Apple Cinema Display

**Apple Cinema Display
Reviewer's Guide**

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Contents

"Wow."

We asked our design and publishing customers—heavy-duty computer users who toil around the clock at graphics-intensive jobs—what they envisioned as their ultimate fantasy computer display. Invariably, they got a dreamy look in their eyes and described a large-screen, flat-panel display with vivid colors and razor-sharp resolution.

We're pleased to announce that it's no longer a dream. Introducing the Apple Cinema Display.

The Apple Cinema Display was created especially for creative professionals who have the highest expectations about what a professional-quality computer display should offer. Its new-generation, all-digital LCD technology provides the important features these customers expect—such as color accuracy and a bright, sharp screen—in addition to many other important advances not yet seen in other flat-panel LCD displays, such as an extrawide viewing angle, lightning-fast pixel response, an enormous virtual workspace, and an incredibly striking industrial design.

Simply stated, once they experience the Apple Cinema Display, creative professionals will be wowed by what this LCD display can do that others can't.

This reviewer's guide will take you through the features, benefits, and specifications of this new industry-leading display. Thank you for viewing—and reviewing—the Apple Cinema Display.

Sincerely,

The Apple Cinema Display Product Team

Feature Summary

The Apple Cinema Display is Apple's elegantly designed, all-digital flat-panel LCD display. Here is a brief summary of the key features of this new product. In the following two sections of this guide, we'll provide in-depth information about who is most likely to use the display and why these features will be important to them.

The Apple Cinema Display offers:

• A 22-inch (diagonal) thin film transistor active-matrix LCD display for bright, sharp text and graphics
• A wide-format design with 1,600 by 1,024 pixels for display of two pages of graphics or full-screen DVD movies without letterbox
• Distortion-free screen images as a result of the all-digital signal from Apple's Power Mac G4 computer to the display
• Lightning-fast pixel response, supporting full-motion digital video playback
• An extrawide viewing angle, up to 160 degrees horizontal and vertical, for maximum color performance
• The highest color resolution of any LCD display to date, with 16.7 million colors for use in all graphics-intensive applications
• Stunning style and streamlined industrial design that takes up a minimum of desktop space
• Built-in user-friendly features, such as a two-port USB hub for easy connection of peripheral devices and a power/instant-on switch to turn on the display and the computer simultaneously or put the system to sleep
• An integrated stand for ease of adjustment, with an integrated single cable to minimize desktop clutter
• Strict adherence to global TCO 95 standards for low power consumption, low emissions, and recyclability

Target Markets

At Apple, we build products for consumer and professional markets. The Apple Cinema Display was designed specifically for the professional segment.

Design and publishing professionals

These customers include graphic designers, art directors, page layout editors, web page designers, multimedia specialists, and others who work in graphics-intensive occupations. Whether these professionals work at home or at an office, they often put in long hours at the computer, day in and day out. Many of them want to use the largest screen possible in order to display their complex layouts and all their software tools at a glance. Screen resolution and color fidelity are very important in their work.

Digital video professionals and enthusiasts

These customers include both professional and amateur movie producers, and film and video editors who want the ability to display and edit video or DVD movies on screen, in native HDTV format, without letterbox. These customers also include special effects animators and producers, who require high-performance computer processors and rapid display refresh rates when working with their complex drawings and 3D renderings.

Scientific and technical customers

These customers include scientists, mathematicians, engineers, and architects. They often work with large graphics files, including complex 3D models and drawings, as well as detailed spreadsheets.

Those concerned with environment, ergonomics, and safety

Many customers all over the world are especially concerned about electric field emissions and the power consumption of traditional CRT displays. They seek products that meet strict controls for safety and will appreciate the fact that as an LCD display, the Apple Cinema Display has near-zero field emissions and extremely low power consumption. Others will appreciate the ergonomics of this sleek flat-panel display, which provides a small, space-saving desktop footprint and is easily adjustable to the customer's desired viewing angle.

Industry-leading Technology and Design

Specialized customers, specialized needs

Creative professionals have unique ways of working, and we understand that the computer display they use can either help or hinder them. They work with large and unwieldy files, move them rapidly around the screen, and often use software programs that include tear-off menus or palettes that can clutter up their virtual desktop.

What these professionals expect in a display is a large screen with bright, crisp, and distortion-free text and graphics; a faithful display of colors; and a rapid pixel response without any artifacts or lag when working with full-motion video, with animations, or when moving elements around on the screen. Because these workers put in many hours on the job, they also need a display that is comfortable to look at for long stretches at a time.

Although LCD technology has been available for several years, only recently have the price and visual performance of these displays become attractive enough to satisfy this selective group of customers. To date, CRT-based displays have been the only sensible high-performance solution. But today, with the advanced digital graphics technology of the Apple Cinema Display and the Power Mac G4, these discriminating customers can enjoy all the advantages of this sleek flat-panel display, without compromising what they see and experience on the screen.

