Sun™ Monitors

Just the Facts

Copyrights

Last Update: 1/9/2002

Table of Contents

Product Line Overview

Introduction

For almost any type of application — from spreadsheets and word processing to graphics-intensive publishing and visualization — there is a Sun™ color monitor with the features and performance to make the most of each system's capabilities. Sun's color monitors are designed to provide complete compatibility, compliance, and excellent screen performance with the full line of Sun workstations. From the 17-inch for mainstream applications to the 18.1-inch flat-panel liquid-crystal display (LCD) for financial, manufacturing, education, and research, all the way to the 24-inch wide-screen for high-end visualization, Sun's complete line of color monitors provides high refresh rates, high resolution, and flicker-free screens to put a customer's work in the best light.

Highlights

- The new 21-inch and 24-inch color monitors utilize flat display (FD), aperture grill (AG), and Trinitron technologies to provide high-quality CRTs for Sun's customers.
- The new 18.1-inch LCD flat-panel display includes a DVI-I input connector supporting both DVI-D and DVI-A (13W3) video inputs as well as an HD15 video input connector.
- Default high resolution and high refresh rates provide a high-quality image that is always centered and sized correctly.
- All of Sun's monitors meet the power-saving guidelines set by VESA, Energy Star, and NUTEK.
- All color monitors are evaluated and tested for optimal screen performance with Sun workstations' graphics capabilities.
- Color monitors and systems are tested together for world-wide safety and regulatory compliance.
- The complete line of high-quality color monitors is supported by Sun Enterprise Services division.

Compatibility

Sun monitors are designed to be fully backward- and forward-compatible with all Sun legacy, current, and future workstations and servers; frame buffer boards such as TurboGX Plus™ graphics, Sun Creator3D series, Sun Elite3D series, and Sun Expert3D graphics; as well as Sun's thin-client products, such as Sun Ray™ appliances.

These monitors are also compatible with Microsoft Windows NT and Microsoft Windows 98/95 systems.

Sun Monitor Overview

Feature	17-inch FST Color Monitor	21-inch Flat-Screen Trinitron CRT Color Monitor	24-inch Wide-Screen Trinitron CRT Color Monitor	18.1-inch Flat-Panel TFT LCD Color Monitor
Screen Size (actual viewing area)	17-inch CRT (15.7-in. viewing area)	21-inch CRT (19.8-in. viewing area)	24-inch CRT (22.5-in. viewing area)	Actual 18.1-inch viewing area (equivalent to 20-inch CRT monitor)
Dot Pitch	0.28 mm	0.24 mm (aperture grille)	0.23 mm(center) - 0.27(corner)	0.28 mm pixel pitch
Resolution (at high refresh rates)	Up to 1152 x 900	Up to 1600 x 1200 or Up to 2048 x 1536 (with special third-party frame buffers)	Up to 1920 x 1200 (16:10 aspect ratio)	1280 x 1024 (5:4 aspect ratio)
Video Input Connector	2-meter captive HD15-pin video input cable	2-meter captive 13W3 video signal cable and HD15-pin video input connector	2-meter captive 13W3 video signal cable and HD15-pin video input connector	DVI-I and HD15 video connectors DVI-D to DVI-D, DVI-Ato13W3 and HD-15 to HD15 cables included
Viewing Angle (10:1 contrast ratio)				+/-80°
Weight	16.5 kg (36.4 lb.)	31.5 kg (79.5 lb.)	42 kg (92.6 lb.)	8.75 kg (19.3lb.) (display and base)
Dimensions	Height: 421 mm Width: 420 mm Depth: 425 mm	Height: 508 mm Width: 501 mm Depth: 505 mm	Height: 500 mm Width: 571.5 mm Depth: 522.5 mm	Height: 460 mm (stand and screen panel) Width: 450 mm Depth: 219 mm
Power Consumption	< 90W	< 135W	< 170W (with no USB devices connected)	< 40W

CRT Technologies: Shadow Mask and Aperture Grille

There are fundamentally two types of masking systems for CRTs on the market today: shadow mask and aperture grille.

- Shadow mask technology is essentially a thin metal plate with holes punched throughout its surface. The electronic beam must focus through these small holes on the mask surface to strike the phosphor.
- Aperture grille consists of a series of unbroken vertical strips that are stretched from top to bottom of the CRT, with two fine damper wires that function as horizontal cross members.

