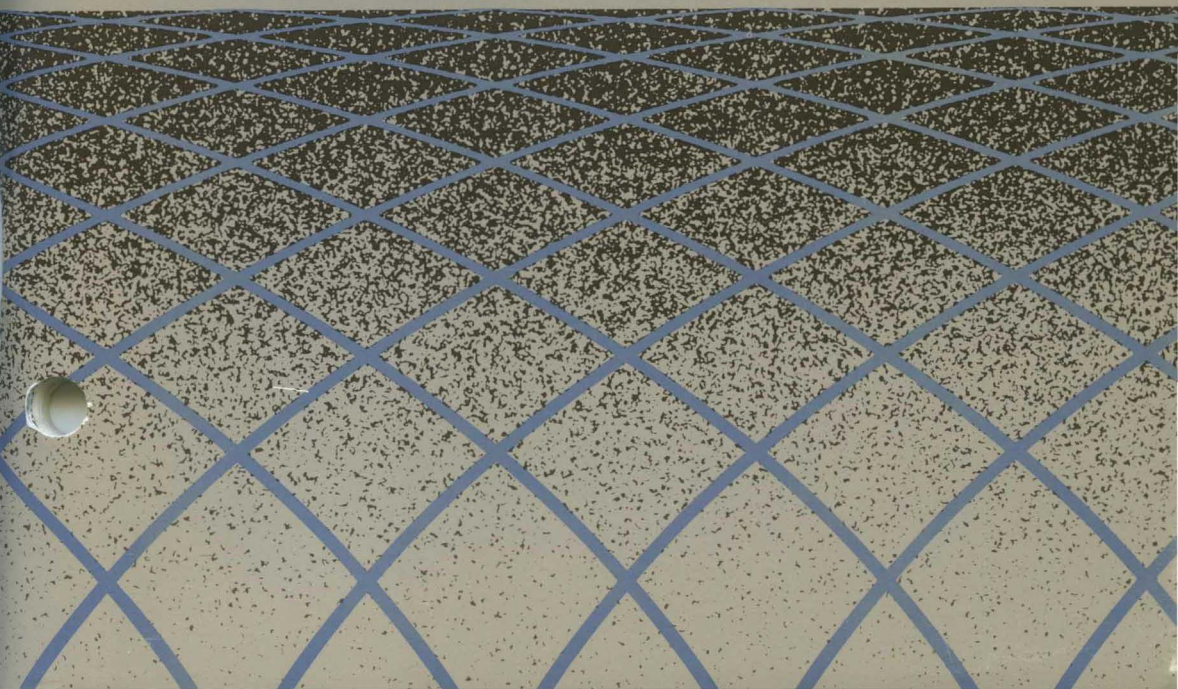
AT&T

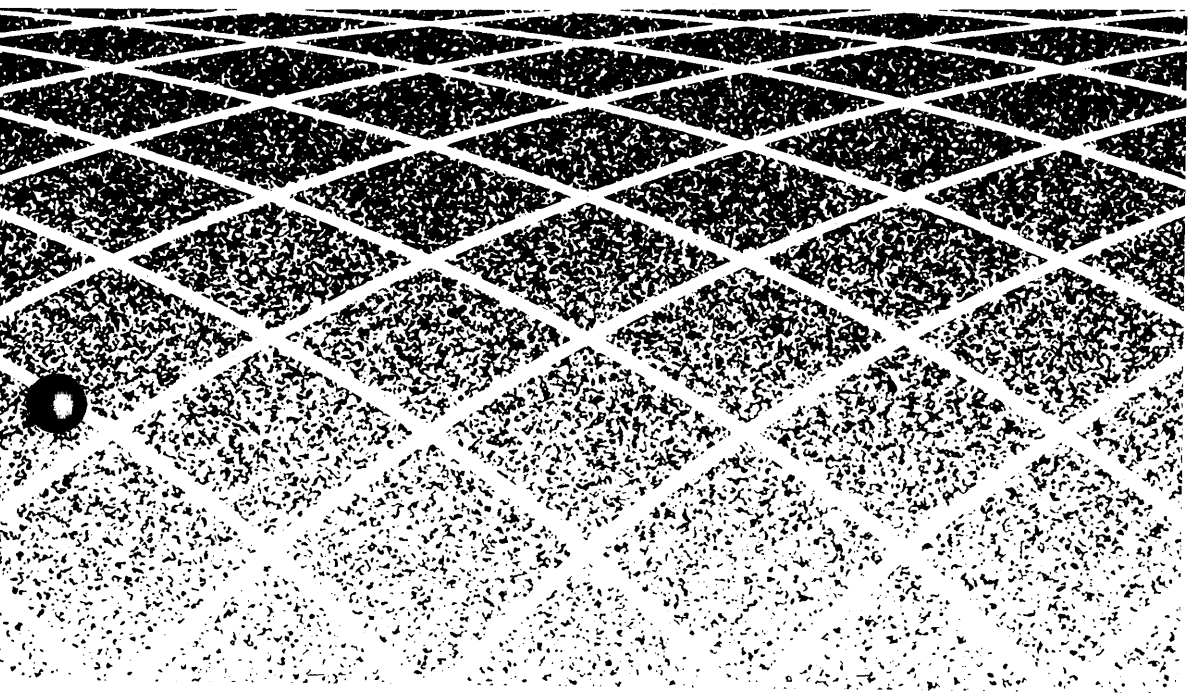
730X

User's Guide



Comcode 501013023
Catalogue Number 999-300-646
Issue 1, November 1989

730X
User's Guide



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Comcode 501013023

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WARNING

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

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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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Chapter 1: Overview

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About This Guide

This 730X User's Guide describes how to install a 730X System and operate a 730X Terminal. Included is a description of the requirements of the 730X System environment.

- **Chapter 1: Overview**
  This chapter briefly defines the 730X System (server and host support utilities) and describes the organization of this manual.
- **Chapter 2: Environment**
  This chapter provides a description of the 730X packages and requirements of the 730X System environment.
- **Chapter 3: Installation**
  This chapter provides instructions to the user for installing the 730X Cartridge in a 730 MTG Terminal. In addition, the system administrator is given instructions for installing the 730X host software packages.
- **Chapter 4: Operation**
  This chapter describes 730X System operation. This includes 730X Server administration, environment swapping, font management and running an X application.
- **Chapter 5: Error Messages**
  This chapter describes how to recover from errors and failures.
- **Manual pages**
- **Index**

Introducing the 730X

The 730X System consists of an X Window System[1] server (730X Server) and host utilities.

The 730X Server is an implementation of an X Window System server for the AT&T 730 Multi-Tasking with Graphics terminal (730 MTG). The X Window System is a network transparent graphical windowing system that enables multiple applications to be simultaneously rendered on a single display. An X Window System server is a program running in a terminal or workstation that controls the display and interacts with X Window System applications (X clients). The 730X server interacts with host-based X clients over a StarLAN 10 local area network. The 730X Server is compatible with X11R3 protocol.

The 730X host utilities provide font and color database files for the 730X Server and a 730X file server, which is needed when using the ISO protocol over a StarLAN 10 network to allow remote access to fonts and the color database. Host utilities also include font and color database compilers and additional font utilities.

When TCP/IP protocol is used over the StarLAN 10 network, the Trivial File Transfer Protocol (TFTP) is used to allow remote access to fonts and the color database in place of the 730X file server. TFTP is assumed to be present on the remote host and is not included with the 730X host utilities.

1 *X Window System* is a registered trademark of Massachusetts Institute of Technology

The 730X System is packaged as follows:

730X Cartridge Package This package consists of the 730X Server (residing in a 730 MTG cartridge), 730X User's Guide and 730X Release Notes.

730X Binary Host Package This package supplies the host utilities on floppy diskettes in binary format (supported hosts are 6386WGS and 3B2/1000).

730X Source Host Package This package supplies all host utilities in source format (except for fonts, which are provided only in binary format) on a 9-track tape. This package is required in order to use the 730X host utilities on computers other than those supported by the 730X Binary Host Package.

Contacting AT&T

For Help with 730X Problems

If you have a problem using the 730X, contact your system or network administrator. If the problem persists, you or your administrator can call a representative at the original place of purchase. If you purchased the 730X from AT&T, call the AT&T National System Support Center hotline:

- In the United States and Puerto Rico, dial 1-800-922-0354.
- In Canada, dial 1-800-245-2480.
- In all other countries, call your authorized AT&T dealer.

For Product Information

For information about AT&T products, call your AT&T Account Executive or the AT&T Advertising Response Center:

- In the United States and Puerto Rico, dial 1-800-247-1212.
- In Canada, dial 1-800-361-7951.
- In all other countries, call your authorized AT&T dealer.

For Design and Installation Services

The AT&T Customer Programming Services Center provides a full range of services, including the following:

- Detailed review of your system needs
- Network design
- Installation of the AT&T 730X in non-standard and non-AT&T wiring environments

For more information about the AT&T Customer Programming Services Center, contact your AT&T Account Executive or the AT&T Advertising Response Center.

Ordering Products

You can order additional 730X packages from your AT&T Account Executive or your authorized AT&T dealer. Provide the following information when you order:

- 730X Cartridge Package Price Element (P.E.) Code: 33503
- 730X Binary Host Package Price Element (P.E.) Code: 1331-731
- 730X Source Host Package Comcode: 846481950
- 730 StarLAN 10 ISO NAU Price Element (P. E.) Code: 33540
- 730 StarLAN 10 TCP/IP NAU Price Element (P. E.) Code: 33541
- Ram expansion kits for the 730 StarLAN 10 ISO NAU and 730 StarLAN 10 TCP/IP NAU.

  The number of kits ordered depends on the memory size you want to expand your 730 MTG terminal to:

RAM Configuration	Number of Kits	P. E. Code
0.5M bytes	1	33542
1M bytes	2	33542
2M bytes	1	33543
2.5M bytes	1	33543
	1	33542
4M bytes	2	33543

Document Conventions

Certain typographical conventions, such as boldface and italics, are used to reinforce and clarify the difference between types of information. The following are the conventions used in this document:

- When used in text, file names and program names appear in *italics*.
- When used in text, computer output, such as prompts and messages, appear in `computer style type`.
- When used in illustrations, computer output appears in normal type.
- When used in illustrations, commands that you issue to the computer appear in **boldface.**
- Keyboard references appear in all boldface letters and are **<BRACKETED>**.

Chapter 2: Environment

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Introduction

This chapter describes the requirements of the 730X System environment and gives a description of the 730X packages required in this environment.

