Sun™ Monitors

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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 monitors are designed to provide complete compatibility, compliance, and excellent screen performance with the full line of Sun workstations. From the 17-inch monitor 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 24.1-inch LCD monitor 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 sleek, new 24.1-inch LCD monitor combines state-of-the-art LCD technology and 1920 x 1200 (WUXGA) resolution driven by a high quality digital interface to provide one of the highest quality flat-panel monitors available today for the high-end graphics markets.
- The 21-inch color monitor utilizes flat display (FD), aperture grill (AG), and Trinitron technologies to provide a high-quality CRT for Sun's customers.
- The 18.1-inch LCD flat-panel display is a 1280 x 1024 (SXGA) resolution product with a high-quality DVI interface (supporting both digital DVI-D and analog 13W3) as well as an HD15 (VGA) connector for PC compatibility.
- 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 Sun 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 Sun legacy, current, and future workstations and servers wherever possible; frame buffer boards such as TurboGX Plus™ graphics, Sun Creator3D series, Sun Elite3D series, Sun Expert3D graphics, and Sun XVR-1000 graphics; as well as Sun's thin-client products, such as Sun Ray™ appliances.

These monitors are also compatible with Microsoft Windows 2000, NT and Windows 98/95 systems as well Apple Macintosh MacOS 9.x and 10.x systems .

Sun Monitor Overview

Feature	17-inch FST Color Monitor	21-inch Flat-Screen Trinitron CRT Color Monitor	18.1-inch Flat-Panel TFT LCD Color Monitor	24-inch Flat-Panel TFT LCD Color Monitor
Screen Size	17-inch (15.7-inch viewing area)	21-inch (19.8-inch viewing area)	18.1-inch, actual image size (equivalent to 20-inch CRT monitor)	24.1-inch, actual image size (equivalent to 27.5-inch CRT monitor)
Dot Pitch	0.28 mm	0.24 mm (aperture grille)	0.28 mm pixel pitch	0.27 mm pixel pitch
Resolution	Up to 1152 x 900	Up to 1600 x 1200	1280 x 1024 @ 60 Hz (5:4 aspect ratio)	1920 x 1200 @ 60 Hz (16:10 aspect ratio)
Video Input Connectors	HD15 on a 2-meter captive video input cable	13W3 on a 2-meter captive video input cable, HD15	DVI-I and HD15	DVI-D, 13W3, S-video and C-video
Detachable Cables	none	none	DVI-D to DVI-D, DVI-A to 13W3 and HD15 to HD15	DVI-D to DVI-D, 13W3 to 13W13, 13W3 to HD15, S-video, C-video, and upstream USB
Viewing Angle			+/-80°	+/-80°
Weight	16.5 kg (36.4 lb.)	31.5 kg (79.5 lb.)	8.75 kg (19.3 lb.) (display and base)	13.4 kg (29.5 lb.) (display and base)
Dimensions	Height: 421 mm Width: 420 mm Depth: 425 mm	Height: 508 mm Width: 501 mm Depth: 505 mm	Height: 460 mm (stand and screen panel) Width: 450 mm Depth: 219 mm	Height: 468-518 mm (stand and screen panel) Width: 588 mm Depth: 277 mm
Power Consumption	< 90W	< 135W	< 40W	< 95W (includes 10W for USB hub)

17-inch Sun Color Monitor

Figure 1. 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	HD15 on a captive 2-meter 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/m^2

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 2. 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 131 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 priority for Sun's information users who spend hours in front of a screen.

New Features

Sun has introduced a new 21-inch CRT monitor (X7146A), which replaces the previous 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	21-inch CRT (measured diagonally)
Viewable 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 Connectors	13W3 on a 2-meter captive video cable HD15
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 131 kHz
Brightness	100 to 120 cd/m^2
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)
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 131 kHz Vertical: 48 to 170 Hz
AC Input Voltage/Current	100 to 240V, 50/60Hz, 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 monitor with Sony's latest Trinitron flat-screen technology provides advanced features and delivers 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

18.1-inch TFT-LCD Digital Monitor

Figure 3. Sun's 18-inch flat-panel monitor

Overview

The Sun™ 18.1-inch Digital LCD monitor provides customers with a full 18.1-inch actual image area, 24-bit color, an 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 introduced a new 18.1-inch digital LCD monitor, part number X7137A in November 2001. This display is a complete replacement for the discontinued part number X7127A.

