PC Hardware: -

Over the next several pages I am going to describe 3 different pieces of PC hardware and the way in which each of them works. I will use pictures gathered from the internet of the external views and internal views of each component and also pictures to describe the way in which it works through its connections!

To start off with I am going to study a TFT flat screen monitor and the ways in which it works.

What it looks like: -

As you can see it is very thin and also flat, creating a perfect picture.

The feet are very wide creating a stable base and also they allow the screen to be tilted.

The screen above clearly shows the new revolutionary technology of the modern monitor. It has very stream-lined shape and a very modern but stylish look to it.

Below are some advantages of a TFT monitor over the old CRT monitors: -

1. There is much less glare from a TFT monitor. During testing in the Arts IT office we were able to have the blinds open and still read the screen, something impossible with CRT displays.

2. The monitor is less bulky. This has a couple of advantages, firstly it gives you more desk space, but secondly because of this you can position the monitor further away from you which we have found more comfortable for the eyes.

3. TFT monitors produce less heat and radiation that CRT monitors.

4. TFT monitors have a very crisp image only comparable to very expensive CRT monitors.

5. The monitor can be mounted on an arm or on the wall to save even more desk space.

Although it does have these advantages there are however disadvantages which I am going to list below: -

1. If you are working with graphics, although the graphics are very clear, due to the limited angle at which you can view the display colours may appear slightly different on non-TFT screens.

2. TFT monitors have a limited angle of view. This is the angle at which you can clearly view the screen. If you are looking directly at the screen while working on your PC this is fine, but if others are trying to read it then they may have difficulty.

3. You may experience some blurring on lower end models when there is movement on the screen. This is most prominent in full screen games where you get a motion blur effect but is also noticeable when scrolling through documents or websites.

How any PC monitor works: -

(Referenced from http://computer.howstuffworks.com/monitor1.htm)

The display function on a monitor provides instant feedback by showing you text and graphic images as you work or play. Most desktop displays use a cathode ray tube (CRT), while portable computing devices such as laptops incorporate liquid crystal display (LCD), light-emitting diode (LED), gas plasma or other image projection technology. Because of their slimmer design and smaller energy consumption, monitors using LCD technologies are beginning to replace the venerable CRT on many desktops. So as above with the TFT monitor it is the next step forward.

Here is a short history of how far the monitor has come since it was first invented: -

Displays have come a long way since the blinking green monitors in text - based computer systems of the 1970s. Just look at the advances made by IBM over the course of a decade:

- In 1981, IBM introduced the Colour Graphics Adapter (CGA), which was capable of rendering four colours, and had a maximum resolution of 320 pixels horizontally by 200 pixels vertically.
- IBM introduced the Enhanced Graphics Adapter (EGA) disp lay in 1984. EGA allowed up to 16 different colours and increased the resolution to 640x350 pixels, improving the appearance of the display and making it easier to read text.
- In 1987, IBM introduced the Video Graphics Array (VGA) display system. Most computers today support the VGA standard and many VGA monitors are still in use.
- IBM introduced the Extended Graphics Array (XGA) display in 1990, offering 800x600 pixel resolutions in true colour (16.8 million colours) and 1,024x768 resolutions in 65,536 co lours.

Here is a picture of the linking cable for a monitor to a tower system with the labels: -

1: Red out	**6**: Red return (ground)	**11**: Monitor ID 0 in
2: Green out	**7**: Green return (ground)	**12**: Monitor ID 1 in or data from display
3: Blue out	**8**: Blue return (ground)	**13**: Horizontal Sync out
4: Unused	**9**: Unused	**14**: Vertical Sync **5**: Ground
5: Ground	**10**: Sync return (ground)	**15**: Monitor ID 3 in or data clock

So that about wraps things up for the monitor and as over the last 3 pages I have said, TFT and plasma screen monitors are the way forward in the monitor technology business.

So now onto modems: -

Short for modulator-demodulator. A modem is a device or program that enables a computer to transmit data over, for example, telephone or cable lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.

Fortunately, there is one standard interface for connecting external modems to computers called RS-232. Consequently, any external modem can be attached to any computer that has an RS-232 port, which almost all personal computers have. There are also modems that come as an expansion board that you can insert into a vacant expansion slot. These are sometimes called onboard or internal modems.