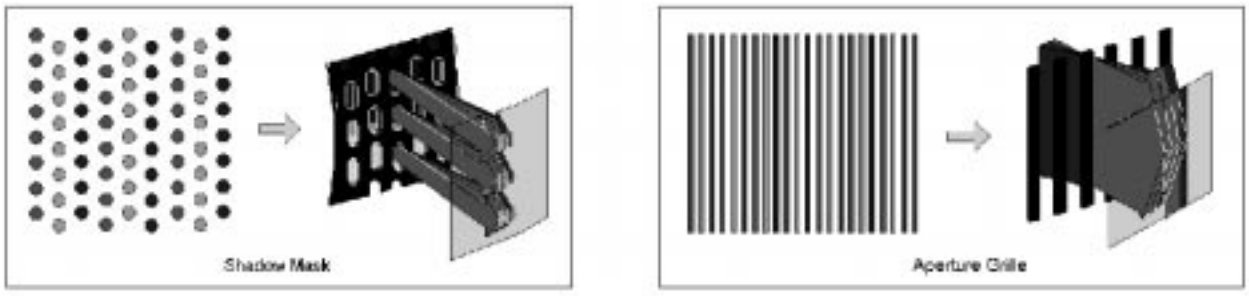

Figure 1. Design differences between shadow mask and aperture grille technologies

The aperture grille design creates a larger phosphor surface area for the electron beam to strike. The result is a brighter picture with richer, crisper colors. Other advantages of the aperture grille include resistance to moire patterns (a rainbow-like pattern of conflicting colors on the CRT's image) and doming (warping that is caused when black text appears within a white background).

CRT Technologies: Flat Display

The following technologies are part of the flat display CRT design:

- **The CRT combines both flatter screens** and **shorter measurement** from front to back. The outer curvature on the 21-inch models is 50,000 mm compared to the 2,000-mm curvature of a conventional Trinitron CRT.
- **The flat glass panel** uses advanced glass technology for the structural rigidity a flat screen requires, and is designed to minimize glare. The fine-pitch aperture grille uses higher tension and thicker support members, which help focus the electrons for enhanced detail. The high-focus electron gun creates more accurate image reproduction by improving corner-to-corner focus by 20 percent compared to Sun's previous 20- and 21-inch premium color monitors. The high-precision deflection yoke keeps the electron beam spot consistent in size and shape, resulting in excellent image clarity from side-to-side and from top-to-bottom.

17-inch Sun Color Monitor

Figure 2. Sun's 17-inch monitor

Overview

Appropriate for most business and simple graphic design applications, the 17-inch flat-screen tube/shadow mask (FST) CRT color monitor provides an actual 15.7-inch viewing area and supports resolutions up to 1152 x 900 at 66-Hz and 76-Hz refresh rates.

Specifications

Feature	Specification
Screen Size	17-inch flat-screen CRT
Viewable Area	15.7 inches
Dot Pitch	0.28 mm
Resolution (at high refresh rates)	Up to 1152 x 900
Video Input Connector	Captive 2-meter HD15-pin video input cable
Weight	16.5 kg (36.4 lb.)
Dimensions	Height: 421 mm Width: 420 mm Depth: 425 mm
Power Consumption	80W (average)
Image Brightness	100 cd/m2 for peak white, measured at the center of the screen.

Target Markets

The 17-inch Sun™ monitor is a low-cost monitor for those situations that do not require large amounts of desktop real estate. This monitor is often purchased with Sun servers and the Sun Blade™ 100 workstation

21-inch Flat-Display AG Trinitron Color Monitor

Figure 3. Sun’s 21-inch monitor

Overview

This virtually flat-screen Trinitron CRT monitor with a 19.8-inch viewing area delivers sharp, detailed color images consistently across the entire screen — even in the corners. With a broad horizontal scan rate of 121 kHz, it supports any VESA ultra-high resolutions and high stereoscopic video timing of 1280 x 1024 at 112 Hz refresh rate. The multiscan capability allows the monitor to display a wide range of resolutions up to 2048 x 1536 if a customer uses it with special third-party frame buffers and systems that support this resolution.

Sun's 21-inch flat-screen Trinitron display offers demanding graphic professionals outstanding performance and value. This model offers significant advancements in flat screen CRT design, maximizing picture quality while minimizing valuable desktop real estate. A flatter CRT design also translates into reduced geometric distortion and glare, making it easier on the eyes to work in front of these displays. This is a a priority for Sun's information users who spend hours in front of a screen.

New Features

Sun is introducing a new 21-inch CRT monitor (X7146A), which replaces the current 21-inch CRT monitor (X7136A). This new monitor meets or exceeds all the previous monitor's specifications and supports a higher default resolution of 1600 x 1200 @ 75 Hz providing 1.9 million pixels of data.

