Sun™ XVR-200 Graphics Accelerator Installation Guide

Sun Microsystems, Inc.
www.sun.com

Submit comments about this document at: http://www.sun.com/hwdocs/feedback

Please Recycle

Adobe PostScript™

Regulatory Compliance Statements

The Sun XVR-200 graphics accelerator is supported on the Sun Fire T2000 server as a Class A device according to worldwide requirements for EMI (Electromagnetic Interference.) The following statements apply:

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables to comply with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted-pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

VCCI 基準について

クラス A VCCI 基準について

クラス A VCCI の表示があるワークステーションおよびオプション製品は、クラス A 情報技術装置です。これらの製品には、下記の項目が該当します。

> この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI Class A Notice

The following statement is applicable to products shipped to Taiwan and marked as Class A on the product compliance label.

警告使用者：
這是甲類的資訊產品，在居住的環境中使用
時，可能會造成射頻 干擾，在這種情況下，
使用者會被要求採取某些適當的對策。

Declaration of Conformity

Compliance Model Number: G55-MDDE32LPDF
Product Family Name: Sun XVR-200 Graphics Accelerator (X3777)

EMC

USA—FCC Class A

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This equipment may not cause harmful interference.
2. This equipment must accept any interference that may cause undesired operation.

European Union

This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

As Telecommunication Network Equipment (TNE) in Both Telecom Centers and Other Than Telecom Centers per (as applicable):

EN 300 386 V.1.3.2 (2003-05) Required Limits:

EN 55022:1994 +A1:1995 +A2:1997	ClassA
EN 61000-3-2:2000	Pass
EN 61000-3-3:1995 +A1:2000	Pass
IEC 61000-4-2	6 kV (Direct), 8 kV (Air)
IEC 61000-4-3	3 V/m 80-1000MHz, 10 V/m 800-960 MHz, and 1400-2000 MHz
IEC 61000-4-4	1 kV AC and DC Power Lines, 0.5 kV Signal Lines
IEC 61000-4-5	2 kV AC Line-Gnd, 1 kV AC Line-Line and Outdoor Signal Lines, 0.5 kV Indoor signal Lines > 10m.
IEC 61000-4-6	3 V
IEC 61000-4-11	Pass

As Information Technology Equipment (ITE) Class A per (as applicable):

EN 55022:1994 +A1:1995 +A2:1997	Class A
EN 61000-3-2:2000	Pass
EN 61000-3-3:1995 +A1:2000	Pass
EN 55024:1998 +A1:2001 +A2:2003	Required Limits:
IEC 61000-4-2	4 kV (Direct), 8 kV (Air)
IEC 61000-4-3	3 V/m
IEC 61000-4-4	1 kV AC Power Lines, 0.5 kV Signal and DC Power Lines
IEC 61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines, 2 kV AC Line-Gnd, 0.5 kV DC Power Lines
IEC 61000-4-6	3 V
IEC 61000-4-8	1 A/m
IEC 61000-4-11	Pass

Safety: This equipment complies with the following requirements of the Low Voltage Directive 73/23/EEC:

EC Type Examination Certificates:
>   EN 60950-1:2001, 1st Edition
>   IEC 60950-1:2001, 1st Edition
>   Evaluated to all CB Countries
>   UL and cUL/CSA 60950-1:2001, CSA C22.2 No. 60950-00
>   FDA DHHS Accession Number (Monitors Only)

Supplementary Information: This product was tested and complies with all the requirements for the CE Mark. This equipment complies with the Restriction of Hazardous Substances (roHS) directive 2002/95/EC.

/S/
_____

Dennis P. Symanski   DATE
Worldwide, Compliance Engineering
Sun Microsystems, Inc.
4150 Network Circle, MPK15-102
Santa Clara, CA 95054   U.S.A.
Tel: 650-786-3255
Fax: 650-786-3723

/S/
_____

Donald Cameron   DATE
Program Manager/Customer Quality
Sun Microsystems Scotland, Limited
Blackness Road, Phase I, Main Bldg.
Springfield, EH49 7LR
Scotland, United Kingdom
Tel: +44 1 506 672 539   Fax: +44 1 506 670 011

Contents

Figures

Tables

Preface

This guide describes how to install the Sun™ XVR-200 graphics accelerator software and hardware in a Sun Fire™ T2000 system.

How This Document Is Organized

Chapter 1 provides an overview of the Sun XVR-200 graphics accelerator.

Chapter 2 provides hardware and software installation instructions.

Chapter 3 describes the procedure for modifying your `Xservers` file for identifying the graphics device.

Appendix A describes how to change the console screen resolution.

Appendix B provides information on cabling for digital and analog monitors.

Appendix C provides the Sun XVR-200 graphics accelerator product specifications.

Appendix D provides information regarding SunVTS™.

Appendix E provides keyboard and mouse information.

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at:

  http://docs.sun.com

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface[1]	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

1 The settings on your browser might differ from these settings.

Documentation, Support, and Training

Sun Function	URL
Documentation	http://www.sun.com/documentation/
Support	http://www.sun.com/support/
Training	http://www.sun.com/training/

Third-Party Web Sites

Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

http://www.sun.com/hwdocs/feedback

Please include the title and part number of your document with your feedback:

Sun XVR-200 Graphics Accelerator Installation Guide, part number 819-5737-10

Sun XVR-200 Graphics Accelerator Overview

The Sun XVR-200 graphics accelerator (FIGURE 1-1) is a low-profile single-slot 24-bit PCI-Express graphics frame buffer. The Sun XVR-200 graphics accelerator runs on the Sun Fire T2000 system. This chapter includes the following topics:

Installation Kit

The Sun XVR-200 graphics accelerator installation kit includes:

- Sun XVR-200 graphics accelerator
- Sun XVR-200 software CD-ROM
- LFH-60 – 2xDVI-I adapter splitter cable
- Two DVI – HD15 adapters
- Antistatic wrist strap
- *Sun XVR-200 Graphics Accelerator Installation Guide,* this document

Features

The Sun XVR-200 graphics accelerator (FIGURE 1-1) offers the following advanced features:

- 32-Mbyte PCI-Express (PCI-E) x1 bus interface
- 8+24-bit simultaneous visuals
- Off-screen pixmap caching
- Sun OpenGL® for Solaris™ support through Sun Direct Pixel Access (DPA) extension

See the following sections for details.

