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Software Manual

Digi PortServer and PortServer II
RealPort Device Driver
AIX Release 4.1.x
92000235 Rev A

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Note:

This product is dependent on multiple devices and connections, including the host machine, the RealPort device driver, the PortServer and the TCP/IP network. The most inconsistent of these is the network itself; thus, depending on the speed and usage of your network, there may be slight delays when making or removing devices. These delays arise from establishing connections and sending data across the network to and from the PortServer. These are unavoidable and relatively small, but can become noticeable on slower systems.

If encountering strange behavior, check the system error log (see Error Messages, on page 32).

Note:

Be sure to read the *Release Notes* that may be included with this software device driver. The *Release Notes* contain information not available at this manual's press time.

Introduction

The RealPort device driver software for AIX Release 4.1 is an Optional Program Product requiring the TCP/IP Runtime System and the AIX Base Operating System (BOS) Runtime.
Once you have completed the hardware installation instructions in the Digi PortServer *User's Guide and Reference Manual*, you may proceed with the software device driver installation starting on page 6.
You may also wish to read the instructions for DigiSCREEN, Digi's multiple screen utility (page 24).

Software Installation

Installation of the RealPort device driver software for AIX Release 4.1 is a three part procedure. First, the device driver software is installed on your system. Second, the PortServer(s) are configured. Third, ttys are configured on the PortServer ports.

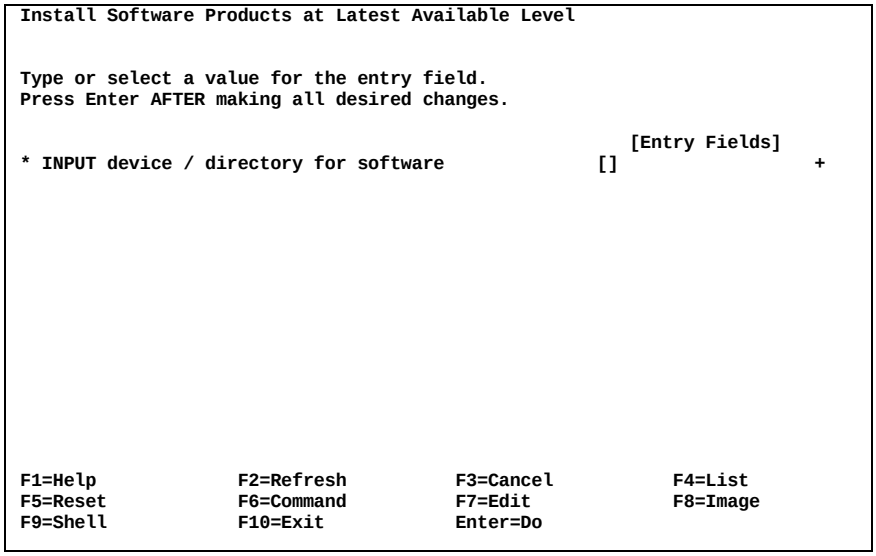
The TCP/IP Runtime System must be installed for the PortServer and the RealPort device driver to work.

Software changes more rapidly than printed documentation can keep up. For this reason, some of the screens or prompts may not appear exactly as shown.

Follow the instructions on the following pages to install and configure the RealPort device driver software.

Installing the Device Driver Software

1. Log onto the system as super-user (root).
2. Insert the DigiWARE diskette, and enter:
   `smit install_latest`
3. The system will display the *Install Software Products at Latest Available Level* screen:



You will be asked to specify the device containing the installation information. If your 3½" diskette drive is device **`/dev/fd0`**, enter:
`/dev/fd0`
or press <F4> for a list of supported devices. Select the appropriate device and press <Enter>.

4. You will now see the following screen:

```
Install Software Products at Latest Available Level


Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                  [Entry Fields]
* INPUT device / directory for software           /dev/fd0
* SOFTWARE to install                             []                +
  Automatically install PREREQUISITE software?    yes               +
  COMMIT software?                                yes               +
  SAVE replaced files?                            no                +
  VERIFY software?                                no                +
  EXTEND file systems if space needed?            yes               +
  REMOVE input file after installation?           no                +
  OVERWRITE existing version?                     no                +
  ALTERNATE save directory                        []




F1=Help           F2=Refresh        F3=Cancel         F4=List
F5=Reset          F6=Command        F7=Edit           F8=Image
F9=Shell          F10=Exit          Enter=Do
```

This screen contains a list of installation parameters you may change. If this is a first time installation of the RealPort driver, you can use the default values for all of the installation parameters. Simply type:

`digiasync.ncxa.obj`

in the **Software to install** field and press <Enter> to begin the installation. If you are reinstalling the RealPort driver, you may wish to change some of the installation parameters. Use the <F1> ("Help") key to display help information for each parameter you wish to change. After selecting the appropriate installation parameters, type:

`digiasync.ncxa.obj`

in the **Software to install** field and press <Enter> to begin the installation.

5. The system will display information similar to the following during the installation:

```
installp:  Performing requisite checking.
        (This may take several minutes.)

installp:  The following software products will be applied:
        digiasync.ncxa.obj at level 1.0.0.0

installp:  Requisite checking complete.

    files restored: 1

installp:  Applying software for the "usr" part of product
        digiasync 1.0.0.0.

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    files restored: 10
The files for package digiasync.ncxa.obj are being verified.
This may take several minutes, please wait.

Validating Database

installp: The installation was SUCCESSFUL for the "usr" part of the
        following software products:
        digiasync.ncxa.obj 1.0.0.0

Installp Summary
----------------
Name                        Fix Id  Part    Event       Result      State
-------------------------------------------------------------------------------
digiasync.ncxa.obj                  USR     APPLY       SUCCESS     APPLIED
```

The RealPort driver software is now installed on your system and you are ready to configure the PortServers you installed in your system. Exit **`smit`** and proceed with the PortServer configuration, beginning on the following page.

Configuring the PortServer

The RealPort device driver must be able to locate the PortServer running on the network. For this to occur, the IP address of the PortServer must be known by the name server or exist in **`/etc/hosts`**. To verify that the host machine can locate the PortServer across the network, enter:

`ping` *IP_Address*

For complete information, refer to your AIX documentation.

