

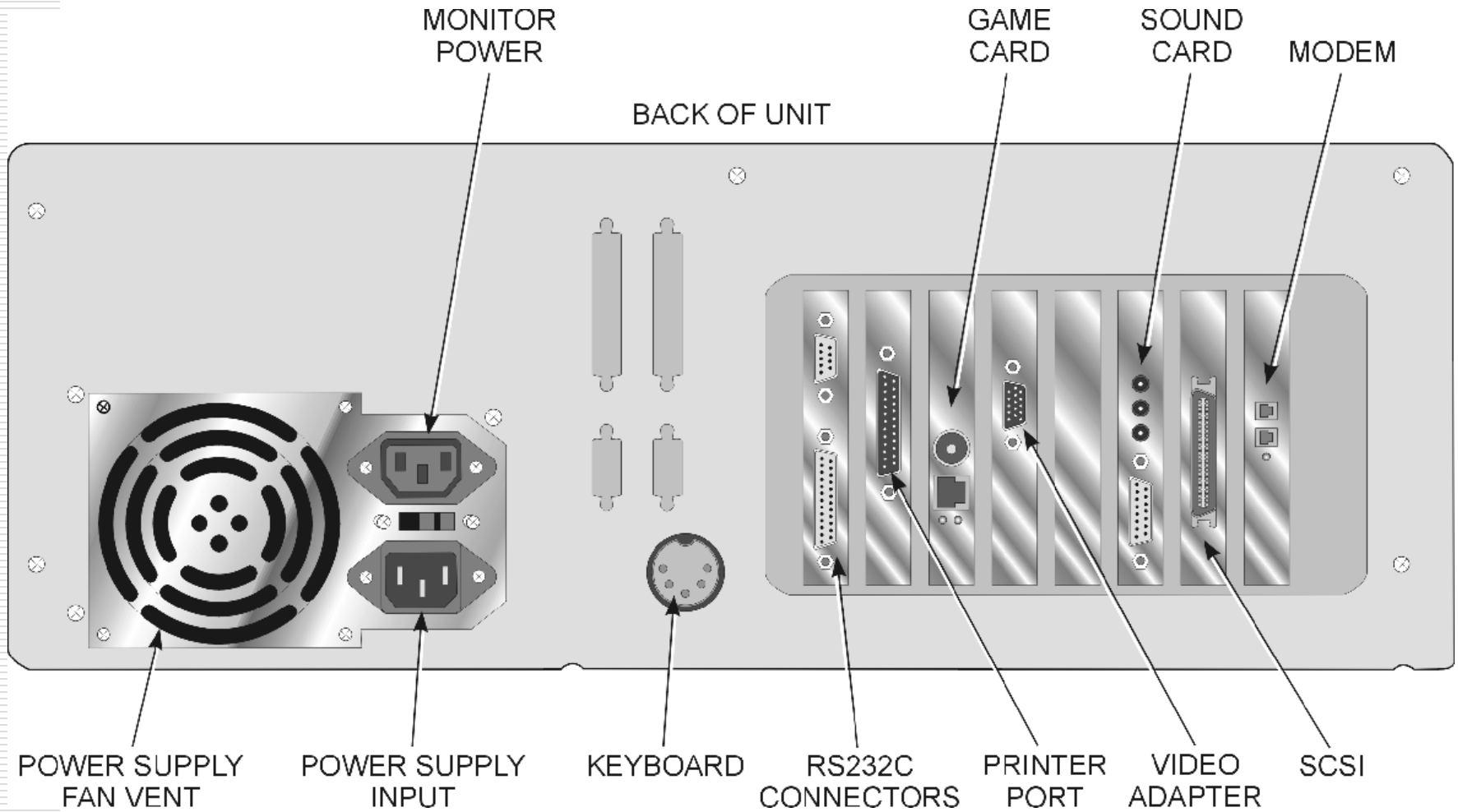
# Chapter4 Peripherals and Ports

- ◆ This chapter examines the different connection methods that have been devised for use with different common PC-compatible peripheral devices and ports. These methods include older parallel and serial ports as well as newer high-speed USB, Firewire, and IrDA port specifications.
- ◆ the chapter also covers cabling specifications associated with those ports.

