XDS Release 3.0 Addendum

This document contains a correction to the *X Display Station Release 3.0 Update Guide*, as well as information on Release 2.8 bug corrections, and Release 3.0 outstanding bugs.

Remote Configuration Model Types

On page 18 of the *XDS Release 3.0 Update Guide*, the second paragraph under the heading "Remote Configuration File Specification" contains a list of MachineModel types for all XDS models. Please use the following MachineModel identifiers (in bold type) instead of those in the guide:

X14ES	X-14/ES
X15	X-15
X19	X-19 (1152 x 900 resolution)
X19ORIG	X-19 (1024 x 800 resolution)
X19TURBO	X-19 Turbo
XTC2	Color Xbase/10
XTC3	Color Xbase/11 & Xbase/12

Bugs Fixed for Release 3.0

The following Release 2.8 software bugs have been fixed for Release 3.0:

- Wildcard characters (*) in remote configuration files were not handled correctly, resulting in bogus error messages. Field separators (.) were required, as in these examples:

      Visual.*.Keyclick
      ..Keyclick

  For 3.0, the field separators are not required, as shown here:

      Visual*Keyclick
      *Keyclick

- X clients can no longer ring the bell when **Audible Bell** in the **Configure Keyboard/Mouse** menu is set to **Off**.

- TFTP errors during the boot process were not flushed. Consequently, the boot command seemed to fail silently, and an error message was displayed after the next successful command. This has been corrected.

X DISPLAY STATION RELEASE 3.0 UPDATE GUIDE
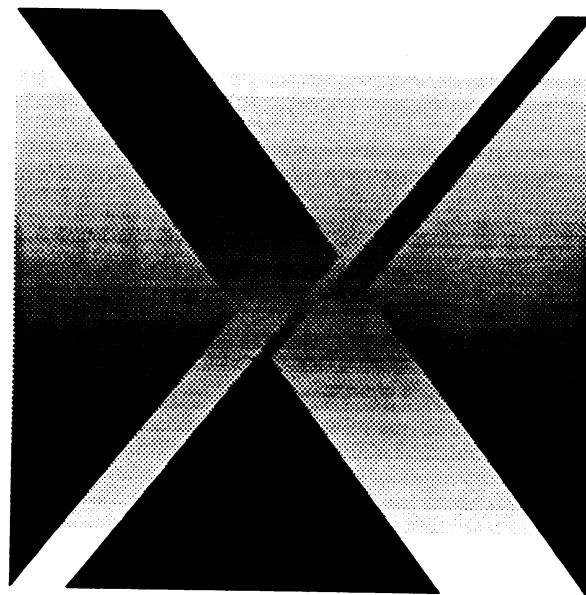
VISUAL

T E C H N O L O G Y

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Introduction

This supplement to Visual's *X Display Station User's Guide* describes XDS software Release 3.0, which is fully compliant with the MIT X.V11R4 server specification. XDS Release 3.0 includes support for:

- The X Display Manager Control Protocol (XDMCP), which controls the user's X terminal login session from startup to shutdown.

- The SHAPE extension, which permits windows to be of any shape. (A clock or a control button, for example, might be round rather than rectangular.)

- The MIT-MAGIC-COOKIE-1 security extension, which, when used in conjunction with XDMCP, permits only users with the MIT-MAGIC-COOKIE-1 authorization code to establish any new XDS connections.

- Optimized wide lines and arcs, which includes enhanced user specification for line widths and endcaps.

- Optimized software cursors.

- Optimized server region code.

- Real window save-unders.

- Input extension support, so alternate input devices can generate standardized events.

In addition, a default ISO standard 8859.1 international font, stored in ROM, can be used in the XDS setup windows, XDS connection window, and X windows. This is also one of the standard fonts selectable in XDS setup mode through the **Configure Font Management Menu** and the **Configure Connection Menu.**

You should already be familiar with the XDS installation and configuration procedures described in the *X Display Station User's Guide.* Only new XDS Release 3.0 features are covered in this document.

Network Special Keywords

Unless you have supplied a specific Internet Protocol (IP) address, the XDS knows only its hardware address, not its IP address, when it starts up.

The XDS works only if it knows its IP address. If you don't specify an IP address, or if you use 0, the XDS sends out Reverse Address Resolution Protocol (RARP) and Bootstrap (BOOTP) requests on the network to learn its IP address from a network host. This host matches the XDS hardware address with the corresponding XDS IP address.

For the XDS hardware address to correspond to an IP address, the XDS hardware address *must* be entered in the RARP or BOOTP data bases on the servers. The network administrator who maintains these data bases should be notified of the XDS hardware address.

Two network special keywords can be used in place of any network host name in the XDS setup and connection windows:

- **BROADCAST** – The XDS replaces this keyword with the IP broadcast address. You can set this address using the **Configure Ethernet Menu**, or the XDS can set it automatically.

- **BOOTPHOST** – The XDS replaces this keyword, wherever in the XDS setup menus it is used, with the IP address of the host that responds successfully to the XDS BOOTP request.

NOTICE: The XDS issues a BOOTP request only if you have not set the IP address of the XDS using the Boot ROM or Configure Ethernet Menu. If you manually set this IP address, references to BOOTPHOST in the setup menus cannot be resolved.

The Configure Network Services Menu

Three new items have been added to the **Network Services Menu**, and **NFS Authentication Mode** has been moved here from the **Font Management Menu**:

```
╔══════════════════════════════════════════════════════════════╗
║              CONFIGURE NETWORK SERVICES                        ║
║                                                                ║
║   To change an item, highlight it and press the left mouse button or RETURN.
║   Press the right mouse button or ESC to return to the Setup Window.
║                                                                ║
║   ┌──────────────────────────────────────────────────────────┐
║   │ XDS Local Name                          unknown          │
║   └──────────────────────────────────────────────────────────┘
║       Edit Local IP Namelist                                   ║
║       Edit IEN116/UDP Nameserver List                          ║
║       Edit Domain Nameserver List                              ║
║       Nameserver Request Timeout (seconds)      10             ║
║                                                                ║
║       Domain Name                                              ║
║       Default Router (none if proxy ARP)                       ║
║                                                                ║
║       TCP Maximum Packet Size                   1460           ║
║       TCP Maximum Window Size                   3072           ║
║       4.2 Compatibility Mode                    On             ║
║       UDP Checksumming                          On             ║
║       ARP Daily (seconds)                       3              ║
║                                                                ║
║       NFS Authentication Mode            AUTH_UNIX name=LOCALNAME
║                                                                ║
║                                                                ║
║       HELP                                                     ║
║       Return to Setup Window                                   ║
║                                                                ║
╚══════════════════════════════════════════════════════════════╝
```

Figure 1   The Configure Network Services Menu

XDS Local Name

This allows you to assign an alphabetic name which maps to the unique IP address of the XDS. The XDS then uses this Local Name in the **NFS Authentication Mode** item, described below. The default name is "unknown".

TCP Maximum Packet Size

This is the maximum size, in *bytes*, of the TCP packet the XDS generates. This is useful if your network routers or bridges do not send TCP commands to tell XDS terminals to use smaller packet sizes.

The default is **1460** bytes.

TCP Maximum Window Size

This is the maximum size, in *bytes*, of the XDS buffer for unacknowledged packets. This item is for use with hosts that have problems with large window sizes.

The default is **3072** bytes.

NOTICE:

If the XDS determines that the host it is talking to needs a lower packet size or window size, then that lower value will be used. This is decided on a host-by-host basis.

NFS Authentication Mode

This item is has been moved here from the **Font Management Menu**. The options are:

AUTH_NONE – Select this option to have the XDS provide no authentication information in its requests over NFS.

AUTH_UNIX name = LOCALNAME – Select this option to have the XDS provide unique information about its identity in requests over NFS, using the name you set in the XDS Local Name item above.

AUTH_UNIX name = xds – Select this option to have the XDS provide information about its general identity in requests over NFS. The NFS server looks up "xds" to verify that it matches the XDS IP addresses.

The Font Management Menu

The **NFS Authentication Mode** item (which now controls all NFS access to the host) has been been moved from the **Font Management Menu** to the **Network Services Menu.** Two other items have been revised:

Edit Font Host List

The default setting is now the "BOOTPHOST" keyword (see the "Network Special Keywords" section above.)