The new monitor meets or exceeds all the previous monitor's specifications and provides the addition of a DVI interface, supporting both digital and analog inputs. 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 18.1-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, hospitals, and radiology clinics

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

Specifications

Feature	Specification
Screen Size	18.1-inch, actual image size (equivalent to 20-inch CRT monitor)
Dot Pitch	0.28 mm pixel pitch
Resolution	1280 x 1024 @ 60 Hz (preferred), @ 76 Hz supported (5:4 aspect ratio)
Video Input Connectors	DVI-I and HD15
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)
Brightness	220 cd/m^2 (minimum)
Display Colors	8-bit/pixel RGB, 24-bit color, 16.7 million colors 256 levels of gray scale
Pixel Response Time	35 ms
Contrast Ratio	400:1 (typical)
Synchronization	Horizontal: 31 to 80 kHz (automatic) Vertical: 56 to 76 Hz (automatic)
Input Signal, Terminated	Analog video 0.714 Vp-p @ 75 Ohms Separate and composite sync Digital video T.M.D.S. (PanelLink™)
Maximum Pixel Clock	135 MHz
Power Adapter	AC 90 to 264 Volt ± 10%, 60 Hz/50 Hz ± 3 Hz
Environmental Specifications	**Temperature** • Operating temperature: 5°C to 40°C (41°F to 104°F) • Non-Operating temperature: -20°C to 60°C (-4°F to 140°F) **Humidity** • Operating humidity: 20 to 80% non-condensing • Non-Operating humidity: 5 to 95% non-condensing **Altitude** • Operating altitude: 3 km maximum
Mounting Options	Desktop: Tilt adjustment with enclosed stand Optional: Variable types of mounting available with the use of third party mechanical mounting products including wall mount options (compatible with VESA 4-hole mechanical mounting standard)

Features

Sun's 18-inch flat-panel color monitor has the following features, making this an attractive alternative to traditional 19- and 21-inch desktop CRT monitors:

- Advanced PVA LCD technology providing users with:
  - 24-bit color, 256 gray scale levels, 16.7 million colors
  - Exceptional picture quality, with perfect focus in all parts of the screen without geometric distortion
  - High contrast ratio providing excellent readability even in environments with high levels of ambient lighting
  - Viewing at wide angles, providing a consistent, uniform display in all directions even with head movement
  - 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
- High-quality computer interface, digital video interface (DVI), supporting both digital and analog inputs
- Low power consumption for high energy efficiency(~70 percent less than comparable CRTs)
- No magnetic field generation or susceptibility, enabling its use in environments where there are strong magnetic fields
- Kensington 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`.

18.1-inch Flat-Panel Interfaces — Digital Versus Analog

Digital and analog interfaces offer distinct advantages for interfacing a monitor to a computer 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 connectors. The first is a DVI-I connector, supporting both a digital (DVI-D) input and an analog 13W3 input. The 13W3 interface provides backward compatibility with Sun's graphics framebuffers. This monitor also has a HD15 (VGA) standard analog input connector. Cables are included to support all three interfaces. The HD15 to HD15, DVI-D to DVI-D, and DVI-I to 13W3 cables are 2 meters +/-5 cm in finished length.

Image Quality, Resolution, and Refresh Rates

The primary or "native" resolution of the Sun 18.1-inch digital LCD monitor is 1280 x 1024. For best image quality, a flat-panel display's native resolution should be used. In cases where the graphics framebuffer is not capable of driving this resolution, a scaling processor scales lower resolution video input to either maximum screen width or to both maximum screen width and depth. The user selects which option in the on-screen menu (OSM).

Both of Sun's flat-panel monitors use advanced LCD technology which has no flicker in normal operation, and it is not 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. This can cause a number of performance issues, included degraded image quality and greater tendency for EMI. The recommended vertical refresh rate for Sun's 18.1-inch flat-panel monitor is 1280 x 1024 @ 60 Hz.

