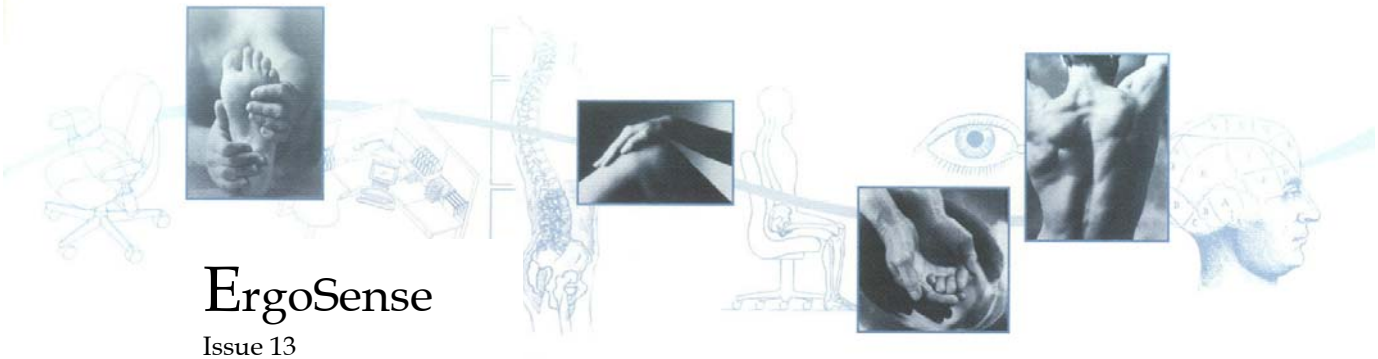

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Comparison of CRT vs. LCD Monitors for Desktop Computers

The CRT monitor has been the dominant display device for desktop computers since they first appeared in the early 1980s. As the new millennium approaches, that is beginning to change. The quality and performance of large flat-panel displays (most notably large color liquid crystal displays or LCDs) has improved significantly, and prices have fallen. The LCD monitor is now the preferred option for some desktop applications.

Each technology (CRT vs. LCD) has advantages and disadvantages; neither is ideal for all situations. The primary advantages for the CRT are its lower cost, somewhat better overall image quality, reliability, and ease of set up. The LCD is much thinner and lighter, uses less electricity, and is much more versatile with respect to placement and viewing options. Each of these considerations and others are discussed below.

Cost

An LCD monitor for a desktop computer costs at least $400 more that a comparable CRT monitor (i.e., one having the same imaging area). Inexpensive LCD monitors sell for about $800. A high-end unit, on the other hand, may cost as much as $2,500 — more than the selling price for most personal computers. Purchasers are usually not willing to pay these premium prices for typical desktop applications. However, prices should continue to fall, and as they do, more will make the switch.

Physical Attributes

LCD monitors are much thinner and much lighter than comparable CRT monitors. The depth of a large LCD monitor is typically 3 - 4 in. (excluding the base). The depth for an equivalent CRT monitor usually exceeds 17 in., and its weight exceed 50 lbs. This makes carrying and positioning very difficult, often requiring two persons. In contrast, the weight for a large LCD monitor usually does not exceed 20 lbs. Additionally, some LCD monitors can be attached to a wall or other vertical surface. Others can be pivoted 90 degrees into an upright

the Ergonomics CONSORTIUM
5730 West Nash Street, PO Box 76306, Milwaukee, WI 53216
PHONE - 800.568.2211 FAX - 414.873.8716 E-MAIL - email@ergonomics-consortium.com WEB SITE - www.ergonomics-consortium.com
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or “portrait” position so that an entire 8 1/2 in. x 11 in. page of text can be displayed without scrolling.

The shallow depth of an LCD monitor makes it ideal for use in confined areas. It is also well-suited for use on a standard computer table (depth = 30 in.). An LCD monitor may be placed toward the back edge of the table to achieve a more comfortable viewing distance, for example. A large CRT monitor, on the other hand, has a much larger “footprint”, restricting the viewing distance and leaving little room for a keyboard. A user that cannot tolerate a short viewing distance must use an add-on keyboard shelf or tray or place the keyboard on his/her lap.

