Network Computing Devices, Inc.

Serial Xpress (SXp) User Manual

Version 3.2

May 1999

Printed in USA

Network Computing Devices, Inc.
350 North Bernardo Avenue
Mountain View, CA 94043 USA

1-800-800-9599 (USA and Canada)
1-503-641-2200

http://www.ncd.com

Manual Revision Status

Serial Xpress

Rev Date	Description
JUL 1992	Original Issue. This release supports the TekXpress Version 2.1 *Utility* tape, and the XP10 Version 2.0 *Quick Install* tape.
MAY 1993	This release supports the TekXpress Version 6.1 *Quick Install* and *Utility* tapes. Part number rolled to 070-8618-01.
JULY 1993	This manual supports TekXpress Version 6.2. Part number rolled to 070-8618-02.
OCT 1993	This manual supports TekXpress Version 6.3. Part number rolled to 070-8618-03.
JUL 1994	This manual supports TekXpress Version 7.0. Part number rolled to 070-8618-04.
JAN 1995	This manual supports XpressWare 8.0. Part number rolled to 070-8618-05.
APRIL 1996	This manual supports XpressWare 8.1. Part number rolled to 070-8618-06.
JULY 1997	This manual supports NCBridge Version 3.0. Part number 070-8618-06 supports this version of software.
MAY 1999	Documentation revised to include features of NCBridge 3.2.

Revision Status

Contents

Contents

Contents

Preface

This manual presents reference information for the network computers. This manual is written for system administrators and network administrators responsible for installing and administering one or more network computers in a distributed-computing environment.

Assumptions

The procedures in this manual assume:

- You understand your operating system and are familiar with the administration of the intended host computer.
- You are familiar with network protocols and understand the concepts related to local-area networks (LAN).
- You are familiar with the X environment, including window managers and display managers.

Conventions

Figure 1 illustrates the typographical conventions used in this manual.

The following terminology is used to describe mouse operations.

Pointing: use the mouse to position the pointer on an object on the display

Moving: use the mouse to change the location of the pointer on the display

Clicking: press and release a mouse button without moving the pointer

Dragging: press and hold down a mouse button while moving the pointer

Releasing: release the mouse button to complete a *dragging* action

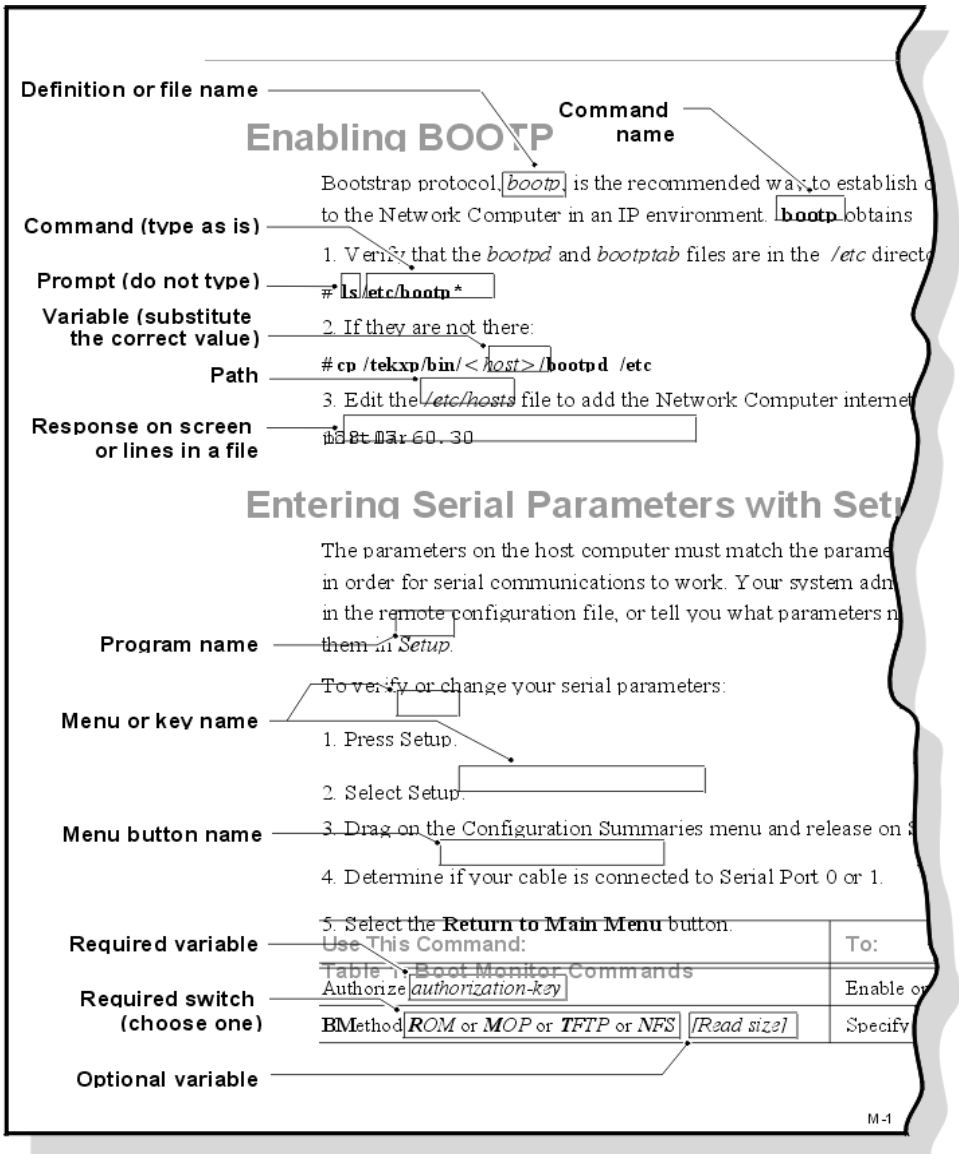

Figure 1 Typographical Conventions.

Related Documentation

The following manuals are available in hard copy:

- *Network Computer Installation for UNIX Environments* — 9300845
  Network Computer Installation for VMS — 9300846
  Network Computer Installation for Windows NT — 9300847

  Explains how to install and configure network computers on a specific host.

The following manuals are available on *CD-ROM:*

- *Network Computer User*

  Provides operating information for the novice user.

- *Network Computer Reference*

  Provides reference information about the network computer.

- *3270/3179G User*

  Provides operating information for the 3270/3179G terminal emulators.

- *3270E/5250 User*

  Provides operating information for the 3270E/5250 terminal emulators.

The following document is available in local bookstores:

- *X Window System User's Guide* — O'Reilly & Associates, Inc.

  Presents window system concepts and includes tutorials for many client programs.

The following documentation from your computer manufacturer would be helpful to look up additional options, subnet masking, and broadcast addresses:

- System Administrator's Manual
- Network Administrator's Manual

Preface

Chapter **1**

Introduction to Serial Xpress

Serial Xpress enables a network computer to connect to a remote host and transmit data over an RS-232 serial connection. The network computer can be connected directly to the host using an RS-232 cable, or indirectly over a phone line using modems. Serial Xpress is a more efficient protocol than SLIP (Serial Line Internet Protocol) and is easier to use.

Serial Xpress consists of two parts: *sxprocess*, a proxy X server that runs on the remote host computer, and *sxptask*, a local process that runs in the network computer.

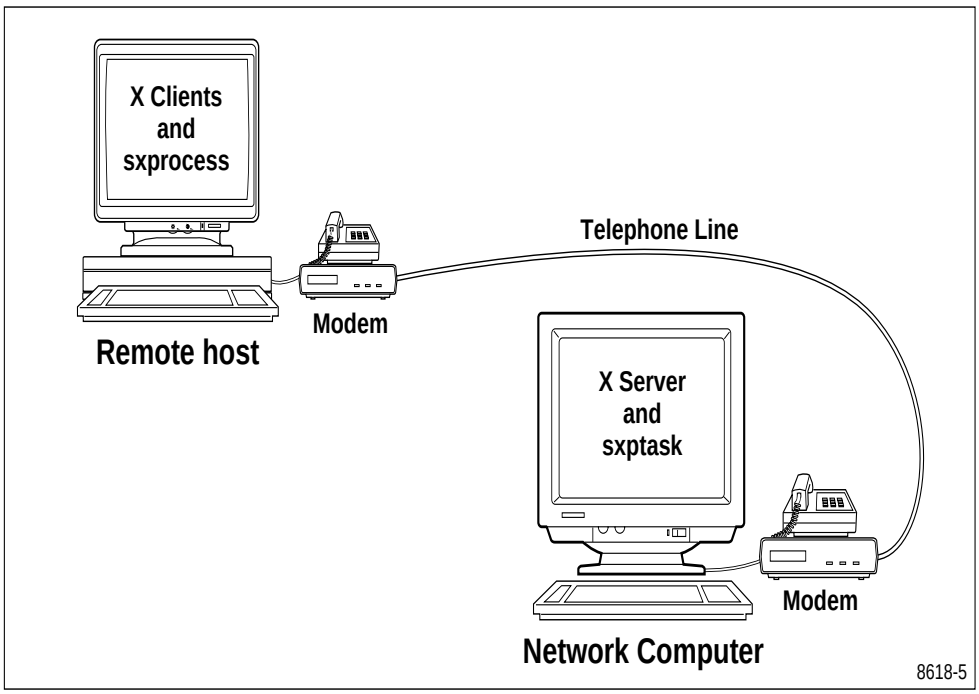

Figure 1-1. Serial Xpress Overview.

Serial Xpress does not require any UNIX kernel configuration. To use Serial Xpress, you first create a Serial Xpress configuration file to define the default Serial Xpress settings (a sample configuration file is provided on the media). You then create a session script to set environment variables, start a window manager, and download fonts (a sample session script is provided on the media). Once the configuration and session files are created, host-based files are configured for use with Serial Xpress (depending on your type of host). In these files you specify the port(s) you are using and the device connected, for example, a modem or network computer. The ports on the network computer are also set to match the host. When the host and network computer are configured, connect them using either an RS232 serial line or modems and the appropriate cables.

Once Serial Xpress is started, the proxy X server accepts X protocol requests generated by clients whose DISPLAY variable specifies the proxy X server. Clients are started automatically when users login.

Serial Xpress can run simultaneously with a network session, accessing files and running applications from the Serial Xpress connection only. Serial Xpress can also access files and applications from an alternate path over a network session. Other clients using the local area network can simultaneously connect to the network computer's X server while the Serial Xpress proxy X server is communicating with the network computer's X server. Refer to Figure 1-2.

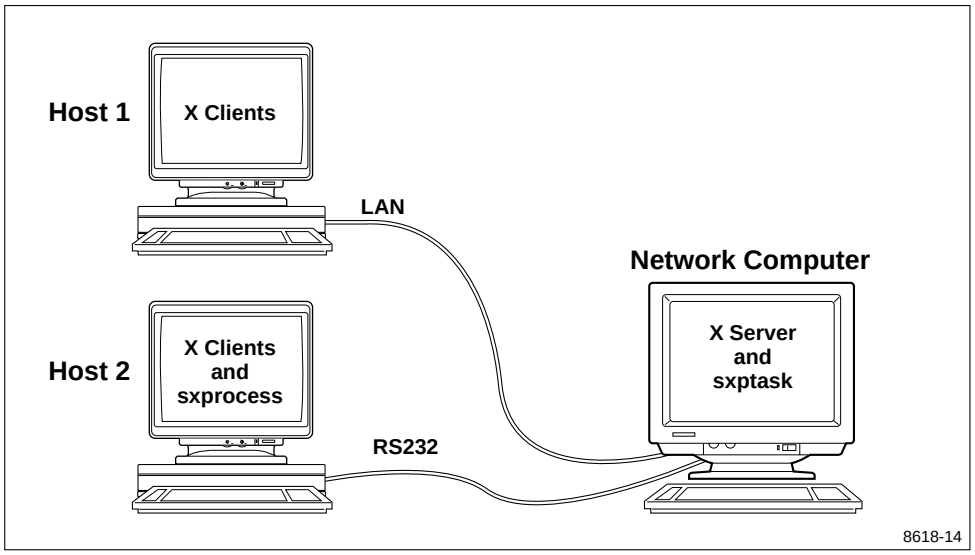

Figure 1-2. LAN and Serial Line Access with Serial Xpress.

Manual Contents

- For instructions on configuring and using Serial Xpress on your type of host, refer to the appropriate chapter:

Table 1-1. Host-Specific Instructions.

Host Type	Chapter
Sun	2
ULTRIX and OSF	3
VMS	4
IBM	5
Hewlett-Packard	6
Silicon Graphics	7

NOTE: For Generic UNIX hosts and MIPS ABI, refer to Chapter 2. The instructions for Sun hosts apply to most Generic UNIX hosts and to MIPS ABI.

Chapter 8, Troubleshooting contains troubleshooting information that may by used when starting and using Serial Xpress.

Appendix A contains an ASCII code chart used when escaping characters for use with Serial Xpress.

Appendix B, Command Line Interface contains information about available commands to use with Serial Xpress on the command line.

Appendix C, Recommended Cable Wiring contains information about wiring your own cables for use with Serial Xpress.

Chapter **2**

Configuring Serial Xpress - Sun

Serial Xpress provides a proxy X server program that runs on the host computer, called **sxprocess**. The **sxprocess** program reads a configuration file, executes a shell script that defines the current session, and closes the Serial Session window. **Sxprocess** is provided on the media and is located in the */tekxp/bin/<os>* directory by default (where <*os*> is sun4 or solaris_i86).

NOTE: If using MIPS ABI, its binary is located in /tekxp/bin/mipsabi.

Creating the Serial Xpress Configuration File

The **sxprocess** configuration file, *.sxprocessrc*, is structured like an X resource database file *(*for example, *.Xdefaults*) and is used to obtain default Serial Xpress configuration settings. A sample *sxprocess* configuration file is provided on the media and is located in the */tekxp/bin/<os>/sxpconfig* directory (where <*os*> is sun4 or solaris_i86). This sample file is named *sxprocessrc*. The following example shows the parameters that can be set and example settings.

Example 2-1 Sample sxprocessrc Configuration File.

```
*escapeChars:          0x0a 0x0d 0x11 0x13 0x7f 0x93 0xff 0x1d 0x9d
*xTransportProtocols: tcpip local
*tmpDir:              /tmp
*display:             1
*sessionScriptName:   .serialSession
*defaultSession:      xterm -geometry +1+1 -n login
```

1. Use the *sxprocessrc* file as a template by copying it to your *$HOME* directory and renaming it *.sxprocessrc*.
2. Edit the file as necessary, uncommenting those parameters you want to set. The following parameters can be set:

- ***escapeChars** specifies characters that cannot be passed across the serial line. The default list of escaped characters includes the carriage return, linefeed, xon, xoff, rubout, 8-bit xoff, 8-bit rubout, and control right bracket (]). These characters are escaped by default because many computer systems treat them specially and may alter their transmission.

(Escaped characters are xor'd with 0x20 and prefixed by an 0x7d when transmitted.) For best performance, do not escape more characters than are necessary. The **loopback** command can help determine which characters need to be escaped for your host.
For information about determining which characters to escape and how to escape them, refer to the **loopback** and **echars** commands in Appendix B, *Command Line Interface*.

- ***xTransportProtocols** specifies the types of X connection sockets that will be used by **sxprocess**. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY environment variable. For example, if the local protocol is last (the default), the display environment variable will have the "unix:n" format. If TCPIP appears last, the "hostname:n" format will be used.
- ***tmpDir** specifies the directory where message files and UNIX type sockets are placed. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME environment variable, then */tmp* is used.
- ***display1** specifies which display number to begin with when setting up X connection sockets by searching through the available display number, starting with display one. This default starting number can be changed by setting the display resource. For more information about setting a display variable, refer to the **:n** command in Appendix B, *Command Line Interface.*
- ***SessionScriptName** specifies a session script that **sxprocess** executes. A session script is a shell script that starts the X clients that you specify and is located in the user's *$HOME* directory. By default, **sxprocess** first looks for the SessionScriptName you specify in this configuration file. If one is not specified or cannot be found, it then looks for *.xsession*. If neither file is found, it then looks for *.xinitrc*.
- ***defaultSession** specifies a command string to execute if a session script is not found in the user's *$HOME* directory. The default session command is **xterm -geometry +1+1 -n login** but the defaultSession resource can be used to change it. It is important that any X client specified in the defaultSession must be in one of the directories found in the user's PATH environment variable.

These parameters can also be set in a command line interface when starting **sxprocess**. Command line entries override entries in the *sxprocess* configuration file. For information about entering commands, refer to Appendix B, *Command Line Interface*.

Creating the Session Script

If you have entered a session script name in the *.sxprocessrc* file, create the script using the name you specified. (Be sure the file has read and execute permissions.) If you create a session script, Serial Xpress will ignore the *.xsession* and *.xinitrc* files by default.

The session script can be used to set environment variables, start a window manager, download fonts, and open an xterm window. A sample session script is provided on the media and is located in */tekxp/bin/<os>/sxpconfig* (where *<os>* is sun4 or solaris_i86). This sample script is named *serialSession* and looks something like the file in Example 2-2:

NOTE: This script assumes that /tekxp/bin/<os> has been added to your PATH environment variable (for example, in your .profile or .cshrc file).