Sun XVR-200
graphics accelerator

Backplate
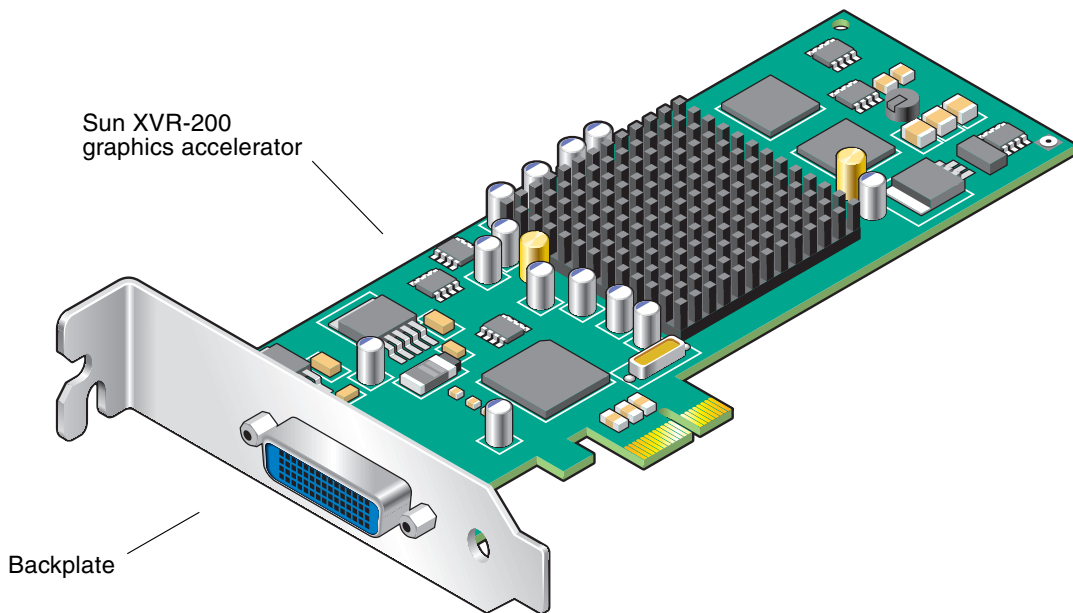
FIGURE 1-1 Sun XVR-200 Graphics Accelerator

FIGURE 1-2 shows the Sun XVR-200 graphics accelerator back panel LFH-60 I/O port.

LFH-60 video port
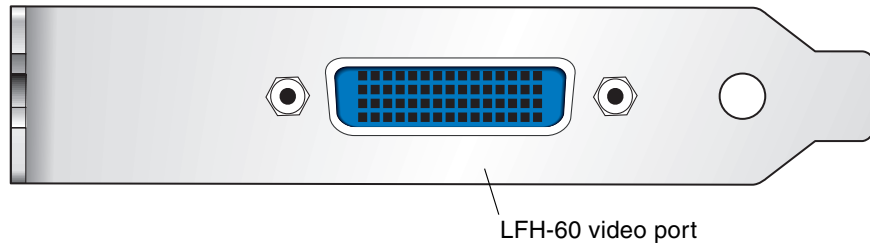
FIGURE 1-2   Sun XVR-200 Graphics Accelerator Back Panel LFH-60 Port

PCI-Express Bus Interface

The Sun XVR-200 graphics accelerator is a low-profile single-slot 32-Mbyte frame buffer keyed for an x1 PCI-Express bus interface. The output connector is an LFH-60 video port that requires the monitor cable adapters provided in the installation kit for DVI and HD15 (VGA) type monitor cabling.

8+24 Simultaneous Visuals

The 8+24 mode simultaneously supports 8- and 24-bit visuals. This mode addresses the classic colormap flashing issue with a 24-bit visual while providing the 8-bit visual that is required by some legacy 8-bit color only applications.

Cached Pixmaps

All Sun XVR-200 graphics accelerators support off-screen pixmap caching. Cached pixmaps are those that are stored in the off-screen memory. These off-screen pixmaps allow faster transfer rates to and from on-screen windows.

The available off-screen memory depends on the amount of video memory, the current resolution, and depth settings. For example, the Sun XVR-200 graphics accelerator has 32 Mbytes of video memory.

If the board is running at 1024×768 resolution with a depth of 8-bits, 768K is used for on-screen memory. That leaves 31.2 Mbytes available for pixmaps. In 24-bit and 8+24-bit modes, the on-screen memory that is used is four times larger than what is used in the 8-bit mode.

The largest pixmaps are stored in off-screen memory. If a larger pixmap replaces a smaller pixmap in the off-screen memory, the smaller pixmap moves to system memory and remains there even after the larger pixmap is destroyed.

OpenGL Support

Sun OpenGL for Solaris support is provided through the Direct Pixel Access (DPA) Extension. The Sun OpenGL 1.5 for Solaris software support is provided in the Solaris 10 1/06 Operating System.

Installing the Software and Hardware

This chapter provides Sun XVR-200 graphics accelerator software and hardware installation information.

Before Installation

Refer to the *Solaris Handbook for Sun Peripherals* that corresponds to your Solaris Operating System. The handbook describes how to shut down the system safely before installing any internal cards and how to reboot your system after installation.

Software Requirements

The Solaris 10 1/06 Operating System, or subsequent compatible version of the Solaris Operating System, is required on your SPARC® system before installing the Sun XVR-200 graphics accelerator software.