Edit Font Path List

The font path list now defaults to:

```
/usr/lib/X11/Visual/fonts/misc
/usr/lib/X11/Visual/fonts/100dpi
/usr/lib/X11/Visual/fonts/75dpi
```

The Configure Auto-Connection Menu

Visual has made several enhancements to the Auto-Connection Menu to support the X Display Manager Control Protocol (XDMCP) specified in X.V11R4.


```
                     CONFIGURE AUTO CONNECTION

   To change an item, highlight it and press the left mouse button or RETURN.
   Press the right mouse button or ESC to return to the Setup Window.


   Auto connection Mode                        XDMCP
   Edit Connection Host List

   XDMCP Callout Mode                          Direct
   XDMCP Host Selection Mode                   First Willing
   XDMCP Retry after Connect Failure           Yes
   XDMCP Connect Timeout (seconds)             4
   XDMCP Check for Dead Session                Yes
   XDMCP Session Check Interval (min)          3
   XDMCP UDP Port                              177

   XDSXDM Request Timeout (seconds)            60
   XDSXDM Daemon UDP Port                      6558




   HELP
   Return to Setup Window
```

Figure 2   *The Configure Auto-Connection Menu*

Auto-Connection Mode

XDMCP – This is the X Display Manager Control Protocol supported by X.V11R4. Whereas XDSXDM makes the host connection exclusively on a first-come-first-served basis, XDMCP provides a greater variety of query requests and X display manager connection schemes. These are fully described under "XDMCP Callout Mode" below.

XDSXDM – This is an early X Display Manager (XDM) protocol Visual added to X.V11R3. When XDSXDM is selected, the XDS attempts to connect to a daemon version of the XDM which runs on a host. The XDS issues an "X Login Request" to each host in the Connection Host List and establishes a connection with the first host that responds. This selection is *not* compatible with the X.V11R4 XDMCP protocol.

Only the above XDMCP and XDSXDM selections bring you directly to an X Display Manager login window whenever you log out of a current X windows session, reboot, or power-up the terminal.

Telnet on Reboot – With this item selected, the XDS automatically brings up the Connection Window whenever you power-up or reboot the terminal using the Reset Terminal (reboot) item on the System Window. If there is a host in the Connection Host List, the command line will contain the string "telnet *hostname*". To actually initiate the telnet session, just press the ENTER key. If you'd rather connect to a different host than the default, simply backspace over the host name and type in another.

Telnet on Logout – With this item selected, the XDS brings up the Connection Window not only on power-up and reboot, but also whenever you log out of your last X client connection, or when you select the Close All Connections (logout) item in the System Window.

Disabled – When selected, the XDS makes no attempt to connect to anything at reboot, power-up, or server reset (logout).

Auto-Connection Mode is a toggle item. The default is **XDMCP.**

Edit Connection Host List

The default setting is now the "BOOTPHOST" keyword (see the "Network Special Keywords" section above.)

XDMCP Callout Mode

This item indicates the type of XDMCP connection request made by the XDS. In each case, the XDS sends a query to determine if a host is willing to provide the terminal with X display management services.

Direct – This is a request sent to a specific host (or hosts) on the Connection Host List. Each host in the list is queried in order, and responds with *Willing* if it is ready to service the terminal, or *Unwilling* if it is not.

Broadcast – This request is broadcast to all hosts on the network (or subnetwork). An unwilling host ignores the broadcast request, and does not respond.

Indirect – This request is sent to a host on the Connection Host List, which then forwards the request to a number of secondary hosts. Typically, the known host is a gateway to another network. Unwilling hosts ignore the request, and do not respond.

XDMCP Callout Mode is a toggle item. The default is **Broadcast.**

XDMCP Host Selection Mode

This is the method the XDS uses to select a host from among those willing to establish a connection. **XDMCP Host Selection Mode** has 3 options:

First Willing – The XDS accepts the first *Willing* host response and establishes a connection to that host.

List Order Priority – The XDS queries all hosts on the **Connection Host List**, and connects immediately if the first host responds *Willing*. Otherwise, after the **XDMCP Connect Timeout** period, it connects with the topmost willing host.

If no host on the **Connection Host List** was willing, no connection is made, unless **XDMCP Callout Mode** is **Broadcast**. In this case, the XDS connects with the first willing host *not* on the list.

User Selectable – *(Local client option only)* The XDS does not automatically connect to any willing host, but instead displays a list of all willing hosts, from which you make a selection.

When you logout, or close all connections from the System Window, the server resets, and the Host Query Manager (a local client), displays a window with a list of all willing hosts. You then use the mouse to choose a host, and select the **Connect** button. If the preferred host is not on the *Willing* list, you can select **Retry HostQuery**.

Since this is a local client and *not* a setup menu, you can go into setup mode, change the XDMCP selection mode to **First Willing** or **List Order Priority**, exit setup, and select **Quit** in the Host Query Manager window. This resets the server and automatically connects you to a willing host.

XDMCP Host Selection Mode is a toggle item. The default is **First Willing.**

XDMCP Retry after Connect Failure

This **Yes/No** item indicates whether or not the XDS should keep trying to connect with a host that does not respond to a connection request. If Yes, the XDS retries after the XDMCP Connect Timeout interval. Eventually, the XDS ceases sending requests if there is no willing response.

XDMCP Retry after Connect Failure is a toggle item. The default is **Yes.**

XDMCP Connect Timeout

This is the initial timeout interval, in *seconds*, between attempts to re-establish a connection with a host. If no host responds, this interval becomes longer up to a predefined limit (in case network response is unusually slow).

The default is **4** seconds.

XDMCP Check for Dead Session

This **Yes/No** item indicates whether or not the XDS should send periodic messages to find out if the connection host is still running. An active host returns an *Alive* message to the terminal. If the XDS determines the host is no longer active, it kills all client application windows, and the server resets.

XDMCP Check for Dead Session is a toggle item. The default is **Yes.**

XDMCP Session Check Interval

This is the interval, in *minutes*, between session check messages to the host. This is meaningful only if XDMCP Check for Dead Session is Yes.

The default is **3** minutes.

XDMCP UDP Port

This is the UDP port the XDS uses to communicate with XDMCP daemons on the remote host.

The default is **177.**

The Configure Keyboard/Mouse Menu

XDS Release 3.0 enables you to select from a set of standard international keyboards, and to configure the numeric keypad to suit different platforms and applications.
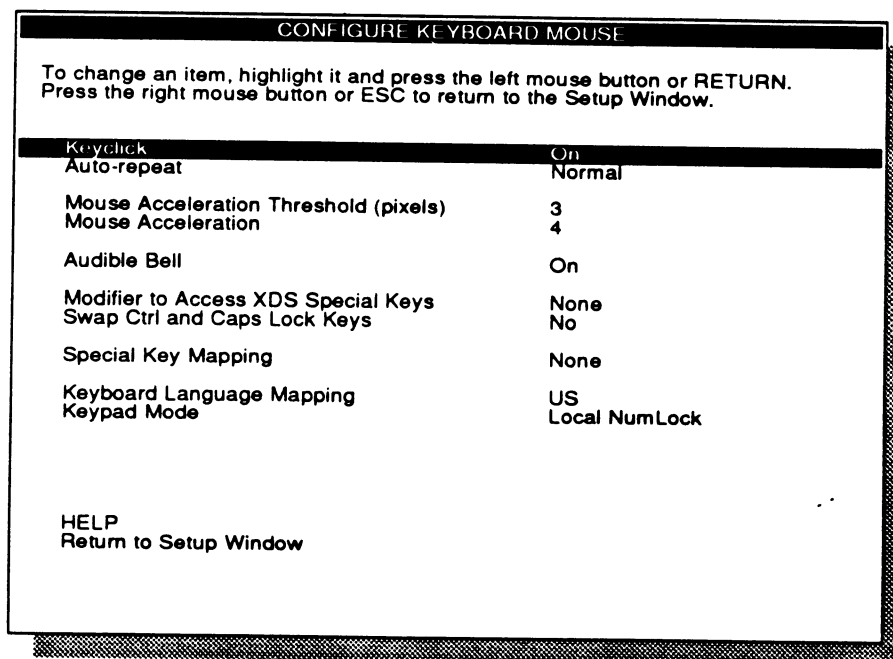
```
╔═══════════════════════════════════════════════════════╗
║              CONFIGURE KEYBOARD MOUSE                  ║
╟───────────────────────────────────────────────────────╢
║  To change an item, highlight it and press the left mouse button or RETURN.
║  Press the right mouse button or ESC to return to the Setup Window.
║
║  Keyclick                                      On
║  Auto-repeat                                   Normal
║
║  Mouse Acceleration Threshold (pixels)         3
║  Mouse Acceleration                            4
║
║  Audible Bell                                  On
║
║  Modifier to Access XDS Special Keys           None
║  Swap Ctrl and Caps Lock Keys                  No
║
║  Special Key Mapping                           None
║
║  Keyboard Language Mapping                     US
║  Keypad Mode                                   Local NumLock
║
║
║
║  HELP
║  Return to Setup Window
╚═══════════════════════════════════════════════════════╝
```

