1. Assemble Computer

The process to fit together the parts or pieces of computer is known as assemble computer.

A branded PC as the name suggest is System already assembled by an specific company like Compaq, Lenovo, Dell, HCL etc. The hardware of such systems are of the same company. It is a bit costly and personally not of much benefit. You will get onsite warranty for your branded pc but that too costs some amount.

An assembled PC is an system in which you decide what you want and what you don't and then get it assembled (yourself or from the shop itself).For e.g. you tell the vendor that you want this and this processor, RAM, graphic card, hard disk, Motherboard, speaker etc. You select your own preferred company/model for each hardware.This is cheap, but you need to have good knowledge about computer hardware's, FSB's, Clock frequencies, Compatibility etc.

You won't need many tools to assemble your computer, in fact the only one you must have is the screwdriver, but if you can get most of the following together, you'll find things go a little easier.

Basic tools

Before you begin building or refitting a computer, you should have some basic tools:

1. #2 Phillips-head (cross-shaped) screwdriver
2. Needle-nose pliers
3. Anti-static Wrist Strap
4. A large level working space

Optional, but useful tools

Some other tools and equipment can come in handy as well, such as:

1. Spring action parts grabber.
2. Electrical tape
3. Wire or nylon ties
4. Flashlight, preferably hands-free
5. A second, working computer to swap parts, look for tips, ask for help on-line, download drivers and patches, etc. - very useful
6. A can of compressed air - useful when working with older parts that have collected dust. A better alternative but also more costly, is a vacuum cleaner designed for cleaning electronics.

1.1. Precautionary measures

a) Static electricity is the biggest danger to the expensive parts you are about to assemble, even a tiny shock, much too small for you to feel, can damage or ruin the delicate electronic traces, many times smaller than a human hair, that make up your CPU, RAM and other chips. It's important to use your anti-static wrist strap to prevent damage to these components. Once you have the power supply installed in the case, clip the end of the wrist strap to the outside of the power supply. (Never plug your computer in while you are connected to it by

a wrist strap.) This will ensure that you, the case and the power supply are all connected to a common ground, in other words there will be no inequality of charge that will allow a spark to jump from you to the case. It's also helpful to have an anti-static mat to set the case and other components on.

b) Nobody but you is at fault if you shock your components with static electricity. Make sure that you take the precautions in the previous paragraph to ground yourself from static electricity. (Note: if you really must work on a computer and have not got proper anti-static equipment, it is *usually* OK if you make sure that you do not move about much; are not wearing any static-prone clothing; handle components by the edges; and regularly (once a minute or so), touch a grounded object.). The *case metal* of your PC's power supply will usually be a suitable grounded object. As noted above, touch it every few minutes while you are working on your PC if you haven't got a wrist strap.

c) Turn off your computer and switch off your Power Supply at the wall before installing or removing any components - if power is flowing to components as they are installed or removed, they can be seriously damaged. In order to have a computer properly grounded, you need it plugged in at the wall but turned off at the power supply and at the wall. The neutral line may be earthed

d) Never cut the grounding pin off your power cord. This "safety ground" stands between you and potentially lethal voltages inside the power supply.

e) Be wary of sharp edges! Many lower-end PC cases have sharp, unfinished edges. This is especially so on interior surfaces, and where the case has been cut or punched-out. Use care and take your time to avoid cutting your hands.If your case has this problem, a little time with some sandpaper before you begin construction can spare you a lot of pain.

f) Dismantling discrete electronic components such as your Power Supply or Monitor is dangerous. They contain high voltage capacitors, which can cause a severe electric shock if you touch them. These hold a charge even when the unit is not plugged in and are capable of delivering a fatal shock.

Step by Step Assembling Procedure.

a) Take Inventory:

Before you start, take inventory of your parts. Do not begin assembling your computer if you don't have everything you need. Begin the step-by-step process once you have determined you have everything you need

.

Figure 1: Take Inventory of the Different Computer Parts

b) **Make Space, Make Time**:

Building a PC take space - about a dining room table worth. So make sure you have plenty of working room and a few hours to proceed with minimal interruption. Work on a flat, stable table top surface or bare floor, where you have room to layout all of the items.

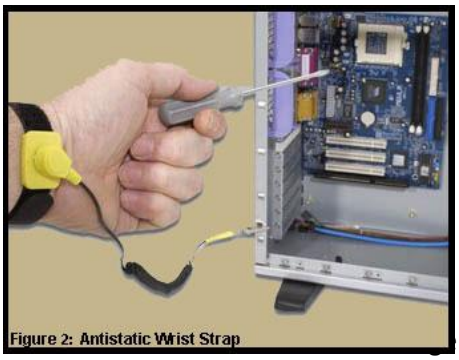


Figure 2: Antistatic Wrist Strap

c) . **Prepare Grounding Protection**:

Use an inexpensive antistatic wrist strap (they are often priced at less than $6) is the perfect preventive measure if you have no alternative to working on carpet. Remember, a table top or bare floor is always the best place to build your system. Make sure you are wearing your antistatic wrist strap correctly (it does you no good at all if you do not wear it!), and you are ready to proceed. Look Figure 2 for details.

d) Have the Drivers Ready**:**

Assuming you have another internet connected PC, download the latest drivers from the vendors' websites for each component you will be installing. Sometimes drivers are updated between the time the component was manufactured and the time you are installing it. It is always best to have the latest. Copy them to a CD for easy access.

e) Installing Motherboard

1. Great care should be taken when installing the motherboard. First, take the board out of its packaging and put it on top of the antistatic bag it came in (see Figure 3). Remember, you always want to safeguard your components from potentially hazardous static electricity (wear your strap).

Figure 3: Motherboard in an Antistatic Bag

2. Before you secure the motherboard onto the PC case/chassis, inspect it carefully for any visible defects.
3. Next, review the motherboard manual, to make sure you are familiar with the motherboard layout and understand which socket is which. Manuals are extremely helpful, usually easy to read, and include illustrations. Following you can find instruction on how to install the processor, the heat sink, and the memory modules on the motherboard. You should not place the motherboard in the computer case until you are told to do so.

f) Installing CPU

1. Use the unlocking mechanism to open the CPU socket which is usually a lever.
2. Carefully line up the pins and place the chip in its socket; it will fit only when oriented the proper way. An arrow or a missing pin on one corner of the chip will show you how to line things up.
3. Align Triangular CPU and socket key marks as shown in Figure 4.
4. Lower the lever to lock the CPU into place.

