User Manual

MIOe-3680

2-port CAN-bus PCIE/MIOe Module with Isolation Protection

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 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

Packing List

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

■ PCIe CAN-bus main communication interface board
■ Industrial Communication Driver, Utility and MIOe communication card user's manual in UNO DVD-ROM

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 MIOe-3680.

Sections include:

■ Introduction

■ Features

■ Specifications

■ Ordering Information

1.1 Introduction

MIOe-3680 is special purpose communication card that offers connectivity to Controller Area Networks (CAN) on your PC. With its built-in CAN controllers, MIOe-3680 provides bus arbitration and error detection with an automatic transmission repetition. This drastically reduces the chance of data loss and ensures system reliability. You can run both CAN controllers independently at the same time. The MIOe-3680 operates at baud rates up to 1Mbps and can be installed with a MIOe slot.

1.1.1 Controller Area Network

CAN is a serial bus system suited for networking "intelligent" I/O devices as well as sensors and actuators within a machine or plant. Characterized by its multi-master protocol, real-time capability, error correction, high noise immunity, and the existence of many different silicon components, the CAN serial bus system, originally developed by Bosch for use in automobiles, is increasingly being used in industrial automation.

1.1.2 Optical Isolation Protection

Onboard optical isolators protect your PC and equipment against damage from ground loops, increasing system reliability in harsh environments.

1.2 Features

- PCIe bus specification 1.2 compliant
- Operates two separate CAN networks at the same time
- High speed transmission up to 1 Mbps
- 16 MHz CAN controller frequency
- Optical isolation protection of 2,500 VDC ensures system reliability
- I/O address automatically assigned by PCI PnP
- LED indicates Transmit/Receive status on each port
- Windows DLL library and examples included
- Supports Windows CE5/CE6/XP/7 driver and utility
- Supports Linux 2.4.xx / 2.6.xx; QNX 6.3x/6.4.x/6.5.x Intel x86 hardware platform

1.3 Specifications

- **Bus Interface:** PCIe bus spec. 1.2 compliant
- **Ports:** 2
- **Protocol:** CAN 2.0 A/B
- **Communication Controller:** NXP SJA-1000
- **CAN Transceiver:** NXP_TJA1051T
- **Signal Support:** CAN_H, CAN_L
- **CAN Controller Frequency:** 16 MHz
- **Speed (bps):** Up to 1 Mbps programmable transfer rate
- **Isolation Protection:** 2,500 V_{DC}
- **Connector:** Dual DB9 male connectors
- **Power Consumption:** 5 V @ 400 mA (Typical)
- **Dimensions:** 102 x 145 mm
- **Operating Temperature:** -40 ~ 85°C (-40 ~ 185°F)
- **Storage Temperature:** -40 ~ 85°C (-40 ~ 185°F)
- **Operating Humidity:** 5 ~ 95% Relative Humidity, non-condensing

1.4 Ordering Information

MIOe-3680-AE: 2-port CAN-bus MIOe /PCIe Module with Isolation Protection (CAN-bus transceiver board included)

Chapter 2

Driver and Advantech Device Manager Installation

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

Sections include:

