




# Software Manual

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

**Solaris x86**

**Solaris SPARC PCI**

92000193 Rev D

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# Introduction

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The Digi device drivers for Solaris x86 and Solaris SPARC PCI are installable device drivers; the software development system is not required to create a new kernel.

This manual also contains instructions for the following features:

- **ditty**, a utility program that sets and displays the terminal options for Digi intelligent serial products (page 26)
- DigiPRINT™ transparent printing (page 30)
- Digi Port Authority™, a port monitoring and diagnostic tool (page 34)

Once you have installed the adapter according to the instructions in the *Installation Guide* for your AccelePort® adapter, you may proceed with the device driver installation, starting on the following page.

## Supported Products

The device driver package provides support for Digi AccelePort EPC/X™, C/X™, Xem™, Xr™ and Xr 920™ adapters on Intel x86 and SPARC PCI platforms.

### **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

---

**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.

## Installing the Driver Package

1. Log onto the console as super-user (root).
2. To begin the installation, insert the Digi device driver diskette in the diskette drive and enter the command:

```
pkgadd -d diskette1
```

(or **pkgadd -d diskette2**, if the diskette is in the second drive)

This will run the System Administration program designed to assist in Add On Package installation.

Refer to the Operations/System Administrator's Guide for more information on **pkgadd**.

**Note:**

As an alternative to **pkgadd**, **pkgask** may be used to create a script file for multiple installations. To use **pkgask**, enter:

```
pkgask -d diskette1 -r filename
```

where *filename* is the name of the response file. If you already have a response file from a previous **pkgask** session, you can use it by entering:

```
pkgadd -d diskette1 -r filename
```

You will see the following (or something similar):

```
Installation in progress. Do not remove the diskette.

The following packages are available:

1. epca    Digi Async Driver Package (i386/sparc) x.x.x

Select package(s) you wish to process (or 'all' to process all packages).
(default: all) [?, ??, q]
```

3. Press <Enter> to select **epca**. **epca** supports AccelePort C/X, EPC/X, Xr and Xem host adapters.

You will now see the following (or a similar) screen:

```
This script installs the Digi Async Host Adapter driver for:

    Solaris 2.x

This script also installs the information needed by UNIX to use
these additional ports. This driver supports up to 8 asynchronous
serial adapters.

By default, dial-in ports are installed with the basename "/dev/dty/".
DigiPRINT ports are installed with the basename "/dev/dpr".

Hit <CR> to proceed, or 'q' to quit:
```

Press <Enter>.

4. The system displays:

```
The port names (in the /dev directory) will look like:

/dev/dty/a001s

where 'dty/' is the subdirectory in /dev, 'a' is an ID letter that can be
different for each port box, '001' is the port number and the suffix 'm' or
's' is 'modem' or 'standard' tty.

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 001-016, the second box to use that letter will get
port numbers 017-032, and so on.

You can have the install script pick ID letters for you, assigning
letters consecutively (a,b,c,d,...) and starting over from the
beginning when it runs out of letters; or you can choose them manually.
Manual ID selection is recommended for larger systems, where it can be
used to help keep port names more organized.

Do you want ID letters picked for you (y/n)?
```

If you answer “y”, ID letters will be automatically picked. If you answer “n”, you will be asked (later in the procedure) to specify an ID letter for each PORTS module.

5. The system then displays:

```
Many Solaris applications expect serial port devices to have links
in the /dev/term directory and serial dial-out devices to have
links in the /dev/cua directory.
Do you want links to the /dev/term and
/dev/cua directories created for you (y or n)?
```

If you answer y, the device nodes for the Digi devices will have links created for them in the **/dev/term** and **/dev/cua** directories. You may experience negative side effects with this procedure if you are using a large number of ports (greater than 250), but choosing this option will avoid the task of linking these device nodes later by hand.

6. Now you will be asked:

```
How many adapters do you wish to install (1-8)?
```

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

Steps 7-11 will be repeated for each AccelePort EPC/X, C/X, Xr or Xem adapter installed in your system.

