

## BASIC COMPUTER MAINTENANCE WORKSHOP



## ***Preamble***

The computer is fifty five years old this year (2013) and yet there are no great world wide celebrations or recognition of what they have done for us. We do seem to have accepted that computers have become a part of everyday life as they can be found almost everywhere, homes, offices, cars, planes and even in toys. The entire military defences and air traffic control systems are now controlled by computers. The technology has advanced at a phenomenal rate over the last ten years and is becoming ever more complex making it hard not to feel intimidated by it. Keeping up with the constant product changes has become near impossible even for IT professionals. Computing manufacturers spend millions of pounds each year on product improvement to the point where the consumer is now completely overwhelmed and the market somewhat saturated by it. The computer sales market is worth hundreds of billions of pounds a year.

Personal computers, servers and networks are found in almost every office and now even in homes but they are still made up of essentially the same components that they have been for years that still require regular maintenance to ensure they continue to function correctly. The purpose of this guide is to show you the very basics of maintaining your PC and how to rectify some common. There are many things you can do yourself. Remember to take care though as severe damage to core system files can occur through carelessness.

For a proper understandings of computer maintenance, certain computer fundamentals need to be discussed.

## **Hardware**

Hardware is the term used to describe the main components of a computer. Items such as the chassis, system/motherboard, processor, hard drive, RAM modules, keyboard and mouse are hardware. Other hardware items such as network cards are usually described as peripherals and CD ROM or floppy drives are referred to as optical storage.

Computer problems are less likely to be caused by hardware failure nowadays, it is the usually an operating system or software application failure that causes an issue as some applications and programs can conflict with one another and while these can be particularly difficult to rectify they may not have occurred at all if the computer user had

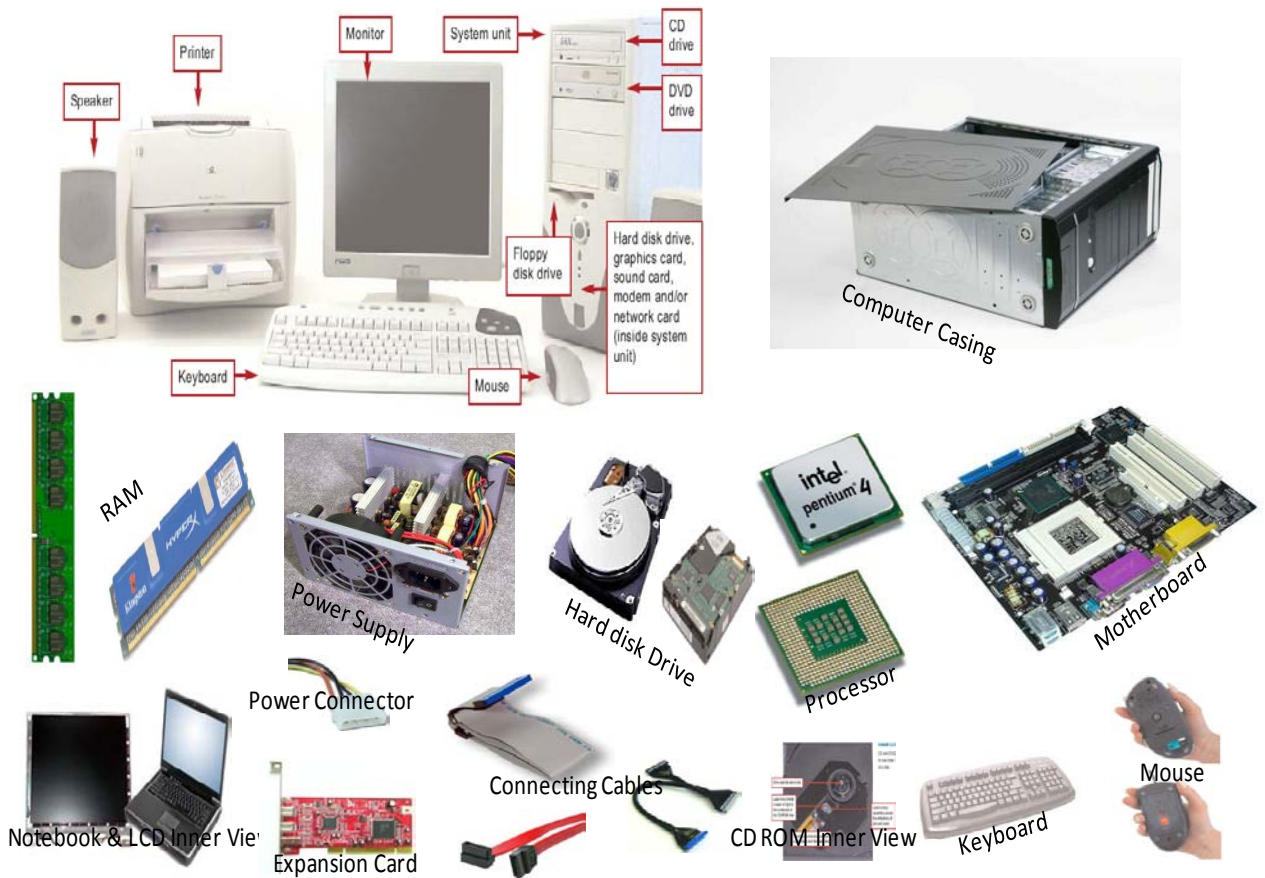
been careful of what was installed and how it was set up. It is always worthwhile to make a note of any small but not so insignificant change you make to the set up configuration.

