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6) Interfaces

- This chapter covers the peripheral interface used in modern PC.
- The interface is used in PC to connect various devices to PC.

① SCSI, SCSI cables and connectors, SCSI drive configuration:

The Small computer system interface, abbreviated as SCSI and often pronounced "skuzzy". It is a high speed standard for physically connecting and transferring data between computers and peripheral devices. Mostly it is used for hard disk drives for server systems.

SCSI standard:

There are three different SCSI standards:

- 1) SCSI-1
- 2) SCSI-2
- 3) SCSI-3

1) SCSI-1 : SCSI-1 was the first implementation of SCSI. Its

some major features are:

1] 8 bit parallel bus

2] 5MHz asynchronous and synchronous operation

3] 4MBPS (asynchronous) or 5MBPS (synchronous) throughput

4] 50 pin cable

5] Single ended unbalanced transmission

6] passive termination

7] Optional bus parity

2) SCSI-2 : SCSI-2 is an improved version of SCSI-1. It added

Several optional features:

1] Fast SCSI (10 MHz)

2] Wide SCSI (16 bit transfers)

3] Command queuing

4] New commands

5] High density, 50 pin cable connectors

6] Active (Alternative) termination for improved single-

ended transmission

7] High voltage differential termination for longer bus

lengths

3) SCSI-3 : It is the latest SCSI implementation, SCSI-3 is a

term used to describe the set of standards currently

being developed. The command set includes hard disk

interface command, commands for tape drives, controlled

commands for RAID and other commands.

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SCSI cables: The term SCSI cable usually refers to a complete cable, including the wires, connectors and possibly a terminator as well. SCSI cables come in two distinct varieties:

1] External 2] Internal

1] External cables: External cables are used to connect SCSI devices that do not reside inside the PC but rather have their own enclosures and power supplies.

2] Internal cables: Internal cables connect SCSI devices installed within the PC system box. These cables are totally different in construction, primarily because of the external environment. They represent much more of a risk to the data corruption.

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SCSI connectors: Connectors are of course the physical devices that are used to attach a SCSI cable to a SCSI drive.

Several different types of SCSI connectors are used to construct SCSI cables:

(A) External connectors (B) Internal connectors

• D-shell

• Regular density

• Centronics

• High density

• High Density

• Single connector

(A) Very high density cable interconnect

Attachment

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D-shell: The earliest SCSI standard, SCSI-1, defined a 50-pin D-shell connector for narrow SCSI implementation. The name of this connector comes from its shape as it is shaped like English alphabet D.

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Centronics: The other external connector type defined by the SCSI-1 standard is a 50-pin connector commonly called as centronics connector, after a formerly popular printer that first used this type of connector. In this connectors, thin pins, two rows of flat contacts are used.

• **High density:** The D-shell connectors defined in the SCSI-1 standard were replaced by newer, high-density shielded connectors in SCSI-2. These are really not all that different from the older D-shell connectors, but the space between the pins were reduced.

• **Very High Density Cable Interconnect (VHDCI):** This connector is wide only (68 pins) and is sometimes called a "micro-centronics" because it uses same design as the most of Centronics connector, only contacts much smaller and close together. This is Alternative 4 for external connectors and is growing in popularity because of its small size.

(B) **Regular density:** These standards defined a single connector type for internal narrow (8-bit) devices. This is rectangular connector with two rows of 26 pins. It is called unsheilded "Alternative 2" in the current SCSI standards.

• **High density:** SCSI-2 defined & called high density because their pin spacing is half that of older SCSI-1 connectors, making them much smaller. These are the most common SCSI connectors and used today within the PC box. The narrow, 50-pin version is unsheilded "Alternative 1" and the much 68-pin version is "Alternative 3".

• **Single Connector Attachment (SCA):** "Alternative 4" in the SCSI standards for unsheilded connectors doesn't actually refers to cable connectors, but the connectors used for giving wall SCA systems for backplane connection of SCSI drives.

• **SCSI drive configuration:** SCSI drives are not too difficult to configure, but they are more complicated than IDE drives. The SCSI standard controls the way the drives must be setup.

