



PDHonline Course E342 (2 PDH)

Computer Upgrade, Home, Business, Game, & Theater

Instructor: Clifford T Johnson, P.E., CSE

2012

PDH Online | PDH Center

5272 Meadow Estates Drive
Fairfax, VA 22030-6658
Phone & Fax: 703-988-0088
www.PDHonline.org
www.PDHcenter.com

An Approved Continuing Education Provider

Computer Upgrade, Home, Business, Game, & Theater

Cliff T Johnson, PE, CSE

Course Introduction

Upgrading an old (or new) computer can be a daunting task. Most engineers are very computer literate and should have no trouble. Old ATX machines can be up graded as far back as the late 1990s with the Pentium II or AMD K7 CPUs (Computer Processing Unit) many people can't throw out something that costs upwards to a thousand or more dollars. The case may be usable, and possible the CD/DVD Drives and Floppy drive, but the rest must go, at present day prices, all but the case should be replaced. Although the course focus is on upgrading a computer it will take you through the assembly of a complete new system.

Course Content

- Is your old unit Upgradable? 2
- Parts needed 2
- Tools Required 3
- BACKUP YOUR DATA FILES 3
- Prepare existing computer for Upgrade 3
- Step 1 Remove covers to open case 4
- Step 2 Remove Power supply and cables 5
- Step 3 Remove Cards, USB Cable, Control Cable and Drives 5
- Step 4 Remove Motherboard (MB) 6
- Upgrade example: 2010 components and prices 6
- Complete new computer adding the following to previous example 8
- Cost of complete new computer 10
- COMPARISON: Home, Business, Gaming, and Theater Computer 11
- Step 5 Motherboard Setup and Checkout 13
- Step 6 Installing new MB and Drives in Old Case 14
- Step 7 Installing new Power Supply 15
- Step 8 Boot up first time in case 15
- Step 9 Troubleshooting 16

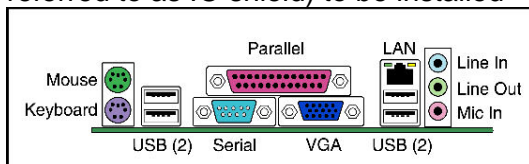
Is your old unit Upgradable?

Let's decide if you can upgrade the computer to make it into a late model machine.

First we will look at the old one and determine if it is upgradable. Then we will discuss what upgrades are necessary to make it into a Home, Business gaming or home theater computer. Finally I will show links to various vendors for components.

NOTE: I use "Computer" and "Machine" interchangeably for the sake of variety.

The computer old must be an **ATX** type ([Click here for PDF specifications](#)) Review the specs for physical size and layout, however, the important item is the **Motherboard I/O Connector Zone** shown below. It must be a removable panel in order for a newer panel (sometimes referred to as IO shield) to be installed



ATX layout



Actual Panel

Notice that the ATX layout differs from the actual panel; this is the reason it needs to be replaceable. Newer motherboards may use a USB port for the mouse and may have many USB ports and (6) Audio connections to allow (5) speakers to be attached for 5.1 surround sound.

If the IO Panel is removable, the power supply is at the left, and there are at least (4) slots to the right of the IO panel it should be upgradable. The case can be a tower or desktop type with (2) or more 5.25" racks for CD/DVD drives and (2) 3.5" racks 1 for a floppy drive.



Tower on its side



Desktop (for Theater)

If you determine you can upgrade an existing computer:

Parts needed

Computer fasteners needed can be purchase at [Cyberguys](http://Cyberguys.com): Ziotek Professional Hardware Assortment Pack ZT1150250 \$9.90



- Brass motherboard standoffs, 24
- Chrome steel ATX motherboard standoffs, 12
- Screws for CD/floppy drive, 48
- Drive mounting screws, hex head, 48
- Case screws, standard, hex head, 48
- Case screws, round head, 48
- Case screws, flat head, 48
- Insulated washers, red, 48
- Micro mini-jumpers, HDDs, 24
- Mini-jumpers, motherboard, 24

NOTE: New Computer cases are normally provided with required fasteners.



Metal Case Slot Covers **6 Pack** ZT1610155 at [Cyberguys](http://Cyberguys.com) for \$2.39 Old computers may have video, sound cards that will no longer be required and the slots should be covered to improve air flow.

Cable Ties; 6in. 30lbs, White, 100 Pack \$1.49 at [Cyberguys](http://Cyberguys.com).

Case Fans; make sure you have at least one 80mm fan in a new computer.

Tools Required

You may already have necessary tools, but here is a list:

- ❖ Power Screwdriver with extension and interchangeable small Philips and hex driver bits
- ❖ Small pair of wire cutters.
- ❖ Small pair of needle nose pliers
- ❖ [Ziotek 68 Piece Computer tool Kit](http://Cyberguys.com), \$67.00 at [Cyberguys](http://Cyberguys.com)
- ❖ Small flashlight
- ❖ Anti-static Work Surface, \$31.39 at [Cyberguys](http://Cyberguys.com).

