PortServer II ®

Hardware Installation Guide

90000073C

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Contents

About This Guide

Purpose

This guide provides the following:

- An introduction to PortServer II hardware
- Information you need to install the hardware

Audience

This manual is intended for those responsible for PortServer II hardware installation.

Scope

This manual provides step-by-step instructions for installing PortServer II hardware. It does not address configuration or administration. Nor does it provide information on using the PortServer II. These subjects are covered in other manuals in the PortServer II library.

chapter **1**

Introducing the PortServer II Hardware

In this chapter

This chapter introduces Digi's PortServer II hardware. It presents the following topics:

Hardware Tour

Introduction

This section provides a brief orientation to PortServer II controls, LEDs, and ports, which you may find helpful when you install the hardware. For information on using hardware controls and interpreting LEDs, see the *PortServer II Configuration and Administration Guide*.

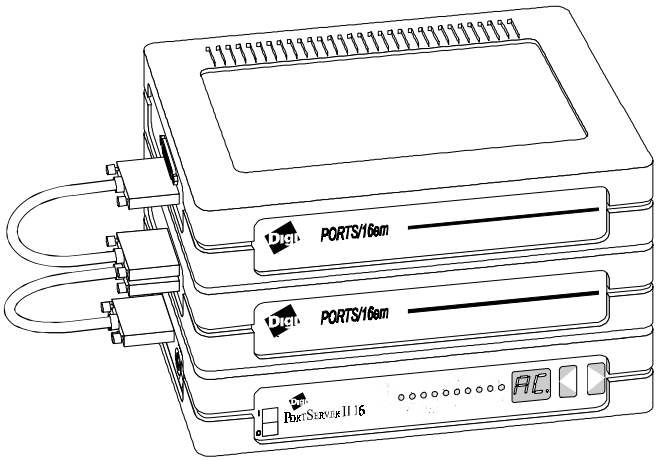


Figure 1-1. PortServer II with Expansion Modules

Front Panel Overview

The front panel, shown in Figure 1-2, features:

- An on/off switch
- A bank of LEDs to report status information
- An alphanumeric display that tells you which port the current LED display is reporting information on and additional information as well
- Push-buttons that enable you to select a port to monitor, run a diagnostic test, or reset PortServer II configuration to factory default settings

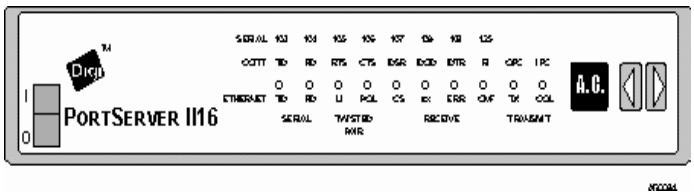


Figure 1-2. PortServer II Front Panel

Side Panel Overview

The side panel, depicted in Figure 1-3, provides the following:

- EBI Out connector, which provides for connection to a PORTS expansion module, enabling you to add ports to the PortServer II
- The D.C. power connector, provided for connection with the PortServer II power supply
- A 10BaseT connector for twisted-pair connection to an Ethernet
- A 10Base2 connector for coaxial connection to an Ethernet

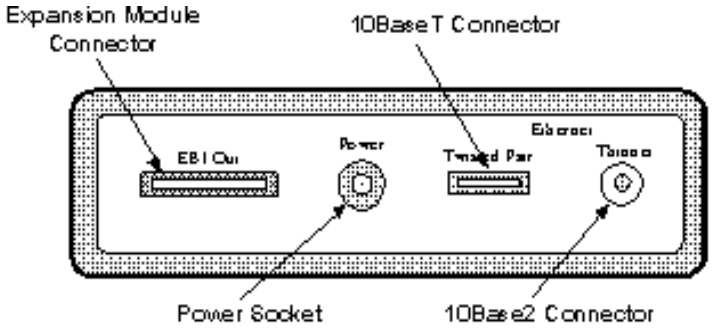


Figure 1-3. PortServer II Side Panel

Rear Panel Overview

The rear panel provides 16 identical EIA-232 compatible serial connectors.

