

USB Plus Series

USB PLUS POWER SOLUTIONS

Installation Guide



Models:

Edgeport/42+

Hubport/4+

Hubport/4c+

Hubport/PCI+

Hubport/PCI+ LP



www.digi.com

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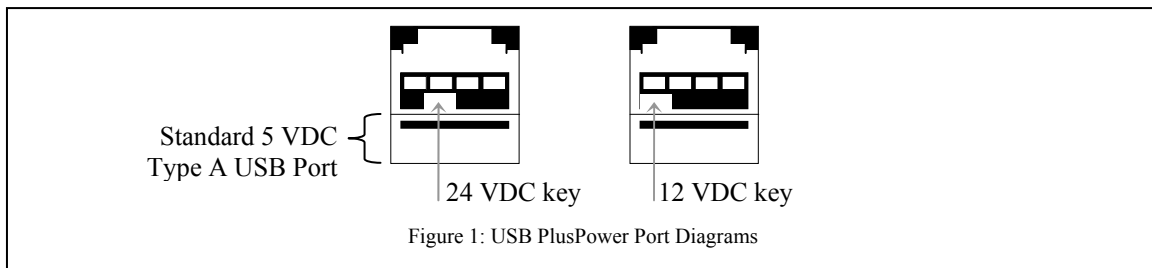
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USB Plus Series

The USB Plus Series of products are fully compliant with standard USB ports. The PlusPower ports allow for the attachment of USB devices that draw more than 500 mA, which is the maximum power provided by standard USB ports. This additional power enables USB PlusPower peripherals to function properly without requiring their own individual power supplies. These ports also have a cable locking mechanism to ensure a secure connection to downstream PlusPower peripherals.

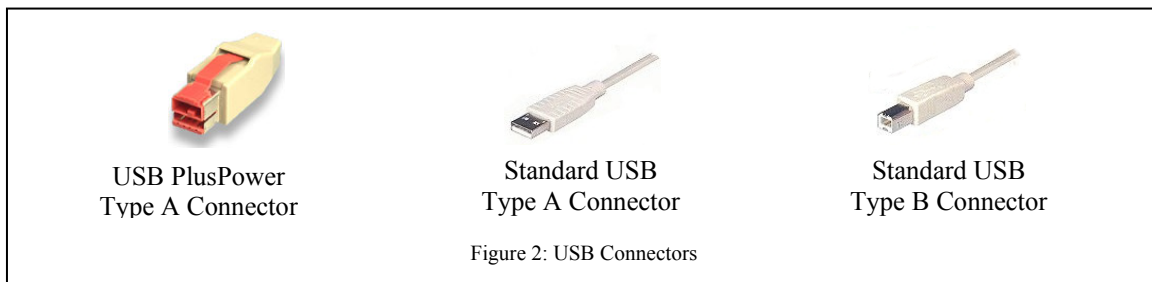
Edgeport[®]/42+

The Edgeport/42+ offers four PlusPower USB ports and two RS-232 serial DB-9 ports, allowing for the connection of PlusPower USB, standard USB, and legacy serial devices in a single box. USB Port 1 supplies 24 VDC, and Ports 2 through 4 supply 12 VDC (in addition to the standard 5 VDC available in all of the PlusPower ports as shown in figure 1 below).



Cabling the Edgeport/42+

Note that Windows NT 4.0 users must install the drivers before connecting their Edgeport/42+. The Edgeport/42+ operates as a self-powered hub, requiring a power supply to function. For more information about hubs, see the “Understanding Hubs” section on page 13.



- 1) Connect one end of the power supply* into the back of the Edgeport/42+ and the other end into an AC outlet.
- 2a) To connect your Edgeport/42+ to a PC, plug the type A end of a standard USB cable into one of the PC’s USB ports and the Type B end into the back of the Edgeport/42+.
- 2b) To connect a standard USB device to the Edgeport/42+, plug the Type A end of the USB cable into the lower section of one of the Edgeport/42+ USB PlusPower slots and the Type B end of the USB cable into the peripheral.
- 2c) To connect a PlusPower USB device to your Edgeport/42+, plug the type A end of the USB PlusPower cable into one of the Edgeport/42+ USB PlusPower slots (ensuring that the voltage key on the cable matches the voltage key of the port) and the other end into the peripheral.

*Power for the Edgeport/42+ may be supplied by a UL Listed “Class 2” power supply or Information Technology Equipment power supply, rated 24 V dc, and not exceeding 4.0 A.



Hubport[®]/4+ and Hubport/4c+

Hubport/4+ and Hubport/4c+ (compact) are externally powered hubs that connect to a standard USB upstream port. They both offer four downstream USB PlusPower ports that are compatible with both standard USB and PlusPower USB devices. Port 1 supplies 24 VDC, and Ports 2 through 4 supply 12 VDC (in addition to the standard 5 VDC available all of the PlusPower ports as shown in figure 1 on page 1). All of the ports are keyed for their specific power rating and have cable locking mechanisms to ensure a secure connection to PlusPower peripheral devices. See Figure 1 on page 1 for a diagram of the different keys.