The 730X System enables a user to interact with any X client on a remote host. Examples include:

- applications in the AT&T Xwin complete package
- X applications conforming to the AT&T OPEN LOOK graphical user interface
- MS-DOS[1] applications running under Simul-Task[2].
- any application that conforms to the X protocol specification, X11R3

1 *MS-DOS* is a registered trademark of Microsoft Corporation.

2 *Simul-Task* is a registered trademark of AT&T. Simul-Task 386 is a separately purchased add-on package that enables the host computer to run the MS-DOS operating system as an application under the UNIX System. It allows you to run the many widely used MS-DOS programs on a UNIX System-based computer. If Simul-Task 386 is run with the 730X, your terminal will be able to display many of these programs in X windows.

730X System Environment Requirements

A typical 730X System environment is shown in Figure 2-1.

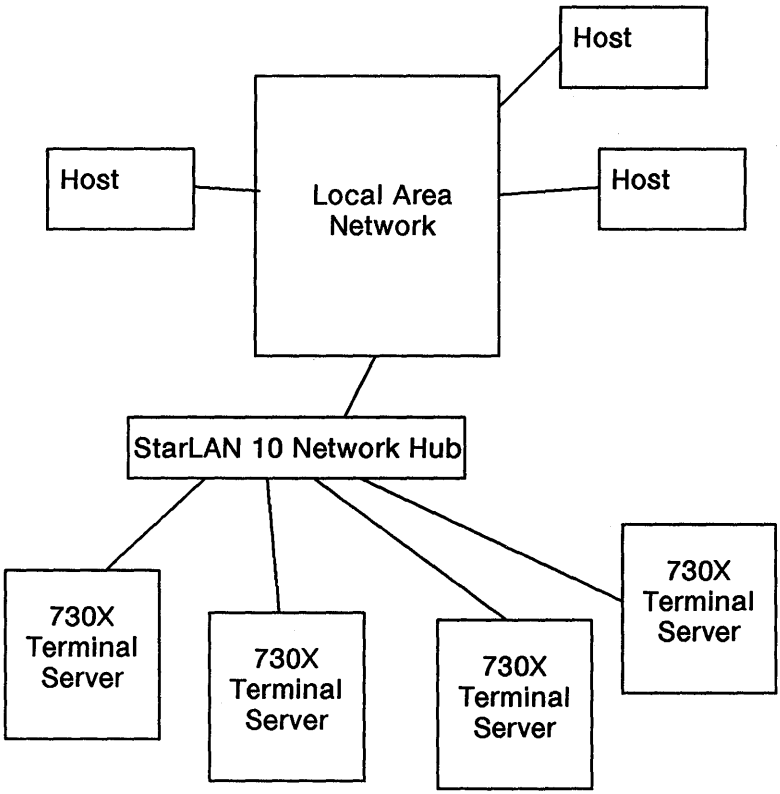


Figure 2–1 Typical 730X System Environment

This environment has the following requirements:

- A 730X Terminal Server consisting of:
  - A 730 MTG terminal. If you have an AT&T 630 MTG Terminal, you can convert this to a 730 MTG by ordering a 730 MTG Upgrade Kit (Comcode 523484293) using the P.E. Code 33544.
  - A network access interface card installed in the 730 MTG terminal. Choose an interface card to match your network.
    - A 730 StarLAN 10 ISO NAU (Network Access Unit) with a minimum of 512K RAM
    - A 730 StarLAN 10 TCP/IP NAU with a minimum of 512K RAM.
  - 730X Server cartridge.
  - A physical network connection to a StarLAN 10 Network Hub. The connection between the 730X Server and the StarLAN 10 Network Hub always uses twisted pair wiring[3].

3 ANSI/IEEE 802.3 (10BaseT) compatible.

- Host(s) having access to the same Local Area Network (LAN) as the 730X terminal server and supporting X clients. At least one of the hosts on the LAN will need to be equipped with the 730X host utilities to allow the 730X server to gain access to font and color database files. Each host on the network equipped with the 730X host utilities can be designated as a 730X font host. The 730X server allows the specification of a primary and secondary font host. Additional information on fonts is in Chapter 4.

  If the host is using StarLAN 10 and the 730X terminal server needs to get fonts from that host, the host must support the 730X file server. The 730X file server is provided in the 730X host utilities.

  If the host is using TCP/IP and the 730X terminal server needs to get fonts from that host, the host must support the tftp (trivial file transfer protocol) feature.

  NOTE: It is not necessary for a host to be equipped with the 730X host utilities in order for X clients on that host to interact with a 730X server.

- A Local Area Network supporting StarLAN 10 ISO or TCP/IP protocol.

  All physical LAN connections to the 730 MTG are to a StarLAN 10 Network Hub. The StarLAN 10 Network Hub allows connection to both StarLAN 10 and Ethernet networks. Thus the 730 MTG may be used with Ethernet networks by first passing thru a StarLAN 10 Network Hub.

730X System Packages

A 730X System environment requires at least one of the 730X host utilities packages and one or more 730X terminal servers. You should order the 730X Binary Host Package if you intend to use a 6386WGS or a 3B2/1000 as a host to provide font and color database file access for 730X terminal servers on the network[3]. You should order the 730X Source Host Package if you intend to use a host other than these as a font host for the 730X server. You should order a 730X Cartridge Package for each 730 MTG you wish to configure as a 730X terminal server.

NOTE: At least one host on the network must provide the 730X host utilities.

730X Cartridge Package

The 730X Cartridge Package (Comcode 523488088, PE Code 33503) consists of the following:

Description	Comcode
730X Cartridge	523488047
730X User's Guide	501013023
730X Release Notes	501014096

3 OPEN LOOK 2.0 and Xwin 3.0 also provide the required 730X host utilities.

Host Utilities Packages

The 730X host utilities are supplied in binary format on diskette (for the 6386WGS or 3B2/1000) or in source format on a 9-track source tape. The 730X host utilities (binary and source) consist of the file server for color database and font file access over the StarLAN 10 network (tftp is used when the LAN protocol is TCP/IP), font and color database compilers, color database, a compiled subset of X11R2 fonts, and font utilities. In addition, the source tape contains a complete set of compiled X11R3 fonts.

730X Binary Host Package

The 730X Binary Host Package (Comcode 523488096, PE Code 1331-731) consists of the following:

Description	Comcode
730X 3B2 5.25" Diskette (1.2Mg Format)	523488054
730X 6386WGS 5.25" Diskette (1.2Mg Format)	523488062
730X 6386WGS 3.5" Diskette (1.44Mg Format)	523488070

730X Source Host Package

The 730X Source Host Package (Comcode 846481950) consists of the following:

Description	Comcode
730X Host Source Tape	523488039

Chapter 3: Installation

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Introduction

This chapter contains procedures for installing the 730X Server Cartridge and the host software utilities. Your 730 MTG terminal should be assembled according to the instructions found in your 730 MTG terminal user's guide.

Not included in this chapter are the instructions for installing the 730 StarLAN 10 ISO NAU or the 730 StarLAN 10 TCP/IP NAU along with its added memory. For this information refer to the user's guide 999-300-624 (Comcode 501011472) that comes with the 730 StarLAN 10 ISO NAU or the user's guide 999-300-659 (Comcode 501014088) that comes with the 730 StarLAN 10 TCP/IP NAU. The 730 StarLAN 10 NAU (ISO or TCP/IP) must be installed before installing the 730X Server Cartridge.

Host Software Installation

Installation and removal of the 730X Binary Host Package is handled by the *installpkg* and *removepkg* commands on the 6386WGS. If you have a 3B2/1000 computer, use the *sysadm installpkg* and *sysadm removepkg* commands to install and remove the host software.

The 730X Binary Host Package requires there to be at least 500 blocks[1] (.25M byte) of free space in each of the */* and */usr* filesystems to install this software.

When you are installing or removing the 730X Binary Host Package, you must be logged in as *root*.

The 730X Source Host Package is supplied on a 9-track tape. It can be installed on any machine that has access to a 9-track tape drive.

The 730X Source Host Package requires there to be at least 8200 blocks (4.1M bytes) of free space in the filesystem that is to contain the source files. When you compile the source code, an additional 1000 blocks (.5M bytes) will be needed.

Installing the 730X Binary Host Package on a 6386WGS

The 730X Binary Host Package is installed on the 6386WGS by executing *installpkg*. Select either the 5.25 or 3.5 inch floppy (depending on the type of floppy drive on your host), and insert it into the floppy drive.

1 Execute *installpkg*.

```
# installpkg
```

1 One block is 512 bytes.

2 *installpkg* first reads in the contents of the floppy disks. If you have more than one floppy disk drive, *installpkg* will ask you which drive you will be using. If you haven't put the floppy diskette in the drive, *installpkg* will prompt you to do so. Insert the appropriate floppy into the floppy disk drive and press **<ENTER>**.

3 A message notifying the user of the package being installed is given:

```
Installing the AT&T 730X Binary Host Package Release 1.0
```

4 If any of the files being installed already exist on the system, the following prompt is given:

```
<File> already exists.
OK to overwrite (yes/no) [n] ?
```

Answering "yes" overwrites the existing file. Striking **<ENTER>** or entering "no" leaves the existing file as is.

5 The file server, *Xmtg*, must be registered with the network listener if the server is to access the host over StarLAN.

```
The Xmtg file server must be registered with the
network listener if STARLAN is to be used.
Register Xmtg with network listener (yes/no) [y] ?
```

The Network Support Utilities (NSU) must be installed to do this. If the NSU is installed and you will be accessing hosts over StarLAN, answer "yes". If you answer "no", Xmtg can be registered with the network listener later by executing */usr/Xmtg/lib/startXmtg*.

If there is a problem registering *Xmtg* with the network listener, an error message is given followed by this warning message:

```
Warning: Unable to register Xmtg with network listener!

   Possible Problems:
   1. STARLAN is not supported on this machine.
   2. Xmtg is already registered with network listener.
   3. Network Support Utilities are not installed.

If you wish to use Xmtg correct the problem and execute
/usr/Xmtg/lib/startXmtg after installation.
```

A checklist of likely causes of the problem is displayed and installation will continue to completion. However, you should correct the problem and execute */usr/Xmtg/lib/startXmtg* as indicated after the installation has completed. See the manual page for more information on *startXmtg*.

6 Once all questions have been answered, the package files are copied into their respective directories.

No kernel tuning is performed during the installation of the 730X Binary Host Package on the 6386WGS.

