

# The Collection

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## Safety In The Computer Room

Many people don't think a lot about safety in the home when it comes to computing. There are no specific regulations [As far as UK laws are concerned.] as such concerning a home-office and/or computer lab that exists within your own home in which only one person; namely yourself, works, and which only you yourself have access to.

Nevertheless HASAW (Health And Safety At Work.) applies just as much to such a situation as it does to an official workplace used by multiple staff. In fact probably more so.

"In space; nobody can hear you scream!" – In the same way, when you're alone in the [computer lab](#) and receive a serious injury, there may well be nobody to hear your calls for help.

It's much more sensible to avoid any accidents in the first place. If you're self-employed then this is particularly true; as time lost through injury or incapacity can be disastrous for the self-employed.

What can you do to make the computer room safer?

In the UK there are government directives concerning the mandatory safety standards in a place of public employment. These are contained in [The Health & Safety at Work etc Act 1974](#). If you abide by these rules where applicable, even in a home-office, then it's very unlikely that you'll have any safety issues in your private workspace.

There may well be equivalents of these regulations in the country in which you live, if you don't live in the UK.

You might consider such guidelines a bit much to stick to in a home environment; but safety now is always better than sorrow later.



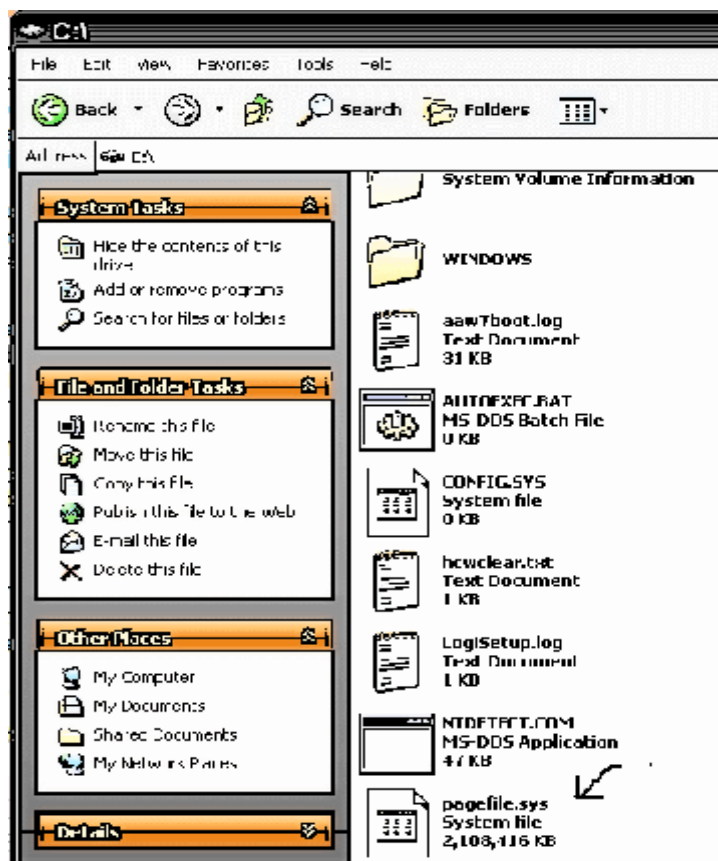
Accidents can damage computer equipment, which can damage the data they contain. Lost or damaged (Corrupt) data is as good as no data.

Accidents can damage you too, and may prove to be fatal in certain circumstances: Dead geeks are no good to anyone; especially to themselves.

## What is pagefile.sys, and Can I Do Without It?

- So what is pagefile.sys? I see it on my [hard-drive](#), hidden away, taking up space, but is it really necessary?

In answer to that; pagefile.sys is the Windows Paging file. It's a file that Windows uses as [RAM](#) when the installed RAM is all in use. If there's not much space left in RAM then Windows may write some of the contents of the RAM to pagefile.sys so that it can fit further memory requests in. The drawback is that reading from pagefile.sys takes comparatively ages longer than reading from RAM. If Windows needs the data that it just wrote to pagefile.sys again it'll dump some other data to pagefile.sys in order to make space in RAM, read the data it needs from pagefile.sys, and write it back to RAM for easy access: Hence the reason pagefile.sys also known as a "swap file".



That's all fine and dandy if you don't have masses of RAM installed. If you have 4GB RAM installed with a 32-bit Windows operating system then it's likely that Windows will have little need for the paging file and will use the 3.5GB of installed RAM that it can see for most everything to a large extent. Even the [2GB](#) I have installed with my 32-bit Windows XP Pro operating system negates a lot of disk activity as Windows has less need for pagefile.sys. – But it still uses it because it's there.

The more RAM that's fitted to the computer in question, the less pagefile.sys is used. Therefore that's less usage of and strain on the hard-drive; meaning that the disk will last at least a little longer. How much longer? Somewhere between an indivisible fraction of a second and infinity. How long is a piece of string?

So how do I stop Windows from using pagefile.sys altogether? If you have enough RAM fitted you *can* delete it; although I see no properly valid reason to do so. I personally still have a pagefile.sys on both of my machines, both of which have 2GB RAM installed, as I myself don't see any point in deleting it. Others will disagree.

\*Remember that pagefile.sys is a hidden system file. In order to see it you'll need to enable "Show hidden files" and disable "Hide protected operating system files" in Folder Options. As a system file you can't simply delete it as you would for, say, a file that you yourself created but no longer wanted on your computer.\*

To do so what you have to do is to set your Virtual Memory to zero and restart your computer. Here's how to do that in Windows XP Pro:-

- Right-click on the My Computer icon in the start menu or on the desktop.
- Click Properties and click the advanced tab.
- In the Performance section click Settings. Click on the Advanced tab and click Change in the Virtual Memory section.
- Put a  in the radio button for No paging file and click Set. Click Apply/OK to clear all the boxes.
- Restart your computer

Your computer is no longer using pagefile.sys, and you can now therefore delete it. If you re-enable Virtual Memory, pagefile.sys will return.

### **What difference has that made to the operating system's operation?**

The operating system is still running as it always was. The difference is that everything is running in RAM only; so the first thing you will notice is that you have less available RAM. I just switched off my paging file and XP Pro was using just over 1GB RAM on tick over, as opposed to the 600MB or so that it usually uses. I have many programs and peripherals running though: Your system may vary with regard to the amount.

If you don't have enough RAM installed you might run into problems; which is why I recommend not trying this unless you have a decent amount of RAM

installed. On the positive side the system appears to run very slightly faster in some aspects. (I have switched the paging [file](#) back on though. I'd rather use it than not.)

## Using Windows Automated System Recovery With No Floppy Drive: Is it Possible?



Situation: You're running Windows XP Professional on a computer without a floppy drive, and you want to use the Automated System Recovery tool to generate a system backup.

