
PCIe/104 PCI EXPRESS MINI CARD (4x4) CARRIER BOARD HARDWARE MANUAL

MODELS

104E-MPCIe-4 AND 104E-MPCIe-2



CHAPTER 1: QUICK START

There are no required software drivers to use this card: **simply install the device into your PCIe/104 stack and it is ready to use.**

We *highly* recommend that you **install your expansion cards first.**

Refer to Chapter 1: Quick Start in the associated hardware manuals for instructions on installing ACCES' PCI Express Mini Cards (mPCIe) such as our [mPCIe-ICM485-4](#) isolated four-port RS485 card, [mPCIe-DIO-24S](#) Digital I/O card with Digital Integration features, or any of our [Relay](#), [FET](#), [Isolated Digital](#), [Quadrature](#), [Analog I/O](#), [Wireless](#), [LAN](#), or [other](#) mPCIe interface cards.

Refer to [Chapter 4: Configuration Settings](#) or the Windows Settings program to configure or confirm options before installation. In particular, please confirm or change the default Type 1 PCIe/104 host switch setting to Type 2, if applicable.

Please note: The 104e-mPCIe-4 does not use drivers so there is no need for the software to be installed on the same computer (or operating system) as the board. It may be more convenient to download, install, and refer to the Settings program and documentation from an available Windows desktop system.

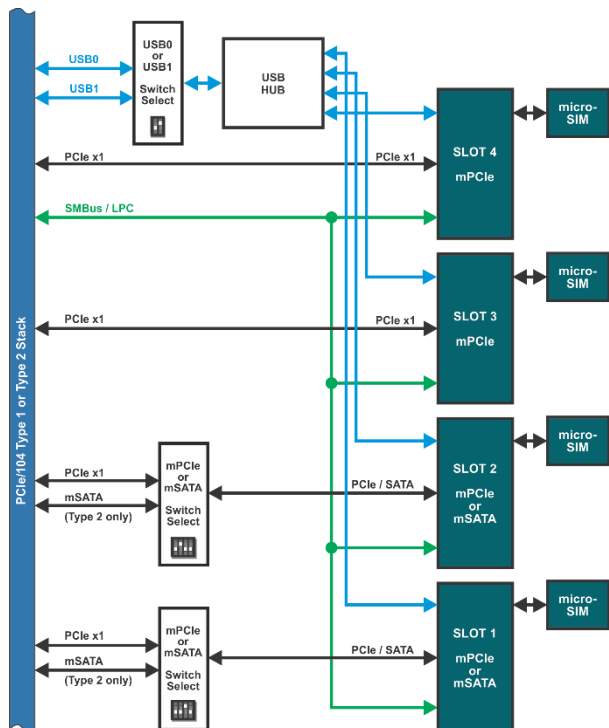
Run the installer you downloaded and follow the prompts to install the software for your device. If you're installing from the optional Software Master CD run *Install.exe* from the root of the disc. Run the Settings program from the Start Menu, or click the button in the installer after installation.

Once the board has been configured, shut down your target system and carefully install the PCIe/104 board.

Re-start your system. Your new device —and the installed PCI Express Mini Cards— should already be installed and ready for use. If there are any issues please refer to the rest of this manual for additional information or contact us for assistance.

[We're here to help.](#)

CHAPTER 2: INTRODUCTION



PCIe/104 is part of the PC/104 family of standards, and incorporates PCI Express, USB, SMBus and other data channels in the stack, not a single bus (ISA or PCI) as in previous standards. It is intended to be used in environments where a truly rugged computer system is required. PCIe/104 allows consumers to stack together boards from a variety of COTS manufacturers to produce a customized system ruggedized against the stresses of embedded environments.

Our 104e-mPCIe-4 multiplies this flexibility by converting one stack position into four mPCIe slots. This allows several storage, WAN, LAN, or other I/O expansion cards to be added to your system with four x1 PCIe lanes and **one** USB port consumed from the PCIe/104 stack.

