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Information Management and Admin System

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FEDERAL UNIVERSITY OF TECHNOLOGY
SCHOOL OF INFORMATION AND
COMMUNICATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

CPT212 COMPUTER HARDWARE AND
MAINTENANCE

TAUGHT BY DR ALHASSAN JOHN AND MR SHEHU M ZUBAIRU

Assignment And Presentation 10marks

(to be submitted on the 6th /02/2015 and presentation start on the same day)

Practical Manual 5marks

Test 25marks 6th of March 2015

1. Motherboard

At the first glance, the components of a motherboard can appear complicated... even daunting to some. How are we supposed to figure that jumble of connectors, ports, slots, sockets and heat sinks?

The good news: To find your way around a motherboard all you'll need to know are the major motherboard parts and their functions

And what better way is there... than to do it with labelled photos? Let's take a closer look at the different motherboard components below:



2

1. Back Panel Connectors Ports
Connectors and ports for connecting the computer to external devices such as display ports, audio ports, USB ports, Ethernet ports, PS/2 ports etc. See image for a close-up view.

For details on the individual back panel ports, [click here](#)

[for our guide to computer cable connections.](#)



2. PCI Slots

PCI: Peripheral Component Interconnect

Slot for older expansion cards such as sound cards, network cards, connector cards. See image below for close-up view.

Have been largely replaced by PCI-Express x1 slots (see motherboard parts #3 below).

3. PCI Express x1 Slots

Slot for modern expansion cards such as sound cards, network cards (Wi-Fi, Ethernet, Bluetooth), connector cards (USB, FireWire, eSATA) and certain low-end graphics cards. See image below for a close-up view.

4. PCI Express x16 Slot

Slot for discrete graphic cards and high bandwidth devices such as top-end solid state drives. See image below for close-up view.

5. Northbridge

Also known as Memory Controller Hub (MCH).

Chipset that allows the CPU to communicate with the RAM and graphics card.

Beginning from the Sandy Bridge generation of Intel

CPUs, motherboards no longer have this component as has been integrated within the CPU itself.

6. CPU Socket

Insert CPU here. To learn how to install a CPU [Click here for our guide to installing a CPU.](#)

7. ATX 12V Power Connector

Connects to the 4-pin power cable of a power supply which supplies power to the CPU.



8. Front Panel USB 2.0 Connectors

Connects to USB 2.0 ports at the front or top of a computer case. See image above for a close-up view.

9. Front Panel Connectors

Connects to the power switch, reset switch, power LED, hard drive LED and front audio ports of a computer case.

See image above for a close-up view.

For more details on the individual front panel ports [click here for our guide to installing a motherboard.](#)

- | | |
|-------------------------|---|
| 10. IDE Connector | Connects to older hard drive disks and optical drives for data transfer. See image above for a close-up view.

Have been replaced over by SATA connectors (see motherboard components #13 below). |
| 11. CMOS Battery | Supplies power to store BIOS settings and keep the time clock running. See image above for a close-up view.

The CMOS battery found on most motherboards is the CR2032 lithium coin cell. |
| 12. Southbridge | Also known as the Input/Output Controller Hub (ICH)

Chipset that allows the CPU to communicate with PCI slots, PCI-Express x 1 slots (expansion cards), SATA connectors (hard drives, optical drives), USB ports (USB devices), Ethernet ports and on-board audio. |
| 13. SATA Connectors | Connects to modern hard disk drives, solid state drives and optical drives for data transfer. See image above for a close-up view. |
| 14. Fan Headers | Supplies power to the CPU heat sink fan and computer case fans. See image above for a close-up view. |
| 15. RAM Slots | Insert RAM here. To learn how to install RAM click here for our guide to installing RAM. |
| 16. ATX Power Connector | Connects to the 24-pin ATX power cable of a power supply unit which supplies power to the motherboard |



17. mSATA Connector Connects to a mSATA solid state drive. In most cases, this SSD is used as cache to speed up hard disk drives, it's possible to re-purpose it as a regular hard drive.

18. Front Panel USB 3.0 Connector Connects to USB 3.0 ports at the front or top of the computer case.

19. Power & Reset Button Onboard button to turn on, turn off and reboot the computer.

This motherboard component is more common among high end boards.

2. Jumper

Computer Jumper



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Jumpers allow the computer to close an electrical circuit, allowing the electricity to flow certain sections of the circuit board. Jumpers consist of a set of small pins that can be covered with a small plastic jumper block as shown in the illustration to the right. Below the illustration is a picture of what the jumpers may look like on your motherboard. In this example, the jumper is the white block covering two of the three gold pins. Also, next to the pins is a silkscreen description of what the pins do, in this case when pins 1-2 are jumped the computer is operating normal, when 2-3 are jumped it is set into configuration mode, and when open the computer will be in recovery mode.

Jumpers are used to configure the settings for computer peripherals such as the motherboard, hard drives, modems, sound cards, and various other components.

For example, if your motherboard supported **intusion detection**, a jumper can be set to enable or disable this feature.

