



Sixteen Bits April 2006

PC Users Group (ACT) Inc
27 Mulley Street
Holder ACT 2611

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We hope you enjoy this edition of *Sixteen Bits*. We are always on the lookout for items for the next edition. If you have anything to contribute - please send it to pcug.editor@pcug.org.au. The nominal cut-off date for submissions is the 15th of each month. All submissions gratefully received. Please send us feedback as to what you might like to see published in your magazine.

For more news of **events to come** - don't forget to check the **PCUG Calendar** at: <http://www.pcug.org.au/members/calendar/>

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Main Monthly Meeting

PC USERS GROUP (ACT)

May 2006 MONTHLY MEETING

The next Main Monthly Meeting will be held on **Tuesday 2nd May 2006** commencing at 7:30 pm in the **Manning Clark Centre, (facility 26A), Lecture Theatre 3, Australian National University, Acton**. Visit the PCUG website <http://www.pcug.org.au/activities/mmm.htm> for a map of the Manning Clark Centre.

The speaker will be Samesh Singh from Microsoft Australia introducing their new operating system, Vista.

The monthly meetings are free. Members, friends and the public are invited to attend. Don't rush home after the meeting! Stay for coffee, tea, biscuits and good company. It's all free! Renew acquaintances, meet new people and ask those questions you didn't get a chance to ask at the meeting! Membership inquiries and renewals are welcomed too!

Email inquiries to pcug.mmm@pcug.org.au or phone 02-6287-2922.

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At the recent committee meeting it was agreed to re-equip the training room at the Holder Centre with new computers to enable us to offer adequate training, particularly the Microsoft Unlimited Potential material that has been donated to the group. The equipment at the Centre is connected via an ethernet lan to a server running Windows 2003 while the workstation computers run dual boot systems with Windows XP Pro and Linux.

All our systems are maintained by volunteers but we can always use more. If you have skills, particularly in Windows 2003 server administration and XP administration including imaging and cloning, we would love to hear from you. Contact either myself at president@pcug.org.au or the network team at lan@pcug.org.au if

you can help.

The committee also agreed to a proposal to increase the bandwidth of the TIP connection to the Internet. This should result in better browsing speed at peak times.

Once again a reminder that the PCUG Office is just that - the office processing membership renewals, TIP subscriptions and other administrative tasks. It is NOT a help desk for computer problems. If you need help, please use one of the helpers listed on the Help Page in Sixteen Bits. Better still, if you have skills, get yourself added to the Help List.

Also remember that the PCUG office has one main phone line. If it is in use while serving another member, then phone calls go to message bank. This does not mean the office is not staffed. Staffers make all possible efforts to check the message and return calls, but this may happen the next day if the office is busy.

Finally, remember that there is an email address feedback@pcug.org.au where you can let us know what we are doing that you particularly like or dislike, and let us know of any other things you think we should be doing.

Allan Mikkelsen

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From the editor's desk



This is a personalities page today.

At our last committee meeting we lost Trevor Frew, who has been a valuable and tireless contributor to PCUG affairs since his election in 2004. Trevor has had to withdraw from committee activities for health reasons and his input will be missed. Fortunately for us he will be staying on as editor of Sixteen Bits and will be back in the chair when I go north for my winter vacation in June.

David Gill joined the committee as Training Room Manager and has a very positive approach to the subject. His behind-the-scene contributions are already extensive and you will be seeing the outcome very soon.

Gary Potts was voted Volunteer of the Month for his long and proficient dedication to office procedures, and the many hours he has contributed. Gary also assists in training at the relatively new Kippax Library, which could accept more volunteers. The library has about nine PCs variously providing access to the ACT libraries catalogue, the Internet (using IE), Word and Excel. They have two computers they dedicate to training on Wednesday and Thursday, when Gary tutors whoever turns up in basic skills in the use of the components of a computer, the Internet, 'free' e-mail (Yahoo), Word and Excel. The library has a computer with scanner, but last time he talked to the manager they needed someone familiar with using the scanner to assist people. Is there a volunteer out there willing to help?

I will be conducting a workshop on Saturday, April 29th, on PC security. See the Training News page for full details.

Terry Bibo

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PCUG Meetings 2006

The Main Monthly Meeting will be held on the first Tuesday night each month during 2006. The planned dates are:

2 May 2006	6 June 2006
4 July 2006	1 August 2006
5 September 2006	3 October 2006
7 November 2006	5 December 2006

The meetings will commence at 7:30 pm, and are normally held in Lecture Theatre 3, Manning Clark Centre, Australian National University, Acton.

The monthly meetings are free. Members, friends, and the public are welcome to attend. Stay for coffee, tea, biscuits and good company after the meeting!

E-mail inquiries to <mailto:pcug.mmm@pcug.org.au> or phone 02-6287-2922

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Main Monthly Meeting - Review

April 2006

The Speaker was: Paul Koerbin from the Digital Archiving Branch, National Library of Australia

The topic was: Pandora, "Preserving and Accessing Networked Documentary Resources of Australia", an initiative of the NLA to preserve significant Australian web sites and web-based online publications.

A good link to the topic is the About PANDORA page at <http://pandora.nla.gov.au/about.html>
Much of the content of Paul's talk can be found in various papers of his in the PANDORA Staff Papers section <http://pandora.nla.gov.au/papers.html>

Susan White

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Training News

I will conduct a workshop at the PCUG centre on Saturday 29th April from 1030 to 1230.

The topic is PC Security and will cover installation and configuration of software for the three main elements of security:

- Firewall
- Antivirus
- Malicious software

Free software to meet all reasonable requirements will be discussed, and provided if you want to bring along a CD. After the free software we can look at some of the recent commercial packages that I am constantly being asked, as editor, to review or promote.

I expect to be using my laptop and the overhead projector: we will not be using the using the PCs installed in the training room. This is primarily a workshop to encourage discussion and understanding of the fundamentals of PC protection.

The class will be limited to 20 persons and will cost \$5.00. Bookings may be made at training@pcug.org.au

See you there

Terry Bibo

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Repairing the Windows Defender Update Problem

There is a widespread problem with Windows Defender (Beta 2) not updating. It purports to update and reports the update as effective, then immediately asks for the same update. Or it will not update at all.

The problem is with **Windows Installer** that is used to install programs in Windows. It can become damaged for a number of reasons, among them being:

- a corrupt registry,
- interruption of the installation of a program using Windows Installer,
- and multiple instances of Setup running simultaneously.

The solution lies in the judicious use of the Windows Installer Clean Up Utility: MSICUU.EXE available from: <http://tinyurl.com/42ul9>. This is used to perform clean up operations of the Windows Installer registry settings.

1. Download the file **msicuu2.exe** from the above URL and save it to disk.
2. You will be advised to close all running programs before installation.
3. Double click to install it. By default it will install in **C:\Program Files\Windows Installer Clean Up**.

Run the file **msicuu.exe** from within the Windows Installer Clean Up folder. It will present the dialog box on the right



Scroll down and select the **Windows Defender Signatures** entry. That is the one causing the problem, but your definition file will be a different number from that shown here. **Remove** this entry and **Exit**.



Restart your PC to restore programs that were terminated, and update Windows Defender with confidence.

Terry Bibo

Spin It Again

[Spin It Again](#) is a dedicated vinyl and tape conversion software utility that revolutionises recording any cassette or LP (33, 45, or 78 rpm) to CD or MP3.

Its difference from the many other utilities for doing this is apparent immediately on installation. Simplicity and ease of use are its forte, yet it does not sacrifice much in providing that. In fact it undoubtedly encourages more users who do not want to be burdened by the undeniable complexities of other popular programs. The software is not limited to recording only from LP or cassette but will accept Microphone, MIDI, Wave, Auxiliary or whatever you'd like. The source for each of these is selected in the Recording Level Adjustment Wizard.

In the process of recording it can remove a variety of noises and imperfections that creep into well used tape and vinyl media. Click, pops, tape hum, needle noise and much more can be removed by simply selecting from a preset menu.

Output files can be in the form of MP3, Ogg, Wave or Wma, suitable for either portable MP3 players or CD. And recordings can be automatically split into their original tracks.



Help on hooking up your stereo, cassette tape player, or record player to your computer.

In setting up the program after installation, there is a hookup wizard that plainly walks through the connection procedure with an excellent tutorial video. It is accompanied with a voice for those needing extra encouragement. Really, nobody should get it wrong.

The same screen and every screen thereafter gives access to the variable settings for the program

and an extensive help file, and the ever helpful voice tutor.



The next step is to make a recording, and I have chosen to record a vinyl LP, which immediately leads me to set the recording level. Again there is a wizard that measures volume over a 30-second interval and sets the recommended recording level. I find this tends to err on the side of safety so as never to cause clipping at peak volume, but generally speaking, the level wizard gives

excellent results without clipping. Anyway, the recording is automatically normalized afterwards to adjust for this.

Perhaps a little paranoid, I then manually increase this level to my satisfaction while replaying the same section and watching for the clipping. Past experience has taught me that maximum acceptable recording level is invaluable in the final analysis.



This is the recording and edit screen.

The top waveform is the entire recording and the lower waveform is a zoomed view of portion of that. The zoom factor can be quite powerful and is useful in noise reduction and adjusting the start and end of each track.

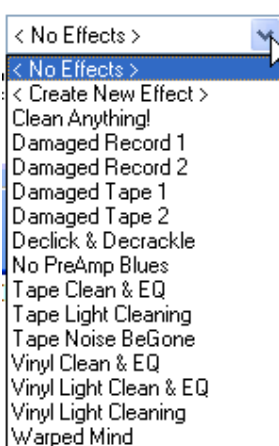
I have two tracks - 37 minutes and 11 minutes - shown in different colours. A track is determined by its volume, length, and separation from other tracks, and these values can be set individually.

The default values correctly defined my two tracks within the recorded data. Any track can be merged with that on its right with the Merge button, or all tracks can be merged into one using the Clear All button.

The Analyze button will create new tracks based on altered values. Any erroneous tracks created, or extra silence at the beginning or end, can be edited by dragging the track markers. That almost unavoidable click of the needle meeting the vinyl for the first track can also be eliminated this way.

The software will automatically pause when it senses the end of the record so that the record can be flipped over for side two.

Unlike more complex audio editing programs this does not show both channels of stereo, but I don't think that is demanded by a vast majority of potential users.



The Clearing & Effects Preset list is a gift to users.

If a noise reduction effect is loaded, Spin It Again will automatically find a clean noise print between songs which it analyses and uses to remove noise from the entire recording.

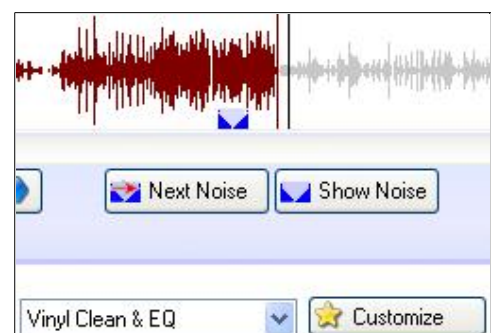
Memories of past experience with other software made me almost ecstatic to find out that all effects in Spin It Again are non-destructive effects applied in real-time to the entire recording, and do not change the original recording at all.

When a noise reduction is selected Noise buttons will appear in the zoomed waveform, with 'Next Noise' and 'Show Noise' controls beneath the waveform.

