



# Software Manual

**Universal QNX4 Device Driver**  
**for**  
**Digi Intelligent Communications Products**  
92000127 Rev D

**AccelePort** and the Digi logo  are either trademarks or registered trademarks of Digi International Inc. in the United States and/or other countries.

**Xr, Xr 920, Xe, Xem, C/X, C/CON-16, C/CON-8, PC/Xi, PC/Xe, MC/Xi** and **COM/Xi** are trademarks of Digi International Inc.

All other brand and product names may be the trademarks of their respective holders.

© Digi International Inc. 1992-1998

All Rights Reserved

Information in this document is subject to change without notice and does not represent a commitment on the part of Digi International.

Digi provides this document “as is”, without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of fitness or merchantability for a particular purpose. Digi may make improvements and/or changes in this manual or in the product(s) and/or the program(s) described in this manual at any time.

This product could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes may be incorporated in new editions of the publication.

# Table of Contents

---

Introduction .....	4
Supported Products .....	4
Pre-Installation .....	5
Installation.....	6
C/X Systems .....	7
Invoking the Device Driver.....	9
Command Line Arguments .....	9
Command Line Examples .....	12
Asynchronous Adapters.....	12
AccelePort C/X System .....	13

# Introduction

---

This package includes two separate device drivers named **Dq.ser16** and **Dq.ser32**. For people using 16 bit environments (Such as QNX 4.22) please use **Dq.ser16**. People using 32 bit environments (QNX 4.23 gives its users the option of running 16 bit or 32 bit) should use **Dq.ser32**. This manual is valid for both versions of the driver and uses the term “**Dq.ser**” generically. Please remember to use the appropriate form of the driver (**Dq.ser16** or **Dq.ser32**) when instructed to execute **Dq.ser** by this document.

**Dq.ser** is a device driver that runs under the QNX4 “**Dev**” process, providing the hardware-dependent component for Digi intelligent serial adapters.

Once the **Dq.ser** driver has initialized the hardware and registered itself with **Dev**, new serial device nodes will appear in the **/dev** directory. **Dq.ser** thereafter takes care of having these devices emulate standard serial communications hardware. When the nature of the I/O requests permits it, **Dq.ser** will take full advantage of the on-board buffering and intelligence of the Digi hardware. Advantages include efficient, flow-controlled transmission of large blocks of data; buffered inputs rendering data loss extremely unlikely; and almost no interrupt-time processing that could interfere with other Real Time Critical processes.

## Supported Products

**Dq.ser** supports the following Digi intelligent communications products:

- AccelePort<sup>®</sup> Xr<sup>™</sup> and Xr 920<sup>™</sup> (PCI or ISA) adapters
- AccelePort C/X<sup>™</sup> (PCI, ISA, EISA or Micro Channel) host adapters
- AccelePort Xem<sup>™</sup> (PCI, ISA, EISA or Micro Channel) host adapters
- AccelePort Xe<sup>™</sup> (ISA or PCI) adapters
- PC/Xi<sup>™</sup> and COM/Xi<sup>™</sup> adapters (ISA)
- MC/Xi<sup>™</sup> (Micro Channel) adapters

# Pre-Installation

---

For successful operation of the driver, the user should establish the following things prior to the driver be installed.

- Invoke **Dev** (the device manager provided by QNX), specifying the number of terminal devices that you expect to be running in the system. When calculating the number of terminal devices to declare, count all serial ports being used (including, but not limited to, ports found on Digi adapters), the number of console windows in use, and an additional terminal device which is taken up by **/dev/null**. If you are still unsure of how many terminal devices will be necessary, we recommend allocating the maximum number allowed, which is 128. Once invoked, **Dev** will insure that sufficient space in the **/dev** directory has been reserved for the expected devices (for more details see the section on **Dev** in the QNX Utilities Reference). For example, if 32 serial ports are expected, and 8 console windows are in use, the line in the **sysinit** file might be:

```
Dev -n 41 &
```

This instructs **Dev** to reserve space for up to 41 nodes in **/dev**.

- For users of ISA, EISA or Micro Channel adapters, note the settings for I/O port addresses, and shared memory addresses.
- Users of cluster controller systems (such as AccelePort C/X systems) should note the configuration of the concentrators attached to the cards (how many concentrators are attached to lines 1 and 2; as well as how many ports are on each of those concentrators).

# Installation

---

**Important!**

Be sure to read the release notes (**relnotes.doc**) that are included with this software device driver. The release notes contain information not available at this manual's press time.

**Dq.ser** is a command line invoked device driver, so installation consists of little more than copying the files into a directory on the hard disk drive.