Perform the following steps to configure Digi PortServers:

1. Enter:

`smit dev`

2. The system will display the *Devices* screen:

```
                                  Devices

Move cursor to desired item and press Enter.

  Configure Devices Added After IPL
  Printer/Plotter
  TTY
  Asynchronous Adapters
  Digi PortServers
  PTY
  Console
  Fixed Disk
  CD ROM Drive
  Diskette Drive
  Tape Drive
  Communications
  High Function Terminal (HFT)
  SCSI Initiator Device
  SCSI Adapter
  Asynchronous I/O
  Multimedia
  List Devices

F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Use the up and down arrow keys to select **Digi PortServers** and press <Enter>.

3. The system will display the *Digi PortServers* screen:

```
                              Digi PortServers

Move cursor to desired item and press Enter.

  List All Defined PortServers
  List All Supported PortServers
  Add a PortServer
  Change / Show Characteristics of a PortServer
  Remove a PortServer
  Configure a Defined PortServer
  Reset PortServer Daemon
  Generate an Error Report
  Trace a PortServer

F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Use the up and down arrow keys to select **Add a PortServer** and press <Enter>.

4. The system will display the following:

```
Digi PortServer

    Move cursor to desired item and press Enter.

      cts_8  Digi PortServer 8
      cts_16 Digi PortServer 16

    F1=Help                 F2=Refresh              F3=Cancel
    F8=Image                F10=Exit                Enter=Do
    /=Find                  n=Find Next
```

Use the up and down arrow keys to select the appropriate type of PortServer (8 port or 16 port) and press <Enter>.

5. The system will display the *Add a Digi PortServer* screen:

```
Add a Digi PortServer

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  Digi PortServer Type                                cts_16
  Description                                         Digi PortServer 16 +
  Location  *Must enter one.
              INTERNET NAME                          []
              INTERNET ADDRESS (dotted decimal)      []
  Current STATE                                       up                 +

F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

You will be asked to specify the IP name and/or the IP address of the PortServer. This screen also contains a **Current STATE** option. The default setting is "up", but you may wish to change this if you want the PortServer to remain at a DEFINED state.

The PortServer must be AVAILABLE to function with the RealPort device driver.

After selecting the appropriate installation parameters, press <Enter> to configure the PortServer.

The PortServer is now configured on your system and you are ready to proceed with tty configuration.

The RealPort Daemon

The daemon for the RealPort driver runs in the background and monitors the connection between the PortServer and the host machine.
The daemon is named **ncxd***?*, where "*?*" equals the **sa** number. For example, a PortServer with device name **sa2** would have a daemon named **ncxd2**.
There is one daemon for each PortServer configured.
If the daemon isn't able to make a valid connection to the PortServer, or loses its network connection, it will log an error message and try again in 60 seconds.
If the PortServer has been powered down and then up again, the daemon will also lose its network connection.
Since there is one daemon for each PortServer configured, to restart the daemon manually, simply enter:

/etc/rst_daemon <*device number*> <*device number*> ...

For example, to restart PortServer **sa2**, enter:

```
/etc/rst_daemon sa2
```

To restart multiple PortServer daemons, list all the device numbers you wish to restart on the command line:

```
/etc/rst_daemon sa2 sa3 sa4
```

To restart the PortServer daemon through smit, enter:

