GIGABIT ETHERNET FOR M.2 AND MINI PCI EXPRESS HARDWARE MANUAL

MODELS **M.2-LAN-GBE AND MPCIE-LAN-GBE**



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MADE IN THE USA

Chapter 1: Quick Start

It is recommended that you install the software package before installing the card in your computer. You can install the software[1] using either a stand-alone installer downloaded from the website or an optional Software Master CD.

Run the installer you downloaded (or autorun.exe on the Software Master CD) and follow the prompts to install the software for your device.

Please note: during the installation you may be prompted regarding the installation of non-WHQL-certified drivers; please carefully confirm the digitally signed source of the drivers and accept the installation.

After the Software package has finished installing the Intel I210 driver installation program will run.

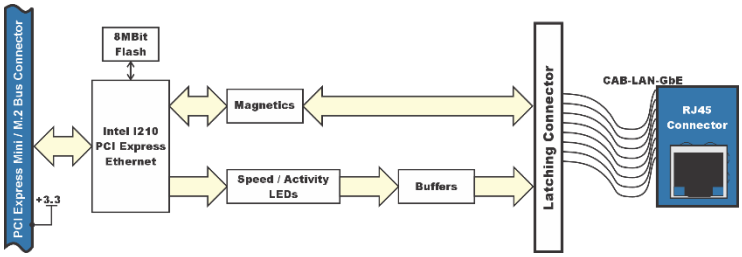
Once the software and driver has been installed, shut down your system and carefully install the card.

Caution: Do not connect an Ethernet cable at this time.

Re-start your system. Once the computer finishes booting your new Ethernet port should already be installed and ready for use; you can confirm this by launching Device Manager and looking under the "Network Adapters" section.

[1] In Linux or OSX please refer to the instructions in those directories.

Chapter 2: Introduction



M.2 and PCI Express Mini Card are low-profile, small-footprint busses standard originally intended for adding peripherals to notebook computers. They have become the de-facto standards for high-performance, small form-factor devices in many applications.

- PCI Express Mini Card (mPCIe) type F1 or M.2 B+M-key 2280/2260
- Latching I/O connectors
- Rugged design with overvoltage protection and buffering on all signals
- Onboard magnetics with built in isolation via transformer coupling
- Industrial temperature and RoHS standard
- 10/100/1000 BASE-T interface on mPCIe
- PCI Express v2.1 (2.5GT/s) interface
- Powered by +3.3V from PCI Express Connector
- Optional low-PPM XTAL to support IEEE 1488 precision timing protocol

FUNCTIONAL DESCRIPTION

The M.2-/mPCIe-LAN-GbE cards are optimized for use in mobile and rugged environments, with latching connectors and protection on all signals. The onboard magnetics feature robust built in isolation via transformer coupling. In addition, industrial temperature and RoHS compliance are standard.

The card's high speed PCI Express 2.1 controller and Intel's industry-leading I210 Ethernet chip provide an often necessary 1000Base-T (gigabit) Ethernet port while low power-consumption, small form-factor and light weight make integration into existing designs a snap. Onboard LEDs provide diagnostic and status information about power, link/activity, and data rate.

Full 10/100/1000 BASE-T compatibility — with IEEE 1488 Precision Timing Protocol support when ordered with a low-PPM XTAL (optional) — makes the M.2-/mPCIe-LAN-GbE perfect for use in any Ethernet environment, from servers to users; mobile, rack, or desktop. The 104e-mPCIe-4 can support 4 mPCIe-LAN-GbE cards in a single stack height for the most compact and robust applications using the PC/104 form factor.

An optional RJ45 positive-retention cable assembly is designed to be easily panel-mounted.

Chapter 3: Hardware

This manual applies to the following models:	
mPCIe-LAN-GbE or **M.2-LAN-GbE**	1 port 10/100/1000 Ethernet mPCIe Card

The M.2 models are M.2 B- & M-key cards in the 2280 size (22 × 80 mm) with a break-away for 2260 (22 × 60 mm). The mPCIe models are full-length "F1" mPCIe devices (30 × 50.95 mm). All units are RoHS compliant and support Industrial temperature environments (-40°C to 85°C operating and storage.)

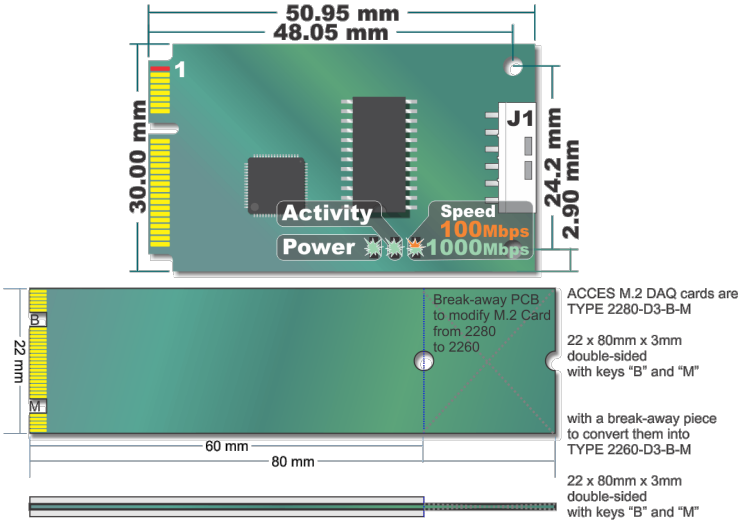
INCLUDED IN YOUR PACKAGE

1-port mPCIe or M.2 LAN card

Available accessories include:	
CAB-mPCIe-LAN	9 inch panel-mount RJ45 cable
mPCIe-HDW-KIT2	Mounting hardware for 2mm
mPCIe-HDW-KIT2.5	Mounting hardware for 2.5mm
M.2-HDW-KIT2	Mounting hardware for 2mm

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

Chapter 4: Configuration Settings



There are no configuration options to set.