7. If your adapter is installed in an **Intel x86 platform**, you will see:

```
Configuring adapter 1.

Adapters supported:

ISA Adapters
  0) AccelePort Xr ISA
  1) AccelePort Xem ISA
  2) AccelePort C/X ISA
  3) AccelePort EPC/X ISA

EISA Adapters
  4) AccelePort Xem EISA
  5) AccelePort C/X EISA
  6) AccelePort EPC/X EISA

Micro Channel Adapters
  7) AccelePort Xem MC
  8) AccelePort C/X MC
  9) AccelePort EPC/X MC

PCI Adapters
 10) AccelePort Xr PCI
 11) AccelePort Xem PCI
 12) AccelePort C/X PCI
 13) AccelePort EPC/X PCI

What type is adapter 1?
```

If your adapter is installed in a **Sun SPARC workstation**, you will see:

```
Configuring adapter 1.

Adapters supported:

PCI Adapters
  0) AccelePort Xr PCI
  1) AccelePort Xem PCI
  2) AccelePort C/X PCI
  3) AccelePort EPC/X PCI

What type is adapter 1?
```

Choose the applicable adapter type.



8. (ISA adapters only—EISA adapters skip to Step 8; Micro Channel adapters skip to Step 10)

You will now be asked to specify the I/O port address for the adapter being configured. You will see the screen:

```
Configuring adapter 1.
Adapter type is AccelePort EPC/X ISA Host Adapter.

Selecting the I/O port:
The I/O port choice must match the setting of the dip switches on the
adapter, and must not conflict with other devices in the system.
Problems with the I/O port selection should be checked for if your
system fails to find the adapter or your system locks up.

The I/O port address choices, in hexadecimal, are:

    108    208    308
    118    228    328
    128

Please enter selection (108-328): 108
```

Select the address that corresponds to the setting of the DIP switches on your adapter (see the *Installation Guide* for your adapter).

9. (EISA and ISA adapters only; Micro Channel adapters skip to Step 10)

Next, you need to specify a starting address for the dual-ported memory on your adapter. If you are installing multiple adapters, the same address may be used for all adapters that are supported by this driver. You will see the screen:

*Memory Address Selection for ISA adapters (see page 11 for EISA adapters):*

```
Configuring adapter 1.
Adapter type is AccelePort Xem ISA.
I/O port is 104.

Selecting the memory address:
The memory address choice must not conflict with other devices in the
system. Problems with the memory address selection should be checked
for if your system fails to find "adapter memory" or your system
locks up.

    The memory address choices, in hexadecimal, are:

*80) 0x00080000 *A0) 0x000A0000 C0) 0x000C0000 E0) 0x000E0000
*88) 0x00088000 *A8) 0x000A8000 C8) 0x000C8000 E8) 0x000E8000
*90) 0x00090000 *B0) 0x000B0000 D0) 0x000D0000 F0) 0x000F0000
*98) 0x00098000 *B8) 0x000B8000 D8) 0x000D8000 F8) 0x000F8000

    *NOTE: selections 80-98 may conflict with system memory.
           selections A0-B8 usually conflict with video adapters.

Please enter selection code (80-F8):
```

Enter the two-digit code to the left of the address you wish to use.

*NOTE—Although there are 16 choices offered for memory start addresses, a limited number of these choices are likely to be available. Of the 16, the best choices are probably **D0** and **D8**. Systems with 512K of base memory (instead of 640K) may be able to use the options **80-98**. See the appendix on memory conflicts in the hardware Installation Guide and Reference Manual for more information.*

*Memory Address Selection for EISA adapters (see page 10 for ISA adapters):*

```
Configuring adapter 1.
Adapter type is AccelePort EPC/X EISA Host Adapter.

Selecting the memory address:
The memory address choice must not conflict with other devices in the
system. Problems with the memory address selection should be checked
for if your system fails to find "adapter memory" or your system
locks up.

    The memory address choices, in hexadecimal, are:

*80) 0x00080000 *A0) 0x000A0000 C0) 0x000C0000 E0) 0x000E0000
*88) 0x00088000 *A8) 0x000A8000 C8) 0x000C8000 E8) 0x000E8000
*90) 0x00090000 *B0) 0x000B0000 D0) 0x000D0000 F0) 0x000F0000
*98) 0x00098000 *B8) 0x000B8000 D8) 0x000D8000 F8) 0x000F8000

    *NOTE: selections 80-98 may conflict with system memory.
           selections A0-B8 usually conflict with video adapters.

F000) 0xF0000000 F400) 0xF4000000 F800) 0xF8000000 FC00) 0xFC000000
F100) 0xF1000000 F500) 0xF5000000 F900) 0xF9000000 FD00) 0xFD000000
F200) 0xF2000000 F600) 0xF6000000 FA00) 0xFA000000 FE00) 0xFE000000
F300) 0xF3000000 F700) 0xF7000000 FB00) 0xFB000000 FF00) 0xFF000000

    Please enter selection code (80-F8 or F000-FF00):
```

Enter the two or four digit code to the left of the address you wish to use (the four digit codes yield addresses in the fourth gigabyte). The address must be the one you specified when you ran the EISA configuration program.