Windows Automated System Recovery writes to a pair of drives: One of them is user-selectable and is where the system backup is stored. This can be another drive on the computer itself, (It is possible to actually write the backup to the same disk as the original files; but that's almost totally pointless.) a drive on another computer, or a [USB](#) drive. The other one of them is Drive A: on the local computer; which is the floppy drive if you have one fitted. If you don't then a problem arises as the ASR wizard asks to write to a floppy-disk in drive A: . The floppy lists the system [files](#) that are installed on the PC; and without it you can't even begin a restore operation using ASR.

If you don't have a floppy drive fitted to that particular computer then there are ways round the situation. None of the available methods are able to get away from having a floppy drive installed on a computer at some point. To save the reader time I'll state here that there appears to be no way out of having to have a floppy drive installed somewhere, on the computer in question or on another computer. In short, if you're using Windows XP and want to use ASR but don't have and can't get hold of a [floppy-drive](#) then in short you're screwed.

You can write the floppy that goes with your backup on the computer in question without having a floppy drive installed on that particular computer. However you will require a second networked computer with a floppy drive installed on it: -

After running the ASR wizard without writing the floppy as per the machine's instructions, navigate to C:\windows\repair\asr.sif and C:\windows\repair\asrnpn.sif . Copy these files across to a location on your networked computer that has a [floppy drive](#) installed, and then copy them from that location to a floppy disk.

You now have a floppy to go with the backup, but if you want to reinstall the backup at any point you'll need a floppy drive fitted to your original computer in order to be able to do so: In this case of reinstallation a networked computer with a floppy drive installed can't help. – That means that, if you can't get hold of a spare floppy drive, you'll have to uninstall the floppy drive from your networked computer and at least plug it in to the original computer; both [power lead](#) and data cable.

The last sentence of the paragraph directly above is in all honesty the only solid solution to the problem: Plug in or fully install an old floppy drive. If you don't have any floppy disks and can't get hold of any then there is a device available that [adapts a floppy drive for a flash card](#), and I see no reason why it won't work with ASR. At \$25.00 USD you might think it to be a trifle too expensive to bother with.

That's about it then: If you don't have a floppy drive anywhere then you won't be able to use [Windows](#) ASR. – End of story. There are other backup solutions available though; some will cost you money, others are free. personally I recommend [Acronis True Image](#) and [Paragon Drive Backup](#), in that order. Neither are free, but if you don't want to pay then I suggest searching on Google for free backup programs.

Further Reading: See [this article](#), and [this article also](#). Also read [this article from oreilly.com](#) .

## **How to Remove Malware from System Volume Information Folders.**

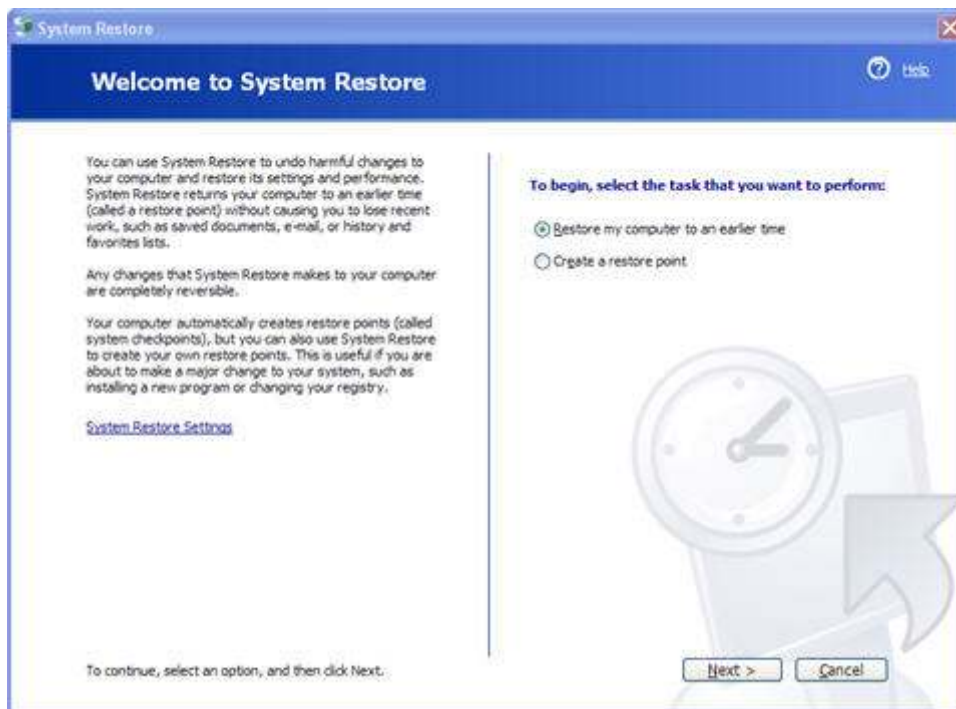
Every internet-connected computer gets infected by malware at some point, and I've yet to find a single Windows user of more than a year on the same computer user who can honestly say that they've never had any malware infection. Windows is targeted by most malware: That's the simple fact.



Fortunately there are a number of programs; some paid-for and some free, that disinfect malware infections, remove spyware and viruses, root out rootkits, and generally clean up an infected system. Although you can never be 100 percent sure that your system has been fully restored to its original infection-free, pristine state, after a malware infection; there's always a good chance that it's fairly close to being so.

There is one place, though, that malware likes to lurk on a [Windows system](#) in the hope of re-activation at a later date; and it's a place where many programs find it hard to capture the malware and eradicate it: That place is in the System Volume Information folders.

The System Volume Information folders record a snapshot of the system state and the registry whenever a System Restore Point is created by either automatically by the system, or manually by the user. If there's malware on your system at the time a System Restore Point is created; then its registry key will be recorded, along with details of the process, and stored for possible future reactivation in the System Volume Information folder.



System Restore is a process rather than an intelligence: It doesn't discern between programs, it doesn't have a preference, it has no ability to think "That's malware: I won't include that in the restore point."; it just does what it's programmed to do. – To take a snapshot of your system at a given time and record it. Therefore any malware that's resident on your disk will be recorded along with everything else. Its registry key will be recorded along with all other [registry keys](#) of entries in your disk's file-system.

At times an anti-virus or anti-malware program might notice that a registry key of a malware process that is known to it and that it recognises is residing in a System Volume Information folder. It might also see the same key in your actual registry too. It deletes the key in your registry; but has trouble accessing the copy of the key stored in your System Volume Information folder. It reports that it can't eliminate that entry, and may ask you to reboot the computer so that it can get to the entry before Windows locks it again. This may or may not be effective: Your anti-malware program may report that it was unable to delete the infection in *C:\System Volume Information...*

Well naturally the last thing you want is a malware infection hanging around waiting to reactivate itself in the case that you ever need to do a system restore. Your regular anti-malware program won't clear it. You might try an online scan; but that might not clear it either; and so you're left with a potential malware-infection on your system – triggered and reactivated whenever you do your next system restore. Fan-bloody-tastic!

