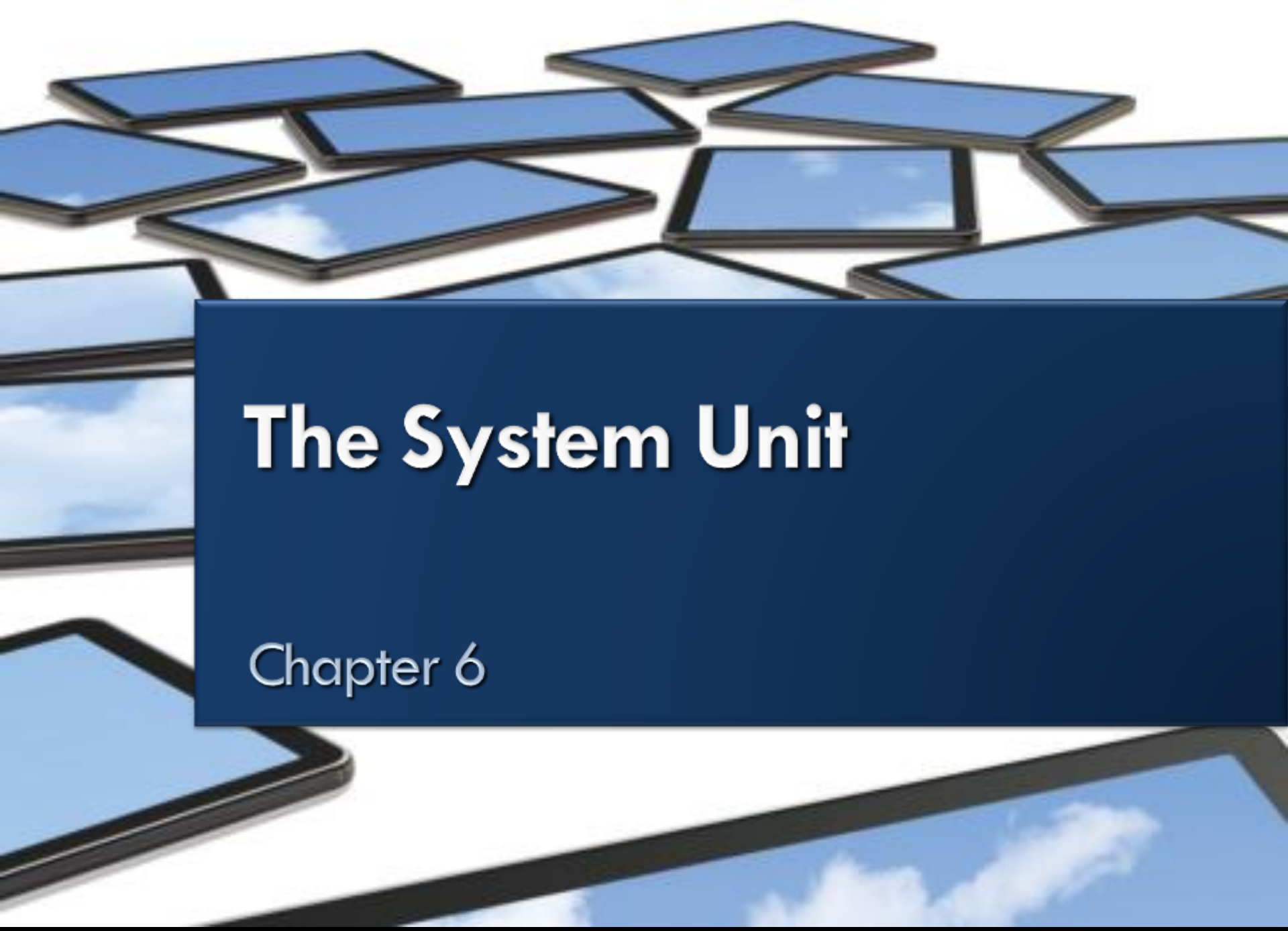
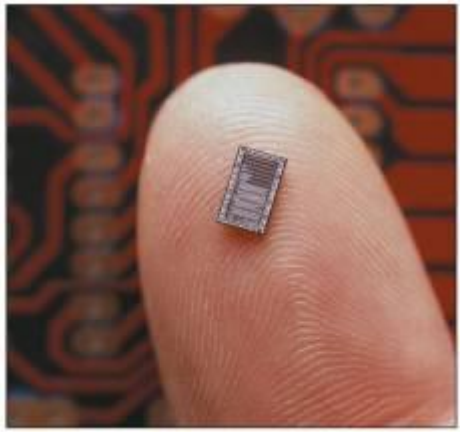


