



# Software Manual

**Digi AccelePort EPC/X, C/X, Xem and Xr 920**

**HP-UX Device Driver**

92000250 Rev B

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# Introduction

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The Digi HP-UX device driver software is an installable device driver supporting both HP-UX 10.10 and HP-UX 10.20. The software development system is *not* required to create a new kernel. The link kit, however, must be installed.

This manual also contains instructions for DigiPRINT transparent printing (page 23).

Once you have completed the hardware installation as outlined in the *Installation Guide* for your adapter, proceed with the software device driver installation instructions starting on the following page.

## Supported Products

The HP-UX device driver supports the Digi AccelePort® EPC/X™, C/X™, and Xem™ host adapters for EISA and PCI bus architectures, as well as the PCI Xr 920™ and the older PCI Xr™ intelligent serial communications products.

### **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.

# Software Installation

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Installation of the device driver software for HP-UX is a four-part procedure. In **Part One**, the driver is configured. In **Part Two**, the new kernel is installed. In **Part Three**, the new devices are created. Finally in **Part Four** you enable the communications ports for use with terminals, modems, etc.

**Note:**

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.

## Part One: Configuring the Device Driver

1. Log onto the console as super-user (root).
2. Insert the Digi HP-UX device driver diskette in the diskette drive and enter the following command:

```
tar xvf floppy_device
```

### Note:

If your HP-UX workstation doesn't have a diskette drive, you will need to use the **dd** command to extract the package information to a stream file on a different machine. The command syntax for this on an SCO UNIX machine is:

```
dd if=/dev/rfd1135ds18 of=/tmp/epca.pkg.tar bs=10k
```

The **if=...** part should be the name of your 3.5" diskette drive. Once this is done you have a package on your local system. Transfer this package to the HP-UX system by using **ftp** or another transfer utility.

Now enter the following command:

```
tar xvf /tmp/epca.pkg.tar
```

(Assuming that the file was placed in **/tmp**)

The **tar** program will extract the software package to the directory **/tmp/epca.pkg**.

3. Now register the installation package with the system by entering the following command:

```
/usr/sbin/swreg -l depot /tmp/epca.pkg
```

4. Once the component files have been copied, use the **swinstall** program to copy the component files to the system. Enter the following command:

```
/usr/sbin/swinstall -s /tmp/epca.pkg
```

One of the installed files is a configuration procedure, which you must execute by entering the following commands:

```
cd /var/adm/sw/products/EPCA  
sh ./configure
```

This procedure will walk you through the driver configuration process, as detailed in steps 5 - 13 below.

5. You will eventually see the following screen:

```
Copyright 1996-98 Digi International, Inc.  
All rights reserved.  
  
RESTRICTED RIGHTS LEGEND  
  
Use, duplication, or disclosure by the Government is subject to  
restrictions as set forth in subparagraph (c)(1)(ii) of the Rights  
in Technical Data and Computer Software clause at DFARS 252.227-7013.  
  
Digi International Inc. d/b/a Digi  
11001 Bren Road East  
Minnetonka, MN 55343  
  
Please hit <Return> to continue:
```

Press <Enter>. You will see:

```
This script installs the Digi AccelePort EPC/X, C/X, Xem, and Xr 920 driver  
for:  
  
HP-UX B.10.20  
  
This script also installs the information needed by HP-UX to use  
these additional ports. This driver currently supports 4 asynchronous  
serial adapters.  
  
Please hit <Return> to continue:
```

Press <Enter> again.

6. The system displays:

```
The port names (in the /dev directory) will look like:  
  
    /dev/ttya01  
  
where `tty' is the basename, `a' is an ID letter that can be  
different for each port box, and `01' is the port number.  
  
Systems with a large number of ports may need to use some letters more  
than once. When this occurs, the first box to use an ID letter will  
get port numbers 01-16, the second box to use that letter will get  
port numbers 17-32, and so on.  
  
Do you want to continue (y or n)?
```

If you answer “**Y**”, the installation will continue. If you answer “**n**”, you will exit the install program.

7. Now the system will ask:

```
How many adapters do you wish to install (1-4)?
```

Enter the number of adapters you have installed in your computer.

