

Sun™ PGX32™ PCI Graphics Card Installation Guide



THE NETWORK IS THE COMPUTER™

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Preface

This manual describes how to install and configure the Sun™ PGX32™ PCI graphics card in your Sun Workstation™.

How This Book Is Organized

Chapter 1 provides an overview of the product.

Chapter 2 describes how to install the PGX32 graphics card.

Chapter 3 describes how to configure the PGX32 display.

Chapter 4 describes how to start a window environment on a PGX32 graphics card.

Appendix A describes how to change console resolutions.

Using UNIX Commands

This document does not contain information on basic UNIX commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris 2.x Handbook for SMCC Peripherals*
- AnswerBook™ online documentation for the Solaris™ 2.x software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output.	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output.	% su Password:
<i>AaBbCc123</i>	Book titles, new words, or terms; words to be emphasized; command-line variable: replace with a real name or value.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be <code>root</code> to do this. To delete a file, type <code>rm filename</code> .

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	%
C shell superuser	#
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

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Overview

The Sun PGX32 card is a simultaneous 8-bit and 24-bit PCI-based graphics accelerator for a Sun Workstation™. This installation guide provides information for PGX32 cards delivered bundled with the Solaris operating environment and unbundled as an X-option.

For assistance and other information concerning the PGX32 card, contact SunServiceSM at 1-800-USA-4SUN.

Features

The PGX32 card has the following features:

- 8/24-bit simultaneous visuals
- Off-screen pixmap caching
- Sun OpenGL® for Solaris support via DPA software rendering pipeline
- Support for multiple PGX32 cards in a system

8/24-Bit Simultaneous Visuals

The 8/24 mode supports 8- and 24-bit visuals simultaneously. This is the default mode and addresses the classic color map flashing issue with a 24-bit visual while providing the 8-bit visual that is required by applications, such as SoftWindows™ and many legacy applications.

The available visuals include PseudoColor and TrueColor. The default visual is PseudoColor.

The resolutions up to 1280 × 1024 are in 8/24 mode unless set explicitly using `GFXconfig` (`pgxconfig` if bundled with the Solaris operating environment). All resolutions over 1280 × 1024 default to an 8-bit visual. See Appendix A for a list of supported resolutions.

Cached Pixmaps

All PGX32 cards support off-screen pixmap caching. Cached pixmaps are stored in the PGX32 off-screen memory. These off-screen pixmaps allow faster transfer rates to and from screen windows. The available off-screen memory depends upon the current resolution and depth settings.

OpenGL Support

OpenGL support is provided through the Direct Pixel Access (DPA) Extension. To use this function, OpenGL v1.1.1 or higher must be already installed on your system.

Note – In Sun OpenGL for the Solaris v1.1.1 environment, there is a bug in the DPA PCI 24-bit support that causes the red and blue colors to be swapped. A Sun patch (ID 106022-07) fixes this problem and is available at <http://sunsolve.sun.com>. It is fixed in Sun OpenGL for Solaris v1.1.2.

OpenBoot Prom (OBP) Support

TABLE 1-1 Supported Platform Boot Proms

System Platform	OBP Version
Sun Ultra™ 5 and Ultra 10	3.19.2, 3.19.0
Sun Ultra 30	3.11.2
Sun Ultra 60	3.17.0, 3.13.1
Sun Enterprise™ 250	3.14.1
Sun Enterprise 450	3.16.1, 3.12.3

PGX32 Specifications

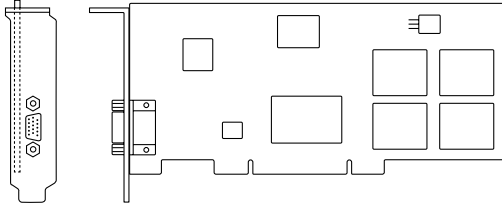


FIGURE 1-1 PGX32 PCI Graphics Card

TABLE 1-2 PGX32 Specifications

Characteristic	Specification
Frame buffer	8-Mbyte SGRAM
Hardware cursor	3 color, 64 × 64 bitmap
Color lookup tables	256 entries
PCI interface	33 MHz, 32-bit
Video interface	Red, green, blue at RS-343 (75 ohm)
Video sync	Separate, composite synchronization using special video adapter
Video connector	15-pin high density D-SUB (VGA)
Temperature rating	0° to 50° operating -40° to 70°C nonoperating
Humidity rating	10% to 95% (noncondensing)
Power rating	+5V @ 1.5 Amps (max)
Physical	168mm × 107mm (6.625 inches × 4.2 inches)

Monitor Adapter

The PGX32 graphics card has a VGA connector for video output that works with most Sun and PC monitors. Some Sun monitors require the 13W3 connector. Sun provides a 13W3-to-VGA adapter cable with your installation kit for these monitors. However, if your monitor requires composite synchronization, you will need a special adapter, such as the 1396-R2 in Figure 1-2.