- ❖ PC Power Supply Tester, \$24.95 Cyberguys
- ❖ Vacuum Cleaner, shop vacuum is best. The small ones just don't get the job done

BACKUP YOUR DATA FILES

If the computer is still operating normally take the time to copy or backup your files to external device. I prefer coping because the files can be easily restored to any computer and using a backup program like Microsoft's® requires the same application (program) to restore them. Click on the following for how to:

- ❖ [How to Backup Data](#)
- ❖ [How to Copy Data to an external drive](#)
- ❖ [How to Transfer-Data-Between-Two-Hard-Drives](#)

NOTE: There are a number of Applications that support coping one hard drive to another, such as Norton Ghost and Seagate [Disk Wizard \(free to download\)](#)

NOTE: If the hard drive has crashed and there is important data on it. You may want to investigate a hard drive recovery service such as [ReWave.com](#)

Now we can begin destructing the old computer.

Prepare existing computer for Upgrade

The first hurdle is opening the computer up, if it is a generic case the sides or top is fastened with hex screws in the rear and the covers will slide off toward the rear. Sometimes you have to remove the front of the case to get to hidden screws. Both options are shown below. However, Gateway and HP computers can be difficult to open

Step 1 Remove covers to open case

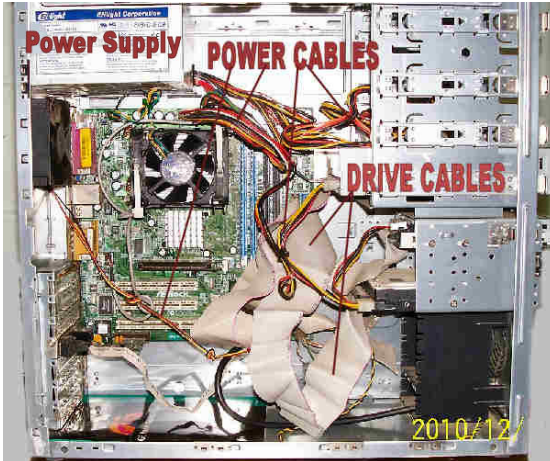
Shown below are (3) computers, an Emachine mATX far left, a generic ATX center and far right is a Dell on its side which **IS NOT** upgradable. I am going to use the generic one for pictures; bear in mind there are many versions of computer cases. A mATX Case will only accept mATX motherboards, but the larger ATX case will accept ether type motherboard.



Remove rear screws left side cover pull up to remove front Remove front screws Front & Rt side
 mATX Computer----- ATX Computer-----

Step 2 Remove Power supply and cables

The Power supply is held with (4) hex screws, however the Power cabling to the motherboard, hard drive and CD/DVD must all be disconnected first. Then remove the drive cables.

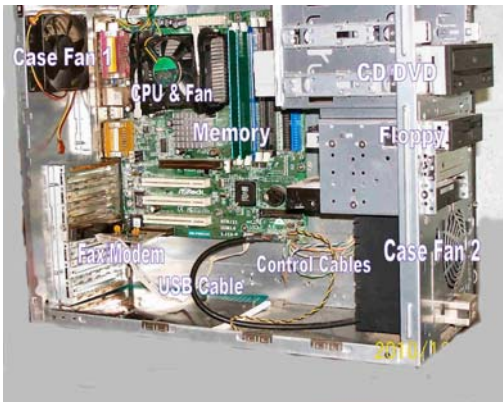


Before removal

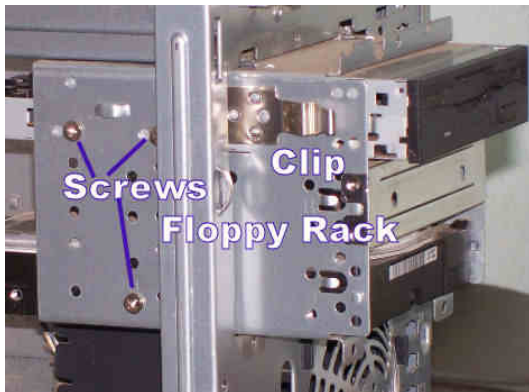


After removable

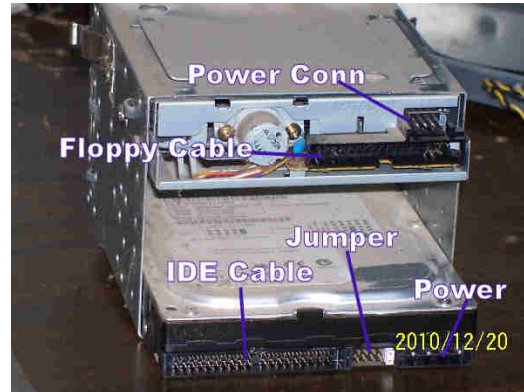
Step 3 Remove Cards, USB Cable, Control Cable and Drives



The modem is the only Card in the unit; yours may have Video, Sound or Network card, remove them all. Then disconnect all cables going to the front of the unit from the MB. Next remove the CD/DVD, Floppy and Hard drive. Snap brackets on this case hold the CD DRIVE, but most cases use screws. A removable rack holds the Floppy and Hard drive.



