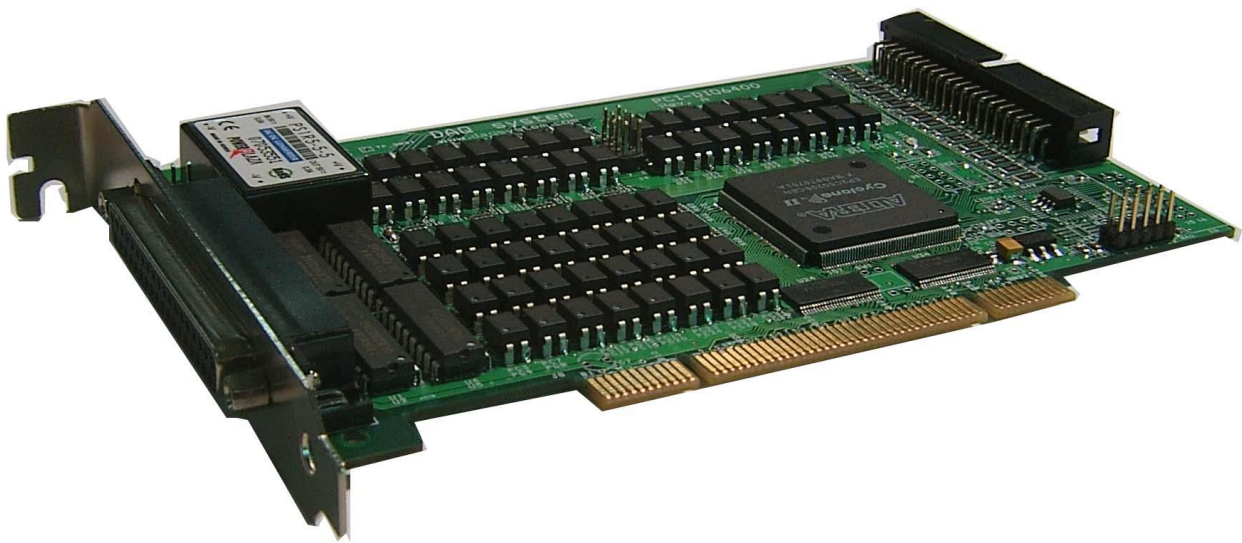


PCI-DIO6400

User's Manual



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Contents

- 1. PCI-DIO6400 Block Diagram**
- 2. Connector Pin Map**
- 3. Digital Input Circuit**
- 4. Digital Output Circuit**
- 5. External Connection (INPUT)**
- 6. External Connection (OUTPUT)**
- 7. Board Option Setup**
- 8. Installation**
- 9. Sample Program Explanation**

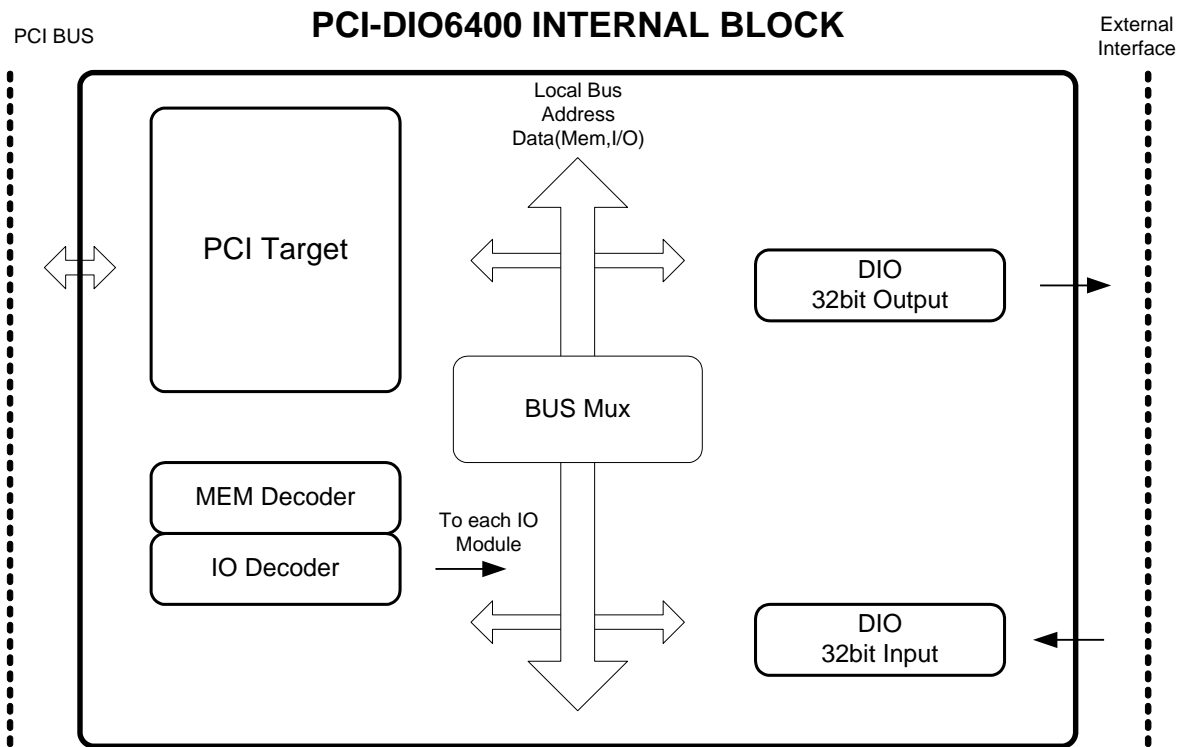
References

UPDATE HISTORY

2011-07-11 (Rev 1.0 → Rev1.1)