*Steps 8-12 will be repeated for each host adapter installed in your system.*

8. You will see the display:

```
Configuring adapter 1...

Adapters supported:

EISA Adapters
  1) AccelePort Xem EISA
  2) AccelePort C/X EISA
  3) AccelePort EPC/X EISA

PCI Adapters
  4) AccelePort Xr PCI
  5) AccelePort Xem PCI
  6) AccelePort C/X PCI
  7) AccelePort EPC/X PCI

What type is adapter number 1?
```

Choose the applicable adapter type.

9. The following step is executed *only* if you are configuring an adapter installed in an EISA bus. If you are configuring an adapter in a PCI bus, go on to step 10; otherwise, you will be asked:

```
In what slot is host adapter installed (1-4)?
```

Enter the slot number for your adapter.

10. Next, you need to select the **altpin** setting. This allows alternate wiring of the RJ-45 modular connectors. The default for **altpin** is OFF, giving you the standard Digi RJ-45 pinouts. Setting **altpin** to ON enables the alternate RJ-45 pinouts. (This is useful for 8-pin RJ-45 connectors. See the *Installation Guide* for your adapter, and page 30 of this manual for more details.)

The software asks:

```
The default setting for altpin is off.
Is this acceptable (y or n)?
```

Answer **y** or **n** as appropriate.

Note that answering “**n**” here activates the **altpin** configuration for *all* ports. Individual ports can be set with **ditty** (see page 30).

11. This step is different depending upon the type of adapter you are configuring. Follow the appropriate procedure for your adapter. If you are installing an Xr or Xr 920 host adapter, skip this step and go to step 12.

*Xem host adapter—for C/X and EPC/X host adapters, follow the procedure on the following page.*

If you are installing an Xem host adapter, you will now be asked for the number of PORTS modules to be connected to the adapter:

```
Configuring adapter 2.  
Adapter type is AccelePort Xem EISA.  
Altpin is set to off.  
  
PORTS/16em or PORTS/8em(p) modules:  
This adapter can have 1 to 4 modules connected.  
  
      How many modules are connected to this adapter (1 - 4)?
```

Select the appropriate number for your installation.

You will also be asked for the number of ports (8 or 16) on each PORTS module. Answer “8” for PORTS/8em modules or “16” for PORTS/16em modules.

*Now proceed to Step 12, on page 15.*

*C/X, EPC/X host adapters—for Xem host adapters, follow the procedure on the previous page.*

If you are installing a C/X or EPC/X host adapter, you will be asked for configuration information for the two synchronous lines. This determines how the host adapter will communicate with the attached concentrator(s).

There are two methods for setting the line configuration: *basic* and *custom*. In the basic configuration, the sync lines are set to 8-wire direct and either 1228K bps or 10M bps (10M bps is applicable only to the EPC/X host adapter). The custom configuration allows you to select the wiring method and data rate for each sync line. You will see:

```
Configuring adapter 1.  
Adapter type is AccelePort EPC/X EISA.  
Altpin is set to off.  
  
Line Configuration:  
The sync lines may be configured two ways. The basic method has all  
connections wired "8 wire direct" at a speed of either 1228K bps or  
10M bps, and can be used for quick set-up for most situations. The  
custom method allows you to choose speeds and wiring methods  
individually.  
  
Do you want to use the basic installation method (y or n)?
```

*Basic Configuration (for Custom Configuration, see page 14)*

**11a.** If you are installing an EPC/X host adapter, you will see the following screen (if you are installing a C/X host adapter, skip to Step **11b**):

```
Configuring adapter 1.  
Adapter type is AccelePort EPC/X EISA.  
  
Basic Configuration:  
  
One of two line speeds must be chosen for the basic configuration  
method. The choices are 1228K bps and 10M bps. Running the sync  
lines at 1228K bps maintains compatibility with C/CON-16  
concentrators. Running the sync lines at 10M bps allows higher  
performance, but is not compatible with C/CON-16 concentrators and  
restricts the length of the sync cable. For more information, see  
the manual.  
  
    1) 1228K bps  
    2) 10M bps  
  
Which speed do you wish to run the sync lines at?
```

**Important!**

Select 10M bps *only* if:

- all attached concentrators are EPC/CON-16 concentrators, and
- the *cumulative* length of all daisy chain cables on either sync line is 30 feet or less.

