# hands on

## contents

This month's *Hands On* has a wealth of practical advice, whether it's maximising hard disk space in Windows 98, or moving your CD-ROM drive to a different letter under NT.

In Unix, Chris Bidmead is on hand to tell you how you can turn a PC into a completely **free fileserver** for your network [p245], while Ken McMahon [p262] and Benjamin Woolley [p264] look at images that are **more than just pixels** on a flat screen.

And for web weavers, Tim Anderson explains how to handle **form data** [p235].

On the lighter side, Apple guru Cliff Joseph explains how you can turn your Mac into a **PlayStation** [p270], while Mark Whitehorn first pulls his hair out over **postcodes**, and then starts clicking on the fish that have taken over his PDA [p242].

We hope to bring you more *Hands On* pages on our cover CDs in 2000, but in the meantime, please keep sending your comments and queries – as you'll see from reading this month's columns, it's you the readers who help to make *Hands On* a vital source of information.

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# The camera never lies

**Nigel Whitfield invites his adoring public to share his world when he sets up his own webcam.**

One way to grab your 15 minutes of fame is via a webcam. A phenomenon of the 1990s, it has persuaded hundreds of people around the world to share their own world with the public.

Webcams have evolved considerably since the first ones which showed things like coffee pots. Now you can watch just about everything imaginable – the Millennium Dome, students at home, ghosts, traffic and plenty more.

Thanks to cheap hardware, joining them is fairly straightforward – but it pays to plan a little. This month's workshop shows you how to set one up using either Ispy for Windows or Oculus for the Mac. Both programs are available for download from the net. Whether you want to give people a glimpse of your garden, keep an eye on things when you're away from home or share every moment of your life with strangers, a webcam is quicker and easier to configure than a live video broadcast.

## Size is everything

Before getting into the mechanics of setting up a webcam page, it's worth checking a few things with your internet provider. How much bandwidth do you have available for people to visit your site? A popular cam could bring lots of visitors to your website, some of them leaving their PCs connected while they get on with other things. The images you're using for a webcam picture might appear small and of little consequence, but when they're continuously updated, you could start to come close to limits for downloads, depending on the terms imposed by your ISP.

The jpeg image we created using Oculus took up 36KB of disk space. And by choosing the quality of your pictures, you can reduce that still further.

If you want visitors to your site to see a reasonable amount of movement, you might decide to upload a new picture every 15 seconds, for example. For a 25KB image, that amounts to 100KB of data per minute, which is easy to upload even with a modest modem.

But when you think about the people looking at your cam, that translates into 6MB of data downloaded from your website per viewer, per hour. If you have a daily bandwidth limit of only 100Mb, it's easy to see how even a slightly popular webcam could push you over the edge.

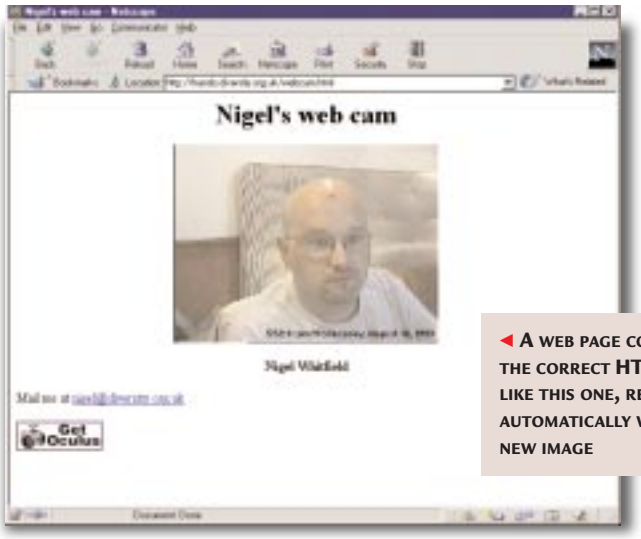
*Webcams have evolved considerably since the first ones which showed things like coffee pots*

Therefore, tweaking the size and quality of the image to make it as small as possible, and choosing the number of times viewers get a new picture, can be crucial to making things work.

## Page updates

It might seem tempting to put a webcam in a corner of your home page, but it could also be a big mistake. Typically, a webcam works by refreshing a page periodically, to collect a new image. If you have the cam on a page with a lot of other graphics and multimedia elements, you'll be forcing your viewers to download those too, slowing everything down and eating up any bandwidth allowance.

So, then, if you want a webcam to appear on a page with other elements, the most sensible tactic is probably to use frames, with the cam in a separate frame, which can be programmed to refresh on its own.




◄ A WEB PAGE CONTAINING THE CORRECT HTML WILL, LIKE THIS ONE, REFRESH AUTOMATICALLY WITH A NEW IMAGE

While many webcam programs will create a page for you, it's worth understanding the HTML code that makes everything work. This is what you'll need in the HEAD section of a page called webcam.html to ensure that it refreshes every 30 seconds:

```
<META HTTP-EQUIV="Pragma" ↙
CONTENT="no-cache">
<META HTTP-EQUIV="refresh" ↙
CONTENT="30; URL=webcam.html">
```

*(Key: ↙ code string continues)*

The first line tells the browser it should always reload the page. Older browsers may not understand it and, as a result, viewers may not see changing images, but current editions of Netscape and IE will respect the no-cache directive.

The second line causes the page to reload every 30 seconds. Changing the number here – rather than in the webcam program – alters the frequency with which visitors will see a new picture. Ideally, you should set the time delay to the same interval you're using to upload pictures; certainly it shouldn't be shorter.

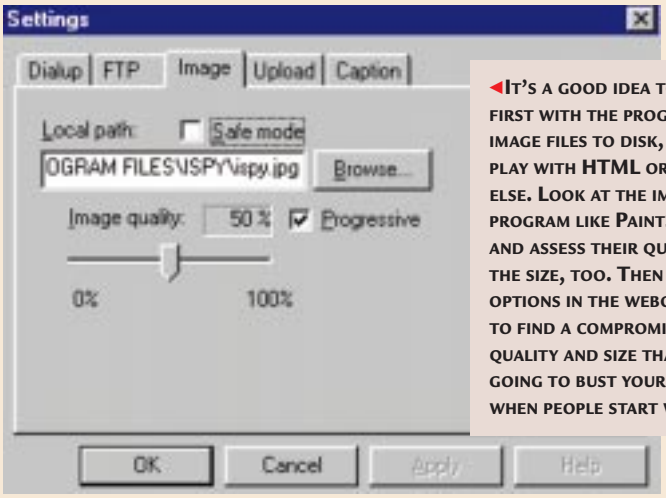
## Home vs away

Most webcam programs offer two options for saving images – uploading them to a web server or saving them on

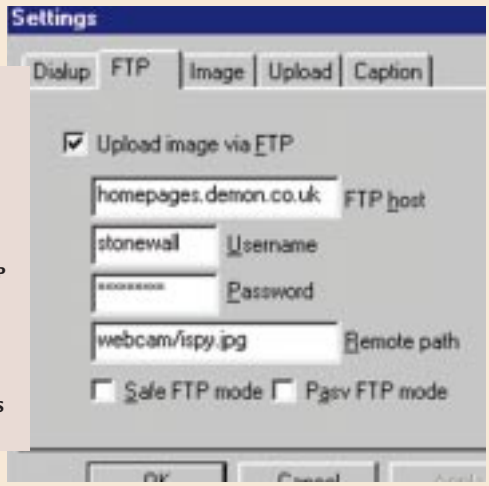
## SETTING IT ALL UP

The first stage in getting up and running is configuring your video camera. You need to make sure the webcam is getting a decent image, using the preview option of the software. Here, we're using Ispy, which allows options such as brightness and contrast to be set, to ensure that the best possible image is grabbed from the camera.

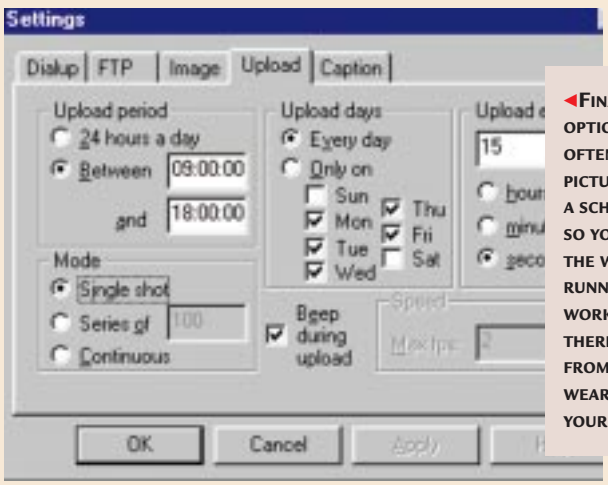
If you're using a cam indoors, it might be best to arrange the lighting in a room to help with this.




◀IT'S A GOOD IDEA TO EXPERIMENT FIRST WITH THE PROGRAM, SAVING IMAGE FILES TO DISK, BEFORE YOU PLAY WITH HTML OR ANYTHING ELSE. LOOK AT THE IMAGES IN A PROGRAM LIKE PAINTSHOP PRO AND ASSESS THEIR QUALITY. CHECK THE SIZE, TOO. THEN TWEAK THE OPTIONS IN THE WEBCAM PROGRAM TO FIND A COMPROMISE BETWEEN QUALITY AND SIZE THAT'S NOT GOING TO BUST YOUR BANDWIDTH WHEN PEOPLE START WATCHING




▶NEXT, CREATE YOUR WEB PAGE AND CONFIGURE THE FTP PART OF THE PROGRAM TO HANDLE THE UPLOAD IF YOU'RE USING A WEB SERVER ON A DIFFERENT MACHINE. SOME PROGRAMS, LIKE ISPY, WILL LET YOU SPECIFY WHICH DIALUP CONNECTION TO USE. THE SAFE FTP MODE HERE UPLOADS THE NEW PICTURE WITH A DIFFERENT NAME, THEN RENAMES IT IF THE TRANSFER WAS SUCCESSFUL, AVOIDING PROBLEMS IF THE CONNECTION DIES PART OF THE WAY THROUGH




◀FINALLY, SET THE OPTIONS TO SAY HOW OFTEN YOU WANT A PICTURE UPLOADED, WITH A SCHEDULE IF NECESSARY, SO YOU CAN JUST LEAVE THE WEBCAM PROGRAM RUNNING AND LET IT DO ITS WORK. AND THAT IS ALL THERE IS TO IT – APART FROM CHOOSING WHAT TO WEAR WHEN IT'S TIME FOR YOUR CLOSE-UP

your hard drive. The latter option is particularly helpful for testing. If you are on a LAN that's connected to the net, or you can mount your web space as a shared drive on your computer, then it's also easier than fiddling around with the setup for an FTP connection.

However, if, like a lot of home users, you connect to the internet via a dialup connection, it would probably be more sensible to configure the cam to ftp to a separate web server.

While you are running the webcam on your desktop system, you can avoid bandwidth restrictions by using Windows Personal Web Server or the Web Sharing extension on a Macintosh. However, it will also give a pretty poor performance once more than a few people have tuned in to watch your webcam.

We have had a look at two programs that are simple to use to create a webcam – Ispy for Windows and Oculus for the Mac. Both can be downloaded

***Most webcams offer two options for saving images – uploading or saving to a hard drive***

from the internet in demo form, which will allow you to create a page and upload pictures. The only other thing you'll need is a video capture device on your system, supported by QuickTime for the Macintosh or Video for Windows on the PC.

Both these programs are straightforward to use. In the case of Oculus, the setup wizard will create a basic webcam page, with the necessary HTML code to ensure that it refreshes. Both offer a similar range of features, with time-stamped captions and the ability to upload pictures only during certain hours of the day. Oculus can also upload images, based on whether or not there has been any movement since the last image was grabbed.

### PCW CONTACTS

*Nigel Whitfield welcomes your feedback. Contact him via the PCW editorial office or email nigel_whitfield@vnu.co.uk*
*Ispy www.ispy.nl*
*Oculus www.intlweb.com*

# Desktop inspection

MONTH TO GO!

**These are difficult times for anyone managing a network, reveals Bob Walder.**

If you thought the millennium bug only infected legacy mainframe systems, think again. Another area that has received huge amounts of publicity – probably because it is one of the few areas that can have an automated quick-fix applied – is your desktop PC.

The good news is that most PCs can be updated to handle the turn of the century. However, identifying which machines in your organisation will experience year 2000 problems and then fixing them can be time-consuming, resource-intensive and costly. When you have more than a couple of PCs on a network, it is much more difficult to make sure they all comply. Get it wrong on one of your file servers and you could find your whole network out of action.

DIY compliance testing is not to be undertaken lightly, even on small networks. On larger LANs, even with an automated testing tool, it has most managers breaking out in a cold sweat. Visiting every PC on the network to check compliance means rebooting a couple of times, keeping users idle while you carry out the tests.

Not only that, but once PCs have been made year 2000 compliant, they should be monitored regularly to ensure they stay compliant. If you have installed a patch which kicks in on 1 January 2000, to correct the century problem, for instance, you do not want a 'helpful' user to wipe it out while doing a spot of housekeeping.

**Given the scale** of the problem, it is surprising that vendors which already produce network-wide auditing software have not added a compliance checking element. However, UK startup Centennial has come up with a solution. Centennial 2000 is a process-driven audit, update and monitoring package, where each stage of the process is controlled from a central console and completed as users log on to the network.

The extensive audit tests include checking for year 2000 Bios, RTC and leap year compliance; PC manufacturer and processor type; operating system and version, Bios ID, date and manufacturer; PC memory size; hard-disk drives, capacities and free space; and the CD-ROM drive. It thus provides a complete hardware audit as well as compliance check. If the Bios can be positively identified and an upgrade is possible, a flash Bios update is performed automatically. Where this is not advisable, a software fix is applied.

Where Centennial 2000 really scores is in the network-based centralised administration in the Enterprise version (a Lite version is available for standalone machines). This is performed via the Control Centre, through which network administrators can specify PC auditing by individual, department or other organisation units from a single console. This provides full automation of the testing process on all networked PCs, even those at remote sites or on the road.

Centennial 2000 Enterprise will also correct non-compliant systems, provide detailed audit reports and continue to monitor each PC automatically. This level of functionality is essential if managers of large PC networks are to be expected to get to grips with the problem.

**There is one other item** which needs considering before we leave the topic of networks, and that is the software contained in the various network hardware devices – bridges, routers, switches and hubs. Some of these devices will not depend on dates, of course, and therefore will not need updating.

But how can you be sure? Devices that implement Quality Of Service may use date and time stamps to prioritise traffic. Routers may use date and time fields in their router tables. Make sure you obtain guarantees from all your network hardware vendors on year 2000 compliance if you don't want your network to come crashing around your ears on New Year's Day 2000.

## ACCESS AND YEAR 2000

**Microsoft Access 2** for Windows 3.x assumes all two-digit years refer to the 20th Century. You will need a software update <http://support.microsoft.com/support/kb/articles/Q231/4/08.asp> so that it recognises the digits 00-30 as referring to 2000-2030. This patch was unavailable as *PCW* went to press, putting pressure on users to consider a full upgrade.

You may be able to avoid issues by using the long format for all dates and using date/time fields, not text fields, in date-related tables.

**Access 95** for Win95 will only properly interpret dates with two-digit years in the 1930-2029 reference frame if you have the file OLEAUT32.DLL (version 2.20.00.4054 or later) in the system folder <www.microsoft.com/technet/year2k/product/user_view68287EN.htm>.

If you use the Access Developer's Toolkit to redistribute updated Access run-time files, install the full compliance update from http://officeupdate.microsoft.com/articles/O95y2kfactsheet.htm>.

**Access 97** for Win 95 has built-in support for the two-digit year format, but the Office 97 Service Release 2 fix is required to be fully Year 2000-ready <office update.microsoft.com/articles/sr2fact.htm >. But dates formatted with two-digit years in text files may not be imported or exported correctly (to text files) by Outlook 97.

Information on an issue with dates in the QBE grid and an object's properties sheet is at http://support.microsoft.com/support/kb/articles/Q172/7/33.asp.

## PCW CONTACTS

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*Centennial 01488 682444*

# The name game

**Nigel Whitfield takes an in-depth look at the complicate[illegible] domain.**

What's in a name? On the internet, an awful lot, as the domain name system is the key to finding information – and thanks to recent changes, it's easier than ever to get hold of a name of your own.

When the UK domain naming system was put on a more professional footing a few years ago, there were some who complained loudly and vigorously about the charges.

They may perhaps consider eating their words now, with the most recent reductions in charges for Nominet members meaning that registering a domain costs only a few pounds. Some enterprising providers are even giving them away free of charge – so if you want a .co.uk address, there's little reason not to have one any more.

**The same, unfortunately,** can't be said of the international domains. Although the top-level domains like .com and .org are supposed to have been freed from the monopoly of registrations that belonged to Network Solutions, in practice, things have been dragging on for months, with trials to provide other registrars with access to the databases being extended.

*Thanks to recent changes, it's easier than ever to get hold of a domain name*

The net result hasn't been a pretty sight, with many people complaining of delays and, in some cases, different registries giving different answers to the question of whether or not a particular domain is available – hardly an ideal situation.

So far at least, the competition beloved of the Americans doesn't appear to have brought the benefits – in particular, cheaper prices – that many net users would like to see. When everything's running properly that may yet happen, but in the meantime don't hold your breath.

**Assuming you** do decide to register a domain, what do you actually need to do – and if you're paying someone else, what exactly are you paying them for, given that the Nominet fees for a UK domain are minimal?

It's worth looking at this in some detail, since it's a question that often comes up – and there's a little more to sorting everything out than some users realise. It's not just a question of a simple entry in the DNS to point to a web server and redirect mail, if you want to use the domain properly.

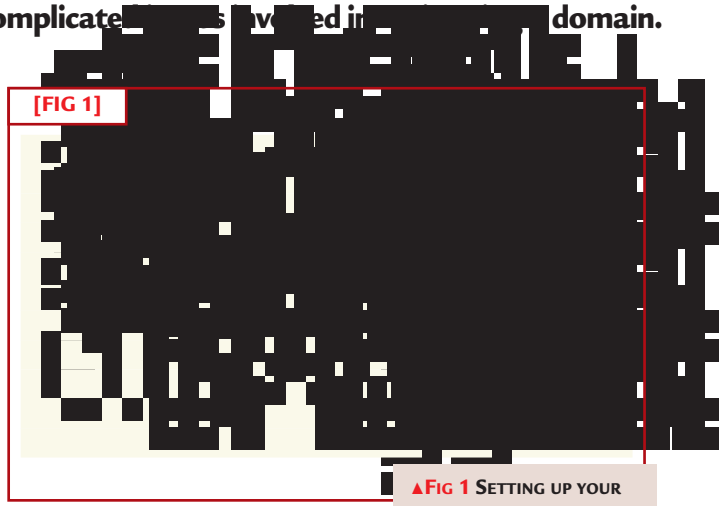
The amount of work you need to do for a domain depends on exactly what you're planning to do with it, but at the very least, you're likely to need 'A' and 'MX' records.

**The A records** in the DNS specify an address – you'll need them to point to a web server, or other systems that you want people to access by name, such as an FTP server.

Those servers will need to be configured to respond to the address – or in the case of a web server, you'll need some other way to rewrite requests, if you want to map your new domain onto an old server, for example, pointing a domain at the free space that came with your net access.

**MX (Mail Exchanger)** records are the part of the DNS that controls where your email is delivered. You can have more than one, and each has a preference assigned. When someone tries to send you email, the lowest preference MX is tried first, then the others. If you're setting up a domain yourself, perhaps by editing the files on a Unix system to run your own name server, you'll need to give this a bit of thought.

[FIG 1]



▲FIG 1 SETTING UP YOUR MX RECORDS REQUIRES CARE; YOU NEED THE FINAL ENTRIES TO ENSURE THAT MAIL ADDRESSED TO YOUR DOMAIN, WITH NO SYSTEM NAME, ARE ROUTED CORRECTLY

**Setting up the mail** can be one of the trickiest aspects of all this; you'll need to make sure that any machine that's listed as an MX for your domain will accept the messages and forward them properly to the final host. And you might even need to rewrite addresses too, delving into the innards of a mailer.

This isn't a trivial exercise, especially if you've never done it before. It's very easy to make simple mistakes, like providing MX entries for all the computers in a domain, but not the domain itself – effectively meaning you could mail to user@somemachine.somedomain.com, but not user@somedomain.com.

Fig 1 shows part of a 'zone' file, setting up both A and MX records for a network of machines, with two systems handling email.

When you pay someone to host a domain for you, this, far more than the amount of work in the registration, is what you're paying for. You may also be paying for storage space for email, or web pages, depending on the deal that's on offer.

If you do go it alone and run your own domain – which means that you'll need to configure name servers on machines with fixed links to the net –

# Questions & answers

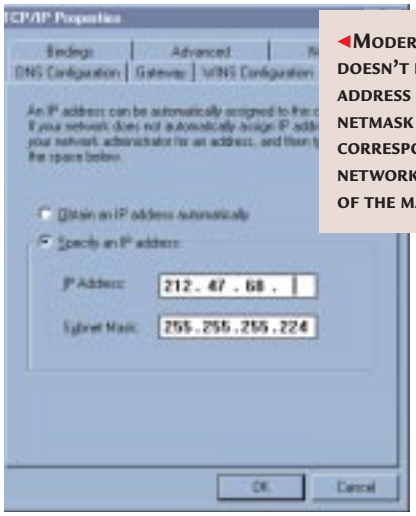
**Q** I want to configure an internet connection, but I don't understand all about Classes of addresses. What is a Class C network? What's the minimum number of addresses that can be allocated?

**A** *When the internet was much less widespread, addresses were allocated in blocks called networks. A Class C network has 256 addresses, a Class B has 65,636 and a Class A has 256 times as many as that. The first few bits of an internet address were used to indicate which class of address it was; there are only a handful of class A addresses, a larger number of class Bs, and lots of class Cs.*

*However, allocating a class C network to a small company that might only have a dozen computers is wasteful – there could be over 200 addresses unused. With this in mind, IP addresses are no longer allocated in classes. Instead, you receive an allocation based on the number of bits that identify the network. For example, my net connection is referred to as a /27. In other words, 27 bits of the address identify the network, leaving five for the systems – 32 addresses.*

*On each network, the address with all the final bits set to either one or zero is reserved, taking two out of the total. So the smallest network you could theoretically be allocated would be a /30, allowing for two usable addresses, though that would be unlikely.*

*Any software that's still asking you what class of net address you have is probably old enough to warrant replacing.*



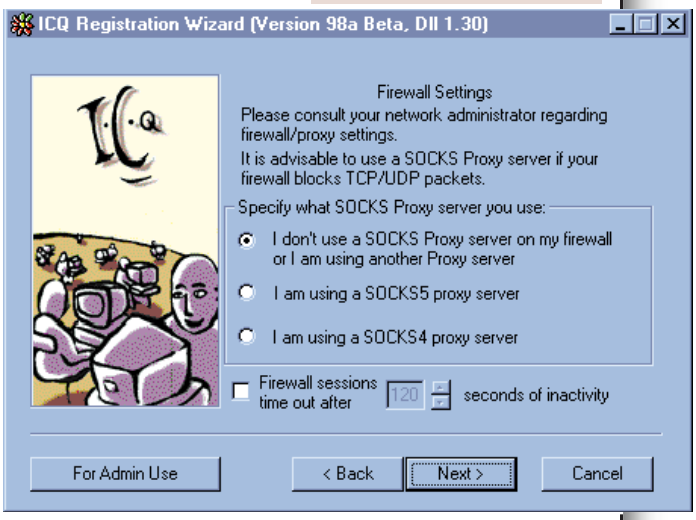

◀ MODERN TCP/IP SOFTWARE DOESN'T BOTHER WITH ADDRESS CLASSES. THE NETMASK SHOWN HERE CORRESPONDS TO A /27 NETWORK, IE THE FIRST 27 BITS OF THE MASK ARE ALL ONES

**Q** I'm trying to configure ICQ to work from my office, so that I can keep in touch with friends elsewhere, but I can't get it to connect to the server. What's the problem?

**A** *It's likely that the connection you have in your office is running through some sort of firewall, and while ICQ can be configured to work through a SOCKS-based firewall, it won't work with some other types, especially those that appear to be transparent to end applications.*

*You have two solutions. One is to ask the people who run your network to allow connections for ICQ, which requires passing UDP data through the firewall on port 4000, or use a different instant messaging system. For example, AOL Instant Messenger may work, depending on the configuration of your firewall.*

▼ ICQ CAN BE CONFIGURED TO WORK THROUGH A FIREWALL, BUT IF YOU HAVE A NON-STANDARD ONE, IT'S TIME TO SPEAK TO THE NETWORK ADMINISTRATORS




you'll also come across something else that has to be done.

**Reverse DNS** is the part of the DNS that maps an IP address back to a domain name. It's not strictly essential – many people use connections that don't have reverse DNS configured – but it's very useful. Some sites, for example, will not accept FTP connections from machines with no or invalid reverse DNS. The same holds true of IRC servers as well as many firewall systems.

Setting up reverse DNS is a little tricky. Sure, the files you need to configure are straightforward enough, but what most of the manuals won't tell you is that it probably won't do you any good; you will typically need to arrange with your internet provider, to whom a block of IP addresses has been delegated, to run the reverse DNS for you – so be absolutely sure that you give them exactly the same information as you'll be providing in any files running on your systems.

