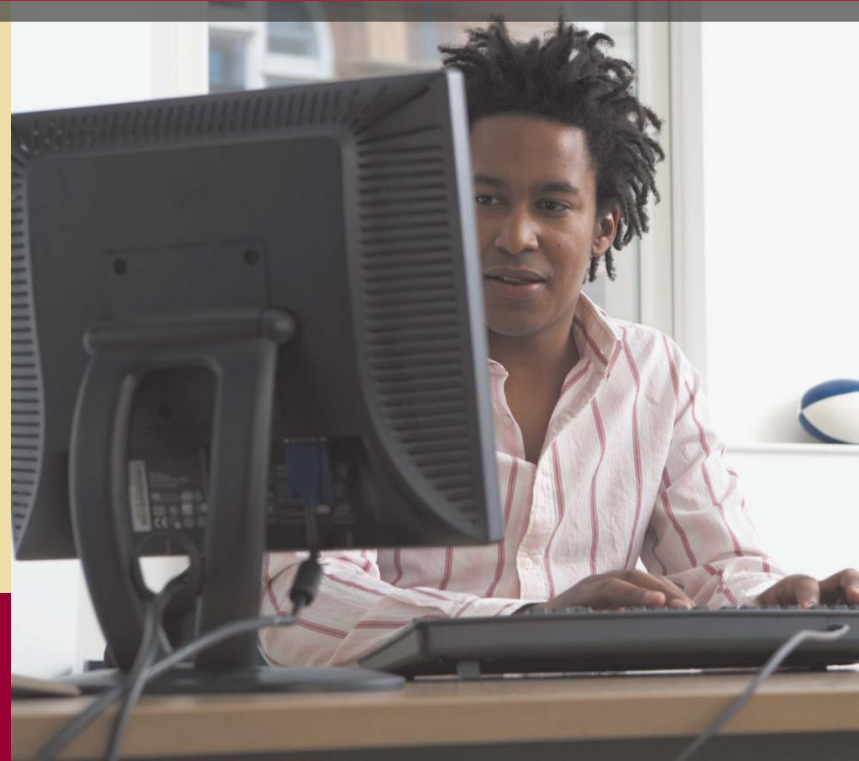# The Components of the System Unit

Discovering Computers 2012

Your Interactive Guide to the Digital World

Edited by : Asma AlOsaimi

The System Unit – Memory

The inside of the system unit on a desktop personal computer includes:
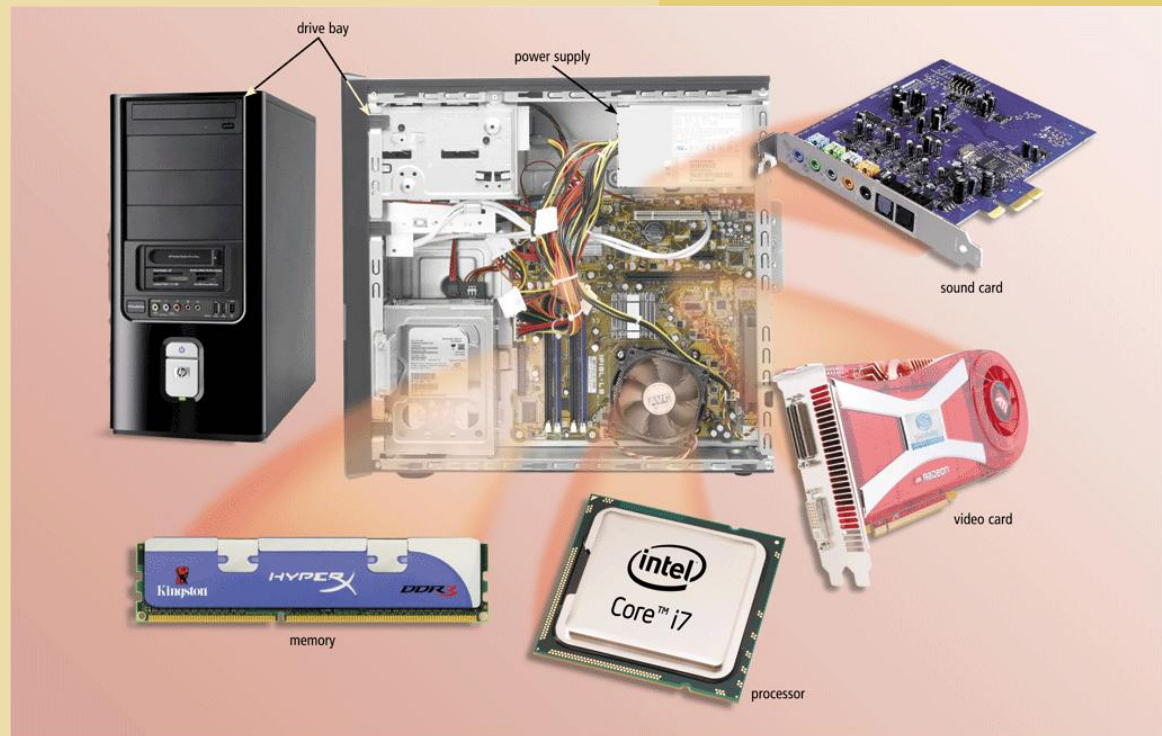
- Drive bay(s)
- Power supply
- Sound card
- Video card
- Processor
- Memory

