VXC Cards User's Manual

VXC-112(A)U/112iAU, VXC-142U/142iU, VXC-182iU, VXC-114U/114iAU, VXC-144U/144iU

Warranty

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

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1. Introduction

The VXC multi-port serial card enables user to increase additional communication ports on the PC. It's the on-top-of-the-list choice while you are managing to connect lots of outer devices through your PC; every VXC card ensures you fluent communication in both time-critical applications and industrial fields. With simply a VXC card, it has never been that easy for integration of a PC with many other devices, like PLCs, FAB machines, meters, controller devices, laboratory instruments, modems, card readers, serial printers, RFID readers, bar code readers, sensors, etc.

COM-Selector:

Each VXC card is equipped with a COM-Selector (Dip Switch) for the COM port number selection (automatically or manually). It's an important and innovative feature for the VXC family.

The COM-Selector provides the following advantages:

- Simplifies the COM port number selection instead of using configuration utility programs.
- Users can specify the COM port number of the VXC card as exactly what they want, no matter which PCI slot it is located at.
- Automatically select an available COM port number is supported by setting the COM-Selector (dip switch) to 0 (default).

Easy COM Port
Selection by Dip-Switch

- No need to install configuration utility and to study its operation for different OS.
- Prevents confusion. Other PnP COM port devices easily confuse users because of adopting the dynamic COM port number setting.
- Easy replacement of an existing card by setting the dip-switch to be the same COM port number.
- Great for mass system installation, since setting the dip-switch to be the same COM port number is very easy.

ESD Protection

The VXC cards offer TVS diode ESD protection technology, protecting your system from being damaged by the high potential voltages.

TVS Diode Operation
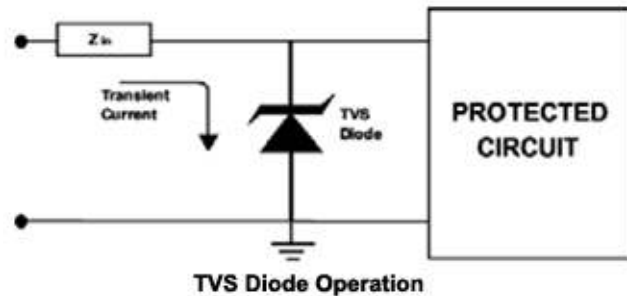
Under normal operating conditions, the TVS diode presents high impedance (appears as an open circuit) to the protected component. When the voltage is beyond the limits, the TVS diode avalanches providing a low impedance path for the transient current. As a result, the transient current is diverted away from the protected components and shunted through the TVS diode. The device returns to a high impedance state after the transient threat passes.

Up To 128 Bytes Hardware FIFO:

The VXC cards offer TVS diode ESD protection technology, protecting your system from being damaged by the high potential voltages.

Software gets data in dynamic timing.

Hardware puts data in fixed speed.
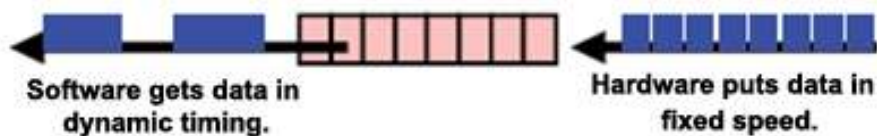
VXC Cards are equipped with 16 or 128 bytes hardware FIFO for each port. Large hardware FIFO is useful to prevent data lost when your system works on heavy loading, and even helpful while you are running on a multi-task operating system, such as Windows, Linux…etc.

Up To 128 KB COM Port Buffer:

The VXC card driver for Windows features a 128 KB maximum software FIFO for each port (default is 4 KB). It's practical for large file transmission.

Self-Tuner:

The VXC card is equipped with a "Self-Tuner" chip to control the sending/receiving direction of RS-485 ports automatically.

Without the help of Self-Tuner, users need to enable RS-485 transmitter before sending, and disable the transmitter after finishing sending. The timing to enable and disable transmitter (direction control) is the major issue on many communication problems, and it is very difficult to debug.

The built-in Self-Tuner on VXC cards effectively gets rid of this direction control issue and also simplifies software programming for communication applications.

Isolation:

Some VXC cards offer photo isolation to protect your computer and equipment against damages in harsh environment.

Photo coupler is a device that uses a short optical transmission path to transfer a signal between elements of a circuit, typically a transmitter and a receiver. This keeping them electrically isolated — since the signal goes from an electrical signal to an optical signal, the electrical contact along the path is broken.

Photo Coupler Operation

It can help cutting down on ground loops, common mode voltages and block voltage spikes, provide electrical isolation, and offer significant protection from serious over-voltage conditions in one circuit affecting the other.
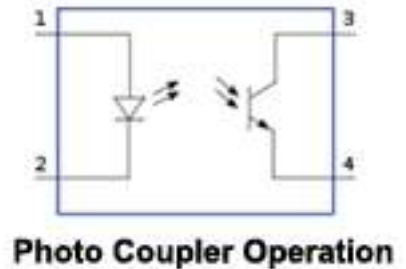
Short Card Design:

The "Short Card" design is suitable for compact-sized computer, especially for IPC (Industrial Personal Computer) and servers.

Universal PCI (3.3 V and 5 V):

The Universal PCI card works with both new 3.3 V PCI bus that has been widely-used in servers, and traditional 5 V PCI bus. The universal PCI interface will be the standard for every card from ICP DAS in the near future.

1.1 Features

- Universal PCI V2.2, supports 5 V and 3.3 V PCI bus
- COM-Selector
- Provides surge protection
- 128 Byte UART FIFO

1.2 Specifications

	VXC-112(A)U	VXC-112iAU	VXC-182iU	VXC-142U	VXC-142iU	VXC-144U	VXC-144iU	VXC-114U	VXC-114iAU
Bus	Universal PCI (5 V and 3.3 V)								
Connector	Male DB-9					Female DB-37			
RS-232	**2-ports**	**2-ports**	**1-ports**	**-**	**-**	**-**	**-**	**4-ports**	**4-ports**
RS-422/485	**-**	**-**	**1-ports**	**2-ports**	**2-ports**	**4-ports**	**4-ports**	**-**	**-**
Self-tuner or equivalence design	**-**	**-**	**Yes (COM1)**	**Yes**	**Yes**	**Yes**	**Yes**	**-**	**-**
Isolation	**-**	**3 kV**	**3 kV**	**-**	**3 kV**	**-**	**3 kV**	**-**	**3 kV**
COM-Selector	**Yes**								
UART	16C950 Compatible								
Baud rate	50 ~ 115200 bps								
Data bits	5, 6, 7, 8								
Parity Bit	None, Even, Odd, Mark, Space								
Stop Bits	1, 1.5, 2								
FIFO size	128 Bytes								
Operating Temperature	0 ~ 50 ^{o}C								
Storage Temperature	-20 ~ 70 ^{o}C								
Humidity	0 ~ 90 % non-condensing								
Dimensions (mm)	130 X105	130 X105	130 X105	130 X105	130 X105	129 X83	129 X83	129 X83	129 X83

1.3 Product Check List

The package includes the following items:

- One VXC series card
- One ICP DAS software CD
- One Quick Start

It is recommended that you read the Quick Start to see the software driver location first.

> **Attention!**
> If any of these items are missing or damaged, contact the dealer from whom you purchased the product. Save all shipping materials and the carton in case you need to ship or store the product in the future.

1.4 Ordering Information

Model	Description
VXC-112(A)U	Universal PCI, 2-port RS-232 communication board
VXC-112iAU	Universal PCI, 2-port Isolated RS-232 communication board
VXC-114U	Universal PCI, 4-port RS-232 communication board
VXC-114iAU	Universal PCI, 4-port Isolated RS-232 communication board
VXC-142U	Universal PCI, 2-port RS-422/485 communication board
VXC-142iU	Universal PCI, 2-port Isolated RS-422/485 communication board
VXC-144U	Universal PCI, 4-port RS-422/485 communication board
VXC-144iU	Universal PCI, 4-port Isolated RS-422/485 communication board
VXC-182iU	Universal PCI, 1-port Isolated RS-422/485 and 1-port RS-232 communication board

1.5 Options

Item	Description	VXC-112(A)U /112iAU	VXC-182iU	VXC-142U /142iU
CA-PC09F	9-pin Female D-sub connector with plastic cover	✓	✓	✓
DN-09-2/ DN-09-2F	I/O Connector Block with DIN-Rail Mounting and two 9-Pin male Header	✓	✓	✓
CA-0910F	9-pin Female-Female D-sub cable, 1M	✓	✓	✓
CA-0910N	9-pin Female-Female D-sub cable, 1M Null Modem Cable	✓	✓	✓
CA-0915	9-pin Male-Female D-sub cable, 1.5M	✓	✓	✓
CA-090910	9-pin Female D-sub & (9-wire) RS-422 Cable, 1M	-	✓	✓
CA-0903	9-pin Female D-sub & 5-wire RS-232 cable, 30cm	✓	✓	-
CA-0910	9-pin Female D-sub & 3-wire RS-232 cable, 1M	✓	✓	-

Item	Description	VXC-114U /114iAU	VXC-144U /144iU
CA-4002	37-pin Male D-sub connector with plastic cover	✓	✓
DN-37	I/O Connector Block (Pitch= 5.08 mm) with DIN-Rail Mounting Include: One CA-3710 (37-pin Male-Male D-sub cable 1.0m)	✓	✓
CA-3710	37-Pin Male-Male D-sub cable 1M (45º)	✓	✓
CA-3710D	37-Pin Male-Male D-sub cable 1M (180º)	✓	✓
CA-3720	DB-37 Male-Male D-sub cable 2M Cable(45 º)	✓	✓
CA-3720D	37-Pin Male-Male D-sub cable 2M (180º)	✓	✓
CA-9-3715D	DB-37 Male(D-sub) to 4-Port DB-9 Male(D-sub) cable 1.5M (180 º)	✓	✓

2. Hardware configuration

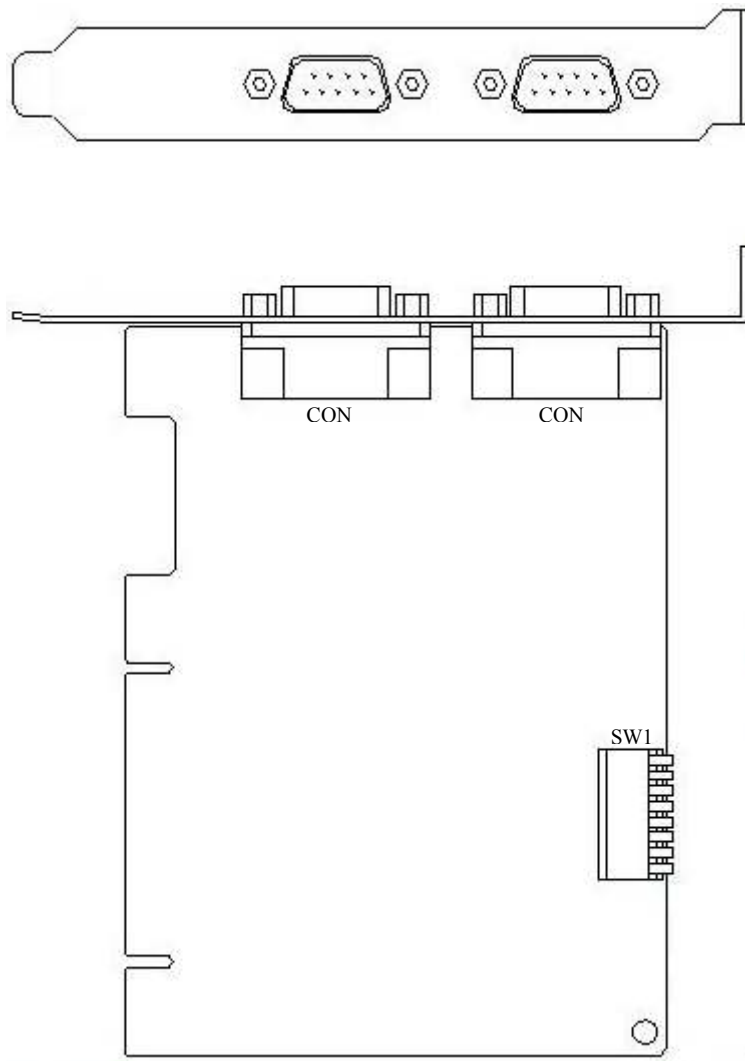## 2.1 Board Layout

● Board layout of the VXC-114U/114iAU/144U/144iU
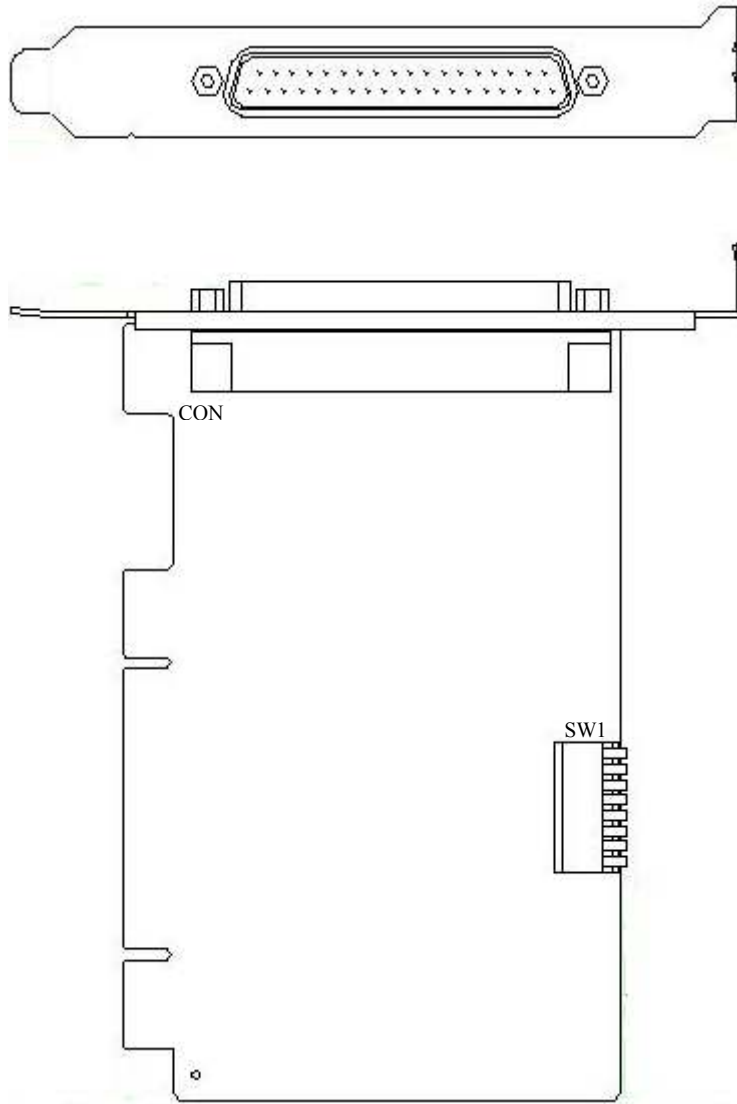
● Board layout of the VXC-112(A)U/112iAU/142U/142iU/182iU