In the past, before **Plug and Play**, jumpers and dip switches were commonly used to adjust device resources, such as changing **IRQ** at the device is using. Today, most users will not need to adjust any jumpers on their motherboard or expansion cards. Usually, most will only encounter jumpers when installing a new drive, such as a hard drive. As can be seen in the below picture, ATA (IDE) hard drives have jumpers with three sets of two pins. Moving a jumper between each two pins will change the drive from **master drive**, **slavedrive**, or **cabl select**



PCI

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CNR and PCI slots



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Examples of PCI devices

- Modem
- Network card
- Sound card
- Video card

PCI device drivers

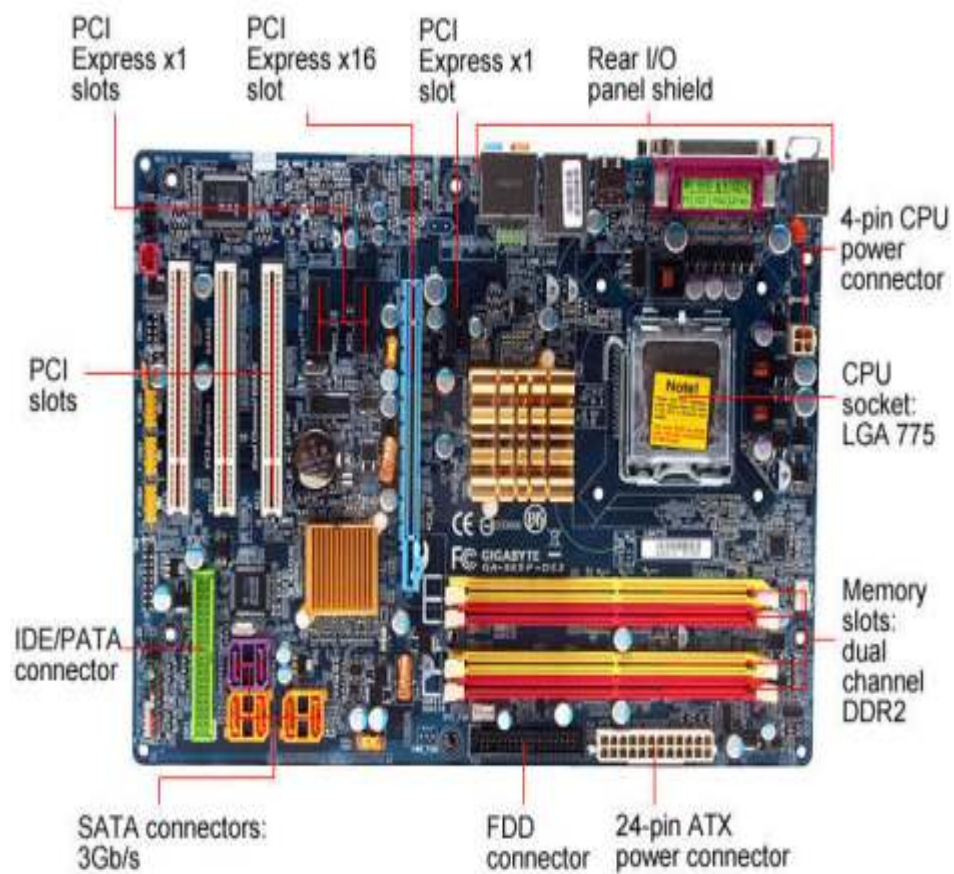
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Different RAM Types and its uses

Intro

The type of RAM doesn't matter nearly as much as how much of it you've got, but using plain old [SDRAM](#) memory today will slow you down. There are mainly 3 types of RAM: SDRAM, [DDR](#) and [Rambus](#) DRAM.

SDRAM (Synchronous DRAM)

Almost all systems used to ship with 3.3 volt, 168 [SDRAM DIMMs](#). SDRAM is not an extension of older EDO DRAM but a new type of DRAM altogether. SDRAM started out running at 66 MHz, while older static RAM and EDO max out at 50 MHz. SDRAM is able to scale to 133 MHz (PC133) officially, and unofficially up to 180MHz or higher. As process get faster, new generations of memory such as DDR and RDRAM are required to keep up performance.

DDR (Double Data Rate SDRAM)

DDR basically doubles the rate of data transfer of standard SDRAM by transferring data on the up and down tick of a clock cycle. [DDR memory](#) operating at 333MHz actually operates at 166MHz * 2 (aka PC3200) or 133MHz*2 (PC266 / PC2100). DDR is a 2.5 volt technology that uses 184 pins in its DIMMs. It is incompatible with SDRAM physically, but uses a similar parallel bus, making it easier to implement than RDRAM, which is a different technology.

Check this site for [information about DDR SDRAM memory and DDR Memory recommendations](#)

Rambus DRAM (RDRAM)

Despite it's higher price, Intel has given RDRAM a blessing for the consumer market, and it will be the sole choice of memory for Intel's Pentium 4. RDRAM is a serial memory technology that arrived in three flavors, PC600, PC700, and PC800. PC800 RDRAM has double the maximum throughput of PC100 SDRAM, but a higher latency. RDRAM designs with multiple channels, such as those in Pentium 4 motherboards, are currently at the top of the heap in memory throughput, especially when paired with [PC1066 RDRAM memory](#)

DIMMs vs. RIMMs

DRAM comes in two major form factors: DIMMs and RIMMs.

DIMMs are 64-bit components, but if used in a motherboard with a dual-channel configuration (like with an Nvidia nForce chipset), you must pair them to get maximum performance. So far there aren't many DDR sets that use dual-channels. Typically, if you want to add 512 MB of DIMM memory to your machine, you just pop in a 512 MB DIMM if you've got an available slot. DIMMs for SDRAM and DDR are different, and not physically compatible. SDRAM DIMMs have 168-pins and run at 3.3 volts, while DDR DIMMs have 184-pins and run at 2.5 volts.

RIMMs use only a 16-bit interface but run at higher speeds than DDR. To get maximum performance, Intel RDRAM chipsets require the use of RIMMs in pairs over a dual-channel 32-bit interface. You have to be more careful when upgrading and purchasing RDRAM.

