



Graphic Workshop
P R O F E S S I O N A L

UPGRADING YOUR WINDOWS SCREEN DRIVER

When Windows wants to display something on your monitor, the communication between Windows and your tube is handled by a screen driver. A screen driver is an interpreter of sorts – it listens to what Windows wants to draw and expresses these requests in terms your display hardware can understand. When Windows wants to draw a line or the colour green or the word "phistoplymungia" in slightly baroque-looking neo-trendy text, it's up to your screen driver to see to it that Windows gets its way.

Actually, there's a catch to this. Your driver is only obliged to see to it that Windows gets its way within the limits of what it thinks your display hardware is capable of displaying. Being a bear of very little brain, a screen driver is easily confused in these matters, and most screen drivers spend their entire lives being lied to contemptibly, never knowing any better. More than a few of them have required therapy.

There are two primary characteristics of your display hardware which will affect what a Windows screen driver can show you, to wit, the dimensions of your screen and the "colour depth" it can reproduce. Screen dimensions are measured in pixels – it matters not a jot how many inches separate the edges of your monitor, and if you find a ruler and measure this distance you'll probably discover that the subspecies who sold you the thing rounded up quite a bit in any case. The pixel dimensions define how much stuff Windows can display on your screen at once.

The pixel dimensions of Windows screen drivers are typically one of the following:

- 640 by 480 pixels
- 800 by 600 pixels
- 1024 by 768 pixels
- 1280 by 1024 pixels

The colour depth defines the number of distinct colours Windows can display at one time. Colour depth is often defined in bits. The actual number of colours can be worked out as 2 raised to the power of *bits*. As such, a display driver which can display four bits of colour can display 2 raised to the power of 4 colours, or sixteen in all. A display driver that can only display sixteen colours is pretty shameful, and probably requires reorientation and sensitivity training.

Common colour depths for Windows are:

- 4 bits, or sixteen colours
- 8 bits, or 256 colours
- 15 bits, or 32,768 colours
- 16 bits, or 65,535 colours
- 24 bits, or 16,777,216 colours

Colour depths of four and eight bits use what is called "palette" colour, which means that all the windows visible on your monitor are constrained to work with the same palette of sixteen or 256 colours. What this means in practice is that the foremost window will probably be able to display colours which are more or less what they should be, and all the background windows will look like drunk stockbrokers who've just returned home after a night of playing "pin the tail on the paint spraying machine."

In fact, 256 colours are not sufficient to display photorealistic images as they are actually stored. Software like Graphic Workshop, which is required to do so anyway, cheats in this situation through a process called "dithering." Dithering creates acceptable reproductions of photorealistic images – if you don't look too closely – but they typically appear coarser and less detailed than they should.

At colour depths of more than 256 colours Windows is unfettered by palettes, and all the windows on your screen can use whatever colours they like. Photorealistic images can look genuinely photorealistic. If you're likely to be called a barbaric, sexist bastard for what you look at on your monitor when you think everyone else is busy playing Doom or actually getting some work done, these are the colour depths to use.

For practical purposes, the latter three colour depths listed earlier all behave the same way under Windows. More colour depth will actually display the colours in photorealistic images more accurately, but unless you sprung for a really good monitor – not one of the cheap ones they sell at Sears – and you have better eyes than most people sport after a few years of bombardment by cathode rays, you'll be hard pressed to spot the difference.

If you anticipate doing something serious with your computer – and more to the point, with Graphic Workshop – you should be reading this document through a screen driver which supports a screen resolution of at least 800 by 600 pixels, with 1024 by 768 decidedly preferable. Its colour depth should be 32,768 colours or better.

This next bit may get a bit technical – you can safely skip it if you find yourself to be in need of sleep.

The Technical Bit

The amount of colour depth and the pixel dimensions of your screen are a function of the amount of memory available on your display adapter. If there's enough memory available to contain all the pixels required for the display mode you have in mind – and allowing that your

display adapter isn't an antediluvian nightmare haggled down to five bucks at a yard sale – you should be able to configure Windows to use the mode in question.

The amount of memory required to contain one pixel can be figured as:

- Half a byte for sixteen colours
- One byte for 256 colours
- Two bytes for 32,768 or 65,536 colours
- Three bytes for 16,777,216 colours

Multiply the two screen dimensions of the mode you're interested in together and then multiply this number by the number of bytes required for one pixel to arrive at the amount of memory your card would need to support it. Display card memory is expressed in megabytes – 'cept for some of the aforementioned antediluvian nightmares – wherein one megabyte is 1,048,576 bytes.