- 8. Installation
- 9. Sample Program Explanation

1. PCI-DIO6400 Block Diagram

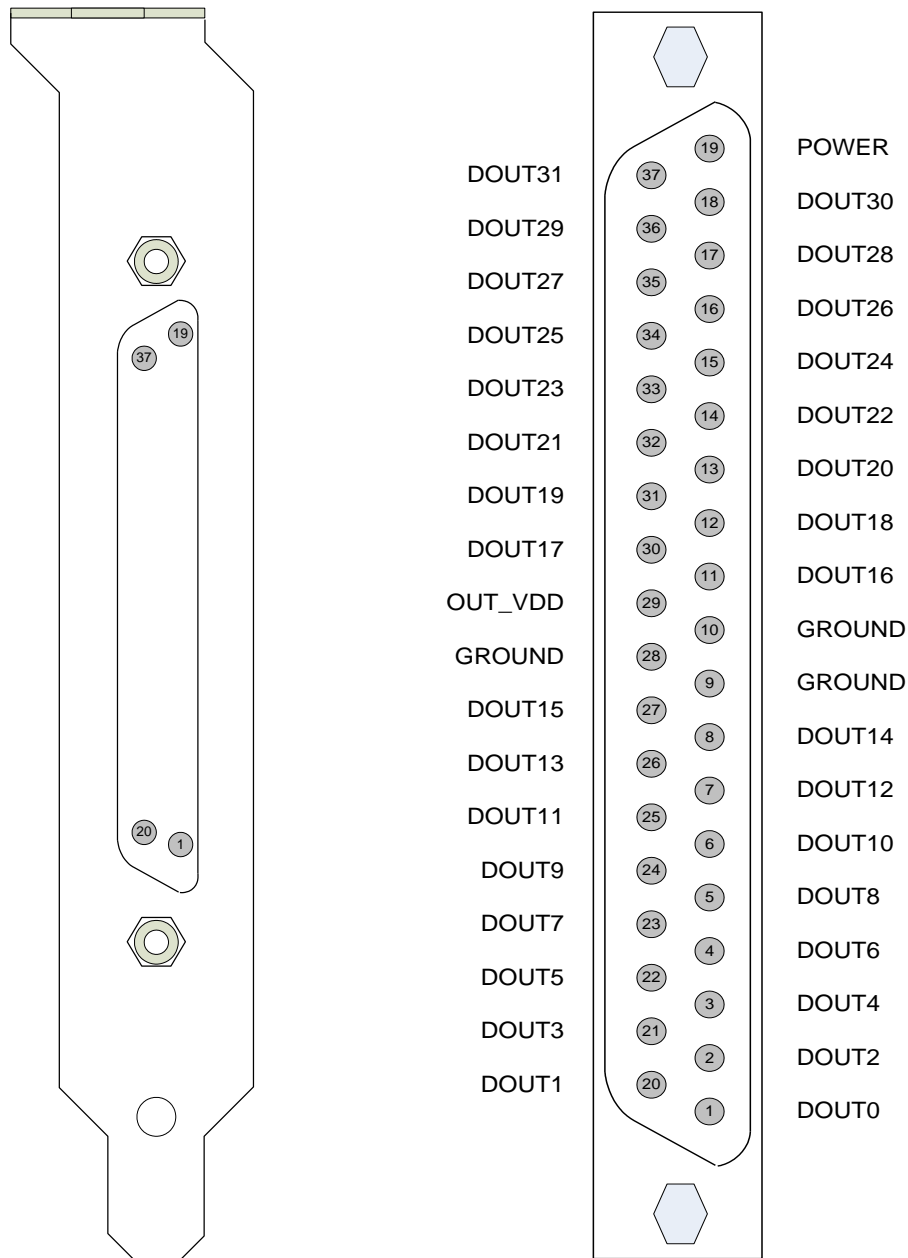


[Figure 1-1. PCI-DIO6400 Internal Block Diagram]

The PCI-DIO6400 is designed for high performance digital logger with PCI Interface. It has a Isolated 32 Digital Input/Output port for external interface like Figure 1-1.

2. Connector Pin Map

The PCI-DIO6400 board is equipped with 37 pin D-SUB connector for external digital output in standard PCI Bracket. Figure 2-1 shows the bracket and connector of the board.



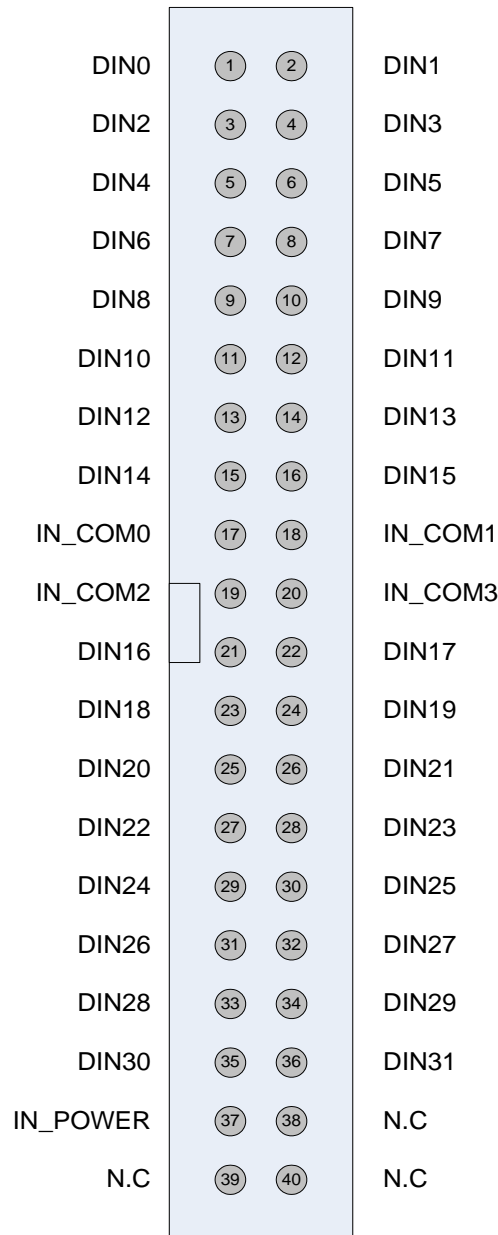
[Figure 2-1. PCI-DIO6400 D-SUB 37 Connector J3 Pin]

[Table 1. PCI-DIO6400 DOUT Connector Pin Description]

Pin#	Pin Name	Description	Remark
1	DOUT0	Isolated Digital Output 0	

2	DOUT2	Isolated Digital Output 2	
3	DOUT4	Isolated Digital Output 4	
4	DOUT6	Isolated Digital Output 6	
5	DOUT8	Isolated Digital Output 8	
6	DOUT10	Isolated Digital Output 10	
7	DOUT12	Isolated Digital Output 12	
8	DOUT14	Isolated Digital Output 14	
9	GROUND	External Ground	
10	GROUND	External Ground	
11	DOUT16	Isolated Digital Output 16	
12	DOUT18	Isolated Digital Output 18	
13	DOUT20	Isolated Digital Output 20	
14	DOUT22	Isolated Digital Output 22	
15	DOUT24	Isolated Digital Output 24	
16	DOUT26	Isolated Digital Output 23	
17	DOUT28	Isolated Digital Output 28	
18	DOUT30	Isolated Digital Output 30	
19	OUT_POWER	Board Power Output	
20	DOUT 1	Isolated Digital Output 1	
21	DOUT 3	Isolated Digital Output 3	
22	DOUT 5	Isolated Digital Output 5	
23	DOUT 7	Isolated Digital Output 7	
24	DOUT 9	Isolated Digital Output 9	
25	DOUT 11	Isolated Digital Output 11	
26	DOUT 13	Isolated Digital Output 13	
27	DOUT 15	Isolated Digital Output 15	
28	GROUND	External Ground	
29	OUT_VDD	Clamp Diode Common Input Pin	Refer Figure 4-1
30	DOUT 17	Isolated Digital Output 17	
31	DOUT 19	Isolated Digital Output 19	
32	DOUT 21	Isolated Digital Output 21	
33	DOUT 23	Isolated Digital Output 23	
34	DOUT 25	Isolated Digital Output 25	
35	DOUT 27	Isolated Digital Output 27	
36	DOUT 29	Isolated Digital Output 29	
37	DOUT 31	Isolated Digital Output 31	

It is used to a header (JP4) of 40 pin (20x2, 2.54mm Pitch) Right-angle for external digital input.