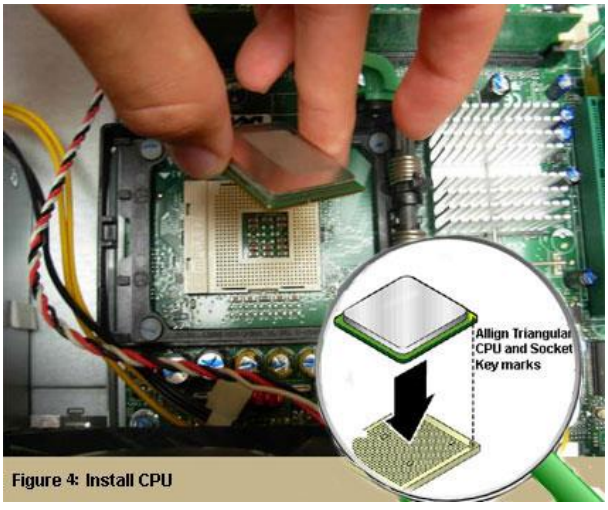


Figure 4: Install CPU

g) Install CPU Heat Sink

1. Follow the manufacturer's directions to install the heat sink and the fan that will cool the processor. If you bought an OEM CPU and a separate heat sink, you may need to spread a thin layer of the thermal grease that came with the heat sink over the chip to ensure proper transfer of heat (some heat sinks come with this grease already applied).

2. Attach the clip that holds the heat sink in place keeping in mind that it may require a fair amount of force. Again, follow the instructions that came with the heat sink. They will show you how to fit it correctly. If you are in doubt, you can visit the manufacturer's website for more information.

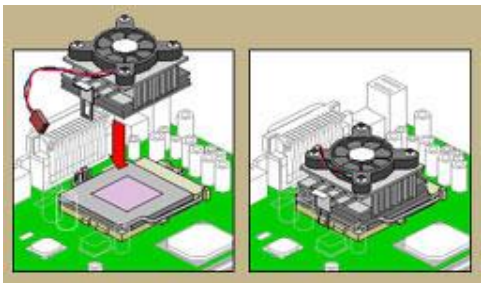


Figure 5: Install CPU Heat Sink

3. Plug the CPU fan's power connector into the proper connector on the motherboard.

h) Install RAM

In order to install the memory modules, insert them into the proper sockets (Figure 7) and push down firmly but evenly until the clips on both sides of the socket pop into place. If your motherboard supports dual-channel memory, consult the user manual to determine which pairs of RAM sockets you should use. The motherboard and the CPU are the brain and nerve center of your PC, so selecting these components is the most important decision you'll make.

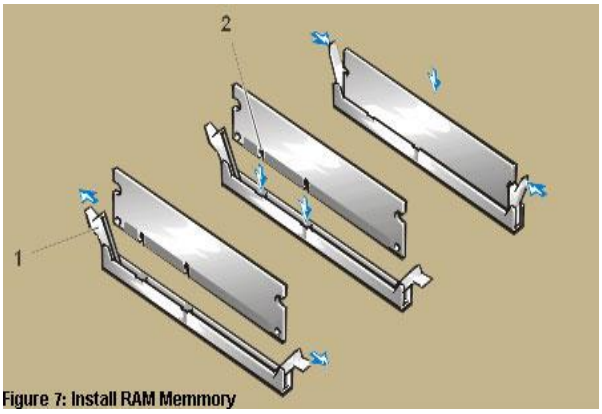


Figure 7: Install RAM Memmory

i) Place the motherboard to Case

- Some PC cases have a removable motherboard tray. If yours does, remove the screws holding it in place and pull it out of the case (Figure 8).

Figure 8: Remove Motherboard Tray

Figure 9: Screw Brass Standoffs Into the Motherboard

Figure 10: Case's I/O Shiled

Figure 11: Mount the Motherboard

- Note the pattern of the holes in your motherboard (Figure 9), and screw brass standoffs into the motherboard tray or into the PC case in the correct locations (ALWAYS check the manual and follow their instructions to the letter).
- Check the layout of the sockets on the motherboard, and confirm that the ports on your motherboard's back panel match the holes on the case's Input/Output (I/O) shield that is installed in your case. If necessary, remove the old I/O shield (Figure 10) by tapping it firmly a few times with the butt-end of a screwdriver, and then replace it with the shield that came with the new motherboard.
- Carefully position the motherboard on top of the brass standoffs (Figure 11), line up all the holes, and use the screws that accompanied the case to fasten down the motherboard. If you are using a removable tray in your system, slide the tray and motherboard back into the case and then secure the tray.

j) Connect the Power Supply

Making the proper connections is crucial to successfully assembling your PC system. Fortunately, manufacturers provide color-coded power cables and unique connector shapes to make the job easy.

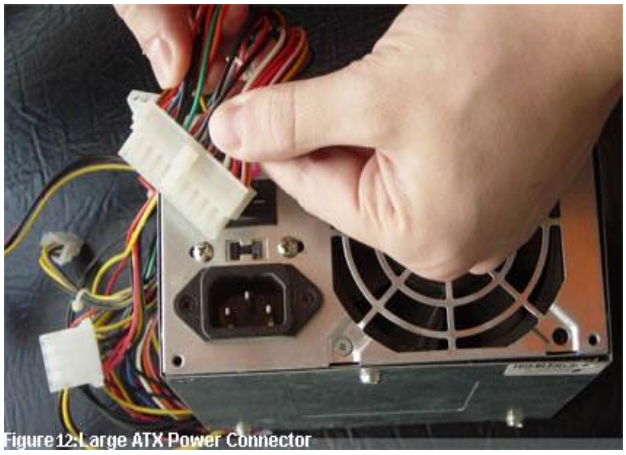
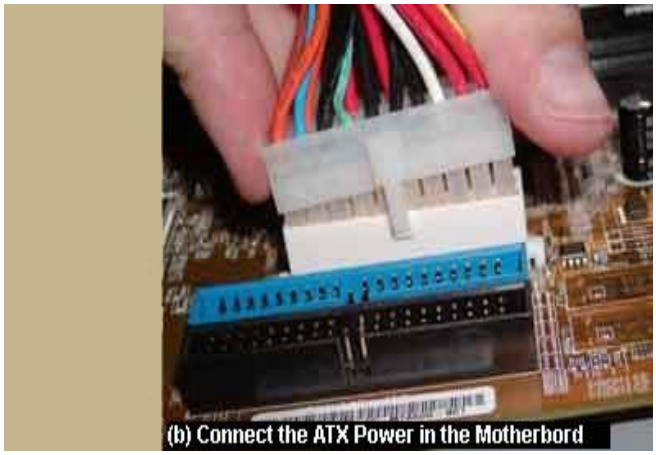


Figure 12: Large ATX Power Connector



(b) Connect the ATX Power in the Motherbord

- First, plug the large ATX power connector (Figure 12a) from your power supply into the matching port on your motherboard. Look Figure for details.
- Locate the smaller, square processor power connector (Figure 13) (you cannot miss it - it is the one sprouting the yellow and black wires) and attach it to the motherboard. Note: your connector is usually located

Figure 13: Square Processor Power Connector

near the processor. As always, refer to your motherboard's manual for the exact locations.

- Use your motherboard user manual and find the description about front-panel connectors.
- Attach each of the tiny leads from the power and reset switches (Figure 14), the hard-disk activity lights, the PC speaker, and any front-panel USB and FireWire ports to the corresponding pin on your motherboard. The needle-nose pliers are useful for manipulating small pieces.