24-inch Flat-Panel TFT-LCD Digital Monitor

Figure 4. Sun's 24-inch monitor

Overview

The sleek new Sun™ 24.1-inch LCD monitor is a high-performance, high-resolution, large-area, full-color, active-matrix TFT liquid-crystal display (LCD) monitor optimized to show the full graphics capabilities of Sun Microsystems' workstations and servers. It combines state-of the-art LCD technology, a 16:10 aspect ratio, 1920 x 1200 pixel resolution, and +/- 80 degrees wide-viewing angle with adjustable tilt to provide one of the highest quality flat-panel monitors available today for the high-end graphics markets. Its two full-page display capability and picture-in-picture (PIP) feature make it a perfect display for the financial, manufacturing, research, publishing, and defense markets.

New Features

Sun is introducing an all new 24.1-inch LCD monitor, part number X7134A. This new display is a complete replacement for the current model, X7145A, a 24-inch wide-screen FD CRT, that will be discontinued.

The new 24.1-inch LCD monitor combines the high resolution and wide-screen display capability of the previous 24-inch CRT offering with all the advantages of LCD technology (less weight, smaller footprint, less power), support for four video inputs: DVI-D digital, 13W3 analog, S-video, and C-video, PIP, and a proposed VESA standard mechanical mount.

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-panel monitor delivers excellent image quality, sharp text, and color uniformity across the entire display area, which can dramatically improve the user's experience. The flat panel also helps minimize distortion and reduce reflective glare, for increased user comfort.

These flat-panel 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, and publishing markets.

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, and corporate visit centers.

Specifications

Feature	Specification
Screen Size	24.1-inch actual image size(equivalent to 27.5-inch CRT monitor)
Dot Pitch	0.27 mm pixel pitch
Active Area	Diagonal = 24.067 in. (611.3 mm) Horizontal = 518.4 mm (20.431 in.) Vertical = 324.0 mm (12.7756 in.)
Maximum Resolution	Digital/analog = 1920 x 1200
Video Input Connectors	DVI-D digital, 13W3 analog, S-video, and Composite NTSC or PAL video
Viewing Angle	Vertical: +/-80° typical Horizontal: +/-80° typical
Tilt Angle	-5 degrees (top of display forward) to about +30 degrees
Weight	Display head assembly = 10.23 kg (22.7 lb.) Stand assembly = 3.1kg (6.2 lb.) Total weight = 13.4 kg (29.9lb.)
Dimensions - Complete Assembly (including display head and base)	Height = 468 to 518 mm (18.43 to 20.4 in.) Width = 588 mm (23.15 in.) Depth = 277 mm (10.91 in.) Display head depth = 72.4 mm (2.85 in.)
Power Consumption	95W (maximum) 8W (5W for Display, 3W for USB, power saver mode)
Brightness	220 cd/m^2 (nominal)
Display Colors	8-bit/pixel RGB, 24-bit color, 16.7 million colors 256 levels of gray scale
Pixel Response Time	35 ms (min.), 20ms (typical)
Contrast Ratio	450:1
Synchronization	Horizontal = 31 kHz to 80 kHz (automatic) Vertical = 56 Hz to 76 Hz (automatic)
Input Signal	Analog video 0.7 Vp-p @ 75 Ohms Separate and composite sync Digital video T.M.D.S. (PanelLink™)
Maximum Pixel Clock	193 MHz (analog) 165 MHz (digital)
Power Adapter	AC 90 to 264 Volt, 60/50 Hz +/- 3 Hz DC 14 Volt/6 Amp

Feature	Specification
MTBF	Monitor assembly = 50,000 hours
Environmental Specifications	**Temperature** • Operating temperature: 0°C to 40°C (32°F to 104°F) • Non-operating temperature: -20°C to 60°C (-4°F to 140°F) **Humidity** • Operating humidity: 20 to 80% non-condensing • Non-operatiing humidity: 5 to 93% non-condensing **Altitude** • Operating altitude: 70 kPa maximum
Mounting Options	Desktop: Height and tilt adjustment Optional: Variable types of mounting available with the use of third party mechanical mounting products including wall mount options

Features

The Sun 24-inch LCD monitor combines the following features, making it an attractive display alternative for a wide range of users:

- Advanced PVA LCD technology providing users with:
  - 24-bit color, 256 gray scale levels, 16.7 million colors
  - Exceptional picture quality, with perfect focus in all parts of the screen without geometric distortion
  - High contrast ratio providing excellent readability even in environments with high levels of ambient lighting
  - Viewing at wide angles, providing a consistent, uniform display in all directions even with head movement
  - Fast response time of 30 milliseconds for displaying video and rapidly changing data images, enabling smooth animation and video streaming without ghosting or other artifacts
- Dual Interface, with four switchable input sources:
  - High-quality computer interface. Users can select from either a digital DVI-D or an analog 13W3 input source.
  - Consumer video interface. Users can select from S-video and C-video inputs for DVD, VCR, and other NTSC, PAL, and SECAM video infeeds. This feature is particularly useful to analysts dependent on news infeeds while working on their systems.
- Picture-in-picture (PIP) allows the secondary video source to be displayed in a smaller separate window in 400 x 300, 640 x 480, and 800 x 600 resolutions. Most users will select the computer input as the primary "picture" but the consumer interface selected can be switched to the larger image using the On-screen Menu (OSM).
- Picture-by-picture (PBP) allows the two separate video sources selected from each interface to be displayed side by side. This mode is selected in the on-screen menu (OSM) but is not available in PIP mode.
- Sun's double-hinged stand/mount allows customers to adjust the overall height from 468 to 518 mm, as well as tilt the display head for various viewing angles.

- VESA (proposed) 6-point standard mount — Once accepted, third-party interface kits can be used for wall-mounting, rack-mounting, and so on. The display stand is easily removable to accommodate other mounting alternatives.
- A four-port USB hub eases connection of USB peripheral such as keyboard and mice.
- A retractable camera mounting pad
- Easy to use on-screen menu (OSM)
- Low power consumption for high energy efficiency (~45 percent less than comparable CRTs)
- No magnetic field generation or susceptibility, allowing its use in environments where there are strong magnetic fields
- Cable management system
- Kensington security lock slot

24.1-inch Flat-Panel Interfaces — Digital Versus Analog

The 24-inch flat-panel monitor provides four input connectors. The high quality computer interface has two connectors. Both the digital (DVI-D) input and the analog (13W3) input support driving the display to it full 1920 x 1200 pixel resolution. The second interface supports consumer video with both S-video and C-video connectors. Cables are included to support all four interfaces as well as a 13W3 to HD15 pin cable for PC compatibility and an upstream USB cable. The 13W3 is 2 meters in finished length. The 13W3 to HD15 is 1.8 meters in finished length. The DVI-D to DVI-D cable is 3 meters finished length.

Image Quality, Resolution and Refresh Rates

The primary or "native" resolution of the Sun 24.1-inch digital LCD monitor is 1920 x 1200. A secondary resolution of 1920 x 1080 is provided (leaving 60 pixels blank across the top and bottom of the screen) to support graphics framebuffers with a 2 million pixel limit. For best image quality, a flat-panel display's native resolution should be used. In cases where the graphics framebuffer is not capable of driving the preferred resolution, the image will be displayed in the lower resolution, thus providing better image quality but not full screen size. This behavior is directly opposite of the Sun 18.1-inch digital LCD monitor. The picture below illustrates the 24.1-inch LCD monitor's behavior.

Figure 5. 24.1-inch monitor resolutions

Both of Sun's flat-panel monitors use advanced LCD technology which has no flicker and is not 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 video timing or "native" resolution for the Sun 24.1-inch flat-panel monitor is 1920 x 1200 @ 60 Hz with a secondary video timing of 1920 x 1080 @ 60 Hz (leaving 60 pixels blank

across the top and bottom of the monitor) to support graphics framebuffers with a 2 million pixel limitation.

Ordering Information

Monitor X-Option Part Numbers

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 compliance
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 compliance
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 compliance
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
X7134A	**24-inch Flat-Panel Monitor, Standard Version** 24.1-inch AM TFT LCD monitor, (27.5-inch CRT equivalent); 1920 x 1200 @ 60 Hz, DVI-D digital, 13W3 analog, S-video, and C-video interfaces; 4-port USB hub; DVI-D, 13W3, and HD15 video input cables included; Sun ID enclosure; Sun logo and color; VESA DPMS; universal power supply; WW agency compliance

