PCI Express Industrial I/O Control Board

User's Manual

Disclaimer

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Trademarks

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Safety Information

1. Keep this User's Manual for future reference.
2. Always read the safety information carefully.
3. Keep this equipment away from direct sunlight, or in humid or damp places.
4. Do not place this equipment in an unstable position, or on vibrating surface before setting it up.
5. Do not use or place this equipment near magnetic fields, televisions, or radios to avoid electronic interface that affects device performance.

Regulatory Compliance

FCC Conditions

This equipment has been tested and found to comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This equipment may not cause harmful interference
(2) This equipment must accept any interference received, including interference that may cause undesired operation.

Important! Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment. Use an approved phone set.

CE

This equipment is in compliance with the requirements of the following regulations: EN 55032: CLASS B and EN55035

WEEE Information

For EU (European Union) member users: According to the WEEE (Waste electrical and electronic equipment) Directive, do not dispose of this product as household waste or commercial waste. Waste electrical and electronic equipment should be appropriately collected and recycled as required by practices established for your country. For information on recycling of this product, please contact your local authorities, your household waste disposal service or the shop where you purchased the product.

Table of Contents

1. Introduction

SUNIX industrial PCI Express I/O Control Board, is designed to meet PCI Express Base Specification Ver2.1. It can be installed in virtually any available PC system and compatible with all major Windows and Linux operating systems.

This board offers independent Digital I/O and RS-232/422/485 ports for connecting kinds of serial terminals on the PC based systems. This board is industrial standard which offers a reliable and high performance solution for industrial applications.

The following topics covered in this chapter:

1.1. Overview

SUNIX SDC4880B, industrial RS-232/422/485 and isolated Digital I/O PCI-Express add-on card, is designed for PC-based IoT Gateway or desktop that enables data acquisition, I/O control and serial communication in the industrial automation. This board built-in SUNIX UART & Digital-I/O controller, QiuNiu, and as well built with many of SUNIX advanced features and technologies. In addition, SUNIX provides API software and SDK library, allowing users to program under Windows 10 operating systems. The software package includes a dynamic library.dll, as well as C, C# programming language sample codes, making it easier to develop application software.

SUNIX PCI Express Industrial I/O Control Board enriches I/O expandable capacity with cost-efficient design; SDC4880B is the best serial and digital I/O communicating solution and SDC0880I is the best digital I/O communicating solution to enrich your system I/O expandable capacity for lite industrial applications.

1.2. 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.

- PCI Express Industrial I/O Control Board (SDC4880B or SDC0880I)
- DB44 to 2-port DB9 Male & 1-port DB25 Female connection cable, 100cm (SDC4880B only)
- DB25 Male to Female connection cable, 100cm (SDC0880I only)
- Serial RS-232 D-Sub 9-pin male with nuts on cable, 30cm, 2pcs (SDC4880B only)
- DB25 Male DIN-rail wiring board
- User's Manual (This document)

1.3. Product Features

- Designed to meet PCI Express Base Specification Revision 2.1.
- With high reliable SUNIX QiuNiu UART & Digital-I/O controller.

- Plug-n-Play, I/O address and IRQ assigned by system.
- Ultra low power consumption (<1.5W) design for green environment and industrial application.
- High quality electronic components, low impedance and high stability ensure product quality and reliability.
- Support Microsoft Windows 10 with C and C# programming language sample code.
- Certified by CE, FCC, RoHS, and Microsoft approvals.
- Support both standard and Low profile bracket design to meet various of PC chassis.

Serial Interfaces: (SDC4880B only)

- Expands internal two (2) ports RS-232/422/485 and external two (2) ports RS-232/422/485.
- Utilize 16C950 UART and on-chip 128-bytes hardware FIFO for reliable, high-speed serial communication.
- RS-232/422/485 interface and 120Ω terminal resistor configured by software.
- On-chip hardware auto flow control to guarantee no data loss.
- 2KV surge protection for all serial signals meets IEC-61000-4-5.

Digital I/O Interfaces:

- Expands isolated eight (8) digital input channels with features for all channels.
  - Support both NPN & PNP devices
  - Support both dry and wet contact connections
  - With digital filter for noise reduction
  - Built-in 32-bit counter for all digital in channels
- Expands isolated eight (8) NPN type digital output channels with initial value (Booting & Restart) protection.
- Each channel built-in 2.5KV isolation protection for signal and power, allowing the input signals to be completely floated so as to prevent ground loops.

1.4. Product Specifications

Board Level

Interface	PCI Express
Controller	SUNIX QiuNiu
BUS	PCI Express Gen1 x 1 (single Lane)
IRQ & IO	Assigned by System
ESD Protection	±15KV IEC61000-4-2 Air Gap Discharge ±8KV IEC61000-4-2 Contact Discharge

Serial Ports (SDC4880B only)

Interface	RS-232/422/485	**No. of Port**	4 ports
Controller	16C950 UART Compatible	**Data bit**	5, 6, 7, 8
FIFO	128byte Hardware	**Parity**	even, odd, none, mark, space
Baud rate	50bps ~921.6Kbps	**Flow Control**	RS-232:CTS/RTS(H/W), DTR/DSR(HW), Xon/Xoff(S/W) RS-422/485: Xon/Xoff(S/W)
Terminator	120Ω	**IRQ & IO**	Assigned by System
Surge Protection	2KV Surge IEC61000-4-5		
Signal	RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND, RI RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485: Data+, Data-, GND		
PCB Connector	2 ports on DB44 Female connector ; 2 ports on pitch 1.0 pin header connectors		

Digital Input

Type	NPN & PNP	**Channel**	8-channel
Dry Contact	Logic Level 0: Open; Logic Level 1: Close to GND	**Wet Contact**	Logic Level 0: 0 to 3VDC; Logic Level 1: 10 to 50VDC
Input Resistance	10KΩ	**Isolation**	2500 VDC
Counter	32-bit counter on all channel	**Frequency**	Input Range 2KHz max.
Digital Filter	Digital filter for noise reduction	**Pin Define**	DI1~DI8, COM, GND
Interrupt Mode	Event trigger (Rising Edge, Falling Edge, Both modes) & polling for all channels		
PCB Connector	**DB44** Female connector for **SDC4880B** **DB25** Female connector for **SDC0880I**		

Digital Output

Type	NPN	**Channel**	8-channel
Voltage Range	3.5 to 40VDC	**Current**	500mA per Channel
Isolation	2500 VDC	**Pin Define**	DO1~DO8, PWR, GND
Initial Protection	Initial Value Setup (Booting & Restart protection)		
PCB Connector	**DB44** Female connector for **SDC4880B** **DB25** Female connector for **SDC0880I**		

Declaration

Green Product	RoHS, WEEE

Regulatory

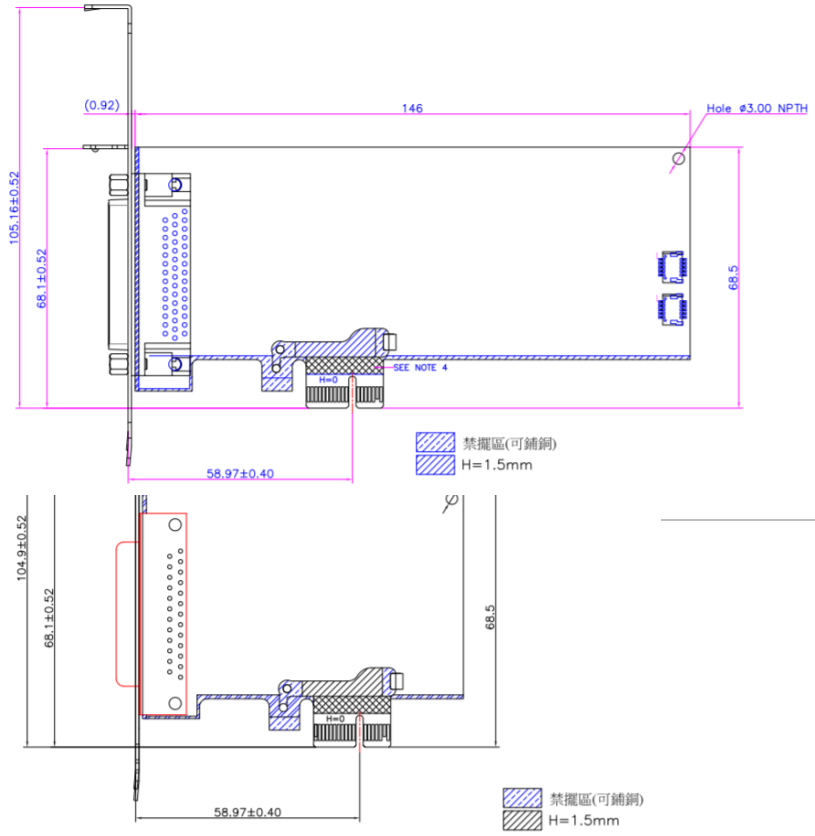
Hardware	CE / FCC / VCCI / BSMI

Environment

Operation Temperature	-20 to 70°C (-4 to 158°F)
Operation Humidity	5 to 95% (non-condensing)
Storage Temperature	-20 to 70°C (-4 to 158°F)

Dimension

SDC4880B	146 x 68.5 mm
Bracket	Standard 121 mm / Low Profile 79.2mm
Bracket Space	1



2. Hardware Installation

This chapter includes information about hardware installation of SUNIX PCI Express Industrial I/O Control Board, connectors and cables, pin assignment of hardware interfaces, and digital input/out settings.

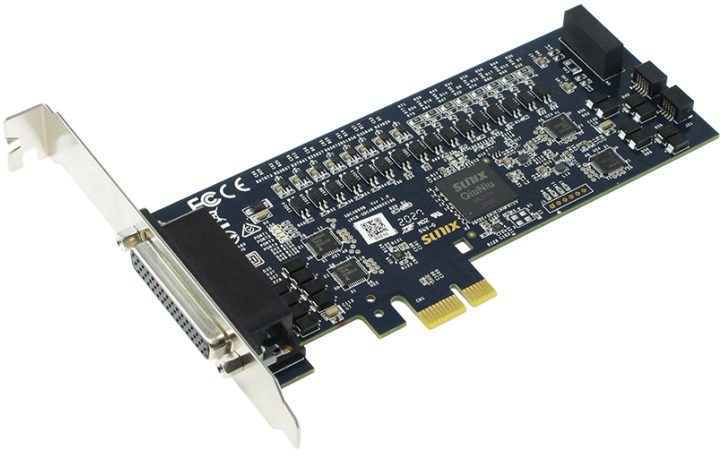
The following topics covered in this chapter:

2.1 Hardware Appearance
2.2 Hardware Installation
2.3 Connector Installation
2.4 Pin Assignments

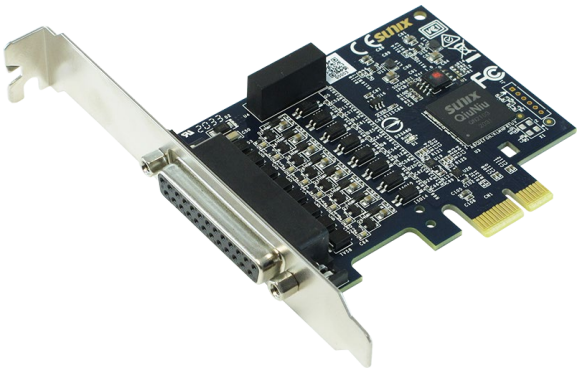
2.1. Hardware Appearance

PCI Express Industrial I/O Control Board appearance shown as below.

SDC4880B



SDC0880I



2.2. Hardware Installation

The hardware installation of PCI Express Industrial I/O Control Board is easy to carry out. Before inserting the card into the PCI Express bus, please follow the detailed steps given below to install the board in your computer.

Safety First

To avoid damaging your system and boards, make sure your PC's power is turned off before installing PCI Express card.

Step1. Turn your PC's power off, and shut off the power to any peripheral.

Step2. Remove the power plug from the plug socket.

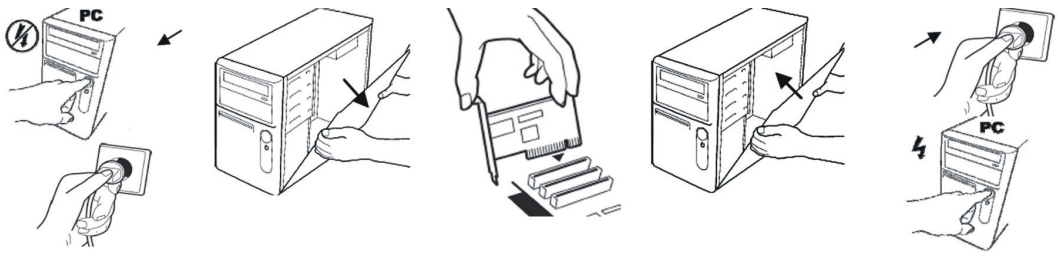
Step3. Remove the cover from the computer case.

