

UNIT 2 HARDWARE COMPONENTS (2) – PERIPHERAL DEVICES

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1.0 INTRODUCTION

The computer peripheral devices are those devices which are attached to the system unit. The devices are necessary to ensure that the computer is able to accept input and display the result for the user. This section therefore discusses the input unit and the output unit.

2.0 OBJECTIVES

At the end of this unit you should be able to:

- identify those components that make up the input unit and the output unit of the computer
- explain the functions of the input and the output units of the computer
- identify and explain the type of input unit and output unit suitable to a particular computing environment.

3.0 MAIN CONTENT

3.1 Input Devices

3.1.1 The Computer Keyboard

A computer keyboard is identical to the conventional typewriter keyboard. However, it has more keys than the typewriter keyboard. A computer keyboard can be a dummy type or intelligent type. A computer keyboard is considered to be intelligent if, in addition to performing the routine functions characteristic of a typewriter keyboard, it can initiate a series of actions for a computer to carry out by mere pressing a key or combination of two or more keys. Thus, an intelligent computer keyboard has a set of keys which, when one of them is pressed, the computer can be made to carry out a specific function. For example, the pressing of a key may cause the computer to display a menu list from which the user may be prompted to select one.

The intelligent computer keyboard has four major divisions, namely: Function keys, Alphanumeric keys, Numeric keys and Control keys.

In addition to the four types of keys, there are some special or important keys such as the following:

- (a) Return or Enter key
- (b) Escape key denoted by ESC
- (c) Control key denoted by CTRL
- (d) Alternate key denoted by ALT
- (e) Delete key denoted by DEL
- (f) Insert key denoted by INS (g) Backspace key (h) Shift key.

Function Keys

The effects of the functions keys are software package dependent. That is, they mean different translations depending on which software package one is running on the computer. The function keys are traditionally labeled F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11 and F12. The function keys are often arranged to the left of the main keyboard in two columns or they are arranged in a row above the main keyboard. In most software packages, the function key F1 is used to run the HELP program. Word perfect, for example, uses F3 for HELP program and F1 to cancel the last command issued on the computer. The function keys F7 and F12 are used to save a text and block a section of a text respectively in word perfect. Function keys can be programmed to carry out the functions desired by a programmer. For example the function key F10 may be programmed to display menus. Thus, the operations of the function keys can be determined by the user or programmed by the software package being used at any point in time.

Alphanumeric Keys

The Alphanumeric keys can be likened with the conventional typewriter keys. They contain alphabetic characters, numeric characters and special characters such as comma, full stop, open bracket, close bracket, asterisk, semicolon, colon, question mark, and so

on. Usually, each key carries a character at the lower part and another character at the upper part. The SHIFT key is used to switch on or off the lower and upper characters by the programmer.

Cursor Control Keys

The cursor marks the active or current spot on the screen. It is an indicator that tells the user where in the midst of a document the system is pointing to. It may be a rectangular bar of light or a blinking underscore. When a text is being typed, the cursor moves as the carriage on a keyboard moves and character are typed in. The cursor control keys include four directional arrow keys.

Table 2: Control Keys and their Functions

Control Key	Functions
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	Moves the cursor one line up.
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	Moves the cursor one line down
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	Moves the cursor one character to the right
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	Move the cursor one character to the left.
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Home	Moves the cursor to the beginning of a line or page
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Move the cursor to the bottom left of a page or to End the end of the current line in most text editors.

Moves the cursor to the top of the next page in PGDN the document or text. For example, pressing this key while on page 5 of the text will place the cursor at the top of page 6 of the text.

PGUP	Moves the cursor to the top of the previous page.
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For example, if you are on page 3 of a document, pressing this key will place the cursor at the top of page 2 of the document.

Other cursor control keys are Home, Page Up, Page Down, and End. These keys may be part of the numeric keypad or separated from the numeric keypad. Moving the cursor around on the screen is one of the most common tasks in an application program. In fact, cursor movement is so important in an application such as word processing that it can usually be accomplished by additional key-driven commands. The control keys and their functions are documented in Table 5.1.

The Numeric Keypad

The numeric keypad contains a set of keys required for typing or entering number digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 into the computer store. A numeric key is often activated by pressing the Numlock Key. The numeric keypad is also used in combination with the

Alternate (Alt) key to produce extended characters. Extended characters are characters not normally found on most keyboards. For example, to produce the character alpha, denoted 'α', one holds down the Alt key and presses 224; to produce character beta denoted by 'β', one holds down the Alt key and presses 255; and to produce the pound sterling sign denoted by '£', one holds down the Alt key and presses 156.

The Shift Key

When the shift key is pressed, the capital letters on the alphanumeric keys are activated. It also serves as the activator of characters that are at the upper part of each alphanumeric key. The Shift key has no effects on itself; its effect are realised when some other keys are pressed. Thus, if one presses the shift key and then 'equals' sign key, the 'plus' sign which is at the upper part of the 'equal' sign is activated, and it then appears on the screen.

