User Manual

PCM-2000 Series

A modular mini-PCIe system for selected industry applications

ADVANTECH

Enabling an Intelligent Planet

Copyright

The documentation and the software included with this product are copyrighted 2014 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

Product Warranty (5 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   – Product name and serial number
   – Description of your peripheral attachments
   – Description of your software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wording of any error messages

Warnings, Cations and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*
There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed in each chapter are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
15. The power cord or plug is damaged.
16. Liquid has penetrated into the equipment.
17. The equipment has been exposed to moisture.
18. The equipment does not work well, or you cannot get it to work according to the user's manual.
19. The equipment has been dropped and damaged.
20. The equipment has obvious signs of breakage.
21. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
22. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
23. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

■ To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

■ Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

Chapter 1

Introduction

This chapter provides a general description of the PCM modules description and support summary.

Sections include:

- Description
- PCM Support Summary

1.1 Description

Advantech designed iDoor technology by support for the flexible optional connector arrangement for the Advantech embedded Automation computing platform including connector, internal cabling and a wide range of I/O and communication Modules.

Supporting:

- Optional WLAN and GPRS modules including Antenna, RT Ethernet and serial Fieldbus options
- Non-volatile Memory options
- Optical isolated Serial Ports RS232/422/485
- LAN ports supporting IEEE-1588 PTP
- I/O extension modules
- Wireless IO communication

1.2 PCM Support Summary

Model	Manual	Drivers	Datasheet	Startup
PCM-2300MR-AE	Chapter 2	Refer to DVD	Refer to DVD	Refer to DVD
PCM-24D2R4-AE	Chapter 3	Refer to DVD	Refer to DVD	Refer to DVD
PCM-24D2R2-AE	Chapter 3	Refer to DVD	Refer to DVD	Refer to DVD
PCM-24D4R4-AE	Chapter 3	Refer to DVD	Refer to DVD	Refer to DVD
PCM-24D4R2-AE	Chapter 3	Refer to DVD	Refer to DVD	Refer to DVD
PCM-26D2CA-AE	Chapter 4	Refer to DVD	Refer to DVD	Refer to DVD
PCM-26D1PB-AE	Refer to DVD	From Hilscher	Refer to DVD	Refer to DVD
PCM-23U1DG-AE	Chapter 5	Refer to DVD	Refer to DVD	Refer to DVD
PCM-2300TP-AE	Chapter 6	Refer to Advantech PCA-TPM-00A1E product information for Driver, Datasheet, Manual and Startup		
PCM-23C1CF-AE	Chapter 7	Refer to DVD	Refer to DVD	Refer to DVD
PCM-24R1TP-AE	Chapter 8	Refer to DVD	Refer to DVD	Refer to DVD
PCM-24R2PE-AE PCM-24R2GL-AE	Chapter 9	Refer to DVD	Refer to DVD	Refer to DVD

Chapter 2

PCM-2300MR-AE

2MB MRAM mini-PCIe card

This chapter shows how to install the driver and Advantech Device Manager.

Sections include:

- ■ **Initial Inspection**
- ■ **Driver Setup & Installation-Advantech Device Manager Installation**
- ■ **Format**

2.1 Initial Inspection

You should find the following items inside the package:

- Mini-PCIe communication interface card
- Industrial Communication Driver, Utility and mini-PCIe communication card user's manual in PCM-2000 DVD-ROM

The PCM-2300MR was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-2300MR, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit.

When you handle the PCM-2300MR, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

2.2 Driver Setup & Installation- Advantech Device Manager Installation

Advantech provides WDM MRAM driver that allows you to configure your hardware and store the settings in your Windows registry. You must install the WDM MRAM driver if you want to add and manage Advantech MRAM cards.

Follow the steps below to install Advantech MRAM WDM Driver.

1. Select "Next" to continue the installation.
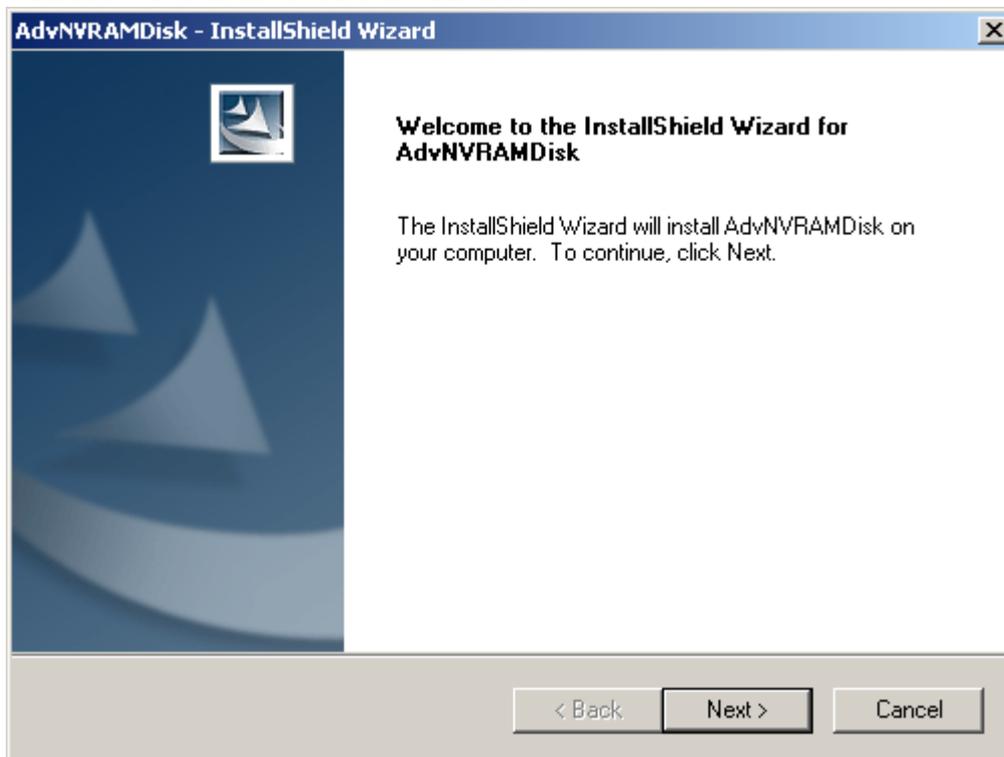
2. Select "Install" to continue the installation.

3. After a while, the installation will be complete.

AdvNVRAMDisk - InstallShield Wizard

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed AdvNVRAMDisk. Click Finish to exit the wizard.

< Back | **Finish** | Cancel
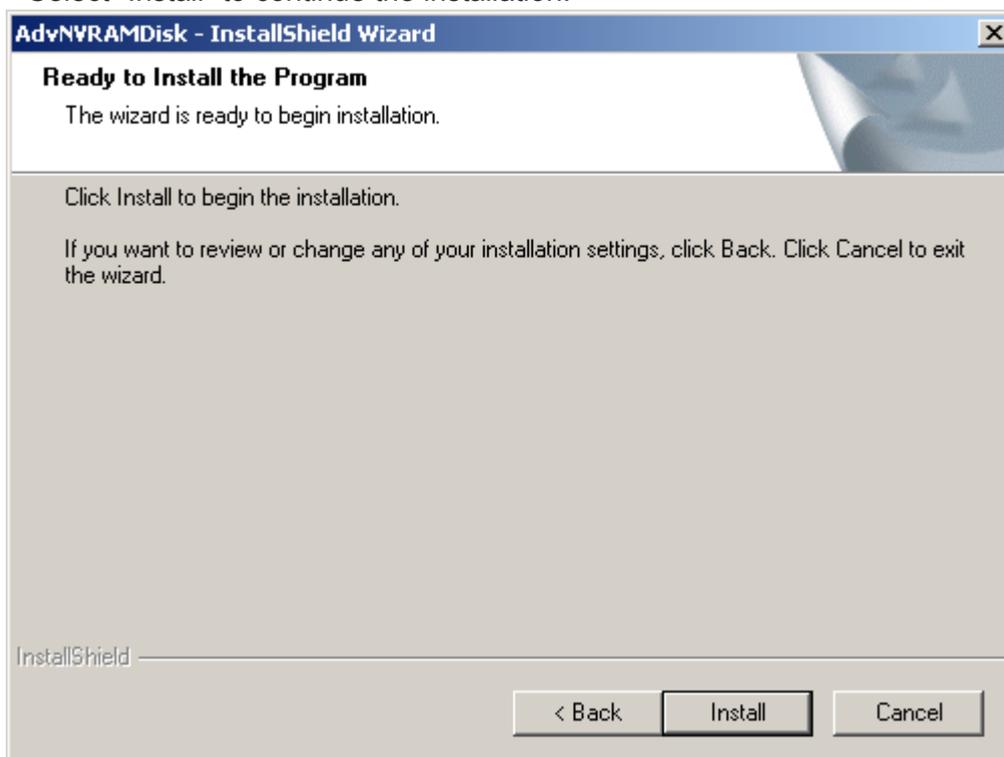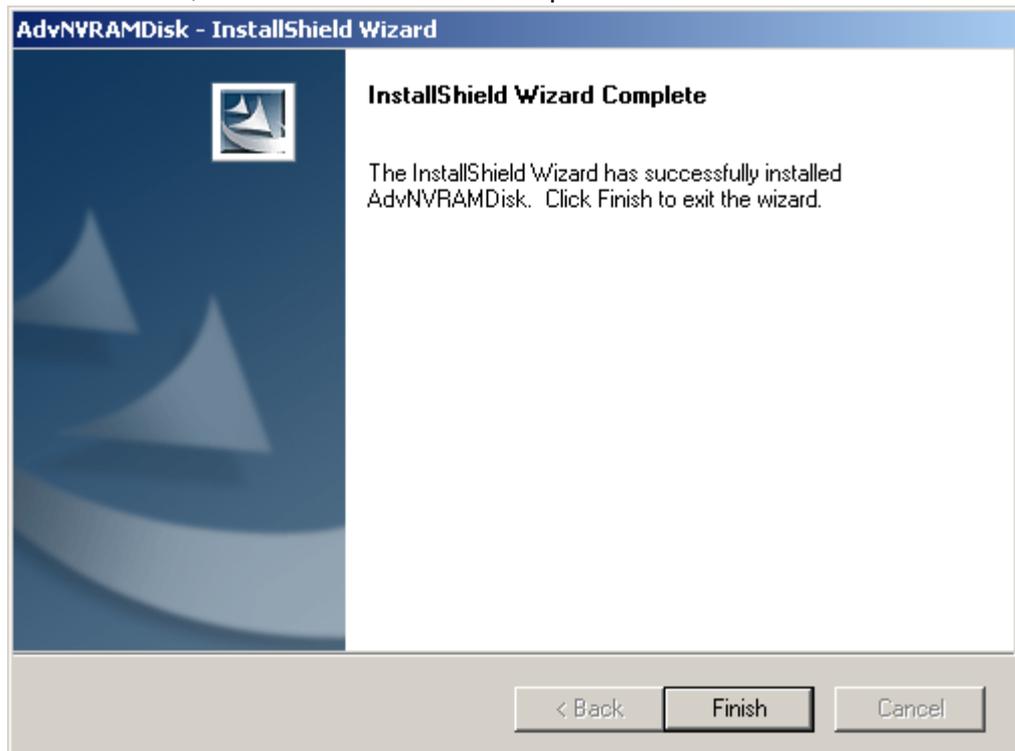
4. Select OK to Restart your computer.

Restarting Windows

Setup has finished copying files to your computer. Before you can use the program, you must restart your computer.

Select one of the following options and click OK to finish setup.

○ Yes, I want to restart my computer now.

○ No, I will restart my computer later.

OK
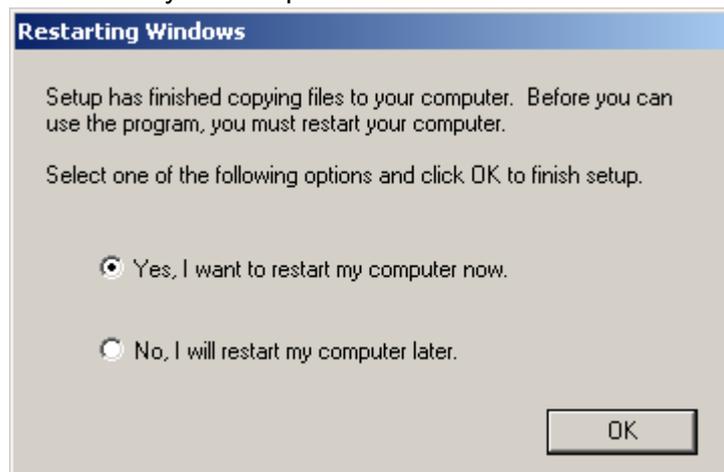
5. After the physical hardware has been installed, the card will be automatically detected.
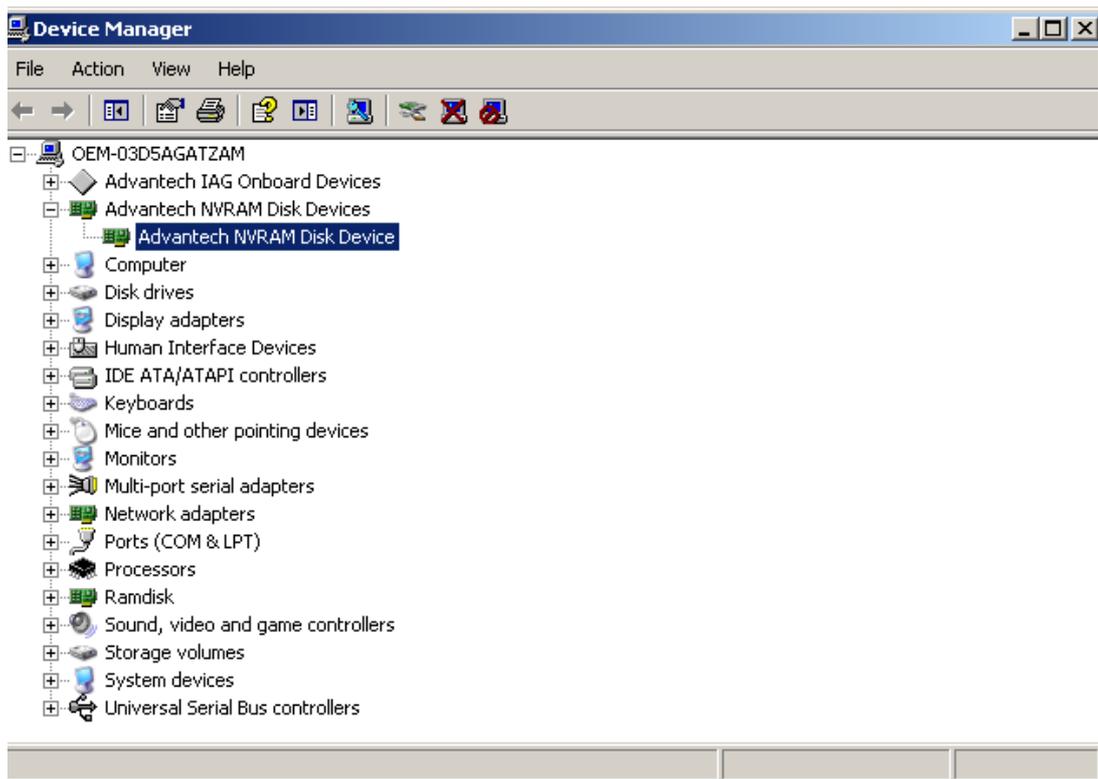
2.3 Format