Cabling the Hubport/4+ and Hubport/4c+

Note that Windows NT 4.0 users must install the drivers before connecting these Hubports. For a diagram of USB cable end types, see Figure 2 on page 1.

- 1) Connect one end of the power supply* into the back of your Hubport and the other end into an AC outlet.
- 2a) To connect your Hubport to a PC, plug the Type A end of a standard USB cable into one of the PC's USB ports and Type B end into the back of the Hubport.
- 2b) To connect a standard USB device to your Hubport, plug the Type A end of the USB cable into the lower section of one of the Hubport USB PlusPower slots and the Type B end of the USB cable into the peripheral.
- 2c) To connect a PlusPower USB device to your Hubport, plug the Type A end of the USB PlusPower cable into one of the Hubport USB PlusPower slots (ensuring that the voltage key on the cable matches the voltage key of the port) and the other end into the peripheral.

*Power for the Hubport/4+ and Hubport/4c+ may be supplied by a UL Listed "Class 2" power supply or Information Technology Equipment power supply, rated 24 VDC, and not exceeding 4.0 A.

Hubport/PCI+ and Hubport/PCI+ LP (Low Profile)

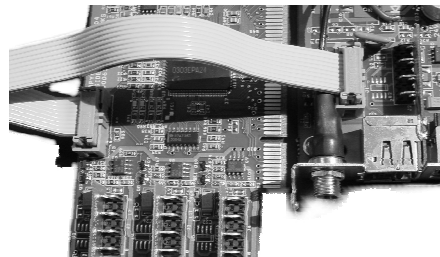
Hubport/PCI+ is a USB 2.0 full size expansion card with powered USB technology. The Hubport/PCI+ card is available in two versions. The externally powered card utilizes a 24 volt external power supply. The internally powered card utilizes power balancing technology to provide maximum power to 12 volt and 24-volt peripherals without exhausting the PC's 5 or 12 volt power. Port 1 supplies 24 VDC, and Ports 2 through 4 supply 12 VDC (in addition to the standard 5 VDC available in all of the PlusPower ports as shown in figure 1 on page 1).

The Hubport/PCI+ LP product refers to two USB 2.0 low profile expansion cards with powered USB technology: the active card, which has 3 ports, and the passive card, which has 1 port. The active card is managed and the passive card can be either managed or not managed, depending on how it is installed (as described in step 6 below). "USB Plus Series Interface" on page 6 and "Edgeport Utility Program" on page 7 describe in detail management of the Hubport/PCI+.

All of the USB ports have cable locking mechanisms to ensure a secure connection to PlusPower peripheral devices. These ports are also keyed to ensure that they can be connected only to a USB plug designed for their specific power rating. See Figure 1 on page 1 for a diagram of the different keys.

Installing the Hubport/PCI+

- 1) Discharge any static electricity from your body by touching a grounded metal object (such as the exposed metal parts on the back of your computer) before handling your Hubport/PCI+ card.
- 2) Turn off power to the computer and disconnect the power cord.
- 3) Open the computer cabinet. See your computer documentation for specific instructions, if needed.
- 4) Locate an unused PCI expansion slot and remove the expansion slot cover. Save the slot cover screw for use in Step 5.
- 5) Insert the USB PlusPower adapter in the PCI expansion slot. Press the adapter firmly into the slot until it clicks into place. Replace the slot cover screw. When installed properly, the adapter should be level with the expansion slot.
- 6) Attach an available hard drive power cable into the connector on the back of the Hubport/PCI+ card or Hubport/PCI+ LP active card (if using separately or together) or the Hubport/PCI+ LP passive card (only if using separately). If none are available, you may need to purchase a standard Y-connector.
- 7) For the Hubport/PCI+ LP passive card only: This board has no controller and must be connected to another controller: either to the Hubport/PCI+ LP active card (managed) OR via USB to the PC (unmanaged).
 - a) Managed: Plug the ribbon cable on the active card into the receptacle on the passive card, making sure that the notches match. (See picture at right.)
 - b) Unmanaged: Plug one end of a USB cable in to the card and the other end into the PC.
- 8) For externally powered cards only, plug the 24 volt power supply into the card and tighten the locking screw.
- 9) Close the computer cabinet and reattach the power cord.
- 10) After restarting your computer you may continue with driver installation.



Driver Installation

For Windows XP and 2003 Server Users

Note: If your computer is connected to the internet, the latest Microsoft certified drivers will be automatically downloaded from the Microsoft driver update server.