```
smit digi_nts
```

then select "**Reset PortServer Daemon**" and press <Enter>. You will now be shown a list of configured PortServers. Select the PortServer you wish to restart.

To obtain a PortServer device number, see the note on the following page.

Configuring ttys

Configuring ttys on the PortServer ports is the same as configuring ttys on IBM async adapters. For complete information, refer to your AIX documentation.

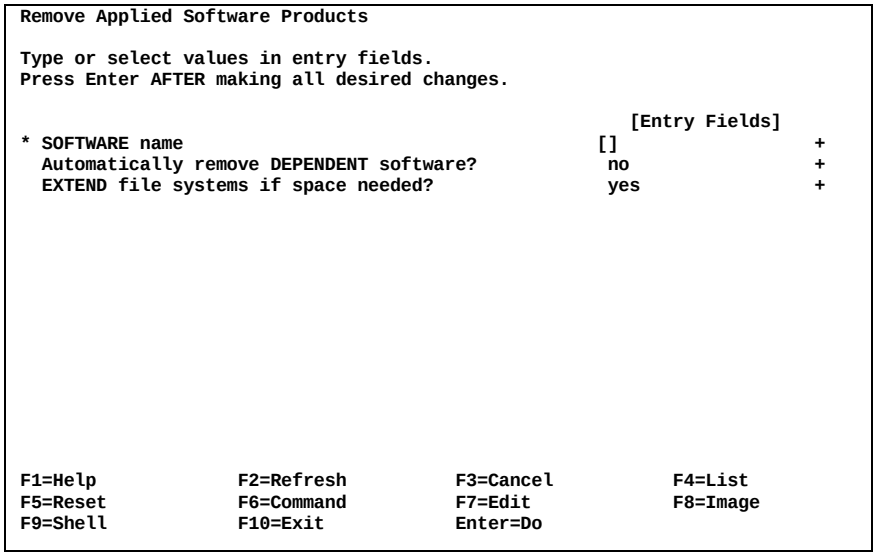
The RealPort device driver for AIX supports PortServer II concentrators with up to three PORTS modules attached. To configure the PORTS modules, simply connect them to the PortServer II, and turn on the power. Configuring the ports on the PORTS modules is just as easy. Once you have configured the PortServer II (see page 10), configure the PORTS module ports as you would the PortServer II ports. The port numbers on the PORTS module are a logical extension of the port numbers on the PortServer II. For example, on a sixteen port PortServer II with an attached PORTS/16em module, the PortServer II ports are numbered 1-16, and the PORTS/16em ports are numbered 17-32. All 32 ports are considered to be part of the same PortServer II **sa** device.

The tty location code consists of four fields. The first two are zero, third field is defined as the PortServer **sa** device number, and the last field is the port number.
For example, a tty (port 6) on a PortServer with device number **sa2**, the tty location code is **`00-00-02-06`**.
For a complete tty listing, enter **`smit tty`** and select "**List All Defined TTYs**".
For a list of PortServers, enter **`smit digi_nts`** and select "**List All Defined PortServers**".

Uninstalling the RealPort Device Driver

The RealPort device driver software can be removed from the system using the **`smit`** command.

1. Run **`smit`** to remove all Digi PortServers you configured on your system.
2. Log onto the system as super-user (root).
3. Enter:
   `smit install_remove`
4. The system will display the *Remove Applied Software Products* screen:



   Type **`digiasync.ncxa.obj`** in the SOFTWARE name field and press <Enter>.

The Digi RealPort device driver will now be removed from your system.

Setting Terminal Options with stty-ncxa

stty-ncxa is a utility program that sets and displays the terminal options for the RealPort device driver. **stty-ncxa** is located in your **/usr/lbin/tty** directory.

The format is:

stty-ncxa [**-a**] [*option(s)*] [*ttyname*]

With no options, **stty-ncxa** displays all Digi special driver settings, modem signals, and all standard parameters displayed by **stty(1)** for the tty device referenced by standard input.

Command options are provided to change flow control settings, set transparent print options, force modem control lines, and display all tty settings. Any unrecognized options are passed to **stty(1)** for interpretation.

The options are:

-a Display all of the unique Digi option settings, as well as all of the standard tty settings reported by **stty -a**.

ttyname Set and display options for the given tty device, instead of standard input. This form can be used with a tty pathname prefixed by **/dev/** or with a simple tty name beginning with **tty**. This option may be used on a modem control line when no carrier is present.

The following options specify transient actions to be performed immediately:

break Send a 250 MS break signal out on the tty line.

flush Immediately flush (discard) tty input and output.

flushin Flush tty input only.

flushout Flush tty output only.

The following options specify actions which are not “sticky,” meaning that the changes are reset when the device is closed, and that the device will use the default values the next time it is opened.

stopout Stop output exactly as if an **xoff** character was received.

startout Restart stopped output exactly as if an **xon** character was received.

stopin Activate flow control to stop input.

startin Release flow control to resume stopped input.

[-]dtr Raise [drop] the DTR modem control line, unless DTR hardware flow control is selected.

[-]rts Raise [drop] the RTS modem control line, unless RTS hardware flow control is selected.

The following options are “sticky”—the effects continue until the system is rebooted or until the options are changed.

[-]fastcook Perform cooked output processing on the intelligent card to reduce host CPU usage, and increase raw mode input performance.

[-]fastbaud Alter the baud rate tables, so 50 baud becomes 57,600 baud.

[-]rtspace Enable [disable] RTS hardware input flow control, so RTS drops to pause remote transmission.

[-]ctspace Enable [disable] CTS hardware output flow control, so local transmission pauses when CTS drops.

[-]dsrpace Enable [disable] DSR hardware output flow control, so local transmission pauses when DSR drops.

[-]dcdpace Enable [disable] DCD hardware output flow control, so local transmission pauses when DCD drops.

[-]dtrpace Enable [disable] DTR hardware input flow control, so DTR drops to pause remote transmission.

[-]forcedcd Disable [re-enable] carrier sense, so the tty may be opened and used even when carrier is not present.

startc *c* Sets the XON flow control character. The character may be given as a decimal, octal or hexadecimal number. Octal numbers are recognized by the presence of a leading zero, and hexadecimal numbers are denoted by a leading "0x". For example, the standard XON character, <CTRL-Q>, can be entered as "17" (decimal), "021" (octal) or "0x11" (hexadecimal).

stopc *c* Sets the XOFF flow control character. The character may be given as a decimal, octal, or hexadecimal number (see **startc**, above, for format of octal and hexadecimal numbers).

astartc *c* Sets auxiliary XON flow control character. The character may be given as a decimal, octal, or hexadecimal number (see **startc**, above, for format of octal and hexadecimal numbers).

astopc *c* Sets auxiliary XOFF flow control character. The character may be given as a decimal, octal, or hexadecimal number (see **startc**, above, for format of octal and hexadecimal numbers).

