



UNESCO-NIGERIA TECHNICAL &  
VOCATIONAL EDUCATION  
REVITALISATION PROJECT-PHASE II



# **NATIONAL DIPLOMA IN COMPUTER TECHNOLOGY**



## **PC UPGRADE & MAINTENANCE**

**COURSE CODE: COM 126**

**VERSION 1.0 PRACTICAL BOOK**

**YEAR 1**

**SEMESTER 2,**

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# WEEK 1

Objective: To know computer maintenance Tools

## Basic Hardware Maintenance Tools

 A black soldering iron with a coiled power cord and a silver tip.	Soldering Iron
 A pair of standard pliers with red and yellow handles.	Pliers
 A pair of nose pliers with red and yellow handles.	Nose Pliers

	Cutter
	Screw driver
	Multimeter
	Wire Stripper
	Hammer

	<p>Drilling Machine</p>
	<p>Tester</p>
	<p>Hacksaw</p>

### **Cleaning The Computer from Dust**

Now that you've backed up the system's vital information, you can proceed with the actual maintenance procedures. The first set of procedures involve exterior cleaning. This might hardly sound like a glamorous process, but you'd be surprised how quickly dust, pet hair, and other debris can accumulate around a computer. You'll need four items for cleaning: a supply of Windex or another mild ammonia-based cleaner (a little ordinary ammonia in demineralized water will work just as well), a supply of paper towels or clean lint-free cloths, a canister of electronics-grade compressed air, which can be obtained from any electronics store, and a small static-safe vacuum cleaner.

As a rule, exterior cleaning can be performed every four months (three times per year) or as required. If the PC is operating in dusty, industrial, or other adverse environments, you might need to clean the system more frequently. Systems operating in clean office environments might only need to be cleaned once or twice each year. Always remember to

turn off the computer and unplug the ac cord from the wall outlet before cleaning.

### **CLEAN THE CASE**

Use a clean cloth lightly dampened with ammonia cleaner to remove dust, dirt, or stains from the exterior of the PC. Start at the top and work down. Add a little bit of extra cleaner to remove stubborn stains. You'll find that the housing base is typically the dirtiest (especially for tower systems). When cleaning, be careful not to accidentally alter the CD-ROM volume or sound card master volume controls. Also, do not dislodge any cables or connectors behind the PC.

### **CLEAN THE AIR INTAKE**

While cleaning the case, pay particular attention to the air intake(s), which are usually located in the front (or front sides) of the housing. Check for accumulations of dust or debris around the intakes, or caught in an intake filter. Clean away any accumulations from the intake area, then use your static-safe vacuum to clean the intake filter, if possible. You might need to remove the intake filter for better access. If the intake filter is washable, you might choose to rinse the filter in simple soap and water for best cleaning (remember to dry the filter thoroughly before replacing it). Of course, if there is no intake filter, simply clean around the intake area.

## **14. Backup**

There are many ways you can unintentionally lose information on a computer. A child playing the keyboard like a piano, a power surge, lightning, floods. And sometimes equipment just fails. If you regularly make backup copies of your files and keep them in a separate place, you can get some, if not all, of your information back in the event something happens to the originals on your computer. Deciding what to back up is highly personal. Anything you cannot replace easily should be at the top of your list. Before you get started, make a checklist of files to back up. This will help you determine what to back up, and also give you a reference list in the event you need to retrieve a backed-up file. Here are some file suggestions to get you started:

- Bank records and other financial information
- Digital photographs
- Software you purchased and downloaded from the Internet
- Music you purchased and downloaded from the Internet
- Personal projects
- Your e-mail address book
- Your Microsoft Outlook calendar
- Your Internet Explorer bookmarks

Backup tool in Windows XP helps you to protect your data in case your hard disk fails or files are accidentally erased. Backup creates a duplicate copy of all the data on your hard disk and then archive it on another storage device, such as a hard disk or a tape.

### **14.1a Making backup copies manually**

Regardless of what version of Windows you are using, you can manually make a backup copy of any file or folder by the following steps:

- **Right-click** the file or folder that you want to back up, and then click **Copy** from the menu.
- Now, in **My Computer**, you can **right-click** the disk or external hard drive where you want to store the backup copy, and then click **Paste** from the menu.

### 14.1b Backup using wizard

By default, the Backup utility uses a wizard that makes the process straightforward. To start Backup: Click **Start**, point to **All Programs**, point to **Accessories**, point to **System Tools**, and then click **Backup** to start the wizard.

Click **Next** to skip past the opening page, choose **Back up files and settings** from the second page, and then click **Next**. You should see the page shown in Figure 14.1, which represents your first decision point.

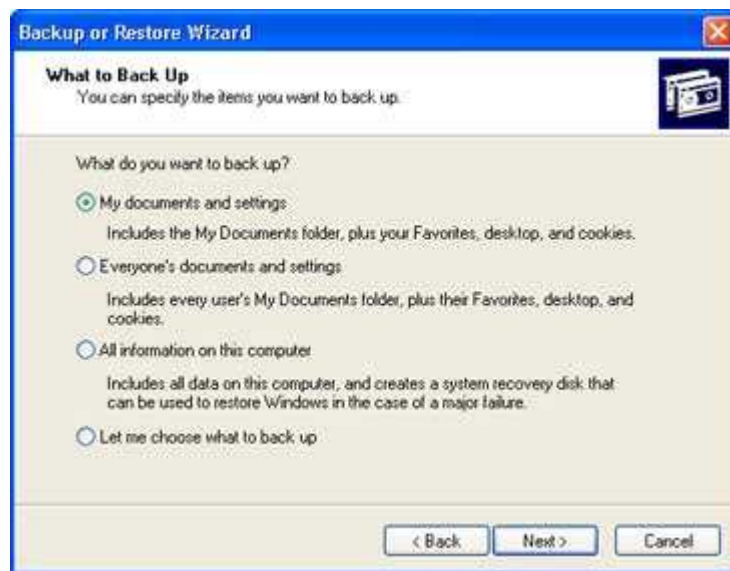


Figure 14.1

### 14.1c Decide What to Back Up

You might be tempted to click **All information on this computer** so that you can back up every bit of data on your computer. Think twice before choosing this option, however. If you've installed a slew of software, your backup could add up to many gigabytes. For most people, the **My documents and settings** option is a better choice. This selection preserves your data files (including e-mail messages and address books) and the personal settings stored in the Windows Registry.

If several people use your computer—as might be the case on a shared family PC—select **Everyone's documents and settings**. This option backs up personal files and preferences for every user with an account on the computer.

If you know that you have data files stored outside your profile, click **Let me choose what to back up**. This option takes you to the **Items to Back Up** page shown in Figure 14.2.



Figure 14.1c.

Select the **My Documents** check box to back up all the files in your personal profile, and then browse the **My Computer** hierarchy to select the additional files you need to back up. If some of your files are on a shared network drive, open the **My Network Places** folder and select those folders.

This option also comes in handy if you have some files you now you don't want to back up. For instance, I have more than 20 GB of music files in the My Music folder. To keep my data file backup to a reasonable size, I click the check box next to the My Music folder. This clears the check box from all the files and subfolders in My Music.

#### 14.1d Decide Where to Store Your Backup Files

On the **Backup Type, Destination, and Name** page, Windows asks you to specify a backup location. If you're one of those exceedingly rare individuals with access to a backup tape, the Backup utility gives you a choice of options in the Select a backup type



box. No tape drive? No problem. Backup assumes you're going to save everything in a single file; you just have to choose a location for that file and give it a name.

By default, Backup proposes saving everything to your floppy drive (drive A). Although that might have made sense 10 years ago, it's hardly a rational choice today. You'd need dozens, perhaps hundreds of floppy disks to store even a modest collection of data files, especially if you collect digital music or photos.

Instead, your best bet is to click **Browse** and choose any of the following locations:

- Your computer's hard disk. The ideal backup location is a separate partition from the one you're backing up. If your hard disk is partitioned into drive C and drive D and your data is on drive C, you can safely back up to drive D.
- A Zip drive or other removable media. At 100-250MB per disk, this is an option if you don't have multiple gigabytes to back up. Unfortunately, the Windows Backup utility can't save files directly to a CD-RW drive.
- A shared network drive. You're limited only by the amount of free space on the network share.
- An external hard disk drive. USB and IEEE 1394 or FireWire drives have dropped in price lately. Consider getting a 40 GB or larger drive and dedicating it for use as a backup device.

After you've chosen a backup location, enter a descriptive name for the file, click **Next** to display the wizard's final page, as shown in Figure 3, and then click **Finish** to begin backing up immediately.

## WEEK 2

### **Some software locks up on systems running 5x86**

processors This is a frequent problem with high-end software, such as AutoDesk's 3D Studio. Often, such programs as 3D Studio use software timing loops in the code. The 5x86 processor executes these loop instructions faster than previous x86 CPUs, which interferes

with timing-dependent code inside the program. In most cases, the software manufacturer will offer a patch for the offending program. For 3D Studio, you can download the FSTCPUFX.EXE file from Kinetix ([ftp://ftp.ktx.com/download/patches/3dsr4/fast\\_cpu/fstcpu.exe](ftp://ftp.ktx.com/download/patches/3dsr4/fast_cpu/fstcpu.exe)). Run the executable patch file and follow the instructions. The patch alters the 3D Studio executable file.

Another prime example of software-related problems is with Clipper applications. Clipper

inserts software timing loops into the applications when the code is compiled, which also interferes with timing-dependent code in the program. For Clipper, you can download the PIPELOOP.EXE file (<ftp://ftp.cyrix.com/tech/pipeline.exe>) and put it in your AUTOEXEC.BAT file.

### **The Windows 95 Device Manager identifies the CPU incorrectly**

In many cases, the CPU is misidentified as a 486 or other older CPU. This is caused by an issue with Windows 95. The algorithm used in Windows 95 to detect the CPU was likely completed before the particular CPU was released; therefore, the CPU responds

to the algorithm just as a 486 does. Use a diagnostic that will identify your particular CPU correctly or check with the CPU maker for a Windows 95 patch that will support proper identification. This problem happens often with Cyrix 6x86 CPUs, and it can be corrected by downloading a patch, such as 6XOPT074.ZIP (see the "Performance enhancement software" bullet under the "Cyrix 6x86 issues" section).

## **CYRIX 6X86 ISSUES**

From a technological standpoint, the Cyrix 6x86 (or *MI*, as it used to be called) is a strong

competitor to the Intel Pentium. In a properly configured system, the 6x86 can actually outclass

the Pentium in some areas. In addition, the 200MHz version of the 6x86 uses a bus speed of 75MHz (replacing the established 66MHz bus speed). However, there are some special

circumstances and symptoms to keep in mind when working on Cyrix-based platforms:

*n Bus speed* This is where Cyrix's problems start because the higher bus speeds demand very fast memory technologies and advanced motherboard chipsets. You can't run the P200 chip in a Triton FX or HX motherboard because those chipsets don't support a bus

speed of 75MHz. In operation, the 6x86 P200 runs at a clock speed of 150MHz by multiplying the 75MHz motherboard bus speed by 2. If you were to try running the P200 at a bus speed of 50MHz and a multiplier of 3, you would lose any performance benefit because of the slow bus speed. For the P166, P150, and P120 versions, motherboard compatibility is much better.

n *Excess heating* Heat is an important issue with every leading-edge CPU, but although similar Intel and AMD processors will typically run hot, the 6x86 runs extremely hot. Excess heat can cause data corruption and system crashes, and even shorten the working life of the CPU. In the worst cases, excess heat can destroy the CPU. Such reliability issues force the use of good-quality heatsink/fan assemblies with all 6x86 models. The recent release of the 6x86L (low-voltage) versions promise to help combat the issues of heating by using a “split voltage” architecture of 2.8 and 3.3 V—the same voltages used by new MMX processors. Cyrix expects that the “L” series will reduce power demands by more than 25%. If you must replace a 6x86, go for a version 2.7 of the 6x86, or a 6x86L version (with proper voltage regulation) if you can.

n *FPU issues* Another point of contention among 6x86 users is that the floating-point capability of a 6x86 is measurably below that of similar Pentiums. For example, the FPU performance of a 6x86 P166 is only rated equivalent to a Pentium 90MHz unit. There is no real solution for the current 6x86 versions, but the coming M2 from Cyrix is expected

to correct these problems.

n *Performance under Windows NT* Here’s another serious problem that plagued earlier 6x86 versions. The CPU is so sensitive to signal reflections from the CPU busses that NT would switch off the L1 cache in the 6x86. This, in turn, causes a performance degradation. Cyrix has resolved many of these issues in the version 2.7 releases, as well as in the new 6x86L CPUs, but you might continue to see NT performance problems in systems with older 6x86 versions.

n *Performance enhancement software.* Given the various limitations of the Cyrix 6x86, a number of utilities are available to enhance the 6x86. You can obtain each utility from

# WEEK 3

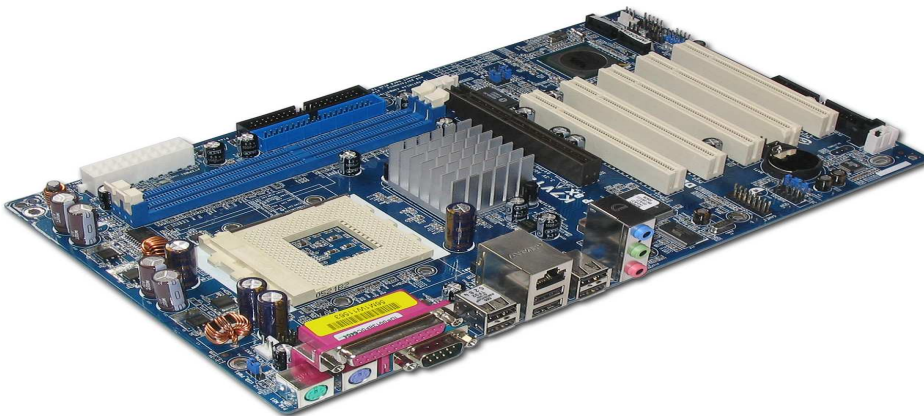
## CPU, Software and Mother Board Compatibility

A [motherboard](#) is a [printed circuit board](#) used in a [personal computer](#). It is also known as the mainboard and occasionally abbreviated to mobo or MB. The term **mainboard** is also used for the main circuit board in this and other electronic devices.

A typical motherboard provides attachment points for one or more of the following: [CPU](#), [graphics card](#), [sound card](#), [hard disk](#) controller, [memory \(RAM\)](#), and external peripheral devices.

All of the basic circuitry and components required for a computer to function sit either directly on the motherboard or in an expansion slot of the motherboard. The most important component on a motherboard is the chipset which consists of two components or chips known as the [Northbridge](#) and [Southbridge](#). These [chips](#) determine, to an extent, the features and capabilities of the motherboard.

The remainder of this article discusses the state of the so-called "[IBM compatible PC](#)" motherboard in the early [2000s](#). It contains the chipset, which controls the operation of the CPU, the [PCI](#), [ISA](#), [AGP](#), and [PCI Express](#) expansion slots, and (usually) the IDE/ATA controller as well. Most of the devices that can be attached to a motherboard are attached via one or more slots or sockets, although some modern motherboards support wireless devices using the [IrDA](#), [Bluetooth](#), or 802.11 ([Wi-Fi](#)) protocols



## CPU sockets

*Main article: [CPU socket](#)*

There are different slots and sockets for CPUs, and it is necessary for a motherboard to have the appropriate slot or socket for the CPU. Newer sockets, those with a three digit number, are named after the number of pins they contain. Older ones are simply named in the order of their invention, usually with a single digit.

A sample of sockets and associated processors:

### Sockets supporting Intel CPUs

- Socket 1 - [80486SX](#), [80486DX](#), [80486DX2](#), [80486DX4](#), and compatible processors from other manufacturers
- Socket 2 - [80486SX](#), [80486DX](#), [80486DX2](#), [80486DX4](#), and clones
- Socket 3 - [80486SX](#), [80486DX](#), [80486DX2](#), [80486DX4](#), and clones
- Socket 4 - early Intel Pentium processors
- Socket 5 - early Intel Pentium processors
- Socket 6 - [80486DX4](#)
- Socket 7 - [Intel Pentium](#) and Pentium MMX (also some AMD and Cyrix CPUs)
- Socket 8 - [Intel Pentium Pro](#)
- Slot 1 - [Intel Pentium II](#), older [Pentium III](#), and Celeron processors (233 MHz - 1.13 GHz)
- Slot 2 - [Intel](#) Xeon processors based on Pentium II/III cores
- Socket 370 - [Celeron](#) processors and newer [Pentium IIIs](#) (800 MHz - 1.4 GHz)
- Socket 423 - [Intel Pentium 4](#) and Celeron processors (based on the Willamette core)
- Socket 478 - [Intel Pentium 4](#) and Celeron processors (based on Northwood, Prescott, and Willamette cores)
- Socket 479 - [Intel Pentium M](#) and Celeron M processors (based on the Baniah and Dothan cores)
- Socket 480 - Intel Pentium M processors (based on the Yonah core)
- Socket 603/604 - Intel [Xeon](#) processors based on the Northwood and Willamette Pentium 4 cores
- Socket T/LGA 775 ([Land Grid Array](#)) - [Intel Pentium 4](#) and Celeron processors (based on Northwood and Prescott cores)

## Sockets supporting AMD CPUs

- Slot A - original AMD Athlon processors
- Socket 462 (aka Socket A) - newer AMD Athlon, Athlon XP, Sempron, and Duron processors
- Socket 754 - lower end AMD Athlon 64 and Sempron processors with single-channel memory support
- Socket 939 - AMD Athlon 64 and AMD Athlon FX processors with dual-channel memory support
- Socket 940 - AMD Opteron and early AMD Athlon FX processors

## Peripheral card slots

There are usually a number of expansion card slots to allow [peripheral](#) devices and cards to be inserted. Each slot is compatible with one or more industry [bus](#) standards.

Commonly available buses include: [PCI](#) (Peripheral Component Interconnect), [PCI-X](#), [AGP](#) (Accelerated Graphics Port), and [PCI Express](#).

ISA was the original bus for connecting cards to a PC. Despite significant performance limitations, it was not superseded by the more advanced but incompatible MCA ([Micro Channel Architecture](#)) ([IBM](#)'s proprietary solution which appeared in their [PS/2](#) series of computers and a handful of other models) or the equally advanced and backward-compatible [EISA](#) (Extended Industry Standard Architecture) bus. It endured as a standard feature in PCs till the end of the 20th century, aided first by the brief dominance of the [VESA](#) (Video Electronic Standards Association) extension during the reign of the [486](#) and later by the need to accommodate the large number of existing ISA peripheral cards. The more recent PCI bus is the current industry standard, which initially was a high-speed supplement to ISA for high-bandwidth peripherals (notably graphics cards, network cards, and [SCSI](#) host adaptors), and gradually replaced ISA as a general-purpose bus. An AGP slot is a high speed, single-purpose port designed solely for connecting high performance graphics cards (which produce [video](#) output) to the monitor. Both AGP and PCI buses are marked for replacement by PCI Express, although this is unlikely to happen prior to 2006 because of the large established base of AGP/PCI motherboards and add-in cards.

A typical motherboard of 1999 might have had one AGP slot, four PCI slots, and one (or two) ISA slots; since about 2002 the last ISA slots in new boards have been replaced with extra PCI slots. Sometimes an [Advanced Communications Riser](#) slot is used instead on less expensive motherboards.

As of 2001, most PCs also support Universal Serial Bus ([USB](#)) connections, and the controller and ports required for this are usually integrated onto the motherboard. An [ethernet](#) interface and a basic audio processor are now almost universally integrated into current motherboards as well.

## **Temperature and reliability**

Generally, motherboards are air cooled with heat sinks on the larger chips such as the northbridge and CPU, and they have monitored sockets for case fans. Newer motherboards have integrated temperature sensors to detect motherboard and CPU temperatures, which can be used by the [BIOS](#) or [Operating system](#) to regulate fan speed. The removal of waste thermal energy became a major concern for workstation PCs around 2000, with the problem becoming more severe over time as computer systems continued to consume more and more power.

A study of the German *c't* computer magazine [c't 2003, vol. 21 pg. 216-221](#) found that some spurious computer crashes and general reliability issues ranging from screen image distortions to I/O read/write errors can surprisingly be attributed not to software or peripheral hardware but to aging PC motherboards.

Motherboard voltage regulation uses [electrolytic capacitors](#). These [capacitors](#) exhibit aging effects which depend on the temperature of the parts, since their water based [electrolytes](#) slowly evaporate leading to capacity loss and motherboard malfunctions due to [voltage](#) instabilities. While most capacitors are rated for 2000 hours at 105 degrees Celsius, their expected design life roughly doubles for every 10 degrees below this. At 45 degrees a lifetime of 15 years can be expected, which appears reasonable for a computer mainboard. In the past, many manufacturers delivered substandard capacitors, which would reduce this life expectancy figure. With inadequate case cooling this can become a serious problem. It is, however, possible to find and replace broken capacitors on PC mainboards. For more information on certain types of premature capacitor failure on PC motherboards, see [capacitor plague](#).

## Physical form factor

The motherboard fits into the computer case with screws or clips. There are many *form factors*, or sizes of motherboard. In general, it is necessary for the case, power supply, and motherboard to conform to the same standard in order for them to operate properly.

- XT (8.5 × 11" or 216 × 279 mm) - obsolete
- [AT](#) (12 × 11"–13" or 305 × 279–330 mm) - obsolete -
- [Baby-AT](#) (8.5" × 10"–13" or 216 mm × 254–330 mm)
- [ATX](#) (Intel 1996; 12" × 9.6" or 305 mm × 244 mm)
- [Mini-ATX](#) (11.2" × 8.2" or 284 mm × 208 mm)
- [MicroATX](#) (1996; 9.6" × 9.6" or 244 mm × 244 mm) - fewer slots than ATX, so can use smaller PSU
- [LPX](#) (9" × 11"–13" or 229 mm × 279–330 mm) - in slimline retail PCs
- [Mini-LPX](#) (8"–9" × 10"–11" or 203–229 mm × 254–279 mm) - in slimline retail PCs
- [NLX](#) (Intel 1999; 8"–9" × 10"-13.6" or 203–229 mm × 254–345 mm) - coming soon; requires add-in card riser
- [FlexATX](#) (1999; 9.6" × 9.6" or 244 × 244 mm max.) - can be smaller than microATX
- [Mini-ITX](#) (VIA Technologies 2003; 6.7" × 6.7" or 170 mm × 170 mm max.; 100W max.)
- [Nano-ITX](#) (VIA Technologies 2004; 120 mm × 120 mm max.)
- [BTX](#) (Intel 2004; 12.8" × 10.5" or 325 mm × 267 mm max.)
- [MicroBTX](#) (Intel 2004; 10.4" × 10.5" or 264 mm × 267 mm max.)
- [PicoBTX](#) (Intel 2004; 8.0" × 10.5" or 203 mm × 267 mm max.)
- [WTX](#) (14" × 16.75" or 355.6 mm × 425.4 mm)
- Retrieved from "[http://en.wikipedia.org/wiki/PC\\_motherboard](http://en.wikipedia.org/wiki/PC_motherboard)"

## Form factors

Motherboards are available in a variety of [Form factors](#), which usually correspond to a variety of [Computer case](#) sizes. The following is a summary of some of the more popular sizes available:

- PC/XT - the original open motherboard standard created by IBM for the first home computer, the IBM-PC. It created a large number of '[clone](#)' motherboards due to its open standard and therefore became the [de facto](#) standard.
- [AT form factor](#) (Advanced Technology) - the first form factor to gain wide acceptance, successor to PC/XT. Also known as Full AT, it was popular during the [386](#) era. **Obsolete** - superseded by ATX.
- Baby AT - IBMs successor to the AT motherboard, it was functionally equivalent to the AT but gained popularity due to its significantly smaller physical size.



- [ATX](#) - the 'evolution' of the Baby AT form factor, it is now the most popular form factor available today.
- Mini-ATX - essentially the same as the ATX layout, but again, with a smaller 'footprint'.
- microATX - again, a miniaturization of the ATX layout. Currently, it only supports [AGP](#) (ie. no [PCI Express](#) support) and therefore is not intended for use with high-end graphics and gaming systems; it is commonly used in the larger of the 'cube'-style cases such as the [Antec ARIA](#).
- FlexATX - a subset of microATX allowing more flexible motherboard design, component positioning and shape.
- LPX - based on a design by [Western Digital](#), it allows for smaller cases based on the ATX motherboard by arranging the expansion cards in a *riser* (an expansion card in itself, attaching to the side of the motherboard - [image](#)). This design allows the cards to rest [parallel](#) to the motherboard as opposed to [perpendicular](#) to it. The LPX motherboard is generally only used by large [OEM](#) manufacturers.
- Mini LPX - a smaller subset of the LPX specification.
- NLX - a 'low-profile' motherboard, again incorporating a 'riser', designed in order to 'keep up with market trends'. NLX never gained much popularity.
- [BTX](#) (Balanced Technology Extended) - a newer standard proposed by Intel as an eventual successor to ATX.
- microBTX and picoBTX - smaller subsets of the [BTX](#) standard.
- Mini-ITX - VIA's highly-integrated small form factor motherboard, designed for uses including [thin clients](#) and [Set-top box](#).
- [WTX](#) (Workstation Technology Extended) - a large motherboard (more so than ATX) designed for use with high-power workstations (usually featuring multiple [Central processing unit](#) or [Hard disk](#)).
- While most [desktop](#) PCs use one of these motherboard form factors, [notebook](#) computers generally use highly integrated, customized and miniaturized motherboards designed by the manufacturers. This is one of the reasons that notebook computers are difficult to upgrade and expensive to repair - often the failure of one integrated component requires the replacement of the entire motherboard, which is also more expensive than a regular motherboard due to the large number of integrated components in it.

# WEEK 4

## COMPUTER ASSEMBLING AND DISASSEMBLING

### OBJECTIVES

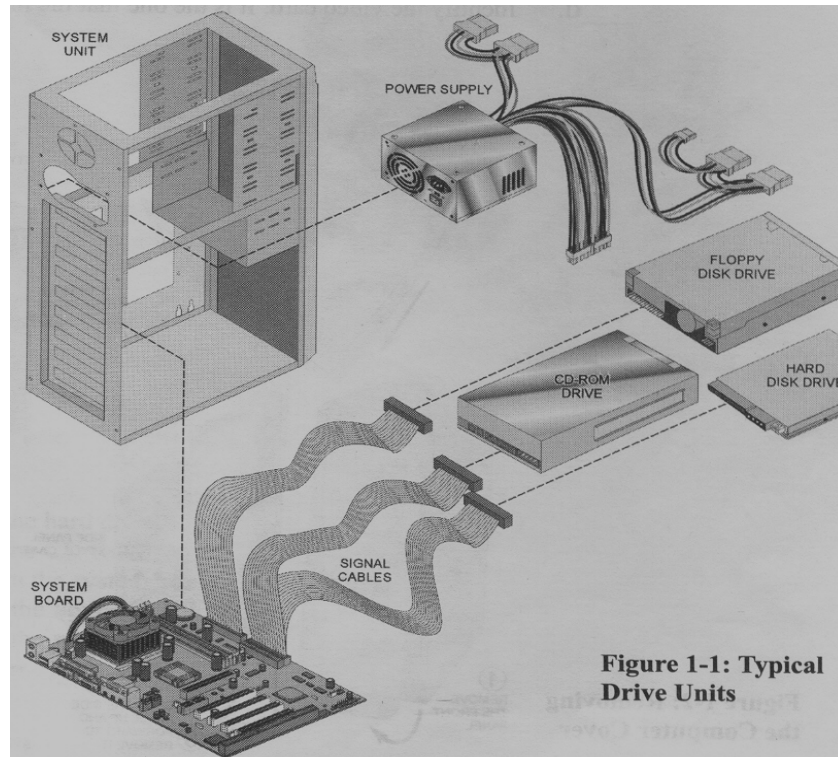
1. Disassemble the PC desktop/tower Computer System
2. Identification of various composite components
3. Verify the correct interface cable
4. Assemble the PC desktop/tower Computer System
5. Boot up the System

### RESOURCES

1. Quality screwdriver, Tester, Soldering Iron,
2. Desktop/tower Computer System
3. Operating system Windows XP or higher version installed
4. Utility programs
5. Multimeter or AVO meter for measuring Ampere, Voltage and Ohmmeter

### DISCUSSION

You must start the computer to verify that it is working properly. Then Disassemble and Assemble the PC. You will go through ALL the steps of disassembling except actually taking out the drives and the Motherboard out of the system unit.



