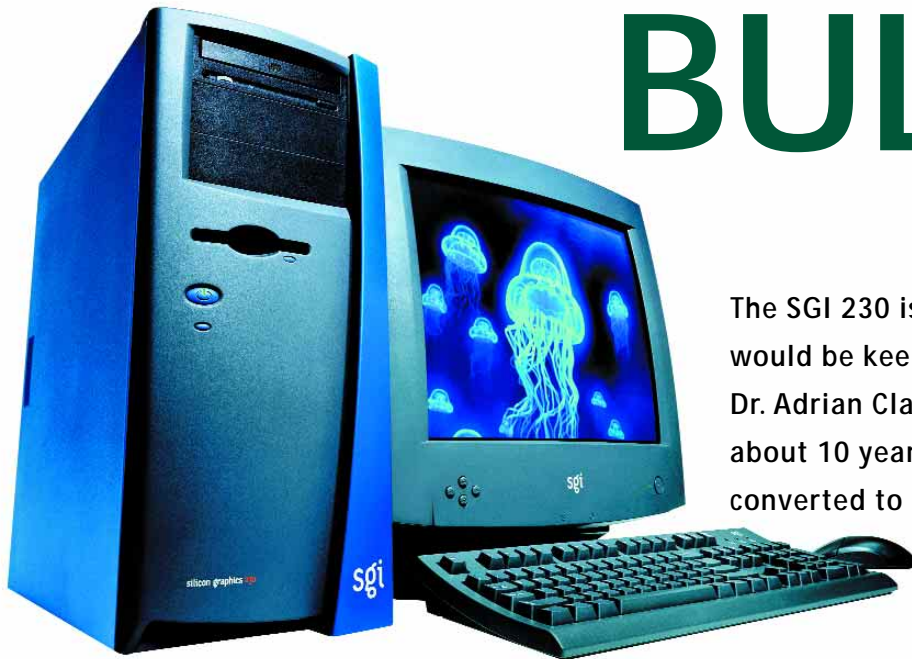


The SGI 230 Visual Workstation FASTER THAN A SPEEDING BULLET



The SGI 230 is a machine any Linux fan would be keen to get their hands on. Dr. Adrian Clark has used SGI systems for about 10 years on and off before being converted to Linux, so was keen to see the two come together in something affordable.

Let's look at the hardware first, working from the outside inwards. The box is basically a tower but comes with a purple side panel that disguises the rectangular appearance a bit. Depending on your point of view, this either gives it a stylish appearance or is a pointless adornment: I rather like it myself. The case is easy to open and the internals are well laid out. The system has a 300W ATX power supply.

The majority of the components in the review machine were things that could easily be bought off the shelf. The motherboard is a VIA Apollo with the usual ports including an Intel 10/100 Mbps Ethernet interface and a sound device (which seems to be unused by Linux). The heart of the machine is a 735MHz Pentium III with a huge fan and 256Mbytes of ECC RAM.

There are five PCI slots, two of which are occupied by an Ensoniq ES1371 sound card and a top-of-the-range two-channel Adaptec 3950 SCSI controller (Linux's *lspci* command identifies it as a 3940). A single 9Gb IBM DNES series hard drive sits in one of the five drive bays. The choice of SCSI card seems a little strange: it can drive up to 30 SCSI devices but surely no-one is going to connect that many to a 230!

The 48x CD-ROM drive connects to the UDMA66 IDE controller on the motherboard. (There

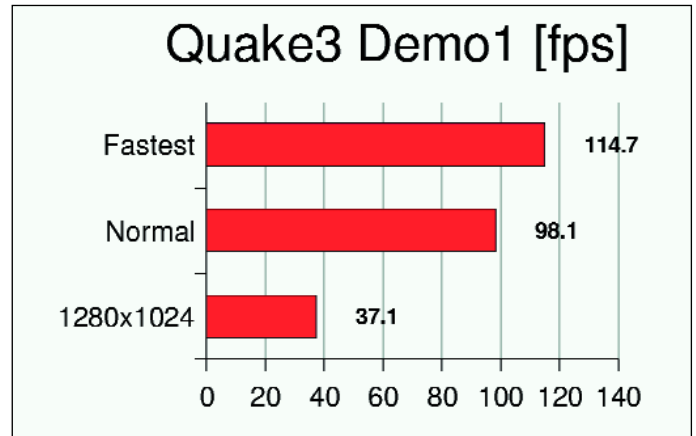
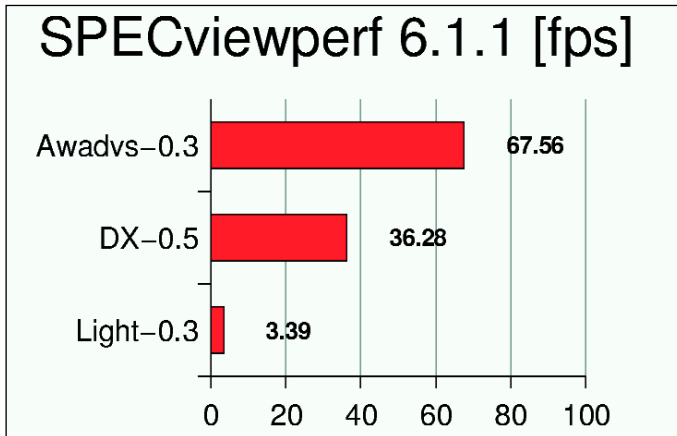
appears also to be a version of the 230 with a UDMA HDD.) A standard 3.5" floppy drive hides discreetly behind the front cover. One minor irritation is that it has no drive active light so if you dump *tar* files directly to floppies you need to wait a few seconds after synching.

