PCI-D96SU/D128SU User Manual

96/128-channel DIO board

Version 1.0, Apr. 2019

SUPPORTS

Board includes PCI-D96SU and PCI-D128SU.

WARRANTY

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If you have any question, please feel to contact us. We will give you quick response within 2 workdays.

Email: service@icpdas.com, service.icpdas@gmail.com

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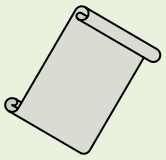
Packing List

The shipping package includes the following items:

One PCI-D96SU or D128SU card as follows:

PCI-D96SU

PCI-D128SU

One printed Quick Start Guide 

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-D96SU/D128SU card is a new generation product provided by ICP DAS to meet RoHS compliance requirements.

The PCI-D96SU/D128SU supports 3.3 V/5 V PCI bus. These cards provide 96/128 Digital I/O lines that consist of three/four 32-bit bi-directional ports for use in a variety of Digital I/O applications. Each channel could be setting for Digital Input or Output. They provide a variety of operating voltage (+1.8 V, +2.5 V, +3.3 V and +5 V) for customers need.

The PCI-D96SU/D128SU cards include an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer. The pull-high/low jumpers allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted. The PCI-D96SU/D128SU provides a single high-density connector that reduces the amount of installation space required for the card in the computer.

These cards support various OS versions, such as DOS and 32/64-bit Windows 10/8/7/2008/2003/XP. DLL and Active X control together with various language sample programs based on Turbo C++, Borland C++, Microsoft C++, Visual C++, Borland Delphi, Borland C++ Builder, Visual Basic, C#.NET, Visual Basic.NET and LabVIEW are provided in order to help users quickly and easily develop their own applications.

1.1 Features

- Support the +3.3/+5 V PCI bus
- 96/128 channels of Digital I/O
- Bi-direction programmable I/O ports under software control
- 3/4 32-bit bi-direction I/O ports
- DIO operating voltage: +1.8 V, +2.5 V, +3.3 V, +5 V
- Pull-high/Pull-low Jumpers for DI channels
- Digital Pattern Generator for DO channels
- Supports DI interrupt, Pattern Match and Change of States
- Supports Card ID (SMD Switch)
- Supports a High-density SCSI II 100-pin Connector

1.2 Specifications

Model Name		PCI-D96SU	PCI-D128SU
Programmable Digital I/O			
Channels		96	128
Digital Input			
Digital Signal Voltage Levels		+1.8 V, +2.5 V, +3.3 V, +5 V	
Input Voltage	+1.8 V	Logic 0: < 0.65 V, Logic 1: > 1.2 V.	
	+2.5 V	Logic 0: < 0.7 V, Logic 1: > 1.7 V.	
	+3.3 V	Logic 0: < 0.8 V, Logic 1: > 2.0 V.	
	+5 V	Logic 0: < 1.5 V, Logic 1: > 3.5 V.	
Response Speed		1 MHz	
Response Speed		Software (Pattern Match, Change of Status)	
Data Transfer		Polling, Interrupt	
Digital Output			
Digital Signal Voltage Levels		+1.8 V, +2.5 V, +3.3 V, +5 V	
Output Voltage	+1.8 V	Logic 0: < 0.65 V, Logic 1: > 1.2 V.	
	+2.5 V	Logic 0: < 0.7 V, Logic 1: > 1.7 V.	
	+3.3 V	Logic 0: < 0.8 V, Logic 1: > 2.0 V.	
	+5 V	Logic 0: < 1.5 V, Logic 1: > 3.5 V.	
Output Capability	+1.8 V	Sink: 1 mA, Source: 1 mA	
	+2.5 V	Sink: 2 mA, Source: 2 mA	
	+3.3 V	Sink: 4 mA, Source: 4 mA	
	+5 V	Sink: 5 mA, Source: 5 mA	
Response Speed		1 MHz	
Operation Mode		Static update, Waveform generation	
General			
Bus Type		3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Data Bus		32-bit	
Card ID		Yes(4-bit)	
I/O Connector		Female SCSI II 100 pin x 1	Female SCSI II 100 pin x 1 20-pin Box Header x 2
Dimensions (L x W)		129 mm x 105 mm	
Power Consumption		600 mA @ +5 V	760 mA @ +5 V
Operating Temperature		0 ~ 60 °C	
Storage Temperature		-20 ~ 70 °C	
Humidity		5 ~ 85% RH, non-condensing	

Note:

The I/O speed is depending on I/O card, bus speed, CPU speed and system loading. Any condition changes may cause the I/O speed different.

1.3 Block Diagram

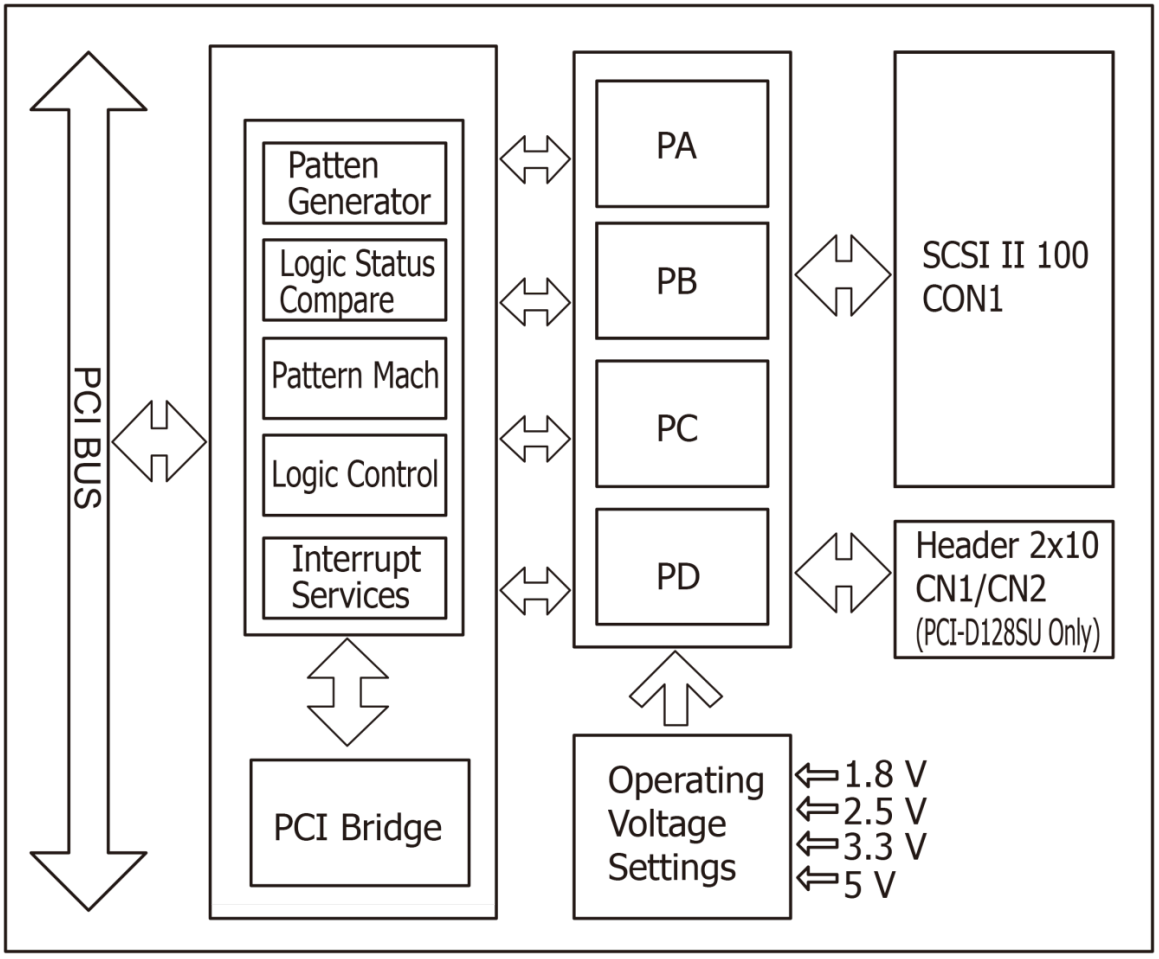
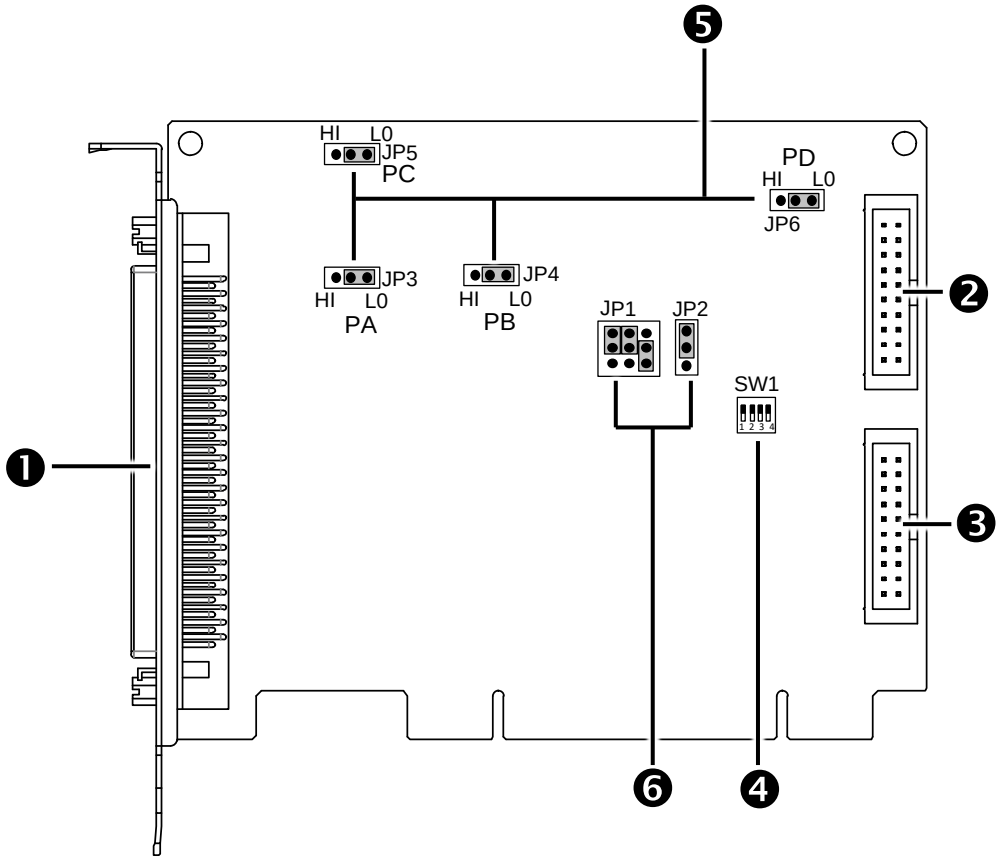


