PCI-M512/M512U

User Manual

512 KB Memory Board with DI/DO   Version 2.8, Sep. 2015

SUPPORT

This manual relates to the following boards:
PCI-M512 and PCI-M512U

WARRANTY

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

WARNING

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If you have any question, feel to contact us by email at:
Email: service@icpdas.com or service.icpdas@gmail.com
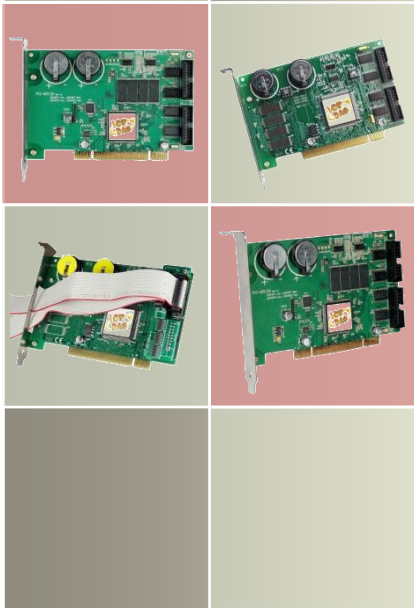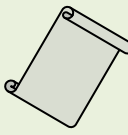We will respond to you within 2 working days.

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Packing List

The shipping package includes the following items:

	One PCI-M512/M512U Series board.
	One printed Quick Start Guide
	One software utility CD

⚠️ *Note:*
If any of these items is missing or damaged, contact the dealer from whom you purchased the product. Save the shipping materials and carton in case you need to ship or store the product in the future.

1. Introduction

The PCI-M512/PCI-M512U is a 512 KB SRAM memory Board with battery-backup. The PCI-M512U supports both 3.3 V and 5 V Universal PCI bus, while the PCI-M512 only supports the 5 V PCI bus. Both the PCI-M512 and PCI-M512U provide 12 Digital Input channels and 16 Digital Output channels, and the PCI-M512U is designed as a direct replacement for the PCI-M512, without requiring any modification to the software or the driver.

A DB-16P daughterboard can be used to connect the input ports (CN2) for isolation purposes, or uses a DB-16R daughterboard as an interface to the output ports (CN1) to provide relay control.

The PCI-M512/PCI-M512U is equipped with two Li-ion batteries to ensure that the content of the SRAM is maintained if a power loss occurs. The batteries can continue supplying power to the SRAM for 10 years, ensuring that any important data is retained. The main benefit of the doublet battery design is that either of the batteries can be replaced without losing data, so when one battery is removed, the other continues to provide power to the SRAM.

Four LED indicators are included on the board to provide clear visual indication of whether the batteries are operating normally, whether the voltage is low or whether the battery is bad or has encountered a fault. The PCI-M512/PCI-M512U board is an ideal solution for improving system reliability.

1.1 Features

- PCI-M512 board, supports the 5 V PCI bus.
- PCI-M512U Universal PCI board, supports both the 3.3 V and the 5 V PCI bus.
- On-board 512 KB SRAM
- Two Li-ion batteries, BT1 & BT2, to provide battery backup of SRAM data
- LED Indicators to monitor the status of the Li-ion batteries normal, low voltage, fault
- 16-bit general purpose TTL-compatible Digital Output
- 12-bit general purpose TTL-compatible Digital Input (DI4 to 15)
- 4-bit battery status read back(DI0 to 3)

1.2   Specifications

Model Name	PCI-M512	PCI-M512U
Digital Input		
Channels	12	
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.	
Response Speed	1.4 MHz (Typical)	
Digital Output		
Channels	16	
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V Source: 0.8 mA @ 2.0 V	
Response Speed	1.4 MHz (Typical)	
Special		
SRAM Size	512 KB	
Li-ion Battery	BT1 & BT2	
Battery Status Bits	BT1 Low, BT1 Bad, BT2 Low, BT2 Bad(low voltage=2.3 V, bad voltage=2.1 V)	
LED Indicators	BT1 Low (Green), BT1 Bad (Red) BT2 Low (Green), BT2 Bad (Red)	
General		
Bus Type	5 V PCI, 32-bit, 33 MHz	3.3 V/5 V Universal PCI, 32-bit 33 MHz
Data Bus	16-bit (DI/DO), 32-bit (Memory)	
I/O Connector	Male 20-bit Box Header x 2	
Dimensions (L x W x D)	140 mm x 90 mm x 22 mm	
Power Consumption	420 mA @ +5 V	
Operating Temperature	-20 ~ 60 °C	
Storage Temperature	-40 ~ 85 °C	
Humidity	0 ~ 90% RH, Non-condensing	

Cell Mode Name	BR2030
Max. Voltage (V)	3.0
Max. Current (mA)	195.0
Type	Lithium Coin Cells
Dimensions (D x H)	7.87 mm x 1.26 mm
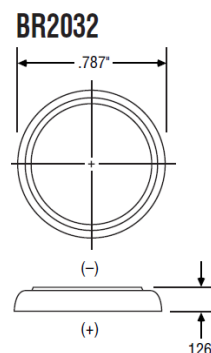
2. Hardware Configuration

2.1 Board Layout

➤ The layout of the PCI-M512/M512U board is illustrated below.
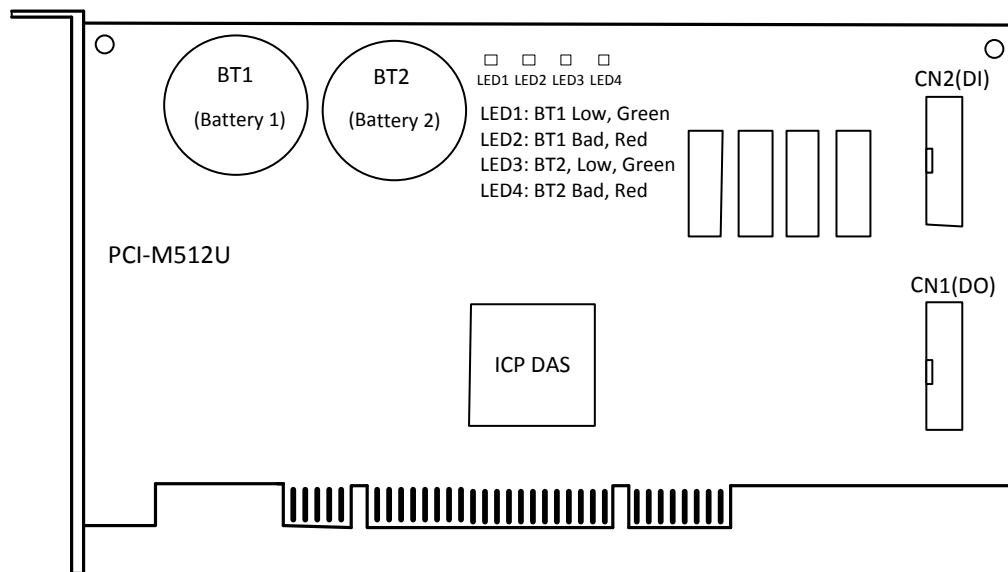
Notes:

1. *If both BT1 and BT2 are OK, LED1 to LED4 will be OFF.*
2. *If the voltage for BT1 is below 2.3 V, the green LED1 will be ON.*
3. *If the voltage for BT1 is below 2.1 V, the green LED1 and the red LED2 will be ON.*
4. *If the voltage for BT2 is below 2.3 V, the green LED3 will be ON.*
5. *If the voltage for BT2 is below 2.1 V, the green LED3 and the red LED4 will be ON.*
6. *If the power to the Host computer is turned off, the power control circuit will **select the battery with the higher voltage** to backup up the SRAM. If the voltage for both BT1 and BT2 is low, any data currently stored in the SRAM may be lost.*
7. *The SRAM can only retain all stored data if the voltage for either BT1 or BT2 is greater than 2 V.*
8. ***If the status of the voltage for either BT1 or BT2 is reported as "Bad", it is recommended that both BT1 and BT2 are replaced with new batteries.***

2.2 Pin Assignments

➢ CN1: pin assignments for the 20-pin Digital Output connector.
➢ CN2: pin assignment for the 20-pin Digital Input connector.

Pin Assign-ment	Terminal No.		Pin Assign-ment		Pin Assign-ment	Terminal No.		Pin Assign-ment
DO 0	01	02	DO 1			01	02	
DO 2	03	04	DO 3			03	04	
DO 4	05	06	DO 5		DI 4	05	06	DI 5
DO 6	07	08	DO 7		DI 6	07	08	DI 7
DO 8	09	10	DO 9		DI 8	09	10	DI 9
DO 10	10	12	DO 11		DI 10	11	12	DI 11
DO 12	12	14	DO 13		DI 12	13	14	DI 13
DO 14	14	16	DO 15		DI 14	15	16	DI 15
GND	16	18	GND		GND	17	18	GND
+5V	18	20	+12V		+5V	19	20	+12V
	CN1					CN2		

Note: DI channels 0 to 3 are reserved for monitoring the status of the internal batteries.

