



**Connectware™**

**RealPort**  
**on**  
**DG/UX**

Setup Guide

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## Purpose

Use this guide for the following:

- An introduction to RealPort, how to install, configure and use RealPort and, how to troubleshoot should you encounter a problem
- Configuration examples
- Administration procedures

## Audience

This manual is intended for the person responsible for configuring and administering RealPort. This person should have experience configuring network devices and be familiar with networking concepts.

## Conventions

Following are the conventions used in this document:

### *Special Fonts*

A special font is used for any input you need to enter. For example,

```
set config
```

### *Square Brackets*

Optional parameters are displayed within square brackets. For example,

```
set config [dhcp=on]
```

**Note:** The square brackets themselves are not actually part of the command, and should not be entered.

### *Italics*

Variables are displayed in italics. For example,

```
set config ip=ip-address
```

**Note:** Substitute an appropriate IP address for *ip-address* in the above command.

### *Vertical Bar*

A vertical bar character (|) is used to denote a choice (logical "or"). For example,

```
set flow=on|off
```

**Note:** The above command would be entered as either:

```
set flow=on or set flow=off
```

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## Requirements and Considerations

Read this section before beginning the RealPort driver installation.

- It is important to read any release notes that may be included with the installation media.
- The Digi DG/UX RealPort driver is compatible with DG/UX System Release R4.20 for Intel.

## Information to Gather

Before you install RealPort, you need to determine:

- The hostname or IP address to assign each unconfigured Digi device.
- The number of ports for each Digi device. Include any Xem PORTS Module ports that are attached to the Digi device.
- Determine the link speed between the host machine and the Digi device if a slow WAN link (for example, a 56K leased line) connects them.

## Configuring a PortServer or PortServer II for RealPort

Use this procedure to configure a PortServer or PortServer II for use with Digi RealPort drivers.

**Note:** See the appropriate Command Reference or Configuration and Administration Guide for information on how to perform the steps below.

### *Procedure*

1. Access a root prompt on the Digi device.
2. Set the Digi device's IP address.
3. Verify that the RealPort TCP port number is set to 771. Change if necessary.
4. For all ports that will be using RealPort, set the device type to rp. The following example configures ports 2 through 16 of a PortServer for RealPort:

```
set ports range=2-16 dev=rp
```



## **Related Documentation**

### **PortServer Documentation**

- PortServer Configuration and Reference Guide
- Digi One/PortServer Cable Guide

### **PortServer II Documentation**

- PortServer II Hardware Installation Guide
- PortServer II Command Reference
- PortServer II Configuration and Administration Guide
- Digi One/PortServer Cable Guide
- Digi Port Authority--Remote Device Monitor Setup Guide



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## Master Setup Process

Use this process to install and configure the DG/UX RealPort driver.

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 2-2.
3. Configure the PortServer for RealPort. See Configuring a PortServer or PortServer II for RealPort, on page 2-2.
4. Install the RealPort driver. See the following procedure.

## Uninstalling RealPort

Use this procedure to remove the Digi device driver software from the kernel by using the program `/usr/sbin/realport_uninstall`.

### *Procedure*

1. Log onto the console as super-user (root), and enter this command:

```
realport_uninstall [system_name]
```

The *system\_name* is the name of the kernel where the RealPort driver is installed; normally this will be `aviion`. The release notes describe other arguments to `realport_uninstall` and explain in more detail what files are removed or changed.

2. Reboot to start the new kernel without the RealPort driver.

To reboot use `sysadm` and choose System, Kernel, and Reboot.

## RealPort Devices

The RealPort installation creates two different Unix devices in /dev for each port: a standard device and a transparent print device. DG/UX uses long names and short names for each device. The short names for RealPort devices have a DG/UX standard form and an optional alternate form.

### Device Name Format

DG/UX standard serial port devices have short names in the form

`ttyNN`

where *NN* is a number. The built-in serial ports are normally `tty00` and `tty01`; then the RealPort serial ports begin with `tty02` and continue counting up. However, the exact numbering depends on what other standard serial ports devices are configured in the kernel. Transparent print devices do not have short names in this form. DG/UX system administration utilities, like `sysadm`, require names in this form.