Figure 1-3: Block Diagram of PCI-D96SU/D128SU

2. Hardware Configuration

2.1 Board Layout



❶ CON1 Connector ❷ CN2 Connector (for PCI-D128SU only) ❸ CN1 Connector (for PCI-D128SU only)	Refer to Section 2.2 "I/O Port Location" for more details.
❹ Card ID Switch	Refer to Section 2.5 "Card ID Switch" for more details.
❺ DI Pull-high/low Jumper	Refer to Section 2.3 "Pull-high/low Jumper" for more details.
❻ DIO Operating Voltage Jumper	Refer to Section 2.4 "DIO Operating Voltage Jumper" for more details.

2.2 I/O Port Location

There are three 32-bit I/O ports in the PCI-D96SU card, while there are four 32-bit I/O ports in the PCI-D128SU card. Each I/O port can be programmed as a DI or DO port. When the PC is first powered-on or reset all the ports are configured as DI ports. These I/O port locations are given as follows:

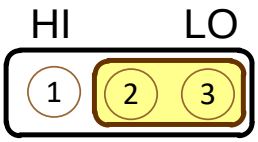
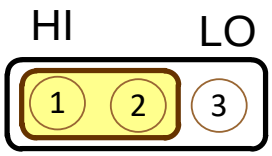
<table>
<tr><th>Model</th><th>Connector</th><th colspan="2">Port</th></tr>
<tr><td rowspan="3">PCI-D96SU
PCI-D128SU</td><td rowspan="3">CON1</td><td>Port 0 (PA0 to PA31)</td><td rowspan="4">For more detailed information related to the pin assignments for the PA, PB, PC and PD Ports, refer to Section 2.6 “Pin Assignments”.</td></tr>
<tr><td>Port 1 (PB0 to PB31)</td></tr>
<tr><td>Port 2 (PC0 to PC31)</td></tr>
<tr><td rowspan="2">PCI-D128SU</td><td>CN1</td><td rowspan="2">Port 3 (PD0 to PD31)</td></tr>
<tr><td>CN2</td></tr>
</table>

Note:

This board is a bi-directional I/O design with default DI mode when power on.
Before switching to DO mode, the DI pull-high jumper setting may activate active-high DO devices (e.g., 24POR / 24C), or the pull-low setting may activate active-low DO devices.
Please have an appropriate jumper setting depending on the characteristics of your external device.

2.3 Pull-high/Low Jumper

Before installing the card into your computer, configure the DI Pull-high/low according to your requirements. **Jumpers JP3 to JP6** are used to specify whether the Digital Input is either Pull-high or Pull-low. The following illustrates the jumper positions used to select the DI Pull-high/low:

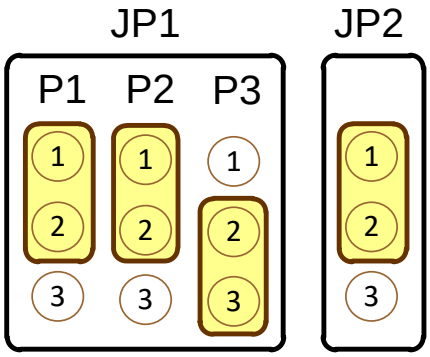
☑ Pull-Low (Default)	Pull- High
	

The shown below provides an overview of the mapping for each Digital Input channel and the corresponding jumper position:

Model	Connector	Port	Pull-high/Low Jumper
PCI-D96SU PCI-D128SU	CON1	Port 0 (PA0 to PA31)	JP3
		Port 1 (PB0 to PB31)	JP4
		Port 2 (PC0 to PC31)	JP5
PCI-D128SU	CN1	Port 3 (PD0 to PD31)	JP6
	CN2		

2.4 DIO Operating Voltage Jumper

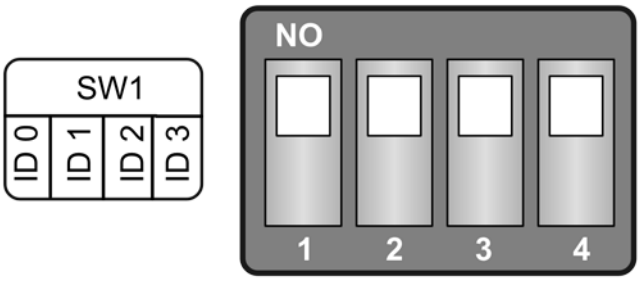
Before installing the card into your computer, configure the DIO operating voltage according to your requirements. **Jumpers JP1 and JP2** are used to specify the DIO operating voltage levels. The following illustrates the jumper positions used to select the digital signal voltage levels:



JP1			JP2	Voltage
P1	P2	P3		
2-3	1-2	1-2	2-3	+1.5 V
1-2	2-3	1-2	2-3	+1.8 V
1-2	1-2	1-2	2-3	+2.5 V
1-2	1-2	2-3	2-3	+3.3 V
X	X	X	1-2	+5.0 V (Default)

2.5 Card ID Switch

Before installing the card into your computer, configure the Card ID according to your requirements. The PCI-D96SU/D128SU card has a Card ID switch (SW1) with which users can recognize the board by the ID via software when using two or more PCI-D96SU/D128SU cards in one computer. The default Card ID is 0x0. For detailed information about the SW1 Card ID settings, refer to Table 2-5.



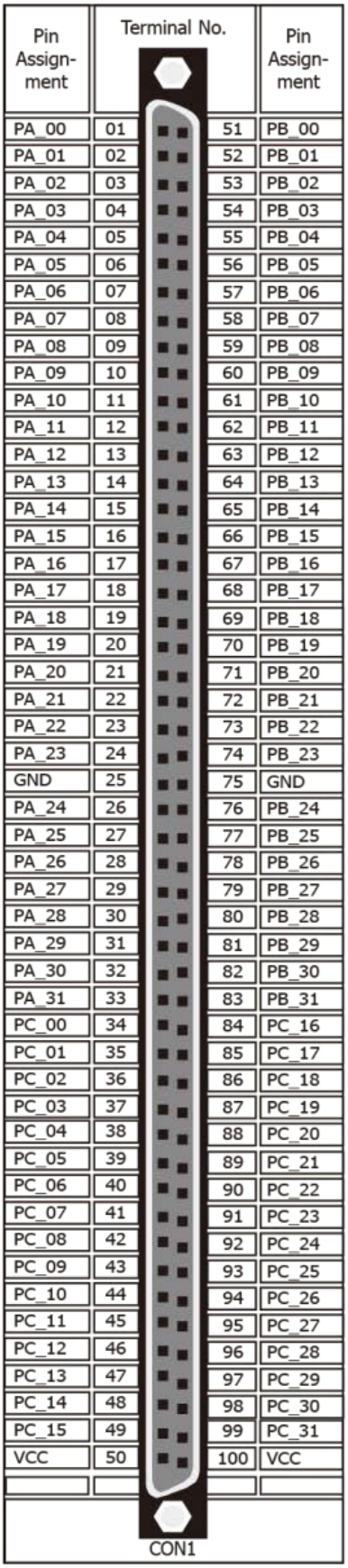
(Default Settings)

Table 2-5: Card ID Settings (SW1)

Card ID (Hex)	1 ID0	2 ID1	3 ID2	4 ID3
(*) 0x0	ON	ON	ON	ON
0x1	OFF	ON	ON	ON
0x2	ON	OFF	ON	ON
0x3	OFF	OFF	ON	ON
0x4	ON	ON	OFF	ON
0x5	OFF	ON	OFF	ON
0x6	ON	OFF	OFF	ON
0x7	OFF	OFF	OFF	ON
0x8	ON	ON	ON	OFF
0x9	OFF	ON	ON	OFF
0xA	ON	OFF	ON	OFF
0xB	OFF	OFF	ON	OFF
0xC	ON	ON	OFF	OFF
0xD	OFF	ON	OFF	OFF
0xE	ON	OFF	OFF	OFF
0xF	OFF	OFF	OFF	OFF