2.3   DIO Block Diagram

The PCI-M512/M512U card provides 16 Digital Input channels and 16 Digital Output channels, and all levels are TTL compatible. An overview of the connections and the block diagram are illustrated below:
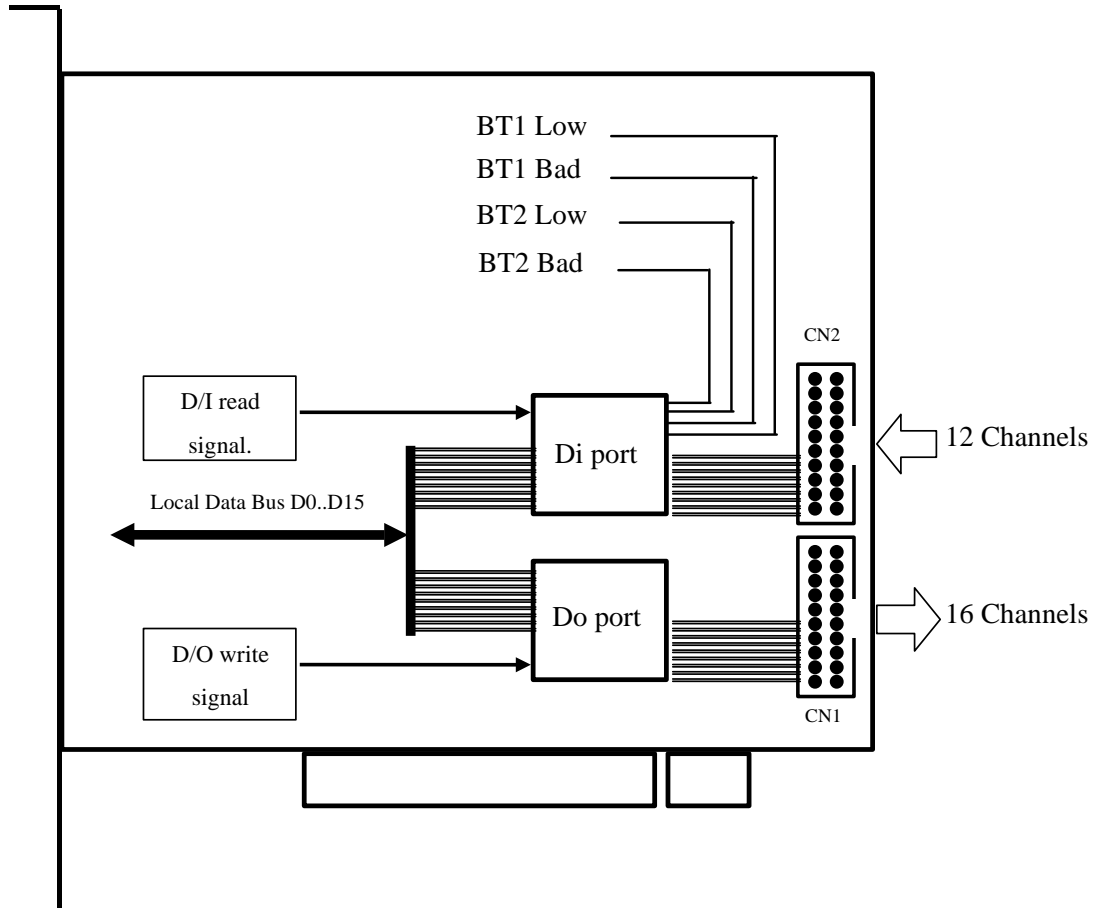
The DO port can be connected to a DB-16R or a DB-24PR daughterboard. The DB-16R is a 16-channel Relay Output board, and the DB-24R is a 24-channel Power Relay Output board. *(Note that only 16 of the 24 channels are valid when used with the PCI-M512/M512U board).*

The Digital Input port can be connected to a DB-16P, which is a 16-channel isolated Digital Input daughter board.

Notes:

1. The starting four channels are used by the battery status bits, as shown in the diagram above.

2. All Digital Input and Digital Output channels are TTL compatible.

2.4   Battery Status Indicators

The following is an illustration of the Battery Status Indicator functionality:
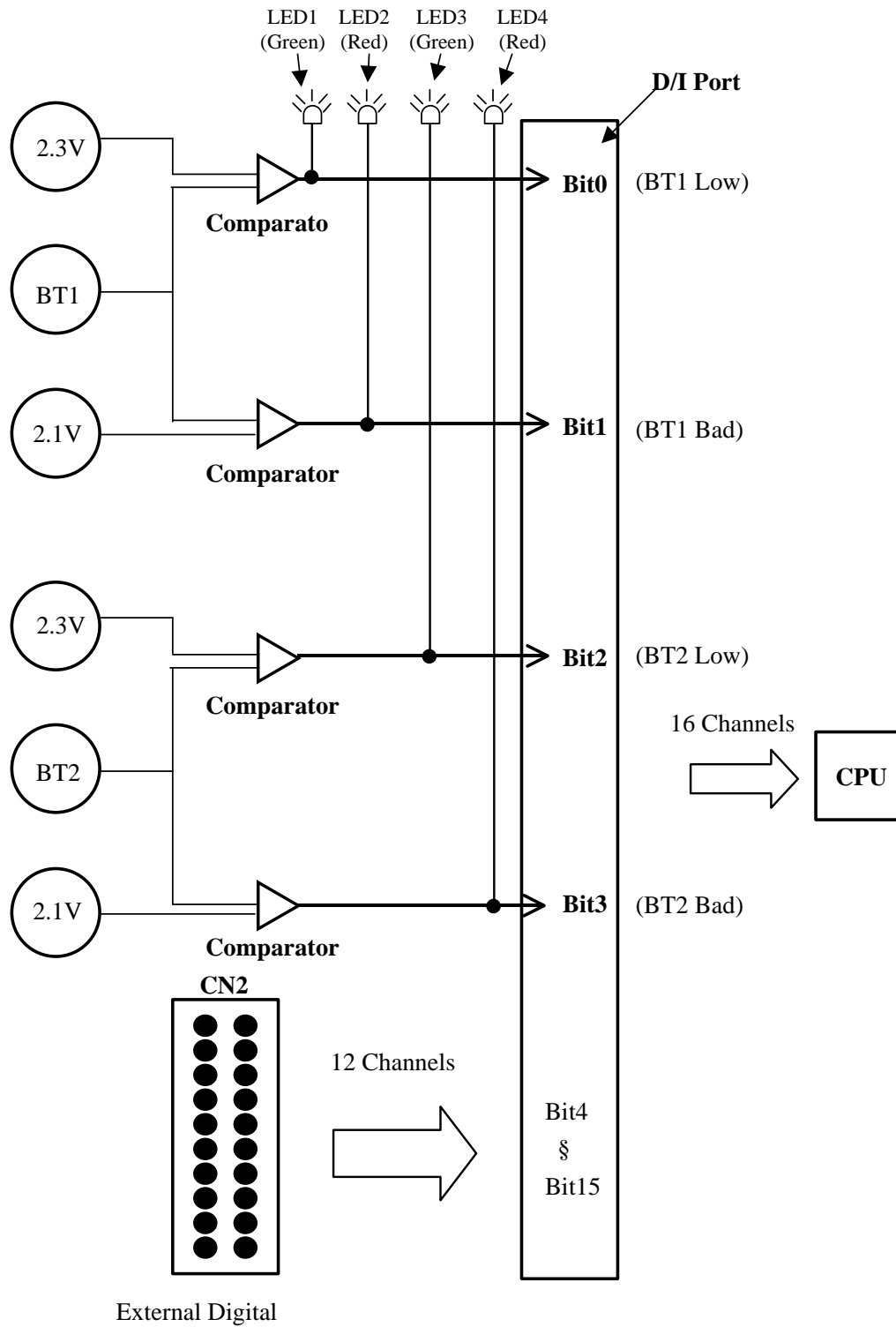
The initial voltage of BT1 will be greater than 3.0 V. If the voltage drops to 2.3 V, BT1 will still be able to retain the stored data in the SRAM for several months. **It is recommended both BT1 and BT2 are replaced when the voltage of either drops to 2.3 V or lower.** If the voltage drops to 2.1 V or below, BT1 will still be able to retain the stored data in the SRAM for several weeks. **It is strongly recommended that both BT1 and BT2 are replaced as soon as possible if the voltage of either BT1 or BT2 drops to 2.1 V or lower.**

The following is a summary of the battery voltage levels and the related LED and DI Port status indications:

Battery Voltage Status	LED Status	D/I Port Status
BT1 > 2.3 V	LED1 OFF, LED2 OFF	Bit0=0, Bit1=0
2.3 V>BT1>2.1 V	LED1 ON, LED2 OFF	Bit0=1, Bit1=0
2.1 V>BT1	LED1 ON, LED2 ON	Bit0=1, Bit1=1
BT2 > 2.3 V	LED3 OFF, LED4 OFF	Bit2=0, Bit3=0
2.3 V>BT2>2.1 V	LED3 ON, LED4 OFF	Bit2=1, Bit3=0
2.1 V>BT2	LED3 ON, LED4 ON	Bit2=1, Bit3=1

The **PCIM512_ReadFromDi(DWORD dwBoardNo, WORD *Data)** function can be used to read the 16-bit data. Refer to Section "PCIM512_ReadFromDi" of the PCI-M512 DLL Software Manual for more detailed information.

The lowest 4 bits, Bit0 to Bit3, are battery status bits. The remaining 12 bits, Bit4 to Bit15, are used for external Digital Input signals. A DB-16P daughterboard can be connected to CN2 to act as a sensor input. Refer to A1.DB-16P for more information.

