VXT Software

On ULTRIX Systems

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VXT Software
On ULTRIX Systems

January, 1994

This section describes VXT software installation and system management tasks on the ULTRIX operating system.

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Revision/Update Information	This is a revised document.
Operating System & Version:	ULTRIX Version 4.2
Software Version:	VXT Version 2.1

Digital Equipment Corporation
Maynard, Massachusetts

Related Documents

For information on...	Refer to...
ULTRIX systems	*ULTRIX Installing Version 4.2 Source Files*
	ULTRIX System and Network Management Manual
VXT software and VXT 2000 windowing terminals	*VXT Software Version 2.1 Release Notes*
	VXT 2000+/VXT 2000 Windowing Terminal Installing and Getting Started
	VXT 2000+/VXT 2000 Windowing Terminal User Information
	VXT 2000+/VXT 2000 Windowing Terminal Release Notes

This document was prepared using VAX DOCUMENT Version 2.1.

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1

Installing VXT Software on an ULTRIX System

This chapter provides instructions for installing VXT software on computers that are running the ULTRIX operating system. Read the chapter before starting the installation procedure.

1.1 Preparing for the Installation

This section discusses the preparations and requirements for installing VXT software on an ULTRIX system.

Your bill of materials (BOM) specifies the number and contents of your media. Be sure to verify the contents of your kit with this information. If you find missing or damaged parts in your kit, contact your local Digital representative.

Checking the Media Software Distribution Kit

For installations from media, use the BOM to check the contents of your software distribution kit.

The kit includes this installation guide and one of the following media:

- A TK50 tape cartridge, labeled VXT Software V2.1, for systems with TK50 or TK70 tape drives
- A 9-track magnetic tape (MT9), labeled VXT Software V2.1, for systems with magnetic tape drives

Using the Release Notes

The software kit provides release notes. The documentation kit also provides a hardcopy of the release notes. Digital strongly recommends that you read the release notes before proceeding with the installation.

Operating Environment

VXT Version 2.1 software requires ULTRIX Version 4.2 or later and UWS Version 4.1 or later software.

1.2 Installation Procedure Requirements

This section describes VXT software installation requirements.

Installation Time

The installation can take up to 60 minutes, depending on the type of media and your system configuration. Loading fonts generally requires more time for installation than other subsets.

Privileges Needed for Installation

You must log in as a superuser on the system where you are installing the software.

1.2.1 Prerequisite Hardware

To perform the installation, you need the following hardware:

- Software distribution device (if installing from media)

  You need a distribution device that corresponds with the software distribution media. For example, if you have a TK50 software kit, you need a TK50 or TK70 tape drive. You must know how to load the media supplied with the software distribution kit on the appropriate drive. The documentation for the tape drive or disk drive that you are using explains how to load the media.

- Terminal or console workstation

  You can use a video terminal, hardcopy terminal, or terminal emulator running on a workstation to communicate with the operating system and respond to prompts from the installation procedure for the software.

1.2.2 Prerequisite Software

Table 1–1 describes the prerequisite software you must use with the VXT software.

Table 1–1 Prerequisite Software—ULTRIX Systems

Prerequisite Products	Purpose
ULTRIX Version 4.2 or later	Provides base system and installation support.
UWS Version 4.1	Optional. Provides X windows support.
C compiler, program development header files, X or DECwindows header files	Required if you install the VXT BOOTP daemon, printer support utilities, application launcher, and X font utilities.

Your system must be running ULTRIX Version 4.2 or later before you try to install VXT Version 2.1 software, or the installation will fail. See your system documentation for instructions on how to install ULTRIX Version 4.2 and ULTRIX workstation (UWS) Version 4.1 software.

1.2.3 Determining Which Subsets to Load

Use Table 1–2 to choose the software subsets you want to load.

Table 1–2 VXT Software Subsets—ULTRIX Systems

Subset	Description	Recommendation
System images	The load images for supporting network booting by host terminals.	Install on a system designated to provide network booting support (MOP[1] or BOOTP) for host terminals.
BOOTP daemon	A BOOTP daemon to provide network service using BOOTP/TFTP.	Do not install. Use your host system's BOOTP daemon to provide network booting (BOOTP) support for host terminals. If your host system does not have a BOOTP daemon, you can use this daemon.
Application launcher	A mechanism that lets terminal users display remote X applications. The launcher supports an `rexec` function used with the `f.exec` function in the local window manager.	Install on any system that needs to support remote X applications.
Printer support utilities	Utilities that support printing from a host to the terminal's attached printer, using the TCP/IP network transport for communication.	Install on any system that wants to use the TCP /IP transport to send printing jobs to a terminal's attached printer.
X font utilities	A BDF-to-PCF font compiler and supporting tools to compile custom fonts and man pages for these utilities. The `xbdfdump` utility retrieves BDF files from any X server.	Install on any system that needs to compile BDF fonts for use by the terminal. (You must have X developers' .h files.) See Chapter 2 for information on using these utilities.
Compiled fonts	Compiled DECwindows and MIT fonts (merged set of all unique fonts). The subset allows you to select 75 dots/in., 100 dots/in., and miscellaneous fonts.	Install on a system designated to provide compiled fonts for terminals and systems that do not already have these fonts.

[1]For DECnet and MOP support, the DECnet/OSI ULTRIX for RISC and VAX layered product is required.

Notes on Installing Fonts

- If your system already has some or all of the compiled fonts, make sure they are the correct resolution required by the terminal. If not, you need to install the font subsets. Even if you have the compiled fonts, you may want to install the X font utilities supplied in the VXT kit, which make compiling and installing fonts easier.
- If you are installing the compiled fonts provided, they must be installed into a new or empty directory. If you are upgrading from an earlier VXT software version, use the `rm-vxt-kit` script supplied with the earlier version to remove the previous installation files.
- You do not need to install X font utilities if your system has UWS software installed, but the font installation utilities subset can be useful.

1.2.4 Determining Which Images to Install

Use Table 1–3 to select the VXT system images you want to install.

Table 1–3 VXT System Images

File	Description	Features, Uses, and Memory Requirements
vxt	VXT software	**Features:** • All VXT software features • VXT local clients • X image extension (XIE) **Uses:** • All VXT 2000 windowing terminals (color, gray scale, and monochrome) **Terminal memory requirements (minimum):** • 10 MB
vxtex	VXT EX software	**Features:** • Clientless version of VXT software • Simple user interface for making X connections to hosts **Uses:** • All VXT 2000 windowing terminals (color, gray scale, and monochrome) **Terminal memory requirements:** • 4 MB
vxtldr	VXT loader	**Features:** • Loads server-based terminals from an InfoServer system. • Installed as one file, but available under two names (vxtldr and vxtldr1). **Uses:** Not needed, unless you are loading terminals from an InfoServer system on a different Ethernet segment. In this case, install the VXT loader on a host in the same segment as the terminals.

1.2.5 Determining Disk Space Requirements

This section describes the disk space requirements for the disks that you load the software subsets on.

Table 1–4 lists the disk space requirements for loading the software subsets on ULTRIX software for VAX ULTRIX computers and RISC ULTRIX systems. The table specifies disk space requirements by subset.

Table 1–4 Worksheet for Subset Sizes on ULTRIX Systems

Subset Name	Transient Size (K bytes/Blocks)	Installed Size (K bytes/Blocks)
VXT software images		
VXT software	6,200/12,400	5,100/10,200
VXT EX software	2,400/ 4,800	1,200/ 2,400
VXT loader	800/ 1,600	400/ 800
Application launcher	700/ 1,400	350/ 700
VXT printer support utilities	400/ 800	200/ 400
X font utilities	1,200/ 2,400	600/ 1,200
Compiled fonts		
75 dots/in	10,120/20,240	5,060/10,120
100 dots/in	19,000/38,000	9,500/19,000
Miscellaneous	12,000/24,000	6,000/12,000
Individual totals:	~52,720/~105,440	~28,060/~56,120

Transient Space

The transient space must be available in the file system containing the installation's working directory. The installed space must be available where the product will reside. These locations might be distributed across multiple file systems.

Add Up Subsets

Using Table 1–4, add up the total values for the subsets you plan to load in each file system. Use this sum to determine the disk space requirement for your installation.

Compare the space required for the subsets with the free space currently in the file systems where the software files will reside.

Determine Free Space

To determine the current amount of free space for a directory path, log in to the system where you plan to install the software and enter the `df` command. For example:

```
% df Return

Filesystem          Total    kbytes   kbytes   %
node                kbytes   used     free     used  Mounted on
/dev/rz2a       29871   11486   15398    43%   /
/dev/rz2d      502534  388304   63977    86%   /usr
/dev/rz3a       29871   21276    5608    79%   /var
/dev/rz3d      274518  156250   90817    63%   /usr/users
/dev/rz3e      217007  136227   59080    70%   /usr/public
```

A file system must have enough free space to meet the Table 1–4 space requirements.

If you have insufficient disk space, you can perform an NFS mount from a server that has sufficient space. For example:

```
% su
# mount -t nfs server:/usr/free_disk /usr/tftpboot
```

Table 1–5 shows the default locations for each subset.

Table 1–5 Default Locations of Individual Subsets—ULTRIX Systems

Subset Name	Default Location
VXT software images	/usr/tftpboot/vxt/images
Application launcher	Images and scripts in /usr/local/bin Man pages in /usr/local/man/man1
VXT printer support utilities	/usr/local/bin Images and scripts in /usr/tftpboot/vxt Man pages in /usr/local/man/man1
X font utilities	Images and scripts in /usr/local/bin Man pages in /usr/local/man/man1
Compiled fonts	/usr/tftpboot/vxt/fonts/75dpi /usr/tftpboot/vxt/fonts/100dpi /usr/tftpboot/vxt/fonts/misc

1.2.6 Backing Up Your System Disk

Digital recommends that you back up your system disk before installing any software. Use the backup procedures established at your site.