The System Unit

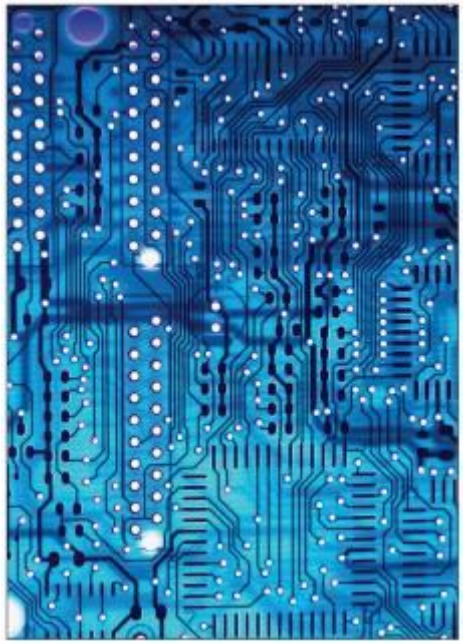
Chapter 6

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.



Competencies (2 of 2)



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.

System Unit Types

- Desktop System Units
- Media Center System Units
- Notebook System Units
- Netbook System Units
- Tablet PC System Units
- Handheld Computer System Units

Desktop


Media Center


Notebook

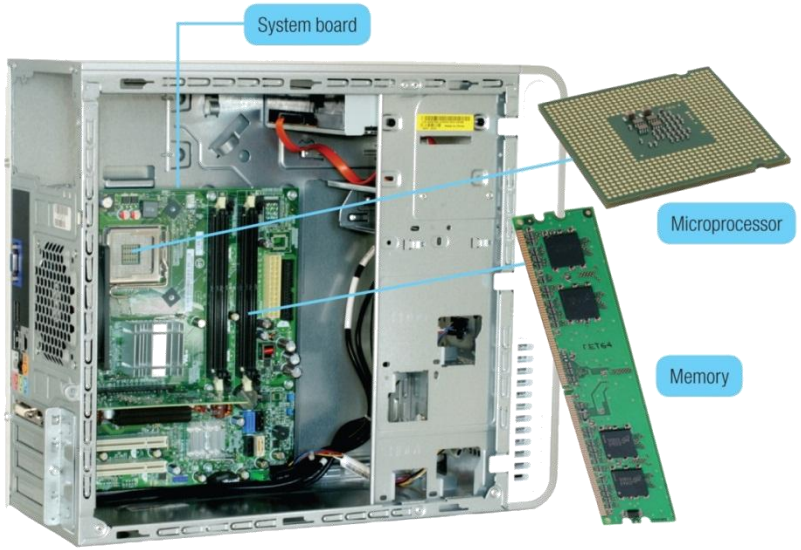

Netbook


Tablet PC


Handheld

System Unit

- System Chassis
- System board
  - Motherboard
- Microprocessor
- Memory
- Socket
- Bus lines
- Expansion slots



Electronic Data and Instructions

- Data and instructions are represented electronically
- Two-state system or Binary System
  - Off/on electrical states
  - Characters represented by 0's (off) and 1's (on)
  - Bits
  - Bytes