Installing the Software

Install the Sun XVR-200 software from the CD-ROM provided with your Sun XVR-200 graphics accelerator installation kit. TABLE 2-1 lists the Sun XVR-200 graphics accelerator CD-ROM directories.

TABLE 2-1   Sun XVR-200 Graphics Accelerator CD Directories

Directory Name	Description
Copyright	U.S. version of copyright
Docs	Sun XVR-200 graphics accelerator documentation
FR_Copyright	French version of copyright
README	Listing of Sun XVR-200 graphics accelerator CD contents
SLA_TRANSLATED.pdf	Translated software licensing agreement
Solaris_10/	Sun XVR-200 software packages
Sun_XVR-200_Driver_SLAandEntitlement.txt	Software licensing agreement and information
install	Product installation script
uninstall	Product removal script

Software Package Locations

The Sun XVR-200 software packages are located in the directory listed in TABLE 2-2.

TABLE 2-2   Location of Sun XVR-200 Software Packages

Software Packages	Directory Location
Solaris 10 software	/cdrom/cdrom0/sun_xvr_200/Solaris_10/Packages

Software Package Names

TABLE 2-3 lists the Sun XVR-200 software package names and descriptions.

TABLE 2-3   Solaris Package Names

Package name	Description
TSImkox	64-bit system software and device driver
TSImkow	Window system support
TSImkomn	Manual pages

Installing the Sun XVR-200 Software

If necessary, see Appendix E for keyboard and mouse installation references.

1. **Boot your system at the `ok` prompt.**

```
ok boot
```

Boot your system to the `ok` prompt by using the procedures outlined in your server installation guide. If you have not already set up your server, you need to use the integrated service console with the server. After you have been able to successfully boot the server and log in as superuser, go to Step 2.

2. **As superuser, check if the Sun XVR-200 graphics accelerator is already on your system.**

To do this, type:

```
# /usr/bin/pkginfo | grep mko
```

3. **Insert the Sun XVR-200 graphics accelerator CD-ROM into the drive.**

   - If the drive is already mounted, type the following, and go to Step 4:

```
# cd /cdrom/cdrom0
```

   - If the CD-ROM is not already mounted, type:

```
# mount -F hsfs -O -o ro /dev/dsk/c0t6d0s0 /cdrom
# cd /cdrom
```

> **Note –** The CD-ROM device might be different on your system. For example,
> `/dev/dsk/c0t2d0s2`.

4. **Run the installation script. Type:**

```
# ./install
```

The following Sun Entitlement information is displayed:

```
Sun Microsystems, Inc. ("Sun") ENTITLEMENT for SOFTWARE

Licensee/Company: Entity receiving Software

Effective Date:  Date Sun delivers the Software to You.

Software: "Software" means all software provided to You to be used with
the Host.

Host: The hardware product described in the Software's documentation
with which the Software is intended to be used.
.
.
.
Do you accept the license agreement? [y/n]: y
```

At the end of the licensing agreement information, you are asked to accept it.

5. **Type `y,` and Return, to accept the license agreement.**

   The following is displayed:

```
Installing TSImkox.v TSImkomn TSImkow for Solaris 10 ...
*** Installation of drivers is complete.

To uninstall this software, use the 'uninstall' script on this CDROM, or
the following script:
        /var/tmp/xvr-200.uninstall

A log of this installation can be found at:
        /var/tmp/xvr-200.install.2006.03.29

To configure a Sun XVR-200 accelerator, use the fbconfig
utility.  See the fbconfig(1m) and TSCmko_config(1m) manual
pages for more details.

*** IMPORTANT NOTE! ***
This system must be rebooted for the new software to take effect.
```

6. **Install the Sun XVR-200 graphics accelerator.**

   (See "Installing the Hardware" on page 11.)

7. **Do a reconfiguration reboot of your system at the `ok` prompt to complete the installation:**

```
ok boot -r
```

   To use the Sun XVR-200 graphics accelerator as a console, type a Solaris prompt:

```
# eeprom output-device=screen
# eeprom input-device=keyboard
```

Removing the Software

1. **Log in as superuser.**

2. **Insert the Sun XVR-200 graphics accelerator CD-ROM into the drive.**

   ■ If the drive is already mounted, type the following, and go to Step 3:

   ```
   # cd /cdrom/cdrom0
   ```

   ■ If the CD-ROM is not already mounted, type:

   ```
   # mount -F hsfs -O -o ro /dev/dsk/c0t6d0s0 /cdrom
   # cd /cdrom
   ```

   Note – The CD-ROM device might be different on your system. For example,
   /dev/dsk/c0t2d0s2.

3. **To remove Sun XVR-200 graphics accelerator software, type:**

   ```
   # ./uninstall
   ```

   In this example, the following is displayed.

```
Removal of Sun XVR-200 Sun XVR-200 Graphics accelerator Software is complete.
A log of this uninstall is at:
        /var/tmp/xvr-200.uninstall.2006.03.29
```

Installing the Hardware

Refer to the hardware installation documentation provided with your Sun system for instructions on accessing your system and installing Sun PCI-Express (PCI-E) graphics cards. Your system platform documentation also provides removal procedures.

To find the most recent information on supported systems for the Sun XVR-200 graphics accelerator, and additional specifications, go to:

http://www.sun.com/desktop/products/graphics/xvr200/

TABLE 2-4 lists the supported systems and number of PCI-E slots supported.

TABLE 2-4   Supported Systems

System	Maximum Number of Boards
Sun Fire T2000 system	1

Man Pages

The Sun XVR-200 graphics accelerator man pages describe how you can query and set frame buffer attributes such as screen resolutions and visual configurations.

Use the fbconfig(1M) man page for configuring all Sun graphics accelerators. TSImko_config(1M) contains Sun XVR-200 device-specific configuration information.