1.3 Starting the Installation

This section provides step-by-step instructions for installing VXT software on an ULTRIX system.

The installation script consists of a series of questions requiring user responses, as well as informational messages. See Section 1.5 for a sample installation session.

To end the installation procedure at any time, press Ctrl C. When you press Ctrl C, the installation procedure saves the files it has already installed, deletes working directories, and exits the process.

Appendix B lists the possible files and directories created during the installation. After your complete the installation, you can check the `install.flist` file for the list of files actually installed.

There are four ways to start the VXT software installation:

- From a TK50 tape or 9-track magnetic tape on a local drive
- From a `tar` file on a local disk drive
- From a `tar` file on a remote disk drive, using DECnet
- From a `tar` file on a remote disk drive, using TCP/IP

The following sections describe each method. In each case, the installation procedure loads the software files onto a disk that belongs to the system you are performing the installation for.

1.3.1 Installing from Local TK50 or Magnetic Tape Distribution Media

To start the installation:

1. Mount the media on the appropriate tape drive. Use a non-rewinding tape device for the installation. For example: `/dev/nrmt0h`.
2. Log in as a superuser (login name root) on the system that you are installing the software on.
3. Choose a convenient empty work directory from which to do the installation. Use the `cd` command to move to that directory. If you do not have an empty work directory, you might choose to create a new directory. Make sure there is sufficient transient work space.

   For example:

   ```
   # mkdir /usr/vxt      #this may already exist
   # mkdir /usr/vxt/kit  #this may already exist
   # cd /usr/vxt/kit
   ```

4. Use the `tar` command to access the kit media in a local tape drive:

   ```
   #  tar -xf /dev/nrmt0h
   ```

   /dev/nrmt0h is the device name of the source drive that holds the distribution tape. The device name may be different on your system.

5. Execute the shell script with the Bourne shell command `sh`, specifying how to access the installation kit:

   ```
   #  sh install.sh /dev/nrmt0h
   ```

To continue the installation, go to Section 1.4.

1.3.2 Installing from Local tar Files

VXT Version 2.1 software uses two `tar` files. Previous versions used one file. You may need to extract the two `tar` files from the media to files, to allow electronic access by another system.

1. Log in as a superuser (login name root) on the system that you are installing the software on.
2. Choose a convenient empty work directory from which to do the installation. Use the `cd` command to move to that directory. If you do not have an empty work directory, you may choose to create a new directory. Make sure there is sufficient transient work space.

   For example:

   ```
   # mkdir /usr/vxt      #this may already exist
   # mkdir /usr/vxt/kit  #this may already exist
   # cd /usr/vxt/kit
   ```

3. Use the following two `dd` commands to extract the two `tar` files. In this example, the media device is `nrmt0h`:

   ```
   # dd if=/dev/nrmt0h of=/usr/vxt/VXT-2.1.tar1 ibs=10k
   # dd if=/dev/nrmt0h of=/usr/vxt/VXT-2.1.tar2 ibs=10k
   ```

VXT-2.1.tar1 is the first extracted file and contains the installation scripts.

VXT-2.1.tar2 is the second extracted file and contains the files to be installed.

You can specify different file names if desired.

To start the installation:

4. Use the `tar` command to access the first local `tar` file, which contains the installation script:

```
# tar -xf /usr/vxt/VXT-2.1.tar1
```

5. Execute the shell script with the Bourne shell command `sh`, specifying how to access the installation kit in the second local `tar` file:

```
# sh install.sh /usr/vxt/VXT-2.1.tar2
```

To continue the installation, go to Section 1.4.

1.3.3 Installing from Remote tar Files, Using TCP/IP

VXT Version 2.1 software uses two `tar` files.You may need to extract the two `tar` files from the media to files, to allow electronic access by another system.

Use the following two `dd` commands to extract the two `tar` files. In this example, the media device is `nrmt0h`:

```
# dd if=/dev/nrmt0h of=/usr/vxt/VXT-2.1.tar1 ibs=10k
# dd if=/dev/nrmt0h of=/usr/vxt/VXT-2.1.tar2 ibs=10k
```

VXT-2.1.tar1 is the first extracted file and contains the installation scripts.

VXT-2.1.tar2 is the second extracted file and contains the files to be installed.

You can specify different file names if desired.

To start the installation:

1. Log in as a superuser (login name root) on the system that you are installing the software on.
2. Choose a convenient empty work directory from which to do the installation. Use the `cd` command to move to that directory. If you do not have an empty work directory, you may choose to create a new directory. Make sure there is sufficient transient work space.

   For example:

```
# mkdir /usr/vxt       #this may already exist
# mkdir /usr/vxt/kit   #this may already exist
# cd /usr/vxt/kit
```

3. Use the `rsh` command to access the first remote `tar` file, which contains the installation script:

```
# rsh ip_nodename cat /usr/vxt/VXT-2.1.tar1 | tar -xf -
```

ip_nodename is the IP name of the remote node where the tar file is retrieved.

To use the rsh command, you need appropriate access to the remote machine.

4. Execute the shell script with the Bourne shell command sh, specifying how to access the installation kit in the second tar file:

```
# sh install.sh rsh ip_nodename cat /usr/vxt/VXT-2.1.tar2
```

To continue the installation, go to Section 1.4.

1.3.4 Installing from Remote tar Files, Using DECnet

VXT Version 2.1 software uses two tar files.You may need to extract the two tar files from the media to files, to allow electronic access by another system.

Use the following two dd commands to extract the two tar files. In this example, the media device is nrmt0h:

```
# dd if=/dev/nrmt0h of=/usr/vxt/VXT-2.1.tar1 ibs=10k
# dd if=/dev/nrmt0h of=/usr/vxt/VXT-2.1.tar2 ibs=10k
```

VXT-2.1.tar1 is the first extracted file and contains the installation scripts.

VXT-2.1.tar2 is the second extracted file and contains the files to be installed.

You can specify different file names if desired.

To start the installation:

1. Log in as a superuser (login name root) on the system that you are installing the software on.
2. Choose a convenient empty work directory from which to do the installation. Use the cd command to move to that directory. If you do not have an empty work directory, you may choose to create a new directory. Make sure there is sufficient transient work space.

   For example:

```
# mkdir /usr/vxt      #this may already exist
# mkdir /usr/vxt/kit  #this may already exist
# cd /usr/vxt/kit
```

3. Use the dcp command to access the first remote tar file, which contains the installation script:

```
# dcp dec_nodename::/usr/vxt/VXT-2.1.tar1 - | tar -xf -
```

   dec_nodename is the name of DECnet node where the tar file is retrieved.

   To use the dcp command, you need appropriate access to the remote machine.

4. Execute the shell script with the Bourne shell `sh` command, specifying how to access the installation kit in the second remote `tar` file:

   ```
   # sh install.sh dcp dec_nodename::/usr/vxt/VXT-2.1.tar2 -
   ```

To continue the installation, go to Section 1.4.

1.4 Responding to Script Prompts

After you enter the `sh install.sh` command for local or remote (node-specific) installations, the installation script begins. See the sample installation script (Section 1.5).

- Choose the ULTRIX operating environment.
- Choose the subsets that you want to load.
- Respond to the questions for each selected subset.

At each point, you have the option to exit the installation.

After you answer all questions, the script performs the installation. You do not have to be present while the installation is in progress.

1.4.1 Error Recovery

If errors occur during the installation, the system displays failure messages. Errors can occur during the installation if any of the following conditions exist:

- Incorrect operating system version
- Incorrect version of prerequisite software
- Incorrect or missing .h or C compiler files for font utilities, `bootpd`, and printer utilities
- Insufficient superuser privileges for a successful installation
- Insufficient quotas for a successful installation
- Insufficient disk space
- Device used was a rewinding device
- Incorrect file accessed using `install.sh` (`VXT-2.1.tar1` script was accessed instead of `VXT2.1.tar2` kit.)

For descriptions of error messages generated by these conditions, see the ULTRIX system documentation on system messages, recovery procedures, and ULTRIX software installation. If you are notified that any of these conditions exist, you should take the appropriate action described in the message. For information on installation requirements, see Section 1.2.2.

See Appendix C for descriptions of subset error messages, user error messages, and other generic error messages.

1.4.2 Installation Procedure Is Complete

See Chapter 2 for startup requirements, procedures, and system management tasks.

After the installation, the following seven relevant files are in your working directory:

File	Description
install.flist	The list of all files installed on your system as part of the VXT software installation.
install.log	The installation log file.
rm-vxt-kit	A script that lets you remove VXT software from your system. This is useful for removing the files *for this version* when you upgrade VXT software. Move this script to a safe place for possible future use.
RelNotes.txt	*VXT Software Version 2.1 Release Notes* in text format.
vxtivp	Installation verification procedure
vxtpostinstall	Postinstallation checklist
isrd	Utility used by `vxtivp`

1.4.3 Determining and Reporting Problems

Software Errors

If you encounter a problem while using VXT software, report it to Digital. Depending on the nature of the problem and the type of support you have, you can take one of the following actions:

- Call Digital if your software contract or warranty agreement entitles you to telephone support.
- Submit a Software Performance Report (SPR).