If the voltage for either BT1 or BT2 is low, it is recommended that both BT1 and BT2 are replaced as soon as possible, following the procedure described below:

1. Ensure that you have two new batteries available for BT1 and new BT2
2. **Power on the Host computer (IMPORTANT DO NOT power off the Host computer)**
3. Replace the old BT1 battery with a new battery
4. Replace the old BT2 battery with a new battery
Note: It is recommended that the batteries for both BT1 and BT2 are individually replaced at the same time.

The dual battery design also ensures that it is safe to replace old batteries without losing data; when one battery is removed, the second battery continues to provide power to the SRAM.

2.5 SRAM Status Indicators

The following is a Block Diagram illustrating the SRAM functionality:
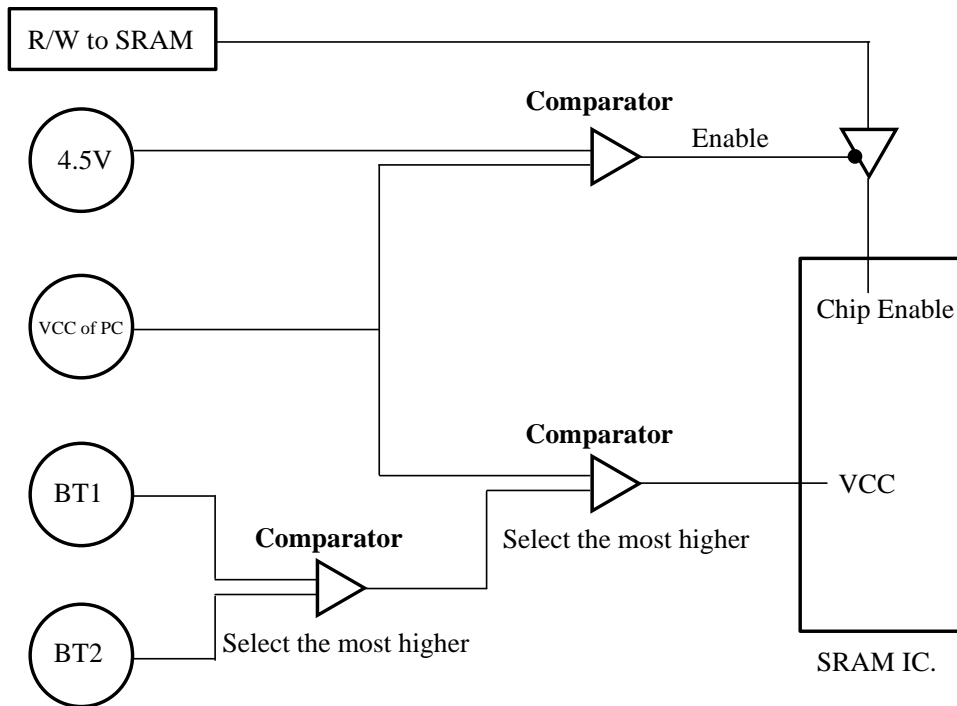
The power supply for the SRAM is selected from whichever of the PC-V$_{CC}$, BT1 and BT2 has the highest voltage. The initial voltage of both BT1 and BT2 is about 3 V. If the power to the Host computer is turned on, the PC-V$_{CC}$ will be about 5 V. If the Host computer is turned off, the PC-V$_{CC}$ will be about 0 V. Consequently, when the Host computer is turned on, PC-V$_{CC}$ will be sued to supply power to the SRAM. In this situation, their battery power for both BT1 and BT2 will be conserved for later usage.

When the Host computer is turned off, the battery that has the higher voltage will be used to supply power to the SRAM. Any data stored in the SRAM will be retained as long as the power is higher than 2.0 V. Consequently, the voltage level for either BT1 or BT2 must be higher than 2.0 V in order to retain the SRAM data.

The PCI-M512/M512U cards include a low battery indicator and a bad battery indicator for both BT1 and BT2. Refer to Section 2.5 for more information.

2.6 PCI-M512 Vendor and Device IDs

PCI-M512/M512U card includes four fixed ID numbers, which are indicated below:

Vendor ID	10B5
Device ID	9050
Sub-vendor ID	2129
Sub-device ID	0512

During the power-on stage, the Plug and Play BIOS will assign suitable resources to each PCI-M512/M512U board installed in the system, which the software driver for the board will then use to access the hardware. The user can execute the PIO_PISO.EXE to get all PCI hardware ID regarding the I/O boards. If the I/O board does not show in the screen correctly, please try to use another PCI slot and try again.

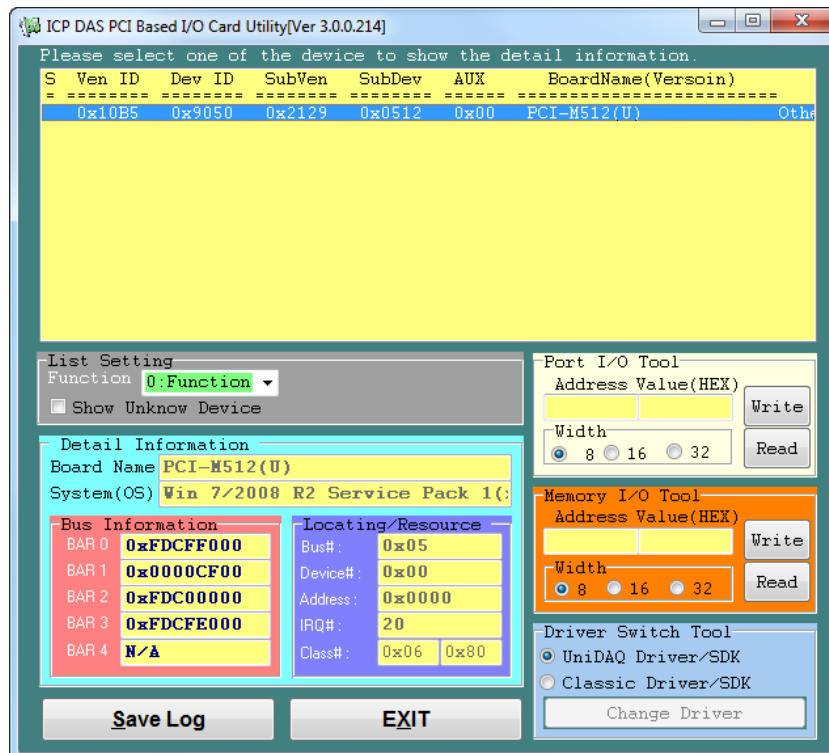The **PIO_PISO.EXE for Windows** is contained in:

	CD:\NAPDOS\PCI\Utility\Win32\PIO_PISO
	http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/utility/win32/pio_piso/

After executing the utility, the detail information for all PIO/PISO cards that installed in the PC will be shown as follows:

3. Hardware Installation

⚠️ *Note:*

It is recommended that the driver is installed before installing the hardware as the computer may need to be restarted once the driver is installed in certain operating systems, such as Windows 2000 or Windows XP, etc. Installing the driver first helps reduce the time required for installation and restarting the computer.

To install your PCI-M512 Series board, complete the following steps:

Step 1: Install the driver for your board on Host computer.

For detailed information about the driver installation, please refer to Chapter 4 Software Installation.
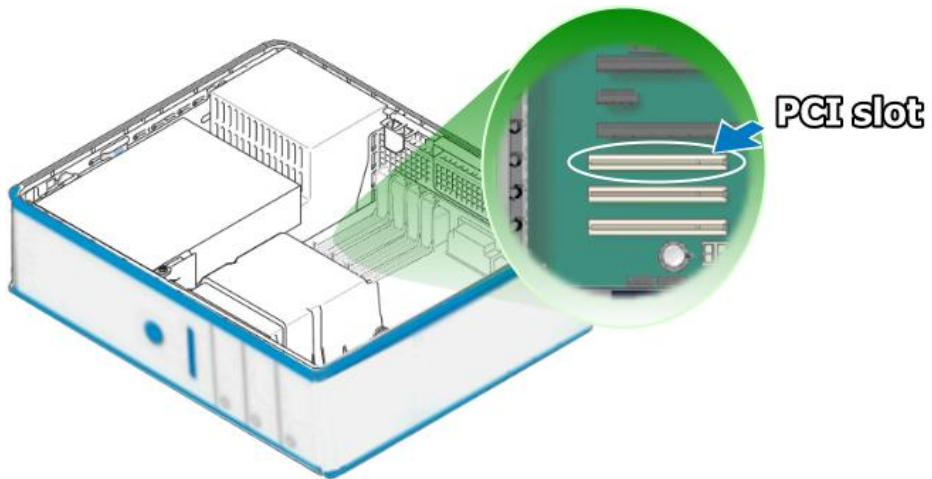
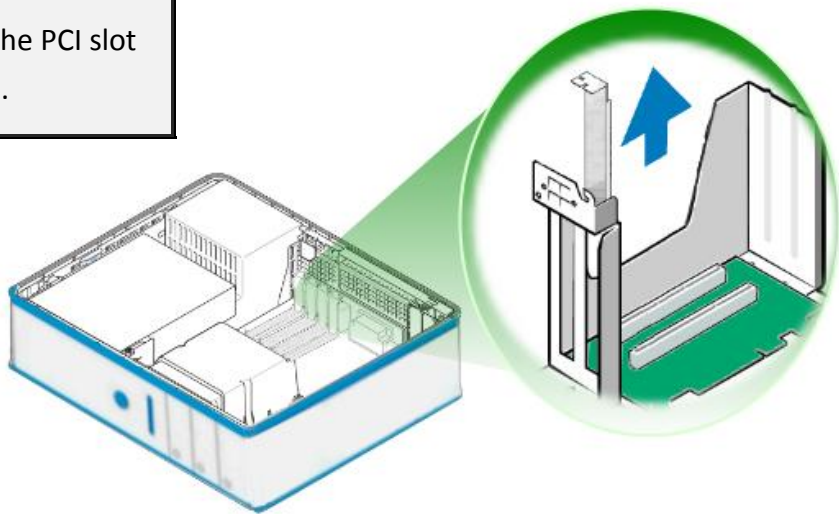Step 2: Shut down and switch off the power to the computer, and then disconnect the power supply.
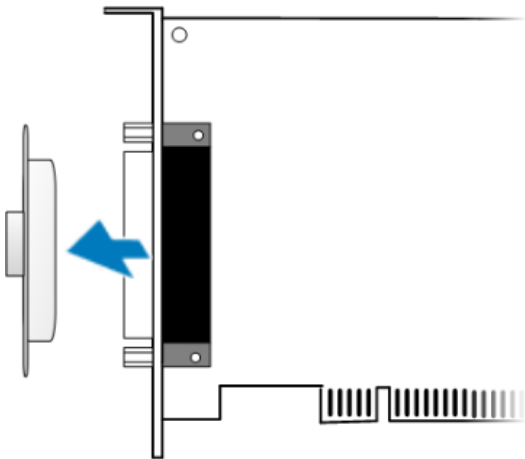
Step 3: Remove the cover from the computer.