Floppy Hard rive holder



Floppy & Hard drive cable connections

Step 4 Remove Motherboard (MB)

Now is the time to remove the motherboard, this unit uses (6) screws to secure the MB. You may leave the Memory, CPU, and CPU fan in place on the MP because it is easier to disassemble when out of the case. The case should almost be empty, remove any other items such as fan covers and fans. Case fans may be left in place if they are relatively new. Old computers are usually pretty dirty; so clean it up before attempting to install new parts



MB Screw Locations



Ready for new components

Upgrade example: 2010 components and prices

Important: The following components and prices were obtained at <http://www.geeks.com/> in December 2010; please take this into consideration as examples based on date that you are taking this course.

Upgrade your old computer (shown above) for **home** use with this Biostar N68S NVIDIA MCP68S Socket AM2+/AM2 (mATX Motherboard fits in ATX case or mATX case) includes AMD Sempron LE-1250 2.2 GHz CPU and Heat sink/fan **Total Cost Just \$65.99 Part #: COMBO6S1250** Warranty: **1 Year Direct** Condition: **New** Packaging: **Retail Box** Ship Weight: **2.75 lbs** Manufacturer: **Supported By: www.biostar-usa.com**



This Biostar N68S socket AM2+/AM2 mATX motherboard is based on the NVIDIA MCP68S chipset with support for socket AM2+/AM2 AMD Phenom II, Phenom, Athlon II, Athlon 64 X2, Athlon 64, and Sempron Processors. The included **AMD Sempron LE-1250 2.2 GHz processor**, heat sink and fan means that you do not have to buy one! **Notice the IO Panel (Shield)** Two 240-pin DIMM sockets support up to **4 GB DDR2 memory**. Key features include NVIDIA GeForce 7025 integrated video, Realtek RTL8201CL 10/100 PHY LAN, and VIA VT1708B 6-Channel HD Audio! Connect the latest high speed SATA hard drives via the **two onboard 3 Gb/s**

SATA connectors. There's room for expansion with one PCI slot and one PCI Express x16 slot.

General Features:

- ❖ AMD Sempron LE-1250 2.2 GHz Socket AM2 CPU installed
- ❖ Includes heat sink and fan
- ❖ Socket AM2+/AM2, NVIDIA MCP68S chipset
- ❖ mATX form factor (also fits ATX cases)
- ❖ Supports up to 4 GB DDR2 memory
- ❖ NVIDIA GeForce 7025 GPU video
- ❖ VIA VT1708B 6-Channel HD Audio
- ❖ Realtek RTL8201CL - 10/100 PHY LAN
- ❖ Two (2) on-board SATA2 3 Gb/s connectors, supports SATA RAID: 0, 1
- ❖ One (1) IDE connector One (1) Floppy connector
- ❖ **Operating System Support: Windows XP/Vista/7**

NOTE: IMPORTANT Determine that new motherboard has drivers that support your existing operating system; you may need to download them from MB provider.

Needed to complete the upgrade:



Qty 1 \$15.99 A-Power 480-Watt 20/24-Pin ATX power supply supports the **SATA** interface and complies with ATX standards. It includes a 12-inch ATX power connector, six 12-inch large molex power connectors, and two 12-inch SATA connectors. **NOTE: Be sure the PS you buy has a large fan.** If the computer is used in business I suggest obtaining a 600-watt or more unit



Qty 2 Micron DDR2 RAM \$32.50 each can keep you from needing a whole new system! Its **2 GB of memory** capacity provides applications with the room they need run free! Its **PC2-5300 rated speed** transfers up to 5.3 gigabytes of data per second, speeding up your system's performance across the board! Total Memory 4 GB **Total \$65.00**



Qty 1 \$37.50 The Western Digital WD3200AVVS is part of the Green line of hard drives designed for AV use. Featuring **320 GB** capacity and fast SATA/300 data transfer rates, you'll come to appreciate the speed of this drive.



