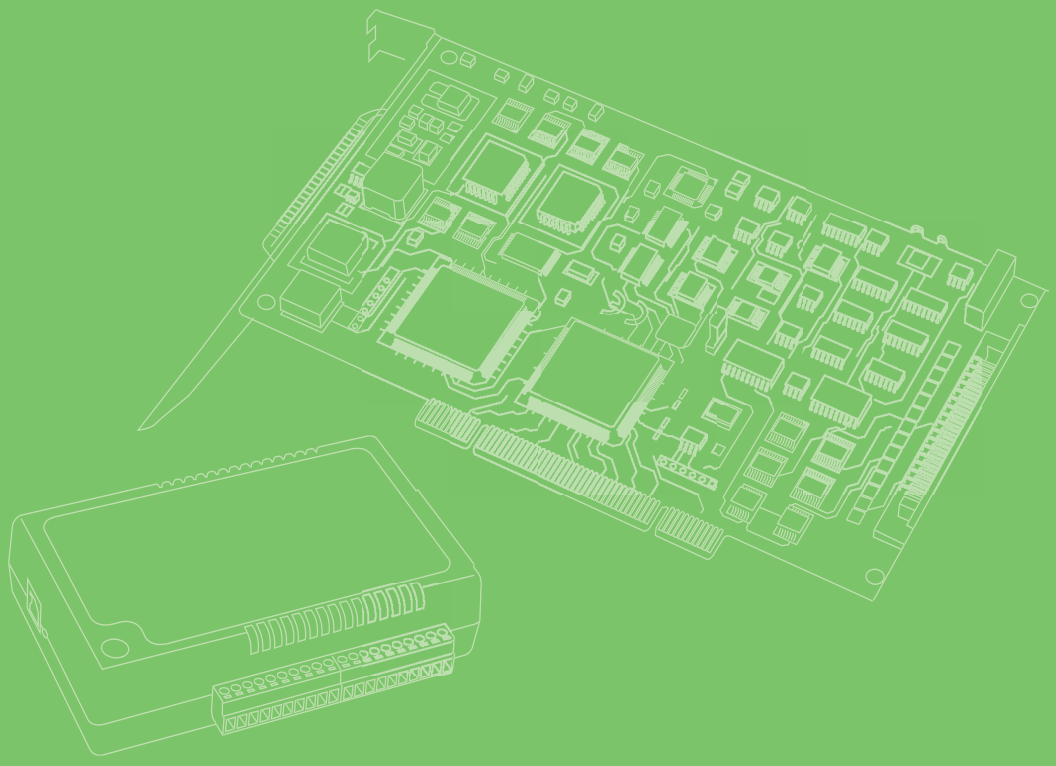

User Manual

PCIE-1680

2-Port CAN-Bus PCIE card with Isolation Protection

ADVANTECH

Enabling an Intelligent Planet

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Advantech warrants to you, the al purchaser, that this product will be free from defects in materials and workmanship for 2 years from the date of purchase.

This warranty does not apply to products that have been repaired or altered by persons other than repair personnel authorized by Advantech, nor does it apply to products that have been subject to misuse, abuse, accident, or improper installation. Under the terms of this warranty, Advantech assumes no liability for consequences arising from 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 believe that you have a defective product, follow these steps:

1. Collect all the information about the problem encountered (e.g., CPU speed, Advantech products used, other hardware and software used, etc.). Note anything abnormal and list any on-screen messages that appear 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 a return merchandize authorization (RMA) 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 proof of purchase date (e.g., a photocopy of 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 clearly on the outside of the package and ship it prepaid to your dealer.

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Declaration of Conformity

CE

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

FCC Class A

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 or her own expense.

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support for the latest information about this product.
2. Should you require additional assistance, contact your distributor, sales representative, or Advantech's customer service center for technical support. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (OS, 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
- Startup Manual

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.

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Chapter 1

Introduction

This chapter provides a general description of the PCIE-1680.

Sections include:

- Introduction
- Features
- Specifications
- Ordering Information

1.1 Introduction

PCIE-1680 is a special purpose communication card that offers connectivity to Controller Area Networks (CAN) on your PC. With its built-in CAN controllers, PCIE-1680 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 PCIE-1680 operates at baud rates up to 1Mbps.