But there's good news and bad news: There is a way to get rid of it, and it's pretty simple. The bad news is that you'll lose all your restore points that you or your system have generated along the way up until then. Unfortunately it's the price you'll have to pay: -



### How to do it:

The following was done in Windows XP

Right-click on the **My Computer** icon, and click **Properties** in the drop-down box that appears.

Click on the **System Restore** tab. Check which drive the anti-malware program found the malware on inside the System Volume Information folder and single-click on the appropriate drive letter in the **Available drives** window inside the dialog box. Click the **Settings** button to the right. Put a check in **“Turn off system Restore on this drive”**.

Before you do anything else you'll notice that the slider below is set by default to use 12% of your drive. That's a ridiculous amount of space to store restore-points if you ask me. 6% is probably quite enough, so set the slider to 6%.

Click **OK**. Windows will instantly warn you that *“You have chosen to turn off System Restore on this drive. If you continue, you will not be able to track or undo harmful changes on this drive.”*

*“Do you want to turn off System Restore on this drive?”*

You have no choice under the circumstances: Click **Yes**.

Now highlight the same drive in the **Available drives** window in the dialogue box and click the **Settings** button. Remove the check from the **Turn off System Restore** on this drive checkbox and click **OK**.

Click **OK** again at the bottom of the dialog box. Windows should immediately create a Restore Point for the contents of that drive; but without the malware in it, provided that you or your anti-malware program removed the malware infection from your system and the malware infection’s key from the registry.

Target neutralised: The malware is no more. You have only one very recent Restore Point for that drive, or for those drives, if you had to do it on more than one drive; but the malware is dead, eradicated, exterminated, and removed totally.

# How to Uninstall IE8 in XP

Many Internet Explorer users have upgraded to IE8, only to find that it just isn't working for whatever reason

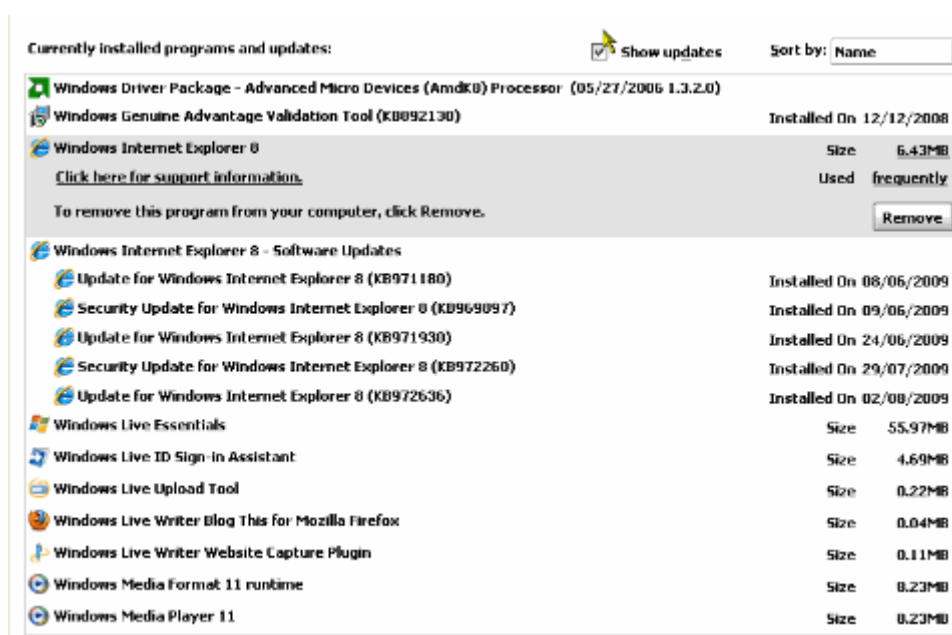
Uninstalling it can pose a few problems: -

Microsoft have written a knowledgebase article: [How do I Uninstall or Remove Internet Explorer 8?](#) The article speaks of a utility that allegedly does the business. I suggest that you go there and give it a try first

If you don't have any joy with that, then look for Internet Explorer 8 in the **Add/Remove programs** section (or the **Programs and Features** section) of **Control Panel**. I'm assuming here that you installed [XP Service Pack 3](#) before you installed IE8. If you didn't then we have another, larger problem: [You can't uninstall Internet Explorer 8 if it is set as not removable. This occurs if you install Internet Explorer 8 before you install Service Pack 3 \(SP3\) for Windows XP](#). If you did indeed do this then you won't find an uninstall link in Control Panel; and... Are you ready for a lot of tedious work?.. You'll have to uninstall SP3, uninstall IE8, reinstall SP3, then if you want to give it another try, re-install IE8 and/or install FireFox. – I did say it would be tedious, and indeed you have several hours' work there; as well as a possibility of other things going tits-up too.

(In the Microsoft KB article [How do I uninstall or remove Internet Explorer 8?](#) There are methods outlined with which you can manually get to and run the uninstaller from a Command Prompt, should you need to do so.)

OK. – Assuming that you can indeed find an entry for IE8 in Control Panel: -



When you click **Remove** it should start the "[Windows Internet Explorer 8 Removal Wizard](#)":

- Which is where things start to go pear-shaped: -

You'll most likely be warned that any number of pieces of software were installed since the upgrade to IE8. It's possible that removing IE8 will break one or more of them. Marvellous!

If you've only recently upgraded then this list should be fairly short; however it does tend to potentially get long after only a short period of time. – Nevertheless, if you're getting grief from IE8, then you have only two options; those being to take the risk and uninstall IE8, hoping that you won't have to reinstall too many broken [applications](#) afterwards, or, and this is the option that I recommend, ignore IE8 (If you can.) and install a much better browser like [FireFox](#) and use that instead.

If you're uninstalling IE8 your computer will ask you to reboot it afterwards. After rebooting you just start Internet Explorer and it should have reverted to IE7.

## How to Test a PSU – Without Load and Also Under Load

I have, in my arsenal, a power-supply tester: All I have to do is connect the 20 or 24-pin connector to the tester; and if all the green lights light up then the [PSU](#) is supposedly working. Is this right? Yes and no:

The power to the [motherboard](#), not including the dedicated [processor](#) supply, is working if all the green lights light up. What it's not testing is the power supplied to the other connectors; such as the dedicated [CPU](#) supply, (The ATX12V or the [EPS12V](#) connector.) the [4-pin Peripheral](#) connectors, (AKA [Molex](#) plugs) the [4-pin Berg](#) connector(s), the [Serial ATA power connector](#)(s), or any others. That renders my tester fairly useless; as if I'm not getting power to the [PCIe](#) graphics card; my tester could still read that there's no problem.