You need to set following items when you configure SCSI drive:

- **SCSI device ID:** Every device on SCSI bus must be uniquely identified for addressing purpose. SCSI drives will have a set of three jumpers that can be used to assign the disk an ID number from 0 to 7. Wide SCSI drives have four jumpers to enable ID numbers from 0 to 15. Some systems don't use jumpers to configure SCSI device ID's.
- **Termination activate:** The devices on the ends of the SCSI bus must terminate the bus for it to function properly.
- **Disable auto start:** This is usually done to prevent excessive startup load on the power supply.
- **Delay auto start:** It is used to offset motor startup load on system with many drives.
- **Stagger spin:** An "enhanced version" of "Delay Auto Start".
- **Narrow/wide:** Some drives have a jumper to control whether they will function in narrow or wide mode.
- **Force SE:** Allows newer Ultra 2, wide Ultra 2, Ultra 160, and Ultra 160+ SCSI drives to be forced to use a single ended (SE) operation instead of low voltage differential (LVD) interface.
- **Disable parity:** Turns off parity checking on the SCSI bus, for compatibility with host adapters that do not support the feature.

(2)

USB: Universal Serial Bus (USB) is a serial bus standard to interface device. It was designed to allow peripherals to be connected using a single standardized interface socket, to improve plug-and-play capabilities. It can connect peripherals like Mouse devices, keyboards, PDAs, game pads and joysticks, scanners, digital cameras and printers.

USB supports four data rates: 1] Low speed (1.0) rate of 1.5 Mbit/s (192 KB/s)

2] Full speed (1.1) rate of 12 Mbit/s (1.5 MB/s)

3] High Speed (2.0) rate of 480 Mbit/s (60 MB/s)

4] Super speed (3.0) rate of 4.8 Gbit/s (600 MB/s)

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USB features: USB has following features:

1] Host: The computer acts as a host.

2] Multiple devices: Up to 127 devices can connect to the host.

3] USB cable length: Individual USB cables can run as long as 5m.

4] Transfer rate: USB 2.0 supported 480 Mbps

USB 2.0 supported 480 Megabits per second

5] Ease of installation

6] Power allocation

7] Hot swappable: Means you can plug them into bus and unplug them at any time.

8] Hot pluggability

9] Hub architecture

10] Host centric

11] Power saving

12] Support of wide range

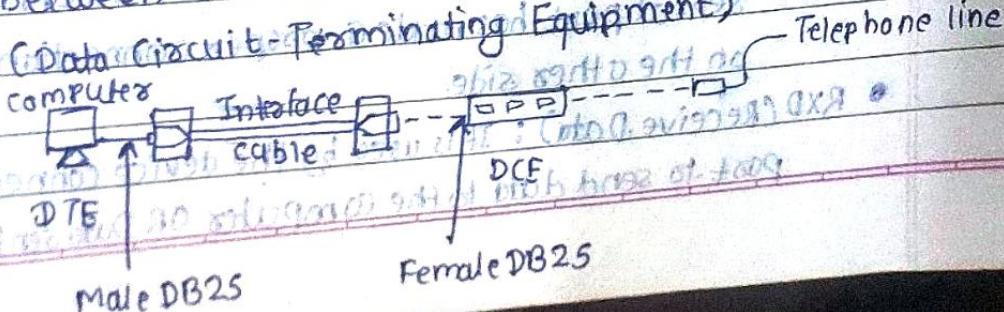
of peripherals

USB Connectors and cables: (Read from textbook for informative purpose)

③ RS232: The RS232 interface is an asynchronous serial

communication method. RS232 (Recommended Standard 232) is a standard for serial binary data signals connecting between a DTE (Data Terminal Equipment) and DCE

(Data Circuit-Terminating Equipment).