Step4. If fitted. Remove the metal cover plate on the rear of a free PCI-E slot.

Step5. Insert PCI Express Industrial I/O Control Board into the free PCI Express slot and screw it firmly on the bracket side.

Step6. Place the cover back onto the computer.

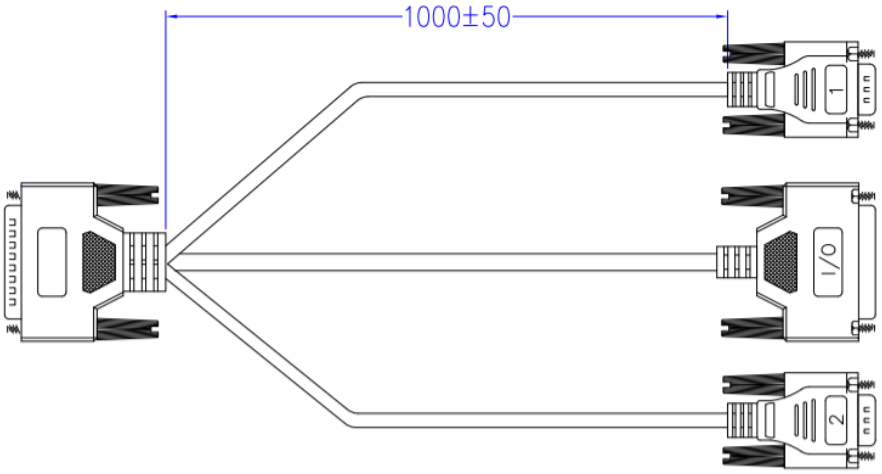
Step7. Insert the plug into the plug socket.



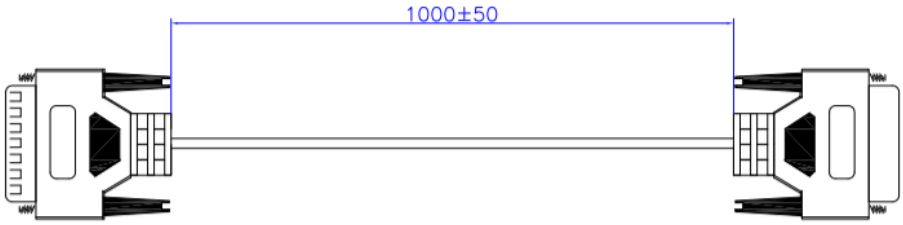
2.3. Connector Installation

This product also contains connection cables and DIN-rail wiring board:

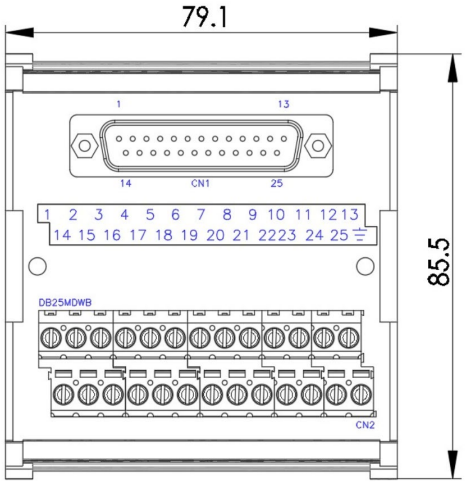
1. DB44 to 2-port DB9 Male & 1-port DB25 Female connection cable, 40cm (SDC4880B only)



2. DB25 Male to Female connection cable, 100cm (SDC0880I only)



3. DB25 Male DIN-rail wiring board



4. Serial RS-232 D-Sub 9-pin male with nuts on cable, 30cm 2 pcs (SDC4880B only)

The chapter demonstrates the assembly of boards, cables and connectors.

Step1. Plug DB44 (SDC4880B only) or DB25 (SDC0880I only) connection cable to PCI Express Industrial I/O Control Board. Two DB9 male connectors on DB44 connection cable are used for RS-232/422/485 serial port interface.

Step2. Fix the DB25 male DIN-rail wiring board on DIN rail mount.

Step3. Please refer to 2.4 Pin Assignment table of RS-232/422/485 to determinate your serial port interface type. (SDC4880B only)

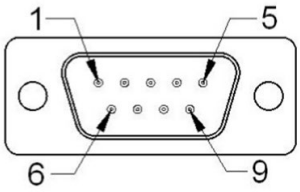
Step4. Please refer to 2.4 Pin Assignment table of Digital in/out terminal block for connecting to your digital control devices.

Step5. If you want to use the two internal serial RS-232/422/485 ports, please plug the Serial RS-232 D-Sub 9-pin male with nuts cable to the pitch 1.0 pin header connectors. (SDC4880B only)

2.4. Pin Assignment

This chapter provides the pin assignment of PCI Express Industrial I/O Control Board, as well as the pin assignment for the optional accessories.

RS-232/422/485 Pin Assignment (SDC4880B only)

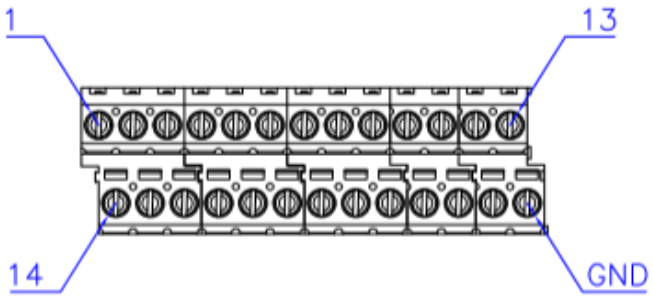


DB9M	RS-232	RS-422	RS-485
1	DCD	Tx -	Data -
2	RxD	Tx +	Data +
3	TxD	Rx +	
4	DTR	Rx -	
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		
9	RI		

Digital in/out terminal block Pin Assignment

PIN	Digital Input	PIN	Digital Output
1	DI COM	14	DO PWR
2	DI COM	15	DO PWR
3	DI GND	16	DO GND
4	DI GND	17	DO GND
5	DI 1	18	DO 1
6	DI 2	19	DO 2
7	DI 3	20	DO 3
8	DI 4	21	DO 4
9	DI 5	22	DO 5
10	DI 6	23	DO 6
11	DI 7	24	DO 7
12	DI 8	25	DO 8
13	NC	GND	NC

Note: DI=Digital in ; DO=Digital out ; NC=No connection



3. Driver and Software Installation

After installing the PCI Express Industrial I/O Control Board in your system successfully, please follow the step by step software installation guide to confirm how to install appropriate driver and configure the Digital I/O and serial port settings.

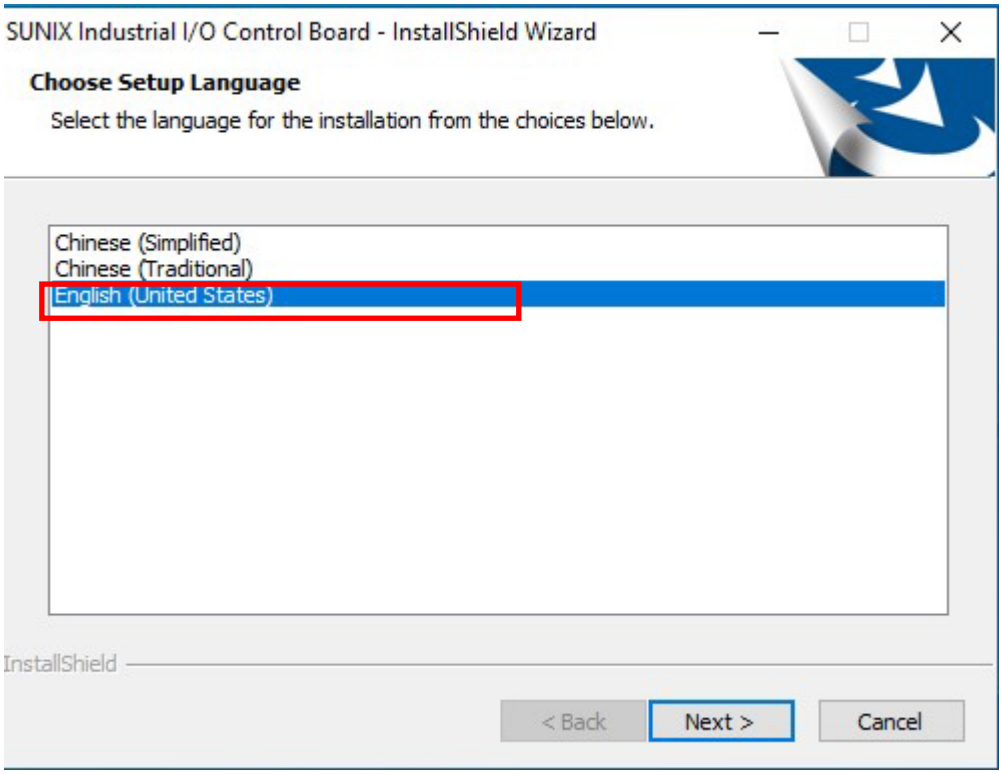
The driver and software for PCI Express Industrial I/O Control Board supports Windows 10 operating systems, and you can select your requirement in the following chapter:

The following topics covered in this chapter:

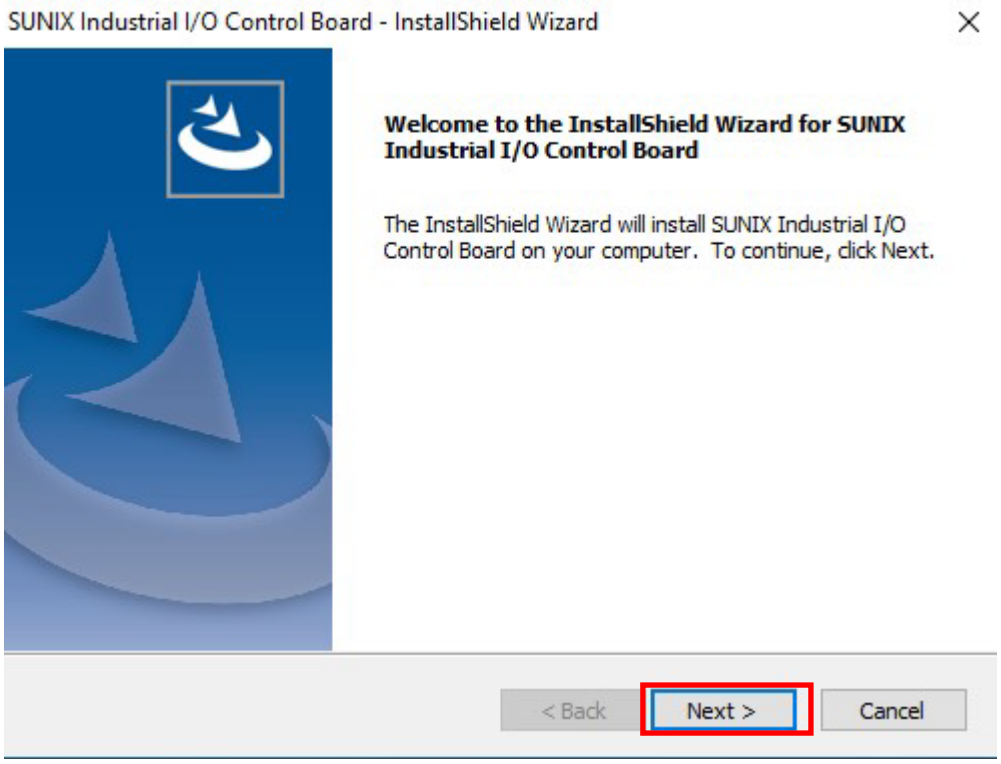
3.1. Windows Driver and software Installation

Please refer to following instructions to install the driver and software for the first time under Windows 10 operation system. Please plug the board in an available PCI Express slot first, before installing the driver.
(1) Unzip the software file and Run setup.exe.