Documentation Errors

If you find an error in the VXT documentation, fill out and submit the Reader's Comments form at the back of the document. Please include the section and page number where the error occurred.

You can also send your comments by electronic mail to the Internet address listed on the title page and Reader's Comments form.

1.5 Sample Installation Session for ULTRIX Systems

This section contains a sample installation from a local file, including all options.

```
% su Return
Password:
# cd /usr/vxt/kit Return
# tar -xf /usr/vxt/VXT-2.1.tar1 Return
# sh install.sh  /usr/vxt/VXT-2.1.tar2     Return

(c) Digital Equipment Corporation  1992, 1993
DIGITAL VXT Software, Version 2.1
```

1.5 Sample Installation Session for ULTRIX Systems

```
This is the installation script for the
        DIGITAL VXT Software
        Version V2.1
installation kit. The kit contains several subsets.  You can choose which
subsets you want to install.  Each selected subset is
extracted into a temporary work area in the current working directory
before final installation.  Unless you request otherwise, all work
areas will be removed after the product is installed.

The installation occurs in two stages.  In the first stage, you answer questions
on images and subsets.  The second stage performs the actual installation
of the system images and subsets that you select. You do not need to be
present during the second stage.

This script refers you to sections of the VXT Software Version 2.1 Installation
and System Management manual for more information on some topics.

Please answer all questions.  Default answers are
displayed in square brackets ([]).  Press Return to choose the default answer.
For yes/no answers enter y or n.


Select your system environment or exit the installation.

        0.  Exit without completing installation
        1.  Digital ULTRIX
        2.  SunOS
        3.  Hewlett-Packard HP-UX
        4.  IBM AIX
        5.  SCO ODT
        6.  DEC OSF/1 AXP

Which environment are you using [1]? : Return

environment is: ULTRIX
is this correct [y]? :    Return

installing in the ULTRIX environment

Select the subsets to install or exit the installation.

If you select subset 2, 3, 4, or the font compiler utilities
in 5, you need a C compiler and program development header files
on your host system.

If you specify more than one number, separate each number with a
space or a comma.

        0.  Exit without installing subsets
        1.  VXT Software Images
        2.  VXT BOOTP Daemon
        3.  VXT Host Application Launcher
        4.  VXT Printer Support Utilities
        5.  X Font Utilities (font compiler, etc.)
        6.  Compiled Fonts
        7.  Converting Sun Fonts for the VXT

You do not need to install the Compiled Fonts if you have already installed
them from a VXT Version 2.0 kit.

Which subsets do you want to install [1 3 4 5 6]? : Return

selecting subsets: images app-launch vxtlpd font-utils fonts
is this correct [y]? : Return

selected subsets: images app-launch vxtlpd font-utils fonts

Now you will answer questions for the subsets you have chosen.
```

```
This is the installation script for the
        VXT Software Load Images
installation kit.  You can select which VXT images to install, and
you have the option to specify where you would like the images installed.

See Table 1-3 in the Installing VXT Software on a ULTRIX System chapter
for a description of the images.

Select the VXT images to install or exit the installation.

        0.   Exit without completing installation
        1.   VXT loader
        2.   VXT
        3.   VXT EX

Install the VXT loader on this system only if you want to support
terminals in server-based mode from an InfoServer on another Ethernet
segment.

Which images do you want to install [2 3]? : Return

selecting subsets: VXT VXT_EX
is this correct [y]? : Return

selected subsets: VXT VXT_EX


Where do you want to install the VXT Software Load images?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/tftpboot/vxt/images]? :  Return

not a directory: /usr/tftpboot/vxt/images
do you want to create it [y]? : Return

created: /usr/tftpboot/vxt/images

Where do you want to install the VXT Configuration File Template?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/tftpboot/vxt/config]? :  Return

not a directory: /usr/tftpboot/vxt/config
do you want to create it [y]? : Return

created: /usr/tftpboot/vxt/config

This is the installation script for the
        Application Launcher installation kit.  You can
specify where to install the Application Launcher image and man pages.
See the System Management Overview and System Management Tasks chapters
for more information on Application Launcher.

Where do you want to install the Application Launcher image?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/local/bin]? :  Return

not a directory: /usr/local/bin
do you want to create it [y]? : Return

created: /usr/local/bin

Where do you want to install the Application Launcher man pages?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
directory [/usr/local/man/man1]? :  Return
```

```
not a directory: /usr/local/man/man1
do you want to create it [y]? : Return

created: /usr/local/man/man1

This is the installation script for the
        VXT Printer Support Utilities
installation kit. You can specify where to install the
VXT Printer Support Utilities images and man pages.

Where do you want to install the VXT Printer Support Utilities documents?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/tftpboot/vxt]? : Return

destination directory: /usr/tftpboot/vxt
is this correct [y]? : Return


Where do you want to install the VXT Printer Support Utilities images?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/local/bin]? : Return

destination directory: /usr/local/bin
is this correct [y]? : Return


Where do you want to install the VXT Printer Support Utilities man pages?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/local/man/man1]? :  Return

destination directory: /usr/local/man/man1
is this correct [y]? : Return


This is the installation script for the
        VXT Font Utilities
installation kit.  You can select which utilities to install.
The font compiler utilities include the font compiler and mkfontdir. These
are not needed for ULTRIX systems with DECwindows installed, but are needed
to compile fonts on other systems. The font installation utilities make
installing fonts easier on all systems.
You can specify where to install the utilities and manpages.

Select the subsets to install or exit the installation.

        0.   Exit without completing installation
        1.   Font compiler utilities
        2.   Font installation utilities

Which utilities do you want to install [1 2]? : Return

selecting subsets: compiler_utilities install_utilities
is this correct [y]? : Return

selected subsets: compiler_utilities install_utilities

Where do you want to install the VXT Font Utilities images?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/local/bin]? :  Return

destination directory: /usr/local/bin
is this correct [y]? : Return
```

```
Where do you want to install the VXT Font Utilities man pages?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/local/man/man1]? :  Return

destination directory: /usr/local/man/man1
is this correct [y]? : Return


This is the installation script for the
        Compiled Fonts
installation kit.  You can install 100dpi fonts, 75dpi
fonts, and miscellaneous fonts. You can specify where to install the
fonts.

Select font sets or exit the installation.

        0.   Exit without completing installation
        1.   100 dpi fonts
        2.   75 dpi fonts
        3.   Miscellaneous fonts

Which font sets do you want to install [1 2 3]? : Return

selecting subsets: 100dpi_fonts 75dpi_fonts misc_fonts
is this correct [y]? : Return

selected subsets: 100dpi_fonts 75dpi_fonts misc_fonts


Where do you want to install the Compiled Fonts?
Enter the absolute pathname of the destination
directory or enter 'q' to quit this subset
[/usr/tftpboot/vxt/fonts]? :  Return

destination directory: /usr/tftpboot/vxt/fonts
is this correct [y]? : Return

created: /usr/tftpboot/vxt/fonts

What do you want to do with the temporary working directories?

        1.   Remove if successful; save if an error occurred (default)
        2.   Save working directories
        3.   Remove working directories

Which option do you want? [1]? :  Return

selecting save_on_error working directories
is this correct [y]? : Return

You have the option of printing or displaying a postinstallation
checklist and running an Installation Verification Program to
ensure the installation completed successfully.

Should the postinstallation checklist be printed [n]? : y  Return

print postinstallation checklist; is that correct [y]? : Return

What printer would you like the postinstallation checklist
to be printed on [default printer]? : Return

Should the postinstallation checklist be displayed
on the terminal (using more) [n]? : Return

do not display postinstallation checklist; is that correct [y]? : Return
```

```
Do you want the Installation Verification Procedure (IVP)
to be run after installation [n]? : Return

do not run the IVP; is that correct [y]? : Return

If the installation encounters errors from the tar utility: See your ULTRIX
system documentation for an explanation of the error and the appropriate
action to take.

If the installation process fails: Look in the install.log file in the working
directory to find information to help you diagnose the problem.

The installation will take approximately 5 minutes to 20 minutes if you do not
install compiled fonts, and from 10 minutes to 60 minutes if you do install the
compiled fonts.  The exact time depends on your system and installation media.

No more questions will be asked.  The installation is in progress.

Extracting from media source:  /dev/nrmt0h

installing images


installing VXT Software Load Images in
        /usr/tftpboot/vxt/images


VXT Software Load Images installation process completed
status: successful installation


installing app-launch


building Application Launcher for ULTRIX

installing Application Launcher in
        /usr/local/bin

installing Application Launcher man pages in
        /usr/local/man/man1


Application Launcher installation process completed
status: successful installation


installing vxtlpd


building VXT Printer Support Utilities for ULTRIX

installing VXT Printer Support Utilities documents in
        /usr/tftpboot/vxt

installing VXT Printer Support Utilities documents in
        /usr/local/bin

installing VXT Printer Support Utilities documents in
        /usr/local/man/man1


VXT Printer Support Utilities installation process completed
status: successful installation


installing font-utils
```

```
building VXT Font Utilities for ULTRIX

installing VXT Font Utilities documents in
        /usr/local/bin

installing VXT Font Utilities documents in
        /usr/local/man/man1


VXT Font Utilities installation process completed
status: successful installation


installing fonts


installing Compiled Fonts in
        /usr/tftpboot/vxt/fonts


Compiled Fonts installation process completed
status: successful installation


Removing temporary working directories.
removing temporary directory images
removing temporary directory app-launch
removing temporary directory vxtlpd
removing temporary directory font-utils
removing temporary directory fonts
Printing postinstallation checklist on default printer

The list of all files installed on your system is in
        /work/kit/install.flist

A script to remove the
        DIGITAL VXT Software
from your system is in
        /work/kit/rm-vxt-kit
You should move this script to a safe place for possible future use.

A postinstallation checklist is in
        /work/kit/vxtpostinstall

The release notes are in
        RelNotes.txt

The installation verification procedure is in
        /work/kit/vxtivp and isrd
You may want to move these scripts to a safe place for possible future use.
To run the installation verification procedure, execute
       /work/kit/vxtivp

The installation log is in
        /work/kit/install.log

DIGITAL VXT Software installation process completed
status: successful installation

#
```

1.6 File Names Installed on Your System

Appendix B lists the possible files installed on your system by the installation procedure. The `install.flist` file lists the files actually installed during your installation.