Qty 1 \$13.99 5.25" USB 2.0/FireWire/eSATA All-in-One MultiFunction Internal Card Reader. If you have an extra 5.25" rack. If not you can purchase one for the 3.5" drive that is normally no longer used. **NOTE:** if you decide to purchase a new case you may want to buy the 3.5" type card reader since new cases are normally supplied with front audio and USB ports. The 3.5" reader only provides for flash cards (on left) both are about the same price.



Qty 1 \$ 22.99 SH-S243N writes to DVD±R media at 24x speeds, double layer DVD+R at 16x and dual layer DVD-R at 12x. Enjoy fast rewrite speeds of DVD+RW media at 8x and DVD-RW discs

at 6x. The **SH-S243N** can burn data on CDs at 48x speed! With LightScribe™ technology, you can create your own labels directly on the disc. Burning software included

If you have the MS Windows XP Operating system from your old computer your total cost would be **less than \$250** and you would have a new computer. All components were found [at www.Computergeeks.com](http://www.Computergeeks.com) on 12/17/2010. To get a present cost as the example-spread sheet below shows, download the real spread sheet *click here* and locate components online.

QTY	ID	Description	net ea	unit total
		Upgrade an old P4 Tower Computer		
	Case Type			\$ -
1	MotherBoard	Biostar N68S NVIDIA MCP68S Socket AM2+/AM2 mATX	\$65.99	\$ 65.99
1	CPU	AMD Sempron LE-1250 2.2 GHz (w/MB)	\$ -	\$ -
1	CPU fan	AM2+ (w/MB)	\$ -	\$ -
2	Memory	Micron DDR2 RAM PC2-5300 2 GB	\$32.50	\$ 65.00
1	Hard Drive	Western Digital WD3200AVVS 320 GB SATA/300	\$37.50	\$ 37.50
1	DVDRW	Sony Optiarc AD-7260S 24x speed SATA connection	\$22.99	\$ 22.99
1	Card Reader	5.25" USB 2.0/FireWire/eSATA All-in-One MultiFunction	\$13.99	\$ 13.99
1	Floppy Drive	NA	\$ -	\$ -
1	Video	Integrated NVIDIA GeForce 7025 (Motherbd)	\$ -	\$ -
1	Sound	Integrated VIA VT1708B 6-Channel HD (Motherbd)	\$ -	\$ -
	Speakers	NA	\$ -	\$ -
1	Ethernet	Integrated Realtek RTL8201CL 10/100 PHY (Motherbd)	\$ -	\$ -
	Printer	NA	\$ -	\$ -
	Front I/O	Yes w/case	\$ -	\$ -
	Keyboard	NA	\$ -	\$ -
	Mouse	NA	\$ -	\$ -
	OS	Support for: Windows XP/Vista/7	\$ -	\$ -
1	Shipping	Estimated	\$24.00	\$ 24.00
			\$ -	\$ -
		Computer Total		\$ 229.47

You can build a new home computer for a lot less than a new one AND you will not have to learn a new operating system (OS) (systems 7 is a good bit different than XP or 2000, especially the file explorer and networking). But be sure the new motherboard will support your existing OS or plan on purchasing a new one.

Complete new computer adding the following to previous example

You may want to go the final step and purchase a new case with better cooling than the old cases, a new keyboard, mouse and speakers.



Qty 1 \$38.99 The **939PL-BLACK ATX Computer Case**. It includes a **550-watt power supply** with a 20+4-pin ATX power connector and a gigantic **9.84-inch/250 mm blue LED case fan** on the side panel for maximum airflow! **NOTE:** Many cases are provided with a power supply so be sure to delete it from your list of components.



Qty 1 \$13.99 SIIG USB JK-US0012-S1-D water resistant Membrane 103 keys for people that like to drink and eat while computing.



Qty 1 \$8.99 The Logitech LX5 931451-040 Cordless Optical Mouse installs effortlessly and reduces desktop clutter. It features Smart Power Management technology for extended battery life (up to 8 months of typical usage), and a convenient indicator light that gives you plenty of advance notice when it's time to change the two 'AA' cells.



Qty 1 \$29.99 Logitech Z313 2.1 Channel Multimedia speaker system. This 3-piece speaker system delivers room-filling sound and deeper bass for all your PC entertainment!