CON   CON

SW1

2.2 COM Port Mapping and Board ID

The Board ID and COM port mapping are the same, which is set by the SW1 DIP switch. The SW1 DIP switch has different functions under different OS.

For **DOS** users, the SW1 DIP switch acts as **Board ID**. When there are two or more multi-port serial cards in a single system, it is difficult to identify individual card number. For easier identification, the VXC series card includes a Board ID function.

For **Windows** users, the SW1 DIP switch acts as **COM port number selector** and the COM port number is depending on the Board ID. If the Board ID is 0, then the driver finds a valid number for each port. If the Board ID is not 0, then the driver uses the "**Board ID**" to be the first COM port number and uses the "**Board ID +1**" to be the next COM port number and so on.

> **Note:**
>   It's recommended to select a unique COM port number (Board ID) by users. This helps users to clear identify and fix the card-number and port-number in a system.

> **Warning:**
>   The port will not work if the COM port number is conflicted under Windows or Linux system. In that case, users should try other COM port numbers.
>   Usually, the COM1 and COM2 are reserved by systems. And it's recommended to reserve the COM3 and COM4 if you will have other Plug&Play serial ports in the future. This prevents conflict.

For **Linux** users, it's the same as Windows users but for **TTY device number selector**.

The configuration examples are as follows.

SW1
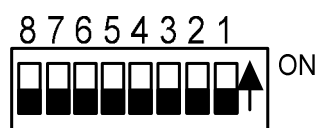
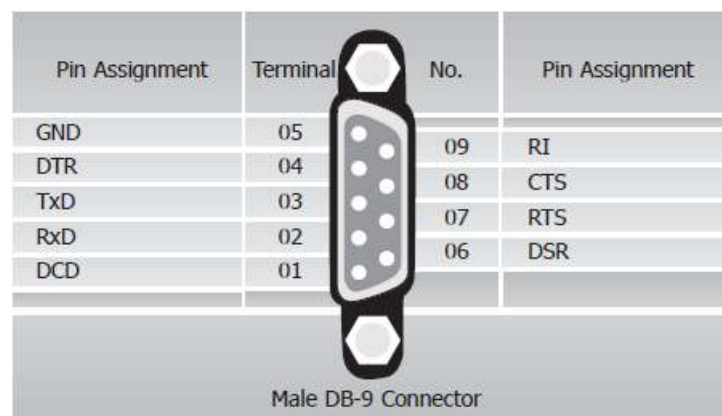| SW1 DIP Switch	8	7	6	5	4	3	2	1
Board ID=**0x00** (**Default**) COM = Auto-defined	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Board ID=**0x03** COM = 3/4/5/6	OFF	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**
Board ID=**0x05** COM = 5/6/7/8	OFF	OFF	OFF	OFF	OFF	**ON**	OFF	**ON**
Board ID=**0x07** COM = 7/8/9/10	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**	**ON**
Board ID=**0x09** COM = 9/10/11/12	OFF	OFF	OFF	OFF	**ON**	OFF	OFF	**ON**
Board ID=**0x14** COM = 20/21/22/23	OFF	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF
Board ID=**0x1E** COM = 30/31/32/33	OFF	OFF	OFF	**ON**	**ON**	**ON**	**ON**	OFF
Board ID=**0x28** COM = 40/41/42/43	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF
Board ID=**0x32** COM = 50/51/52/53	OFF	OFF	**ON**	**ON**	OFF	OFF	**ON**	OFF
Board ID=**0x3C** COM = 60/61/62/63	OFF	OFF	**ON**	**ON**	**ON**	**ON**	OFF	OFF
Board ID=**0x64** COM = 100/101/102/103	OFF	**ON**	**ON**	OFF	OFF	**ON**	OFF	OFF
Board ID=**0x96** COM = 150/151/152/153	**ON**	OFF	OFF	**ON**	OFF	**ON**	**ON**	OFF
Board ID=**0xC8** COM = 200/201/202/203	**ON**	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF
. . .								
Board ID=**0xFF** COM = 255/256/x/x	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**

Note: If multi-port serial board is 2-port VXC card the COM number is the first two numbers.

2.3 Pin Assignment

2.3.1 VXC-112(A)U/VXC-112iAU Pin Assignment

RS-232 Cable Wiring (Null Modem)

Pin Assignment	Terminal	No.	Pin Assignment
GND	05		
DTR	04	09	RI
TxD	03	08	CTS
RxD	02	07	RTS
DCD	01	06	DSR

Male DB-9 Connector

System1	Pin		Pin	System2
RxD	2	←	3	TxD
TxD	3	→	2	RxD
GND	5	↔	5	GND
DTR	4	→	6	DSR
--			1	DCD
DCD	1		--	
DSR	6	←	4	DTR
RTS	7	→	8	CTS
CTS	8	←	7	RTS
RI	9	←	9	RI

2.3.2. VXC-142U/VXC-142iU Pin Assignment

RS-422 Cable Wiring

Pin Assignment	Terminal	No.	Pin Assignment
GND/VEE	05		
RxD-(A)	04	09	CTS-(A)
RxD+(B)	03	08	CTS+(B)
TxD+(B)/Data+(B)	02	07	RTS+(B)
TxD-(A)/Data-(A)	01	06	RTS-(A)

RS-422/485 Male DB-9 Connector

VXC.COM	Pin No.		Pin No.	VXC.COM
TxD-	1	→	4	RxD-
TxD+	2	→	3	RxD+
RxD+	3	←	2	TxD+
RxD-	4	←	1	TxD-
GND	5	↔	5	GND
RTS-	6	→	9	CTS-
RTS+	7	→	8	CTS+
CTS+	8	←	7	RTS+
CTS-	9	←	6	RTS-

RS-485 Cable Wiring

VXC.COM	Pin No.		Pin No.	VXC.COM
DATA-	1	↔	1	DATA-
DATA+	2	↔	2	DATA+

Warning:

The RS-485 bus is a differential (balanced) signal, thus **you cannot wire the Data+ with Data- directly for a single port loop-back test.** It will not work at all!

2.3.3. VXC-114U/VXC-114iAU Pin Assignment

Pin Assignment	Terminal		No.	Pin Assignment
N.C.	01			
DCD3	02		20	RI3
GND	03		21	DTR3
CTS3	04		22	DSR3
RxD3	05		23	RTS3
RI4	06		24	TxD3
DTR4	07		25	DCD4
DSR4	08		26	GND
RTS4	09		27	CTS4
TxD4	10		28	RxD4
DCD2	11		29	RI2
GND	12		30	DTR2
CTS2	13		31	DSR2
RxD2	14		32	RTS2
RI1	15		33	TxD2
DTR1	16		34	DCD1
DSR1	17		35	GND
RTS1	18		36	CTS1
TxD1	19		37	RxD1

RS-232 Female DB-37 Connector

DB-37 to 4-port DB-9 (CA-9-3715D)

Pin Assignment	Terminal		No.	Pin Assignment
GND	05			
DTR	04		09	RI
TxD	03		08	CTS
RxD	02		07	RTS
DCD	01		06	DSR

Male DB-9 Connector

RS-232 Cable Wiring (Null Modem)

System1	Pin		Pin	System2
RxD	2	←	3	TxD
TxD	3	→	2	RxD
GND	5	↔	5	GND
DTR	4	→	6	DSR
	--		1	DCD
DCD	1		--	
DSR	6	←	4	DTR
RTS	7	→	8	CTS
CTS	8	←	7	RTS
RI	9	←	9	RI

2.3.4. VXC-144U/VXC-144iU Pin Assignment

Pin Assignment	Terminal	No.	Pin Assignment
N.C.	01		
TxD3-(A)/Data3-(A)	02	20	CTS3-(A)
GND/VEE3	03	21	RxD3-(A)
CTS3+(B)	04	22	RTS3-(A)
TxD3+(B)/Data3+(B)	05	23	RTS3+(B)
CTS4-(A)	06	24	RxD3+(A)
RxD4-(A)	07	25	TxD4-(A)/Data4-(A)
RTS4-(A)	08	26	GND/VEE4
RTS4+(B)	09	27	CTS4+(B)
RxD4+(B)	10	28	TxD4+(B)/Data+(B)
TxD2-(A)/Data2-(A)	11	29	CTS2-(A)
GND/VEE2	12	30	RxD2-(A)
CTS2+(B)	13	31	RTS2-(A)
TxD2+(B)/Data2+(B)	14	32	RTS2+(B)
CTS1-(A)	15	33	RxD2+(B)
RxD1-(A)	16	34	TxD1-(A)/Data1-(A)
RTS1-(A)	17	35	GND/VEE1
RTS1+(B)	18	36	CTS1+(B)
RxD1+(B)	19	37	TxD1+(B)/Data1+(B)

RS-422/485 Female DB-37 Connector

DB-37 to 4-port DB-9 (CA-9-3715D)

Pin Assignment	Terminal	No.	Pin Assignment
GND/VEE	05		
RxD-(A)	04	09	CTS-(A)
RxD+(B)	03	08	CTS+(B)
TxD+(B)/Data+(B)	02	07	RTS+(B)
TxD-(A)/Data-(A)	01	06	RTS-(A)

RS-422/485 Male DB-9 Connector

RS-422 Cable Wiring

VXC.COM	Pin No.		Pin No.	VXC.COM
TxD-	1	→	4	RxD-
TxD+	2	→	3	RxD+
RxD+	3	←	2	TxD+
RxD-	4	←	1	TxD-
GND	5	↔	5	GND
RTS-	6	→	9	CTS-
RTS+	7	→	8	CTS+
CTS+	8	←	7	RTS+
CTS-	9	←	6	RTS-

RS-485 Cable Wiring

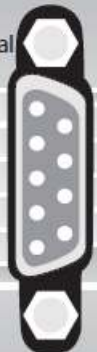| VXC.COM	Pin No.		Pin No.	VXC.COM
DATA-	1	↔	1	DATA-
DATA+	2	↔	2	DATA+

Warning:

The RS-485 bus is a differential (balanced) signal, thus **you cannot wire the Data+ with Data- directly for a single port loop-back test.** It will not work at all!

2.3.5. VXC-182iU Pin Assignment

CN1: Isolation RS-422/485 port

Pin Assignment	Terminal	No.	Pin Assignment
GND/VEE	05		
RxD-(A)	04	09	CTS-(A)
RxD+(B)	03	08	CTS+(B)
TxD+(B)/Data+(B)	02	07	RTS+(B)
TxD-(A)/Data-(A)	01	06	RTS-(A)

RS-422/485 Male DB-9 Connector

RS-422 Cable Wiring

VXC.COM	Pin No.		Pin No.	VXC.COM
TxD-	1	→	4	RxD-
TxD+	2	→	3	RxD+
RxD+	3	←	2	TxD+
RxD-	4	←	1	TxD-
GND	5	↔	5	GND
RTS-	6	→	9	CTS-
RTS+	7	→	8	CTS+
CTS+	8	←	7	RTS+
CTS-	9	←	6	RTS-

Warning:

The RS-485 bus is a differential (balanced) signal, thus **you cannot wire the Data+ with Data- directly for a single port loop-back test.** It will not work at all!