2

ULTRIX System Management Tasks

Chapter Overview

This chapter describes system management tasks for using VXT software with the ULTRIX operating system.

The details for performing some procedures on your host system may differ slightly from the procedures described here. In that case, use the procedures in this chapter as a guideline and refer to your operating system documentation for specific instructions.

2.1 System Administration Checklist

The ULTRIX operating system is a supported boot host for VXT 2000 and VT1300 terminals. Before you use an ULTRIX system as a boot host for these terminals, you must perform some minor reconfiguration steps on the host system.

Host and Terminals in the Same Subnet

To download VXT software successfully, the boot host and the VXT 2000 windowing terminal must be in the same subnet.

Checklist

Use the following checklist to ensure that you complete the system management tasks:

☐ **Booting and Downloading**

☐ **VXT system images**	Install the VXT system images before starting with system management tasks (Chapter 1).
☐ **Directory structure**	Configure the system so that the VXT system images and fonts are not on the root file system. You may use symbolic links to other file systems. See Section 2.3.
☐ **IP addresses**	Contact your network administrator to obtain a unique Internet protocol (IP) address for each VXT 2000 windowing terminal that you plan to boot from your ULTRIX system. Add these addresses to the `/etc/hosts` file on your system; if necessary, update the name server on your network.
☐ **Network services**	Your host system must provide the boot protocol/trivial file transfer protocol (BOOTP/TFTP) or maintenance operations protocol (MOP) network services.

ULTRIX System Management Tasks
2.1 System Administration Checklist

☐ **Boot setup**

- **Loading VXT software with IP (BOOTP/TFTP)**
  To download VXT software with an IP boot sequence, the host system needs a resident `bootp` daemon, configured correctly in the `/etc/inetd.conf` file. You also need a corresponding `bootptab` configuration file.

  Section 2.4, step 2, includes a sample `bootptab` file. Use the sample to set up a `bootptab` entry in the `/etc/bootptab` file.

  After you configure the system for IP (BOOTP/TFTP) booting, restart the Internet daemon to initialize the changes you made.

- **Loading VXT software with MOP**
  If you plan to boot the VXT through MOP, make sure the `mop_mom` listener is running and the directories are set up correctly. See Section 2.5.

☐ **Fonts** — VXT software provides fonts in the portable compiled font (PCF) format. If you need to use custom fonts, compile and install fonts in the PCF format. See Sections 2.6 to 2.10.

☐ **NFS Access** — If you use the NFS transport to access fonts or resource files, those file systems must be exported.

Optional System Management Tasks

☐ **X Services** — If you plan to use IP X sessions on terminals, make sure your host system supports the X display manager control protocol (XDMCP). If needed, install XDMCP and customize its associated files. See Section 2.12.

☐ **Character Cell Services** — If you plan to use terminal windows, make sure your host system is configured for LAT, Telnet, or DECnet access.

☐ **Terminal and Group Settings** — You can use the terminal's configuration manager or your own host-based resource files to configure and manage terminals. See the *Managing Terminals and Work Groups* section in this guide.

☐ **Printing**

☐ **Printer Ports** — Your host system can use the LAT or TCP/IP transport to access a serial or parallel printer connected to a VXT 2000 windowing terminal. To set up a printer port, see Section 2.16.

☐ **Printer Names** — Select `ptys` and corresponding printer names for each VXT. Add a line in the `/etc/vxtlpdtab` file for each printer.

☐ **VXT Application launcher** — VXT Version 2.1 software provides an application launcher that lets terminal users send commands to a host to display host X applications on the terminal. For setup procedures, see the Application Launcher section in this chapter.

Note

For DECnet and MOP support, the DECnet/OSI ULTRIX for RISC and VAX layered product is required.

Booting and Downloading

This section describes the VXT system images, how to create directory structures, and how to download the VXT software using the BOOTP/TFTP or MOP protocols.

2.2 VXT System Images

VXT Version 2.1 software provides the following system image files:

Table 2–1 VXT System Images

Install this image . . .	If you want . . .
vxt	VXT software with local clients. This image can run on color, gray scale, and monochrome VXT 2000 windowing terminals with 10 megabytes of terminal memory.
vxtex	VXT EX software without local clients. This image can run on color, gray scale and monochrome VXT 2000 windowing terminals with only 4 megabytes of terminal memory.
vxtldr	To support terminals in server-based mode from an InfoServer system on another Ethernet segment.

2.3 Creating Directory Structures

You must log in as the superuser to perform all procedures in this chapter.

Use the following commands to create the directory structure that will contain the VXT system images for IP and MOP loading:

```
#  mkdir /usr/tftpboot                # may already exist
#  ln -s /usr/tftpboot /tftpboot      # may already exist
```

You can use an alternate location for `/usr/tftpboot`, such as `/var/tftpboot`.

2.4 Loading VXT Software with IP—Host System Setup

Perform the following steps to boot the VXT 2000 windowing terminal using IP:

Step 1. Edit the /etc /inetd.conf file.

Find the `bootp` and `tftp` command lines in the `/etc/inetd.conf` file. Your `inetd.conf` may vary depending on your configuration. If you installed the BOOTP daemon from the VXT installation kit, the installation created the daemon file `/etc/bootpd`, which is the Berkley `bootpd` daemon. Modify these command lines to look like the following example.

Example

```
❶ bootp   dgram   udp     wait    /usr/etc/bootpd     bootpd  -i [-d]
❷ tftp    dgram   udp     nowait  /usr/etc/tftpd  tftpd [-r /tftpboot]
```

Explanation of Example

Make sure to remove the # comment character from the beginning of the `bootp` and `tftp` lines.

❶ The `bootp` command line causes `/etc/inetd` to start the `bootpd` when the system receives a request for BOOTP services.

- The `-i` option allows the `bootp` daemon to run under the `inet` daemon.
- The `-d` option enables the `bootp` daemon to write messages into the `syslog` file if logging is enabled on your system.

Check the syslog Daemon

Verify that the `syslog` daemon is running. The `syslog` file should be stored in `/usr/spool/mqueue/syslog`. Check the `/etc/syslog.conf` configuration file for the location of the `syslog` file.

To view the most recent log entries, enter the following command and substitute the name of your `syslog` file:

```
# tail /usr/spool/mqueue/syslog
```

❷ The `tftp` command line causes the `/etc/inetd` process to start the `tftp` daemon when the system receives a request for TFTP services.

- The `-r` option starts `tftpd` in restricted or secure mode. This limits the ability of `tftpd` to access the system file structure to the specified directory tree. In the sample lines, access is limited to the subtree starting from `/tftpboot`. To set up the path to the load file, refer to step 2 on editing the `/etc/bootptab` file.

Symbolic Links in Restricted Mode

When `tftp` is running in restricted mode, any symbolic links from **inside** the specified subtree to **outside** that subtree do not work. Symbolic links **within** the subtree do work. The `tftpd` daemon performs a `chroot` (change root) command to the specified subtree, preventing the subtree from accessing the remainder of your file system.

Step 2. Edit the /etc/bootptab file.

For each terminal, create an entry in the `/etc/bootptab` file. If the file does not exist, you must create it. Be sure to maintain the format of the example file. Using the existing entries as examples, create an entry for your terminal.

The Internet protocol host name used in the `/etc/bootptab` file must be the same as the official host name used in other files that refer to the terminal's IP address. These other files include the

/etc/hosts name server database. See your system administration manuals for details.

loadfile Path Name

The loadfile path name specified in the /etc/bootptab file is relative to any restrictions on tftpd. See step 1.

Examples

The following example shows a typical ULTRIX bootptab entry in Berkley format. The example has two entries. The first entry is for a terminal named vxtf, running VXT software. The second entry is for a terminal named vxte, running VXT EX software.

The VXT bootpd does not support default and relative pathnames in bootptab. These are supported by the ULTRIX bootpd.

Sample /etc/bootptab Entries—Berkley Format

```
#@(#)bootptab.example
# /etc/bootptab:  database for bootp server (/etc/bootp)
#
# Blank lines and lines beginning with '#' are ignored.
#
# home directory

/

# default bootfile

nosuchfile

# end of first section

%%
# The remainder of this file contains one line per client interface
# with the information shown by the table headings below.
# The 'host' name is also tried as a suffix for the 'bootfile'
# when searching the home directory.  (e.g., bootfile.host)
#
# host  htype haddr              iaddr          bootfile
#

vxtf  1 08:00:2b:25:3e:c6 12.122.128.27 /vxt/images/vxt
vxte  1 08:00:2b:25:3e:c7 12.122.128.28 /vxt/images/vxtex
```

Step 3. Modify /etc/services file.

Add the following two lines to /etc/services, if not already present. Make sure there is not a # comment character at the beginning of the lines.

```
bootp           67/udp              # Provide bootp service.
tftp            69/udp              # Provide tftp service.
```

Step 4. Restart the Internet daemon.