Figure 3   The Configure Keyboard/Mouse Menu

Modifier to Access XDS Special Keys

IF your XDS has a VT220 keyboard, you can define a modifier key that activates one of the XDS special keys (MESSAGES, RESET, SETUP, CONNECT, and BREAK). With a modifier pressed, the XDS interprets the above keys as XDS special keys, and without the modifier, as F1 through F5.

None – When None is selected, F1–F5 are always assumed to be XDS special keys and do not work as function keys.

Shift – When Shift is selected, the XDS assumes an XDS special key only when you press SHIFT and an XDS special key at the same time. When you do not press SHIFT, the XDS assumes a function key (F1–F5).

Ctrl – When Ctrl is selected, the XDS assumes an XDS special key only when you press CTRL and an XDS special key at the same time. When you do not press CTRL, the XDS assumes a function key (F1–F5).

Modifier to Access XDS Special Keys is a toggle item. The default is **None**.

Special Key Mapping

This item changes the mapping of some function keys to be compatible with VAX or VMS hosts.

None – This setting does not change any function keys.

F11=ESC – This changes the mapping of the F11 key to ESCAPE.

F11=ESC/F12=BS/F13=LF – This changes the mapping of the F11 key to "Escape", F12 to "BackSpace", F13 to "LineFeed".

Special Key Mapping is a toggle item. The default is **None.**

Keyboard Language Mapping

This toggle item offers a choice of five keyboard maps: **US** English, **German**, **French**, **UK** English, and **Swedish/Finnish**. Changes immediately take effect upon leaving setup, and X clients receive the appropriate mapping notify event. The default is **US** English.

Each option has a default keyboard map in ROM, which, when selected, is copied as the current X server keyboard map. You can further modify this keyboard map copy by downloading a keymap file from a host on your network. (See the **Remote Configuration Menu** and "Keyboard Map File Specification" for more information.)

The XDS Setup Menus and Connection Window use the same keyboard map as the X server. Therefore, any non-standard keymaps affect setup and terminal emulation as well as X applications.

NOTICE: When the VT220 keyboard is installed, you can only select **US** English. The XDS disables selection of any other keyboard map. You can, however, still download modifications in a keymap file.

Keypad Mode

This item, which allows you to assign different keymaps for the numeric keypad, has the following options:

Numeric Unshifted – In lower case mode, keys "0" through "9" are numeric. In upper case mode (SHIFT key pressed), keys "0" through "9", except "5", are used to position the character cursor (or XDS Setup cursor). This mapping avoids problems with xterm and DEC applications.

Numeric Shifted – In lower case mode, keys "0" through "9", except "5", are used to position the character cursor (or XDS Setup cursor). In upper case mode (SHIFT key pressed), keys "0" through "9" are numeric.

Numeric Only – This setting uses both upper case and lower case for numeric key values. This is primarily for DEC applications.

Local NumLock – The X terminal emulation program (xterm) does not recognize the NUMLOCK key when it is pressed. If you are using an application, like xterm, that does not recognize the NUMLOCK key, then Local NumLock causes the XDS to remap the numeric keypad to *numeric unshifted* when you press NUMLOCK. When NUMLOCK is off, it remaps the numeric keypad to *numeric shifted.*

If Local NumLock is set and NUMLOCK is turned on, the LED on the keyboard lights up, and goes out when NUMLOCK is turned off.

If Local NumLock not set, then all client programs still receive the NUMLOCK key code as usual—this does *not* disable NUMLOCK for those programs that normally recognize it. It simply means that for programs like xterm NUMLOCK has no effect, and the XDS does not remap the numeric keypad if NUMLOCK is pressed.

Keypad Mode changes are always applied to the current language keyboard map copied from ROM—for the keypad, this is Numeric Unshifted. Likewise, any custom keypad changes you make using a download file will, upon power-up or reboot, revert to default before any of the above optional settings are applied. You can, however, modify the keypad at any time after booting with the Load Keyboard Map Now command in the Remote Configuration Menu.

Keypad Mode is a toggle item. The defaults are **Numeric Only** for the VT220 keyboard, and **Local NumLock** for the PC/AT keyboard.

The Configure X Server Features Menu

The following Release 3.0 enhancements have been made to the X Server Features Menu. In addition, the **Input Synthesis** item has been removed.

Pre-X11R4 Bug Compatibility

Several applications have been written to take advantage of certain anomalies in the X protocol prior to X.V11R4 (such as setting undefined bits in an event mask). Corrections made in X.V11R4 by the X Consortium may mean these programs now receive X protocol errors. If you have applications incompatible with X.V11R4, you may need to set **Pre-X11R4 Bug Compatibility** to **Enabled**. If you are developing a new client application you want to be fully X.V11R4 compliant, set this item to **Disabled**.

Pre-X11R4 Bug Compatibility is a toggle item. The default is **Enabled.**

Old DECwindows Compatibility

Some versions of DECwindows applications have difficulties with bit-ordering of image data files.

Enabled – This forces the XDS to bit-swap any image data on a connection made from a byte-order-switched host. This effectively masks a problem with old versions of DECwindows that distorted images loaded from a VAX.

Disabled – This forces the XDS to use image data as-is.

Old DECwindows Compatibility is a toggle item. The default is **Disabled**.

X Protocol Error Reporting

Enabled – This causes the XDS to print a message in the Messages Window whenever an X Protocol error event is sent to an X client. Not all errors are fatal, and many are common with standard MIT clients.Because of the asynchronous nature of X error reporting, this is a valuable debugging feature.

Disabled – This causes the XDS to silently send client error events.

X Protocol Error Reporting is a toggle item. The default is **Disabled.**

Verbose Messages

When **Enabled,** the XDS displays in the Message Window more detailed information on its current activities. For example, enable Verbose Messages if you are having trouble accessing fonts, or making an auto-connection. Enabling this item also gives you error reporting on low memory or non-existent fonts.

Verbose Messages is a toggle item. The default is **Disabled.**

The Remote Configuration Menu

This menu has revised boot host capabilities, and three new items which support custom keyboard mapping enhancements. The **Remote Configuration Host** item has been changed to **Edit Configuration File List.**

Edit Boot Host List

XDS Release 3.0 allows you to specify a list of boot hosts. When the XDS attempts to TFTP the boot image, it starts at the top of the list, and tries to download the boot image from each host until it is either successful or reaches the end of the list.