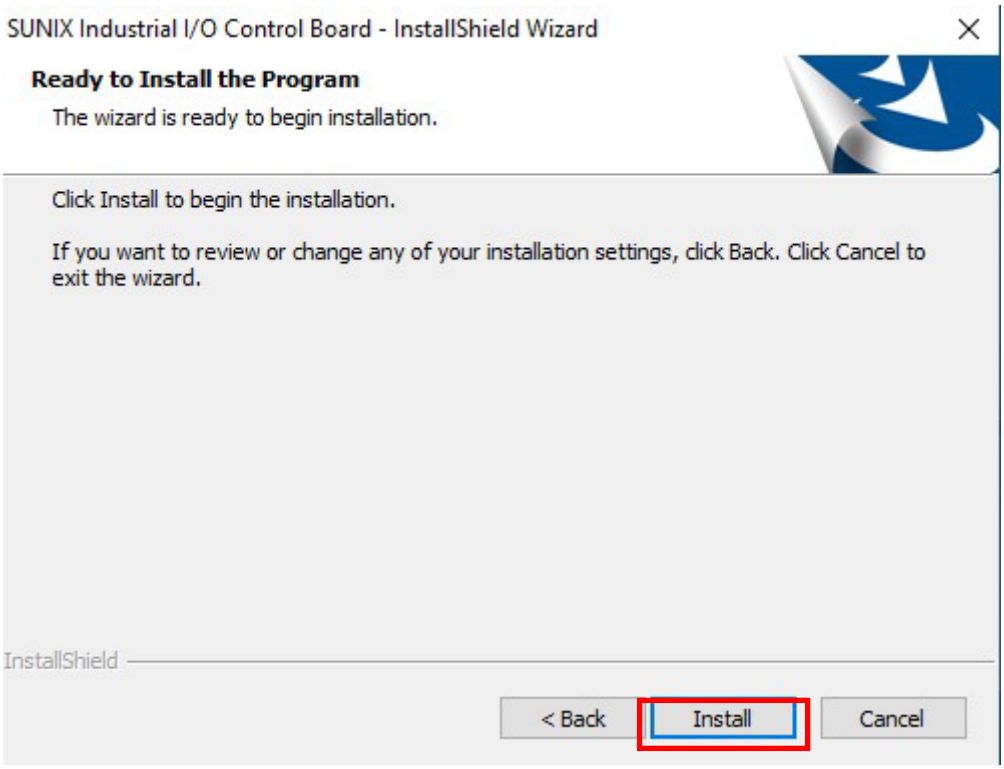
(2) Please select setup language for your operation system.



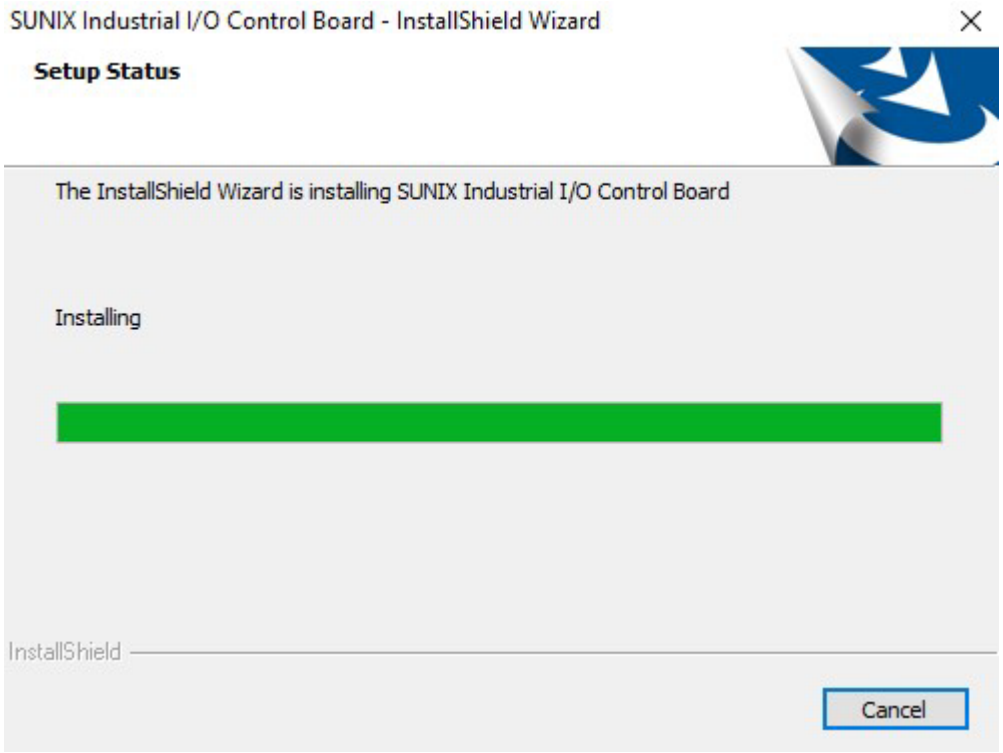
(3) Click "**Next**" to continue installation steps.



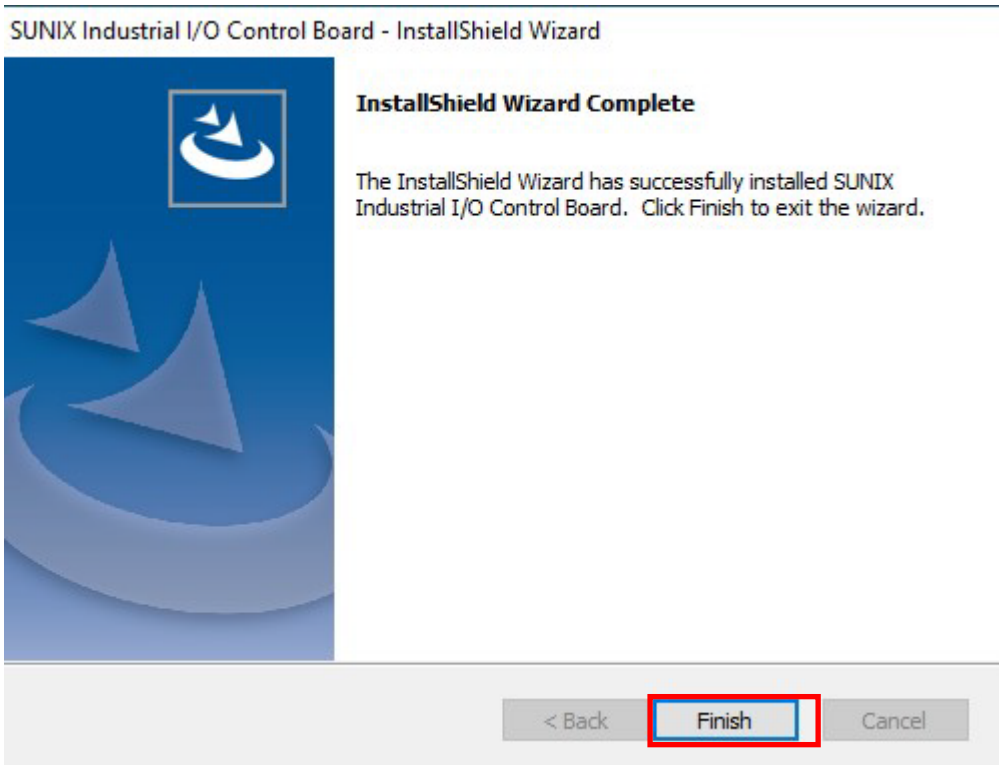
(4) Click “Install” to continue installation steps.



(5) System will install driver and software automatically.



(6) Click “**Finish**” to end installation steps.



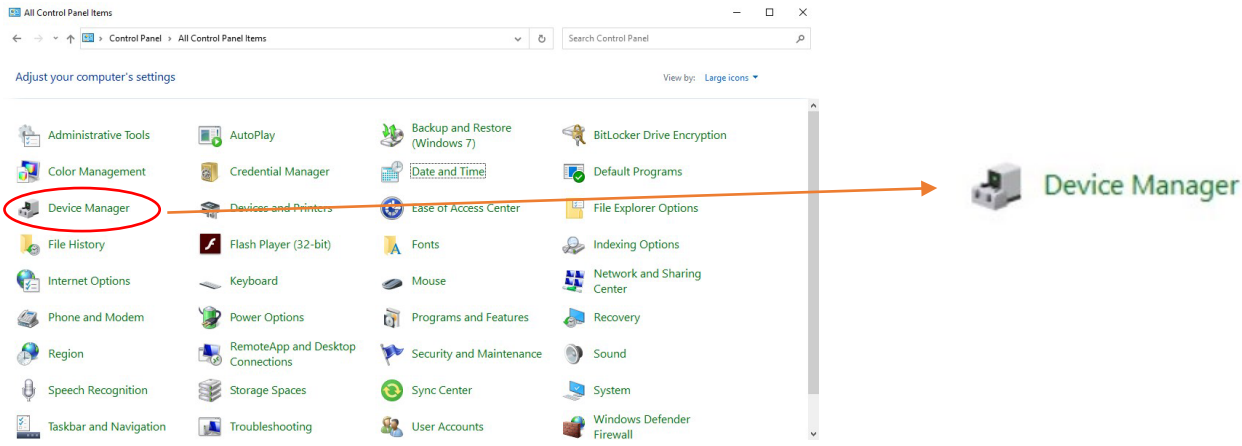
Note: PCI Express Industrial I/O Control Board is certificated by Windows 10 operation system. Please visit SUNIX official website (http://www.sunix.com) to download latest driver.

3.2. Windows Driver Verify Installation

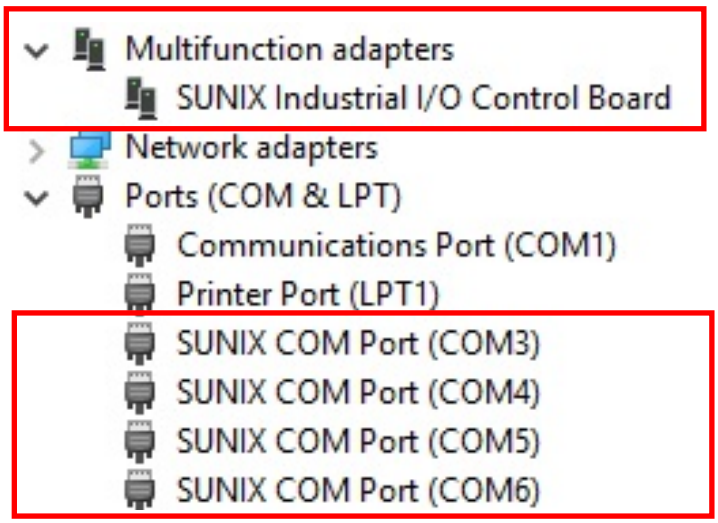
You can use Windows "**Device Manager**" to verify proper installation.

(1) Select Device Manager in the in the Windows Control Panel.

Controller Panel > All Control Panel Items > Device Manager



(2) In the Device Manager window, you would read **SUNIX PCI Express Industrial I/O Control Board** under **Multifunction adapters** catalog, and **SUNIX COM Port (COM3 ~ COM6)** under **Ports (COM & LPT)** catalog.



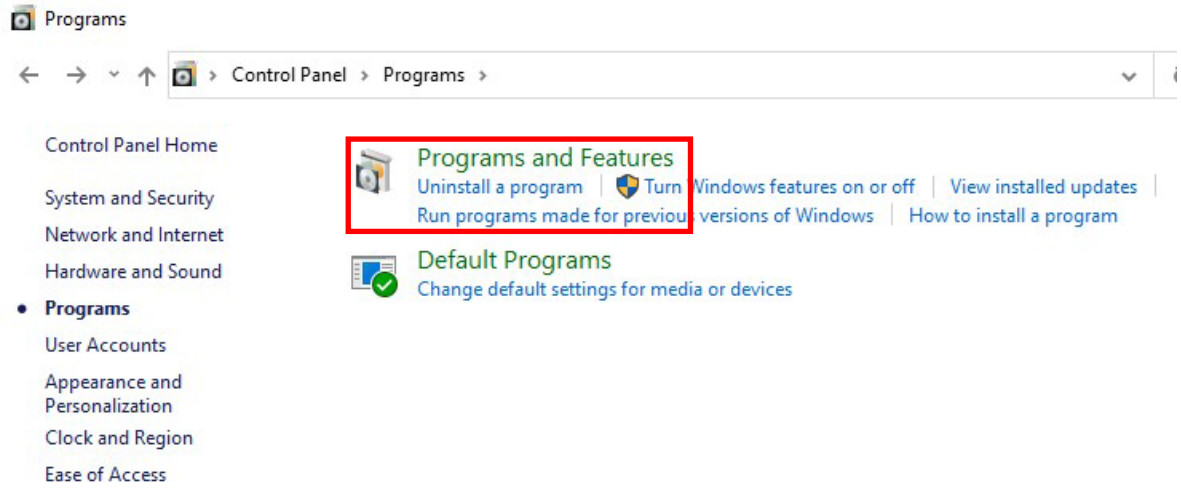
Above screenshot is the example of SUNIX SDC4880B PCI Express Industrial I/O Control Board shown on device manager of Windows OS but these COM number may be different according to system assignment.