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
- Transmit/Receive status LED indicators
- Windows DLL library and examples included
- Supports latest Windows OS
- Supports Linux up to latest kernel

1.3 Specifications

- **Bus Type:** PCI Express V1.0
- **Ports:** 2
- **Protocol:** CAN 2.0 A/B
- **Communication Controller:** NXP SJA-1000
- **CAN Transceiver:** NXP_TJA1051T (Compatible with ISO 11898-2)
- **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:** 3.3 V @ 600 mA (Typical)
- **Dimensions:** 168 x 100 mm(6.6" x 3.9")
- **Operating Temperature:** 0 ~ 70° C
- **Storage Temperature:** -40 ~ 85°C (-40 ~ 185°F)
- **Operating Humidity:** 5 ~ 95% Relative Humidity, non-condensing

1.4 Ordering Information

PCIE-1680-B: 2-Port CAN-Bus PCIE card with Isolation Protection

1.5 Accessories

OPT1-DB9E-AE: DB9 to 10-pin wiring board

Chapter 2

Driver and Advantech Device Manager Installation

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

Sections include:

- Advantech Device Manager/ Driver Installation
- User API descriptions

2.1 Driver Download

Driver packages can be found on the Advantech Support Portal (https://www.advantech.com/support). Search for PCIE-1680 on the support portal and you'll get the XNavi installer after the download session finishes. For a Linux driver, please download from Linux driver link directly.

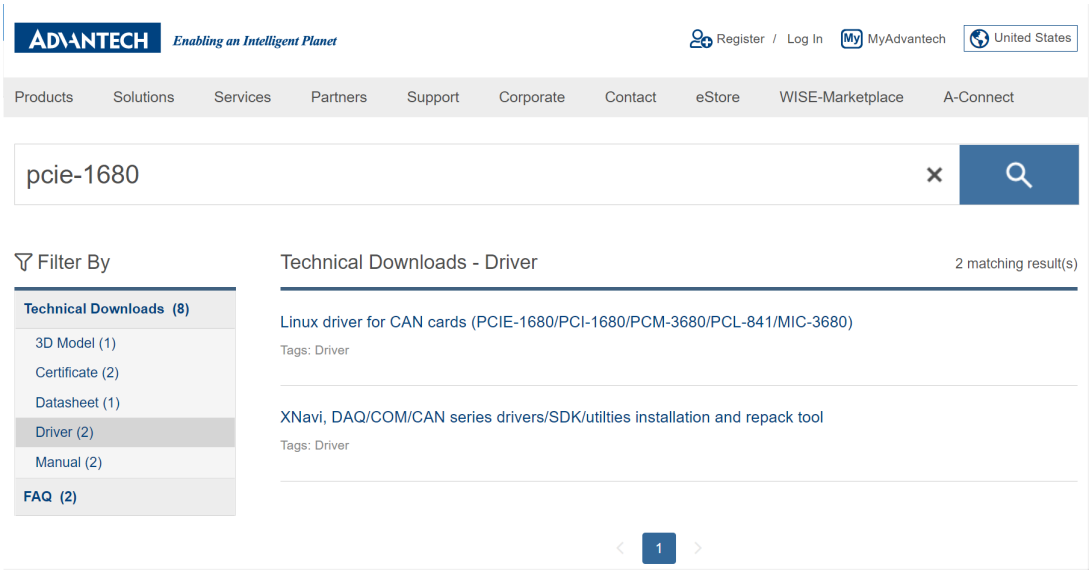


Figure 2.1 Search and Download XNavi Installer on Advantech Support Portal

2.2 Driver Installation in Windows System via XNavi

The Windows driver for PCIE-1680 are included in drivers of COM/CAN series. You only need to install the drivers for CAN series via XNavi installer, so that PCIE-1680 will be recognized in your system.