Target Markets

This 21-inch FD Trinitron monitor is ideal for a multitude of users. The flat CRT design is designed to maximize image quality while reducing geometric distortion and glare, thus reducing eye fatigue, a priority for many of today's information workers. At the same time, its high resolution capabilities make it suitable for high-density graphics and the CAD/CAM professional audience. This monitor is also a good fit for challenging desktop publishing, digital imaging applications, and standard business graphics.

Specifications

Feature	Specification
Screen Size (actual viewing area)	21-inch CRT (measured diagonally)
Viewing Area	19.8-inch
Dot Pitch	0.24 mm (aperture grille)
Resolution (at high refresh rates)	Up to 1600 x 1200 (recommended) Up to 2048 x 1536 (with special third-party frame buffers)
Video Input Connector	2-meter captive 13W3 video cable and HD15-pin video input connector
Weight	31.5 kg (79.5 lb.)
Dimensions	Height: 508 mm (20 in.) Width: 501 mm (19.75 in.) Depth: 505 mm (20 in.)
Power Consumption	Approx. 135W
Horizontal Scan	30 to 130 kHz
Brightness	100 to 120 cd/m2
CRT	90-degree deflection FD Trinitron
Input Signal Levels	Video signal analog RGB: 0.700 Vp-p (positive), 75 Ohms SYNC signal H/V separate or composite sync: TTL 2.2 k, polarity-free sync on green: 0.3 Vp-p (negative)
Standard Image Area	Approx. 388 x 291 mm (w/h) (15 3 /8 x 11 1 /2 inches) or Approx. 364 x 291 mm (w/h) (14 3 /8 x 11 1 /2 inches)
Deflection Frequency [1]	Horizontal: 30 to 130 kHz Vertical: 48 to 170 Hz
AC Input Voltage/Current	100 to 240V, 50 to 60 Hz, 2.0 to 1.0 A
Operating Temperature	10°C to 40°C
Plug and Play	DDC2B/DDC2Bi, GTF [2]

Notes:

1. Recommended horizontal and vertical timing condition
   - Horizontal sync width duty should be more than 4.8 percent of total horizontal time or 0.8 msec., whichever is larger.
   - Horizontal blanking width should be more than 2.3 msec.
   - Vertical blanking width should be more than 450 msec.
2. If the input signal is generalized timing formula (GTF) compliant, the GTF feature of the monitor automatically provides an optimal image for the screen.

Features

Sun's 21-inch monitors with Sony's latest Trinitron flat-screen technology provide advanced features and deliver outstanding image performance. Features include a significantly flatter screen surface than previous Sun monitors, high-contrast picture performance, and high resolution rates. Flat-screen Trinitron technology helps deliver a picture that is natural, detailed, and consistent, with colors that are bright, purer, and more accurate.

Why is a flat image so important? A flat display give the user optically accurate linearity. Lines in any direction appear perfectly straight. In addition, a flat display eliminates shape distortion.

The tube itself is not actually flat, but has the standard horizontal curve that all aperture grille monitors have. However, a layer of glass — essentially a lens — is added to the curved surface to optically correct the picture for a flat screen. Then a flat layer of glass is added. The result is a completely flat screen that, at first glance, appears almost concave. The other effect of having several extra layers of glass is an almost stereoscopic sense of depth to any image.

Additional features include:

- Horizontal radius of 50,000 mm
- Digital color restoration
- TCO 99 compliance

24-inch Wide-Screen FD AG Trinitron Color Monitor

Figure 4. Sun's 24-inch monitor

Overview

As a digital multiscanning FD Trinitron wide-screen color monitor with an actual 22.5-inch viewing area (30 percent more screen real estate than 20-inch monitors), the 24-inch wide-screen provides a 16:10 aspect ratio, a vertically flat screen that supports up to 1920 x 1200 at 70 Hz refresh rate, and two full-page display capability.

Target Markets

Because of the complexity of information being displayed, many technical and corporate computing users require high image quality and large screen sizes on the desktop. This flat-screen Trinitron technology delivers a flat screen with excellent image quality, sharp text, and color uniformity across the entire display area, which can dramatically improve the user's experience. The flat screen also helps minimize distortion and reduce reflective glare, for increased user comfort.

These flat-screen Trinitron monitors are specifically targeted for graphic professionals, CAD users, and corporate professionals who require high-quality video display and additional screen real estate. It is ideal for the GIS/mapping, geological engineering, medical imaging, and publishing markets.

