USER'S MANUAL

PCI Express RS-232 Communication Board

English Version

Second Edition, October 2009

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User's Manual

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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.

Table of Contents

WHQL Certification Approval

The Designed for Microsoft Windows 32/64-bit operation system WHQL logo identifies products that meet Microsoft's quality standards, SUNIX I/O products carry with this logo and listed on Windows Catalog. WHQL logo includes below operation system version

Microsoft Windows Client: Windows 2000 / XP / Vista / 7 (X86/X64)
Microsoft Windows Server: Windows 2003 / 2008 (X86/X64)

1.
Introduction

RS-232 Golden I/O series, a line of PCI Express Multi-port Serial Communication Board, is designed to meet PCI Express Base Specification Ver1.1 (Compliable with PCI Express General 2 Specification). Its 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.

These boards offer independent serial ports for connecting terminals, modems, printers, scanners, cash registers, bar code readers, keypads, numeric displays, electrical scales, data acquisition equipment, and other serial devices for the PC and compatible systems. This board offers a reliable and high performance solution for serial multi-port communications.

The following topics covered in this chapter:

- **Overview**
- **Package Checklist**
- **Product Features**
- **Product Specifications**

Overview

Thanks for purchasing SUNIX PCI Express Multi-Port Communication Board; it is compatible with RS-232.V24 standard serial interfaces. User can expand Multi RS-232 ports on PC-based system by installing in PCI Express x1, x2, x4, x8 and x16 lane slots. Each port has on-chip hardware and software flow control, a built-in 128-byte Tx/Rx FIFO, and WHQL certificated device drivers. This board is designed with SUNIX 16C950 UART controller and as well built with many of SUNIX advanced features and technologies, making it the best solution for commercial and industrial automation applications.

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. Hardware:
    Serial Communication Board:
        RS-232 PCI Express Multi-Port Communication Board × 1

    Cable: (Depend on what product you bought)

        * 4 ports PCI series: DB44M to 4 ports DB9/25 Male Cable × 1

        * 8 ports PCI series: DB62M to 8 ports DB9/25 Male Cable × 1

2. CD Driver
3. Quick Installation Guide
4. User's Manual (This document)

Product Features

- Expands Multi RS-232 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 1.1
- Supports x1, x2, x4, x8, x16 (lane) PCI Express Bus connector keys.
- Data transmission speeds up to 115.2Kbps (*921.6Kbps Optional).
- On-chip hardware auto flow control to guarantee no data loss.
- Built-in ± 15KV ESD protection for all serial signals.
- 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 High Speed RS-232 Card (**H** Version) baud rate setting supports 921.6Kpbs, and please refers to the Chapter5 Appendix, Product Family for detail.

Product Specifications

Serial Communication

Interface	RS-232	**Signal**	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
Controller	SUNIX SUN1999 (16C950 UART Compatible)	**Baud rate**	50bps ~115.2Kbps (921.6Kpbs Optional)
BUS	PCI Express one lane (x1)	**Stop bit**	1, 1.5, 2
No. of Port	2/4/8/16-port	**Parity**	even, odd, none, mark, space
IRQ & IO	Assigned by System	**Flow Control**	None, Xon/Xoff, RTS/CTS
FIFO	128byte Hardware	**Connector**	DB9 / 25 Male
Protection	±15KV ESD protection for each signal Human Body Model (HBM)		

Driver Support

Microsoft Client	XP / Vista / 7 (X86/X64)
Microsoft Server	2000 / 2003 / 2008 (X86/X64)
Microsoft Embedded	XP Embedded / POS Ready 2009 / Embedded System 2009
Linux	Linux 2.4.x / 2.6.x
DOS	DOS
FreeBSD	FreeBSD 5.3~5.5 / 6.0~6.4
QNX	QNX 6.3.2 / 6.4.0
IBM OS/2*	WARP 3 / WARP 4
SCO UnixWare*	UnixWare 7.1.3 / 7.1.4 Open Server 5.0.7 / 6.0
Sun Microsystems*	Solaris 10
Note : *" * " Supported by special inquiry.*	

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 (X86/X64) Microsoft Server: 2000 / 2003 / 2008 (X86/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)

2.
Hardware Installation

This chapter includes information about hardware installation for RS-232 PCI Express Multi-Port Communication Board. The following topics are covered:

- **Hardware Installation**
- **Pin Assignments**

Hardware Installation

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

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.

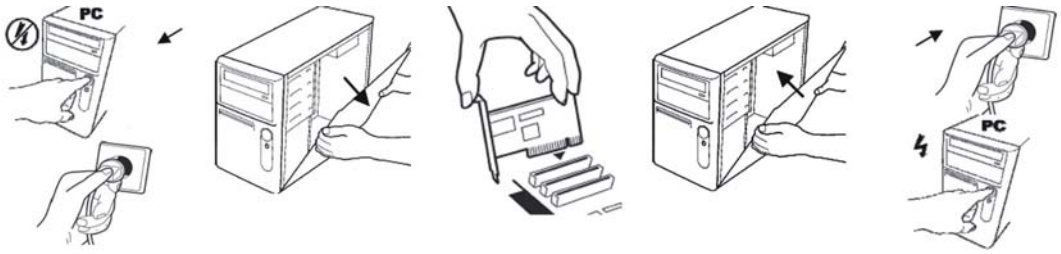
Step 3: Remove the cover from the computer case.