- So I need a way of testing each individual output, individually, to see if the unit is working as it should.

A voltmeter seems a good place to start. – And where's a good place to find one of those?

On a multimeter or multimeter no doubt.

OK so I have the ([ATX](#)) power-supply that I want to test on my test-bench in front of me, all wired up to the mains power and switched on. – But there's absolutely no response – or possibly only the 5V rail is powered on. Why?

On an ATX power supply there's a wire which goes to the motherboard which allows certain pieces of hardware, including the "Power on" button on the front of the case to bring the power-supply out of standby. Some PSUs go to +5V standby, where only the 5V rail remains powered up, others switch everything off. (Some of the much older PSUs would go to +12V standby; but not any recent models built within the last 5 years.)

That wire is the green wire on the P1 connector. (The 20 / 24-pin connector that plugs in to the [motherboard](#).) To fire up the PSU it needs to be grounded. Fortunately the wire either side of it is a ground wire; so all you need to do is short out either way on the [connector](#), (Short green and black.) using a short piece of wire or a paper-clip or something, and voila: Power-up has been achieved.

If it doesn't happen; connect a DC voltmeter across green and black: Positive to green and negative to black. You should read 5V. If you don't get a reading, or you read anything less than 2V, the PSU is faulty. Bin it.

\*Power supplies can be fixed. I fixed one myself by cannibalising spare parts from 2 identical dead units. The drawbacks are:

1) It's dangerous: there are extremely high voltages present in the circuitry when the power's on.

2) You need to know what you're doing; which can take up to 4 years training to achieve.

3) It's very time-consuming: Even if you know what you're doing; it can take hours to trace and diagnose multiple faults and repair them.

It's easier and usually more cost-effective to bin the faulty unit and buy a new one.

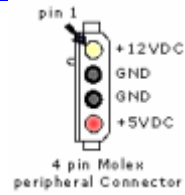
Now, having powered up; check the voltages of all the connectors.

The pinouts are as follows:

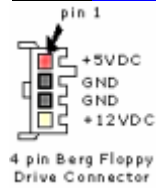
Color	Signal	Pin	Pin	Signal	Color
Orange	+3.3 V	1	13	+3.3V	Orange
				+3.3 V sense	Brown
Orange	+3.3 V	2	14	-12 V	Blue
Black	Ground	3	15	Ground	Black
Red	+5 V	4	16	Power on	Green
Black	Ground	5	17	Ground	Black
Red	+5 V	6	18	Ground	Black
Black	Ground	7	19	Ground	Black
Grey	Power good	8	20	-5 V ( <i>optional</i> )	White
Purple	+5 V standby	9	21	+5 V	Red
Yellow	+12 V	10	22	+5 V	Red
Yellow	+12 V	11	23	+5 V	Red
Orange	+3.3 V	12	24	Ground	Black

(Image above from [Wikipedia.org](https://en.wikipedia.org))

## 4-pin Peripheral



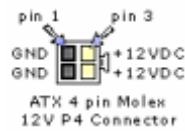
## 4-pin Berg



## 6-PIN AUX



## ATX 4-pin Molex 12V P4:



## Serial ATA (SATA)

Pin	Signal	PSU Color Wire
1	+3.3VDC	orange
2	+3.3VDC	orange
3	+3.3VDC	orange
4	GND	black
5	GND	black
6	GND	black
7	+5VDC	red
8	+5VDC	red
9	+5VDC	red
10	GND	black
11	GND	black
12	GND	black
13	+12VDC	yellow
14	+12VDC	yellow
15	+12VDC	yellow

- And that's how to check the voltages.

The above procedure doesn't test the PSU under load. In the following pages I'll show you how to test the PSU's voltages under load; including a circuit that'll load any PSU up to 350W

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In the above we looked at measuring the voltages while the [PSU](#) had no load attached to it. In this article we're going to give it a number of loads to run. We'll put a total load of around 464 Watts on the unit. If the unit is rated below that figure then it'll be fully loaded. If the unit is rated above that figure then it'll still be fairly heavily loaded.

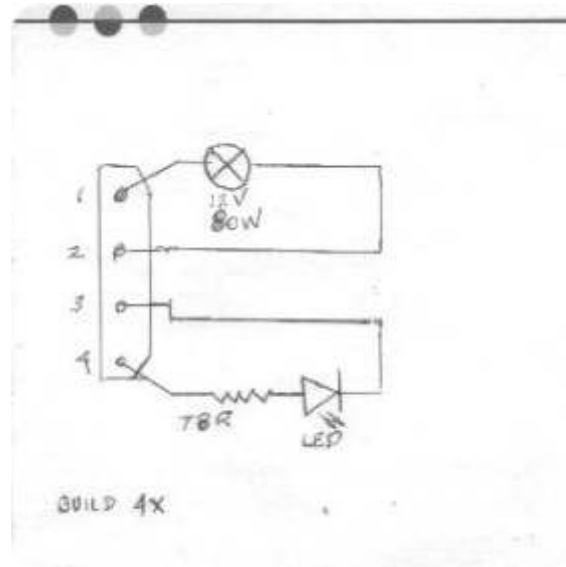
We'll load the unit using five small circuits which I've set out in circuit-diagrammatical form below. The smaller circuit, consisting of a bulb, a resistor, and a light-emitting diode, needs to be built four times, the larger one, consisting of six bulbs, seven light-emitting [diodes](#), and seven resistors, only once.

Why bulbs, resistors, and LEDs? The resistors are in series with the LEDs to prevent them from overloading. The LEDs are to indicate that the 5V lines are all working; also that the PSU is lighting the Power OK [LED](#) as it should. We're not loading the 5V lines much because it's ideally the 3V3 and the 12V lines that we need to test under load; because they're the ones through which the main wattage is drawn from a modern PSU by modern computers.

Which leaves the bulbs: It's the bulbs that provide the heavy loading. Incandescent [tungsten](#)-filament bulbs are notorious these days for using too much wattage and producing too little light and too much heat. We're intending to use those negative properties of them to "waste" the PSUs output. We'll be buying products from the automotive industry too, which might help it on its way to recovery; as the bulbs we're using are car headlamp and tail light bulbs. They are made to work on a [voltage](#) of 12 Volts; which means they could be bright and very hot when in operation. – Especially so with the 80 Watt bulbs in the 4 small circuits that test the 12V lines. When you are building the circuits please bear this in mind, as it is possible that looking directly at them for more than a second could result in at least temporary blindness. Also touching them during or shortly after operation could result in severe burns, and if they come into contact with flammable objects or materials they could start a fire. Be warned, and design appropriate safety parameters into the housing for the bulbs when you design the test units built from the circuit-diagrams provided.