PCI Express Mini Card (mPCIe), a low-profile small-footprint bus standard originally intended for adding peripherals to notebook computers, has become the de-facto standard for high-performance, small form-factor devices in many applications.

mPCIe peripheral cards can be implemented using any of the interfaces the standard provides, which includes PCIe, USB, and SMBus interfaces, making it a great fit for use inside PCIe/104 stacks (which also have these same interfaces).

FEATURES

- Converts **Four** PCIe x1 lanes from stack into **Four** (4x4) PCI Express Mini Card sockets
- Supports half- or full- size Mini PCIe cards, for use in a Type 1 or Type 2 PCIe/104 Stack
- All four sockets support USB, SMBUS, micro-SIM, as well as PCI Express signals
- mSATA devices supported on two sockets (Type 2)
- Powered from the PCIe/104 stack +5V rail, no 12V needed
- 2mm standoffs integrated into design for easy installation, hardware included
- RoHS and Industrial Temp (-40°C to 85°C) *STANDARD*

CHAPTER 3: HARDWARE

This manual applies to the following models:

104e-mPCIe-4	Four PCI Express Mini Card slots on a single PCIe/104 board for bottom stacking
104e-mPCIe-2	Two slot version

INCLUDED IN YOUR PACKAGE

- 1x PCIe/104 Board for use as the bottom-most position on Type 1 or Type 2 PCIe/104 stacks, converting one stack-height into four fully-flexible PCI Express Mini Card (mPCIe) slots.
- 4x mPCIe-HDW-KIT2 (4 pairs of 2mm nylon screws)

Available accessories include:

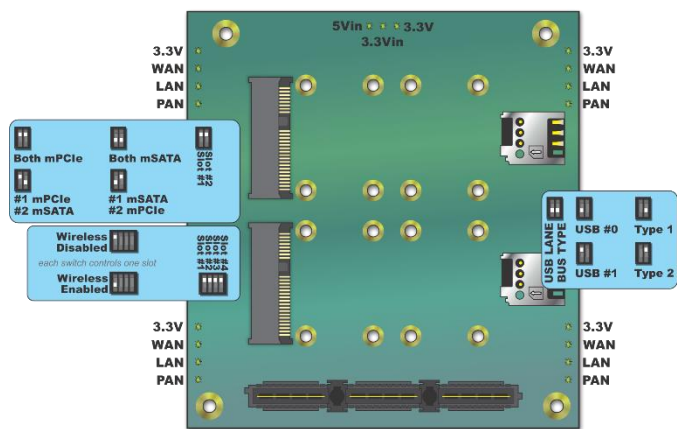
mPCIe-HDW-PEM2	Two 2mm standoffs for mounting half-length mPCIe cards and two 2mm nylon screws. One mPCIe-HDW-PEM2 kit needed per slot being converted to half-length mPCIe card use.
mPCIe-HDW-KIT2	Two 2mm nylon screws

Contact the factory for information regarding additional accessories, options, and specials that may be available to best fit your specific application requirements.

Available factory options include:

- CC Conformal Coating on board assemblies
Version intended for stacking on top of the stack (with the PCIe/104 connectors installed on the underside of the 104e-mPCIe-4 suitable for use as the topmost board in your stack)
- TOP Version compatible with the One Bank connector implementation of PCIe/104
- 1B

CHAPTER 4: CONFIGURATION SETTINGS



The 104e-mPCIe-4 modules need the following configurations:

- USB lane: USB port selected via switch
- PCIe/104 Type: Set this switch corresponding to the type of PCIe/104 stack, Type 1 or Type 2.
- Wireless Disable: Set each switch to ON to disable Wireless features for the corresponding slot. Defaults to Enabled (OFF) for all slots. Switch to ON to disable Wireless features for the corresponding slot.
- mSATA Mode: Configure these two switches to convert slot 1 and/or slot 2 for use by mSATA devices (Type 2 PCIe/104 stacks only)

CHAPTER 5: PC INTERFACE

This product interfaces with a PCIe/104 system via the PCIe/104 stacking connectors. The default configuration ships ready for installation on the bottom of the stack. See [Available Factory Options](#) for details on other stacking versions.