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

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

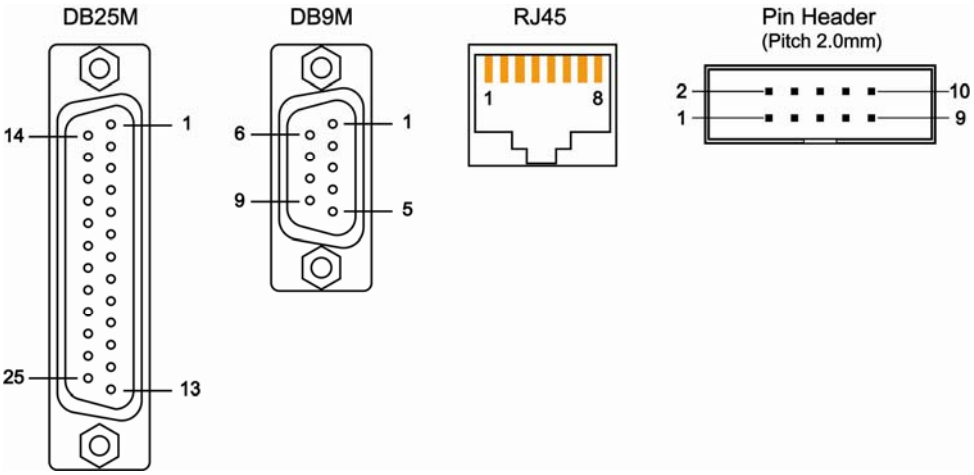
Step 6: Place the cover back onto the computer.

Step 7: Insert the plug into the plug socket.



Pin Assignment

This chapter provides the pin assignments for SUNIX PCI Express Multi-Port Communication Board, as well as the pin assignments for the optional accessories.

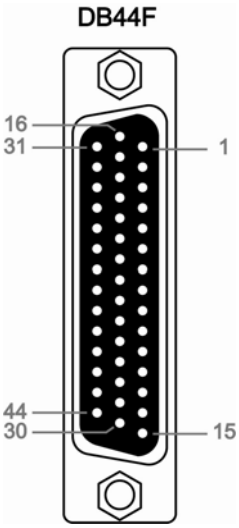


PIN	DB9M	DB25M	RJ45	Pin Header
DCD	1	8	7	1
RxD	2	3	6	3
TxD	3	2	3	5
DTR	4	20	2	7
GND	5	7	4	9
DSR	6	6	8	2
RTS	7	4	1	4
CTS	8	5	5	6
RI	9	22	-	8

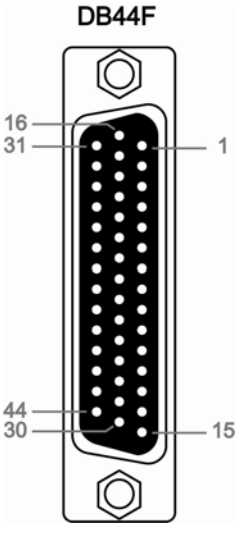
Note:

8-port RS-232 card product line does not build RI signal.

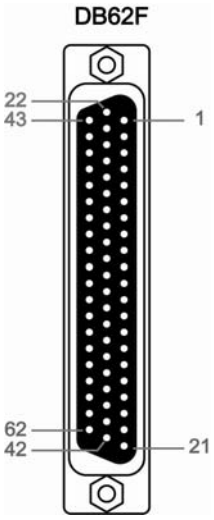
SUNIX 2-port RS-232 Low Profile Card builds DB44F connector on board.

SUNIX DB44 Female 2 ports Serial Communication Boards Pin Assignment				
	Port / Signal	1	2	
RS-232	TxD	3	7	
	RxD	32	36	
	RTS	2	6	
	CTS	31	35	
	DSR	18	34	
	GND	4	21	
	DCD	17	22	
	DTR	1	5	
	RI	16	20	

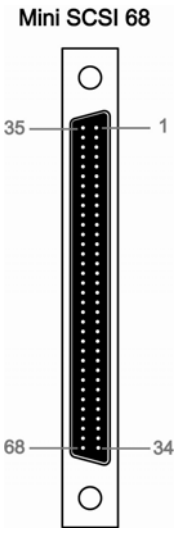
SUNIX 4-port RS-232 Card builds DB44F connector on board.

SUNIX DB44 Female 4 ports Serial Communication Boards Pin Assignment						
	Port / Signal	1	2	3	4	
RS-232	TxD	3	7	11	15	
	RxD	32	36	40	44	
	RTS	2	6	10	14	
	CTS	31	35	39	43	
	DSR	18	34	38	42	
	GND	4	21	25	29	
	DCD	17	22	26	30	
	DTR	1	5	9	13	
	RI	16	20	24	28	

SUNIX 8-port RS-232 Card builds DB62F connector on board.

SUNIX DB62 Female 8 ports Serial Communication Boards Pin Assignment										
	Port / Signal	1	2	3	4	5	6	7	8	
RS-232	TxD	24	45	8	50	11	55	58	21	
	RxD	44	47	49	52	54	57	60	62	
	RTS	23	26	28	31	34	36	39	41	
	CTS	2	5	7	10	13	15	18	20	
	DSR	3	3	29	32	37	37	16	42	
	GND	1	4	6	9	12	14	17	19	
	DCD	22	25	27	30	33	35	38	40	
	DTR	43	46	48	51	53	56	59	61	
	RI	-	-	-	-	-	-	-	-	

SUNIX 8-port RS-232 Low Profile Card builds DB68F connector on board.