Clicking 'Show Noise' will zoom in on the analyzed spot. The 'Next Noise' button will automatically find the next good noise print and select it.

The noise content can be tested by right clicking on the Noise button and selecting Play Noise Print.

If the noise print is music and not actual noise, it will deteriorate the recording. You might need to try a different Preset.



You can freely switch between presets, then select No Effects, and your audio will play back in its original form completely unchanged.

Following the Next>> button takes us down through naming your recording with Album, Artist and Genre, and then to the productive stage. This is where you will go to determine what format you want; WAV, MP3, OGG or WMA, and where you want it saved.

Or alternatively you can burn your CD directly from here. No external CD burning application is necessary, as Spin it Again uses the Goldenhawk technology burning engine to burn CDs or Audio CDs. I initially had problems here because my burner was not recognized and I had to use the alternative IMAPI (Image Mastering Applications Programming Interface) engine provided by WindowsXP. This is set in Start> All Programs> Acoustica Spin It Again>Burning Engine> Use-IMAPI (XP Only).

Incompatibility with Goldenhawk is not a problem at all for Win98 users, because we can save the audio files for burning with any CD burning software that we have - from Nero to the freeware CDBurnerXP Pro.

In evaluating this program I have recorded from both classical and popular LPs, burned CDs that are superior to those made earlier on other software, made several MP3 files for my MP3 player, and re-edited original WAV files from my archive of past recordings.

In summary, it is a program that anyone should be able to use effectively straight out of the box. It is just so easy I regret it has taken so long for me to find it.

Enjoy your computing.

Terry Bibo



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Discover the hidden treasures of the Internet

Join the thousands of people all over the world who...

- * Keep up with sports, news, politics and current events;
- * Research family heritage and genealogy;
- * Ask questions and get answers;
- * Make friends and express opinions in discussion forums.

These people have discovered the immense information available in over 35,000 Usenet Newsgroups accessible on TIP.

What Are Usenet Newsgroups?

Usenet Newsgroups have been called "the hidden half of the Internet," because most people browse the web and use email but they never discover Usenet Newsgroups.

Usenet Newsgroups are worldwide discussion areas where people exchange messages and files about every conceivable topic and they complement both the Web and e-mail. The Web is a tremendous repository of information, but it lacks the intimacy of exchanging information with another person, and it is not the best place to exchange opinions on some event that happened yesterday or to post a message asking for help or information. Email is a wonderful way to communicate, but you have to know to whom you want to send a message.

Usenet Newsgroups bridge the gap between the Web and email. Like the Web, they carry an enormous amount of useful information, but the information is in the form of messages posted recently by individuals, so the information is fresh and topical. Reading these messages allows you to discover who else in the world shares your interests. As you make contacts through newsgroups, you can exchange public Usenet messages or you can decide to use email to carry on private conversations. Usenet Newsgroups are a great way to make friends around the world.

What's In Usenet Newsgroups?

There are newsgroups with sports, genealogy (research your family), TV shows, computers (somebody has the answer), travel, hobbies, pets, jobs -- you name it, there's a Usenet newsgroup for it!

What Do Newsgroups Cost?

Access to the newsgroups carried on the TIP news server is available to you at no extra cost, so you can tap into the immense information available on newsgroups for free! All you need to do is get a good news reader and configure it to access the TIP news server. Our news server is addressed as newshost.pcug.org.au. Some people are discouraged by the jargon which describes the process of selecting to read a newsgroup as subscribing. In the Usenet context, subscribing to a newsgroup simply means selecting it, and no costs are involved.

What Software Do I Need?

Programs you use to access newsgroups are called "news readers". There are several newsreaders in common use on TIP - Microsoft Outlook Express, Mozilla Thunderbird, and Free Agent (together with its commercial version Agent).

Alternatively, if you wish to make only a quick browse or ask a single question rather than participate, you can access most discussion groups through Google Groups at <http://groups.google.com>

What Sorts of Topics and Information Can I Find in Usenet Newsgroups?

Anything and everything. For example, if you are interested in the X-Files TV show, you could browse the `aus.tv.x-files` newsgroup. Many TV shows have a newsgroup. If you are a fan of Garth Brooks, then you can meet other fans on `alt.music.garth-brooks`. There are newsgroups for many stars of music, stage and screen as well as other well-known individuals. There are newsgroups about TV shows, movies, science, cooking, gardening, pets, hobbies, items for sale or wanted, and available jobs.

Want to do some research?

You can post a message and tens of thousands of people around the world will read it. For example, if you are researching your family origin, you might want to post a message with a summary of your family history on one of the many genealogy newsgroups such as `soc.genealogy.surnames.britain`. Or suppose you need help configuring Windows networking; just post a question on `comp.os.ms-windows.networking.windows`. The chances are good that someone will know the answer.

Can I Get Pictures, Music, and Programs?

Unfortunately, through the TIP news server, generally No. There are thousands of newsgroups devoted to sending binary files with pictures, music, executable programs and even movies in the `alt.binaries` sector of Usenet. The last time I checked, these distributed over 2000 gigabytes of data per day. It is beyond the capacity of any Australian ISP to carry all this information and most binary messages on Australian news servers are incomplete and thus useless.

Dedicated news servers are available, at a fee, if you wish to access a full newsfeed. A list of some of these is at http://www.geeks.org/~ed/Usenet_Servers.html.

TIP newsgroups

Most newsgroups are carried on most news servers but some groups are local to a particular server. The `tip.*` groups are carried only on the TIP news server and to use this, you must be connected to the internet via TIP OR have a TIP account (available free to all PCUG members) and authenticate to the server through a secure connection.

If you want casual access to `tip.*` newsgroups you can read them through a web interface at <http://www.tip.net.au/tipnews/> if you are connected through TIP. Non-TIP users should follow the instructions to register a password.

Allan Mikkelsen

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Press Releases

Folder Lock

Press release. A slim security tool that lets you password-protect files, folders, drives and removable disks in seconds.

IP Traffic Monitor

Press release. Make Bandwidth Usage on Your Local Machine Transparent!

Aurora Password Manager

Press release. Absolutely free. 256-bit encryption.

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Kiss Your Privacy Worries Goodbye with Folder Lock!

A slim security tool lets you password-protect files, folders, drives and removable disks in seconds and protect sensitive information in Safe Mode and even in real DOS Mode

Folder Lock gives you a pain-free ability to lock, hide, encrypt and password-protect files, folders and drives on your PC. Also, you can protect files on USB flash drives, memory sticks, CD-RW, floppies, and notebooks. Unique to Folder Lock is its ability to protect files in Safe Mode and DOS Mode. Your files remain protected if you boot your PC with a floppy or CD, and even when you switch from one Windows platform to another, so that files protected in Windows XP remain protected in Windows 98.

"You can work with Folder Lock in much the same way as you would with a safe in the physical world," says Steve Frank, manager at NewSoftwares.net. "Just like it is with a real safe, you have a special folder, named Locker, where you can keep any number of private files and folders. This may be your passwords, credit card numbers, software source code, images and anything else that needs to be protected. Once the Locker is locked up, all files inside become inaccessible for unauthorized users, be they your spouse, co-workers, cyber-hackers or computer viruses. You can simply lock the folder, scramble its content, or encrypt it using 256-bit Blowfish encryption, which is the strongest today. Plus, there are five methods of locking, known as patent pending, two of which are unknown even to the most advanced hackers."

"As for the files and folders that are located outside the Locker folder, you can lock them too," continues Mr. Frank. "Simply right-click the file you want to protect, select the "Lock Folder" item from its context menu, enter a password, and voila! Your file is locked. Now, it cannot be deleted, renamed, accessed, and even seen, that's, of course, if the Stealth Mode is on. However if you want this file to be protected in real DOS Mode or Safe Mode, you had better drag it to the Locker folder. In addition to providing the strongest level of protection, the Locker eliminates the hassle of having to lock up or encrypt each file separately. Another good thing about Folder Lock is that it locks files even on portable devices. Copy the program folder of Folder Lock to the device and secure your files in the Locker it creates. Simple."

What tricks does Folder Lock let you play on hackers?

1. Expose the hacker before he exposes you.

Folder Lock has a Hacker Attempt Monitoring feature that records a log of all invalid passwords used with respect to their time and date. You can learn who tried to access your personal files in your absence by providing different passwords. You can also set the program to lock or shutdown your PC if more than three invalid passwords have been entered.

2. Use stealth, become invisible

Folder Lock has a Stealth Mode to hide Folder Lock from the eyes of curious people. Once this mode is on, all links, shortcuts and traces of Folder Lock in Control Panel and the context menu of Windows Explorer disappear completely. This can help you make your private information totally protected from intruders as they are simply not aware of its existence. To disable the Stealth Mode, you should press the combination of CTRL+ALT+F.

3. Auto-Locking operations

Folder Lock lets you lock your files, and even your PC after a certain period of time. You can choose whether to autolock, lock PC, log off, reboot or shutdown your computer after a certain time of mouse or keyboard inactivity or total time. All this is done automatically. And this is not all. Find other useful auto-locking tricks at <http://www.newsoftwares.net>. Good luck!

Make Bandwidth Usage on Your Local Machine Transparent!

New **IP Traffic Monitor** lets you capture and view the content of TCP/IP packets for any selected connection on your local machine and visualize all connections statistics as a pie chart

Skyward Software, announces the release of version 2.2 of TCP/IP Traffic Monitor. This is a real-time TCP/IP monitor that tracks and analyzes all network connections on the local machine and provides you with the detailed information on each connection, including traffic direction and traffic volume in both directions. This information can help you detect spyware, adware, viruses and other suspicious activities before they compromise your system's security.

What's new in IP Traffic Monitor 2.2?

"With viruses and spyware causing havoc in homes and offices on a daily basis, there is a need for a simple, yet reliable tool to control bandwidth consumption on a local machine. IP Traffic Monitor delivers this competitive edge," says John Douglas, CEO of Skyward Software. "In version 2.2 we have introduced two additional features - Traffic Spy and Traffic Bar. As a real-time sniffer, Traffic Spy captures the data stream in real time, decodes packets and shows their content for any selected connection or all connections simultaneously. You can also filter packets by their content so that only packets that contain specified text are captured. Traffic Bar is another useful novelty. Instead of struggling through the digits, this feature lets you visualize connections statistics as a pie to easily estimate bandwidth distribution over hosts."

IP Traffic Monitor at a glance

IP Traffic Monitor has a simplistic interface, which shows the list of all currently available connections between your machine and a remote host. Statistics is updated in real time, so changes are immediately displayed. Information on each connection is detailed and includes remote IP: port, remote host, downloaded and uploaded bytes, local source (PID): port (process name, process identifier, and local port number), first activity and last activity time, and a full path to an executable file. For your convenience, IP Traffic Monitor lets you sort connections by any column, copy interesting statistics to clipboard and save it to a log file that can be analyzed in the built-in log viewer at any convenient time in the future. The program supports Proxy servers and works with ADSL, ISDN, Dial-Up, cable modem, and Ethernet cards.

Pricing and Availability

IP Traffic Monitor runs under Microsoft Windows 2000/XP/2003 and costs \$20 (USD) for a single-user license. Licensed customers are entitled to the unlocked version of the program, free upgrades, and priority technical support. Additional information on IP Traffic Monitor, as well as its functionally limited evaluation version is available from <http://www.skyward-soft.com>.