See the EPC/CON-16 *Installation Guide* for more detailed information about data rates versus cable lengths.

- 11b.** Now you will be asked how many concentrators are attached to each sync line. For EPC/X host adapters, you will also be asked how many EBI modules are attached to each concentrator (this refers to PORTS/16em, PORTS/8em or PORTS/8emp modules connected to the “EBI Out” port of EPC/CON-16 concentrators), and how many ports (8 or 16) are on each EBI module (answer “8” for PORTS/8em modules and “16” for PORTS/16em modules).

### **Important!**

#### **EPC/CON-16 and C/CON-16 Concentrators**

EPC/CON-16 and C/CON-16 concentrators (which have a plastic case) must have their node numbers set manually at installation (see the concentrator *Installation Guide* for instructions). When asked for the number of concentrators, enter the *node number* of the last concentrator in each sync line (which may be different from the actual number of concentrators). Normally concentrator node numbers are assigned sequentially, beginning with 1; however, if you are planning to add more concentrators later, and want to configure the driver and create the devices in `/dev` to support the future concentrators, you may skip node numbers to allow for later insertion of concentrators. For example, if you have three concentrators attached to a sync line, but are planning to add three more, the node number of the last concentrator in the chain should be set to “6”, and you should enter “6” for the number of concentrators (it is important that these numbers match, because the driver uses them to set the communication mode of the last concentrator to enable it to return data to the host adapter).

*Now proceed to Step 12, on page 15.*

### ***Custom Configuration***

The custom configuration requires you to specify the wiring method and the data rate for each host adapter synchronous line. The wiring options are:

- 1) 4-wire direct
- 2) 8-wire direct
- 3) 8-wire synchronous modem
- 4) EIA-232 synchronous modem

The supported data rates are:

#### *4-wire direct*

- |         |         |          |           |
|---------|---------|----------|-----------|
| 1) 230K | 2) 460K | 3) 921K* | 4) 1843K* |
|---------|---------|----------|-----------|

#### *8-wire direct*

- |          |          |           |            |          |
|----------|----------|-----------|------------|----------|
| 1) 2400  | 5) 38.4K | 9) 230K   | 13) 1843K* | 17) 10M* |
| 2) 4800  | 6) 57.6K | 10) 460K  | 14) 2458K* |          |
| 3) 9600  | 7) 76.8K | 11) 921K  | 15) 3686K* |          |
| 4) 19.2K | 8) 115K  | 12) 1228K | 16) 7373K* |          |

#### *8-wire synchronous modem*

- |          |          |           |
|----------|----------|-----------|
| 1) 2400  | 6) 38.4K | 10) 460K  |
| 2) 4800  | 7) 57.6K | 11) 921K  |
| 3) 9600  | 8) 76.8K | 12) 1228K |
| 4) 14.4K | 9) 115K  |           |
| 5) 19.2K | 10) 230K |           |

#### *8-wire EIA-232 synchronous modem*

- |         |          |          |
|---------|----------|----------|
| 1) 2400 | 4) 14.4K | 7) 57.6K |
| 2) 4800 | 5) 19.2K | 8) 64.1K |
| 3) 9600 | 6) 38.4K | 9) 76.8K |

\* Rates with an asterisk are incompatible with C/CON-16 concentrators. These data rates can only be used if *all* concentrators on a given sync line are EPC/CON-16 concentrators. Also, see *Restrictions on Cable Lengths* in the *EPC/CON-16 Installation Guide*.

