Chapter 11: Input/Output Organisation

Lesson 18:

Peripheral Devices– Keyboard, Mice, touch screen and light-pen

Objective

- Understand about keyboard interfacing to a computer and learn that keyboard is a input device to send the input ASCII codes at transfer rate 1200 baud
- Familiarize with functioning of mice, touch screen and light-pen

Keyboard

Keyboard

- A mechanical assembly on a panel mounted over a circuit beneath it
- Connects to computer via a serial interface
- The entered character displayed on the screen provides an HCI (human computer interface)

Keyboard

- A keyboard is a device to enter text for alphanumeric characters (0 to 9), (a to z), and (A to Z), and other signs like ., @, ... It also enters the commands with function, control, and up-down keys. It sends an ASCII character (byte) on each entry as input to the computer. An interrupt occurs on each key press and a corresponding service routine does the interpretation and takes appropriate action.

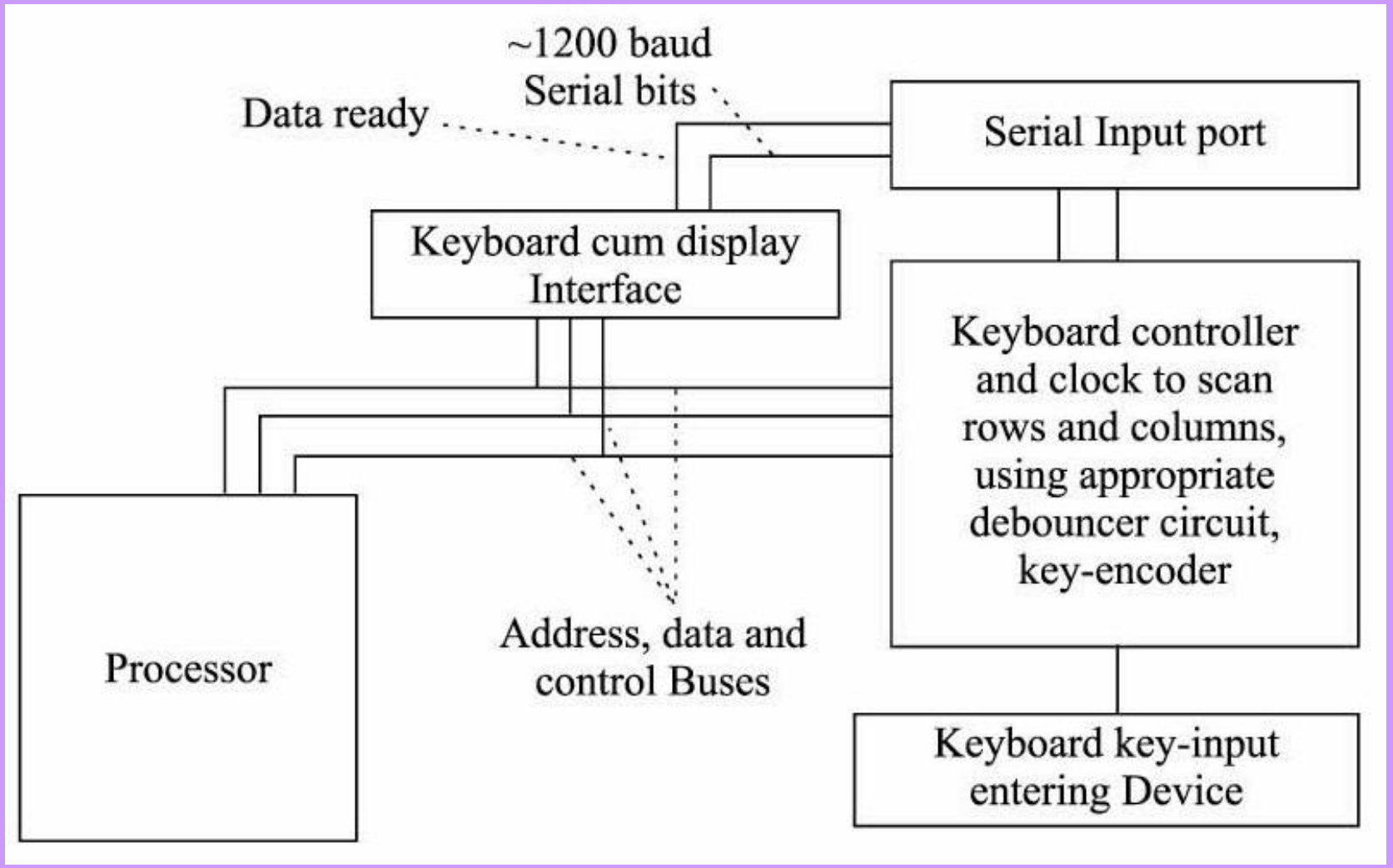
Keyboard circuit

- Device connects to a keyboard controller
- Detect a pressed key using an appropriate debouncer circuit
- Encode the key entered with the appropriate code using an encoder
- A clock is used to repeatedly scan the row and column switches

Keyboard circuit

- Send the encoded key input to the serial input port
- The port sends the code on the serial line and also sends a data-set ready (DSR) signal
- The port interfaces to the system buses through a keyboard-cum-display interface

Keyboard Interface



Baud Rate

- Sends the input transfer rate to computer at 1200 baud
- Approximately 9 ms are taken for each input from it
- The serial input in UART (universal asynchronous receiver and transmitter) format

UART mode of transfer from keyboard

- The UART serial format serial line has in each time slice T one start bit, 8-bits for a byte, one parity check bit, and one stop bit—a total of 11 bits in time interval = 11T per byte. 11 T = (11/1200) s at 1200 baud = 9 ms
- Reciprocal of T is the baud rate
- The word baud is taken from German word for *drop*
- The bytes pour on the serial line like raindrops
- The interval between successive characters is variable
- Not like a stream of bytes

Baud rate

- The word baud is taken from German word for *drop*
- The bytes pour on the serial line like raindrops
- The interval between successive characters is variable
- Not like a stream of bytes

Mice

Mice