To copy the files, perform the following steps:

To install the driver follow these steps.

1. Log in as super user (root).
2. Place the Digi device driver diskette in Drive A (**/dev/fd0**).
3. Enter: **install**.

The **install** program will extract all files from the Digi diskette and place them in the default Digi directory **/etc/digi**.

## C/X Systems

If you are installing an AccelePort C/X host adapter, the application **configL** must be run prior to invoking the driver.

**configL** is an application which obtains configuration information for C/X systems. **configL** requests the following information from the user:

- The number of C/X host adapters in the system.
- The number of concentrators attached to each host adapter's synchronous lines, the number of ports on each concentrator, and the communications modes to be used. When entering the communications modes we strongly recommend accepting the default of 1.2M, but other data rates may be specified by the user. See the tables below:

**Table 1** **EIA-422 Synchronous Modes**

Eight Wire Internal Clock		Eight Wire External Clock		Four Wire Self Clocking	
<i>Mode</i>	<i>Baud Rate</i>	<i>Mode</i>	<i>Baud Rate</i>	<i>Mode</i>	<i>Baud Rate</i>
0	115K	15	2400	1	230K
		16	4800	2	460K
3	2400	17	9600		
4	4800	18	19.2K		
5	9600	19	38.4K		
6	19.2K	20	57.6K		
7	38.4K	21	76.8K		
8	57.6K	22	115K		
9	76.8K	23	230K		
10	115K	24	460K		
11	230K	25	920K		
12	460K	26	1.2M		
13	920K				
14	1.2M	33	14000		

**Table 2****EIA-232 Synchronous Modes**

<b>Eight Wire External Clock</b>	
<i>Mode</i>	<i>Baud Rate</i>
35	2400
36	4800
37	9600
38	14000
39	19.2K
40	38.4K
41	57.6K
42	64000
43	76.8K

AccelePort C/X host adapters communicate with attached C/CON-16 and C/CON-8 concentrators via two EIA-422 synchronous channels (newer concentrators and host adapters also support EIA-232 synchronous communication—see your concentrator’s *Installation Guide*). The default operating mode for these channels is 1.2 megabaud, 8-wire, internally clocked (mode 14). This provides the fastest possible communication between the host adapter and locally connected concentrators (in this context, *local* indicates that concentrators are connected directly to the host adapter via a four or eight wire cable; *remote* refers to concentrators that are connected to the host adapter via data communications devices such as modems or DSUs).

Local concentrators always communicate with the host adapter in either an eight wire internally clocked mode or a four wire self clocked mode (in the four wire modes the clock is encoded with the data instead of being carried on separate lines as in the eight wire modes).

Remote concentrators always use an eight wire externally clocked mode (the clock signal is provided by the synchronous modem).

Table 1 shows the EIA-422 synchronous modes supported by **Dq.ser**; Table 2 shows the supported EIA-232 synchronous modes. Note that the external clock baud rates are approximations used to set up time-outs and tuning parameters only. Values do not need to be exact; select the speed closest to the actual speed of your synchronous modem.

# Invoking the Device Driver

---

**Dq.ser** is invoked from the command line (or from **sysinit**); all Digi ISA, EISA and Micro Channel adapters to be supported by the driver must be described in the command line arguments. PCI adapters are detected automatically. After initialization, which will take a few seconds, the device names will appear in **/dev** and are ready for use. See the QNX4 Administrator's Guide for information on enabling ports for logins.

## Command Line Arguments

The standard QNX4 usage utility **use** will give a brief overview of the command line options. The syntax of the command line is:

```
Dq.ser port, mem [,cfg] [port, mem [,cfg] ...] [options]
```

When invoking the driver for an **ISA, EISA, or Micro Channel adapter**, *port* and *mem* are mandatory fields which identify the I/O port address and shared memory addresses of the adapters. In situations where I/O port and shared memory addresses have been indicated; *cfg*'s presence or lack of presence indicates to the driver what type of adapter is being initialized. If *port* and *mem* parameters are given but *cfg* is absent, the driver assumes the adapter is a PC/Xi (ISA) or an MC/Xi (Micro Channel).

When invoking the driver for a **PCI adapter**, only the *options* field is valid. The driver automatically scans for PCI adapters and therefore requires no special parameters other than the driver invocation itself.

The formats for *port*, *mem*, *cfg* and *options* are described below:

*port*     Hexadecimal I/O port address of Digi intelligent adapter. ISA, EISA and Micro Channel adapters must have a unique I/O port address, and that address must not be used by any other device in the system.