See below for cost of complete new computer system including new operating system

QTY	ID	Description	net ea	unit total
		New complete computer system		
1	Case Type	939PL-BLACK ATX w/550 Power Supply	\$ 38.99	\$ 38.99
1	MotherBd	Biostar N68S NVIDIA MCP68S Socket AM2+/AM2 mATX	\$ 65.99	\$ 65.99
1	CPU	AMD Sempron LE-1250 2.2 GHz	\$ -	\$ -
1	CPU fan	AM2+	\$ -	\$ -
2	Memory	Micron DDR2 RAM PC2-5300 2 GB	\$ 32.50	\$ 65.00
1	Hard Drive	Western Digital WD3200AVVS 320 GB SATA/300	\$ 37.50	\$ 37.50
1	DVDRW	Sony Optiarc AD-7260S 24x speed SATA connection	\$ 22.99	\$ 22.99
1	Card Reader	5.25" USB 2.0/FireWire/eSATA All-in-One MultiFunction	\$ 13.99	\$ 13.99
1	Floppy Drive	NA	\$ -	\$ -
1	Video	integrated NVIDIA GeForce 7025 (Motherbd)	\$ -	\$ -
1	Sound	integrated VIA VT1708B 6-Channel HD (Motherbd)	\$ -	\$ -
1	Speakers	Logitech Z313 2.1 Channel Multimedia speaker system	\$ 29.99	\$ 29.99
1	Ethernet	integrated Realtek RTL8201CL 10/100 PHY (Motherbd)	\$ -	\$ -
	Printer	NA	\$ -	\$ -
	Front I/O	Yes w/case	\$ -	\$ -
1	Keyboard	SIIG USB JK-US0012-S1-D water resistant Membrane 103 keys	\$ 13.99	\$ 13.99
1	Mouse	Logitech LX5 931451-040 Wireless	\$ 8.99	\$ 8.99
	OS	Support for: Windows XP/Vista/7	\$ -	\$ -
1	Shipping	Estimated	\$ 24.00	\$ 24.00
			\$ -	\$ -
		Computer Total		\$ 321.43
1	OS	MS Windows 7 home	\$199.00	\$ 199.00
	Antivirus	AVAST AntiVirus or MS Essentials	\$ -	\$ -
	Office	Sun Office	\$ -	\$ -
	Burner	Included with DVD	\$ -	\$ -
			\$ -	\$ -
		<i>subtotal</i>		\$ 520.43

NOTE: You may download the calculation sheets shown above and below at

- **Calc sheet for [computer upgrade parts](#)**
- **Calc Sheet for parts to build [new computer](#)**
- **Calc sheet for [Computer comparison](#)**

COMPARISON: Home, Business, Gaming, and Theater Computer

Unit	Home	cost	Business	cost	Gaming	cost	Theater	cost
Case Type	Tower/Desk	\$ 40.00	Tower/ Desk	\$ 40.00	TowerTitan TWC-A88/AB BFG Tech 800W ATX12V 2.2 PS	\$ 140.00	Antec NSK1480 w/350 Watt PS	\$ 139.00
Mother Board	mATX/ATX	\$ 50.00	mATX/ATX	\$ 50.00	Asus Sabertooth USB3 & SATA III X58 MB	\$ 199.00	Biostar TA785G3+ AMD 785G Socket AM3 mATX w/DVI,	\$ 75.00
CPU	AMD Socket M2+ Intel Socket 775	\$ 50.00	AMD Socket M2+ Intel Socket 775	\$ 50.00	Intel Core i7-950	\$ 299.00	AMD Athlon II x3 3.1 Gh	\$ 99.00
CPU fan	M2+	\$ 10.00	775	\$ 10.00	Liquid Cooler	\$ 75.00	AMD AM3	\$ 8.00
Memory	2-4GB	\$ 120.00	2-4GB	\$ 120.00	6GB (3 x 2GB) 240-Pin DDR3 SDRAM DDR3 1600 (PC3 12800)	\$ 120.00	(2) Kingston - 2 GB - DIMM 240-pin - DDR3 800	\$ 70.00
Hard Drive	250 GB	\$ 65.00	320 GB	\$ 90.00	1TB SATA III 7200	\$ 100.00	1TB SATA III 7200	\$ 100.00
DVDRW	1	\$ 30.00	2	\$ 60.00	2	\$ 60.00	Hitachi/LG CH08LS10 SATA Blue Ray	\$ 74.99
Video	VGA	W/MB	VGA	W/MB	EVGA 012-P3-1470-AR GeForce	\$ 269.00	ATI Radeon HD4200	w/MB
Sound	Sterio	W/MB	Sterio	W/MB	Realtek ALC662 6-channel HD audio S/PDIF-Out	W/MB	Realtek ALC662 6-channel HD audio S/PDIF	w/MB
Ethernet	10/100	W/MB	10/100/1000	W/MB	10/100/1000	W/MB	10/100/1000	W/MB
Totals		\$365.00		\$420.00		\$1,262.00		\$565.99
Other Special requirements for system					Note 1	\$219.99	Note 2	\$624.79
Geeks.com pricing except if linked					Total	\$1,481.99	Total	\$1,190.78

NOTE 1: Gaming Computer:

Gamers have special needs when it comes to such monitors, including a display that's large, easy to read, allows for quick identification of foes or pickups in dark areas, can handle lots of animation without hiccups or ghosting and supports multiple resolutions to facilitate playing many different types of games.