The default list is the single keyword "BOOTPHOST". This means that the XDS defaults to booting from the first responding "bootp" host. You can

also add the "BROADCAST" keyword at the end of the boot host list, so the XDS can download the boot image from the first responding host on the network in case "bootp" fails. This combination gives you total control over the XDS boot process.
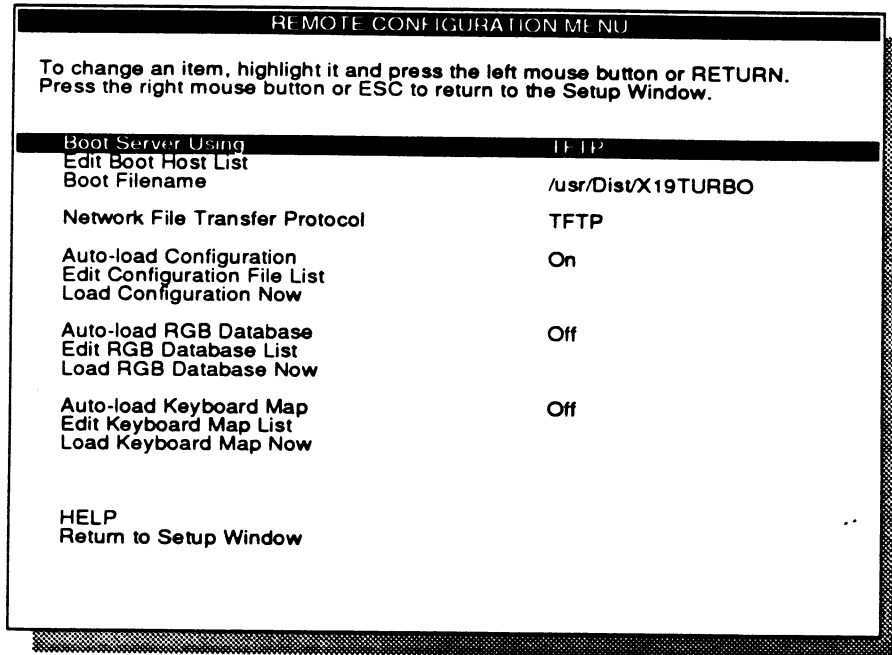
```
REMOTE CONFIGURATION MENU

To change an item, highlight it and press the left mouse button or RETURN.
Press the right mouse button or ESC to return to the Setup Window.


Boot Server Using                        TFTP
Edit Boot Host List
Boot Filename                            /usr/Dist/X19TURBO

Network File Transfer Protocol           TFTP

Auto-load Configuration                  On
Edit Configuration File List
Load Configuration Now

Auto-load RGB Database                   Off
Edit RGB Database List
Load RGB Database Now

Auto-load Keyboard Map                   Off
Edit Keyboard Map List
Load Keyboard Map Now



HELP
Return to Setup Window
```

Figure 4   *The Remote Configuration Menu*

Auto-Load Keyboard Mapping

Set this item to **On** if you want one of the host keyboard map files in the Keyboard Map List to be downloaded to the XDS upon power-up or reboot.

Auto-load Keyboard Map is a toggle item. The default is **Off**.

Edit Keyboard Map List

This is a list of hosts and optional paths for custom keyboard map files. You can specify any host and full path name. However, if you specify a host name *only*, the XDS uses the following default path:

```
/usr/lib/X11/Visual/keyboard.map
```

The following is an example of a keyboard map list:

```
bird
mchale:/usr/local/lib/keyboard.map
chief:/tmp/keys.map
rocket
```

The XDS goes through the list in order, and loads only the first keyboard map file it finds. This applies for both Auto-Load Keyboard Mapping and Load Keyboard Map Now items.

The XDS applies only those keymap changes that differ from the currently selected keyboard map. Therefore, your custom keyboard map file can be a subset of a complete keyboard map.

The default setting is now the "BOOTPHOST" keyword (see the "Network Special Keywords" section above.)

Load Keyboard Map Now

Select this command item if you want to immediately download a keyboard map file from the host to the XDS. This change takes effect upon leaving XDS setup mode.

Load Keyboard Map Now is a instant-action item. Force the load action to occur immediately by highlighting the item and pressing RETURN or the left mouse button.

There is no way to *undo* this operation. You can, however, clear down-loaded keymap changes by doing the following:

1.   First exit setup mode, then return to setup mode.

2.   Go to the **Keyboard/Mouse** menu, and cycle through the **Keyboard Language Mapping** options to reset your desired language.

3.   Exit setup mode. The XDS clears any downloaded keymap changes, and applies your new keyboard mapping.

Remote Configuration File Specification

The Remote Configuration File is formatted much like an X resource file, consisting of one or more lines of the form:

```
Manufacturer.MachineModel.Option: Value
```

For Visual Technology, the manufacturer is **Visual** and the 5 possible MachineModel types are **X15, X19, X15TURBO, X19TURBO,** and **X14ES**. The **Value** depends on the particular option being set. For example:

```
Visual.X19.MouseAcceleration:          2
```

Some of the settable options allow a list to be entered, in which case the list items should be separated by commas. A continuation to the next line is indicated by a backslash (\) in the last position on the line, for example:

```
Visual.X19.AutoConnectionHostList:      niña,pinta,santamaria

Visual.X19.FontPathList:    /usr/lib/X11/Visual/fonts/100dpi,\
           /usr/lib/X11/Visual/fonts/misc
```

Blank lines are ignored. If an exclamation point (!) appears anywhere on a line, the rest of that line is considered a comment and is ignored. If no value appears on a line after the colon, that option is not altered when the file is downloaded, and retains its current value. For example:

```
Visual.X19.KeyClick:        ! Use current setting
```

The **Manufacturer** or the **MachineModel** and their associated period separators may be replaced by an asterisk (*) for universal applicability. For example:

```
Visual*AudibleBell:        On
```

would turn on the bell on all Visual products, while:

```
*AutoRepeat:        Off
```

would turn off autorepeat on all manufacturers' models to which this file is downloaded (provided, of course, that they accept this file format).

Case is not important anywhere except, of course, when it matters to a **particular** option value, such as a UNIX file name. It is important to check **carefully** for syntax errors and misspellings, since many options are not **checked** until actually used by the XDS.