2.3.1 Windows Format

1. Right click the mouse to select "format"
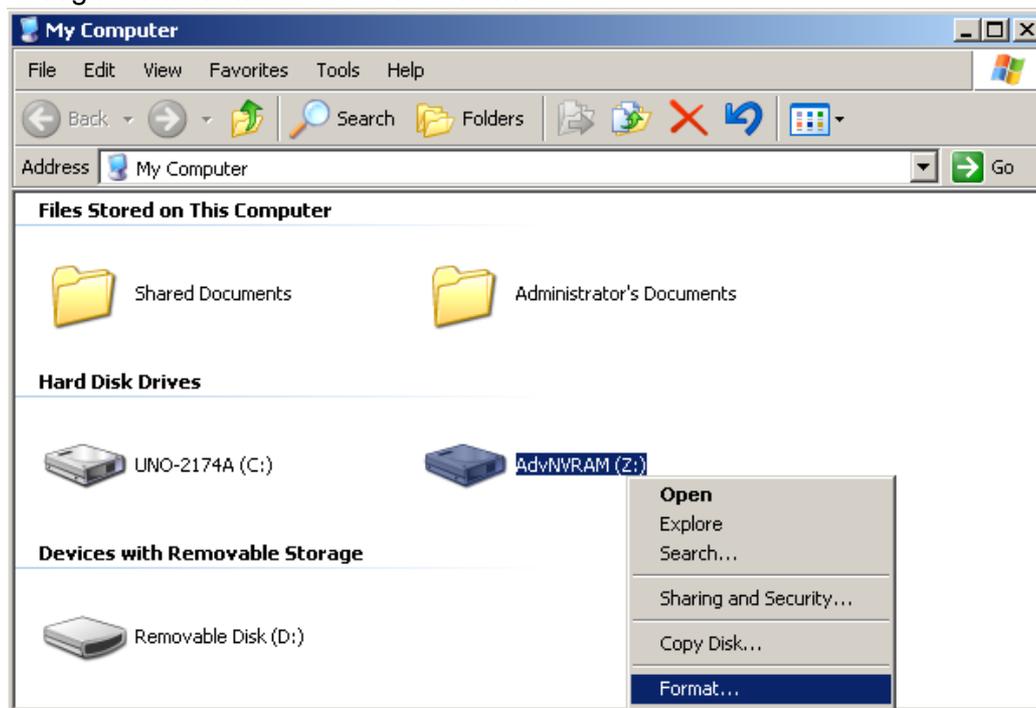
2. Select "Start" to complete MRAM format.
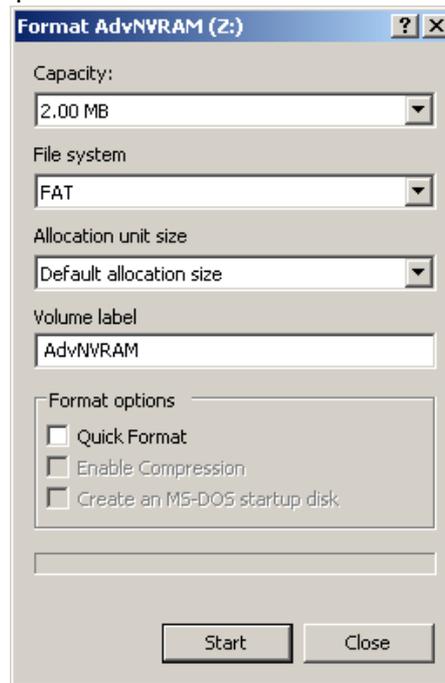
2.3.2 Advantech provides MRAM driver format

1. Use Device Manager….
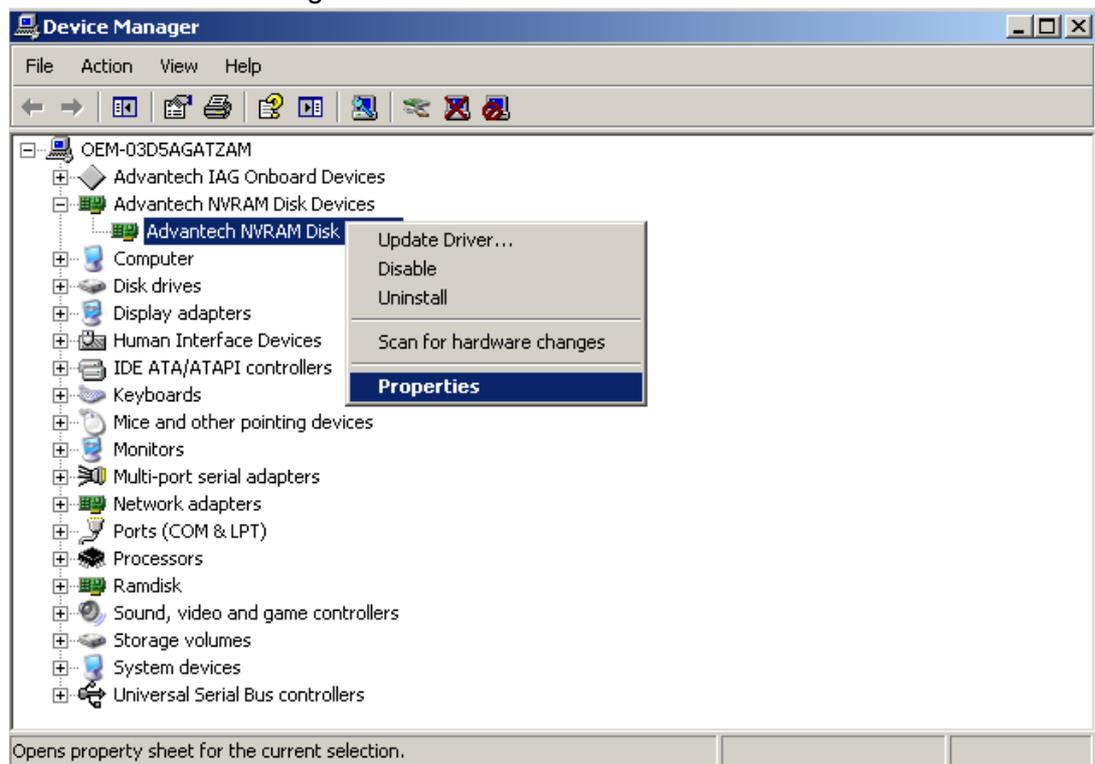
2. Select "Settings" page and then click "Clear data" button to format MRAM disk.
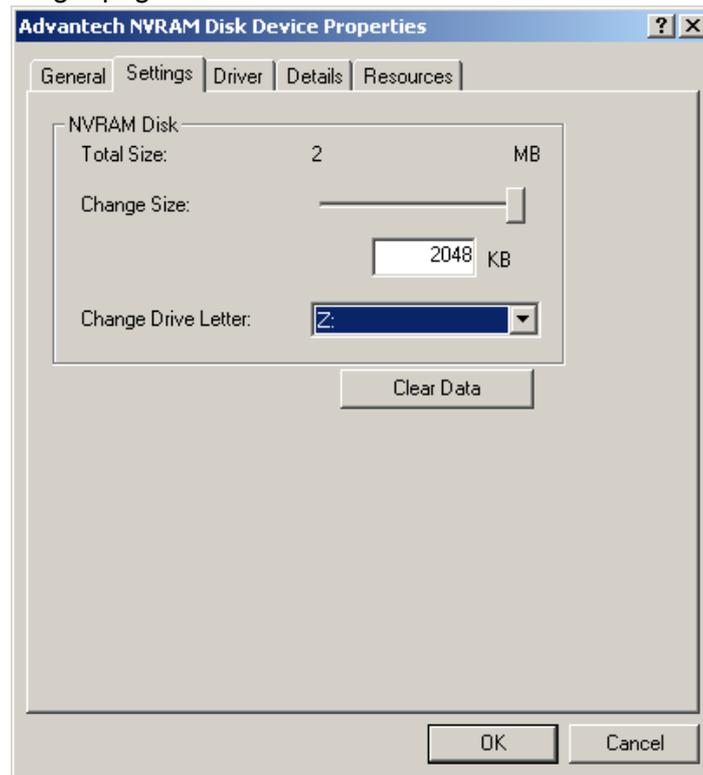
Chapter 3

PCM-24DxRx-AE

PCM-24D2R4-AE, PCM-24D2R2-AE, PCM-24D4R4-AE, PCM-24D4R2-AE
Industrial Serial Communication Cards

This chapter covers inspection and installation of hardware and drivers.

Sections include:

- Ordering Information
- Initial Inspection
- Jumper and Switch Settings
- Driver Setup & Installation
- Pin Assignment
- Wiring

Ordering information:

Product	Description
PCM-24D2R2-AE	2-Ports Isolated RS-232 mini-PCIe, DB9
PCM-24D2R4-AE	2-Ports Isolated RS-422/485 mini-PCIe, DB9
PCM-24D4R2-AE	4-Ports Non-Isolated RS-232 mini-PCIe, DB37
PCM-24D4R4-AE	4-Ports Non-Isolated RS-422/485 mini-PCIe, DB37

3.1 Initial Inspection

1. PCM-2400 Communication card including:
   A. PCM-2400 mini-PCIe Card
   B. I/O plate.
   C. Wire cable
   D. DB37 to DB9(4 ports) cable (For PCM-24D4R4-AE only)
2. PCM-2000 DVD-ROM including:
   A. User manual
   B. Industrial Communication Driver

We carefully inspect our PCM-2400 communication card mechanically and electrically before shipping. It should be free of marks and scratches and in perfect working condition on receipt.

As you unpack, check for any signs of shipping damage (damaged box, scratches, dents, etc.). Should any damage is found or it fail to meet specifications, please notify our service department or your local sales representative immediately. Also the carrier should be notified. Retain the shipping carton and packing material for further inspections by the carrier.

After inspection we will make arrangements to repair or replace the unit.

When you handle the communication card, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packaging for further storage, as the card was removed from the PC.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

3.2   Jumper and Switch Settings

3.2.1   PCM-24D2R4 Settings
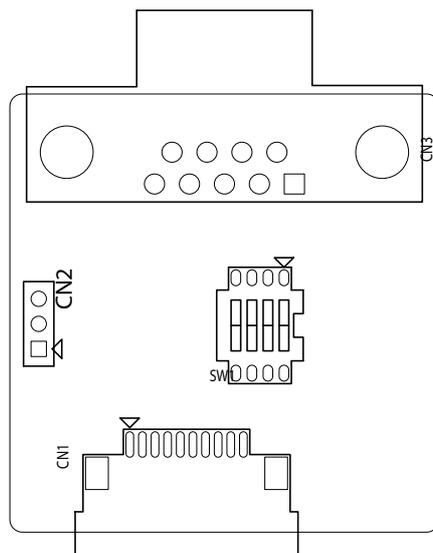
Table 3.1: Master/Slave Settings		
Jumper	**Pin**	**Description**
CN2	1-2	RS-422 Master
	2-3	RS-485/RS-422 Slave (Default)

Table 3.2: Terminal Resistor Settings		
Switch	Terminal Resistor	Switch Setting
SW1		1(D+/-) on 2(RX+/-) on
	120 ohm	
		3,4 off
	300 ohm	3(D+/-) on 4(RX+/-) on
		1,2 off

3.2.2 PCM-24D4R4 Settings
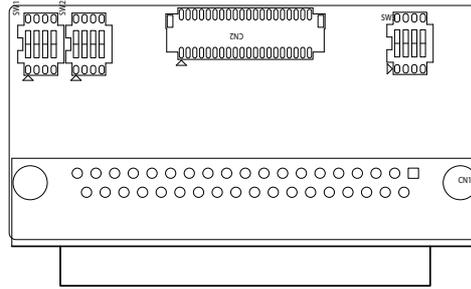
Table 3.3: Master/Slave Settings				
COM Port	**Switch**	**Pin**	**Setting**	**Description**
COM 1		1	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (Default)
COM 2		2	ON	RS-422 Master
	SW1		OFF	RS-485/RS-422 Slave (Default)
COM 3		3	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (Default)
COM 4		4	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (Default)

Table 3.4: Terminal Resistor Settings					
COM Port	**Switch**	**Pin**	**Setting**	**RS-422 Description**	**RS-485 Description**
COM 1		1	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (Default)	
		2	ON	120 Ohm between Rx+/Rx-	Invalid
	SW2		OFF	Open (Default)	
COM 2		3	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (Default)	
		4	ON	120 Ohm between Rx+/Rx-	Invalid
			OFF	Open (Default)	
COM 3		1	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (Default)	
		2	ON	120 Ohm between Rx+/Rx-	Invalid
	SW3		OFF	Open (Default)	
		3	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (Default)	
COM 4		4	ON	120 Ohm between Rx+/Rx-	Invalid
			OFF	Open (Default)	

3.3 Driver Setup & Installation

3.3.1 Introduction

This chapter describes the driver installation, configuration and removal procedures for the for the afore mentioned Windows operating system. We strongly recommend that you install the software driver before you install the hardware into your system, since this will guarantee a smooth and trouble-free installation process.

3.3.2 Driver Setup

Windows operating system supports COM1 to COM256, meaning up to 256 serial ports. In order to fully utilize the advanced features of Windows operating system, such as multi-process and multi-thread, pure 32-bit Windows 2K/XP/Vista/7 and others, as afore indicated, device drivers are provided for the PCI/PCIe communication cards. All these drivers conform to the Win32 COMM API standard.

3.3.3 Steps for Operating System Driver Setup

Before you install the card into your system, we recommend you install the driver first. Follow the steps below for the PCI/PCIe communication cards' windows operating system driver installation.