Example 2-2 Sample Session Script.

```
#! /bin/sh
# NOTE: This script assumes that the NCD supplied fonts and
# binaries have been installed from the installation media. If you
# installed these files somewhere other than in the default
# directory location, you should modify the following line:

XPDIR=/tekxp/boot
#
# The following lines set the OPENWINHOME, PATH, and LD_LIBRARY_PATH
# environment variables if they are not already configured. They can
# be removed if they are configured in .cshrc, .login, or some other
# initialization file. These environment variables must be set in
# order to run X clients.
#
if test -z “OPENWINHOME”
then
       OPENWINHOME=”/usr/openwin”
       export OPENWINHOME
fi
PATHSTRING=’echo “$PATH” | grep “${OPENWINHOME}/bin”’
if test -z “$PATHSTRING”
then
       PATH=“${PATH}:${OPENWINHOME}/bin”
       export PATH
fi
LIBSTRING=’echo “$LD_LIBRARY_PATH” | grep “${OPENWINHOME}/lib”’
if test -z “$LIBSTRING”
then
       LD_LIBRARY_PATH=”${LD_LIBRARY_PATH}:${OPENWINHOME}/lib”
       export LD_LIBRARY_PATH
fi
#
# The following lines set the network computer’s font paths, start
# a local window manager on the network computer, and start an xterm
# client. The xterm functions as a session control window, when it
# exits, the session ends.
# Setting font paths can take considerable time.
# Uncomment these lines only if necessary.
#
# if test -d “${XPDIR}/fonts”
# then
#      xset +fp “${XPDIR}/fonts/100dpi,${XPDIR}/fonts/misc”
# fi
xpsh mwm &
xterm -geometry +1+1 -name “Serial Session” -title “Serial Session”
```

In this sample file, the variables OPENWINHOME, PATH, and LD_LIBRARY_PATH are set, font paths are set using **xset**, local Motif Window Manager is started, and an xterm window is opened. The environment variables may already be set in your *.login* or *.cshrc* files, or in some other initialization file. However, also including the variables in this file is fine. The script also assumes that the NCD-supplied fonts and binaries have been installed from the media.

1. Use the *serialSession* file as a template by copying it to your *$HOME* directory and naming it *.serialSession*.
2. Edit the file as needed.

NOTE: Serial Xpress requires that the last client in this file be in the foreground so that when the client closes, the session script exits, causing the session to end. Therefore, do not place an ampersand (&) after the last client.

Configuring the Host (for SunOS)

This section provides steps for configuring the Sun host running SunOS for use with Serial Xpress. The steps include:

- Change the serial port jumpers on the main logic board to RS-232 mode (if necessary)
- Configure the host's tty ports as terminal login ports (in the *ttytab* file)
- Configure the serial ports to match the modem settings (in the *gettytab* file)

Set Ports for RS-232 Mode

Serial Xpress requires that the serial port jumpers be in RS-232 mode. If your host is set for RS-423 mode (the factory default), change the serial port jumpers on the main login board to RS-232 mode. This involves powering down the host and moving the position of the jumpers from RS-423 to RS-232. Refer to your *Sun Installation Guide* for complete directions.

Configure Ports For Use With Serial Xpress

On the host, edit the *ttytab* and *gettytab* files located in the */etc* directory. The *ttytab* file is read by the **init** process and specifies which serial ports will have a login process created for them. The *gettytab* file displays the values that the Sun host recognizes for different baud rates and performs such tasks as setting the baud rate and reading the login name.

NOTE: Superuser privileges are required to edit the ttytab and gettytab files.

1. In */etc/ttytab*, edit the file to configure the port you are using, either ttya or ttyb. The fields in this file are:

   name specifies the name of the device.

   getty specifies the program that the **init** process should run. Replace the std. entry with **sxp**. to specify Serial Xpress.

   type specifies the termcap designed for the network computer attached to the port. For use with a network computer, enter **vt220** as the type. To see a list of available types of network computers for your system, look in the */usr/share/lib/termcap* file.

   status specifies On or Off. If On, **init** creates a log in process. If Off, **init** ignores the line and a log in is not be allowed.

   comments specifies any comments for that line. If the comment is secure, users will be able to log on the network computer as root.

   The following example shows *ttyb* configured at 19200 baud for a network computer using Serial Xpress:

Example 2-3 Sample ttytab File.

```
#
# @(#)ttytab 1.6 93/12/18
#
#name   getty                     type     status     comments
#
console “usr/etc/getty std.9600”  sun      on local   secure
ttya    “usr/etc/getty std.9600”  vt100    on
ttyb    “usr/etc/getty sxp.19200” vt220    on
tty00   “usr/etc/getty std.9600”  unknown  off local
tty01   “usr/etc/getty std.9600”  unknown  off local
```

2. In the */etc/gettytab* file, add a new entry for the baud rate and flow control.

   Set the baud rate to match *ttyb* in the previous example (19200) by entering the following:

   ```
   sxp.19200:\
      :p8:sp#19200:
   ```

   (The :p8: entry specifies 8-bit operation which is required for Serial Xpress.)

   Set the flow control to CTS/RTS. Serial Xpress works without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.)

   To set CTS/RTS flow control, add **:ms=crtscts:** to the entry above as follows:

   ```
   sxp.19200:\
      :p8:sp#19200:\
      :ms=crtscts:
   ```

   CTS/RTS flow control can also be set by entering **stty crtscts** in a Serial Session window.

3. After editing the *ttytab* and *gettytab* files, restart the **init** process by entering:

   kill -HUP 1

   The **init** process rereads the */etc/ttytab* and */etc/gettytab* files and restarts the program specified in the *ttytab* file for each line whose status is ON.

Configuring the Host (for Solaris)

This section provides steps for configuring the Sun host running Solaris for use with Serial Xpress. The steps include:

- Change the serial port jumpers on the main logic board to RS-232 mode (if necessary)
- Configure the ports on the host for use with Serial Xpress

Set Ports for RS-232 Mode

Serial Xpress requires that the serial port jumpers be in RS-232 mode. If your host is set for RS-423 mode (the factory default), change the serial port jumpers on the main login board to RS-232 mode. This involves powering down the host and moving the position of the jumpers from RS-423 to RS-232. Refer to your *Sun Installation Guide* for complete directions.

Configure Ports For Use With Serial Xpress

Perform the following steps to configure the host for use with Serial Xpress.

NOTE: Superuser privileges are required.

1. Remove any existing port monitor tags named zsmon using the `sacadm` command. This is the port monitor that will be used in this example.

   # **sacadm -r -p zsmon**

   You can use `sacadm` with the -l option to list the current status of port monitors.

2. Determine the version number of the current port monitor administrative file using the `ttyadm` command. The version number displays.

   # **ttyadm -V**
   1

3. Create an entry in the */etc/ttydefs* file for use with Serial Xpress. The *ttydefs* file displays the values that the Sun host recognizes for different baud rates and performs such tasks as setting the baud rate and reading the login name. For example:

   sxp.9600:9600 -opost onlcr:9600 -parity ::sxp.9600

   The following options are set:

sxp.9600:9600	port label and baud rate for use with Serial Xpress
-opost	output mode setting (default setting)
onlrc	NL and CR-NL mapping for output (default setting)
-parity	disables automatic parity detection (parenb) and sets it to cs8 (8 bit parity is required for Serial Xpress)
::sxp.9600	specifies the next port to try if a connection fails. In this example, the same port is to be tried again.

   Refer to the ttydefs and stty man pages for details about the command options used above, and for information about additional options.

4. Add an entry in the */etc/uucp/Devices* file for standard modem use (in this example, port a with the baud rate set at 9600):

   ACU term/a,M - sxp.9600 hayes

5. Add an entry in the */etc/remote* file used to describe the remote host system (in this example, host system cuaa using port a with the baud rate set at 9600):

   cuaa:dv=/dev/cua/a:br#9600

   Refer to the remote man page for details about the command options used.

6. Create a port monitor tag and start the monitor using the `sacadm` command. In this example, the port monitor is named zsmon.

   # sacadm -a -p zsmon -t ttymon -c /usr/lib/saf/ttymon -v 1

   Refer to the sacadm man page for details about the command options used.

7. Use the `pmadm` command to associate the port monitor with the service it will provide. This command includes an embedded command (`ttyadm`) used to provide port monitor-specific information. For example:

   # pmadm -a -p zsmon -s a -i root -fu -v 1 -m "`ttyadm -b -d /dev/cua/a \ -l sxp.9600 -m ldterm,ttcompat -s /usr/bin/login -S n`"

   The following options are set:

-a	adds an entry to the new port monitor service
-p zsmon	specifies the tag *zsmon* associated with the port monitor
-s a	specifies the service tag *a*
-i root	specifies the identity assigned to the service tag
-fu	creates a utmp entry for the service tag
-v 1	specifies the version number of the port monitor administrative file
-m	the options following -m specify the port monitor entry information for the service
ttyadm	the command used to provide port-monitor specific information
-b	indicates that the port is to be bi-directional
-d	specifies the full path and name of the device file for the port (specified in the */etc/remote* file)
-l	specifies the port label (from the *ttydefs* file)
-m	specifies a list of modules to push before the service is started
-s	specifies the full pathname of the service to be invoked, in this example, a login service
-S	sets the software carrier value to no

   Refer to the pmadm and ttyadm man pages for detail about the command options used above and for information about additional options.

Configuring the Network Computer

On the network computer, use *Setup* to configure the serial port parameters to match the host or modem.

1. Drag on Configuration Summaries and release on Peripheral Ports.
2. Configure the network computer port, entering the same settings as the port on the host or modem. Recommended settings are:

Data Bits	8
Stop Bits	1
Parity	None
Flow Control	Set flow control to CTS/RTS. If flow control is not available, set to None. Serial Xpress will work without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.) The flow control method must be set before **sxprocess** is executed from the host.
Baud rate	Same speed as the host or modem. The baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.

3. Drag on Configuration Summaries and release on Host File Access. In the Primary Access field, select **SXp** to specify Serial Xpress as the primary access method. Leave the Path field blank.
4. Drag on Configuration Summaries and release on X Environment. In the Font Cache Limit field, enter **50** to reserve 50 kilobytes of memory for the font cache. You may need to increase or decrease this amount as needed, depending on the number of fonts you use and the amount of available memory.
5. Return to the Main Menu and select **Save Current Settings**.

Touchscreen or Tablet Users

To use the touchscreen or tablet with Serial Xpress, do the following:

1. Enter *Setup* and drag on Configuration Summaries and release on Host File Access.
2. Select **SXp** as the Primary File Access.
3. Drag on Configuration Summaries and release on Input Extension. Choose the device file (from the drop down menu) for the device connected to Serial Port 0 or Serial Port 1.
4. Select **Return to Main Menu** and then **Save Current Settings**.

For information about configuring the host for use with the touchscreen or tablet, refer to the *Installation* Manual for your host. For information about using the touchscreen or tablet, refer to the *XPT/A Graphics Tablet* manual, or the *Touchscreen* manual from your Touchscreen manufacturer.

Connecting the Cables

The required cables depend on whether the network computer and Sun host are connected directly, or whether the network computer and Sun host are connected via phone lines and a modem. In all cases, use shielded data cables to assure compliance with FCC, DOC, VCCI, and VDE radio frequency emission standards.

This section includes information about connecting the host, network computer, and modem. The example host is a Sun SPARCstation 2. Use this as an example when connecting your host.

Connecting the Modem to the Sun Host

Sun hosts have two DTE (data terminal equipment) ports with DB25 female connectors and most modems have a female DB25 DCE port. Therefore, a DB25 male to DB25 male straight-through cable is required to connect the Sun host to the modem. A male-to-male straight-through cable can be purchased at most electronics supply stores. Figure 2-1 shows a Sun SPARCstation 2 connected to a Hayes-compatible modem.

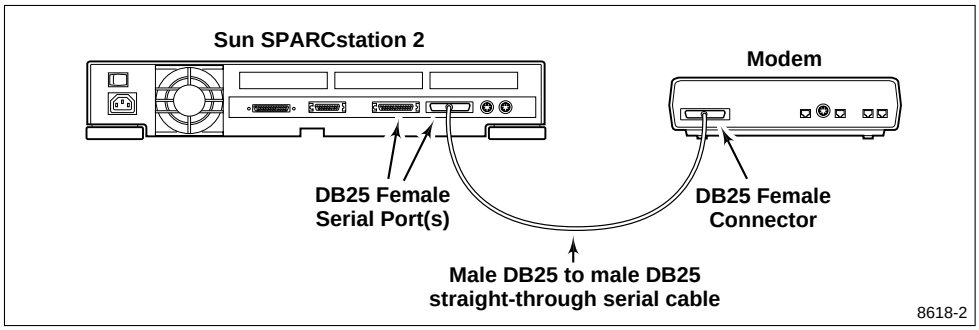

Figure 2-1. Connecting the Modem to a Sun SPARCstation 2.

Connecting the Network Computer to the Modem

The NCD network computer provides a male DB9 IBM PC-AT style port. Because the network computer serial port is a DTE port and most modems provide a DB25 female DCE (data communication equipment) port, the cable connecting them must be wired in a straight-through configuration and must properly translate the PC-AT pinout to the 25 pin RS-232 configuration. NCD has a cable which can be used to connect a modem to the network computer. To order this cable, contact NCD. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 straight-through wiring. A standard 9 pin PC-AT modem cable can also be purchased.

Figure 2-2 shows a NCD network computer connected to a Hayes-compatible modem.

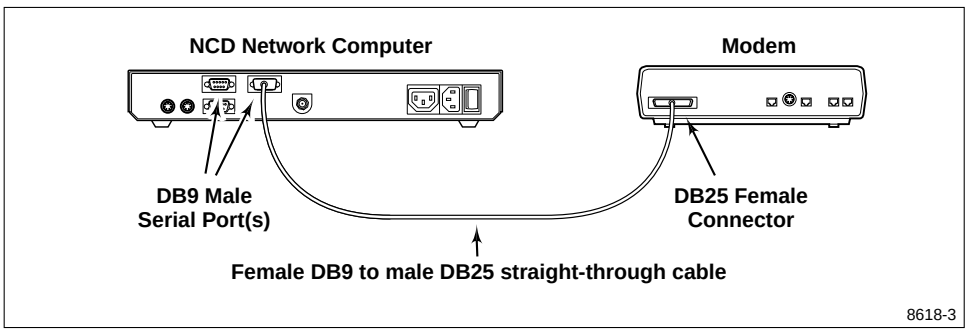

Figure 2-2. Connecting the Network Computer to the Modem.

Connecting the Network Computer to the Sun

Sun SPARCstations have two DTE (data terminal equipment) ports with DB25 female connectors. The NCD network computer has a male DB9 port. Because the two ports are wired differently, the cable connecting them must be a null modem cable and must properly translate the pinout to the 25-pin RS232 configuration. A null modem cable can be purchased at most electronics supply stores. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 null modem wiring.

Figure 2-3 shows a Sun SPARCstation 2 connected to a NCD network computer.

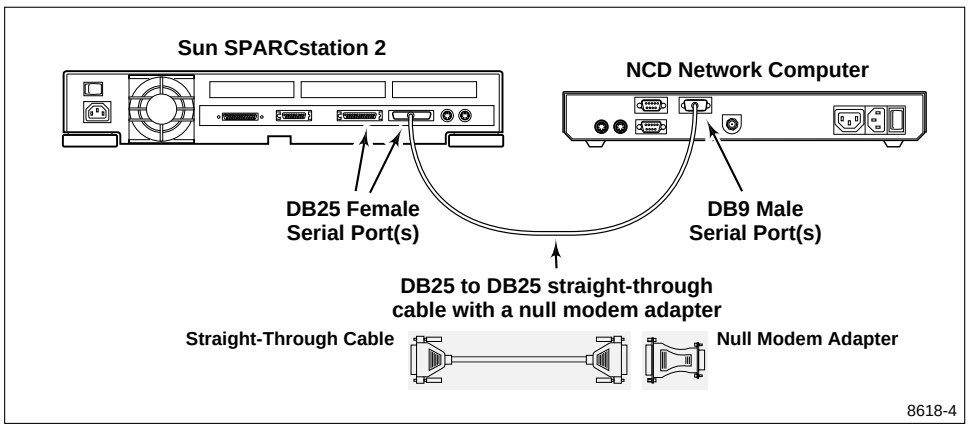

Figure 2-3. Connecting the Network Computer to a Sun SPARCstation 2.

Starting Serial Xpress

When the session script, host files, and serial ports are configured, and when the cables are connected, make the connection from the network computer to the host and start Serial Xpress.

1. In the *Client Launcher*, select Serial Port 0 or Serial Port 1 to open a Serial Session window. Select the session window for the port you are using.

   NOTE: To close a Serial Session window, press Enter and then tilde (~) period (.). To display a list of available commands, press Enter and then tilde (~) question mark (?).

If you are using a modem, perform steps two and three. If the network computer is connected directly to a host, go to step four.

2. If you are using a modem, enter **AT** to check the modem connection. If the connection is successful, an `OK` message displays.