SUNIX DB68 Female 8 ports Serial Communication Boards Pin Assignment										
	Port / Signal	1	2	3	4	5	6	7	8	
RS-232	TxD	6	15	24	33	63	54	45	36	
	RxD	3	12	21	30	66	57	48	39	
	RTS	7	16	25	34	62	53	44	35	
	CTS	4	13	22	31	65	56	47	38	
	DSR	2	11	20	29	67	58	49	40	
	GND	8	9	26	27	61	60	43	42	
	DCD	1	10	19	28	68	59	50	41	
	DTR	5	14	23	32	64	55	46	37	
	RI	-	-	-	-	-	-	-	-	

3.
Driver Installation

After installing the RS-232 PCI Express Multi-Port Communication Board in your system successfully, please follow the step by step software installation guide to confirm how to install appropriate driver and configure the serial port settings.

The driver for PCI Express serial board supports Windows and Linux operating systems, and you can select your requirement in the following chapter:

The following topics covered in this chapter:

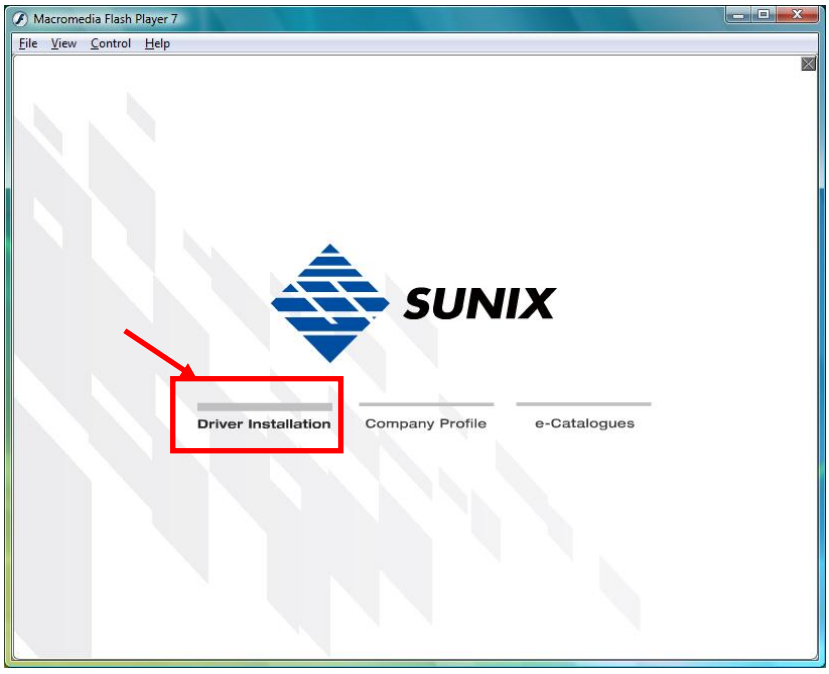
- **Windows Driver Install**
- **Windows Driver Uninstall**
- **Windows Verify Installation**
- **Linux Driver Install**

Windows Driver Install

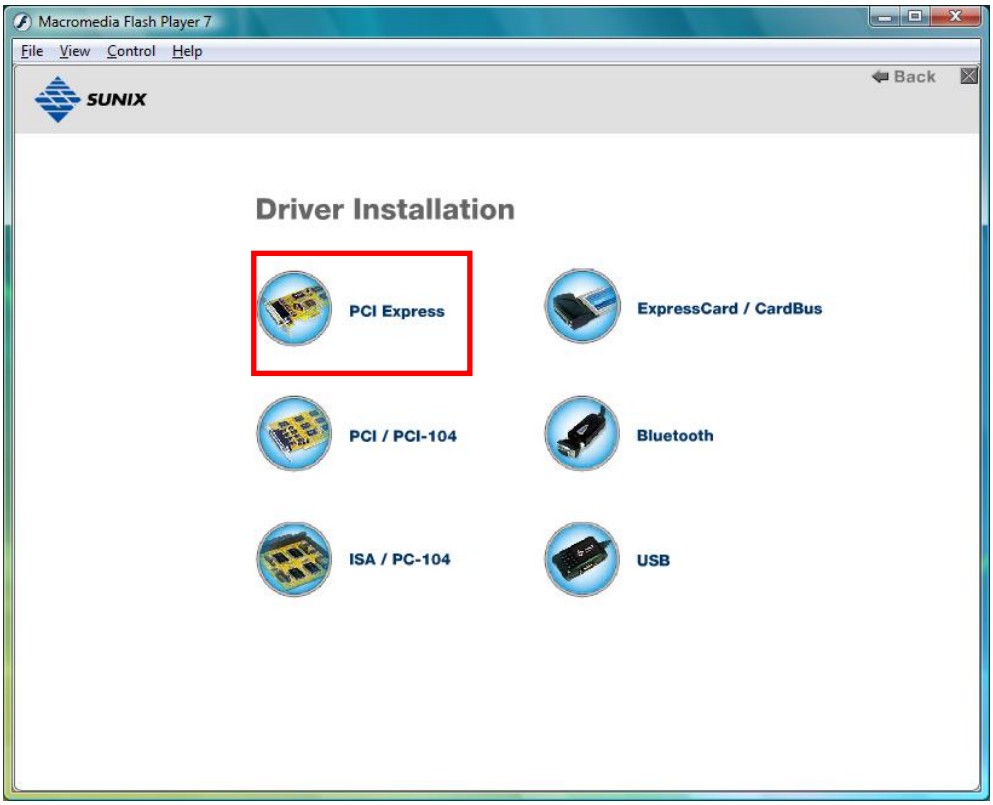
Please refer to following instructions to install the driver for the first time under Windows operation system. You will need to plug the board in an available PCI Express slot first, before installing the driver.