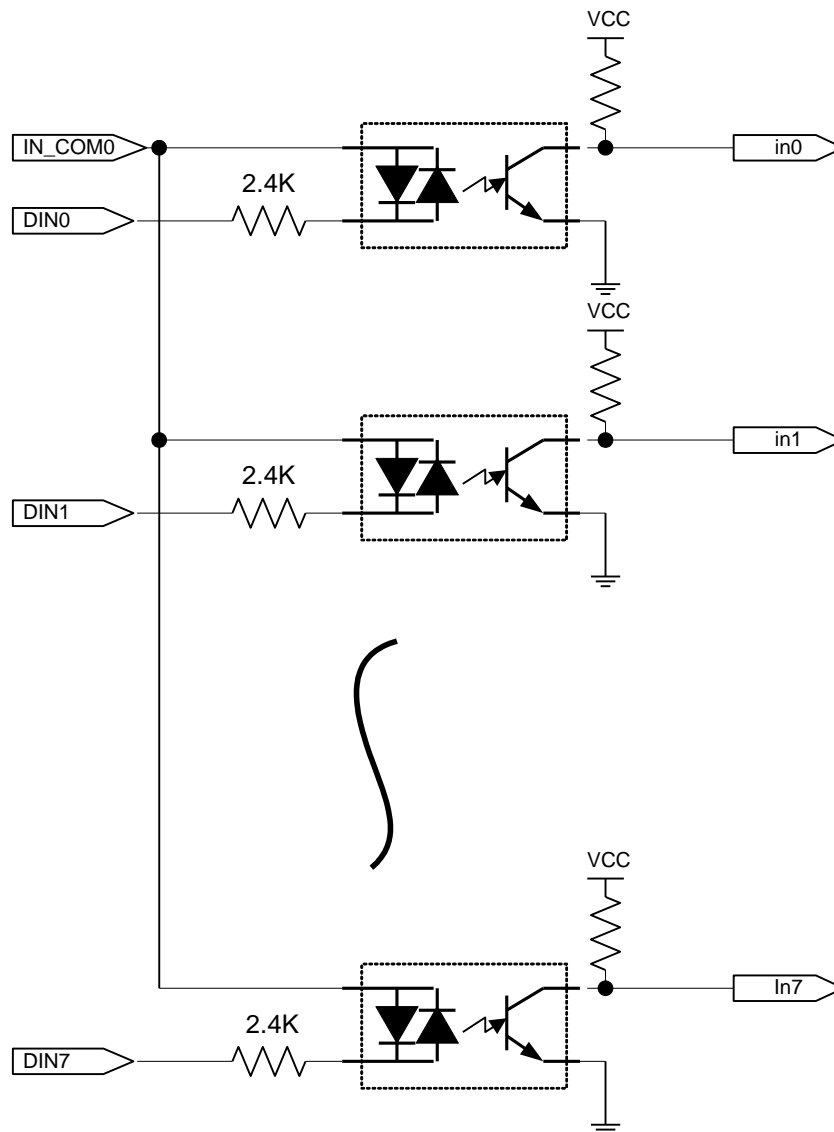
[Figure 2-2. PCI-DIO6400 BOX 40 Pin Connector]

[Table 2. PCI-DIO6400 DIN Connector (HIROSE HIF3F-40PA-2.54DS) Pin Description]

Pin#	Pin Name	Description	Remark
1	DIN0	Isolated Digital Input 0	
2	DIN1	Isolated Digital Input 1	
3	DIN2	Isolated Digital Input 2	
4	DIN3	Isolated Digital Input 3	

5	DIN4	Isolated Digital Input 4	
6	DIN5	Isolated Digital Input 5	
7	DIN6	Isolated Digital Input 6	
8	DIN7	Isolated Digital Input 7	
9	DIN8	Isolated Digital Input 8	
10	DIN9	Isolated Digital Input 9	
11	DIN10	Isolated Digital Input 10	
12	DIN11	Isolated Digital Input 11	
13	DIN12	Isolated Digital Input 12	
14	DIN13	Isolated Digital Input 13	
15	DIN14	Isolated Digital Input 14	
16	DIN15	Isolated Digital Input 15	
17	IN_COM0	Isolated Digital Input common 0	DIN0~7 Common Input
18	IN_COM1	Isolated Digital Input common 1	DIN8~15 Common Input
19	IN_COM2	Isolated Digital Input common 2	DIN16~23 Common Input
20	IN_COM3	Isolated Digital Input common 3	DIN24~31 Common Input
21	DIN16	Isolated Digital Input 16	
22	DIN17	Isolated Digital Input 17	
23	DIN18	Isolated Digital Input 18	
24	DIN19	Isolated Digital Input 19	
25	DIN20	Isolated Digital Input 20	
26	DIN21	Isolated Digital Input 21	
27	DIN22	Isolated Digital Input 22	
28	DIN23	Isolated Digital Input 23	
29	DIN24	Isolated Digital Input 24	
30	DIN25	Isolated Digital Input 25	
31	DIN26	Isolated Digital Input 26	
32	DIN27	Isolated Digital Input 27	
33	DIN28	Isolated Digital Input 28	
34	DIN29	Isolated Digital Input 29	
35	DIN30	Isolated Digital Input 30	
36	DIN31	Isolated Digital Input 31	
37	N.C	NO CONNECTION	
38	N.C	NO CONNECTION	
39	N.C	NO CONNECTION	
40	N.C	NO CONNECTION	