Note: (*) Default Settings; OFF → 1; ON → 0

2.6 Pin Assignments



Pin Assignment	Terminal No.		Pin Assignment
PA_00	01	51	PB_00
PA_01	02	52	PB_01
PA_02	03	53	PB_02
PA_03	04	54	PB_03
PA_04	05	55	PB_04
PA_05	06	56	PB_05
PA_06	07	57	PB_06
PA_07	08	58	PB_07
PA_08	09	59	PB_08
PA_09	10	60	PB_09
PA_10	11	61	PB_10
PA_11	12	62	PB_11
PA_12	13	63	PB_12
PA_13	14	64	PB_13
PA_14	15	65	PB_14
PA_15	16	66	PB_15
PA_16	17	67	PB_16
PA_17	18	68	PB_17
PA_18	19	69	PB_18
PA_19	20	70	PB_19
PA_20	21	71	PB_20
PA_21	22	72	PB_21
PA_22	23	73	PB_22
PA_23	24	74	PB_23
GND	25	75	GND
PA_24	26	76	PB_24
PA_25	27	77	PB_25
PA_26	28	78	PB_26
PA_27	29	79	PB_27
PA_28	30	80	PB_28
PA_29	31	81	PB_29
PA_30	32	82	PB_30
PA_31	33	83	PB_31
PC_00	34	84	PC_16
PC_01	35	85	PC_17
PC_02	36	86	PC_18
PC_03	37	87	PC_19
PC_04	38	88	PC_20
PC_05	39	89	PC_21
PC_06	40	90	PC_22
PC_07	41	91	PC_23
PC_08	42	92	PC_24
PC_09	43	93	PC_25
PC_10	44	94	PC_26
PC_11	45	95	PC_27
PC_12	46	96	PC_28
PC_13	47	97	PC_29
PC_14	48	98	PC_30
PC_15	49	99	PC_31
VCC	50	100	VCC

CON1

CON1: 100-pin SCSI II Connector (PA, PB and PC Ports).

Pin Assignment	Terminal No.		Pin Assignment
PD_16	01	02	PD_24
PD_17	03	04	PD_25
PD_18	05	06	PD_26
PD_19	07	08	PD_27
PD_20	09	10	PD_28
PD_21	10	12	PD_29
PD_22	12	14	PD_30
PD_23	14	16	PD_31
GND	16	18	GND
VCC	18	20	--

CN2 (PCI-D128SU only)

Pin Assignment	Terminal No.		Pin Assignment
PD_00	01	02	PD_08
PD_01	03	04	PD_09
PD_02	05	06	PD_10
PD_03	07	08	PD_11
PD_04	09	10	PD_12
PD_05	11	12	PD_13
PD_06	13	14	PD_14
PD_07	15	16	PD_15
GND	17	18	GND
VCC	19	20	--

CN1 (PCI-D128SU only)

CN1/CN2: 20-pin flat-cable Connector for PCI-D128SU only (PD Port).

2.7 Pattern Match Function

The PCI-D96SU supports the pattern match function for Port0 (PA), Port1 (PB) and Port2 (PC) of Digital Input, while the PCI-D128SU supports the pattern match function for Port0 (PA), Port1 (PB), Port2 (PC) and Port3 (PD) of Digital Input. It monitors the status of the enabled input channels, which are chosen in Bar0+0x030, and compares the received state values with the compare values written in Bar0+0x020/0x24/0x28/0x2C. When the actual state values match the compare values, the PCI-D96SU/D128SU will deliver a trigger (interrupt) signal to the system. This function releases the CPU from the burden of polling all of the I/O points, enabling a computer to handle more I/O points with higher performance.

The following is an example:
Assume that the pattern match function for the DI Port0 (PA) of the PCI-D128SU is enabled (i.e. the DI Port1 (PB), Port2 (PC) and Port3 (PD) on the PCI-D128SU are ignored during the patter match monitoring process). The user can set the compare values for the enabled input channels, and these will be compared to the actual channel states of the enabled channels.

2.8 Change of State Function

The PCI-D96SU/D128SU supports the change of state function for Port0 (PA) and Port1 (PB) of Digital Input. It monitors the status of the enabled input channels, which are chosen in Bar0+0x030. When one of the enabled DI channels changes its state, the PCI-D96SU/D128SU delivers a trigger (interrupt) signal to the system to handle this event.

The following is an example:
Assume that the change of state function for the DI channels Port1 (PB) on the PCI-D128SU is enabled (i.e. the signals in Port0 (PA) on the PCI-D128SU is ignored during the change of state process). When a change of state occurs in the Port1 (PB), an interrupt signal will be delivered to the system.

2.9 Digital Pattern Function

The PCI-D96SU/D128SU supports the digital pattern function for Port2 (PC) of Digital Output. When the PC port is set to output mode and enabled pattern output, which is chosen in Bar0+0x05C. The digital pattern can be continuously generated on a PC port using a user-defined pattern data (Refer to Bar1+0x000 to 0x01FF), pattern number (Bar0+0x058) and pattern base clock (Refer to Bar0+0x054).

The following is a sample of the source code:

```
dwDataCount   = 512

//Write DO Pattern data
for(dwIndex = 0; dwIndex< dwDataCount ; dwIndex++)
{
    mem4g_write_dword((DWORD)(Bar1Address+dwIndex*4),dwDOVal[dwIndex]);
}

//Check DO Pattern data
for(dwIndex = 0; dwIndex< dwDataCount ; dwIndex++)
{
    dwVal = mem4g_read_dword((DWORD)( Bar1Address+dwIndex*4));
    if(dwVal!=dwDOVal[dwIndex]) return PD128_SetPatternErr;
}

//Set Port2 (PC) to Output Mode
mem4g_write_dword((DWORD)(Bar0Address+0x10),0xF);

//1000000/fSamplingRate us
//Set pattern base clock 1 us * (N+2)
mem4g_write_dword((DWORD)(Bar0Address+0x54),(DWORD)(1000000.0/fSamplingRate)-2);

//Set pattern number
mem4g_write_dword((DWORD)( Bar0Address+0x58),dwDataCount-1);

//Pattern Start
mem4g_write_dword((DWORD)(Bar0Address+0x5C),0x1);
```

3. Hardware Installation

Note:

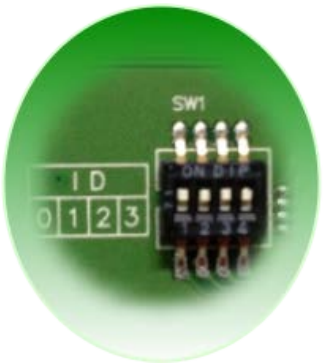
It is recommended that the driver is installed before installing the hardware as the computer may need to be restarted once the driver is installed in certain operating systems, such as Windows 2000 or Windows XP, etc. Installing the driver first helps reduce the time required for installation and restarting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

To install your PCI-D96SU/D128SU card, follow the procedure described below:

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

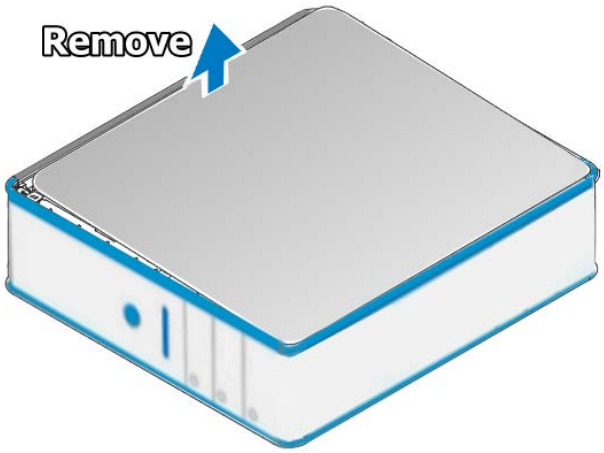
For detailed information about the driver installation, please refer to Chapter 4 "Software Installation".

Step 2: Configure the Card ID using the DIP Switch (SW1) on PCI-D96SU/D128SU.



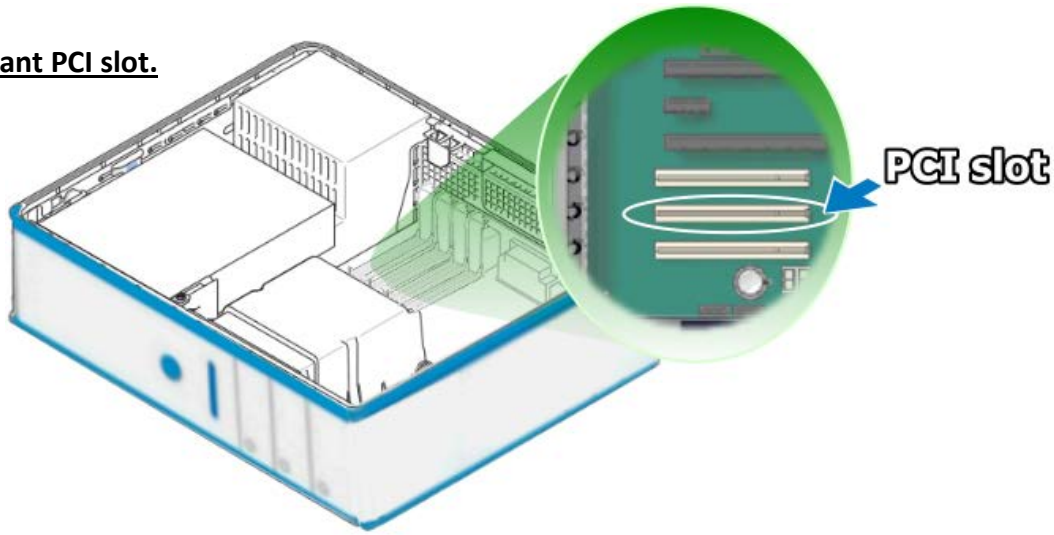
For detailed information about the card ID (SW1), please refer to Section 2.5 "Card ID Switch".