*NOTE—Although there are 16 choices offered for memory start addresses below 1 megabyte, a limited number of these choices are likely to be available. Of the 16, the best choices are probably **D0** and **D8**. Systems with 512K of base memory (instead of 640K) may be able to use the options **80-98**. See the appendix on memory conflicts in the hardware Installation Guide and Reference Manual for more information.*

10. This step is different depending on whether you are installing Xr, Xem, C/X or EPC/X host adapters. Follow the appropriate procedure for your adapter.

#### *AccelePort Xem Host Adapters*

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 1.
Adapter type is AccelePort Xem ISA.
I/O port is 104.
Memory Addr. is 0x000D8000.

PORTS modules:
This adapter can have 1 to 4 EBI modules connected, for 8 to 64 ports.

How many PORTS modules are connected to this adapter (1 - 4)? 1
```

Select the appropriate number for your installation.

If you answered “n” to the question “Do you want ID letters picked for you?” back in Step 6, you will also be prompted at this time for the ID letters to be assigned to each of the PORTS modules.

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.

#### *AccelePort Xr Adapters*

If you are installing a AccelePort Xr adapter, you will now be asked for the number of ports on the adapter:

```
Configuring adapter 1.
Adapter type is AccelePort Xr ISA.
I/O port is 104.
Memory Addr. is 0x000D8000.

AccelePort Xr ISA:
How many ports are on this adapter (4 or 8)?
```

Select the appropriate number for your installation.

*Now proceed to Step 11, on page 17.*

### *AccelePort C/X and EPC/X Host Adapters*

If you are installing an AccelePort 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 ISA Host Adapter.
I/O port is 108.
Memory Addr. is 0x000C0000.

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/n)?
```

**Basic Configuration** (for Custom Configuration, see page 16)

- 10a.** If you are installing an AccelePort EPC/X host adapter, you will see the following screen (if you are installing an AccelePort C/X host adapter, skip to Step 10b):

```
Configuring adapter 1.
Adapter type is AccelePort EPC/X ISA Host Adapter.
I/O port is 108.
Memory Addr. is 0x000C0000.

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 and Reference Manual* for more detailed information about data rates versus cable lengths.

- 10b.** Now you will be asked how many and what type of 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 or PORTS/8em 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, C/CON-8 and Newer C/CON-16 Concentrators**

EPC/CON-16, C/CON-8 and newer 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).

### **Older C/CON-16 Concentrators**

Older C/CON-16 concentrators (which have a metal case) are always assigned node numbers sequentially, beginning with 1. If all of the concentrators on a sync line are older models, enter the actual number of concentrators (which will correspond to the node number of the last concentrator in the chain).

### **Mixed Older and Newer Concentrators**

When mixing older and newer concentrators on a sync line, the older concentrators must be attached closest to the host adapter, and newer concentrators must be at the end of the chain. In this case, use the *node number* that has been set in the last concentrator in the chain (which may be different from the actual number of concentrators).

*Now proceed to Step 11, on page 17.*

### ***Custom Configuration***

The custom configuration requires you to specify the wiring method and the data rate for each sync 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-8 and 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*.



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

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

```
You have selected the following configuration for adapter 1:
Adapter Type:  AccelePort Xem ISA.
I/O address:   104.
Memory address: 0x000D8000.

