

Easy Steps



Unit 2790 (V7)

**Use and maintain personal
computer peripherals**

- ☒ Easy to follow
- ☒ Step-by-step instructions
- ☒ Covers Unit Standard Criteria

A Cheryl Price Publication

Unit Standard 2790 (Version 7)

Use and maintain personal computer peripherals

This book covers the course outline for the following New Zealand Qualifications Authority Unit Standard:

Unit Standard 2790 - GENERIC COMPUTING (Level 2, Credit 3)
Use and maintain personal computer peripherals (Version 7).

All topics in this Unit Standard are included in this book.

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Unit Standard 2790 Version 7

Title	Use and maintain personal computer peripherals		
Level	2	Credits	3

Purpose	People credited with this unit standard are able to describe, use and maintain personal computer peripherals.
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Classification	Computing > Generic Computing
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Available grade	Achieved
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Explanatory notes

- Range

Computer peripherals may include but are not limited to – computer monitor, printer, plotter, external hard disk, removable storage devices (internal and external), tape drive, joystick, keyboard, mouse, track ball, touch screen or pad, light pen, scanner, modem, data projector, microphone, digital camera, video camera or recorder, speaker(s), computer controlled devices including robotics, sensors, wireless devices.

A minimum of seven peripherals must be described, used and maintained, of which at least one must be an input device, one an output device, and one a storage device.
- Legislation relevant to this unit standard includes the:

Health and Safety in Employment Act 1992,
Copyright Act 1994,
and their subsequent amendments.
- An assessment resource to support computing unit standards (levels 1 to 4) can be found on the NZQA website at <http://www.nzqa.govt.nz/providers/resources/index.html>.

Outcomes and evidence requirements

Outcome 1

Describe selected computer peripherals.

Evidence requirements

- 1.1 The peripherals are described in terms of their purpose and typical use.
- 1.2 The technology used by each peripheral, and how each performs its function is explained in terms of its specifications and operation.

Outcome 2

Use and maintain personal computer peripherals.

Evidence requirements

- 2.1 The peripherals are connected to the computer according to manufacturer's specifications.
- 2.2 Communication is established between peripherals and personal computer software by following manufacturer's instructions, and is checked to ensure that operational functions can be performed.
- 2.3 The peripherals' settings are configured according to the requirements of the user.

Range may include but is not limited to – settings, advanced settings.
- 2.4 User maintenance is completed according to manufacturer's specifications.

Range may include but is not limited to – cleaning, troubleshooting, replacing consumables, storage.

Sample Document

What is a Peripheral? Input Devices

Learning Outcomes

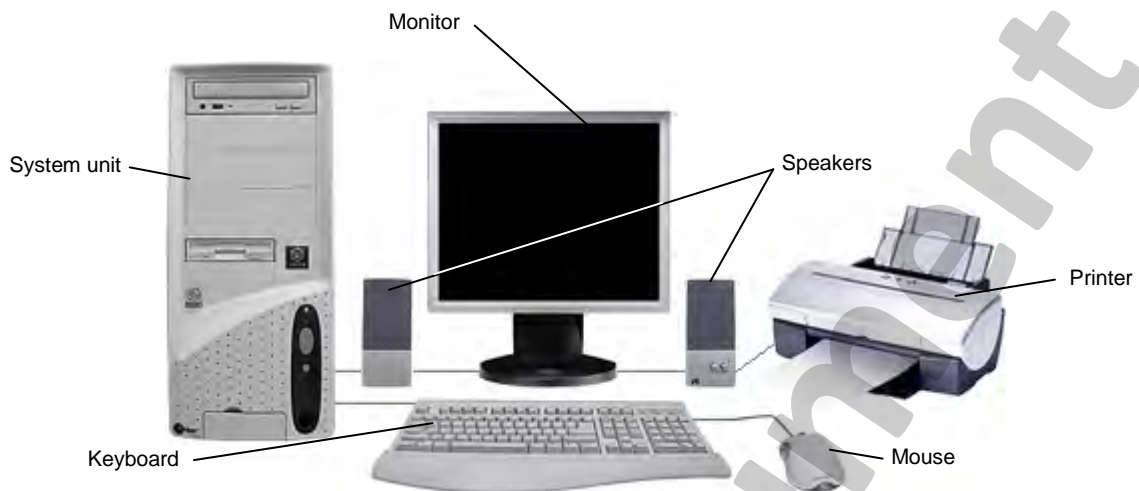
At the end of this unit you should be able to -

- ☐ Describe peripherals
- ☐ Identify the purpose of peripherals in terms of their typical applications
- ☐ Identify the different kinds of ports for attaching peripherals to a computer
- ☐ Understand a range of input devices, in terms of their purpose, connection to the system unit and maintenance
 - Keyboard
 - Mouse
 - Trackball
 - Touch screen
 - Touch pad
 - Light Pen
 - Joystick
 - Scanner
 - Microphone
 - Digital Camera
 - Digital Video Camera
 - Graphics Tablets and Pen

Sample Document

What is a Peripheral?