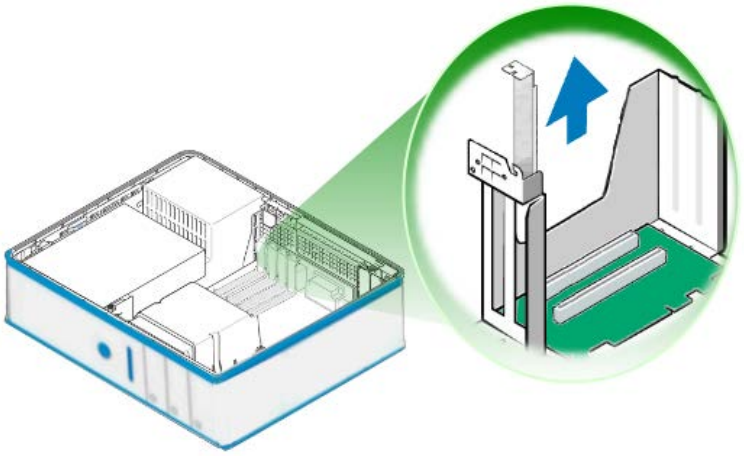
Step 3: **Shut down and switch off the power to the computer, and then disconnect the power supply.**



Step 4: **Remove the cover from the computer.**

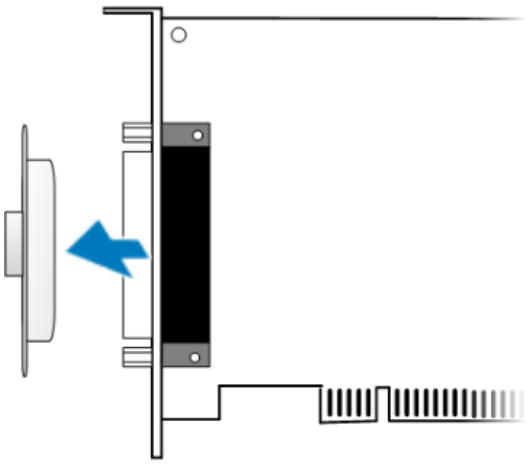
Step 5: **Select a vacant PCI slot.**



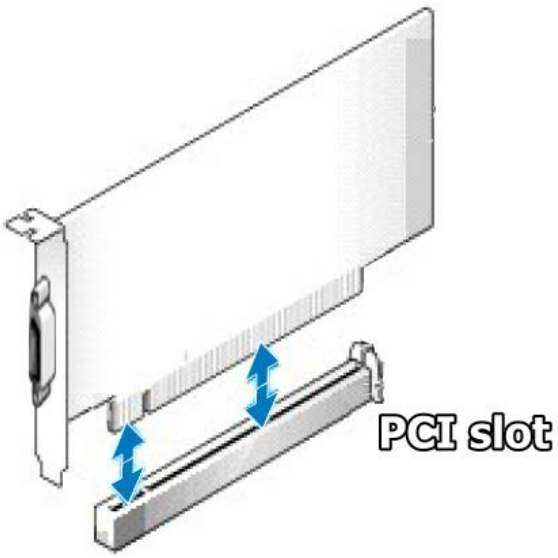


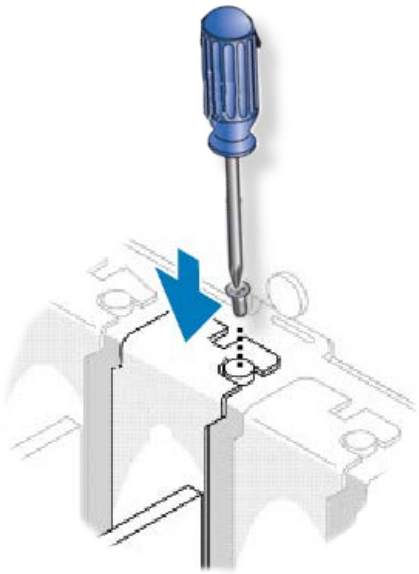
Step 6: **Unscrew and remove the PCI slot cover from the computer case.**

Step 7: **Remove the connector cover from your board.**

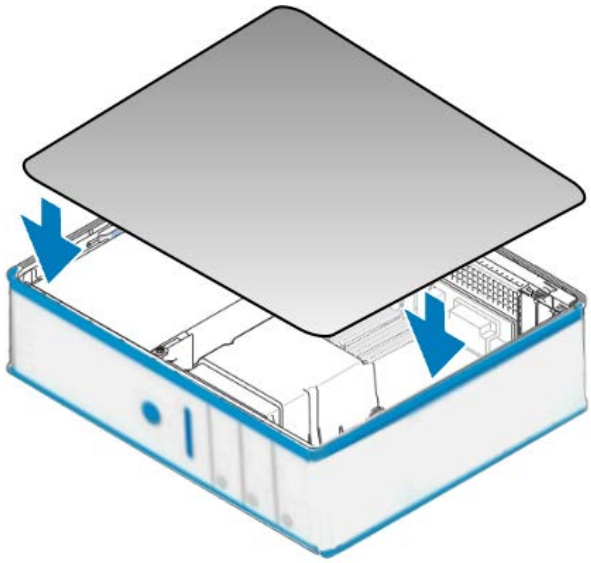


Step 8: **Carefully insert your board into the PCI slot by gently pushing down on both sides of the board until it slides into the PCI connector.**





Step 9: **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 6.**



Step 10: **Replace the covers on the computer.**

Step 11: **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 PCI-D96SU/D128SU driver and how to verify whether the PCI-D96SU/D128SU was properly installed. PCI-D96SU/D128SU card can be used on DOS and 32/64-bit XP/2003/2008/7/8/10 based systems, and the drivers are fully Plug and Play (PnP) compliant for easy installation.

4.1 Obtaining/Installing the Driver Installer Package

The driver installation package for PCI-D96SU/D128SU card can be found 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**

OS	32/64-bit Windows XP, 32/64-bit Windows 2003, 32/64-bit Windows Vista, 32/64-bit Windows 7, 32/64-bit Windows 2008, 32/64-bit Windows 8, 32/64-bit Windows 10
Driver Name	UniDAQ Driver/SDK (unidaq_win_setup_xxxx.exe)
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 downloaded from: http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/unidaq/manual/

4.2 PnP Driver Installation

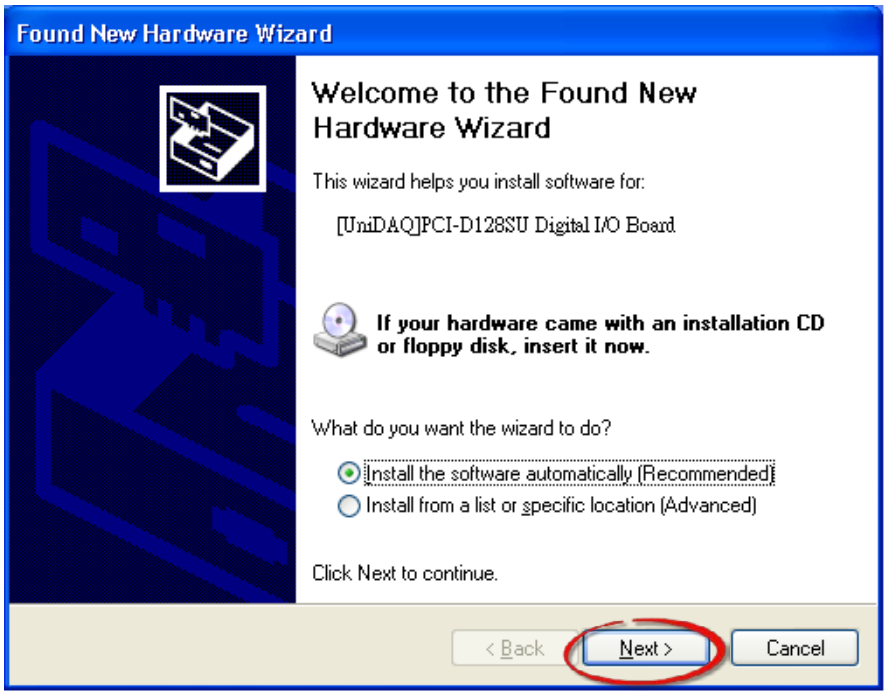
Step 1: Correctly shut down and power off your computer and disconnect the power supply, and then install your board into the computer. For detailed information about the hardware installation of PCI-D96SU/D128SU card, refer to Chapter 3 "Hardware Installation".