Memory

What is memory?

➢ **Electronic components that store instructions, data, and results**

➢ **Consists of one or more chips on motherboard or other circuit board**

➢ **Each byte stored in unique location called an address, similar to seats in a concert hall**

Memory sizes

How is memory measured?

➢ **By number of bytes available for storage**

Term	Abbreviation	Approximate Size
Kilobyte	KB or K	1 thousand bytes
Megabyte	MB	1 million bytes
Gigabyte	GB	1 billion bytes
Terabyte	TB	1 trillion bytes

Memory Types

The system unit contains two types of memory:

Volatile memory

Loses its contents when power is turned off

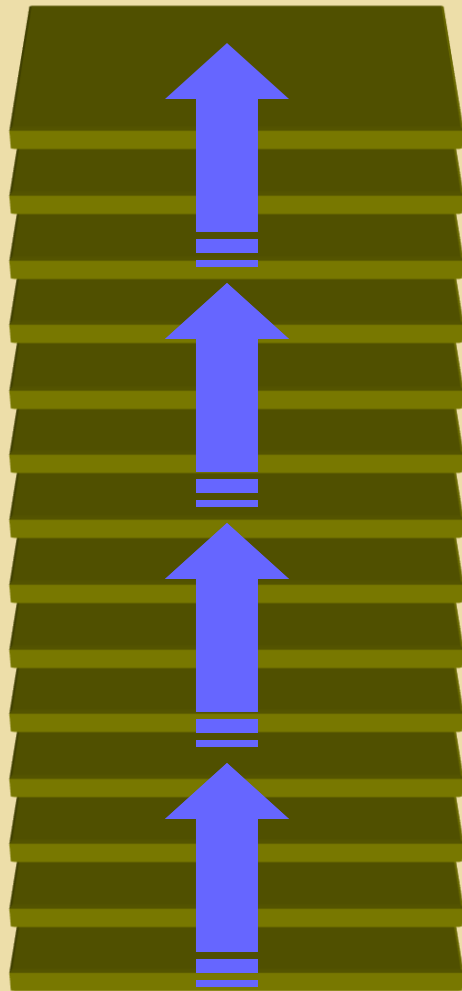Temporary memory

Example includes **RAM**

Nonvolatile memory

Does not lose contents when power is removed

Permanent memory

Examples include **ROM**, **flash memory**, and **CMOS**

Memory - RAM

What is random access memory (RAM)?

Memory chips that can be read from and written to by processor

Also called main memory

The content my changed.

Saving is a process of copying Items from RAM to a storage device such as a hard disk.

Memory – Types of RAM

Three basic types of RAM chips exist:

Dynamic RAM (DRAM)
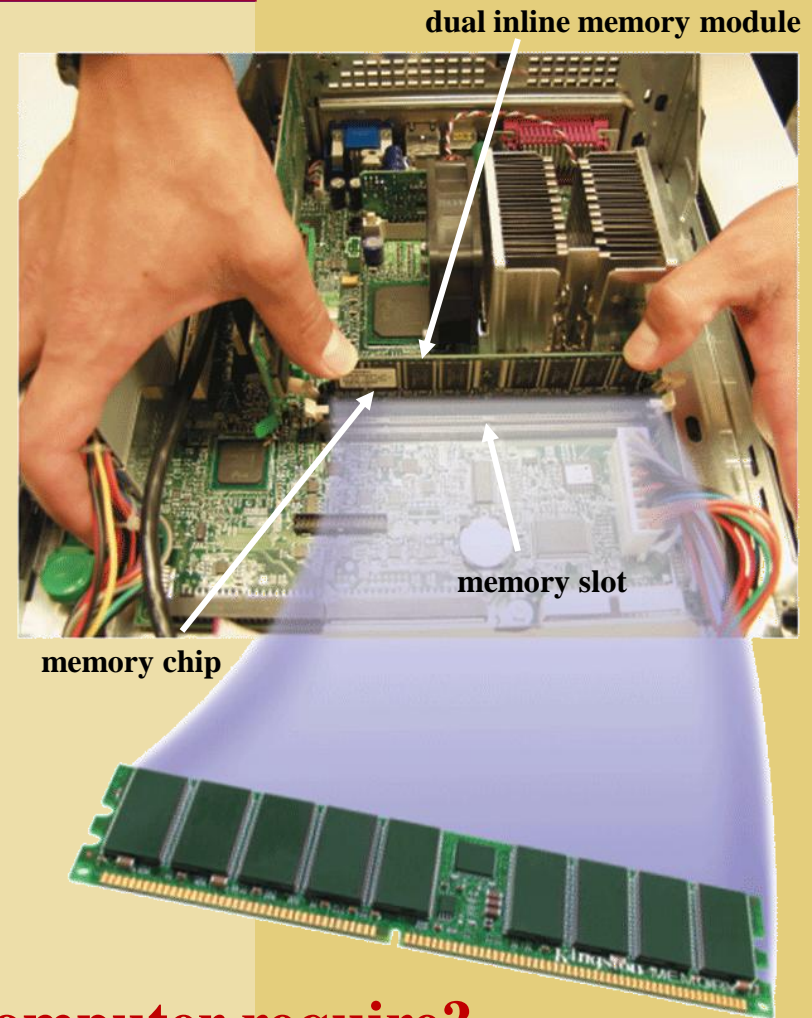
Static RAM (SRAM)

Magnetoresistive RAM (MRAM)

Click to view Web Link, click Chapter 4, Click Web Link from left navigation, then click RAM below Chapter 4

Memory – Module & slots

Where does RAM memory reside?

➢ **Resides on small circuit board called memory module**

➢ **Memory slots on motherboard hold memory modules**

How much RAM does a computer require?

dual inline memory module

memory slot
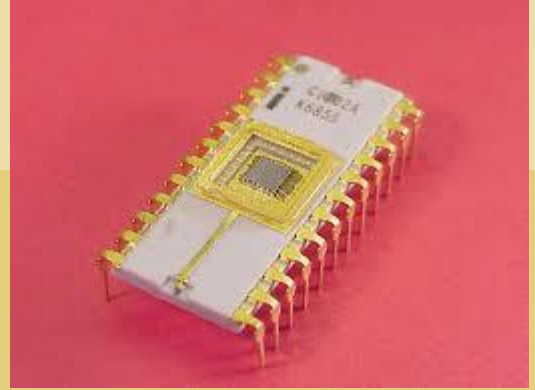
memory chip

Memory –cash memory

What is cache?

➢ **Helps speed computer processes by storing frequently used instructions and data**

➢ **Memory cache**

- **L1 cache** built into processor

- **L2 cache** slower but has larger capacity

- L2 **advanced transfer cache** is faster, built directly on processor chip

Memory - ROM

What is read-only memory (ROM)?

❖ The data on most ROM chips cannot be modified.

❖ Manufacture of ROM chips often record data, instructions, or information on the chip when they manufacture the chip.

❖ Computers almost always contain a small amount of read-only memory that holds instructions for starting up the computer.

Memory – Types of ROM

Types of ROM:

❖ **PROM** (programmable read-only memory): A **PROM** is a memory chip on which you can store a program. But once the PROM has been used, you cannot wipe it clean and use it to store something else. Like ROMs, PROMs are non-volatile.

❖ **EPROM** (erasable programmable read-only memory): An **EPROM** is a special type of PROM that can be erased by exposing it to <u>ultraviolet light</u>.

❖ **EEPROM** (electrically erasable programmable read-only memory): An EEPROM is a special type of PROM that can be erased by exposing it to an <u>electrical charge</u>.

Next ▶

Memory – flash Memory

What is flash memory?

➢ **Nonvolatile memory that can be erased electronically and rewritten**

➢ **Used with PDAs, smart phones, printers, digital cameras, automotive devices, audio players, digital voice recorders, and pagers**

Step 1.