Removing the 730X Binary Host Package from a 6386WGS

Follow these procedures to remove the 730X Binary Host Package from a 6386WGS. After removing this package from your host, new client connections to the 730X Server may still be made from your host, but the 730X Server must obtain font file and color database information from another host on the network.

1 Before you remove the 730X Binary Host Package, check to ensure that no 730X terminals are currently using this machine as a Primary Font Host or Secondary Font Host.

For a StarLAN 10 network this is done by first executing the command, */usr/Xmtg/lib/stopXmtg*. See the manual page for more information on *stopXmtg*.

```
# /usr/Xmtg/lib/stopXmtg

Removing Xmtg from network listener's set of services ...
```

stopXmtg removes *Xmtg* from the network listener's set of services. 730X terminals which are currently connected to this host are not affected by this command. They remain connected until they are shut off, rebooted, or their host fileserver process is killed.

If font and rgb host access is done using TCP/IP network protocol, notify users that this package is being removed and that font and rgb requests to this host will not be serviced and skip the next step (Step 2).

2 Determine if any 730X terminals are still connected to this host.

```
# ps -fe | grep Xmtg | grep -v grep
```

This command lists any instances of the fileserver, *Xmtg*, which are still running. An instance of */usr/Xmtg/lib/Xmtg* is displayed for each 730X terminal that is connected to this host. The users of these terminals should be notified and the *Xmtg* processes killed.

3 Once all instances of *Xmtg* have been terminated, you can remove the 730X Binary Host Package. Execute *removepkg*.

```
# removepkg
```

4 *Removepkg* initially displays a menu of installed packages. You should select the *AT&T 730X Binary Host Package Release 1.0* from the menu.

5 A message notifying the user of the package being removed is given:

```
Removing the AT&T 730X Binary Host Package Release 1.0
```

6 *Xmtg* is removed from the network listener's list of services (in case this was not done before *removepkg* was executed).

```
Removing Xmtg from network listener's set of services ...
```

7 All binary files are then deleted.

```
Deleting Files ...
```

8 If any file that should be deleted cannot be found, no error is reported.

Installing the 730X Binary Host Package on a 3B2/1000

The 730X Binary Host Package is installed on the 3B2/1000 by executing *sysadm installpkg*.

1 Execute *sysadm installpkg*.

```
# sysadm installpkg
```

2 The user is prompted to insert the first installable floppy:

```
Insert the removable medium for the package you want
to install into the diskette1 drive.
Press <RETURN> when ready.  Type q to quit.
```

Insert the floppy disk containing the 730X Binary Host Package (3B2 format) into drive 1 and press **<ENTER>**. *Sysadm installpkg* mounts the diskette and reads in its contents.

3 First, a check is made to make sure there is enough room in the */* and */usr* file systems to install the package. If there is not enough room, a message of the following form will be displayed:

```
**ERROR** <package> cannot be installed --
Not enough space on the hard disk
.
.
Installation Aborted!
```

The installation is then aborted. You will need to provide at least 500 blocks (.25M byte) of disk space in each of the */* and */usr* filesystems and restart the installation.

4 A message notifying the user of the package being installed is given:

```
Installing the AT&T 730X Binary Host Package Release 1.0
```

5 If any of the files being installed already exist on the system, the following prompt is given:

```
<File> already exists.
OK to overwrite (yes/no) [n] ?
```

Answering "yes" overwrites the existing file. Striking **<ENTER>** or entering "no" leaves the existing file as it.

6 The file server, *Xmtg*, must be registered with the network listener if the server is to access the host over StarLAN.

```
The Xmtg file server must be registered with the
network listener if STARLAN is to be used.
Register Xmtg with network listener (yes/no)  [y] ?
```

The Network Support Utilities (NSU) must be installed to do this. If the NSU is installed and you will be accessing hosts over StarLAN, answer "yes". If you answer "no", Xmtg can be registered with the network listener later by executing */usr/Xmtg/lib/startXmtg*.

If there is a problem registering *Xmtg* with the network listener, an error message is given followed by this warning message:

```
Warning: Unable to register Xmtg with network listener!

   Possible Problems:
   1. STARLAN is not supported on this machine.
   2. Xmtg is already registered with network listener.
   3. Network Support Utilities are not installed.

If you wish to use Xmtg correct the problem and execute
/usr/Xmtg/lib/startXmtg after installation.
```

A checklist of likely causes of the problem is displayed and installation will continue to completion. However, you should correct the problem and execute */usr/Xmtg/lib/startXmtg* as indicated after the installation has completed. See the manual page for more information on *startXmtg*.

7 Once all questions have been answered, the package files are copied into their respective directories.

No kernel tuning is performed during the installation of the 730X Binary Host Package on the 3B2/1000.

Removing the 730X Binary Host Package from a 3B2/1000

Follow these procedures to remove the 730X Binary Host Package from a 3B2/1000. After removing this package from your host, new client connections to the 730X Server may still be made from your host, but the 730X Server must obtain font file and color database information from another host on the network.

1 Before you remove the 730X Binary Host Package, check to ensure that no 730X terminals are currently using this machine as a Primary Font Host or Secondary Font Host.

For StarLAN 10 networks, this is done by first executing the command, */usr/Xmtg/lib/stopXmtg*. See the manual page for more information on *stopXmtg*.

```
# /usr/Xmtg/lib/stopXmtg

Removing Xmtg from network listener's set of services ...
```

stopXmtg removes *Xmtg* from the network listener's set of services. 730X terminals which are currently connected to this host are not affected by this command. They remain connected until they are shut off, rebooted, or their host fileserver process is killed.

If font and rgb host access is done using TCP/IP network protocol, notify users that this package is being removed and that font and rgb requests to this host will not be serviced and skip the next step (Step 2).

2 Determine if any 730X terminals are still connected to this host.

```
# ps -fe | grep Xmtg | grep -v grep
```

This command lists any instances of the fileserver, *Xmtg*, which are still running. An instance of */usr/Xmtg/lib/Xmtg* is displayed for each 730X terminal that is connected to this host. The users of these terminals should be notified and the *Xmtg* processes killed.

3 Once all instances of *Xmtg* have been terminated, you can remove the 730X Binary Host Package. Execute *sysadm removepkg*.

```
# sysadm removepkg
```

4 *Sysadm removepkg* initially displays a menu of installed packages. Then, it prompts:

```
Insert the removable medium for the package you wish
to remove into the diskette1 drive.
Press <RETURN> when ready.  Type q to quit.
```

To remove the package from a 3B2/1000, the floppy containing the 730X Binary Host Package Release 1.0 (3B2 format) must be inserted in the main floppy disk drive. Insert the floppy and press return.

5 A message notifying the user of the package being removed is given:

```
Removing the AT&T 730X Binary Host Package Release 1.0
```

6 *Xmtg* is removed from the network listener's list of services (in case this was not done before *sysadm removepkg* was executed).

```
Removing Xmtg from network listener's set of services ...
```

7 All binary files are then deleted.

```
Deleting Files ...
```

8 If any file that should be deleted cannot be found, no error is reported.

```
The AT&T 730X Binary Host Package Release 1.0
has been removed.

You may now remove the medium from the diskette 1 drive.

Insert the removable medium for the package you wish
to remove into the diskette1 drive.
Press <RETURN> when ready.  Type q to quit.
```

9 Enter 'q' and press **<ENTER>** to exit *sysadm removepkg.* You may now remove the floppy disk from the disk drive.

730X Source Host Package Installation

The 730X Source Host Package resides on a 9-track tape. It contains the source code for the 730X host software executables, and fonts and rgb database that have been compiled for the 730X Server. See the Release Notes for more information about the contents of the 730X Source Host Package.

The source tape may be loaded (using cpio *-iBdcum)* anywhere. It is recommended that the source files be loaded into the */usr/Xmtg* directory. This will create and fill the three subdirectories *misc*, *100dpi*, and *75dpi* in */usr/Xmtg/lib/fonts*. The source files for executables will be in */usr/Xmtg/src/mtg*.

You will need 8200 blocks (4.1 megabytes) of disk space to load the tape and an additional 1000 blocks (.5M bytes) to compile the source code.

Installation of the 730X Source Host Package into the */usr/Xmtg* directory is shown below. To load the software into a different directory, replace occurences of */usr/Xmtg* with the pathname of the directory in which you wish to install the software.

1. Create the directory (if necessary) where you want to install the software and then change your current working directory to the newly created directory.

```
$ mkdir /usr/Xmtg
$ cd /usr/Xmtg
```

2. Mount the tape on the 9-track tape drive and use *cpio* to load in the files.

```
$ cpio -idcBumv < /dev/rmt/0m
```

If your host machine does not have a 9-track tape drive, you can copy the 730X Source Host Package from another computer that has one.

Compiling the Source Code

The source code supplied in the 730X Source Host Package can be compiled to produce binaries of the font compiler, font utilities, rgb compiler, and file server. The fonts and rgb database supplied in the 730X Source Host Package are already compiled and are ready to use by the 730X server. They will work on any type of machine.

The source code has been tested to compile correctly on a 6386WGS or a 3B2/1000. If the 730X Source Host Package has been installed on a machine other than a 6386WGS or 3B2/1000, some modifications may need to be made to the source code to correctly compile the source code.

To compile the source, follow these steps: In this example, the 730X Source Host Package is assumed to have been previously loaded into */usr/Xmtg*.

1 Go to the root of the source tree.

```
$ cd /usr/Xmtg/src/mtg
```

2 Make *boot.sh* executable.

```
$ chmod +x boot.sh
```

3 Execute *boot.sh*.

```
$ ./boot.sh
```

This command builds Makefiles, compiles the source code, and installs the binaries in */usr/Xmtg/bin* and */usr/Xmtg/lib*. Manual pages are installed in */usr/Xmtg/man/mann*.

While compiling the source code, several warning message may be displayed. These are normal and should be ignored unless compiling aborts.

730X Cartridge Installation

Unpacking

Remove the 730X cartridge from its carton. Before installing it, confirm ordering information against the carton markings, check for damage to contents, and confirm that the 730X Cartridge Package contains those items listed in Chapter 2. Contact your AT&T Account Executive if any items are damaged or missing.

Caution: *To avoid condensation on the electronic components, the 730X cartridge should be allowed to assume room temperature before installing. This is especially important when the carton is brought into a warm humid room from outside subzero temperatures.*

Inserting the Cartridge

With terminal power "off", insert the cartridge into the slot on the right side of the base of your terminal with the guide tab side up (refer to figure 3-1). The bottom of the cartridge has raised letters **OTHER SIDE UP** to eliminate the possibility of inserting the cartridge incorrectly.