Although computer hardware has become more reliable, it still remains sensitive so keeping the internal hardware clean is the first place to start any maintenance. A layer of dust across the internal system board for example can cause a short circuit. Dust and fluff will gather around the central processing unit, especially the cooling fan . A fan clogged up with dirt cannot reach its optimal performance which then leads to overheating problems so it is vitally important to keep all air vents clear and the computer in a cool airy place so that it can breathe. If you find that the internals of the computer have an accumulated layer of dust on them you'll need to remove it. Disconnect all cables from the computer – noting where they all go – then place the computer on a flat surface in a well ventilated area. Remove the access panels taking care as the metal edges can be sharp.



Examine the inside of the computer, check in and around all cooling fans for dust and especially on the system board. Using a small soft haired brush such as a painting brush, carefully brush and blow away as much of the dust and fluff as you can and if necessary use a vacuum cleaner with a small narrow attachment to help but exercise extreme care keeping the attachment away from the small system board components. Once you have removed all traces of dirt reattach the access panel and reconnect all cables and devices ensuring they are correctly placed. Power on the computer, it should start normally but if

there are any error messages or beeps read them, it could be that you have connected something incorrectly.



**A gallery showing computer components**

## **Software**

Software are program that manages the hardware resource, while applications are the terms used to describe programs that are installed on a computer hard drive that allow the user to perform specific tasks. Microsoft Windows is an example of operating system. If you do not have an operating system then you cannot install software applications to your computer. It is the users choice which operating system they use. The contents of this maintenance guide are based on the Microsoft Windows operating system environment as it is the most commonly used – the industry standard.

## **Basic Terminologies You Should Know**

**Upgrading:** An act of taking your system unit from a lower version to a higher version

**Dual Booting:** An act having multiple operating system on you're a single PC

**Alternative Boot Option:** Boot options made available for user to boot up their system with in case of malfunctions. To get there continue pressing F8 on your keyboard immediately your system is powered on and select from choice of options from the menu.

**Boot Sequences:** The understandings of booting process from DOS to desktop environment

**Threat:** This is concern with various attacks and its care.

**Command:** These are software utilities used to maintain or fix a system unit

**Installation:** An act of installing or storing a program on your system unit

**Uninstallation:** An act of removing an installed program from your system

**Formatting:** An act of wiping off the content in the volume of a storage device such as Hard disk drive, flash drive etc.

**Configuration:** Defining settings in the system unit such as BIOS, Device and program settings.

## **Concept of Maintenance**

Although manufacturers try to make their products as fool proof and maintenance free as possible, we still must take certain preventive measures to keep them running in top condition for the longest time. If you follow these steps, you will find yourself having fewer problems and the problems that you do have are easier to diagnose and repair. Most are simple, common sense steps. Some take some effort and planning. However, the payoff will be greater ease of use and less frustration for you.

Some of the most common problems suffered by users are file storage related. Most of us have little or no backup plan or if the files are backed up, it is to a floppy disk. Here are some of the most common problems and ways to avoid them.

