SUNIX

Quick Installation Guide

RS-422/485 ◀ ▶ PC

For the Latest Driver & Manual Downloads:
Visit https://www.sunix.com and search keyword "**DevicePort**" or "**DPAS**" for detail manual and driver update.

M.2 PCI Express RS-422/485 Communication Board

Introduction
RS-422/485 industrial I/O series, a line of PCI Express Multi-Port Serial Communication Board, is designed to meet PCI Express Base Specification Ver. 2.0. It can be installed in virtually any available PC system and compatible with all major operating systems. Users do not need to manually set jumpers to configure I/O addresses and IRQ locations.
This board offers independent RS-422 and RS-485 ports for connecting kinds of serial terminals on the PC based systems. This board is industrial stand which offers a reliable and high performance solution for serial multi-port communications.

Package
Please check if the following items are present and in good condition upon opening your package. Contact your vendor if any item is damaged or missing.

1. Hardware:
   1). Serial Communication Board:
   M.2 PCI Express RS-422/485 Multi-Port Communication Board x1pcs
   * IPC-M2204S – M.2 4-port RS-422/485 Type2280 with 180°wafer
   * IPC-M2204SR– M.2 4-port RS-422/485 Type2280 with 90°wafer
   * IPC-M2204S – M.2 2-port RS-422/485 Type2280 with 180° wafer
   * IPC-M2204SR– M.2 2-port RS-422/485 Type2280 with 90°wafer
   2). D-Sub 9 pin male with nuts Cable. (Product Dependent)
   * 4 ports series: D-Sub 9 pin male with nuts Cable, 30cm ×4pcs
   * 2 ports series: D-Sub 9 pin male with nuts Cable, 30cm ×2pcs
2. Quick installation guide (This document)
3. CD Driver
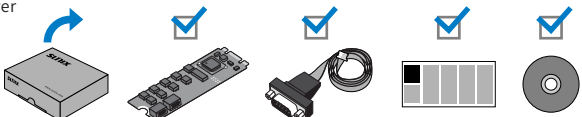
Features
- Expands Multi RS-422/485 serial ports on the system.
- Suitable for M.2 slot with Key-M or B based over PCI-E communication.
- Designed to meet PCI Express Base Specification Revision 2.0.
- High performance SUNIX 16C950 compatible UART controller on-board.
- On-chip hardware auto flow control to guarantee no data loss.
- RS-422 & 485 auto detect and switching technology by software settings.
- Optional 120ohms terminator for each RS-485 port by jumper settings.
- AHDC/CS™ technology for collision free communication.
- RS-422/485 serial data transmission speeds up to 921.6Kbps.
- 15KV ESD protection for all serial signals meets IEC-61000-4-2 std.
- 2KV surge protection for all serial signals meets IEC-61000-4-5 level3 std.
- Ultra low power consumption design for Green Environment.
- Plug-n-Play, I/O address and IRQ assigned by BIOS.
- Certified by CE, FCC, RoHS, and Microsoft WHQL approval.
- Support Microsoft Windows, Linux, and DOS.

Note: SUNIX M.2 RS-422/485 Card with **Surge** protection is available with each models which include TVSS (Transient Voltage Surge Suppressor) technology to help prevent damage due to lightning or high potential voltage. It meets IEC-61000-4-5 Level 3 standard, 2KV surge protection for all RS-422 and RS-485 serial signals.

1

Specification

Serial Communication

Interface	RS-422/485	Baud rate	50bps ~ 921.6Kbps
Controller	SUNIX SUN2412 (16C950 UART Compatible)	BUS	PCI Express 2.0 x 1 (single lane) M.2 59-pin 2280 Type Key B+M Male
No. of Port	2 & 4-port (Product Dependent)	Stop bit	1, 1.5, 2
IRQ & IO	Assigned by System	Parity	even, odd, none, mark, space
Flow Control	None, Xon/Xoff, RTS/CTS	FIFO	128byte Hardware
Signal	RS-422: Tx D+, Tx D-, Rx D+, Rx D-, GND 4-wire RS-485: Tx D+, Tx D-, Rx D+, Rx D-, GND 2-wire RS-485: Data+, Data-, GND		
ESD Protection	±15KV ESD protection for each signal Human Body Model (HBM) ±15KV IEC1000-4-2 Air Gap Discharge ±8KV IEC1000-4-2 Contact Discharge ±4KV ESD IEC61000-4-2 Level 2 Line-to-Line		
Surge Protection	2KV Surge IEC61000-4-5 Level 3 Surge Immunity Test		
PCB Connector	Wafer 2x5P pitch 1.0mm (180° or 90°)		
Cable	D-Sub- 9 pin male with nuts 30cm		

