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

92000235B

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http://www.digi.com

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Introduction

Note: In this document, the term PortServer refers to either the PortServer or PortServer II. Digi's RealPort software works with both the PortServer and PortServer II products.

RealPort® is a protocol developed by Digi International that, when used in conjunction with device driver software on a host operating system, allows ports on the PortServer to be used as if they were connected directly to the host system.

RealPort software can be installed on one or more host servers to provide local serial port functionality. RealPort can be used to provide standard system TTY interfaces to control baud rate, parity, stop bits, and flow control of local serial ports. Any system utility or user application that works with a locally attached serial port should work with RealPort.

Requirement: The RealPort device driver software for AIX is an Optional Program Product requiring the TCP/IP Runtime System and the AIX Base Operating System (BOS) Runtime.

Installing RealPort

This chapter discusses RealPort installation. It includes the following topics:

Installation Overview

Follow this procedure to install RealPort in AIX.

Procedure

1. Read any release notes that may be included with the installation media.
2. Gather information necessary for installation. See *Information to Gather* on page 8.
3. Configure the PortServer for RealPort. See *Configuring a PortServer for RealPort* on page 9.
4. Install the RealPort driver. See *Installing the RealPort Driver* on page 11.
5. Add the PortServer in AIX. See *Adding a PortServer in AIX* on page 12
6. Create and configure the TTY devices. See *Creating and Configuring TTYs* on page 12.

Information to Gather

Get this information before installing RealPort:

- Determine the name and IP address to assign to each unconfigured PortServer
- Determine which PortServer ports will be mapped to which RealPort host.
- Determine the baud rate, data bits, parity, and other settings for each port.

Configuring a PortServer for RealPort

Follow this procedure to configure a PortServer to use RealPort.

Repeat this procedure for every PortServer.

1. Access a root prompt on the PortServer using one of the two following methods:

If this is an unconfigured PortServer:

Note: Telnet can also be used to login as root on the PortServer if **RARP** and **bootp** are correctly configured. For more information on **RARP** and **bootp**, refer to the *PortServer II Configuration and Administration Guide* or the *PortServer User's Guide and Reference Manual*.

a. Attach a terminal to port 1 of the PortServer and configure the terminal for VT-100 emulation, 9600 baud, 8 data bits, 1 stop bit, and no parity.

b. Turn on the PortServer and press **Return** or **Enter**.

c. At the login prompt, enter **root**

d. At the **passwd** prompt, enter **dbps**, which is the default root password.

If this PortServer has already been configured:

Login to the PortServer as root directly from an attached terminal or by using **telnet**.

Note: If a port is configured to bypass the PortServer login, you cannot directly log into the PortServer from that port. Use another port that does not bypass the PortServer login or use **telnet** to login to the PortServer.

5. Set the PortServer's IP address with this command:

   set config ip=[*ipaddress*]

   where **[*ipaddress*]** is the IP address the PortServer will use.

6. Set any other relevant PortServer **set config** parameters such as **nameserver**, **gateway**, etc. Refer to the *PortServer II Configuration and Administration Guide* or the *PortServer User's Guide and Reference Manual* for details on initial PortServer configuration.

7. Check the RealPort TCP port value with this command:

   set config

   The default value is 771. If it is some other number, change it to 771 with this command:

   set config realport=771

8. Configure the PortServer ports using RealPort to **prn** by using a **set ports** command. The following example configures ports 2-16 of a PortServer for RealPort:

   set ports range=2-16 dev=prn

9. If 8-pin RJ-45 cables are used on the PortServer, the **altpin** option should be enabled. The following example enables altpin on ports 2-16 of a PortServer:

   set flow range=2-16 altpin=on

10. This configuration can be confirmed with these commands:

    set config
    set ports range=2-16
    set flow range=2-16

Installing the RealPort Driver

Use this procedure to install the AIX RealPort device driver.

Installation Procedure

1. Log onto the console as super-user (root).
2. Insert the Digi AIX RealPort driver diskette and enter:

   smit install_latest

   The system will display:

   ```
   Install Software Products at Latest Available
   Level

   Type or select a value for the entry field.
   Press Enter AFTER making all desired changes.

   * INPUT device / directory for software
   ```

3. Specify the device or directory containing the installation information. Typically, the 3½" diskette drive is device **/dev/fd0**. Press **F4** for a list of supported devices.
4. Press **Enter**.