The Caps Lock Key

The Caps Lock shifts all alphabetic characters into the upper case (capital letters). Thus all characters typed are in lower case (small letters) when not pressed.

The Alternate Key (Alt)

The alternate key can be used in combination with numeric keys to generate characters not shown on the keyboard, that is, extended characters. For example, holding the Alt key down and pressing 228 produces the summation (∑) sign; holding the Alt key down and pressing 235 produces the ∏ sign. To restart or reboot your computer, press Alt, Ctrl and Del keys simultaneously.

The Num Lock Key

The Num Lock key activates the numeric keypad. Neither the Num Lock key nor the Caps Lock key affects the function keys.

The Control Key (Ctrl)

The control key is often used in most text mode to perform block operations like mass deletion, insertion and so on. For example, Ctrl + Y deletes a line in most text documents. It can also be used in combination with other keys to move the cursor to different locations in a text or document. In some application packages, the Alt, Ctrl and Shift keys are used in combination with the function keys to perform several operations. For example, in the Word Perfect word processing package, to centre a text, press Shift and F6; to print a text, press Shift and F7.

The Escape Key (Esc)

The escape key cancels an operation in progress. For example, when one is editing a file or issuing a command, Esc cancels any changes one might have made or terminates the command.

The Return or Enter Key

The return key serves as one of the most important keys on most keyboards. It is actually used to inform the computer of the end of an input or command. It performs two functions depending on the program on which it is used. For example, suppose you are asked to respond to an operating system command at the prompt or other entries, the operating system will wait until the return key is pressed before continuing. Pressing the return key also positions the cursor at the beginning of the next line (in text mode), which is the equivalent of pressing the carriage return on a typewriter.

The Insert Key (Ins)

Pressing the insert key puts one's keyboard in the insert mode, pressing it again returns to the overstrike (type over) mode. In the insert mode, the characters one types are inserted at the cursor position, the character at the cursor position and all characters to the right shift to make room for them. In overstrike or type over mode, newly typed characters overwrite the characters at the current cursor position. In most applications, the insert mode is indicated by a symbol in the status line.

The Delete Key (Del)

The delete key deletes the character at the cursor position when pressed and the remaining text moves to the left while the cursor remains at the same position.

The Back Space Key

The back space key deletes the characters to the left of the cursor when pressed and all other characters to the right of the cursor are shifted one space to the left.

The Spacebar

The spacebar is the longest key found on most keyboards. It erases characters at the cursor position or gives a blank space when pressed.

The Tab Key

The tab key moves the cursor by five spaces to the right when pressed. The number of positions moved depends on the software or the Tab Set by the operator. The Tab is normally pressed to insert paragraphs during typing. In some programs, when this key is pressed in combination with shift the key, the same number of positions is moved backwards.

The Print Screen Key (Prtsc)

When the print screen key is pressed in combination with the shift key, whatever is on the screen will be printed on a printer. The same effect can be achieved by pressing the key alone on some keyboards.

Keeping Your Keyboard Clean and Working

Never spill liquids on your keyboard. Coffee, soda, and other beverage spills can ruin your keyboard. Liquid spills on the keyboard have even been known to cause electrical damage to the PC itself. With that in mind, though you may not stop drinking coffee around your computer, you should at least get a spill-proof mug or keep the coffee on the other side of the desk.

Another enemy of the keyboard is static electricity. Static electricity can have the same damaging effect on your keyboard as does liquid. If your keyboard doesn't respond properly after a strong static charge, you may just need to turn off the PC and turn it back on to reset the keyboard. In some cases, however, the static discharge can zap the keyboard and even parts of the PC. If you shuffle your feet across the carpet or your PC is in a room with dry air, avoid touching the PC or the keyboard until you have touched something metal to discharge any static electricity. If you don't have a metal desk or bookcase in your work area, consider buying an anti-static mat and keeping it where you can touch it before touching the PC.

Dust, dirt, food crumbs, and hair are other enemies of the keyboard. Try to avoid eating over the keyboard and if your computer is in a dirty, dusty area, keep the keyboard covered when not in use.

Some dirt and dust is unavoidable. To keep the keyboard working well, you should occasionally clean it.

3.1.2 The Mouse and Joystick

A mouse looks like the electrical clipper in a barber's shop. It consists of a pointing device very sensitive to movements. It has a roller ball and two or more buttons which can be pressed to make a selection. By moving the mouse on a flat smooth surface and

clicking one or a combination of two buttons on its upper surface, a computer to which it is connected can be sensitised and commanded to carry out some specific tasks.