In reality, for those of us who do want a computer monitor to view from a short distance while sitting at a computer desk, there's a fixed upper limit for the size of a widescreen LCD gaming monitor. I've personally tested different sizes, and that limit for displays is 24 inches. Beyond that size, given the closeness of the desk chair to the monitor, anything larger would force you to swivel your eyes or head

back and forth constantly to take in everything. Indeed, many companies sell much bigger LCD screens for computer gamers, but savvy desk-bound buyers avoid these.

TFT/TN displays tend to have very speedy response rates but can have limited viewing angles and lower color fidelity (they use dithering), while more expensive S-PVA displays tend to have slower response times but can have wider viewing angles and greater color fidelity. Although TFT/TN panels are often touted as the very best for computer gamers due to their response rates, it's not at all clear that they're preferable to S-PVA panels overall. There's absolutely no substitute for actually seeing LCD monitors in person, preferably in a setting where you can compare multiple models side-by-side. When you do, you'll find that some models with more modest specifications outshine those with superior ones.

Some assume that the standard VGA input is sufficient for high-quality gaming, but, digital DVI inputs provide crisper, clearer graphics, and looking for a monitor with an HDMI port is helpful to provide versatility in being able to connect to other multimedia devices and game consoles.

My Choice:

Asus LCD 21.5inch Wide VH222H-P DVI FullHD HDMI HDCP 5ms Speaker Black Bare.



- ❖ 21.5 inch 16:9 widescreen with 1920x1080 resolution enables borderless Full HD 1080p full-screen video display.
- ❖ Embedded HDMI simplifies cabling and provides pristine and stunning clarity multimedia experience together with PC, game consoles, Blu-ray Disc players, etc.
- ❖ Built-in hidden stereo speakers and SPDIF audio output enable audio enjoyment together with true-to-life Full HD visual.
- ❖ You can see optimized images on screen and select five modes via hotkey quickly at your will.
- ❖ Inspect Control function allows users to select a preferred display mode among Full and 4:3 for true-to-life gaming or movie watching without any data loss or image distortion. Splendid Video Intelligence Technology adopts a color engine to detect activation and usage of video applications and automatically optimizes image quality with intelligent color, brightness, contrast and sharpness corrections for the best visual results. The Splendid? offers 5 video modes designed for scenery, theater, gaming, night view, and standard images, 3 skin tones of yellowish, natural and reddish to add a human touch to videos on PC. \$219.99

NOTE 2: Home Theater:



SPDIF RCA Out Plate Cable Bracket, This accessory is **required** in order to use the S/PDIF internal connection on a Biostar, Gigabit, ECS, Asus, or Foxconn motherboard may be purchased at Amazon.com

.....\$10.80



EzCAP116 USB 2.0 Video Capture Device. Convert Video+Audio from VHS, V8, Hi8, All Camcorders, Video Recorder, DVD player, Satellite TV, Freeview etc. Capture xbox360 & playstation3 in PAL 60 color. Includes Arcsoft Showbiz 3.5 editing software. Capture in widescreen 16:9 or 4:3. Upload videos direct to YouTube . Supports Windows XP/Vista + Windows 7 32/64. Buy at Amazon.com \$35.99



STR-DH510 5.1-channel high-definition A/V receiver. Outfitted with 5 HD inputs (3 HDMI, 2 component), it's easy to integrate your HD home components such as a Blu-ray Disc player or PlayStation 3 system. You'll also experience audio closer to the way it was recorded with built-in Blu-ray Disc audio decoding (LPCM only). Additional features include Audio Return Channel which eliminates the need for extra cables connected to your TV, and standby pass-through which lets you access all of your HDMI connected devices without having to power on the receiver. Buy at [TIGERDIRECT](#) \$179.00

5.1 CHANNEL



Klipsch HD300 Home Theater Speaker System This compact Klipsch HD300 Home Theater Speaker System is simple to set up and use. It consists of four identical speakers for main and surround sound use, a center channel for precise dialogue and a subwoofer for heart-thumping effects. Buy at [TIGERDIRECT](#)\$399.00

Step 5 Motherboard Setup and Checkout

First down load the instruction manual from my website for the **Biostar Motherboard N68S Setup Manual** and we will walk through it as you install components.

- Chapter 1: Introduction**.....1
- 1.1 Before You Start1
- 1.2 Package Checklist1
- 1.3 Motherboard Features.....2
- 1.4 Rear Panel Connectors3
- 1.5 Motherboard Layout.....4

The Before You Start instructions get you ready. It is a good idea to use a grounding mat on your table (See Tools). Review the balance of the Chapter

The actual motherboard had a serial connector, but otherwise was a shown for Rear Connectors. The Motherboard Layout was exactly the same except for the addition of the Serial Port.

