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# Installation Guide

**Digi Xr (AccelePort Xr)**
**RISC Based Intelligent Asynchronous**
**Serial Communications Boards**

90029900 Rev D

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# Approvals and Notices

## Federal Communications Commission (FCC) Statement

**Radio Frequency Interference (RFI)** **(FCC 15.105)**

This equipment has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Labeling Requirements** **(FCC 15.19)**

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Modifications** **(FCC 15.21)**

Changes or modifications to this equipment not expressly approved by the manufacturer may void the user's authority to operate this equipment.

**Cables** **(FCC 15.27)**

Shielded cables *must* be used to remain within the Class B limitations.



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# Industry Canada Compliance Statement

This Class B digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

# European Union EMC Directive

This product has been tested and found to comply with the following European Union standards:

- EN 55022 Class B
- EN 50082-1



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## Notes



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# Introduction

This Installation Guide covers the installation and configuration of the Digi 4r and 8r, and the AccelePort 4r and AccelePort 8r RISC based intelligent serial communications boards for personal computers supporting the ISA or PCI bus standards ("ISA" stands for Industry Standard Architecture, and includes IBM AT and compatible computers, and most 80286, 80386, 80486 and Pentium based computers; "PCI" stands for Peripheral Control Interconnect, and refers to the 32-bit local bus incorporated in many personal computers).

In addition to the board itself (hardware), you will also need to install device driver software for your operating system, so that programs can communicate with the board. Device driver installation instructions are in separate manuals, included with the software diskette(s).




Digi 4r and 8r boards are collectively referred to as Xr boards. This includes PC/Xr, PCI/Xr and AccelePort Xr (ISA and PCI) boards, which are functionally identical.

## Components

The carton in which your AccelePort board was shipped should contain the following items:

- Digi Xr board
- *Installation Guide* (this book)
- One or more software packets containing device driver diskettes and manuals
- Connector assembly



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# About the Boards

(*Technical information for those who are interested*)

The Digi Xr board is a multi channel intelligent serial communications board for computers incorporating the ISA or PCI bus standards.

The heart of the Xr board is a 32-bit RISC processor. The board has 128K of dual-ported high-speed RAM used for program code and data buffering. The Xr board supports "cooked" throughput speeds of up to 115K bps for each asynchronous port.

The processor and dual ported RAM relieves your computer of the burden of managing the serial ports. The computer can transfer large blocks of data directly to the memory on the board, then move on to other tasks while the board sends the data out the serial ports one character at a time. Similarly, the board receives input data and stores it in buffers in its dual ported RAM, so the computer only needs to check periodically to see if data is available.

The dual ported RAM is memory which is accessible for read and write operations by both the board and the computer. To the computer, the dual ported RAM looks exactly like its own memory, and can be accessed by the same high speed memory referencing commands it uses for its internal memory. This means that a block of data that may take a number of seconds for the Xr board to receive or transmit to the outside world can be transferred between the board and the computer in mere microseconds.

The ISA Xr board's dual ported RAM is mapped into a 32K unused area in the host computer's memory address space (typically somewhere between 0C0000h and 0EFFFFh—the area traditionally reserved for expansion board BIOS ROMs and dual ported memory).

The PCI Xr board's dual ported RAM is mapped into a 4 Megabyte unused area in the host computer's memory address space.



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# Installation Tips

This section provides information about the Digi memory mapping and diagnostic utilities.

Installing your Xr board is easy; however, since the boards require unique I/O and memory addresses, you may experience conflicts with other devices in your system. To minimize installation difficulties, two utilities are available: **DIGIMMAP.EXE**, a program which will help you find a block of available memory address space in your computer (ISA boards only — PCI adapters are configured automatically), and **UD-RISC.EXE** (**UD-PCI.EXE** for PCI Xr boards), a diagnostic program which will verify that the board is functioning correctly, and help you to identify any hardware problems with the board. These utilities are on the diagnostics diskette.

**Note:** The diagnostics diskette is a DOS format diskette; if you purchased the board for a UNIX system, the diagnostics diskette is not included, but the programs may be obtained via our BBS, FTP server, or by calling Digi Customer Service. See the Customer Support Services section in the back of this book for addresses and phone numbers.

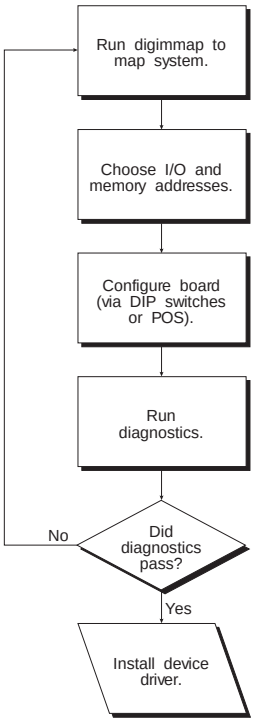
The flow chart on the following page shows a good sequence to follow when installing your board. Following this procedure will minimize installation difficulties and minimize the need for calls to Technical Support.

**Important!** Please run the memory map utility and diagnostics before calling Technical Support for assistance.



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**Figure 1 Xr Installation Flow Chart**




**Note:** If you are installing the PCI version of the Xr board, skip the first three boxes in the flow chart and simply run the diagnostics.



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# Memory Map Utility

**Note:** If you are installing the PCI version of the Xr board, skip this procedure. PCI boards are mapped automatically.

The memory map utility, **DIGIMMAP.EXE**, is an MS-DOS based executable program that is designed to aid in the installation of Digi hardware by detailing locations in memory that are available for the Digi product.

To run **DIGIMMAP.EXE**, follow this procedure:

1. Boot your system normally. This should cause any adapters in your system to be initialized.
2. Place a bootable DOS formatted diskette in drive A (or your boot drive, if different from drive A). This diskette must have no TSRs or memory managers present, or **DIGIMMAP** may give erroneous results (hint: rename **CONFIG.SYS** and **AUTOEXEC.BAT**, if present, so they are not executed during bootup).
3. Press the <Ctrl>, <Alt> and <Delete> keys simultaneously to reboot your machine. DO NOT press the RESET button or cycle power to reboot; resetting the machine may turn off any adapters that were activated in Step 1.
4. Now place the diskette containing the diagnostic software in the diskette drive and enter: **A:\RISC\DIGIMMAP** (assuming that you put the diskette in drive A).
5. After reading the initial screen, press <**E**> to execute the utility.
6. The center column will contain a list of 32K starting addresses which appear to be available. Write down several of these addresses (some devices can fool the memory mapper by turning their memory off, making the area appear to be available). A good order for trying addresses is:
    1. Addresses beginning with "**D**" (D0000h & D8000h)
    2. Addresses beginning with "**C**" (C0000h & C8000h)
    3. Addresses beginning with "**E**" (E0000h & E8000h)



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# User Diagnostics

## ISA Adapters

The **\RISC** directory on the Digi diskette contains a user diagnostic program called **UD-RISC.EXE**.