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 Flat-Panel
Sun PGX64 (X3668A)[1]	X	X	X	X[2]
Sun Creator3D, series 3 (X3670A)[3]	X[8]	X	X	X[4]
Sun Elite3D m6 (X3679A)	X[8]	X	X	
Sun Expert3D (X3678A)	X[8]	X	X	X[5]
Sun Expert3D-Lite (X3684A)[6]	X	X	X	X
Sun XVR-500 (X3685A)[7]	X	X	X	X
Sun XVR-1000 (X3256A)	X[8]	X	X	X

Notes:

1. Maximum resolution of 1600 x 1000 @ 76 Hz, single-buffered 8/24-bit color mode, preferably for desktop publishing, windowing, and text-based applications.
2. Maximum resolution of 1920x1080 @60Hz, 8/24-bit color mode. Maximum resolution of 1920x1200@60, 8-bit color mode. The later is not generally recommended. Solaris 8 support only. Requires m64 patch 108606-26 or later.
3. Maximum resolution of 1280x1024 @76Hz, double-buffered, 8/24-bit color mode. 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. Support for 1920 x1200 @60Hz, single-buffered, 24-bit color mode requires the following patches.
   Solaris 2.6: 105360-42 or later, 1053620-40 or later
   Solaris 7: 106145-26 or later, 106148-14 or later, and 106146-25 or later
   Solaris 8: 108605-25 or later
5. Support for 1920 x1200 @60Hz, double-buffered, 24-bit color mode requires the following patches. Solaris 8 support only. Requires m64 patch 108576-19 or later.
6. Maximum resolution of 1600 x 1000 @ 76 Hz single, double or Z-buffered, 24-bit color mode. Support for 1920x1080@60Hz, double-buffered, 24-bit color mode requires patch 108676-29 or later.
7. Maximum resolution of 1600 x 1000 @ 76 Hz single, double or Z-buffered, 24-bit color mode. Supports 1920x1080@60Hz, double-buffered, 24-bit color mode.
8. Requires X3872A video connector adapter, HD15 to 13W3.

Video Connector Adapter

Adapter	Option Number	Monitors			
		17-inch Entry	18.1-inch LCD Color	21-inch Flat-Screen Color	24.1-inch LCD Color
Video Connector Adapter, HD15F to 13W3M	X3872A	X[1]			
Video Connector Adapter, 13W3F to HD15M	X471A			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) HD15 connector on the Ultra 5 and Ultra 10 systems, and PGX32™ graphics card.

Warranty

- The 18.1-inch and 24.1-inch LCD monitors come with a 1-year warranty on parts, labor, and backlight.
- Sun's 17-inch and 21-inch monitors come with a 1-year warranty on parts and labor.

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	18.1-inch LCD	24.1-inch LCD
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	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	X
EMI/EMC Regulation					

Regulation	Description	17-inch CRT	21-inch CRT	18.1-inch LCD	24.1-inch LCD
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
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		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

AM-LCD	Active-Matrix Liquid Crystal Display. For Active-Matrix LCDs, each subpixel element is activated individually by a Thin-Film Transistor. Both of Sun's LCD monitors utilize AM-TFT-LCD technology.
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.
Contrast ratio	The ratio between white and black reproduction, measured according to the VESA Flat-Panel Display Measurements (FPDM) standard.
CRT	Cathode Ray Tube. A display technology commonly used for desktop displays. Color CRTs contain a large vacuum tube with three electron guns that scan the image onto the screen's phosphor layer.
Composite-Video	Composite Video, such NTSC or PAL video. A type of video signal in which all information -- the red, blue, and green signals (and sometimes audio signals as well) -- are mixed together. This is the type of signal used by televisions in the United States
DVI	Digital visual interface.
DVI-D	24-pin connector that only accepts a digital video signal.
DVI-I	29-pin connector accept digital or analog video signal.
LCD	Liquid-Crystal Display. LCDs consist of liquid-crystal material surrounded on one or both sides by an electrode driving structure and polarizing layers.
Luminance	The proper term for Brightness, usually referenced as candelas per meter squared and sometimes as Foot-Lamberts.
Pixel pitch	The space between pixels.
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.
S-Video	Short for Super-Video, a technology for transmitting video signals over a cable by dividing the video information into two separate signals: one for color (chrominance), and the other for brightness (luminance).
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.
TMDS	Transition-Minimized Differential Signaling (PanelLink™)
VESA	Video Electronic Standards Association. VESA is an organization devoted to developing standards for displays and display interfaces.

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`			