(1) After the board is physically installed and the PC boots up, system will detect the PCI Express Serial card and prompt for driver installation wizard, please choose cancel.

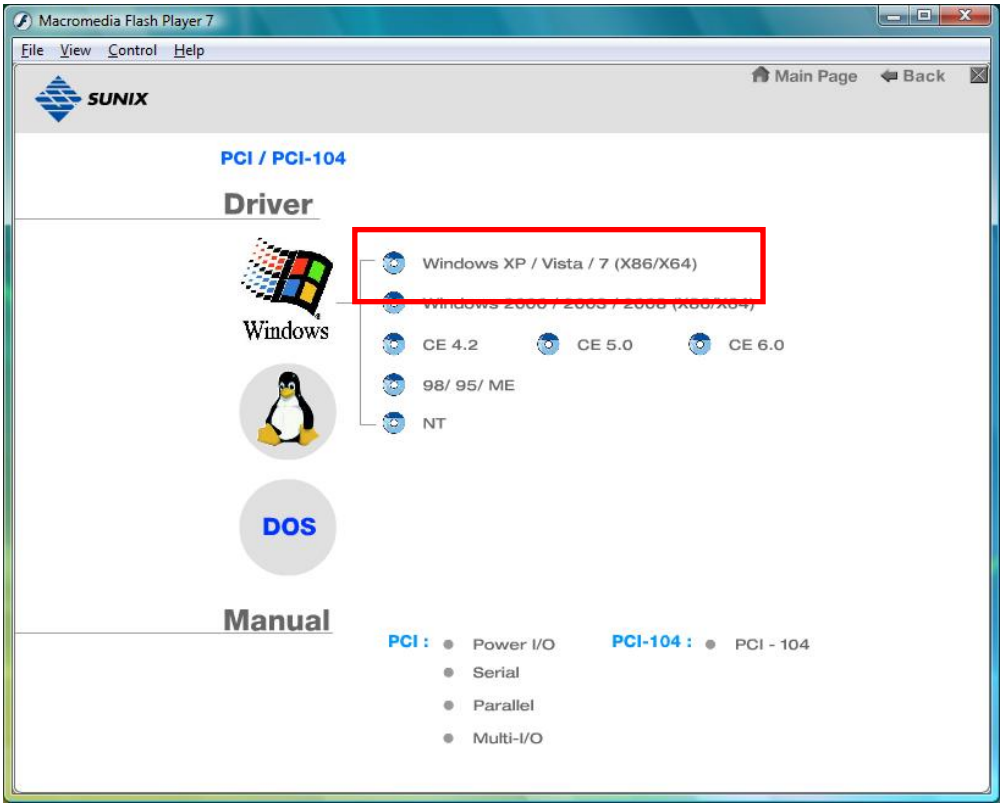
(2) Put CD driver bound with product in your CD / DVD ROM drive.
Please select autorun.exe., then select "**Driver Installation**".



(3) Please select the product interface you bought, such as PCI Express.



(4) Please select the O.S. version you are using, such as Windows Vista. Then system will process the driver installation step automatically.



(5) Click “**Next**” to continue driver installation steps.

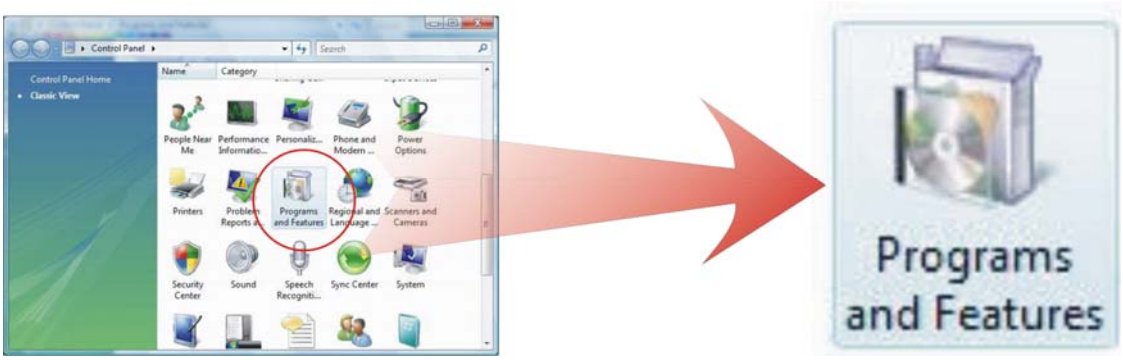
(6) Click “**Finish**” to end installation steps. If SUNIX I/O card install correct in your system, you can read “**V**” icon in this picture.

