82C55

Programmable Peripheral Interface (PPI)

Protocols

3 methods to transfer data from one device to other exists in micro computers.

1. **Programmed I/O or Basic I/O**

When the data transfer between two devices is according to the data transfer program, without exchanging any handshake signals before or after data transfer.

2. **Hand shaking I/O**

Before transferring the data between two devices , few hand shaking signals are exchanged between the two entities to ensure the readiness of device for the upcoming data & few hand shaking signals are exchanged after the data transfer to signal the receiving side that data transfer is finished.

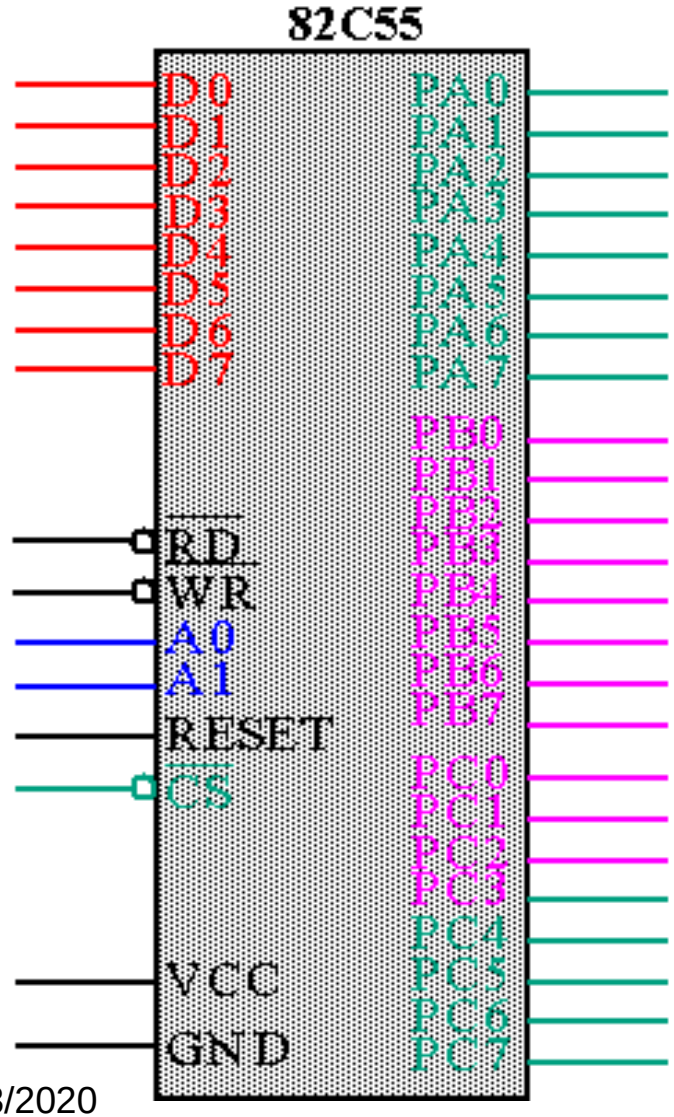
3. **Direct memory access (DMA)**

Already studied.

About 82C55

- It is used to interface 8 bit parallel I/O device to a microprocessor.
- It is used to interface the keyboard and a parallel printer port in PCs.
- Programmable Peripheral Interface (PPI) has 24 pins for I/O, that are programmable in two groups each of 12 pins and has three distinct modes of operation.

82C55 : Pin Layout



Group A

Port A (PA7-PA0) and upper half of port C (PC7 - PC4)