A mouse can be used to draw diagrams on the computer screen more effectively and efficiently than the computer keyboard. Generally, the keyboard and the mouse do complement each other. For example, the mouse can be used to highlight an item in a menu list while the keyboard Enter Key can be pressed to activate or evoke the command associated with the highlighted item.

A mouse is the primary input device for modern computers that feature operating systems with a graphical user interface, such as Windows 98 or Windows XP. While keyboards obviously excel at entering text, numbers, and symbols, your mouse is the tool you'll use to tell your computer what to do with all the data you've entered.

Joysticks are almost exclusively used with game software and help the user more effectively control the actions of computer-simulated airplanes or arcade-style games.

All modern PC operating systems (Windows 98, Windows XP, and the Macintosh) rely on an on-screen pointer to select and execute commands. A mouse is simply an input device built to help the user control this on-screen pointer in as natural and efficient a manner as possible.

The pointer on the screen mimics the movements of your mouse. As you move your mouse, a ball encased in the bottom of your mouse rolls on the desk and in turn sends signals to the computer as to which direction to move the pointer on the screen. Move the mouse side to side, or up and down, and the on-screen pointer moves in a similar manner.

Once you have the mouse positioned to select the command or data you want to act on, you use the mouse buttons to execute the command. *The mouse controls the on-screen pointer and lets you select program icons, manipulate property sheets, and access data.*

3.2 Output Devices

3.2.1 Printers

A printer is the computer component that lets you create copies of the information stored in your computer on paper. The printed material is often called the hard copy, to differentiate it from the data stored on a disk, or held in the computer's memory.

There are three basic types of printers available for use with personal computers:

Laser Printers: These combine a magnetic roller with powdered ink called toner to transfer high-quality characters or images onto a page.

Inkjet Printers: These have small nozzles that actually spray fastdrying ink onto the page to form characters or images. Inkjet printers spray a fine, quick-drying ink through small nozzles to produce characters and images on paper. Although the results are not quite as sharp as those of laser printers, inkjet printers provide very good quality output at a lower cost.

Dot-matrix Printers: These use a print head to strike an inked ribbon against paper, like a typewriter, creating characters out of a series of dots. Dot-matrix printers are the cheapest printers available. They create text and images on the page by hammering several small pins against an inked ribbon. The more pins used, the better the image. The 9-pin and 24-pin are common options. The 24-pin printers produce a better quality output, but are somewhat slower than the 9-pin printers.

Print quality for dot-matrix printers is often described in terms of mode: draft mode (low resolution), near-letter-quality mode (medium resolution), or letter-quality mode (high resolution). The speed depends on the mode, with the draft mode being the fastest.

The type of printer you choose depends on your budget and the type of output you need. For example, if all you need to print are grocery lists, you may be happy with a dot-matrix printer. In general, dot-matrix printers are noisier, slower, and produce a poorer-quality image than do laser or inkjet printers, but they are also less expensive. If you need to print newsletters, brochures, or illustrated reports, you will probably want a high-quality laser printer. Laser printers cost more than other printers, but they may be worth the price because they are fast, quiet, and produce high-quality text and graphics.

3.2.2 Monitors

The monitor does not do any processing itself. It only displays the information that the video card tells it to display.

Monitor Sizes

The two most common monitor sizes are 15-inch and 17-inch. If you have an older, hand-me-down PC or a very inexpensive starter PC, you may have a smaller 14-inch monitor. 21-inch monitors are also available but mostly used by graphics professionals.

VGA and SVGA Monitors

The two most common acronyms you will see on current monitors are VGA or SVGA. Both of these terms generally refer to how many dots (or pixels) in each direction the monitor can display. VGA is 640x480 (width by height) and SVGA is 800x600. This measurement is called the monitor's *resolution*, and more is better! Most new monitors are capable of displaying at least SVGA quality. In fact, 1,024x768 is somewhat of a minimum to look for.

Almost any VGA or SGVA monitor made in the last few years is capable of displaying any of these resolutions. However, it's actually the video card that determines what resolution your monitor displays at any time. The monitor is capable of switching from one resolution to another on command from the video card.

3.2.3 Scanners

Scanners are peripheral devices used to *digitise* (convert to electronic format) artwork, photographs, text, or other items from hard copy. In a sense, a scanner works as a pair of eyes for your PC. Your eyes see an image and translate the image into electrical impulses that travel to and are interpreted by your brain. Similarly, a scanner captures images and converts them to digital data that travel to and are interpreted by the computer.

A scanner works by dividing an image into microscopic rows and columns and measuring, like the film in a camera, how much light (or lack of it) reflects from each individual intersection of the rows and columns. Each reflection is recorded as a dot, or picture element (pixel). After the scanner collects information from each dot, it compiles the result into a digital file on the computer.

There are a wide variety of scanners that work in a number of different ways, but the technology behind them is essentially the same. The following sections discuss the more popular types of scanners available today.