   ```
   AT
   OK
   ```

3. Enter the standard modem command (ATDT) followed by the telephone number of the remote host.

   ATDT *phone_number*

   The modem begins making the connection to the remote host. When a successful connection is made, a login prompt displays.

4. Log in to the host.

   You may want to perform a loopback test to determine characters that need to be escaped. For information about performing a loopback test, refer to the **loopback** command in Appendix B, *Command Line Interface*.

5. Start the **sxprocess** program by entering the following:

   sxprocess

   The **sxprocess** program reads the *.sxprocessrc* file to obtain the script name to execute. It then executes the session script, for example, *.serialSession* to define the current Serial Xpress session environment, access fonts, and close the Serial Session window. If you are having trouble starting Serial Xpress, refer to Chapter 8, *Troubleshooting* for possible causes and solutions.

Exiting a Serial Xpress Session

To exit a Serial Xpress session, exit the last client in the session script file (for example, xterm in the *.serialSession* file). Serial Xpress requires that the last client in the session script file be in the foreground so that when the client closes, the Serial Xpress session ends.

Chapter 3

Configuring Serial Xpress - ULTRIX and OSF

Serial Xpress provides a proxy X server program that runs on the host computer, called **sxprocess.** The **sxprocess** program reads a configuration file, executes a shell script that defines the current session, and closes the Serial Session window. **Sxprocess** is provided on the media and is located in */tekxp/bin/risc_ultrix* for ULTRIX hosts, and in */tekxp/bin/AlphaAXP_OSF1* for OSF hosts by default.

Creating the Serial Xpress Configuration File

The **sxprocess** configuration file, *.sxprocessrc*, is structured like an X resource database file *(*for example, *.Xdefaults*) and is used to obtain default Serial Xpress configuration settings. A sample sxprocess configuration file is provided on the media and is located in */tekxp/bin/risc_ultrix/sxpconfig* for ULTRIX hosts, and in */tekxp/bin/AlphaAXP_OSF1/sxpconfig* for OSF hosts. This sample file is named *sxprocessrc*. The following example shows the parameters that can be set and example settings.

Example 3-1 Sample sxprocessrc File.

```
*escapeChars:         0x0a 0x0d 0x11 0x13 0x7f
*timeout              45
*xTransportProtocols: decnet tcpip local
*tmpDir:              /tmp
*display:             1
*sessionScriptName:   .serialSession
*defaultSession:      xterm -geometry +1+1 -n login
```

1. Use the *sxprocessrc* file as a template by copying it to your *$HOME* directory and renaming it *.sxprocessrc*.

2. Edit the file as necessary, uncommenting those parameters you want to set. The following parameters can be set:

- ***escapeChars** specifies characters that cannot be passed across the serial line. The default list of escaped characters includes the carriage return, linefeed, xon, xoff, rubout, 8-bit xoff, 8-bit rubout, and control leftbracket (]).

These characters are escaped by default because many computer systems treat them specially and may alter their transmission. (Escaped characters are xor'd with 0x20 and prefixed by an 0x7d when transmitted.) For best performance, do not escape more characters than are necessary. The **loopback** command can help determine which characters need to be escaped for your host. For information about determining which characters to escape and how to escape them, refer to the **loopback** and **echars** commands in Appendix B, *Command Line Interface*.

- ***timeout** specifies the maximum time, in seconds, that the protocol will wait for successful serial communication. If a successful serial connection is not made, the connection shuts down. When the protocol shuts down in this way, a message is placed in the sxp_log file in the tmpDir directory.
- ***xTransportProtocols** specifies the types of X connection sockets that will be used by **sxprocess**. The DECnet type is valid only on VAX VMS and ULTRIX versions of **sxprocess**. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY variable. For example, if the local protocol is last (the default), the display environment variable will have the "unix:n" format. If TCPIP appears last, the "hostname:n" format will be used.
- ***tmpDir** specifies the directory where message files and type local sockets are placed. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME environment variable, then */tmp* is used.
- ***display1** specifies which display number to use when setting up X connection sockets by searching through the available display number, starting with display one. This default starting number can be changed by setting the display resource. For more information about setting a display variable, refer to the **:n** command in Appendix B, *Command Line Interface*.
- ***SessionScriptName** specifies a session script that **sxprocess** executes. A session script is a shell script that starts the X clients that you specify and is located in the user's *$HOME* directory. By default, **sxprocess** first looks for the SessionScriptName you specify in this configuration file. If one is not specified or cannot be found, it then looks for *.xsession*. If neither files is found, it then looks for *.xinitrc*.

- ***defaultSession** specifies a command string to execute if a session script is not found in the user's *$HOME* directory. The default session command is **xterm -geometry +1+1 -n login** but the defaultSession resource can be used to change it. It is important that any X client specified in the defaultSession must be in one of the directories found in the user's PATH environment variable.

These parameters can also be set in a command line interface when starting **sxprocess**. Command line entries override entries in the *sxprocess* configuration file. For information about entering commands, refer to Appendix B, *Command Line Interface*.

Creating the Session Script

If you have entered a session script name in the *.sxprocessrc* file, create the script using the name you specified. (Be sure the file has read and execute permissions.) If you create a session script, Serial Xpress will ignore the *.xsession* and *.xinitrc* files by default.

The session script can be used to set environment variables, start a window manager, download fonts, and open an xterm window. A sample session script is provided on the media and is located in */tekxp/bin/risc_ultrix/sxpconfig* for ULTRIX hosts, and in */tekxp/bin/AlphaAXP_OSF1/sxpconfig* for OSF hosts. This sample script is named *serialSession* and looks something like Example 3-2.

NOTE: This script assumes that /tekxp/bin/risc_ultrix or /tekxp/bin/AlphaAXP_OSF1 has been added to your PATH environment variable (for example, in your .profile or .cshrc file).

Example 3-2 Sample Session Script.

```
#! /bin/sh
# NOTE: This script assumes that the NCD supplied fonts and
# binaries have been installed from the installation media. If you
# have installed these files somewhere other than in the default
# directory location, you should modify the following lines:

XPROOT=/tekxp
XPDIR=${XPROOT}/boot
#
# The following lines check the user's PATH environment variable and
# add the path to the NCD supplied xset command. These checks
# can be eliminated entirely if the PATH environment variable is
# configured in .cshrc, .login, or some other initialization file.
#
BINPATH=${XPROOT}/bin/risc_ultrix
PATHSTRING='echo "$PATH | grep "${BINPATH}"'
if test -z "$PATHSTRING"
then
       PATH="${PATH}:${BINPATH}"
       export PATH
fi
##
# The following lines set the network computer's font paths, start
# a local window manager on the network computer, and start an xterm
# client. The xterm functions as a session control window, when it
# exits, the session ends.
#
# Setting font paths can take considerable time.
# Uncomment these lines only if necessary.
#
# if test -x "${BINPATH}/xset
# then
#      xset +fp "${XPDIR}/fonts/100dpi,${XPDIR}/fonts/misc,"\
#      ${XPDIR}/fonts/75dpi
# fi
xpsh mwm &
xterm -geometry +1+1 -name "Serial Session" -title "Serial Session"
```

In this sample file, the user's PATH environment variable is set, font paths are set using **xset**, local Motif Window Manager is started, and an xterm window is opened.

1. Use the *serialSession* file as a template by copying it to your *$HOME* directory and naming it *.serialSession*.
2. Edit the file as needed.

NOTE: Serial Xpress requires that the last client in this file be in the foreground so that when the client closes, the Serial Xpress session ends. Therefore, do not place an ampersand (&) after the last client.

Configuring the Host

This section provides steps for configuring the ULTRIX and OSF hosts for use with Serial Xpress.

To Configure the ULTRIX Host

- Configure the host's tty ports as terminal login ports (in the *ttys* file)
- Configure the serial ports to match the modem settings (in the *gettytab* file)

Configure Ports for Use With Serial Xpress

On the host, edit the *ttys* and *gettytab* files located in the */etc* directory. The *ttys* file is read by the **init** process and specifies which serial ports will have a login process created for them. The *gettytab* file displays the values that the host recognizes for different baud rates. The *gettytab* file performs such tasks as setting the baud rate and reading the login name.

NOTE: Superuser privileges are required to edit the ttys and gettytab files.

1. In */etc/ttys*, edit the file to configure the port you are using.The fields in this file are:

name	specifies the name of the device.
getty	specifies the program that the **init** process should run. Replace the std. entry with **sxp**. to specify Serial Xpress.
type	specifies the termcap designed for the network computer attached to the port. For use with a network computer, enter **vt220** as the type. To see a list of available types of network computers for your system, look in the */usr/share/lib/termcap* file.
status	specifies On or Off. If On, **init** creates a log in process. If Off, **init** ignores the line and a log in is not allowed.
comments	specifies any comments for that line. If the comment is secure, users will be able to log on the network computer as root.

The following example shows *tty02* configured at 19200 baud for a network computer:

Example 3-3 Sample ttys File.

```
#
#name   getty                type    status     comments
#
console "/etc/getty std.9600"vt100   on secure  #console
ttyd0   "/etc/getty std.9600"vt100   on secure  #modem line 1
tty00   "/etc/getty std.9600"network on nomodem #lat terminal
tty01   "/etc/getty std.9600"unknown off local
tty02   "/etc/getty sxp.19200 vt220  on
```

2. In the */etc/gettytab* file, scroll to the line:

   ```
   # Setup terminal with full 8-bit support.
   ```

3. Find the line for the baud rate you are using and remove the # from the beginning of the line. For example, to match the baud rate set for tty02 in the above example (19200), the entry in the gettytab file would look like this:

   ```
   sxp.19200|19200-baud-8-bit:\
         :sp#19200:p8:
   ```

   The `:p8:` specifies 8 bit operation which is required for Serial Xpress.

4. Set the flow control to CTS/RTS. Serial Xpress works without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.)

   To set CTS/RTS flow control, add **:ms=crtscts:** to the entry in the */etc/gettytab* file as shown below:

   ```
   sxp.19200|19200-baud-8-bit:\
         :sp#19200:p8:\
         :ms=crtscts:
   ```

   CTS/RTS flow control can also be set by entering **stty crtscts** in a Serial Session window.

5. After editing the *ttys* and *gettytab* files, restart the **init** process by entering:

   kill -HUP 1

   The **init** process rereads the */etc/ttys* and */etc/gettytab* files and restarts the program specified in the *ttys* file for each line whose status is ON.

To Configure the OSF Host

Edit the *gettydefs* and *inittab* files located in the */etc* directory. The *gettydefs* file is read by the `init` process and specifies a login process for the serial port. The *inittab* file entry specifies which port the entry in the *gettydefs* file affects.

1. In the */etc/gettydefs* file, add a new line any where in the file to create an entry for Serial Xpress. In this entry, specify the following:

   ```
   SXP  #B9600 HUPCL IGNPAR ICRNL IXON OPOST ONLCR CS8 CREAD
                ISIG ICANON ECHO ECHOK IXANY CRTSCTS
        #B9600     SANE CS8 IXANY TAB3
        #login: #SXP
   ```

   In this example, the baud rate is 9600. Set this to match the baud rate you are using.

2. After editing the */etc/gettydefs* file, invoke getty with the check option to check the file for errors by entering the following:

   ```
   /usr/sbin/getty -c /etc/gettydefs
   ```

3. Edit the */etc/inittab* file to specify which port you are using for Serial Xpress so that the correct port is configured. Enter the following line in the *inittab* file:

   ```
   tty01:2:respawn:/usr/sbin/getty -h tty00 SXP
   ```

   In this example, port 0 is being used for Serial Xpress. If you are using port 1, the entry would look like this:

   ```
   a1:2:respawn:/usr/sbin/getty -h tty01 SXP
   ```

Configuring the Network Computer

On the network computer, use *Setup* to configure the serial port parameters to match the host or modem.

1. Drag on Configuration Summaries and release on Peripheral Ports.
2. Configure the network computer port, entering the same settings as the port on the host or modem. Recommended settings are:

Data Bits	8
Stop Bits	1
Parity	None
Flow Control	Set flow control to CTS/RTS. If flow control is not available, set to None. Serial Xpress will work without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.) The flow control method must be set before **sxprocess** is executed from the host.
Baud rate	Same speed as the host or modem. The baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.

3. Drag on Configuration Summaries and release on Host File Access. In the Primary Access field, select **SXp** to specify Serial Xpress as the primary access method. Leave the Path field blank.
4. Drag on Configuration Summaries and release on X Environment. In the Font Cache Limit field, enter **50** to reserve 50 kilobytes of memory for the font cache. You may need to increase or decrease this amount as needed, depending on the number of fonts you use and the amount of available memory.
5. Return to the Main Menu and select **Save Current Settings**.

Touchscreen or Tablet Users

To use the touchscreen or tablet with Serial Xpress, do the following:

1. Enter *Setup* and drag on Configuration Summaries and release on Host File Access.
2. Select **SXp** as the Primary File Access.
3. Drag on Configuration Summaries and release on Input Extension. Choose the device file (from the drop down menu) for the device connected to Serial Port 0 or Serial Port 1.
4. Select **Return to Main Menu** and then **Save Current Settings**.

For information about configuring the host for use with the touchscreen or tablet, refer to the *Installation* Manual for your host. For information about using the touchscreen or tablet, refer to the *XPT/A Graphics Tablet* manual, or the *Touchscreen* manual from your Touchscreen manufacturer.

Connecting the Cables

The required cables depend on the type of host computer you have. The required cables also depend on whether the network computer and ULTRIX host are connected directly, or whether the network computer and ULTRIX host are connected via phone lines and a modem. In all cases, use shielded data cables to assure compliance with FCC, DOC, VCCI, and VDE radio frequency emission limits.

This section includes information about connecting the host, network computer, and modem. The example host is a DECstation 5000. Use this as an example when connecting your host.

Connecting the Modem to the ULTRIX Host

DECstations have two DTE (data terminal equipment) ports with DB25 female connectors and most modems have a female DB25 DCE port. Therefore, a DB25 male to DB25 male straight-through cable is required to connect the DECstation 5000 to the modem. A male-to-male straight-through cable can be purchased at most electronics supply stores. Figure 3-1 shows a DECstation 5000 connected to a Hayes-compatible modem.

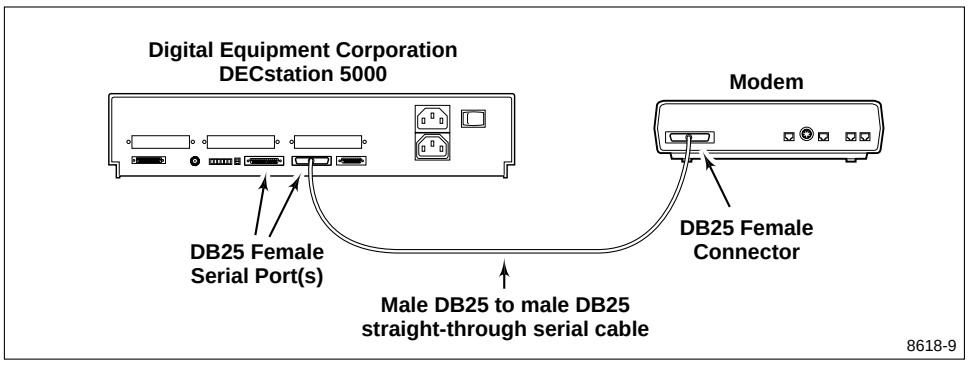

Figure 3-1 Connecting the Modem to a DECstation 5000.

Connecting the Network Computer to the Modem

The NCD network computer provides a male DB9 IBM PC-AT style port. Because the network computer serial port is a DTE port and most modems provide a DB25 female DCE (data communication equipment) port, the cable connecting them must be wired in a straight-through configuration and must properly translate the PC-AT pinout to the 25 pin RS-232 configuration. NCD has a cable which can be used to connect a modem to the network computer. To order this cable, contact NCD. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 straight-through wiring. A standard 9 pin PC-AT modem cable can also be purchased.

Figure 3-2 shows a NCD network computer connected to a Hayes-compatible modem.

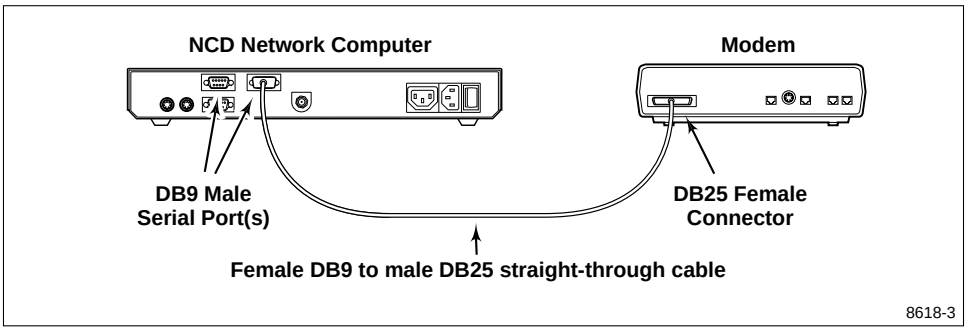

Figure 3-2 Connecting the Network Computer to the Modem.

Connecting the Network Computer to the ULTRIX Host

DECstations have two DTE (data terminal equipment) ports with DB25 female connectors. The NCD network computer has a male DB9 port. Because the two ports are wired differently, the cable connecting them must be a null modem cable and must properly translate the pinout to the 25-pin RS232 configuration. A null modem cable can be purchased at most electronics supply stores. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 null modem wiring.

