# *ACCELERATED-X*

*GRAPHICAL DISPLAY SERVER*

*USER'S GUIDE*

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# Credits

None of this would have been possible without the MIT X Consortium and the new X Consortium.

This software is primarily the work of Thomas Roell. X Inside is grateful to the following individuals and organizations for testing and product enhancement suggestions:

- Arne Steinkamm and other BSDI users
- Tapio Lapinnen for SVR4 work
- Larry Lipstone of StoneWare (lrl@stoneware.com)
- Users of the X386 freely distributed server

We are especially grateful to Manoj Goyal, Barry Greenberg, Scott Weisner, and all at SunSoft. Thanks, the product wouldn't be what it is now, without your help and suggestions!

# PREFACE

## Document Overview

**Chapter One—Introduction** describes the features of the Accelerated-X graphical display server. Please note that graphics technology is changing rapidly and we keep thinking of new things to do. Unavoidably, by the time this manual is in print, it's obsolete. The installation of the program should result in a smallish README file containing the latest and greatest information at the time that the installation diskette was made. The most up to date information is available from the X Inside automated support services.

**Chapter Two—System Requirements** details the software and hardware requirements to install and use the programs. You have probably already resolved any compatibility issues with your sales person or from technical information. If you have remaining doubts, read this section and then try the server if there's no obvious reason why it should fail.

**Chapter Three—Installation** documents the installation process and notes any Operating System specific variations to the procedure. The installation process covers loading the software to the disk and tuning the server to the best match of graphics chip set and monitor. Many System Administrators and technical users will want to know what files have been installed and what files are used. This information is included in Chapter Five.

**Chapter Four—Configuration** documents the many aspects of the Accelerated-X Server that you can configure. This chapter includes steps for performing the configuration.

**Chapter Five—Technical Details** documents technical aspects of the product, useful for GUI programmers and System Administrators.

**Chapter Six—Help Information** is the final chapter. This chapter includes troubleshooting for both the installation process and continued operation, as well as support information and a glossary of technical terms.

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*Chapter One*

# *INTRODUCTION*

# Introduction

Thank you for purchasing this copy of the Accelerated-X graphical display server. We hope that you will find this high performance server simple to install and unobtrusive to use.

If you know your way around your operating system and the X Window System, you can skip most of this manual and just read the technically oriented material in chapters 3 and 4.

# Features

This server is tuned for performance. We expect that the server will show only moderate performance improvements on standard VGA chip sets, but will give you outstanding performance on modern high performance chip sets.

It is normal to find that the same server and graphics board will get different performance indices when running on different Operating Systems or even different revisions of the same OS. Add the variation of PC's and the continuous development cycles running at most graphics solution providers and there is little chance that you can exactly match our figures or of us being able to quote exact performance measures for your specific hardware combination.

## Feature List

The 1.0 server is X11R5 based; the 2.0 server is X11R6 based. The server base has been in continuous development for over three years. Early versions of the server were shipped as the freely distributed X386 server (later, XFree86). Features of this server include the following:

- Benchmark ratings on a PCI Bus machine with Intel 486DX2 processor running at 66MHz with the BSD/386 Operating System using a PCI bus Matrox MGA-II card:

  350,000 xStones

  6.7 Xmarks

- 8 bit PseudoColor (256 colors) and 15/16 bit (32k and 64k colors) and 24 bit TrueColor (16 million colors or so) modes are supported.
- Virtual Desktop of up to 1600x1200, with panning by mouse movement, permits monitors capable of displaying as little as 640x480 to be used with an effective screen of 1600x1200.
- System V style virtual terminal support allows you to run up to eight X Servers at the same time on one machine.
- Up to eight graphics boards can be supported by one X Server (up to six Matrox MGAs and two ELSA WINNER

2000 S3 928 boards or combinations of ColorGraphic Twin and Twin Turbo). Each of the boards can have different resolutions and depths. The mouse slides from one screen to another, but it is not possible to move windows between screens in release 1.x of the product.

- 25 European, US and Japanese keyboards are supported by the X Server.
- Text based descriptions of configuration, graphics board capabilities, and monitors permit easy site-specific or per machine custom configuration.
- VESA VDIF files for describing the monitor allow the X Server to use any resolution that the graphics hardware is able to display, not just standard resolutions.
- When the server fails, it will send us some email (*bugs@xinside.com*) with a stack trace so that we can diagnose the problem. We can frequently work out what the problem is before you are fully aware that the server has failed.
- Mouse support of host OS is used or you can directly use mice compatible with:
  - Microsoft Mouse
  - Mouse Systems Mouse
  - Logitech MouseMan, TrackMan series
  - Logitech C7/S9
- *Shared-Memory*, *Shape*, *Multi-Buffering*, and *Xidle* are included as standard shipped X-Extensions.
- An integrated device color management system implements the full XCMS System, including gamma correction, gamma compression, and white point adjustment.
- X-Extensions can be added to the X environment without installing a new revision of the X Server.
- HotKeys for switching the display resolution.
- Compatible with quirks of X Servers supplied with the OS.
- X-Extensions and font-renderers are loaded on demand.
- *Adobe Type-1* and *BitStream Speedo* are included as standard shipped font-renderers.

- A wide range of graphics boards and resolutions are supported. The chart below is sorted by the graphics chip versus resolution and the number of bits used to represent color.
  - A chip set supporting 4 bit planes provides 16 colors.
  - A chip set supporting 8 bit planes provides 256 colors.
  - A chip set supporting 15 bit planes provides 32,768 colors.
  - A chip set supporting 16 bit planes provides 65,536 colors.
  - A chip set supporting 24 bit planes provides 16 million colors.

  The following chart shows 4 for 4 bits, 8 for 8 bits, and 16 for 15 and 16 bits, while 32 is used for 24 bits. This reflects how color representation works in the hardware. This also implies that for 24 bits there are actually 32 bits used. We have no driver that supports 24 bits using 3 bytes per pixel, because performance suffers badly.

***Table 1: Supported Hardware( at June 10, 1994)***

| Chip Vendor | Chip Set Name | 640 x 480 | 800 x 600 | 1024 x 768 | 1152 x 900 | 1280 x 1024 | 1600 x 1200 |
|---|---|---|---|---|---|---|---|
| ATI | MACH8 | 4/8 | 4/8 | 4/8 | 4 | 4 | - |
| | MACH32 | 4/8/16 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | - |
| | MACH64 | 8/16/32 | 8/16/32 | 8/16/32 | 8/16 | 8/16 | 8 |
| Cirrus Logic | GD5402 | 4/8 | 4/8 | 4 | 4 | - | - |
| | GD5420 | 4/8 | 4/8 | 4/8 | 4/8 | - | - |
| | GD5422 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| | GD5424 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| | GD5426 | 4/8/16 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | - |
| | GD5428 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4/8 | - |
| | GD5429 | 4/8/16 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | - |
| | GD5430 | 4/8/16 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | - |
| | GD5434 | 4/8/16/32 | 4/8/16/32 | 4/8/16/32 | 4/8/16 | 4/8/16 | - |
| Compaq | Qvision 2000 | 8/16/32 | 8/16/32 | 8/16 | 8/16 | 8 | 8 |
| Dell | DGX | - | - | 8/16 | 8 | 8 | |
| IBM 8514 | VESA 8514 | 4/8 | 4/8 | 4/8 | - | - | - |
| | 82C480 | 4/8 | 4/8 | 4/8 | 4/8 | 4/8 | - |
| | 82C481 | 4/8 | 4/8 | 4/8 | 4/8 | 4/8 | - |

| Chip Vendor | Chip Set Name | 640 x 480 | 800 x 600 | 1024 x 768 | 1152 x 900 | 1280 x 1024 | 1600 x 1200 |
|---|---|---|---|---|---|---|---|
| IBM VGA | STDVGA | 4 | - | - | - | - | - |
| IBM XGA | XGA | 8/16 | 8 | 8 | - | - | - |
| | XGA-2 | 8/16 | 8 | 8 | - | - | - |
| IIT | AGX014 | 8 | 8 | 8 | - | - | - |
| | AGX015 | 8 | 8 | 8 | 8 | 8 | - |
| MATROX | MGA-I | 8/16/32 | 8/16/32 | 8/16/32 | 8/16/32 | 8/16/32 | 8 |
| | MGA-II | 8/16/32 | 8/16/32 | 8/16/32 | 8/16/32 | 8/16 | 8/16 |
| Oak | OTI067 | 4/8 | 4/8 | 4/8 | - | - | - |
| Technology | OTI077 | 4/8 | 4/8 | 4/8 | 4/8 | 4 | - |
| | OTI087 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| S3 | 86C801 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4/8 | - |
| | 86C805 | 4/8/16 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | - |
| | 86C805i | 4/8/16 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | - |
| | 86C864 | 8/16/32 | 8/16/32 | 8/16 | 8 | 8 | - |
| | 86C911 | 4/8 | 4/8 | 4/8 | 4 | 4 | - |
| | 86C924 | 4/8 | 4/8 | 4/8 | 4 | 4 | - |
| | 86C928 | 4/8/16/32 | 4/8/16/32 | 4/8/16/32 | 8/16 | 8/16 | 8 |
| | 86C964 | 8/16/32 | 8/16/32 | 8/16/32 | 8/16/32 | 8/16 | 8/16 |
| Trident | TVGA8900B | 4/8 | 4/8 | 4/8 | 4/8 | - | - |
| | TVGA8900C | 4/8 | 4/8 | 4/8 | 4/8 | - | - |
| | TVGA8900CL | 4/8 | 4/8 | 4/8 | 4/8 | - | - |
| | TVGA9000 | 4/8 | 4/8 | 4 | 4 | - | - |
| | TVGA9000i | 4/8 | 4/8 | 4 | 4 | - | - |
| Tseng Labs | ET3000 | 4/8 | 4/8 | 4 | 4 | - | - |
| | ET4000 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| | ET4000/W32 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4/8 | - |
| | ET4000/W32i | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4/8 | - |
| | ET4000/W32p | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4/8 | - |
| Weitek | P9000 | 8/16/32 | 8/16/32 | 8/16 | 8/16 | 8 | 8 |
| WDC | PVGA1 | 4/8 | 4/8 | 4 | - | - | - |
| | WD90C00 | 4/8 | 4/8 | 4 | - | - | - |
| | WD90C11 | 4/8 | 4/8 | 4 | - | - | - |
| | WD90C30 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| | WD90C31 | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| | WD9500 | 4/8 | 4/8 | 4/8 | - | - | - |

*Chapter Two*

# *SYSTEM REQUIREMENTS*

# Requirements

This implementation of the server is for Intel 386/486 and Pentium PC based UNIX systems. You will need an Intel based PC that meets the minimum requirements for graphical operations under the UNIX implementation that you are running. This server, unlike some others available, is optimized for Intel processors, so we use integer arithmetic extensively. You do not need a 486DX or 387 math coprocessor to obtain reasonable performance (though other features of a 486DX or Pentium will improve performance).

## OS & Hardware

To implement the server, you must be able to login as the superuser or have someone login as *root* for you. You must also have the following:

- An Operating System included in the list below, or one fully compatible, with its native implementation of X Windows or Openwindows installed:
  - SCO UNIX 3.2.4 or later or SCO ODT 1.1 or later
  - SunSoft Solaris 2.1 or later
  - Novell or Univel UnixWare 1.0 or later
  - OnSite UNIX 1.0 or later (SVR4.2)
  - SVR 4.0 from ICL, Dell, and ESIX
  - SNI SINIX-Z
  - Berkeley Software Design Inc. BSD/386 1.1 or later
- At least 3MB free disk space under /usr.
- A graphics board with one of the graphics chips listed in Table 1 (page 6).

## Recommendations

You should make sure that the X display server supplied with the Operating System works in at least one mode, such as standard VGA (640x480, 16 colors), before installing the Accelerated-X server. This ensures that you have a working environment of graphical programs before you change the server.

For the highest graphical performance we recommend:

- A 3 button bus mouse
- At least 8MB RAM more than the minimum required by the OS.
- More swap space than you think you'll need; graphical applications are memory hungry and swap space shortage can lead to strange problems.

*Chapter Three*

# *INSTALLATION*

# Installation

## Before you start

Here's a short description of what you need to do to install the server and use it:

- disable graphical logins
- install the software using *custom*, *installpkg*, or *pkgadd*
- reboot the system (if the install procedure tells you to)
- run Xsetup to configure
- enable graphical logins

Before you start the installation process, make sure that you have everything ready. The installation and configuration processes require some knowledge of the graphics hardware that you are using. Please have the handbooks for the following components ready or have some other knowledge source available for questions.

Graphics Board(s)

- Board name and vendor
- Installed graphics memory
- Graphics chip (S3, XGA....)
- Display capabilities of the board

Monitor

- Monitor name and vendor
- Maximum resolution
- Maximum refresh frequency

Keyboard

- National language keyboard used by the system

Mouse

- 2 or 3 button
- Serial, PS/2 (keyboard) or bus
- If serial, the name of the serial port to which the mouse is connected

Make sure that you have installed the graphics board before you start installing Accelerated-X. Make sure that your system fulfills all the basic requirements described in the previous chapter.

## Basic Steps

The installation process has several distinct steps. Each must be completed successfully before beginning the next step.

1. The installation program detects which Operating System you are using.
2. All files needed for your environment will be unpacked from the installation media. This can take quite some time, since all files are compressed on the floppy diskette.
3. For some Operating Systems a device driver will be added to your system for exclusive use by the X Server.
4. You are prompted to reboot your system in order to reflect all changes at the kernel level.
5. You should use the Xsetup utility to configure the X Server.

## Installation Utilities

Depending on your Operating System, you have to use a specific installation utility to install the software. Each installation utility uses the same floppy disk. The following sections describe the process for every supported installation utility:

| | |
|---|---|
| custom | SCO UNIX |
| installpkg | ISC UNIX |
| pkgadd | Solaris, UnixWare, OnSite, ICL, ESIX, Dell, SINIX-Z |

# *Installation with* custom *on SCO operating systems*

## *Installing*

The first step is to prepare the machine for installing Accelerated-X. To do this, you must terminate the graphical login you are running.