- Chapter 2: Hardware Installation**.....5
- 2.1 Installing Central Processing Unit (CPU).....5
- 2.2 FAN Headers.....7
- 2.3 Installing System Memory.....8
- 2.4 Connectors and Slots 10



Most MBs do not have a socket cap; so don't be alarmed if yours doesn't. Follow the instructions and **DO NOT force** the CPU into the socket, if you have it aligned correctly it will fall in. If it doesn't, make sure that there are no bent pins. I try to sight down a row of pins on the CPU to make sure they are all lined up, if not **carefully** put a pin or pins back into line.

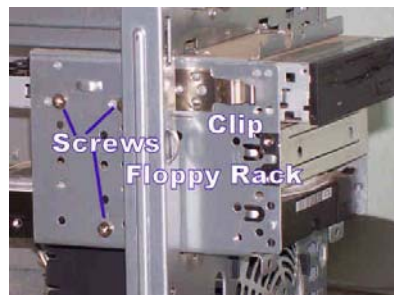
Install the Heat sink and Fan, Connect the CPU fan cable (page 7) and System Memory (page 8). When you have this done, before you do anything else, Set the MB on the box it came in **WITHOUT** the antistatic Bag it was supplied in (see picture) Connect the Mouse, Keyboard and Video cable to the proper components, then place the power supply next to the MB and connect the power cables to the MB as per the instruction manual (page 13). Plug Power supply into 115Vac outlet and turn power supply on (if it has a switch). You are now ready to boot the MB for the first time. Go to page 12 and determine which pins on the Front Header control are used to start the computer. Finally use a screwdriver or

jumper to short for 2-3 seconds between the (2) pins that are labeled "On/OFF" or "Power" or "PWR" and the MB fan should run. The computer monitor should be connected and turned on. The computer should now boot up and stop showing a statement "no drives connected" If the CPU Fan runs, but there is nothing on the monitor, disconnect Power Supply from 115Vac outlet and **count to 20**, then check all connections. The MB will not boot if the Memory, Keyboard and mouse are not plugged in, and **BOTH** power supply cables (4or6 Pin and 20/24pin) are not connected. If everything is connected correctly and the MB boots you can continue to assembly the computer in the case, discount power, count to 20, disconnect all cables and go to step 6. **IF not**, reset the BIOS (page 16), and then try booting again. **If it still does not boot** you will need some expert help or a BIOS update.

Step 6 Installing new MB and Drives in Old Case



If you have not removed the IO Panel (Shield) from the old case, do so now, then place case on a table with the rear panel flat on the table (see picture) you can now insert new IO Panel, then insert MB. Note the IO Panel has a few tabs that require you to insert MB at a slight angle, and then push flat against case. You will have to make sure that the standoffs for the MB in the old case line up with the new MB and change them if required. If it's a new case you will have to insert the MB standoffs, which do not get put into every threaded connections. Once you have the MB secured set the case up normally.



each side, the CD/DVD and Floppy are secured with fine-threaded screws, (2) on a side. The floppy is usually no longer used and can be replaced with flash card reader.

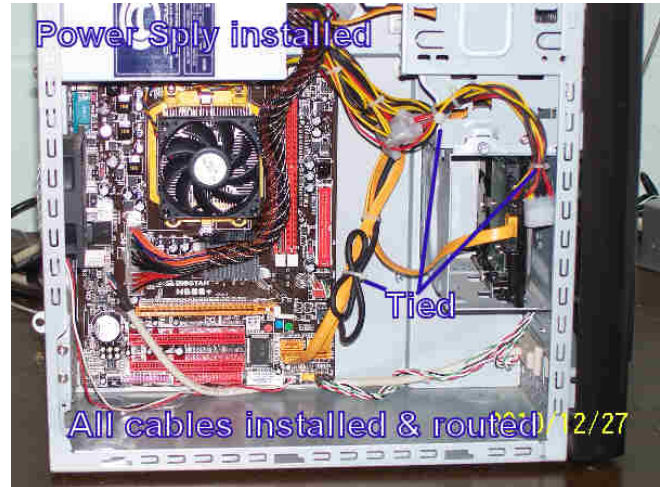
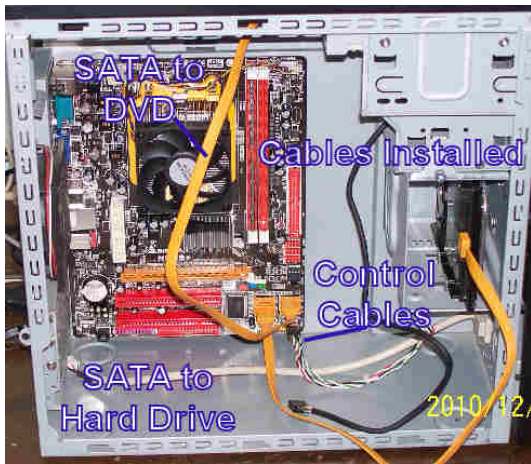
Step 6 Installing Cabling for new devices