● **To get a list of all graphics devices on your system, type:**

```
host% fbconfig -list
```

This example shows a list of graphics devices displayed:

```
  Device-Filename              Specific Config Program
  ---------------              -----------------------
  /dev/fbs/mko0                TSImko_config
```

Use the fbconfig -help option to display the attributes and parameters information of the man page.

```
host% fbconfig -dev mko0 -help
```

● **To access the** fbconfig **man page, type:**

```
host% man fbconfig
```

● **To access the Sun XVR-200 graphics accelerator man page, type:**

```
host% man TSImko_config
```

Changing Resolution and Color Depth Through the GUI

The default resolution is dictated either by EDID information from the connected monitor or by the console resolution that is set (Appendix A). In the absence of this piece of information, the default resolution is $1024 \times 768 \times 75$ Hz and the default window system color depth is 24-bit.

● **To get a list of available screen resolutions for your display device, type:**

```
host% fbconfig -res \?
```

See Appendix A, "Changing the Console Resolution", which includes methods on changing your screen resolution from the OpenBoot ok prompt, a list of supported resolutions, and additional information.

However, if you decide to set a different resolution and color depth configuration under the X Window System, follow the instructions in this section to set your resolution and color depth appropriately.

You can use the fbconfig utility any time after installation to change these parameters and to turn on dual-screen mode.

Please see the man page on TSImko_config for a detailed description.

Note – dual-screen mode is a feature described in "Dual-Screen Mode" on page 17. In this mode, you can only configure the Sun XVR-200 to a color depth of 24-bits.

The next two sections describe two methods of using fbconfig to configure the graphics board.

Interactive Configuration

fbconfig has an interactive menu-style interface (FIGURE 2-1).

● **To configure your Sun XVR-200 graphics accelerator, type one of the following:**

```
# fbconfig -i
```

or

```
# fbconfig -dev mko0 -i
```

Note – If the X Window System is running on the Sun XVR-200 graphics accelerator to be configured, please exit out of it before running fbconfig. Failure to do so could result in a corrupted screen for the remainder of the X Windows session.

The Sun XVR-200 graphics accelerator device is listed in the left column of the configuration screen displayed by fbconfig –i (FIGURE 2-1).
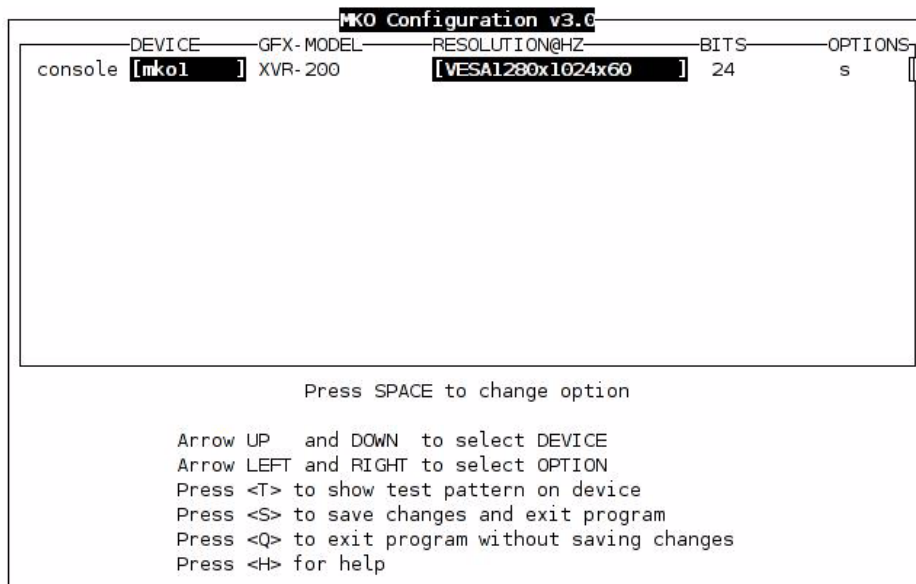
FIGURE 2-1   Configuration Interface Display

TABLE 2-4 lists the configuration interface options:

TABLE 2-5   Configuration Interface Options

Option	Description
Up/Down Arrow	To select the desired graphics device you want to modify.
Left/Right Arrow	To select the parameter to modify (for example, resolution, color depth, or sync).
Space Bar	To modify the parameter for the selected graphics device (displays a menu when applicable).
t	Puts a test pattern on the entire display (press any key to return to the main screen). Note that the test pattern feature is disabled if the X Window System is running.
s	Saves current settings and exits.
h	Help
q	Exits the program without saving any changes.

Note – To enable dual-screen, select the OPTION menu and enter **w**. (See "Dual-Screen Mode" on page 17.)

Noninteractive Configuration

Sometimes it is convenient to configure the Sun XVR-200 graphics accelerator noninteractively. This method is especially useful when configuring many systems identically or when the appropriate configuration for the system is already known.

You can set the parameters using the interactive version by specifying the option followed by a desired value. TABLE 2-4 lists the parameters.

TABLE 2-6   Parameter Options

Parameter	Description
-d *device*	Selects the device to configure.
-res *resolution*	Sets the resolution.
-res \?	Lists supported resolutions.

TABLE 2-6 Parameter Options *(Continued)*

Parameter	Description
`-file machine	system`	Specifies whether to modify `OWconfig` from `/etc/openwin/server/etc` or `/usr/openwin/server/etc`, respectively.
`-depth 8|24|8+24`	Changes the color depth to 8 only or 8+24 mode.
`-defaults`	Changes all option values to their default values.
`doublewide, doublehigh enable/disable`	Enable/disable the dual-screen output feature. (See "Dual-Screen Mode" on page 17.)
`-24only enable/disable`	Forces all windows to use 24-bit visuals. This disables 8+24 mode and might prohibit some 8-bit applications from working.
`-cachedpixmap enable/disable`	Turns off the off-screen cached pixmap feature. Default is `enable`.
`-propt`	Displays current settings.
`-prconf`	Displays hardware information.
`-help`	Shows complete usage listing.