For example, to display 800 by 600 pixels at 32,768 colours, you would require $800 \times 600 \times 2$ bytes of display card memory, for a total of 960,000 bytes. This is less than one megabyte – this mode would be available on a display adapter with one or more megabytes of memory.

Should you have lost the mysterious book with a lot of badly-translated English which came with your display adapter, you can usually ascertain the amount of memory on your display card by looking at the BIOS power-up message which appears when your computer first wakes up in the morning. You might have to turn on the monitor a minute or two before powering-up the computer.

Having said all this, it's worth noting that you can use the instructions in this document without knowing how much memory is on your display card, or even which one of the mysterious little horrors in your computer is the display card. Your Windows screen driver knows, and it won't be offended if you prove not to care about such things.

How to Update Your Driver

The failings of Windows 95, Windows NT and Windows 98 are legion – future archeologists who dig up the remains of our civilization will no doubt remark on how just and fitting the widespread terrorist attacks on Microsoft in the spring of 2008 were, and ponder on why they didn't take place much sooner. None the less, it must be said that Windows screen drivers are currently handled much more conveniently than was previously the case. In times gone by, installing a new Windows screen driver was only slightly less complex than doing brain surgery on a house cat with nothing more than a chain saw, a power stapler and a bottle of iodine for after.

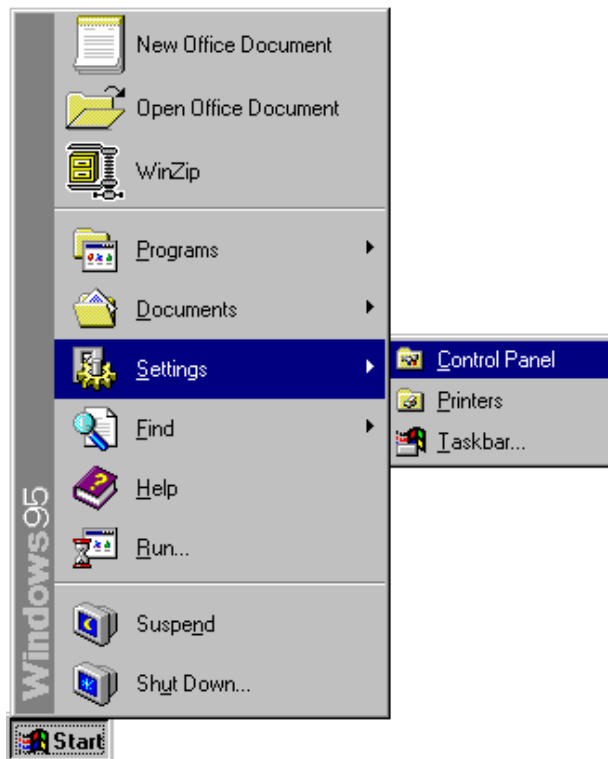
For reasons not easily explained, most computers which come with Windows installed on them are set up with 256-colour screen drivers, usually running at 800 by 600 pixels, or perhaps even 640 by 480. If you sprung the extra fifty dollars for a high-end accelerated video card, your display hardware can probably do vastly better than this. As was discussed earlier, even cheesy

one-megabyte display cards can handle a reasonable 800 by 600 pixel screen resolution without resorting to palette colour.

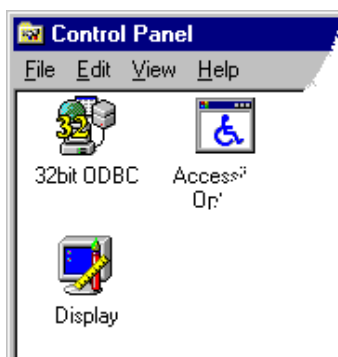
All that's required to make Windows display things with better colour depth than your computer came configured for is to select the appropriate screen driver. Liberal politicians could probably manage it without assistance. Probably.