Caution: *Never insert or remove the cartridge with terminal power "on".*

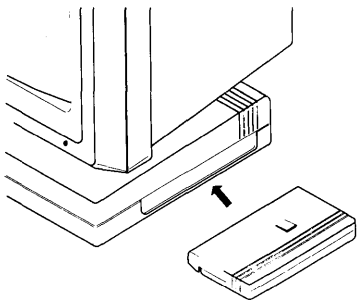


Figure 3–1 Cartridge Installation

Powering Up the Terminal

Turn the terminal on.

The terminal will perform a selftest, followed by a selftest for the network interface card. If either selftest fails, take corrective action as described in the user's guide for the terminal or network interface card.

After both selftests are finished, the terminal will be in the 730 MTG environment. The display will show a 730 MTG window and the Xadmin local window. The X Server Diagnostics area will show the status of the server startup procedures. Since the 730X options have not been entered, it is normal for various error messages to appear in the X Server Diagnostics area of the Xadmin local window.

Enter the options as described in Chapter 4 and reboot the 730X server.

Note: After the terminal boots, the user may switch between 730 mode and X mode by typing **<CTRL-SPACE>**. Refer to "Environment Swapping" in Chapter 4.

Removing the Cartridge

To remove the cartridge, turn off power, press down on the cartridge so that the guide tab clears the top edge of the opening in the side of the base, and slide the cartridge out of the base.

Chapter 4: Operation

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Introduction

This chapter describes how to configure the 730X Server via the Xadmin administration window and how to login and start a session. General information about font and memory usage is included at the end of the chapter.

730X Options

730 MTG Terminal and Network Interface Options

The 730X Server does not require any 730 MTG Setup options to be modified to use the 730X Server. Setup information for the 730 MTG can be found in the 730 MTG User's Guide, 999-300-652, that came with your terminal.

Setup information for the 730 StarLAN 10 ISO NAU can be found in the 730 StarLAN 10 ISO NAU User's Guide, 999-300-624, that came with your network access unit. Setup information for the 730 StarLAN 10 TCP/IP NAU can be found in the 730 StarLAN 10 TCP/IP NAU User's Guide, 999-300-659, that came with your network access unit.

The 730X Server may require changes to the 730 StarLAN 10 ISO or 730 StarLAN 10 TCP/IP network access unit options depending on the amount of memory on your network card. If your 730X Server has a network access unit with 512K of memory, refer to the section in this chapter, Memory Usage, for recommended option settings in the network access unit.

If you are using a 730 StarLAN 10 ISO network access unit in your 730X Server, the 730 StarLAN 10 ISO NAU option for **Expected NAU Load** should be set to heavy, regardless of the amount of memory in the network access unit.

If you have the 730 StarLAN 10 ISO network interface card installed in the 730 MTG, you should register the file server with the network listener during installation. This should be done during installation of the 730X Binary Host Package or after the 730X Source Host Package has been compiled. Refer to the installation instructions in Chapter 3.

Xadmin

Xadmin is the 730X Server's administration utility that provides access to user selectable options, a diagnostics window, a memory usage indicator, and the ability to reset the 730X Server without resetting the entire terminal. User selectable options for the 730X Server are provided to set the default font, control the mouse speed, specify the screen saver operation, and select the network address for the host that contains the font and color database.

When the 730 MTG is turned on, the Xadmin window is automatically created as a 730 MTG local window. Xadmin runs in the 730 MTG environment, not the X environment, within the 730 MTG's window manager.

If the Xadmin window has been deleted, via the "Delete" item from the 730 MTG button 3 menu, it can be created by selecting the "Xadmin" entry from the More submenu of the 730 MTG button 3 menu as shown in Figure 4-1. Refer to Chapter 3 in the 730 MTG User's Guide for information about mouse button naming conventions and mouse usage.

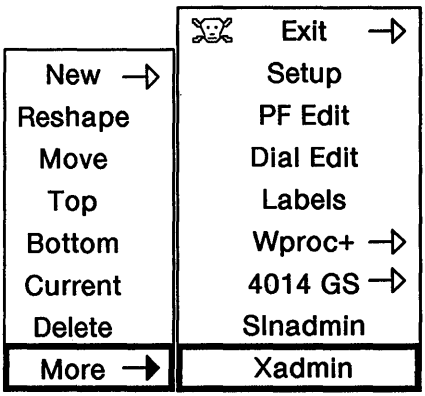
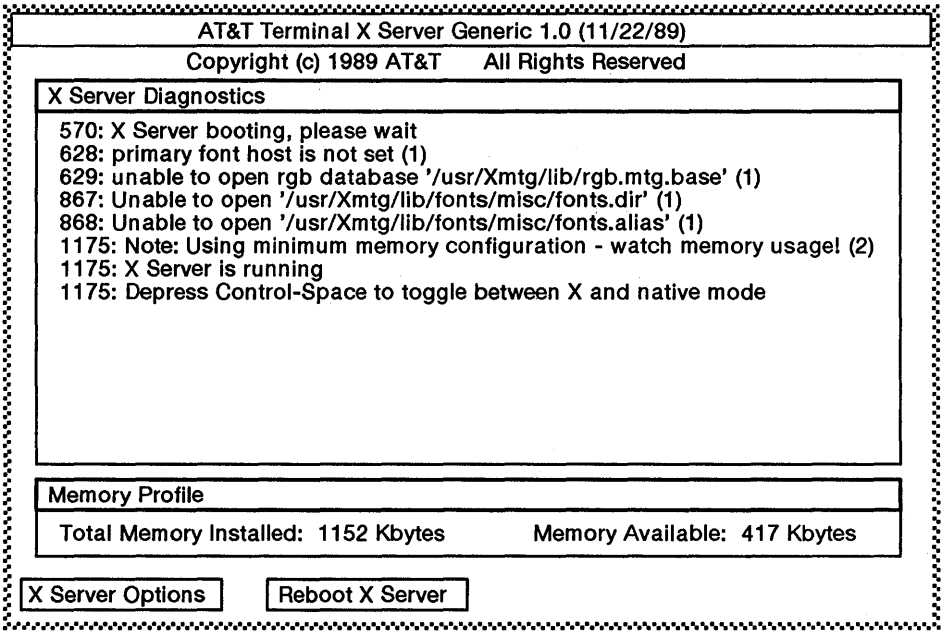


Figure 4–1 Selecting Xadmin

Xadmin is a local window and has a checkerboard pattern used for the border.



(1) These messages appear when the font host is not specified, such as when the 730X is turned on for the first time.
(2) This message appears when you have 512K of memory installed.

Figure 4–2 Xadmin Menu

The features of Xadmin are:

Diagnostics	Displays X diagnostic messages in real time.
Memory Profile	Indicates how much memory is available.
X Server Options	Position the mouse over this area and click button 1 to view or change options.
Reboot X Server	Position the mouse over this area and click button 1 to reboot the 730X Server without rebooting the terminal.

X Server Diagnostics

This portion of the window provides 730X Server diagnostics. Each message is preceded by a number that is a time stamp.

Memory Profile

This portion of the window indicates memory usage for the entire terminal. When a window is created or deleted or when a client is started or killed, the Memory Available indicator will change.

Reboot X Server

This feature allows you to reboot the 730X Server without rebooting the terminal. 730 MTG applications are not affected by rebooting the 730X Server.

To cause the 730X Server to reboot, position the mouse cursor over the "Reboot X Server" box and click mouse button 1. A confirmation message is displayed as shown below.

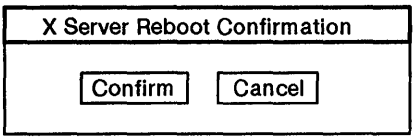


Figure 4–3 730X Server Reboot Confirmation Message

Clicking mouse button 1 on the "Confirm" box, will cause the Xadmin window to be deleted and the 730X Server to be restarted. A new Xadmin window will be displayed with the reboot status shown in the X Server Diagnostics window.

Clicking mouse button 1 on the "Cancel" box, will cancel the reboot operation. The confirmation message is cleared and the Xadmin window is redrawn.

X Server Options Screen 1

Move the mouse to the "X Server Options" box of the main Xadmin menu and click button 1 to display the first page of the 730X Server options.

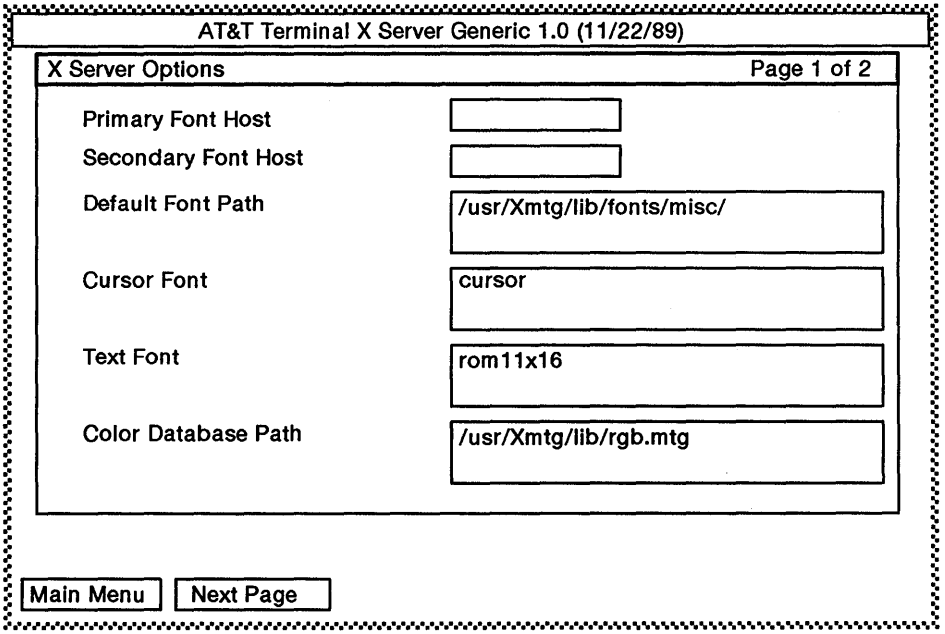


Figure 4–4 X Server Options (Page 1 of 2)

To move on to the next page of options, move the mouse to the "Next Page" box and click button 1. To return to the Xadmin main menu, move the mouse to the "Main Menu" box and click button 1.

