Chapter 11: Input/Output Organisation

Lesson 19:

Peripheral Devices─ Printer Devices

Objective

• Understand the functioning of dot matrix, ink-jet and laser printers

Dot Matrix Printer

Dot Matrix Printer

- Depends on a concept that each character is mapped to a matrix of say 7 rows × 9 columns

- A matrix can have elements 0 or 1 that value maps to white or dark space

ROM to encode the codes corresponding to the characters

- A ROM can be used to encode the code corresponding to a character into the 8-bytes encoded output

- The ROM stores bytes as per the character and font type

- Such an arrangement has the advantage that different fonts can be printed

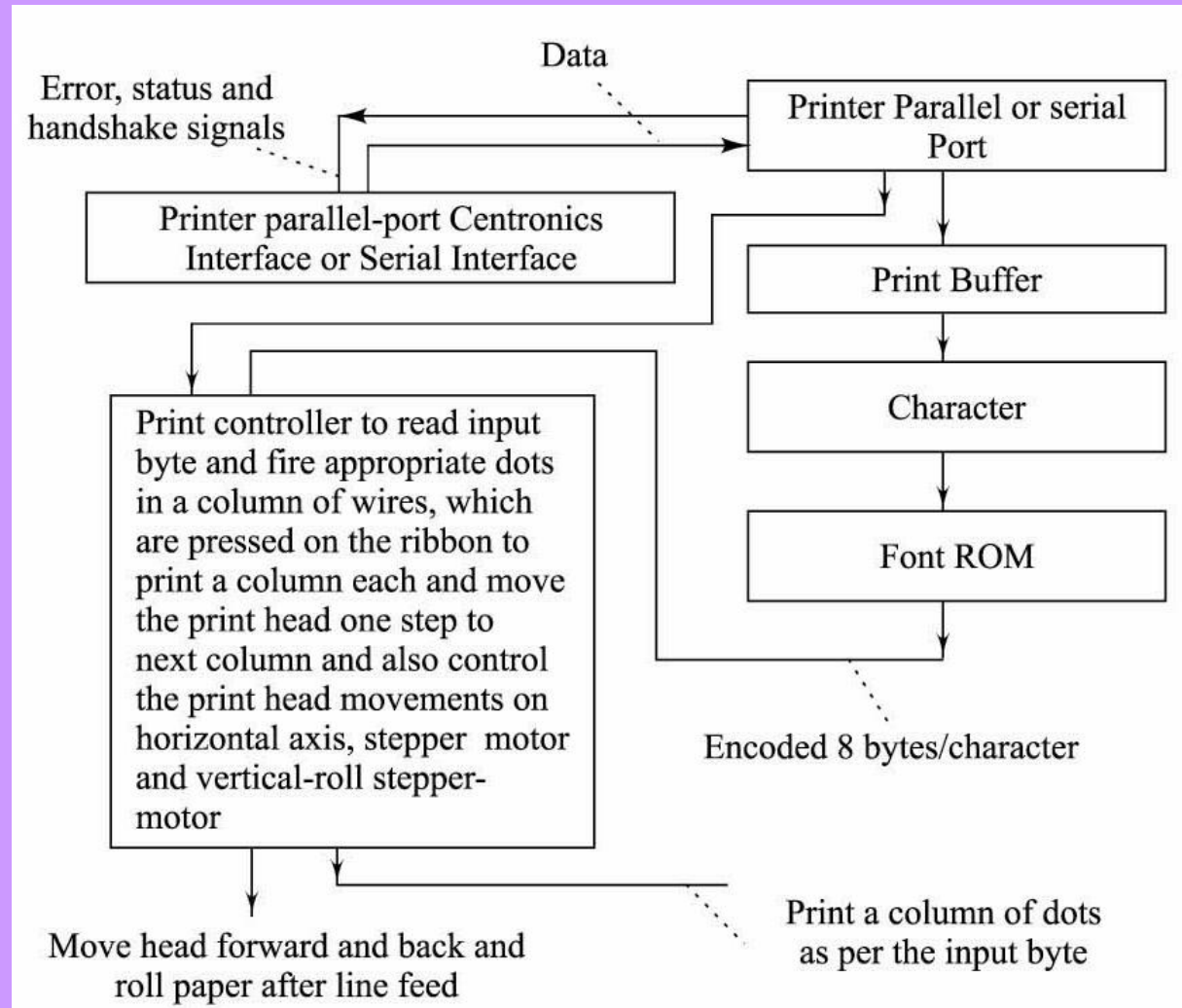- Changing the ROM can also print characters other than those in English