Figure 3-3 shows a DECstation 5000 connected to a NCD network computer.

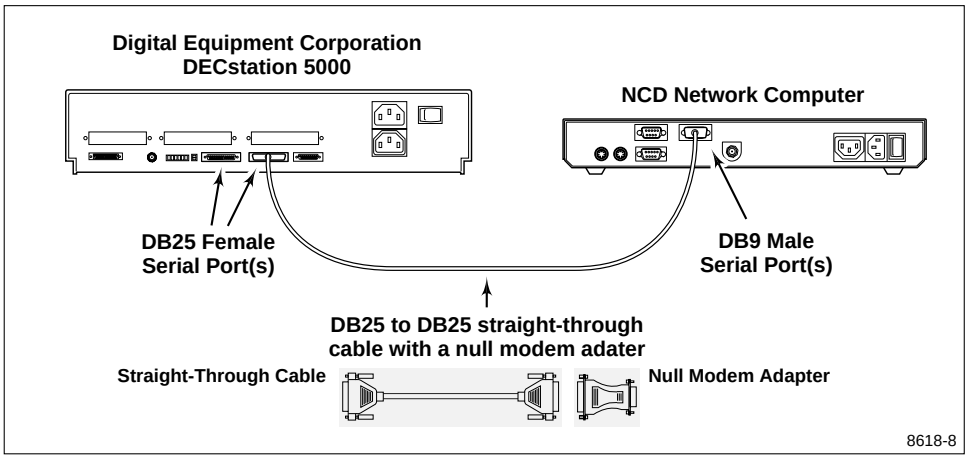

Figure 3-3 Connecting the Network Computer to a DECstation 5000.

Starting Serial Xpress

When the session script, host files, and serial ports are configured, and when the cables are connected, make the connection from the network computer to the host and start Serial Xpress.

1. In the *Client Launcher*, select Serial Port 0 or Serial Port 1 to open a Serial Session window. Select the session window for the port you are using.

   NOTE: To close a Serial Session window, press Enter and then tilde (~) period (.). To display a list of available commands, press Enter and then tilde (~) question mark (?).

If you are using a modem, perform steps two and three. If the network computer is connected directly to a host, go to step four.

2. If you are using a modem, enter **AT** to check the modem connection. If the connection is successful, an `OK` message displays.

   ```
   AT
   OK
   ```

3. Enter the standard modem command (ATDT) followed by the telephone number of the remote host.

   ATDT *phone_number*

   The modem begins making the connection to the remote host. When a successful connection is made, a login prompt displays.

4. Log in to the host.

   You may want to perform a loopback test to determine characters that need to be escaped. For information about performing a loopback test, refer to the **loopback** command in Appendix B, *Command Line Interface*.

5. Start the **sxprocess** program by entering the following:

   sxprocess

   The **sxprocess** program reads the *.sxprocessrc* file to obtain the script name to execute. It then executes the session script, for example, *.serialSession* to define the current Serial Xpress session environment, access fonts, and close the Serial Session window. If you are having trouble starting Serial Xpress, refer to Chapter 8, *Troubleshooting* for possible causes and solutions.

Exiting a Serial Xpress Session

To exit a Serial Xpress session, exit the last client in the session script file (for example, xterm in the *.serialSession* file). Serial Xpress requires that the last client in the session script file be in the foreground so that when the client closes, the Serial Xpress session ends.

Chapter 4

Configuring Serial Xpress - VMS

Serial Xpress provides a proxy X server program that runs on the host computer, called **sxprocess**. The **sxprocess** program reads a configuration file, executes a command procedure that defines the current session, and closes the Serial Session window. **Sxprocess** is provided on the *Installation* tape and is located in the *TEK$TOOLS_ROOT:[XP]* directory by default.

Logging In

NOTE: If you have already logged in and completed the* TEK$TOOLS:TEK_SYLOGIN.COM *command procedure, skip this step and go to the Creating the Serial Xpress Configuration File section.

The **TEK$TOOLS:TEK_SYLOGIN.COM** command procedure defines the commands used to run Tek-supplied utilities.

The logical name *HLP$LIBRARY* is used within this command procedure. A search is made for unused *HLP$LIBRARY_number* where *number* is the next consecutive number starting at 1.

Add the command:

$ **@TEK$TOOLS:TEK_SYLOGIN.COM**

to either the system login command procedure (the default is *SYS$MANAGER:SYLOGIN.COM*) or each user's private login command procedure (default *LOGIN.COM*).

Creating the Serial Xpress Configuration File

The *sxprocess* configuration file, *sxprocessrc*., is structured like an X resource database file (for example, *.Xdefaults*) and is used to define default Serial Xpress configuration settings. A sample *sxprocess* configuration file is provided on the *Installation* tape and is located in the *TEK$TOOLS_ROOT:[XP.EXAMPLES]* directory. This sample file is named *sxprocessrc*. The following example shows the parameters that can be set and example settings.

Example 4-1 Sample sxprocessrc. Configuration File.

```
*escapeChars:        0x0a 0x0d 0x11 0x13 0x7f
*xTransportProtocols decnet
*tmpDir:             sys$login:
*sessionScriptName:  sxpsession.com
*defaultSession:     tek$tools_root:[xp.examples]sxpsession.com
*display:            1
```

1. Use the *SXPROCESSRC.TEMPLATE* file as a template by copying it to your *SYS$LOGIN* directory and renaming it *SXPROCESSRC*.

2. Edit the file as necessary, uncommenting those parameters you want to set. The following parameters can be set:

- ***escapeChars** specifies characters that cannot be passed across the serial line. The default list of escaped characters includes the line feed, carriage return, xon, xoff, and delete. These characters are escaped by default because many computer systems treat them specially and may alter their transmission. (Escaped characters are xor'd with 0x20 and prefixed by an 0x7d when transmitted.) For best performance, do not escape more characters than are necessary. The **loopback** command can help determine which characters need to be escaped for your host. For information about determining which characters to escape and how to escape them, refer to the **loopback** and **echars** commands in Appendix B, *Command Line Interface*.

- ***xTransportProtocols** specifies the types of logical links that will be used by **sxprocess**. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY environment variable. In Example 4-1, DECnet is the xTransportProtocol so the display variable will have the format "nodename::display number" (where nodename is the name of the host).

- ***tmpDir** specifies the directory where message files and logical links are placed. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME environment variable, then *SYS$LOGIN* is used.
- ***SessionScriptName** specifies a session script that **sxprocess** executes. A session script is a command procedure that starts the X clients that you specify and is located in the user's default login directory (*SYS$LOGIN:*). By default, **sxprocess** first looks for the sessionScriptName you specify in this configuration file. If you do not specify a sessionScriptName parameter, Serial Xpress uses the defaultSession parameter.
- ***defaultSession** specifies a command to execute if a session script is not found in the user's default login directory (*SYS$LOGIN:*). The default session command is **tek$tools_root:[xp.examples]sxpsession.com** but the defaultSession parameter can be used to change it.
- ***display** specifies which "display server" number to use when setting up logical links by searching through the available display server number, starting with the default display one. This default starting number can be changed by setting the display resource. For more information about setting a display server variable, refer to the **:n** command in Appendix B, *Command Line Interface*.

These parameters can also be set in a command line interface when starting **sxprocess**. Command line entries override entries in the *sxprocess* configuration file. For information about entering commands, refer to Appendix B, *Command Line Interface*.

Creating the Session Script

If you have entered a session script name in the *SXPROCESSRC.* file, create the command procedure script using the name you specified. (Be sure the file has read and execute permissions.)

The session script can be used to start a session manager and download fonts. A sample session script is provided on the *Installation* tape and is located in *TEK$TOOLS_ROOT:[XP.EXAMPLES]*. This sample script is named *SXPSESSION.COM* and looks something like this:

Example 4-2 Sample Session Script.

```
$! sample template sxpsession.com
$! create/term=decterm
$! this last command MUST not terminate, or sxprocess terminates
$  run sys$system:decw$session
$! xset fp resident/,tek$xp_fonts:[100dpi],tek$xp_fonts:[misc]
```

In this example file, a DECwindows session is started and the 100 dpi and miscellaneous fonts are accessed using xset:

1. Use the *SXPSESSION.COM* file as a template by copying it to the *SYS$LOGIN* directory.
2. Edit the file as needed.

NOTE: Serial Xpress requires that the last client in this file not terminate or spawn another process so that when the last client closes, the Serial Xpress session ends.

Configuring the Network Computer

On the network computer, use *Setup* to configure the serial port parameters to match the host or modem.

1. Drag on Configuration Summaries and release on Peripheral Ports.
2. Configure the network computer port, entering the same settings as the port on the host or modem. Recommended settings are:

Data Bits	8
Stop Bits	1
Parity	None
Flow Control	Set flow control to CTS/RTS. If flow control is not available, set to None. Serial Xpress will work without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.) The flow control method must be set before **sxprocess** is executed from the host.
Baud rate	Same speed as the host or modem. The baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.

3. Drag on Configuration Summaries and release on Host File Access. In the Primary Access field, select **SXp** to specify Serial Xpress as the primary access method. Leave the Path field blank.
4. Drag on Configuration Summaries and release on X Environment. Drag on Configuration Summaries and release on X Environment. In the Font Cache Limit field, enter **50** to reserve 50 kilobytes of memory for the font cache. You may need to increase or decrease this amount as needed depending on the number of fonts you use and the amount of available memory.
5. Return to the Main Menu and select **Save Current Settings**.

Touchscreen or Tablet Users

To use the touchscreen or tablet with Serial Xpress, do the following:

1. Enter *Setup* and drag on Configuration Summaries and release on Host File Access.
2. Select **SXp** as the Primary File Access.
3. Drag on Configuration Summaries and release on Input Extension. Choose the device file (from the drop down menu) for the device connected to Serial Port 0 or Serial Port 1.
4. Select **Return to Main Menu** and then **Save Current Settings**.

For information about configuring the host for use with the touchscreen or tablet, refer to the *Installation* Manual for your host. For information about using the touchscreen or tablet, refer to the *XPT/A Graphics Tablet* manual, or the *Touchscreen* manual from your Touchscreen manufacturer.

Connecting the Cables

The required cables depend on whether the network computer and host are connected directly, or whether the network computer and host are connected via phone lines and a modem. In all cases, use shielded data cables to assure compliance with FCC, DOC, VCCI, and VDE radio frequency emission standards.

There are various communication boards with varying number of serial ports. The required cable depends on the type of communications board you have.

This section includes information about connecting the host, network computer, and modem. The example host is a DEC VAXstation equipped with a DHV-11 communications board. Use this as an example when connecting your host.

Connecting the Modem to the Host

There are many VAX models for use with VMS. The communications board you have will determine the type of cables needed. Figure 4-1 shows a Digital Equipment Corporation VAXstation equipped with a DHV-11 communications board attached to a Hayes-compatible modem using a Female DB25 to a Male DB25 straight-through cable:

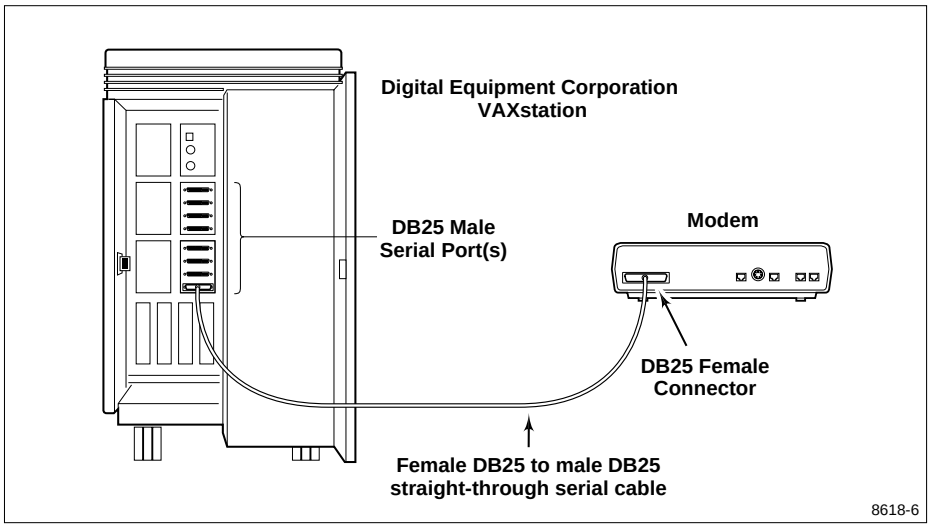

Figure 4-1 Connecting the Modem to a DEC VAXstation equipped with a DHV-11 Communications Board.

Connecting the Network Computer to the Modem

The NCD network computer provides a male DB9 IBM PC-AT style port. Because the network computer serial port is a DTE port and most modems provide a DB25 female DCE (data communication equipment) port, the cable connecting them must be wired in a straight-through configuration and must properly translate the pinout to the 25 pin configuration. NCD offers a cable which can be used to connect a modem to the network computer. To order this cable, contact NCD. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 straight-through wiring.

Figure 4-2 shows a NCD network computer connected to a Hayes-type modem.

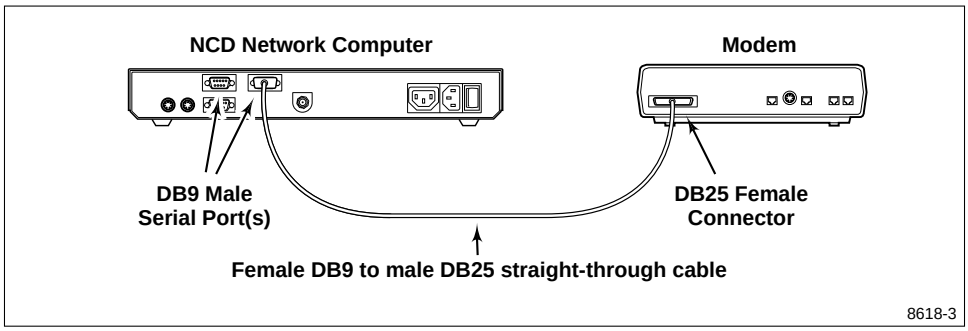

Figure 4-2 Connecting the Network Computer to the Modem.

Connecting the Network Computer to the Host

The type and number of ports on your host depends on your host's communications board. The NCD network computer has a male DB-9 port. Figure 4-3 shows the NCD network computer connected to a Digital Equipment Corporation VAXstation with a DHV-11 communications board using a DB25 to DB25 straight-through cable with a null-modem adapter:

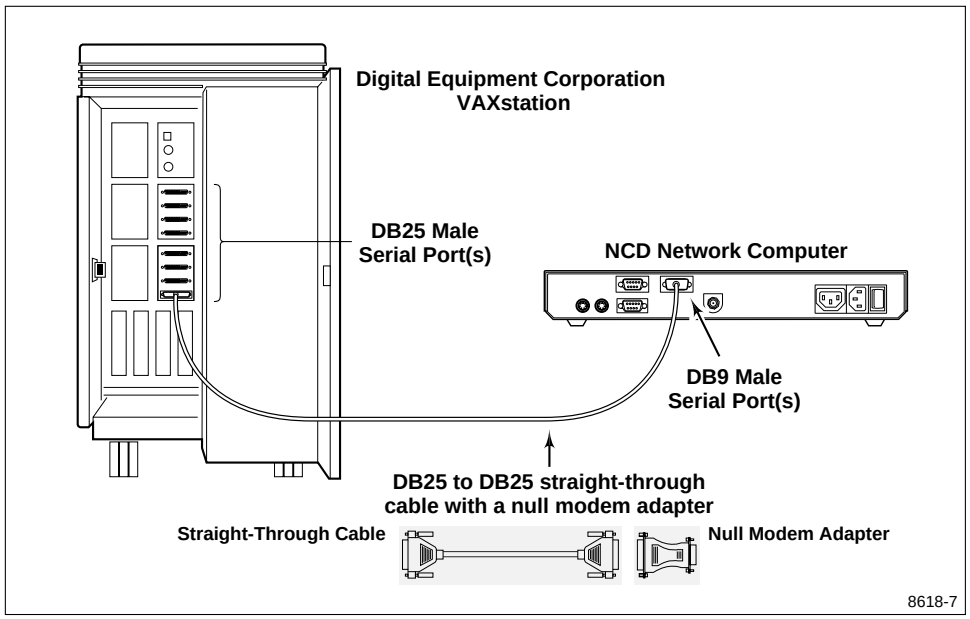

Figure 4-3 Connecting the Network Computer to a VAXstation equipped with a DHV-11 Communications Board.

Starting Serial Xpress

When the session script, host files, and serial ports are configured, and when the cables are connected, make the connection from the network computer to the host and start Serial Xpress.

1. In the *Client Launcher*, select Serial Port 0 or Serial Port 1 to open a Serial Session window. Select the session window for the port you are using.

   NOTE: To close a Serial Session window, press Enter and then tilde (~) period (.). To display a list of available commands, press Enter and then tilde (~) question mark (?).

If you are using a modem, perform steps two and three. If the network computer is connected directly to a host, go to step four.