Purchase and download music tracks from a Web site. With one end of a special cable connected to the system unit, connect the other end to the USB port in the portable media player.
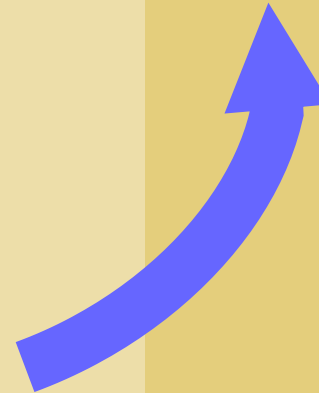
flash memory chips

USB port
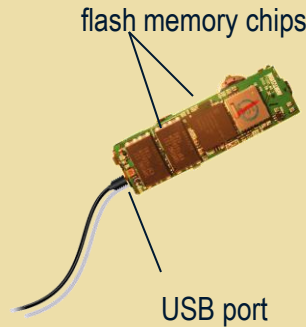
Step 2.

Instruct the computer to copy the music tracks to the flash memory chip in the portable media player.

Step 3.

Plug the headphones into the portable media player, push a button on the portable media player, and listen to the music through the headphones.

MP3 Player

Memory – Access Time

What is access time?

➢ **Amount of time it takes processor to read data from memory**

➢ **Measured in nanoseconds (ns), one billionth of a second**

➢ **It's affects how fast the computer process data.**

➢ **It takes 1/10 of a second to blink your eye; a computer can perform up to 10 million operations in same amount of time!!**

10 million operations – 1 blink

Term	Abb.	Speed
Millisecond	ms	One-thousandth of a second
Microsecond	μs	One-millionth of a second
Nanosecond	ns	One-billion of a second
Picosecond	ps	One-trillionth of a second

Next

The System Unit – Adapter Cards

The inside of the system unit on a desktop personal computer includes:
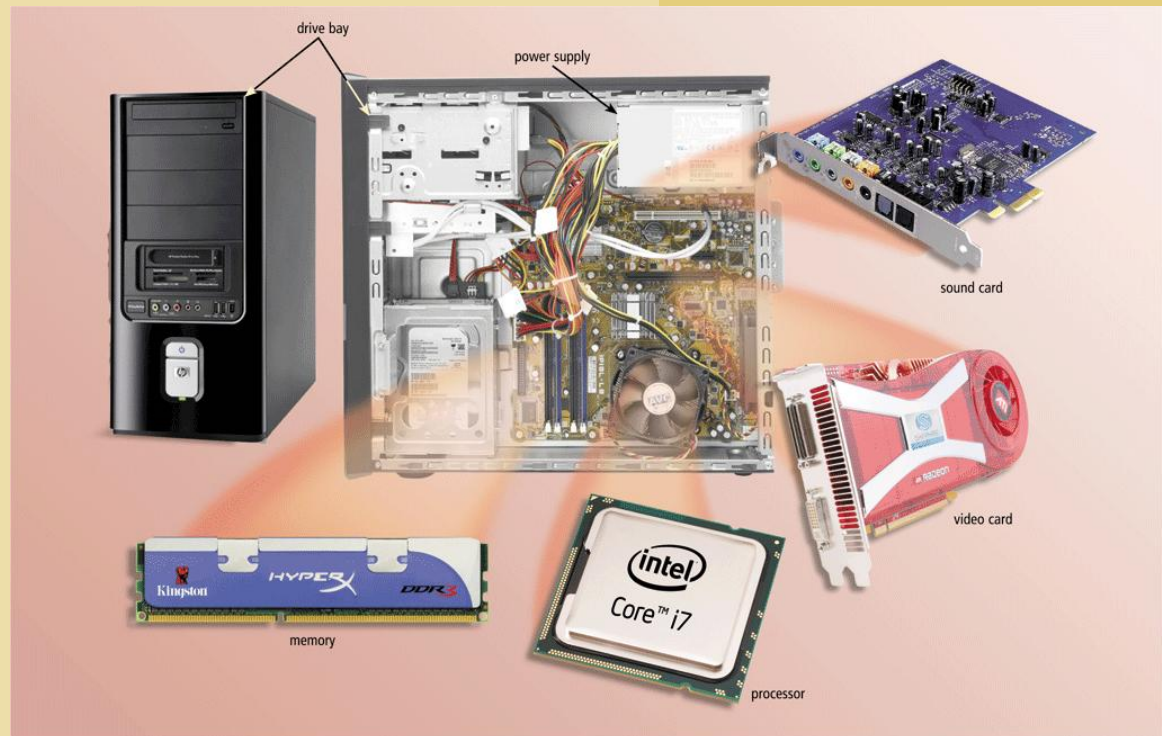
- Drive bay(s)
- Power supply
- Sound card
- Video card
- Processor
- Memory