1. **Store documents to your hard drive, not to floppy disks or flash drive.** If your data is very critical, do not use floppy disks or flash drive as the main storage media.
2. **Schedule system and data backups.** If you have a tape backup, Zip drive or CD burner; Schedule a backup at least on a weekly basis. If you have enough tapes or other removable media available, a daily backup (differential backup) is best, as this will make sure that all data that is changed has been backed up. Tape drives are more difficult to restore from than memory sticks or even recordable CD's, so choose the media that you are going to be most comfortable with and will give you the best protection.
3. **Do not move your computer while it is on.** While hard drives are fairly robust and trouble free, they do need some maintenance and some protection to maintain file integrity. Moving your computer while it is in operation may cause head crashes, where the wire thin head strikes the platter spinning at up to 7200 rpm and scratches are dug into the recordable media on the metal platter. In most instances, there is data loss and sometimes, or eventually, hard drive failure with unrecoverable data loss. This is one of the surest ways to lose all data on your computer. Sending off a hard drive for data recovery is very expensive and there is no guarantee that the data can be recovered. CD's can be scratched too, and a scratched CD is often good only as a coaster.
4. **Schedule regular defragmentation and disk scanning.** These two items alone can often mean the difference between lost data and trouble free usage. Right click on a drive and choose the properties option. You should run scan disk at least once a month, using the thorough setting. This may take some time, depending on the size of the hard drive. You might want to schedule this to be done overnight. Running disk defragmentation should be done at least every two weeks, more often if you are saving large amounts of data. Even if the program says that the drive is not fragmented, go ahead and run defrag. This will keep all of the data for each program in contiguous clusters, resulting in faster access times, less wear on the hard drive and less chance for data loss. Both of these programs can be scheduled to run at preset times and on preset days.

5. **Keep all magnets away from disks.** Except for CD's, all data media is magnetic. Small refrigerator magnets, phone handsets, unshielded speakers, etc. will erase data. Even paper clips or tools can be magnetic. Data lost to magnets is lost forever, so watch what you lay on floppy disks or tapes.
6. **Heat can kill.** This applies to computers just as well as it does to human. Keep your room close to 28 degrees if possible. This is a comfortable temperature for you and the computer. If it is too hot for you, bets are your computer feels the same. As computers get faster and more heavily configured, heat builds up. Excess heat will cause the memory chips and chips on the motherboard to give errors or even fail. You will get random and unpredictable problems that often are hard to pinpoint or diagnose. Keep your computer away from windows where you get direct sunlight on the system and never put your computer over a radiator.
7. **Static electricity can destroy systems.** This can be something as simple as walking across a carpet and touching the keyboard or as complex as a lightning strike. A good rule of thumb is to avoid or limit the use of your system during a thunderstorm if possible. If there is a thunderstorm in progress or there are thunderstorms predicted for the evening or night, consider unplugging the system. One of the best ways to protect your computer during a thunderstorm is a six foot air gap between the cord and the socket. During the winter, touch a grounded metal object before touching your computer. It only takes 20 volts to damage a memory chip, that little spark you get when you touch the doorknob is about 20,000 volts. You should have an uninterruptible power supply for your computer. This will help prevent power spikes and surges from damaging the system. The minimal protection you should have is a fused power strip. It is not, however, advisable to mix the two. Some UPS manufacturers suggest not even using a fused strip with the UPS.
8. **If you are going to be gone for 3 or more days, shut down and unplug the computer.** This will help keep the system from getting surges and spikes and keep it from being damaged when we lose power and it comes back on and off and on and off again. It is ok to leave the system on overnight. However, it is better to shut the system down over the weekend or over extended periods of absence.



9. **Make sure that you have the current version of an antivirus program installed on your system.** We have had cases of several viruses in town. This can protect your system from malicious threat as some viruses will either format or corrupt a hard drive.

## **Troubleshooting, Daignosing and Repair**

Should you have a problem with your computer, try doing some basic troubleshooting before calling for further help. "My computer won't work" does not give us much to go on when trying to get you going again. Use the steps listed below and determine if it is something that you can fix yourself or if you have to get help.

### **General Troubleshooting Steps**

**Aparatus:** Stop watch

**Steps:** Start timing, detach the devices from the system unit one by one with respect to timing, repeat the steps till problem device detected, replace the device with working one.