## PROCEDURE

### 1. BOOT UP THE PC (COLD BOOTING)

- (a) Put **ON** the PC by pushing the power button
- (b) The PC will boot to Graphical users interface, Windows XP or higher version
- (c) Use the path **Start/Shut Down** to shut down
- (d) Click on **Turn OFF** to finally Shut Down

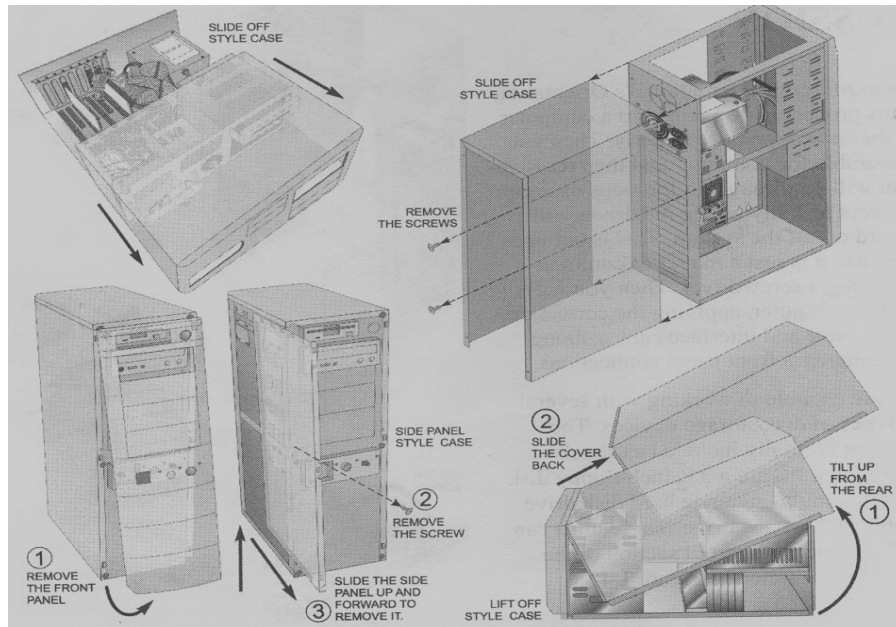
*NOTE: the computer will shut down Windows and the power will turn off automatically.*

### 2. IDENTIFY THE ADAPTER CARDS

- (a) Unplug the **power cord** from the back of the PC
- (b) Remove the screw on the back panel of the PC cover

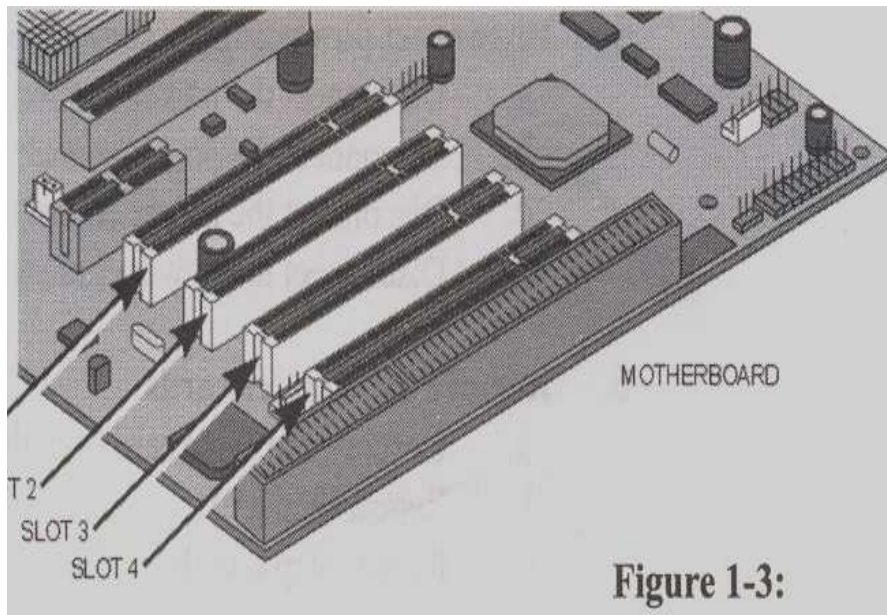
(c) Take the cover or the side panel off.

(d) Identify the **video card**. It is the one that the monitor is plugged into.



**Figure 1-2 Removing the PC cover**

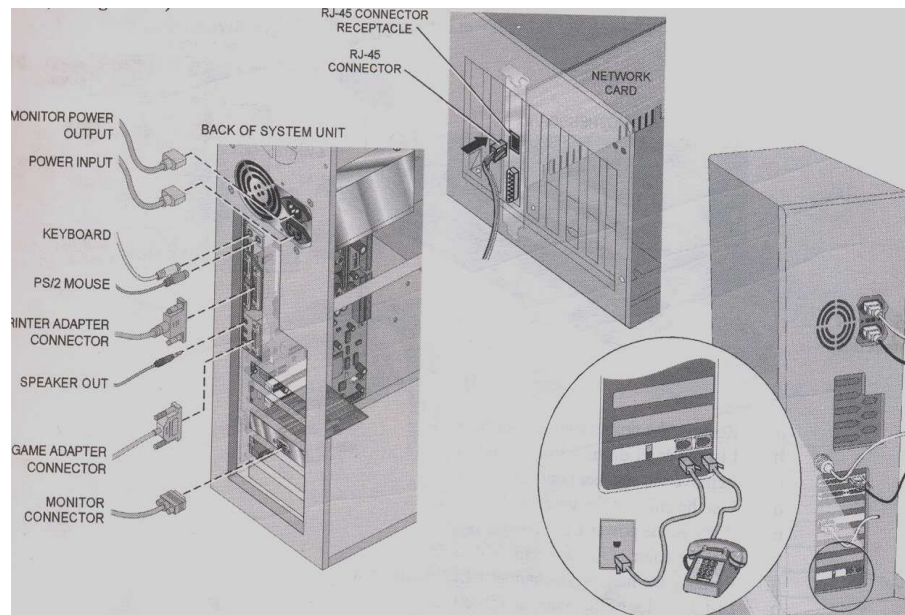
(e) Write down the slots the **video card** is plugged into in Table 1-1. Slots are numbered from right to left starting from slot 1



**Figure 1-3:**

- (f) Identify the **modem card**. It is the card with the two telephone ports at the back of it.
- (g) Write down the slots the modem card is plugged into in Table 1-1
- (h) Identify the **network card**. It is the card with the oversize phone ports. This is really a network port called RJ-45 or 10-base-T port.
- (i) Write down the slots the **network card** is plugged into in Table 1-1

### 3. DISCONNECT EXTERNAL CABLES



**Figure: !-4**

- (a) Disconnect the **keyboard** from the back of the computer
- (b) Disconnect the **PS/2 or Serial mouse**
- (c) Disconnect the **phone** cable (if any )
- (d) Disconnect the **RJ-45 network** cable (if any )
- (e) Disconnect the **printer** cable (if any )
- (f) Disconnect the **monitor** cable

#### **4. DISCONNECT INTERNAL CABLE**

- (a) Disconnect the IDE ribbon cable from the **hard drive**
- (b) Disconnect the IDE ribbon cable from the **CD-ROM**
- (c) Disconnect the IDE ribbon cable from the **motherboard**
- (d) Disconnect the FDD ribbon cable from the **floppy disk drive**
- (e) Disconnect the FDD ribbon cable from the **motherboard**
- (f) Remove ALL the cable from the computer

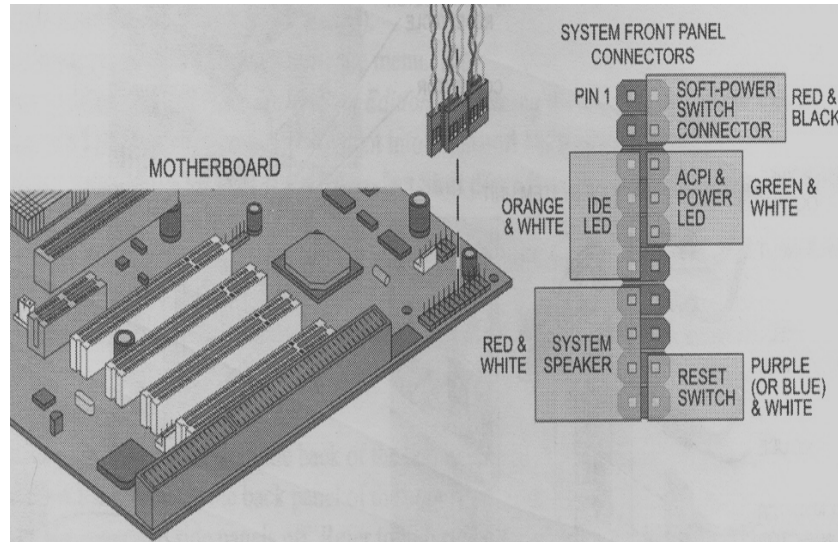
#### **5. DISCONNECT ALL POWER SUPPLY CONNECTION**

- (a) Disconnect the power supply connector from the **hard drive**
- (b) Disconnect the power supply connector from the **CD-ROM**
- (c) Disconnect the power supply connector from the **floppy**
- (d) Disconnect the power supply connector from the **motherboard**

#### **6. REMOVE THE ADAPTER CARD**

- (a) Unscrew the **video card** from the back panel, and then remove it
- (b) Unscrew the **modem card** from the back panel, and then remove it
- (c) Unscrew the **network card** from the back panel, and then remove it

#### **7. DISCONNECT ALL FRONT PANEL CONNECTIONS**



**Figure 1-5: Front Panel Connection**

- (a) Remove the **power Switch connector**
- (b) List the color of the wire in Table 1-2
- (c) Remove the **speaker connector**
- (d) List the color of the wire in Table 1-2
- (e) Remove the **power LED connector**
- (f) List the color of the wire in Table 1-2
- (g) Remove the **hard drive channel 1 LED connector**
- (h) List the color of the wire in Table 1-2
- (i) Remove the **hard drive channel 2 LED connector**
- (j) List the color of the wire in Table 1-2
- (k) Remove the **reset switch connector**
- (l) List the color of the wire in Table 1-2

***NOTE: Computer disassembly is now complete. Now let's start to reassemble back the computer***

## 8. CONNECTING THE FRONT PANEL CONNECTION

- (a) Find the power LED connector and connect it to the motherboard where it is  
- labeled Power LED. Go to Table 1-2 if needed
- (b) Find the **reset switch connector** and connect it to the motherboard.
- (c) Find the **power switch connector** and connect it to the motherboard
- (d) Find the **hard-disk LED channel 1 connector** and connect it to the  
motherboard
- (e) Find the **hard-disk LED channel 2 connector** and connect it to the motherboard
- (f) Find the **speaker connector** and connect it to the motherboard

## 9. INSTALL THE ADAPTER CARDS

*NOTE: Always make sure the cards are lined up properly with the slots. It will require a firm push to get the card to reseat on the motherboard expansion slot*

- (a) Install the **video card** into the slot recorded in Table 1-1 and screw it into  
the back panel
- (b) Install the **modem card** into the slot recorded in Table 1-1 and screw it  
into the back panel
- (c) Install the **network card** into the slot recorded in Table 1-1 and screw it  
into the back panel



## 10. CONNECT THE POWER SUPPLY

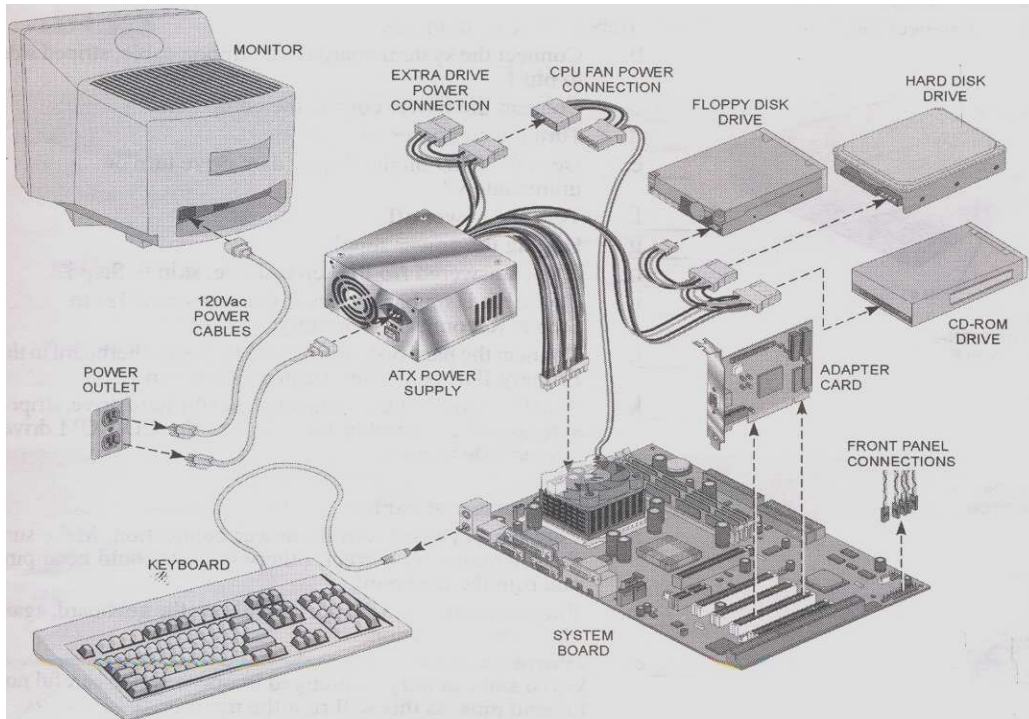


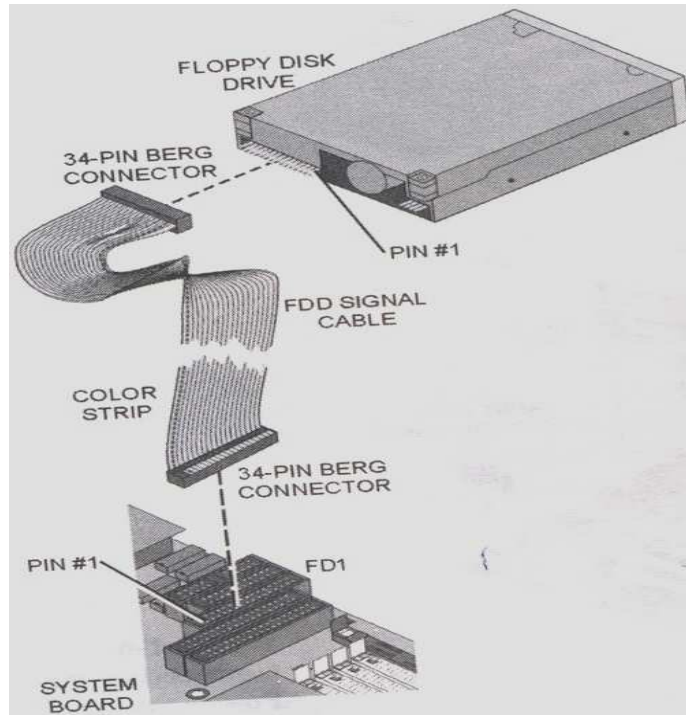
Figure 1-6: Connecting the Power Supply

**NOTE:** All the connectors are keyed to plug only in one way

- (a) Plug the ATX or AT power connector into the **motherboard**
- (b) Plug the power connector into the **floppy disk drive**
- (c) Plug the power connector into the **hard disk drive**
- (d) Plug the power connector into the **CD-ROM**

## 11. CONNECT THE RIBBON CABLES

- (a) Connect the **floppy disk drive** to ribbon cable as in Figure 1-7



**Figure 1-7: Connecting the Ribbon Cable**

- (a) Connect the **motherboard** to ribbon cable, striped side to pin 1
- (b) Connect the **power cords** to the PC
- (c) Turn ON the PC
- (d) Does the LED on the **floppy turn ON** immediately?
- (e) Turn OFF the PC
- (f) Unplug the power supply.
- (g) If the answer is NO to step e above, skip to step j
- (h) The cable is on backward if you answer YES to step e. Reconnect it correctly
- (i) Connect the **hard disk drive** cable to motherboard in the primary IDE controller, striped side to pin 1
- (j) Plug the middle of the connector into the **hard disk drive**, striped side to pin 1, and plug the end into the **CD-ROM drive**, striped side to pin 1

## **12. CONNECT THE EXTERNAL CABLE**

- (a) Plug the keyboard into the lower connection. Make sure that the orientation is correct. Otherwise you can bend the pins and ruin the keyboard.
- (b) Plug the mouse into the port just below or beside the keyboard as the case may be. Make sure that the orientation is correct
- (c) Plug the monitor back into the video card. The connector is keyed in only one way. Make sure that the orientation is correct; otherwise you can bend the pins and ruin the monitor
- (d) Plug in the power cord
- (e) Replace the cover of the PC
- (f) Screw in the cover screw

*NOTE: reassemble is complete. You need to reboot the PC to see if it is still working properly*

## **13. BOOTING UP THE PC**

- (a) Put **ON** the PC by pushing the power button
- (b) The PC will boot to Windows XP
- (c) Use the path **Start/Shut** Down to shut down
- (d) Click on **Turn OFF** to finally Shut Down

# TABLES

TABLE 1-1

ADAPTER CARD	SLOT
VIDEO CARD	
MODEM CARD	
NETWORK	

TABLE 1-2

CABLE	COLOR
POWER SWITCH:	
SPEAKER:	
POWER LED:	
IDE 1 <sup>ST</sup> CHANNEL:	
IDE 2 <sup>ND</sup> CHANNEL:	
RESET:	

## LAB QUESTIONS

1. What does the color stripes on a disk drive's signal cable indicator?
2. How do you shut down Windows XP?
3. How do you shut down NIC?
4. What will happen if you plug a floppy drive cable in backward?
5. How many wires are on the power connectors for a hard drive?



# WEEK 5

## LAB WORK 2

### MEASUREMENTS OF ELECTRICAL QUANTITIES ON A COMPUTER

#### OBJECTIVES

1. Measure Resistance on a speaker
2. Measure Voltage from a power supply

#### RESOURCES

1. PC desktop/tower Computer System
2. Digital Multimeter with Lead
3. A good fuse
4. A bad fuse

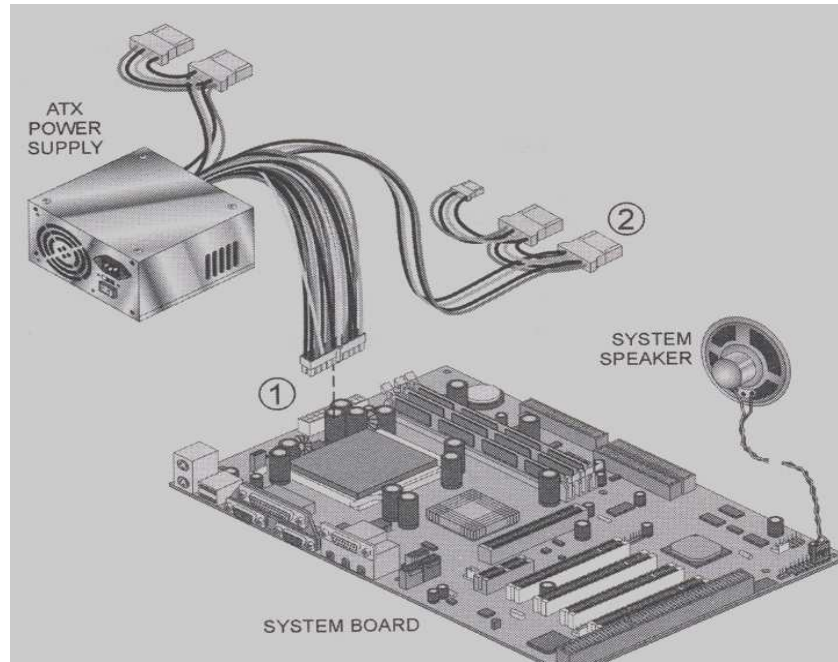
#### DISCUSSION

Here you will measure various electrical quantities on a computer. The Multimeter can be used to measure resistance, current and potential across a circuit

#### *PROCEDURE*

##### **1. RESISTANCE ON A SPEAKER**

- (a) Open the inside of the PC
- (b) Rotate the Multimeter dial to 200 ohms
- (c) Hold the Red lead on the exposed end of the Red wire that connect the systems' speaker



**Figure 2-1: Power Supply Connector**

- (d) Hold the Black lead on the exposed end of the Black wire that connect the systems' speaker
- (e) Record the reading of the meter in Table 2-1

## **2. VOLTAGE**

- (a) Turn on the power of the PC
- (b) Look for the 20-pin ATX power connector that in plugged into the motherboard.  
It should look like the location 1 in Figure 2-1.
- (c) Rotate the Multimeter dial to 20 Vdc
- (d) Firmly secure the black connector to the Multimeter into a black connector of the 4-pin internal drive power connector as in location 2

- (e) Insert the Red Multimeter connector into each pin on the ATX connector and record their various voltages in Table 2-2

*NOTE: the pin number is small and may be labeled on the back wire of the connector.*

*The yellow wire should be one*

- (f) Check the voltage at each pin of the 4-pin internal drive power connector and record the . values in Tables 2-3

- (e) Turn off the PC
- (f) Replace the side panel

### **3. FUSES**

- (a) Obtain the two fuses; one good and one bad
- (b) Rotate the Multimeter dial to 200 ohms
- (c) Touch the two leads together and record the Multimeter reading in Table 2-4. You now establishing a datum or zero point of no resistance
- (d) Without touching the leads together, record the Multimeter reading in Table 2-5
- (e) Place one lead on one end of the good fuse.
- (f) Place the other lead on the other end of the good fuse. Make sure that your finger or the leads are not touching each other

*NOTE: The only path for electricity to flow is through the fuse*

- (g) Record the Multimeter reading in Table 2-6
- (h) Place one lead on one end of the bad fuse
- (i) Place the other lead on the other end of the bad fuse. Make sure that your finger or the leads are not touching each other

*NOTE: The only path for electricity to flow is through the fuse*

- (j) Record the Multimeter reading in Table 2-7



# TABLES

Table 2-1

<b>Speaker Resistance</b>	
---------------------------	--

Table 2-2

ATX Voltage

<b>Pin No.</b>	<b>Voltage</b>	<b>Pin No.</b>	<b>Voltage</b>
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Table 2-3

4-Pin Internal Drive Power Connector Voltage

<b>Pin No.</b>	<b>Voltage</b>	<b>Pin No.</b>	<b>Voltage</b>
1		3	
2		4	

Table 2-4

<b>Zero Resistance</b>	
------------------------	--

**Table 2-5**

<b>Maximum Resistance</b>	

**Table 2-6**

<b>Good Fuse Resistance</b>	

**Table 2-6**

<b>Bad Fuse Resistance</b>	

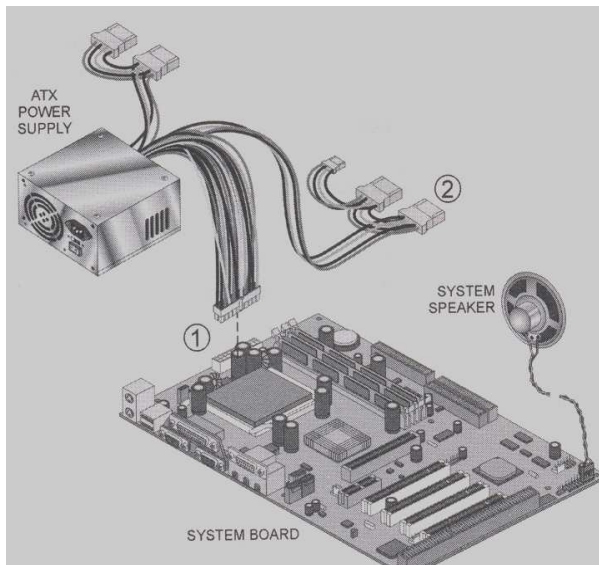
**LAB QUESTIONS**

1. What is the total range of Voltage across the power supply?
2. How many pins does an ATX power connector have?
3. What is the Multimeter used to measure?
4. What should be the resistance of a good fuse?



# WEEK 6

## Removing The Power Supply Unit



### Power Supply Unit

1. from Power Unit To Motherboard
2. Feeding Mass Storage Unit

### Removing a Power Supply

1. Remove the two power connectors (P8 and P9) from the system board, using the plastic connector, not the wires.
2. Remove the power connectors from all other components, including the hard, floppy, and CD-ROM drives.
3. Remove the screws that hold the power supply to the chassis. Do *not* remove the screws from the power supply case itself!
4. Slide the power supply away from the computer.

Reverse this procedure to install a power supply. It is important to note that the P8 and P9 connectors look almost identical. Although each will attach to the system board only one way, it is possible to place them beside each other the wrong way. When attaching them to the system board, make sure the *black* wires of the connectors are together.

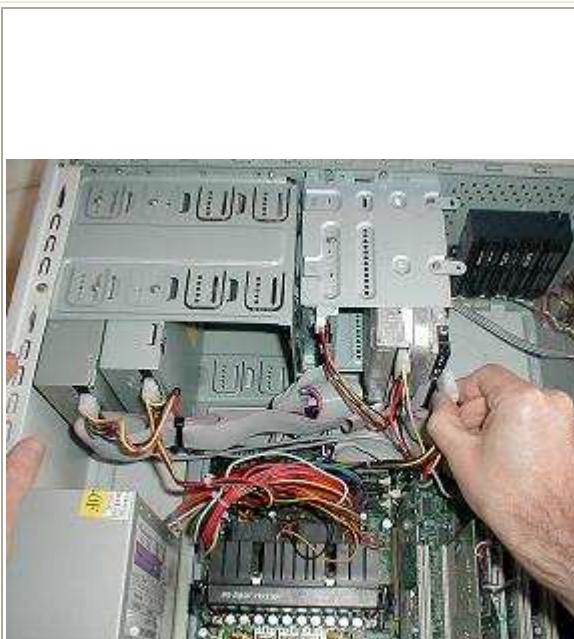
***The P8 and P9 connectors are attached to the system board with the black wires together.***

## WEEK 7

### The following are steps required to replace your motherboard:

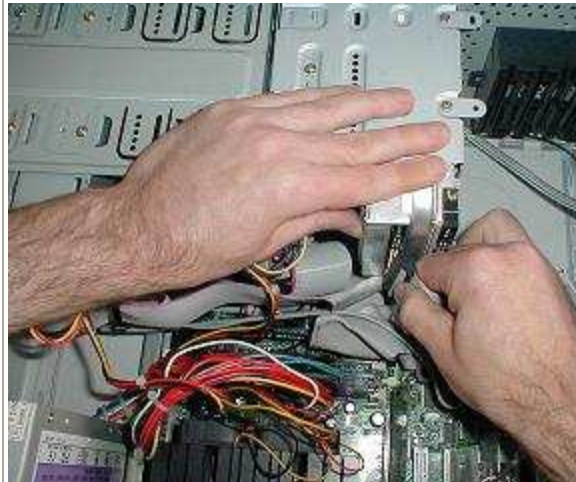
First of all is removing the old motherboard:

The following steps are involved regarding the removal of the old board.



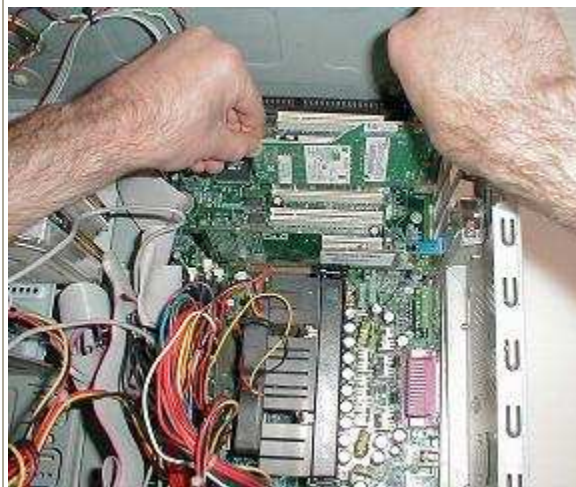
The first step to replacing a motherboard in a desktop computer is to remove the old motherboard. That may sound trivial, but it's literally half of the job, and I'm splitting removal and installation onto two pages so it doesn't get too big. In order to remove the motherboard, you not only have to disconnect all connections between the motherboard and components in the case, you should also remove any cables that are simply in the way. Remember to touch the metal edge of the case to ground yourself from time to time. Some techs like to leave the power supply plugged in for a ground, but that's pretty crazy with ATX technology, since if the switch on the back of the supply goes on, the power supply will be live. I unplug the power supply and avoid dancing on the rug to generate static electricity. We start by removing the 1x4 power connector from the hard drives.

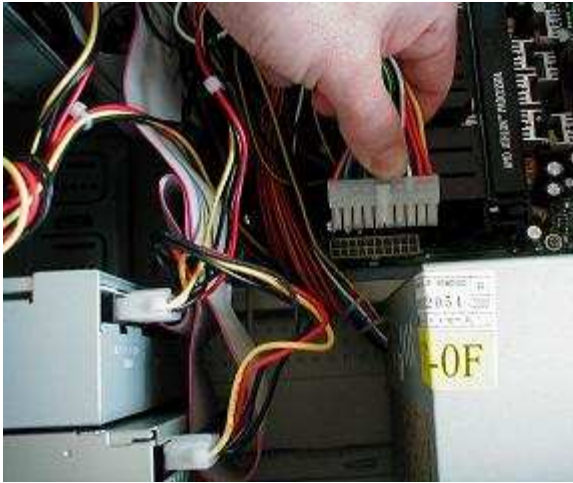
Next we remove the data cable from the hard drives. In a larger case, I might have left the data cables installed on the drive end, but there's very little clearance between the motherboard and the drive cages, and you don't want to start wrestling the old motherboard out because you didn't prepare properly. It's just like working on a car, if you don't get enough stuff out of the way to have room to get a wrench in and see what you're doing, you're just wasting time in the long run. Keep in mind that we're replacing the motherboard, not just taking the old one out, and you don't want to bash the new motherboard around as you're installing it.



Now it's time to remove the PCI adapters and the video card. All of the adapters that mount in motherboard slots are secured to the back rail of the case with single screw each, though the screws are often missing in systems that have been worked on. You may as well take all the screws out at the same time and put them aside in a glass or any other small container to keep them from getting too lost.

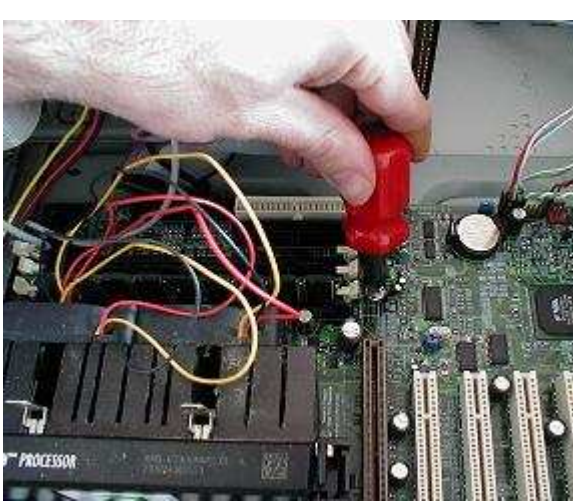
You should always handle adapters by the the edges and by the metal bracket when removing them from the motherboard. Again, you can't race through this part like you're just waiting to get to the main course, because you're going to need to put all these adapters back in after you replace the motherboard, unless the new motherboard has those features integrated in the I/O core. You should especially avoid touching the gold contacts on the card edge that pulls out of the motherboard slots, because the oil from your fingers is an electrical insulator.





Standard ATX motherboards feature a single 10x2, 20 pin connector for the power supply. The connection features a sort of a simple latch which is released from the nub on the motherboard connector by depressing the top of the latch (just below my thumb). You can also see the nub on the motherboard connector, on the side near the motherboard edge. It can take a bit of force to pull the connection out of the motherboard even once it's release, since there are 20 tight connection, so be prepared to use your off hand to hold the motherboard down if the edge lifts as you remove the connector.