1. After starting MS-DOS, insert the diskette containing the diagnostic software in the diskette drive and enter **A:\RISC\UD-RISC** (assuming that you put the diskette in drive A).
2. When asked for a board family, press <**A**>.
3. Now you need to enter at least two parameters: the board's I/O address (as set on the DIP switches; see page 11) and the Host Base Address (the starting address of the board's dual ported memory—use the memory map utility **DIGIMMAP.EXE** to find a good address to use).

   Depending on the version of the diagnostic program, the other parameters may already be filled in with default values; if they are not, enter the following values:

   | | |
   |---|---|
   | Window Size: | **32K** |
   | IRQ: | **Disabled** |
   | Machine Environment: | **ISA** |
   | Port: | **1** |
   | EIA-232/422: | **232** |
   | Loopback: | **No** |
   | Continuous Test: | **Yes** |
   | Stop on first: | **Yes** |

4. Now press <**E**> to start the tests. The tests will be run consecutively, and pass/fail status will be indicated on the right hand side of your screen.
5. If all the tests pass, the board is functioning correctly and you are ready to install the device driver software. Make a note of the Host Base Address and I/O address before exiting the diagnostic program (you will need to specify these when you install the device driver software).
6. If failures occur, the most likely cause is a memory conflict. Try a different Host Base Address and execute the diagnostics again. If you get a Hardware Reset Error, try a different I/O address (be sure to set the DIP switches for the new address).



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## PCI Adapters

The **\PCI** directory on the Digi diskette contains a user diagnostic program called **UD-PCI.EXE**.

1. After starting MS-DOS, insert the diskette containing the diagnostic software in the diskette drive and enter **A:\PCI\UD-PCI** (assuming that you put the diskette in drive A).
2. When asked for a board family, press <**A**>.
3. The program will display the adapter base address that was assigned by the host. The other parameters are be filled in with the following default values:

   | | |
   |---|---|
   | Port: | **1** |
   | EIA-232/422: | **232** |
   | Loopback: | **No** |
   | Continuous Test: | **Yes** |
   | Stop on first: | **Yes** |

4. Now press <**E**> to start the tests. The tests will be run consecutively, and pass/fail status will be indicated on the right hand side of your screen.
5. If all the tests pass, the board is functioning correctly and you are ready to install the device driver software.

**Note:** For more information on the diagnostic software, see the text files **USERPCI.TXT** and **RELNOT-P.TXT**, in the **\PCI** directory of the diagnostics diskette.



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# Installing Digi Xr Boards

## Before you plug in the board. . .

Write down the serial number of the board in the space provided. You will need it if you have to contact Digi regarding the board.

ISA boards have a bank of four DIP switches on the connector end of the board. Digi recommends that you initially set all four DIP switches to the ON position (towards the circuit board). If necessary, you can change them later without removing the board.

There are no switches or jumpers on the PCI version of the Xr board.

**Important!** Xr boards contain static-sensitive components. Always touch a grounded surface to discharge static electricity before handling the circuit board.



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# Plugging in the Board

Now you are ready to install the Xr board in your computer. Follow these steps:

1. Turn off your computer's power and remove the cover (refer to your computer's manual for instructions on cover removal and option board installation and cautions).

2. Locate an available slot in your computer and remove the slot plate:

   - ISA boards require a 16-bit ISA (or AT) slot;
   - PCI boards require a PCI local bus slot.

3. Plug the Xr board into the slot and screw the endplate to the computer chassis (use the screw you removed from the slot plate). The endplate must to be screwed in to the computer chassis to remain in compliance with Part 15 of the FCC rules.

4. Install the interface cable assembly or connector box (see *Connector Options*, beginning on page 27) on the Xr board by connecting the female 78-pin connector on the assembly to the male 78-pin plug on the end of the Xr board. *Be sure that the plug is completely installed—it may be a snug fit.*

   *HINT: if you have difficulty plugging in the DB-78 connector, try loosening the screw in the endplate—the connector may not be exactly centered in the slot in the back of the computer. Be sure to re-tighten the endplate screw once the DB-78 connector is securely attached.*

   **IMPORTANT! Use only the Digi-supplied shielded cable assemblies or connector boxes to remain in compliance with FCC limits for Class B operation.**

5. Screw the connector into the board's endplate. *Do not over-tighten the screws*. If the screws don't go in several turns, or if they don't reach the nuts in the endplate, the 78-pin connectors are probably not completely mated.

6. Replace your computer's cover.



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# Software Installation

**Important!** Before installing device drivers, be sure to run the memory map utility to find available memory addresses (ISA boards only), and run the user diagnostics to verify that the board is functioning correctly. See Installation Tips, beginning on page 3, for instructions.

The actual procedures for installing the device driver software for the Xr board are covered in a separate manual, included with the software diskette. There are, however, a couple of points that should be made here to make the software installation go more smoothly.

## I/O Port Address (ISA boards only)

When configuring the device driver software, one of the first things you will be asked for is the I/O address of the Xr board.

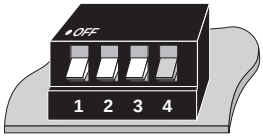
The Xr board has four 8-bit I/O registers which the computer uses to configure the board (for example, this is how the computer sets the starting address of the board's dual ported memory window). The four registers occupy consecutive I/O addresses, the first of which is defined by setting switches 1-3 on DIP switch DS1. In the initial setup, on page 8, we had you set the switches to the ON position. This sets the first I/O address of the board to **324h** (324h-327h will be used), which is a good address to try first if this is the only Digi intelligent serial board in your computer.

If you are installing multiple Xr boards, each board must have its own I/O addresses. The Xr board can be set to seven different I/O address ranges, so it should be easy to find addresses that aren't already in use. The switch settings for the different I/O address ranges are shown in Figure 2 on the next page.