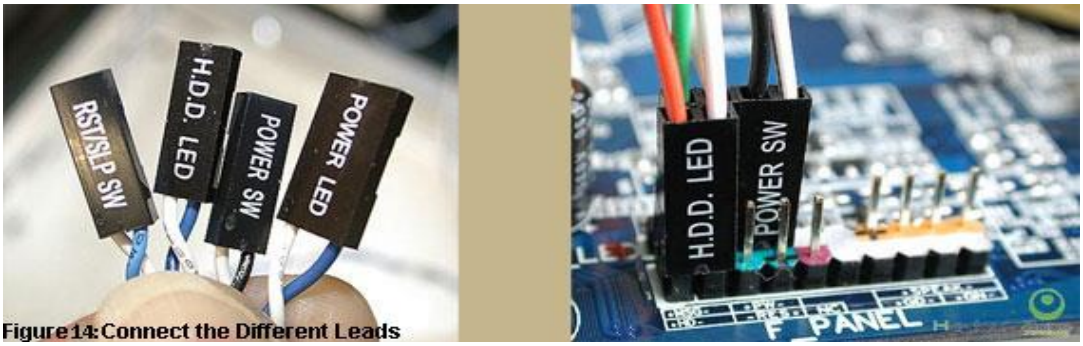


Figure 14: Connect the Different Leads

k) Install Graphics/Vedio Card if needed

- Begin by removing the backplane cover from the AGP or PCI Express X16 slot (the metal piece where the monitor connector will emerge)

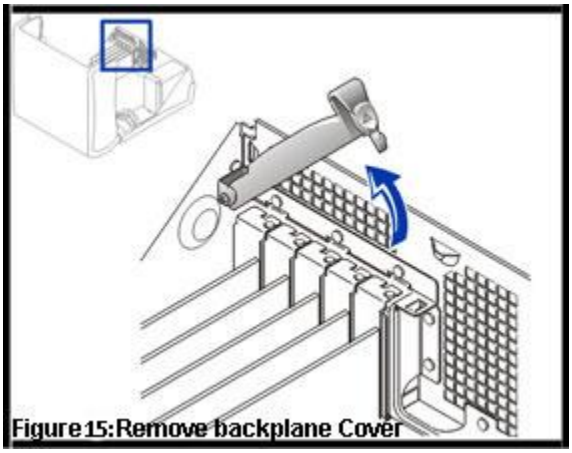


Figure 15: Remove backplane Cover

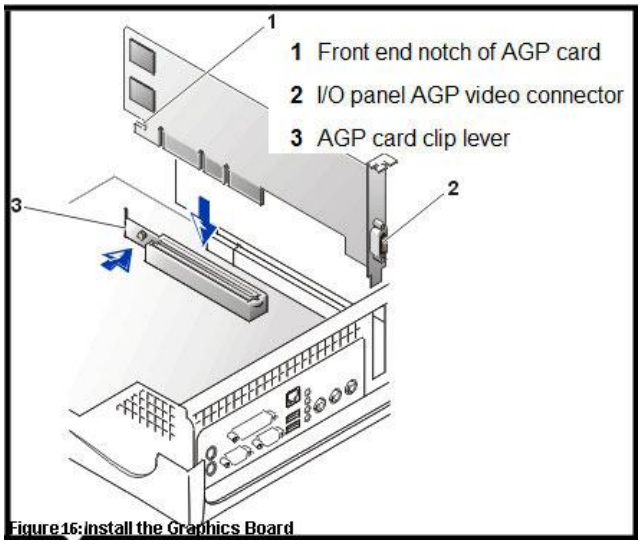


Figure 16: Install the Graphics Board

- Install the graphics board in that slot, and then secure the card with a screw
- Some graphics boards require a dedicated connection to your computer's power supply. If yours does, you should plug in the correct power connector now. Some video cards allow the insertion of a second video card connected to the first (see CrossFire). If you purchased such a configuration, install and connect the second video card.

l) Connect Computer Peripherals(Input/Output)

- Connect a keyboard, mouse, monitor, and power cable to your computer and turn it on.

- If the internal fans begin to whir, the system beeps, and you see the machine starting to boot, power down by holding the power button for 5 seconds and continue building

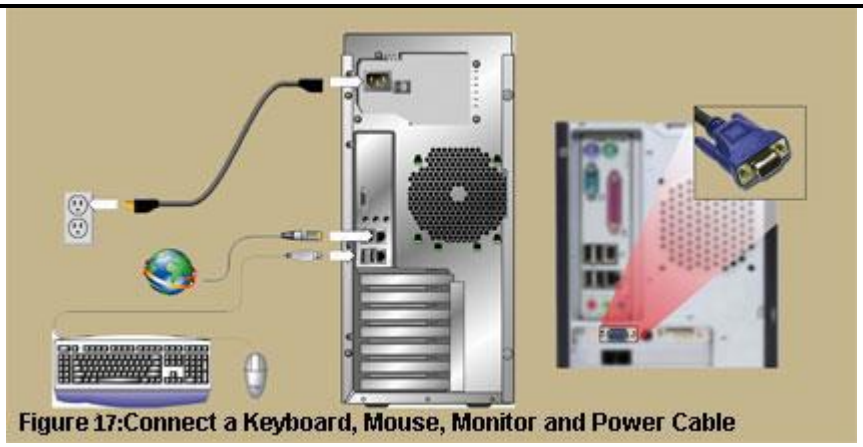


Figure 17:Connect a Keyboard, Mouse, Monitor and Power Cable

- **If nothing happens,** back up a step and recheck all of your connections. Make sure that both the processor and the memory are properly seated, and recheck those minuscule leads connecting the motherboard to the power and reset switches
- If it performs as expected, shut down your PC, unplug it, and open the case

m) Install the drives
Now it is time to install your drives. This is an easy process, but it requires attention to detail.

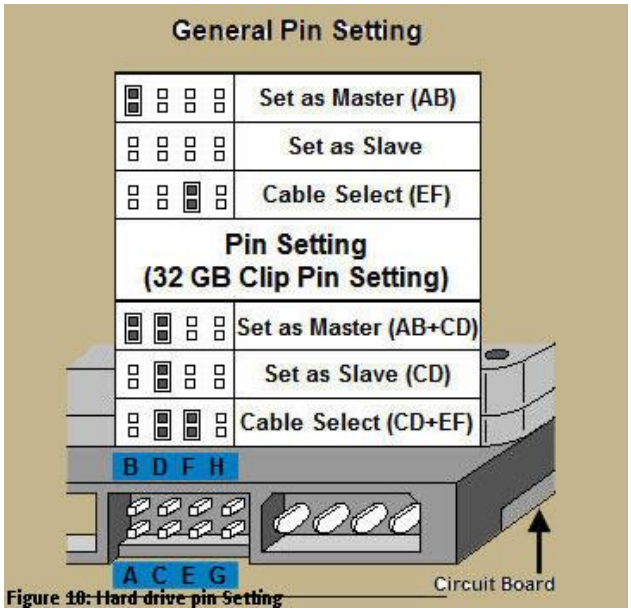


Figure 18: Hard drive pin Setting

Figure 19: Attach your Drives

- Make any necessary changes to jumpers on the drives before mounting them in the case. A two-drive system (one or two SATA hard drives, plus one parallel ATA optical drive, for example) is easy to set up; the SATA drives are jumper less, and the optical drive can be set as master on its own parallel ATA channel. Many cases have removable drive rails or cages to house drives. Figure 18 will prove to be of great help.
- Use the included screws to attach your drives to the rails or cage, and slide them into the case. For externally accessible drives such as a DVD recorder, you can save time by installing one drive rail and sliding the drive in for a test fitting to make sure that its front is flush with the case(fig 19)

