Edgeport®

USB EXPANSION MODULES INDUSTRIAL

Installation Guide

Models:
Edgeport/1i
Edgeport/2i
Edgeport/2s MEI
Edgeport/4s MEI
Edgeport/4s Isolated
Edgeport/8s MEI

www.digi.com

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Edgeport/1i

Edgeport® USB-to-Serial Converters from Digi International® provide high-speed serial connectivity via USB port expansion for Windows 2003 Server, 2000, XP, NT 4.0, 98, SE, and Me applications. Edgeport/1i provides one RS-422/485 serial DB-9 port. For more detailed information, as well as the latest manual and technical updates, visit **www.digi.com**.

Cabling Edgeport

USB Connection

Type A

Type B

Plug the Type A (flat) end of the USB cable into the USB port located in the back of your PC or into an available USB port on a standard hub or into a Digi International Hubport®. Plug the Type B (square) end of the USB cable into the Edgeport.

RS422/485 Serial Connection

The Edgeport/1i supports RS422/RS485 protocol. To configure the features of RS-422/485 communication on the Edgeport/1i, you will short or leave unconnected certain pins at the DB9 connector of the cable. See the following pin assignment:

3 → TA (T-) transmit data negative
7 → TB (T+) transmit data positive
8 → RA (R-) receive data negative
4 → RB (R+) receive data positive
5 → signal ground
2 → no connect

For "jumper wire" based mode configuration, use the following pins:

1 → full and half duplex
6 → echo on and off
9 → line termination

The user can switch on and off the following features:

Line termination (120 ohm): To enable the line termination resistor, the user connects pin 9 to pin 8. To disable line termination, the user leaves pin 9 unconnected.

Full Duplex and Half Duplex: For Full Duplex operation, pin 1 is left unconnected. For Half Duplex operation, the user shorts pin 1 to pin 5 (GND) at the cable connector.

Echo On and Echo Off: For Echo On mode, pin 6 is left unconnected. For Echo Off mode, the user shorts pin 6 to pin 5 (GND) at the cable connector.

If the drivers are not already installed, go to "Edgeport Driver Installation" starting on page 6.

Edgeport/2i

Edgeport USB-to-Serial Converters from Digi International provide high-speed serial connectivity via USB port expansion for Windows 2000, XP, NT 4.0, 98, SE, and Me applications. Edgeport/2i provides a combination of up to two RS-422 and/or RS-485 serial DB-9 ports. For more detailed information, as well as the latest manual and technical updates, visit **www.digi.com**.

Cabling Edgeport

USB Connection

Type A

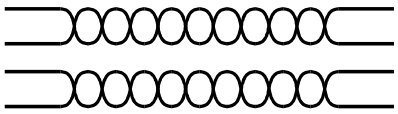
Type B

Plug the Type A (flat) end of the USB cable into the USB port located in the back of your PC or into an available USB port on a standard hub or into a Digi International Hubport. Plug the Type B (square) end of the USB cable into the Edgeport.

RS422/485 Serial Connection

Cable Connections (DB9 Female) for Full Duplex

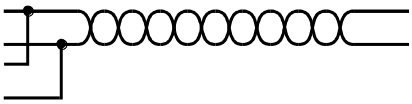
3 → TA	(T-)	transmit data negative
7 → TB	(T+)	transmit data positive
8 → RA	(R-)	receive data negative
4 → RB	(R+)	receive data positive
5 →		signal ground
1, 2, 6, 9		no connect



NOTE: For full duplex (in the above diagram) the differential pair TA and TB should be together in one twisted pair and R_A and R_B should be together in another twisted pair.

Cable Connections (DB9 Female) for Half Duplex

3 → TA	(T-)	transmit data negative
7 → TB	(T+)	transmit data positive
8 → RA	(R-)	receive data negative
4 → RB	(R+)	receive data positive
5 →		signal ground
1, 2, 6, 9		no connect



NOTE: Half duplex contains only one twisted pair.

Configuring the DIP Switches

Two Position Switch

The two position DIP switch, located on the back panel, connects the signal ground to chassis ground. **IMPORTANT**: Do not connect signal ground to chassis ground on more than one location in order to prevent ground loops and potentially high currents (figure 1).