   An **Install Software** screen appears. This screen contains a list of installation parameters you may change. If this is a first-time installation of the RealPort driver, enter **digiasync.ncxa.obj** in the **SOFTWARE to Install** field and use defaults for the remainder of the installation parameters.

   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.

5. Press **Enter** to begin the installation.

   The RealPort installation should proceed to a successful conclusion.

Adding a PortServer in AIX

Use this procedure to add a PortServer to an AIX system

1. Log onto the console as super-user (root).
2. Enter this command: **smit devices**
3. Select **Digi PortServers**.
4. Select **Add a PortServer**.
5. Select appropriate PortServer type to be added.

   Note: If you have a PortServer 16, 16 ports can be configured per unit. If you have a PortServer 8, 8 ports can be configured. A PortServer II can be configured for 16-64 ports, depending on the number of EBI modules connected to it.

6. Enter the PortServer's IP address in the **IP Address** field.

   An **sa** device will be created for the PortServer.

7. Make sure that it is available by typing this command at a root prompt:

   lsdev -Cc nts

Creating and Configuring TTYs

Use this procedure to create and configure the TTY devices in AIX.

Note: The procedure for creating and configuring TTY devices for the PortServer is similar to the procedure used to create standard AIX TTY devices. For complete information, refer to your AIX documentation.

TTY Creation and Configuration Procedure

Note: Repeat this procedure for each TTY device.

1. Log onto the system as super-user (root).

2. Enter this command: **smit mktty**

   The **Add a TTY** menu appears.

3. Select **Add a TTY.**

   A list of **tty** types appears.

4. From the list, select **tty rs232 Asynchronous Terminal**

   Note: If you are adding a tty on an EIA-422 EBI module attached to a PortServer II, select **tty rs422 Asynchronous Terminal** instead.

   A list of **sa** devices appears.

5. Select the item that identifies the Digi PortServer (it will be similar to: **sa3 Available Digi PortServer II 16**).

   A dialog panel appears with fields to configure the port. These fields may be changed as needed. The only required entry is the **PORT number** field.

6. Press **Enter** to complete the **tty** addition.

   The name of the **tty** that was created is displayed when **smit** command processing has completed.

Uninstalling RealPort

Follow this procedure to uninstall the AIX RealPort driver.

Note: Before uninstalling Realport, all RealPort devices must be either removed or in the defined state.

Procedure

1. Log onto the system as super-user (root).
2. Enter this command: **smit install_remove**

   A dialog panel appears:

```
          Remove Installed Software

* SOFTWARE name                                 digiasync.ncxa.obj
PREVIEW only? (remove operation will NOT occur)no
REMOVE dependent software                      no
EXTEND file systems if space needed?           no
DETAILED output                                no
```

3. Alter the fields labeled **SOFTWARE name** and **PREVIEW only**, as shown in step 2.
4. Select **OK**.

   This prompt appears: *Are You Sure?*
5. Enter **OK**.

   The uninstallation should proceed to a successful conclusion.
6. Reboot the system to complete the removal of the driver.

Configuring RealPort Devices in Smit

This chapter discusses RealPort device configuration. It includes the following topics:

General Port Configuration

After installating RealPort, RealPort ports can be configured with **smit** using this procedure. Refer to your AIX documentation for complete information on the **smit** command used in this procedure.

Procedure

1. Login as super-user (root) on the console.

   Enter this command: **smit tty**

2. Select **TTY**.
3. Select **Change / Show Characteristics of a TTY**.
4. Select a **tty** device. Here's an example of a listed device:

   tty7 Available 00-00-04-02 Asynchronous Terminal

   In this example, the number:

   00 is the bus number. This is unused and will always be **00**.

   00 is the slot number. This is unused and will always be **00**.

   04 is the **sa** device number.

   02 is the port number.

5. If the data carrier detect signal is not wired between the port and the peripheral device attached to it, set **Force Carrier** to **enable**.
6. Configure the remaining **tty** fields as necessary.

Configuring a Terminal Connection

Use this procedure to configure and enable a login on a port for a terminal in AIX.

Note: This procedure assumes that a tty has previously been created for the terminal. See *Creating and Configuring TTYs* on page 12.