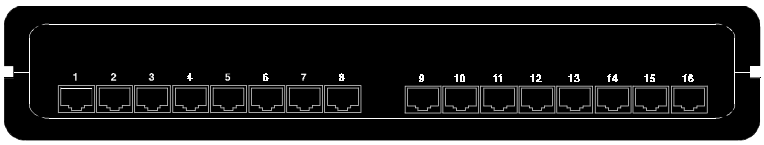


Figure 1-4. PortServer II Rear Panel

Specifications

Introduction

This section lists PortServer II specifications.

Ethernet Connections

- One 10BaseT twisted-pair Ethernet port with an RJ-45 8-pin connector
- One 10Base2 Ethernet port with a BNC coaxial connector

Ports

- 16 EIA EIA-232 synchronous/asynchronous serial ports, each with a 10-pin RJ-45 connector that accommodates either an RJ-45 or RJ-11 plug.
- Each port supports 115.2 Kbps. Connection of an expansion module may reduce per-port available bandwidth.
- One EBI (External Bus Interface) connector, allowing the connection of external modules that can provide a total of up to 64 ports

Power Requirements

Internal

- +5 volts ± 5%, 1.8A max
- +12 volts ± 5%, 420mA max
- –12 volts ± 5%, 330 mA max

External

43W 50/60 Hz power supply. 100-250 VAC.

Environment Requirements

- Ambient temperature: 10° C (50° F) to 55° C (130° F)
- Relative humidity: 5% to 90%
- Air movement: normal connection
- Altitude: 0 to 3,660 meters (0 to 12,000 feet)

Dimensions

- Length: 12 inches (305 mm)
- Width: 7 inches (224 mm)
- Height: 2.4 inches (57 mm)
- Weight: 2.25 lbs (1.0 kg)

Other

Free-standing and rack-mount versions are available.

chapter **2**

Installing PortServer II Hardware

In This Chapter

This chapter describes how to install PortServer II hardware. It discusses the following topics:

Installation Considerations

Introduction

This section discusses

- Safety practices to follow to ensure safe installation and operation
- Power supply warnings
- Environmental considerations to ensure efficient operation
- ESD damage prevention
- Tools required to install PortServer II

Safety Practices

Here are safety practices to follow when you install PortServer II:

- Do not attempt to service the power supply that comes with PortServer II. This sealed unit contains no user-serviceable parts or adjustments. Do not open or tamper with the power supply.
- Use of a non-Digi power supply with this product will void your warranty and may damage your product or cause it to function incorrectly. Contact a Digi International representative to obtain a suitable power supply for your PortServer II.
- Carefully inspect the work area in which the PortServer II will be located to ensure against hazards such as damp floors, ungrounded power extension cords, and missing ground connections.
- Before you connect PortServer II to power, locate the power OFF switch on the PortServer II and locate the main circuit breaker for the room in which PortServer II is installed. If an electrical accident occurs, turn power OFF immediately.
- Before operating PortServer II, ensure that external power sources comply with the requirements listed on page 1-4. If you are not sure of the type of power source, contact your dealer or power company.
- Ensure that the power supply is connected with the 3-wire, ground-connection plug that comes with PortServer II. If you are unable to insert this plug into an outlet, have an electrician replace the obsolete outlet. Do not attempt to defeat the safety feature of the plug.
- Ensure that the ampere rating of all equipment plugged into wall outlets does not exceed the capacity of the outlet.
- If you require an extension cord, ensure that the ampere rating of all equipment plugged into the extension cord does not exceed the cord's ampere rating.
- If PortServer II is exposed to moisture or condensation, disconnect it from the power source immediately and obtain service assistance.
- If PortServer II exhibits unexpected behavior, such as smoking or becoming extremely hot, disconnect it from power sources immediately and then obtain service assistance.
- Ensure that the cover is secure on completion of installation to reduce safety hazards.