3.3. Windows Driver Uninstallation

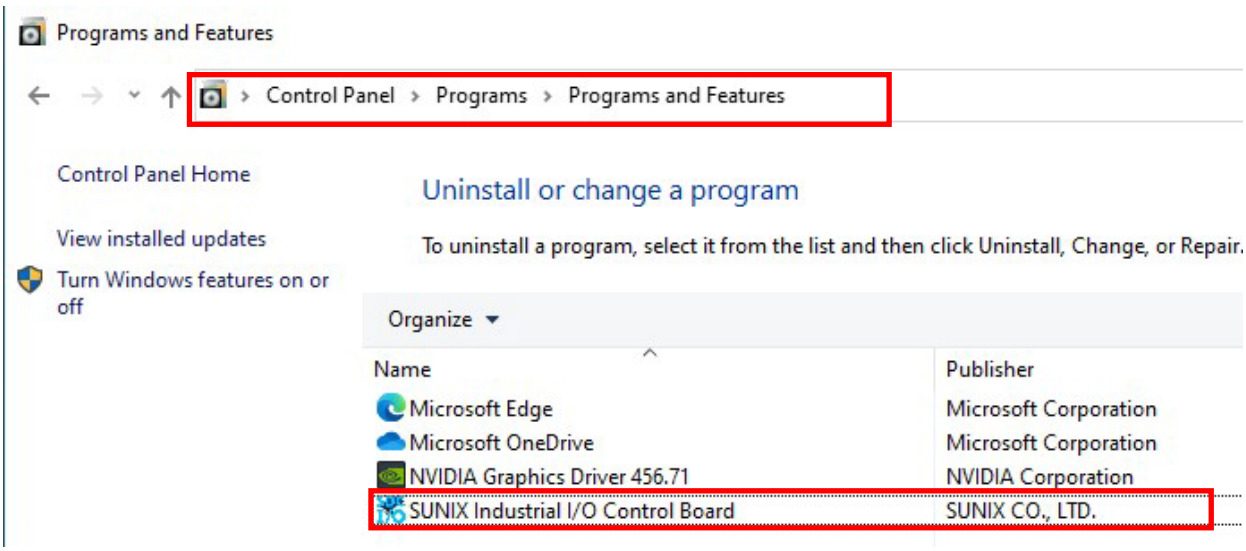
Please refer to following instructions uninstall PCI Express Industrial I/O Control Board driver.

(1) Click on the "**Programs and Features**" tab in the Windows Control Panel.

Controller Panel > Programs > Programs and Features



(2) Enter Uninstall or change a program page, and double click "**SUNIX PCI Express Industrial I/O Control Board**" to process uninstallation procedure.



4. Software Operation

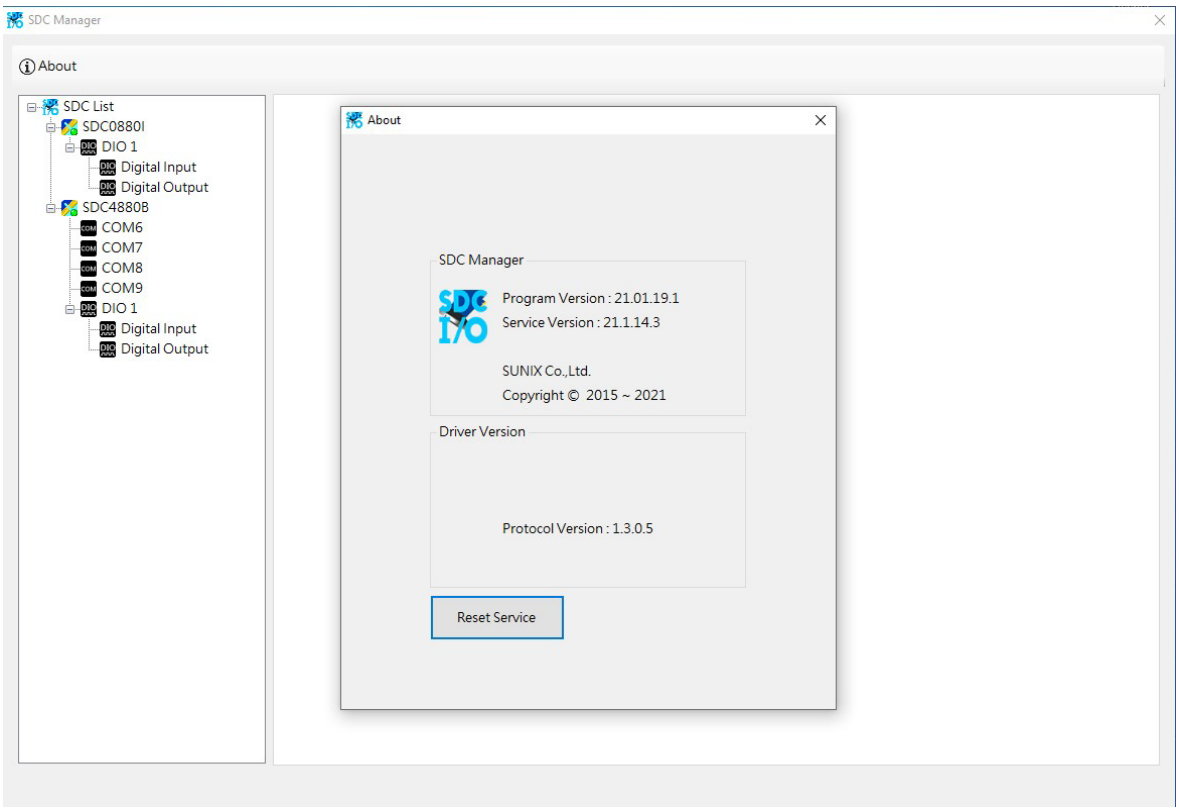
This chapter introduces the operation of the I/O Control Manager utility of industrial control board that comes with isolated digital input/output channels and Serial (RS-232/422/485) COM ports interfaces.

The following topics covered in this chapter:

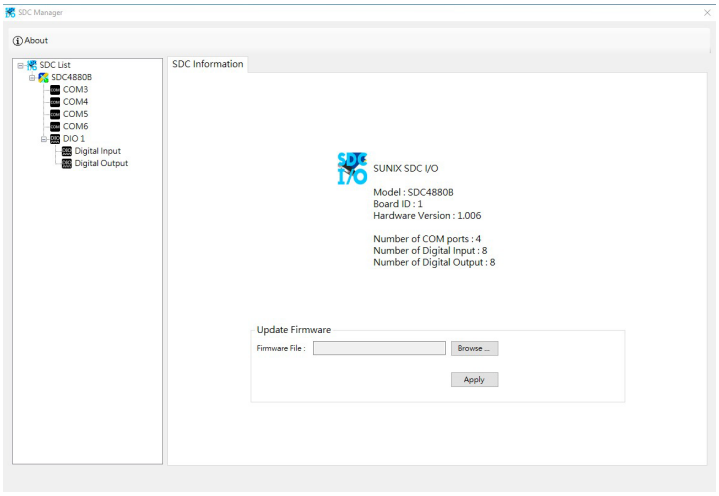
4.1. Overview

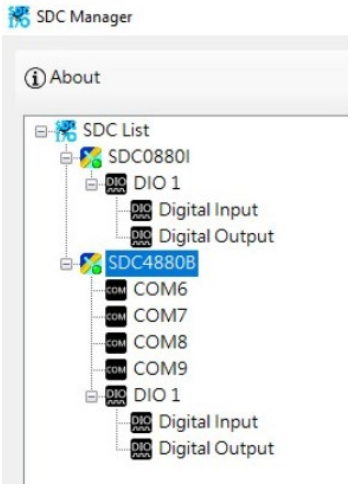
The I/O Control Manager utility could be launched after PCI Express Industrial I/O Control Board hardware is installed. Therefore, be sure to install hardware and driver properly at first.

Launch I/O Control Manager utility, and you can read the control panel windows that shows utility version, service version, and driver version information. User can update latest version from Microsoft Store where you download from.



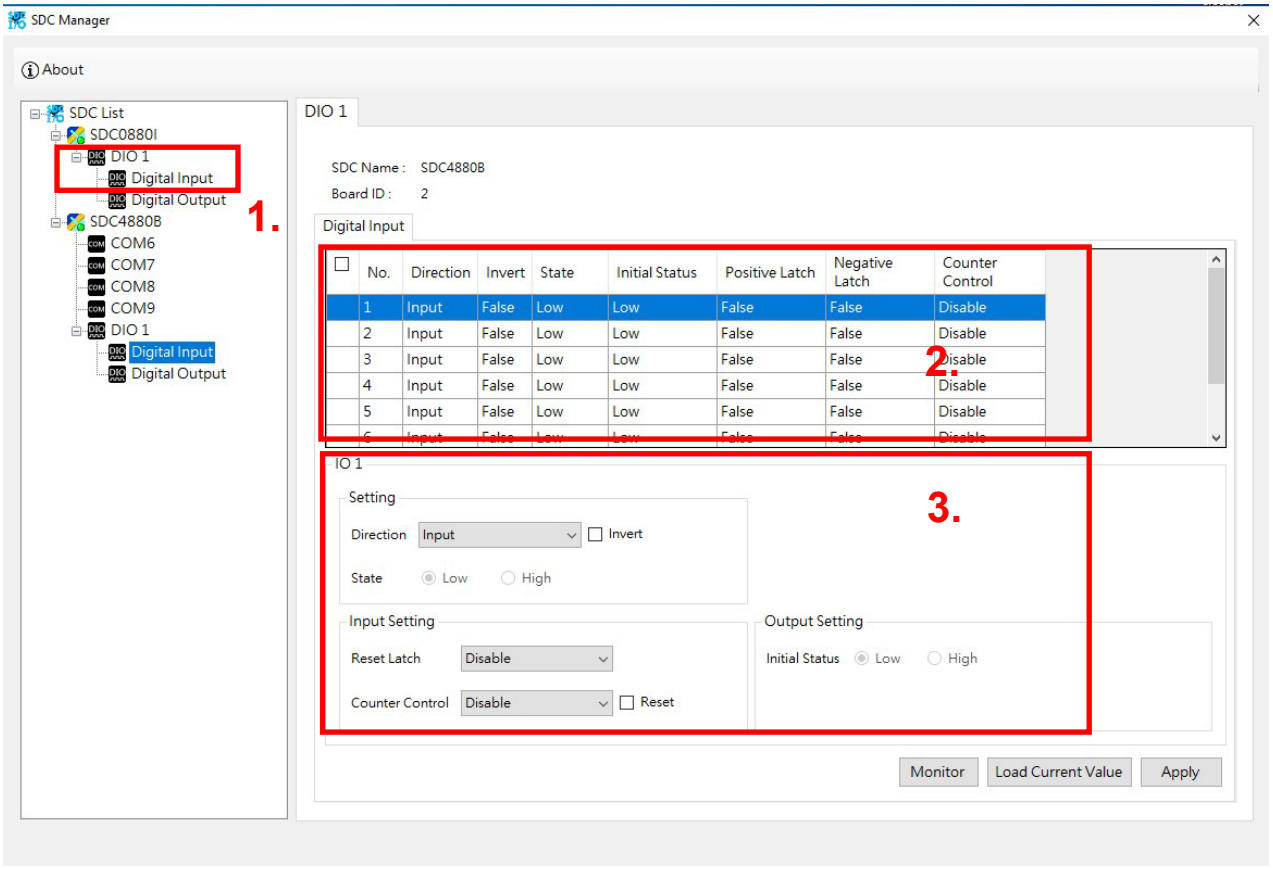
Click I/O Expansion Card catalog, user could read the hardware interfaces support list, including Digital I/O Interface, and Serial Interface. Please note that hardware support list depends on the industrial card that installed in your system. The following screen is an example of one of the industrial control board.





4.2. Configure Digital Input interface

Under Digital I/O interface catalog, select “**Digital Input**” 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. Digital Input Interface

Select this item to read Digital Input channel state on the table.

2. Digital Input Channel State List

User can read the state table of the digital input channel and individually set each digital input channel in the control panel.

3. Digital Input Control Panel

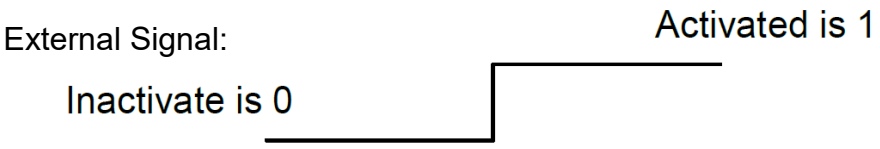
Please refer to following instructions.