Expansion Slots and Adapter Cards

An **expansion slot** is a socket on the motherboard that can hold an adapter card

An **adapter card** enhances functions of a component of the system unit and/or provides connections to **peripherals**

➢ **Sound card** and **video card**

Adapter Card	Purpose
Graphics accelerator	Increases the speed at which graphics are displayed
Modem	Connect other computers through telephone or cable TV line
Network	Connects other computers and peripherals
Sound	Connects speakers or microphone
Video	Connects a monitor

then click Video Cards
below Chapter 4

Expansion Slots and Adapter Cards

Removable flash memory includes:

➢ **Memory cards**, **USB flash drives**, **and PC Cards**/**ExpressCard modules**

memory card
in camera slot

ExpressCard module in
an ExpressCard slot

USB flash drive
in USB port

The System Unit – Bays & power supply

The inside of the system unit on a desktop personal computer includes:

- Drive bay(s)
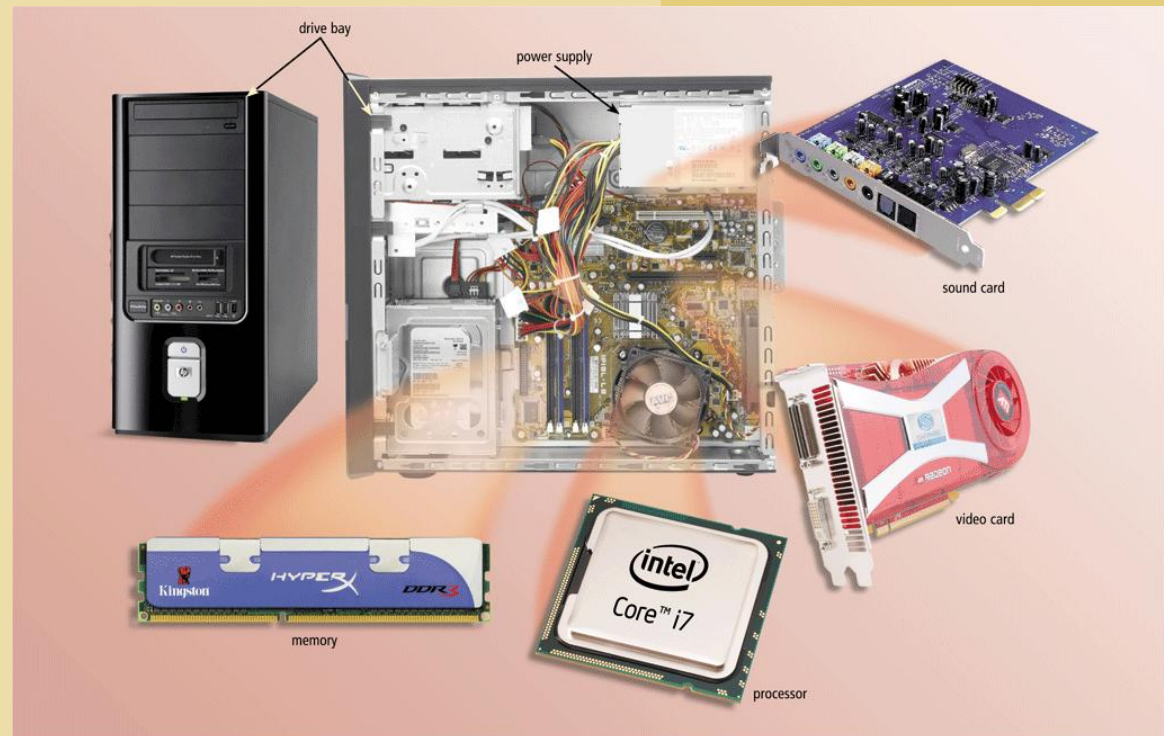- Power supply
- Sound card
- Video card
- Processor
- Memory

Bays

What is a bay?