A sample Remote Configuration File template can be found on the Visual Host Utilities Tape, which you can obtain by calling Visual's Customer Support Department. Following is a template showing all current Visual setup items:

```
!
! XDS REMOTE CONFIGURATION FILE TEMPLATE
!
! ───────────────────────────────────────────
! Ethernet Menu
! ───────────────────────────────────────────
Visual*IpNetworkMask:                    ! NONE for automatic
Visual*IpBroadcastAddress:               ! NONE for automatic
Visual*DcpAddr:                          ! DECnet option ONLY


! ───────────────────────────────────────────
! Network Services Menu
! ───────────────────────────────────────────
Visual*XDSLocalName:                     ! <local name>
Visual*LocalIpNamelist:                  ! <ipaddr name> pairs
Visual*Ien116UdpNameserverList:          ! host ID's
Visual*DomainNameserverList:             ! Host ID's
Visual*DomainName:
Visual*DefaultRouter:                    ! Host ID's
Visual*LocalDCPNameList:                 ! <node>.<addr name>
                                         ! (DECnet option ONLY)
Visual*TCPMaxPacketSize:                 ! number of bytes
Visual*TCPMaxWindowSize:                 ! number of bytes
Visual*42Compatibility:                  ! On, Off
Visual*UdpChecksumming:                  ! On, Off
Visual*ArpDally:                         ! Number of seconds
Visual*NameserverRequestTimeout:         ! Number of seconds
Visual*NFSAuthentication:                ! AUTH_NONE, AUTH-UNIX=xds,
                                         ! AUTH-UNIX=<local name>


! ───────────────────────────────────────────
! Serial Line Network Menu
! ───────────────────────────────────────────
Visual*SerialCommunicationProtocol:      ! NONE, SLIP
Visual*SlipIpAddr:                       ! IP Address
Visual*SlipNetworkMask:                  ! NONE for automatic
Visual*SlipBroadcastAddress:             ! NONE for automatic


! ───────────────────────────────────────────
! Serial Port Menu
! ───────────────────────────────────────────
Visual*SerialPortBaudRate:               ! 300, 600, 1200, 2400, 4800,
                                         ! 7200, 9600, 19200, 38400
Visual*SerialPortDataBits:               ! 7, 8
Visual*SerialPortParity:                 ! None, Even, Odd, Mark, Space
Visual*SerialPortCheckReceiveParity:     ! Yes, No
Visual*SerialPortStopBits:               ! 1, 2
Visual*SerialPortXonXoffFlowControl:     ! Enabled, Disabled
Visual*SerialPortRtsCtsFlowControl:      ! Enabled, Disabled
Visual*SerialPortModemControl:           ! Enabled, Disabled
Visual*SerialPortRs422Select:            ! On, Off
```

```
!  _____
!Font Management Menu
!  _____
Visual*DefaultTextFont:                    ! 6x13, 8x13, 9x15, 10x16, 12x20,
                                           ! visual-iso8859-1
Visual*FontHostList:                       ! Host ID's
Visual*FontPathList:                       ! Font directory names
Visual*NetworkFontAccess:                  ! None, FontDaemon, NFS, DAP, TFTP
Visual*NetworkFontRequestTimeout:          ! Number of seconds
Visual*FontDaemonUdpPort:                  ! Font host's port number


!  _____
! Auto-Connection Menu
!  _____
Visual*AutoConnectionMode:                 ! Disabled, XDMCP, XDSXDM,
                                           ! Telnet on Logout, Telnet on Reboot
Visual*AutoConnectionHostList:             ! Host ID's
Visual*XDMCPCalloutMode:                   ! Broadcast, Direct, Indirect
Visual*XDMCPHostSelectionMode:             ! First Willing, List Order Priority
Visual*XDMCPRetryAfterConnectFailure:      ! On, Off
Visual*XDMCPConnectTimeout:                ! Number of seconds
Visual*XDMCPCheckForDeadSession:           ! Yes, No
Visual*XDMCPSessionCheckInterval:          ! Number of minutes
Visual*XDMCPUdpPort:                       ! XDMCP port number
Visual*XDMXDMRequestTimeout:               ! Number of seconds
Visual*XDSXDMUdpPort:                      ! XDSXDM port number


!  _____
! Authorization Menu
!  _____
Visual*HostAuthorization:                  ! Disabled, Inactive, Active
Visual*AuthorizedHostList:                 ! Host ID's


!  _____
! Keyboard/Mouse Menu
!  _____
Visual*KeyClick:                           ! On, Off
Visual*AutoRepeat:                         ! Off, Slow, Normal, Fast
Visual*MouseAccelerationThreshold:         ! Number of pixels
Visual*MouseAcceleration:                  ! Multiplier
Visual*AudibleBell:                        ! On, Off
Visual*ModifierToAccessXdsSpecialKeys:     ! None, Shift, Ctrl
Visual*SwapCtrlAndCapsLockKeys:            ! Yes, No
Visual*SpecialKeyMapping:                  ! None, F11=ESC, F11=ESC/F12=BS/F13=LF
Visual*KeyboardLanguageMapping:            ! US, German, French, UK, Swedish/Finnish
Visual*SKeypadMode:                        ! Local Numlock, Numeric Unshifted,
                                           ! Numeric Shifted, Numeric Only
```

```
!  ───────────────────────────────
!  Connection Window Menu
!  ───────────────────────────────
Visual*ConnectionWindowFont:                        ! 9x15, 12x20, visual-iso8859-1
Visual*ConnectionWindowBackground:                  ! White, Black
Visual*ConnectionWindowWraparound:                  ! On, Off
Visual*ConnectionWindowReverseWraparound:           ! On, Off
Visual*ConnectionWindowAutoNewline:                 ! On, Off
Visual*ConnectionWindowCursesEmulation:             ! On, Off
Visual*ConnectionWindowTerminalEmulation:           ! xterm, ANSI, VT102, VT100, VT52, TTY
Visual*ConnectionWindowTelnetTerminalTypeResponse:      ! a string


!  ───────────────────────────────
!  X Server Features Menu
!  ───────────────────────────────
Visual*BackingStoreDefaultMode:             ! Disabled, When Requested, When Mapped
Visual*PreX11R4BugCompatibility:            ! Enabled, Disabled
Visual*OldDecWindowsCompatibility:          ! Enabled, Disabled
Visual*XProtocolErrorReporting:             ! Enabled, Disabled
Visual*VerboseMessages:                     ! Enabled, Disabled
Visual*Grayscale:                           ! Enabled, Disabled


!  ───────────────────────────────
!  Screen Saver Menu
!  ───────────────────────────────
Visual*EnableScreenSaver:                   ! Yes, No
Visual*ScreenSaverTimeout:                  ! Number of minutes
Visual*PreferredScreenSaver:                ! Blanking, X Logo


!  ───────────────────────────────
!  Remote Configuration Menu
!  ───────────────────────────────
Visual*BootServerUsing:                     ! ROM, TFTP
Visual*BootHostList:                        ! Host ID's
Visual*BootFilename:                        ! Path to boot file
Visual*NetworkFileTransferProtocol:         ! TFTP, NFS
Visual*AutoLoadConfiguration:               ! On, Off
Visual*RConfigurationHostList:              ! Host ID's
Visual*AutoLoadRgbDatabase:                 ! On, Off
Visual*RgbDatabaseList:                     ! Host ID's
Visual*AutoLoadKeyboardMap:                 ! On, Off
Visual*KeyboardMapList:                     ! Host ID's
```

Keyboard Map File Specification

The Keyboard Map download file has a format similar to the Remote Configuration file, consisting of one or more key assignment lines of the form:

```
Keycode = Keysymbol Keysymbol . . .
```

Blank lines are ignored, and an exclamation point (!) anywhere on a line signifies that the rest of the line is a comment. Case is not important anywhere except when it matters to a particular option value, such as a UNIX file name. A continuation to the next line is indicated by a backslash (\) in the last position on the line. Values within a line may be separated by either SPACE or TAB characters.

The first line in the file is a header, containing the following information:

- the number of keysymbols to be changed

- the maximum number of keysymbols to be assigned to any one keycode.

The following keymap file example changes function keys F5 through F8 to serve as a simple hexadecimal keypad. Use the standard X client xprkbd to display the current mapping of key codes to key symbols.

NOTICE: If your XDS is setup to use the standard US English keyboard, the XDS interprets both *Left Alt* (Alt_L) and *Right Alt* (Alt_R) keys as Xlib modifier *Mod1*. If you have configured another language keyboard, or if you have downloaded a keyboard map file, the XDS interprets *Left Alt* as *Mod1*, and *Right Alt* as *Mod2*.

```
! ─────────────────────────────────────────
! Sample Keyboard Map Download File.
!
! The 4 keysymbols for each keycode are:
! Unshifted, Shifted, Alt_Unshifted, & Alt_Shifted.
! ─────────────────────────────────────────

5 4                                      ! nkeys = 4, width = 4

11 = 0x0030 0x0034 0x0038 0x0043         ! map "F5" to "0", "4", "8", "C"
12 = 0x0031 0x0035 0x0039 0x0044         ! map "F6" to "1", "5", "9", "D"
13 = 0x0032 0x0036 0x0041 0x0045         ! map "F7" to "2", "6", "A", "E"
14 = 0x0033 0x0037 0x0042 0x0046         ! map "F8" to "3", "7", "B", "F"
94 = 0xff7e                              ! map "Alt-R" to "Mode-switch"
```

VISUAL
T E C H N O L O G Y

X DISPLAY STATION
RELEASE 3.0
BOOT ROM GUIDE

VISUAL
T E C H N O L O G Y

- A **PolyText** command with a string of more than 32 characters could display garbage when the font in use was paged. This has been corrected.

- The **Boot Host** and **Boot Filename** items in the **Remote Configuration** menu no longer display the string "NpN" when no host or no filename is specified.

- Loading two large bitmaps onto the root window when memory is low no longer crashes the server.

- Obscure out-of-memory conditions no longer crash the server.

Known Bugs in Release 3.0

The following minor bugs are known to exist Release 3.0:

- Downloading a 2.8 server image with a 3.0 boot ROM or full-server firmware module causes minor configuration problems. See the *X Display Station Release 3.0 Boot ROM Guide* for information.

- It is possible, though unlikely, that chaff from the cursor may be left in a window that uses a paged font.

- When XDS memory is extremely low, a **DestroyWindow** operation may fail to completely remove a window from the screen. This may result in portions of windows (and their clipping regions) left on the screen. Resetting the server by selecting **Close All Connections** in the XDS **System Window** cleans up the display.

- If XDS memory is extremely low, creating many non-rectangular shaped windows over an extended period of time may cause the XDS to hang.

XDS Release 3.0 Addendum

This document contains a correction to the *X Display Station Release 3.0 Update Guide*, as well as information on Release 2.8 bug corrections, and Release 3.0 outstanding bugs.