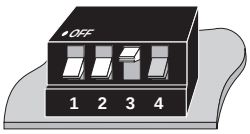


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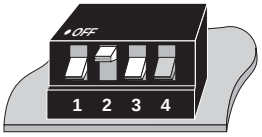
**Figure 2 DIP Switch Settings for I/O Port Addresses (ISA Only)**



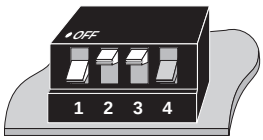

324h (ON-ON-ON)



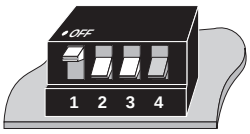

304h (ON-ON-OFF)



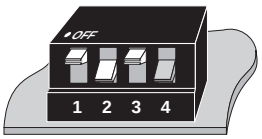

224h (ON-OFF-ON)



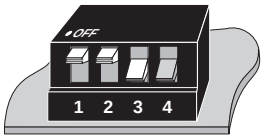

204h (ON-OFF-OFF)




124h (OFF-ON-ON)




114h (OFF-ON-OFF)




104h (OFF-OFF-ON)

**Important!** The fourth switch should always be in the ON position (towards the circuit board).



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## Memory Window Size and Starting Address

***ISA Xr Boards***

The memory window size and starting address are programmed into the board by the device driver. No switches or jumpers are required to change these parameters.

The Xr board requires 32K bytes of unused memory address space in your computer. This is typically allocated from the area between 0C0000h and 0EFFFFh in your computer's memory map (it can, however, be mapped into any free region in the first sixteen megabytes of address space, depending on your operating system).

When deciding on a memory start address, keep in mind that the Xr board may have to coexist with a number of other devices which also require memory address space. You may have to try a number of different starting addresses before you find a free area. The starting addresses for 32K windows between 0C0000h and 0EFFFFh are **0C0000h**, **0C8000h**, **0D0000h**, **0D8000h**, **0E0000h** and **0E8000h**.

**NOTE—If you are installing two or more Xr boards, they may all share the same starting memory address.**

**See *Installation Tips* (beginning on page 3) for more information on finding available memory address space.**

If you don't know what areas in this region are free, you'll have to use trial and error to find an available 32K window. A good sequence to try is 0D0000h first, then 0D8000h, 0C8000h and 0C0000h. If these don't work, try some of the addresses in the 0E0000h column (if your computer has Extended BIOS functions, this area may not be available). If your system has monochrome graphics (e.g. Hercules), you may be able to use addresses in the 0A0000h-0AFFFFh range. If your system has 512K of base memory (memory below 1 megabyte), instead of the usual 640K, you may be able to use addresses between 080000h and 09FFFFh.

**Important!** Shadow RAM must be disabled in the memory address range assigned to the Xr board's dual ported memory.



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**Table 1 Memory Addresses Typically Used by Other Devices**

| Device | Addresses |
|---|---|
| VGA | A0000-C7FFF |
| Shadow RAM | Possibly anywhere. Check system BIOS setup. |
| SCSI Controller | DC000-DA000. Check controller documentation. |
| Network Interface | Check network interface controller documentation. |
| .<br>.<br>. | |

***PCI Xr Boards***

The memory starting address is determined by the PCI BIOS. No switches or jumpers are required to change these parameters.

The Xr board requires 4 Megabytes of unused memory address space in your computer. This is typically allocated from the third or fourth gigabyte in your computer's memory map (it can, however, be mapped into any free region above the 1 Megabyte boundary, depending on your operating system).



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# Interrupt Request Line (IRQ)

### *ISA Xr Boards*

Depending upon the operating system or environment, it may be necessary to assign an IRQ (Interrupt Request) line to the board. The Xr board can be set to use IRQs 3, 5, 7, 10, 11, 12 or 15, or IRQs can be disabled (some Digi device drivers, such as the OS/2 driver, do not use IRQs). The IRQ selection is programmed into the board by the device driver. No switches or jumpers are required to change the IRQ selection.

When run with an IRQ enabled (such as with Windows), the IRQ chosen for the board must be unique—that is, no other board or device can have the same IRQ assigned to it.

The most common sources of contention for IRQs are:

IRQ3: Used by standard serial ports COM2 and COM4, if present.
IRQ5: Used by secondary parallel printer port, if present.
IRQ7: Used by primary parallel printer port, if present.

Many different expansion boards use IRQs. Check the documentation for the boards installed in your computer to see which, if any, IRQs they may be using.

### *PCI Xr Boards*

An IRQ will be assigned by the PCI BIOS. It should be noted that not all device drivers require an IRQ.

It is important to keep in mind that some older ISA products may have interrupts set by switches or jumpers which may go undetected by the PCI BIOS. Be sure to verify that your PCI Xr board has not been assigned an IRQ that is already being used by another board.



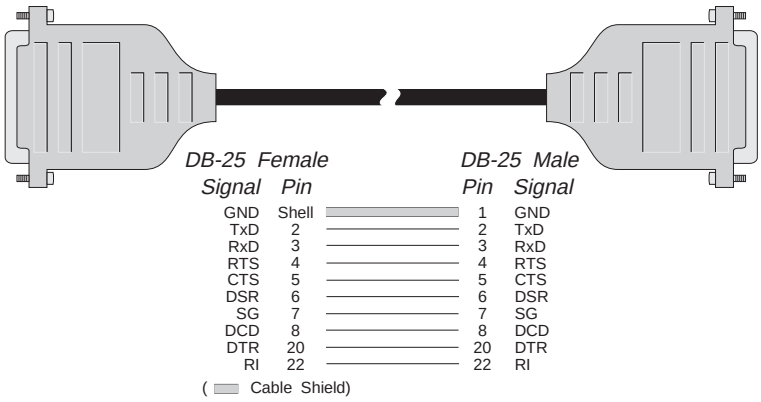
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# Connecting Peripherals

## Connecting to a Modem

### DB-25 Equipped Boards

**Figure 3** **DB-25 to DB-25 Modem Cable**




To connect a DB-25 equipped Xr board to a modem, use a standard “straight-through” cable (see Figure 3) to connect the modem to one of the DB-25 connectors on the fan out cable or connector box.

**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.

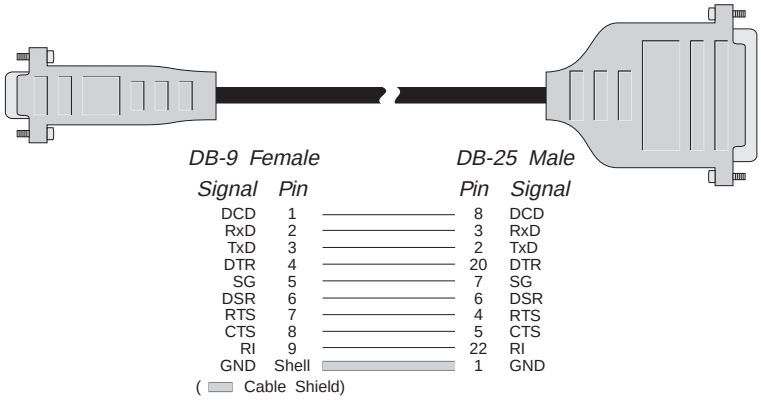


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## DB-9 Equipped Boards

To connect a DB-9 equipped board to a modem, use standard PC modem cables, available from most electronics stores and computer dealers. The wiring diagram for a 9-pin to 25-pin modem cable is shown in Figure 4.