To modify the options on screen 1, click mouse button 1 on the box associated with the option that you want to change. While editing an option:

- Typing is inserted before the ^ cursor symbol.
- Backspace erases and moves the ^ cursor symbol.
- The ^ cursor symbol may be moved by pressing mouse button 1 and dragging to the desired position.
- The ^ cursor symbol may be moved by ↑, ↓, ← and → keys.
- The Delete key restores the string option to the value it had before you started editing.
- Return ends the edit session.
- Home puts ^ cursor symbol at the beginning of the string.

The 730X Server must be rebooted for any changes to take effect.

Primary Font Host

This option defines the host from which the 730X Server will request font information. If you are using StarLAN, enter the "hostname". If you are using TCP/IP, enter the network address (eg. 123.45.67.89). This information can be supplied by your System or Network Administrator.
Initial value: none

Secondary Font Host

If the Primary Font Host is unavailable, the Secondary Font Host will be requested for the font information. If there is no Secondary Font Host, leave this region blank. Enter the Secondary Font Host information in the same manner as the Primary Font Host information.
Initial value: none

Default Font Path

Enter the names of the directories where the font information is located on both the Primary and Secondary Font Hosts. Multiple directory names are separated using a comma or space and will be searched in order. An example of a multiple directory font path is given.

```
/usr/Xmtg/lib/fonts/misc/,/usr/Xmtg/lib/fonts/100dpi/
```

No directory path information is needed to specify the fonts that are stored in the 730X cartridge.
Initial value: /usr/Xmtg/lib/fonts/misc/

Cursor Font

Enter the name of the cursor font you wish to use. The font must be in one of the directories specified in the Default Font Path. The "cursor" font is located in the 730X Server firmware.
Initial value: cursor

Text Font

Enter the name of the text font you wish to use. The font must be in one of the directories specified in the Default Font Path. The "rom11x16" font is located in the 730X Server firmware.
Initial value: rom11x16

Color Database Path

Enter the complete pathname of the color database file on the Primary and Secondary Font Host. Omit the ".base" extension of the filename.
Initial value: /usr/Xmtg/lib/rgb.mtg

X Server Options Screen 2

Move the mouse to the "Next Page" box of the first X Server Options menu and click button 1 to display the next page of the 730X Server options.

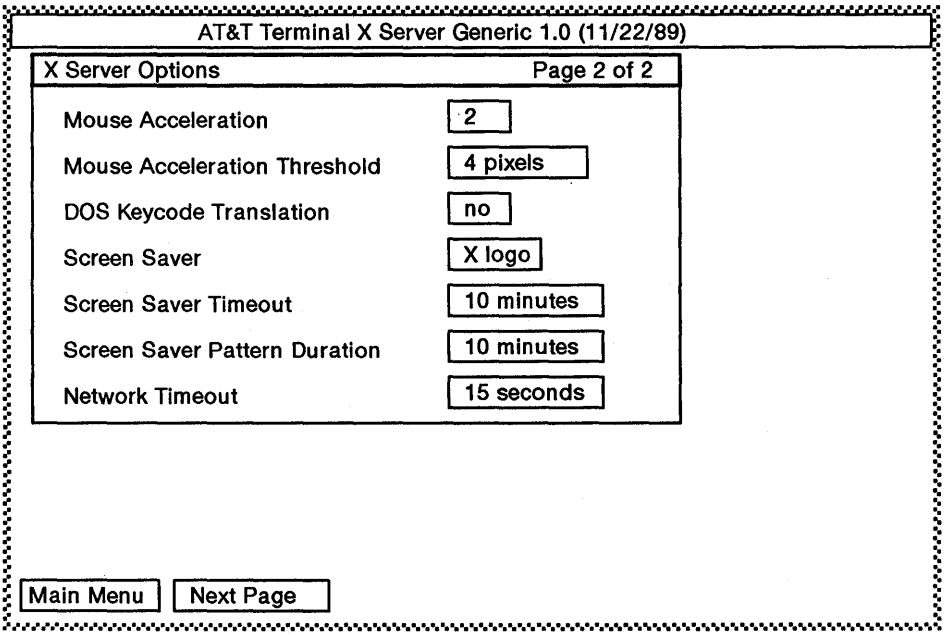


Figure 4–5 X Server Options (Page 2 of 2)

To return to the previous page of options, move the mouse to the "Next Page" box and click button 1. To return to the Xadmin main menu, move the mouse to the "Main Menu" box and click button 1.

To modify the options on screen 2, click mouse button 1 on the box associated with the option that you want to change. The value box will appear in reverse video and a scroll menu will appear. The scroll menu displays up to 16 possible values at a time from all the values that are available for a particular option. A reverse video bar is also available within the scroll menu when there is a large range of choices

to select from. To change the range of values, position the mouse cursor inside the reverse video bar and move the mouse up or down. To select a specific value, position the mouse cursor over the value and then click and release mouse button 1. The scroll menu will disappear and the new option value will be shown in the value box for that option.

The 730X Server must be rebooted for any changes to take effect.

Mouse Acceleration

The value of this option determines the amount of movement of the mouse cursor on the screen with respect to the movement of the mouse. A small value will cause the mouse cursor to move very little for large movements of the mouse.
Range: 1-128, Initial value: 2 pixels

Mouse Acceleration Threshold

The value of this option specifies the amount of movement of the mouse before the mouse cursor actually starts accelerating.

The mouse cursor will go "acceleration" times as fast when it travels more than "threshold" pixels in a short time. This way, the mouse can be used for precise alignment when it is moved slowly, but can also travel large distances across the screen with a "flick-of-the-wrist".
Range: 1-128, Initial value: 4 pixels

DOS Keycode Translation

When set to "yes", causes the 730X Server to be compatible with early versions of the DOS emulator in Simul-Task 386.
Initial value: no

Screen Saver

This option has three values to control the action of the display if not used for the amount of time specified in the Screen Saver Timeout option.

Off	The screen saver feature is turned off.
X logo	The X logo is used for the screen saver pattern.
blank	A blank screen is used for the screen saver pattern.

Initial value: X logo

Screen Saver Timeout

The value of this option specifies the number of minutes before the screen saver pattern is displayed.
Range: 1-128, Initial value: 10 minutes

Screen Saver Pattern Duration

The value of this option specifies the number of minutes before the "X logo" screen saver pattern shifts position.
Range: 1-128, Initial value: 10 minutes

Network Timeout

Specifies the number of seconds the 730X Server will try unsuccessfully to write to a client before closing down the client connection.
Range: 1-128, Initial value: 15 seconds

Environment Swapping

The 730 MTG offers various capabilities to the user. All of these capabilities can be accessed when your terminal is in the 730 MTG environment. When you install the 730X Server cartridge in a 730 MTG, you are adding another environment, the X environment. In this environment, you have available all of the features of the 730X System. You can have both environments active in the terminal at the same time. Although only one environment is displayed on the screen at any one time, the other will continue to receive data.

Note: When the terminal is displaying the 730 MTG environment, the 730X Server will not process any received commands until you switch the terminal to the 730X environment. When the terminal is displaying the 730X environment, the 730 MTG environment will continue to process received commands.

To switch between environments, a 2-key keyboard sequence is used, **<CTRL-SPACE>**. When both of these keys are pressed at the same time, your display will toggle between the 730 MTG environment and the X environment.

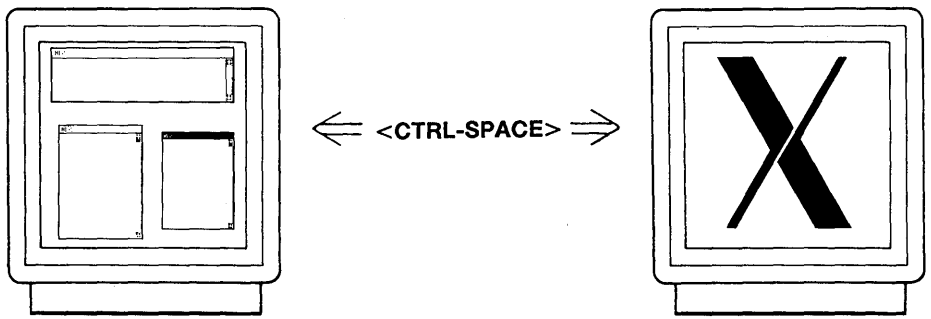


Figure 4–6 Environment Swapping

Starting the 730X Server

1 When the terminal is turned on and after self-test has finished, the terminal will be in the 730 MTG environment. The display will show a 730 MTG window and the Xadmin local window. The X Server Diagnostics area of the Xadmin window will show the status of the 730X Server startup procedures. The "Reboot X Server" feature is disabled until the X Server has finished its boot process.

   While the 730X Server is booting, the following message will appear in the X Server Diagnostics area:

```
X Server booting, please wait
```

2 When the 730X Server has successfully booted, the following messages will appear in the X Server Diagnostics area:

```
X Server is running
Depress Control-Space to toggle between X and
native mode
```

   Both the 730 MTG and 730X environments are now active and **<CTRL-SPACE>** can be used to toggle between the two environments.

   Note: The first time the 730 MTG terminal is turned on with the 730X Server cartridge installed, there will be additional error messages indicating that the fonts could not be found. This is because the 730X Server options have not been set. After you have configured the 730X Server, you must select the "Reboot X Server" box in the main Xadmin window to have the changes take effect.

3 In the 730 MTG environment, you can login to a host that supports X clients. This may be done using StarLAN, or Telnet.

4 Before you start X clients on the 730X Server, you must tell the X clients the address of your terminal. To do this, you must define and export the UNIX System shell environment variable, DISPLAY, to the logical name of your terminal on the network followed by ":0". The logical name (address) of your terminal depends on the network protocol you are using.

StarLAN The address of the terminal is the same as the Local Node Name specified in the Local NAU Configuration menu of the Slnadmin window. Refer to the 730 StarLAN 10 ISO NAU User's Guide, 999-300-624, Chapter 7.

TCP/IP Each terminal is assigned an Internet Address and a logical name by the network administrator. The address of the terminal is the same as the Internet Address or the TCP/IP logical name.

If your terminal's StarLAN network node name is "mynode", you can define and export the DISPLAY variable as follows.

```
DISPLAY=mynode:0
export DISPLAY
```

If your terminal's TCP/IP network Internet Address is "123.45.67.89", you can define and export the DISPLAY variable as follows.

```
DISPLAY=123.45.67.89:0
export DISPLAY
```

Note: If you are using Xwin or OPEN LOOK clients, some special remote display configuration must be done. Refer to the appropriate user's manual to configure outgoing remote display connections.