Procedure

1. Connect a proper terminal cable between the port and terminal. Refer to the *PortServer II Hardware Installation Guide* or the *PortServer User's Guide and Reference Manual* for detailed cable information.
2. At an AIX root prompt, enter this command:

   smit tty
3. Select **Change/Show Characteristics of a TTY**.
4. Select a **tty** device. Here's an example of a listed device:

   tty7 Available 00-00-04-02 Asynchronous Terminal

   In this example, the number:

   - **00** is the bus number. This is unused and will always be **00**.
   - **00** is the slot number. This is unused and will always be **00**.
   - **04** is the **sa** device number.
   - **02** is the port number.
5. Set **Enable LOGIN** to **enable**.
6. Set **BAUD rate** to match the terminal's baud rate.
7. Set **PARITY**, **BITS per character**, and **Number of STOP BITS** to match the terminal's settings.

8. Set **TERMINAL type** to match the type of terminal on the port. This is important if you will be using transparent printing on the auxiliary port of the terminal.
9. Set **FLOW CONTROL to be used** to match the flow control used by the terminal
10. If DCD is not physically wired high in your cable, set **Force Carrier** to **enable**.

Configuring a Printer Device

Use this procedure to add a printer in AIX on a RealPort device.

Procedure

1. Connect a proper cable between the port and printer. Refer to the *PortServer II Hardware Installation Guide* or the *PortServer User's Guide and Reference Manual* for detailed cable information.
2. Enter this command at a root prompt:

   smit printer
3. Select **Printer/Plotter Device**.
4. Select **Add a Printer/Plotter**.
5. Select **osp Other serial printer**.
6. Select **rs232**.

   Note: Select **rs422** if your port is on a 422 EBI module (not a standard EIA-232 EBI module) connected to a PortServer II.
7. Select an **sa** device.
8. Enter a port number in the **PORT number** field.

9. Set **BAUD rate**, **PARITY**, **BITS per character**, and **number of STOP BITS** to match the settings of the printer.

10. Set **FLOW CONTROL to be used** to match the flow control used by the printer.

Configuring a Dial-in/Dial-out Modem Device

Use this procedure to configure and enable login on a RealPort device for a modem connection.

Note: This procedure assumes that a tty has previously been created for the modem. See *Creating and Configuring TTYs* on page 12.

Procedure

1. Connect a proper cable between the port and modem. Refer to the *PortServer II Hardware Installation Guide* or the *PortServer User's Guide and Reference Manual* for detailed cable information.
2. Turn the modem on.
3. Access a root prompt on the AIX system.
4. Add an entry for the device in the file **/usr/lib/uucp/Devices**. The following example allows a connection of 9600 baud to the device:

   Direct tty3 - 9600 direct

5. Use the following command to connect to the modem:

   telnet [*ipaddress*] 20XX

   In this command, **[*ipaddress*]** is the IP address of the PortServer and **XX** is the port number that to which the modem is connected.

   The modem should respond with an **AT** prompt.

6. Train the modem to the port speed by entering this command at the **AT** prompt: **at&w**

7. Terminate the connection by entering a tilde followed by a period followed by the **Enter** key at the **AT** prompt:
   ~. [Enter]
8. At an AIX root prompt, enter this command:

   smit tty
9. Select **Change/Show Characteristics of a TTY**.
10. Select the **tty** device to which the modem is connected. Here's an example of a listed device:

    tty7 Available 00-00-04-02 Asynchronous Terminal

    In this example, the number:

    00 is the bus number. This is unused and will always be **00**.

    00 is the slot number. This is unused and will always be **00**.

    04 is the **sa** device number.

    02 is the port number.

11. Set **Enable LOGIN** to **share**.
12. Set **BAUD rate** to the modem's highest configurable baud rate.
13. Set **PARITY**, **BITS per character**, and **number of STOP BITS** to match the settings of the modem.
14. Set **FLOW CONTROL to be used** to match the flow control used by the modem.

Configuring RealPort Devices with stty-ncxa

Description

stty-ncxa is a utility program that sets or displays options for the RealPort device driver. The command offers additional features not configurable in **smit**. Once the RealPort driver is installed, **stty-ncxa** is located in the directory **/usr/lbin/tty**.