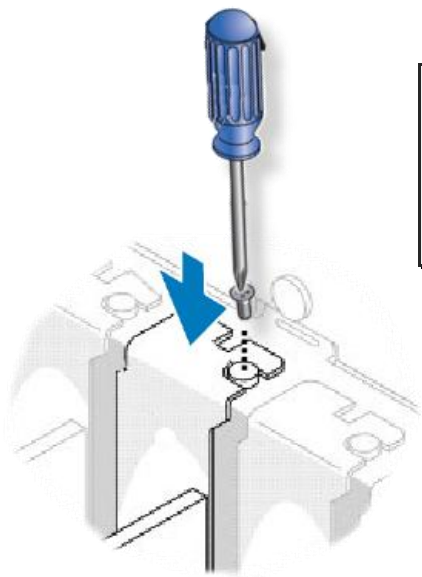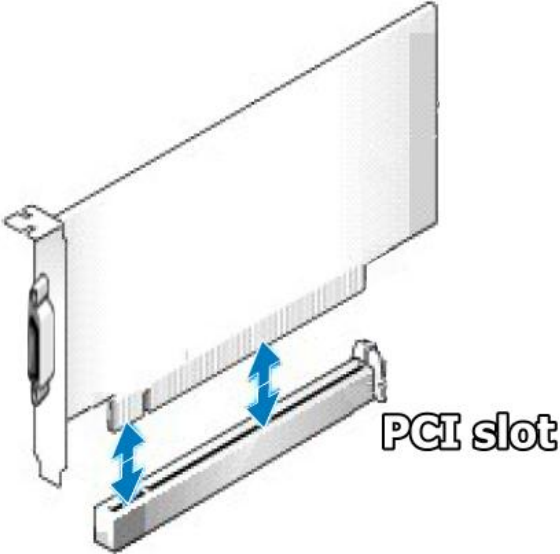Step 4: Select a vacant PCI slot.

Step 5: Unscrew and remove the PCI slot cover from the computer case.

Step 6: Remove the connector cover from your board.

Step 7: Carefully insert your board into the PCI slot by gently pushing down on both sides of the board until it slides into the PCI connector.

Step 8: Confirm that the board is correctly inserted in the motherboard, and then secure your board in place using the retaining screw that was removed in Step 5.

Step 9: Replace the covers on the computer.
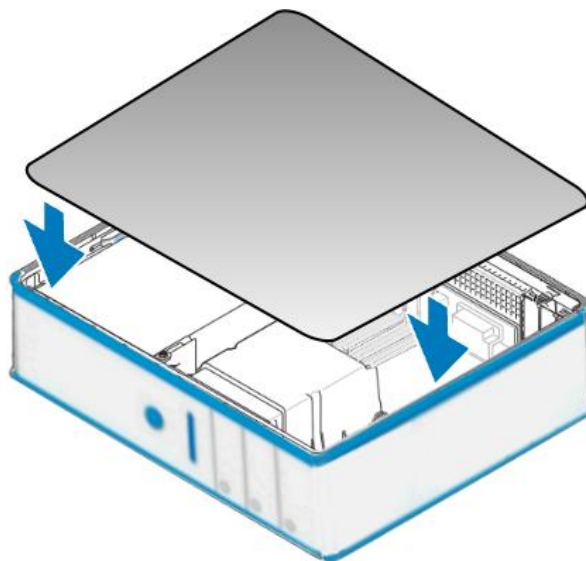
Step 10: Re-attach any cables, insert the power cord and then switch on the power to the computer.

Once the computer reboots, follow any message prompts that may be displayed to complete the Plug and Play installation procedure. Refer to Chapter 4 Software Installation for more information.

4. Software Installation

This chapter provides a detailed description of the process for installing the driver for the PCI-M512 series board as well as how to verify whether your board was properly installed. PCI-M512 series can be used on DOS, Linux and Windows 98/NT/2000 and 32/64-bit versions of Windows XP/2003/2008/7/8 based systems, and the drivers are fully Plug and Play compliant for easy installation.

4.1 Obtaining/Installing the Driver Installer Package

The driver installation package for PCI-M512 series board can be found on the companion CD-ROM, or can be obtained from the ICP DAS FTP web site. Install the appropriate driver for your operating system. The location and website addresses for the installation package are indicated below.

➢ **UniDAQ Driver/SDK**

Operating System	Windows 2000, 32/64-bit Windows XP, 32/64-bit Windows 2003, 32/64-bit Windows 7, 32/64-bit Windows 2008, and 32/64-bit Windows 8
Driver Name	UniDAQ Driver/SDK (unidaq_win_setup_xxxx.exe)
CD-ROM	CD:\\ NAPDOS\PCI\UniDAQ\DLL\Driver\
Web site	http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/unidaq/dll/driver/
Installing Procedure	To install the UniDAQ driver, follow the procedure described below. **Step 1:** Double-click the **UniDAQ_Win_Setupxxx.exe** icon to begin the installation process.

Installation Procedure	**Step 2:** When the "Welcome to the ICP DAS UniDAQ Driver Setup Wizard" screen is displayed, click the **"Next>"** button to start the installation. **Step 3:** On the "Information" screen, verify that the DAQ board is included in the list of supported devices, then click the **"Next>"** button. **Step 4:** On the "Select Destination Location" screen, click the **"Next>"** button to install the software in the default folder, **C:\ICPDAS\UniDAQ**. **Step 5:** On the "Select Components" screen, verify that the DAQ board is in the list of device, and then click the **"Next>"** button to continue. **Step 6:** On the "Select Additional Tasks" screen, click the **"Next>"** button to continue. **Step 7:** On the "Download Information" screen, click the **"Next>"** button to continue. **Step 8:** Once the installation has completed, click **"No, I will restart my computer later"**, and then click the **"Finish"** button. For more detailed information about how to install the UniDAQ driver, refer to "Section 2.2 Install UniDAQ Driver DLL" of the UniDAQ Software Manual, which can be found in the \NAPDOS\PCI\UniDAQ\Manual\ folder on the companion CD, or can be downloaded from: http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/unidaq/manual/

➢ **PCI-M512 Series Classic Driver**

|	
Operating System	**Windows 95/98/ME, Windows NT, Windows 2000, 32-bit Windows XP, 32-bit Windows 2003, 32-bit Windows Vista, 32-bit Windows 7 and 32-bit Windows 8**
Driver Name	**PCI-M512 Series Classic Driver (PCI-Memory_Win_Setup_xxxx.exe)**
CD-ROM	CD:\\NAPDOS\PCI\PCI-M512\DLL\Driver\
Web site	http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/pci-m512/dll/driver/
Installing Procedure	Please follow the following steps to setup software: **Step 1:** Double click the **PCI-M512 Series Classic Driver** to setup it. **Step 2:** When the Setup Wizard screen is displayed, click the **Next>** button. **Step 3:** Select the folder where the drivers are to install. The **default path is C:\DAQPro\PCI-Memory**. But if you wish to install the drivers to a different location , click the **"Browse…"** button and select the relevant folder and then click the **Next>** button. **Step 4:** Click the **Install** button to continue. **Step 5:** Click the **Finish** button. For more detailed information about how to install the PCI-M512 series classic driver, refer to "Section 2.2 Driver Installing Procedure" of the PCI-M512 DLL Software Manual, which can be found in the \NAPDOS\PCI\PCI-M512\Manual\ folder on the companion CD, or can be downloaded from: http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/pci-m512/manual/

4.2   PnP Driver Installation

Step 1: Correctly shut down and power off your computer and disconnect the power supply, and then install your board into the computer.

