Technology Handbook Module 2

Hardware

## Input Devices

peripheral
input device
keyboard
mouse
scanner
joystick
microphone
digital camera
port

Anything connected to your computer is considered a **peripheral**. In order for a computer to work, it must first have data. You can use peripherals called **input devices** to put information into a computer.

A **keyboard** is one of the most common input devices. You can use a keyboard to enter information in the form of words, numbers, and punctuation. By pressing combinations of keys, you can also give commands to some programs.

You use a **mouse** to control objects you see on a computer screen. Using a mouse, you can point to objects, select objects, and move objects. You can open programs, delete files, and create new folders. A mouse allows you to give information to a computer in a variety of ways.
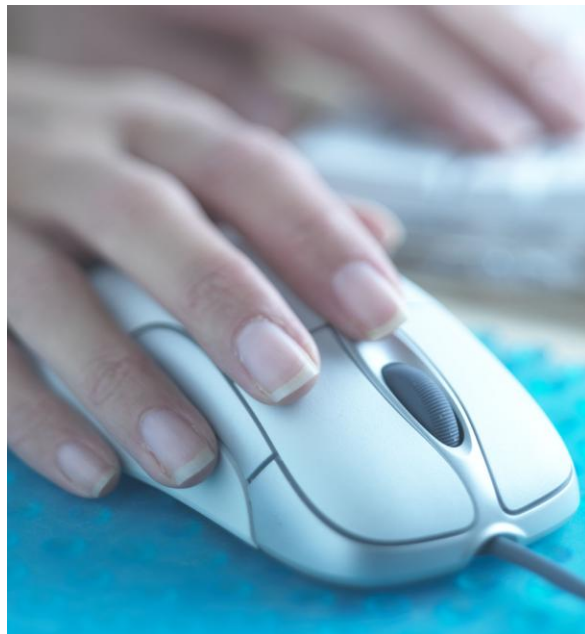
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A **scanner** collects information in the form of pictures. These pictures might be drawings or photographs. Once the drawing or photograph has been scanned, the scanner sends the information to the computer.

A **joystick** is an input device that usually has buttons that can be pressed to send instructions to the computer. Joysticks, game pads, and simulated race car steering wheels are just some of game controllers that you can use to input commands when playing computer games.

A **microphone** can be used to input audio such as music into a computer. Voice recognition programs allow individuals to enter text into a computer by speaking into a microphone.

A **digital camera** captures photographs as digital files that can be uploaded directly to a computer. A digital camcorder is used to create original video files.
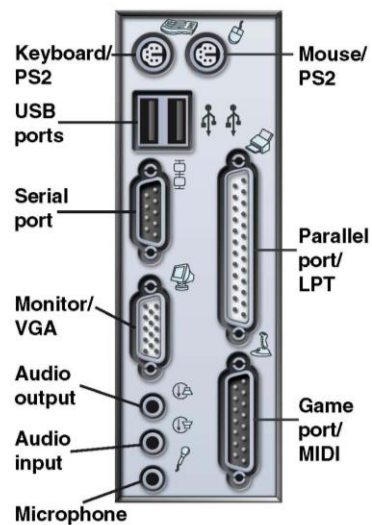
Hardware

Many input devices must be plugged into the computer before they can be used. A **port** allows users to connect external input devices to the computer system. Ports are usually located at the back of the computer.

✓ Tech Check

Answer the questions on a separate piece of paper.

1. Differentiate What type of information would you enter into a computer using a keyboard?

2. Relate In this topic, you learned about keyboards, mice, and scanners. Think of three other devices that can be used as input devices.

Hardware

Key Terms

output device

monitor

printer

speaker

> **TIP**
>
> You can also use a printer to print pictures.

Output Devices

You have learned that input devices put information *into* a computer. An output device carries information *out* of a computer. First, the computer changes the information into something usable. Then, the output devices present the information to the computer user.

A monitor, which is also called a computer screen, displays information visually, just like a television set. An LCD (liquid crystal display) monitor is much thinner than a CRT (cathode ray tube) monitor.

You use a printer to transfer images from a monitor to paper. For instance, when you key an essay on a computer, you can then print it out to turn in for class.

A speaker carries information in the form of sound. They can output music, speech, and noises.

✓ **Tech Check**

Answer the questions on a separate piece of paper.

Activity Information flows out of a computer through output devices. Create a diagram that shows information flowing from a computer to three different output devices. Write a brief explanation next to each output device that explains what sort of information the device outputs.

Hardware

Key Terms

process
microprocessor
clock speed
CPU
memory
RAM
storage device
motherboard

Processing Components

A computer uses hardware to **process** data into useful information. The part of the computer that processes information has many parts that work together.

The **microprocessor** is the brain of a computer. A computer makes almost all of its calculations in the microprocessor. Not all microprocessors are the same. Some can perform more calculations per second than others. A processor's **clock speed** is the number of calculations the processor can do each second.

The **CPU**, or central processing unit, is made of one microprocessor in small computers. In larger machines, the CPU can be made of several microprocessors.