Windows Driver Uninstall

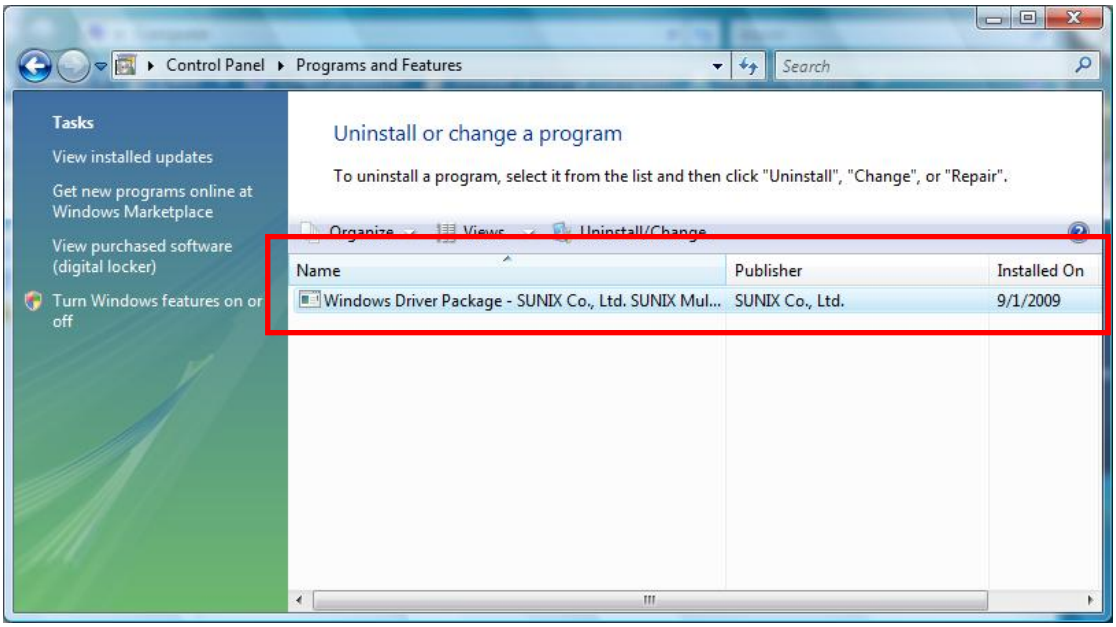
Please refer to following instructions uninstall Multi-I/O card driver.

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

Start > Controller Panel > Programs and Features



(2) Entry Uninstall or change a program page, and double click "**Windows Driver Package – SUNIX Co., Ltd SUNIX Multi-I/O Controller**" to process driver uninstallation procedure.

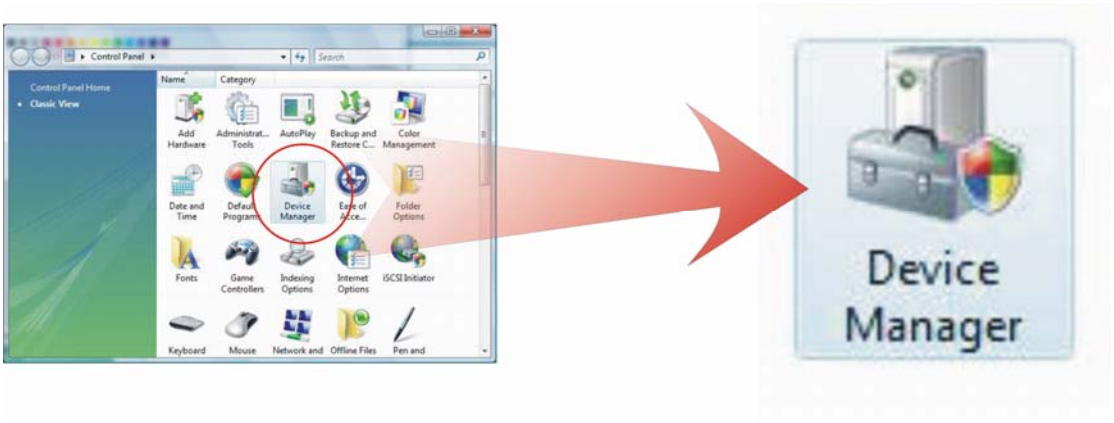


Windows Verify Installation

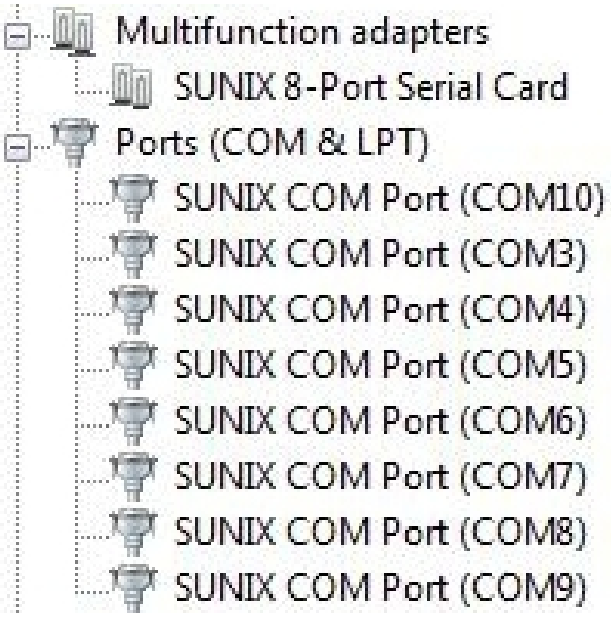
You can use Windows "**Device Manager**" to verify proper installation.