In addition, if you specified `server_port_names` on in the `/etc/realport.conf` file, RealPort standard serial ports have short names in the form

`tty-SERVER-PORT`

and transparent print devices have short names in the form

`tty-SERVER-PORTp`

where *SERVER* is the number identifying the server (from the `/etc/realport.conf` file) and *PORT* is the port number on the PortServer, counting from 0. These names cannot be used in `sysadm` when setting up terminals, modems, or UUCP devices; however they can be used in `sysadm` when setting up a printer and in most other contexts outside `sysadm` where a Unix character device name is expected.

For example, assuming your DG/UX system has only the two standard built in serial ports in addition to RealPort devices, the first port on the first PortServer would be named `/dev/tty02` or `/dev/tty-0-0`, and the corresponding transparent print device would be `/dev/tty-0-0p`. If you had two PortServers, the first with one expansion module for a total of 32 ports, the first port on the second PortServer would be named `/dev/tty34` or `/dev/tty-1-0`.

Each device also has a long name, which is rarely used directly. See the release notes for a description of these names.

### Standard Device

**Examples:** `/dev/tty02` or `/dev/tty-0-0`

The default handshake method is XON/XOFF. Data Carrier Detect must be present to open the device. To allow the device to be used without the Data Carrier Detect signal, use

```
stty-nxxa forcedcd /dev/ttyNN
```

To configure a RealPort to be used as a login port, use `sysadm` and choose Device, Port, Terminal, and then Add. To ensure that a login session will be terminated when carrier is dropped, select a modem TTY definition label for the newly added login port, like `M9600`; if a direct connection TTY definition label like `9600` is used, the login session will not be terminated when carrier drops. Complete details on setting up login ports can be found in Setting Up and Managing Terminals on the DG/UX System on the DG/UX user documentation CD that came with your system. See also Configuring a Device for a Terminal, on page 3-4.

When used with a terminal or other device, it is usually wise to use a modem TTY definition label and to wire the Digi DCD signal to the terminal's DTR (Data Terminal Ready) line. When the terminal is turned off, any associated jobs are killed, and the user is logged out.

### Transparent Print Devices

**Example:** `/dev/tty-0-0p`

The "Transparent Print Devices" (DigiPRINT) can be used with auxiliary printer ports on terminals. Output directed to a transparent print device goes out the auxiliary port of a terminal while the user continues to use the terminal normally.

## Setting Device Options with stty-ncxa

With the stty-ncxa command, options such as flow control settings, speed, and transparent print settings can be configured for your RealPort tty devices. For detailed information on the stty-ncxa command, refer to Setting TTY Options, on page 3-9, and the DG/UX man pages (stty-ncxa is inserted into the man pages when the driver is installed).

**Note:** stty-ncxa is also called ditty for compatibility with other Digi International software. ditty is the same as stty-ncxa and can be substituted for stty-ncxa in commands described in this documentation.

## Configuring a Device for a Terminal

Use the following procedure to configure a RealPort device for a terminal. For more information on configuring a serial device for a terminal see Setting Up and Managing Terminals on the DG/UX System on the user documentation CD that came with your system.

The PortServer and RealPort should be properly installed, configured and functioning before connecting a terminal.

### *Procedure*

1. Connect a proper cable between the port and terminal.
2. Set the port to dev=prn on the PortServer by entering this command at a PortServer root prompt:

```
set dev port=prn ra=12
```

This example sets dev=prn for port 12 of a PortServer.

3. If you are using 8-pin RJ-45 cabling from the PortServer to the terminal, set the port to altpin=on by entering this command at a PortServer root prompt:

```
set port altpin=on ra=12
```

This example sets altpin=on for port 12 of a PortServer.

4. If you want a loss of carrier to terminate the login session, you should use a modem TTY definition entry in the /etc/ttydefs file. These entries begin with the letter "M" followed by the baud rate. For best results with RealPort devices this file should be modified from the standard DG/UX distribution.

As root edit /etc/ttydefs and change lines that begin with an "M" by adding clocal just before the second ":" in the line and adding -clocal just before the third ":". These should be separated by spaces like the other options. For example, here is the "M9600" line after editing.

```
M9600: 9600 echo echoe echok kill erase intr hupcl cs8 opost onlcr icrnl cread clocal : 9600  
echo echoe echok iexten kill erase intr hupcl icanon cs8 opost icrnl onlcr cread ixon ixoff isig  
tab3 -clocal ::M9600
```

5. To enable the terminal port in DG/UX, as root run sysadm and select Device, Port, Terminal, and then Add. Enter the requested information. Select a modem TTY definition label such as M9600 if you want a loss of carrier to terminate the login session.