Chapter 5: PC Interface

This product interfaces with a PC using either a PCI Express M.2 or PCI Express Mini Card (mPCIe) connection; a small-form-factor, high-performance, rugged peripheral interconnect technology first introduced for use in laptops and other portable computers.

The small size and powerful PCI Express performance, combined with perfect software compatibility with PCIe peripheral designs, has led to their recent adoption as go-to standards for embedded Data Acquisition and Control, and many other applications.

Although M.2 is a broadly adopted industry standard, the actual connection to the computer shares a specification with mSATA: both mSATA and M.2 use the same edge-connector. In fact, well-designed PCs can automatically detect and configure their onboard connectors to work with either M.2 or mSATA devices – and, according to the standards for M.2 and mSATA they are *supposed* to do so! However, some PC manufacturers ship computers that *only* support mSATA devices. Please confirm in your PC documentation that your edge-connector is *actually* PCI Express M.2 Card compliant before installing this, or any, M.2 card.

M.2 and mPCIe define mounting holes for securing the otherwise loose end of the card, so it is impossible for these cards to wiggle or flap themselves loose devices. Eliminating this concern for M.2 and mPCIe cards is a major reason these standards have seen rapid adoption by the Data Acquisition and Control industry.

Chapter 6: I/O Interface

The card incorporates a 12-pin right-angle latching connector suitable for rugged environments. When used with the CAB-mPCIe-LAN optional cable accessory this 12-pin embeddable connector is broken out to a standard RJ45 panel-mount connector.

On Card Pin Assignments

Function	Pin Name	Pin	Pin	Pin Name	Function
Ethernet Link/Activity	LINKACT LED	1	7	SPEED1000	1000Mbps speed ind
MDIx LANE 1 Positive	LAN1+	2	8	LAN0+	MDIx LANE 0 Positive
MDIx LANE 1 Negative	LAN1-	3	9	LAN0-	MDIx LANE 0 Negative
MDIx LANE 3 Positive	LAN3+	4	10	LAN2+	MDIx LANE 2 Positive
MDIx LANE 3 Negative	LAN3-	5	11	LAN2-	MDIx LANE 2 Negative
100Mbps speed ind	SPEED100	6	12	3.3V	+3.3V voltage rail

RJ45 Pin Assignments

Pin	Pin Name	Function
1	LAN0+	MDIx LANE 0 Positive
2	LAN0-	MDIx LANE 0 Negative
3	LAN1+	MDIx LANE 1 Positive
4	LAN2+	MDIx LANE 2 Positive
5	LAN2-	MDIx LANE 2 Negative
6	LAN1-	MDIx LANE 1 Negative
7	LAN3+	MDIx LANE 3 Positive
8	LAN3-	MDIx LANE 3 Negative

Chapter 7: Software Interface

This card provides a standard 10/100/1000 Ethernet Interface using the Intel I210 PCI Express to Ethernet Bridge chip, and operates seamlessly using your operating systems' native Ethernet utilities and driver stack. Configure and operate the Ethernet port as you would any other; refer to your operating system manual for specific information, if needed.

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

Links to useful downloads	
Main web site	https://accesio.com
Product web page	accesio.com/mPCIe-LAN-GbE accesio.com/M.2-LAN-GbE
This manual	accesio.com/MANUALS/M.2- mPCIe-LAN-GbE.pdf
Windows Software Install Package	accesio.com/files/packages/M.2-_mPCIe-LAN-GbE Install.exe
Intel I210 Driver	https://downloadcenter.intel.com/product/64399/Intel-Ethernet-Controller-I210-Series

Chapter 8: Specifications

PC Interface	
PCI Express Mini Card	Type F1 "Full Length"
M.2 PCI Express	2280/2260 B+M-key

Ethernet I/O	
Protocol	10/100/1000 Base T

Environmental		
Temperature	Operating	-40° to +85°C
	Storage	-40° to +85°C
Humidity		5% to 95%, non-condensing

Power required	+3.3VDC @ 176mA (1000Mbps) +3.3VDC @ 109mA (100Mbps) +3.3VDC @ 86mA (idle, no link)

Physical		
Size, M.2		2280 with breakaway for 2260
	Length	80 mm or 60 mm
	Width	22 mm
Weight, M.2		4.6 grams
Size, mPCIe		Type F1 "Full Length"
	Length	50.95mm (2.006")
	Width	30.00mm (1.181")
Weight, mPCIe		5.4 grams

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 DC voltages above 5V, and no AC voltages of any kind, 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.

DISCLAIMER

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PCI EXPRESS MINI CARD STANDARD NOTICE

The mPCI-LAN-GbE is fully compliant with PCI Express Mini Card v1.2.