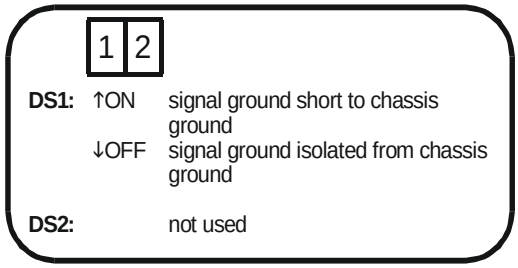


Figure 1: Two Position DIP Switch

Eight Position Switch

The Edgeport/2i also has two sets of eight position DIP switches, located on the back panel next to their corresponding serial port. Figure 2 shows what each switch selects in the ON and OFF positions. Consult the diagrams in figure 3 for various configuration options. For more configuration information, go to the documentation section of our web site at **www.digi.com/support**. If the drivers are not already installed, go to "Edgeport Driver Installation" starting on page 6.

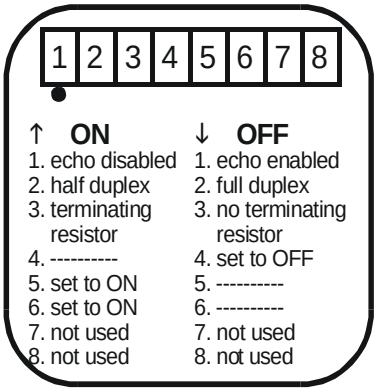


Figure 2: Eight Position DIP Switch

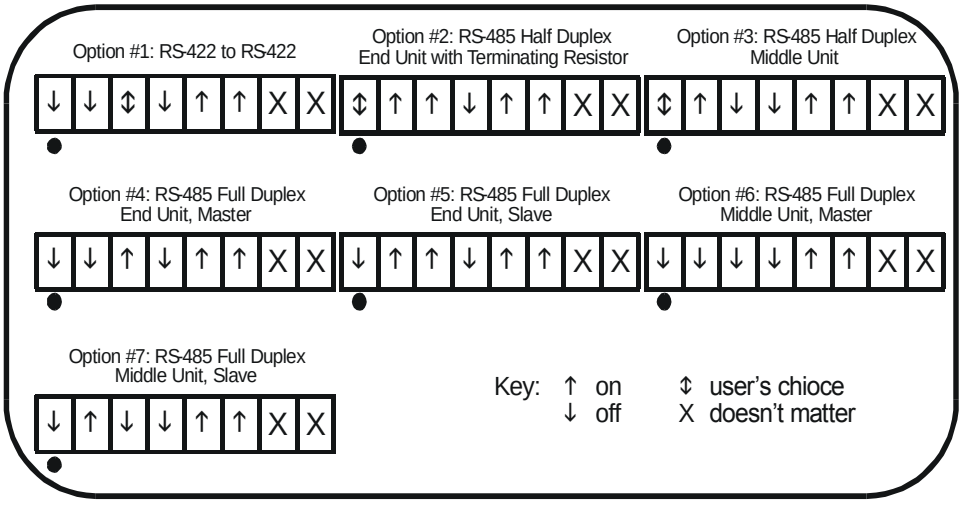


Figure 3: Various Configurations for the Edgeport/2i DIP Switches

Edgeport/2s MEI, Edgeport/4s MEI, Edgeport/4s Isolated, Edgeport/8s MEI

Edgeport USB-to-Serial Converters from Digi International provide high-speed serial connectivity via USB port expansion for Windows 2000, XP, NT 4.0, 98, 95, SE, and Me applications. Edgeport/2s MEI, Edgeport/4s MEI and Edgeport/8s MEI provide a combination of up to two, four or eight (respectively) RS-232 and/or RS-422 and/or RS-485 serial DB-9 ports. For more detailed information, as well as the latest manual and technical updates, visit **www.digi.com**.
The Isolated version has 2KV DC isolation between all of its ports including the serial ports and the USB port.

Cabling Edgeport

USB Connection

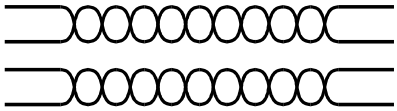
Type A

Type B

Plug the Type A (flat) end of the USB cable into the USB port located in the back of your PC or into an available USB port on a standard hub or into a Digi International Hubport. Plug the Type B (square) end of the USB cable into the Edgeport.