- 1) You must be logged into an account with administrator privileges.
- 2) Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.
- 3) When the Found New Hardware Wizard appears click **Next**, and the drivers will be automatically installed from the CD

For Windows 2000

- 1) You must be logged into an account with administrator privileges
- 2) Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.
- 3) When the Found New Hardware Wizard appears, select **Install from a list or specific location (Advanced)** and click **Next**.
- 4) Select **Search for a suitable driver for my device** and click **Next**.
- 5) Select **Specify a location** and click **Next**.
- 6) Type in <CD drive letter>:\Win2k and click **OK**.
- 7) Confirm that Windows is pointing to <CD drive letter>:\Win2k. Then click **Next**.

Note: Drivers installed from the CD have received "Designed for Windows 2000" certification. Drivers downloaded from our web site may be pending certification. If so, Windows 2000 will display a warning: Digital Signature Not Found. Click **Yes** to continue with driver installation. If you click **No** you will need to contact Digi International Technical Support before installing your USB Plus Series product.

- 8) Windows will then finish installing the driver files.
- 9) Click **Finish** to complete the driver installation.

Installation is complete when no more dialogs appear. Your new COM port(s), numbered sequentially following the existing ports in your system, is/are ready.

For Windows 98, and Me Users

- 1) Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.
- 2) After connecting the USB cable, the Add New Hardware Wizard appears. Click **Next**.
- 3) Select **Search for the best driver for your device** and click **Next**.
- 4) Select **Specify a location** and type in <CD drive letter>:\Win98. Then click **Next**.
- 5) Confirm that Windows is pointing to <CD drive letter>:\Win98. Click **Next**. Windows will then copy over the driver files.
- 6) Click **Finish** to complete the driver installation.

Installation is complete when no more dialogs appear. Your new COM port(s), numbered sequentially following the existing ports in your system, is/are ready.

For Windows NT 4.0 Users

Because Microsoft does not support USB in NT4.0, Inside Out Networks supplies a set of USB drivers that will be installed along with the necessary Edgeport drivers. NOTE: You must install the drivers using an account that has administrative privileges.

To install the USB stack and Edgeport drivers:

- 1) Insert the “Edgeport Driver” CD version 3.60 or above into your CD-ROM drive.
- 2) When the welcome dialog appears, click the **Install Driver** button.

Once the driver installation program has begun, follow the on screen instructions.

- 3a) *If you are installing drivers for the first time:* An Information dialog informs you that the installation was successful. After clicking **OK**, the installation is complete.
- 3b) *If you are replacing existing Edgeport drivers:* Follow the on-screen instructions. Note that, before beginning the installation of the drivers, all applications with open ports must be closed and all USB devices unplugged. If you close all the applications and unplug all the USB devices, then you will not need to reboot for the new drivers to take effect immediately. If any applications are left open or USB devices plugged in, you may choose to abort the installation or to continue and be required to reboot before the upgrade can take effect.

Note that because Windows NT 4.0 is *not* Plug-and-Play, you will *not* see a pop-up dialog box indicating that new hardware has been found. You may verify correct installation with the Edgeport Utility (see page 7) or the USB Status Utility (as described below).

The USB Status Utility (Viewer) can be accessed by clicking the USB icon in your system tray or by clicking on **Start, Programs, Inside Out Networks Utilities, USB Status Utility**. This utility lists all the USB devices installed on your PC and provides other relevant information for each device. You may also use this utility to create a log file.

USB Plus Series Interface

(for Hubport/4c+ and the managed Hubport/PCI+ and Hubport/PCI+ LP cards)

The USB Plus Series products present themselves to a user application by way of a virtual serial port. This serial port is named as all standard serial ports in the form of COMx where x is a number between 1 and 255. The number assignment can be configured using the Edgeport configuration utility. (See the “Edgeport Utility Program” section for more information about using this utility.)

There are two ways to manage the power on these devices: You can either use an ASCII command interface to send commands to the Power Management COM port, as described in this section, or you can use the Edgeport Utility program (see page 7).

All ASCII commands sent to the device must be terminated with a carriage return character <CR>.

The format of the response sent from the USB Plus Series product to the application is an ASCII printable character string terminated by a <CR>.

Other response strings generated by the USB Plus Series product include `Invalid Command` <CR>.

Command Set

Command	Description	Return Value
?<CR>	Tells about the command set available for the USB Plus Series.	as described herein
I<CR>	Displays port type.	Power Management Port<CR>
Eh<CR>	Enables port power as defined by the hexadecimal value of h.	OK<CR>
Dh<CR>	Disables port power as defined by the hexadecimal value of h	OK<CR>
S<CR>	Returns port power status in hexadecimal.	h<CR>

Changes to the configuration are saved in the device. If the device is reset, it will be initialized with the saved values.

Commands D and E each have a bit-mapped hexadecimal argument indicating which port, or ports, should be enabled or disabled. The bit map will have the least significant bit representing port 1, the next least significant bit representing port 2, etc. For example, to enable port 1, the user would send the string 'E1<CR>'. To disable both port 1 and port 3, the user would send 'D5<CR>'. To enable ports 1, 2, and 4, the user would send 'EB<CR>'.

The response to the S command will be a hexadecimal bit-mapped value indicating the current powered state of the four ports, with a 1 indicating power enabled, 0 indicating power disabled.