RS-485 Cable Wiring

VXC.COM	Pin No.		Pin No.	VXC.COM
DATA-	1	↔	1	DATA-
DATA+	2	↔	2	DATA+

CN2: RS-232 port

Pin Assignment	Terminal	No.	Pin Assignment
GND	05		
DTR	04	09	RI
TxD	03	08	CTS
RxD	02	07	RTS
DCD	01	06	DSR

Male DB-9 Connector

RS-232 Cable Wiring (Null Modem)

System1	Pin		Pin	System2
RxD	2	←	3	TxD
TxD	3	→	2	RxD
GND	5	↔	5	GND
DTR	4	→	6	DSR
	--		1	DCD
DCD	1		--	
DSR	6	←	4	DTR
RTS	7	→	8	CTS
CTS	8	←	7	RTS
RI	9	←	9	RI

2.4 Hardware Installation

Warning:

Static electricity can easily damage computer equipment. Ground yourself by touching the chassis of the computer before touching any boards.

To install your VXC series cards, complete the following steps:

1. Refer to Chapter 3 for installing driver first
2. Shut down and power off your computer
3. Remove all covers from the computer
4. Select an empty PCI slot
5. Remove the PCI slot cover from the PC
6. Carefully insert your VXC card into the PCI slot
7. Attach the cable to the connector
8. Replace the PC cover
9. Power on the computer

Note:

It's recommended to install driver first, since some OS (operating system such as Windows 2000) may ask you to restart the computer again after driver installation. This reduces the times to restart the computer.

3. Software Installation

ICP DAS provides following device drivers for most operation systems such as Windows NT 4.0 and Windows 2000/XP/2003/Vista32/Windows 7. These Windows drivers provide full interrupt-driven, buffered I/O for each COM ports. And also supports the Plug & Play mechanism for easy installation.

VxCard2K_Vista32_V20702.exe:

This is the VXC Card driver for Windows NT 4.0, 2000/XP/2003/ Vista32 and Windows 7.

> **Note:**
> Please refer to "**Quick Start**" for getting the location of setup program on CD.

For Windows users to access COM ports, please refer to the "**Serial Communications in Win32**" article for programming information. It can be found by searching on the http://msdn.microsoft.com.

This chapter shows you the detail steps to install these drivers.

> **Note:**
> For more information about COM port number selection, please refer to **Section 2.2 "COM Port Mapping & Board ID"**.
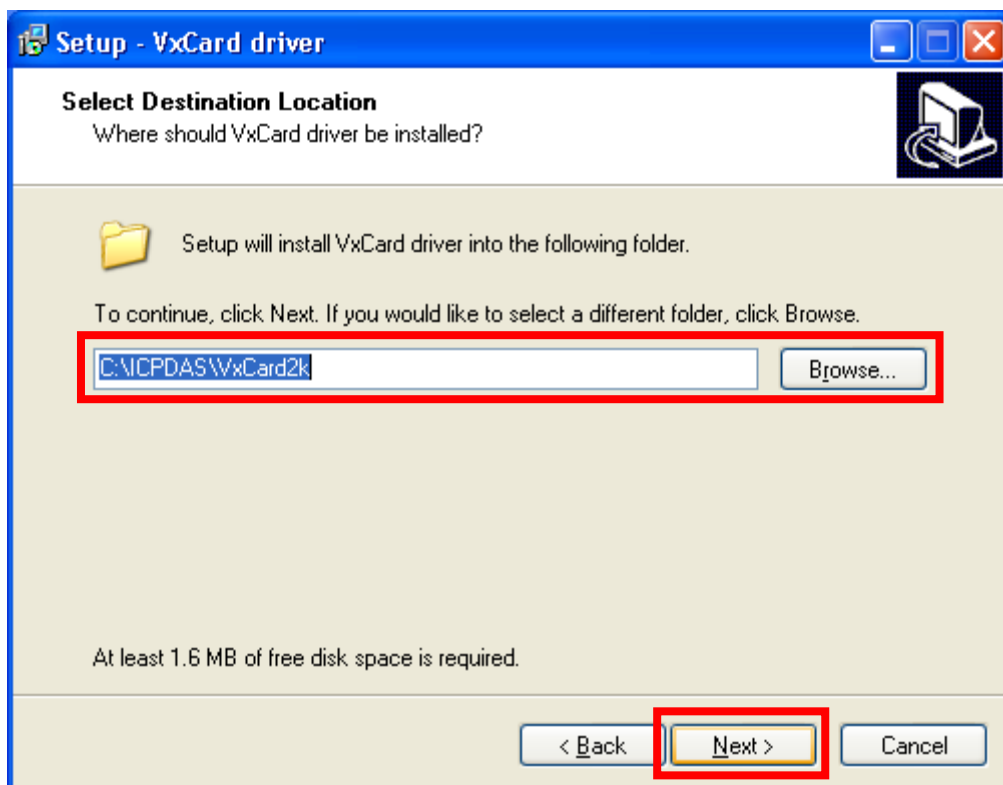
3.1   Windows NT 4.0

3.1.1   Installation

> **Note:**
>
> It's recommended to install the software first, and then the hardware. This reduces the configuration procedures.
>
> Refer to "**Quick Start**" for getting the location of setup program on CD.

1. Launch the "**VxCard2K_Vista32_V20702.exe**" setup program.

2. Click the "**Next >**" button to start installation.

3. Select a folder where setup will install files, and click "**Next>**" button.
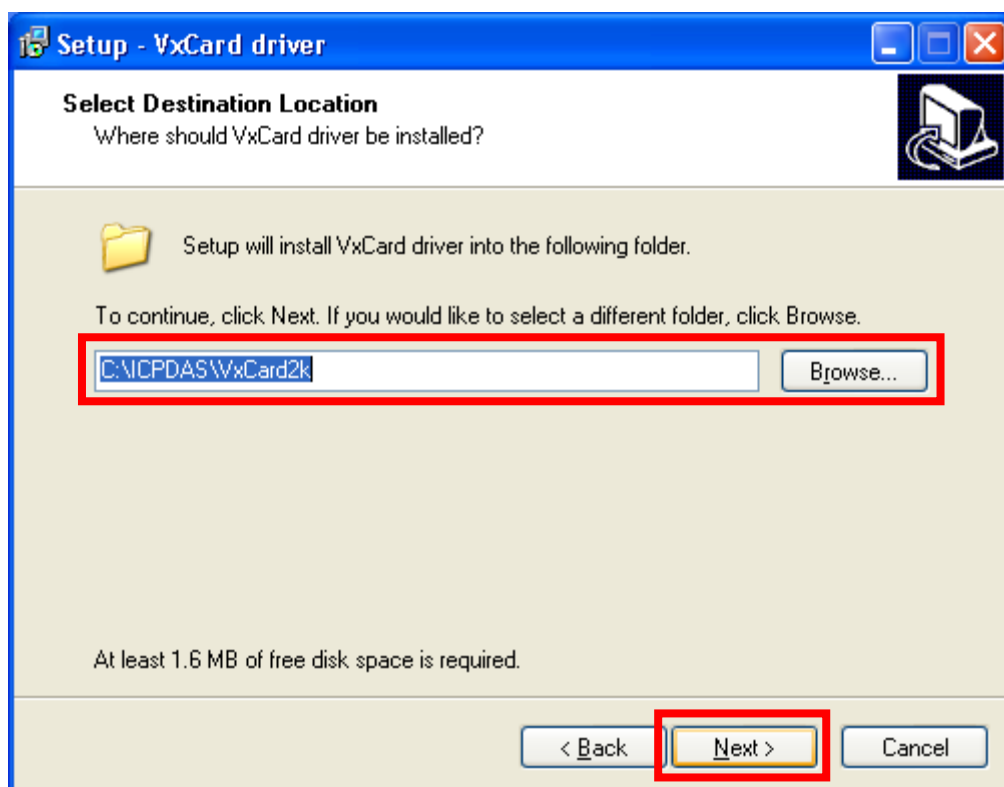
4. Select "**No, I will restart the computer later**" and click "**Finish**" button.
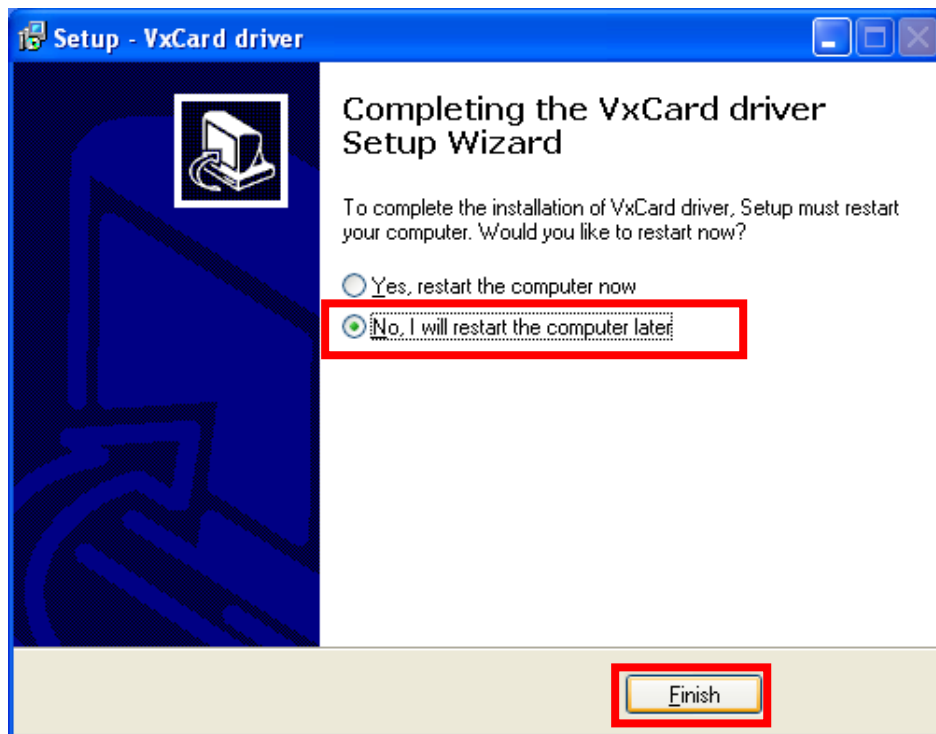
5. Turn off the computer and install the VXC card into the PC.

6. Power on the computer.

3.1.2 Verification

ICP DAS provides a "**VxCard Util**" program (VxCard Utility.exe) for users to see all the COM ports on the system. It shows COM ports in two gorups, one for VXC Card and one for others. So, users can check if any conflict occurred between COM ports.

To launch the utility, just double-click on the "**VxCard Utility**" short-cut on your desktop.
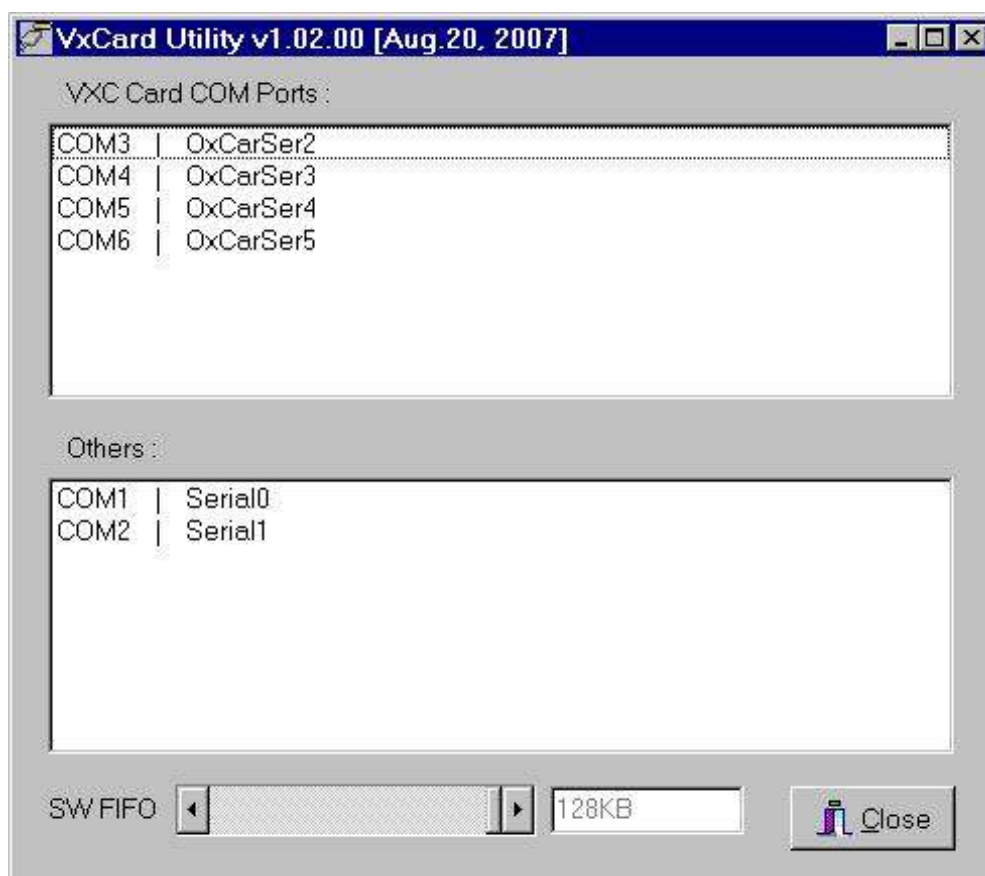
3.1.3 Configuration

If need, users can change the input buffer size (default is 4 KB for each port, up to 128 KB) by setting the "SW FIFO" scroll-bar on the VxCard Utility.