1. Insert your companion DVD-ROM disc into your DVD-ROM drive.
2. Double click the .exe file from the DVD-ROM, then the driver will begin to setup. For example, PCM-24DxRx\Driver\xx.exe.
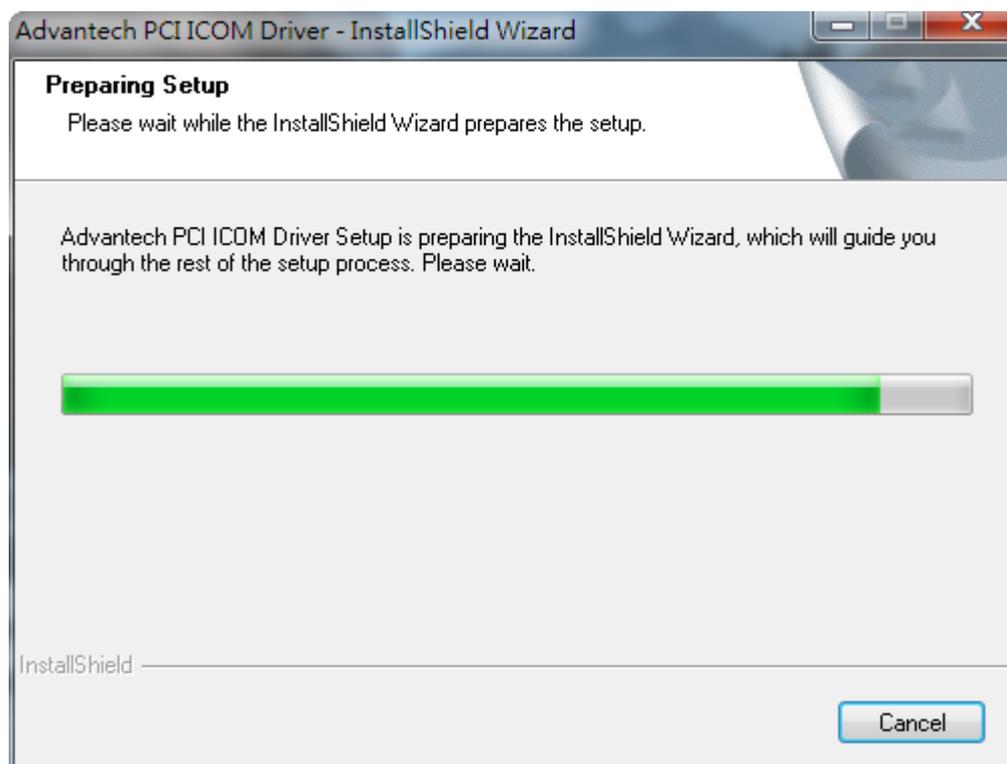
3.3.4 Driver Uninstall

1. In the Control Panel, click **Advantech PCI ICOM Driver** then uninstall.
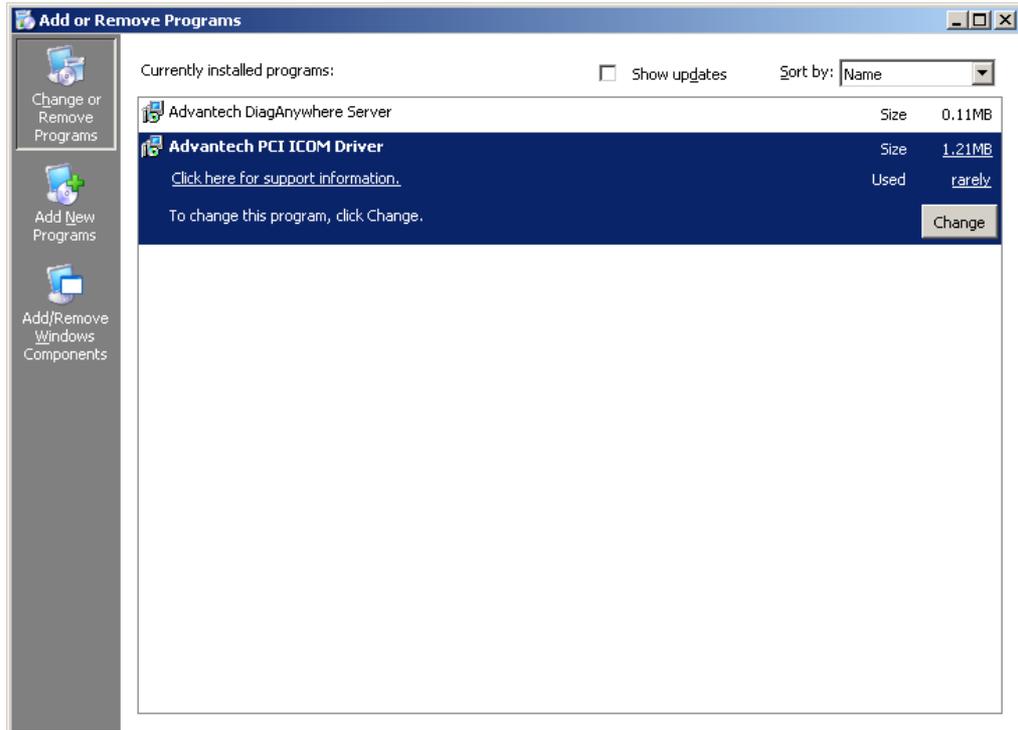
2. Choose "**Remove**" then click "**Next**" then start to remove all installed components.
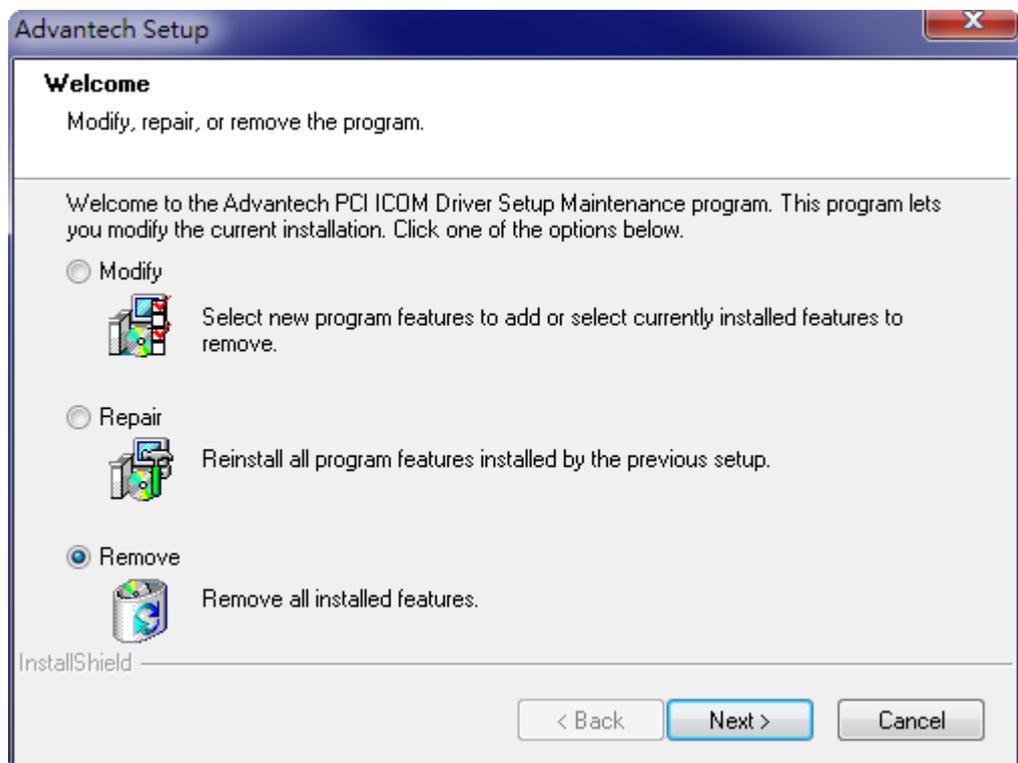
3.4   Pin Assignments

3.4.1   PCM-24D2R2

The following table and figure shows the pin assignments of two male DB9 connectors on the iDoor bracket for PCM-24D2R2 card in RS-232 Mode.

**Table 3.5: PCM-24D2R2 Male DB9 on iDoor bracket**

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
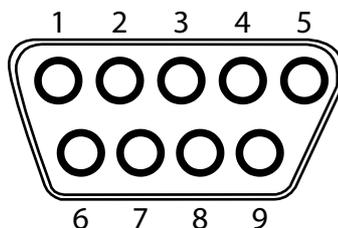
3.4.2   PCM-24D2R4

The following table and figure shows the pin assignments of two male DB9 connectors on the iDoor bracket for PCM-24D2R4 card in RS-422 and RS-485 Modes.

Table 3.6: PCM-24D2R4 Male DB9 on iDoor Bracket

Pin	RS-422	RS-485
1	Tx-	Data-
2	Tx+	Data+
3	Rx+	-
4	Rx-	-
5	GND	GND
6	RTS-	-
7	RTS+	-
8	CTS+	-
9	CTS-	-
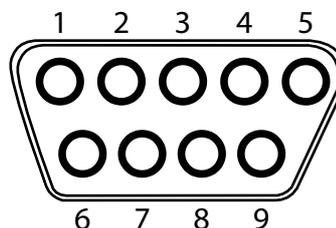
3.4.3 PCM-24D4R2

The following tables and figures show the pin assignments of 1 female DB37 connector one the iDoor bracket to male DB9 for PCM-24D4R2 card in RS-232 mode.

Table 3.7: PCM-24D4R2 Male DB9 on Cable

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
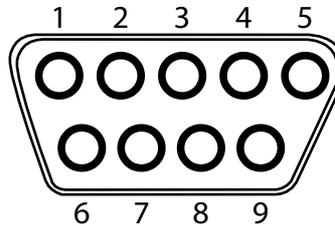
Table 3.8: PCM-24D4R2 Female DB37 on iDoor bracket

Pin	RS-232	Pin	RS-232
1	-	20	3_RI
2	3_DCD	21	3_DTR
3	3_GND	22	3_DSR
4	3_CTS	23	3_RTS
5	3_RxD	24	3_TxD
6	4_RI	25	4_DCD
7	4_DTR	26	4_GND
8	4_DSR	27	4_CTS
9	4_RTS	28	4_RxD
10	4_TxD		
		29	2_RI
11	2_DCD	30	2_DTR
12	2_GND	31	2_DSR
13	2_CTS	32	2_RTS
14	2_RxD	33	2_TxD
15	1_RI	34	1_DCD
16	1_DTR	35	1_GND
17	1_DTS	36	1_CTS
18	1_RTS	37	1_RxD
19	1_TxD		
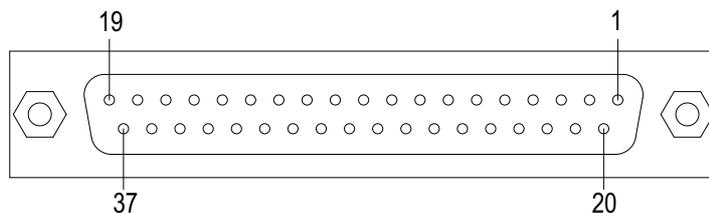
3.4.4 PCM-24D4R4

The following tables and figures show the pin assignments of 1 female DB37 connector one the iDoor bracket to male DB9 for PCM-24D4R4 card in RS-422 and RS-485 modes.

**Table 3.9: PCM-24D4R4 Male DB9 on Cable**

Pin	RS-422	RS-485
1	Tx-	Data-
2	Tx+	Data+
3	Rx+	-
4	Rx-	-
5	GND	GND
6		-
7		-
8		-
9		-
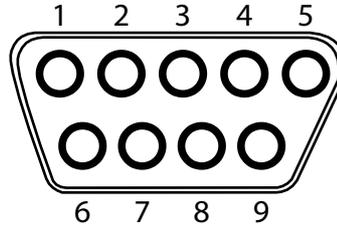
Table 3.10: PCM-24D4R4 Female DB37 on iDoor bracket

Pin	RS-422	RS-485	Pin	RS-422	RS-485
1	-	-	20	-	-
2	3_TxD-	3_Data-	21	3_RxD-	-
3	3_GND	3_GND	22	-	-
4	-	-	23	-	-
5	3_TxD+	3_Data+	24	3_RxD+	-
6	-	-	25	4_TxD-	4_Data-
7	4_RxD-	-	26	4_GND	4_GND
8	-	-	27	-	-
9	-	-	28	4_TxD+	4_Data+
10	4_RxD+	-			
			29	-	-
11	2_TxD-	2_Data-	30	2_RxD-	-
12	2_GND	2_GND	31	-	-
13	-	-	32	-	-
14	2_TxD+	2_Data+	33	2_RxD+	-
15	-	-	34	1_TxD-	1_Data-
16	1_RxD-	-	35	1_GND	1_GND
17	-	-	36	-	-
18	-	-	37	1_TxD+	1_Data+
19	1_RxD+	-			
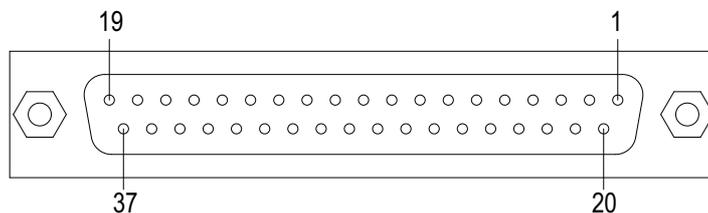
3.5 Wiring

3.5.1 RS-232 Signal Wiring

Since the RS-232 interface is not strictly defined, many devices have their own connection methods which may ignore some signal lines or define reserved lines for other functions. It is best to refer to the user's manual for your device for installation instructions. You may find the following helpful.

In general, DTE (Data Terminal Equipment) refers to the device that is leading the communication. Examples include PC's, terminals and some printers. DCE refers to the device being communicated with or controlled. Examples include modems, DSU's (digital service units), printers and lab/factory equipment.

In some situations you may be able to get by with just three lines: data on TXD, a signal ground and a handshaking line. Examples are printer or plotter connections, troubleshooting and situations where you require only one-wire communication.

Table 3.11: Terminal or PC (DTE) Connections			
DB-25 Male		**DB-25 Male or Female: Terminal**	
Pin	**Signal**	**Pin**	**Signal**
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS	5	CTS
5	CTS	4	RTS
6	DSR	20	DTR
7	GND	7	GND
20	DTR	6	DSR
8	DCD	8	DCD

Table 3.12: Modem Connections			
DB-25 Male		**Modem (DCE)**	
Pin	**Signal**	**Pin**	**Signal**
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS	5	CTS
5	CTS	4	RTS
6	DSR	20	DTR
7	GND	7	GND
20	DTR	6	DSR
8	DCD	8	DCD

For DTE to DCE connections, use a straight through cable (i.e., you don't have to reverse lines 2 and 3, lines 4 and 5, and lines 6 and 20 since, in general, the DCE RS-232 interfaces are reversed themselves).

Table 3.13: Terminal without Handshake			
DB-25 Male		**Terminal, PC (DTE)**	
Pin	**Signal**	**Pin**	**Signal**
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS		
5	CTS		
7	GND	7	GND
6	DSR		
20	DTR		
8	DCD		

Therefore, if you are not using CTS, RTS, DSR,DTR and DCD signals, short pins 4 and 5 together, and please short pins 6, 8,and 20 together.

3.5.2 RS-422 Signal Wiring

The RS-422 interface wiring is based on one-to-one principles. The transmit lines on one side connect to the receive lines on the other side, and vice versa. With RS-422, you can transmit and receive data simultaneously (full duplex). The connections are as follows:

Table 3.14: RS-422 DB9 Pin Assignment			
DTE (Male DB-9)		**Terminal DTE**	
Pin	**Signal**	**Pin**	**Signal**
1	TxD-	1	RxD-
2	TxD+	2	RxD+
3	RxD+	3	TxD+
4	RxD-	4	TxD-
5	GND	5	GND
6	RTS-	6	CTS-
7	RTS+	7	CTS+
8	CTS+	8	RTS+
9	CTS-	9	RTS-

Terminator Resistors Setup

The signals DSR, DTR and DCD are shorted internally on the PCM-24D2R4/24D4R4 cards when operating in RS-422 mode.

A user can solder in termination resistors if necessary for impedance matching. The card has two mounting spaces for termination resistors, but no resistors are installed at the factory. Each pair of signal lines has a separate resistor (RxD+/-, TxD+/-).

3.5.3 RS-485 Signal Wiring

The RS-485 standard supports half-duplex communication. This means that just two wires are needed to both transmit and receive data. Handshaking signals (such as RTS, Request To Send) are normally used to control the direction of the data flow and to switch the transmission accordingly. In RS-485 mode, the PCM-24D2R4/24D4R4 cards automatically sense the direction of the data flow and switch the transmission direction — no handshaking is necessary. This means a user can build an RS-485 network with just two wires. This RS-485 control is completely transparent to the user. The software written for half duplex RS-232 works without any modification.
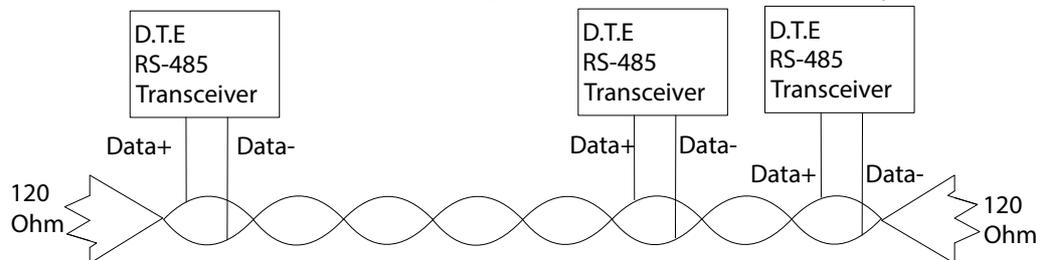
Figure 3.1 RS-485 Wiring Topology

Termination Resistor Setup

You can install termination resistors if necessary for impedance matching. The card has mounting spaces for termination resistors, but no resistors are installed at the factory. Depending on your application you may need to solder in a single resistor to handle the DATA+/DATA- pair (**and a corresponding resistor on the other end of the connection**). The value of the resistor should equal the characteristic impedance of the signal wires (approximately 120 Ohms or 300 Ohms).