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

Start > Controller Panel > Device Manager



(2) In the Device Manager window, you should see this board under **Multifunction adapters** (8-port RS-232 Serial Card in this example). You should also see SUNIX COM port under **Ports (COM & LPT)**.



Linux Driver Install

This installation guide describes the procedures to install the PCI serial board in Linux kernel 2.4.x and 2.6.x. Please refer to “snx_Vx.x.x.x.tar.gz” for driver installation detail in CD Driver (Linux folder) directory.

: \ PCI_IO \ Linux

(1) Driver install

Please create a directory under root directory, e.g /temp, do commands:

```
# cd /
# mkdir temp
```

After get driver file "snx_Vx.x.x.x.tar.gz". Copy file to /temp directory, then extract and install, do commands:

```
# cp snx_Vx.x.x.x.tar.gz /temp
# cd /temp
# tar xvfz snx_Vx.x.x.x.tar.gz
# cd /temp/snx
# make clean ; make install
```

```
************************************************************
* If system is Suse 9.0 and errors occur when
* "make clean ; make install", do commands:
*
* # cd /usr/src/linux/
* # make cloneconfig
* # make dep
*
* then do "make clean ; make install" again in /temp/snx
************************************************************
```

Load driver module, do command:

```
# modprobe snx
or
# insmod /temp/snx/driver/snx.ko (snx.o for kernel 2.4)
```

Check driver module, do command:
lsmod | grep snx

Unload driver, do command:
rmmod snx

(2) Device node creation

Each serial port has one device node which is named "ttySNX?", maximum up to 32 serial ports.

Each parallel port has two device node which is name "lp?" and "parport?". This step will backup lp2~lp3 and parport2~parport3 to lp?.bak and parport?.bak in /dev for your system first. Then, create lp2~lp3 and parport2~parport3 in /dev for sunix driver, maximum up tp 2 parallel ports.

This setp will be done when do "make clean ; make install", if device nodes aren't in /dev, do commands:

cd /temp/snx/snxmknod
./snxmknod

This will create device nodes in /dev.

If there are more than two boards installed, serial port device nameing convention please refer to F1.

4.
Port Configuration

This chapter shows all Serial COM port settings that user came with usually, such as COM port number, FIFO length(size), baud rate, IO address and others.

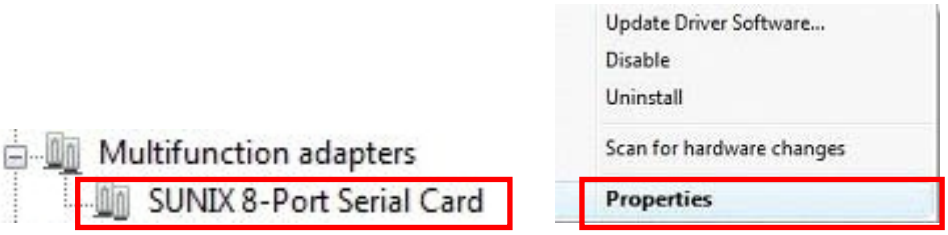
The following topics covered in this chapter:

- **Configure Serial Port Settings**
- **COM Port Number Settings**
- **COM I/O Resource**
- **FIFO Settings**

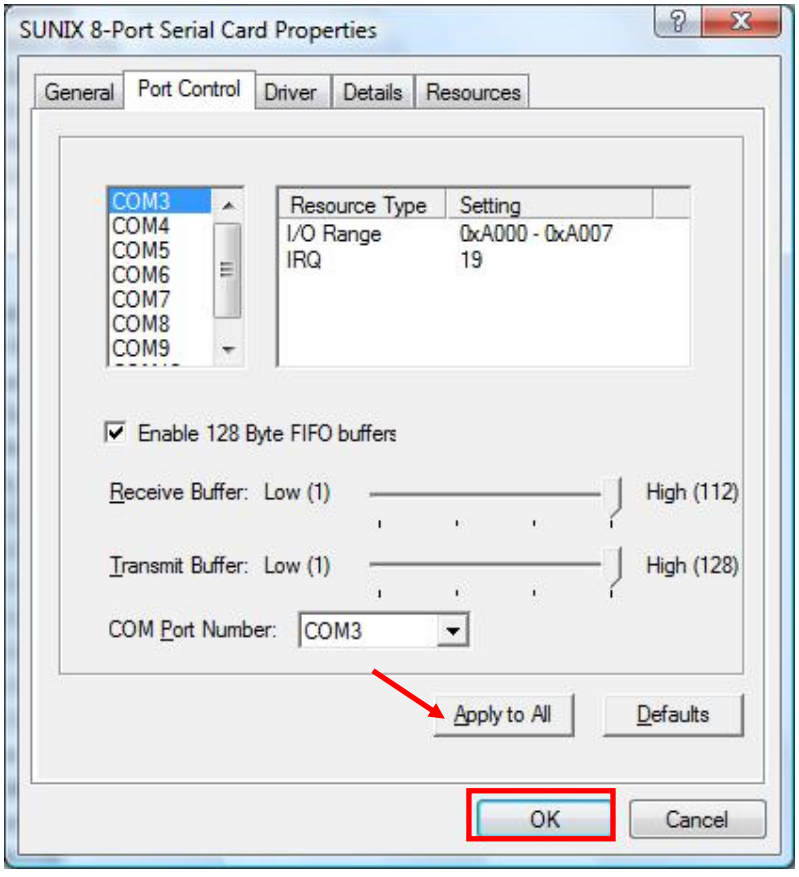
Configure Serial Port Settings

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**".