To change the COM port mappings (see **Section 2.2 COM Port Mappings and Board ID**), users should restart the driver by rebooting the computer.

3.2 Windows 2000

3.2.1 Installation

> **Note:**
>
> It's recommended to install the software first, and then the hardware. This reduces the configuration procedures.
>
> Refer to "**Quick Start**" for getting the location of setup program on CD.

1. Launch the VxCard2K_Vista32_V20702.exe to install the driver and register the related information onto the system.

2. Click "**Next>**" button to start installation.

3. Select a folder where setup will install files, and click "**Next>**" button.

4. Select "**No, I will restart the computer later**" and click "**Finish**" button.
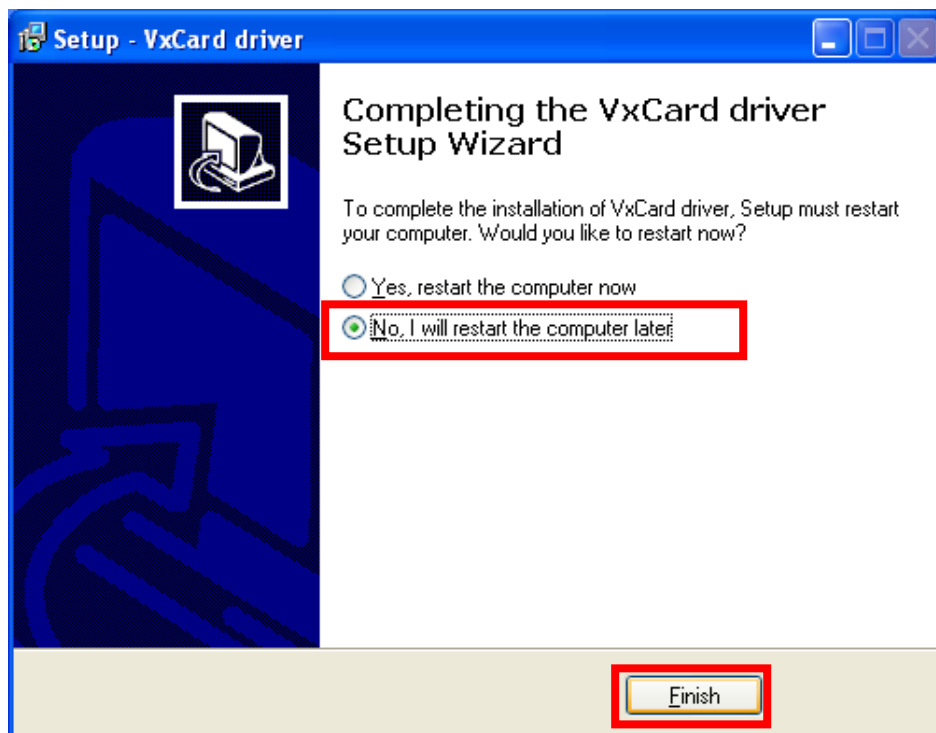
5. Turn off the computer and install the VXC card into the PC.

6. Power on the computer, Windows 2000 should find the new card and load the driver automatically. (Sometimes Win2K pops up few confirm dialog box, just click "next" or "OK" to finish it.)

3.2.2 Verification

To verify the installation, please complete the following steps:

1. Select "**Start / Settings / Control Panel**" and double-click the "**System**" icon.
2. Click the "**Hardware**" tab and then click the "**Device Manager**" button.

The VXC Card is listed under the "**VXC Multi-port serial Card**" class, and each Communications Port is listed under the "**Ports (VxCard – RS-232/422/485)**" class.
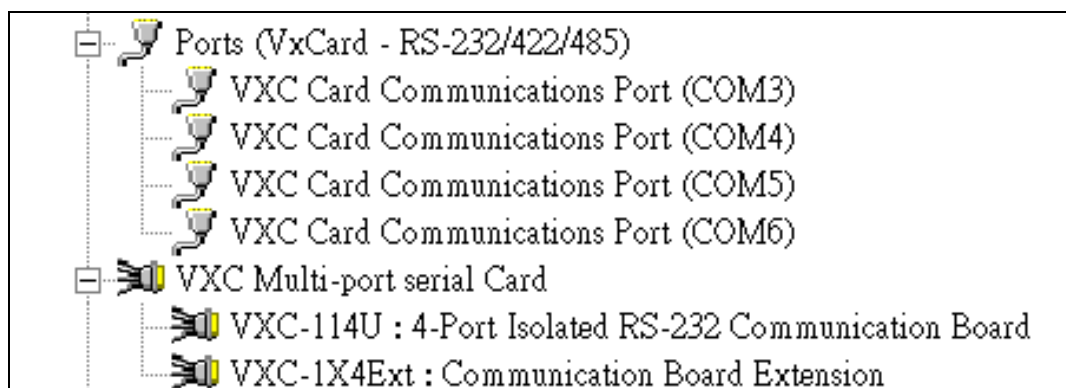
3.2.3　Configuration

If needed, users can change the input buffer size (default is 4 KB for each port, up to 128 KB) by setting the "SW FIFO" scroll-bar on the VxCard Utility. The utility's short cut is placed on the desktop after installation.
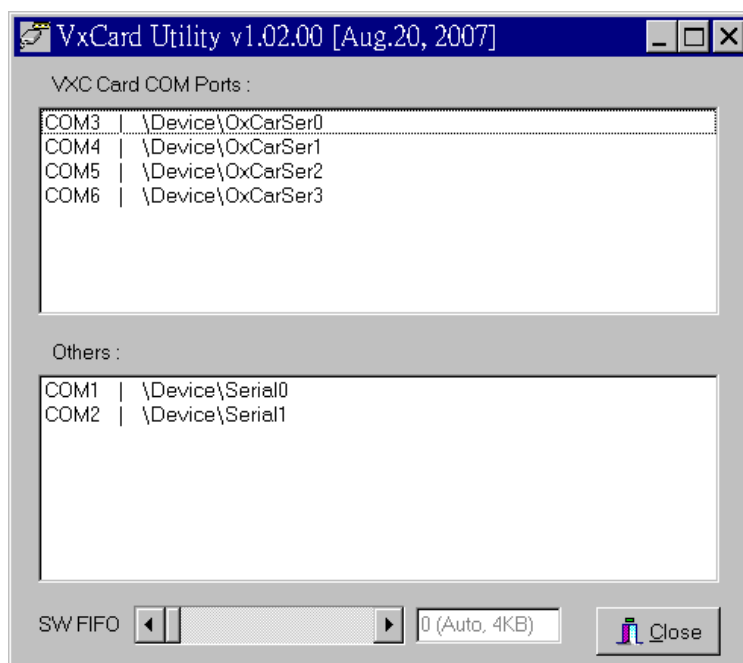
To change the COM port mappings (see **Section 2.2 COM Port Mappings and Board ID**), users should restart the driver by rebooting the computer, or re-install the "**VXC Card**" hardware in the "**Device Manager**" by un-install card and then scan new hardware.

3.2.4　Uninstallation

Before removing the card from your computer, it's recommended to uninstall the device from the "**Device Manager**". This removes unused hardware information from the database (registry) of Windows.

3.3 Windows XP/2003

It's recommend to disable the **Driver Signing** and **Windows Update** options in Windows to suppress the lots of prompt messages during driver installation.

3.3.1 Disable Driver Signing

1. Select "**Start / Settings / Control Panel**" and then "**System**".

2. Select the "**Hardware**" page on "**System Properties**" window and click the "**Driver Signing**" button.
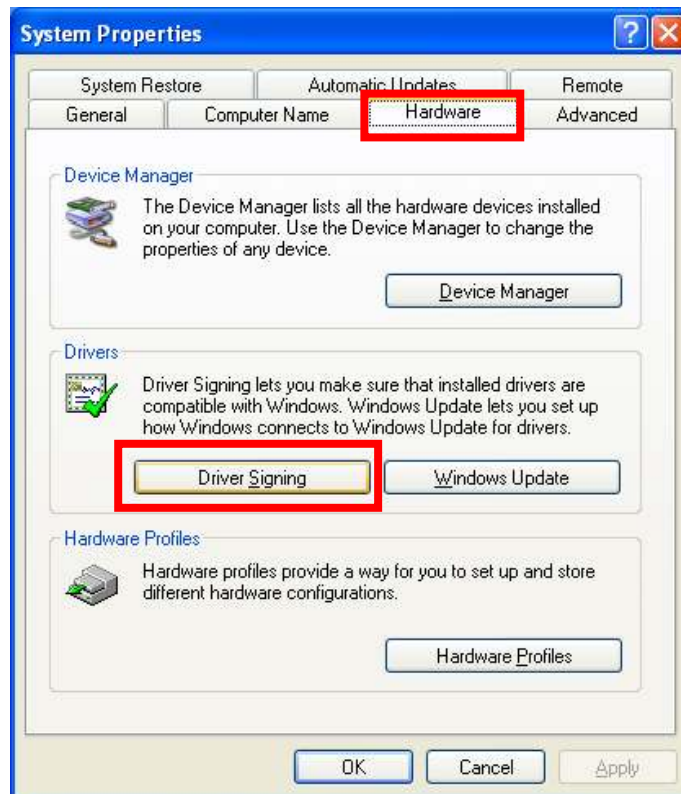
3. Select "**Ignore – Install the software anyway and don't ask for my approval**", check "**Make this action the system default**" and then click "**OK**" to close the "**Driver Signing Options**" window.
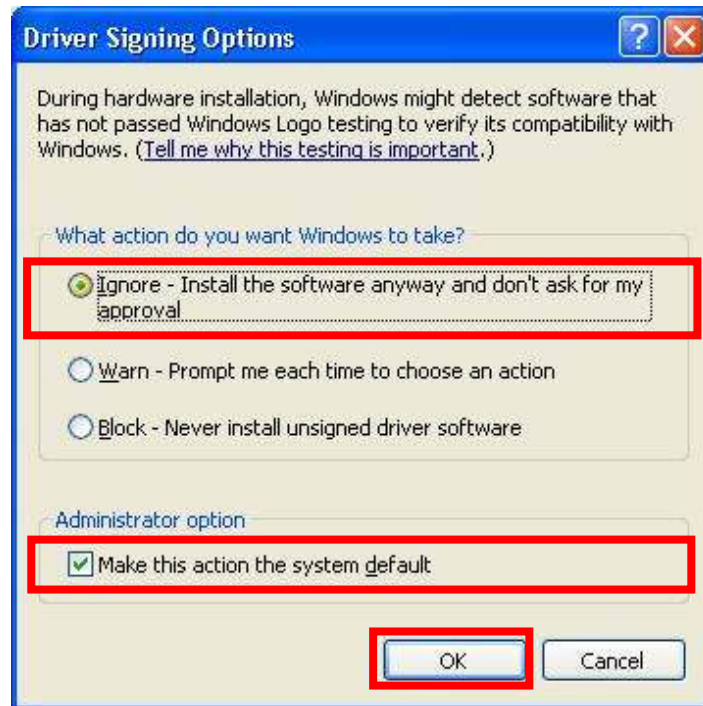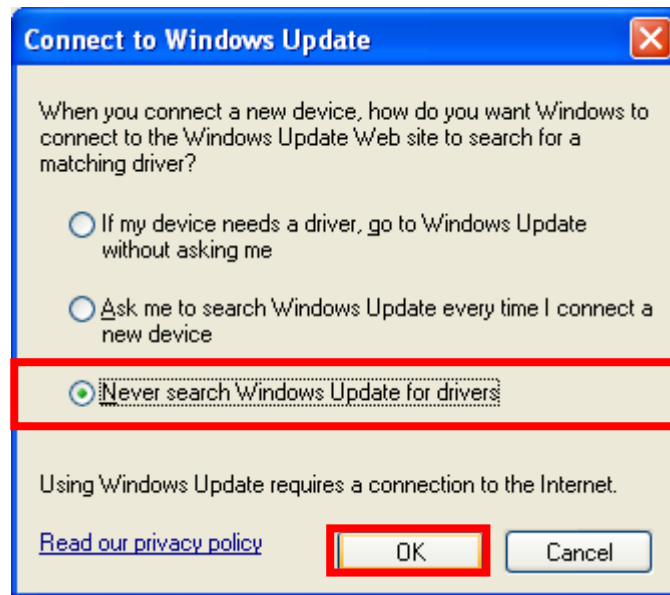

4. Click the "**Windows Update**" button on "**System Properties**" window.

Note:

The "**Windows Update**" setting supports **Windows XP SP2** only. If the system is not Windows XP SP2, please skip step 4 to 6.