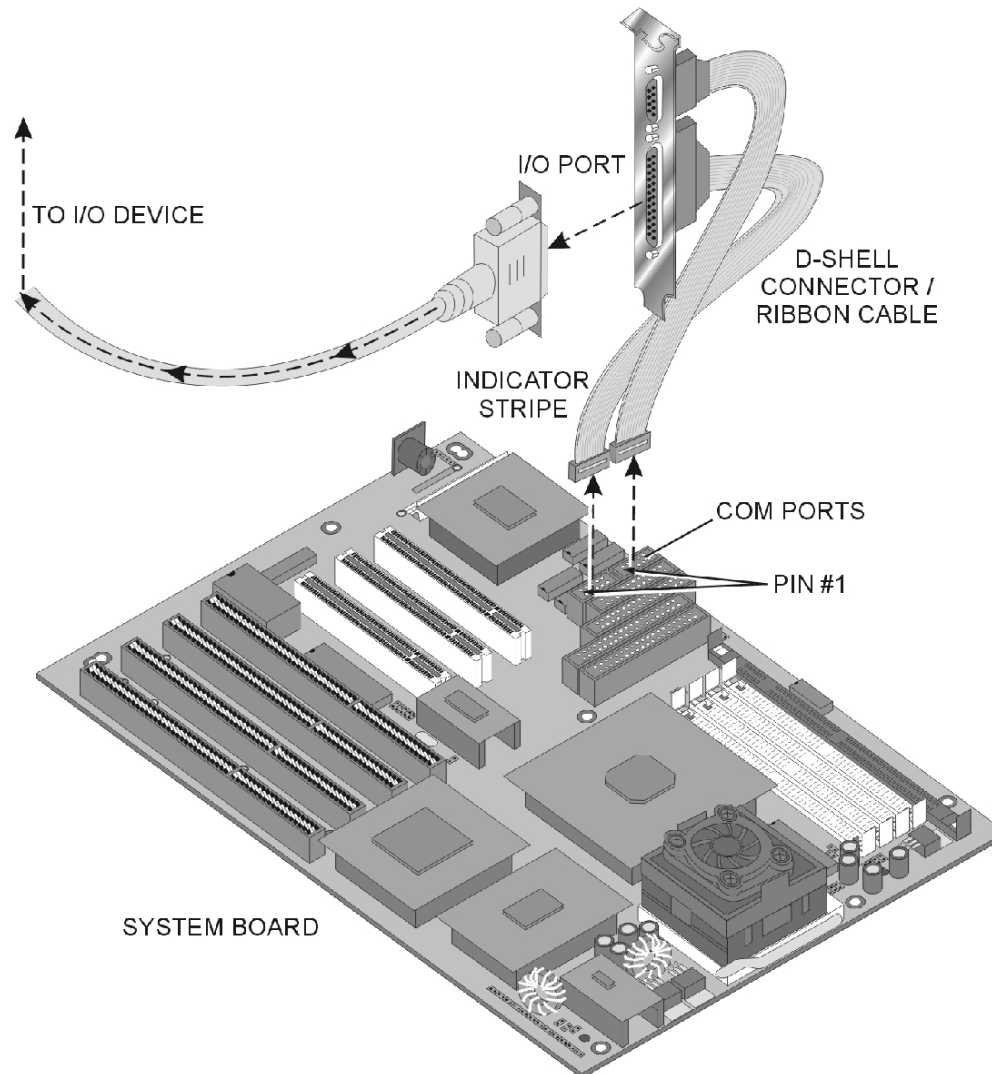
# STANDARD I/O PORTS

- ◆ there are three ports that have been standard since the original PCs were introduced. These are
- ◆ The IBM versions of the Centronics parallel port .
- ◆ The RS-232C serial port
- ◆ The IBM game port
- ◆ Two connection types have become standards for connecting
- ◆ networked computers together. These are *RJ-45 (Registered Jack) Ethernet connectors*
- ◆ *BNC (British Naval Connector) Coaxial*