Chapter 4

PCM-26D2CA

2-Ports Isolated CANBus mini-PCIe, CANOpen, DB9

This chapter covers the pin assignment for the CAN connector, and the wiring of the two transmission wires.

Sections include:

■ **Initial Inspection**

■ **Driver and Advantech Device Manager Installation**

■ **Jumper and Switch Settings**

■ **Pin Assignment**

■ **Wiring**

4.1 Initial Inspection

You should find the following items inside the shipping package:

- Mini-PCIe communication interface card
- Industrial Communication Driver, Utility and mini-PCIe communication card user's manual in PCM-2000 DVD-ROM

PCM-26D2CA was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM Module, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier.

Retain the shipping carton and packing material for inspection by the carrier.

After inspection we will make arrangements to repair or replace the unit.

When you handle the PCM Module, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

## 4.2 Driver and Advantech Device Manager Installation

Advantech provides WDM CAN driver that allows you to configure your hardware and store the settings in your Windows registry. You must install the WDM CAN driver if you want to add and manage Advantech CAN cards.

Please follow the steps below to install Advantech CAN WDM Driver.

1. Select "Next" to continue the installation.
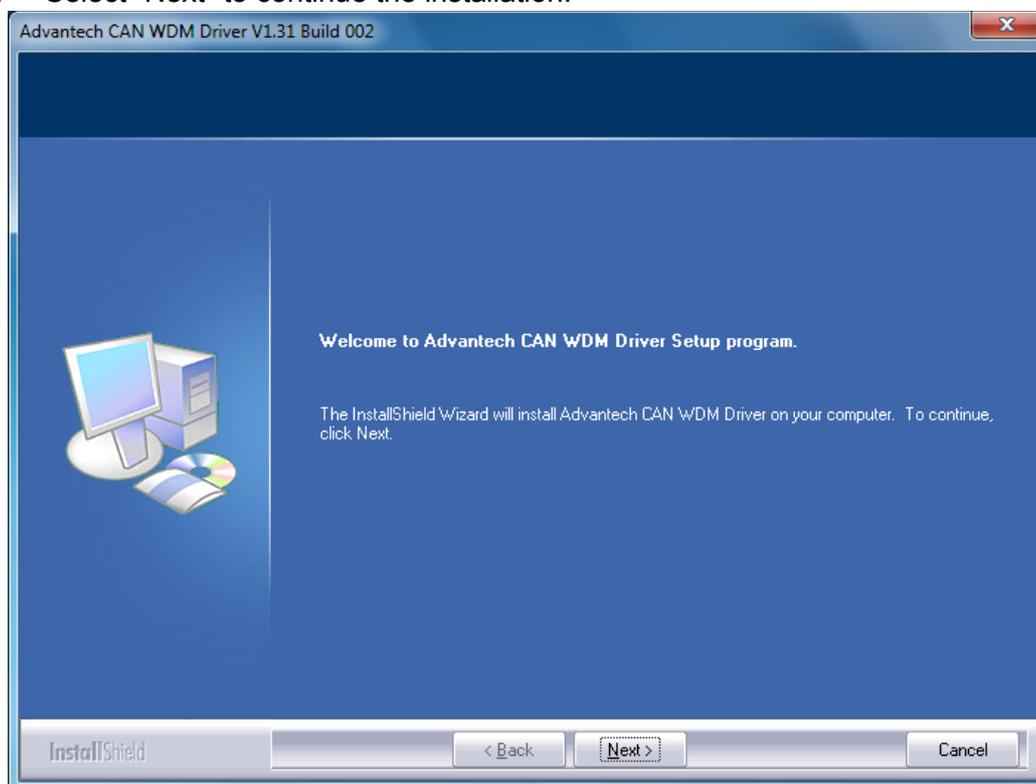
2. After a while, the installation will be complete.
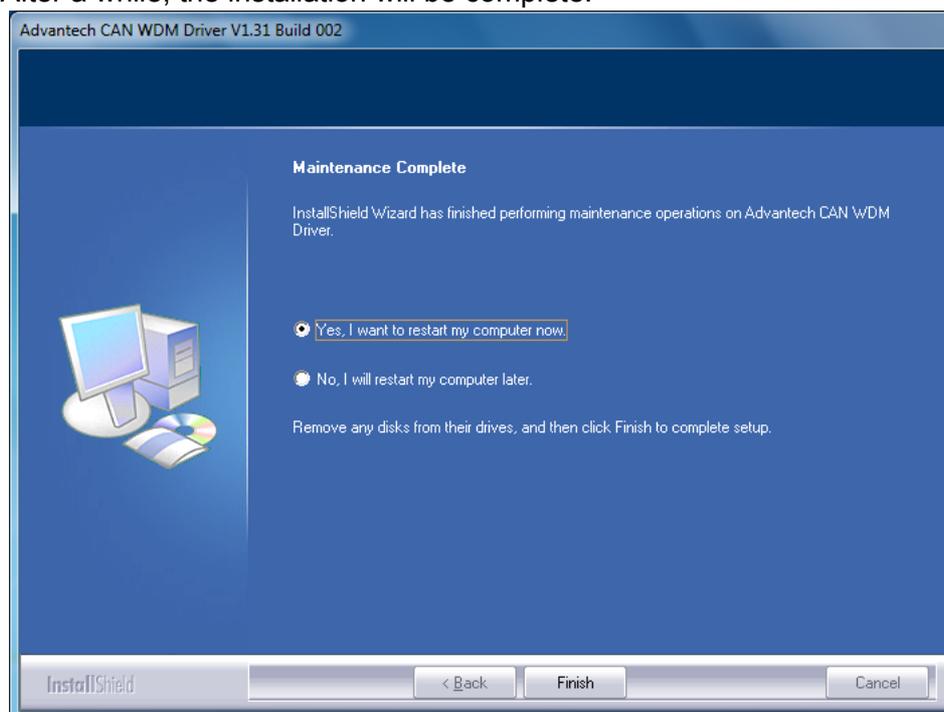
3. After the physical hardware has been installed, the card will be automatically detected.
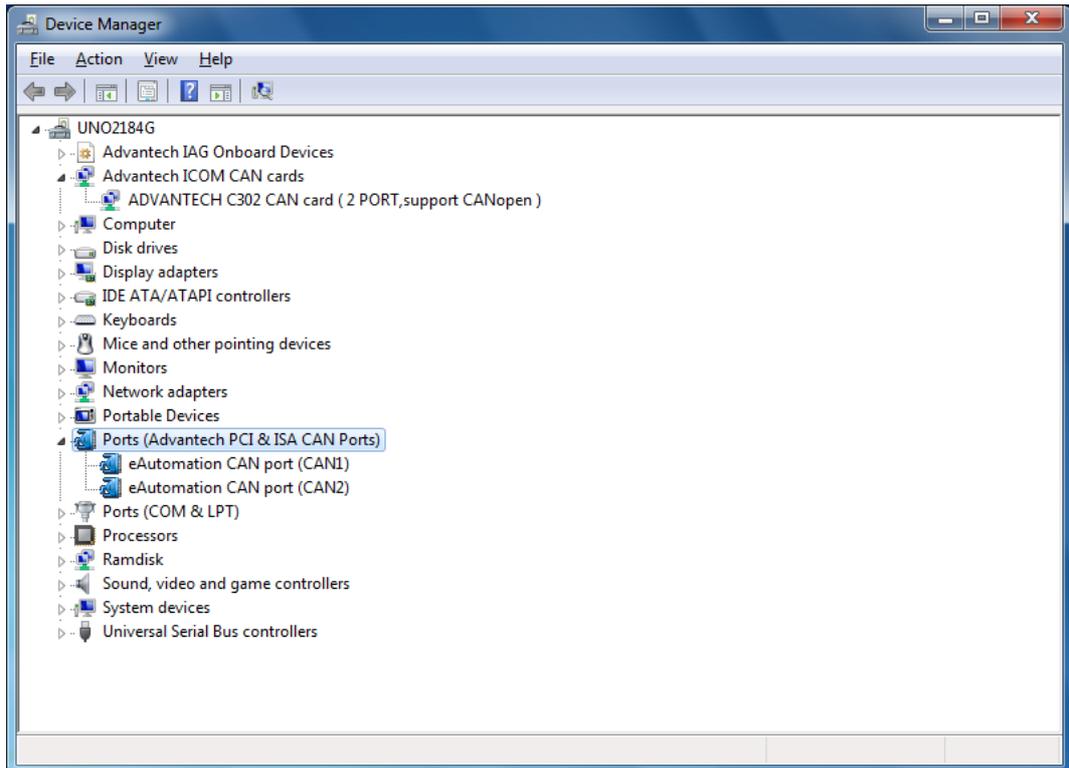
4.3 Jumper and Switch Settings
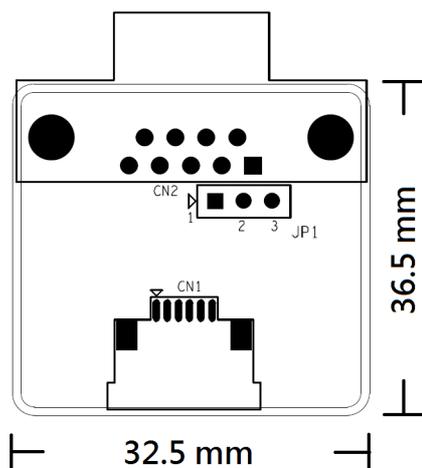
Figure 4.1 CAN-bus transceiver board silk screen

4.3.1 How to Set Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip. To "open" a jumper you remove the clip.
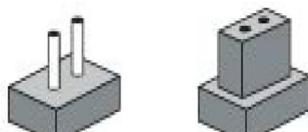
Figure 4.2 How to set the jumpers

4.3.2 Terminator Resistor Setup (JP1)

You can set the terminator resistor if necessary to match impedance. Each port has a separate resistor located on its own transceiver board.

Table 4.1: PCM-26D2CA Terminator Resistor Jumper Setting		
Status		Value of Terminator Resistor (Ohm)
Pin 2-3	Open mode	None
Pin 1-2	Close mode	120 Ohms

> **Note!** is suggested to set the terminator resistor to 120 Ohm to maintain a satisfactory baud rate performance.

4.4 Pin Assignments

Figure 4.3 shows the pin assignment for the card's male DB-9 connectors and corresponding pin assignments of female DB-9 connectors of the cable.
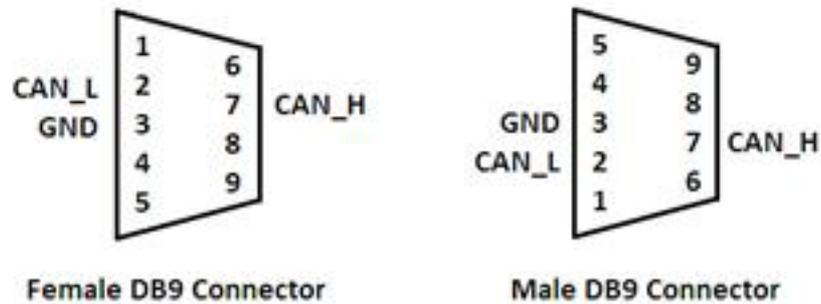


Figure 4.3 PCM-26D2CA DB-9 connector pin assignments
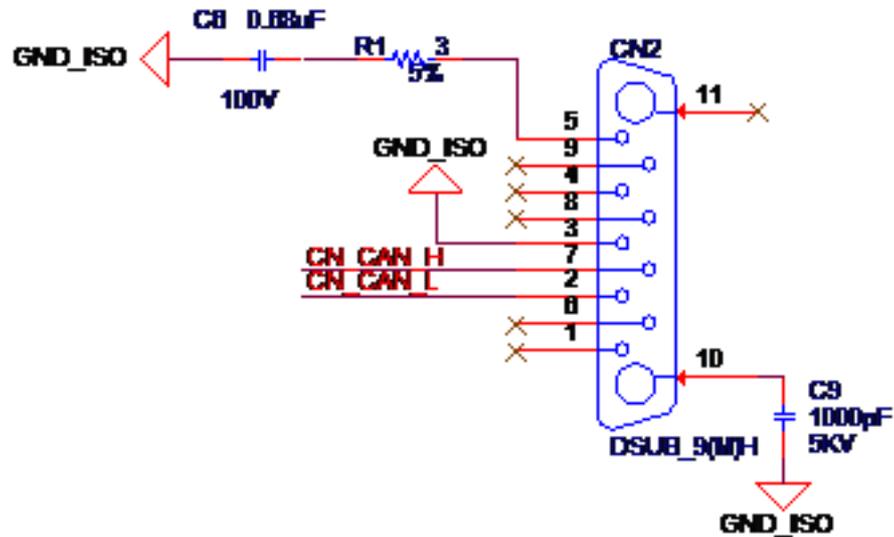
Figure 4.4 PCM-26D2CA DB-9 connector schematics

The CAN standard supports half–duplex communication. This means that just two wires are used to transmit and receive data.

Table 4.2: PCM-26D2CA Pin Description		
Pin	**Signal**	**Description**
2	CAN_L	LOW-level CAN voltage input/output
3	GND	Ground
7	CAN_H	HIGH-level CAN voltage input/output

4.5 Wiring

CAN-bus main board has two FPC connectors for wiring to two CAN-bus transceiver boards through FPC cables. Please ensure to follow Figure 4.5 and Figure 4.6 for appropriate wiring in between.
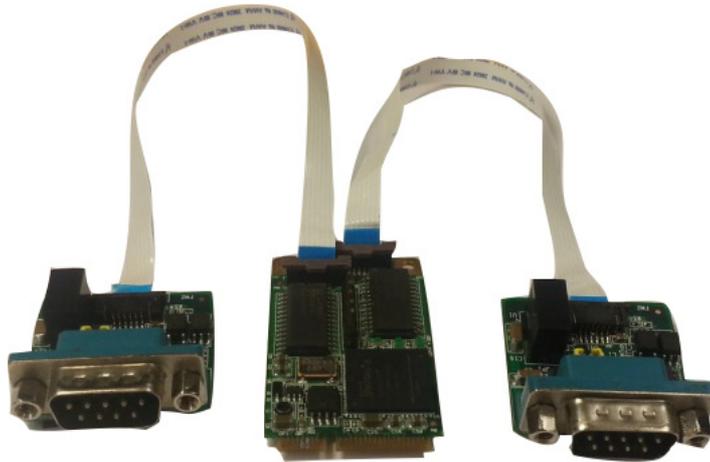
Figure 4.5 FPC cable wiring

Figure 4.6 Wiring on module side

Chapter 5

PCM-23U1DG-AE

USB Slot w/ Lock for USB Dongle

Sections include:

■ **Initial Inspection**

■ **Driver Setup and Installation**

■ **Pin Assignment**

■ **Wiring**

5.1 Initial Inspection

You should find the following items inside the shipped package:
- PCM-2300 Storage Module:
  – I/O plate.
  – Wire cable
- PCM-2000 DVD-ROM including:
  – A. Industrial Communication Driver, Utility and mini-PCIe communication card

The PCM-23U1DG was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-23U1DG, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit. When you handle the PCM-23U1DG, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

> *Warning!* *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

5.2 Driver Setup & Installation- Advantech Device Manager Installation

The Advantech PCM-23U1DG is an internal USB with locked interface for security dongle disk or storage. The driver is based on the storage and there is no need for a driver on the PCM-23U1DG.