Driver Support

Windows Client	XP / Vista / 7 / 8.x / 10 (X86/X64)
Windows Server	2003 / 2008 (x86/x64), 2008R2 / 2012 / 2012R2 / 2016 (x64)
Microsoft Embedded	XP Embedded / POS Ready / Embedded System
Linux	Linux 2.x / 3.x / 4.x
DOS	DOS

Regulatory Approvals

Hardware	EN55032 Class B, EN55035, EN61000-3-2, EN61000-3-3, FCC Part 15 Class B, BSMI: CNS13438, C-Tick: CISPR22 AS/NZS, RoHS
Software	Microsoft WHQL Windows Microsoft Client: XP / Vista / 7 / 8.x / 10 (X86/X64) Microsoft Server: 2003 / 2008 / 2012 / 2016 (X64)

Environment

Operation Temperature	0 to 60°C (32 to 140°F)
Operation Humidity	5 to 95% RH
Storage Temperature	-20 to 85°C (-4 to 185°F)

Pin Assignment
Pin assignments for SUNIX M.2 PCI Express RS-422/485 Multi-Port Communication Board & optional accessories.

DB25M   DB9M   Pin Header (Pitch 2.0mm)

	PIN	DB9M	DB25M	Pin Header
RS-422 or 4-Wire RS-485	Tx+	2	3	3
	Tx-	1	8	1
	Rx+	3	2	5
	Rx-	4	20	7
	GND	5	7	9
2-Wire RS-485	Data+	2	3	3
	Data-	1	8	1
	GND	5	7	9

2

Hardware Installation
The hardware installation of M.2 PCI Express serial boards is simple. Before inserting the card into the M.2 slot, please follow the detailed steps given below to install the PCI Express serial board into your computer.

Step 1: Remove the screw attached to the motherboard.
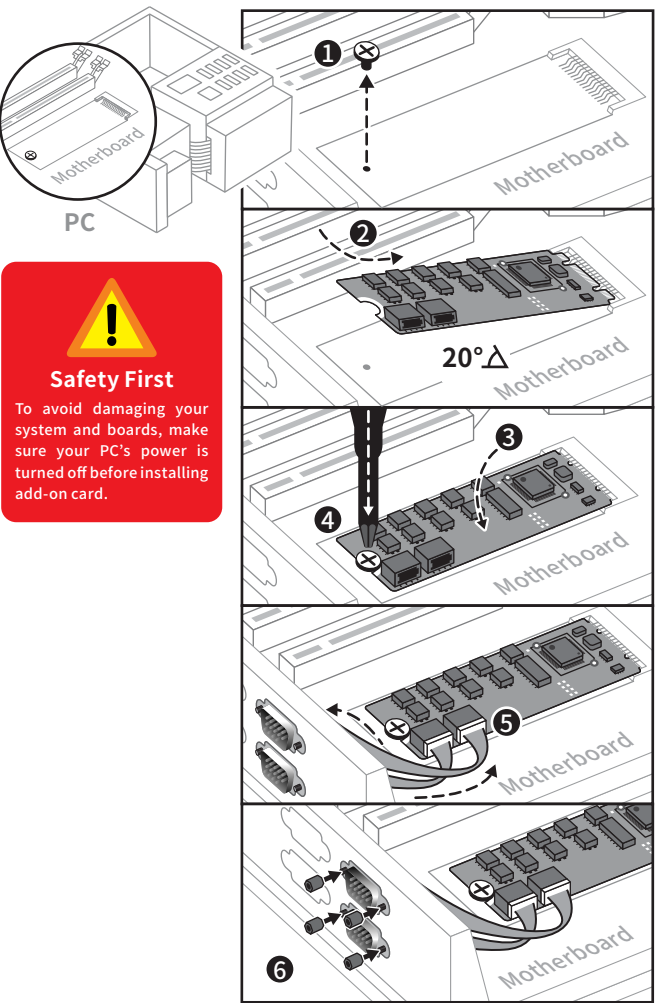**Step 2:** Insert M.2 Card tightly into the M.2 slot with 20° angle.
   (SUNIX M.2 Card supports Key-M and Key-B slot)
Step 3: Push the M.2 card down to the screw hole.
Step 4: Lock screw on M.2 card that you remove from motherboard in step1.
**Step 5:** Connect D-Sub- cable with the M.2 card header one by one.
Step 6: Secure the other end of the D-Sub cable to the PC chassis by locking the hex screw.