Here's how it works:

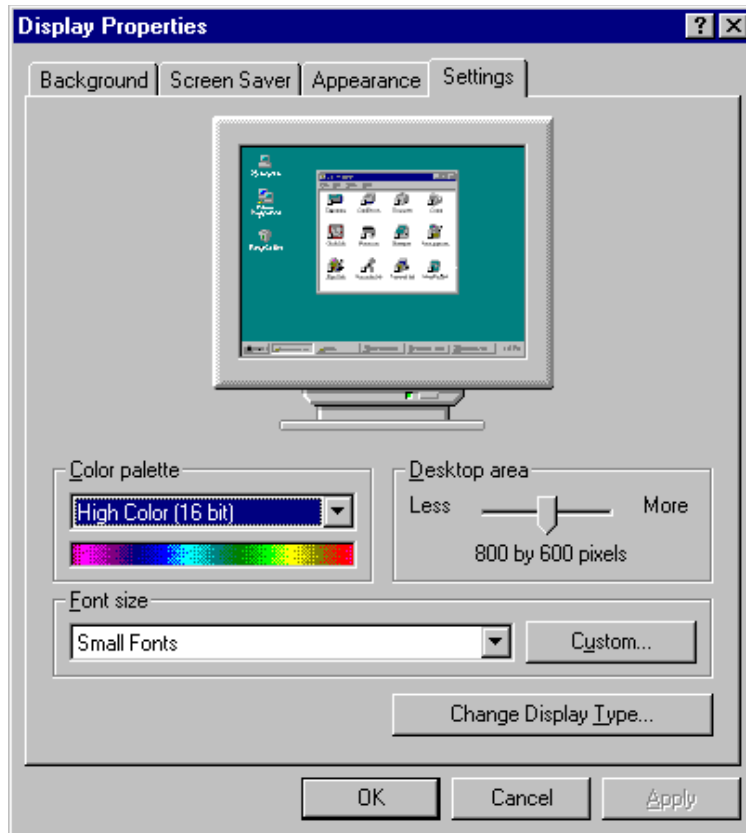
1. Click on the Start button in the Windows task bar with the left button of your mouse. Select Settings from the menu which appears. Select Control Panels from the Settings sub-menu.



2. Double click on the Display applet.



3. Select the Settings tab of the Display applet. You'll see a display properties panel that looks something like the one shown here – more sophisticated display cards typically have more options and fancier properties panels.



To select a higher screen resolution, drag the Desktop Area slider to the right. For the moment, try 800 by 600 or 1024 by 768 pixels.

To select more colour depth, open the Color Palette combo box and select a suitable colour depth item. Choose a high colour item, or true colour if you have enough memory to support it.

The Settings tab of the Display applet will not let you choose a screen resolution and colour depth combination which would require more display memory than is available on your display adapter. As such, if you ask for 1024 by 768 pixels of screen resolution and you find that the best colour depth available is 256 colours, you'll have to scale back the Desktop Area slider by one notch.

When you have the Settings tab configured the way you want it, click on OK. If your screen driver is reasonably new, Windows will blank your screen for an instant and then redraw it with the new resolution and colour depth settings. If it's an old driver with barnacles growing on it, Windows might have to restart for your new settings to take effect.

Depending upon the sophistication of your screen driver and your monitor, you might be able to configure additional characteristics of your display. One setting you'll probably want to pay particular attention to is the refresh rate, the number of times per second your monitor is

updated. Higher refresh rates will eliminate the visible flicker that often attends higher resolution screen modes, and helps sell extra-strength aspirin in such remarkable quantities.

It's important to keep in mind that your monitor will have a maximum screen resolution and refresh rate at which it can operate. Attempting to set it up with screen characteristics it can't support will make Windows' desktop look like extra-chunky industrial waste, and may damage your tube if you leave running with these characteristics for an extended period. The definition of "extended period" varies inversely with the cost of your monitor. The expensive ones typically smoke themselves first.

Before you change the refresh rate setting, consult the documentation for your monitor to ascertain what the monitor expects.

Reasonably new Windows screen drivers have fail-safe mode switching. Having selected a new display mode, Windows will prompt you to verify that you want to use it. If you don't agree that it's wholesome and exciting and more or less readable after fifteen seconds, Windows will return to its regularly scheduled programming with your old mode.

If you have an older screen driver installed – one which requires that Windows restart to change modes – you might find yourself in the awkward situation of selecting a mode your monitor can't support and then not being able to change your mind because Windows' desktop is no longer accessible when it reboots in its incorrect mode. Should this occur, keep in mind that if you hold down the F8 key when Windows is booting, Windows will start up in "safe" mode. Safe mode uses a temporary sixteen-colour, 640 by 480 screen driver, and it will allow you to return to the Display applet in the Control Panel and choose different driver settings.