Aurora Password Manager: Leave Keeping of Your Passwords to a Professional!

Animabilis Software gives you a brilliant assistant that is able to bear total responsibility for your confidential data. Besides, this piece of software is absolutely free!

A recognized specialist in privacy technologies, Animabilis Software, today announces the release of Aurora Password Manager, a tool to protect your passwords. Not only does it take care of your private information, but it also features a number of remarkable functions, which are especially significant, since Aurora Password Manager is free of charge. A clear and simple style of the customizable interface is the very first feature you are certain to like. Secondly, it is worth to note that the program uses a strong encryption mechanism, which prevents unauthorized access (256-bit AES - Advanced Encryption Standard).

Apart from this, we need to dwell on the way your private information is kept. First of all, every user can create a file of his/her own (the program is virtually an SQL database, featuring simultaneous work of several users). In this file every user has a hierarchically structured list of folders (you can create the new ones, delete, rename, etc.). Each password record you add to one of these folders contains the following fields: subject, user name, password, URL, file path, comments. The user has an ability to create the unlimited number of extra fields to store data. In addition to this, you can set an expiration date for you password.

We often use very simple passwords and by doing so, we pose a serious threat to our security, but now you can feel relaxed: Aurora Password Manager has a built-in password generator, which chooses arbitrary combinations of symbols and generates passwords, which are impossible to guess. Advantages of the tool go further and another option to be mentioned is a special toolbar for MS Internet Explorer. This toolbar allows you to save and then automatically fill out web forms with data. This becomes very convenient as day by day you need to fill in your e-mail passwords, log-in forms and the like.

Aurora Password Manager has a built-in backup system, which allows you to set a number of copies you need to store. In practice this means that your data is certain to be safe and sound. Aurora Password Manager provides for a multitude of commonly used templates for storing such kind of data, as web site accounts, pin-codes or e-mail passwords, so you can go over to adding data right after you have installed the manager onto your computer.

Aurora Password Manager Features at a Glance:

- Provides strong 256 bit AES encryption;
- Features one multi-user database for all employees;
- Has a built-in toolbar for filling web forms in IE;
- Generates passwords, which are very hard to guess;
- Provides for advanced backup and restore options;
- Features data search and categorization options;
- Aurora Password Manager is free of charge.

Availability

Aurora Password Manager runs under Windows 98/Me/2000/XP/2003. You can download it at <http://www.animabilis.com/password-manager/download/Password-Manager-Installer.exe> (2.13 Mb)

HARD DRIVE AND CPU TEMPERATURES ON A 2.80C GHZ PENTIUM 4 PC SYSTEM

Author: Mike Boesen (mboesen@gmail.com)

Last updated: 23 March 2006

1. Background

This article is a follow up to an article I wrote for the PC Users Group magazine *Sixteen Bits*, describing applications that are useful in monitoring the temperatures of the CPU, motherboard and hard drives. The most up to date version of that article is here: http://www.pcuq.org.au/~boesen/temperature_software/temperature_software.htm). I used the applications when undertaking a number of tests on my PC to see how different circumstances affected the temperatures of hard drives, the CPU and motherboard. This new article summarises the results of those tests. I'll incorporate any improvements that people might suggest in an up to date version that is kept on my web site.

What lead me to become interested in temperatures was assistance that I gave to a number of PC users who were having problems with their PCs. I felt that in a few problem cases the possible cause was overheating. Initially, my initial concern related to hard drives and the CPU.

To be better informed about this topic I undertook a number of tests with my own PC. In these tests I observed the temperatures of the CPU, motherboard and hard drives under a number of conditions: different fan speeds, fans on and off, drive mounted internally and drive in removable caddy, idling and loaded conditions.

Taking into account the tests and my experience with other persons' PCs and from information that is available on the web, I am now of the view that it is unlikely that CPU temperature problems will occur for the vast majority of PC users. On the very few occasions that I have encountered CPU overheating problems it was because the CPU cooler had been installed inappropriately. On the other hand, I suspect that hard drive temperatures may possibly be a cause of some problems and that the life of some hard drives are likely to be shorter than they might otherwise be.

2. How hot is too hot?

2.1 CPU temperature

Modern CPUs are built to operate quite efficiently even when they are quite hot. For the Pentium 4 series for instance, Intel's stated maximum "case temperatures" are between 66 and 78 C. The "case temperature" is the temperature measured at the centre of the CPU's heat spreader - NOT the temperature of the PC's case. For my P4 2.80c CPU, Intel indicates that the maximum temperature is 74 C. Table 2 in this Intel article about Pentium 4 processors provides details about maxima for various versions of the P4: <http://support.intel.com/support/processors/pentium4/sb/CS-007999.htm> An abridged version of the table is below in [Appendix 1](#).

CPU temperatures will change rapidly in accordance with how much work the CPU is undertaking. A large range in temperatures for a CPU is quite normal and depends on the amount of work being undertaken, the ambient air temperature, the type and effectiveness of the CPU's cooling system and the ventilation conditions within the PC's case.

In the absence of specific information about the manufacturer's maximum operating temperature for a

CPU, I would be concerned if a CPU's temperature exceeded 65 C when the CPU is under heavy load and the ambient temperature is 27 C or less.

However, even if the manufacturer's maximum operating temperature is exceeded, a modern CPU such as the Intel Pentium 4 series is designed to slow itself down automatically, reducing power consumption and hence limiting the overheating to a tolerable level. This is referred to as "thermal throttling" or simply "throttling". When such CPUs get really hot - around 95 to 100 C they are designed to shut down completely. Infrequent shutdowns of this nature should not affect the operating life of the CPU but frequent shut downs **can** affect the life of the CPU.

If you want to see some nice charts showing throttling in action, have a look at this article:

<http://www.digit-life.com/articles2/p4-throttling/index.html> The testing conducted is described thus by the authors: "...we conducted a very simple experiment on two top Pentium 4 3.2 GHz CPUs, one with a Northwood core and the other with a Prescott. With the CPU loaded at 100 percent, we powered off the cooler fan and watched the temperature rise and the performance decrease as time went by."

There are a number of possible causes of excessively high CPU temperatures. My servicing checklist is this:

- Is the CPU cooler (fan plus heatsink) attached properly to the motherboard so that the heatsink is locked snugly onto the CPU? If the mounting clips are loose or unattached, this can have a VERY BIG effect on temperatures. Check gently to see if the cooler assembly is wobbly. Check clips visually.
- Is the fan on the CPU cooler operating reliably? Check speed. Check for bearing noise. Check for loose plug and sockets. Clean fan's fins if there is a lot of accumulated gunk (use a long-haired small flexible brush and vacuum cleaner to fix).
- Are the fins on the cooler's heatsink clogged up with accumulated dust and gunk so as to prevent air flow? Use a long-haired small flexible brush and vacuum cleaner to fix.
- Is the cooler's heatsink interfaced with the CPU using an effective heatsink interface material? This would be an extremely low frequency problem and requires removing the CPU cooler, so unless you are a technogeek, don't fiddle with this.
- If the only fan in the case is the one in the Power Supply Unit (PSU), make sure that fan is operating reliably and exhausting hot air out the back of the case. Clean fan's fins if there is a lot of accumulated gunk.
- Check that any other case fans are operating reliably. Rear mounted case fans should be exhausting warm air out the back of the case. Front mounted intake fans should be sucking air into the case. Clean fans' fins if there is a lot of accumulated gunk.

2.2 Hard drive temperature

Information available on the web about the effect of heat on hard drive reliability suggests that heat affects the reliability of the operation of a hard drive's components and its service life. For instance, this statement is made by one author: "*Moreover, reliability and durability of these drives depends much on their operating temperatures. According to our research, increasing HDD temperature by 5°C has the same effect on reliability as switching from 10% to 100% HDD workload! Each one-degree drop of HDD temperature is equivalent to a 10% increase of HDD service life.*" (<http://www.digit-life.com/articles2/storage/hddpower.html>)

The rotation speed of the platters in a hard drive has a very marked effect on temperature. This is because the rotating platters in the drive generate heat through air friction and the faster they spin, the more heat is generated. Therefore modern 7,200 rpm drives can generate a lot of heat that needs to be dissipated. Heat is also generated by the spindle motor and other electronic components.

Hard drive manufacturers provide information about the claimed minimum and maximum operating temperature for their hard drives. These maxima vary depending on the brand and model of the drive. Once again, if you really want to know what the maximum operating temperature is for a hard drive, you will need to do a Google search. For example:

- for 7,200 rpm Maxtor Diamond Max 10 drives, the manufacturer's stated maximum operating temperature is 60 C.
- for 7,200 rpm Maxtor Diamond Max 9 drives, the maximum is 55 C.
- for the Seagate ST340014A Barracuda drive the maximum is 69 C
- for the Seagate ST3200822A and ST3200021A (PLUS) models the maximum is 64 C.

I suspect that the setting of maxima may be a little arbitrary and that a manufacturer would be unable to provide a really scientific basis for the temperature stated. However, what seems to be generally agreed is that the service life and reliability of a hard drive will be affected by the temperature of the drive, irrespective of whatever the claimed maximum operating temperature is. My own rules of thumb (rule of thumbs?) are:

1. keep the drive temperature as low as possible
2. be concerned if the drive temperature exceeds 50 C.

If excessively hot drive temperatures are noted there are a number of possible causes. Virtually all are related to inadequate air flow over the hard drive. The importance of achieving such ventilation cannot be overemphasised. To improve ventilation I'd recommend consideration of these solutions:

- Ensure that there is a good air space between multiple drives and between a drive and any other other device or object that might constrain air flow. Wherever possible, avoid installing multiple hard drives in adjacent drive bays.
- If the PC has no case fans, make sure that the fan in the power supply unit is operating correctly and reliably.
- Increase ventilation by installing either a front intake fan or a rear exhaust fan (or both).
- If there is a front intake fan, position the hard drive/s so that the intake air is directed over and under the drive/s.
- Ensure that there is some form of air intake aperture at the front of the case near the hard drive/s. This is needed to ensure that any air drawn into the PC case will ventilate the drive/s. Close off any unnecessary apertures that would be preventing such an air flow occurring (e.g. missing PCI slot baffles, open optical drive bays, redundant ventilation holes that do not promote an effective ventilation path).
- Ensure that cables are situated so as to minimise obstruction of air flow inside the case. If the location of flat 40-core or 80-core hard drive or optical drive cables is a problem, replace flat cables with round cables. (But note that if there is no air flow over the drive/s this may be a pointless expenditure.)
- Ensure that removable caddies or their cradles have an exhaust fan and the caddy/cradle design is effective.
- Ensure that external drive enclosures have fan ventilation (may not be necessary for the small drives that are normally used for laptops).