There's more to size than dimensions

The Apple Cinema Display's 22-inch (diagonal) screen may be impressive because of its dimensions alone, but there's even more to consider beyond the obvious physical size. With a native resolution of 1,600 by 1,024 pixels, you can fit a lot more information onto the screen all at once, such as two full A4-size pages of text, and still have room for menus, toolbars, and palettes. With all this extra space to work, there's much less need for time-consuming scrolling or toggling between windows.

Another important consideration of a display's size is its aspect ratio, which in this case is reflected in a unique wide-screen format. Because of its aspect ratio, the Apple Cinema Display's screen is especially useful to creative professionals who work with full-motion video. The screen is large enough to view and edit DVD movies in their native HDTV format without the letterbox, making it the perfect companion for use with Apple's DVD Player or the exciting new Final Cut Pro software (www.apple.com/finalcutpro), a powerful and affordable application that combines professional editing, compositing, and special effects capabilities.

A display's pixel density also plays an important part in determining the value of its on-screen "real estate." The last thing customers want to do is squint to see images because the pixel density at high resolution renders them too small to see very well. With the Apple Cinema Display, the pixel density is such that you can use the display at the maximum resolution all the time and still view everything at a size and sharpness that is easy on the eyes.

An all-digital signal for all-digital image quality

An industry-leading high-performance graphics engine in the Power Mac G4 provides an all-digital signal between the computer and the Apple Cinema Display. Why is this important? Because an all-digital solution avoids the need to convert the signal to an analog form, which leads to some image degradation. The all-digital solution produces undistorted screen images every time.

Here's how it works: In traditional CRT displays, digital data from a desktop computer is converted to an analog signal by way of a graphics card that uses a digital-to-analog converter (DAC), because an analog signal works best with the way a CRT's electron beam renders an image on its screen. But because LCDs are digital devices, they need to work differently than CRTs do. Any analog signal that comes from the desktop computer must be translated back into digital data within the LCD monitor so it can understand the information and display the image. Unfortunately, most computers still use graphics cards with a DAC. Therefore, any conversion from digital to analog data in the computer, and then from analog back to digital data in the monitor, means that translation errors are inevitable. These errors cause the image quality to degrade, resulting in screen distortion and artifacts, such as banding and jittery pixels. Most LCD monitors have a set of user controls, such as phase and clock controls, to help compensate for these artifacts and distortions by adjusting the monitor's circuitry, but often the problems remain visible even after adjustment. So the customer not only has a distorted image to deal with, but is also inconvenienced by all the tweaking necessary to get images to look right.

But with the Apple Cinema Display, no signal conversion is needed, because the Power Mac G4 computer does not use a DAC as it would if it were connected to a CRT display. Instead, it uses a powerful all-digital graphics engine developed in partnership with ATI Technologies that produces a digital signal directly from the computer to the Apple Cinema Display. This means that each pixel is displayed in precisely the right spot, with no artifacts, no banding, no flicker, and no distortion. It's so accurate that the Apple Cinema Display doesn't need any special user controls—customers see the same high-quality images every time.

User controls needed on a LCD without an all-digital signal	User controls on Apple Cinema Display
• Fine tracking and coarse tracking • White and black balance controls • Horizontal and vertical position • Brightness and contrast	• On/off/sleep • Brightness and contrast

But an LCD display should not be judged only by how crisp and clear its images look while sitting static on the screen. It should also be measured by the way it performs under the demands of actual use—when the images are moving around and being manipulated by the user. In the past, moving images have been problematic for LCD displays— even displays that have employed all-digital interconnect technology. When images were moved from one side of the LCD screen to another, a lag would occur that made watching full-motion video or animations a real challenge. Naturally, these known LCD idiosyncrasies were not acceptable to customers purchasing a desktop display, given the rigorous standards that creative professionals have for the efficiency and quality of their work. This subpar performance, which was primarily based on the graphics chips being used at the time, has been overcome by Apple with the Power Mac G4 and Apple Cinema Display solution.

With the latest graphics technologies in the Power Mac G4 and the Apple Cinema Display, customers now can own and use a desktop LCD display designed specifically with the demands of the creative professional in mind. Not only are the images distortion and artifact free, but they can be moved around the screen quickly, without any delays in image rendering. Apple has again demonstrated that it is able to deliver real solutions for demanding customers.

Great color from almost any angle

Another factor of critical importance to creative professionals is the accuracy of color on their display screen. In earlier-generation LCD displays, color accuracy was a limitation, because viewers saw shifts in color when they looked at the screen from even a slightly off-center angle. But with the Apple Cinema Display, color remains consistent even when viewing it at an angle. Using industry-leading technology, the Apple Cinema Display has a wide viewing angle of 160 degrees both horizontal and vertical—wider than any other LCD. This means it has the ability to produce accurate colors at wide angles, twice as good as the next-best LCD display on the market.

Add to this an amazing color gamut of 16.7 million colors, and you can see why the Apple Cinema Display will be the choice of creative professionals, providing better color resolution than any other LCD display.

USB connection is a snap

We've included two USB (Universal Serial Bus) ports on a conveniently located built-in hub, so customers can easily connect peripheral devices such as keyboards, mice, printers, storage devices, and digital cameras. USB delivers on the promise of plug-and-play convenience because the ports are "hot-swappable," which means there's no need to turn off or restart the computer when connecting a new peripheral device.

