Software Product Description

Product Name: **PX Windows**

Product Description: X11R6 X Window System Server

Products Supported: VCL Series 34020-based boards

PX Windows Description

The Rastergraf **PX Windows** is an X11R6-based X Window System server which interfaces Rastergraf VMEbus display controllers to X Windows clients.

Please see the opposite side for a description of the Rastergraf boards, special performance features, and software distribution including PROM versions.

Overview of X Windows

The X11R6 X Windows System is a public domain, machine independent, network-based windowing system for graphics workstations. It runs on computers ranging from PCs to supercomputers. X was originally developed as a joint project of MIT's Project Athena, IBM, and Digital Equipment Corporation. Many other companies contributed as well.

X supports a large number of bitmapped display controllers and workstations, many text fonts (both fixed and variable width), keyboards and pointing devices (e.g. trackball, mouse).

The X Window System divides the graphics function into two parts - the server, which controls the hardware dependent functions such as the mouse, keyboard and graphics display; and the clients, which are the actual programs which the user wants to interact with. The clients might include a terminal emulator (such as mwm or xterm), a process control application (DataViews), desktop publishing (Interleaf), or an image processing package like PV-WAVE. The server and the clients may be on the same computer, or they may be connected through the network.

The client applications are usually linked to the standard X library (XLIB) which manages the actual communications with the server. Other libraries, called Toolkits, are available which add more functionality to the X Windows programming environment.

PX Windows Structure

The PX Windows server functions are split between the host and the board. Only the network interface and file and font resources run under the host operating system; the balance of the server runs on the board. Connection between clients and the server is made through the operating system's socket interface.

The host side code (known as the stub program) operates at the user level. It communicates directly with the board by mapping it into its program space. The direct access method enhances the efficiency of the server, since system level access is not usually required. A system driver is provided just for interrupt service.

Protocol cracking and graphics functions are executed by the Rastergraf on-board graphics processor. This maximizes performance and eliminates many host processor responsibilities. In this way about 85% of the X Server machine cycles are executed by the 34020.

The server takes advantage of the unique features of Rastergraf's boards including 2-bit hardware bitmap cursor, off-screen display memory, and Floating Point Coprocessor (VCL-V only).

Operating System Support

Rastergraf has a variety of operating system ports for PX Windows. The chart on the back page shows what is available at the time of writing. Please contact Rastergraf if you do not see support for the OS you are using.

Multiple servers may be run in the same machine, which permits one computer to support multiple workstations.

X11R6 Features

X11R6 includes overlay support, the Xie image extension, and a new version of PEX. Rastergraf has added several Xtensions to the basic PX Windows offering, including Overlays, OpenGL (GLX), Xinput, Xtest, and proprietary crosshair cursor, touchscreen, and fast frame buffer and draw bypass functions.

Motif

Among the variety of Graphic User Interfaces (GUI) which PX Windows supports is Motif from the Open Systems Foundation. Contact Rastergraf for availability of Motif 2.0. Many OS vendors bundle supply Motif into their distributions.

Applications Software

Numerous applications are available which use X. Some of those tested with PX Windows include mwm (Motif Window Manager), VAPS, PV-Wave, Interleaf, Dataviews, Framemaker, ATC-GKS, and IDL.

Testing and Verification

The PX Windows server functionality is verified with the X Test suite. While not capable of testing every last function, it provides a high degree of certainty that the server is functioning correctly.

Performance has been tested with X11perf and Xbench. Running remote clients, we have observed wide variation in performance as a function of network software provided by the OS vendors. Typical (not best) numbers yield better than 300K dots/second and 85K Xstones for a VCL-V/8 running on a fast VME CPU.

Rastergraf

Rastergraf, Inc.
1804-P SE First St.
Redmond, OR 97756
(541) 923-5530
FAX: (541) 923-6475
email: sales@rastergraf.com
web: http://www.rastergraf.com/

PX Windows Performance Features

The server makes full use of the VCL's TMS34020 Graphics System Processor, which provides hardware assisted line drawing, fills, and bitblts.

Additional performance enhancements include hardware byte swapper and Video RAM writemask, color register, VFILL, VBLT, and page mode functions. These functions yield a 160 Mpixel/second fill rate for the VCL-V/8. Speed can be further enhanced when the 34082 Floating Point Processor is installed (required for GLX).