Format

The format is:

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

Options

With no options, **stty-ncxa** displays the Digi special driver settings, modem signals, and 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 most tty settings. Any unrecognized options are passed to **stty(1)** for interpretation.

-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 as long as the port is not busy.

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:

fastbaud Alters the baud rate tables. With fastbaud enabled, 50 baud becomes 57,600 baud, 75 baud becomes 76,800 baud and 110 baud becomes 115,200 baud.

Note: PortServer 16 and PortServer 8 units support up to 57,600 baud per port. PortServer II units support up to 115,200 baud per port.

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", meaning that the effects continue until the system is rebooted or until the options are changed.

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

[-]altpin No effect in this device driver. To enable alternate wiring for DCD and DSR, use the PortServer's **set flow** command. See the PortServer *Installation Guide* for details or see *Configuring a PortServer for RealPort* on page 9.

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.

maxcps *n* Sets the maximum Characters Per Second (CPS) rate at which characters are output to the transparent print device. The rate chosen should be just below the average print speed. If the number is too low, printer speed will be reduced. If the number is too high, the printer will resort to flow control, and user entry on the terminal will be correspondingly impaired. The default is 100 CPS.

maxchar *n* Sets the maximum number of transparent print characters the driver will place in the output queue. Reducing this number increases system overhead; increasing this number delays operator keystroke echo times when the transparent printer is in use. The default is 50 characters.

bufsize *n* Sets the driver's estimate of the size of the transparent printer's input buffer. After a period of inactivity, the driver bursts this many characters to the transparent printer before reducing to the maxcps rate selected above. The default is 100 characters.

onstr ***s*** Sets the terminal escape sequence to turn transparent printing on. The string s can be composed of standard ASCII printing and non-printing characters; control (non-printing) characters must be entered by their octal values, and must consist of three digits preceded by a back-slash ("\") character. For example, the "Escape" character <Esc>, 33 octal, should be entered as "\033". Thus, if transparent printing is turned on by the string "<Esc>[5i" (ANSI standard), s should be entered as "\033[5i".

offstr ***s*** Sets the terminal escape sequence to turn transparent printing off. See "**onstr**", above, for the format of the string ***s***.

term t Sets the term type and also the transparent printer on/off strings to values found in the internal default table. Internal defaults are used for the following terminals: **adm31**, **ansi**, **dg200**, **dg210**, **hz1500**, **mc5**, **microterm**, **multiterm**, **pcterm**, **tvi**, **vp-a2**, **vp-60**, **vt52**, **vt100**, **vt220**, **wyse30**, **wyse50**, **wyse60**, or **wyse75**. If the terminal type is not found in the internal default table, then ditty reads the terminfo entry for the terminal type and sets transparent print on/off strings to values given by the **mc5/mc4** attributes found there.

Also see **stty**, **ioctl**, **termio**, and **terminfo**.

DigiPRINT
Transparent Printing

Description

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 sequence, and follows it with the Transparent Print Mode OFF sequence.

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.

DigiPRINT Configuration

Use this procedure to configure a RealPort port for transparent printing.

Procedure

1. Connect the printer to the terminal's auxiliary port with a proper cable.
2. Access the terminal's setup utility. Consult your terminal manual for more information.
3. Enable the auxiliary port on the terminal.
4. Set the baud rate and flow control (handshaking) on the auxiliary port to match the printer settings.
5. On your AIX system, set the tty option **term** in **smit** (**smit > devices > TTY**) to your terminal type. This will set the start and stop escape codes used by the driver. When you do this, use the standard device and not the transparent print device. A transparent print device has a "**p**" at the end of it. For example, the transparent print device for **tty1** is **tty1p**. Both the standard and transparent print devices are created when the TTY is created in **smit**.

   Note: If your terminal is not directly supported by **smit**, you must determine the auxiliary port start and stop escape sequences on your terminal and configure the driver to use them with the **stty-ncxa** command. See *Configuring DigiPRINT with stty-ncxa* on page 32.
6. Set the **stty-ncxa** options **bufsize**, **maxchar**, and **maxcps** to ensure that your printer does not flow control. If data is sent to the printer faster than the printer can handle, the printer will flow control and the terminal will also flow control as a result. In many cases, the default settings for these parameters are adequate. See *Control-*

ling DigiPRINT Output on page 31 for more information on adjusting **bufsize**, **maxchar**, and **maxcps**.

