

by Marlene Orton

## What it is

Computer monitors for desktop work on graphic images or text now are manufactured with new technologies. The cathode ray tube (CRT) is still the leading desktop workhorse. Newer flat-screen models are becoming popular, but they are distinct from the liquid crystal display (LCD) models, which are thinner and draw less power.

## How they work

Flat screen is essentially the rounded CRT, flattened slightly by adding electron shooters to allow a sharper, more precise image by ironing out the convex curve. The flat screen also provides a less distorted picture and less glare. Sony Trinitron innovation perfected the flat-screen technology, and providers of flat-screen monitors, such as Dell Computers, essentially repackage Trinitron technology.

LCD technology works by blocking light, since liquid crystals don't generate light, which explains the power consumption differential. An LCD that can show colors must have three subpixels with red, green and blue color filters to create each color pixel. LCDs use thin film transistors or TFTs, which turn screen cells off and on based on signals from the computer's video card. LCD monitors can more accurately render pixels.

## Pros and cons

Performance, cost and the amount of information that can be displayed on the monitor will be paramount considerations. The most critical choices involve the following:

- Display technology – CRT and LCD,
- Viewable area (usually measured diagonally),
- Maximum resolution,
- Dot pitch or pixels,
- Refresh rate,
- Power consumption.

"Unless you have a specific requirement for LCDs, you should consider the extra costs if you are using the screen for basic applications such as Word, WordPerfect and PowerPoint. The standard CRT is the cheapest way to go from a basic cost consideration," says Andrew Catton, IT Practice Leader with ITNet, a management and technology solutions consulting firm in Ottawa. CRT is still considered the king for colour depth, and resolution can be adjusted with a video card.

## Technology

LCDs are trendy and sleek but CRTs still have a strong hold on most desktops for good reason. CRT technology has been decades in the making and is a long way from 1981, when IBM introduced the color graphics adapter (CGA) capable of rendering four colors with a maximum resolution of 320 pixels horizontally by 200 pixels vertically.

Most displays sold today support the ultra extended graphics array (UXGA) standard with a palette of up to 16.8 million colors and resolution of up to 1600x1200 pixels, depending on the video memory of the graphics card in your computer.

LCDs – technology that is still evolving – currently employ several variations of liquid crystal technology, but manufacturing is still a difficult process. Display size is limited by the quality-control problems faced by manufacturers as they add more pixels and transistors. The

number of rejected screens off the assembly line are said to still affect LCD prices, still a little higher.

## Power requirements

CRTs are power hungry at about 110 watts for a typical display. LCDs tend to average between 30 and 40 watts. An LCD monitor might cost more up front, but could save money in the long run. However, LCDs require stronger backlighting or ambient light levels to see the screen effectively, so there are significant trade-offs to consider in energy consumption.

## Size matters

Screen sizes are generally measured in inches diagonally from corner to corner, a measuring system that evolved from early television makers who wanted to make their screen sizes look larger. Since the actual display footprint of the CRT monitor varies from the listed measurement, check the number inside the display casing. Thus a 21-inch CRT monitor may actually have a 17-inch screen. The LCD screen is tighter to the edge of the monitor, so 15 inches will be close to the exact measurement.

The size of the display directly affects resolution. The same pixel resolution will be sharper on a smaller monitor and fuzzier on a larger monitor because the same number of pixels is being spread out over a larger number of inches. An image on a 21-inch monitor with a 640x480 resolution will not appear nearly as sharp as it would on a 15-inch display at 640x480.

## Refresh or flicker

CRT monitors have a refresh rate or flicker rate that is the number of times the image on the display is drawn each second. A CRT monitor with a refresh rate of 72 Hertz (Hz) cycles through all the pixels from top to bottom 72 times a second. Refresh rates control flicker, so the refresh rate should be as high as possible. Too few cycles per second and you will notice a flickering, which can lead to headaches and eyestrain.

LCDs have no flicker and research shows they are often preferred both by older eyes and particularly women, who are more sensitive to flicker.

## Cost

CRTs have dropped in price substantially. A 15- to 17-inch screen easily runs below \$300. Prices for 15-inch LCD screens typically are \$550 and up. The larger screens still are above \$1,000 due largely to production quality as mentioned.

## Vendors

Several dozen suppliers from the larger, better known brand names to the clones offer substantially the same kind of product within similar price margins. NEC/Mitsubishi, Philips, HP, Sony and Compaq compete with Samsung, ViewSonic and Acer. For some quick window-shopping check the Internet. Insight Canada ([www.insight.com/canada](http://www.insight.com/canada)) lists nearly 700 different computer monitors, with prices and specifications. London, Ontario-based DirectDial.com ([www.directdial.com](http://www.directdial.com)) provides a similar window-shopping experience.

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