Ok so let's take a look at the first circuit diagram: -





Note once again that the pin-out numbers correspond to the peripheral power “Molex” plug and not the socket.

These four bulbs; one on each circuit, will load the 12V lines to another 320 Watts in total; making a grand total of  $320 + 96 + 48$  Watts load = 464 watts; plus a couple of Watts loading by the LEDs with their series resistors.

### What should happen?

When you build and connect the circuits to a known-working PSU; the following should happen:

All the LEDs should light up. If they do it shows that all the 5-volt lines are working and that the PSU is in better health than not. The 80W bulbs will produce a lot of light and heat. All but 2 of the 24W bulbs will be rather dim; but could still get quite hot.

### What do these circuits accomplish?

They put a reasonable load on the PSU, so that you can test its performance under near-normal working-conditions.

You could check the output voltages again under load to see if there is any significant voltage-drop under such conditions.

### Another thing to bear in mind: -

It is well documented that when some of the cheap and nasty PSUs are fully loaded to specification they can fail or even explode. Therefore if you happen to be testing out £10 worth of cheapo Chinese unknown-label 250 Watt PSU for example; **expect** it to explode under the full-load that these circuits will give it. If it doesn't and it still works afterwards then you were lucky. A good-

quality 250 Watt PSU will strain and maybe complain in some way, but will easily survive a minute or so of full load.

Yes the above is a bit Heath-Robinson I admit. – But if you're on a budget you really don't want to shell out for the proper professional test-loads that can cost anything up to a small fortune. This is the scrub-round-it approach to the matter. – And it works; so why knock it? (Just keep an eye on; or should I say keep an eye off, those hot bright bulbs.)

Now that we've loaded it we can do the same measurements that we did in Part 1. The two readings will be slightly different. The difference corresponds to the voltage-drop under load. This amount will depend upon the power-rating of the PSU as well as the quality of the unit.

Ideally the voltage-drop should be less than 5% of the voltage-rating of that rail. If it's any more then the unit is either wearing out or wasn't particularly good quality to begin with. If it's over 10% then replace the unit.

# How To Upgrade an AMD Socket AM2 Processor

If you've never done this before; please read the [entire](#) article before you begin [any](#) operations.



OK. The first thing you might ask is:

**“Why would I want to upgrade a socket AM2 processor?”**

AMD's Socket AM2 has been around a while; and in some cases an AM2 [motherboard](#) capable of supporting a dual-core processor has been fitted with a single-core processor; an Athlon 64 for example. You may feel the need to upgrade to dual-core but not want to go to all the expense of a total rebuild.

If your motherboard has a single-core socket AM2 processor attached then it might very well be fairly easy to upgrade the [CPU](#) without doing very much else. An [AMD Athlon 64 x 2](#) processor is a good direct replacement for a single-core Athlon 64. In many cases it's also a good replacement for a socket AM2 Sempron too. (Please bear in mind that the Sempron processor is commonly a 32-bit processor. A 64-bit version is available and was used on some occasions. Check that your motherboard is capable of supporting 64-bit architecture, in addition to the checks below, before upgrading a 32-bit Sempron to a 64-bit Athlon.)

The first thing I would suggest before doing any upgrade of any kind is that you back up all of your data: Operating system as well as other files. – In essence ghost your disk(s) and have a backup ready on a [USB](#) device or another computer.

**Why?** The reason for making a ghost backup is that if you're upgrading from a single-core to a dual-core processor, you'll need to perform a [maintenance-reinstall](#) of your operating system after you've physically upgraded your processor. If the maintenance reinstall goes tits-up then you'll have the original backup to reinstall. (A maintenance-reinstall is completely different to a full reinstall. The only data you'll lose, if you're using [Windows](#), is probably the Microsoft patches and upgrades. – But you can always download these again anyway.)

So you have backed up all of your data: In effect ghosted the contents of your hard-disk(s).

You now need to ensure that your motherboard is capable of supporting dual-core processor technology. Go to your motherboard's manufacturer's website and look up data on your particular model and revision of motherboard. If yes then we can proceed. If no then that total rebuild that you were trying to avoid appears to be the only option if you want to go multi-core.

Select the exact [AMD](#) Athlon 64 x 2 processor that you want to use.

A word of caution here: Some motherboards will only support a processor operating frequency of up to 2.2 GHz. This may be particularly true in the case of older boards. (pre-2007) that are fitted with a single-core socket AM2 Athlon 64 or Sempron. If this is the case then you may find that you have trouble getting hold of a new Athlon 64 x 2 with the required operating frequency, and have to purchase a secondhand Windsor – cored Athlon 64 x 2; 1.8, 2.0, or 2.2 GHz, or a Brisbane-cored 2.1 GHz model from eBay or Craigslist.

\*Added 28th April 2009: A further word of caution, and something that I omitted to add to this original article: -

If you do happen to use a Brisbane-cored 2.1 GHz Athlon 64 x 2; your existing BIOS may not recognise its architecture. The chances are, from my experience, that it'll still work reasonably well if you can force the BIOS to accept it anyway; but stability could well be an issue.

The best thing to do if intending to use a Brisbane-cored Athlon 64 x 2 on an older motherboard would be to check that there is a BIOS upgrade available before purchasing the secondhand Brisbane-cored processor. If a BIOS upgrade is available then either get an experienced geek to flash your BIOS

for you, or risk doing it yourself if you're brave enough, after installing the new CPU and receiving the message that the old BIOS doesn't recognise the architecture. (I've flashed a considerable number of BIOSes and only cocked-up once AFAIR; at the worst possible time. The result was that basically the [motherboard](#) was rendered worthless...But that's another story.)

If you get the message that the new CPU's architecture is unrecognised, but there isn't a BIOS upgrade available for your board; then the choice is either to try and stick with the situation regardless, or to remove the Brisbane-cored Athlon 64 x 2 and insert a Windsor-cored Athlon 64 x 2: The choice is yours.

The better option in this case is to fit the Windsor-cored CPU, although either option may or may not produce satisfactory results.

\*End of addition.

If, on the other hand, your motherboard will support the operating frequency of your desired Athlon 64 x 2 and you have no problems acquiring it new then go for it. If you can't find an OEM package and can only get a boxed processor in that model, complete with a cooler heatsink/fan, then do so. It won't hurt to replace the cooler as well as the CPU.



Having acquired your replacement CPU after doing all these checks; you now come to the practical bit; i.e. fitting the damn thing:

It's not exactly brain-surgery or rocket-science to do this; but you'll need to prepare yourself beforehand. Here's what you'll need: -

- Screwdriver; if you need to remove or loosen screws to remove the side-panel of your computer's case.
- New processor at the ready. Leave it inside its packaging until the very last moment.