<<Digital Input Value Setting>>

A digital input detects if a voltage is above/below a specific threshold. If the voltage is higher than some value, the computer will detect the digital input as **HIGH=1**. If the voltage is lower than some value, the computer will detect the digital input as **LOW=0**.

Standard digital input (default) state: (0:Low, 1:High)

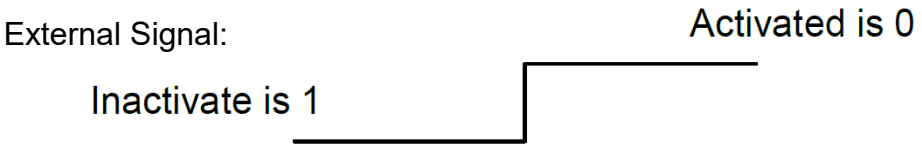
- If the external signal is logic level high, the digital input value is 1.
- if the external signal is logic level low, the digital input value is 0.



Invert Value:

"Enable" invert digital input state: (1:Low, 0:High)

- If the external signal is logic level high, the digital input value is 0.
- If the external signal s logic level low, the digital input value is 1.



Box State	Settings	Result
Uncheck (Default)	Default Mode	0:Low, 1:High
Check	Invert Mode	1:Low, 0:High

<<Counter Setting>>

Each digital input channel supports a counter feature that counts the number of digital input triggers. The counter value can be increased when a Positive (rising) edge, Negative (falling) edge or both (positive or negative edge) occur.

1). None (Default):

Disable counter feature.

2). Positive edge:

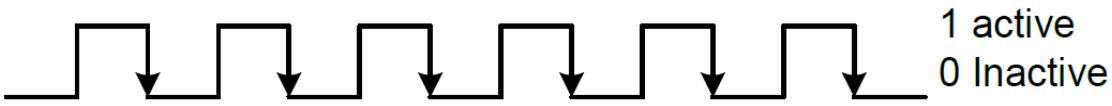
If positive (rising) edge-trigged, counter +1.

Positive Edge Counter:

3). Negative edge:

If negative (falling) edge-trigged, counter +1.

Negative Edge Counter:



4). Both:

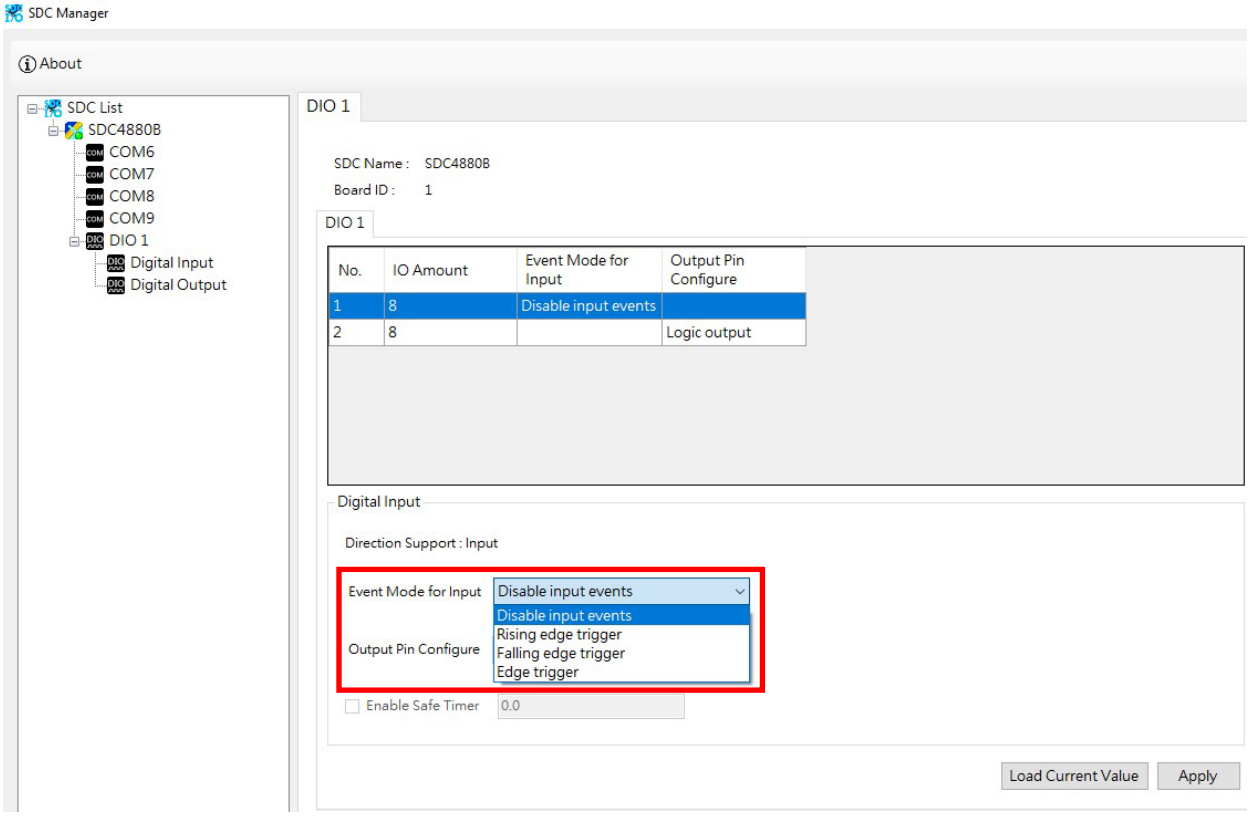
If positive (rising) or negative (falling) edge-trigged, counter +1.

5). Reset Counter:

Clear digital input counter result, value=0.

<<Event Trigger Condition Setting>>

Event Mode settings must be used with the API (Application Programming Interface) and Library. When the event trigger happens, the corresponding action can be performed through the software. User can enable positive (rising) or negative (falling) trigger event.



1). None (Default):

Disable event trigger feature.

2). Positive edge:

Event trigger when positive (rising) edge happens.

3). Negative edge:

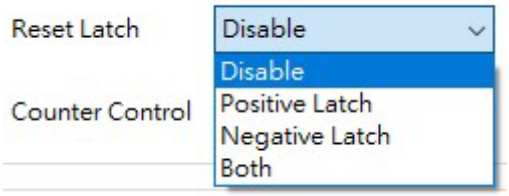
Event trigger when negative (falling) edge happens.

4). Both:

Event trigger when positive (rising) or negative (falling) edge happen.

<<Latch Setting>>

The latch will record the result of whether the digital input state has changed. User can monitor positive and negative latch state in the digital input channel state List table. "**True**" will be displayed if the state has changed, if not it shows "**false**". Latch default settings is enable.



By clicking "Reset Positive Latch" or "Reset Negative Latch" button to clear the value to default.

1). Reset positive latch:

Clear digital input positive latch result.

If it's **true**, after reset, result back to default **false**.

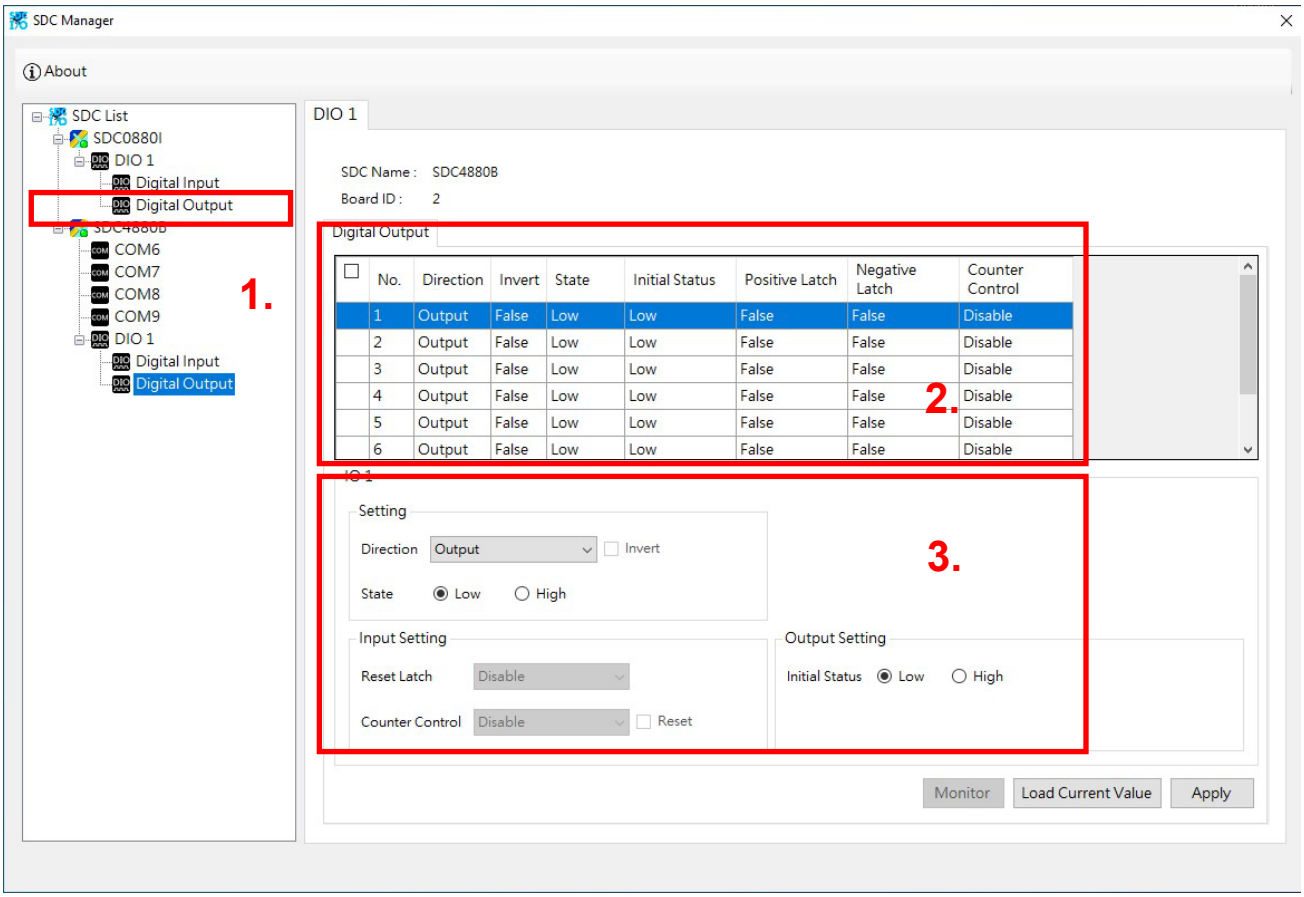
2). Reset negative latch:

Clear digital input negative latch result.

If it's **true**, after reset, result back to default **false**.

4.3. Configure Digital Output interface

Under Digital I/O interface catalog, select “**Digital Output**” 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. Digital Output Interface

Select this item to read Digital Output channel state on the table.

2. Digital Output Channel State List

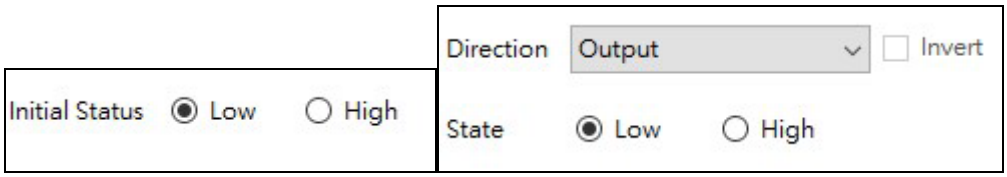
User can read the state table of the digital output channel and individually set each digital output channel in the control panel.

3. Digital Output Control Panel

Please refer to following instructions.

<<Digital Output Value Setting>>

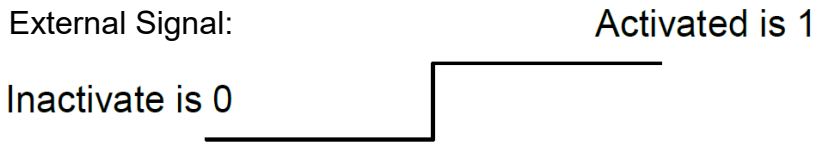
A digital output is the closed or opened circuit to indicate whether the given state is high or low. The digital output hardware design is a NPN (Sink) type.



1). Digital Output Initial State: (Default: 0=Low)

The digital output channel has the function (“High” or “Low” state) during computer boot (before entering the operation system).

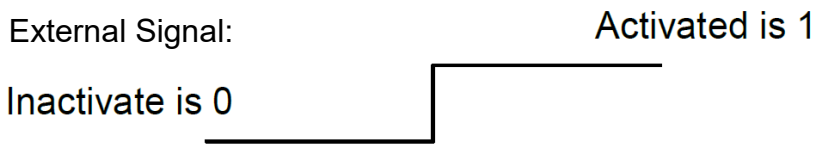
Digital Output initial state “**High**” or “**Low**” setting when system booting.



