PCI Express RS-422/485 Board

Quick Installation Guide

Please visit SUNIX website http://www.sunix.com
for latest manual and driver update. Ver.3

Introduction

RS-422/485 Golden I/O series, a line of PCI Express Multi-Port Serial Communication Board, is designed to meet PCI Express Base Specification Ver2.0. 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 Checklist

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. Card - PCIe RS-422/485 Multi-Port Communication Board x 1
   Cable - (Product Dependent)
   *4 ports series: DB44M to 4 ports DB9 Male x 1
   *8 ports series: DB44M to 8 ports DB9 Male x 1
2. Driver CD
3. Quick Installation Guide (This document)
4. Termination Resistor Jumper

Please go to SUNIX website http://www.sunix.com to get latest driver, firmware, user's manual, and product information update.

Features

- Expands Multi RS-422/485 serial ports on the system.
- High performance SUNIX 16C950 compatible UART controller on-board.
- Ultra low power consumption design for Green Environment.
- Designed to meet PCI Express Base Specification Revision 2.0.
- Supports x1, x2, x4, x8, x16 (lane) PCI Express Bus connector keys.
- Data transmission speeds up to 921.6Kbps.
- On-chip hardware auto flow control to guarantee no data loss.
- RS-422 and RS-485 auto detect and switching technology.
- AHDC/CS™ technology for collision free communication.
- 15KV ESD protection for all serial signals meets IEC-61000-4-2 standard.
- 2KV surge protection for all serial signals meets IEC-61000-4-5 Level 3 standard.
- 1.5KV isolated protection for all signal and power meets IEC-60747-5-5 standard. (**SI** Version Only)
- 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 RS-422/485 Card with **Surge** and **Isolation** (**SI** Version) is available with certain models which include TVSS (Transient Voltage Surge Suppressor) technology to help prevent damage due to lightning or high potential voltage. Optical isolation (2000V) and embedded protection (max. ESD of 16 KV, max. EFT of 2 KV). These features help provide protection in critical or harsh factory-type environments.

Specification

Serial Communication

Interface	RS-422/485	Stop bit	1, 1.5, 2
Controller	SUNIX SUN2412 (16C950 UART Compatible)	No. of Port	2 / 4 / 8-port (Product Dependent)
PCB Connector	DB9 / 25 Male	Baud Rate	50bps ~921.6Kpbs
Parity	even, odd, none, mark, space	Flow Control	None, Xon/Xoff, RTS/CTS
IRQ & IO	Assigned by System	FIFO	128byte Hardware
BUS	PCI Express one lane (x1)		
Signal	RS-422: TxD+, TxD-, RxD+, RxD-, GND 4-wire RS-485: TxD+, TxD-, RxD+, RxD-, 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		
Isolation Protection	1.5 KV Isolation IEC60747-5-5 Hi-Pot (**SI** Version Only)		

Driver Support

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

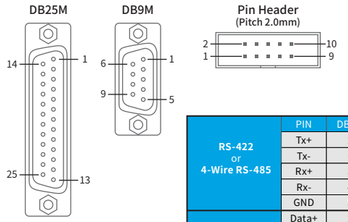
Regulatory Approvals

Hardware	EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, FCC Part 15 Class B, 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)

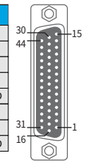
Pin Assignment



	PIN	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

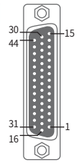
SUNIX 4 ports **DB44 Female** Pin Assignment

	Signal \ Port	1	2	3	4
RS-422 or 4-Wire RS-485	Tx+	32	36	40	44
	Tx-	17	22	26	30
	Rx+	3	7	11	15
	Rx-	1	5	9	13
	GND	GND	GND	GND	GND
2-Wire RS-485	Data+	32	36	40	44
	Data-	17	22	26	30
	GND	GND	GND	GND	GND



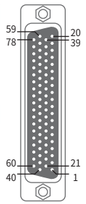
SUNIX 8 ports **DB44 Female** Pin Assignment

	Signal \ Port	1	2	3	4	5	6	7	8
RS-422 or 4-Wire RS-485	Tx+	32	2	36	6	40	10	44	14
	Tx-	17	18	22	34	26	38	30	42
	Rx+	3	31	7	35	11	39	15	43
	Rx-	1	16	5	20	9	24	13	28
	GND	GND	GND	GND	GND	GND	GND	GND	GND
2-Wire RS-485	Data+	32	2	36	6	40	10	44	14
	Data-	17	18	22	34	26	38	30	42
	GND	GND	GND	GND	GND	GND	GND	GND	GND



SUNIX 16 ports **DB78 Female** Pin Assignment

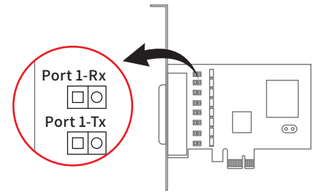
	Signal \ Port	1	2	3	4	5	6	7	8
RS-422 or 4-Wire RS-485	Tx+	60	21	43	4	65	26	48	9
	Tx-	40	1	62	23	45	6	67	28
	Rx+	61	22	44	5	66	27	49	10
	Rx-	41	2	63	24	46	7	68	29
	GND	GND	GND	GND	GND	GND	GND	GND	GND
	Signal \ Port	9	10	11	12	13	14	15	16
	Tx+	70	31	53	14	75	36	58	19
	Tx-	50	11	72	33	55	16	77	38
	Rx+	71	32	54	15	76	37	59	20
	Rx-	51	12	73	34	56	17	78	39
	GND	GND	GND	GND	GND	GND	GND	GND	GND
2-Wire RS-485	Signal \ Port	1	2	3	4	5	6	7	8
	Data+	60	21	43	4	65	26	48	9
	Data-	40	1	62	23	45	6	67	28
	GND	GND	GND	GND	GND	GND	GND	GND	GND
	Signal \ Port	9	10	11	12	13	14	15	16
	Data+	70	31	53	14	75	36	58	19
	Data-	50	11	72	33	55	16	77	38
	GND	GND	GND	GND	GND	GND	GND	GND	GND