As with the D and E commands, the bit map for the S response will have the least significant bit representing port 1, etc. For example, a response of '4<CR>' would indicate that port 3 is power enabled, and ports 1, 2, and 4 are power disabled. A response of 'E<CR>' would say that ports 2, 3 and 4 are enabled, and port 1 is disabled. A response of '0<CR>' would indicate that all ports are power disabled.

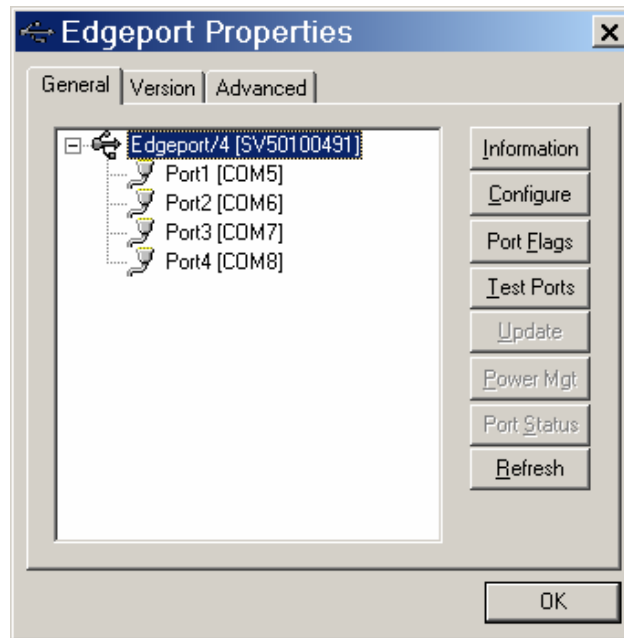
Edgeport Utility Program

For All Windows Operating Systems

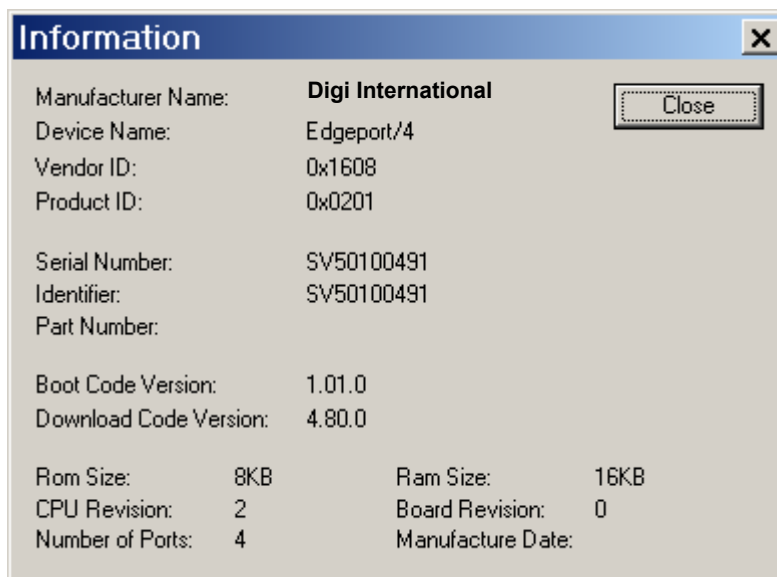
The Edgeport configuration utility program (**edgeport.exe**) allows you to manage the serial ports of your device. Note that with Windows NT you must have administrative privileges in order to change the COM port settings. For more information, see the Support section at **www.digi.com**.

General Tab

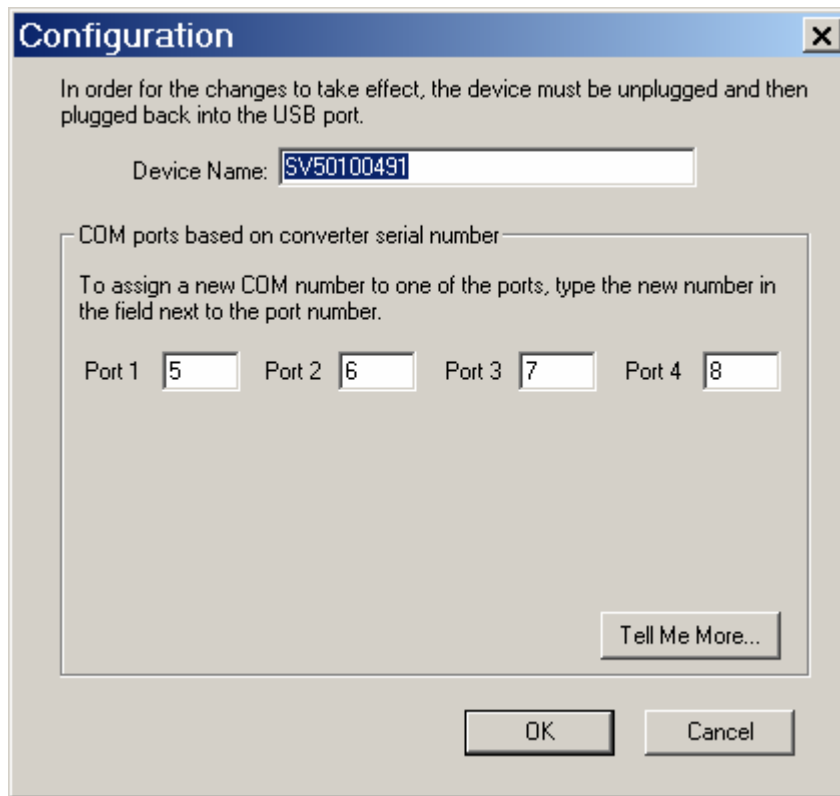
The **General** tab in this utility allows you to do the following:



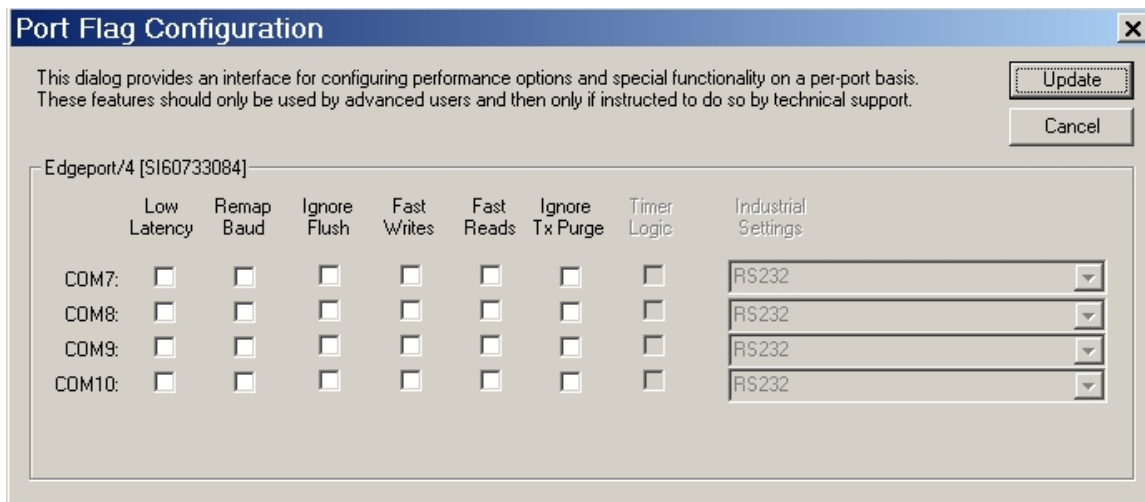
- **Information** - Check the manufacturing information pertaining to your device.



- **Configure** - Reassign the physical port on your device to any available Windows COM port number from 1 to 255 and give your device a user friendly Device Name. This capability is particularly helpful if you have more than one device.



- **Port Flags** - Configure performance options and special functionality on a per-port basis.



Low Latency:

Normally the UART will interrupt when the receiver has been idle for 4 character times. (For example 4ms at 9600) As long as data is being received the UART will continue to buffer them until its internal FIFO is full (~56 bytes). This flag causes the Edgeport to poll the RX FIFO for received bytes. If any bytes are available they will be sent to the driver without any delay.

Remap Baud: (All operating systems)

Setting the baud rate to 1200 baud will result in 230400 baud

Ignore Flush: (Windows NT/2K/XP)

If an application sends IRP_MJ_FLUSH_BUFFERS it will be ignored.

Excerpt from Microsoft documentation:

Drivers of devices with internal caches for data and drivers that maintain internal buffers for data must handle this request.

When Sent

Receipt of a flush request indicates that the driver should flush the device's cache or its internal buffer, or, possibly, should discard the data in its internal buffer.

Operation

The driver transfers any data currently cached in the device or held in the driver's internal buffer(s) before completing the flush request. The driver of an input-only device that buffers data internally might simply discard the currently buffered device data before completing the flush IRP, depending on the nature of its device.

Fast Writes: (All operating systems)

When an application sends a write to the driver, by default the Edgeport driver will wait until all data has been transmitted out of the Edgeport device before completing the write. When the Fast Writes flag is set, we complete the write even if data is still buffered in the driver and the Edgeport device.

Fast Reads:

This flag is used when an application requires that a read complete immediately. In the read immediate case, the Edgeport driver will send a request to the Edgeport device asking for any buffered data to be sent up. This buffered data will be included when the read completes. If this flag is set, the driver will not query the Edgeport device for additional data.

Timer Logic: (Windows 9x only)

If application uses PortSetReadCallback(), the notification routine will only be called when the number of bytes in the receive buffer is greater than the RX trigger. The Microsoft serial VxD also implements a timer that will trigger and call the notification routine if some amount of data is available in the RX buffer but no new data has been received for ~200ms (receiver is no longer active).