3. Testing conditions

The PC that I undertook my tests on had these components:

- Antec SLK3700 case, with a 120 mm Antec exhaust fan at the rear of the case (see [Appendix 2](#)) and a 120 mm Spire intake fan at the front of the case. For both fans, I cut out the grille that comprises holes drilled in the PC case's wall. I did this to maximise the airflow created by the fans and to eliminate any noise caused by air turbulence. In place of the original grilles I installed thin wire grilles to prevent ingress of tiny fingers (see [Appendix 3](#)). Because of their size and the grille modification, the large fans move a lot of air very quietly.
- Case fan speeds manually controllable through a Super Flower Fan Master unit mounted in an optical drive bay.
- Zalman ZM400B-APS power supply unit (PSU). This has one internal exhaust fan with its speed governed by the temperature of the PSU's heat sink. When the PC is idling and the temperature has stabilised, the fan is inaudible.
- CPU: Intel 2.8 GHz Pentium 4 (2.80c)
- CPU cooling via a Zalman CNPS 7000 Al-Cu CPU heatsink and fan (see [Appendix 4](#)). The fan speed is controllable through settings in the PC's BIOS. The fan is quieter than the stock Intel cooler fan.
- Internally mounted hard drive: 7,200 rpm 120 GB Maxtor Diamond Max 10 with a Serial ATA interface. The drive is sited directly in front of the airflow generated by the front case fan and there is no other drive or device or airflow obstruction in close proximity (see [Appendix 5](#)).
- removable drive mounted in a Laser brand caddy inserted into a cradle positioned in an optical drive bay: 7,200 rpm 250 GB Maxtor Diamond Max 10 with Parallel UATA interface. Cradle has a 40 mm exhaust fan that sucks air through the front of the caddy, over the drive and then into the inside of the PC's case. The fan is only ever on when the caddy is fully inserted - see http://www.pcug.org.au/~boesen/backup_devices/caddy_fix.htm if you are interested in how I achieve that.

I monitored temperatures of my drives and CPU using the freeware application Motherboard Monitor 5. (See details in http://www.pcug.org.au/~boesen/temperature_software/temperature_software.htm)

All my tests were conducted with the speed of the CPU cooler's fan slowed to 2,150 rpm (versus the maximum possible of 2,660). Because of the efficiency of the Zalman cooler design and my use of two case fans I can run the cooler fan at this slower speed maintaining the CPU at an acceptable temperature, with virtually inaudible cooler fan noise.

I monitored temperatures under various conditions:

- Front and rear case fans off, then slowed (to about 1,500 rpm) and then at full speed (about 2,540 rpm). Results reported below in relation to the slowed fan rate may be indicative of what the situation might be if smaller case fans were used at full speed.
- CPU at idle (no programs running actively) then CPU at 100% full load. The full load condition was achieved using the application Stress Prime 2004. This excellent freeware application is available from <http://sp2004.fre3.com/> To achieve 100% CPU utilisation I had to run two instances of SP2004 simultaneously because my CPU has hyper threading enabled.
- Hard drives at idle and then under heavy load. The heavy load condition was achieved by making a compressed backup of the 95 GB of data on my internal SATA drive onto the removable PATA drive using Acronis True Image (see <http://www.acronis.com/homecomputing/products/trueimage/>) This heavy load condition was not as severe as could possibly be achieved but I felt that it was about as severe as most PC users would ever encounter. However, some data processing applications that involve really heavy disk read/writing might generate marginally higher drive temperatures.

My tests were undertaken in January 2006 (i.e. Summer here in the antipodes) and during days when the ambient temperature in the computer room was between 25 C and 27 C.

4. Test results

I won't bore you with the results of all the tests (the stuff below is boring enough). However, here are the highlights, presented in summary form.

4.1 CPU temperature results

- CPU at idle:
 - 43 C with no case fans on
 - 37 C with only rear case fan on full
 - 39 C with only front case fan on full
 - 36 C with both case fans on full
- CPU 100% loaded:
 - 60 C with no case fans on
 - 54 C with only rear case fan on full
 - 58 C with only front case fan on full
 - 54 C with both case fans on full

So:

- When idling, the CPU stays nice and cool (43 C) even with no case fans operating.
- However, one or two case fans make it even cooler at idle - between 36 C and 39 C.
- At idle one rear case fan is just a little more effective than a front case fan and brings the temperature down to 37 C.
- Under full load and with no case fans operating, the CPU gets quite hot (60 C) but still comfortably below the maximum of 75 C for my CPU .
- However, one or two case fans ensure that it is even cooler under full load.
- Under full load, one rear case fan is a little more effective than the front case fan and brings the temperature down to 54 C - some 23 C below the maximum.
- At idle and under full load, there is no real gain through having both a front case fan and a rear case fan. (But note that this applies to the CPU temperature - the story for hard drive temperatures is quite different!)

I also undertook testing with the case fans running at slowed speed. The results are consistent with the patterns in the above results, with temperatures being only about 2 C lower than those above.

4.2 Internal hard drive temperature results

- drive idling:
 - 55 C with no case fans on
 - 50 C with only rear case fan on full
 - 40 C with only front case fan on full
 - 35 C with both case fans on full
- with heavy drive activity:
 - 64 C with no case fans on
 - 54 C with only rear case fan on full
 - 41 C with only front case fan on full
 - 39 C with both case fans on full

So:

- When idling with no case fans on, the hard drive gets very hot - 55 C, or only 5 C below the maximum operating temperature.
- During heavy drive activity with no case fans on, the drive's temperature at 64 C **exceeded** the maximum operating temperature by 4 C - a big worry!!
- Turning the front case fan (only) on full brings the drive temperature down by a significant amount: to 40 C at idle; or to 41 C under heavy load.
- Turning the rear case fan (only) on full also provides some reduction in temperature: to 50 C at idle and 54 C under heavy load. However these reductions are smaller than was achieved for the front case fan. This suggests the importance of achieving air flow over the drive itself.
- With the two case fans on full, the idling temperature drops to 35 C at idle and to 39 C when undertaking heavy work. So the total temperature benefit compared with the no fans situation is 20 C at idle and 25 under heavy load!

I also undertook testing with the case fans running at slowed speed. The results are consistent with the patterns in the above results, but the cooling effectiveness is about 5 C less than with a fan or fans running at full speed.

4.3 removable hard drive temperature results

- drive idling:
 - 36 C with no case fans on
 - 36 C with only rear case fan on full
 - 41 C with only front case fan on full
 - 36 C with both case fans on full
- with heavy drive activity:
 - 44 C with no case fans on
 - 45 C with only rear case fan on full
 - 49 C with only front case fan on full
 - 41 C with both case fans on full

So:

- Under all the test conditions the temperature of the drive in the caddy was never greater than 49 C.
- Surprisingly, the worst performance (49 C) was under heavy load when the front case fan was running at full speed and there was no rear case fan operating. I assume that this is because the front fan is then generating a positive pressure inside the case, decreasing the ventilation effect of the small fan inside the cradle in which the caddy is inserted.
- The best performance under heavy load was 41 C when both case fans were on full.

I also undertook testing with the case fans running at slowed speed. The cooling effectiveness is about 2 C less than with a fan or fans running at full speed.

5. Conclusions

5.1 Caveats

Keep in mind that my conclusions reflect results for a system that:

- Has a moderately powered (70 W) CPU (Intel 2.80 c Pentium 4). Other CPU's will generate a lesser or greater amount of heat and may have different temperature maxima.

- Has a very efficient CPU fan and heatsink (Zalman) even though operating at a slow speed (2,150 rpm).
- Has large case fans (120 mm) mounted over unobstructed ventilation ports. Smaller case fans will provide poorer ventilation unless they are operating extremely fast (and hence generating a lot of noise). Ventilation effectiveness will also be a function of the speed of a fan and its blade and shroud design. It will also be a function of the construction of the ventilation ports - if the port has small ventilation holes in the port then the airflow will be constrained.
- Has a caddy/cradle design (Laser) that maximises the effectiveness of the airflow produced inside the caddy by the small 40 mm fan in the rear of the cradle. Other types of caddies will have less airflow if they do not have a fan, or if the cradle and caddy do not mate in a way that maximises airflow over the drive.
- Has a power supply unit (Zalman) that has its own very effective internal fan.
- Has fast (7,200 rpm) Maxtor hard drives that generate a fair amount of heat. Heat generated by other brands and models of drives may be greater or less. They may have different manufacturers' specifications regarding maximum operating temperature.
- Has only one internal hard drive that is sited directly in front of the airflow generated by the front case fan and which has no other drive or device or airflow obstruction in close proximity (see [Appendix 5](#)). Equivalent drives that are less favourably located will have considerably higher temperatures.
- Is not designed for or used for applications that require a really powerful video card or multiple video cards. The Graphics Processing Unit in my PC is an Nvidia GeForce FX 5700. So the amount of heat being generated by the graphics card in my PC is minimal.
- Was tested when the ambient air temperature was about 27 C. Lower ambient temperatures will mean lower CPU and drive temperatures, and the opposite will apply for higher ambient temperatures.

5.2 Conclusions about my own PC

1. CPU temperature:

- Even when running at 100% load, and with the two case fans turned off, my CPU temperature of 60 C was comfortably below the maximum of 75 C - a safety margin of 15 C.
- However, if I ever wanted further assurance that I would never exceed the maximum temperature under full load, then running the rear case fan alone would provide a big safety margin of about 23 C running at full speed or about 21 C when running at reduced speed .
- The front case fan would not provide any further benefit over the rear case fan. However, running it would have no negative effects on CPU temperature (and would have a positive benefit for the temperature of the internal hard drive - see below).

2. Internal hard drive under heavy load:

- With no case fans operating, the internal drive would become hotter than the manufacturer's stated maximum under heavy load. That is an unacceptable situation.
- If run at slow speed, I'd be very concerned about whether or not the 120 mm rear case fan by itself would be enough to keep the temperature lower than the maximum of 60 C under heavy load. Also not an acceptable situation.

- If run at full speed, the 120 mm rear case fan by itself still would not provide sufficient cooling: the drive would be at 54 C.
- If run at half speed, the rear case fan by itself does a better job than the rear case fan, but the drive is still a very warm 46 C.
- If run at full speed, the front case fan by itself does a better job than the rear case fan, and the drive is a tolerably warm 41 C. However this option would not be a good one because having the rear fan in operation has benefits for the CPU temperature and the temperature of a drive if it were to be in the removable caddy (see below).
- If both 120 mm case fans are run at slow speed, under idling conditions the temperature of the internal hard drive is about 30 C. In my view this is quite an acceptable temperature. So what I will do when the PC is idling or I am doing work that requires infrequent or intermittent read/writes to the hard drive, is to turn both fans to the slowed speed.
- However, if both 120 mm case fans are run at slow speed under heavy load the drive would be quite warm at about 44 C. In contrast, running both 120 mm fans at full speed would ensure that under heavy load the drive was kept at a reasonably low temperature of 39 C. So when I am undertaking work requiring heavy disk activity (e.g. creating a compressed backup, defragmenting, virus scan of the whole drive), I will run the fans at full speed. An associated cost is a slight increase in fan noise. However, because of the large fan diameters and the absence of a punched metal grille, the fan noise is very muted and is only a gentle whooshing. In any event, when such heavy disk activity is being undertaken, I am elsewhere.

3. removable hard drive in a caddy when under heavy load:

- With both case fans operating on full, the temperature of the removable drive would be a tolerable 41 C.
- The effectiveness of the small fan is greatest when there is a front and rear case fan operating, and worst when there is a front case fan operating but no rear case fan.