Remote Configuration Model Types

On page 18 of the *XDS Release 3.0 Update Guide*, the second paragraph under the heading "Remote Configuration File Specification" contains a list of MachineModel types for all XDS models. Please use the following MachineModel identifiers (in bold type) instead of those in the guide:

X14ES	X-14/ES
X15	X-15
X19	X-19 (1152 x 900 resolution)
X19ORIG	X-19 (1024 x 800 resolution)
X19TURBO	X-19 Turbo
XTC2	Color Xbase/10
XTC3	Color Xbase/11 & Xbase/12

Bugs Fixed for Release 3.0

The following Release 2.8 software bugs have been fixed for Release 3.0:

- Wildcard characters (*) in remote configuration files were not handled correctly, resulting in bogus error messages. Field separators (.) were required, as in these examples:

    ```
    Visual.*.Keyclick
    *.*.Keyclick
    ```

    For 3.0, the field separators are not required, as shown here:

    ```
    Visual*Keyclick
    *Keyclick
    ```

- X clients can no longer ring the bell when **Audible Bell** in the **Configure Keyboard/Mouse** menu is set to **Off**.

- TFTP errors during the boot process were not flushed. Consequently, the boot command seemed to fail silently, and an error message was displayed after the next successful command. This has been corrected.

Table of Contents

Introduction

The boot ROM is a firmware module that requires an X Display Station (XDS) to download an image of XDS software into RAM from a network host using the Trivial File Transfer Protocol (TFTP). This software image consists of the X server and fonts necessary for XDS operation. Downloading via the boot ROM allows you to install updated versions of XDS software on a single boot host, rather than installing a new, full-server firmware module on each XDS at your site.

Reading the Tape Cartridge Files

The XDS *tar* formatted boot tape you have received contains X-15, X-19, and X-19 Turbo server images, a README file, a sample remote configuration file, and a source code patch file for XDMCP enhancement.

To extract the entire contents of the tape, you must have 8 Mb of disk space available. If so, execute the following commands:

```
cd /tftpboot
mkdir Visual
cd Visual
tar xv
```

If your system uses a secure version of TFTP, then you should create a new sub-directory for the boot image in /*tftpboot*. Otherwise, you could use /*usr*/*lib*, or whatever directory you wish. *mkdir Visual* creates a new sub-directory *Visual, cd Visual* changes the current directory to *Visual,* and *tar xv* extracts the entire tape contents, puts all files into the current directory, and lists those files on the screen.

If you wish to extract an individual download image, change the above *tar* command to one of the following:

```
tar xv DOC X19
tar xv DOC X19ORIG
tar xv DOC X19TURBO
tar xv DOC X15
```

Each of the image directories requires about 2 Mb of disk space, and contains two server image files: for example, /X19/X19-3.0 and /X19/X19-3.0L. They differ in that the image ending in "L" has the local client feature, and the other version has no local client. (See "XDMCP Host Selection Mode" in the *X Display Station Release 3.0 Update Guide*.)

There are two X-19 image directories for different versions of the XDS model X-19. The original X-19 has a 1024 x 800 screen resolution, and a 9-pin video connector on the XDS base unit. The later X-19 has an 1152 x 900 screen resolution, and a 15-pin video connector on the XDS base unit. Note that *both* models have 9-pin video connectors on the monitor. The resolution is printed on the large label on the back of the monitor.

Setting Up Network Protocols

The XDS requires TFTP to download the X server image from the boot host. You should be sure that your system supports TFTP before attempting to use the boot ROM. If you are uncertain whether or not TFTP is running on your system, refer to the section "Verifying and Starting TFTP" in this guide.

Modifying the BOOTP Database

If you wish to use BOOTP to configure your XDS, you must add XDS information to the host BOOTP database file, usually /etc/.bootptab.

First, add a subnet entry for each XDS model on the network. An entry for a model X-15 would look like the following example:

```
subnet.X15:\
            :sm=255.255.0.0:\
            :ht=ethernet:\
            :ds=128.0.0.1:\
            :ns=128.0.0.1:\
            :hd=/tftpboot/Visual/X15:\
            :bf=X15-3.0
```

The "\" is simply a line continuation character added for clarity — you could eliminate "\" and type all of the above as one line of input. The above subnet entry parameters are:

- **sm** – the subnet mask
- **ht** – the hardware type
- **ds** – the IP address of the domain nameserver host
- **ns** – the IP address of the IEN-116 nameserver host
- **hd** – the home directory of the XDS boot image file
- **bf** – the name of the boot image file.

You can now add a bootp entry for each individual X-15 terminal on the network. This must follow the subnet entry in the *bootptab* file:

```
xds1:  tc=subnet.X15:ha=00002210019c:ip=128.0.4.202:
```

where "xds1" is any name for your XDS. The above parameters are:

- **tc** – refers to the model X-15 subnet entry
- **ha** – the hardware address of the individual XDS
- **ip** – the IP address of the individual XDS.

Modifying the RARP Database

If you are using RARP to configure your XDS, you must update the RARP database file, which is usually /etc/ethers. This entry is a machine hardware address followed by an ASCII name, or alias. For example, the above X-15 entry might be

```
0:0:22:10:1:9c    nickname
```

where *nickname* is whatever name you assign to the individual XDS.

NOTICE: The RARP daemon requires that each byte of the hardware address has no leading zero.

Once you have updated the BOOTP or RARP database file, you may want to add an individual XDS entry to the /etc/hosts file. This would allow you to refer to the XDS by an alias name rather than its IP address. The required format is the machine IP address followed by whatever aliases you wish to use:

```
128.0.4.202 xds1 nickname
```

Initial Boot ROM Configuration

The first time you power up your XDS with the boot ROM module, it performs a series of self-tests, displays a logo, and the messages "Testing Video Memory" and "Testing Dynamic Memory". It then shows a message similar to this:

```
Selftest passed: (4096K+0K) 4096K Bytes dynamic memory.
Video Ram - 512K Bytes.
68020 ROM version 3.0 - Nov 6, 1990
Load error: not configured
```

The two first lines tell you the XDS is working, show the total RAM installed, and the amount of video RAM . (The figures in parentheses "(4096K+0K)" are used for internal diagnostic purposes only.) The next line tells you the release date and version number of the boot ROM. "Load error: not configured" only means that you have not yet entered any configuration data into XDS non-volatile memory.

```
Language Codes: 0=US, 1=German, 2=French, 3=UK, 4=Swedish/Finnish
Keyboard Language [0]:
```

This sets the keyboard language: Since further setup items may be affected by the keyboard language mapping, set this value first. Press **<Enter>** to accept the default "0" for US English, or type in the number corresponding to your keyboard, followed by **<Enter>**.

NOTICE: If your XDS has the VT220 keyboard, you may *only* select US English.

```
Configure Ethernet
Thick AUI or Thin BNC [thick]:
```

This item sets the Ethernet cable interface. Press **<Enter>** to accept thick wire, or type "thin" and **<Enter>** to set the XDS for thin wire.

```
IP address [0.0.0.0]:
```

This is the IP address of the XDS. If you wish to use BOOTP or RARP allowing the XDS to automatically determine its IP address, press **<Enter>** to accept the default zero value. If you are not using the BOOTP/RARP facility, you must enter a valid IP address.

```
Boot host 1 [BOOTPHOST]:
Boot host 2 []: 128.0.0.40
Boot host 3 []: rocket
Boot filename []: /tftpboot/Visual/X19TURBO/X19TURBO-3.0
```

NOTICE: "BOOTPHOST" is a special XDS keyword. If you choose to boot using BOOTP or RARP, then wherever in the XDS setup menus the keyword "BOOTPHOST" appears, the XDS substitutes the IP address of the first host responding to BOOTP or RARP.

This item allows you to specify the location of the XDS software image file on your network. If you accept the default keyword "BOOTPHOST" the XDS attempts to obtain this information using BOOTP or RARP. You may enter up to 3 boot hosts. If BOOTP/RARP fails, the XDS prompts you for this information again at boot time. If you choose not to use BOOTP or RARP, you should change "BOOTPHOST" to a specific host IP address. **Boot host 2, Boot host 3,** and **Boot filename** have no default values.

NOTICE: You can refer to a boot host by name rather than IP address only if you have specified a host as a Domain nameserver or IEN116 nameserver. (See "Full Boot ROM Configuration" below.)