7. Test the printer by sending some data to the transparent print device. Enter this command at a root prompt:

   cat /etc/inittab > /dev/tty1p

   In this command, use your specific transparent print device instead of **tty1p**.)

Controlling DigiPRINT Output

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.

The **stty-ncxa** command provides three parameters to limit printer output and avoid a flow control situation. In many cases, the default settings for these parameters are adequate. See *Configuring RealPort Devices with stty-ncxa* on page 23 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. Consult your printer manual for this number.

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. Consult your printer manual for this number.

Configuring DigiPRINT with stty-ncxa

The **stty-ncxa** command is used to configure port options for transparent printing. The pathname for **stty-ncxa** is **/usr/lbin/tty/stty-ncxa**. See *Configuring RealPort Devices with stty-ncxa* on page 23 for a complete description of **stty-ncxa** settings.

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.

DigiPRINT transparent print Options are set using the **stty-ncxa** program in the following manner:

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

The following options are used to configure transparent printing.

maxcps n
Sets the maximum Characters Per Second (CPS) rate at which characters are output to the transparent print device.

maxchar n
Sets the maximum number of transparent print characters the driver will place in the output queue.

bufsize n
Sets the driver's estimate of the size of the transparent printer's input buffer.

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.

port
Specifies the tty device.

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/tty1p**). **maxcps**, **maxchar** and **bufsize** are left to defaults:

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

Example 2:

The following example uses **onstr** and **offstr** arguments to set the terminal to use ANSI Standard.

```
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
```

Troubleshooting

Introduction

This chapter contains several AIX RealPort troubleshooting procedures. Follow the procedure below that most closely addresses your problem.

- One or several RealPort ports do not function at all. Use the procedure *Port Does not Function* on page 35.
- One or several RealPort ports do not function correctly. Use the procedure *Port Does not Function Correctly* on page 36.
- All RealPort ports do not function. The PortServer boots to AC. Use the procedure *Ports Do not Function - PortServer Boots to AC* on page 39.
- All RealPort ports do not function. The PortServer does not show AC on the front panel LED display or fails to show AC after a reboot. Use the procedure *PortServer Fails to Boot to AC* on page 38.

Port Does not Function

This procedure is intended to be a general guideline for troubleshooting a RealPort port that is not functioning. You may want to skip steps, add steps, modify steps, or follow steps in a different order based on your particular problem. Exit this procedure if one of these steps solves the port problem.

If all RealPort ports are not functioning, use the procedure *PortServer Fails to Boot to AC* on page 38 or *Ports Do not Function - PortServer Boots to AC* on page 39.

Procedure

1. Power-cycle the device attached to the port.

2. Reboot the PortServer if possible.

   Note: All PortServer ports will be unavailable while the PortServer reboots and the daemon reestablishes a connection.

3. Use the PortServer front panel LED display to inspect the EIA-232 signals on the port with the problem. Make a note of the active signals. Refer to the *PortServer II Hardware Installation Guide* or the *PortServer User's Guide and Reference Manual* for detailed information on the LED display.
4. Check for flow control issues. See *Flow Control* on page 44.
5. Check for DCD issues. See *Data Carrier Detect Issues* on page 40.
6. Check for cable issues. Refer to the *PortServer II Hardware Installation Guide* or the *PortServer User's Guide and Reference Manual* for detailed cable information.
7. Check the port configuration on the PortServer. See *PortServer Port Configuration* on page 42.
8. Run a loopback test with a loopback plug installed on the port. See *Loopback Port Test* on page 45.
9. If possible, configure the device on another port.

Port Does not Function Correctly

This procedure is intended to be a general guideline for troubleshooting a port that is functioning but not correctly. You may want to skip steps, add steps, or follow steps in a different order based on your particular problem. Exit the procedure if one of the steps corrects the port problem.

Procedure

1. Power-cycle the device attached to the port.
2. Reboot the PortServer if possible.

Note: PortServer RealPort users will lose their connections while the PortServer reboots and the daemon establishes a connection.