Note – By default, the color depth is set to 24-bit for all resolutions.

Examples

To configure the resolution to $1280 \times 1024 \times 60$ Hz, type:

```
# fbconfig -res 1280x1024x60
```

Note – If no device is specified, `fbconfig` configures the console Sun XVR-200 graphics accelerator.

To verify the resolution prior to setting it permanently, add the word `try` after the resolution name. This option displays a test pattern on the screen until you press the Return key. The resolution is then accepted or rejected. For example:

```
# fbconfig -dev /dev/fbs/mko0 -res 1280x1024x60 try
```

To set the resolution to $1024 \times 768 \times 60$ with a single TrueColor visual (no 8-bit PseudoColor visual):

```
# fbconfig -res 1024x768x60 -24only enable
```

To display the current settings for /dev/fbs/mko0:

```
# fbconfig -dev /dev/fbs/mko0 -propt
```

Dual-Screen Mode

The Sun XVR-200 graphics accelerator has the ability to support two displays – two digital displays, two analog displays, or one analog and one digital. You can configure the card so that the two displays appear as one unified screen to the X Windows display. In other words, windows can be easily moved between the two displays (without the need for a special xinerama mode). This unified screen mode is also called dual-screen mode.

The Sun XVR-200 graphics accelerator has only one graphic processor and two DACs. The drawing engine is capable of driving both DACs. See "X Window System (Dual-Screen Mode) Configuration" below.

Console Display Configuration

In console mode (that is, prior to starting the X Window System), only one monitor head is used.

X Window System (Dual-Screen Mode) Configuration

You can configure graphics boards under the X Window System in either a single-screen mode or a dual-screen mode, using the fbconfig utility.

● **To configure the graphics board to dual-screen mode, type:**

```
# /usr/sbin/fbconfig -dev /dev/fbs/mko0 -doublewide enable
```

When running fbconfig in the interactive mode (fbconfig -i), select w under the OPTION menu to enable dual-screen mode.

In dual-head configurations, the X Window System acts as one single display across two screens. Both heads must be set to the same resolution, and each is limited to $1600 \times 1200 \times 60$ analog. So, the maximum effective resolution across both screens is $3200 \times 1200 \times 60$ analog. In the dual-screen mode, only the 24-bit TrueColor visual is supported.

In single-head configurations, the resolution is limited to $1920 \times 1200 \times 76$, and supports 8-bit, 24-bit, and 8+24-bit modes.

Note – These limits apply to analog output only. Digital output is restricted to $1280 \times 1024 \times 60$. Dual-head configurations that include a digital monitor are also limited to $1280 \times 1024 \times 60$ for both heads.

Modifying the `Xservers` File

To configure the Sun XVR-200 graphics accelerator, you must modify your `Xservers` file. This chapter describes how to make that modification.

Configuring the Graphics Device Through the `Xservers` File

The Sun XVR-200 graphics accelerator device name is `mko0`. To configure the `Xservers` file, do the following:

1. **Become superuser and open the** `/etc/dt/config/Xservers` **file.**

```
# cd /etc/dt/config
# vi + Xservers
```

If the `/etc/dt/config/Xservers` file does not exist, create the `/etc/dt/config` directory and copy the `Xservers` file from `/usr/dt/config/Xservers` to `/etc/dt/config`.

```
# mkdir -p /etc/dt/config
# cp /usr/dt/config/Xservers /etc/dt/config
# cd /etc/dt/config
# vi + Xservers
```

2. **Modify the file by adding the device location for the Sun XVR-200 graphics accelerator device.**

   Enter the Xservers file content in one long line.

   This example shows the Xservers configuration file modified for one Sun XVR-200 graphics accelerator (mko0) to start the desktop:

```
:0 Local local_uid@console root /usr/openwin/bin/Xserver :0 -dev
/dev/fbs/mko0 -nobanner
```

3. **Log out, then log back in.**

4. **If you are editing the Xservers file after completing installation, reboot your system.**

Changing the Console Resolution at the OpenBoot Prompt

This appendix describes how to change the console screen resolution.

Overview

Changing the screen resolution at the OpenBoot `ok` prompt enables you to view console boot messages and the DT login screen. If a type of monitor is used where the EDID auto-detect is not preset at the `ok` prompt, console boot messages and DT login screen will not display. In this case, set screen resolutions using `fbconfig` or the GUI method, which displays console boot messages and the DT login screen (see "Changing Resolution and Color Depth Through the GUI" on page 13).

Console Resolution

The the Sun XVR-200 graphics accelerator has a default console resolution and default color depth as shown in the TABLE A-1:

TABLE A-1   Default Console Resolution

Board	Resolution	Refresh	Bits/Pixels	Sync
XVR-200	Auto Detect	-	24	Separate/composite

Reason for Changing the Console Resolution

Normally, the default console resolution is sufficient for most users. If the monitor does not sync up at the default console resolution, it might be necessary to choose a different console resolution.

Guidelines for Changing the Console Resolution

By default, all console resolutions are set to 24-bit mode. Use `fbconfig -i` to test a resolution before configuring the console to that resolution.

Note – Digital output on the LFH-60 port is limited to $1280 \times 1024 \times 60$.

EDID Auto-Detect Feature

Auto-Detect is limited to $1280 \times 1024 \times 60$ on the digital video port only. If overrides are used to exceed this limit, only analog signals will be produced by the DVI port. Digital signals will be turned off.

If you are using a monitor with DDC2B/EDID protocol the default resolution will be determined using the Auto-Detect feature. With this protocol, the Sun XVR-200 graphics accelerator first checks the Established Timing Identifiers (taking the first one supported) then tries to match the Standard Timings.

Note – The monitor must be powered up and turned *on* prior to booting the system in order for the Sun XVR-200 graphics accelerator to communicate with it. Some adapters and cables might block this signal.