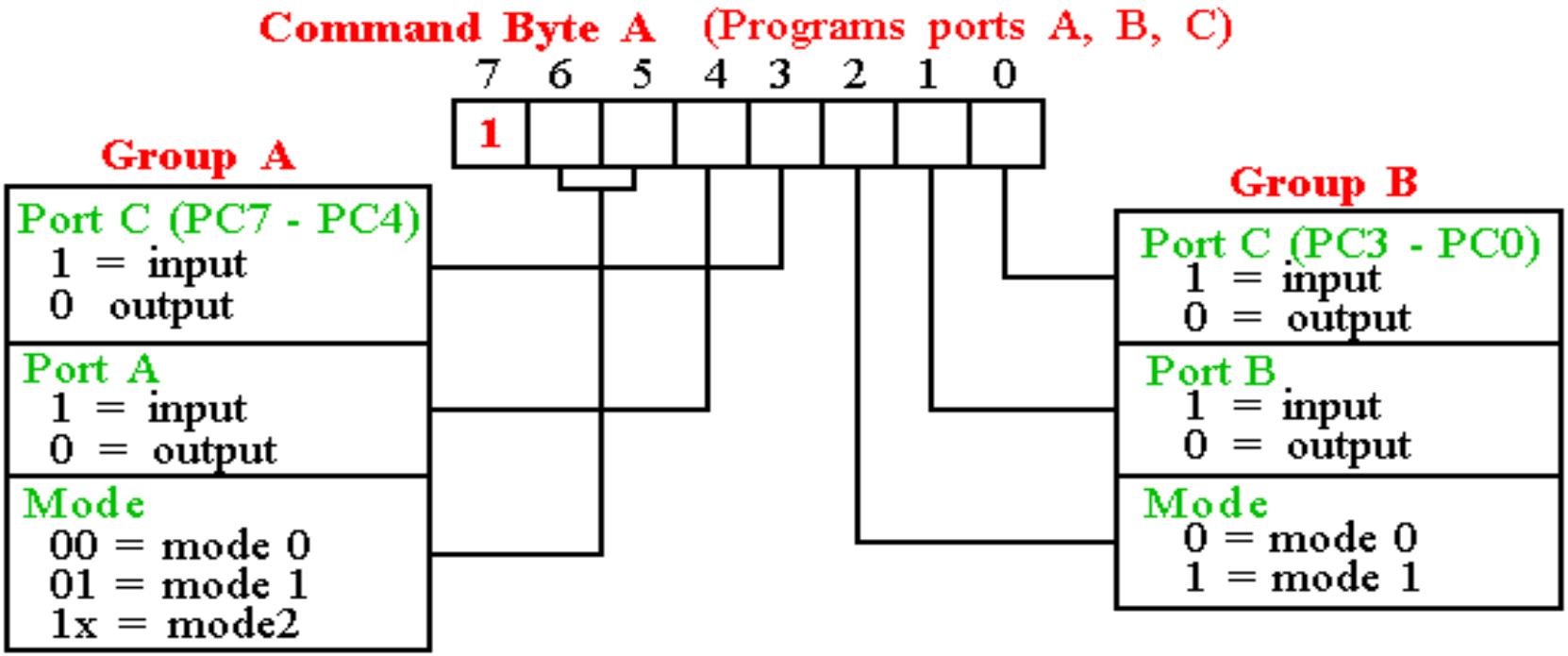
Group B

Port B (PB7-PB0) and lower half of port C (PC3 - PC0)