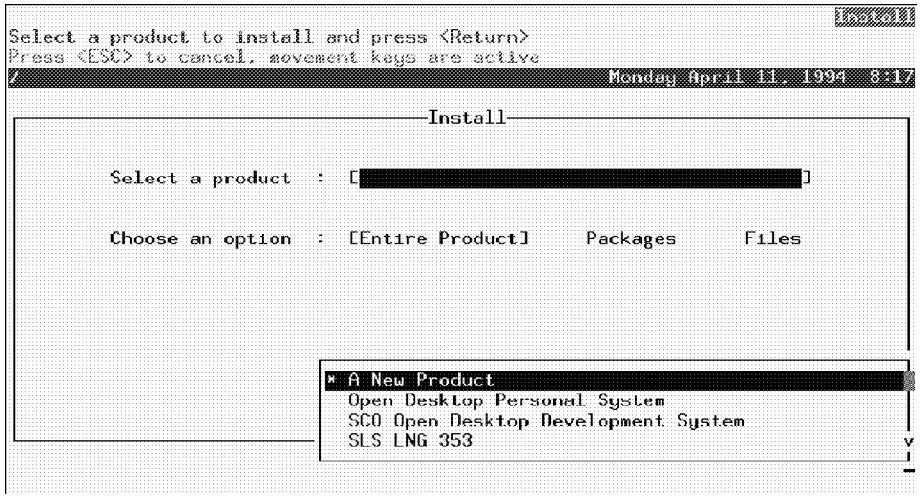
```
puga:/# scologin disable
```

At this point all you have to do is start the custom utility. Use the cursor keys to select the item *Install* and then press return.

```
puga:/# custom
```

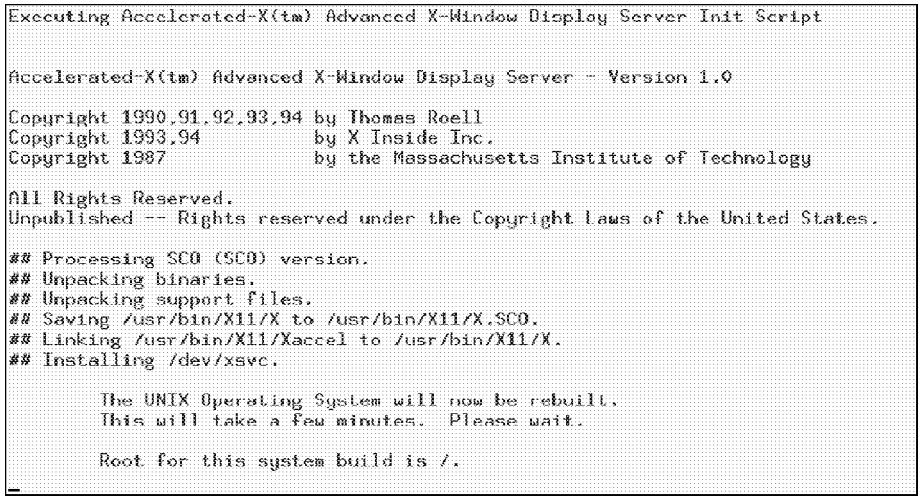
The *custom* utility asks you if you want to install a new product (which is true for our scenario) and in which floppy drive the distribution diskette is placed.

***Figure 1: The custom utility asks if you want to install a new product.***



Normally all questions can be answered with **Yes**. Now custom reads in the correct files from the floppy and starts the Accelerated-X installation script.

***Figure 2: Watch to make sure the correct operating system is selected.***




The Accelerated-X installation process detects the system type and other internal features. First it detects the installation scenario, which in this case should be SCO (SCO).

If you are installing for the first time, watch the installation to make sure that the correct operating system is selected. You'll see text as in Figure 2. Otherwise, from here on everything is automated and you can just head for the next cup of espresso .

The **Processing** line is the important line. The primary name *SCO* represents the flavor of the base version *(SCO)*. If these do not represent a close match to your OS, please cancel the installation and get help from your software supplier. You can cancel the installation with the Interrupt key, which is usually DELETE but may be CONTROL-C.

After displaying the OS version line the installation process works for some time on its own with heavy disk usage. All the individual files are extracted from a compressed archive. Be patient and all the files will be put on the hard disk.

After all files are in place the installation enables the new X Server as the default, while saving the original default X Server.

Since Accelerated-X needs a special device driver to run under SCO UNIX, the last action is to install this driver and rebuild the kernel. This, of course, means that Accelerated-X won't run without rebooting the machine.

During the course of rebuilding the kernel SCO, UNIX asks you if it should install this kernel as the default and if it should rebuild the kernel environment. Both questions must be answered with **Yes** in order to install the new kernel correctly.

Finally, leave the *custom* utility, reboot the machine, and continue with the setup of Accelerated-X described in a following section.

## Removing

To remove the Accelerated-X server you must login as **root** from a character mode session, as shown in the installation process. After logging in, use *custom* to uninstall the package. Use the cursor keys to select the item *Remove a package* and walk through the following menus.

All files are removed with the exception of:

```
/etc/Xaccel.ini
```

We deliberately leave this configuration file behind, so that reinstalling the server is easier. You may delete this file if you are permanently removing the Accelerated-X server.

```
puga:/# rm /etc/Xaccel.ini
```

# *Installation with* installpkg *on ISC*

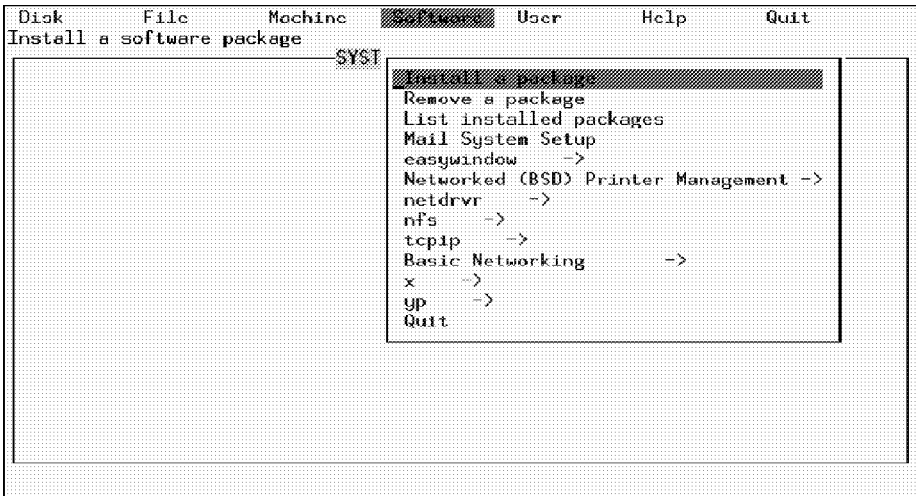
## *Installing*

The first step is to prepare the machine for installing Accelerated-X. To do this, you must terminate the graphical login you are running. Normally there is no graphical login running under ISC. In case you are running xdm, please disable xdm as well as the automatic startup on reboot time.

At this point all you have to do is start the *sysadm* utility. Use the cursor keys to select the item *Software/Install a package* and press return.

```
puga:/# sysadm
```

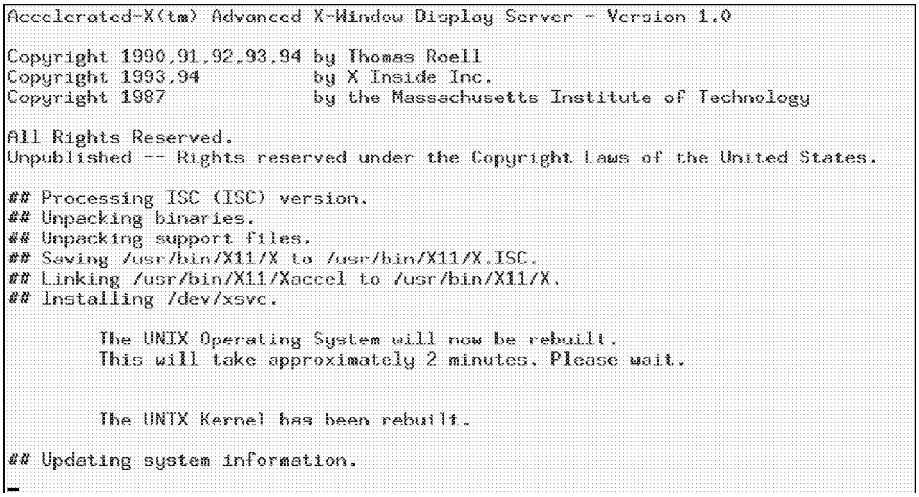
***Figure 3: Choose* Install a package *from the* Software *menu.***




The *sysadm* utility asks you in which floppy drive the distribution diskette is placed. Normally all questions can be answered with **Yes**. Now sysadm reads in the correct files from the floppy and then starts the Accelerated-X installation script.

The Accelerated-X installation script performs several internal actions. First, it detects the installation scenario, which in this case should be ISC (ISC).

***Figure 4: Watch to make sure the correct operating system is selected.***




If you are installing for the first time, watch the installation to make sure that the correct operating system is selected. You'll see text as in Figure 4. Otherwise, from here on everything is automated and you can just head for the next cup of cappuccino.

The **Processing** line is the important line. The primary name *ISC* represents the flavor of the base version *(ISC)*. If these do not represent a close match to your OS, please cancel the installation and get help from your software supplier. You can cancel the installation with the Interrupt key, which is usually DELETE but may be CONTROL-C.

After displaying the OS version line the installation process works for some time on its own with heavy disk usage. All the individual files are being extracted from a compressed archive. Be patient and all the files will be put on the hard disk.

After all files are in place the installation enables the new X Server as the default, while saving the original default X Server.

Since Accelerated-X needs a special device driver to run under ISC UNIX, the last action is to install this driver and rebuild the

kernel. This, of course, means that Accelerated-X won't run without rebooting the machine.

Finally, leave the *sysadm* utility, reboot the machine, and continue with the setup of Accelerated-X described in a following section.

## Removing

To remove the Accelerated-X server you must login as **root** from a character mode session, as shown in the installation process. After logging in, use *sysadm* to uninstall the package. Use the cursor keys to select the item *Software/Remove a package* and walk through the following menus.

All files are removed with the exception of:

```
/etc/Xaccel.ini
```

We deliberately leave this configuration file behind, so that reinstalling the server is easier. You may delete this file if you are permanently removing the Accelerated-X server.

```
puga:/# rm /etc/Xaccel.ini
```

# *Installation with* **pkgadd** *on Solaris, UnixWare, OnSite, ICL, ESIX, Dell and SINIX-Z*

## *Installing*

The first step is to prepare the machine for installing Accelerated-X. To do this, you must terminate the graphical login you are running. Solaris doesn't normally use a graphical login, since you start the window system from text-mode. Just login as **root**.

For UnixWare & UNIX System V Release 4.2 derivatives you have to switch to the console character mode login with the key chord *Alt-SysReq h*. Login as **root** on the console. Do not use *disable_glogin* and *enable_glogin* as they do not work properly in early versions of UnixWare.

```
puga:/# kill -1 `cat /dev/X/xdm-pid`
puga:/# mv /etc/rc2.d/S69xdm /etc/init.d/xdm
```

At this point all you have to do is use the *pkgadd* utility to install the software. If you are using the primary floppy drive, type:

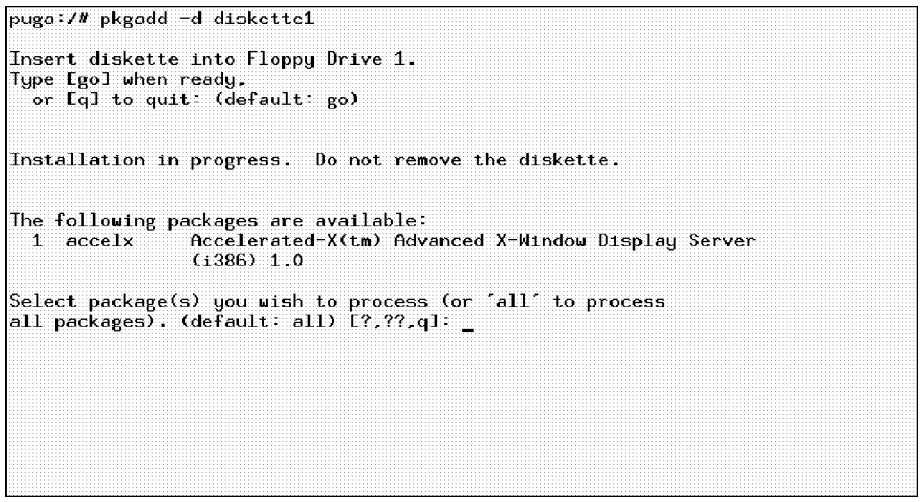
```
puga:/# pkgadd -d diskette1
```

If you are using the secondary floppy drive, type:

```
puga:/# pkgadd -d diskette2
```

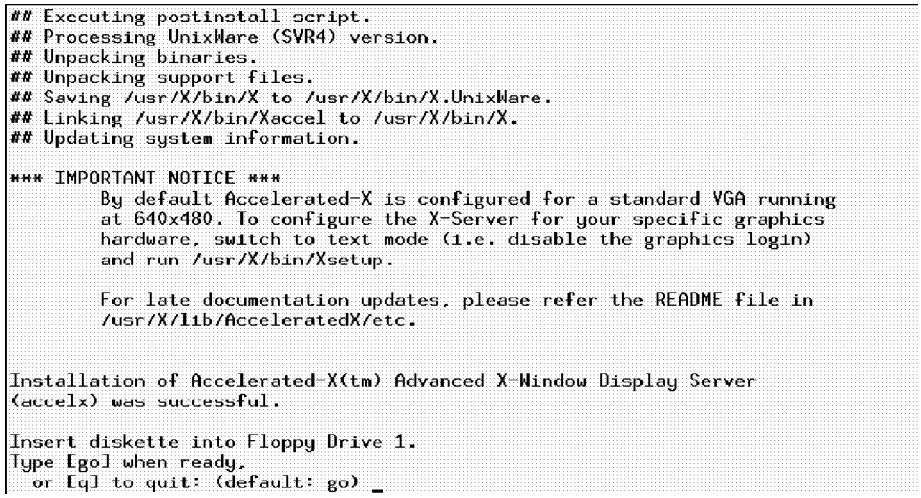
*Pkgadd* searches the floppy disk for available packages and prompts you to specify which of the available packages you want to install. Since there is only one package on the floppy disk, just press <Enter>.