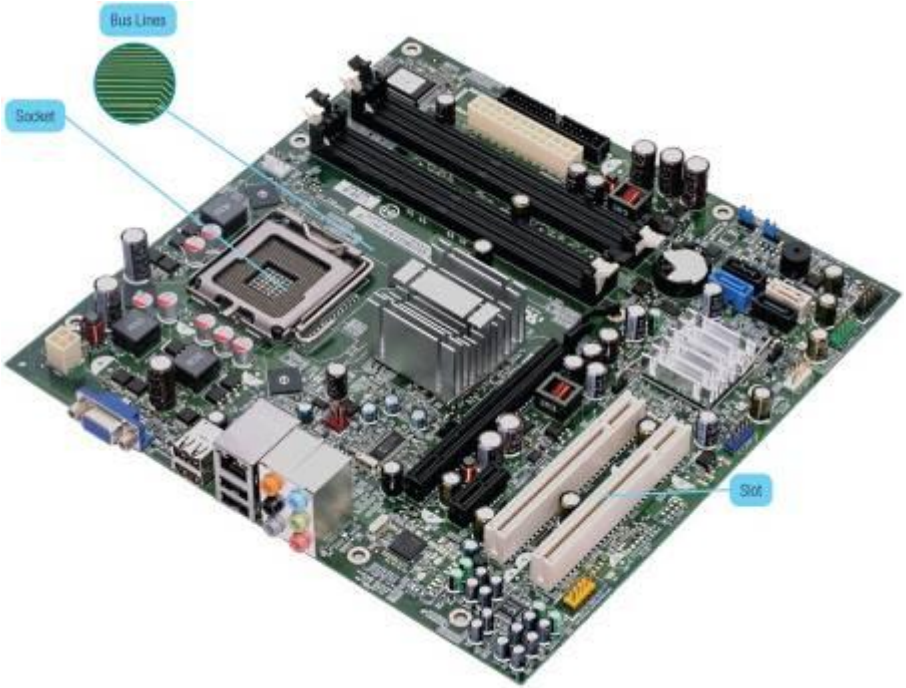
Character Coding Schemes

- Binary coding schemes
  - ASCII - American Standard Code for Information Exchange
  - EBCDIC - Extended Binary Coded Decimal Interchange Code
  - Unicode - handles languages with large numbers of characters

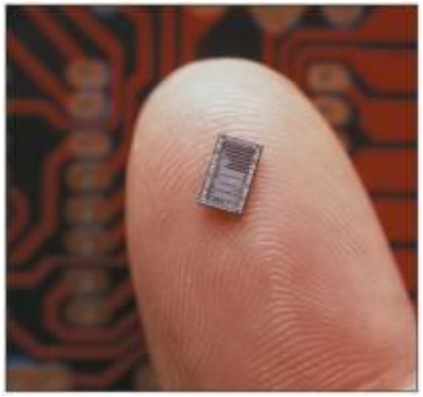
Decimal	Binary	Hex
00	00000000	00
01	00000001	01
02	00000010	02
03	00000011	03
04	00000100	04
05	00000101	05
06	00000110	06
07	00000111	07
08	00001000	08
09	00001001	09
10	00001010	0A
11	00001011	0B
12	00001100	0C
13	00001101	0D
14	00001110	0E
15	00001111	0F

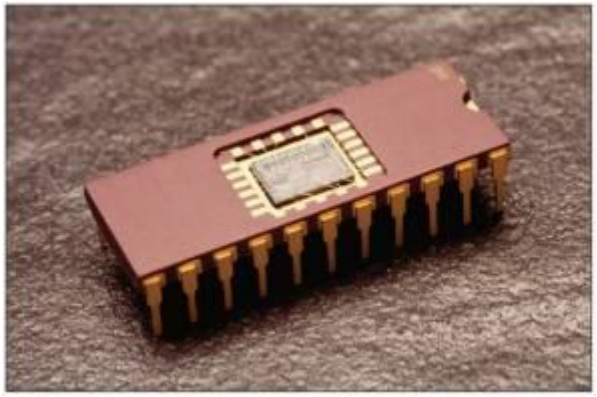
System Board

- Main board or motherboard
- Controls communications
- Components connect to the system board
- Data path
- Traffic monitor



System Board Components (Page 1 of 2)

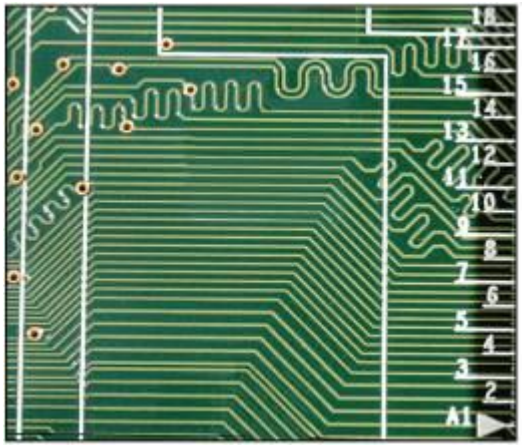




- Sockets
  - Connection point for chips
- Chips
  - Tiny circuit boards etched onto squares of silicon
  - Silicon chip, semiconductor, or integrated circuit
  - Mounted on carrier packages

System Board Components (Page 2 of 2)

- Slots
  - Provide a connection point for specialized cards or circuit boards
- Bus lines
  - Provide pathways that support communication among the various electronic components



Microprocessor

- Central Processing Unit (CPU)
  - Contained on the microprocessor chip
  - Brains of the computer
- Two Basic Components
  - Control unit
  - Arithmetic-logic unit (ALU)

Microprocessor Chips (Page 1 of 2)

- Chip capacities expressed in word size
- Word
  - The number of bits that can be processed at one time
  - 64-bit standard
- Clock Speed
  - Processing speed
  - The number of times the CPU fetches and processes data or instructions in a second

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

Microprocessor Chips (Page 2 of 2)

- Multi-Core Chip
  - Two separate and independent CPUs
  - Parallel Processing
  - Windows 7 and Mac OS X

Processor	Manufacturer
i7	Intel
i5	Intel
Xeon	Intel
Athlon Opteron	AMD
Athlon	AMD
Nano	Via
Cell	Sony/Toshiba/IBM

