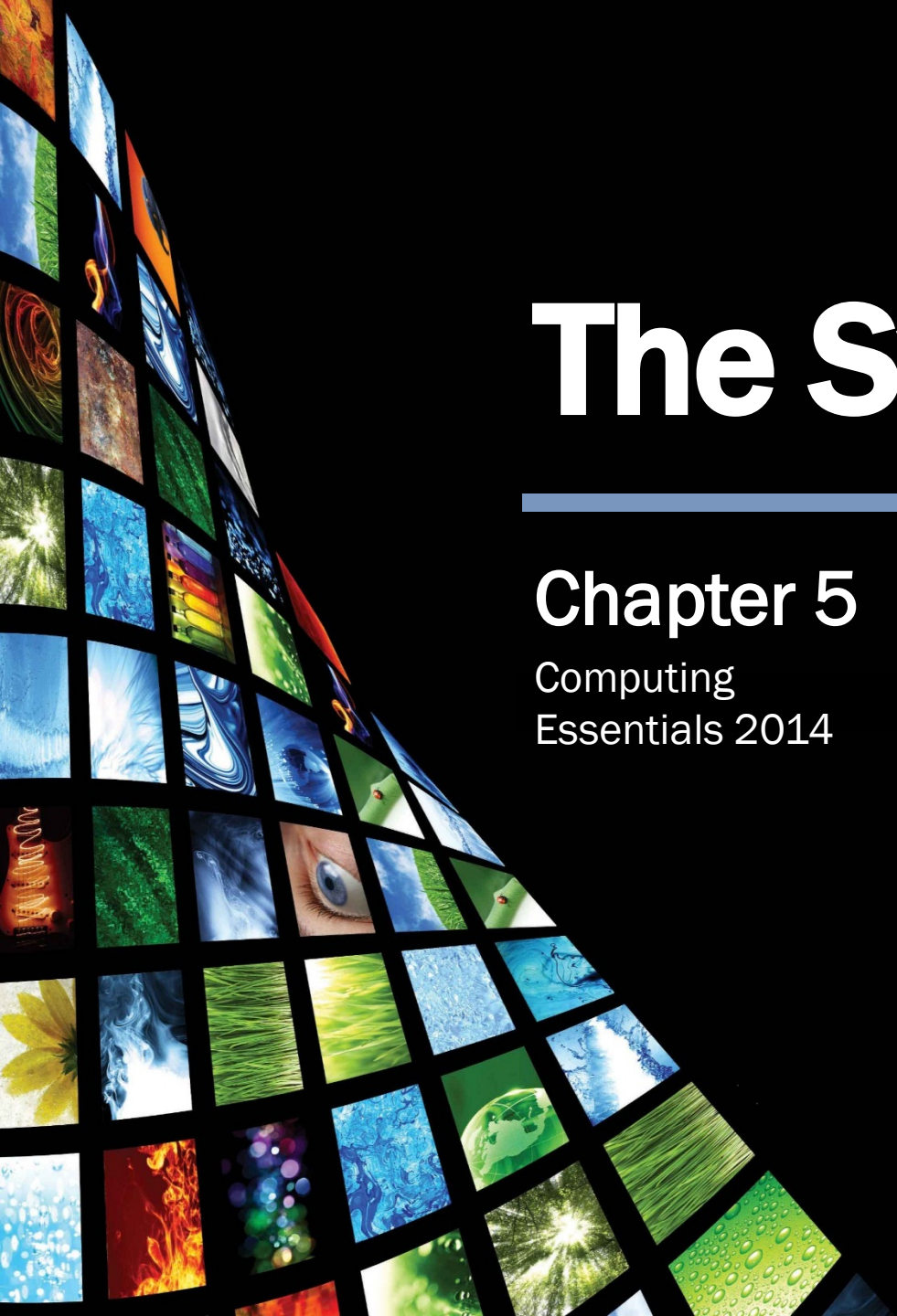


The System Unit

Chapter 5

Computing
Essentials 2014

Competencies (1 of 2)

- Describe the four basic types of system units.
- Describe system boards, including sockets, slots, and bus lines.
- Discuss microprocessors, including microprocessor chips and specialty processors.
- Discuss memory including RAM, ROM, and flash memory.

Competencies (2 of 2)

- Discuss expansion slots and cards.
- Describe bus lines, bus widths, and expansion buses.
- Describe ports, including standard and specialized ports.
- Discuss power supply for desktop, notebook, tablet, and handheld computers .
- Discuss how a computer can represent numbers and encode characters electronically.