3. Digital Input Circuit



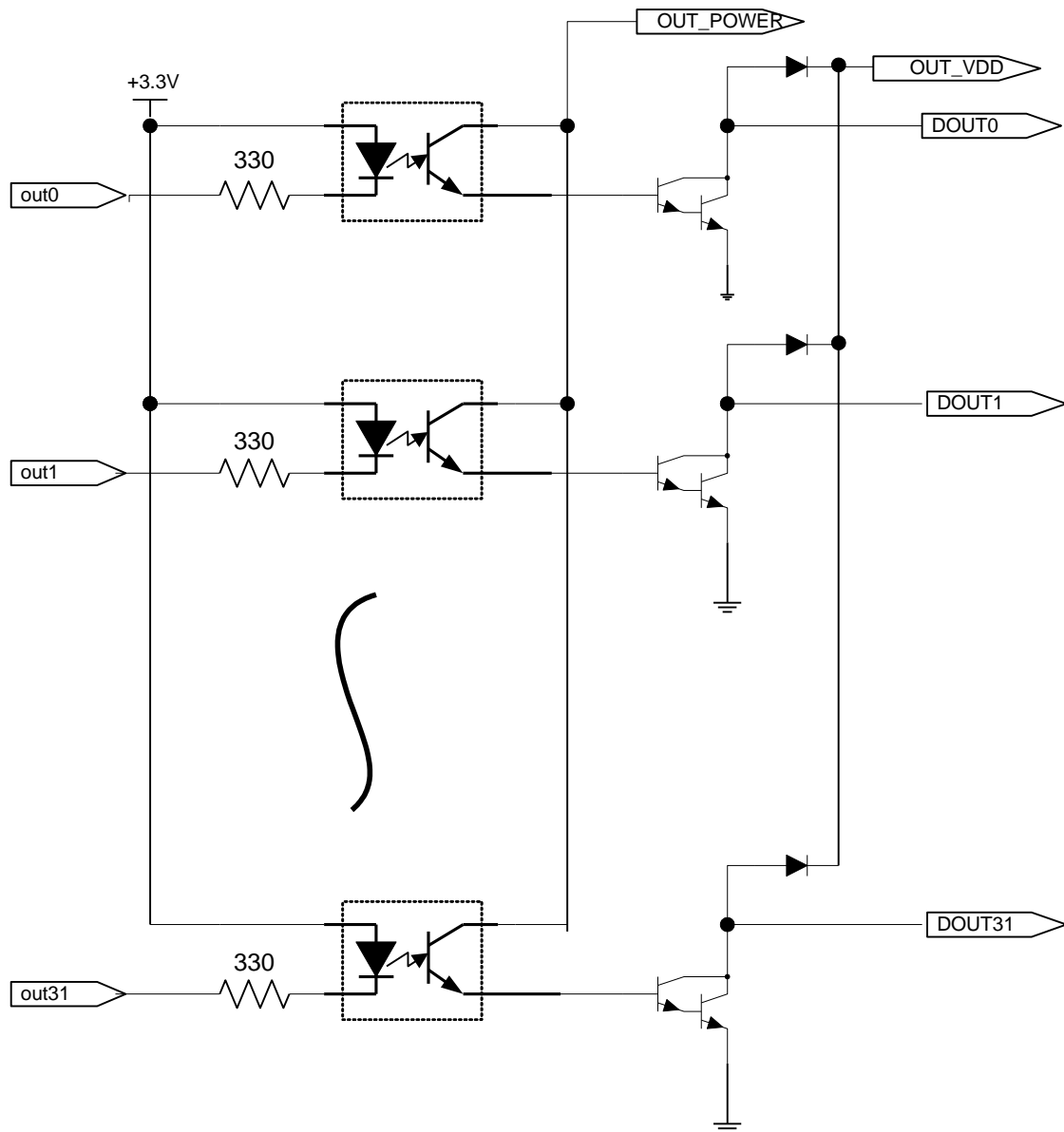
[Figure 3-1. Digital Input Circuit]

Figure 3-1 shows that digital input is isolated by photo-coupler. When applying plus(+) voltage to “IN_COM0”, and applying minus(-) voltage to digital input(DIN0 ~ DIN7), the current is flowing through diode in the inside to photo-coupler and an output direction transistor is applied an electric current according to flow electric current.

There are 4 circuits as above picture to a board. In other words, there is a IN_COM signal each 8 photo-couplers, total IN_COM signals are 4 (IN_COM0 ~ IN_COM3).

If you want completely isolated circuit, it is good to use the external power better than to use the board power.

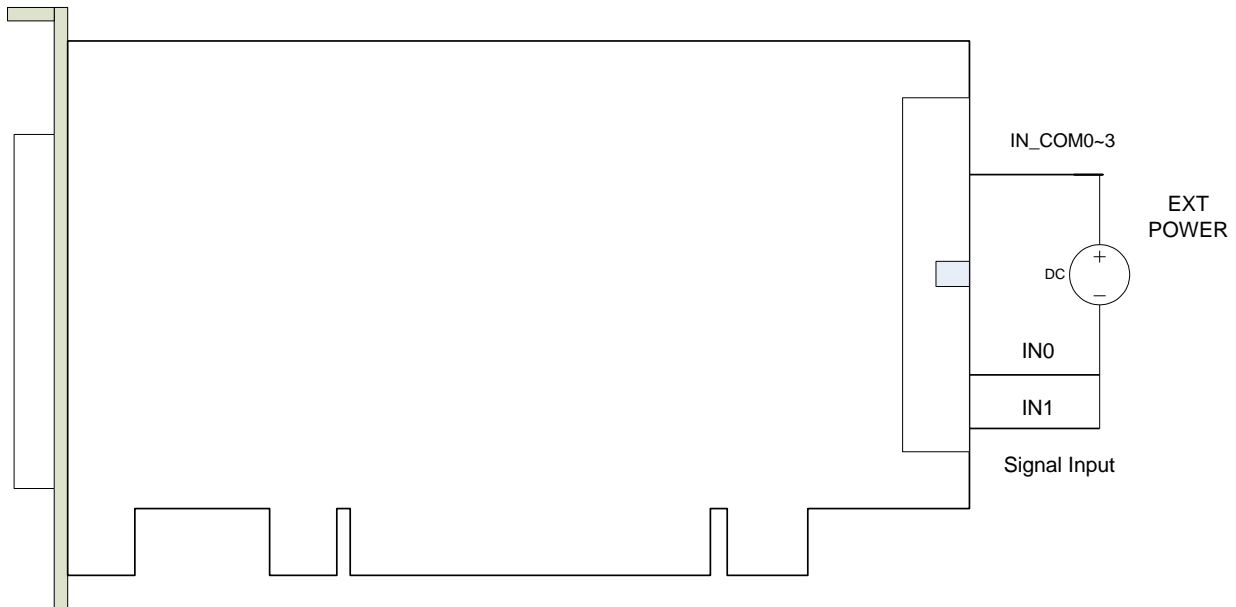
4. Digital Output Circuit



[Figure 4-1. Digital Output Circuit]

Figure 4-1 shows that the digital output is isolated by photo-coupler. The “OUT_POWER” is connected commonness to an output circuit. The “OUT_VDD” works external power or 5V PCI of internal board or ISO 5V (DC-DC Output power) according to connector J2 jumper setting. The “OUT_VDD” connects an anode of Clamp-Diode for protecting board’s circuits. Generally, it had better use the external power 5V.

5. External Connection (INPUT)



[Figure 5-1. Input Port External Connection]

Ordinary noise and ground issue can occur if industry equipments operate to connect each other. In ways to solve these issues, it use the isolated connection way that it was completely cut electrically off. It is good example that used a photo-coupler.