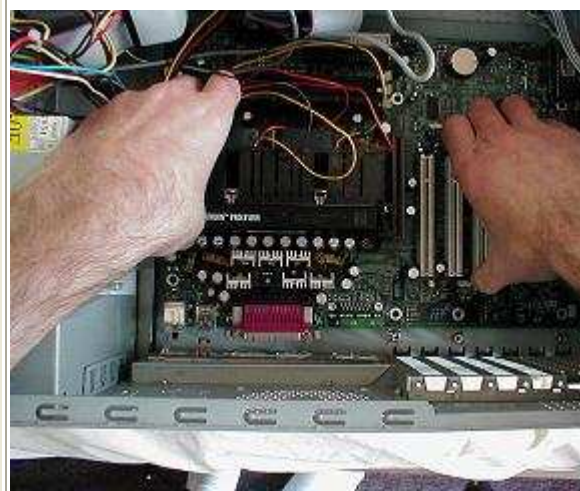
Now we get to removing the data cables from the old motherboard. If we had more room in the case, I would have left them attached to the drives on the other end. If you have trouble remembering where everything goes when you go to install the new motherboard, I'd recommend the book I write for McGraw-Hill, "Build Your Own PC," which uses extensive photographic illustrations to detail the complete assembly of three state-of-the-art PCs. Note that I'm using both hands to pull out the ribbon cable, holding it as near to the connector as possible. High quality ribbon cables often include a pull loop or tab so you can remove them without stressing the cable.



The motherboard is actually mounted in the case with a series of screws through the motherboard, seven in this case, all of which must be removed. About the worst thing that can happen when you're replacing a motherboard is that one of the screws will turn and turn without releasing. Normally, this is due to the screw having been over-tightened in a brass standoff, which comes unscrewed from the motherboard pan and remains attached to the screw. If you think this is happening, proceed to removing the rest of the screws first so you won't place undo strain on the motherboard by flexing it

up. If the standoff thread in the motherboard pan is stripped, you can take off the other side of the case and grab it with vise grips from the back.

The final set of connections we have to deal with are the front panel leads that attach to the motherboard. This includes the LEDs for hard drive activity and power status, the case speaker, and most importantly, the power switch. ATX systems use a logic switch to tell the motherboard, which is always receiving a trickle of power from the ATX power supply, to power full on. These are all small format connectors that easily pull off, and frankly, the power switch is the only one you really need to reconnect when you replace the motherboard, the other's are bells and whistles.

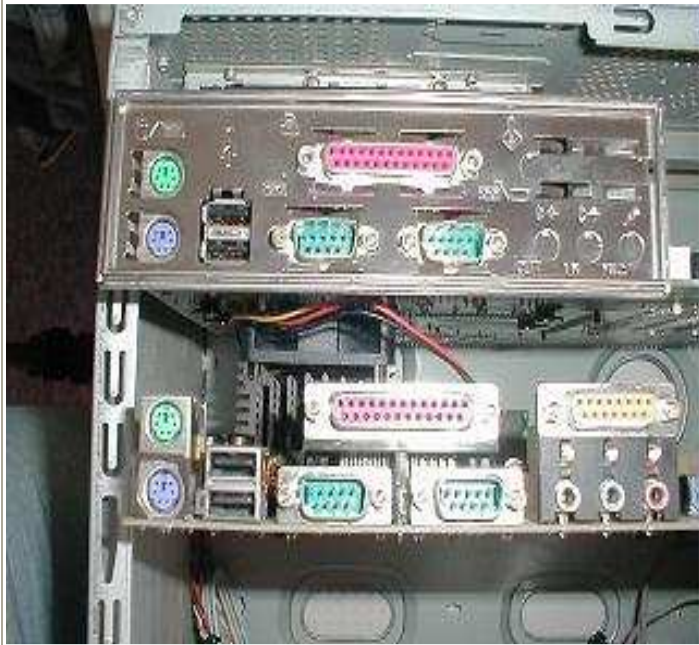


Once all the connections to the motherboard are removed and the screws are all out, you can lift the motherboard a little and pull it away from the back of the case, where the connectors of the I/O core protrude through the shield (left). Once you disengage the I/O core, you can lift the motherboard right out of the case. I usually hold onto a PCI slot and the CPU heatsink, there's just no room to get your fingers on the edges of the motherboard in most cases (below). That pretty much covers the removal phase of replacing a motherboard, so skip over to [how to install a new motherboard](#)

**Next we must assemble the new motherboard**

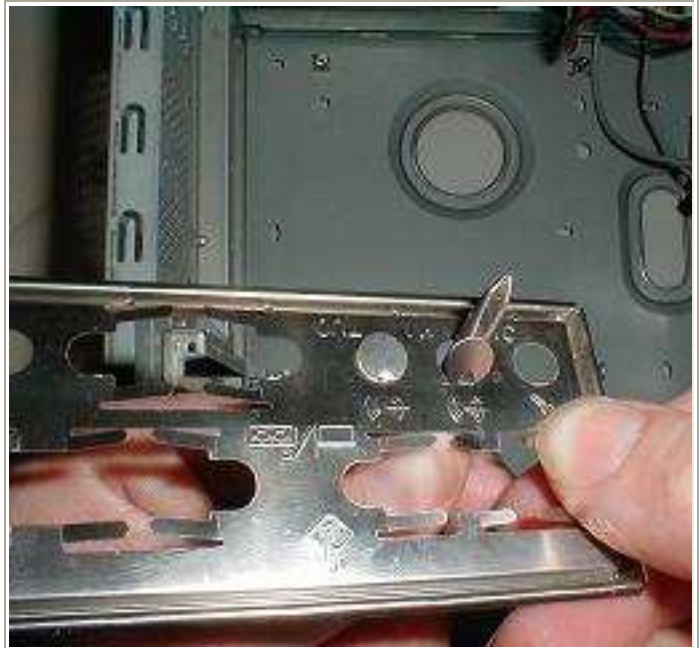
**Here are the steps:**

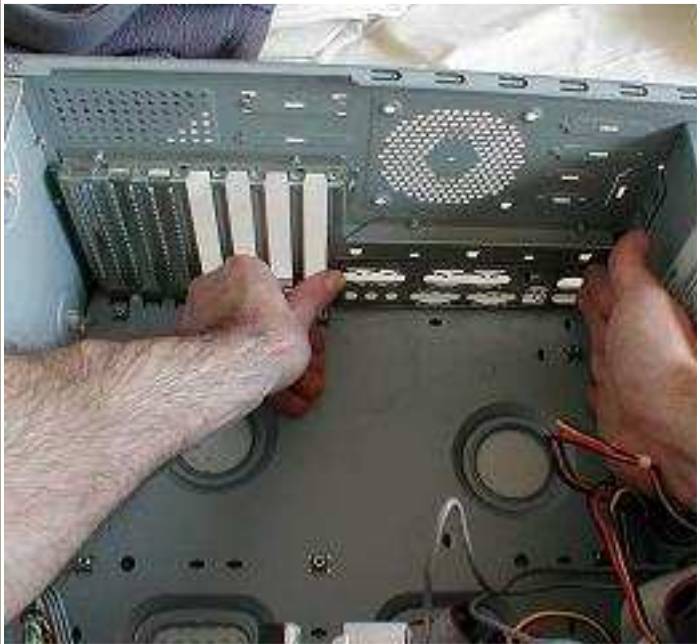




The process of replacing the motherboard began with [removing the old motherboard](#). Now it's time to compare the old motherboard with the replacement motherboard to see how they physically match. I've pulled the I/O core shield out of the back of the case, and I've placed it on the I/O core of the old motherboard. You can see (if the flash isn't blinding you:-) that the old I/O core didn't have a game port or integrated sound, which the new motherboard supports. New motherboards should always ship with their own I/O shield, but with a second-hand replacement like we're using here, you have to make due. Fortunately, the old I/O shield has punch-outs in the proper locations.

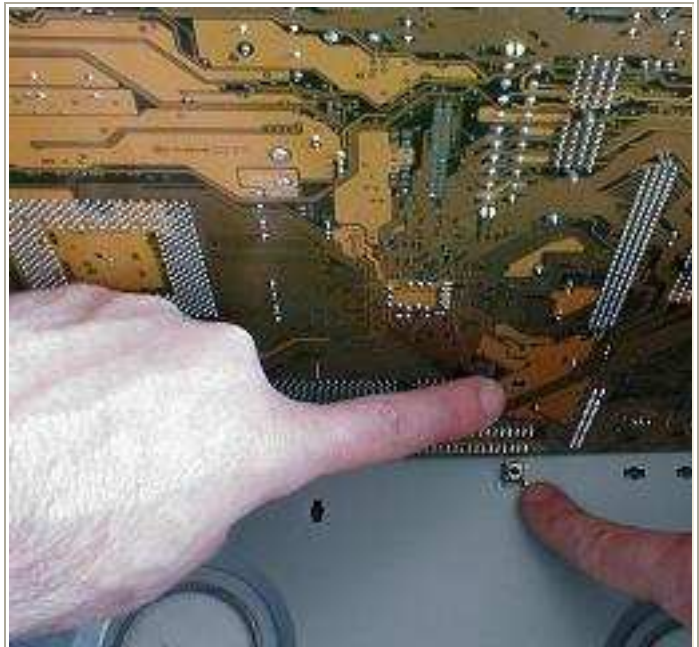
You need to exercise a bit of common sense when removing sharp pieces of tin from a flimsy shield. While pliers may seem like a good idea, you want to control the amount of force carefully, it doesn't take much to stretch the shield so that it will never fit on the motherboard I/O core properly. I worked the game port cover out with my fingers, and now I'm using a screwdriver to pop out the tabs over the sound jacks for mic, line and speakers. Once the metal tab is standing up, one or two bends is enough to break it off.





After we double check that the I/O shield now fits over the new I/O core, we install it in the case. It's always a two handed job, the only thing that secures the shield is the spring force on the dimples around the edges, and of course, the motherboard, once the ports protrude through the shield. You need to get the shield firmly fixed in place because otherwise it will just slip when you're trying to align the motherboard ports and making installing the motherboard a pain.

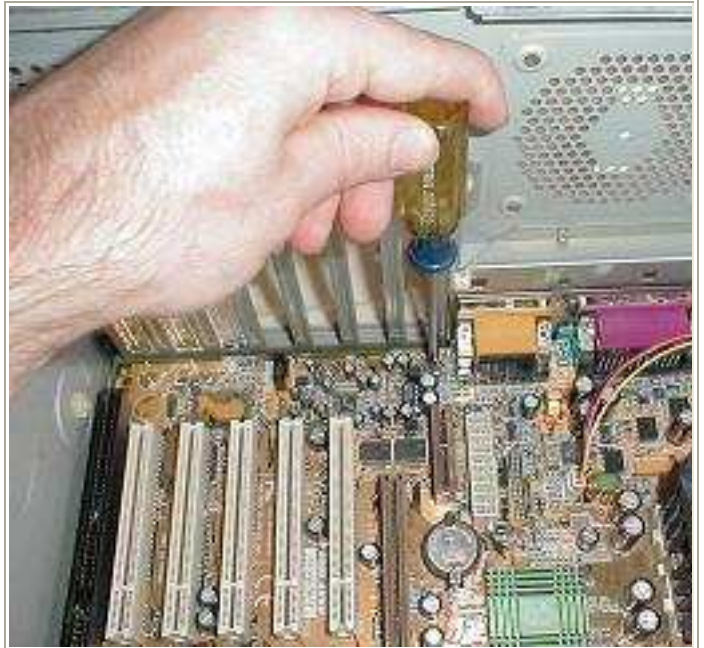
Here I've stood the new motherboard up in the case to compare the locations of the holes in the motherboard with the standoffs in the case. In this particular instance, it happens that all seven of the installed standoffs aligned properly with holes in the motherboard (thanks to a standard ATX form factor) so we didn't have to do anything. The main trick is to count the standoffs before installing the motherboard, count out a like number of screws, and make sure you use all of them to secure the motherboard.





The motherboard is installed into the case on an angle, with the back edge and the I/O core going first. Once the I/O core is properly aligned with the shield, you can push the ports through the openings and set the motherboard down on the standoffs. Check for wires and cables having been caught below the motherboard before you start securing it with screws.

We counted out seven screws to match the number of standoffs in the case, and now we are going to use every one of those screws to secure the motherboard. If there's a screw leftover when you're done, it means that there's a metal standoff that didn't end up under a hole in the motherboard, and is probably waiting for you to plug in the power and burn up the replacement motherboard. In other words, if you didn't use up all the screws, take the motherboard back out and count again. If you counted right, you need to visually inspect the motherboard and the standoff locations, figure out which one isn't being used, and remove it.

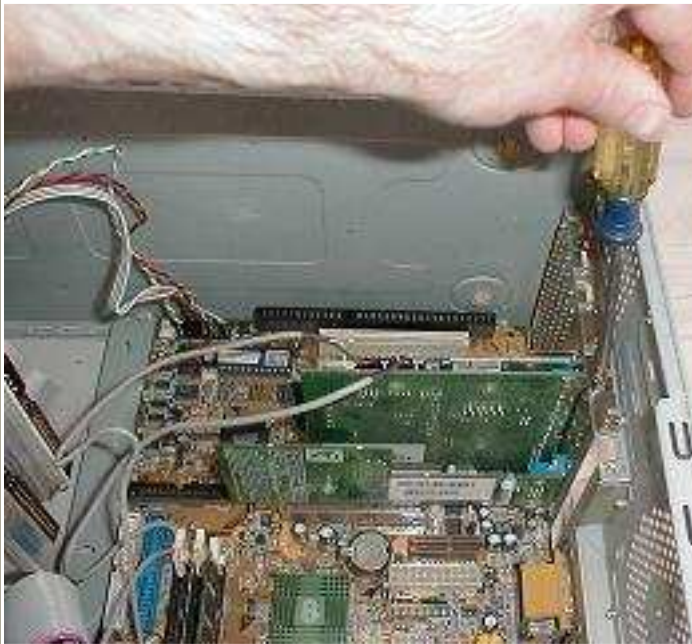




I like to make the most important motherboard connection first, and that's the power switch. It's normally labeled "PW SW" or "Power SW" and the motherboard will be labeled with "PW SW", "P-ON" "PW" or something similarly cryptic. You won't hurt anything if you attach the power switch to the wrong connector in the block, but you won't get the PC to turn on either. I went ahead and connected the rest of the front panel leads to the motherboard, but you really don't need to. Nobody uses reset switches or keyboard locks anymore, most motherboards have a built in piezoelectric speaker, and who cares about LED's.

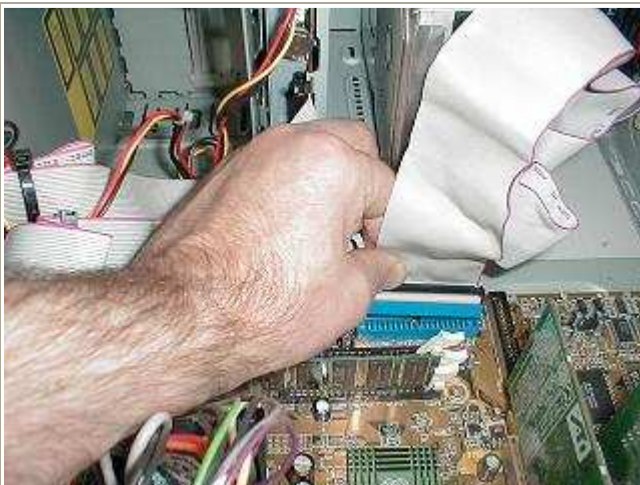
Now it's time to load the adapters back in, in no particular order. I did the PCI adapters first, starting with the modem, and I even reinstalled the sound card even though the replacement motherboard had integrated sound. Last was the AGP adapter, which fortunately was compatible with the new motherboard. If you were doing a serious motherboard upgrade, with PCI Express or AGP 8X video, you'd need a new video card as well.





As soon as all the adapters are in place, secure them all with a single hold down screw on the back rail. It pays to do them all at once since the exact dimensions of each card and motherboard vary a little, which means if you installed the adapters and secured them one at a time, you might have to loosen the screws up later to get another adapter to seat in the motherboard. Just make sure you inspect the way the adapters are seated in the motherboard when you're done, that inserting the screw didn't force the back of the adapter down so far that the front popped out, especially with AGP cards.

Standard ATX motherboards all use the 20 pin ATX power connector, but newer motherboards for Pentium 4 and Athlon 64 will always require at least one more connection, often a 2x2 12V header, sometimes an addition 1x4 lead, as the type used for the drives



All that's left is reconnecting all the drive cables, power and data, that we undid when removing the old motherboard (left). The recent ATA ports are color coded for use with 80 wire cables and auto selecting master/slave on ATA drives. If you have serial ATA (SATA) drives, it's even easier, just one slim data cable per drive. Plenty more details for the individual component is available in the other replacing parts pages on this site if you get a little lost. Below we finish the job off with a cable tie, just to neaten up the case a little and encourage better air circulation.

## WEEK 8

### Replacing the CPU:

One of the most items that is continuously upgraded is the processor (CPU).

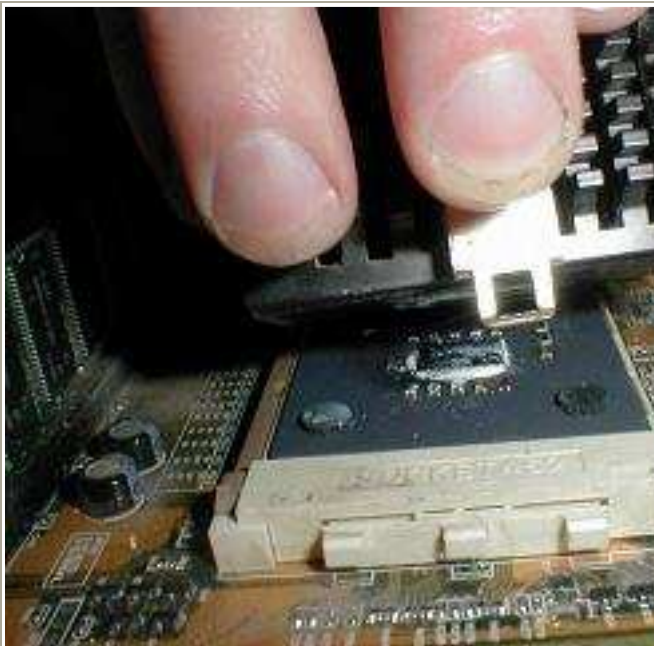
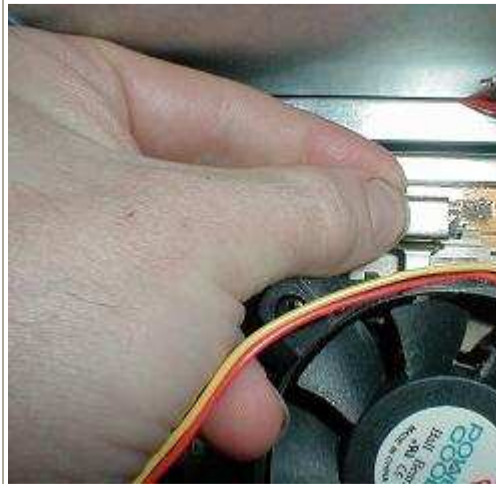
When choosing to upgrade a CPU you must know the performance of it compared to the older one. For instance, you should not replace an Intel 2.4 GHz CPU with 512 KB cache memory with an Intel 2.8 GHz with 256 cache.

The following steps depict the process of replacing the CPU, they show replacing an AMD Athlon processor.



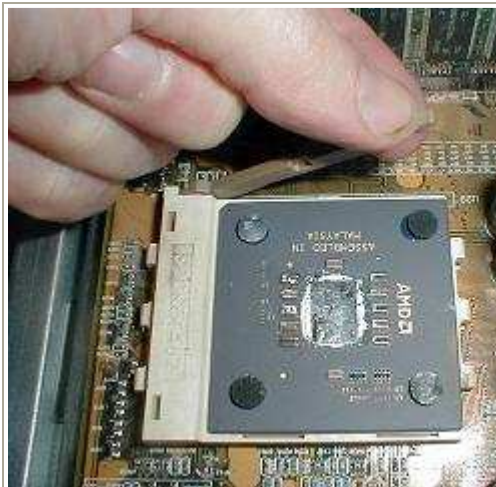
Despite the high clock speeds and high heat dissipation of modern CPU, out-and-out CPU failure is a fairly rare occurrence. Replacing a CPU isn't particularly challenging if you've done it before, but it can be a little intimidating for the first timer..

The first step to replace a CPU is to remove the heatsink. All modern CPU's require an active heatsink, a chunk of finned heat-conductive metal with a cooling fan and mounted on top. The leading cause of CPU failure is probably fan failure, since the CPU can overheat and sustain damage if there's not enough cooling air flowing over the fins. The only rule of thumb for removing heatsinks is to study the latching mechanism then use your thumb to release it.



A standard Socket A heatsink is latched on both sides, but as soon as you release the main spring force by doing the easy side, the other side will fall off as you lift the heatsink away from the CPU. You can see the dried out (not so good) thermal compound on our old Athlon as we lift away the heatsink. You can just see the same dried out crud on the bottom of the heatsink at this angle.

All modern CPUs since the inception of Socket 7 back in the early 90's have used ZIF (Zero Insertion Force) sockets, where the CPU legs are locked in place by moving a locking lever. To remove the Athlon CPU, we first have to release the locking lever and lift it up to the vertical position. The Athlon CPU is then lifted straight out of the socket (below). Also below, to the right, we show the keying on two corners of the socket and the CPU that prevents you from installing it improperly.





The new Athlon CPU we are installing here isn't a new CPU at all, it's a "pull", a CPU that's been removed from a system. When you shop for a replacement CPU to install on an older motherboard, you'll see that the prices are super low and most are identified as "pulls. The Athlon is installed in the socket and locked into place with the locking lever, which is pulled a little away from the side of the socket to get past the locking nub.

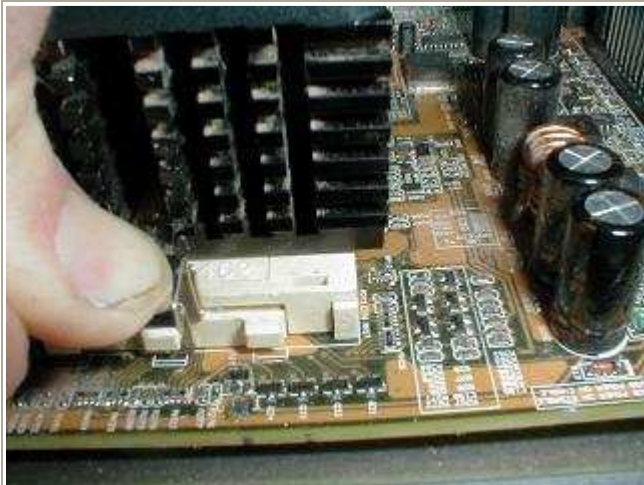
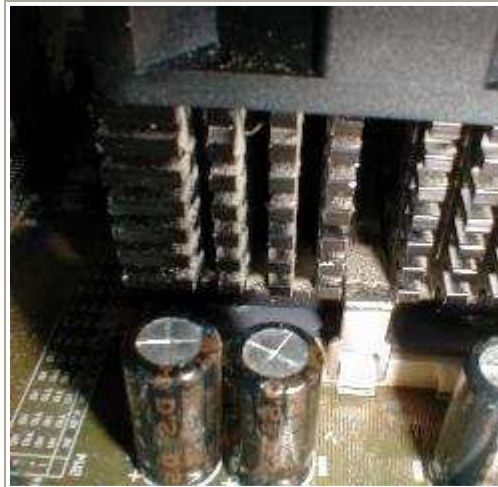






Now comes the critical step. All modern CPUs require some sort of thermal material be added to the die to improve the thermal interface with the heatsink. The purpose of a thermal compound, like this Arctic Silver Ceramique, is to fill in the microscopic voids in both the CPU die and the metal bottom of the heatsink. You don't want to drown the CPU in thermal compound, just use enough (many manufacturers define the amount as a large grain of rice or a small pea) so when the heatsink presses down on it, it will spread over the die.

That's it, time to reinstall the heatsink by first latching the far side of the retaining spring over the center nub on the opposite side of the socket. You can see it latched on here between the capacitors, which makes this the "poor access" side and the reason we install the CPU heatsink retainer on this side first.



Next we do the hard side, which we've made a lot easier by pulling the power supply first:-) With the active heatsink in place, the final step is reconnecting the power to the heatsink fan (below) to the CPU fan point on the motherboard. It's critical you connect it to the proper point which the BIOS manages for low power and sleep modes.

# WEEK 9

## **Installation procedure for SCSI drive**

The five steps to installing a SCSI hard drive are;

1. Setting the jumper configuration
2. Connect the Data cable
3. Connect the Power cable
4. Define drive parameters at the SCSI Host Adapter. (default or automatic choices are best)
5. Partitioning and formatting.

Before you begin, you must remove static electricity. This can be avoided by simply touching the metal case of your PC. You must have the computer plugged-in for this to be effective.

### **- Jumper Configuration**

All SCSI devices include 3 jumpers in order to define the drive's SCSI ID string. Please refer to your SCSI hard disk manual for setting the proper jumper ID. If case 2 devices have the same ID, during boot-up process, the system will not detect them (and probably will not proceed). On a Quantum SCSI drive there are two locations for drive options. Most Quantum SCSI drives have an option connector at the front and back of the drive. Use only one jumper option connector and be sure to orient the jumpers correctly.

The following table identifies the various SCSI ID values and the jumper settings required to set them.

Drive ID	A0	A1	A2	A3
ID 0	OFF	OFF	OFF	OFF
ID 1	ON	OFF	OFF	OFF
ID 2	OFF	ON	OFF	OFF
ID 3	ON	ON	OFF	OFF
ID 4	OFF	OFF	ON	OFF
ID 5	ON	OFF	ON	OFF
ID 6	OFF	ON	ON	OFF
ID 7	ON	ON	ON	OFF
ID 8	OFF	OFF	OFF	ON
ID 9	ON	OFF	OFF	ON
ID 10	OFF	ON	OFF	ON
ID 11	ON	ON	OFF	ON
ID 12	OFF	OFF	ON	ON
ID 13	ON	OFF	ON	ON
ID 14	OFF	ON	ON	ON
ID 15	ON	ON	ON	ON

**Note:** ID 7 is normally used by the SCSI Host Adapter.

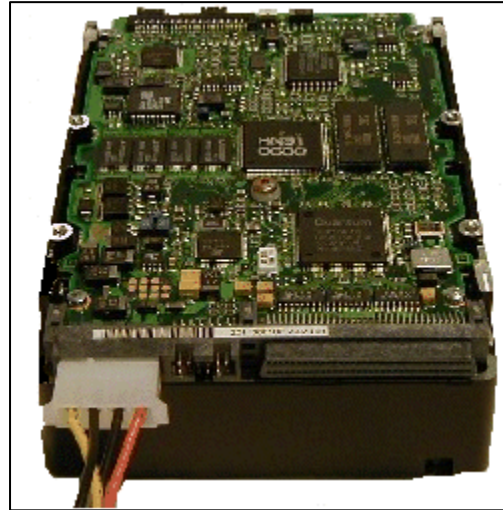
Each SCSI device on the bus must have a unique SCSI ID number. The drive can be configured for SCSI ID numbers that range from 0 through 15. Set the SCSI ID for the drive at the 12-pin Option connector or the 28-pin Secondary Option connector. Jumper locations are shown. Refer to your system or SCSI Host Adapter documentation for recommendations about assigning SCSI ID numbers for your specific system.

### - SCSI Termination Power

To ensure that there is a sufficient level of power along the entire SCSI bus, we recommend that all devices on the SCSI bus supply Termination Power (if they are capable). SCSI devices are protected by a diode or similar semiconductor, to prevent back flow of the terminator power when more than one device supplies this power. Configure the drive to provide Termination Power by installing a jumper across the appropriate connector on the Secondary Option Connector located on the front of the drive. Most drives intended for File Servers have features of minimal value in a [PC](#) configuration. For the most part, these minimal use features are disabled by default. These options include Spin Delay, Force Narrow mode, and others. They can typically be ignored. It is important to confirm whether a function is enabled or disabled. That is, it needs a jumper in place, or off, before proceeding further.

## - Power Cable

Power cables must be connected correctly and securely. The System power supply must be rated to accept today's 7,200 and 10,000 RPM drives. Spin up /down errors may result. See your system manufacturer to confirm the power source is rated for today's high speed drives. To insure proper connection the power cable connector is keyed so that the connector can only fit onto the drive's four power pins correctly. After you insure pin alignment, firmly push the cable into place.



## Data Cable



There are many types of SCSI cables-internal and external. Usually the cable supplied with the SCSI controller is adequate. If you're using both internal and external cables, be sure all cable sets are from the same manufacturer. Mismatched cable independence ratings causes signal reflections. If you are using a SCSI LVD drive, 'twisted pair' cable sets and system level (cable attached) terminators should be used.

Poor quality cables result in excessive error correction. Refer to your SCSI controller manufacturer or system manufacturer for details on choice of SCSI cables and terminator. It is commonly said



over 90% of SCSI errors can be traced to inattention to SCSI cable and termination concerns.

When properly connected both the power and data cables will present a snug secure connection to the drive. When connecting the data cable you want to make sure that Pin # 1 on the SCSI host adapter is connected to Pin # 1 on the drive. Data cables have a stripped edge to help facilitate this configuration. Pin # 1 on the SCSI host adapter should be well marked but if you cannot find it you will need to reference your Motherboard manual or contact the SCSI host adapter manufacture. Pin # 1 of the data cable interface on a Quantum SCSI hard drive is always located next to the power connector. The red stripe on the data cable should be facing the red wire of the power connection when properly attached to the drive.

### **Standard SCSI flat ribbon (Teflon) data cable**

Ribbon data cable is commonly used internally, on SCSI Single Ended drives. If you are installing only a single drive, place it at the end of the data cable. Consult your SCSI Host Adapter documentation or system manufacture for details on SCSI cable placement.