Introduction

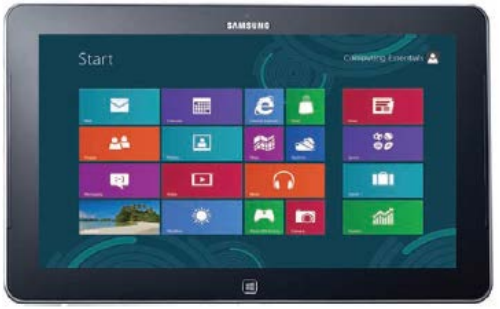
- Speed, capacity, and flexibility determine the power of microcomputers.
- Knowledge of a computer's power allows you to make good buying decisions and to determine if your current system will run new applications.
- Competent end users need to understand the basic principles of how microcomputers are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

System Unit Types

- Desktops
  - Tower Unit, All-in-one
- Notebooks
  - Laptops
  - Netbooks
- Tablets
- Handhelds

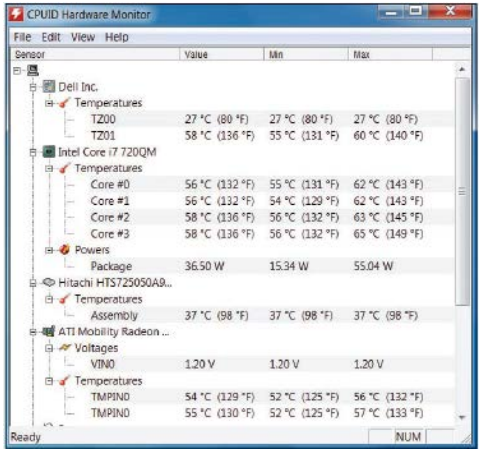
All-in-one

Traditional notebook



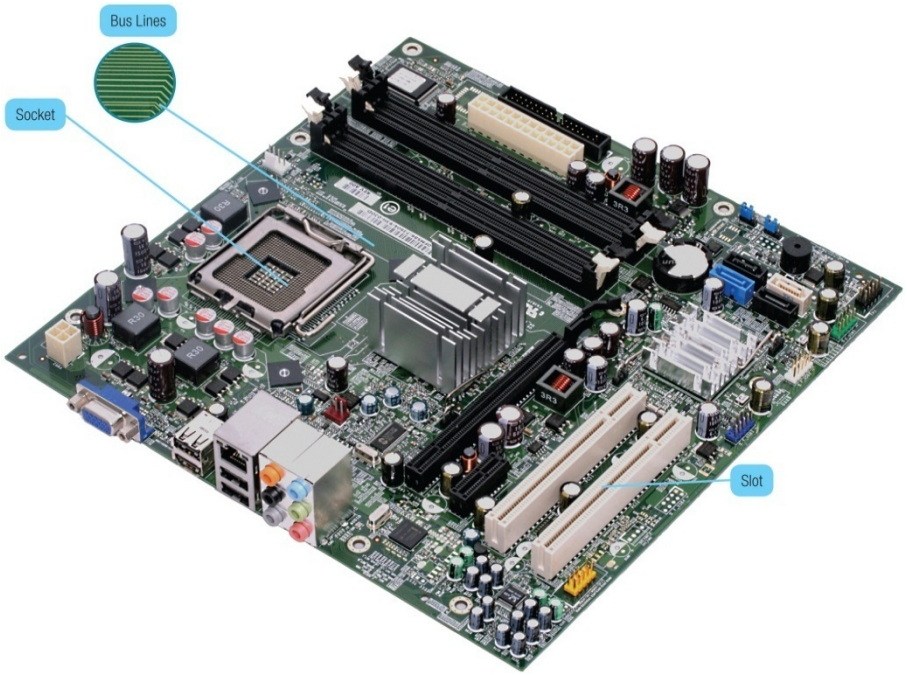
Making IT Work for You ~ Keeping Your Computer Cool

- Computer components generate a significant amount of heat
- Can damage your system
- Notebooks present a special challenge