Environmental Considerations

The following is a list of environmental considerations that will ensure safe and efficient operations of PortServer II:

- Ensure that PortServer II has at least 12 inches of clearance on all sides to allow for proper ventilation. PortServer II generates heat and requires adequate circulation to maintain proper operating temperatures. For the same reason, never cover or obstruct PortServer II ventilation slots.
- Do not position PortServer II near high-powered radio transmitters or electrical equipment, such as electrical motors or air conditioners. Interference from electrical equipment can cause intermittent failures.
- Avoid exceeding the maximum cabling distances discussed in *About Cabling*. PortServer II performance may be degraded.
- Do not install PortServer II in areas where condensation, water, or other liquids may be present. These may cause safety hazards and equipment failure.

ESD Damage Prevention

Always follow ESD prevention procedures when you work with PortServer II. Damage from static discharge can cause immediate or intermittent failure.

Tools Required for Installation

No special tools are required to install PortServer II.

About Cabling

Introduction

This section provides cabling information.

About the Cable Shipped with the PortServer II

The PortServer II comes with a 2-foot, 10-wire RJ45-to-DB-25 cable that you can use to connect a terminal to the PortServer II. It is included to facilitate PortServer II configuration.

EIA-232 Signal Support

The PortServer II has 16 EIA-232 compliant DTE serial ports, which use 10 of the EIA-232 signals. The cables you select to provide physical connections between PortServer II and other devices must support some or all of these signals, depending on the device. Table 2-1 lists the following:

- Supported EIA-232 signals
- The signals carried by each type cable
- The pins on which individual signals are carried

Table 2-1: Supported EIA-232 Signal Support

EIA-232 Signal	RJ-45		RJ-11	
	10 Pin	8 Pin	6 Pin	4 Pin
RI	1	Not available	Not available	Not available
DSR	2	1	Not available	Not available
RTS	3	2	1	Not available
GND	4	3	2	1
TxD	5	4	3	2
RxD	6	5	4	3
SG	7	6	5	4
CTS	8	7	6	Not available
DTR	9	8	Not available	Not available
DCD	10	***** Not available	Not available	Not available

***** See *About Altpin* on page 2-5 for information on making DCD available with 8-pin configurations.

About Signal Names

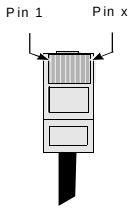
This manual uses signal names from the RS-232-C specification. The documentation for the printer, modem, terminal, or computer you connect to PortServer II probably does too, but it may use the signal names defined in EIA-232-D or EIA/TIA-232-E. To avoid confusion, Table 2-2 translates signal names.

Table 2-2: Alternate Signal Names

RS-232-C Signal Name	Alternate Signal Name
Ring Indicator	Ring Indicator
Data Set Ready	DCE Ready
Request To Send	Request To Send/Ready for receiving
Chassis Ground	Shield
Transmitted Data	Transmitted Data
Received Data	Received Data
Signal Ground	Signal Common
Clear To Send	Clear To Send
Data Terminal Ready	DTE Ready
Data Carrier Detect	Received Line Signal Detector

Pin Numbering for Cable Makers

If you make your own cables, remember that pin 1 is on the left side of the RJ-45 connector as you hold the cable upright (as shown in the figure), with the clip facing away from you.



About Altpin

Several of the cabling recommendations that follow mention a feature called Altpin that allows you to use an 8-pin RJ-45 connection instead of a 10-pin RJ-45 connection. Altpin swaps pins 2 and 10, making DCD available on pin 1 of an 8-pin RJ-45 connector. If you use Altpin, you must configure the PortServer II port with a `set flow` command that specifies `altpin=on`. See the *PortServer II Command Reference* for more information.

Recommended Terminal and Printer Cabling

To avoid cabling problems with terminals and printers, Digi recommends that you do the following:

- Use cables with the pinouts described in Table 2-3
- Configure the ports that use these cables by supplying a `set flow` command that specifies `altpin=on`.