➢ **Opening inside system unit used to install additional equipment**

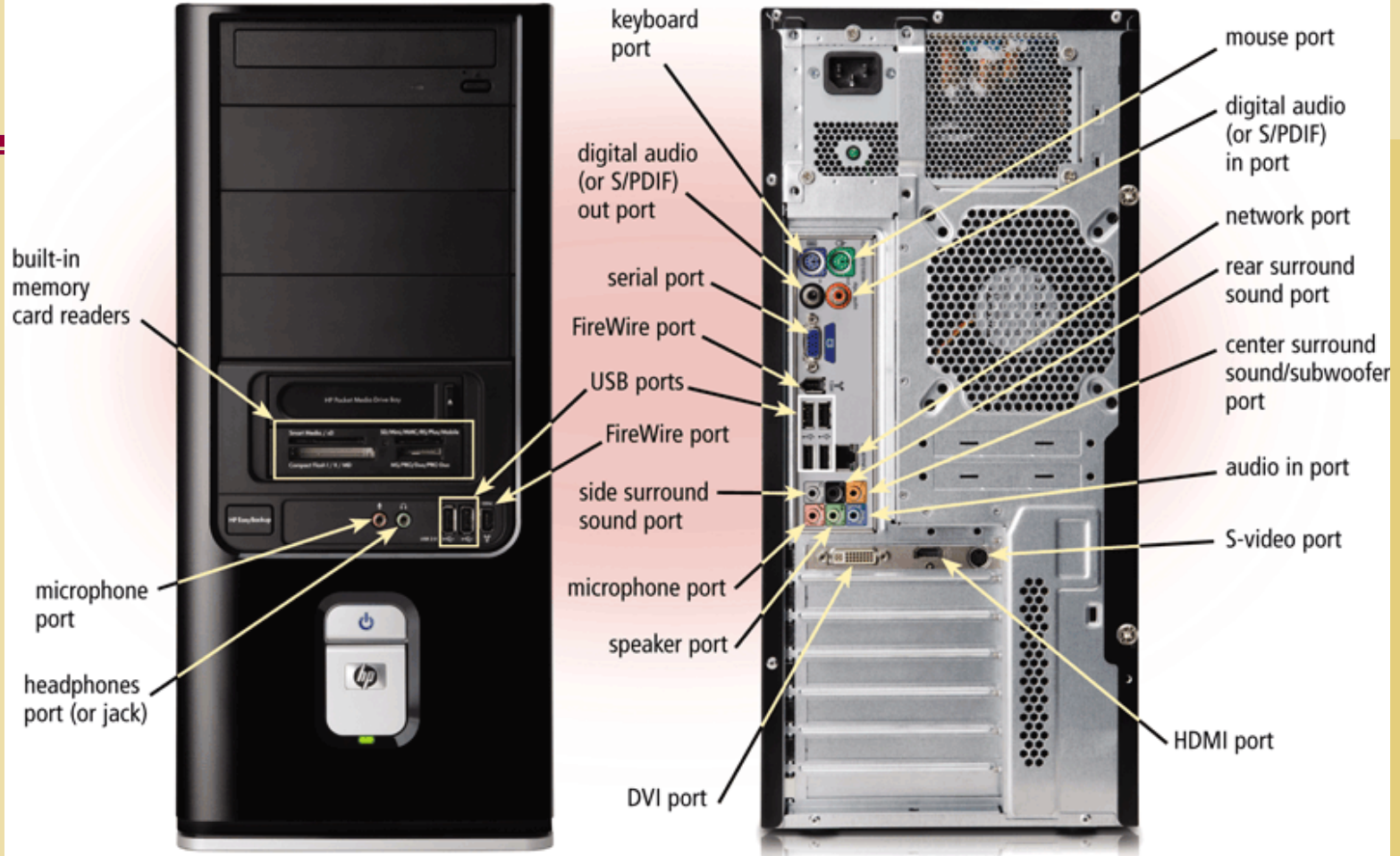➢ **Drive bays typically hold disk drives**

Power Supply

What is a power supply? [Supply + Conversion]

**Converts
AC Power
into
DC Power**

**External peripherals
might use an AC
adapter, which is an
external power supply**

built-in
memory
card readers

microphone
port

headphones
port (or jack)