Specifications

Feature	Specification
Screen Size	24-inch CRT (measured diagonally)
Viewable Area	22.5 inches
Dot Pitch	0.23 mm(center) to 0.27 mm(corner) (aperture grille)
Resolution (at high refresh rates)	Up to 1920 x 1200 (16:10 aspect ratio); recommended
Video Input Connector	2-meter captive 13W3 video input cable and HD15-pin video input connector

Feature	Specification
Weight	42 kg (92.6 lb.)
Dimensions	Height: 500 mm (19.75 in.) Width: 571.5 mm (22.5 in.) Depth: 522.5 mm (20.625 in.)
Power Consumption	Approx. 170W (with no USB devices connected)
CRT	90-degree deflection FD Trinitron
Input Signal Levels	Video signal = Analog RGB: 0.700 Vp-p (positive), 75 Ohms SYNC signal = H/V separate or composite sync: TTL 2.2 kW, polarity-free sync on green: 0.3 Vp-p (negative)
Standard Image Area (width x height)	16:10 = Approx. 474 x 296 mm (18.75 x 11.75 inches) 4:3 = Approx. 395 x 296 mm (15.625 x 11.75 inches) 5:4 = Approx. 370 x 296 mm (14.625 x 11.75 inches)
Deflection Frequency [1]	Horizontal: 30 to 121 kHz Vertical: 48 to 160 Hz
AC input Voltage/Current	100 to 240V, 50/60 Hz, 2.2 to 1.2 A
Operating Temperature	10 to 40°C
Plug and Play	DDC1/DDC2B/DDC2Bi, GTF [2]

Notes:

1. Recommended horizontal and vertical timing condition
   - Horizontal sync width duty should be more than 4.8 percent of total horizontal time or 0.8 msec., whichever is larger.
   - Horizontal blanking width should be more than 2.3 msec.
   - Vertical blanking width should be more than 450 msec.
2. If the input signal is generalized timing formula (GTF) compliant, the GTF feature of the monitor automatically provides an optimal image for the screen.

Features

The Sun 24-inch wide-screen FD Trinitron color monitor is a high resolution display with digital multiscanning capabilities. The monitor features front panel controls, a 4-port USB hub, a VESA DDC interface, power management, and tilt swivel capabilities.

18.1-inch TFT LCD Digital Monitor

Figure 5. Sun's 18-inch flat-panel monitor

Overview

The Sun flat-panel, thin-film-transistor (TFT) LCD provides customers with a full 18.1-inch viewing area, true 24-bit color with no dithering, a 80-degree wide-viewing angle with adjustable tilt, a space-saving small footprint profile, dual video inputs, and low power consumption. It is the perfect flat-panel display for financial, medical, manufacturing, education, research, and transportation markets.

New Features

Sun is introducing a new 18.1-inch flat-panel display, part number X7137A. This new display is a complete replacement for the current model (X7127A) which is discontinued.

The new monitor meets or exceeds all the previous monitor's specifications and provides the addition of a digital DVI interface. It also provides higher luminance, more saturated colors, faster response time, and lower power consumption.

Target Markets

Flat-panel technology is appealing to an increasing number of Sun's typical customers. The 18-inch flat-panel's slim, lightweight design is ideal for customers with space and weight constraints. Customers with space efficiency, weight, or power concerns may be interested in using flat-panel alternatives to traditional CRT monitors. Some examples include military, trading floor and financial, and publishing applications, as well as corporate visit centers, and hospitals and radiology clinics

Technical market users include those in software engineering, MCAE/MCAD, EDA, scientific research, R&D, animation, geoscience and geo-engineering, simulation, defense, measurement and control, industrial process analysis, biological and chemical engineering, and imaging.

Specifications

Feature	Specification
Screen Size	Actual 18.1-inch viewing area (equivalent to 20-inch CRT monitor)
Dot Pitch	0.28 mm pixel pitch
Resolution (at high refresh rates)	1280 x 1024 @ 60 Hz (preferred), @ 76 Hz supported (5:4 aspect ratio)
Video Input Connector	DVI-D and HD15-pin video input connectors
Viewing Angle	Vertical: +/-80° Horizontal: +/-80°
Weight	8.75 kg (19.3 lb.) (display and base)
Dimensions	Height: 460 mm (stand and screen panel) (18.1 in.) Width: 450 mm (17.7 in.) Depth: 219 mm (8.6 in.)
Power Consumption	40W (maximum) 36W (nominal)
Synchronization	Horizontal: 31 to 80 kHz (automatic) Vertical: 56 to 76 Hz (automatic)
Power Adapter	AC 90 to 264 Volt ± 10%, 60 Hz/50 Hz ± 3 Hz
Brightness	220 cd/m2 (minimum)
Display Colors	16.7 million (24-bit true color, no dithering) ~ 256 levels of gray scale
Pixel Response Time	35 ms
Contrast Ratio	400:1 (minimum full screen)
Input Signal, Terminated	Input signal, terminated analog video 0.714 Vpp positive at 75 Ohm Separate sync, composite, and digital video VESA T.M.D.S. (Panel Link)
Maximum Pixel Clock	135 MHz
Environmental Specifications	**Temperature** • Operating temperature: 5°C to 40°C (41°F to 104°F) • Storage temperature: -20°C to 60°C (-4°F to 140°F) **Humidity** • Operating humidity: 20 to 80% non-condensing • Storage humidity: 5 to 95% non-condensing **Altitude** • Operating altitude: 3 km maximum
Mounting Options	Desktop: Tilt adjustment Optional: Wall mount (compatible with VESA 4-hole mechanical mounting standard)