Restart the Internet daemon to initialize the changes you made to the /etc/inetd.conf file as follows.

1. You must supply the process ID (PID) of the daemon in the restart command. To display the PID of the inetd daemon, use the following command:

   ```
   # ps -ax | grep inetd | sed '/grep/d'
   ```

Here is a typical system response to the `ps -ax` command:

```
5426 ?  I     0:02 /etc/inetd
```

In this example, 5426 is the PID of the `inetd` process.

2. To restart the `inetd` daemon using this PID, enter the following command:

```
# kill -9 5426 ; /etc/inetd
```

For more information, see the man pages.

Note

Users cannot connect to the system or load from the system during the short time required to restart the daemon.

Step 5. Load the terminal.

You can now load the terminal from the newly configured system. Turn on the terminal, then quickly press and release the halt button on the rear of the terminal to display the >>> prompt. At the >>> prompt, enter the following boot command:

```
>>> b Return
```

Clearing the Boot Method

After a successful boot procedure, the VXT software remembers the protocol used and always attempts to use that protocol first for booting.

If you decide later that you want to boot through MOP instead of BOOTP/TFTP, you must enter the following command at the >>> prompt:

```
>>> b/10000 Return
```

2.5 Loading VXT Software with MOP—ULTRIX System Setup

This section describes how to load VXT software using MOP by name or MOP from a preconfigured host.

2.5.1 MOP by Name

To load VXT software using MOP by name, set up the path to the load file as follows:

1. The system must be running a `mop_mom` listener to provide MOP boot service. To see if the listener is present, enter the following command:

```
# ps -ax | grep mop_mom | grep -v grep
```

If the `mop_mom` listener is not running, then start it with the following command:

```
# /etc/mop_mom &
```

This command must execute every time the system reboots. The command is typically placed in the `/etc/rc.local` file. See `mop_mom` (8) for more details.

2. Link the VXT images into the /usr/lib/mop directory, where the MOP listener can access them. Note that VXT software requires the image names to be all uppercase.

   Perform the following commands for all VXT installations (new or upgraded):

   ```
   # cd /usr/lib/mop
   # ln -s /tftpboot/vxt/images/vxt VXT
   # ln -s /tftpboot/vxt/images/vxtex VXTEX
   ```

3. You can verify that the new link has been created by entering the following command:

   ```
   # ls -l /usr/lib/mop/VXT*
   ```

   The system response should look similar to the following:

   ```
   lrwxr-xr-x  1 root 36 May  1 15:30 VXT ->
   /tftpboot/vxt/images/vxt
   lrwxr-xr-x  1 root 36 May  1 15:29 VXTEX ->
   /tftpboot/vxt/images/vxtex
   .
   .
   .
   ```

4. After you complete the previous steps, you can load the terminal from the newly configured system.

   Turn on the terminal, then quickly press and release the halt button at the rear of the terminal to display the >>> prompt. At the >>> prompt, enter the following boot command:

   ```
   >>> b/100 Return
   Bootfile:
   ```

   At the Bootfile: prompt, enter the system image name. For example:

   ```
   Bootfile:  vxt Return
   ```

Clearing the Boot Method

After a successful load, the VXT software remembers the protocol used and always attempts to uses that protocol first. If you decided later to boot through BOOTP/TFTP (the IP boot) instead of MOP, then enter the following command:

```
>>> b/10000 Return
```

2.5.2 MOP by Ethernet Address (Preconfigured Host)

To configure your host system for booting by Ethernet address, use your system's addnode utility. Here is the command format:

```
# addnode vxt_node_name -A vxt_node_address -h hw_address -l load_file
```

- *vxt_node_name* is the DECnet node name of the terminal.
- *vxt_node_address* is the DECnet node address of the terminal.
- *hw_address* is the Ethernet address of the terminal.
- *load_file* is the VXT image file to load into the terminal.

See addnode (8) and getnode (8) in your host system documentation.

2.5.3 Troubleshooting MOP Loading

If a MOP load does not work, check the network to make sure there is no MOP-filtering bridge between the terminal and the load host.

You can look in the `/usr/spool/mqueue/syslog` file to see if the host receives load requests from the terminal. MOP logs all load requests in that file.

Note

First verify that the `syslog` daemon is running.

If there are no requests from the terminal, look for a bridge. If there are failed requests, check that the system image file name is available in the proper directory (`/usr/lib/mop`).

2.5.4 MOP Trigger to Boot a Remote Node

The MOP protocol provides a trigger mechanism for rebooting a remote node. The VXT 2000 windowing terminal can accept these trigger messages and reboot at a remote node's request. By default, the terminal ignores these trigger messages.

Password

You can customize a terminal or work group of terminals to enable MOP triggering. You can also supply a password to restrict access for remote rebooting of your terminals. The MOP trigger password can be from 1 to 16 hexadecimal characters (0 to 9 and A to F characters). If you do not supply a password, a default value of 0 is used (equivalent to no password).

See your host system's NCP manual or online help for more information on the syntax for triggering remote nodes.

Fonts

2.6 Font Access

This section describes font paths. The VXT 2000 windowing terminal can access fonts by using the TFTP or NFS transport.

2.6.1 TFTP Font Paths

The TFTP font paths used by the VXT 2000 windowing terminal depend on the system setup of the `tftp` daemon.

2.6.2 Unrestricted tftp

If your system is configured for unrestricted `tftp`, the VXT 2000 user must specify the full path to the fonts they plan to access. For example, if you choose the default directory locations for VXT fonts when installing the VXT host software, you can use the following paths:

```
/tftpboot/vxt/fonts/100dpi/fonts.dir
/tftpboot/vxt/fonts/75dpi/fonts.dir
/tftpboot/vxt/fonts/misc/fonts.dir
```

The previous example assumes a symbolic link from `/tftpboot` to `/usr/tftpboot`. If you do not use symbolic links, the paths are

```
/usr/tftpboot/vxt/fonts/100dpi/fonts.dir
/usr/tftpboot/vxt/fonts/75dpi/fonts.dir
/usr/tftpboot/vxt/fonts/misc/fonts.dir
```

2.6.3 Restricted tftp

If your system is configured for restricted `tftp`, the font path is relative to the root `tftp` directory as specified in the file `/etc/inetd.conf`. Here is a sample ULTRIX `tftp` daemon in restricted mode:

```
tftp dgram udp nowait /usr/etc/tftpd tftpd -r /tftpboot.
```

The `-r` option is for restricted mode. See step 1 in Section 2.4 for examples of the `-r` option.

The `/tftpboot` directory indicates the root directory for `tftp`.

In this case, the font paths specified by the user must be relative to `/tftpboot`. For example, if you choose the default directory locations for VXT fonts when installing the VXT host software, you must use the following paths:

```
/vxt/fonts/100dpi/fonts.dir
/vxt/fonts/75dpi/fonts.dir
/vxt/fonts/misc/fonts.dir
```

2.6.4 NFS Font Paths

If you use the NFS transport to access fonts or host-based resource files, the file system containing the fonts and resource files must be exported to allow NFS access. Modify the `/etc/exports` file to list the file system, access privileges, and clients allowed access. Here are examples of exported file systems:

```
/usr    -r=o                  # export as read-only to world
/usr/local                    # export as read/write to world
/usr/bin  -r=o vxtc vxtm      # export as read-only to clients
                              # vxtc and vxtm
```

2.7 PCF Font Format for VXT 2000 Windowing Terminals

The terminal requires fonts in the portable compiled font (PCF) format. VXT software can access fonts in big endian and little endian format. If you have existing PCF fonts, you do not need to recompile to use them with the VXT 2000 windowing terminal.

2.7.1 ULTRIX Fonts

The fonts supplied with the software kit are already in PCF format. The fonts supplied with UWS Version 4.1 and later are also in PCF format.

2.7.2 UNIX Fonts

VXT software relies on the `fonts.dir` file located in each font directory.

mkfontdir

If you make any changes in the directories where the fonts are stored, you must update the `fonts.dir` file using the `mkfontdir` utility.

Use `mkfontdir` (`dxmkfontdir` utility on ULTRIX systems) to create a new or updated `fonts.dir` file.

Enter the font paths in the Customize Font Path dialog box, accessed from the Terminal Manager window's Customize menu. See *VXT 2000+/VXT 2000 Windowing Terminal User Information* for instructions.

2.8 Compiling Fonts for ULTRIX TFTP Systems

This section describes the use of VXT font utilities and how to compile and install custom fonts.

2.8.1 Font Utilities

The typical ULTRIX installation includes only some shell scripts that make compiling fonts easier. The scripts are especially useful if you need to compile many fonts. However, ULTRIX fonts are compatible with the VXT 2000 windowing terminal, so you normally do not need to compile many fonts. For typical ULTRIX systems with DECwindows software, you would install only subset 2 of the font installation, the font installation utilities.

If you have installed the VXT font utilities, see Section 2.9.

If you have not installed the font utilities, use Sections 2.9 and 2.9.2 for reference only.

2.8.2 Compiling and Installing Custom Fonts for ULTRIX Systems

If you have fonts that are not in the PCF format, you can compile fonts and create the `fonts.dir` file with the programs supplied with ULTRIX. You must have UWS Version 4.1 and later installed on your system. The fonts supplied with UWS Version 4.1 and later are in PCF format.

To compile a font, the source font must be in bitmap distribution format (BDF). BDF is the standard source format for fonts used with the X Window System.