Memory, where computers keep their information, comes in the form of computer chips.
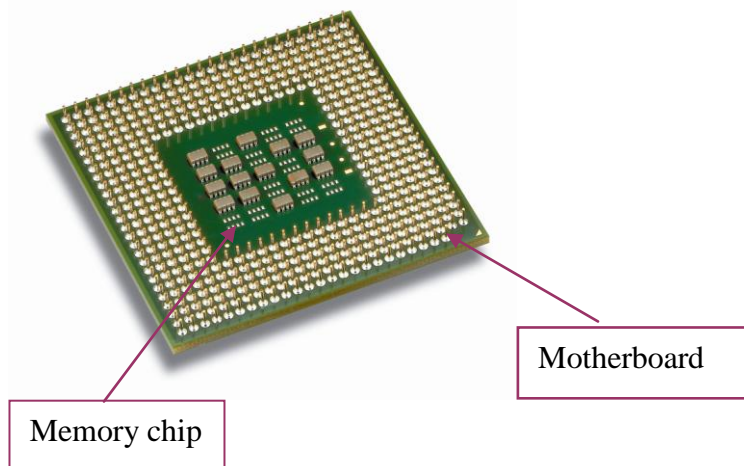
Motherboard

Memory chip

Hardware

RAM, or random access memory, holds information temporarily.

A storage device, also called a secondary storage device, is another place where information is kept in a computer. Unlike memory, however, storage devices hold information permanently. Storage comes in the form of hard disks, floppy disks, CDs, and memory sticks or flash drives.

Storage devices

CPU

RAM
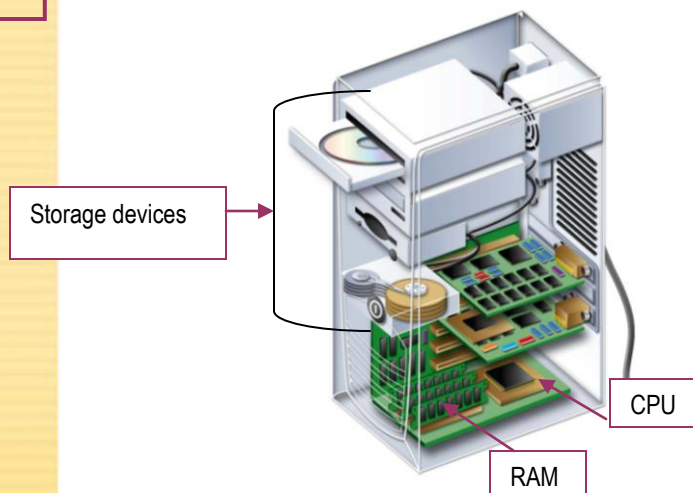
✓ Tech Check
Answer the questions on a separate piece of paper.

1. Describe List three pieces of hardware in a computer and explain what each does.

2. Compare How are memory and storage alike? How are they different?

3. Classify What makes some microprocessors different from others?

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Storage Devices

As you have already learned, computers change data into useful information. Computers are also useful for storing information. In this section, you will learn about some of the devices that are used to store information.

A **hard drive**, also called a hard disk, is the most widely used secondary storage device. They can be internal or external. Hard drives today can usually hold 120 to 300 gigabytes of data. One gigabyte is equal to 1000 megabytes. A hard drive with 120 gigabytes could hold more than an entire library floor of journals and magazines!

A **floppy disk** contains a small portable disk inside a plastic cover. Floppy disks can hold up to 1.4 megabytes of information, which is about enough space to store the words in a small book.

A **ZIP disk**, like a floppy disk, has a portable disk inside a plastic case. A ZIP disk can hold 100 to 750 megabytes. Seven hundred fifty megabytes is roughly equal to 15 volumes of an encyclopedia!

Flash memory uses chips to hold information. You can add information to flash memory in large chunks rather than piece by piece, making storage faster and easier than with other types of memory.

All of the storage devices you have read about so far use electric charges to store information. **Optical disks**, another type of storage device, use lasers to read and write information. Four types of optical disks are explained in this article.

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CD-ROM drives are very common in PCs because the CD-ROM is a cheap way to store lots of information.

A **CD-ROM** is an optical disk that can hold up to 1 gigabyte of information. One gigabyte of information is equal to 700 floppy disks or 300,000 pages of text.

Like the CD-ROM, a **DVD-ROM** is an optical disk. However, the DVD-ROM can hold up to 17 gigabytes of information. It would take 17 CD-ROMs to hold the information in one DVD-ROM. DVD-ROMs are commonly used to store movies.

A **CD-R**, which stands for Compact Disk-Recordable, is a CD-ROM that does not yet contain any information. A CD-R drive writes information onto the CD-R. A CD-R can hold about the same amount of information that the CD-ROM can hold.

Information can only be put on CD-ROM and CD-R once. A **CD-RW** is an optical disk that can record information many times. CD-RWs are useful for making copies of important information for backup.

If you have problems using a storage device, try the basic troubleshooting procedures below.