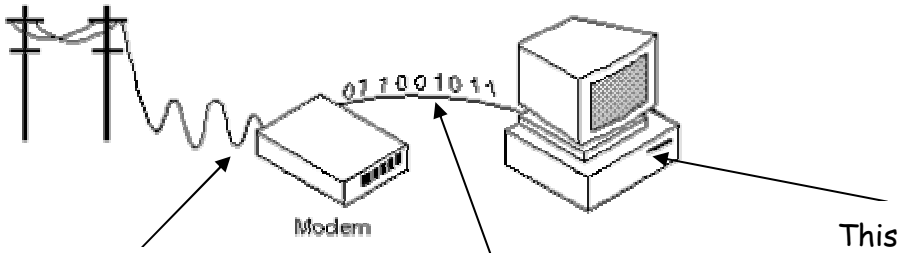
While the modem interfaces are standardized, a number of different protocols for formatting data to be transmitted over telephone lines exist. Some, like CCITT V.34, are official standards, while others have been developed by private companies. Most modems have built-in support for the more common protocols -- at slow data transmission speeds at least, most modems can communicate with each other. At high transmission speeds, however, the protocols are less standardized.

Aside from the transmission protocols that they support, the following characteristics distinguish one modem from another:

1. bps : How fast the modem can transmit and receive data. At slow rates, modems are measured in terms of baud rates. The slowest rate is 300 baud (about 25 cps). At higher speeds, modems are measured in terms of bits per second (bps). The fastest modems run at 57,600 bps, although they can achieve even higher data transfer rates by compressing the data. Obviously, the faster the transmission rate, the faster you can send and receive data. Note, however, that you cannot receive data any faster than it is being sent. If, for example, the device sending data to your computer is sending it at 2,400 bps, you must receive it at 2,400 bps. It does not always pay, therefore, to have a very fast modem. In addition, some telephone lines are unable to transmit data reliably at very high rates.

2. voice/data: Many modems support a switch to change between voice and data modes. In data mode, the modem acts like a regular modem. In voice mode, the modem acts like a regular telephone. Modems that support a voice/data switch have a built-in loudspeaker and microphone for voice communication.
3. auto-answer : An auto-answer modem enables your computer to receive calls in your absence. This is only necessary if you are offering some type of computer service that people can call in to use.
4. data compression : Some modems perform data compression, which enables them to send data at faster rates. However, the modem at the receiving end must be able to decompress the data using the same compression technique.
5. flash memory : Some modems come with flash memory rather than conventional ROM, which means that the communications protocols can be easily updated if necessary.
6. Fax capability: Most modern modems are fax modems, which means that they can send and receive faxes.

To get the most out of a modem, you should have a communications software package, a program that simplifies the task of transferring data.



This is the connection from the phone line to the modem.

This is the information cable from the modem to the PC.

This is the PC receiving the information.

Above is a basic external modem connection which with a server will allow you connection to the internet.

Other types of internet connection: -

ISDN connection wires, no modem needed: -

Integrated Services Digital Network (ISDN) was specified by the CCITT standards body (now known as ITU-T) as long ago as 1984. It was originally designed as a "next generation" telephone system, integrating voice and data into one connection. The ISDN Basic Rate Interface (or BRI) is a standard connection you would have in any home or small business, offering two simultaneous connections (any mix of fax, voice and data). When used as a data connection, ISDN BRI can offer two independent data channels of 64kbps each, or 128kbps when combined into one connection. The ISDN Primary Rate Interface (or PRI) offers 30 channels (of 64kbps each), giving a total of 1920kbps. As with BRI, each channel can be connected to a different destination, or they can be combined to give a larger bandwidth. These channels, known as "bearer" or "B" channels, are at the heart of the flexibility of ISDN.

As we know, the standard telephone connection did not die, and in fact increasing demand for extra phone lines (and fax lines) has made the telco business very profitable. However, ISDN has grown into a premium service, which the telcos like to target towards high-end or highvolume telephony users, typically businesses rather than home users. Let's look at some of the advantages that have given ISDN its unique niche:

• Dialup is fast. ISDN calls typically dial and connect in 1 to 3 seconds.
• It's digital. 64kbps bandwidth for each "B" channel is guaranteed.
• It's multi-mode. A "B" channel can carry data, voice, fax or video.
• It concentrates calls: a PRI connection can deliver 30 concurrent calls through one cable. A BRI delivers 2 calls through one cable.
• Through MSN you can associate many telephone numbers to the same line (at a fraction of the cost of separate, multiple telephone lines).

So as you can see there are many different ways in which to connect your PC to the internet, and there are different ways in which the information can be sent and received. This shows the changing environment developers have created.

Now onto the third and last hardware piece the mouse: -

Types of mice: -

1. Cordless
2. Footmouse
3. Glidepoint
4. IntelliMouse
5. J mouse
6. Joystick
7. Touch pad
8. Trackball
9. TrackPoint
10. Wheel mouse

Descriptions for each mouse type: -

1. Also known as wireless, cordless is the ability to operate a device without any wires that may cause constricted movement. Cordless computer hardware devices commonly utilize such Infrared or Bluetooth. Cordless networks commonly utilize one of the IEEE 802.11 wireless standards to achieve wireless.