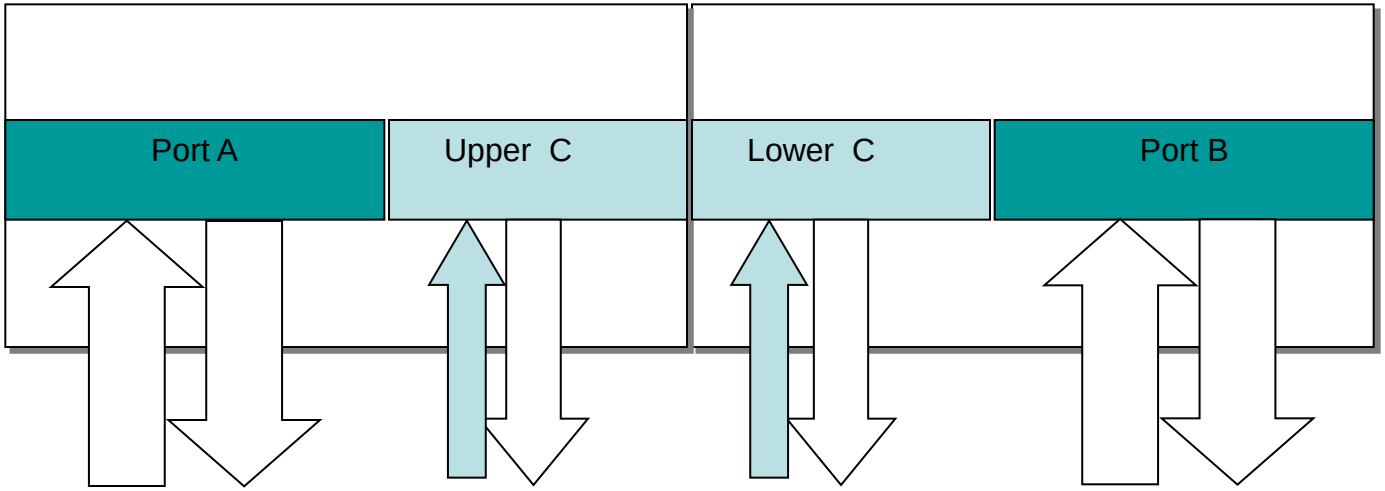
I/O Port Assignments

A_1	A_0	Function
0	0	Port A
0	1	Port B
1	0	Port C
1	1	Command Register

Control Register for Mode Programming 82C55



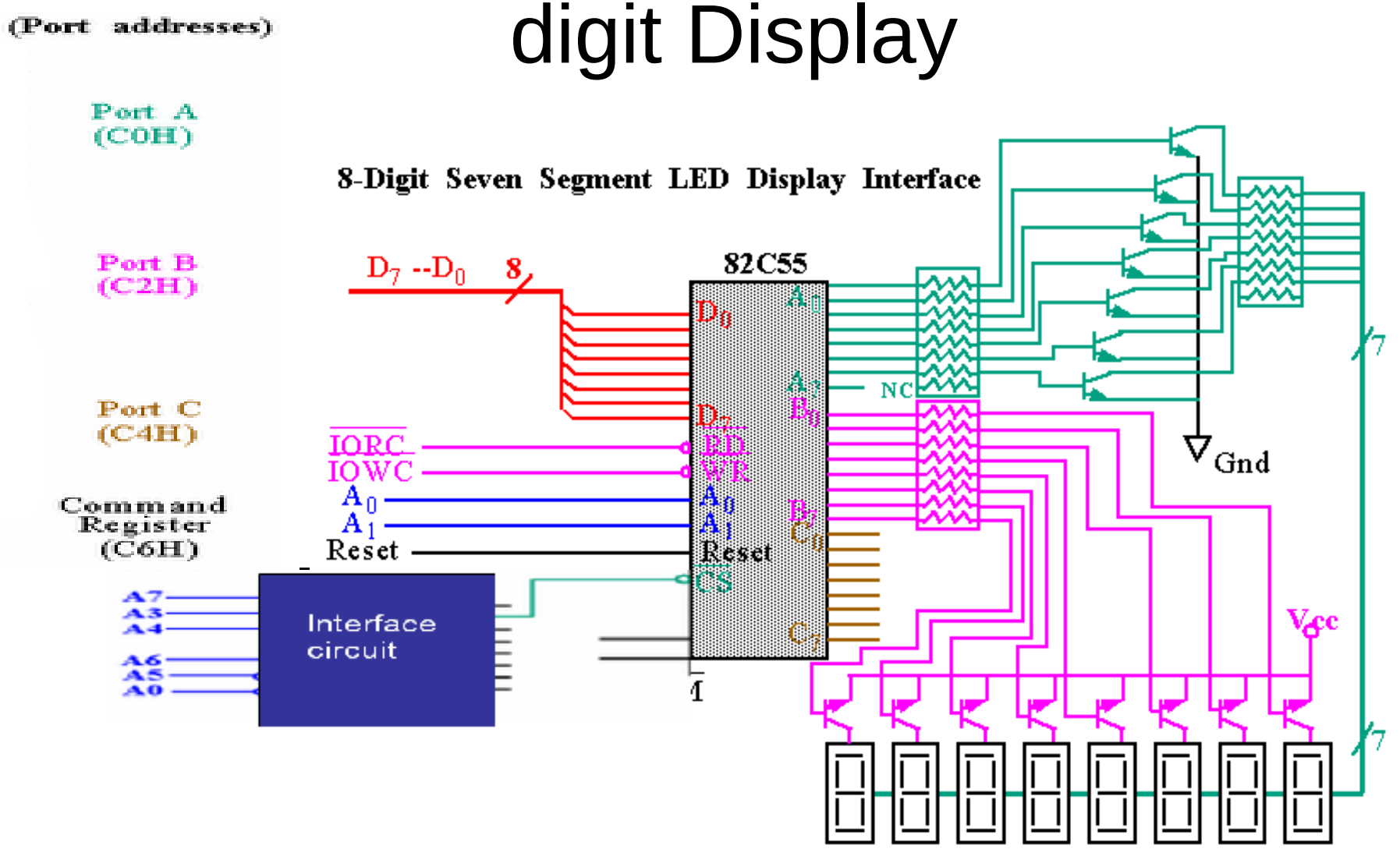
Mode 0



Mode 0 (Basic Input/Output).