***While registering a domain is easy, in practice, it can be rather fiddly***

In short, while registering a domain is easy – and, as long as you have a suitable connection, with a bit of work you can do all the management yourself – in practice it can be rather fiddly. If you want to find out more, recommended reading is *DNS and BIND*, published by O'Reilly.

## PCW CONTACTS

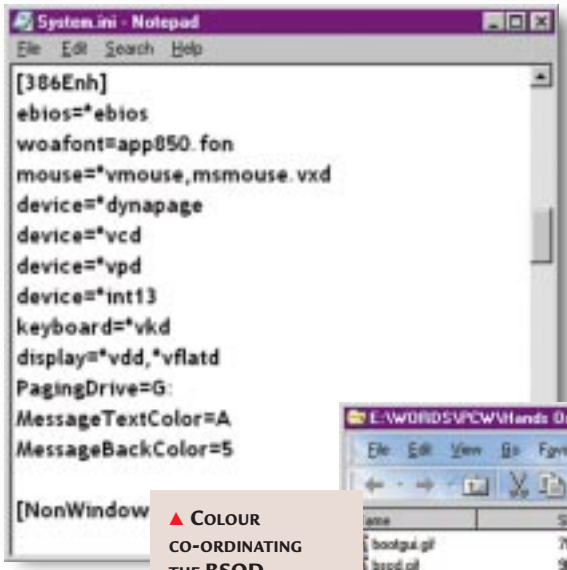
*Nigel Whitfield welcomes your feedback on the internet column. Contact him via the PCW editorial office or email* internet@pcw.co.uk

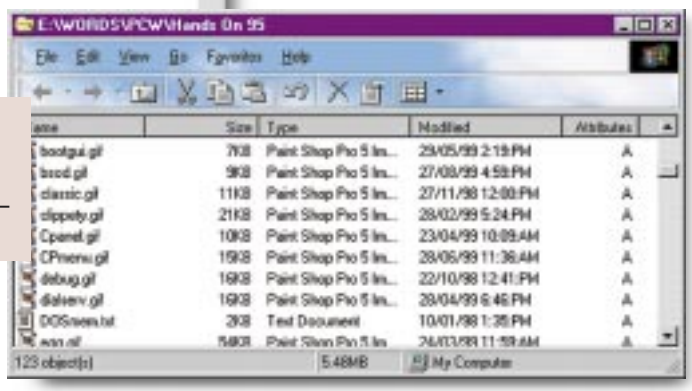
# The colour of Windows

**Tim Nott sees the world through rose-coloured screens and holds the key to password security.**

Last month's spoof on customising the Blue Screen Of Death (BSOD) has been worrying me, as I had this nagging feeling that somewhere I'd read that it really was possible to have, for example, a Mauve Screen Of Death (MSOD), although not, alas, a Paisley one.

After some digging around, I found that by some incredible coincidence the tip appeared exactly five years ago, in this very column. As Windows historians will realise, this places the tip back in the 16bit world of Windows 3.1, but having checked – much to my amazement – it still works in Windows 98.




▲ COLOUR CO-ORDINATING THE BSOD
▶ FILE ATTRIBUTES – NOW YOU SEE THEM

To customise the screen, use Notepad to open the file SYSTEM.INI, which resides in the Windows folder. In the section headed [386Enh] add the following entries:

```
MessageTextColor=A
MessageBackColor=5
```

Reboot, and you'll find your BSOD has changed to a MSOD with green text.

The only remaining problem is that, despite last month's piece, I have to admit it's very rare to get this screen in Windows 98. One way to provoke it is to eject a floppy or CD-ROM while trying to read from it. If you want to try other colours, then they are assigned as in Fig 1. However, setting the background colour to a value greater than seven seems to revert to the corresponding darker colour.

**[FIG 1]**

## Codes to the system screen colours

| | | | |
|---|---|---|---|
| 0 | Black | 8 | Dark Grey |
| 1 | Dark Blue | 9 | Blue |
| 2 | Dark Green | A | Green |
| 3 | Dark Cyan | B | Cyan |
| 4 | Dark Red | C | Red |
| 5 | Dark Mauve | D | Mauve |
| 6 | Dark Yellow | E | Yellow |
| 7 | Grey | F | White |

■ **Great advice?**

Although the MS Knowledge Base (the company's online support web pages) is a mine of useful information, I was rather taken aback by the following article, which you can find at http://support.microsoft.com/support/kb/articles/Q221/8/29.ASP. 'How to install Windows 98 on a machine with no operating system.

1) Insert The Windows 98 CD in the CD-ROM drive.
2) If necessary, type the following at the DOS prompt to change to the CD-ROM drive:
cd <drive>: (where <drive> is the drive letter of your CD-ROM drive).
3) Type SETUP at the command prompt and press ENTER:'

For those who don't see the joke, then if a PC has a DOS prompt, then it has an operating system. However, in fairness to Microsoft, this article (Q221829) has since been updated to include the essential step of booting from a floppy, and there's comprehensive advice about Fdisk, partitioning and FAT16 versus FAT32.

■ **Better advice**

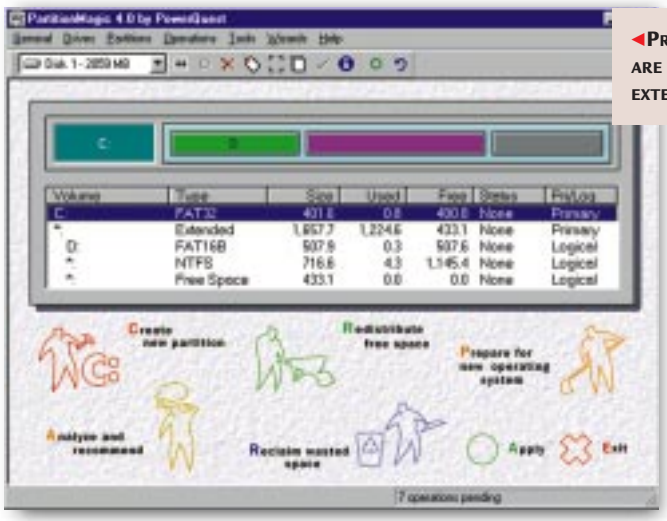
Ian Chapple, Carol Steele, Alex Nicholl and Matthew Day all took me to task for stating that physical drives are listed before partitions, so that if you have more than one hard disk, splitting the C: drive will create partition letters that straddle the other drives.

***I'd read that it really was possible to have a Mauve Screen of Death***

This isn't the case – what is true is that primary partitions are listed before extended ones. So, if you configure the second drive as extended partitions only, its drive letters will run after all those on the first drive.

**Matthew has more to say** on the subject: 'In the rush to partition, care is needed not to generate a layout which requires frequent partition crossing, as that means extra seek-time delays. It is better to split mutually active files between real drives, or keep them on the same partition.

'Before FAT32, drives were partitioned first as the only way to handle drives



PRIMARY PARTITIONS ARE LISTED BEFORE EXTENDED ONES

larger than 2GB, and second to alleviate the large cluster size and consequent space wastage on smaller files. FAT32 lets you handle large drives with a 4K cluster, but the penalty is abysmal defragmentation and scandisk times.'

## Lost attributes

Last month I mentioned that TweakUI had been removed from Windows 98 SE. Apparently, another casualty is the facility to view file attributes in Explorer's 'Details' view. If you upgrade from Windows 98 to 98 SE, you'll still have this feature, but not, it seems, on a clean installation. I'm most grateful to Nigel Smith for pointing out the problem and supplying a solution.

What appears to have happened is that Microsoft left out the necessary Registry entries in Windows 98 SE, but copying those from an original Windows 98 installation does the trick. The key to export is:

```
HKEY_LOCAL_MACHINE\ Software\
Microsoft\ Windows\
CurrentVersion\ Explorer\
Advanced\ Folder\
ShowAttribCol
```

## Who goes there?

Passwords are a necessary nuisance. At the last count I had over 20 of the damned things, including BIOS settings, dial-up networking, Office documents, web discussion groups, beta sites, mailboxes, online shopping and so on. It's impossible to remember them all. So it's very tempting to let the PC do this for you.

Passwords can be 'remembered' by a PC in various ways. First, there's the Windows Password list (.PWL) file. Typical candidates include usernames and passwords for DUN connections and some websites.

Note that although the PWL file is encrypted, anyone who has access to your PC will be able to use these passwords. Worse still, there are utilities (see April's column) that will reveal the true password instead of the row of asterisks you see, for example, in DUN connections.


CONVENIENT – BUT NOT SAFE

Both Windows 95 and 98 come with a utility, buried deep on the CD, called PWLEDIT.EXE which will show which services have cached passwords (although not the passwords themselves) and let you remove them.

***The most secure password uses a mixture of upper and lower case letters***

A password can be automatically remembered by proprietary software, such as mail programs – always as an option you can turn off. Many websites can also store your password in a 'cookie', which means that anyone with access to your PC has access to these services.

**The important thing to decide** is what needs to be secure and what doesn't. I couldn't really care less if someone logged on to a press release service pretending to be me. I'd be very concerned, however, if they could access my mailbox or log on to my bank account. For the non-sensitive stuff, the answer is simple – let the PC do the work, or if that isn't possible, use the same password.

Neither of these approaches should ever be used if security is important, and there are other golden rules of secure password control. Don't use your wife/husband/dog's name, your car registration, phone number or any string that can be associated with you. Change your password frequently.

Undoubtedly the most secure password is one that uses a mixture of upper and lower case letters and digits. But who can remember q28Ub7h2aj? A good compromise is to do what, for example, Compuserve does when it first generates a password for new users. Take two ordinary, but unrelated, dictionary words and combine them – such as voltage+daffodil or bouncy+doorknob.

If you are not blessed with an eidetic memory, and have to store your passwords, be cunning. Passwords can masquerade as entries in an address book, or in a misleadingly-titled Word file which is itself password-protected.

Alternatively, you could write down a list and keep it in a safe place – preferably in another room. Then all you have to do is remember the safe place.

Tip – hide it in between the pages of Dante's *Inferno*. No-one will ever open it, and when you ask yourself: 'Where in hell did I put that password?' – well, need I say more?

## PCW CONTACTS

*ZipMagic and FreeSpace can be found at www.mijenix.com*
*Partition Magic is at www.powerquest.com*
*Partition It is available from www.symantec.com*
*Tim Nott welcomes your feedback on the Windows column. Contact him via the PCW editorial office, or email win@pcw.co.uk*

# Questions & answers

**Q** My computer runs Windows 98 and has ceased to shut down when I select the Shut Down radio button on the Shut Down Windows panel. Instead it restarts! There's no delay or any other problem that I can see, but I end up having to switch off as the thing starts to boot up again. What have I lost?

JOHN LONGBOTTOM

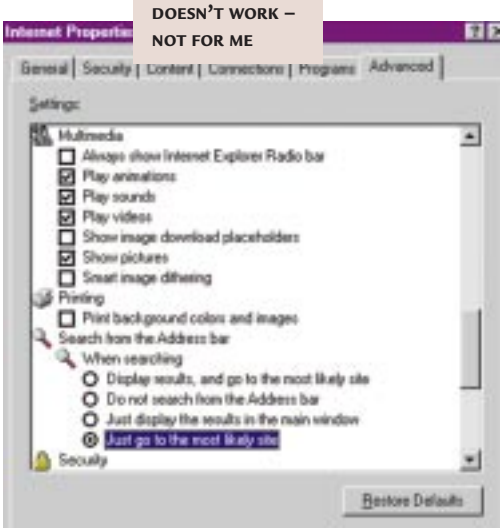
**A** *This seems to be a common problem: try running the Windows 98 System Configuration Utility (MSCONFIG.EXE) and on the General Tab clicking the Advanced button. The ensuing dialog gives you the option to disable fast shut-downs: in many cases this cures the problem.*

**Q** I would like to be able to just type 'hotmail' in the address bar and have the browser bring up the address, without going through the Auto Search function. The idea is to avoid typing www.blahblah.com in full. It is odd that I cannot do this in IE 5, yet I could in IE 4. Am I missing something out in the tools menu?

JENNII WALLACE

**A** *IE4 keeps a list of masks in the registry – so if you type in 'blahblah' it will try www.blahblah.com, then www.blahblah.org and so on, until it gets a hit or runs out of possibilities – the list is editable, so you can add www...co.uk as a mask. IE5 has been improved, in that if you type in an incomplete site address, it will do a web search and return a list of the most likely matches. If you just want to go straight to the first hit, then go to Tools, Options, Advanced and scroll down through the list until you find 'Search from the Address bar'. Then select the 'Just go to the most likely site' option. The only remaining problem is that it doesn't work. The MSN search engine seems to muscle in on the act – whatever I choose I still get the list.*

▼ BUT THIS DOESN'T WORK – NOT FOR ME




**Q** I am using Windows 95 but have a small problem when trying to open files in certain programs, including Notepad, Wordpad, Paint Shop Pro and others. The problem is the files appear in no particular order so the file I am looking for is hard to find.

KEITH BELL

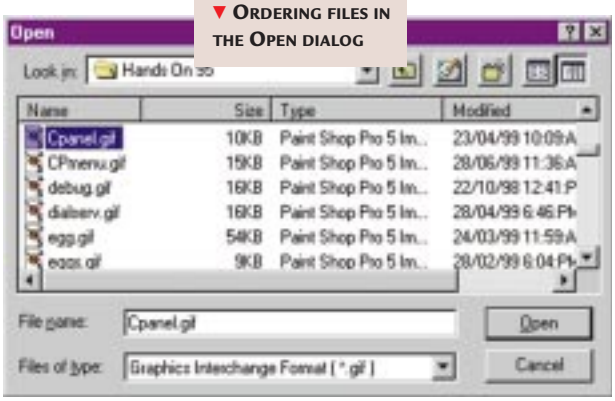
**A** *On the toolbar of the File Open dialog, click on the Details button – the one on the far right. You'll then see columns for date, size, etc as well as for name. Click on any one of the column heads to order files by that column. Click again to reverse the order.*

**Q** When I start MS-DOS from the Start Menu it covers the entire screen – how can I get it back to working within a normal window?

ROLAND CLEMENTS

**A** *Pressing Alt + Enter will toggle between window and full screen. Once in a window you can click on the icon at the left of the window title bar and choose Properties. On the Program tab, check that Normal Window is selected in the Run box, and in the Screen tab, check that Window is selected under Usage. These settings should then stick. Alternatively, you can get at these properties by exploring the Start Menu and right-clicking on the MS-DOS prompt shortcut.*

▼ ORDERING FILES IN THE OPEN DIALOG




**Q** I want to compress my computer's hard drive using Drivespace. When I click Compress the computer tells me that it cannot comply because my hard drive is in FAT32 mode. Could you please tell me how to get my hard drive out of FAT32 mode and into standard mode?

JOHN CLUBLEY

**A** *Bad news, I'm afraid. You need to use FDISK to create new partitions on your hard disk, then FORMAT it. This will destroy all data on the disk and so you will have to back up all your data first, and reinstall Windows and applications afterwards.*

*Alternatively, there are third-party utilities, such as Partition Magic or Partition It, that do this non-destructively, but it would still be wise to back up first. Finally, a third alternative is to use a different sort of compression, ZipMagic and FreeSpace, for example, compresses on a per-folder basis, and support both FAT16 or FAT32.*

**Q** Recently, I've been getting messages that my copy of Office 2000 beta has expired. Only snag is that I don't have – and never have had – a copy of Office 2000 beta.

ANDREW SINGER

**A** *This is what we conspiracy theorists call a cock-up on the part of Microsoft. What, in fact, has happened is that you have a beta copy of IE 5 which is past its eat-by date. Replace this with one from the PCW CD-ROM or download from www.microsoft.com, and all will be well.*

# Ready for interaction

**Tim Anderson gets to grips with how to read form variables from a CGI script.**

If you have been following this column over the past few months, you will have seen a couple of ways of getting dynamic content back from a web server. One is Server-Side Includes (SSI) and another is Perl. So far, though, it has not been truly interactive. The next step is to take information entered by the user and to do something with it.

The starting point for this kind of interactivity is an HTML form. A bare-bones form looks like Fig 1.

[FIG 1]

```
<FORM ACTION="/cgi-bin/hello.pl" METHOD=GET>
<p>Enter your name: <INPUT TYPE="text" NAME="username">
<p><INPUT TYPE="submit">
<INPUT TYPE="reset">
</FORM>
```

*(Key: ↙ code string continues)*

There are several key elements. First, the ACTION attribute identifies the URL that is the target of the form. This is similar to the HREF attribute of an anchor tag, except that it typically identifies a CGI script or executable.

The METHOD attribute can have the value GET or POST. You need to think about a lower level of HTTP than you usually see in a web browser. Web servers accept requests and return responses. An HTTP request looks like Fig 2.

[FIG 2]

```
<method> <request_URI> <HTTP_Version>
<header1_fieldname>: <field1_value>
...other header fields
<data>
```

In this format, URI stands for Uniform Resource Identifier, which is similar to a URL. The METHOD tells the web server what sort of request is being received. When a web browser requests a web page, the actual request sent over HTTP might look like this:

```
GET /index.html HTTP/1.1
Host: www.onlyconnect.co.uk
```

There are eight methods defined by the latest HTTP 1.1 specification: OPTIONS, GET, HEAD, POST, PUT, DELETE, TRACE and CONNECT. Extension methods may also be defined. Each method is officially described in web standards document RFC 2616.

## Back to the form

Returning to the HTML form, the METHOD attribute lets you choose between the GET and POST request methods. The request is activated when the Submit button is clicked. If you choose the GET method, the request from the example form looks like this:

```
GET /cgi-bin/hello.pl?username=whatever
```

Other field values are tagged on the end, with each name=value pair separated by an ampersand.

If you choose the POST method, the request looks like Fig 3.

Both techniques are common, although POST is the preferred standard. One reason for this is that the reliable length of a URL is only 255 characters, whereas POST allows more flexibility. The counter-argument is that GET is usually a little quicker.

## Reading the request

The next step is for your Perl script or CGI executable to read the request. In the simplest case, the web server calls the executable and sets some environment variables containing details of the request. If there is data in the request, it is sent to the standard input stream, as if it had been typed at the keyboard. A slight complication is that special characters such as spaces, slashes or queries are encoded. Fig 4 shows a Perl script that reveals all.

The script inspects several environment variables. REQUEST_METHOD has the method used, PATH_INFO shows the base URL called, QUERY_STRING has

[FIG 3]

```
POST /cgi-bin/hello.pl ↙
HTTP/1.1
...headers here
username=whatever
otherfield=othervalue
...etc
```

[FIG 4]

```
#!/usr/bin/perl
$methodused = $ENV{'REQUEST_METHOD'};
print "Content-type: text/html\n\n";
print <<ONE;
<HTML>
<HEAD>
<TITLE>This page generated by Perl</TITLE>
</HEAD>
<BODY>
<h3>Thank you for submitting this form.</h3>
<p>The method used was: $methodused
<p>The path info is:
<p>$ENV{'PATH_INFO'}
ONE
if ($methodused eq "GET") {
$whatwassent= $ENV{'QUERY_STRING'};
}else{
$contentlength = $ENV{'CONTENT_LENGTH'};
read(STDIN,$whatwassent,$contentlength);
}
print "<p>Before translation, this was sent:";
print "<p> $whatwassent";
$whatwassent=~ tr/+/ /;
$whatwassent=~ s/%([a-fA-F0-9][a-fA-F0-9])/pack("C", hex($1))/eg;
print <<TWO;
<p>The translated query string or posted data is:
<p>$whatwassent
</BODY>
</HTML>
TWO
```

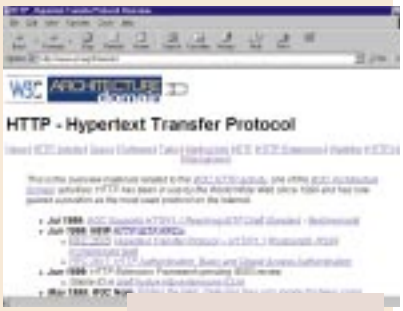
# CONNECTING TO A WEB SERVER

You do not need a web browser to connect to a web server! For example, you can connect to a web server with Telnet and type in the request directly. If you do this with the Windows Telnet client, check Local Echo in Terminal – Preferences so you can see what you are typing.

To connect, specify the target host name (a name or an IP address) and the port number, usually 80. You can do this in the Telnet client's connect dialog, or from the command line: Telnet localhost 80. This assumes you have a local web server running. If not, choose a valid host name. To get a response, type a valid request and complete it by pressing Enter on a blank line. For this to work, you have to be an accurate typist as correcting mistakes with backspace usually will not work. Note that the request is case-sensitive. For example, try:

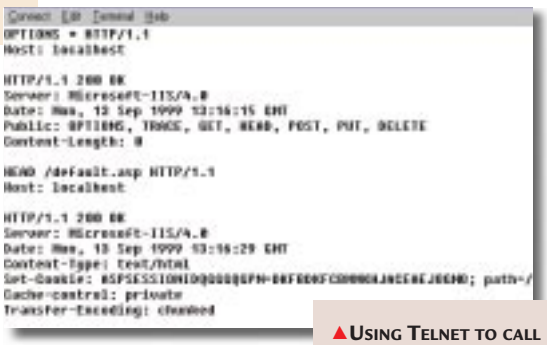
```
GET / HTTP/1.1
Host: localhost
```

not forgetting to send a blank line at the end. All being well, you should receive the default home page of the web server running on your PC as pure HTML.

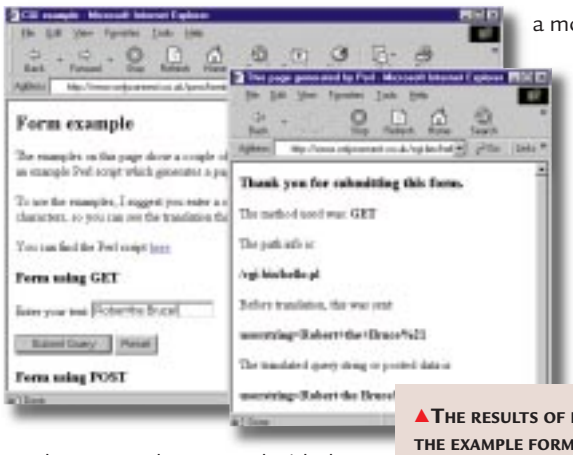



▲ GET ALL THE HTTP OFFICIAL SPECIFICATIONS FROM WWW.W3.ORG

The point of this exercise is to get a lower-level glimpse of what is going on between the browser and the web server. It can also be handy for debugging. And it lets you try out some of the other methods, like OPTIONS and TRACE.




▲ USING TELNET TO CALL A WEB SERVER WITHOUT USING A BROWSER. THIS LETS YOU TRY OUT METHODS LIKE OPTIONS AND HEAD




▲ THE RESULTS OF RUNNING THE EXAMPLE FORM AND PERL SCRIPT SHOW WHAT HAS BEEN RETRIEVED FROM THE REQUEST METHOD

supplementary data passed with the URL and, in the case of POSTed forms, CONTENT_LENGTH enables you to read the data from STDIN.

The script in Fig 4 also shows the form data before and after translation. Using the example form, try entering values with spaces, slashes or other awkward characters. You don't have to use Perl: any language that can read and write from standard input and output will do. C, C++ and Delphi will do this easily. There is housekeeping here that is well suited to object-oriented wrapping. If you are using Perl, the answer is to use a module called CGI.pm. This creates a handy CGI object with any parameters translated for you and placed into an array. It also helps in generating HTML for the response and with getting and setting cookie values.

Delphi users have another option. If you have the client-server edition, you can use the web application wizard, which builds a skeleton CGI application. The inner workings of HTTP are wrapped in several objects, including TWebModule, TWebRequest and TWebActionItem. However, you are limited in Delphi to Windows-based web servers.

## Other kinds of web application

It's worth learning about CGI for the insight it gives into what happens when you click Submit on a form button. A common criticism of CGI is that it begins a new process for every script instance, but whether or not this matters depends on how busy the site is likely to be.

There are ways around it. For example, the mod_perl extension to Apache embeds the Perl interpreter into the web server, so scripts run in the same process.

Microsoft's first answer to the problem is ISAPI, an API that lets you write extensions to Internet Information Server (IIS) as DLLs. They are loaded only once, when they are first called, and run in the same process as IIS. A twist in IIS 4.0 is that the loading of ISAPI extensions can be delegated to a COM Web Application Manager object, running in Microsoft Transaction Server. In this case, ISAPI DLLs can run either in-process or out-of-process, but in both cases they are still loaded once only. It is a matter of compromise between protecting IIS from buggy ISAPI extensions and achieving maximum performance.

The second Microsoft solution is ASP (Active Server Pages). There are two clever things about ASP. First, it lets you write HTML pages with scripts that execute partly on the client and partly on the server. Built-in objects encapsulate key elements such as Request and Response. Second, it lets you instantiate COM objects and work with them. We will look more closely at ASP next month.

## PCW CONTACTS

*Tim Anderson welcomes your web development queries and tips, via the usual PCW address or at webdev@pcw.co.uk*

- *You can find RFC 2616 at www.w3.org. I have also posted a copy at www.onlyconnect.co.uk/pcw/rfc2616.txt*
- *Get CGI.pm from www.perl.com*

# Given Alpha chance

**Andrew Ward unravels the mysteries of FX!32 and unearths a way to change CD drive letters.**

Readers frequently ask how to get hold of Compaq's FX!32. You can get it from www.digital.com/amt/fx32/fx-download.html but not everyone wants to do a 17MB download. Fortunately, Graeme Clarke has come to the rescue and notified me of a UK systems house that will happily send out FX!32 for the price of a blank CD and return postage.