SGI machines have always had a reputation for their graphics performance and the 230 follows this tradition. The 4x AGP slot carries SGI's VR3 64Mbyte 3D graphics card, a mid-range VPro card whose design originates from Nvidia. The great plus point about this card is that it is supposed to handle vertex transformations and lighting on the card, which should help when rendering geometrically-complex scenes – this has certainly been a problem area with many of the other PC-class graphics solutions I've looked at in the past.

On the odds and ends front, the review machine had a badged 19-inch monitor capable of doing 1600x1200 at 75Hz, with on-screen controls for everything under the sun. The keyboard was compact with a soft feel, but the mouse was dire. If I bought a 230, I'd have to replace it straight away with the only Microsoft product worth buying. The powered speakers sound fine when playing Quake but are certainly not what I consider to be hi-fi.



The main board runs at a frequency of 133 MHz.



The Linux Installation

Of course, the thing that makes the 230 interesting to us is the fact that it runs Linux! On booting, the machine displays a huge SGI logo and then self-tests. Lilo's boot prompt makes an appearance, after which you can choose the regular Linux kernel (2.2.13) or one that incorporates SGI's patches. I only looked at the latter.

The system comes with Red Hat 6.1 pre-installed, with extra goodies like the drivers for the graphics card. SGI also provide their additions on a CD-ROM in RPM format: the accompanying documentation states that they can be installed on top of SuSE as well as RedHat. Apart from the kernel and X server, this seems to be a straight-from-the-box RedHat installation.

The review system boots X directly and presents a GDM-type login box. After logging in, you get the GNOME desktop by default. This isn't my preference (I still use *fvwm* v1!) but is easily changed. The X server is XFree 4.0 with GLX extensions and defaults to 1280x1024 at 24 bits per pixel, but with only a 60Hz refresh rate. I noticed that there was a kernel module that deals with the graphics card, and that the kernel had the *kni* patch, which allows users to run Pentium III SSE code (the "floating-point MMX"). The SCSI driver doesn't seem to have tagged command queueing enabled, which I have found improves disk throughput substantially, especially when the system is being thrashed.

Putting it through its paces

As usual, the first thing to do is install Quake III, turn all the settings to their maximum and give it a go. Rendering at 1280x1024, the frame rate averaged at about 60 fps, peaking at 80 and never dropping below 40! The rendering is also flawless, with none of the cracked edges or corrupted textures that you sometimes see. The GLX hacks that come with xscreensaver all work; in fact, most of them run too quickly! The same is true of the Mesa 3.1 demos and the GLUT demos that come with SuSE. For those of you who know it, the "gears" Mesa demo gives a staggering 1465 frames per second! (For comparison, my trusty G400 card in a 450MHz Pen-

tium III gives just 312.) I have a VRML model of some buildings with over 44,000 quadrilaterals in it; the 230 was able to render this at between 4 and 11 frames per second, which is stunning.

I was interested in the stability of the OpenGL drivers under Linux, so I pushed them quite hard by running several applications at once, including some home-grown ones. Nothing unexpected was found, though killing an OpenGL program can sometimes make the system pause for several seconds before coming back to life: not a major problem but something of an irritation.

The raw processing power of the machine is pretty much what you'd expect. Benchmarks aren't tremendously meaningful in this reviewer's opinion; but if you're into them *nbench*, the Linux version of BYTEmark, is one of the better ones. It reports an integer index of 11.4 and a floating-point one of 10.2, with ECC error correction turned on in the BIOS. In practical terms, encoding a 5-minute audio CD track into an MP3 file took all of 45 seconds. The disk performance was better than expected, giving (curiously) 18.9 Mbyte/s for writing and 16.8 Mbyte/sec for reading.

The manuals are up to SGI's usual high standard. Every port had its pin-outs labelled and the BIOS settings were all explained. There were no Linux documents, though there's so much information around in one form or another that this won't concern anyone but a total Linux newbie. It would have been nice if the system had included a boxed version of Red Hat or SuSE for those people who won't be connecting their machines to the Internet.

Verdict

In conclusion, the 230 is a well-engineered piece of hardware with a solid Linux installation and solid-looking drivers for the specialised hardware. The graphics performance is stunning, so if your applications are able to exploit that or you're a dedicated Quake-player with deep pockets, it's an excellent buy. If you don't need the graphics performance there are probably better buys available elsewhere, though the build quality and expansion space remain attractive. I'm already saving up for one! ■

[left]
The graphics card delivers outstanding performance.
[right]
A perfect, but rather expensive, games machine

Info

Price: £3424
SGI: (0118) 925 7500
<http://www.sgi.com/>

Drives can easily be changed thanks to the ingenious plug-in system