keyboard
port

digital audio
(or S/PDIF)
out port

serial port

FireWire port

USB ports

FireWire port

side surround
sound port

microphone port

speaker port

DVI port

mouse port

digital audio
(or S/PDIF)
in port

network port

rear surround
sound port

center surround
sound/subwoofer
port

audio in port

S-video port

HDMI port

PORTS & CONNECTORS

Ports and Connectors

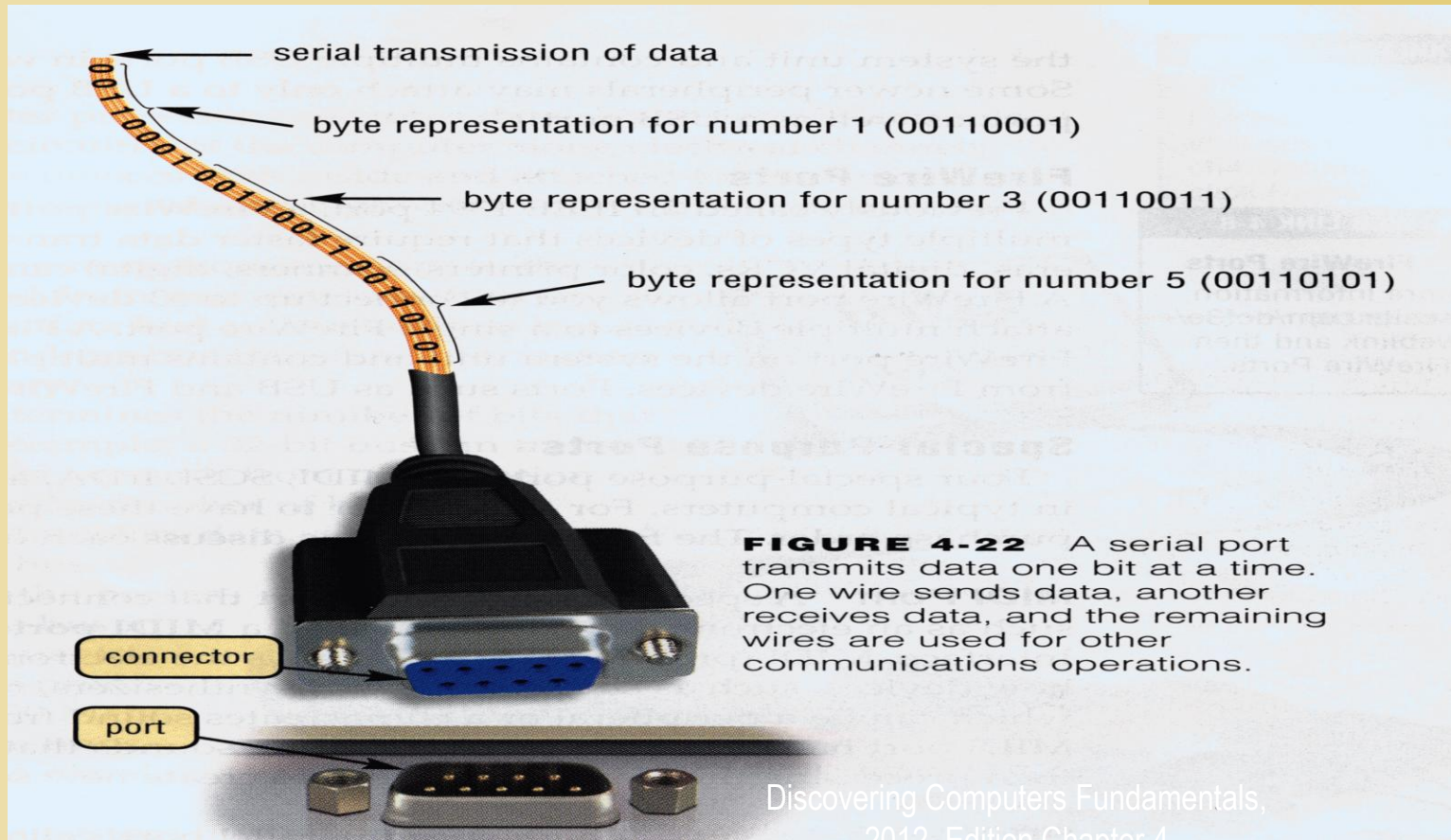## What are ports and connectors?

- ➤ **Port** connects external devices to system unit
- ➤ **Connector** joins cable to peripheral

Ports and Connectors

What is a serial port?

➢ **Transmits one bit of data at a time**

➢ **Connects slow-speed devices, such as a mouse, keyboard, or modem**

serial transmission of data

byte representation for number 1 (00110001)

byte representation for number 3 (00110011)

byte representation for number 5 (00110101)

connector

port

FIGURE 4-22 A serial port transmits data one bit at a time. One wire sends data, another receives data, and the remaining wires are used for other communications operations.

Ports and Connectors

What is a **parallel port**?