For those who don't know FX!32, it's a means of executing 32bit x86 applications under NT4 on a Compaq Alpha processor, so Alpha owners can run a lot more software under NT.

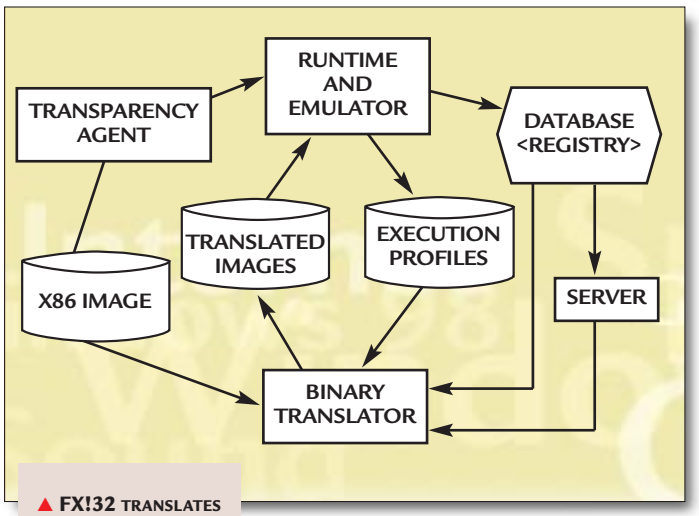
FX!32 supports high-level Win32 software, but not low-level non-Win32 software such as device drivers or debuggers. There is a list of applications known to work with FX!32 at www.digital.com/amt/fx32/fx-testapps.html but check the read-me file for the quirks of individual applications.

**Execution speeds are** comparable to a high-performance x86 system. Compaq is continually improving FX!32 and the latest version, 1.5, loads x86 programs faster and uses a new floating-point model to improve x86 compatibility and performance.

To run FX!32 1.5 on your Alpha, you need Windows NT Alpha 4 with the Alpha Service Pack 5 and Microsoft Internet Explorer 4.01 or higher – both can be obtained from the Microsoft website. Microsoft is expected to include FX!32 with Alpha versions of Windows 2000.

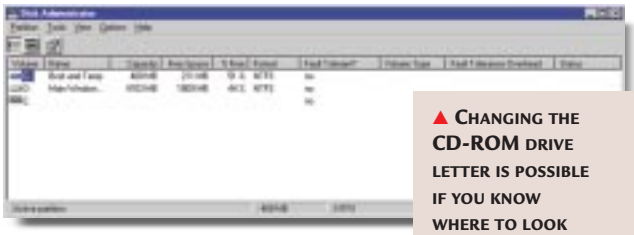
There are two main components to FX!32 – the background optimiser and the runtime emulator. FX!32 works as follows. When you first run an x86 application, FX!32 develops a profile that is later used to translate parts of the application to native Alpha code. Successive runs of the application will gradually exchange more and more of the application's x86 instructions for native Alpha instructions until, eventually, little of the application is actually run in the emulator.

The background optimiser applies optimisation techniques similar to those used by modern compilers to achieve its high performance, including global optimisations, value propagation, common sub-expression elimination and scheduling.




▲ **FX!32** translates x86 code into native Alpha instructions for fast execution

However, at the time of writing, Windows NT support for the Alpha processor appears to have come to an end, following the news that Compaq laid off about 100 engineers responsible for developing Windows NT on the Alpha platform. Many or all of them were employed at the former DECWest facility that had worked for several years with Microsoft on NT kernel, clustering and 64bit support. Microsoft confirmed that 32bit versions of Windows 2000 for the Alpha would cease at release candidate 2, and the 64bit version will founder too, owing to the lack of Compaq support.



▲ Changing the CD-ROM drive letter is possible if you know where to look

## CD-ROM drive letters

Melanie Rhianna Lewis asks whether it's possible to change the CD-ROM drive letter in Windows NT, as you can in Windows 95 and 98. The answer is yes, but it's not surprising that many people aren't aware of this because it's well hidden. You have to run the Disk Administrator (which you will find under Start/Programs/Administrative Tools) but even then it's not obvious, because in the default Disk Configuration view you don't get to see the CD-ROM drive at all and can't change it.

**So, you have to select** Volumes from the View menu, and you should then see a display like the one in the screenshot below. If you highlight the CD-ROM drive, under the Tools menu the option Assign Drive Letter should no longer be greyed out. If you get an error when attempting to change the CD-ROM drive letter, that's possibly because it's in use by some application in the system. If you can work out what it is, close it down or terminate the process and then try again.

However, you should be careful when assigning drive letters because a lot of software makes reference to a specific letter. If you installed any applications from CD-ROM, they have probably remembered the original drive letter, so when you add or remove modules in future you may have to browse manually for the drive. If you have the time and are feeling brave, you can search for references to the old drive letter within the registry and manually change them there.

When you add new drives to the


▲ **The Windows NT4 Network Wizard holds your hand through the installation process**

system, hard disks or CD-ROM drives that have had letters specifically assigned to them via the disk administrator will not be affected. Otherwise, you could find that your drives move around, disrupting your applications.

## ■ Joysticks

Going back to joystick driver installation, Melanie also says you can avoid installing the service pack after the joystick drivers by in[redacted]rvice pa[redacted]ce pack to a[redacted] the fo[redacted]ng

[redacted]

you will be able to install the latest drivers directly from that location. This technique would work for any other upgrade or installation – just direct the NT installation program (for example, the Network control panel) to use the service pack files instead of the original CD. This will only work where the necessary files have been updated by a service pack, but I think virtually all of them have.

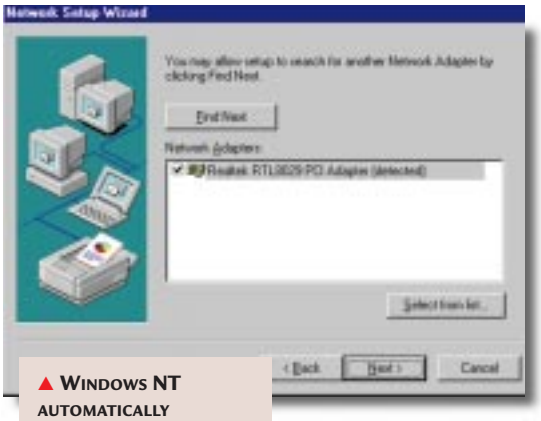
## ■ Networking

Robert Lewis asks how to network two systems running Windows NT, to allow his laptop to use the printer and tape backup drive attached to his desktop machine and to share files between the two.

Adding networking capabilities to NT4 is easier if networking wasn't configured when NT was first installed, because then you can use the wizard. Otherwise, you have to reconfigure it manually via the Network control panel.

When installing Windows NT, network configuration can be avoided by selecting Do Not Connect This Computer To A Network At This Time. Then, at a later date, when you select the Network control panel, you'll receive the message: 'Windows NT networking is not installed. Do you want to install it now?' Answering Yes will cause the Network Setup Wizard to be initiated. Remember, you will need administrator privileges in order to perform network installation.

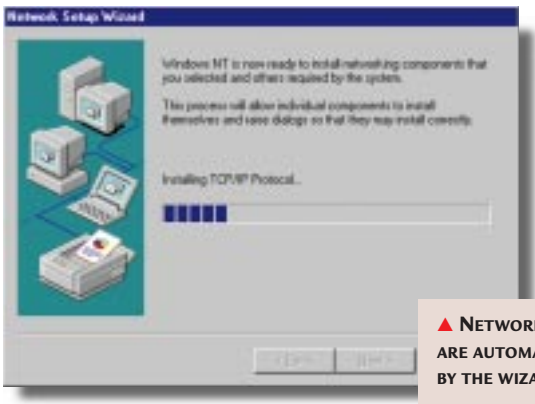
The first step is to specify whether you are using remote access or are wired to the network, and in this case the default selection of being wired is the correct one. The next screen (*right*) causes Windows NT to automatically search for your networking adaptor, and usually this will be the correct procedure. If that doesn't do the trick, you will have to provide a disk with the appropriate device driver.




▲ **Windows NT automatically searches for your network adaptor**

Next comes the thorny issue of choosing the network protocol. These days, the default setting is TCP/IP, and since this is now the universal standard networking protocol there's no particular reason to choose any other if you're simply linking a couple of NT machines. Alternative protocols you can use are NWLink IPX/SPX Compatible Transport and Microsoft's own NetBEUI.

As standard, Windows NT will select at least the following four services for you: RPC Configuration, NetBIOS Interface, Workstation and Server.




▲ **Networking components are automatically installed by the wizard**

Unless you have a specific reason to include any others, that's all you'll need at this stage.

**Unfortunately, the Network** wizard will default to copying the necessary files from your floppy drive – unlikely to be the correct option. To access the files from your Windows NT CD-ROM instead, you'll have to enter the drive letter manually because there's no Browse... button. Type in D:\ or whatever, and the software will automatically switch to the correct CD-ROM folder D:\i386\.

You may be presented with dialog boxes raised by the adaptor driver itself, but these should be self-explanatory.

The wizard will ask whether it should obtain an address from a DHCP server. Unless you have an ISDN router or similar device for internet access, it's unlikely that you'll have an address, so answer no.

For TCP/IP networking, you have to specify an IP address and subnet mask. If you don't know what this means, don't worry. Choose the IP address 192.168.1.1 for one system and 192.168.1.2 for the other. (If there are more, they can be 192.168.1.3 and so on.) For the subnet mask, specify 255.255.255.0, which is not the default. Addresses within the class B network 192.168 are some of those that have been reserved for private use in this way – they are guaranteed not to conflict with any public addresses on the internet.

These settings are made under the IP Address tab of the Microsoft TCP/IP Properties dialog. You won't need to change the Advanced settings or anything under

the other tabs, although I always turn off Enable LMHOSTS Lookup on the WINS Address tab. If you leave it turned on and someone fiddles with your LMHOSTS file, you can end up with horrendous remote domain access problems that can prove difficult to diagnose.

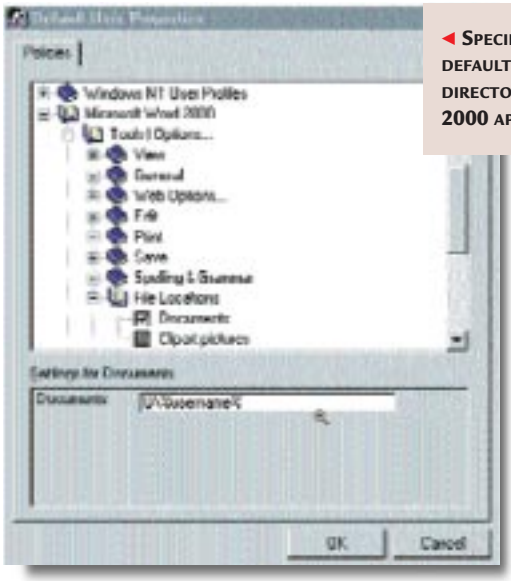
When you click OK, you'll receive a warning that at least one of the adaptor cards has an empty primary WINS address. Ignore this warning and click on Yes to continue. You'll be presented with a complicated-looking Bindings screen, but you can ignore it and press Next to continue. It is possible, by removing some bindings and changing the order of others, to achieve a small performance improvement, but it's not worth worrying about. It's also possible to stop things working properly.

**On the next screen**, specify that the computer is to be a member of a workgroup rather than a domain (we don't have a domain controller in this example). You can change the name of the workgroup from the default of Workgroup if you like, but you'll only have to remember what you changed it to. Most people don't bother.

Now you'll have to restart the system and re-apply the latest service pack. Repeat the procedure with the other system(s) on the network, changing the IP addresses of course.

That establishes a network, but we still have no means of file or printer sharing. To share a printer, find it via Explorer/Printers, right-click on the printer name and select Sharing... from the drop-down menu. Change its status from Not Shared to Shared and choose a suitable name.

When you add a printer to the other systems on the network, you can specify that the printer is remote rather than attached locally and that it should automatically browse for and discover any shared printers out there – assuming that the user permissions are correct. If security isn't an issue but usability is, simply set up user accounts on both machines for all users, with the same user name and password. You will then never have a problem accessing resources across the network.




◄ **Specifying the default save directory for Office 2000 applications**

You can access a remote drive in its entirety by using Tools/Map Network D[redacted] menu. For the path[redacted] C [redacted]mote machine nam[redacted] drive letter with a $ sign [redacted] map drive C: on machi[redacted] type in:

If you want to share specific folders, find them with the Explorer, right-click on the folder name and select Sharing... from the menu. Choose a suitable name and restrict the number of concurrent users and their permissions, if you wish. In a simple network environment such as the one we're discussing, such settings aren't usually important.

That really is about all there is to it. For taking tape backups of the notebook system over the network to the desktop, on the desktop you would map the notebook drive to a spare drive letter. You need to do this before running NTBACKUP or other tape backup software, or it won't see the mapped drive. Then proceed just as you would when backing up a local drive. Note that with NTBACKUP, you won't be able to back up the registry of the remote machine (a subject covered in some depth previously in this column).

If you have already installed networking, perhaps if you use dial-up networking to connect to the internet, you'll have to go to the Network control panel and add your network adaptor card under the Adapter tab. The automatic search won't work, so add the adaptor manually. You will probably have the TCP/IP protocol installed and Windows NT will bind this to the new adaptor. With an internet connection, your IP address is probably determined automatically, but for the local network, you'll have to specify one manually.

***Adding networking to NT4 is easier if networking wasn't configured during installation***

### Home paths

On the subject of default home directories for users' application data files, Neil Syborn points out that in Microsoft Office, you can dictate the default save path using a system policy file. For Office 97 the file is called Off97nt4.adm and for Office 2000 it's Office9.adm.

The mechanism works slightly differently in each case. For Office 97, you can make one setting that applies to all Office applications (alternatively, you can also specify different settings for each application). For Office 2000, you have to specify the path for each application individually.

These template files are supplied along with the Office Resource Kit, which is downloadable over the web. For Office 2000, the file that includes the System Policy Editor and associated templates is ORKTools.exe, a 9MB download. You can find this and the files for other Office versions at www.microsoft.com/office/ork/.

To apply the new templates (which, incidentally, are automatically installed to your systemroot\INF folder), run the Policy Editor and choose Options/Policy Template/Add.

In Neil's case, drive letter Q: is mapped to the shared user directory. Each user has a subfolder called after their username, so they use the policy setting Q:\%username% to force the use of each user's directory by default.

### PCW CONTACTS

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*Siamese Systems 01525 210053*
*www.siamese.co.uk*

# The need for speed

**Mark Whitehorn digs out his old Psions to see how far they've come since the dark ages.**

There I was, minding my own business, when I was suddenly struck by a strong desire to quantify how much faster the Psion 5mx is than its predecessor. There was no reason for this fancy, it was just a piece of passing whimsy. Then I thought: 'Of course, it would be interesting to compare those speeds with the 3mx.' And then: 'What about the 3a?' Before I knew what I was doing, I had dragged out the entire range of Psions from their dusty dens. Some of them needed new batteries but they all fired up.

The only problem was finding a benchmark that would run on them all. Some form of demanding worksheet? No, the original Psion 3 doesn't have a spreadsheet – I'd forgotten after all this time! But OPL has been there since day one, so I used the program in Fig 1.

[FIG 1]

```
PROC Penguin:
Local X,T1,T2
T1=minute
T2=second
Print T1,T2
X=1
Do
      Print "hello ↙
      world",X,second
      X=X+1
Until X=1000
Print T1,T2,minute,second
Beep 40,40
Pause 500
EndP
```

*(Key: ↙ code string continues)*

This simply writes a line of data to the screen 1,000 times and then writes start and end times to make it easier to work out how long the test took.

When you REM out the `Print "hello world"` line, you discover that the execution times plummet – which strongly suggests that this test mainly measures how quickly the machine handles the screen. That's fine, because screen handling is a crucial function in a PDA, but to test the processor more directly I also ran the same code 100,000 times without the Print line. The results speak for themselves [Fig 2].

[FIG 2]

| Machine | Write 1,000 statements | Perform 100,000 increments | Processor |
|---|---|---|---|
| 3 | 149 | 231 | 3.84MHz, 16bit |
| 3a and 3c* | 150 | 139 | 7.68MHz, 16bit |
| 5 | 50 | 51 | 18.432MHz, 32bit |
| 3mx | 44 | 42 | 28MHz, 16bit |
| 5mx | 27 | 13 | 36MHz, 32bit |

* The 3a and 3c performed identically. Since the screen and processor specs are identical for these two, this seems perfectly reasonable.

The 3 is lamentably slow by today's standards, but using it again reminded me what a great design it is. I was also impressed that despite being eight years old, mine still runs and is perfectly usable. The 3a/c can process data much faster, but handles the screen at about the same speed.

This is unexpected until you remember that the screen of the 3a/c has four times as many pixels, so it looks better but is much harder to drive. The 5 is about three times faster than the 3a/c and the 3mx is a tad faster again, but the 5mx blows all the others into the weeds. So, in both cases, the mx version performs much better than the standard version – and to such an extent that the 3mx outperforms the standard 5.

I wouldn't claim for a minute, rolled over or not, that these tests are definitive (*see boxout on Psion time, below*), but they do provide some indication of performance. Now, if only WinCE machines came with the same sort of language, we could do cross-platform comparisons...

## Speed and the FBI

....which we can't. On the other hand, some of the new WinCE machines really burn rubber. The Cassiopeia E-100 has a 130MHz MIPS processor; it also can display up to 64K colours. What can you possibly do with all that horsepower? Go fishing, of course.

In the October issue, I wrote about John Kennedy's Sticky Buttons. He has now come up with an extension called

## PSION TIME

Minute is a built-in OPL function that returns, from the system clock, the number of minutes past the hour. Second does likewise for seconds. The programmers among you will have noticed that my mechanism for capturing the time is potentially flawed. Imagine that the system clock has been set at 1:34:59.99999999999. T1 gets the value 34 and then T2 gets 00 because, in the interim, the clock has flipped over to 1:35:00. Unlikely, but possible. It didn't matter for my timings because I would have noticed the one minute error, but if you want to use the same kind of timing mechanism in a program where it does matter, you can program the potential error out by using something such as Fig 3.

[FIG 3

```
Do
   Hold = second
   T1=minute
   T2=second
Until Hold = T2
```

If the minute rolls over, as described above, the loop forces another pickup and all is well.

FBI, which stands for Fish-Based Interface. At first glance, FBI simply appears to turn your palm-size WinCE device into a fish tank. You can sit it in its cradle on your desk and be soothed by the passing and re-passing of piscatorial exotica, gently blowing bubbles on-screen.

Tap once anywhere on the screen, however, and each fish acquires a name: not Zebra Fish or Angel Fish, but Calculator and Calendar. Double-tap on a fish and the application opens – these fish are really icons.

This is, of course, a silly way to design an interface because occasionally, the fish/icon that you are desperately seeking swims off the screen as your pointer homes in on it and you must await its return. But if you wanted an ordinary interface, you wouldn't be tempted to try something called FBI, would you? The rest of us can enjoy its amiable fishy wackiness. I already have it installed.

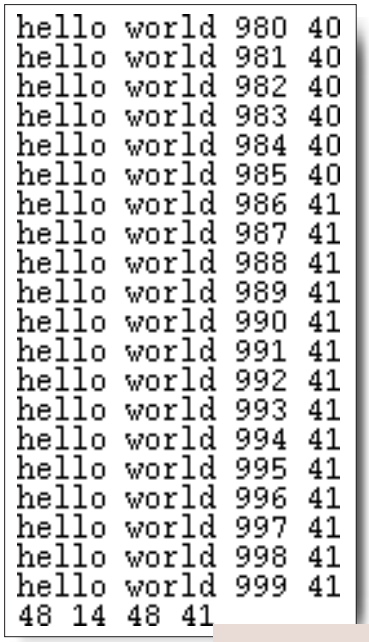
Indications that the vast bulk of available processing power is being used by the FBI is apparent when you use the Start menu – the performance is somewhat sluggish. This is a minor criticism (more of an interesting aside, really) because as soon as you move to another application, the FBI is no longer visible and the processor is freed up.

## Fishing for files

John also supplies a further application that fills a long-felt want. Tools have always been available on a PC, right back to the DOS days, for navigating directory structures to locate files.

To my surprise, Windows CE devices don't come with an explicit file browser. The argument appears to be that you've bought a commodity item and that users of commodity items neither want nor need to know where their files are. I disagree and, happily, others seem to agree with my disagreement as browsers are turning up from third-party suppliers – such as Sticky Explorer. Details of this and John's other apps can be found on www.sticky.co.uk.


◀THE TIMING CODE ABOUT TO RUN ON THE 5MX...




▲...AND THE RESULT, 27 SECONDS LATER

An alternative, which applies to both Psions and CE devices, is to fire up the internet browser and use that to explore your file structure – but this, of course, presumes that your PDA has browser software. Jason Mees has pursued this line and writes:

'I have recently discovered how to show the files on the Psion Series 5's file and folder structure, including memory size and date, via the Psion web browser. As long as the web browser from the message suite has been installed, all you need to type is:

```
file:///C/
```

'This then brings up folders and files on the C: drive. Clicking on a folder (which acts as a hyperlink) opens up another screen, although only .mbm, .jpg, .gif and .htm files can be opened and accessed directly.'

## GPS

On the subject of exploration (OK, this link is extremely tenuous – sorry) you may have noticed my propensity for writing about GPS (Global Positioning Satellite) units. If you have a unit that failed to proceed towards the end of August, the enjoyment you get from reading this will depend on where you threw it in disgust.

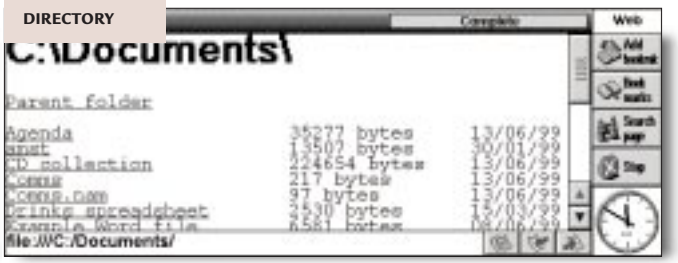
News coverage at the time reported that the re-setting of satellite clocks to zero was causing some GPS units to fail, but didn't include the more heartening information that it may be possible to recover a failed unit.

My four-year-old Garmin 45 did indeed die, but was resuscitated by holding down the Page key and keeping it down while turning the unit on, then releasing both keys. The Garmin then downloads a new almanac from the satellites, a process that takes upwards of 40 minutes, so check your batteries are fit for the task before you start. Happily, the 45 doesn't dump its waypoints during this operation.

For details of how to reset any other Garmin model, check the site at

▼USING THE WEB BROWSER TO SHOW THE FILES ON THE PSION. YOU CAN EVEN DOUBLE-CLICK ON THE NAME OF A SUBDIRECTORY SUCH AS DOCUMENTS...


▼...TO OPEN THAT PARTICULAR DIRECTORY



www.garmin.com or the site of your manufacturer. Not all GPS units can be brought back to life, but it's certainly worth checking the web if you have a deader. So, did you hurl it out to sea or cast it to the bottom of your sock drawer?

### Another deader?

Wyndham Hollis <Wyndham@compuserve.com> emailed me about the LG Phenom Express. In fact, he forwarded an email from the LG technical support department, which states unequivocally that the machine will cease to be manufactured in the US and that there is no replacement in the pipeline.

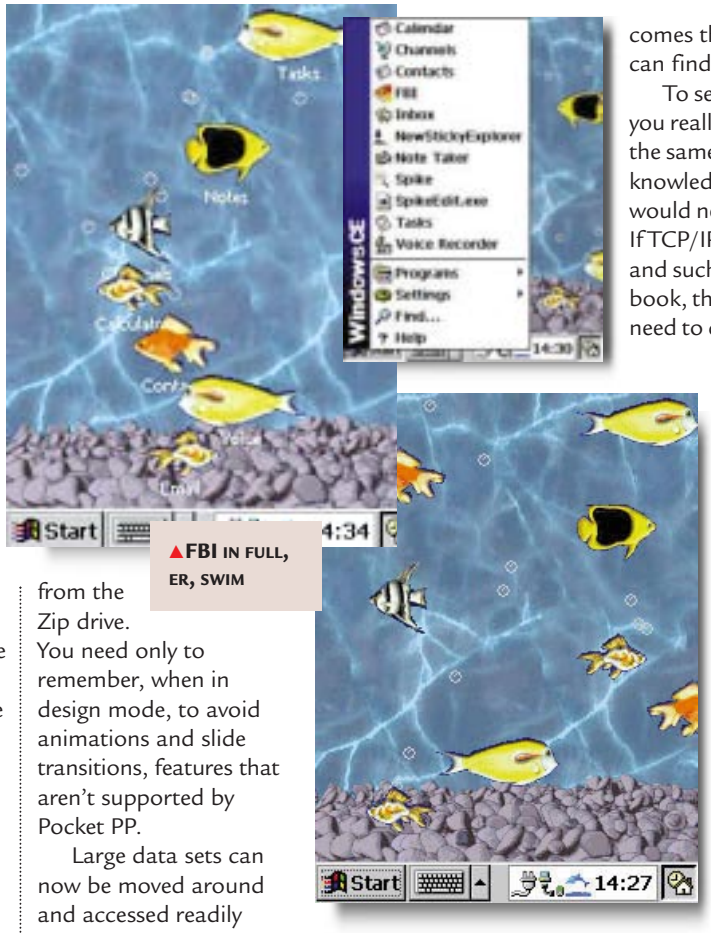
LG is not a big name in the PDA world and one wonders if it hasn't been edged out by the likes of Hewlett-Packard and Casio as competition in the WinCE market becomes ever more fierce. The Phenom Express is a machine that I consider to be somewhat better than the bulk of offerings and I am saddened if this signals its untimely demise.