Module  Port Names
-----
1      dty/a001[ms] - dty/a006[ms]
2      dty/b001[ms] - dty/b009[ms]
3      dty/c001[ms] - dty/c008[ms]
4      dty/d001[ms] - dty/d016[ms]

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

If you have installed an AccelePort EPC/X host adapter, you will see something like:

```
You have selected the following configuration for adapter 1:
AccelePort EPC ISA Host Adapter. I/O address:108. Memory Address:0x000C0000.

Connections  Speed  Cabling      Port Names
-----
Line 1
Concentrator 1  10M    8 wire direct  dty/a001[ms] - dty/a016[ms]
  EBI Module 1
  EBI Module 2
  EBI Module 3
Concentrator 2  10M    8 wire direct  dty/b001[ms] - dty/b016[ms]
  dty/c001[ms] - dty/c008[ms]
  dty/d001[ms] - dty/d008[ms]
Concentrator 2  10M    8 wire direct  dty/d001[ms] - dty/d008[ms]
  dty/e001[ms] - dty/e016[ms]
Line 2
Concentrator 1  9600   EIA-232 modem  dty/f001[ms] - dty/f016[ms]
Concentrator 2  9600   8 wire direct  dty/g001[ms] - dty/g016[ms]
  EBI Module 1
Concentrator 3  9600   8 wire direct  dty/h001[ms] - dty/h008[ms]
Concentrator 3  9600   8 wire direct  dty/i001[ms] - dty/i016[ms]
Concentrator 4  9600   8 wire direct  dty/j001[ms] - dty/j016[ms]

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

If you have installed an AccelePort Xr ISA adapter, you will see:

```
You have selected the following configuration for adapter 1:
Adapter Type:  AccelePort Xr ISA.
I/O address:   104.
Memory address: 0x000D8000.

Port Names
-----
dty/a001[ms] - dty/a008[ms]

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

If you accept the configuration, Steps 7-11 will be repeated for each additional adapter specified in Step 6. Otherwise, you will be returned to Step 7 (page 8) to re-enter the configuration for the current adapter.

12. 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 27 of this manual for more details).

The following will be displayed when setting up adapter number 1:

```
Altpin is provided to allow the DCD input signal to be exchanged with the DSR
input. This is useful on products with RJ-45 connectors as these products
have DCD on pin 10. Choosing altpin will allow the use of 8-pin connectors
while still having the benefit of full modem control. The use of altpin on
products with DB-25 connectors is not normally recommended.
```

The software then 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 27.)

## Creating New Devices

Devices will now be created in `/dev`, giving the operating system the information to use the additional ports.

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

AccelePort C/X host adapters can have up to eight concentrators attached.

AccelePort EPC/X host adapters can each have up to 14 concentrators and/or PORTS modules attached. 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 14.

AccelePort Xem host adapters can each have four PORTS modules attached.

The devices are named according to the following conventions:

### Format used for port names

**/dev/dty/**

Directory path for tty devices.

**/dev/dpr/**

Directory path for DigiPRINT transparent printer devices.

**a-z** Concentrator or PORTS module letter I.D. Legal letters are a-z.

**001-096**

Port number on the individual concentrator or PORTS module.

**s, m** Indicates whether port is a “standard” (**s**) or “modem” (**m**) port. Modem ports can only be opened when Data Carrier Detect (DCD) is active.

For example, standard tty port 4 on concentrator or PORTS module “**b**” will be **/dev/dty/b004s**. The same port with modem control enabled would be named **/dev/dty/b004m**. The DigiPRINT transparent printer device for that port is **/dev/dpr/b004s**.

*NOTE: A port may be enabled as either a standard or modem tty device, but not both.*

#### **Note:**

If you answered **y** to the question in Step 5, the device nodes for the Digi devices will have links created for them in the **/dev/term** and **/dev/cua** directories.

## Loading the Driver

When the driver loads, you will see the following (or similar) message:

```
epca port:0x00000208 mem=0x000C0000 ports=32 AccelePort Xem ISA V x.x.x
```

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

It is not necessary to reboot after the initial installation, but it is encouraged, to be certain that the driver is properly installed. When the system is rebooted, the driver will be force loaded and the above message will be seen if all is well.

### **Important!**

**ditty** options set form an **rc** script must be set after the download program has run, and must wait for the adapter to boot before running.

**ditty** options should be added to the end of **/etc/rc2.d**. This can be done by giving it a name such as “**S99epc**” or “**S99dittystuff**”, where the “**S**” must be a capital letter, and the greater the number, the later the script is run.