Step 2: Power on the computer and complete the Plug and Play installation**.**

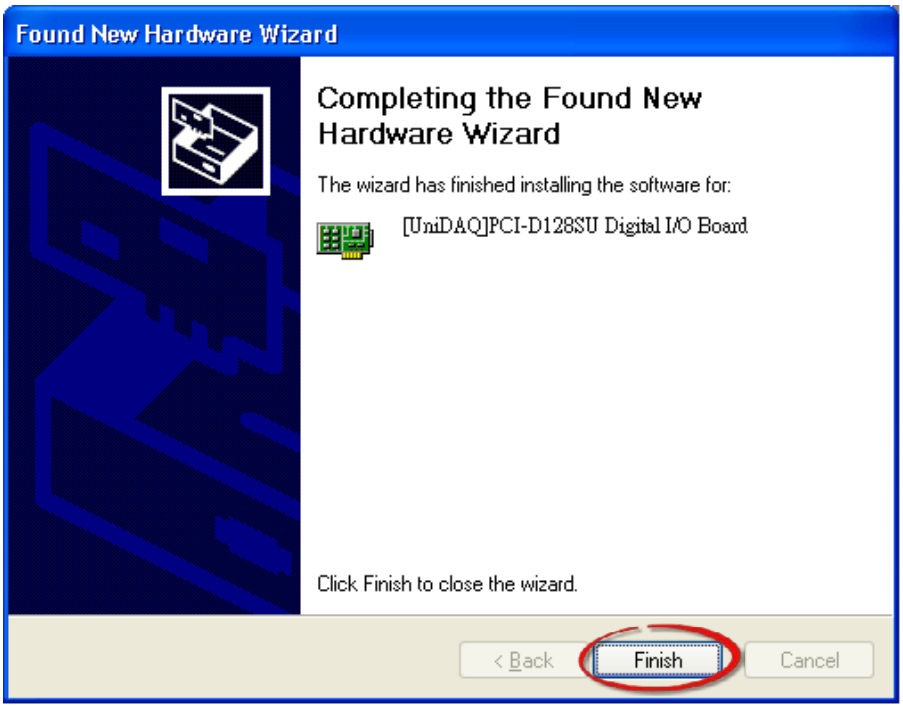
Note:

Recent operating systems, such as Windows 7/8/10 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

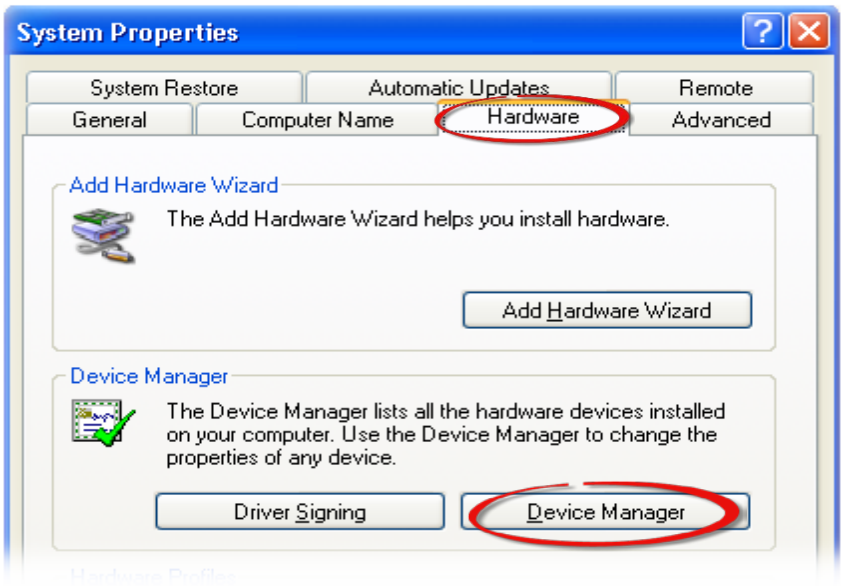
To verify that the driver was correctly installed, use the Windows **Device Manager** to view and update the device drivers installed on the computer, and to ensure that the hardware is operating correctly. The following is a description of how access the Device Manager in each of the major versions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

4.3.1 Accessing Windows Device Manager

- **Windows 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.

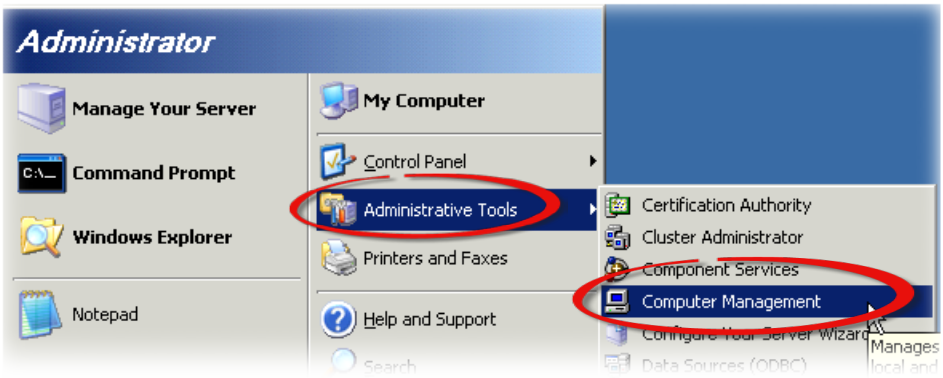
Step 2: Click the "**Hardware**" tab and then click the "**Device Manager**" button.



➢ 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 7/10

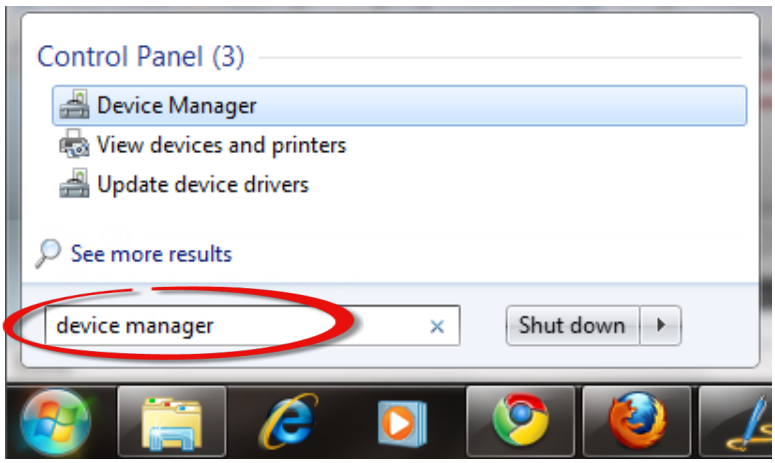
Step 1: Click the **"Start"** button, and then click **"Control Panel"**.

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:

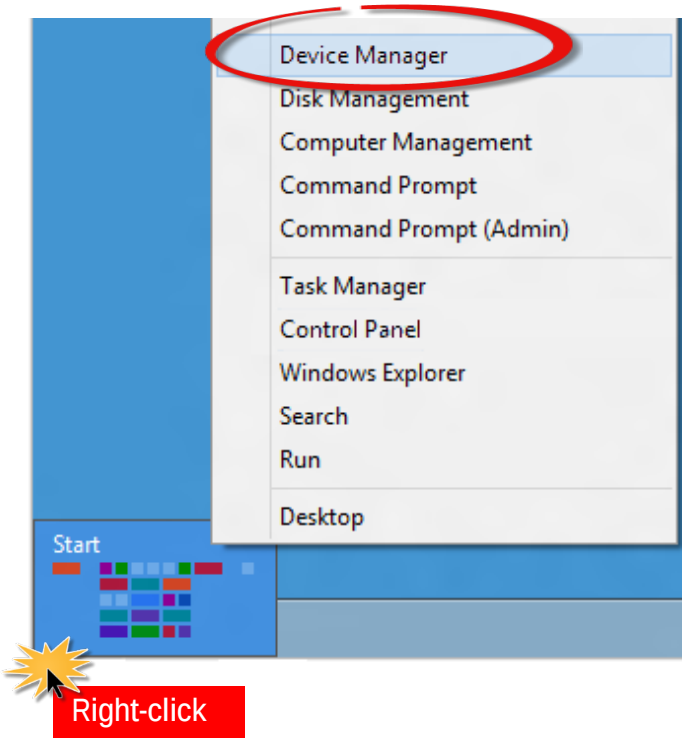
Administrator privileges are required for this operation. If you are prompted for an administrator password or confirmation, enter the password or provide confirmation by clicking the "Yes" button in the User Account Control message.

➢ 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.

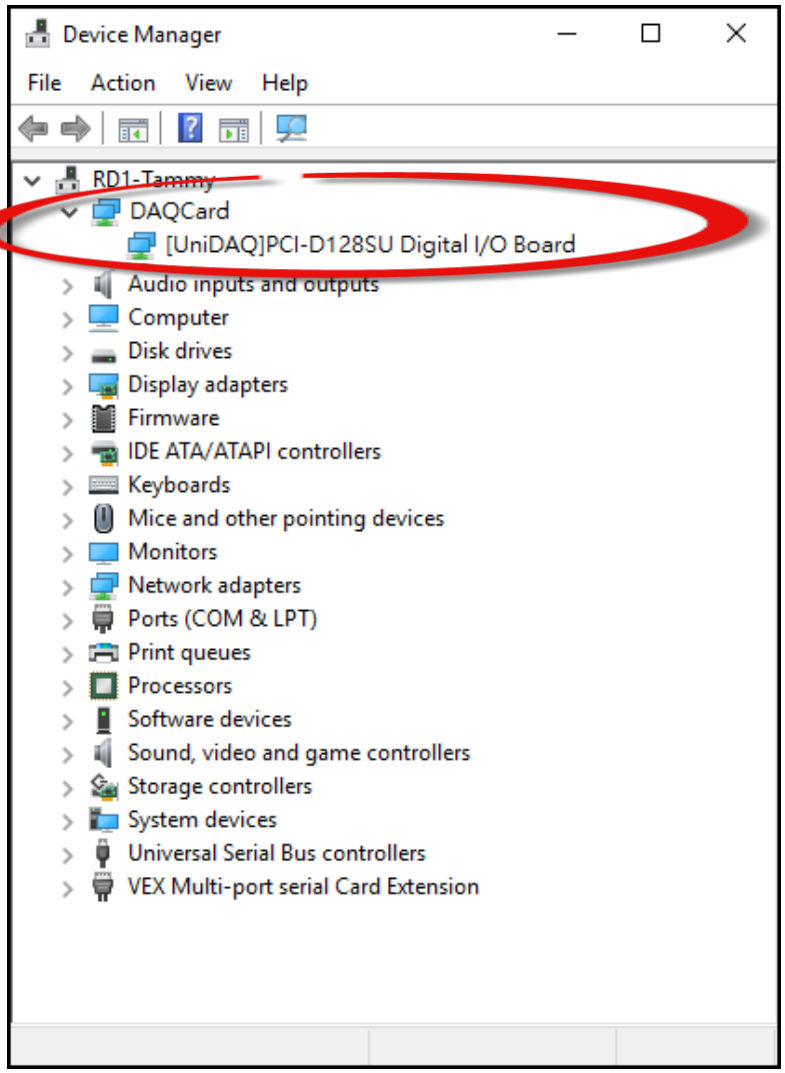
Step 2: **Right-click** the Start screen icon and then click "**Device Manager"**.