5. Select "**Never search Windows Update for drivers**" and click "**OK**".

6. Click "**OK**" on "**System Properties**" window to close it.
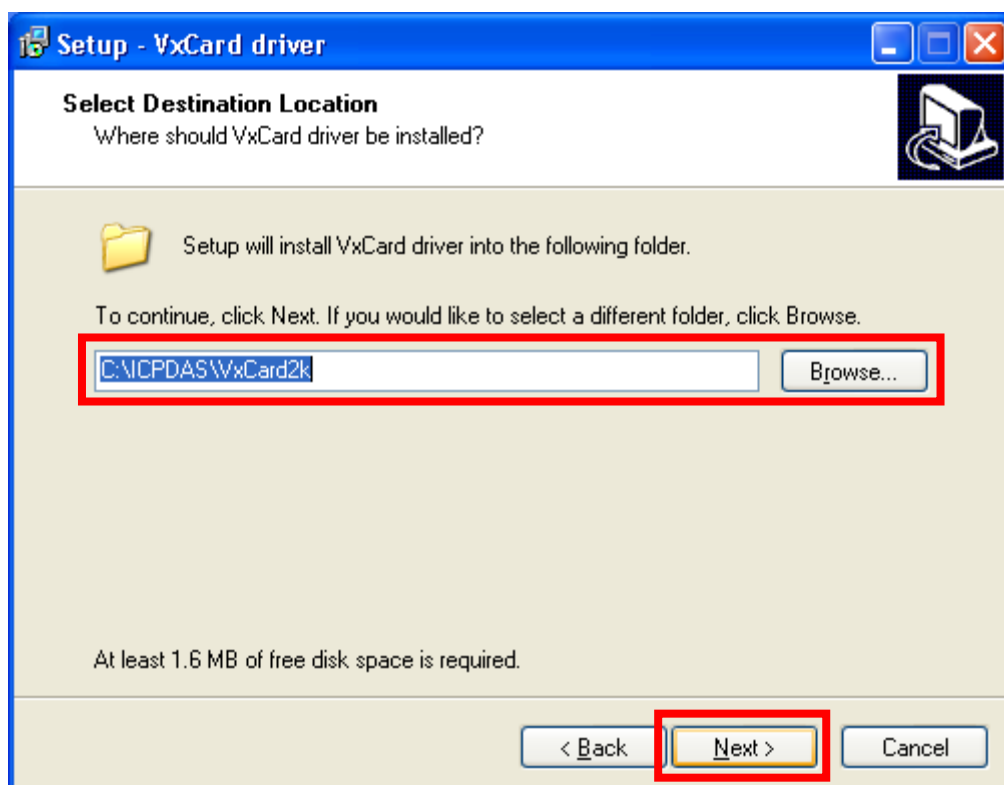

3.3.2 Driver Installation

> **Note:**
>
>   It's recommended to install the software first, and then the hardware. This reduces the configuration procedures.
>
>   Refer to "**Quick Start**" for getting the location of setup program on CD.

1. Launch the VxCard2K_Vista32_V20702.exe to install the driver and register the related information onto the system.

2. Click "**Next>**" button to start installation.

3. Select a folder where setup will install files, and click "**Next>**" button.

4. Select "**No, I will restart the computer later**" and click "**Finish**" button.
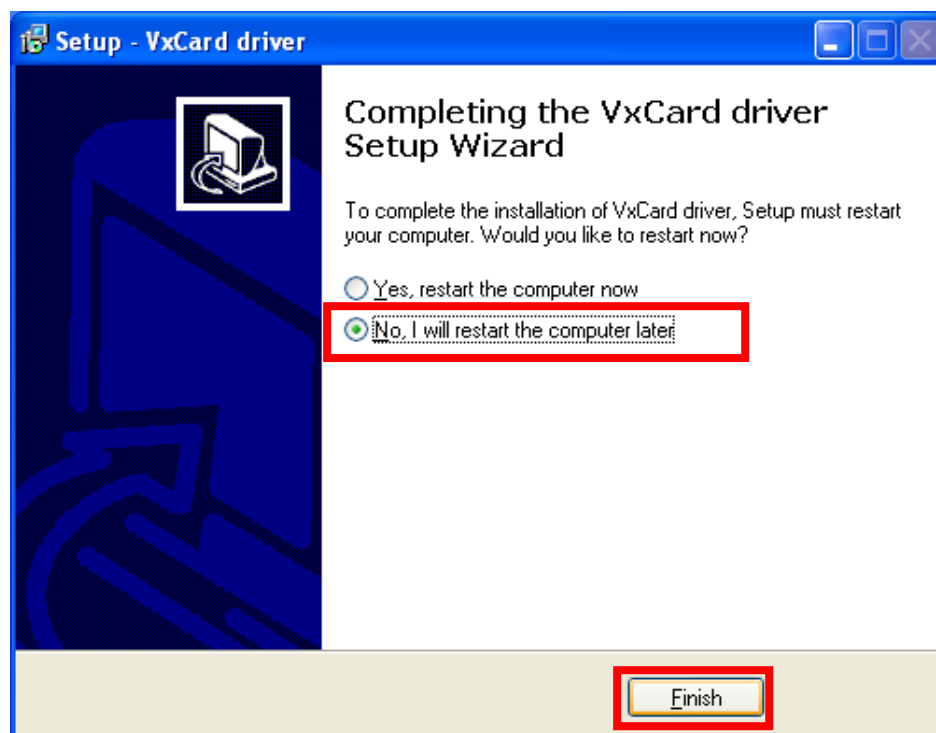
5. Turn off the computer and install the VXC card into the PC.

6. Power on the computer and continue to finish the Plug and Play procedures.

7. Select "**Install the software automatically [Recommended]**" and Click "**Next>**" button.
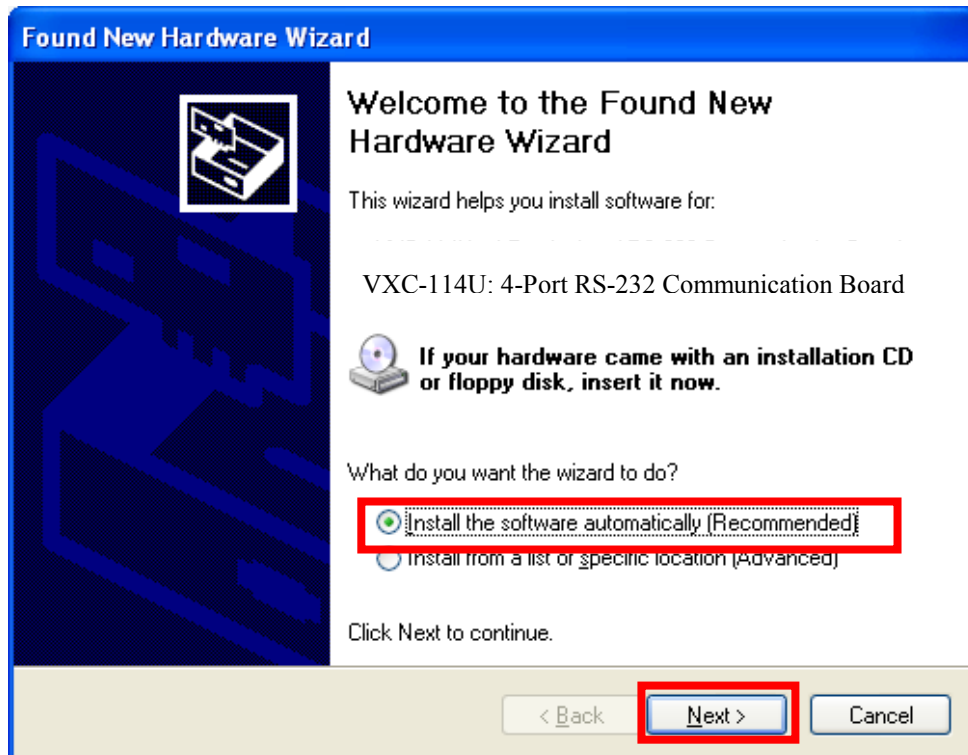
8. Click "**Finish**" button.

9. Windows pops up "**Found New Hardware Wizard**" dialog box again. Please repeat the step 8 to 9 to finish the installation for all COM ports.

3.3.3 Restore the Driver Signing Setting

1. Select "**Start / Settings / Control Panel**" and then "**System**".

2. Select the "**Hardware**" page on "**System Properties**" window and click "**Driver Signing**".

3. Select "**Warn – Prompt me each time to choose an action**",
   check "**Make this action the system default**" and then
   click "**OK**" to close the "**Driver Signing Options**" window.
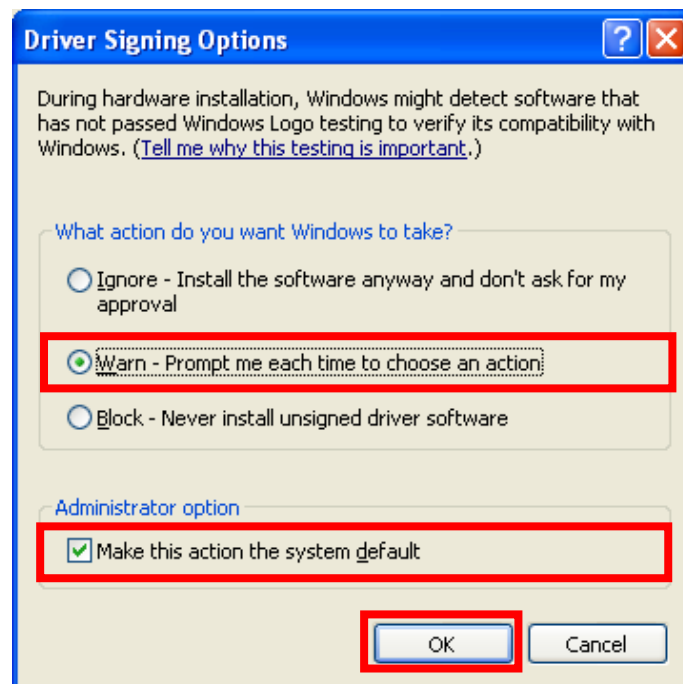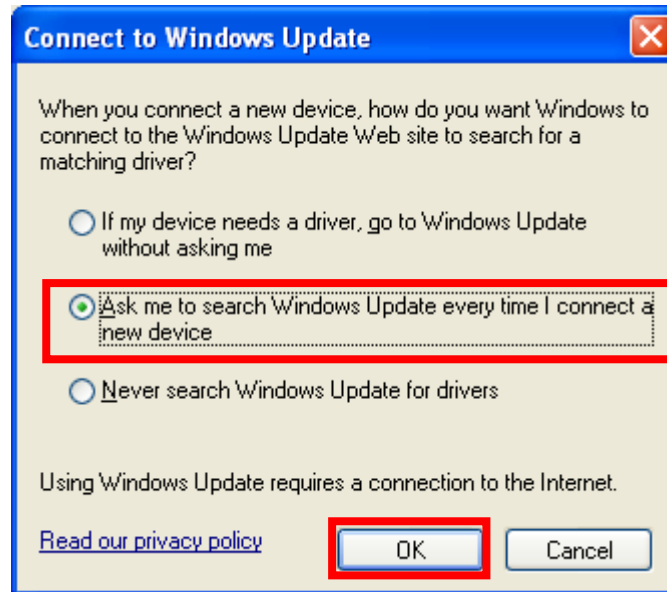

4. Click the "**Windows Update**" button on "**System Properties**" window.

> **Note:**
>   The "**Windows Update**" setting supports **Windows XP SP2** only. If the system is not Windows XP SP2, please skip step 4 to 6.

5. Select "**Ask me to search Windows Update every time I connect a new device**" and click "**OK**" button.

6. Click "**OK**" button to close the "**System Properties**" window.

3.3.4 Verification

To verify the installation, please complete the following steps:
1. Select "**Start / Settings / Control Panel**" and double-click the "**System**" icon.
2. Click the "**Hardware**" tab and then click the "**Device Manager**" button.

The VXC Card is listed under the "**VXC Multi-port serial Card**" class, and each Communications Port is listed under the "**Ports (VxCard – RS-232/422/485)**" class.
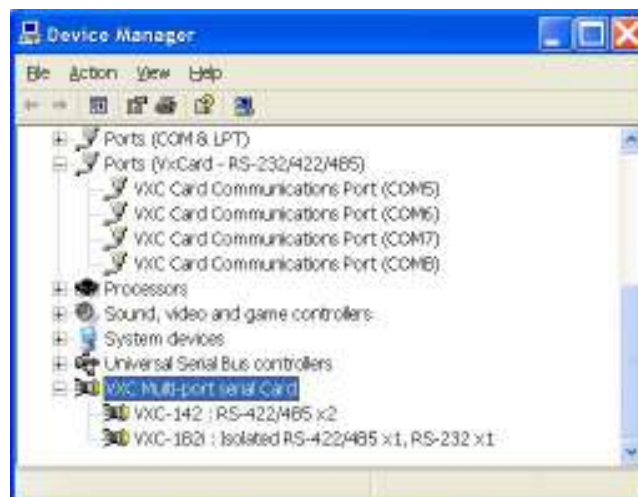
3.3.5 Configuration

If need, users can change the input buffer size (default is 4 KB for each port, up to 128 KB) by setting the "SW FIFO" scroll-bar on the VxCard Utility. The utility's short cut is placed on the desktop after driver installed.
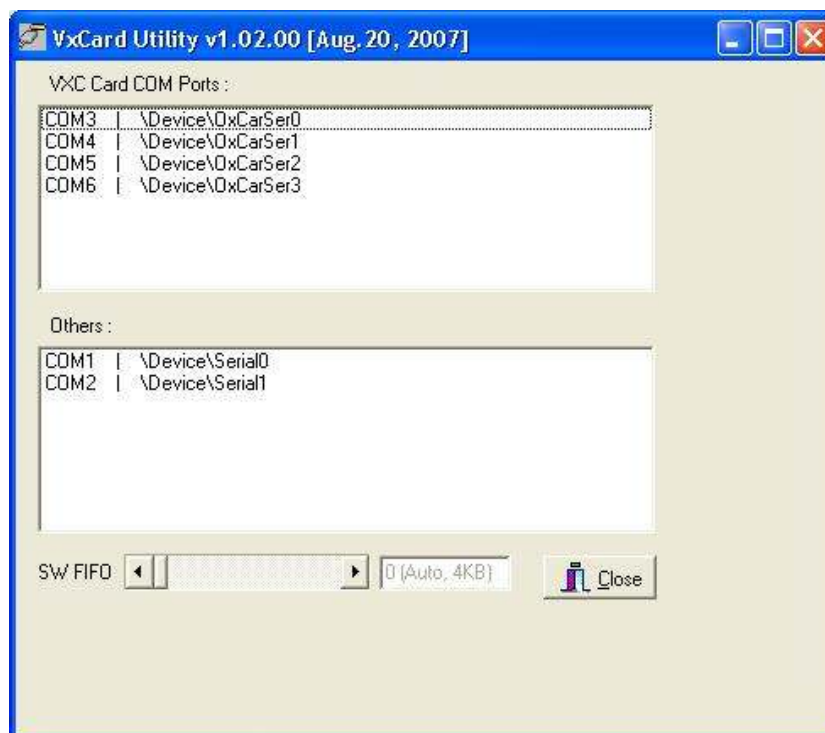
To change the COM port mappings (see **Section 2.2 COM Port Mappings and Board ID**), users should restart the driver by rebooting the computer, or re-install the "**VXC Card**" hardware in the "**Device Manager**" by un-install card and then scan new hardware.