- A screen cursor pointing device
- It is a device that provides a powerful HCI (Human Computer Interface) and GUI (graphic user interface) in conjunction with the displayed text and icons on the computer screen

Mice functioning

- A clock is used to repeatedly track the ball X and Y position row and column switches or direction of movement
- Detect the position on the flat base, also detect the pressed button, encode these into three byte codes using an encoder, and send three input bytes repeatedly to the serial input port

Mice interfacing

- The port sends the codes on the serial line and also sends a data-set ready (DSR) signal
- The port interfaces to the system buses through a mouse-cum-keyboard-cum-display interface

Optical mice

- An LED emits light radiation, which are reflected from the surface beneath the mouse
- A phototransistor detects the reflected light
- The intensity variations are used to sense the mouse's X-Y movement

IntelliMouse

- Uses the images of the surface taken by a pixel-sized camera and ~ 1500 images are processed each second
- The analysis of the successive images used to sense the mouse X-Y movement

Touch screen panel

Touch Screen Panel

- Input cum LCD Display Device
- Menu select and pointing device, in which a finger used
- Displays a menu or icons for the menu
- A touch panel consists of 32 × 32 or 16 × 32 or 8 × 16 sections, the number of sections depends on the panel size

Touch Screen Panel

- When a finger touches a menu or icon, the capacitance changes and signals an input
- The input is encoded and sent to an input-cum-display interface

Touch Screen Panel

- Supplements the keyboard for entering the commands
- For example, a command by key press can be equivalent to the icon touched on the panel
- The touch panel cum display device is also used to enter phone numbers etc. in PocketPC cum mobile device

Light pen device

Light Pen Device

- A pen-shaped device has a photodetector inside and a switch over it
- When the switch pressed, the displayed icon gets selected
- The pen movements─ tracks the pen positions on the screen

Summary

We learnt

- Keyboard a input device to send the input ASCII codes at transfer rate 1200 baud
- Mice a human-computer interaction device
- Touch screen is an input cum LCD Display Device functioning as menu select and pointing device, in which a finger used
- light pen an input device

End of Lesson 18 on

Peripheral Devices– Keyboard, Mice, touch screen and light-pen