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



4.3.2 Check that the Installation

Check that the PCI-D96SU/D128SU card is correctly listed in the **Device Manager** window, as illustrated below.



5. Board Testing

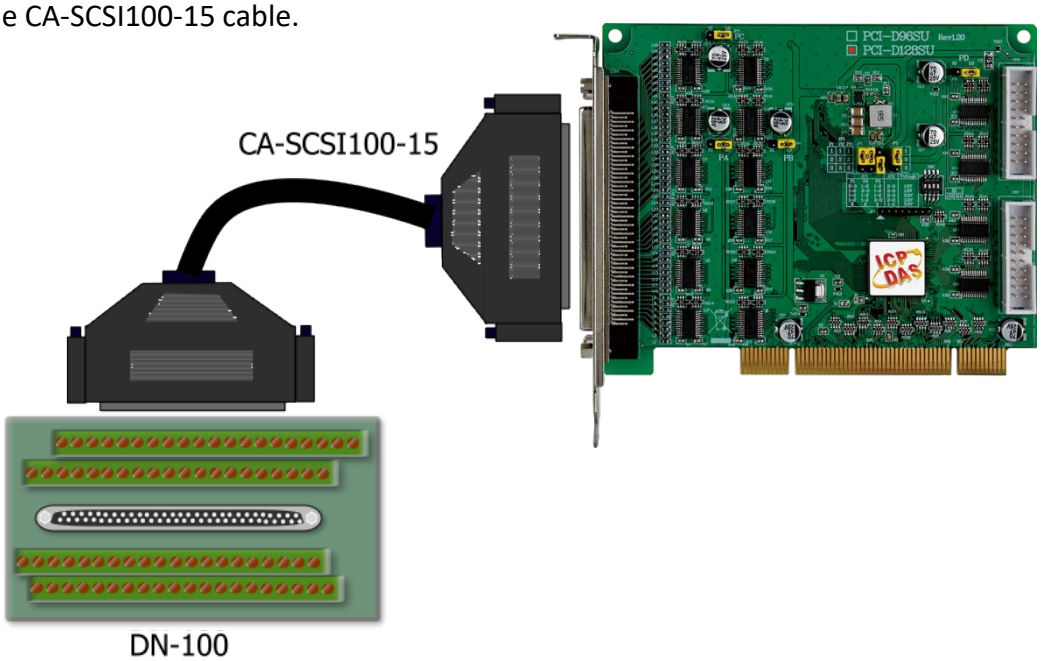
This chapter provides detailed information about the **"Self-Test"** process, which is used to confirm that the PCI-D96SU/D128SU card is operating correctly. Before beginning the **"Self-Test"** process, ensure that both the hardware and driver installation procedures are fully completed. For detailed information about the hardware and driver installation, refer to Chapter 3 "Hardware Installation" and Chapter 4 "Software Installation".

5.1 Self-Test Wiring

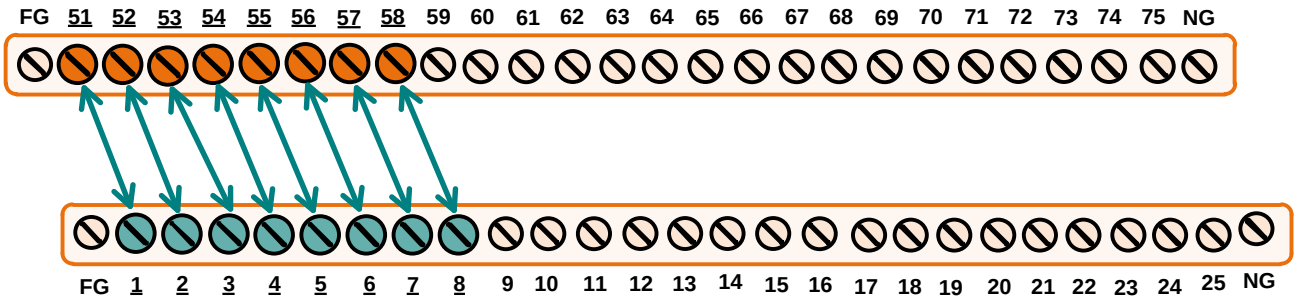
Before beginning the **"Self-Test"** procedure, ensure that the following items are available:
☑ A CA-SCSI100-15 Cable
(Optional, Website: http://www.icpdas.com/products/Accessories/cable/cable_selection.htm)

☑ A DN-100 Terminal Board
(Optional, Website:
http://www.icpdas.com/root/product/solutions/pc_based_io_board/daughter_boards/dn-100.html)

Step 1: Connect the DN-100 terminal board to the CON1 connector on PCI-D96SU/D128SU card using the CA-SCSI100-15 cable.



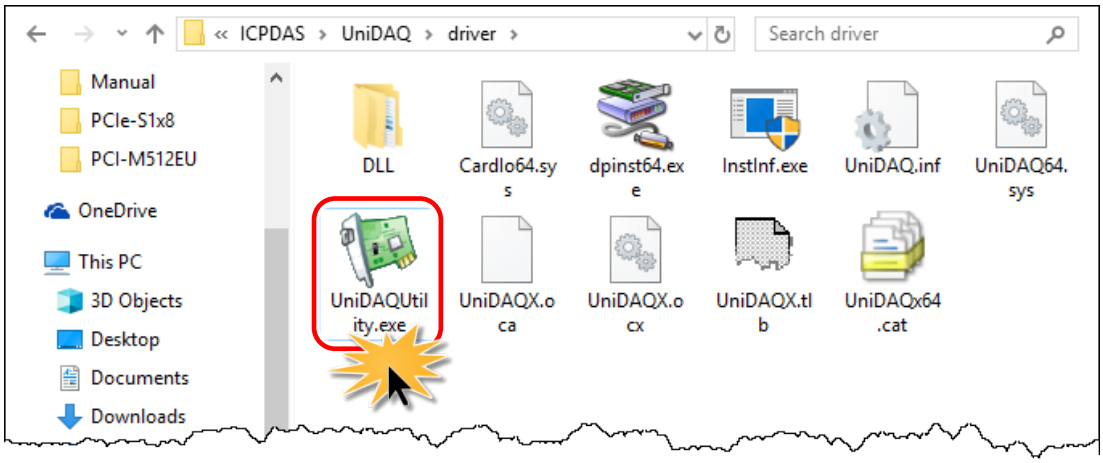
Step 2: Connect the Port0 (PA00~PA07) with Port1 (PB00~PB07).

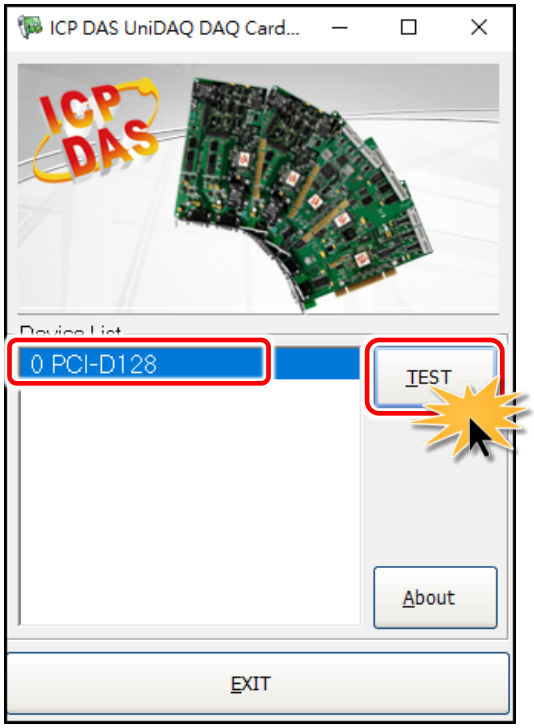


5.2 Launch the Test Program

Step 1: Double-click the **UniDAQ Utility** software.

The UniDAQ Utility will be placed in the **default path "C:\ICPDAS\UniDAQ\Driver"** after completing installation.