Software Distribution

The PX Windows software distribution consists of the following components:

- host side stub program
- host side device driver (for interrupts and board mapping)
- board side server and downloader
- installation scripts and readme files

While fonts and a sample color map database files are distributed, neither clients nor XLIB are included. XLIB is required if you are using local clients, and is usually bundled into the OS software. X documentation and the complete X distribution with many sample clients are widely available.

Client applications are "commercial off the shelf packages" or can be developed by the user in a suitable host/target environment. For most applications, a Sun or UNIX workstation is the appropriate development platform.

PROM based PX Windows

It is sometimes not desirable to download code to the board. Rastergraf can provide the PX Windows server code in board based PROM. When started by the stub, the PROM loads the server code into 34020 memory and loads default fonts, colormap database, and timing parameters specified by the customer. It then goes into the standard PX Windows command loop.

A version of the PROM is also available which includes a ***vi*** compatible terminal emulator which uses a serial port on the graphics board to communicate with the host console terminal. On power-up, the terminal emulator initializes the board and allows the access to the host using the local keyboard and mouse. Once X is started, the console function goes away.

Machine Requirements

Host Processor should have a PowerPC, 68040 or 68060, SPARC, or HP (PA-RISC) processor with at least 8 MB of memory.

Disk and Memory requirements are very much a function of the operating system, X clients and processor type. The server distribution requires only about 20 MB. Rastergraf will be happy to discuss your particular requirements with you.

Keyboard, Mouse and Monitor

Rastergraf can supply monitor, keyboard and mouse for use with PX Windows.

The PX Windows server supports a variety of keyboards, both RS-232 (LK-401) and PC compatibles, and Microsoft and Mouse systems compatible pointing devices (e.g. mouse, touchscreen, or trackball).

Graphics Board Configuration

Board must be configured with at least

- 4 MB 34020 memory for **VCL-[V or M]/8**
- 8 MB 34020 memory for **VCL-V/24**
- Rastergraf LK Keyboard or PC Compatible
- Rastergraf Optical or Roller Mouse, or third party 2 or 3 button serial mouse

Rastergraf VCL Series Boards

Rastergraf's VCL graphics boards are based on the TMS 34020 Graphics Systems Processor. Features common to the designs include:

- optional 34082 Floating Point Coprocessor/Accelerator (VCL-V only)
- programmable video timing
- optional on-board PROM for X server and terminal emulator
- 2 serial I/O ports
- PC type mouse and keyboard ports
- programmable color map
- hardware cursors
- hardware byte swapper
- generic 2 and 3 button serial pointing devices
- high refresh rate options
- low power 6U VMEbus or PMC design
- extended temperature range options
- sufficient display memory to support double buffered displays

Most VCL "/8" boards have an 8-bit/pixel primary plane plus an 8-bit/pixel overlay plane and PX Windows supports both primary and overlay.Contact Rastergraf for availability of overlay support for the VCL-V/24.

The VCL-V/8 series boards have an 8-bit/pixel primary plane plus an 8-bit/pixel overlay plane.The VCL-V supports analog RGB and/or analog and digital color and monochrome flat panel (EL, LCD, and plasma types) display output. Analog display resolution ranges from 640 x 480 up to 1600 x 1280 pixels. Digital display resolution ranges from 640 x 485 up to 1280 x 1024 pixels.

The VCL-V/24 series boards offer the same features as the VCL-V/8 with the additional enhancement of a true color (24-bit/pixel primary plane).

Ordering Information

Standard PX Windows is available in object. A license agreement must be executed prior to shipment of software. CD is the standard distribution media. Other methods are available by special arrangement and extra cost. Please contact Rastergraf if you need an OS which doesn't appear in the table.

Operating System	Minimum OS Release Level
Solaris	2.4
VxWorks (PPC, 68K, and SPARC)	5.1
HP-UX (PA-RISC)	9.5, 10.0
LynxOS (68K, PPC)	2.3

Rastergraf

Rastergraf, Inc.
1804-P SE First St.
Redmond, OR 97756
(541) 923-5530
FAX: (541) 923-6475
email: sales@rastergraf.com
web: http://www.rastergraf.com/

111606