The Manual shows the location of the various cables that are required:

1. Install the front header control cables, page 12
2. Install the sATA or IDE cables for the hard drive and DVD, (page10 & 14). SATA 1 is connected to the primary (bootable) hard drive, the DVD to SATA 2. If IDE drives are used make sure to set the jumpers correctly, the hard drive is usually the master and CD/DVD are slaves. If a hard drive and a CD/DVD are connected to the same IDE cable the jumper can be installed on "CS" cable select, connect hard drive to the end cable

connection and the CD/DVD to the center connection. The Blue end of the cable goes to the MB.

3. Connect case fan cables (page 7)
4. Connect Floppy drive Cable, if used (page 10)
5. **DO NOT connect any USB or Card reader cables at this time**
6. Connect Audio cable for Front Header Panel (page 15) [read note in manual]
7. Connect Serial port to rear adapter if required (page 15) [requires separate purchase]
8. Connect Printer port to rear adapter if required (page 17) [requires separate purchase]
9. The JUSBPWR jumpers are for supplying power to devices like the mouse, even when the computer is powered down during sleep, in order to boot the computer. STB stands for "Supply To Boot". Normal home use does not require this option and, if it used, does require larger power supplies.



Step 7 Installing new Power Supply

Once all the cables are connected except those to USB and Card readers, install the power supply and connect it, don't forget that most MBs require (2) power cables. You may want to make sure your power supply is sufficient wattage; you can use the calculator at <http://www.schrockinnovations.com/computer-power-supply-calculator/> to calculate the power requirements for the system



To the left is the complete upgraded computer.

Step 8 Boot up first time in case

Chapter 4: RAID Functions [not used for this upgrade, but good information]

Chapter 5: Useful Help.....2-21

5.1 Driver Installation Note.....2-21

5.2 Software.....2-22

5.3 Award BIOS Beep Code2-23

5.4 Extra Information.....2-23

5.5 Troubleshooting.....2-24

Review the above information before proceeding, **especially driver installation that is required after OS is up and running normally.**

Connect monitor, mouse, keyboard, sound, network, and power cables to respective devices (page 3 rear connectors) color code is:

Mouse, PS2 **Green**: Keyboard, PS2 **Purple**, Speakers, Mini Jack **Green**, MIC, Mini Jack **Blue**
Don't put the case sides on yet because the USB connections must be made after the OS is running normally, also this particular case requires that the sides be installed before the front cover is installed.

Press the power on button and watch the fan start, if all is correct the CD/DVD light should flash and the green "power on" be illuminated, the hard disk light should be blinking. It may take a few minutes for the BIOS to recognize components then the boot up should begin and stop with an error msg "no leader". If this happens put the operating system CD in the drive and reboot the computer (press <CTRL> <ALT> keys). If everything has been detected the boot up should restart and the screen should display the msg "Boot from CD?" you press enter and the operating system should begin loading. However, if you don't get the msg "Boot from CD?" you will have to enter the BIOS (SETUP) in order to change the first BOOT device to CD/DVD drive. Refer to motherboard manual for instructions for entering BIOS and changing BOOT menu. Page (3-2) & (3-10)

Back to the USB ports... once the operating system is installed you must load the software drivers that came on a disk with the motherboard (or download them from the MB manufacturers website) once you think you have them loaded, you must check and make sure they are working by going to the "Device Manager" (Control Panel, System, Hardware, Device Manager), if there are no flags shown indication a problem, then have completed OS installation, if a device has a problem you must correct it or it will not work.

If all devices are working, then turn off the computer and connect the USB cables, card readers and the like, then reboot.

Step 9 Troubleshooting

Review the trouble shooting section in the manual. I have found that if a MB doesn't boot as expected it is usually some little thing was missed or overlooked, many times it is because the wrong memory was installed. Most motherboards for home use cannot use ECC memory and people buy it because it is cheaper. If you install ECC memory the MB will BEEP. Many times the memory is not pushed in correctly or some other component is loose.

It is very important to check out the Motherboard as instructed in step 5 to assure that you do know that the CPU and Memory have been installed and working properly. If you get passed this step the problem is likely to be a device has not been connected correctly or jumper on a drive has not been set correctly. Check and recheck.

You may also call me at 704-568-9598 if I can be of some help, but bare in mine it is very difficult to correct things over the phone.

Conclusion

This course instruction was limited to hardware and did not discuss driver installation and setup, BIOS upgrading, and RAID, however there are many helpful sites on the Internet that can help with these items if you do a search. Also refer to course description for helpful links.