# AT back panel connections

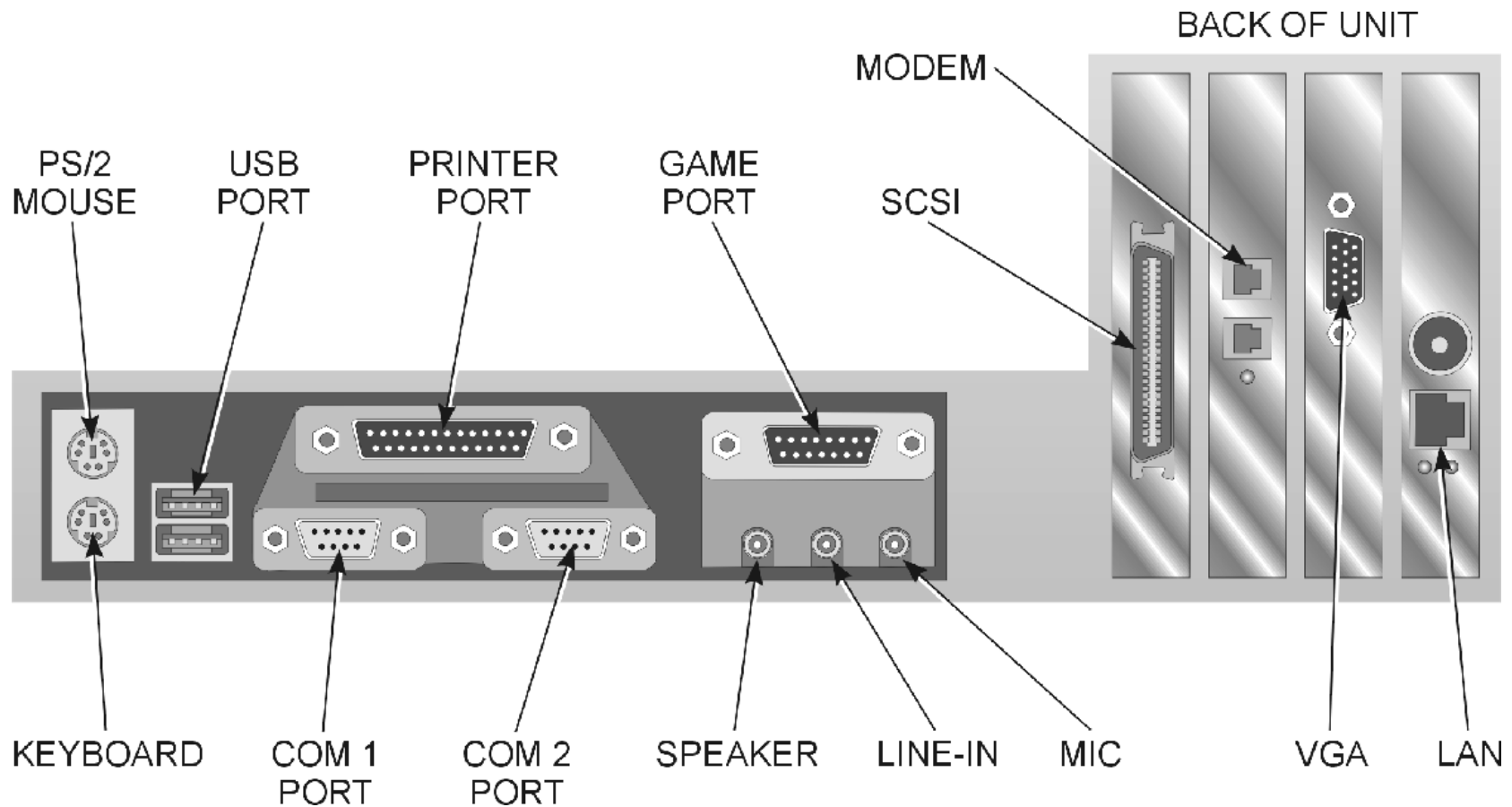


# AT-style I/O port connections



# ATX Ports

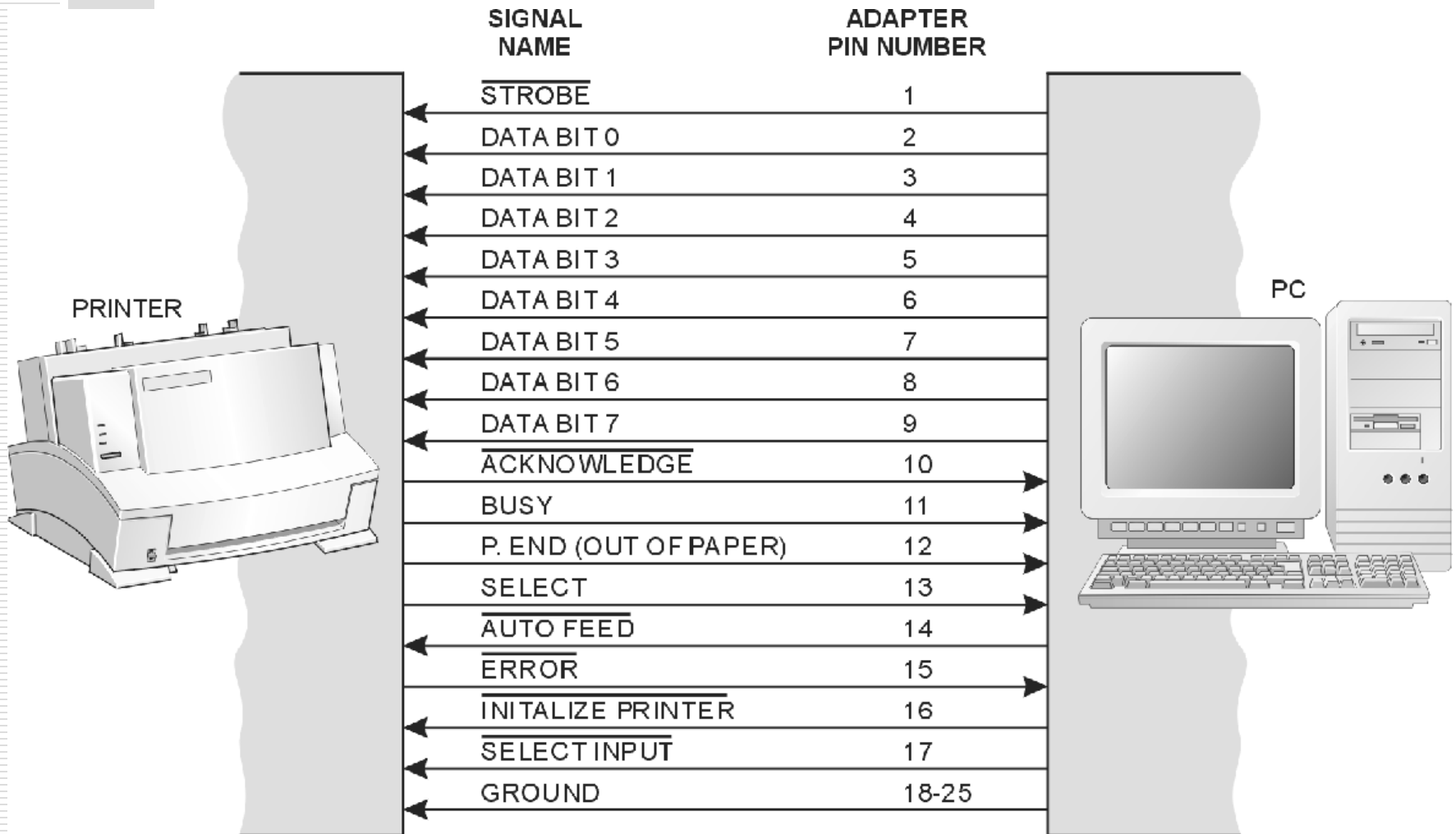
- ◆ the I/O port connections have been integrated into a vertical stack form factor located at the rear of the board.



