

# Flat Panel Monitors Are Here

And they offer us the opportunity to revolutionize office design.



SURE, THEY'RE CONTEMPORARY, STYLISH, AND SLEEK. For some corporate clients, that might be enough. But most others are going to demand some real return on investment before they set aside a portion of their IT budgets for flat panel monitors. The good news is that there are very real benefits to be derived from installing flat panel monitors—benefits that show up on the bottom line.

Corporations are already the largest purchasers of flat panel monitors in the United States, especially in the financial industry, where the size and flexibility of flat panel monitors has made them the monitor of choice for trading rooms and stock exchanges throughout the world. But they will soon take over the display market as a whole.

## The CRT/Flat Panel Comparison

In North America, flat panel monitors accounted for 28% of the 40.1 million monitors sold last year, and this year that number might well reach 40%. Still, North America lags far behind Japan, where last year, 75% of the 6.8 million new monitors were flat panels. Besides Japan's obvious love affair with any new technology, corporations there have found two very concrete benefits of flat panel monitors: They save space and conserve energy, both of which translate into a savings of cold, hard cash.



## LEARNING OBJECTIVES

This article covers the advantages and disadvantages of flat panel computer monitors for offices, including how they can be used to realize savings in real estate, furniture, and energy costs, while also improving the comfort and productivity of employees.

### Key points include:

- > The advantages and disadvantages of flat panel computer monitors versus CRTs
- > The cost savings that can be realized with flat panel monitors when used with adjustable monitor arms
- > The health and productivity benefits of converting to flat panel monitors with adjustable monitor arms

In addition to space and energy savings, flat panel monitors don't flicker as much as traditional monitors, known as cathode ray tubes (CRTs). They also tend to be brighter and have less glare than CRTs, making them easier on the eyes for employees who work with a lot of text.

CRTs do still have a few advantages. They provide better screen resolution with an average 17" CRT at 1280 x 1024 resolution. The average flat panel monitor, on the other hand, operates at 1024 x 768. The higher CRT resolution produces a better image quality, which is particularly important to workers who use a lot of graphics and photos. In addition, CRTs have been significantly less expensive than comparable flat panel monitors.

Price differences, however, are quickly narrowing. In 2002, the average price for a 15-inch flat panel monitor was \$297, an astounding drop from the average price of \$700 in 2001. As major flat panel monitor manufacturers continue to improve the technology and lower their costs, prices are expected to continue to drop. Still, the average price for a 17-inch CRT, which provides about the same viewable space as a 15-inch flat panel monitor, was only \$155 in 2002.

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by Irene Korn

# Flat Panel Monitors Are Here



With a CRT, the user has no usable work space in front of him, forcing him to turn to the right and left to answer the phone, read, write, and perform other normal office tasks.



A flat panel monitor, without an adjustable arm, only frees up space behind the computer monitor and does not result in any additional usable work space.



With the addition of a flat panel monitor arm, space is opened directly underneath the monitor and the monitor can easily be pushed back when the user needs full access to his work surface.

However, most experts agree that flat panel monitors, implemented correctly, can significantly reduce an organization's overall costs.

## Flat Panel Monitor Energy and Space Savings

Flat panel monitors reduce energy consumption because they are based on fluorescent lighting technology versus the electron beams found in CRTs. In fact, a study commissioned by IBM and completed by Pittsburgh-based KSBA Architects in association with New York City-based engineers Flack+Kurtz found that flat panel monitors use approximately 60% less energy than the average CRT, resulting in a savings of \$26.74 per monitor per year.

The real savings, however, come from more efficient use of the workspace, which translates into lower facility costs. The same study, for example, found that workstations designed for the smaller flat panel monitors can be between 10 and 20% smaller than comparable CRT-based workstations, while still allowing for the same functional work surface area. Less space, quite simply, means less money paid in rent. It can also mean savings in furniture costs and possibly construction costs. The study found that the energy savings combined with the space savings can result in ROIs of 100% or more on the purchase of flat panel monitors.