4. In the light of the above findings, I am now confident that this hardware configuration will ensure that the temperatures for my drives and the CPU will never exceed the maxima, and there will be very little fan noise:

- CPU cooler fan (running at the reduced speed that applied during all the tests).
- 120 mm rear case and 120 mm front case fans normally running at reduced speed and only run at full speed when very intensive disk operations are being undertaken. This change in speed is possible on my system because I can control the speed of the case fans using the Fan Master unit.
- 40 mm cradle fan ventilating the drive in the caddy on the occasions that it is inserted (but fan off when no caddy is inserted).
- Internal drive situated directly in front of the airflow generated by the front case fan and with no other drive or device or airflow obstruction in close proximity.

5.3 Recommendations that other PC users may wish to consider

Here are some recommendations for others to consider in respect of their PCs:

- If your CPU cooler (fan plus heatsink) is correctly installed and appropriate for the CPU, and

there is at least one effective exhaust fan (e.g. that in the the power supply unit), it is unlikely that the maximum operating temperature for the CPU will be exceeded.

- If you ever have any reason to believe that your CPU is overheating, it could be useful to find out what the maximum operating temperature is for your CPU and to do a spot check on its temperature during some process that involves heavy CPU activity. The freeware application Everest (see http://www.pcug.org.au/~boesen/temperature_software/temperature_software.htm) can tell you the CPU temperature and the freeware application SP2004 (see <http://sp2004.fre3.com/>) can be used to put the CPU under 100% load.
- While I'd guess that CPU temperatures in the vast majority of PCs would be OK, I'd also guess that there are quite a number of PCs that have hard drives that will be operating at higher than acceptable temperatures during times when the hard drive is undertaking heavy work (e.g. during the creation of a backup clone or compressed backup or a defragmentation). The reason I say that is that in my PC, with a single drive mounted well clear of any other drives or hardware, with an air intake vent located in front of the drive, a large rear case fan mounted over an unobstructed port and operating at half speed, the drive temperature under heavy load was only 1 C lower than the maximum. I have seen many PCs that have either no case fans, or only a small rear case fan mounted on a small-holed exhaust port, with hard drives sandwiched on top of each other or tucked away with optical drives at the top of the case (the hottest part of the case), and no suitably located air intake vent. The temperature of at least some such drives will be exceeding the manufacturer's stated operating temperature and others will have drives that are running unacceptably hot.
- If you ever have concerns about hard drive temperatures, it could be useful to find out what the maximum operating temperature is for each drive and to do at least a spot check of temperature during some process that involves heavy drive activity. To stress the drive, run some disk-intensive activity (e.g. backup, virus scan, defragmentation).
- The freeware applications HDD Thermometer, HDD Health and Everest (see http://www.pcug.org.au/~boesen/temperature_software/temperature_software.htm) can tell you the drive temperatures are for drives that have SMART (Self Monitoring and Analysis Reporting Technology) implemented. For more information about SMART and which of the SMART attributes are critical, see http://en.wikipedia.org/wiki/Self-Monitoring,_Analysis_and_Reporting_Technology Most modern drives implement SMART. HDD Thermometer can be configured to show real time drive/s temperature/s all the time in the system tray. HDD Health can be configured to monitor the temperature and other attributes of your drives, to display the temperatures on request and to provide a warning whenever the temperature of a drive exceeds a limit that you select. It can also provide an predictive estimate of the health of your drives. It is very much worthwhile configuring HDD Health to load automatically whenever you start your PC. Everest is good only for a spot check on drive (and CPU) temperatures.
- If a drive's temperature appears to be too high under load, consideration should be given to these types of fixes:
 - Relocate hardware so that that there is an air space between each drive and other hard drives or other devices.
 - Relocate dual drives so that they are not in adjacent drive bays.
 - Install a front intake fan or both front and rear fans.
 - Make sure that there is an air intake aperture at the front of the case near the hard drive/s. Position the hard drive/s so that any drawn in air flows over and under the drive/s.

- Close off any unnecessary apertures that would be preventing an air flow occurring across the drive/s.
- Relocate cables to minimise obstruction of air flow inside the case. If the location of flat 40-core or 80-core hard drive or optical drive cables is a problem, replace flat cables with round cables. (But note that if there is no air flow over the drive/s this may be a pointless expenditure.)
- Only use caddy/cradle units that have an exhaust fan and that have an effective design in terms of air flow route. Check periodically to make sure that the exhaust fan is still functional (being small, they can wear out quickly).
- Only use external drive enclosures that have fan ventilation (may not be necessary for the small drives such as the Travelstar that are normally used in laptops)
- If noise from additionally installed case fans is a concern, consider installing a fan speed control unit. There are many types of such units, ranging in price from \$25 AUD to about \$100 AUD.

Appendix 1. Boxed Intel Pentium 4 Processor Thermal Specifications

Source: <http://support.intel.com/support/processors/pentium4/sb/CS-007999.htm>

Note: This table is an abridged version of the original table in the source.

Processor Core Frequency (GHz)	Processor Package	Maximum Case Temperature (oC)	Maximum Recommended Fan Inlet Temperature (oC)	Processor Thermal Design Power (W)
1.30	423-pin OOI	69	40	48.9
1.30	423-pin OOI	70	40	51.6
1.40	423-pin OOI	70	40	51.8
1.40	423-pin OOI	72	40	54.7
1.40	478-pin FC-PGA	72	40	55.3
1.40	478-pin FC-PGA	72	40	55.3
1.50	423-pin OOI	72	40	54.7
1.50	423-pin OOI	73	40	57.8
1.50	423-pin OOI	73	40	57.8
1.50	478-pin FC-PGA2	73	40	57.9
1.50	478-pin FC-PGA2	73	40	57.9
1.50	478-pin FC-PGA2	71	40	62.9
1.60	423-pin OOI	75	40	61.0
1.60	423-pin OOI	75	40	61.0

1.60	478-pin FC-PGA2	75	40	60.8
1.60	478-pin FC-PGA2	75	40	60.8
1.60A	478-pin FC-PGA2	66	40	46.8
1.70	423-pin OOI	76	40	64.0
1.70	423-pin OOI	76	40	64.0
1.70	423-pin FC-PGA2	76	40	63.5
1.70	478-pin FC-PGA2	76	40	63.5
1.70	478-pin FC-PGA2	73	40	67.7
1.80	423-pin OOI	78	40	66.7
1.80	423-pin OOI	78	40	66.7
1.80	478-pin FC-PGA2	77	40	66.1
1.80	478-pin FC-PGA2	77	40	66.1
1.80A	478-pin FC-PGA2	67	40	49.6
1.90	423-pin OOI	73	40	69.2
1.90	478-pin FC-PGA2	75	40	72.8
2	423-pin OOI	74	40	71.8
2	478-pin FC-PGA2	76	40	75.3
2A	478-pin FC-PGA2	68	40	52.4
2.20	478-pin FC-PGA2	69	40	55.18
2.26	478-pin FC-PGA2	70	40	56.0
2.40	478-pin FC-PGA2	70	40	57.8
2.40A	478-pin FC-PGA2	69.1	38	89
2.40B	478-pin FC-PGA2	71	40	59.8
2.40C	478-pin FC-PGA2	74	40	66.2
2.50	478-pin FC-PGA2	72	40	61.0
2.53	478-pin FC-PGA2	71	40	59.3

2.53	478-pin FC-PGA2	72	40	61.5
2.60	478-pin FC-PGA2	72	40	62.6
2.60C	478-pin FC-PGA2	75	40	69.0
2.66	478-pin FC-PGA2	74	40	66.1
2.80	478-pin FC-PGA2	75	40	68.4
2.80A	478-pin FC-PGA2	69.1	38	89
2.80C	478-pin FC-PGA2	75	40	69.7
2.80E	478-pin FC-PGA2	69.1	38	89
3	478-pin FC-PGA2	70	38	81.9
3E	478-pin FC-PGA2	69.1	38	89
3.06	478-pin FC-PGA2	69	38	81.8
3.20	478-pin FC-PGA2	70	38	82.0
3.20E	478-pin FC-PGA2	73.2	38	103
3.40	478-pin FC-PGA2	70	38	82
3.40E	478-pin FC-PGA2	73.2	38	103

Appendix 2. Rear case fan

Rear case fan is 120 mm Antec. Note the grille behind the fan's blades. Fan is attached to case using zip ties with silicon pads behind each corner of the fan to minimise any noise due to vibration. The Zalman cooler is in the foreground. Another view of the Zalman cooler is shown in [Appendix 4](#).



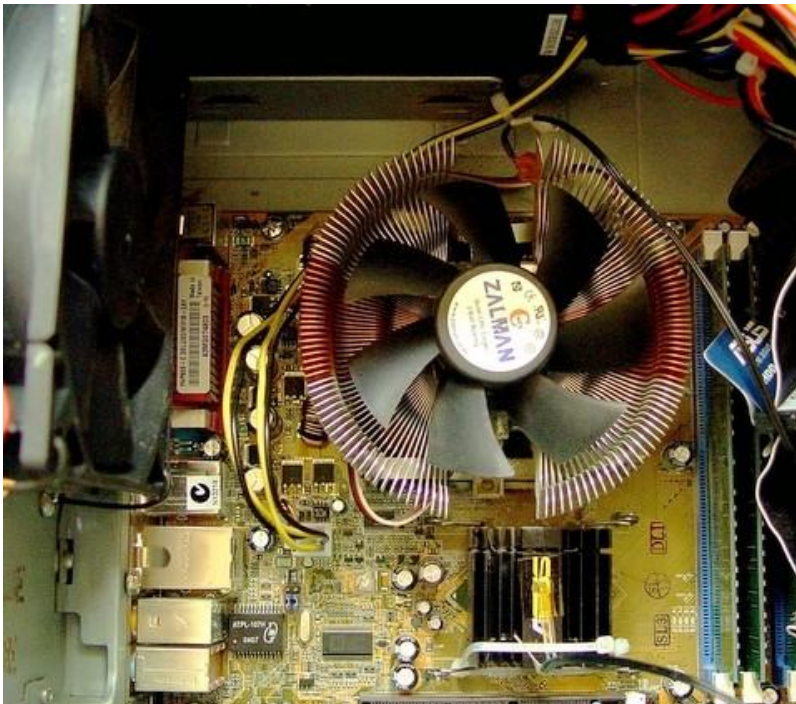
Appendix 3. Grille for rear case fan

Fan's grille is on the right. Original punched hole port for this fan has been nibbled out. Not elegant, but is effective. The smaller grille is on the Zalman power supply unit.

fan_grille.jpg

Appendix 4. Zalman cooler

The cooler consists of the heatsink (the thing with all the fins) with a integrated fan the centre. The black object on the left is the rear case fan. ASUS P4P800E-Deluxe motherboard..



Appendix 5. Drive bay

The drive bay has space for 5 drives, only one of which is occupied by the 120 GB SATA drive. The ANTEC case is extremely well designed. Note the rubber grommets for mounting screws. The drive cage is removable.

The orange object is a 120 mm fan at the front of the case. This is a slow-revving Nexus 'Real Quiet'

fan which I am currently testing in place of my normal 120 mm Spire fan. The fan is attached to case with zip ties and silicon pads under each corner.



Mike Boesen

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Freeware discussion

SmartClose

[SmartClose](#) is a freeware alternative to [EndItAll2](#) (still available for free download at the time of printing) that allows you to close all currently running programs - to minimize conflicts and to avoid replacing in-use files. This can be a tedious task when performed manually with ctrl-alt-del, and usually requires a restart to get all your programs back up and running.