### Expanding Windows CE devices

I reviewed two products in the November issue of *PCW*: the Adaptec SlimSCSI 1460, which is a PC Card Type II SCSI adaptor, and the Xircom CompactCard Ethernet 10, a network card for Windows CE devices. I described them, explained what they were like to install and use, and concluded that they were both fine, upstanding products. What I could not discuss in those short-format reviews is that they both open up whole new ways of working with a WinCE device.

The Adaptec SCSI card allows you to attach a Zip or Jaz drive to a handheld WinCE machine; I attached an Iomega 250MB Zip drive to an HP Jornada 820. The drive can, of course, be used for backing up, which is a thoroughly worthwhile and valid use, but a world of other possibilities also open up.

You can, for instance, create a huge and impressive PowerPoint presentation on your PC, save it to the Zip drive and set off for the conference burdened with merely the Jornada and the Zip drive. On arrival, you connect the Jornada to a monitor or projector (so you might want to pack a cable for that too) and deliver a presentation to the accompaniment of your sophisticated PowerPoint slides, accessed by Pocket PowerPoint from the Zip drive. You need only to remember, when in design mode, to avoid animations and slide transitions, features that aren't supported by Pocket PP.




▲FBI IN FULL, ER, SWIM

Large data sets can now be moved around and accessed readily from a handheld, opening up new ways of using that data. The possibilities are manifold: copies of CD-ROMs (you can fit several on a 2GB Jaz drive), the complete company database, images by the score... whatever you need.

And while I hate to eulogise, the Xircom network card is, for me, an even more revolutionary step in WinCE usability. Connectivity between PDAs and PCs is problematical, but it is also essential for the synchronisation of agenda and contact details, and for moving files between the two machines.

Psion devices seem to generate my biggest headaches, although WinCE connectivity is certainly not without its grim moments (see the November column). The Xircom card does away with all this grief and strife at a stroke.

**Fitting the CompactCard** lets me plug instantly into the existing network infrastructure, which in turn allows me to use tried and trusted protocols for communication between the PC and the WinCE device. All the cable-waving and hair-tearing is bypassed. It's wonderful, it only costs £89 and I love it. Here comes the only 'but' I can find.

To set up the card, you really need to have the same level of network knowledge that you would need for a PC. If TCP/IP, IP addresses and suchlike are a closed book, then you will need to do a bit of background reading.

This particular network card, just like the SCSI card, has changed the way I work. For example, I keep an archive of all my articles in a directory structure on a fileserver and now I can plug the Jornada into the network, use the web browser to navigate to a particular file and double-click on it. Pocket Word opens the document and it's ready for editing. The high level of file compatibility between Office and Pocket Office makes more sense when you can do this sort of thing.

Whether the CompactCard is for you depends entirely on your individual circumstances. So, if you've already beaten PC-PDA connectivity into working order, know absolutely nothing about networking and don't want to wade into a whole new world of cables, configuring cards, protocols and the like, then please feel free to disregard the latest love of my life.

If you have networking experience, however, then setting up the card and using it is as easy as falling off a log. Speaking as someone with a network at home (how sad) and with a deep-seated loathing of serial cables and their ilk, I fell off a log and I am laughing.

## PCW CONTACTS

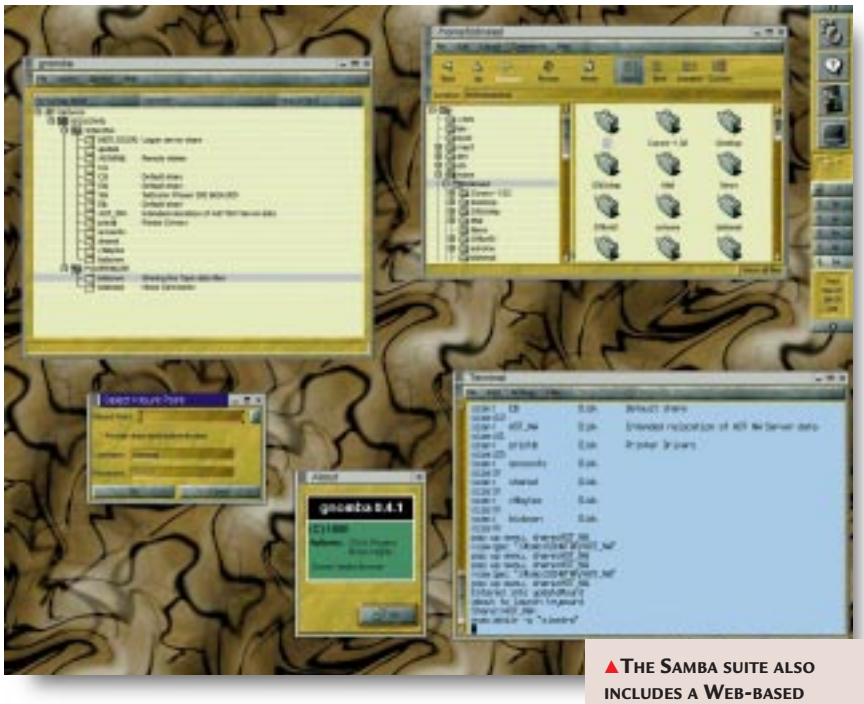
*Mark Whitehorn welcomes your feedback on the PDAs column. Contact him via the PCW editorial office or email pda@pcw.co.uk*

# Samba step by step

**Chris Bidmead sways to the beat of the SMB file server emulator, and attempts a spot of filing.**

The application that is doing more than any other to shift Linux into Windows sites is Samba, the SMB file server emulator conceived in Australia by Andrew Tridgell. Like many of the other components contributing to the roaring success of Linux, Samba isn't specifically a Linux application at all – it belongs generally to the world of Unix and free software.

SMB stands for System Message Block, the Microsoft network protocol underlying LAN Manager and NetBios. SMB's ubiquity owes more to Microsoft's marketing clout than engineering excellence, and its implementation in products like Windows 9x and Windows NT is inconsistent and buggy, presenting interesting hurdles for its implementers.



▲ THE SAMBA SUITE ALSO INCLUDES A WEB-BASED FRONT END, SWAT (SAMBA WEB ADMINISTRATION TOOL) FOR CONFIGURING THE /ETC/SMB.CONF FILE

**Samba is a collection** of programs. The core of the suite is smbd, the Samba daemon that runs on a Unix system to provide file and print services to SMB clients such as Windows or Windows NT. The way the daemon operates is defined in a file called /etc/smb.conf – smbd and smb.conf each have their own separate manual pages. There's also a special utility called testparm, designed to test and report on your /etc/smb.conf setup. Another utility, smbstatus, reports on current use of the SMB server.

A second daemon, nmbd, is there to provide support for NetBios-style name-serving and browsing, so the machine running Samba can respond to network browsers such as the Windows Network Neighbourhood. Again, this daemon has its own manual page.

***Samba isn't specifically a Linux application – it belongs generally to Unix and free software***

Smbclient is a utility that works as an ftp-like client to an SMB server, which may be Samba or a Windows machine of some kind. In addition to providing a way for a Unix machine to access directories shared using the SMB protocol, smbclient can be set up to allow a Unix machine to print to a printer attached to the SMB server. Man smbclient will give you more details.

But often you want something that works more like NFS, allowing you to mount remote SMB shares. Two European programmers, Paal-Kr Engstad and Volker Lendecke, resourcefully kludged together a utility called smbmount for the purpose, and until recently this separate effort was distributed as part of the Samba package. Current Samba distributions offer an equivalent function by extending smbclient with a rewrite of smbmount which calls on a helper program called smbmnt, each of which has its own man page.

### Where do all the files go?

A frequent theme in your emails is bafflement about the way Unix lays out its files. Dick Stuart-Grenville writes that, after working with Windows: 'I find it difficult to come to terms with a different file system, which encourages the re-use adlib of directory names such as /etc – I can never be sure I'm looking in the right place.'

Well, there is only ever one /etc, although there may certainly be other directories called etc buried deeper (an interesting one is /home/ftp/etc which is designed to appear as /etc to anyone logging in by anonymous ftp). The Unix philosophy for laying out standard files and directories is not too defined, and a lot of the detail varies between different versions. The Red Hat Linux system is built around an initiative called the Filesystem Hierarchy Standard (FHS). This was formerly known as the Linux Filesystem Standard (FSSTND), but it was expanded to take in members of the BSD community and now aims to offer a standard file system hierarchy for all Unix-like operating systems.

**Root, or / is the root directory** at the very top of the directory tree. It belongs to root (the super-user), who is the only one allowed to store files here.

Under modern Unixes, no files are stored here. The root directory exists simply as the anchor point for all the other directories.

Don't confuse / with /root (although some older Unixes did just this). /root is the directory off the root that is used as the super-user's home directory.

☛ **/bin** contains the essential executables. It should be immediately accessible in single-user mode because its components are required to bring up the system or repair it. The same applies to /sbin, the distinction being that the /sbin executables won't usually be needed by ordinary users.

**The Linux Filesystem Standard now aims to offer a standard for all Unix-like systems**

☛ **/dev and /proc** are 'strange' directories, a function of the Unix philosophy of making everything look like a file. The 'files' under /dev are actually drivers for a whole range of devices or, strictly speaking, funnels that connect these drivers to the system. For example, on Linux systems, /dev/fd0 is the device that accesses the floppy disk drive. Be aware, though, that these /dev files offer only low-level access to their respective devices, which brings us to...

☛ **/mnt**, the home of the mount points. If you want to write files to (or read files from) a floppy disk, you will first need to mount it. That is to say, the raw device as represented by /dev/fd0 will have to be incorporated into the file system. You do this by creating a mount point (which is exactly the same as creating an empty directory), for example, /mnt/floppy, and attaching it to the appropriate device with a command such as:

mount /dev/fd0 /mnt/floppy.

**Officially, /mnt is described** as 'a mount point for temporarily mounted filesystems', but more usually you will be mounting on arbitrarily created directories below /mnt. For example, /mnt/cdrom is the standard place to mount a CD-ROM. For a temporary mount I tend to create a mount point under /tmp.

☛ **/proc** is an even stranger and much newer concept than /dev. The 'files' under /proc are manifestations of the running system (or an 'interface to kernel data structures', as the proc man page officially puts it.) For example, if you type out the text file /proc/meminfo to the screen thus: 'cat /proc/meminfo', you'll see something similar to Fig 1.

[FIG 1]

| | total: | used: | free: | shared: | buffers: | cached: |
|---|---|---|---|---|---|---|
| Mem: | 31387648 | 28807168 | 2580480 | 32976896 | 614400 | 12759040 |
| Swap: | 45379584 | 3944448 | 41435136 | | | |

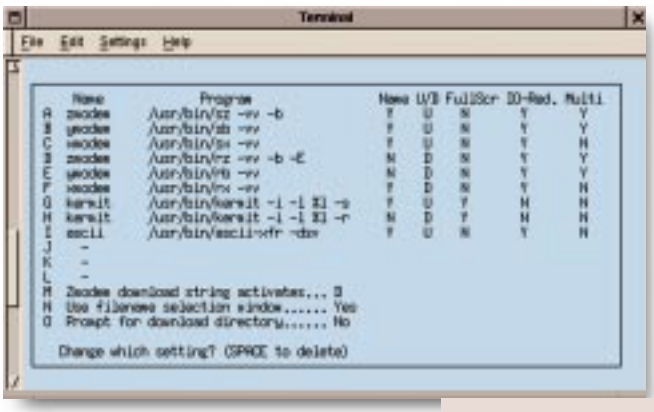
| | |
|---|---|
| MemTotal: | 30652 KB |
| MemFree: | 2520 KB |
| MemShared: | 32204 KB |
| Buffers: | 600 KB |
| Cached: | 12460 KB |
| SwapTotal: | 44316 KB |
| SwapFree: | 40464 KB |

**Other key directories** are /var (used for files of uncertain length, like log files; /tmp (temporary files); and /home (under which the home directories of the ordinary, non-super-users are located).

A particularly important directory, to revert to Dick's original question, is /etc. Here, or in directories below /etc, all the system's configuration files are stored. Hence /etc/hosts is the file that keeps tracks of the names and TCP/IP addresses of all the machines on the local network.

**Older Unixes took the** directory's name literally and used it as a general repository for system scripts and other oddments. Linux is attempting to shake off this stubborn tendency and follow the rule that /etc should house only configuration files, not executables. Some of the key differences between, say, SuSE Linux and Red Hat Linux hinge on the extent to which this rule has been followed.

That should give you some feel for the Unix directory structure. I hope it has whetted your appetite for fuller details which you'll find in the Linux man pages under man hier. If you want the complete story, you can read the full FHS documentation at, for example, www.pathname.com/fhs/2.0/fhs-toc.html.




▲ FIG 2 MINICOM'S OPTIONS LET YOU SPECIFY WHICH UTILITIES WILL BE CALLED WHEN YOU EVOKE THE VARIOUS SERIAL TRANSFER PROTOCOLS. THE INTEGRATION IS SEAMLESS, BUT MINICOM DOESN'T COMPLAIN IF A REQUIRED UTILITY DOESN'T EXIST

## More on that router

As I told you last month, the ZyXel router I put on top of the Altec-Lansing sub-woofer succumbed after a couple of hours to the powerful magnetic field around the unshielded speaker. I concluded that it must have fried the router's Flash RAM – but only after the same thing happened to a second ZyXel router. I figured that if the contents of the Flash RAM had been munged, I should be able to reload them by going through the Flash update procedure. Unfortunately, I made a mess of this too.

**Uploading firmware is carried** out through the router's serial port. Under Linux (and this works with most Unixes), I used the free software serial


◀GNOMBA IS ANOTHER SAMBA ACCESSORY, WHICH YOU'LL NEED TO DOWNLOAD SEPARATELY FROM HTTP://GNOMBA.DARKCORNER.NET. IT BROWSES THE NET FOR SMB SHARES AND SIMPLIFIES THE PROCESS OF MOUNTING THEM UNDER THE LOCAL FILE SYSTEM

communication program called minicom, which was originally put together by Miquel van Smoorenburg. I needed to run minicom as root to match the default permissions on /dev/ttyS0 (or I could have changed the permissions). I set the baud rate to the default baud rate of the router's serial port and logged into the router's menuing system, confirming I had a connection.

**But all attempts** to upload the firmware failed. I set up the router to receive the xmodem stream and minicom was giving me a growing string of dots on the screen as if the upload were in progress. But the string of dots just went on growing... for hours.

If I'd known minicom better, I would have realised much earlier that I didn't actually have an xmodem connection.

***It turned out the dots were minicom's way of twiddling its thumbs while it waited***

Despite what the minicom upload menu leads you to believe, minicom doesn't actually do xmodem. Or ymodem, or zmodem. Eh? What kind of serial comms utility is this?

Actually, it's a damn fine one. It turned out that the dots were minicom's way of twiddling its thumbs while it waited for the xmodem connection to be established – by some other utility. If I'd taken the trouble to explore minicom a little, I would have discovered a setup screen that establishes which utility is going to take care of which protocol.

You'll see from the menu [Fig 2, previous page] that xmodem uploads and downloads are supposed to be handled by /usr/bin/sx and /usr/bin/rx respectively. Inspection of the /usr/bin directory revealed that I didn't have either of these utilities installed. And locate couldn't find them anywhere else, either.

You can, of course, change the menu to point to whatever serial connection utilities you feel like using. But there were none on my system. I went back to the Mandrake installation CD and discovered lrzsz-0.12.20-3mdk.i586.rpm. Running rpm on the package with the -qpi switch (similar to the -qi switch we discussed last month, but with an extra -p because the package is not yet installed) revealed a note that said: 'If you're installing minicom, you need to install lrzsz.'

**I would be embarrassed** to tell you how long I spent with minicom before I discovered why it wouldn't upload the Flash code. In the meantime, I'd been on the phone to Paul McGeever, business development manager at Electronic Frontier, the distribution company that took over the handling of ZyXel gear from P&L Systems.

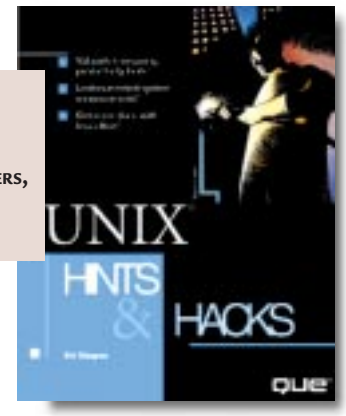
He arranged to come round and sort me out with a new version of the ZyXel router – the Prestige 100IH, which also includes a four-port 10BaseT hub. So, together with an eight-port InBusiness hub, I now have plenty of spare capacity on my network. And I'm back on the internet.

## Unix Hints and Hacks

There are a lot of dud Unix books out there, but *Unix Hints and Hacks* by Kirk Waingrow (Que) is a worthy tome.

The title is a little misleading. The book is a collection of real-world wisdom from users who have evidently lived through the trials and tribulations of administrators on a traditional multi-user Unix site (the author runs the Unix Guru Universe site at www.ugu.com).

**This sounds – and, indeed, is** – a far cry from the typical Linux home user who has to be both user and administrator rolled into one. I've read Unix admin books that are decades out of touch and if my mail bag is anything to go by, so have many readers of this column. But in *Hints and Hacks*, Kirk has achieved a remarkable feat. The book is firmly anchored in real-world multi-user Unix and covers a multitude of valuable generalities (and tricky specifics) that make it a must-read for anyone running a Unix system, particularly for the Linux beginner who's looking for a wider horizon and a closer acquaintance with the real stuff below the GUI.




▶'UNIX HINTS & HACKS' IS A MUST-READ FOR ANYONE, INCLUDING BEGINNERS, RUNNING A UNIX SYSTEM

## PCW CONTACTS

*Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email* ***unix@pcw.co.uk***

Unix Hints and Hacks *by Kirk Waingrow is published by Que, price £18.49 and is available now. ISBN: 0789719274*

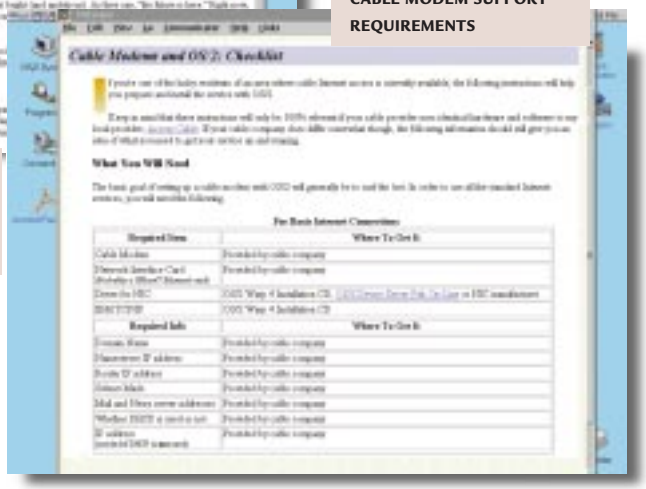
# Cable and unwilling

**Terence Green struggles with the intolerance of cable modem providers and the IBM helpdesk – again.**

Users of OS/2 are sometimes overlooked when new technologies emerge. Quite often, OS/2 can support the technology, but the people who deliver it live within the Windows monoculture, which leaves them blind to other operating systems, even though they could be equally effective.

The recent flurry of free ISPs is a case in point. As we've discovered, it's a doddle to connect with Warp even though many ISPs only support Windows. We can do this thanks to the shift from proprietary networking protocols to TCP/IP, which Warp has always supported.

▲OS/2 AND CABLE MODEMS – WILL THEY OR WON'T THEY WORK TOGETHER?



▼A CHECKLIST FOR WARP CABLE MODEM SUPPORT REQUIREMENTS

**Now it's about to happen** again, as cable companies finally deliver the cable modems they've promised. NTL has an internet service via cable modem for £30 per month. The service is asynchronous, offering 'up to' 512Kbit/sec downlinks and 128Kbit/sec uplinks.

Reader Nigel MacLeod, an NTL cable subscriber, received a letter from NTL inviting him to partake of the new service, but NTL only supports Windows 9x and Nigel is a staunch OS/2 user. So Nigel is looking for cable modem information. One place to look would be the OS/2 networking newsgroups, where cable modems have long been discussed. For anecdotal information, have a look at www.os2ezine.com/v2n10/cable.htm

**The good news** is that the standard connection for cable modems is Ethernet and TCP/IP, both well supported by OS/2. If the cable modem is an external box with an Ethernet connection, you're in luck. Your main obstacle will be the cable company's stipulation that you have a Windows PC. You could get around this by providing a Windows PC when the engineer calls and transferring the details to your Warp PC once they have done their job and departed. In most cases, getting a cable modem to work with OS/2 will be a re-run of the free ISP situation, where it was a tortuous process to locate the logon details and the addresses of nameservers. Note, however, that USB and PCI cable modems are also in production and may not include OS/2 drivers.

If you're in the market for a cable modem, you should also consider BT's Asynchronous Digital Subscriber Line (ADSL) service, which will be rolled out in metropolitan areas such as London, Birmingham and Leeds over the next few

## PPP DIALLER UPDATE

George Szaszvari wants to know whether Warp 3 can be used with ISPs that only support PPP connections. He recently brought his copy of Warp 3 out of retirement to see if it would provide a more reliable internet connection than Windows. But then George hit a problem: the Warp 3 Dial Other Internet Provider won't connect to his internet service provider, Pipex, as it no longer supports SLIP connections.

The original DOIP code released with Warp 3 in 1994 has some problems with PPP, which was not widely used at that time. However, there is a PPP update for DOIP, released in 1995, which should solve the problem. The update can be found at ftp://ftp.ibm.net/pub/PPP/ as PPP.ZIP. It's a 0.5MB download. In order to use it, first install the Internet Access Kit from the Warp 3 Bonus Pak, then install the files from PPP.ZIP to update the DOIP software.

Full installation instructions are in the enclosed README.PPP file. Be sure to follow the installation instructions to the letter in order to install the update.

months. ADSL also connects to a PC via Ethernet and TCP/IP and, like cable modems, offers a permanent, fast internet connection. The service may cost about £40 for an equivalent bandwidth to that offered by NTL for £30 – 512Kbit/sec down, 128Kbit/sec up – but BT's prices are yet to be confirmed.

### Support act

Dave Bailey wrote to agree with the consensus that IBM doesn't offer a very helpful face to the individual OS/2 user. Dave says that when he contacts IBM for OS/2 support, he 'just gets passed around a number of people who know the same amount about OS/2 – nothing'.

Dave's query wasn't particularly esoteric. He had upgraded his hard disk to a new 6.4GB model, which triggered a 'partition mapping may be corrupted' message. As Dave discovered by reading the *Hands On* OS/2 column, the problem arises because the original Warp hard disk driver isn't aware of multi-gigabyte hard drives. The solution is simple – an updated driver that IBM provides in the IDEDASD.EXE file, which can be downloaded from the OS/2 Device Driver Pak Online.

**The problem was** that no-one at IBM was able to point Dave in this direction. They referred him to the HelpFax line, which turned out to be constantly engaged, and even offered a support contract at one point. But Dave says: 'Luckily, the person I was put in touch with had the sense to realise that a contract costing hundreds of pounds was not what I was looking for.'

This isn't very good, but it is in line with the message we have begun to repeat every month. OS/2 has excellent support from both the online community and from IBM – as evidenced by the regular Fix Packs, device driver updates and Netscape and Java developments – but individual Warp users are not favoured customers any more. To get support, you have to tap into OS/2 online through the Usenet newsgroups OS/2 hierarchy (try comp.os.os2.* as a search word) or via one of the OS/2 websites maintained by enthusiasts.

Alternatively, you can read the OS/2 *Hands On* column! This is especially recommended if you don't have a good internet connection, a situation I now understand all too well. This column comes from the southern tip of Africa, where the maximum connect speed is 19.2Kbit/sec. Downloading even the smallest file is a pain. As a result, we will try harder to deliver Fix Packs, plus Netscape and Java updates, whenever space permits!

## NETSCAPE 4.61 AT WARP SPEED

By the time you read this, Netscape Communicator 4.61 for OS/2 Warp should be available for download. IBM put up the first preview (read this as 'beta') version in July and a second one in August. We hope to be able to place it on the *PCW* cover CD in due course, but you might want to go ahead and download it anyway if you can face the 7MB-odd download.


▲ NETSCAPE COMMUNICATOR 4.61 FOR OS/2 WARP – AVAILABLE NOW

Netscape 4.61 for OS/2 Warp includes the Navigator browser, Messenger email and news, and Composer HTML editor. The preview version supported the latest OS/2 Warp Java 1.1.7 runtime and development environment, but IBM has since shipped Java 1.1.8 and that will also be supported in the shipping version. Netscape 4.61 brings Warp users bang up to date with the latest Netscape browser developments, including SmartUpdate, HTML 3.2+, What's Related and JavaScript 1.3. More details can be found at www.ibm.com/software/os/warp/netscape/.

The ongoing development of OS/2 browsing and Java services is fully in line with IBM's positioning of the Warp client (actually, both Warp clients, as Java 1.1.8 and Netscape 4.61 support Warp 3 and Warp 4) as a premier network client. An interesting article in the daily WarpCast www.warpcast.com identifies IBM's Java 1.1.8 for OS/2 as the top performer in the SciMark 2.0 Java benchmark. Results and the chance to test your own system online can be found at http://math.nist.gov/scimark2/index.html.