➢ Connects devices that can transfer more than one bit at a time, such as a printer

00110001
00110011
00110101
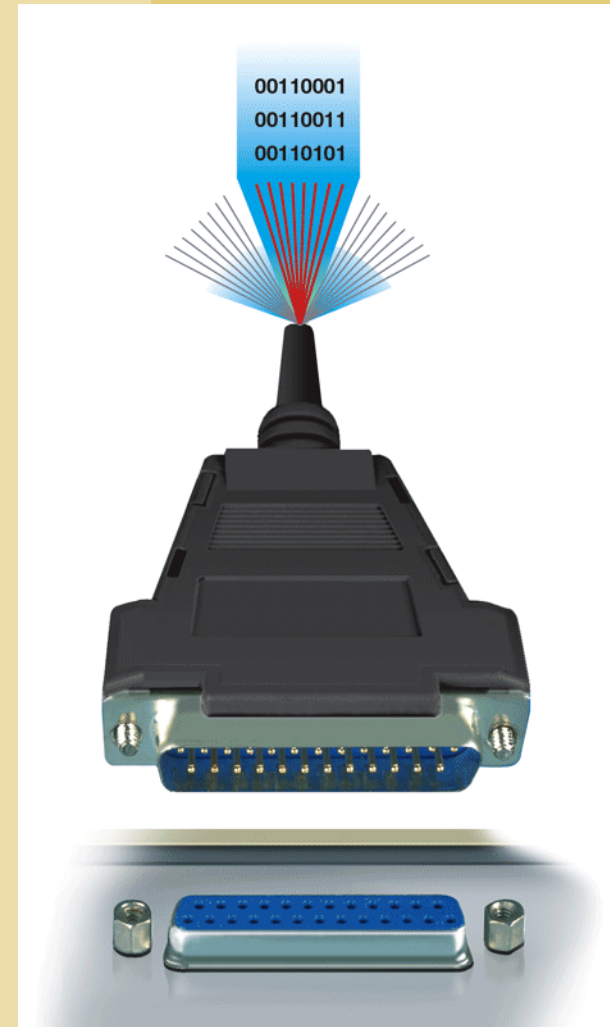
Ports and Connectors

What are **USB ports**?

USB (**u**niversal **s**erial **b**us) **port** can connect
up to 127 different peripherals together
with a single connector

PCs typically have six to eight USB ports on front or back of the system unit

Single USB port can be used to attach multiple peripherals using a USB hub

The latest version of USB is called USB 3.0

127 = 2^7 - 1

USB connectors and ports

USB Connectors and Ports

	Connector	Port	Where Used
Type A			Desktop computers, traditional notebook computers, netbooks, and Tablet PCs
Type B			Peripherals (printers, scanners, external hard disks, etc.)
Mini-B			Mobile devices (cameras, phones, handheld game consoles)

Figure 4-32 A variety of USB ports and connectors are available.

Ports and Connectors

What are FireWire ports?

- ➢ **Connects multiple types of devices that require faster data transmission speeds**
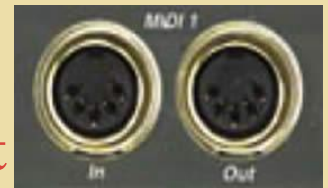- ➢ **Allows you to connect up to 63 devices together**

63 = 2^6 - 1

Ports and Connectors

What are special-purpose ports?

➢ **Allow users to attach specialized peripherals or transmit data to wireless devices**

- **MIDI (Musical Instrument Digital Interface) port**
- **eSATA (External Serial Advanced Technology Attachment) port**
- **SCSI (Small Computer System Interface)**
- **IrDA (Infrared Data Association) port**
- **Bluetooth port**

Port Types

Type	Picture	Type	Picture	Type	Picture
Audio in		HDMI port		Serial	
Cable TV		Headphones		Side surround sound	
Center surround sound/subwoofer		Keyboard		S/PDIF in	
Composite video in		Microphone		S/PDIF out	
Digital Video Interface (DVI)		Monitor		Speaker	
eSATA port		Mouse		S-video	
FireWire		Network		Telephone line in	
FM reception		Rear surround sound		USB	

Figure 4-31   Examples of different types of ports on a system unit.

Buses

What is a bus?

- Channel that allows devices inside and attached to the computer to communicate with each other
- Parallel lines (wires or PCB)

- **System bus** connects processor and main memory
- Bus width determines number of bits transmitted at one time