

Old drivers never die...

...they just lose their resolution. **Tim Nott** tells you about buses, DRAM, VRAM and redundant driver files. DOS is dealt with, too, as a new regular feature of this column.

Alan Semple emailed me with what must be a common problem: having upgraded his display card, installed the drivers, then upgraded those a couple of times, the list of available drivers in Windows Setup has grown alarmingly. He's tried removing the driver files from the System directory but this makes no difference. We covered this topic, in

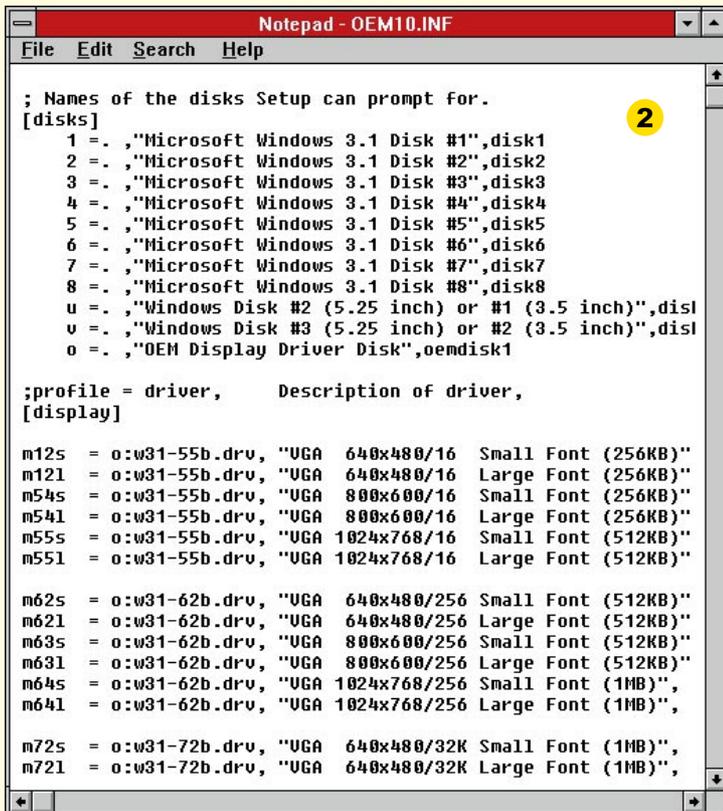
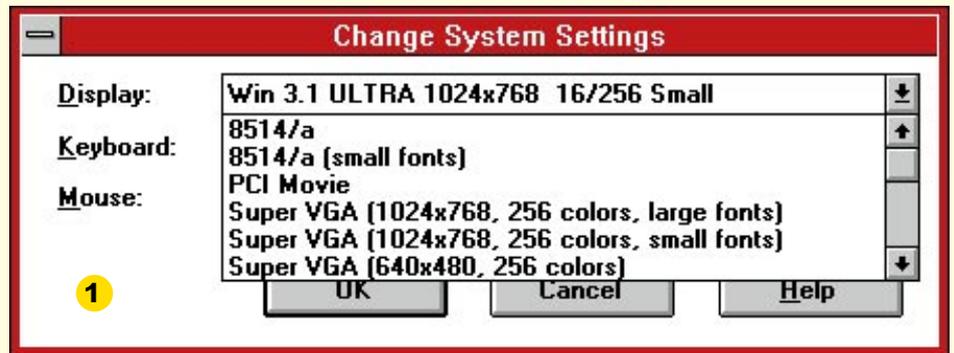


Fig 1 All the lonely drivers — where do they all come from?...

Fig 2 ...they come from the OEM*.INF files

passing, in last year's grand spring-cleaning article, but let's take a closer look.

Drivers and grabbers

Although we speak of "installing a driver", several files are actually involved.

Firstly, the driver itself; the *.DRV file. There may be just one of these, with a separate utility for changing resolution, or a separate file for each resolution/colour depth.