***Figure 5: Use the* pkgadd *utility to install the software.***




Now *pkgadd* reads in the correct files from the floppy and then starts the installation script. This script first detects the installation scenario, which in this case should be either *UnixWare (SVR4)* or *Solaris (SVR4)*.

***Figure 6: Watch to make sure the correct operating system is selected.***



If you are installing for the first time, watch the installation to make sure that the correct operating system is selected. You'll see text as in Figure 6. Otherwise, from here on everything is automated and you can just head for the next cup of fine Darjeeling tea.

The **Processing** line is the important line. The primary name *UnixWare* represents the flavor of the base version *(SVR4)*. If this does not represent a close match to your OS, please cancel the installation and get help from your software supplier. You can cancel the installation with the Interrupt key, which is usually DELETE but may be CONTROL-C.

After displaying the OS version line the installation process works for some time on its own with heavy disk usage. All the individual files are extracted from a compressed archive. Be patient and all the files will be put on the hard disk.

After all files are in place the installation enables the new X Server as the default, while saving the original default X Server.

Depending on the release of the Operating system, Accelerated-X needs a special device driver to run correctly. Therefore, the last action is to install this driver, if needed, and rebuild the kernel. If you see the kernel being rebuilt or get some message about needing to reboot, it means that Accelerated-X won't run without rebooting the machine.

If a device driver was installed, please reboot the machine and continue with the setup of Accelerated-X described in a following section.

Finally, if you are on UnixWare or a close derivative, you may want to re-enable graphical logins by default.

```
puga:/# ln /etc/init.d/xdm /etc/rc2.d/S69xdm
```

## Removing

To remove the Accelerated-X server you must login is as **root** from a character mode session, as shown in the installation process. After logging in, use *pkgrm* to uninstall the package.

```
puga:/# pkgrm accelx
```

All files will be removed with the exception of:

```
/etc/Xaccel.ini
```

We deliberately leave this configuration file behind, so that reinstalling the server is easier. You may delete this file if you are permanently removing the Accelerated-X server.

```
puga:/# rm /etc/Xaccel.ini
```

*Chapter Four*

# *CONFIGURATION*

# Configuring the Accelerated-X Server

## Before you start

Before you touch the keyboard we'd like to explain how the Accelerated-X server works. This will help you understand what has to be done to configure the X Server correctly.

Unlike other graphical software, Accelerated-X uses no fixed set of precomputed resolutions. Instead, we use another approach which makes it possible for you to get the best results from your graphics board and monitor. To do this you must tell Accelerated-X exactly which graphics board(s) you have and which monitor is connected to each board. Accelerated-X uses this information to compute the best possible resolution/refresh rate. Common available resolutions are:

- 640x480
- 800x600
- 1024x768
- 1152x900
- 1280x1024
- 1600x1200

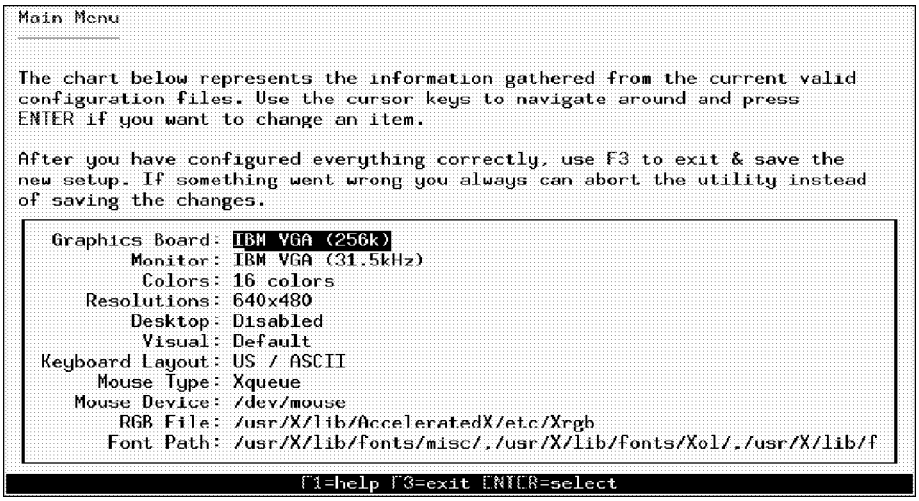
Next, think about how many colors you'd like to use. Most boards support 256 colors efficiently. For an initial configuration we strongly recommend that you use only 256 colors to avoid possible hardware incompatibilities that can occur if you use more colors. Many cards can support 32,768 and 65,536 colors. A few high end graphics boards can also support 16 million colors. Very often modes with more than 256 colors are not supported in accelerated mode by the underlying hardware and hence will be slower.

Accelerated-X also supports a virtual desktop feature. That means you can have a big virtual screen of 1600x1200 and only display a 1024x768 image on the screen. Using the mouse, you can quickly pan the 1024x768 viewable section around the larger virtual area.

Many graphics accelerators support only a few possible virtual desktop sizes, and some don't allow it at all. Also, there are some chips which have display problems if you pan around (snow on the screen while panning).

You should leave this feature disabled for the initial configuration and experiment with it when you have the server working in all other respects.

***Figure 7: A menu displays the current valid configuration.***




After the installation, Accelerated-X is configured for the system default setup with support for a VGA in 640x480 with 16 colors. This will most likely work on all graphics boards supported. So if anything goes wrong or for some reason Accelerated-X fails to come up correctly, just delete /etc/Xaccel.ini and you can again start from this default configuration. Also, we strongly recommend that if the display looks wrong on the screen, try out the default VGA setting to ensure that there is no other hardware problem involved.

Here are some steps to try during installation and configuration:

1. Use default Xaccel.ini
2. Verify 640x480 operation.
3. Set up the monitor description.
4. Set up the graphics board using 640x480 and 256 colors (8 bit planes) or more.
5. Verify operation.
6. Set up greater resolution.

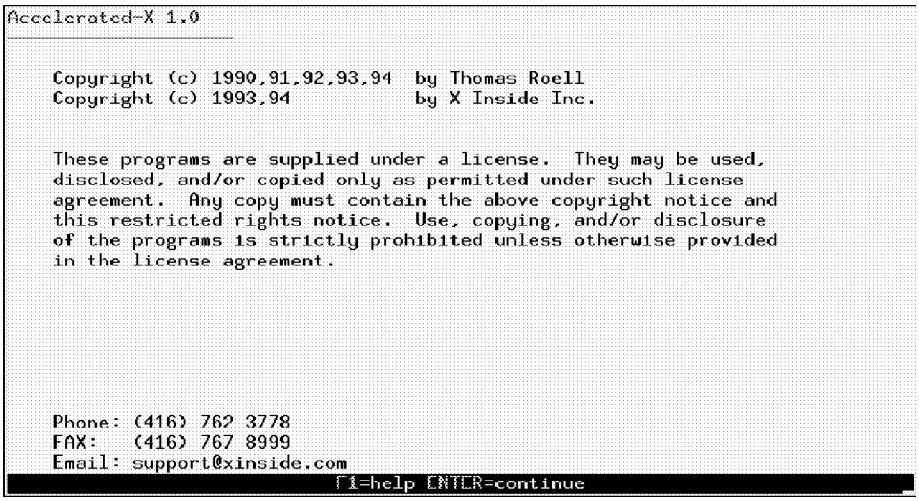
7. Verify operation.
8. Set up virtual desktop.
9. Verify operation.
10. Repeat the above steps for other graphics boards.

Now let's start the setup utility (being logged in as **root**):

```
puga:/# Xsetup
```

***Note:*** *Xsetup is in the same directory as the normal X Window applications. So, if this directory is not included in the default $PATH, please use the full pathname.*

***Figure 8: A menu displays the copyright and support information.***

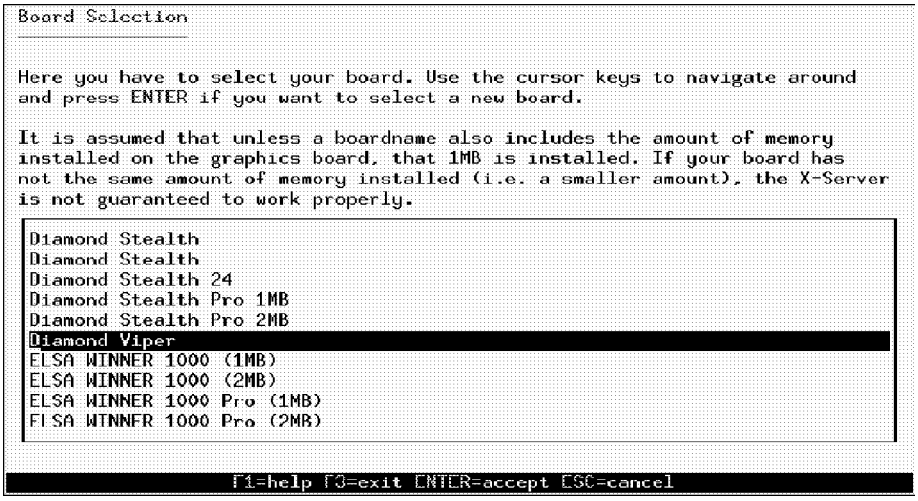



Xsetup takes a while to start up. It has to parse all configuration files for the supported graphics boards and monitors. You'll see a spinning wheel at the bottom of the first screen. After everything is loaded you'll see the copyright and support information screen. Press <Enter> to see the main menu, which, the first time you run, will be set up with defaults that should work.

## Graphics Board

By default the cursor is over the *Graphics Board* option. Just press <Enter> to choose a different option. This displays a list of boards that you can choose from.

***Figure 9: Choose the appropriate graphics board from the list.***



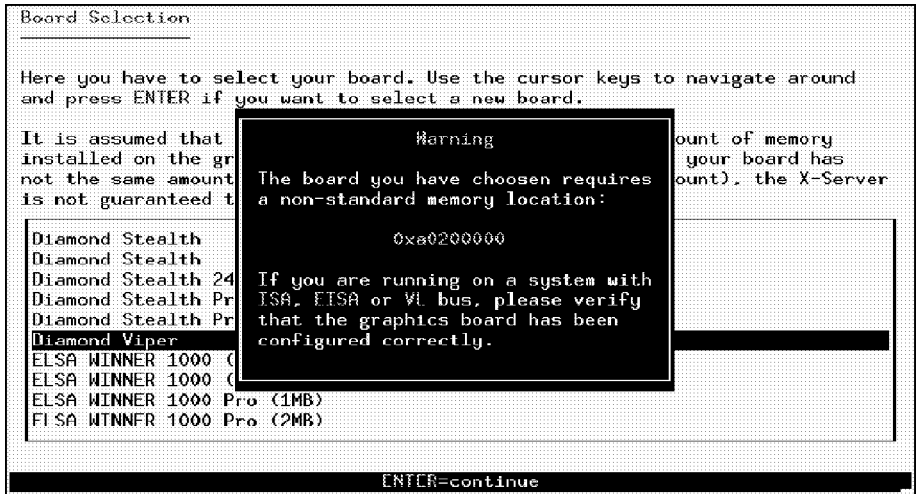

Use the cursor keys to scroll through the list to find your specific board. If it is listed, press <Enter> while the entry is highlighted. Make sure that you choose the correct entry. There might be more than one entry per board, reflecting perhaps a different memory size.

If you don't find your board, scroll through the list and try to find an entry that best matches your hardware (there are many boards shipped from different vendors which are basically identical).

You can also choose one of the *generic* entries. These are identified by having the graphics chip vendors name included in the board name. Most likely, one of these will work for you as well. However, not all features that the graphics board might offer are available within these entries.

If you want to exit from this scrolling list without changing the original board entry, press ESC.

*Figure 10: A warning box notifies you of any problems.*




Sometimes a little box pops up and notifies you of an address range for the selected board. The reason for this is that unless you have a PCI system, there is no way for the software to find out where the memory of a graphics board has been mapped, unless it uses only the portion of the address space to which the VGA is normally mapped.

Under normal circumstances Accelerated-X can take care of those hairy cases by hard coding the address spaces of the graphics cards into configuration files. This makes sense, since most graphics boards have only one fixed address range available. However, there are a few boards that can be mapped to a user-configurable address range. Obviously, Accelerated-X cannot cope with that directly, given the possible variations of graphics hardware.

In cases where this address range is different from the VGA address range, there is a popup box telling you where the X Server expects the card to be mapped to. If that popup appears on your screen, double check your documentation or write down the address where the X Server expects the hardware. Later, run the setup utility that came with the graphics board.

If you are running a PCI graphics board, all these things don't concern you, since PCI allows Accelerated-X to reliably detect the address range of a graphics board.

