computing ESSENTIALS 2012

Making IT work for you

Chapter 06: The System Unit

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Competencies (1 of 2)

- Describe the six basic types of system units
- Discuss how a computer can represent numbers and encode characters electronically
- Describe each of the major system unit components
- Discuss microprocessors, including microprocessor chips and specialty processors
- Discuss memory including RAM, ROM, and flash memory

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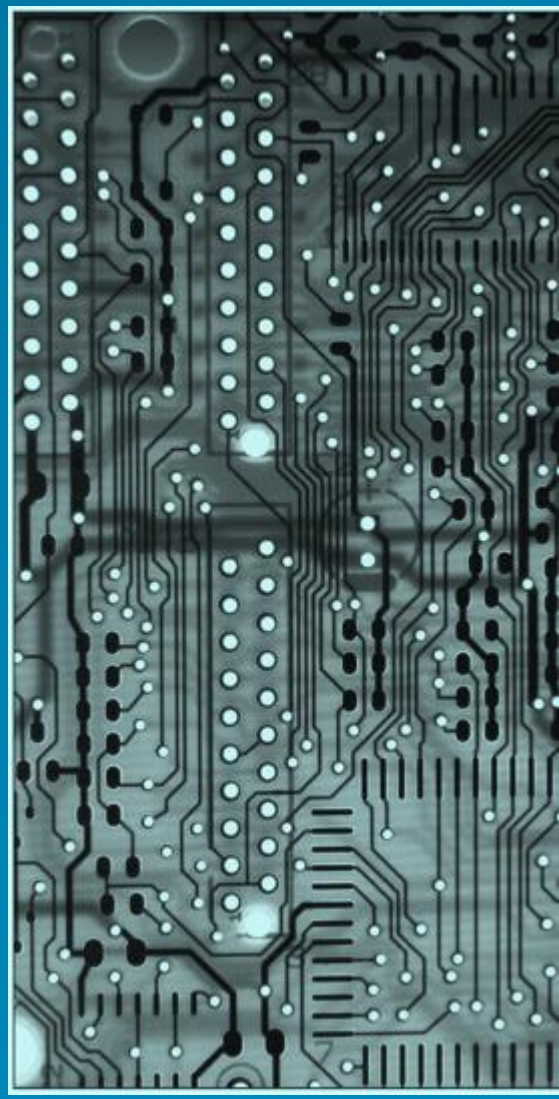
Competencies (2 of 2)

- Discuss expansion slots and cards
- Describe five principal types of expansion buses
- Compare standard, specialized, and legacy ports
- Discuss power supply for desktop and notebook computers



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Introduction

- Speed, capacity, and flexibility determine the power of microcomputers.
- Knowledge of a computer's power allows you to make good buying decisions and to determine if your current system will run new applications.
- Competent end users need to understand the basic principles of how microcomputers are put together.

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System Unit Types

- **Desktop System Units:**

1. contain the system's electronic components
2. selected secondary storage devices
3. Input and output devices such as

a (mouse and monitor), are located outside the system

- **Media Center System Units**

1. use powerful desktop system hardware with specialized
2. graphics cards for interfacing
3. televisions and other home entertainment devices.
4. special operating system

- **Notebook System Units**

1. units contain the electronic components,
2. selected secondary storage devices,
3. input devices (keyboard and pointing device).

Located outside the system unit.

1. the monitor is attached by hinges.


Desktop


Media Center


Notebook


Netbook


Tablet PC


Handheld

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System Unit Types

- **Netbook system unit**

similar to notebook system units .But smaller, less powerful, and less expensive

- **Tablet PC System Units**

1. are similar to notebook system units .But highly portable devices
2. support the use of a stylus or pen to input.

- **Handheld Computer System Units**

electronic components, secondary storage, and input and output devices.