Features

Sun's 18-inch flat-panel color monitor has the following features which make this an attractive alternative to traditional desktop CRT monitors:

- Thin-film-transistor (TFT) liquid-crystal display (LCD) technology
- True 24-bit, 256 gray scale levels, 16.7 million colors
- High-quality digital video interface (DVI)
- Exceptional picture quality, with perfect focus in all parts of the screen without geometric distortion
- Fast response time of 35 milliseconds for displaying video and rapidly changing data images, enabling smooth animation and video streaming without ghosting or other artifacts
- Viewing at wide angles, providing a consistent, uniform display in all directions even with head movement
- High contrast ratio providing excellent readability even in environments with high levels of ambient lighting
- Low power consumption for high energy efficiency
- No magnetic field generation or susceptibility, enabling its use in environments where there are strong magnetic fields
- Security lock slot
- Compatibility with the VESA 100-mm mechanical mounting standard, allowing third party interface kits to be used for wall-mounting, rack-mounting, and so on. The display stand is easily removable to accommodate other mounting alternatives.
- Customers may purchase the mounting solutions directly from Ergotron, Inc. Their contact information is as follows:

  Ergotron, Inc., 181 Trapp Road, St. Paul, MN 55112, USA; Phone: (800) 888-8458 or (612) 681-7600; FAX: (612) 6817715; web site: `http://www.ergotron.com`

LCD Technology Overview

Liquid-crystal displays (LCDs) have the highest momentum. A well-established technology, LCDs are produced in large volumes and are prominent in the computer laptop market. One reason LCD technology has assumed a leadership role in the laptop market is its low power requirements, which puts less demand on laptop battery life.

LCD panels consist of a layer of cells of liquid-crystal material, with an electrode driving structure on one or both sides.

There are two fundamental types of LCD panels — passive matrix (PM) and active matrix (AM) — terms that refer to the type of addressing used to activate each pixel. With passive-matrix displays, rows and columns of electrodes surround the liquid-crystal layer. To display an image, voltage is applied to each row, and the corresponding column driver activates the appropriate pixel locations in the row. Because the voltage degrades as a function of distance across the row, passive-matrix LCDs (PM LCDs) can often suffer from performance variations, especially with larger screen sizes. The most common PM LCDs, used in everyday items like phones or calculators, are twisted-nematic LCDs (TN-LCDs). The name refers to a characteristic of the liquid crystal (nematic), and how the polarized light twists 90 degrees within the liquid-crystal material. In super-twisted nematic LCDs (STN-LCDs), the amount of twist is more pronounced, usually 180 to 270 degrees, resulting in a higher contrast ratio.

With active-matrix LCDs (AM-LCDs), an individual transistor acts as a switch for activating each pixel, providing a consistent voltage at every location. This results in uniform quality across the display, especially in comparison to PM LCDs. The most common AM LCDs use a type of transistor called a thin-film transistor, hence the acronym TFT-LCD.

LCDs are either reflective or transmissive devices — they either reflect ambient light from the environment, or a light mechanism is housed behind the display that transmits light through it. Transmissive LCDs — those which have "backlight" structures — result in bright, high-luminance displays. Sun's flat-panel monitor is transmissive, achieving a very bright, high luminance display through the use of a cold cathode fluorescent (CCFL) tube, which provides long life for the backlight assembly.

When compared to other flat-panel technologies, TFT-LCD display was chosen by Sun primarily because of its thin footprint, high-quality imaging, wide availability, and reasonable price point. In addition, TFT-LCD technology is very energy-efficient, consuming less power than many other types of flat-panels. Sun's flat-panel monitor offers high resolution (1280 x 1024) with a large viewing area similar to Sun's 21-inch color CRT monitor. In the desktop market, the momentum is clearly behind TFT-LCD technology — no other flat-panel technology provides a suitable alternative for large-screen desktop CRTs.