Next, there are the "grabbers"; files ending in .2GR (standard mode) and .3GR (386 Enhanced) which support copying text and graphics in Windows DOS sessions.

Then, there's the Virtual Device Driver (VDD*.386) for displaying DOS applications in "Virtual Machines" in 386 Enhanced mode. And it doesn't stop there: each resolution may have a different set, or choice of fonts (*.FON). Some of these, like VGASYS.FON, are used by Windows itself; others such as EGA80WOA.FON are used in DOS sessions by the "grabbers".

Finally, the card manufacturer may include *.LGO and *.RLE files to replace the standard startup screen.

A brand-new installation of Windows offers support for a small range of display drivers, including VGA, SVGA, Video 7 and 8514. The instructions, for which files get copied from whence to where, are contained in a file named SETUP.INF, located in the System directory. Browse (but don't alter) this in Write because it is too big for Notepad, and you'll start to get the idea.

Third-party vendors use their own file, of the form OEM*.INF — Setup looks for these, too, and reports on anything it finds. So even if you've removed all the actual driver files, their ghosts will linger on if the OEM*.INF file remains.

We'll look more closely at the .INF files (how they work and how they can help you remove redundant drivers from your system) next month, but now let's move on to a related issue.

Can it go by bus?

Andrew Melville wrote from Bristol to ask what it all means: he's thinking about upgrading his display card, but is totally baffled by buses, DRAM, VRAM and all that. He asks whether I can recommend a good Windows display card?

Taking the last question first, the answer is, I'm afraid; no. I don't have hands-on experience of the many cards on offer, but we did run a group test in last May's issue of *PCW* and another is planned for June.

I can help Andrew narrow down the choice, however. In general, "accelerated" display cards (which is just about all of them) work by subcontracting from the main processor. To put it simply, instead of the CPU sending all the pixel-by-pixel information needed to display a green circle on screen, for example, it just sends the command "Draw green circle" and lets the chip on the card get on with the job.

The bus route

The first consideration is how the information gets from the CPU to the card: the "bus" route. This is dependent on your existing motherboard. Older PCs will probably have the standard ISA bus, with a bank of slots in which to fit display, sound and other cards. More recent ones will have a "local" bus — a separate set of slots. Of the two local bus standards, VLB and PCI, the latter has proved the most successful and is the platform on which manufacturers are concentrating their

development. So if you have a PCI motherboard, go for a PCI card.

The amount of on-board memory determines the resolution and colour depth. For standard VGA, the screen consists of 640 x 480 pixels. Each pixel can be one of sixteen colours, taking up half a byte. The total screen memory needed, therefore, is 153,600 bytes.

However, this display is woefully inadequate for a desktop machine. Many games and multimedia applications need at least 256 colours.

The practical minimum is a card with one megabyte of RAM which will provide you with 1,024 x 768 x 256 colours (768Kb), 800 x 600 x 65,536 colours (937Kb), or 640 x 480 x 16,777,216 colours (900Kb). This last, taking three bytes per pixel, is also known as True or 24-bit Colour. Two megabytes will raise these limits to 65,536 colours at 1024 x 768 or 16,777,216 at 800 x 600.

Two hundred and fifty-six colours is also known as "palletised": each image is displayed using a set of 256 colours drawn from a possible 16.7 million. While this is perfectly adequate for things such as multimedia encyclopedias, you need more for serious image work; Kai's Power Tools, for example, won't work with a palletised display. Such a display can also cause clashes. When two images "fight" for the palette, the loser is displayed in the wrong colours. Very serious graphics buffs might be looking at 32-bit colour at 1,280 x 960, needing 4Mb.

Dynamic or video?

DRAM or VRAM? This one's simple. VRAM is faster (it has separate in and out pathways) and is more expensive. Another essential is refresh rate — check first what settings your monitor can support and look for a minimum of 72Hz vertical refresh rate at the highest resolution you use. Anything less may cause flicker; for the same reason, avoid anything "interlaced". From then on, it's bells and whistles — AVI and MPEG video acceleration, video capture, or the ability to connect add-on cards for these.