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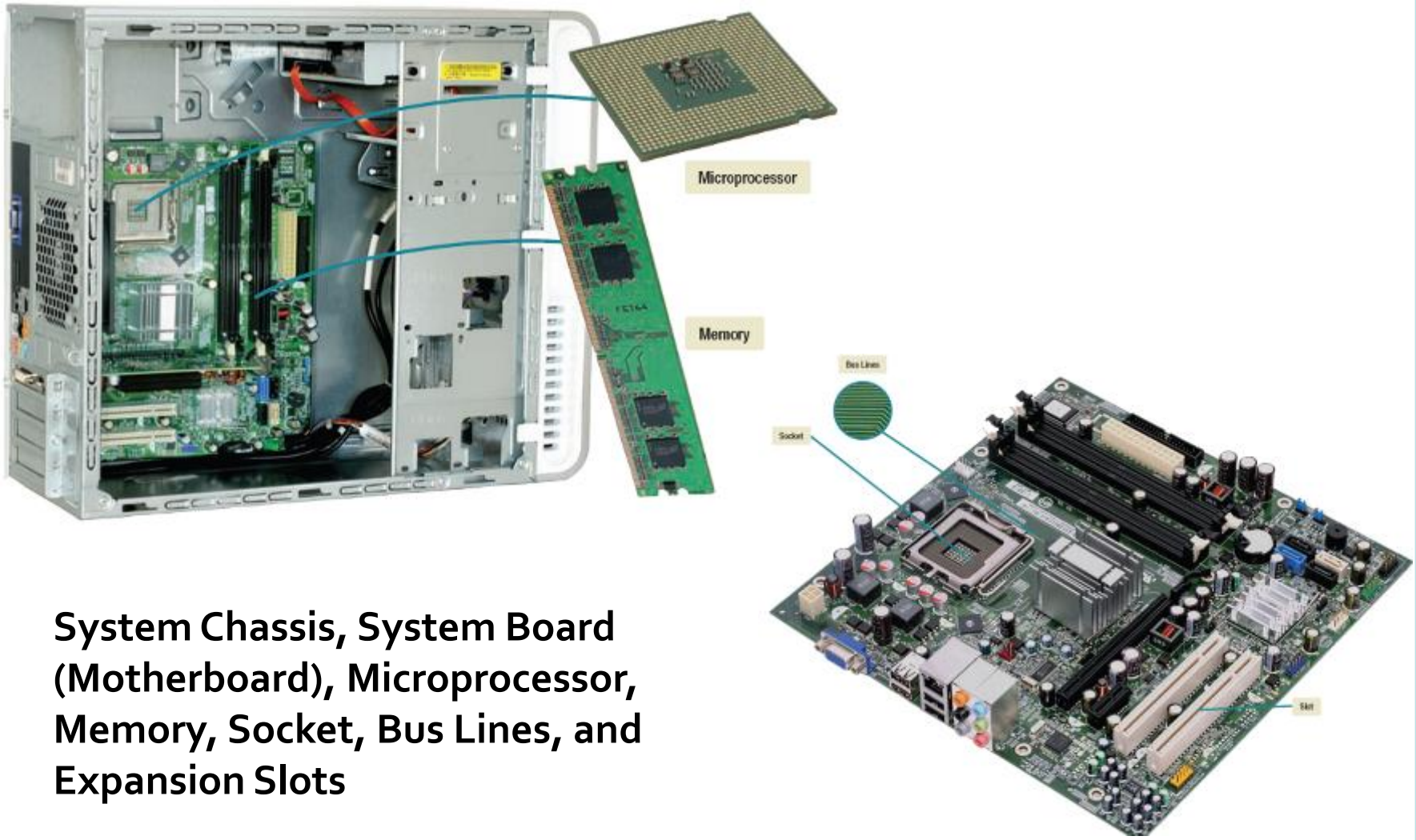
System Unit



System Chassis, System Board (Motherboard), Microprocessor, Memory, Socket, Bus Lines, and Expansion Slots

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Electronic Data and Instructions

- Data and instructions are represented electronically

- Two-state system or Binary System
  - Numeric Representation
  - Off/On electrical states
  - Characters represented by 0's (off) and 1's (on)
  - Bits (Each 0 OR 1)
  - Bytes (8 bits grouped together to represent number , litter ,special character)

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Character Coding Schemes

- Three types of binary coding schemes
  - ASCII - American Standard Code for Information Exchange (primarily desktop)
  - EBCDIC - Extended Binary Coded Decimal Interchange Code (primarily mainframe and super)
  - Unicode - handles languages with large numbers of characters