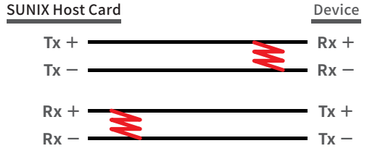
Jumper Settings

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 line ends as in the line itself 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.



RS-422 or 4-Wire RS-485 working model with termination resistor:



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

SUNIX RS-422/485 PCI Express Serial board equips independent TX and RX termination resistors for each serial port. User can modify the jumper setting (short the pins) to avoid impedance mismatched problem when operate under Multi-drop transmission. Resistors should be added near the receiving side. Note: Stands for termination resistor near the receiving side.

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

Hardware Installation

The hardware installation of PCI Express serial boards is easy to carry out. Before inserting the card into the PCIe bus, please follow the detailed steps given below to install the PCI Express serial board in your computer.

SAFETY FIRST

To avoid damaging to the computer, make sure to remove any power connection before card installation.

Step 1: Turn your PC's power off, and shut off the power to any peripheral.

Step 2: Remove the power plug from the plug socket.

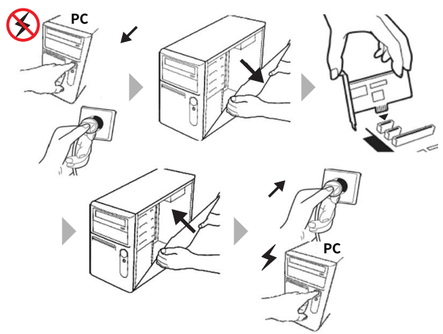
Step 3: Remove the cover from the computer case.

Step 4: If fitted. Remove the metal cover plate on the rear of a free PCIe slot.

Step 5: Insert Universal PCIe Multi-Port Communication Board into the free PCIe slot and screw it firmly on the bracket side.

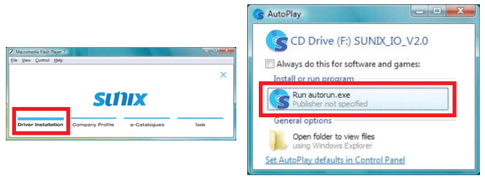
Step 6: Place the cover back onto the computer.

Step 7: Insert the plug into the plug socket.



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):

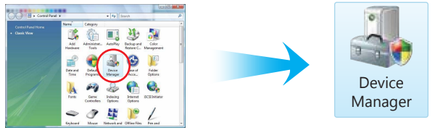


* You can find the detail of the installation steps in the user manual.

Hardware Verify

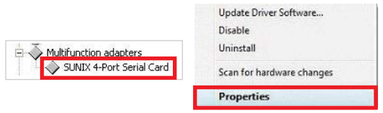
Please launch the "**Device Manager**" to verify hardware installation correctly.
Start > Control Panel > Device Manager

* The number of COM ports will depend on what products you bought.

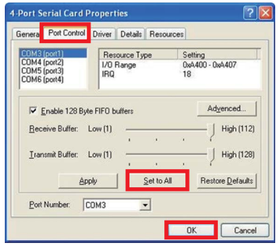


Configure Serial Port Settings

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**".

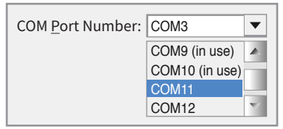


3. On the "**Port Control**" tab, select a port to configure.
   * Click "**OK**" to approve the settings for the selected port.
   * Click "**Set to All**" to approve the settings for all COM ports.



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.

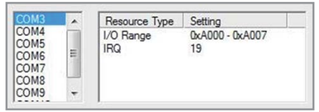


NOTE:
In order to prevent system resource conflict, do not select "**in use**" port.

COM 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.



Troubleshooting

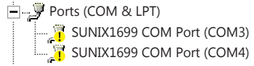
Q 1. System fails to find the PCI Express serial board or COM port.
Ans: It may cause by following issue:

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: It may cause by following issue:

a. The possible reason is an IRQ or I/O address conflict with other PCIe bus adapters, such as LAN or serial boards, or with the system BIOS. Refer to the corresponding problem in the previous FAQ for solutions.
b. Please check driver update from your vendor.

Q 3. There are some exclamation marks in device manager and serial ports can not work properly.
Ans: It may cause by following issue:



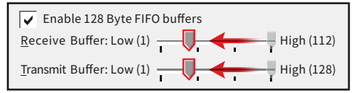
a. It caused by the wrong driver installing or hardware settings.
Please turn off your computer firstly and re-install hardware and software, especially re-install the correct driver.
b. Please update driver manually by specifying driver INF file folder.

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.



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771-QPCIE4223-S01