After you have entered these initial setup values, the XDS displays this message, followed by the boot ROM command menu (described below):

```
Standalone configuration saved
Ethernet address is 00:00:22:10:01:9c, Thin BNC selected
```

Auto-Booting

Once you have configured the XDS, an auto-boot sequence occurs at power-up. The boot ROM displays a message similar to the following:

```
Selftest passed: (4096K+0K) 4096K Bytes dynamic memory.
Video Ram - 512K Bytes.
68020 ROM version 1.0 - Feb.20, 1990
Ethernet address is 00:00:22:10:01:9c, Thin BNC selected

Press ENTER within 10 seconds to prevent auto-boot
```

If you do not press **<Enter>** within 10 seconds, the XDS initiates the auto-boot procedure. If you press **<Enter>**, the XDS displays the boot ROM command menu.

The Boot ROM Command Menu

This is the boot ROM command menu:

```
Commands:
        boot [host file]                    serial [baudrate]
        ping host [timeout [count]]         telnet [host [port]]
        netstats [s|i|r]                    config [full]
        diagnostics                         reset [factory]
        romboot
   >
```

To select a command, type the name and **<Enter>**, or type the name, **<Space>**, and any optional arguments followed by **<Enter>**. If the command has two or more arguments, separate them with a **<Space>**. You may also select a command by typing a minimum identifiable character string, as in the following examples:

```
boot 128.0.0.40 /tftpboot/Visual/X19TURBO/X19TURBO-3.0
b 128.0.0.40 /tftpboot/Visual/X19TURBO/X19TURBO-3.0

reset factory
re

romboot
ro
```

boot [host file]

Use this command to boot the XDS, and also to specify the host and path of the software image file. If you have already configured the boot host and path, the **host** and **file** arguments are optional.

ping host [timeout [count]]

If you cannot establish a host connection, you can send a ping (Packet InterNet Groper) packet to that host to find out if it is responding. The **host** you wish to ping is a required argument. The default **timeout** is 5 seconds. **Count**, the number of times you wish to send a ping packet, has a default of one.

netstats [s | i | r]

This command causes the XDS to display sets of network statistics. The option flags notify the XDS to show the following information:

   s – display protocol statistics
   i – display InterNet statistics
   r – display network data tables

no option flag displays all of the above plus connection data.

diagnostics

This command invokes the boot ROM diagnostics menu. These functions are described in "The Boot ROM Diagnostics Menu" below.

romboot

The XDS with a full-server firmware module can either download a host server image file, or use the X server in firmware. If your XDS has full-server firmware, use **romboot** to boot using the firmware X server. (See "Accessing Diagnostics with Full-Server Firmware" below.)

NOTICE:

If your XDS has boot ROM firmware, this command is the same as **reset** *without* the *factory* option.

---

serial [baudrate]

This enables you to initiate (or resume) a VT100-emulator session on the XDS serial port at the specified **baudrate.** Without the **baudrate** option, the XDS uses the default **9600**, or whatever baudrate you have configured. To suspend a terminal session on the serial port, press **<Connect>** on a VT220-compatible keyboard, or **<SysRq>** on a PC/AT-compatible keyboard.

telnet [host [port]]

This command initiates (or resumes) a VT100-emulator TELNET session to the specified host and (optional) host **port.** You *must* specify a **host** when first starting a TELNET session — when you resume a suspended session, the **host** argument is optional. (See "TELNET Escape Sequences" below.)

config [full]

This command allows you to configure your XDS. *Without* the **full** option, the XDS prompts you for the same information described in the "Initial Boot ROM Configuration" section, above: keyboard language, Ethernet interface, IP address, boot host, and boot filename. If you select **full**, you can specify more detailed information, described in the "Full Boot ROM Configuration" section below.

reset [factory]

This command restarts the terminal. With the **factory** option, **reset** erases all configuration data stored in static (non-volatile) memory, and restores the XDS to its original factory settings.

TELNET Escape Sequences

While you're in a TELNET session, you can use the following escape sequences. (Press **<Break>** and one of the following characters to perform an escape sequence.)

To see the list of commands, press **<Break>** plus any key *not* listed below. The XDS shows you the list of commands.

a	checks if the host is responding, and if yes, displays a message
b	sends a break to the remote TELNET
f	flushes any output
h	erases a character
q	closes the TELNET connection
s	displays TELNET and TCP statistics
x	aborts by resetting the TELNET connection
z	suspends TELNET and displays the boot ROM commands.

Pressing **<Connect>** or **<SysRq>** suspends the TELNET session and displays the boot ROM command menu. To resume a suspended session, type **telnet** (or **t**) and press **<Enter>**.

The Boot ROM Diagnostics Menu

This is the boot ROM diagnostics menu:

```
Commands:
        comprehensive          burn-in [dvt]
        memtest [start end]    sramtest [check]
        ethertest [count]      serialtest
        clocktest              keybdtest
        mousetest              align [hv]
        config                 netstats
        graytest               bootmenu
>
```

As with the boot ROM commands, select a command by typing the name followed by **<Enter>**, or the name and any optional arguments separated by **<Space>** characters, followed by **<Enter>**. You may also select a command by entering a minimum identifiable character string.

NOTICE: Some of the tests require special loopback connectors on the back of the XDS base unit. These are described under "Loopback Connectors" below.

comprehensive

This performs **memtest, sramtest, clocktest, keybdtest, serialtest,** and **ethertest** in succession, one time each. These tests are described below.

You must install *all* loopback connectors for this series of tests (but only **one** Ethernet loopback connector — see **ethertest** below).

NOTICE: The **comprehensive** test erases all user-specified configuration settings.

memtest [start end]

This tests the XDS volatile (dynamic) RAM. Two tests are performed for each loop: (1) a march test, which writes and reads back a unique value for each address, and (2) a stress test, which writes and reads back known patterns. Press any key to quit the test. **Start** and **end** specify an optional address range.

ethertest [count]

Performs an Ethernet loopback test as many times as requested by the optional **count**. The default **count** is one.

This test requires one loopback connector on either the *thick* or *thin* Ethernet port, depending on how you have configured Ethernet.

clocktest

This verifies that 100 clock ticks occur within a fixed time period. The acceptable error range is ± 4%.

mousetest

This verifies that the mouse is communicating correctly with the the XDS. The characters "< > ^ v " shown on the screen indicate the direction of mouse movement, and "o" indicates which mouse button is down. Press any key to terminate the mouse test.

config

This allows you to configure your XDS for keyboard language, Ethernet interface, IP address, boot host, and boot filename. This is the same as **config** (without the **full** option) in the boot ROM command menu.

graytest

For grayscale models only, this displays 4 test patterns on the screen in succession. Press **<Enter>** to go to the next pattern, and to return to the diagnostics menu.

burn-in [dvt]

This performs **memtest, sramtest, clocktest, keybdtest, serialtest,** and **ethertest** in succession, continuously, until you power off the XDS. With the **dvt** option, **burn-in** runs a series of 4 screen alignment test patterns concurrently with the above tests.

You must install *all* loopback connectors for this series of tests (but only *one* Ethernet loopback connector).

NOTICE: The **burn-in** test erases all user-specified configuration settings.

sramtest [check]

This tests the XDS non-volatile (static) RAM. Two tests are performed for each loop: (1) a march test, which writes and reads back a unique value for each address, and (2) a stress test, which writes and reads back known patterns. Press any key to quit the test.

NOTICE: The **sramtest** test erases all user-specified configuration settings. Do not use the **check** option, which is for internal manufacturing tests only.

serialtest

This tests the integrity of the asynchronous and mouse serial ports. This test requires both asynchronous and mouse loopback connectors.

keybdtest

This tests keyboard integrity. During the interactive portion of the test, the XDS prompts you to press each key once. This verifies which keys are pressed and how often, and reports multiple presses of individual keys.

align [hv]

This displays 4 screen alignment test patterns in succession. Press **<Enter>** to go to the next pattern, and to return to the diagnostics menu. Pressing the **<Space>** bar at any time inverts the current pattern.

The **hv** option causes the XDS to display a white border around a solid black screen. With **hv** selected, **<Space>** results in a black border around the edge of a solid white screen. You can use the **hv** patterns to check the monitor for high voltage as well as screen alignment.

netstats

This gives you the same network statistics as **netstats** (with no option) from the boot ROM command menu.

bootmenu

This selection brings you back to the boot ROM command menu.