2. If you are using a modem, enter **AT** to check the modem connection. If the connection is successful, a message displays.

   ```
   AT
   OK
   ```

3. Enter the standard modem command (ATDT) followed by the telephone number of the remote host.

   ATDT *phone_number*

   The modem begins making the connection to the remote host. When a successful connection is made, a login prompt displays.

4. Log in to the host.

   You may want to perform a loopback test to determine characters that need to be escaped. For information about performing a loopback test, refer to the **loopback** command in Appendix B, *Command Line Interface*.

5. Start the **sxprocess** program by entering the following:

   $ SXPROCESS

   The **sxprocess** program reads the *sxprocessrc*. file to obtain the script name to execute. It then executes the session script, for example, *.serialSession* to define the current Serial Xpress session environment, access fonts, and close the Serial Session window. If you are having trouble starting Serial Xpress, refer to Chapter 8, *Troubleshooting* for possible causes and solutions.

Starting Serial Xpress on a Target Device

You can start a Serial Xpress session on a remote network computer via a common host. For example, if you want to start Serial Xpress on a remote network computer, you can login to a common host, connect the remote network computer to the same host, and then start Serial Xpress and other applications. To do this:

1. Configure the remote network computer's serial port as explained in the *Configuring the Network Computer* section.
2. Connect the remote network computer to the host's serial port.
3. If the host's serial port access is:

   S : RWLP, O:, G:, W:

   you need SYSPRV privilege. If you do not have SYSPRV privilege, contact your system manager to set the device protection to allow appropriate access using the **SET PROTECTION/DEVICE** command. For example, the following command would be used to provide world access to the terminal device TXA7:

   $ SET PROTECTION=W=RWLP/DEVICE TXA7:

4. Define the logical name SXP_TERM to the remote network computer's name using the **DEFINE** command. For example, for a network computer whose name is TXA7, you would enter the following:

   $ DEFINE SXP_TERM TXA7:

5. Customize the *sxprocess* configuration file and session script and place them in your *SYS$LOGIN* directory. Refer to the *Creating the Serial Xpress Configuration File* and *Creating the Session Script* sections earlier in this chapter for information about these files.
6. Open a Serial Session window for the port you are using and connect to the remote network computer.

7. Start the **sxprocess** program by entering the following:

   $ SXPROCESS

If Serial Xpress fails to start:

- Check that the remote network computer is not in use. If the `Username:` login prompt appears in the Serial Session window, wait for the login prompt to time out before continuing.
- Check that the remote network computer specified by the SXP_TERM logical is connected to host's Serial Port. To determine the terminal device, press **Enter** and then enter **SHOW TERMINAL**. Log out from the Serial Session window. In your control process, redefine the SXP_TERM logical name and re-issue the **SXPROCESS** command.
- Check that the correct privileges are set. The privileges should allow access to the world.

Exiting a Serial Xpress Session

To exit a Serial Xpress session, exit the last client in the session script file. Serial Xpress requires that the last client in the session script file be in the foreground so that when the client closes, the Serial Xpress session ends.

Chapter **5**

Configuring Serial Xpress - IBM

Serial Xpress provides a proxy X server program that runs on the host computer, called **sxprocess**. The **sxprocess** program reads a configuration file, executes a shell script that defines the current session, and closes the Serial Session window. **Sxprocess** is provided on the media and is located in the */tekxp/bin/ibmRS6000* directory by default.

Creating the Serial Xpress Configuration File

The **sxprocess** configuration file, *.sxprocessrc*, is structured like an X resource database file *(*for example, *.Xdefaults*) and is used to obtain default Serial Xpress configuration settings. A sample sxprocess configuration file is provided on the media and in the */tekxp/bin/ibmRS6000/sxpconfig* directory. This sample file is named *sxprocessrc*. The following example shows the parameters that can be set and example settings.

Example 5-1 Sample sxprocessrc Configuration File.

```
*escapeChars:          0x0a 0x0d 0x11 0x13 0x7f 0x93 0xff 0x1d 0x9d
*xTransportProtocols: tcpip local
*tmpDir:              /tmp
*display:             1
*sessionScriptName:   .serialSession
*defaultSession:      xterm -geometry +1+1 -n login
```

1. Use the *sxprocessrc* file as a template by copying it to your *$HOME* directory and renaming it *.sxprocessrc*.

2. Edit the file as necessary, uncommenting those parameters you want to set. The following parameters can be set:

- ***escapeChars** specifies characters that cannot be passed across the serial line. The default list of escaped characters includes the carriage return, linefeed, xon, xoff, rubout, 8-bit xoff, 8-bit rubout, and control rightbracket (]). These characters are escaped by default because many computer systems treat them specially and may alter their transmission. (Escaped characters are xor'd with 0x20 and prefixed by an 0x7d when transmitted.) For best performance, do not escape more characters than are necessary. The **loopback** command can help determine which characters need to be escaped for your host.

For information about determining which characters to escape and how to escape them, refer to the **loopback** and **echars** commands in Appendix B, *Command Line Interface*.

- ***xTransportProtocols** specifies the types of X connection sockets that will be used by **sxprocess**. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY environment variable. For example, if the local protocol is last (the default), the display environment variable will have the "unix:n" format. If TCPIP appears last, the "hostname:n" format will be used.
- ***tmpDir** specifies the directory where message files and UNIX type sockets are placed. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME environment variable, then */tmp* is used.
- ***display** specifies which display number to begin with when setting up X connection sockets by searching through the available display number, starting with display one. This default starting number can be changed by setting the display resource. For more information about setting a display variable, refer to the **:n** command in Appendix B, *Command Line Interface.*
- ***SessionScriptName** specifies a session script that **sxprocess** executes. A session script is a shell script that starts the X clients that you specify and is located in the user's *$HOME* directory. By default, **sxprocess** first looks for the SessionScriptName you specify in this configuration file. If one is not specified or cannot be found, it then looks for *.xsession*. If neither file is found, it then looks for *.xinitrc*.
- ***defaultSession** specifies a command string to execute if a session script is not found in the user's *$HOME* directory. The default session command is **xterm -geometry +1+1 -n login** but the defaultSession resource can be used to change it. It is important that any X client specified in the defaultSession must be in one of the directories found in the user's PATH environment variable.

These parameters can also be set in a command line interface when starting **sxprocess**. Command line entries override entries in the *sxprocess* configuration file. For information about entering commands, refer to Appendix B, *Command Line Interface*.

Creating the Session Script

If you have entered a session script name in the *.sxprocessrc* file, create the script using the name you specified. (Be sure the file has read and execute permissions.) If you create a session script, Serial Xpress will ignore the *.xsession* and *.xinitrc* files by default.

The session script can be used to set environment variables, start a window manager, download fonts, and open an xterm window. A sample session script is provided on the media and is located in */tekxp/bin/ibmRS6000/sxpconfig*. This sample script is named *serialSession* and looks something like this:

NOTE: This script assumes that /tekxp/bin/ibmRS6000 has been added to your PATH environment variable (for example, in your .profile or .cshrc file.)

Example 5-2 Sample Session Script.

```
#! /bin/sh
# NOTE: This script assumes that the NCD supplied fonts and
# binaries have been installed from the installation media. If you
# have installed these files somewhere other than in the default
# directory location, you should modify the following line:

XPDIR=/tekxp/boot
#
# The following lines set the PATH environment variable if it is
# not already configured for running X clients. These lines can be
# removed if they are configured in .cshrc, .login, or some other
# initialization file.
#
PATHSTRING='echo "$PATH" | grep "/usr/bin/X11"'
if test -z "$PATHSTRING"
then
       PATH="${PATH}:/usr/bin/X11"
       export PATH
fi
#
# The following lines set the network computer's font paths, start
# a local window manager on the network computer, and start an xterm
# client. The xterm functions as a session control window, when it
# exits, the session ends.
# Setting font paths can take considerable time.
# Uncomment these lines only if necessary.
#
# if test -d "${XPDIR}/fonts"
# then
#      xset +fp "${XPDIR}/fonts/100dpi,${XPDIR}/fonts/misc"
# fi
xpsh mwm &
xterm -geometry +1+1 -name "Serial Session" -title "Serial Session"
```

In this sample file, the PATH variable is set, font paths are set using **xset**, local Motif Window Manager is started, and an xterm window is opened. The environment variables may already be set in your *.login* or *.cshrc* files, or in some other initialization file. However, also including the variables in this file is fine. The script also assumes that the NCD-supplied fonts and binaries have been installed from the media.

1. Use the *serialSession* file as a template by copying it to your *$HOME* directory and naming it *.serialSession*.
2. Edit the file as needed.

NOTE: Serial Xpress requires that the last client in this file be in the foreground so that when the client closes, the session script exits, causing the session to end. Therefore, do not place an ampersand (&) after the last client.

Configuring the Host

This section provides information about configuring the host's serial ports for use with Serial Xpress. The serial port settings on the host must match those settings for the modem or network computer.

Configure the Host Serial Ports

If the serial ports have not been added and configured, use the following System Management Interface Tool (SMIT) options to add and configure a port:

1. Devices-> TTY-> Add a TTY->
2. In the Single Select List window, select the type of port to add, for example, tty RS232 Asynchronous terminal.
3. In the next Single Select List window, choose the port on the parent adapter, for example, tty0.
4. Configure the port, setting the baud rate to 9600, parity to none, stop bits to 1, and bits per character to 8. As a general rule, the baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.
5. Exit SMIT.

If a port has already been added and configured, you can view the configuration settings and make changes if necessary using the following SMIT options:

1. Devices-> TTY-> Change / Show Characteristics of a TTY->.
2. In the Single Select List window, select the port whose settings you want to view, for example tty0.
3. The Change / Show Characteristics of a TTY window shows the serial port settings. Edit the settings if necessary, setting the baud rate to 9600, parity to none, stop bits to 1, and bits per character to 8. As a general rule, the baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.
4. Exit SMIT.

Configuring the Network Computer

On the network computer, use *Setup* to configure the serial port parameters to match the host or modem.

1. Drag on Configuration Summaries and release on Peripheral Ports.
2. Configure the network computer port, entering the same settings as the port on the host or modem. Recommended settings are:

Data Bits	8
Stop Bits	1
Parity	None
Flow Control	Set flow control to CTS/RTS. If flow control is not available, set to None. Serial Xpress will work without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.) The flow control method must be set before **sxprocess** is executed from the host.
Baud rate	Same speed as the host or modem. The baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.

3. Drag on Configuration Summaries and release on Host File Access. In the Primary Access field, select **SXp** to specify Serial Xpress as the primary access method. Leave the Path field blank.
4. Drag on Configuration Summaries and release on X Environment. In the Font Cache Limit field, enter **50** to reserve 50 kilobytes of memory for the font cache. You may need to increase or decrease this amount as needed depending on the number of fonts you use, and the amount of available memory.
5. Return to the Main Menu and select **Save Current Settings**.

Touchscreen or Tablet Users

To use the touchscreen or tablet with Serial Xpress, do the following:

1. Enter *Setup* and drag on Configuration Summaries and release on Host File Access.
2. Select **SXp** as the Primary File Access.
3. Drag on Configuration Summaries and release on Input Extension. Choose the device file (from the drop down menu) for the device connected to Serial Port 0 or Serial Port 1.
4. Select **Return to Main Menu** and then **Save Current Settings**.

For information about configuring the host for use with the touchscreen or tablet, refer to the *Installation* Manual for your host. For information about using the touchscreen or tablet, refer to the *XPT/A Graphics Tablet* manual, or the *Touchscreen* manual from your Touchscreen manufacturer.

Connecting the Cables

The required cables depend on whether the network computer and host are connected directly, or whether the network computer and host are connected via phone lines and a modem. In all cases, use shielded data cables to assure compliance with FCC, DOC, VCCI, and VDE radio frequency emission standards.

This section includes information about connecting the host, network computer, and modem. The example host is an IBM RS6000/520. Use this as an example when connecting your host.

Connecting the Modem to the IBM Host

The IBM RS6000/520 provides a proprietary 10 pin serial port connector. Use the IBM modem cable (part number 00G0943) to connect to your modem. Figure 5-1 shows an IBM RS6000/520 connected to a Hayes-compatible modem.

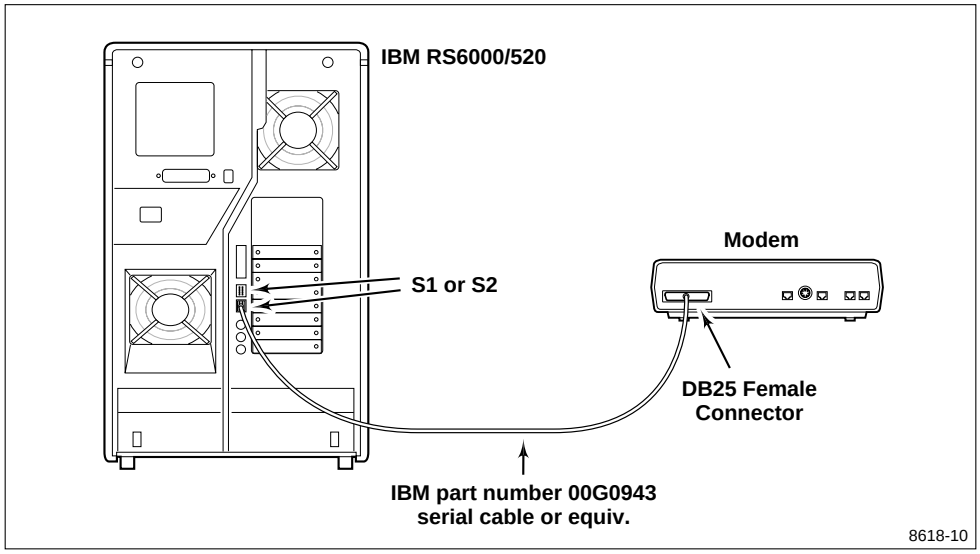

Figure 5-1 Connecting the Modem to an IBM RS6000/520 host.

Connecting the Network Computer to the Modem

The NCD network computer provides a male DB9 IBM PC-AT style port. Because the network computer serial port is a DTE port and most modems provide a DB25 female DCE (data communication equipment) port, the cable connecting them must be wired in a straight-through configuration and must properly translate the PC-AT pinout to the 25 pin RS-232 configuration. NCD has a cable which can be used to connect a modem to the network computer. To order this cable, contact NCD. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 straight-through wiring. A standard 9 pin PC-AT modem cable can be substituted.

Figure 5-2 shows a NCD network computer connected to a Hayes-compatible modem.

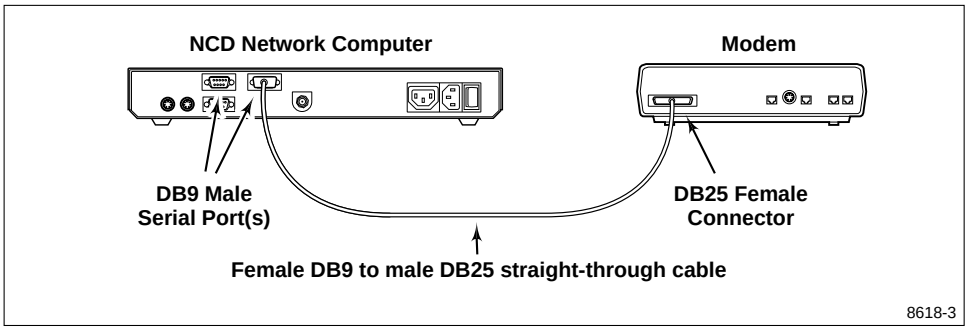

Figure 5-2 Connecting the Network Computer to the Modem.

Connecting the Network Computer to the Host

The IBM RS6000/520 has 10 pin male DTE (data terminal equipment) serial ports. The NCD network computer has a male DB9 port. Because the two ports are wired differently, the cable connecting them must be a null modem cable and must properly translate the pinout to the 25-pin RS232 configuration. A null modem cable can be purchased at most electronics supply stores. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 null modem wiring.

Figure 5-3 shows an IBM RS6000/520 connected to a NCD network computer.

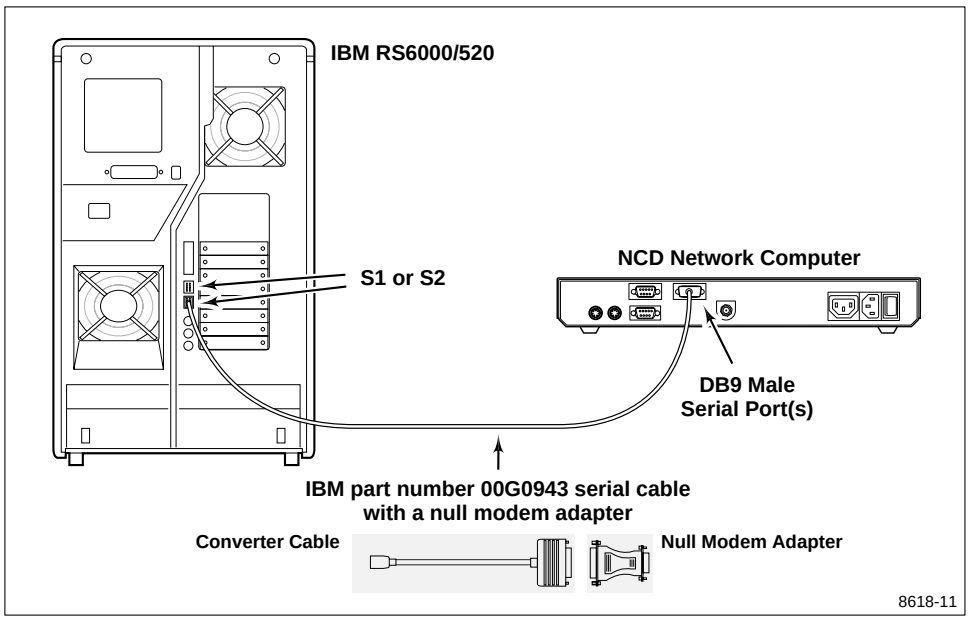

Figure 5-3 Connecting the Network Computer to an IBM RS6000/520 host.