ROM encoding example

- ROM encodes the English character 'Z' into 8 bytes for successive 8-column of wires for printing

- Dot matrix, when not using the ROM encoded outputs, can be used for graphic printing also
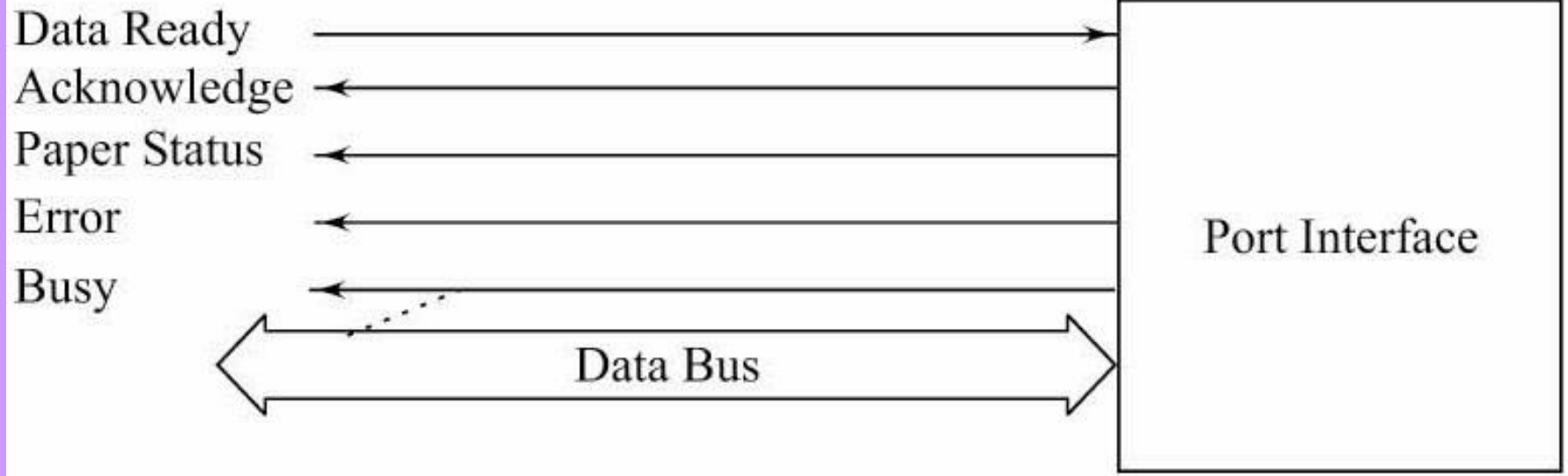
	1	1	1	1	1	1	1
						1	
					1		
				1			
			1				
		1					
	1	1	1	1	1	1	1