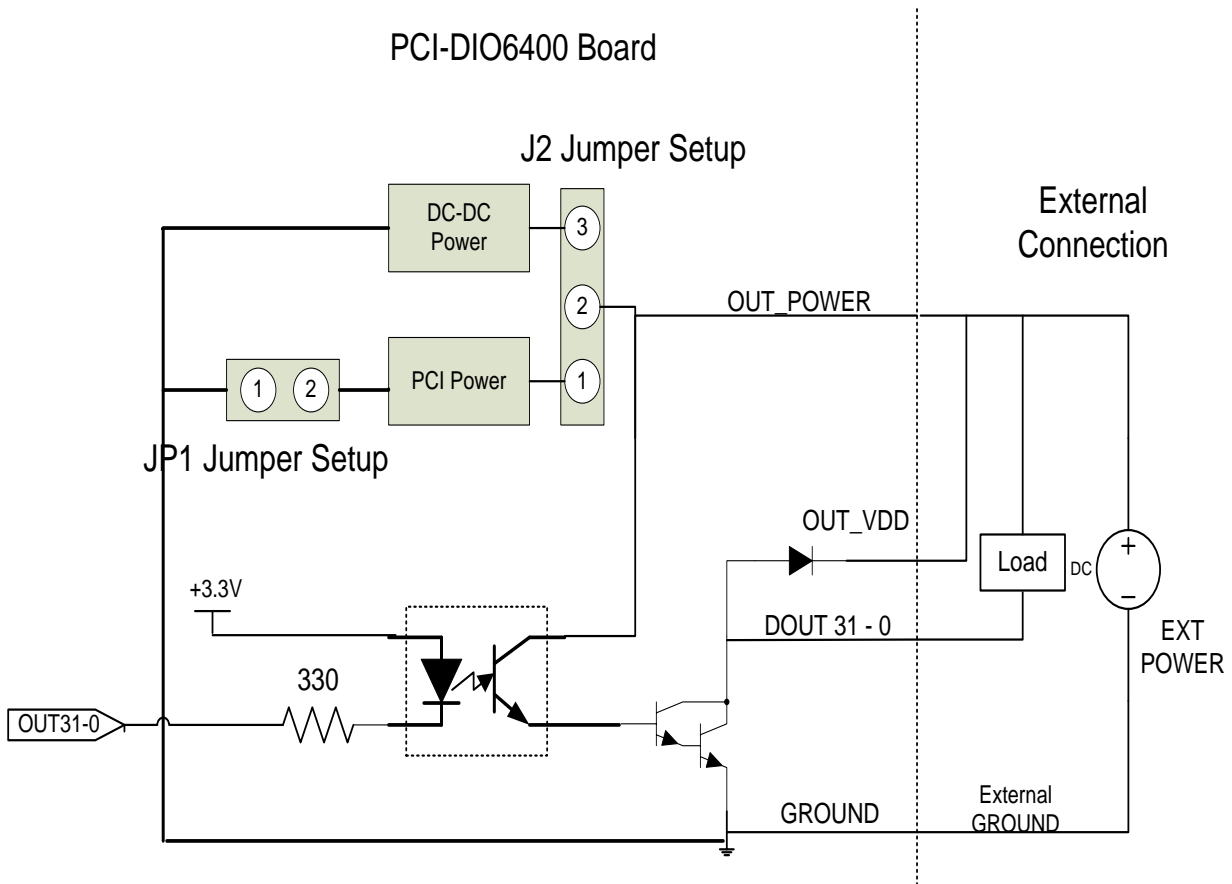
As the Photo-coupler exchange a signal by the light not electrical signal, it can protect equipment from noises and over-voltage. At this time, if board connect to external equipment and want completely isolated connection, you should use an external power.

The above mentioned picture is a connection of an input part. If it connect external power to IN_COM0 ~ IN_COM3 and give to minus(-) power at signal input part, it will be activated.

***1. It is use for test only in manufacturer in case of J4.**

***2. The input power voltage range is 5 – 24V.**

6. External Connection (OUTPUT)



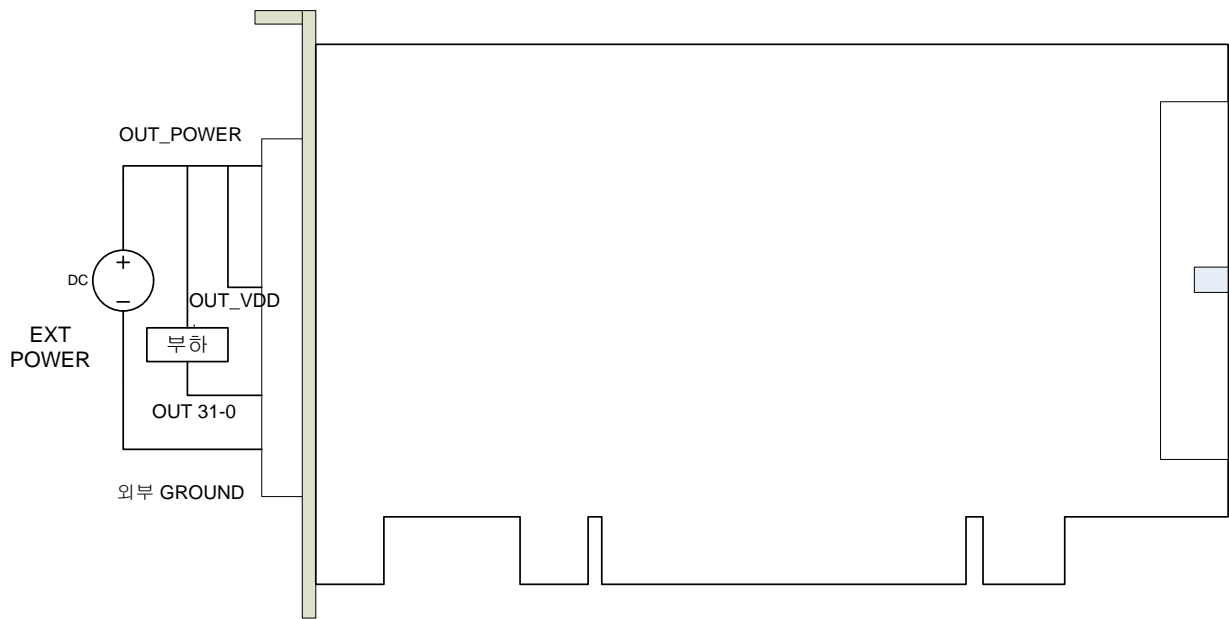
[Figure 6-1. Output Port External Connection]

The OUTPUT can use to select the external power or internal power. When use the external power, perfect isolated input works if you shall not connect a jumper J2 and JP1.

You can select a DC-DC converter or PCI 5V power in case of internal power. If DC-DC converter use, jumper set up only J2 (3-2 short), JP1 do not connect to a jumper. If PCI 5V power use, J2 jumper set up (1-2 short) and JP1 use to short to jumper.

If a load generated a counter electromotive force to an inductive load (Coil, Solenoid, Relay etc.) at the above picture, the OUT_VDD uses to connect to power plus(+) part.