However, a flat panel monitor does not, in and of itself, create desktop space savings benefits. When a flat panel monitor stands alone on a work surface, the only real space savings is behind the monitor—space that is effectively useless—because the addition of a flat panel does not change the relationship between the user and the monitor. That is, the front of the screen must remain the same distance from the user's eyes as the CRT screen, which is in the range of 20 to 26 inches. In other words, someone who simply puts a flat panel monitor on his or her work space in place of a CRT will not realize any effective gain in usable work space (see photos at left).

The only way to transform that unused space into usable space is with the help of an adjustable monitor arm, the cost of which must be added into the overall equation. Depending on the configuration, adjustable monitor arms typically sell in the range of \$125 to \$225 per monitor.

## Adjustable Monitor Arms

Picture an average knowledge worker at her desk. In the course of the day, she will use the computer, reference documents, write, and use the phone. However, with a CRT taking up all the space in front of her, these four tasks can't be accomplished in the same area. So, she will use the computer, typically in the corner, then shuffle to one side of the corner (to her primary work area) for writing, referencing, and phone use. Then she will shuffle back to the computer, and so on, performing this "work dance" all day long, moving back and forth to complete her daily tasks. With the CRT smack in front of her, one side becomes the

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A flat panel monitor arm enhances the flexibility and collaborative possibilities of a workstation, allowing users to easily move the monitor to share data or images with co-workers and other visitors.

### Armed With Technology

Many flat panel monitor arms available today are simply updated CRT arms adapted to support a flat panel monitor. While this provides more space than simply putting the flat monitor directly on the desk, it doesn't make the most of the flat panel technology. When considering a flat panel monitor arm, you should look for the following features:

- > Height and depth positioning that are independent of each other (this will maximize ease of adjustability)
- > Arm, with monitor attached, should move easily with one hand
- > Arm should be strong enough so the monitor doesn't bounce when moved, or when others walk by
- > An aesthetically pleasing design
- > Easy installation
- > Additional options such as a quick release bracket so the monitor can be popped off when service is required; mounting options to meet placement requirements; and products that accommodate several monitors on a single adjustable post.

### The Lowdown

According to the KSBA study, cost savings associated with flat panel monitors can include:

- > **Rent:** Less rent due to reduced workstation areas; affiliated costs are also lower, including taxes, maintenance, and janitorial
- > **Electrical Energy:** Includes less cost to power the monitor, plus less costs for air conditioning due to the reduced heat output of the monitors
- > **Furniture:** Smaller and less complex furniture required
- > **Tenant Fit-Out:** Reduced costs in completing interior tenant construction
- > **Base Building Mechanical/Electrical:** Reduced energy requirements allow for downsized major mechanical and electrical equipment

### For Your Health

The way that CRTs work create a number of vision-related problems for users. In fact, some OSHA studies have found that a full 90% of CRT users suffer from Computer Vision Syndrome (CVS), which is characterized by eye fatigue, blurred vision, dry eyes, and headaches. Furthermore, since people with vision-related problems frequently hunch over to see better, CVS is often accompanied by neck, back, and shoulder pain.

One of the reasons that users have problems with CRTs is the "halo" effect, wherein the beam of light from the cathode bleeds around the individual pixels, creating a fuzzy image similar to what you would see if someone was walking toward you with the sun behind them. This causes eye muscles to constantly adjust and focus on the characters, leading to eye strain and fatigue. In addition, each time the CRT refreshes—hundreds of times per minute—it flickers, and although we are not consciously aware of it as we look at the screen, this causes further eye strain.