PCIe lanes 3 and 0 from the PCIe/104 bus are connected to mPCIe slots 3 and 4 respectively. PCIe lanes 2 and 1 are connected to mPCIe slots 1 and 2 respectively via a 2:1 mux which also connects to the PCIe/104 SATA Port 0 and SATA Port 1 -Type 2 only.

One USB2.0 port is consumed from the stack, converted to four via an integrated USB Hub, then distributed to each connector. USB Port 0 or USB Port 1 are selected via a 2:1 mux using the onboard switch.

The SMBus interface is designed as a shared multi-drop bus and is brought directly to all four mPCIe slots.

Only the +5V rail is used from the PCIe/104 stack, no +12V needed.

Three status LEDs along the top edge of the 104e-mPCIe-4 indicate the validity of 5V and 3.3V from the stack, as well as the 3.3V being delivered to the mPCIe slots. All three should light green. The 3.3Vin is purely informational as it is unused by this board.

The PCIe/104 standard shares PC/104 physical dimensions and mounting locations.

Custom hardware interfaces can be produced to fit your specific application requirement. For example, we also offer a One Bank connector option.

CHAPTER 6: I/O INTERFACE

Up to four PCI Express Mini Card (mPCIe) slots are provided.

Each slot is compatible with either full-length (F1) cards, including PEM standoff provided in the PCB, or half-length cards using the PCB's provided mounting holes and optional mounting hardware kits.

Each slot includes a Micro-SIM connector for use with cellular mPCIe peripherals.

Each slot also provides four status LEDs:

- 3.3V
- WAN Flickers to show activity
- LAN Flickers to show activity
- PAN Flickers to show activity

All slots include the complete range of mPCIe signals: a x1 PCIe lane, a USB 2.0 port and SMBus interface. Slots 1 and 2 can be configured for mSATA use (type 2 PCIe/104 CPUs only).

For best results: install your mPCIe cards *before* stacking the 104e-mPCIe-4.

CHAPTER 7: SOFTWARE INTERFACE

The PCIe/104 standard is implemented using various interface busses, each of which implements modern switching / bridging support at a fundamental level. As a result, all operating systems natively support the 104e-mPCIe-4. There is no software required. No drivers are needed.

A software package with documentation and utilities, including *Settings.exe*, a program you can reference for information about configuring options on the device, is provided. We recommend that you install the software package before installing the board, so you can refer to the Settings program before the board is integrated. This will allow you to configure the various options more conveniently than after it has been installed in your PCIe/104 stack. You can also refer to [Chapter 4: Configuration Settings](#) and skip the software package entirely.

Please note: The 104e-mPCIe-4 does not use drivers so there is no need for the software to be installed on the same computer (or operating system) as the board. It may be more convenient to download, install, and refer to the Settings program and documentation from an available Windows desktop system.

Available Downloads

The latest information can always be found on the product page on the website. Here are some useful links:

Links to useful downloads

Main site	http://aces.io
Product's page	aces.io/104e-mPCIe-4
This manual	aces.io/MANUALS/104e-mPCIe-4.pdf
PCIe/104 info	PC104.org
mPCIe info	pcsig.org

CHAPTER 8: SPECIFICATIONS

PC Interface

PCIe/104 Type 1 or Type 2

I/O Interface

PCI Express Mini Card Socket (x4) (PCIe, USB, SMBus, Micro-SIM socket)

mSATA (x2) -Type 2 only

Environmental

Temperature	Operating	-40°C to +85°C
	Storage	-40°C to +85°C
Humidity		5% to 95%, non-condensing
Power required	5VDC	60mA typical (from PCIe/104 stack) Each PCI express mini slot supports the full power spec of 3.3v @ 1.1A and 1.5v @ 0.375A.