A peripheral is a device that is attached to a computer and is external to the system unit. Some examples of peripherals are shown below.



Peripherals perform specific functions, such as printing, scanning, or connecting to the telephone. They can generally be divided into one or two of the following categories. Note that many peripheral devices perform more than one function, however.

Input device (An input device is used to enter data or give commands to a computer.)

Examples of input devices are:

- Keyboard
- Mouse
- Graphics tablet and pen
- Scanner
- Modem
- Digital camera
- Microphone

Output device (An output device is used to produce or display information from a computer.)

Examples of output devices are:

- Monitor
- Printer
- Speakers
- Modem

Storage device (A storage device is used to store data or information.)

Examples of storage devices are:

- External hard disk drive
- External optical disc drive
- Removable storage devices (internal and external)
- USB flash memory drives
- External tape drive

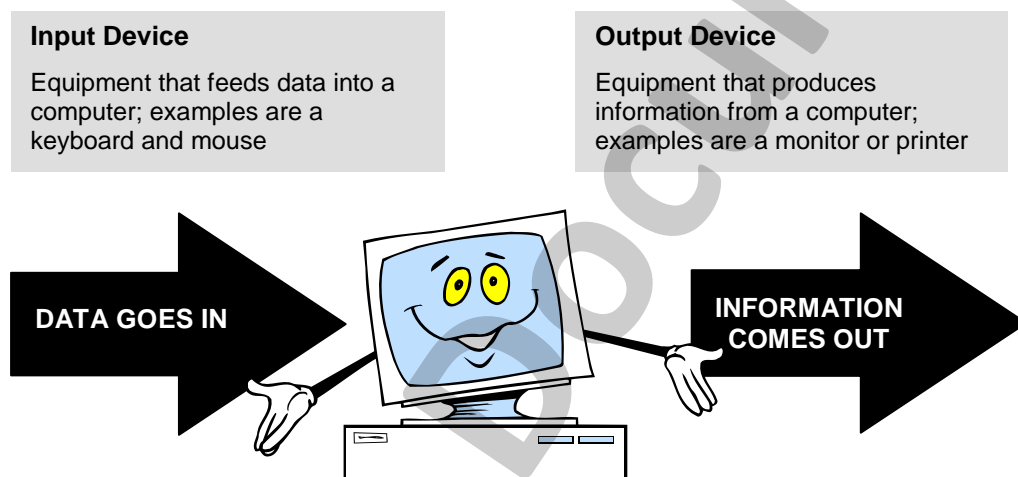
In some instances a peripheral device can be both an input **and** an output device. Examples are a modem, which both receives data and sends it. Another example is a headset used in computer telephony, which both receives data, turning it into sound waves, and also sends voice signals.

Most peripherals can be said to be "dumb" devices. They don't generally perform data processing or perform any tasks other than what they are specifically intended for. Neither do peripherals usually communicate with each other directly; all data has to be processed through the system unit to which they are connected through a cable or a wireless connection.