You should now be able to login over the terminal.

## Configuring a Device for a Printer

Use the following procedure to configure a RealPort device for a printer.

**Note:** The PortServer and RealPort should be properly installed, configured and functioning before connecting a printer.

### *Procedure*

1. Connect a proper cable between the port and printer.
2. Set the port to dev=prn on the PortServer by entering this command at a PortServer root prompt:

```
set dev port=prn ra=12
```

This example sets dev=prn for port 12 of a PortServer.

3. If you are using 8-pin RJ-45 cabling from the PortServer to the printer, set the port to altpin=on by entering this command at a PortServer root prompt:

```
set port altpin=on ra=12
```

This example sets altpin=on for port 12 of a PortServer.

4. From a root prompt run sysadm and choose Device, Printer, Devices, and then Add. Enter the requested information when prompted. For connection type choose Local /dev/tty, /dev/lp, or /dev/parallel. Normally you can answer yes to "Quick Add using default values?"; if the default values are not appropriate you can later choose Modify to change the defaults, including stty settings. For device, enter /dev/ttyNN for a printer directly connected to a PortServer serial port, or enter /dev/tty-N-Mp for a printer connected to a terminal on port tty-N-M. (Replace NN, N and M with the appropriate numbers.)
5. When you have completed the Add process, the printer should be ready for use. To print a file, use the command

```
lp -d [printer_name] [file_to_print]
```

6. If neither your cable nor printer set carrier, you will need to configure the printer port to assume it has carrier with this command:

```
stty-ncxa forcedcd ttyNN
```

## Configuring a Device for a Modem

Use this procedure will configure a RealPort device for a Dial-in/Dial-out modem connection.

**Note:** Configuring a device for a modem requires familiarity with both the operating system and the modem being used. While the following procedure is sufficient for most cases, it may be necessary to take additional steps to properly configure your modem or to set up the operating system for a specific application.

For more information on configuring a serial device for a modem see "Managing Modems and UUCP on the DG/UX System" and "Setting Up and Managing Terminals on the DG/UX System" on the user documentation CD that came with your system.

### *Requirements*

The PortServer and RealPort should be properly installed, configured and functioning before proceeding.

### *Procedure*

**Note:** The following procedure contains an example. This example shows that you are configuring a dial-in and dial-out modem on port 16 of the first PortServer, which corresponds to device /dev/tty17.

1. Connect a proper cable between the port and modem.
2. Power the modem on.
3. Set the port to dev=prn on the PortServer by entering this command at a PortServer root prompt:

```
set dev port=prn ra=16
```

This example sets dev=prn for port 16 of a PortServer.

4. If you are using 8-pin RJ-45 cabling from the PortServer to the terminal, set the port to `altpin=on` by entering this command at a PortServer root prompt:

```
set port altpin=on ra=16
```

This example sets `altpin=on` for port 16 of a PortServer.

5. You must be logged in as root to perform the following steps.
6. Run `sysadm` and choose Networking, UUCP, Devices, and then Add.

When prompted, enter the TTY number; for `/dev/tty17` this would be 17.

When prompted for Local modem type?, enter `direct`. When prompted, enter a modem speed, for example 9600.

7. Edit the file `/etc/uucp/Devices`.

At the end of the file you should find the Direct line for the device you just added. Modify this line by adding an `M` at the end of the second field, which will be the device name.

In this example, the line should look like this after editing:

```
Direct tty17,M - 9600 direct
```

8. Change the ownership of the device to `uucp` with the `chown` command:

```
chown uucp /dev/tty17
```

9. You should now be able to connect to the modem and enter modem commands. The following procedure is an example.

- a. Enable `forcedcd` on the device.

```
stty-ncxa forcedcd /dev/tty17
```

- b. Connect to the modem with the `cu` command.

```
cu -l tty17
```

If you do not get the "Connected" message, check the UUCP device configuration above.

- c. Test the connectivity with the `at` command.

```
at
```

If you do not see "at" or "OK", check the modem: power it down and back up, try modem commands `ate1`, `atq0`, and `atq2`, or see your modem manual for other suggestions.