- When the drives are installed, connect power and data cables to each one. Parallel ATA drives use wide, flat data cables that can be installed only in the correct way. Floppy drives use a similar but smaller cable; SATA drives use a thin, 1cm-wide data cable. SATA drives use a new type of power connector that many power supplies don't come with. Fortunately, many motherboards ship with adapters for converting a standard four-pin power connector to a SATA power connector(fig 20)

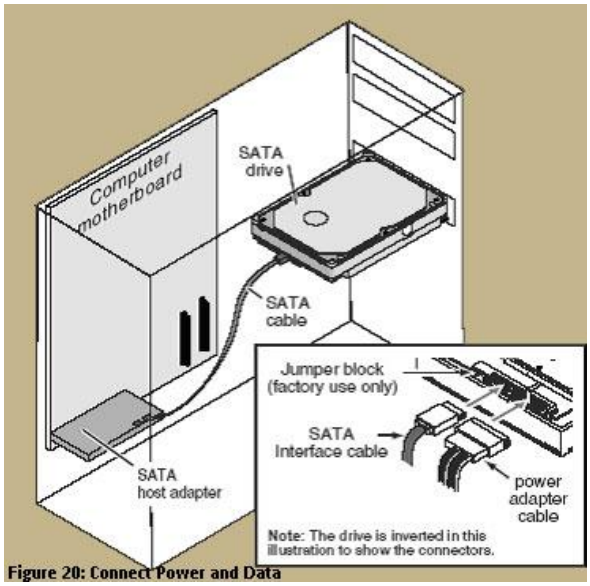


Figure 20: Connect Power and Data

- Some drives ship with both the older connector and the SATA power connector. In that case, use one power connector or the other, but not both. The capacity of hard drives continues to increase: You can now hold over 1TB (Terabyte or 1,000GB) of data on a single drive. But though you don't have to compromise on the drive's size, you still have a few choices to make when picking a hard disks

n) Install Add-in Cards.

- For each add-in card, you must choose a free PCI slot.
- Remove its backplane cover to allow access from the rear of the case.
- Carefully position the card above the slot, and press down firmly to seat the card (Figure 21).
- Secure the card with a screw.

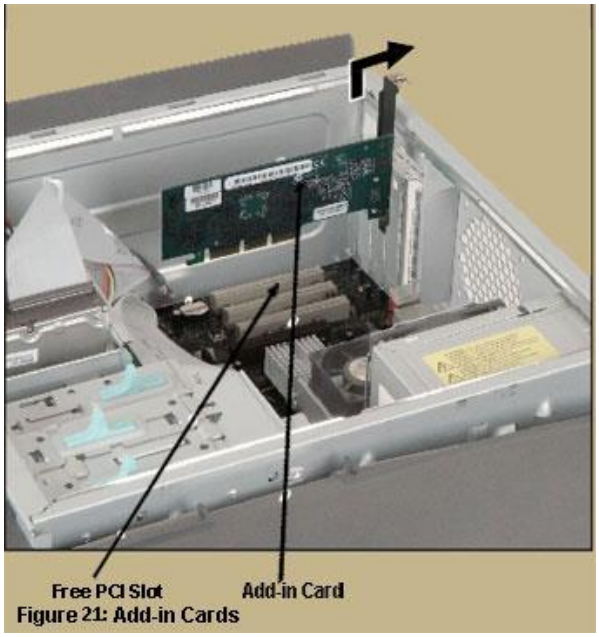


Figure 21: Add-in Cards

Many motherboards have additional sound connectors or ports housed on small add-in boards. Some of these plug into slots on the motherboard; others screw into the back of the case in place of slot covers. Usually the additional ports are not essential to your PC's operation. For example, if you install a sound card, you do not need connectors to the motherboard's built-in sound chip. Check your motherboard manual to determine what each of these boards does.

o) Turn on Computer

Check your PC Set Up:

It is time to turn on your system and check your PC set up!

- Make sure the keyboard, mouse, and monitor are all plugged into the appropriate ports on the back of the PC. Plug the power cord back in, and turn the machine on.
- When prompted, enter your PC's BIOS setup screen by pressing the indicated key (often Delete) as the machine boots. Menu options (Figure 23) will vary from motherboard to motherboard, but they share the same general categories.

Figure 22: Turn the Computer On

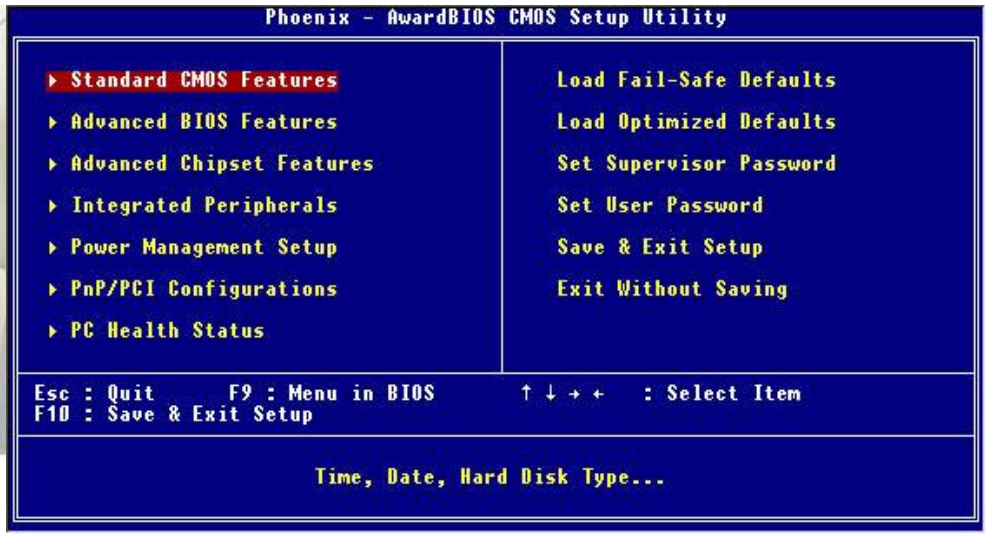


Figure 23: BIOS Setup

- Set the date and time.