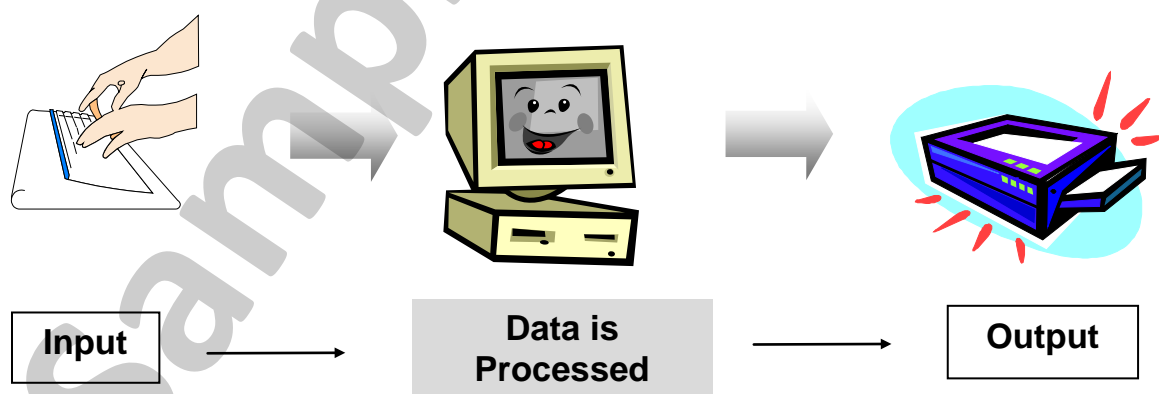
In this book you will learn about the different types of peripherals and their functions, the technologies they use and how to connect, operate, and maintain them.

The Input/Process/Output Cycle

Data is entered into a computer using an *input device*. The data is then *processed* by the computer into useable information that can be produced on an *output device* in a way that is understandable to the user. Processed data is then stored on a storage device so that it can be retrieved later.



An example of a basic input/process/output cycle is shown below. The cycle starts with the keyboard, a common *input* peripheral device, the system unit for *processing* data, and a printer, a common *output* peripheral device.



Exercise 1

➤ Circle the correct answer or answers:

A peripheral is:

- Always an input device.
- A device that is attached to a computer.
- An intelligent device.
- A "dumb" device that can't be used on its own.

Processed data that has travelled the Input/Process/Output cycle can be kept permanently on storage devices such as the hard disk inside the system unit.

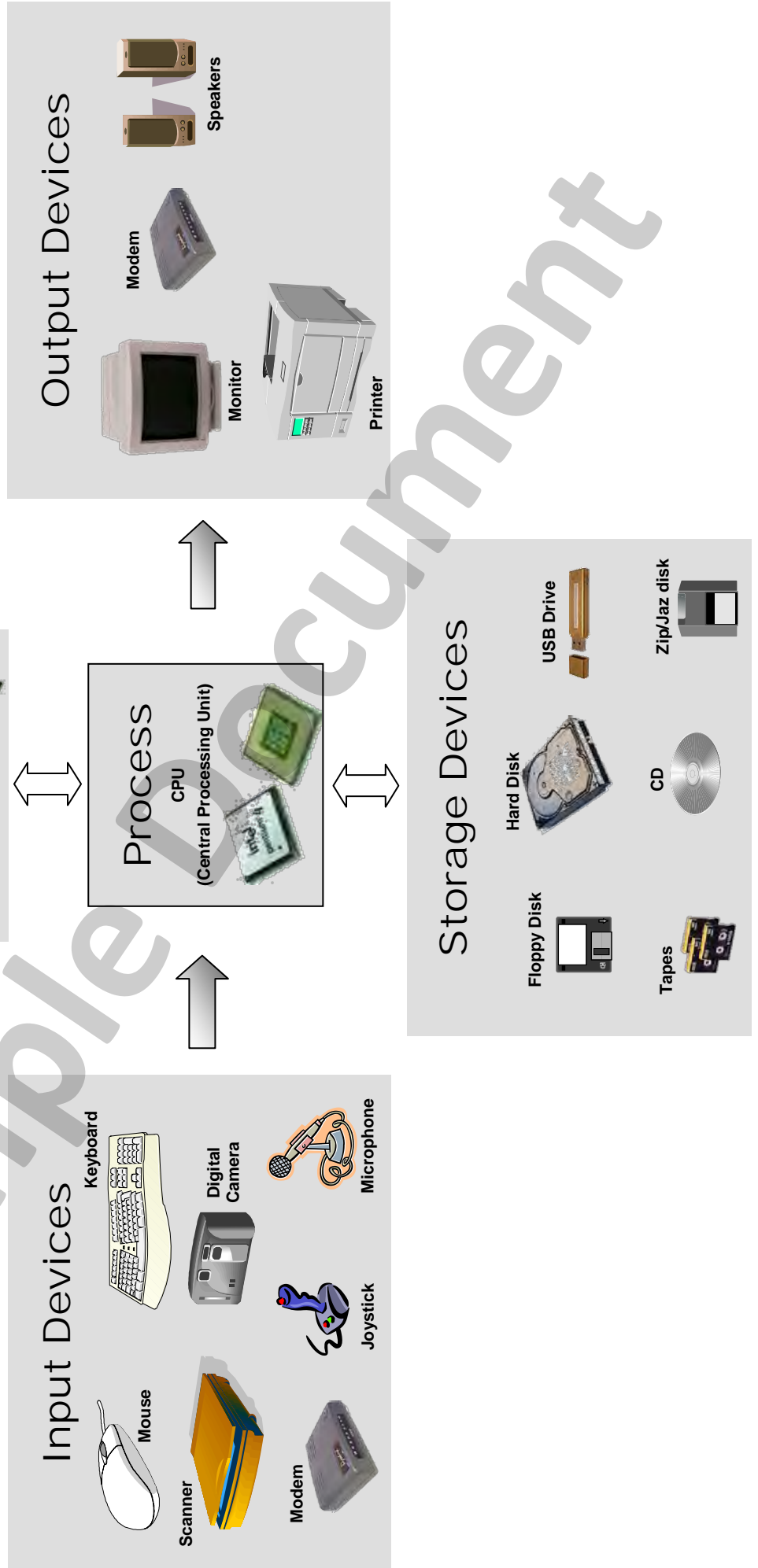
Data can also be stored on removable or external peripheral storage devices such as a supplemental hard disk drive, optical disc drives, tape drives, and USB flash drives.