Cable Connections (DB9 Female) for Full Duplex

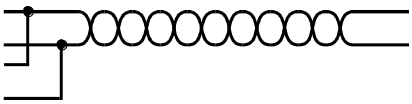
3 → TA	(T-)	transmit data negative
7 → TB	(T+)	transmit data positive
8 → RA	(R-)	receive data negative
4 → RB	(R+)	receive data positive
5 →		signal ground
1, 2, 6, 9		no connect



NOTE: For full duplex (in the above diagram) the differential pair TA and TB should be together in one twisted pair and R_A and R_B should be together in another twisted pair.

Cable Connections (DB9 Female) for Half Duplex

3 → TA	(T-)	transmit data negative
7 → TB	(T+)	transmit data positive
8 → RA	(R-)	receive data negative
4 → RB	(R+)	receive data positive
5 →		signal ground
1, 2, 6, 9		no connect



NOTE: Half duplex contains only one twisted pair.

DB9 RS-232 Pin Assignment

1 → DCD	data carrier detect	6 → DSR	data set ready
2 → RD	receive data	7 → RTS	request to send
3 → TD	transmit data	8 → CTS	clear to send
4 → DTR	data terminal ready	9 → RI	ring indicator
5 → SGND	ground		

Configuring the Port Flags

The Edgeport/2s MEI, Edgeport/4s MEI, Edgeport/8s MEI and the Edgeport/4s Isolated, which support RS-232, RS-422 and RS-485, are configured using the Edgeport Utility program. Before configuring, make sure that the drivers have been installed and that the device is connected to your computer.

Open **edgeport.exe**, select the Edgeport that you want to configure, and click on the **Port Flag Configuration** button. The drop down boxes under the **Industrial Settings** allow you to select from the following options for each port listed:

RS232
RS422: No Terminating Resistor
RS422: Terminating Resistor
RS485: Half Duplex, End Unit, Echo
RS485: Half Duplex, End Unit, No Echo
RS485: Half Duplex, Middle Unit, Echo
RS485: Half Duplex, Middle Unit, No Echo
RS485: Full Duplex, End Unit, Master
RS485: Full Duplex, End Unit, Slave
RS485: Full Duplex, Middle Unit, Master
RS485: Full Duplex, Middle Unit, Slave

If the drivers are not already installed, go to "Edgeport Driver Installation" starting on page 6.

Edgeport Driver Installation

For Windows XP, 2003 Server

If your computer is connected to the internet, the latest Microsoft certified drivers will be automatically downloaded from the Microsoft driver update server. You must be logged into an account with administrator privileges.

Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.

When the Found New Hardware Wizard appears click **Next**, and the drivers will be automatically installed from the CD

For Windows 2000

You must be logged into an account with administrator privileges

Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.

When the Found New Hardware Wizard appears, select **Install from a list or specific location (Advanced)** and click **Next**.

Select Search for a suitable driver for my device and click Next.

Select Specify a location and click Next.

Type in <CD drive letter>:\Win2k and click OK.

Confirm that Windows is pointing to **<CD drive letter>:\Win2k**. Then click **Next**.

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.

Windows will then finish installing the driver files.

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, Me

Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.

After connecting the USB cable, the Add New Hardware Wizard appears. Click **Next**.

Select Search for the best driver for your device and click Next.

Select Specify a location and type in <CD drive letter>:\Win98. Then click Next.

Confirm that Windows is pointing to **<CD drive letter>:\Win98**. Click **Next**. Windows will then copy over the driver files.

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

Because Microsoft does not support USB in NT4.0, Digi International 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:

Insert the "Edgeport Driver" CD version 3.60 or above into your CD-ROM drive.

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 9) or the USB Status Utility (Viewer), as described below.

The USB Status Utility can be accessed by clicking the USB icon in your system tray or by clicking on Start, Programs, Digi USB, Edgeport Configuration 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.

Interpreting the System Status Light

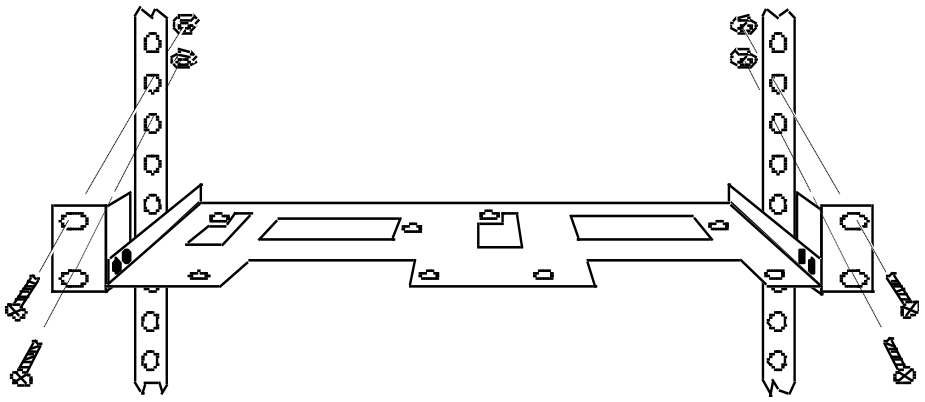
For All Edgeports except the Edgeport/1i