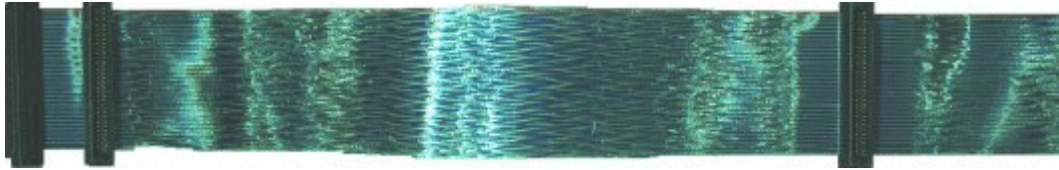


### **SCSI LVD (Low voltage differential) Twisted-pair cable.**

Twisted pair data cables and system level (external) bus termination is required for LVD drives running at SCSI Ultra2 or Ultra3 speeds. A twisted pair cable set has greater immunity to signal (cross-talk) interference. System level termination allows easy exchange of SCSI peripherals without regard to bus termination concerns.

When properly connected, both the power and data cables present a snug and secure connection to the drive. SCSI data cables typically have a missing pin

to help identify correct orientation. (In some cases the connector is keyed), but if you cannot locate it, you must reference your System manual or contact the SCSI Host Adapter manufacturer for assistance.



**68 pin Twisted Pair Data Cable**



**Active LVD Terminator**

Once you have installed jumpers on the drive(s), and data and power cables connected, turn on the PC (but leave the cover off). Listen to the hard drive to be sure the disks are spinning.

### **Define the drive in the system's SCSI Host Adapter**

A SCSI Host Adapter of recent build, with BIOS support for Logical Block Addressing (LBA) generally can detect the full physical capacity of today's large capacity hard drives (>8.4 GB). If you are unsure of your SCSI host adapter's ability to detect the drive or its full capacity, consult your PC manufacturer or SCSI host adapter documentation to determine if it supports of large capacity hard disk drives. A BIOS or ASPI driver update may be needed.

There are many ways to configure your SCSI device(s) and host adapter setting according to your needs. It is impossible to mention every variation. For the purposes of this section, we'll focus on installation of a hard drive in a PC compatible system with a DOS/ Windows 9x configuration. Your

computer system or host adapter vendor is the best resource for the latest product information on device driver support, cable, and SCSI termination concerns.



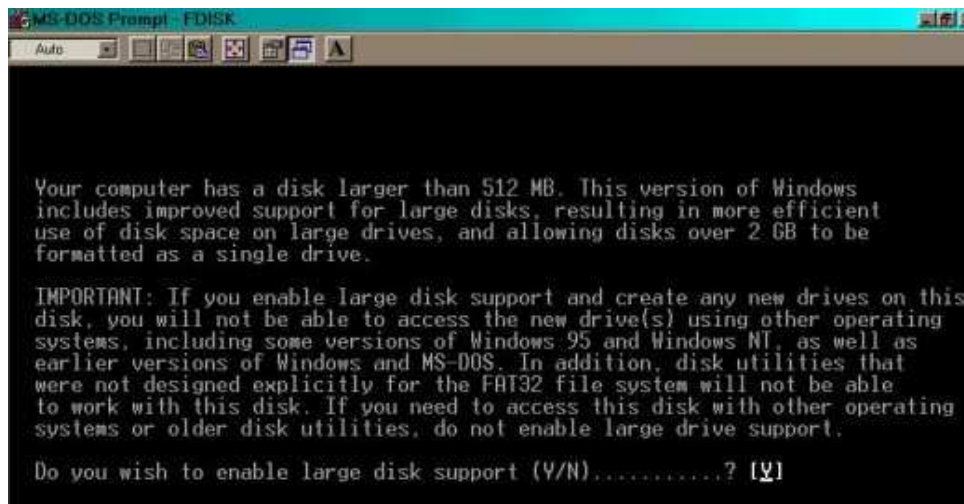
## SCSI Host Adapter BIOS

### Partition and Format

The final step to preparing a drive for use is to partition and format it. Partitioning the drive defines the storage area and prepares the drive to accept data. Formatting sets up the File Allocation Table (FAT).

At this point you will need to decide what Operating System you will be installing. For Win9x Operating Systems you will use fdisk.exe to partition the drive and format.com to format. If you will be installing Win NT, partitioning and formatting is part of the Operating System installation process. If you use fdisk.exe from Win95 second edition, Win98, or Win2000 the

"Large Drive" screen will be the first page

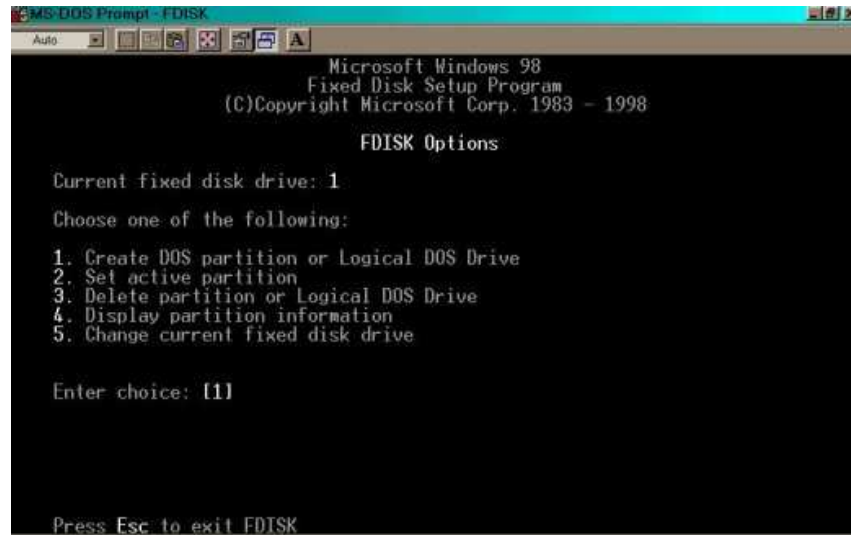


displayed.

## Large Drive Screen

Answering Yes will create a 32bit FAT (File Allocation Table). FAT 32 will support partitions sizes up to two terra bytes. If you answer No, a 16bit FAT will be created which allows for only two GB partition sizes. Once you answer Y or N the next screen displayed is the fdisk main menu.

### Fdisk Main Menu Screen



1. Menu Item #1 is used to create Pri DOS, Logical, and Extended partitions.
2. Menu Item #2. is used to set a Pri DOS partition **Active**. A partition must be set Active in order to make it bootable.
3. Menu Item #3. is used to delete Pri DOS, Logical, Extended, and Non-DOS partitions.
4. Menu Item #4. is used to display partition information.
5. Menu Item #5. is viewable only if you have two or more SCSI drives installed in the system. It is used to toggle between the drives.

After you have created your partition it will need to be formatted. If the drive you are installing is the C: drive you will need to boot from a floppy that has a copy of fdisk.exe, so you can create the partition, and a copy of format.com that you will use to format the partition. At the A: prompt you would enter;  
**format C:/s** (the /s copies the system files to the hard\_drive).



If you are installing a second, third, or fourth drive you would, at the C: prompt type format and the drive letter of the partition(s) you just created followed by a colon.

For example if you just installed a second hard drive and made two partitions on it you would type

**format D:** at the C: prompt.

When that partition is done formatting you would then type;

**format E:** (for the second partition)

### **Troubleshooting Checklist for SCSI Drives**

#### SCSI checklist

For DOS, Windows, and OS/2 operating systems

1. SCSI ID (device address jumper settings):
  - Each device must have a unique SCSI ID.
  - Recommended SCSI ID for the boot device is 0.
2. Interface type:
  - If you have more than one SCSI device on the cable, make sure that all devices are of the same type.
  - High Voltage Differential (HVD) SCSI devices are not compatible with Single Ended (standard) or Low Voltage Differential (LVD) SCSI devices.
3. Termination:
  - SCSI systems should have termination at both ends of the cable. Make sure that the controller terminates one end of the cable and that a drive supplies termination at the other end. If a drive doesn't have onboard termination, a terminator should be placed on the last connector of the cable.
  - Make sure that there is no extra cable after the terminator at the end.
  - Any device attached that is not at the end of the cable must have internal termination disabled.
  - For adapters with multiple SCSI ports with differing performance, ALL ports must be correctly terminated.

- For adapters with a common port with both internal and external connections in use, DO NOT enable termination on the controller.
- Narrow (50 pin) devices SHOULD NOT be connected at the end of a wide (68 pin) SCSI cable. A terminator in a 50 pin SCSI device cannot provide the correct termination for the unused data lines.
- Using a 68-50 pin cable converter to connect a 68 pin disk drive to a 50 pin SCSI adapter could cause problems because the 68-50 pin cable converter leaves 18 of the 68 pins on the disk drive without termination.

**Resolution:**

Place the 68 pin drive at the end of the bus and set the jumpers for the drive for active termination which provides termination to all 68 pins. If the drive does not provide termination, the converter should provide on board termination so that all unused lines are terminated.

- The termination for a drive should match the interface type of drive. For example, Single Ended drives should use Single Ended terminators.

4. Cables and connectors:

- Check that the cables are seated tightly and that no pins are bent.
- If possible, try replacing the cable and terminators and use the drive's internal termination.
- Make sure that pin 1 of the cable is plugged into pin 1 of the SCSI connector. Pin 1 on the SCSI cable is normally identified by a red or red-striped wire. This is especially important if you are using cables or connectors (on the SCSI adapter) that are not keyed. The connectors on our drives have a slotted key to prevent you from plugging the cable in backwards but not all SCSI cables are made with a key.

5. Ensure that the drive is jumpered to enable auto start when power is applied.

6. Try resetting the SCSI adapter defaults:

- Enable "Reset IC Initialization"
- Disable "plug and play" SCAM support
- Enable "Unit Start" command
- Enable Synchronous and Wide negotiations if available

7. Ensure that the drive is jumpered to disable sync negotiations.
8. Does the drive spin up and remain spinning?
9. Does the SCSI adapter recognize the drive during boot up?
10. Check that the cable lengths are within the ANSI specification for the interface transfer rate used and the number of devices installed on the bus.
11. If the drive is attached through a removable carrier, try removing the drive from the carrier and attaching the drive directly to the bus.
12. If you are using a narrow bus/cable (50 pin) with a wide (68 pin) device and a wide SCSI adapter, try disabling wide negotiation in the adapter settings.
13. LVD devices are backward compatible to Single Ended adapters as long as the system and the drives are configured correctly. When attaching LVD devices to Single Ended, Wide or Narrow adapters, the following applies:
  - LVD hard disk drives have no termination on the drive.
  - You must provide termination externally, either from another device or from a separate termination block.
  - Depending on how the adapter handles the "Diff Sense" line on the interface, you may need to set the jumper on the drive to Force Single Ended mode.
14. On multi-channel SCSI adapters, do not use more than two channels off each adapter.
15. In RAID environments, it is important to disable SCAM.
  - Disable at the adapter, if available.
  - Disable at the drive. This is only necessary with the DORS-3xxxx, DCAS-3xxxx and DDRS-3xxxx family of SCSI drives. Newer drives have SCAM disabled as default or removed completely.

# WEEK 10

## Replacing Mass Storage

The main mass storage device in any PC is the hard disk. If we ever want to choose a newer hard disk then we must take into consideration the following:

- 1- The manufacturer of the hard disk
- 2- capacity of the newer hard disk (in GB)
- 3- speed (in rpm)
- 4- seek time (in milliseconds)

Hard disk normally sits in a cage like the following. It has two screws from each side of the cage.



Hard Drive in Cage



Removing Hard Drive Mounting Screws

Hard drives in PCs are either mounted in fixed cages (as above), in removable drive cages, or on rails. The standard method in older clones was fixed cages, these being the cheapest to build and the hardest to work with. The problem is that while the two screws on the front side are exposed and easily removed, as shown to the left, the two screws on the back side or hidden within the case infrastructure and in some instances, even blocked by the motherboard! So keep in mind that you have to remove four screws to replace your hard drive.

Once the screws are all removed, the hard drive is sitting in the bottom of the cage. This won't always be the situation, some really cheap cages are open at the bottom, so the instant the last screw is removed the drive drops if you aren't holding on. Oddly enough, this is the most critical stage of replacing a hard drive, in the sense that removing the drive through the case where the ribbon cables are bunched up and over the CPU and heatsink is most likely to create another problem. If the cables are long enough, you can leave them attached to the hard drive as you slide it out, but don't try pulling through a mess, clear a path first.



Removing Hard Drive



Remove IDE Cable

Once the hard drive is out, you can remove the broad ribbon cable which carries the data and the 4x1 power cable. The ribbon cable is sometimes secured in place with a glob of glue or silicon to prevent it from working out of the drive due to vibrations. The cable is often keyed properly to the drive, but if not, the important thing is to get the red wire on the Pin 1 location. The power connector is often tough to remove just because it's a tight fit. Work it back and forth gently along the long axis, making sure you aren't flexing the circuit board as you do so. The jumpers for Master/Slave are between the two cables.

When you replace or upgrade any hard drive, you want to make sure that the jumper settings for Master/Slave selection on older drives are set correctly. The correct setting, in case of replacing a drive, means they should be set the same way they were on the old drive. In this case, the CD drive is installed on its own cable and controller, so the proper setting was "Single" (same as Master on most drives) and didn't need changing. These settings are normally shown on the label on the face of the drive, as to the right.



### Install IDE Cable



Replace Hard Drive in Cage

Again, since hard drive are three dimensional objects and fairly large relative to the size of the computer case, you have to clear plenty of room behind the cage to slide the drive straight in. Any time that you replace a hard drive and have new problems, like a CD that doesn't work or a new noise in the case, the culprit is usually a ribbon cable that's gotten loose on the controller while you were installing the hard drive, or a cable that's now hitting a fan. Install four screws (three is actually plenty) and the physical part of the job is over.

### Install Hard Drive Mounting Screws



# **PRACTICAL 1**

## **COMPUTER ASSEMBLING AND DISASSEMBLING**

### **OBJECTIVES**

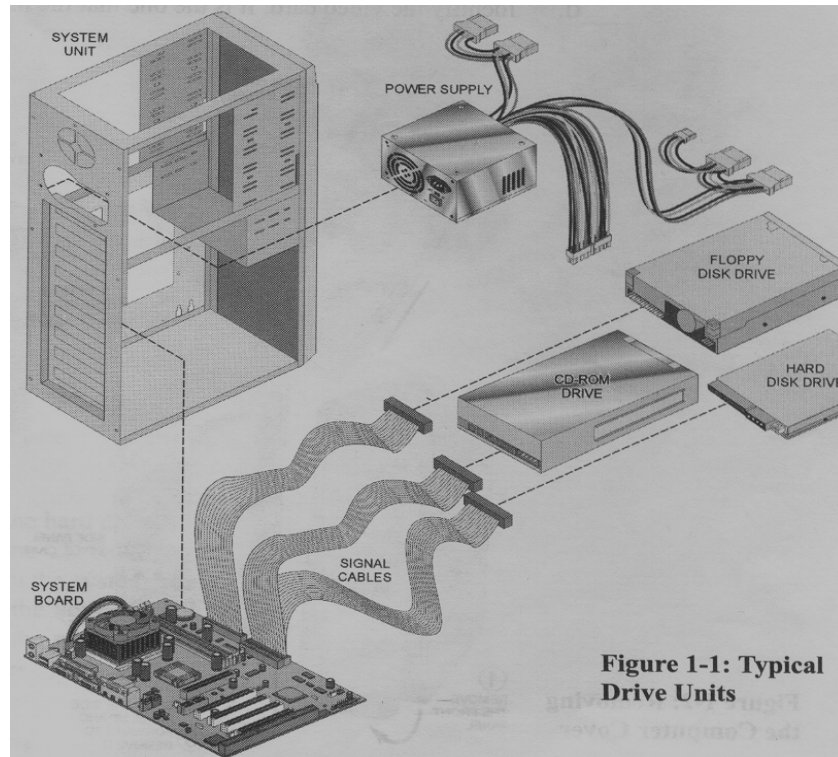
6. Disassemble the PC desktop/tower Computer System
7. Identification of various composite components
8. Verify the correct interface cable
9. Assemble the PC desktop/tower Computer System
10. Boot up the System

### **RESOURCES**

6. Quality screwdriver, Tester, Soldering Iron,
7. Desktop/tower Computer System
8. Operating system Windows XP or higher version installed
9. Utility programs
10. Multimeter or AVO meter for measuring Ampere, Voltage and Ohmmeter

### **DISCUSSION**

You must start the computer to verify that it is working properly. Then Disassemble and Assemble the PC. You will go through ALL the steps of disassembling except actually taking out the drives and the Motherboard out of the system unit.



## PROCEDURE

### 2. BOOT UP THE PC (COLD BOOTING)

- (e) Put **ON** the PC by pushing the power button
- (f) The PC will boot to Graphical users interface, Windows XP or higher version
- (g) Use the path **Start/Shut Down** to shut down
- (h) Click on **Turn OFF** to finally Shut Down

*NOTE: the computer will shut down Windows and the power will turn off automatically.*

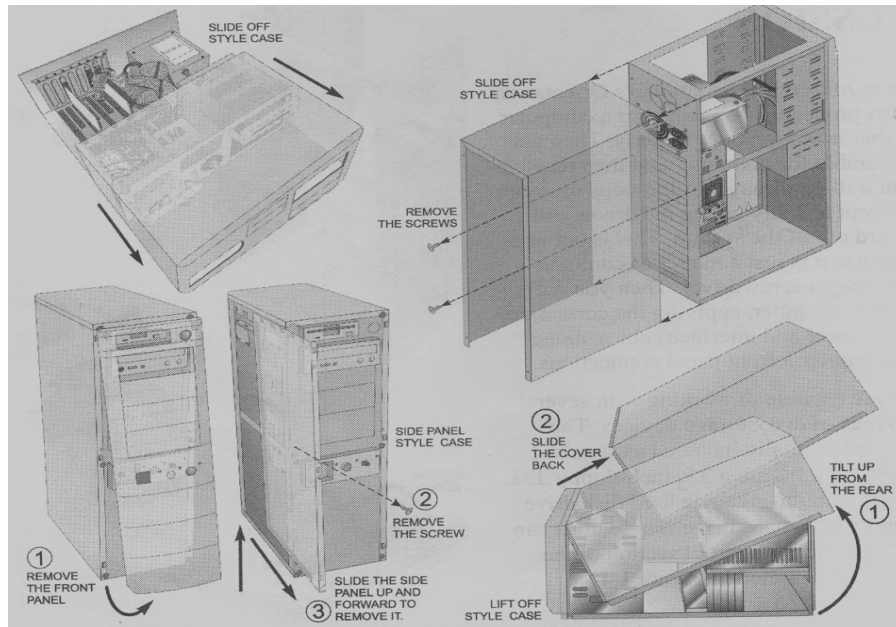
### 2. IDENTIFY THE ADAPTER CARDS

- (j) Unplug the **power cord** from the back of the PC
- (k) Remove the screw on the back panel of the PC cover



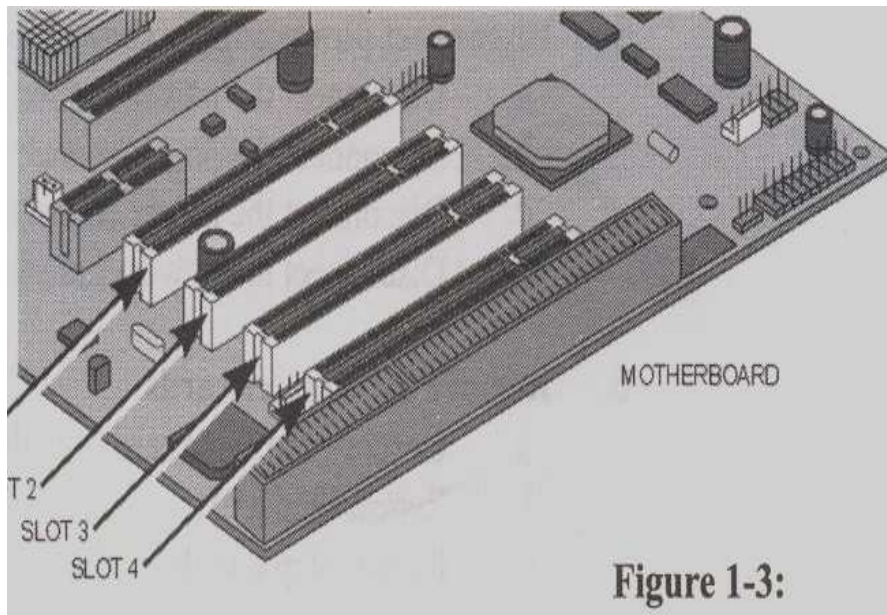
(l) Take the cover or the side panel off.

(m) Identify the **video card**. It is the one that the monitor is plugged into.



**Figure 1-2 Removing the PC cover**

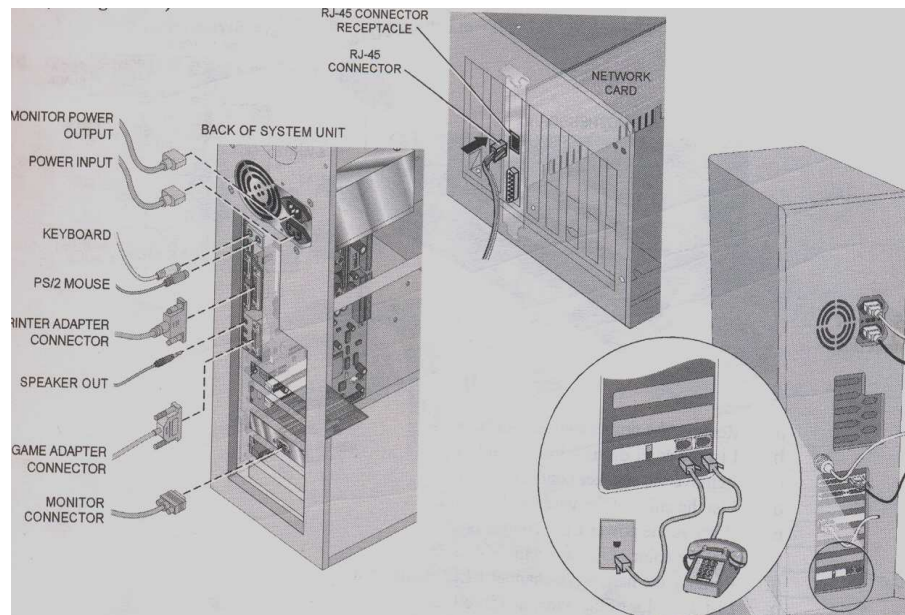
(n) Write down the slots the **video card** is plugged into in Table 1-1. Slots are numbered from right to left starting from slot 1



**Figure 1-3:**

- (o) Identify the **modem card**. It is the card with the two telephone ports at the back of it.
- (p) Write down the slots the modem card is plugged into in Table 1-1
- (q) Identify the **network card**. It is the card with the oversize phone ports. This is really a network port called RJ-45 or 10-base-T port.
- (r) Write down the slots the **network card** is plugged into in Table 1-1

### 3. DISCONNECT EXTERNAL CABLES



**Figure: !-4**

- (g) Disconnect the **keyboard** from the back of the computer
- (h) Disconnect the **PS/2 or Serial mouse**
- (i) Disconnect the **phone** cable (if any )
- (j) Disconnect the **RJ-45 network** cable (if any )
- (k) Disconnect the **printer** cable (if any )
- (l) Disconnect the **monitor** cable

#### **4. DISCONNECT INTERNAL CABLE**

- (a) Disconnect the IDE ribbon cable from the **hard drive**
- (b) Disconnect the IDE ribbon cable from the **CD-ROM**
- (c) Disconnect the IDE ribbon cable from the **motherboard**
- (d) Disconnect the FDD ribbon cable from the **floppy disk drive**
- (e) Disconnect the FDD ribbon cable from the **motherboard**
- (f) Remove ALL the cable from the computer

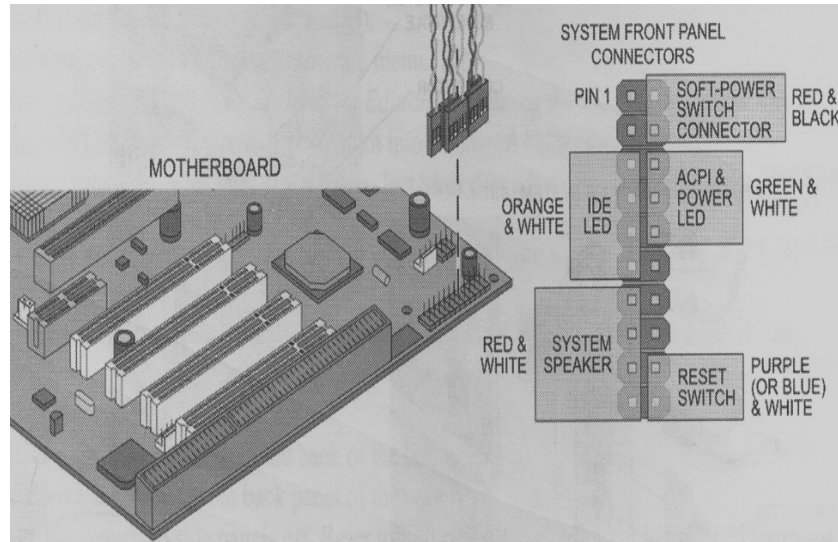
#### **5. DISCONNECT ALL POWER SUPPLY CONNECTION**

- (a) Disconnect the power supply connector from the **hard drive**
- (b) Disconnect the power supply connector from the **CD-ROM**
- (c) Disconnect the power supply connector from the **floppy**
- (d) Disconnect the power supply connector from the **motherboard**

#### **6. REMOVE THE ADAPTER CARD**

- (a) Unscrew the **video card** from the back panel, and then remove it
- (b) Unscrew the **modem card** from the back panel, and then remove it
- (c) Unscrew the **network card** from the back panel, and then remove it

#### **7. DISCONNECT ALL FRONT PANEL CONNECTIONS**



**Figure 1-5: Front Panel Connection**

- (a) Remove the **power Switch connector**
- (b) List the color of the wire in Table 1-2
- (c) Remove the **speaker connector**
- (d) List the color of the wire in Table 1-2
- (e) Remove the **power LED connector**
- (f) List the color of the wire in Table 1-2
- (g) Remove the **hard drive channel 1 LED connector**
- (h) List the color of the wire in Table 1-2
- (i) Remove the **hard drive channel 2 LED connector**
- (j) List the color of the wire in Table 1-2
- (k) Remove the **reset switch connector**
- (l) List the color of the wire in Table 1-2

***NOTE: Computer disassembly is now complete. Now let's start to reassemble back the computer***

## 8. CONNECTING THE FRONT PANEL CONNECTION

- (a) Find the power LED connector and connect it to the motherboard where it is  
- labeled Power LED. Go to Table 1-2 if needed
- (b) Find the **reset switch connector** and connect it to the motherboard.
- (c) Find the **power switch connector** and connect it to the motherboard
- (d) Find the **hard-disk LED channel 1 connector** and connect it to the  
motherboard
- (e) Find the **hard-disk LED channel 2 connector** and connect it to the motherboard
- (f) Find the **speaker connector** and connect it to the motherboard

## 9. INSTALL THE ADAPTER CARDS

*NOTE: Always make sure the cards are lined up properly with the slots. It will require a firm push to get the card to reseat on the motherboard expansion slot*

- (a) Install the **video card** into the slot recorded in Table 1-1 and screw it into  
the back panel
- (b) Install the **modem card** into the slot recorded in Table 1-1 and screw it  
into the back panel
- (c) Install the **network card** into the slot recorded in Table 1-1 and screw it  
into the back panel

## 12. CONNECT THE POWER SUPPLY

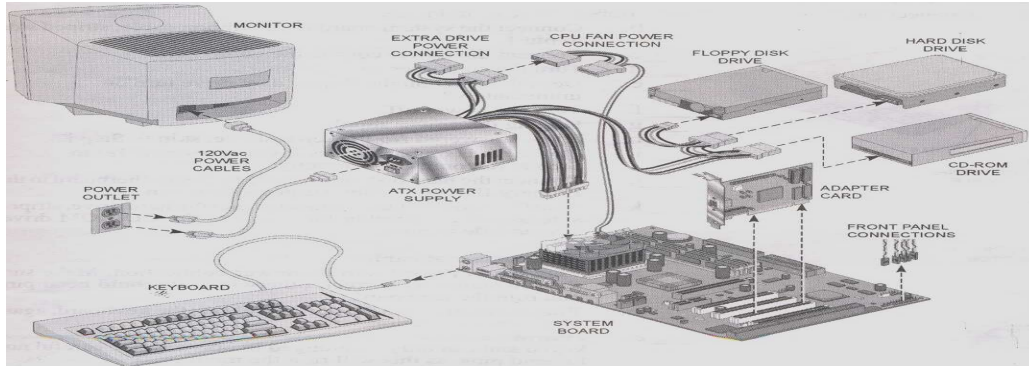


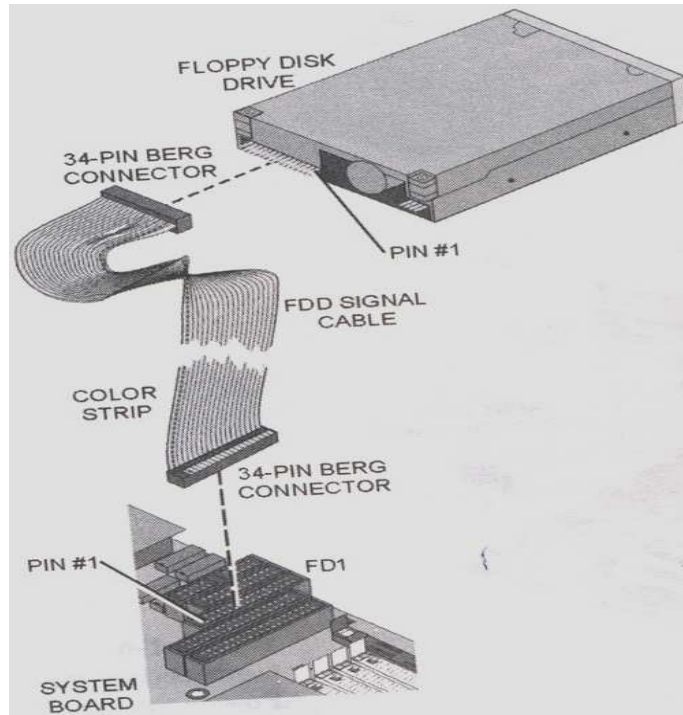
Figure 1-6: Connecting the Power Supply

**NOTE:** All the connectors are keyed to plug only in one way

- (e) Plug the ATX or AT power connector into the **motherboard**
- (f) Plug the power connector into the **floppy disk drive**
- (g) Plug the power connector into the **hard disk drive**
- (h) Plug the power connector into the **CD-ROM**

## 13. CONNECT THE RIBBON CABLES

- (a) Connect the **floppy disk drive** to ribbon cable as in Figure 1-7



**Figure 1-7: Connecting the Ribbon Cable**

- (k) Connect the **motherboard** to ribbon cable, striped side to pin 1
- (l) Connect the **power cords** to the PC
- (m) Turn ON the PC
- (n) Does the LED on the **floppy turn ON** immediately?
- (o) Turn OFF the PC
- (p) Unplug the power supply.
- (q) If the answer is NO to step e above, skip to step j
- (r) The cable is on backward if you answer YES to step e. Reconnect it correctly
- (s) Connect the **hard disk drive** cable to motherboard in the primary IDE controller, striped side to pin 1
- (t) Plug the middle of the connector into the **hard disk drive**, striped side to pin 1, and plug the end into the **CD-ROM drive**, striped side to pin 1

## **12. CONNECT THE EXTERNAL CABLE**

- (a) Plug the keyboard into the lower connection. Make sure that the orientation is correct. Otherwise you can bend the pins and ruin the keyboard.
- (b) Plug the mouse into the port just below or beside the keyboard as the case may be. Make sure that the orientation is correct
- (c) Plug the monitor back into the video card. The connector is keyed in only one way. Make sure that the orientation is correct; otherwise you can bend the pins and ruin the monitor
- (d) Plug in the power cord
- (e) Replace the cover of the PC
- (f) Screw in the cover screw

*NOTE: reassemble is complete. You need to reboot the PC to see if it is still working properly*

## **13. BOOTING UP THE PC**

- (a) Put **ON** the PC by pushing the power button
- (b) The PC will boot to Windows XP
- (c) Use the path **Start/Shut** Down to shut down
- (d) Click on **Turn OFF** to finally Shut Down



# TABLES

TABLE 1-1

ADAPTER CARD	SLOT
VIDEO CARD	
MODEM CARD	
NETWORK	

TABLE 1-2

CABLE	COLOR
POWER SWITCH:	
SPEAKER:	
POWER LED:	
IDE 1 <sup>ST</sup> CHANNEL:	
IDE 2 <sup>ND</sup> CHANNEL:	
RESET:	

## LAB QUESTIONS

1. What does the color stripes on a disk drive's signal cable indicator?
2. How do you shut down Windows XP?
3. How do you shut down NIC?
4. What will happen if you plug a floppy drive cable in backward?
5. How many wires are on the power connectors for a hard drive?