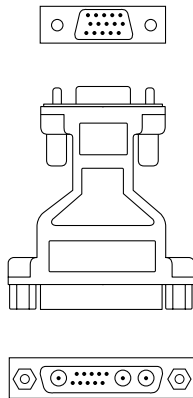


FIGURE 1-2 PGX32 Adapter

Installing the PGX32 Card

The chapter describes how to install the PGX32 card.

Installing the Hardware

Refer to the hardware documentation provided with your workstation or server for instructions on installing a PCI graphics card. You may also contact SunService and/or view the `docs.sun.com` website to locate your platform documentation.

Screen Resolution

The PGX32 card automatically detects and refreshes to your screen resolution. To change screen resolution configuration for your monitor (which is independent of the console resolution), see Chapter 3. To change the console screen resolution, see Appendix A.

Installing the Software

System Requirements

- One of the following Sun systems is required:
 - Sun Ultra 5
 - Sun Ultra 10
 - Sun Ultra 30
 - Sun Ultra 60
 - Sun Ultra 80
 - Sun Ultra AX
 - Sun Ultra AXi
 - Sun Enterprise 250
 - Sun Enterprise 450
- Solaris 2.5.1 Hardware: 11/97 or a subsequent compatible version of the operating environment
- OpenWindows™ Version 3.5.1 and later
- 2 Mbytes of available disk space in `/usr`
- Customers with pre-1996 monitors that support composite synchronization require the following video adapter: F130-4195-01 (FRU, PGX32 Video Adapter)

Software Package Names

PGX32 software is delivered unbundled as an `x`-option or bundled with the Solaris operating environment. TABLE 2-1 and TABLE 2-2 lists the package names of these two versions of software.

TABLE 2-1 PGX32 Unbundled Software Packages

Package Name	Description
<code>TSIgfxdrv</code>	Solaris 2 device driver
<code>TSIgfxOW</code>	Loadable DDX modules for accelerated OpenWindows support

TABLE 2-2 PGX32 Bundled with Solaris Software Packages

Package Name	Description
TSIpgxx.u	PGX32 device driver (64-bit)
TSIpgx.u	PGX32 device driver (32-bit)
TSIgpwx	Loadable DDX for accelerated OpenWindows support
TSIpgxmn	PGX32 manual pages

Installing PGX32 Unbundled Software From a CD-ROM

Note – You only need to do this installation if the Solaris environment does not already have the PGX32 drivers. You can check for the drivers by typing:

```
# pkginfo | grep TSI
```

If the output of this command includes packages listed in TABLE 2-1 and TABLE 2-2, the PGX32 software is already installed on your machine.

1. After installing the PGX32 card into your system, boot your system. Type:

```
# boot -r
```

2. Log in as superuser on the target install machine, using `/bin/sh` as your shell.
3. Remove any previously installed PGX32 software.

Note – The installation will fail if PGX32 software already exists on your system. It is important to use the removal procedure provided with that previous release to uninstall it.

4. Insert the CD-ROM labeled “GFX OpenWindows for Solaris 2” into the drive.
5. Mount the CD-ROM drive.
 - If the drive is already mounted, type the following, and go to Step 6:

```
# 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 may be different on your system. For example, `/dev/dsk/c0t2d0s2`.

- 6. To install the software, type:**