Decimal	Binary	Hex
00	00000000	00
01	00000001	01
02	00000010	02
03	00000011	03
04	00000100	04
05	00000101	05
06	00000110	06
07	00000111	07
08	00001000	08
09	00001001	09
10	00001010	0A
11	00001011	0B
12	00001100	0C
13	00001101	0D
14	00001110	0E
15	00001111	0F

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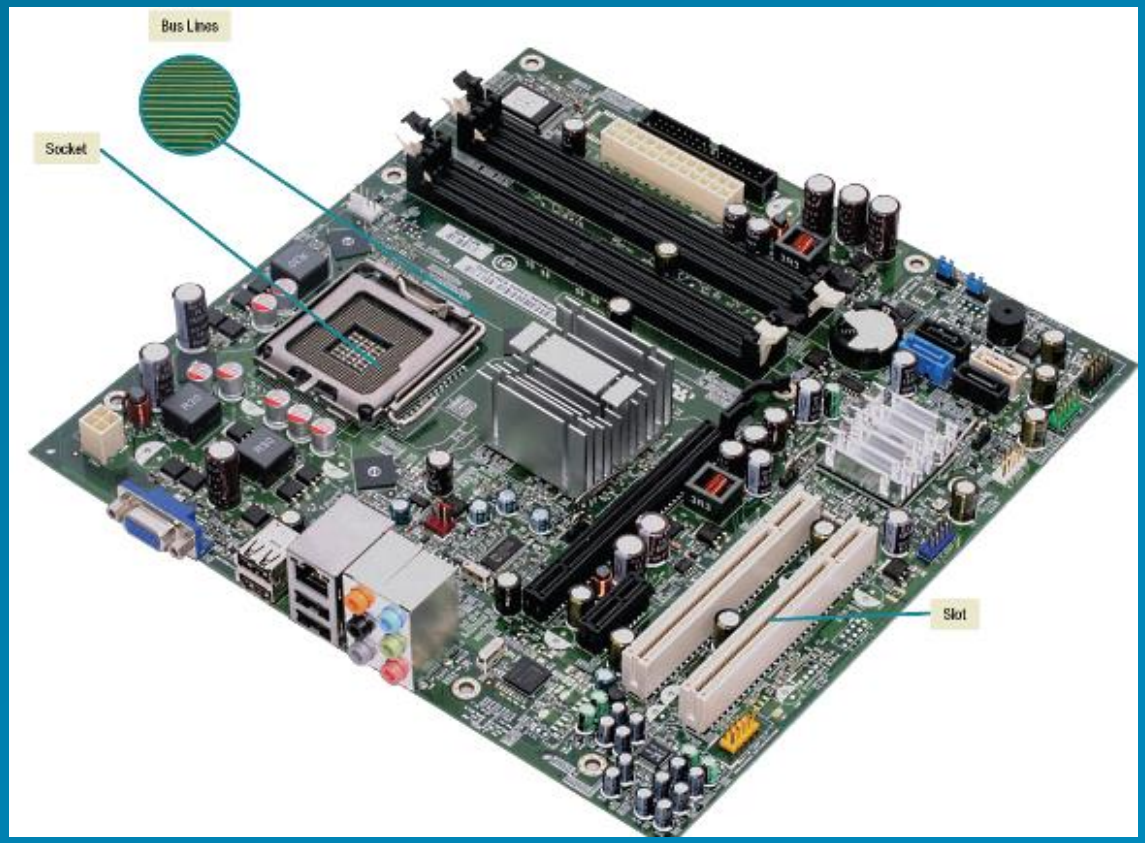
System Board

- Connects all components
- Allows communication between devices
- Main board or motherboard
- Large flat Circuit Board coverd with deffrent components
  - Sockets
  - Slots
  - Bus lines



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– Sockets

provide a connection point for small specialized electronic parts called chips.

- **Chips :** consist of tiny circuit boards etched onto squares of sandlike material called silicon.

– Slots

provide a connection point for specialized cards or circuit boards.