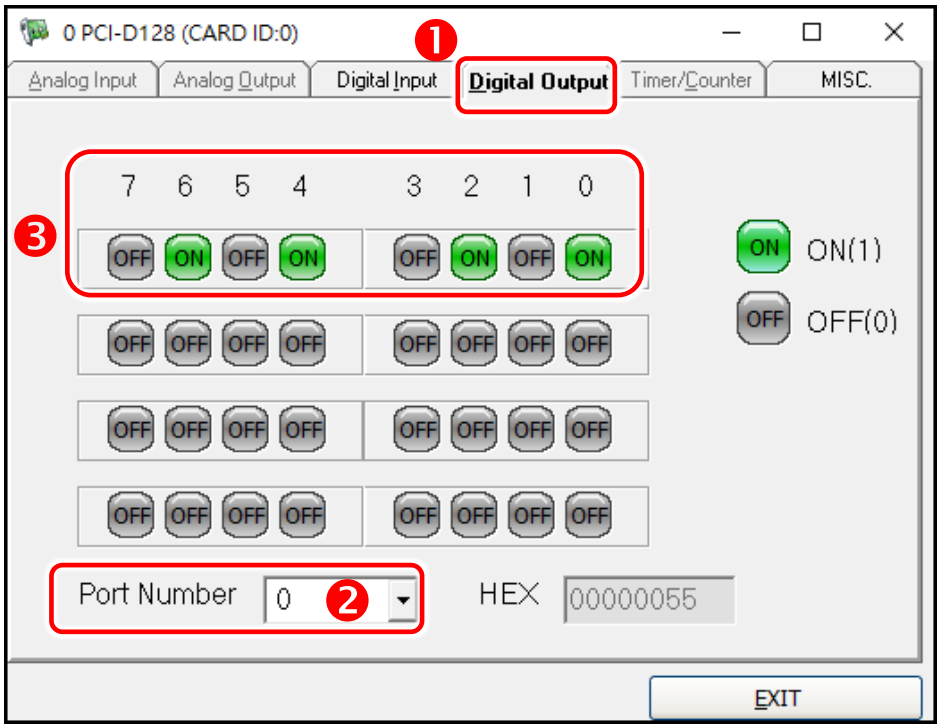


Step 2: Confirm that your board has been successfully installed in the Host system. **Note that the device number starts from 0**.

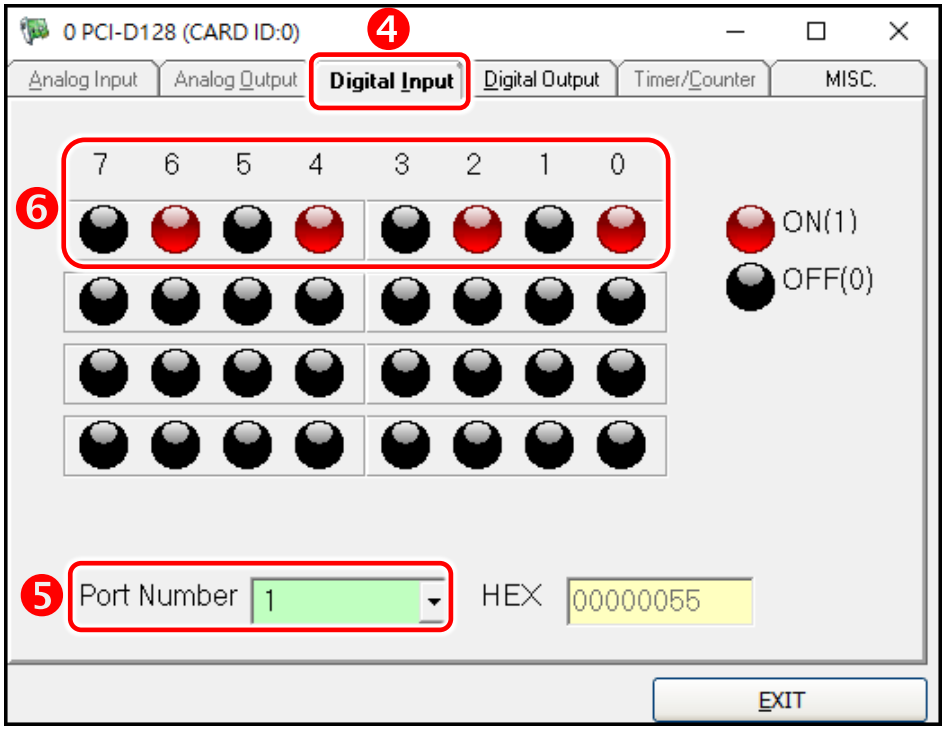
Step 3: Click the **"TEST"** button to start the test.

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

1. Click the **"Digital Output"** tab.
2. Select **"Port 0"** from the **"Port Number"** drop-down menu.
3. Check the checkboxes for **DO channels 0, 2, 4 and 6**.



4. Click the **“Digital Input”** tab.
5. Select **“Port 1”** from the **“Port Number”** drop-down menu.
6. The DI indicators will turn **red** when the corresponding **DO channels 0, 2, 4 and 6 are ON**.



6. I/O Register Addresses

The PCI-D96SU/D128SU cards are I/O mapped devices that are easily configured from any language. The following is a summary of the address registry that can be used with the PCI-D96SU/D128SU.

6.1 Hardware ID

During the power-on stage, the Plug and Play BIOS will assign an appropriate I/O address to each PCI-D96SU/D128SU card installed in the system. Each board includes four fixed ID numbers that are used to identify the board, and are indicated below table 6-1:

Table 6-1: Hardware ID

Model	PCI-D96SU	PCI-D128SU
Vendor ID (HEX)	0xE159	0xE159
Device ID (HEX)	0x0003	0x0003
Sub-Vendor ID (HEX)	0x3577	0x3577
Sub-Device ID (HEX)	0xD096	0xD128

6.2 I/O Address Mapping

An overview of the registers for the PCI-D96SU/D128SU series card is given below. The address of each register can be determined by simply adding the offset value to the base address of the corresponding BAR number. More detailed descriptions of each register can be found in the below tables 6-2 and 6-3.

Table 6-2: Index of BAR Address Space

Bar No.	Mapping	Size
0	M/M Mapped Registers	32 x 1024 (0x000 ~ 0x7FFF)

Table 6-3: Address Mapping

Bar No.	Offset (HEX)	Register Function Description	
		Read	Write
0	0x000	PA In/Out direction	PA In/Out direction
	0x004	PA In/Out Status read back	PA In/Out Status read back
	0x008	PB In/Out direction	PB In/Out direction
	0x00C	PB In/Out Status read back	PB In/Out Status read back
	0x010	PC In/Out direction	PC In/Out direction
	0x014	PC In/Out Status read back	PC In/Out Status read back
	0x018 (PCI-D128SU Only)	PD In/Out direction	PD In/Out direction
	0x01C (PCI-D128SU Only)	PD In/Out Status read back	PD In/Out Status read back
	0x020	Read back PA Compare Value	Setting PA Compare Value and Clear PA Compare Interrupt
	0x024	Read back PB Compare Value	Setting PB Compare Value and Clear PB Compare Interrupt
	0x028	Read back PC Compare Value	Setting PC Compare Value and Clear PC Compare Interrupt
	0x02C (PCI-D128SU Only)	Read back PD Compare Value	Setting PD Compare Value and Clear PD Compare Interrupt
	0x030	Compare Value and Change Status interrupt function Enable/Disable status and Interrupt Status flag	Enable/Disable Compare Value or Change Status interrupt function Note that the Compare Value and Change Status interrupt function can only one enable.
	0x034	-	Clear change Status
	0x03C	-	Clear change Status
	0x054	-	PC Pattern CLK Setting (BaseCLK 1MHz)
	0x058	PC Pattern Number Read back	PC Pattern Number Setting Max. value (n+1) : 511
	0x05C	PC Pattern Enable Read back	Enable PC Pattern Out Function
	0x060	Read Card ID (SW)	-
1	0x000 | 0x01FF	PC Patten Read back	PC Patten Setting

6.3 BAR 0

6.3.1 I/O Selection Control Register

(Read/Write): 0x000/0x008/0x010/0x018 **PA/PB/PC/PD Port I/O Selection Control**

Bit	Function	Read	Write
0	Bit 7-0	Read back the current port's direction control	Set the port's direction control 1: this port is used as a Digital Output port 0: this port is used as a Digital Input port
1	Bit 15-8		
2	Bit 23-16		
3	Bit 31-24		
4:31	Reserved		

These registers provide the function for configuration Digital Input or Output Port of the PCI-D96SU/D128SU card. Every ports uses 8-bit as a group that can be programmed to be a DI or a DO Port. Note that all ports are used as DI ports when the PC is first turned on.

6.3.2 I/O Status Register

(Read/Write): 0x004/0x00C/0x014/0x01C **PA/PB/PC/PD Port I/O Status**

Bit	Function	Port Type	Read	Write
0:31	Data	DI	Read the Input value	-
		DO	Read back Output value	Output data value

There are three/four 32-bit I/O ports in the PCI-D96SU/D128SU card. Every I/O port can be configured as DI or DO Port. User can send/receive digital data to/from this register for Digital Input or Output. Note that all ports are used as DI port when the PC is first turned on.

Note: Make sure the I/O port is configured first before using this register, refer to Section 6.3.1 "I/O Selection Control Register" for more details.