Image Quality

Most users will not notice any significant difference between the quality of images displayed on high quality CRTs and LCDs when using business software applications (such as word processing, spreadsheets, business graphics, and presentation software). The CRT, however, is capable of better color rendering (usually noticeable when displaying photographic images) and provides the user with more control over the appearance of color images in general. Similarly, full-motion video generally looks better on a CRT.

Image quality for an LCD is optimized for only one resolution — the “native resolution”. *Resolution* in this context refers to the number of pixels (i.e., picture elements) both horizontally (in individual rows) and vertically (in individual columns). The *native resolution* for most LCD monitors is currently 1024 x 768. A few monitors have higher native resolutions such as 1280 x 1024. If the user chooses to use a lower resolution (i.e., a resolution that is lower than the native resolution), then image quality will be noticeably poorer. In contrast, the CRT works well at several resolutions.

Images displayed on an LCD at its native resolution often appear to be sharper than the same images displayed on a comparable CRT. This is due to:

- the one-to-one correspondence between pixels in the displayed image and imaging elements in the display.
- the LCD’s higher contrast

Some people prefer the higher contrast images; others do not.

5730 West Nash Street, PO Box 76306, Milwaukee, WI 53216
PHONE - 800.568.2211 FAX - 414.873.8716 E-MAIL - email@ergonomics-consortium.com WEB SITE - www.ergonomics-consortium.com

Other Factors

Power consumption for an LCD monitor is usually about 40 watts. In contrast, the power consumption for a comparable CRT monitor may be over three times as great. As a consequence, operating costs for LCD monitors are significantly lower.

Failure of individual LCD imaging elements is very common. Loss of a few elements is annoying, but if a large number of failures occur, the display may become unusable. Since the problem is so pervasive, it pays to purchase only from vendors with a good warranty and liberal replacement policy.

Finally, set up for a CRT monitor is usually trivial. An LCD monitor, on the other hand, may require extensive adjustment to achieve optimum results.

Concluding Remarks

Table 1, which follows, summarizes both the advantages and disadvantages of CRT and LCD monitors. A plus ("+") indicates that a given technology (CRT or LCD) is better than the other technology with respect to a specific attribute, while a minus ("-") indicates the opposite.

Clearly, an LCD monitor is superior for workstations in confined areas where use of a large CRT would not be practical. Similarly, an LCD monitor's lower weight makes it easier to move and position on a work surface. Other features such as wall mounting and 90 degree pivot are useful in some situations. Low energy consumption and good to excellent image quality are other pluses. The most significant disadvantages for LCD monitors are higher cost and poorer image quality in some situations (low resolution images and video).

The CRT monitor, on the other hand, is less costly, more reliable, and easier to set up. Image quality is also better in some situations. The chief drawbacks of the CRT monitor are its size and weight.

The final selection of a display device for a desktop computer is usually driven by three factors:

- the application (i.e., workplace characteristics and tasks)
- price
- and purchaser preferences

LCD monitors will become more prevalent as quality improves and prices continue to decline. Most industry experts believe that the LCD (or some other flat-panel technology) will eventually replace the CRT as the preferred technology for desktop computer displays.

Table 1 – CRT Vs LCD Monitors

Attributes	**CRT**	**LCD**
Cost	+	-
Size/depth	-	+
Weight	-	+
Power Consumption	-	+
Viewing/mounting options	-	+
Contrast	-	+
Color	+	-
Image quality - multiple resolutions	+	-
Image quality - full motion video	+	-
Reliability	+	-
Set up effort	+	-

This is paper was written for The Ergonomics Consortium by Dr. William H. Cushman. Dr. Cushman is president of Highland Technologies, Inc., an ergonomic consulting firm in Dallas-Ft. Worth, Texas, and is a board-certified Professional Ergonomist with a Ph.D. in psychology from UCLA. Dr. Cushman has published over 30 articles in scientific journals and conference proceedings. He is a member of the Human Factors and Ergonomics Society and has held several national offices in that organization. Dr. Cushman is also a member of The Ergonomics Consortium.