Figure 24: PC Health Status Setting. Look the CPU temperature

- Look for a setting that deals with PC health status and monitoring (Figure 24). That choice should bring up a screen showing processor and case temperature. Watch the processor temperature for a few minutes. It should stabilize at a level between 30°C and 50°C. If it keeps increasing, your heat sink probably is not installed properly. Power down and check to see whether the heat sink is securely attached and making good contact with the processor
- Next, find the section of the BIOS setup that determines the order in which your machine checks drives and devices for one it can boot from (Figure 25). Set CD-ROM to the highest priority so that your machine will boot from the Windows installation CD.

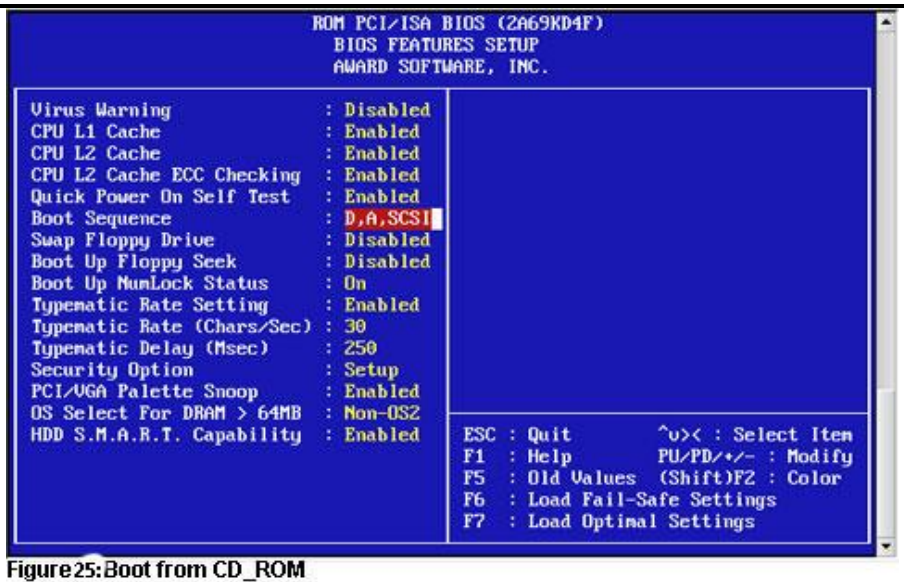


Figure 25: Boot from CD_ROM

p) Install Operating System

Before Installing the OS

You may be "cloning" a PC, and want to copy the same configuration. To do this you would use a "ghosting" tool to create an exact copy of the data from the first PC on the new one. Follow the instructions for the software to perform this operation. Some create the clone before the OS is installed, some afterwards.

Installing the OS

You are just a couple of steps away from using your new custom-built personal computer. Now you will install the operating system and then update your drivers, and install the different programs.

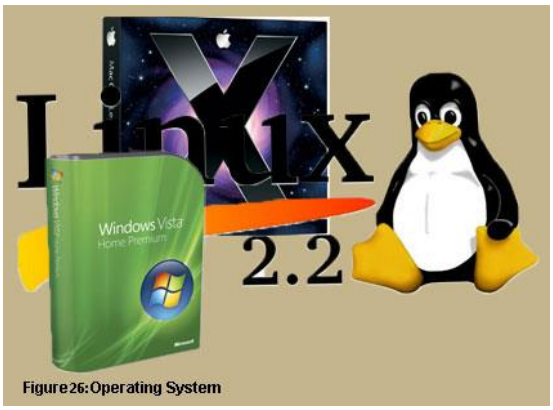


Figure 26: Operating System

- First, place the Operating System installation CD in your optical drive, reboot the PC, and allow the system to boot off the disc (assuming you setup the BIOS to boot from the CD/DVD). The Operating System setup should begin.
- Early in the process, Windows may ask you whether you need to install a third-party SCSI or RAID driver. If you're using a RAID setup, press F6 when this message appears; then insert the disc containing the appropriate driver when it is requested.

q) Install Drivers

Once Windows is up and running, the last step in this process is to update your hardware drivers. This is not an optional procedure.

Insert the CD with the latest drivers (downloaded from the web, or provided otherwise by the manufacturers) and install them starting with the drivers of the motherboard and graphics card and then moving on to the less critical ones (mouse and sound card drivers). Windows comes with basic

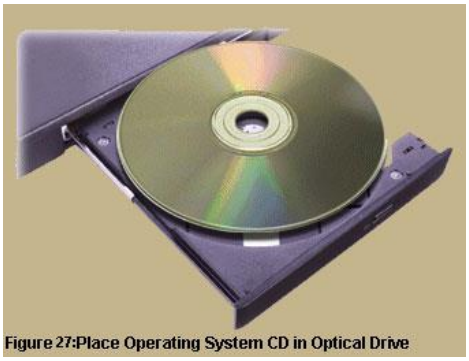


Figure 27: Place Operating System CD in Optical Drive

drivers to get you up and running, but specific or updated drivers are vital. Several reboots later, you should have a fully updated PC!

r) Install Antivirus and Setup Internet Connection.

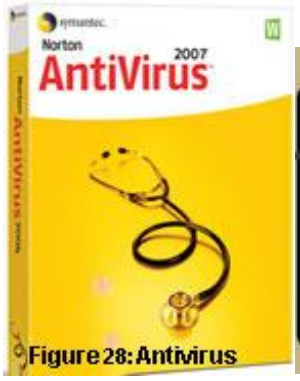


Figure 28: Antivirus

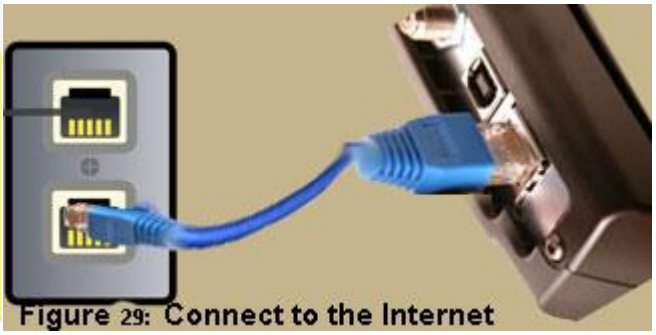


Figure 29: Connect to the Internet

- Before you establish an internet connection, you should first install a good antivirus and firewall product for security reasons (CA's is strongly recommended).
- Download the latest patches of the operating system.
- Make sure that everything runs smoothly, and then back up your system.
- Save the hardware configuration under Windows. That way you will have a clean, current image of Windows to go back to if serious trouble arises in the future.
- Get your network and internet connection up and running. Plug one end of the ethernet cable into the wall jack and the other end of the cable into the ethernet port of your computer. If you are not sure which jack it is, check the motherboard manual. After everything is connected, your setup should resemble Figure

s) Install Application Software

After installing the operating system, you will need to install the software you will be using, such as Microsoft Office, Adobe Photoshop, Corel Draw, and others. Some software will require registration or validation, so have the original discs with the software registration or license key ready. After installing the software, you may need to validate the software with the manufacturer or published via the web or by phone.

Once this is all done, you are ready to use.