If the Auto-Detect feature fails, the card will default to $1024 \times 768 \times 75$ Hz.

Note – The other methods described in this appendix override any information obtained through EDID.

Output-Device Method

To specify the console resolution of Sun XVR-200 graphics accelerator through the `output-device` environment variable, use the format `screen:rAxBxC` where:

- *A* is the desired horizontal resolution.
- *B* is the desired vertical resolution.
- *C* is the desired refresh rate.

The system checks these values against an internal list of resolutions (see "Video-Mode Method" on page 24 for a list of video modes) and use the corresponding entry as the console resolution. For example, to use VESA1280 × 1024 × 75 as the console resolution, go to the `ok` prompt and type:

```
ok setenv output-device screen:r1024x768x75
ok reset-all
```

Note – The Sun Fire T2000 system default console defaults to:
`output-device=virtual-console`
`input-device=virtual-console`

To use the Sun XVR-200 graphics accelerator as a console, type a Solaris prompt:
`# eeprom output-device=screen`
`# eeprom input-device=keyboard`

Or, at the `ok` prompt, type:
`ok setenv output-device screen`
`ok setenv input-device keyboard`

Reboot after installing the Sun XVR-200 graphics accelerator into the Sun Fire T2000 system.

Video-Mode Method

You can set the Sun XVR-200 console resolution at the ok prompt in boot PROM mode, using one of the 32 preinstalled resolution modes. These resolution settings are identified by video modes 1-32.

● **To change the video mode, type:**

```
ok nvedit
   0:8 value video-mode
   1: <ctrl-c>
ok nvstore
ok setenv use-nvramrc? true
ok reset-all
```

where **8** is the selected video mode.

Note – The last three commands enable the NVRAM. Without these lines, the changes you make with nvedit will be ignored.

TABLE A-2 Screen Resolutions by Video Mode

Video Mode	Resolution
1	$640 \times 480 \times 72$
2	$640 \times 480 \times 75$
3	$640 \times 480 \times 85$
4	$800 \times 600 \times 60$
5	$800 \times 600 \times 72$
6	$800 \times 600 \times 75$
7	$800 \times 600 \times 85$
8	$1024 \times 768 \times 60$
9	$1024 \times 768 \times 70$
10	$1024 \times 768 \times 75$
11	$1024 \times 768 \times 77$ ∗
12	$1024 \times 768 \times 85$
13	$1024 \times 800 \times 85$ ∗

TABLE A-2   Screen Resolutions by Video Mode *(Continued)*

Video Mode	Resolution
14	$1152 \times 900 \times 60$
15	$1152 \times 900 \times 66$ *
16	$1152 \times 900 \times 70$
17	$1152 \times 900 \times 75$
18	$1152 \times 900 \times 76$ *
19	$1152 \times 900 \times 85$
20	$1280 \times 800 \times 76$ *
21	$1280 \times 1024 \times 60$
22	$1280 \times 1024 \times 67$
23	$1280 \times 1024 \times 67$ *
24	$1280 \times 1024 \times 75$
25	$1280 \times 1024 \times 76$ *
26	$1280 \times 1024 \times 85$
27	$1600 \times 1000 \times 66$ *
28	$1600 \times 1000 \times 76$ *
29	$1600 \times 1200 \times 60$
30	$1600 \times 1200 \times 65$
31	$1600 \times 1200 \times 70$
32	$1600 \times 1200 \times 75$

* Uses composite sync.

Video-Timing Method

If all of the previously described methods fail for your configuration, it is possible to specify the exact timing numbers for a particular resolution. The last method for setting the console resolution also uses nvedit. This method is more involved and requires knowledge of all timing parameters for the desired resolution, and is only to be used for monitors with resolutions that are not available in the video-mode method.

> **Note –** The video-timing method should be used only if the preceding methods have been unsuccessful.

For example, to set the console resolution to $1280 \times 1024 \times 76$ Hz, type:

```
ok nvedit
  0: :video-timing " 1280, 384, 32, 64, 1024, 43, 3, 8, 135000000, 0" ;
  1: <ctrl-c>
ok nvstore
ok setenv use-nvramrc? true
ok reset-all
```

> **Note –** The syntax is very important. The spaces must be present exactly as they appear in the example.

> **Note –** The last three commands enable the NVRAM. Without these entry lines, the changes you make with nvedit will be ignored.

The following is a brief description of the 10 parameters used in this method:

- Horizontal resolution (in pixels)
- Horizontal blanking total
- Horizontal front porch
- Horizontal sync width
- Vertical resolution (in lines)
- Vertical blanking total
- Vertical front porch
- Vertical sync width
- Dotclock in Hz
- Sync value:

  - 0   separate sync
  - 25   6sync on green
  - 512   positive vertical sync pulse
  - 1024   positive horizontal sync pulse
  - 2048   composite sync

You can add the sync values together to select more than one of the preceding values.

Video Mode Troubleshooting

TABLE A-3   Video Mode Troubleshooting

Problem	Solution
Used the method described in this Appendix to configure the console resolution, but the card still defaults to something other than the resolution specified.	A priority scheme is used to determine the boot console resolution. The Sun XVR-200 graphics accelerator firmware checks the various methods in order of priority. If the device finds the resolution from the current method, it uses that resolution. Otherwise, it goes down the priority list to find the resolution information. Finally, if there is no resolution information, the device uses the default resolution. The resolution-setting methods are enumerated in order of decreasing priority: 1. output-device method (see "Output-Device Method" on page 23) 2. video-timing method (see "Video-Timing Method" on page 26) 3. video-mode method (see "Video-Mode Method" on page 24) 4. DDC2B/EDID (see "Output-Device Method" on page 23) 5. Default resolution for the board

Monitor Cable Adapters

This appendix describes Sun XVR-200 graphics accelerator cabling for DVI and HD15 (VGA) type monitor video ports.