**Figure 4 DB-9 to DB-25 Modem Cable**




**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.

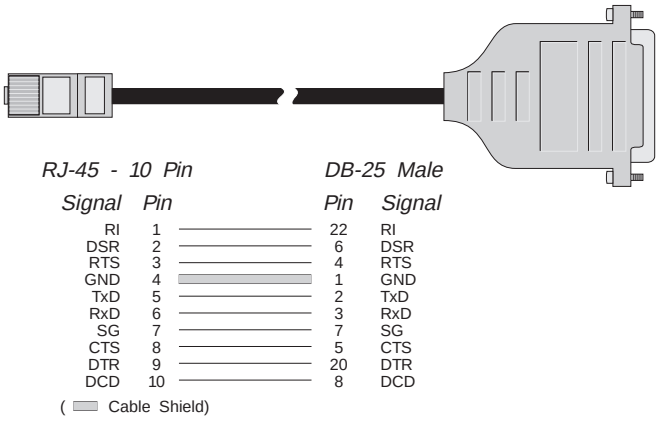


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## RJ-45 Equipped Boards

The simplest way to connect a modem to a board with RJ-45 connectors is to use RJ-45 to DB-25 “Cable Legs”, available from Digi (see page 33 for a description and part numbers). These adapters use 10-pin RJ-45 plugs, and therefore provide full modem support (Ring Indicator and Data Carrier Detect are only available on 10-pin RJ-45 connectors).

**Figure 5 RJ-45 to DB-25 Modem Cable (10 Wire)**




If you wish to build your own modem cable, follow the diagram in Figure 5.

**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.

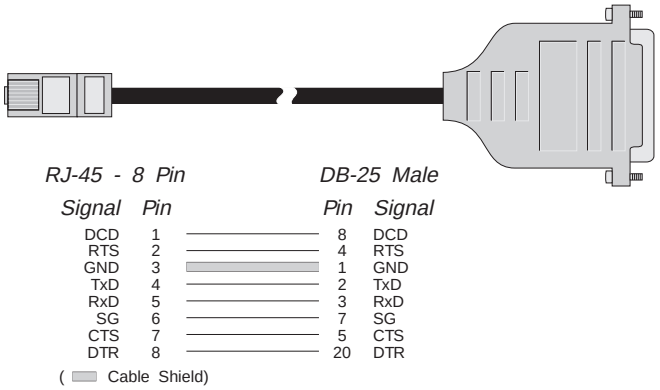


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### *ALTPIN Modem Wiring (RJ-45 Versions)*

10-pin RJ-45 plugs may be difficult to obtain in the retail market; therefore, most Digi device driver software incorporates an optional feature called ALTPIN, which swaps the logical functions of DSR (Data Set Ready) with DCD (Data Carrier Detect). When ALTPIN is enabled (see your device driver software reference manual for instructions), DCD becomes available on pin 1 of an 8-pin RJ-45 connector (equivalent to pin 2 of a 10-pin connector).

**Figure 6 8-Wire Modem Cable for use with ALTPIN Configuration**




If you wish to build an 8-wire modem cable for an RJ-45 equipped board, use an 8-pin RJ-45 plug wired as shown in Figure 6.

**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.

**Note:** ALTPIN is not supported under Windows NT. Xr boards installed in Windows NT systems must use the full 10 wire modem cable shown on the previous page.



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# Connecting to a DTE Device

A DTE device is a terminal, serial printer, another computer's serial port, etc. To connect the Xr board (which is also a DTE device) to another DTE device, you need a *null modem* cable or adapter.

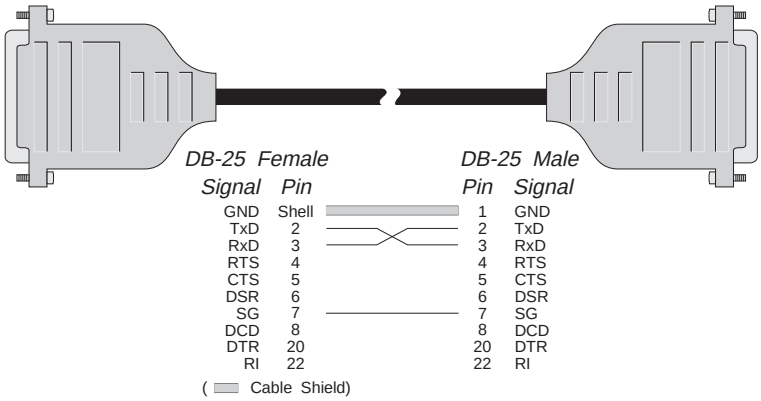
## DB-25 Equipped Boards

***Software Handshaking (XON/XOFF)***

In most cases, serial terminals and printers need only a "three-wire" connection to the Xr board. Digi device driver software supports XON/XOFF (software) handshaking, so the only signal lines necessary are Transmitted Data (TxD), Received Data (RxD) and Signal Ground (SG). It may be necessary to disable DCD (Data Carrier Detect) sensing through a software command—see the Digi device driver manual for instructions. Cables must be shielded to remain in compliance with FCC certification requirements, and the shield should be connected to Chassis Ground (GND) at both ends of the cable run.

A simple cable for connecting a terminal or a printer to a DB-25 equipped Xr board is shown in Figure 7.

**Figure 7 Simple Terminal/Printer Cable (DB-25)**




**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.



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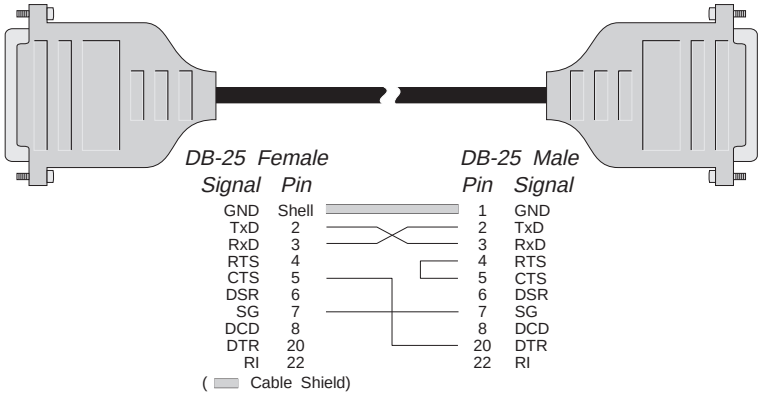
The cable shown in Figure 7 is a three-wire null modem cable—that is, Transmitted Data on one end of the cable is connected to Received Data at the other end, and vice versa.