Physical

Weight	48.5 grams	
Size	PCIe/104 Compliant (3.55" x 3.775")	
I/O connectors	PCIe/104	Samtec: ASP-129637-03 (Component side) Samtec: ASP-129646-03 (Solder side)
	OneBank	Samtec: ASP-129637-13 (Component side) Samtec: ASP-129646-22 (Solder side)
	PCI Express mini slot	JAE Elec: MM60-52B1-E1-R650
	Micro-SIM	Molex: 786463001

CHAPTER 9: CERTIFICATIONS

CE & FCC

These devices are designed to meet all applicable EM interference and emission standards. However, as they are intended for use installed on motherboards, and inside the chassis of industrial PCs, important care in the selection of PC and chassis is important to achieve compliance for the computer as a whole.

UL & TUV

No AC or DC voltages above 31V are consumed or produced during normal operation of this device. This product is therefore exempt from any related safety standards. Use it with confidence!

ROHS / LEAD-FREE STATEMENT

All models are produced in compliance with RoHS and various other lead-free initiatives.

WARNING

A SINGLE STATIC DISCHARGE CAN DAMAGE YOUR CARD AND CAUSE PREMATURE FAILURE! PLEASE FOLLOW ALL REASONABLE PRECAUTIONS TO PREVENT A STATIC DISCHARGE SUCH AS GROUNDING YOURSELF BY TOUCHING ANY GROUNDED SURFACE PRIOR TO TOUCHING THE CARD.

ALWAYS CONNECT AND DISCONNECT YOUR FIELD CABLING WITH THE COMPUTER POWER OFF. ALWAYS TURN COMPUTER POWER OFF BEFORE INSTALLING A CARD. CONNECTING AND DISCONNECTING CABLES, OR INSTALLING CARDS, INTO A SYSTEM WITH THE COMPUTER OR FIELD POWER ON MAY CAUSE DAMAGE TO THE I/O CARD AND WILL VOID ALL WARRANTIES, IMPLIED OR EXPRESSED.

WARRANTY

Prior to shipment, ACCES equipment is thoroughly inspected and tested to applicable specifications. However, should equipment failure occur, ACCES assures its customers that prompt service and support will be available. All equipment originally manufactured by ACCES which is found to be defective will be repaired or replaced subject to the following considerations:

GENERAL

Under this Warranty, liability of ACCES is limited to replacing, repairing or issuing credit (at ACCES discretion) for any products which are proved to be defective during the warranty period. In no case is ACCES liable for consequential or special damage arriving from use or misuse of our product. The customer is responsible for all charges caused by modifications or additions to ACCES equipment not approved in writing by ACCES or, if in ACCES opinion the equipment has been subjected to abnormal use. "Abnormal use" for purposes of this warranty is defined as any use to which the equipment is exposed other than that use specified or intended as evidenced by purchase or sales representation. Other than the above, no other warranty, expressed or implied, shall apply to any and all such equipment furnished or sold by ACCES.

TERMS AND CONDITIONS

If a unit is suspected of failure, contact ACCES' Customer Service department. Be prepared to give the unit model number, serial number, and a description of the failure symptom(s). We may suggest some simple tests to confirm the failure. We will assign a Return Material Authorization (RMA) number which must appear on the outer label of the return package. All units/components should be properly packed for handling and returned with freight prepaid to the ACCES designated Service Center, and will be returned to the customer's/user's site freight prepaid and invoiced.

COVERAGE

FIRST THREE YEARS: Returned unit/part will be repaired and/or replaced at ACCES option with no charge for labor or parts not excluded by warranty. Warranty commences with equipment shipment.

FOLLOWING YEARS: Throughout your equipment's lifetime, ACCES stands ready to provide on-site or in-plant service at reasonable rates similar to those of other manufacturers in the industry.

EQUIPMENT NOT MANUFACTURED BY ACCES

Equipment provided but not manufactured by ACCES is warranted and will be repaired according to the terms and conditions of the respective equipment manufacturer's warranty.

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