5.3 Pin Assignment and Wiring

5.3.1 Pin Assignment

The following table and figure shows the pin assignments of connector on the iDoor I/O module for the PCM-23U1DG.

Cable PIN assignment			
CN1, USB w/locked		**CN2, Internal cable for USB**	
PIN1	5V	PIN1	5V
PIN2	D-	PIN2	D-
PIN3	D+	PIN3	D+
PIN4	GND	PIN4	GND
		PIN5	GND_IO
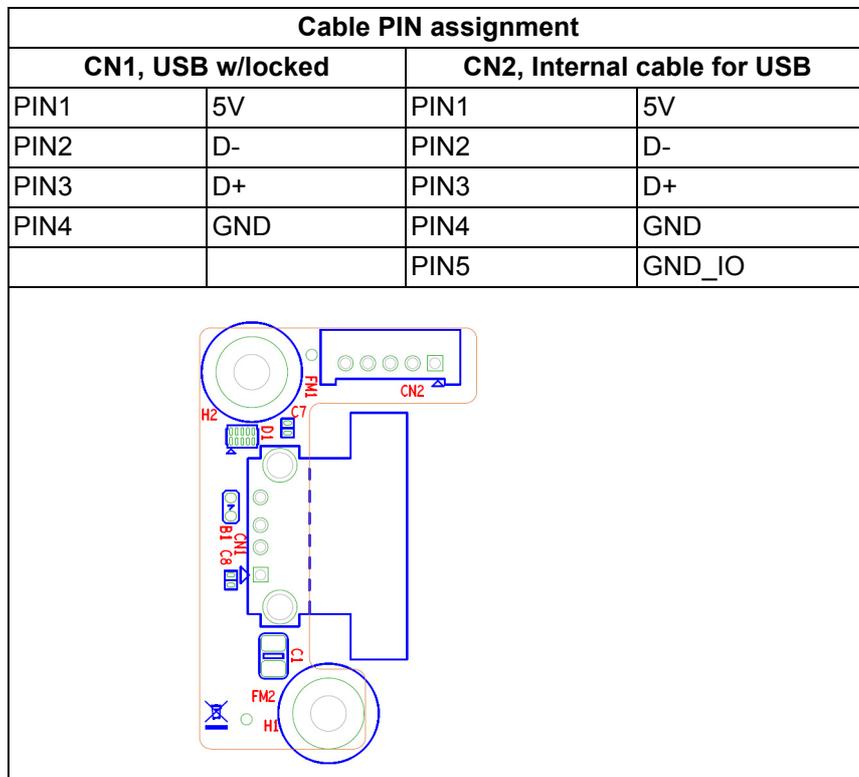
5.3.2 Wiring

PCM-23U1DG is using flat cable to connect from IO plate to internal USB pin-header. The PIN assignment in the below table

Cable PIN assignment			
CN2, Internal cable for USB		**Cable head for the system PIN header**	
PIN1	5V	PIN2	5V
PIN2	D-	PIN4	D-
PIN3	D+	PIN6	D+
PIN4	GND	PIN8	GND

The PIN assignment of the cable may different from the current system pin definition. Advantech can help to customize the cable for different pin assignments.

Chapter 6

PCM-2300TP-AE

Sections include:
- Initial Inspection
- Driver Setup and Installation
- Pin Assignment
- Wiring

6.1 Initial Inspection

You should find the following items inside the shipped package:
- PCM-2300 Storage Module:
  - I/O plate.
  - Wire cable
- PCM-2000 DVD-ROM including:
  - Industrial Communication Driver, Utility and mini-PCIe communication card

The PCM-2300TP was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-2300TP, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit. When you handle the PCM-2300TP, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

6.2 Driver Setup & Installation- Advantech Device Manager Installation

For details about Advantech's PCM-2300TP Driver Setup and Device Manager Installation, refer to Advantech PCA-TPM-00A1E product information on the DVD.

6.3 Pin Assignment and Wiring

For details about Advantech's PCM-2300TP Pin Assignment and Wiring, please refer to the user manual from Advantech PCA-TPM-00A1E product information

The PIN assignment of the cable may different from the current system pin definition. Advantech can help to customize the cable for different pin assignments.

Chapter 7

PCM-23C1CF-AE

SATAII to CFast
Sections include:
- **Initial Inspection**
- **Driver Setup and Installation**
- **Pin Assignment**
- **Wiring**

7.1 Initial Inspection

You should find the following items inside the shipped package:

- PCM-2300 Storage Module:
  - I/O plate.
- PCM-2000 DVD-ROM including:
  - A. Industrial Communication Driver, Utility and mini-PCIe communication card

The PCM-23C1CF was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-23C1CF, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit. When you handle the PCM-23C1CF, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

> *Warning!* *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

# 7.2 Driver Setup & Installation- Advantech Device Manager Installation

Advantech's PCM-23C1CF is a SATAII 3G/Sec to CFast interface for storage. The driver is on the storage device and no need driver is required.

7.3 Pin Assignment and Wiring

7.3.1 Pin Assignment

The following table and figure shows the pin assignments of CFast connector on the iDoor IO module for PCM-23C1CF.

Description of PIN Use - CN2, CFast Connector			
PINS1	GND	PINPC6	NC
PINS2	SATA_TX+	PINPC7	GND
PINS3	SATA_TX-	PINPC8	NC
PINS4	GND	PINPC9	NC
PINS5	SATA_RX-	PINPC10	NC
PINS6	SATA_RX+	PINPC11	NC
PINS7	GND	PINPC12	NC
PINPC1	NC	PINPC13	3.3V
PINPC2	GND	PINPC14	3.3V
PINPC3	NC	PINPC15	GND
PINPC4	NC	PINPC16	GND
PINPC5	NC	PINPC17	NC

7.3.2 Wiring

The PCM-23C1CF uses a flat cable to connect from the I/O plate to the internal SATA HDD connector. The PIN assignment is in the below table.

Description of PIN Use- CN1			
PINS1	GND	PINP5	GND
PINS2	SATA_TX+	PINP6	GND
PINS3	SATA_TX-	PINP7	5V
PINS4	GND	PINP8	5V
PINS5	SATA_RX-	PINP9	5V
PINS6	SATA_RX+	PINP10	GND
PINS7	GND	PINP11	NC
PINP1	3.3V	PINP12	GND
PINP2	3.3V	PINP13	NC
PINP3	3.3V	PINP14	NC
PINP4	GND	PINP15	NC
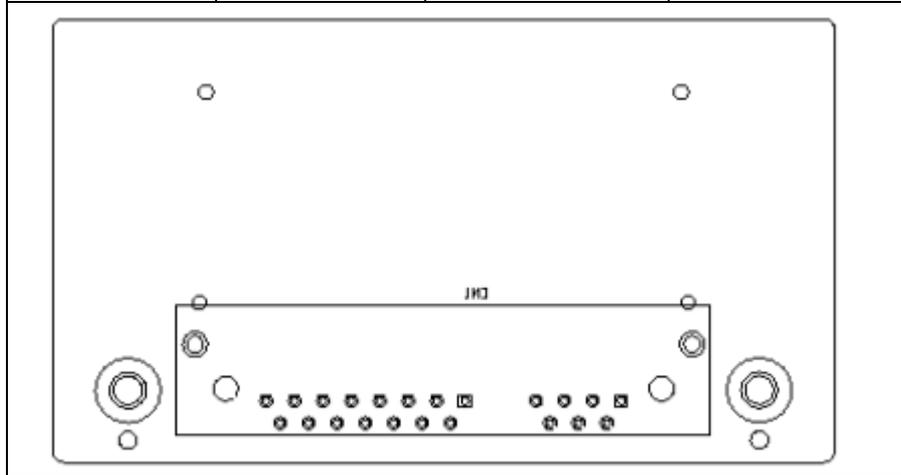
The existing SATA cable length may not be enough. Advantech can help to customize the cable for your system requirements.

Chapter 8

PCM-24R1TP-AE

1 port Giga LAN mPCIe, RJ45

Sections include:

- **Initial Inspection**
- **Driver and Advantech Device Manager Installation**
- **Pin Assignment and Wiring**

8.1 Initial Inspection

You should find the following items inside the shipped package:
- PCM-2400 Communication Module:
  - PCM-2400 mini-PCIe Card
  - I/O plate.
  - Flat Cable
- PCM-2000 DVD-ROM including:
  - Industrial Communication Driver, Utility and mini-PCIe communication card

The PCM-24R1TP was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-24R1TP, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit. When you handle the PCM-24R1TP, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

## 8.2 Driver Setup & Installation- Advantech Device Manager Installation

8.2.1 Introduction

This chapter describes the driver installation, configuration and removal procedures for the mentioned Windows operating system. We strongly recommend that you install the software driver before you install the hardware into your system.

8.2.2 Installation

Follow the steps below to install Advantech PCM-24R1TP Driver.

1. Select "**Next**" to continue the installation.
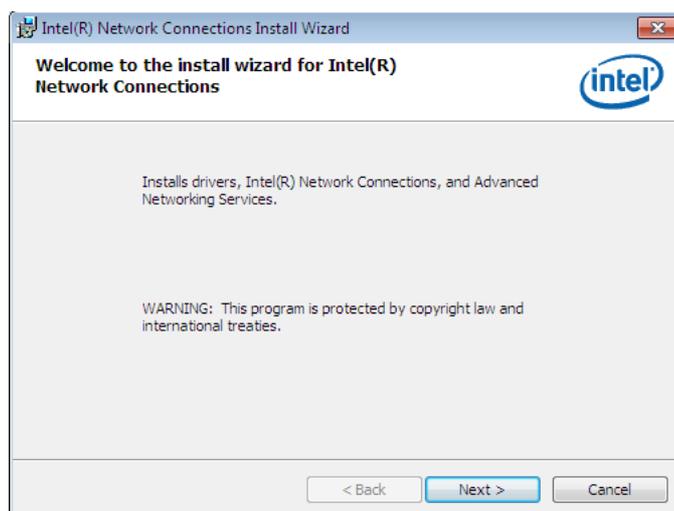
2. Select "**I agree**" to continue the installation.

3. Select "**Driver for Windows Device Manager Intel® PROSet**" to continue the installation.
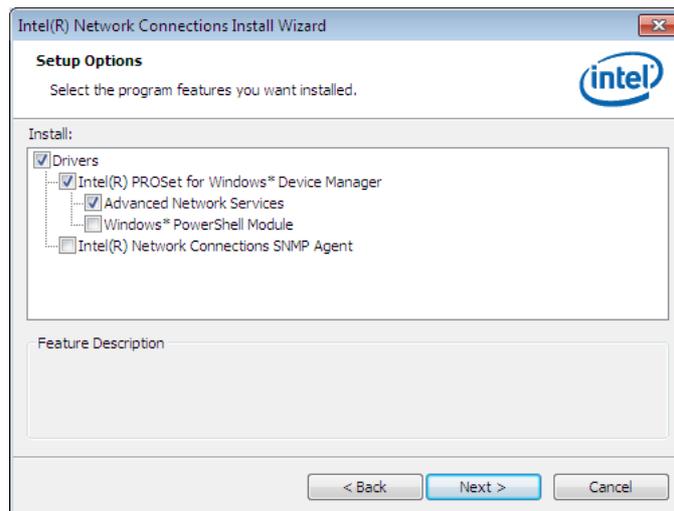
4. Select "**Install**" and start to installation
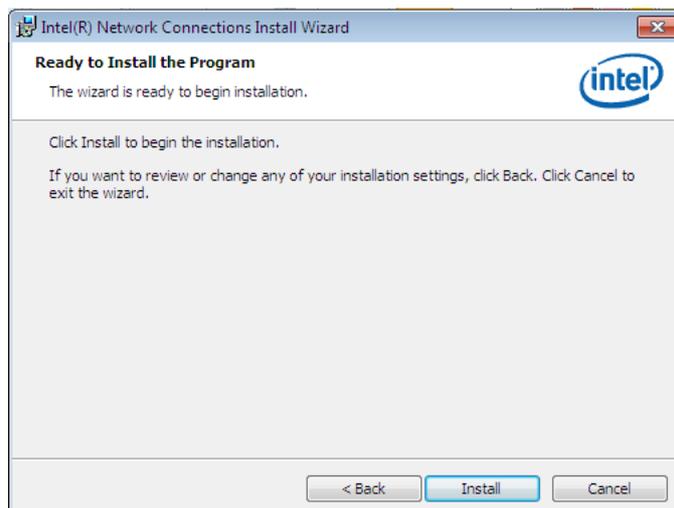
5. Driver is being installed.
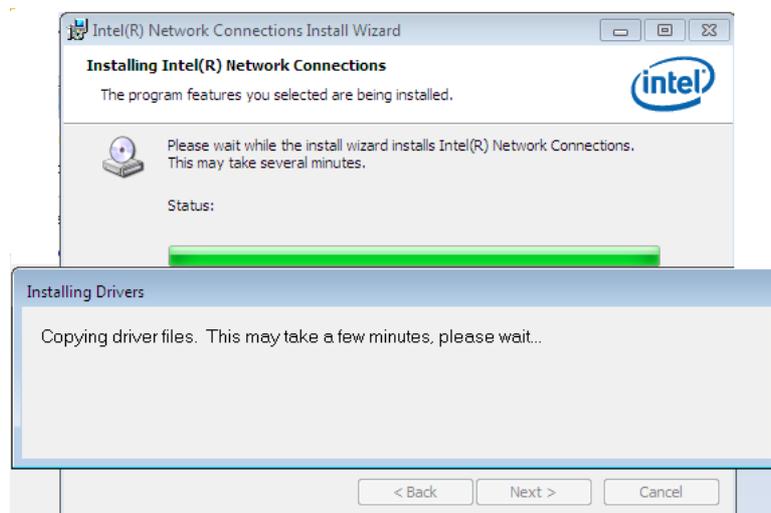
6.   Select "**Finish**" to complete the installation.
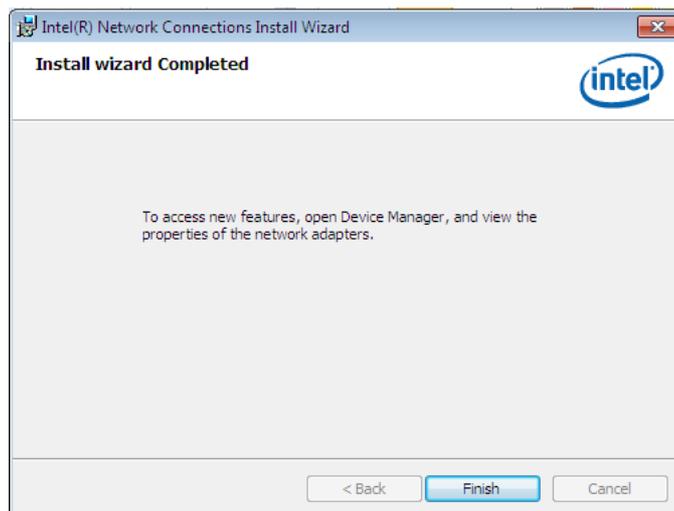
7.   After the hardware has been installed, the card will be automatically detected.Open Device Manager to check it.
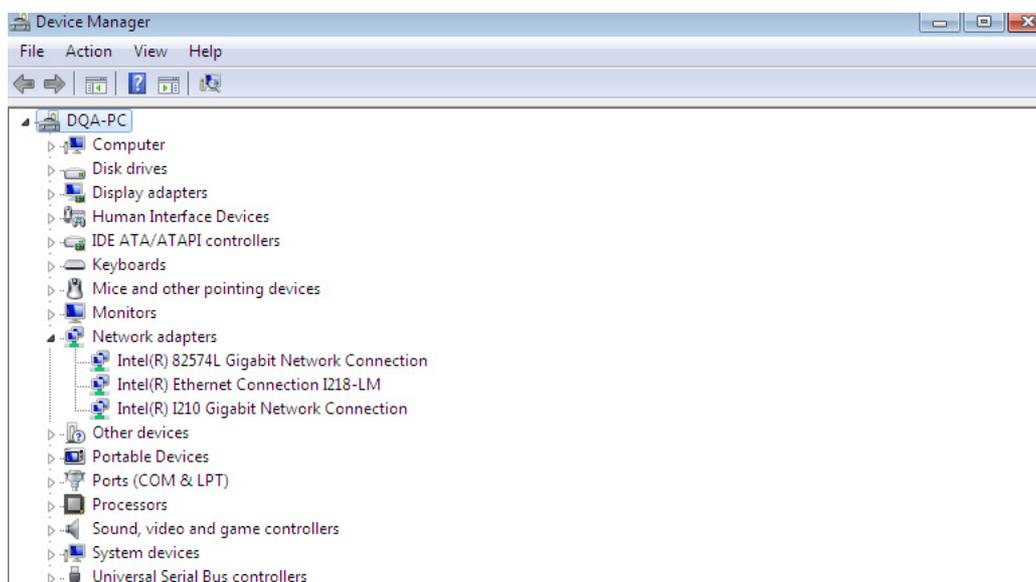
8.3 Pin Assignment and Wiring

8.3.1 Pin Assignment

The following table and figure shows the pin assignments of the LAN connector on the iDoor I/O module for PCM-24R1TP.