With SmartClose however, the entire process is simplified and automatic as it stores the running program information in a system snapshot, and not only closes all applications for you but also restarts/restores them later. The program can be customized in various aspects, and a quick wizard also allows you to exclude programs from being closed or restored. It will automatically skip applications that are required for the Windows system to run. In addition, it supports services, as well as Explorer and Internet Explorer windows and saves their current location, so they can be restored properly.

While offering essentially the same features as EndItAll it is immensely slower and, while it permits restoration of the system state without rebooting, it does not appear to restore all running programs. On my PC it does not restore the desktop search, *Copernic*, or the antivirus, *Avast*, icon to the system tray. Checking through Process Explorer revealed that both of these programs were, in fact, running. I was able to scan files by right clicking, and I could show the Copernic toolbar on my desktop, but no longer had direct access to either program. This issue is one of the negative aspects discussed in the user forum at <http://www.snapfiles.com/opinions/SmartClose/SmartClose.html>

My own peace of mind requires that I restart anyway, so I see no advantage in the restore function. Try it for yourself.

TerryB

How to directly boot into Windows XP, without logging-in or entering passwords:

1. Click **Start > Run**
 2. Type '**cmd**', hit **enter**
 3. At the command prompt type: **control userpasswords2**
 4. A Windows-2000 looking window will popup, and under the Users tab **uncheck** the option selected,
"Users Must Enter A User Name And Password To Use This Computer"
 5. Click **OK**
 6. Enter the **username** and **password** of the account you would like Windows to automatically log into after booting up
 7. Close, reboot windows to test it out.
-

Booklet macro for Microsoft Word

It is often desirable to produce a document in other than conventional A4 format, and many PC users employ programs like [FinePrint](#) to print professional A5 size booklets with correct page numbering automatically and painlessly. But many users cannot justify the expenditure on this fine program when they only need to print the occasional booklet.

Microsoft have addressed this issue and provide a macro for their Word 2002 word processor that has the built-in ability to print booklets with automatically numbered pages, and is available for free download from <http://word.mvps.org/FAQS/Macros/VBA/BookletMacro.htm>

Changing the "registered owner" in Windows

Does Windows think your name is "Satisfied Dell Customer"? When you install new programs, do they want to send a confirmation e-mail to "OEM User"? Or when you first installed Windows, did you misspell your own name?

A rose by any other name

When you first install Windows, the installer prompts you to type in your name and organization. If you bought your computer with Windows pre-installed, you probably had an opportunity to type your name and organization too, although the computer manufacturer may have filled it in for you. (Thus, the ubiquitous "Satisfied Dell Customer".)

You might think the name and organization live somewhere deep inside your PC, chiselled in stone on some super-secret security chip. Not so. In fact, they're both stored in the Windows Registry - and they're very easy to change, if you know where to look.

Tweaking the Registry safely

Many people believe that demons and monsters lurk inside the Registry; one wrong step and your system's toast, never to boot again.

Guess what? They're right.

If you bang around the Registry, you may well succeed in reducing your PC to a lump of quivering dissociated electrons. But if you're reasonably good at following instructions - say, on a par with the "Apply, lather, rinse, repeat" directions on a shampoo bottle - there's no reason in the world why you can't go in and change your registered owner name, and live to tell the tale.

Finding RegisteredOwner in the Registry

First, do a "System Restore".

To dig into the Registry, you need a program called the Registry Editor. It's easy to find: click Start, Run, type **regedit** and press Enter.

On the left side of the Registry Editor window, double-click HKEY_LOCAL_MACHINE, then double-click SOFTWARE, then double-click Microsoft, then double-click Windows NT (yes, it's Windows NT, even if you're using Windows XP), then double-click CurrentVersion.

On the right, you should see a list of Registry values, with columns labelled Name, Type, and Data. The two names we're concerned about: RegisteredOwner and RegisteredOrganization. If you don't see those names in the right pane, you're in the wrong place, so click File, Exit to get out of the Registry Editor, and start all over again.

Changing Windows' owner and organization

To change the registered owner, double-click the name **RegisteredOwner**. In the box marked Value Data, type in whatever name you want to appear as the Registered Owner (such as William Gates III). When you have the name right, click OK.

Similarly, to change the Registered Organization, double-click **RegisteredOrganization** and type the new organization name in the Value Data box.

When you're done, click File, Exit to get out of the Registry Editor and back into reality. Make sure you got it right by clicking Start, right-clicking My Computer, and choosing Properties.

Baillie McKenny

PopTray

[PopTray](#) is a freeware mail notifier similar to [Mailwasher](#), and [FrontGate](#). Each of these utilities has its particular presentation and features, and consequently its devotees. Unlike some other mail clients Poptray has plugin support for protocols other than the common POP3, including IMAP4, POP3SSL, Hotmail, etc.

PopTray integrates with all popular mail clients such as Microsoft Outlook Express, Eudora, and Mozilla Thunderbird, and permits an unlimited number of accounts. Each of these is allocated its own tab. Messages can be quickly previewed without downloading. You'll be able to see who the email is from, the subject, and the attachment. This will enable you to decide if you want to delete the email, mark it as spam, or keep it. A great way to stop viruses or large attachments.

Spam management includes creating rules and using white/black lists for control. Rules identify a message according to your criteria then carry out the action you specify, like deleting from the server or marking as spam. The white list is used to specify friends you would want to receive messages from. If someone is listed in the white list, any email from him would not be deleted even when a rule attempts to delete the message. The black list is email addresses that you do not want to receive any mail from. If the address is listed here any message from that address will be deleted every time you check the server.

Creating new mail will open your default email client ready to send a message. Clicking the Reply button will open your default email client and create a message ready to reply. When the *"MAPI instead of mailto:"* option is checked, the reply will use your default MAPI client. When using MAPI your complete body will be quoted in the reply message. Using "mailto:" limited the reply body to 2000 characters.

With the prevalence of spam and malicious emails like phishing scams, it is almost essential to have a facility for previewing your mail. Mailwasher and FrontGate have been around for a long time. This newcomer to the field may be what you need.

TerryB

Windows XP Chkdsk

Recently, I used the Windows disk checking and repair utility (in anger) and successfully. Again I realised that this procedure was relatively unknown, and by those who, perhaps, should have known. This utility should be one of the first steps in troubleshooting a failing hard drive...

It can also be useful if you cannot boot into Windows, but can get to the DOS prompt (Using F8 on boot)

In Windows XP you can perform error checking on hard drives by using the chkdsk.exe command line

utility. Chkdsk will verify and repair (optionally) the integrity of the file system on any chosen volume. You should run this utility (yes, another one) on a regular basis (at least once a month?).

Windows XP Chkdsk - How To Use The Command Line...

When Windows XP encounters a problem and has to shut down - perhaps there is a power cut, a motherboard problem etc.. the operating system will "flag" the volume as "dirty" and attempt to check it on reboot.

NB - You can manually check the state of the dirty flag for your C: drive.

To do this at the Command Prompt type : **fsutil dirty query c:**

The response should be **Volume - c: is NOT Dirty**

However, you can manually run the chkdsk command.

To do this:

Step One: Click **Start**, select **Run**

Step Two: In the box, type **cmd**

Step Three: Click **OK**

Step Four: Run the chkdsk utility by typing in the following command: **chkdsk c:**

..or **chkdsk c: /f /r**

NOTE: The /f command automatically fixes any errors encountered; the /r command locates bad sectors and recovers readable information.(Assuming the drive you wish to check is the C: drive.)

Step Five: A reboot is normally required for the chkdsk program to run correctly, so simply restart the computer and chkdsk will run automatically. When it's finished, (this process can take quite a while depending on the size of your disk, etc.), it will boot back to normal Windows.

On Rebooting the PC you will see the disk being checked as in the screenshot below:



This process can take up to an hour!

Windows XP Chkdsk - How To Use The Graphical Version...

In addition to the command line utility detailed above, it is possible to access a graphical version of the Windows XP chkdsk.

To do this:

Step One: Open **"My Computer"**, RIGHT click on the C drive icon, choose **"Properties"**.

Step Two: When that loads, click on the **"Tools"** tab, then click on the **"Check Now"** button in

the "**Error Checking**" section.

Step Three: When that little window loads, place a **CHECK** in **BOTH** boxes, then click on "**Start Now**".

Step Four: A message will pop up saying that Error Checking will run after you restart the computer, so... **restart** the computer.

Error Checking will run automatically after the restart and it locks you out until it's finished.

It takes some time to perform the task - it will restart into Windows automatically.

Baillie McKenny

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Digital Discussion

Digital Zoom - A brief discussion with recommendations

Introduction

In the early days of only optical lenses on cameras we had to carry around a bag of various focal length lenses to meet different needs - wide angle, telephoto, close-up. Ponderous! Then we had the luxury of zoom lenses that encompassed focal lengths from wide angle to quite powerful telephoto in the one lens. A further development embraced macro photography, so the one lens was then capable of close-ups of insects or flowers through wide angle to telephoto. At the same time lens construction advanced to reduce the physical size and weight of the lens by an astonishing degree. Approaching photographic Nirvana.

Then came digital cameras, becoming increasingly smaller and lighter in weight. And with them came the concept of digital zoom to reduce the need for the physical components of telephoto lenses. That feature could be accomplished by digital manipulation of the image within the camera, in the same way that we resize pictures using digital image editing software on our PCs. Now my 3.0 megapixel old Olympus with an 8x optical zoom and a 3x digital zoom claims to give me a seamless zoom to 24x. But is this really an acceptable alternative to optical magnification? In a word - "No". However, in some situations, for some people optical zoom may be useful.

Cameras achieve optical zoom by moving lenses to increase the magnification. What happens is that the image that is directed onto the full area of the sensor in the camera is a magnified part of the image that would appear if there were no zoom. An unzoomed image occupies all the full area of the sensor; the zoomed image also occupies the full area of the sensor and is simply a magnified smaller part of the real life image.

In most, if not all digital cameras that have both optical and digital zoom, the digital zoom is implemented only after the full extent of the optical zoom has been reached. However, to keep things simple, in the hypothetical example of optical versus digital zoom that follows, I have compared what happens with a 3x optical by itself and a 3x digital zoom by itself.

Optical zoom example

In my 3 MP (megapixel) camera I can set various resolutions for my picture, from 640x480 pixels to 1984x1488 pixels (the maximum for a 3 MP camera). For convenience, let's see what happens if I get my camera to record an image of a bird in a tree, with a resolution of 1600x1200 pixels.

An unzoomed image encompassing the whole tree will produce an image of 1,920,000 pixels (1600x1200). Let's say we do a 3x optical zoom to achieve an image comprising just the bird, the size of the captured image will still be 1,920,000 pixels. However, the area captured in this image will be only 1/9th of the area for the unzoomed image of the whole tree.

If we compare the bird part of both images, the resolution (i.e. fineness of detail captured) for the optically zoomed bird image will be much greater than for the bird portion of the unzoomed image: the bird in the unzoomed image will be represented by 213,333 pixels of information; the bird in the 3x zoomed image will be represented by 1,920,000 pixels of information.