3.3.6 Uninstallation

Before removing the card from your computer, it's recommended to uninstall the device from the "**Device Manager**". This removes unused hardware information from the database (registry) of Windows.
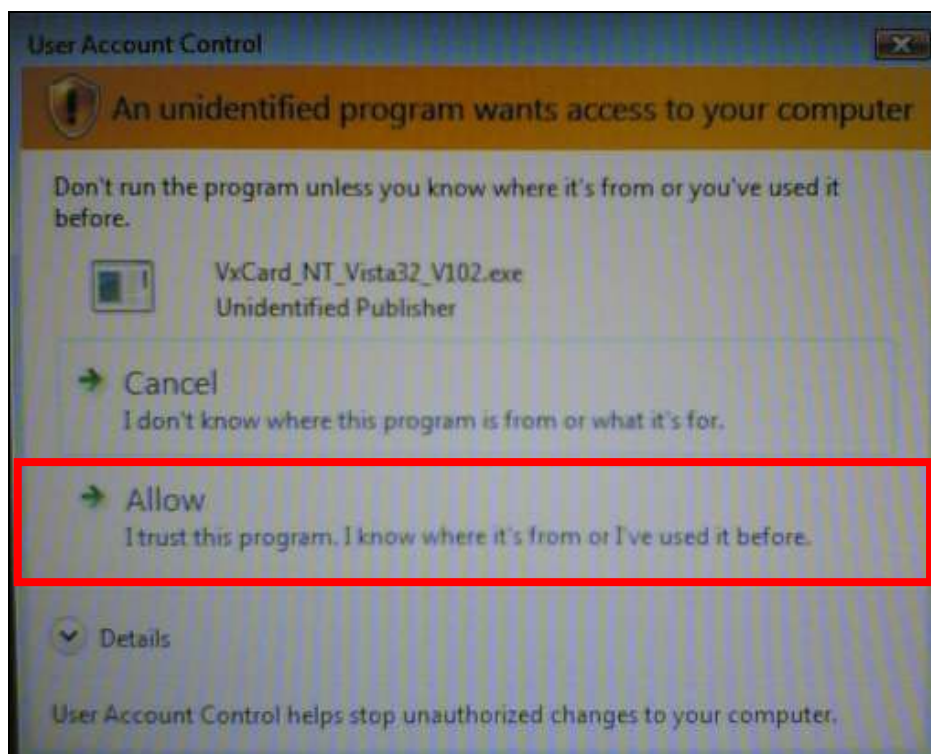
3.4　Windows Vista

3.4.1　Driver Installation

> **Note:**
>   It's recommended to install the software first, and then the hardware. This reduces the configuration procedures.
>   Refer to "**Quick Start Guide**" for getting the location of setup program on CD.

1. Launch the VxCard2K_Vista32_V20702.exe to install the driver and register the related information onto the system.

2. Click "**Allow, I trust this program. I know where it's from or I've used it before**" on the "**User Account Control**" window.

3. Click "**Next>**" button to start installation.

4. Select folder where setup will install files, and click "**Next>**" button.
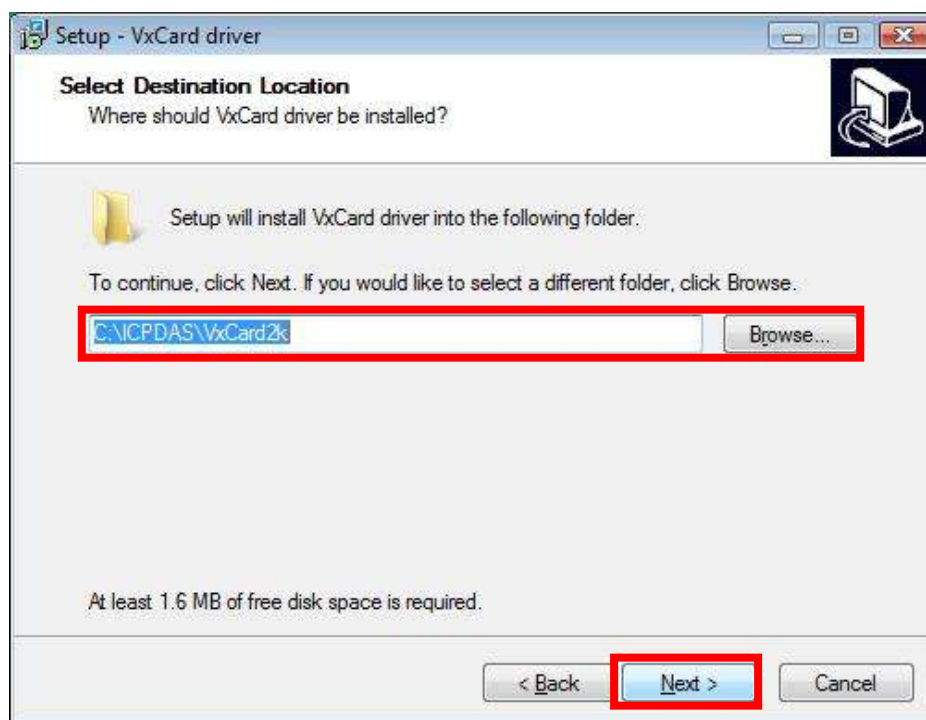
5. Click "**Install this driver software anyway**".
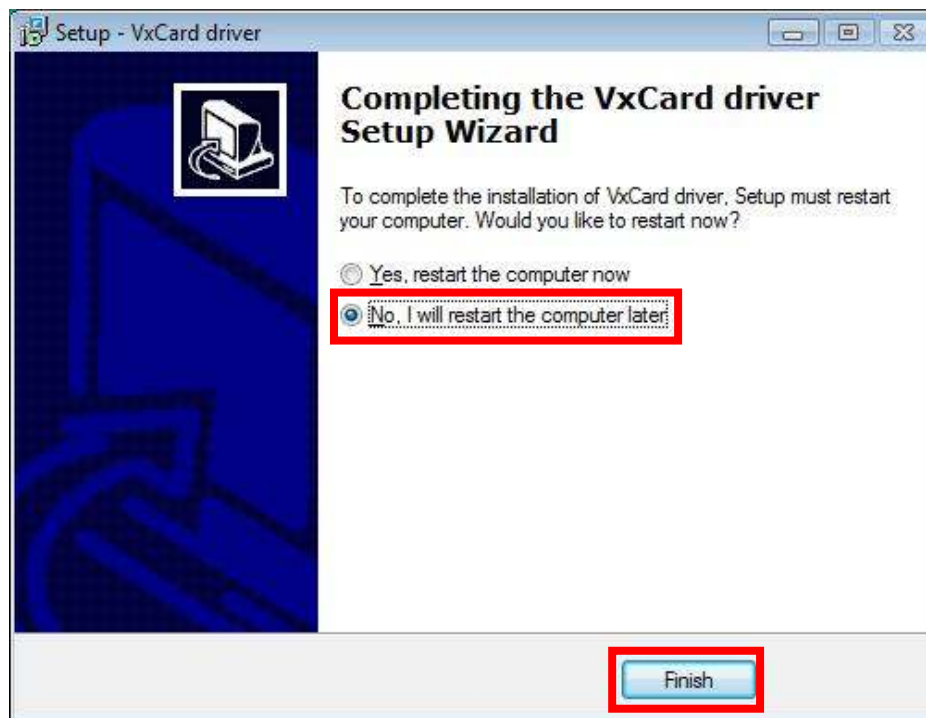

Note:

The prompt will repeat for several times. Please click "**(Install this driver software anyway)**" for all these prompts.

6. Select "**No, I will restart the computer later**" and click "**Finish**" button.


7. Turn off the computer and install the VXC card into the PC.
8. Power on the computer and system will find the new card and make it work automatically.

3.4.2 Verification

To verify the installation, please complete the following steps:
1. Select "**Start / Settings / Control Panel**" and double-click the "**System**" icon.
2. Click the "**Hardware**" tab and then click the "**Device Manager**" button.

The VXC Card is listed under the "**VXC Multi-port serial Card**" class, and each Communications Port is listed under the "**Ports (VxCard – RS-232/422/485)**" class.
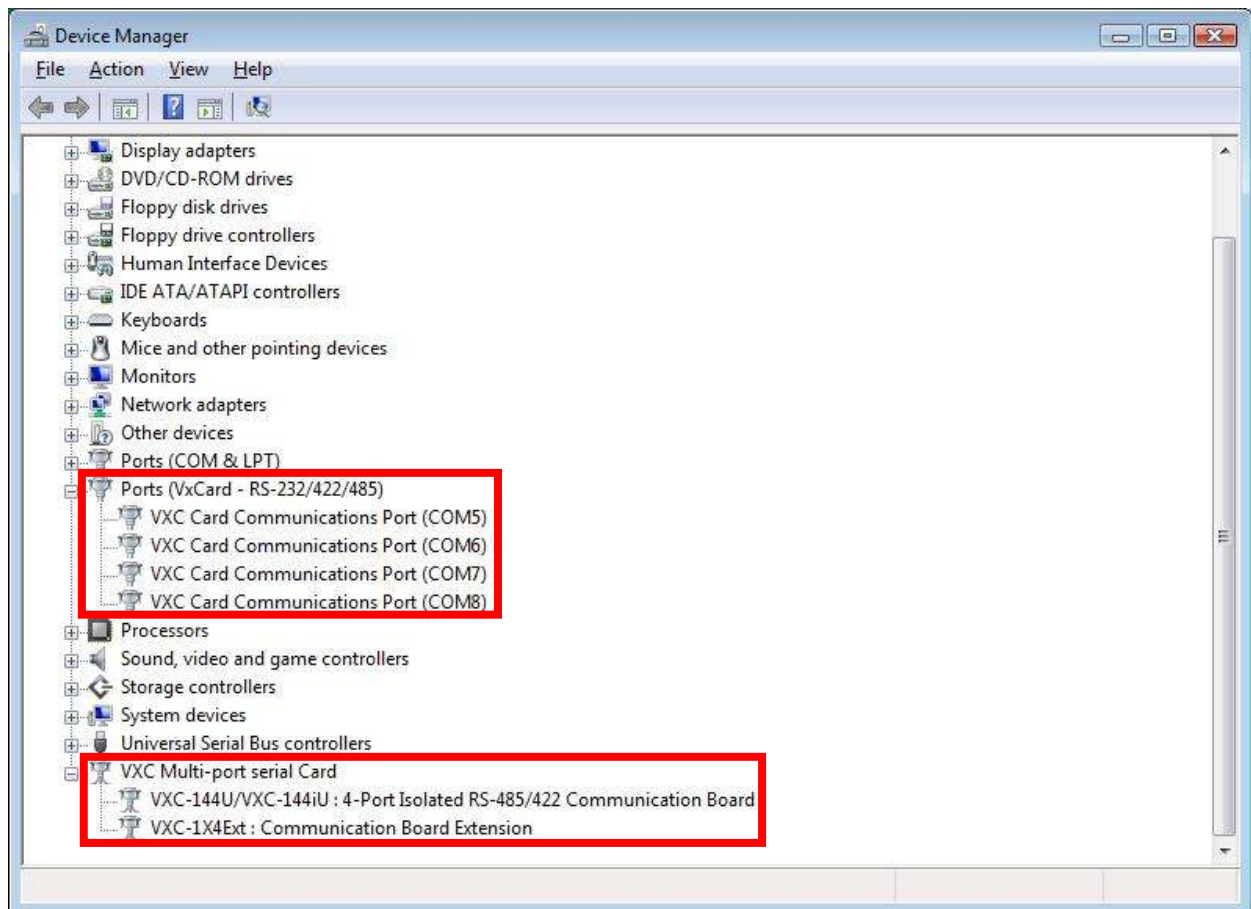

3.4.3 Configuration

If needed, users can change the input buffer size (default is 4 KB for each port, up to 128 KB) by setting the "SW FIFO" scroll-bar on the VxCard Utility. The utility's short cut is placed on the desktop after driver installed.