Description of PIN Use - CN2			
PIN1	TX_D0+	PIN7	BI_D3+
PIN2	TX_D0-	PIN8	BI_D3-
PIN3	RX_D1+	PIN9	LAN_ACT#
PIN4	BI_D2+	PIN10	+V3.3_LAN
PIN5	BI_D2-	PIN11	LAN_LINK1000#
PIN6	RX_D1-	PIN12	LAN_LINK100#
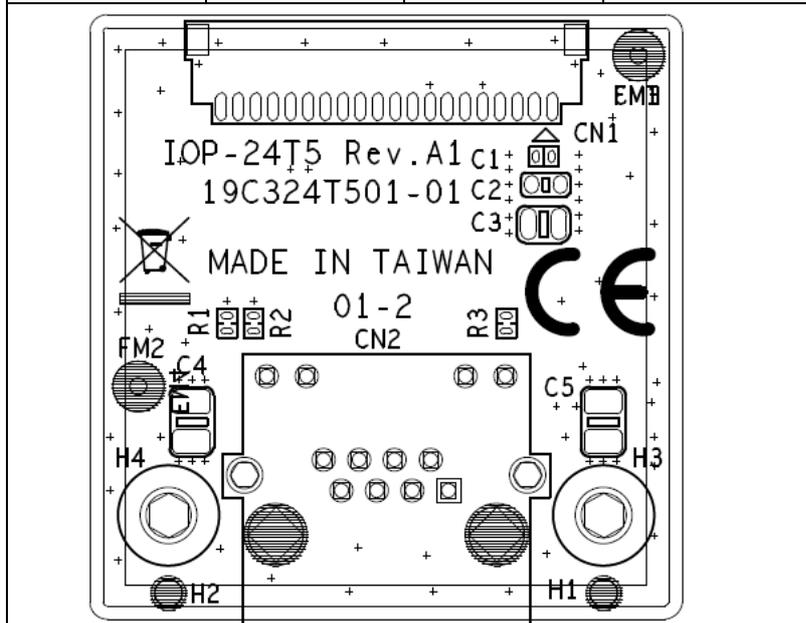
8.3.2 Wiring

The PCM-24R1TP uses a wired cable to connect from the I/O plate to the mPCIe module. The PIN assignment is below.

Description of PIN Use - CN1			
PIN1	GND	PIN9	NC
PIN2	+V3.3_LAN	PIN10	NC
PIN3	NC	PIN11	LAN_MDI0+
PIN4	NC	PIN12	LAN_MDI0-
PIN5	LAN_LINK1000#	PIN13	LAN_MDI1+
PIN6	+V1.9_LAN	PIN14	LAN_MDI1-
PIN7	LAN_ACT#	PIN15	LAN_MDI2+
PIN8	LAN_LINK100#	PIN16	LAN_MDI2-
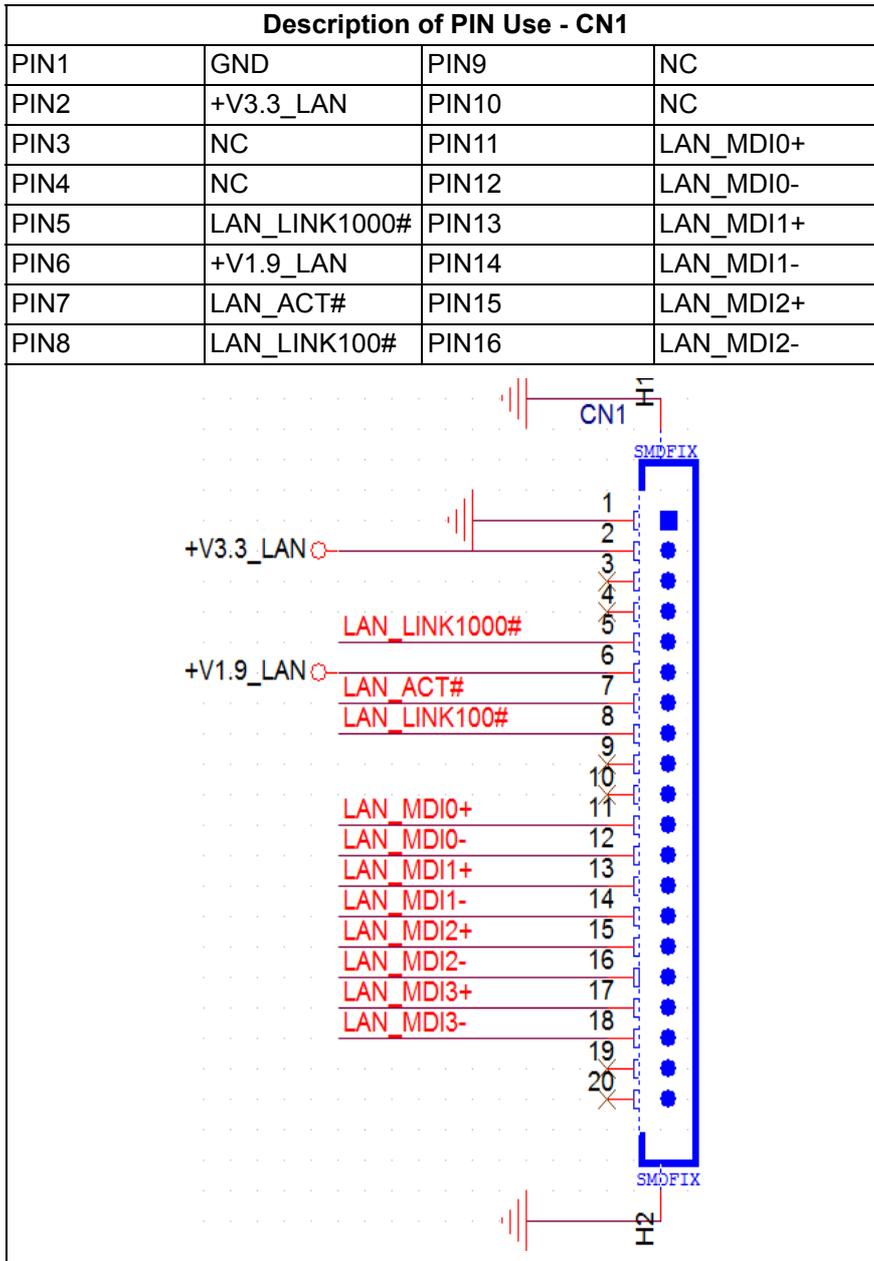
The existing cable length may not enough. Advantech can help to customize the cable for system inquires.

Chapter 9

PCM-24R2PE-AE

2 Port Giga LAN/w PoE mPCIe, RJ45

PCM-24R2GL-AE

2 Port Giga LAN mPCIe, RJ45

Sections include:

- Initial Inspection
- Driver and Advantech Device Manager Installation
- Pin Assignment and Wiring

9.1 Initial Inspection

You should find the following items inside the shipped package:

- PCM-2400 Communication Module:
  - PCM-2400 mini-PCIe Card
  - I/O plate
  - Power board (For PCM-24R2PE-AE only)
  - Wire Cable
- PCM-2000 DVD-ROM including:
  - User Manual
  - Industrial Communication Driver, Utility and mini-PCIe communication card

The PCM-24R2PE was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-24R2PE, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit. When you handle the PCM-24R2PE, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

## 9.2   Driver Setup & Installation- Advantech Device Manager Installation

9.2.1   Introduction

This chapter describes the driver installation, configuration and removal procedures for the mentioned Windows operating system. We strongly recommend that you install the software driver before you install the hardware into your system.

9.2.2   Installation

When you follow the startup manual to install the module appropriated. Please follow the steps below to install Advantech PCM-24R2PE Driver.

1.   Go to **Device Manager** and you will find an error in "**Other devices**"
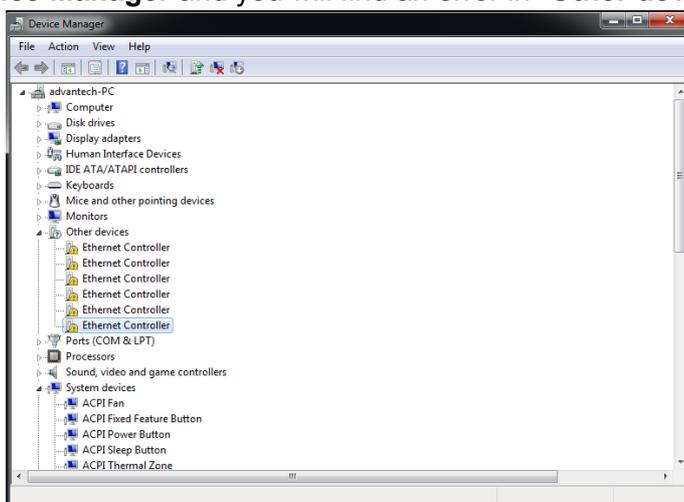
2.   Get the driver from the DVD or Intel website, click it, then run the driver and select "**I agree**" to continue the installation.
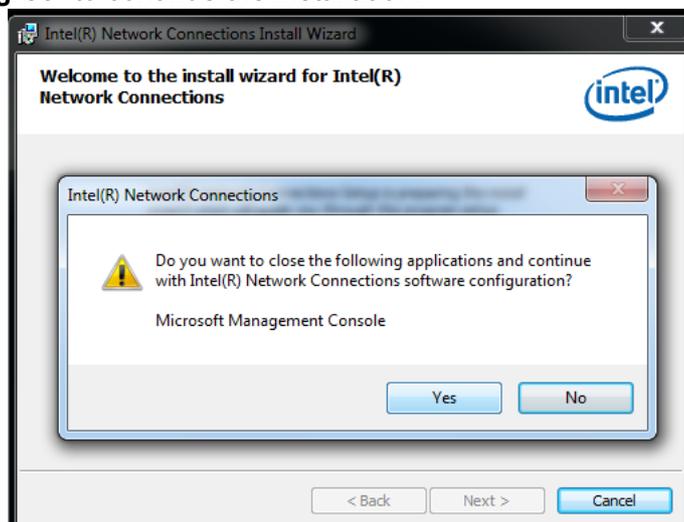
3. Select "**Next**" to continue installation.
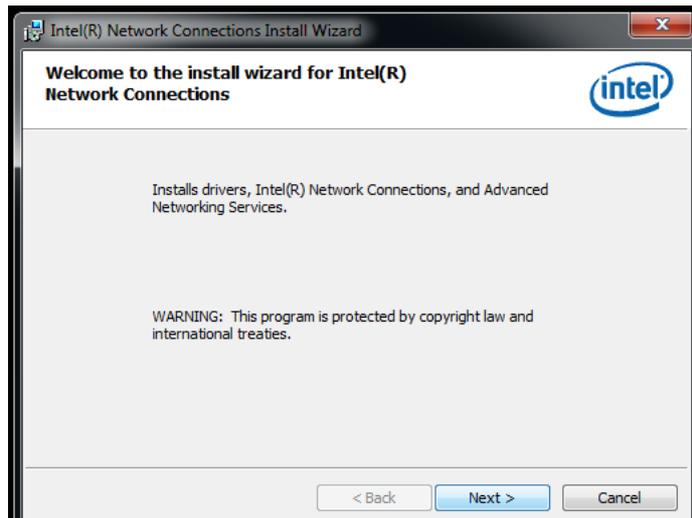
4. Select "**I accept the terms in the license agreement**" to continue installation and click "**Next**"

5. Select "**Driver for Windows Device Manager Intel® PROSet**" to continue the installation.
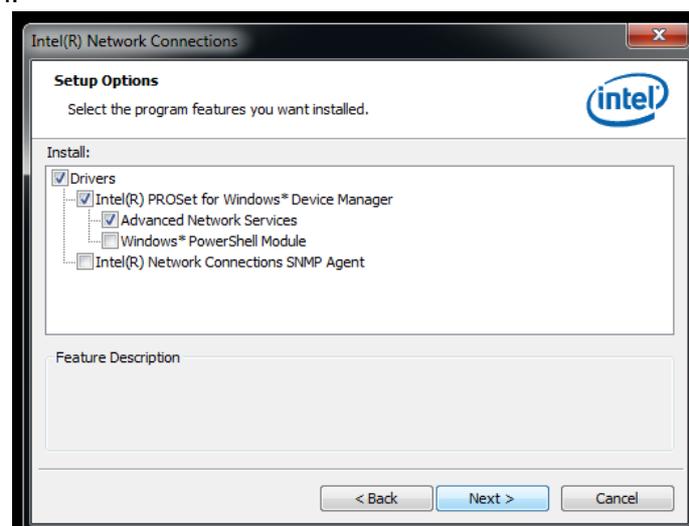
6.   Select "**Install**" and start to installation.
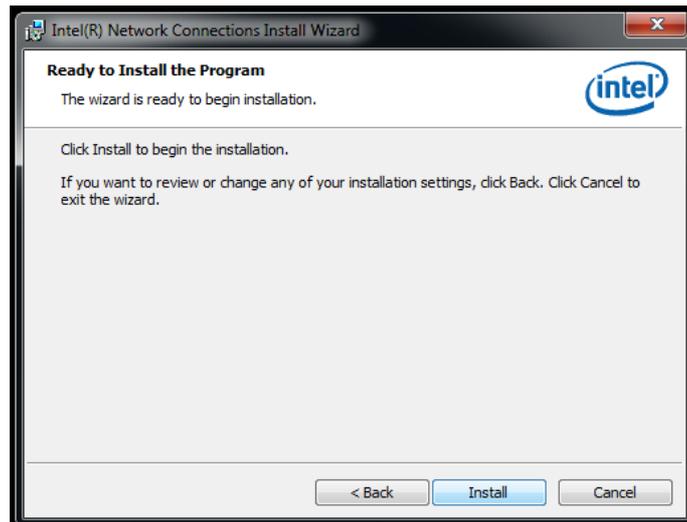