- Driver Installation

## 2.1 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.

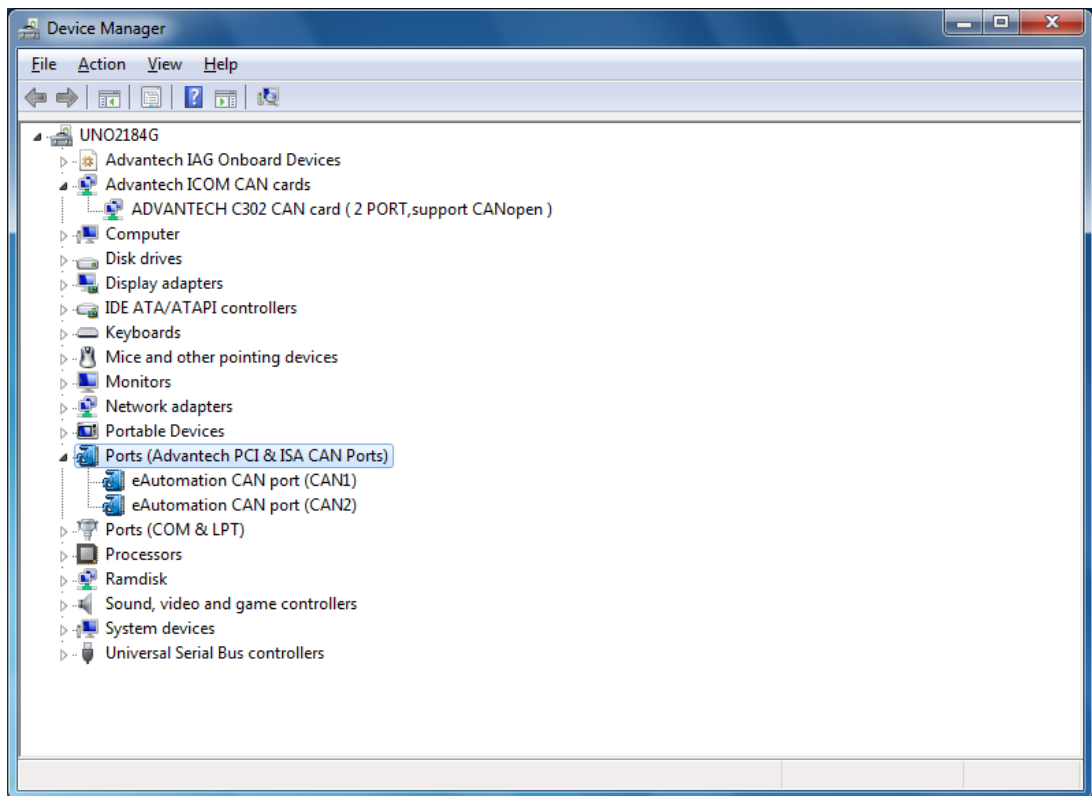Please follow the steps below to install Advantech CAN WDM Driver.