12. You will now be asked to confirm the configuration for the adapter:

If you have installed an Xem host adapter with four PORTS modules, you will see something like this:

```
You have selected the following configuration for adapter 1:
Adapter Type: AccelePort Xem EISA. Altpin is set to off.

Module  Port Names
-----
1      ttya01 - ttya08
2      ttyb01 - ttyb09
3      ttyc01 - ttyc16
4      ttyd01 - ttyd16

Is this configuration acceptable (y or n)?
```

If you have installed an EPC/X host adapter, you might see something like this:

```
You have selected the following configuration for adapter 1:
AccelePort EPC/X EISA. Altpin is set to off.

Connections  Speed  Cabling      Port Names
-----
Line 1
Concentrator 1  10M   8 wire direct  ttya01 - ttya16
  EBI Module 1
  EBI Module 2
  EBI Module 3
Concentrator 2  10M   8 wire direct  ttyb01 - ttyb08
  ttyc01 - ttyc09
  ttyd01 - ttyd16
  ttye01 - ttye16
Line 2
Concentrator 1  10M   8 wire direct  ttyf01 - ttyf16
Concentrator 2  10M   8 wire direct  ttyg01 - ttyg16
  EBI Module 1
Concentrator 3  10M   8 wire direct  ttyh01 - ttyh16
  ttyi01 - ttyi16
Concentrator 4  10M   8 wire direct  ttyj01 - ttyj16

Is this configuration acceptable (y or n)?
```

If you accept the configuration, Steps 8-12 will be repeated for each additional adapter specified in Step 7. Otherwise, you will be returned to Step 8 (page 9) to re-enter the configuration for the current adapter.

13. Finally, the software asks:

```
Do you wish to update /etc/ttytype (y or n)?
```

For a new installation, answer “**y**” (yes). For updates, answer “**n**” to preserve the current setup. If you are not sure, answer “**y**”.

## Part Two: Installing the New Kernel

The device driver software configuration is now complete, and the new kernel must be installed.

You will see several messages as the new kernel is being generated and installed. When everything is done, you will see the following:

```
Your HP-UX installation was successful; you need to reboot before you can use
your ports.
```

During the final portion of the configuration process, the following files are added to the startup database:

```
/sbin/init.d/digiepca
/sbin/rc3.d/S100digiepca
/sbin/rc3.d/K900digiepca
/etc/rc.config.d/digiepca
```

These procedures will create the device files on your first reboot after installing the new kernel, and will start the Digi download process on subsequent reboots. If you wish to disable the Digi devices for any reason, see the file `/etc/rc.config.d/digiepca`.

If you are configuring any EISA host adapters, you must make sure they are properly registered with the HP-UX EISA configuration software before rebooting your system. For information regarding EISA configuration, check the `eisa_config` man page. To reboot, you may be able to use the command:

```
exec reboot
```

When the computer reboots, you should see a message similar to the following:

```
Starting the Digi download process ..... [ OK ]
```

This message indicates that the installation and configuration process completed correctly. If the adapter is functioning, you should also find a message similar to the following in your system log file (`/var/adm/syslog/syslog.log`):

```
AccelePort Xr Host Adapter (PCI) at 0xf0a00000: mem=0xf0800000, # of
ports=8 V 1.0.0
```

If errors are encountered during initialization, they will also be copied to the system log file. For information about some of these error messages, see page 32.

If no errors are detected, C/X and EPC/X host adapters will proceed to download the operating software to the C/CON-16 and/or EPC/CON-16 concentrators. Once the concentrators are running, their displays will show **“AC”**.

## Part Three: Creating New Devices

Once the newly configured kernel boots, the startup script creates devices in `/dev`, giving HP-UX the information to use the additional ports.

The Digi driver will support up to four EPC/X, C/X, Xem and/or Xr 920 host adapters.

C/X host adapters can have up to eight concentrators attached, for a total of 128 asynchronous ports per host adapter, or 512 ports per system (four host adapters).

EPC/X host adapters can each have up to fourteen concentrators and/or PORTS/em modules attached for a total of 896 asynchronous ports per system (four host adapters). The maximum number of concentrators per synchronous line is eight. PORTS/em modules may be attached to the concentrators, as long as the total number of boxes (concentrators and PORTS modules) does not exceed fourteen.

Xem host adapters can each have four PORTS modules attached, for up to 64 ports per adapter or 256 asynchronous ports per system.