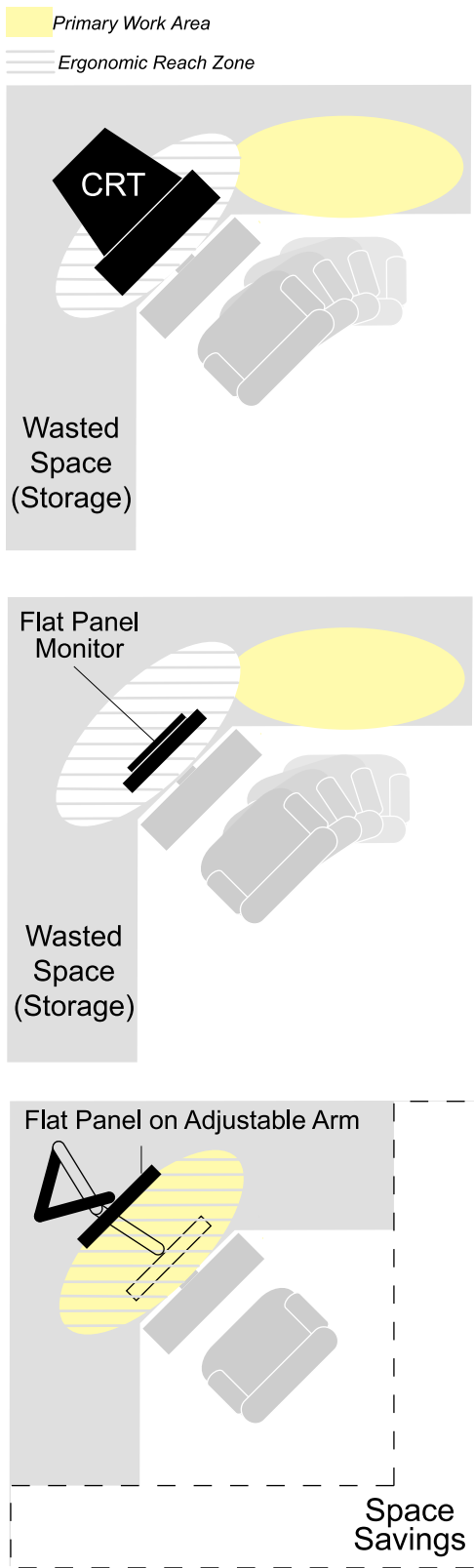
On the other hand, flat panel monitors incorporate a polarizing filter, which sharpens the contrast behind the transistors, or pixels, and eliminates any bleeding of light (the halo effect). There is no screen flicker with flat panel technology and the backlight is even throughout the screen with perfect pixel geometry. While the actual resolution of flat panel monitors does not yet equal that of CRTs (though the gap is getting narrower with improved technology), overall flat panel monitors are much easier on the eyes, and so CVS should be less of an issue when flat panel monitors are used.

Also, when flat panel monitors are mounted to an adjustable arm, they can be easily adjusted to the right height for each individual user. Researchers agree that the top line of text on the monitor should be at or slightly below eye level because any portion of the monitor higher than eye level contributes to neck and shoulder strain. Similar problems occur when the monitor is too low. CRTs are difficult to position correctly and in the case of very tall or very short users, can't necessarily be moved into an ideal position at all.

For a downloadable PDF of a full article on the results of the KSBA study, originally published in "SCOPE," go to [www.architecturemag.com](http://www.architecturemag.com), click on "Continuing Ed," then "Flat Panel Monitors Are Here."

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primary work area while the other is often used for nothing more than stacking work items. This has always been one of the drawbacks of CRTs, a problem which has increased proportionally to monitor size. The CRT not only reduces work space, but it creates an awkward way of working.

Now, consider the same employee with a flat panel monitor at her desk. With the flat panel monitor in the same position as her old CRT, the usability of her workspace will not have changed. She'll still need to shuffle to one side of the monitor for her writing, referencing, and phone tasks, and then shuffle back to do her computer work. Really, nothing has changed.

Now, add a flat panel monitor arm to the picture and see what happens. Not only is the work surface directly under the flat panel monitor freed up for other uses, but the flat panel monitor can easily be pushed back and out of the way when the user needs access to her full work surface. In addition, from this position, the user has full visibility to her monitor screen while at the same time having space to do her other tasks. She no longer has to perform the "work dance," but instead is able to keep all of her work in front of her in what's called the "Ergonomic Reach Zone."

### Design Implications

The above example shows how much more desk space can be made available to the typical worker when a flat panel monitor is paired with a flat panel monitor arm. However, imagine the savings if the workspace was actually designed with flat panel monitors in mind. Corner workstations, which were necessary for the most part because they provided a logical home for space-hogging CRTs, are not required when workstations are outfitted with flat panel monitors. This gives designers a great deal of flexibility to rethink the workspace. Instead of designing workstations around the computer—CRTs have hogged the desktop for over 20 years—they can now tailor designs to the needs of their clients. Workstations can truly be shaped and arranged to meet specific work and collaboration requirements. This will not only allow the designs to better support an organization's people and culture, but will require simpler, less expensive furniture and less space per workstation. This extra space can be used to add common areas or to reduce occupancy costs.