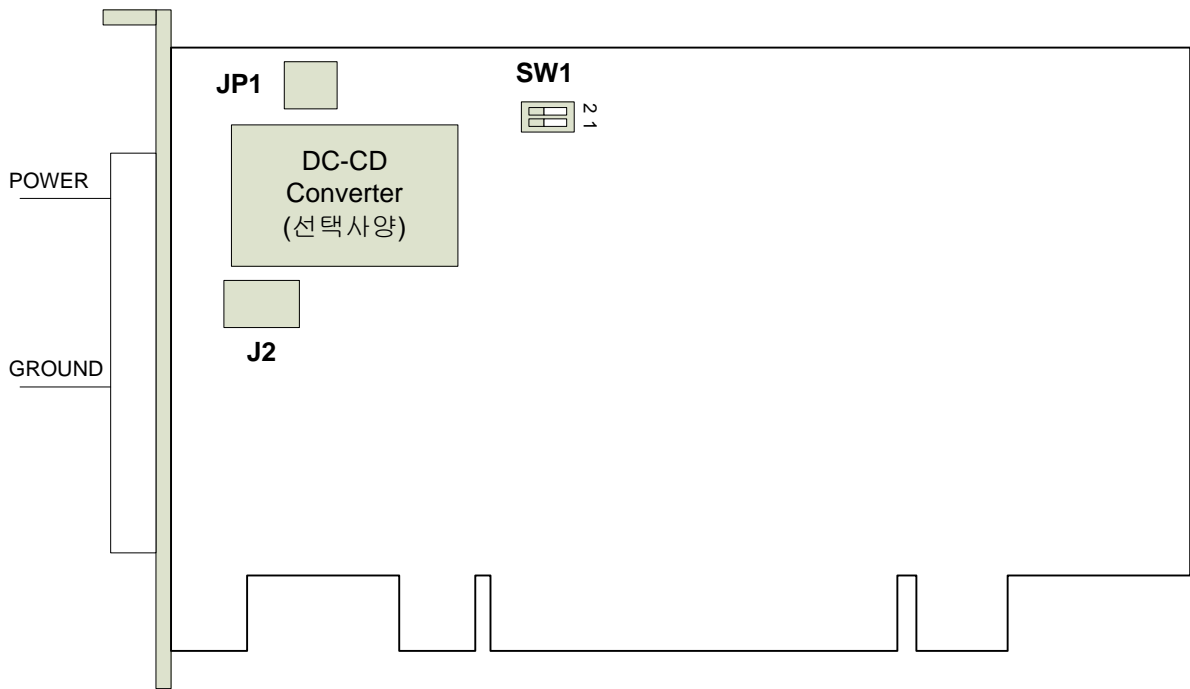
***1. The Output power voltage range is 5 – 24V.**



[Figure 6-2. External Connection]

Figure 6-2 shows the making an output port connection as it uses a 37pin D-Sub connector.

7. Board Option Setup



[Figure 7-1. cPCI-DIO6400 Appearance]

7-1. Power Option Setup

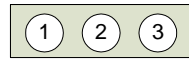
If usable environment don't use external power, it can use at boards which it supplied the power. At this time it can set up by jumper whether or not output to power of isolated DC-DC Converter (option) or output to power of PC Internal Power (+5V).

Also the GROUND can select whether or not output to DC-DC Converter (option) GROUND or output to internal PC GROUND. If it uses PC internal power, it shall certainly set up to PC GROUND.

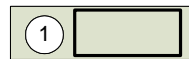
*** The basic option doesn't work to include a DC-DC Converter.**

7.1.1 J3점퍼 설정

J3 Jumper Setup



POWER PIN
Floating(External Power
Use)



DC-DC converter Power

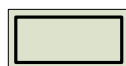
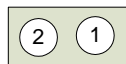


PC +5V Output

* Refer Figure 6-1

7.1.2 JP1 Jumper Setup

JP1 Jumper Setup



PC GROUND

* Refer Figure 6-1

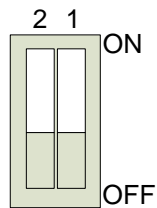
* The basic option doesn't work to set up a jumper setting in case of shipment.

7-2. Board Address Setup

Several DIO6400 series boards classify each board address, you shall use it at systems that a lot of I/O ports was required.

Distribution of each board sets it up through 4 pin switch (SW1) in a board. A system is designed of 4 maximum boards at the same time so as usable.

SW1 Setup

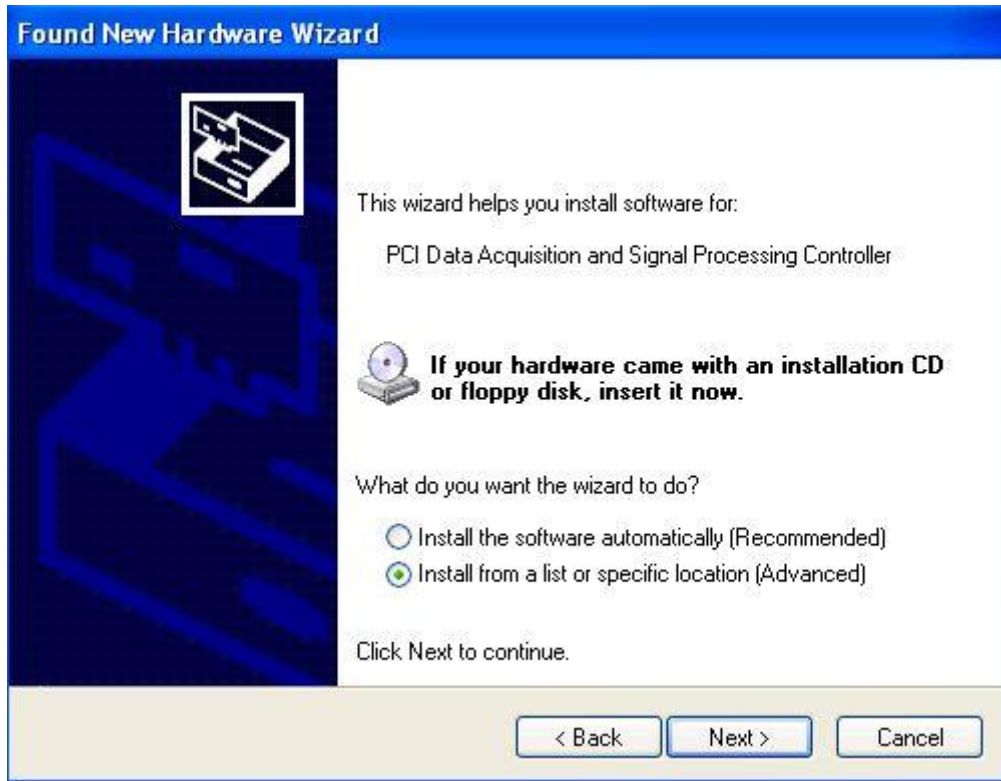


1	2	Board No.
OFF	OFF	0
ON	OFF	1
OFF	ON	2
ON	ON	3

8. Installation

The installation order is as follows, explain Windows XP basis if there isn't special explanation.