– Bus lines

provide pathways that support communication between electronic components

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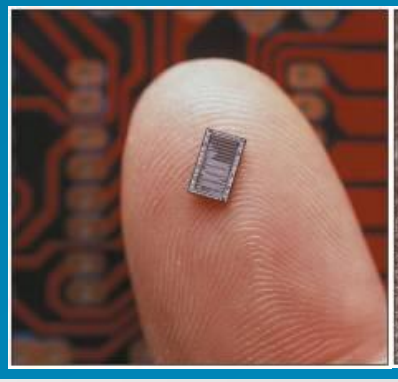
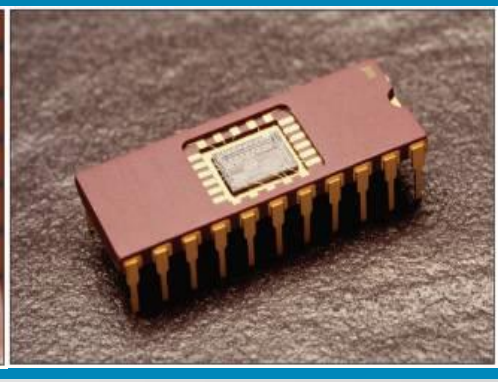
Microprocessor Chips

- **Central Processing Unit (CPU) (or processor)**
- **is contained on a single chip called the microprocessor.**
- **The microprocessor is the "brains" of the computer system.**
- **Measurement units for processing speed (shown here)**
- **clock speed:** number of times the CPU can fetch and process data or instructions in a second

Unit	Speed
Microsecond	Millionth of a second
Nanosecond	Billionth of a second
Picosecond	Trillionth of a second

- **Two Basic Components**
  - **Control unit**
  - **Arithmetic-logic unit (ALU)**





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Microprocessor Chips

- Two Basic Components of CPU
  - Control unit (CU)

    extracts instructions from memory and decodes and executes them.

  - Arithmetic-logic unit (ALU)

    performs two types of operations:

1. Arithmetic operations (+ , * , - , /)
2. Logical operations (= ,<, >)

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Microprocessor Chips

- Chip capacities are expressed in word sizes
- word is the number of bits (such as 16, 32, or 64) that can be accessed at one time by the CPU.
- Two significant developments
  - 64-bit processors
    - Have become standard for most of today's desktop and laptop computers
  - Multi-Core Chips
    - Can provide two separate and independent CPUs
    - Parallel Processing

Processor	Manufacturer	Description
Core 2 Quad	Intel	64-bit, quad-core
Core 2 Extreme	Intel	64-bit, quad-core
Xeon	Intel	64-bit, dual- and quad-core
Athlon 64 X2	AMD	64-bit, dual-core
AMD Phenom X4	AMD	64-bit, multicore
Nano	Via	64-bit, low power
Cell	Sony/Toshiba/IBM	64-bit, eight-core

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Memory

- Holding area for data, instructions, and information
- Memory is contained on chips connected to the system board
- Types of memory chips
  - RAM Programs and data
  - ROM Fixed start-up instructions
  - Flash Flexible start-up instructions

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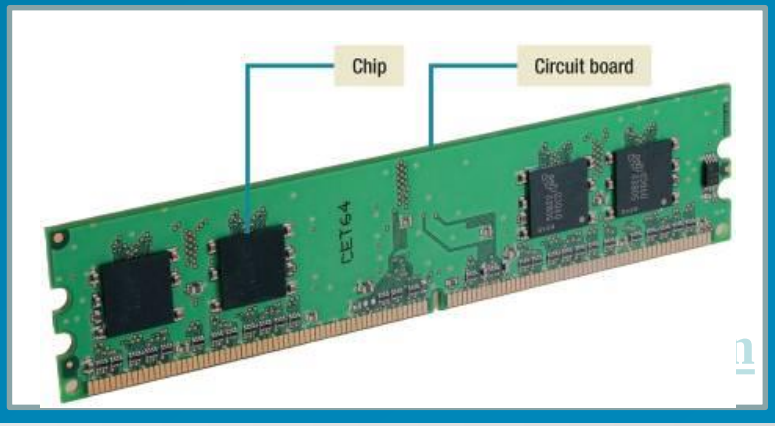
RAM