For example, to set **altpin** for port **a001s**, add the following line to **/etc/rc2.d/S99dittystuff**:

```
/usr/bin/ditty altpin /dev/dty/a001s
```

## Enabling the New Ports

Please refer to your Solaris System Administrator's Guide, under the *Peripherals Setup* section, for the details on how to enable serial ports. The following example shows how to set up serial ports for use with terminals:

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/dty/a001s
```

(Assuming the terminal is connected to **a001s**.)

*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.

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

2. Log onto the console as super-user (root).
3. Enter (on a single command line):

```
pmadm -a -p ttymonx -s a001s -fu -i root -v `ttyadm -V`\  
-m "`ttyadm -d /dev/dty/a001s -l 9600 -s /usr/bin/login`"
```

where **ttymonx** is the port monitor tag. This will enable the port suitably for a terminal. For more information, see **ttymon** and **ttyadm** in the *Answer Book*.

## Un-Installing the Device Driver

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

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

**pkgrm**

A list of installed packages will be presented. Choose the **epca** package. The package containing the driver will now be removed from the system. In the event that some of the ports were open when **pkgrm** was initiated, the unloading of the driver will fail. In this case it will be necessary to reboot to complete the driver removal.

# Digi TTY Devices

---

This device driver supports three different device types on each line. On line “**a001**,” where “**a**” refers to concentrator **a**, and “**001**” refers to first line (port) on that concentrator, there are three devices:

## **/dev/dty/a001m**

The “modem” tty device, used for terminals, modems, printers, laboratory equipment, etc. This is also sometimes referred to as a “dial-in” device.

The **XXm** device is a traditional UNIX port with modem control. It requires Carrier Detect to be high before it will operate. RTS/CTS handshaking is enabled by default.

When used with a modem, the port will wait for carrier before sending out the **login:** prompt, so the user is greeted properly upon making a connection.

When used with a terminal or other device, it is usually wise to wire the Digi DCD signal to the terminal’s DTR (Data Terminal Ready) line. When the terminal is turned on, the system outputs a **login:** prompt. When the terminal is turned off, any associated jobs are killed, and the user is logged out.

## **/dev/dty/a001s**

Standard device. This is the same as **/dev/dty/a001m** with the exceptions that the default handshake method is XON/XOFF, and that Data Carrier Detect need not be present to open the device. *Once a connection is established and DCD becomes active, standard devices behave in the same way as modem devices—subsequent loss of the Data Carrier Detect signal will cause the jobs to be killed and the user will be automatically logged off.*



### `/dev/dpr/a001s`

The “Transparent Print Devices” (DigiPRINT ) for use with the auxiliary printer port of a terminal. Output directed to a **dpr** device goes out the auxiliary port of a terminal while the user continues to use the terminal normally.

Transparent print devices allow you to use your terminal and a local printer connected to the terminal’s auxiliary port at the same time. The system assumes data you send to the **dpr** device is destined for the printer. Before sending data to the printer, the system sends a special control sequence to the terminal to activate the printer port, sends the data, then turns the printer port back off again before sending more data for the terminal.

For correct operation, several parameters must be provided to the *ditty* program. It is usually best to set these up in `/etc/rc2.d`, since they must be set each time the system is rebooted. See *Setting Terminal Options with ditty* (page 26) and *DigiPRINT Transparent Print Feature* (page 30).

An example setup line in one of the `/etc/rc` files might be:

```
ditty term wyse60 maxcps 80 bufsize 2000 maxchar 50 /dev/dty/a001s
```

# Setting Terminal Options with **ditty**

---

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

The **ditty** command must be run each time the machine is booted. Usually, the best way to do this is by adding **ditty** commands to your **etc/rc** system initialization file (put them in a text file in the directory **/etc/rc2.d**—see your System Administrators Guide for details). Alternatively, you may include the **ditty** command sequence in your **.login** or **.profile** files. Your System Administrator can help you edit these files. The pathname for **ditty** is **/usr/bin/ditty**.

The format is:

```
ditty [-a] [-n ttname] [option(s)] [ttname]
```

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 *ttname*** 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 devices.
- ttname*** Set and display options for the given tty device, instead of standard input. *ttname* can be the full pathname (e.g. **/dev/dty/a001s**), or a simplified pathname where the reference to **/dev** is implied (e.g. **dty/a001s**). 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 are “sticky”—the effects continue until the system is rebooted or until the options are changed.

**[-]fastbaud** Alter the baud rate tables by the following mapping scheme.

	<i>Xr, 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

**[-]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.

<b>maxcps</b> <i>n</i>	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>termcap</b> file and sets transparent print on/off strings to values given by the <b>po/pf</b> attributes found there.

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.
<b>[-]rtspc</b>	Enable [disable] RTS hardware input flow control, so RTS drops to pause remote transmission.
<b>[-]ctspc</b>	Enable [disable] CTS hardware output flow control, so local transmission pauses when CTS drops.
<b>[-]dsrpc</b>	Enable [disable] DSR hardware output flow control, so local transmission pauses when DSR drops.
<b>[-]dcdpc</b>	Enable [disable] DCD hardware output flow control, so local transmission pauses when DCD drops.
<b>[-]dtrpc</b>	Enable [disable] DTR hardware input flow control, so DTR drops to pause remote transmission.

Also see **stty(1)**, **ioctl(2)**, **termio(7)**, and **termcap(5)**.

# DigiPRINT Transparent Print Feature

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## 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 26 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 (**/dev/dpr/a001**, 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. Usually, the best way to do this is by adding **ditty** commands to your **etc/rc** system initialization file (put them in a text file in the directory **/etc/rc2.d**—see your System Administrators Guide for details). 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 by using the **ditty** program in the following manner:

```
ditty [ -a ] [ option(s) ] port
```

The command line options are:

<b>maxcps</b> <i>n</i>	Sets the maximum Characters Per Second (CPS) rate at which characters are output to the transparent print device. See <i>Setting Terminal Options with ditty</i> (page 26) for more information.
<b>maxchar</b> <i>n</i>	Sets the maximum number of transparent print characters the driver will place in the output queue. See <i>Setting Terminal Options with ditty</i> for more information.
<b>bufsize</b> <i>n</i>	Sets the driver's estimate of the size of the transparent printer's input buffer. See <i>Setting Terminal Options with ditty</i> for more information.
<b>onstr</b> <i>s</i>	Sets the terminal escape sequence to turn the transparent printer on. An arbitrary octal character <i>xxx</i> may be given as <b>\xxx</b> .
<b>offstr</b> <i>s</i>	Sets the terminal escape sequence to turn the transparent printer off. An arbitrary octal character <i>xxx</i> may be given as <b>\xxx</b> .
<b>term</b> <i>t</i>	Specifies the terminal type. See <i>Setting Terminal Options with ditty</i> for more information.
<b>port</b>	Specifies the tty device.



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

**Example:**     `cat filename > /dev/dpr/a001s`

## **ditty Examples**

### **Example 1:**

The following command configures the DigiPRINT options for a DEC VT100 terminal connected to `/dev/dty/a001s`. (Note that the printer uses `/dev/pr001s`). `maxcps`, `maxchar` and `bufsize` are left to defaults. Enter:

```
ditty term vt100 /dev/dty/a001s
```

### **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. Enter:

```
ditty onstr "\033[5i" offstr "\033[4i" /dev/dty/a001s
```

### **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. Enter:

```
ditty term wyse30 maxcps 75 maxchar 100 bufsize 1000 /dev/dty/a001s
```

# Digi Port Authority

---

## Introduction

The Digi Port Authority (DPA) program is a software tool which provides a means to monitor the status of the Front End Processor/Operating System (FEP/OS), which is the on-board software run by Digi intelligent serial communications products.

The DPA software also shows the status of the individual ports on a concentrator or PORTS module by displaying a simulated concentrator front panel. Each of the eight supported EIA-232 signals is displayed, along with input and output flow control status and the status of the host adapter to concentrator connection status.

The DPA program can be run from any terminal on the system, and supports the following Digi hardware and device drivers:

Hardware: Digi AccelePort C/X, EPC/X, Xr and Xem families  
Software: Device drivers for Solaris x86 and Solaris SPARC PCI

The DPA software is installed automatically when you install this device driver.



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

## Using the DPA Software

To run the Digi Port Authority software, enter the following command from any terminal, or the system console:

```
dpa [-l logfile]
```

The **-l logfile** option specifies the file path for screen dumps. If this option is not specified, the default log file path is **/tmp/dpalog**.

Digi Port Authority is fully documented in context-sensitive help screens.