# PARALLEL PORTS

- ◆ They have traditionally been the most widely used ports for connecting printers and other parallel devices to the computer.
- ◆ This interface enables the computer to pass information to the printer, 8 bits at a time, across the eight data lines. The other lines in the connection carry control signals (*handshaking signals*) *back and forth between* the computer and the printer.

# Parallel printer connection



# Printer Cabling

- ◆ The original *Centronics interface* employed a 36-pin D-shell connector at the adapter and a 36-pin Centronics connector at the printer end. The IBM version of the interface, which became known as the *Standard Parallel Printer (SPP) port specification*, reduced the pin count to 25 at the computer end of the connection.
- ◆ The cable length used for the parallel printer should be kept to less than 10 feet. If longer lengths are needed, the cable should have a low-capacitance value. The cable should also be shielded, to minimize *electromagnetic field interference (EFI)*A



# LPT Handles

- ◆ Microsoft operating systems keep track of the system's installed printer ports by assigning them the logical device names (handles) LPT1, LPT2, and LPT3.
- ◆ Whenever the system is booted up, the operating system searches the hardware for parallel ports installed at hex addresses 3BCh, 378h, and 278h consecutively.
- ◆ If a printer port is found at 3BCh, the operating system assigns it the title of LPT1.
- ◆ Normal interrupt request settings for printer ports in a PC-compatible system are IRQ5 or IRQ7. IRQ7 is normally assigned to the LPT1 printer port

# SERIAL PORTS

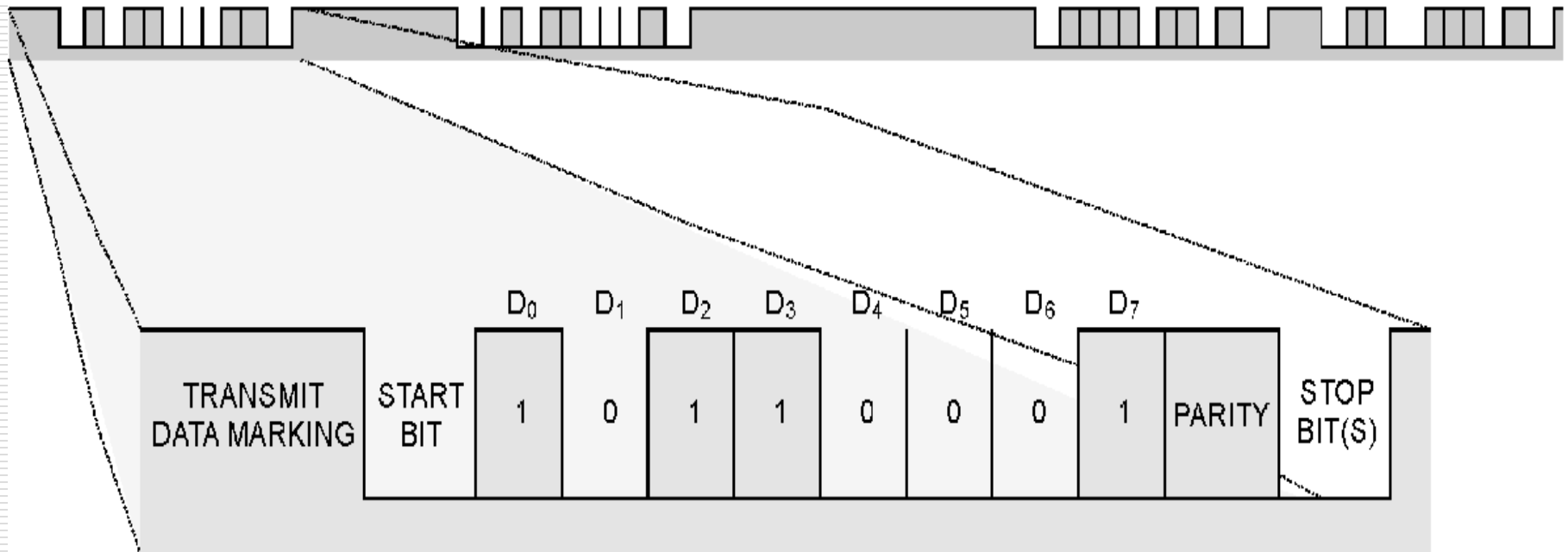
- ◆ As the distance becomes over 10 feet, An alternative method of sending data is to break the parallel words into their individual bits and transmit them, one at a time, in a serial bit stream over a single conductor.