1. To compile a font, use the following command:

   ```
   # dxfc bdf-file-name > pcf-file-name
   ```

   bdf-file-name is the name of the source (.bdf) file, and *pcf-file-name* is the name of the output (.pcf) file. Full pathnames are allowed.

2. After compiling the font and placing it in the destination directory, you must use the `cd` command to go to that directory. Then run `dxmkfontdir` to produce the `fonts.dir` file.

   See `dxfc` (1) and `dxmkfontdir` (1) man pages for more information.

2.9 Compiling Fonts for UNIX TFTP Systems

This section describes font utilities and how to compile and install custom fonts.

2.9.1 Font Utilities

The VXT software kit for UNIX systems includes font utilities. Use these utilities to compile custom fonts for the terminal. Make sure to include the directory where you installed the utilities in your PATH variable; the default location is `/usr/local/bin`. The default location for the man pages is `/usr/local/man/man1`. See your host system documentation for information about using man pages.

On ULTRIX systems with DECwindows software, you typically install only the VXT font installation utilities, not the font compiler utilities.

2.9.2 Compiling and Installing Custom Fonts for UNIX Systems

If you have fonts that are not in the PCF format, you can compile fonts and create the `fonts.dir` file with the font utilities supplied. To compile a font, the source font must be in bitmap distribution format (BDF). BDF is the standard source format for fonts used with the X Window System.

First determine the directory to contain the compiled PCF fonts. You must place all fonts that you want to use in the same directory. Create this directory if it does not exist. This directory must contain PCF fonts only, if the font utilities are to work properly.

Fonts

To compile the fonts:

1. Use the `cd` command to go to the directory containing the source .bdf fonts.

   Check for Duplicate File Names

   Make sure the directory does not contain any .pcf files with the same names as the .bdf files your are compiling. Any existing .pcf files with the same names will be overwritten.

mkvxtfonts

2. Compile the fonts from BDF to PCF, using the `mkvxtfonts` utility:

   ```
   # mkvxtfonts *.bdf
   ```

   If you do not specify a file, the default is *.bdf.

   This example assumes that `mkvxtfonts` was installed in this default directory. If `mkvxtfonts` was not installed in `/usr/local/bin`, specify the complete path to `mkvxtfonts`.

instvxtfonts

3. Move the fonts to the destination directory by using the `instvxtfonts` utility:

   Check for Duplicate File Names

   Make sure the destination directory does not already contain .pcf files with the same names as the files you are copying. Any existing files with the same names will be overwritten.

   ```
   # instvxtfonts [-c] path-to-pcf-directory *.pcf
   ```

   This example assumes that `instvxtfonts` is installed in a directory that is in your current path.

   path-to-pcf-directory is the path to the directory you want the .pcf files to be placed in. You must specify the path. If you do not specify the .pcf files, the default is *.pcf.

   This command moves the specified .pcf files from the current directory to the target directory. The command also creates a `fonts.dir` file in the target directory, listing all .pcf fonts (new and existing) in the directory.

   The `-c` option lets you copy the `.pcf` files to the destination directory instead of moving them.

Repeat this procedure for each directory containing BDF fonts you want to use.

2.10 Managing Fonts

VXT Version 2.1 software implements the X Version 11 Release 5 (X11R5) server, so you can access fonts from multiple systems, using different transports. If you serve fonts from multiple systems, refer to the *System Management Overview* chapter for requirements.

2.10.1 Alias Names and XLFD Names

fonts.alias

Most systems have a `fonts.alias` file that allows fonts to have multiple names. VXT Version 1.2 and later supports the `fonts.alias` file mechanism, so an understanding of the file may be useful. Each line in the file lists two names — an alias name, followed by the actual name of the font to use when the alias is requested.

XLFD

Many applications use the X logical font description (XLFD) naming convention for fonts. The MIT X Window System documentation describes this convention. Fonts with the same XLFD name should be interchangeable. They may look slightly different, but there should be no important differences. Here is an example of an XLFD name:

```
-adobe-new century schoolbook-bold-r-normal--10-100-75-75-p-66-iso8859-1
```

Generally, aliases are short names for XLFD names, such as `fixed`, `8x13`, and `times_bold14`. In most cases, substituting one font with a similar font does not cause problems. Applications that are particular about their fonts (such as WYSIWYG editors) generally use XLFD names.

X Services

Before you can create IP X sessions on a VXT 2000 windowing terminal, the host system must support the X display manager control protocol (XDMCP). The MIT X11R4 and X11R5 distributions provides a component called `xdm` that supports XDMCP. Some host systems also provide support.

This section provides information for setting up XDMCP support on the ULTRIX operating system. Your host system documentation may have slightly different procedures; in that case, refer to the host system documentation.

To install and set up XDMCP support, you must log in as the superuser.

2.11 Installing XDMCP Support on ULTRIX Systems

On the VAX ULTRIX and RISC ULTRIX Version 4.2 platforms from Digital, install `xdm` from the following unsupported subsets:

System	Subset
VAX ULTRIX	ULXUNMIT420
RISC ULTRIX	UDXUNMIT420

Note

These subsets contain more than `xdm`. Check your disk space before installing.

Files

After installing `xdm` from the MIT X11R4 or X11R5 kit, you should have the following files on your system:

```
/usr/bin/X11/xdm
/usr/lib/X11/xdm/Xreset
/usr/lib/X11/xdm/Xresources
/usr/lib/X11/xdm/Xservers.fs
/usr/lib/X11/xdm/Xservers.ws
/usr/lib/X11/xdm/Xsession
/usr/lib/X11/xdm/Xstartup
/usr/lib/X11/xdm/xdm-config
```

Section 2.12 describes the purpose of each file and how to customize it.

2.12 Customizing Configuration Files for XDMCP Support

This section describes some files associated with XDMCP support and how to customize them.

2.12.1 Xservers

The Xservers file contains a list of X window displays managed by the host xdm process. These are displays that do not use XDMCP to communicate with the host xdm. Examples are local workstation displays and older (pre-X11R4) X terminals that do not support XDMCP.

XDMCP Recommended

The VXT 2000 windowing terminal can communicate with the host xdm using XDMCP, or the host xdm can manage the terminal without XDMCP. Digital recommends using XDMCP, because the VXT 2000 windowing terminal will provide more reliable initiation, termination, and reinitiation of xdm sessions. XDMCP involves less loading of the host. Allowing the host to manage the terminal is less reliable; this option is provided for backward compatibility and user convenience, but is not recommended.

Creating the Xservers File

The Xservers file must exist, whether or not the host xdm manages the VXT 2000 windowing terminal. If the terminal communicates with the host xdm using XDMCP and the Xservers file does not exist, create an empty file with the touch command:

```
# touch /usr/lib/X11/xdm/Xservers
```

2.12.2 xdm-pid

The xdm-pid file contains the process ID of the xdm parent process. This file is maintained by xdm.

2.12.3 xdm-errors

The xdm-errors file contains a list of errors reported by xdm. If this file does not exist, create an empty version as follows:

```
# touch /usr/lib/X11/xdm/xdm-errors
```

2.12.4 xdm-config

The xdm-config file controls the operation of xdm. The file is read when xdm is first started. If you change this file, you must restart xdm for the changes to take effect.

Example

```
DisplayManager.servers:         /usr/lib/X11/xdm/Xservers
DisplayManager.errorLogFile:    /usr/lib/X11/xdm/xdm-errors
DisplayManager.pidFile:         /usr/lib/X11/xdm/xdm-pid
DisplayManager*resources:       /usr/lib/X11/xdm/Xresources
DisplayManager*session:         /usr/lib/X11/xdm/Xsession
DisplayManager.0.authorize:     true
DisplayManager*authorize:       false
```

2.12.5 Xresources

This file specifies the resources used when displaying the login box. The file also specifies the failsafe client option.

Example

```
xlogin*login.translations: #override\
     <Key>F1: set-session-argument(failsafe) finish-field()\n\
     <Key>Return: set-session-argument() finish-field()
xlogin*borderWidth: 3
#ifdef COLOR
xlogin*greetColor: #f63
xlogin*failColor: red
xlogin*Foreground: black
xlogin*Background: #fdc
#else
xlogin*Foreground: black
xlogin*Background: white
#endif
```

2.12.6 Xstartup

The `Xstartup` file is executed by `xdm` after the user has successfully logged in. Be careful when adding commands to this file, because it is executed with superuser privileges. This file is normally empty.

Example

```
#!/bin/sh
#
# Xstartup
#
# This program is run as root after the user is verified
#
```

2.12.7 Xsession

The `Xsession` file runs after `Xstartup`. Commands in this file are executed with the user's default login privileges.

Example

```
#!/bin/sh
#
# Xsession
#
# This is the program run as the client
# for the display manager.  This example is
# quite friendly as it attempts to run a per-user
# .xsession file instead of forcing a particular
# session layout. The .xsession should be executable.
#    chmod a+x .xsession
#

case $# in
1)
        case $1 in
        failsafe)
                exec xterm -geometry 80x24-0-0 -ls
                ;;
        esac
esac

startup=$HOME/.xsession
resources=$HOME/.Xresources
```

```
if [ -f $startup ]; then
        exec $startup
        exec /bin/sh $startup
else
        if [ -f $resources ]; then
                xrdb -load $resources
        fi
        twm &
        exec xterm -geometry 80x24+10+10 -ls
fi
```

2.12.8 Xreset

The Xreset file runs after the user logs out. Like Xstartup, Xreset runs at superuser level. Be careful when adding commands to this file. This file is normally empty.

Example

```
#!/bin/sh
#
# Xreset
#
# This program is run as root after the session terminates, but
# before the display is closed
#
```

2.12.9 Hints for Configuring XDMCP Support

The following hints can help you customize your applications for XDMCP support:

Use the /var file when the /usr file is read-only.