Starting Serial Xpress

When the session script, host files, and serial ports are configured, and when the cables are connected, make the connection from the network computer to the host and start Serial Xpress.

1. In the *Client Launcher*, select Serial Port 0 or Serial Port 1 to open a Serial Session window. Select the session window for the port you are using.

   NOTE: To close a Serial Session window, press Enter and then tilde (~) period (.). To display a list of available commands, press Enter and then tilde (~) question mark (?).

If you are using a modem, perform steps two and three. If the network computer is connected directly to a host, go to step four.

2. If you are using a modem, enter **AT** to check the modem connection. If the connection is successful, an `OK` message displays.

   ```
   AT
   OK
   ```

3. Enter the standard modem command (ATDT) followed by the telephone number of the remote host.

   ATDT *phone_number*

   The modem begins making the connection to the remote host. When a successful connection is made, a login prompt displays.

4. Log in to the host.

   You may want to perform a loopback test to determine characters that need to be escaped. For information about performing a loopback test, refer to the **loopback** command in Appendix B, *Command Line Interface*.

5. Start the **sxprocess** program by entering the following:

   sxprocess

   The **sxprocess** program reads the *.sxprocessrc* file to obtain the script name to execute. It then executes the session script, for example, *.serialSession* to define the current Serial Xpress session environment, access fonts, and close the Serial Session window. If you are having trouble starting Serial Xpress, refer to Chapter 8, *Troubleshooting* for possible causes and solutions.

Exiting a Serial Xpress Session

To exit a Serial Xpress session, exit the last client in the session script file (for example, xterm in the *.serialSession* file). Serial Xpress requires that the last client in the session script file be in the foreground so that when the client closes, the Serial Xpress session ends.

Chapter 6

Configuring Serial Xpress - Hewlett-Packard

Serial Xpress provides a proxy X server program that runs on the host computer, called **sxprocess**. The **sxprocess** program reads a configuration file, executes a shell script that defines the current session, and closes the Serial Session window. **Sxprocess** is provided on the media and is located in the */tekxp/bin/host_type* directory by default (where *host_type* is *hp300* or *hp700*).

Creating the Serial Xpress Configuration File

The **sxprocess** configuration file, *.sxprocessrc*, is structured like an X resource database file *(*for example, *.Xdefaults*) and is used to obtain default Serial Xpress configuration settings. A sample sxprocess file is provided on the media and is located in the */tekxp/bin/<host_type>/sxpconfig* directory. This sample file is named *sxprocessrc*. The following example shows the parameters that can be set and example settings.

Example 6-1 Sample sxprocessrc Configuration File.

```
*escapeChars:          0x0a 0x0d 0x11 0x13 0x7f 0x93 0xff 0x1d 0x9d
*xTransportProtocols: tcpip local
*tmpDir:              /tmp
*display:             1
*sessionScriptName:   .serialSession
*defaultSession:      xterm -geometry +1+1 -n login
```

1. Use the *sxprocessrc* file as a template by copying it to your *$HOME* directory and renaming it *.sxprocessrc*.

2. Edit the file as necessary, uncommenting those parameters you want to set. The following parameters can be set:

- ***escapeChars** specifies characters that cannot be passed across the serial line. The default list of escaped characters includes the carriage return, linefeed, xon, xoff, rubout, 8-bit xoff, 8-bit rubout, and control rightbracket (]). These characters are escaped by default because many computer systems treat them specially and may alter their transmission. (Escaped characters are xor'd with 0x20 and prefixed by an 0x7d when transmitted.)

For best performance, do not escape more characters than are necessary. The **loopback** command can help determine which characters need to be escaped for your host. For information about determining which characters to escape and how to escape them, refer to the **loopback** and **echars** commands in Appendix B, *Command Line Interface*.

- ***xTransportProtocols** specifies the types of X connection sockets that will be used by **sxprocess**. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY environment variable. For example, if the local protocol is last (the default), the display environment variable will have the "unix:n" format. If TCPIP appears last, the "hostname:n" format will be used.

  If using a local protocol, be sure that a sockets directory exists and that the socket is created (for example, */usr/spool/sockets/X11*).

- ***tmpDir** specifies the directory where message files and UNIX type sockets are placed. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME, then */tmp* is used.

- ***display** specifies which display number to begin with when setting up X connection sockets by searching through the available display number, starting with display one. This default starting number can be changed by setting the display resource. For more information about setting a display variable, refer to the **:n** command in Appendix B, *Command Line Interface.*

- ***SessionScriptName** specifies a session script that **sxprocess** executes. A session script is a shell script that starts the X clients that you specify and is located in the user's *$HOME* directory. By default, **sxprocess** first looks for the SessionScriptName you specify in this configuration file. If one is not specified or cannot be found, it then looks for *.xsession*. If neither file is found, it then looks for *.xinitrc*.

- ***defaultSession** specifies a command string to execute if a session script is not found in the user's *$HOME* directory. The default session command is **xterm -geometry +1+1 -n login** but the defaultSession resource can be used to change it. It is important that any X client specified in the defaultSession must be in one of the directories found in the user's PATH environment variable.

These parameters can also be set in a command line interface when starting **sxprocess**. Command line entries override entries in the *sxprocess* configuration file. For information about entering commands, refer to Appendix B, *Command Line Interface*.

Creating the Session Script

If you have entered a session script name in the *.sxprocessrc* file, create the script using the name you specified. (Be sure the file has read and execute permissions.) If you create a session script, Serial Xpress will ignore the *.xsession* and *.xinitrc* files by default.

The session script can be used to set environment variables, start a window manager, download fonts, and open an xterm window. A sample session script is provided on the media and is located in */tekxp/bin/<host_type>/sxpconfig*. This sample script is named *serialSession* and looks something like this:

NOTE: This script assumes that /tekxp/bin/<host_type> has been added to your PATH environment variable (for example, in your .profile or .cshrc file).

Example 6-2 Sample Session Script.

```
#! /bin/sh
# NOTE: This script assumes that the NCD supplied fonts and
# binaries have been installed from the installation media. If you
# have installed these files somewhere other than in the default
# directory location, you should modify the following line:

XPDIR=/tekxp/boot
#
# The following lines set the PATH environment variable if it is
# not already configured for running X clients. These lines can be
# removed if PATH is configured in .cshrc, .login, or some other
# initialization file.
#
PATHSTRING='echo "$PATH" | grep "/usr/bin/X11"'
if test -z "$PATHSTRING"
then
       PATH="${PATH}:/usr/bin/X11"
       export PATH
fi
#
# The following lines set the network computer's font paths, start
# a localwindow manager on the network computer, and start an xterm
# client. Thexterm functions as a session control window, when it
# exits, the session ends.
# Setting font paths can take considerable time.
# Uncomment these lines only if necessary.
#
# if test -d "${XPDIR}/fonts"
# then
#      xset +fp "${XPDIR}/fonts/100dpi,${XPDIR}/fonts/misc"
# fi
xpsh mwm &
xterm -geometry +1+1 -name "Serial Session" -title "Serial Session"
```

In this sample file, the PATH variable is set, font paths are set using **xset**, local Motif Window Manager is started, and an xterm window is opened. The environment variables may already be set in your *.login* or *.cshrc* files, or in some other initialization file. However, also including the variables in this file is fine. The script also assumes that the NCD-supplied fonts and binaries have been installed from the media.

1. Use the *serialSession* file as a template by copying it to your *$HOME* directory and naming it *.serialSession*.
2. Edit the file as needed.

NOTE: Serial Xpress requires that the last client in this file be in the foreground so that when the client closes, the session script exits, causing the session to end. Therefore, do not place an ampersand (&) after the last client.

Configuring the Host

This section provides steps for configuring the Hewlett-Packard host for use with Serial Xpress. These steps include:

- Configure the host serial ports
- Configure the host files

Configure the Host Serial Ports

If the serial port does not have a device associated with it, add the device using the following System Administration Management (SAM) options:

Peripheral Devices-> Add a terminal or modem

NOTE: You must be super-user to use SAM.

To check the existence of a tty device, enter the following:

```
ls -l /dev/tty[0-9]*
```

Configure the Host Files

Edit the *gettydefs* and *inittab* files located in the */etc* directory. The *gettydefs* file is read by the `init` process and specifies a login process for the serial port. The *inittab* file entry specifies which port the entry in the *gettydefs* file affects.

1. In the */etc/gettydefs* file, add a new line any where in the file to create an entry for Serial Xpress. In this entry, specify the following:

   ```
   SXP  #B9600 HUPCL IGNPAR ICRNL IXON OPOST ONLCR CS8 CREAD
                ISIG ICANON ECHO ECHOK IXANY CRTSCTS
        #B9600     SANE CS8 IXANY TAB3
        #login: #SXP
   ```

   In this example, the baud rate is 9600. Set this to match the baud rate you are using.

2. After editing the */etc/gettydefs* file, invoke getty with the check option to check the file for errors by entering the following:

   ```
   /etc/getty -c /etc/gettydefs
   ```

3. Edit the */etc/inittab* file to specify which port you are using for Serial Xpress so that the correct port is configured. Enter the following line in the *inittab* file:

   ```
   a0:2:respawn:/etc/getty -h tty00 SXP
   ```

   In this example, port 0 is being used for Serial Xpress. If you are using port 1, the entry would look like this:

   ```
   a1:2:respawn:/etc/getty -h tty01 SXP
   ```

Configuring the Network Computer

On the network computer, use *Setup* to configure the serial port parameters to match the host or modem.

1. Drag on Configuration Summaries and release on Peripheral Ports.
2. Configure the network computer port, entering the same settings as the port on the host or modem. Recommended settings are:

Data Bits	8
Stop Bits	1
Parity	None
Flow Control	Set flow control to CTS/RTS. If flow control is not available, set to None. Serial Xpress will work without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.) The flow control method must be set before **sxprocess** is executed from the host.
Baud rate	Same speed as the host or modem. The baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.

3. Drag on Configuration Summaries and release on Host File Access. In the Primary Access field, select **SXp** to specify Serial Xpress as the primary access method. Leave the Path field blank.
4. Drag on Configuration Summaries and release on X Environment. In the Font Cache Limit field, enter **50** to reserve 50 kilobytes of memory for the font cache. You may need to increase or decrease this amount as needed depending on the number of fonts you use and the amount of available memory.
5. Return to the Main Menu and select **Save Current Settings**.

Touchscreen or Tablet Users

To use the touchscreen or tablet with Serial Xpress, do the following:

1. Enter *Setup* and drag on Configuration Summaries and release on Host File Access.
2. Select **SXp** as the Primary File Access.
3. Drag on Configuration Summaries and release on Input Extension. Choose the device file (from the drop down menu) for the device connected to Serial Port 0 or Serial Port 1.
4. Select **Return to Main Menu** and then **Save Current Settings**.

For information about configuring the host for use with the touchscreen or tablet, refer to the *Installation* Manual for your host. For information about using the touchscreen or tablet, refer to the *XPT/A Graphics Tablet* manual, or the *Touchscreen* manual from your Touchscreen manufacturer.

Connecting the Cables

The required cables depend on whether the network computer and host are connected directly, or whether the network computer and host are connected via phone lines and a modem. In all cases, use shielded data cables to assure compliance with FCC, DOC, VCCI, and VDE radio frequency emission standards.

This section includes information about connecting the host, network computer, and modem. The example host is a Hewlett-Packard 9000/400. Use this as an example when connecting your host.

Connecting the Modem to the Host

The Hewlett-Packard 9000/400 has DB25 Female DTE (data terminal equipment) serial ports, and most modems have a female DB25 DCE port. Therefore, a DB25 male to DB25 male straight-through cable is required to connect the host to the modem. A male-to-male straight-through cable can be purchased at most electronics supply stores. Figure 6-1 shows a Hewlett-Packard 9000/400 connected to a Hayes-compatible modem.

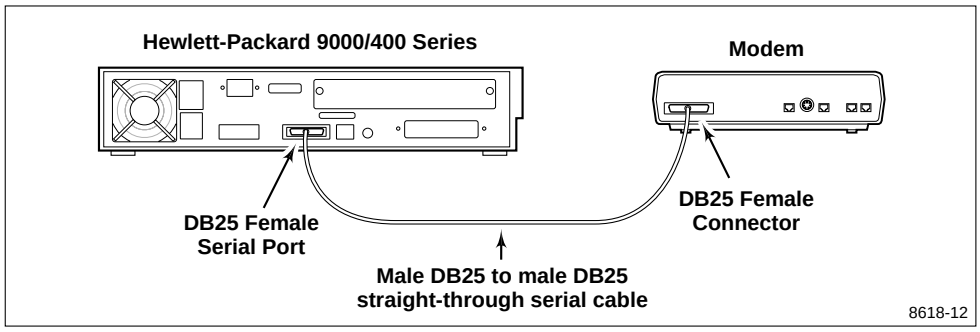

Figure 6-1 Connecting the Modem to a Hewlett-Packard 9000/400 host.

Connecting the Network Computer to the Modem

The NCD network computer provides a male DB9 IBM PC-AT style port. Because the network computer serial port is a DTE port and most modems provide a DB25 female DCE (data communication equipment) port, the cable connecting them must be wired in a straight-through configuration and must properly translate the PC-AT pinout to the 25 pin RS-232 configuration. NCD has a cable which can be used to connect a modem to the network computer. To order this cable, contact NCD. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 straight-through wiring. A standard 9 pin PC-AT modem cable can also be purchased.

Figure 6-2 shows a NCD network computer connected to a Hayes-compatible modem.

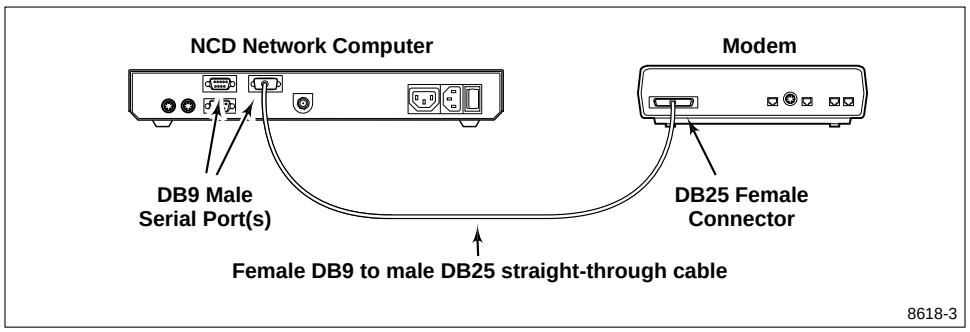

Figure 6-2 Connecting the Network Computer to the Modem.

Connecting the Network Computer to the Host

The Hewlett-Packard 9000/400 has DB25 Female DTE (data terminal equipment) serial ports. The NCD network computer has a male DB9 port. Because the two ports are wired differently, the cable connecting them must be a null modem cable and must properly translate the pinout to the 25-pin RS232 configuration. A null modem cable can be purchased at most electronics supply stores. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 null modem wiring.

Figure 6-3 shows a Hewlett-Packard 9000/400 connected to a NCD network computer.

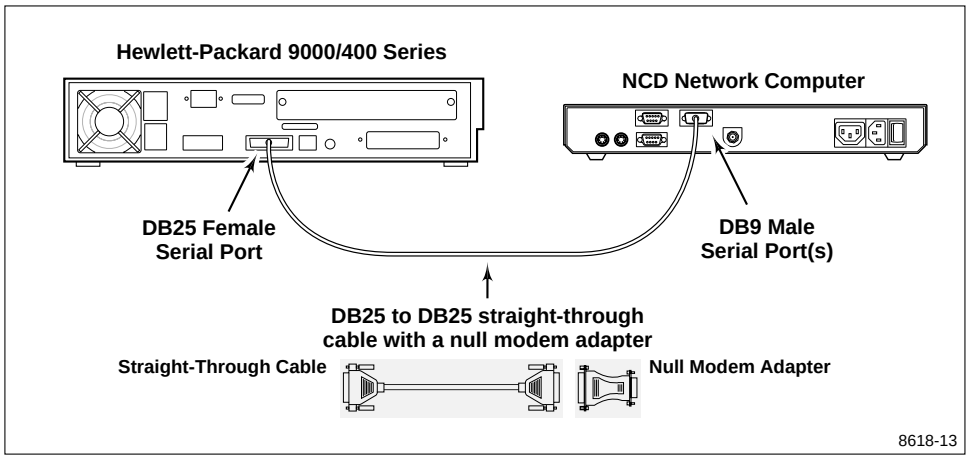

Figure 6-3 Connecting the Network Computer to the Hewlett-Packard 9000/400.