3 SOUND CARD

Alternatively referred to as sound board or an audio card, a sound card is an expansion card or integrated circuit that provides a computer with the ability to produce sounds that can be heard by the user via speakers or headphones. Below is an image of the Creative Sound Blaster sound card and an example of what a sound card that connects to expansion slot inside your computer may look like.

Computer Sound Blaster sound card



The computer sound card is considered a peripheral, although the computer does not need a sound card to function almost every computer today will include a sound card in the expansion slot or on the motherboard (onboard).

Sound card connections

Back of Sound Card



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In the picture to the right, is an example of what sound card audio ports aka audio jacks may look like on the back of your computer, associated colors, and the connector symbols you should find next to each of the connections.

- "Digital Out") - Used with surround sound or loudspeakers.
- Sound in or line in (Blue) (Arrow pointing into waves) - Connection for external audio sources, e.g. tape recorder, player, or CD player.
- Microphone or Mic (Pink) (Microphone) - The connection for a microphone or headphones

- Sound out or line out (Green) (Arrow pointing out of waves) - The primary sound connection for your speakers or headphones. Sound card also has a second (black) and third (orange) sound out connection.
- Firewire (Not pictured) - Used with some high quality sound cards for digital video cameras and other devices.
- MIDI or Joystick (15 pin yellow connector) - Used with earlier sound cards to connect MIDI keyboard or Joystick.

Tip: Usually the cables connecting to the devices are color-coded and will match or be close to the colors the cables connect into. For example, the end of the speakers cord may have a green line or be completely green.

Uses of a computer sound card

Games

Audio CDs and listening to music

Watch movies

Audio conferencing

Creating and playing Midi

Educational software

Business presentations

Record dictations

Voice recognition

4 Different Types Of PC Hard Disk Drives (HDD)



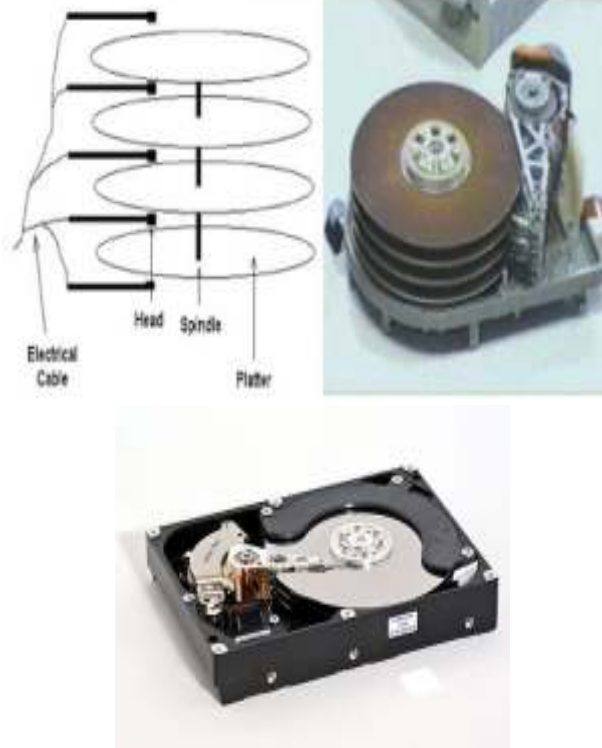
Hard Disk Drive:

Hard disk is an important part in pc which stores software's (including OS and Application software), user data, files and folders. It is a permanent memory storage type which can retain data after power interruption.

Why it is called Hard Disk Drive:

It is made up of concentric metallic disk fitted to a Spindle, bunch of head each placed one after the other to read data from both side of each disk. These metallic disks are coated with magnetic material to store data. Since these disks are made up of hard metallic substance so it called hard disk.

Hard Disk Construction



Different type of HDD: Mainly five types of HDD available in market.

1. IDE : Integrated Drive Electronics. IDE drives are also known as PATA drives(Parallel advance technology attachment)
2. SATA : Serial advance technology attachment
3. SCSI : Small Computer System Interface. SCSI pronounced as scuzzy.
4. SAS : Serial Attached SCSI

IDE / PATA (Integrated Drive Electronics Drive / Parallel Advance Technology Attachment Drive)

- IDE/PATA Drives have usually 40 pins.
- IDE/PATA Drives offer 133 MB/sec transfer rate
- It sends 8 bit data at a time.
- PATA Cables are used to connect PATA HDD. Two drives can be connected in a single pata cable. One as master and other as slave. The configuration of master and slave is done by different combination of jumpers on the hdd.

IDR / PATA
(Integrated Drive Electronics Drive
Parallel Advance Technology Attachment Drive)



SATA (Serial Advance Technology Attachment Drive)

- SATA Drives have usually 7 pins, 4 pins in pair two for sending and receiving data and rest 3 pins are grounded.
- SATA Drives offers generally 300MB/sec transfer rate.
- It sends data bit by bit.
- SATA Cables are used to connect SATA HDD. Only one drive can be connected in a single sata cable.

SATA (Serial Advance Technology Attachment Drive)



SCSI (Small Computer System Interface Drive)

- SCSI Drives have usually 50 to 68 pins.
- SCSI Drive offers generally 640MB/sec transfer rate.
- These drives are hot swappable (means it can be attached or detached from system in running condition)
- SCSI cables are used to connect SCSI HDD. Max of 16 drives can be connected in a single scsi cable. Each hdd has a hexadecimal code known as WWN (world wide name) for its identification in the cable.



SAS (Serial Attached SCSI Drive)

- SAS Drives generally offers 805 MB/sec transfer rate.
- These drives are hot swappable.
- SAS Cables are used to connect SAS Drives. Max of 128 drives can be connected in a single sas cable.