# Serial Transmission Modes

- ◆ synchronously
- ◆ Asynchronously
- ◆ The standard serial ports in a PC employ the **asynchronous** method. (2 clocks)
- ◆ The transmitted material is sent character-by-character, with the beginning and end of each character framed by character start and stop bits. Between these marks, the bits of the character are sent at a constant rate, but the time interval between characters might be irregular

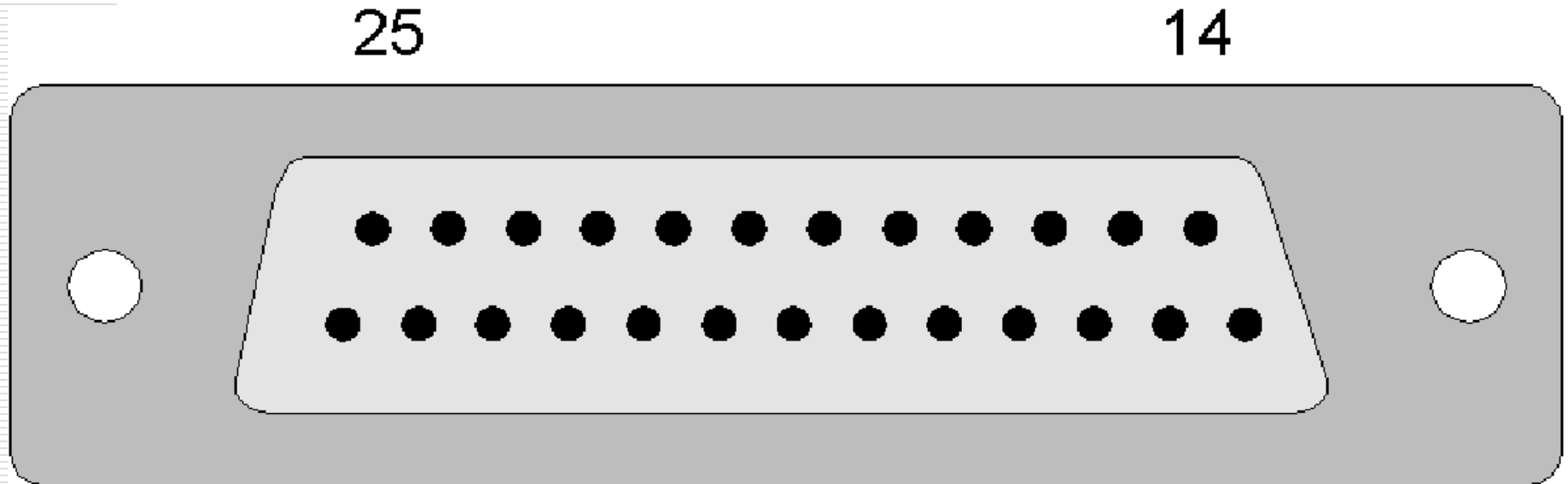
# Cont.

- ◆ asynchronous transfer methods have been the standard for serial ports in the PC industry.
- ◆ newer ports and buses include a high-speed synchronous mode as a standard option



# Serial Cables

- ◆ The original IBM version of the RS-232C standard calls for a 25-pin, male D-type connector



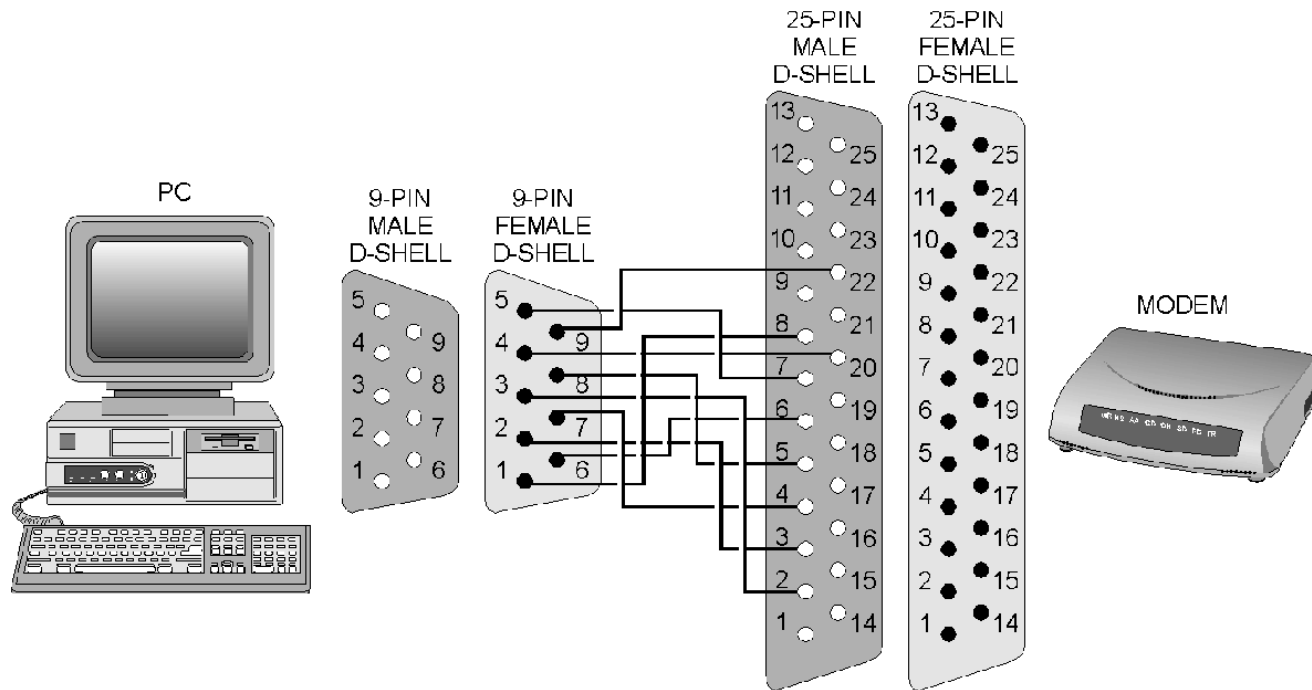
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25-PIN MALE D-SHELL  
CONNECTOR

