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Thin is In
Flat panel monitors do graphics better - sometimes

By Donald Jenner

The tendency, to think of flat-panel displays as strictly a portable computer phenomenon, is changing. Advances in the technology and lower costs couple with the ability to tuck a flat-panel places where CRT-based monitors will never fit change that picture. Flat-panels are not for everyone, but they offer an increasingly interesting and viable alternative to conventional displays.

Most flat-panel displays use LCD technology. Liquid Crystal technology has been around for over a hundred years; it was Sharp that took what was a lab toy, and made it a product, about 25 years ago. Sharp remains a principal source of high quality LCD panels, though the market is now shared by a number of, principally, East Asian makers, as well as a small number of makers for special-purpose flat-panel displays in the U.S. and elsewhere. Firms such as Samsung and Mitsubishi have announced enhanced-capability LCD panels, improving detail by increasing image-element density, or offering wider angled viewing.

An LCD involves sealing the liquid crystal material between two sheets of glass or other transparent material. Charge the material, and get a change in colour. Power consumption is low, size is easily constrained, and the colour in most displays is remarkably accurate. While sometimes not up to the level required for the high-end graphic arts community, it's more than sufficient for other kinds of design and for working even with photo-editing.

The downside to LCD panels, most notably in portable applications, is the need for back-lighting. While the LCD needs little power, the backlight drains the battery quite substantially. Even with good backlighting, most LCD panels have significant viewing limitations from any angle except dead-ahead.

Another limitation, cited in conversation with flat-panel OEMs, is the cost, apparently tied directly to manufacturing yields. Especially in the preferred, "active matrix" designs, the number of panels discarded on QA grounds is large enough that the unit cost is seriously affected. The larger the panel, the greater the problem.

LCD limitations have encouraged research into other technologies. Fujitsu, for example, is among companies offering sophisticated gas-plasma flat-panel displays.

Gas plasma is not new; my first small-format portable, a Toshiba AT-class 286-based computer a decade back, sported a monochrome gas plasma display.

About the same time, IBM was featuring gas plasma flat-panels in its advertising as the computer display of the future.

Fujitsu's technology has three "sub-pixels" in each dot. Charge the gas in the dot and it shifts to plasma state. The plasma reacts with the phosphors in the subpixels, and the result is red, green and blue light.

Another approach is under development at Motorola. Using field-emissive (FE) technology, Motorola's design has an array of micro-cathodes all stimulating the phosphors opposite. The cathode array is fine enough that high resolution is achieved; using the array instead of a CRT's single "gun", there is no scanning process. Like gas plasma, this is inherently light-producing, eliminating the need for backlighting. Like gas plasma, there is no special directional limitation to the display.

Gas plasma and field-emissive technologies are still pretty much things of the future. Gas plasma is shipping from several companies, but generally in larger formats only. FE displays are not yet commercially available.

In all of these technologies, perhaps the most interesting element is the return to direct digital interfaces. For over a decade, colour display systems have relied on a digital-to-analogue conversion. This delivered lots of colours but with some sacrifice in image quality. A number of flat-panel OEMs are offering a digital-direct version of some flat-panel models, claiming better image quality with no adjustments necessary.

So, what can you buy, today?

15-inch LCD flat-panel models with an effective display area of about 14 to 14.5 inches, supporting 1024x768 pixel resolution are becoming commonplace. Pricing ranges upward from US$850. to around US$1,000. Though these displays are smaller than the 16-inch to 19-inch displays commonplace for graphics users, type is crisp. Run the system with "small fonts" at maximum resolution and the results are still entirely readable. Part of the proof of this: Notebook computers with somewhat smaller screens are being deployed as desktop-replacements. Even bifocal-wearers like me can get used to these panels without much trouble. Most of the major brands have offerings in this size range.

Design professionals, however, really need larger screens, both for long stints working on details and for collaborative sessions. Pride of place in this class goes to Silicon Graphics. The company's digital-direct 1600SW display delivers a wide-screen 1600x1024 pixel resolution on a surface 17.3 inches on the diagonal. SGI supplies this panel with Number Nine's Revolution IVFP, a special implementation of that company's favorably reviewed high-resolution, high-speed graphics adapter. In short, this is a complete display system, carrying a price tag of US$2,600. It couples with both PC-family machines under Windows 95/98 and Windows/NT (including newly introduced SGI WinNT boxes) and Macintosh systems.

Viewsonic's VG180 is typical of more conventionally designed analogue LCD monitors. With a diagonal measurement of 18 inches, this monitor delivers up to 1280x1024 pixel resolution, and works equally well with PCs and Macs. Other firms offering panels in this category include Mitsubishi, Samsung and Sceptre. NEC Technologies offers 1280x1024 display in both 18-inch and 20-inch models. IBM, not short on the innovation front, offers a 16.1-inch diagonal display in the "SXGA" format (another name for 1280x1024 pixel resolution.).

All these products have price-tags ranging from US$2,250. to just under US$3,000. Should you consider spending this kind of premium for a display? Consider the cost of real estate: A flat-panel display - inherently more ergonomically acceptable - fits nicely in a standard 36-40 square foot cubicle. A large-screen flat-panel is not

particularly more demanding of desktop real estate than a smaller model. This is not true of large-screen CRT-based monitors, where even "slim" models require depth equivalent to the screen size - the bigger the monitor, the deeper the desk, among other things. On brokerage and exchange trading floors, this is common wisdom; flat-panels are the display of choice in these crowded spaces.

Add that apparent resolution is better on flat-panel displays. A 15-inch flat-panel display appears to yield the same ease of viewing as a 17-inch CRT-based monitor. An 18-inch flat-panel is almost as good as having a 20-inch CRT. And so on. This can translate into happier, more productive designers and draughtspersons.

These larger considerations are driving demand for flat-panel displays; the higher monitor cost is offset by lower space preparation costs, etc.