- d. Set the modem to answer after the first ring with this command:

```
ats0=1
```

- e. Train the modem to the port speed with this command:

```
at&w
```

- f. Enter any other desired `at` commands.

- g. Disconnect from the modem by entering a tilde-period:

```
~.
```

10. **IMPORTANT:** Restore the `-forcedcd` setting with the `stty-ncxa` command:

```
stty-ncxa -forcedcd /dev/tty17
```

11. Edit the file `/etc/ttydefs`.

On each line that begins with an `M` add `clocal` just before the second ":" in the line. Add `-clocal` just before the third ":".

These should be separated by spaces like the other options. For example, here is the "M9600" line after editing.

```
M9600: 9600 echo echoe echok kill ^u erase ^? intr ^c hupcl cs8 opost onlcr icrnl cread clocal :
9600 echo echoe echok iexten kill ^u erase ^? intr ^c hupcl icanon cs8 opost icrnl onlcr cread
ixon ixoff isig tab3 -clocal ::M9600
```



12. To configure dial-in logins on the modem port, you must have a port monitor running. You can use an existing port monitor or add a new one. This example assumes that you will add a new one.

Run `sysadm` and choose Device, Port, Port Monitor, and then Add. Use the defaults (just press enter) for all the prompts except "Port monitor tag" where you will enter a name for the port monitor. In this example, `modem` is used for the name.

When this is completed the port monitor should be added to the system.

13. Add the port service for this port.

In `sysadm` go to Device > Port > Port Service > and then choose Add.

You are prompted for several responses; in most cases you can accept the default by pressing enter, except for the following.

For Controlling port monitor, enter the name of the port monitor, `modem`.

For Port service tag, enter the device name, `tty17`.

For Path name of terminal device, enter the full path of the device, `/dev/tty17`.

For TTY Definition Label, enter a modem definition label such as `M9600`.

For Bidirectional?, enter `yes` if you want to use the modem for dial-out or to connect to the modem with `cu` to send modem commands.

When this is completed the port service for this port should be added to the system.

You can change any port service settings later with `sysadm` by choosing Modify in the Port Service menu.

14. If you want hardware flow control on the port, this can be configured in the `/etc/ttydefs` file for dial-in, or with `stty-nxca` for dial-in or dial-out. For example,

```
stty-nxca rtspc ctspc /dev/tty17
```

15. The port is now configured for dial-in and, if you answered yes to "Bidirectional?" in the port service configuration, for dial-out use.

To dial-out you will need to first run `stty-nxca` to set `forcedcd` to connect to the modem:

```
stty-nxca forcedcd /dev/tty17
```

When you are done with dial-out, you must reset `-forcedcd`:

```
stty-nxca -forcedcd /dev/tty17
```

If you forget to reset `-forcedcd`, logins will not be terminated when the modem drops carrier.

# Transparent Printer Setup

## About Transparent Printing

Most terminals have an auxiliary port that can be connected to a serial printer. When this port is configured as a transparent printer port, print jobs may be run simultaneously with normal terminal operation.

Data bound for the printer is preceded by a terminal escape sequence which turns on transparent printing, and followed by a sequence which turns transparent printing off.

Set up a transparent printer in the same way you would set up a printer wired directly to a serial port. Data sent to a transparent printer device is automatically "wrapped" in the transparent print on/off command strings for the specified printer.

## Configuring Transparent Printers

Use this procedure to set up transparent printers on terminals.

**Note:** This procedure sets up the communication characteristics for transparent printers. Once a transparent printer has been set up, you can use it as you would a printer connected directly to a serial port. See your UNIX documentation for information on setting up print queues.

### *Procedure*

At the command prompt, enter:

```
stty-ncxa -n ttyname [options]
```

where ttyname is the name of the terminal device and options are selected from the list below..