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- ◆ maximum baud rate of 20,000 baud over distances of less than 50 feet .
- ◆ The RS-232C version extends this length to 100 feet
- ◆ Since the advent of the PC AT, the system's first serial port has typically been implemented in a 9-pin,

# A 9-pin to 25-pin RS-232 cable



PC	3	TX DATA	2	MODEM
	2	RX DATA	3	
	7	RTS	4	
	8	CTS	5	
	6	DSR	6	
	5	SIG GND	7	
	1	CXR	8	
	4	DTR	20	
	9	RI	22	

# Serial Port Names and Resources

- ◆ DOS assigns COM port designations to the system's serial ports during bootup.
- ◆ COM port designations are normally COM1 and COM2 in most systems , extended to COM3,4.
- ◆ COM1 is assigned as port address hex 3F8h and uses IRQ channel 4.

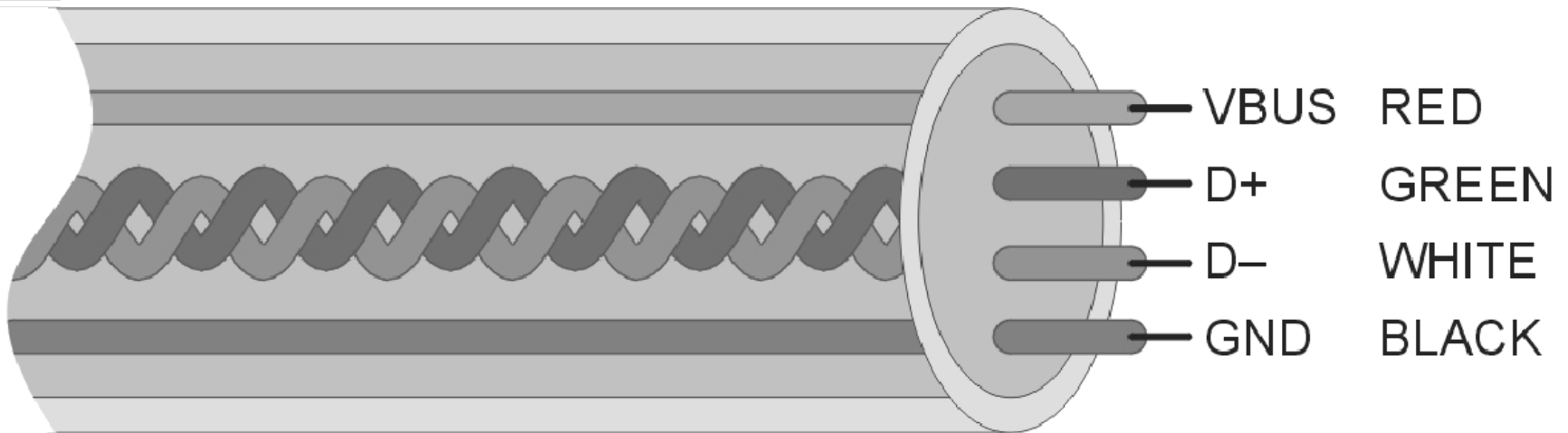


# UNIVERSAL SERIAL BUS

- ◆ It provide a fast, flexible method of attaching up to 127 peripheral devices to the computer.
- ◆ The USB provides a connection format designed to replace the system's traditional serial- and parallel-port connections.
- ◆ USB devices can be added to or removed from the system while it is powered up and fully operational. This is referred to as *hot-swapping* or *hot plugging the device*. *The plug-and-play capabilities of the system* will detect the presence (or absence) of the device and configure it for operation.