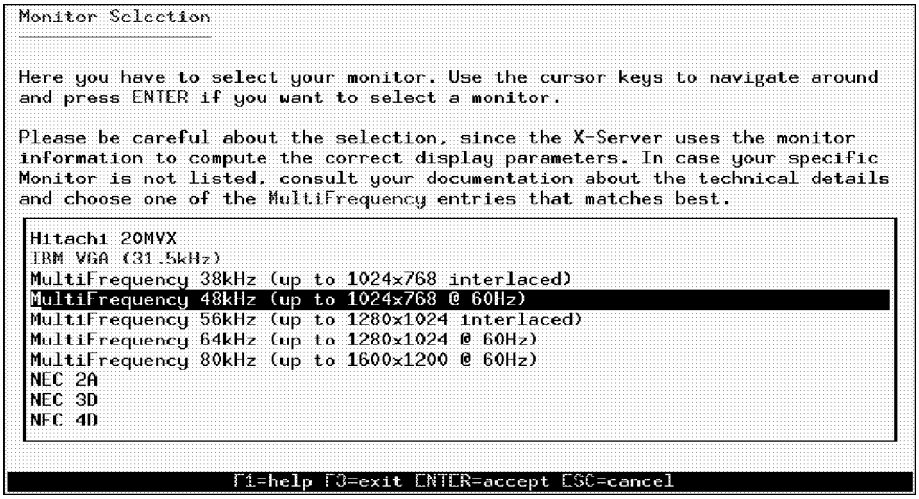
## Monitor

```
WARNING: If you select a monitor description with a higher
frequency than is supported by your monitor, then you may
cause the monitor to fail catastrophically.
```

Now you have to select the monitor to use. Use the cursor down key to navigate to the *Monitor* option and press <Enter>. A list of monitors appears. If you are not sure which monitor is the right one for you, select one of the *Multifrequency* monitors. For example, if you know your monitor will support 1024x768 noninterlaced at over 60Hz, select the one from the list that provides 1024x768 non-interlaced at 60Hz.

```
HINT: You'll probably get a sharper image by selecting a
lower frequency than your monitor and board support.
```

***Figure 11: Choose the appropriate monitor on the Monitor Selection screen.***



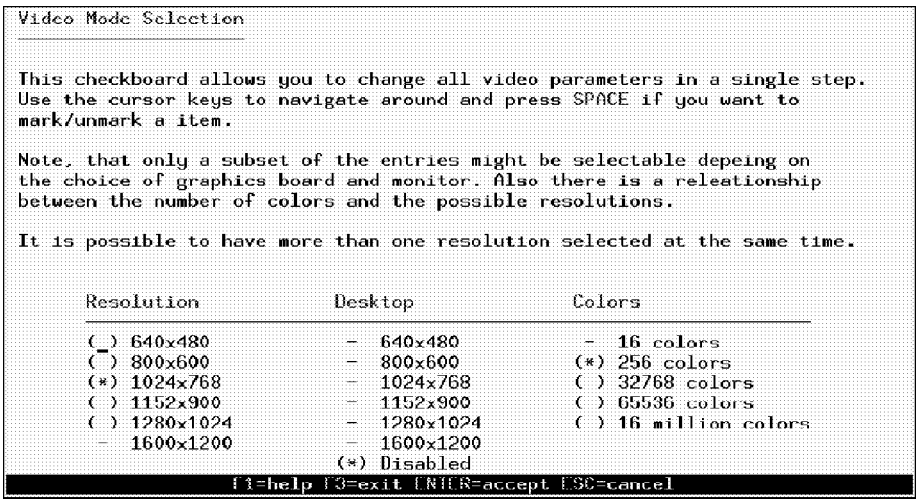

The video-timings used by the *Multifrequency* entries are the official VESA standard video-timings. That means that many of the monitors available today will be able to use them directly, and therefore require no special entry in this list.

However, if your monitor vendor provided you with a special VESA VDIF file for your monitor, you can use this together with Accelerated-X. Copy the file to the directory $XACCELHOME/monitor/misc.

## Resolution, Desktop, and Colors

On the main setup screen move the cursor down to *Colors* (or *Resolution* or *Desktop*) and press <Enter>. A checkboard appears where you can choose the different resolutions and colors. Use the cursor keys to move around. To select an item, press the spacebar. If you want to get back without any changes, just press ESC. If you press <Enter>, your choices become valid.

***Figure 12: Choose the desired items on the Graphics Mode Selection screen.***




In the *Resolution* column there may be more than one entry enabled at one time. The result is that the X Server is able to switch between these resolutions on the fly. By default the highest selected resolution will be used as default at server startup time.

For the *Desktop* column there is only one choice valid at one time. Note also that this virtual desktop feature is not available for all graphics boards, resolutions, and depths.

Within the *Colors* column you can choose the number of colors the X Server should be able to display at the same time. Not all entries here are selectable. This largely depends upon your graphics board. The number of colors is also a limiting factor for both the possible resolutions and the virtual desktop. This means

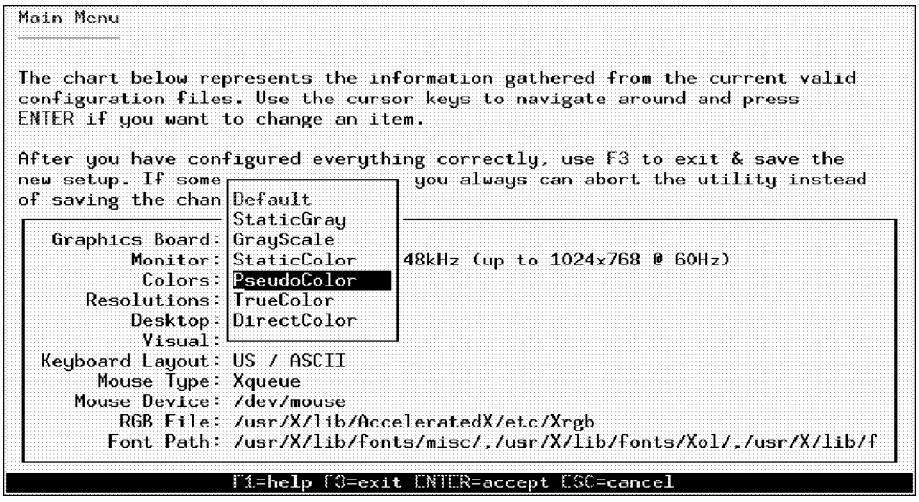
that if you change the number of colors, the Xsetup utility might also change the selected resolution and the virtual desktop to present valid entries.

## Visual

From the main screen you can now choose a specific X-Visual. This makes sense only for special applications that will not run with the default visual. The Default visual is:

| Colors | Visual |
|---|---|
| 16 | StaticColor |
| 256 | PseudoColor |
| 32,768/65,536/16 million | TrueColor |

***Figure 13: Choose the Visual details on the main screen.***




Unless you are really sure why and to what the default visual should be changed, you should leave this at the *Default* entry. This allows the X Server to choose the best default visual for most applications.

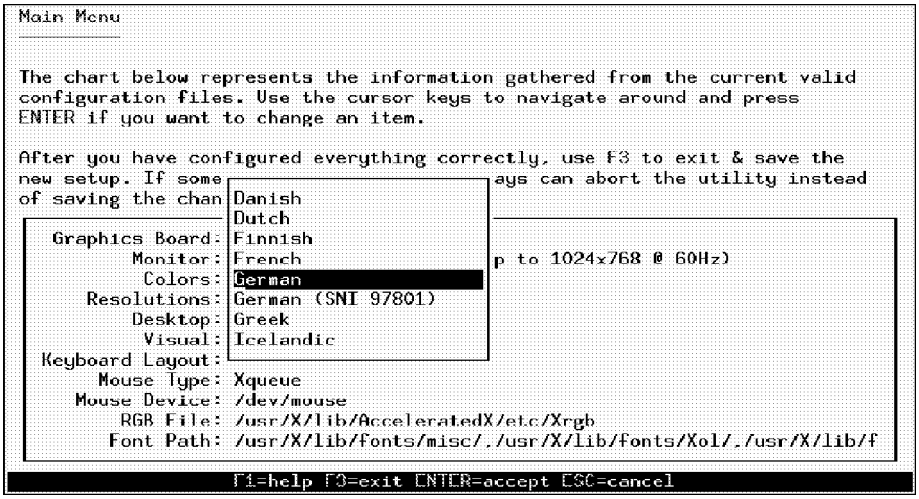
If you have a monochrome monitor you might want to change the default visual to *GrayScale*. If your board supports High- or True-

Color (32,768/65,536/16 million color) modes you will probably want to use *DirectColor* as the default .

## Keyboard

If you are a non-US user, you might want to change the keyboard layout. Accelerated-X provides a large collection of national keyboard layouts which are loaded at X Server startup time. You can avoid using xmodmap to load the keymap from the client-side (Release 2.x uses Virtual Keyboards, an X11R6 feature).

***Figure 14: Choose the keyboard layout on the main screen.***




Note that Accelerated-X does NOT use the $LANG variable, since users often have different keyboards than their locale would imply.

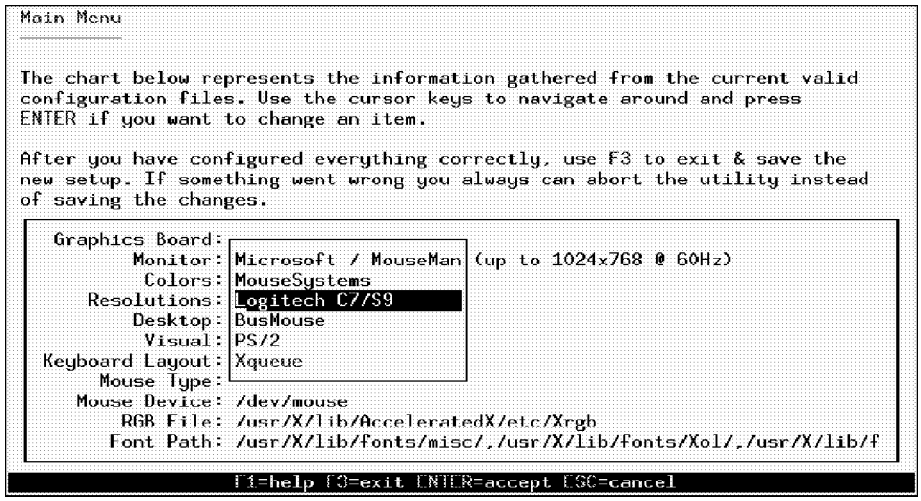
## Mouse

Hint: Use the default XQUEUE entry on SCO, UnixWare, Dell, Esix, OnSite.

Hint: On SCO, be sure you have run ‘mkdev mouse’.

Hint: Use the mouse type & device fields on Solaris, ISC.

***Figure 15: Choose the mouse you are using on the main screen.***




If you are selecting a mouse type that is different from *XQUEUE* you may also have to change the mouse device. By default, */dev/tty00* is used, which is probably what most people are using. Be careful to <Enter> the correct device name. On some operating systems, opening the wrong device may hang the whole system.

If you are on an Operating System that provides Event Management Services (XQUEUE), and you select a specific mouse type, you will see a pop-up that warns you to select XQUEUE.

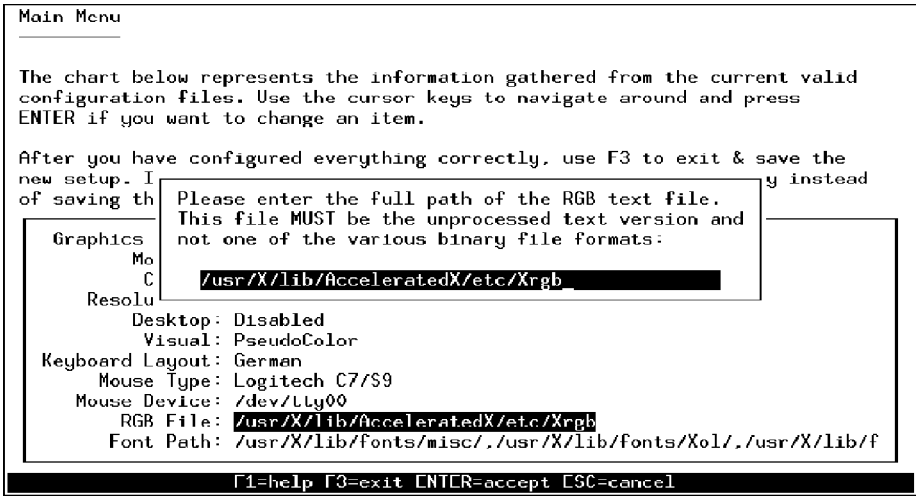
Note that the newer Logitech mice are Microsoft compatible. The entry for *Logitech C7/S9* is meant for the older Logitech C7 and Logitech S9 mice, which use a different mouse protocol.

## RGB Database

The X Server has a built-in functionality to allow it to map from color names to RGB values used by X Window applications. This is realized through an external file that contains this database.

Accelerated-X comes with its own extended database file. This is a superset of most other commonly used *rgb.txt* files. The advantage of using this file is that you will get the same colors on every platform on which you are using Accelerated-X.

***Figure 16: Set the RGB database file on the main screen.***



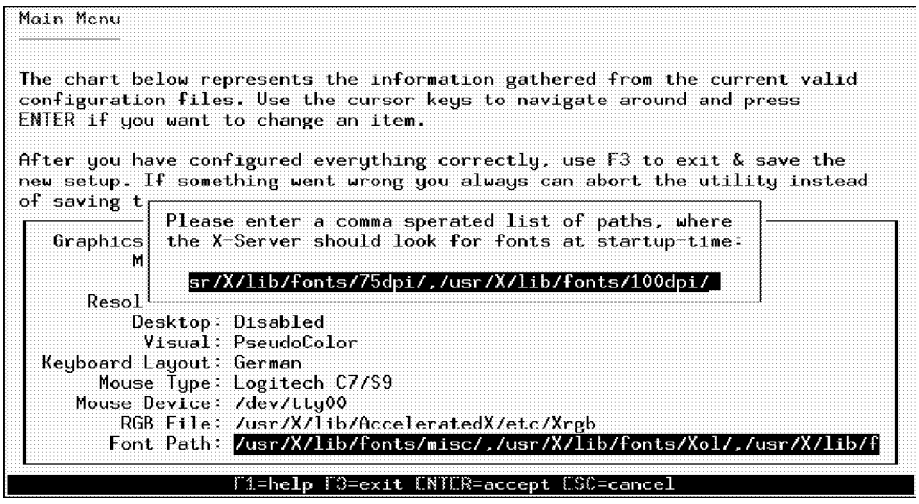

If you are really sure you need to change this default, please make sure that the filename you are entering points to the ASCII-Text form of the rgb database file. Accelerated-X does not use the *rgb.pag* or *rgb.dat* files (which are preprocessed binary formats). Instead, the ASCII form is read at startup and translated into an internal database format.

## Font Path

Accelerated-X normally uses the default font path that would be used by the standard X Server for that Operating System.

If you really need to change this you can enter a comma separated list of font directories that will be used as a default font path at startup. Note that the configuration utility performs no validation at configuration time.