The devices are named according to the following convention:

### Format used for port names

- tty** Base name.
- pr** Base name for DigiPRINT transparent printing.
- a-o** Concentrator or PORTS module letter I.D. Legal letters are **a-o**; ports (tty or printer) with modem control are identified by a capital letter **A-O**.
- 01-96** Port number on the individual concentrator or PORTS module.

For example, port 4 on concentrator or PORTS module “**b**” will be **tt**y**b04**. The same port with modem control enabled would be named **tt**y**B04**.

## Part Four: Enabling the New Ports

1. Connect terminals to the ports (using a null modem, if necessary) and test the connections to each terminal by entering the following command for *each* port added:

```
date > /dev/ttya01
```

(Assuming the terminal is connected to **ttya01**.)

*(Please note that in the above, the “date” command is used as a simple test, to provide text output that can be redirected; there is no other significance to “date” in this test.)*

- If the date appears on the terminal’s screen, the device is properly connected.
- If the date *does not* appear on the terminal’s screen, then that terminal is not receiving data; check the power, cables, connections, etc.
- If nonsense characters are printed on the terminal’s screen, check the baud rates, data bits, stop bits, and parity setting on your terminal (HP-UX default parameters are 300 baud, 8 data bits, 1 stop bit, and no parity).

Another test you can perform will verify that a port can both transmit and receive data:

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), and enter the following commands:

```
cat </dev/ttya01 &  
cat /etc/termcap > /dev/ttya01
```

The first command runs in the background, and directs all input from **ttya01** to **stdout** (your screen). The second command transmits the **termcap** file to **ttya01**. If the port is working, the data is sent out the port, received back by the same port and displayed on your screen.

If the port fails, check another port. If more than one port fails, the problem is probably due to memory contention, rather than defective hardware. Try reinstalling the device driver with a different memory start address.

Once you can redirect output to a terminal with the test above, perform the following steps to enable that port.

2. Use **vi** to enable the new terminal entries in the **/etc/inittab** file. The following entries have been automatically added for the adapters (and ports) installed:

```
Xx01:23:off:/etc/getty ttya01 9600  
Xx02:23:off:/etc/getty ttyb02 9600...
```

and so on.

- Change the word “**off**” to “**respawn**” for each terminal you want to be enabled.
- The numbers associated with each “**tty**” represent the adapter and port number (“**ttya01**” is Port 1 of the first configured adapter, “**ttya08**” is Port 8 of the first configured adapter).
- The last number is an entry into the **/etc/gettydefs** file, which may be set to any of the allowable baud rates. (Check your operating system’s manual.) In this case, “9600” specifies 9600 baud, 7 data bits, 1 stop bit, and even parity.

**Important!**

If the port tests above work, but you still can’t respawn a **getty**, it is probably because DCD is not asserted.

Remember that modem controlled ports (where the module ID is a capital letter—e.g. **ttyA01**) must have Data Carrier Detect (DCD) asserted before they can function. If DCD is not connected to an active output line of the peripheral device, it can be defeated by “tying it high” (e.g. connecting it to the same port’s DTR line).

Another way to bypass the DCD requirement is to use non modem control devices (where the “module” id is a small letter—e.g. **ttya01**). Non modem control devices function identically to modem control devices, except that they do not require DCD in order to function.

3. Finally, enter the following command to get the login prompt on the screen:

```
init q
```

## Un-Installing the HP-UX Device Driver

Removing the driver from the kernel is a two-part process. First, the driver references are removed from the system configuration files. Secondly, a new kernel is linked, and copied to the root directory.

Enter the following commands to *un-install* the device driver software:

1. Log onto the console as super-user (root).
2. Enter the following commands:

```
cd /var/adm/sw/products/EPCA
sh ./unconfigure
/usr/sbin/swremove EPCA
```

### **Note:**

During the execution of the **unconfigure** script, you will be asked whether you would like the kernel to be rebuilt for you. Until the kernel is rebuilt, the Digi device driver will not be fully removed from the system. If you answer **n**, be sure to rebuild the kernel by hand before your next reboot.

# 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 **ditty** command provides three parameters to limit printer output and avoid this situation. (See *Setting Terminal Options with ditty* on page 27 for a complete description of the **ditty** 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 **ditty**.