# USB Cabling and Connectors

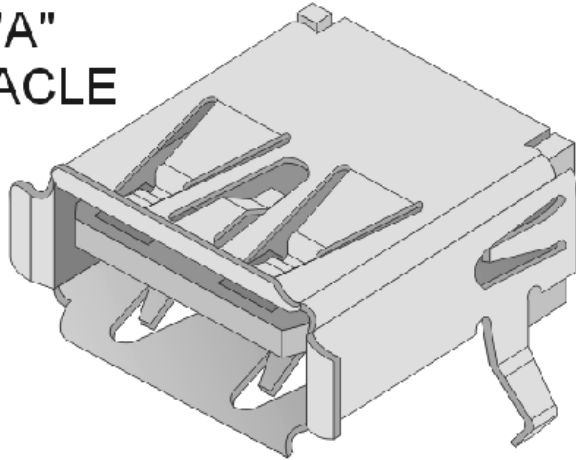
- ◆ USB transfers are conducted over a four-wire cable
- ◆ The signal travels over a pair of twisted wires (D+ and D–) in a 90-ohm cable
- ◆ The differential signal and twisted-pair wiring provide minimum signal deterioration over distances and high noise immunity.



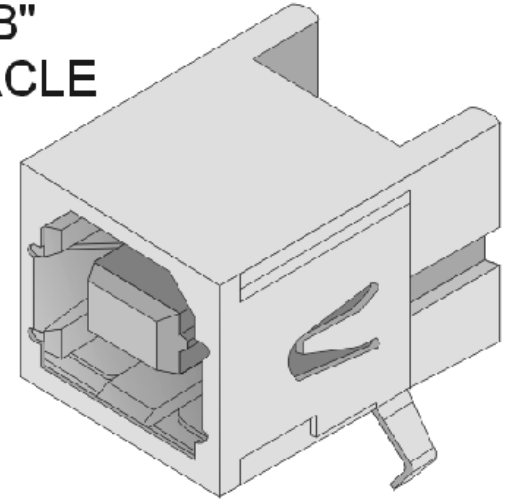
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- ◆ The USB specification defines two types of plugs: series-A and series-B.
- ◆ Series-A connectors are used for devices in which the USB cable connection is permanently attached to devices at one end (keyboards, mice, and hubs)
- ◆ series-B plugs and jacks are designed for devices that require detachable cabling (printers, scanners)
- ◆ Both are four-contact plugs and sockets embedded in plastic connectors
- ◆ The length limit for a USB cable serving a full speed device is 16 feet 5 inches (5 meters).

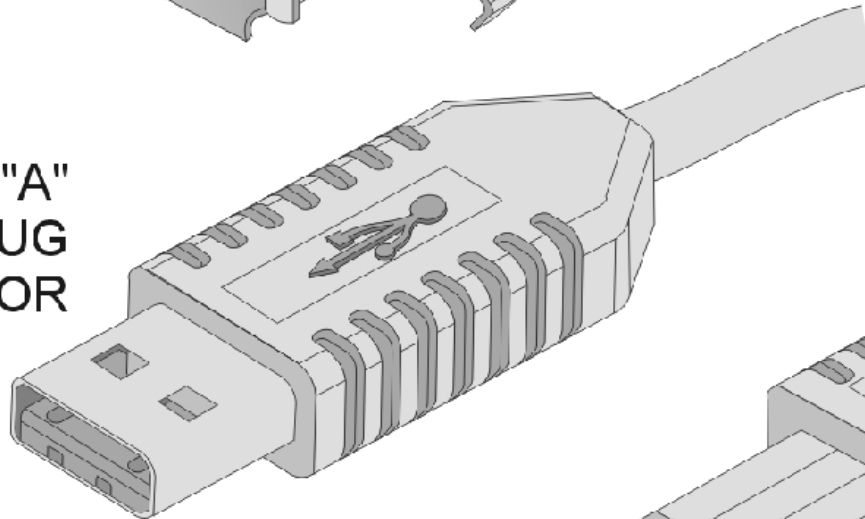
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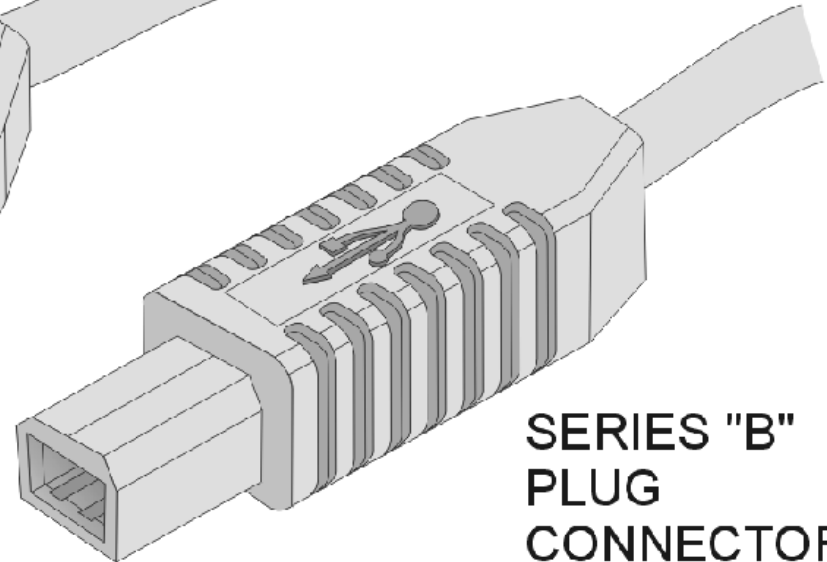
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**SERIES "A"  
PLUG  
CONNECTOR**