1. Select "Next" to continue the installation.
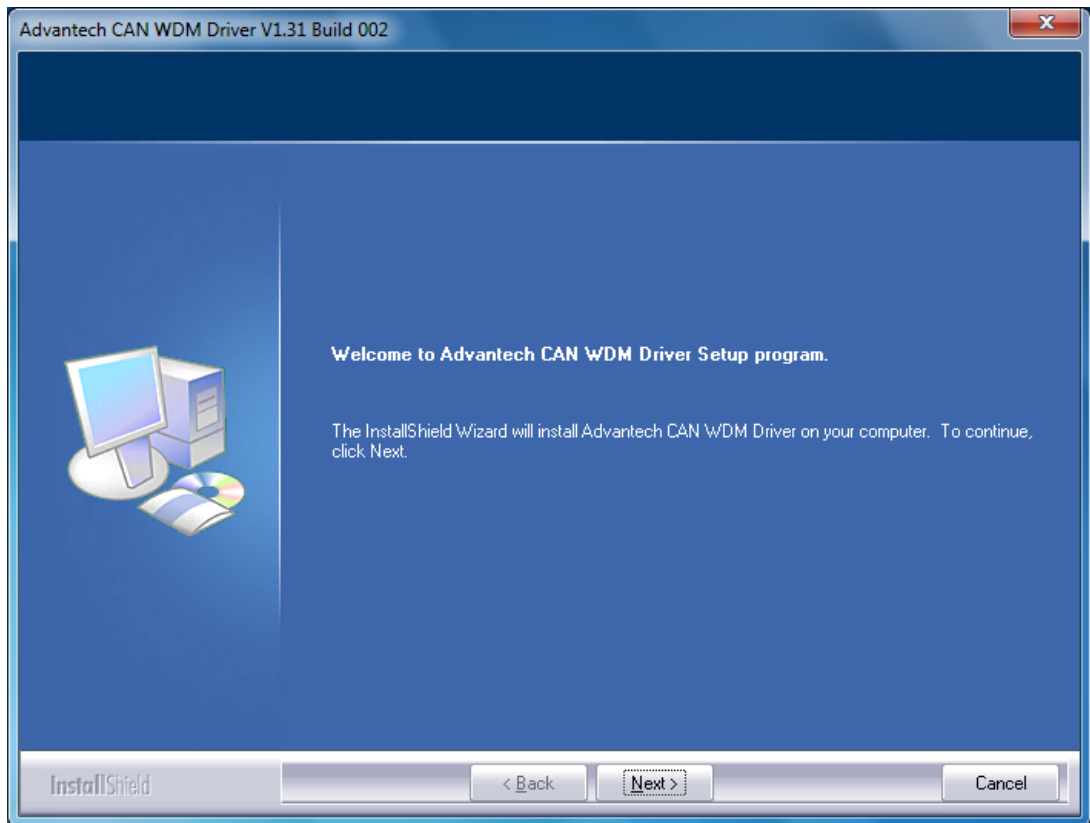
2. After a while, the installation will be complete.
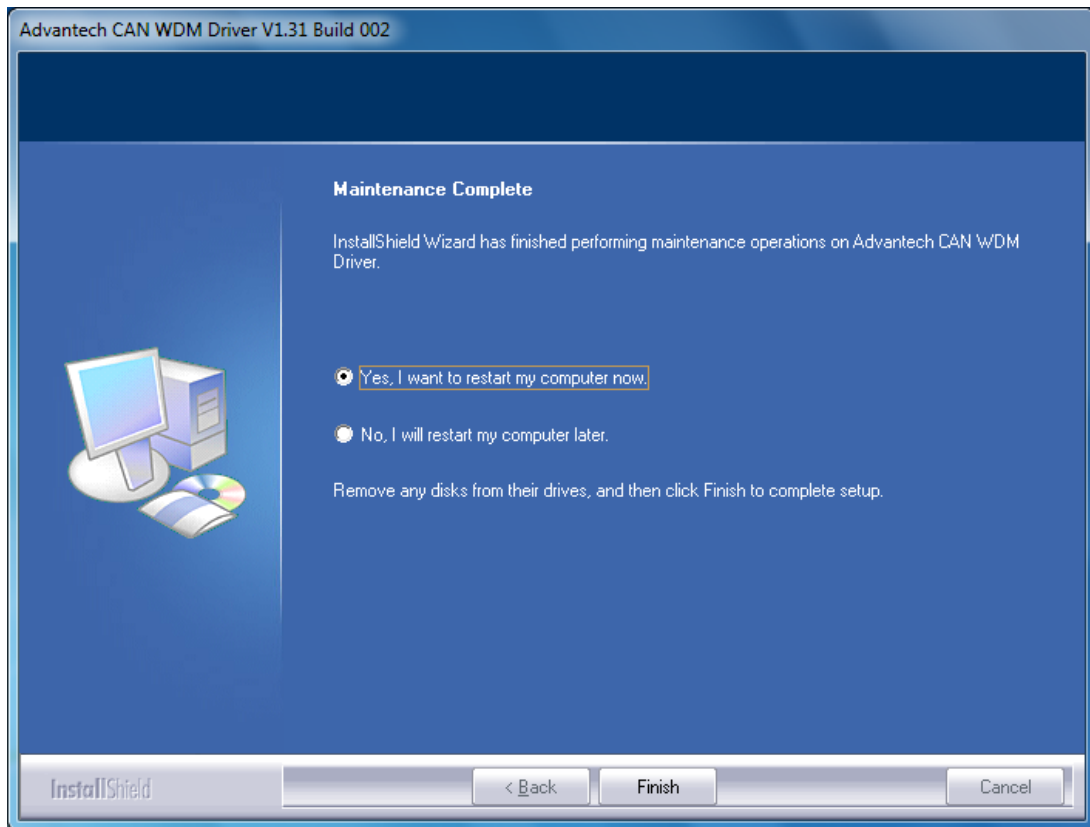
3. After the physical hardware has been installed, the card will be automatically detected.