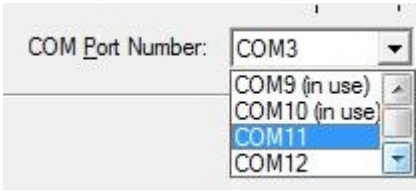


(3) On the "**Port Control**" tab, select a port to configure.
* Click "**OK**" to approve the settings for the selected port.
* Click "**Apply to All**" to approve the settings for all COM ports.



COM Port Number Settings

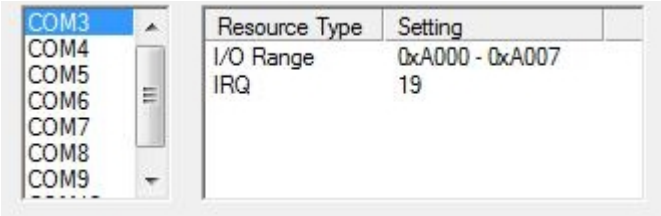
Under Port Number, select a COM number to assign to the serial port. Click "**OK**" to approve the settings for the selected port.



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

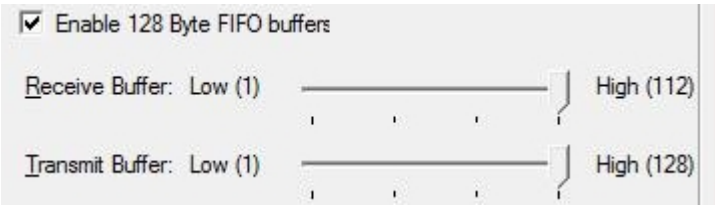
COM I/O Resource

User can read the COM "**IO Range**" and "**IRQ**" located in system by selecting COM port.



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 "**Apply to All**" to change this setting for all serial ports on the board. Then click "**OK**" to save the settings.



5.
Appendix

This chapter shows some problems that user came with usually. Also you can check it if the PCI Express serial board can not work properly in your system after following hardware and software installation steps. In addition, you could contact with us for detail technical product information.

In this appendix, we cover the following topics.

- **Troubleshooting**
- **Product Family**
- **Contact Information**

Troubleshooting

1. System fails to find the PCI Express serial board or COM port.

A: 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.

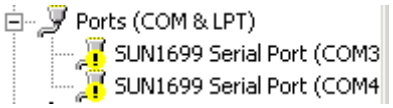
d. The mainboard does not have an available IRQ for the PCI Express serial board. Enter the PC.s BIOS and make sure an IRQ setting is available in the PCI/PnP settings.

e. The board itself might be defective. You can try another mainboard testing this board working or not.

2. There is a blue screen when I entry operation system.

A: 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.

3. There are some exclamation marks in device manager and serial ports can not work properly.



A: It caused by the wrong driver installing or hardware settings. Please turn off your computer firtly and re-install hardware and software, especially re-install the correct driver.

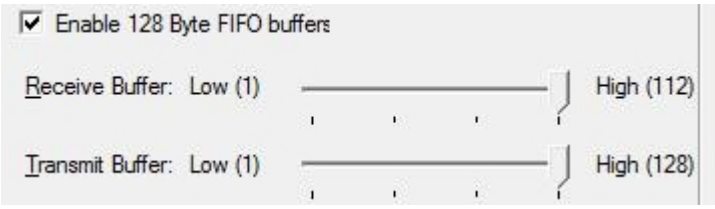
4. Should I enable auto flow control features?

A: 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.

5. How large FIFO length I should set?

A: FIFO (First-in-First-out) buffers are used to reduce the frequency of interrupt processes for UART chips. The size of the buffer will determines 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.



Product Family

SUNIX provides kinds of RS-232/422/485 interface cards for customer selection, including PCI Express, PCI, PCI/104, CardBus, and ExpressCard. Please refer to the product family table for reference.

RS-232 PCI Express Interface						
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Power output**	**Bracket**	**Model NO.**
16	Mini SCSI 68 Female	921.6Kbps	±15KV	-	Standard	SER1640A
8	DB62 Female	115.2 kbps		-	Standard	SER5466A
		921.6Kbps		-		SER5466H
	Mini SCSI 68 Female	115.2 kbps		-	Low profile	SER5466AL
		921.6Kbps		-		SER5466HL
4	DB44 Female	115.2 kbps		-	Standard	SER5456A
				5V/12V		SER5456P
				-	Low profile	SER5456AL
				5V/12V		SER5456PL
		921.6Kbps		-	Standard	SER5456H
				5V/12V		SER5456PH
				-	Low profile	SER5456HL
				5V/12V		SER5456PHL
2	DB9 Male	115.2 kbps		-	Standard	SER5437A
				5V/12V		SER5437P
	DB44 Female			-	Low profile	SER5437AL
				5V/12V		SER5437PL
	DB9 Male	921.6Kbps		-	Standard	SER5437H
				5V/12V		SER5437PH
	DB44 Female			-	Low profile	SER5437HL
				5V/12V		SER5437PHL