DigiPRINT will be available for use after the Digi device driver software for your operating system is installed, and the transparent print options are activated with the **ditty** 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 (**pra01**, etc.) must not be in **/etc/inittab**, and must not be enabled.

## Transparent Print Activation

DigiPRINT is activated with **ditty**. The **ditty** program configures the Digi tty device driver for transparent print options (see *Setting Terminal Options with ditty* for a complete description of the **ditty** command). The **ditty** command must be run each time the machine is booted. One way to do this is to utilize a mechanism which Digi has provided through its startup scripts. If you place the commands that you wish to execute into the file **/usr/conf/digi/portconfig** and make that file executable (with the command **chmod u+x /usr/conf/digi/portconfig**), the Digi startup scripts will execute your commands after the ports are enabled. Alternatively, you may include the **ditty** 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 **ditty** is **/usr/bin/ditty**.

DigiPRINT transparent print options are set using the **ditty** program in the following manner:

```
ditty [ -a ] [ 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 ditty* (page 27) 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 ditty* 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 ditty* 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 ditty* for more information.
- port** Specifies the tty device.

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

**Example:** `cat filename > /dev/pra01`

## ditty Examples

### Example 1:

The following command configures the DigiPRINT options for a DEC VT100 terminal connected to `/dev/ttya01`. Note that the printer uses `/dev/pra01`. `maxcps`, `maxchar` and `bufsize` are left to defaults. Type:

```
ditty term vt100 /dev/ttya01
```

### 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:

```
ditty onstr "\033[5i" offstr "\033[4i" /dev/ttya01
```

### 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):

```
ditty term wyse30 maxcps 75 maxchar 100 bufsize 1000 /dev/ttya01
```

# Setting Terminal Options with ditty

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**ditty** is a utility program that sets and displays the terminal options for the Digi concentrators and/or PORTS modules.

The format is:

```
ditty [-a] [-p] [-n ttyname] [option(s)] [ttyname]
```

With no options, **ditty** 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**.
- 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 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** (or the basename you selected during installation, if different). 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.

<b>stopout</b>	Stop output exactly as if an <b>xoff</b> character was received.
<b>startout</b>	Restart stopped output exactly as if an <b>xon</b> character was received.
<b>stopin</b>	Activate flow control to stop input.
<b>startin</b>	Release flow control to resume stopped input.
<b>[-]dtr</b>	Raise [drop] the DTR modem control line, unless DTR hardware flow control is selected.
<b>[-]rts</b>	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.

<b>[-]fastcook</b>	Perform cooked output processing on the intelligent card to reduce host CPU usage, and increase raw mode input performance.
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**[-]fastbaud** Alter the baud rate tables by the following mapping scheme:

	<i>Xem, EPC/X</i>	<i>Xr 920</i>	<i>C/X</i>
<b>Specified Baud Rate:</b>	<b>Baud Rate Mapped to:</b>	<b>Baud Rate Mapped to:</b>	<b>Baud Rate Mapped to:</b>
50	57600	57600	57600
75	76800	76800	75
110	115200	115200	115200
134	14400	14400	14400
150	57600	57600	57600
200	230400	230400	200
300	76800	76800	300
600	115200	115200	115200
1200	230400	230400	1200
1800	28800	28800	28800
2400	2400	460800	2400
4800	4800	921600	4800
9600	9600	9600	9600
19200	19200	19200	19200
38400	38400	38400	38400

- [-]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.
- [-]altpin** Switches the function of the DSR and the DCD inputs on the interface connector, so that DCD is available when using an 8-pin RJ-45 connector instead of a 10-pin RJ-45 connector.
- 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. Default is 100 CPS.

<b>maxchar</b> <i>n</i>	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.
<b>bufsize</b> <i>n</i>	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 <b>maxcps</b> rate selected above. Default is 100 characters.
<b>onstr</b> <i>s</i>	Sets the terminal escape sequence to turn transparent printing on. The string <i>s</i> 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), <i>s</i> should be entered as “\033[5i”.
<b>offstr</b> <i>s</i>	Sets the terminal escape sequence to turn transparent printing off. See “ <b>onstr</b> ”, above, for the format of the string <i>s</i> .
<b>term</b> <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 terminals: <b>adm31</b> , <b>ansi</b> , <b>dg200</b> , <b>dg210</b> , <b>hz1500</b> , <b>mc5</b> , <b>microterm</b> , <b>multiterm</b> , <b>pcterm</b> , <b>tvi</b> , <b>vp-a2</b> , <b>vp-60</b> , <b>vt52</b> , <b>vt100</b> , <b>vt220</b> , <b>wyse30</b> , <b>wyse50</b> , <b>wyse60</b> , or <b>wyse75</b> . If the terminal type is not found in the internal default table, then <b>ditty</b> reads the <b>terminfo</b> entry for the terminal type and sets transparent print on/off strings to values given by the <b>mc5/mc4</b> attributes found there.

Also see **stty(1)**, **ioctl(2)**, **termio(7)**, and **terminfo(4)**.

# Error Messages

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The following error messages (or similar) may be generated by the driver. When these messages are produced, they are logged in the system log file (`/var/adm/syslog/syslog.log`).