   Although a cordless hardware device requires no wires it will commonly require some type of device to broadcast a signal, for example a Bluetooth mouse may require a USB Bluetooth transceiver to send and receive signals from the mouse. In addition to this all wireless hardware devices will require batteries to power the device.

2. A different type of idea that enables a user to control the mouse with their feet. The idea behind this technology is to enable a user to not have to move their hands from their keyboard. An example of a company who develops this company is Hunter Digital.

3. Also known as a glidepoint, a touch pad is a input device used on a large majority of portable computers as a mouse device. A touch pad is operated by using your finger and dragging it across a flat surface, as you move your finger on the surface the mouse cursor will move in that same direction.

4. Also known as a "wheel mouse", the IntelliMouse is a mouse developed by Microsoft in 1996 that had a wheel between the left and right mouse buttons that enabled the user to easily scroll up and down. Because of the wide use and popularity of this feature all mice now have this feature.

5. A type of mouse solution used for portable computers that utilized the "J" key on the keyboard and commonly had two separate buttons for the left and right click below the space bar. Many of the computer keyboards that had a J mouse had a "J" key that was a different colour then all the other keys. Because of its difficulty and better technologies that were later introduced this type of mouse is no longer used
6. A peripheral input device that looks similar to a game joystick that you would find on a gaming system. A computer joystick allows an individual to easily navigate an object in a game such as navigating a plane in a flight simulator.
7. Same as a Glide Point or number 3 in the list of types of mice.
8. Type of input device that looks like an upside-down mouse. The onscreen pointer is moved by the trackball with a thumb or finger. A trackball requires less arm and wrist motion that a regular mouse takes.
9. A type of mouse solution used with portable computers that is a small isometric joystick that resembles a pencils eraser head and is located between the "G", "H" and "B" keys on the keyboard. This technology enables a user to keep his hands on the keyboard and still be able to control the mouse. The buttons for this mouse are commonly located under the space bar.
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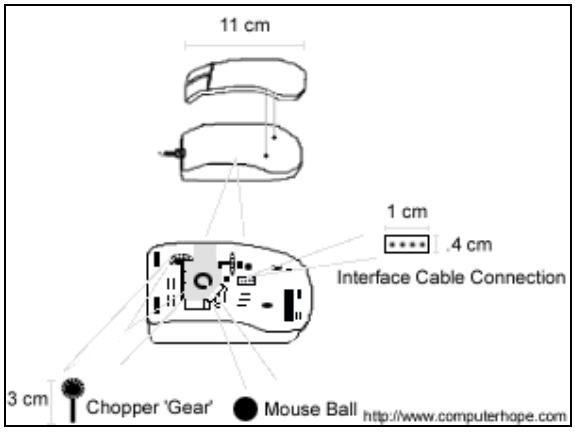
The two main types of mice and how they work: -

Mechanical Mice - Mechanical Mice requires that the mouse be set on a flat surface. The distance and the speed of the rollers inside the mouse determines how far the mouse cursor moves on the screen depending on the software configuration.

Optical Mice - Optical Mice require a special mouse pad which has a grid pattern. A sensor inside the mouse determines the movement by reading the grid as the mouse passes over it while emitting a light from an LED or sometimes a laser. This type of mouse is much more accurate than the ordinary optical mechanical mouse which relies on the traction between the mouse ball and the rollers. One drawback to an optical mouse is they can have problems in bright lights.

How a mouse basically works: -

The illustration below shows the disassembly of a standard mouse. As shown you can see that the internal components of a mouse. I have illustrated the general location of four main components within the mouse.



First you will notice the two Choppers and or Gears these two represent the axis of where the cursor is located. The chopper furthest to the represents the X axis which is the vertical axis. The other chopper which is only partially shown represents the Y axis which is the horizontal axis.

Second you notice the mouse ball. The mouse ball is the main part within the mouse which allows the user to move the mouse which moves the appropriate axis which then moves the mouse cursor on the screen. Without the mouse ball the mouse would be useless.

Third you notice the four pin Interface Cable Connection, which is where the information is transferred from the mouse to the computer.

Conclusion on Hardware: -

Over the past ten pages I have studied 3 different pieces of commonly found hardware and shown the different types of each one which is available. I have also show how they work and the development of them since early models.

It has become apparent to me as I have being doing this that there are several different points which I have seen that show a dramatic and sudden change from the old hardware to the new. For example with the monitors it suddenly went from the old CRT monitors to the new TFT and plasma screen monitors very quickly due to the mass number of competing companies trying to gain supremacy in the technological market. So it would be no surprise if we see a sudden shift in the development of everything else technologically related and we will soon have pieces of hardware which are a thousand times better than that of the hardware we have at the moment!