


Introduction

SUNIX RS-232/422/485 Serial Card allows users to expand RS-232/422/485 ports on PC-based system. Each serial port achieves data rates up to 921.6 Kbps and utilizes UART with an on-chip 128-bytes hardware FIFO buffer for reliable, high-speed serial I/O. With SUNIX patented Auto-Switching RS-422/485 and RS-485 AHDC™ technology, user can easily manage different serial interfaces selection and RS-485 signal direction control. We provided with 2KV IEC6100-4-5 Level 3 Surge Suppressor and 15KV IEC61000-4-2 ESD Discharge Transceiver. Besides, board supports a wide variety of operating systems, including Windows and Linux. It is the best serial communicating solution for industrial and harsh environment applications.

1. Hardware Installation

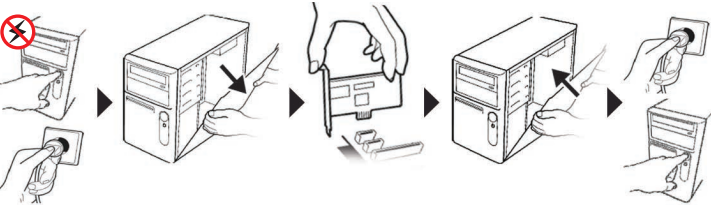


SAFETY FIRST

To avoid damages, please make sure to remove any power connection before card installation, and follow the detailed steps given below before inserting the card into your computer.

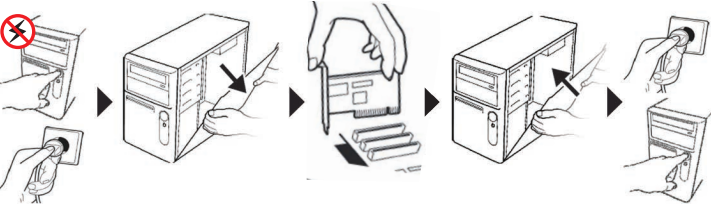
1-1 PCI Express Card

- 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 PCI Express Industrial I/O Control 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.



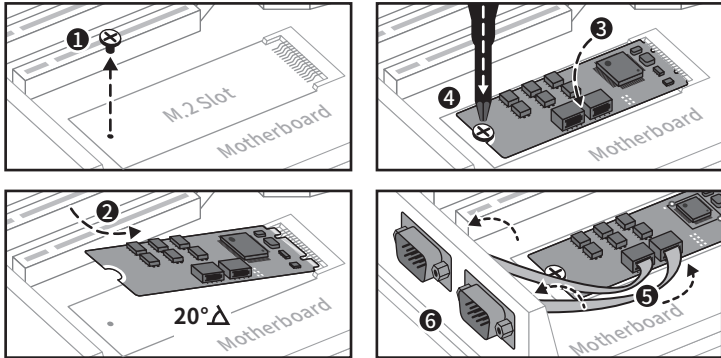
1-2 PCI Card

- 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 PCI slot.
- Step 5: Insert PCI Industrial I/O Control Board into the free PCI 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.



1-3 M.2 Card

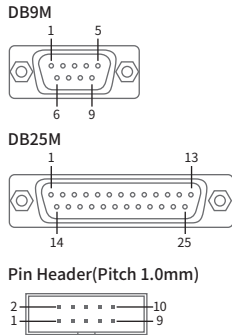
- Step 1: Remove the screw attached to the motherboard.
- Step 2: Insert M.2 Card tightly into the M.2 slot with 20° angle. (SUNIX M.2 Card supports Key-M and Key-B slot)
- Step 3: Push the M.2 card down to the screw hole.
- Step 4: Lock screw on M.2 card that you remove from motherboard in step1.
- Step 5: Connect ribbon cable between M.2 card and extension board.
- Step 6: Secure the extension board to PC chassis.



2. Pin Assignment

D-Sub 9-pin male with nuts on cable

	PIN	DB9M	DB25M	Pin Header
RS-232	DCD	1	8	1
	RxD	2	3	3
	TxD	3	2	5
	DTR	4	20	7
	GND	5	7	9
	DSR	6	6	2
	RTS	7	4	4
	CTS	8	5	6
	RI	9	22	8
RS-422 or 4-Wire RS-485	Tx+	2	3	3
	Tx-	1	8	1
	Rx+	3	2	5
	Rx-	4	20	7
2-Wire RS-485	GND	5	7	9
	Data+	2	3	3
	Data-	1	8	1
	GND	5	7	9



Note: 8-port RS-232/422/485 Multi-Port Control Card does not build RI signal under the RS-232 communication.

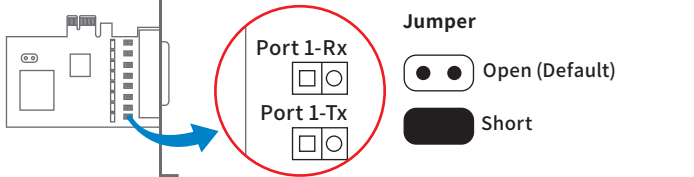
3. Jumper Settings

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.