***Figure 17: Enter the paths where the server looks for fonts at start-up.***



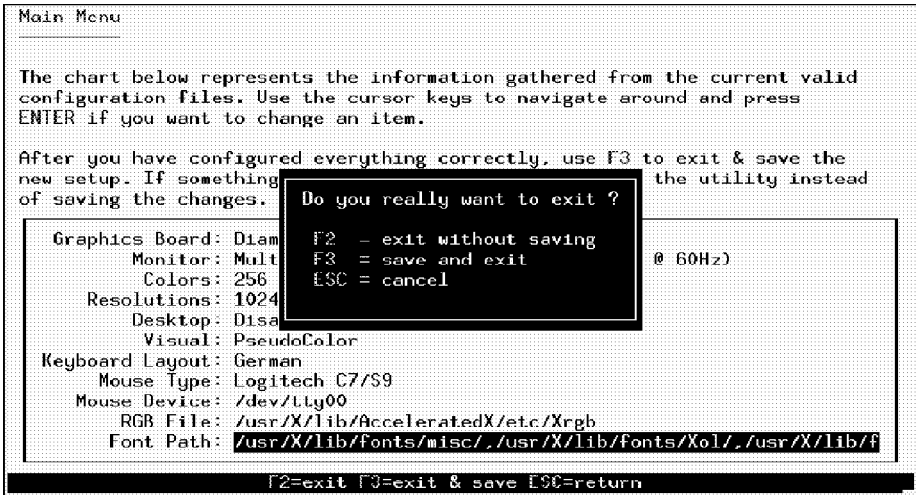

We strongly recommend that you not change this default font path at this level. If you need a different font path you can always add new font directories within the startup scripts (.olsetup, .xinitrc, .xsession) at X-Session time using the *xset +fp* command.

## Save and Exit

If you have set everything up correctly, press F3 to save the configuration.

You are prompted for the location where the setup file is being saved to. Normally this is saved to /etc/Xaccel.ini, the system-wide default. However, the X Server will also look for $HOME/.Xaccel.ini, the per-user configuration file. This allows you to have a configuration file for every user. If the file you want to save to doesn't exist, it will be created.

***Figure 18: When you exit, a box appears asking you to verify the command.***




To try out the new configuration we recommend you start the server by itself and terminate it with <CTRL+ALT+BackSpace>. Due to the dynamic nature of the Accelerated-X server it is very difficult to integrate a test-image into the setup utility.

```
NOTE: SCO users may be used to <Alt-SysRq> to terminate
the server.  We follow the conventions of the X Window
Consortium reference implementation (also written by
Thomas Roell).  That's why we use <Ctl-Alt-Backspace>.
```

The server's name is X and you can start it for testing by just invoking it. You may need to type the full path name to the program because some operating systems don't normally include the X program directory in the $PATH environment parameter.

For example:

| | |
|---|---|
| SCO | /usr/bin/X11/X |
| UnixWare | /usr/X/bin/X |

If everything goes well, then you are all set. If not, then look at the error text from the server. You can catch the text in a file with a Bourne Shell command like:

```
/usr/X/bin/X > file 2>&1
```

Read the file because it will probably have something useful in it about why the server died. We'll want this information if you need support assistance to get any further.

## OS Specific Notes

SCO: We use <Ctl-Alt-Backspace> for Server Kill. SCO Default is <Alt-SysRq>.

SCO: Locus Merge requires the Xsight Extension to Zoom.

*Chapter Five*

# *TECHNICAL DETAILS*

# Technical Details

This section is evolving as we add new server features. You can obtain the latest information from the automated support services of X Inside.

Significant major sections of the information described are:

- Multi-headed configurations
- Keyboard layouts
- Tablet support
- Environment Parameters
- Special Function Keys
- Configuration Files for the Server, Graphics Board, and Monitor

## Multi-headed Configurations

It is possible to have more than one graphics board in a system (which should be connected to more than one monitor) or to use multiport graphics boards such as the ColorGraphics Twin boards. All screens are driven by one single X Server process. You can *switch* between the screens by simply moving the X-Cursor over the border of the current screen.

It is not possible in the 1.x versions to move a window from one screen to another screen. The reason for this is the topology of the X Window system, where one window can only belong to one screen during its lifetime.

Enabling a multi-headed configuration is not directly supported within the Xsetup utility. You have to edit Xaccel.ini by hand to make this work. Also, only a few combinations are supported.

There are only a few combinations because PC type hardware was not designed for multiple graphics adapters, so most graphics boards have the same memory/io address space. This makes multiple graphics boards in one system impossible.

We support four basic combinations in Release 1.x:

- a basic VGA, SVGA, or XGA (excludes S3 graphics accelerators) together with a true 8514/A clone.
- two ELSA WINNER 1000/2000 boards in any ELSA specified combination.
- one, two or three ColorGraphic Twin or Twin Turbo boards in any ColorGraphic specified combination.
- up to six Matrox MGA based cards, together with either of the upper combinations or together with one other (no matter what) graphics board supported by Accelerated-X.

A short part of a sample Xaccel.ini file shows you how to enable this feature:

```
[SCREEN]
   Board   = "matrox/mga-ult2.xqa";
   Monitor = "hitachi/20mvx.vda";
   Depth   = 8;

   [RESOLUTIONS]
      1280x1024;

[SCREEN]
   Board   = "matrox/mga-ult4.xqa";
   Monitor = "hitachi/20mvx.vda";
   Depth   = 24;

   [RESOLUTIONS]
   1024x768;
```

As this implies, both screens can have different resolutions and even different depths. There is no restriction at all as long as both boards can coexist. You can use up to 8 monitors concurrently, given that your system supports enough graphics cards.

The sequence in which you specify the [SCREEN] sections automatically determines the order of the screens seen by the X-Clients. The first screen (256 colors, 1280x1024 here) will be accessible by *-display:0.0*, while you can access the second one with *-display:0.1*.

Whenever you move the mouse cursor over the left screen border the X Server switches to the next screen on the left. For example,

if you are on screen :0.2, you will switch to screen :0.1. If you go over the right border you get from screen :0.2 to screen :0.3. However if there is no screen 0.3 a wraparound takes place to screen :0.0.

A question that arises here is: why the notation :0.x and not :x? This is quite simple. The reason for this is well hidden in most X Window documentation. The full syntax for describing the target display is <host>:<server#>.<screen#>. If there is only one screen attached to a server the notation :0.0 and :0 are identical.

With Accelerated-X it is possible to start more than one server on the same machine. If your operating system has so-called virtual terminals, you can start an X Server on each of those virtual terminals and simply switch between them. With 8 servers, each supporting up to eight screens, a given window could be in one of 64 locations. This is complex to administer and use and is not well supported by most graphical logins.

## Keyboard Layouts

The keyboard mapping that Accelerated-X uses is compatible with the Univel and SCO X Servers. However, there are some cases where the original keyboard mapping betrayed a US centered view of keyboard handling. Many European keyboards couldn't be fully and correctly handled by the original X Server supplied by those operating system vendors.

We have tried to maintain full compatibility between Accelerated-X and native X Servers while still allowing all keys for all supported national language keyboards to be mapped in a reasonable way. If you have an application that requires an even higher level of compatibility with the native X Server, please let us know the following details so we can attempt to resolve the issue:

- the application program and version
- how to get hold of the creators of the program
- how we can reproduce the problem

We are not aware of any applications that are unable to operate with the modified keyboard mappings.

We have created a modified keyboard mapping file for DOS Merge. To allow extended European keyboards to be handled correctly, Accelerated-X is shipped with a support file for DOS-Merge 3.1 to reflect the corrected keyboard mapping. This file is integrated automatically by the installation. To disable this feature by hand, you must edit /usr/X/lib/app-defaults/DOS (or wherever the app-defaults are on your system) to inform Merge of the change in the mapping and remove the following line from the file:

```
dos*xcodetable: /usr/X/lib/AcceleratedX/etc/Xcodes
```

Accelerated-X uses a private file format to load keyboard layouts at server startup. They are located under $XACCELHOME/keyboards. Note that this scheme is somewhat different from using the standard *xmodmap* in that xmodmap is an X-Client. The use of xmodmap sometimes leads to problems with graphical logins which don't know about the xmodmap files until after the user has logged in, though they must login with an unmodified keyboard map.

| | |
|---|---|
| da_DK.xkm | Danish |
| de_AT.xkm | Austrian |
| de_CH.xkm | Swiss German |
| de_DE.SNI.xkm | German (SNI 97801 compatible) |
| de_DE.xkm | German |
| el_GR.xkm | Greek |
| en_CA.xkm | Canadian English |
| en_GB.xkm | UK English |
| en_US.xkm | US/ASCII |
| es_ES.xkm | Spanish |
| es_LA.xkm | Latin American Spanish |
| fi_FI.xkm | Finnish |
| fr_BE.xkm | Belgian |
| fr_CA.xkm | Canadian French |
| fr_CH.xkm | Swiss French |
| fr_FR.xkm | French |
| is_IS.xkm | Icelandic |

| | |
|---|---|
| it_CH.xkm | Swiss Italian |
| it_IT.xkm | Italian |
| ja_JP.xkm | Japanese |
| nl_NL.xkm | Dutch |
| no_NO.xkm | Norwegian |
| pt_PT.xkm | Portuguese |
| sv_SE.xkm | Swedish |
| tr_TR.xkm | Turkish |

## Tablets

Accelerated-X has built-in support for graphics digitiser tablets. This is done to allow you to use a tablet instead of a mouse. Most serial tablets are supported, since most tablets have either MMSeries (i.e. SummaGraphics) or BitPadOne emulations built-in. A sample Xaccel.ini portion for configuring a SummaGraphics tablet looks like:

```
[TABLET]
   Protocol   = "MMSeries";
   Device = "/dev/tty00";
   LinesPerInch    = 2016;
   ScaleX = 23;
   ScaleY = 29;
```

Since this feature is a little tricky to use, its configuration has been omitted from the Xsetup utility. This means that to use tablets you have to edit Xaccel.ini by hand.

The main problem is that there are too wide a range of parameters necessary. One reason for this is that tablets use a different coordinate system from X. For a tablet, the origin is at the lower left corner, while for X the origin is at the upper left corner. This means that the X Server has to translate the tablet coordinates into the X-coordinate system.

Another problem is that a tablet may have a very high resolution (up to 30,000x30,000), while an X Window screen typically uses only 1280x1024. This would mean either decreasing the resolution of the tablet by reconfiguring the table (implying a loss of

accuracy) or rescaling the incoming coordinates from the tablet before generating a motion report to the X-Clients. Accelerated-X uses the latter method.

To summarize, the tablet coordinates are first translated and then rescaled. The transformation is implicitly specified through the following line within Xaccel.ini (sample here):

```
Size = 30000x30000;
```

This tells the X Server that the tablet reports only coordinates within that specific range. Note that this is only necessary for BitPadOne types of tablets. MMSeries tablets have a way of reporting this information directly back to the X Server.

For the rescaling you have to specify more parameters:

```
LinesPerInch = 2016;
    ScaleX = 23;
    ScaleY = 29;
```

The LinesPerInch tell the server how accurate the tablet is reporting the motions (the higher this number is the better it is). With ScaleX and ScaleY you specify by which amount the incoming coordinates are being divided before they are passed off to the X-Clients.

In the upper sample you would have specified a 15x15 inch tablet with a resolution of 2016 lines per inch. The X-Clients, however, would see only motion reports within 1304x1034.

If you are running in a multiheaded configuration you can switch to a different screen if you move the transducer out of the normal digitizing area and press a button. This normally causes an **Out of Area** processing within the tablet (sometimes the tablet beeps). This is reported to the X Server and the server decides to which screen to switch. If you are going out of area on the left side, the X-Cursor flips to the screen left of the current screen.

## Environment Parameters

The Accelerated-X Server uses standard UNIX environment parameters, such as PATH, but has many of its own configuration parameters. These can be set in the system wide */etc/profile* or users' individual *.profile* and *.login* scripts. The server does not set, create, or modify any environment parameters. Remember to export any new environment parameters so that they are visible to child processes, such as the Accelerated-X Server. You should also be aware that the Server is started before a graphical login, so modifications to /etc/profile or the users' profile files will be ineffective; the Server cannot pick up those values after it is running. You must set any variations in the scripts that start the graphical login, such as the xdm-config file.

**XACCELHOME** The base name of the directory below in which all the Accelerated-X files can be found. This has different defaults on different Operating Systems.

SCO

XACCELHOME=/usr/lib/X11/AcceleratedX

Solaris

XACCELHOME=/usr/openwin/lib/AcceleratedX

UnixWare

XACCELHOME=/usr/X/lib/AcceleratedX

**DISPLAY** Normally set in *.olinitrc*, *.xinitrc* or equivalent files. Carries the name of the server for the client program to use. For a local connection, the parameter should be set to DISPLAY=:0. A few vendors have chosen their own naming conventions. The XLOCAL environment parameter can be used to specify the local client access method.

**XLOCAL** The name of the service used to provide local program access to the server. This can improve performance of local clients if they

| | |
|---|---|
| | don't have to format a packet for TCP/IP for local transport. The basic problem here is that for some reason every SVR3.2 vendor has added its own way to connect local clients. By simply setting DISPLAY=:0, it's not clear which of these various ways is actually chosen. Newer implementations of the clients' libraries (i.e. Xlib), therefore, support the XLOCAL variable which gives the application hints on how to connect to the X Server. |
| SCO | XLOCAL=[SCO\|ISC\|ATT] |
| Solaris | XLOCAL=[NAMED\|UNIX\|SCO\|ISC\|ATT] |
| UnixWare | XLOCAL=[UNIX\|SCO\|ISC\|ATT] |

## HotKeys

Accelerated-X provides some HotKeys for several Features. Each of these magic HotKeys consists of pressing the ALT key together with the CONTROL key (it does not matter if you use the left or right one) along with a third key:

## Resolution Switching

CONTROL-ALT-Numberpad_+ and CONTROL-ALT-Numberpad_-

If you specify multiple resolutions with Xsetup or in the configuration file, this command changes the resolution on the fly.

## Server Terminate

CONTROL-ALT-BACKSPACE

This keystroke sequence may be disabled in the configuration file. This kills the server immediately and terminates all clients with extreme prejudice. This is normally an emergency exit, quite handy to terminate your session without closing each single application. If you have programs with a termination dialogue (for example, asking you about saving your work) the program terminates *before* the dialogue. Your work is unsaved.

## VT Switch

CONTROL-ALT-<Function key F1 - F8 or letters N and P>

These are alternate sequences to force Virtual Terminal Switching (VT-Switching). Some operating systems don't handle VT-Switching if they are running X. By using these alternate keys you can still switch to an alternate Virtual Terminal session.

## Fonts

Accelerated-X loads Graphics Support, Font-renderers, and Extensions only when they are needed. This reduces memory usage and allows Xaccel to startup faster.