- Random Access Memory (RAM) chips hold the program and data
- called temporary or volatile storage because every thing is lost when power turned off.
  - Cache memory or RAM cache

    improves processing by acting as a temporary high-speed holding area between the memory and the CPU
- Other types of RAM
  - DRAM
  - SDRAM
  - DDR
  - Direct RDRAM



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ROM

- Read-only memory (ROM) chips are
- not volatile and cannot be changed by the user
- CPU can read, or retrieve data and programs but the computer cannot write
- Contain special instructions
  - Needed to start a computer
  - Give keyboard keys their special capabilities
  - Put characters on screen

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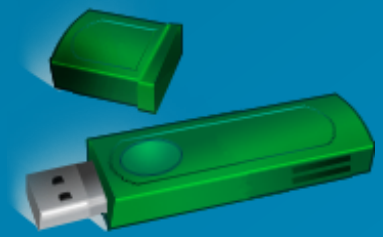
Flash

- Flash memory offers a combination of the features of RAM and ROM.
- Flash memory is used for a wide of range of applications.
- If changes are made to the computer system, these changes are reflected in flash memory.



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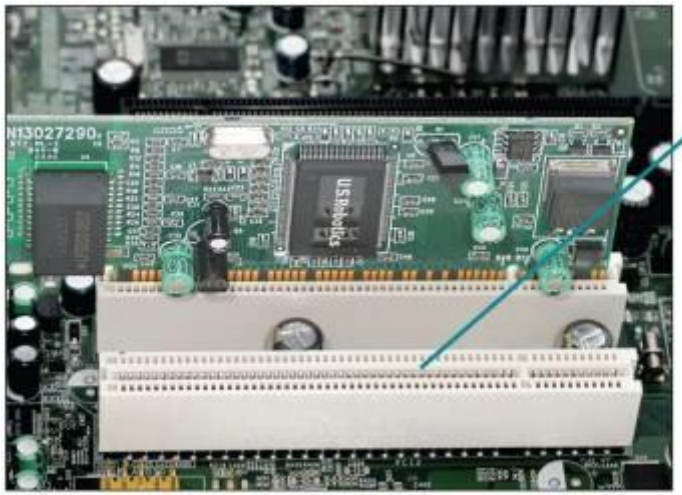
Expansion Slots and Cards

- Allows for new devices to be added
  - Open architecture
  - Slots provide for expansion
- Expansion cards are also called
  - Plug-in boards
  - Controller cards
  - Adapter cards
  - Interface cards



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Commonly Used Expansion Cards

- Graphics cards
- Sound cards
- Network interface cards (NIC)
- Wireless network cards
- PC cards & Express cards
- TV tuner cards

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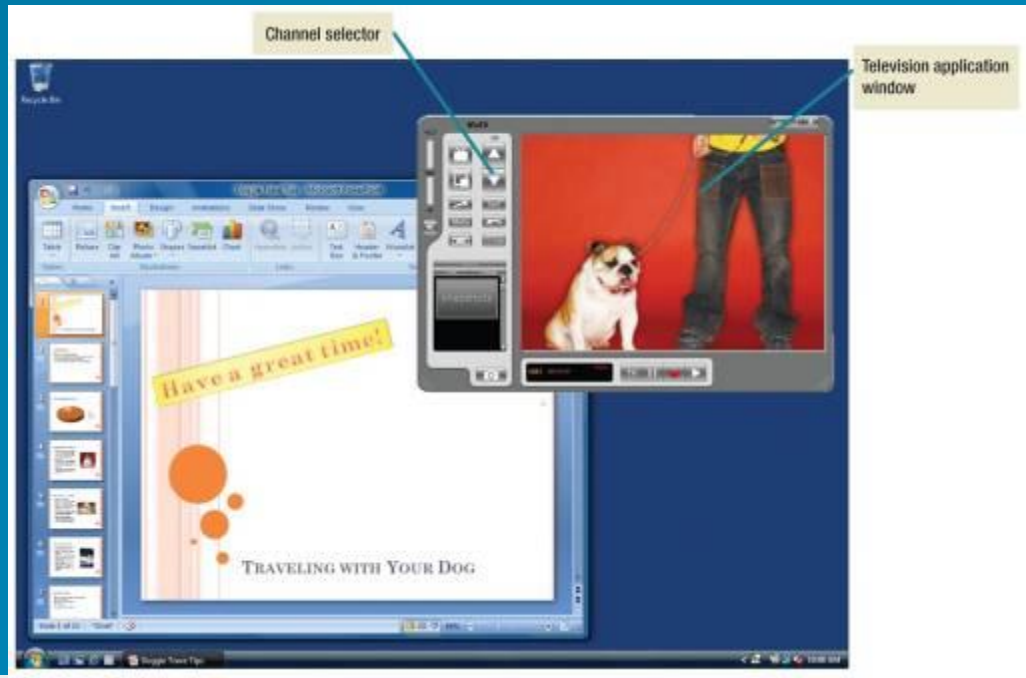
TV Tuner Cards And Video Clips