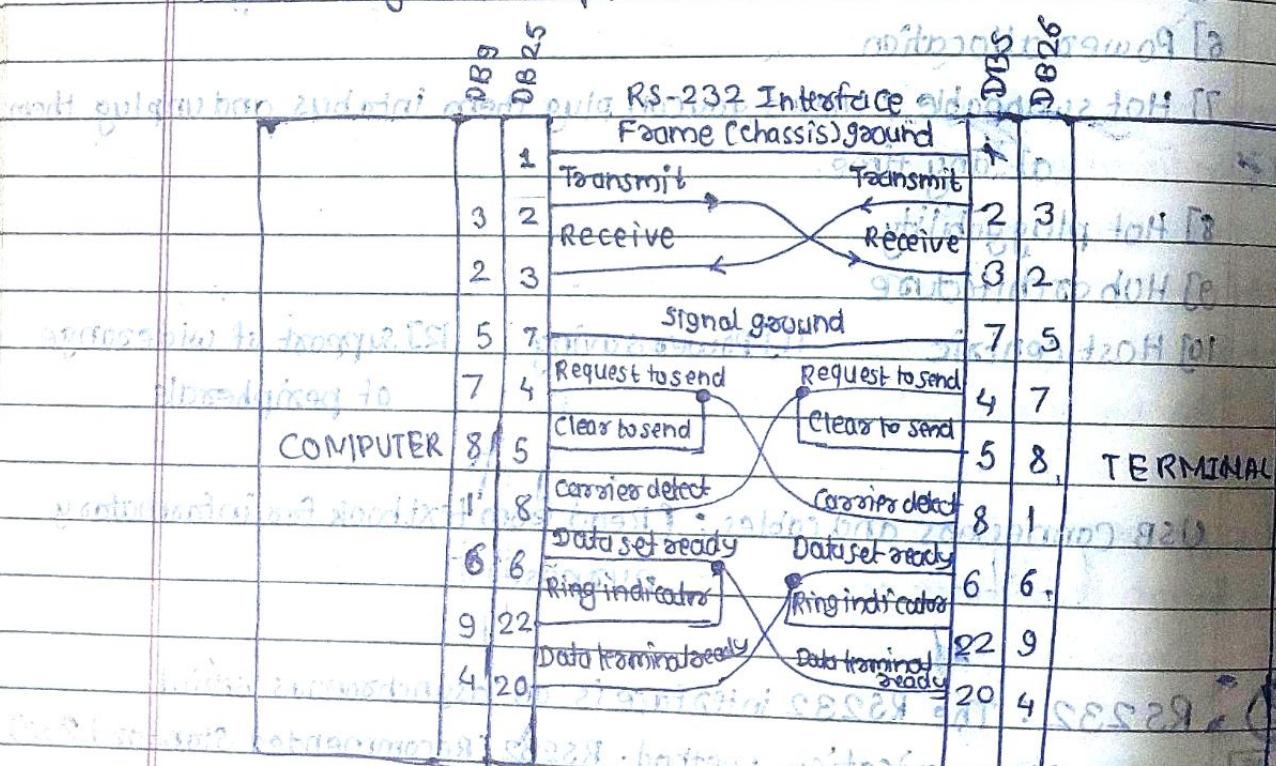
Voltage levels of RS232:

Level	Transmitter	Receiver
Logical 0	+5V to +15V	-3V to +25V
Logical 1	-5V to -15V	-3V to +25V
Undefined	-3V to +3V	

Control signals:

Signal	Driver	Termination
"Off"	-5V to -15V	-3V to -25V
"On"	5V to +15V	-3V to +25V

RS232 signal description:



- CDE (Carrier Detect or Data Carrier Detect): It is used by computer to know that the modem connected to the serial port has made a proper connection with the modem on the other side.

- RXD (Receive Data): It is used by the device connected to the serial port to send data to the computer OR Data sent from DCE to DTE.

- TXD (Transmit Data) : It is used by the computer to send data to a device connected to the serial port. OR it is sent from DTE to DCE.
- DTR (Data Terminal Ready) : It is sent from computer to the device connected to the serial port to inform that computer is ready for communication.
- GND (Signal Ground) : This wire provides necessary return path for the data signals and the hand shaking signals.
- DSR (Data Set Ready) : It is sent from the device connected to the serial port to the computer to inform that device is ready for communication.
- RTS (Request to send) : Once clear to send signal is received the computer send RTS signal to the device connected to the serial port to inform that computer ^{is also ready to start} can start data transmission.
- CTS (Clear to send) : CTS signal is used by the device connected to the serial port to inform to the ~~computer~~ computer that computer can start data transmission.
- RI (Ring Indicator) : RI signal is used by the device connected to the serial port to inform to the computer that it has detected ringing voltage on the telephone line.
(Read further concepts for informative purpose).