1. Right–click "**VxCard Utility.exe**" and select "**Run as administrator**".
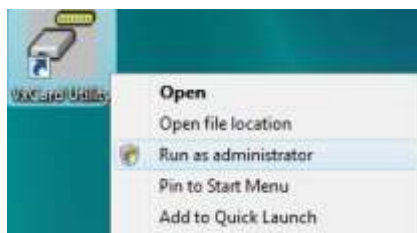
2. Click "**Allow, I trust this program. I know where it's from or I've used it before**" on the "**User Account Control**" window.

3. The VXC Card Utility shows all COM ports that existing in the system.
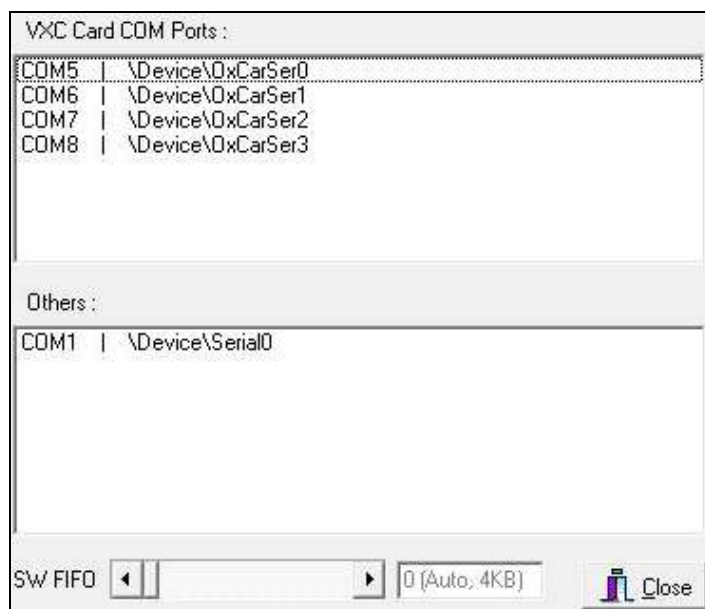
   To change the COM port mappings (see **Section 2.2 COM Port Mappings and Board ID**), users should restart the driver by rebooting the computer, or re-install the "**VXC Card**" hardware in the "**Device Manager**" by un-install card and then scan new hardware.

3.4.4 Uninstallation

Before removing the card from your computer, it's recommended to uninstall the device from the "**Device Manager**". This removes unused hardware information from the database (registry) of Windows.

3.5 Windows 7

3.5.1 Driver Installation

> **Note:**
>   It's recommended to install the software first, and then the hardware. This reduces the configuration procedures.
>   Refer to "**Quick Start Guide**" for getting the location of setup program on CD.

1. Launch the VxCard2K_Vista32_V20702.exe to install the driver and register the related information onto the system.

2. Click "Yes" button.
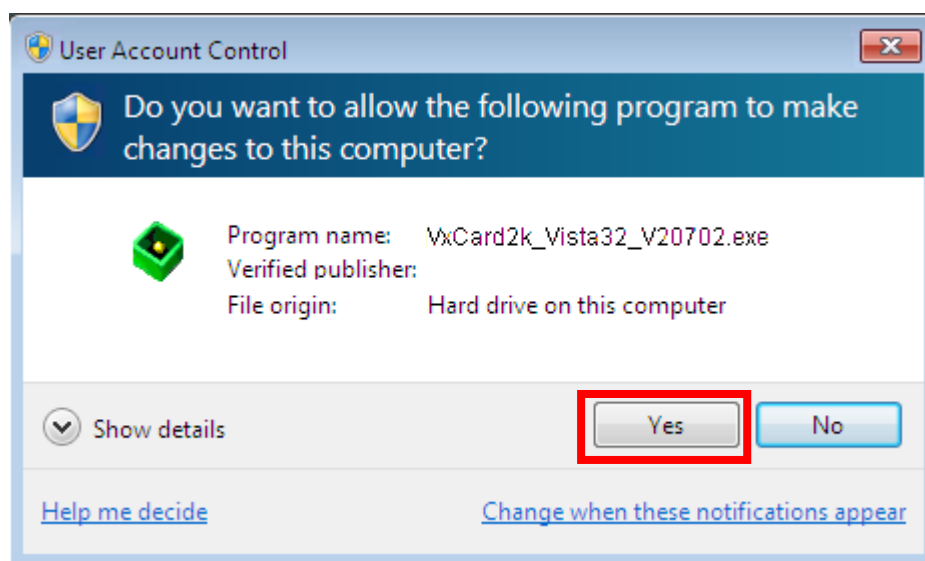
3. Click "**Next>**" button to start installation.

4. Select folder where setup will install files, and click "**Next>**" button.
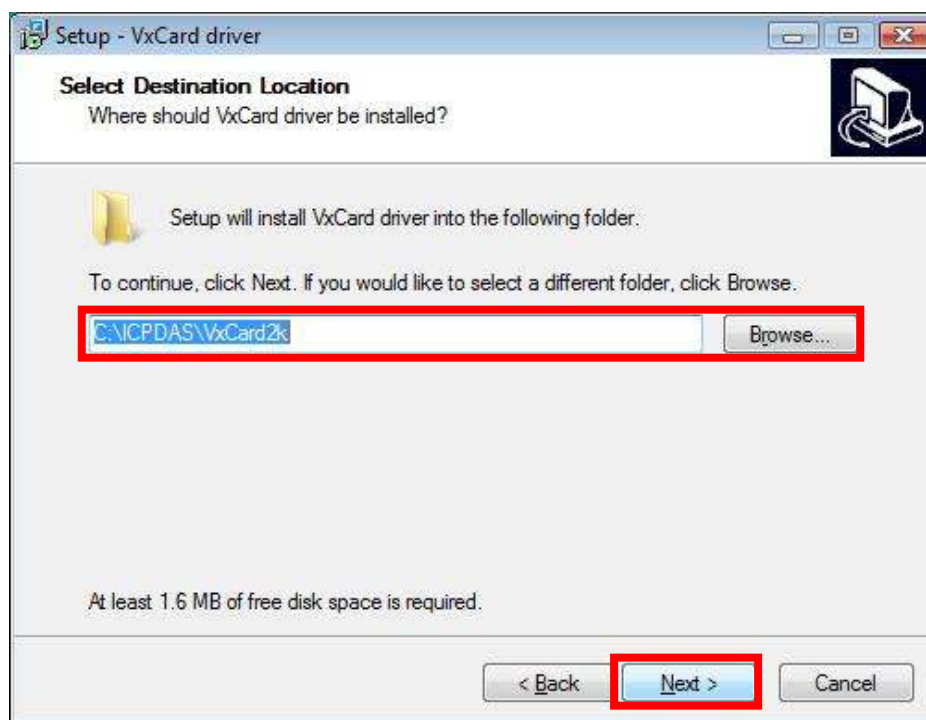
5. Click "**Install this driver software anyway**".

Note:

The prompt will repeat for several times. Please click "**(Install this driver software anyway)**" for all these prompts.

6. Select "**No, I will restart the computer later**" and click "**Finish**" button.
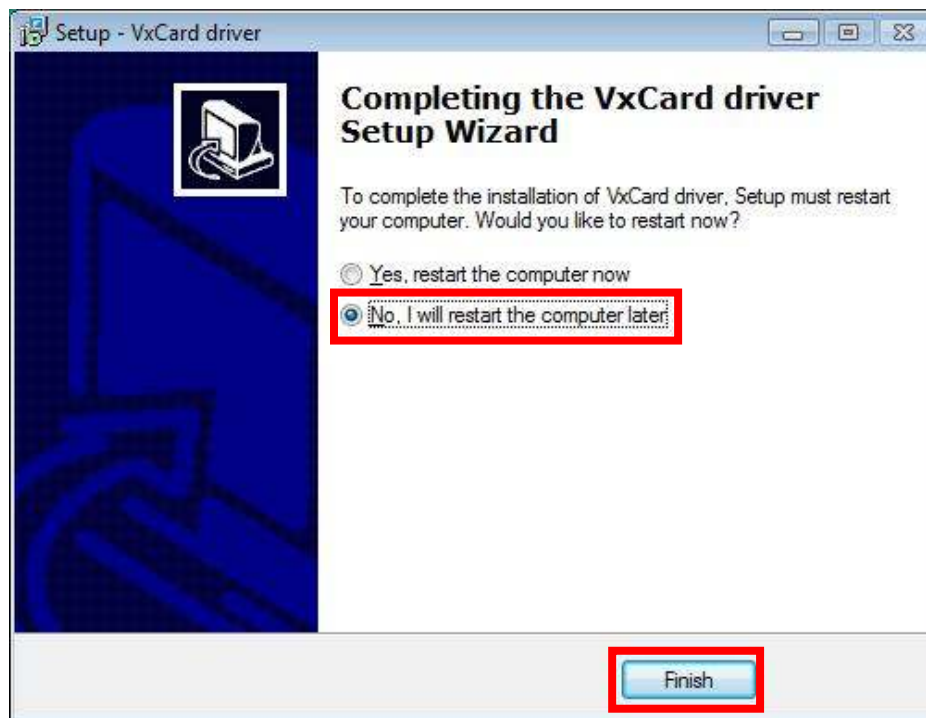
7. Turn off the computer and install the VXC card into the PC.

Power on the computer and system will find the new card and make it work automatically.

3.5.2 Verification

To verify the installation, please complete the following steps:

3. Select "**Start / Settings / Control Panel**" and double-click the "**System**" icon.
4. Click the "**Hardware**" tab and then click the "**Device Manager**" button.

The VXC Card is listed under the "**VXC Multi-port serial Card**" class, and each Communications Port is listed under the "**Ports (VxCard – RS-232/422/485)**" class.
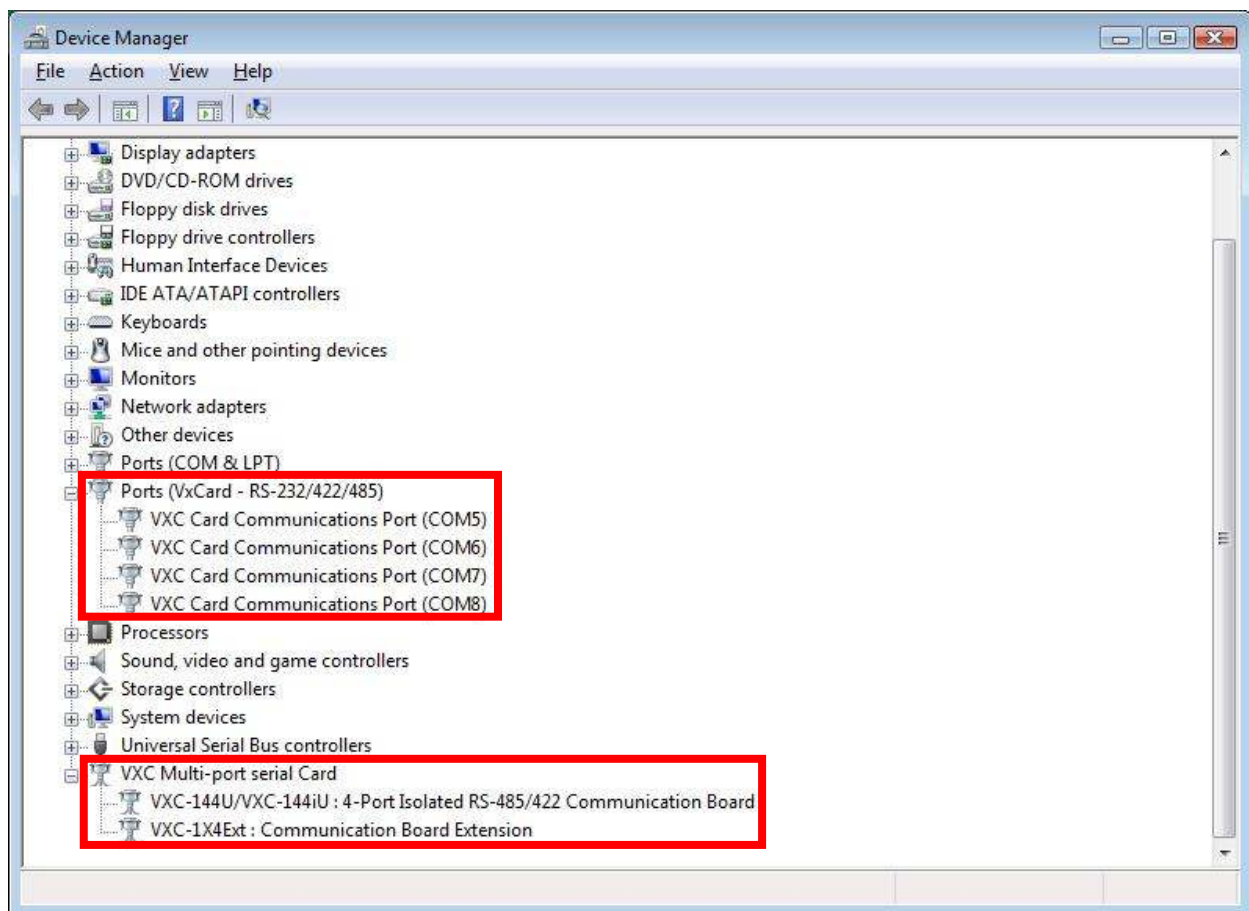
3.5.3 Configuration

If needed, users can change the input buffer size (default is 4 KB for each port, up to 128 KB) by setting the "SW FIFO" scroll-bar on the VxCard Utility. The utility's short cut is placed on the desktop or start menu after driver installed.