Flat-Panel Interfaces — Digital Versus Analog

Digital and analog interfaces offer distinct advantages for interfacing a monitor to a system.

The advantage of a digital interface is that the framebuffer does not need to convert the digital signal to analog before transmitting it to the display. With a digital interface, the signal remains digital through the entire transmission process, preventing a possible loss of integrity or distortion in the timing information.

Analog interfaces, on the other hand, offer a compatibility advantage. Since most desktop monitor interfaces are analog, an analog interface allows a flat-panel display to be easily interchanged with existing desktop monitors.

The 18.1-inch flat-panel monitor provides two input interfaces. The first is a DVI-I interface supporting both a digital (DVI-D) input and an analog (DVI-A) input, allowing backward compatibility with Sun’s standard 13W3. This monitor also has a HD-15 pin PC standard analog input connector. Cables are included to support all three interfaces.

Refresh Rates

The Sun flat-panel monitor uses advanced LCD technology which has no flicker in normal operation, and it is never influenced by the refresh rate. 60-Hz (or even lower) refresh rates have no flicker. When users run video at rates higher than 60 Hz, there is processing overhead. Pixels must be delivered to the display at faster clock rates and there is more dead time during the blanking interval, which is unnecessary for the LCD. These can cause a number of performance issues, included degraded image quality and greater tendency for EMI. The recommended vertical refresh rate for the Sun 18.1-inch flat-panel monitor is 1280 x 1024 @ 60 Hz. Use the Sun timing 1280 x 1024 @ 76 Hz only if the recommended rate is unavailable.

Ordering Information

Monitor X-Options

Order Number	Description
X7143A	**17-inch Entry Color Monitor, Standard Version** 17-inch entry color monitor, 15.7-inch diagonal viewable area; 0.28-mm dot pitch; 1152 x 900 @ 66/76 Hz; 1024 x 768 @ 60/77 Hz; 30 to 75 kHz; MPR-II; TCO'99; DDC1/2B; VESA DPMS; digital OSD; universal power supply; WW agency compliances
X7143A-O	**17-inch Entry Color Monitor, Logoless Version** 17-inch entry color monitor; 15.7-inch diagonal viewable area; 0.28-mm dot pitch; 1152 x 900 @ 66/76 Hz; 1024 x 768 @ 60/77 Hz; 30 to 75 kHz; MPR-II; TCO'99; DDC1/2B; VESA DPMS; digital OSD; universal power supply; WW agency compliances
X7137A	**18.1-inch TFT LCD Color Monitor, Standard Version** 18.1-inch TFT LCD color monitor (20-inch CRT equivalent); PVA wide viewing angle; 1280 x 1024 @ 60/76 Hz; analog RGB interface; digital DVI interface; DVI-D, 13W3, and HD15 video output cables; Sun ID enclosure; Sun logo and color; Digital OSD controls; TCO'99; VESA DPMS; universal power supply; WW agency compliances
X7146A	**21-inch Color Monitor, Standard Version** 21-inch color monitor, 19.8-inch viewing area; 0.24-mm dot pitch aperture grille; 30 to 130 kHz; WW agency compliance; 2-meter DB13W3 captive video cable and HD15-pin connector; Sun unique ID; logo and color TCO 99; 10-language users guide
X7146A-STH	**21-inch Color Monitor, Southern Hemisphere Version** 21-inch color monitor, 19.8-inch viewing area; 0.24-mm dot pitch aperture grille; 30 to 130 kHz; WW agency compliance; 2-meter DB13W3 captive video cable and HD15-pin connector; Sun unique ID; logo and color TCO 99; 10-language users guide
X7145A	**24-inch FD Trinitron Monitor, Standard Version** 24-inch FD Trinitron monitor 22.5-inch viewing area.; 0.23-0.27-mm variable dot pitch aperture grille; 30-121 kHz; 2-meter DB13W3 captive video cable and HD15-pin connector; Sun unique ID; logo and color; WW agency compliance; TCO 99; 10-language users guide
X7145A-O	**24-inch FD Trinitron Monitor, Logoless Version** 24-inch FD Trinitron monitor, 22.5-inch viewing area; 0.23-0.27-mm variable dot pitch aperture grille; 30-121 kHz; 2-meter DB13W3 captive video cable and HD15-pin connector; Sun unique ID; logo and color; WW agency compliance; TCO 99; 10-language users guide

Note: Sun has discontinued the logoless version of the 21-inch monitor, and plans to meet logoless market needs with a co-logo strategy. Sun plans to make an additional announcement about this program in the future.