```
# ./install_all
```

During installation, you may be asked a number of questions. Answer `y` to all of these questions.

- 7. Reboot the system to complete the installation.**

Installing PGX32 Software From FTP Files

To complete an installation from FTP files, you must first obtain the packages from Sun. Contact SunService for the correct packages and the site where the packages are located.

Follow the directions in the README file that is included with the downloaded file for proper installation.

New Devices

A new device name is created in the `/dev/fbs` directory for the PGX32. The device name is `gfxp#` or `pgxp#`, where `#` is the instance number assigned by the operating system.

Installing Currently Available PGX32 Patches

Patches are available for both bundled and unbundled versions of the PGX32 software. The patch for the unbundled software is 107851-xx. The patches for the bundled version are 107716-xx (Solaris 7), 107715-xx (Solaris 2.6), and 107714-xx (Solaris 2.5.1). Install the latest version of the patch. All patches are cumulative.

Removing This Version of PGX32 Software

Caution – This procedure applies *only* to the release of the PGX32 software described in this document. It is *not* for use with older versions of the PGX32 software you may have had installed prior to this release of the product.

To check the PGX32 software currently installed, type:

```
# pkginfo | grep TSI
```

Refer to TABLE 2-1 and TABLE 2-2 to determine if you have the bundled or the unbundled PGX32 software.

- To remove bundled PGX32 software installed in the above procedure, type:

```
# pkgrm TSIPgx TSIPgxx TSIPgxw TSIPgxmn
```

- To remove unbundled PGX32 software installed in the above procedure, type:

```
# pkgrm TSIGfxdrv TSIGfxOW
```

PGX32 VTS

If the PGX32 VTS (validation test suite) is not bundled with SunVTS™ version in your system, you must obtain VTS versions 3.0 and 3.1. To do this:

1. Type the ftp command to go to `www.techsource.com`.

```
prompt% ftp www.techsource.com
```

2. Log in as `sun-support`.

```
Name: sun-support
```

3. Type the password `pgx32`:

```
Password: pgx32
```

4. Set the transfer mode to binary:

```
ftp> bin
```

5. Look for the software title `pgx32vts.tar.Z`.

```
ftp> dir
```

6. Retrieve the software:

```
ftp> get pgx32vts.tar.Z
```

7. Close the connection

```
ftp> bye
```

8. If the file ends with .Z, uncompress the file:

```
prompt% uncompress pgx32vts.tar.Z
```

9. If the file ends with .tar, untar the file:

```
prompt% tar xvf pgx32vts.tar
```

Note – For SunVTS version 3.2, refer to Patch #107732. This patch has been incorporated in the Solaris 7: 5/99 Supplement CD.

Configuring the PGX32 Screen

After installation, you can configure the X Window screen resolution, bit-depth, and refresh rate for your monitor. (This resolution is independent of the console resolution described in Appendix A.) You can accept the default resolution and skip this chapter.

You can use the configuration menu-style interface utility any time after installation to change screen resolutions. See the `GFXconfig` (unbundled) or `pgxconfig` (bundled) manual pages for detailed descriptions.

Interactive Configuration

- **To configure your PGX32 card, as superuser, use either the `GFXconfig` or `pgxconfig` command.**

For example, use `pgxconfig` if the PGX32 software is bundled with Solaris:

```
# pgxconfig -i
```

The PGX32 configuration window is displayed (FIGURE 3-1).

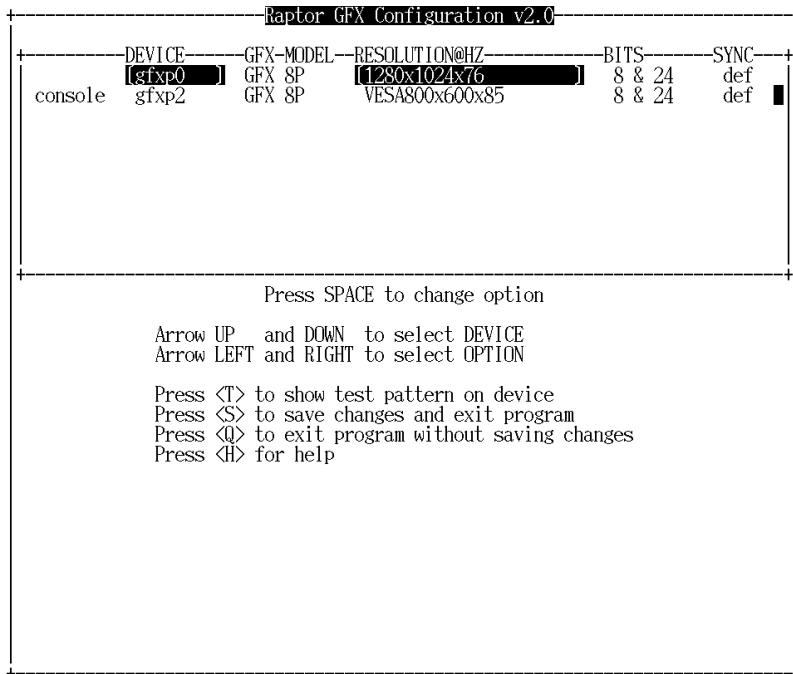


FIGURE 3-1 PGX32 Configuration Window

TABLE 3-1 describes the PGX32 configuration window.

TABLE 3-1 PGX32 Configuration Window

Function	Description
Up and down arrows	Selects the desired PGX32 device to modify.
Left and right arrows	Selects the parameter to modify (for example, screen resolution, bit-depth, or synchronization).
Space bar	Modifies the parameter for the given PGX32 device (brings up a menu when applicable).
T	Puts a test pattern on the entire display. Press any key to return to the main screen. Do not use this function when running under X windows.
S	Saves the current settings and exits the configuration window.
H	Help
Q	Exits the program without saving any changes.

Noninteractive Configuration

Sometimes it is convenient to configure the PGX32 card noninteractively. This method is especially useful when configuring many systems identically or when you know which configuration is appropriate for the system.

The PGX32 configuration command uses the same conventions as the `m64config` utility. `m64config` is used for all ATI-based graphics which include the Sun Ultra 5 and Sun Ultra 10 motherboard graphics (both 8-bit and 24-bit systems) and PGX 8-bit PCI frame buffer. You can set the parameters using the interactive version by specifying the correct parameter flag followed by a desired value. TABLE 3-2 describes these parameters.

TABLE 3-2 Noninteractive Configuration Parameters

Parameter	Description
<code>-dev device</code>	Selects the device to configure.
<code>-res resolution</code>	Sets the resolution name. (You may also use <code>noconfirm</code> , <code>nocheck</code> , and <code>try</code> parameters in addition to the <code>resolution</code> variable.)
<code>-res \?</code>	Shows resolutions.
<code>-file filename</code>	Displays the configuration file: <code>system</code> or <code>machine</code> .
<code>-depth depth</code>	Shows the bit depth (8 or 24, default is 24).
<code>-defaults</code>	Resets the device to the default parameters.
<code>-24only (TRUE/FALSE)</code>	Forces all windows to use 24-bit visuals. This may prohibit some 8-bit applications from working.
<code>-gfile gamma file</code>	Lists the gamma file (currently not supported).
<code>-gvalue gamma value</code>	Lists the gamma value (currently not supported).
<code>-propt</code>	Displays the current settings.
<code>-prconf</code>	Displays hardware information.
<code>-i</code>	Displays graphical user interface.
<code>-help</code>	Shows usage information.

Note – By default, the bit depth is set to 8/24 for resolutions of 1280 × 1024 and less, or 8 only for higher resolutions.

Examples

- To configure the resolution on the PGX32 to 1152 x 900 x 66, type:

```
# GFXconfig -res 1152x900x66
```

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. Then you can accept or reject the resolution. For example:

```
# GFXconfig -res 1152x900x66 try -dev /dev/fbs/gfxp0
```

- To set the resolution to 1024 x 768 x 60 with a single TrueColor visual (no 8-bit PseudoColor visual), type:

```
# GFXconfig -res 1024x768x60 -24only true
```

- To see the current settings for /dev/fbs/gfxp0, type:

```
# GFXconfig -propt -dev /dev/fbs/gfxp0
```

Note – Use `pgxconfig` if the PGX32 software is the Solaris bundled version.

Setting PGX32 as the Console (Optional)

To use the PGX32 software as the console device, use the procedures in the sections that follow.

PGX32 Card as the Only Frame Buffer

Sun Ultra 5 and Sun Ultra 10 Systems

To use the PGX32 card as the system console in an Sun Ultra 5 or Sun Ultra 10 system as the only frame buffer, first disable the 8-bit or 24-bit onboard graphics, that comes standard with these systems.

- **To disable the 8-bit or 24-bit graphics device built into the motherboard, type:**