Red	This light signifies a loss of USB communication with the host. If the loss is due to unplugging the unit, when it is reconnected the light will blink red a few moments before turning green. Otherwise, the light indicates a problem with the drivers, which may need to be reinstalled. The red light will also blink during installation until the installation is complete.
Amber	This light signifies serial port activity on the Edgeport. The amber light may also flash briefly during installation.
Green	This light indicates the serial ports are successfully set up and the Edgeport is operating normally.

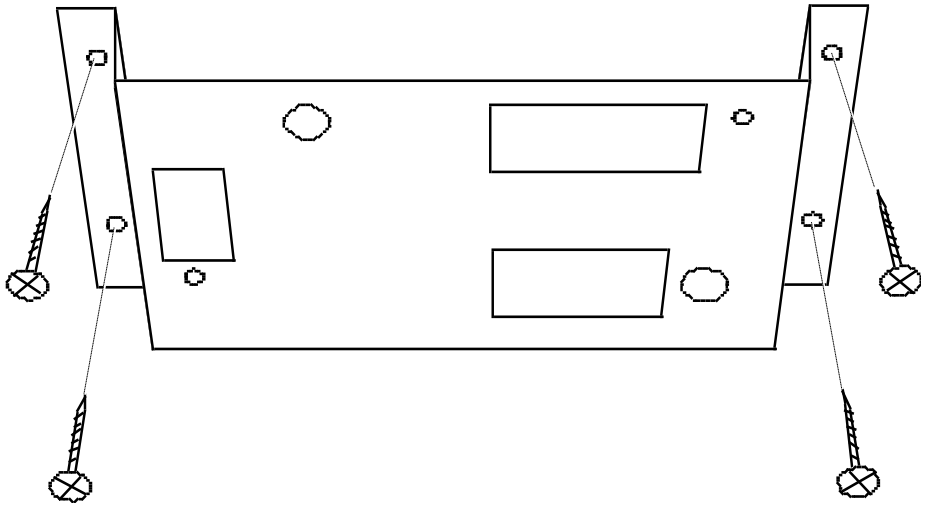
Mounting Diagrams