RS-232 PCI Interface						
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Power output**	**Bracket**	**Model NO.**
8	Mini SCSI 68 Female	921.6Kbps	±15KV	-	Standard	SER1600A
	DB62 Female	115.2Kbps	±2KV	-	Standard	SER5066A
	Mini SCSI 68 Female			-	Low profile	SER5066AL
	5x2 Pin Header				Standard	SER5066U
				-	Low profile	SER5066UL
	DB62 Female	921.6Kbps	±15KV	-	Standard	SER5066H
	Mini SCSI 68 Female			-	Low profile	SER5066HL
	5x2 Pin Header			-	Standard	SER5066UH
				-	Low profile	SER5066UHL
4	DB44 Female	115.2Kbps	±2KV	-	Standard	SER5056A
				5V/12V		SER5056P
				-	Low profile	SER5056AL
				5V/12V		SER5056PL
	5x2 Pin Header			-	Standard	SER5056U
				-	Low profile	SER5056UL
	DB44 Female	921.6Kbps	±15KV	-	Standard	SER5056H
				-	Low profile	SER5056HL
				5V/12V	Standard	SER5056PH
	5x2 Pin Header			-		SER5056UH
				-	Low profile	SER5056UHL
	DB44 Female			5V/12V		SER5056PHL
2	DB9 Male	115.2Kbps	±2KV	-	Standard	SER5037A
				5V/12V		SER5037P
	5x2 Pin Header			-		SER5037U
	DB44 Female			-	Low profile	SER5037AL
				5V/12V		SER5037PL
	5x2 Pin Header			-		SER5037UL
	DB9 Male	921.6Kbps	±15KV	-	Standard	SER5037H
				5V/12V		SER5037PH
	5x2 Pin Header			-		SER5037UH
	DB44 Female			-	Low profile	SER5037HL
				5V/12V		SER5037PHL
1	DB9 Male	115.2Kbps	±2KV	-	Standard	SER5027A
				5V/12V		SER5027P
				-	Low profile	SER5027AL
				5V/12V		SER5027PL
		921.6Kbps	±15KV	-	Standard	SER5027H
				5V/12V		SER5027PH
				-	Low profile	SER5027HL
				5V/12V		SER5027PHL
	5x2 Pin Header	115.2Kbps	±2KV	-	Standard	SER5027U
					Low profile	SER5027UL
		921.6Kbps	±15KV		Standard	SER5027UH

RS-232 ExpressCard Interface					
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Bracket**	**Model NO.**
4	DB44 Female	921.6Kbps	±15KV	34mm	ECS4000
2				34mm	ECS2000
1	DB9 Male			34mm	ECS1000

RS-232 CardBus Interface					
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Bracket**	**Model NO.**
4	DB44 Female	115.2Kbps	±15KV	54mm	CBS4000
2				54mm	CBS2000
1	DB9 Male			54mm	CBS1000

RS-232 PCI/104 Interface				
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Model NO.**
8	5x2 Pin Header	115.2Kbps	±2KV	SER5337A
4				SER5356A
2				SER5366A

PCI Express Interface

Port	Connecter	Baud Rate	ESD Protection	Surge Protection	Isolation Protection	Model NO.
8	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-E2108SI
				-	-	IPC-E2108
4	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-E2104SI
				-	-	IPC-E2104
2	DB9 Male	921.6Kbps	±15KV	600W	2.5KV	IPC-E2102SI
				-	-	IPC-E2102

PCI Interface

Port	Connecter	Baud Rate	ESD Protection	Surge Protection	Isolation Protection	Model NO.
16	DB79 Female	921.6Kbps	±15KV	-	-	IPC-P2116
8	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-P2108SI
				-	-	IPC-P2108
4	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-P2104SI
				-	-	IPC-P2104
2	DB9 Male	921.6Kbps	±15KV	600W	2.5KV	IPC-P2102SI
				-	-	IPC-P2102

PCI/104 Interface

Port	Connecter	Baud Rate	ESD Protection	Surge Protection	Isolation Protection	Model NO.
8	5x2 Pin Header	921.6Kbps	±15KV	600W	2.5KV	IPC-B2108SI
				-	-	IPC-B2108
4	5x2 Pin Header	921.6Kbps	±15KV	600W	2.5KV	IPC-B2104SI
				-	-	IPC-B2104
2	5x2 Pin Header	921.6Kbps	±15KV	600W	2.5KV	IPC-B2102SI
				-	-	IPC-B2102

RS-232/422/485 PCI Express Interface						
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Surge Protection**	**Isolation Protection**	**Model NO.**
8	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-E3108SI
				-	-	IPC-E3108
4	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-E3104SI
				-	-	IPC-E3104

RS-232/422/485 PCI Interface						
Port	**Connecter**	**Baud Rate**	**ESD Protection**	**Surge Protection**	**Isolation Protection**	**Model NO.**
8	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-P3108SI
				-	-	IPC-P3108
4	DB44 Female	921.6Kbps	±15KV	600W	2.5KV	IPC-P3104SI
				-	-	IPC-P3104

Contact 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.tw

World Wide Web (WWW) Site for product information:

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