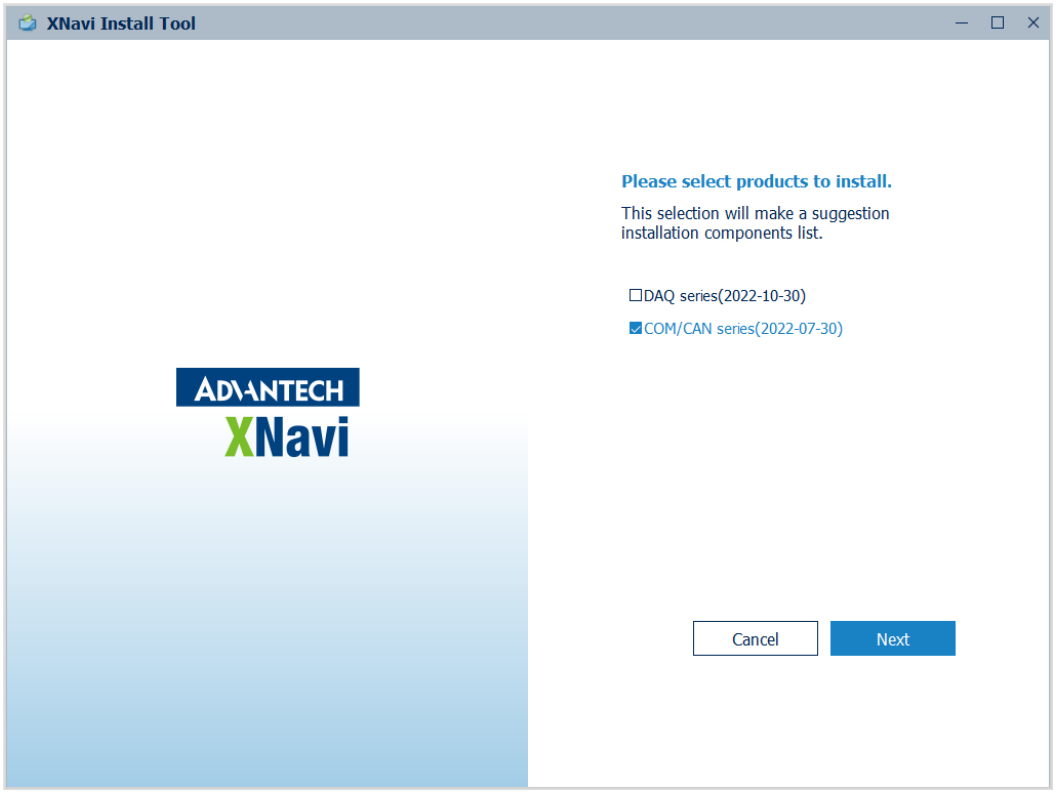


Figure 2.2 Selecting Driver Series

Execute the installer, then it will guide you through the session. You can choose the device and software components you'd like to install in the system. After the selection, click on "start" to begin the installation.

