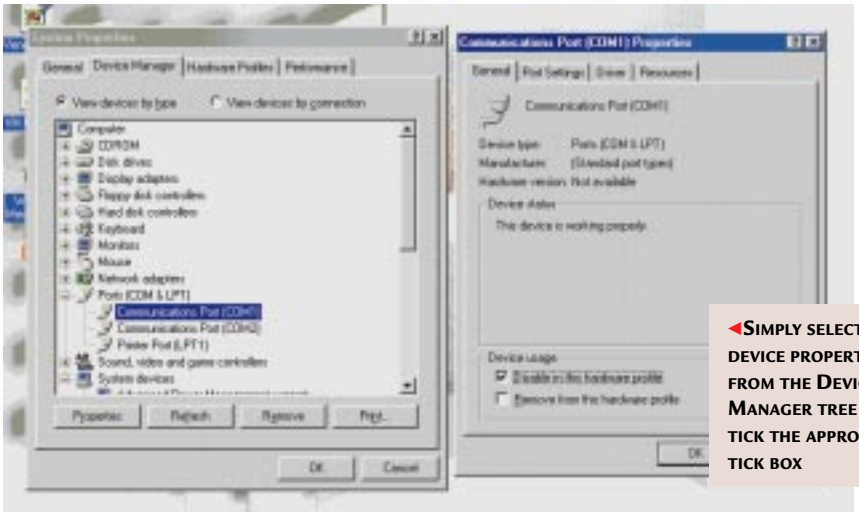
Making the connection

Roger Gann gets to grips with the profusion of SCSI connectors: tackling the installation of Ultra 2 SCSI, and a fine example of how hardware profiles can be an invaluable diagnostic tool.

As promised last month, I'll round up my musings on SCSI with some leftovers and titbits. As you will have seen from the screenshot in last month's column, there are as many different types of SCSI connectors as there are standards — too many, in fact. Some of them were defined with SCSI-1 and are now obsolete, like the DB-50 connector, even though you still find it on current Apple Macs, Zip drives and the like. The most common ones today are the 50-pin Centronics-type SCSI-1 connector, the 50-pin High Density SCSI-2 connector and the 68-pin Ultra SCSI version. Most new host adapters and external devices use the SCSI-2 HD.



◀SIMPLY SELECT THE DEVICE PROPERTIES FROM THE DEVICE MANAGER TREE AND TICK THE APPROPRIATE TICK BOX

This profusion of sockets is very bad news indeed, particularly for the pocket. I have SCSI devices with all four types of connector on them, and in order to guarantee that I can connect to them, I have to have cables to suit the various permutations. At about £30 a pop for a SCSI cable, I reckon I must have £300-worth of wire lying around my office. Cable lengths were defined up to 6m maximum in SCSI-1 and SCSI-2, for a single-ended SCSI bus and up to 5Mb/sec data rate. Keep this in mind, if you use long cables, and include the internal device cables in your cable-length calculations. With Fast SCSI-2, as the data rate doubled to 10Mb/sec, so the maximum cable length was halved to 3m. SCSI-2 allows up to a 10cm cable "stub" length from the device to the main bus cable. Sometimes this length is exceeded, causing higher capacitive loading.

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These limitations can be overcome with a different kind of host adapter, one that supports "differential" SCSI. A differential SCSI bus can use the full cable length up to 25m (approx. 82 feet) and keep the maximum data rate of 10MHz. This is especially important with external devices, as most external single-ended cables can't cope with 10MHz. But you can't mix and match differential and ordinary SCSI devices on older host adapters. There is a compromise of sorts, and this technology is now a part of the Ultra 2 SCSI standard.

COM and get it

And now some light relief. A columnist on this magazine phoned me the other day with a COM port problem. He'd upgraded his old Gateway P166 to Windows 98, and in doing so, his modem, which normally sat on COM1, had ceased to work. As soon as the PC booted, the TR (Terminal Ready) LED on the modem came on and stayed on. And if he tried to access the modem from DUN or HyperTerminal or even via modem diagnostics, up would pop an "Open COM port" error message. He'd tried everything to get to the bottom of it — Safe Mode, the new System Configurator tool, Dr Watson — you name it, he'd tried it; but everything failed. He'd looked at what was running in memory (using a CTRL ALT DEL to display the Task List) and shut down items selectively to see if that would free up the port, but still no joy. Booting from a DOS disk revealed that the hardware was fine, so he knew the problem was software-based. His last resort? Me.