- |                     |  |
|---------------------|--|
| maxcps <i>n</i>     | Limits the maximum printer port character-per-second data rate. <i>n</i> should be set to the minimum character rate the printer can sustain in typical use.   |
| maxchar <i>n</i>    | 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.   |
| bufsize <i>n</i>    | This parameter 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.  |
| onstr " <i>s</i> "  | Defines the terminal escape sequence to direct subsequent data to the transparent printer.<br><br><i>s</i> is a string of ASCII characters, enclosed in quotes, that command the terminal to enter transparent printing mode. An arbitrary octal character xxx may be given as \xxx.<br><br>For example, the sequence "<Esc>[5i" would be entered as: "\033[5i".   |
| offstr " <i>s</i> " | Defines the terminal escape sequence to stop directing data to the printer.<br><br><i>s</i> is a string of ASCII characters, enclosed in quotes, that command the terminal to enter transparent printing mode. An arbitrary octal character xxx may be given as \xxx.<br><br>For example, the sequence "<Esc>[4i" would be entered as: "\033[4i".  |
| term <i>t</i>       | Sets the transparent printer on/off strings to values found in the internal default table. Internal defaults are used for the following terminal types: adm31, ansi, dg200, dg210, hz1500, mc5, vt100, vt220, vt320, vt420, wang2x36, wyse30, wyse50, wyse60 or wyse75.<br><br>If the terminal type is not found in the internal default table, then ditty reads the terminfo entry for the terminal type and sets the transparent print on/off strings to the values given by the mc5/mc4 attributes found there. |

## Setting TTY Options

The RealPort DG/UX device driver package includes a command, `stty-nxca`, which is a superset of `stty`, and may be used to set and display the device options for Digi RealPort devices.

The general command format is:

```
stty-nxca [-a] [-n ttyname] [option(s)] [ttyname]
```

With no options, `stty-nxca` 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.

`stty-nxca` commands may be executed from the command line, or placed in a startup script to be run whenever the system is booted.

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`.
- n *ttyname*    Set and display options for the given TTY device, instead of standard input. This option may be specified multiple times to perform the same operation on multiple TTYs.
- ttyname*       Set and display options for the specified TTY device. Replace *ttyname* with the TTY pathname (such as `/dev/ttya01s`, `/dev/term/a01` or `/dev/dty/a001s`, depending on your operating system). 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 cancelled 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 were received.
- `startout`     Restart stopped output exactly as if an XON character were 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.

<code>[-]fastbaud</code>	Alter the baud rate tables to permit the use of data rates that are beyond the range supported by the operating system. See fastbaud Data Rate Mapping, on page 3-11.
<code>[-]rtspace</code>	Enable [disable] RTS hardware input flow control, so RTS drops to pause remote transmission.
<code>[-]ctspace</code>	Enable [disable] CTS hardware output flow control, so local transmission pauses when CTS drops.
<code>[-]dsrpace</code>	Enable [disable] DSR hardware output flow control, so local transmission pauses when DSR drops.
<code>[-]dcdpace</code>	Enable [disable] DCD hardware output flow control, so local transmission pauses when DCD drops.
<code>[-]dtrpace</code>	Enable [disable] DTR hardware input flow control, so DTR drops to pause remote transmission.
<code>[-]forcedcd</code>	Disable [re-enable] carrier sense, so the TTY may be opened and used even when carrier is not present.
<code>startc c</code>	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).
<code>stopc c</code>	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).
<code>astartc c</code>	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).
<code>astopc c</code>	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).
<code>[-]aixon</code>	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.
<code>maxcps n</code>	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. Default is 100 CPS.
<code>maxchar n</code>	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. Default is 50 characters.
<code>bufsize n</code>	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. Default is 100 characters.

- onstr "s"** Defines the terminal escape sequence to direct subsequent data to the transparent printer.
- s* is a string of ASCII characters, enclosed in quotes, that command the terminal to enter transparent printing mode. An arbitrary octal character xxx may be given as \xxx.
- For example, the sequence <Esc>[5i would be entered as: "\033[5i".
- offstr "s"** Defines the terminal escape sequence to stop directing data to the printer.
- s* is a string of ASCII characters, enclosed in quotes, that command the terminal to enter transparent printing mode. An arbitrary octal character xxx may be given as \xxx.
- For example, the sequence <Esc>[5i would be entered as: "\033[5i".
- term *t*** Sets 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, pterm, 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.

### fastbaud Data Rate Mapping

Use the table below to see how setting fastbaud affects RealPort data rates.

Specified Data Rate:	Data Rate Mapped to:
50	57600
75	76800
110	115200
134	131657
150	153600
200	230400
300	460800