# LAB WORK 2

## MEASUREMENTS OF ELECTRICAL QUANTITIES ON A COMPUTER

### OBJECTIVES

1. Measure Resistance on a speaker
2. Measure Voltage from a power supply

### RESOURCES

1. PC desktop/tower Computer System
2. Digital Multimeter with Lead
3. A good fuse
4. A bad fuse

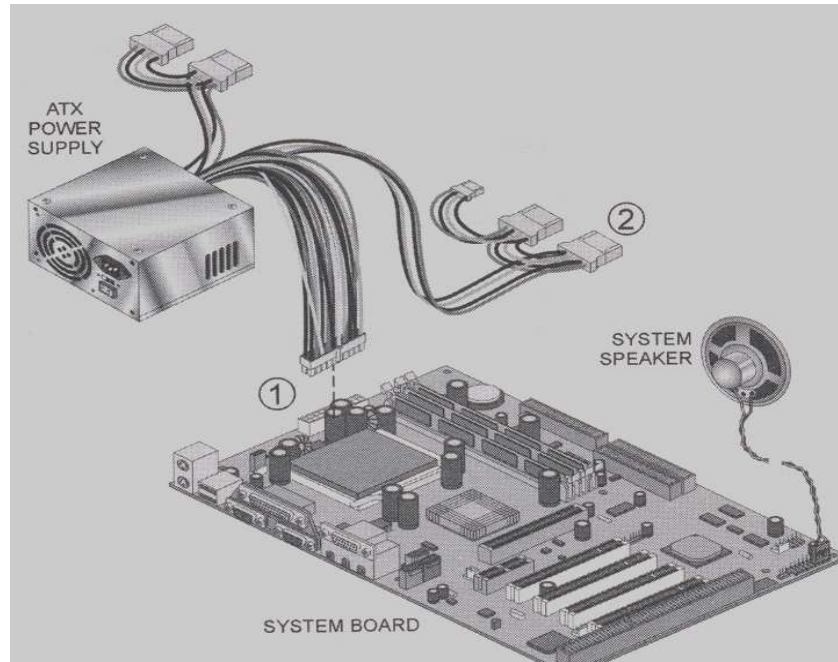
### DISCUSSION

Here you will measure various electrical quantities on a computer. The Multimeter can be used to measure resistance, current and potential across a circuit

#### *PROCEDURE*

#### **4. RESISTANCE ON A SPEAKER**

- (f) Open the inside of the PC
- (g) Rotate the Multimeter dial to 200 ohms
- (h) Hold the Red lead on the exposed end of the Red wire that connect the systems' speaker



**Figure 2-1: Power Supply Connector**

- (i) Hold the Black lead on the exposed end of the Black wire that connect the systems' speaker
- (j) Record the reading of the meter in Table 2-1

## **5. VOLTAGE**

- (f) Turn on the power of the PC
- (g) Look for the 20-pin ATX power connector that in plugged into the motherboard.  
It should look like the location 1 in Figure 2-1.
- (h) Rotate the Multimeter dial to 20 Vdc
- (i) Firmly secure the black connector to the Multimeter into a black connector of the 4-pin internal drive power connector as in location 2

- (j) Insert the Red Multimeter connector into each pin on the ATX connector and record their various voltages in Table 2-2

*NOTE: the pin number is small and may be labeled on the back wire of the connector.*

*The yellow wire should be one*

- (f) Check the voltage at each pin of the 4-pin internal drive power connector and record the . values in Tables 2-3

- (e) Turn off the PC
- (f) Replace the side panel

## **6. FUSES**

- (k) Obtain the two fuses; one good and one bad
- (l) Rotate the Multimeter dial to 200 ohms
- (m) Touch the two leads together and record the Multimeter reading in Table 2-4. You now establishing a datum or zero point of no resistance
- (n) Without touching the leads together, record the Multimeter reading in Table 2-5
- (o) Place one lead on one end of the good fuse.
- (p) Place the other lead on the other end of the good fuse. Make sure that your finger or the leads are not touching each other

*NOTE: The only path for electricity to flow is through the fuse*

- (q) Record the Multimeter reading in Table 2-6
- (r) Place one lead on one end of the bad fuse
- (s) Place the other lead on the other end of the bad fuse. Make sure that your finger or the leads are not touching each other

*NOTE: The only path for electricity to flow is through the fuse*

(t) Record the Multimeter reading in Table 2-7

## TABLES

Table 2-1

Speaker Resistance	
--------------------	--

Table 2-2

### ATX Voltage

Pin No.	Voltage	Pin No.	Voltage
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Table 2-3

### 4-Pin Internal Drive Power Connector Voltage

Pin No.	Voltage	Pin No.	Voltage
1		3	
2		4	

Table 2-4

Zero Resistance	
-----------------	--

**Table 2-5**

<b>Maximum Resistance</b>	

**Table 2-6**

<b>Good Fuse Resistance</b>	

**Table 2-6**

<b>Bad Fuse Resistance</b>	

**LAB QUESTIONS**

1. What is the total range of Voltage across the power supply?
2. How many pins does an ATX power connector have?
3. What is the Multimeter used to measure?
4. What should be the resistance of a good fuse?







# **LAB WORK 3**

## **TROUBLESHOOTING THE IDE ON A COMPUTER**

### **OBJECTIVES**

1. Explore IDE cable Configuration
2. Explore IDE device Master/Slave Jumper Setting

### **RESOURCES**

1. PC desktop/tower Computer System
2. Faulted hardware component- faulted IDE cable

### **DISCUSSION**

The setting of the various drives comprises the Master/Slave format. The Master/Slave setting will normally Master if the unit is the primary or the only HDD in the system.

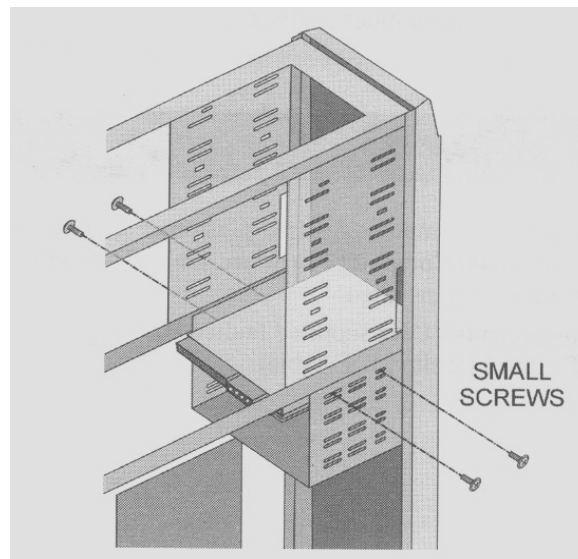
This is called the default setting, that is, from the factory. The CD-ROM will be the Slave unit by default.

Hard drives are very sensitive to physical damage. If a Hard drive drops from your hand from about 4 inches above the table, there is no guarantee that it will still work. The hard drive's head will crash on the disk and will create bad or unreadable sectors, especially if sector 0 is involved. Then the drive table and information will be lost and drive will be unusable.

#### ***PROCEDURE***

##### **1. STANDARD CONFIGURATION**

- (a) Refer to the HDD documentation to determine the Drive Select or Master/Slave jumper setting
- (b) Obtain the drive's parameter information from the driver or information booklet and record it in Table 3-1
- (c) Check to make sure that ALL the screws are secured in the drive and that it is not loosed. See Figure 3-1



**Figure 3-1: Hard Drive Mounting Screws are Secure**

*NOTE: IDE drives use a signal wide signal cable's you know from lab 1, the signal cable must be aligned correctly at both the drive and controller ends. The strip must be aligned with #1 pin at both ends. All new cables are keyed to prevent backwards installation.*

- (d) Verify the connection of the signals cable to the HDD, the CD-ROM, and the HDD controller on the mother board .
- (i) Turn on the computer.
- (j) Press **DELETE** to enter CMOS when prompted.
- (k) Go into standard CMOS setup.

- (l) The primary master should be the HDD. Press **ENTER** to verify it is set to “*AUTO*”.
- (m) Make sure all other hard drives are set up for **Auto** deletion, and be sure the “*Access mode*” is also set to *Auto*. Change the settings if they are not set to *Auto*.
- (n) Press **ESC** to view the *Main* menu.
- (o) Press **F10, Y, and ENTER** to save and exit CMOS.
- (p) Verify that the computer boots up to the **Microsoft Windows XP**.
- (q) Turn the computer off.

## **2. MASTER IDE DEVICES**

- (a) Connect the CD-ROM and hard disk drive to the same ribbon cable (the original HDD cable). Verify that the hard disk drive is set to master on the Drive Select jumper. Verify the CD-ROM to the Master setting also on the Drive Select jumper.
- (b) Turn the computer on.
- (c) Write the result in table 3-2.
- (d) Turn the computer off

## **3. MASTER CD-ROM, SLAVE HDD**

- (a) *Change the jumper on the hard disk drive on the slave settings.*
- (b) Turn the computer on.
- (c) Press **DELETE** to enter CMOS.
- (d) *Enter standard CMOS setup.*

- (e) Note the differences in Table 3-3.
- (f) Press **F10, Y, and ENTER** to save and exit CMOS.
- (g) Write the results in Table 3-4.
- (h) Turn off the computer.

## **7. MASTER *HDD*, SLAVE *CD-ROM***

- (a) Change the CD-ROM Drive Select jumper back to the Slave position.
- (b) Change the hard drive jumper back to the Master position.
- (c) Turn the computer on.
- (d) Record the result in table 3-5.
- (e) Turn the computer off.

As you can see, it does not matter which drive is set to Master as long as there is one drive set to Master .However , if the slave device had been a hard drive instead of a CD-ROM the computer would have tried to boot from the IDE-0 every time. If it was not bootable you would have received an error message.

## **8. INCORRECT IDE CABLE ORIENTATION**

- (a) Unplug the 80-pin cable from the CD-ROM and HDD.
- (b) Plug the 40-wire CD-ROM cable into the HDD.
- (c) Turn the computer on.
- (d) Write the results in Table 3-6.
- (e) Turn the computer off.

**9. RETURN ALL CABLES AND JUMPER TO THEIR ORIGINAL CONFIGURATION.**

## **TABLES**

**Table 3-1**

**HDD PARAMETER FROM INFORMATION BOOK OR STICKER**

<b>CYLINDER</b>	<b>HEADS</b>	<b>SECTORS</b>

**Table 3-2**

--

**Table3-3**

--

**Table3-4**


**Table 3-5**

--

**Table 7-6**


**Table7-7**


**LAB QUESTIONS**

1. Before exchanging a hard disk what should be done first?
2. Name two configurations for HDD jumper settings used in the lab.
3. What is the default setting for a CD-ROM from the factory?
4. If you have two drives, one a master and the other a slave, does it matter which device is plugged into the center or end of an **IDE** cable?
5. If two hard drives are both set to slave on one cable, **WHAT WILL HAPPEN?**







# LAB WORK 4

## TROUBLESHOOTING HARDWARE OF A COMPUTER

### OBJECTIVE

1. Unplug The Keyboard.
2. Unplug The Mouse.
3. Disable The L2 Cache.
4. Unplug The Video Card.
5. Unplug The Ram.
6. Unplug The FDD Interface Cable.
7. Unplug The Power To FDD, CD-ROM , HDD , and The Mother Board.

### RESOURCES

1. PC-compatible desktop /tower computer system
2. Fault hardware components:-user supplied fault hardware components  
(defective mouse, defective DIMM module, defective FDD cable  
,defective power connector)

### DISCUSSION

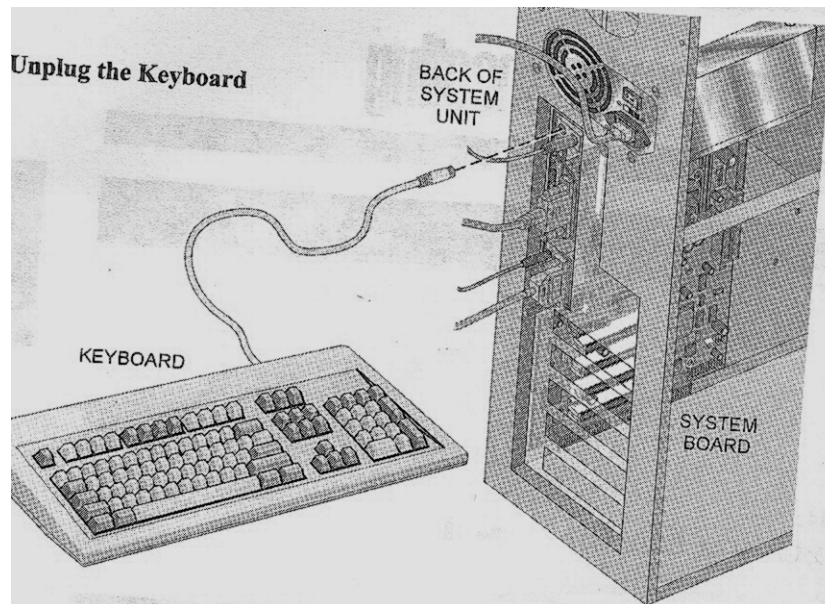
This lab will familiarize you with some of the error associated with bad devices. You will receive different messages from the computer depending on which device has a problem .You will explore a fault with IDE connectivity various no –signal problems

## ***PROCEDURE***

### **. 1. ESTABLISH THE “HALT ON” SETTING IN THE CMOS SETUP UTILITY**

- (a) Turn **ON** the PC
- (b) Press the **DELETE** key to enter the *CMOS* setup Utility
- (c) Press the **ENTER** key to enter the *Standard CMOS* setup
- (d) Change the Halt On: setting to **All errors**, and press the **ESC** key
- (e) Press the **F10** key and **ENTER** key to save the change and exit the CMOS Setup Utility

### **. 2. KEYBOARD**

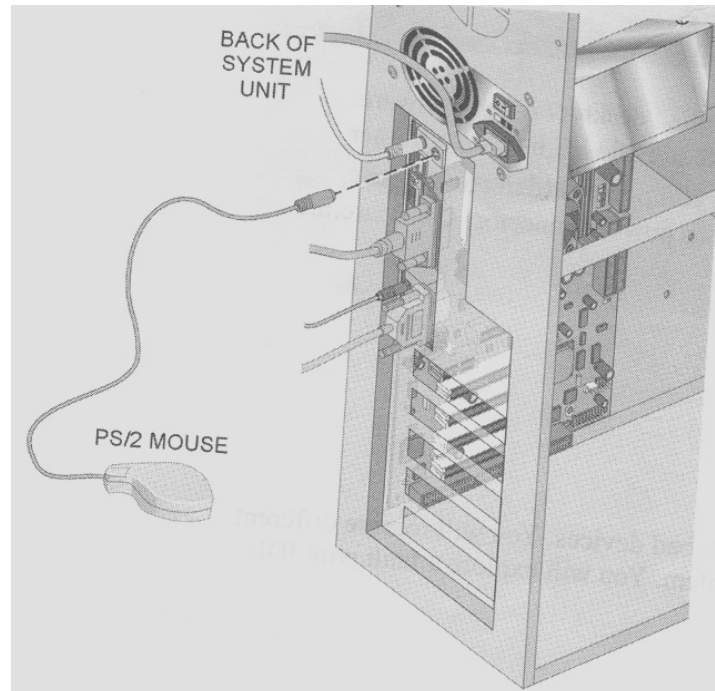


**Figure 4-1**

- (a) Verify that the PC is off; if it is not, shut it down.
- (b) Unplug the keyboard connector from the back of the PC as shown in Figure 4-1
- (c) Put on the PC
- (d) Record your observation about any error given in Table4-1
- (e) Put off the PC

(f) Plug in the keyboard

### 3. MOUSE



**Figure 4-2: Unplug the Mouse**

Unplug the mouse connector from the back of the PC as shown in Figure 4-2

- (a) Plug in the faulted mouse
- (b) Put on the PC
- (c) Let the PC boot to **Windows XP desktop**
- (d) Move the mouse and record your observation in Table 4-2
- (e) Make sure that “Shut Down” is selected from the Start button
- (f) Click on Turn Off to put off the PC
- (g) Replace the original mouse

#### . 4. L2 CACHE

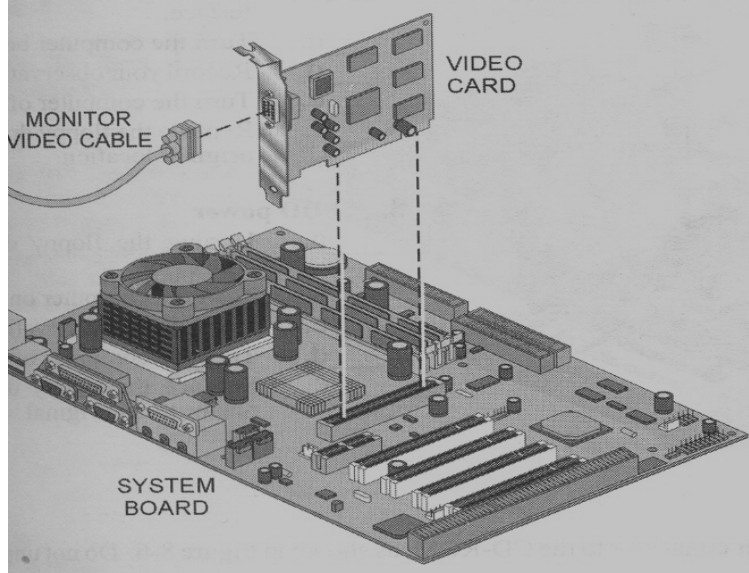
- (a) Turn on the PC and press **DELETE** to enter CMOS setup
- (b) Use the arrow keys to browse to **L2 Cache**, usually in *Advance settings*

***NOTE: the L2 Cache is sometimes called the External Cache***

- (c) Disable L2 Cache by pressing the +/- key or by pressing **ENTER** and using the arrow keys
- (d) Save settings and exit CMOS Setup
- (e) Boot the PC to Windows XP
- (f) Record your observation in Table4-3
- (g) Restart the PC and enter CMOS Setup as before
- (h) Repeat Steps b-d, only this time, Enable L2 Cache
- (i) Put off the PC

#### . 5. VIDEO CARD

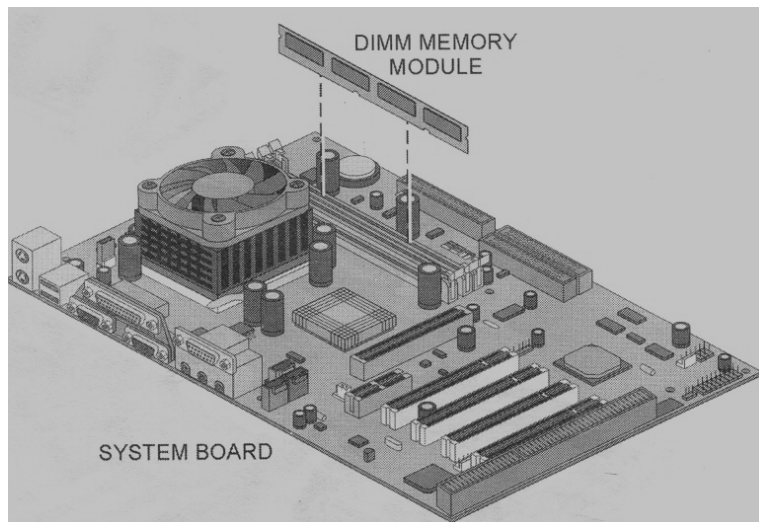
- (a) Remove the side panel of the PC
- (b) Unplug any external connection to the video card
- (c) Unscrew the mounting screw of the video card
- (d) Pull the card out of the slot, either a PCI or AGP slot as shown in Figure 4-3
- (e) Turn the PC on and record you observation in Table 4-4
- (f) Put off the PC
- (g) Replace the Video card in it's slot
- (h) Replace the mounting screw.
- (i) Replace any external connection.



**Figure 4-3: Unplug the Video Card**

## **. 6. RAM**

- (a) Unplug All the external memory from the motherboard. Be careful with the clamps on the ends of the memory slot as shown in Figure 4-4



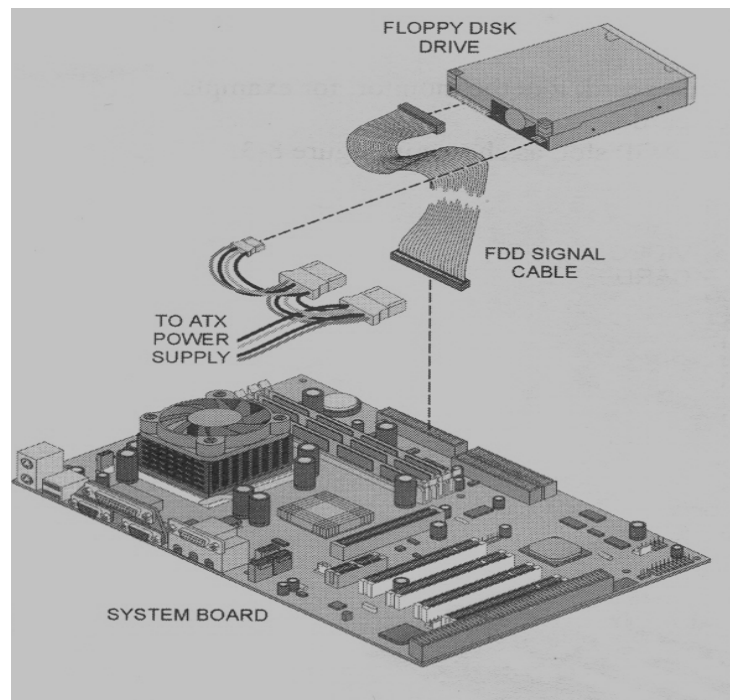
**Figure4-4 Unplug Memory**

- (b) Insert the faulted memory
- (c) Put on the PC on and record your observation in Table 4-5

- (d) Put off the PC
- (e) Replace the memory in their original slot

## 7. FDD INTERFACE

- (a) Unplug the floppy-disk interface at the end connected to the floppy drive as shown in Figure 4-5



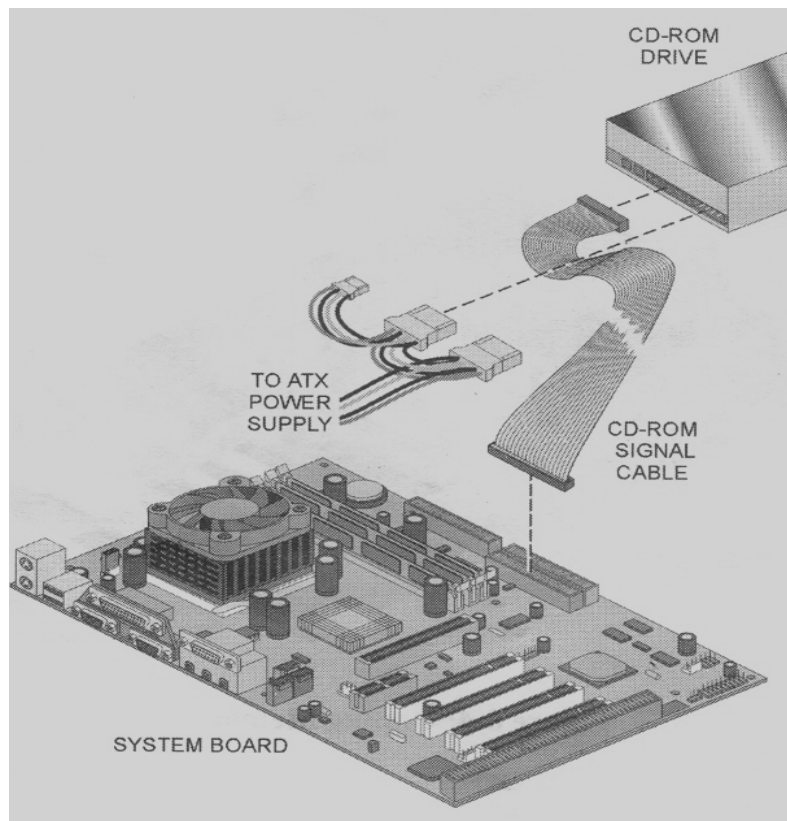
**Figure 4-5: Unplug Floppy Interface**

- (b) Plug in the faulted floppy interface
- (c) Put ON the PC
- (d) Record you observation in Table 4-7
- (e) Put off the PC
- (f) Replace the floppy drive power connector to it's original location

## 9. CD-ROM POWER

(a) Unplug the power connector to the CD-ROM as in Figure 4-6. Don't unplug the interface cable

(b) Put ON the PC



**Figure 4-6:CD-ROM Connection**

(c) If the hard drive and CD-ROM are on the same cable, record the error of the non-booting system in Table 4-8. Skip to Step i

(d) Once Windows has boot up, move the mouse and double-click on **My Computer**

(e) Record the icon listed on the right in Table 4-9



- (f) Close My Computer by clicking the X in the top right part of the Window.
- (g) Shut down Windows by clicking **Start/Shut Down** and **Turn Off**.
- (h) Put off the PC and replace the CD-ROM power connector into it's original location

## 10. HDD POWER

- (a) Unplug the power connector to the HDD as in Figure 4-7.
- (b) Put on the PC on and record your observation in Table 4-10
- (c) Put off the PC and replace the HDD power connector

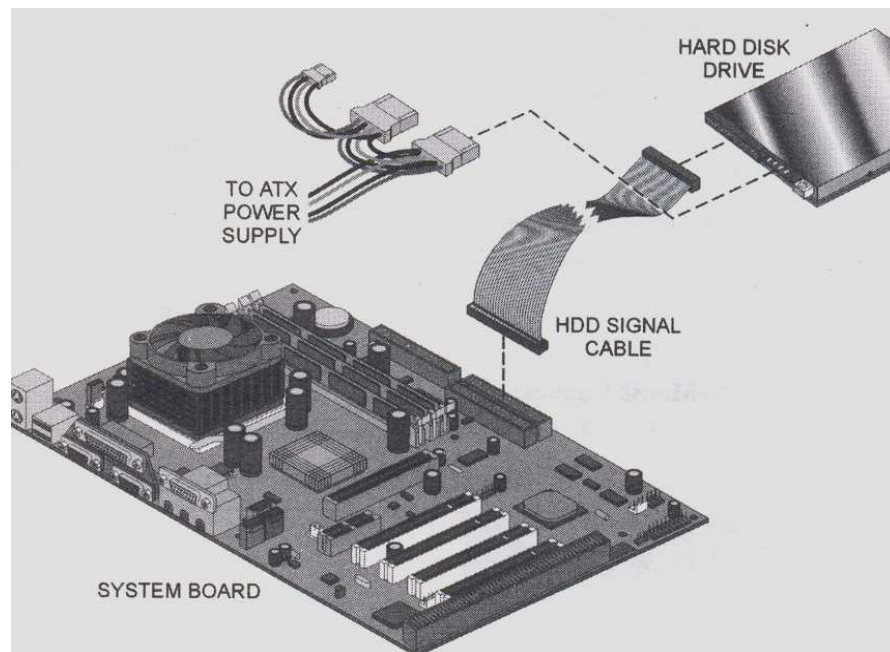
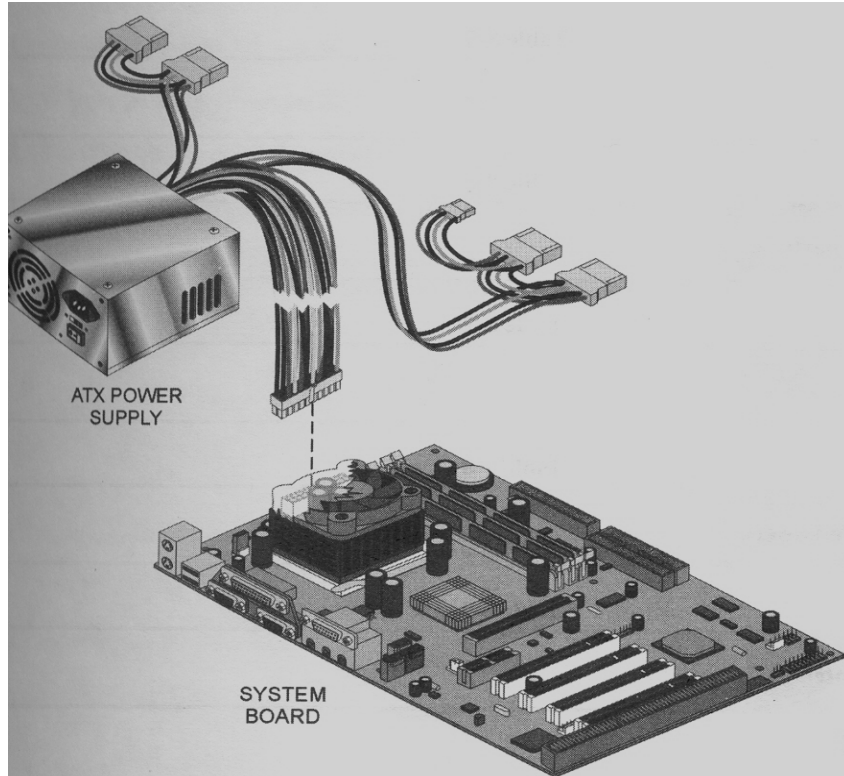


Figure 4-7: Hard Drive Connections

## 11. MOTHERBOARD

- (a) Unplug the motherboard power connector to the HDD as in Figure 4-8
- (b) Put on the PC on and record your observation in Table 4-11
- (c) Put off the PC and replace the motherboard power connector



**Figure 4-8: Power Connectors**

## **TABLES**

**Table 4-1**

<b>No Keyboard Connected</b>	
------------------------------	--

**Table 4-2**

<b>No mouse Connected</b>	
---------------------------	--

**Table 4-3**

<b>L2 Cache Disable</b>	
-------------------------	--

**Table 4-4**

<b>No Video Adapter</b>	
-------------------------	--

**Table 4-5**

<b>No Memory</b>	
------------------	--

**Table 4-6**

<b>No Floppy Drive Interface</b>	
----------------------------------	--

**Table 4-7**

<b>No Floppy Drive Power</b>	
------------------------------	--

**Table 4-8**

<b>No CD-ROM Drive Power</b>	
------------------------------	--

**Table 4-9**

<b>My Computer Content</b>	
----------------------------	--

**Table 4-10**

<b>No Hard Drive Power</b>	

**Table 4-11**

<b>No Power to Motherboard</b>	

## **LAB QUESTIONS**

1. What type of Mouse did you use?
2. How many Memory modules did you remove?
3. What slot does your Video Card use?
4. What item do you think was missing from My Computer during the CD-ROM steps?
5. Why do you think there are different results between
  - (a) a non-power CD-ROM set to Slave with a hard drive as Master on one cable
  - (b) a non-power CD-ROM set to Master on it's own?