```
EPCA: [slot 3] An adapter past the 1 configured was detected
EPCA: Card in slot 3 was not configured
EPCA: An unconfigured board [id: 0x114f0001] was detected
```

*What they mean:*

The system found more adapters than the driver was configured for.

*Action to take:*

Reconfigure the driver by using the `configure` script found in `/var/adm/sw/products/EPCA`.

```
EPCA: [slot 3] cannot kmem_alloc for *various structures*
EPCA: AccelePort Xem (EISA): [slot 3] cannot map mem to host
```

*What they mean:*

The system would not allocate memory to the driver.

*Action to take:*

Adjust kernel resources.

```
EPCA: [slot 3] NOT resetting, check switch settings
```

*What it means:*

The adapter doesn't respond to reset, or cannot be detected. Adapter may not be installed, or may not be installed correctly.

*Action to take:*

Make sure the adapter is fully seated in the slot. Make sure that, in the case of EISA adapters, the EISA configuration utility has been executed and the selected adapter type matches the installed card. Potential hardware problem.

**EPCA: [slot 3] No memory at 0xc0000, check switch settings**

*What it means:*

The driver cannot read the adapter's dual ported memory.

*Action to take:*

Make sure the adapter is fully seated in the slot. Make sure that, in the case of EISA adapters, the EISA configuration utility has been executed and that the selected adapter's dual ported memory selection does not conflict with other devices. Potential hardware problem.

**EPCA: [port 0x0] diagnostics failed**

*What it means:*

The driver encountered an error executing on-board BIOS.

*Action to take:*

Make sure there is no memory contention with other devices. Potential software problem. Potential hardware problem.

**EPCA: [port 0x0] FEPOS not functioning.**

*What it means:*

The driver encountered an error executing on-board FEPOS.

*Action to take:*

Make sure there is no memory contention with other devices. Potential software problem. Potential hardware problem.

**EPCA: EMUX card at port 0x0**

*What it means:*

The driver discovered the FEPOS has encountered non-recoverable errors.

*Action to take:*

Make sure there is no memory contention with other devices. Potential software problem. Potential hardware problem.

Reboot the machine. If the host adapter has suffered a catastrophic error, it will probably fail diagnostics during reboot.

If the problem is transient, the adapter may function correctly for a period of time before this message recurs. Please make note of the conditions that cause this error and report them to Digi Technical Support.

**EPCA: event() port=0x10, reason=0x00, b0=0x00, b1=0x00**  
**EPCA: assertion failure. line=nnnn, \*various messages\***

*What they mean:*

The driver has encountered a situation that is not supposed to be possible.  
Possible hardware problem. Possible software problem.

*Action to take:*

Write down the exact error message, and contact Digi Technical Support.

**EPCA: [conf\_idx 2] No memory allocated**

*What it means:*

The PCI subsystem of the host machine would not allocate bus memory  
for the adapter. Possible hardware problem.

*Action to take:*

Write down the exact error message, and contact Digi Technical Support.