The Processing Cycle

The diagram below displays the flow of data between the various *input*, *processing*, *storage*, and *output* devices.

Note Memory is included in this diagram for the sake of accuracy, but you are not required to know about memory to pass this unit standard.



Ports











A *port* is a physical interface where a peripheral input or output (I/O) device connects to the computer. There are ports integrated into the computer case for external peripherals, as well as ports inside the system unit for integrated peripherals. In this book you will learn how to connect external peripherals only.

Ports for connecting external peripherals are either part of the motherboard itself or directly connected to the motherboard and then attached to the computer case, where they can be easily accessed.

Most ports have input and output capabilities—in other words they send data to the peripheral and receive data back from it.

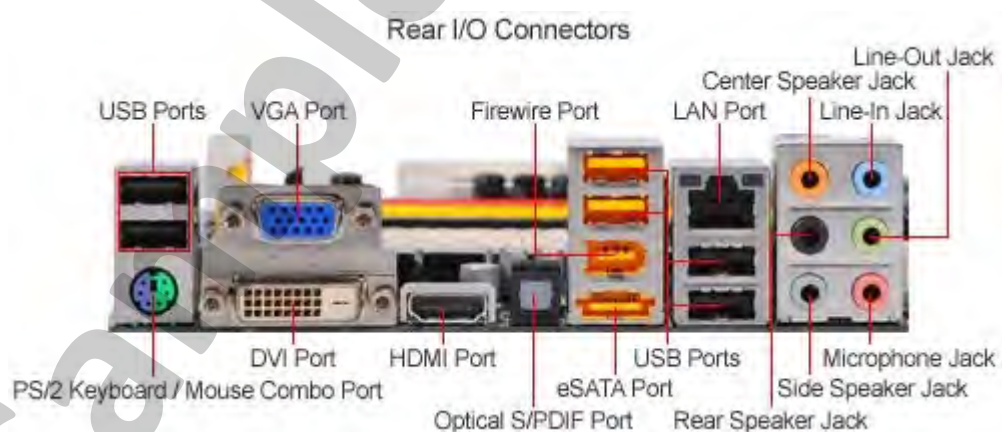
The USB and FireWire connections have largely replaced the old serial, parallel, and to some extent, the PS/2 ports in modern computers. The PS/2 port is still often used because mice and keyboards have a long life, and the older ones use that connection. Newer external peripherals almost all use the USB port or other more advanced connections, but PS/2 peripherals were still being manufactured through 2010. For this reason, a computer bought today will have at least two USB ports as standard, as well as capabilities for several more. It will also likely have at least one PS/2 port.

**Examples of common cable ends and ports
for connecting external peripheral input and output devices**

Connection Type	Cable End	Port
PS/2		
USB		
Ethernet		
FireWire		
VGA		

DVI		
HDMI		
Jack	 →	
eSATA		
Serial	 →	
Parallel	 →	

Rear input/output connectors on a modern motherboard



Almost all ports work as input/output, or bidirectional, ports. That is, they allow transfer of data to and from the peripheral. Even the older serial and PS/2 ports were technically I/O ports, even though their input functions were the only ones apparent. A few ports, however, are used for transferring data in only one direction. The VGA and DVI ports are used for output to a monitor. Ports that work with sound operate in one direction or the other: speaker and line-out jacks are for sound output; microphone and line-in jacks are for input.