# LAB WORK 5

## UPGRADING/OVERCLOCKING THE CPU

### OBJECTIVES

1. Install a CPU on a Motherboard.
2. Employ different clock frequency.

### RESOURCES

1. PC-compatible desktop /tower computer system

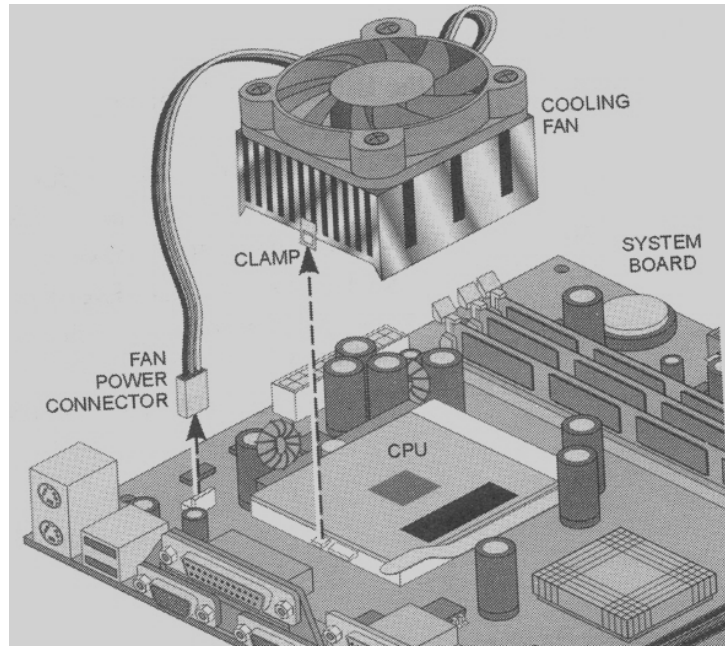
### DISCUSSION

This lab will familiarize you with upgrading a CPU. The process is fairly simple with today's auto -detecting motherboard. When you are Upgrading a CPU, you need to be concern with the Voltage, Internal Frequency, and FSB (Front Side Bus). The internal frequency is determined by multiplying the PC's BUS by a particular number. The frequency specifications are usually written on the box the processor came in or on the processor. You will physically remove a CPU and reinstall it as if it were a new processor. Your motherboard may have Physical jumper's settings for clock frequencies or software-controllable settings in the BIOS. Overclocking can be dangerous to your PC and may cause PC failure. It is recommended not to overclock more than 20% above the recommended frequency. It is also important to have a good heat sink and fan on the processor

### *PROCEDURE*

#### **. 1. REMOVE THE CPU FROM THE MOTHERBOARD**

- (a) Shut down the PC if in operation
- (b) Put off the power supply
- (c) Open the panel of the PC and lay the case horizontally
- (d) Unplug the CPU cooling fan's power connector
- (e) Unclamp the cooling fan and the heat sink from the CPU as shown in Figure 5-1



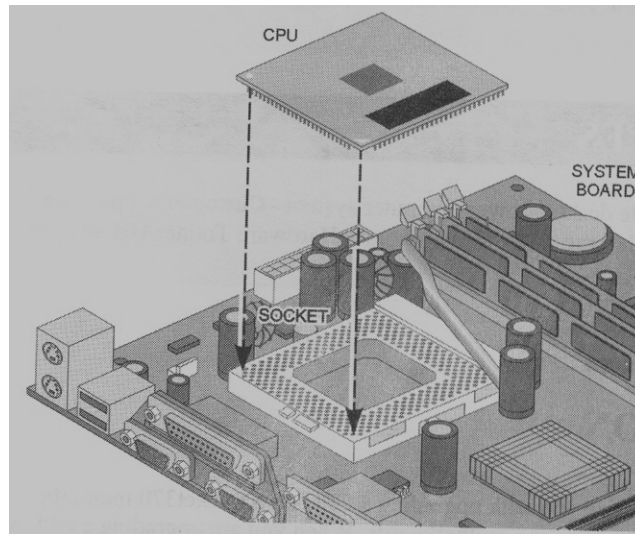
**Figure 5-1: CPU, Fan and Clamp**

- (f) Release the CPU by gently sliding the lever slightly away from the socket and rotating the lever to - vertical
- (g) Remove the CPU gently by being careful not to torch the PINS on the bottom of the CPU. If you bend the pins, the CPU will be useless.

## **. 2. INSTALL THE CPU INTO THE MOTHERBOARD**

- (a) Refer to the documentation to determine the Voltage, FSB, and internal frequency.

The processor may have internal frequency printed on it. Record the values in Table 5-1



**Figure 5-2: CPU in the Socket**

(b) Reinsert the CPU into the socket as illustrated in Figure 5-2. Make sure you insert correctly. Usually - two of the corner pins are missing in order to prevent improper connection

(c) Close the clamping mechanism

(d) Clamp the cooling and heat sink on the processor and plug in its power connector.

### **. 3. CPU SETTINGS**

(a) Verify that everything is properly connected and put on the PC

(b) Press the PAUSE key and record the values in Table 5-2

### **4. CPU OVERLOCKING**

(a) Enter the BIOS setup by press **DELETE**

(b) Depending on the processor, you can change its clock frequency or multiplier to attain higher performance from the processor. Select **frequency Control** and press

**ENTER**

(c) Select **CPU Host Clock** and press **ENTER**



- (d) Increase the frequency to its next highest setting
- (e) Press **ESC**, **F10**, **Y**, and **ENTER** to save changes.
- (f) Restart the PC and record the result in results in Table 5-3. if the PC does not start you will need to reset the CMOS.
- (g) If the CPU does not generate a higher frequency turn the multiplier back to its last working settings.
- (h) Restore all settings to their original state.
- (i) Put the case back on the computer and set it back to its original position.

## **TABLES**

**Table 5-1**

**Documented CPU Parameter**

<b>Voltage</b>	
<b>FSB</b>	
<b>Internal Frequency</b>	

**Table 5-2**

**CPU Parameter I Chipset Features Setup**

<b>CPU Name</b>	
<b>CPU Speed</b>	
<b>CPU Clock Frequency</b>	
<b>CPU Clock Ratio</b>	

**Table 5-3**

<b>Increase BUS Speed- Result</b>	
-----------------------------------	--

**LAB QUESTIONS**

1. What are two methods of settings frequencies on various motherboards?  
Which one is yours?
2. How many pins are missings to prevent improper installation?
3. What was the smallest increment used to overclock the CPU?
4. What was the name of the menu for CPU settings in your particular BIOS(if available)?
5. Is it possible to underclock a CPU?







# LAB WORK 6

## Boot Sequence

### OBJECTIVE

1. Show the boot sequence of the PC-compatible desktop/tower computer system.
2. See the extended memory count.
3. Change settings in CMOS.
4. See the LED sequence.
5. Detect hard disk drives.
6. Boot to operating system.

### RESOURCES

1. PC-compatible desktop/tower computer system
2. Windows XP Installed

### DISCUSSION

In this lab you will learn about the booting sequence of a computer, observing what the computer checks before going on the next sequence of events. The sequence will be manipulated so that it will either skip checking something or stop booting up because of a diagnostic check.

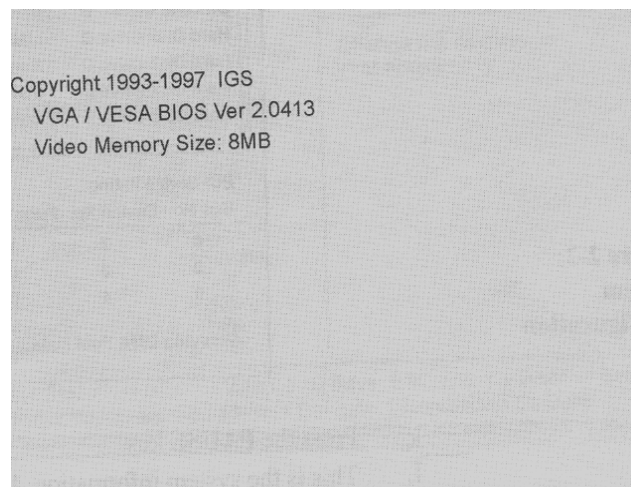
You will learn how to set up hard drives easily in CMOS.

## ***PROCEDURE***

### **1. PAUSING THE BOOTUP PROCESS**

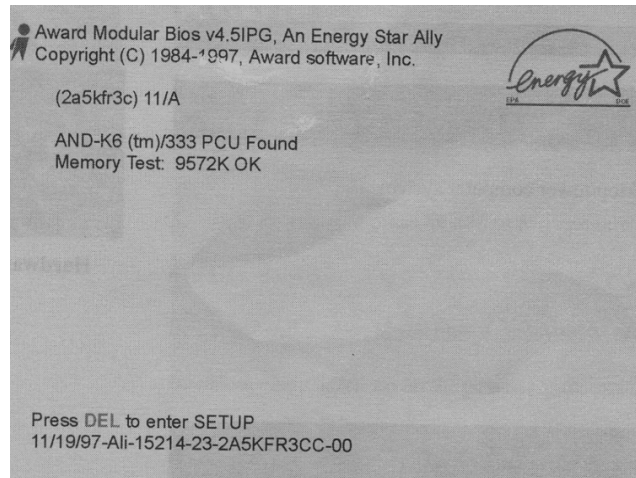
(a.) Put on the PC: Depending on the video card in the system, you may see a video ROM message flash on the screen. Some video cards display this message while others do not.

If so this will tell you the video card type and amount of memory on the card as in figure6-1.



**Figure 6-1: Bootup Process Video ROM Message Screen**

(b) When the computer is counting memory press the PAUSE key: The PAUSE key allows you to pause the bootup process so that you can see some key processes happening. Notice the bottom of the screen says you can press the DEL key to enter setup or press the ESC key to bypass the memory test as shown in the figure 6-2. We will be entering CMOS later. Notice at the bottom there is a CMOS BIOS date and serial number; these would be useful in an upgrade.



**Figure 6-2: Boot-up Memory Test Complete**

- (c) Press the **SPACE** key to memory test.
- (d) After the memory count is done a plug and play BIOS extension should pop up.  
Press **PAUSE** and record the copyright date info in Table 6-1
- (e) Press the **SPACE** key to continue.
- (f) The plug and play BIOS should find a CD-ROM drive.
- (g) Press the **PAUSE** key.
- (h) Record the CD-ROM type and number in Table 6-2
- (I) Press the **SPACE** key.
- (j) A System Configuration box should come up, as shown in figure 6-3.
- (k) Press the **PAUSE** key
- (l.) This is the system information. Fill out Table 2-3 as completely as you can



Award Software, Inc.  
System Configuration

CPU	: AMD-K6(tm)-2	Base Memory	: 640 K
Co-Processor	: Installed	Extended Memory	: 130048 K
CPU Clock	: 400Mz	Cache Memory	: 512 K
Diskette Drive A	: 1.44M, 3.5 in.	Display Type	: EGA/VGA
Diskette Drive B	: None	Serial Ports(s)	: 3F8 2F8
Hard Disk Drive C	: LBA, Mode 4, 4299MB	Parallel Ports(s)	: 378
Hard Disk Drive D	: None	Bank0 DRAM Type	: EDO DRAM
Hard Disk Drive E	: CDROM, Mode 4	Bank1 DRAM Type	: None
Hard Disk Drive F	: None	Cache L2 Type	: Pipe-Burst

PCI device listing...

Bus No.	Device No.	Func. No.	Vendor/Device	Class	Device Class	IRQ
0	2	1	10B9 5219	0101	IDE Controller	14
0	3	0	1013 00B8	0300	Display Controller	NA
0	4	0	10EC 8139	0200	Network Controller	11

Verifying DMA Pool Data .....

**Figure 6-3: Systems Configuration**

(m) Below the System Configuration box is a PCI device listing. In Table 6-4 write down the Device No., Device Class, and IRQ numbers used for each device.

(n) Press the SPACE key to continue.

(o) The PC will boot Microsoft Windows XP

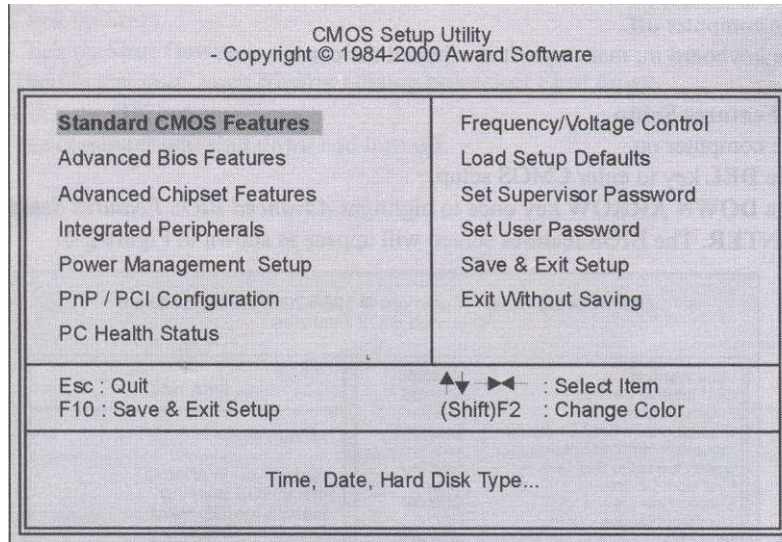
(p) Put off on the PC by flipping the power switch on the back of the power supply.

## 2. STANDARD CMOS SETUP UTILITY

(a) Put on the PC.

(b) Press the **DEL** key when the PC is counting memory. The CMOS Setup Utility screen appears as shown in figure 6-4.

(c) Press **ENTER** on *standard CMOS features setup*.



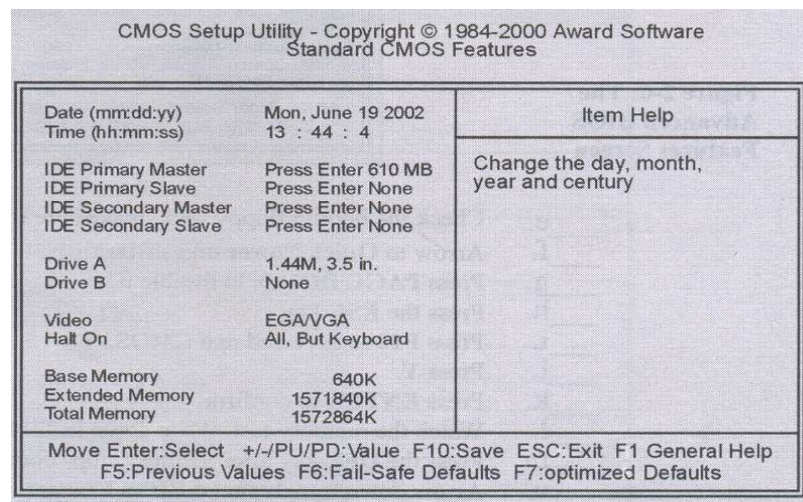
**Figure 6-4: CMOS Setup Utility Screen**

(d) Here you can change the date, time, floppy-disk drive type, hard-disk drive settings, video display type, and what errors to halt the boot process on.

(e) Use the **DOWN ARROW** key to highlight the halt on: area as shown in figure2-5

(f) Press the **PAGE DOWN** key to change the settings.

(g) Enter all possible options in Table2-5



**Figure 6-5: Standard CMOS Features Screen**

(h) Set it to halt on all errors.

(i) Press the **ESC** key to exit the *standard CMOS features Setup screen*.

- (j) Press **F10** to save changes and exit CMOS.
- (k) Press **Y**
- (l) Press **ENTER** to confirm.
- (m) Put off the PC.
- (o) Unplug the keyboard.
- (p) Put on the PC.
- (q) Write the message from the screen into Table 6-6
- (r). Put off the PC.
- (s) Plug the keyboard in; make sure it is oriented the correct way.

### **3. CMOS BIOS FEATURES SETUP**

- (a) Put on the PC.
- (b) Press the **DEL** key to the enter CMOS setup.
- (c) Press the DOWN ARROW key once to highlight Advanced BIOS features setup.
- (d) .Press **ENTER**. The BIOS features screen will appear as shown in figure 6-6.
- (e) Check the bootup floppy seek; make sure that it is enabled. Press **PAGE DOWN** to change.
- (f) Move arrow to **Quick Power on self-test**.
- (g) Press **PAGE DOWN** to disable it.
- (h) Press the **ESC** key.
- ( I).Press **F10** to save and exit CMOS.
- (j). Press **Y**.
- (k). Press **ENTER** to confirm.

- (l) Watch the memory test. Write down in Table 6-7 what is different from before.
- (m) Press the **DEL** key after memory stops counting to enter CMOS setup.
- (n) Arrow down to **Advanced BIOS Features Setup**.
- (o) Press ENTER.
- (p) Arrow down and change the *Quick Power on self-test* to Enabled.
- (q) Press **ESC**.
- (r) Press **F10**.to Save and Exit
- (s) Press **Y**
- (t) Press ENTER to confirm
- (u) Put off the PC

#### **4. THE DRIVE LED SEQUENCE**

- (a). Put on the PC.
- (b) Watch the LED on the front of the case. Write down the order in which the floppy disk drive . . . LED and the hard disk drive LED come on in table 6-8
- (c) Let the computer boot to **MICROSOFT WINDOWS XP**
- (d). Press **ENTER**
- (e). Click on start button.
- (h) Click on shut down.
- (i). Then shut down the PC

## TABLES

Table 6-1

--

Table 6-2

--

Table 6-3

### System Information

<b>CPU type</b>		<b>Base Memory</b>	
<b>Co-processor</b>		<b>Extended Memory</b>	
<b>CPU Clock</b>		<b>Cache Memory</b>	
<b>Drive A</b>		<b>Display Type</b>	
<b>Drive B</b>		<b>Serial Port</b>	
<b>Primary Master</b>		<b>Parallel Port</b>	
<b>Primary Slave</b>		<b>Cache L2 Type</b>	
<b>Secondary Master</b>		<b>SDRAM at Rows</b>	
<b>Secondary Slave</b>		<b>EDO RAM at Row</b>	
<b>Power Management</b>		<b>Fast-Page Ram at Row</b>	

**Table 6-4**  
**System Configuration**

Device No.	Device Class	IRQ No.

**Table 6-5**  
**Standard CMOS Setup**

**Halt On**


**Table 6-6**  
**Keyboard Removed**

--

**Table 6-7**  
**Quick Power on Self-Test Disable**



**Table 6-8**  
**Drive LED Sequence**



**LAB QUESTIONS**

1. How do you enter a CMOS set up screen on most BIOS?
2. How do you *Pause* the bootup process?
3. What is the box called on bootup that has a lot of information about the computer?
4. How do you save changes and exit CMOS setup?
5. What does the Quick Power on Self-Test do?








# LAB WORK 7

## CMOS Passwords and Resources

### OBJECTIVES

1. Use BIOS Features extended setup.
2. Use CMOS password.
3. Learn about power management settings.
4. Learn about integrated peripherals.

### RESOURCES

1. PC-compatible desktop/tower computer system
2. Windows XP Installed
3. Phillip Screwdriver

### DISCUSSION

CMOS settings may differ from Manufacturer to Manufacturer. Passwords for PC can give you the necessary security for your PC. One of the biggest problems faced when repairing PCs is CMOS password. You need to know what to do if the PC you are trying to repair has a password and you don't know what it is. The way to get around this is to clear the CMOS settings. This will clear out the password, but it will also clear out any custom settings that may has been set up

## PROCEDURE

### 1. PREPARE THE PC FOR ADDING A BOOTUP PASSWORD

- (a) Start the PC
- (b) Press **DELETE** to enter CMOS when prompted on the bottom of the screen
- (c) Arrow down to **Advance BIOS Features Setup** and press **ENTER**
- (d) Arrow down to highlight the **Security** option
- (e) Press **PAGE DOWN** to change it from Setup to System as shown in Figure 7-1

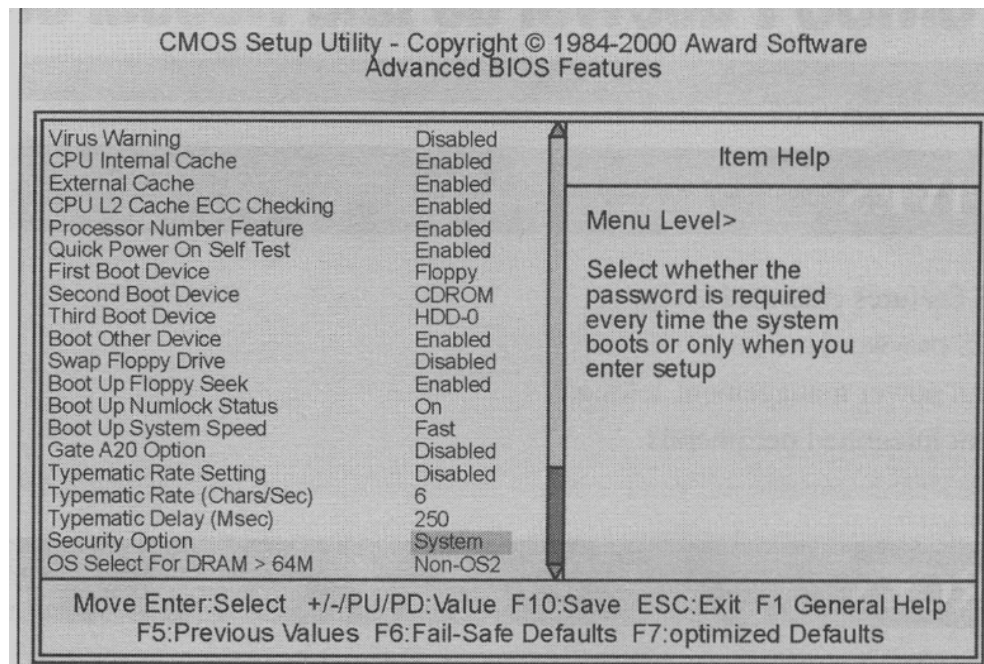
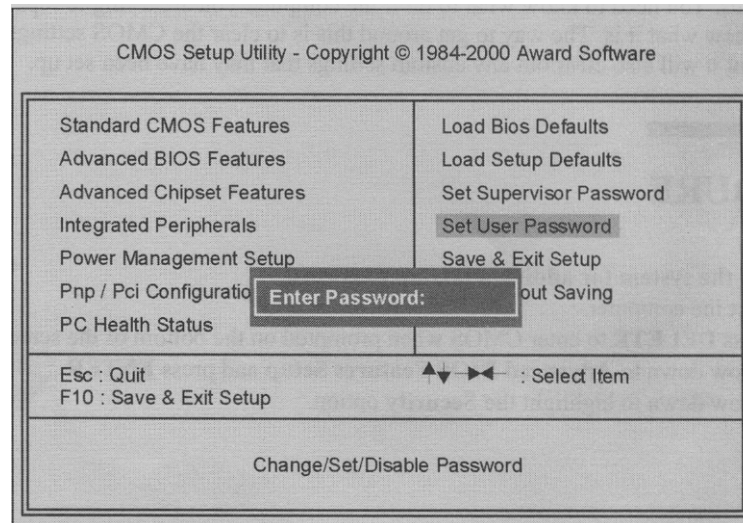


Figure 7-1 Advance BIOS Features Screen

- (f) Press **ESC**
- (g) Press **F10**
- (h) Press **Y**
- (i) Press **ENTER** to save and exit CMOS. The PC will reboot

### 2. SETTING UP USER PASSWORD FOR CMOS ENTRY

- (a) Press **CRTL+ALT+DELETE** to reboot the PC
- (b) Press the **DELETE** key when the PC is counting Memory.
- (c) Arrow over and highlight **Set User Password**
- (d) Press **ENTER**
- (e) The Enter Password box will appear as in Figure 7-2



**Figure 7-2 Enter Password Box**

- (f) Type **hardware** for user Password
- (g) Press **ENTER**
- (h) Type **hardware** again to confirm
- (i) Press **ENTER**
- (j) Press **F10**
- (k) Press **Y** to save and exit CMOS
- (l) Press **ENTER**
- (m) Reboot the PC
- (n) When prompted to enter password, type **hardware**
- (o) The PC then boots to **Windows XP**

### 3. DISABLING THE USER PASSWORD

- (a) Press **CRTL+ALT+DELETE** to reboot the PC
- (b) Press the **DELETE** key to enter CMOS when prompted
- (c) When prompted to enter password, type **hardware**
- (d) Arrow over and highlight **Set User Password**
- (e) Press **ENTER**
- (f) Leave it blank and press **ENTER**. This should disable the password
- (g) Press a key to continue
- (h) Press **F10**
- (i) Press **Y**
- (j) Press **ENTER** to save and exit CMOS
- (k) Press the **DELETE** key to enter CMOS.