4 What is the difference between BIOS and CMOS?

The BIOS and CMOS are often times thought to be the same thing, but they are not. They are two different components of a computer that they do work together to make the computer function properly.

Computer BIOS



The BIOS is a computer chip on the motherboard that resembles the picture to the right. This chip contains a special program that helps the computer processor interact and control the other components in the computer. These other components include disc drives, video cards, sound cards, network cards, floppy drives, USB ports, hard drives, and others. Without the BIOS, the processor would not know how to interact or interface with the computer components, and the computer would not be able to function.

CMOS Battery



The CMOS is also a computer chip on the motherboard, but more specifically, it is a **RAM** chip. This is a type of memory chip which stores information about the computer components, as well as various settings for those components and other variables.

However, normal RAM chips lose the information stored in them when power is no longer supplied to them. In order to retain the information in the CMOS chip, a CMOS battery on the motherboard supplies constant power to that CMOS chip. If the battery is removed from the motherboard or runs out of juice (e.g. a dead CMOS battery), the CMOS would lose the information stored in it. Any settings you made in the CMOS Setup would be lost, and you would need to make those settings changes again after a new CMOS battery was put on the motherboard. For example, with a dead CMOS battery the time and date will reset back to the manufacturer's default if it has been off for a long period of time.

The BIOS program on the BIOS chip reads information from the CMOS chip when the computer is starting up, during the boot process. You may notice on the initial start up screen, called POST screen, an option is available to enter the BIOS or CMOS setup. When you enter this setup area, you are entering the CMOS setup, not the BIOS setup. The BIOS chip and program cannot be updated directly by a user. The only way to update the BIOS is using a BIOS flash program called BIOS update, which updates the BIOS to a different version. These updates usually are provided by either the motherboard manufacturer or the computer manufacturer.

The CMOS setup lets you change the time and date settings for how devices are loaded at start up, like hard drives, CD and DVD drives and floppy drives. The CMOS setup lets you enable or disable various hardware devices, including USB ports, the onboard video card and sound card (if present), parallel and serial ports, and other devices.

5 Computer beep sounds

When your computer beeps, it means that an error has occurred in the hardware. BIOS recognizes internal errors and sends signals in the form of beep sounds, indicating the location of the problem in the hardware. The computer power-on self-test (POST) tests the computer to make sure it meets these system requirements and that all hardware is working properly before starting the remainder of the boot process. If the computer passes the POST the computer gives a single beep (with some computer BIOS manufacturers it may beep twice) as the computer starts and the computer will continue to run normally. However, if the computer fails the POST, the computer will either not beep at all or will generate a beep code, which tells the user the source of the problem. When you start your computer and hear strange beeps in the boot up process, it means trouble. It would be good to understand what the beeps mean. Every BIOS has a unique code of beep. BIOS manufactures AMI and Award (now Phoenix) signal different codes for similar errors.

It is not uncommon to get some beep sounds while starting your computer, and they correspond to different errors that can occur with your hardware. Below is a list of the most common ones and what they refer to.

AMI BIOS beep codes

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Beep Code	Descriptions
1 short	DRAM refresh failure
2 short	Parity circuit failure
3 short	<u>Base 64K RAM failure</u>
4 short	<u>System timer failure</u>

5 short	<u>Process failure</u>
6 short	<u>Keyboard controller Gate A20 error</u>
7 short	<u>Virtual mode exception error</u>
8 short	<u>Display memory Read/Write test failure</u>
9 short	<u>ROM BIOS checksum failure</u>
10 short	<u>CMOS shutdown Read/Write error</u>
11 short	<u>Cache Memory error</u>
1 long, 3 short	<u>Conventional/Extended memory failure</u>
1 long, 8 short	<u>Display/Retrace test failed</u>

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Beep Code	Description
No Beeps	<u>No Power, Loose Card, or Short.</u>
1 Short Beep	Normal POST, computer is ok.
2 Short Beep	POST error, review screen for error code.
Continuous Beep	<u>No Power, Loose Card, or Short.</u>
Repeating Short Beep	<u>No Power, Loose Card, or Short.</u>
One Long and one Short Beep	<u>Motherboard issue.</u>
One Long and Two Short Beeps	<u>Video (Mono/CGA Display Circuitry) issue.</u>

One Long and Three Short Beeps.

[Video \(EGA\) Display Circuitry.](#)

Three Long Beeps

[Keyboard or Keyboard card error.](#)

One Beep, Blank or Incorrect Display

[Video Display Circuitry.](#)

How to Clean a Desktop PC Motherboard

Edited by Jhnri6, T.crawford714, Ichitousai, Sam Phillips and 8 others

As your computer ages, dust will build up inside of it. The intake fans suck dust in and then it collects near the vents and on the motherboard. If not removed from time to time dust can cause your computer to overheat and malfunction. It can even short circuit and ruin your motherboard!

Ad

Steps



1.

1

Turn off and unplug your computer.

Ad

2. 2

Use compressed air to remove dust.

Purchase a can of compressed air (can be found on line and at most department stores) Or alternatively you can use an air compressor.
But make sure to have your PSI (pound per square inch) setting below 50 PSI to ensure you do not damage your motherboard.





3

A soft tipped paint brush will work as well for dust that has caked up in areas such as the fans, power supply, intake vents and between RAM modules.



4

Open your computer's case. The case may be held together with screws or some other mechanical latching system.

If you cannot figure out how to open your case, consult your manual for your PC or Google your computer's model number for details.