5 At this point you can start X applications from the 730 MTG environment. You can switch to the X environment by typing **<CTRL-SPACE>**.

Using the System

Now that your 730X Server has been configured and your DISPLAY variable defined and exported, you can start X clients.

Initially, you will start your X clients from the window in the 730 MTG environment that you logged into and where you set the DISPLAY variable.

To run an X client, enter the command (from your keyboard) that starts the X client at the *UNIX* System prompt (usually $), and then press the **<ENTER>** key. If you want to start an *xterm*, you would enter:

```
$ xterm &
```

The client will not begin to execute on the 730X Server until you swap to the X environment.

Additional clients may be started in the same manner from the 730 MTG environment. Clients can also be started from xterms or from a window manager running in the X environment.

Remember, it is necessary to have your DISPLAY variable defined and exported. If this has not been done, the client will not be able to connect to the 730X Server. You may want to set the DISPLAY variable in your *.profile*.

Font Information

730X System Fonts

The 730X Server uses the X11R3 font naming convention. In the following discussion, fonts will be referred to using three different types of names:

Font file name
: This is the name of the file on the host in which the font definition resides.

Actual font name
: This is the name given to the font in the font definition.

Aliased font name
: This is an alternate name, associated with the actual font name using the X11R3 font naming convention.

The X11R3 font naming convention has two benefits: 1) it separates the actual font name from the font file name on the host, which eliminates host operating system dependencies, and 2) it allows font names to be long enough to convey detailed information about the font.

Font Naming Convention Implementation

The X11R3 font naming convention uses two files, *fonts.dir* and *fonts.alias*, to implement actual font name and font file name separation. There must be a *fonts.dir* file in every directory having compiled fonts to be used by the 730X Server. The *fonts.alias* file is optional and can be located in any (one or more) directory that contains compiled fonts.

The *fonts.dir* file associates font file names with actual font names. For example, a line in the *fonts.dir* file might look like the following:

```
6x10.snf          6x10
```

where 6x10.snf is the font file name and 6x10 is the actual font name used in the font definition. The 730X Server reads the *fonts.dir* file from each directory specified in the Default Font Path during initialization and creates an internal database from the information contained in these files. When a font is requested by an X client, the 730X Server checks the internal database to determine the file name associated with the actual font name requested. X clients request fonts using the actual or aliased font names.

The *fonts.alias* file associates aliased font names with actual font names. For example, a few lines from a *fonts.alias* file might look like the following:

```
smallfont        6x10
littlefont       6x10
```

where smallfont and littlefont are aliases for the actual font name, 6x10. This allows an actual font name to be referenced by more than one name. The 730X Server also reads the *fonts.alias* file at initialization and adds this information to its internal database.

Creating Fonts.dir

The *mkfontdir* font utility creates the file *fonts.dir*, containing font file name to actual font name association, for directories containing compiled fonts. The first line of the file contains the number of fonts in the directory. The following lines contain font file name to actual font name association sorted in alpha-numerically ascending order by actual font name.

Mkfontdir must be executed each time fonts are added to or deleted from a directory containing compiled fonts. Multiple font directories are allowed in the 730X Server font path, and *mkfontdir* must be run for each directory in the font path.

Creating Fonts.alias

The *fonts.alias* file, which contains aliases for actual font names, must be created manually. The file has a two column format similar to the *fonts.dir* file with the first column containing the alias and the second column containing the actual font name.

An additional aliasing feature allows font file names (without their extensions) to be used as aliases for their actual font names for each compiled font in the directory. This occurs when one of the lines in the *fonts.alias* file contains the string FILE_NAMES_ALIASES. A *fonts.alias* file containing the line FILE_NAMES_ALIASES must exist in each font directory where font file name to actual font name aliasing is desired.

For example, suppose there are two fonts in a directory with the file names font1.snf and font2.snf with actual font names real_name1 and real_name2, respectively. If the *fonts.alias* file in that directory contains the line FILE_NAMES_ALIASES, the actual font names would be aliased as shown in the following table:

File Name	Aliased Font Name	Actual Font Name
font1.snf	font1	real_name1
font2.snf	font2	real_name2

A *fonts.alias* file containing the line

```
FILE_NAMES_ALIASES
```

is just a short hand way for specifying a *fonts.alias* file with the following contents:

```
font1          real_name1
font2          real_name2
```

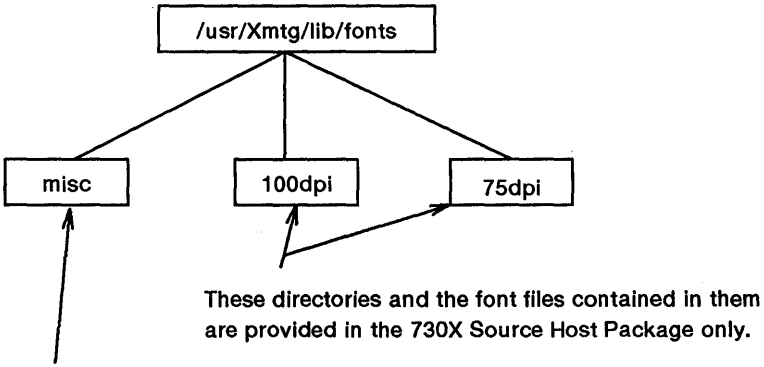
For additional details about the files *fonts.dir* and *font.alias*, refer to the *mkfontdir(1)* manual page at the end of this user's guide.

The bdftosnf Font Compiler

A *bdftosnf* font compiler is provided to convert source font files from their bitmap distribution format (bdf) to compiled font files in the 730X Server natural format (snf). The snf font files contain the displayable font definition in a 730X Server dependent format. The 730X Server requires the fonts and RGB color database to be in the same format as that used by Xwin 3.0 running on a 6386WGS. Any font in that format can be read and used by the 730X Server. For additional details on the *bdftosnf* font compiler, refer to the *bdftosnf(1)* manual page found at the end of this user's guide.

Font Directory Hierarchy

There are three default directories for fonts under the lib/fonts directory. They include the directory "misc" which contains X11R2 fonts (the 730X Binary Host Package provides selected X11R2 fonts). They also include the directory "100dpi" which contains fonts designed for displays with 100 dots-per-inch (dpi), such as the 730 MTG terminal, and the directory "75dpi", which contains fonts designed for 75 dpi displays. The fonts provided in the 730X host packages reside in the following directory structure if they were installed into */usr/Xmtg*.



The 100dpi and 75dpi fonts are also included with Xwin 3.0 and can be used by the 730X Server by modifying the default font path in Xadmin to specify the Xwin directories containing these fonts.

730X Font Paths

The 730X Server assumes that fonts are stored in files on the host and that the font name mappings are kept in the files *fonts.dir* and *fonts.alias*. By default the 730X Server sets the default font path to:

```
/usr/Xmtg/lib/fonts/misc
```

If the 730X Source Host Package is installed, the path should be modified to:

```
/usr/Xmtg/lib/fonts/misc,/usr/Xmtg/lib/fonts/100dpi
```

In addition to fonts accessible on the primary or secondary font hosts, the 730X Server keeps the two fonts, "cursor" and "rom11x16", in ROM. These two fonts enable the 730X Server to achieve basic functionality even when fonts cannot be read from the primary or secondary font hosts specified in Xadmin.

When an X client requests a font, the 730X Server first checks to see if the ROM fonts satisfy the request and then, failing that, it searches the directories specified in the current font path. The font path can be changed by using Xadmin or the *xset* command.

If the font path was changed by the *xset* command and the 730X Server is later rebooted, the font path will be reset to the font path specified in Xadmin.

The 730X Font Search Mechanism

The 730X fonts are distributed in the 730X Binary Host Package and the 730X Source Host Package. To access any fonts other than the ROM fonts, these files must be installed on a host that is configured to support TFTP or StarLAN. In the case of StarLAN, a special file server, called *Xmtg*, is used to enable the 730X Server to access fonts.

When the 730X Server is booted, it attempts to build a font database from the *fonts.dir* and *fonts.alias* files found in the font path directories on the font host. The ROM fonts are included in the font database. The following scheme is used at reboot time to establish the font database.

1. The 730X Server attempts to connect to the primary font host. If this connection fails, the 730X Server will try to connect to the secondary font host. If this attempt also fails, the font database is created using only the ROM fonts in the 730X Server. The 730X Server will not attempt to build the font database again until the 730X Server is rebooted or the *xset* program is used to force the font database to be rebuilt.
2. When the 730X Server is successful in making a connection with either the primary or secondary font host, it will establish its font database using the *fonts.dir* and *fonts.alias* files found on that host in the directories specified in the default font path. Once the 730X Server is booted, all X client font requests will be directed to this host.

3 If at any time the 730X Server is unable to communicate with its font host, it will try to connect to the other font host specified in Xadmin (if one is specified). If the connection to the other host succeeds, the 730X Server will use that host to retrieve font files. However, the font database will not be rebuilt unless the *xset* command is used or the 730X Server is rebooted.

4 If the 730X Server cannot connect to a host or if the files on that host are not found, an error message will be printed in the diagnostics window of Xadmin.

The RGB color database is read only on initialization. If the 730X Server is not able to read the color database at that time, the only way to cause another attempt at reading it is by rebooting the 730X Server.

When an X client requests a particular font, the following scheme is used to satisfy that request.

1 The 730X Server checks if the font is in the internal font database that was built from the *fonts.dir* and *fonts.alias* files that were read previously.

2 If the requested font is not in the database, the 730X Server returns an error to the client.

3 If the requested font is in the database, the 730X Server then checks if the font is one of the ROM fonts or has already been read by the 730X Server.

4 If the font has already been read, the 730X Server uses the current data.

5 If the font has not been read, the 730X Server requests the font from the font host. Using the font path and file name from the appropriate *fonts.dir* file, the 730X Server reads the font file.

6 An error is generated if the 730X Server can't read a font file. This can occur when the font host goes down or when *mkfontdir* was not run in a directory after it was modified.

Memory Usage

The 730 MTG contains memory which is used by the terminal to perform its functions. The 730 MTG contains .5M byte of memory. Additional memory resides on the network access unit. The total amount of memory that is available is .5M byte plus the amount installed on the network access unit. The total amount of memory will be one of: 1M, 1.5M, 2.5M, 3M or 4.5M bytes. Refer to your network access unit user's guide for memory configuration information.

The 730X Server will work with .5M bytes of RAM on the network access card, but 1M byte or more (on the network access card) is recommended.