When the fontpath is changed, every font-renderer that would be needed to read those new fonts is loaded. The X Server uses the suffix of a font name file to decide which font-renderer is needed. You should note that many of the operating systems provide a *mkfontdir* program that recognizes a smaller list of fonts specifically for the native server and will not create a *fonts.dir* font information file reflecting all the fonts available. Since the server reads the fonts.dir file to get the list of fonts available, you may have unusable font files on your disk. The list below reflects what font-types and file name suffixes are recognized for Accelerated-X ($XACCELHOME/etc/Xrenderers contains the same information):

| | | |
|---|---|---|
| Bitmap Fonts | .bdf | .bdf.Z |
| | .snf | .snf.Z |
| | .pcf | .pcf.Z |
| | .fb | .fb.Z |
| Type1 Fonts | .pfa | |
| | .pfb | |
| Speedo Fonts | .spd | |

Compressing font files can save a lot of disk space at the expense of additional time to decompress the file for use. If you have directories of uncompressed files and the server recognizes the compressed form, you may want to use the *compress* utility to reduce disk usage. If you are using many fonts and want higher performance, do not compress the files. Whenever you change the name of a font file, you should use *mkfontdir* to remake the font information file.

## Memory Requirements

The amount of memory available to the graphics chip set affects the maximum resolution and maximum number of color bitplanes that can be represented. The chart below shows the maximum number of color bitplanes that can be used for each resolution with a given amount of graphics memory. Note that the graphics chip set and monitor also dictate which resolutions are usable, not just the amount of memory.

| On board RAM | 640x480 | 800x600 | 1024x768 | 1152x900 | 1280x1024 | 1600x1200 |
|---|---|---|---|---|---|---|
| 256KB | 4 | 4 | - | - | - | - |
| 512KB | 4/8 | 4/8 | 4 | 4 | - | - |
| 1MB | 4/8/16 | 4/8/16 | 4/8 | 4/8 | 4 | - |
| 2MB | 4/8/16/32 | 4/8/16/32 | 4/8/16 | 4/8 | 4/8 | 8 |
| 4MB | 4/8/16/32 | 4/8/16/32 | 4/8/16/32 | 4/8/16 | 4/8/16 | 8/16 |

# File Formats for Configuration Files

Accelerated-X uses a few key configuration files, all in ASCII form. They are described in detail below. System Administrators and technical staff may want to edit them directly rather than using the Xsetup utility.

Xaccel uses 3 types of configurable files:

| | |
|---|---|
| Xaccel.ini | toplevel configuration file for the X Server |
| .xqa | graphics board description files |
| .vda | monitor description files (VESA Display Information Format) |

Xaccel.ini points to the xqa/vda files used by the Server. All xqa-files are found under $XACCELHOME/boards and the vda-files are under $XACCELHOME/monitors.

All three file types share the same basic grammar, which is modeled after the VESA SVPMI standard (VS911020) and the VESA VDIF standard. The descriptions below borrow heavily from both standard documents.

## Grammar

The core types in the ASCII files are:

| | |
|---|---|
| <*integer*> | non-negative numbers |
| <*scaled*> | <*integer*> or <*integer*>.<*integer*> |
| <*string*> | characters or "characters" |
| <*date*> | <*integer*>/<*integer*>/<*integer*> (year/month/day) |

<*integer*> can be given as either a decimal number or as a hex number in C style. An <*integer*> is always treated internally as a 32 bit unsigned number.

The <*scaled*> type is used for representing a floating point value. Since floating point usage within the files is limited, there is no provision for exponents.

A <*string*> is composed of 7 bit ASCII characters. Normally strings are case insensitive which means DATE, Date, date and dATE all represent the same string. However, if you quote a string with double quotation marks ("), then no case translation takes place and it is used as it is.

All keywords used are case insensitive. This means you can use uppercase and lowercase letters to make the file more readable. Individual tokens must be separated by white space(s). White space may be any of the following characters:

- a space
- a tab character
- a comma ','
- an open or close parenthesis '(' ')'
- an open or close brace '{' '}'

Comments may appear anywhere in the file. Following C++ language conventions, comments begin with a // and continue to the end of the current line.

The end of a line is denoted by a <*LF*> or a <*CR*><*LF*>. This is compatible with both UNIX and MS-DOS file conventions.

No explicit End-Of-File (<*EOF*>) character is used. The <^*Z*> used by MS-DOS editors as an <*EOF*> is ignored.

The overall structure of the configuration files is composed from a small number of syntactically simple elements.

A file is structured into a number of sections. These sections build up the information hierarchy of a configuration file. A section name is a keyword that is always enclosed in square brackets (e.g. [TOKEN]) on a line by itself.

The information within a section can be given in several ways (dependent upon the semantics of a section):

### *Direct form:*

<*value*> ;

*Statement form:*

<*keyword*> = <*value*> ;

*Array form (may span multiple lines):*

<*value*>, <*value*>, <*value*> ;

In the case of the statement form, not all <*keywords*> need be given. If a statement is missing, a default value will be used. For the special case of vda-files no omissions are permitted by the VESA standard.

# Xaccel.ini

There are two forms of Xaccel.ini files, depending upon whether you use the Operating Systems Event Queue or not. When you use the Event Queue the information usually placed under the [KEYBOARD] and [MOUSE] sections are merged together into one [XQUEUE] section. The rest of the layout is identical:

```
[FONTPATH]
[RGBPATH]
[KEYBOARD]
[MOUSE] | [TABLET]

[SCREEN]
   [RESOLUTIONS]

[SCREEN]
   [RESOLUTIONS]

...
```

Note that there may be more than one [SCREEN] section per Xaccel.ini file. Multiple SCREEN sections tell the server to use more than one graphics board.

The overall syntax of an Xaccel.ini file looks like this:

```
[FONTPATH]
   <strings>; // one string per directory

[RGBPATH]
   <string>;

[KEYBOARD]
   DontZap          = YES | NO | TRUE | FALSE; // default NO
   DeadKeys         = YES | NO | TRUE | FALSE; // default NO
   ServerNumLock    = YES | NO | TRUE | FALSE; // default YES
   Layout           = <string>; // default "en_US.xkm"

[MOUSE]
```

```
   Device        = <string>; // default "/dev/tty00"
   Protocol            = MICROSOFT | // default MICROSOFT
      MOUSEMAN |
      MOUSESYSTEMS |
      LOGITECH |
      BUSMOUSE |
      PS/2
   BaudRate          = <integer>; // default 1200
   Emulate3Buttons = YES | NO | TRUE | FALSE; // default NO

[TABLET]
   Device        = <string>;    // default "/dev/tty00"
   Protocol            = MMSERIES | // default MMSERIES
      BITPADONE
   BaudRate          = <integer>; // default 9600
   LinesPerInch      = <integer>; // default 200
   ScaleX            = <integer>; // default 1
   ScaleY            = <integer>; // default 1
   Transducer        = STYLUS | CURSOR; // default CURSOR
   Size              = <integer>x<integer>; // default 0x0

[SCREEN]
   Visual            = DEFAULT | // default DEFAULT
      STATICGRAY |
      GRAYSCALE |
      STATICCOLOR |
      PSEUDOCOLOR |
      TRUECOLOR |
      DIRECTCOLOR;
   Desktop         = <integer>x<integer>;
   Depth         = <integer>; // default 8
   Monitor           = <string>;
   Board         = <string>;

   [RESOLUTIONS]
<integer>x<integer> list;
```

Here is a description of the parameters:

| | |
|---|---|
| FONTPATH | Search path for fonts. This path is a comma separated list of directories which the server searches looking for font databases (fonts.dir). |

| | |
|---|---|
| RGBPATH | Name of the RGB color database (ASCII file version). Normally $XACCELHOME/etc/Xrgb. |
| DONTZAP | Enable the CTRL+ALT+BackSpace sequence |
| DEADKEYS | Enable the dead key mapping proposed by USL for SVR4.2. In general this is only useful under SVR4.2's desktop. |
| SERVERNUMLOCK | Forces the server to handle the NumLock Key internally. This is provided for systems where the Xlib cannot handle the NumLock Key correctly. |
| LAYOUT | Specifies the keyboard layout to use at startup. (See the Keyboard Layouts section.) |
| DEVICE | Describes the UNIX device for use with the mouse |
| PROTOCOL | Selects the type of mouse (i.e. it's protocol) that is connected to the system |
| BAUDRATE | For mice that allow dynamic speed adjustments (like LOGITECH) the baudrate is changed in the mouse. Otherwise the rate is set on the computer's side to allow mice with non-standard rates. |

| | |
|---|---|
| EMULATE3BUTTONS | Enable/Disable the emulation of a third button for mice which have only two physical buttons. The third button is emulated by pressing both buttons simultaneously. |
| LINESPERINCH | Accuracy of the Tablet |
| SCALEX<br>SCALEY | Scale factors to postscale the coordinates coming from the tablet before they are posted as an X-Event |
| TRANSDUCER | Type of the Transducer |
| SIZE | Tablets have a different coordinate system than X itself. To transform the tablet coordinates into X-coordinates the X Server has to know the size of the tablet in terms of reported coordinates. For BITPADONE type tablets this information cannot be queried from the tablet itself and hence has to be specified explicitly. |
| VISUAL | Default visual for X-Clients |
| DESKTOP | Size of the virtual desktop. This can be much larger than the physical screen. |
| DEPTH | Log 2 of the number of colors to be used. This can be thought of as the number of bitplanes used to represent color, or the number of bits used by the RAMDAC. Raising 2 to the power of this number yields the maximum |

| | |
|---|---|
| | number of colors that the Server will show on this board. |
| MONITOR | Path to the vda-file relative to $XACCELHOME/monitors. For example, if you use an IBM VGA monitor you would supply the following string:<br>*ibm/vga.vda* |
| BOARD | Path to the xqa-file relative to $XACCELHOME/boards. For example, if you use a standard IBM VGA graphics board you would supply the following string:<br>*ibm/vga.xga* |

# eXtended Query Architecture

XQA files are designed to describe the capabilities of the graphics hardware at a very low level. There is no programming information in them, unlike SVPMI files. All the explicit programming is done by the X Server. However, the xqa-file does provide the server with all necessary details to program the hardware. Hardware limitations are explicitly given in this file as well as the different modes of operation (depths) the hardware can use. This is used by the server and by the Setup Utility to present the available choices:

```
[ADAPTER]
[ADAPTER_INFO]
   [PCLK_TABLE] (optional)

[VISUAL] (multiple sections per file)
   [RESOLUTIONS]
   [DESKTOPS]

[VISUAL]
   [RESOLUTIONS]
   [DESKTOPS]

...
```

The overall structure is as follows (very similar to the SVPMI format):

```
[ADAPTER]
      <string>;

[ADAPTER_INFO]
      Module          = <string>;
      Vendor          = <string>;
      Board           = <string>;
      GraphicsChip    = <string>;
```

```
        Ramdac          = <string>;
        Clock           = <string>;
        VideoMemory     = <integer>; // in kilo Bytes
        WinAAttributes  = READWRITE | // default UNUSED
          READONLY |
          WRITEONLY |
          UNUSED;
        WinBAttributes  = READWRITE | // default UNUSED
          READONLY |
          WRITEONLY |
          UNUSED;
        WinGranularity  = <integer>; // in kilo Bytes
        WinSize         = <integer>; // in kilo Bytes
        WinABase        = <integer>;
        WinBBase        = <integer>;
        MemoryClock     = <scaled>; // in Mega Hertz
        MinPClk         = <scaled>; // in Mega Hertz
        MaxPClk         = <scaled>; // in Mega Hertz
        MaxHorTotal     = <integer>; // in Pixel
        MaxVerTotal     = <integer>; // in Pixel
        Interlaced      = SUPPORTED | // default SUPPORTED
          UNSUPPORTED;

          [PCLK_TABLE]
<scaled>; // in Mega Hertz

[VISUAL]
        Depth           = <integer>;
        BitsPerPixel    = <integer>;
        MemoryModel     = TEXT |
          CGA |
          HGC |
          PLANAR |
          PACKED |
          RIX |
          DIRECTCOLOR <
          YUV
        ColorModel      = GRAY |
          INDEXED |
          DIRECT;
        BitsRGB         = <integer>;
        NumberOfColors  = <integer>;
        MaxPixelClock   = <scaled>; // in Mega Hertz
```

```
// If ColorModel is DIRECT then the parameters below are also needed)

      RedSize         = <integer>;
      RedPosition     = <integer>;
      GreenSize       = <integer>;
      GreenPosition   = <integer>;
      BlueSize        = <integer>;
      BluePosition    = <integer>;


      [RESOLUTIONS]
<integer>x<integer> list;

      [DESKTOPS]
<integer>x<integer> list;
```

Here is a description of the parameters:

| | |
|---|---|
| MODULE | Path of driver module relative to $XACCELHOME/modules. |
| VENDOR | Name of graphics board vendor. |
| BOARD | Model name of graphics board. |
| GRAPHICSCHIP | Graphics chip name. |
| RAMDAC | RAMDAC used on this board. Accelerated-X knows how to program the following list of RAMDACs:<br><br>ATT20C490/ATT20C491/ ATT20C492/ATT20C493<br>ATT20C498<br>ATT20C505<br>Bt458<br>Bt481/Bt482 |

| | |
|---|---|
| | Bt484<br>Bt485/Bt9485<br>GD5200<br>IMS176/IMS178<br>SC11481/SC11486/SC11488<br>SC11482/SC11483/SC11484<br>SC11485/SC11487/SC11489<br>SC15025/SC15026<br>SS2410<br>TLC34075/TLC34076<br>TKD8001<br>TVP3020<br><br>If this parameter is not given or the driver doesn't support this specific entry, then the default is to assume an IMS176 was given. |
| CLOCK | Clock chip used on the board. |
| VIDEOMEMORY | Installed graphics memory usable by the server. |
| WINAATTRIBUTES<br>WINBATTRIBUTES<br>WINGRANULARITY<br>WINSIZE<br>WINABASE<br>WINBBASE | Describes the memory mapping of a graphics board identical to the SVPMI standard. If the graphics board supports linear mapping only WINA* is used and WINSIZE is the full length of the mapped framebuffer. |

| | |
|---|---|
| MINPCLK<br>MAXPCLK | For a programmable graphics clock this specifies the limits within which the clock chip can be programmed (note that modern RAMDACs allow clock doubling onchip, so it's half the rate the clock chip can produce). |
| MAXHORTOTAL | Maximum pixel value the horizontal crtc counter can count to. |
| MAXVERTOTAL | Maximum pixel value the vertical crtc counter can count to. |
| INTERLACED | Specifies whether interlaced modes can be used with this graphics chip. |
| DEPTH | Depth for this specific visual. |
| BITSPERPIXEL | Hardware representation of this depth. |
| MEMORYMODEL | If the memory is accessible this tells how the pixels are formatted from a CPU's point of view. |
| COLORMODEL | Describes whether the device has one color lookup table or one for each primary color, or whether it is a direct color mode. |
| BITSRGB | If 0, then the color lookup table is readonly. Otherwise, this tells how many bits per gun are valid for that RAMDAC. |

| | |
|---|---|
| NUMBEROFCOLORS | Number of colors (1 << DEPTH normally) |
| MAXPIXELCLOCK & | Highest allowed PixelClock for that visual (may vary for different depths). |
| REDSIZE<br>REDPOSITION<br>GREENSIZE<br>GREENPOSITION<br>BLUESIZE<br>BLUEPOSITION | Describes for DIRECT ColorModels the position of the Red, Green, and Blue parts of a single Pixel. |

# VESA VDIF Files

VDIF files contain a common set of parameters that define a display sufficiently for a graphics controller to configure itself for an optimal monitor timing. VDIF also provides information about the display geometry and color characteristics. A VDIF file consists of a general description section and a number of Operational Limit Sections, each of which may cover several Preadjusted Timing Sections.