Starting Serial Xpress

When the session script, host files, and serial ports are configured, and when the cables are connected, make the connection from the network computer to the host and start Serial Xpress.

1. In the *Client Launcher*, select Serial Port 0 or Serial Port 1 to open a Serial Session window. Select the session window for the port you are using.

   NOTE: To close a Serial Session window, press Enter and then tilde (~) period (.). To display a list of available commands, press Enter and then tilde (~) question mark (?).

If you are using a modem, perform steps two and three. If the network computer is connected directly to a host, go to step four.

2. If you are using a modem, enter **AT** to check the modem connection. If the connection is successful, an `OK` message displays.

   AT
   `OK`

3. Enter the standard modem command (ATDT) followed by the telephone number of the remote host.

   ATDT *phone_number*

   The modem begins making the connection to the remote host. When a successful connection is made, a login prompt displays.

4. Log in to the host.

   You may want to perform a loopback test to determine characters that need to be escaped. For information about performing a loopback test, refer to the **loopback** command in Appendix B, *Command Line Interface*.

5. Start the **sxprocess** program by entering the following:

   sxprocess

   The **sxprocess** program reads the *.sxprocessrc* file to obtain the script name to execute. It then executes the session script, for example, *.serialSession* to define the current Serial Xpress session environment, access fonts, and close the Serial Session window. If you are having trouble starting Serial Xpress, refer to Chapter 8, *Troubleshooting* for possible causes and solutions.

Exiting a Serial Xpress Session

To exit a Serial Xpress session, exit the last client in the session script file (for example, xterm in the *.serialSession* file). Serial Xpress requires that the last client in the session script file be in the foreground so that when the client closes, the Serial Xpress session ends.

Chapter 7

Configuring Serial Xpress - Silicon Graphics

Serial Xpress provides a proxy X server program that runs on the host computer, called **sxprocess**. The **sxprocess** program reads a configuration file, executes a shell script that defines the current session, and closes the Serial Session window. **Sxprocess** is provided on the media and is located in the */tekxp/bin/sgi* directory by default.

Creating the Serial Xpress Configuration File

The **sxprocess** configuration file, *.sxprocessrc*, is structured like an X resource database file *(*for example, *.Xdefaults*) and is used to obtain default Serial Xpress configuration settings. A sample **sxprocess** configuration file is provided on the media and is located in the */tekxp/bin/sgi/sxpconfig* directory. This sample file is named *sxprocessrc*. The following example shows the parameters that can be set and example settings.

Example 7-1 Sample sxprocessrc Configuration File.

```
*escapeChars:         0x0a 0x0d 0x11 0x13 0x7f
*timeout:             45
*xTransportProtocols: decnet tcpip local
*tmpDir:              /tmp
*display:             1
*sessionScriptName:   .xsession
*defaultSession:      xterm -geometry +1+1 -n login
```

1. Use the *sxprocessrc* file as a template by copying it to your *$HOME* directory and renaming it *.sxprocessrc*.

2. Edit the file as necessary, uncommenting those parameters you want to set. The following parameters can be set:

- ***escapeChars** specifies characters that cannot be passed across the serial line. The default list of escaped characters includes the carriage return, linefeed, control-q, control-s, and rubout. These characters are escaped by default because many computer systems treat them specially and may alter their transmission. (Escaped characters are xor'd with 0x20 and prefixed by an 0x7d when transmitted.) For best performance, do not escape more characters than are necessary. The **loopback** command can help determine which characters need to be escaped for your host. For information about determining which characters to escape and how to escape them, refer to the **loopback** and **echars** commands in Appendix B, *Command Line Interface*.
- ***timeout** specifies the maximum time, in seconds, that the protocol will wait for a successful serial communication. If either side (**sxprocess** or sxptask) does not successfully receive any communications for a period longer than specified, the connection close. When the protocol shuts down, a message is included in the *sxp_log* file in the *tmpDir* directory (if there is no **tmpDir** directory, then the $HOME environment variable is used).
- ***xTransportProtocols** specifies the types of X connection sockets that will be used by **sxprocess**. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY environment variable. For example, if the local protocol is last (the default), the display environment variable will have the "unix:n" format. If TCPIP appears last, the "hostname:n" format will be used.
- ***tmpDir** specifies the directory where message files and type local sockets are placed. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME, then */tmp* is used.
- ***display** specifies which display number to begin with when setting up X connection sockets by searching through the available display numbers, starting with display one. This default starting number can be changed by setting the display resource. For more information about setting a display variable, refer to the **:n** command in Appendix B, *Command Line Interface.*
- ***SessionScriptName** specifies a session script that **sxprocess** executes. A session script is a shell script that starts the X clients that you specify and is located in the user's *$HOME* directory. By default, **sxprocess** first looks for the SessionScriptName you specify in this configuration file. If one is not specified or cannot be found, it then looks for *.xsession*. If neither files is found, it then looks for *.xinit*.

- ***defaultSession** specifies a command string to execute if a session script is not found in the user's *$HOME* directory. The default session command is **xterm -geometry +1+1 -n login** but the defaultSession resource can be used to change it. It is important that any X client specified in the defaultSession must be in one of the bin directories found in the user's PATH environment variable.

These parameters can also be set in a command line interface when starting **sxprocess**. Command line entries override entries in the **sxprocess** configuration file. For information about entering commands, refer to Appendix B, *Command Line Interface*.

Creating the Session Script

If you have entered a session script name in the *.sxprocessrc* file, create the script using the name you specified. (Be sure the file has read and execute permissions.) If you create a session script, Serial Xpress will ignore the *.xsession* and *.xinitrc* files by default.

The session script can be used to set environment variables, start a window manager, download fonts, and open an xterm window. A sample session script is provided on the media and is located in */tekxp/bin/sgi/sxpconfig*. This sample script is named *serialSession* and looks something like this:

NOTE: This script assumes that /tekxp/bin/sgi/sxpconfig has been added to your PATH environment variable (for example, in the .profile or .cshrc file).

Example 7-2 Sample Session Script.

```
#! /bin/sh
# The font directory below would be correct if the software was
# installed under the /usr directory. Change this path to the
# location of the fonts for your installation and uncomment the
# line.
# xset +fp "/usr/tekxp/boot/fonts/100dpi,/usr/tekxp/XP/fonts/misc"
#
# The xpsh command below starts up the local window manager
# xpsh mwm &
#
# The last process must be left in the foreground as the session
# controlling process. Exiting this process will exit Serial Xpress.
#
xterm -geometry +1+1 -name "session control" -title "session\
control"
```

In this sample file, local Motif Window Manager is started, and an xterm window is opened. The environment variables may already be set in the *.login* or *.cshrc* files, or in some other initialization file. However, also including the variables in this file is fine. The script also assumes that the NCD-supplied fonts and binaries have been installed from the media.

1. Use the *serialSession* file as a template by copying it to your *$HOME* directory and naming it *.serialSession*.
2. Edit the file as needed.

NOTE: Serial Xpress requires that the last client in this file be in the foreground so that when the client closes, the session script exits, causing the session to end. Therefore, do not place an ampersand (&) after the last client.

Configuring the Host

This section provides steps for configuring the Silicon Graphics IRIS Indigo host files for use with Serial Xpress.

Edit the *gettydefs* and *inittab* files located in the */etc* directory. The *gettydefs* file is read by the `init` process and specifies a login process for the serial port. The *inittab* file entry specifies which port the entry in the *gettydefs* file affects.

1. In the */etc/gettydefs* file, check to see that there is a line for the baud rate you are using. For example, to use a 9600 baud rate, the line would look something like this:

   ```
   dx_9600# B9600 # B9600 SANE TAB3 HUPCL #\r\n\
      n$HOSTNAME login: #dx_9600
   ```

2. Edit the */etc/inittab* file to specify which port and communication signal to use for Serial Xpress. The available communication signals are: ttyd used to directly connect simple devices; ttym used to connect devices that use modem control signals; and ttyf used to connect devices that understand hardware flow control signals.

   The example below shows a line in the *inittab* file that configures port one to use a 9600 baud rate and hardware flow control:

   ```
   t1:23:respawn:/etc/getty ttyf1 dx_9600 #alt console
   ```

   For more information about the *inittab* file, refer to the inittab man page.

3. Enter the following command to inform *init* of the change to */etc/inittab* and start a getty process for the port:

   telinit q

Configuring the Network Computer

On the network computer, use *Setup* to configure the serial port parameters to match the host or modem.

1. Drag on Configuration Summaries and release on Peripheral Ports.
2. Configure the network computer port, entering the same settings as the port on the host or modem. Recommended settings are:

Data Bits	8
Stop Bits	1
Parity	None
Flow Control	Set flow control to CTS/RTS. If flow control is not available, set to None. Serial Xpress will work without a flow control setting, however, for maximum performance, use CTS/RTS. (Avoid using XON/XOFF flow control because in a noisy environment a bit pattern may be mistaken for XOFF and the network computer may stop sending data.) The flow control method must be set before **sxprocess** is executed from the host.
Baud rate	Same speed as the host or modem. The baud rate should be 9600 or greater for acceptable performance. Serial Xpress will work at a lower baud rate, however, the performance will be slower.

3. Drag on Configuration Summaries and release on Host File Access. In the Primary Access field, select **SXp** to specify Serial Xpress as the primary access method. Leave the Path field blank.
4. Drag on Configuration Summaries and release on X Environment. In the Font Cache Limit field, enter **50** to reserve 50 kilobytes of memory for the font cache. You may need to increase or decrease this amount as needed depending on the number of fonts you use and the amount of available memory.
5. Return to the Main Menu and select **Save Current Settings**.

Touchscreen or Tablet Users

To use the touchscreen or tablet with Serial Xpress, do the following:

1. Enter *Setup* and drag on Configuration Summaries and release on Host File Access.
2. Select **SXp** as the Primary File Access.
3. Drag on Configuration Summaries and release on Input Extension. Choose the device file (from the drop down menu) for the device connected to Serial Port 0 or Serial Port 1.
4. Select **Return to Main Menu** and then **Save Current Settings**.

For information about configuring the host for use with the touchscreen or tablet, refer to the *Installation* Manual for your host. For information about using the touchscreen or tablet, refer to the *XPT/A Graphics Tablet* manual, or the *Touchscreen* manual from your Touchscreen manufacturer.

Connecting the Cables

This section includes information about connecting the host, network computer, and modem. The required cables depend on whether the network computer and host are connected directly, or whether the network computer and host are connected via phone lines and a modem. In all cases, use shielded data cables to assure compliance with FCC, DOC, VCCI, and VDE radio frequency emission standards.

The example host is a Silicon Graphics IRIS Indigo. Use this as an example when connecting your host.

Connecting the Modem to the Host

The Silicon Graphics IRIS Indigo has a DIN8 female DTE (data terminal equipment) serial port, and most modems have a female DB25 DCE port. Therefore, a DIN8 to DB25-pin male straight-through cable is required to connect the host to the modem. This type of cable can be purchased from Silicon Graphics. Figure 7-1 shows a Silicon Graphics IRIS Indigo connected to a Hayes-compatible modem.

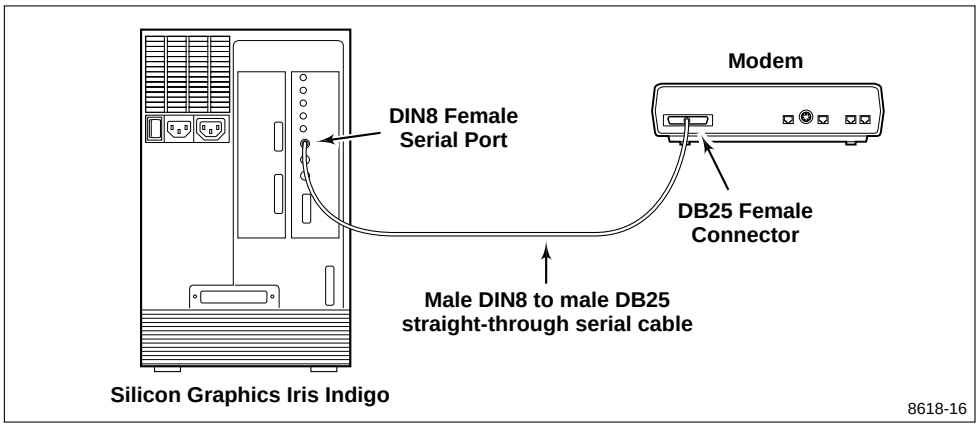

Figure 7-1 Connecting the Modem to a Silicon Graphics IRIS Indigo host.

Connecting the Network Computer to the Modem

The NCD network computer provides a male DB9 IBM PC-AT style port. Because the network computer serial port is a DTE port and most modems provide a DB25 female DCE (data communication equipment) port, the cable connecting them must be wired in a straight-through configuration and must properly translate the PC-AT pinout to the 25 pin RS-232 configuration. NCD has a cable which can be used to connect a modem to the network computer. To order this cable, contact NCD. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DB9 to DB25 straight-through wiring. A standard 9 pin PC-AT modem cable can also be purchased.

Figure 7-2 shows a NCD network computer connected to a Hayes-compatible modem.

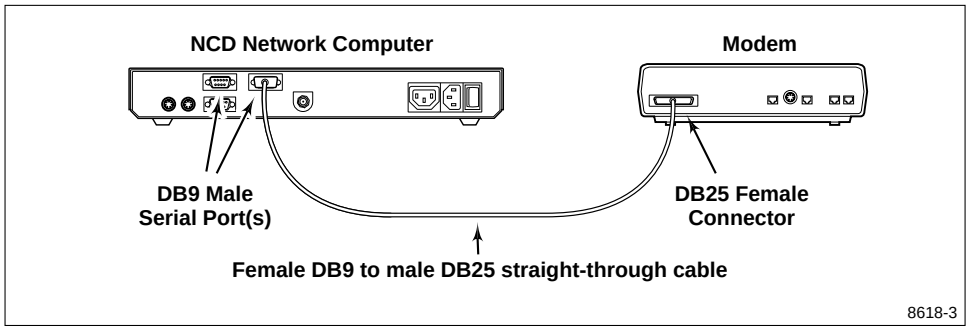

Figure 7-2 Connecting the Network Computer to the Modem.

Connecting the Network Computer to the Host

The Silicon Graphics IRIS Indigo has a DIN8 female DTE (data terminal equipment) serial ports. The NCD network computer has a male DB9 port. Because the two ports are wired differently, the cable connecting them must be a null modem cable and must properly translate the pinout to the RS232 configuration. A null modem cable can be purchased at most electronics supply stores or can be custom made. Refer to Appendix C, *Recommended Cable Wiring* for the recommended DIN8 to DB9 null modem wiring.

Figure 7-3 shows a Silicon Graphics IRIS Indigo connected to a NCD network computer.

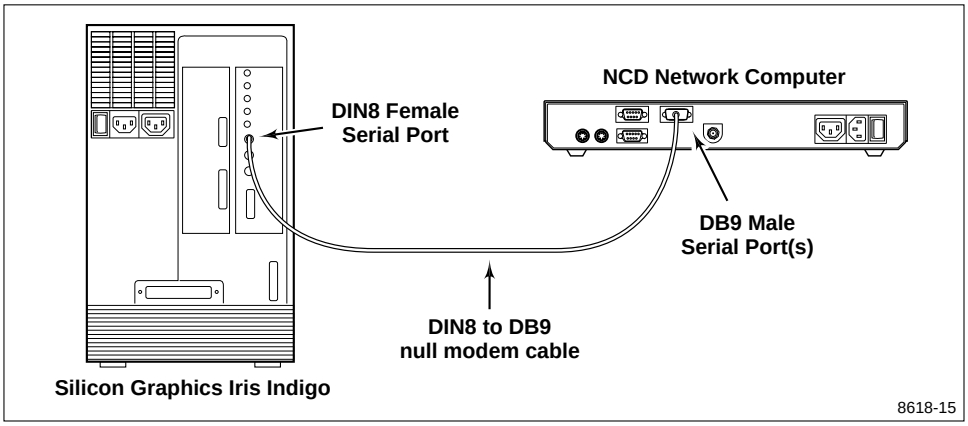

Figure 7-3 Connecting the Network Computer to the Silicon Graphics IRIS Indigo host.

Starting Serial Xpress

When the session script, host files, and serial ports are configured, and when the cables are connected, make the connection from the network computer to the host and start Serial Xpress.

NOTE: To close a Serial Session window, press Enter and then tilde (~) period (.). To display a list of available commands, press Enter and then tilde (~) question mark (?).

1. In the *Client Launcher*, select Serial Port 0 or Serial Port 1 to open a Serial Session window. Select the session window for the port you are using.

   If you are using a modem, perform steps two and three. If the network computer is connected directly to a host, go to step four.

2. If you are using a modem, enter **AT** to check the modem connection. If the connection is successful, an `OK` message displays.

   ```
   AT
   OK
   ```

3. Enter the standard modem command (ATDT) followed by the telephone number of the remote host.

   ATDT *phone_number*

   The modem begins making the connection to the remote host. When a successful connection is made, a login prompt displays.