Chapter 3

Hardware Installation

This chapter covers inspection and installation of hardware and drivers.

Sections include:

■ Initial Inspection

■ Jumper Locations & Setting

■ Card Installation

3.1 Initial Inspection

You should find the following items inside the shipping package:

- PCIe communication interface card
- Industrial Communication Driver, Utility and MIOe communication card user's manual in DVD-ROM

MIOe-3680 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 MIOe-3680, 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 MIOe-3680, remove it from its protective packaging by grasping the rear metal panel. Keep the antivibration 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.*
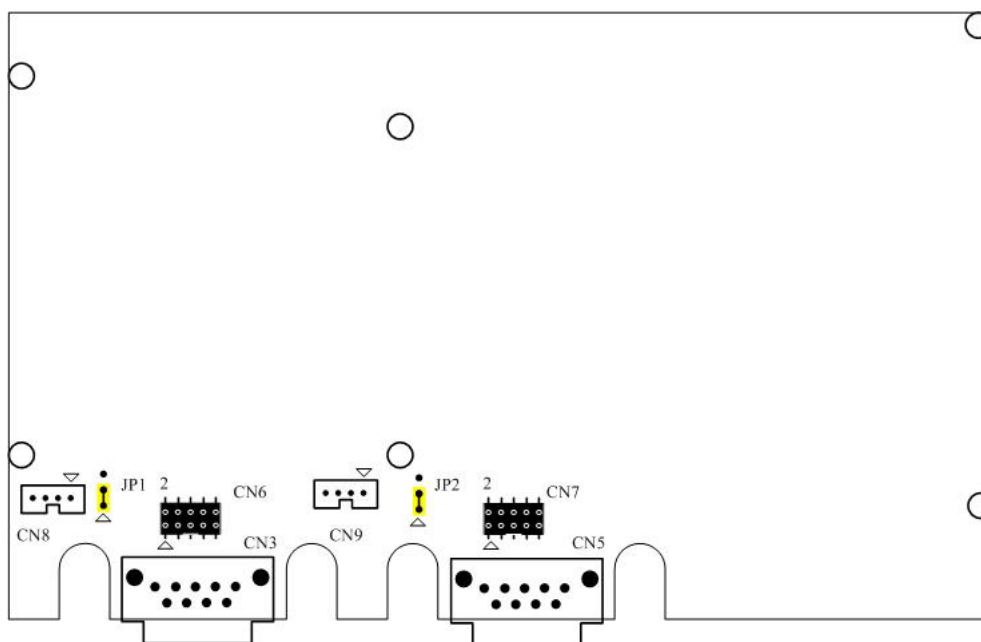
3.2 Connector and Jumper Locations & Settings

Figure 3.1 MIOe-3680 CAN-bus board silk screen

Table 3.1: MIOe-3680 Board Silk Screen	
Item	**Description**
CN3, CN5	DB-9 Male Connector
CN6, CN7	2 x 5 Pin CAN Connector
CN8, CN9	LED Connector
JP1, JP2	Terminator Resistor Jumper

3.2.1 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.
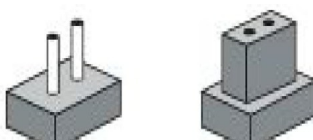

Figure 3.2 How to set jumpers

3.2.2 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 3.2: MIOe-3680 Terminator Resistor Jumper Setting		
Status		**Value of Terminator Resistor (Ω)**
PIN 2-3	Open mode	None
PIN 1-2	Close mode	120 Ohms

> **Note!** *It is suggested that users should set the terminator resistor to 120 Ω to maintain a satisfactory baud rate performance.*

3.3 Card Installation

> **Note!** *Make sure you have installed the driver before installing the card. We strongly recommend that you install the software driver before installing the hardware into your system, since this will guarantee a smooth and trouble-free installation process.*