Here is an example of how the VDIF file is structured:

```
[VERSION]
[MONITOR_DESCRIPTION]

[OPERATIONAL_LIMITS]        <----------------------,
  [PREADJUSTED_TIMING]                             |
  [PREADJUSTED_TIMING]    2 PTs for this OL. --'

[OPERATIONAL_LIMITS]        <----------------------,
  [PREADJUSTED_TIMING]    1 PT   for this OL. --'

[OPERATIONAL_LIMITS]        <----------------------,
  [PREADJUSTED_TIMING]                             |
  [PREADJUSTED_TIMING]                             |
  [PREADJUSTED_TIMING]    3 PTs for this OL. --'

[GAMMA_TABLE_ENTRIES]
[GAMMA_TABLE]
```

The whole file layout looks like this:

```
[VERSION]
  <integer>.<integer>;                    // version.revision

[MONITOR_DESCRIPTION]
  Date                  = <date>;         // yyyy/mm/dd
  FileRevision          = <string>;
  Manufacturer          = <string>;
  ModelNumber           = <string>;
  MinVDIFIndex          = <string>;
  Version               = <string>;
```

```
SerialNumber            = <string>;
DateManufactured        = <date>;
MonitorType             = COLOR | COLOUR | MONOCHROME;
CRTSize                 = <integer>;        // inches
```

If Color Monitor (this line is not part of the ASCII file):

```
RedPhosphorDecay        = <scaled>;         // milliseconds
GreenPhosphorDecay      = <scaled>;         // milliseconds
BluePhosphorDecay       = <scaled>;         // milliseconds
BorderRed               = <integer>;        // percent
BorderGreen             = <integer>;        // percent
BorderBlue              = <integer>;        // percent
WhitePointx             = <scaled>;         // in CIExy (cd/m2)
WhitePointy             = <scaled>;
WhitePointCapY          = <scaled>;
RedChromaticityx        = <scaled>;
RedChromaticityy        = <scaled>;
GreenChromaticityx      = <scaled>;
GreenChromaticityy      = <scaled>;
BlueChromaticityx       = <scaled>;
BlueChromaticityy       = <scaled>;
RedGamma                = <scaled>;
GreenGamma              = <scaled>;
BlueGamma               = <scaled>;
```

If Monochrome Monitor (this line is not part of the ASCII file):

```
Phosphor1Decay          = <scaled>;         // milliseconds
Phosphor2Decay          = <scaled>;         // milliseconds, optional
Phosphor3Decay          = <scaled>;         // milliseconds, optional
Border                  = <integer>;        // percent
WhitePointx             = <scaled>;         // in CIExy (cd/m2)
WhitePointy             = <scaled>;
WhitePointCapY          = <scaled>;
Phosp1Chromaticityx     = <scaled>;         // optional information
Phosp1Chromaticityy     = <scaled>;         // optional information
Phosp2Chromaticityx     = <scaled>;         // optional information
Phosp2Chromaticityy     = <scaled>;         // optional information
Phosp3Chromaticityx     = <scaled>;         // optional information
Phosp3Chromaticityy     = <scaled>;         // optional information
Gamma                   = <scaled>;         // optional information
```

```
[OPERATIONAL_LIMITS]
   MaxHorPixel             = <integer>;          // pixels
   MaxVerPixel             = <integer>;          // lines
   MaxHorAddrLength        = <integer>;          // millimeters
   MaxVerAddrHeight        = <integer>;          // millimeters
   VideoType               = ANALOG | TTL | ECL | DECL | OTHER ;
   TerminationResistance   = <integer>
   WhiteLevel              = <scaled>;           // Volts
   BlackLevel              = <scaled>;           // Volts
   BlankLevel              = <scaled>;           // Volts
   SyncType                = ANALOG | TTL | ECL | DECL | OTHER;
   SyncConfiguration       = SEPARATE | C | CP | G | GP | OTHER;
   SyncLevel               = <scaled>;           // Volts
   MaxPixelClock           = <scaled>;           // MegaHertz
   MinHorFrequency         = <scaled>;           // kiloHertz
   MaxHorFrequency         = <scaled>;           // kiloHertz
   MinVerFrequency         = <scaled>;           // Hertz
   MaxVerFrequency         = <scaled>;           // Hertz
   MinHorRetrace           = <scaled>;           // microseconds
   MinVerRetrace           = <scaled>;           // milliseconds

[PREADJUSTED_TIMING]
   Preadjustedtimingname   = <string>;
   HorPixel                = <integer>;          // pixels
   VerPixel                = <integer>;          // lines
   HorFrequency            = <scaled>;           // kiloHertz
   VerFrequency            = <scaled>;           // Hertz
   PixelClock              = <scaled>;           // MegaHertz
   CharacterWidth          = <integer>;          // pixel clock cycles
   HorAddrLength           = <integer>;          // millimeters
   VerAddrHeight           = <integer>;          // millimeters
   PixelWidthRatio         = <integer>;          // gives H:V
   PixelHeightRatio        = <integer>;
   ScanType                = INTERLACED | NONINTERLACED | OTHER;
   HorSyncPolarity         = NEGATIVE | POSITIVE;
   VerSyncPolarity         = NEGATIVE | POSITIVE;
   HorTotalTime            = <scaled>;           // microseconds
   HorAddrTime             = <scaled>;           // microseconds
   HorBlankStart           = <scaled>;           // microseconds
   HorBlankTime            = <scaled>;           // microseconds
   HorSyncStart            = <scaled>;           // microseconds
   HorSyncTime             = <scaled>;           // microseconds
```

```
   VerTotalTime          = <scaled>;      // milliseconds
   VerAddrTime           = <scaled>;      // milliseconds
   VerBlankStart         = <scaled>;      // milliseconds
   VerBlankTime          = <scaled>;      // milliseconds
   VerSyncStart          = <scaled>;      // milliseconds
   VerSyncTime           = <scaled>;      // milliseconds

[GAMMA_TABLE_ENTRIES]
   <integer>;

[GAMMA_TABLE]
   <integers>
```

Here is a description of the individual parameters:

For a complete description please refer to the related VESA VDIF standard document. The description that follows is simply a brief overview.

| | |
|---|---|
| VERSION | Major and minor version of the VDIF format |
| DATE | Date when the file was created |
| FILEREVISION | Major and minor file revision |
| MANUFACTURER | Manufacturer identification |
| MODELNUMBER | Display Model identification |
| MINVDIFINDEX | VDIF Index |
| SERIALNUMBER | Identification of the individual units |
| DATEMANUFACTURED | Date the monitor was manufactured |

| | |
|---|---|
| MONITORTYPE | Monochrome or Color |
| CRTSIZE | Actual CRT size diagonally measured in inches |
| REDPHOSPHORDECAY<br>GREENPHOSPHORDECAY<br>BLUEPHOSPHORDECAY<br>PHOSPHOR1DECAY<br>PHOSPHOR2DECAY<br>PHOSPHOR3DECAY | Decay time from 100% to 10% luminance in microseconds |
| BORDERRED<br>BORDERGREEN<br>BORDERBLUE<br>BORDER | Percentages of the primary colors used for the border |
| WHITEPOINTX<br>WHITEPOINTY<br>WHITEPOINTCAPY | White point of screen described in CIE 1931 xy coordinates |

| | |
|---|---|
| REDCHROMATICITYX | |
| REDCHROMATICITYY | |
| GREENCHROMATICITYX | |
| GREENCHROMATICITYY | |
| BLUECHROMATICITYX | |
| BLUECHROMATICITYY | |
| PHOSP1CHROMATICITYX | |
| PHOSP1CHROMATICITYY | |
| PHOSP2CHROMATICITYX | |
| PHOSP2CHROMATICITYY | |
| PHOSP3CHROMATICITYX | |
| PHOSP3CHROMATICITYY | The CIE 1931 xy coordinates for the primary colors or phosphors at full illumination |
| REDGAMMA | |
| BLUEGAMMA | |
| GREENGAMMA | |
| GAMMA | Gamma curve description if no [GAMMA_TABLE] is given. This gamma factor is used according to following formula:<br>output = constant * input gamma |
| VIDEOTYPE | Type of Video SIgnal applied to the display unit |
| TERMINATIONRESISTANCE | The nominal termination resistance of the video signal inputs |
| WHITELEVEL | Level in volts above the blank level that corresponds to 100 luminance |

| | |
|---|---|
| BLACKLEVEL | Level in volts above the blank level that corresponds to the darkest signal which should be provided during the active time |
| BLANKLEVEL | If non zero, the value gives the offset in volts for the blank level in a DC-coupled system |
| SYNCLEVEL | Level in volts below the blank level which corresponds to the expected level of the sync pulses in the video signal |
| SYNCTYPE | Type of Sync. Configuration applied to the display unit |
| MINHORFREQUENCY | Minimum horizontal frequency in kiloHertz |
| MAXHORFREQUENCY | Maximum horizontal frequency in kiloHertz |
| MINVERFREQUENCY | Minimum vertical frequency in Hertz. For interlaced scanning this is the minimum field rate. |
| MAXVERFREQUENCY | Maximum vertical frequency in Hertz. For interlaced scanning this is the maximum field rate. |
| MAXPIXELCLOCK | Maximum pixel clock in MegaHertz |

| | |
|---|---|
| MAXHORPIXEL | Maximum number of horizontal pixels that can be addressed |
| MAXVERPIXEL | Maximum number of vertical pixels that can be addressed |
| MAXHORADDRLENGTH | Maximum horizontal line length in millimeters of addressable pixels |
| MAXVERADDRHEIGHT | Maximum vertical height in millimeters of addressable pixels |
| MINHORRETRACE | Minimum time required for horizontal retrace |
| MINVERRETRACE | Minimum time required for vertical retrace |
| HORPIXEL | X-Resolution of timing |
| VERPIXEL | Y-Resolution of timing |
| HORFREQUENCY | Horizontal scanning frequency |
| VERFREQUENCY | Vertical scanning frequency |
| PIXELCLOCK | Pixel clock in MegaHertz |
| CHARACTERWIDTH | All horizontal timing values are multiples of the charactertime which is CHARACTERWIDTH/PIXELCLOCK |

| | |
|---|---|
| HORADDRLENGTH | X-Size of timing in millimeters |
| VERADDRLENGTH | Y-Size of timing in millimeters |
| PIXELWIDTHRATIO<br>PIXELHEIGHTRATIO | Aspect ratio of a single pixel |
| SCANTYPE | Type of Scantype applied to the display unit |
| HORSYNCPOLARITY<br>VERSYNCPOLARITY | Polarity of sync signals applied to the display unit |
| HORTOTALTIME | Period of a total horizontal frame |
| HORADDRTIME | Time within a horizontal frame where the display image is viewable |
| HORBLANKSTART<br>HORBLANKTIME | Start and duration of the horizontal blank pulse |
| HORSYNCSTART<br>HORSYNCTIME | Start and duration of the horizontal sync pulse |
| VERTOTALTIME | Period of a total vertical frame |
| VERADDRTIME | Time within a vertical frame where the display image is viewable |

| | |
|---|---|
| VERBLANKSTART | |
| VERBLANKTIME | Start and duration of the vertical blank pulse |
| VERSYNCSTART | |
| VERSYNCTIME | Start and duration of the vertical sync pulse |

# Files Installed

## File Locations

We've tried to keep to standard locations for files and have otherwise restricted ourselves to a new directory tree in the X library directory. The root of this directory tree can be changed by modifying the environment parameter XACCELHOME. Putting as many files as possible under this directory should eliminate significant sources of confusion about where to find information and what to modify. Since different operating systems have different layouts for placing the files for the X Window system, the final location of $XACCELHOME is operating system specific. The Xaccel and Xsetup files are in a fixed location for all supported UNIX implementations; all other files are in the location $XACCELHOME for the target OS.

Under $XACCELHOME you should find our standard directory layout:

| | |
|---|---|
| boards | Graphics board configuration files |
| etc | Server support files |
| keyboards | Keyboard layouts |
| modules | Loadable drivers, font-renderers, & extensions |
| monitor | Monitor configuration files |

You will find a default configuration file in $XACCELHOME/etc/Xaccel.ini which may be useful if you manage to completely confuse the /etc/Xaccel.ini file contents. The *boards* and *monitors* directories contain text and binary files to support graphics boards and directories. Unsupported monitors can be easily added by creating a text file for them in the *monitors* directory.