The male DB-25 end can be plugged directly into most serial terminals and printers without any adapters. The female DB-25 end plugs directly into one of the DB-25 connectors on the fan out cable or connector box assembly.



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**Figure 8 Terminal/Printer Cable with DTR Handshaking (DB-25)**




Most terminals and printers use Data Terminal Ready (DTR) for Ready/Busy hardware handshaking. The cable shown in Figure 8 supports this method.

**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.

**Note:** Some Okidata printers use a control signal on pin 11, called Supervisory Send Data (SSD) instead of DTR. In this case, simply connect CTS on the female DB-25 side to pin 11 of the male DB-25, instead of pin 20.

Other printer manufacturers may use different methods of flow control. Consult your printer's documentation for specific wiring requirements.

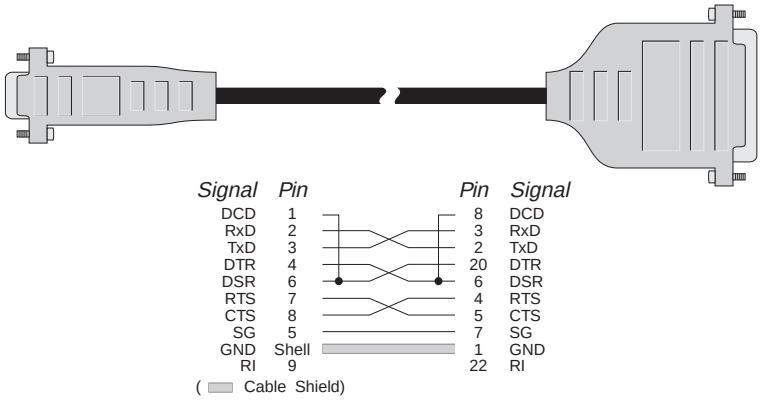


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## DB-9 Equipped Boards

Use a standard PC printer cable, or build a cable as shown in Figures 9 or 10.

**Figure 9 9-Pin to 25-Pin Null Modem Cable**

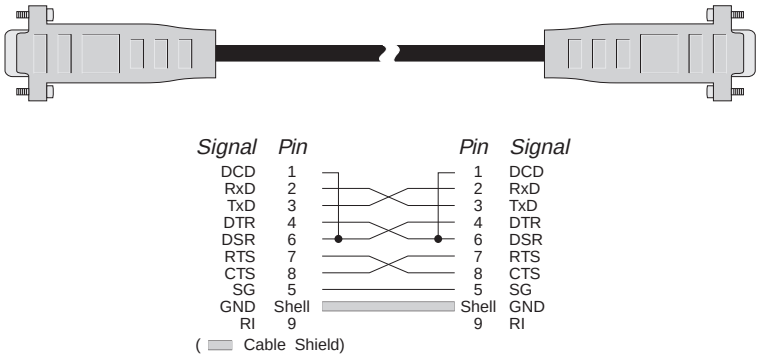



**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.



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**Figure 10** **9-Pin Null Modem Cable**




**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.



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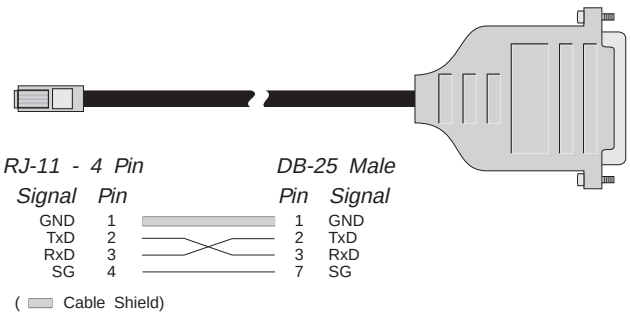
## RJ-45 Equipped Boards

***Software Handshaking (XON/XOFF)***

In most cases, serial terminals and printers need only a "three-wire" connection to the Xr board. All Digi device driver software supports XON/XOFF (software) handshaking, so the only signal lines necessary are Transmitted Data (TxD), Received Data (RxD) and Signal Ground (SG). It may be necessary to disable DCD (Data Carrier Detect) sensing through a software command—see your Digi device driver software manual for instructions. Cables must be shielded to remain in compliance with FCC certification requirements, and the shield should be connected to Chassis Ground (GND) at both ends of the cable run.

A simple cable for connecting a terminal or a printer to an RJ-45 equipped Xr board is shown in Figure 11.

**Figure 11 Simple Terminal/Printer Cable (RJ-45)**




The cable shown is a three-wire null modem cable—that is, Transmitted Data on one end of the cable is connected to Received Data at the other end, and vice versa.

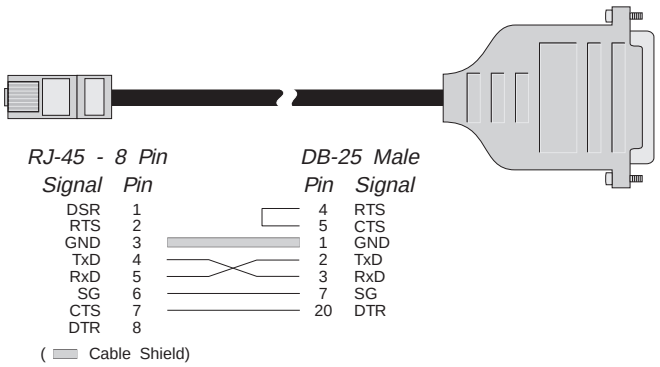
The male DB-25 end can be plugged directly into most serial terminals and printers without any adapters. The RJ-11 plug fits into the center of the RJ-45 jack.

**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.



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**Figure 12 Terminal/Printer Cable with DTR Handshaking (RJ-45)**




Most terminals and printers use Data Terminal Ready (DTR) for Ready/Busy hardware handshaking. The cable shown in Figure 12 supports this method.

**Important!** Shielded cable must be used to remain in compliance with Part 15 of FCC rules.

**Note:** Some Okidata printers use a control signal on pin 11, called Supervisory Send Data (SSD) instead of DTR. In this case, simply connect CTS on the RJ-45 side to pin 11 of the DB-25, instead of pin 20.

Other printer manufacturers may use different methods of flow control. Consult your printer's documentation for specific wiring requirements.



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# EIA-232 Cables and Connector Options

## Cables

EIA-232 serial interface cables should be shielded, low capacitance cables, ideally designed specifically for serial data transmission.

### Grounding

The shield should be grounded at both ends of the cable. Chassis Ground—available on the shell of Digi's DB-25 and DB-9 connectors, and pin 4 of our 10-pin RJ-45 connector, is ideal for this purpose.