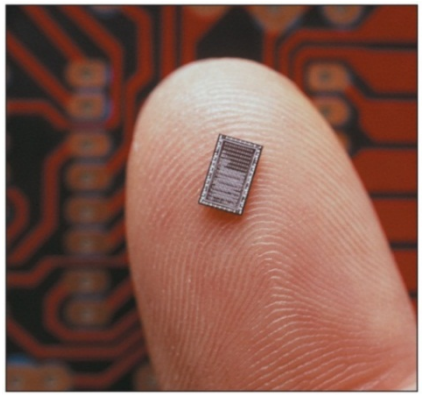
System Board

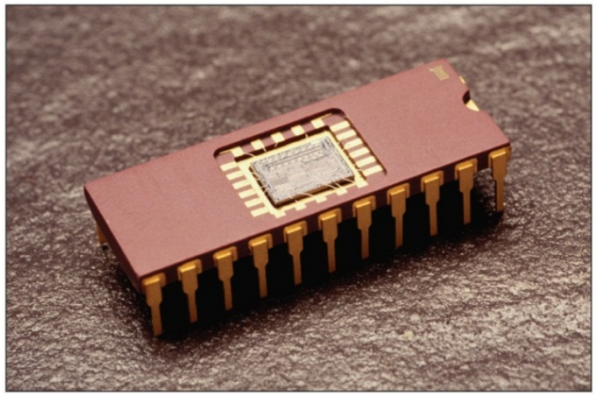
- Main board or motherboard
- Controls communications
- Components connect to the system board
- Data path
- Traffic monitor



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 8 and Mac OS X

Processor	Manufacturer
A5	Apple
Phenom	AMD
Athlon	AMD
A-series	AMD
Atom	Intel
i7	Intel

Specialty Processors

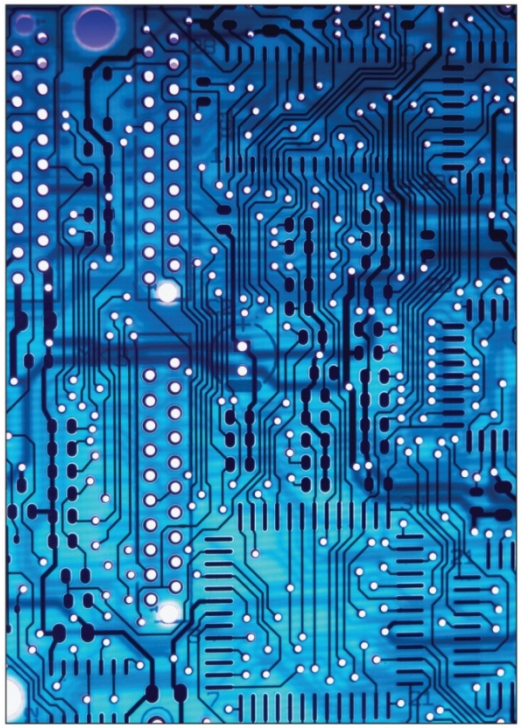
- Coprocessors
  - Designed to improve specific computing operations
  - Graphics coprocessors / Graphics Processing Unit (GPU)

Expansion Slots and Cards

- Advanced graphics cards
- Sound cards
- Network interface cards (NIC)
- Wireless network cards
- Plug and Play

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

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

Making IT Work for You ~ TV Tuners

- Using Windows Media System as a DVR
- Install TV Tuner

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

Electronic Data and Instructions

- Digital electronic signals
  - Recognized by computers
- Analog signals
  - Created by voices
- Conversion must take place from analog to digital before processing can occur

Numeric Representation

- Binary System only two digits called bits
  - On = 1; positive charge
  - Off = 0; no charge
- Byte = 8 bits grouped together
- Hexadecimal system

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

Character Encoding

- **Character encoding standards**
- **ASCII**
  - American Standard Code for Information Interchange
  - Microcomputers
- **EBCDIC**
  - Extended Binary coded Decimal Interchange Code
  - Mainframe
- **Unicode**
  - Uses 16 bits
  - Recognized by virtually all computer systems

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 annual salary of $31K to $46K

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 3)

- Describe the four basic types of microcomputers and microcomputer system units.
- Describe system boards including sockets, chips, carrier packages, slots, and bus lines.
- Discuss microprocessor components, chips, and specialty processors.

Open-Ended Questions (Page 2 of 3)

- Define computer memory including RAM, ROM, and flash memory.
- Define expansion slots, cards, Plug and Play, PC cards, PCMCIA slots, and Express-Card slots.
- Describe bus lines including bus width, system bus, and expansion bus.

Open-Ended Questions (Page 3 of 3)

- Define ports including standard and specialized ports. Give examples of each.
- Describe power supply including power supply units and AC adapters.
- Discuss electronic data and instructions.