6.3.3 Compare Value Setting Register

(Read/Write): 0x020/0x024/0x028/0x02C **PA/PB/PC/PD Port Compare Value Setting**

Bit	Function	Port Type	Read	Write
0:31	Compare Value	DI	Read back the current port's compare value	Set the compare value and Clear port's Interrupt status

6.3.4 Pattern Match/Change Status Control Register

(Read/Write): 0x030 **PA/PB/PC/PD Port Pattern Match/Change of Status function Control**

Bit	Function	Port Type	Read	Write
0	PA_C	DI	Read back the enable/disable status of PA Port's Pattern Match function	Settings enable/disable the Pattern Match function of PA Port. 1: Enable, 0: Disable
1	PB_C		Read back the enable/disable status of PB Port's Pattern Match function	Settings enable/disable the Pattern Match function of PB Port. 1: Enable, 0: Disable
2	PC_C		Read back the enable/disable status of PC Port's Pattern Match function	Settings enable/disable the Pattern Match function of PC Port. 1: Enable, 0: Disable
3	PD_C		Read back the enable/disable status of PD Port's Pattern Match function	Settings enable/disable the Pattern Match function of PD Port. 1: Enable, 0: Disable
4	PA_S		Read back the enable/disable status of PA Port's Change of State function	Settings enable/disable the Change of State function of PA Port. 1: Enable, 0: Disable
5	PB_S		Read back the enable/disable status of PB Port's Change of State function	Settings enable/disable the Change of State function of PB Port. 1: Enable, 0: Disable
6:7	-	-	-	-
8	PA_C_F	DI	Read the PA Port's Pattern Match active status. 1: Active, 0: Non Active	-

Bit	Function	Port Type	Read	Write
9	PB_C_F	DI	Read the PB Port's Pattern Match active status. 1: Active, 0: Non Active	-
10	PC_C_F		Read the PC Port's Pattern Match active status. 1: Active, 0: Non Active	-
11	PD_C_F		Read the PD Port's Pattern Match active status. 1: Active, 0: Non Active	-
12	PA_S_F		Read the PA Port's Change of State active status. 1: Active, 0: Non Active	-
13	PB_S_F		Read the PB Port's Change of State active status. 1: Active, 0: Non Active	-
14:15	-	-	-	-
16	PA_C_Isr	DI	-	Set the Interrupt function of PA Port's Pattern Match. 1: with Interrupt, 0: No Interrupt
17	PB_C_Isr		-	Set the Interrupt function of PB Port's Pattern Match. 1: with Interrupt, 0: No Interrupt
18	PC_C_Isr		-	Set the Interrupt function of PC Port's Pattern Match. 1: with Interrupt, 0: No Interrupt
19	PD_C_Isr		-	Set the Interrupt function of PD Port's Pattern Match. 1: with Interrupt, 0: No Interrupt
20	PA_S_Isr		-	Set the Interrupt function of PA Port's Change of State. 1: with Interrupt, 0: No Interrupt
21	PB_S_Isr			Set the Interrupt function of PB Port's Change of State. 1: with Interrupt, 0: No Interrupt
22:23	-	-	-	-
24:31	Reserved			

6.3.5 Clear Change of Status Register

(Read/Write): 0x034/0x03C **PA/PB Port Clear Change of Status**

Bit	Function	Port Type	Read	Write
0	Clear	DI	-	Clear Change of Status
1:31	Reserved			

6.3.6 Pattern Clock Register

(Read/Write): 0x054 **PC Port's Pattern CLK**

Bit	Function	Port Type	Read	Write
0	PC_CLK	DO	-	Set the Pattern clock (CLK) of PC Port. Valid value = (1 MHz/CLK) - 2 Base Clock (CLK) = 1 MHz Max. Value: 500 KHz
1:31	Reserved			

6.3.7 Pattern Number Register

(Read/Write): 0x058 **Start/Stop PC Port's Pattern Number**

Bit	Function	Port Type	Read	Write
0	PC_N	DO	Read back the Pattern number of PC Port	Set the number of SRAM scan on the PC Port. Valid value = n-1. If you want to scan 10 pens should be set n to 11. Max. Value (n+1): 511
1:31	Reserved			

6.3.8 Start Pattern Output Register

(Read/Write): 0x05C **Start PC Port's Pattern Output**

Bit	Function	Port Type	Read	Write
0	PC_START	DO	Read back the start/stop status of PC Port's Digital Pattern	Settings start/stop the Digital Pattern of PC Port. 1: Start Pattern Output, 0: Stop Pattern Output
1:31	Reserved			

6.3.9 Card ID Register

(Read): 0x060 **Card ID (Switch)**

Bit	Function	Read	Write
0	SW0	Read Card ID (SW)	-
1	SW1		-
2	SW2		-
3	SW3		-
4:31	Reserved		

6.4 BAR 1

6.4.1 Pattern Data Setting Register

(Read/Write): 0x000 to 0x01FF **PC Port's Pattern Data Setting**

Bit	Function	Port Type	Read	Write
0	Data	DO	Read back the PC Port's Digital Pattern Data	Set the PC Port's Digital Pattern Data
1:31	Reserved			

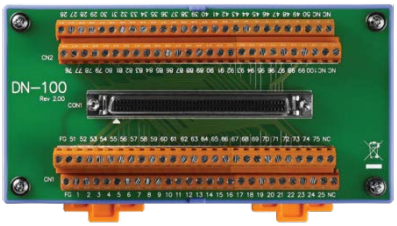
7. Windows API Function

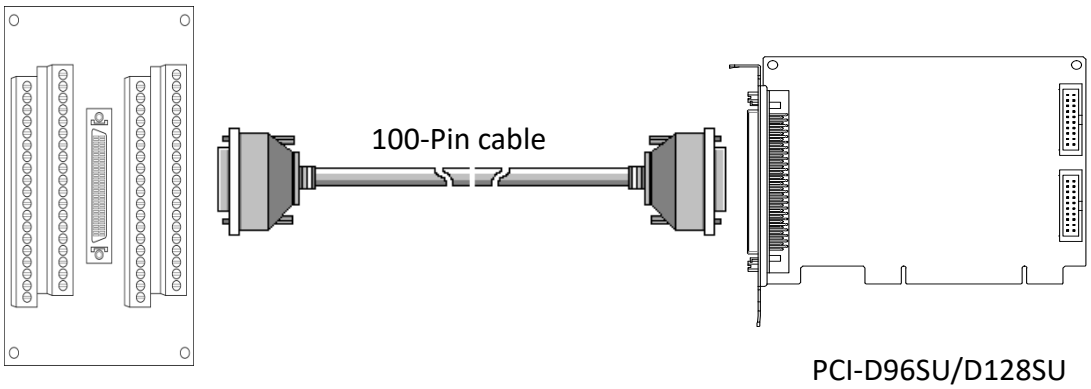
For more details regarding the Windows API Functions for the PCI-D96SU/D128SU card, refer to UniDAQ SDK User manual, which can be downloaded from:
http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/pci/unidaq/manual/

8. Daughter Boards

DN-100

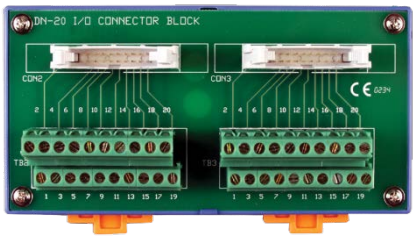
The DN-100 is a general-purpose DIN-Rail mountable daughter board containing female 100 pin D-sub I/O Connectors and is designed to allow easy field wiring connections. Pins 01 to 100 on the DN-100 daughter board are connected to the CON1 connector on the PCI-D96SU/D128SU using a 100-pin male-male cable.



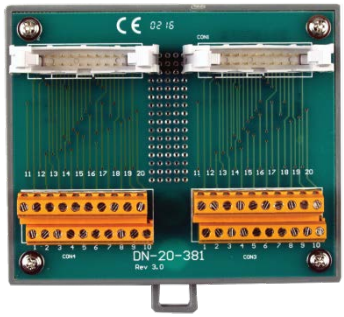


DN-20/DN-20-381

The DN-20/20-381 is a general-purpose DIN-Rail mountable daughter board containing 20-pin header I/O Connectors and is designed to allow easy field wiring connections. Pins 01 to 20 on the DN-20 daughter board are connected to the CN1/CN2 connector on the PCI-D128SU using a 20-pin flat cable.



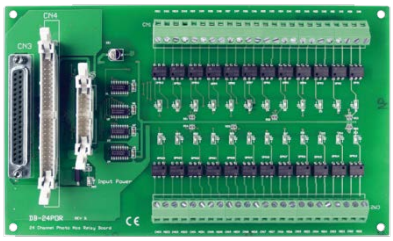
DN-20



DN-20-381

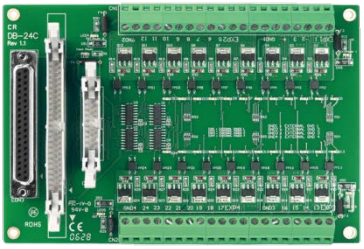
DB-24POR

The DB-24POR includes 24 normally open, form A, Photo-MOS relays. The board interface to field logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The user can use the DB-24POR to switch load, up to 350 V_{AC} and up to 130 mA. The DB-24POR has one 37-pin D-sub connector, one 50-pin OPTO-22 compatible male header and one 20-pin male header.



The relay is energized by applying a 5 voltage signal to the appropriate relay channel on the n the 50-pin header or 20-pin header or 37-pin D-sub connector. Twenty-four indicators LEDs, one for each relay, light when their associated relay is activated. The DB-24POR daughter board is connected to the CN1/CN2 connector on the D128SU using a 20-pin flat cable.

DB-24C



The DB-24C has 24 channels of optically isolated digital outputs, arranged into four isolated banks. Each digital output offers a Darlington transistor and integral suppression diode for inductive load. The board interface to field logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The DB-24C has one 37-pin D-sub connector, one 50-pin OPTO-22 compatible male header and one 20-pin male header.

The transistor is energized by applying a 5-voltage signal to the appropriate input channels on the 50-pin header or 20-pin header or 37-pin D-sub connector. Twenty-four enunciator LEDs, one for each transistor, light when their associated transistor is activated. The DB-24C daughter board is connected to the CN1/CN2 connector on the D128SU using a 20-pin flat cable.