Cable Adapter

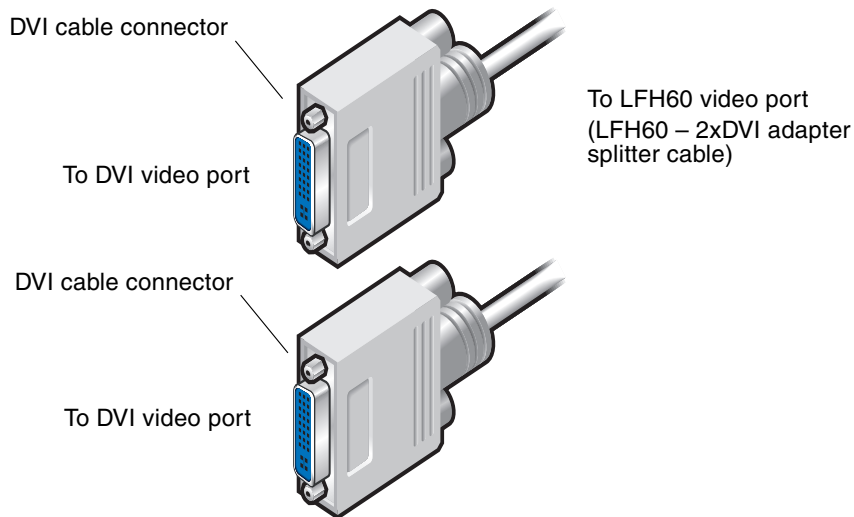The Sun XVR-200 graphics accelerator installation kit includes the following adapter assemblies:

- LFH60 – 2xDVI-I adapter splitter cable
- Two DVI – HD15 adapters

You can order DVI – HD15 adapters (part number 530-3474) through the Sun store (http://store.sun.com).

Connecting Monitors With DVI Video Ports

1. **Connect the LFH60 end of LFH60–DVI adapter splitter cable to the Sun XVR-200 graphics accelerator LFH60 video port.**

2. **Connect each DVI connector end of the adapter splitter cable to the DVI ports of your digital monitor (**FIGURE B-1**).**

DVI cable connector

To LFH60 video port
(LFH60 – 2xDVI adapter
splitter cable)

To DVI video port

DVI cable connector

To DVI video port

FIGURE B-1   LHF60 Video Port Connection to DVI Video Ports Using LFH60 – 2xDVI Adapter Splitter Cable

Monitors With HD15 (VGA) Video Ports

1. **Connect the LFH60 end of the LFH60–DVI adapter splitter cable to the Sun XVR-200 graphics accelerator LFH60 video port.**

2. **Connect a DVI–HD15 adapter to each end of the LFH60–DVI adapter splitter cable DVI connector (**FIGURE B-2**).**

3. **Connect the HD15 end of the DVI-HD15 adapter to the HD15 (VGA) monitor video port.**

DVI – HD15 adapter

To LFH60 video port
(LFH60 – 2xDVI adapter
splitter cable)

To HD15 (VGA) video port

DVI – HD15 adapter

To HD15 (VGA) video port
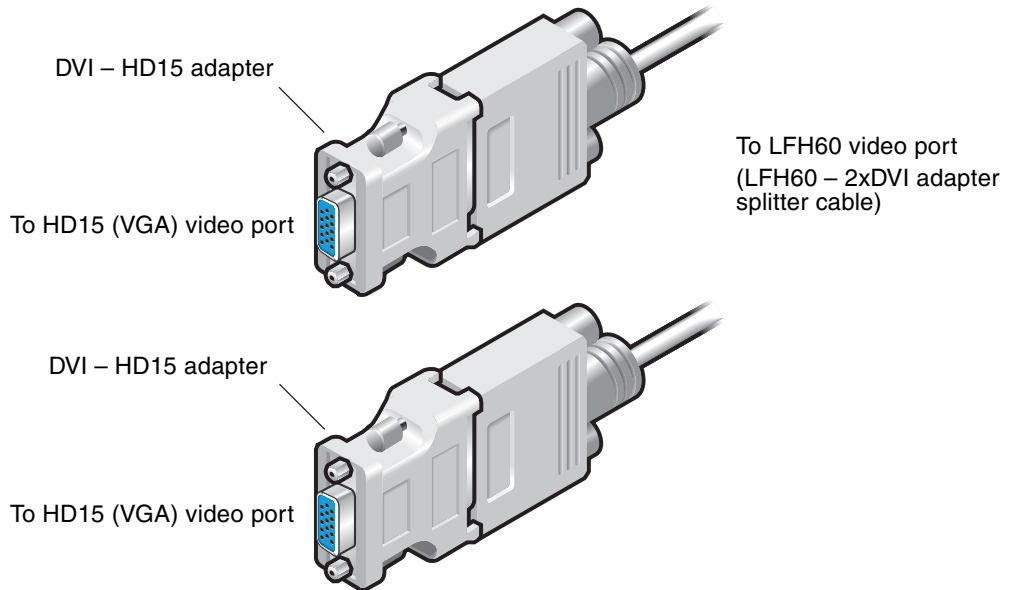
FIGURE B-2   LHF60 Video Port Connection Using DVI–HD15 Adapters

Sun XVR-200 Graphics Accelerator Specifications

This appendix provides the Sun XVR-200 graphics accelerator product specifications.

Board Specifications

This graphics accelerator is for use with UL Listed ITE that have installation instructions detailing user installation of card cage accessories.

TABLE C-1 lists the product specifications.