  Note: Some devices may work with other pinout configurations. To avoid problems, however, the cable depicted in Table 2-3 is recommended.

  Note: For Okidata printers, you may have to wire pin 7 (CTS) on the RJ 45 side to pin 11 (SSD) on the DB-25 side.

Table 2-3: Recommended Terminal and Printer Cable

Signal	Connect...		Signal
	RJ 45 8-Pin	DB-25	
Data Carrier Detect	1	4	Request to Send
Request To Send	2	5	Clear To Send
Shield Ground	3	Shell	Shield Ground
Transmitted Data	4	3	Received Data
Received Data	5	2	Transmitted Data
Signal Ground	6	7	Signal Ground
Clear To Send	7	20	Data Terminal Ready
Data Terminal Ready	8	8 (also wire to pin 6 on the DB-25)	Data Carrier Detect and Data Set Ready

Recommended Modem Cabling

To avoid cabling problems with modems, Digi recommends that you do the following:

- Use cables with the pinouts described in Table 2-4
- Configure the ports that use these cables by supplying a `set flow` command that specifies `altpin=on`.

Table 2-4: Recommended Modem Cable

Signal	Connect...		Signal
	RJ 45 8-Pin	DB-25	
Data Carrier Detect	1	8	Data Carrier Detect
Request To Send	2	4	Request To Send
Ground	3	Shell	Ground
Transmitted Data	4	2	Transmitted Data
Received Data	5	3	Received Data
Signal Sround	6	7	Signal Ground
Clear To Send	7	5	Clear To Send
Data Terminal Ready	8	20	Data Terminal Ready

Note: Some modems may work with other pinout configurations. To avoid problems, however, the cable depicted in Table 2-4 is recommended.

Note: If you are using a port for a connection between a modem and a Windows NT system running RealPort, you must use a 10-pin straight through cable, which is depicted in Table 2-5.

Modem Cabling Requirements for Window NT RealPort

For ports controlled by Windows NT systems running RealPort, you must use a cable that supports all 10 modem control signals. This is a Windows NT RAS requirement. The pinouts for this type of cable are provide in Table 2-5.

Table 2-5: 10-Pin Straight-Through Cable

Signal	Connect...	
	RJ-45 10 Pin	**DB-25 Pin**
Ring Indicator	1	22
Data Set Ready	2	6
Request To Send	3	4
Chassis Ground	4	1
Transmit Data	5	2
Receive Data	6	3
Signal Ground	7	7
Clear To Send	8	5
Data Terminal Ready	9	20
Data Carrier Detect	10	8

Note: To order 10-pin RJ-45 to DB-25 cables from Digi, use the following part numbers:

Length	Part Number
24 inches	76000129
48 inches	76000195

Frame Relay Cabling Requirements

Frame relay connections require an EIA-232/V.24 cable, which specifies the pinouts described in Table 2-6.

In synchronous environments such as frame relay, pins 1 and 10 (RI and DCD in EIA-232) become Receive and Transmit clocks.

Table 2-6: EIA-232/V.24 Pin outs

Signal	Connect...	
	RJ-45 10 Pin	**DB-25 Pin**
Receive Clock	1	17
Data Set Ready	2	6
Request To Send	3	4
Shell Chassis Ground	4	Shell
Transmit	5	2
Receive	6	3
Signal Ground	7	7
Clear To Send	8	5
Data Terminal Ready	9	20
Transmit Clock	10	15

Note: To order EIA-232/V.24 RJ-45-to-DB-25 synchronous shielded cables from Digi, use the following part number:

Length	Part Number
24 inches	76000252

Hardware Installation Procedure

Introduction

This section provides an installation procedure.

Procedure

1. Connect PortServer II to the Ethernet LAN:

- If you are using 10Base2 (Thinnet), connect the coaxial connector marked THINNET to the LAN cable using a T-connector and terminator.
- If you are using 10BaseT, plug the RJ-45 connector into the connector marked TWISTED PAIR.