The 730X allows many X client applications to run simultaneously. Although the amount of memory in the terminal that is used by X applications varies, the amount of free memory in the terminal always decreases as the number of X clients increases. The total amount of free memory, indicated by the Xadmin window, is typically the sum of several smaller contiguous sections of memory. The tendency of the 730 MTG to divide memory into smaller contiguous sections is often referred to as fragmentation.

The first time an X client requests more than the amount of memory available in the largest of these fragments, you will see the message shown in Figure 4-7. After you press a key as indicated, the 730X Server will attempt to recover from the failure and resume operation by terminating the client(s) whose memory requests were not satisfied. After this message is first shown, future memory failures may or may not be accompanied by the message shown on Figure 4-7.

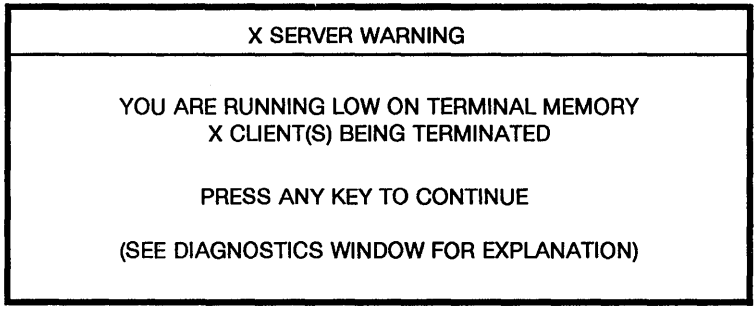


Figure 4–7 Low Memory Warning Message

In cases where an X client memory request exceeds the available memory in the terminal and the 730X Server is unable to recover from the failure, you will see the message shown in Figure 4-8. In this case, the 730X Server will terminate all clients and prompt the user to reboot the 730X Server.

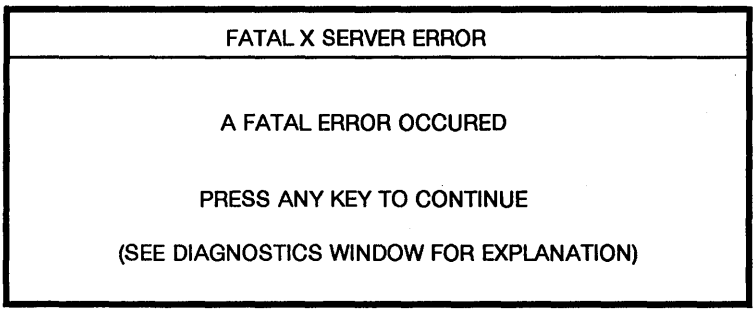


Figure 4–8 Fatal X Server Error Message

Memory Conservation

There are a number of guidelines you can observe to conserve memory in the terminal and thus increase the number of X clients the 730X Server can support.

- Avoid unnecessary usage of windows in the native 730 MTG environment.
- Avoid overlapping windows since hidden 730 MTG windows are saved in memory.
- Whenever the message shown in Figure 4-7 is displayed, you should reduce the number of X clients being used.
- If low memory warnings continue, it may be due to excessive memory fragmentation. To reduce memory fragmentation, exit all X clients, reboot the terminal, and start only those X clients needed for the work at hand.
- Use the fonts provided in the 730X Server firmware.

If you have observed all of the above guidelines and X clients continue to exceed the available memory in the terminal, you should consider upgrading the amount of memory installed in your 730X.

Minimum Memory Configuration

If your 730 StarLAN 10 (ISO or TCP/IP) NAU is configured with the minimum .5M bytes of memory (equivalent to 1M byte for the entire 730 MTG), you should observe the following memory conservation guidelines.

- If you are using the 730 StarLAN 10 ISO NAU, set the **Maximum Sessions** to no more than 16.
- If you are using the 730 StarLAN 10 TCP/IP NAU, set the **Maximum TCP Endpoints** to no more than 16 and the **Expected STREAMS Load** to low.

Chapter 5: Troubleshooting

Contents

Introduction 5–1

Trouble Conditions and Solutions 5–2

Introduction

This chapter describes problems that you may encounter when using the 730X System, and suggests corresponding recovery procedures.

Trouble Conditions and Solutions

Refer to the section on Xadmin in Chapter 4, for a description of the X Server Diagnostic capability.

The following is a list of trouble conditions, their cause and a suggested course of action to remedy the problem.

Condition:
Xadmin displays the following message in the X Server Diagnostics window:

```
Network Protocol Not Installed
```

Explanation: TCP/IP has not been configured properly and therefore, the 730X Server will not initialize properly.

Action: Use the Network Configuration of Netadmin to set the terminal's internet address and reboot the terminal to have the change take effect. For more information, refer to the 730 StarLAN 10 TCP/IP Network Access Unit User's Guide.

Condition:
Xadmin displays one of the following messages in the X Server Diagnostics window:

```
primary font host not responding
secondary font host not responding
```

Explanation: When the TCP/IP protocol is installed this message may occur for the following reasons:

1. The font host address is in an incorrect format for the TCP/IP protocol.
2. *tftp* daemon is not installed on the font host.
3. The font host is down or the host networking is down.

Action:

1. The font host address must be the internet address of the host.
2. Check if the *tftp* daemon is running on the host. If it is not, consult with your system administrator.
3. Check if the font host and network are running properly.

Condition:
Xadmin displays the following message in the X Server Diagnostics window:
`file server service not available on host`

Explanation: When using StarLAN this message may occur for the following reasons:

1. The 730X host software is not installed.
2. The *Xmtg* file server is not registered with the network listener.

Action:

1. Install the host software as described in Chapter 3.
2. Execute the *startXmtg* script to register the *Xmtg* file server with the network listener.

Condition:
Xadmin displays the following message in the X Server Diagnostics window:
`unable to establish file server connection with` *'hostname'*

Explanation When using StarLAN this message may occur for the following reasons:

1. The font host address is in an incorrect format for the StarLAN protocol.
2. The font host is down or the host networking is down.

Action

1. The font host address must be the hostname of the host.
2. Check if the font host and network are running properly.

Condition:
Xadmin displays the following message in the X Server Diagnostics window:
`primary font host is not set properly`

Explanation: The Xadmin option, Primary Font Host, is not set or it is in an incorrect format. If it is not set the 730X Server will not be able to retrieve fonts or the color database from a host computer.

X clients that can use the default server font in ROM and clients that do not need fonts or color translation will still be able to run with the 730X Server even when the 730X Server cannot connect to a font host.

Action: If you have TCP/IP protocol installed, the font host must be the internet address of the host containing the fonts and color database. Change the Primary Font Host option and reboot the 730X Server.

Condition:
730X Server is unable to open the file, *fonts.dir*, for a particular directory. An example of a message that Xadmin would display is:
`Unable to open '/usr/Xmtg/lib/fonts/misc/fonts.dir'`

Explanation:

1. The Default Font Path is incorrect.
2. The file, *fonts.dir*, does not exist in the font directory.

Action:

1. Check that the Default Font Path is correct and that the directory and the files have the proper read permissions.
2. If the file, *fonts.dir*, does not exist in the directory containing the fonts, execute the *mkfontdir* utility in that directory.

For more information on fonts see the Font Information section in Chapter 4.

Condition:
730X Server finds the file, *fonts.dir*, for a particular directory but is unable to open the file, *fonts.alias*. An example of a message that Xadmin would display is:
`Unable to open '/usr/Xmtg/lib/fonts/misc/fonts.alias'`

Explanation: The file, *fonts.alias*, is optional. It does not need to exist in the directory.

Action: For more information on fonts see the Font Information section in Chapter 4.

Condition:
Xadmin displays one of the following messages in the X Server Diagnostics window:
`Could not open default cursor font` *'fontname'*
`Could not open default font` *'fontname'*

Explanation: The Cursor Font or the Text Font option in the 730X Server is set incorrectly.

Action: The recommended default Cursor Font in Xadmin is "cursor". The recommended default Text Font in Xadmin is "rom11x16". These fonts are supplied with the 730X Server so they will always be found. If another cursor font or text font is desired those fonts must be in directories in the font path to be retrieved from the font host.

Condition:
Server is unable to open the color database. An example of a message that Xadmin would display is:
`Unable to open '/usr/Xmtg/lib/rgb.mtg.base'`

Explanation: The Color Database Path is set improperly in Xadmin

Action: The Color Database Path should be the complete pathname of the color database file on the font host, omitting the .base extension of the filename. Verify that the file has read permission.

Condition:
Clients cannot connect to the 730X Server.

Explanation:

1 The DISPLAY variable is not set or it is not set properly.

2 The Local Node Name of the terminal, using StarLAN, or the Internet Address of the terminal, using TCP/IP, has been changed and the terminal has not been rebooted.

3 The terminal is not known by the host network databases for TCP/IP.

4 Remote configuration not done for Xwin or OPEN LOOK clients.

Action:

1 Verify that ":0" is not part of the StarLAN Local Node Name. See the section, Starting the 730 Server, in Chapter 4 on how to set the DISPLAY variable

2 Reboot the terminal after you change the node name or the internet address of your terminal

3 Your system or network administrator should verify that the address of your terminal is known by the host networking configuration.

4 If you are using Xwin or OPEN LOOK clients some special remote display configuration must be done. Please refer to the appropriate user's manual on how to configure outgoing remote display connections.

Condition:
A font could not be opened by a client.

Explanation:

1. The font is not in a directory in the font path being used by the 730X Server.
2. The font does not exist
3. There is no file, *fonts.dir*, in the directory containing the font, or *fonts.dir* was not updated when the font was added to the directory.
4. The font host or host networking has gone down.

Action:

1. Change the Default Font Path in Xadmin and reboot the 730X Server or use *xset* to change the font path.
2. Create an alias for the missing font to an existing font.
3. Execute the *mkfontdir* utility in the font directory.
4. Check to see if the font host and network are running properly.

For more information on fonts see the Font Information section in chapter 4.

Condition:
Low Memory warning box is displayed and/or Xadmin displays the following messages in the X Server Diagnostics window:

```
Closed down client due to low memory condition
client index: <decimal number>
client sequence number: <decimal number>
request type: <decimal number>
```

Explanation: The terminal is running low on memory.

Action: Refer to the Memory Usage section in Chapter 4.

Condition:
Fatal Error Box is displayed and Xadmin displays the following message in the X Server Diagnostics window:

```
Fatal Error
Out of memory in Xalloc

Please Reboot X Server
```

Explanation: The terminal has run out of memory.

Action: Refer to the Memory Usage section in Chapter 4.