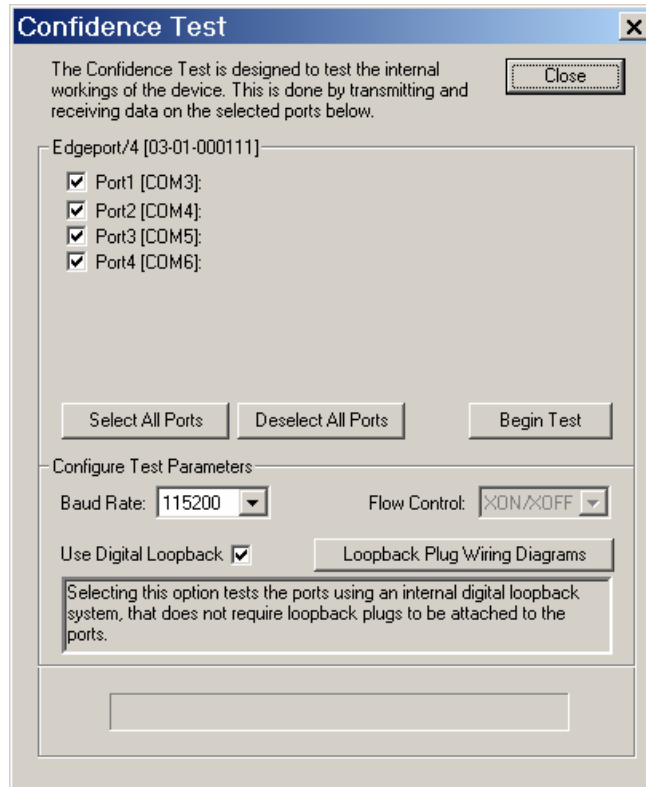
We do not enable this behavior by default because of the nature of Edgeport buffering.

But if you set the flag we will complete the read when we detect ~200 ms no activity.

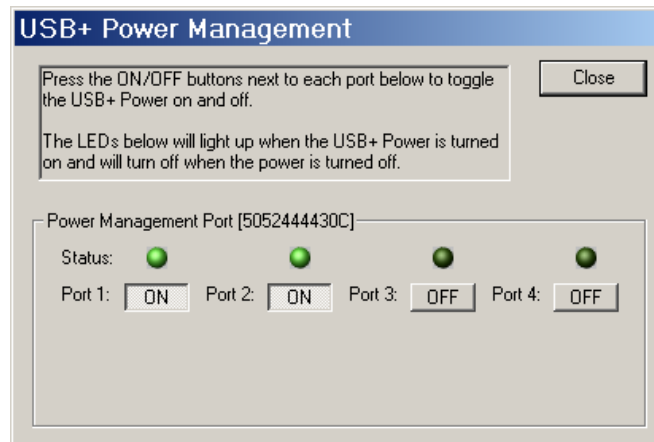
Here is a comment from the code:

If the receiver is active then do not complete this read. The problem is that the Edgeport buffers the RX bytes and we poll the driver. If we do not receive any bytes in 200ms we may report an erroneous event even if there are available bytes in the Edgeport device or driver.

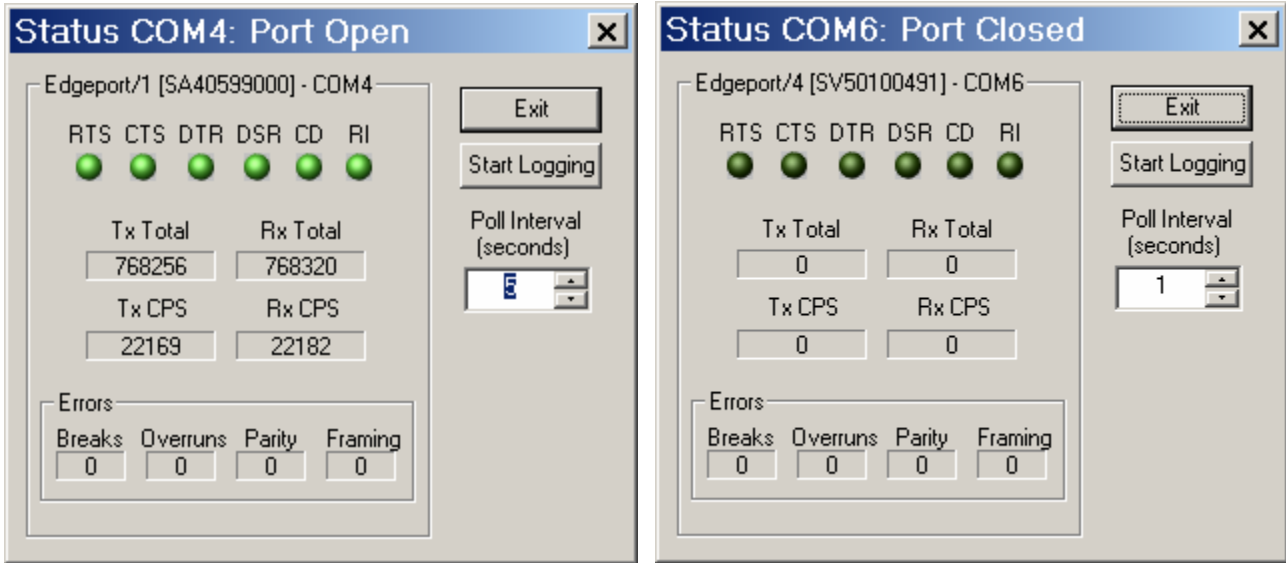
- **Test Ports** - Perform a confidence test on the internal workings of the serial ports.