For detailed information about the hardware installation of PCI-M512 Series board, please refer to Chapter 3 Hardware Installation.
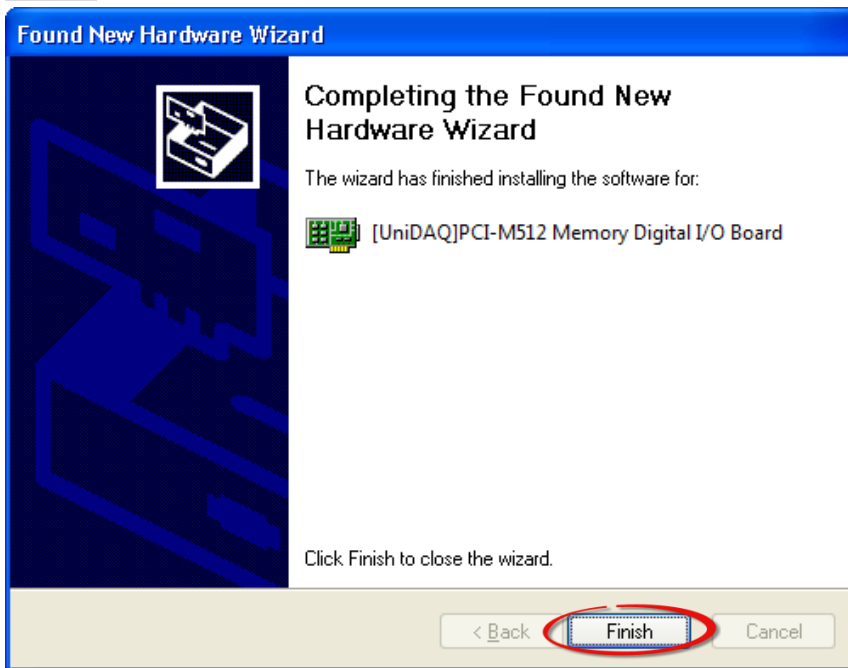
Step 2: Power on the computer and complete the Plug and Play installation.

⚠ *Note: More recent operating systems, such as Windows 7/8 will automatically detect the new hardware and install the necessary drivers etc., so Steps 3 to 5 can be skipped.*

Step 3: Select **"Install the software automatically [Recommended]"** and click the **"Next>"** button.
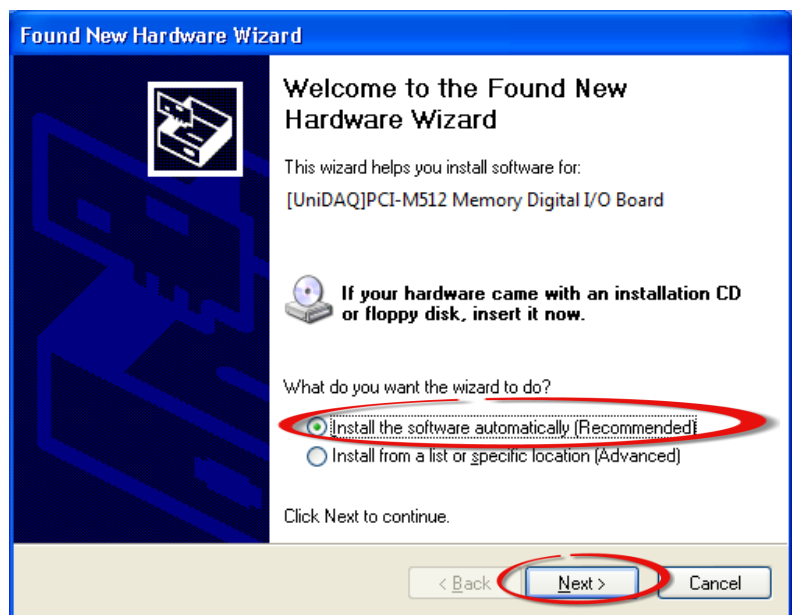
Step 4: Click the **"Finish"** button.

Step 5: Windows pops up **"Found New Hardware"** dialog box again.

4.3 Verifying the Installation

To verify that the driver was correctly installed, use the Windows **Device Manager** to view and update the device drivers installed on the computer, and to ensure that the hardware is operating correctly. The following is a description of how access the Device Manager in each of the major versions of Windows. Refer to the appropriate description for the specific operating system to verify the installation.

4.3.1 Accessing Windows Device Manager

■ **Windows 95/98/ME**

Step 1:   Either right-click the **"My Computer"** icon on the desktop and then click **"Properties"**, or open the **"Control Panel"** and double-click the **"System"** icon to open the System Properties dialog box.

Step 2:   In the **System Properties** dialog box, click the "**Device Manager**" tab.
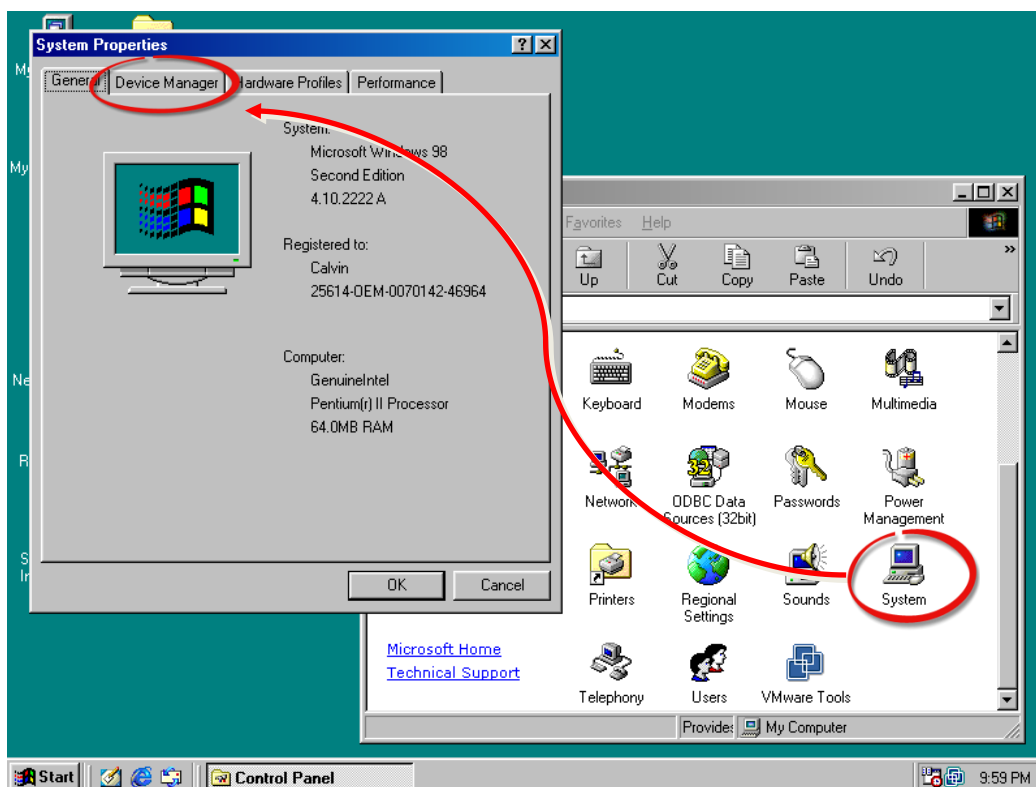
■ **Windows 2000/XP**

Step 1: Click the "**Start**" button and then point to "**Settings" and click** "**Control Panel**".
Double-click the "**System**" icon to open the **"System Properties"** dialog box.
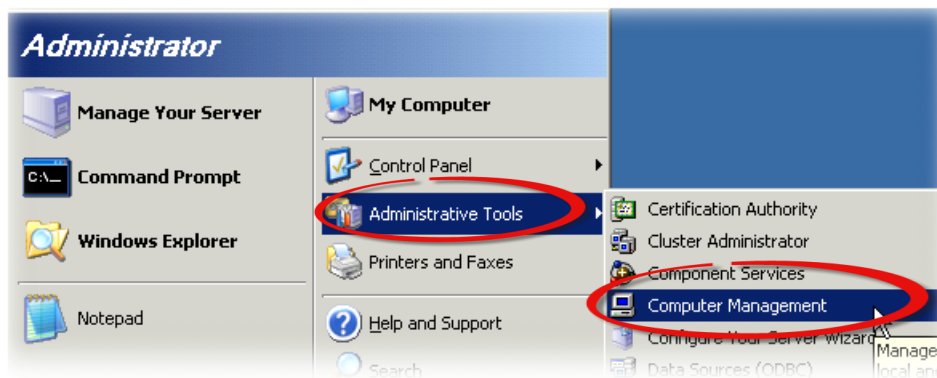
Step 2: Click the "**Hardware**" tab and then click the "**Device Manager**" button.

■ **Windows Server 2003**

Step 1: Click the **"Start"** button and point to **"Administrative Tools"**, and then click the **"Computer Management"** option.