Condition:
Xadmin displays one of the following messages in the X Server Diagnostics window:

```
t_open failed for file server connection
t_open of network connection failed
unable to initialize network connection
```

Explanation: The number of sessions or endpoints as configured in the NAU Configuration is not enough.

Action: If you have StarLAN use the Local NAU Configuration of Slnadmin to increase the Maximum Sessions.

If you have TCP/IP protocol use the Network Configuration of Netadmin to increase the Maximum TCP Endpoints.

The terminal must be rebooted before changes to the network access unit options take effect.

Condition:
Xadmin displays the following message in the X Server Diagnostics window:

```
Write to client timed out - closing down connection to
client
```

Explanation: The 730X Server has received flow control from a client on a host system. The 730X Server will wait the period of time specified by the Network Timeout option in Xadmin. If the 730X Server still cannot write to the client, the client connection will be closed down. It is possible that this period of time is not enough. It is also possible that the host or client is having problems.

Action: If you suspect that the amount of time specified in the Network Timeout option of Xadmin is not enough time for your network, simply increase the time.

Condition:
Xadmin displays the following message in the X Server Diagnostics window:

```
received disconnect from the file server
```

Explanation: This may occur when using StarLAN and indicates that:

1. The font host has gone down.
2. The *Xmtg* file server process has been killed. The 730X Server will attempt to reconnect to a file server first on the primary font host then on the secondary font host.

Action:

1. Check if the font host is running properly.
2. If the 730X Server was able to reopen a connection to the *Xmtg* file server everything should proceed normally. If a file server connection could not be reopened, this may indicate the font host is down. The 730X Server must be rebooted to reestablish a connection with an *Xmtg* file server when the font host again becomes available.

Appendix M: Manual Pages

This section contains manual pages for:

bdftosnf(1)
mkfontdir(1)
rgb(1)
showsnf(1)
startXmtg(1)
stopXmtg(1)

NAME

bdftosnf - BDF to SNF font compiler for X11

SYNOPSIS

bdftosnf [-s] [-p#] [-s#] [-m] [-l] [-M] [-L] [-w] [-W] [-t] [-i] [bdf-file]

DESCRIPTION

bdftosnf reads a Bitmap Distribution Format (BDF) font from the specified file (or from standard input if no file is specified) and writes an X11 server normal font (SNF) to standard output.

OPTIONS

`-s` Force byte swapping. This should always be used on the 6386 and 730X.

`-p#` Force the glyph padding to a specific number. The legal values are 1, 2, 4, and 8.

`-s#` Force the scanline unit padding to a specific number. The legal values are 1, 2, and 4.

`-m` Force the bit order to most significant bit first.

`-l` Force the bit order to least significant bit first.

`-M` Force the byte order to most significant byte first.

`-L` Force the byte order to least significant byte first.

`-w` Print warnings if the character bitmaps have bits set to one outside of their defined widths.

`-W` Print warnings for characters with an encoding of -1; the default is to silently ignore such characters.

`-t` Expand glyphs in "terminal-emulator" fonts to fill the bounding box.

`-i` Don't compute correct ink metrics for "terminal-emulator" fonts.

SEE ALSO

X(1), Xserver(1)
"Bitmap Distribution Format 2.1"

NAME

mkfontdir - create fonts.dir file from directory of font files.

SYNOPSIS

mkfontdir [directory-names]

DESCRIPTION

For each directory argument, mkfontdir reads all of the font files in the directory searching for properties named "FONT", or (failing that) the name of the file stripped of its suffix. These are used as font names, which are written out to the file "fonts.dir" in the directory along with the name of the font file.

The kinds of font files read by mkfontdir depends on configuration parameters, but typically include SNF (suffix ".snf"), compressed SNF (suffix ".snf.Z"), BDF (suffix ".bdf"), and compressed BDF (suffix ".bdf.Z"). If a font exists in multiple formats, the most efficient format will be used.

FONT NAME ALIASES

The file "fonts.alias" which can be put in any directory of the font-path is used to map new names to existing fonts, and should be edited by hand. The format is two white-space separated columns, the first containing aliases and the second containing font-name patterns.

When a font alias is used, the name it references is searched for in the normal manner, looking through each font directory in turn. This means that the aliases need not mention fonts in the same directory as the alias file.

To embed white-space in either name, simply enclose them in double-quote marks, to embed double-quote marks (or any other character), preceed them with back-slash:

```
"magic-alias with spaces"    "\"font\\name\" with quotes"
regular-alias                fixed
```

If the string FILE_NAMES_ALIASES stands alone on a line, each file-name in the directory (stripped of the .snf suffix) will be used as an alias for that font.

USAGE

Xserver(1) looks for both "fonts.dir" and "fonts.alias" in each directory in the font path each time it is set (see xset(1)).

SEE ALSO

X(1), Xserver(1), xset(1)

NAME

rgb - rgb compiler for X11

SYNOPSIS

rgb

DESCRIPTION

rgb reads a sorted file containing the *red-green-blue* values for a color and the color name. The compiler verifies the values of the rgb values and adds the values and the color name to a database file.

The format of each entry in the file is as follows:

red_value green_value blue_value color_name

The values for the individual color components can range from 0 through 255. The color name can be up to 41 characters long, excluding the null terminator; anything after the 41st character is truncated. The separator between fields can be any white space character.

NAMING CONVENTIONS

The naming convention is to use the names *rgb.<display_type>.txt* for the rgb source file and *rgb.<display_type>.base* for the compiled rgb file.

OPTIONS

Since the server performs a binary search on the color name, the database must be sorted according to the color name before being compiled. *Sed* is used to change multiple tabs into a single space before the file is sorted. The following command is used to *sed*, sort, and compile the database and direct the output to *rgb.<display_type>.base*.

```
/bin/sed "s/[    ][       ]*/ /g" < rgb.display_type.txt |
  sort -f +3 | ../bin/rgb rgb.display_type.base
```

The data within each square bracket pair is a single space character followed by a single tab character.

DIRECTORY SPECIFICATION

The full pathname containing the rgb database must be specified for the server. Normally it is */usr/Xmtg/lib/rgb.<display_type>*. The server appends *.base* to the file name before reading it.

SEE ALSO

X(1), Xserver(1)

NAME

showsnf - print contents of an SNF file

SYNOPSIS

showsnf [-s] [-v] [-g] [-m] [-M] [-l] [-L] [-p#] [-u#]

DESCRIPTION

The *showsnf* utility displays the contents of font files in the Server Natural Format produced by *bdftosnf*. It is usually used only to verify that a font file hasn't been corrupted or to convert the individual glyphs into arrays of characters for proofreading or for conversion to some other format.

OPTIONS

`-s` This options indicates that byte swapping should occur. This is needed for the 6386 XWIN format, which is also used by the 730X Server.

`-v` This option indicates that character bearings and sizes should be printed.

`-g` This option indicates that character glyph bitmaps should be printed.

`-m` This option indicates that the bit order of the font is MSBFirst (most significant bit first).

`-l` This option indicates that the bit order of the font is LSBFirst (least significant bit first).

`-M` This option indicates that the byte order of the font is MSBFirst (most significant byte first).

`-L` This option indicates that the byte order of the font is LSBFirst (least significant byte first).

`-p#` This option specifies the glyph padding of the font (# is a number).

`-u#` This option specifies the scanline unit of the font (# is a number).

SEE ALSO

X(1), Xserver(1), bdftosnf(1)

BUGS

There is no way to just print out a single glyph.

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NAME

startXmtg - register Xmtg with StarLAN network listener

SYNOPSIS

startXmtg

DESCRIPTION

startXmtg is a utility supplied with the 730X Binary and Source Host Packages that registers the *Xmtg* file server with the StarLAN network listener. The *Xmtg* file server allows the 730X server to communicate with a host computer over StarLAN. StartXmtg allows instances of the *Xmtg* file server to be started for each 730X server that requests a host connection. Once this connection has been made, the 730X server can access fonts and the color database from the host computer.

StartXmtg can optionally be invoked during installation of the 730X Binary Host Package. If the 730X Source Host Package has been installed on a 6386WGS or 3B2/1000 host computer and StarLAN is to be used, startXmtg must be executed by the user on the host before that host can be accessed by the 730X server.

Note that startXmtg does not need to be executed if the host is accessed over TCP/IP. In this case, the trivial file transfer protocol, *tftp*, is used to access fonts and the color database.

To remove *Xmtg* from the StarLAN network listener's list of services (disable usage of *Xmtg*), use *stopXmtg*.

USAGE

StartXmtg can only be run on a 6386WGS or 3B2/1000 computer. The user must be logged in as root to execute this command. Furthermore, the Network Support Utilities (NSU) package and StarLAN must be installed for startXmtg to execute correctly. There are no arguments to startXmtg.

ERRORS

StartXmtg can fail for the following reasons:

1. The user is not logged in as root.
2. StarLAN is not installed on the host computer.
3. The Network Support Utilities (NSU) package is not installed on the host computer.
4. *Xmtg* is already registered with the StarLAN network listener.

SEE ALSO

stopXmtg(1)

NAME

stopXmtg - remove Xmtg from StarLAN network listener's list of services

SYNOPSIS

stopXmtg

DESCRIPTION

stopXmtg is a utility supplied with the 730X Binary and Source Host Packages that removes the *Xmtg* file server from the StarLAN network listener's list of services. *Xmtg* sessions that are in process when *stopXmtg* is executed are not disconnected. Once *Xmtg* has been removed from the StarLAN network listener's list of services, 730X servers can no longer start new StarLAN connections with *Xmtg* on the host computer. Previously started Xmtg sessions are not disconnected.

StopXmtg is automatically invoked during removal of the 730X Binary Host Package. If the 730X Source Host Package has been installed on a 6386WGS or 3B2/1000 host computer and *startXmtg* was previously invoked, stopXmtg should be executed by the user when the package files are removed.

To register *Xmtg* with the StarLAN network listener (reenable usage of *Xmtg*), use *startXmtg*.

USAGE

StopXmtg can only be run on a 6386WGS or 3B2/1000 computer. The user must be logged in as root to execute this command. *Xmtg* must have been previously registered with the StarLAN network listener (using startXmtg) for stopXmtg to execute correctly. There are no arguments to stopXmtg.

ERRORS

StopXmtg can fail for the following reasons:

1. The user is not logged in as root.
2. StarLAN is not installed on the host computer.
3. The Network Support Utilities (NSU) package is not installed on the host computer.
4. *Xmtg* is not currently registered with the StarLAN network listener.

SEE ALSO

startXmtg(1)

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