- **Power Management** – Turn on and off the power for Hubports with USB PlusPower ports



- **Port Status** – Provide the status of a selected (highlighted) serial port.



The Poll Interval is the number of seconds between updates of this window. This is also the number of seconds between each entry in the log file.

To create a log file, click the Start Logging button and enter a filename for the log file. This file will contain all of the information displayed in the Port Status window until the Stop Logging button is clicked.

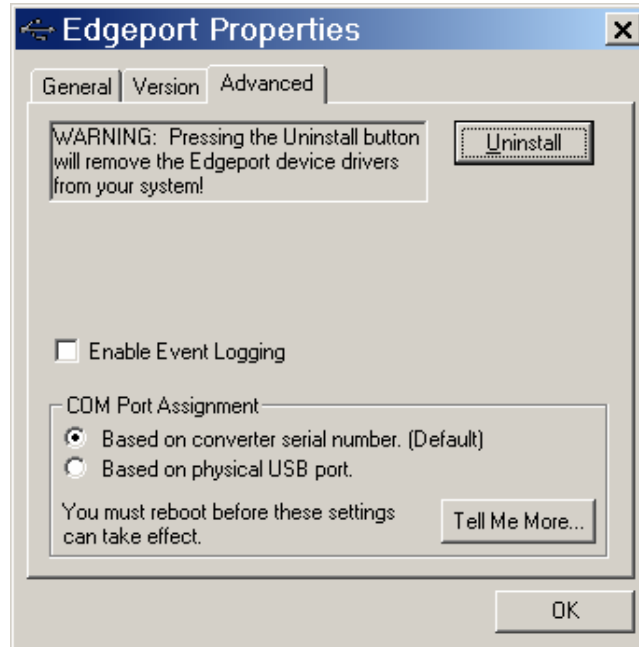
- **Refresh** – Scan for ports. Note that NT 4.0 does not automatically scan.

Version Tab

The **Version** tab allows you to check the file information pertaining to the software.

Advanced Tab

The **Advanced** tab allows you to do the following:



- **Uninstall** – Uninstall the drivers.
- **Enable Event Logging** – Place event messages in system event log.
- **COM Port Assignment** – Configure how COM ports will be assigned.

The driver supports COM port number assignment in two ways:

1. Assign COM ports based on converter serial number.

This is the default setting. In this mode, the driver uses the serial number of each converter to uniquely identify it, and the COM port assignments for a given converter are based on its serial number. No matter which physical USB port a converter is plugged into, it will maintain its assigned COM port numbers.

2. Assign COM ports based on physical USB port.

In this mode, the driver identifies a converter based on the physical USB port it is plugged into. This effectively assigns COM port numbers to physical USB ports. No matter which converter is plugged into a given USB port, it will use the COM port numbers assigned to that USB port. This permits a converter to be replaced with a new unit, and, although the new unit has a different serial number, it will receive the same COM port assignments as the old unit because they were both plugged into the same USB port.

When using this mode, converters are identified not by their serial number, but by a 2-7 digit number that identifies which USB port it is plugged into.

After changing this setting, you will need to reboot before the change takes effect.

Understanding Hubs

Hubs, critical components in the USB architecture, are wiring concentrators that enable the attachment of multiple devices, thus converting a single attachment point into multiple attachment points. USB architecture allows a cascaded multiple hub configuration with certain power limitations (explained later in this section). See figure 1.

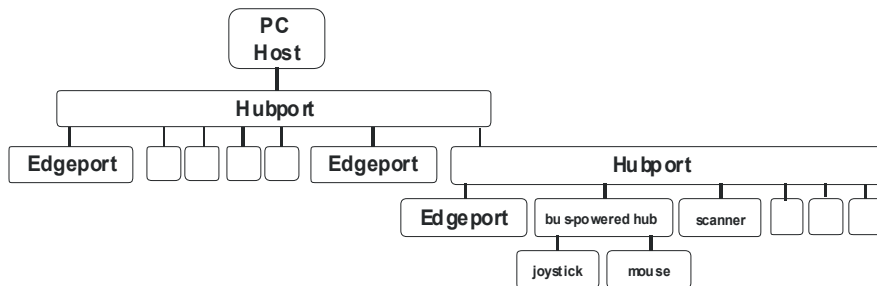


Figure 1: Example of a Typical Hub Configuration

Each hub has an upstream port, connecting to the host, and multiple downstream ports, connecting to downstream devices, possibly including other hubs. A hub can detect attachment and detachment of downstream devices and enable and monitor the distribution of the power to downstream devices via their integral hardware and the operating system.