Interpolated digital zoom example

An image captured via digital zoom is quite different. There are two types of digital zoom. The most common form of digital zoom involves image "interpolation" and is discussed here first. The

second type is called "smart zoom" and is discussed later. For our example, if we still want the bird as a 1600x1200 pixel image, and were to do a 3x digital zoom, the camera would create a crop comprising 1/9th the 1,920,000 pixel image of the whole tree - that part of the image that contains just the bird. That crop contains only 213,333 pixels of information. The 213,333 pixels in the crop would then be used to generate a 1600x1200 image containing 1,920,000 pixels. The extra 170,666,666 pixels are generated by the camera's software using a process called "interpolation".

If you were to compare those images of the bird captured using optical zoom and digital zoom, the optical zoom image would provide a more accurate depiction of what the bird really looks like. The digital zoom image would be a less accurate depiction because the interpolation process has created (fudged up) a whole lot of pixels. In some circumstances, the quality of such an image may be quite adequate. For example, it may be quite OK in creating a 6 x 4 print. Loosely equating pixels on a monitor to dots per inch on paper, we can see that a 1600x1200 pixel image will print at 5.3 x 4.0 inches at 300 dpi - or near enough to the standard 6 x 4 postcard sized output that can be produced from one of those ubiquitous print kiosk machines. If you don't intend to produce anything larger than postcard size photos, then even 100 dots per inch can be acceptable. And the resolution of an interpolated image may be quite adequate for viewing on many PC monitors or inserting into HTML pages for the Internet, or as an attachment to an email. However, if you plan to generate larger prints - say, 8 x 10 size - portions of the print may appear fuzzy and with peculiar colouring.

In contrast, a 3x optically zoomed image of the same resolution as an interpolated image created through digital zoom will display a more accurate representation of the actual object. When viewed on a high quality PC monitor, or if printed as a largish sized picture, the result should be much clearer, realistic and without interpolation artefacts.

If you do decide to use a camera's digital zoom feature to capture an image, one way to create a higher quality result is to use a higher resolution. For my camera, for instance, I could generate pictures with a resolution of 1984x1488. In that case my digitally zoomed cropped digital image would have contained more detail at 328,021 pixels. So cameras with a 5 or 7 megapixel image sensor provide more capacity for exploiting digital zoom. However, the sizes of images saved are enormous and would severely restrict the number of photos you could fit on any memory card. Not worth the effort in my opinion. But if you are planning on printing big pictures you can surely use all the pixels you have available.

A straight comparison of digital and optical zoom is presented at:

<http://www.cambridgeincolour.com/tutorials/image-interpolation.htm#digital-zoom>

Smart Zoom

There is at least one different way of undertaking digital zoom: Sony has a digital zoom function that it calls "smart zoom". This achieves an in-camera digital zoom that does not involve interpolation with its associated artefacts and loss of original information. What it does is to save as a non-interpolated image a smaller part of the full image. So for instance, if the camera's sensor is 5 MP, the image that is actually saved may be the 3 MP central portion of that full image. What would be saved is an image smaller than the maximum available but with the same image quality.

More information about smart zoom, and a fuller explanation of digital zoom in general are available in these articles:

<http://www.megapixel.net/html/articles/article-dzoom.php> ,

<http://www.photoxels.com/article-optical-digital-zoom.html>

And if you are really interested in a very technical exposition with examples:

<http://www.digitalsecrets.net/Sony/AdvancedKnow5-SZ.html>

Bottom line

If you intend to process a digital image yourself using any of the excellent digital imaging applications that are available such as Photoshop or Paintshop Pro, keep in mind that you would be able to use the application to undertake the cropping and interpolation process that the camera undertakes in making a digitally zoomed image. In doing that work yourself you may be able to achieve a better result than the camera does. For example, you have the option of selecting exactly what part of the full area is to be selected as the crop, so as to get a good composition. In addition, if you are going to make other enhancements involving interpolation (e.g. sharpening) you may obtain a better result, because you can manipulate the original information that was captured rather than undertaking interpolations on an already interpolated image.

Even smart digital zoom is still only simulating the net result of an optical zoom by saving a crop of part of a full-size image. If you intend to edit and manipulate your digital images in an image editing application, then you can achieve the same or better outcome through in-application cropping of the full size image. Again, you may be able to achieve a better outcome because you can locate the cropping borders so that an ideal composition is achieved. With an image saved with smart zoom, anything outside the borders of the "zoomed" image is not saved.

If you have the software and skills required to undertake editing of digital images yourself, my view is that you will gain nothing through use of interpolated digital zoom or smart digital zoom. In fact, you may be able to achieve a better outcome through your own editing of an image that has not been generated via digital zoom.

However, if are not ever going to do any image editing yourself and/or you are only going to get small prints made, and/or all you want are small images to be used in web pages or email attachments, digital zoom can be useful, especially "smart zoom".

Terry Bibo & Mike Boesen

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POWER CONNECTOR PROBLEMS WITH HARD DRIVES, CADDIES AND OPTICAL DRIVES

Author: Mike Boesen (mboesen@gmail.com)

Last updated: 3 April 2006

1. Background

In recent days a number of PCUG members have reported intermittent problems with hard drives and optical drives (CD or DVD drives). Some of these appear to have been due to loose or faulty power connectors. This risk of this type of problem is compounded if a hard drive is in a caddy that can be inserted into a cradle located in one of the optical drive bays, because there are two power connectors per drive:

- one 4-socket plug connects the power supply to the cradle in which the caddy resides when it is in use
- inside the caddy another 4-socket plug connects to the drive inside the caddy.

With permanently mounted hard drives and optical drives, there is usually only one plug involved per drive, except where a power lead has been extended with another power lead.

Irrespective of whether or not your hard drives are mounted internally or in caddies, intermittent problems with hard drives and also with optical drives may be due to loose or faulty power sockets. So it is worth while checking the condition of your hard drive and optical drive power connectors if you are having intermittent problems with them.

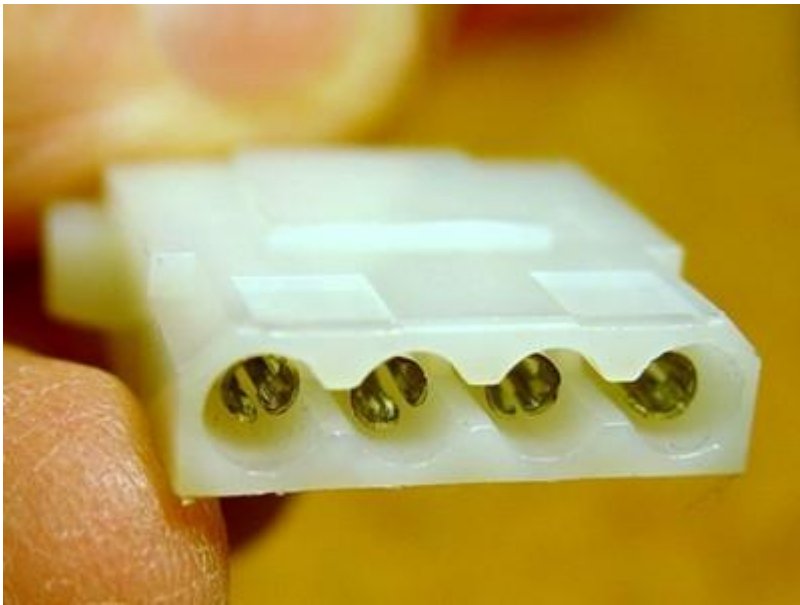
Checking power connectors

If you are inspecting your power connectors, check for these two things:

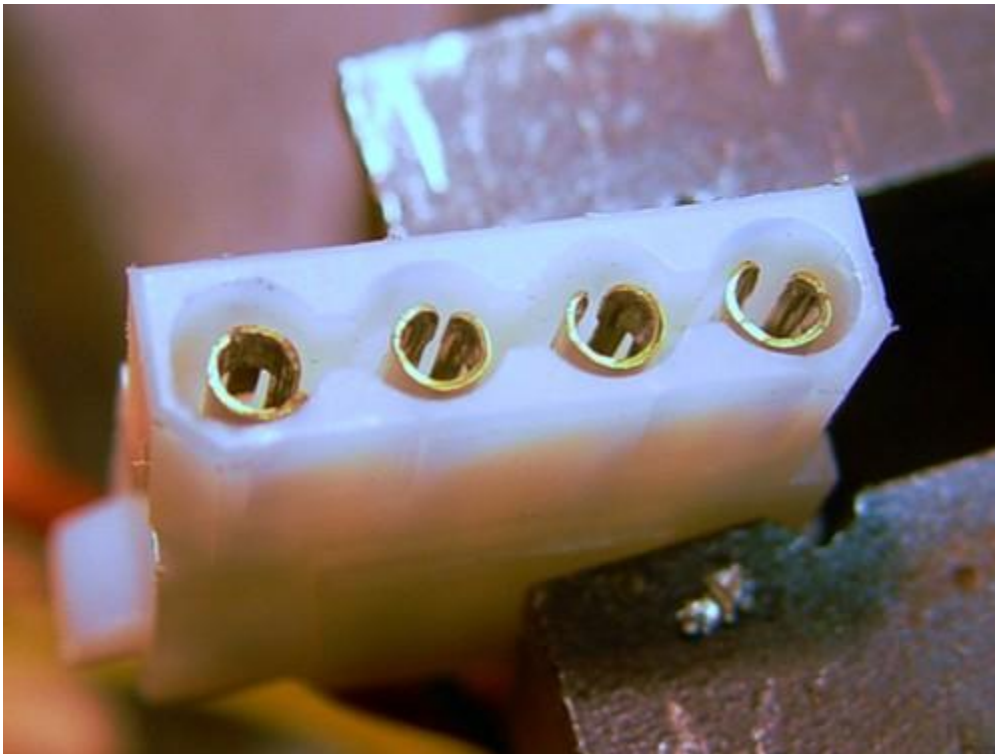
- Is it very easy to extract the 4-sleeve female power plug that connects to the 4-pin male socket at the rear of the drive (or rear of the cradle)? If so, it is indicative of either being only partially inserted, or having spread sleeves (explained below). This is not an uncommon problem. Ideally, the socket should be moderately hard or even quite difficult to remove because that indicates full insertion of the plug into the socket and sleeves that grip the pins tightly.
- Does a gentle pull on each of the wires that go into the rear of the 4-sleeve plug meet with firm resistance? If not, the sleeve may not be inserted correctly into the plug or the wire may not be attached to the sleeve inside the plug. Don't pull the wires hard. This is a very uncommon problem.