In some systems /usr is read-only. To use xdm in such systems, create a directory under the root /var as follows:

```
# mkdir /var/X11/xdm
```

This step avoids the need for xdm to have write access to /usr. When you make this change, ensure that the xdm configuration file xdm-config has correct pointers to the other xdm files. For example, if you intend to use the root /var, change /usr/lib/X11/xdm/xdm-config as follows:

```
DisplayManager.errorLogFile: /var/X11/xdm/xdm-errors
DisplayManager.pidFile:  /var/X11/xdm/xdm-pid
DisplayManager.remoteAuthDir: /var/X11/xdm
```

Modify the xlogin dialog.

On ULTRIX systems, you can change the appearance of the xlogin dialog to be more consistent with VXT and ULTRIX conventions by appending the following lines to the /usr/lib/X11/xdm/Xresources file:

```
xlogin.Login.width: 512
xlogin.Login.height: 192
xlogin.Login.*Font: -*-Menu-*-*-*--*-120-*-*-*-*-ISO8859-1
xlogin.Login.greeting: IP X Session
xlogin.Login.unsecureGreeting: unsecure IP X Session
xlogin.Login.fail: Login incorrect
```

X Services

Modify the /usr/lib /X11/Xsession file to start a remote session manager.

On some host systems, a session manager provides the way to start remote X window applications. You can customize `Xsession` to start the session manager instead of the window manager and terminal emulator. For example, on ULTRIX systems you can start the DECwindows session manager dxsession by making the following changes to `/usr/lib/X11/Xsession`.

Find these two lines in the file:

```
twm &
exec xterm -geometry 80x24+10+10 -ls
```

Replace those two lines with this line:

```
exec dxsession
```

To start xdm each time the host system is rebooted:

Append the following lines to the `/etc/rc.local` file:

```
 [ -f /usr/bin/X11/xdm ] && {
        /usr/bin/X11/xdm & echo -n ' xdm'          >/dev/console
}
```

To start xdm manually:

Enter the following command:

```
# /usr/bin/X11/xdm
```

Character Cell Terminal Services

This section describes how to configure ULTRIX systems for LAT, Telnet, or DECnet access.

2.13 Configuring ULTRIX Systems for LAT Access

To configure your system for LAT access, see your host system documentation for details.

2.14 Configuring ULTRIX Systems for Telnet Access

To configure your system for Telnet access, see your host system documentation.

2.15 Configuring ULTRIX Systems for DECnet Access

To create DECnet terminal windows on a VXT 2000 windowing terminal, you need DECnet installed and enabled on your ULTRIX system.

DECnet Guest Account

ULTRIX systems running DECnet require a guest account for incoming terminal sessions.

See the DECnet documentation and the *ULTRIX System and Network Management Manual* for more details.

Managing Terminal and Group Settings

When a terminal uses a host-based VXT system image, the terminal stores its customizations in a native resource file in the terminal's nonvolatile memory (NVRAM). You have two options for centrally managing terminals on your network:

- Use your terminal's configuration manager to manage the settings in the native resource file of each terminal.
- Create your own resource files on a host system and configure terminals to access the files.

See the *Managing Terminals and Work Groups* section of this guide for details.

Printing

2.16 Setting Up Access to VXT 2000 Printer Ports

This section describes how to set up access to the printer ports on VXT 2000 windowing terminals.

2.16.1 Setting Up the LAT Printer Port

ULTRIX hosts can use the LAT transport to access a serial or parallel printer connected to a VXT 2000 windowing terminal. You must have configured your system for LAT support. See the *ULTRIX System and Network Management Manual* for more details.

Although LAT-accessible ports are typically used for printers, you can attach other devices to the printer port. You can use the serial port to read data from and send data to the attached device. VXT 2000 hardware restricts the parallel port to sending data only.

Example

Here is a typical example of how you would set up LAT ports on an ULTRIX host to access a LAT printer on a VXT 2000 windowing terminal:

```
# lcp -h /dev/ttyn:VXT_name:LAT_PORT
```

- *VXT_name* is the VXT 2000 windowing terminal's LAT address, in the form LAT_*xxxxxxxxxxxx*.
- *ttyn* is a terminal device created for LAT use in `/etc/ttys`.

For example:

```
# lcp -h /dev/tty14:LAT_08002B24BB2B:LAT_PORT
```

You can then use the created LAT ports to set up print queues, using your host queuing software. See your host's system management documentation for information on setting up and using remote LAT printer devices and queues. The ULTRIX system must be configured for LAT support.

Selecting ttys

Select the `tty` you want to use. To display an alphabetical list of `ttys`, use the following command:

```
# ls /dev/tty*
```

Start with the last `tty` in the alphabetical list and proceed to earlier ones.

Set the `tty` to `off nomodem` and add an entry to the `/etc/ttys` file to make the setting permanent. Here is a a typical entry in the `/etc/ttys` file:

```
tty15  "/etc/getty std.9600" vt100 off nomodem # LAT printer
```

If needed, issue a `kill` command to make the changes to the `/etc/ttys` file take effect:

```
# kill -HUP 1
```

Printing

Making ttys Available

Use the LAT server control program to set the `ttys` available for host-initiated connections. For example:

```
# /etc/lcp -s -h /dev/tty15
```

You also must enter the `lcp` command in the `/etc/rc.local` file.

Setting Up a Printer Port

Use the `lprsetup` command to set up the ports on the ULTRIX host to access the printer on a VXT 2000 windowing terminal.

The `lprsetup` command prompts you for information about the printer:

When prompted for...	Enter...
The connection type	lat
The terminal server name	The LAT node address of the terminal (in uppercase letters)
The terminal server output port	LAT_PORT

Example

```
#   lprsetup Return
ULTRIX Printer Setup Program

Command  < add modify delete exit view quit help >:   a Return

Adding printer entry, type '?' for help.

Enter printer name to add [17] :   lat_print Return

For more information on the specific printer types
Enter 'printer?'

Enter the FULL name of one of the following printer types: la50
la75 la100 la120 la210 lcg01 lg01 lg02 lg31 lj250 ln01 ln01s
ln03 ln03s ln03r lp25 lp26 lp27 lp29 lqp02 lqp03 lvp16 printserver
remote unknown or press RETURN for [unknown] :   ln03 Return

Enter printer synonym:    Return

Set device pathname 'lp' [/dev/tty17] ?    /dev/tty15 Return

Set accounting file 'af' [/usr/adm/lp17acct] ?    Return

Set spooler directory 'sd' [/usr/spool/lpd17] ?    Return

Set printer error log file 'lf' [/usr/adm/lp17err] ?    Return

Set printer connection type 'ct' [dev] ?    lat Return

Set terminal server name 'ts' [] ?    LAT_08002B253EC6 Return
Set terminal server output port 'op' [] ?   LAT_PORT Return

Set terminal server output service 'os' [] ?   Return

Enter the name of the printcap symbol you wish to modify.  Other
valid entries are:

     'q'     to quit (no more changes)
     'p'     to print the symbols you have specified so far
     'l'     to list all of the possible symbols and defaults

The names of the printcap symbols are:
```

```
     af  br  cf  ct  df  dn  du  fc  ff  fo  fs  gf  ic  if lf  lo
     lp  mc  mx  nc  nf  of  op  os  pl  pp  ps  pw  px  py rf  rm
     rp  rs  rw  sb  sc  sd  sf  sh  st  tf  tr  ts  uv  vf xc  xf
     xs  Da  Dl  It  Lf  Lu  Ml  Nu  Or  Ot  Ps  Sd  Si  Ss Ul  Xf

Enter symbol name:   q Return

Printer #17
-----------

Symbol  type  value
------  ----  -----
af    STR    /usr/adm/lp17acct
br    INT    4800
ct    STR    lat
fc    INT    0177777
fs    INT    03
if    STR    /usr/lib/lpdfilters/ln03of
lf    STR    /usr/adm/lp17err
lp    STR    /dev/tty15
mx    INT    0
of    STR    /usr/lib/lpdfilters/ln03of
op    STR    LAT_PORT
os    STR
pl    INT    66
pw    INT    80
rw    BOOL   on
sd    STR    /usr/spool/lpd17
ts    STR    LAT_08002B253EC6
uv    STR    4.0
xc    INT    0177777
xf    STR    /usr/lib/lpdfilters/xf
xs    INT    044000
xs    INT    044000

Are these the final values for printer 17 ? [y]   Return

Adding comments to printcap file for new printer, type '?' for
help.

Do you want to add comments to the printcap file [n] ? :   Return

Set up activity is complete for this printer.
Verify that the printer works properly by using
the lpr(1) command to send files to the printer.

Command  < add modify delete exit view quit help >:   q Return
```

Customizing the Terminal's Printer Port Settings

You must customize the printer port settings on the terminal to match the port and printer in use. For more information, see *VXT 2000+/VXT 2000 Windowing Terminal User Information*.

2.16.2 Setting Up the TCP/IP Printer Port

With VXT Version 2.0 or later software, ULTRIX hosts can use the TCP/IP protocol to access a serial or parallel printer connected to a VXT 2000 windowing terminal.

The printer ports are typically used for printers, but you can attach other devices. You can use the serial port to read data from and send data to the attached device. VXT 2000 hardware restricts the parallel port to sending data only.

Software Requirements

You need the VXT printer support utilities subset provided with the VXT software installation kit. This subset provides the `vxtlpd` printer daemon.