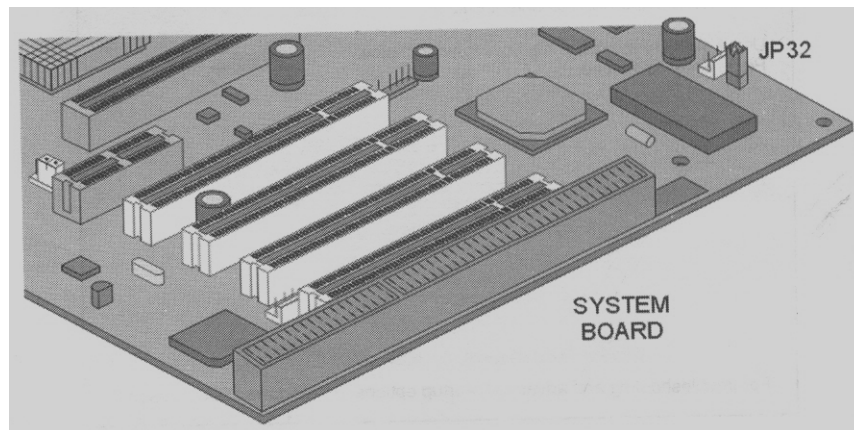
*NOTE: there may com a time you may not know the password and will need to get into CMOS setup. We will enable the password again and show you how to clear it and proceed to enter CMOS*

- (l) Arrow over to **User Password**
- (m) Press **ENTER**
- (n) Type **hardware**
- (o) Press **ENTER**
- (p) Type **hardware** again
- (q) Press **ENTER** and confirm it.
- (r) Press **F10**
- (s) Press **Y**

- (t) Press **ENTER** to exit CMOS
- (u) Boot PC to password prompt
- (v) Put off the PC

#### 4. CLEARING THE CMOS SETTINGS

- (a) Unplug the PC
- (b) Remove the screws from the PC cover
- (c) Remove the PC case cover
- (d) Remove the CMOS battery
- (e) Locate jumpers JP32 in Figure 7-3



**Figure 7-3: Jumper JP32**

*NOTE: this is the jumper for clearing the CMOS. See motherboard manual on other PCs*

- (f) Move jumper from Pins 2 and 3 to 3 and 4. Put on the PC and count to 20
- (g) Put off the PC and then return the jumper back to Pins 2 and 3 on JP32
- (h) Put the PC on and press **DELETE** key during the memory count. The password should be gone
- (i) Press **ESC** key and then press the **ENTER** key to reboot

- (j) Write down the error message that appears when rebooting in Table 7-2
- (k) Press **F1** to continue booting
- (l) Replace the case cover
- (m) Screw on the cover
- (n) Press **CRTL+ALT+DELETE** to reboot the PC
- (o) Press the **DELETE** key to enter CMOS setup

*NOTE: the default CMOS settings will be fine except that the time may have been reset to the BIOS date. If the time is reset, we can reset the time in CMOS by the Step 5 below.*

## 5. CHANGING THE DATE AND TIME IN CMOS

- (a) Press **ENTER** on standard CMOS Setup
- (b) Highlight the Month
- (c) Press **PAGE DOWN** on the Month to change it to the desired Month as shown in

Figure 7-5

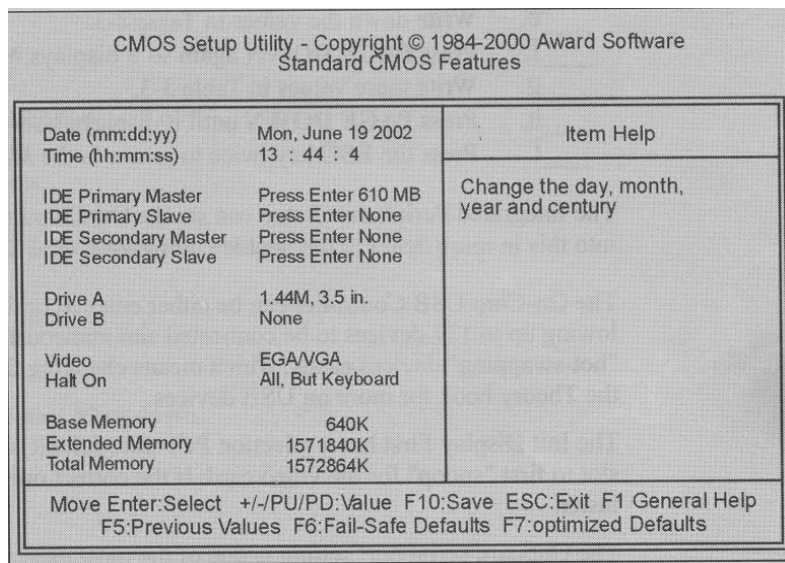


Figure 7-4: Standard CMOS Features Screen

- (d) Highlight the Day
- (i) Press **PAGE DOWN** or **UP** to change it to the correct Day
- (j) Highlight the Year
- (k) Press **PAGE DOWN** or **UP** to change it to the correct Year
- (l) Highlight the Hour
- (m) Press **PAGE DOWN** or **UP** to change it to the correct Hour
- (n) Highlight the Minute
- (o) Press **PAGE DOWN** or **UP** to change it to the correct Minute
- (p) Press **ESC** to exit

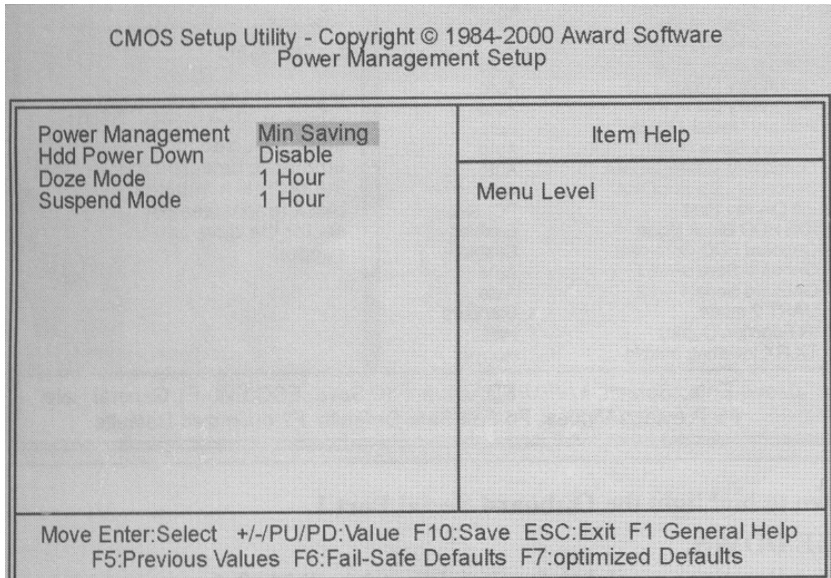
*Power management in CMOS helps preserve power usage on a PC. Integrated peripherals are the Input/Output devices that are included on the Motherboard. These are USB, serial ports or COM port, parallel port (for printers and scanners), IDE hard drive controllers, and floppy-disk drive controller*

*We will now deal with Power Management setup in the CMOS. Power Management is sometimes used for computers that are always on, but mostly it is used for battery-powered computers like laptops. By changing these setting you will be able to save power. You can also be able to let the computer know on which type of activity it should “wake up”.*

## **6. POWER MANAGEMENT SETUP**

- (a) Arrow down to highlight **Power Management Setup**.
- (b) Press **ENTER**
- (c) Arrow down the highlight **Power Management** ,, and press **ENTER**
- (d) Press **PAGE DOWN** to change it to **Min Savings** as shown in figure7-5





**Figure7-5: Power Management Screen**

- (e) Write down the value in the Table 7-3
- (c) Press **PAGE DOWN** again so it display **Max Saving**
- (d) Write these value in Table 7-3
- (e) Press **PAGE DOWN** until it displays **User Defined settings**.
- (f) Press **ESC** key twice to return to the main menu

*The integrated peripherals setup can set the on-clip primary IDE to be enabled or disabled.*

*The On-Clip USB controller can be either enabled or disabled. USB is a relatively new serial bus type, allowing up to 127 devices to be connected simultaneously through one USB port. It also allows for “hot-swapping” devices easily, which means changing the devices while the computer is still power on..*

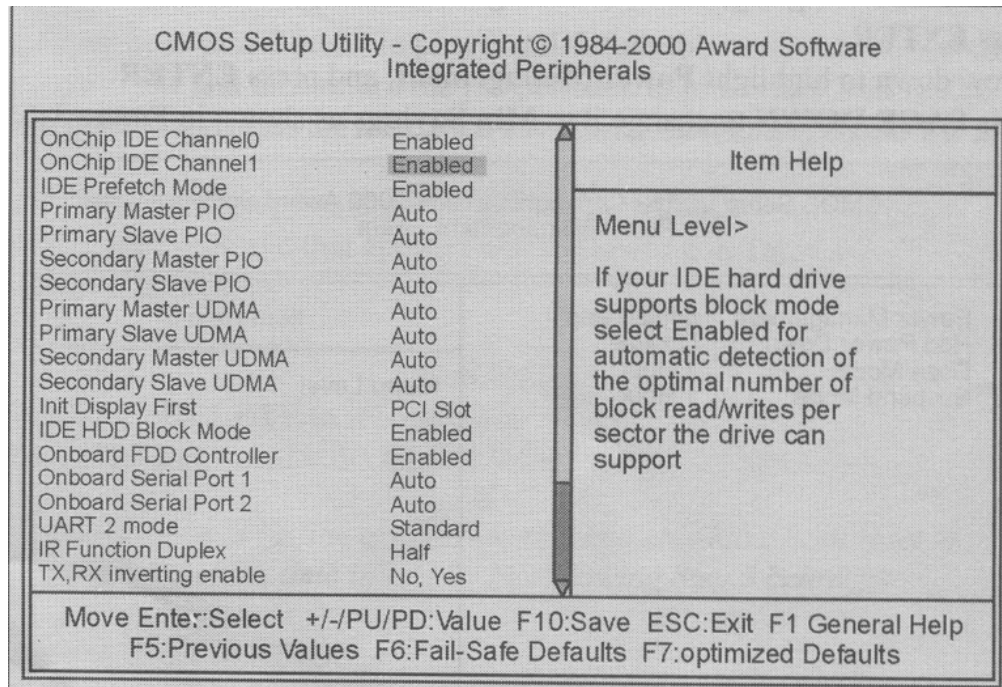
*The Unit for Display first, has a selection PCI slot (default) or AGP slot. This simply tells the computer what slot to first “snoop” for the video card. If the correct one is listed here, it will make booting up slightly faster.*

*The onboard serial port setting is one of the most used settings in this CMOS section. It allows you to select what COM port you want each serial port to be. The main reason this is important is that old modems work best if they are on one of the standard COM port; 1, 2, 3, or 4. In order for the IRQ of the modem not to conflict with the IRQ of the COM port, you must either change the modem or change the setting in CMOS. Usually you would just disable COM 2 and set the modem to use the COM 2 settings.*

*The Onboard parallel port allows you to change the mode in which the parallel port operates. This is important because some devices, such as scanner, require the port to operate in ECP mode in order to communicate correctly. This is where you would change those settings.*

## **7. INTEGRATED PERIPHERALS SETUP**

- (a) Arrow up to highlight **Integrated Peripherals**.
- (b) Press **ENTER**. The integrated peripherals screen will appear as in figure 7-6



**Figure7-6: Integrated Peripherals Screen**

- (c) Arrow down to highlight the **Onboard Serial Port 1**
- (d) Press **PAGE DOWN**.
- (e) Write down all options available for Serial Port 1 in Table 7-4.
- (f) Change the setting back to **Auto**.
- (g) Press **ESC**
- (h) Press **F10**
- (i) Press **Y**
- (j) Press **ENTER** to confirm and exit CMOS setup.

## **8. VERIFYING THE COMPUTER IS STILL BOOTING PROPERLY**

- (a) The computer will boots up to **Microsoft Windows XP**.
- (b) Click on **Start**.
- (c) Click on **Shut Down**.
- (d) In the Shut Down windows dialog box select **turn off**.

# TABLES

Tables 7-1

--

Tables 7-2

*Error  
Messages*


Tables 7-3

Power Management	Min Savings	Max Saving
HDD Power Down		
Doze Mode		
Suspend Mode		

Tables 7-4

## Options Available for Serial Port


## LAB QUESTIONS

1. When will a user be prompted for a password if the security option is "Setup"?

2. When will a user be prompted for a password if the security option is “System”?
3. How do you reboot the computer without pushing the reset switch or the power switch?
4. How do you get into the CMOS of a computer if you don't know the system password that it is asking for?
5. When clearing the CMOS setting with the jumper, what time will the computer be set to?
6. What computer system is Power Management most useful to and why?
7. How many serial Port setting can be set up in CMOS?

**ANSWERS.....**





# LAB WORK 8

## HDD Setting

### OBJECTIVE

1. Auto-detect IDE drive in CMOS.
2. Use CMOS IDE modes.
3. Learn about CD-ROM setup consideration.

### RESOURCES

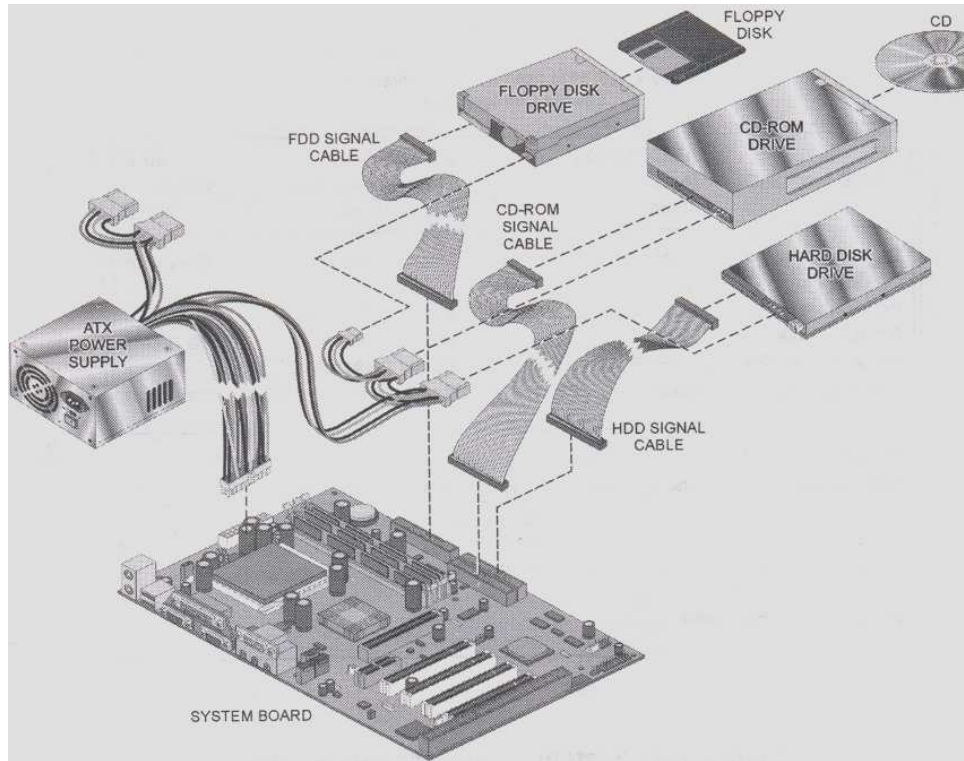
1. PC-compatible desktop/tower computer system
2. Windows XP Installed

### DISCUSSION

You need to enter the BIOS's CMOS configuration Setup program during boot up and set several parameters to match the type of HDD being installed. Before exchanging or reformatting a hard disk, it is always advisable to make backups of the drives content and record its configuration parameter

There are certain pieces of information that should be known, and Configuration verified before inserting the drive into the disk drive bay. In particular, the drive's type parameter should be verified and its physical Drive Select or Master/Slave setting should be made.





**Figure 8-1: HDD-related Component**

For some drives, this information is contained in an information booklet that comes with the drive. Other drives include this information on a sticker that is mounted on the drive itself. In these cases, it is somewhat difficult to access the information after the drive has been installed in the system unit

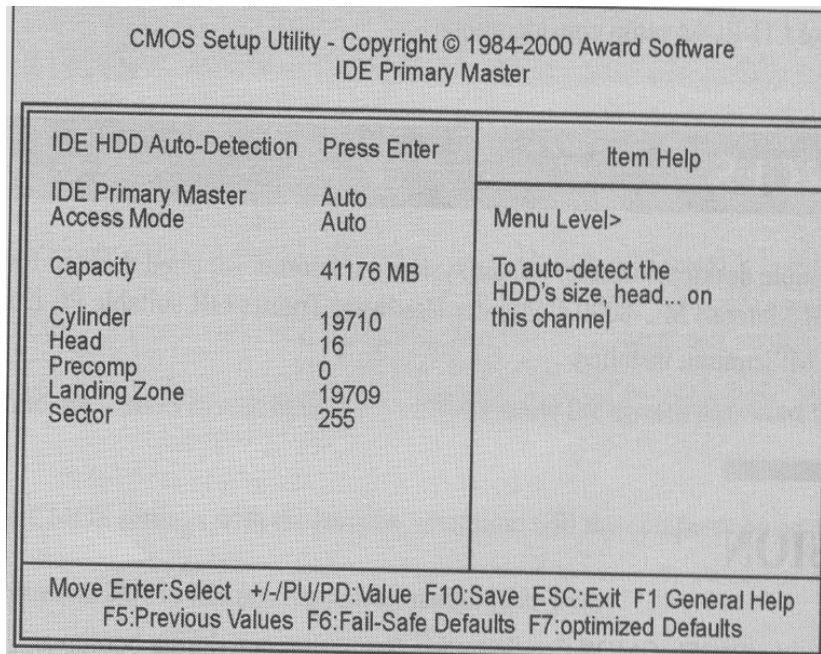
Figure 8-1 depicts the relationship of the hard disk drive to the rest of the system. In addition, it shows the hard disk drive's information and controls the signal path between the drives and motherboard (through the signal cable).

## ***PROCEDURE***

### **1. AUTO-DETECTION**

- (a) Put on the PC
- (b) Press reset to reboot the PC; and then press **DELETE** to enter CMOS
- (c) Press **ENTER** to go into **standard CMOS features**

- (d) Arrow down to highlight **IDE Auto-Detection** and then press **ENTER**. The IDE Primary Master setup is open as shown in Figure 8-2

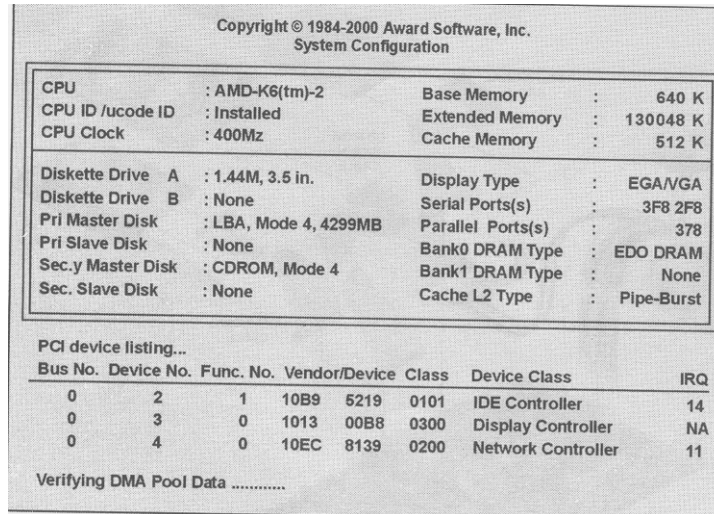


**Figure 8-2: IDE Primary Master Screen**

- (e) Press the **ENTER** key to begin the auto-detection process
- (f) Press the **ESC** key twice to access the main menu and then use the **ARROW** keys to highlight **Integrated Peripherals**
- (g) Press the **ENTER** key
- (h) Make sure the On-Chip IDE Channel 0 and Channel 2 are both enabled, and press the **ESC** key
- (i) Press **F10**, **Y**, and **ENTER** to save and exit CMOS. The PC will boot

## **2. CHECK CONFIGURATION**

- (a) Press the **PAUSE** key on the keyboard at the *System Configuration Box*. See Figure 8-3

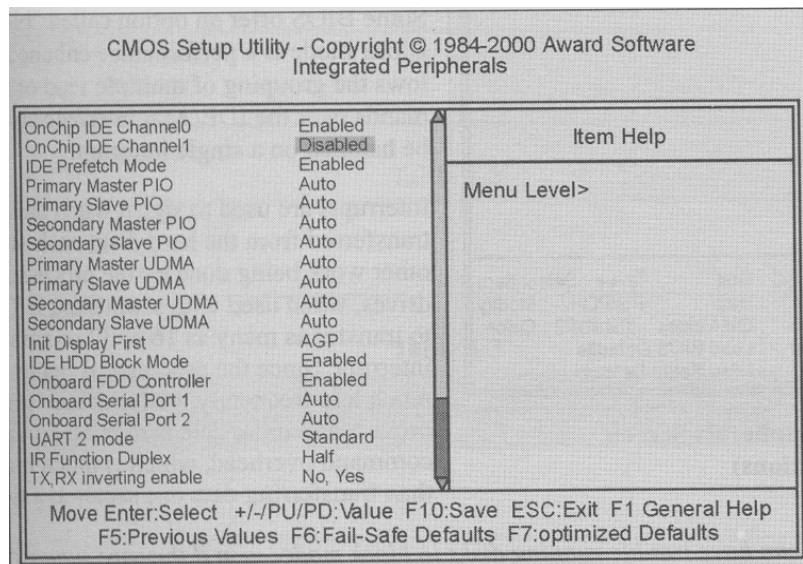


**Figure 8-3: System Configuration Screen**

- (b) At the bottom of the screen, under *Device Class*, find *IDE Controller*
- (c) Write down the IRQ(s) that it is using in Table 8-1; press SPACE.
- (d) Press **CRTL+ALT+DELETE** to reboot the PC

**3. DISABLE 2<sup>ND</sup> CHANNEL IDE (1)**

- (a) Press **DELETE** to enter CMOS when prompted
- (b) Arrow over to **Integrated Peripherals** and then press **ENTER**
- (c) Arrow down to On-Chip IDE Channel 1. See Figure 8-4



- (d) Press PAGE DOWN to disable it.
- (e) Press **ESC** to return to the Main menu
- (f) Press **F10, Y**, and **ENTER** to save and exit CMOS.

# LAB WORK 9

## WINDOWS XP COMPUTER MANAGEMENT

### OBJECTIVE

- a. View various area of Computer Management
- b. Use Task Manager

### RESOURCES

3. PC-compatible desktop/tower computer system
4. Windows XP Installed

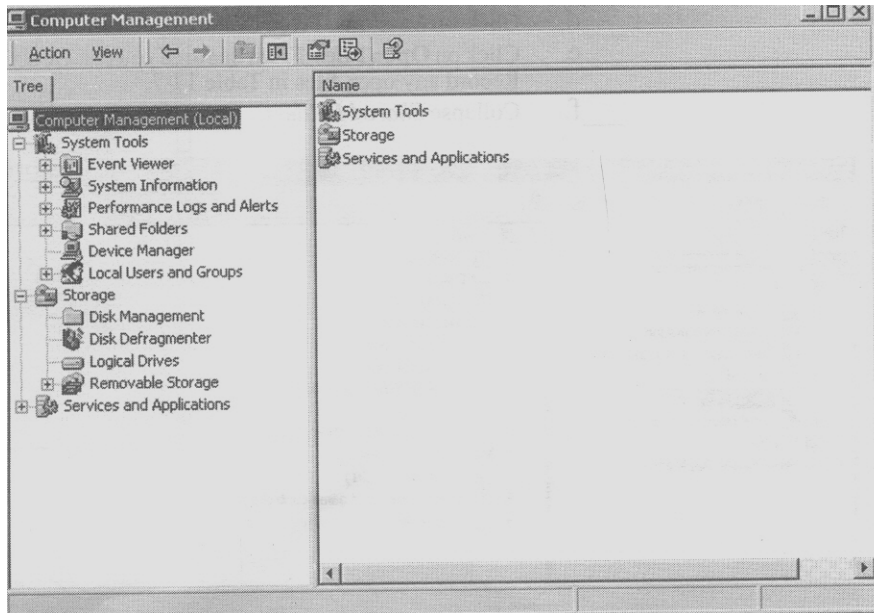
### DISCUSSION

Windows Computer Management provides access to administration tools for managing disk as well as local and remote computer. Some of the tools include are Event Viewer, Performance Logs and Alerts, Shared Folders, Device Manager, User , and Disk Defragmenter. These can be useful tools for viewing the hardware and software component of your PC.

### *PROCEDURE*

- A. **START COMPUTER MANAGEMENT**
  - (a) Boot the PC to Window XP

- (b) Open Computer Management through the part *Start/ Control Panel*. Double-click on **Administrative Tools** and double-click on **Computer Management**. The window looks like Figure 9-1



**Figure 9-1: Computer Management**

- (c) Click on **Event Viewer**. Notice the content in the right-hand windows plain.

## **2. PERFORMANCE LOGS AND ALERTS**

- (a) From Computer Management, expand **Performance Logs and Alerts** by clicking on (+)
- (b) List the area you see in Table 9-1 and collapse Performance Logs and Alert by clicking on (-)

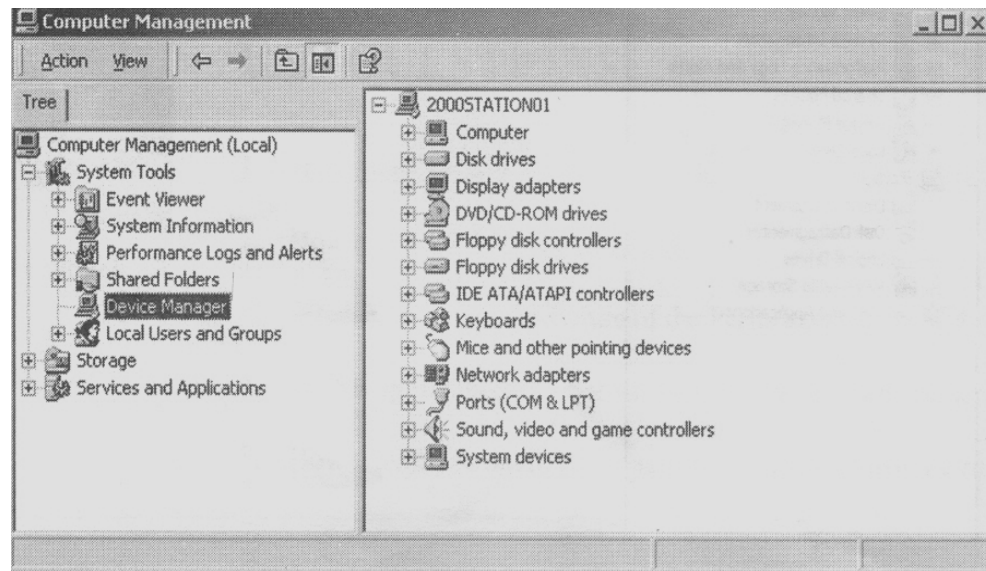
## **3. SHARED FOLDERS**

- (a) From Computer Management, expand **Shared Folders**

- (b) Click on the **Shares Icon**. From this Window, you can see all the folders that are shared on you computer
- (c) Click on the **Shares**. Record the Shared Folder in Table 9-2
- (d) Click on the **Sessions Icon**. From this Window, you can view all the remote users attach to you computer
- (e) Click on the **Open Files**. From this Window, you can view which files are being accessed over the Network. Record any open file in Table 9-3 and collapse Shared Folders.

#### 4. DEVICE MANAGER

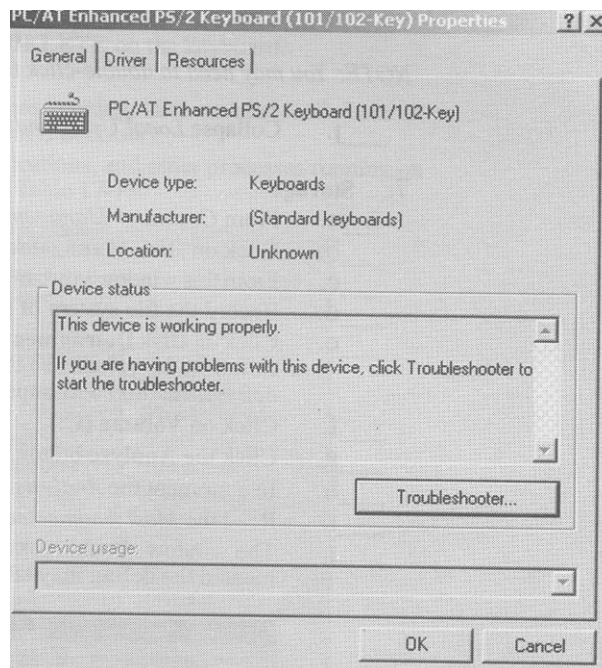
- (a) From Computer Management, click on **Device Manager**. The Window should look like Figure 9-2



**Figure 9-2: Device Manager**

- (b)The Device Manager is a useful tool for viewing any conflict or hardware setup problem with various components on the computer

- (c) Expand Mice and other pointing devices and record any item listed in Table 9-4
- (d) Click on the **View** menu and selected **Device by connection**. From this view, you can see the hierarchical structure of connection to the PC.
- (e) Click on the **View** menu and selected **Resource by type**.
- (f) Expand the **Interrupt Request (IRQ)** list.
- (g) Look for the keyboard and double-click on its icon
- (h) You will see a properties Window appear. It looks like Figure 9-3. Click the **Resources** tab.



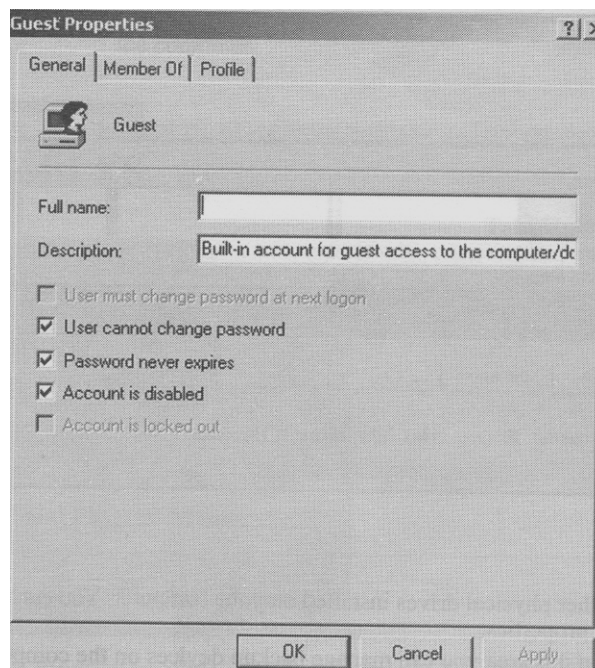
**Figure 9-3: Keyboard Properties**

- (i) From this Window, you can view the I/O and IRQ of the device. Record the Input/Output Ranges of the keyboard in Table 9-5. Click **Cancel**

## **5. LOCAL USER AND GROUP**



- (a) From *Computer Management*, double-click on the **Local Users and Group** icon to expand it
- (b) Click on **User**
- (c) By default, there are two users set up by Windows: Administrator and Guest. Guest is disabled by default. Double-click on **Guest**.
- (d) You will see a Window similar to Figure 9-4. The account is disabled by default. *Uncheck Account is disabled*



**Figure 9-4: Guest User Properties**

- (e) Click **OK**
- (f) Click in the blank space in the Window
- (g) Click on **Action** menu and **Select New User**
- (h) From this Window, you can create a new user to log on the PC. They can log on locally or over the Network. Click **Close**
- (i) Click on Group and record the description of Administrator in Table 9-6

*NOTE: you may need to double-click the icon next to the name to view the user properties*

(j) Collapse Local User and Groups

## **6. STORAGE**

(a) ) From Computer Management, expand **Storage**

(b) Click on **Disk Management**.

(c) From this Window, you can view partitioning information, similar to the Fdisk command in DOS.