4. Right–click "**VxCard Utility.exe**" and select "**Run as administrator**".
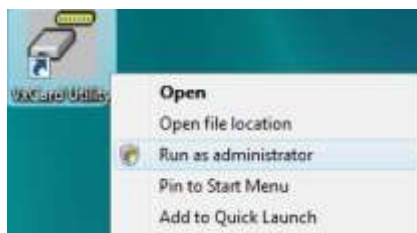
5. Click "**Allow, I trust this program. I know where it's from or I've used it before**" on the "**User Account Control**" window.

6. The VXC Card Utility shows all COM ports that existing in the system.
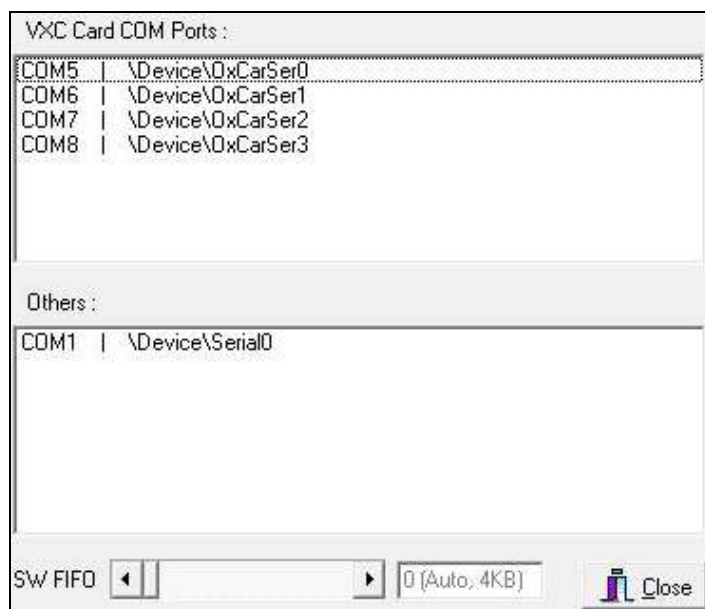
To change the COM port mappings (see **Section 2.2 COM Port Mappings and Board ID**), users should restart the driver by rebooting the computer, or re-install the "**VXC Card**" hardware in the "**Device Manager**" by un-install card and then scan new hardware.

3.5.4 Uninstallation

Before removing the card from your computer, it's recommended to uninstall the device from the "**Device Manager**". This removes unused hardware information from the database (registry) of Windows.

3.6 Linux

This section describes VXC Card Linux driver's features and how to compile and install into a general Linux system (Linux kernel 2.4.X or 2.6.X). The VXC Card Linux driver is modified from Linux kernel source and supports most of popular PC-based Linux distributions.

3.6.1 Driver Features

- Device file.
- Dynamic device allocation.
- Dynamic major number.
- One major number for multiple devices.
- Use the GNU configure and build system.

3.6.2 Installation

Please refer to the following steps to complete it.

1. Download or copy the **IxCOM** package to a directory that you have access to.

2. Extract the package. For example, the package's file name is "**ixcom-0.8.1.tar.gz**" and its path related to your current working directory is../pkg, then the extraction command would be
   #tar -zxvf ../pkg/ixcom-0.8.1.tar.gz

   An ixcom-0.8.1 directory is created after extraction.

3. For convenient access, it is a good idea to put a symbol-link on it.
   #ln -s ixcom-0.8.1 ixcom

4. Change to the **ixcom** working directory you just made, type
   #./configure to create proper Makefiles.

5. Once the configuring has done successfully, type "**make**" to build all.

> **Note:** If you like to install files to system directory, the make install will do it for you. However, install files to system directory is not necessary for further operation. You will need the root privilege for that.

Script "**./ixcom.inst**" loads modules automatically. Script "**./ixcom.remove**" removes the loaded modules. The root privilege is required when installing or removing these kernel modules.

3.6.3 Access to VXC Serial Port

Script "**ixcom.inst**" will establish unused device major number dynamically and create correspond device node for access VXC serial port.

```
# ./ixcom.inst
IxCOM Installer 0.5.0
Check kernel version... 2.6
Use proc-file /proc/icpdas/ixcom
Load module ixcom
```

Use "**dmesg**" command to inspect the driver output message.

```
dmesg
……….
……….
ICPDAS VXC multi-serial card Serial driver version ixcom-0.8.1 (2007-08-21)
Found ICPDAS VXC-114U series board(BusNo=0,DevNo=20)
PCI: Found IRQ 11 for device 0000:00:14.0
PCI: Sharing IRQ 11 with 0000:00:07.2
PCI: Sharing IRQ 11 with 0000:00:14.1
ttySV0 at port cc00 (irq = 11) is a 16C950/954
ttySV1 at port d000 (irq = 11) is a 16C950/954
ttySV2 at port d400 (irq = 11) is a 16C950/954
ttySV3 at port d800 (irq = 11) is a 16C950/954
```

The script "**ixcom.inst**" had loaded module into kernel and find a VXC card that have four serial port, ttySV0, ttySV1, ttySV2 and ttySV3.

The "**ixcom.inst**" script will use major number 254 to create correspond device on the /dev.

```
# ls -la /dev/ttySV?
crw-rw-rw-  1 root  root  254,  64 Jul 14 10:13 /dev/ttySV0
crw-rw-rw-  1 root  root  254,  65 Jul 14 10:13 /dev/ttySV1
crw-rw-rw-  1 root  root  254,  66 Jul 14 10:13 /dev/ttySV2
crw-rw-rw-  1 root  root  254,  67 Jul 14 10:13 /dev/ttySV3
crw-rw-rw-  1 root  root  254,  68 Jul 14 10:13 /dev/ttySV4
crw-rw-rw-  1 root  root  254,  69 Jul 14 10:13 /dev/ttySV5
crw-rw-rw-  1 root  root  254,  70 Jul 14 10:13 /dev/ttySV6
crw-rw-rw-  1 root  root  254,  71 Jul 14 10:13 /dev/ttySV7
crw-rw-rw-  1 root  root  254,  72 Jul 14 10:13 /dev/ttySV8
crw-rw-rw-  1 root  root  254,  73 Jul 14 10:13 /dev/ttySV9
```

To remove VXC driver from system use script "**./ixcom.remove**" to removes the loaded modules.

4. Programming Reference

4.1 PCI Hardware IDs

Card	Vendor ID	Device ID	Sub-Vendor ID	Sub-Device ID	Version
VXC-114U	0x1415	0x9504	0x1441	0x0090	Rev1.1
VXC-114iAU	0x1415	0x9501	0x1441	0x0091	Rev4.0
VXC-144U	0x1415	0x9504	0x1440	0x0090	Rev3.1
VXC-144iU	0x1415	0x9501	0x1440	0x0091	Rev4.0
VXC-112(A)U	0x1415	0x9501	0x1441	0x0080	Rev1.3
VXC-112iAU	0x1415	0x9505	0x1441	0x0080	Rev4.0
VXC-142U	0x1415	0x9501	0x1440	0x0080	Rev1.2
VXC-142iU	0x1415	0x9505	0x1440	0x0080	Rev4.0
VXC-182iU	0x1415	0x9501	0x1442	0x0080	Rev1.1
	0x1415	0x9505	0x1442	0x0080	Rev4.0

4.2   I/O Address Mapping

The I/O address of the VXC series card is automatically assigned by the main-board ROM BIOS. The universal version of VXC series cards using two PCI functions as followings:

Application:
> VXC-112U, VXC-142U/142iU, VXC-182iU, VXC-114U/114iAU (Version after Rev1.2),
> VXC-144U (Version after Rev1.2), VXC-144iU (Version after Rev3.2)

Base Address Register	Function 0	Function 1
BAR0	**UARTs** (I/O Mapped)	Local Bus (I/O Mapped)
BAR1	**UARTs** (Memory Mapped)	Local Bus (Memory Mapped)
BAR2	Local Configuration Registers (I/O Mapped)	Reserved
BAR3	Local Configuration Registers (Memory Mapped)	Reserved
BAR4	Reserved	Reserved
BAR5	Reserved	Reserved

Application:
> VXC-112(A)U/112iAU (Rev4.0), VXC-142U/142iU (Rev4.0), VXC-182iU (Rev4.0)

Base Address Register	Function 0	Function 1
BAR0	**UART0** (I/O Mapped)	Local Bus (I/O Mapped)
BAR1	**UART1** (I/O Mapped)	Local Bus (Memory Mapped)
BAR2	Reserved	Reserved
BAR3	Reserved	Reserved
BAR4	Local Configuration Registers (I/O Mapped)	Reserved
BAR5	Local Configuration Registers (Memory Mapped)	Reserved

> **Note:** Please contact us for more information about I/O Address Mapping.

Application:

VXC-114U (Rev1.1), VXC-144U (Rev1.1), VXC-144iU (Rev3.1)

Base Address Register	Function 0	Function 1
BAR0	UART0 (I/O Mapped)	Local Bus (I/O Mapped)
BAR1	UART1 (I/O Mapped)	Local Bus (Memory Mapped)
BAR2	UART2 (I/O Mapped)	Reserved
BAR3	UART3 (I/O Mapped)	Reserved
BAR4	Local Configuration Registers (I/O Mapped)	Reserved
BAR5	Local Configuration Registers (Memory Mapped)	Reserved

Note: Please contact us for more information about I/O Address Mapping.

4.3   UART Register

Register Name	Address	R/W	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
THR [1]	000	W	Data to be transmitted							
RHR [1]	000	R	Data received							
IER [1,2] 650/950 Mode	001	R/W	CTS interrupt mask	RTS interrupt mask	Special Char. Detect	Sleep mode	Modem interrupt mask	Rx Stat interrupt mask	THRE interrupt mask	RxRDY interrupt mask
550/750 Mode			Unused		Alternate sleep mode					
FCR [3] 650 mode	010	W	RHR Trigger Level		THR Trigger Level		Tx Trigger Enable	Flush THR	Flush RHR	Enable FIFO
750 mode			RHR Trigger Level		FIFO Size	Unused				
950 mode			Unused							
ISR [3]	010	R	FIFOs enabled		Interrupt priority (Enhanced mode)		Interrupt priority (All modes)			Interrupt pending
LCR [4]	011	R/W	Divisor latch access	Tx break	Force parity	Odd / even parity	Parity enable	Number of stop bits	Data length	
MCR [3,4] 550/750 Mode	100	R/W	Unused		CTS & RTS Flow Control	Enable Internal Loop Back	OUT2 (Int En)	OUT1	RTS	DTR
650/950 Mode			Baud prescale	IrDA mode	XON-Any					
LSR [3,5] Normal	101	R	Data Error	Tx Empty	THR Empty	Rx Break	Framing Error	Parity Error	Overrun Error	RxRDY
9-bit data mode								9th Rx data bit		
MSR [3]	110	R	DCD	RI	DSR	CTS	Delta DCD	Trailing RI edge	Delta DSR	Delta CTS
SPR [3] Normal	111	R/W	Temporary data storage register and Indexed control register offset value bits							
9-bit data mode			Unused							9th Tx data bit
Additional Standard Registers – These registers require divisor latch access bit (LCR[7]) to be set to 1.										
DLL	000	R/W	Divisor latch bits [7:0] (Least significant byte)							
DLM	001	R/W	Divisor latch bits [15:8] (Most significant byte)							

4.4 Programmable Baud Rate

Baud Rates Using a 14.7456-MHz Crystal (Universal series cards)

DESIRED BAUD RATE	DIVISOR USED TO GENERATE 16× CLOCK	PERCENT (%) ERROR
50	18432	
75	12288	
110	8376	0.026
150	6144	
300	3072	
600	1536	
1200	768	
2400	384	
4800	192	
9600	96	
14400	64	
19200	48	
23040	40	
28800	32	
38400	24	
56000	16	2.86
57600	16	
115200	8	
184320	5	
230400	4	
307200	3	
460800	2	

Warning: The baud rates higher than 115,200 bps are not guaranteed to work.

4.5. Customized Baud Rate

To generate baud rate 125,000 bps:

125,000 * 16 * 8 = 16,000,000 = 16MHz crystal

So, when you use a 16MHz crystal and selecting the baud rate 115,200 bps in your software setting, the hardware will generate baud rate 125kbps actually.

Warning: The baud rates higher than 115,200 bps are not guaranteed to work.

To generate baud rate 250,000 bps:

250,000 * 16 * 4 = 16,000,000 = 16MHz crystal
(Baud rate * 16x clock * Divisor = Crystal Clock Frequency)

Thus, when you use a 16MHz crystal and selecting the baud rate 230,400 bps in your software setting, the hardware will generate baud rate 250kbps actually.

Note: The multi-port serial cards can have a special baud rate in OEM version. Please contact us for more information regarding the OEM products.