Printing

vxtlpd Printer Daemon

The vxtlpd printer daemon works with the UNIX printer daemon and filters to send data to and from the specified terminal printer port. The lpd command on the host communicates with the slave side of a pseudoteletype pty as it would to any serial device.

The vxtlpd printer daemon reads a configuration file that specifies the ptys, the terminal's IP address and port number, and the starting timeout period for retrying a connection. The timeout period doubles each time a connection attempt fails, up to a maximum of 30 minutes.

Configuration File Syntax

You must create the configuration file used with the vxtlpd printer daemon. The default name and path for the configuration file is /etc/vxtlpdtab. You can use vxtlpd to specify a different file. Use the following syntax for configuration file entries:

/dev/ptyqf *ip_address_or_name* 9100 time #optional comment

Examples:

```
/dev/ptyqf 1.2.3.4 9100 60
/dev/ptyqe myvxt 9100 120
```

- Specify the pty device used for printing.
- You can specify the terminal's host name or IP address (in dotted decimal notation).
- VXT 2000 windowing terminals use IP port 9100 for the printer.
- The timeout period specifies the time in seconds between retries if the connection to the terminal fails. The maximum timeout period is 30 minutes.

  If you specify 0 seconds, then no retries are done. These retries are only done if the terminal is not reachable. If the terminal is reachable but the printer is not ready or not available, the printing job will be lost and must be requeued by the user.

  Example: Suppose the starting timeout period is 60 seconds. If a connection is not made after 60 seconds, the timeout period advances to 120 seconds. If a connection is not made after 120 seconds, the timeout period advances to 240 seconds and continues advancing until 30 minutes is reached.

Selecting ptys

Choose the ptys you want to use.

List the ptys. On most systems, you can use the following command to display an alphabetical list:

```
ls /dev/pty*
```

Start with the last pty in the alphabetical list and proceed to earlier ones.

The vxtlpd command connects to the master side of the pty. The slave side of the pty is used by the host's printing system. Put the selected ptys and all other required information in the configuration file for vxtlpd, then start vxtlpd.

Creating Printers

Creating printers for the print subsystem is identical to creating printers directly connected to the system. The procedure differs for each system and each printer type.

In each case, the device for the printer is the slave side of the pty for the corresponding VXT 2000 windowing terminal.

For example, the slave device /dev/ttyqf corresponds to the master device /dev/ptyqf.

If you do not configure the printer correctly, you may get printing errors, displayed errors messages, or no printout. Among possible solutions, Digital recommends that you manually assign protection to ptys and verify that they are not being used by other users.

Setting Up a Printer

Use lprsetup command to set up supported ULTRIX hosts to access the printer on a VXT 2000 windowing terminal.

Use the lprsetup command to create a printer entry with the slave device as previously explained. The lprsetup command prompts you to specify a baud rate and connection type (ct). Enter 0 for the baud rate and dev for connection type. Set lp to the slave side of the pty, for example: /dev/ttyqf . For more information, see the lprsetup man page.

Example

```
# lprsetup
ULTRIX Printer Setup Program
Command  < add modify delete exit view quit help >:  a  Return
Adding printer entry, type '?' for help.
Enter printer name to add [15] :  vxt_printer  Return
For more information on the specific printer types
Enter 'printer?'
Enter the FULL name of one of the following printer types:
la50 la75 la100 la120 la210 lcg01 lg01 lg02 lg31 lj250 ln01 ln01s ln03 ln03s
ln03r lp25 lp26 lp27 lp29 lqp 02 lqp03 lvp16 printserver remote unknown
or press RETURN for [unknown] :  ln03   Return
Enter printer synonym:
Set device pathname 'lp' [/dev/tty15] ?   /dev/ttyqf  Return
Set accounting file 'af' [/usr/adm/lp15acct] ?   Return
Set spooler directory 'sd' [/usr/spool/lpd15] ?   Return
Set printer error log file 'lf' [/usr/adm/lp15err] ?   Return
Set printer connection type 'ct' [dev] ?   Return
Set printer baud rate 'br' [4800] ?   0   Return
```

```
Enter the name of the printcap symbol you wish to modify.  Other
valid entries are:
        'q'     to quit (no more changes)
        'p'     to print the symbols you have specified so far
        'l'     to list all of the possible symbols and defaults
The names of the printcap symbols are:

 af  br  cf  ct  df  dn  du  fc  ff  fo  fs  gf  ic  if  lf  lo
 lp  mc  mx  nc  nf  of  op  os  pl  pp  ps  pw  px  py  rf  rm
 rp  rs  rw  sb  sc  sd  sf  sh  st  tf  tr  ts  uv  vf  xc  xf
 xs  Da  Dl  It  Lf  Lu  Ml  Nu  Or  Ot  Ps  Sd  Si  Ss  Ul  Xf

Enter symbol name:  q   Return

        Printer #15
        -----------
Symbol  type  value
------  ----  -----
  af    STR    /usr/adm/lp15acct
  br    INT    0
  ct    STR    dev
  fc    INT    0177777
  fs    INT    03
  if    STR    /usr/lib/lpdfilters/ln03of
  lf    STR    /usr/adm/lp15err
  lp    STR    /dev/ttyqf
  mx    INT    0
  of    STR    /usr/lib/lpdfilters/ln03of
  pl    INT    66
  pw    INT    80
  rw    BOOL   on
  sd    STR    /usr/spool/lpd15
  uv    STR    4.0
  xc    INT    0177777
  xf    STR    /usr/lib/lpdfilters/xf
  xs    INT    044000

Are these the final values for printer 15 ? [y]   Return

Adding comments to printcap file for new printer, type '?' for help.
Do you want to add comments to the printcap file [n] ? :   Return

Set up activity is complete for this printer.
Verify that the printer works properly by using
the lpr(1) command to send files to the printer.

Command  < add modify delete exit view quit help >:  q   Return
```

Starting vxtlpd

If you previously installed vxtlpd, kill all the running copies of vxtlpd. Note that this action also stops any jobs currently printing on VXT 2000 windowing terminals.

Before starting a new version of vxtlpd:

1. Enter the following command:

   # **ps -ax | grep vxtlpd | sed '/grep/d'**

2. For each PID, enter the following command:

   # **kill -9 *pid***

To automatically restart vxtlpd each time the system is rebooted, you must edit the /etc/rc.local file. You can also run vxtlpd from the command line.

To run vxtlpd from the command line, use the following syntax:

vxtlpd [-c *file*] [-l *file*] &

- The -c *file* option lets you specify the configuration file. The default file is /etc/vxtlpdtab.
- The -l *file* option lets you specify a log file for error messages and other messages. If you omit this option, no messages are generated.
- Comments begin with the # character and can continue to the end of the line.

To automatically start vxtlpd when the system is rebooted, add the following lines to /etc/rc.local:

```
[ -x /usr/localbin/vxtlpd ] && {
 /usr/local/bin/vxtlpd [-c config_file ] [-l log_file] > /dev/console
}
```

Use the correct path to vxtlpd if you installed it in a different location. Specify the -c and -l options if desired.

Customizing the Terminal's Printer Port Settings

You must customize the printer port settings on the terminal to match the port and printer in use. For more information, see *VXT 2000+/VXT 2000 Windowing Terminal User Information*.

2.16.3 Printing from the ULTRIX Host

On the ULTRIX host, use the lpr command to submit printing jobs to the terminal's printer. Use the printer name specified in the lprsetup command to direct the printing job to the correct print queue.

Syntax

Enter lpr commands as follows:

lpr -P*vxt_printer* [-Dpostscript] *printfile*

- *vxt_printer* is the name of the printer connected to the terminal.
- *printfile* is the file to print.
- The -Dpostscript option is for postscript files. You can use this option if your printer supports PostScript printing.

For more information, see the lpr man page.

Note

In general, the host software cannot tell when a print request is rejected. The user must reprint the file.

Application Launcher

Overview

VXT Version 2.1 software provides an application launcher that lets users enter commands from a host session to display remote X applications on the terminal.

The host passes remote launching commands to the terminal's local window manager. Users can enter the commands through the VXT Terminal Manager window. Advanced users can use the local window manager to bind commands to mouse buttons, keyboard keys, or terminal menus; this method allows users to start remote X applications without running the terminal manager or a remote session manager.

Installation

The application launcher is part of the VXT software kit. See Chapter 1 for installation instructions.

The host system must have a C compiler and X Window System link libraries to build the application launcher.

Security

Users must be authorized to access the terminal from the host system. You can enter authorized hosts and users in the Customize Security dialog box of the Terminal Manger window. You can centrally manage these security settings by using the terminal's configuration manager or a host-based resource file. See the *Managing Terminals and Work Groups* section.

Setup and Use

The VXT installation procedure automatically builds the executable application launcher file named `vxtlaunch`. By default, the file is placed in the `/usr/local/bin` directory. Notify users of the launcher's name and location.

To launch an application, a terminal user must

1. Log in to the host.
2. Run the application launcher.
3. Enter a command to launch the desired remote application.

See *VXT 2000+/VXT 2000 Windowing Terminal User Information* for details on running the application launcher and entering commands.

Running the Application Launcher

After logging in to the host, the user must start the application launcher. There are several methods to start the launcher:

- Interactively
- In the user's .login file
- In the .xsession file

If a user starts the launcher from a login file, the launcher will run each time the user logs in and consume process space.

Entering Remote Launching Commands

Users can enter launch commands from the Terminal Manager window (Create dialog box). Advanced users can use the local window manager to bind commands to buttons, keys, or menus (Workspace: Customize Resource Configuration dialog box).

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