Multi-Port Serial for M.2 and Mini PCI Express Hardware Manual

Models	M.2-COM-4SM, M.2-COM-4S, M.2-COM232-4 M.2-COM-2SM, M.2-COM-2S, M.2-COM232-2 mPCIe-COM-4SM, mPCIe-COM-4S, mPCIe-COM232-4 mPCIe-COM-2SM, mPCIe-COM-2S, mPCIe-COM232-2

ACCES I/O Products, Inc.
10623 Roselle Street
San Diego CA 92121-1506 USA

858 550 9559
800 326 1649
sales@accesio.com

accesio.com/mPCIe-COM-4SM
accesio.com/M.2-COM-4SM
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.

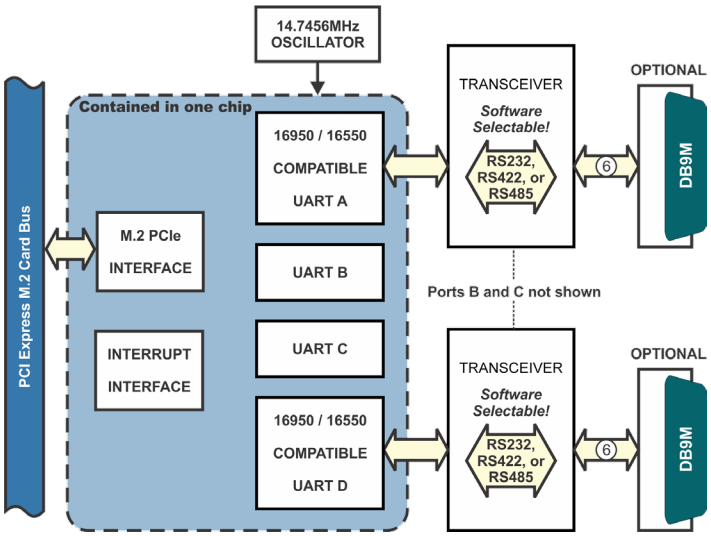
Please note: During the installation you may be prompted regarding the installation of non-WHQL-certified drivers; please carefully confirm the digitally signed source of the drivers and accept the installation.

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

Re-start your system. Once the computer finishes booting your new serial ports should already be installed and ready for use; you can confirm this by launching Device Manager and looking under the "Ports" section. If, for any reason, the card or its ports displays a warning triangle, right-click and select "Update Driver".

[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.

- 2- or 4- port multi-protocol serial interface
- Up to 3 Mbps / 921.6kbps, 9-bit mode[1], CTS and RTS – up to 10Mbps with factory option
- RoHS and Industrial temperature standard

The M.2-/mPCIe-COM-4SM family of cards feature high performance 16C950-class UARTs. Each port is capable of communication speeds up to 921.6kbps in RS232 mode, 3Mbps in differential modes (10Mbps factory option available), and has 128-byte deep transmit and receive FIFOs which protect against data loss in multitasking operating systems, reduce CPU utilization, and improve data throughput. [1]: Windows driver only.

The advanced integrated circuit supports a wide variety of custom baud rates, and any rates not otherwise achievable can be supported via a factory-installed custom crystal oscillator.

The RS232 ports provided by the card are 100% compatible with every other industry-standard serial COM device, supporting TX, RX, RTS, and CTS.

Communication is possible either with custom application software, with off-the-shelf applications (such as HyperTerminal), or with provided samples and utilities, including WinRISC™ ("Windows Really Incredibly Simple Communication").

Each serial port can be individually configured for any supported protocol (any combination of RS232, RS422, RS485-2Wire, and RS485-4Wire, depending on the specific model) and the configuration is stored in onboard EEPROM for future use.

The serial ports on the device are each accessed using a low-profile latching 6-pin Hirose connector. Optional breakout cable kits are available, and bring each port connection to a panel-mountable DB9-M.

Chapter 3: Hardware

This manual applies to the following models:	
M.2-/mPCIe-COM-4SM	4-port, RS-232, -422, and -485
M.2-/mPCIe-COM-2SM	2-port, RS-232, -422, and -485
M.2-/mPCIe-COM-4S	4-port, RS-422, and -485
M.2-/mPCIe-COM-2S	2-port, RS-422, and -485
M.2-/mPCIe-COM232-4	4-port RS-232
M.2-/mPCIe-COM232-2	2-port RS-232

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, -65°C to 150°C storage.)