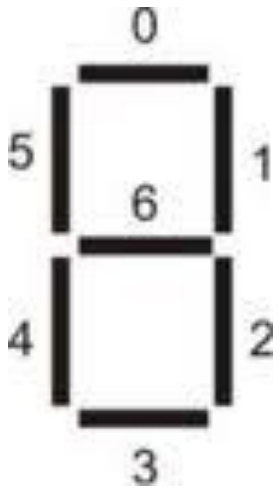
- This mode is called programmed or basic I/O mode.
- All 3 ports A, B, C are simple I/O ports
- No “handshaking” is required, data is simply written to or read from a specified port.

82C55: Mode 0, 7 segment multiple digit Display

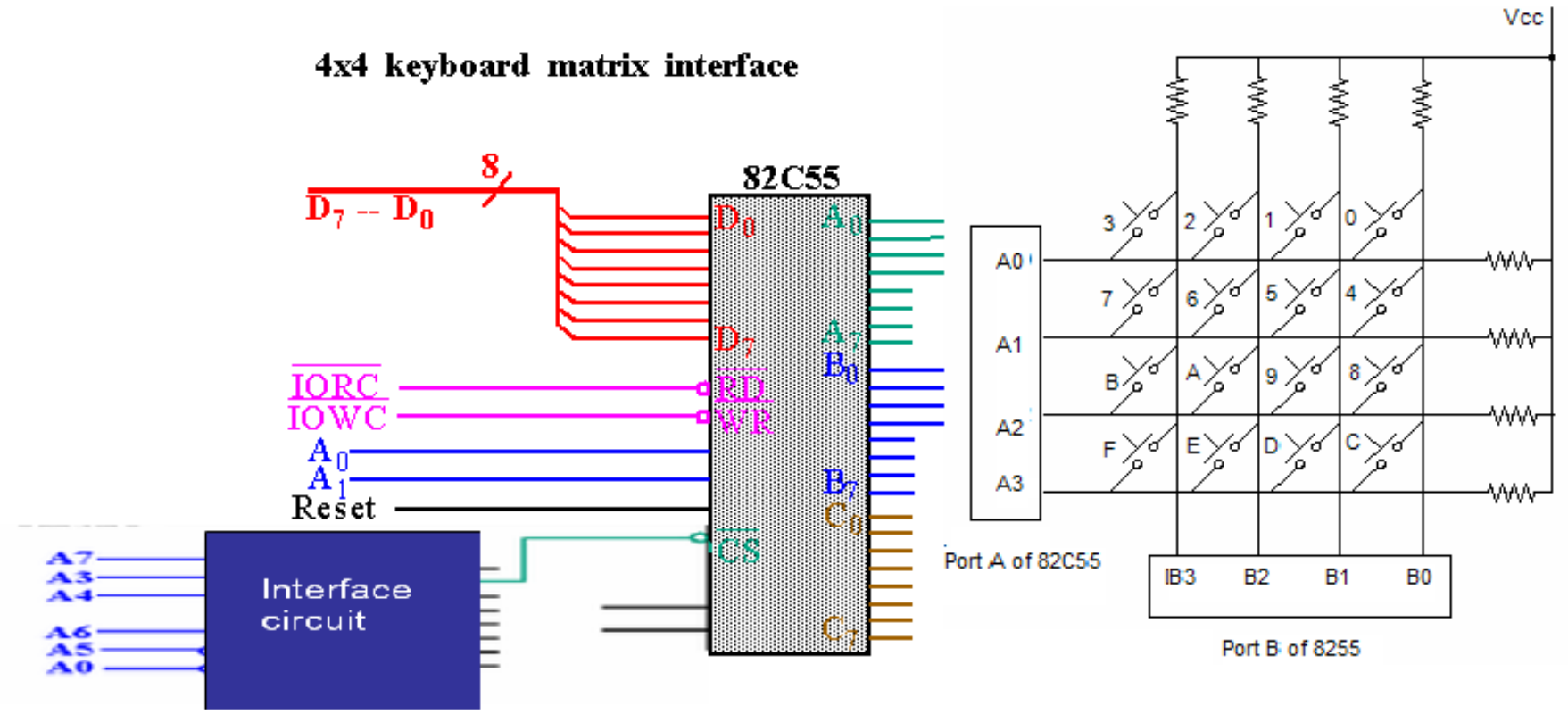


82C55: Mode 0, 7 segment multiple digit Display

- Port A turns on required segments of a single digit and port B selects one digit position at a time.
- Different values are displayed in each digit via fast time division multiplexing.



82C55: Mode 0, Scan Key of Hex Key board

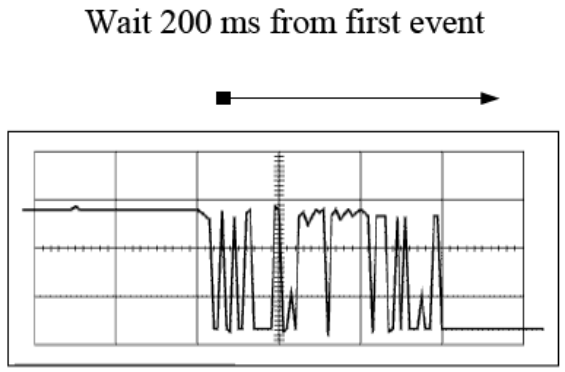


Data saved as

Row #	Col #

Debouncing