Step 2: Expand the **"System Tools"** item in the console tree, and then click **"Device Manager"**.
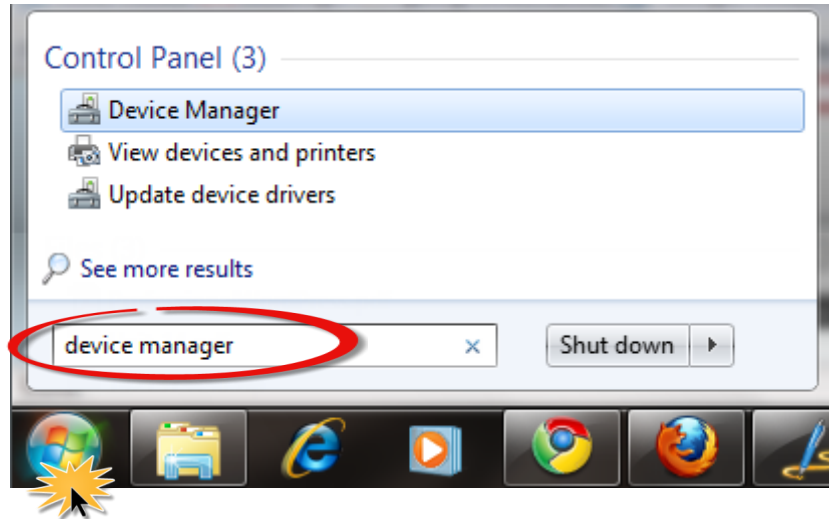
■ Windows Vista/7

Step 1: Click the **"Start"** button, and then click **"Control Panel"**.

Step 2: Click **"System and Maintenance"**, and then click **"Device Manager"**.

Alternatively,

Step 1: Click the **"Start"** button.

Step 2: In the **Search field,** type **Device Manager** and then press Enter.

⚠ *Note that Administrator privileges are required for this operation. If you are prompted for an administrator password or confirmation, enter the password or provide confirmation by clicking the "Yes" button in the User Account Control message.*

■ Windows 8

Step 1:   To display the **Start screen icon** from the desktop view, hover the mouse cursor over the **bottom-left corner** of screen.
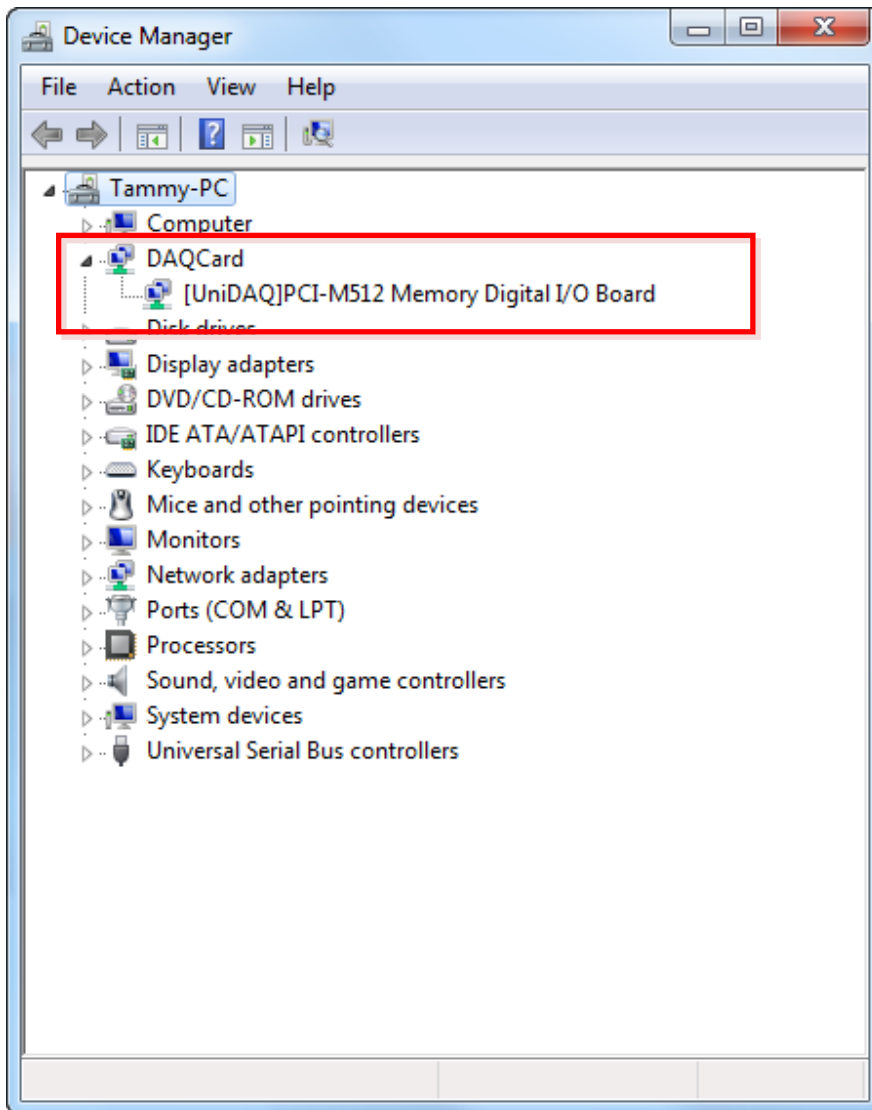
Step 2:   **Right-click** the Start screen icon and then click **"Device Manager"**.

Alternatively, press **[Windows Key] +[X]** to open the Start Menu, and then select Device Manager from the options list.
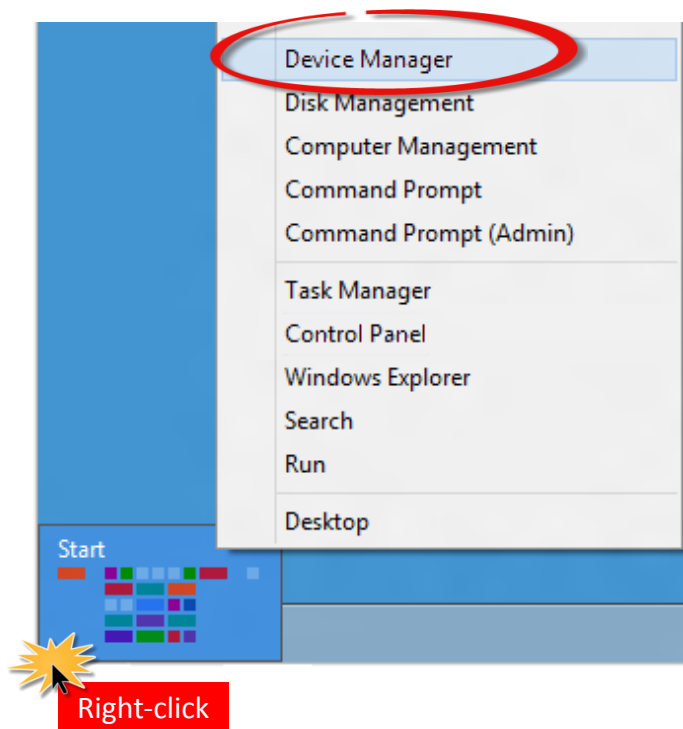
4.3.2 Check the Installation

Check that the PCI-M512/M512U Series board is correctly listed in the Device Manager, as illustrated below.

5. Testing the PCI-M512 Board

This chapter provides detailed information about the "Self-Test" process, which is used to confirm that the PCI-M512 Series board is operating correctly. Before beginning the "Self-Test" process, ensure that both the hardware and driver installation procedures are fully completed. For detailed information about the hardware and driver installation, refer to Chapter 3 Hardware Installation and Chapter 4 Software Installation.

5.1 Self-Test Wiring

The following is a description of how to configure the wiring in order to perform the "Self-Test" procedures for the Digital Input or/and Digital Output.

Before beginning the "Self-Test" procedure, ensure that the following items are available:
☑ A CA-2002 Cable
(Optional, Website: http://www.icpdas.com/products/Accessories/cable/cable_selection.htm)

Step 1: Use CA-2002 cable to connect the CN1 with CN2.

CA-2002 Cable
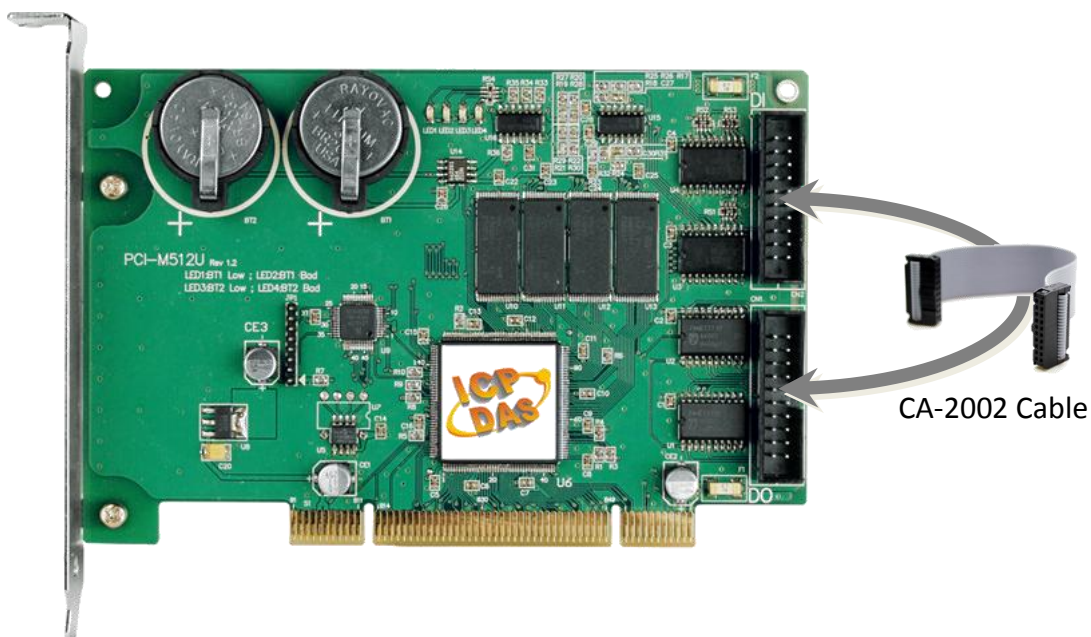
5.2 Execute the Test Program