1.2. BIOS setup

BIOS is variously referred to as "Basic Input Output System" or "Binary Input Output System". BIOS is what gets the computer up and running at startup. BIOS is intended to provide the basic input/output services between the computer's mainboard and its busses, disk, card slots and controller chipsets. Newer BIOS is often built with a SYMBIOS link to the Desktop Management Interface in the operating system allowing the operating system to directly query and change BIOS settings (such as date and time) while running. The term BIOS should be used to refer to the actual ROM or Flash ROM or EPROM containing the program code gets the computer running and helps it load an Operating System. The BIOS frequently stores values it determines what type of hardware is installed or after configuration changes are made through its configuration interface. The memory where these BIOS settings are stored is called the CMOS. The two terms are frequently (and mistakenly) used to refer to the BIOS itself.

When powered on, the BIOS is copied from ROM into RAM and begins to run. The BIOS performs a POST (Power On Self Test) of the computer hardware, establishes

communication with a boot device, searches for the operating system on that device, loads the operating system from disk. Today's modern BIOS is stored in EPROM.

How to enter the BIOS or CMOS setup.

Solution

Note: This document doesn't help users who cannot enter BIOS or CMOS setup because of a password.

Because of the wide variety of computer and BIOS manufacturers over the evolution of computers, there are numerous ways to enter the BIOS or CMOS Setup. Below is a listing of the majority of these methods as well as other recommendations for entering the BIOS setup.

New computers

Computers that have been manufactured in the last few years will allow you to enter the CMOS by pressing one of the below five keys during the boot. Usually it's one of the first two.

- F1
- F2
- DEL
- ESC
- F10 *

* F10 is also often used for the boot menu. If F10 is the boot menu your computer is likely F2 to enter setup.

A user will know when to press this key when they see a message similar to the below example as the computer is booting. Some older computers may also display a flashing block to indicate when to press the F1 or F2 keys.

Press <F2> to enter BIOS setup

Tip: If your computer is a new computer and you are unsure of what key to press when the computer is booting, try pressing and holding one or more keys the keyboard. This will cause a stuck key error, which may allow you to enter the BIOS setup.

Once you've successfully entered the CMOS setup you should see a screen similar to the below example.

Older computers

Unlike the computers of today, older computers (before 1995) had numerous different methods of entering the BIOS setup. Below is a listing of general key sequences that may have had to be pressed as the computer was booting.

- CTRL + ALT + ESC
- CTRL + ALT + INS
- CTRL + ALT + ENTER

- CTRL + ALT + S
- PAGE UP KEY
- PAGE DOWN KEY

ACER BIOS

If your computer is unable to boot or you wish to restore the BIOS back to bootable settings and your computer uses an ACER BIOS, press and hold the F10 key as you turn on the computer. While continuing to hold the F10 key, you should hear two beeps indicating that the settings have been restored.

AMI BIOS

Older AMI BIOS could be restored back to bootable settings by pressing and holding the Insert key as the computer is booting.

BIOS or CMOS diskettes

Early 486, 386, and 286 computers may have required a floppy disk in order to enter the BIOS setup. These diskettes are known as ICU, BBU, and SCU disks. Because these diskettes are unique to your computer manufacturer, you must obtain the diskettes from them. See the computer manufacturers list for contact information.

Early IBM computers

Some models of early IBM computers required that the user press and hold both mouse buttons as the computer was booting in order to enter the BIOS setup.

Other suggestions

Finally, if none of the above suggestions help get you into your CMOS setup you can cause a stuck key error, which will usually cause the CMOS setup prompt to appear and remain until you press a key to continue. To do this press and hold any key on the keyboard and do not let go (you may get several beeps as you're doing this). Keep holding the key until the computer stops booting and you're prompted with an option to enter setup or to press another key to continue booting.

1.3. HD Partition

Disk partitioning is the act of dividing a hard disk drive into multiple logical storage units referred to as *partitions*, to treat one physical disk drive as if it were multiple disks. A partition can be thought of as a division or "part" of a real hard disk drive. When you partition a hard drive, you make it available to an operating system. Multiple partitions on a singe hard drive appear as separate drives to the operating system.
For example, when you install an operating system like Windows 7, part of the process is to define a partition on the hard drive. This partition serves to define an area of the hard drive that Windows 7 can use to install all of its files. In Windows operating systems, this primary partition is usually assigned the drive letter of "C".

Primary Partition is a partition that is needed to store and boot an operating system, though applications and user data can reside there as well, and what's more, you can have a primary

partition without any operating system on it. There can be up to a maximum of four primary partitions on a single hard disk, with only one of them set as active (see "Active partition").

Active (boot) partition is a primary partition that has an operating system installed on it. It is used for booting your machine. If you have a single primary partition, it is regarded as active. If you have more than one primary partition, only one of them is marked active (in a given PC session).

Extended partition can be sub-divided into logical drives and is viewed as a container for logical drives, where data proper is located. An extended partition is not formatted or assigned a drive letter. The extended partition is used only for creating a desired number of logical partitions.

Logical drive is created within an extended partition. A logical partition is a way to extend the initial limitation of four partitions. An extended partition can contain up to 24 logical partitions (you're limited by the number of drive letters and the amount of hard drive space available for creating drives; of course, it's senseless to use 24 partitions on a system in most cases, because it will be a data organization nightmare). Logical partitions are used for storing data mainly, they can be formatted and assigned drive letters; their details are listed in the extended partition's table - EMBR (Extended Master Boot Record).

1.4. Formatting

Making a digital storage media ready (usually by the user or reseller) to receive and store data in a logical mannenr is known as Disk Formatting. Upon their manufacture, diskettes and hard disks are like blank sheets of paper which need to be divided (formatted) into logically numbered or named equal-size sections (called sectors) so that data can be entered and found quickly. Every operating system (OS) has its unique (non-standard) procedure for formatting magnetic media which normally cannot be used by other OS. Optical media (CD and DVD), however, can be used by any OS because it is formatted (always by the manufacturer) according to the universally-followed ISO standards.

1.5. Format Types

1.5.1. FAT32

Stands for a 32-bit File Allocation Table, which is a method of storing information on a hard disk that supports drives up to two terabytes and pathnames greater than 256 characters. File Allocation Table, available on OSR2 and higher. Correct name is HPFS (High Performance File System). This strange term refers to the way Windows stores data on your hard drive. "FAT" stands for "File Allocation Table," which keeps track of all your files and helps the computer locate them on the disk. The successive major versions of the FAT format are named after the number of table element bits: 12 (FAT12), 16 (FAT16), and 32 (FAT32). Even if a file gets fragmented (split up into various areas on the disk), the file allocation table still can keep track of it. FAT32 is an improvement to the original FAT system, since it uses more bits to identify each cluster on the disk. This helps the computer locate files easier and allows for smaller clusters, which improves the efficiency of your hard disk. FAT32 supports up to 2 terabytes of hard disk storage. Unless you are a *serious* power user, that should be more than enough space for you. Maximum formatin

1.5.2. NTFS

NTFS (New Technology File System) is the standard file system of Windows NT, including its later versions Windows 2000, Windows XP, Windows Server 2003, Windows Server 2008, Windows Vista, and Windows 7. The native file system of Microsoft Windows NT. NTFS offers superior performance compared to the FAT file system, excellent security, and can handle hard disks of virtually any size with significantly less waste caused by the large cluster sizes of FAT. NT File System, has a maximum partition size of 16EB.