Note: Before turning computer power on, digital out state will be 0=Low.

2). Digital Output Current State: (Default: 0=Low)

Change the current digital output channel state to **"High"** or **"Low"** setting.



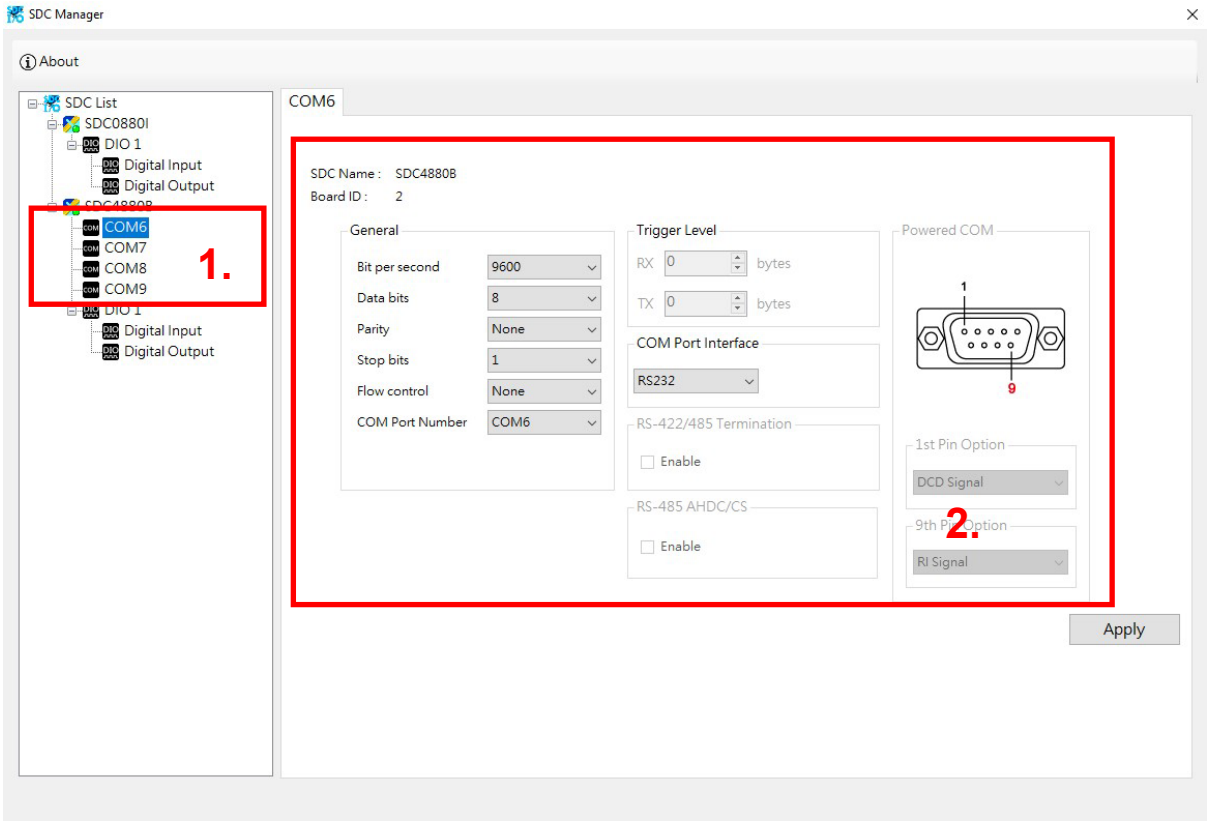
3). Invert Value:

“Enable” invert digital output state: (1:Low, 0:High)

Box State	Settings	Result
Uncheck (Default)	Default Mode	0:Low, 1:High
Check	Invert Mode	1:Low, 0:High

4.4. Configure Serial Interface (SDC4880B only)

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.

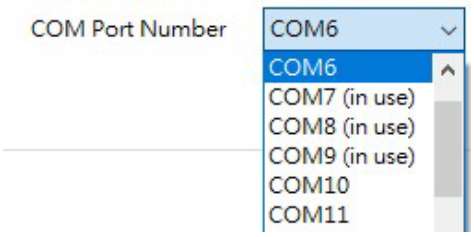
2. COM Port Control Panel

Please refer to following instructions.

1). COM Port Number Setting

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

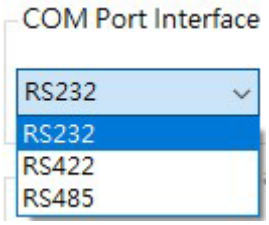
Click “**Apply**” to approve the settings for the selected port.



Note: In order to prevent system resource conflict, do **not** select “**in use**” port.

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 unselect-able, 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

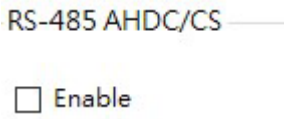
This COM port forces to run RS-485 half duplex mode.

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.

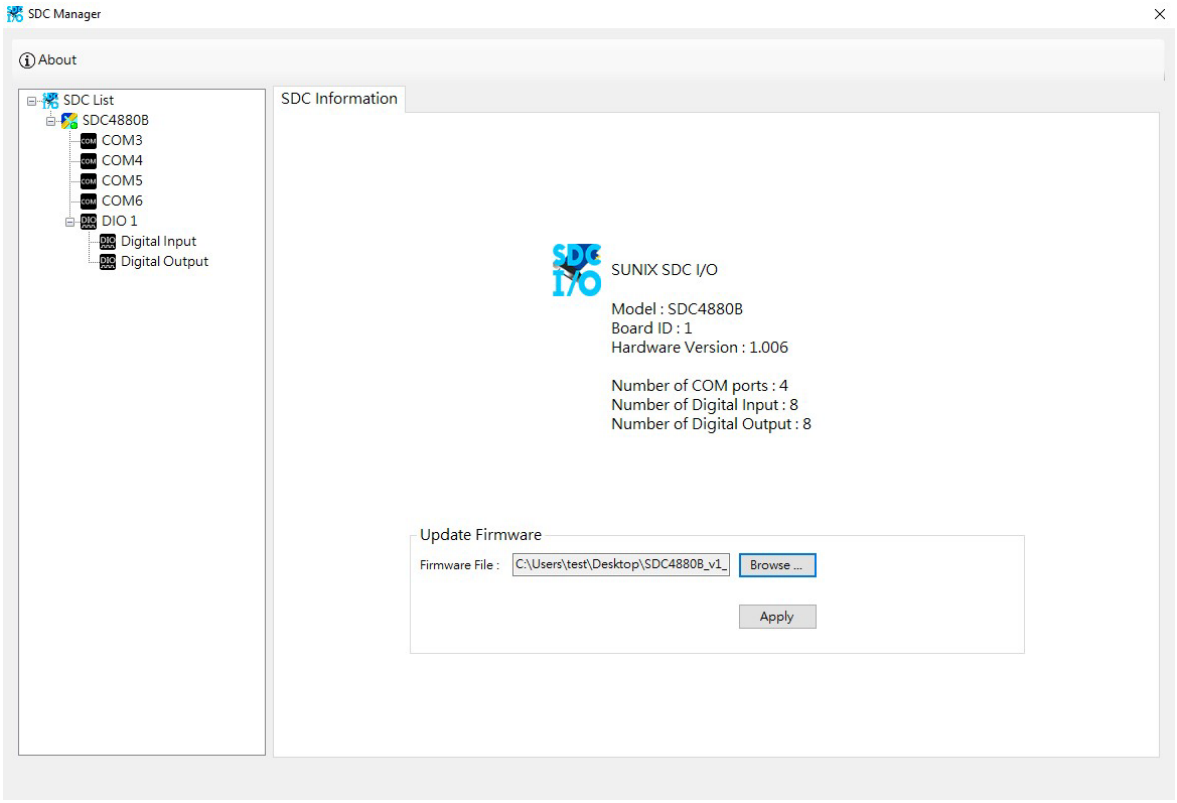
4). RS-485 Carrier Sense (Default: Enable)

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.

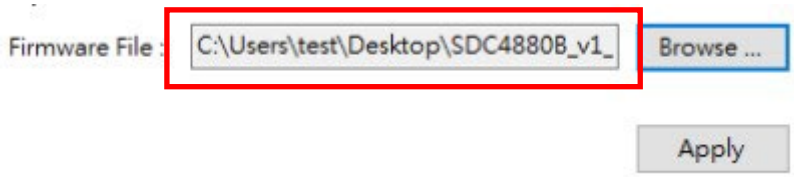


4.5. Firmware Upgrade

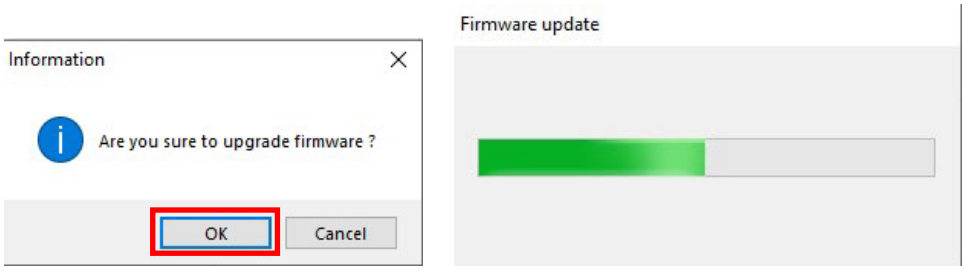
In the main page of I/O Controller Manager utility, user can update the firmware version of the I/O expansion card in the setting options of this page.



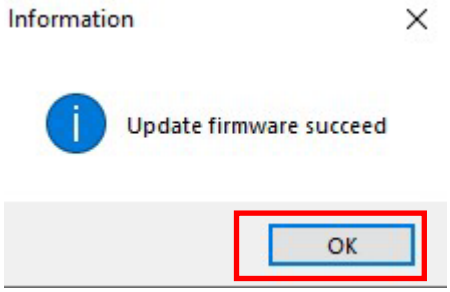
After successfully downloading the latest firmware version, "**Browse**" the file storage path location of the firmware ROM file and click the "**Upgrade**" button to run firmware upgrade process. The latest version of the firmware can be downloaded from the official SUNIX website.



Click "**OK**" to approve firmware upgrade process.



Click “**OK**” to finish firmware upgrade process. To enable new firmware feature, please turn the computer off, and then power it on later. (PC restart is useless)

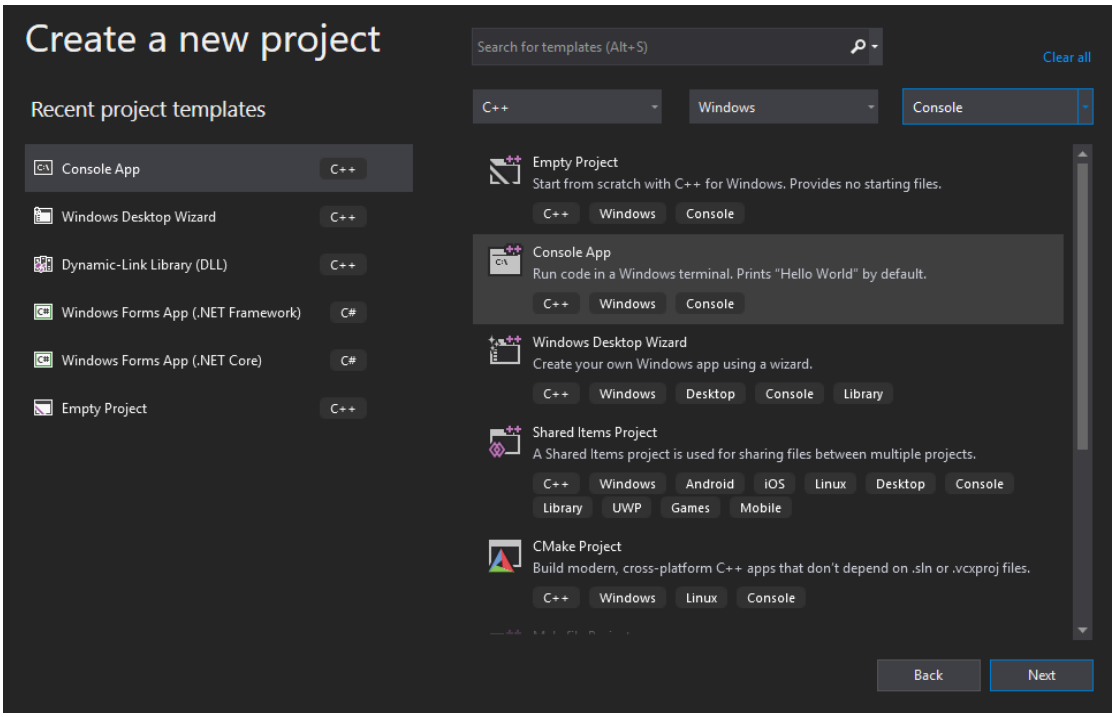


Note:
1). Do NOT turn off or restart your computer while updating the firmware ROM.
2). Be sure to power off your computer, after finishing firmware upgrade.