TABLE C-1   Sun XVR-200 Graphics Accelerator Power Consumption

Parameter	Specification
Frame buffer	32 Mbytes
Hardware cursor	3 color, 64 x 64 bitmap
Color lookup tables	256 entries
PCI-E interface	PCIe x 1
Video interface	Analog (75 ohm) or DVI
Temperature rating	0° to 55° C operating -40° to 75° C nonoperating
Humidity rating	20 to 80% operating (noncondensing) 5 to 95% nonoperating (noncondensing

TABLE C-1 Sun XVR-200 Graphics Accelerator Power Consumption *(Continued)*

Parameter	Specification
Power rating	+5V @ 3 Amps
Dimensions	16.13cm x 6.89cm (6.35" x 2.712")
Dot clock max	360 MHz (primary) 230 MHz (secondary) 135 MHz (digital)
Video sync	Separate, composite
Video connector	LFH60 (15pm D-shell, VGA or DVI-I using splitter cable)
Boot support	IEEE 1275 Compliant F Code

LFH60 Connector Pinout

FIGURE C-1 shows the Sun XVR-200 LFH60 video connector and pin signal descriptions.
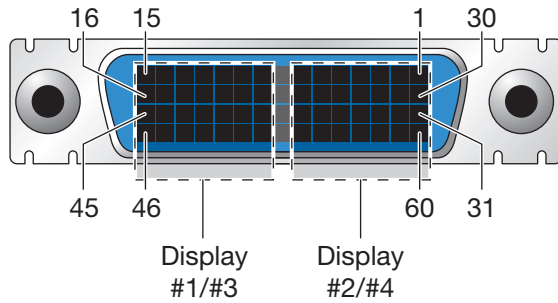
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	Ground	24	—	31	TMDS data1+	54	Ground
2	Analog red output	25	—	32	TMDS data1–	55	VSYNC
3	Analog blue output	26	—	33	TMDS clock data+	56	HSYNC
4	Ground	27	TMDS data2–	34	TMDS clock data–	57	Ground
5	5V Power	28	TMDS data2+	35	—	58	—
6	SCL (DDC)	29	TMDS data0–	36	Hot plug detection	59	Analog green output
7	SDA (DDC)	30	TMDS data0+	37	—	60	Ground
8	—	23	—	38	—	53	—
9	SDA (DDC)	16	TMDS data0+	39	—	46	Ground
10	SCL (DDC)	17	TMDS data0–	40	Hot plug detection	47	Analog green output
11	5V Power	18	TMDS data2+	41	—	48	—
12	Ground	19	TMDS data2–	42	TMDS clock data–	49	Ground
13	Analog blue output	20	—	43	TMDS clock data+	50	HSYNC
14	Analog red output	21	—	44	TMDS data1–	51	VSYNC
15	Ground	22	—	45	TMDS data1+	52	Ground

FIGURE C-1 LFH60 Connector and Pin Signal Descriptions

DVI Connector Pinouts

FIGURE C-2 and TABLE C-2 shows the DVI connector and pinout signals. The DVI cable connector is a 30-pin connector for a supported workstation monitor.
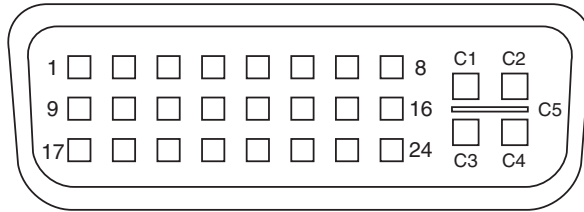
FIGURE C-2   DVI Connector Pinouts

TABLE C-2   Sun XVR-200 Graphics Accelerator DVI Cable Pinouts

Pin	Signal
1	TMDS Data 2-
2	TMDS Data 2+
3	TMDS Data 2/4 Shield
4	TMDS Data 4-
5	TMDS Data 4+
6	DDC Clock
7	DDC Data
8	Analog vertical sync
9	TMDS Data 1-
10	TMDS Data 1+
11	TMDS Data 1/3 shield
12	TMDS Data 3-
13	TMDS Data 3+
14	+5V power
15	Ground

TABLE C-2   Sun XVR-200 Graphics Accelerator DVI Cable Pinouts *(Continued)*

Pin	Signal
16	Hot plug detect
17	TMDS Data 0-
18	TMDS Data 0+
19	TMDS Data 0/5 shield
20	TMDS Data 5-
21	TMDS Data 5+
22	TMDS Clock shield
23	TMDS Clock+
24	TMDS Clock-
C1	Red analog
C2	Green analog
C3	Blue analog
C4	Analog horizontal sync
C5	Analog ground

HD15 (VGA) Connector Pinouts

FIGURE C-3 and TABLE C-3 shows the HD15 (VGA) connector and pinout signals.
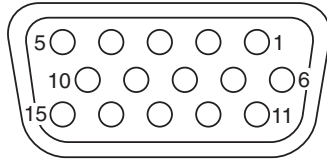
FIGURE C-3   HD15 (VGA) Connector Pinouts

TABLE C-3   Sun XVR-200 Graphics Accelerator HD15 Connector Pinouts

Pin	Signal
1	Red analog video
2	Green analog video
3	Blue analog video
4	Monitor ID2
5	Ground
6	Red shield
7	Green shield
8	Blue shield
9	No connect
10	Sync RTN
11	Monitor ID0
12	Monitor ID1 or DDC data
13	Horizontal sync
14	Vertical sync
15	Monitor ID3 or DDC clock

SunVTS

This appendix provides information regarding SunVTS™ for the Sun XVR-200 graphics accelerator.

For information regarding SunVTS, refer to the *SunVTS Test Reference Manual* which lists a number of tests that exercise frame buffers. Use graphicstest for the mko devices. You can run SunVTS on the Sun XVR-200 graphics accelerator at the console or on the desktop (follow the guidelines for each specific test).

Note – Use SunVTS that comes with the Solaris 10 1/06 Operating System, or subsequent compatible version of the Solaris Operating System.

Keyboard and Mouse

Refer to the *Sun Type 7 Keyboard and Mouse Installation Guide* (819-2907) for instructions on connecting the keyboard and mouse to a Sun system.

Refer to the *Sun Fire T2000 Server Installation Guide* (819-2546) to locate the four USB ports for the keyboard, and other devices, on the Sun Fire T2000 server.

Index