Input peripherals usually use USB, FireWire, serial, PS/2 ports, or jacks. Output devices, covered in Section 2 of this book, connect to USB, FireWire, parallel ports, or jacks. Most external storage devices, covered in Section 3, use USB or FireWire ports.

Serial ports

Although many ports in a computer (such as USB) are technically "serial," the term "serial port" usually refers to the nine-pin port pictured. Serial ports are used to connect devices such as older computer mice. Modern mice use USB or PS/2 ports. The old-style serial ports don't have the advantages of USB and other new technologies. A peripheral has to be plugged into the serial port when the computer is off.



PS/2 ports

The PS/2 port is a small round port with six round holes and one rectangular hole. This port is used primarily for connecting the keyboard and mouse. It is important that the keyboard and mouse are plugged into the correct PS/2 port when the motherboard provides more than one. You can tell which is the correct port by the small symbols for keyboard and mouse by the ports. Also, the blue PS/2 port has traditionally been for the keyboard, the green one for the mouse. As with serial ports, peripherals can't be plugged into a PS/2 port and be instantly recognized by the computer and used; the device needs to be connected when the computer is off.



USB ports

Most computers today have at least two built-in USB ports either directly on the motherboard or on the front of the system unit. Often the motherboard will have connections for additional USB ports. USB technology has several advantages over older serial ports and parallel ports:



- Peripherals can be connected while the computer is running and then used without rebooting (called "hot plugging.")
- Modern operating systems such as Windows 7 will usually recognize the device immediately and set it up (called "plug and play.")
- USB ports have much faster data transfer rates than previous port technologies.
- Up to 127 devices can also be connected to a single USB port in a process called "daisy-chaining."

These benefits have made USB technology extremely popular. According to PCWorld, there were about 2 billion USB devices sold in 2008 alone and about 6 billion total sold through that year.

Adapters are available to connect older serial devices to USB ports, although there is no guarantee that an operating system will support every older device even if you can connect it.

FireWire ports

FireWire is a high-speed serial connection that is mostly used for digital camcorders and external storage devices. It was developed by Apple, but modern PC motherboards also often contain a FireWire port. Like with a USB connection, FireWire devices can be hot plugged and are plug and play. A four pin FireWire port is pictured here, which carries data only, but there is also a six pin variety that can carry power to the device as well.



Note Technically, this port is known as the IEEE 1394 interface. FireWire is Apple's name for it; Sony calls the interface i.Link in its products.

Jacks

The ports commonly found for connecting analogue audio peripherals to the computer are called by the generic name of "jacks." The basic technologies for the cables and plugs for jacks are perhaps the oldest to be found in a computer. The basic design was used in the late 19th century for use in manual telephone exchanges! This technology comes in different sizes; computers use the 3.5mm diameter jack. Speakers, headphones, and microphones are the most commonly used peripherals connected to jacks. Jacks are also known as TRS connectors.



Expansion Cards

The motherboard in the system unit contains expansion slots that accommodate circuit boards called expansion cards. These cards can be added to the system to provide additional or enhanced functions, such as improved sound and video, a network port, or additional USB ports. Many peripherals plug into ports that are part of expansion cards, as shown below.

Expansion Card	Devices Connecting To The Card's Port(s)
Sound card	Speakers, microphone, and other analogue audio devices for input or output
Video card	Monitor, joystick, digital camera or camcorder
Network interface card	Modems and other networking devices

Power ports

The *power port* connects the system unit to the power cord that supplies electricity to the computer. The monitor requires its own power supply and may plug directly into the electricity supply or may connect to the system unit by its own power cord, and share the supply to the computer. Printers and scanners also require their own power supply. USB and FireWire devices get power through the same cable that carries data.



Wireless Devices

The word "wireless" has become a generic term used to describe communications between devices which don't rely on data cables, as described above. Instead, electromagnetic waves carry a signal over a section of—or the entirety of—a communication path. A wireless keyboard, for example, connects via a radio frequency to a receiver in the system unit.