7.   Select "**Finish**" to complete the installation.
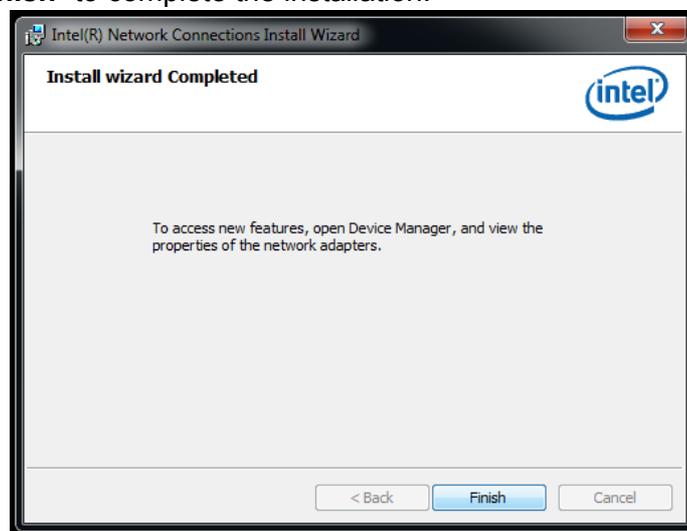
8.   After the hardware has been installed, the card will be automatically detected. Open Device Manager to check it.
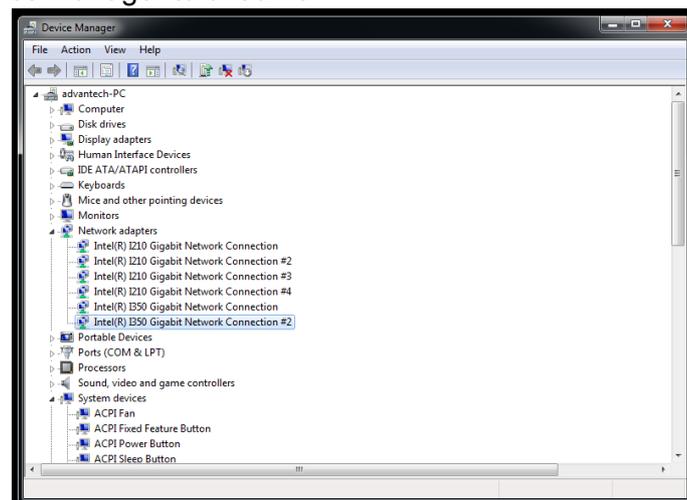
9.2.3 Uninstall

Go to **Device Manager** to check the device you want to remove.
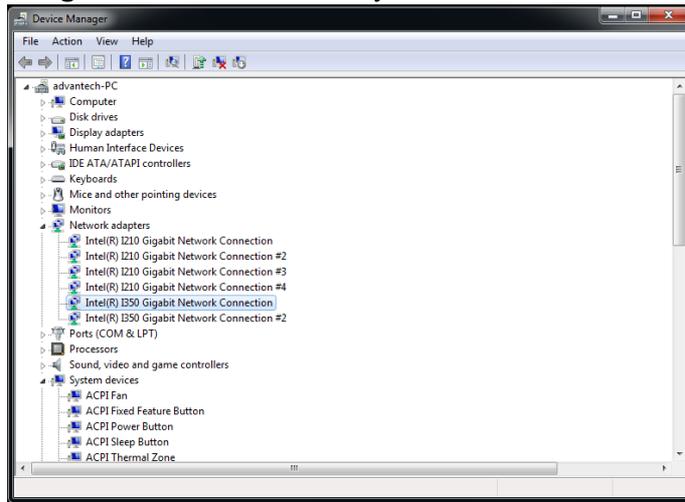
1. Go to **Control Panel** and select "**Intel® Network Connections 19.1.51.0"** and click "**Uninstall"**
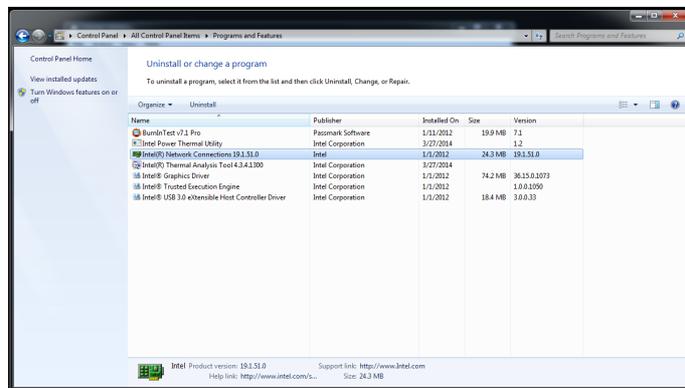

2. Select "**Yes**" to continue the removal process.
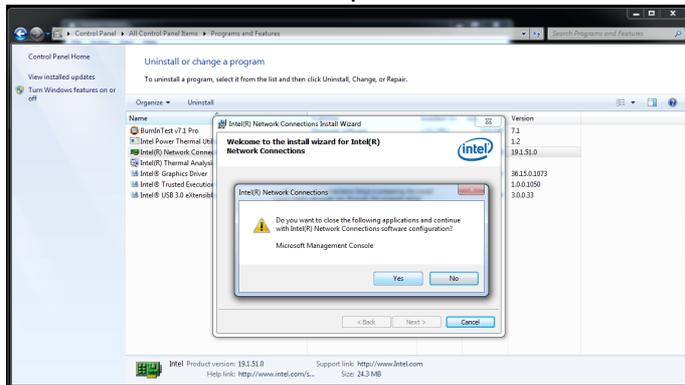
3. In "**Remove Options**" panel, just select "**Remove**" to continue the process.
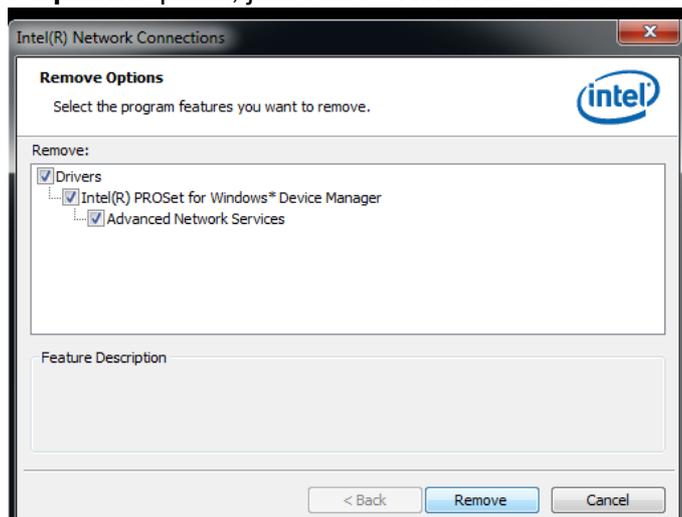
4. Select "**Yes**" to continue the removal process.
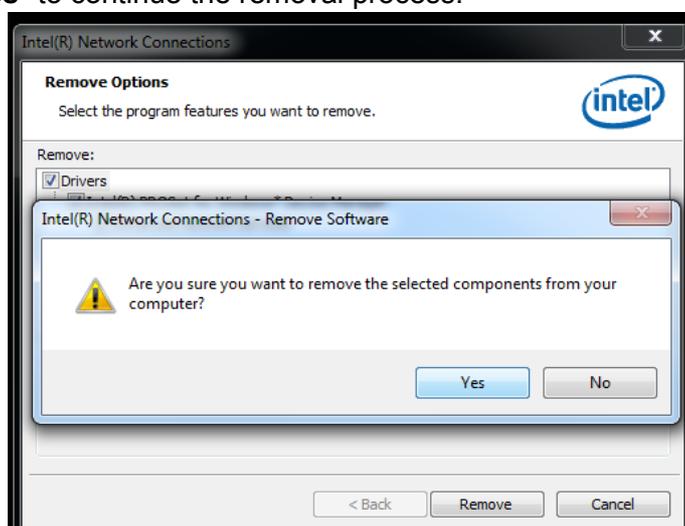
5. Select "**Finish**" to complete the uninstallation process.
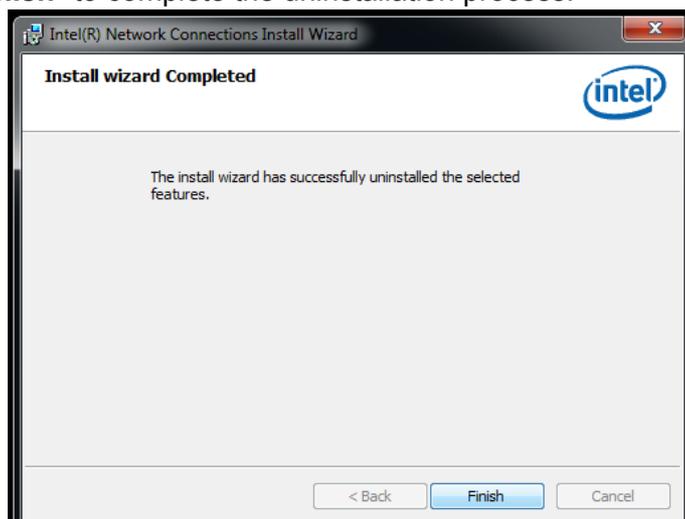
9.3 Pin Assignment and Wiring

9.3.1 Pin Assignment

The following table and figure shows the pin assignments of the LANs connector on the iDoor IO module for PCM-24R2PE and PCM-24R2GL

| Description of PIN Use			
PIN1	MDIO+	PIN7	MDI3+
PIN2	MDIO-	PIN8	MDI3-
PIN3	MDI1+	PIN9	LED3_LINK1000#
PIN4	MDI2+	PIN10	LED2_LINK100#
PIN5	MDI2-	PIN11	+V3.3SB
PIN6	MDI1-	PIN12	LED1_ACT#
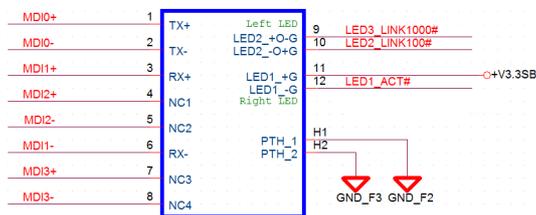
9.3.2 Wiring

PCM-24R2PE and 24R2GL is using wired cable to connect from I/O plate to mPCIe module. The PIN assignment is below.

Description of PIN Use			
PIN1	+V3.3SB	PIN16	LAN0_LED2_LINK100#
PIN2	PLTRST#	PIN17	LAN1_LED1_ACT#
PIN3	MDI_1_3N	PIN18	LAN0_LED1_ACT#
PIN4	MDI_1_2P	PIN19	GND
PIN5	MDI_1_3P	PIN20	GND
PIN6	MDI_1_2N	PIN21	MDI_0_2P
PIN7	GND	PIN22	MDI_0_3P
PIN8	GND	PIN23	MDI_0_2N
PIN9	MDI_1_0N	PIN24	MDI_0_3N
PIN10	MDI_1_1N	PIN25	GND
PIN11	MDI_1_0P	PIN26	GND
PIN12	MDI_1_1P	PIN27	MDI_0_0P
PIN13	LAN1_LED3_LINK1000#	PIN28	MDI_0_1N
PIN14	LAN0_LED3_LINK1000#	PIN29	MDI_0_0N
PIN15	LAN1_LED2_LINK100#	PIN30	MDI_0_1P
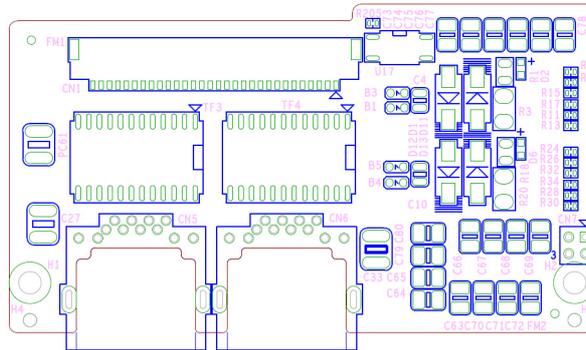
The PCM-24R2PE will need an additional 24VDC from the internal power source, refer to the PIN assignment on the power board as shown in the table below. The PCM-24R2PE power board supports an external power connector on CN1 as an option,

Description of PIN Use			
PIN1	DCIN24V	PIN3	GND
PIN2	DCIN24V	PIN4	GND
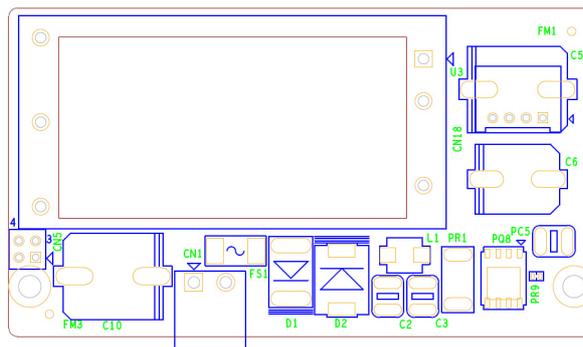
Chapter 10

PCM-24U2U3

Sections include:

- Initial Inspection
- Driver and Advantech Device Manager Installation

Pin Assignment and Wiring

10.1 Initial Inspection

You should find the following items inside the shipped package:
- PCM-24U2U3 Communication Module:
  – PCM-24U2U3 PCI Express Mini Card
  – 2-port USB3.0 I/O plate
  – Wired signal Cable
  – Wired power Cable
- PCM-2000 DVD-ROM including:
  – User Manual
  – Industrial Communication Driver, Utility and mini-PCIe communication card

The PCM-24U2U3 was carefully inspected mechanically and electrically before it was shipped. It should be free of marks and scratches and in perfect working order when received.

As you unpack the PCM-24U2U3, check for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit. When you handle the PCM-24U2U3, remove it from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors. We also recommend that you use a grounded wrist strap and place the card on a static dissipative mat whenever you work with it.*

Note!
1. *Power requirements: 5 ~ 24 VDC, 10 W (Max)*
2. *Power consumption: 5 V @ 900 mA (Max)*
3. *Full-size PCI Express Mini Card Revision TM 2.0*
4. *With xHCI specification compliance*
5. *Universal Serial Bus 3.0 specification Rev. 1.0 compliant*
6. *Operating Temperature: - 20 ~ 60°C (- 4 ~ 140°F)*

## 10.2 Driver Setup & Installation- Advantech Device Manager Installation

10.2.1 Introduction

This chapter describes the driver installation, configuration and removal procedures for the mentioned Windows operating system. We strongly recommend that you install the software driver before you install the hardware into your system.

10.2.2 Installation

When you follow the startup manual to install the module appropriated. Please follow the steps below to install Advantech PCM-24U2U3 Driver.