### Environment

While good shielding provides reasonable protection against "noise" (Electro-Magnetic Interference, or EMI), cables should still be routed away from noise sources wherever possible. Avoid laying cables in close proximity to transformers, generators, motors, fluorescent lights, etc.

### Capacitance vs. Length of Run

The total capacitance of a cable affects the integrity of transmitted data. As a rule of thumb, the *total* capacitance of a cable (including the connectors) should not exceed 2500 pF for baud rates of up to 57,600 (1200pF for 115K baud and 600 pF for 230K baud). Serial interface cable is usually rated in pico Farads per foot. Therefore, if a cable has a capacitance of 50 pF/ft, and the connectors are 100 pF each, the maximum recommended cable length is 46 feet for baud rates of up to 57,600. If the cable is rated at 12.5 pF/ft, the maximum recommended cable length is 184 feet, and 5 pF/ft cable can be run up to 460 feet.

In situations where low-capacitance cable is unavailable, or very long cable runs are required, "short-haul" modems, available from suppliers such as Black Box, can be used to increase the effective range of the EIA-232 interface. Short-haul modems are similar to standard modems, except that they are connected directly to each other via a cable instead of going through a telephone circuit.

*NOTE—Use only externally-powered short-haul modems with Digi products.*



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# Connector Options

A variety of connector types is available. Xr boards can be set up with DB-25 connectors (male or female, DTE or DCE wiring), DB-9 connectors (male or female, DTE wiring) or 10-pin RJ-45 jacks.

The following pages give the part numbers and wiring information for the various connector types.

# DB-25 Connectors

**Table 2 DB-25 Connector Pin Assignments**

| Signal | Description | DTE Use | DCE Use | Pin # |
|---|---|---|---|---|
| GND | Chassis Ground | N/A | N/A | Shell |
| TxD | Transmitted Data | Output | Input | 2 |
| RxD | Received Data | Input | Output | 3 |
| RTS | Request to Send | Output | Input | 4 |
| CTS | Clear to Send | Input | Output | 5 |
| DSR | Data Set Ready | Input | Output | 6 |
| SG | Signal Ground | *reference* | *reference* | 7 |
| DCD | Data Carrier Detect | Input | Output | 8 |
| DTR | Data Terminal Ready | Output | Input | 20 |
| RI | Ring Indicator | Input | Output | 22 |

Digi Xr boards can be configured with DB-25 connectors in any of four configurations: DTE male, DTE female, DCE male or DCE female. The pin assignments for the DB-25 connectors follow the usual conventions for EIA-232 wiring.

It should be noted that the DCE configuration is equivalent to a DTE connector plus a fully-wired null modem adapter. Thus, DCD (Data Carrier Detect) and DSR (Data Set Ready) are wired together internally and carry the DTE equivalent of DTR (Data Terminal Ready). *For this reason, DCE cables* cannot *be used with modems*.



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## DB-25 Connector Options

DB-25 connectors are available in two styles: a quad or octa cable assembly, or a connector box assembly. Either style may be ordered with male or female DB-25 connectors, configured as DTE or DCE devices.

***Quad and Octa Cable Option (DTE or DCE)***

**Figure 13 Octa-Cable Assembly**

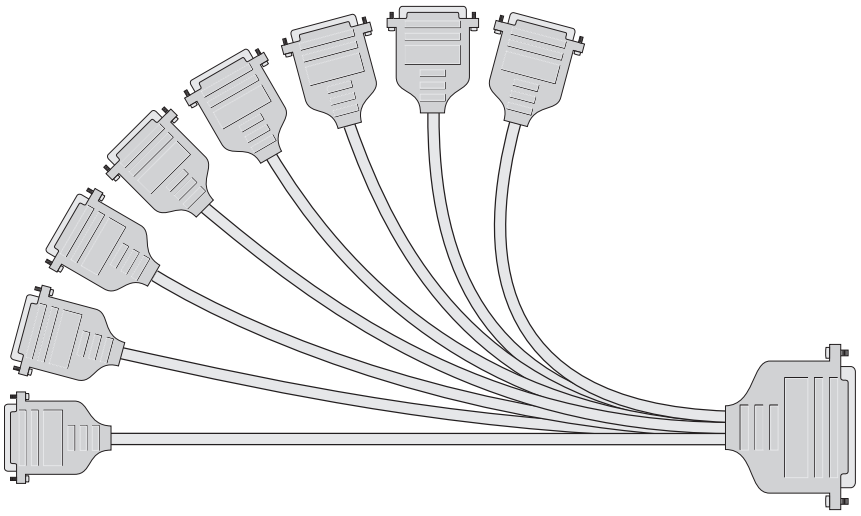


**Table 3 DB-25 Cable Options and Part Numbers**

| | DTE Quad | DCE Quad | DTE Octa | DCE Octa |
|---|---|---|---|---|
| **DB-25 Male** | 76000008 | 76000007 | 76000021 | 76000020 |
| **DB-25 Female** | 76000006 | 76000005 | 76000019 | 76000018 |

Figure 13 shows the eight-port cable assembly, and Table 3 gives the part numbers of the available configurations.



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**Figure 14 Eight-Port DB-25 Connector Box**

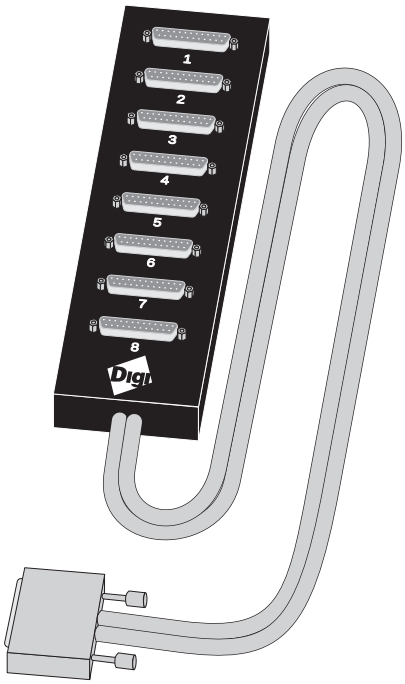



Figure 14 shows the eight-port DB-25 connector box option. A four-port box is also available.

**Table 4 Connector Box Options and Part Numbers**

| | DTE Quad | DCE Quad | DTE Octa | DCE Octa |
|---|---|---|---|---|
| **DB-25 Male** | 76000030 | 76000028 | 76000031 | 76000029 |
| **DB-25 Female** | 76000026 | 76000024 | 76000027 | 76000025 |



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# DB-9 Connectors

Xr boards can be configured with male or female DB-9 connectors (DTE wiring only).

DB-9 connectors are available only in the “fan-out” cable configuration (see Figure 13, on page 28).