Step 1: In Windows 7, click the "**Start"** button, point to **"All Programs",** and then click the **"ICPDAS"** folder. Point to **"UniDAQ Development Kits"**and then click the **"UniDAQ Utility**" to execute the UniDAQ Utility Program.
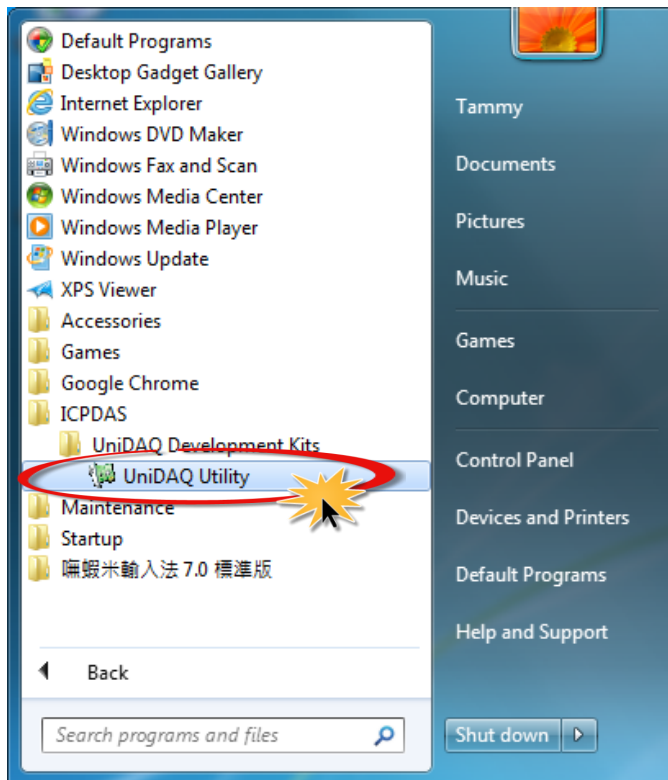
Step 2: Confirm that your board has been successfully installed in the Host system. Note that the device numbers start from 0.

Step 3: Click the **"TEST"** button to start the test.

Step 4: Check the results of the **Digital Input/Output** functions test.

1. Click the **"Digital Output"** tab.

2. Select **"Port0"** from the **"Port Number"** drop-down menu.

3. Check the checkboxes for **channels 4, 6, 8, 10, 12 and 14**.
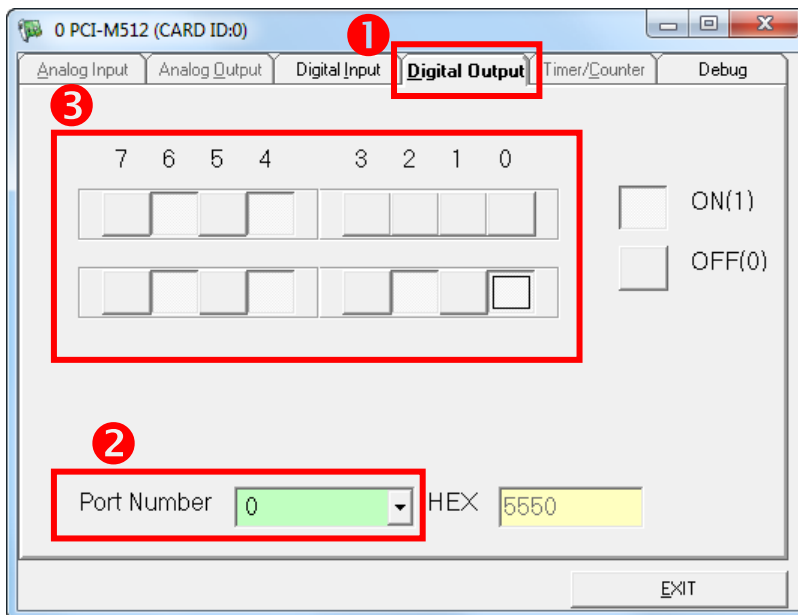
4. Click the **"Digital Input"** tab.

5. Select **"Port1"** from the **"Port Number"** drop-down menu.

6. The DI indicators will turn **red** when the corresponding DO channels 4, 6, 8, 10, 12 and 14 are **ON**.
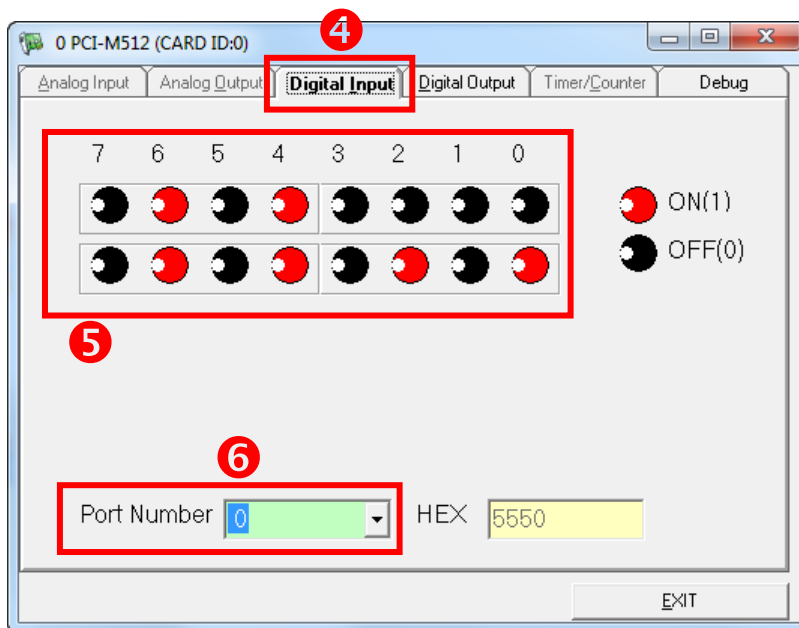
6. Demo Program

PCI-M512 Series board provides Digital Input/Output and SRAM demo programs, together with the source code for the library, that can be used in either a Windows or a DOS environment, based on a variety of programming languages, including TC/BC/MSC (DOS), Borland C++, Delphi, Visual Basic, Visual C, VB.NET 2005, and C#.NET2005, etc. (Windows).

Detailed information about the demo programs is provided below.

| Sample Program	UniDAQ SDK/Driver	PCI-M512 Series Class Driver	DOS
TC	-	-	✓
BC	-	-	✓
MSC	-	-	✓
Borland C++ Builder 4	-	✓	-
Borland C++ Builder 6	✓	-	-
Delphi 4	-	✓	-
Delphi 6	✓	-	-
Visual Basic 6	✓	✓	-
Visual C++ 6	✓	✓	-
VB.NET 2005 (32-bit)	✓	✓	-
VB.NET 2005 (64-bit)	✓	-	-
C#.NET 2005 (32-bit)	✓	✓	-
C#.NET 2005 (64-bit)	✓	-	-
VC.NET 2005 (32-bit)	✓	-	-
VC.NET 2005 (64-bit)	✓	-	-
MATLAB	✓	-	-
LabVIEW	✓	✓	-

Appendix: Daughter Board

A1. DB-16P

The DB-16P is a 16-channel isolated Digital Input daughter board with optically isolated inputs that consist of a bi-directional optocoupler with a resistor to allow current sensing. The DB-16P can be used to sense DC signals from TTL levels up to +24 V, or can be used to sense a wide range of AC signals. This board can also be used to isolate the Host computer from high common-mode voltages, ground loops and transient voltage spikes that often occur in industrial environments. *Note: The lowest nibbles, bit_0 to bit_3, are used by the PCI-M512, so only the highest 12-bits, bit_4 to bit_15, are available.*
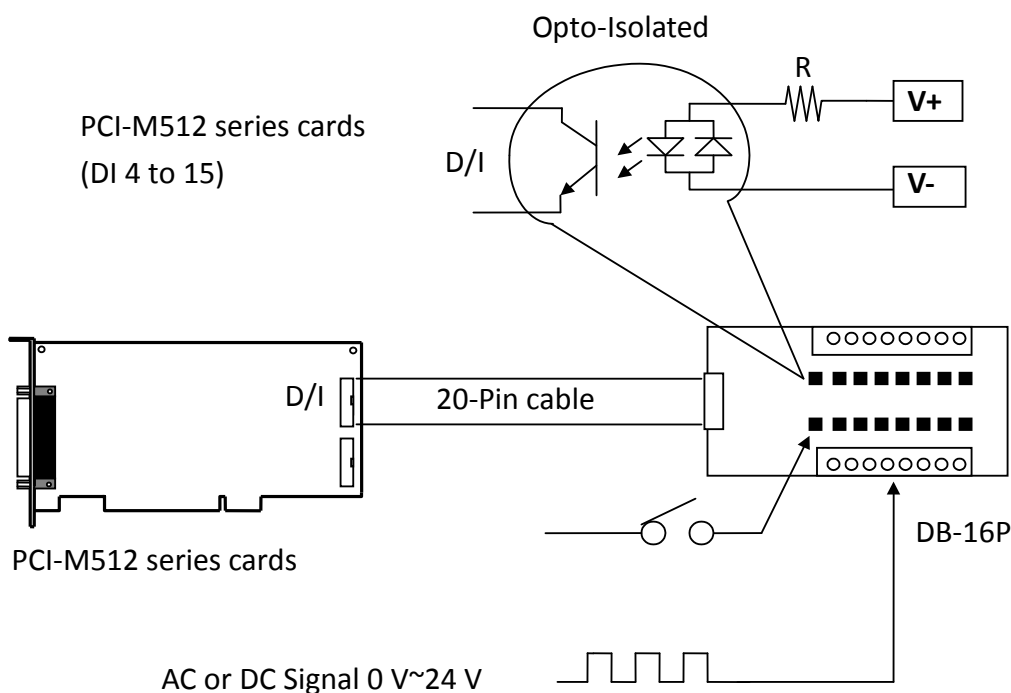
A2. DB-16R Relay Board