Specialty Processors

- Coprocessors
  - Designed to improve specific computing operations
  - Graphics coprocessors / Graphics Processing Unit (GPU)
- Smart cards
  - Credit card with an embedded chip
- Specialty processors in cars
- RFID tags
  - Information chips
  - Embedded in merchandise to track their location

Memory

- Holding area for data, instructions, and information
- Chips connected to the system board
- RAM
  - Random Access Memory
- ROM
  - Read Only Memory
- Flash

Expansion Slots and Cards

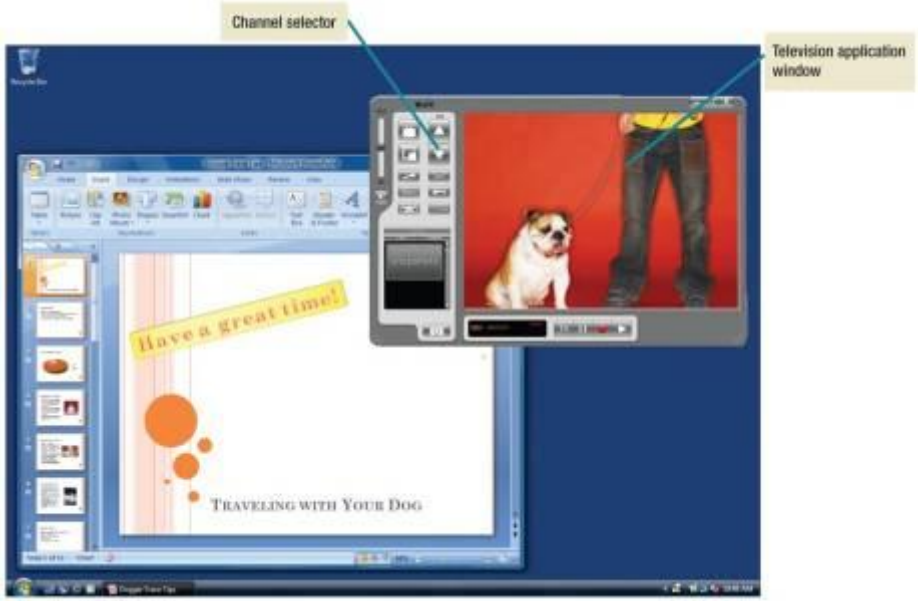
- For adding devices
- Plug and play
- ExpressCard slots
  - PCMCIA slots
  - Notebooks and handheld devices

Expansion Cards

- Advanced graphics cards
- Sound cards
- Network interface cards (NIC)
- Wireless network cards
- TV tuner cards

Making IT Work for You
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 presentation
- Inexpensive and easy to install



Bus Lines

- Also known as a bus
- Connect parts of the CPU to each other
- Pathway for bits
- Bus width
  - Number of bits that can travel at once
- Two basic categories
  - System buses
  - Expansion buses

Expansion Buses

- Connects the CPU to other components on the system board, including expansion slots
- Universal Serial Bus (USB)
  - Connects external USB devices onto the USB bus
- FireWire
  - Audio and video equipment
- PCI Express (PCIe)
  - Single dedicated path for each connected device

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
  - Specialized Ports
  - Legacy Ports

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

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
- Notebooks and handhelds use AC adapters

Careers In IT

- Computer technicians repair and install computer components and systems
- Employers look for:
  - Certification
  - Communication skills
- Continued education is required
- Computer technicians can expect to earn an hourly wage of $13.50 to $22.50

A Look to the Future

- Wearable computers
- Send and receive email while jogging
- Maintain your personal schedule book
- Remember the names of people at a party

Open-Ended Questions (Page 1 of 4)

- Describe the six basic types of system units. What is the difference between a traditional and a slate tablet PC?
- Discuss electronic data and instructions including numeric representation and character encoding.
- Describe system boards including sockets, chips, carrier packages, slots, and bus lines.

Open-Ended Questions (Page 2 of 4)

- Discuss microprocessors including the two basic components, words, clock speed, multicore chips, and specialty processors.

- Define computer memory including RAM, cache, DIMM, virtual memory, ROM, and flash memory.

Open-Ended Questions (Page 3 of 4)

- Define expansion slots and cards and discuss five commonly used expansion cards. What is Plug and Play? What are PCMCIA slots and ExpressCard slots?

- Describe bus lines including bus width, system bus, expansion bus, and three types of buses.

Open-Ended Questions (Page 4 of 4)

- Define ports including standard, specialized, and legacy ports. Give examples of each.
- Describe power supply including power supply units and AC adapters.