- ④ Centronics : The centronics interface is an old I/O interface standard used for connecting printers. It is also called as parallel interface as it was used for connecting old printers. Nowadays this interface is obsolete due to advancement in technology and speed of other interfaces.

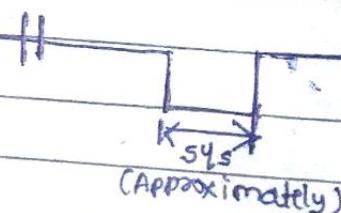
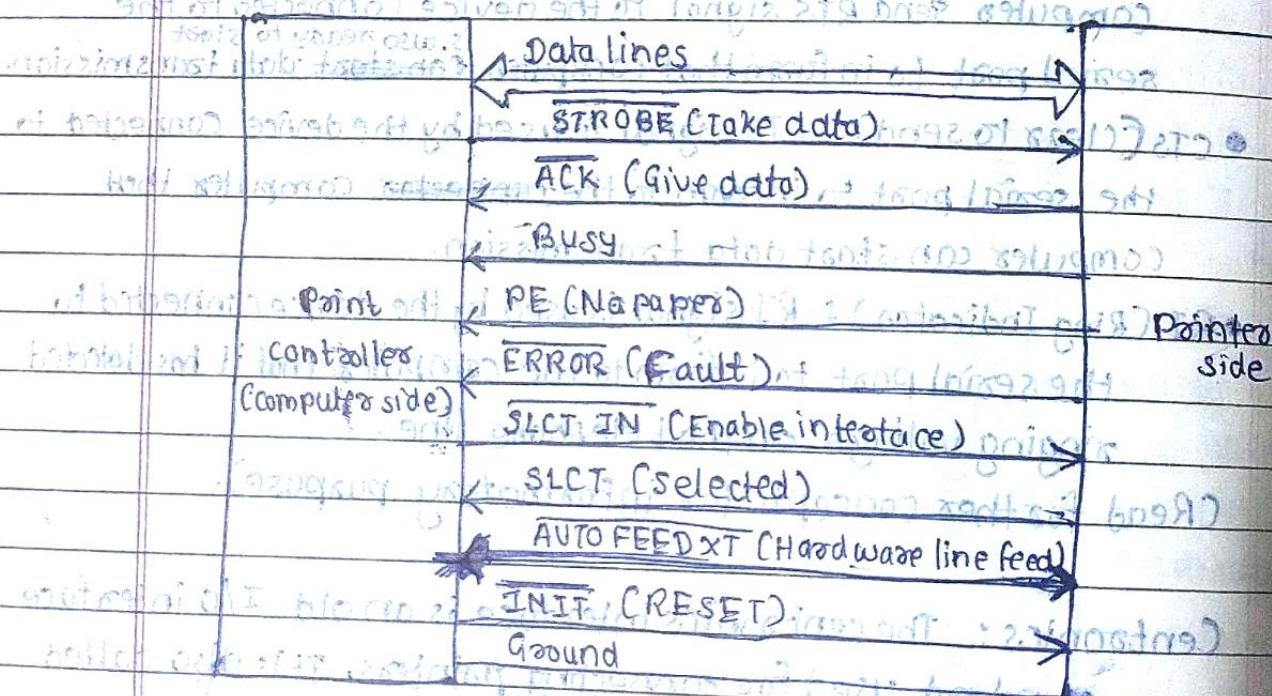