PC

Safety First
To avoid damaging your system and boards, make sure your PC's power is turned off before installing add-on card.
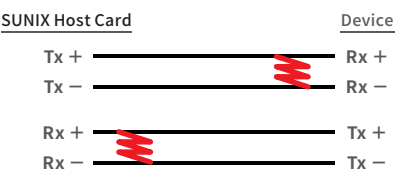
20°

3

Jumper Settings
For RS-422/485 serial communications, when an electrical signal travels through two different resistance junctions in a transmission line, the impedance mismatch will sometimes cause signal reflection. Signal reflection causes signal distortion, which in turn will contribute communication errors. The solution to this problem is to establish the same impedance at the end of the lines by terminating them with resistors.

Ideally, the two ends of the cable will have a termination resistor connected across the two wires. Without termination resistors, reflections of fast driver edges can cause multiple data edges that can cause data corruption. Termination resistors also reduce electrical noise sensitivity due to the lower impedance, and bias resistors (120 ohms for twisted pairs) are required. The value of each termination resistor should be equal to the cable impedance.

ON 1 2 3 4 5 6 7 8
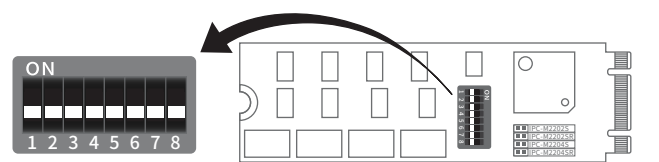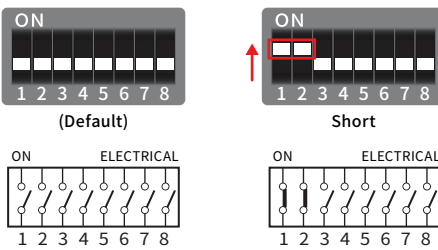
RS-422 or 4-Wire RS-485 working model with termination resistor:

SUNIX Host Card		Device
Tx +		Rx +
Tx −		Rx −
Rx +		Tx +
Rx −		Tx −

2-Wire RS-485 working model with termination resistor:

SUNIX Host Card		Device
D + (Tx +)		D +
D − (Tx −)		D −

SUNIX M.2 PCI Express RS-422/485 Serial board equips independent TX and RX termination resistors for each serial COM port. User can modify the dip switch setting to avoid impedance mismatched problem when operate under Multi-drop transmission. Resistors should be added near the receiving side.
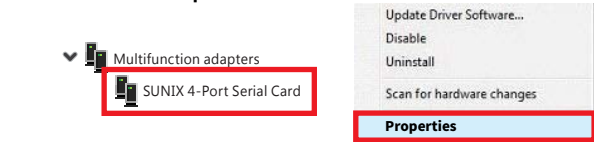**Note:** Termination resistor near the receiving side.

ON 1 2 3 4 5 6 7 8 (Default)   ON 1 2 3 4 5 6 7 8 Short

ON ELECTRICAL 1 2 3 4 5 6 7 8   ON ELECTRICAL 1 2 3 4 5 6 7 8

Manufacturer default jumper setting is OPEN (disable 120ohms termination resistors across the two wires)

4

Termination Resistor Setting Table
Please refer to the following table to enable or disable 120ohms termination resistor for each COM (RS-422/485) port. Each COM port is controlled by a pair of DIP Switch.

4-port RS-422/485 model:

Mode	Function	DIP Switch Settings
1.	Manufacturer default (Disable termination resistor)	ON 1 2 3 4 5 6 7 8
2.	COM1 enables 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8
3.	COM2 enables 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8
4.	COM3 enables 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8
5.	COM4 enables 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8
6.	COM1&2&3&4 enable 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8

2-port RS-422/485 model:

Mode	Function	DIP Switch Settings
1.	Manufacturer default (Disable termination resistor)	ON 1 2 3 4 5 6 7 8
2.	COM1 enables 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8
3.	COM2 enables 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8
4.	COM1&2 enable 120 ohms termination resistor	ON 1 2 3 4 5 6 7 8

5

Driver Installation
In order to ensure proper operation of your RS-232 PCI Express serial board, the driver will be in the CD bound with your product. You can specify the location(folder):

CD Drive (F:) SUNIX_IO_V4.0
Always do this for software and games:
Install or run program
Run autorun.exe
Publisher not specified
General options
Open folder to view files using Windows Explorer
Set AutoPlay defaults in Control Panel

● Driver   ● Tools

Driver - PCI Express

Please select the O.S. you are using, and system will process the driver installation step automatically. * You can find the detail of the installation steps in the user manual.