HP Compaq 6200 Pro Microtower PC



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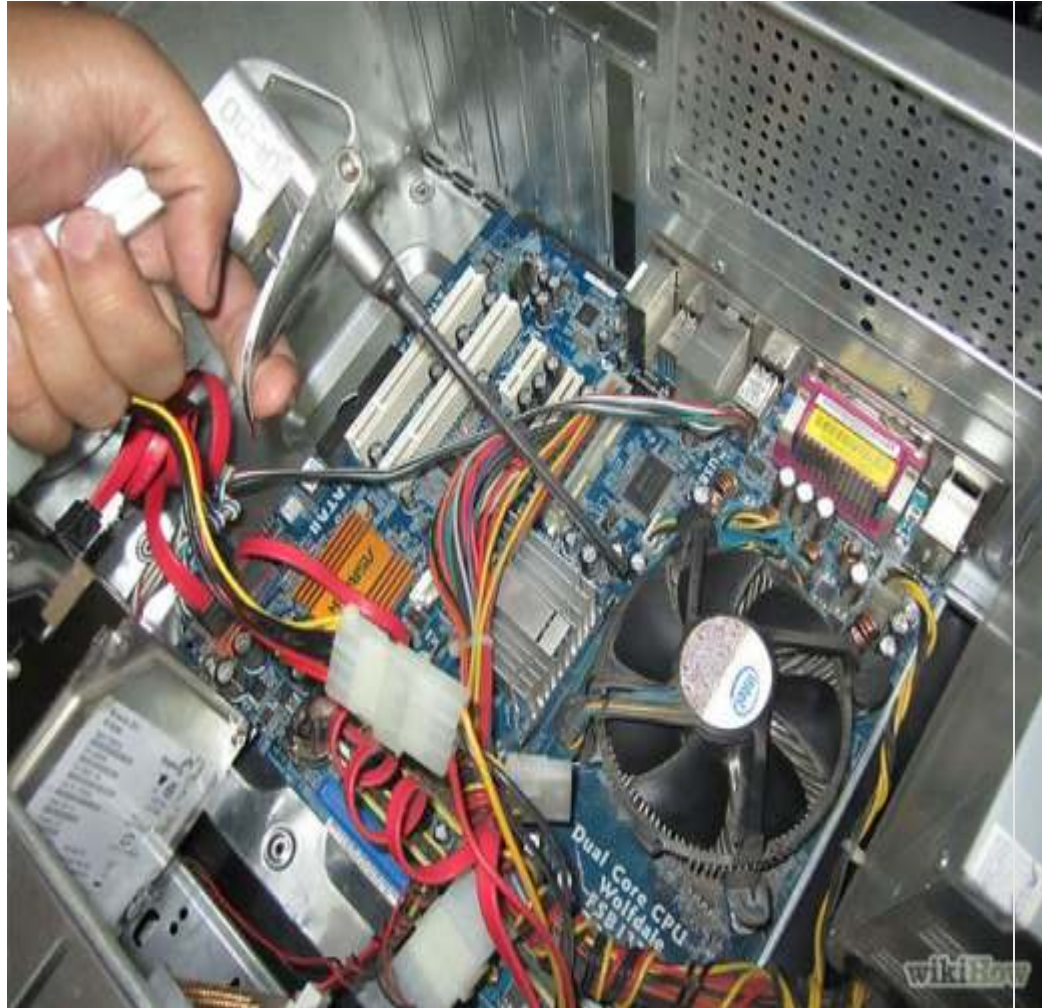
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wikiHow



5

Blow all parts of the motherboard, including the fan and the heat sink.



6

Close the computer's case.



7

Plug in the computer, and turn it on.

PCI

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CNR and PCI slots



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Examples of PCI devices

- Modem
- Network card
- Sound card
- Video card

PCI device drivers

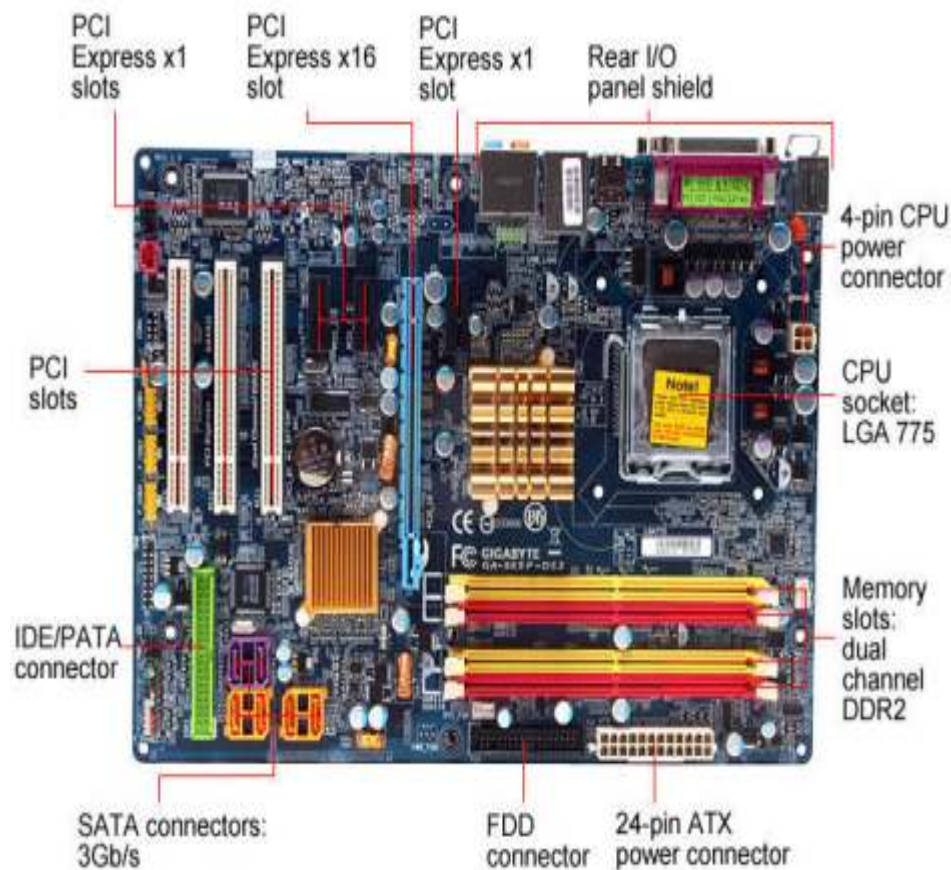
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Difference Between PCI and PCI Express

