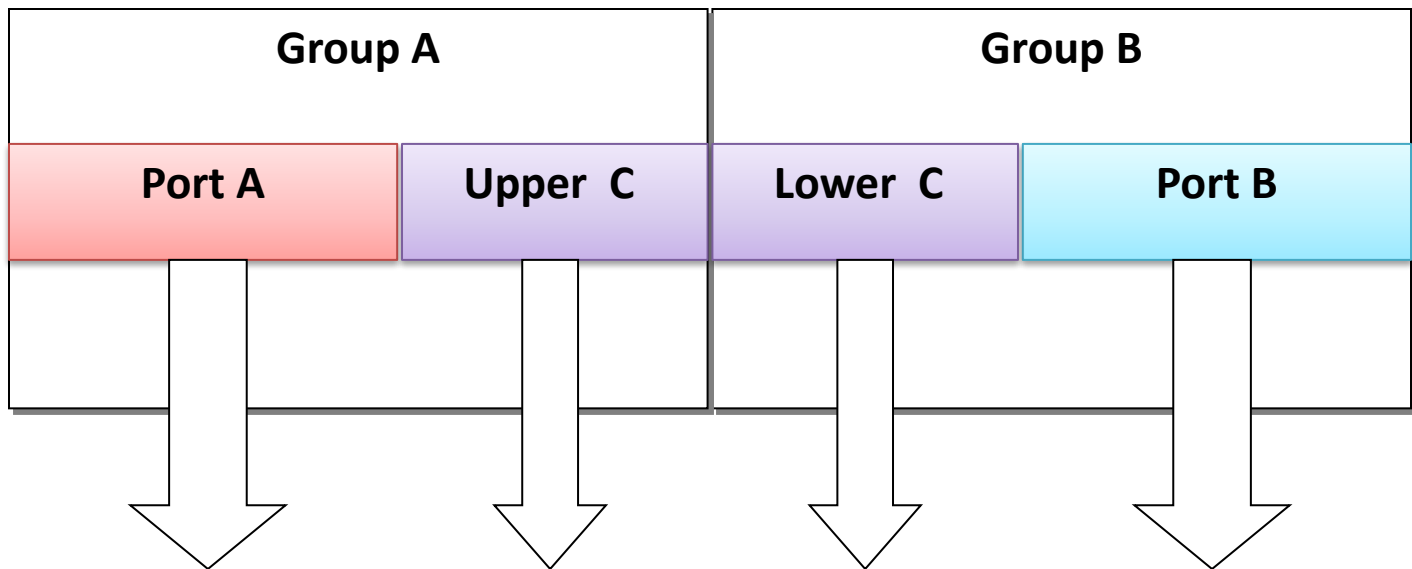
- Set/Reset bit of Port C
- Heavily used for HS and Interrupt mode
- BSR Control word

D7	D6	D5	D4	D3	D2	D1	D0
0 BSR Mode	Not used, So (000)			Bit Select			S/R (1/0)

- BSR Control word
 - To set PC7= 0 000 111 1 (0FH)
 - To reset PC7= 0 000 111 0 (0EH)
 - To set PC3 = 0 000 011 1 (07H)

Ports

- Control register controls the overall operation of 8255
- All three ports A, B and C are grouped into two



AVAILABLE AT:

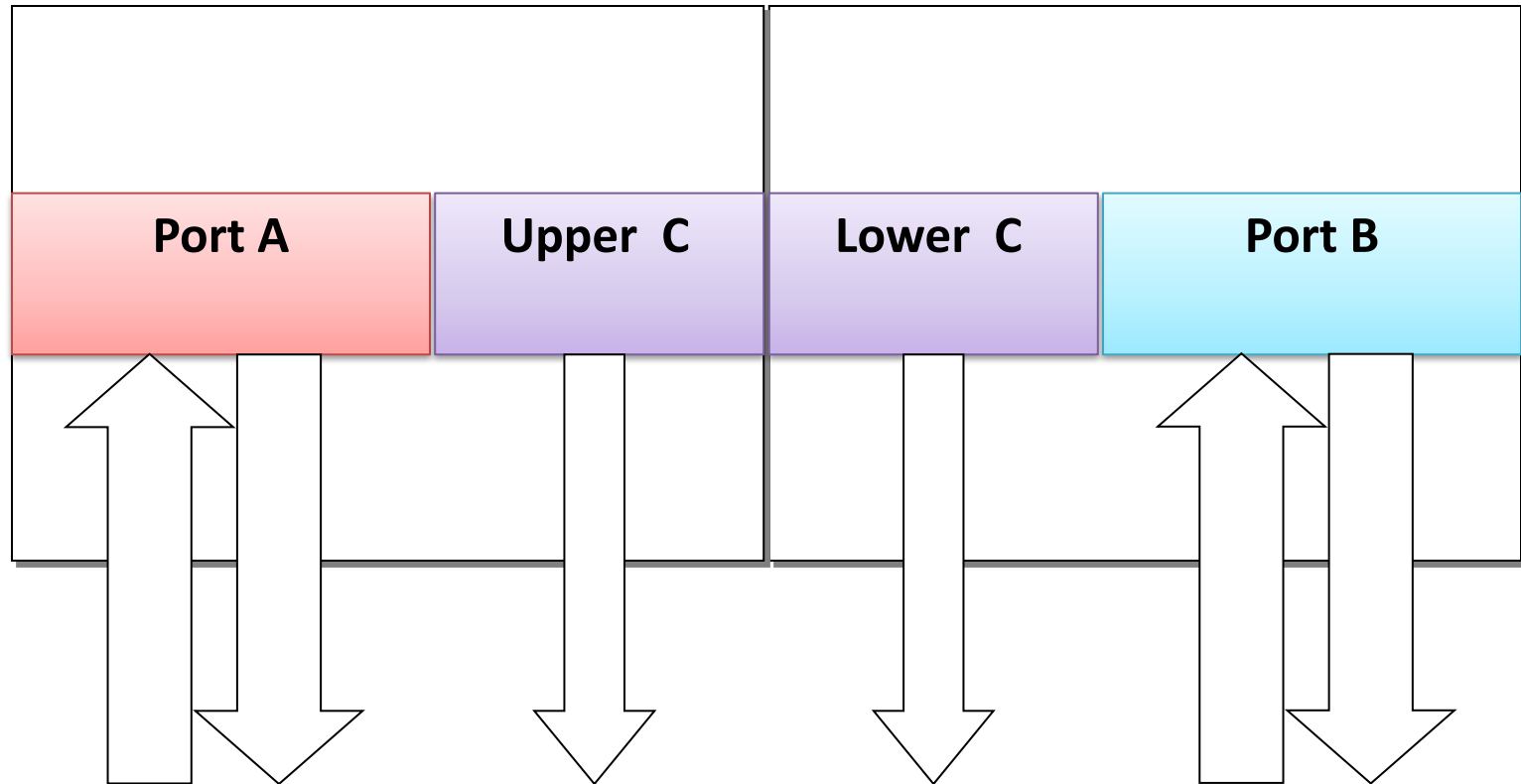
Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Operation modes

- 8255 has three modes:
 - mode 0: basic input-output
 - mode 1: strobed input-output
 - mode 2: strobed bidirectional bus I/O
- In mode 0
 - two 8-bit ports and two 4-bit ports
 - any port can be input or output
 - Outputs are latched, inputs are not latched

Mode 0



AVAILABLE AT:

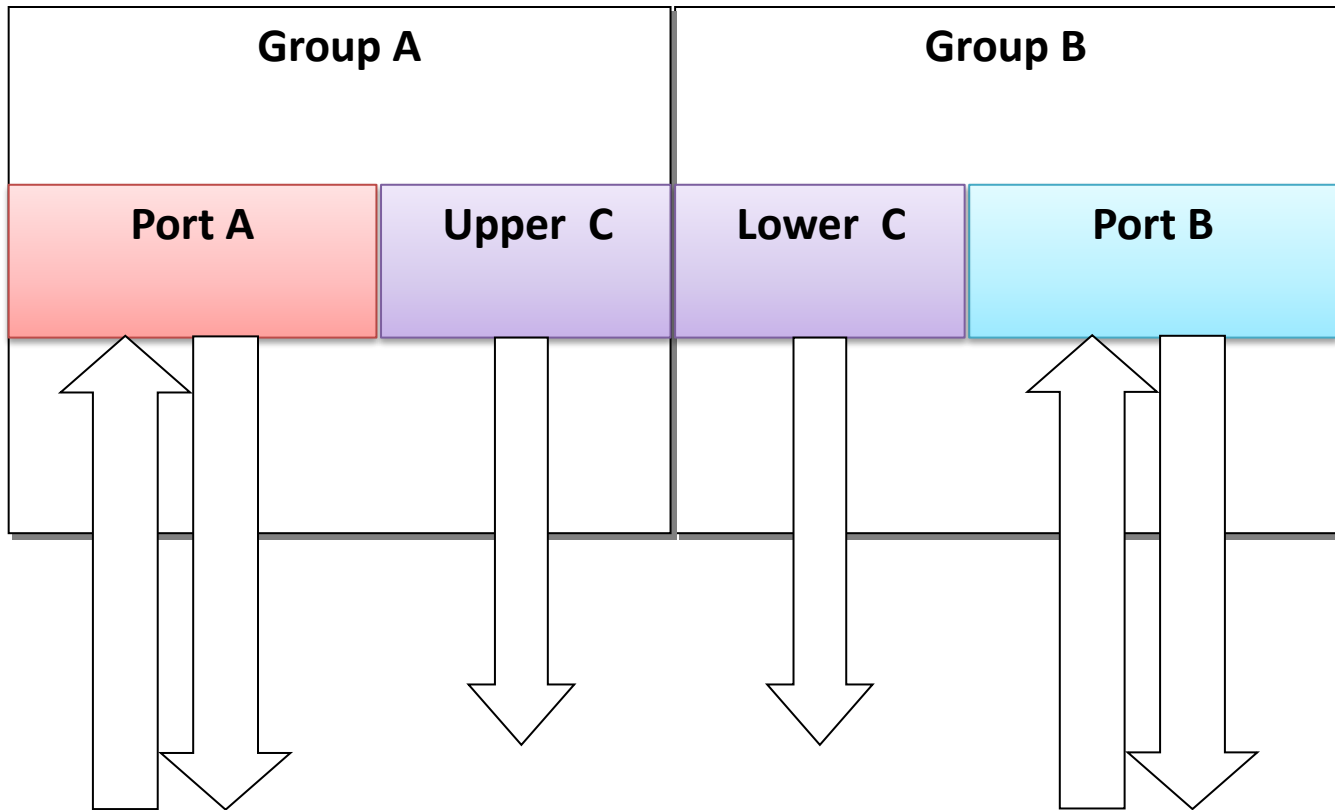
Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Operation mode 1

- In mode 1:
 - three ports are divided into two groups
 - each group contains one 8-bit port and one 4-bit control/data port
 - 8-bit port can be either input or output and both latched
 - 4-bit port used for control and status of 8-bit data port

Mode 1



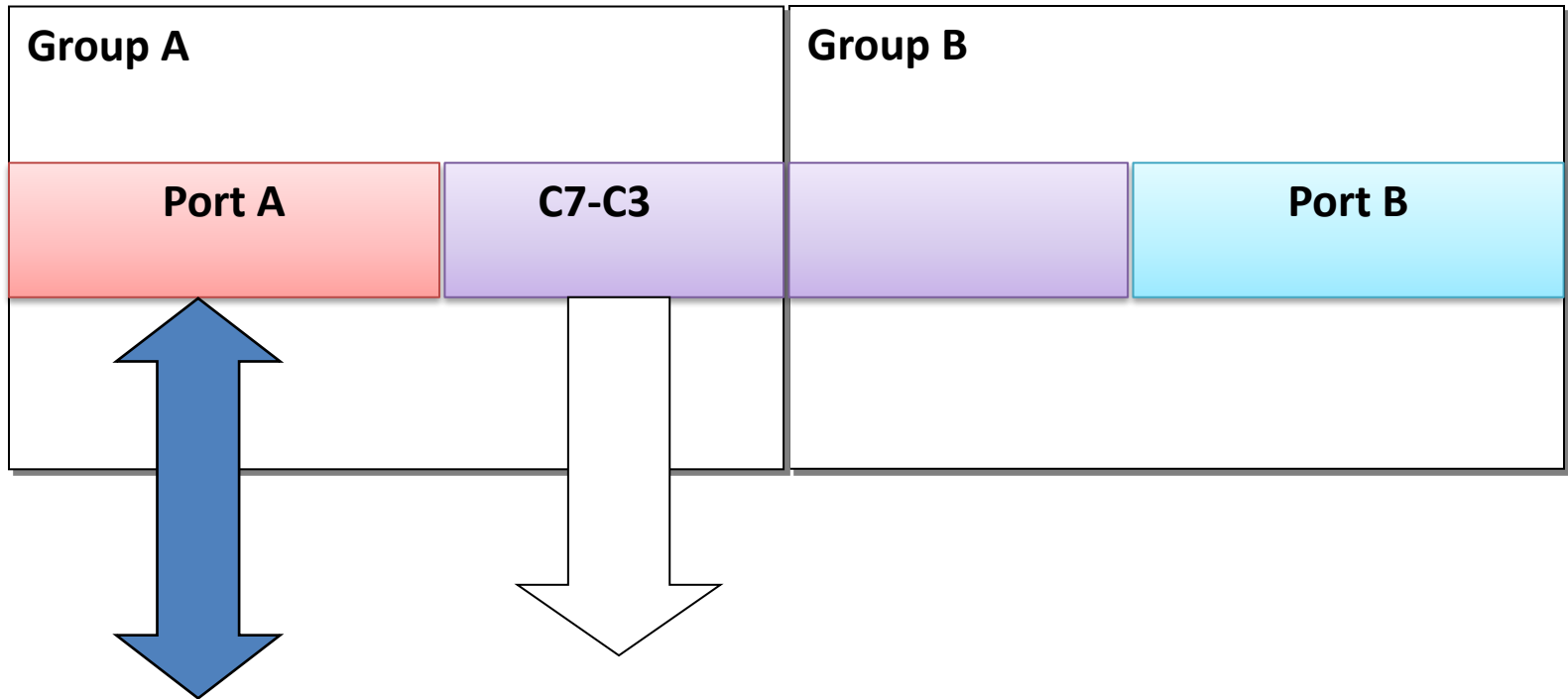
AVAILABLE AT:

Onebyzero Edu - Organized Learning, Smooth Career
The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Operation mode 2

- In mode 2
 - only port A is used
 - port A becomes an 8-bit bidirectional bus
 - port C acts as control port (only pins PC3-PC7 are used)

Mode 2



AVAILABLE AT:

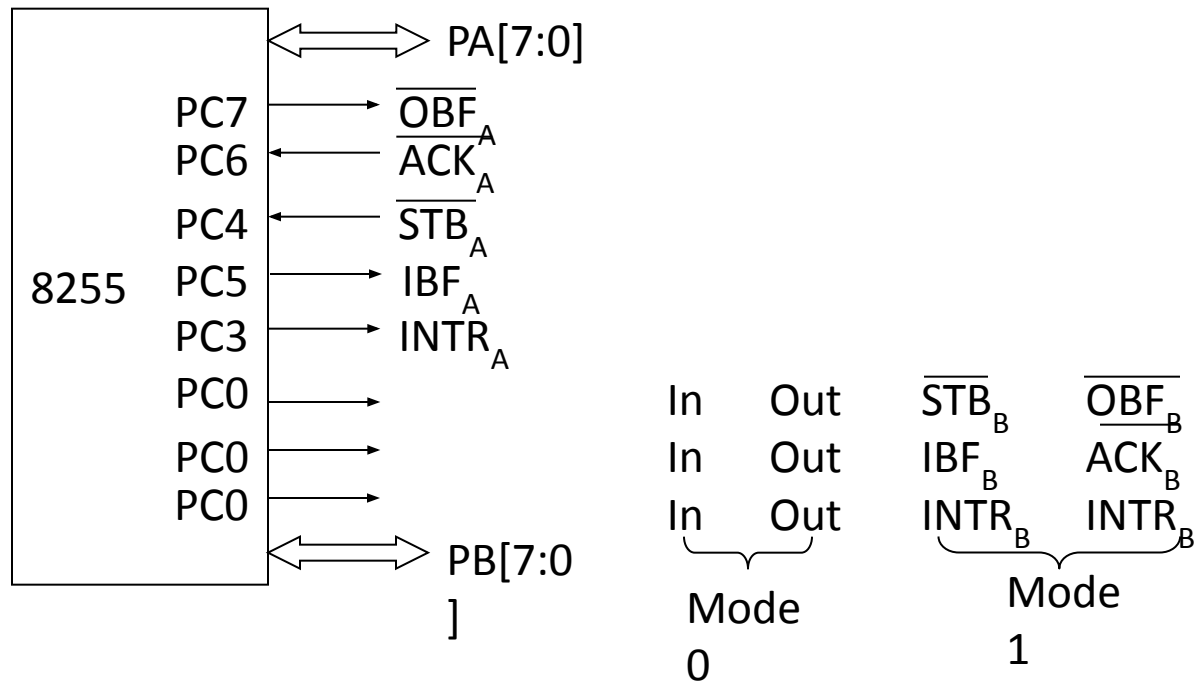
Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)

Programming 8255

□ Mode 2:

- Port A is programmed to be bi-directional
- Port C is for handshaking
- Port B can be either input or output in mode 0 or mode 1



Reference

- R S Gaonkar, “Microprocessor Architecture”, Chapter 15

Thanks

AVAILABLE AT:

Onebyzero Edu - Organized Learning, Smooth Career

The Comprehensive Academic Study Platform for University Students in Bangladesh (www.onebyzeroedu.com)