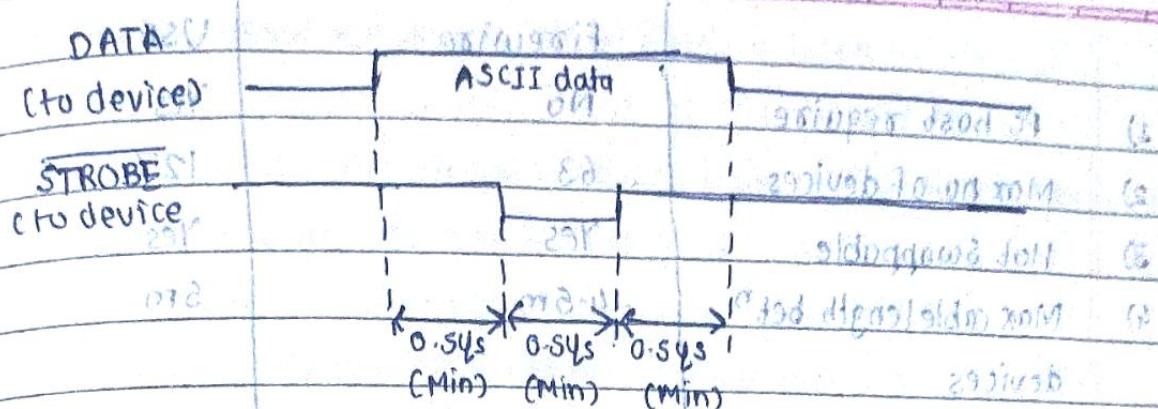
Modes of operation of centronics interface

[Read modes of operation for informative purpose]

- ① Compatibility mode (use old interface calls)
 - ② Nibble mode (must have 8 bits) (upper 4 bits are ignored) → TD
 - ③ Byte mode (use old interface calls)
 - ④ ECP mode (no interface calls) → TD
 - ⑤ EPP mode (new interface calls) → TD

S-08 S-13 Centronics interface signals: The Centronics interface provides a handshake protocol between a computer and printer.





(Read further concepts for informative purpose)

⑤ Firewire (IEEE 1394): Firewire is a brand name for the IEEE 1394 High Speed Serial Bus interface, it is also known as iLink. It is a personal computer and digital audio/digital video) serial bus interface standard offering high speed communications and synchronous real-time data services.

Features of FireWire: Features of firewire are listed as follows:

- 1] Hot pluggability allowing 2ⁱ hosts up to 2¹⁸
 - 2] It can connect together upto 16 peripherals in acyclic topology.
 - 3] It allows peer to peer device communication
 - 4] It also supports multiple hosts per bus.
 - 5] It is designed to support plug and play and hot swapping.

7] Snap connection: No need for device ID; Jumper DIP

switch, terminator, etc.

8] Power sourcing: ~~return to club until 10:00 9/11~~ ②
~~Arrive at 10:00 hrs Hootsuite~~ ③

9] Dynamic reconfiguration (not in DS Hoorn via P)

Comparison between Firewire and USB: 2011

		USB 1.1
1)	PC host require	Yes
2)	Max no. of devices	127
3)	Hot swappable	Yes
4)	Max cable length bet' n devices	5m
5)	Transfer rate	12 Mbps / 480 Mbps
6)	Devices supported	Keyboard, Mice, joysticks, DV camcorders, High-end digital cameras HDTV, Set top boxes, high speed drives, High-end printers; low-end digital cameras, musical instruments, scanners, HDTVs, Set top boxes, high speed drives, high end scanners

⑥ **Bluetooth:** Bluetooth is a wireless technology standard for exchanging data over small distances. It uses short-wavelength radio transmissions in the ISM band from 2400-2480 MHz from fixed and mobile devices, creating a wireless Personal Area Network (PAN) with high levels of security.

- S-14 Features of Bluetooth:
- ① Operates in the 2.4 GHz frequency band without a licence for wireless communication
 - ② The real time data transfer usually possible between 10-100 m
 - ③ Bluetooth can connect upto 8 devices simultaneously
 - ④ It is used in mobile phones, headsets, MP3 players, computers, boom boxes, laptops, etc.

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W-14 S-15 → Advantages and disadvantages of Bluetooth technology

Advantages: (i) It is a wireless and portable technology

- ① It does not require a clear line of sight between the synced device
- ② Major advantage is in simplicity of use.
- ③ It is wireless and inexpensive.
- ④ Low interference and energy consumptions.
- ⑤ Support to share voice and data.
- ⑥ It is used to form instant PAN or short range for 10m.

Disadvantages: (i) Short range < 10m & battery life < 3h

- ① Range that it offers is only 100 meters; only limited.
- ② Data transfer speed is limited.
- ③ Battery consumption is more, when the number of device connected.
- ④ Less secured.

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