Spread sleeves

The most frequent bad connection problem is spread sleeves in the 4-sleeve plug. The sleeves are split metal cylinders with an inside diameter a bit smaller than 2 mm. They are designed to fit tightly over the four pins in the receiving socket. The diameter of the pins are a bit over 2 mm. This is a picture of a plug (in reasonable condition):



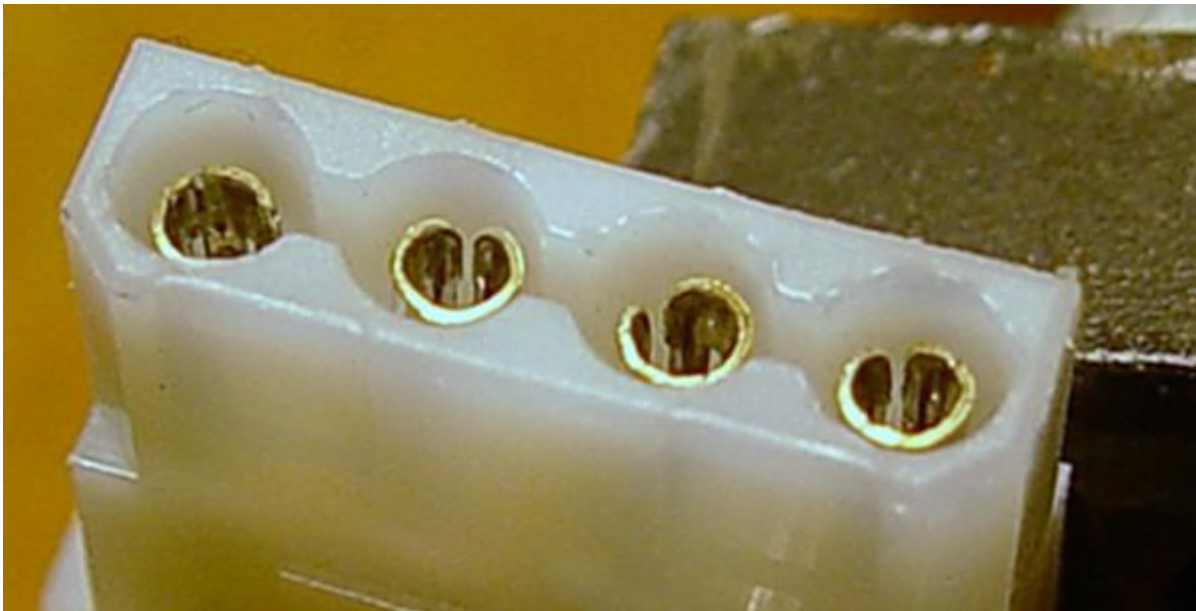
If the 4-sleeve plug is removed at an angle or inserted at an angle, or extracted and inserted often, the sleeves can be easily spread. The spread increases with frequent extractions and insertions. This is a picture of plug with a sleeve spread to show you what a defective one can look like - the one on the right is definitely sick and the second from the right looks marginal. The third from the right looks OK.



To close up a sleeve, insert a small jeweller's screwdriver with a 2 mm wide blade (or maybe a pointed nail file) between the outside of the sleeve and the wall of the hole in the plastic case. Lever the metal side of the sleeve inwards so as to close the gap in the sleeve.



Do that both sides of the gap. Achieve a nice round result if possible. The sleeve material is relatively malleable, so don't worry if you need to do a bit of fiddling to get the gap closed up to the desired amount and the sleeve nicely rounded. A good idea of the desirable gap can be obtained by looking at any of the unused 4-sleeve plugs that may be inside your computer. Or have a look at a 4-sleeve plug that is extracted and inserted infrequently and/or which is hard to extract from its socket. After adjustment, the cylinder on the right should be closed up to look like this:



I need to close up a tad the second sleeve from the right, too. After closing up any errant sleeves, see how the plug fits - it should require a fair bit of force to insert and to extract. If it slips in and out quite easily, the sleeve gaps are still too big.

Incorrectly inserted IDE/UATA cables

Another possible cause of erratic behaviour of a hard drive or optical drive is the IDE or UATA cable's socket not being inserted all the way. This is the socket (or sockets) on the cable that runs from the motherboard to the rear of the drive/s (or rear of the cradle for the caddy if you have one). So while you are checking the power cable, make sure that all cable headers (rectangular sockets with 39 holes) are pushed fully onto the 39 pin plug at the back of the drive (or at the rear of the caddy's cradle). Do the same check for the other end of the cable where it connects to the motherboard.

Caddy and cradle mating lands that are too low in profile

For folk with cradle/caddy arrangements, there is yet another possible cause of erratic behaviour for a drive in a caddy. I have checked out a number of systems on which there was unreliable transfer of data and the hard drive in a caddy was operated slowly. The problems were caused by inadequate mating of the lands (flat raised metal band usually gold plated) on the big 50-land plug at the outside

rear of the caddy with the big 50-land socket at the inside rear of the cradle. With these problem PCs the caddy seemed to slip into the cradle with very little insertion force being applied and I became concerned that some of the caddy and cradle lands were not always touching. After I fine tuned the lands in the caddies' sockets, the problems vanished and have not reoccurred. To see how to do that tuning read section 4 of my article on caddy fixes which is accessible through my web site: <http://www.pcuq.org.au/~boesen/>

Check the functioning of the hard drive after fixing anything

If you have had an erratically behaving hard drive and you undertake any fixes for cables and sockets, you should then run the Windows application CHKDSK. The chances are that erratic drive behaviour will create bad sectors on your hard drive. To run CHKDSK is easy:

When you are in Windows normal mode or safe mode, to run CHKDSK say, for your C drive:

- hit the Start button
- hit Run
- in the Open panel type 'CHKDSK C: /R' (without the quotes) and hit OK
- If there are any open files on the drive (as is normally the case for a boot drive), Windows will inform you that CHKDSK will run at the time of next booting. If you are checking a drive that is not your boot drive, CHKDSK will operate within the Windows environment.
- exit

The '/R' option will repair any errors automatically. If you don't want errors repaired but only reported, leave out the '/R' bit.

CHKDSK will undertake a faster but less comprehensive check if you replace '/R' with '/F'

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More humour from the net

Star Trek TNG Meets Microsoft

Picard:

Mr. LaForge, have you had any success with your attempts at finding a weakness in the Borg?
And Mr. Data, have you been able to access their command pathways?

Geordi:

Yes, Captain. In fact, we found the answer by searching through our archives on late Twentieth-century computing technology.

Geordi presses a key, and a logo appears on the computer screen.

Riker *[puzzled]*

What the hell is *Microsoft*?

Data *[turns to explain]*

Allow me to explain. We will send this program, for some reason called *Windows*, through the Borg command pathways. Once inside their root command unit, it will begin consuming system resources at an unstoppable rate.

Picard:

But the Borg have the ability to adapt. Won't they alter their processing systems to increase their storage capacity?

Data:

Yes, Captain. But when *Windows* detects this, it creates a new version of itself known as an *upgrade*. The use of resources increases exponentially with each iteration. The Borg will not be able to adapt quickly enough. Eventually all of their processing ability will be taken over and none will be available for their normal operational functions.

Picard:

Excellent work. This is even better than that *unsolvable geometric shape* idea.

. . . . 15 Minutes Later . . .

Data:

Captain, we have successfully installed the *Windows* in the Borg's command unit. As expected, it immediately consumed 85% of all available resources. However, we have not received any confirmation of the expected *upgrade*.

Geordi:

Our scanners have picked up an increase in Borg storage and CPU capacity, but we still have no indication of an *upgrade* to compensate for their increase.

Picard:

Data, scan the history banks again and determine if there is something we have missed.

Data:

Sir, I believe there is a reason for the failure in the *upgrade*. Apparently the Borg have circumvented that part of the plan by not sending in their registration cards.

Riker:

Captain, we have no choice. Requesting permission to begin emergency escape sequence 3F!

Geordi: *[excited]*

Wait, Captain! Their CPU capacity has suddenly dropped to 0% !

Picard:

Data, what do your scanners show?

Data: *[studying displays]*

Apparently the Borg have found the internal *Windows* module named *Solitaire*, and it has used

up all available CPU capacity.

Picard:

Lets wait and see how long this *Solitaire* can reduce their functionality.

. . . . Two Hours Pass . . .

Riker:

Geordi, what is the status of the Borg?

Geordi:

As expected, the Borg are attempting to re-engineer to compensate for increased CPU and storage demands, but each time they successfully increase resources I have set up our closest deep space monitor beacon to transmit more *Windows* modules from something called the *Microsoft Fun-Pack*.

Picard:

How much time will that buy us?

Data:

Current Borg solution rates allow me to predict an interest time span of 6 more hours.

Geordi:

Captain, another vessel has entered our sector.

Picard:

Identify.

Data:

It appears to have markings very similar to the Microsoft logo...

[over the speakers]

This is admiral Bill Gates of the Microsoft flagship *MONOPOLY*. We have positive confirmation of unregistered software in this sector. Surrender all assets and we can avoid any trouble. You have 10 seconds to comply.

Data:

The alien ship has just opened its forward hatches and released thousands of humanoid-shaped objects.

Picard:

Magnify forward viewer on the alien craft!

Riker:

My God, captain! Those are human beings floating straight toward the Borg ship - with no life support suits! How can they survive the tortures of deep space?!

Data:

I don't believe that those are humans, sir. If you will look closer I believe you will see that they are carrying something recognized by twenty-first century man as doeskin leather briefcases, and wearing Armani suits.

Riker and Picard, together *[horrified]*

Lawyers!!

Geordi:

It can't be. All the Lawyers were rounded up and sent hurtling into the sun in 2017 during the Great Awakening.

Data:

True, but apparently some must have survived.

Riker:

They have surrounded the Borg ship and are covering it with all types of papers.

Data:

I believe that is known in ancient vernacular as *red tape*. It often proves fatal.

Riker:

They're tearing the Borg to pieces!

Picard:

Turn the monitors off, Data, I cant bear to watch. Even the Borg doesn't deserve such a gruesome death!

PCUG Help Directory

The people in this directory are volunteers, so please observe the times given. The Help Directory is designed to help individual users and should not be used as a substitute for corporate support calls to vendors. This service is provided for members only.

Email addresses have been altered to foil spam farmers; just replace the @ symbol.

Please quote your membership number to the helper. Additions or amendments to this directory should be sent to

editor@pcug.org.au

Region	Subject	Name	Email	Phone	Days	Times
Chifley	WinXP, PC hardware, Connections Home Installation Team (HIT)	John Saxon	jsaxon at pcug.org.au	6161 1524	All days	9am to 7pm
Dickson	WinXP, Mozilla, Office XP	John Agnew	jfa at pcug.org.au	6249 7911 0411147321	All days	9am to 9pm
Fisher	MS Word, Excel, Lotus WordPro, Agent	Derek Jordan	Derek.Jordan at tpg.com.au	6288 7810	All days	Any decent time
Flynn	Flight Simulator	Roger Lowery	bandrlowery at optusnet.com.au	6258 1583	All days	Any decent time
Hall Village	Noteworthy Composer	Andrew Purdam	apurdam at pcug.org.au	6230 2231	All days	Any decent time
Hawker	Home Installation Team (HIT) Internet connections, software and hardware.	Gordon Urquhart	gordonu at pcug.org.au	6254 5480	All days	Any decent time
Holt	FrontPage, Publisher, Internet Explorer	Gary Potts	gjpotts at pcug.org.au	6254 2818 0402342818	Mon Wed Sat	9:00am to 12:00 noon
Macquarie	Linux	Rod Peters	rpeters at pcug.org.au	6251 2580	All days	9am to 7pm
O'Connor	Digital Photography, Paint Shop Pro, Paint Shop Album	Jeff Colwell	jeffmeg at webone.com.au	6247 7756	All days	9am to 8pm
Page	Free software - installation and advice	Terry Bibo	tbibo at pcug.org.au	6255 2168	All days	9am to 7pm

[Some handy links](#)

Committee Members	http://www.pcug.org.au/members/committee/index.htm
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