- Allows you to view your favorite TV shows while running other applications such as Excel
- Video can be captured to a file, added to a Web page, attached to an email, or added to a class presentation
- Inexpensive and easy to install



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Plug and Play

- Set of specific hardware and software standards developed by Intel, Microsoft, and others
- Creating devices that are able to configure themselves when installed

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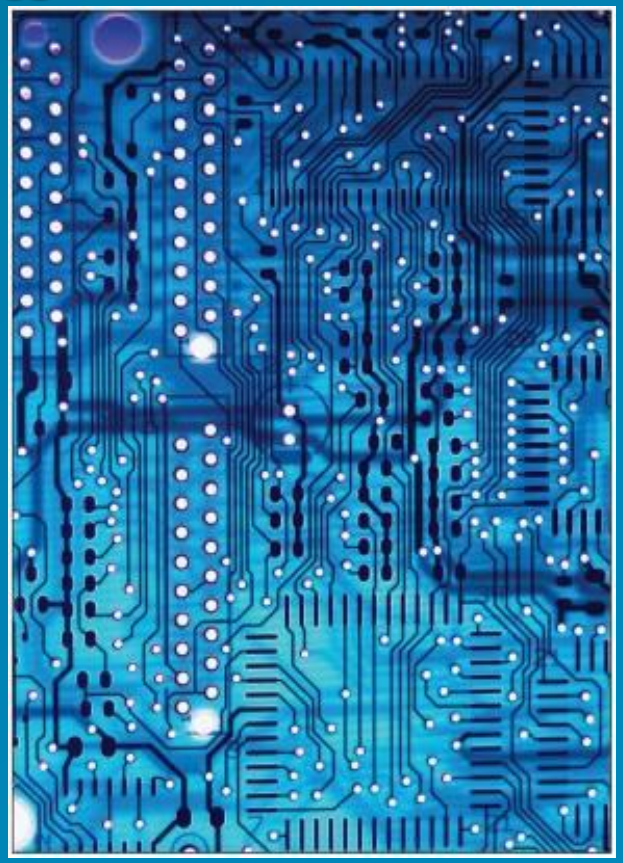
Bus Lines

- Connect parts of the CPU to each other
- Data roadway for traveling bits
  - Measured as **bus width**
  - More lanes, faster traffic
- Two basic categories
  - **System buses**

    connects the CPU to memory on the system board.
  - **Expansion buses**

    connects the CPU to other components on the system board



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Expansion Buses

- Connects the CPU to other components on the system board, including expansion slots
- Principal types
  - Peripheral Component Interconnect (PCI)
  - Universal serial bus (USB)
  - FireWire buses
  - Serial Advanced Technology Attachment (SATA)
  - PCI Express (PCIe)

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Ports

- Socket for connecting external devices
- Ports can connect directly to the system board or they can connect to cards that are inserted into slots on the system board
- Three Types
  - Standard Ports
  - Legacy Ports
  - Specialized Ports