2. Connect the configuration terminal to port 1 on the PortServer II.

Notes: (a) The PortServer II comes with a 2-foot, 10-pin, RJ45-to-DB-25 cable that you can use to connect the PortServer II and the configuration terminal. (b) If you use a PC as a configuration terminal, the PC must run terminal emulation software.

3. Connect other devices to serial ports as required.

- See *About Cabling* presented earlier in this chapter to ensure that the cable you use supports the connected device.
- Record which device is connected to each port. You will need to know this information when you configure the PortServer II.

Adding Expansion Ports

Introduction

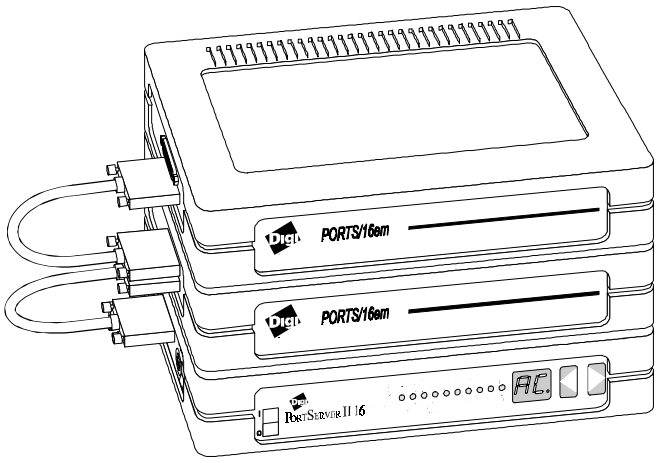
This section describes how to connect PORTS modules to the external bus interface, to add up to 48 expansion ports, for a total of 64 serial ports.

PORTS Modules

The following are PORTS modules that can be added to PortServer II:

- PORTS/16em, which provides 16 additional serial ports
- PORTS/8em, which provides 8 additional serial ports

Expansion Ports Illustration



Procedure

Follow this procedure to add expansion ports.

1. Turn off the power to the PortServer II. If you attempt to connect expansion modules to the base unit while the power is on, severe electrical problems and damage to PortServer II and the expansion modules can occur.
2. Connect the cable that came with expansion module to the EBI OUT port on the base unit and the EBI IN port on the expansion module.
3. If you are adding more than one expansion module, continue this cabling procedure from expansion module-to-expansion module, linking EBI OUT ports to EBI IN ports. Be sure that you do **not** connect EBI OUT ports together or EBI IN ports together.

appendix A

Emissions

In this chapter

This chapter describes PortServer II hardware emissions compliance and certification. It discusses the following topics:

Federal Communications Commission (FCC) Statement

Radio Frequency Interference (RFI) FCC 15.105)

The PortServer II has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, 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)

Thiss 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 Digi may void the user's authority to operate this equipment.

Cables (FCC 15.27)

This equipment is certified for Class B operation when used with shielded cables.

Industry Canada

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.

Declaration Of Conformity

(in accordance with FCC Dockets 96-208 and 95-19)

Manufacturer's Name:	Digi International
Corporate Headquarters:	11001 Bren Road East Minnetonka MN 55343
Manufacturing Headquarters:	10000 West 76th Street Eden Prairie MN 55344

Digi International declares, that the product:

Product Name:	PortServer II
Model Numbers:	50000309-02

to which this declaration relates, meets the requirements specified by the Federal Communications Commission as detailed in the following specifications:

Part 15, Subpart B, for Class B Equipment
FCC Docket 96-208 as it applies to Class B personal Computers and Peripherals

The product listed above has been tested at an External Test Laboratory certified per FCC rules and has been found to meet the FCC, Part 15, Class B, Emission Limits. Documentation is on file and available from the Digi International Homologation Department.

Certification

The Digi International PortServer II meets the following standards:

- FCC Part 15, Class B
- ICES-003, Class B
- EN 55022, Class B
- VCCI
- EN50082-2 Heavy Industry
- UL-1950
- CSA C22.2 No.950
- EN60950

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