Although we rightly bemoan the lack of direct end-user support for Warp, it's instructive to compare it with competing desktop operating systems. These grow like Topsy, gather ever more fluff, become increasingly complex to maintain and require ever more desktop resources, sometimes for no apparent purpose other than to prevent folder animation from slowing to a crawl.

By contrast, Warp 3, first released in 1994, can be brought right up to date with the latest Java and browsing functions. As the SciMark results show, older CPUs powered by Warp Java (available from www.ibm.com/java) can deliver performance in excess of the latest CPUs, as they struggle to cope with the load imposed by less efficient Java virtual machines.

## PCW CONTACTS

*Terence Green welcomes your feedback on the OS/2 column. Contact him via the PCW editorial office or email: os2@pcw.co.uk*

# Going by the booklet

**Tim Nott puts his pages in order with A5 printing tips and assigns Word Pro keystrokes**

One long-standing problem that frequently figures in this column's mail is how to make A5 booklets in Word by printing pages 'two-up' on A4 paper. The core of the problem is what is known as imposition – getting the pages in the right order. In the simplest case, a single A4 sheet folded, pages 4 and 1 need to be facing on one side of the sheet with 2 and 3 on the other. An eight-page booklet goes 8-1, 2-7 and 6-3, 4-5. More pages and I have to scribble on bits of scrap paper to work it out. We've looked at various solutions, including macros, tables, feeding the paper through four times and using commercial add-ons such as Clickbook.

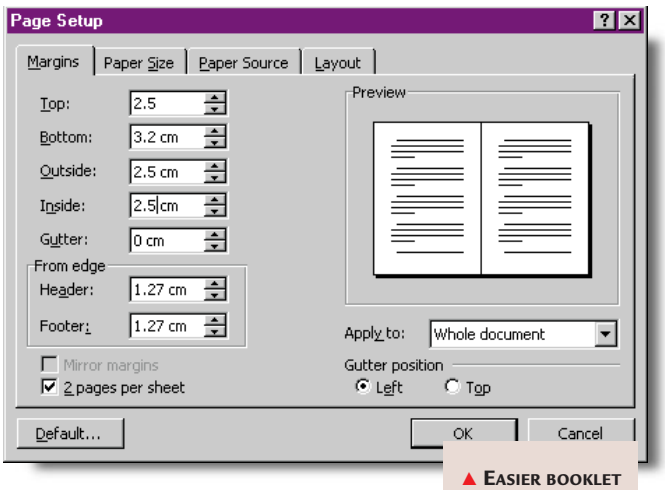
The good news is that Word 2000 seems to have got this right – nearly – as there is an option in Page Setup for two pages per sheet. First, you need to set the orientation as landscape on the Paper Size tab, then switch to Margins and check the '2 pages per sheet' option. Then set your margins. For some peculiar reasons, these are reversed on my setup: changing the measurement in the Inside box alters the outer margins and vice versa. Having set up the page, you create your document with normal page numbering.

Now comes the clever bit. Let's assume we're printing an eight-page leaflet and you have a standard single-side printer. Go to the Print dialog and, in the Page Range options, select Pages, type 8,1,6,3 in the box and then set the number of copies you want. Print, and you'll find pages 8 and 1 are on the first sheet, with 6 and 3 on the second. Repeat the print run on the other side of the paper for pages 4,5,2,7 (assuming the 8-1 pages are now at the bottom of the stack). Your paper path – and hence the order – may vary, but this works on my DeskJet.

***The good news is that Word 2000 seems to have got this right – nearly***

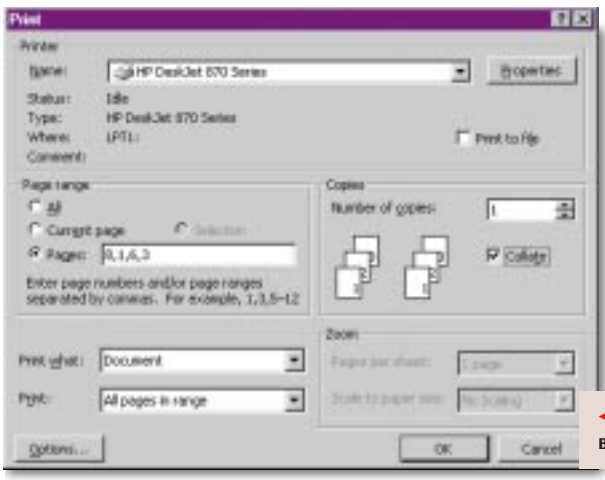
For those still labouring under the yoke of Word 97, the following (fiddly) method fulfils the essential condition of preserving an editable text stream.

**First, set up the page as** landscape, with two columns. Make sure you have text boundaries visible from Tools, Options, View, then use the column outlines as guides to draw two text boxes – these will hold the body text. Next, draw two more small text boxes in suitable positions to hold the page numbers. Using your preferred copy and paste technique, create sufficient additional blank pages for the entire booklet, then manually number these as they will be printed, eg 8-1, 2-7 etc.




▲ **Easier booklet printing in Word 2000**

Now copy and paste your previously prepared text – all of it – into the text box on the right of the first sheet, which should be marked as page 1. Obviously, it won't all fit. Right-click and choose Create Text Box Link. This 'loads' the cursor with the excess text: click in the text box designated as page 2 to fill that, then repeat the linking for the rest of the pages. Print using a variation of the 'Pages' technique above – remember that these will be the sheet numbers, not those that appear in your booklet.




◀ **Printing the booklet - side one**

## Word Pro hotkeys

A while back, I asked if anyone out there knew a way to assign keystroke shortcuts to actions in Lotus Word Pro. A deafening silence ensued and then the originator of the enquiry, Alan Hitchin, supplied the answer himself. You can assign CycleKeys or styles to the function keys from File/User Setup, but this isn't very flexible – you can't, for example, mix the two or assign other key combinations. What Alan wanted was to get his favourite AmiPro shortcut keys back, such as Control + D to swap between full-page and 100 per cent zoom. The answer, it seems, involves editing the registry. So, with the usual caveat of making sure you have a recent registry backup (see *Hands On* Windows passim), here's what you do: first, record

# Questions & answers

**Q** I am constantly saving news stories, technical reports and reviews from the internet. The problem is the space formatting of the text cut from a web page. If I want it to fill a normal A4 page economically, I am faced with the long task of highlighting spaces and deleting them. Microsoft Word 97 solves this problem with Autoformat, but I cannot seem to do this with Lotus Word Pro.

CHRIS ANDERSON

***A** Using the spacebar as a formatting aid is a relic of steam typewriting, and I agree, it's annoying. One thing worth a try is choosing Paste Special from the Edit menu, then selecting RTF as the format (if available). In Word Pro 9, this seems to strip out extra spacing as it pastes. There is a similar feature to Word's Autoformat (Edit, Proofing Tools, Check Format), but this only seems to check for double spaces – it ignores three or more. The following method lacks elegance, but is a lot less effort than manual editing.*

*Open the Find & Replace toolbar and type two spaces in the Find box, then one space in Replace. Hit the Replace All button, and a message appears telling you how many replacements have been made and asking whether you want to close Find & Replace.*

*Click on No, click on Replace All again, and repeat these two steps until the message shows zero replacements. The final step is to get rid of any single spaces at the beginning of lines. Type ^r in the Find box, followed by a space. Type ^r in the Replace box, with no trailing space. Replace All and the job is done.*

**Q** Recently, I had to re-install Windows 98. Afterwards, I discovered that I had lost all my AutoCorrect entries in Word 97 – both the installed ones and the ones that I had created. Can I get them back? And if not, how do I re-install the AutoCorrect entries that came with Word 97?

DAVID STEWART

***A** For reasons I cannot fathom, Word 97 keeps these in .ACL files in your Windows folder. Normally, there's a generic one plus other, user-specific ones. You need to back these up before deleting the Windows folder prior to a clean re-install. Re-install Word to get the standard ones back.*

**Q** Maybe things have changed in Word 97, and I'm no expert, but in Word 95, under Windows 95, your macros to launch external programs from Word (*Hands On* June and September 1999) consistently fail with syntax errors.

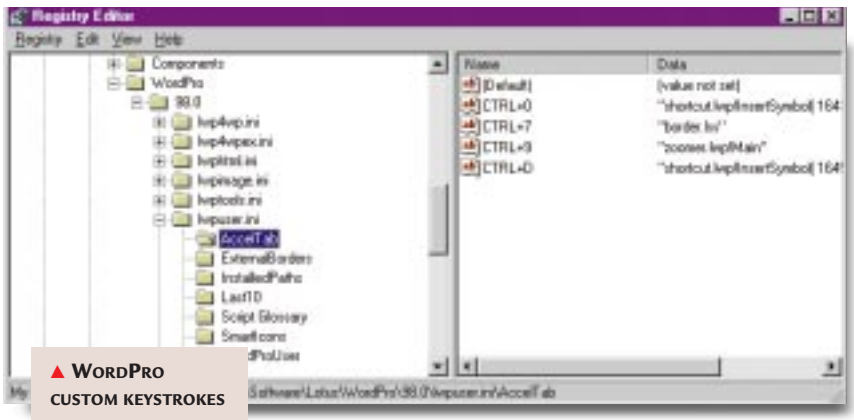
In any case, your placement of commas and spaces is unclear and inconsistent. If you are going to publish code, you need to establish a symbol to stand for 'space' so as to avoid confusion.

DR ERIC WEBB

***A** Things have indeed changed. The macro code you mention was written in Visual Basic for Applications (VBA), which comes with Word 97 and 2000. Word 95 and earlier uses WordBasic, which is a different dialect – sorry if I didn't make that clear.*

*With regard to the spaces and commas, it's always a problem to reproduce code in narrow columns, because of the necessity to wrap long lines. An arrow symbol at the end of a printed line indicates that the code string continues onto the next printed line. We use a monospaced font, so it should be obvious where the spaces are.*

*Having said that, there was a slight glitch in September's example as an extra space somehow crept in at the end of the fourth line.*




▲ WORDPRO CUSTOM KEYSTROKES – NOT EASY, BUT POSSIBLE

or write the scripts to carry out the relevant commands, then close Word Pro.

Run Regedit and go to:

HKEY_CURRENT_USER\ Software\ Lotus\ WordPro \9?.0\lwpuser.ini

(the question mark is either 6, 7 or 8). If there is no key here called AccelTab, create one. Under this key, create (in the right-hand pane) new string values for each shortcut key you want to define. The name should be in the form of Alt or Ctrl followed by +, and then the key, with no spaces eg Alt+D. Double-click on the new name to edit its value and type in the name of the script. If it isn't in your default scripts folder you'll need to include the whole path. If the script is a freestanding .LSS file you just type in the name. If it's in a document (.LWP) file, type in the name of the document, followed by an exclamation mark, followed by the name of the script – no spaces. Close Regedit, open Word Pro and your assignments should be in effect.

On a related matter, my copy of SmartSuite Millennium came with a document (Shortcut.lwp) that allows you to assign keystrokes to insert symbols. This stores the information in the same place in the registry – note that you need to copy the document to your Scripts folder for the assignments to work.

## PCW CONTACTS

*Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk*

# Match-making

**Stephen Wells discovers the difference between the approximately true and the exactly false.**

The following people: Kevin Allan, Clive Burt, Tony Cowling, Sam Edge, J Mcilroy, Mike Petrie and Geoff Wyss, to name a few, have been kind enough to comment on my use of a combination of the INDEX and MATCH functions in the September column instead of using VLOOKUP.

Initially I responded to these correspondents by saying that the VLOOKUP function required the data to be sorted into ascending order. But some readers replied that VLOOKUP has a fourth optional argument. If it's omitted or entered as TRUE then VLOOKUP finds an approximate match, but if entered as FALSE the function will find an exact match. So instead of using

```
=INDEX(G1:H10,MATCH ↙
(B2,G1:G10,0),2)
```

you can use the simpler formula

```
=VLOOKUP(B2,G1:H10,2,FALSE)
```

where cell B2 holds the value to be looked up in the first column of the table; G1 to H10 is the range of the table, and 2 is the column number in the table where the match is sought.

**What is interesting** is Microsoft's development of the function. I'm used to arguments being handled differently between the same-named functions in Excel, 1-2-3 and Quattro Pro. But this is the first case I've come across of Excel improving a function between versions. With Excel 4, Microsoft included three excellent manuals to which I frequently refer. In the Function Reference, VLOOKUP has three arguments and it says that if VLOOKUP can't find a lookup value, it uses the largest value that is less than or equal to the lookup value. Yes, I do have Microsoft Press' *Excel 97 Worksheet Function Reference* but, at £22.99, it's not as comprehensive as the free Excel 4 version of the same book. But now that I look at this newer book again – and double-check with the Excel 97 Help file – it's true that VLOOKUP has sprouted this fourth argument. And it's not to keep up with Lotus and Corel as 1-2-3, 97 and Quattro Pro 8 still use

```
@VLOOKUP(X,RANGE,↙
COLUMN_OFFSET)
```

Microsoft's Works 4.5 also retains the three-argument version of VLOOKUP.

Although Microsoft recommends in several articles in the Knowledge Base, even for Excel 2000, that it is safer to use the INDEX/MATCH combo over LOOKUP, or VLOOKUP to allow for all eventualities, I give equal weight to the opinions of readers using Excel for everyday tasks.

### What's that name?

Bill F Hamilton, who uses Excel 5, wrote to ask if I knew the VBA vocabulary to write a macro which would display the Name of the range which contained the active cell. My level of expertise here is like the schoolboy with enough French to say that his aunt has a pen in the garden.

[FIG 1] Macro to find names

```
Sub Find_Names()
For Each n In ActiveWorkbook.Names
  On Error Resume Next
  If Mid(n.RefersTo, 2, InStr(n.RefersTo, "!") - 2) = _
   ActiveSheet.Name Then
    Set y = Intersect(ActiveCell, Range(n.RefersTo))
     If TypeName(y) = "Range" Then MsgBox "Cell is in : " & n.Name
  End If
  Next
  MsgBox "No More Names"
End Sub
```

After I failed Bill, he got back to me with the answer to share with other readers. The macro is listed in Fig 1. How it works is illustrated in Fig 2. In my example cells A2 to A13 are named Months. I have created a button on the worksheet to start the macro and labelled it Names. Here the active cell is A7.

When you click the button, a dialog box appears which says that the active cell is in the range labelled Months. When you click OK in the box, another appears that says No More Names because, in this instance, there are no more applicable Names. Cell A7 could, of course, be in several named ranges at once. In that case the macro would display each Name in turn. This macro works in Excel 5 and any later version.

### Timely tips

It's wise to include on an invoice the date by which payment is expected. That's easy if the period of agreed credit

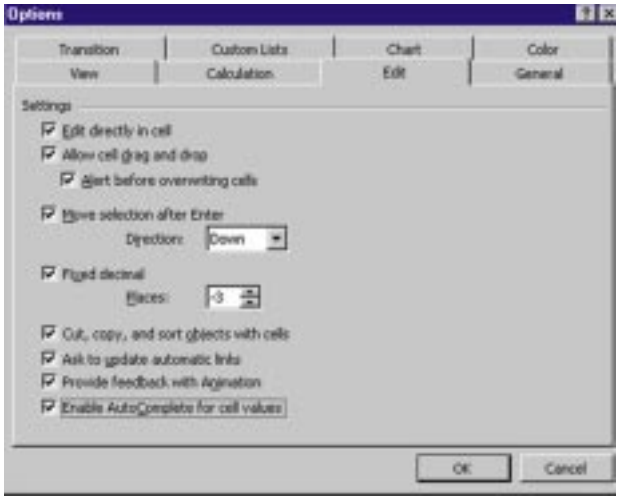
## IT'S THE WEEKEND

It can be cheering to have a topical message pop up on your worksheet. In Excel, enter `=IF(WEEKDAY ↙ (NOW())=6, ↙ "Hooray, it's ↙ Friday!","")` and on the last day of the working week the message will appear. To remind you to keep that cell clear on the other days, you could have an anodyne phrase such as, 'Keep striving' between the final quotes. In Lotus 1-2-3 the equivalent formula is `@IF(@ ↙ WEEKDAY (@NOW)=4,↙ "Hooray, it's ↙ Friday!","Keep ↙ striving")` as Monday is counted as zero and Sunday as six. In Corel Quattro Pro, the formula is the same as 1-2-3, except the four becomes a six as in Excel, which counts Sunday as one.

# Questions & answers

**Q** How can I have Excel add zeroes automatically to my entered numbers? For instance, if I enter 23 I want Excel to store and display 23,000.

**A** *Choose Tools, Options, Edit and check Fixed decimal (see right). Then in the Places box select -3. Then format the cells as a Number, with a comma for a 1,000 separator.*




**Q** What's the fastest way of moving columns or rows around in Excel?

**A** *In Excel 97 or 2000, select the column or columns you want to move by clicking on the column letters. Move the mouse pointer to the edge of the selection until it changes from a cross to a regular pointer arrow. Hold down Shift and then click and drag the column to the new position. A faint 'I' bar which runs the entire length of the column shows you where the column(s) are going. Release the mouse button before releasing the Shift key, and the column is moved without overwriting any data. If you do wish to overwrite other data, then don't use the Shift key. You can move rows the same way by clicking on the row number(s) first.*

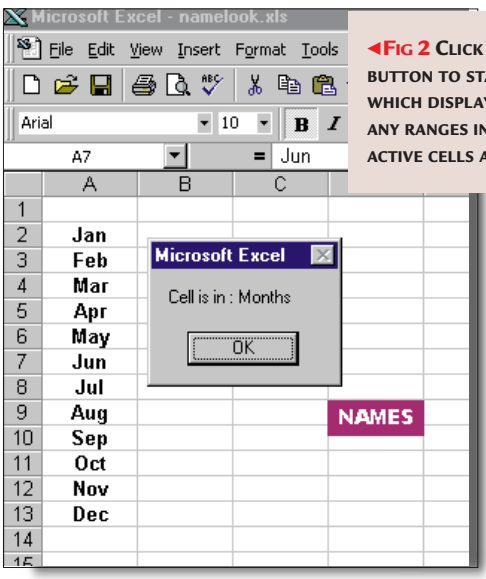
**Q** When we're calculating the production of orders we often end up with percentage points like 98.63 sets. Obviously .63 of a set is no good to anybody. And Excel makes things worse by rounding more than half a set up to another whole one. How can I just display the number of fully completed sets?

**A** *Use the ROUND DOWN function. If you have 98.63 in L23 then in L24 enter =ROUNDDOWN(L23,0).*

**Q** Sometimes the SUM of a column of figures on a spreadsheet is obviously slightly wrong. What is happening?

**A** *Spreadsheets display an entered or calculated stored value according to the selected or default formatting. In Excel you might like to go to Tools, Options, and select Calculation Precision as displayed. But when you do this Excel permanently changes any constant values on the worksheets in the workbook. If you later choose to calculate with full precision, the original underlying values cannot be restored.*

*One solution is to use the ROUND function with a number argument (any number that you want rounded) and a num_digits argument (the number of digits to which you want the number rounded). So ROUND(10.46,0) and ROUND(10.46,2) display 10, but ROUND(10.46,1) displays 11 because Excel has independently rounded the .46 up to .5. For peace of mind, just with formatting, you can display a lot of decimal places to check what is happening.*




**◄FIG 2 CLICK ON THE NAMES BUTTON TO START A MACRO WHICH DISPLAYS THE NAME OF ANY RANGES IN WHICH THE ACTIVE CELLS APPEARS**

is given in days. All you need to do is add the number of days to the issuing date with a formula like =B2+C2 in cell D2. That's because spreadsheets store dates as a number which is a count of days since a start date, such as 1-1-1900.

But supposing the issuing dates of the invoices are in column B and column C has the number of months of credit extended. This may vary due to a number of factors. In column D the DATE function can pick up the year, month and day from column C and add the number of months to be added to the date specified in column C.

In Microsoft Works and Excel the formula is:

```
=DATE(YEAR(B2),MONTH(B2),↙
DAY(B2)+C2)
```

Drag this down the column. Format column C as numbers and columns B and D as dates. The equivalent formula in Lotus 1-2-3 and Quattro Pro is

```
@DATE(@YEAR(B2),@MONTH(B2)+C2↙
,@DAY(B2))
```

*(Key: ↙ code string continues)* although this only works as long as the total number of months doesn't exceed 12 – the maximum number of months these two spreadsheets will recognise. They don't 'carry months forward' as Excel and Works do.

## PCW CONTACTS

*Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk*

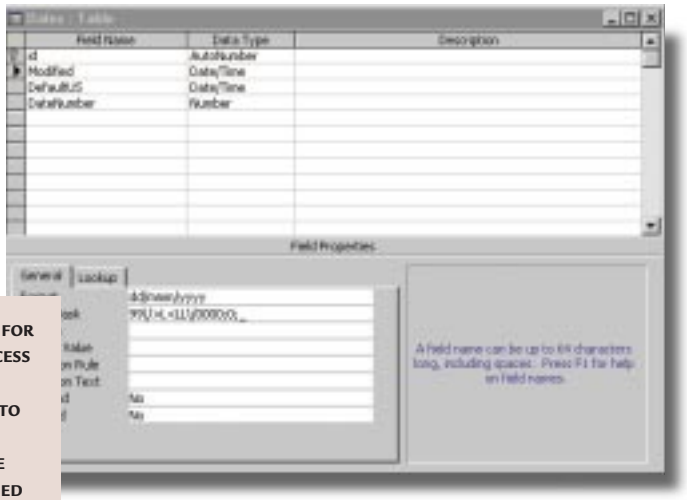
◆ *Please do not send attached files unless they have been requested.*

# Microsoft masquerade

**Mark Whitehorn plans to enlist Tony Blair to resolve Anglo-American differences over Access.**

In the September issue of *PCW* I wearily raised the issue of the postcode and phone number input masks that Microsoft supplies for the UK. They don't work; they haven't worked since they were introduced in Access 2.

The problem keeps on tripping up new users of the product who think it is themselves who are at fault when they can't enter data. I (and I'm sure others) have repeatedly reported the problem, but it remains. When I explained the difficulty again to Microsoft US, it replied that there wasn't a problem, indeed there was a document explaining how to work with zip codes.



▶ FIG 1 A TEST TABLE FOR DATES. THIS IS IN ACCESS 97 RUNNING ON NT WHICH HAS BEEN SET TO US FORMAT IN THE CONTROL PANEL. THE FIELD CALLED MODIFIED HAS BEEN SET UP WITH THE REQUIRED INPUT MASK AND FORMAT

Undeterred, I replied that UK postcodes (and phone numbers) used a different format, and that it was the input masks supplied specifically for the UK that didn't work. In September I promised to let you know how it went.

Here is the official answer from Microsoft. A UK representative has confirmed that this isn't a UK localising issue, it's an area of Access that is dealt with in the US, which means that the UK end of Microsoft can't fix the problem. He also confirmed that the US is not replying to correspondence on this subject. However, whether this is just my correspondence, or all correspondence, is not clear.

***I will be writing to Tony Blair asking for the postcodes to be changed***

After some deliberation, I now realise that my whole approach to this problem has been wrong and that it is much easier to fix than I had at first thought. I will therefore be writing to Tony Blair explaining the problem to him and asking, as a matter of urgency, for the format of the postal codes and phone numbers to be changed to bring them in line with the Microsoft input masks.

Since the phone numbers are changing at present anyway, this shouldn't really be too much of a problem. I urge you to write to him as well so that we can get this matter resolved as soon as possible.

## Fancy a date?

Barbara Harding <Barbara@hhcs.demon.co.uk> writes: 'On first use of my Access 97 database I realised my dates were not displaying as expected – I use medium dates to show the month in words as it is more explicit for users. The problem is that the organisation (using Windows NT) had not bothered to change the default regional settings on individual machines to British, so they were still set to US.

Of course, it is just not reasonable to expect them to update their system for my little database, so what to do? The current user says she will remember to enter dates in words, but what about when there is another user or two?'

Interesting, and the answer applies to more than just Barbara's problem.

Dates in Access (and any RDBMS) can be thought of as having three separate parts:

- Input – the bit the user types in, perhaps a series of keystrokes, for example, 2/3/2002
- Storage – the way in which the RDBMS stores the date, typically a number called a 'date value', for example, 37317.
- Output – the format in which the number is displayed back to the user, for example, 2 March 2002.

### Input

In Access 97, when a field is declared to be of type date, only certain input is acceptable from the user. If you try to type in a string such as 'Hello Date Field' then it will be cruelly rejected. On the other hand, most reasonable date formats are acceptable, for example: 1/1/97, 1/1/1997, 2/3/2002, 2 Mar 2002, 2 March 2002 and so on.

Clearly, between input and storage, Access must have an interpreter that looks at a string like '2 March 2002' and turns it into a date value; in this case 37317. This particular string is unequivocal, but what about something like 2/3/2002? If you are a Brit this means 2 March 2002, but to an American this is 3 February 2002.

By default, to resolve this issue, Access looks at the settings in the Date tab of the Regional Settings in the Control Panel. If they are set to m/d/y then this date will be interpreted as 3 February 2002 and stored as 37290. If set to d/m/y then the date is interpreted as 2 March 2002 and stored as 37317.

So far so good (but see 'For your information' overleaf).

### Storage

Simple. Once the date value is stored as 37317 it means, unequivocally, 2 March 2002.