- Thermal paste. You'll need this to paste onto the surface of the new processor after you've fitted it into the processor socket and before you fit the cooler onto it. If your replacement processor came boxed with a new cooler then chances are that the paste is pre-applied to the cooler. The amount pre-applied should be adequate (Some computer-builders would disagree with me here; but I've always found it to be so.). If on the other hand you've bought an OEM or a secondhand processor then you'll need to apply thermal paste as above.
- An anti-static wristband connected to electrical earth. If you don't have one you might be able to use a crocodile-lead and connect a piece of metal jewellery or a watch that you're wearing to the computer's case, provided that the computer's case remains earthed.
- Finally a positive calm attitude: I personally find it a good idea to meditate for a short while before any computer-work in order to achieve a level psyche so that I don't panic or do anything wrong during the operation through lack of concentration. Forget the gas bill, forget your boy or girlfriend for the time being. Ensure that you won't be disturbed for a while, adopt a levelled and intellectual thinking-pattern, and we're off.

Ensure that the switch on the computer's power-supply unit (Usually situated at the back of the computer.) is off. If it is off but the [power-lead](#) remains connected then the case is earthed. If you disconnect it then the case is not earthed or only partially earthed. Open the computer's case by removing the side-panel.

You will notice the (black) cooler fan protruding from the board. On one of the sides of the cooler, near the motherboard's surface, you will see a lever connected to a clip on the cooler heatsink. Pull this lever to the upward position. You will see a pair of wires (Maybe three(?)), (Probably red and black (and white(?)).) leading from the cooler's fan to a small plug in a socket on the motherboard. Remove the two or three-pinned plug.



Release the clips; one under the lever, the other diametrically opposite it on the cooler heatsink. The cooler heatsink and fan should now pop-off the board, with maybe a little upward pressure, to reveal the existing processor seated in its socket.

On one side of the processor you will see another lever. Lift this lever into the upward position and carefully remove the old processor from the socket without touching any of its pins. You may wish to retain this processor. If so it would be a good idea to place it into the new processor's packing after the new processor has been removed from it.

Carefully remove the new processor from its packaging without touching any of the pins. Insert it straight into the waiting empty socket, ensuring that the marked corners of both the processor and the socket are lined up. Place your old processor into the empty packaging.

Once again check that the marked corners of both the processor and the socket are lined up. Also ensure that your anti-static wristband or otherwise is connecting your body to electrical earth. Apply slight pressure to the processor's surface and push the lever downwards into the position that you originally saw it in when you removed the cooler from the old processor. If anything resists your attempts **DO NOT FORCE IT**. Recheck that you are doing the operation correctly and try again.



If you have bought a secondhand replacement or OEM processor then you'll need to re-use the old cooler. Gently and carefully, trying not to cause any scratches, clean the upward-facing surface of the processor. (Do not wipe the markings off. – You don't need to clean it that well!) and also clean the underside of the cooler that will end up on top of the processor, Apply a very thin layer of thermal paste to each surface. The edge of a credit card will assist you to keep it thin. You may notice that it seems slightly thicker in some places than others: This is normal. The paste is filling the gaps that would otherwise be left free of contact between processor and cooler.

If you bought a new, boxed processor complete with a new cooler; remove the plastic cover to expose the pre-applied thermal-paste.

Place the cooler on top of the processor and slide around a little to ensure that it's located in exactly the right place. Locate the two clips diametrically opposite one another on the cooler with the lugs on the socket. Push the lever back into its original position: flush with the motherboard's surface.

Connect the cooler's fan by plugging the plug into the appropriate socket on the motherboard.

The operation as regards hardware is now complete.

If you removed the power lead from your computer's power socket; replace it and switch the power switch on the rear of the computer back on.

Power-up your computer and immediately insert your Windows or other CD or DVD.

Perform a [maintenance-reinstall](#) of your operating system and re-download any patches and updates provided by your operating system's manufacturer.

Your computer should now be running both cores of your new processor. To check this in Windows XP, press Ctrl+Alt+Del simultaneously. The Windows Task Manager should display two [performance](#) graphs: One for each core.

If you have any problems with this, or you are unsure of anything before you start, then consult a professional geek first before doing anything.

See also: [Problems upgrading to a Phenom.](#)

## What Do I Do If My Power Supply's Voltage Drops Under Load?



I assume that either you've checked your power supply's output in one of or both of the two ways I've suggested earlier. Those being:

a) [While the PSU's outputs are unconnected](#), and also [while the PSU is running under the artificial load I suggested](#).

OR you preferred to leave the [PSU](#) fitted and tested it: -

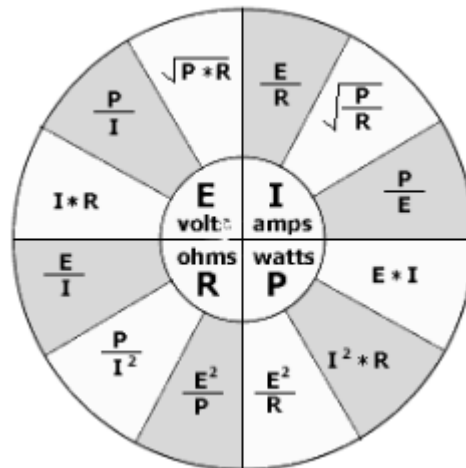
b) While the PSU is connected to the computer's components in a normal way.

The question "What do I do if my power supply voltage drops Under Load?" is a bit of a multi-pronged question. I'll try in this article to cover a number of those points in the hope that you can come to a conclusion based upon the information and guidance herein.

I'll start by saying that, in the case of any supply of power, the voltage will always drop to some extent under sufficient load. To clarify that point somewhat, I'll draw your attention back to [Ohm's Law](#) and the relationship between wattage (Power), current (Amperage), voltage, and resistance (The load):

If the wattage or power (P) = the current (I) squared multiplied by the load resistance (R) in a DC circuit; then it follows that R divided by I squared = P.

If we give I the fixed value of 10 amps in this example, then we can see that as R decreases, so does P. : Translated into English, this shows that as the load increases and therefore the parallel load resistance decreases, so the amount of unused power available from the supply also decreases. Why does this occur? Because as the load increases so the resistance decreases, therefore more of the available [electrical power](#) in watts is used by the load and transformed into other kinds of energy.



We know from Ohm's Law that  $V = IR$  (Voltage = current multiplied by resistance.). Therefore, if we use the fixed figure of 10 [amps](#) as the value for I again, we note that as the value of R (The resistance) increases then so does the value of V (The voltage.). Inversely as the (load) resistance drops as extra load is added to a DC circuit, so the voltage drops proportionally.