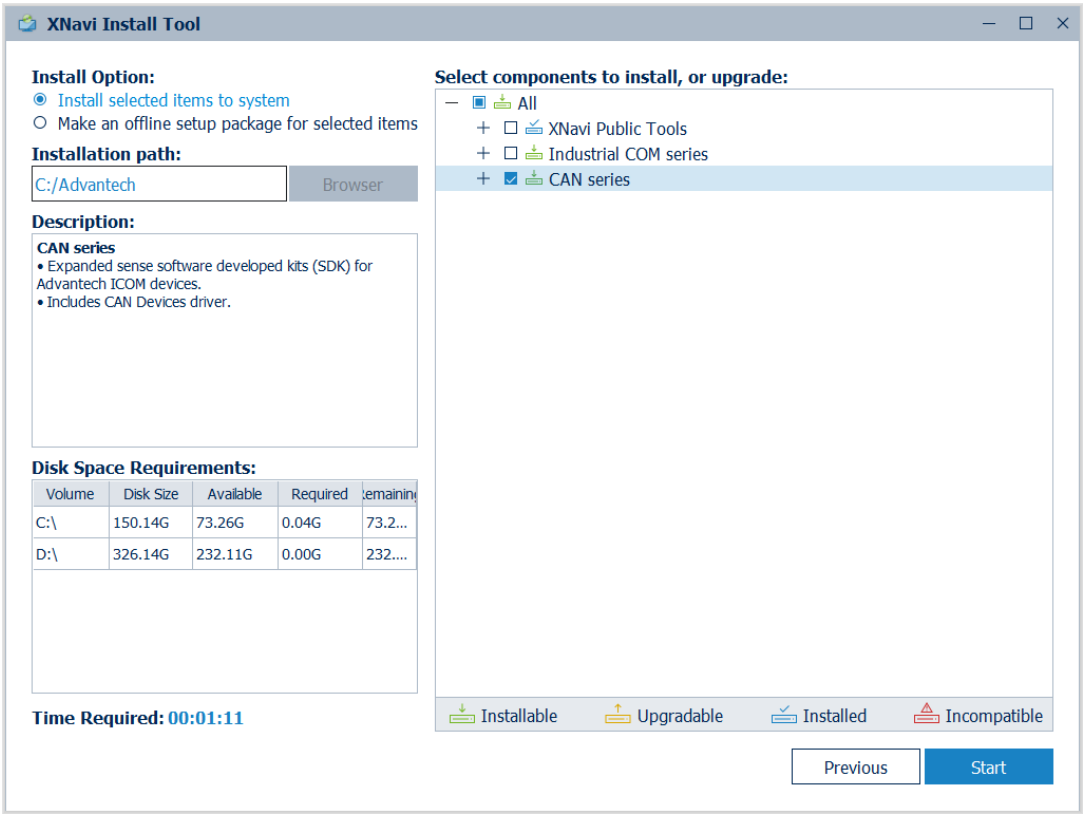


Figure 2.3 Choosing the driver to be installed

2.3 Driver Installation in Linux

There are AdvCAN and Socket CAN drivers in Linux respectively. The AdvCAN driver follows same the architecture of what is made in Windows. Socket CAN driver on the other hand, follows standard Socket CAN architecture in Linux.

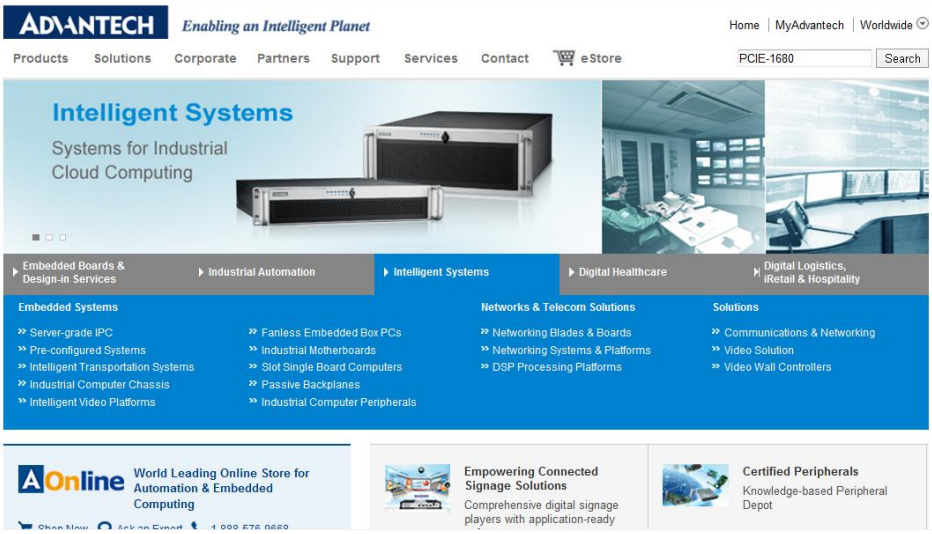
The CAN driver installation should be done in console mode. You should manage all the installation actions via terminal. All the instructions and information are in README files, which are included along with both driver packages. Follow the instructions in the Installation section to install the drivers correctly.

2.4 User API descriptions

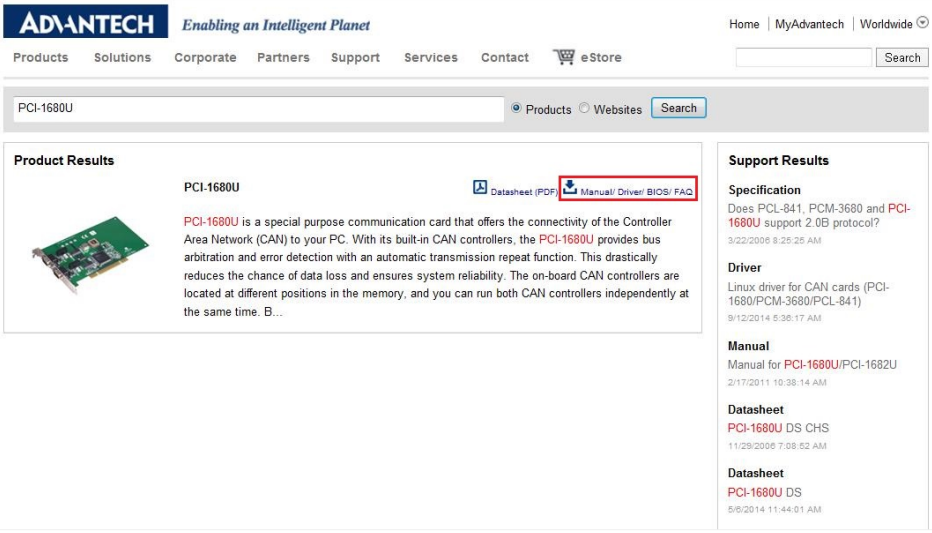
Download the products user API description from Advantech's website. http://www.advantech.com/

Follow the steps below to search Advantech's user API description.