For all Edgeports except the Edgeport/1i

Rack Mount Kit*



Under-Shelf Mounting Bracket*



**Nuts, bolts, and screws are not included.*

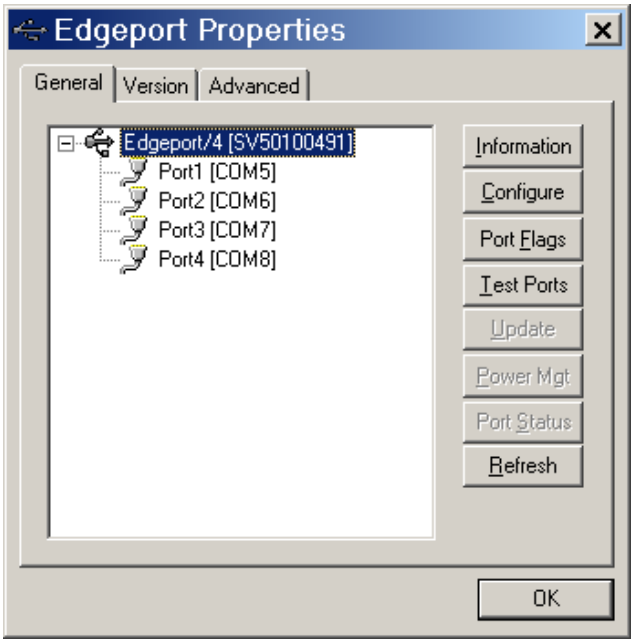
The Edgeport Utility Program

For All Windows Operating Systems

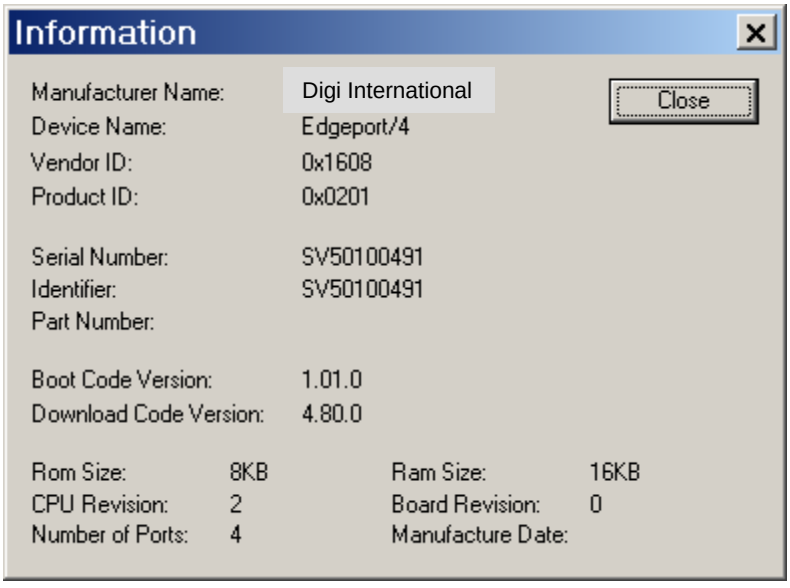
The Edgeport configuration utility program (**edgeport.exe**) allows you to manage the serial ports of your Edgeport product. Note that with Windows NT you must have administrative privileges in order to change the COM port settings. For more information, see the Support section at **www.digi.com**.

General Tab

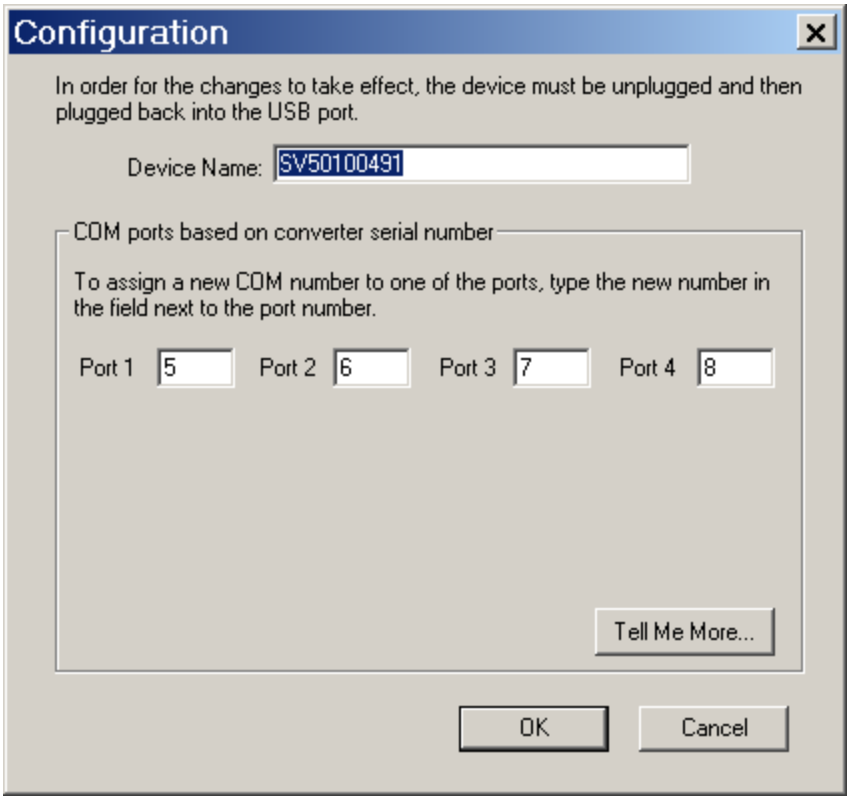
The General tab in this utility allows you to do the following:



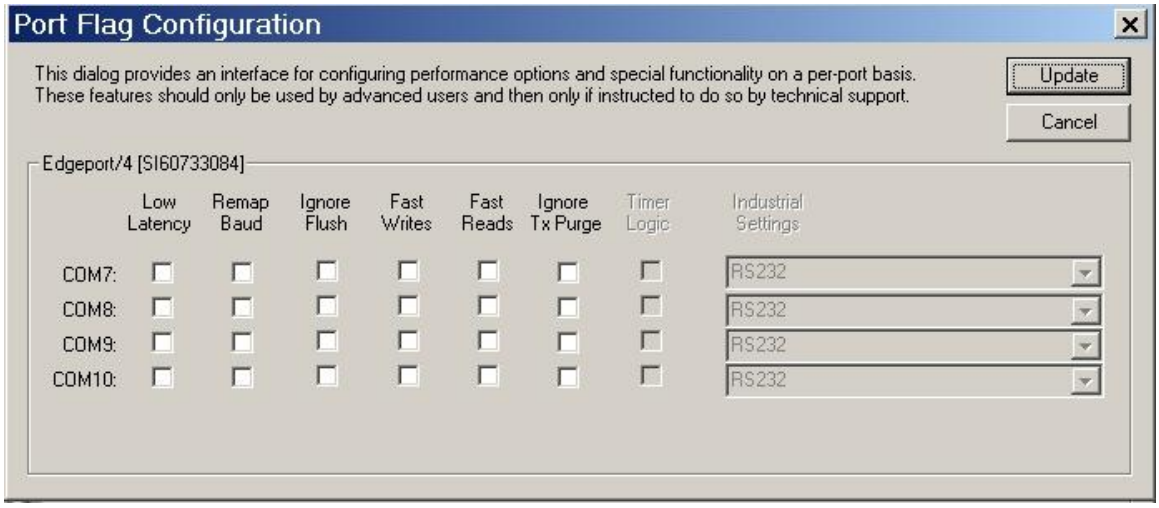
- **Information** - Check the manufacturing information pertaining to your device.



- **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.



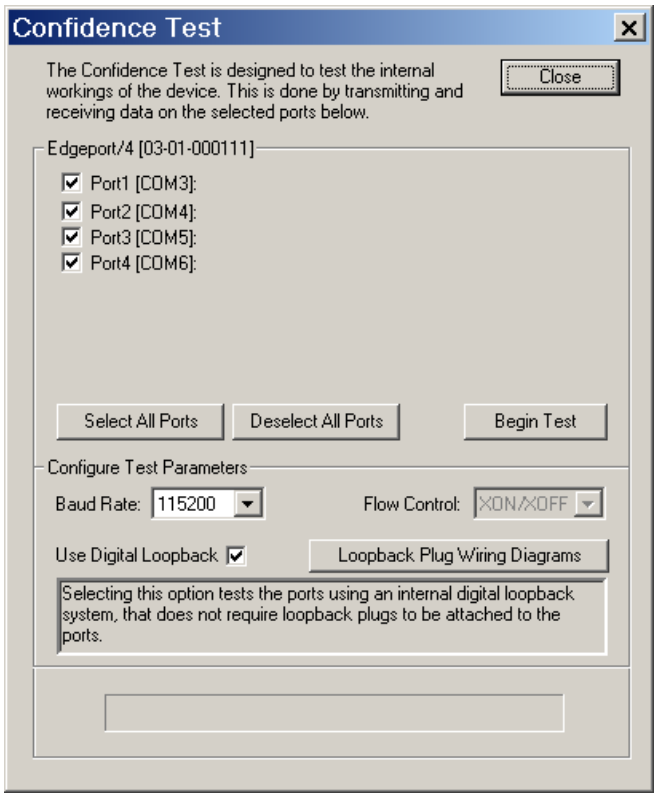
- **Port Flags** - Configure performance options and special functionality on a per-port basis.



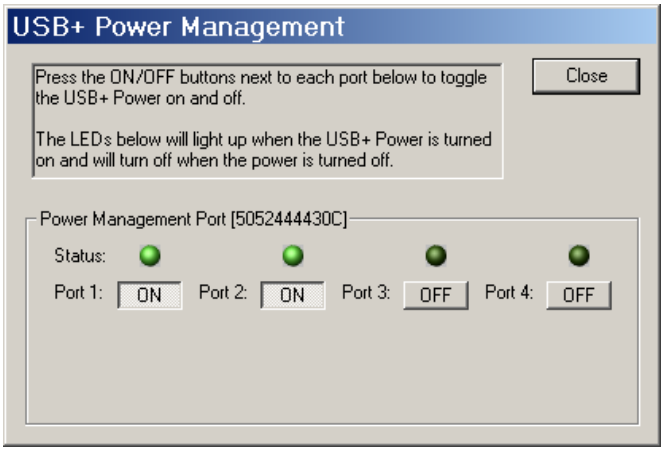
Low Latency:
Normally the UART will interrupt when the receiver has been idle for 4 character times. (For example 4ms at 9600) As long as data is being received the UART will continue to buffer them until its internal FIFO is full (~56 bytes). This flag causes the Edgeport to poll the RX FIFO for received 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 then 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.