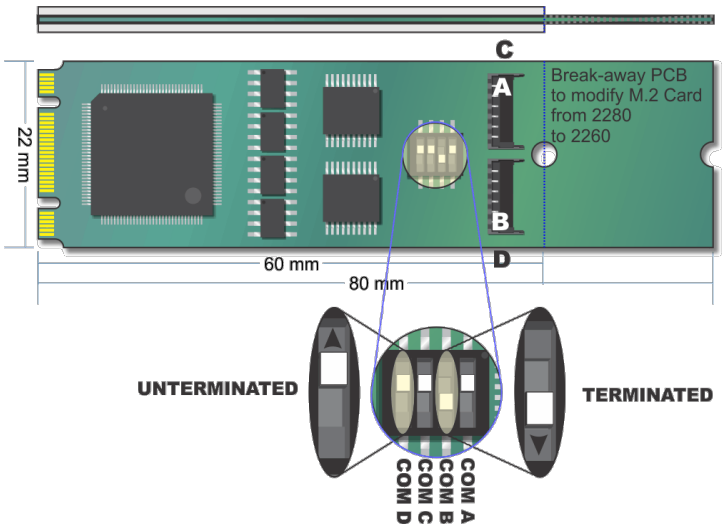
INCLUDED IN YOUR PACKAGE

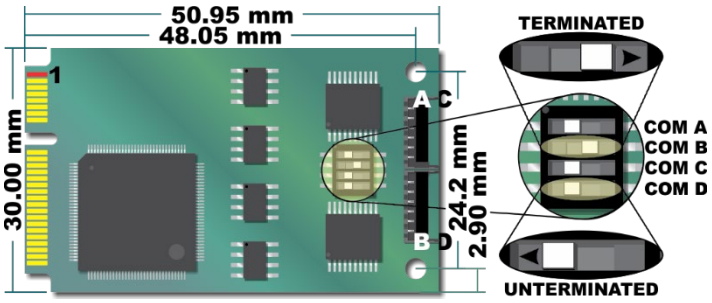
Four- or two-port M.2- or mPCIe-COM card

Available accessories include:	
CAB-M.2-COM4	Four port DB-9 cable accessory kit
CAB-M.2-COM2	Two port DB-9 cable accessory kit
ADAP9	DB-9 Screw Terminal Accessory
mPCIe Accessories	
mPCIe-HDW-KIT2	Mounting hardware for 2mm
mPCIe-HDW-KIT2.5	Mounting hardware for 2.5mm
M.2 Accessories	
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





Configuring a port's Termination switch in the Terminated position applies a 120Ω load in series with a 0.01µF capacitor across the Rx+/Rx- pair in RS422 mode, or across TRx+/TRx- in RS485 mode.

Do not configure RS232 ports for Termination.

Important: It is necessary to disable "hardware handshaking" in your communication program when operating in RS485 or RS422 mode.

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.

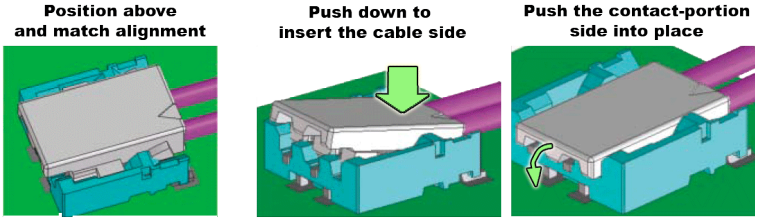
Chapter 6: I/O Interface

Hirose 6-pin	232	422	485
1	GND	GND	GND
2	Tx	Rx+	Rx/Tx+
3	Rx	Tx+	
4	RTS	Rx-	Rx/Tx-
5	CTS		
6		Tx-	

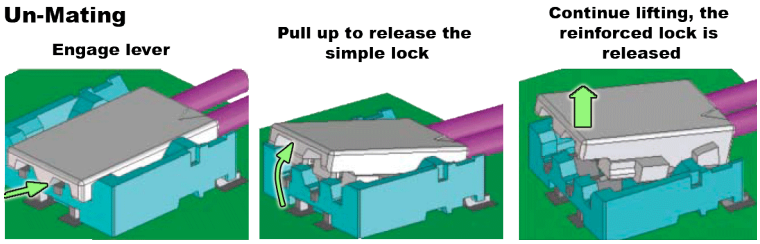
This card provides one 6-pin latching Hirose DF57 connector per port. The mating connector is the Hirose DF57H-6S-1.2C.

The DF57 connector is a low-profile latching device. To operate it correctly, please note: the front of the cable connector clicks down, into a locked position, *after* the rear has been mated by pushing it into the socket. To disconnect, pop the front of the cable connector upwards to disengage the latch before moving the connector away from the card.