0x00. 0x81. 0x83. 0x85. 0x89. 0x91. 0xa1.
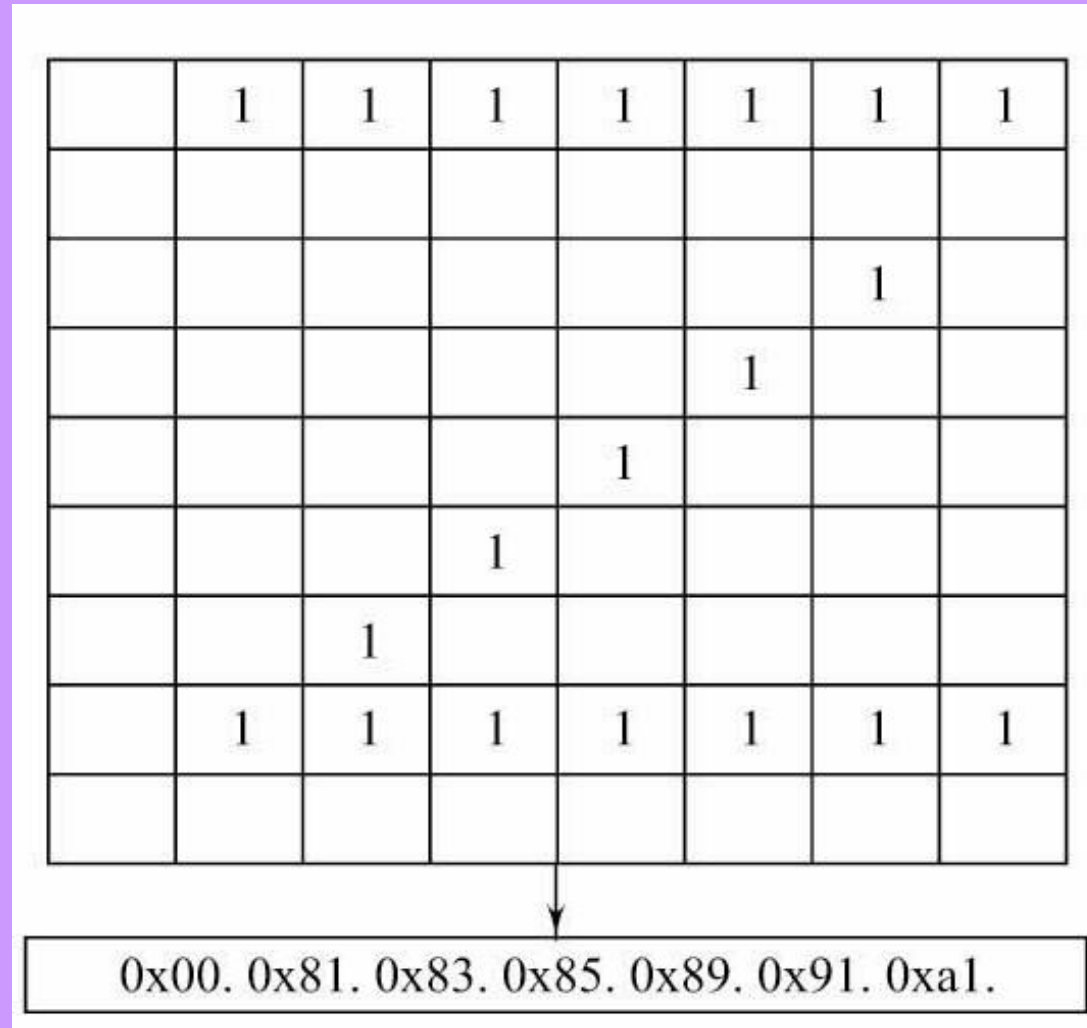
Dot matrix printer Interface

Printer port Interfacing

- Uses Centronics standard 36-pin interface as parallel port

- Or RS232C serial asynchronous UART based standard interface

Printer port functioning

- The printer port gives the input to a print buffer

- The print buffer stores the ASCII codes (bytes) sent by the computer printer interface

- The buffer output byte, which gives 8-bytes for the encoded output, is given to the ROM as its address input

print controller

- Reads the input byte from the encoder and fires an appropriate set of dots

- The dots in a set are mapped to a column of wires, which are pressed on the ribbon to print a column each and move the print head one step to next column

Print controller

- Controls the print head movements on the horizontal axis

- A stepper motor used to move the print head horizontally forward in odd lines and back on the even lines on a page

- A line feed character changes the line on the page

- A vertical-roll stepper-motor rolls the paper on each line feed or page change

Inkjet Printer

Ink jet printer

- Uses a droplet, which is ejected through a thin nozzle. It is a non-impact technology

- Droplets fired through the nozzle as per the character

- A bubble jet nozzle has a mini-heater, which when it heats, evaporates the ink drop in the jet to mark the paper where it condenses on the colder surface

Colour Ink jet printer

- Different nozzles for three different colors─ red, green, and blue

Laser Printer

Laser printer functioning

- A drum is coated with photoconductive material that gets positively charged

- On illumination by a laser beam falling onto a tiny area, the photoconductive material in that area starts electrically conducting

- The charge in that area annihilates (discharges)

Laser printer functioning

- The ink powder particles negatively charged
- The ink powder particles get attracted only to that area that is not discharged on illumination by laser beam
- A photocopier also based on same principle
- The illumination comes from those areas that are white and therefore the ink powder does not stick there

Laser printer functioning

- When the laser beam falls only those areas where no prints (only white spaces) should be there, the drum prints the page areas where the beam has not fallen

Laser Advantage

- A laser has the property of intense and fine aperture beam

- Therefore the laser printer gives high quality when compared to a dot matrix or ink jet

Summary

We learnt

- Functioning of dot matrix, ink-jet and laser printers

End of Lesson 19 on
Peripheral Devices─ Printer Devices