4. Log in to the host.

   You may want to perform a loopback test to determine characters that need to be escaped. For information about performing a loopback test, refer to the **loopback** command in Appendix B, *Command Line Interface*.

5. Start the **sxprocess** program by entering the following:

   ```
   sxprocess
   ```

   The **sxprocess** program reads the *.sxprocessrc* file to obtain the script name to execute. It then executes the session script, for example, *.serialSession* to define the current Serial Xpress session environment, access fonts, and close the Serial Session window. If you are having trouble starting Serial Xpress, refer to Chapter 8, *Troubleshooting* for possible causes and solutions.

Exiting a Serial Xpress Session

To exit a Serial Xpress session, exit the last client in the session script file (for example, xterm in the *.serialSession* file). Serial Xpress requires that the last client in the session script file be in the foreground so that when the client closes, the Serial Xpress session ends.

Chapter **8**

Troubleshooting

This chapter contains information to help solve potential problems when starting Serial Xpress. Below are some examples of what could happen when you start Serial Xpress and possible solutions.

When using Serial Xpress, the Console displays network computer messages, and the */tmp/sxp_log.<display number>* file displays host messages. Having the Console open and access to the *sxp_log.<display number>* file will be helpful in troubleshooting problems that may arise.

> ***NOTE: The log file is located in the tmpDir directory specified in the .sxprocessrc file. If you do not specify a tmpDir directory, the $HOME environment variable is used. If there is no $HOME environment variable, the /tmp (UNIX) or SYS$LOGIN (VMS) directory is used to store Serial Xpress messages.***

If you are having trouble connecting to a modem

- Make sure the modem is turned on.
- Verify all cables. Refer to the *Connecting the Cables* section in the appropriate chapter for your host.
- Make sure that the network computer and modem serial port settings match.
- Verify the modem configuration settings. Refer to your modem documentation.

If there is no response when you try to enter a command in the Serial Port window

- Make sure that the cables are connected to the correct port.
- Make sure that the mouse pointer is in the Serial Port window.
- Check the processes on the host to see if there is an old *sxprocess* still running that's using the tty. If there is, kill the process and restart *sxprocess*.
- Check the host's serial port configuration files. Refer to the *Configuring the Host* section in the appropriate chapter for your host.

If you open the Serial Port window and characters that you type are not displayed

- If a previous Serial Xpress session was running and now there are "garbage" characters in the window, wait 30 seconds until the session times out. A login message should then display.
- If a previous Serial Xpress session ended or crashed abruptly, the Serial Port window may re-appear and may not correctly echo characters as you enter them. Log out of this session and start again with a new Serial Port window.

If you start sxprocess and sporadic characters appear in the Serial Port window

- Make sure that the tty line is in 8-bit mode. Refer to the *Configuring the Host* section in the appropriate chapter for your host.
- Make sure that the baud rate set at the network computer matches the baud rate on the modem, or matches the baud rate on the host if you're using a direct connection.
- Run the loopback test to determine if any characters need to be escaped. Refer to the **loopback** and **escape** commands in Appendix B, *Command Line Interface*.

If you start sxprocess and receive a "Command not found" message

- Check to see that the directory containing the Serial Xpress program is in your PATH environment variable. Make sure also that the path is readable and executable.
- Make sure that the Serial Xpress software (sxprocess) is installed. Check with your system administrator if you're not sure.

If you start sxprocess and receive a "Permission denied" message

- Make sure that the sxprocess program has read and execute permissions.

If you start sxprocess and the Serial Port window disappears and then re-appears

- Be sure that the user path environment variable is configured to run X clients. Also make sure that the X clients are set up and have correct permissions.
- Verify entries in the session script.
- Try to execute the session script in a networked computer environment to see if it executes properly.
- Try to execute the session script line by line.
- Verify that there is sufficient memory in the network computer to run Serial Xpress.
- Look at the *sxp_log.<display number>* file for messages.

If you start sxprocess and the Serial Session window appears and then disappears, and the Serial Port Window re-appears

- A previously opened Serial Port window may still be using the serial port. Choose the Reset Server button in *Setup* and start over.
- Run the loopback diagnostic test to determine if additional characters need to be escaped. Refer to the **-loopback** command in Appendix B, *Command Line Interface*.

General Performance Information

- When using the **xset** command to load fonts, use as few fonts as possible by limiting the number of paths indicated in the session script, or configuring applications to use a limited set of fonts. You can also enable font caching in *Setup*.
- Make sure that the default backing_store option is set to enabled. If you have plenty of memory, set this option to AlwaysWhenMapped (in *Setup* or in the remote configuration file.)
- Avoid large applications that load large pixmaps.
- Avoid running X clients that perform frequent screen updates in the beginning of the session script. These bandwidth-intensive programs slow the process of starting the other clients in the session script.

Appendix **A**

ASCII Chart

B7 B6 B5 / Bits / B4 B3 B2 B1	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
	Control		Numbers Symbols		Uppercase Symbols		Lowercase Symbols	
0 0 0 0	0 **NU** NUL 0	20 **DL** DLE 16	40 **SP** 32	60 **0** 48	100 **@** 64	120 **P** 80	140 **`** 96	160 **p** 112
0 0 0 1	1 **SH** SOH 1	21 **D1** DC1 17	41 **!** 33	61 **1** 49	101 **A** 65	121 **Q** 81	141 **a** 97	161 **q** 113
0 0 1 0	2 **SX** STX 2	22 **D2** DC2 18	42 **"** 34	62 **2** 50	102 **B** 66	122 **R** 82	142 **b** 98	162 **r** 114
0 0 1 1	3 **EX** ETX 3	23 **D3** DC3 19	43 **#** 35	63 **3** 51	103 **C** 67	123 **S** 83	143 **c** 99	163 **s** 115
0 1 0 0	4 **ET** EOT 4	24 **D4** DC4 20	44 **$** 36	64 **4** 52	104 **D** 68	124 **T** 84	144 **d** 100	164 **t** 116
0 1 0 1	5 **EQ** ENQ 5	25 **NK** NAK 21	45 **%** 37	65 **5** 53	105 **E** 69	125 **U** 85	145 **e** 101	165 **u** 117
0 1 1 0	6 **AK** ACK 6	26 **SY** SYN 22	46 **&** 38	66 **6** 54	106 **F** 70	126 **V** 86	146 **f** 102	166 **v** 118
0 1 1 1	7 **BL** BEL 7	27 **EB** ETB 23	47 **´** 39	67 **7** 55	107 **G** 71	127 **W** 87	147 **g** 103	167 **w** 119
1 0 0 0	10 **BS** 8	30 **CN** CAN 24	50 **(** 40	70 **8** 56	110 **H** 72	130 **X** 88	150 **h** 104	170 **x** 120
1 0 0 1	11 **HT** 9	31 **EM** 25	51 **)** 41	71 **9** 57	111 **I** 73	131 **Y** 89	151 **i** 105	171 **y** 121
1 0 1 0	12 **LF** A 10	32 **SB** SUB 26	52 ***** 42	72 **:** 58	112 **J** 74	132 **Z** 90	152 **j** 106	172 **z** 122
1 0 1 1	13 **VT** B 11	33 **EC** ESC 27	53 **+** 43	73 **;** 59	113 **K** 75	133 **[** 91	153 **k** 107	173 **{** 123
1 1 0 0	14 **FF** C 12	34 **FS** 1C 28	54 **,** 44	74 **<** 60	114 **L** 76	134 **** 92	154 **l** 108	174 **|** * 124
1 1 0 1	15 **CR** D 13	35 **GS** 1D 29	55 **-** 45	75 **=** 61	115 **M** 77	135 **]** 93	155 **m** 109	175 **}** 125
1 1 1 0	16 **SO** E 14	36 **RS** 1E 30	56 **.** 46	76 **>** 62	116 **N** 78	136 **^** 94	156 **n** 110	176 **~** 126
1 1 1 1	17 **SI** F 15	37 **US** 1F 31	57 **/** 47	77 **?** 63	117 **O** 79	137 **_** 95	157 **o** 111	177 **DT** DEL RUBOUT 7F 127

KEY octal 20 / **DL** DLE / 10 16 hex — graphic representation, mnemonic, decimal

* ¦ on some keyboards or systems

8618-1

Appendix A

Appendix **B**

Command Line Interface

When starting the *sxprocess* program, the following parameters can be specified on the command line to override the Serial Xpress defaults:

-config *filepath* Specifies the file path for the *sxprocess* configuration resource file, (default is *.sxprocessrc*). The *sxprocess* program looks first for *$HOME/.sxprocessrc* or *SYS$LOGIN:SXPROCESSRC* (depending on your host). If that fails, it then uses the **-config** *filepath* parameter.

-echars "*charlist*" Specifies characters to be escaped when they are transmitted over the tty line. Characters that will be altered in some way when transmitted over the tty line should be escaped. *charlist* is a single string containing the characters to be escaped. The individual characters can be represented in either hexadecimal (0xdd) or octal (\ddd) format. These characters are escaped by default:

Table B-1 Characters Escaped by Default.

ASCII character	Keyboard characters
0x0a	Line feed
0x0d	Carriage return
0x11	Control-Q (D1, XON)
0x13	Control-S (D3, XOFF))
0x1d	7-bit Control-right bracket (])
0x7f	DELETE character (DT)
0x93	8-bit XOFF
0xff	8-bit DELETE
0x9d	Telnet Control-right bracket (])

NOTE: The characters 0x13 and 0x93 may be removed from the list of default characters if the communications link has no equipment using them as flow control characters (XON or XOFF, DC1 or DC3).

To escape an additional character, find that character's hex or octal values on a standard ASCII table and add it to the default list of escaped characters. *(Appendix A* contains an ASCII table for your reference.) For example, to add the vertical Tab character (hex 0x09) to the list, enter the following:

```
-echars "0x09 0x0a 0x0d 0x11 0x13 0x7f"
```

To help you determine which characters to escape, Serial Xpress provides a diagnostic test that searches ASCII character codes to see if the character can be transmitted back and forth between the host and network computer without being lost or altered. Refer to the **-loopback** command later in this appendix.

NOTE: Escape only those characters as necessary. If your communications link can accept any of the default escaped characters without being escaped, remove them from the list. The more characters escaped, the longer it takes Serial Xpress to transmit.

-loopback The *sxprocess* program provides a diagnostic test that searches ASCII character codes to see if the character can be transmitted back and forth between the host and network computer without being lost or altered. This test is started with the **-loopback** command.

Characters that will be altered in some way when transmitted over the tty line should be escaped using the **-echars** command, explained earlier in this appendix. The characters listed in Table B-1 are escaped automatically so ensure that almost any system can use Serial Xpress.

As a result, some of the default escaped characters may not need to be escaped for your system. For example, 0x13 and 0x93 do not need to be escaped if flow control is not used. If flow control is used, these characters should then be escaped.

You can use the **-lechars** and **-x25** options to tell **-loopback** to ignore specific characters. These options are especially useful if you know of specific characters they may interfere with the **-loopback** test. Refer to the **-lechars** and **-x25** options later in this appendix.

The loopback test takes about two minutes to run at 9600 baud on a lightly loaded host. Those characters that should be escaped are printed into the log file named *./sxp_log.result*. Upon successful completion of the loopback test, the following message appears in the *./sxp_log.result* file:

```
The following escape character string should be placed
        in your .sxprocessrc file:
        *escapeChars: 0xdd 0xdd 0xdd . . .
```

Add those characters listed in the *./sxp_log.result* file to the *sxprocess* configuration file on the ***escapeChars** line. (0x13 and 0x93 do not need to be escaped if flow control is not used. If flow control is used, these characters should then be escaped.) Also, the loopback test will almost always list 0x1b as needing to be escaped because that character cannot be read by loopback. 0x1b does not need to be escaped.

The following messages may appear when using the **-loopback** command:

```
Could not complete loop time test, connection timeout.
        Essential characters (0x90 and 0x9c) are
        probably getting garbled.
```

This usually occurs when the serial line is not configured for 8-bit data, or *sxprocess* is not started from the Serial Session window.

```
Character 0xnn could not be escaped!
```

This message appears when a character that needed to be escaped was discovered but failed when a loopback test was performed. This could happen if the escape character could not successfully be escaped, or if the line is so noisy that all attempts to test the character received a line hit.

:*n* (UNIX hosts) Sets the X display number for X protocol connection requests. This parameter is used to reserve X display numbers for use by Serial Xpress. For example, the host's X server may use the X display number 1, so Serial Xpress could use 2. In this case, you would enter **:2** on the command line. If for some reason 2 is already taken by another client or process, Serial Xpress increments by 1 until it finds an available display number.

-server<*n*> (VMS hosts) Sets the display server number for X protocol connection requests. The parameter is used to reserve X display numbers for use by Serial Xpress. For example, the host's X server may use the X display server number 1, so Serial Xpress could use 2. In this case, you would enter **2**. If for some reason 2 is already taken by another client or process, Serial Xpress increments by 1 until it finds an available display number.

-xtports Specifies a list of X connection socket types to be created. Specify a DECnet, tcpip, or local connection socket.

-xTransportProtocols
Specifies the types of X connection sockets that will be used by *sxprocess*. The transport protocol types can be specified in any order, however, the last type in the list determines which format will be used for the DISPLAY environment variable. The DECnet type is only valid on VAX VMS and ULTRIX versions of *sxprocess*.

-tmpdir Specifies the directory where message files and type local sockets are placed. The default value for this parameter is */tmp*.

-ver *level* Specifies the Serial Xpress program and protocol versions you are currently using. The *level* argument is optional. Entering no argument or **1** displays the program version. Entering **2** displays the program version and the protocol version.

-lechars *charlist* Specifies a list of characters that are to be avoided by the **-loopback** test.

-x25 Specifies that the X.25 network control characters are avoided by the **-loopback** test.

-sxptrans Specifies to which network computer and port to connect when not using a serial connection. Enter the network computer's name or address and the port number, separated with a colon. For example, *term:6250.*

-compression 1-9 Specifies the amount of compression to perform when passing data to and from the remote host. Entering **1** specifies the minimum compression, but uses less CPU. Entering **9** specifies the maximum compression, but takes more CPU.

Appendix B

Appendix **C**

Recommended Cable Wiring

The following tables show the recommended pinout wiring for the following cables:

- DB9 to DB25 straight-through (Table C-1)
- DB9 to DB25 null modem (Table C-2)
- DB25 to DB25 null modem (Table C-3)
- DB9 to DIN8 null modem (Table C-3)

If you create cables based on these tables, be sure to indicate on the cable the appropriate wiring. This eliminates confusion if you use the cable for another purpose in the future.

Figure C-1 shows the standard 9-pin serial port pinouts.

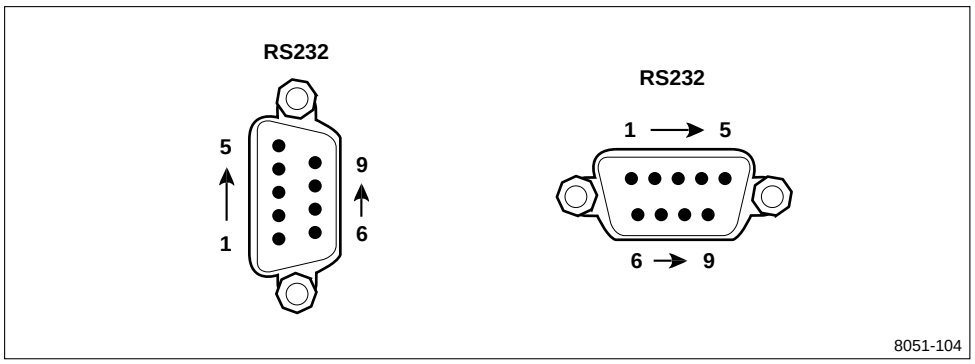

Figure C-1 Serial Port Pinouts.

Appendix C

Table C-1 Recommended DB9 to DB25 Straight-Through Wiring.

Signal	DB9 Pin	DB25 Pin
DCD	1	8
RXD	2	3
TXD	3	2
DTR	4	20
GND	5	7
DSR	6	6
RTS	7	4
CTS	8	5
no connect	9	

Table C-2 Recommended DB9 to DB25 Null Modem Wiring.

Signal	DB9 Pin	DB25 Pin
DCD	1	20
RXD	2	2
TXD	3	3
DTR	4	6, 8
GND	5	7
DSR	6	20
RTS	7	5
CTS	8	4
no connect	9	

Table C-3 Recommended DB25 to DB25 Null Modem Wiring.

Signal	DB25 Pin	DB25 Pin
GND	1	1
TXD	2	3
RXD	3	2
RTS	4	5
CTS	5	4
DSR	6	20
GND	7	7
DCD	8	20
DTR	20	6, 8

Table C-4 Recommended DB9 to DIN8 Null Modem Wiring.

Signal	DB9 Pin	DIN8 Pin
DCD	1	1
RXD	2	3
TXD	3	5
DTR	4	7
GND	5	4
GND	5	8
RTS	7	2
CTS	8	6

Appendix C

Index

Network Computing Devices, Inc.
350 North Bernardo Avenue
Mountain View, CA 94043-5207

9300834