Loopback Connectors

You need four special loopback connectors to run all of the above tests. The **mouse** loopback is a 9-pin, female D-sub connector with the following pins wired together: (2 & 3 & 6).
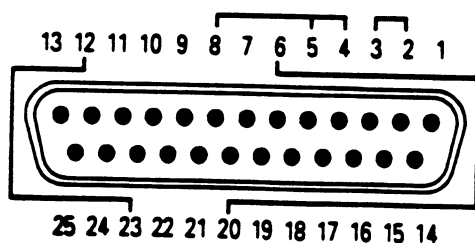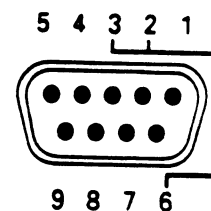
The **asynchronous serial port** loopback is a 25-pin, female D-sub connector with the following pins wired together: (2 & 3), (4 & 5 & 8), (6 & 20), (12 & 23).

The **Ethernet thickwire** AUI loopback is a 15-pin, male D-sub connector with the following pins wired together: (3 & 5), (6 & 9), (10 & 12).

The **Ethernet thinwire** BNC loopback is a T-shaped, male connector with a terminator and ground lead on each end that would normally connect to the network cable.
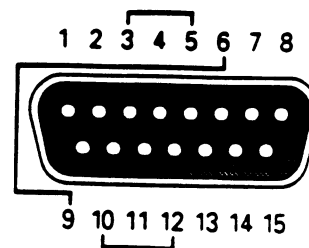
Accessing Diagnostics with Full-Server Firmware

If your XDS has a full-server firmware module instead of a boot ROM module, you can still access the boot ROM command and diagnostic menus by performing these steps:

1.   Log out of your current session — you will have to reboot the XDS, and cannot resume.

2.   Press **<Connect>** on the VT220 keyboard to bring up the **Connection Window**. On the PC/AT keyboard,press **<SysRq>** to bring up the XDS System Window, and then select the **Connection Window**.

3.   Type "STANDALONE" in upper case, as shown below:

```
Enter serial [baudrate]   ping host [timeout]
      telnet host [port]   netstats [s i r]
       : STANDALONE
```

4.   Respond by typing "yes" (or "y") and **<Enter>** to this prompt:

```
Enter standalone diagnostics: are you sure? yes
```

5.   The screen goes black, and the XDS displays the following message. Press **<Enter>** immediately to bring up the boot ROM commands.

```
Press ENTER within 10 seconds to prevent auto-boot
```

You can now choose any boot ROM command, or any test if you go to the **diagnostics** menu. Select **romboot** to start up your XDS using the full-server firmware.

Full Boot ROM Configuration

If you select **config** with the **full** option from the boot ROM command menu, the XDS prompts you to supply the following information. Default values, enclosed in square brackets, apply if you press **<Enter>** only.

```
Language Codes: 0=US, 1=German, 2=French, 3=UK, 4=Swedish/Finnish
Keyboard Language [0]:


        LANCE network
Enabled [y]:
Thick AUI or Thin BNC [thick]:
IP address [0.0.0.0]:
Network mask [0.0.0.0]:
Broadcast address [0.0.0.0]:
```

See "The Configure Ethernet Menu" in the *X Display Station User's Guide* for information on LANCE network settings.

```
        SLIP network
Enabled [n]:
IP address [0.0.0.0]:
Network mask [0.0.0.0]:
Broadcast address [0.0.0.0]:
```

See "The Configure Serial Line Network Menu" in the *X Display Station User's Guide* for information on SLIP settings.

```
        Globals
Default router [0.0.0.0]:
Nameserver request timeout [10]:
Default domain name []:
Domain nameserver 1 [0.0.0.0]:
IEN116 nameserver 1 [0.0.0.0]:
Boot host 1 [BOOTPHOST]:
Boot host 2 []:
Boot filename []:
```

See "The Configure Network Services Menu" in the *X Display Station User's Guide* for information on the above global settings.

```
        Serial Port
Baud rate [9600]:
Data bits (7 or 8) [8]:
Parity [none]:
Check receive parity [no]:
Stop bits (1 or 2) [1]:
Xon/Xoff Flow Control [yes]:
RTS/CTS Flow Control [no]:
Modem Control [yes]:
RS422 select [no]:
```

See "The Configure Serial Port Menu" in the *X Display Station User's Guide* for information on serial port settings.

```
        General
Set new password? [no]:
New password []:
Retype password []:
```

When selected, a password prevents unauthorized access to the **config**, **diagnostics**, and **reset factory** commands from the boot ROM command menu. It also prevents unauthorized access to the standard XDS setup menus. You can clear an existing password by typing <Enter> *only* in response to the **Set new password** and **Retype password** prompts.

Downloading XDS Release 2.8 to a 3.0 Boot ROM

If you have a Release 3.0 Boot ROM module, you can still a download an XDS Release 2.8 server image. When you setup the boot file, simply specify the pathname of the XDS 2.8 server image instead of the XDS 3.0 server image. You must, however, manually specify the 2.8 boot file every

time you reboot the XDS. This is due to a boot command syntax change in the 3.0 boot ROM.

When you reboot the XDS after downloading an XDS 2.8 server image, press **<Enter>** to stop the auto-boot sequence. If you select **config** to check the boot file, you see something like the following. Note that the boot host entry incorrectly includes the boot file path:

```
Boot host 1 [128.0.0.40 /usr/lib/xdslib/X15-2.8]
```

You can simply specify the 2.8 boot file using the **boot** command, although you must do this whenever you reboot.

```
> b 128.0.0.40 /usr/lib/xdslib/X15-2.8
```

If you boot an XDS 3.0 server, however this problem goes away, and you can auto-boot the XDS as usual.

Verifying and Starting TFTP

On systems running BSD UNIX, you can use the following examples find out whether TFTP is running on your system. The command syntax is slightly different for System V UNIX — see your system administrator for assistance.

Since the most common way TFTP runs is through the *inetd* daemon, you can execute the following command to determine the set of *inetd* processes:

```
ps aux | grep inetd
```

If this command locates an *inetd* other than that used to execute *grep*, then the *inetd* daemon is running on your system. You should now check the *inetd* configuration file to verify (1) that the line used to start TFTP is not commented out, and (2) that the TFTP command does not contain the -s option. The *inetd* configuration file on most systems is /etc/inetd.conf. On some older systems is /etc/servers.

In /etc/inetd.conf the TFTP command should look something like this:

```
tftp dgram udp wait root /usr/etc/in.tftpd in.tftpd
```

In /etc/servers the TFTP command should look something like:

```
tftp udp /usr/etc/in.tftpd
```

In either case, make sure that the TFTP line is not commented out, and that there is no -s option. If you should have to change the configuration file and *inetd* is already running on your system, send a "hangup" signal to the *inetd* process to force it to reread the configuration file. To do this, first determine the process ID of *inetd* by executing

```
ps aux | grep inetd
```

The process ID is the number in the second column from the left. Use this number to send the "hangup" signal as follows:

```
kill -HUP <process ID>
```

The *inetd* process is not actually killed, but rereads the configuration file and starts TFTP in the proper manner.

If *ps l grep* does not locate *inetd,* then your system may be running TFTP directly, rather than through *inetd.* Use the *ps l grep* commands to check for TFTP instead of *inetd:*

```
ps aux | grep tftpd
```

If the above steps fail to locate *inetd,* see your system manager about starting up *inetd* and adding it to your /etc/rc system boot file. If your system does not support *inetd,* then you may start TFTP directly by entering the following path and command:

```
/etc/tftpd
```

Booting Your XDS Using SLIP

You can easily boot your XDS using SLIP (Serial Line Internet Protocol) as well as Ethernet, provided your XDS has a valid SLIP IP address:

1.   Enter the relevant SLIP information into your XDS using the **config** command with the **full** option. (See "Full Boot ROM Configuration" above.) You can leave the network mask and broadcast address set to zero.

2.   Select **boot** from the command menu. When you are prompted for the boot host, be sure you give its SLIP address (which is *not* the same as its Ethernet IP address).

3.   Press **<Enter>** and the XDS should boot. Please note that you can- not use BOOTP and RARP when booting the XDS over SLIP.

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