3. Check the port settings in **smit**, the settings on the device attached to the port, and the settings in any software application being run on the port. Make sure the baud rate, data bits, stop bits and parity match. Make sure flow control settings match. Check other applicable settings.
4. Use the PortServer front panel LED display to inspect the EIA-232 signals on the port when the problem occurs. Make a note of the active signals. Determine which signals change from active to inactive or vice-versa when the problem occurs. Refer to the *PortServer II Configuration and Administration Guide* or the *PortServer User's Guide and Reference Manual* for details on the PortServer LED display.
5. Check for DCD issues if the problem is that the port occasionally stops functioning. See *Data Carrier Detect Issues* on page 40.
6. Check for cable issues. Refer to the *PortServer II Hardware Installation Guide* or the *PortServer User's Guide and Reference Manual* for detailed cable information.
7. Run a loopback test with a loopback plug installed on the port. See *Loopback Port Test* on page 45.
8. If possible, configure the device on another port.

PortServer Fails to Boot to AC

This procedure is intended to be a general guideline to follow when all RealPort ports are not functioning and the PortServer does not show **AC** on the front panel LED display. You may want to skip steps, add steps, or follow steps in a different order based on your particular problem.

Procedure

1. Wait five minutes and then check your PortServer and your devices. Your PortServer may have not been able to establish a network connection.
2. Log in to the PortServer as root from an attached terminal or by using **telnet**.

   Note: If you cannot access the PortServer with a terminal or telnet, reboot the unit by turning the power switch off, waiting a few seconds, and then turning the power back on.
3. Reboot the PortServer with this command:
   boot action=reset
4. Check the status of the PortServer front panel LED display. The PortServer should display "**AC**" after rebooting. PortServers configured to boot from a boot file or image on a host may take several minutes to completely boot.

Result	Action
If the PortServer shows **AC**:	Proceed to step 5.
If the PortServer does not show AC and is configured for **tftp** booting.	Troubleshoot **tftp**. See *Troubleshooting TFTP* on page 46.

If the PortServer does not show **AC** and is **not** configured for **tftp** booting.	Call Digi Technical Support for Assistance. Refer to the *PortServer II Configuration and Administration Guide* or the *PortServer User's Guide and Reference Manual* for additional LED information.

Note: Remote booting may be bypassed by pressing and releasing the two arrows on the front of the PortServer when it is trying to remotely boot.

5. Continue to the procedure *Ports Do not Function - PortServer Boots to AC* on page 39.

Ports Do not Function - PortServer Boots to AC

This procedure is intended to be a general guideline to follow when all RealPort ports are not functioning. You may want to skip steps, add steps, or follow steps in a different order based on your particular problem.

Procedure

1. Wait five minutes and then check the PortServer and your devices. Your PortServer may have lost it's network connection. It is designed to automatically reconnect after losing the network connection.
2. Make sure the network and power cables attached to the PortServer are securely connected.
3. Log in to the PortServer as root from an attached terminal or by using telnet.

   Note: If you cannot access the PortServer with a terminal or telnet, you will have to reboot the unit by

turning the power switch off, waiting a few seconds, and then turning it back on.

4. Reboot the PortServer with this command:
   boot action=reset

   After rebooting, if the PortServer fails to show **AC** on the front panel LED display, follow the procedure *PortServer Fails to Boot to AC* on page 38 until you can get the PortServer to display **AC**. Refer to the *PortServer II Configuration and Administration Guide* or the *PortServer User's Guide and Reference Manual* for an explanation of PortServer LED error codes.

5. Check the status of the RealPort daemon. See *Checking the RealPort Daemon Status* on page 43.
6. Verify the network connection. See *Checking the Network Connection* on page 42.
7. Check the network configuration on the PortServer. See *PortServer Network Configuration* on page 44.
8. Verify the PortServer **sa**. See *Verifying the RealPort sa* on page 43.

Data Carrier Detect Issues

In AIX, all tty and lp devices are modem devices. They require DCD in order to function. Ideally, DCD is wired from the device to the port.

DCD Signal Status

If DCD is wired from the device to the port and the port is not functioning, check to see if the device is powered on and online. Also, check the status of the DCD signal for the port by reading the LED display on the front panel of the PortServer. If DCD is not lit, the port is not receiving the DCD signal necessary to function. See your *PortServer II Configuration and Administration Guide* or *PortServer User's*

Guide and Reference Manual for details on the PortServer LED display.