Each USB device reports its power requirements to the operating system, which then enables and disables the device as a function of its power requirements and the amount of available power. High powered devices typically need to be connected to a self-powered hub, such as the Hubport, which obtains power from its external power supply and provides up to 500 mA for each standard USB port. Only low powered devices, such as a mouse, can be connected to a bus-powered hub, which obtains power from its upstream host and provides up to 100 mA for each standard USB port.

Due to the limited available power for bus-powered hubs, cascading two bus-powered hubs is an illegal topology, and devices connected to the second hub will not function. *USB specifications limit the connection of a bus-powered hub to a self-powered hub or host only.*

According to the USB Specification, the maximum limit of hubs cascaded in series cannot exceed five. In other words, you may have a maximum of five hubs between any device and the host. This does NOT mean that the maximum number of hubs in a system is five. Indeed, up to seven hubs can be connected parallel *at any given level*. You must tally both external and embedded hubs when counting downstream hubs.

Regulatory & Other Information

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Federal Communications Commission (FCC) Regulatory Information (USA only)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable

protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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 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 that is on a circuit different from the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: The connection of a non-shielded interface cable to this equipment will invalidate the FCC Certification for this device.

FCC Regulation - Part 15 Declaration of Conformity (DoC)

This device complies with the requirements of the Code of Federal Regulations listed below:

FCC Title 47 CFR, Part 15 Class B for a digital device.

Operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.

Department of Communication (DOC) Notice (Canada only)

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 brouiller du Canada.

**European Community - CE Mark
Declaration of Conformity (DOC)**

According to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:

Inside Out Networks

Manufacturer's Addr.:

11001 Bren Road East
Minnetonka, MN 55343

declares that the product

Product Name: **Edgeport/42+**

Model Numbers:

North America International

301-1001-42 301-2001-42

Product Name: **Hubport/4+**

Model Numbers:

North America International

301-1010-14 301-2010-14

Product Name: **Hubport/4c+**

Model Numbers:

North America International

301-1157-01 301-1157-01

Product Name: **Hubport/PCI+**

Model Numbers:

North America International

301-1149-01 301-1149-01

301-1150-01 301-1150-01

301-1151-01 301-2151-01

301-9007-01 301-9207-01

Product Name: **Hubport/ PCI+ LP**

Model Numbers:

North America International

301-1170-01 301-1170-01

301-1171-01 301-1171-01

301-1172-01 301-2172-01

301-1173-01 301-1173-01

Product Options:

All

conforms to the relevant EU Directives listed here:

EMC Directive 89/336/EEC |
Low Voltage Directive 73/23/EEC
Amending Directive 93/68 EEC

using the relevant section of the following EU standards and other normative documents:

Safety:

IEC 950:1991 +A1, A2, A3, A4
EN 60950:1992 + A1, A2, A3, A4
EMC

The following summarizes the specifications and requirements for EN55024:1998, EN55022:1998 Class B & CISPR 22 Class B emission and immunity tests and the EN61000-3-2(2000), EN61000-3-3(1995) current harmonics and voltage variation tests. Actual test levels are listed in the appropriate tables.

EN55024 (1998)

Test	Specification EN55024	Requirement
Electrostatic Discharge	EN61000-4-2	+4 kV contact +8kV air
Radiated Immunity	EN61000-4-3	3 V/m
Electrical Fast Transient Burst	EN61000-4-4	1kV (A/C), .5kV (I/O)
Surge	EN61000-4-5	2kV common mode 1kV differential mode
Conducted Immunity	EN61000-4-6	3V rms
Magnetic Immunity	EN61000-4-8	1 A/m Not Applicable
Voltage Dips & Interrupts	EN61000-4-11	>95%, 30% & >95%

**EN 55022 Class B
(1994 w/A1 1995)**

Test	Specification EN55022	Requirement
Radiated Emissions	—	Class B
Conducted Emissions	CISPR 22	Class B

EN61000-3-2 (2000)

Test	Specification	Requirement
Limits for harmonic current emission	EN61000-3-2	Class A

EN61000-3-3 (1995)

Test	Specification	Requirement
Limitation of voltage fluctuation and flicker	EN61000-3-3	-

European Contact

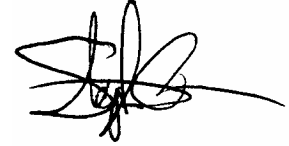
Digi International
Joseph-von-Fraunhofer Str. 23
44227 Dortmund, GERMANY
49-231-9747-0

UL/CSA Safety Information

This device complies with the requirements of following safety standards below:

UL 1950, 3rd edition
CSA No. 950

Quality Manager
Austin, Texas
July 2006



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