Graphics Accelerator Support

The following table shows which monitor options are supported with which graphics accelerators and options. Note that not all monitors support all resolutions supported by each graphics option.

Graphics Board	Monitors			
	17-inch Entry	18.1-inch Flat-Panel	21-inch Flat-Screen	24-inch
Sun PGX64 (X3668A)	X	X	X	X[1]
Sun Creator3D, series 3 (X3670A)	X[2]	X	X	X[3]
Sun Elite3D m6 (X3679A)	X[2]	X	X	
Sun Expert3D (X3678A)	X[2]	X	X	X
Sun Expert3D-Lite (X3684A)	X	X	X	X[4]

Notes:

1. Maximum resolution of 1600 x 1000 @ 76 Hz, single-buffered 8-bit color mode, preferably for desktop publishing, windowing and text based applications.
2. Requires X3872A video connector adapter, HD15 to 13W3M.
3. Maximum resolution of 1900 x 1200 @ 70 Hz single-buffered, 24-bit mode, preferably where very high image resolution and color quality is required.
4. Maximum resolution of 1600 x 1000 @ 76 Hz single, double or Z-buffered, 24-bit mode.

Video Connector Adapter

Adapter	Option Number	Monitors			
		17-inch Entry	18.1-inch TFT LCD Color	21-inch Flat-Screen Color	24-inch Color
Video Connector Adapter, HD15F to 13W3M	X3872A	X[1]			
Video Connector Adapter, 13W3F to HD15M	X471A		X[2]	X[2]	X[2]

Notes:

1. Ultra™ SBus-based systems with either S24, TurboGX™, or TurboGXplus™ graphics require video connector adapter (HD15F to 13W3M) when the 17-inch entry monitor.
2. Video cable adapter (X471A) required only when using motherboard built in video (PGX™ based) HD-15 connector on the Ultra 5 and Ultra 10 systems, and PGX32™ graphics card.

Warranty

- The 18-inch flat-panel monitor comes with a 1-year warranty on parts, labor, and backlight
- Sun's 17-inch, 21-inch, and 24-in ch monitors come with a standard 15-month warranty.

Regulatory Compliance

These standards help provide a safe product and also meet global regulatory compliance for monitors.

Regulation	Description	17-inch CRT	21-inch CRT	24-inch CRT	18.1-inch Flat Panel
UL 1950	Standard for Safety: Information Technology Equipment Including Electrical Business Equipment	X	X	X	X
CSA C22.2, No. 950	Standard for Safety: Information Technology Equipment Including Electrical Business Equipment	X	X	X	X
IEC 417	Graphic Symbols for use on Equipment. Covered by EN60950.	X	X	X	X
EN 60950	Safety of Information Technology Equipment Including Electrical Business Equipment (Including Nordic Deviations)	X	X	X	X
EMKO-TSE (74-SEC) 20/977 D/F/N/S	Nordic deviations to EN60950 or Demko, Fimko, Nemko, Semko	X	X	X	
CB Scheme	Report to IEC950 and Nordic deviations	X	X	X	X
ZH1/618	German Ergonomic Regulations for Video Display Workstations	X	X	X	X
EN 29241-3, -7, -8 ISO9241-3, -7, -8	Visual Display Terminals (VDTs) Used for Office Tasks - Ergonomic Requirements - Part 3: Visual Displays, Part 7: Reflections, Part 8: Color Visual Displays	X	X	X	X
ANSI/HFS 100-1988	American National Standard for Human Factors Engineering of Visual Display Terminal Workstations; covered by ISO9241-3	X	X	X	X
DHHS Rule21, Subchapter J	X-Ray Emissions, USA	X	X	X	X
PTB	German X-Ray Decree	X	X	X	X
GOST-R	Russian - EMI regulations; PCT mark	X	X	X	X
Korea , K-Mark. Jeon	Korean Safety and EMC	X	X	X	X
CCIB	China -Safety EMI regulations	X	X	X	X
DNHW	Canada - X-Ray		X		X
EMI/EMC Regulation					
EN55022 class B (CISPR 22 class B)	Specification for Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment; EMI regulation for CE mark, Europe	X	X	X	X
EN60555-2/EN61000-3-2	Power harmonics, Europe	X	X	X	X
FCC Part 15, Subpart B	Rules for computing devices, USA	X	X	X	X
CSA C108.8 class B	EMI Rules for Computing Devices, Canada (Covered by ICES-003)	X	X	X	X