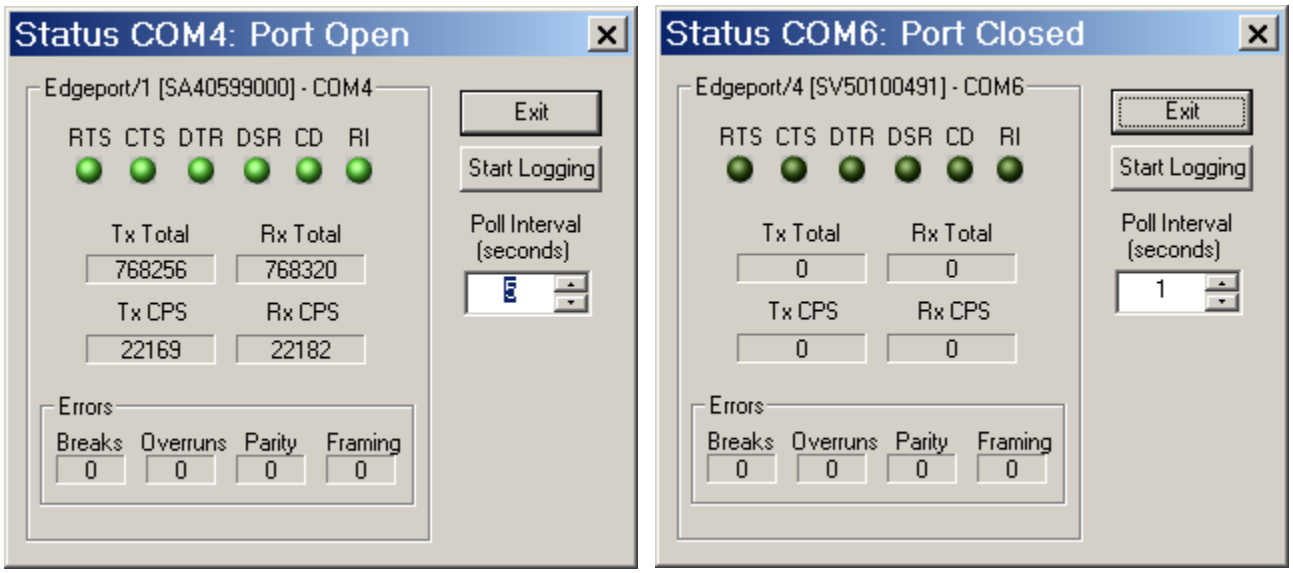
- **Test Ports** - Perform a confidence test on the internal workings of the serial ports.



- **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.

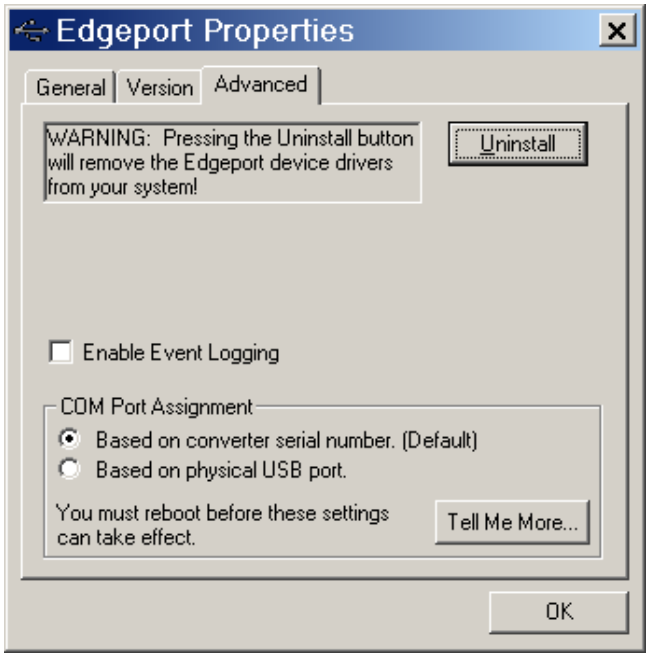
- **Refresh** – Scan for ports. Note that NT 4.0 does not automatically scan.