1. PCIe is much faster compared to PCI.
2. PCIe uses a serial interface while PCI uses a parallel interface.
3. PCIe speed is classified into lanes, each capable of delivering up to 1GB/s data transfer.
4. PCI slots are standardized while PCIe slots vary depending on the number of lanes the slot is intended for.
5. Despite PCIe superiority, most manufacturers still use the PCI standard for their devices.

Installing Windows

Now here's some easy step how to format your computer with windows 7 or windows 8. There's no doubt that Windows 7 is far better than the previous version of Windows XP or Windows Vista. To format you need a boot disk of Windows 7 or Windows 8 which you've bought or Downloaded. Now Here's The Steps With Pictures:

- Data Backup:

Remember, to install Windows only one drive(eg: C Drive) need to be formatted. And formatting C Drive will delete everything from C Drive, My Documents Folder and Desktop. So make sure you've backed up every important file before format.

By the way, if you want format a whole Hard Disk or want to make partition then back up everything from your Hard Disk.



Data Backup

- Boot Menu Setting:

To boot from CD or DVD or USB drive you have to make your CD/DVD or USB Drive first boot device in priority. To do this, while starting your computer enter in BIOS set up when Manufacturers logo screen appears. To enter in this setting page, press F2, F10, F12 or DEL key while starting your computer.(The particular key will be displayed below the screen when manufacturers logo screen appears)



Step 1



Step 2

Now in BIOS menu go to the Boot menu option. And change the order of boot device making the CD Drive as first boot device. This will boot from CD rather than Hard Disk while starting your system. Now Save your changes you made and exit (by pressing F10 and this may vary system to system) Now your computer will restart.

Note: If you are installing from a USB drive, then you have to set the Removal Storage as first boot device priority.

• Begin Setup:

1) After completion of BIOS setup insert the boot disc and restart your computer. Now you will see a message while start asking you to "Press any key to boot from CD..." So press any key on the keyboard and The Windows 7 setup process will be launched.



Press any key...

2) Now you can see the Windows files will be loaded. After completion Windows 7 logo will appear. Nothing have been copied or altered in your computer yet. And the data will be deleted in later steps.



Windows is loading file...

3) In this step you have to choose your preferences. Here you will be prompted to confirm and specify your Language, your time zone & Currency format, and Keyboard-input method(US). After selecting the exact options for your system click Next.



Language and Keyboard setting

4) Now click on Install Now. Do not click repair Even if you repairing your system by re-installing Windows. Once clicked, setup will proceed automatically, just wait for a min.



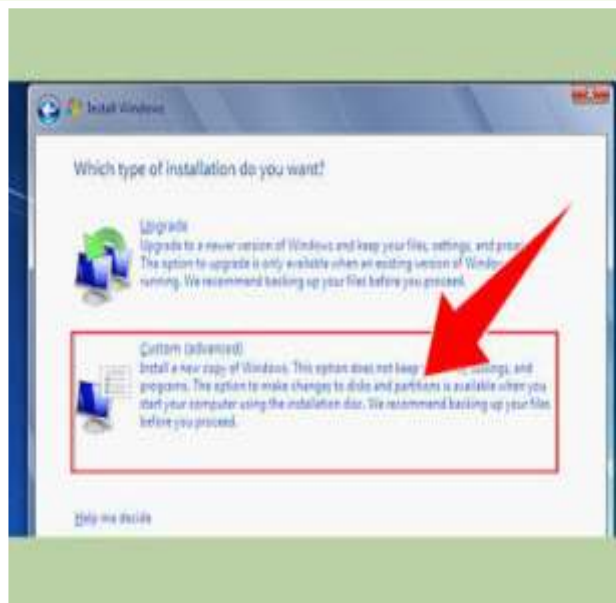
Install now

5) Now click on 'I accept the license terms' by reading the agreements and terms(if you want to :-P) and click Next.



Accept Terms

6) Now a screen will appear asking 'What type of installation do you want?' Choose Custom install. If you want to upgrade from Vista then click on Upgrade. Upgrading from XP to Windows 7 is not possible.



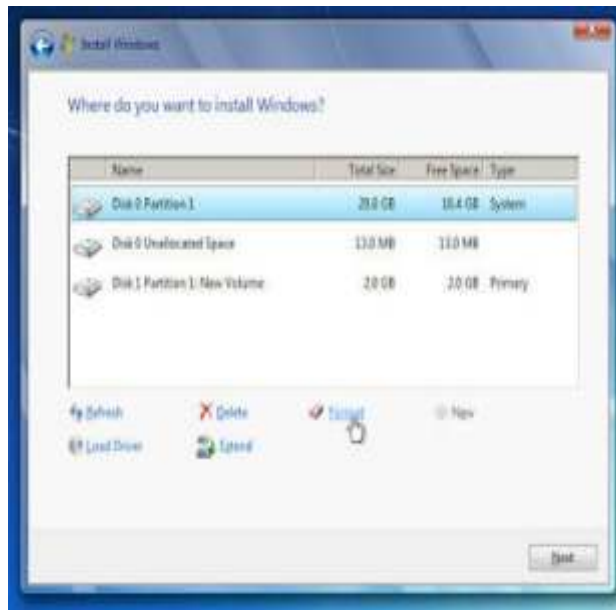
Custom Install

7) A new window will appear asking 'Where do you want to install Windows?' Now Click "Drive options (advanced)." From here you can delete, format or manage your partitions.