The higher the amount of current (I) available in the circuit; the less the decrease in R (Increasing the load.) affects the decrease of V. (Drop in voltage.)

We can prove that by increasing the value of I to 20 amps: Do the math again and you'll see that this is true.

**Conclusion: The greater the electrical load on a given supply; the greater the voltage drop on said supply.**

This is *always* true to a given extent; no matter how much current is available.

Bearing this in mind, then; how much voltage drop is too much?

In a perfect world; any voltage drop is too much. – But as we've seen above; there can never be zero voltage drop unless there is zero load. As we know; if there is zero load then there is zero computer, so the point is mute. The objective of the exercise then is to minimise the voltage drop to the greatest extent possible.

In the examples above we saw that the more current we had at our disposal, the smaller the voltage drop under any given load: In Joule's Law;  $I \times V = P$  (Current multiplied by voltage = power (wattage)). We know that the voltage outputs of a computer power supply are fixed at 12v, 5v, and 3.3v. therefore the available current (Amperage) is dependant upon the available power (Wattage): The more wattage the supply can output the more current is available; therefore the less the voltage drop will be under any given load.

**Conclusion: To minimise any voltage drop under any given load conditions; make more wattage (power) accessible.**

In other words; if the voltage on your supply rails drops substantially under the load that your computer's components put on those supply rails, then your power supply isn't outputting the required wattage.

( It is possible that a malfunctioning piece of hardware is drawing far too much current from the supply; but this is unlikely: A malfunctioning piece of hardware that draws such high currents would get very hot very quickly and would probably begin to cook, causing noticeable odor and smoke. It's far more likely that the power supply itself is at fault if nothing else is frying itself. )

In the face of that; you have two choices. Either: -

1) Keep your existing [power supply unit](#) and decrease the load on it. (- By not running so many components: In other words removing something from the circuit, such as a [hard-drive](#), graphics card, whatever.)

OR

2) Fit a new power supply capable of delivering the required wattage.

At this point you may say:

"I've checked everything and worked out that the load on *whatever* rails is X amps; that's Y watts at Z volts. My power supply's output rating on *whatever* rails is greater than that: Therefore something's wrong."

Correct. Something is indeed wrong. There is an inconsistency somewhere. The problem now is to discover exactly what that inconsistency is.

It could be three main things: -

- 1) The equations are wrong.
- 2) Your calculations have arrived at an incorrect figures.
- 3) The PSU ratings are wrong.

Firstly there is no chance that the equations are wrong. The equations used form the basis for modern electronics theory and have done so for more than 100 years. They are an integral part of basic electronic calculus and have been proven to be correct time and time again.

Secondly, check that your calculations are correct and that you have indeed arrived at the correct figures.

If there is no fallacy in your calculations then there is now only one possibility left – That being that the PSU ratings are wrong. How can this be?

Some manufacturers; especially the manufacturers of cheapo power supplies, overrate their product. This isn't actually lies though. It's an overstatement:



A PSU rated at 500 watts is indeed capable of supplying 500 watts; but not necessarily 500 watts of continuous power. In tests done by a leading UK computer magazine in the last 2 years, a number of 500 watt PSUs failed when fully loaded. One, the second cheapest under test, even detonated! There is an old saying that you get what you pay for. Sure; a \$15 PSU built in China and rated at 500 watts will supply a computer that needs 300 watts to run efficiently without (m)any problems. It's when you add a powerful graphics card that drains an extra 100 watts, plus a [RAID](#) array = another 30 watts, extra optical disk = +10 watts, and upgrade to a more powerful [processor](#) = +35 watts that things start going askew: [BSODs](#) occur, [the graphics card](#) doesn't perform properly, the power supply starts making strange noises...

- That's only 475 watts total, and the PSU is rated at 500 watts, so theoretically it should work; but it doesn't. – Because the PSU can provide 500 watts *peak*, – but not 500 watts *continuous*. – In fact probably only 400 watts or less continuous. At peaks where the power requirement is at its greatest there may be a voltage drop of over a volt causing memory failures and processor outages.

Maybe it's not that serious in your case? Maybe you're on the edge of the precipice; but are still noticing a voltage drop on measurement under load, even though the PSU is still holding up, the CPU's not having outages, and the [RAM](#) is just managing on the reduced voltage?

That's a good thing inasmuch as your computer is still working. – But it's so close to the wire that it'll only take a feather to tilt the balance. – So don't expect your computer to carry on without problems much longer in those circumstances. All you need is for the PSU to get too hot, the [CPU](#) to use a few watts more, the graphics card to draw that extra piece of polygonal shading, and...

Get a better quality and / or higher-rated power supply unit: The sooner the better. Once it's fitted, measure the voltage drop. There will still be a voltage-drop; but it'll be smaller and your computer will be happier as a result.

## List All Installed Drivers in Windows XP Professional

In Windows XP Professional there is a tool called Driver Query. (This tool is not available in [Windows XP Home](#).) This tool, when run, will provide you with a list of **all** local drivers. – You might even see some drivers that you didn't even know existed.

To run Driver Query; open a command prompt window, (Start>Run and type "cmd".) and type "driverquery" on the command line at the command prompt.

Driver Query displays the results in a table in the command prompt window.