We have become accustomed to using many kinds of wireless devices today, including the mobile phone. We will talk here, however, only of wireless peripherals. Note that wireless devices are not the same as so-called cordless devices. The term "cordless" refers to a device which runs on battery power rather than being connected to an electrical outlet. A wireless device connects to another device without using a cable connection.

A wireless device, therefore, may or may not be cordless. What matters is how it transfers data to the other device. An example of the distinction is a laptop computer with wireless capabilities connected to a wireless router. The laptop may be connected to a power outlet (not cordless) or be running on battery power (cordless), but it is connecting to the router—and therefore transmitting and receiving data—wirelessly.

Types of wireless connections

The main types of signals used by wireless peripherals are:

- Radio frequencies, which are a type of electromagnetic radiation in the range of about 30 kilohertz (KHz) to 300 gigahertz (GHz).
- Microwave frequencies, which are a type of electromagnetic radiation in the range between 300 megahertz (MHz) and 300 gigahertz (GHz).
- Infrared frequencies, which are a type of electromagnetic radiation in the range between approximately 1 terahertz (THz) and 430 THz.

The radio and infrared frequencies are the most commonly used for connecting wireless peripherals. Microwave frequencies are also used, especially for wireless router and Bluetooth connections. They are also used for satellite communications.

Wireless mice and keyboards

Perhaps the most common wireless computer peripherals are wireless mice and keyboards. These work in the same way as standard devices of the same kind, although the keyboards may have additional features such as a smaller size for tight working conditions.



Wireless mice and keyboards give the user more freedom of movement than the same devices connected via a data cable. They are also portable and easier to store away when not in use. Maintain them in the same way as mice and keyboards with cords. They usually connect through a radio frequency.

Wireless Routers

Wireless routers are becoming common networking peripherals in homes and in public places like libraries and coffee shops. When you see a public place advertising "Wi-Fi," that means it has a wireless router installed.

Used in conjunction with a modem, wireless routers provide properly equipped laptops and other devices with wireless access to the Internet. In a home setting, they can be used in conjunction with a modem, a desktop computer, a printer, and other devices to create a wireless local area network (WLAN) that includes Internet access. Using a router, the desktop computer can share its resources with a wirelessly connected laptop. The desktop computer does not need to be powered on for the wireless laptop to connect to the Internet.



Wireless routers are set up using browser-based software, which makes it an easy process even if you don't know the details of computer networks. Make sure you follow the documentation, however, even when the connection is obviously "working." In other words, don't stop the installation when you can get to the Internet. You should also make sure the router is secured with a password. Without securing the router, it may be able to be accessed by anyone within its range, and you don't want to share your Internet connection—or worse, the shared data on your computers—with the whole neighbourhood!

As with any peripheral, when purchasing a wireless router consider how it is going to be used. There are three main types of wireless router based on the Wi-Fi specification. Their technical names are 802.11b, 802.11g, and 802.11n, also known simply by their letters, B, G, and N. Wireless routers use radio frequencies.

Make sure you know your laptop's wireless capabilities before buying a wireless router. If it has an N-type wireless card, get an N-type router. (Most modern wireless routers use the N specification.) The N specification also supports all of the earlier specifications: G, B, and A.

Maintain a router simply by keeping its case clean with a damp cloth.

Wireless Headsets

Headsets, which contain a microphone and headphone in a single unit, were originally used only by pilots, who needed



to keep their hands free while communicating via radio. Now wireless headsets are used in computer telephony and with mobile phones. They give the user free use of both hands and allow movement away from the computer and telephone. This makes them useful in call centers, help

desks, and in office settings, especially for administrative assistants or other workers who receive many calls during a day.

Most wireless headsets, such as those using Bluetooth technology, operate on the 2.4GHz radio frequency. This is the same frequency that most wireless routers (and other devices) use; care must be taken when using both in close proximity because of possible interference. Changing the channel on the router may help. Contact your tech support person if you think you are experiencing such a conflict.

A Note About Router Speeds

Router manufacturers often promote the faster N standard as superior to the earlier B and G, and it can be. But if you are only going to use your router to allow a laptop to connect to the Internet, a G-type router will work just as well as an N-type, even though it is slower. Why is this so? Because most Internet connections are far slower than even a B- or G-type router's capabilities.

For example, if your Internet connection averages approximately 1MB per second while downloading, that far exceeds the 20MB bandwidth of the B or G router. In other words, that extra 19MB of bandwidth is "wasted." A more advanced router only puts its higher speed to use when you have multiple devices trying to access each other within a WLAN, which is more typical of an office setting than one you are likely to see in a home.