[-]aixon Enables auxiliary flow control, so that two unique characters are used for XON and XOFF. If both XOFF characters are received, transmission will not resume until both XON characters are received.

Also see **stty**(1), **ioctl**(2), **termio**(4), and **terminfo**(5).

DigiPRINT Transparent Print Feature

Description & Theory of Operation

Most terminals have an auxiliary port that can be connected to a serial printer. These terminals support two print modes, Auxiliary and Transparent. If both print modes are OFF, data received by the terminal is simply displayed on the screen. With Auxiliary print mode ON, data received by the terminal is displayed on the screen, and is also transmitted to the printer. With Transparent Print Mode ON, the terminal transmits data received directly to the printer, without displaying it on the screen.

DigiPRINT allows you to use your terminal in a normal manner, while information is also being sent *over the same serial connection from the host* to the printer connected to the terminal's auxiliary printer port. This is "transparent printing." The DigiPRINT software determines whether packets of data are bound for the screen or for the printer, and precedes data bound for the printer with the Transparent Print Mode ON command, and follows it with the Transparent Print Mode OFF command.

Data for the terminal screen has the highest priority, and DigiPRINT sends data to the printer only if there is a break in information being sent to the screen. If continuous data is being transmitted to the terminal device, nothing gets sent to the printer.

Whenever an auxiliary printer port is used, flow control to the printer becomes an issue. If the printer falls behind and invokes flow control, output to both the printer and the terminal is stopped: this is aggravating to the terminal user.

The **`stty-ncxa`** command provides three parameters to limit printer output and avoid this situation. (See *Setting Terminal Options with stty-ncxa* on page 16 for a complete description of the **`stty-ncxa`** command.)

The parameter **`maxcps`** limits the maximum printer port character-per-second data rate. This number should be set to the minimum character rate the printer can sustain in typical use.

The parameter **`maxchar`** limits the number of characters queued to the printer ahead of terminal output. Lower numbers increase system overhead, higher numbers result in keystroke echo delays. A value of 50 is generally a good compromise at 9600 baud.

The parameter **bufsize** should be set to a value just below the printer's buffer size. After a period of inactivity, the driver will burst up to this many characters to the printer to fill the print buffer before slowing to the maxcps rate.

The printer on/off strings are also set using **stty-ncxa**.

DigiPRINT will be available for use after the DigiBoard device driver software for your operating system is installed, and the transparent print options are activated with the **stty-ncxa** program.

A cable must be connected between the auxiliary port of the terminal and the printer. The baud rate on the terminal auxiliary port and the printer must be the same, and the printer and the auxiliary port of the terminal must use the same handshaking mode. The auxiliary port must also be enabled. If your terminal is not one of those directly supported, you must know the escape sequence of your terminal.

Refer to your terminal and printer manuals for connection information, escape codes, and to see what handshaking modes are supported (i.e. xon/xoff, busy/ready, rts/cts, etc.).

Printer devices (**lp1**, etc.) must not be in either the **/etc/inittab** or **/etc/ttys** files, and must not be enabled.

Transparent Print Activation

DigiPRINT is activated with **stty-ncxa**. The **stty-ncxa** program configures the DigiBoard tty device driver for transparent print options (See *Setting Terminal Options with stty-ncxa* for a complete description of the **stty-ncxa** command). The **stty-ncxa** command must be run each time the machine is booted. Usually, the best way to do this is by adding **stty-ncxa** commands to your **etc/rc** system initialization file. Alternatively, you may include the **stty-ncxa** command sequence in your **.login** or **.profile** files, to ensure that DigiPRINT is activated when you log in. Your System Administrator can help you edit these files. The pathname for **stty-ncxa** is **/usr/lbin/tty/stty-ncxa**.
DigiPRINT transparent print Options are set using the **stty-ncxa** program in the following manner:

stty-ncxa [*option(s)*] *port*

The command line options are:

maxcps ***n*** Sets the maximum Characters Per Second (CPS) rate at which characters are output to the transparent print device. See *Setting Terminal Options with stty-ncxa* (page 16) for more information.

maxchar ***n*** Sets the maximum number of transparent print characters the driver will place in the output queue. See *Setting Terminal Options with stty-ncxa* for more information.

bufsize ***n*** Sets the driver's estimate of the size of the transparent printer's input buffer. See *Setting Terminal Options with stty-ncxa* for more information.

onstr ***s*** Sets the terminal escape sequence to turn the transparent printer on. An arbitrary octal character *xxx* may be given as ***xxx***.

offstr ***s*** Sets the terminal escape sequence to turn the transparent printer off. An arbitrary octal character *xxx* may be given as ***xxx***.

term ***t*** Specifies the terminal type. See *Setting Terminal Options with stty-ncxa* for more information.

port Specifies the tty device.

Now data can be sent to your printer via the printer devices.

Example: **`cat`** *filename* **`> /dev/lp1`**

stty-ncxa Examples

Example 1:
The following command configures the DigiPRINT options for a DEC VT100 terminal connected to **`/dev/tty1`**. (Note that the printer uses **`/dev/lp1`**). **`maxcps`**, **`maxchar`** and **`bufsize`** are left to defaults. Type:

```
stty-ncxa term vt100 /dev/tty1
```

Example 2:
The following example uses **`onstr`** and **`offstr`** arguments. (This sets the terminal to use ANSI Standard.) Again **`maxcps`**, **`maxchar`**, and **`bufsize`** are defaults. Type:

```
stty-ncxa onstr "\033[5i" offstr "\033[4i" /dev/tty1
```

Example 3:
This example command sets the DigiPRINT option for a WYSE30 terminal, with **`maxcps`** of 75, a **`maxchar`** of 100, and a printer buffer size, **`bufsize`**, of 1000. Type (all on one line, with a carriage return at the end only):

```
stty-ncxa term wyse30 maxcps 75 maxchar 100 bufsize 1000 /dev/tty1
```

Remote Booting of Firmware

For more information, see the PortServer *User's Guide and Reference Manual* for documentation on remote booting of the PortServer. For a more detailed description of the tftp process, refer to your AIX documentation regarding **`tftp`** and the **`tftpd`** daemon.

To set up remote booting of firmware,
On the PortServer, enter the following commands:
`set config boothost=`*<IP address of host machine with firmware>*
`set config Bootfile=`*<full path to location of firmware>*
On the host machine:

1. Edit **`/etc/inetd.conf`** to verify that **`tftp`** line is not commented out.
   If file **`inetd.conf`** is altered, enter:
   `inetimp` to copy changes to ODM.
   `refresh -s inetd` to reinitialize the **`tftpd`** daemon.
2. For controlled tftp access make sure that **`/etc/tftpaccess.ctl`** exists and verify that it only allows access to public directories.
   If this file is not present **`tftp`** will allow full access.
   (Sample file is located in **`/usr/lpp/tcpip/samples/`**)

DigiSCREEN Multiple Screen Utility

Description and Theory of Operation

DigiSCREEN is a utility that allows a single physical terminal to be connected to several virtual terminal sessions (*screens*) at one time. It is mainly intended for use with terminals that have two or more pages of screen memory. With such terminals, switching between virtual screens will also switch between physical terminal screen pages, allowing each virtual screen's image to be saved and restored. On terminals without multiple pages of screen memory, DigiSCREEN can still be used to switch among virtual screen sessions, although the appearance of the screen will not be maintained when switching screens.

Note: For full support of DigiSCREEN, your terminal must be able to switch internal screen pages on command *and must remember the cursor position for each page*. While DigiSCREEN will work on both smart and dumb terminals, screen images are not saved during screen changes on dumb terminals. DigiSCREEN also supports terminals connected to two or more computers through separate serial ports.

Options

DigiSCREEN is called with the following format:

`dscreen` [**`-i`** *infofile*] [**`-t`** *termtype*]

If *infofile* is specified, it will be used as the source of terminal configuration information. Otherwise, if the environment variable **`DSINFO`** is defined, it specifies the name of the file to be used as the source of terminal configuration information. If neither *infofile* nor **`DSINFO`** is specified, the configuration information is read from the file **`/etc/dsinfo`**. This option is used to define a different set of keys to be used with DigiSCREEN, e.g. when the originally defined DigiSCREEN keys conflict with an application one wishes to use. The terminal type is used to select which entry in the *infofile* (default **`/etc/dsinfo`**) is used to describe the terminal. If the desired terminal type does not match the setting of the **`TERM`** environment variable (again, for alternate key mappings), it can be specified as *termtype* with the **`-t`** option.

Using DigiSCREEN

When DigiSCREEN is run, it starts up one virtual screen. Some of the keys on the terminal keyboard will not be passed through to the virtual screen; instead, DigiSCREEN will intercept these keys and perform certain actions when they are pressed. The actions include select a specific screen, block all input and output, start a new screen, end DigiSCREEN (exit code 0), quit DigiSCREEN (exit code 1), switch to the previous screen, and list the DigiSCREEN keys and what they do. Which function each key performs is dependent upon the terminal and the terminal description in the **`dsinfo`** file.

When a new virtual screen is created, it is assigned to a select key. When this key is pressed, DigiSCREEN will switch the physical terminal to the video page associated with the particular virtual screen and direct all input and output to go between the physical terminal and the virtual screen. Each virtual screen must have a select key; once all of the select keys defined in the **`dsinfo`** file have virtual screens assigned to them, no more screens may be created. Individual screen sessions will end when the original shell process exits, and this will free the associated select key for use with another virtual screen. DigiSCREEN exits when there are no more active screens.

Block keys can be used to stop output (in a fashion similar to <Ctrl-S> when using "**`ixon`**" flow control). However, the true purpose of these keys is to allow for transparently setting up terminal sessions on two computers using a terminal that has two serial ports. See **`dsinfo`** (page 27) for more information.

Pressing a new screen key will create a new screen and assign it to one of the select keys, unless one of the necessary resources is exhausted. Each new screen requires a select key as defined in the **`dsinfo`** file, a DigiSCREEN pseudo terminal device, enough memory for the various structures used to keep track of the screen, and a process to run the shell. If any of these are not available, the new screen operation will fail and print a message indicating the reason for the failure.

Pressing an end key will send a SIGHUP signal to all the screen sessions, clean up, and exit with a status of 0. Pressing a quit key will perform the same actions, but will exit with a status of 1.

Pressing a previous key will switch the terminal to the screen that was last displayed.

Pressing a list key will cause a list of the keys recognized by DigiSCREEN and their actions to be displayed on the terminal. When DigiSCREEN starts a new screen, it will display the message "Press *KEY* for help" (where *KEY* is the name of the list key) if there is a list key defined.

Dynamic Screen Assignment

Normally, the terminal description entry in the **dsinfo** file will have the same number of screen selection keys as the terminal has physical screen pages. However, if more screen selection keys are defined than the number of physical screen pages defined, DigiSCREEN will dynamically assign physical screen pages to virtual screens. When a virtual screen that doesn't have an associated page of screen memory in the terminal is selected, DigiSCREEN assigns the least recently used physical screen to the virtual screen. When this occurs, some sort of indication is given that the physical screen is connected to a different virtual screen; for instance, the screen may be cleared. Using a terminal that has only one physical screen is the simplest case of this; the one screen is shared between all virtual screens.

Notes:

- Avoid switching screens when the screen is being written to; you may interrupt an escape sequence and leave the terminal in an unknown state.
- Even if your terminal saves the cursor position for individual screens, it may not save other states such as insert mode, inverse video, etc. If this is the case in your situation, make sure you are not in any such mode when you switch screens.

DSINFO DigiSCREEN Information File

Description

/etc/dsinfo is a database of terminal descriptions used by **dscreen** (DigiSCREEN). The information in the descriptions include what keys are to be used by DigiSCREEN and what functions they perform, how many pages of screen memory the terminal has, and what code sequences are sent/received to use these features.

Entry Format

Entries in **/etc/dsinfo** consist of a number of comma separated fields. The first field is a list of alternate names for the terminal, separated by "**|**" characters.
The remaining fields are strings describing the capabilities of the terminal to DigiSCREEN. Within these strings, the following escape codes are recognized:

\E,\e	escape character
\n,\l	newline (a.k.a. linefeed) character
\r	carriage return
\t	tab character
\b	backspace character
\f	formfeed character
\s	space character
*****nnn*	character with octal value *nnn*
^*x*	<Ctrl-*x*> for any appropriate *x*

Any other character preceded by a backslash will yield the character itself. The strings are entered as *type=string*, where *type* is the type of string as listed below, and *string* is the string value.

String Types
The string types are as follows:

dsk*x* A string type that starts with "**dsk**" describes a key. The type must be four letters long, and the fourth letter *x* indicates what action is taken when the key is received. The key types are:

Type	Action
dsks	Switch Screens
dskb	Block Input and Output
dske	End DigiSCREEN
dskq	Quit DigiSCREEN (non-zero exit status)
dskc	Create New Screen
dskp	Switch to Previous Screen
dskl	List Keys and Actions

Any other key type (a string type **dsk***x* that doesn't end in **s**, **b**, **e**, **q**, **p**, or **l**) will cause no internal dscreen action, but will show up in the key listing and will be recognized and acted upon (see below). A type of **dskn** (**n** for No Operation) is guaranteed not to be used for any function in future versions; it is recommended that this be used when no internal dscreen action is desired. The value string for each key has three substrings, which are separated by "**|**" characters (use "**\|**" to include the "**|**" character in one of the substrings). The first substring is the sequence of characters that the terminal sends when the key is pressed. The second substring is a label for the key that is printed when a list of the keys is presented (for example, "Shift-F1"). The third substring is a sequence of characters that DigiSCREEN sends to the terminal when this key is pressed, before performing the action this key requests.

dsp A string type of "**dsp**" describes a physical screen in the terminal. One **dsp** string should be present for each physical screen in the terminal. The value string for each physical screen has two substrings, which are separated by a "**|**" character (again, use "**\|**" to include the "**|**" character in one of the substrings). The first substring should be the sequence of characters to send to the terminal to display and output to the particular physical page on the terminal. The second substring is sent to the terminal any time the page is used for something new. This second substring is usually set to the clear screen sequence. It is sent under two conditions. The first condition is when a new virtual terminal session is being created. The second condition occurs when the user is running more virtual terminals than there are physical screens; if

the user selects a virtual terminal such that DigiSCREEN has to re-use one of the physical screens, it will send this sequence to the screen to indicate to the user that the screen contents don't match the output of the virtual terminal to which it is connected. Note that running with more virtual terminals than physical screens can be quite confusing and is not particularly recommended; it can be avoided by defining no more screen selection keys ("**dsks=...**") than physical screens ("**dsp=...**") in the **dsinfo** entry.

dst A string with a type of "**dst**" adjusts DigiSCREEN's input timeout. The value of the string should be a decimal number. The timeout value is in tenths of a second, and has a maximum value of 255. The default timeout value is 1 (or .1 seconds). When DigiSCREEN recognizes a prefix of an input key sequence but doesn't have all the characters of the sequence, it waits for more characters. If the timeout occurs before more characters are received, the characters are sent on to the virtual screen and DigiSCREEN will not consider these characters as part of an input key sequence. It may be necessary to raise this value if one or more of the "keys" DigiSCREEN is to trigger on is actually a number of keystrokes (i.e. assigning Ctrl-Z 1, Ctrl-Z 2, Ctrl-Z 3, etc. for screen selection, Ctrl-Z N for new screen and so on).

Example 1

The following example entry is for a Wyse 60 with three screens:

```
wy60|wyse60|wyse model 60,
            dsks=^A`^M|Shift-F1|,
            dsks=^Aa^M|Shift-F2|,
            dsks=^Ab^M|Shift-F3|,
            dskc=\200|Ctrl-F1|,
            dske=\201|Ctrl-F2|\Ew0\E+,
            dskl=\202|Ctrl-F3|,
            dsp=\Ew0|\E+,
                  dsp=\Ew1|\E+,
                  dsp=\Ew2|\E+,
```

With this entry, <Shift-F1> through <Shift-F3> are used for selecting screens 1 through 3, respectively. <Ctrl-F1> will create a new screen, <Ctrl-F2> will send "<ESC> w 0 <ESC> +" to the screen (switching to window 0 and clearing the screen) and then end dscreen, and <Ctrl-F3> will list the keys and their functions. The three physical screens are displayed by sending "<ESC> w 0", "<ESC> w 1", and "<ESC> w 2." Each time a physical screen is used for a new screen, the sequence "<ESC> +" will be sent to the terminal, which will clear the screen.

Example 2

This example is, again, for a Wyse 60 with three screens, but one of the screens is on a second computer communicating through the second serial port on the terminal:

```
wy60-1|wyse60-1|wyse model 60 - first serial port,
                      dsks=^A`^M|Shift-F1|,
                      dsks=^Aa^M|Shift-F2|,
                      dskb=^Ab^M|Shift-F3|\Ed#^Ab\r^T\Ee9,
                      dskc=\200|Ctrl-F1|,
                      dske=\201|Ctrl-F2|\Ed#\201^T\Ew0\E+,
                      dskl=\202|Ctrl-F3|,
                      dsp=\Ew0|\E+,dsp=\Ew1|\E+,

wy60-2|wyse60-2|wyse model 60 - second serial port,
                      dskb=^A`^M|Shift-F1|\Ed#^A`\r^T\Ee8,
                      dskb=^Aa^M|Shift-F2|\Ed#^Aa\r^T\Ee8,
                      dsks=^Ab^M|Shift-F3|,
                      dskc=\200|Ctrl-F1|,
                      dske=\201|Ctrl-F2|\Ed#\201^T\Ew0\E+,
                      dskl=\202|Ctrl-F3|,
                      dsp=\Ew2|\E+,
```

For this setup to work, DigiSCREEN must be run on both computers, with terminal type **`wy60-1`** on the first computer and terminal type **`wy60-2`** on the second computer (using the **`-t`** option to DigiSCREEN). The **`wy60-1`** entry will be examined first.

The first two key entries are unchanged from the original wy60 entry. The third key, however, has type "**`dskb`**," which means block both input and output. When this key is pressed, the sequence "<ESC> d # <Ctrl-A> b <CR> <Ctrl-T> <ESC> e 9" is sent to the terminal; after this output is blocked and DigiSCREEN continues scanning input for key sequences but discards all other input.

The effects caused by the sequence sent to the terminal contain the real magic here. The sequence "**<ESC> d #**" puts the terminal in "Transparent Print Mode," which echoes all characters up to a **<Ctrl-T>** out the other serial port. The characters "**<Ctrl-A> b <CR>**" are sent out the other serial port, informing the **`dscreen`** process on the other computer that it should activate the window associated with the **<Shift-F3>** key. The "**<Ctrl-T>**" takes the terminal out of the Transparent Print mode, and the sequence "**<ESC> e 9**" tells the terminal to switch to the other ("AUX") serial port for data communications.

At this point the other computer takes over and sends an "**<ESC> w 2**" to switch to the third physical screen, and then resumes normal communication. The wy60-2 entry follows the same general pattern for keys **<Shift-F1>** and **<Shift-F2>**: switch to transparent print mode; send function key string to other computer; switch transparent print off; and switch to the other serial port. The end key (**<Ctrl-F2>**) works the same for both computers; it sends the end key sequence to the other computer through the transparent print mechanism, switches the terminal to window 0, clears the screen, then exits.

Error Messages

Error messages from the Digi RealPort device driver are written to the system error log. The **errpt** command can be used to produce an error report from the system error log.
The device driver may generate the error messages on the following pages (as reported by **errpt -a -N ncxadd**):

For more information on error messages, see:
The **errdemon** daemon.
The **errclear** command, **errdead** command, **errlogger** command, **errpt** command, **errstop** command.
The *Error Logging Overview* in *General Concepts and Procedures*.

```
ERROR LABEL:   COM_CFG_RESID
ERROR ID:      F8DE6FFF

Date/Time:       Oct 11 16:32:08
Sequence Number: 108214
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Configuration failed: resid not correct

Install Causes
Configuration data base improperly set up.

        Recommended Actions
        Correct configuration data base.

Failure Causes
Call to configuration entry point does not have proper size \
for DDS.

        Recommended Actions
        Fix customized configuration program.
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Error code as defined in sys/errno.h
           0
ERROR CODE
```

What it means:

The DDS structure passed from the **`cfgncxa`** configuration method to the driver configuration entry point is not the correct size.

Action to take:

Reinstall the driver software. If the problem persists, contact your service representative.

```
ERROR LABEL:   COM_CFG_UIO
ERROR ID:      34799EB6

Date/Time:       Oct 11 16:32:08
Sequence Number: 108215
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Configuration failed: resid not correct

Install Causes
Configuration data base improperly set up.

        Recommended Actions
        Correct configuration data base.

Failure Causes
Call to configuration entry point attempts to use a DDS not \
readable by process.

        Recommended Actions
        Fix customized configuration program.
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Error code as defined in sys/errno.h
           0
```

What it means:
The DDS structure passed from the **`cfgncxa`** configuration method to the driver configuration entry point is unreadable.
Action to take:
Reinstall the driver software. If the problem persists, contact your service representative.

```
ERROR LABEL:   COM_CFG_DEVA
ERROR ID:      C2D34FCD

Date/Time:       Oct 11 16:32:08
Sequence Number: 108216
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Configuration failed: devswadd failed

Install Causes
Configuration data base improperly set up.

        Recommended Actions
        Correct configuration data base.

Detail Data
Error code as defined in sys/errno.h
           0
```

What it means:
The driver configuration entry point encountered an error adding entries to the device switch table.

Action to take:
Reinstall the driver software. If the problem persists, contact your service representative.

```
ERROR LABEL:   COM_CFG_PIN
ERROR ID:      396A4EE2

Date/Time:       Oct 11 16:32:08
Sequence Number: 108217
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Configuration failed: pincode failed

Install Causes
Configuration data base improperly set up.

        Recommended Actions
        Correct configuration data base.