- When a key is depressed, its contact bounce for a short period of time. This problem is overcome by either using hardware de-bouncer or sampling the key second time a bit later to assure that the same key is depressed.



More than one key of a row is depressed

- Techniques to overcome the problem

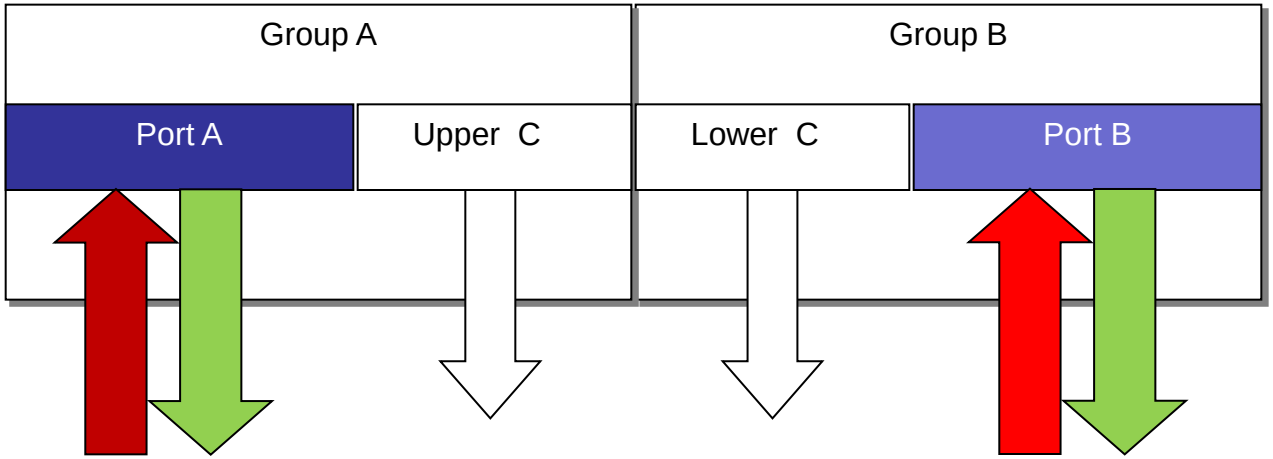
1. **Two key lock out:**

During the second scan if still two keys of a row are found depressed, both keys will be locked out & neither is accepted by the µP. However if any one of them is released after first scan, the second key still depressed will be accepted by µP.

2. **N key roll over:**

During the second scan if still more than one key is found depressed, they are accepted by the µP. The key entries are accepted in the order in which they were pressed.