For Floppy Disks:
- Make sure the disk is right side up and the metal side is facing the drive.

- Make sure the write-protect tab is in the locked position. Look at the top right and top left corners of the disk. If there is a hole in both corners, turn the disk over. Then move the tab in the upper left corner to cover the hole.

- Put a different floppy disk into the drive. If neither floppy works, the disk drive may be broken.

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If you delete a file from a portable storage device, such as a floppy disk, the name of the file will no longer appear on the disk's file directory. The file, however, has not yet been physically deleted from the disk. Although it is difficult, the file can be recovered with special utility software.

For Optical Disks:

- Make sure the CD or DVD is seated right side up in the disk tray. The shiny side should be on the bottom. Make sure there is not more than one CD or DVD in the tray.

- If a CD will not work, as a last resort, wipe it with a very soft cloth. Wipe the shiny side gently from the center of the disk outward. Ask your teacher or a parent before attempting this.

✓ Tech Check
Answer the questions on a separate piece of paper.

1. Distinguish Describe two ways that flash memory is different from other storage devices that were discussed in this section.

2. Identify What are the storage capacities of floppy disks, ZIP disks, and hard drives?

3. Describe Describe three things you can do if your CD-ROM is not working.

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Networks

When computers are properly connected, they can share information. By sharing information, a group of computers becomes a more useful resource than one computer by itself. A **network** is a group of computers that are connected to each other. There are two basic types of networks.

A **LAN**, or Local Area Network, is a connected group of computers that are close to one another. For example, a connected group of computers in a home or in an office is a LAN. LANs are often used to allow several computers access to one printer.

WAN, or Wide Area Network, is a connected group of computers that are not close to each other. For example, the Internet is a WAN. A WAN provides users with access to large amounts of information.

Connecting computers properly so that they can communicate is challenging. Devices called **network hardware** and software called **network operating systems (NOS)** help computers share information. All computers on a network need a **network interface card (NIC)** so that the computers can communicate over the network.

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One way to connect computers is by **Ethernet cable**. Information travels through the Ethernet cable from one computer to another.

A **router** connects multiple computers to each other as well as to a WAN like the Internet. Thus, the computers connected to the router can communicate with one another. They can also obtain information from the Internet.

A **server** manages the flow of information on a network. This allows network resources, such as files and printers.

A **network topology** is the actual arrangement of computers in a network. Three network topologies are shown below.

Star

Bus
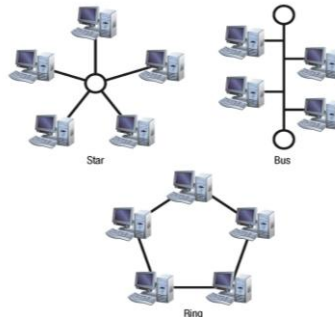
Ring

✓ Tech Check
Answer the questions on a separate piece of paper.

1. Differentiate What is the difference between a LAN and a WAN? Describe one use for a LAN and one for a WAN.

2. Predict Based on what you have learned about star networks and ring networks, what do you think a star-ring network would look like?

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Assessment

Hardware

Key Term Review

Answer the following questions on a separate sheet of paper.

1. Anything connected to your computer is considered a(n) _____.
2. You use a(n) _____ to control objects you see on a computer screen.
3. A(n) _____ can be used to input audio such as music into a computer.
4. A(n) _____ allows users to connect external input devices to the computer system.
5. A(n) _____, which is also called a computer screen, displays information visually.
6. You use a(n) _____ to transfer images from a monitor to paper.
7. The _____ is the brain of a computer.
8. _____ is the number of calculations the processor can do each second.
9. _____, or random access memory, holds information temporarily.
10. The _____ is the main circuit board in a computer.
11. _____ is a type of storage that uses chips to hold information.
12. _____ are storage devices that use lasers to read and write information.
13. A(n) _____ is a group of computers that are connected to each other.
14. A(n) _____ is a connected group of computers that are close to one another.
15. A(n) _____ is the actual arrangement of computers in a network.

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Assessment

Hardware

Concept Review

Answer the following questions on a separate sheet of paper.

16. Information goes into a computer through _____ and comes out through _____.
17. Most of the calculations done in a computer take place in the _____.
18. Disks that are used to store information for a long time are called _____.
19. A group of connected computers that are far apart is called a(n) _____.
20. A(n) _____ manages the flow of information on a network.

Critical Thinking

Complete the following exercises to reinforce your understanding of the lesson.

21. **Organize** Computers are very useful for dealing with all kinds of information. Create a chart that shows how a basic microcomputer system handles information. The chart should show the flow of information, where information is stored, and where it is processed. The chart should contain the following items:
    - at least three input devices
    - at least three output devices
    - memory
    - storage
    - processing
22. **Compile** Create a table that you can use to evaluate or compare microcomputer systems. On the left side of your paper, create a column that contains at least seven categories (such as "Amount of Memory") that you can use to evaluate a computer system. Find an online computer store or look at an advertising flyer. Look up two different computer systems and fill in the categories you have created.