Altpin

The signal DCD is on pin 10 of the RJ-45 PortServer jack. DCD can be asserted on 8-pin cables by enabling **altpin** on the port. The PortServer **altpin** option asserts the data carrier detect signal on pin 1 of an 8-pin RJ-45 cable. If **altpin** is desired, be sure to tie the device's DCD pin to pin 1 of your cable. The following PortServer command enables **altpin** on ports 7 through 14 of a PortServer.

set flow altpin=on ra=7-14.

Setting Force Carrier

If DCD is not wired, then force carrier may be enabled on the port to satisfy the DCD requirement.

Procedure

1. Log onto the console as super-user (root).
2. Enter this command: **smit tty**
3. Select **change/show characteristics**.
4. Select a device.
5. Set **Force Carrier** to **enable**.

DCD and LP Devices

Depending on your cabling, you may need to set **forcedcd** on the port for it to function. To force carrier on a port configured as an LP device, enter this AIX command at a root prompt:

/usr/lbin/tty/stty-ncxa forcedcd /dev/lp##

For **forcedcd** to remain in effect after a reboot, this command can be used:

chdev -l /dev/lp# -a forcedcd=enable

PortServer Port Configuration

Use this procedure to verify port settings on the PortServer.

1. Log onto the PortServer as root.
2. Enter this command: **set port ra=***
   Any port configured for RealPort should show:
   - **dev=prn auto=off bin=off dest=255.255.255.255** (PortServer)
   - **dev=prn auto=off bin=off dest=0.0.0.0** (PortServer II)
3. Enter this command: **set flow ra=***
   Any port having a RealPort device attached should show:
   - all signals off except **ixon** and **ixoff** (which can be on or off)
   - altpin disabled when using a 10-pin cable or enabled for any other cable.

Checking the Network Connection

Use this procedure to verify the network connection between the PortServer and the AIX RealPort host.

Procedure

1. Make sure there are no processes running on the port.
2. Enter this command from the AIX root prompt:

   telnet [PS IP Address] [2000+port number]

   {i.e. 2001 for port 1, 2016 for port 16}

   If **telnet** is successful, you might see a message confirming the connection, or you might see nothing at all. Generally, an error message will occur if **telnet** fails. If the AIX host cannot **telnet** to the port, then RealPort can’t connect to it either.

Verifying the RealPort sa

Use this procedure to verify that the IP address of the **sa** is the same as the IP address configured on the PortServer.

Procedure

1. Log onto the console as super-user (root).
2. Enter this command: **smit dev**
3. Select **Digi PortServers**.
4. Select **Change/Show**.
5. Select the **sa** associated with the PortServer in question.

   Make sure that the IP address matches the IP address configured for the PortServer with the **set config** PortServer command.

Checking the RealPort Daemon Status

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**. There is one daemon for each PortServer configured for RealPort.

If a RealPort daemon loses the network connection between the PortServer and the host, it will try to reconnect. The daemon can fail to reconnect if a device associated with that PortServer is busy. A device is considered busy if a print queue has print jobs in it, or a non-getty login process such as Pick is used on a tty.

Procedure

1. Log onto the console as super-user (root).
2. Enter this command: **ps -ef | grep ncxd**

   This example shows two RealPort daemons, one associated with **sa14** and another with **sa15**.

root 9852 1 0 Mar30 - 0:00 /etc/ncxd -p771 /dev/sa14 199.x.x.x
root 9976 1 0 Mar30 - 0:00 /etc/ncxd -p771 /dev/sa15 199.x.x.x

3. Check the output of the command in step 2. The absence of a RealPort daemon confirms that there is a problem. In any case, continue troubleshooting.

PortServer Network Configuration

Use this procedure to verify the network settings on the PortServer.

Procedure

1. Log onto the PortServer as root.
2. Enter this command: **set config**

   Verify the settings; **IP address**, **submask**, **gateway**, **myname**, and **nameserv**. **Myname** and **nameserv** are important if you are using DNS. Make sure the **IP address** is unique on your network and that the **gateway** and **submask** are correct.

   For more information on these settings, refer to the *PortServer II Configuration and Administration Guide*, the *PortServer II Command Reference Manual*, or *PortServer User's Guide and Reference Manual*.