After some consideration, I came to the blindingly obvious conclusion that some program was hogging the COM port. It couldn't have been any TAPI-based applications because they are co-operative and "yield" the COM port when requested. Loading a TAPI-based program, such as HyperTerminal, proved this much. Our problem lay in identifying the mysterious COM port hogger. Finally, I suggested a little tweak to force the errant program to reveal itself. Our columnist rebooted and found that it was Windows 98's Direct Cable Connection that lay at the bottom of all this endless grief. He'd been using a Windows CE 2.0 PDA, and when he installed the HPC software on the PC, it automatically activated DCC — but without telling him. And DCC is a "proper" program so there was nothing actually "wrong" with the system and no amount of diagnosis would reveal this existing "fault". Uninstalling DCC restored the modem.

So what had I suggested? A simple way to get a program to reveal itself is to force an error condition; at least you'd then get

a clue from the resulting error message. The way this was done in this case was to make the COM port unavailable. When DCC loaded invisibly at boot time, it checked that the COM port was available and when it wasn't, protested. The way to turn off individual devices in Windows 98, and Windows 95, is through the use of hardware profiles. Every Windows 9x PC has a default hardware profile and this includes all the devices in your PC. But if you examine the properties of that device in Device Manager, at the bottom of the dialog box is a tick box, "Disable in this hardware profile". Tick, and the next time you reboot, that device will no longer be available. Actually, Windows 9x gives you some flexibility here, and allows you to set up multiple hardware profiles, a feature useful for notebooks which can have hardware devices available to it, depending whether or not it is attached to a docking station. To set up a second hardware profile, click on the Hardware Profile tab, copy the default hardware profile and give it a different name. When you reboot you're given a simple menu of hardware profiles. You simply choose your new hardware profile as the default and disable/enable hardware as required.

The next time you select this hardware profile, your choice of hardware is enabled. When used in this way, hardware profiles can be an invaluable diagnostic tool.

NEW RELEASE: EZ-SCSI 5.0

▶SOMETHING OLD, SOMETHING NEW, AND SOMETHING BORROWED

Adaptec kindly shipped me the current release of **EZ-SCSI, version 5.0**. EZ-SCSI normally ships with host adapter cards, though it is available as a separate retail product. It is without doubt the easiest way to install SCSI drivers: doing this manually, under DOS, used to make purgatory look attractive — until EZ-SCSI came along.

There are no big surprises with the new release — it's business as usual here. There are the obligatory updated drivers plus the normal suite of useful utilities, including SCSI Explorer, which lets you examine all your SCSI devices and set things like power management sleep times and read/write cacheing which, amazingly, is sometimes switched off by default. You also get a simple SCSI benchmarking program which displays the relative data throughputs for your devices at various settings, definitely handy but not essential.

Adaptec has finally woken up to the potential of the internet and now includes an on-line driver updater, called Web-Checkup. Sadly, I couldn't test this fully because EZ-SCSI installs the latest drivers anyway. You also get a buckshee copy of the CD-ROM burner, Easy CD Creator Lite, chucked in for good measure.

One interesting addition to the roster of utilities is Disk ImageSaver, a simple backup utility. However, it doesn't back up individual files; rather, it stores an image of the entire disk, sector by sector, on another SCSI device, which doesn't necessarily have to be a tape drive, it could be a removable hard disk. Why back up an image? It's faster than a file backup and it's also convenient for certain kinds of tasks, such as machine cloning, disaster recovery or restoring a system configuration that's been changed. Disk ImageSaver creates a bootable DOS disk that restores the contents of the image backup. So, to clone a standard workstation that's been fine-tuned, you'd save an image of it to an external SCSI drive, then plug the drive into the new machine and boot from the DOS disk — and DiskImage Saver does all the rest. A scheduler is now included with EZ-SCSI 5.0 which allows you to automatically run the utilities, such as DiskImage Saver, at regular intervals.

A far more useful addition to EZ-SCSI is Drive Preparer. Normally, to add a new SCSI hard disk to your system you would have to get your hands dirty, quit Windows 9x and enter the "Dark Side", i.e. DOS, in order to partition and format it. With Drive Preparer, you can do all this and still stay within the comfort zone that is Windows 9x.