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Standard Ports

- **Four common ports**
  - **VGA (Video Graphics Adapter) and DVI (Digital Video Interface)** ports provide connections to analog and digital monitors
  - **USB ports(Universal serial bus)** used to connect several devices (keyboards, mice , printers, storege device)
  - **FireWire ports** provide high-speed connections to specialized FireWire devices such as camcorders Or storage devices>
  - **Ethernet ports** high-speed networking port

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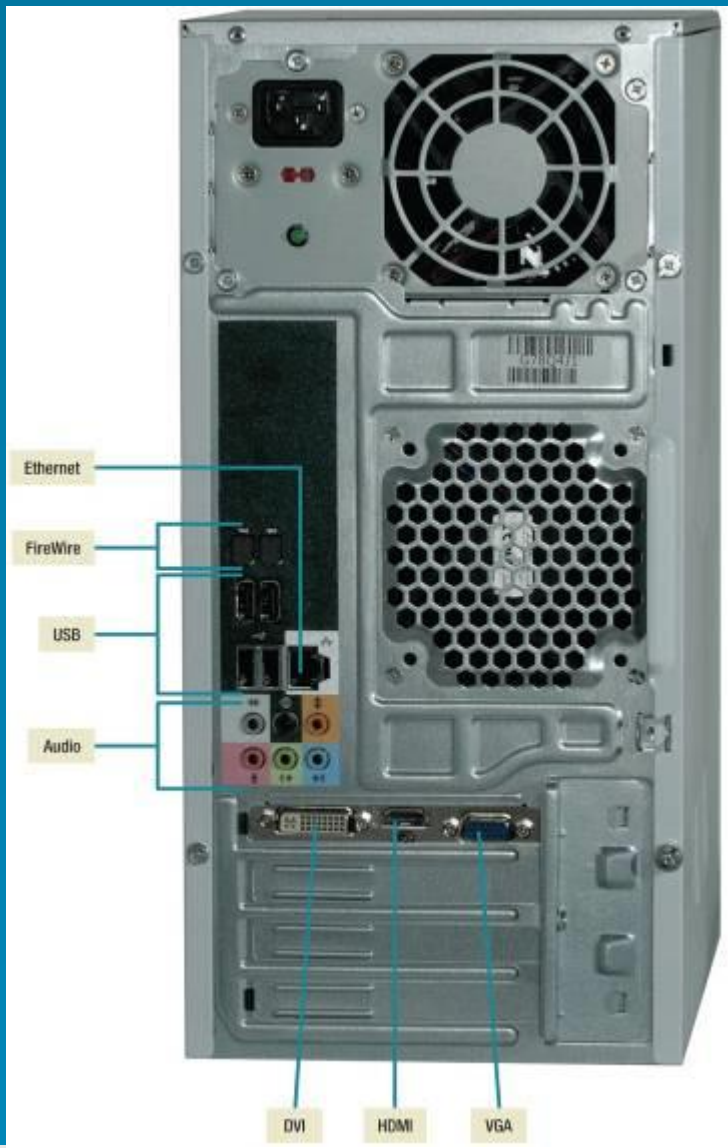

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Legacy Ports

In the past, additional ports were common on microcomputer systems to connect specific types of devices. These older ports, known as **legacy ports,**

- Serial ports
- Parallel ports
- Keyboard and mouse ports
- Infrared data association (IrDA)
- Game ports

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Specialized Ports

- Three specialized ports
  - Musical Instrument digital interface (MIDI)
  - Sony/Philips Digital Interconnect Format (S/PDIF)
  - High Definition Multimedia Interface (HDMI)

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Cables

- Used to connect external devices to the system unit via the ports
- One end of the cable is attached to the device and the other end has a connector that is attached to a matching connector on the port

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Power Supply

- Computers require direct current (DC)
- DC power provided by converting alternating current (AC) from wall outlets or batteries
- Desktop computers use power supply units (located within the system unit)
- Notebooks and handhelds use AC adapters (located outside the system unit.)

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Open-Ended Questions (1 of 2)

- Describe the six basic types of system units.
- Describe the two basic components of the CPU.
- What are the differences and similarities between the three types of memory?

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Open-Ended Questions (2 of 2)

- Identify five expansion cards and describe the function of each.
- Identify and describe four standard ports, three specialized ports, and five legacy ports.

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