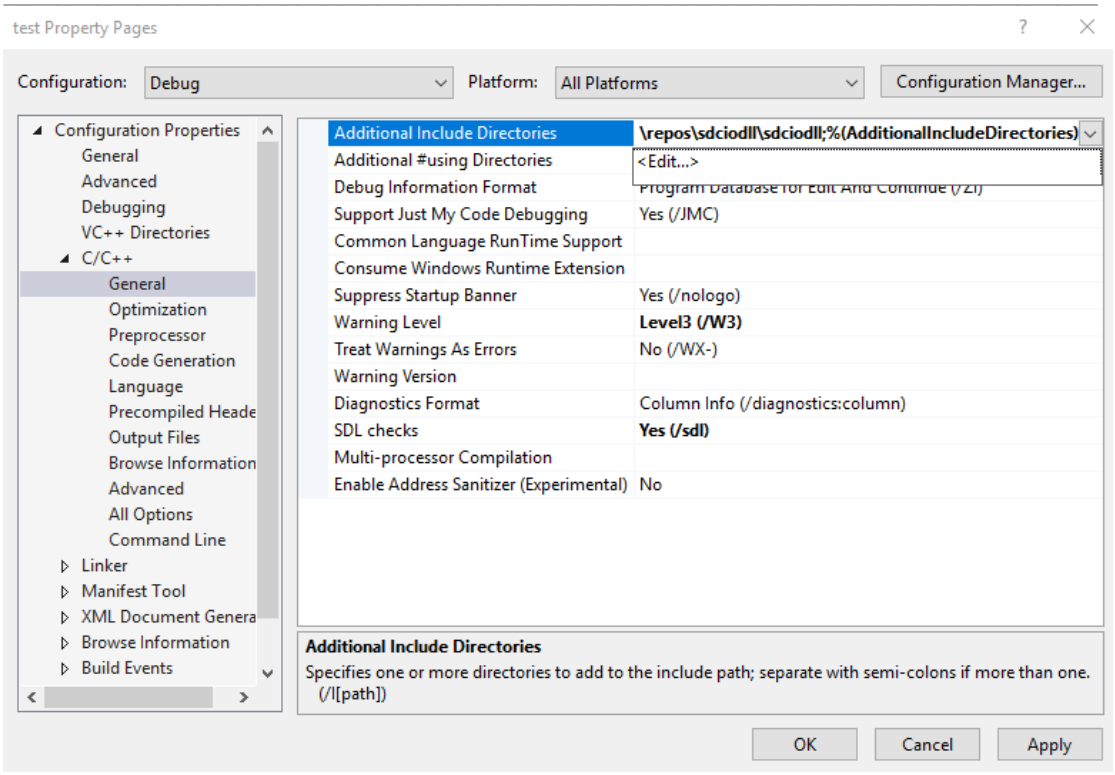
5. How to use DLL library in C, C++

5.1. Create Console APP from Visual Studio

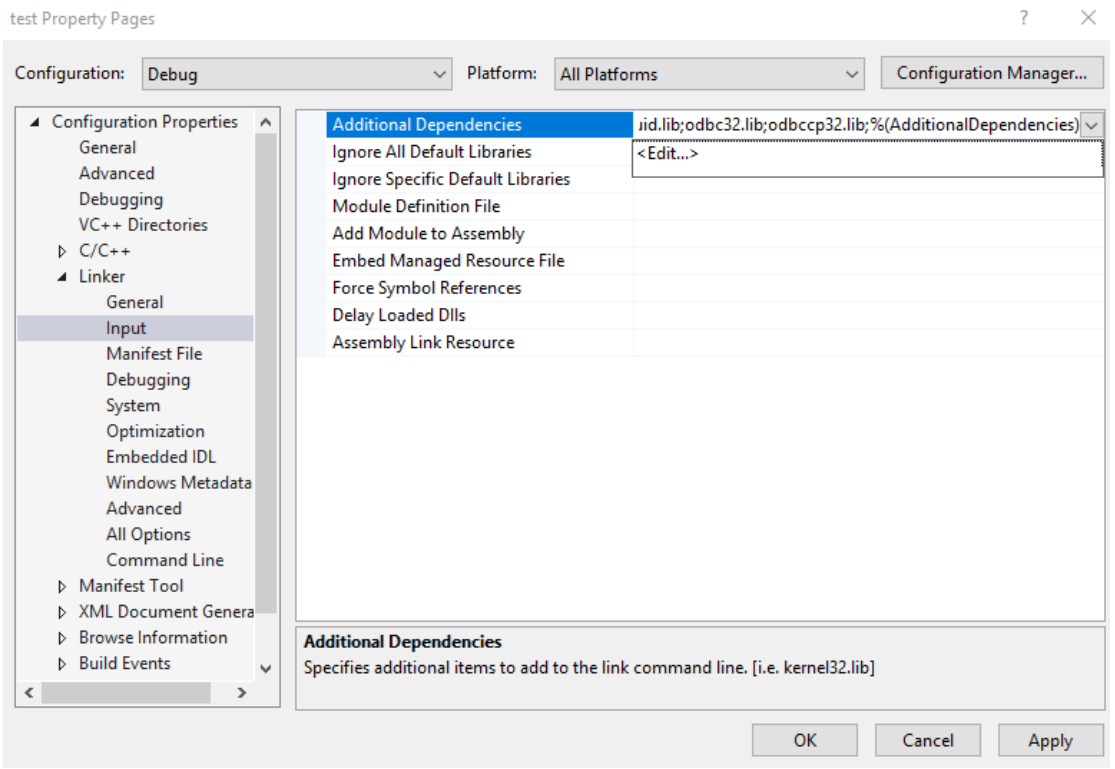
（[Programming Language] select **C++ or C** ， [Platform] select **Windows**， [Template] select **Console App**）



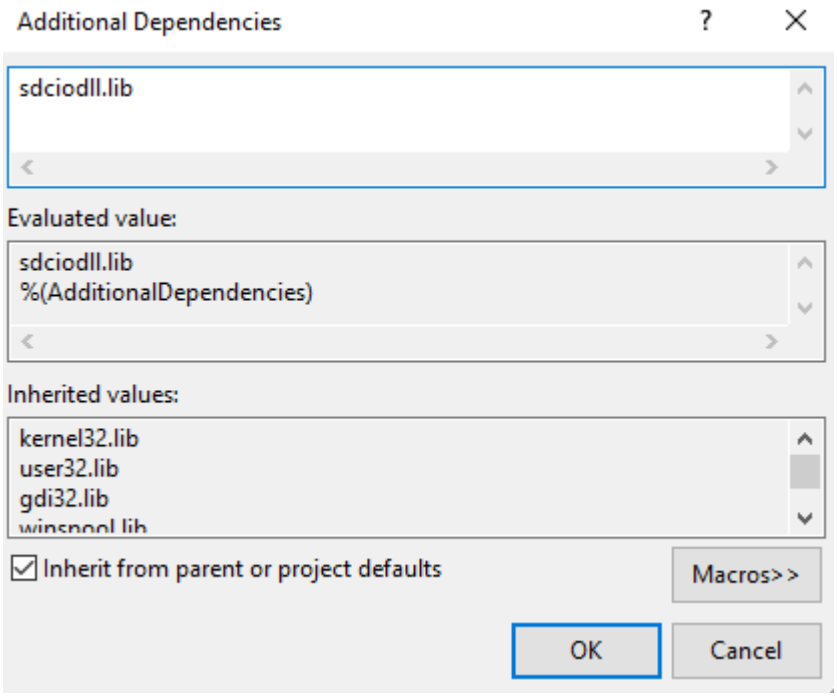
5.2. Add DLL file to C/C++ /General/ **Additional Include Directories**



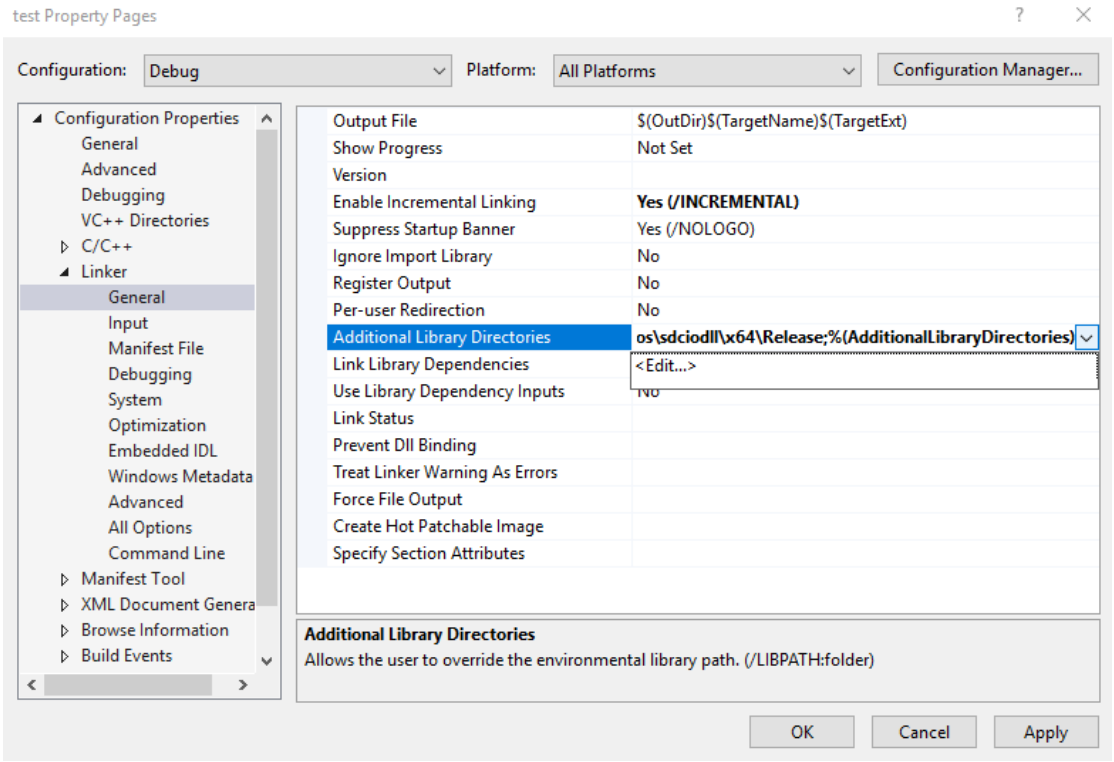
5.3. Add DLL file to Linker/ Input / **Additional Dependencies**



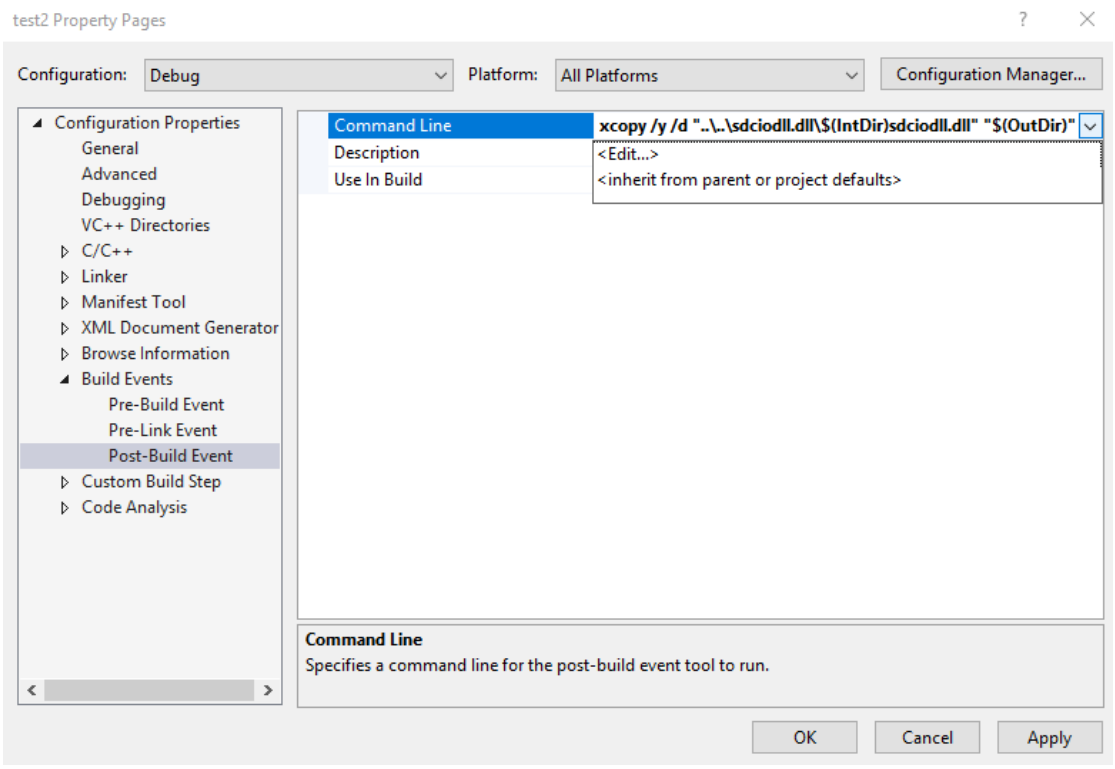
5.4. Add DLL to **Additional Dependencies**