Finally, if you play DOS games, check out the performance under DOS as some Windows-specific cards perform badly in this area.



The new DOS section appears overleaf



DOS and Don'ts



This column has now taken DOS under its wing. But since we're all still recovering from recent issues' mammoth sessions on optimising CONFIG.SYS and AUTOEXEC.BAT for Windows, I'll confine this month's coverage to some short tips.

● **Help.** With DOS version 5 and later you can get a brief explanation and a list of available options by typing a forward slash followed by a question mark after the command (Fig 3).

● **More Help.** DOS also has its own extended help system — typing "HELP BATCH", for example, will tell you all about batch commands. "HELP" on its own gives a list of topics.

● **DOS under Windows. (1)** Don't try to run disk utilities (e.g. chkdsk or scandisk) from a Windows DOS session; at best it won't let you, at worst you can corrupt your disk.

(2) You might like an on-screen reminder when in a full-screen DOS session under Windows, so don't do daft things such as the above, or worse, turn off the PC. Method one (thank you, Barry Moore of Northumberland) is to create a text file called WINDOS.BAT consisting of two lines:

```
@PROMPT Windows is active! $p$g
@COMMAND
```

Load Windows and highlight the DOS Prompt icon. Select "File/Properties..." and change the contents of the "Command Line" box to "WINDOS.BAT".

(3) An easier way to get a reminder is to use an undocumented Microsoft feature and add the line:

```
SET WINPMT = Windows is active! $p$g
```

to AUTOEXEC.BAT. In either case you can use your own message.

● **Redirection.** The ">" symbol after a command will redirect the output of that command. For example, "DIR > LPT1:" will print the contents of the current directory rather than show it on screen. "DIR > MYFILES.TXT" will save the list to a plain-text file — an especially useful trick under Windows, which has no way of doing this from File Manager.

● **Directory listings.** The "DIR" command has many options or "switches" — see my Help tip (above) to get a list. You can make one or more of these options the default by using the "DIRCMD" environmental variable. For example, the most irritating thing about the unadorned "DIR" is that the listing scrolls off the screen before you get a chance to use it. If you add:

```
SET DIRCMD = /p
```

to AUTOEXEC.BAT, then it will default to pausing between each screenful.

● **More directory.** Note that if you combine the previous two examples, your PC will appear to grind to a halt when redirecting a listing to file or printer as it's waiting for you to "Press any key to continue...". A more elegant solution than stabbing away at "Any key" until it has finished is to turn off the "pause" option on a one-off basis by preceding the same switch with a minus sign:

```
DIR /-p > MYFILES.TXT
```

does the trick.

● **More redirection. (1)** Redirecting to a file with the ">" symbol will overwrite any existing file of the same name — you don't get a "File exists..." warning. If you want to add to, rather than replace an existing file, use ">>" instead.

(2) It's not just the DIR command that can be redirected. One especially useful trick is to print, or save to file, the brief explanation of commands and switches mentioned in my Help tip (above) for future reference:

```
PROMPT /? > LPT1:
```

for example, will print out the low-down on customising your DOS prompt.

```
Dos
Windows is active! E:\DOS>attrib /?
Displays or changes file attributes.
ATTRIB [+R | -R] [+S | -S] [+H | -H] [[drive:][path]filename] [/S]
+ Sets an attribute.
- Clears an attribute.
R Read-only file attribute.
S System file attribute.
H Hidden file attribute.
/S Processes files in all directories in the specified path.
Windows is active! E:\DOS>set /?
Displays, sets, or removes MS-DOS environment variables.
SET [variable=[string]]
variable Specifies the environment-variable name.
string Specifies a series of characters to assign to the variable.
Type SET without parameters to display the current environment variables.
Windows is active! E:\DOS>
```

Fig 3 A slash and a question mark gets brief help on most DOS commands

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