On all Operating Systems, the default X server is known by the name *X*. We back up the existing server to X.{OSNAME} and replace the file X with a symbolic link (if available, otherwise a link) to the Xaccel server program. You can easily switch between

Accelerated-X and the OS provided server by pointing the X link to the appropriate file.

| Operating System | File Name | Purpose |
|---|---|---|
| Some | /dev/xsvc | Accelerated-X System Services |
| All | /etc/Xaccel.ini | The Configuration File |
| SCO | | |
| | /usr/bin/X11/Xaccel | X Server |
| | /usr/bin/X11/Xsetup | Setup Utility |
| | /usr/lib/X11/AcceleratedX | $XACCELHOME |
| ISC | | |
| | /usr/bin/X11/Xaccel | X Server |
| | /usr/bin/X11/Xsetup | Setup Utility |
| | /usr/lib/X11/AcceleratedX | $XACCELHOME |
| UnixWare | | |
| | /usr/X/bin/Xaccel | X Server |
| | /usr/X/bin/Xsetup | Setup Utility |
| | /usr/X/lib/AcceleratedX | $XACCELHOME |
| Solaris | | |
| | /usr/openwin/bin/Xaccel | X Server |
| | /usr/openwin/bin/Xsetup | Setup Utility |
| | /usr/openwin/lib/AcceleratedX | $XACCELHOME |

On some operating systems the installation changes a few files of the standard Operating System. All those changes are removed when the Accelerated-X Server package is removed:

| | |
|---|---|
| SCO | /usr/lib/mkdev/graphics |
| | /usr/lib/X11/app-defaults/DOS |

| | |
|---|---|
| UnixWare | /usr/X/lib/app-defaults/DOS |
| Solaris | /usr/openwin/bin/openwin |

*Chapter Six*

# *HELP INFORMATION*

# Troubleshooting

### *Problem:*

The Server doesn't come up at all or flickers on the screen and dies.

There may be two classes of problem with similar symptoms:

1. The server is failing to start.
2. The Server is crashing.

### *Diagnosis:*

If the server is crashing, it will leave a new panic file. The panic file is written in /usr/adm and its name is dependent upon the Server instance. Since most people run just one server, the most common name for the file is */usr/adm/X0panic*. If you note the modification date of this file or move it to another name, you will be able to see if the Server is crashing or simply failing to start. If the Server is crashing, send us the panic file by email, FAX, or in a letter.

If the Server is failing to start, then the normal output messages from the server will indicate the reason. The Server may be started by *xdm* (the X Display Manager), or by running one of a variety of shell scripts or binaries, depending upon the Operating System. Look for an X Inside copyright message in the following files for the appropriate OS listed below:

| | |
|---|---|
| SCO: | /usr/lib/X11/scologin/Xerrors |
| ISC: | /usr/lib/X11/xdm/xdm-errors |
| Solaris: | /var/tmp/xdm-errors |
| UnixWare: | $HOME/.oliniterr |
| | $HOME/.olinitout |
| | /dev/X/xdm-errors |

You can probably get the same error message by running the Server from the command line:

```
puga:/# X:0
```

Some servers will clear the screen, so you may need to direct the output to a file and then read the file.

```
puga:/# X:0 > file 2>&1
puga:/# pg file
```

If the Server starts, you can stop it with the Server Termination Keystroke <CONTROL-ALT-BACKSPACE>. This start is important because it suggests that the start problem has something to do with the startup mechanism being used. This is rare unless the startup has been customized. You could try restoring the startup script and then testing.

The most common reason for a startup failure is a mismatch between the configuration file and the hardware or between the requirements of the chipset and the capabilities of the monitor.

### *Workrounds for startup failures:*

Diagnostic error messages from the Server are reasonably clear. It is usually possible to see that the configuration file describes a graphics board or chipset that it can't find in the machine or that the monitor does not have the frequency characteristics needed to support the demands of the graphics chipset.

In the first case, check the hardware in the machine, run any diagnostics that you have to confirm that the graphics board is installed correctly, and make sure that the correct configuration file is being used.

In the second case, change the required resolution to match the capabilities of the monitor.

### *Workround for crashes at startup:*

You may be able to run the server using different settings, so try running the Xsetup command and changing to different resolutions or number of colors.

Sometimes specific graphic boards require special jumper settings on both the graphics board and the motherboard. Please double-check your documentation to make sure that all jumper settings are set correctly.

### ***Problem:***

VGA Passthrough with 8514 and 8514/A graphics adapters causes screen interference.

### *Diagnosis:*

There are interference problems and VGA passthrough problems with some 8514 graphics adapters. These problems cannot be resolved by changes to the way in which the graphics chipset is driven. Therefore, unfortunately, our best advice is that you pretend you can't see the problems, since neither you nor we can eliminate them. It's intrinsic to the hardware.

### ***Problem:***

An Application causes the Server to Crash.

Please send us the /usr/adm/X*panic files. We can often provide fixes to these problems within a week.

### *Workround:*

Nothing obvious. We'll need to look at the problem and get it fixed.

### ***Problem:***

An Application works fine with the native X server but fails or works differently with the Accelerated-X Server.

### *Workround:*

Nothing obvious. Please send us details of the program you are using and how we can reproduce the problem at our facilities. If we can reproduce the problem, we will probably be able to provide a fix within a week or so.

### ***Problem:***

I found some font files that aren't available.

### *Diagnosis:*

Although the Server is capable of reading and using a wide variety of font file formats, the list of fonts that can be used is made by a program called *mkfontdir*. Some implementations do not understand as many font file formats, so the generated list of fonts does not include all of the font files in that directory. We intend to provide a replacement *mkfontdir* in a future release.

### *Workround:*

None.

### ***Problem:***

The colors aren't what I expected.

### *Diagnosis:*

Different Servers may interpret the same color name differently. Accelerated-X provides a mapping file so that colors can be matched with other servers. You may have fewer colors available than with the other Server because of Xsetup choices. If you are trying to match colors between a 16 million color Server and a 16 color Server, you'll have problems making the 16 color Server match...

The Color Matching System is supported by the Accelerated-X server and VDIF files are used if available, so it should be possible to match colors with almost anything, if using enough color bitplanes.

*Workround:*

Change the rgb file.

***Problem:***

I have problems typing usernames and passwords with graphical logins.

*Workround:*

You may need to use xmodmap rather than our keyboard files.

***Problem:***

Screen is fuzzy or blurred looked.

*Diagnosis:*

The problem here is that we drive the RAMDAC very hard to get performance. If you are the edge of the RAMDAC performance, you won't get sharp edges to the signals it emits.

*Workround:*

You can reduce the frequency of the monitor (e.g. select a 64khz frequency monitor, rather than an 80khz monitor, etc) to slow the RAMDAC. This will sharpen the image. Programs like Windows have no separate adjustment for monitor frequency, so they tend to be sharp, by selecting a default low frequency supported by all monitors. The drawback is that the rate of screen refresh is also reduced, which makes for slower screen updates.

***Problem:***

Monitor synchronises at some resolutions and not at others.

### *Diagnosis:*

You may have a monitor that requires Synchronisation on the Green signal. Early versions of the product do not support this (it's extremely rare in VGA monitors, normally only found on monitors for RS/6000 and similar workstations).

### ***Problem:***

My board wasn't listed, so I chose a generic chipset entry and I can't get {non-interlaced, so many colors, etc} as I should get.

### *Workround:*

Generic chipset entries are conservative. We assume a very basic RAMDAC. Copy the generic chip set entry in $XACCELHOME/boards/{vendor}/{chipset}.xqa file to $XACCELHOME/boards/{realvendor}/{realboard}.xqa and edit the board name fields (so you can recognise the new entry in Xsetup) and correct the RAMDAC type and perhaps the PixelClock frequencies. When it works, send it to us (*support@xinside.com*) for inclusion in the next release and we'll continue to maintain the entry! You may need to call your hardware & software vendor for help in identifying the RAMDAC and Pixel Clock frequencies.

### ***Problem:***

My board was listed, but I still can't get 16 million color mode to work. It isn't even offered!

### *Diagnosis:*

You have selected a board with a single 24 bit frame. We don't support the use of that mode.

There are two ways to implement 24 bit color. One way uses two frames and provides a 24 bit frame and an 8 bit frame. The other provides a single 24 bit frame. Early TrueColor implementations tended to use a 24 bit frame. Hardware memory issues make a double frame (4 bytes) much faster than the 3 byte alignment. We support the 24+8 model, which will also permit some bits of future magic.

# Support Information

X Inside Incorporated tries to provide the highest performance and greatest reliability of any commercially obtainable X server. If you are dissatisfied with your server, we want to know about the problem. We can keep down the costs of our support service if you can send full problem reports to us by FAX, email, or hard copy, though we do accept phone calls to our main office phone number.

In general, you should go to the company that sold you the Accelerated-X server for anything other than initial installation support; email, FAX or talk to us about that. We're trying to sell only through technically competent organisations, so this support scheme should be no problem and will probably give you access to a company in the same time zone and that knows the local market. In the case of OEM's, such as BSDI, OnSite, Esix, etc, your first and last stop is with them. They will pass the problem to us for resolution.

There are three main classes of failure:

1. Installation & Configuration
2. Catastrophic failure of the server (it crashes)
3. Sub-optimal behavior (there's a suspect bug)

Most installation and configuration problems can be resolved by Faxing or emailing a description of the problem to your supplier. You should include the information requested in the Software Problem Report Form that is in the envelope with the Customer Registration Card and the distribution media. We have attempted to make the Software Problem Report Form a suitable size for you to photocopy, fill in, and FAX.

If the Server crashes it will leave a file in /usr/adm whose name depends on the server instance. Most people only run one server, so the file is /usr/adm/X0panic (on a few systems, this will be /var/adm/X0panic). This file is a human readable text file and has been set up so that executing the file will probably send email to us. Since not all systems are Internet connected and may need additional routing information, you may have to send the file using your normal mailer. It would be helpful to send us the

other information requested in the Software Problem Report Form.

For suspect bugs, please send email or FAX the Software Problem Report Form with details of how to reproduce the problem. If you cannot reproduce the problem, we probably won't be able to, either. If we can't see the problem, we probably can't fix it.

If we can reproduce the problem, we frequently turn around fixes within one working week, sometimes much less.

X Inside Incorporated maintains the following support services:

- email—send to *support@xinside.com*
- Faxes—send to (303)470-5513 in the USA

We expect to provide an email mailing list for customers and anonymous FTP and UUCP, WAIS and Web services some time in 1994. Send email to *info@xinside.com* for current details.

# Glossary of Technical Terms

### *Analog Device*

An analog device requires a continuously variable input voltage for operation. Digital devices use only two voltage levels to represent data.

### *DAC*

Digital to Analog Converter. This device translates a binary value to a voltage. Modern computers use binary data representation. Setting the position of the electron beam used in a monitor and the intensity of the color chosen are all performed by analog devices.

### *Dot Clock Frequency*

One of the timings needed to set up a graphics chip for correct behavior.

### *Gamma Correction*

One series of a set of numbers needed to have colors accurately represented. Different monitor models will not give exactly the same colors when given the same electrical input. The Gamma Correction lets the Server know how to change the normally linear output of the color map to provide the right electrical signals for accurate color presentation.

### *Horizontal Frequency*

The frequency of scanning the electron beam across the monitor's display. Higher frequencies mean that it takes less time for the whole screen to be drawn, which means that the screen can be drawn more times per second. This usually makes for a more stable and less flickery screen. However, you may drive the RAMDAC too hard and get a fuzzier image.

### *Horizontal Front Porch*

One of the magic numbers needed to position an image correctly on a monitor

### *Monitor*

A display device. The characteristics of the monitor are one of the constraints that limit the number of lines and dots that make up a rasterised display. High resolution monitors rarely limit the number of displayable colors, but the manufacturer's choice of color generating phosphors means that calibrating files are needed so that monitors will show the same colors with the same user request. See *Gamma Correction*.

### *Multi-Sync Monitor*

A monitor capable of detecting and locking into one of many possible sets of synchronization frequencies. A multisync monitor is normally more expensive than a single frequency monitor, but it is more flexible. Some modern multisync monitors have mechanisms to automatically size and centre a displayed image or to remember settings for size and centering when the input signal is recognized again.

### *RAM*

Random Access Memory. You need at least two sorts of RAM to improve the performance of your graphical applications. Graphics chips need private RAM to store an image of the screen; the more memory the graphics chip has, the more colors and the higher the resolution image it can show. The processor needs RAM to keep data and programs. The more primary RAM the machine has, the less it will need to refer to the disk for data or to move program memory to and from the disk.

### *RAMDAC*

A Digital to Analog Converter typically used for graphics RAM. Converts the binary image data to the analog voltage needed to control a monitor. The more input bits that the RAMDAC can handle, the more colors that it can represent.

### *Resolution*

The count of how many dots can be created on each individual line of the display and of how many individual lines make up the display. This is determined by the maximum horizontal and vertical frequencies that can be generated by the graphics chip and accepted by the monitor.

### *Super VGA*

A relatively loose term meaning any graphics subsystem capable of greater than 640x480 and 16 colors. VESA standard Super VGA defines an 800x600 display capable of up to 256 colors. Strictly, Super VGA is a specific vendors implementation, but the term is abused. SVGA is the proper generic term.

### *SVGA*

See Super VGA.

### *Sync*

Synchronization. A signal for a monitor that determines the timing of the other presented signals for colors. VGA style analog monitors, the most common types found with PCs, use a vertical and horizontal synchronization signal.

### *Sync Polarity*

The synchronization signal can be positive-going or negative-going. Graphics chips can be set up to send either polarity, as required by the monitor for the particular resolution.

### *Vertical Front Porch*

Another of the magic numbers needed to position an image correctly on a monitor.

### *VDIF*

Video Display Information File. A file format for specifying monitor characteristics. The Accelerated-X server is capable of using VDIF files to supply information such as Gamma Correction factors.

### *VESA*

Video Electronics Standards Association. VESA has been active in promoting some standards in the video area. The most notable successes are VESA BIOS extensions for DOS, the VESA VDIF file for documenting monitor characteristics, and the VESA Local Bus for high speed processor to video chip communications. VESA timings, standardized and encapsulated in the VESA BIOS extensions, are good for almost any multisync monitor and make a nice starting point for further tuning.

### *VGA*

Video Graphics Adapter. An IBM specification for a 640 line, 480 horizontal dot, 16 color display interface adapter. Most high performance graphics boards offer either a built-in VGA mode or a VGA Pass through mode. See also Super VGA and VESA.

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