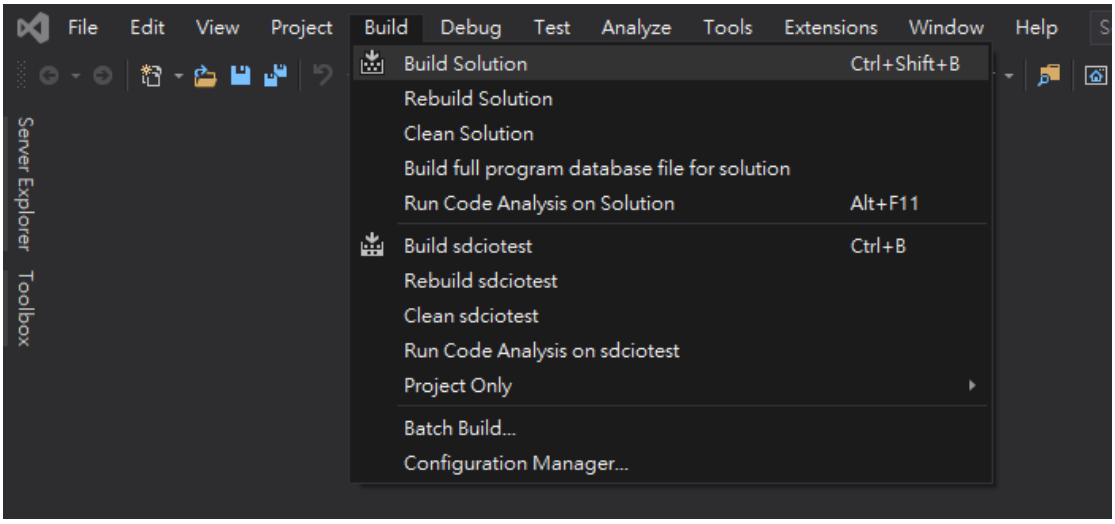
5.5. Add sdciodll.lib to Linker/General/ **Additional Library Directories**

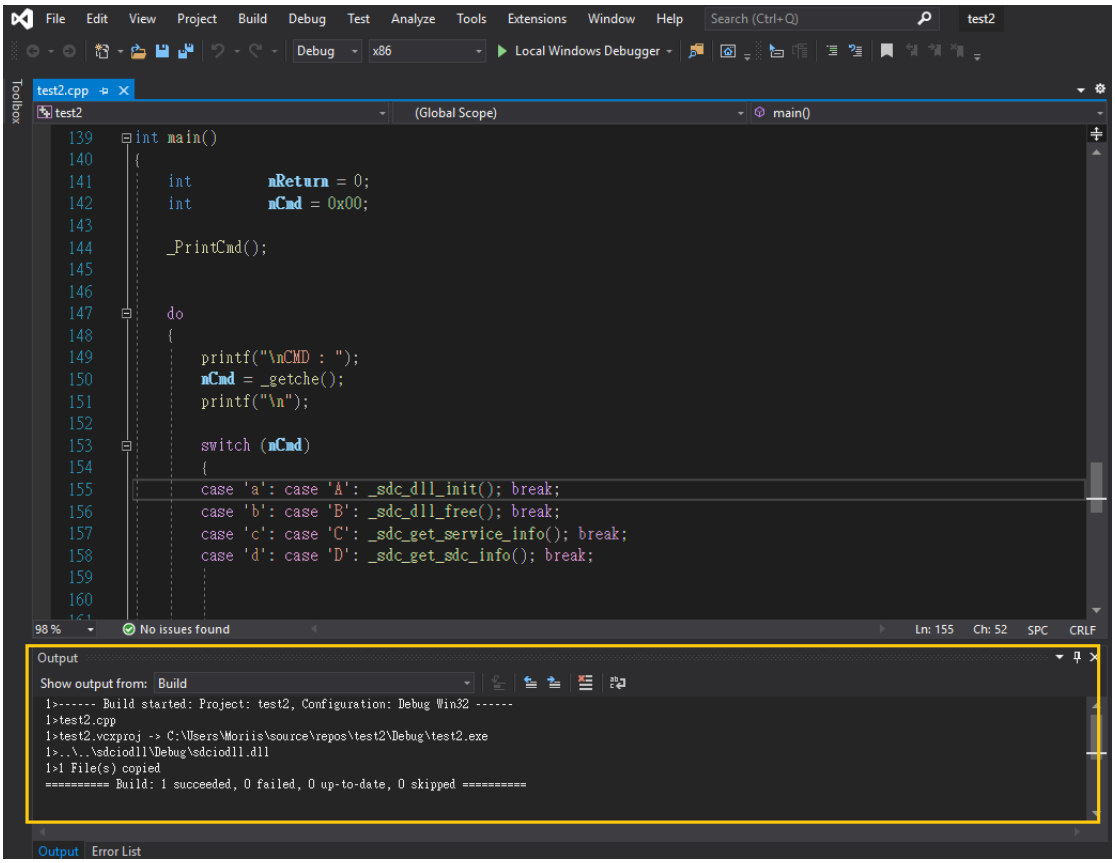


5.6. Add following copy command into Build Events/Post-Build Event/ **Command Line**



5.7. Select [Build> Build Solution] on the menu bar to create an application. According to your version of Visual Studio, the "Output" window in Visual Studio should have an example similar to the following:




File Edit View Project Build Debug Test Analyze Tools Extensions Window Help
Search (Ctrl+Q)
test2
Debug
x86
Local Windows Debugger
Toolbox
test2.cpp
test2
(Global Scope)
main()
139 int main()
140 {
141 int nReturn = 0;
142 int nCmd = 0x00;
143
144 _PrintCmd();
145
146
147 do
148 {
149 printf("\nCMD : ");
150 nCmd = _getche();
151 printf("\n");
152
153 switch (nCmd)
154 {
155 case 'a': case 'A': _sdc_dll_init(); break;
156 case 'b': case 'B': _sdc_dll_free(); break;
157 case 'c': case 'C': _sdc_get_service_info(); break;
158 case 'd': case 'D': _sdc_get_sdc_info(); break;
159
160
98 %
No issues found
Ln: 155 Ch: 52 SPC CRLF
Output
Show output from: Build
1>------ Build started: Project: test2, Configuration: Debug Win32 ------
1>test2.cpp
1>test2.vcxproj -> C:\Users\Moriis\source\repos\test2\Debug\test2.exe
1>..\..\sdciodll\Debug\sdciodll.dll
1>1 File(s) copied
========== Build: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ==========
Output
Error List

6. Appendix

This chapter introduce technology detail that user came with usually. In addition, you could contact with us for detail technical product information.

In this appendix, we cover the following topics.

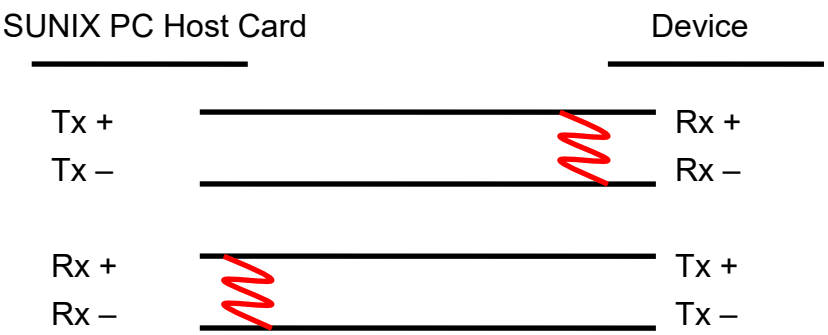
6.1. Technology Topics

(1) Termination Resistor Setting (Default: Disable)

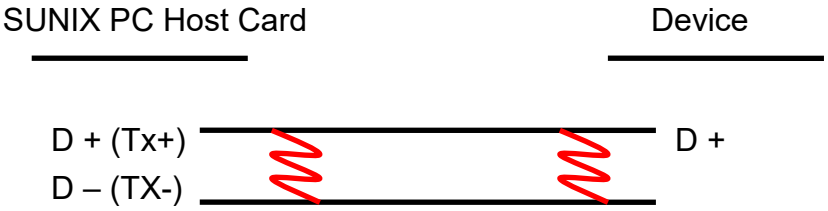
For RS-422/485 serial communications, when an electrical signal travels through two different resistance junctions in a transmission line, the impedance mismatch will sometimes cause signal reflection. Signal reflection causes signal distortion, which in turn will contribute communication errors. The 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:



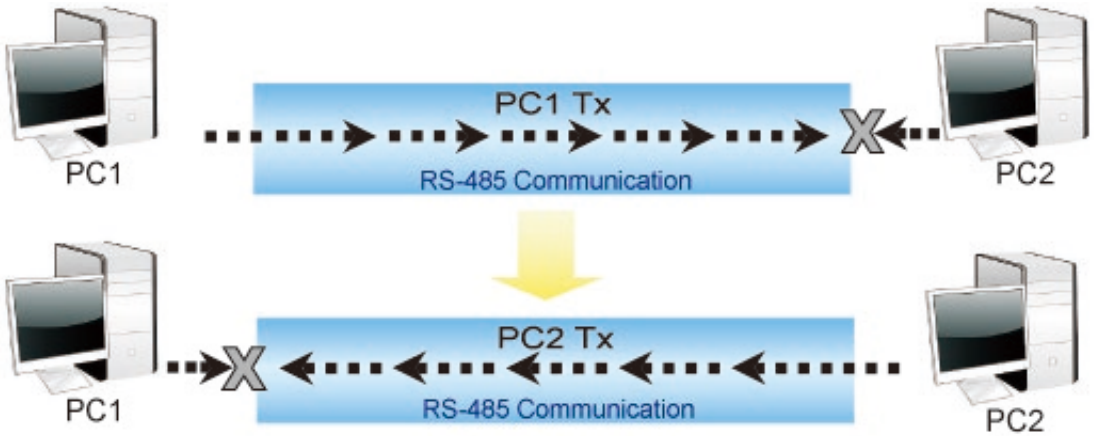
RS-485 working model with termination resistor:



To maximum RS-485 driving ability, manufactory default setting is Disable. (Disable 120 ohms termination resistors across the two wires).

(2) RS-485 Carrier Sense Technology (Default: Enable)

RS-485 Carrier Sense technology is the data flow control under RS-485 half duplex (one-way traffic) communicating. It manages data flow between computers or devices or between nodes in a RS-485 network, so that the data can be handled at an efficient pace



RS-485 Carrier Sense technology will check the state of RS-485 communication bus. If the bus is idle, it starts transmission. If the bus is not idle

(some data flows in the bus), then it will postpone the transmission of UART until the bus is idle. 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.

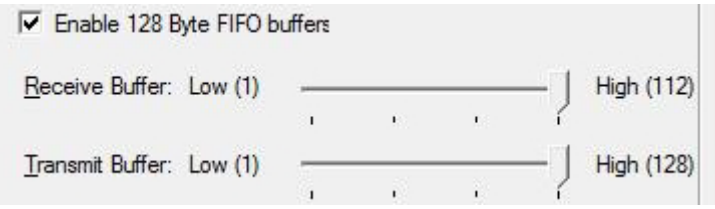
(3) Should I enable auto flow control features?

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.

(4) How large FIFO length I should set?

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.



6.2. Customer Service Information

Customer satisfaction is our number one concern, and to ensure that customers receive the full benefit of our products, SUNIX services has been

set up to provide technical support, driver updates, product information, and user's manual updates.

The following services are provided

E-mail for technical support

..... info@sunix.com

World Wide Web (WWW) Site for product information:

..... http://www.sunix.com