**Table 5 DB-9 Quad and Octa Cable Options and Part Numbers**

| | DTE Quad | DTE Octa |
|---|---|---|
| **DB-9 Male** | 76000003 | 76000015 |
| **DB-9 Female** | 76000001 | 76000013 |

**Table 6 DB-9 Connector Pin Assignments**

| Signal | Description | Direction | Pin # |
|---|---|---|---|
| GND | Chassis Ground | N/A | Shell |
| DCD | Data Carrier Detect | Input | 1 |
| RxD | Received Data | Input | 2 |
| TxD | Transmitted Data | Output | 3 |
| DTR | Data Terminal Ready | Output | 4 |
| SG | Signal Ground | *reference* | 5 |
| DSR | Data Set Ready | Input | 6 |
| RTS | Request to Send | Output | 7 |
| CTS | Clear to Send | Input | 8 |
| RI | Ring Indicator | Input | 9 |



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# RJ-45 Connectors

**Figure 15** **Eight-Port RJ-45 Connector Box**

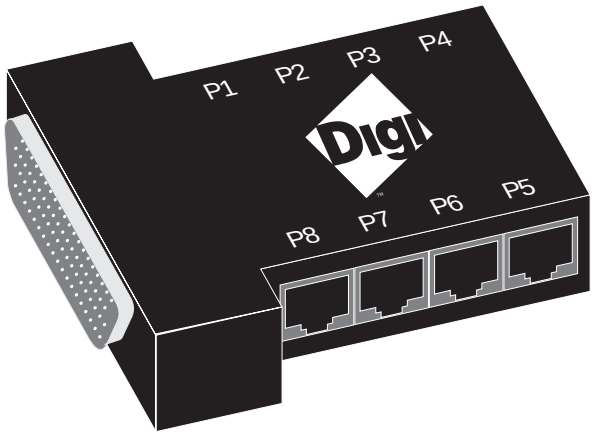



**Table 7** **RJ-45 Connector Box Options**

| | Quad | Octa |
|---|---|---|
| **RJ-45** | 76000038 | 76000033 |

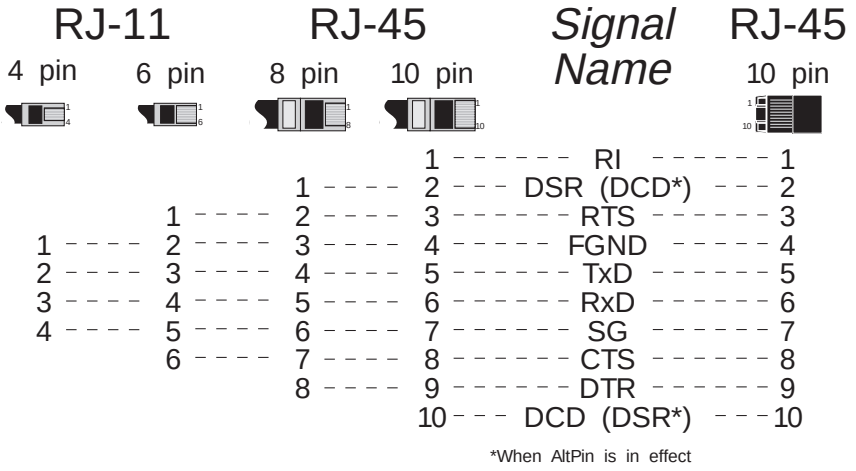
Xr boards can be configured with 10-pin RJ-45 modular jacks. These accept plastic snap-in plugs like the ones used for connecting telephones. They are less bulky and more convenient to use than the DB-25, but have not undergone the standardization rigors that have been applied to the larger DB-25 connectors. Figure 15 shows the eight-port RJ-45 connector block, and Table 7 gives the associated part numbers.



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The diagram below illustrates the relationship of the various modular plug configurations to Digi's standard 10-pin RJ-45 jack, and show which EIA-232 signals are available in each configuration.

**Figure 16 Correspondence of Different RJ Plugs to RJ-45 Jack**

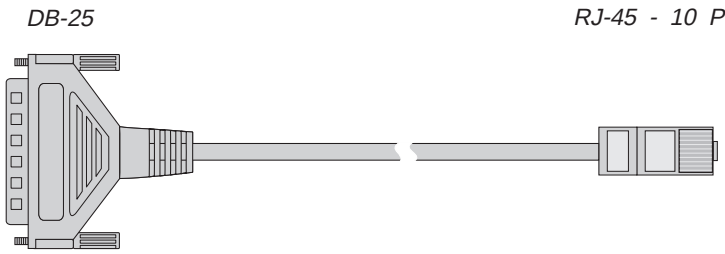





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# RJ-45 to DB-25 Conversion

**Figure 17** **RJ-45 to DB-25 "Cable Leg"**




| *Pin* | *Signal* |
|---|---|
| Shell | Chassis Ground |
| 2 | TxD |
| 3 | RxD |
| 4 | RTS |
| 5 | CTS |
| 6 | DSR |
| 7 | Signal Ground |
| 8 | DCD |
| 20 | DTR |
| 22 | RI |

| *Pin* | *Signal* |
|---|---|
| 1 | RI |
| 2 | DSR |
| 3 | RTS |
| 4 | Chassis Ground |
| 5 | TxD |
| 6 | RxD |
| 7 | Signal Ground |
| 8 | CTS |
| 9 | DTR |
| 10 | DCD |

**Table 8** **Cable Leg Options and Part Numbers**

| | DB-25 Male | DB-25 Female | DB-9 Male |
|---|---|---|---|
| **24 Inch Cables** | 6102024 | 6103024 | 6107024 |
| **48 Inch Cables** | 6102048 | 6103048 | N/A |

Since most EIA-232 devices are equipped with DB-25 connectors, it is necessary to buy or build an adapter to transfer the signals to a DB-25 plug. The most simple and direct approach is to purchase ready-made "Cable Legs" from a Digi dealer or distributor. These are made with a full 10-pin RJ-45 plug (which can be difficult to obtain in the retail market), connected via a two or four foot cable to a DTE-configured DB-25 plug.



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The pin configuration of the DB-25 connector on the Cable Leg is identical to that of the DB-25 connectors on the standard Digi DTE octa cable, and provides full modem control.

If you don't need full modem control, you can use one of the many commercially available RJ-45 to DB-25 adapters. These have both an 8-pin RJ-45 jack and a DB-25 plug in a housing no larger than that found on a standard DB-25 plug. The plug and jack are connected within the housing by jumpers which may be installed by the user in any desired configuration.