1 Kilo byte (KB)	=	1024 byte
1 Megabyte (MB)	=	1024 KB
1 Gigabyte (GB)	=	1024 MB
1 Terabyte (TB)	=	1024 GB
1 Petabyte (PB)	=	1024 TB
1 Exabyte (EB)	=	1024 PB
1 Zettabyte (ZB)	=	1024 EB
1 Yottabyte (YB)	=	1024 ZB

2. Software Installation

Installation (or **setup**) of a computer program (including device drivers and plugins), is the act of making the program ready for execution. Because the process varies for each program and each computer, programs (including operating systems) often come with an *installer*, a specialized program responsible for doing whatever is needed for their installation.

2.1. Operating Software Installation

Installation (or **setup**) of a system software ie. Operating System in the computer which makes a computer ready to run is termed as Operating Software Installation. In other words, it gives life to the computer. Eg, Windows XP, Windows 7, Windows 8, Ubuntu 12, Kubuntu 11, Red Hat Enterprises etc.

2.2. Driver Installation

Installation (or **setup**) of a computer programs for device driver in the computer which makes a device ready to run is termed as Driver Installation. Eg: Sound driver, Ethernet driver,etc

2.3. Application Software Installation

Installation (or **setup**) of a computer programs for specific application in the computer which is used for specific task is termed as Appication Software Installation. Eg: Office Package, Adobe Package, etc.

3. Utilities

Utility programs, commonly referred to as just "utilities," are software programs that add functionality to your computer or help your computer perform better. These include antivirus, backup, disk repair, file management, security, and networking programs. Utilities can also be applications such as screensavers, font and icon tools, and desktop enhancements. Some utility programs help keep your computer free from unwanted software such as viruses or spyware,

while others add functionality that allows you to customize your desktop and user interface. In general, programs that help make your computer better are considered utilities. And unlike water and electric bills, computer utilities don't send you a bill every month!

3.1. Virus Scanning

A Virus Scanner is a program which used to prevent, detect and remove malware (of all descriptions), such as: computer viruses, malicious, etc. Computer security, including protection from social engineering techniques, is commonly offered in products and services of antivirus software companies. Eg: Kaspersky, Avira, ESET, NOD32, AVG, etc.

3.2. Disk Compression

A type of data compression that works by storing compressed versions of fileson the hard disk. A **disk compression** software utility increases the amount of information that can be stored on a hard disk drive of given size. Unlike a file compression utility which compresses only specified files - and which requires the user designate the files to be compressed - a disk compression utility works automatically and the user doesn't need to be aware of its existence.

Step for Disk Compression

i> Select the required local disk drive from computer.
ii> Right click
iii> Select **Properties** option
iv> Then ***Check*** *Compress this drive to save disk space* from **General** tab.

3.3. Disk Defragmentation

Disk Defragmenter is a utility which is designed to increase access speed by rearranging files stored on a disk to occupycontiguous storage locations, a technique called defragmentation. Defragmenting a disk minimizes head travel, which reduces the time it takes to read files from and write files to the disk.[1] Beginning with Windows XP, Disk Defragmenter also reduces system startup times.

Steps:

i> Select the required local disk drive from computer.
ii> Right click
iii> Select **Properties** option
iv> Click **Optimize** or **disk defragment** from **Tools** tab.
v> Click **Analyze** selecting required drive which you want to defragment.
vi> After Analyzing the data, Click on defragment button.(it will take some minutes.)

3.4. Scandisk

ScanDisk is a diagnostic utility included in MS-DOS and Windows 9x. It checks and repairs file systems errors on a disk drive. It was first introduced in MS-DOS 6.2 . A Windows utility that checks the integrity of data stored on a hard disk drive, identifies problems, and where possible puts them right.

Steps:

i> Select the required local disk drive from computer.
ii> Right click
iii> Select **Properties** option
iv> Click **Check** or Scandisk in Error Checking from **Tools** tab.
v> After Scanning , if you get error then Click Repair option.

4. Multimedia

multimedia is the integration of multiple forms of media. This includes text, graphics, audio, video, etc. For example, a presentation involving audio and video clips would be considered a "multimedia presentation." Educational software that involves animations, sound, and text is called "multimedia software." CDs and DVDs are often considered to be "multimedia formats" since they can store a lot of data and most forms of multimedia require a lot of disk space.Due to the advancements in computer speeds and storage space, multimedia is commonplace today.

4.1. Component of Multimedia

A. Text

It may be an easy content type to forget when considering multimedia systems, but text content is by far the most common media type in computing applications. Most multimedia systems use a combination of text and other media to deliver functionality. Text in multimedia systems can express specific information, or it can act as reinforcement for information contained in other media items. This is a common practice in applications with accessibility requirements. For example, when Web pages include image elements, they can also include a short amount of text for the user's browser to include as an alternative, in case the digital image item is not available.

B. Images

Digital image files appear in many multimedia applications. Digital photographs can display application content or can alternatively form part of a user interface. Interactive elements, such as buttons, often use custom images created by the designers and developers involved in an application. Digital image files use a variety of formats and file extensions. Among the most common are JPEGs and PNGs. Both of these often appear on websites, as the formats allow developers to minimize on file size while maximizing on picture quality. Graphic design software programs such as Photoshop and Paint.NET allow developers to create complex visual effects with digital images.

C. Audio

Audio files and streams play a major role in some multimedia systems. Audio files appear as part of application content and also to aid interaction. When they appear within Web applications and sites, audio files sometimes need to be deployed using plug-in media players. Audio formats include MP3, WMA, Wave, MIDI and RealAudio. When developers include audio within a website, they will generally use a compressed format to minimize on download times. Web services can also stream audio, so that users can begin playback before the entire file is downloaded.

D. Video

Digital video appears in many multimedia applications, particularly on the Web. As with audio, websites can stream digital video to increase the speed and availability of playback. Common digital video formats include Flash, MPEG, AVI, WMV and QuickTime. Most digital video requires use of browser plug-ins to play within Web pages, but in many cases the user's browser will already have the required resources installed.

E. Animation

Animated components are common within both Web and desktop multimedia applications. Animations can also include interactive effects, allowing users to engage with the animation action using their mouse and keyboard. The most common tool for creating animations on the Web is Adobe Flash, which also facilitate desktop applications. Using Flash, developers can author FLV files, exporting them as SWF movies for deployment to users. Flash also uses Action Script code to achieve animated and interactive effects.

4.2. Application of Multimedia

Multimedia can be used for entertainment, corporate presentations, education, training, simulations, digital publications, museum exhibits and so much more. With the advent multimedia authoring applications like Flash, Shockwave and Director amongst a host of other equally enchanting applications, your multimedia end product is only limited by your imagination.