Keyboard

A computer keyboard copies its layout primarily from that of a typewriter. The computer keyboard also has extra keys for functions that are needed for computer functions. It allows you to communicate with your computer by using keystrokes to type letters and numbers, like with a typewriter, or send it commands. Pressing a key on the keyboard sends an electronic signal to the computer. The electronic signal results in the inputting and processing of data.

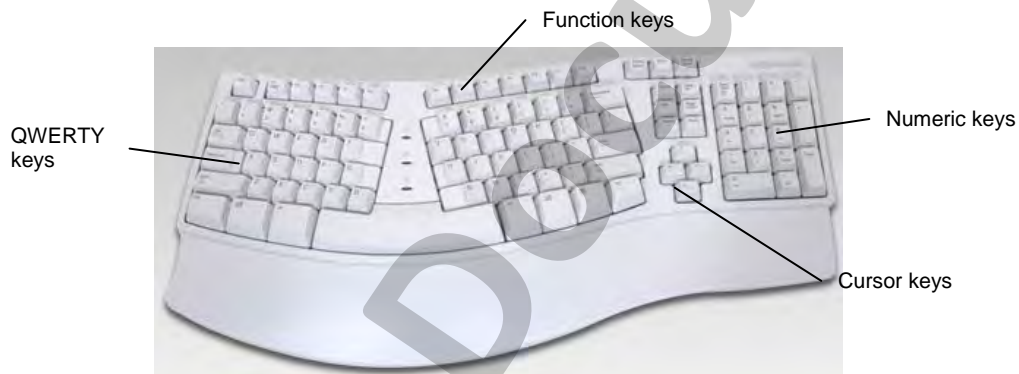
There are many styles of keyboard available, including some that have additional functions, such as for controlling the sound card or to launch a Web browser or other application on the computer. Some keyboards abandon the flat, typewriter-type layout in favour of a more ergonomic design to encourage a natural hand, wrist and forearm position.



Standard 101 Keyboard



Multimedia Keyboard



Microsoft Natural Keyboard

'QWERTY' keys

The vast majority of English-language keyboards use the “QWERTY” layout of keys, borrowed from the traditional typewriter layout. The name comes from the fact that the top row of alphabetic keys are Q, W, E, R, T, and Y.



Function keys

The function keys (usually labelled F1 to F12) are programmable keys found on the top row of most keyboards. They perform special operations in many software programs. The F1 key is often used to access an open software program's Help files. When you become familiar with their purpose, function keys can be quicker to use than the mouse for some tasks.



Direction keys

The direction or cursor keys enable you to move the cursor around the screen in four directions.



Numeric keypad

The numeric keypad is designed for fast keying in of numbers for people who are familiar with its layout. The NUM LOCK key determines whether the keypad is used for this purpose, or for navigation in the same manner as the cursor keys.



Modifier and miscellaneous keys

The computer keyboard is augmented with several other keys not found in the older typewriter layout. Above the cursor keys are the Print Screen, Scroll Lock, Pause, Insert, Delete, Home, End, Page Up, and Page Down keys. Their functions are very similar across most applications.



The "Shift", "Ctrl", and "Alt" keys, found along the bottom two rows of the keyboard, are called modifier keys. They don't do anything by themselves; instead they are pressed with other key(s) to perform a context-sensitive function. These keyboard shortcuts can be a faster way to initiate a function than using a mouse. For example, highlighting text in a word processor and then pressing "Ctrl" and "B" at the same time makes the text **bold**.

General peripheral connection tips

Always look at the documentation for a peripheral before connecting it. Modern operating systems will usually automatically install the correct software updates for peripherals, but on rare occasions a conflict may arise, causing the peripheral not to work. This is most likely to happen with an older peripheral connected to a brand new operating system.

When this happens, disconnect the peripheral and restart the computer. Uninstall all of the software that came with the peripheral, and then restart the computer again. Now connect the peripheral to see if the operating system can recognize it on its own. If this fails to work, you may find information to solve the problem at the website of the company that manufactured the peripheral. The website also may contain updated software for use with your

The "Esc" (or escape) key is located in the upper-left of the keyboard. It is used to immediately cancel operations in certain applications. The Windows key, usually placed between the "Ctrl" and "Alt" keys, by default opens Windows Start menu. It can also be used as a modifier key in Windows 7.