```
ok setenv pcib-probe-list 1,3
ok reset
```

Once the system is reset, all console messages are directed to the PGX32 card.

- **To restore the motherboard 8-bit or 24-bit graphics device as the console for any reason, simply add it back to `pcib-probe-list` by typing:**

```
ok setenv pcib-probe-list 1,2,3
ok reset
```

Sun Ultra 30 and Sun Ultra 60 Systems

If no other frame buffers are present in a Sun Ultra 30 or Sun Ultra 60, then the PGX32 card is the console by default, provided that the board is in a valid probed PCI slot.

PGX32 Card With a Secondary Frame Buffer

The PGX32 card can be made the console device when other secondary frame buffers are present in the system.

Onboard Graphics (Ultra 5 and Ultra 10 Only)

The onboard graphics card can coexist with the PGX32 card(s). The onboard graphics card is the default console. To change the console to the PGX32 card, follow the procedure described below.

Systems With UPA Bus Frame Buffers

To configure the PGX32 card as the console when UPA frame buffers are in the system, you must change the output-device variable in NVRAM to the actual path of the selected PGX32 cards. You can determine this path by searching for the string `TSI` in the `/` tree at the `ok` prompt.

For example, to find the `pci` devices, type:

```
ok cd /pci@1f,4000
ok ls
```

When you are in the correct location, you should see at least one entry containing the string `TSI` (that is, `TSI,gfxp@#` where `#` is a digit representing your PGX32 slot location).

Use this entry as the console device for your selected PGX32 card. For example, if the path is `/pci@1f,4000` (as shown above) to the device `TSI,gfxp@#`, type:

```
ok setenv output-device /pci@1f,4000/TSI,gfxp@#
ok reset
```

Note – Replace `#` with whatever your PGX32 device requires.

Once the system is reset, all console messages are directed to that PGX32 card.

To restore the default graphics device as the console, simply set the `output-device` variable back to its default value of the screen. To do this, type:

```
ok setenv output-device screen
ok reset
```

Other PCI Frame Buffers

To make the PGX32 the console device when other PCI frame buffers are present in the system, it may be necessary to change the `pcia-probe-list` to probe the PGX32 slot before probing the secondary frame buffer (in addition to the changes described above in “PGX32 Card as the Only Frame Buffer” on page 17.)

- **Determine the slot numbers that correspond to these frame buffers, then ensure that the PGX32 slot number precedes that of the secondary frame buffer in the `pcia-probe-list`.**

For example, if the PGX32 is located in slot 3, and the secondary frame buffer is located in slot 1, then update the `pcia-probe-list` so that slot 3 is probed before slot 1. A possible configuration is:

```
ok setenv pcia-probe-list 3,2,1,4
ok reset
```

Once the system is reset, all console messages are directed to the PGX32 card.

Starting Desktop Environment

This chapter describes how to start the OpenWindows environment, Common Desktop Environment (CDE), and the X Display Manager on the PGX32 card.

OpenWindows Environment

The following sections describe how to start the OpenWindows environment as a console or with multiple PGX32 cards. The PGX32 device name is `gfxp#`.

Using PGX32 Card as the Console

- If the PGX32 card is the console, type:

```
# openwin
```

Using Multiple PGX32 Cards

- To start the OpenWindows environment on two PGX32 devices, use the `openwin` command. The device names for PGX32 is `gfxp#`.

For example, type:

```
# openwin -dev /dev/fbs/gfxp0 -dev /dev/fbs/gfxp1
```

Note – In the above example, the `gfxp` device numbers are 0 and 1. The device numbers may be different in your configuration. Please check `/dev/fbs/` or `dmesg` for correct device numbers.

Common Desktop Environment (CDE)

If you have installed CDE and would like CDE to appear on the PGX32 display, you need to modify your `/etc/dt/config/Xservers` file. If the PGX32 card is the console device, you do not need to modify the `Xservers` file.

The following sample `Xservers.gfx` file assumes that the PGX32 card is the only frame buffer on which to start CDE:

```
:0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -dev /
dev/fbs/gfxp0 -nobanner
```

Note – If for some reason the name of your PGX32 device is something other than `gfxp0`, as shown in the above example, you need to substitute the correct name in the file.

You can add any other desired command line arguments to the end of this line. For example, you can start CDE on multiple displays.

- **To do this, list each display device following the convention above.**

The following example configuration displays CDE on the display named `/dev/fbs/gfxp0` and uses the device named `/dev/fbs/m640` (the built-in graphics device on the Sun Ultra 5 and Sun Ultra 10 systems) as a secondary frame buffer:

```
:0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -dev /
dev/fbs/gfxp0 -dev /dev/fbs/m640
```

X Display Manager

The PGX32 card also supports the X display manager (xdm). A configuration file is provided as `/usr/openwin/lib/X11/xdm/Xservers`.

If you had an `Xservers` file already in place, the PGX32 software installation will have saved it as `/usr/openwin/lib/X11/xdm/Xservers.nogfx`.

By default, the installation will have added the following line, which assumes that the PGX32 is the only frame buffer on which to start `xdm`:

```
:0 Local Local /usr/openwin/lib/xdm/StartOW :0 -dev /dev/fbs/gfxp0
```

You can add any other desired command line arguments to the end of this line. For example, you can start `xdm` on multiple displays.

- **To do this, list each display device following the convention above.**

The following example configuration displays `xdm` on the display named `/dev/fbs/gfxp0` and uses the device named `/dev/fbs/m640` (the built-in graphics device on the Sun Ultra 5 and Sun Ultra 10 systems) as a secondary frame buffer:

```
:0 Local local_uid@console root /usr/openwin/lib/xdm/StartOW :0  
-dev /dev/fbs/gfxp0 -dev /dev/fbs/m640
```


Changing the Console Resolution

This appendix describes how to change the default PGX32 console resolution. This appendix also includes a troubleshooting section describing possible problems and answers associated with changing the console resolution.

Reasons for Changing the Console Resolution

Usually, the default console resolution is sufficient for most users. However, you may need to change the default resolution if:

- You change the X Windows depth from the default listed in the table, then you should configure the console depth to match the X Windows depth.
- The monitor does not “sync up” at the default console resolution, then you need to choose a different console resolution.

Guidelines for Changing the Console Resolution

The general guidelines to follow when changing the default console resolutions are:

- In order to run the X Windows environment in 8/24 mode, set the console resolution to 24 bit-depth.
- By default, console resolutions 1280x1024 and lower will automatically be set to 24-bit. Higher resolutions will default to 8-bit mode.

- Use `GFXconfig -i` or `pgxconfig -i` to test a resolution before configuring the console to that resolution.

Methods for Changing the Console Resolution

The procedures for changing the console resolution described in this appendix include:

- EDID Auto-Detect feature
- `output-device` method
- Video-Mode method
- Video-Timing method

EDID Auto-Detect Feature for PGX32

If you are using a monitor with DDC2B/EDID protocol, then the default resolution is determined using the Auto-Detect feature.

With this protocol, the GFX card first checks the Standard Timing Identifiers (taking the first one supported), then tries to match the Established Timings.

Failing the above method, the card defaults to 1152x900x66.

Note – The monitor must be turned *on* prior to booting the system in order for the PGX32 to communicate with it.

The methods described in this appendix override any information obtained via EDID.

`output-device` Method

It is possible to specify the console resolution of PGX32 card via the `output-device` environment variable by using the format `screen:rAxBxC`,

where: A is the desired horizontal resolution, B is the desired vertical resolution, and C is the desired refresh rate.

The system checks these values against an internal list of resolutions, and uses the corresponding entry as the console resolution.

For example, to use VESA1024x768x75 as the console resolution, type:

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

Note – The new console resolution takes effect following the reset, and holds the resolution information until the `output-device` variable is changed manually.

Video-Mode Method

At the `ok` prompt in Boot PROM mode, the console resolution can be easily set on the PGX32 cards by using one of the 34 preinstalled resolution modes. These resolution settings are identified by video modes 0-33 (TABLE A-1).

Note – Use video modes 0-25 to select a console depth of 24 bits, or video modes 26-33 to select a console depth of 8 bits.

TABLE A-1 PGX32 Console Resolutions

Mode	Resolution
0	640 × 480 @ 60
1	640 × 480 @ 72
2	640 × 480 @ 75
3	640 × 480 @ 85
4	800 × 600 @ 60
5	800 × 600 @ 72
6	800 × 600 @ 75
7	800 × 600 @ 85
8	1024 × 768 @ 60
9	1024 × 768 @ 70
10	1024 × 768 @ 75
11	1024 × 768 @ 77 *

TABLE A-1 PGX32 Console Resolutions (*Continued*)

Mode	Resolution
12	1024 × 768 @ 85
13	1024 × 800 @ 85 *
14	1152 × 900 @ 60
15	1152 × 900 @ 66 *
16	1152 × 900 @ 70
17	1152 × 900 @ 75
18	1152 × 900 @ 76 *
19	1152 × 900 @ 85
20	1280 × 800 @ 76 *
21	1280 × 1024 @ 60
22	1280 × 1024 @ 67 *
23	1280 × 1024 @ 75
24	1280 × 1024 @ 76 *
25	1280 × 1024 @ 85
26	1600 × 1200 @ 66 *
27	1600 × 1200 @ 76 *
28	1600 × 1200 @ 60
29	1600 × 1200 @ 65
30	1600 × 1200 @ 70
31	1600 × 1200 @ 75
32	1600 × 1200 @ 85
33	1600 × 1200 @ 76

* This resolution supports composite sync.

Note – See “Using `nvedit` to Modify NVRAM” on page 32 for a description of `nvedit` commands.

For example, to set the console resolution to 1024x768@60Hz, video-mode 8, type:

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

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

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. Therefore, this method is only meant for monitors whose resolutions are not available in the Video-Mode Method. See “Using `nvedit` to Modify NVRAM” on page 32 for a description of `nvedit` commands.

Note – You should use this method *only* if the previous methods have been unsuccessful.

For example, to set the console resolution to 1280x1024@76Hz:

```
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
```

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 lines, the changes you make with `nvedit` are ignored.

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

256 sync on green

512 positive vertical sync pulse

1024 positive horizontal sync pulse

2048 composite sync

(Add the values together to select more than one)

Note – To obtain the timing parameters required to use this method, contact SunService at 1-800-USA-4SUN with your monitor requirements.

Troubleshooting

TABLE A-2 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 PGX32 firmware checks the various methods in the order of priority that is discussed below. If it finds the resolution from the current method, it uses it; otherwise, it goes down the priority list to find the resolution information. Finally, if there is no resolution information, it uses the default resolution. The resolution-setting methods are enumerated in the order of decreasing priority: <ol style="list-style-type: none">1. DDC2B/EDID auto-detect2. output-device Method3. Video-Timing Method4. Video-Mode Method5. Default resolution for the card
The chosen resolution on the PGX32 is compatible with my monitor, but there is still no video.	Early versions of the PGX32 card require an adapter in order to support composite sync.
Applications using PHIGS, XGL or PEX can cause the window system to crash on a PGX32 frame buffer.	This is caused by bugs in the PEX library and is not specific to the PGX32 frame buffer. The workaround is to set the <code>XGLNOPEX</code> variable before executing PHIGS, PEX or XGL applications. To set the variable, type: <pre>% setenv XGLNOPEX TRUE</pre> XIL patches 105361-06, 107013-01, and 105570-03 must be installed in order to run ShowMeTV™.

Using `nvedit` to Modify NVRAM

- To edit the NVRAM, begin the `nvedit` editor at the `ok` prompt:

```
ok nvedit
```

See “Video-Timing Method” on page 29 for using the `nvedit` editor. There are several key sequences that you must use to edit the variables in NVRAM:

TABLE A-3 NVRAM Editor

Key Sequence	Description
Backspace	Delete the character preceding the cursor
<code>ctrl-l</code>	List NVRAM current values
<code>ctrl-p</code>	Move to the previous line
<code>ctrl-n</code>	Move to the next line
<code>ctrl-b</code>	Move to the previous character
<code>ctrl-f</code>	Move to the next character
<code>ctrl-u</code>	Delete to the beginning of the line
<code>ctrl-j</code>	Join the current and next line
<code>ctrl-k</code>	Delete the current line
<code>ctrl-c</code>	Exit <code>nvr</code> editor (return to <code>ok</code> prompt)

The changes takes effect only if they are stored using the `nvstore` command, entered at the `ok` prompt. Once the changes are stored, the NVRAM must be enabled before the system will execute it. This is done by setting the environment variable `use-nvramrc?` to `true`.