Flow Control

A RealPort port that is not responding may be stuck in a state of flow control. Determine if your port and peripheral device are configured for software (ixon/ixoff) or hardware flow control, then, check the status of the stuck port using the front panel LED display on the PortServer. If the OFC LED is lit, the port is waiting for a response from the device. This could be a restart character if software flow

control is used, or an EIA-232 signal if hardware flow control is used.

Software Flow Control

To unlock a port if the OFC light is active on the port, and the port is configured for software flow control, try entering a <CTRL-Q> (standard ixon/ixoff restart character) from a terminal attached to the port.

Hardware Flow Control

To unlock a port if the OFC light is active on the port, and the port is configured for hardware flow control, the hardware flow control signal must be raised on the port. For example, if the port is configured for DTR flow control, the DTR signal of the device is normally tied to CTS on the port. The CTS signal must be active on the port for the port to function. If the device is not raising the flow control signal or if the port is not receiving the signal through the cable, the port will remain stuck in a flow control state.

Loopback Port Test

Introduction

This procedure can be used to verify RealPort functionality by redirecting data through a RealPort port in which the transmit and receive pins have been tied together.

Procedure

1. If the port is enabled for login in the operating system, disable it.
2. Connect the port's transmit and receive lines together (pins 2 and 3 of a DB-25 connector, or the middle two pins of an RJ-45 connector). A Digi loopback plug will also work.
3. Enter these commands from a root prompt:

cat < /dev/tty1 &
date > /dev/tty1

Note: Use the device name of the port your are testing instead of **tty1**.

The first **cat** command runs in the background, and directs all input from the device to stdout (your console screen). The **date** command transmits date to the device.

4. Verify the results..

Result	Meaning
The date appears on the console screen.	Data can be sent successfully out of the port, through the loopback plug and back into the port.
The date does not appear on the console screen.	The date was not successfully transferred to the port, through the loopback plug, back into the port and to the console screen. In this case, try the loopback test on another port.

Troubleshooting TFTP

Use this procedure to verify that tftp is working correctly on your Unix host.

Procedure

Perform a Test Transfer

1. Access a root prompt on the Unix host.
2. Make sure that you are not in the **/tftpboot** directory.
3. Enter these two commands:

   tftp host_ip_address

   tftp > get tftp_file_name

In the previous commands, **host_ip_address** is the IP address of the tftpboot host and **tftp_file_name** is the name of the PortServer boot image in the **/tftpboot** directory.

4. Enter this command:

   tftp> quit

   Your Unix root prompt should reappear.

5. Examine the results of step 3.

Result	Action
This message appears: received [number] bytes in [number] seconds	Continue to step 6. of this procedure.
An error message appears	Skip to step 8. of this procedure.

6. Compare the size of the original file against the transferred file using this command:

   ls -l tftp_file_name /tftpboot/tftp_file_name

Result	Action
The file sizes match.	**tftp** is working correctly. Exit this procedure and continue troubleshooting RealPort
The file sizes do not match.	Continue to the next step in this procedure.

Verify the Unix host tftp settings.

7. Verify that the **/tftpboot** directory exists and has read, write and execute (777) permissions with this command:

   ls -l /tftpboot

If necessary, use this command to create the directory:

mkdir /tftpboot

If necessary, use this command to change permissions of the directory to read, write and execute:

chmod 777 /tftpboot

8. Verify that the file **/tftpboot/ftp_file_name** exists and has read and execute permissions with this command:

   ls -l /tftpboot/ftp_file_name

   if necessary, use this command to change permissions of the file to read and execute:

   chmod 666 /tftpboot/ftp_file_name

9. Verify that the **inetd.conf** file is properly configured for **tftp** by displaying the file **/etc/inetd.conf**.

   This entry should be uncommented:

   ```
   tftp      dgram      udp       etc.
   ```

Note: For controlled **tftp** access, make sure that the file **/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. A sample file is located in the directory **/usr/lpp/tcpip/samples/**.

10. If the file **inetd.conf** is altered in step 9, enter these commands to copy the changes to ODM and reinitialize the **tftpd** daemon:

    inetimp
    refresh -s inetd

11. Test **tftp** by repeating steps 1-7.

    If successful, reboot the PortServer and check for an **AC** status on the front panel. If the PortServer still does not boot to **AC**, call Digi Technical support for assistance.