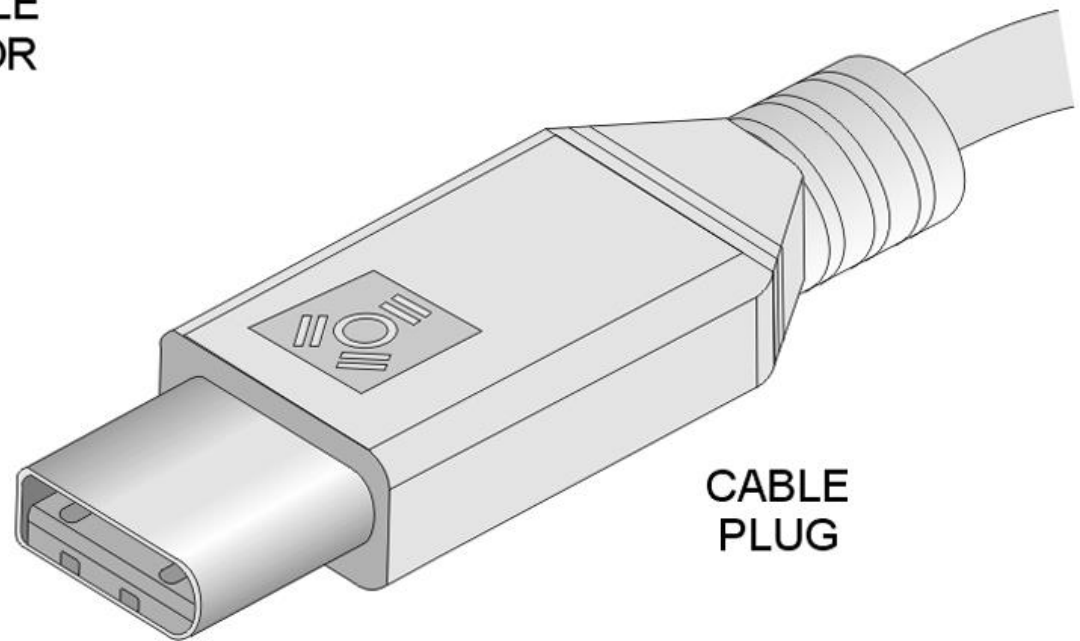
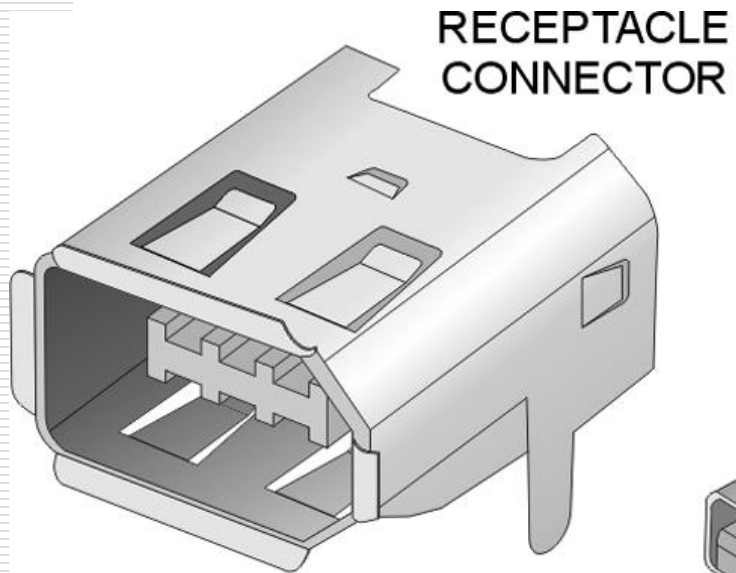
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PLUG  
CONNECTOR**



# FIREWIRE (*IEEE-1394*)

- ◆ It's a bus offers a very fast option for connecting consumer electronics devices, such as DVDs, to the computer system.
- ◆ Firewire has the capability of data transfer rates up to 400Mbps.
- ◆ computers normally use a 6-pin connector, with a 4-pin to 6-pin converter.
- ◆ The IEEE-1394 cable is composed of two twisted pair conductors similar to those used in the local area networks.

# Firewire plug and connector



# INFRARED PORTS

- ◆ The *Infrared Data Association (IrDA)* has produced a wireless peripheral connection standard based on infrared light technology, similar to that used in consumer remote control devices
- ◆ The IrDA standard specifies four protocols that are used with different types of devices:
- ◆ ***IrLPT***—The protocol used with character printers to provide a wireless interface between the computer and the printer.
- ◆ ***IrDA-SIR***—The standard infrared protocol used to provide a standard serial port interface with transfer rates ranging up to 115Kbps.

- ◆ **IrDA-FIR**—*The fast infrared protocol used to provide a high speed serial port interface with transfer rates ranging up to 4Mbps.*
- ◆ **IrTran-P**—*The protocol used to provide a digital image transfer standard for communications with digital image capture devices.*
- ◆ These protocols specify communication ranges up to 2 meters (6feet), but most specifications usually state 1 meter as the maximum range. All IrDA transfers are carried out in half-duplex mode and must have a clear line of sight between the transmitter and receiver.