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 the drivers.
- Enable Event Logging – Place event messages in system event log.
- 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 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.

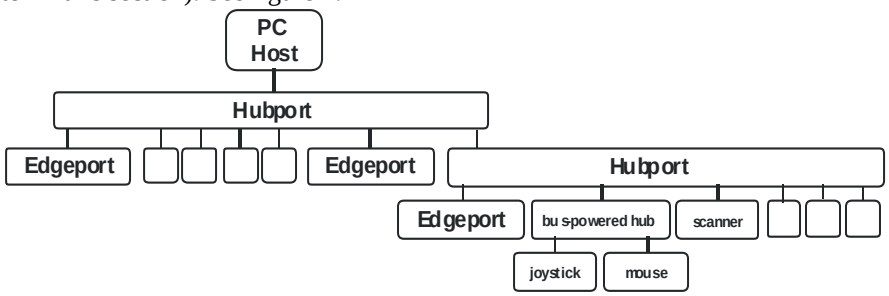


Figure 1: Example of a Typical Hub Configuration

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 downstream 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 downstream 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.

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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:

Digi International

Manufacturer's Address:

11001 Bren Road East
Minnetonka, MN 55343 USA

declares that the product

Product Name(s): Edgeport/1i
Model Number(s): 301-1001-31
Product Name(s): Edgeport/2i
Model Number(s): 301-1000-12
Product Name: Edgeport/2s MEI
Model Number(s): 301-1000-92
Product Name: Edgeport/4s MEI
Model Number(s): 301-1000-94
Product Name: Edgeport/4s Isolated
Model Number(s): 301-1000-95
Product Name: Edgeport/8s MEI
Model Number(s): 301-1002-98

Product Options: All

Conforms to the relevant EU Directives listed here:

EMC Directive 2004/108/EC|
Low Voltage Directive 2006/95/EC
R&TTE 1999/5/EC

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

EMC:
EN55022 Class B(2006)
EN55024 (1998+A1,A2)
EN61000-3-2(2000+A2)
EN61000-3-3(1995+A1,A2)
Safety:
EN 60950 (2001)

The following summarizes the specifications and requirements for EN55024, EN55022 Class B & CISPR 22 Class B emission and immunity tests. If the actual test levels are higher or different than required, these levels are listed in the appropriate tables.

EN55022

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

EN 55024

Test	Specification EN55024	Requirement
Electrostatic Discharge	EN61000-4-2	+2,+4 kV direct contact +2,+4 kV and +8kV air (insulated surfaces) +2,+4 kV(HCP&VCP) indirect
Radiated Immunity	EN61000-4-3	3 V/m, 80Mhz-1000Mhz, amp mod 1kHz sine wave at 80%
Electrical Fast Transient Burst	EN61000-4-4	+0.5kV,+ 1kV (A/C) +0..5kV (I/O)
Surge	EN61000-4-5	+0.5kV,+ 1kV 1kV
Conducted Immunity	EN61000-4-6	3Vrms, .150Mhz to 80Mhz, amp mod. 1kHz wave at 80%
Magnetic Immunity	EN61000-4-8	1 A/m Not Applicable
Voltage Dips & Interrupts	EN61000-4-11	>95%10ms, 30%@500ms & >95%@5sec reduction at rated voltage

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 60950-1
CSA C22.2 No.60950-1

Quality Manager
Austin, Texas – October 2007

China RoHS statement:

The Table of Toxic and Hazardous Substances/Elements and their Content shall apply to any product covered by this manual and labeled with the following symbol:

The Table of Toxic and Hazardous Substances/Elements and their Content as required by China's Management Methods for the Control of Pollution from Electronic Information Products						
Part Name (部件名称)	Toxic and Hazardous Substances or Elements **(有毒有害物质或元素)** Lead (Pb) (铅)	Mercury (Hg) (汞)	Cadmium (Cd) (镉)	Hexavalent Chromium (Cr (VI)) (六价铬)	Polybrominated biphenyls (PBB) (多溴联苯)	Polybrominated diphenyl ethers (PBDE) (多溴二苯醚)
301-1002-08	X	O	O	O	O	O

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T 11363-2006.
表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T 11363-2006.
示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求.

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