In addition to the space savings, a flat panel monitor arm also increases the ergonomic integrity of the workspace by allowing users to correctly position the flat panel monitor with easy height, depth, and tilt adjustments. Also, the flexibility of monitor positioning can make a workstation more collaborative—employees can easily move their monitor to share data or images with co-workers or visitors.

### Conclusion

With flat panel monitor prices continuing to drop, architects and designers now have more freedom than ever to create great workplace solutions for their clients. If used to full effect, this new technology can deliver significant tangible benefits, including cost savings, improved worker health and comfort, better workflow and productivity, and increased collaboration.



TEST QUESTIONS

1. Which of the following costs savings is associated with flat panel monitors and arms?
  - a. Less cost to power the monitor, saving on electrical energy
  - b. Less rent because of reduced floor space
  - c. Smaller and less complex furniture is needed
  - d. All of the above
2. What are the characteristics of Computer Vision Syndrome?
  - a. Eye fatigue, dry eyes, and wrist problems
  - b. Eye fatigue, blurred vision, and headaches
  - c. Eye fatigue, blurred vision, and back and shoulder pains
  - d. Eye fatigue, far sightedness, and headaches
3. Which is a problem associated with flat panel monitors?
  - a. The halo effect
  - b. Constant flickering and eye strain
  - c. The resolution does not yet equal that of CRTs
  - d. They are difficult to position correctly
4. How does a flat panel monitor on a monitor arm provide more space for users?
  - a. The flat panel monitor is smaller so it frees up space to the right and left of the computer monitor
  - b. It can be positioned closer to the user
  - c. It allows the desk space directly in front of the user to be usable
  - d. It creates a natural division between areas, allowing for a work area and a stacking/filing area
5. Why doesn't a flat panel monitor alone—without an arm—result in maximum space savings?
  - a. The user still has to shuffle back and forth between the monitor and work space to the left and right of the monitor
  - b. The only space that's gained is in back of the monitor
  - c. The flat panel monitor, alone, occupies as much of the Immediate Reach Zone as a CRT
  - d. All of the above
6. Which of the following is not a reason that flat panel monitors are increasing in popularity?
  - a. Flat panel monitors with arms save space, resulting in rent, furniture, and other financial savings
  - b. Flat panel monitors are better than CRTs for graphics-based applications
  - c. Flat panel monitor prices are quickly falling
  - d. Flat panel monitors use less energy than CRTs so utility costs are lower
7. How does a flat panel monitor reduce energy consumption?
  - a. The smaller screen size uses less energy than the larger CRTs
  - b. Fluorescent lighting technology uses 60% less energy than the electron beams in CRTs
  - c. Less air conditioning is needed due to the reduced heat output of the monitors
  - d. Both B and C
8. Which of the following statistics is not true?
  - a. In 2002, the average price for a flat panel monitor was about \$350
  - b. Workstations designed for flat panel monitors can be 10 to 20% smaller than for CRTs while still allowing the same functional work space
  - c. A study by KSBA found that one flat panel monitor can save \$26.74 per year in energy costs versus the average CRT
  - d. This year, as much as 40% of new monitor purchases will be flat panel monitors
9. Which of the following should you look for in flat panel monitor arms?
  - a. Independent height and depth positioning
  - b. Extreme stability so the monitor doesn't bounce
  - c. A wide range of adjustability
  - d. All of the above
10. Which of the following statements is not true about flat panel monitors with arms?
  - a. A flat panel monitor arm increases the ergonomic integrity of the work space by allowing users to correctly position the flat panel monitor
  - b. A flat panel monitor arm can make a workstation more collaborative, allowing users to share information with co-workers and visitors
  - c. A flat panel monitor arm will help reduce the risk of carpal tunnel syndrome
  - d. A flat panel monitor arm makes the space-saving promise of flat panel monitors a reality

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