8) Select the partition of your existing operating system.

9) If your Hard Disk has multiple drive then be sure and choose the correct one(Generally its always "C[Partition 1]" Drive). Because formatting a partition delete everything within this particular partition.

10) Now Click on the Drive and Click on format.



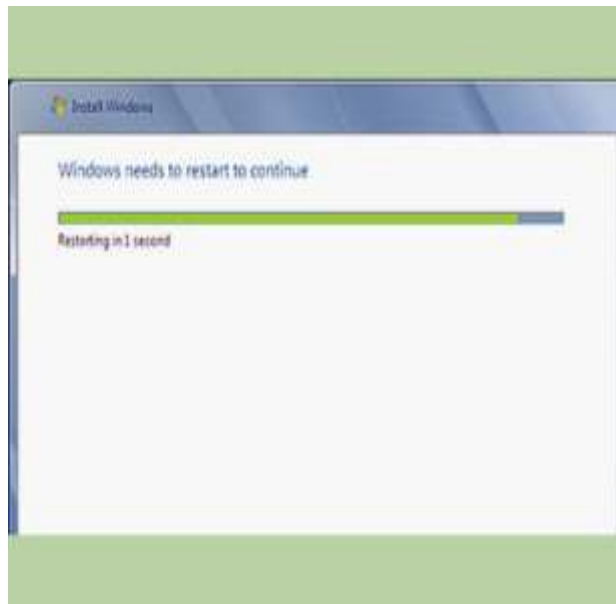
Format

- 11) After completing this formatting process you will be notified.
- 12) After the very process completed click Next. This will continue the Windows installation. And this process may take 30min to 1hour depending on the speed of your system.



Installation

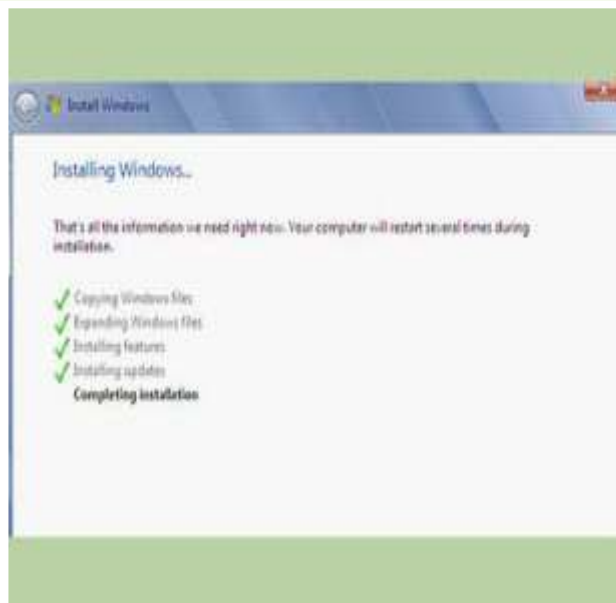
- 13) After completion of installation your computer will be restarted.



Restarting

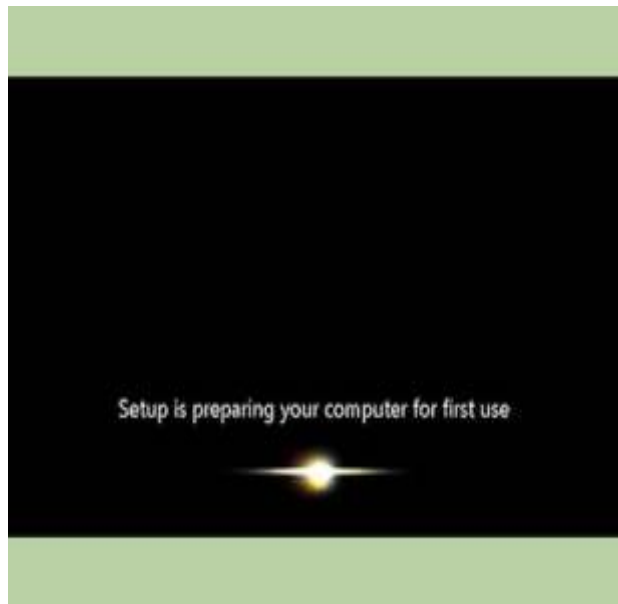
After starting 'Press any key to continue...' will be displayed again. But this time don't press anything. Because you already did that.

14) Now just wait for a min and your PC will continue booting and complete the whole installation process within just few more min.



Completing Installation

15) Finally the process completed.



Installation Completed

Now enter your user name(this will be your Windows name)



Windows Name

And Windows will ask you for a password. This is optional.

Set a password for your account

Creating a password is a smart security precaution that helps protect your user account from unwanted users. Be sure to remember your password or keep it in a safe place.

Type a password (recommended):

Retype your password:

Type a password hint:

Choose a word or phrase that helps you remember your password. If you forget your password, Windows will show you your hint.

[Next](#)

Password

16) Now click next and type your Windows 7 product key. And check the “Automatically activate Windows when I’m online” option. This will verify and activate your Windows next time you connected to the internet.