The benefits of USB include the following:

• Up to 12-megabit-per-second transfer rate
• Industry standardization, which eliminates the need for separate hardware for each operating system (operating system–specific drivers are required)
• Hot swapping and autoconfiguration of devices
• Provision of power to certain devices, reducing the need for external power adapters
• Support for up to 127 devices at one time

For more information on USB, check out www.apple.com/usb. For a list of USB peripherals, go to guide.apple.com/uscategories/usb.html.

Fingertip controls, easy adjustment

We've included some handy touches in the Apple Cinema Display that make the computer and display easier to use together. With a single button, you can instantaneously start up the display and the computer at the same time, or put the system in and out of sleep mode.

We've also incorporated an integrated stand so that users can adjust the screen easily, and an integrated cable to minimize desktop clutter.

Stunning design

In creating the Apple Cinema Display, Apple took its lead from the automotive industry and combined techniques for molded metal with the latest advances in plastic resins and injection molding. The result: a sleek and elegant flat-panel computer display that takes up very little desktop space and that almost seems to vanish when not in use.

The importance of hardware and software integration

Apple has long been in the unique position of developing both the hardware and the underlying software for all of its products. This is different from other computer companies that might manufacture hardware and simply license their underlying software or firmware technologies, or vice versa.

There's an important benefit to customers in the way Apple engineers its products: As developer of both the hardware and the software, Apple has the advantage of engineering its components to work together seamlessly from the start. One result is that Apple customers spend little or no time configuring their computer systems and more time enjoying them. At Apple, we call this our "plug and play" philosophy, and we demonstrate it by creating leading-edge products that work the way our customers expect them to work right out of the box: reliably and consistently, with minimal effort on the customer's part.

Many of our product benefits are noticeable only "under the hood," such as the all-digital interface between the Power Mac G4 and the Apple Cinema Display, and the advanced digital graphics engine—a perfect example of how careful engineering of hardware and software at the drawing board stage can result in a superior finished product.

Ergonomically and environmentally friendly

We believe in being good environmental world citizens. Our LCD displays comply with strict global TCO 95 standards for low power consumption, low emissions, and recyclability. They also use just one-third the power of a traditional CRT.

Specifications

Following are the specifications for the Apple Cinema Display.

Screen size
• 22 inches (diagonal)

Screen type
• Thin film transistor (TFT) active-matrix liquid crystal display

Display colors (maximum)
• 16.7 million

Viewing angle (typical)
• 160° horizontal; 160° vertical

Brightness (typical)
• 180 cd/m^2

Contrast ratio (typical)
• 300:1

Resolutions
• 1,600 by 1,024 pixels*
• 1,280 by 800 pixels
• 1,024 by 640 pixels
• 800 by 500 pixels

*Optimum resolution

User controls (hardware and software)
• System startup/sleep
• Power on/off
• Brightness

Screen treatment
• Antiglare hardcoat

Connectors and cables
• Digital Visual Interface (DVI) 24-pin connector with Transition Minimized Differential Signaling (TMDS)
• Two-port self-powered USB hub
• DC connector for DC input

Power supply electrical requirements
- Line voltage: 100V to 240V AC
- Frequency: 50 to 60 Hz, single phase
- Power: less than 62W (operating)

Agency approvals
- FCC Part 15 Class B
- CISPR 22 Class A (EN5008211f)—complies with European EMC directive
- DOC Class B
- MPR II
- VCCI Class 2
- CE Mark
- EPA ENERGY STAR compliant
- IEC 950
- NUTEK
- TCO 95

Environmental requirements
- Operating temperature: 50° to 95° F (10° to 35° C)
- Storage temperature: –40° to 115° F (–40° to 47° C)
- Operating humidity: 20% to 80%, noncondensing
- Operating altitude: 0 to 10,000 feet (0 to 3,048 m)

Size and weight
- Height: 18.9 inches (47.9 cm)
- Width: 23.1 inches (58.8 cm)
- Depth: 8.3 inches (21.0 cm) minimum; 12.2 inches (31.0 cm) maximum
- Weight: 25 pounds (11.4 kg)—display; 14 ounces (398 g)—power supply

System requirements
- Power Mac G4 computer with AGP 2X expansion slot and built-in USB

Pricing and Availability

Suggested retail price

The suggested retail price for the Apple Cinema Display (M7478LL/A) is $3,999.

Availability

The Apple Cinema Display will be available in limited quantities and will only be sold to those who are purchasing or who already own a Power Mac G4 computer. It is only available directly from Apple through the online Apple Store.

For More Information

For more information about the Apple Cinema Display, visit www.apple.com/products on the World Wide Web. Other resources on the web include the following.

Apple Computer, Inc.	www.apple.com
The Apple Store	www.apple.com/store
Power Mac G4 computer	www.apple.com/powermac
USB information	www.apple.com/usb
List of USB peripherals	guide.apple.com/uscategories/usb.html