- (1) If new hardware is found, Wizard will ask you to install the corresponding driver. For installation of the driver, select the item "Install from a list or specific location (Advanced)" and click "Next" as in the below figure.



[Figure 8-1. PCI-DIO6400 Search Window]

- (2) After find a driver folder of the CD, press "next" button.

ex) F:\PCI-DIO6400\driver

The driver folder includes a file of "**pci_dio6400.inf**" and "**pci_dio6400.sys**" that it is necessary for driver installation.

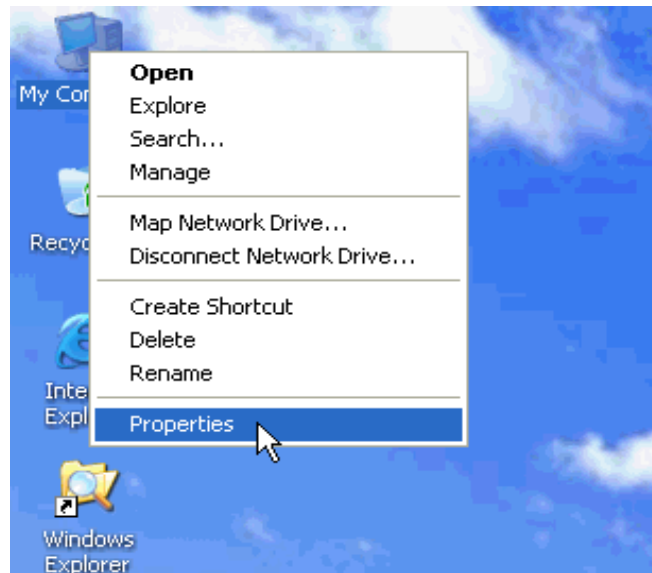
(3) When you click Next, the driver files are installed.



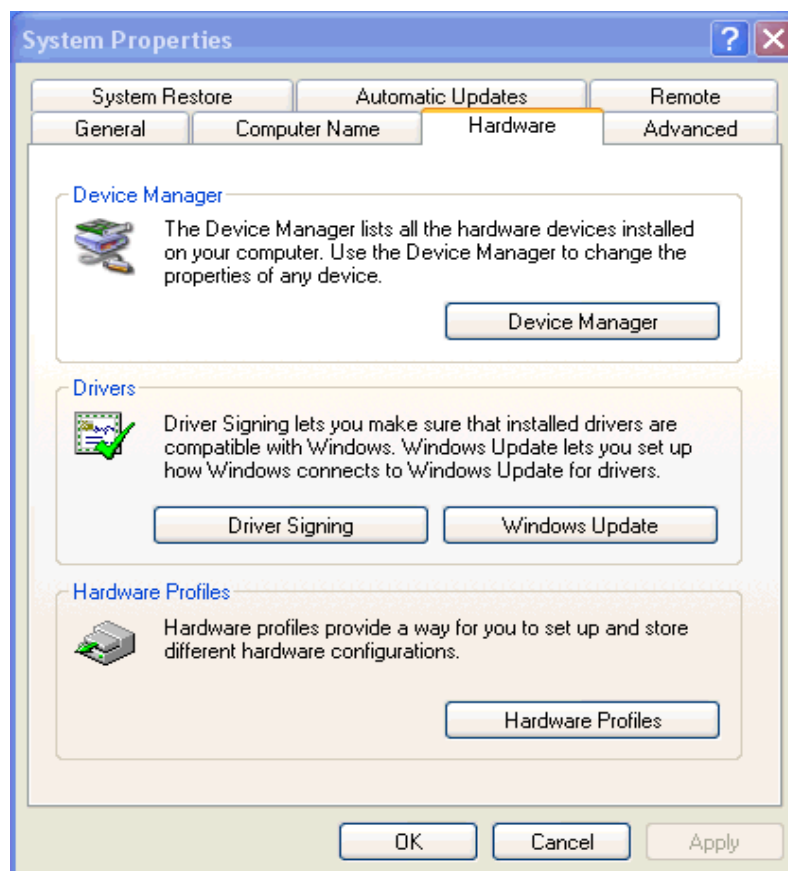
(4) When the installation is complete, normally same as the picture below.



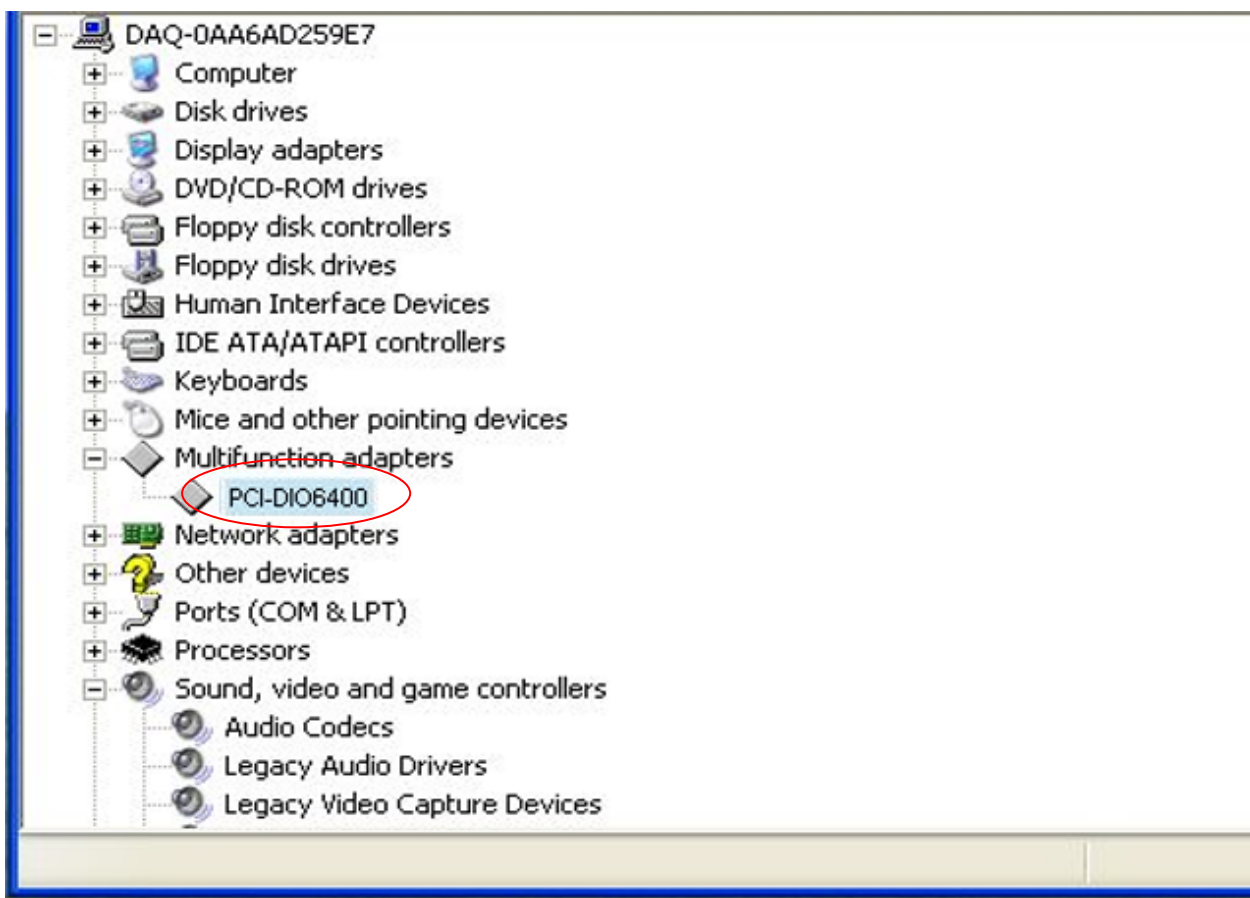
- (5) If the installation is completely finished, you confirm it in the following ways. Do the following steps to show up the “Device Manager” window. [My Computer -> properties -> Hardware -> Device Manager -> **Multifunction Adaptors -> PCI-DIO6400**]