Regulation	Description	17-inch CRT	21-inch CRT	24-inch CRT	18.1-inch Flat Panel
VCCI Class 2 VCCI Class B	Japanese Regulations for Voluntary Control of Interference	X	X	X	X
BCIQ Class B CNS-13438	Taiwan - EMI regulations Taiwan (BCIQ standard based on CISPR)	X			
BMSI	Taiwan EMC		X	X	X
C-Tick class B AS 3548	Australia - EMI regulations Australia Regulations for Control of Interference	X	X	X	X
GOST-R	Russian - EMI regulations; PCT mark	X	X	X	X
RRL	Korea EMC			X	X
EN61000-3-2	Power Harmonics, Europe (01/01/2001)		X	X	X
EN61000-3-3	Voltage Fluctuations (01/01/2001)		X	X	X
Electrical/Immunity					
IEC	IEC1000-4-2 Electrostatic discharge (ESD) IEC1000-4-3 Radiated electromagnetic field IEC1000-4-4 Electrical fast transient IEC1000-4-5 Surge	X	X	X	X
MPR 1990:10 (MPR/TCO)	MPRII, TCO'99	X	X	X	X

Power Saving Function

All of Sun's current monitors meet the power-saving guidelines set by VESA, Energy Star, and NUTEK. If the monitor is connected to a computer or video graphics board that is display power management signaling (DPMS) compliant, the monitor automatically reduces power consumption.

Glossary

Active-matrix LCD	Fundamental type of LCD display. With active-matrix LCDs, each cell is activated individually by a transistor.
Backlight	In transmissive LCDs, a light mechanism is housed behind the display and used to transmit light through it, resulting in a high-luminance display.
CRT	Cathode ray tube. Technology used most commonly for desktop displays. Color CRTs contain a large vacuum tube with three electron guns that scan the image onto the screen's phosphor layer.
Contrast ratio	The range between white and black reproduction, measured according to the VESA Flat-Panel Display Measurements (FPDM) standard.
Coplanar electrodes	A technology used in Sun's flat-panel monitor that improves viewing angles.
EL	Electroluminescent display. A type of flat-panel display technology. ELs contain a phosphor layer surrounded by two layers of electrodes that are driven in a matrix fashion
FED	Field emission display. A type of flat-panel display technology. FEDs use a very thin vacuum tube and many tiny emitters to activate phosphor locations.
LCD	Liquid-crystal display. The highest volume flat-panel display technology. LCDs consist of liquid-crystal material surrounded on one or both sides by an electrode driving structure and polarizing layers.
Luminance	Often called brightness, measured in candelas per square meter as defined by the VESA Flat-Panel Display Measurements (FPDM) standard.
Passive-matrix LCDs	Fundamental type of LCD display. With passive-matrix LCDs, voltage is applied to each row, and the corresponding column driver activates the electrodes at the appropriate locations.
Pixel pitch	The space between pixels.
PDP	Plasma display panel. A type of flat-panel display technology. PDPs contain gas that fluoresces in response to an electric charge.
Reflective display device	Device which reflects ambient light from the environment rather than producing or transmitting light (see transmissive display device).
Refresh rate	The rate at which the full screen is updated.
Response time	How fast a pixel can turn on and then off, as defined by the VESA Flat-Panel Display Measurements (FPDM) standard.
Screen size	The size of the display, measured along the diagonal according to the VESA Flat-Panel Display Measurements (FPDM) standard.
Security lock slot	Feature which enables theft protection. Also known as a "Kensington" security lock slot.

STN-LCD	Super twisted-nematic liquid-crystal display. Type of passive-matrix LCD.
TFT-LCD	Thin-film-transistor liquid-crystal display. The most common active-matrix LCDs, particularly for high-end laptop and desktop monitors. TFT-LCDs use a matrix of transistors to activate individual cells of liquid-crystal material.
Transmissive	Device that transmits light. Transmissive include a backlight structure for this purpose.
TN-LCD	Twisted-nematic liquid-crystal display. Type of passive-matrix LCD.
VESA	Video Electronic Standards Association. VESA is an organization devoted to developing display and display interface standards. There are three VESA standards that are particularly relevant to the discussion of Sun's flat-panel monitor.

Materials Abstract

All materials are available on SunWIN except where noted otherwise.

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
Product Literature				
– *Sun™ Monitors, Just The Facts*	Reference Guide (this document)	Sales Tool Training	SunWIN, Reseller Web	111780
– *Flat-Panel Data Sheet*	Data Sheet	Sales Tool	SunWIN, Reseller Web	95570
– *Literature - Sun Monitor Product Family Brochure*	Brochure	Sales Tool	SunWIN, Reseller Web	95571
External Web Site				
– *Monitor Information Site*	`http://www.sun.com/products-n-solutions/hw/peripherals/monitors.html`			