3-1. PCI/PCIe Card Jumper Settings

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



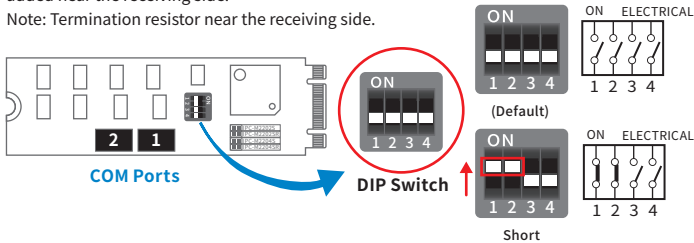
Working model with termination resistor: RS-422 or 4-Wire RS-485	
SUNIX Host Card	Device
Tx +	Rx +
Tx -	Rx -
Rx +	Tx +
Rx -	Tx -

Working model with termination resistor: 2-Wire RS-485	
SUNIX Host Card	Device
D + (Tx +)	D +
D - (Tx -)	D -

3-2. M.2 Card DIP Switch Settings

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.



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

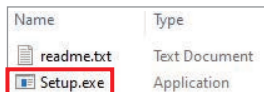
Mode	DIP Switch Settings	Mode	DIP Switch Settings
1.	<div>ON</div> <div>1 2 3 4</div> <div>Manufacturer default (Disable termination resistor)</div>	3.	<div>ON</div> <div>1 2 3 4</div> <div>COM2 enables 120 ohms termination resistor</div>
2.	<div>ON</div> <div>1 2 3 4</div> <div>COM1 enables 120 ohms termination resistor</div>	4.	<div>ON</div> <div>1 2 3 4</div> <div>COM1&2 enable 120 ohms termination resistor</div>

4. Driver Installation

- 1) You can download the latest driver from SUNIX official website (<https://www.sunix.com>)
- 2) Please plug the card into the available I/O slot
- 3) Unzip the software file and run setup.exe under Windows operating system.



Setup.exe



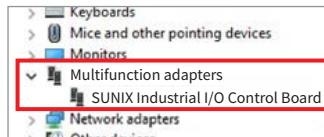
5. Hardware Verification

Please launch "Device Manager" to verify hardware installation correctly.

Controller Panel > All Control Panel Items > Device Manager



Device Manager



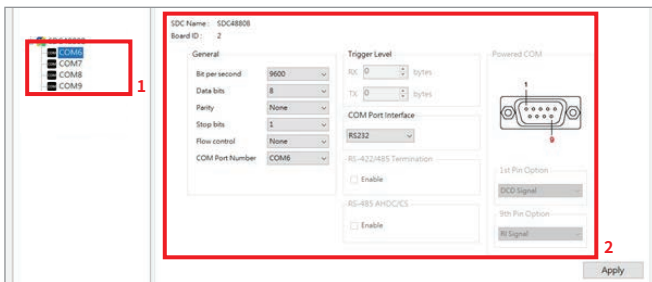
6. Configure Serial Interface

Under Serial interface catalog, select "COM" port item and you can read control panel as shown as below. If there are any settings changes, be sure to execute the "Apply" button to save the settings, or execute "Default" button to restore manufactory default settings.

(1) Serial Interface

Select this item to set Serial COM port settings.

(2) COM Port Control Panel



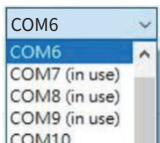
6-1 COM Port Number Setting

Under Port Number, select a COM number to assign to the serial port.

Click "Apply" 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



6-2 Interface Setting (Default: RS-232)

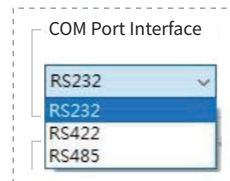
User can select RS-422 or RS-485 interface for each COM port of this board. User need to configure each COM port for different UART interfaces in this page. Please note if the select menu is unselectable, it means that this COM port does not support multi-interface feature.

— RS-422 (4-Wire RS-485)

This COM port forces to run RS-422 (4-Wire RS-485) full duplex mode.

— RS-485

This COM port forces to run RS-485 half duplex mode.



6-3 RS-422/485 Termination Setting (Default: Disable)

Under COM Port interface, user could disable or enable 120 ohms termination resistors across the two wires. Please refer to chapter 3 for technology detail.

RS-422/485 Termination

☐ Enable

6-4 RS-485 Carrier Sense (Default: Enable)

RS-485 Carrier Sense technology is the data flow control under RS-485 half duplex (one-way traffic) communicating. Due to the reduction of TX/RX packet conflicting on RS-485 one-way traffic bus, it will enhance better system performance and RS-485 communication ability. Please refer to chapter 6.1 for technology detail.

RS-485 AHDC/CS

☐ Enable

7. Troubleshooting

Q 1. System fails to find the Industrial I/O Control Board.

Ans: It may cause by following issue:

- a. The board is not properly plugged into the PCIe (M.2 / Mini PCIe) slot.
- b. Please clean the golden finger.
- c. The M.2 slot is defective. Please try other slots until you find one that works.
- d. The mainboard does not have an available IRQ for the PCIe (M.2 / Mini PCIe) 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.

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