> **Warning!** *Turn off your PC's power supply whenever you install or remove the MIOe communication card or its cables. Static electricity can easily damage computer equipment. Ground yourself by touching the chassis of the computer (metal) before you touch any boards.*

Chapter 4

Pin Assignments and Wiring

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

Sections include:

■ Pin Assignments

■ Wiring

4.1 Pin Assignments

Figure 4.1 shows the pin assignment for the card's male DB-9 connectors and corresponding pin assignments of female DB-9 connectors of the cable.
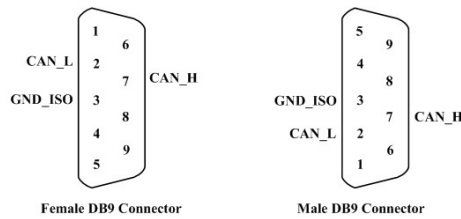

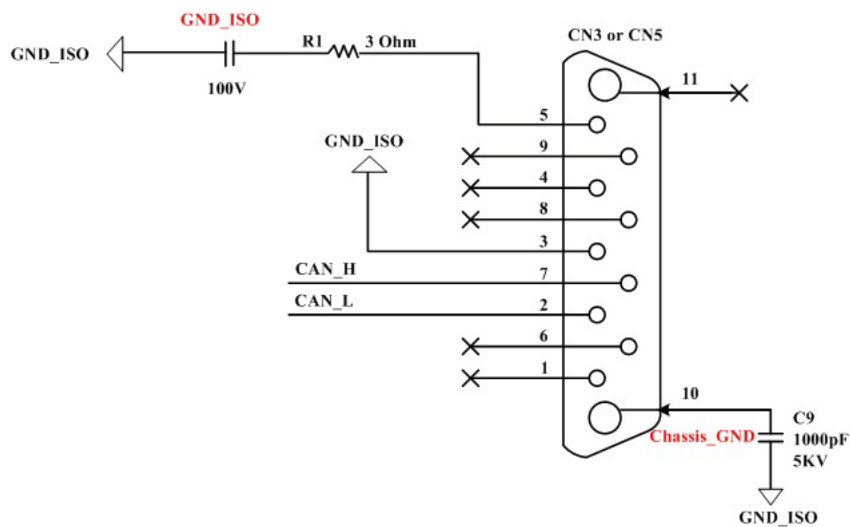**Figure 4.1 MIOe-3680 DB-9 connector pin assignments**

Figure 4.2 MIOe-3680 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 4.1: CN3 and CN5		
Pin	Signal	Description
2	CAN_L	LOW-level CAN voltage input/output
3	GND_ISO	Ground
7	CAN_H	HIGH-level CAN voltage input/output
Others	N/A	

Table 4.2: CN6 and CN7		
Pin	Signal	Description
3	CAN_L	LOW-level CAN voltage input/output
4	CAN_H	HIGH-level CAN voltage input/output
5	GND_ISO	Ground
Others	N/A	

Table 4.3: CN8 and CN9

Pin	Signal	Description
1	TX (V+)	TX LED positive
2	TX (V-)	TX LED negative
3	RX (V+)	RX LED positive
4	RX (V-)	RX LED negative
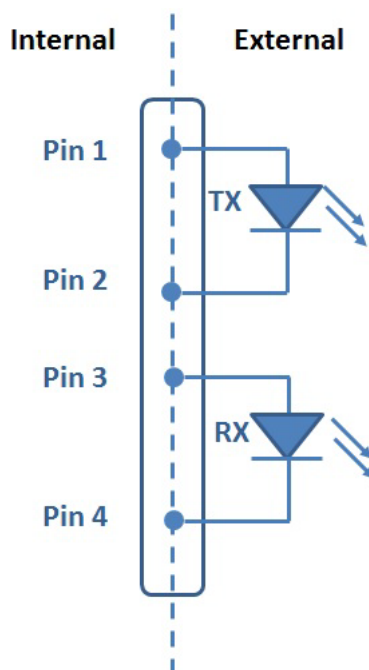
Figure 4.3 MIOe-3680 TX and RX LED Connections

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