**Output**
Access will look at the Control Panel and interpret the date value according to that setting.

▶ SAME TABLE, SAME DATA IN EACH FIELD. THE FIRST TWO ARE DATE FIELDS DISPLAYING WITH DIFFERENT FORMATS, THE THIRD WAS ONCE A DATE FIELD BUT I'VE CONVERTED IT TO A NUMERIC TO SHOW THE DATE VALUE

Dates : Table

| id | Modified | DefaultUS | DateNumber |
|---|---|---|---|
| 1 | 23/Jan/1999 | 1/21/99 | 36181 |
| 2 | 23/Jan/1999 | 1/23/99 | 36183 |
| 4 | 03/Feb/2002 | 2/3/02 | 37290 |
| 5 | 02/Mar/2002 | 3/2/02 | 37317 |
| 6 | 02/Mar/2002 | 3/2/02 | 37317 |
| 9 | 02/Mar/2002 | 3/2/02 | 37317 |
| 10 | 03/Feb/2002 | 2/3/02 | 37290 |
| (AutoNumber) | | | 0 |

Record: 1 of 7

All of this works fine most of the time. You have a machine set up for use in the UK and you type 2/3/2002 into a date field. Access understands this to be 2 March 2002, stores it as 37317 and displays it as 2/3/2002.

You have control.

The good news is that you can fine-tune much of this behaviour using input masks and the format properties of the field. For example, Barbara can set the input mask to be:

```
99\/>L<LL\/0000;0;_
```

This forces the user to input the date in the format: 2 Mar 2002.

The beauty of this input format is that both UK and US people understand it.

If she then sets the format for the field [Fig 1 on previous page] to be, say: dd/mmm/yyyy, it will display as: 02/Mar/2002

So, she can use a machine set to either US or UK format and provide the users with a consistent format that people on both sides of the Atlantic can understand.

## ■ For your information

As a side issue to the above, given a machine set up in the Control Panel for UK dates, there are several other questions worth answering.

☛ What would you expect Access 97 to do with the input 3/2/2002 from a user?
Answer: interpret it as per a UK date – which is what it does.

☛ What about 30/2/2002?
Answer: reject it as a non-existent date – which is what it does. (You're getting good at this).

☛ So, what about 2/17/2002?
Answer: reject it as a non-existent date – which is what I expected but which doesn't happen. Instead it accepts it as meaning 17 Feb 2002.

Dates : Table

| Field Name | Data Type | Description |
|---|---|---|
| id | AutoNumber | |
| Modified | Date/Time | |
| DefaultUS | Date/Time | |
| DateNumber | Number | |

Field Properties

General | Lookup

Format: dd/mmm/yyyy
Input Mask
Caption
Default Value
Validation Rule
Validation Text
Required
Indexed

| | |
|---|---|
| General Date | 6/19/94 5:34:23 PM |
| Long Date | Sunday, June 19, 1994 |
| Medium Date | 19-Jun-94 |
| Short Date | 6/19/94 |
| Long Time | 5:34:23 PM |
| Medium Time | 5:34 PM |
| Short Time | 17:34 |

The display layout for the field. Select a pre-defined format or enter a custom format. Press F1 for help on

▲ THE FORMAT PROPERTY APPEARS AS A POP-DOWN LIST WHICH SEEMS TO IMPLY THAT YOU CAN'T ENTER YOUR OWN FORMATS, BUT YOU CAN...

Access 97 and Access 2000 running on a 'UK' machine seem to process dates as follows. If the input string can be interpreted as a UK format date, then it is. If not, but the string can be interpreted as a US format date, then this is what happens. Only if it fits neither format is it rejected.

This seems strange. Access 2, in the same situation, rejects anything that is not an acceptable UK format date. The above is based on observation; if any reader knows more, let me know.

**[FIG 2]**

```
NVL(expr1, expr2). If expr1 is null,
returns expr2; if expr1 is not null,
returns expr1.
```

## ■ Taking stock

Nick White <nrwhite@rac.co.uk> has contributed the following to the stock level problem, discussions about which have appeared in both the April and July 1999 issues: 'The only database I know about is Oracle, but this has a function called NVL which takes the form as shown in Fig 2 and would be used in an expression such as in Fig 3.

'If Oracle has this function I would be surprised if other RDBMSs didn't include it and to me it seems simpler than the code examples in your article.'

Access doesn't have this function but it would be perfectly possible to write it using IFF() and ISNULL(). However, an Oracle-specific solution adds a touch of class to the column and is, of course, gratefully received!

**[FIG 3]**

```
SELECT SUM(NVL(NoOrdered, 0),
       SUM(NVL(NoSold, 0),
       ( (SUM(NVL(NoOrdered, 0))-↙
       (SUM(NVL(NoSold, 0)) )
FROM TotalNoItemsSold.
```

*(Key: ↙ code string continues)*

## PCW CONTACTS

*Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email: database@pcw.co.uk*

# Calling international rescue

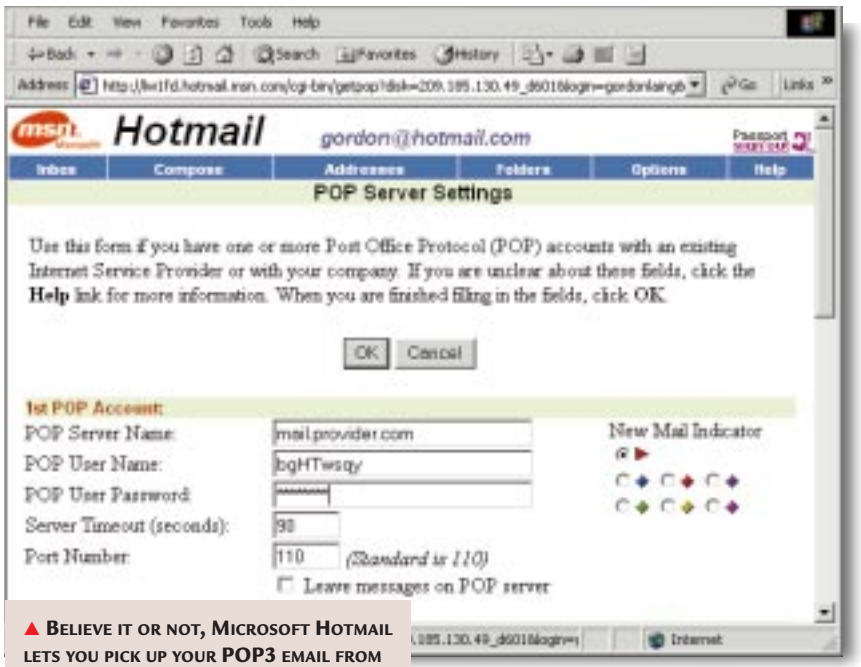
**Gordon Laing takes his work away with him and finds that all roads can lead to roam.**

Mobile computing may free you from the office, but it does take a bit of practice to get it right. This month's column is all about preparing your notebook or handheld for a trip away and how to get your work done once you're there.

Preparing for a trip can be as simple as copying work in progress onto your portable and continuing where you left off. Windows Explorer allows two connected systems to drag and drop files between each other easily. Most handheld PDA utilities offer similar functionality, although with typically only 8MB to 16MB built-in memory, you might have to be stingy with those big presentations.

Files are one thing, but the truly mobile traveller will want to make sure they take away the right messages and that schedules are kept up to date. This is not a one-way process, as any diary modifications or messages received while away will need to be transferred back to your main system on your return. The process of two systems exchanging information to ensure both are up to date is known as synchronisation.

**Microsoft Outlook** is the email and scheduling client of choice for anyone who wants to manage and update appointments, contacts and messages. Installed on a PC and notebook, it will happily compare notes and update details when both are connected. Outlook is also happy to swap information with a Psion 5 or WinCE. Full Outlook is usually required, as most PDAs don't want to synchronise with Outlook Express. On the upside, full Outlook will sync appointments and contacts along with your email in one go. Synchronising address books is also essential, as you're unlikely to remember all those obscure but vital email addresses.




▲ **Believe it or not, Microsoft Hotmail lets you pick up your POP3 email from any web browser. Just enter your account details, remember to leave messages on the server, then click OK. A neat trick down the cybercafe**

Knowing which files to copy and synchronise is, however, only half of the story – you'll need to get both systems connected before they can start talking. Ironically, it's easier with handhelds as they always come supplied with the correct serial cable and drivers to talk to your PC or Mac.

It is, however, worth pointing out that both Psion's and Microsoft's PDA utilities tend to hog your COM ports in their continual search for a lonely handheld. So if you're experiencing COM-rage or a mysteriously flaky modem, you should consider disabling the PDA utility in the system tray until you're ready to connect.

***Why bother with wires? Virtually all notebooks and PDAs feature infra-red ports***

Users of Windows notebooks have many options open to them, although several could be ruled out depending on the model and available accessories. If both systems can be connected to the same network, this is the easiest route. If you have a floppy drive on your notebook, you could copy files in 1.4MB increments, although this is slow and often insufficient. If you have a serial or parallel cable with the right plugs, you could use Windows' direct cable connection (DCC) which is located in the accessories group. However, DCC may not have been installed on both your machines, so you'll need your original Windows CD plus a ROM drive to spin it in. Suddenly, that ultra-thin floppy and CD-less notebook don't look quite so desirable any more.

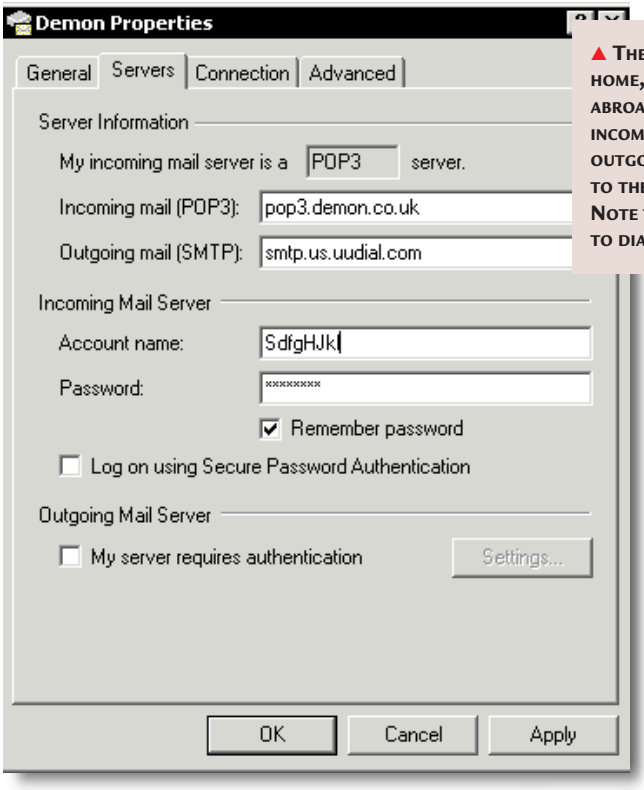
LapLink Professional does the wiring job much better than DCC and is supplied with a serial cable. It will even let you control your desktop PC remotely, which is handy if you've forgotten to bring a crucial file with you. Laplink is also the only remote access package that supports an optional fast USB connection (we had data transfer at up to 8Mbit/sec) and provides a free downloadable version for Windows CE to registered users.

Then again, why bother with wires at all? Virtually all notebooks and PDAs feature infra-red ports and Windows supports the feature directly from the

OS. It's the perfect way to communicate without the worry of installing software or remembering a cable. It's great in theory, but in practice, IR is unforgivably absent on almost all desktop PCs.

The good news is that virtually all Taiwanese motherboards feature a five-pin jumper labelled IrDA. You simply connect a suitable infra-red module, enable one of your serial UARTs to use infra-red from the Bios, and then Windows 95, 98 and 2000 will sense it and do the rest. Once activated from Windows, you will be able to connect wirelessly with your notebook or PDA and exchange data limited only by internal storage and time. Sadly, the PC's UART limits data rates to 115Kbit/sec, but it's a nice solution and a cheap one too.

Dabs Direct sells Asus IrDA modules which should work on any five-pin jumper for about £10 (see *PCW*, November 1999 issue, page 98 for a review, or search on www.dabs.com). However, most of the salespeople I spoke to hadn't heard of the device. The only problem you'll have is where to house the IR transceiver – mine's dangling gracelessly out of the front of a 5.25in drive bay.




▲ The author uses Demon as an ISP at home, and Pipex/UUNet as an ISP abroad. Demon always provides the incoming POP3 mail, but while away, the outgoing SMTP mail server is changed to the country-specific Pipex details. Note the SMTP server in this case refers to dialling UUNet in North America

## The right connections

If your modem works and you have the right cables for the country you're visiting, your hardware worries are over. If you're using a mobile phone to get online, you'll need to make sure your account has data and, if required, foreign roaming enabled. Check with your provider, too, to see if it has an agreement with a foreign network and whether there will be coverage where you intend to be.

An increasing number of mobile phones are being fitted with built-in data hardware and infra-red ports. In theory, a Windows portable or PDA should be able to use them as if they were a plain old 9.6Kbit/sec modem connected to the standard comms port. However, not all phones or PDAs behave as well as they should. Windows CE users relying on Ericsson's SH888 will need to download and install the software update at http://mobileinternet.ericsson.se/emi/Default.asp. This sets up a dedicated option for the 888 on the WinCE modem list. The site also has a patch that lets the phone work with 3Com Palm's non-standard infra-red port.

***You could always grab a local PC magazine and install the nearest free ISP trial***

## Service providers

Now you're ready to get connected, and unless you're dialling into a corporate server, your first port of call will be an ISP. All UK ISPs provide local rate 0845 access numbers, but they cannot always be dialled from abroad. Some will give you a non-0845 number to dial, but you'll incur expensive international charges. If there's no way around it, use a calling card – you can make relatively cheap foreign calls, charged to your credit card, by dialling a freephone number, then entering an account and PIN number. If this is how you want to do it, all your normal UK ISP settings will work, except that you'll need to use the +44 country code to access the UK.

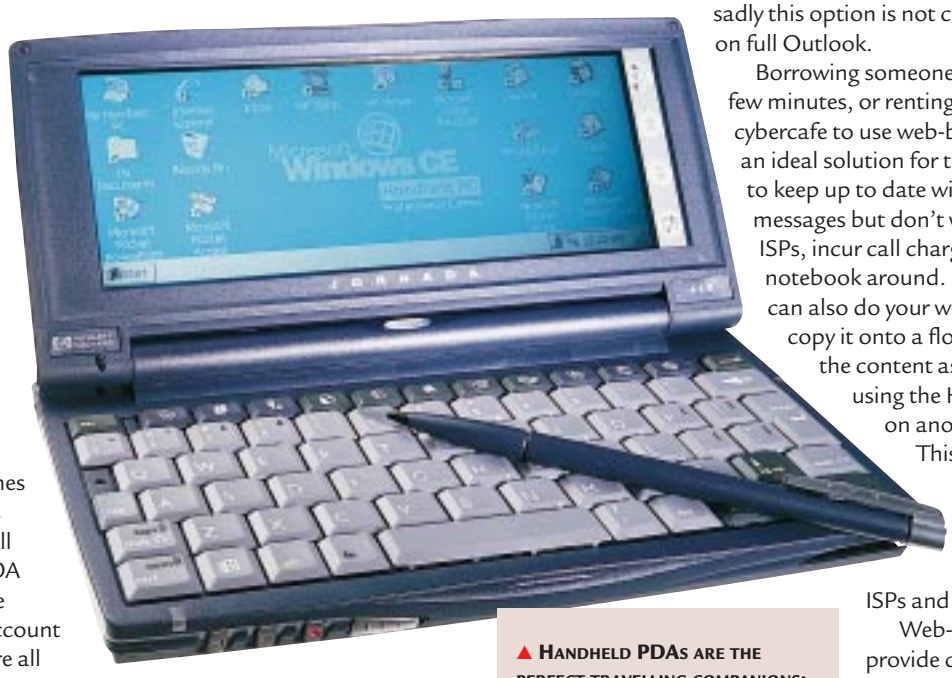
Fortunately, there is a better way. Some ISPs, such as Pipex Dial, offer global roaming facilities with local access numbers to dial around the world. Usually there is a charge for roaming, and some local settings to change manually, but otherwise it's simple and cheap. Third parties such as iPass <www.ipass.com> have agreements with a wealth of foreign ISPs and provide software to sort out your access numbers and settings automatically. You'll have to pay, but it's an easy solution for Windows and a CE version is promised in the near future.

One of the easiest routes to international roaming is to sign up with a worldwide provider such as AOL, which has local access numbers across the globe. The AOL client is easy to use in a roaming environment, although it is for Windows only – PDA users should look elsewhere. If you have a Windows notebook with a CD-ROM drive, you could always grab a local PC magazine and temporarily install the nearest free ISP trial. By the time the trial expires, you'll either be back home or setting up the next one. Remember, there's no need to be precious about the ISP you use. It's only there to connect you to the internet, at which point you can usually access your mail wherever it resides.

## Incoming mail

Once you're connected to the internet, picking up your messages is quite simple. Standard POP3 accounts are easily accessed with just three pieces of information: your account username,

password and mail server address. The latter will probably be called something like mail.provider.com, while your POP username and password are normally eight randomly generated characters – not necessarily the ones you use to access your home ISP. All Windows and PDA email clients have fields for these account details and they're all you need to get hold of your POP email once you're connected to the internet.



▲ HANDHELD PDAS ARE THE PERFECT TRAVELLING COMPANIONS: SMALL, LIGHT, LONG BATTERY LIFE AND INSTANT STARTUP TIMES. THE AUTHOR WROTE THIS FEATURE WHILE AWAY WITH AN HP JORNADA 680, AND USED ITS 56K MODEM TO SEND AND RECEIVE OVER 100 EMAILS

### Outgoing mail

Sending messages requires access to an outgoing SMTP server. If you're dialling directly into your home ISP, there's no need to change anything, but if you're dialling a foreign server it won't work. Fortunately, most ISPs offer an outgoing SMTP server as part of the standard access package, so just enter this address setting in your account control panel. Remember to change it back when you get home.

Lotus Notes is a special case: users should use the Notes client to dial directly into their server to send and receive messages, while those lucky enough to have Domino back at base should be able to access their information using a standard web browser.

### Web-based mail

It's worth considering Hotmail or other web-based email services. Almost all of them offer access to your incoming POP3 email by entering your standard three account settings into the right boxes. They also have the facility to send messages, although they will be sent from your web account address. If someone replies to this address, you have to pick it up separately from your normal POP mail. In a strange twist of fate, Outlook Express 5 now lets you pick up Hotmail messages and read them offline, but sadly this option is not currently offered on full Outlook.

Borrowing someone's system for a few minutes, or renting time in a cybercafe to use web-based email, is an ideal solution for those who want to keep up to date with their messages but don't want to set up ISPs, incur call charges or lug a notebook around. Remember, you can also do your work on a PC, copy it onto a floppy, then email the content as an attachment using the Hotmail service on another system. This again allows you to do your work and get it home without worrying about ISPs and SMTP servers.

Web-based email can provide cunning backup too. I always send important messages or files that I'll need while away to my Hotmail account. I may have a portable with me, but if this fails or is lost, I can still get hold of my work and contacts from any cybercafe. Another good trick is to email your work to yourself as soon as it's completed, so that a safe copy resides on a remote server. This again protects you from losing your work if your notebook goes belly-up.

A quick note on sending files, though, particularly from PDAs. Most use a proprietary format by default, so when sending, say, text files, make sure you save them as something compact and compatible like an RTF.

There may be a unique set of challenges to overcome with mobile computing, but it's worth it. This entire column, along with several others, was written on an HP Jornada 680 Windows CE handheld during a week away in California. My entire office could slip into my jacket pocket and it was at my fingertips wherever I went – technology had truly set me free.

## CHECKLIST FOR ROAMING

1. Files, contacts and documents – do you have everything you need?
2. Email and ISP accounts – make notes of names and passwords
3. Cables and adaptors – overseas plugs aren't like ours
4. Power – take spare batteries and remember the charger
5. Mobile phones – enable data and roaming on your account
6. Landlines – use charge cards for international calls
7. Voicemail – set up PINs so you can access your answerphone
8. Be certain – make sure it all works before leaving

## PCW CONTACTS

*Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office or email hardware@pcw.co.uk*

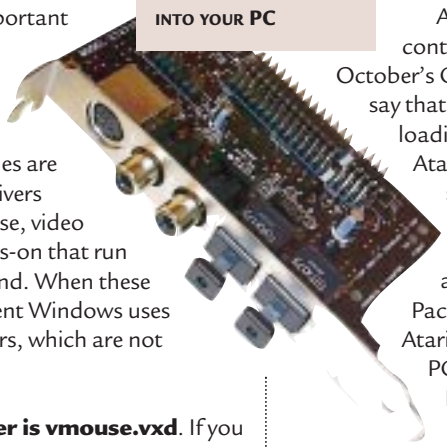
# The GRM reaper

**Steven Helstrip has time on his side when it comes to MIDI, and waxes lyrical over VST plug-ins.**

In this month's *Sound* column, we'll be looking at ways to overcome the MIDI timing problems that can occur when playing complex arrangements. Before we get stuck in, though, it's time we caught up with some tips proffered by you, the readers.

I received an interesting letter from Andy Perring a few months back to say he was having trouble with Cubase VST and other music programs crashing unexpectedly. After re-installing just about everything he could, and moments before reformatting his hard disk, he came by some advice that seemed to cure his problems.

Andy points out that Windows 98 omits to install seven important files during setup, which can make some systems unstable. The files are virtual device drivers needed for mouse, video and other goings-on that run in the background. When these files aren't present Windows uses alternative drivers, which are not so stable.



▼Creative's Digital I/O board – possibly the cheapest way to get digital audio into your PC

**One such driver is vmouse.vxd**. If you take a look at the Driver File Details for your mouse in System Properties, you will notice that vmouse.vxd is in brackets, indicating that the file cannot be found. This file, along with vcomm.vxd, vdmad.vxd, vdd.vxd, ntkern.vxd and vflatd.vxd, can be found on the Windows 98 CD, in the Zip files windows98_47.zip and windows98_48.zip. Simply extract them to C:\windows\system and C:\windows\system\vmm32 and reboot. I did just that after reading Andy's letter and am happy to report that I have had noticeably fewer system crashes ever since.

David Lee has a tip for anyone who needs to get digital audio in and out of their PCs cheaply. He writes: 'In the August issue, you mentioned the new optical, digital I/O board (*above*) for the SoundBlaster Live!. Contrary to what Creative Labs is saying, this upgrade works fine with the Live! Value and not just the full-blown package. I know this because I now have one.

'Provided your Live! Value has the AUD_EXT connector, you will gain the full functionality of the board (optical and co-axial digital I/O along with MIDI input and output). Note, however, that some values only have an SPDIF_EXT connector. In such cases, the MIDI I/O will not be available. Even so, I'm sure you'll agree that £40 isn't much to shell out for the two digital I/Os that do work.'

Adrian Bradshaw contacted me after reading October's Questions & Answers to say that he, too, had problems loading Cubase songs from Atari formatted disks. He says: 'I don't have access to an ST any more, but have found a neat utility called PacifiST that lets me read Atari disks straight into my PC (*see screenshot above*). It's basically a shareware ST emulator that allows you to make an image file of any ST disk. The file can then be copied to a 'virtual hard disk', which is basically a directory on the PC. It's a bit long-winded, but it does the trick.'

PacifiST can be downloaded from http://www.fatal-design.com/pacifist/.

◄Remember that green, Atari desktop? Well, now you can have an ST inside your PC

## ■ MIDI timing

Much of today's computer-based music is created using a few synths or a sound card and sequencer setup. While it's possible to achieve great results with a modest setup, one thing that can ruin your efforts is poor MIDI timing. Since MIDI itself is a serial protocol, a note on/off event cannot be sent to an instrument until the previous one has been transmitted. If you have 20 MIDI tracks reciting complex rhythm patterns, juicy block chords and reams of controller data, the MIDI data path will inevitably clog up and something has to give.

**If you only have one MIDI** device, the problems can be more noticeable since MIDI data cannot be split over several ports to ease the load. However, a few tweaks in your sequencer can overcome most predicaments. This includes offsetting parts that are not time-critical –

▼GRM Tools could be the most exciting set of plug-ins we've seen

## Questions & answers

**Q** In August's *Sound* column there was a piece on Cubase VST 3.7. The screenshot showed a miniMoog plug-in in which I was very interested. However, when I downloaded the upgrade it was nowhere to be found. Where can I get it from?

SIMON DAW

***A** The screenshot was supplied by Steinberg and showed the E-Type synth in early development. As you point out, this is a model of a miniMoog and, if all goes to plan, it should be released by the end of November. In the meantime, you may be interested to hear that the world's first 24bit drum machine, the LM4, is available in VST 2.0 plug-in format right now. Koblo is also planning to port its virtual synths, samplers and drum machines to this format in the not-too-distant future. For more information, point your browser at www.steinberg.net*

◀IF YOU MISSED THE SNEAK PREVIEW OF THE E-TYPE SYNTH FIRST TIME AROUND, HERE IT IS AGAIN

sounds with a slow attack, such as strings – by a few milliseconds, and prioritising the time-critical tracks. Although the following tips will go some way to resolving most timing problems, if you send more voices to your synth than it can handle, a more radical approach will need to be taken – you'll have to take out some notes!

The first thing to mention is that the top track in any sequencer takes priority, followed by the second and so on. Likewise, at the receiving end, lower MIDI channel assignments take priority over higher ones. Placing time-critical sequences near the top of your arrangement – kick drums, triggers for loops, percussion and the main synth lines – will ensure the important parts get through first and on time. If you have a SoundBlaster Live! you should also consider splitting your tracks equally between the two synths, to reduce congestion.