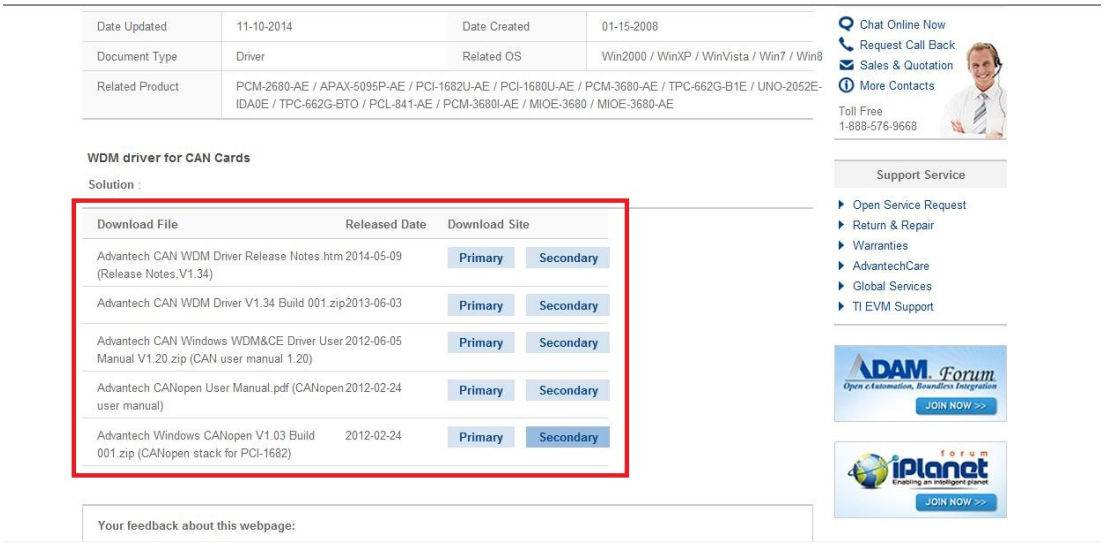
1. Go to http://www.advantech.com/, then search for the product.



2. Click the Manual/ Driver/ BIOS/ FAQ hyperlink



3. Click the driver to download it. Users can download drivers and user API manuals from this page.



Date Updated	11-10-2014	Date Created	01-15-2008
Document Type	Driver	Related OS	Win2000 / WinXP / WinVista / Win7 / Win8
Related Product	PCM-2680-AE / APAX-5095P-AE / PCI-1682U-AE / PCI-1680U-AE / PCM-3680-AE / TPC-662G-B1E / UNO-2052E-IDA0E / TPC-662G-BTO / PCL-841-AE / PCM-3680I-AE / MIOE-3680 / MIOE-3680-AE		

Chapter 3

Hardware Installation

This chapter covers inspection and installation of hardware and drivers.

Sections include:

- Initial Inspection
- Connector and Jumper Locations & Settings
- Card Installation

3.1 Initial Inspection

You should find the following items inside the shipping package:

- PCIe communication interface card

PCIE-1680 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 PCIE-1680, 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 PCIE-1680, 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.*