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Sharron>driverquery

Module Name      Display Name      Driver Type      Link Date
-----
Aaumker4         avast! Asynchronous Ui  Kernel          05/02/2009  21:05:10
ACPI             Microsoft ACPI Driver  Kernel          13/04/2008  19:36:33
ACPIEC          ACPIEC             Kernel          17/08/2001  21:57:55
acc             Microsoft Kernel Acous  Kernel          24/05/2007  20:53:32
AFD             AFD                Kernel          14/08/2008  11:04:35
AmDKB           AMD Processor Driver  Kernel          19/06/2006  07:37:31
Arp1394         1394 ARP Client Protoc  Kernel          13/04/2008  19:51:22
Aspi32          Aspi32             Kernel          11/09/1999  00:46:10
asuskbnt        Enhanced Display Drive  Kernel          18/10/2005  00:01:37
aswFeBlk        aswFeBlk           File System     05/02/2009  02:40:50
aswMon2         avast! Standard Shield  File System     05/02/2009  02:41:46
aswRdr          aswRdr             Kernel          05/02/2009  21:06:09
aswSP           avast! Self Protection  Kernel          05/02/2009  02:41:01
aswSdi          avast! Network Shield  Kernel          05/02/2009  21:06:19
AsynchMac       RAS Asynchronous Media  Kernel          13/04/2008  19:57:27
atapi           Standard IDE/ESDI Hard  Kernel          13/04/2008  19:40:29
Atmarpc         ATM ARP Client Protoco  Kernel          13/04/2008  19:51:24
audstub         Audio Stub Driver      Kernel          17/08/2001  21:59:40
Beep            Beep                 Kernel          17/08/2001  21:47:33
BthEnum         Bluetooth Request Bloc  Kernel          13/04/2008  19:46:33
BTHMODEM        Bluetooth Modem Commun  Kernel          13/04/2008  19:46:32
BthPan          Bluetooth Device (Pers  Kernel          13/04/2008  19:51:32
BTHPORT         Bluetooth Port Driver   Kernel          13/06/2008  12:05:50
BTHUSB          Bluetooth Radio USB Dr  Kernel          13/04/2008  19:46:27
chidf2k         chidf2k             Kernel          17/08/2001  21:52:06
CCDECODE        Closed Caption Decoder  Kernel          13/04/2008  19:46:22
Cdaudio         Cdaudio             Kernel          17/08/2001  21:52:26
Cdafa           Cdafa                File System     13/04/2008  20:14:21
Cdrom           CD-ROM Driver         Kernel          13/04/2008  19:40:45
DqiUecp         Iean MFP Comm Driver   Kernel          17/05/2004  14:04:14
Disk            Disk Driver           Kernel          13/04/2008  19:40:46
dnboot          dnboot               Kernel          13/04/2008  19:44:45
dmio            Logical Disk Manager D  Kernel          13/04/2008  19:44:45
dnlload         dnlload              Kernel          17/08/2001  21:58:15
DMusic          Microsoft Kernel DLS S  Kernel          13/04/2008  19:45:00
drnkaud         Microsoft Kernel DRM A  Kernel          13/04/2008  19:45:13
Fastfat         Fastfat              File System     13/04/2008  20:14:28
Fdc             Floppy Disk Controller  Kernel          13/04/2008  19:40:25
Fips            Fips                 Kernel          13/04/2008  19:33:27
Flpydisk        Floppy Disk Driver     Kernel          13/04/2008  19:40:24
FltMgr          FltMgr               File System     13/04/2008  19:32:50
Ftdisk          Volume Manager Driver  Kernel          17/08/2001  21:52:41
GEARASPIWDM     GEAR ASPI Filter Drive  Kernel          19/03/2009  15:32:37
Gpc             Generic Packet Classif  Kernel          13/04/2008  19:56:32
HCUWBT8xx       Hauppauge WinTV 848/9  Kernel          12/05/2003  17:01:26
HDAudBus        Microsoft UAA Bus Driv  Kernel          26/05/2005  16:46:29
HidBth          Microsoft Bluetooth HI  Kernel          13/04/2008  19:46:30
HidUsb          Microsoft USB Classif   Kernel          13/04/2008  19:46:30
```

If you wish to save the results to a csv file so that you can open them in a spreadsheet, you can do so by typing the following on the command line. (Do not include the inverted commas themselves.): -

```
“Driverquery /v /fo csv > drivers.csv”
```

This will save the table in comma separated values to the file *drivers.csv* .

...And that's the way it's done. Please take note, once again, that this will only work in the Professional version of XP. – If you run Windows [XP Home](#) then I'm afraid it just won't produce results.

## How To identify Drive Cables

If, in an attempt to upgrade your computer's [hard-drive](#) or add an extra drive, you open up your computer for the first time by removing the side-panel; you'll see quite a large amount of baffling stuff inside. All the electronic components on the [motherboard](#) that you'll probably see before anything else may look extremely intricate, delicate, and confusing.

You don't, however, unless you understand a fair bit about electronics, have to worry about the components on the motherboard; especially if you just want to change or add a drive. What you need to look for are cables from plugs which are plugged into sockets on the motherboard that lead to the drive that you want to replace or add to.

I'll just mention here that for the purposes of computer-building; there's no need to know every detail of how everything works; although it could help if you do have that knowledge. – What you do need to know are the overall basics of how a computer works, and how to assemble the main pre-built components in any number of variations of a general rule-of-thumb, so that the finished product works and has the features and specifications that it's intended to have.

In a little more detail: Forget [capacitors](#), [resistors](#), [transistors](#), [integrated circuits](#), [voltage-regulators](#), [diodes](#), etc, and all the tiny and not-so-tiny basic electronic components that go into the pre-built components of a computer, for the time being. – Think of a computer as a machine made from a number of pre-built components: Hard-drive(s), motherboard, [processor](#), [RAM](#) stick(s), [power supply unit \(PSU\)](#), extension cards; [PCI](#) and [PCIe](#), graphics card, connectors, leads, case, etc: Thinking in this way simplifies the job one heck of a lot for those people who are new to computer building/repair but have no previous experience of electronics.

- So we're looking, in your box, for [cables](#) that connect drives to [motherboard](#) and/or motherboard to drive; whichever way you prefer to look at it: There are 3 main types of cable that connect your motherboard to drives; and these three are pictured below: -



The first is the floppy-ribbon: This multi-cored ribbon connector is the thinner of the two or maybe three ribbon-connectors that you'll find inside a(n) (older) computer. This cable connects the [floppy-drive](#), (Usually drive A:, or maybe drive B:) to the floppy controller on the motherboard.

Note the twist in a bit of the ribbon separated off just before the connector at one end: That end is the one that goes to the drive itself. When it comes to plugging the connector back into the drive; you'll find that, unlike the motherboard end that only goes into the socket one way, the drive end will fit whichever way round you try to insert it. There is a right way and a wrong way; but I've never bothered to learn it to be honest: If your floppy-drive's light is always on then you've plugged it in the wrong way round; simple as that. Doing so inadvertently won't damage the drive or the motherboard; it just needs to be plugged in the right way before you can use the drive.

A lot of recently-built computers don't have a floppy-drive fitted, (I don't even bother with them anymore, despite being a bit of a retro-type.) as they are very uneconomical with the amount of storage on a single floppy-disc, combined with the fact that people just don't write anything on a floppy-disc these days. – So it's pretty pointless to have one now.



Next we come to the [IDE](#) or [PATA](#) ribbon cable: These are now mainly only found in older computers too; although you might find one or more in any computer built up to this time of writing.

(In my last build that I did for myself, I included an IDE ribbon to connect a secondhand PATA optical drive to the motherboard's only IDE port.)

This ribbon cable can connect up to 2 PATA drives to the motherboard's IDE controller: These drives can be all-optical-drives, all-hard-drives, or one of each. See the article entitled "[How to Install/Change a Hard-Drive](#)" for more information on this.

This cable is generally longer than a floppy cable, and is always wider.



Lastly out of the three we come to the [SATA](#) cable: The cable that you'll most likely find in today's computers, connecting both hard-drives and optical drives to the motherboard's [SATA controller](#)

SATA cables can be up to a metre long and take up a lot less room inside the case, therefore allowing better air-flow. Unlike IDE/PATA ribbons, though, they are a one-cable-per-drive cable.

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