**As mentioned earlier, parts** with a slow attack should be offset by a few milliseconds to ensure note on events don't fall on the beat with other notes. Most sequencers have an offset parameter on each track, sometimes called delay. Continuous controller events, such as volume and pan sweeps, are also a cause of congestion. If you're still having the occasional glitch, try deleting every other event. Chances are that this will go unnoticed to the ear, but it will significantly reduce the load on your MIDI outputs.

### GRM Tools

GRM Tools is a collection of four creative plug-ins for VST-compatible applications. Unlike everyday, run-of-the-mill reverb and delay effects, this series is intended for users who require extreme processing capabilities. The package comprises a band pass filter, comb filters, a shuffler and pitch shifter. Nothing out of the ordinary so far. But each plug-in has a twist – you can morph between 16 preset effects in real time. In addition, three of the plug-ins have a Super Handle, enabling several parameters to be tweaked simultaneously within a multi-dimensional display. Intriguing, eh?

***Flicking through presets produces outrageous pitch-sweeping effects***

The Band Pass filter combines low and high-pass filters configured with a 560dB per octave cut-off slope. Now that's extreme. A filter like the North Pole, which we looked at last month, provides a gentle 24dB cut-off slope in comparison. In addition to band pass, there's a band reject setting which can produce some wonderful phasing effects when you sweep through the frequency spectrum. This is easily achieved when you morph between two presets. A fader enables you to set the transition time.

**Comb Filters is a set of five** parallel comb filters with a high Q (resonance) setting. Flicking through the presets produces outrageous pitch-sweeping effects that wouldn't sound out of place on one of Fat Boy Slim's productions.

Other uses include hum removal and creating space within a stereo mix. Pitch Accum combines two transposers with a feedback delay. Creating harmonies for vocals would be one use, although I did try it on a few drum loops and was quite taken with the results. Finally, Shuffler splices audio into segments and rearranges them on the fly. It's always unpredictable, perhaps too much so for my liking. If you're into producing music with an experimental edge, though, you'll love it.

All in all, this is a very desirable set of tools for audio manipulation. The only thing I would like to have seen is a way to enter transition times between presets in bars and beats, rather than seconds. That aside, it is highly recommended.

### PCW CONTACTS

*Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk*

*GRM Tools costs £149 (£122.93 ex VAT) and is available from Arbiter on 0181 970 1909*

# Blots on the landscape

**Digital camera-toting Ken MacMahon is having panorama problems – apparently, he's in stitches.**

I recently bought a digital camera and I've been having so much fun with it that I decided not to bother with this month's column, but instead continue to irritate my family, friends and everyone else in sight by constantly photographing them.

Then I hit on the genius idea of doing both, so for the foreseeable future, expect these pages to be filled with my experiences at the sharp end of digital photography.

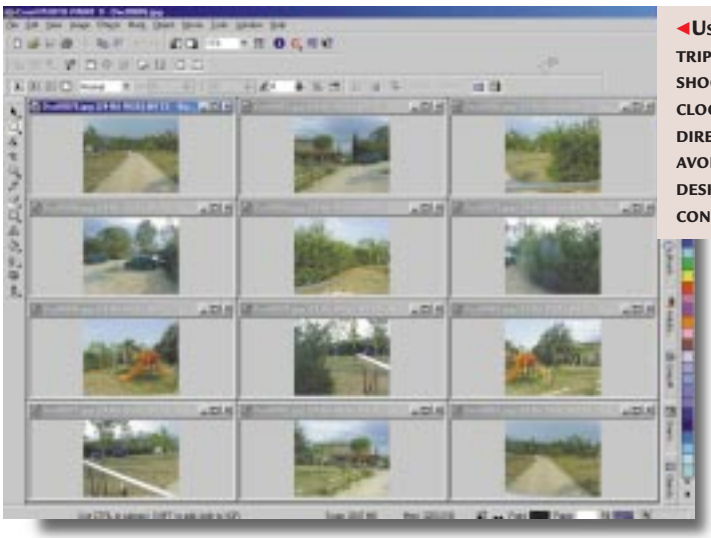
One of the first things I wanted to try out with my new toy was panoramic shots. Panoramic cameras used to be complicated mechanical affairs, involving a tripod-mounted camera which panned horizontally while recording the image onto a strip of film mounted on a rotating drum inside. Then David Hockney turned it into an art form using a Polaroid instant camera and some SprayMount, and since then everyone's been at it.

These days, of course, you can achieve much better, more versatile results a lot more easily. The technology that has transformed panoramic photography is Apple's QuickTime VR. This is part of QuickTime 4, the latest release of Apple's video authoring and playback software available free for Windows as well as MacOS from www.apple.com/quicktime.

Alternatively, you can install QuickTime 3.02 from the CorelDraw 9 application CD.

**You can, of course, simply** take a load of pictures and stick them together using any old image-editing software, and that's exactly what we'll be doing in just a moment, but QuickTime VR provides a number of advantages. First, it allows you to pan through 360 degrees vertically and horizontally. You can also zoom in and out of the image and use hotspots to jump to other locations or views. For example, you could use a QuickTime VR movie on a website to create a virtual museum tour.

Having cast a critical eye over the editing tools available, I decided on Corel PhotoPaint 9, because it has a nifty feature that allows you to stitch together overlapping images and is one of the few applications to support the export of QuickTime VR movies.



◀USING A STEADY TRIPOD AND SHOOTING IN A CLOCKWISE DIRECTION WILL AVOID A LOT OF DESKTOP CONFUSION

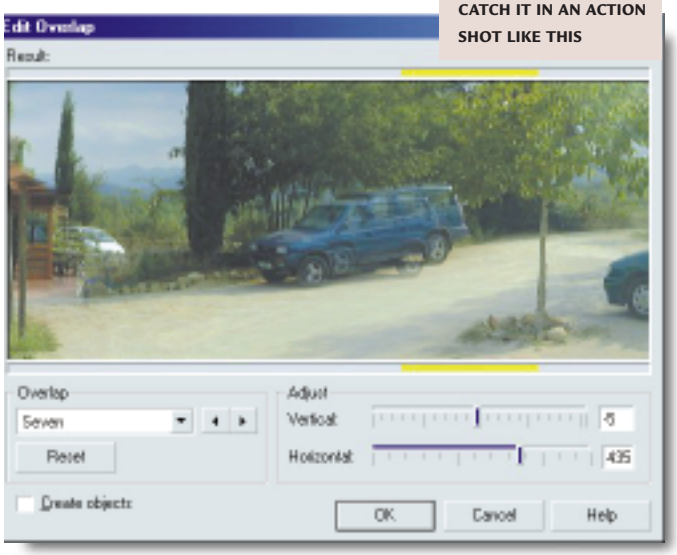
Stitching pictures in PhotoPaint is simplicity itself. First, open all the images you want to use for your panorama. Looking at my collection, it was immediately obvious I had made a few fundamental errors.

**For a start, I had been** standing at the centre of my 360-degree panorama and taken nine pictures, turning, I suppose, about 40 degrees to the left after each shot to position for the next. This caused me two problems. First, because both PhotoPaint and your brain like to work from left to right, my pictures were in reverse order. Second, many of my shots overlapped by a considerable amount, which made stitching them together more difficult than it might have been.

To stitch your images together, select Image/Stitch and in the Select Images dialog click the Add All button.

If, as I have done, you've gone around anti-clockwise, the button at the top right of the panel reverses the order. Finally, make sure that the horizontal stitch button is depressed before clicking OK.

Next, you should see the Edit Overlap screen, which allows you to adjust the vertical and horizontal alignment of each overlapping section. You can do this using the sliders, but it's actually easier and quicker to enter a value in the numeric field. The preview window shows one image semi-transparent above the other, so it's easy to see what you're doing, and




▼YOU MAY NEED TO CLEAN UP YOUR CAR AFTERWARDS IF YOU CATCH IT IN AN ACTION SHOT LIKE THIS

# Questions & answers

**Q** Our village millennium committee is photographing all the inhabitants and their homes for an album and would like to make all of the photographs available on CD-ROM. Can you suggest some software which we could use to store 200 to 300 photographs, plus some structured text. We will scan in the photographs or the negatives. The contents should be searchable/indexed, eg by surname or address. The software needs to be cheap enough to be provided with each CD, or the publication must be capable of storage in a 'pack and go' format like Powerpoint, and preferably runnable on low-spec PCs. We will be copying a small number of CDs – about 20. Can you suggest how this might be done?

JEAN MORGAN

***A*** ***The two widely used image catalogue applications with the type of features you mention are Canto Cumulus Desktop and Extensis Portfolio. It would, however, be prohibitively expensive to distribute a copy with each CD. One solution is to make use of their Export to HTML feature, which would create a website with captioned thumbnails of the images. This would be searchable using the browser's Find function and would run reasonably quickly on low-specification machines using either Internet Explorer or Netscape Navigator, both of which are free.***

***If you can handle an HTML editor, you could link a page with a full-screen photo to the thumbnail preview. In addition to the jpeg thumbnail images, you could include high-resolution scans on the CD for those with an image-editing application capable of viewing them.***

***You can buy a CD writer for less than £200 and recordable CDs for about £1 each. If you know someone with a CD writer, you can probably persuade them to do it for you in return for a pint. Alternatively, publishing the website via a free account with an ISP will cost you nothing and gain you a much wider audience.***

***www.canto.com***
***www.extensis.com***

yellow bars indicate the degree of horizontal overlap.

Now it became obvious that more care at the shooting stage would have made things easier and produced better results. Had I mounted the camera on a tripod, it would not have been necessary to adjust the vertical overlap at all and I would also have avoided the problem of the seam. QuickTime automatically stitches the two ends of your panorama together to create a 360-degree image, but, during the course of my rotation, I had lowered the camera by a few degrees, resulting in a severe vertical mismatch. The cars on the extreme left of the image are the same ones that are on the extreme right, about 50 pixels higher up.

Finally, next time I'll avoid including anything in the near foreground, like that entrance barrier. The problem is that when you rotate the camera, the perspective of a close object alters radically, making it impossible to stitch them together in any meaningful way.

◀FOREGROUND IMAGES CAN PLAY HAVOC WITH YOUR STITCHING

**At this stage, it's worth** doing a little cleaning up. There's bound to be some ghosting where you haven't been able to match up all the detail on overlapping sections and these glitches can be eradicated with a clone brush. Assuming your ends matched up horizontally, it would also be a good idea to create a seamless join, by cutting a narrow section from the left edge and pasting it into position on the right side. You can check the seam using the offset filter from the Effects/Distort menu.

All that remains is to create the QuickTime VR movie. If you didn't do it with the original images, you should downsample the panorama. Mine is 4,000 pixels wide and occupies about 5MB on disk. For web use, you'd need to go down a lot more. In any case, the width of the image must be a multiple of four pixels.

Next, select Movie/Create from Document, then Save As and MOV-QuickTime VR from the Files of Type pulldown menu. To define objects in the image as hotspots, click the Hot Spots tab, select the object from the list and enter the URL or node you want to jump to. Finally, you can set the VR World size – this is simply the size of the viewing window in which the image is displayed. Obviously, the bigger this is, the more of the entire picture you will see.

To view the QuickTime VR image, double-click on the file in Windows Explorer or open it in the QuickTime player. Here, the final shortcoming of my approach is exposed – my panorama is 360 degrees horizontally but has a woefully inadequate vertical field of view, which is particularly depressing given the beautiful mountain scenery that's missing. Next time, as well as mounting the camera on a tripod, I'll complete three (clockwise) revolutions – an additional one above and below the original plane to add sky and ground detail – then I should be able to crop the entire thing to a neat rectangle to hide those awful jagged edges.

## PCW CONTACTS

*Ken McMahon welcomes your feedback on the Graphics &DTP column. Contact him via the PCW editorial office, or email graphics@pcw.co.uk*

# The eye of the beholder

**Benjamin Woolley looks at some of the techniques used by 3D animation pioneer Disney.**

Disney's *Beauty and the Beast* was one of its first animations to feature computer graphics. They were mostly used in one scene, when the apparently ill-matched eponymous couple danced in the candle-lit ballroom of the Beast's castle.

Those of us in the know could immediately see that the scene was computer-generated. It was not the quality of the drawing that gave the game away, however. Indeed, the twirling pair who were the focus of our attention were hand-drawn in the conventional way.

The giveaway was the camera movement. It began from the top of an impossibly high ceiling, and craned down until it reached a close-up of Beauty and the Beast. The clever bit was that it did this using the same whirling movement as the couple, swinging around them as though tied to them by a gradually shortening length of invisible string.

Few viewers would have been aware of the computer's presence in this scene. They probably did not notice the use of computer graphics in *Aladdin*, either, which featured a magic carpet roller-coaster ride through a computer-generated landscape. In both cases, computers were primarily used because of the nature of the camerawork involved.

In conventional animation, the camera (that is, the audience's point of view, or PoV) is very simple – a 2D plane perpendicular to the landscape, set a small distance from the foreground of the scene. Anything more elaborate presents big problems. It means having to redraw not just the moving elements in any scene, but everything else too, to show what it would look like from a different perspective.

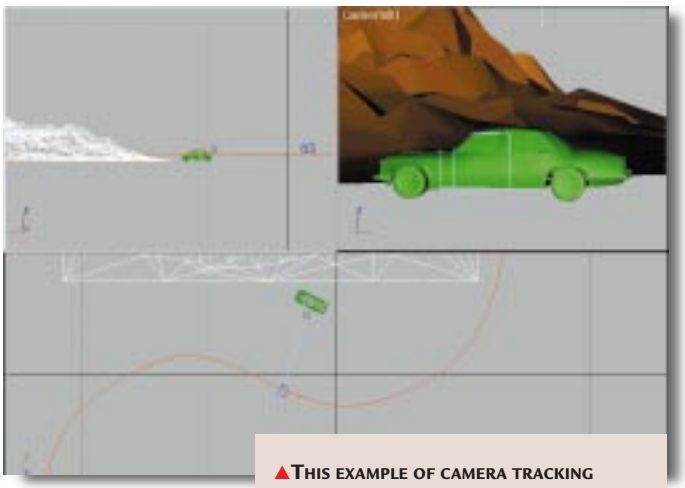
**With computer graphics,** the problem is not nearly as acute. The camera can burst through the 2D PoV plane and really get into the action, allowing the audience to become bound up with the principal characters as they move freely through the landscape.

To realise these sorts of effects, the camera itself has to be animated. Most packages include a variety of tools designed to help achieve this. One of the most useful is the Look At function, which enables you to tell the camera to keep facing a particular object, even when both camera and object are moving. That, crudely, is what was done in *Beauty and the Beast*. Despite the principal couple moving around the dance floor, and the camera dancing around the roof space above them, the camera's gaze on Beauty and the Beast never flinched.

**Another method** is to tie the camera directly to an animated object so that it moves wherever the object moves. For example, when Aladdin's magic carpet hurtles along, the camera sticks to it, swooping through tunnels, soaring over buildings and so on as though it, too, was one of the carpet's passengers.

***Despite Beauty and the Beast whirling around the dance floor, the camera's gaze didn't flinch***

This sort of effect is normally achieved with an invisible 'dummy'. A dummy acts as a parent object to which the camera and the object being filmed are linked in a simple hierarchy. It is a mobile platform upon which both the camera and the main characters can stand. You can move this platform around, knowing that the objects on it, including the camera, will move with it.



▲ THIS EXAMPLE OF CAMERA TRACKING IS TAKEN FROM THE PROJECT USED TO ILLUSTRATE LAST MONTH'S COLUMN OF A CAR DRIVING THROUGH MOUNTAINS. THE LOWER, RECTANGULAR VIEWPORT SHOWS THE CAMERA'S ANIMATION PATH AS A RED, CURVING LINE, WHICH WAS DERIVED FROM THE LINE OF THE ROAD ALONG WHICH THE CAR IS DRIVING (NOT DISPLAYED). THE 'LOOK AT' PARAMETER OF THE CAMERA HAS BEEN SET TO KEEP THE LENS POINTING AT THE CAR AS IT MOVES ALONG THE ROAD

The big advantage of using a dummy object is that you can change the position of the elements linked to the object relative to one another, without changing their overall motion through the scene. For example, in the case of *Aladdin*, the camera tracked around the carpet's passengers as both the dummy and the carpet continued along their roller-coaster ride.

**Just as camera animation** introduces possibilities, it also creates some complications. Chief among these is creating a suitable animation path.

For example, a path designed to animate a dodgem car will not suit a camera. Unless the camera's PoV is that of a driver of the dodgem, it will not seem natural for the camera to take sudden 90-degree turns or come to an instant halt.

Ideally, therefore, the link between a camera and the object it is filming should be an elastic one. There should be slack so that it can swing out a bit as

the object turns corners, slow down and accelerate at a more even rate, or bank at a sharper angle. You might even want to add kinks to the path to simulate camera shake or similar naturalistic artefacts. This requires a pretty sophisticated understanding of keyframe parameters, so make sure you have a good grasp of them before rushing headlong into rendering.

◄FIG 2 THIS IMAGE IS BY MICHAEL KOCH, A 3D ARTIST WITH A WEBSITE AT WWW.MWORX.COM (STILL UNDER CONSTRUCTION WHEN I VISITED IT). THE DIAPHANOUS, FLUID TEXTURE OF THE GIRL'S BLOUSE IS PARTICULARLY IMPRESSIVE

### ■ Impulse Imagine

Nothing upsets some readers of this column quite as much as a failure to mention their favourite software. Andrew Stevens, for example, sent a withering email in response to my foolhardy statement two months ago that I knew of no package which included focus as a camera parameter. 'I take it you've never played around with the Depth Of Field parameter in Impulse's Imagine, then?' he asks. He is correct, I am ashamed to say.

Impulse Imagine is a 3D package which, like a lot of graphics software, originated on the Amiga. I haven't yet managed to get hold of a copy, but after some hunting, I did find some information relating to it on the web. Impulse's home pages are at www.coolfun.com, and there is a useful resources page to be found at Conney's Corner, www.is.kiruna.se/~cjo/imagine.html, which has an extensive range of FAQs and a digest of the Imagine Mailing List. I would be interested to hear from readers of their experiences using this software – and, indeed, of any other 3D software they might be using.

### ■ More MAX

No doubt adding to the irritation of the likes of Andrew, I thought I ought to take a quick look at 3D Studio MAX Release 3 (3DSMAXR3), the latest version of the package I use most. As usual, there is the obligatory claim of an all-new, better and faster renderer – every new release of every new package seems to make this boast.

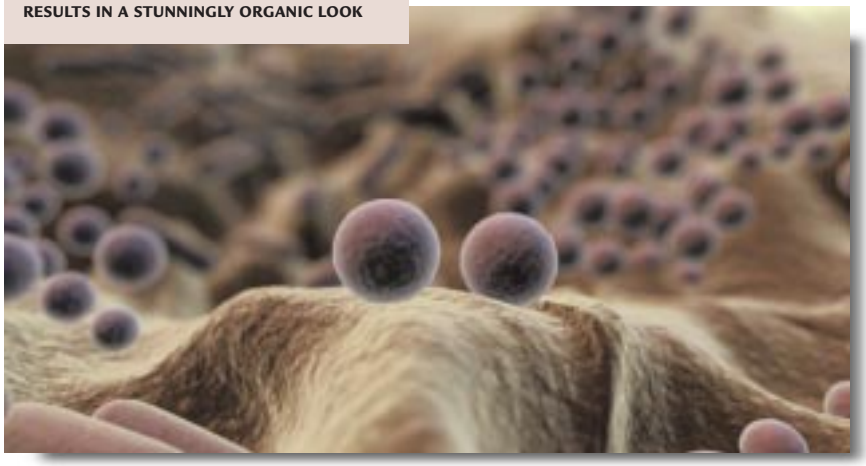
This time, however, there really has been a significant change. The architecture of the renderer has been redesigned so that core stages of the rendering process, such as anti-aliasing (the process of smoothing out hard edges) are separated out. This will make rendering much more flexible. It will be interesting to see whether the mainstream mid-range packages will follow this route.

Another significant development is a renewed emphasis on tools designed to help produce more organic-looking models. We all know by now about NURBS (Non-Uniform Rational B-splines). 3DSMAXR3 now has NURMS – Non-Uniformally Rational MeshSmooth. There is a useful website on these and other Release 3 features at www.ktx.com/3dsmaxr3/html/organic_modeling.html. These seem to provide a sort of half-way house between conventional modelling and NURBS, allowing surfaces of objects to be manipulated like soft clay.

MAX also includes a much more comprehensive range of tools for reaching down into the geometry of models. Of course, as always, the more tools you have, the more complex the job becomes, and you will find that the learning curve for Release 3 is a real Everest.

However, if you are prepared to climb the mountain, it appears that you will be rewarded with some lovely views, at least if the example renderings provided with the package are anything to go by – see Figs 2 and 3.

▼FIG 3 THIS IS CALLED INTIMATE STRANGERS AND WAS CREATED BY MONDO MEDIA WWW.MONDOMEDIA.NET. THE MODELLING SEEMS QUITE SIMPLE, YET RESULTS IN A STUNNINGLY ORGANIC LOOK



## PCW CONTACTS

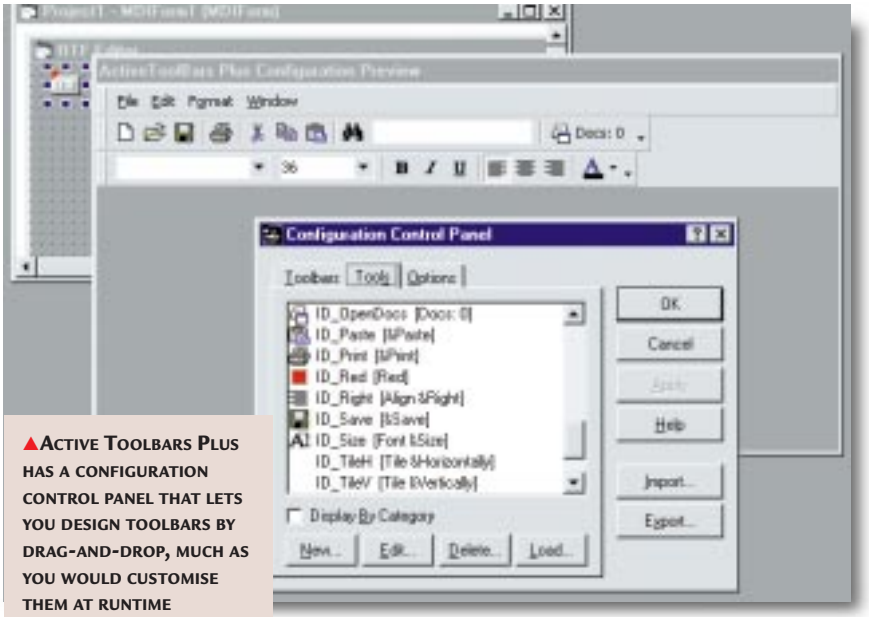
*Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office or email 3d@pcw.co.uk*

# Tool hot to handle

**Tim Anderson looks at jazzy toolbars in Visual Basic, the new Delphi 5 TFrame component, and how to choose a data access API.**

Floating and docking toolbars are a mixed blessing from a usability point of view. The idea of customising your working environment is excellent, but against that is the problem that users may lose icons because their position is no longer fixed. They do look good, though, and including this feature in an application makes it look more up-to-date with Microsoft Office and many other shrinkwrap solutions.

For the developer, making toolbars float and dock is not necessarily easy. Visual C++ developers get MFC support, while Delphi's VCL has docking windows in version 4.0 and higher, but there is considerable work involved in creating full-featured floating and customisable toolbars.




▲ ACTIVE TOOLBARS PLUS HAS A CONFIGURATION CONTROL PANEL THAT LETS YOU DESIGN TOOLBARS BY DRAG-AND-DROP, MUCH AS YOU WOULD CUSTOMISE THEM AT RUNTIME

VB users have to put up with a basic fixed toolbar control, or the toolbar control that has sliding panels but still refuses to float. It is a good candidate for a third-party control and that gap is filled by Sheridan's Active ToolBars Plus. The latest version aims to emulate not only floating, docking, sliding toolbars as found in Office 97, but also the smart personalised menus and dropdown icons of Office 2000.

There are three controls in Active-ToolBars Plus, including the ActiveToolBars control itself and ActiveTab and ActiveTab panel controls that come as a bonus. At design-time, the ActiveToolBars is a disappointing single icon, but its true capabilities are exposed by the right-click Configure option. This gives you a control panel similar to the Customise option found in Microsoft Office applications, but with some extra possibilities. On the first tab, a New button creates either a toolbar or a menubar. The second tab lets you define and edit tools, complete with an image editor and the ability to steal icons from other applications. Once you have defined a tool, you drag it to a toolbar to build it, just as the user would at runtime. The third and last tab has options including animation, tooltips and shortcut keys.

***An important feature of ActiveToolBars is that you only have one click event***

An important feature of Active-ToolBars is that you have only one click event to worry about. The ToolClick event has a Tool parameter and you can reliably detect which tool has been clicked by inspecting its ID property. Since any individual tool can appear on an unlimited number of toolbars, or as a menu option, this centralised event handler is convenient.

The built-in functionality is impressive. Menu items can be always visible, or visible if recently used, as in Office 2000. Docking, floating and user customisation are built-in. There is also a SaveLayout method that makes it easy to save the current layout to disk.