Detail Data
Error code as defined in sys/errno.h
           0
```

What it means:
The driver configuration entry point encountered an error pinning driver resources in memory.

Action to take:
Reinstall the driver software. If the problem persists, contact your service representative.

```
ERROR LABEL:   COM_CFG_DEVD
ERROR ID:      297E736E

Date/Time:       Oct 11 16:32:08
Sequence Number: 108221
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Configuration failed: devswdel failed

Install Causes
Configuration data base improperly set up.

        Recommended Actions
        Correct configuration data base.

Detail Data
Error code as defined in sys/errno.h
           0
```

What it means:
The driver configuration entry point encountered an error removing entries to the device switch table. A previous attempt to configure a Digi PortServer has failed and left the configuration data base in an incomplete state.

Action to take:
Verify the PortServer is no longer configured. If the problem persists, contact your service representative.

```
ERROR LABEL:   TTY_BADINPUT
ERROR ID:      86008481

Date/Time:       Oct 11 16:32:08
Sequence Number: 108222
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      TEMP
Resource Name:   ncxadd

Error Description
Bad ttyinput return

Failure Causes
If the error code is -1 or ENOMEM, then the problem is that the
system is out of cblocks.
Noisy port.
Communications program error.

        Recommended Actions
        If error code is -1 or ENOMEM, then fix the noisy port
or the communications package.
        For other error codes, third party vendor software may
be involved.
        IF PROBLEM PERSISTS, CONTACT APPROPRIATE SERVICE
REPRESENTATIVE

Detail Data
Error code as defined in sys/errno.h
           0
```

What it means:
This message is logged in a number of places in the driver for various reasons. This usually means there is a problem between the device driver and the tty subsystem.

Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_IO_ATT
ERROR ID:      062EC22C

Date/Time:       Oct 11 16:32:08
Sequence Number: 108223
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
I/O Segment Attach Failed

Failure Causes
Device Driver Error.
Adapter is going bad.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Driver Line Number:
         1064
```

What it means:
An error occurred attempting the attach to I/O memory and usually indicates a device driver error.

Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_MEM_ATT
ERROR ID:      8950E14E

Date/Time:       Oct 11 16:32:08
Sequence Number: 108224
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Memory Segment Attach Failed

Failure Causes
Device Driver Error.
Adapter is going bad.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Driver Line Number:
         1065
```

What it means:
An error occurred attempting the attach to bus memory and usually indicates a device driver error.

Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_CFG_TALLOC
ERROR ID:      9F6AA215

Date/Time:       Oct 11 16:32:08
Sequence Number: 108225
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
talloc failed

Failure Causes
Out of virtual memory space.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Error code as defined in sys/errno.h
           6
```

What it means:
An error occurred attempting to allocate a trb timer structure.
Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_CFG_RST
ERROR ID:      B0B2EC91

Date/Time:       Oct 11 16:32:08
Sequence Number: 108226
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Adapter Reset Failed

Failure Causes
Adapter is going bad.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Adapter I/O Port Address:
0000 0108
```

What it means:
The Digi PortServer did not respond to reset.
Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_CFG_BIOS
ERROR ID:      C28602A2

Date/Time:       Oct 11 16:32:08
Sequence Number: 108228
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Adapter BIOS Initialization Failed

Failure Causes
Device Driver Error.
Adapter is going bad.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
POSTAREA data:
0000
```

What it means:
An error occurred executing the on-board BIOS.
Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_CFG_FEPOS
ERROR ID:      2AC1B753

Date/Time:       Oct 11 16:32:08
Sequence Number: 108229
Machine Id:      000061453100
Node Id:         mynode
Error Class:     S
Error Type:      PERM
Resource Name:   ncxadd

Error Description
Adapter FEPOS Execution Failed

Failure Causes
Device Driver Error.
Adapter is going bad.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
FEPOS Status data:
0000
```

What it means:
An error occurred executing the on-board FEPOS.
Action to take:
Contact your service representative.

```
ERROR LABEL:   DASYNC_ADP_FAIL
ERROR ID:      944912ED

Date/Time:       Oct 11 16:32:08
Sequence Number: 108236
Machine Id:      000061453100
Node Id:         mynode
Error Class:     H
Error Type:      PERM
Resource Name:   ncxadd
Resource Class:  NONE
Resource Type:   NONE
Location:        NONE

Error Description
Async Adapter Failed

Failure Causes
Adapter is going bad.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Slot Number:
           0
```

What it means:
The driver software has detected an unrecoverable error communicating with the Digi PortServer.
Action to take:
Contact your service representative.

```
ERROR LABEL:   CXMA_CFG_PORT
ERROR ID:      680A6C7C

Date/Time:       Mon Apr 17 16:50:11
Sequence Number: 753
Machine Id:      000099133100
Node Id:         mynode
Class:           S
Type:            PERM
Resource Name:   ncxadd

Error Description
Bad Adapter I/O Port Address

Install Causes
4010

        Recommended Actions
        CORRECT ADDRESS FROM MODEM KEYPAD

Failure Causes
Adapter should not be at this I/O Port Address.

        Recommended Actions
        Choose a Different Adapter I/O Port Address

Detail Data
Adapter I/O Port Address:
```

What it means:

Unable to get PortServer IP address from IP name entered.

Action to take:

Check that the PortServer IP name and address in name server or **`/etc/hosts`**. Try configuring the PortServer with its IP address. Contact your service representative.

```
ERROR LABEL:   COM_CFG_UNK
ERROR ID:      7993098B

Date/Time:       Mon Apr 17 16:50:11
Sequence Number: 751
Machine Id:      000099133100
Node Id:         mynode
Class:           S
Type:            PERM
Resource Name:   ncxadd

Error Description
Configuration failed: bad adapter type

Install Causes
Configuration data base improperly set up.

        Recommended Actions
        Correct configuration data base.

Failure Causes
Adapter type specified not known to this level of driver.

        Recommended Actions
        Install updated driver code.
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
TYPE
```

What it means:
Unable to make proper connection to PortServer. RealPort driver currently only supports TCP/IP.
Action to take:
Contact your service representative.

```
ERROR LABEL:   CXMA_CONC_DOWN
ERROR ID:      E180FD0E

Date/Time:       Mon Apr 17 16:50:11
Sequence Number: 752
Machine Id:      000099133100
Node Id:         mynode
Class:           H
Type:            PERM
Resource Name:   ncxadd
Resource Class:  NONE
Resource Type:   NONE
Location:        NONE

Error Description
Concentrator Removed From System

Failure Causes
Concentrator removed from system

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Node ID:
```

What it means:
Unable to find PortServer on network with current settings.
Action to take:
Check that the network is functioning properly, the PortServer can be found by the host machine, and that the PortServer is running. Contact your service representative.