Hardware Verify
Please launch the "**Device Manager**" to verify proper installation.
(1) Click on the "**Programs and Features**" tab in the Windows Control Panel.
   Start > Control Panel > Device Manager
* The number of COM ports will depend on what products you bought.

Device Manager

(2) In the Device Manager window, you should see this board under **Multifunction adapters** (4-port RS-422/485 Serial Card in this example).
   You should also see SUNIX COM port under **Ports (COM & LPT)**.

Ports (COM & LPT)
Multifunction adapters
SUNIX 4-Port Serial Card
SUNIX COM Port (COM10)
SUNIX COM Port (COM7)
SUNIX COM Port (COM8)
SUNIX COM Port (COM9)

6

Configure Serial Port Settings
After the board and serial port drivers are installed, please refer to following instructions to configure Serial COM settings.
1. Please launch the "**Device Manager**".
2. Right click the "**SUNIX Serial Card**" item from the "**Multifunction adapters**" sub-tree and click "**Properties**".

Multifunction adapters
SUNIX 4-Port Serial Card
Update Driver Software...
Disable
Uninstall
Scan for hardware changes
Properties

3. On the "**Port Control**" tab, select a port to configure.
   * Click "**OK**" to approve the settings for the selected port.
   * Click "**Set to All**" to approve the settings for all COM ports.

SUNIX 4-Port Serial Card Properties
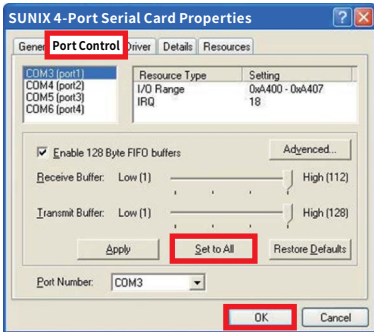
COM Port Number Settings
Under Port Number, select a COM number to assign to the serial port. Click "**OK**" to approve the settings for the selected port.
Note: In order to prevent system resource conflict, do not select "**in use**" port.

COM Port Number: COM3
COM9 (in use)
COM10 (in use)
COM11
COM12
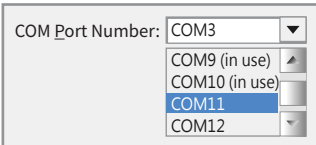
COM I/O Resource
User can read the COM "**IO Range**" and "**IRQ**" located in system by selecting COM port.
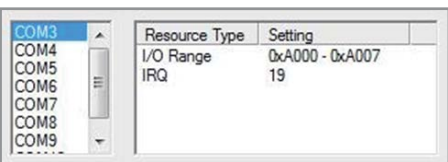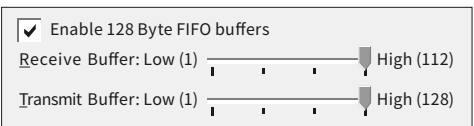
IRQ and I/O address is automatically assigned by the mainboard PCI (PCI Express) BIOS automatically (before COM card driver installing). User can NOT assign legacy ISA address (3F8, 3E8, 2F8, 2E8) for the specific COM port. But for IRQ setting, user can set specific IRQ value for this PCI Express bus slot via mainboard's BIOS settings (not via SUNIX driver). But all COM ports will share one IRQ value.

7

FIFO Settings
Select an Rx FIFO Trigger and Tx FIFO Size.
The default Rx FIFO Trigger is 112 bytes. The default Tx FIFO Size is 128 bytes. Click "**Set to All**" to change this setting for all serial ports on the board.
Then click "**OK**" to save the settings.