(d) Record the File system of (C:) in Table 9-7

(e) Click on the **Disk Defragmenter**. Disk Defragmenter moves the piece of each file or folder to one location on the volume, so that each occupies a single, contiguous space on the disk drive. Regular defragmentation will improve PC performance

(f) Click on **Volume (C: )**

(g) Click on **Analyze** button

(h) That moment, the Analysis Complete dialog will appear. Click **View Report**

(i) Read the Most fragmented files section and click **Close**

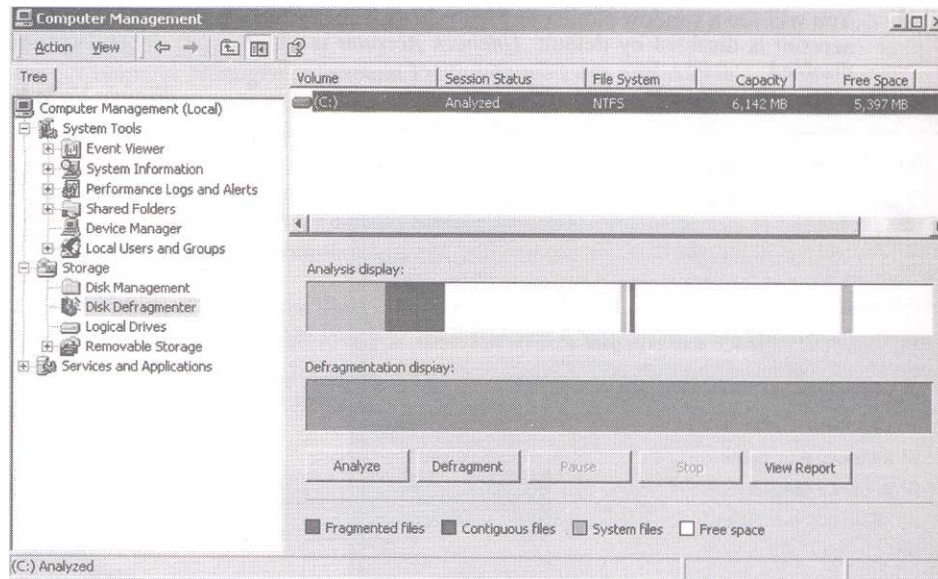
(j) You will see a Window similar to Figure 9-5. Depending on system speed and percentage fragmented, the defrag may take from 5-60 minute. If time permits, click Defragment.

(k) ) Click on **Logical Drive**

(l) You will see A:, C:, D:, and any other physical drives installed in your PC.

You can double-click on each one and view its properties.

(m) Expand Removable Storage. From this area you can manage backup devices on the PC



**Figure 9-4: Disk Defragmenter**

## **7. SERVICE AND APPLICATION**

(a) From Computer Management, expand **Service and Application**

(b) Click on **Services**.

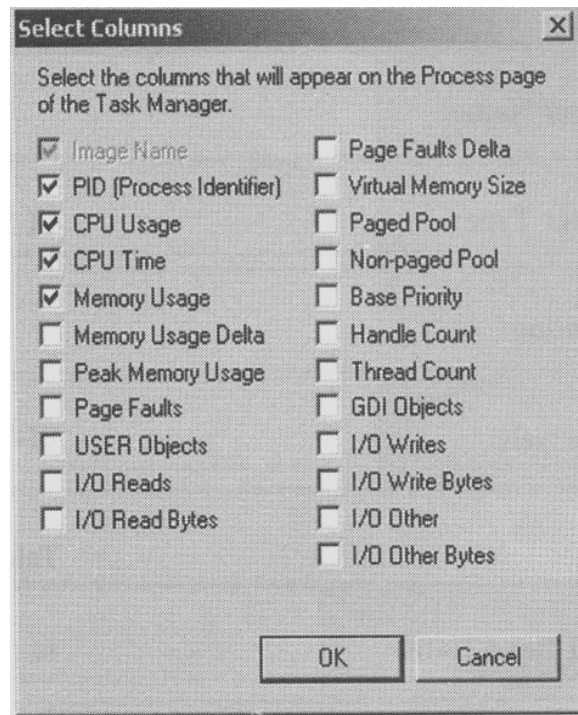
(c) Expand **Indexing Service**. This services indexes all the files and folders on the {C for east searching. Record any catalog items in Table 9-8

(d) Close Computer Management and all Windows.

## **8. TASK MANAGER**

(a) From Windows XP desktop, press **CTRL+ALT+DELETE** on the keyboard

- (b) Click on **Task Manager** button.
- (c) Click on **Task Manager** tab. If you have any application running, such as Microsoft Word, you can view their statue and end them if necessary.
- (d) Click on **Process** tab. This displays all services, application, and other processes running on the PC. Record how many processes are running in Table 9-9
- (e) Click on **View/Select Column**. The Windows looks like Figure 9-5



**Figure 9-5: Select Column**

- (f) From this Column, you can add column that display advance information about a process. Select the entire column by clicking in the box to the left of each name and placing a check mark.
- (g) Click **OK**. You can now view more in formations about a specific process. You may need to use the horizontal scroll bar.

- (h) Look at the *system idle process* and record its memory usage in Table 9-10
- (i) Click the **Performance** tab.
- (j) From this tab, you can view a graphical representation of CPU usage and Memory usage. Record the values for total Physical Memory (K) in Table 9-11.
- (k) Close the *Task Manager*
- (l) Close all Windows and shut down the PC.

## **TABLE**

**TABLE 9-1**

### **Performance Log and Alerts**


**TABLE 9-2**

### **Shared Folders**


**TABLE 9-3**

<b>Open Files</b>	
-------------------	--

**TABLE 9-4**

<b>Items Listed</b>	
<b>in Mice and</b>	
<b>other</b>	

**Pointing Devices**

**TABLE 9-5**

<b>Keyboard</b>	
<b>Input/Output</b>	
<b>Ranges</b>	

**TABLE 9-6**

<b>Administrat</b>	
<b>or</b>	
<b>Descriptions</b>	

**TABLE 9-7**

<b>File System of (C:):</b>	
-----------------------------	--

**TABLE 9-8**

<b>Indexing Service Catalog:</b>	
----------------------------------	--

**TABLE 9-9**

<b>Processes Running on System:</b>	
---	--

**TABLE 9-10**

<b>System Idle Process:</b>	
-----------------------------	--

**TABLE 9-11**

<b>Total Physical Memory:</b>	
-------------------------------	--

## **LAB QUESTIONS**

1. What is Systems Information used for?

2. How can you view all the shared folders in your PC
3. What is Device Manager used for?
4. What default user are set by Windows?
5. What does Disk Defragmenter do?

**ANSWERS.....**







# **LAB WORK 10**

## **WINDOWS XP START UP MODE**

### **OBJECTIVE**

- a. Restart and try various startup options

### **RESOURCES**

1. PC-compatible desktop/tower computer system
2. Windows XP Installed
3. A PS2 Mouse

## DISCUSSION

Here, we are going to explore different startup options when typing the F8 key at startup. These options can be useful when troubleshooting PC problems. The Windows Advance Option Menu include the following default options.

- Safe Mode
- Safe Mode with Networking
- Safe Mode with Command Prompt
- Enable Boot Logging
- Enable VGA Mode
- Last Known Configuration (Your Most recent setting that worked)
- Directory Services Restore
- Debugging Mode
- Start Windows Normally
- Reboot

Safe Mode will start windows with a minimal set of drivers to run Windows, including mouse, monitor, keyboard, hard drive etc. you can enter Safe Mode with Command Prompt /Networking and so on, by selecting the appropriate mode.

- VGA mode is useful when you have installed a vide driver and configured it incorrectly. If the PC starts with a blank screen or you see random lines all over the screen, you may choose VGA mode to start Windows. This mode will start the PC with the base video setting (640 X 480, 256 Colors).

- Boot logging start Windows and log services that load or do not load to C:\winnt\ntbtlog.txt.
- Last Known Good Configuration start Windows using the Registry information saved at the last proper shut down.
- Directory Services Restore is used for Windows Domain Server System
- Debugging Mode starts Windows and sends debugging information through the serial port to another PC

In hardware Profile, you can change Windows start up to select a designated profile. Hardware Profile can be useful for saving hardware specific information when transporting a hard drive between two PCs. One can do this without the need to re-install all devices on each PC at every startup.

## ***PROCEDURE***

### **1. SAFE MODE**

- (a) Boot the PC to Window XP
- (b) As it boots, keep pressing F8 key until you get to Advance Option Menu
- (c) Select Safe Mode and press **ENTER**
- (d) As Windows starts, you will see an information window about Safe Mode. Click **OK**
- (e) Right-click the desktop and select **Properties** from the drop down menu to open the *Display Properties* window, and click the **Setting** tab

- (f) While in Safe Mode, Window gives small options on many things.  
Click the **Color** drop-down menu. Record your observation in Table 10-1
- (g) Click the **Cancel** button
- (h) From desktop, double-click the **My Network Places** Icon.
- (i) Double-click on **Entire Network**
- (j) Double-click on **Microsoft Window Network**
- (k) You will see a dialog box like Figure 10-1. Click **OK** button
- (l) Close all windows and restart

*NOTE: During Safe Mode, You cannot view the network*

## **2. SAFE MODE WITH NETWORKING**

- (a) Boot your PC to Window XP and press the **F8** key.
- (b) From Windows XP, select by the scrolling down to **Safe Mode With Networking** and press **ENTER**
- (c) Then you will see an information Window about Safe Mode. Click **Yes** to the question asked.
- (d) From desktop, right-click the **My Network Places** Icon and select **Explore** from the drop down menu.
- (e) Double-click on **Entire Network**
- (f) Double-click on **Microsoft Window Network**
- (g) You will see your work group in the windows.
- (h) Close all windows and restart

### 3. SAFE MODE WITH COMMAND PROMPT

- (a) Boot your PC to Windows XP and press the **F8** key.
- (b) From Windows XP, select by scrolling down to **Safe Mode With Command Prompt** and press **ENTER**
- (c) Select Windows XP and hit **ENTER** on your keyboard

Week 12

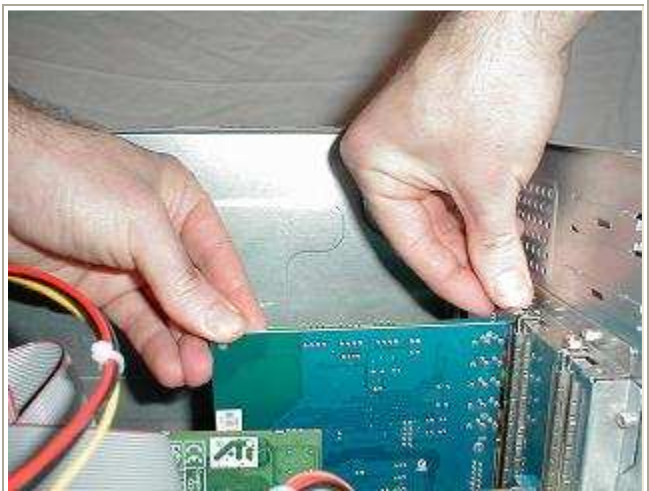
#### **Replacing other Add-On cards:**

Sometimes we need to replace a sound card, a modem, or even a network card. In modern systems, these cards all occupy a PCI slot on the motherboard so the procedure for replacing one of them will be the same for others.

Sometimes we need to replace a sound card if we want a better performance of audio software. Also some sound cards have better audio quality, or support more channels if we are using a subwoofer or a system of speakers.

Replacing a modem is required sometimes if we need a faster browsing of the internet or additional features of the newer one.

Whenever you install a sound card or other adapter in your PC, you should be careful not to touch the contact edge (the gold stripes) when handling the adapter, and ideally, you should only touch them on the metal bracket or unused real estate on the card. You must seat this adapter in the PCI slot with even pressure on the bracket and the back edge of the sound card. Immediately after installing the sound card, secure both it and the SPDIF riser with one screw each through the bracket on the back rail. That covers how to install a sound card, now you have to get the internal and external connections made right.



Week 12

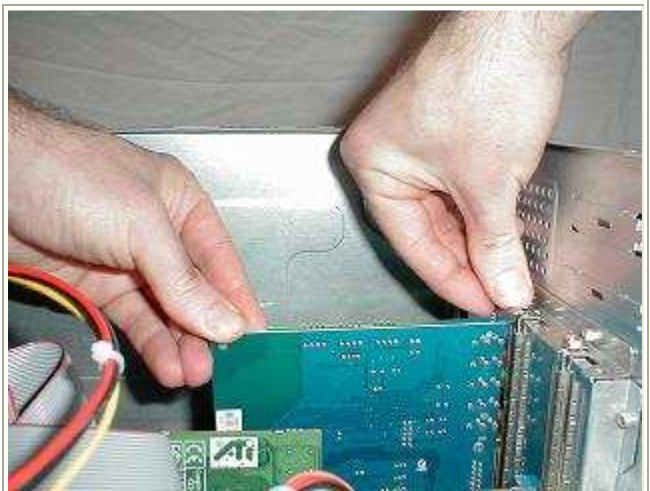
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Week 14

### **Installing a Keyboard**

The following steps explain how to install the keyboard:

**Step 1.** Identify the type of keyboard to be installed. If the keyboard's cable



has a connector at the end that's a circular plug with 6 pins, it will connect to a PS/2 port. If the connector has a flat, rectangular plug, the keyboard will connect to a USB port. Figures below show a PS/2 and USB connectors respectively.



PS/2 Connector



USB Connector

**Step 2.** Power down your system before you begin the installation. Anytime you're connecting a device to a computer system, it is best to have the power turned off (with the exception of **hot-pluggable** devices, such as a thumb drive or card reader, which the system will recognize immediately after you plug it in, even if the system is running).

**Step 3.** Locate the appropriate port in the I/O (input/output) port cluster at the back of your computer. Remember, PS/2 ports are circular with six round pin holes, and USB ports are flat and rectangular. Figure below shows the ports.



**Step 4.** Insert the keyboard connector into the corresponding port. PS/2 and USB cables will fit into their corresponding ports only one way. If the plug doesn't slide easily into the port with minimal force, double-check that you're using the correct orientation. The rectangular key in a PS/2 cable should line up with the rectangular hole in the port. If the USB connector doesn't readily slide into the USB port, flip the connector over and try again. The USB icon that's branded into the connector will usually face up. If the connector is not fitting correctly, take care to not use excessive force or you may damage the pins on a PS/2 connector.

**Step 5.** With the connector in place, power-up the system and let your operating system load and detect the keyboard.

**Step6:** Once the keyboard is connected to your system, there is usually no other configuration necessary. However, with some motherboards and USB keyboards, you may have to enter the system's **BIOS (Basic Input/Output System;** software built into the system that controls certain routines and functions of the computer, including the keyboard) and enable USB keyboard or USB legacy device support.

To enable USB keyboard support, power up your system and press DELETE (or F1 or F2, depending on your BIOS type) to enter the BIOS. The specific option to enable USB Keyboard support, is found in the Integrated Peripherals section or in a subsection of Integrated Peripherals that's labeled OnChip PCI Device or PCI Devices. Change the setting from Disabled to Enabled and then exit the system BIOS, making sure to save the changes. When the system restarts, the keyboard will be ready for use..

### **Keyboard Cleaning**

1. Switch off the computer and unplug the keyboard.
2. There is a removable cover on the bottom of the keyboard. open all the screws and remove the cover of keyboard.
3. Take a air blower or vacuum cleaner and blow the air on it. this will remove all the dust from the keyboard.
4. Now make a keyboard map on paper so you know where each key goes.
5. Carefully pry each key loose with a small screwdriver and place all these keys in to a container. open wider keys properly which may have guide wires like space bar, enter, caps lock and shift keys. Now clean every key with a dishwasher or rubbing alcohol with a soft cloth.
6. Now clean the rubber components and the plastic cover of keyboard.
7. Dry completely all the keys, rubber and plastic covers.
8. Lubricate keys if needed.

9. Properly fit all the keys to the right place. you can take the help of the paper map. cover them and tighten the screws.
10. Connect the keyboard to the computer and turn on the computer.

Week 15

### **Installation of a Dial-up Modem**

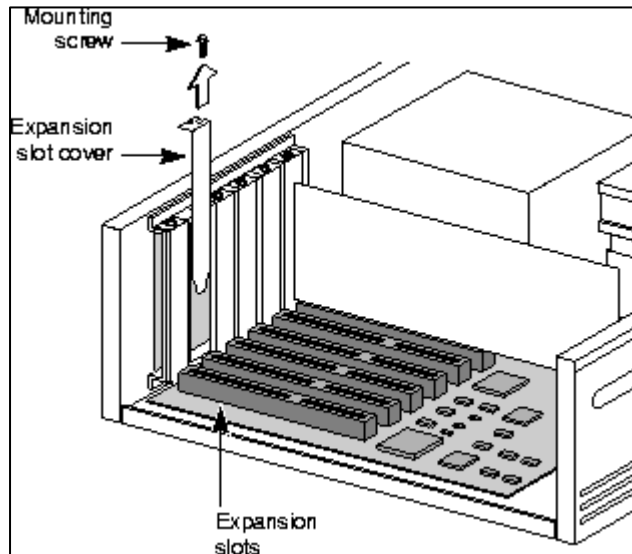
#### **Procedure Steps:**

1. Turn System Off and unplug it.
2. If your modem is a conventional type that uses jumpers to set the COM port and IRQ number, you need to configure the jumpers

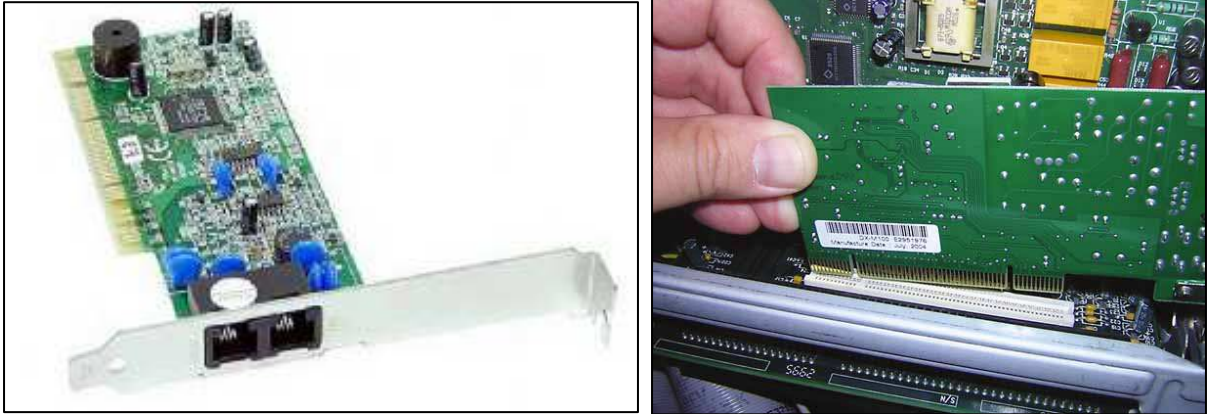


according to the instructions in your modem manual. If your modem is plug and play (most newer ones are) then you do not need to configure any jumpers on it.

3. Select an open expansion slot (shown above), preferably away from as many other components as possible.
4. Unscrew and remove the metal insert on the back of the system case that corresponds to this expansion slot.



5. Insert the card into the expansion slot carefully. You may have to rock it back and forth from front to back to get it to go in. Figure below shows a modem card and insertion of the card into the slot.



6. Secure the card by screwing it into place.
7. Connect one end of the phone cord to the back of the modem (in the "Wall" or "Line" jack) and the other end to the wall socket.



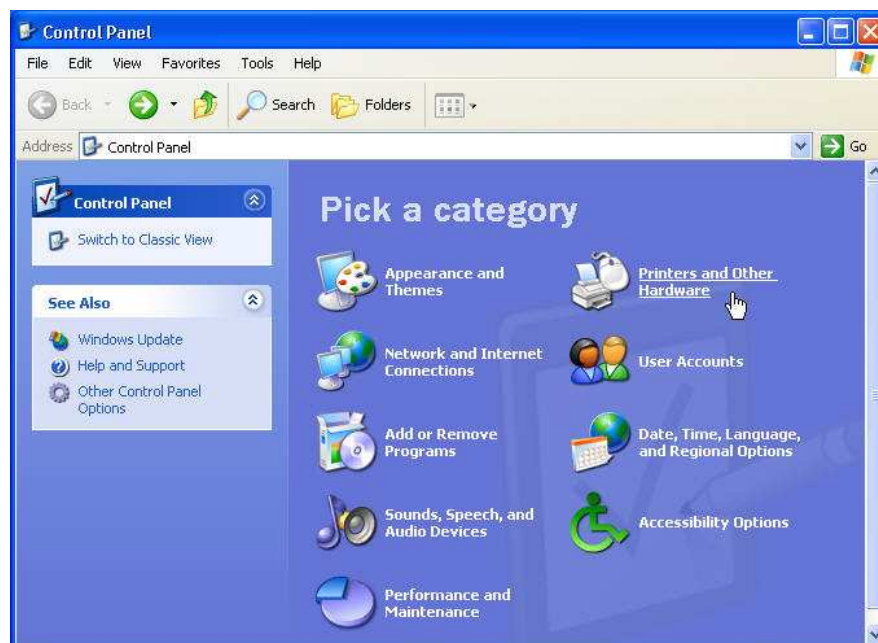
*Included with your new modem should be a CD (or perhaps a floppy diskette) that contains the software the computer needs to recognize and work with the modem. This small utility program is called a **device driver**. Most computers come with preinstalled device drivers for a selection of the most common modems, but it's best to work with the software the modem manufacturer provides, as it is specifically created to match your modem. (It also may be more up-to-date than that supplied with your computer's operating system.)*

8. When your computer starts up after the new modem has been installed, you should see the Found New Hardware Wizard. Follow the instructions on your screen, and the wizard will configure the computer to work with the new modem.
9. Insert the disc into the CD (or floppy) drive on your computer when the wizard prompts you to do so. When the installation is complete, the wizard will ask you to restart your computer.
10. If the Found New Hardware Wizard doesn't start up, Follow the steps given below (For Windows XP)

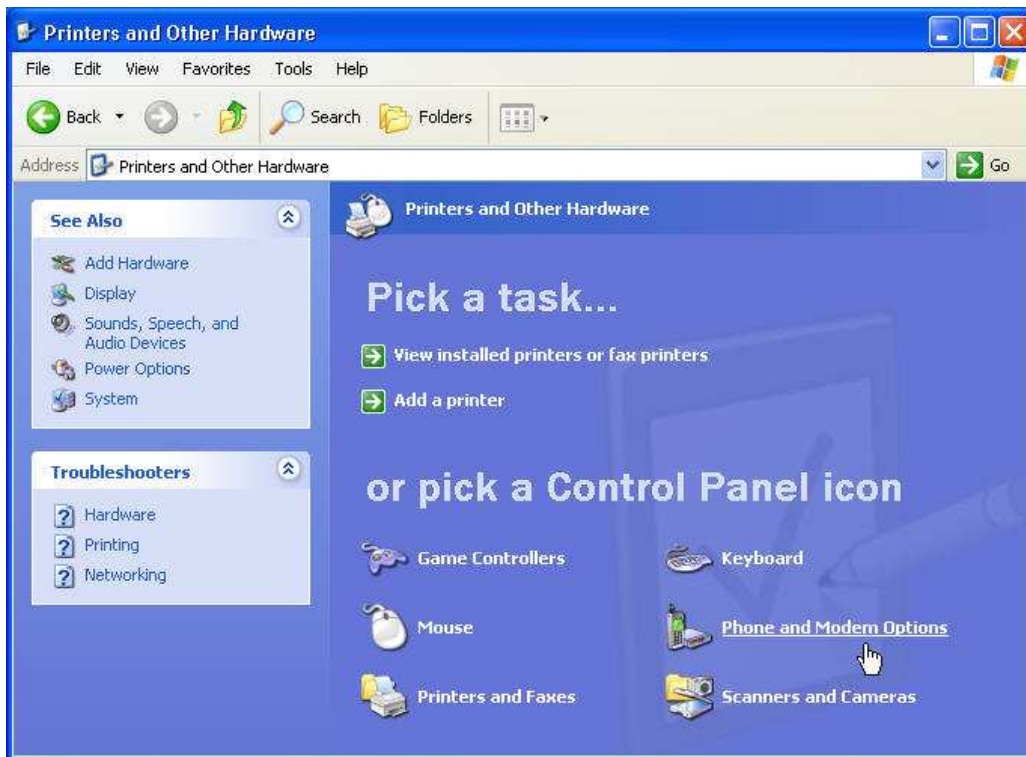
a) Click Start -> Control Panel



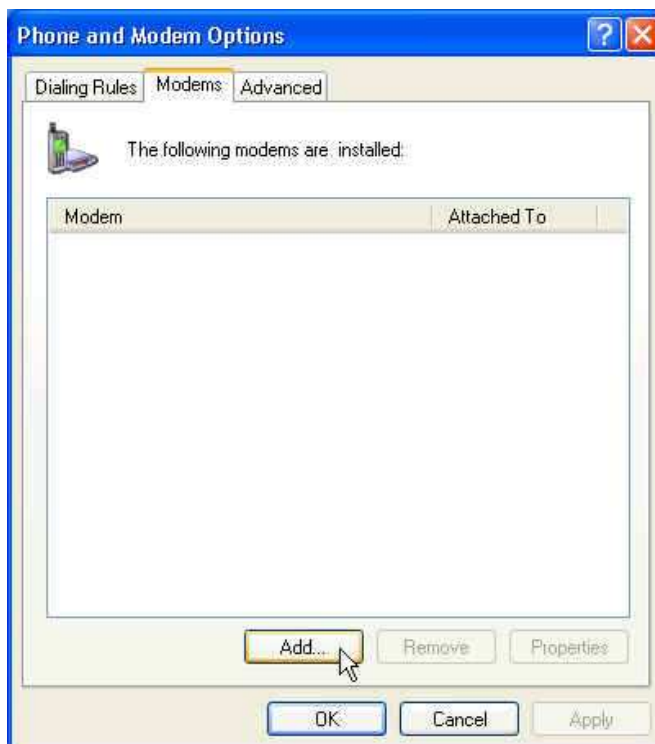
b) Double click on the Printers and Other Hardware icon



c) Double click on **Phone and modem Options**



d) To install a new modem, click on the Modems tab and press the Add button.



e) Click Next



f) Windows will now detect your modem.





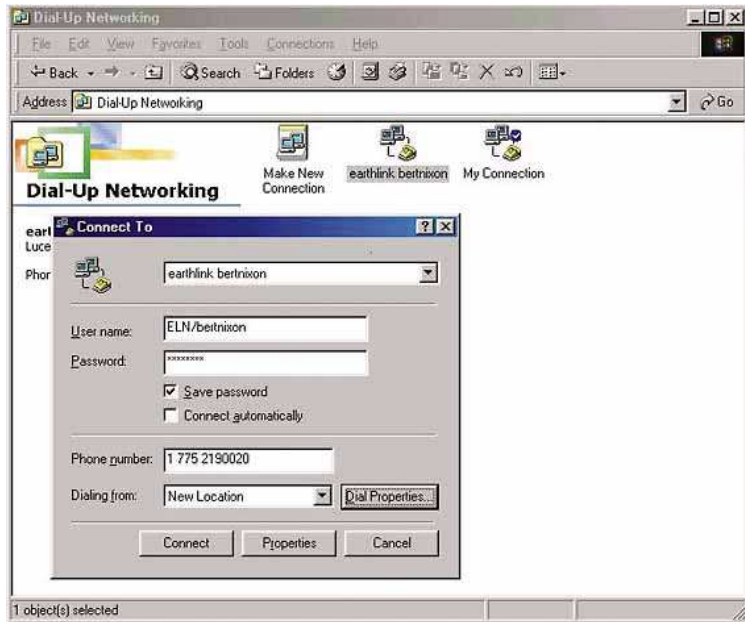
g) Press Finish to complete the installation procedure.



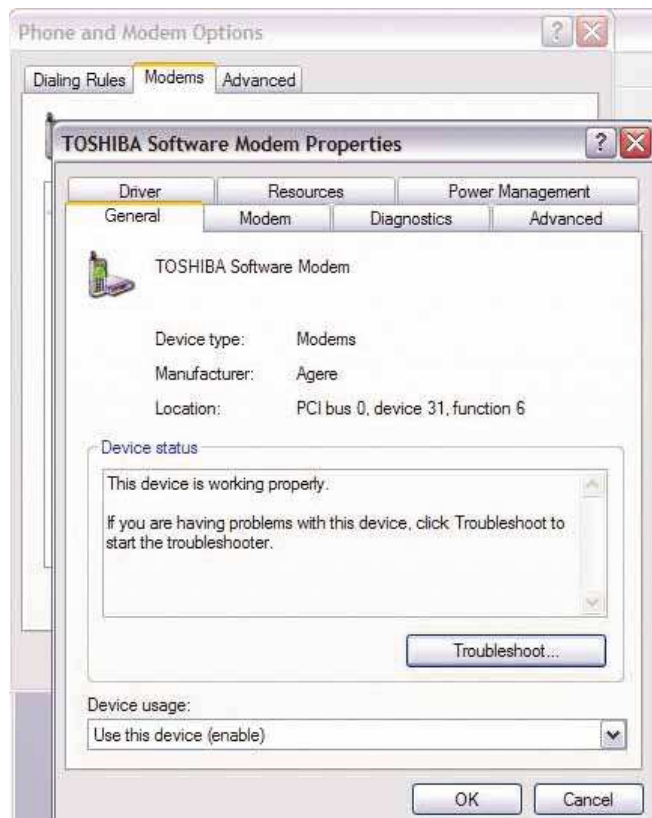
Note: By following the instructions above, you can install the majority of the modems that can be found in the market. However, if for any reason the installation of your modem fails, you will have to consult the manual that came with the modem for further instructions. There is also a possibility that your modem gets installed automatically by your O/S, since Windows XP uses the Plug and Play technology.

## 11. Set Up Your Modem

- a) Click Start, Settings, and Control Panel and select Dial-Up Networking.



- b) Select the icon labeled Make New Connection. You will need to name the connection (the ISP name, for instance) and supply the ISP's dial-up information, as well as the username and password you use with the ISP.



- c) you can set up the connection by opening the Internet Options Icon on the Control Panel. When you select the Connections tab, you will see a button labeled Setup; clicking the button will guide you through

setting up your connection. You will need some information from your ISP to do this, including the phone number to call, the names of the ISP's email servers, the type of service, and your password for initial login.