```
ERROR LABEL:   CXMA_IO_ATT
ERROR ID:      2AA90CCD

Date/Time:       Mon Apr 17 16:50:11
Sequence Number: 750
Machine Id:      000099133100
Node Id:         mynode
Class:           S
Type:            PERM
Resource Name:   ncxadd

Error Description
I/O Segment Attach Failed

Failure Causes
Device Driver Error.
Adapter is going bad.

       Recommended Actions
       CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Driver Line Number:
```

What it means:
Unable to make transport endpoint connection.
Action to take:
Make sure that the network is functioning normally. Contact your service representative.

```
ERROR LABEL:   IENT_ERR5
ERROR ID:      47E84916

Date/Time:       Mon Apr 17 16:50:11
Sequence Number: 749
Machine Id:      000099133100
Node Id:         mynode
Class:           S
Type:            UNKN
Resource Name:   ncxadd

Error Description
COMMUNICATIONS SUBSYSTEM FAILURE

Probable Causes
ADAPTER HARDWARE
SOFTWARE DEVICE DRIVER
DEVICE CABLE

Failure Causes
SOFTWARE DEVICE DRIVER
COMMUNICATIONS ERROR
ADAPTER

        Recommended Actions
        PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
RETURN CODE

STATUS CODE

PROGRAM CHECK CODE

SENSE DATA
```

What it means:
A transmit error has occurred.
Action to take:
Make sure that your network is functioning properly. Contact your service representative.

```
ERROR LABEL:   CXMA_CFG_TALLOC
ERROR ID:      59853D4A

Date/Time:       Mon Apr 17 16:50:11
Sequence Number: 754
Machine Id:      000099133100
Node Id:         mynode
Class:           S
Type:            PERM
Resource Name:   ncxadd

Error Description
talloc failed

Failure Causes
Out of virtual memory space.

        Recommended Actions
        CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detail Data
Error code as defined in sys/errno.h
```

What it means:
Unable to dynamically allocate memory for the transport-function.
Action to take:
Contact your service representative.

```
ERROR LABEL:   COM_PERM_PIO
ERROR ID:      622E5500

Date/Time:       Oct 11 16:32:08
Sequence Number: 108237
Machine Id:      000061453100
Node Id:         mynode
Error Class:     H
Error Type:      PERM
Resource Name:   ncxadd
Resource Class:  NONE
Resource Type:   NONE
Location:        NONE

Error Description
PIO exception

Failure Causes
0506

        Recommended Actions
        Adapter can be isolated based upon the address being
accessed and the adapter assignments made at configuration time.
        PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
PIO csr register
6000 3404
PIO dsisr register
8200 0000
PIO srval register
8200 0040
PIO dar register
4410 0100
ADAPTER CHECK STATUS
2000 0000
Additional information
0000 0000
```

What it means:
Permanent PIO error detected by driver.
Action to take:
Contact your service representative.

Digi Support Services

The Digi Bulletin Board System

Digi provides an electronic bulletin board service (BBS) for our customers. This bulletin board provides general and technical information about Digi's products.

The Digi BBS allows users to download software drivers as soon as they become available. There is also a feature to allow users with problems or questions about Digi products to leave messages to Digi Technical Support.

Using the Digi BBS is easy. Simply dial **(612) 912-4800**. In Europe, dial **+49 221 9205211**; in Asia, dial **+65 735 2460**.

The recommended modem communications parameters are 8 bits, no parity and one stop bit (**8 N 1**). Other settings may also work.

Download protocols include Zmodem, Xmodem, Ymodem, Kermit and others.

Internet FTP Server

Digi has set up an Anonymous FTP server for those with access to the Internet network. The address is **ftp.dgii.com**. Log in as **anonymous**, and enter your E-mail address when asked for a password. Drivers and installation tips are located in the **/drivers** directory. A text file, **download.doc**, gives information on uncompressing the files after downloading. Tip: Be sure to enter "**bin**" before downloading, to ensure binary transfer of files.

World Wide Web Server

Product information, manuals, new product announcements, programs, application stories and more can be obtained through the World Wide Web. Our address is **http://www.dgii.com**.

DigiFACTs FaxBack Server

Manuals and technical information can also be obtained by FAX. To use the FaxBack server, simply call (612) 912-4990 on a touch tone phone.

Information About Your System

Serial number of your Digi product: _____

Make, model and clock speed of your computer: _____

_____

How much RAM does your computer have? _____

Hard disk controller: Type: _____ Memory addressed at: _____

I/O port used: _____ IRQ: _____

LAN card: Type: _____ Memory addressed at: _____

I/O port used: _____ IRQ: _____

Other: Type: _____ Memory addressed at: _____

I/O port used: _____ IRQ: _____

Operating system: _____ Version: _____

Digi device driver version: _____

Technical Support

At Digi, we are proud of our products, and support them. Our dealers and distributors are fully trained on our product line, so that they can help you on a technical level should assistance be needed.
Your first level of support is your Digi dealer, the place where you purchased your Digi product. Your dealer has the training to help you with any installation questions or difficulties you might have.
If you still experience difficulties (after contacting your first level of support), Digi has a staff of Technical Support Specialists that can assist you. They can be reached at **(612) 912-3456**. In Europe, call **+49 221 920520**, and in Asia, call **+65 732 1318**. FAX numbers are: (612) 912-4958 (USA), +49 221 9205210 (Europe) and +65 732 1312 (Asia).
When you call Digi Technical Support, please call from a position where you can operate your system. Also, please fill out the form on the preceding page before calling, so your Technical Support representative can have a clear picture of your system and any potential conflicts between devices.
Digi Technical Support can also be reached via Internet E-mail. Please send correspondences to **support@dgii.com**, and include your voice and FAX phone numbers.

Customer Service

Digi also has a staff of Customer Service representatives to help you with software and documentation update requests, as well as Returned Merchandise Authorizations (RMAs) in case you need to return your Digi product for repair. They may be reached at **(612) 912-3456**. Digi Customer Service may be contacted by FAX at (612) 912-4959.
Digi Customer Service can also be reached via Internet E-mail. Please send correspondences to **cust_serv@dgii.com**, and include your voice and FAX phone numbers.