Types of Scanners

Flatbed Scanners

Flatbed scanners look and behave a lot like a photocopier. You lay the item to be scanned on a glass plate and the scanning head passes below the glass.

Flatbed scanners are very versatile: you can scan objects in a variety of sizes and shapes, including pages from a book, without damaging the original. While flatbed scanners are the best choice for a wide variety of uses, if you plan to do a lot of text scanning (called *OCR* for *Optical Character Recognition*) work, keep in mind that flatbeds only accommodate one page at a time. Scanning multi-page documents can be a slow, tedious process, because you have to manually remove one page and insert the next.

Sheet Fed Scanners

Sheet fed scanners look and act more like fax machines. The page or item is fed into the machine, scanned, then spat out on the other end. A sheet fed scanner is a good choice for large volumes of text, but not for handling delicate original photographs. Scanning directly from a book or other three-dimensional objects is impossible.

Hand Scanners

Hand scanners are a low-cost alternative to their larger, more sophisticated counterparts. As their name implies, hand scanners are manual devices you move over a flat surface, just as you do your PC's mouse.

The hand scanner's advantages are many, but so are its disadvantages. Generally, hand scanners work best for small, uncomplicated images such as company logos or small black-and-white photographs. You might want a hand scanner if you do not plan to use it on a regular basis, because it usually does not require adding internal cards to your CPU, and it's easily disconnected and stored away. Most hand scanners can only scan a four-inch wide image at one time and require a steady hand. You're usually provided with software that helps you "sew up" a series of these 4-inch, side-by-side scans into one image, but this is obviously not as convenient as getting the full image at once.

3.2.4 Speakers and Sound

The built-in speakers in most PC cases are used just for making system sounds, such as warning beeps and action indicators. To play more sophisticated sounds on your PC, you need a set of external speakers. Usually speakers come in pairs, and there is a plug that connects them to your sound card. Arrange the speakers with one on the left and one on the right of your desk or work area to get a stereo effect.

Optionally, some speakers come with a *subwoofer*. This improves the bass (low notes) sound. If you have a subwoofer with your speakers, it should go on the floor under your desk.

Sound is one of the favorite options on today's PCs. In fact, sound is a standard feature of most new PCs.

Everyone has their own uses for sound. You may just want to play a few music CDs with your CD-ROM drive while you are working, or you may use multimedia applications for presentations or educational programs. You may just like the sound of your jet engines roaring as you punch the throttle in a flight simulator.

Components for Sound on Your PC

To produce sound on your PC, you need a sound card and speakers. The *sound card* is an expansion card that plugs into one of the slots on your motherboard. This card processes all of the instructions that have to do with sound, and then sends the sounds to the speakers to be played.

Sound Cards

Sound cards plug into an expansion slot in your PC. The card has a set of connectors that are exposed on the back of the PC; you can plug a microphone and speakers into the connectors. Some cards include an optional connector for a *line input*, which is used to connect another input source such as the output from a tape player or portable CD player. Other optional connectors can include a joystick connector and a MIDI connector (for connecting a MIDI keyboard). The card may include a volume control, which controls the volume of the speakers and/or headphones.

4.0 CONCLUSION

The system unit cannot function without the peripheral devices. The input and the output units are very important peripheral devices that must be taken care of in setting up a computer system.

5.0 SUMMARY

This unit has handled the following:

- (a) Input unit which comprises
 - (i) the keyboard – (the different categories of keys on the keyboard and their functions)
 - (ii) the scanner – different types of scanners
- (b) The output unit which is made up of the
 - (i) monitor (ii) the printer and (iii) the speakers.

6.0 TUTOR-MARKED ASSIGNMENT

1. Justify the need for the input and output units in a computer system.
2. Describe the functions of the following keys: the numeric keys, control keys, shift keys and the function keys.
3. In what situation would you recommend the laser jet printer and the dot matrix printer?

7.0 REFERENCES/FURTHER READING

- Akinyokun, O.C. (1999). *Principles and Practice of Computing Technology*. Ibadan: International Publishers Limited.
- Balogun, V.F., Daramola, O.A., Obe, O.O. Ojokoh, B.A. and Oluwadare S.A., (2006). *Introduction to Computing: A Practical Approach*. Akure: Tom-Ray Publications.
- Larry Long (1984). *Introduction to Computers and Information Processing*. Prentice-Hall Inc., New Jersey.
- Francis Scheid (1983). *Schaum's Outline Series: Introduction to Computer Science*. . Singapore: McGraw-Hill Book Company
- Richard H. Austin and Lillian Cassel (1986). *Computers in Focus*. California: Books/Cole Publication Company. Monterey.
- Gray S. Popkin and Arthur H. Pike (1981). *Introduction to Data Processing with BASIC* (2nd ed.). Houghton Boston: Mifflin Company.