Mating



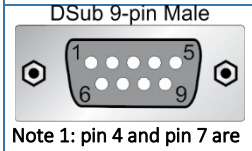
Un-Mating



Signal Definitions	
Signal	Meanings
	no connect
RX	Receive Data
TX	Transmit Data
GND	Signal Ground
RTS	Request To Send
CTS	Clear To Send
Tx-	Diff. full-duplex TX -
Tx+	Diff. full-duplex TX+
Rx+	Diff. full-duplex Rx+
Rx-	Diff. full-duplex Rx-
Rx/Tx+	Diff. half-duplex +
Rx/Tx-	Diff. half-duplex -
Rx- RTS	Pin 4 and pin 7 are connected, so these signals are duplicates to be ignored.

DB-9 Male Pin	232	422	485
1		Tx-	
2	RX	Tx+	
3	TX	Rx+	Rx/Tx+
4	*RTS[1]*	Rx-	Rx/Tx-
5	GND	GND	GND
6			
7	RTS	*Rx-[1]*	
8	CTS		
9			

DSub 9-pin Male



Note 1: pin 4 and pin 7 are connected.

Order the CAB-M.2-COM2 or –COM4 cable kit accessory to cable the DF57 connectors to industry standard DB9 Male connectors. Alternately, custom hardware interfaces can be produced to fit your specific application requirement.

Chapter 7: Software Interface

Although the UARTs provided by this card are fully 16550/16950 compatible, the advanced features are best enabled by using the provided software drivers for Windows.

The card installs ports into the OS as standard serial COM devices. Therefore, in each OS or programming environment, standard COM APIs are used to communicate. For example, in the .NET Common Language Runtime use methods provided by the System.IO.Ports namespace. Other operating systems have similar, OS-specific, standard methods of communication with RS232 devices.

Various sample programs are provided to demonstrate application programming of the serial ports, in a variety of popular programming languages.

WinRISC is a serial port utility provided with this card. It is very useful when working with any serial device: it provides a very simple, very easy, interface.

Note for old Linux kernels: This device uses a baud rate clock eight times faster than the default for most COM devices. To configure the TTYs for normal baud use add "`baud_base 921600`*" to the parameters in your call to* `setserial`.

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/M.2-COM-4SM accesio.com/mPCIe-COM-4SM
This manual	accesio.com/MANUALS/M.2-_mPCIe-COM-4SM.pdf
Windows Software Install Package	accesio.com/files/packages/M.2-_mPCIe-COM-4SM Install.exe

Chapter 8: Specifications

PC Interface

M.2 PCI Express	2280/2260 B+M-key
mPCIe (PCI Express Mini Card)	Type F1 "Full Length"

Communications Interface

I/O connector		Hirose DF57-6P-1.2V 6-pin latching
I/O Mating connector		Hirose DF57H-6S-1.2C
Serial Ports		4 (or 2)
	-4SM (-2SM)	RS-422, RS-485, and RS-232
	-4S (-2S)	RS-422 and RS-485
	232-4 (232-2)	RS-232 only
		software selected per port serial protocol, stored in EEPROM for later use.
UART		Quad 16C950
	FIFO	128-byte transmit & receive
Baud Rates		up to 921.6k baud in RS-232 up to 3MBaud in differential modes. An advanced-prescaler allows a wide variety of unusual baud rates to be achieved, and up to 10Mbps can be achieved with a factory option.
Character length		5, 6, 7, 8 bits (contact factory for assistance with 9-bit data)
Parity		Even, Odd, None, Mark, Space
Stop Interval		1, 1½, 2 bits
Flow Control		
	RS-232	RTS/CTS, Xon/Xoff, None
	RS-422, RS-485	Xon / Xoff, None

Environmental

Temperature		
	Operating	-40° to 85°C
	Storage	-65° to 150°C
Humidity		5% to 95%, non-condensing
Power required		+3.3 VDC @ 500mA (typical)
ESD Protection		±15kV on all signal pins (IEC 61000)

Physical

Size, M.2		2280 with breakaway for 2260
	Length	80 mm or 60 mm
	Width	22 mm
Weight, M.2		6.4 grams
Size, mPCIe		Type F1 "Full Length"
	Length	50.95mm (2.006")
	Width	30.00mm (1.181")
Weight, mPCIe		6.4 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

The information in this document is provided for reference only. ACCES does not assume any liability arising out of the application or use of the information or products described herein. This document may contain or reference information and products protected by copyrights or patents and does not convey any license under the patent rights of ACCES, nor the rights of others.

PCI EXPRESS MINI CARD STANDARD NOTICE AND EXCEPTION

The mPCI-COM-4SM family of devices are fully compliant with PCI Express Mini Card v1.2.