### **Common Computer Problems**

- **Keyboard Failure:** Clean the keyboard panel, fix the connector to the appropriate port, if persist change it.
- **Mouse Failure:** Clean the mouse panel, fix the connector to the appropriate port, if persist change it.
- **Sound Failure;** check to see if sound driver is installed on the system if none found then get a sound driver that fit and install it. You can also check if the speaker is not muted.
- **Poor Display;** check to see if display driver is installed on the system if none found then get a display driver that fit and install it.
- **Network Failure such as Wireless, Bluetooth or LAN;** check to see if their drivers are installed on the system if none found then get a those drivers that fit and install them. You can also check if these devices are disabled then enable them.
- **Is the system getting power?** Make sure that the UPS or power strip is plugged in and the switch is turned on. Make sure that the computer and monitor power



buttons have been pressed. Try using a different wall socket. If a peripheral, such as a printer, is not working, make sure it is plugged in and turned on. This is probably the most common user fixable problem we encounter.

- **Is the failing device connected to the system unit and/or network?** This is the second most common problem that can be fixed by the user without calling for help. Make sure the power cables are plugged in. Make sure that the video cable has not come loose from the back of the monitor. Make sure that the network cable is properly plugged into the jack on the wall. You cannot use a modem or phone cable to make a connection with your network card and if you should get a call on that line while it is plugged into the network card, you may destroy your system.
- **Beeping and no display but there is flow of current on the system board:** check or change RAM, or VGA card if available, then check your motherboard for faint beeping.
- **Noise and no display but there is flow of current on the system board:** check your keyboard or mouse
- **No display but system boots;** check the VGA or flesh connector of the display device. If the problem persist, change the display device
- **Faded display on the screen;** change the power inverter also known as fluorescence.
- **Ports or connector failure;** clean the ports with recommended cleanser or replace the port either with onboard or expansion card version.
- **DC jack failure;** remove the DC jack, clean it with sandpaper then fix it back or replace it.
- **Adapter or power cable or supply failure;** just change it entirely to avoid more damages to your computer.
- **No noise nor beeping and no display but there is flow of current on the system board:** check RAM, VGA, motherboard or power outlet for sufficient current output
- **System hanging at DOS or OS;** use boot sequences understandings to resolve it.
- **System Slowness;** check to see if you are having enough RAM, perform defragmentation or Identify the stage at which it occurs. If at boot sequences, it is

- possible to be malware injection, then use an updated anti-malware to resolve it. Or delete everything from LOCAL SETTINGS, then TEMP.
- **Program Malfunctions;** Reboot the system, if persist remove the program and reinstall it back.
  - **No Power flow:** check your power outlet or the power cable, concentrate more on the motherboard, and read the panel for short circuit and probes check the power ICs, sort bridge or change the motherboard entirely.
  - **Power flows but no sign of booting;** concentrate first on the processor by checking its status, or check your RAM.
  - **System trip off;** check power outlet, check processor heat sink and fan, check RAM for incompatibility or use **GTS** formula to detect the failure device.
  - **System Restarting;** Identify the restarting point. If it is at DOS then use **GTS** formula for it is caused by Hardware Devices, if it is at program environment such as boot sequences, desktop environment then you can use command or built in repair of the OS bootable disk or reload the OS entirely. You can as well check if you are using double RAM then check for its compatibility.
  - **Strange noises;** Hard drives going bad and bad CPU fans will make loud noises. This should be taken care of immediately to prevent data from being lost and/or system failure. Be aware that some CD players are very noisy and that they will make lots of racket when a CD is first put in or when accessing data.
  - **Windows Error Protector (Blue Screen Error);** use **bootcfg** utilities in case of Window XP or **bootrec** utilities in case of Vista or Win7 to resolve the error screen.
  - **Trouble printing?** Again, make sure the printer is plugged in and that the printer is turned on. Make sure that ink jet printers have ink in the cartridges. If it is a laser and it is printing streaks or unevenly, makes sure that the toner cartridge has toner in it or replace it. Remove ink jet cartridges if you are going to be away for an extended period, they sometimes leak and will damage the printer. Keep bugs and debris out of the printer; get a printer cover to keep it clean.

## Conclusion

Computer problem maintenance and troubleshooting is a step-by-step process. Some PC problems are easy to troubleshoot while some are very complicated and should be done

with care. However, when there is a problem it is hard for a novice PC user to understand whether it is software or a hardware problem. Thus this material was prepared to explain most common computer maintainances and problems and how to, troubleshoot and repair these problems.

*Wish you the best of luck in all your endeavours.*

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