[Figure 8-2. “Select “My computer”->”Properties”]



[Figure 8-3. “System Properties” window-“Hardware” Tab]



[Figure 8-4. "Device Manager" window]

If you can see the "PCI-DIO6400" at Multifunction Adaptors, the driver installation is to have been over. (Check the red circle)

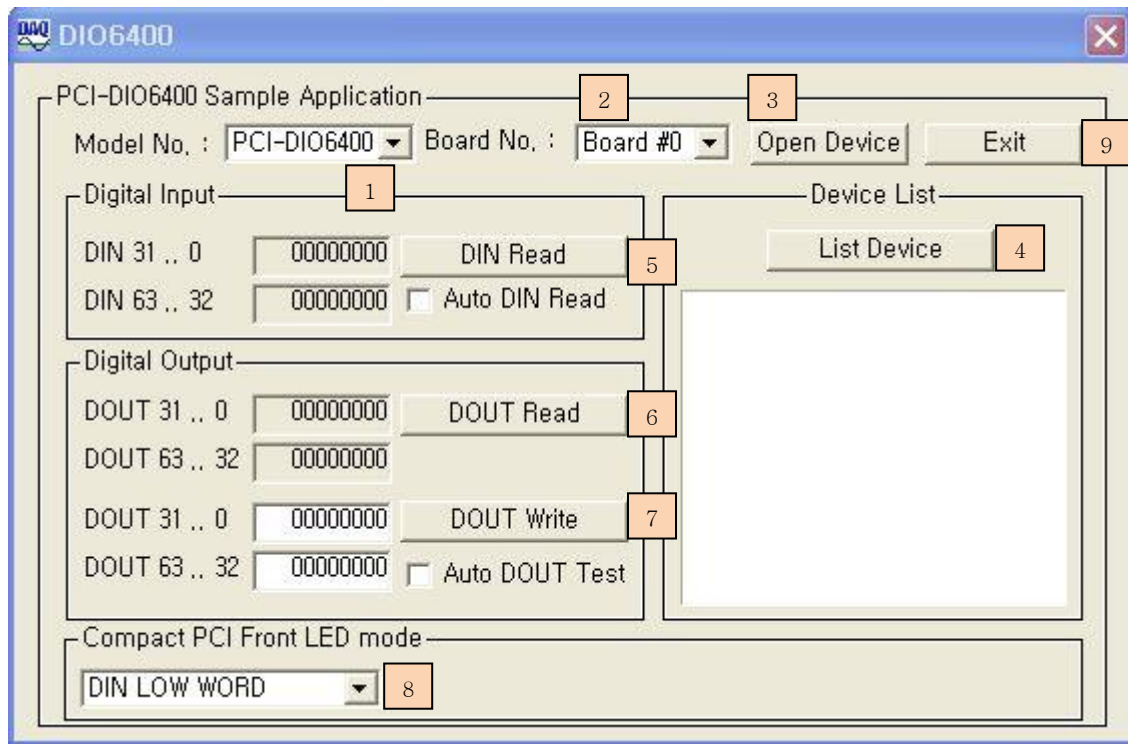
Notice : After installation, you should re-boot the system for the proper operation.

9. Sample Program Explanation

9-1 Program Interface

DAQ system provides a sample program to make the user be familiar with the board operation and to make the program development easier. You can find the sample program in the CDROM accompanying with the board. One of the execution file is “**PCI_DIO6400.exe**”.

Sample program is provided in source form in order to show the usage of API (Application Programming Interface) of the board and may be modified for customer’s own usage.



[Figure 9-1. When Sample program “PCI_DIO6400.exe’ is executed]

To run the sample application program, you need to use API, it is a form of client DLL. To compile the sample source to make its executable file, you have to use Import Library files and header files. You can find them in the CDROM. To run the .exe file, the API DLL file (**PCI_DIO6400.DLL**) must be in the same directory with the .exe file or Windows system folder. Another method is to add the directory of API DLL file to PATH environmental variable.

9-2 Function Explanation

No.	Name	Description	Note
1	Model No	Select the Model Name	PCI-DIO6400 selection
2	Board No	Select the Board Number (Board#0 ~ #3)	By SW1 Setup
3	Open Device	Open the selected Board	
4	List Device	It displays a board number which installed in a system.	Not Used currently.
5	DIN Read	When the button click, a value to read an input port is marked to hex number at a window beside "DIN 31..0". Example) If it reads to "00008001", the number 15 and 0 get to "On" state. When "Auto DIN Read" check, you confirm it right now.	The "DIN 63..32" is a reservation window for future.
6	DOOUT Read	When the button click, a value to read an output port is marked to hex number at a window beside DOOUT "31..0".	The "DOOUT 63..32" is a reservation window for future.
7	DOOUT Write	Press this button after a value that will be written an output port at a window beside "DOOUT 31..0", a value of each bit will be display. Example) If it reads to "00008001", the number 15 and 0 get to "On" state. When "Auto DOOUT Test" check, from bit 0 to bit 31 get to "On" in turn.	The "DOOUT 63..32" is a reservation window for future.
8	Compact PCI Front LED Mode	Only use cPCI-DIO6400	
9	Exit	Stop the program	

References

1. PCI System Architecture -- MindShare Inc.
2. PCI Local Bus Specification -- PCI-SIG
3. General information on PCI board API -- DAQ system
4. AN201 How to build application using APIs -- DAQ system
5. AN242 PCI-DIO64xx API Programming -- DAQ system