The DB-16R is a 16-channel Relay Output daughterboard that provides of 16 Form C Relay Output channels for that enable the efficient switching of loads through a programmable control. Both the connectors and the functionality are compatible with 785 series boards, and the DB-16R contains an industrial type terminal block. The relays are powered by applying a 5 V signal to the appropriate relay channel via the 20-pin flat cable connector. The DB-16R provides 16 LEDs, one for each relay, which are illuminated the associated relay is activated. To avoid overloading the power supply of the Host computer, the DB-16R includes a screw terminal to allow an external power supply to be connected.
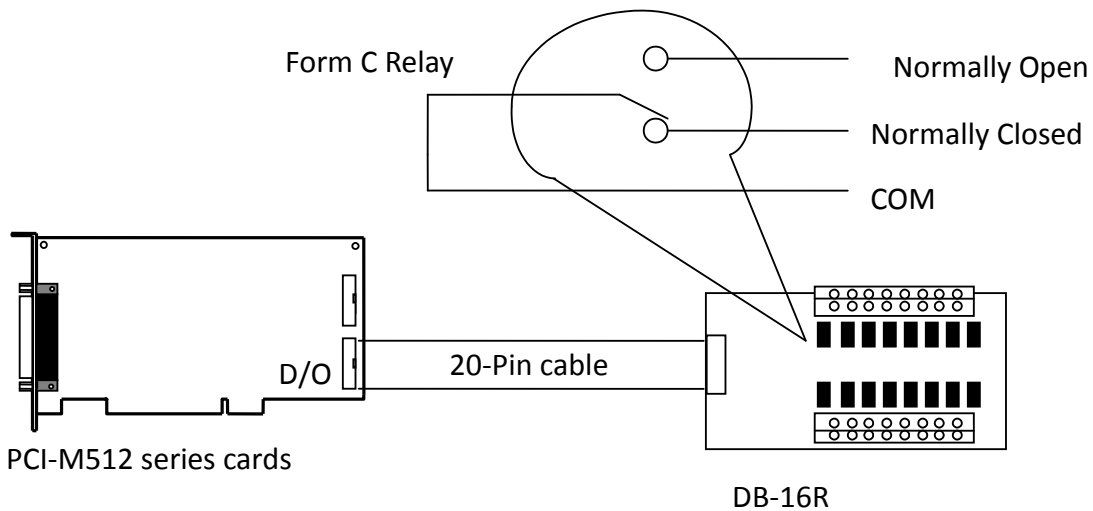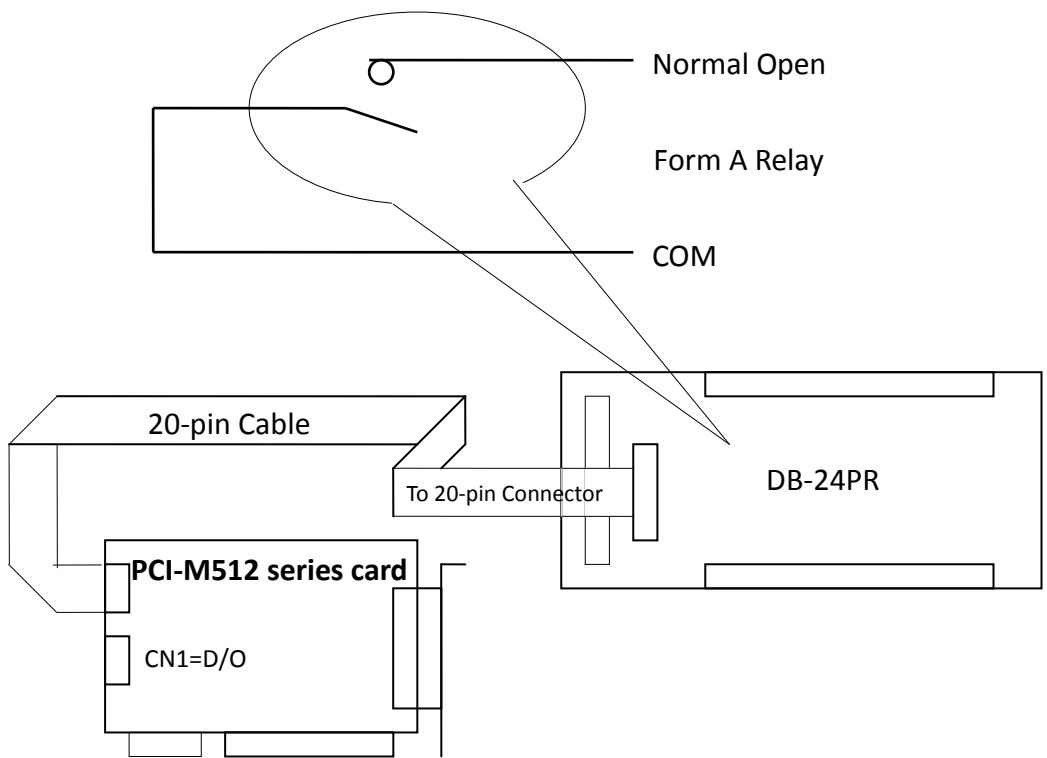

Note:

Channel: 16 Form C Relays
Relay: Switching up to 0.5 A @ 110 V_{AC}/ 1 A @ 24 V_{DC}

A3. DB-24PR, DB-24POR, DB-24C

DB-24PR	24 x Power Relay channels, 5A/250 V
DB-24POR	24 x PhotoMOS Relay channels, 0.1 A/350 V$_{AC}$
DB-24C	24 x Open Collectors, 100 mA per channel, 30 V Max.

The DB-24PR is a 24-channel Power Relay Output daughterboard that provides 8 Form C and 16 Form A electromechanical relay channels to enable the efficient switching of loads through a programmable control. The contact of each relay can be used to control a 5 A load at 250 V$_{AC}$/30 V$_{DC}$. The relays are powered by applying a 5 V signal to the appropriate relay channel via the 20-pin flat cable connector, which only uses 16 relays, or 50-pin flat cable connector, which is OPTO-22 compatible, for the DIO-24 series. The DB-24PR contains 24 LEDs, one for each relay, which are illuminated when the associated relay is activated. To avoid overloading the power supply of the Host PC, the DB-24R requires either a +12 V$_{DC}$ or +24 V$_{DC}$ external power supply to be connected.

Normal Open

Form A Relay

COM

20-pin Cable

To 20-pin Connector

DB-24PR

PCI-M512 series card

CN1=D/O

Note:
1. The 50-pin connector (OPTO-22 compatible) is for use with DIO-24, DIO-48 and DIO-144 modules.
2. The 20-pin connector is for use with 16-channel Digital Output modules, including A-82X, A-62X, DIO-64 and ISO-DA16/DA8.
3. Channels: 16 Form A Relays, 8 Form C Relays
4. Relays: Switching up to 5 A @ 110 V$_{AC}$ / 5 A @ 30 V$_{DC}$

Reporting Problems

If you experience any difficulties while using your PCI-M512/M512U board, and are unable to find help either in this manual or on our website, technical support is available from ICP DAS at no charge. The best way to report a problem is to send a description of the difficulty by email to service@icpdas.com.

When reporting a problem, ensure that the following information is included:

1. Is the problem reproducible? If so, how? Provide full details describing the procedure used to reproduce the problem.
2. Details of the Host configuration you are using, for example, Windows 3.1, Windows 95, or Windows NT 4.0, etc.
3. Details of the ICP DAS product are you using. Check the product manual for full details.
4. If a dialog box with an error message is displayed, provide the full text of the dialog box, including the text in the title bar.
5. If the problem involves other programs or hardware devices, provide full details of the devices and/or program version you using.
6. Any other comments or any suggestions related to the problem are welcome.

After receiving your request, it will take about two business days to test and resolve the issues that you have reported, and then we will reply to you as soon as possible.

ICP DAS
E-mail: Service@icpdas.com
Web Site: http://www.icpdas.com