Some of Multimedia softwares are:

a. Players

- Windows Media Player
- VLC Player
- Real Player
- QuickTime Player
- Flash Player
- WinAMP

b. Converter

- Any video converter
- Video converter
- Real Player free video converter

c. Animation and Edit

- Photoshop
- Window Movie Maker
- Premier
- Ulead Video

d. Recorder

- Soundbooth

Multimedia Devices or Components of Multimedia System

Capture devices

-- Video Camera, Video Recorder, Audio Microphone, Keyboards, mice, graphics tablets, 3D input devices, tactile sensors, VR devices. Digitising/Sampling Hardware

Storage Devices

-- Hard disks, CD-ROMs, Jaz/Zip drives, DVD, *etc*

Communication Networks

-- Ethernet, Token Ring, FDDI, ATM, Intranets, Internets.

Computer Systems

-- Multimedia Desktop machines, Workstations, MPEG/VIDEO/DSP Hardware

Display Devices

-- CD-quality speakers, HDTV,SVGA, Hi-Res monitors, Colour printers *etc.*

5. Network Devices

Network devices are components used to connect computers or other electronic devices together so that they can share files or resources like printers or fax machines. Devices used to setup a Local Area Network (LAN) are the most common type of network devices used by the public. A LAN requires a hub, router, cabling or radio technology, network cards, and if online access is desired, a high-speed modem. Happily this is much less complicated than it might sound to someone new to networking.

In a network, one computer is designated as the server, and the others, clients. The server is connected to an external hub, which the clients are also connected to. Now that the computers each have one foot in a common electronic door (the hub), they can use the hub to pass signals back and forth. To direct these signals, the hub contains a device known as a router. The router is the equivalent of an electronic traffic cop that handles data traffic between the computers.

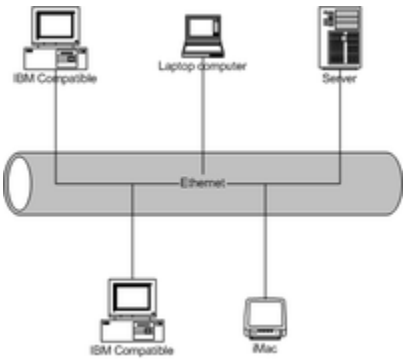
Sounds good, but how does the router know one computer from another? The answer is that every computer in the network must have a network card installed. These network devices each contain a unique address. In a hard-wired network, special cabling called Ethernet runs from the network card to the hub. In a wireless network the network cards and router/hub communicate using radio waves.

5.1. Dialup

Dial-up Internet access is a form of Internet access that uses the facilities of the public switched telephone network (PSTN) to establish a dialed connection to an Internet service provider (ISP) via telephone lines. The user's computer or router uses an attached modem to encode and decode Internet Protocol packets and control information into and from analogue audio frequency signals, respectively.

A **modem** (***mo****dulator-****dem****odulator*) is a device that modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information. The goal is to produce a signal that can be transmitted easily and decoded to reproduce the original digital data. Modems can be used over any means of transmitting analog signals, from light emitting diodes to radio. The most familiar example is a voice band modem that turns the digital data of a personal computer into modulated electrical signals in the voice frequency range of a telephone channel. These signals can be transmitted over telephone lines and demodulated by another modem at the receiver side to recover the digital data.

5.2. LAN



A **local area network (LAN)** is a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building using network media. The defining characteristics of LANs, in contrast to wide area networks (WANs), include their usually higher data-transfer rates, smaller geographic area, and lack of a need for leased telecommunication lines.

The different types of media access control of LAN are:

=> **Ethernet** - Ethernet is a 10Mbps LAN that uses the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol to control access network. When an endstation (network device) transmits data, every endstation on the LAN receives it. Each endstation checks the data packet to see whether the destination address matches its own address. If the addresses match, the endstation accepts and processes the packet. If they do not match, it disregards the packet. If two endstations transmit data simultaneously, a collision occurs and the result is a composite, garbled message. All endstations on the network, including the transmitting endstations, detect the collision and ignore the message. Each endstation that wants to transmit waits a random amount of time and then attempts to transmit again. This method is usually used for traditional Ethernet LAN.

=> **Token Ring** - This is a 4-Mbps or 16-Mbps token-passing method, operating in a ring topology. Devices on a Token Ring network get access to the media through token passing. Token and data pass to each station on the ring. The devices pass the token around the ring until one of the computer who wants to transmit data , takes the token and replaces it with a frame. Each device passes the frame to the next device, until the frame reaches its destination. As the frame passes to the intended recipient, the recipient sets certain bits in the frame to indicate that it received the frame. The original sender of the frame strips the frame data off the ring and issues a new token.

=> **Fast Ethernet** - This is an extension of 10Mbps Ethernet standard and supports speed upto 100Mbps. The access method used is CSMA/CD .For physical connections Star wiring topology is used. Fast Ethernet is becoming very popular as an upgradation from 10Mbps Ethernet LAN to Fast Ethernet LAN is quite easy.

=> **FDDI (Fiber Distributed Data Interface)** - FDDI provides data speed at 100Mbps which is faster than Token Ring and Ethernet LANs . FDDI comprise two independent, counter-rotating rings : a primary ring and a secondary ring. Data flows in opposite directions on the rings. The counter-rotating ring architecture prevents data loss in the event of a link failure, a node failure, or the failure of both the primary and secondary links between any two nodes. This technology is usually implemented for a backbone network.

5.3. Bandwidth

Bandwidth describes the maximum data transfer rate of a network or Internet connection. It measures how much data can be sent over a specific connection in a given amount of time. For example, a gigabit Ethernet connection has a bandwidth of 1,000 Mbps, (125 megabytes per second). An Internet connection via cable modem may provide 25 Mbps of bandwidth.

While bandwidth is used to describe network speeds, it does not measure how fast bits of data move from one location to another. Since data packets travel over electronic or fiber-optic cables, the speed of each bit transferred is negligible. Instead, bandwidth measures how much data can flow through a specific connection at one time.

When visualizing bandwidth, it may help to think of a network connection as a tube and each bit of data as a grain of sand. If you pour a large amount of sand into a skinny tube, it will take a long time for the sand to flow through it. If you pour the same amount of sand through a wide tube, the sand will finish flowing through the tube much faster. Similarly, a download will finish much faster when you have a high-bandwidth connection rather than a low-bandwidth connection.

Data often flows over multiple network connections, which means the connection with the smallest bandwidth acts as a bottleneck. Generally, the Internet backbone and connections between servers have the most bandwidth, so they rarely serve as bottlenecks. Instead, the most common Internet bottleneck is your connection to your ISP.

In computer networking, bandwidth (or data transfer speed) is measured in binary bits per second (bps) or bytes per second (B/s), where one byte is equal to eight bits. For example, a broadband connection speed of 8Mbps would theoretically allow a user to download 1MB of data every second.