1. Select "Next" to continue the installation.
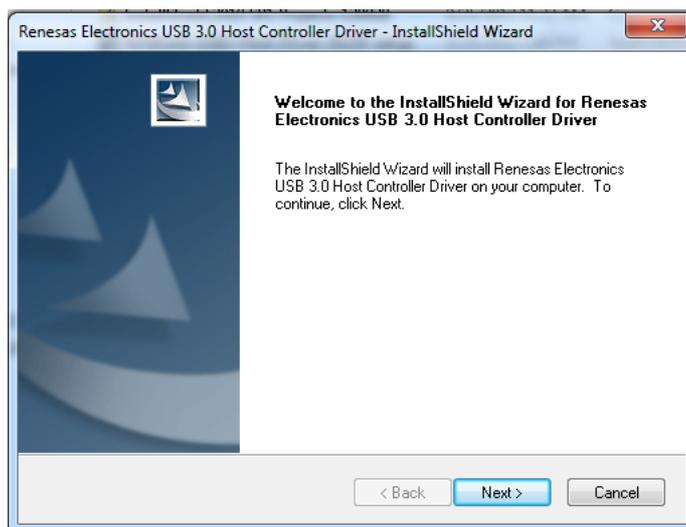
2. Select "I accept the terms of the license agreement", and then click "Next" to continue the installation.
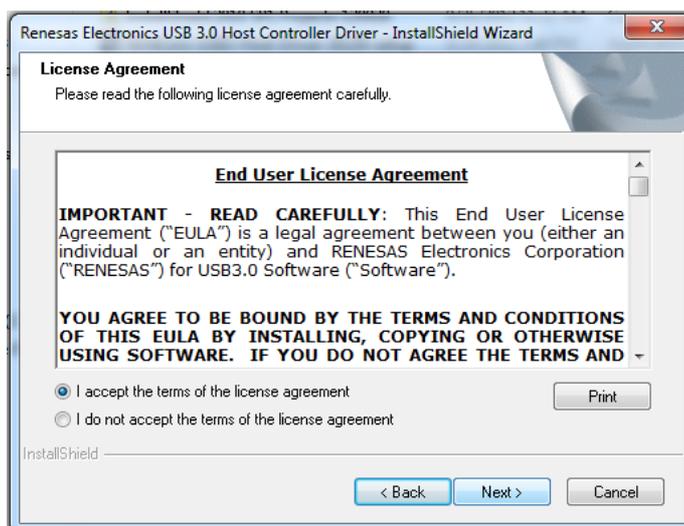
3. Select "Install" to continue the installation.
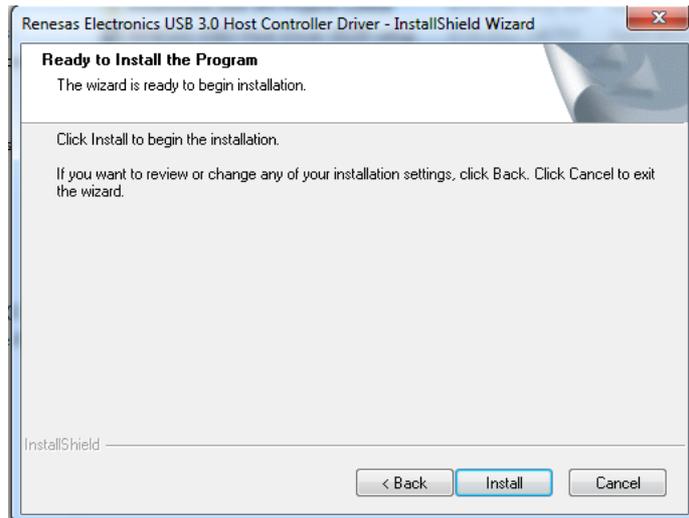
4. After a while, the installation will be complete.
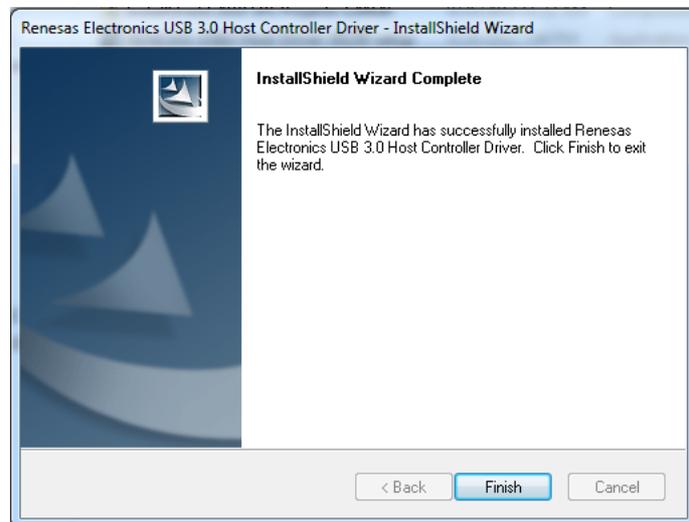
5. After the hardware has been installed, the card will be automatically detected.
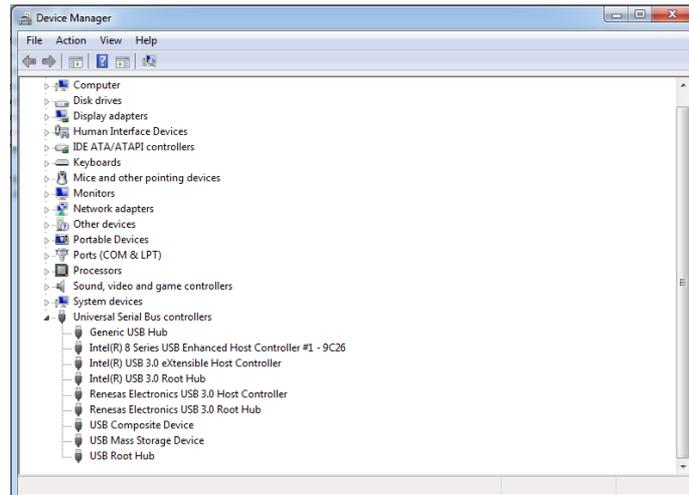
10.2.3 Uninstall

1. In the Control Panel, click "Renesas Electronics USB 3.0 Host Controller Driver" then uninstall.
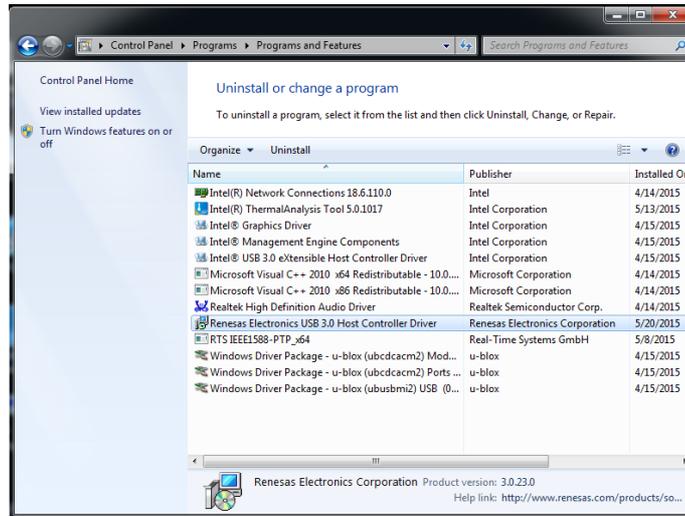
2. After a while, the uninstallation will be complete.
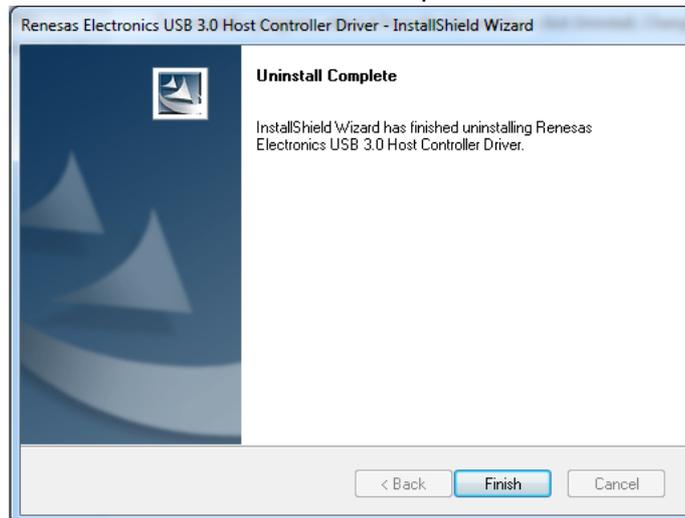
10.3 Pin Assignment and Wiring

10.3.1 Pin Assignment

The following table and figure shows the pin assignments of the USB connector on the iDoor IO module for PCM-24U2U3.

PIN Assignment of USB Type-A Connector (9-Pin)

Description of PIN Use			
PIN1	VBUS	PIN6	SSRX+
PIN2	D-	PIN7	GND
PIN3	D+	PIN8	SSTX-
PIN4	GND	PIN9	SSTX+
PIN5	SSRX-		
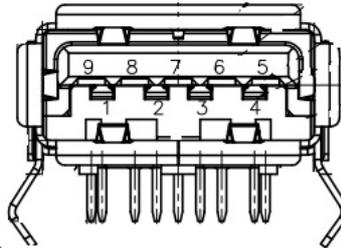
10.3.2 Wiring

The PCM-24U2U3 utilizes wired cable to connect I/O plate and mPCIe module. The PIN assignments are listed below.

I/O board overview
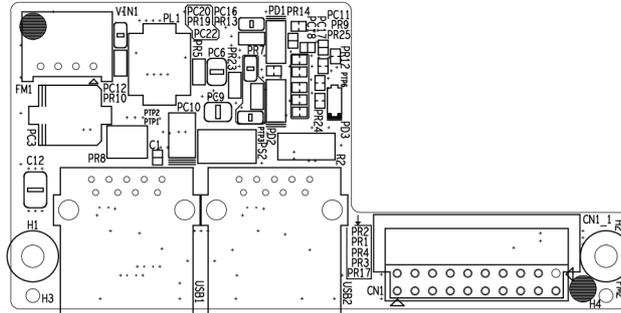
CN1_1 - I/O board to mPCIe Cabling

Description of PIN Use			
PIN2	NC	PIN13	USB3_y_TXDP2
PIN3	NC	PIN14	GND
PIN4	USB3_RXDP1	PIN15	GND
PIN5	USB3_RXDN2	PIN16	USB2_DM1
PIN6	USB3_RXDP1	PIN17	USB2_DM2
PIN7	USB3_RXDP2	PIN18	USB2_DP1
PIN8	GND	PIN19	USB2_DP2
PIN9	GND	PIN20	NC
PIN10	USB3_y_TXDN1		
PIN11	USB3_y_TXDN2		
PIN12	USB3_y_TXDP1		

VIN1- Internal Power Cabling

Description of PIN Use			
PIN1	+VIN (5V~24V)	PIN3	GND
PIN2	+VIN (5V~24V)	PIN4	GND
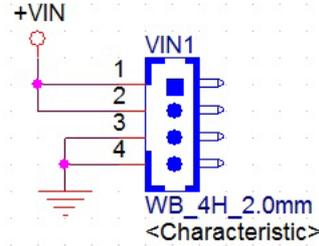
Appendix A

PCM-2300MR-AE

A.1 Initial Inspection

```
*********************************************************************
// * Program       : CheckZ.cpp
// * Description    : Demo program for file access
// *
// * APIs used      : GetLogicalDrives, fopen_s, fscanf_s, fprintf, fclose
// *
// * Date           : 1/31/2013        Advantech Co., Ltd.
//*******************************************************************
//

#include "stdafx.h"
#include <windows.h>


// The default drive letter of NVRAM Disk is 'Z'
#define DEFAUT_HD_LETTER 'Z'

int _tmain(int argc, _TCHAR* argv[])
{


    DWORD dw;
    dw = GetLogicalDrives();
    char ch = DEFAUT_HD_LETTER;
    int n;
    char pathInOut[50] = {0};
    char bufferOut[] = "0123456789abcdefghijklmnopqrstuvwxyz";
    char bufferInput[50] = {0};
    errno_t ErrRet = 0;
    FILE *fp_r = NULL;
    FILE *fp_w = NULL;


    n = ch - 'A';

    // Step 1: To check if Z drive exists.
    printf("\nStep 1: Check %c Drive.\n", ch);
    if( (dw != 0) && (dw >>= n) != 0 )
    {
        printf("There is a %c drive.\n", ch);
    }
    else
    {
        printf("There is NO %c drive.\n", ch);
        exit(1);
    }


    // Step 2: Prepares the path for Input and Ouput
    printf("\nStep 2: Prepares the path.....\n");
    sprintf_s(pathInOut, 100, "%c:\\inout.txt", ch);
    printf("PATH for Input and Output: %s\n", pathInOut);

    // Step 3: Writes something to a file....
    printf("\nStep 3: Writes something to a file....\n");
    ErrRet = fopen_s(&fp_w, pathInOut, "w");
    if( ErrRet != 0 )
    {
        printf("Failed to open %s !!\n", pathInOut);
        exit(1);
    }
    else
    {
        // Output data to the text file.
```

```
        fprintf(fp_w, "%s", bufferOut);
        // Close file handle.
        fclose(fp_w);
        fp_w = NULL;
    }


    // Step 4: Reads a file and displays its content on the screen.
    printf("\nStep 4: Reads a file and displays its content.....\n");
    ErrRet = fopen_s(&fp_r, pathInOut, "r");
    if( ErrRet != 0 )
    {
        printf("Failed to open %s !!\n", pathInOut);
        exit(1);
    }
    else
    {

        // Reads the content and shows it to console.
        fscanf_s(fp_r, "%s", bufferInput);
        printf("%s\n", bufferInput);


        // Close file handle.
        fclose(fp_r);
        fp_r = NULL;
    }

    system("pause");
    return 0;
```

A.2 Diagnostic LEDs
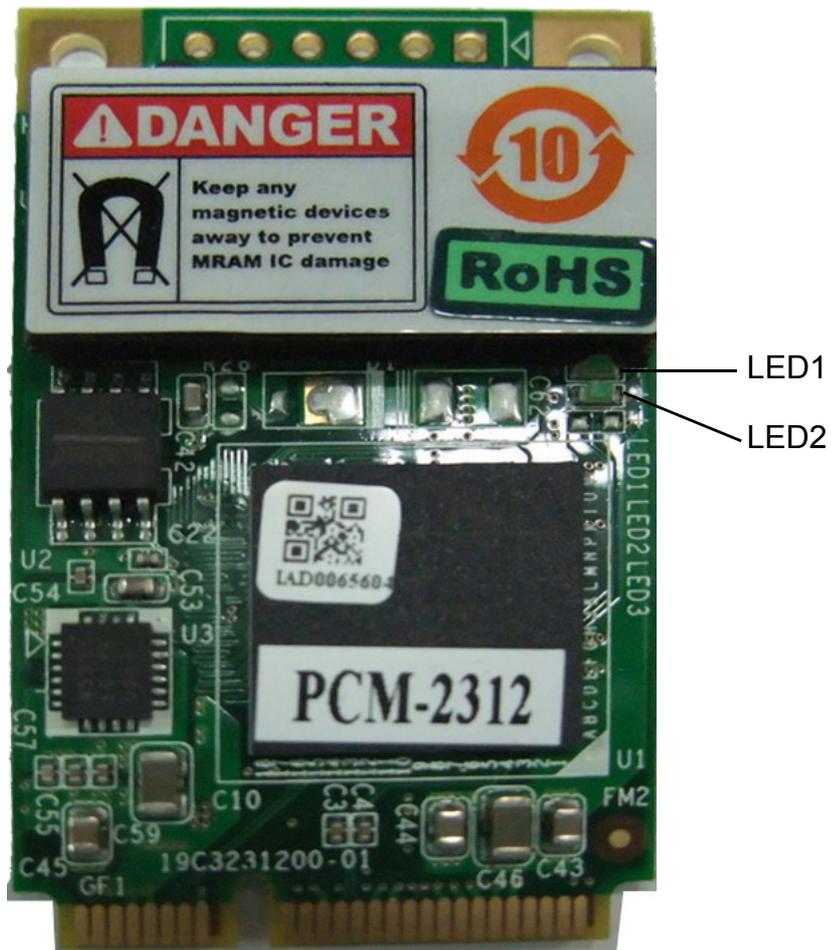
Table A.1: Diagnostic LED Definitions		
LED	Light On	Light Off
LED 1 - Chip Status	It's working	It's not working
LED 2 - MRAM Access Status	MRAM is being accessed	MRAM isn't being accessed

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com