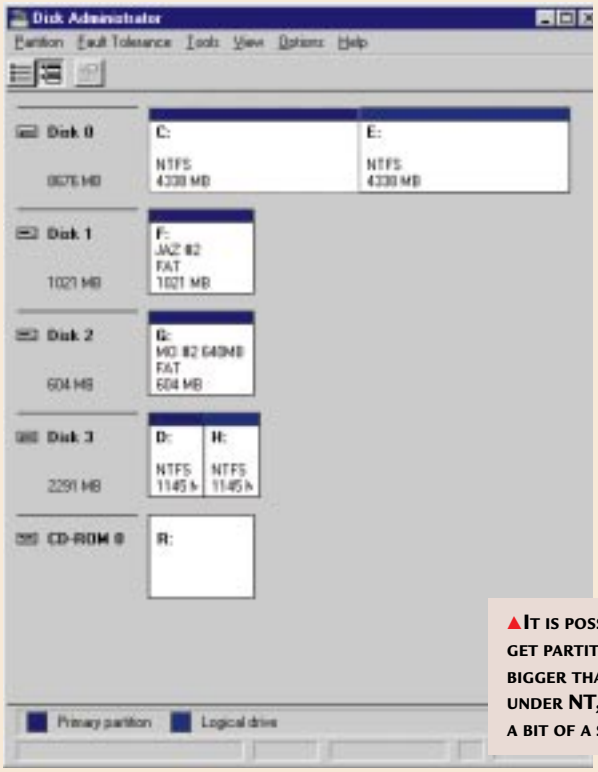
INSTALLING ULTRA 2 SCSI IN WINDOWS NT 4.0

Installing the AHA-2940U2W in my Windows NT 4.0 Server **called for some extensive preparation**. I was already using an AHA-2940UW card and a 2Gb Ultra Wide Fujitsu hard disk as my boot drive, plus sundry other SCSI devices. Swapping the drive from one SCSI host adapter to another wasn't a problem, but while installing the drivers I realised a "chicken and egg" problem would inevitably arise.

The server booted from this hard disk and clearly, the correct miniport drivers for the new card had to be in place for the card to be recognised and the drive booted from. With the new card in place, I'd be unable to boot Windows NT 4.0 and then install the required drivers. And the drivers for the new card weren't backwardly compatible with the old host adapter. And with the AHA-2940U2W post-dating Windows NT 4.0, it wouldn't have the drivers in its driver database — and so on. The problems just continued to spiral.

The solution was incredibly simple — you can have more than one SCSI host adapter in a PC. I downed the server and inserted the AHA-2940U2W card in a spare PCI slot. I then booted Windows NT 4.0 and ran through the Adaptec install routine to install the correct drivers. Having made sure that the new card was working adequately, I downed the server again, swapped the hard disk SCSI cable over from the AHA-2940UW to the AHA-2940U2W and removed the AHA-2940UW. At the same time I installed a 9.1Gb Seagate Barracuda U2W drive, and my server started to fill up with SCSI cables at an alarming rate. I finally rebooted, and all was sweetness and light.

Installing Windows NT 4.0 onto a blank Ultra 2 SCSI drive also calls for some gymnastics. Windows NT 4.0 doesn't support Plug and Play and so it uses a brute force technique to identify hardware — it loads all the device drivers it has into memory and tests them to see if they work, rejecting those that don't. Well, that's fine if the device drivers form part of the core drivers that NT comes with as standard, and in this case, Ultra 2 drivers are conspicuous by their absence — you get a blue screen crash if you try and install. Unfortunately, there's no obvious "Have disk" option, similar to that in Windows 9x.



▲ IT IS POSSIBLE TO GET PARTITIONS BIGGER THAN 4GB UNDER NT, BUT IT'S A BIT OF A STRUGGLE

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☛ **The trick is** to reboot again, and just after Windows NT 4.0 "signs on", you have a whole two seconds to press F6. This will pop up the screen that allows you to specify your SCSI host adapter.

☛ **You should** then specify "Other" and insert the floppy containing the correct SCSI drivers. This trick is also useful if, during installation, you want NT to use a newer host adapter driver than the standard ones that accompany Windows NT 4.0.

Irritatingly, Windows NT 4.0 isn't entirely happy with very large hard disks during setup. By default, on virgin hard disks, you're limited to a maximum partition size of 4Gb or thereabouts. Bizarrely, Windows NT 4.0 is capable of supporting partition sizes roughly twice this figure, 7.8Gb on the first hard disk. And even if you choose the NTFS, with the assumption that you'll get bigger partitions, think again: it will install a FAT file system and convert it at the next reboot. So, either way, when you install a single 9.1Gb hard disk, you have no choice but to carve it up into smaller partitions.

The only way round this setup madness is to partition it first on another identical NT machine (subject to the maximum partition ceiling) and then switch it over to the current machine. Or another solution is to use something like Partition Magic, which I hope to look at in next month's column.

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