*mem*     Hexadecimal starting address for shared memory. All Digi adapters (except COM/Xi and Micro Channel adapters) may share the same memory addresses. The designated shared memory must not be used by any other device in the system.

*cfg* Identifies Digi adapter type. If this parameter is absent, the adapter is assumed to be a PC/Xi (on ISA platforms) or an MC/Xi (on Micro Channel platforms). Values for *cfg* are:

- p** Specifies Xem adapter.
- r** Specifies Xr or Xr 920 adapter.
- e** Specifies an Xe adapter.
- c** Specifies a COM/Xi adapter.
- f** Specifies a C/X host adapter. The application **configL** must be executed prior to using this option.

The *options* field lets you to change some of the default configuration settings:

- b** *baud rate* Set initial baud rate for all ports. See Table 3, on the following page, for supported baud rates. Default: 9600 baud.
- n** *name* Prefix for port names. Default: **dt**
- d** *data path* Location of driver data files. Default: **/etc/digi**
- p** Disable automatic scanning for Digi PCI adapters.
- v** Verbose. Full banner including copyright, adapter names and settings will be output upon initialization of the driver. Default: non-verbose (silent).
- a** Select ALTPIN configuration for all channels. ALTPIN switches the Data Set Ready (DSR) and Data Carrier Detect (DCD) signals so that DCD is available on pin 1 of 8-pin RJ-45 connectors (normally a 10-pin RJ-45 connector is required to support DCD). Default: ALTPIN *not* selected.

**Note:**

Multiple *options* must be separated by a space, and each option must begin with a dash (-); thus, to select ALTPIN and Verbose, use **-a -v**, *not* **-av**.

**Table 3 Digi Adapters and Supported Baud Rates**

Supported Baud Rates	Xr 920	Xr	Xem	C/X	COM/Xi PC/Xi MC/Xi
0	X	X	X	X	X
50	X	X	X	X	X
75	X	X	X	X	X
110	X	X	X	X	X
134	X	X	X	X	X
150	X	X	X	X	X
200	X	X	X	X	X
300	X	X	X	X	X
600	X	X	X	X	X
1200	X	X	X	X	X
1800	X	X	X	X	X
2400	X	X	X	X	X
4800	X	X	X	X	X
9600	X	X	X	X	X
19200	X	X	X	X	X
38400	X	X	X	X	X
57600	X	X	X	X	
76800	X	X	X		
115200	X	X	X		
230400	X	X			
460800	X				
921600	X				

# Command Line Examples

## Asynchronous Adapters

**Dq.ser 300,d0000**

Adapter is at I/O port 0x300, shared memory starting at 0x000D0000. If installed in an ISA system, a PC/Xi adapter is expected. If installed in a Micro Channel system, an MC/Xi adapter is expected. All other settings are left at default values. Devices will be named `/dev/dty1`, `/dev/dty2`, etc.

**Dq.ser -p 324,d0000,p -b 1200 -n digi**

Specifies an Xem adapter at I/O port 0x324, shared memory location 0x000D0000 and instructs the driver to disable the scan normally done for Digi PCI devices. Set initial baud rate for all ports to 1200 baud. Devices will be named `/dev/digi1`, `/dev/digi2`, etc.

**Dq.ser 324,d0000,r -b 230400**

Specifies an Xr adapter at I/O port 0x324, shared memory location 0x000D0000. Set initial baud rate for all ports to 230400 baud (valid only for Xr 920 adapters). Devices will be named `/dev/dty1`, `/dev/dty2`, etc.

**Dq.ser 320,d8000,c 300,e80000 -v -d /dfiles**

COM/Xi adapter at I/O port 0x320, shared memory starting at 0x000D8000, and a PC/Xi adapter at I/O port 0x300, shared memory starting at 0x00E80000. All driver related data files are expected to be in directory `/dfiles` instead of `/etc/digi`. Full banner including copyright, adapter names and settings will be output upon initialization of the driver (verbose).

**Dq.ser -v**

Instructs the driver to scan for and boot any Digi PCI adapters found in the system. If the `-p` configuration is given, `port`, `mem` and `cfg` must also be given as applicable.

## AccelePort C/X System

**Dq.ser 1005,d8000,f -v**

C/X EISA host adapter at I/O port (slot address) 1005, shared memory starting at 0xd8000, with verbose option turned on. The C/X configuration will be read from a data file generated by **configL**. **configL** *must* be run first.

**Dq.ser -v**

Instructs the driver to scan for and boot any Digi PCI adapters found in the system. The C/X configuration will be read from a data file generated by **configL**. **configL** *must* be run first.