Mode 1

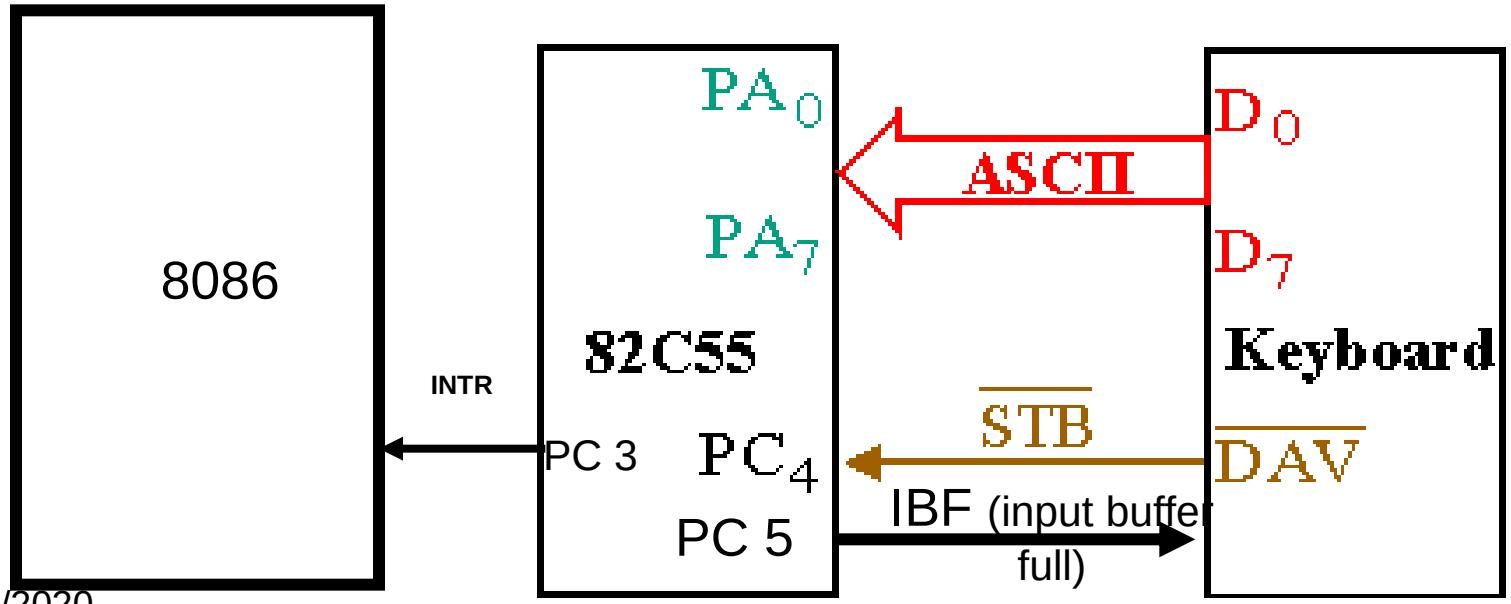


Mode 1 Basic functional Definitions

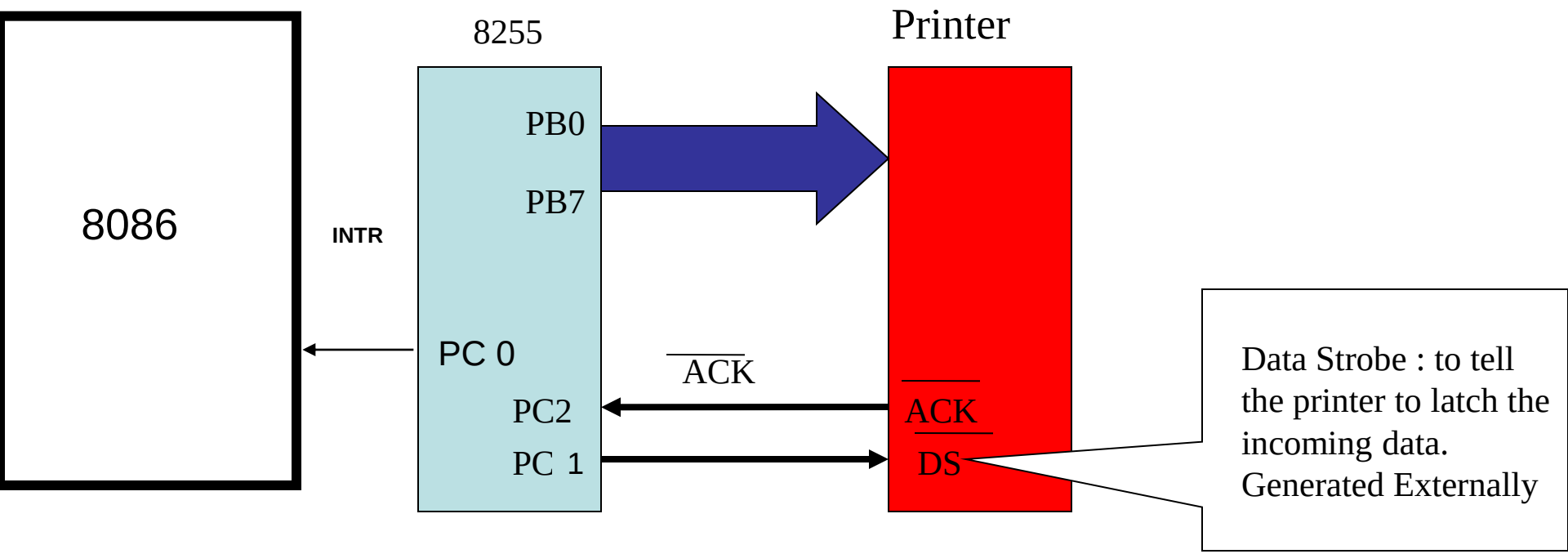
- This is called Handshaking mode.
- The 8-bit data port A & B can be either input or output.
- Pins of port C provide Hand shaking signals for two Groups (Group A and Group B).

82C55: Mode 1 Input Exam.

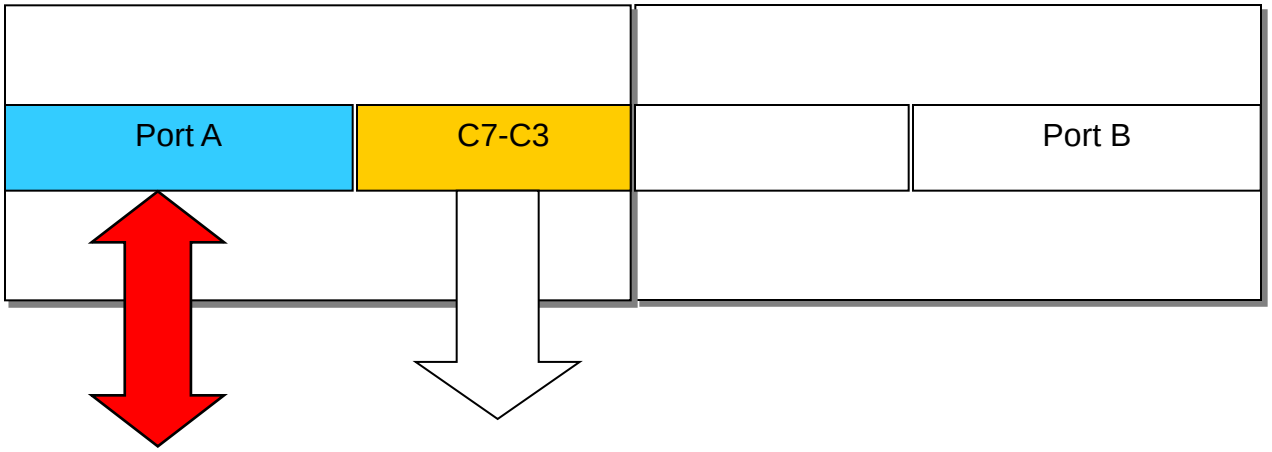
- Keyboard encoder encodes the key-pressed into 8 bit ASCII code & sends it to 82C55.
- DAV (Data Available) is activated on a key press, strobing (latching) the ASCII-coded key code into Port A of 82C55A.



Example: Mode 1 output



Mode 2



82C55: Mode 2 Bi-directional Operation

- In this mode data is transmitted in both directions between the 8255 & the peripheral devices on port A.
- “Handshaking” signals are provided to maintain proper bus flow discipline in a similar manner to MODE 1.
- Port B can be only configured for mode 0 or 1.