ActiveToolBars Plus is excellent if you want to add this kind of feature, particularly for VB developers. There are still plenty of pitfalls, however. It is easy to crash the supplied example application, an RTF editor, by removing certain tools at runtime with the Customise option. The code assumes these are still present and raises a run-


◀ AN EXAMPLE APPLICATION WITH FLOATING AND DOCKING ACTIVE TOOLBARS

time error. Making a user interface configurable and robust is a challenge. Even so, this is a well-designed package and considerably easier than rolling your own smart toolbars.

## Using frames in Delphi 5

The biggest change in the Delphi 5 VCL is the new frame component. Frames are a clever idea, although at first sight it is not obvious how they work.

It is only worth using a frame if you have some customised component or group of components that will appear on more than one form. To take the simplest example, imagine you wanted a corporate logo to appear on every form in an application. To make things a little more interesting, we will have it so a message appears when you click on the logo. Here are the steps:

**1** Start a new application, and from the File menu choose New Frame.

**2** The design surface of the frame looks similar to a form. Place a label on the frame and give it a suitable caption and font. In the handler for the label's OnClick event, write a line of code to display a message. Rename the frame, say to 'frameLogo'.

**3** Open the application's main form, and from the Standard tab in the component palette choose the Frame component. When you place it on the form, it throws up a dialog asking which frame you would like to use. Select your logo frame.

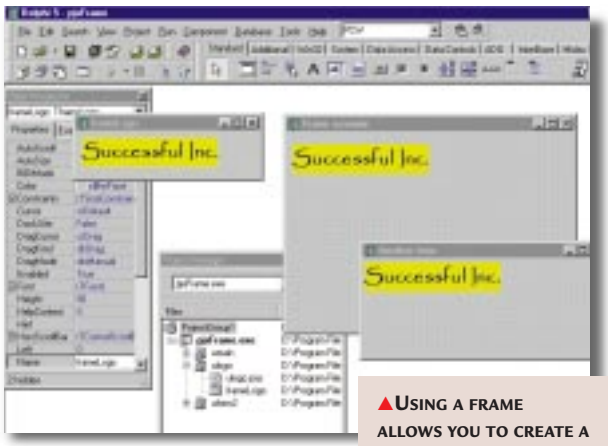
Because frames have no border, it can be tricky to move a frame with the mouse if its components fill it completely. There is nothing to grab onto, so you end up moving components within the frame instead. The solution is to edit the Top and Left properties in the property inspector.

**4** Run the application. When you click the logo your message appears.

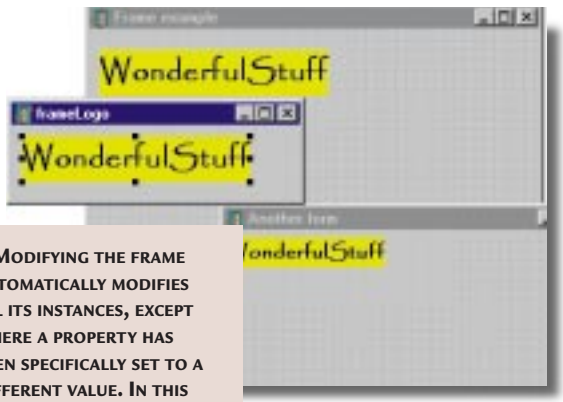
## The ins and outs of frames

Where this gets interesting is where you have several instances of the frame in use in your application. For example, if the company changes its logo, you only have to modify the original frame, and the changes automatically appear in all the instances. That's good, but what if you wanted to modify just one of the instances, for example to use a smaller font on one particular dialog? This is not a problem. The properties of the frame's components are fully exposed in each instance and you can modify them as required. Properties specifically set for a particular instance are sticky; they override the inherited properties and will not change even if the parent frame changes. Other properties continue to inherit changes.

The screenshots below show how a particular instance of the logo frame keeps its modified font size, but still reflects changes made to the text of the caption in its parent. If you decide you don't want this behaviour after all, there is a Revert to inherited option on the frame's right-click menu.




▲ USING A FRAME ALLOWS YOU TO CREATE A CUSTOMISED GROUP OF COMPONENTS FOR USE ANYWHERE IN A PROJECT




▲ MODIFYING THE FRAME AUTOMATICALLY MODIFIES ALL ITS INSTANCES, EXCEPT WHERE A PROPERTY HAS BEEN SPECIFICALLY SET TO A DIFFERENT VALUE. IN THIS EXAMPLE, THE FONT SIZE IN THE SECOND INSTANCE HAS BEEN SET SMALLER

Using frames can save resources. If you have a bitmap in a frame, only one copy will be saved in the project's resources, however many times you use it. They also make applications easier to maintain. You can use data-aware components on a frame, so one obvious use would be to embed database functionality into a frame. For example, you could create a frame for listing, adding and deleting customer records. Afterwards, you could use that frame anywhere that a customer list is required.

One limitation of frames is that although individual instances can have different property settings from the parent frame, you cannot remove any components. There is no problem, however, in adding new components.

## Getting polyphonic with VB

Derek Ballard asks: 'I have written a program in Visual Basic 6, which sounds bells, in WAV files, one after the other. Using the sndPlaySound DLL call, each sound stops when the next one starts.

The real problem is that a sound can be lost altogether if another one follows immediately. Is it possible to use MIDI, or some other mechanism within the program, to provide polyphony?'

First off, do not use sndPlaySound because it is only maintained for backward compatibility. The PlaySound API function that replaces it has a few more options. It is a simple function that looks like this:

```
Public Declare Function ↙
   PlaySound Lib "winmm.dll" ↙
Alias "PlaySoundA" (ByVal ↙
lpszName As String, ByVal ↙
hModule As Long, ByVal ↙
dwFlags ↙
As Long) As Long
```

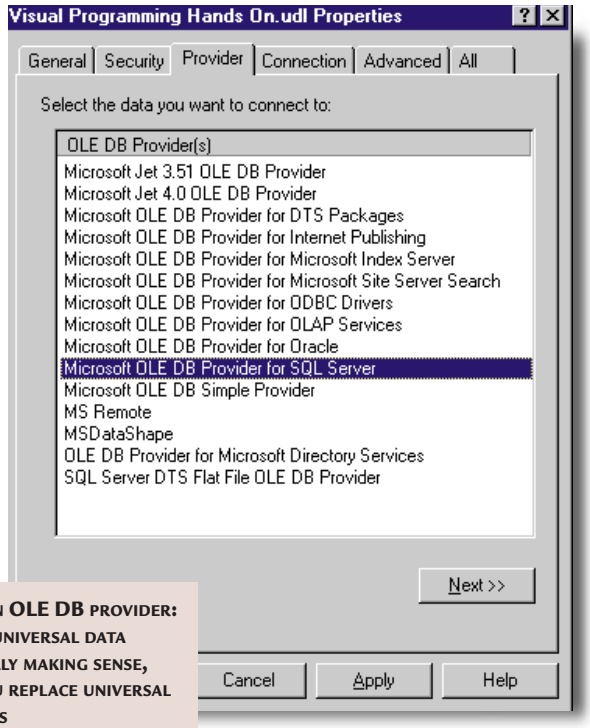
*(Key: ↙ code string continues)*

The Flags parameter specifies options including synchronous or asynchronous operation, and the SND_NOSTOP flag which tells the function not to stop a sound that is playing already. If it is still playing,

the function returns false without interrupting the sound. Therefore, you can ensure that each sound is played in its entirety, and by checking the return value you can check that every sound is played.

What this does not get you is polyphony. MIDI is one answer, although this is a very different way of obtaining sounds. Whereas .WAV files are true digitised sounds, MIDI sounds simply specify what sound is required. It is up to the MIDI player to determine how to render it, and these vary from player to player. This may or may not be satisfactory, depending on the purpose of the application. The solution would be to obtain a sequencer for editing and saving the MIDI compositions, and to stick to sounds in the standard General MIDI set, which is supported by every modern MIDI player. You will get polyphony, up to the limits of the sequencer or player, whichever is less. This is an easy solution, since MIDI files can be played using the VB multimedia control.

If you need to play .WAV files with polyphony, then the DirectSound API, with built-in mixing capabilities, will do the trick. There is also an ancient, now unsupported Microsoft DLL called Wavemix that has limited mixing options. Unfortunately, DirectSound is relatively complex and the example applications use C++. Probably the easiest option is to find a third-party component that will handle the low-level coding for you.




▶ **Choosing an OLE DB provider: Microsoft's universal data access is finally making sense, at least if you replace universal with Windows**

**ODBC is for remote data and is rarely the right choice for file-sharing databases**

## Which database API?

Adrian Mulhall writes: 'I currently use VB5 and DAO to access Access, or RDO to access SQL Server/Oracle, but this necessitates developing two parallel applications because of features such as OpenRecordsets and OpenResultsets and the various different requirements between the two, like including database names for Oracle.

'Is there a method, using different access methods such as ADO, where my recordset constructs and record handling could be common, with only the initial connection settings being different? Also, if you could outline the pros and cons of the different database access methods, this would be of great interest.'

Microsoft has given us more database APIs than is really decent and this does cause some head-scratching. Some, like ODBCDirect, have been introduced solely to solve performance problems with others. Certain routes to data, such as using the Access ODBC driver, are particularly poor. So what should you use? The matter is further confused by the combinations available, such as DAO (Data Access Objects), JET and ODBC together.

Different considerations apply to different cases, but here are some general pointers. ODBC is the oldest Windows data access standard – which means that drivers are likely to be mature – and it is fast. ODBC is designed for remote data and is rarely the right choice if you are working with file-sharing databases like dBase, FoxPro or Access. Assuming you are working with a suitable database such as Oracle or SQL Server, ODBC will probably yield the best performance as long as it is used efficiently, which means RDO (Remote Data Objects), ODBCDirect or even calling the ODBC API directly.

DAO is a COM API for the JET database engine used by Access. Again, it is mature, and probably the fastest way to use Access data. It is a poor choice for client-server work, however.

ADO is the newest COM database API and runs against OLE DB, a lower-level COM interface. ADO uses drivers called OLE DB providers. The default OLE DB provider is for ODBC, so you can use ADO with ODBC, but there is a performance cost. ADO and OLE DB represent Microsoft's current database strategy, and after a couple of years it is becoming useful. The latest drivers for JET and for SQL Server are much improved.

In particular, ADO has been designed with Windows DNA (Distributed Internet Applications) in mind, so for multi-tier or web-based solutions it is the preferred option. VB 6.0 has ADO support built-in.

Overall, the answer is that you should use ADO if you can, although there might still be good reasons to use RDO for ODBC or DAO for Jet. Note that in Windows 2000, the data access components will be part of the base operating system, so developers can count on their presence.

Finally, the idea of switching database engines simply by changing a connection parameter is a false trail. There are too many differences in SQL syntax and optimisation techniques for this to work, although using ADO throughout will help. What you can do instead is encapsulate data access into custom objects so that your client code is database-independent.

## PCW CONTACTS

*Tim Anderson welcomes your Visual Programming comments and queries. Contact him at visual@pcw.co.uk or via the PCW editorial office*

◆ *ActiveToolbars Plus costs £149 (£175.08 inc VAT) from Contemporary Software 01344 873434 www.contemporary.co.uk*

# Worm in the Apple

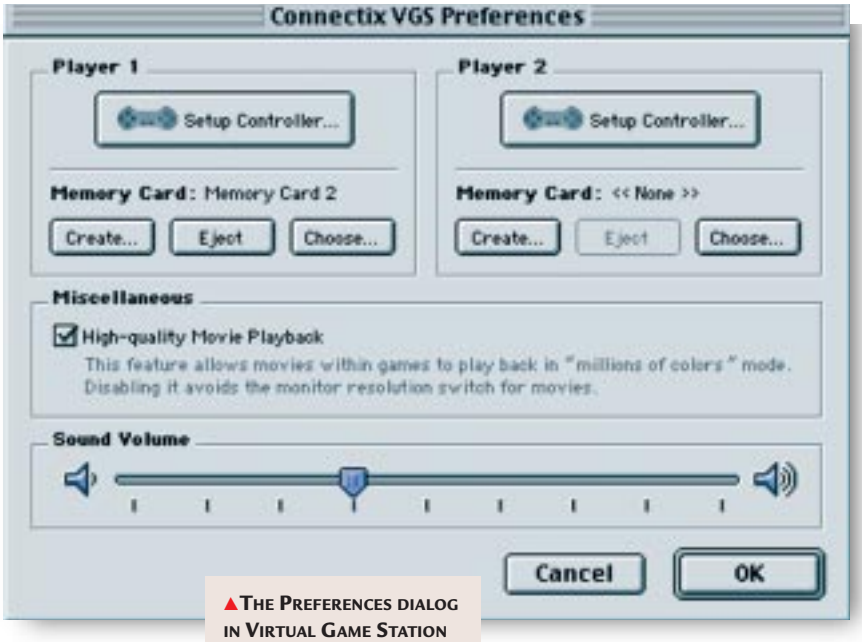
**Cliff Joseph wonders why Sony is underestimating the power of the latest emulation software.**

As we go to press on this issue, Connectix is about to enter the final stage of its David-and-Goliath legal battle with Sony over the fate of its Virtual Game Station Software.

Connectix, as you may well be aware, is the company that produces Virtual PC, the software emulator that enables Macs to run PC software. The Virtual Game Station (VGS) works on the same principle as Virtual PC, using software to emulate the hardware inside a Sony PlayStation.

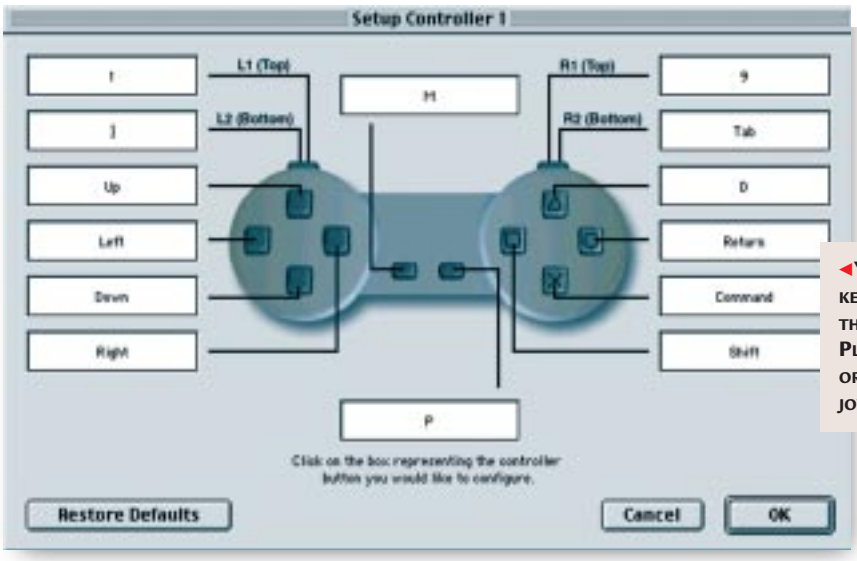
This rather wonderful idea allows the Mac to play PlayStation games – not every single game that's available, admittedly, but a pretty good selection of them nevertheless.

**We were fortunate enough** to pick up a copy of VGS at the MacWorld Expo in New York a couple of months ago and bring it back to the UK. And, much to our surprise and delight, we found that it works extremely well – that is, as long as you have the right hardware and software setup on your Mac. So, this month, we're going to let our hair down a bit and explain how you can use the VGS to play PlayStation games.




▲ The Preferences dialog in Virtual Game Station allows you to control sound, memory and other settings for PlayStation games

It would have made sense, of course, to call the program Virtual PlayStation rather than Virtual Game Station but then Sony's legal eagles would have gone even more bonkers than they have done already. Sony is attempting to have the sales of VGS banned, by arguing that somehow it encourages people to pirate PlayStation games. That's nonsense, of course. All it does is encourage Mac users – who have actually been starved of games for years – to go out and buy legitimate copies of PlayStation games. As proof of this, I can personally attest that while I was researching this column, I spent a small fortune on perfectly legitimate PlayStation software that I would not otherwise have been able to use.




◀ You can use the Mac's keyboard to duplicate the controls on the PlayStation gamepad, or use a Mac-compatible joystick if you prefer

**Let's hope that** the courts see sense and decide to overturn Sony's case. If that doesn't happen, then the logical extension of such a decision would be to make other emulators, such as Virtual PC and SoftWindows, illegal as well.

Whatever the outcome of this case, VGS is still a really neat piece of software. However, it hasn't been distributed in the UK so far, for a number of reasons. The first is simply that PlayStation games, like videotapes, have to be produced in different versions that

work with the specific television formats used in different countries.

Take a look at the PlayStation games in your local branch of Woolworth and you'll find that they have a little PAL logo somewhere on the cover to indicate that they work with the PAL television system used in the UK and throughout most of Europe. And of course, the US version of any PlayStation game will have a label indicating that it works with the NTSC television format used in the US.

**On top of that,** the US version of VGS is designed to run on the US version of the Mac operating system. It also has certain specific hardware requirements, which we'll come to in a minute. There are ways around all of these problems, though. The first thing to do is get hold of the software itself. You can order it from websites such as www.outpost.com for just $50 (£31.25), which is less than a third of the cost of buying an actual PlayStation.

Then, of course, you need to find NTSC versions of the games that you want to play. Again, you can order these over the internet, but there are also quite a few specialist shops within the UK that stock US versions of games. Many of these shops also sell second-hand titles – we managed to pick up the PlayStation version of Doom – which combines Doom II and the Final Doom add-on pack – for a mere £12. (Doom may be looking a bit dated now, but at least I can now thrash my nephew – who's used to playing it on his PlayStation – at the Deathmatch game.

**The program's hardware** requirements are a little more problematical. VGS needs to run on a G3 Power Mac, an iMac or an iBook, and it isn't guaranteed to run on older machines, even if they have been upgraded with a new G3 processor card.

*First-generation iMacs may be a bit sluggish when playing PlayStation games*

It also requires an ATI graphics chip. That means you need the Rage, Rage Pro or Rage 128, and it's only G3 machines and iMacs that have these built in as standard. I suppose you could try to buy one of the cards, but it would probably be both cheaper and easier just to go out and buy a real PlayStation.

First-generation iMacs running at less than 300MHz may be a bit sluggish when playing PlayStation games, but any iMac or PowerMac that runs at 300MHz or more should be fast enough to play games at full tilt.

Assuming that you have the necessary hardware, you will also need a non-UK version of the Mac OS, and that needs to be at least version 8.0. You don't specifically need to have the US version of the operating system, however. Both Mac OS 8.5 and the recent 8.6 update have an option that allows you to install either a UK-specific version of the operating system or a World Wide English version. The latter version seems to run Virtual Game Station perfectly well.

If you are reluctant to change the UK version of the Mac OS on your primary hard disk, you could always install the World Wide English software on a backup device like a Jaz or Zip drive. Once you have this installed, you can go ahead and load the VGS. And, unlike Virtual PC, which needs stacks of memory to run efficiently, VGS will run quite happily in about 10MB of RAM.

**The Preferences dialog box** within the VGS software allows you either to configure your keyboard or to use a Mac-compatible joystick or game pad as a replacement for the standard PlayStation game pad. This can be a bit of a fiddly process, as there are quite a few buttons on a PlayStation pad and they sometimes perform more than one action depending on whether you're actually playing the game or are inside one of the game's menus. It works really well, though, and you'll find that you can be up and running with PlayStation games in a couple of minutes.

VGS isn't compatible with every single PlayStation game that's available, but Connectix keeps a regularly updated list of compatible games on its website at www.connectix.com. So take a look and see whether there's anything on there that takes your fancy. Hopefully, some time this year, Sony will lose its court case and Connectix will be free to develop a proper European version.


◀BINGO! HERE'S THE PLAYSTATION VERSION OF DOOM MERRILY RUNNING ON A G3 POWERMAC

## PCW CONTACTS

*Cliff Joseph welcomes your feedback on the Mac column. Contact him via the PCW editorial office or email mac@pcw.co.uk*

# Trust is the key

**Bob Walder delves into the levels of security available when acquiring your digital certificate.**

Over the last couple of months, I have covered the basics of cryptography and the differences between secret key and public key technologies. I then looked at the use of digital signatures and digital certificates. This month we will move on to how you might actually acquire your own digital certificate and how you would go about using it.

**There are several places** where you can get hold of your certificate – certification authorities (CAs) can be operated by employers, banks or government bodies, for example.

The key requirement is that the body can be trusted. Trusted to offer confidential services. Trusted to keep your private details private. Trusted to operate a secure facility so that undesirables cannot simply walk through the door, or hack into their computer systems and make off with our private keys (if they are kept on site). Above all, the CA must be trusted not to allow its own root keys to be compromised, which would immediately invalidate every certificate issued under those keys.

***The assurance level depends on how a person's identity is verified during enrolment***

All in all, this is a large responsibility which requires a huge investment in infrastructure, physical security and personnel. This is why there aren't many CAs around at the moment. One of the best known is VeriSign, so we will concentrate on it in this month's *Hands On*, although the procedures described here will be similar no matter which authority you use.

In a digital ID, a key pair is bound to a user's name and other identifying information. When a digital ID is installed in a web browser, it functions as electronic credentials that can be verified by PKI-aware applications. This enables digital IDs to be used in place of password dialogs for information or services that either require membership

## THE EASY WAY TO GET A DIGITAL ID

Here's the good bit – how do you go about getting a digital ID? We'll be sticking with a Class 1 digital ID, which is the easiest to obtain, and you will use the browser enrolment service to request one from VeriSign.

**1** Fire up your browser and go to www.verisign.com/client/enrollment/index.html.


**2** Click on Enrol Now.

**3** Complete the enrolment form with your name and email address – this is used to mail the PIN number back to you.


**4** The easy website registration section can be used to simplify registration and replace passwords at certain websites that accept digital certificates. If you would rather not provide personal info, such as your date of birth, postcode and country, you can click on No here.

**5** Enter your Challenge phrase. This is your password, which will protect your private keys on your local hard drive, so make sure it's secure.

**6** Select full service ID for $14.95 (£9.34) or a free 60-day trial. Selecting the latter is a good way to try out this technology, but be aware that the trial ID does not include revocation, replacement or renewal (*see previous articles for explanations of these*).

**7** If you want the full service ID, complete the billing information, otherwise leave this blank.

**8** If you use smart cards, you can select the appropriate one at the Cryptographic Service Provider prompt. Most users should leave this set at the MS Base Crypto Provider default.

**9** Choose 'Level of security for the private key associated with your digital ID'. These security settings are provided to protect your private key, which resides in your computer's registry. Your private key is the part of your ID that only you are supposed to have. Every time you use your digital ID, your private key is accessed. The medium and high options ensure that

or restrict access to particular users. A digital ID is signed by the CA that issued it – in our case, VeriSign.

Multiple digital IDs can be attached to a message or transaction, forming a certification chain where each digital ID testifies to the authenticity of the previous ID. The top-level certification authority must be independently known and trusted by the recipient, and this is achieved by hard-coding Root CA certificates in the web browser (more on this next month).

VeriSign digital IDs are differentiated by the level of assurance they provide regarding a person's identity. The assurance level depends on how a person's identity is verified during the enrolment process. The class of digital ID that is appropriate for you will depend on how you intend to use it and the level of identity assurance required by the individuals or organisations with whom you communicate.

VeriSign Class 1, 2 and 3 digital IDs are intended for use by individuals – no assurance is made regarding the individual's affiliation with a company or organisation. Class 4 digital IDs are intended for business use. In addition to providing assurance of an individual's identity, a Class 4 digital ID verifies and assures the individual's relationship to a business or organisation.

**A Class 1 digital ID** provides you with an unambiguous name and email address, and you can obtain one regardless of where you live. If you intend to use your digital ID for casual www browsing, a Class 1 digital ID will probably provide the level of assurance you need.

Class 2 digital IDs provide identity assurance by requiring third-party verification of your name, address and other personal information. At this time, VeriSign Class 2 digital IDs are only available to residents of the US and Canada. VeriSign's automated enrolment system checks the information you provide against a consumer database maintained by Equifax. Expected uses of Class 2 digital IDs for browsers include most online purchases and online subscriptions.

Class 3 digital IDs provide an even higher level of identity assurance, by requiring that you appear before a notary to have your digital ID request authenticated. In addition to submitting your application electronically, you must mail a notarised copy to VeriSign before your enrolment application can be processed. Class 3 digital IDs provide the highest level of assurance typically needed by an individual. Expected uses include electronic commerce applications such as electronic banking, and online services for which you have to pay a fee.

Once you have the digital certificate in your web browser, you will want to know how to view it and use it. You will also need to know how the same certificate can be used to digitally sign your email. All these topics will be covered in next month's column.

your private key is only being accessed with your permission.

- **High** – This setting will require you to enter a password before your private key is accessed.
- **Medium** – This setting will alert you and ask for your permission before your private key can be accessed.
- **Low** – This setting will not add any additional security. This means your private key is protected only by your system's login procedure. I usually go with low, to be honest, but if you want more security you should check the Protect Your Private Key option.

**10** Read the Subscriber Agreement and the Certificate Practice Statement (CPS) and click on Accept.

**11** Confirm your email address – make sure this is spot on or you will not be able to use your ID.


**12** Check your email – within seconds you will receive an email with a unique PIN number embedded in it in addition to a URL.

**13** Select the PIN number and copy it.

**14** Go to the URL specified.

**15** Paste the PIN number in the box provided.


**16** Click on Submit.

**17** The digital ID is generated by the CA.

**18** Once the digital ID has been generated, it can be installed. Clicking on the Install button ensures that it will be stored and recognised by your browser.


## PCW CONTACTS

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