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# Specifications

## PC/4r, PCI/4r (AccelePort 4r)

- **Power requirements**

| | ISA 4r Boards | PCI 4r Boards |
|---|---|---|
| +5 VDC ±5%: | 1.4 Amps typical | 955 mA typical |
| +12 VDC ±5%: | 70 mA typical | 40 mA typical |
| -12 VDC ±5%: | 70 mA typical | 40 mA typical |

- **Board dimensions**

| | ISA Xr Boards | PCI Xr Boards |
|---|---|---|
| Length: | 8.25 inches | 6.875 inches |
| Width: | 0.5 inches | 0.5 inches |
| Height: | 4.2 inches | 4.2 inches |
| Weight: | 6.5 ounces | 5.4 ounces |

- **Operating environment**

| | |
|---|---|
| Ambient temperature: | 10° C to 55° C |
| Relative humidity: | 5% to 90% |
| Air movement: | 30 CFM forced |
| Altitude: | 0 to 12,000 feet |

- **Serial Interface Surge Suppression**

| | ISA 4r Boards | PCI 4r Boards |
|---|---|---|
| Threshold Voltage — | | |
| TxD & RxD: | 24 Volts | 12 Volts |
| Control Lines: | 12 Volts | 12 Volts |
| Response Time: | Less than 10 nS | Less than 10 nS |



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# PC/8r, PCI/8r (AccelePort 8r)

- **Power requirements**

| | ISA 8r Boards | PCI 8r Boards |
|---|---|---|
| +5 VDC ±5%: | 1.4 Amps typical | 960 mA typical |
| +12 VDC ±5%: | 140 mA typical | 80 mA typical |
| -12 VDC ±5%: | 140 mA typical | 80 mA typical |

- **Board dimensions**

| | ISA 8r Boards | PCI 8r Boards |
|---|---|---|
| Length: | 8.25 inches | 6.875 inches |
| Width: | 0.5 inches | 0.5 inches |
| Height: | 4.2 inches | 4.2 inches |
| Weight: | 6.5 ounces | 6.1 ounces |

- **Operating environment**

| | |
|---|---|
| Ambient temperature: | 10° C to 55° C |
| Relative humidity: | 5% to 90% |
| Air movement: | 30 CFM forced |
| Altitude: | 0 to 12,000 feet |

- **Serial Interface Surge Suppression**

| | ISA 8r Boards | PCI 8r Boards |
|---|---|---|
| Threshold Voltage — | | |
| TxD & RxD: | 24 Volts | 12 Volts |
| Control Lines: | 12 Volts | 12 Volts |
| Response Time: | Less than 10 nS | Less than 10 nS |



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# Digi Support Services

## The Digi Bulletin Board System

Digi provides an electronic bulletin board service (BBS) for our customers. This bulletin board provides general and technical information about Digi's products.

The Digi BBS allows users to download software drivers as soon as they become available. There is also a feature to allow users with problems or questions about Digi products to leave messages to Digi Technical Support.

Using the Digi BBS is easy. Simply dial **(612) 912-4800**. In Europe, dial **+49 221 9205211**; in Asia, dial **+65 735 2460**.

The recommended modem communications parameters are 8 bits, no parity and one stop bit (**8 N 1**). Other settings may also work.

Download protocols include Zmodem, Xmodem, Ymodem, Kermit and others.



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# Internet FTP Server

Digi has set up an Anonymous FTP server for those with access to the Internet network. The address is **ftp.dgii.com**. Log in as **anonymous**, and enter your E-mail address when asked for a password. Drivers and installation tips are located in the **/drivers** directory. A text file, **download.doc**, gives information on uncompressing the files after downloading. Tip: Be sure to enter "**bin**" before downloading, to ensure binary transfer of files.

# World Wide Web Server

Product information, manuals, new product announcements, programs, application stories and more can be obtained through the World Wide Web. Our address is **http://www.dgii.com**.

# DigiFACTs FaxBack Server

Manuals and technical information can also be obtained by FAX. To use the FaxBack server, simply call (612) 912-4990 on a touch tone phone.



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# Information About Your System

**Serial number of your Digi product:** _____

**Make, model and clock speed of your computer:** _____

_____

**How much RAM does your computer have?** _____

**Hard disk controller:** Type: _____ Memory addressed at: _____

I/O port used: _____ IRQ: _____

**LAN card:** Type: _____ Memory addressed at: _____

I/O port used: _____ IRQ: _____

**Other:** Type: _____ Memory addressed at: _____

I/O port used: _____ IRQ: _____

**Operating system:** _____ Version: _____

**Digi device driver version:** _____



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# Technical Support

At Digi, we are proud of our products, and support them. Our dealers and distributors are fully trained on our product line, so that they can help you on a technical level should assistance be needed.

Your first level of support is your Digi dealer, the place where you purchased your Digi product. Your dealer has the training to help you with any installation questions or difficulties you might have.

If you still experience difficulties (after contacting your first level of support), Digi has a staff of Technical Support Specialists that can assist you. They can be reached at **(612) 912-3456**. In Europe, call **+49 221 920520**, and in Asia, call **+65 732 1318**. FAX numbers are: (612) 912-4958 (USA), +49 221 9205210 (Europe) and +65 732 1312 (Asia).

When you call Digi Technical Support, please call from a position where you can operate your system. Also, please fill out the form on the preceding page before calling, so your Technical Support representative can have a clear picture of your system and any potential conflicts between devices.

Digi Technical Support can also be reached via Internet E-mail. Please send correspondences to **support@dgii.com**, and include your voice and FAX phone numbers.

# Customer Service

Digi also has a staff of Customer Service representatives to help you with software and documentation update requests, as well as Returned Merchandise Authorizations (RMAs) in case you need to return your Digi product for repair (see page *41*). They may be reached at **(612) 912-3456**. Digi Customer Service may be contacted by FAX at (612) 912-4959.

Digi Customer Service can also be reached via Internet E-mail. Please send correspondences to **cust_serv@dgii.com**, and include your voice and FAX phone numbers.



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# Return Procedures

All Digi products have a five-year parts and labor warranty, and we are ultimately responsible for any defective parts, according to the limits specified in the warranty. However, many of the reported problems are due to factors other than defects in the product itself. To save you time and possibly additional cost, Digi asks that you *first* try to resolve any difficulties by contacting our Technical Support representatives at **(612) 912-3456.**




***Be sure to have the serial number of your Digi product at hand before calling Technical Support.***

Returns should be directed to the dealer or distributor from whom you purchased the product. If you need to return your Digi product for repair, it is first necessary to obtain an RMA (Returned Merchandise Authorization) number from Digi, by speaking to a Digi Customer Service representative. Authorized returns should be shipped to Digi International, 10000 West 76th Street, Eden Prairie, MN 55344. The RMA number should appear on the shipping carton, on or near the address label.




*Products received without an RMA number clearly marked on the outside of the package will be returned, unopened, to the sender*



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