3.2 Connector and Jumper Locations & Settings

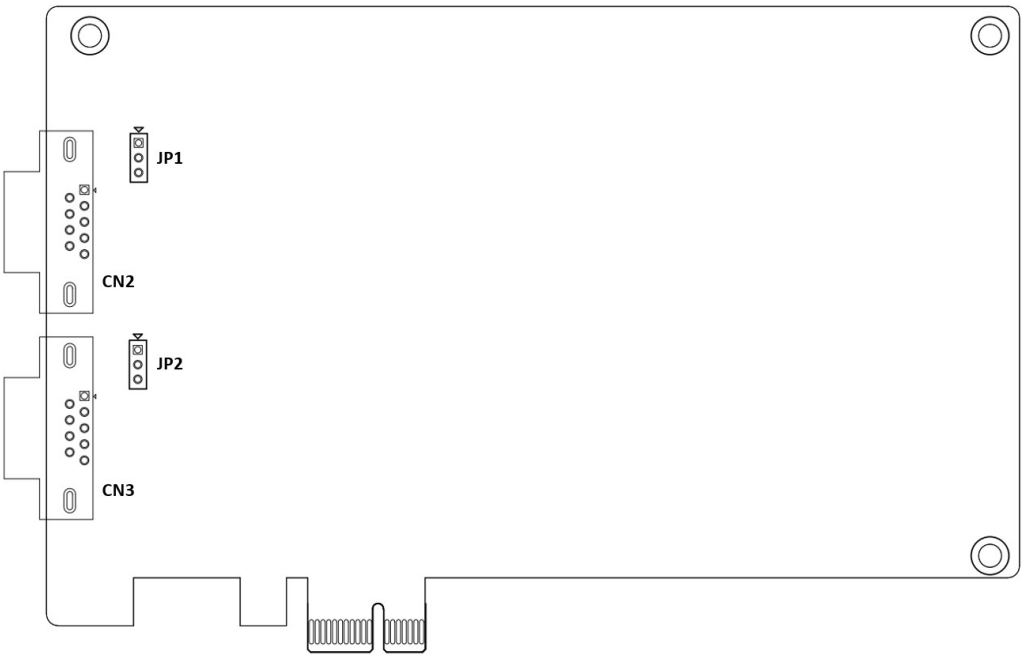


Figure 3.1 PCIE-1680 CAN-bus board silk screen

Table 3.1: PCIE-1680 Board Silk Screen

Item	Description
CN2, CN3	DB-9 Male Connector
JP1, JP2	Terminating 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.

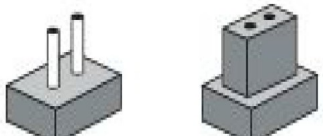


Figure 3.2 How to set jumpers

3.2.2 Terminating Resistor Setup (JP1)

You can set the terminating resistor if necessary to match impedance. Each port has a separate resistor setting located near the corresponding transceiver.

Table 3.2: PCIE-1680 Terminating Resistor Jumper Setting

Status		Value of Terminating Resistor (Ω)
PIN 2-3	Open	Open
PIN 1-2	Closed	120 Ohms (default)

Note! *It is suggested that users should set the terminating 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 PCIE 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

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.

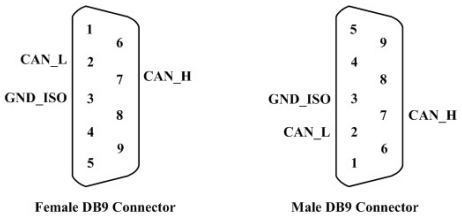


Figure 4.1 PCIE-1680 DB-9 connector pin assignments

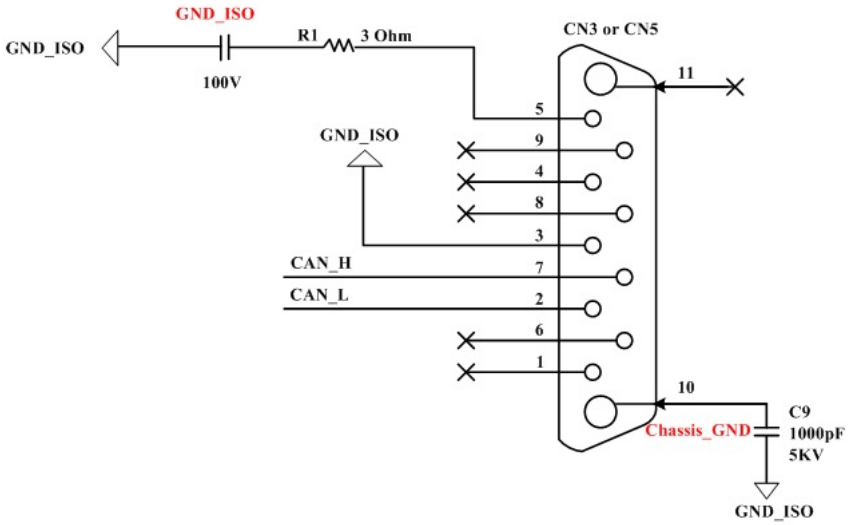


Figure 4.2 PCIE-1680 DB-9 connector schematics

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

Table 4.1: CN2 and CN3

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	

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