☑ Enable 128 Byte FIFO buffers
Receive Buffer: Low (1) ——— High (112)
Transmit Buffer: Low (1) ——— High (128)

Receive FIFO interrupt trigger level:
When the level of data in the receiver FIFO reaches this value, a receiver data interrupt is triggered.
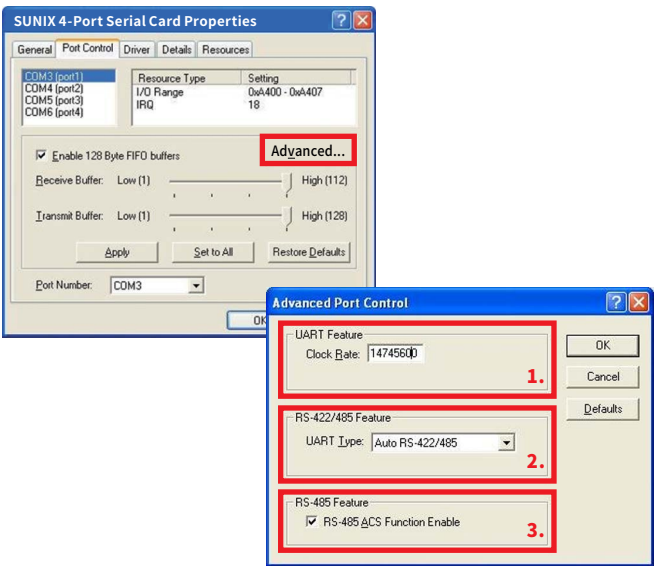
Transmit FIFO interrupt trigger level:
When the level of data in the transmit FIFO falls below this value, a transmitter interrupt is triggered. Setting this value to zero will not trigger an interrupt until the transmitter is completely idle.

The FIFO trigger levels can be fine tuned to gain optimum performance, depending on system performance, baud rate used, levels of serial traffic etc.

Advanced Settings for RS-422/485 Communication
User can control RS-422/485 communication in Advanced Port Control page through "**Advanced**" settings.

SUNIX 4-Port Serial Card Properties

Advanced Port Control
UART Feature
Clock Rate: 14745600   1.
RS-422/485 Feature
UART Type: Auto RS-422/485   2.
RS-485 Feature
☑ RS-485 ACS Function Enable   3.

8

Troubleshooting
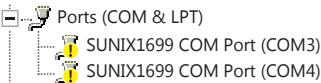Q 1. System fails to find the PCI Express serial board or COM port.
Ans: It may cause by following issue:
   a. The board is not properly plugged into the PCI Express slot.
   b. Please clean the golden finger.
   c. The PCI Express slot is defective. Please try other slots until you find one that works.
   d. The mainboard does not have an available IRQ for the PCI Express serial board. Enter the PC.s BIOS and make sure an IRQ setting is available in the PCI/PnP settings.
   e. The board itself might be defective. You can try another mainboard testing this board working or not.

Q 2. There is a blue screen when I entry operation system.
Ans: The possible reason is an IRQ or I/O address conflict with other PCI Express or PCI bus adapters, such as LAN or serial boards, or with the system BIOS. Refer to the corresponding problem in the previous FAQ for solutions.

Q 3. There are some exclamation marks in device manager and serial ports can not work properly.
Ports (COM & LPT)
SUNIX1699 COM Port (COM3)
SUNIX1699 COM Port (COM4)
Ans: It caused by the wrong driver installing or hardware settings. Please turn off your computer completely and re-install hardware and software, especially re-install the correct driver.

Q 4. Should I enable auto flow control features?
Ans: Enable Auto CTS/RTS Flow Control means the CTS/RTS flow control is controlled by hardware automatically. System will be more stable if the function is enabled. Please make sure your serial device and cable wiring before enabling the hardware flow control function.

Q 5. How large FIFO length I should set?
Ans: FIFO (First-In-First-Out) buffers are used to reduce the frequency of interrupt processes for UART chips. The size of the buffer will determine the number of times the cards need to interrupt the computer's CPU in order to process a string of data. With larger FIFO buffer size; there is more data flow and less interruption to the CPU, therefore allowing the CPU to be free to handle other more crucial tasks.
   Set the Receive/Transmit Buffer to higher value will get faster performance because the interrupts will be reduced, but the time for interrupt service routine will become shorter. The receive buffer overflow will be easily happened if the CPU speed is not enough to handle. If the system is not stable, select the lower value to correct problems.

☑ Enable 128 Byte FIFO buffers
Receive Buffer: Low (1) ——— High (112)
Transmit Buffer: Low (1) ——— High (128)

9