Type your Windows product key

You can find your Windows product key on a label included with the package that came with your copy of Windows. The label might also be on your computer case. Activation pairs your product key with your computer.

The product key looks similar to this:

PRODUCT KEY: XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

(letters will be added automatically)

☒ Automatically activate Windows when I'm online

[What's a product key?](#)
[Need a product key?](#)

[Next](#)

Product Activation

17) Now select the windows update option. To run your system securely and with stability it's recommended that you choose one of the first two options. The first will search and install updates automatically from internet. And the second option will notify you when important updates are available..



Windows Update

18) In the next window set date and time.



Set Date & Time

19) Next select network preferences. Generally most of users select Home Network. If your network is being used in public place then select public network.



Network Preferences

20) FINALLY! Everything done. After a final loading Windows will start. And now you can explore your PC.



Windows Desktop

OPTIONS FOR SYSTEM REPAIR AND RECOVERY



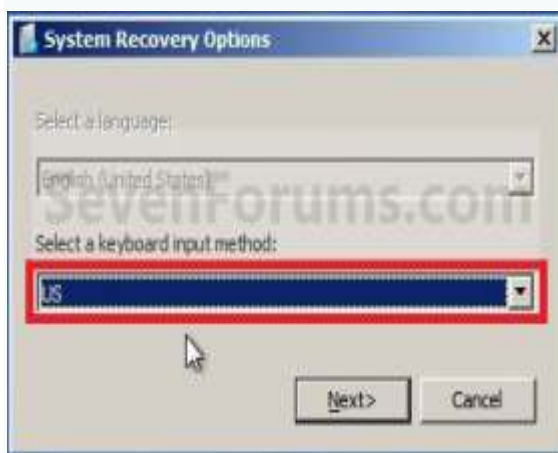
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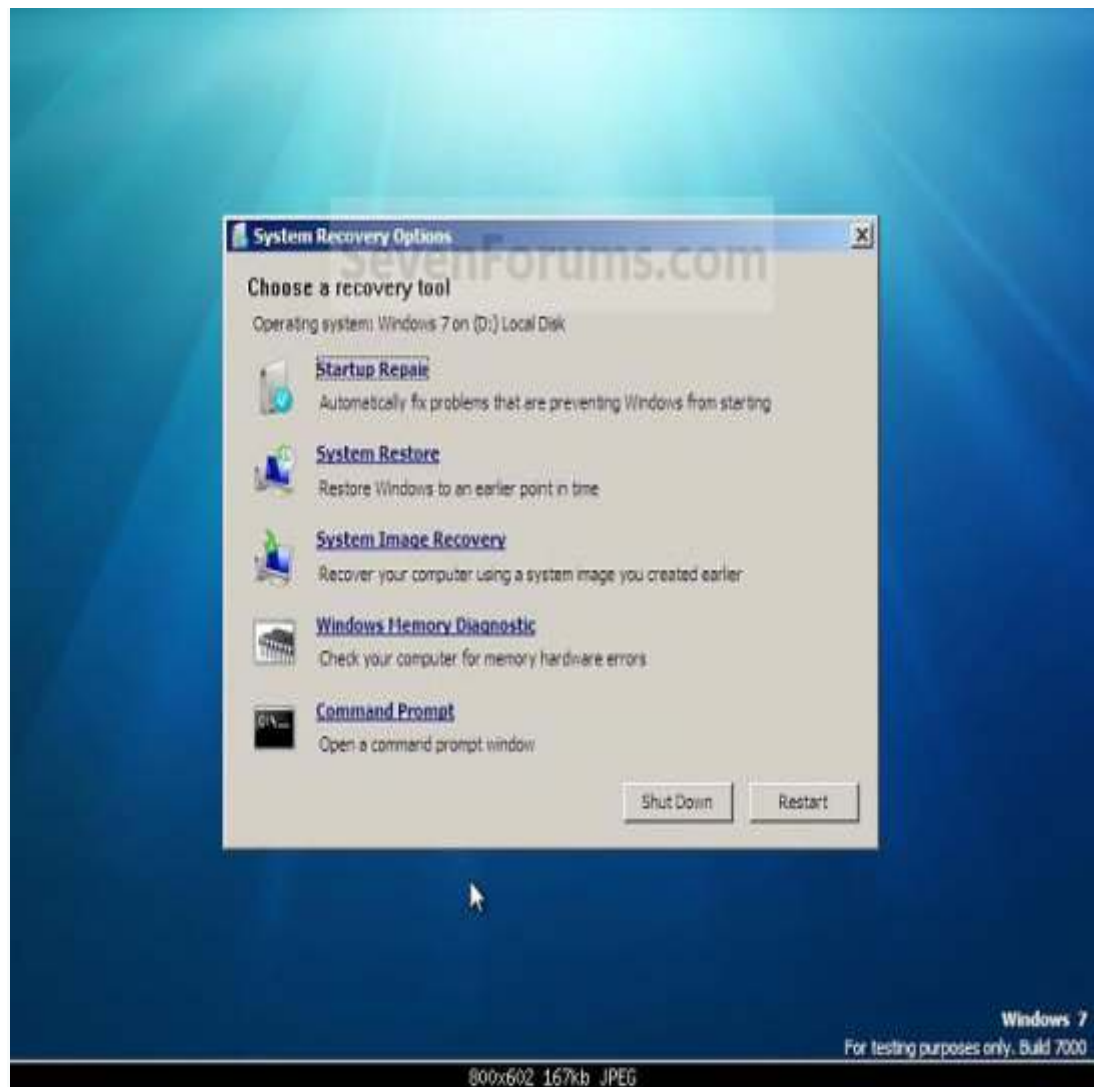




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